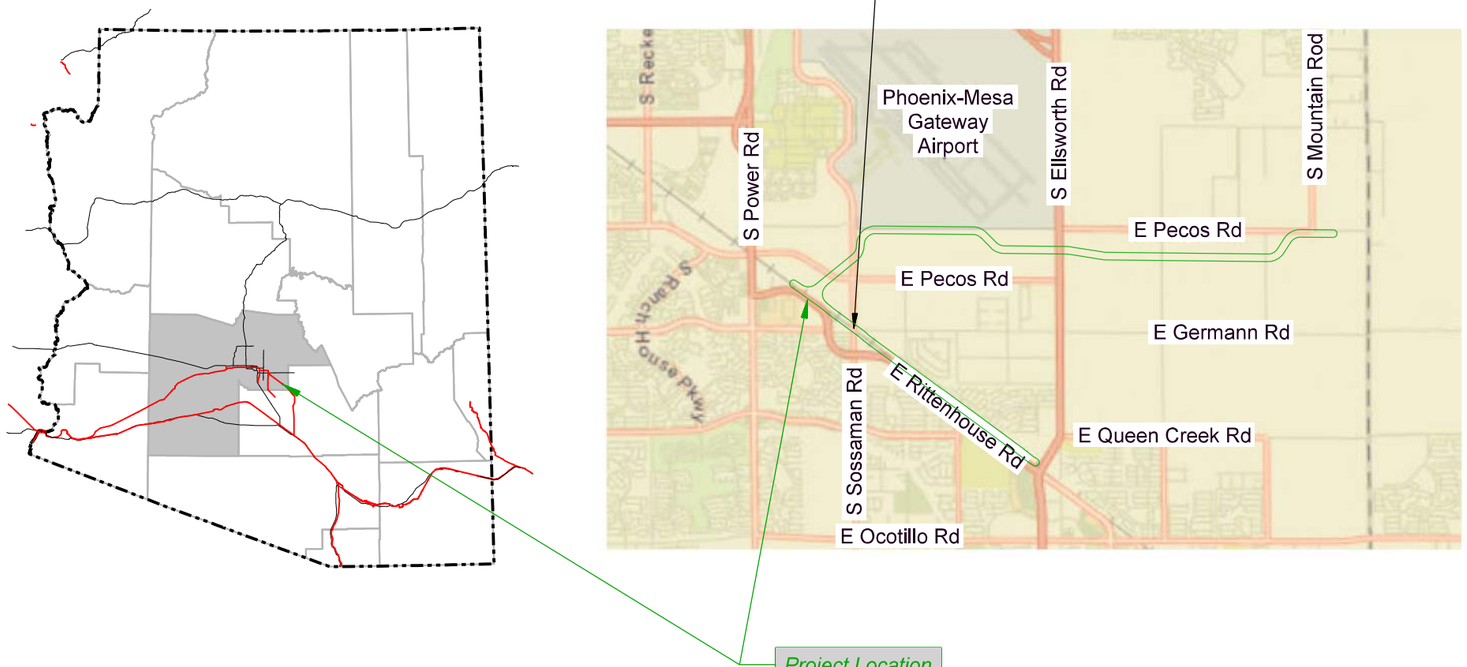
ENGINEERING DESIGN



State of Arizona

Project Location Map

MCESD SANITARY SEWER AND WATER APPROVAL

Qingyun Ping — 03/05/2026
MARICOPA COUNTY ENVIRONMENTAL SERVICES DEPARTMENT — DATE
DWR2500668
VWR2500593

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

MESA, ARIZONA
PHOENIX SUBDIVISION
MP 937.83
MP 934.78 TO MP
CONSTRUCT INDUSTRIAL LEAD TRACK

100% PLANS
ISSUED FOR BID

WORK ORDER: 54975
PROJECT NUMBER: 115884
BUDGET REFERENCE: 20CF060

LAST REVISED
03/09/2026

PROJECT INDEX

PROJECT DESIGN	SHEET NO.	DESCRIPTION
G001	1	COVER SHEET WITH VICINITY MAP
G002	2	PROJECT INDEX & REVISIONS
G003 to G005	3-5	GENERAL NOTES & PROJECT CONTACTS
G006	6	ABBREVIATIONS & LEGEND
G007	7	CONTROL POINTS & GEOMETRY
G008	8	SCHEMATIC PLAN
G009 to G011	9-11	PLAN OVERVIEW
P001 to P037	12-48	TRACK PLAN & PROFILE
T001 to T013	49-61	TRACK TYPICAL SECTIONS
C001 to C019	62-80	CULVERT DETAILS
R001 to R043	81-123	ROAD CROSSINGS
TC001 to TC012	124-135	PAVEMENT MARKINGS & SIGNING
U001 to U030	136-165	UTILITIES
D001	166	ENCASEMENT DETAILS
D002	167	PRIVATE CROSSING DETAILS
D003	168	UTILITY PROTECTION SLAB DETAIL
D004 to D005	169-170	DRIVEWAY DETAILS
D006	171	UTILITY PROTECTION SLAB DETAIL
D007	172	VERTICAL CURB & GUTTER TERMINATION DETAILS
D008	173	SCUPPER DETAILS
GD001 to GD002	174-175	SOUTH & NORTH DETENTION CELL GRADING PLANS
EC001 to EC003	176-178	EROSION & SEDIMENT CONTROL PLAN NOTES
EC004 to EC016	179-191	EROSION CONTROL DETAILS
EC017 to EC036	192-211	EROSION CONTROL PLANS
PH001 to PH029	212-240	CONSTRUCTION PHASING
X001 to X026	241-266	MAIN TRACK CROSS SECTIONS
X027 to X033	267-273	TRACK 751 CROSS SECTIONS
X034 to X140	274-380	TRACK 101 CROSS SECTIONS
X141 to X194	381-434	ROADWAY CROSS SECTIONS
X195	435	PROJECT EARTHWORK SUMMARY

STANDARDS	DESCRIPTION
MARICOPA ASSOCIATION OF GOVERNMENTS UNIFORM STANDARD DETAILS	
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY (FCDMC) STANDARD DETAILS	
CITY OF MESA STANDARD DETAILS	
TOWN OF QUEEN CREEK DESIGN AND CONSTRUCTION STANDARDS FOR WATER, WASTEWATER, AND IRRIGATION SYSTEMS	
OLDCASTLE 13' X 7' PRECAST FIBER OPTIC VAULT (612-LA)	

STRUCTURES DESIGN	SHEET NO.	DESCRIPTION
CE 123084	436-445	TRIPLE CELL 12'-0" x 8'-0" RCB x 134'
CE 123075	446-459	DOUBLE CELL 6'-0" x 6'-0" RCB x 140'
CE 123076	460-469	TRIPLE CELL 12'-0" x 8'-0" RCB x 154'
CE 123077	470-475	2 - 60" DIA. CMP x 132'
CE 123078	476-486	DOUBLE CELL 6'-0" x 6'-0" RCB x 230'
CE 123079	487-498	DOUBLE CELL 6'-0" x 6'-0" RCB x 242'
CE 123080	499-504	4 - 60" DIA. CMP x 144'
CE 123081	505-514	TRIPLE CELL 9'-0" x 6'-0" RCB x 32'
CE 123082	515-518	3 - 72" DIA. SSP x 78'
CE 123083	519-522	4 - 54" DIA. SSP x 70'
CE 123249	523-531	1 - 36" DIA. SSP x 141' AND SIPHON BOXES
CE 123250	532-540	1 - 36" DIA. SSP x 126' AND SIPHON BOXES
CE 123251	541-549	1 - 36" DIA. SSP x 135' AND SIPHON BOXES

PROJECT INDEX (CONTINUED)

MECHANICAL DESIGN	SHEET NO.	DESCRIPTION
CP-1 to CP-2	550-551	CATHODIC PROTECTION DETAILS

ELECTRICAL DESIGN	SHEET NO.	DESCRIPTION
E001	552	ELEC ABBREVIATIONS & SUBMITTAL REQUIREMENTS
E002	553	ELECTRICAL GENERAL NOTES
E003	554	ELECTRICAL LEGEND
E201 to E213	555-567	ELECTRICAL SITE PLANS
E301 to E304	568-571	ELECTRICAL ONE-LINE
E401 to E404	572-575	ELECTRICAL DETAILS
E501	576	ELECTRICAL SCHEDULES
LT01 to LT02	577-578	ROADWAY LIGHTING GENERAL NOTES & QUANTITIES
LT03 to LT07	579-583	ROADWAY LIGHTING
LT08 to LT11	584-587	PHOTOMETRIC PLANS

PROJECT REVISIONS

REV. #	BY	DATE:	SHEET:	DESCRIPTION

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: G002 of 011

UNION PACIFIC RAILROAD
Sheet 002 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
PROJECT INDEX & REVISIONS

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\01.General\T_GEN_200927.dgn
Default
3/9/2026

GENERAL NOTES

1. Contractors shall notify UPRR Call Before You Dig (CBUD), by following instructions on UPRR's website, https://www.up.com/cbud, to arrange for locates prior to commencing work. The USA Authorization Numbers shall be kept at the job site.
2. No work whatsoever shall be commenced without first notifying the UPRR Engineer.
3. The Contractor shall comply with all Federal, State, County, and City Laws and Ordinances and Regulations of the Department of Industrial Relations, OSHA, NPDES and Industrial Accident Commission related to the safety and character of the work, equipment and labor personnel.
4. Contractor shall be responsible for coordinating with all Utility agencies.
5. Contractor shall protect in place (by any means necessary) all existing utilities to remain unless otherwise specified herein, contractor shall be responsible for the complete repair at his expense, for any damage to existing utilities, structures, or other site features, as a result of his work.
6. Prior to placing curbs, pavements, base, subbase, track, etc., all underground utilities shall be installed, backfill completed, and the Engineer notified by each of the utility companies having facilities within the work area, that the utility installation has satisfactorily passed acceptance tests.
7. All existing underground utilities, that are not to be re-used shall be abandoned in place. All existing pipelines to be abandoned in place shall be cement slurry filled and capped at least 3'-0" below top of proposed subgrade.
8. Contractor shall verify locations and elevations of existing utilities whether known or unknown prior to beginning construction.
9. Any underground structures such as cesspools, cisterns, mining shafts, tunnels, septic tanks, wells, and pipelines not located prior to construction shall be brought to the attention of the engineer for determination of appropriate action such as removal or treatment in a manner judged suitable to the engineer.
10. Contractor shall coordinate location of all proposed utilities with UPRR to assure accuracy of utility connections and compliance with local codes.
11. Any existing conditions found to be a variance with these drawings must be immediately reported to the Engineer.
12. Contractor shall maintain and clean to the satisfaction of the Engineer, all access and service roads used during construction.
13. Contractor shall perform all construction in such a manner as to protect adjacent existing buildings, and other site elements which are to remain in service.
14. Contractor shall provide As-built Drawings for all improvements.
15. No field changes will be permitted without direct written authorization from the UPRR Engineer or his representative.
16. Contractor shall coordinate work which affects adjacent property owners. Any questions or agreements between adjacent property owners and contractor shall be made in writing. A copy of such agreement shall be provided to the UPRR Engineer or his representative.
17. The contractor is responsible for preparing a Stormwater Pollution Prevention Plan (SWPPP) to comply with State regulations. General specifications and typical erosion control details are included in the plan set.
18. Right-of-way lines shown on the plans were taken from existing UPRR right-of-way map and are approximate.
19. Match lines for sheets are based on the existing Main Line stationing unless otherwise specified.
20. Track laying, ballasting, and installation of road crossing panels will be done by UPRR unless otherwise stated.
21. Where existing culverts are to be extended, the contractor shall expose existing drainage structures and field verify size and type before ordering.
22. The contractor is responsible for the removal of all pavement markings that will be in conflict with the proposed work.
23. Contractor shall comply with all agency standards, specifications, details, and requirements for those agencies having jurisdiction at locations where construction activities are performed.
24. Contractor shall maintain at least one access to all affected business. If necessary, multiphase construction shall be utilized.

DESIGN CRITERIA

1. UPRR standard plans and trackwork
2. City of Mesa 2023 Version, Engineering & Design Standards and Standard Details & Specifications
3. Town of Queen Creek Design Standards and Procedures Manual
4. Maricopa Association of Governments (MAG) Uniform Standard Specifications and Details for Public Works Construction 2025 Version
5. Flood Control District of Maricopa County (FCDMC) Drainage Design Manual, Drainage Policies and Standards Manual, Standard Details, and Standard Procedures

SURVEY NOTES

1. Railroad stationing for project profiles and alignments is based on stations established for chord definition spiraled curves at the centerline of the existing UPRR Main Line unless otherwise noted.
2. Roadway stationing for project profiles and alignments is based on stations established for arc definition curves at the centerline of the proposed roadway unless otherwise noted.
3. The contractor is responsible for the preservation of all survey control monuments. In the event monuments are damaged or destroyed by the contractor, the Engineer will replace the monument solely at the contractor's expense.

	DATUM
HORIZONTAL	NAD 83 ARIZONA CENTRAL STATE PLANE FIPSZONE 0202 SCALE FACTOR OF 0.99984662
VERTICAL	NAVD 88

TRAFFIC NOTES

1. All barricades, warning signs, lights, devices, etc. for the guidance of vehicle traffic and pedestrians must conform to the installation shown in the Manual on Uniform Traffic Control Devices (MUTCD), current edition.
2. Contractor shall make twice daily inspections of barricades and flashing lights to ensure proper placement and functioning of warning devices.
3. Grade crossings closed to traffic during construction shall be barricaded in accordance with the MUTCD.
4. At all grade crossings, all grade crossing warning signs (crossbuck) shall temporarily be relocated during construction and reset after the grade crossings construction is completed to a point adjacent to the roadway and 15 feet from the centerline of the near track as stated in the MUTCD except where automatic grade crossing warning signals/gates exist. All automatic warning devices are the responsibility of UPRR. At no time shall a crossing be left open without proper warning signs in place.
5. Contractor shall be responsible for obtainment of Temporary Traffic Control (TTC) Permits per conditions set forth in the City of Mesa Temporary Traffic Control Manual (TTCM). Traffic Control Plans (TCP) shall comply with Section 1.5 of the City of Mesa TTCM. Road closures require a minimum lead time of 30 calendar days for City of Mesa review and coordination.
6. Contractor shall comply with the Town of Queen Creek Roadway SIgning and Pavement Marking Guidelines document, specifications, and requirements. Contractor shall be responsible for coordination with the Town of Queen Creek, including obtainment of Full Road Closure Permits, notifications, scheduling, haul roads, and inspections. Requests for full road closures shall be submitted to the Town of Queen Creek at least 21 days prior to proposed closures.
7. The contractor is responsible for the prompt replacement and/or repair of all traffic control devices and appurtenances damaged or disturbed due to construction.

PROJECT CONTACTS

CONTACT	PHONE NUMBER	UPRR
Carlos Mendoza	(209) 663-5406	Civil Construction Project Manager
Levi Hawkins	(402) 544-3304	Project Design Manager
Justin Mohlman	(402) 938-2420	Project Design Sr. Project Designer
Ajmal Stanigzai	(402) 544-7164	Structures Design Sr. Manager
Marla Cox	(402) 544-2253	Information Technology - Fiber
Mark Mentele	(402) 544-8532	Real Estate - Utilities
Kris Anderson	(402) 544-3162	Real Estate - Acquisitions
Greg Brigham	(402) 544-8568	Real Estate - Acquisitions

CONTACT	PHONE NUMBER	FIBER

CONTACT	PHONE NUMBER	UTILITIES

CONTACT	PHONE NUMBER	FEDERAL AND LOCAL GOVERMENT AGENCY

PHONE NUMBER	GENERAL
https://www.up.com/cbud	UPRR CALL BEFORE YOU DIG (CBUD)
(888) 258-0808	CALL BEFORE YOU DIG (NATIONAL DIRECTORY)
(888) 877-7267	UPRR Response Management Communications Center (RMCC)
(800) 877-5591	UPRR Signal Operations Center

Contact Arizona 811 at least two full working days before you begin excavation
ARIZONA811 BLUE STAKE, INC.
Call 811 or click Arizona811.com

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: G003 of 011

UNION PACIFIC RAILROAD
Sheet 003 of 587
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track
SHEET TITLE:
GENERAL NOTES & PROJECT CONTACTS

Color table:K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\01_General\T_GEN_200927.dgn
Default
3/9/2026

CITY OF MESA GENERAL NOTES

(2025 VERSION, REVISED 07-10-25)

1. ALL WORK AND MATERIALS SHALL CONFORM TO CURRENT UNIFORM STANDARD SPECIFICATIONS AND DETAILS FOR PUBLIC WORKS CONSTRUCTION AS PUBLISHED BY THE MARICOPA ASSOCIATION OF GOVERNMENTS AND AS AMENDED BY THE CITY OF MESA, AND CITY OF MESA APPROVED PRODUCTS LISTS. ALL WORK AND MATERIALS NOT IN CONFORMANCE WITH THESE AMENDED SPECIFICATIONS, DETAILS, AND APPROVED PRODUCTS ARE SUBJECT TO REMOVAL AND REPLACEMENT AT THE CONTRACTOR'S EXPENSE.

   A. THE CITY OF MESA MAINTAINS APPROVED PRODUCTS LISTS INCLUDING:
      I. ASPHALT MIXES
      II. CONCRETE MIXES
      III. STREET LIGHT MATERIALS
      IV. WATER PRODUCTS
      V. WASTEWATER PRODUCTS
      VI. DETECTABLE WARNING PRODUCTS (TRUNCATED DOMES)
      VII. ITS & ITD COMMUNICATIONS SYSTEM PRODUCTS
      VIII. TRAFFIC SIGNAL EQUIPMENT

   B. CITY OF MESA APPROVED PRODUCT LISTS ARE AVAILABLE ELECTRONICALLY AT HTTPS://WWW.MESAAZ.GOV/BUSINESSDEVELOPMENT/ENGINEERING/APPROVED-PRODUCTS-EQUIPMENTCONTRACTORS AND HTTPS://WWW.MESAAZ.GOV/BUSINESSDEVELOPMENT/ENGINEERING/MESA-DESIGN-STANDARDS#SECTION-5

2. THE INFORMATION SHOWN ON DRAWINGS CONCERNING THE TYPE AND LOCATION OF EXISTING UNDERGROUND UTILITIES IS APPROXIMATE AND HAS NOT BEEN INDEPENDENTLY VERIFIED BY THE ENGINEER OR THE ENGINEER'S AGENT. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MAY OCCUR BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND AND OVERHEAD UTILITIES.

   A. CALL 602-263-1100 OR 811 FOR BLUE STAKE SERVICES.

   B. CALL SALT RIVER POWER FOR POLE BRACING, ELECTRIC SERVICE OR CONSTRUCTION SCHEDULING AT 602-236-8888.

   C. CALL CITY OF MESA ELECTRICAL FOR POLE BRACING, ELECTRICAL SERVICE OR CONSTRUCTION SCHEDULING AT 480-644-2251 WITHIN CITY OF MESA ELECTRICAL SERVICE TERRITORY (DOWNTOWN MESA).

   D. WHEN EXCAVATING IN OR ADJACENT TO A CITY PARK OR AQUATIC FACILITY THE CONTRACTOR SHALL CONTACT AQUATICS AND PARKS MAINTENANCE AT 480-644-3097 TO REQUEST ASSISTANCE IN LOCATING UNDERGROUND UTILITY FACILITIES.

   E. WHEN EXCAVATING IN OR ADJACENT TO LANDSCAPING WITHIN THE RIGHTOF-WAY, THE CONTRACTOR SHALL CONTACT TRANSPORTATION FIELD OPERATIONS AT 480-644-3380 TO REQUEST ASSISTANCE IN LOCATING UNDERGROUND IRRIGATION FACILITIES.

3. TRAFFIC CONTROL SHALL CONFORM TO THE CITY OF MESA TEMPORARY TRAFFIC CONTROL MANUAL. ELECTRONIC COPIES ARE AVAILABLE AT M HARD COPIES CAN BE MADE AVAILABLE AT DEVELOPMENT SERVICES, 55 N. CENTER ST., MESA, ARIZONA

4. CONTRACTOR TO NOTIFY TRAFFIC OPERATIONS AT 480-644-3126 PRIOR TO SIGN REMOVAL AND WHEN READY TO PERMANENTLY RELOCATE SIGN.

5. CONTRACTOR TO OBTAIN ANY PERMITS REQUIRED UNLESS OTHERWISE INDICATED, AND COORDINATE ALL IRRIGATION DRY-UPS, RELOCATIONS, AND REMOVALS BY OTHERS.

6. CONTRACTOR SHALL POTHOLE EXISTING UTILITIES AHEAD OF CONSTRUCTION TO ALLOW FOR ANY NECESSARY ADJUSTMENTS IN GRADE LINE AND TO VERIFY PIPE MATERIALS FOR ORDERING THE APPROPRIATE TRANSITION AND TIE-IN FITTINGS THAT MAY BE REQUIRED.

7. THE CONTRACTOR IS RESPONSIBLE TO REMOVE ALL ABANDONED UTILITIES THAT INTERFERE WITH PROPOSED IMPROVEMENTS. THE CITY OF MESA UTILITIES DEPARTMENT LOCATING SECTION WILL ASSIST THE CONTRACTOR AS NEEDED, IN DETERMINING IF THE UTILITY (GAS, WATER, AND WASTEWATER ONLY) IS ABANDONED BY CALLING 480-644-4500.

8. PRIOR TO START OF CONSTRUCTION ON PRIVATE PROPERTY (EASEMENTS), THE CONTRACTOR SHALL GIVE THE OWNER SUFFICIENT TIME (MINIMUM 48 HOURS) TO REMOVE ANY ITEMS IN CONFLICT WITH CONSTRUCTION. THE CONTRACTOR SHALL ARRANGE TO REMOVE AND REPLACE ALL OTHER CONFLICTS AS REQUIRED.

9. THE CONTRACTOR SHALL COORDINATE WORK SCHEDULES TO PREVENT ANY CONFLICTING WORK CONDITIONS WITH THE CITY OF MESA UTILITY AND TRANSPORTATION CREWS.

10. THE CONTRACTOR IS ADVISED THAT A DUST CONTROL PERMIT AND A DUST CONTROL PLAN MAY BE REQUIRED BY THE MARICOPA COUNTY AIR QUALITY DEPARTMENT. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN THIS PERMIT, IF NECESSARY, AND COMPLY WITH ITS REQUIREMENTS. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL PROVIDE A COPY OF THE DUST CONTROL PERMIT AND DUST CONTROL PLAN TO THE CITY FOR REVIEW.

11. INSPECTIONS WILL BE PROVIDED BY THE CITY OF MESA. THE CONTRACTOR SHALL NOTIFY THE CITY INSPECTION DEPARTMENT AT LEAST 48 HOURS IN ADVANCE OF ANY CONSTRUCTION.

12. THE JOB SITE SHALL BE CLEANED OF ANY DEBRIS OR SPOIL RESULTING FROM THIS PROJECT AT THE COMPLETION OF CONSTRUCTION.

13. ALL EQUIPMENT AND MATERIALS NOT SHOWN OR SPECIFIED ON THE PLANS OR SPECIFICATIONS, BUT REQUIRED TO COMPLETE THIS PROJECT, SHALL BE SUPPLIED BY THE CONTRACTOR AS PART OF THIS CONTRACT WORK (NO ADDITIONAL COST TO THE CITY).

14. WHEREVER PAVEMENT REPLACEMENT PER MESA STD DETAIL M1200.1 (OLD M19.04.1) OR MAG STD DETAIL 200 IS REFERRED TO WITHIN THESE PLANS, BACKFILLING SHALL BE PER THE CITY OF MESA STREET TRENCH BACKFILLING AND PAVEMENT REPLACEMENT POLICY STATEMENT, REVISED SEPTEMBER 29, 1999 AVAILABLE ELECTRONICALLY AT HTTPS://WWW.MESAAZ.GOV/BUSINESSDEVELOPMENT/ENGINEERING/ENGINEERING-CONSTRUCTION-POLICIES-FORMS.

CITY OF MESA GENERAL NOTES (CONTINUED)

15. FOR PURPOSES OF PAVEMENT PER MAG STD DETAIL 200 OR MESA STD DETAIL M1200.1 (OLD M-19.04.1), INTERSECTIONS ARE DEFINED BY THE CURB RETURNS IN ALL DIRECTIONS.

16. ANY SURVEY MARKERS DISTURBED OR DAMAGED BY THE CONTRACTOR SHALL BE REPLACED IN KIND BY A REGISTERED LAND SURVEYOR AT NO ADDITIONAL COST TO THE CITY.

17. ALL EXISTING PAVEMENT MARKINGS, SIGNS, AND SIGNAL EQUIPMENT THAT ARE NOT PART OF THIS PROJECT BUT NEED TO BE REMOVED, REPLACED, RELOCATED, OR REPAIRED BECAUSE OF CONTRACTOR'S WORK SHALL BE DONE AT THE CONTRACTOR'S EXPENSE.

18. THE CONTRACTOR IS ADVISED THAT DAMAGE TO ANY PUBLIC SERVICES OR SYSTEMS AS A RESULT OF THIS PROJECT SHALL BE REPAIRED BY THE CONTRACTOR AND INSPECTED BY THE CITY INSPECTOR. DEPENDING ON DAMAGES, ALL REPAIRS SHALL BE DONE WITHIN 24 HOURS. THE CONTRACTOR IS ADVISED THAT ANY COSTS RELATED TO REPAIR OR REPLACEMENT OF DAMAGED PUBLIC SERVICES OR SYSTEMS AS A RESULT OF CONTRACTOR'S NEGLIGENCE SHALL BE BORNE BY THE CONTRACTOR

CITY OF MESA PAVING GENERAL NOTES

(2025 VERSION, REVISED 07-15-25)

1. CONTRACTOR SHALL COORDINATE ALL DRIVEWAY LOCATIONS WITH PRIVATE PROPERTY OWNERS AND THE CITY INSPECTOR.

2. FOR THE APPROVED LIST OF PAVING PRODUCTS SEE: HTTP://WWW.MESAAZ.GOV/BUSINESS-DEVELOPMENT/ENGINEERING/APPROVE-PRODUCTS-EQUIPMENT-CONTRACTORS.

3. ALL GUTTER GRADES LESS THAN 0.0020 FT/FT SHALL BE STAKED ALONG THE ACTUAL GUTTER ALIGNMENT (NOT OFFSET) AND CHECKED BY CITY OF MESA INSPECTOR IMMEDIATELY PRIOR TO PLACEMENT OF CONCRETE.

4. BEFORE PAVING THE CONTRACTOR SHALL RECORD THE LOCATION OF ALL FRAMES, COVERS, VALVE BOXES, ETC. THAT WILL BE AFFECTED BY THE PLACEMENT OF PAVEMENT SO THEY CAN BE READILY LOCATED AND ADJUSTED TO GRADE AFTER PAVING.

5. ALL FRAMES, COVERS, VALVE BOXES, ETC. SHALL BE ADJUSTED BY THE CONTRACTOR TO FINISHED GRADE WITHIN 10 DAYS AFTER PLACEMENT OF ASPHALT CONCRETE SURFACE COURSE PER MAG STD DETAILS 270, 422, OR 391-1-C. IF THERE WILL BE A DELAY OF MORE THAN 3 WEEKS BETWEEN THE PLACEMENT OF BASE COURSE AND SURFACE COURSE, THE CONTRACTOR SHALL ALSO MAKE THE ADJUSTMENTS OF ALL GAS VALVES AFTER THE PLACEMENT OF BASE COURSE. IF THERE WILL BE A DELAY OF MORE THAN 8 WEEKS, THE CONTRACTOR SHALL MAKE ALL ADJUSTMENTS AFTER THE PLACEMENT OF BASE COURSE.

CITY OF MESA LANDSCAPE GENERAL NOTES

(2025 VERSION, REVISED 02-15-18)

1. LANDSCAPE CONTRACTOR SHALL CONFIRM LOCATION OF ALL UNDERGROUND UTILITIES PRIOR TO ANY EXCAVATION AND SHALL BE RESPONSIBLE FOR THE FOLLOWING:
   A. DAMAGES TO SUCH UTILITIES CAUSED AS A RESULT OF THE CONTRACTOR'S ACTIVITIES.
   B. DAMAGES TO EXISTING WALKS, WALLS, DRIVES, CURBS, ETC.
   C. INSPECTING THE SITE IN ORDER TO BE FULLY AWARE OF EXISTING CONDITIONS PRIOR TO SUBMITTING A BID.

2. INSTALLATION OF ALL LANDSCAPE AND IRRIGATION MATERIALS SHALL COMPLY WITH SECTIONS 424, 425, 757, AND 795 OF THE MAG STANDARD SPECIFICATIONS.

3. CONTRACTOR SHALL REPAIR ANY DAMAGE MADE TO THE EXISTING SPRINKLER SYSTEM TO THE SATISFACTION OF THE CITY AT NO ADDITIONAL COST TO THE CITY.

4. LANDSCAPE REMOVAL IS A NON-PAY ITEM UNLESS OTHERWISE NOTED.

5. ALL EXISTING VEGETATION, WEEDS, DEBRIS, ETC. NOTED TO BE REMOVED ON THE PLANS AND SPECIFICATIONS SHALL BE REMOVED FROM PROJECT AREA AND DISPOSED OF PROPERLY OFF THE SITE AT THE CONTRACTOR'S EXPENSE (SCARIFY EXISTING SUBGRADE, MINIMUM SIX (6) INCHES DEPTH).

6. DAMAGE TO TURF SHALL BE REPAIRED BY CONTRACTOR, I.E., RUTS FILLED WITH CLEAN SOIL, COMPACTED TO MATCH SURROUNDING GRADES, EXCESS SOIL, ROCK, ETC. SHALL BE REMOVED TO LEAVE THE SITE CLEAN.

7. ALL PLANT MATERIAL, OTHER THAN TREES, SHALL CONFORM TO GRADING, TYPE, ETC. AS SET FORTH IN THE AMERICAN STANDARD FOR NURSERY STOCK BY THE AMERICAN ASSOCIATION OF NURSERYMEN. ALL TREES SHALL CONFORM TO THE CURRENT ARIZONA NURSERY ASSOCIATION TREE SPECIFICATIONS AND MAG SPEC 795.7. SHOULD ANY CONFLICTS IN THE SPECIFICATIONS OCCUR, THE ARIZONA NURSERY ASSOCIATION'S SPECIFICATIONS SHALL PREVAIL.

8. CITY RESERVES THE RIGHT TO INSPECT SHRUBS AND CONTAINERED TREES FOR CONDITION OF ROOT BALLS. FOR ANY SUCH INSPECTIONS WHICH MAY DESTROY ROOTBALL, CONTRACTOR SHALL SUPPLY ADDITIONAL PLANT AT NO COST TO CITY.

9. PLANT PITS SHALL BE INSPECTED BY CITY PRIOR TO PLANTING BY THE CONTRACTOR BY REQUESTING AN INSPECTION 48 HOURS IN ADVANCE.

10. ROUGH AND FINE GRADING TO ESTABLISH UNIFORM SMOOTH GRADE IS INCLUDED IN THIS PROJECT.

11. SOIL TEST FOR FERTILITY AND ADDITIVE RECOMMENDATIONS (FOR TURF AND ORNAMENTALS) SHALL BE COMPLETED BY CONTRACTOR TO DETERMINE IF ADDITIVES ARE REQUIRED. CONTRACTOR SHALL PROVIDE COPY OF SOIL TEST RESULTS FOR REVIEW AND APPROVAL TO ENGINEERING INSPECTOR AT LEAST SEVEN (7) DAYS PRIOR TO ANTICIPATED PLANTING. AFTER APPROVAL BY THE CITY, THE CONTRACTOR SHALL PROVIDE AND INCORPORATE ANY ADDITIVES REQUIRED PRIOR TO OR AT TIME OF PLANTING.

12. PLANT PIT SOIL MIXTURE SHALL CONSIST OF FOUR AND ONE-HALF PARTS NATURAL FERTILE, FRIABLE SOIL AND ONE PART HUMUS BY VOLUME, THOROUGHLY MIXED PRIOR TO BACKFILLING IN PITS. BACKFILLING SHALL BE IN 6" LIFTS WITH EACH LIFT WATER SETTLED WITHOUT PUDDLING.

CITY OF MESA LANDSCAPE GENERAL NOTES

13. CONTRACTOR SHALL STAKE TREE AND SHRUB LOCATIONS FOR 5-GALLON PLANTS AND LARGER. STAKES SHALL BE MARKED WITH PLANT NAME OR PLANT LEGEND ITEM NUMBER FROM PLANS.

14. ALL EXISTING (GAS, ELECTRIC, WATER, ETC.) COVERS AND BOXES SHALL REMAIN UNCOVERED. CONTRACTOR TO ADJUST TO FINAL GRADE AS NECESSARY. NON-PAY ITEM (NPI) UNLESS OTHERWISE NOTED.

15. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING THE UNDERGROUND SPRINKLER SYSTEMS IN ADVANCE OF CONSTRUCTION. THE SPRINKLER SYSTEM LOCATIONS NOTED ON PLANS ARE FOR REFERENCE ONLY.

16. CONTRACTOR TO VERIFY DEPTH OF ALL INLET STRUCTURES AND SPRINKLER SYSTEMS PRIOR TO TRENCHING FOR LOW-FLOW CHANNEL.

17. CONTRACTOR TO PROVIDE PUMPING WITHIN FIVE (5) DAYS AFTER THE NOTICE TO PROCEED IS GIVEN AS REQUIRED TO DRY THE AREA SUFFICIENTLY TO BEGIN CONSTRUCTION.

18. CONTRACTOR SHALL ARRANGE FOR SPRINKLER SYSTEM SHUTDOWN DURING CONSTRUCTION BY CONTACTING THE ENGINEERING INSPECTOR.

19. NO ROCKS LARGER THAN 1" IN DIAMETER SHALL BE ALLOWED IN THE TOP SIX (6) INCHES OF TOPSOIL WHERE TURF ESTABLISHMENT IS SPECIFIED. ROCK REMOVAL AS NECESSARY IS A NON-PAY (NPI) ITEM UNLESS OTHERWISE NOTED.

20. WHERE CALICHE IS ENCOUNTERED IN PLANT PITS, DEPTH AND WIDTH OF PIT SHALL BE INCREASED BY ONE-THIRD (1/3) OVER SPECIFICATION, AND A LIQUID PENETRATOR, "AL-KALICHE" OR EQUAL, SHALL BE INCORPORATED FOR EACH PIT PER MANUFACTURER'S RECOMMENDATIONS.

21. CONTRACTOR SHALL INSTALL DECOMPOSED GRANITE TO A ROLLED DEPTH PER THE APPROVED PLANS AND SPECIFICATIONS. DECOMPOSED GRANITE SHALL BE PER THE APPROVED PLANS AND SPECIFICATIONS WITH THE COLOR AS SPECIFIED ON THE PLANS. PRE-EMERGENT HERBICIDE SHALL BE APPLIED BEFORE AND AFTER PLACEMENT OF DECOMPOSED GRANITE PER THE MANUFACTURER'S RECOMMENDATIONS. PRE-EMERGENT HERBICIDE SHALL BE SURFLAN, DACTHAL, OR APPROVED EQUAL. SAMPLE TO BE PROVIDED FOR CITY REVIEW AND APPROVAL. CONTRACTOR SHALL WASH OFF ROCK MULCH ONCE FINAL PLACEMENT HAS OCCURRED.

22. RESTORE ALL EXISTING LANDSCAPE IRRIGATION SYSTEMS, COMPONENTS AND LANDSCAPE AREAS IMPACTED BY ANY WORK UNDER THIS CONTRACT. RESTORE ALL EXISTING IRRIGATION AND LANDSCAPE IN ACCORDANCE WITH THE APPROVED PROJECT PLANS AND SPECIFICATIONS, INCLUDING ENGINEERING AND ARCHITECTURE PLANS. AT A MINIMUM, ALL RESTORATION SHALL BE IN ACCORDANCE WITH M.A.G. SPECIFICATION 107.9 - PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPE. ALL RESTORATION WORK SHALL BE COMPLETED TO THE SATISFACTION OF THE CITY OF MESA ENGINEER.

THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY GENERAL CONSTRUCTION NOTES

THE FOLLOWING NOTES BELOW SHALL BE PROVIDED ON ALL CIVIL, DRAINAGE AND LANDSCAPING CONSTRUCTION PLANS. IF PLANS ARE NOT REQUIRED, THEN NOTES SHALL BE PROVIDED ON THE PERMITTEE'S CONSTRUCTION WORK PLAN.

1. ALL WORK PERFORMED WITHIN FLOOD CONTROL DISTRICT OF MARICOPA COUNTY (DISTRICT) RIGHTS-OF-WAY (ROW) SHALL CONFORM TO THE LATEST DISTRICT STANDARD PROCEDURES AND DETAILS AS PUBLISHED ON THE DISTRICT'S WEB SITE.

2. THE PERMITTEE SHALL OBTAIN A COPY OF THE EXECUTED DISTRICT ROW USE PERMIT PRIOR TO COMMENCEMENT OF WORK WITHIN DISTRICT RIGHT-OF-WAY, MAINTAIN A COPY OF THE PERMIT AND STAMPED APPROVED PLANS ON THE PROJECT SITE AT ALL TIMES, AND SHALL BE AVAILABLE UPON REQUEST.

3. THE PERMITTEE SHALL NOTIFY THE DISTRICT'S ASSIGNED OPERATIONS AND MAINTENANCE (O&M) INSPECTOR OR DAM SAFETY INSPECTOR AT LEAST 48 HOURS IN ADVANCE PRIOR TO ANY EXCAVATION, BACKFILL, SLURRY, CONCRETE, AND/OR RIPRAP PLACEMENT BEING PERFORMED WITHIN THE DISTRICT'S ROW. REFER TO THE EXECUTED DISTRICT PERMIT FOR THE O&M INSPECTOR'S CONTACT INFORMATION. IF WORK IS IMPACTING A DISTRICT LEVEE, DAM OR FLOOD RETARDING STRUCTURE (FRS), REFER TO THE EXECUTED DISTRICT PERMIT FOR THE LEVEE/DAM SAFETY INSPECTOR'S CONTACT INFORMATION.

4. THE PERMITTEE PERFORMING EXCAVATION OPERATIONS IS RESPONSIBLE FOR LOCATING AND PROTECTING ALL UNDERGROUND UTILITIES. TO EXPEDITE THIS PROCESS, THE PERMITTEE SHALL CALL ARIZONA 811 (FORMALLY ARIZONA BLUE STAKE) AT 811 OR 1-800-782-5348 TO IDENTIFY UNDERGROUND UTILITIES AT LEAST 48 HOURS IN ADVICE PRIOR TO START OF THE WORK.

5. ANY DAMAGE OR DISTURBANCE TO DISTRICT STRUCTURES, EQUIPMENT, MATERIALS, VEGETATION, OR SURROUNDING DISTRICT ROW SHALL BE REPLACED OR REPAIRED, IN-KIND, TO THE SATISFACTION OF THE DISTRICT'S O&M INSPECTOR OR LEVEE/DAM SAFETY INSPECTOR.

6. IN THE EVENT THE TERMS AND CONDITIONS IN THE DISTRICT'S PERMIT ARE NOT CONSISTENT WITH THE DISTRICT-APPROVED PLANS, THE DISTRICT'S PERMIT WILL HAVE PRECEDENCE. 2801 WEST DURANGO STREET PHOENIX, ARIZONA 85009 PHONE: 602-506-1501

7. IN ORDER TO CLOSE OUT THE DISTRICT'S PERMIT AND RELEASE PERFORMANCE BONDS, ALL WORK (INCLUDED ASSOCIATED PUNCH-LIST ITEMS) MUST BE COMPLETED IN FULL TO THE SATISFACTION OF THE DISTRICT'S INSPECTOR AND ENGINEER. CERTIFIED AS-BUILT PLANS ALONG WITH REQUIRED QUALITY ASSURANCE TESTS MUST BE PROVIDED AND ACCEPTED BY THE DISTRICT, AND ALL EASEMENTS REQUIRED BY THE PROJECT MUST BE RECORDED PRIOR TO PERMIT CLOSEOUT. IF THE WORK ONLY INVOLVES GEOTECHNICAL ANALYSIS, SITE INVESTIGATIONS, SURVEYS, OR FLOOD RELATED STUDIES, THEN FINALIZED REPORTS, STUDIES AND/OR SURVEY PLANS MUST BE PROVIDED AND ACCEPTED BY THE DISTRICT PRIOR TO PERMIT CLOSEOUT

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: G004 of 011

UNION PACIFIC RAILROAD
Sheet 004 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
GENERAL NOTES & PROJECT CONTACTS

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\01_General\T_GEN_200927.dgn
Default
3/9/2026

TOWN OF QUEEN CREEK GENERAL NOTES

"ALL IMPROVEMENTS SHALL CONFORM TO THE LATEST MAG STANDARDS AND SPECIFICATIONS OR THE LATEST STANDARDS AND SPECIFICATION ADOPTED BY THE TOWN."

"THE TOWN PUBLIC WORKS DIRECTOR SHALL BE NOTIFIED 48 HOURS PRIOR TO ANY CONSTRUCTION ON THE PROJECT SITE."

"ALL IMPROVEMENTS SHALL BE CONSTRUCTED WITH THE INSPECTION AND APPROVAL OF THE TOWN PUBLIC WORKS DEPARTMENT AND WILL REQUIRE A TOWN CONSTRUCTION PERMIT. CONSTRUCTION WILL NOT BEGIN UNTIL A PERMIT HAS BEEN ISSUED. IF THE WORK IS DISCONTINUED, IT SHALL NOT RESUME UNTIL AFTER NOTIFYING THE TOWN PUBLIC WORKS DIRECTOR."

"UTILITIES MUST BE INSTALLED EITHER IN DEDICATED PUBLIC RIGHT-OF-WAYS OR IN PUBLIC UTILITY EASEMENTS DEDICATED BY THE LAND OWNER FOR SUCH USAGE AND MAINTENANCE. THE DEVELOPER/OWNER IS RESPONSIBLE FOR THE COORDINATION OF THE RELOCATION OF UTILITIES ON SITE."

"ALL UNDERGROUND UTILITY INSTALLATION IN STREETS OR PUBLIC ACCESS WAYS SHALL BE CONSTRUCTED PRIOR TO SURFACING SUCH STREET OR PUBLIC ACCESS WAY."

"THE DEVELOPER SHALL PROVIDE FOR AN ARIZONA REGISTERED ENGINEER TO BE PRESENT ON THE SITE FOR SUFFICIENT TIME TO ASSESS COMPLIANCE WITH THE PLANS AND SPECIFICATIONS FOR EACH ELEMENT OF CONSTRUCTION AND NO LESS THAN ONCE A DAY WHEN CONSTRUCTION IS IN PROGRESS."

"THE TOWN PUBLIC WORKS DIRECTOR SHALL BE NOTIFIED UPON COMPLETION OF ALL UNDERGROUND UTILITIES WITHIN THE STREET RIGHT-OF-WAYS AND PRIOR TO ANY STREET PREPARATION WORK. INTERIM AS-BUILT PLANS OF THE UTILITIES AND ALL PASSING TEST RESULTS WILL BE SUBMITTED FOR REVIEW. UPON REVIEW AND APPROVAL OF THE SUPPLIED INFORMATION, THE DEVELOPER MAY PROCEED WITH THE INSTALLATION OF STREET IMPROVEMENTS."

"THE DEVELOPER'S ENGINEER SHALL REQUEST THE TOWN PUBLIC WORKS DIRECTOR PERFORM INSPECTION OF THE SUB GRADE BASE PRIOR TO PLACEMENT OF THE OVERLAYING MATERIALS. IN ADDITION, THE TOWN PUBLIC WORKS DIRECTOR SHALL PERFORM PERIODIC INSPECTIONS THROUGHOUT THE COURSE OF CONSTRUCTION. THESE INSPECTIONS OR APPROVALS DO NOT SIGNIFY THAT THE TOWN HAS ACCEPTED ANY OF THE IMPROVEMENTS FOR MAINTENANCE."

"THE DEVELOPER'S ENGINEER SHALL SUBMIT WEEKLY PROGRESS REPORTS TO THE TOWN PUBLIC WORKS DIRECTOR THROUGHOUT THE CONSTRUCTION. THE WEEKLY PROGRESS REPORTS WILL INCLUDE THE RESULTS OF ALL TESTS TAKEN DURING THE WEEK."

"CONSTRUCTION MATERIALS TESTING SHALL BE PERFORMED AT THE DIRECTION OF THE TOWN PUBLIC WORKS DIRECTOR OR HIS REPRESENTATIVE AND AT THE EXPENSE OF THE OWNER/DEVELOPER."

"THE CONTRACTOR IS RESPONSIBLE FOR NOTIFYING INDIVIDUAL UTILITY COMPANIES FOR UTILITY LOCATION, OR FOR CALLING BLUE STAKE TO COORDINATE UTILITY LOCATION, AT LEAST 48 HOURS PRIOR TO EXCAVATION OF ALL UNDERGROUND UTILITIES."

"THE ENGINEER CERTIFIES THAT HE HAS CONTACTED ALL APPLICABLE UTILITY COMPANIES AND HAS SHOWN ALL EXISTING AND/OR PROPOSED UTILITY LINES AND PERTINENT INFORMATION TO THESE PLANS, AND HAS PLOTTED CORRECTLY THE EXISTING AND PROPOSED UTILITY RIGHT-OF-WAY AND/OR EASEMENT LINES ON THE PLANS."

TOWN OF QUEEN CREEK GRADING & DRAINAGE NOTES

1. A GRADING PERMIT SHALL BE REQUIRED.
2. AN APPROVED GRADING AND DRAINAGE PLAN SHALL BE ON THE JOB SITE AT ALL TIMES. DEVIATIONS FROM THE PLAN MUST BE PRECEDED BY A TOWN OF QUEEN CREEK APPROVED PLAN REVISION.
3. ALL DRAINAGE PROTECTIVE DEVICES SUCH AS SWALES, PIPES, OR OTHER MEASURES DESIGNED TO PROTECT BUILDINGS OR PROPERTY FROM STORM RUNOFF MUST BE COMPLETED PRIOR TO ANY STRUCTURE BEING BUILT. 2/4/2020GRADING & DRAINAGE NOTES
4. PREPARATION OF GROUND: THE AREA OVER WHICH FILLS ARE TO BE MADE SHALL BE CLEARED OF ALL TRASH, TREES, STUMPS, DEBRIS OR OTHER MATERIAL NOT SUITABLE AS A FOUNDATION FOR FILL.
5. LOCATION OF ALL UTILITIES SHOWN ON THIS PLAN ARE BASED ON INFORMATION SUPPLIED TO THE ENGINEER BY THE APPROPRIATE UTILITY COMPANIES, NO GUARANTEE ON LOCATIONS OR ACCURACY IS IMPLIED OR GIVEN. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO CONTACT BLUE STAKE (602)263-1100 AND ANY OTHER INVOLVED AGENCIES TO LOCATE ALL UTILITIES PRIOR TO CONSTRUCTION.
6. DISTURBED AREAS SHALL BE (RE)VEGETATED WITH TOWN APPROVED DESERT PLANTS OR DROUGHT RESISTANT PLANS. EXISTING VEGETION SHALL BE RELOCATED IF DISTURBED BY CONSTRUCTION.
7. SWALES SHALL BE LINED WITH 6" MINIMUM DIAMETER ROCK SIZE AND THE DEPTH SHALL MATCH THE APPROVED SWALE DETAIL.
8. CONTRACTOR/BUILDER SHALL NOTIFY THE ENGINEER OF ANY VARIANCES BETWEEN THESE PLANS NOTIFY THE ENGINEER OF ANY VARIANCES BETWEEN THESE PLANS AND ONSITE CONDITIONS.
9. ALL DRAINAGE SWALES SHALL BE FREE OF TRASH, DELETROUS MATERIAL, SILT, VEGATION, AND DEBRIS. MAINTAINENCE SHALL BE BY THE HOMEOWNERS ASSOCIATION.
10. DROPS IN GRADE OF 30" OR MORE IN OR ADJACENT TO TRAILS, SIDEWALKS ETC. SHALL BE PROTECTED BY SAFETY RAIL THAT IS OSHA COMPLIANT.
11. CONTRACTOR SHALL VERIFY PROPERTY LINE LOCATIONS PRIOR TO PROCEEDING WITH WORK.
12. FINISHED GRADE SHALL SLOPE AWAY FROM RESIDENCE AT 5% FOR A MINIMUM DISTANCE OF 5' TO AN APPROVED WATER DISPOSAL AREA.
13. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH CURRENT MAG SPECIFICATIONS AND/OR TOWN OF QUEEN CREEK STANDARD DETAILS .
14. CONTRACTORS SHALL OBTAIN ALL REQUIRED PERMITS PRIOR TO STARTING CONSTRUCTION.
15. CONTRACTOR SHALL UNCOVER ALL UTILITIES BEING TIED INTO TO VERIFY THEIR LOCATION PRIOR TO STARTING NEW LINES.
16. CONTRACTOR SHALL ADHERE TO THE REQUIREMENTS OF THE APPROVED PROJECT SOIL INVESTIGATION REPORT

TOWN OF QUEEN CREEK PAVING NOTES

1. THE BASE COURSE WILL NOT BE PLACED ON SUBGRADE UNTIL BASE REQUIREMENTS HAVE BEEN COMPLETED AND ACCEPTED BY THE ENGINEERING MANAGER AND/OR HIS REPRESENTATION
2. BLUE REFLECTIVE SPOTTERS SHALL BE INSTALLED ON THE STREET PAVEMENT AT FIRE HYDRANT LOCATION IN ACCORDANCE WITH MAG STANDARDS.
3. STREET NAME SIGNS WILL BE INSTALLED AT THE DEVELOPERS' EXPENSE.
4. ALL WORK UNDER THE ENCROACHMENT PERMITS SHALL BE DONE IN ACCORDANCE WITH LATEST REVISIONS OF THE MARICOPA ASSOCIATION OF GOVERNMENTS UNIFORM STANDARD SPECIFICATION AND DETAILS (MAG SPECIFICATION AND DETAILS), TOWN OF QUEEN CREEK SUPPLEMENT TO THE MAG SPECIFICATION AND DETAILS, AND MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
5. A RIGHT-OF-WAY ENCROCHMENT PERMIT ISSUED BY THE TOWN ENGINEERING DIVISION SHALL BE REQUIRED FOR ALL WORK IN THE TOWN OF QUEEN CREEK RIGHT-OF-WAYS.
6. THE PUBLIC WORKS DEPARTMENT (480-358-3003) SHALL BE NOTIFIED 24 HOURS PRIOR TO STATRING THE DIFFERENT PHASES OF CONSTRUCTION FOR SCHEDULING INSPECTIONS.
7. ACCEPTANCE OF THE COMPLETED RIGHT-OF-WAY IMPROVEMENTS WILL NOT BE GIVEN UNTIL 4 MIL MYLAR REPRODUCIBLE AS-BUILTS AND CD IN PDF FORMAT HAVE BEEN SUBMITTED TO AND APPOVED BY THE TOWN'S ENGINEERING DIVISION.
8. LOCATION OF ALL WATER VALVES, MANHOLES AND CLEANOUTS MUST BE REFERENCED AT ALL TIMES DURING CONSTRUCTION AND ACCES MADE AVAILABLE TO THE PRIVATE WATER COMPANYS AND THE TOWN PUBLIC WORKS DEPARTMENT.
9. NO PAVING CONSTRUCTION SHALL BE STARTED UNTIL ALL UNDERGROUND UTILITIES WITHIN THE ROADWAY PRISM AND ON-SITE ARE COMPLETED.
10. STAKING SHALL INCLUDE:
    A. RIGHT-OF-WAY LINES AT 100'
    B. PRE-GRADE AND REFERENCE CONTROL -AS NECESSARY
    C. CULVERT, STORM DRAIN AND DITCH INVERTS AT 50' INTERVALS AND BREAKS IN GRADE
    D. BLUETOP SUBGRADE AT CENTERLINE AND UNCURBED EDGE OF PAVEMENT AT 50' INTERVALS
    E. BLUETOP ABC AT CENTERLINE, UNCURBED EDGE OF PAVEMENT AND 1/4 POINTS AT 50' INTERVALS.
    F. STRADDLE POINTS FOR PERMANENT MONUMENTS. PUNCH THE MONUMENT CAP AFTER SETTING.
    G. STRUCTURE LOCATION AND GRADES.
    H. CONCRETE CURB AND GUTTER AT 50' INTERVALS MAXIMUM. ON HORIZONTAL OR VERTICAL CURVES, AND ON GRADES LESS THAN 05%, STAKE AT 25' MAXIMUM INTERVALS. STAKE ALL CURB RETURNS AT THE P.C. AND THE 1/4 POINTS OF RETURN.
11. GUTTERS SHALL BE WATER TESTED IN THE PRESENCE OF THE PUBLIC WORKS DEPARTMENT TO INSURE PROPER DRAINAGE PRIOR TO THE FINAL APPROVAL BY THE TOWN ENGINEERING DIVISION AND PUBLIC WORKS DEPARTMENT.
12. EXACT POINT OF MATCHING, TERMINATION AND OVERLAY, IF NECESSARY, MAY BE DETERMINED IN THE FIELD BY THE TOWN ENGINEERING DIVISION AND/OR THE PUBLIC WORKS DEPARTMENT.
13. NO JOB WILL BE CONSIDERED COMPLETE UNTIL ALL CURBS, PAVEMENT AND SIDEWALKS HAVE BEEN SWEPT CLEAN OF ALL DIRT AND DEBRIS AND ALL SURVEY MONUMENTS ARE INSTALLED ACCORDING TO THE PLANS.
14. THE TOWN WILL NOT PARTICIPATE IN THE COST OF CONSTRUCTION OR UTILITY RELOCATION UNLESS OTHERWISE SPECIFIED ON THESE PLANS.
15. THE CONTRACTOR SHALL UNCOVER ALL EXISTING LINES BEING TIED INTO TO VERIFY THEIR LOCATIONS. THE CONTRACTOR SHALL LOCATE OR HAVE LOCATED ALL EXISTING UNDERGROUND PIPELINES, TELEPHONE AND ELECTRICAL CONDUITS, AND STRUCTURES IN ADVANCE OF CONTRUCTION AND WILL OBSERVE ALL POSSIBLE PRECAUTIONS TO AVOID DAMAGE TO SAME. CALL BLUE STAKE AT 1-800-STAKE-IT.
16. FACILITIES WHICH ARE NOT SPECIFICALLY LOCATED WITH ACTUAL VERTICAL AND HORIZONTAL CONTROLS, ARE LOCATED ONLY APPROXIMATELY AND TO THE BEST AVAILABLE KNOWLEDGE.
17. CONSTRUCTION LIMITS- ADEQUATELY STAKE, FENCE, AND SIGN THE CONSTRUCTION LIMITS. THE CONSTRUCTION LIMITS SHALL REMAIN MARKED THROUGHOUT THE CONSTRUCTION PERIOD.
18. EARTHWORK SHALL BE PERFORMED ACCORDING TO THE GEOTECHNICAL REPORT DONE BY _____ DATED _____. ALL COMPACTION UNDER PAVEMENT AREAS SHALL BE PREFORMED ACCORDING TO MAG SPECIFICATIONS AND/OR THE SOILS REPORT RECOMMANDATIONS.
19. PRIOR TO CONSTRUCTION:
    A TRAFFIC CONTROL PLAN FOR WORK WITHIN THE PUBLIC RIGHT-OF-WAY SHALL BE PROVIDED TO THE TOWN PUBLIC WORKS DEPARTMENT FOR REVIEW AND APPROVAL. PAD COMPACTION CERTIFICATION SHALL BE SUBMITTED TO THE PUBLIC WORKS DESIGNATED INSPECTOR PRIOR TO ANY BUILDING CONSTRUCTION. SCHEDULE ALL PRECONSTRUCTION MEETINGS THROUGH THE TOWN PUBLIC WORKS DESIGNATED INSPECTOR.
20. AN APPROVED (SIGNED-OFF) GRADING, DRAINAGE AND PAVING PLAN SHALL BE ON THE JOB SITE AT ALL TIMES. DEVIATIONS FROM THE PLANS MUST BE PRECEDED BY AN APPROVED PLAN REVISION, OR SUBJECT TO ?WORK STOP ORDER? BY THE TOWN PUBLIC WORKS DEPARTMENT INSPECTOR TO REMOVE ANY WORK THAT DOES NOT REFLECT THE APPROVED IMPROVEMENT PLANS.

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: G005 of 011

UNION PACIFIC RAILROAD
Sheet 005 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
GENERAL NOTES & PROJECT CONTACTS

Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\01_General\T_GEN_200927.dgn
Default
3/9/2026

ABBREVIATIONS

MISCELLANEOUS

Ac.	Acres
Ave.	Avenue
Blvd.	Boulevard
Bldg.	Building
BNSF	BNSF Railway
C.Y.	Cubic Yards
Conc.	Concrete
°	Degree (s)
Dia.	Diameter
Dr.	Drive
Dwg.	Drawing
E	East
Elev.	Elevation
Exist.	Existing
'	Foot, Feet or Minute (s)
F.S.	Finished Surface
Horiz.	Horizontal
"	Inch, Inches or Second (s)
Inv.	Invert
Lt.	Left
L	Length
L.F.	Lineal Feet
Max.	Maximum
Min.	Minimum
N	North
NTS	Not to Scale
No.	Number
OH	Overhead
Prop.	Proposed
RR	Railroad
Rwy	Railway
R/W	Right of Way
Rt.	Right
S	South
S.F.	Square Feet
Sta.	Station
Std.	Standard
St.	Street
Twp.	Township
Typ.	Typical
UG	Underground
UPRR	Union Pacific Railroad
V	Velocity
Wt.	Weight
W	West
X-ing	Crossing

SIGNAL

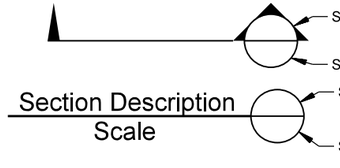
ABS	Automatic Block Signal
ATC	Automatic Train Control
CTC	Centralized Traffic Control
DED	Dragging Equipment Detector
DTC	Direct Traffic Control
ELTO	Electric Lock Turnout
HBD	Hot Box Detector
HTTO	Hand Throw Turnout
HWD	High Wide Dectector
POTO	Power Operated Turnout
TWC	Track Warrant Control
WILD	Wheel Impact Load Dectector

STRUCTURES

Bldg.	Building
Br.	Bridge
CB	Catch Basin
CPT	Concrete Pile Trestle - Ballast Deck
CIP	Cast Iron Pipe
CMP	Corrugated Metal Pipe
CMPA	Corrugated Metal Pipe Arch
CSP	Corrugated Steel Pipe
Culv.	Culvert
DI	Drop Inlet
DPGBD	Deck Plate Girder - Ballast Deck
DPGOD	Deck Plate Girder - Open Deck
EBW	East Backwall
F.L.	Flowline
F.F.	Finished Floor
GIP	Galvanized Iron Pipe
Hdwl	Headwall
NBW	North Backwall
PCB	Prestressed Concrete Box
PSCT	Prestressed Concrete Trestle
RCA	Reinforced Concrete Arch
RCB	Reinforced Concrete Box
RCP	Reinforced Concrete Pipe
SBW	South Backwall
SSP	Smooth Steel Pipe
SPTBD	Steel Pile Trestle - Ballast Deck
SPTOD	Steel Pile Trestle - Open Deck
SPP	Structural Plate Pipe
TPGBD	Through Plate Girder - Ballast Deck
TPGOD	Through Plate Girder - Open Deck
TPTBD	Timber Pile Trestle - Ballast Deck
TPTOD	Timber Pile Trestle - Open Deck
TTBD	Through Truss - Ballast Deck
TTOD	Through Truss - Open Deck
TWB	Treated Wood Box
VCP	Vitrified Clay Pipe
Viad.	Viaduct
WBW	West Backwall
WIP	Wrought Iron Pipe

TRACK

ATR	Above Top of Rail
Align.	Alignment
BBR	Below Base of Rail
Cntrs.	Centers
CWR	Continuous Welded Rail
DSPD	Double Switch Point Derail
EOT	End of Track
HH	Head Hardened
Jtd.	Jointed Rail
LH	Left Hand
ML	Main Line
MM	Mile Marker
MP	Mile Post
NSC	Not Sufficient Clearance
OTM	Other Track Material
PCC	Point of Compound Curve
PC	Point of Curve
PCS	Point of Curve to Spiral
POC	Point on Curve
PF	1/2" Point of Frog
PI	Point of Intersection
PITO	Point of Intersection of Turnout
PS	Point of Spiral
PSC	Point of Spiral to Curve
POS	Point on Spiral
PT	Point of Tangent
POT	Point on Tangent
Pt. Sw.	Point of Switch
PVC	Point of Vertical Curve
PVI	Point of Vertical Intersection
PVT	Point of Vertical Tangent
RH	Right Hand
SH	Second Hand
SSPD	Single Switch Point Derail
TC	Track Centers
T.F.	Track Feet
Trk.	Track
UXO	Universal Cross-Over
X-Over	Cross-Over



SYMBOLS

UTILITIES

- Compressed Air
- Fiber Optic Cable
- Gas Pipeline
- Overhead Power Line
- Sanitary Sewer
- Overhead Signal Line
- Underground Signal Line
- Steam Line
- Storm Sewer
- Telephone
- Underground Electric
- Water Main
- Underground Wire
- Under Drain
- Valve
- Manhole
- Catch Basin
- Fire Hydrant
- Junction Box
- Electric Meter
- Gas Meter
- Water Meter
- Monitoring Well
- Pump

TRACK

- Existing Mainline
- Existing Siding or Spur
- Proposed
- Remove
- Shift
- Relay
- Surface & Line
- Future
- Foreign Railroad or Industry
- In Buildings or Under Structures
- Turnout
- Power Turnout
- Bumping Post
- Earthen Bumper
- Inert Retarder
- Dowty Retarder
- Hayes Derail
- Double Switch Point Derail

PROPERTY

- Section Line
- Center Section Line
- Parcel or Easement Line
- Right of Way
- Former Right of Way
- Right of Way to be Acquired
- Temporary Construction Easement
- Foreign Right of Way

ROAD CROSSING WARNING DEVICES

- Crossbuck Sign
- Flashing Light Warning Device
- Flashing Light Warning Device with Gate
- Cantilever Flashing Light Warning Device
- Cantilever Flashing Light Signal with Gate

SIGNAL

- Absolute Signal
- Signal Bridge
- Cantilever Signal
- ACS or CTC Signal
- Dwarf Signal
- Begin CTC
- Microwave Tower
- AEI
- Battery Box
- Dragging Equipment Detector
- Generator
- Hot Box Detector

STRUCTURES

- Culvert
- Culvert with Headwalls
- Double Culvert
- Railroad Bridge
- Highway Overpass
- Highway Underpass
- Tunnel
- Building
- Flag Pole

OTHER

- Embankment
- Flow Line
- Milepost
- Milemarker
- Control Point
- Revision Number
- Revision Cloud

SIGNS

- Stop
- Yard Limit
- 1 Mile to Yard Limit
- Whistle Post
- Flanger
- Station
- Reduce Speed
- Resume Speed
- General Purpose

FENCES

- Barbed Wire
- Chain Link
- Snow / Sand
- Cattle Guard

ROADS

- Paved Road
- Unimproved Road
- Interstate Highway
- Federal Highway
- State Highway
- County Highway

PERMITTING

- Temporary Workspace - Permitted
- Sensitive Resources - Impacted / Permitted
- Sensitive Resources - Do Not Impact
- FEMA Floodplain/Floodway Boundary

CONSTRUCTION

- Note (Work by Contractor)
- Note (Work by Others)
- Cut Lines
- Fill Lines
- Grading Limits

LIGHTING

- Light Pole
- Light Tower

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	RSP
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	G006 of 011

UNION PACIFIC RAILROAD

Sheet 006 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
ABBREVIATIONS & LEGEND

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\01.General\T_GEN_200927.dgn
Default
3/9/2026

Control Points					
Point No.	Project Stationing	Offset	Northing	Easting	Elevation
1	1584+78.30	10,323.50 LT	833975.542	786264.795	1390.60
2	-	-	833901.241	802029.433	1442.54
3	1620+80.93	5,067.62 LT	827529.344	786155.310	1394.01
4	1588+58.48	9,606.96 LT	833095.294	786255.103	1390.42
5	1590+90.31	9,311.99 LT	832720.303	786266.676	1391.63
6	1504+80.52	3,208.83 LT	832902.287	775702.881	1352.34
7	1501+96.60	3,598.24 LT	833384.504	775704.811	1352.02
8	1481+60.81	1,393.87 LT	832816.563	772758.436	1340.12
9	1487+62.60	1,480.96 LT	832529.865	773294.669	1343.08
101	1468+63.57	309.16 LT	832712.325	771070.566	1330.04
102	1501+36.92	78.26 RT	830459.416	773476.794	1346.25
103	1502+77.39	3,342.95 LT	833130.746	775618.869	1352.47
104	1539+28.97	4,066.66 LT	831548.492	778987.871	1367.93
105	1580+57.61	6,958.36 LT	831529.900	783893.451	1386.25
106	1592+84.51	11,118.68 LT	834059.300	787495.056	1393.32
107	-	-	833949.449	799221.020	1431.31
108	-	-	833950.836	801801.074	1442.43
109	-	-	833462.054	808022.662	1477.30
10	1512+71.71	69.16 LT	829905.134	774477.902	1350.84
11	1506+01.02	67.40 LT	830301.471	773936.847	1347.99
12	1498+70.62	71.58 LT	830737.974	773351.200	1345.52
13	1491+33.87	62.38 LT	831167.420	772752.484	1342.79
14	1485+13.60	68.55 LT	831540.172	772256.676	1340.37
15	1479+39.31	82.78 LT	831892.158	771802.667	1340.35
16	1473+39.76	71.46 LT	832238.537	771313.176	1337.99
17	1466+51.36	31.48 LT	832614.451	770735.067	1336.76
11009	1526+08.13	29.07 LT	829080.397	775530.237	1356.24
11007	1505+29.82	32.38 LT	830315.505	773858.755	1349.90
11008	1507+30.63	1,673.52 LT	831517.787	774993.723	1351.66
11006	1467+18.22	41.47 LT	832582.868	770794.838	1336.24
11002	1499+00.27	3,954.04 LT	833846.711	775677.166	1351.41
11003	1523+32.46	6,116.56 LT	834145.804	778917.734	1362.22
11004	1541+79.53	6,879.04 LT	833664.600	780857.196	1370.63
11005	1549+98.01	7,959.26 LT	834049.145	782156.778	1372.64
11021	1512+71.73	69.16 LT	829905.124	774477.917	1350.87
11010	1559+55.03	61.28 RT	827023.146	778171.757	1367.06
11011	1607+93.35	69.73 RT	824158.241	782070.476	1379.38
11012	1643+21.42	34.59 LT	822136.982	784963.344	1390.10
11019	-	-	833971.765	796912.095	1422.98
11017	-	-	834037.719	797977.148	1424.91
11016	-	-	835302.482	797920.339	1426.75
11018	-	-	833882.819	800505.540	1436.37
11020	-	-	831107.114	796867.473	1419.89

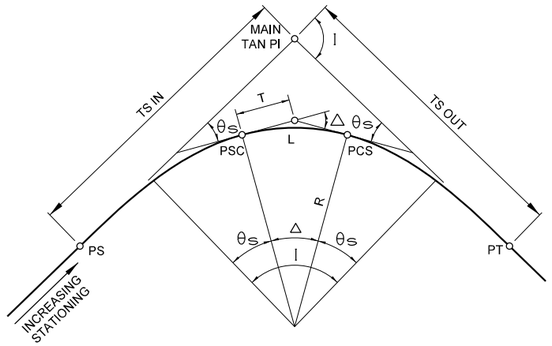


FIGURE A
CIRCULAR CURVES WITH SPIRAL TRANSITION

I - TOTAL INTERSECTION ANGLE

θ_S - SPIRAL ANGLE = $\frac{A L^2}{2}$

Δ - CENTRAL ANGLE OF CIRCULAR CURVE = I - 2 θ_S

Dc - DEGREE OF CURVE

A - RATE OF CHANGE OF DEGREE OF CURVE PER 100-ft. OF LENGTH = $\frac{Dc}{L}$

R - RADIUS OF CIRCULAR CURVE

T - TANGENT LENGTH OF CIRCULAR CURVE = R TAN $\frac{\Delta}{2}$

L - LENGTH OF CIRCULAR CURVE = $\frac{\Delta}{Dc}$ x 100

PS - TANGENT TO SPIRAL

PSC - SPIRAL TO CURVE

PCS - CURVE TO SPIRAL

PT - SPIRAL TO TANGENT

MAIN TAN PI - POINT OF INTERSECTION OF MAIN TANGENTS

(TS IN)
(TS OUT) - TANGENT LENGTH OF COMPLETE CURVE = (R+o) TAN $\frac{I}{2}$ + t

(WHEN SPIRALS OF EQUAL LENGTH ARE USED ON BOTH SIDES OF CIRCULAR CURVE, SEE FIGURE C. FOR o AND t).

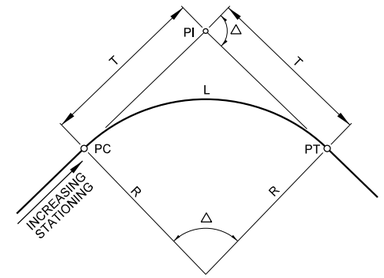


FIGURE B
SIMPLE CIRCULAR CURVE

R = RADIUS OF CIRCULAR CURVE

Δ = CENTRAL ANGLE OF CIRCULAR CURVE

T = R TAN $\frac{\Delta}{2}$

L = $\frac{\Delta}{Dc}$ x 100

Dc = 2 SIN^{-1} (50/R) = DEGREE OF CURVE (CHORD DEFINITION)

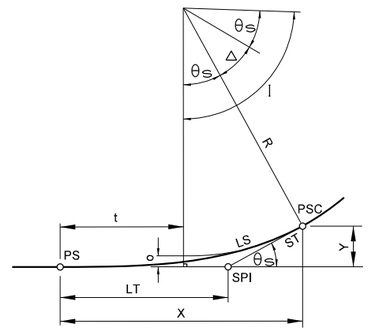


FIGURE C
SPIRAL TRANSITION CURVE

SPIRAL TRANSITION CURVE DATA:
THE SPIRAL USED IS DEFINED BY THE TALBOT SPIRAL.

LS = LENGTH OF SPIRAL (TS TO PSC)

θ_S = $\frac{A L^2}{2}$

X = $100\,L_1 - 0.000762A^2L_1^5$

Y = $0.291AL_1^3 - 0.00000158A^3L_1^7$

o = $0.0727AL_1^3$

t = $50L_1 - 0.000127A^2\,L_1^5$

ST = $\frac{Y}{\text{SIN}\,\theta_S}$

LT = $X - \frac{Y}{\text{TAN}\,\theta_S}$

Dc = 2 SIN^{-1} (50/R) = DEGREE OF CURVE (CHORD DEFINITION)

L_1 - TOTAL NO. OF STATIONS IN SPIRAL

SPI - SPIRAL POINT OF INTERSECTION

NOTE: Dc, θ_S, Δ, AND I ARE IN DEGREES.
ALL OTHERS DIMENSIONS ARE FEET.

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: G007 of 011

UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CONTROL POINTS & GEOMETRY

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\01_General\T_GEN_2
Default
3/9/2026

To Kendall & Hyder Timetable West

MP 934.38 DOT# 741833U

Power Rd. Xing
Pecos Rd. Xing

Sossaman Rd. Xing

Pecos Rd. Xing

MP 935

TRACK 101

TRACK 751

TRACK 120

(2) CMP 18" X 124'
(4) CMP 60" X 144'
Pt. Sw. #11 LH HTTO
Pt. Sw. #11 RH HTTO
Pt. Sw. #11 RH HTTO
Pt. Sw. #11 RH HTTO
Pt. Sw. #11 LH HTTO
Pt. Sw. #11 LH HTTO
Pt. Sw. #11 LH HTTO
Pt. Sw. #11 LH HTTO
Pt. Sw. #11 RH HTTO

TRACK E
TRACK D
TRACK C
TRACK 750
TRACK 749
TRACK 101

Track 749: 3,053' Clear
Track 750: 3,054' Clear (2,736' Future)
Track C: 2,406' Clear
Track D: 2,065' Clear
Track E: 2,065' Clear

MP 0.81 DOT# 980159X

(1) CMP 36" X 56'
(2) RCB 6' X 6' X 230'
MP 0.52 DOT# 980158R

MP 935.64 DOT# 741834B
MP 935.70 Pt. Sw. #11 LH HTTO
RH HT DERAIL
MP 935.77 (1) SSP 36" X 76'
MP 935.93 (1) CMPA 3.2' X 1.5' X 44'

MP 936

MP 936.16 Pt. Sw. #10 RH HTTO

5,000'

MP 936.75 (1) SSP 36" X 80'
LH HT DERAIL
MP 936.75 (1) CMPA 4.1' X 2.5' X 56'
MP 936.86 Pt. Sw. #11 RH HTTO

TRACK 121

MP 937

MAIN TRACK
TRACK 120

15,000' Signal to Signal

EL 1429
GERMANN
LB400
931.03
8207

MP 938

TRACK 744

MP 937.83 Pt. Sw. #15 LH PO/TO
MP 937.83 Pt. Sw. #10 LH HTTO
MP 937.84 Pt. Sw. #10 LH HTTO
MP 937.89 (2) DPG 146' [SIMN]

To Magma & West Picacho Timetable East

MP 3.03 DOT# 980160S
(3) RCB 9' X 6' X 32'
(1) CMP 36" X 50'

Ellsworth Rd. Xing

(1) CMP 36" X 46'
Pt. Sw. #11 RH HTTO

MP 4.03 DOT# 980161Y

Crismon Rd. Xing

(3) SSP 72" X 78'

Merrill Road

(4) SSP 54" X 70'
(1) SSP 36" x 141'
(1) SSP 18" x 125'
(1) SSP 36" x 126'

TRACK 101
TRACK 752
5,000'

Pt. Sw. #11 LH HTTO
(1) SSP 18" x 135'
(1) SSP 36" x 135'
MP 5.04 DOT# 980163M

Signal Butte Rd. Xing

(1) CMP 36" X 67'
Pt. Sw. #9 LH HTTO
(1) CMP 36" X 100'
(1) CMP 36" X 50'
Pt. Sw. #11 RH HTTO
(1) CMP 36" X 84'

Sossaman Rd. Xing

MP 934.78 Pt. Sw. #15 RH PO/TO
MP 934.82 Pt. Sw. #15 LH PO/TO
RH PO DSPD
MP 934.96 (2) MBC 4' X 1.5' X 22'
Access Road
(3) RCB 12' X 8' X 154'
Access Road
Pt. Sw. #11 LH HTTO
(2) CMP 60" X 132'
Access Road
(3) RCB 12' X 8' X 134'
Access Road
MP 935.22 (1) SSP 36" X 84'
(1) CMP 36" X 112'
LH HT DSPD
MP 935.33 Pt. Sw. #15 RH HTTO

TRACK 101
TRACK 751
MP 935
TRACK 120

LEGEND

	EXISTING	REMOVE	SHIFT	PROPOSED
TRACK				
ACCESS ROAD				
XING PANEL				
HAND THROW SWITCH				
POWER OPERATED SWITCH				
DERAIL				
ABSOLUTE SIGNAL				
CULVERT				
BRIDGE				

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: G008 of 011

UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SCHEMATIC PLAN

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGNSheets\01_General\T_GEN_200927.dgn
Default
3/9/2026

Restricted Work Area

North Detention Cell

Phoenix-Mesa
Gateway Airport

Williams Field Rd.

Restricted Work Area

National Weather Service
Weather Radar Site

City of Mesa
Utility Station

Track 749 & Track 750

031 032 033 034

E. Pecos Rd.

Retention Area 1 Outfall
to Ellsworth Channel

035 036 037 038 039 040

S. Power Rd.

South Detention Cell

030

026 029

Track 101

MESA

QUEEN CREEK

GILBERT

027 028

025

Diversion to North Detention Cell

Track 101

Retention Area 1

North Detention Cell Outfall
to Trackside Ditch

Track 751

012

South Detention Cell
to Rittenhouse Channel

024

013 014

935

E. Rittenhouse Rd.

S. Sossaman Rd.

S. 80th St.

E. Pecos Rd.

S. Ellsworth Rd.

015

E. Germann Rd.

MESA
QUEEN CREEK

E. Germann Rd.

Rittenhouse Channel Outfall

016

Restricted Work Area

017

Track 120 Extension

936

018

Hawes Rd.

019

1250 0 1250 2500

SCALE IN FEET

Phoenix Sub Main Track

N

olsson

2111 South 67th Street, Suite 200
Omaha, NE 68106-2810

TEL 402.341.1116
FAX 402.341.5895

www.olsson.com

UNION PACIFIC

DRAWN BY:	RSP
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	G009 of 011

UNION PACIFIC RAILROAD

Sheet 009 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
PLAN OVERVIEW

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\01_General\T_GEN008_200927.dgn
Default
3/9/2026

Restricted Work Area

SR 24

S. 222nd St.

S. Mountain Rd.

Retention Area 6 Outfall to Trackside Ditch

MESA CITY LIMITS

E. Pecos Rd.

047

048

Retention Areas 3 & 4 Outfall to Existing Retention

Track 101

040

041

042

043

044

045

046

Retention Area 6

Track 752

Retention Area 2

Retention Area 5

Retention Area 2 Outfall to Trackside Ditch

Retention Area 5 Outfall to Signal Butte Road

Crismon Rd.

S. Merrill Rd.

S. Signal Butte Rd.

S. Meridian Rd.

N IRONWOOD RD

E. Germann Rd.

MESA

QUEEN CREEK

MARICOPA COUNTY

PINAL COUNTY

N

1250 0 1250 2500

SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: G010 of 011

UNION PACIFIC RAILROAD

Sheet 010 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
PLAN OVERVIEW

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\01_General\T_GEN009_200927.dgn
Default
3/9/2026

E. Pecos Rd.

S. 80th St.

E. Germann Rd.

MESA

QUEEN CREEK

936

Hawes Rd.

Restricted Work Area

E. Ryan Rd.

E. Fulton Pkwy.

S. Ellsworth Loop

Phoenix Sub Main Track

Track 744

015 016 017 E. Fulton Pkwy. 018 019 020 021 022 023

E. Rittenhouse Rd.

Track 120

Track 120

QUEEN CREEK

S. Sossaman Rd.

Hawes Rd.

Google Earth

Legend

800 0 800 1600

SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: G011 of 011

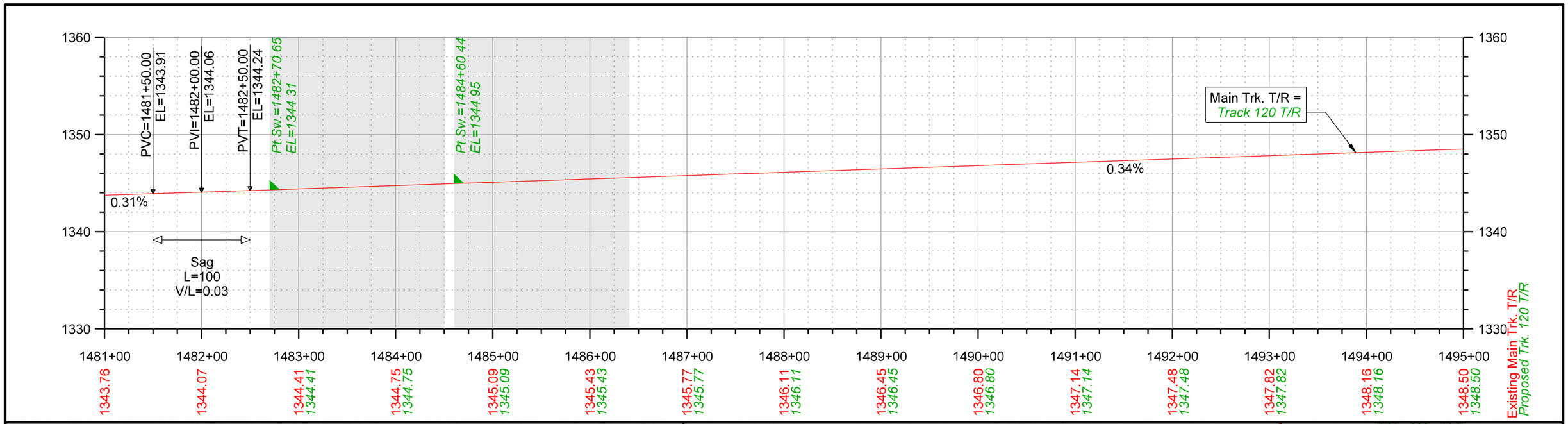
UNION PACIFIC RAILROAD

Sheet 011 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
PLAN OVERVIEW

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\01_General\T_GEN010_200927.dgn
Default
3/9/2026



olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

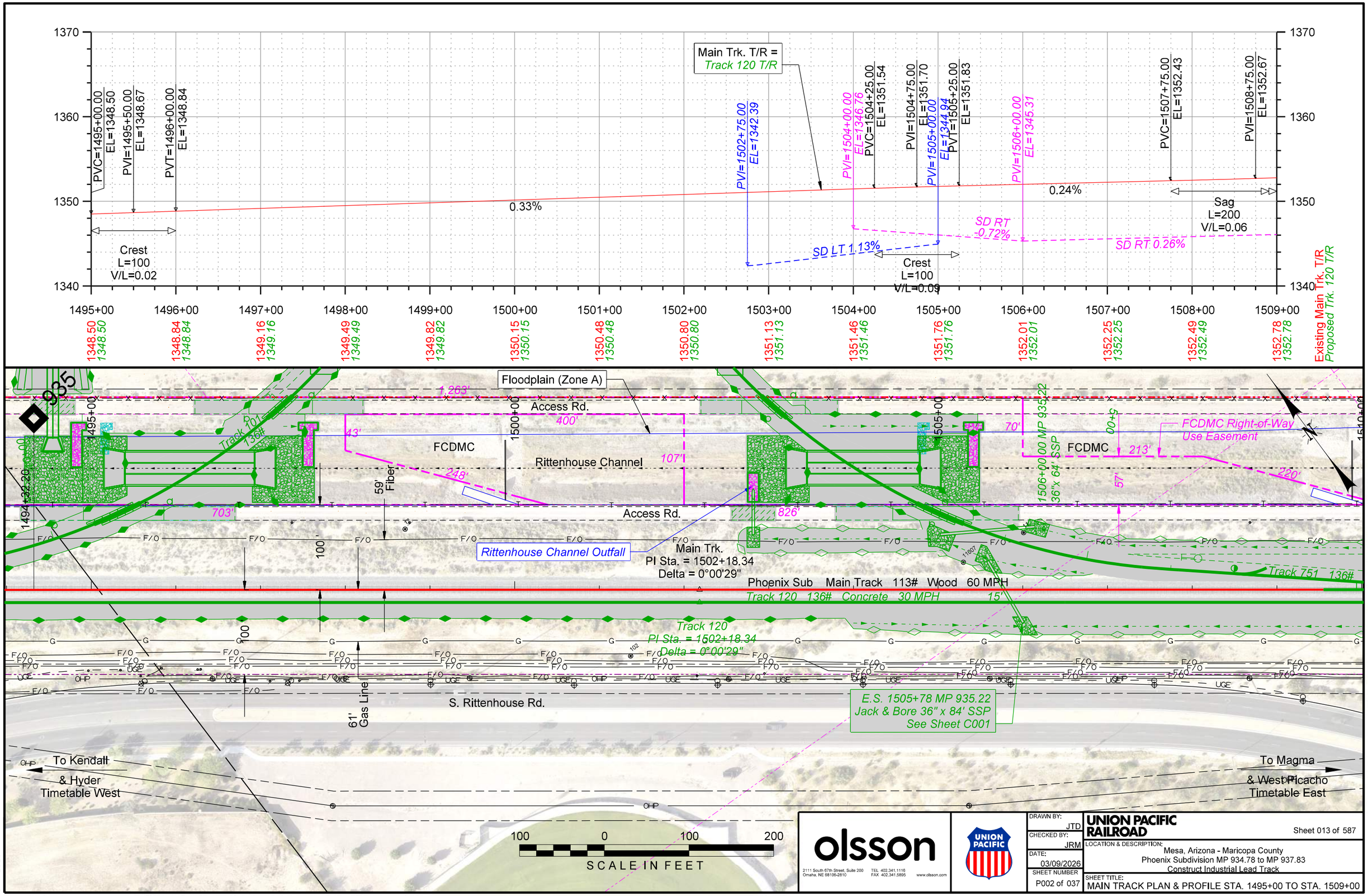
DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	P001 of 037

UNION PACIFIC RAILROAD Sheet 012 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
MAIN TRACK PLAN & PROFILE STA. 1481+00 TO STA. 1495+00

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\02_Plan - Profile\T_RPP01_ML_TRK_200927.dgn
Default
3/9/2026



olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

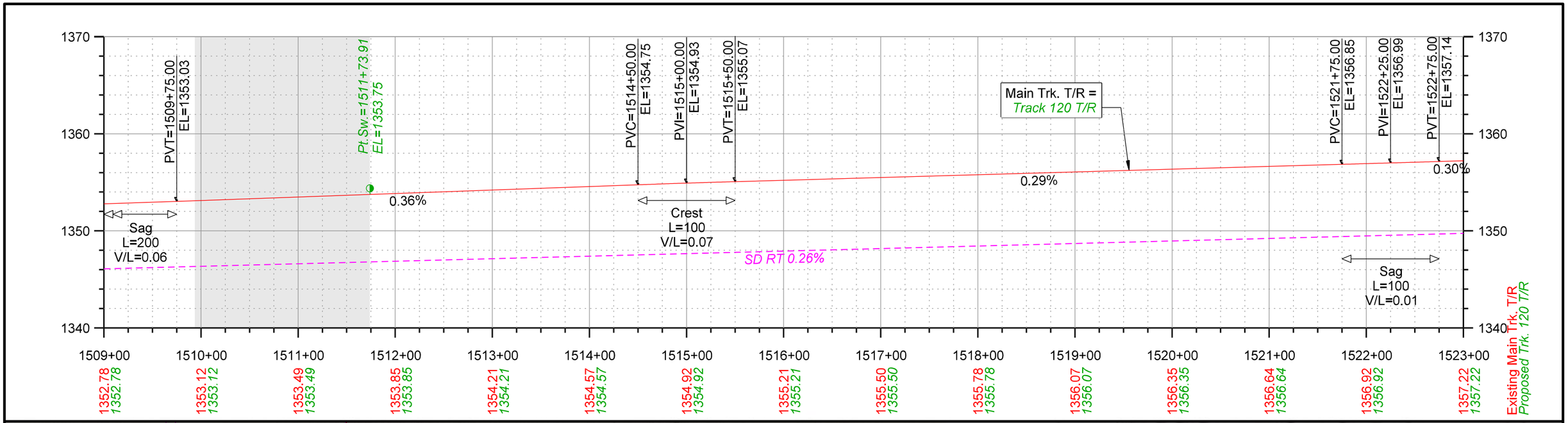
DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	P002 of 037

UNION PACIFIC RAILROAD Sheet 013 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
MAIN TRACK PLAN & PROFILE STA. 1495+00 TO STA. 1509+00

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\02_Plan - Profile_RPP02_ML_TRK_200927.dgn
Default
3/9/2026



olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	P003 of 037

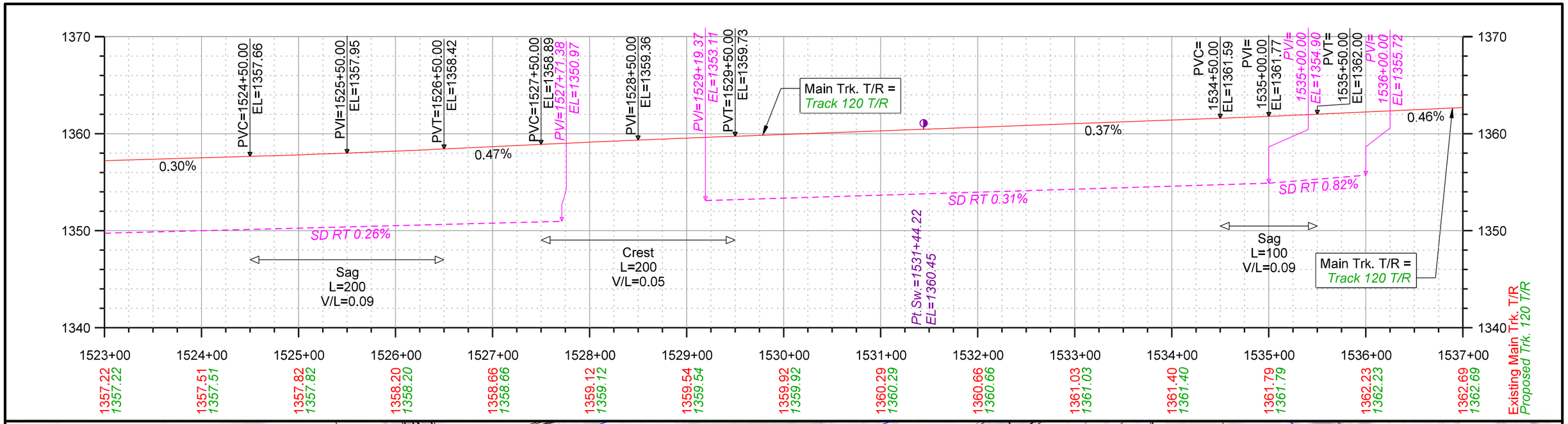
UNION PACIFIC RAILROAD

Sheet 014 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
MAIN TRACK PLAN & PROFILE STA. 1509+00 TO STA. 1523+00

Color tables:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\02_Plan - Profile\T_RPP03_ML Default
3/9/2026
T_RPP03_ML TRK_200927.dgn



olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

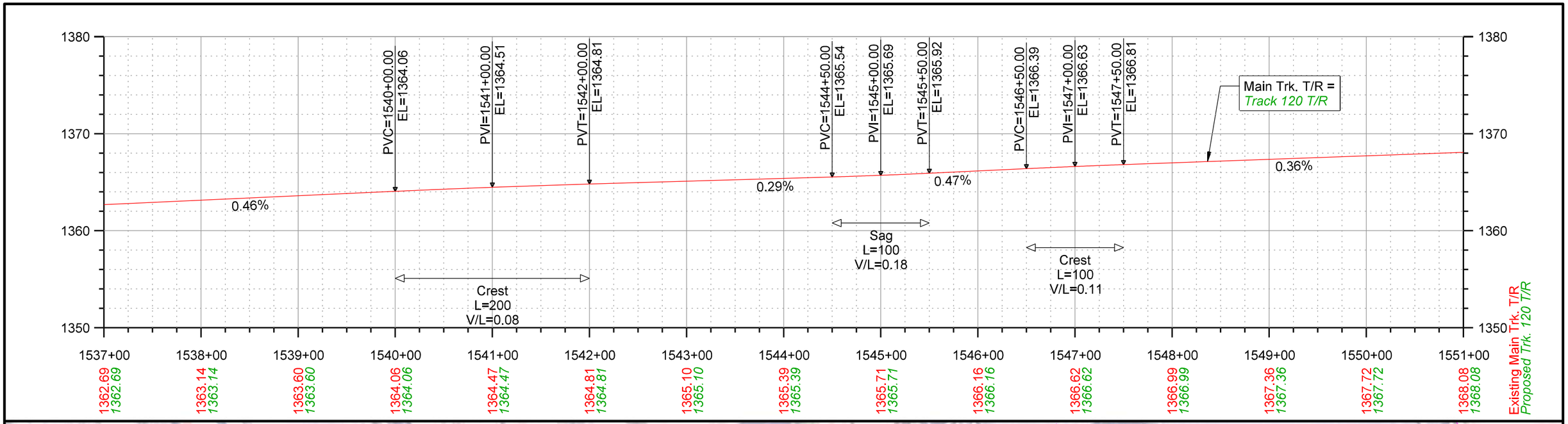
DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	P004 of 037

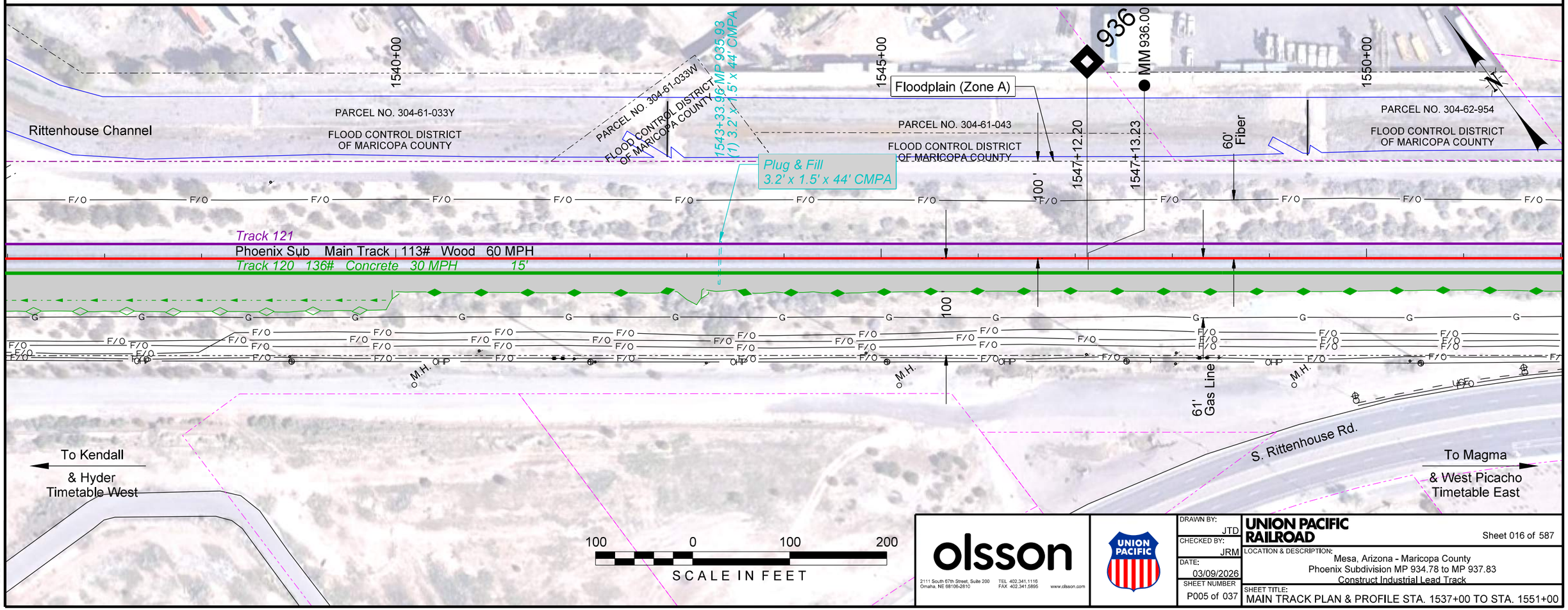
UNION PACIFIC RAILROAD Sheet 015 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
MAIN TRACK PLAN & PROFILE STA. 1523+00 TO STA. 1537+00

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\02_Plan - Profile\T_RPP04_ML_TRK_200927.dgn
Default
3/9/2026





olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

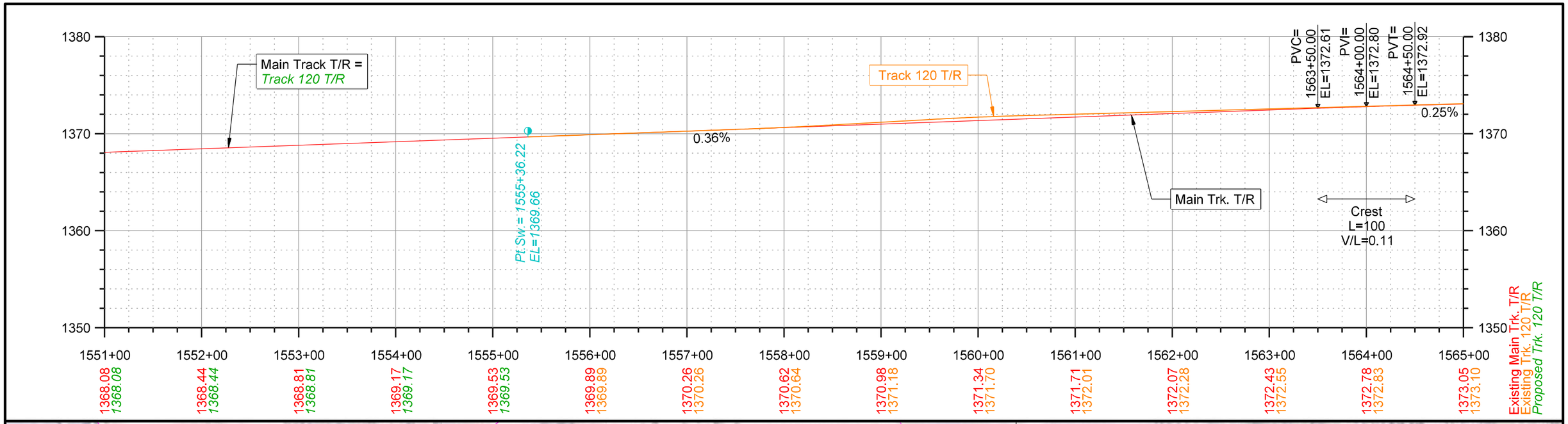
DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: P005 of 037

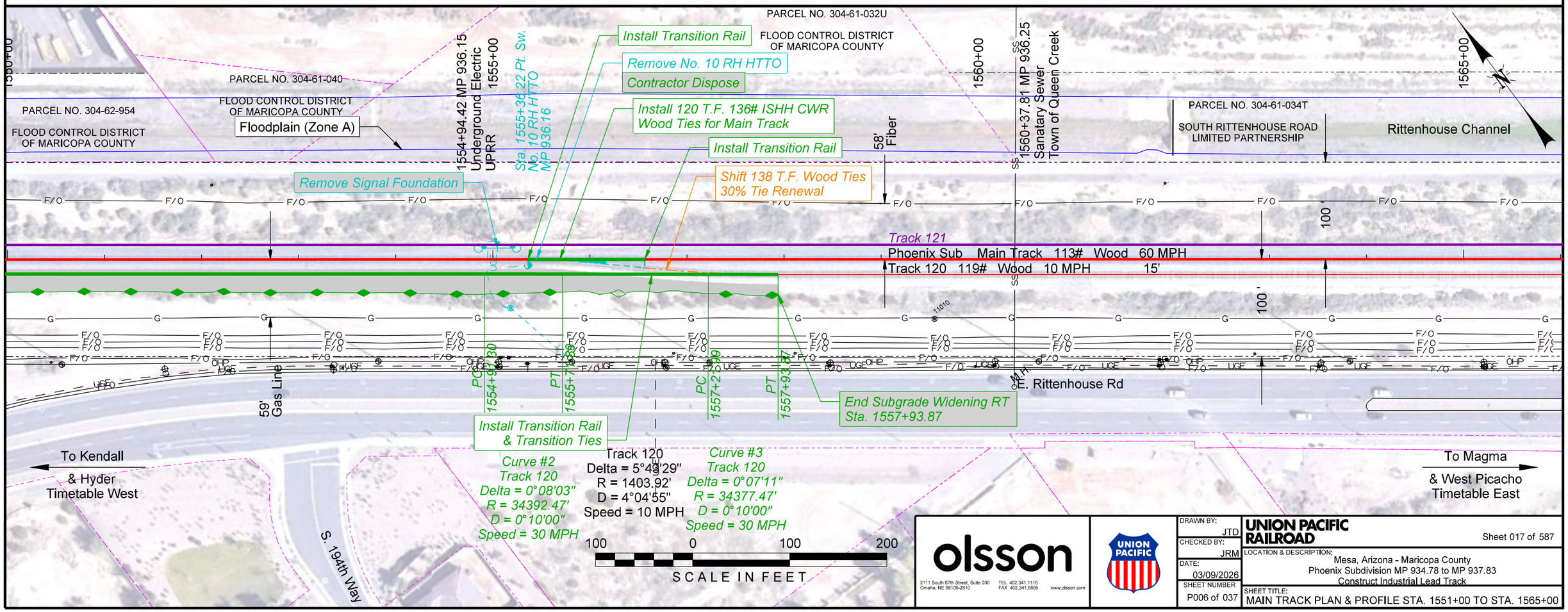
UNION PACIFIC RAILROAD
Sheet 016 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
MAIN TRACK PLAN & PROFILE STA. 1537+00 TO STA. 1551+00

Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927.40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927.40-Design\Microstation\020-0927_RLTK\DGN\Sheets\02_Plan - Profile\T_RPP05_ML_TRK_200927.dgn
Default
3/9/2026





olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	P006 of 037

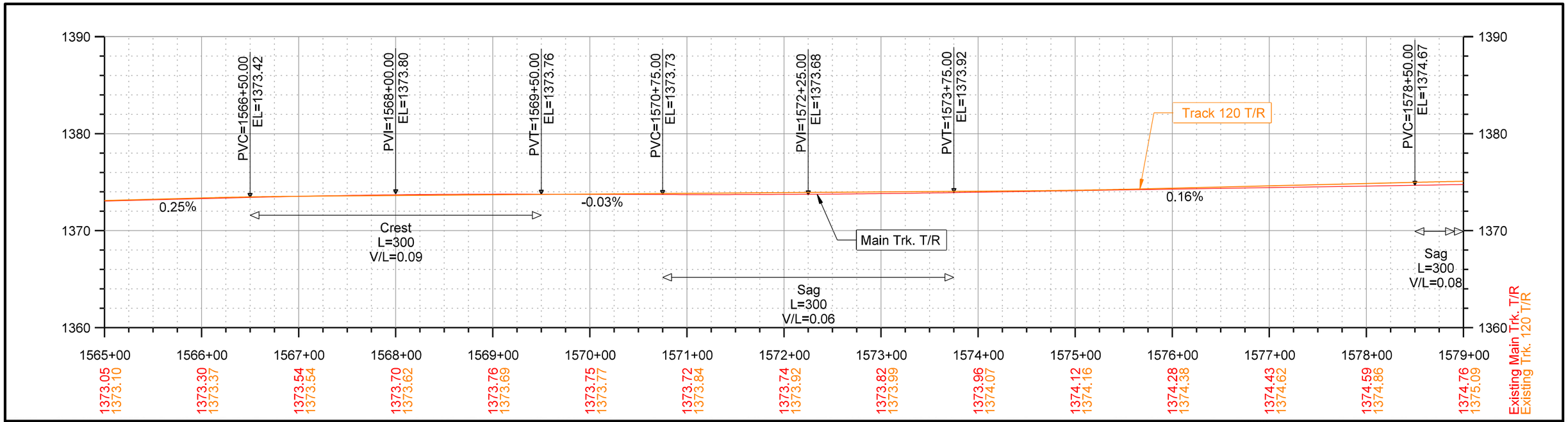
UNION PACIFIC RAILROAD

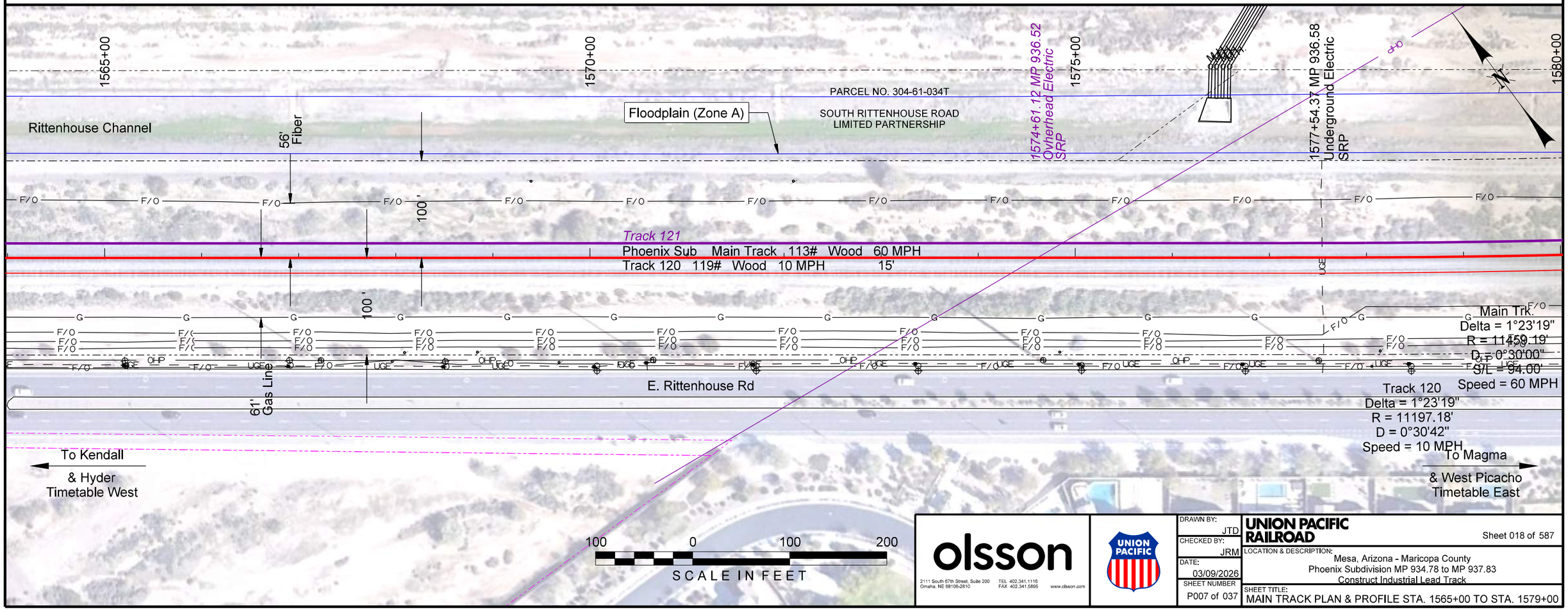
Sheet 017 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
MAIN TRACK PLAN & PROFILE STA. 1551+00 TO STA. 1565+00

Color table:K:\Bentley\Workspace\Projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\02_Plan - Profile\T_RPP06_ML_TRK_200927.dgn
Default
3/9/2026





olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

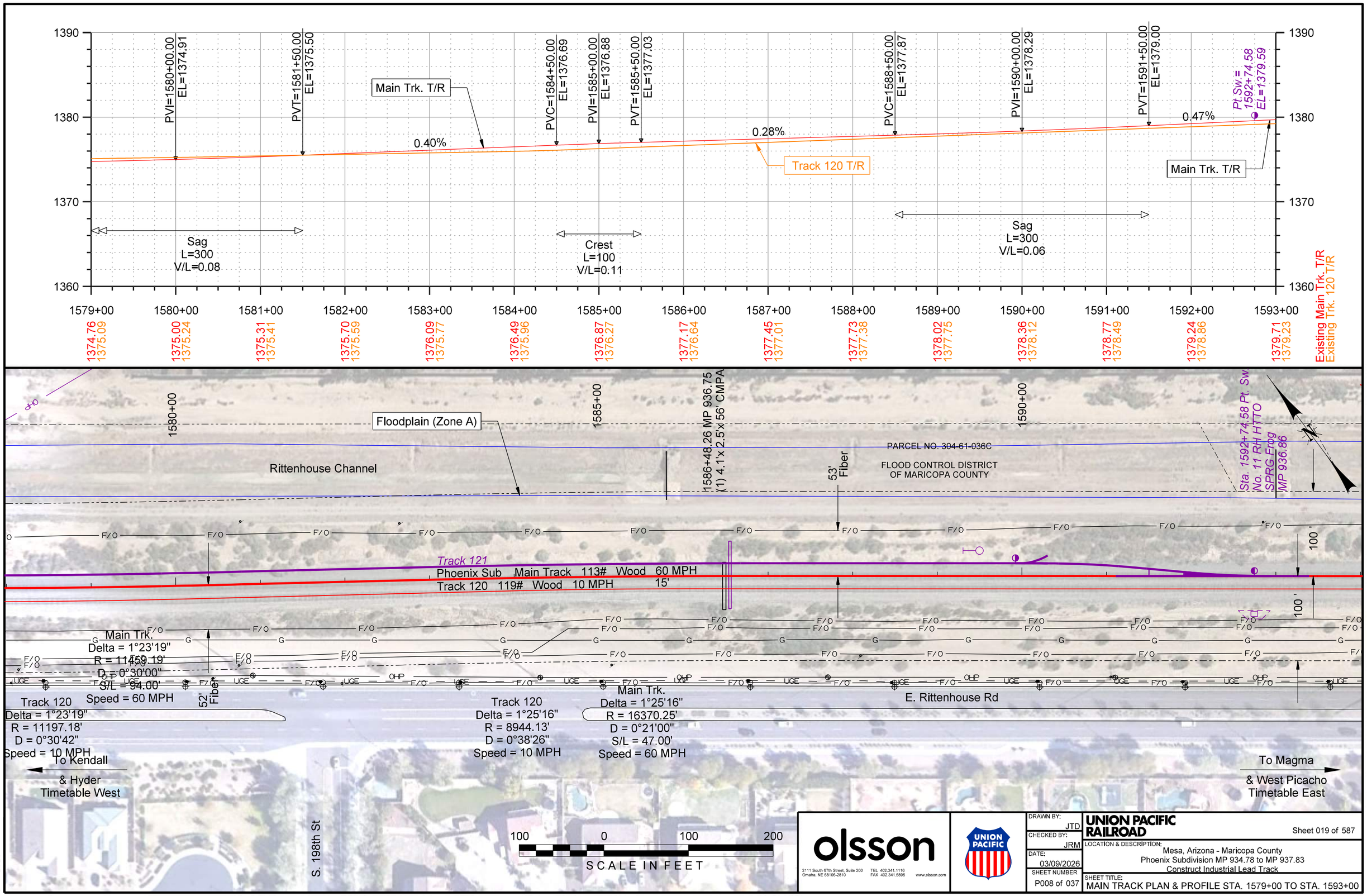
DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	P007 of 037

UNION PACIFIC RAILROAD Sheet 018 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
MAIN TRACK PLAN & PROFILE STA. 1565+00 TO STA. 1579+00

Color_table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\02_Plan - Profile\T_RPP07_ML_TRK_200927.dgn
Default
3/9/2026



olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

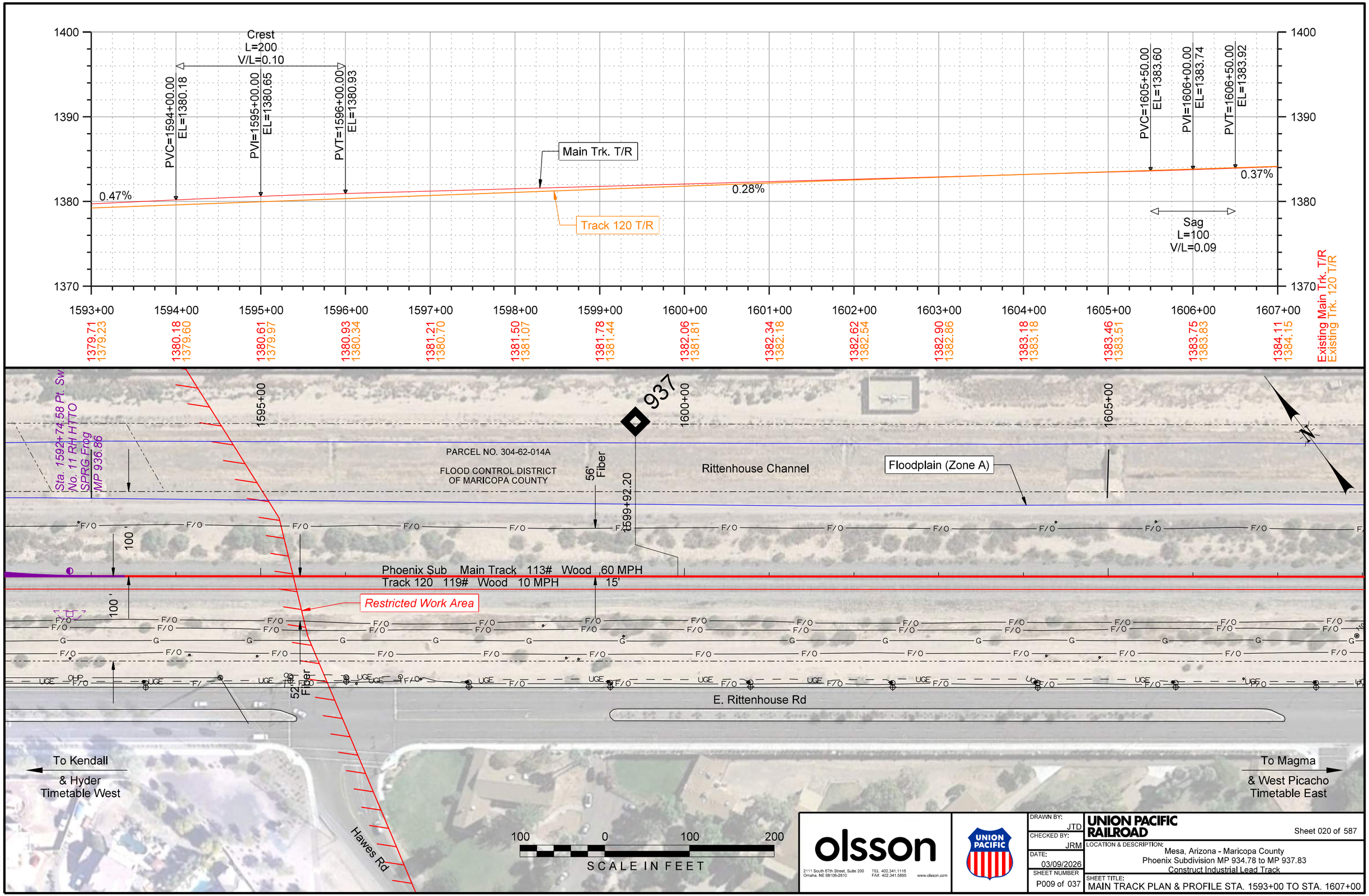
DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: P008 of 037

UNION PACIFIC RAILROAD
Sheet 019 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
MAIN TRACK PLAN & PROFILE STA. 1579+00 TO STA. 1593+00

Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\02_Plan - Profile\T_RPP08_ML_TRK_200927.dgn
Default
3/9/2026



olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

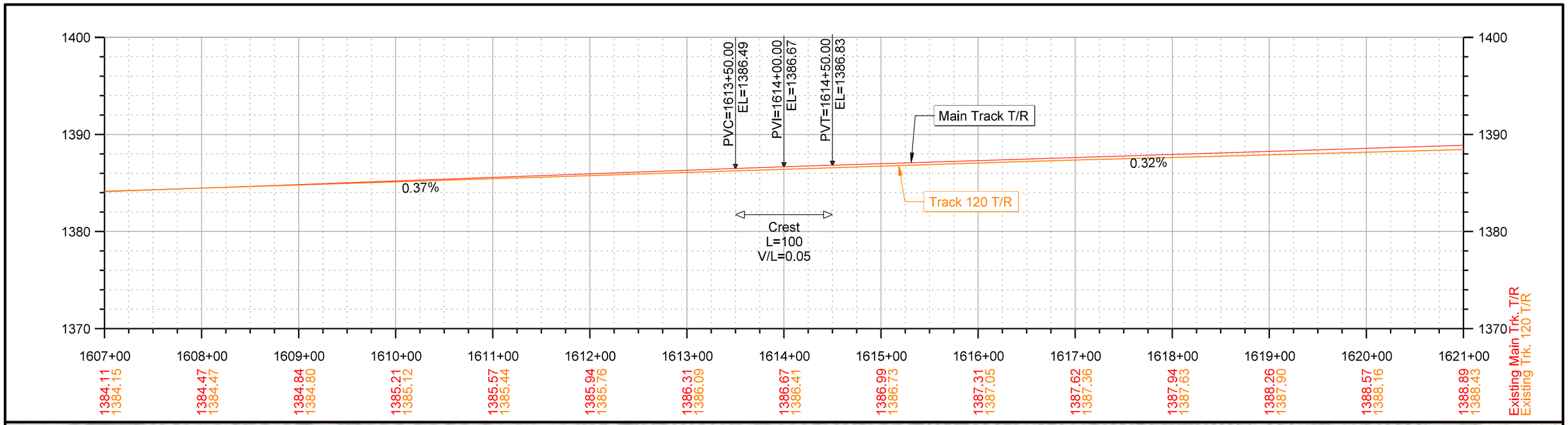
DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	P009 of 037

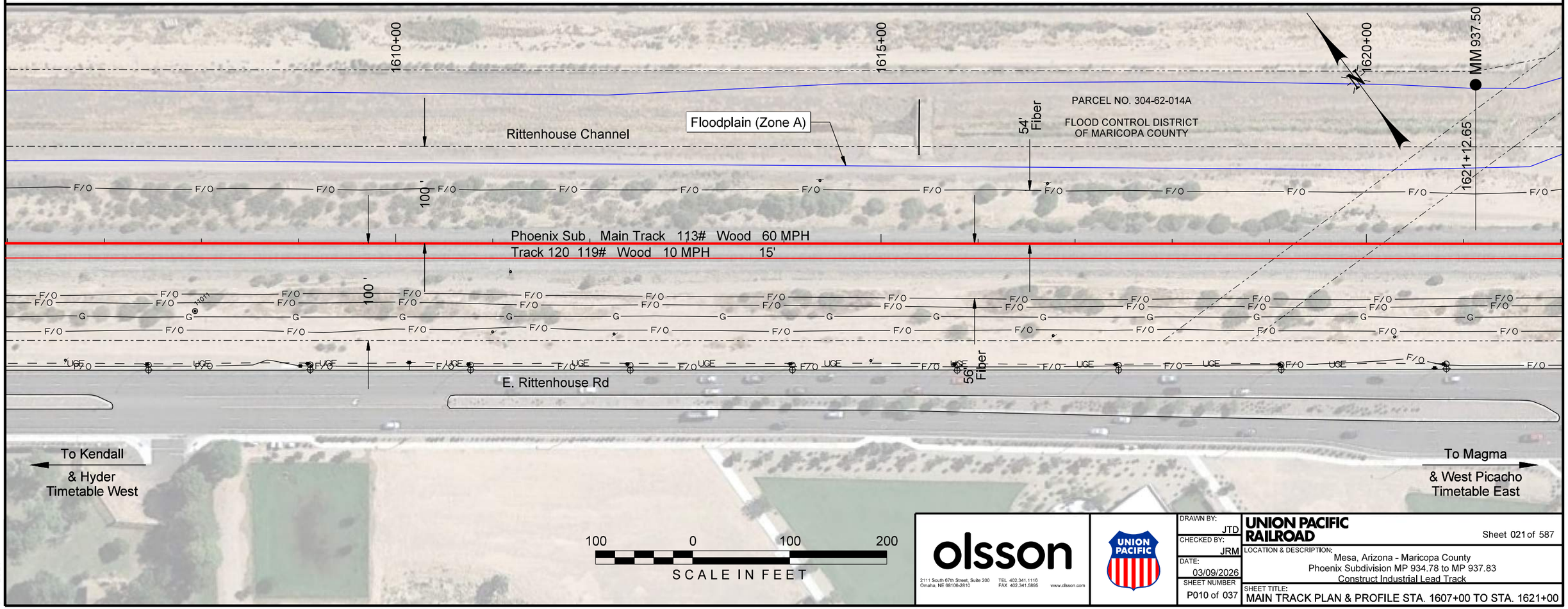
UNION PACIFIC RAILROAD — Sheet 020 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
MAIN TRACK PLAN & PROFILE STA. 1593+00 TO STA. 1607+00

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\02_Plan - Profile\T_RPP09_ML_TRK_200927.dgn
Default
3/9/2026





olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

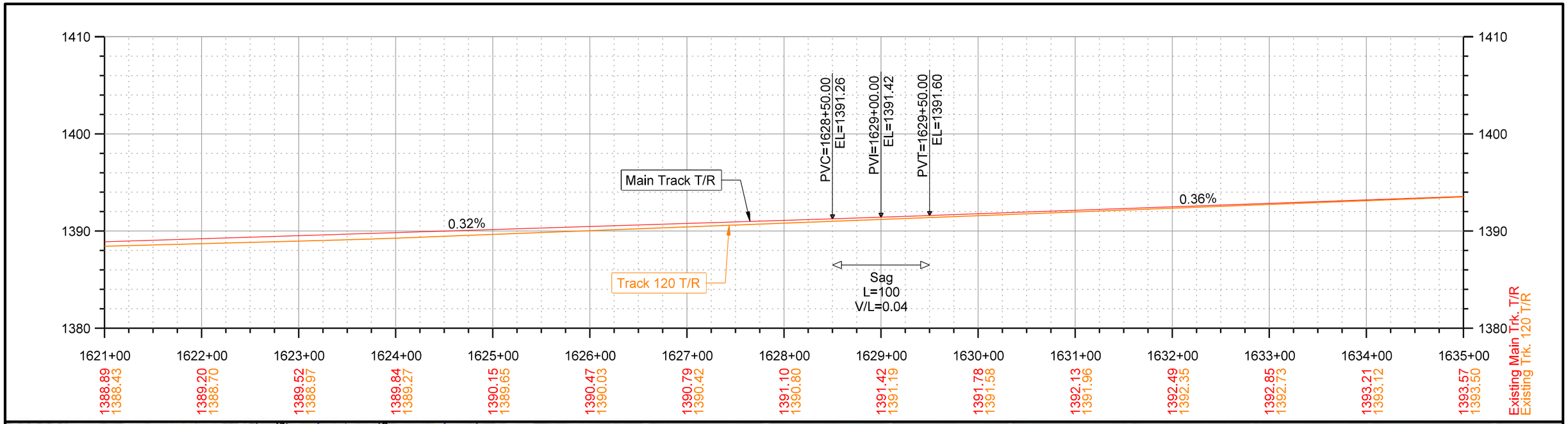
DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	P010 of 037

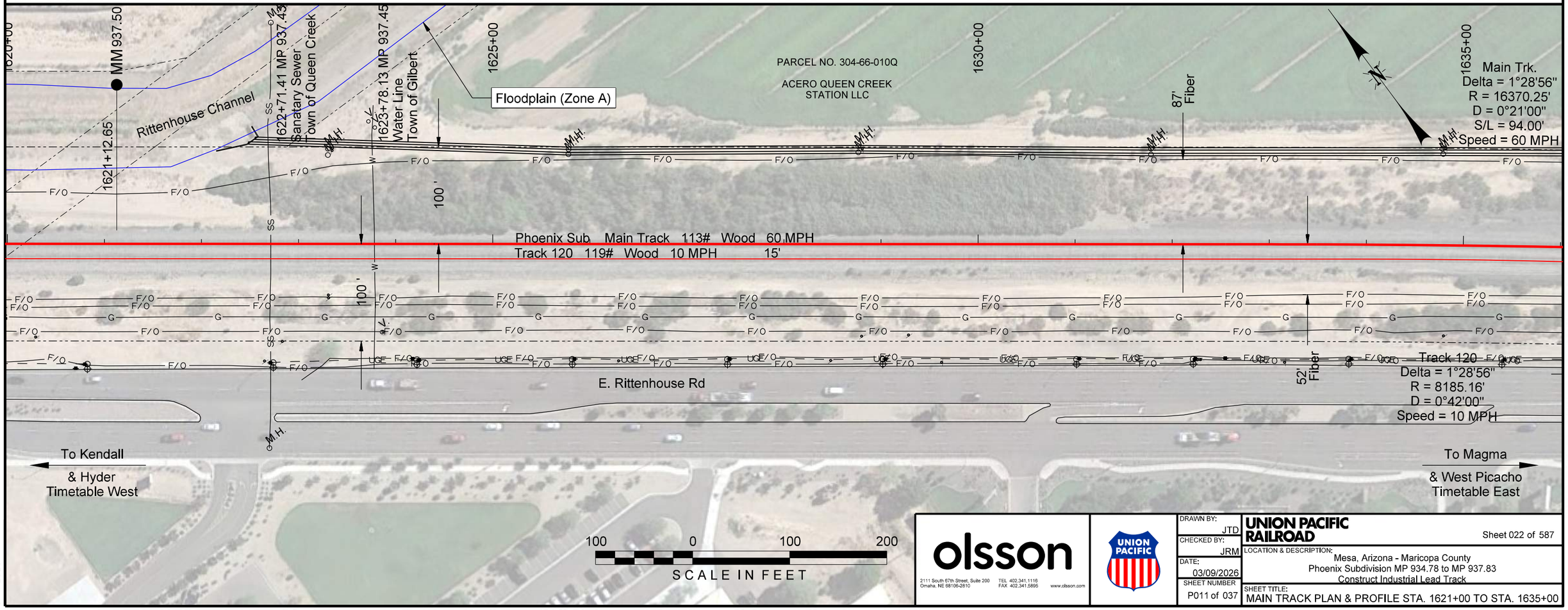
UNION PACIFIC RAILROAD — Sheet 021 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
MAIN TRACK PLAN & PROFILE STA. 1607+00 TO STA. 1621+00

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RL TK\Pentable_020-0927_RL TK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RL TK\DGN\Sheets\02_Plan - Profile\T_RPP10_ML TRK_200927.dgn
Default
3/9/2026





olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

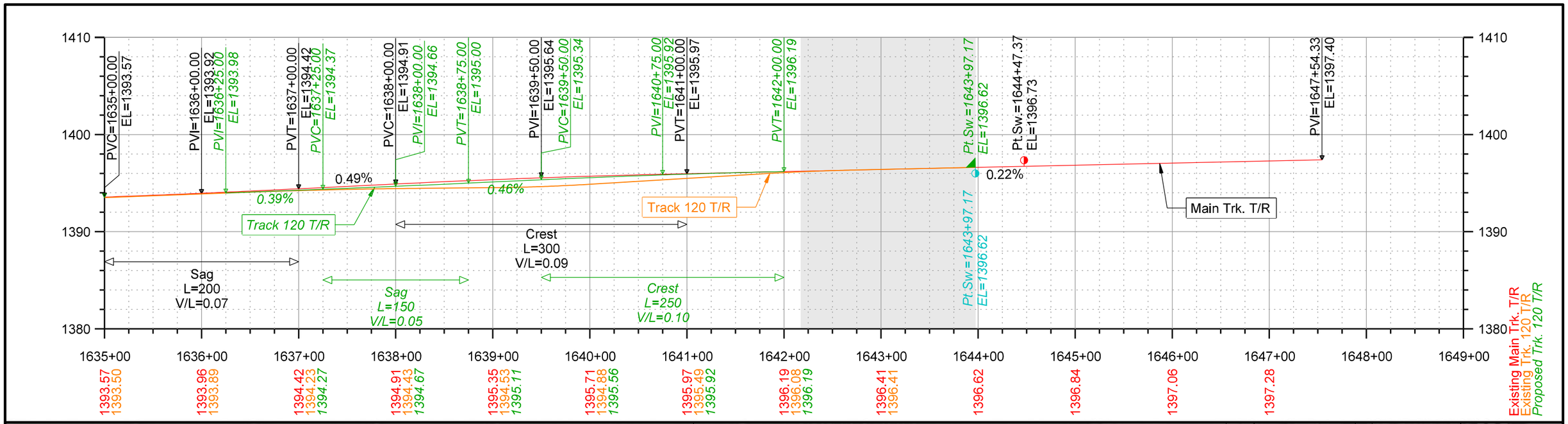
DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	P011 of 037

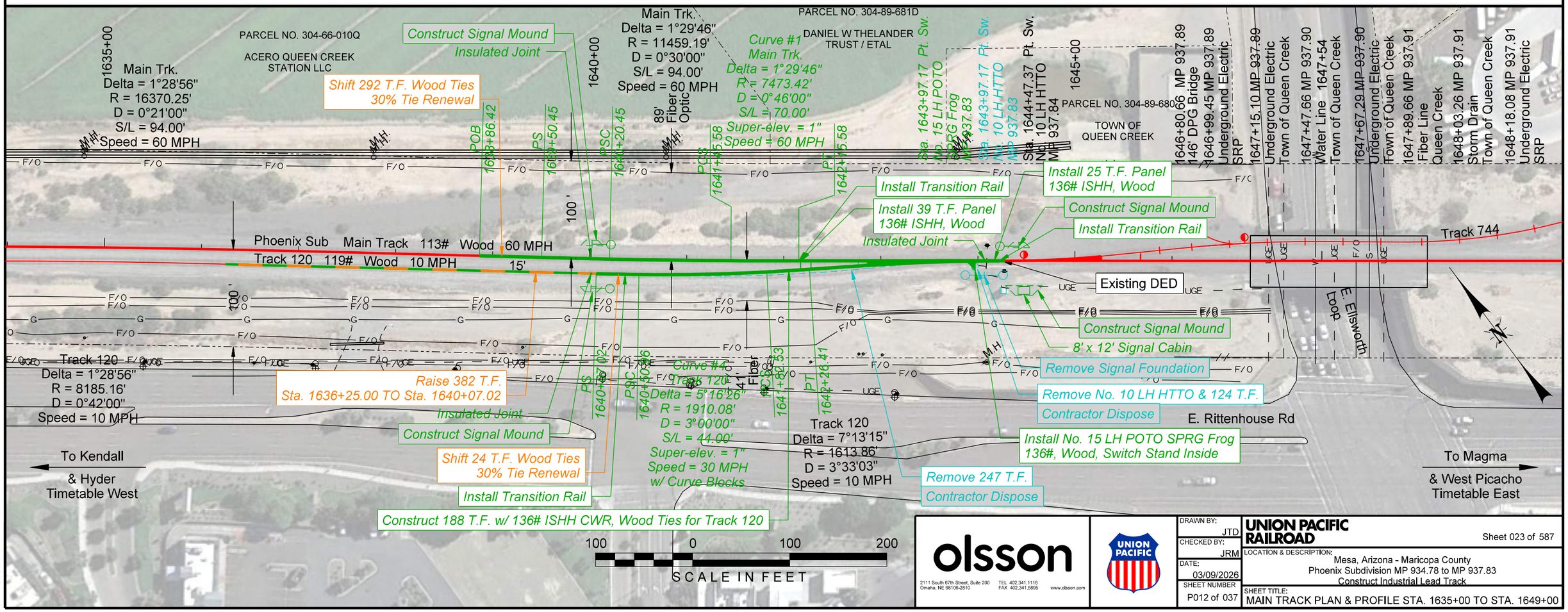
UNION PACIFIC RAILROAD Sheet 022 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
MAIN TRACK PLAN & PROFILE STA. 1621+00 TO STA. 1635+00

Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\02_Plan - Profile\T_RPP11_ML_TRK_200927.dgn
Default
3/9/2026





olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

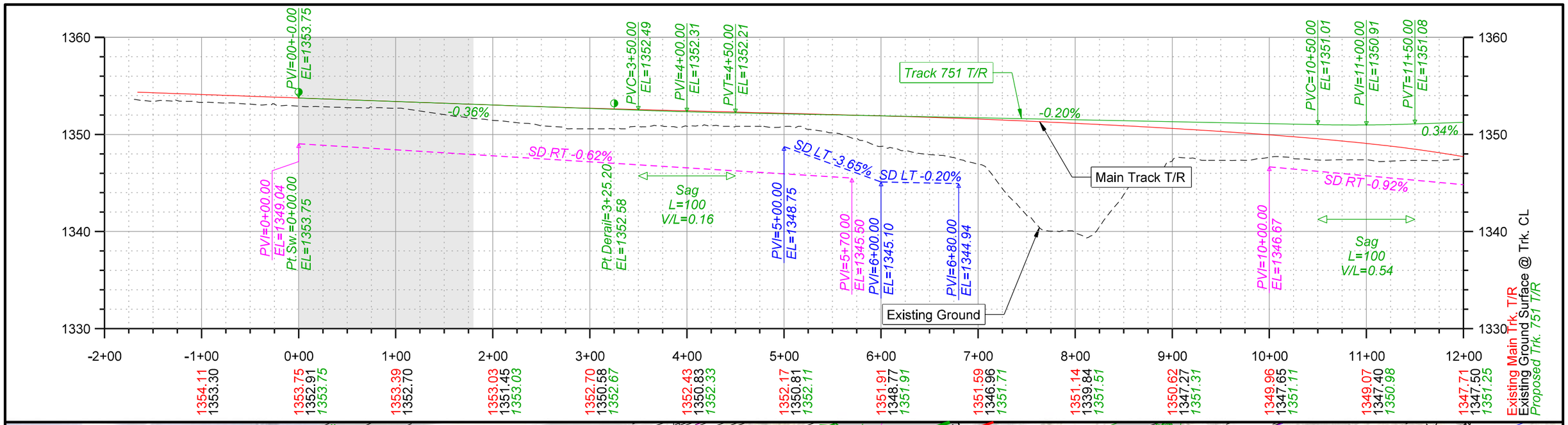
DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	P012 of 037

UNION PACIFIC RAILROAD Sheet 023 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
MAIN TRACK PLAN & PROFILE STA. 1635+00 TO STA. 1649+00

Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\05011-1000\020-0927.40-Design\Microstation\020-0927.RLTK\Pentable\020-0927.RLTK.tbl
F:\2020\05011-1000\020-0927.40-Design\Microstation\020-0927.RLTK\DGN\Sheets\02.Plan - Profile\T_
Default
3/9/2026



olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

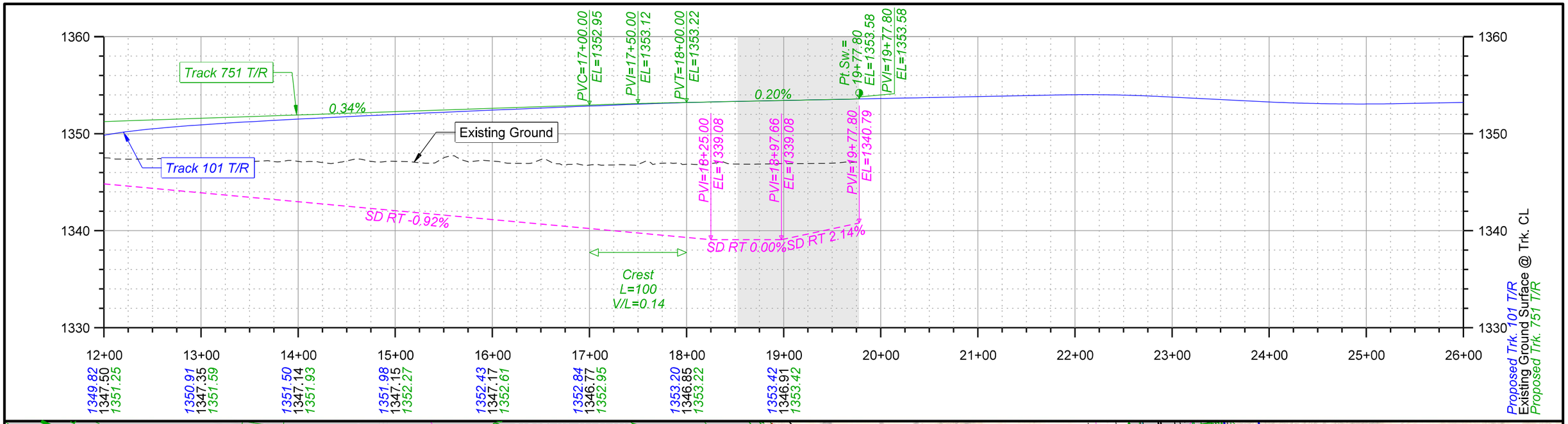
DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	P013 of 037

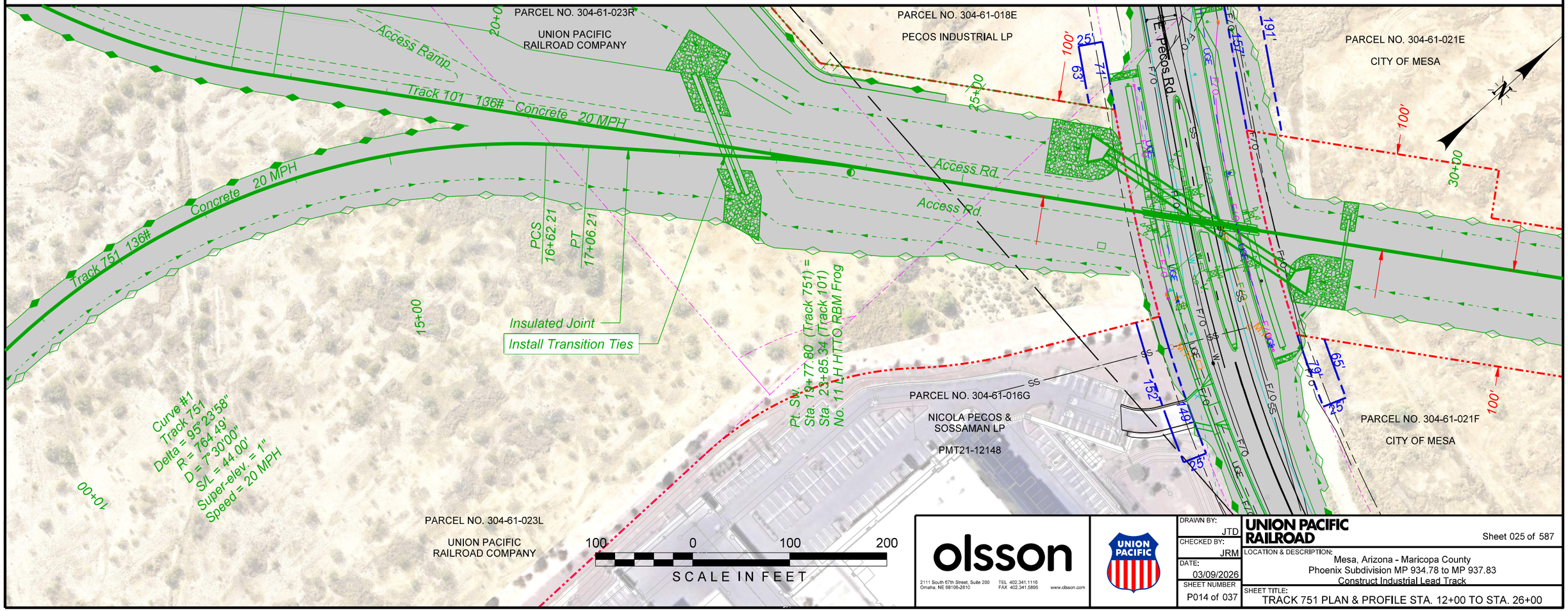
UNION PACIFIC RAILROAD — Sheet 024 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 751 PLAN & PROFILE STA. -2+00 TO STA. 12+00

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable_020-0927_RL_TK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\02_Plan - Profile\T_RPP13_PIRATE Lead_200927.dgn
Default
3/9/2026





olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

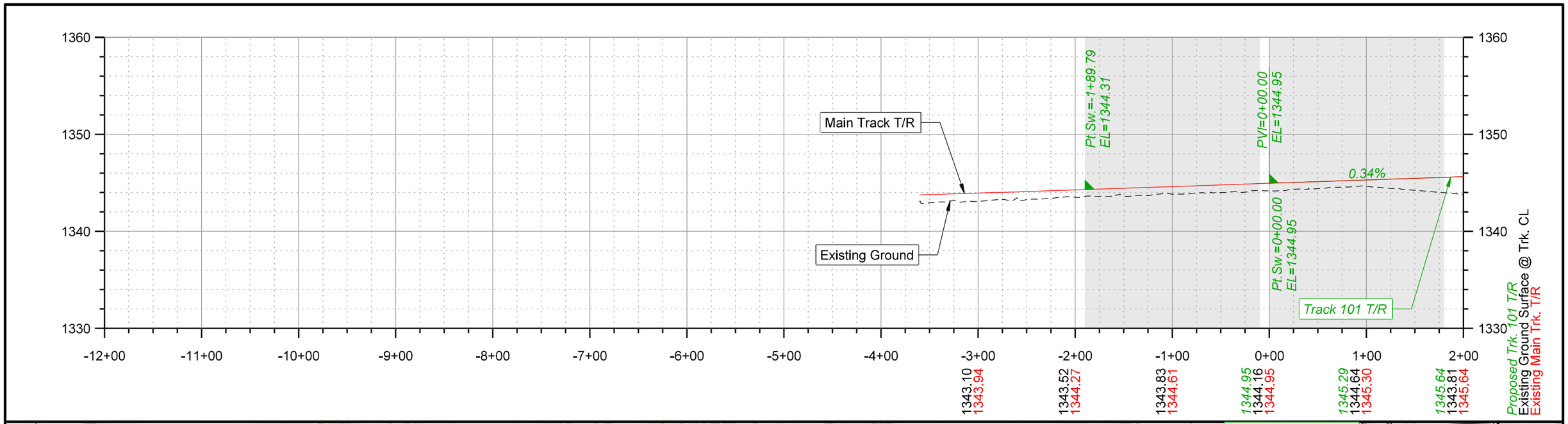
DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	P014 of 037

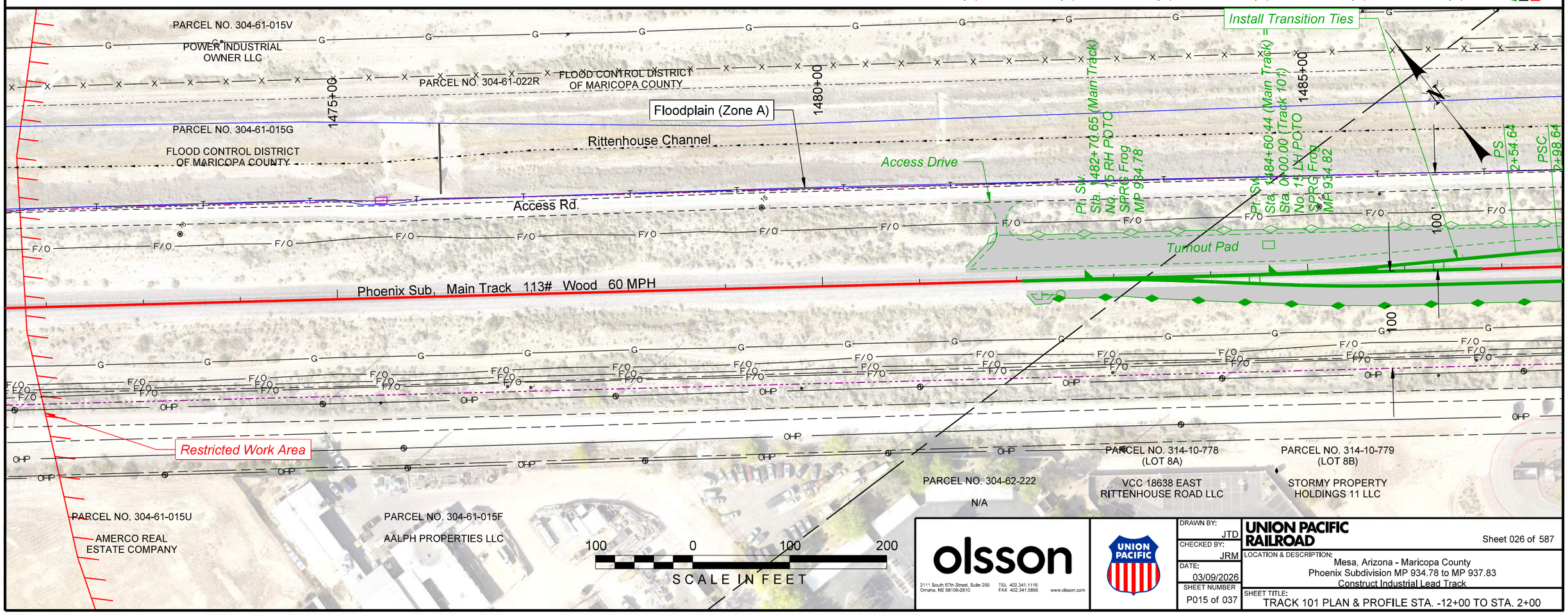
UNION PACIFIC RAILROAD — Sheet 025 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 751 PLAN & PROFILE STA. 12+00 TO STA. 26+00

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\02_Plan - Profile\T_RPP14_PIRATE Lead_200927.dgn
Default
3/9/2026





olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

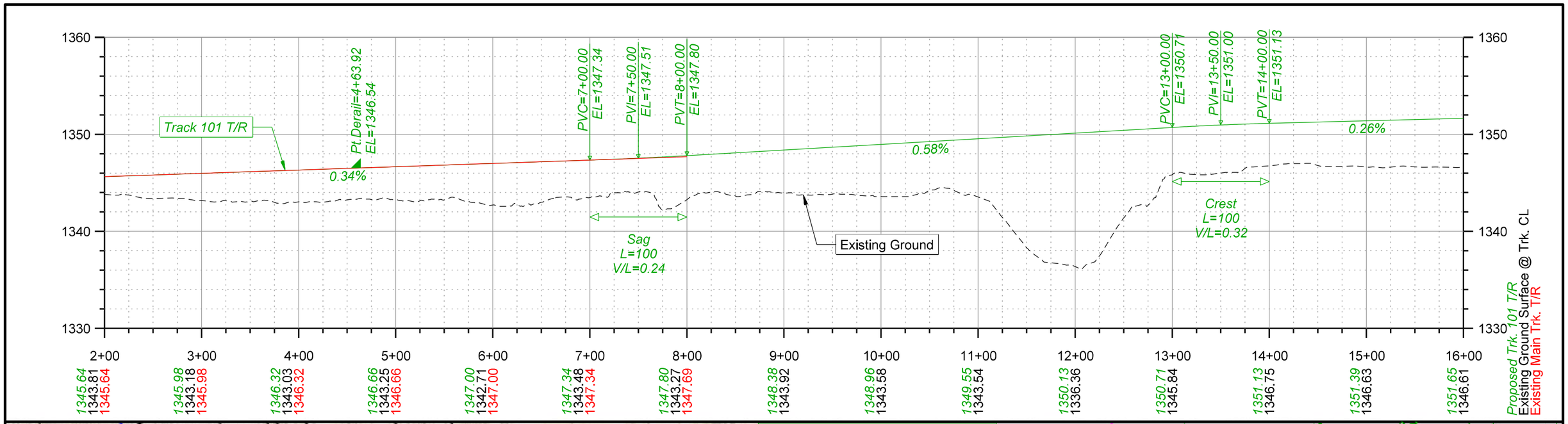
DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	P015 of 037

UNION PACIFIC RAILROAD Sheet 026 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 PLAN & PROFILE STA. -12+00 TO STA. 2+00

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\02_Plan - Profile\T_RPP15_PIRATE Lead_200927.dgn
Default
3/9/2026



olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

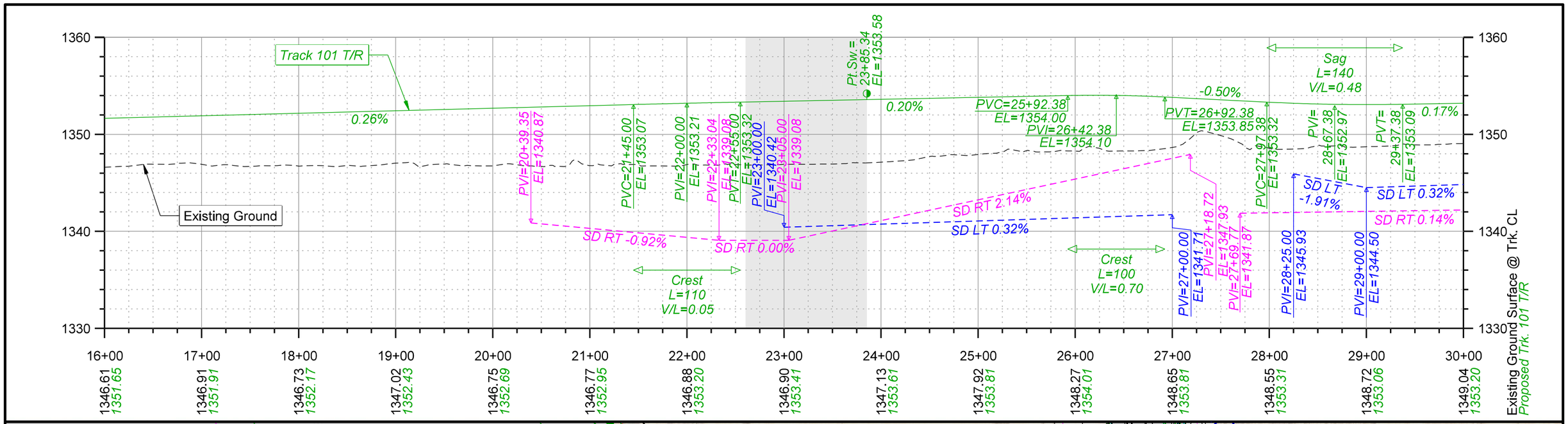
DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: P016 of 037

UNION PACIFIC RAILROAD Sheet 027 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 PLAN & PROFILE STA. 2+00 TO STA. 16+00

Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\02_Plan - Profile\T_RPP16_PIRATE Default
3/9/2026



olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

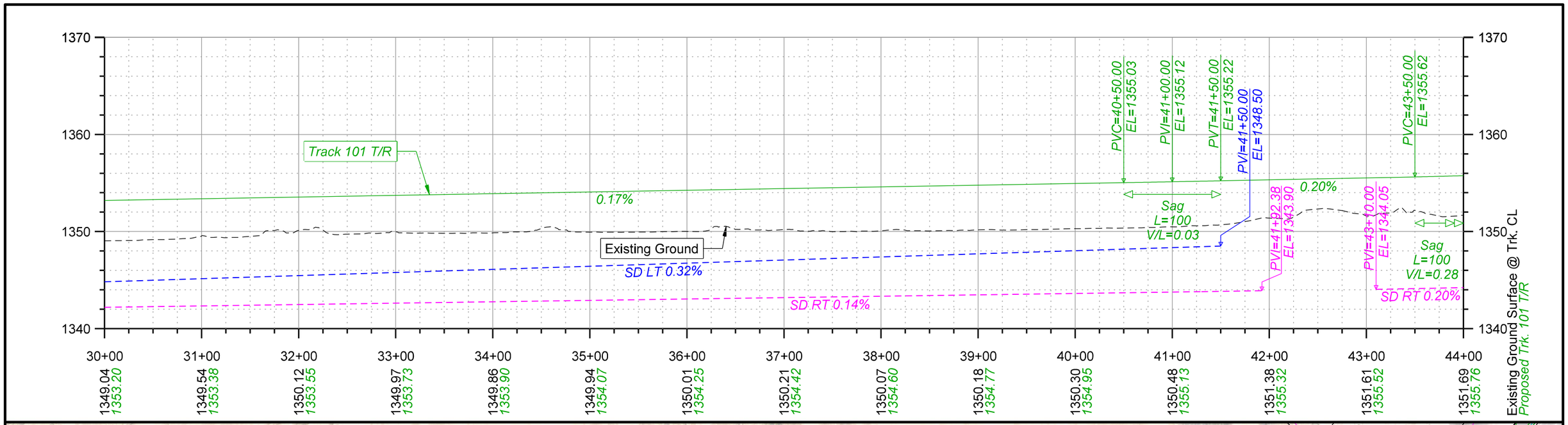
DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	P017 of 037

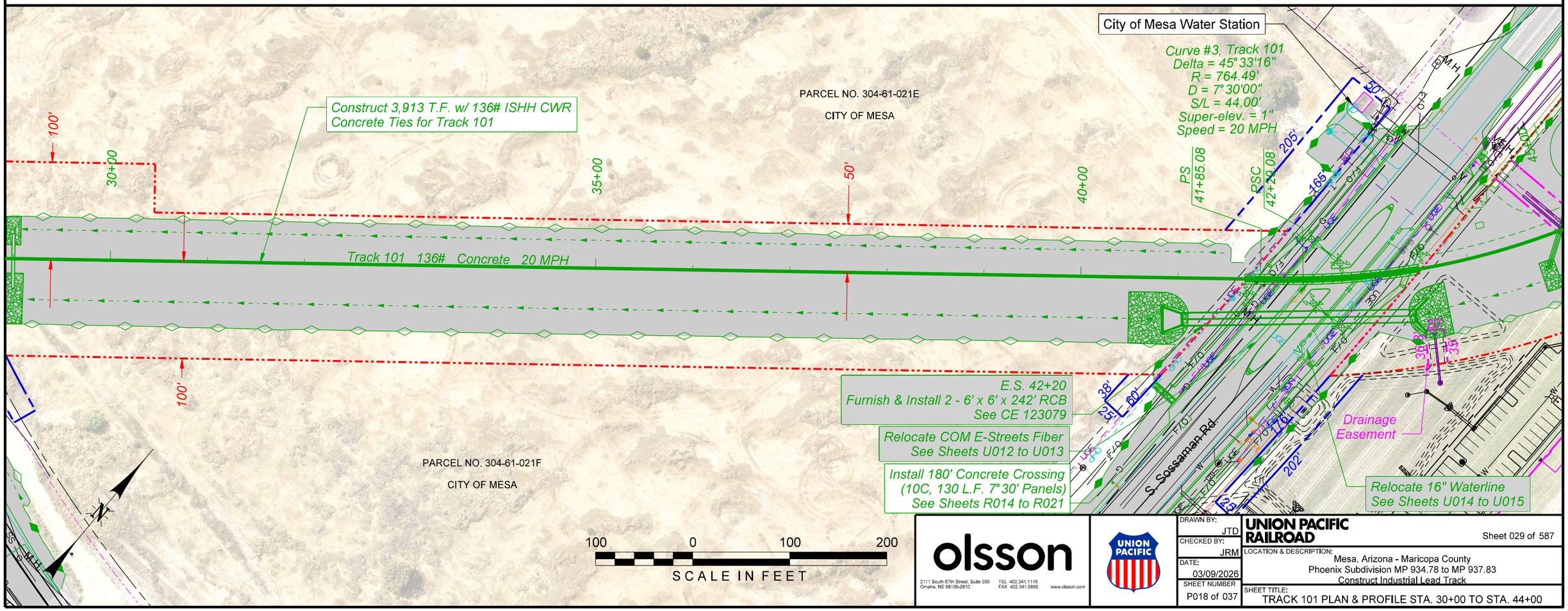
UNION PACIFIC RAILROAD — Sheet 028 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 PLAN & PROFILE STA. 16+00 TO STA. 30+00

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\02_Plan - Profile\T_RPP17_PIRATE Lead_200927.dgn
Default
3/9/2026





olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

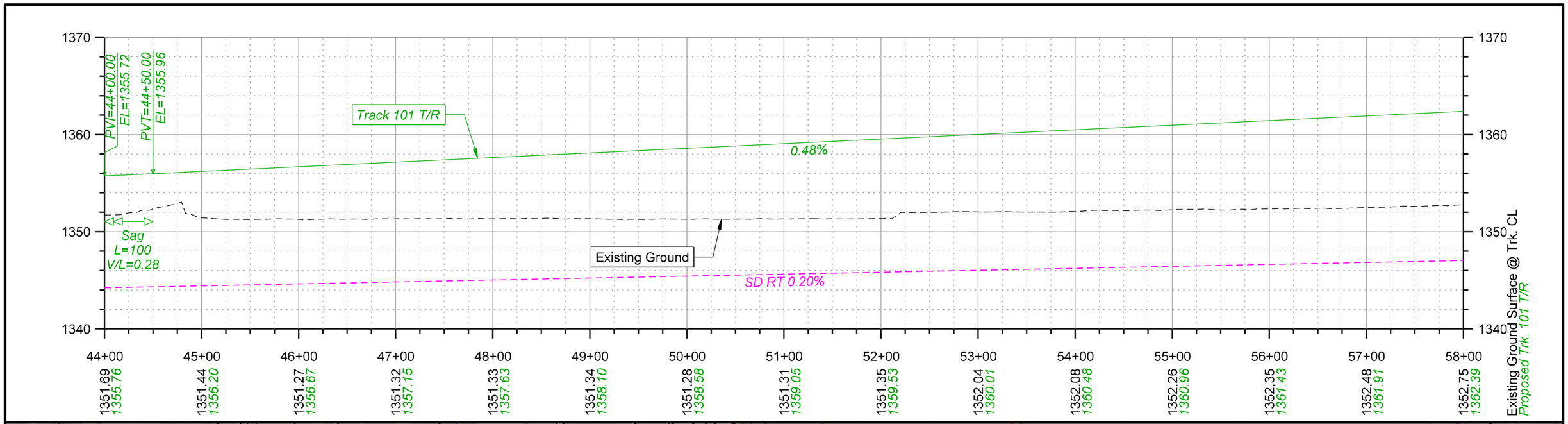
DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	P018 of 037

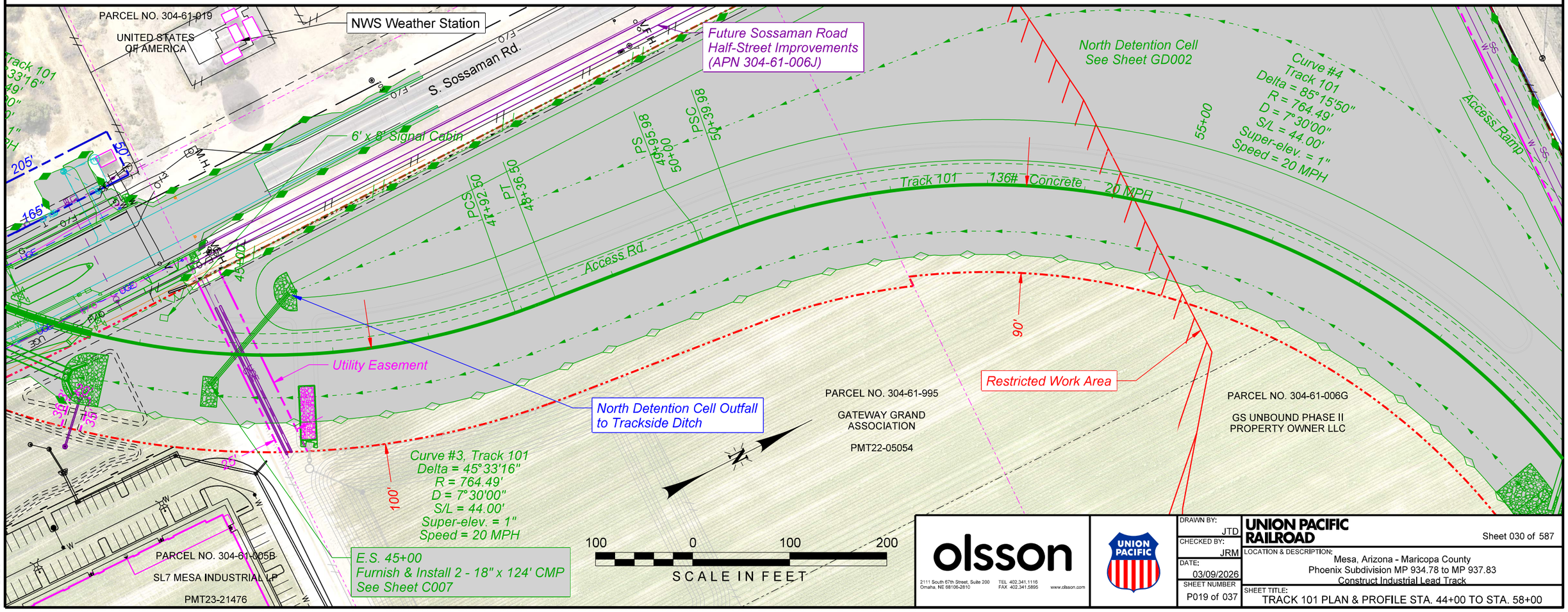
UNION PACIFIC RAILROAD Sheet 029 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 PLAN & PROFILE STA. 30+00 TO STA. 44+00

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable_020-0927_RL_TK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\02_Plan - Profile\T_RPP18_PIRATE Lead_200927.dgn
Default
3/9/2026





olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

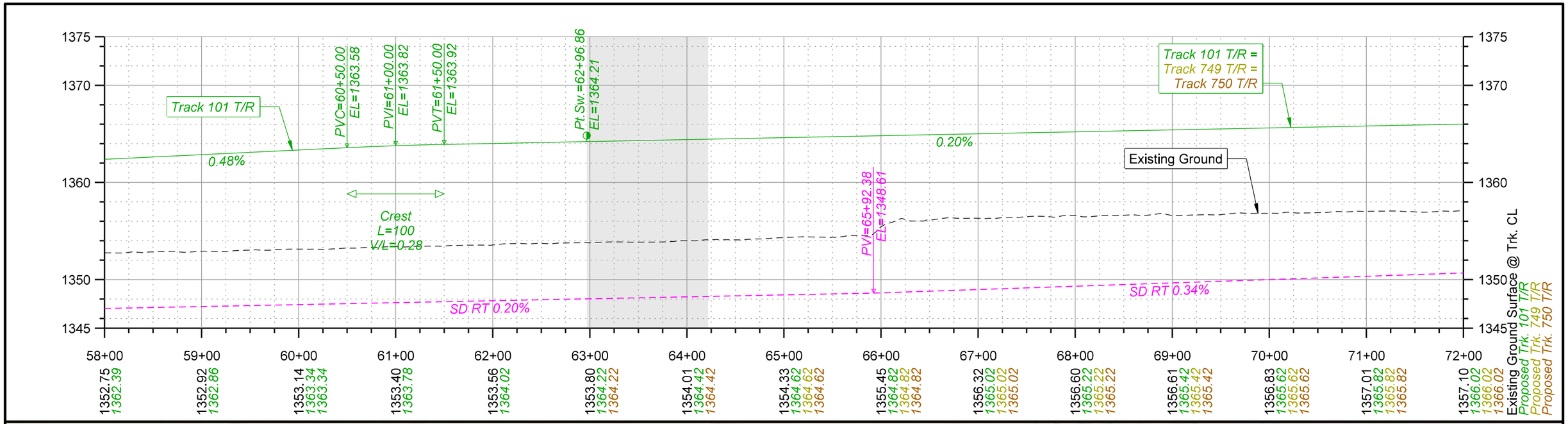
DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	P019 of 037

UNION PACIFIC RAILROAD — Sheet 030 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 PLAN & PROFILE STA. 44+00 TO STA. 58+00

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\02_Plan - Profile\T_RPP19_PIRATE Lead_200927.dgn
Default
3/9/2026



olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

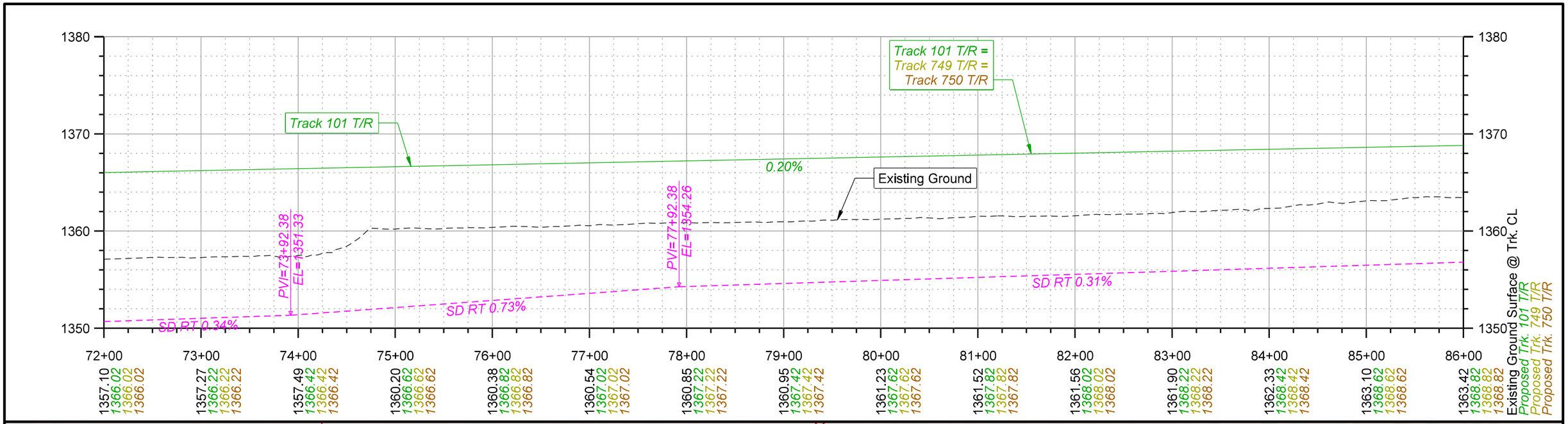
DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	P020 of 037

UNION PACIFIC RAILROAD Sheet 031 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 PLAN & PROFILE STA. 58+00 TO STA. 72+00

Color tables:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\02_Plan - Profile\T_RPP20_PIRATE Lead_200927.dgn
Default
3/9/2026



olsson

2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

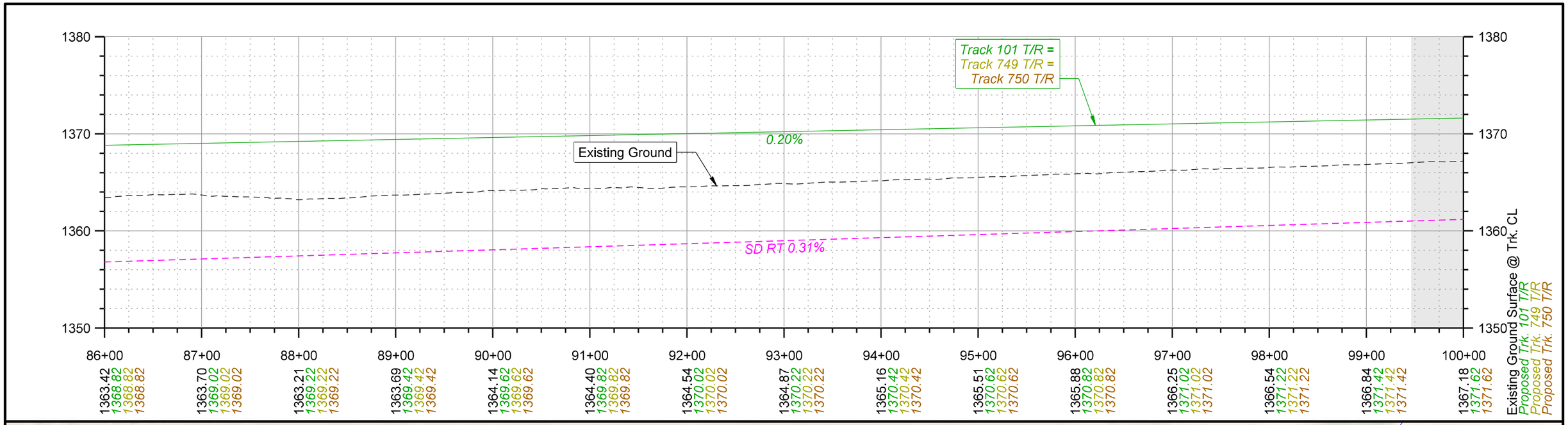
DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	P021 of 037

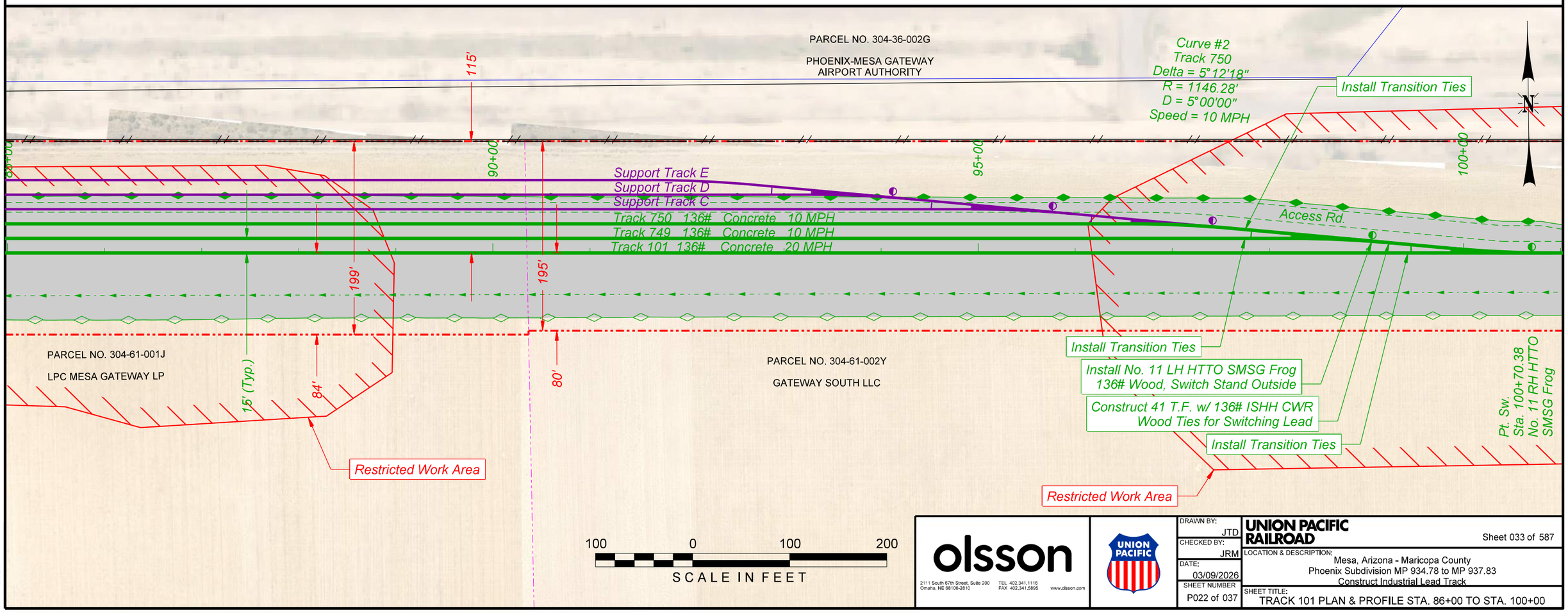
UNION PACIFIC RAILROAD Sheet 032 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 PLAN & PROFILE STA. 72+00 TO STA. 86+00

Color_table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\02_Plan - Profile\T_
Default
3/9/2026





olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

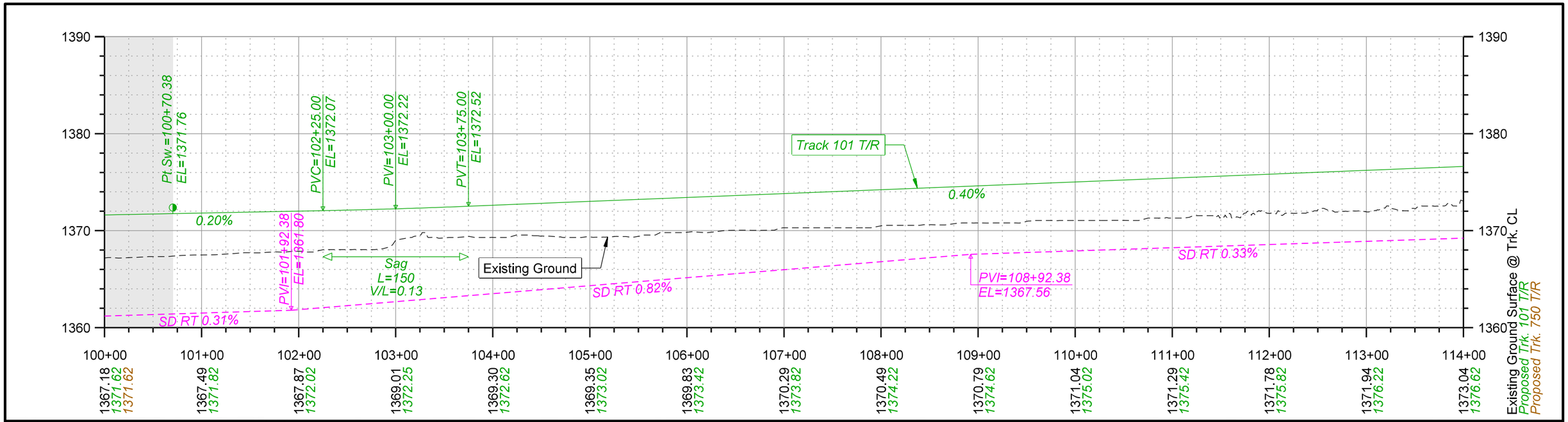
DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	P022 of 037

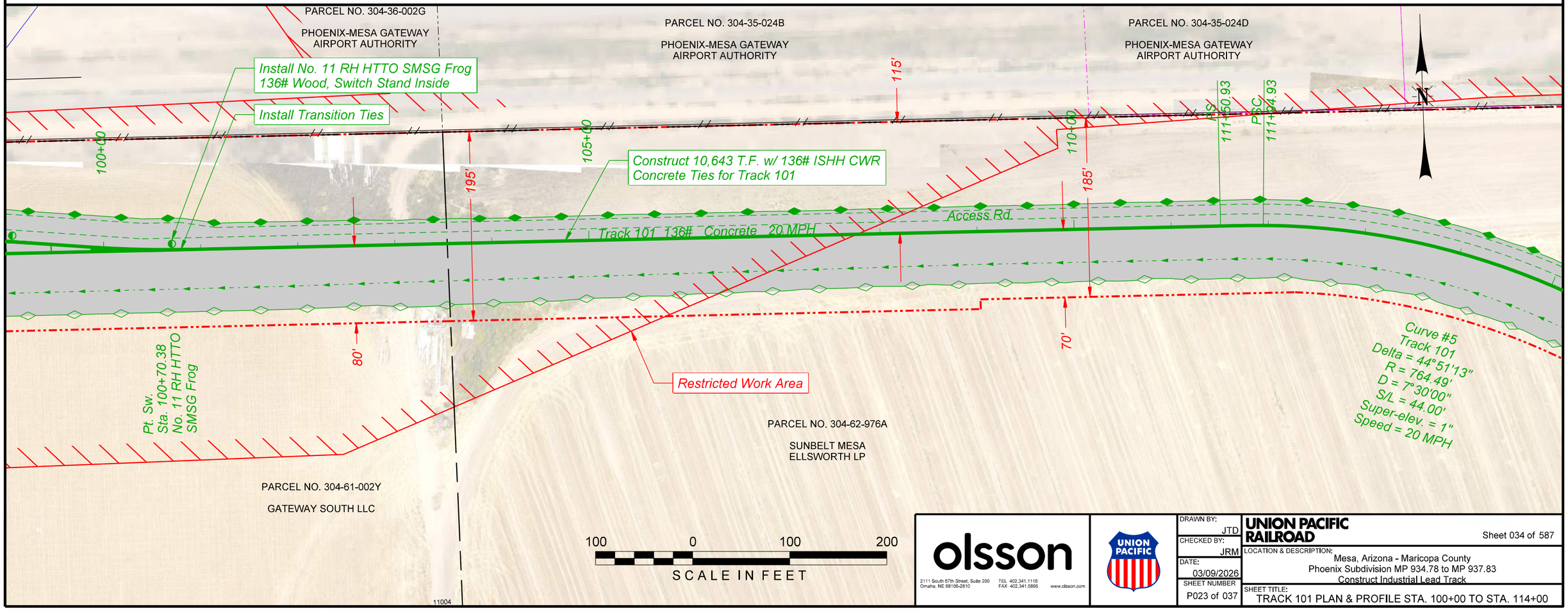
UNION PACIFIC RAILROAD Sheet 033 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 PLAN & PROFILE STA. 86+00 TO STA. 100+00

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\02_Plan - Profile\T_RPP22_PIRATE Lead_200927.dgn
Default
3/9/2026





olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	P023 of 037

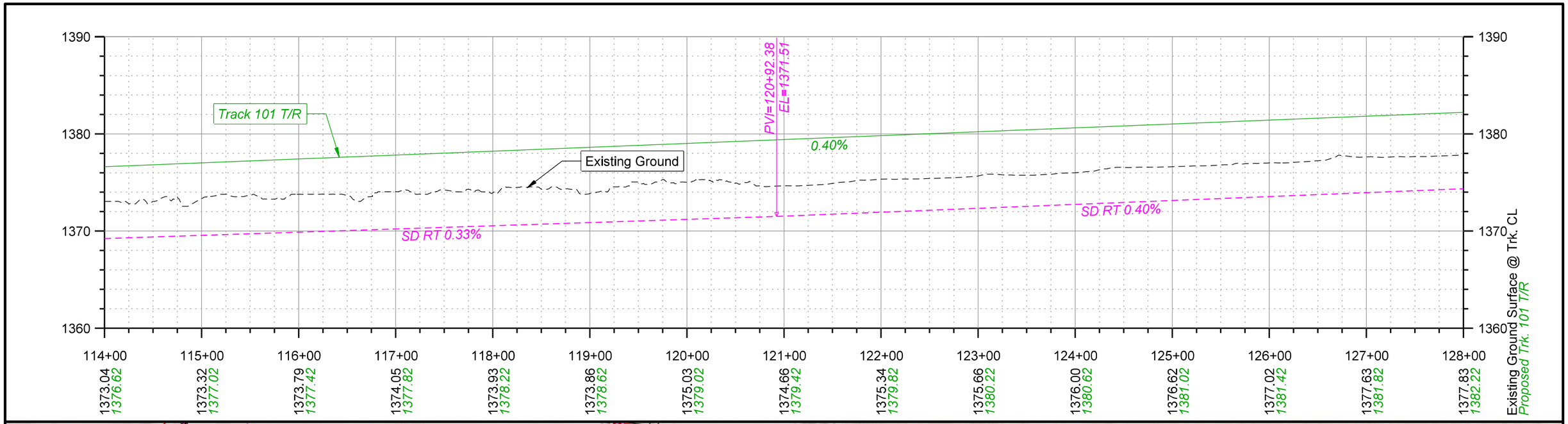
UNION PACIFIC RAILROAD

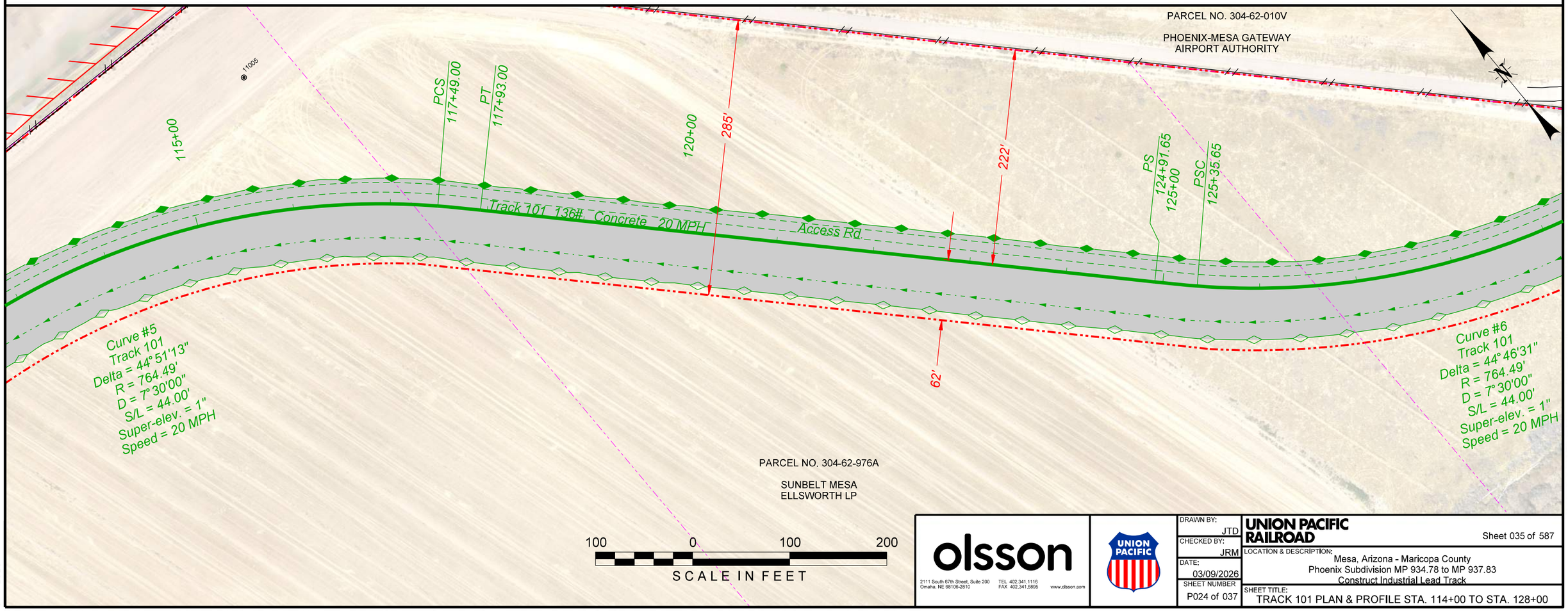
Sheet 034 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 PLAN & PROFILE STA. 100+00 TO STA. 114+00

Color_table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\02_Plan - Profile\T_RPP23_PIRATE Lead_200927.dgn
Default
3/9/2026





olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

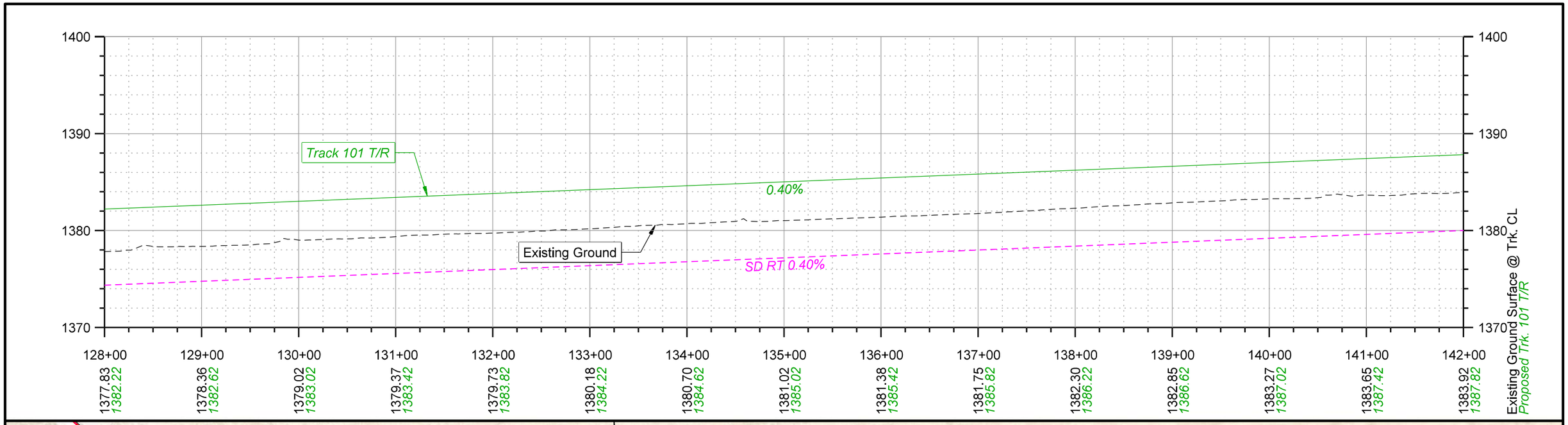
DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	P024 of 037

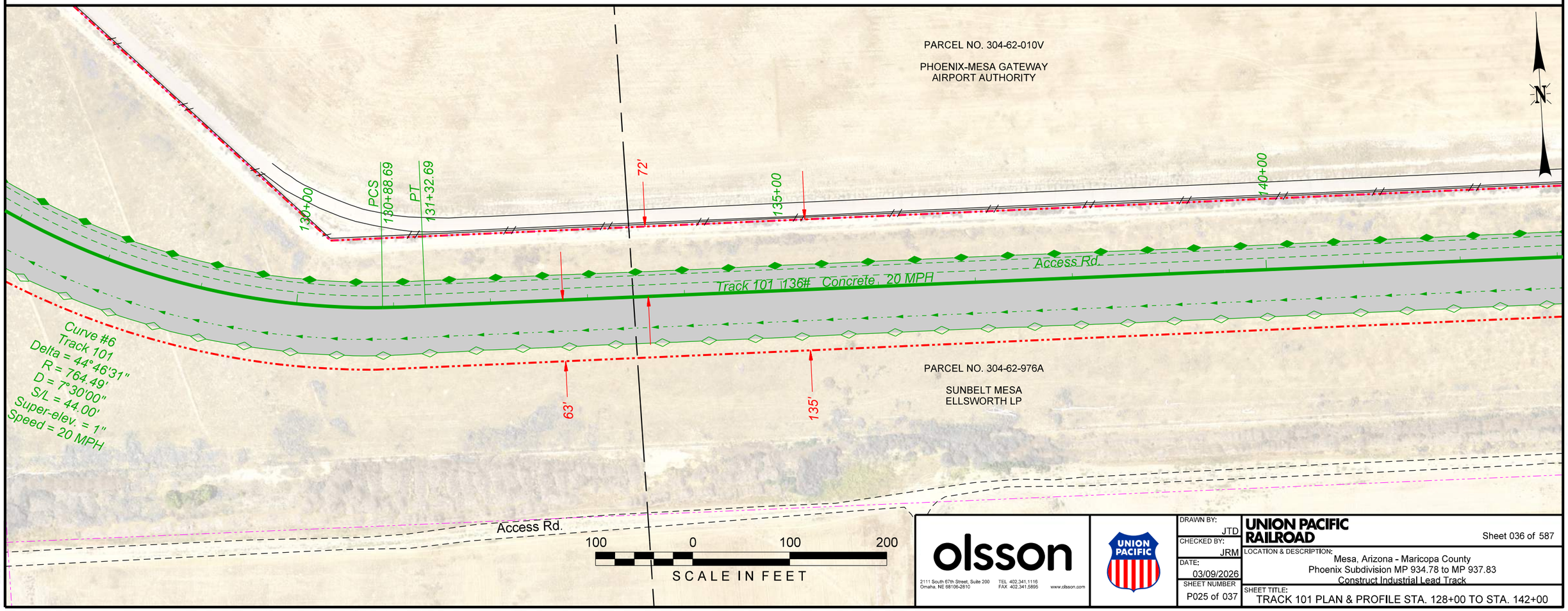
UNION PACIFIC RAILROAD Sheet 035 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 PLAN & PROFILE STA. 114+00 TO STA. 128+00

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\02_Plan - Profile\T_RPP24_PIRATE Lead_200927.dgn
Default
3/9/2026





olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

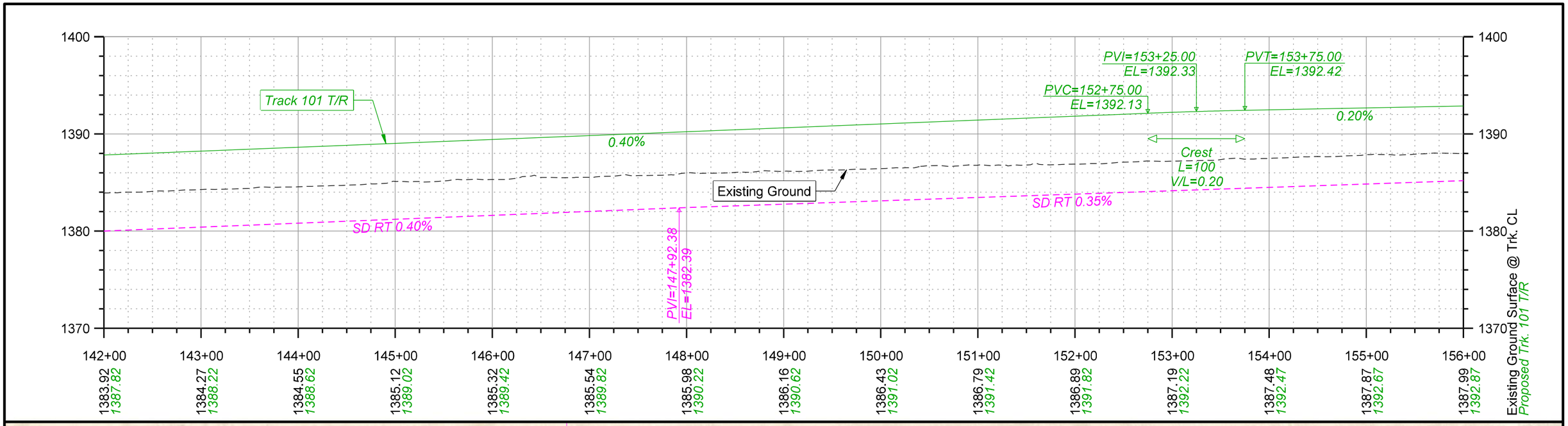
DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	P025 of 037

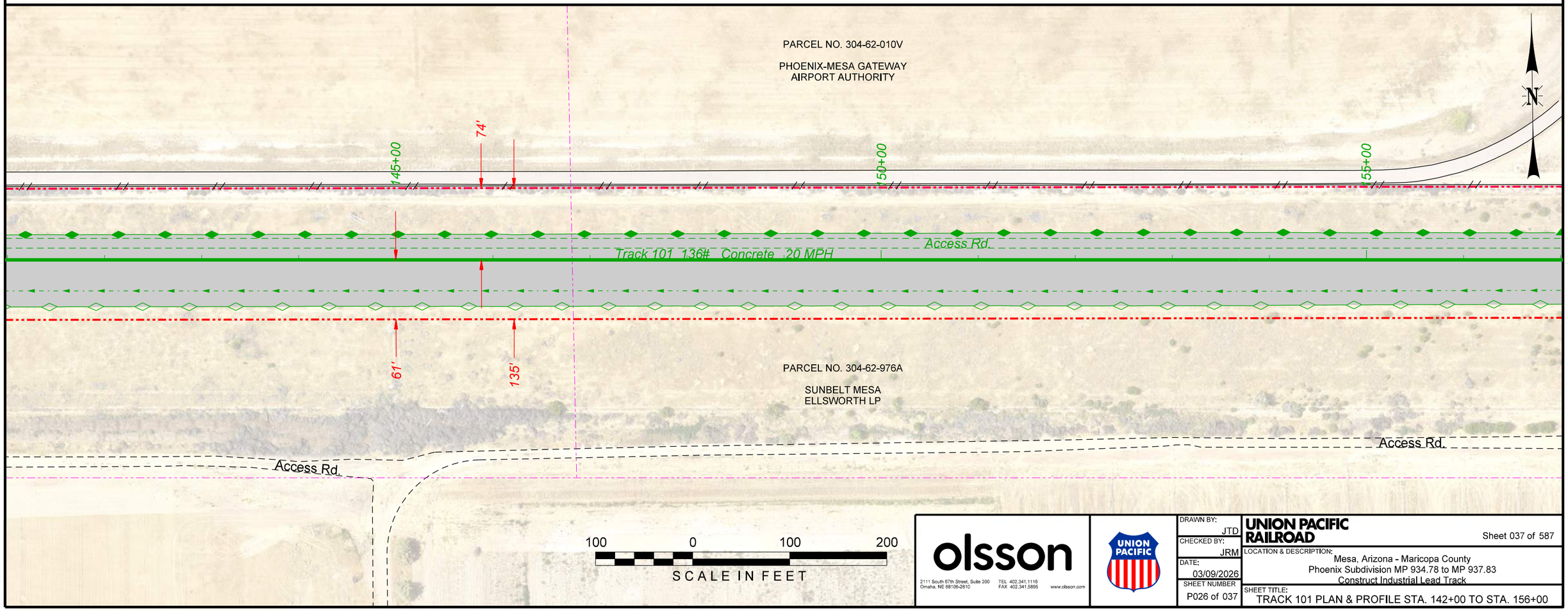
UNION PACIFIC RAILROAD Sheet 036 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 PLAN & PROFILE STA. 128+00 TO STA. 142+00

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\02_Plan - Profile\T_RPP25_PIRATE Lead_200927.dgn
Default
3/9/2026





olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

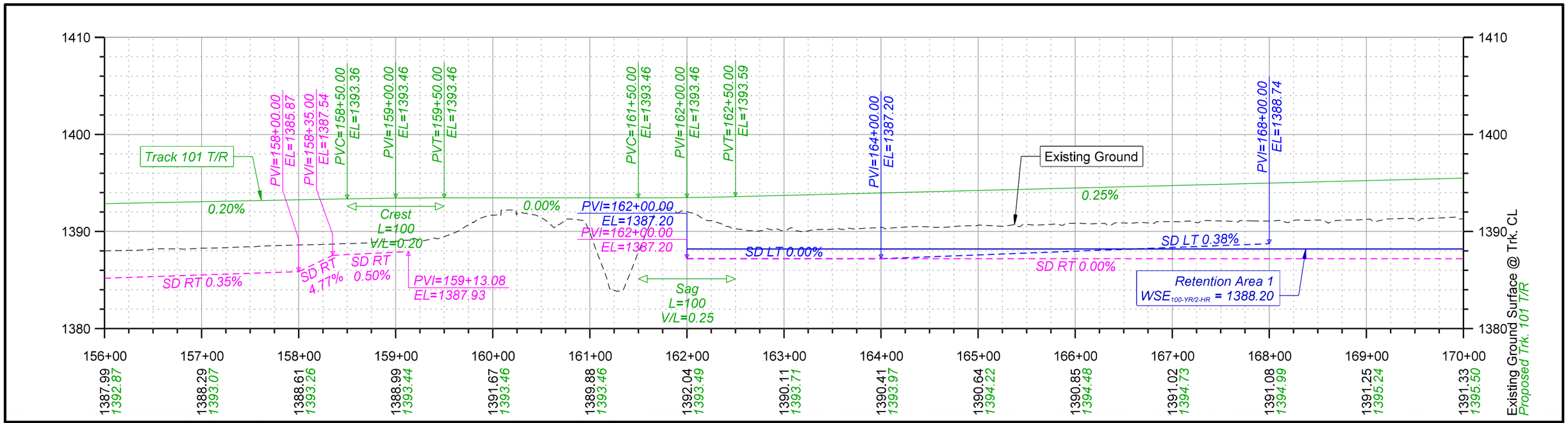
DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	P026 of 037

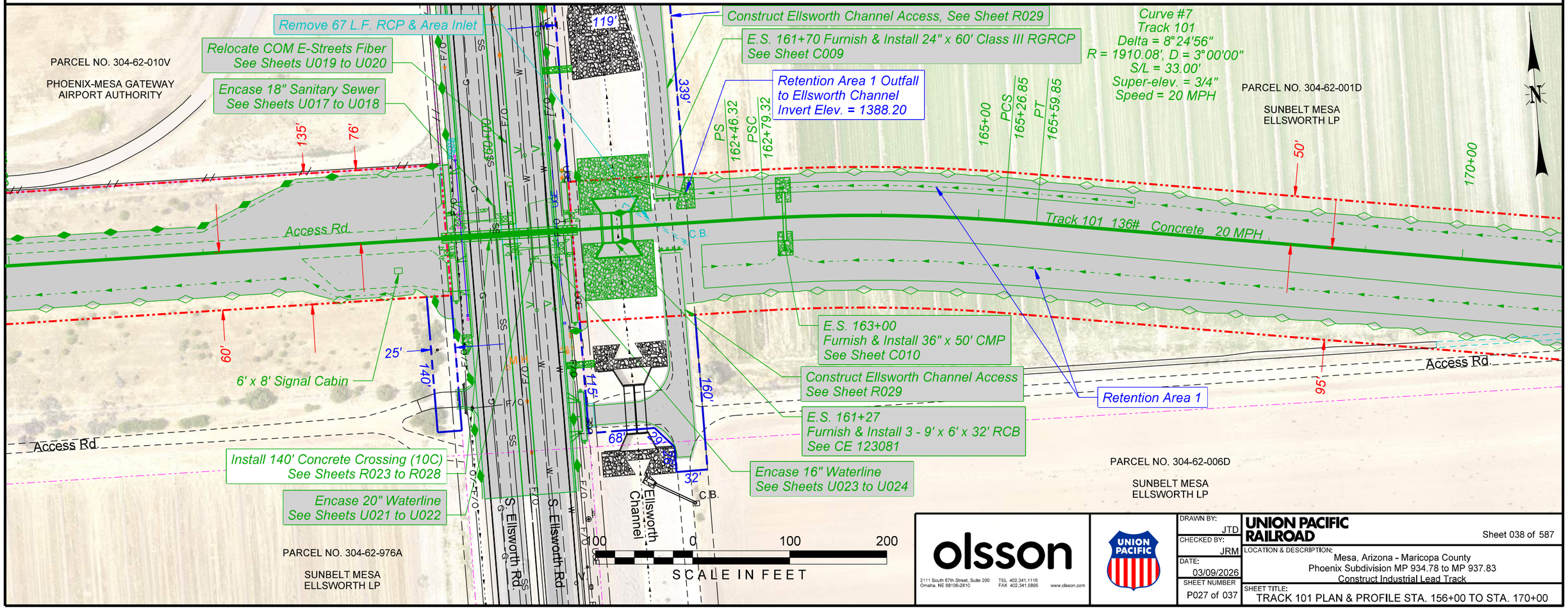
UNION PACIFIC RAILROAD Sheet 037 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 PLAN & PROFILE STA. 142+00 TO STA. 156+00

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\02_Plan - Profile\T_RPP26_PIRATE Lead_200927.dgn
Default
3/9/2026





olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

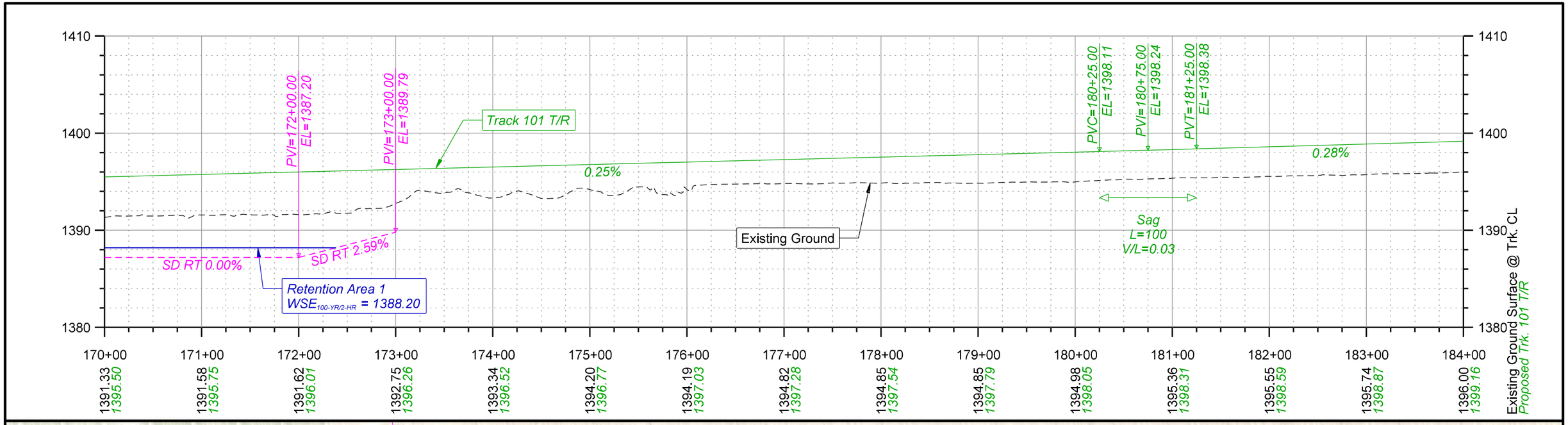
DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	P027 of 037

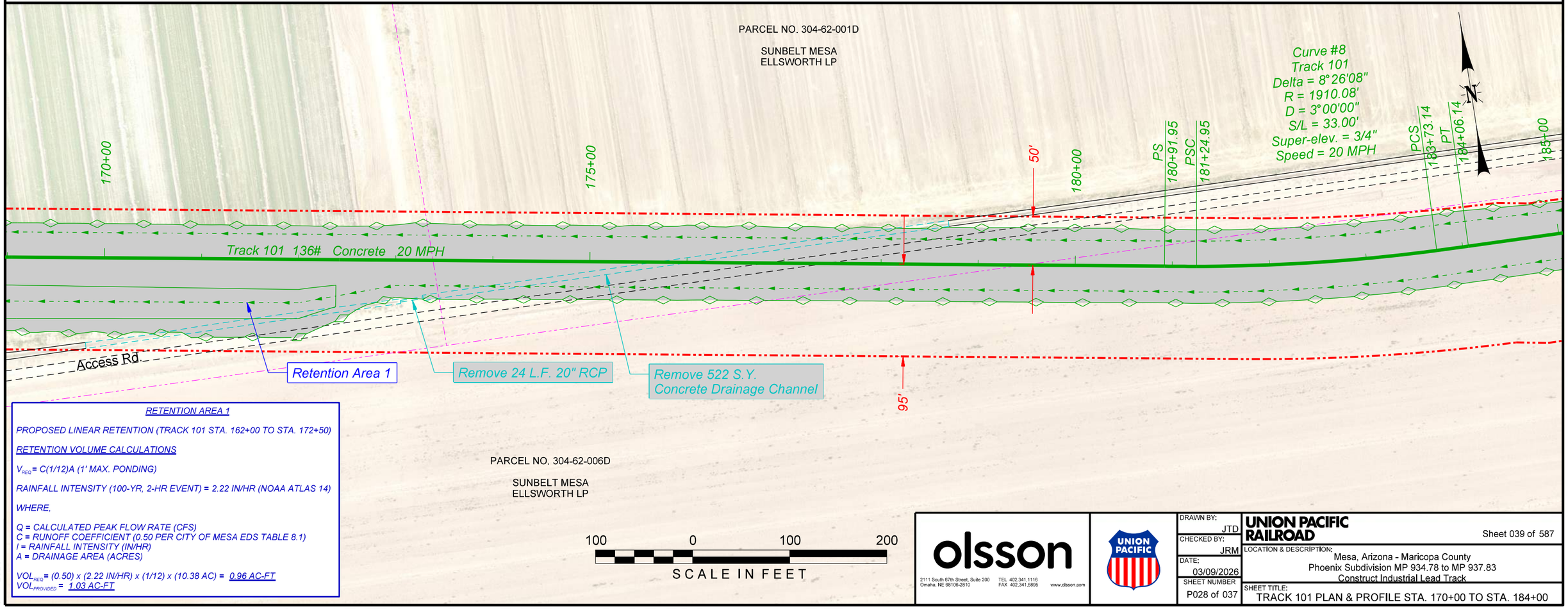
UNION PACIFIC RAILROAD — Sheet 038 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 PLAN & PROFILE STA. 156+00 TO STA. 170+00

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\02_Plan - Profile\T_RPP27_PIRATE Lead_200927.dgn
Default
3/9/2026





RETENTION AREA 1

PROPOSED LINEAR RETENTION (TRACK 101 STA. 162+00 TO STA. 172+50)

RETENTION VOLUME CALCULATIONS

V_{REQ} = C(1/12)A (1' MAX. PONDING)

RAINFALL INTENSITY (100-YR, 2-HR EVENT) = 2.22 IN/HR (NOAA ATLAS 14)

WHERE,

Q = CALCULATED PEAK FLOW RATE (CFS)
C = RUNOFF COEFFICIENT (0.50 PER CITY OF MESA EDS TABLE 8.1)
I = RAINFALL INTENSITY (IN/HR)
A = DRAINAGE AREA (ACRES)

VOL_{REQ} = (0.50) x (2.22 IN/HR) x (1/12) x (10.38 AC) = 0.96 AC-FT
$VOL_{PROVIDED}$ = 1.03 AC-FT

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

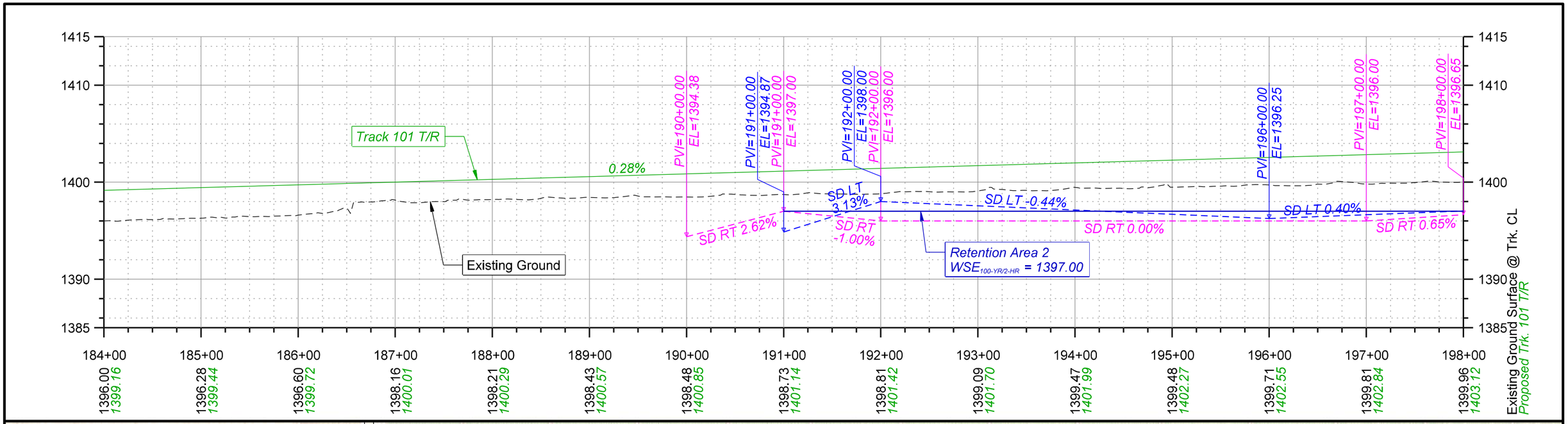
DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: P028 of 037

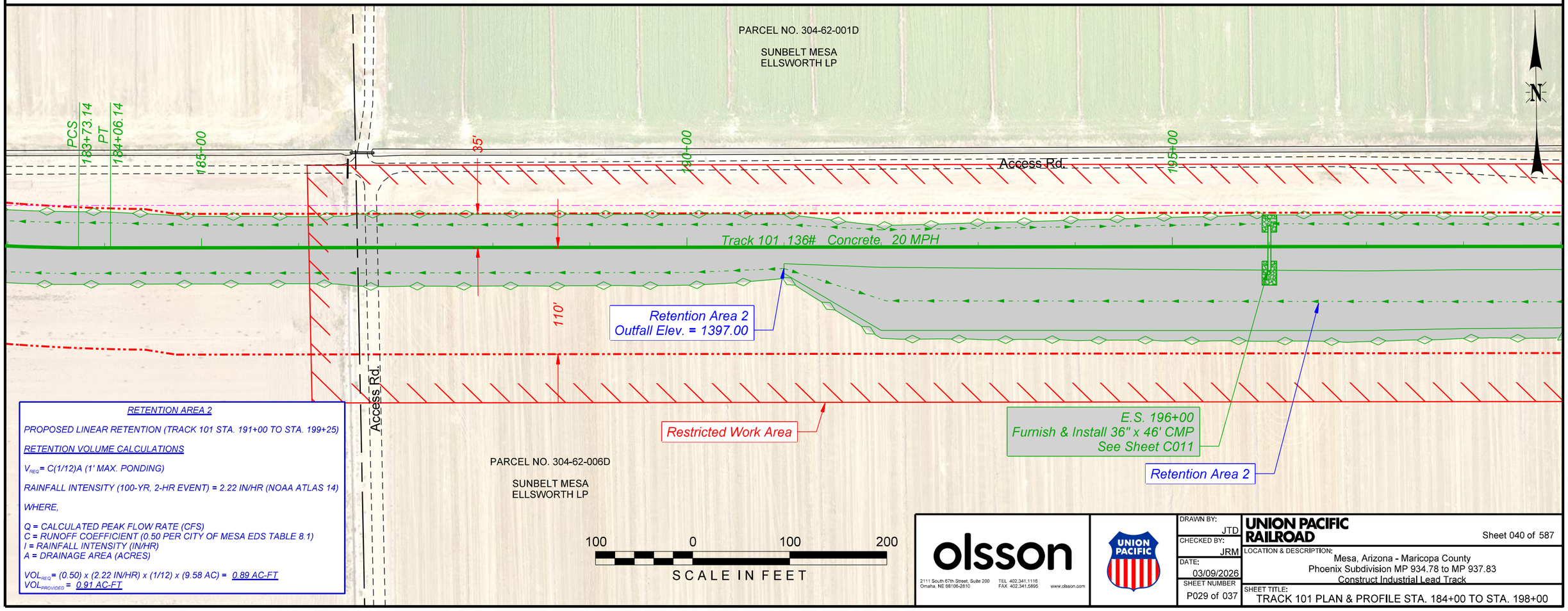
UNION PACIFIC RAILROAD
Sheet 039 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 PLAN & PROFILE STA. 170+00 TO STA. 184+00

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\02_Plan - Profile\T_RPP28_PIRATE Lead_200927.dgn
Default
3/9/2026





RETENTION AREA 2

PROPOSED LINEAR RETENTION (TRACK 101 STA. 191+00 TO STA. 199+25)

RETENTION VOLUME CALCULATIONS

V_{REQ} = C(1/12)A (1' MAX. PONDING)

RAINFALL INTENSITY (100-YR, 2-HR EVENT) = 2.22 IN/HR (NOAA ATLAS 14)

WHERE,

Q = CALCULATED PEAK FLOW RATE (CFS)
C = RUNOFF COEFFICIENT (0.50 PER CITY OF MESA EDS TABLE 8.1)
I = RAINFALL INTENSITY (IN/HR)
A = DRAINAGE AREA (ACRES)

VOL_{REQ} = (0.50) x (2.22 IN/HR) x (1/12) x (9.58 AC) = 0.89 AC-FT
$VOL_{PROVIDED}$ = 0.91 AC-FT

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

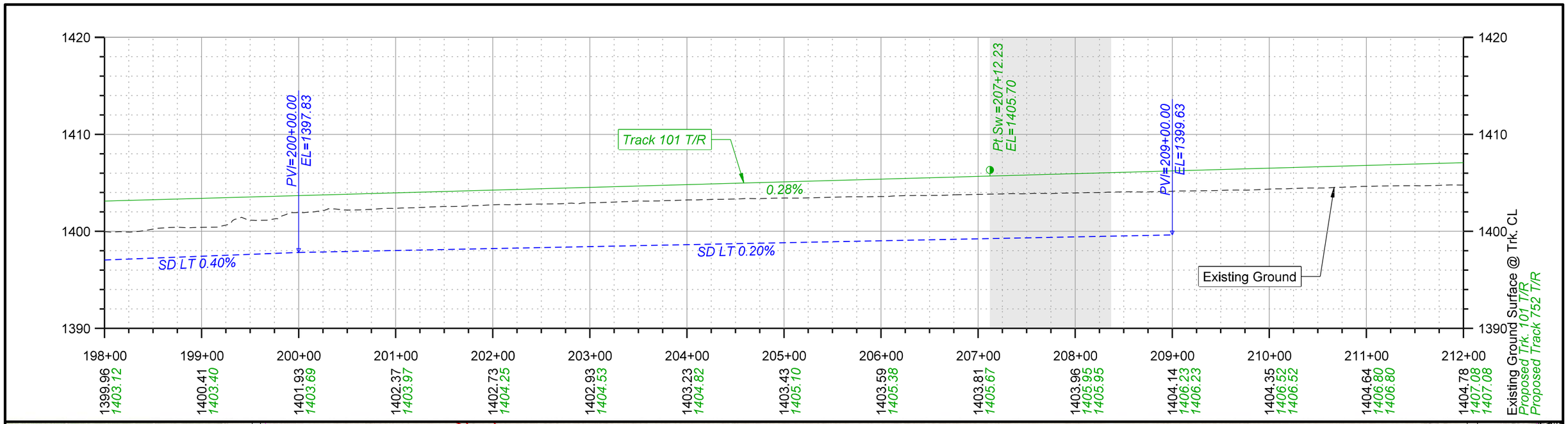
DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	P029 of 037

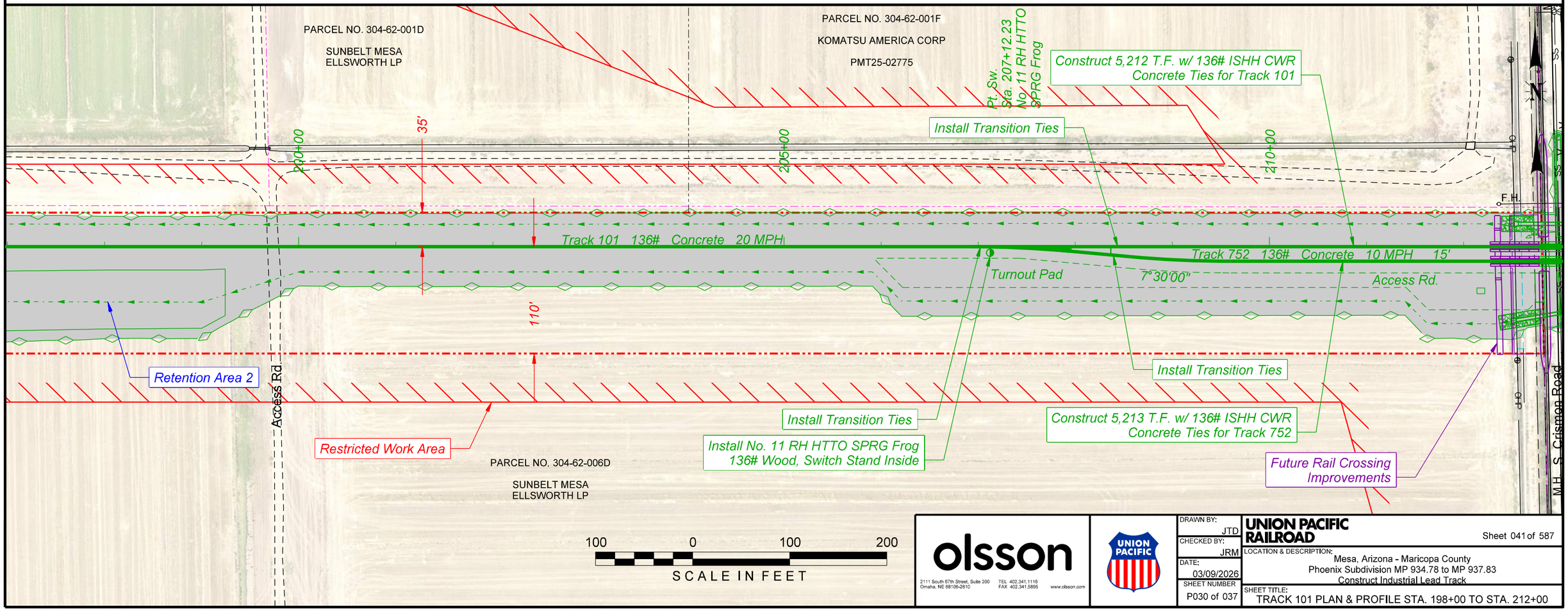
UNION PACIFIC RAILROAD — Sheet 040 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 PLAN & PROFILE STA. 184+00 TO STA. 198+00

Color_table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927.40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927.40-Design\Microstation\020-0927_RLTK\DGN\Sheets\02_Plan - Profile\T_RPP29_PIRATE Lead_200927.dgn
Default
3/9/2026





olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

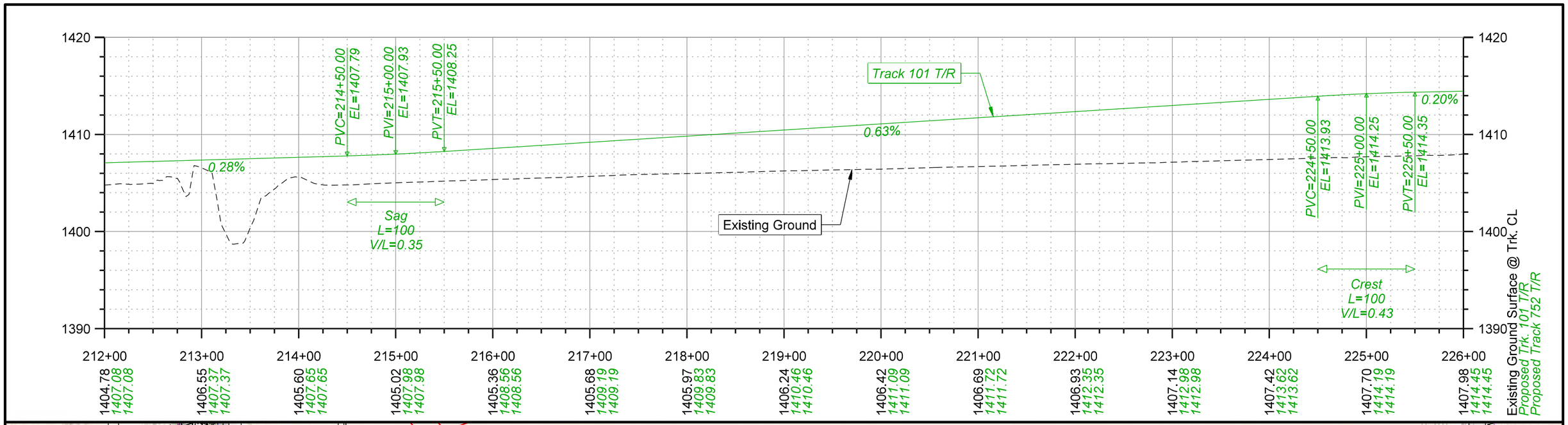
DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	P030 of 037

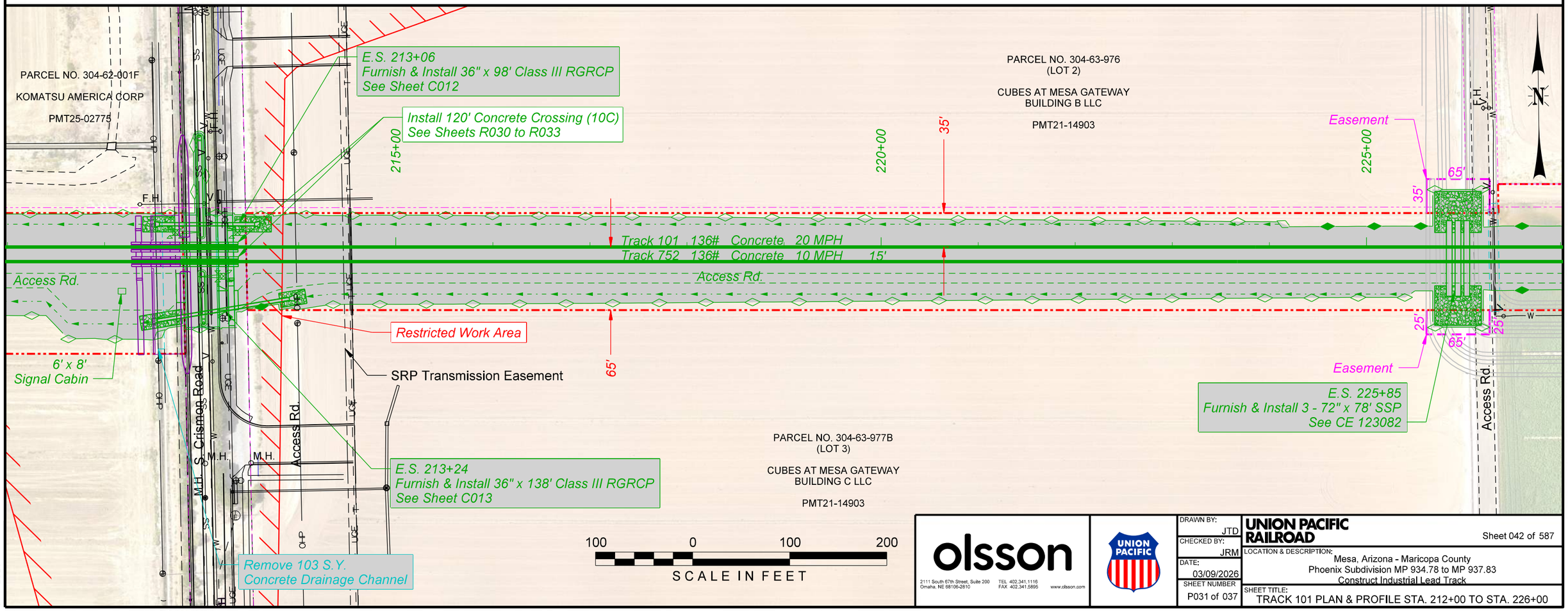
UNION PACIFIC RAILROAD Sheet 041 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 PLAN & PROFILE STA. 198+00 TO STA. 212+00

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\02_Plan - Profile\T_RPP30_PIRATE Lead_200927.dgn
Default
3/9/2026





olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

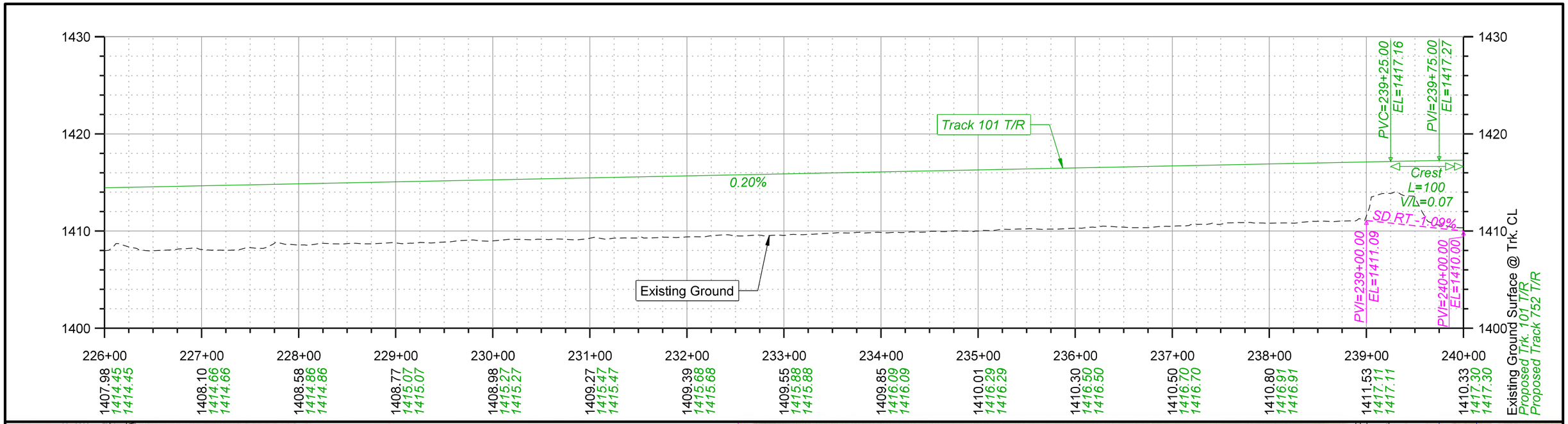
DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	P031 of 037

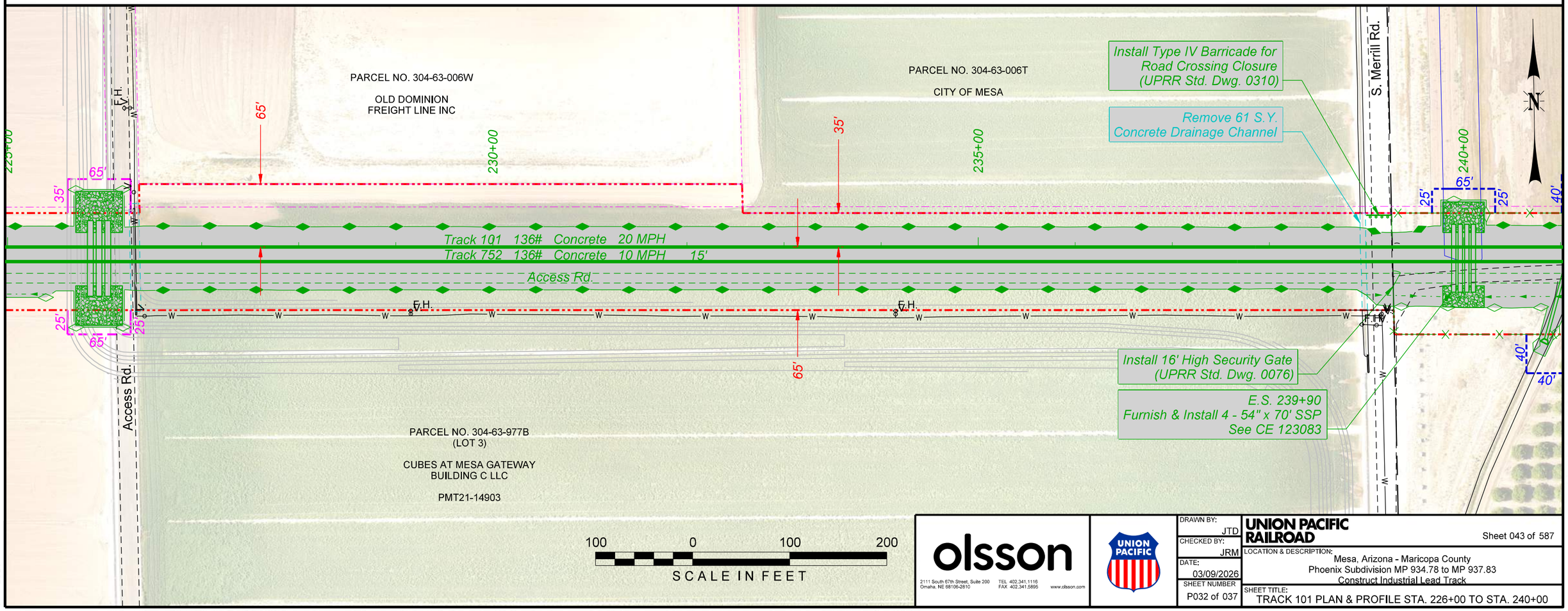
UNION PACIFIC RAILROAD Sheet 042 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 PLAN & PROFILE STA. 212+00 TO STA. 226+00

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927.40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927.40-Design\Microstation\020-0927_RLTK\DGN\Sheets\02_Plan - Profile\T_RPP3L_PIRATE Lead_200927.dgn
Default
3/9/2026





olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	P032 of 037

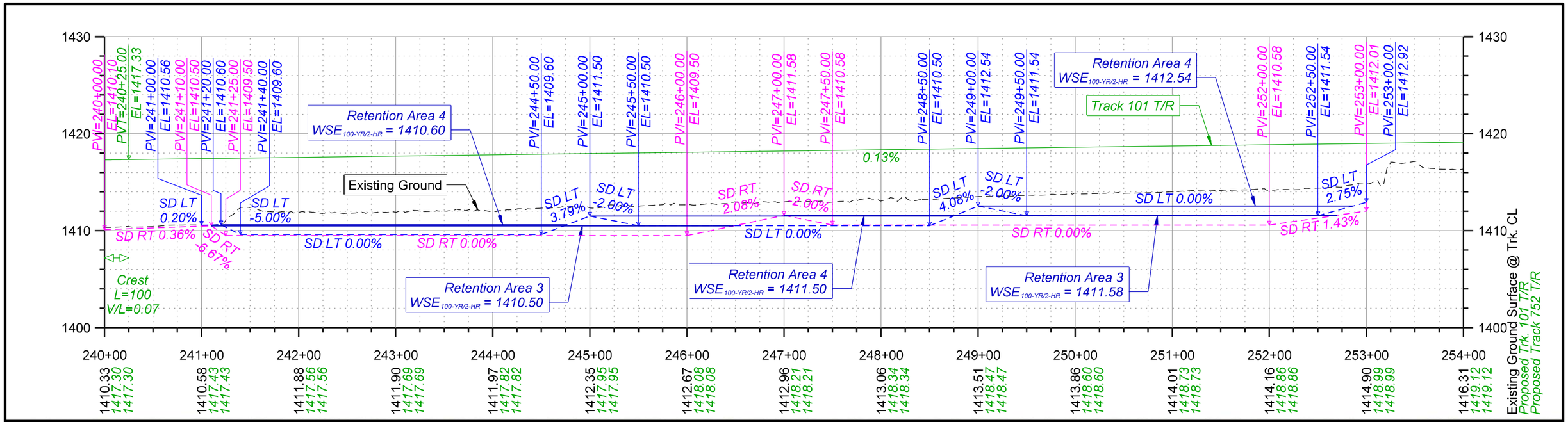
UNION PACIFIC RAILROAD

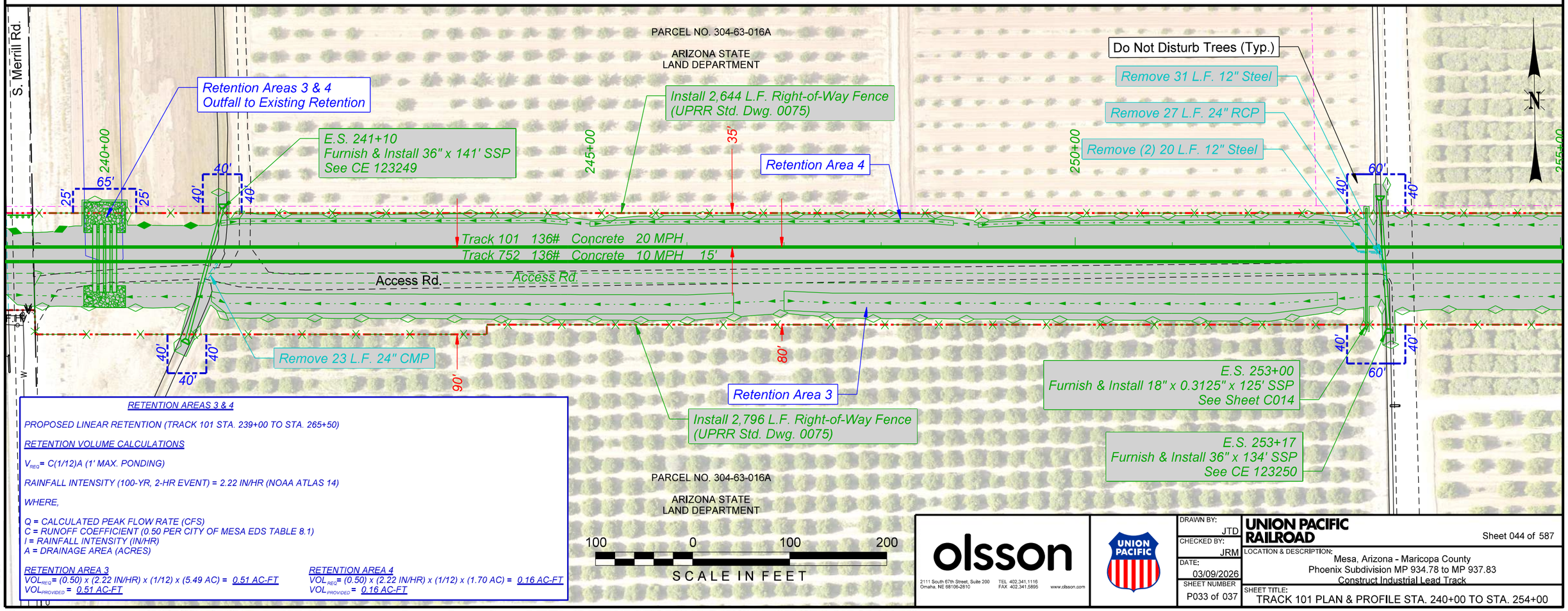
Sheet 043 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 PLAN & PROFILE STA. 226+00 TO STA. 240+00

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RL_TK\Pentable\020-0927_RL_TK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RL_TK\DGN\Sheets\02_Plan - Profile\T_RPP32_PIRATE Lead_200927.dgn
Default
3/9/2026





RETENTION AREAS 3 & 4

PROPOSED LINEAR RETENTION (TRACK 101 STA. 239+00 TO STA. 265+50)

RETENTION VOLUME CALCULATIONS

V_{REQ} = C(1/12)A (1' MAX. PONDING)

RAINFALL INTENSITY (100-YR, 2-HR EVENT) = 2.22 IN/HR (NOAA ATLAS 14)

WHERE,

Q = CALCULATED PEAK FLOW RATE (CFS)
C = RUNOFF COEFFICIENT (0.50 PER CITY OF MESA EDS TABLE 8.1)
I = RAINFALL INTENSITY (IN/HR)
A = DRAINAGE AREA (ACRES)

RETENTION AREA 3
VOL_{REQ} = (0.50) x (2.22 IN/HR) x (1/12) x (5.49 AC) = 0.51 AC-FT
$VOL_{PROVIDED}$ = 0.51 AC-FT

RETENTION AREA 4
VOL_{REQ} = (0.50) x (2.22 IN/HR) x (1/12) x (1.70 AC) = 0.16 AC-FT
$VOL_{PROVIDED}$ = 0.16 AC-FT

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

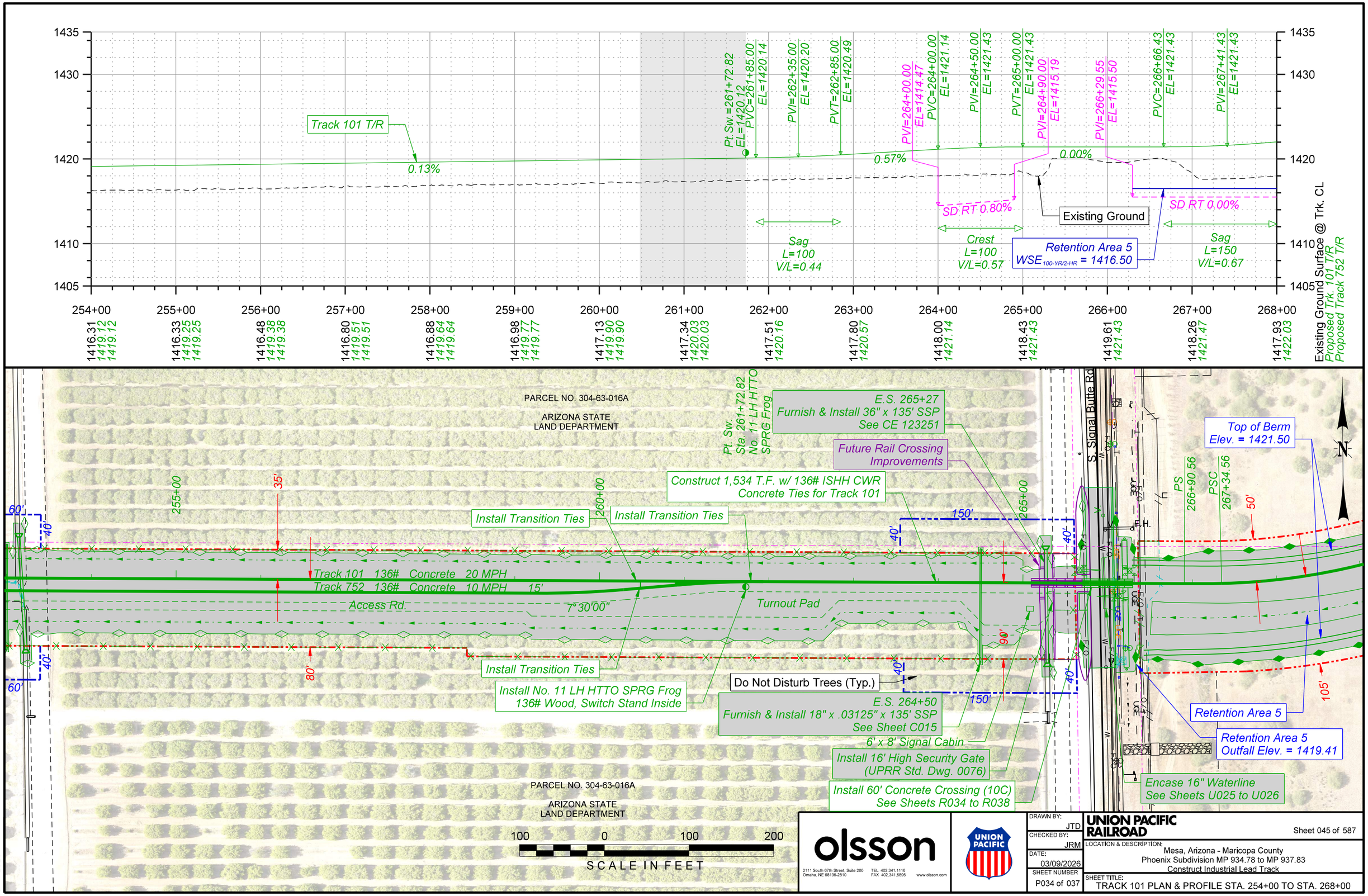
DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	P033 of 037

UNION PACIFIC RAILROAD — Sheet 044 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 PLAN & PROFILE STA. 240+00 TO STA. 254+00

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\02_Plan - Profile\T_RPP33.P
Default
3/9/2026
T_RPP33_PIRATE Lead_200927.dgn



olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

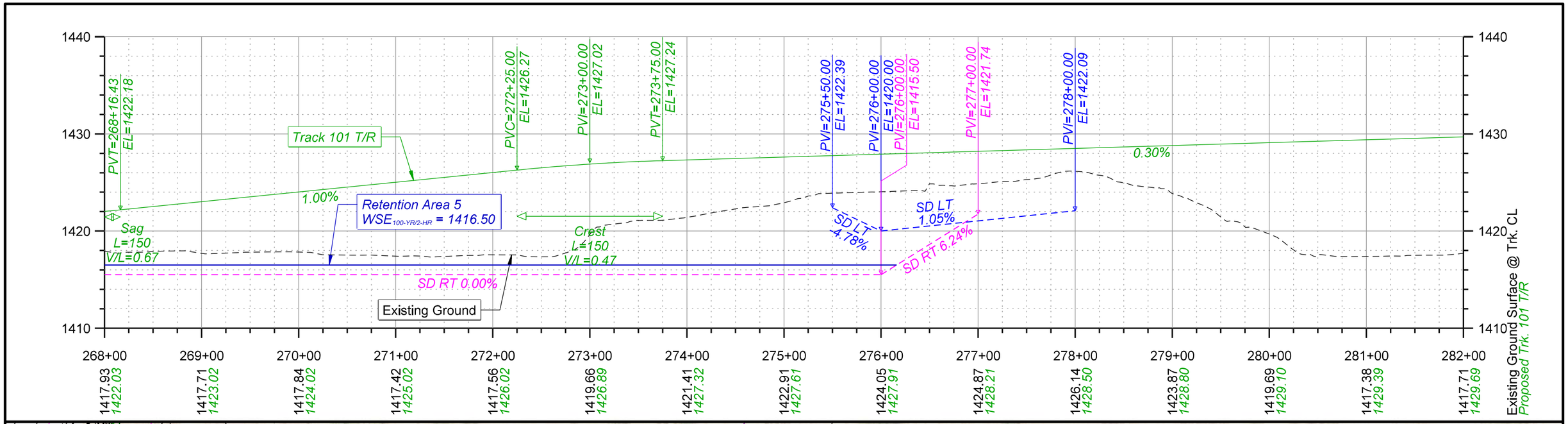
DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	P034 of 037

UNION PACIFIC RAILROAD Sheet 045 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 PLAN & PROFILE STA. 254+00 TO STA. 268+00

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\02_Plan - Profile\T_RPP34_PIRATE Lead_200927.dgn
Default
3/9/2026



olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

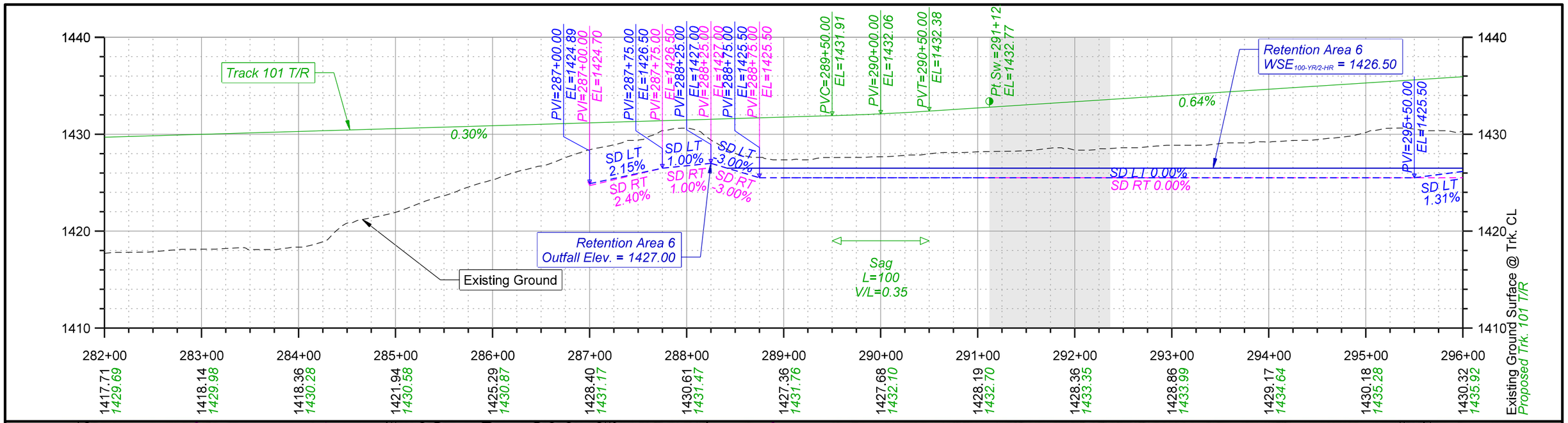
DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	P035 of 037

UNION PACIFIC RAILROAD — Sheet 046 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 PLAN & PROFILE STA. 268+00 TO STA. 282+00

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RL TK\Pentable_020-0927_RL TK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RL TK\DGN\Sheets\02_Plan - Profile\
Default
3/9/2026



olsson
2111 South 67th Street, Suite 200 Omaha, NE 68106-2810 TEL 402.341.1116 FAX 402.341.5895 www.olsson.com

UNION PACIFIC

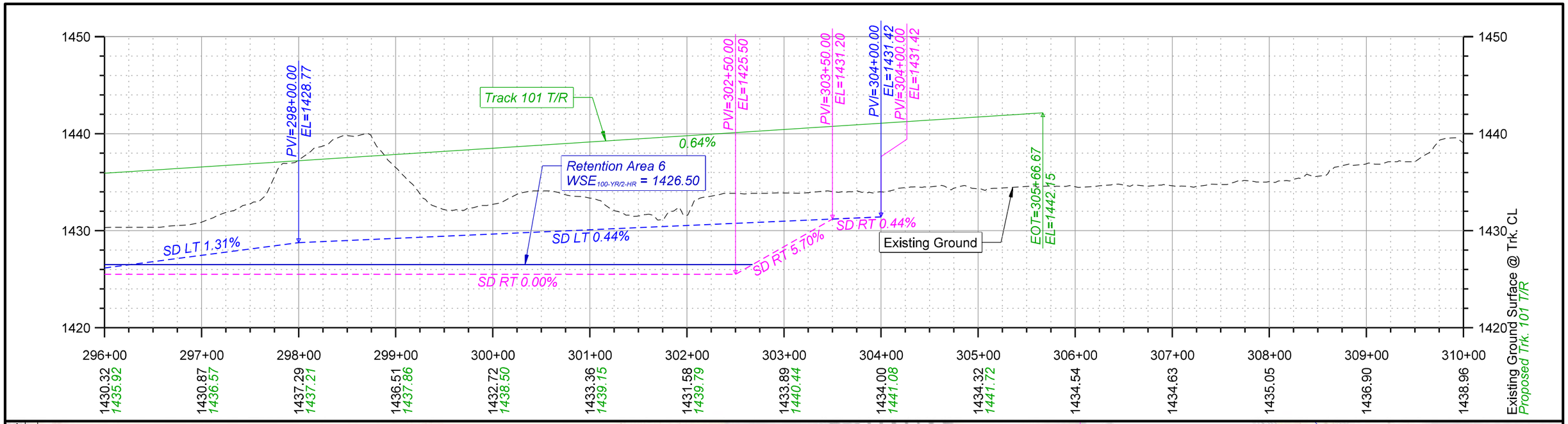
DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	P036 of 037

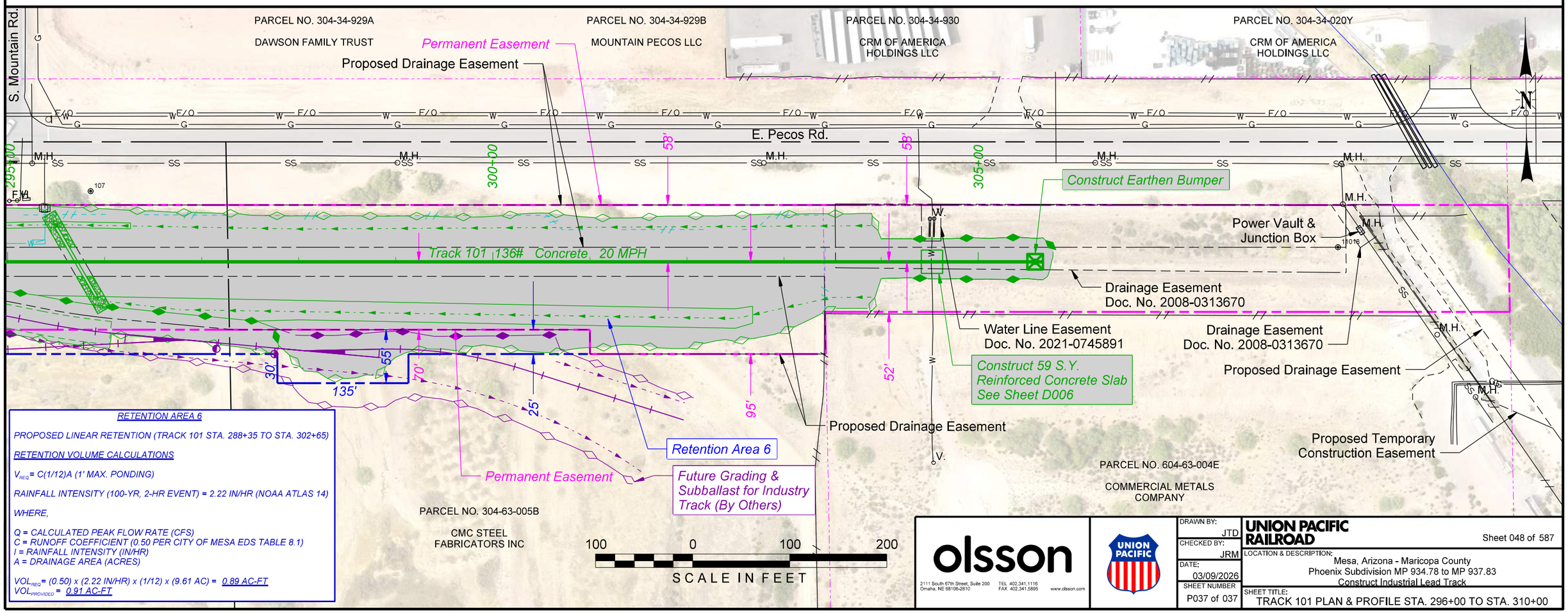
UNION PACIFIC RAILROAD — Sheet 047 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 PLAN & PROFILE STA. 282+00 TO STA. 296+00

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\02_Plan - Profile\T_RPP36_PIRATE Lead_200927.dgn
Default
3/9/2026





RETENTION AREA 6

PROPOSED LINEAR RETENTION (TRACK 101 STA. 288+35 TO STA. 302+65)

RETENTION VOLUME CALCULATIONS

V_{REQ} = C(1/12)A (1' MAX. PONDING)

RAINFALL INTENSITY (100-YR, 2-HR EVENT) = 2.22 IN/HR (NOAA ATLAS 14)

WHERE,

Q = CALCULATED PEAK FLOW RATE (CFS)
C = RUNOFF COEFFICIENT (0.50 PER CITY OF MESA EDS TABLE 8.1)
I = RAINFALL INTENSITY (IN/HR)
A = DRAINAGE AREA (ACRES)

VOL_{REQ} = (0.50) x (2.22 IN/HR) x (1/12) x (9.61 AC) = 0.89 AC-FT
$VOL_{PROVIDED}$ = 0.91 AC-FT

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	P037 of 037

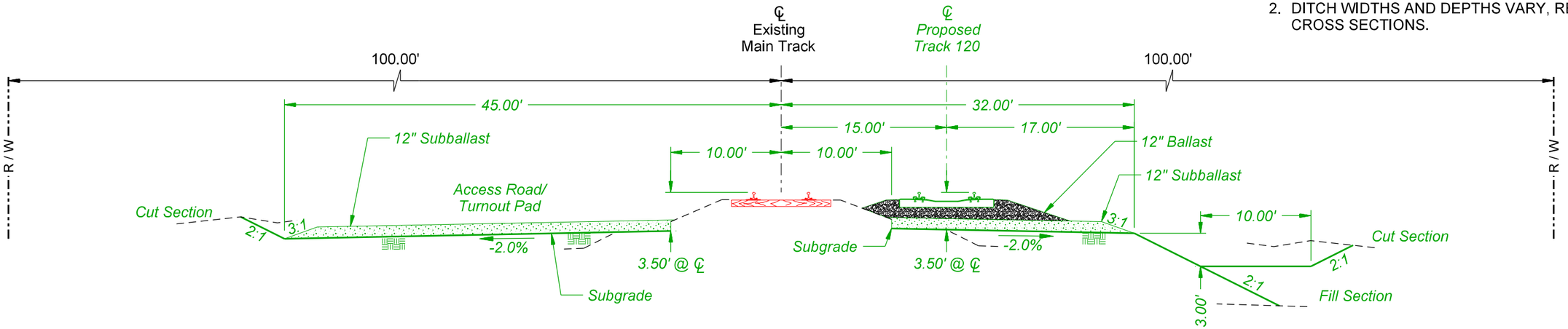
UNION PACIFIC RAILROAD Sheet 048 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 PLAN & PROFILE STA. 296+00 TO STA. 310+00

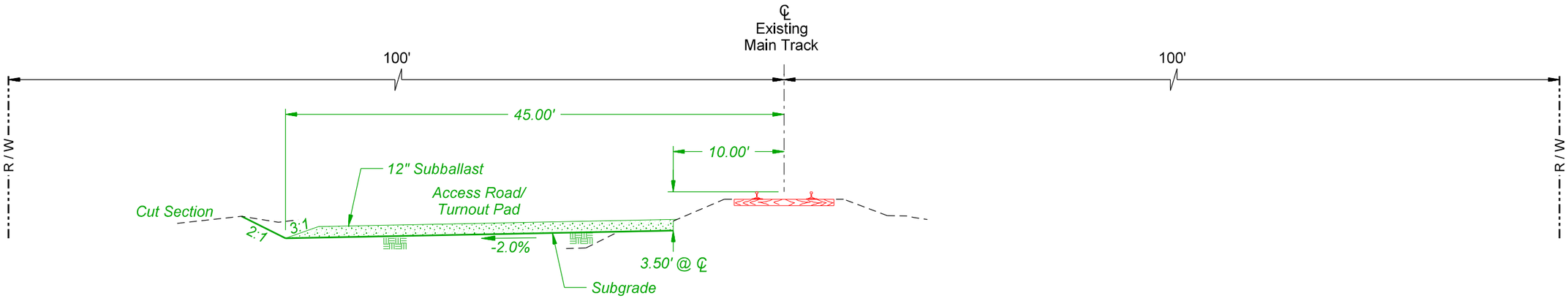
Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\05011-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\05011-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\02_Plan - Profile\T_RPP37_PIRATE Lead_200927.dgn
Default
3/9/2026

NOTES:
1. SHOULDER WIDENS TO ACCOMODATE SUPERELEVATION, REFER TO CROSS SECTIONS.
2. DITCH WIDTHS AND DEPTHS VARY, REFER TO CROSS SECTIONS.



TYPICAL SECTION

Sta. 1482+10 to Sta. 1484+60 (Track 120)
Sta. -1+90 to Sta. 0+00 (Track 101)



TYPICAL SECTION

Sta. 1481+48 to Sta. 1482+10 (Track 120)
Sta. -3+13 to Sta. -1+90 (Track 101)

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: T001 of 013

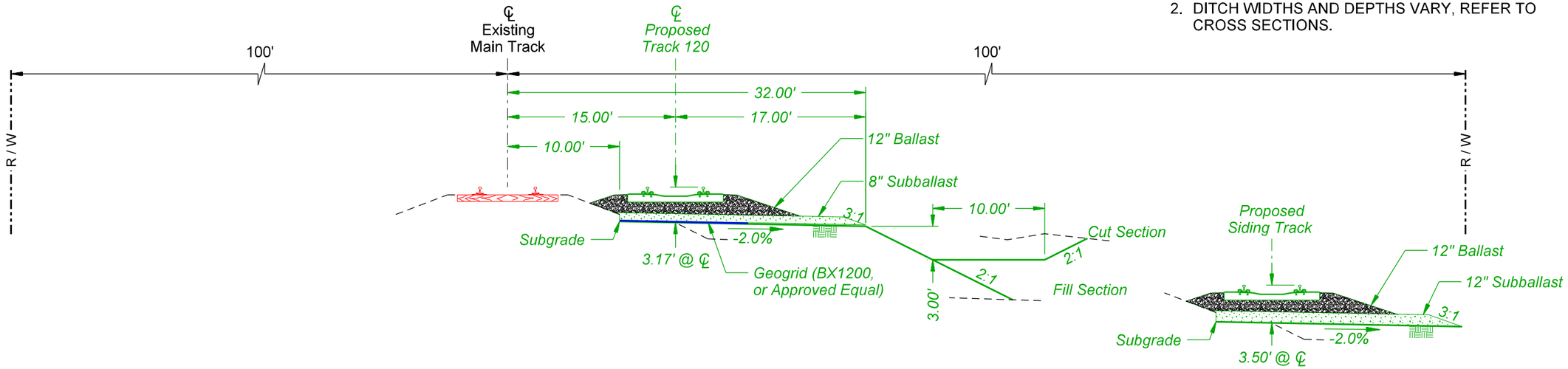
UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TYPICAL SECTIONS

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\03_Typicals\T_TYP_200927.dgn
Default
3/9/2026

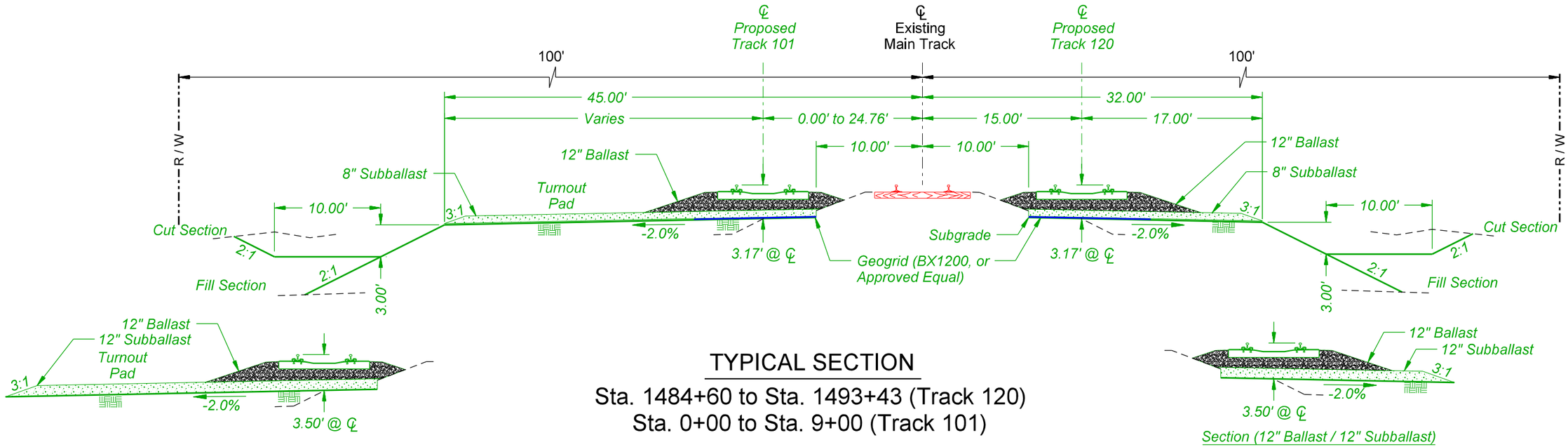
NOTES:
1. SHOULDER WIDENS TO ACCOMODATE SUPERELEVATION, REFER TO CROSS SECTIONS.
2. DITCH WIDTHS AND DEPTHS VARY, REFER TO CROSS SECTIONS.



TYPICAL SECTION

Sta. 1493+43 to Sta. 1507+54
Sta. 1512+97 to Sta. 1530+21

Section (12" Ballast / 12" Subballast)
Sta. 1527+70 to Sta. 1528+80



TYPICAL SECTION

Sta. 1484+60 to Sta. 1493+43 (Track 120)
Sta. 0+00 to Sta. 9+00 (Track 101)

Section (12" Ballast / 12" Subballast)
Sta. 1484+60 to Sta. 1490+20 (Track 120)
Sta. 0+00 to Sta. 5+52 (Track 101)

Section (12" Ballast / 12" Subballast)
Sta. 1484+60 to Sta. 1490+20

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	T002 of 013

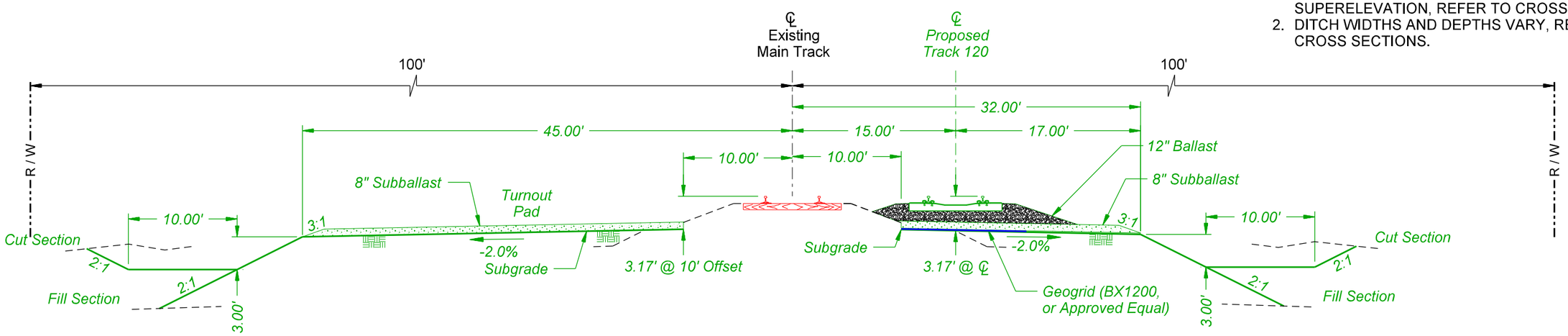
UNION PACIFIC RAILROAD — Sheet 050 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TYPICAL SECTIONS

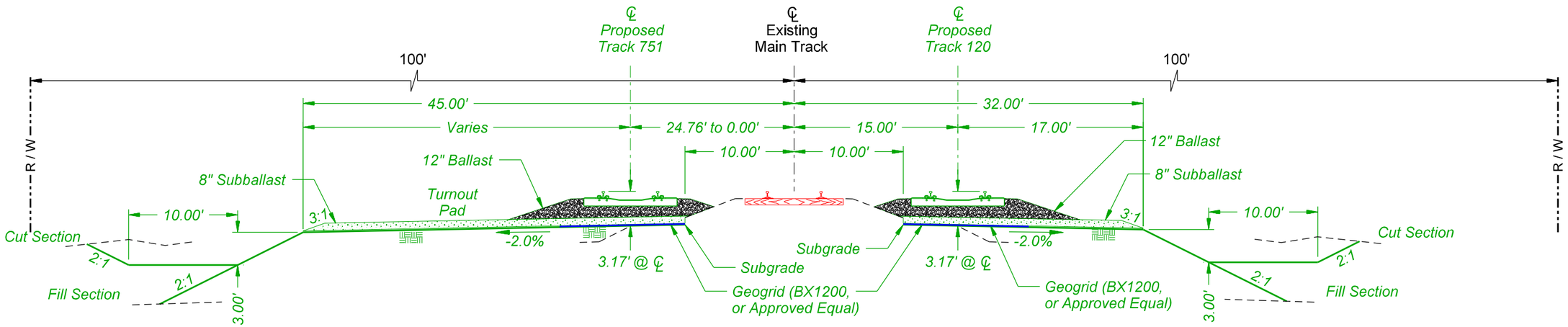
Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\03_Typicals\T_TYP_200927.dgn
Default
3/9/2026

NOTES:
1. SHOULDER WIDENS TO ACCOMODATE SUPERELEVATION, REFER TO CROSS SECTIONS.
2. DITCH WIDTHS AND DEPTHS VARY, REFER TO CROSS SECTIONS.



TYPICAL SECTION

Sta. 1511+74 to Sta. 1512+97
Sta. 1530+21 to Sta. 1531+44



TYPICAL SECTION

Sta. 1507+54 to Sta. 1511+74

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	T003 of 013

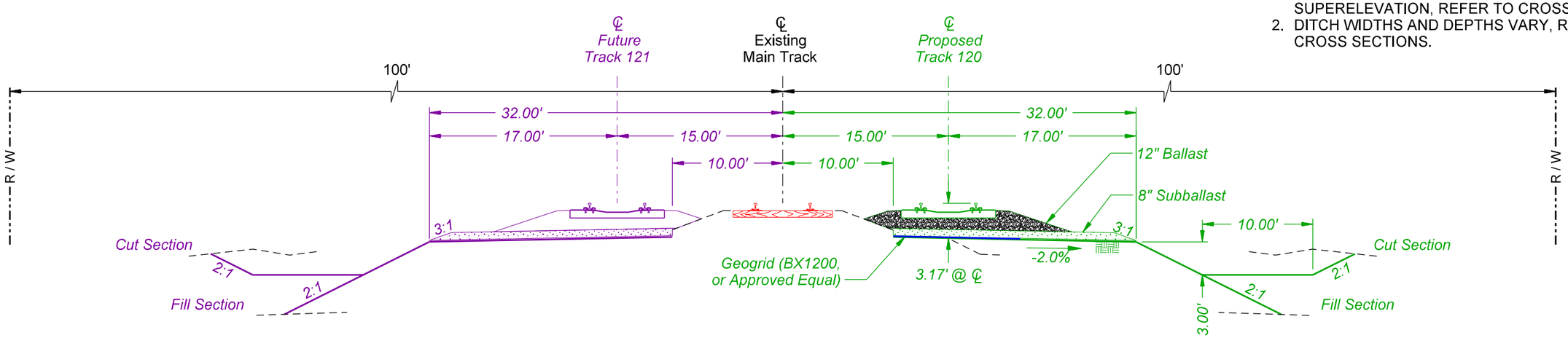
UNION PACIFIC RAILROAD — Sheet 051 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

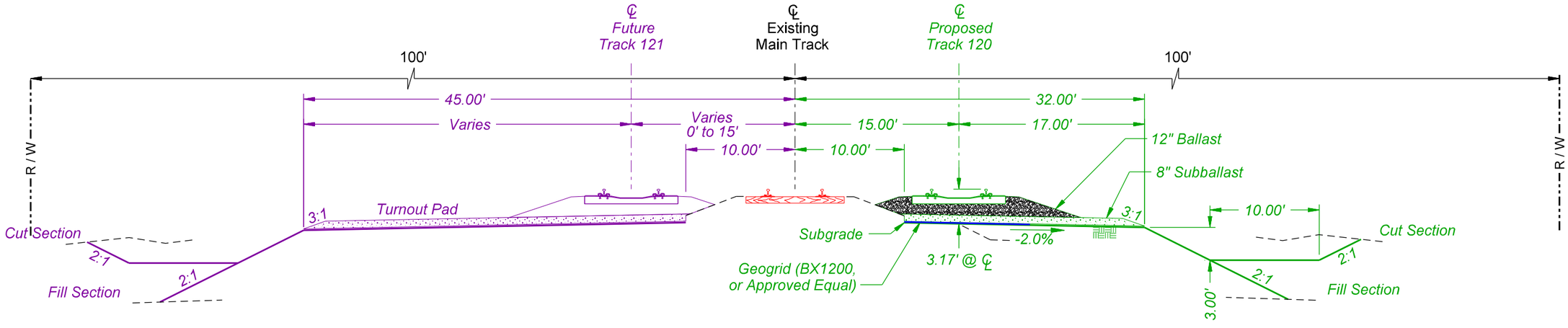
SHEET TITLE:
TYPICAL SECTIONS

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927.RLTK\DGN\Sheets\03_Typicals\T_TYP_200927.dgn
Default
3/9/2026

NOTES:
1. SHOULDER WIDENS TO ACCOMODATE SUPERELEVATION, REFER TO CROSS SECTIONS.
2. DITCH WIDTHS AND DEPTHS VARY, REFER TO CROSS SECTIONS.



TYPICAL SECTION
Sta. 1534+78 to Sta. 1557+94



TYPICAL SECTION
Sta. 1531+44 to Sta. 1534+78

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: T004 of 013

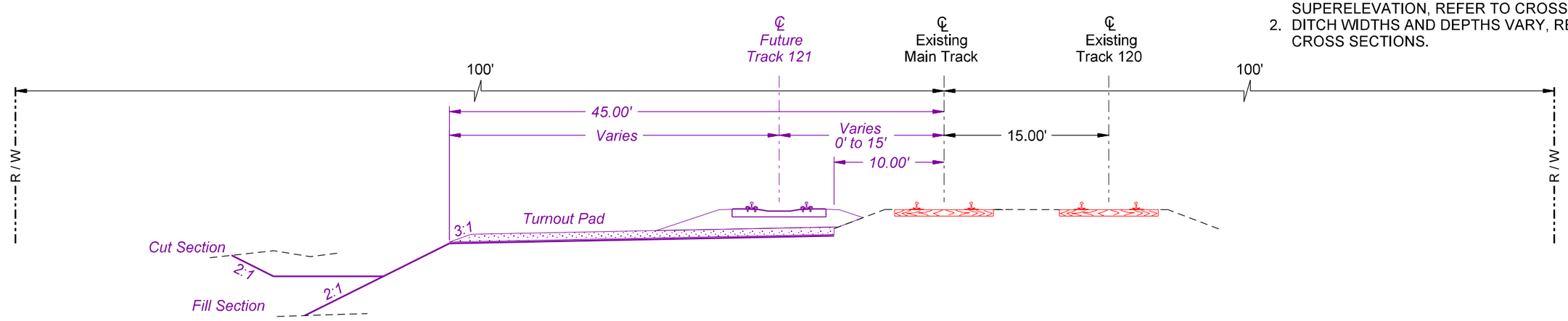
UNION PACIFIC RAILROAD
Sheet 052 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

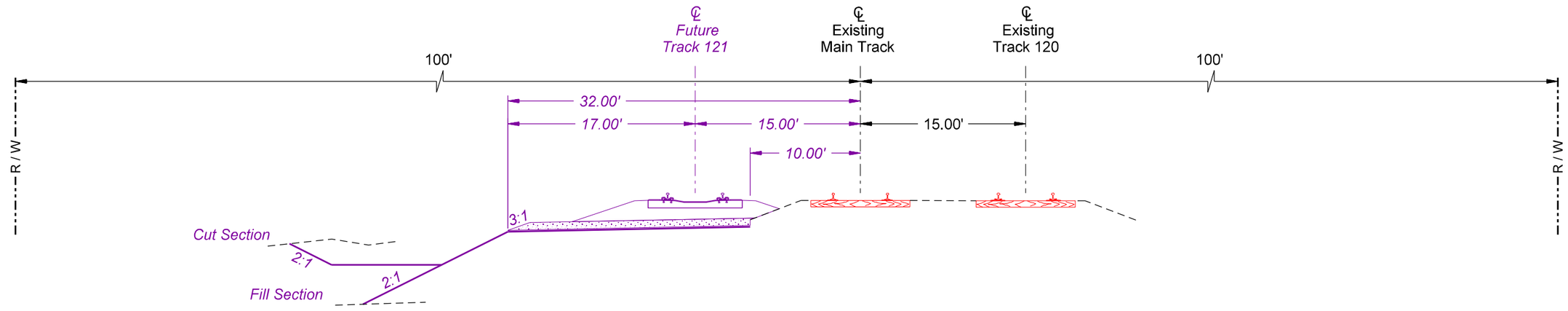
SHEET TITLE:
TYPICAL SECTIONS

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\03_Typicals\T_TYP_200927.dgn
Default
3/9/2026

NOTES:
1. SHOULDER WIDENS TO ACCOMODATE SUPERELEVATION, REFER TO CROSS SECTIONS.
2. DITCH WIDTHS AND DEPTHS VARY, REFER TO CROSS SECTIONS.



TYPICAL SECTION
Sta. 1589+00 to Sta. 1593+97



TYPICAL SECTION
Sta. 1557+94 to Sta. 1589+00

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: T005 of 013

UNION PACIFIC RAILROAD

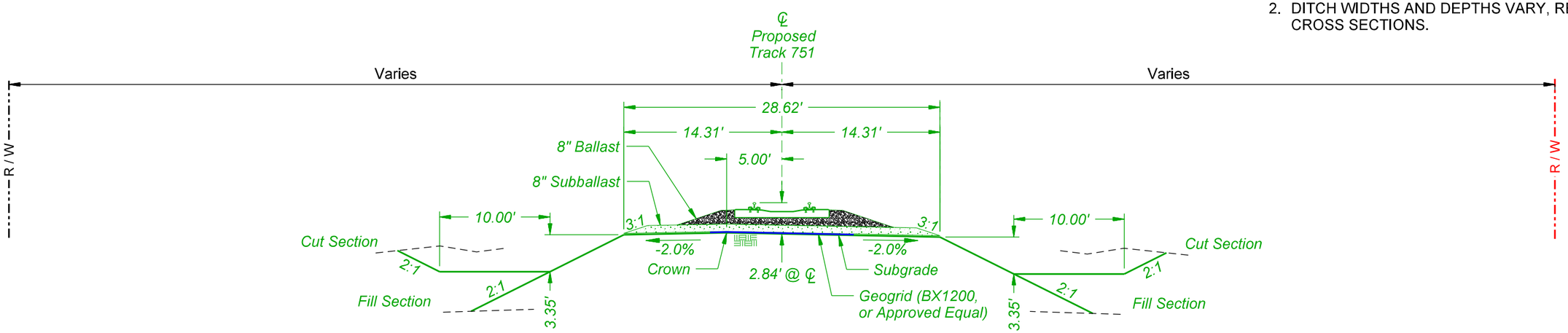
Sheet 053 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

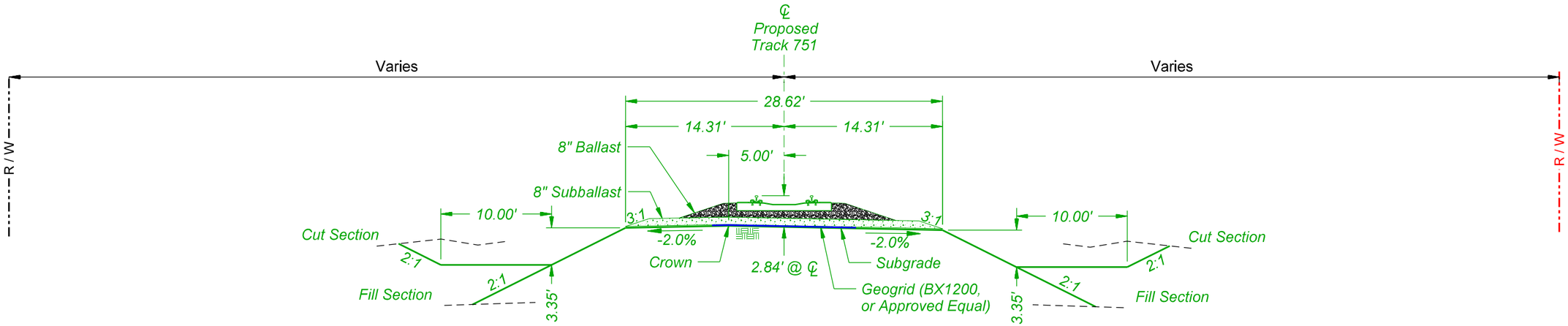
SHEET TITLE:
TYPICAL SECTIONS

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\03_Typicals\T_TYP_200927.dgn
Default
3/9/2026

NOTES:
1. SHOULDER WIDENS TO ACCOMODATE SUPERELEVATION, REFER TO CROSS SECTIONS.
2. DITCH WIDTHS AND DEPTHS VARY, REFER TO CROSS SECTIONS.



TYPICAL SECTION
Sta. 9+00 to Sta. 15+84



TYPICAL SECTION
Sta. 5+10 to Sta. 9+00

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: T006 of 013

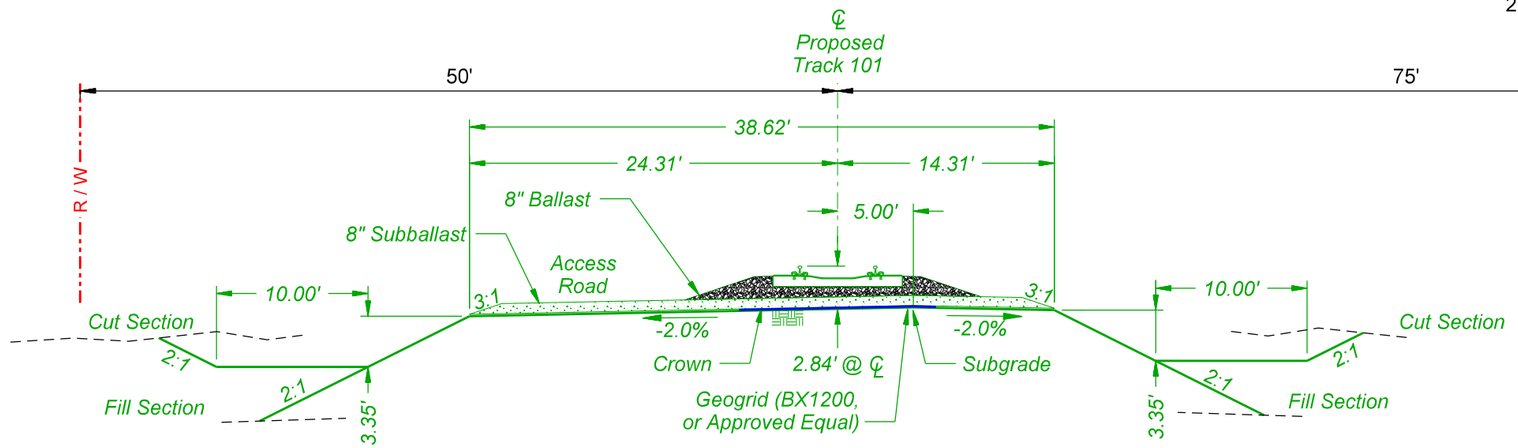
UNION PACIFIC RAILROAD
Sheet 054 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TYPICAL SECTIONS

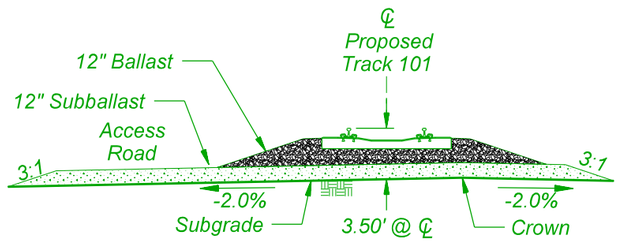
Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\03_Typicals\T_TYP_200927.dgn
Default
3/9/2026

NOTES:
1. SHOULDER WIDENS TO ACCOMODATE SUPERELEVATION, REFER TO CROSS SECTIONS.
2. DITCH WIDTHS AND DEPTHS VARY, REFER TO CROSS SECTIONS.

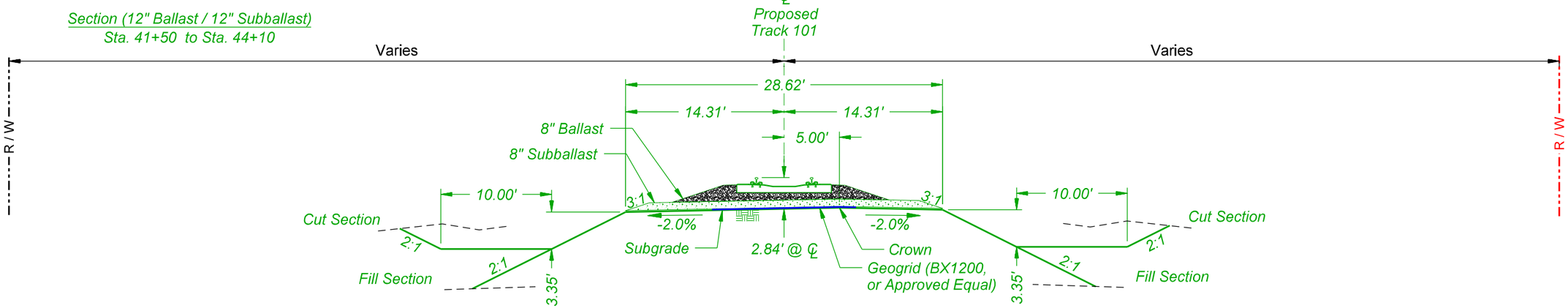


TYPICAL SECTION

Sta. 12+40 to Sta. 19+89
Sta. 23+85 to Sta. 26+85
Sta. 41+72 to Sta. 62+97



Section (12" Ballast / 12" Subballast)
Sta. 41+50 to Sta. 44+10



TYPICAL SECTION

Sta. 9+00 to Sta. 12+40

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: T007 of 013

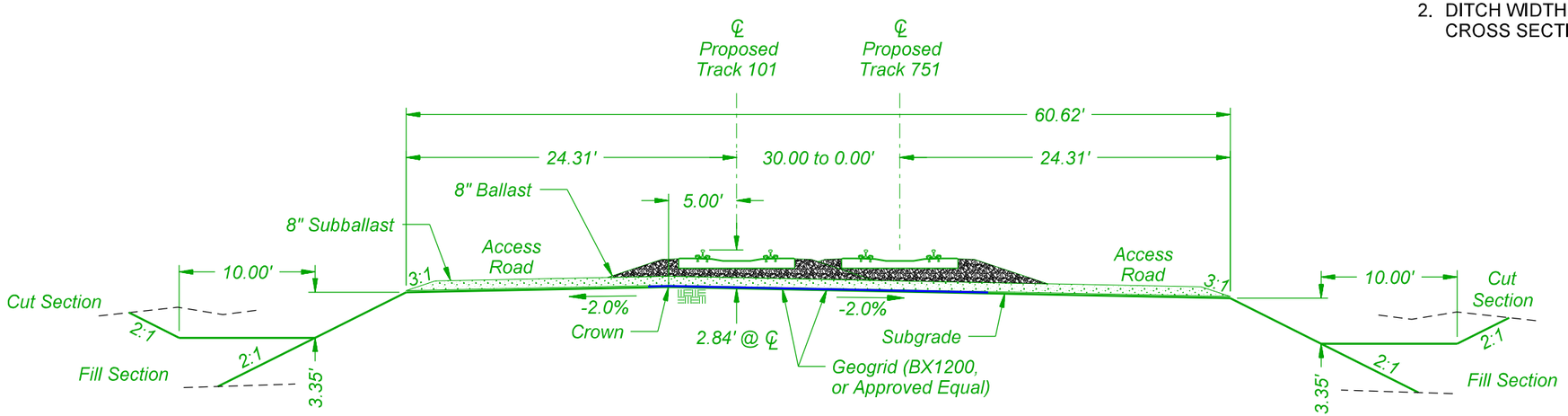
UNION PACIFIC RAILROAD
Sheet 055 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TYPICAL SECTIONS

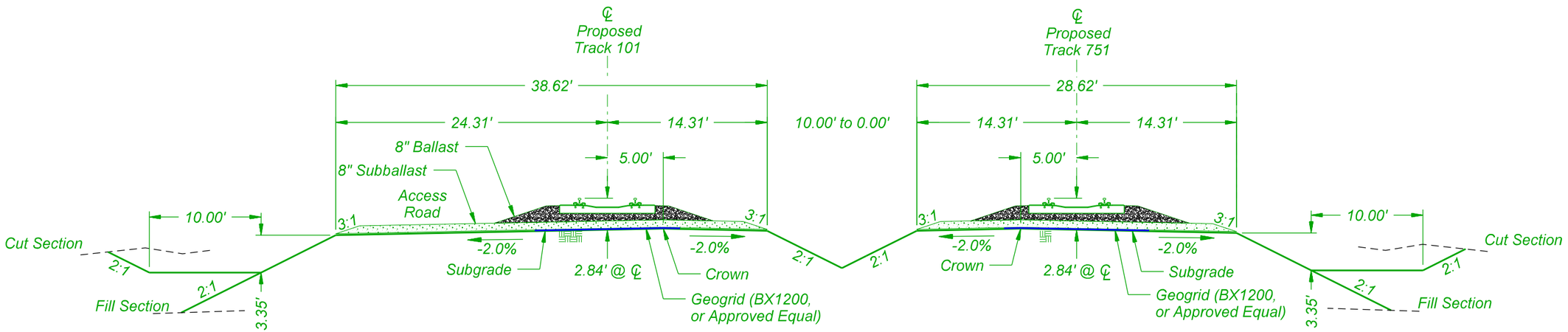
Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\03_Typicals\T_TYP_200927.dgn
Default
3/9/2026

NOTES:
1. SHOULDER WIDENS TO ACCOMODATE SUPERELEVATION, REFER TO CROSS SECTIONS.
2. DITCH WIDTHS AND DEPTHS VARY, REFER TO CROSS SECTIONS.



TYPICAL SECTION

Sta. 16+33 to Sta. 19+78 (Track 751)
Sta. 20+39 to Sta. 23+85 (Track 101)



TYPICAL SECTION

Sta. 15+84 to Sta. 16+33 (Track 751)
Sta. 19+89 to Sta. 20+39 (Track 101)

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: T008 of 013

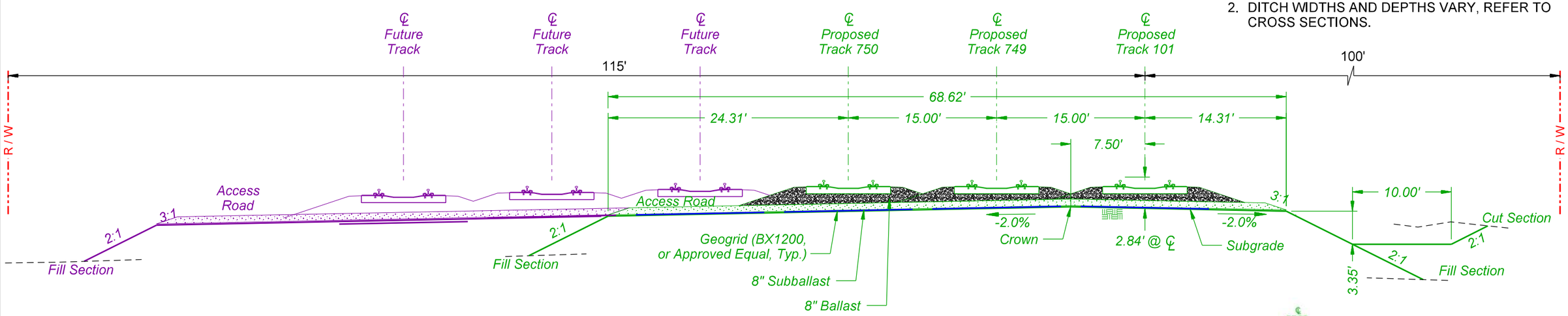
UNION PACIFIC RAILROAD
Sheet 056 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

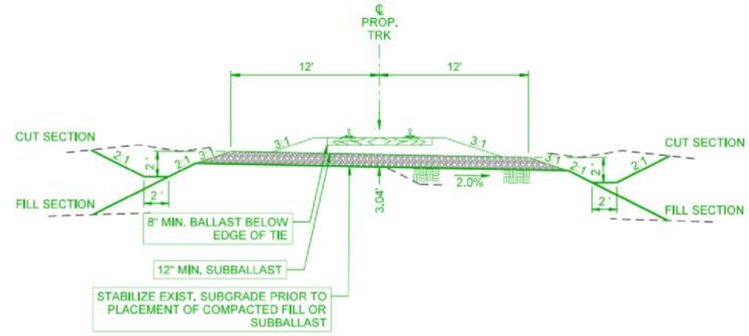
SHEET TITLE:
TYPICAL SECTIONS

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\03_Typicals\T_TYP_200927.dgn
Default
3/9/2026

NOTES:
1. SHOULDER WIDENS TO ACCOMODATE SUPERELEVATION, REFER TO CROSS SECTIONS.
2. DITCH WIDTHS AND DEPTHS VARY, REFER TO CROSS SECTIONS.

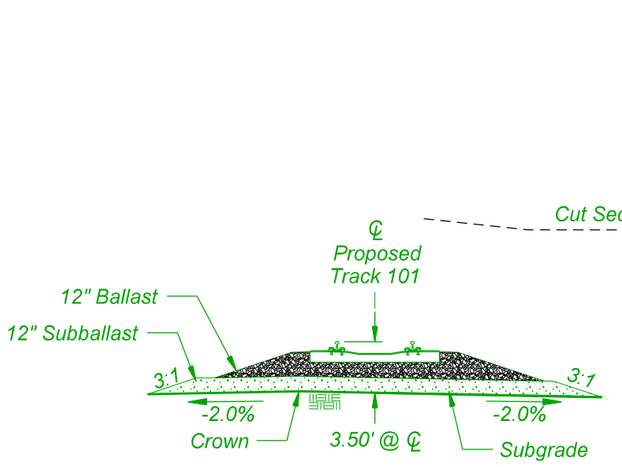


TYPICAL SECTION
Sta. 62+97 to Sta. 100+70

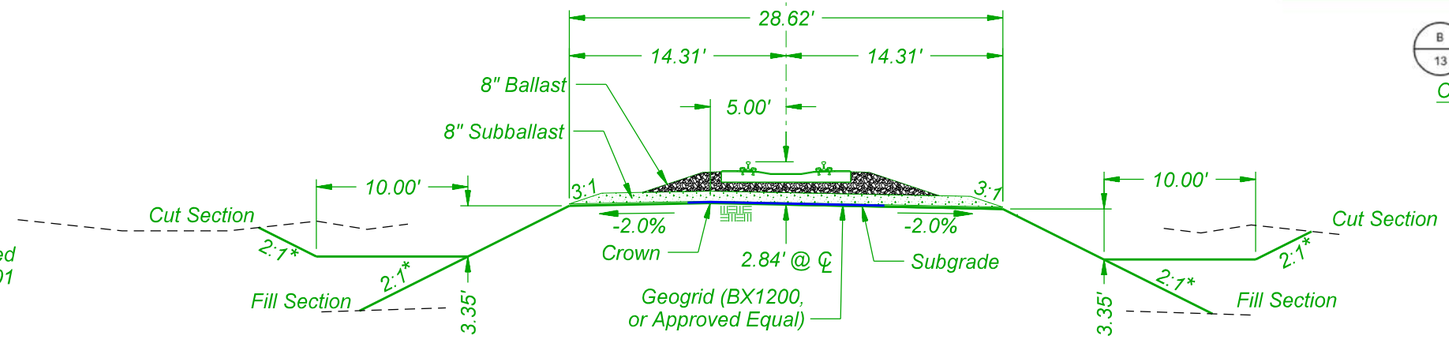


B/13 TYPICAL SECTION - SINGLE TRACK
SCALE: 1"=10' (11x17 PRINT)

CMC Industry Track Project (Track A)
Sta. 292+76 to Sta. 296+06



Section (12" Ballast / 12" Subballast)
Sta. 26+60 to Sta. 28+10
Sta. 159+10 to Sta. 161+00



*Sta. 288+25 to Sta. 304+00, 3:1 Slopes

*Sta. 274+60 to Sta. 277+00, 3:1 Slopes
*Sta. 288+25 to Sta. 304+00, 3:1 Slopes

TYPICAL SECTION
Sta. 26+85 to Sta. 41+72
Sta. 159+46 to Sta. 205+92
Sta. 274+60 to Sta. 278+90
Sta. 286+00 to Sta. 305+67

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	T009 of 013

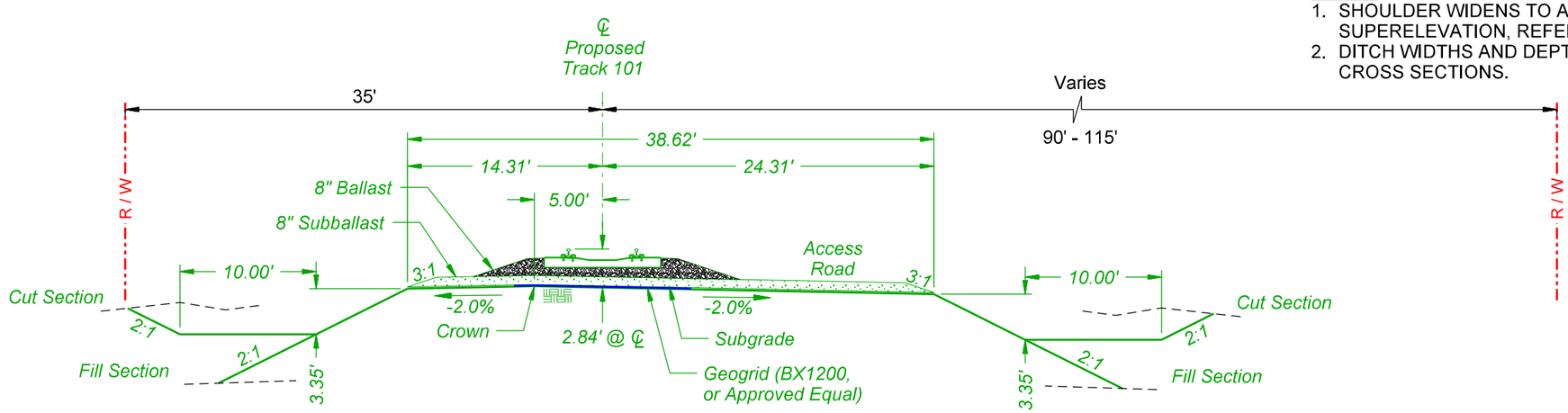
UNION PACIFIC RAILROAD — Sheet 057 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TYPICAL SECTIONS

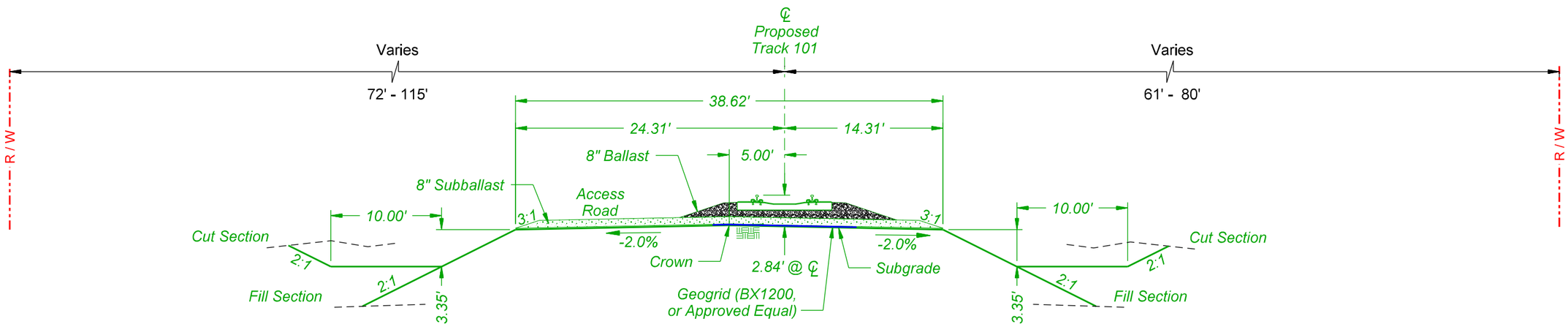
Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\03_Typicals\T_TYP_200927.dgn
Default
3/9/2026

NOTES:
1. SHOULDER WIDENS TO ACCOMODATE SUPERELEVATION, REFER TO CROSS SECTIONS.
2. DITCH WIDTHS AND DEPTHS VARY, REFER TO CROSS SECTIONS.



TYPICAL SECTION

Sta. 205+92 to Sta. 207+12
Sta. 261+73 to Sta. 266+46



TYPICAL SECTION

Sta. 100+70 to Sta. 159+46

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: T010 of 013

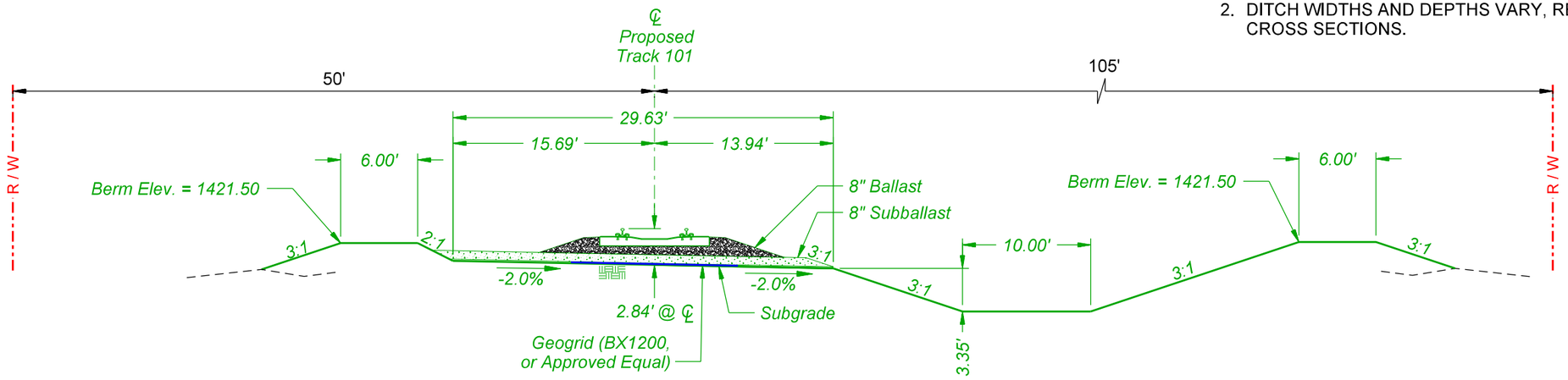
UNION PACIFIC RAILROAD
Sheet 058 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

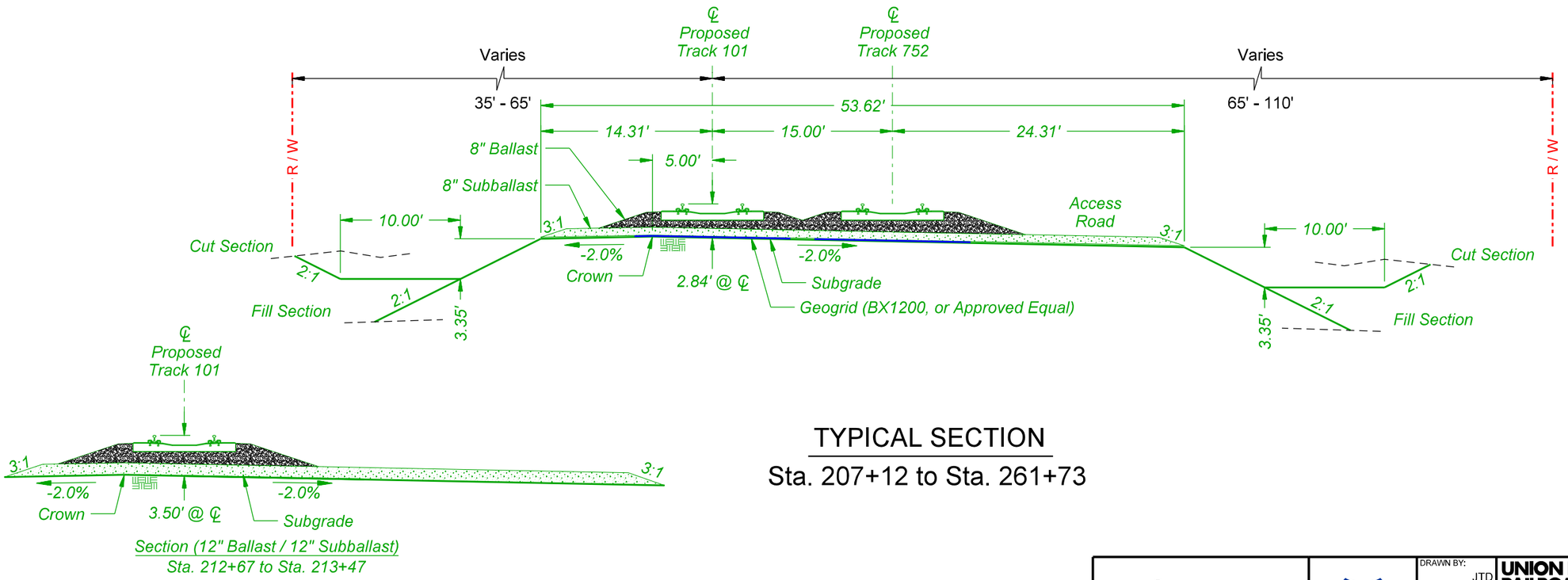
SHEET TITLE:
TYPICAL SECTIONS

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\03_Typicals\T_TYP_200927.dgn
Default
3/9/2026

NOTES:
1. SHOULDER WIDENS TO ACCOMODATE SUPERELEVATION, REFER TO CROSS SECTIONS.
2. DITCH WIDTHS AND DEPTHS VARY, REFER TO CROSS SECTIONS.



TYPICAL SECTION
Sta. 266+46 to Sta. 270+20



TYPICAL SECTION
Sta. 207+12 to Sta. 261+73

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	T011 of 013

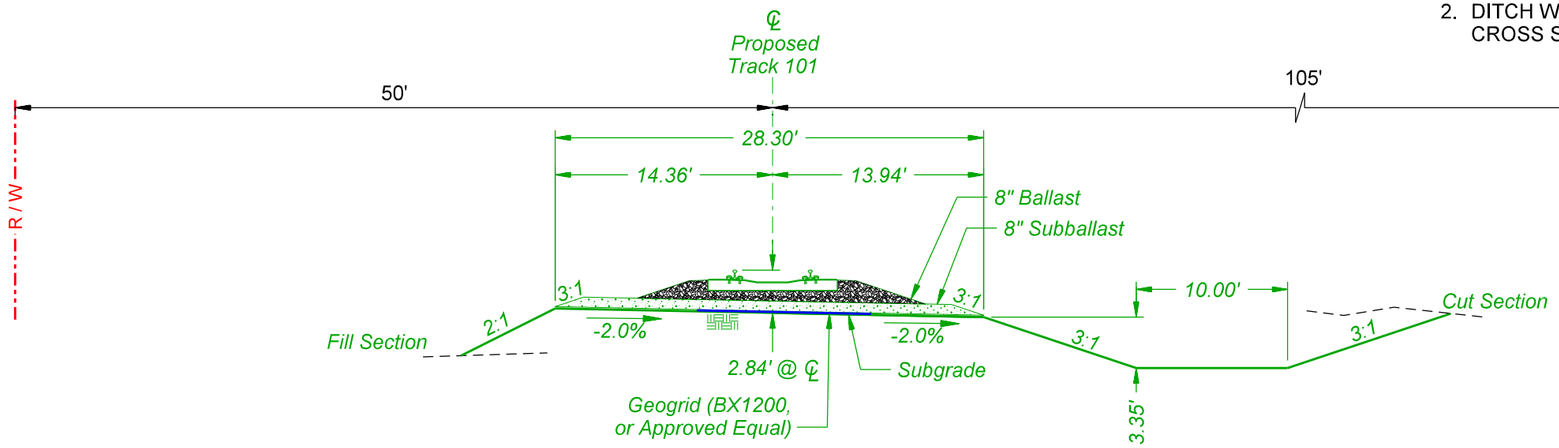
UNION PACIFIC RAILROAD — Sheet 059 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

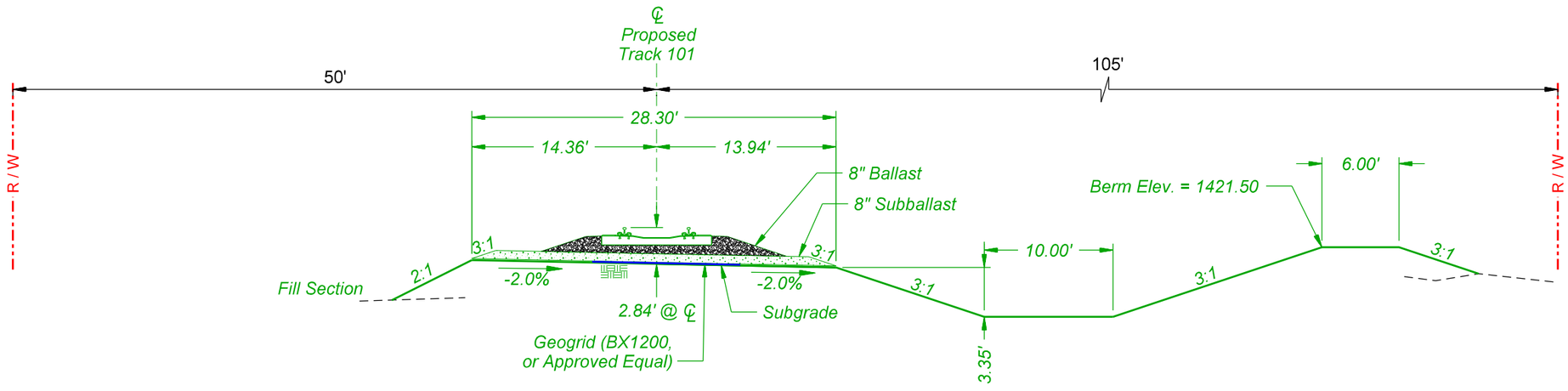
SHEET TITLE: TYPICAL SECTIONS

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\03_Typicals\T_TYP_200927.dgn
Default
3/9/2026

NOTES:
1. SHOULDER WIDENS TO ACCOMODATE SUPERELEVATION, REFER TO CROSS SECTIONS.
2. DITCH WIDTHS AND DEPTHS VARY, REFER TO CROSS SECTIONS.



TYPICAL SECTION
Sta. 273+10 to Sta. 274+60



TYPICAL SECTION
Sta. 270+20 to Sta. 273+10

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

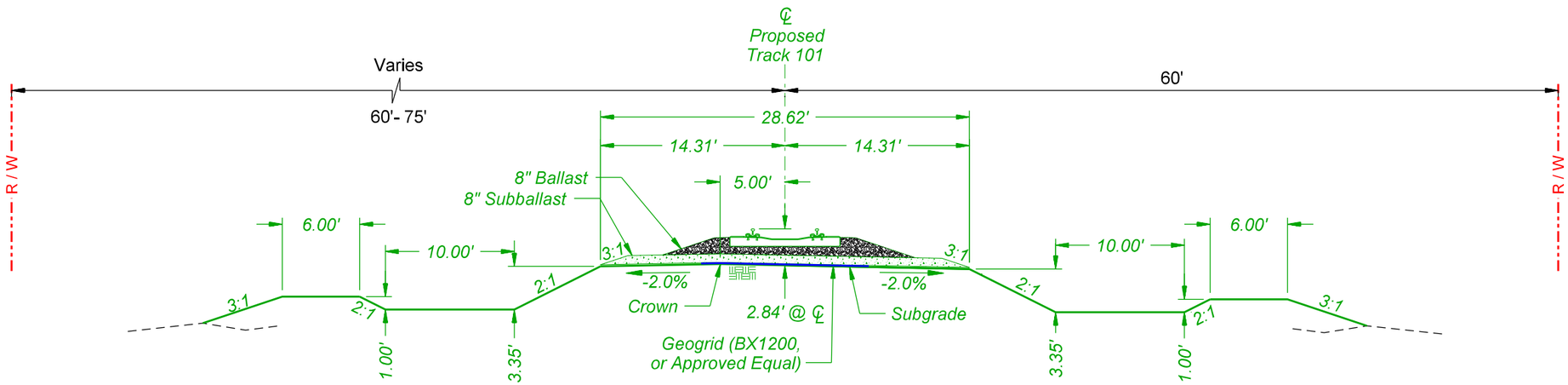
UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: T012 of 013

UNION PACIFIC RAILROAD
Sheet 060 of 587
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track
SHEET TITLE:
TYPICAL SECTIONS

Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\03_Typicals\T_TYP_200927.dgn
Default
3/9/2026

NOTES:
1. SHOULDER WIDENS TO ACCOMODATE SUPERELEVATION, REFER TO CROSS SECTIONS.
2. DITCH WIDTHS AND DEPTHS VARY, REFER TO CROSS SECTIONS.



TYPICAL SECTION

Sta. 278+90 to Sta. 286+00

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

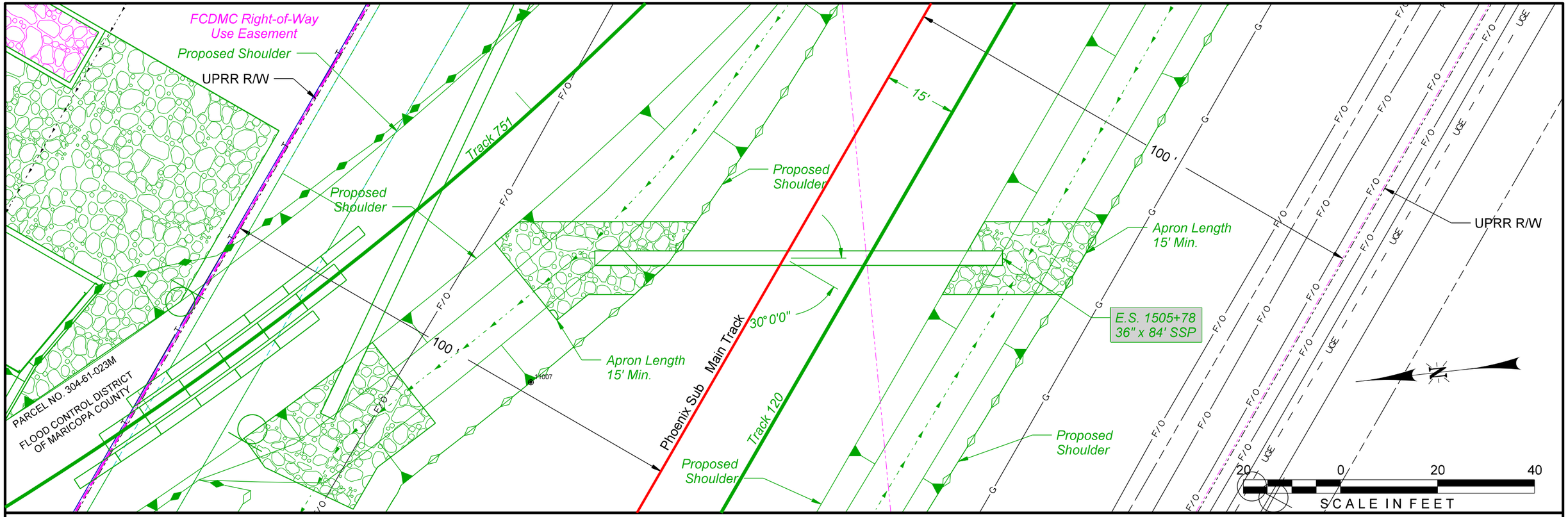
DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: T013 of 013

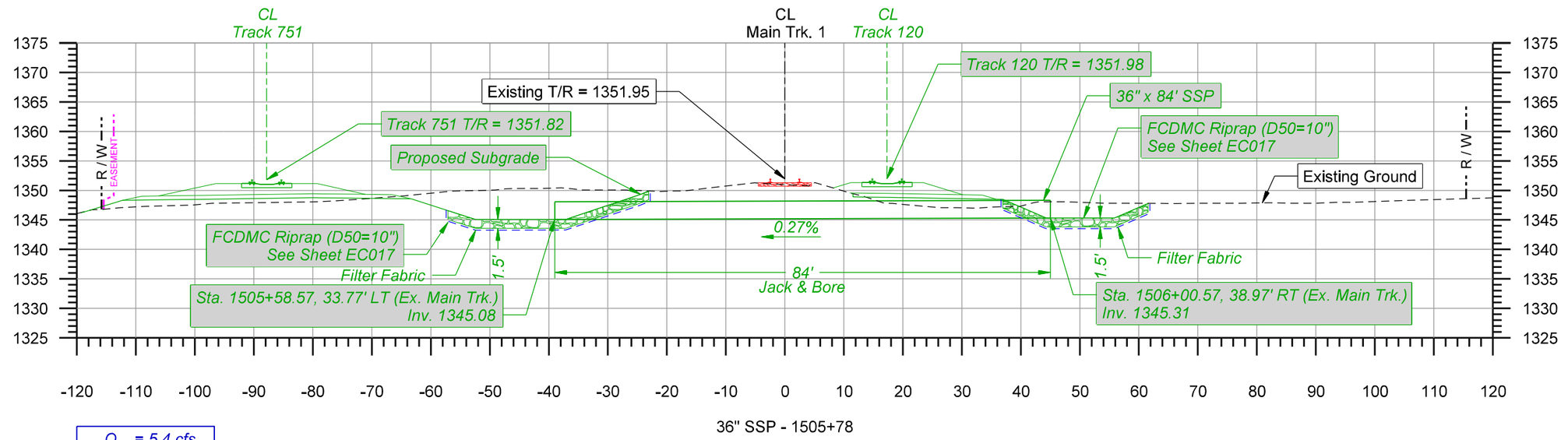
UNION PACIFIC RAILROAD
Sheet 061 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TYPICAL SECTIONS

Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\03_Typicals\T_TYP_200927.dgn
Default
3/9/2026





Q_{100} = 5.4 cfs
WSE_{100} = 1346.41
EGL_{100} = 1346.43
VEL_{100} = 4.07 fps

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

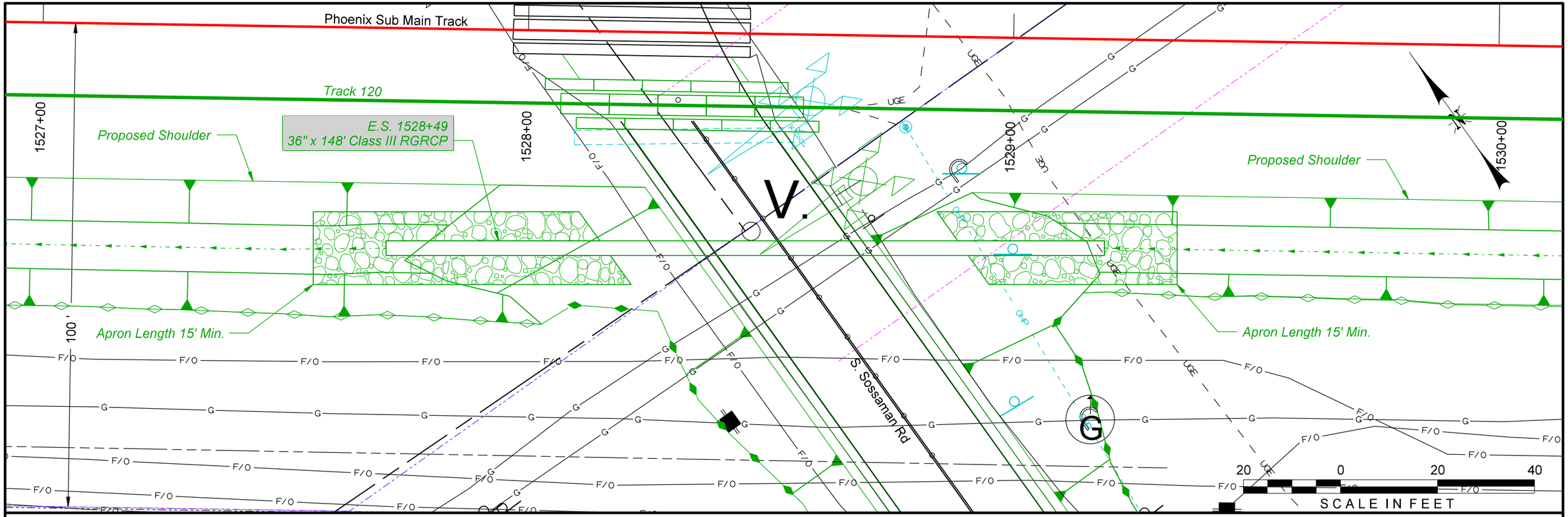
DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: C001 of 019

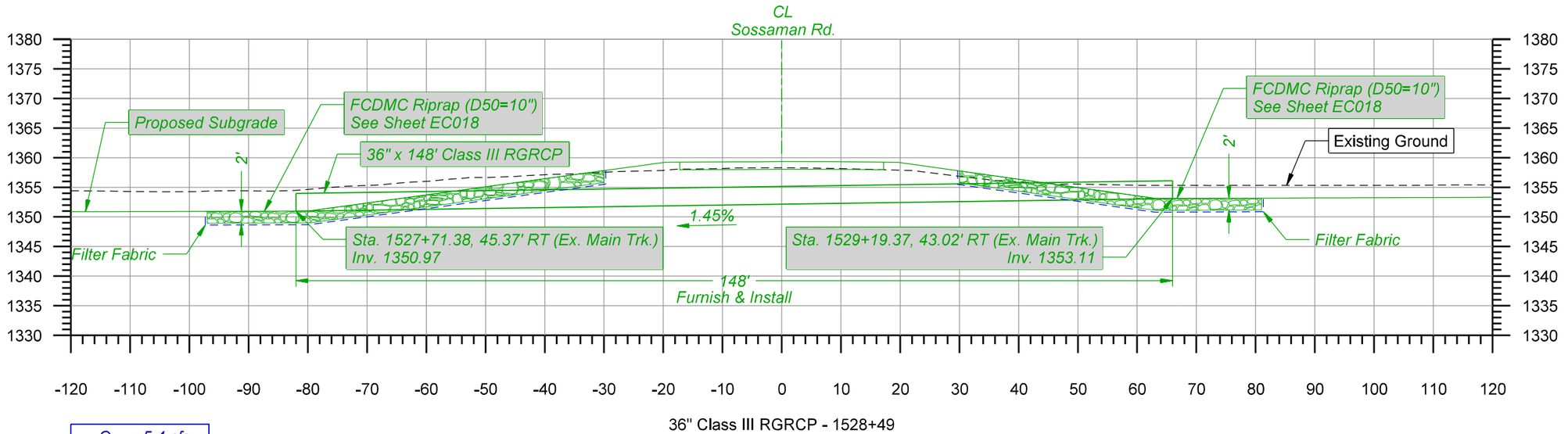
UNION PACIFIC RAILROAD
Sheet 062 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CULVERT STA. 1505+78 - 36" SSP

Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927.RLTK\DGN\Sheets\04-Drainage\T_DR_01.1505+78_200927.dgn
Default
3/9/2026





36" Class III RGRCP - 1528+49

Q_{100} = 5.4 cfs
WSE_{100} = 1354.10
EGL_{100} = 1354.13
VEL_{100} = 6.86 fps

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: C002 of 019

UNION PACIFIC RAILROAD
Sheet 063 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CULVERT STA. 1528+49 - 36" Class III RGRCP

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Drainage\T_DR_02.1528+49_200927.dgn
Default
3/9/2026

PARCEL NO. 304-61-033U
FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

UPRR R/W

PARCEL NO. 304-61-033R
REBECCA ESTRADA

Proposed Shoulder

E.S. 1535+00
36" x 78' SSP

1535+00

Apron Length 15' Min.

F/O

Track 121

Phoenix Sub Main Track

Track 120

15'

15'

100 '

Proposed Shoulder

G

Apron Length 15' Min.

100 '

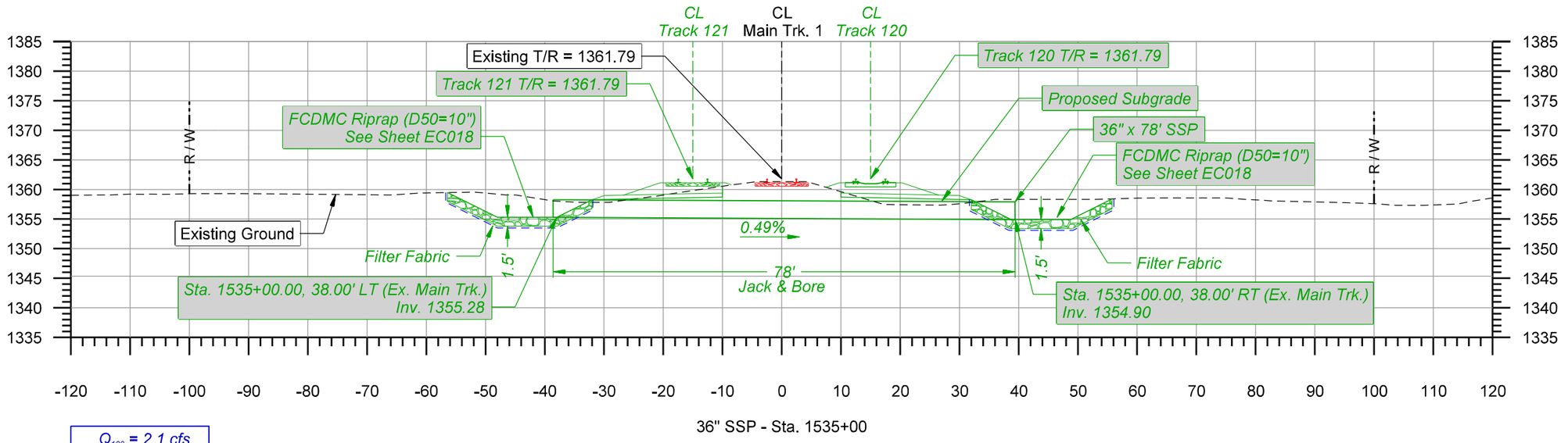
M.H.

UPRR R/W

PARCEL NO. 314-02-916
(LOT 1)

QUEEN CREEK
TOWNHOMES LLC

20 0 20 40
SCALE IN FEET



36" SSP - Sta. 1535+00

Q_{100} = 2.1 cfs
WSE_{100} = 1355.89
EGL_{100} = 1355.92
VEL_{100} = 3.57 fps

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: C003 of 019

UNION PACIFIC RAILROAD

Sheet 064 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CULVERT STA. 1535+00 - 36" SSP

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Drainage\T_DR_03.1535+00_200927.dgn
Default
3/9/2026

PARCEL NO. 304-61-023M

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FCDMC Right-of-Way Use Easement

UPRR R/W

Access Road

E.S. 6+28
36" x 112' CMP

Apron Length 15' Min.

Proposed Shoulder

Track 751

F/O

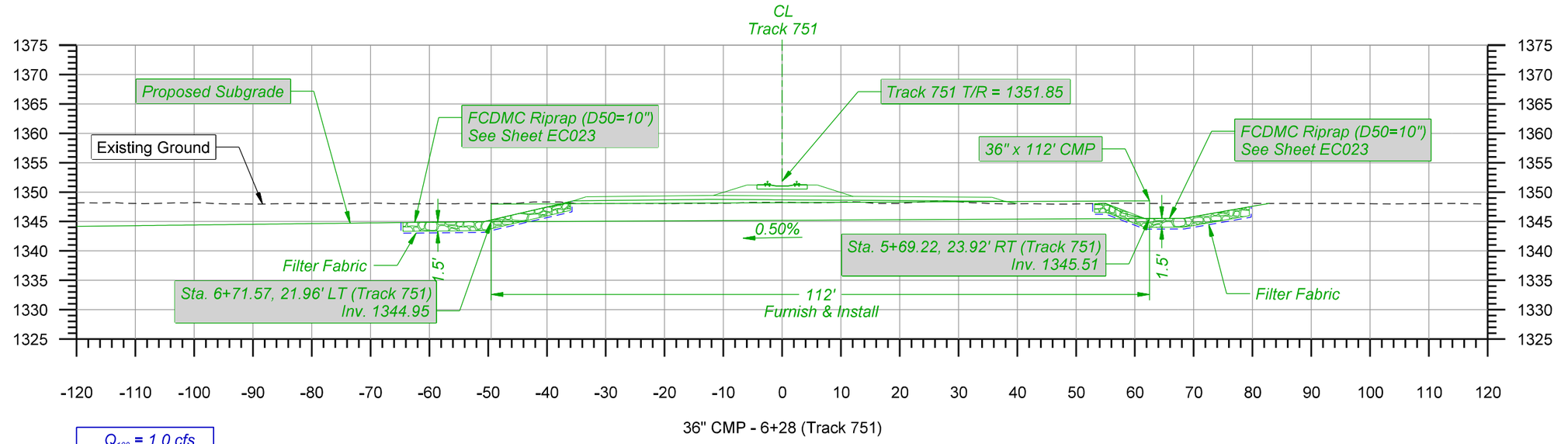
5+00

Apron Length 15' Min.

Proposed Shoulder

11007

20 0 20 40
SCALE IN FEET



Q_{100} = 1.0 cfs
WSE_{100} = NA
EGL_{100} = NA
VEL_{100} = 1.00 fps

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: MHD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: C004 of 019

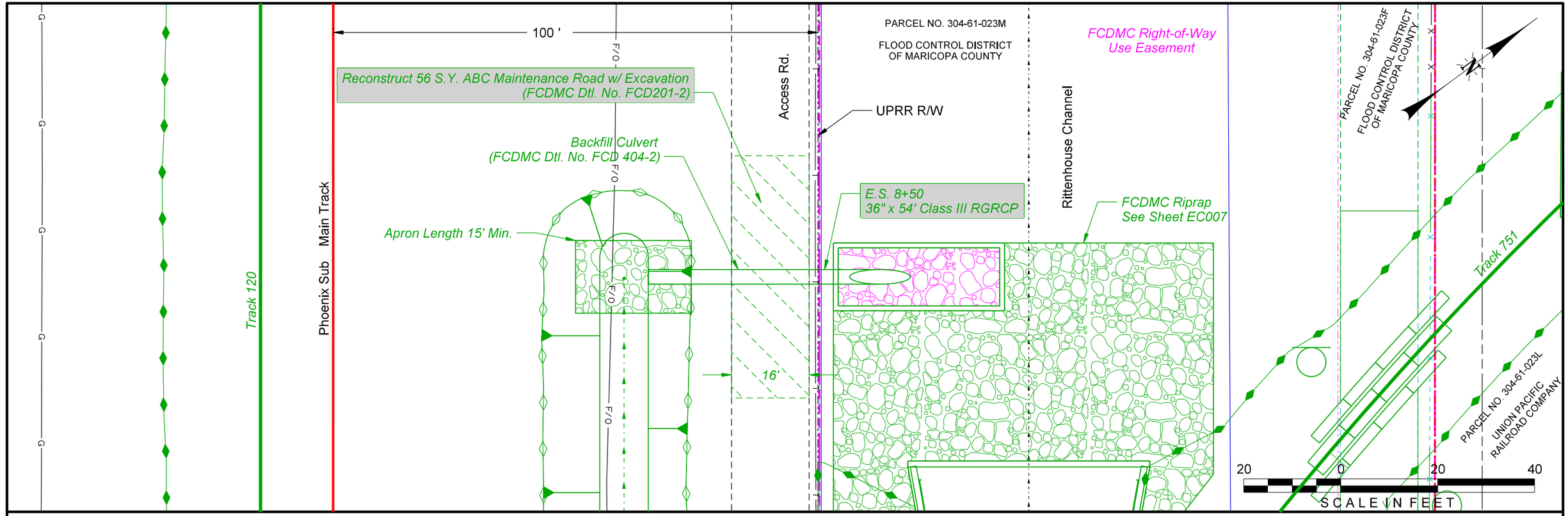
UNION PACIFIC RAILROAD

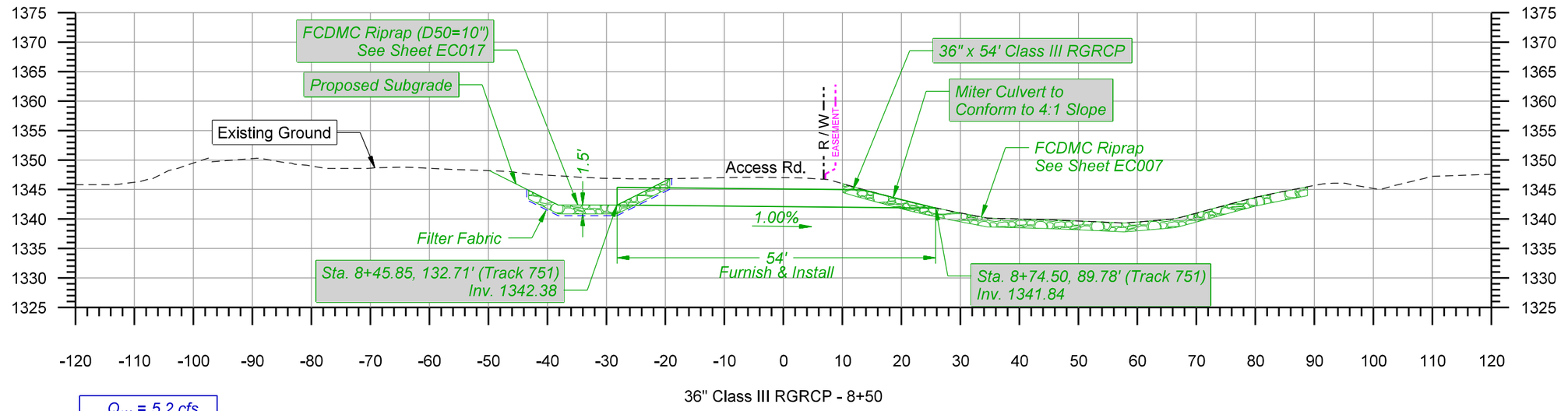
Sheet 065 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CULVERT STA. 6+28 - 36" CMP

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Drainage\T_DR_04_6+28_200327.dgn
Default
3/9/2026





Q_{100} = 5.2 cfs
WSE_{100} = 1343.35
EGL_{100} = 1343.87
VEL_{100} = 5.80 fps

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

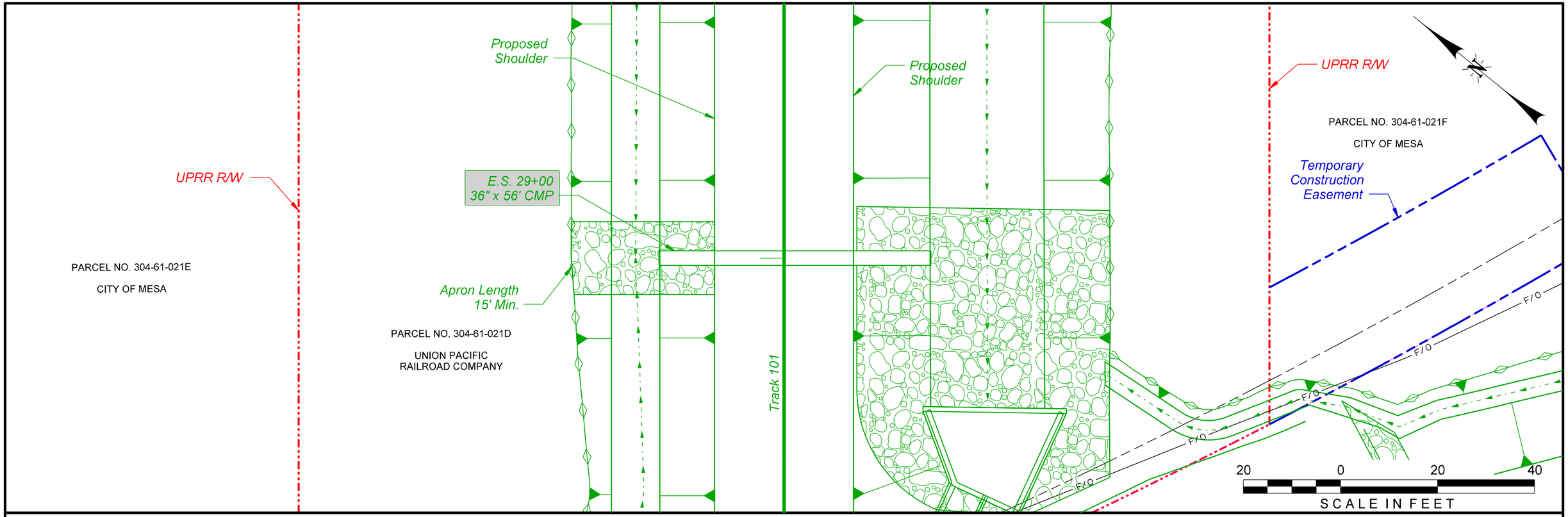
DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: C005 of 019

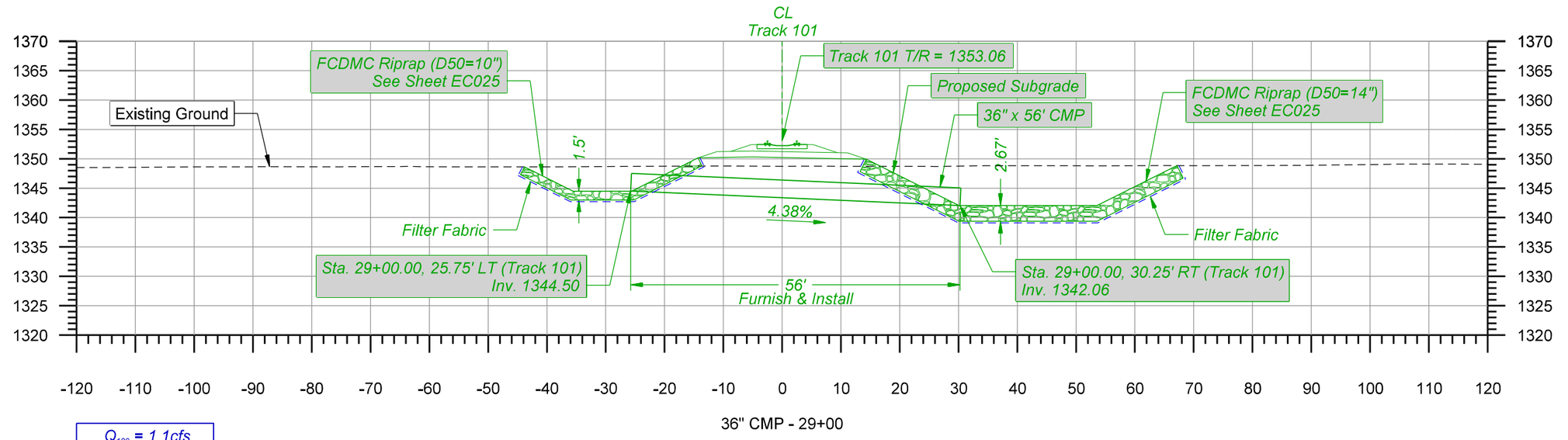
UNION PACIFIC RAILROAD
Sheet 066 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CULVERT STA. 8+50 - 36" CLASS III RGRCP

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Drainage\T_DR_05_8+50_200927.dgn
Default
3/9/2026





Q_{100} = 1.1cfs
WSE_{100} = 1344.92
EGL_{100} = 1345.55
VEL_{100} = 6.35 fps

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

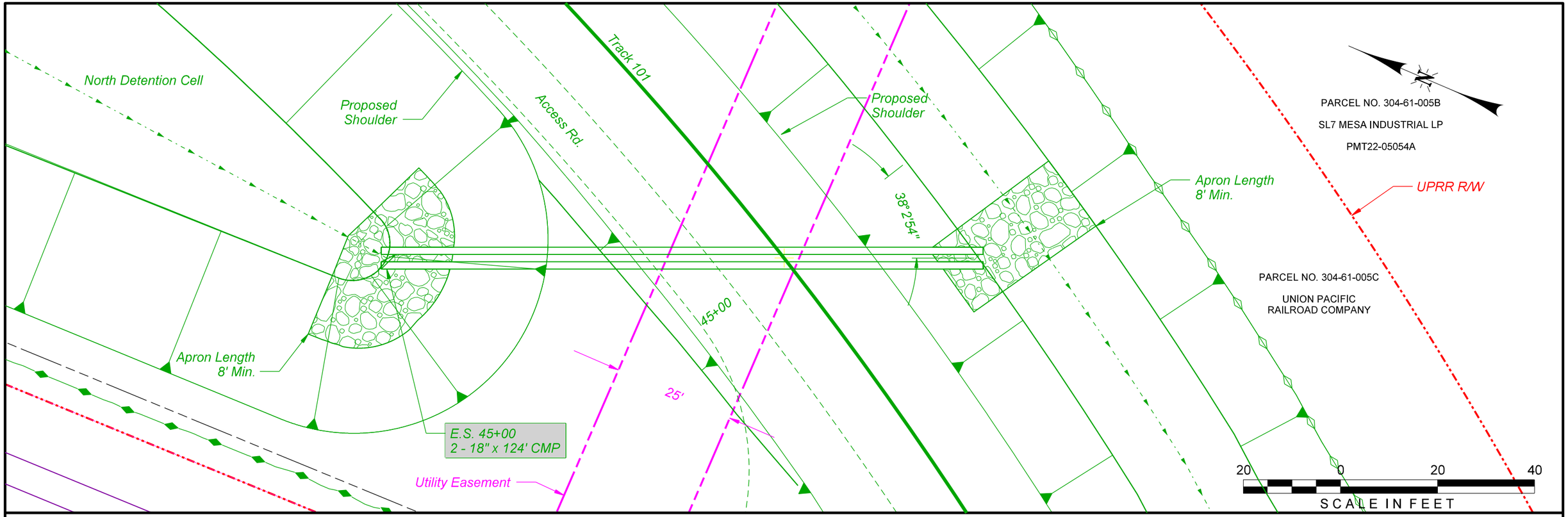
DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: C006 of 019

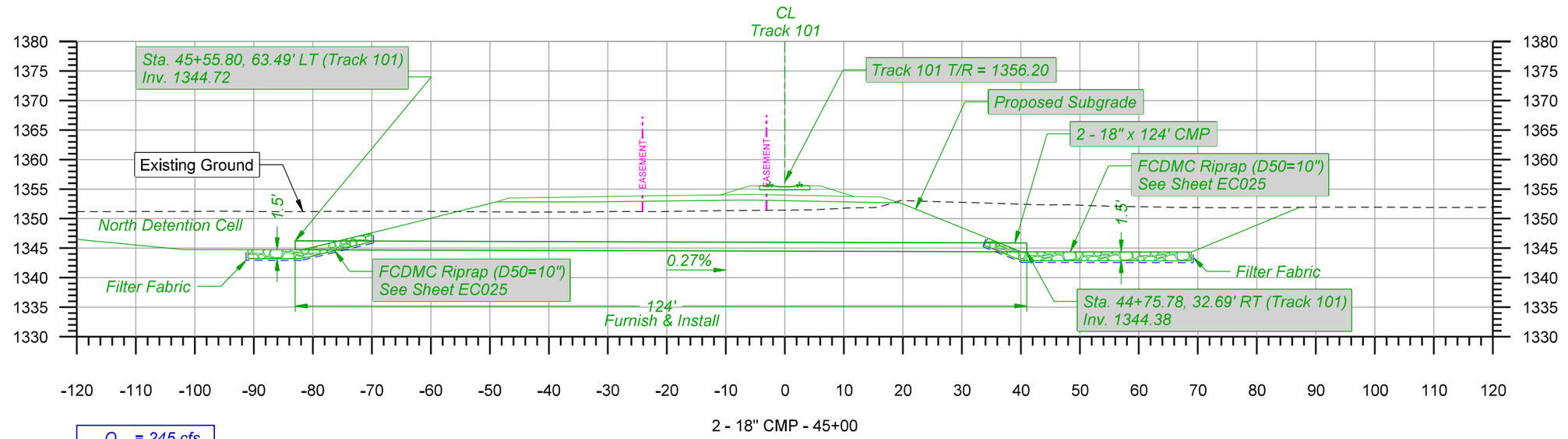
UNION PACIFIC RAILROAD
Sheet 067 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CULVERT STA. 29+00 - 36" CMP

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Drainage\T_DR_06a_29+00_200927.dgn
Default
3/9/2026





Q_{100} = 245 cfs
WSE_{100} = 1349.10
EGL_{100} = 1349.10
VEL_{100} = 4.90 fps

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: C007 of 019

UNION PACIFIC RAILROAD

Sheet 068 of 587

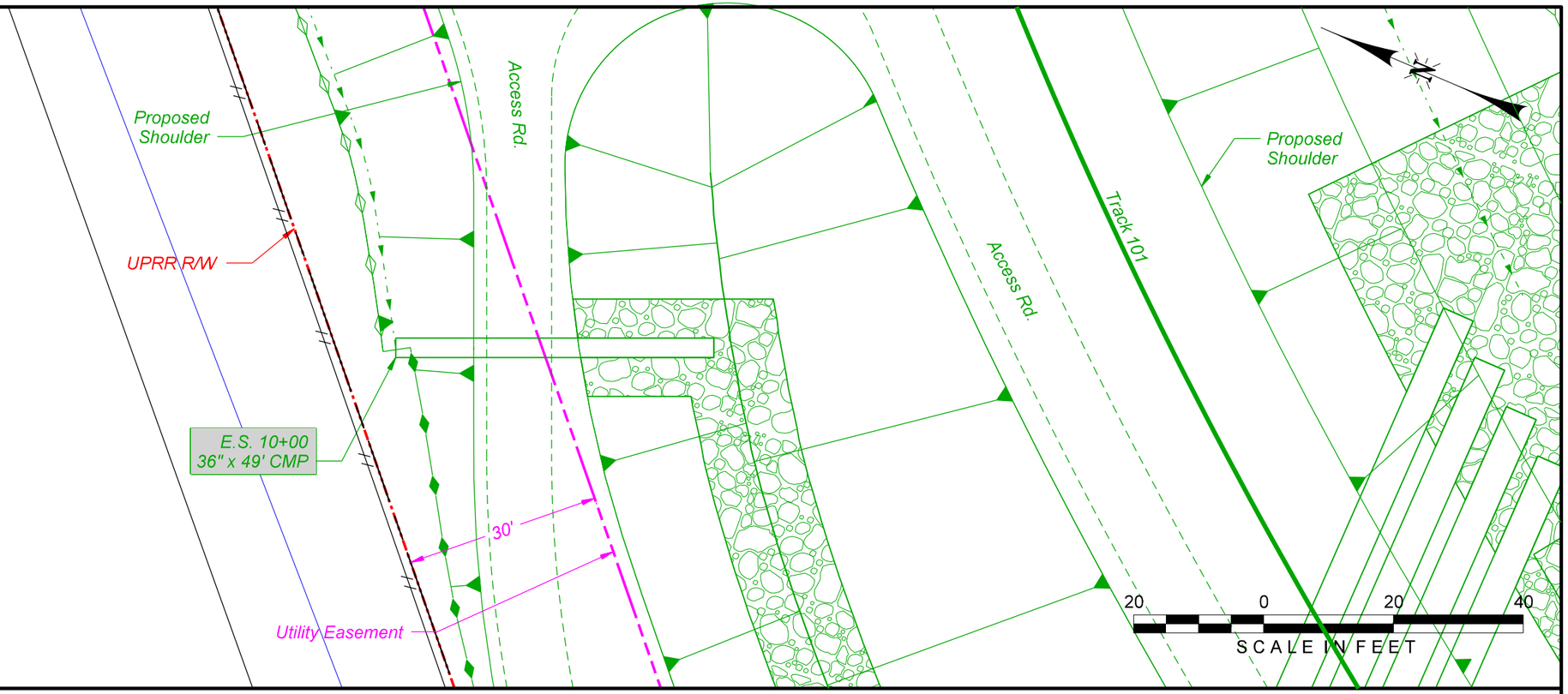
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

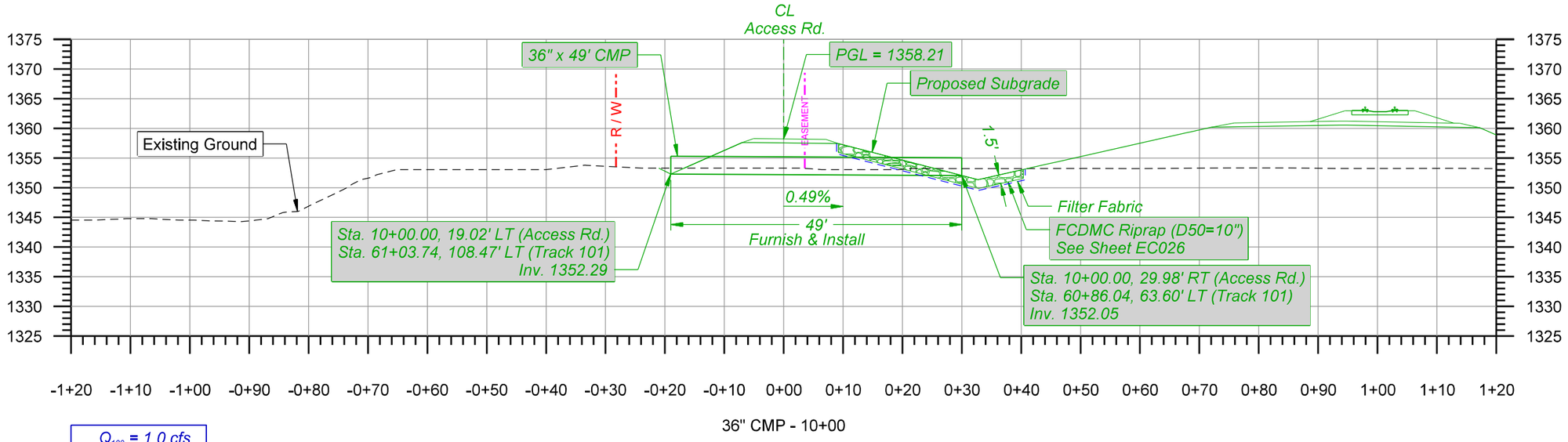
SHEET TITLE:
CULVERT STA. 45+00 - 2 -18" CMP

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Drainage\T_DR_06_45+00_200927.dgn
Default
3/9/2026

PARCEL NO. 304-36-002G

PHOENIX-MESA GATEWAY
AIRPORT AUTHORITY





36" CMP - 10+00

Q_{100} = 1.0 cfs
WSE_{100} = N/A
EGL_{100} = N/A
VEL_{100} = 1.00 fps

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: C008 of 019

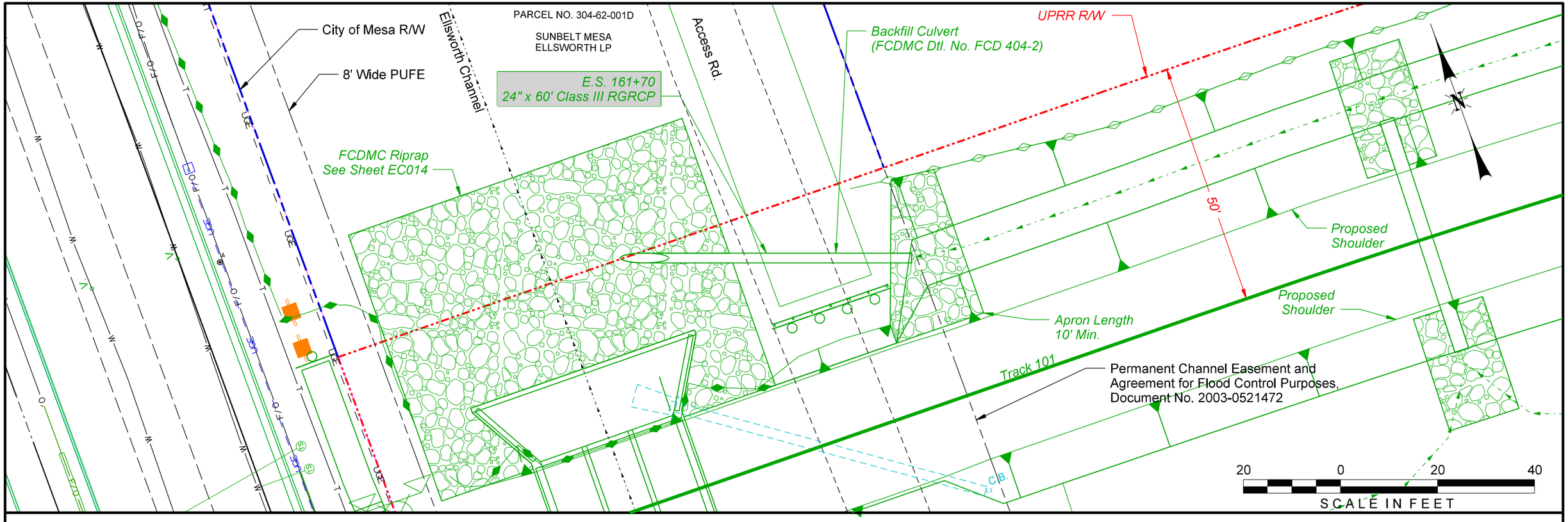
UNION PACIFIC RAILROAD

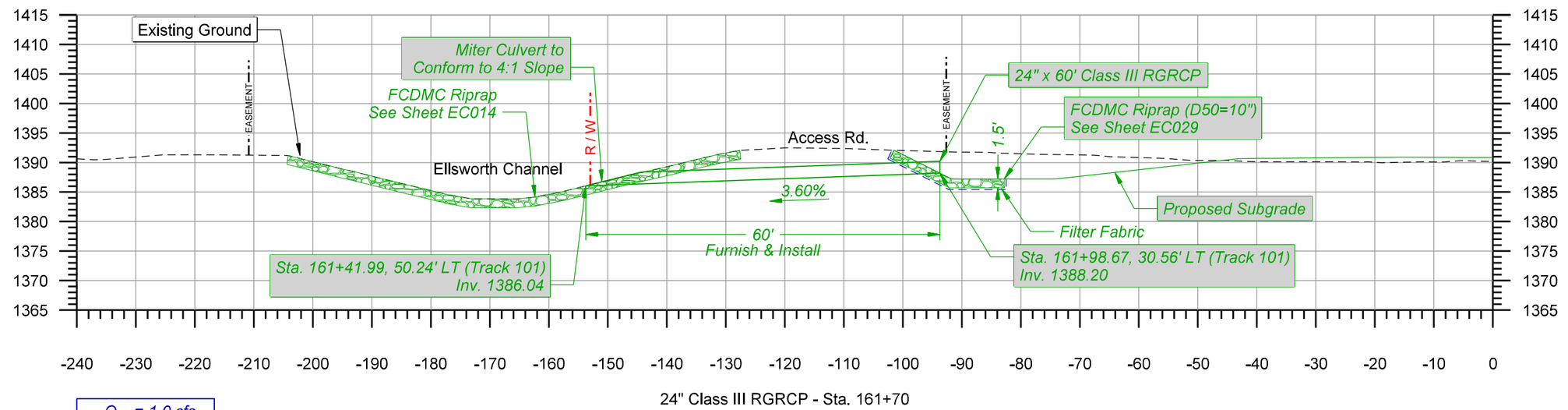
Sheet 069 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CULVERT STA. 10+00 - 36" CMP

Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927.RLTK\DGN\Sheets\04-Drainage\T_DR_07_10+00_200927.dgn
Default
3/9/2026





24" Class III RGRCP - Sta. 161+70

Q_{100} = 1.0 cfs
WSE_{100} = 1388.56
EGL_{100} = 1388.56
VEL_{100} = 0.32 fps

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

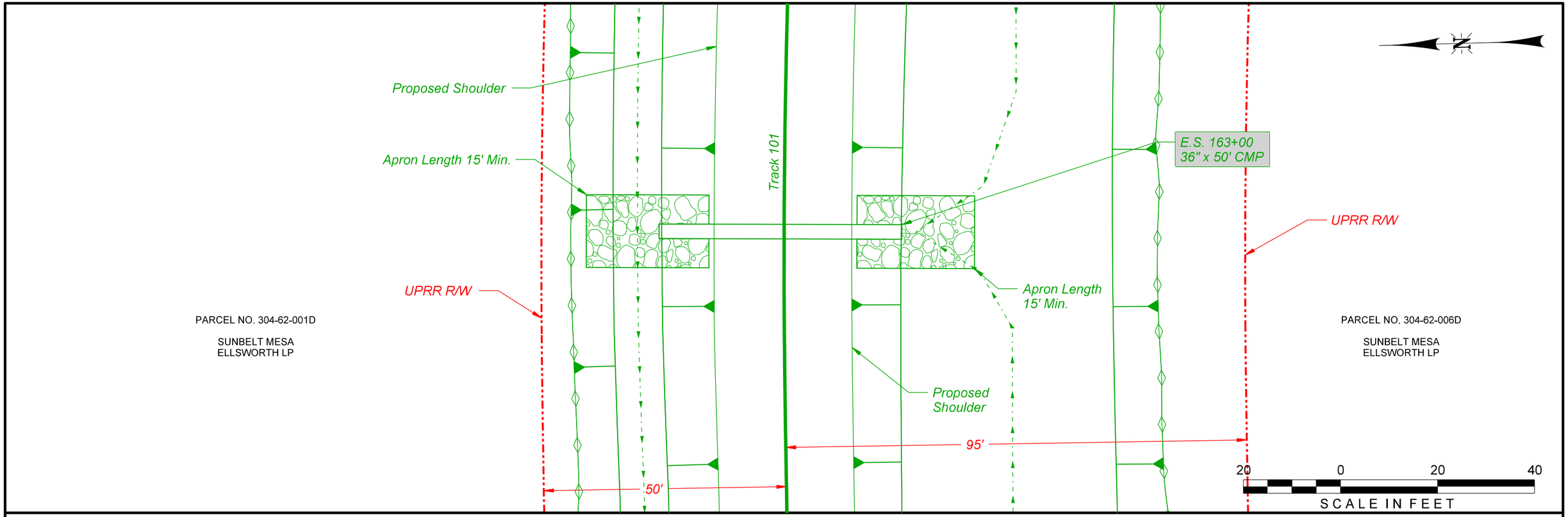
DRAWN BY:	MHD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	C009 of 019

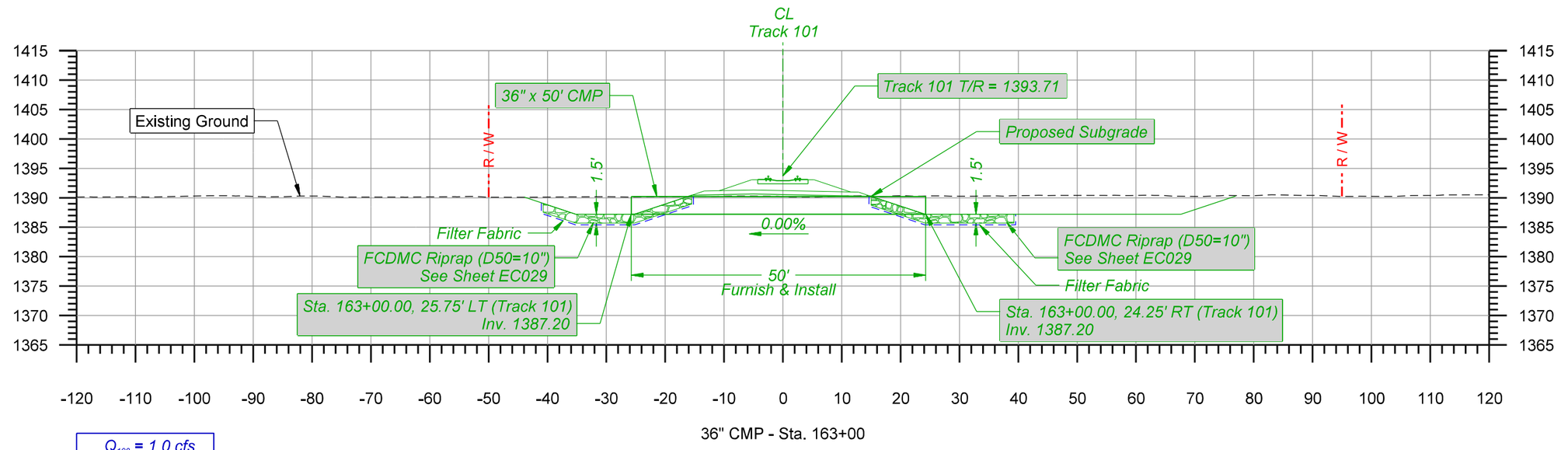
UNION PACIFIC RAILROAD Sheet 070 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CULVERT STA. 161+70 - 24" CLASS III RGRCP

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Drainage\T_DR_08.161+70_200927.dgn
Default
3/9/2026





Q_{100} = 1.0 cfs
WSE_{100} = 1389.13
EGL_{100} = 1389.13
VEL_{100} = 0.21 fps

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

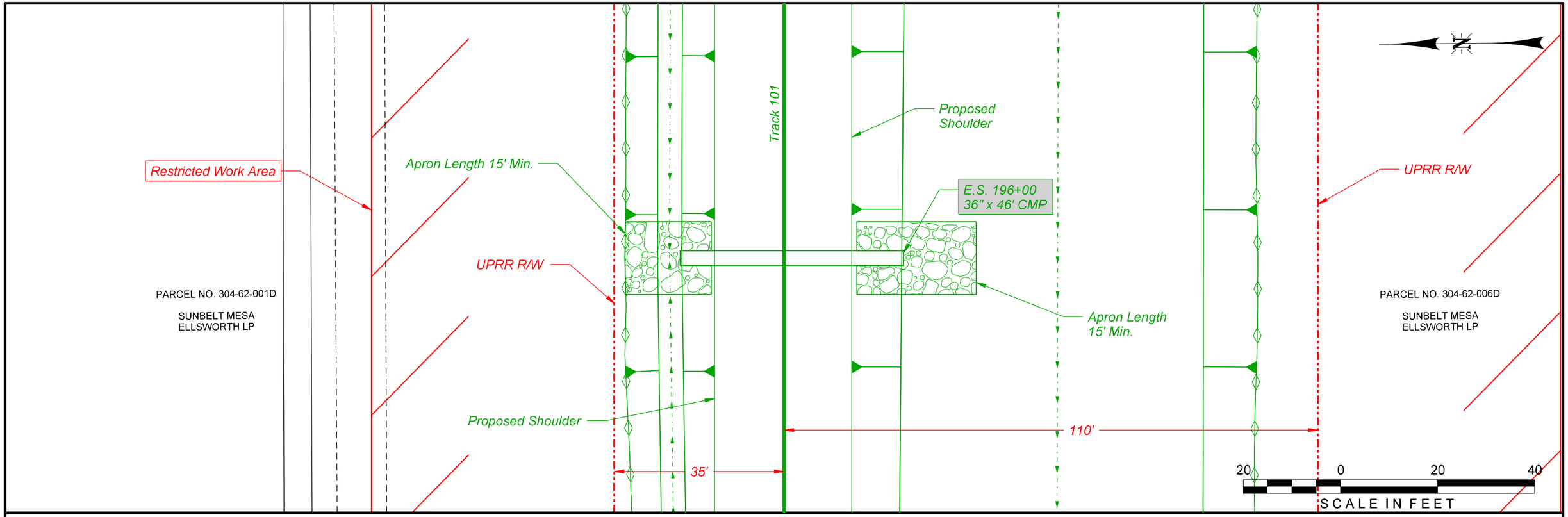
DRAWN BY:	MHD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	C010 of 019

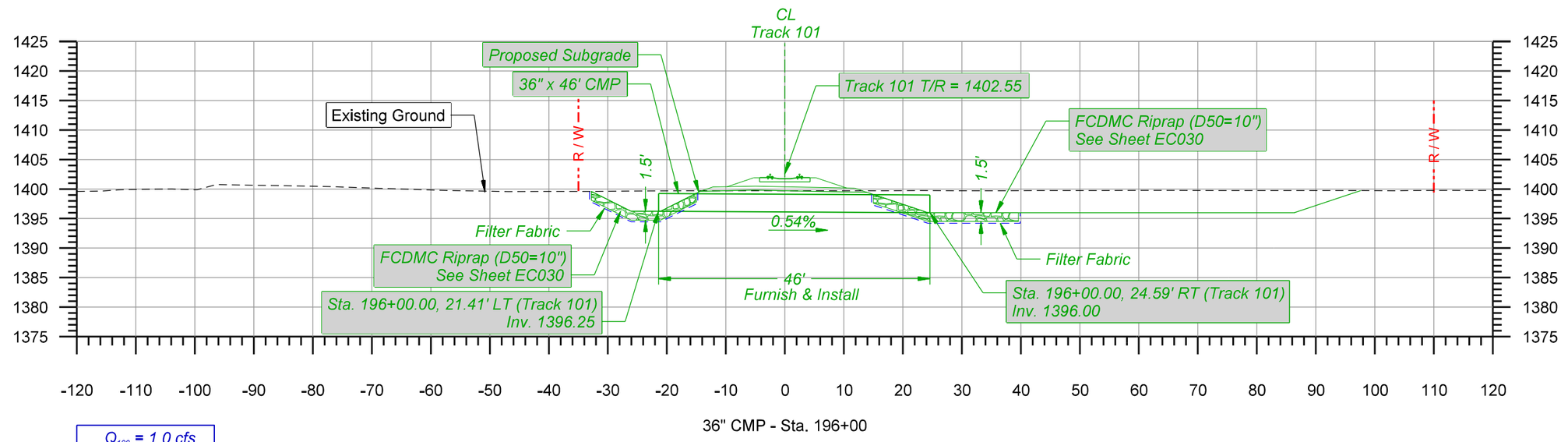
UNION PACIFIC RAILROAD — Sheet 071 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CULVERT STA. 163+00 - 36" CMP

Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Drainage\T_DR_09_163+00_200927.dgn
Default
3/9/2026





Q_{100} = 1.0 cfs
WSE_{100} = 1396.74
EGL_{100} = 1396.77
VEL_{100} = 1.00 fps

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

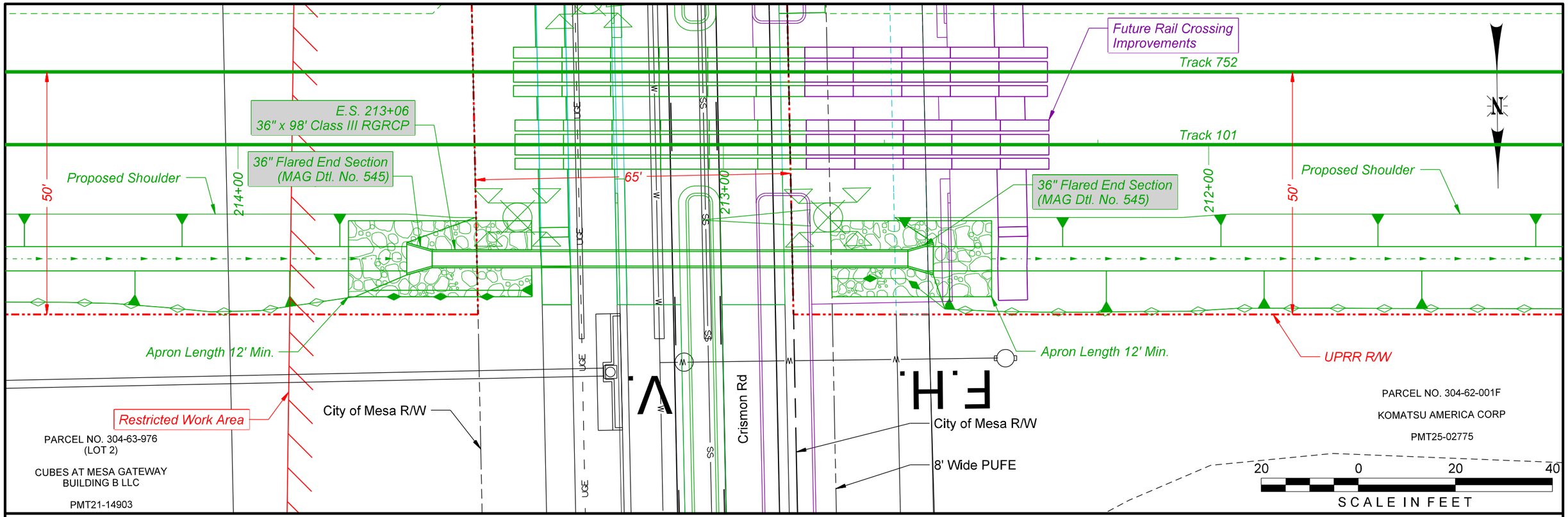
DRAWN BY: MHD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: C011 of 019

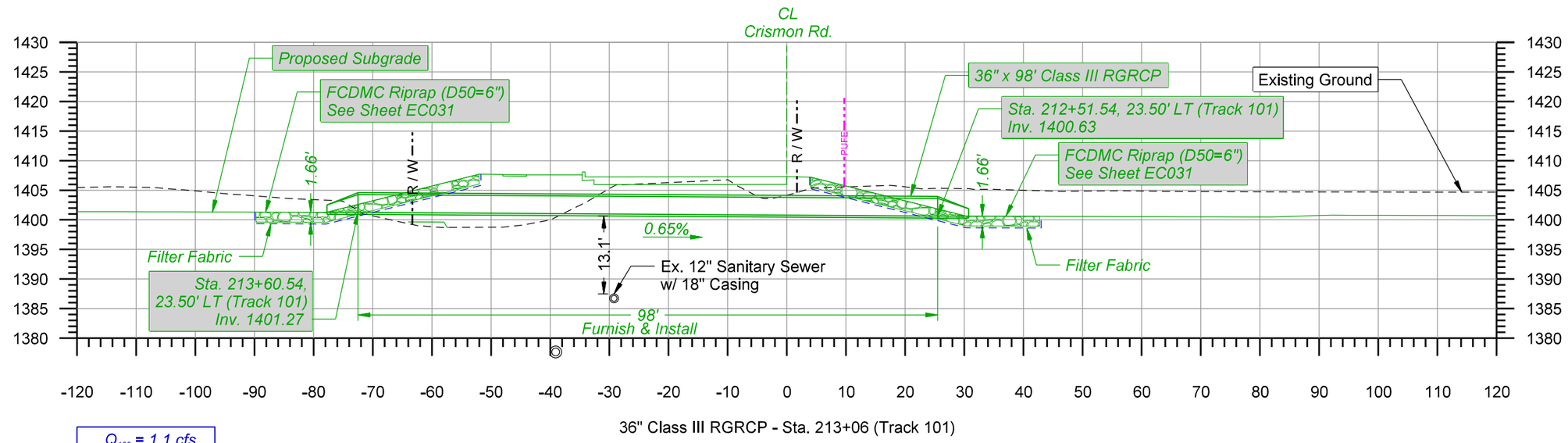
UNION PACIFIC RAILROAD
Sheet 072 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CULVERT STA. 196+00 - 36" CMP

Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Drainage\T_DR_10_196+00_200927.dgn
Default
3/9/2026





Q_{100} = 1.1 cfs
WSE_{100} = 1401.74
EGL_{100} = 1401.74
VEL_{100} = 2.65 fps

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: C012 of 019

UNION PACIFIC RAILROAD
Sheet 073 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CULVERT STA. 213+06 - 36" Class III RGRCP

Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Drainage\T_DR_11_Crismon Rd_213+06_200927.dgn
Default
3/9/2026

PARCEL NO. 304-63-977B
(LOT 3)

CUBES AT MESA GATEWAY
BUILDING C LLC

PMT21-14903

PARCEL NO. 304-62-006D

SUNBELT MESA
ELLSWORTH LP

Restricted Work Area

SRP Transmission
Easement

8 '

65 '

City of Mesa R/W

8' Wide PUFE

Crismon Rd

UPRR R/W

36" Flared End Section
(MAG Dtl. No. 545)

Apron Length 12' Min.

E.S. 213+24
36" x 138' Class III RGRCP

Access Rd

Proposed Shoulder

Track 752

Track 101

Futrue Rail Crossing
Improvements

20 0 20 40

SCALE IN FEET

CL
Crismon Rd.

Existing Ground

Proposed Subgrade

36" x 138' Class III RGRCP

FCDMC Riprap (D50=6")
See Sheet EC031

1.66'

R / W

PUFE

0.91%

11.9'

Ex. 12" Sanitary Sewer
w/ 18" Casing

Filter Fabric

Sta. 213+98.16, 52.09' RT (Track 101)
Inv. 1400.61

138'
Furnish & Install

Sta. 212+48.45,
76.71' RT (Track 101)
Inv. 1399.36

1430 1425 1420 1415 1410 1405 1400 1395 1390 1385 1380

-160 -150 -140 -130 -120 -110 -100 -90 -80 -70 -60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60 70 80

36" Class III RGRCP - Sta. 213+24 (Track 101)

Q_{100} = 1.4 cfs
WSE_{100} = 1401.01
EGL_{100} = 1401.01
VEL_{100} = 0.76 fps

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: C013 of 019

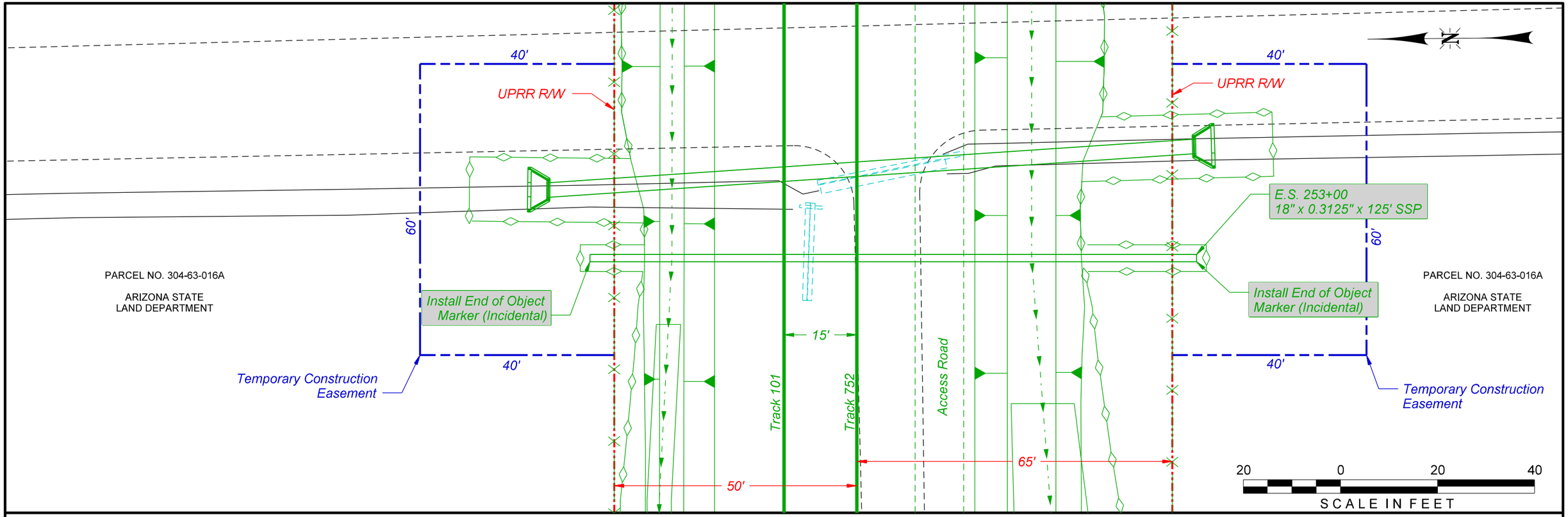
UNION PACIFIC RAILROAD

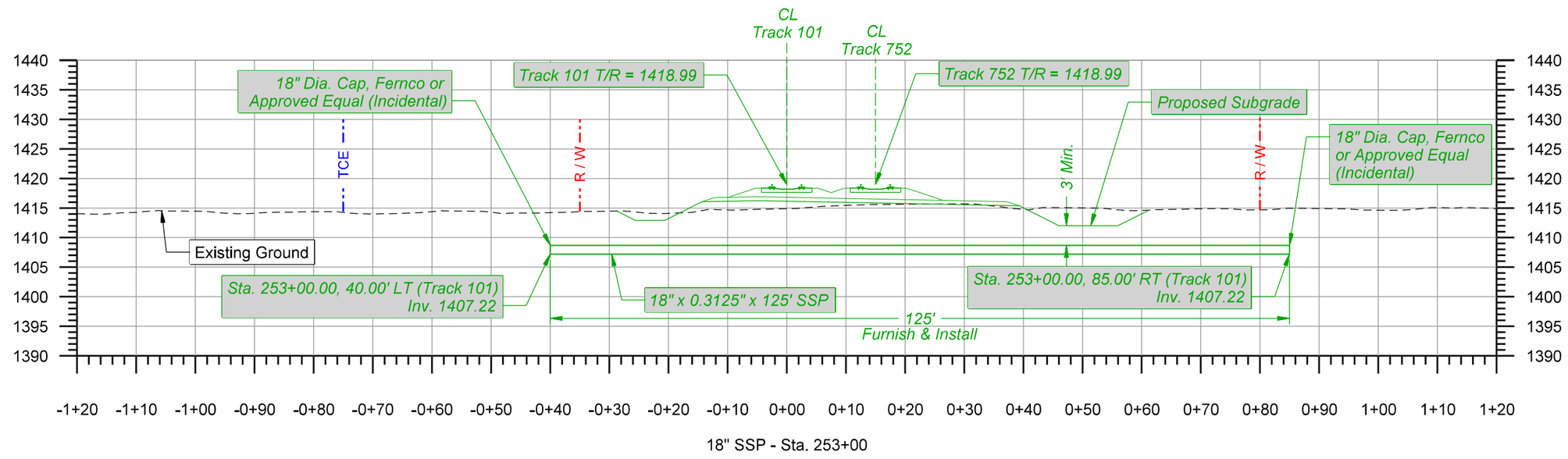
Sheet 074 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CULVERT STA. 213+24 - 36" Class III RGRCP

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Drainage\T_DR_12_Crismon Rd_213+24_200927.dgn
Default
3/9/2026





18" SSP - Sta. 253+00

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

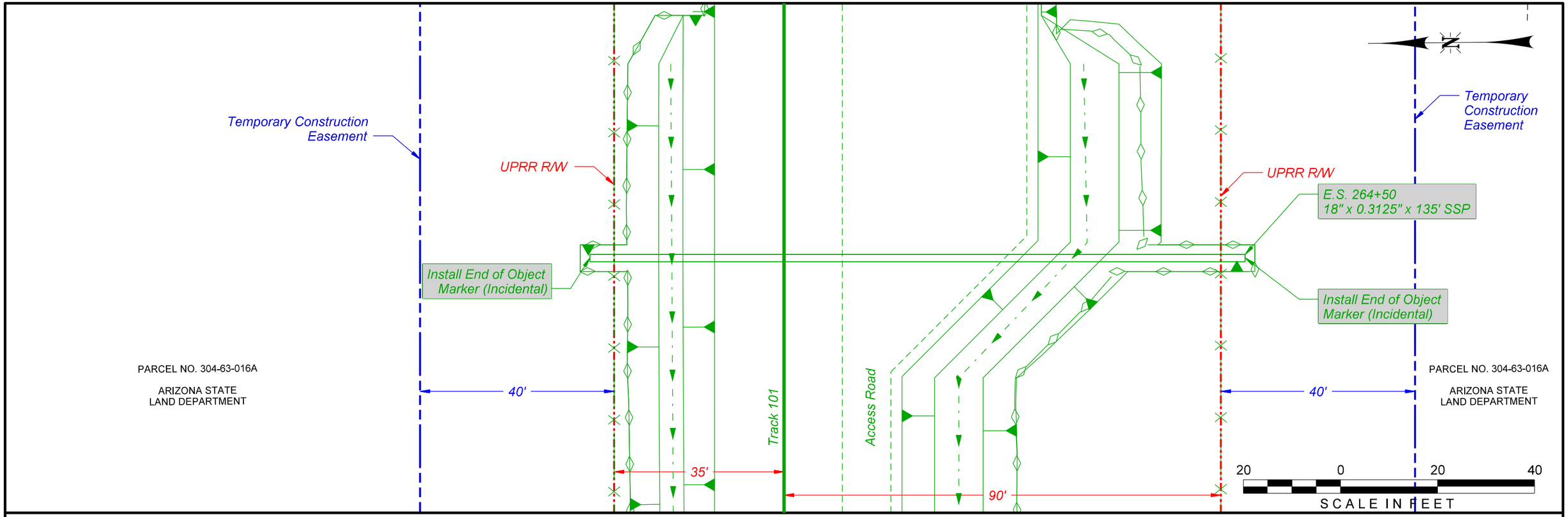
DRAWN BY:	RSP
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	C014 of 019

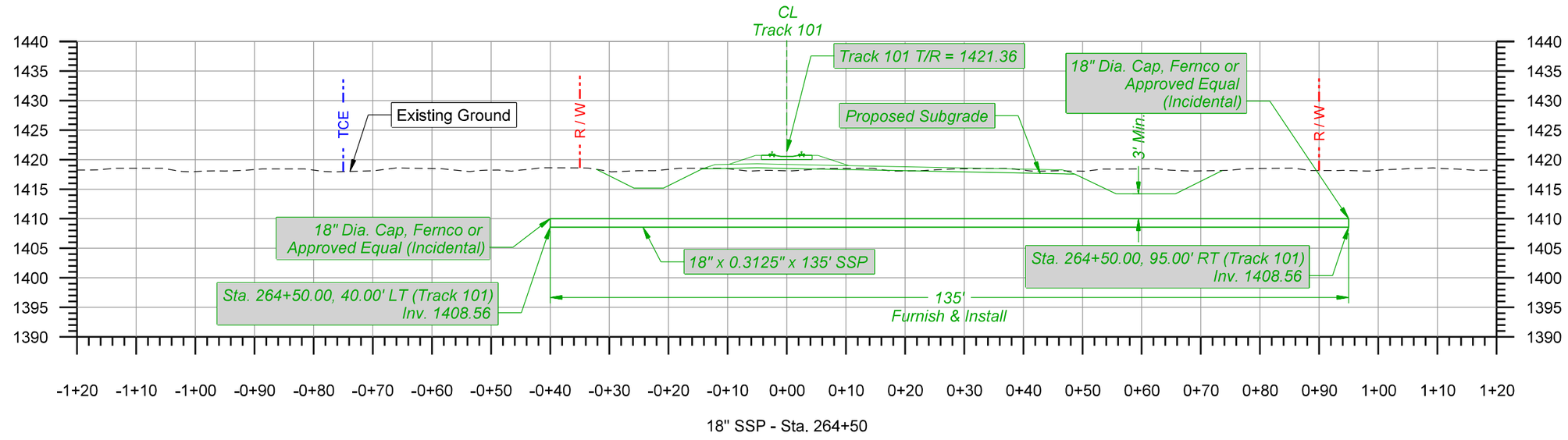
UNION PACIFIC RAILROAD Sheet 075 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
IRRIGATION ENCASEMENT STA. 253+00 - 18" SSP

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Drainage\T_DR_13_ENCASEMENT_253+00_200927.dgn
Default
3/9/2026





18" SSP - Sta. 264+50

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: C015 of 019

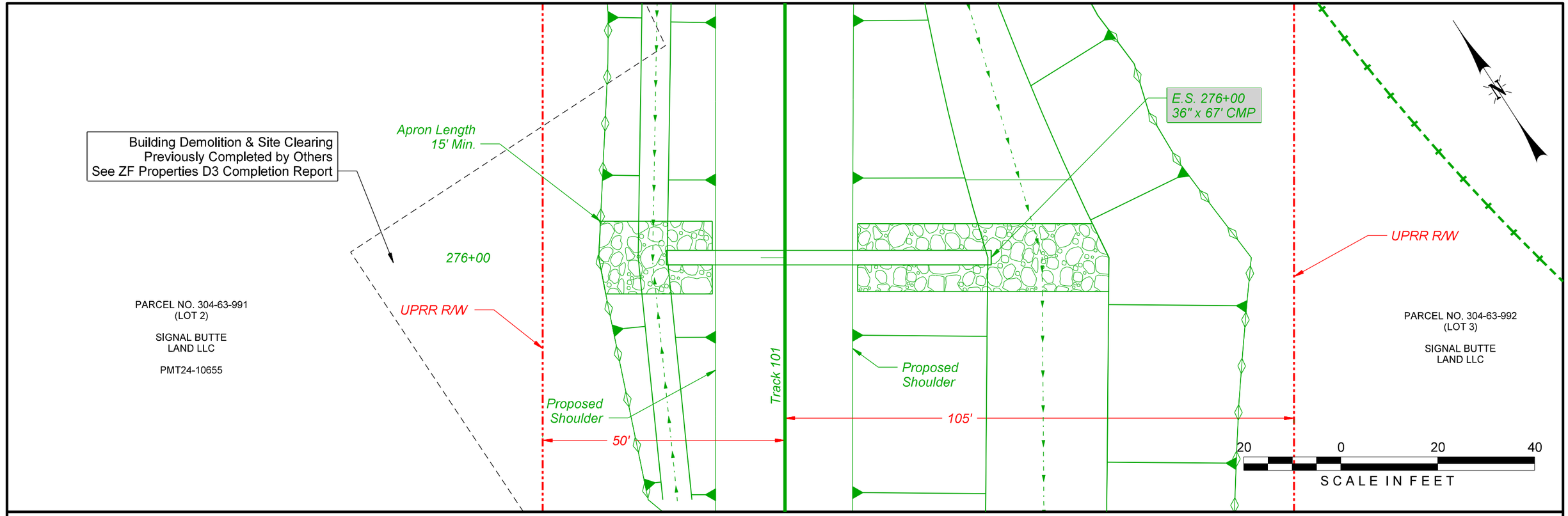
UNION PACIFIC RAILROAD

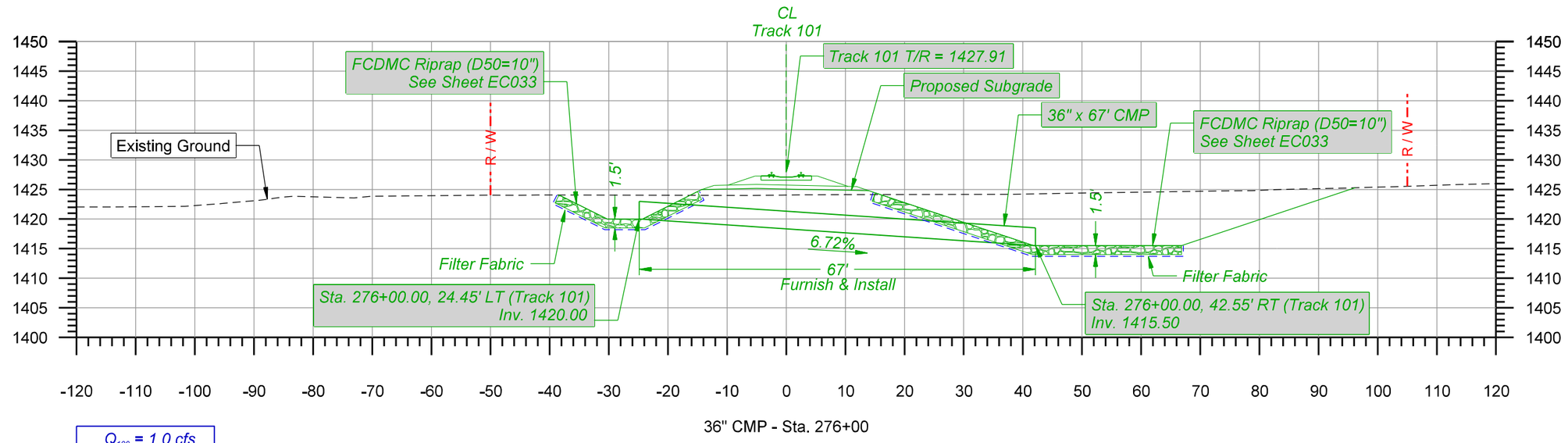
Sheet 076 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
IRRIGATION ENCASEMENT STA. 264+50 - 18" SSP

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Drainage\T_DR_14_ENCASEMENT_264+50_200927.dgn
Default
3/9/2026





Q_{100} = 1.0 cfs
WSE_{100} = 1420.42
EGL_{100} = 1420.72
VEL_{100} = 4.38 fps

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

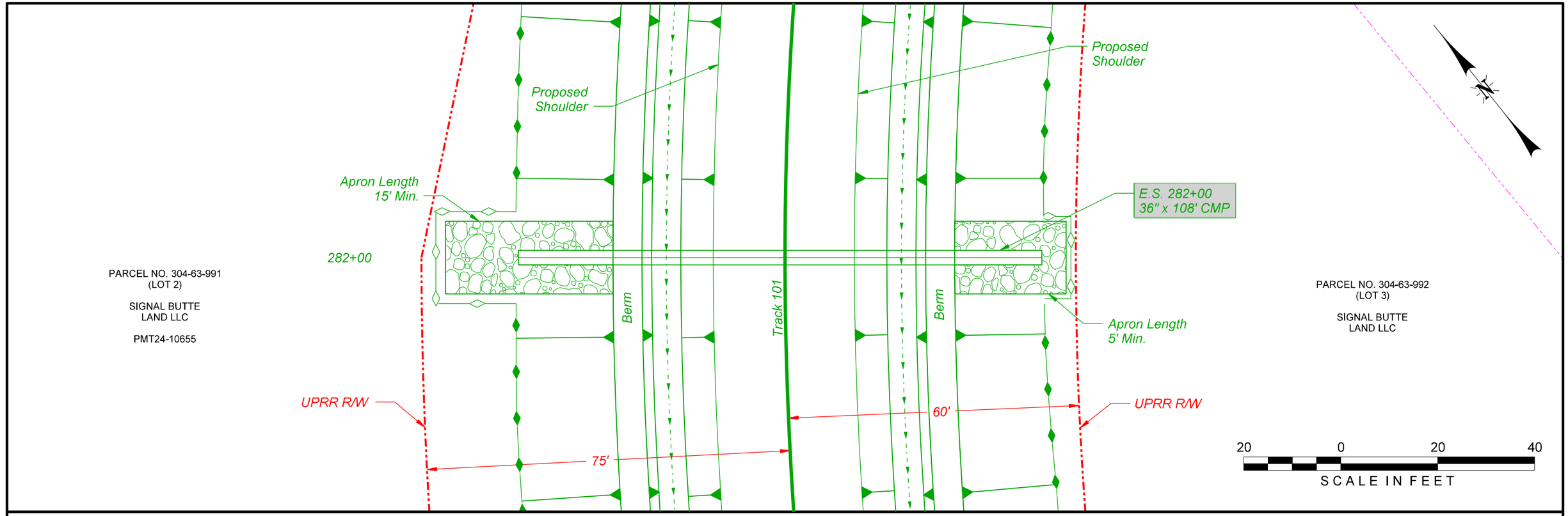
DRAWN BY: MHD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: C016 of 019

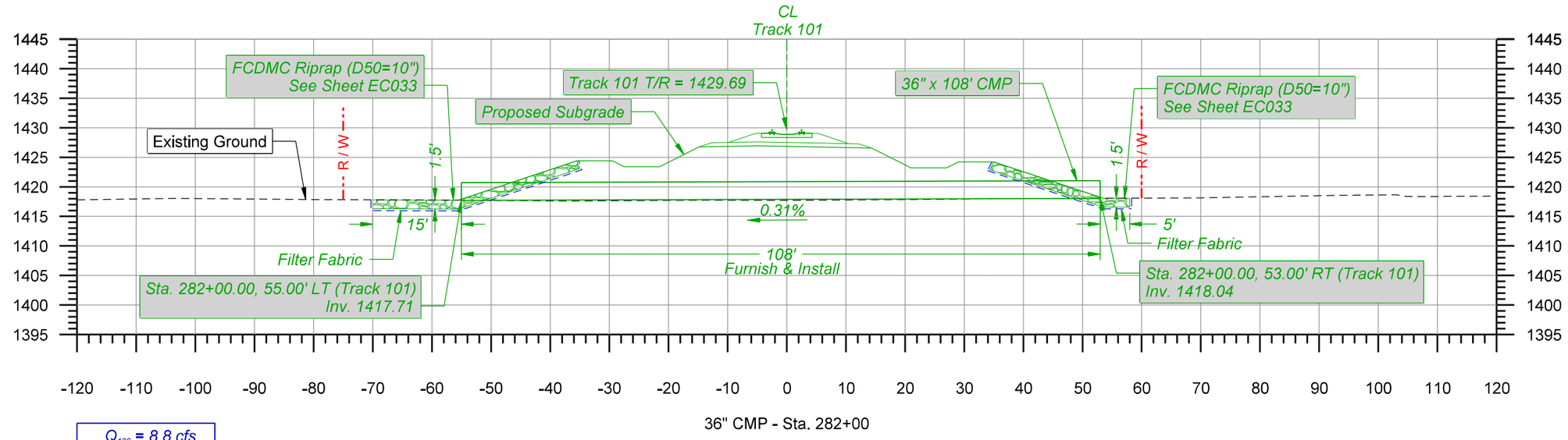
UNION PACIFIC RAILROAD
Sheet 077 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CULVERT STA. 276+00 - 36" CMP

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Drainage\T_DR_15_EQ_276+00_200927.dgn
Default
3/9/2026





Q_{100} = 8.8 cfs
WSE_{100} = 1419.62
EGL_{100} = 1419.94
VEL_{100} = 4.67 fps

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

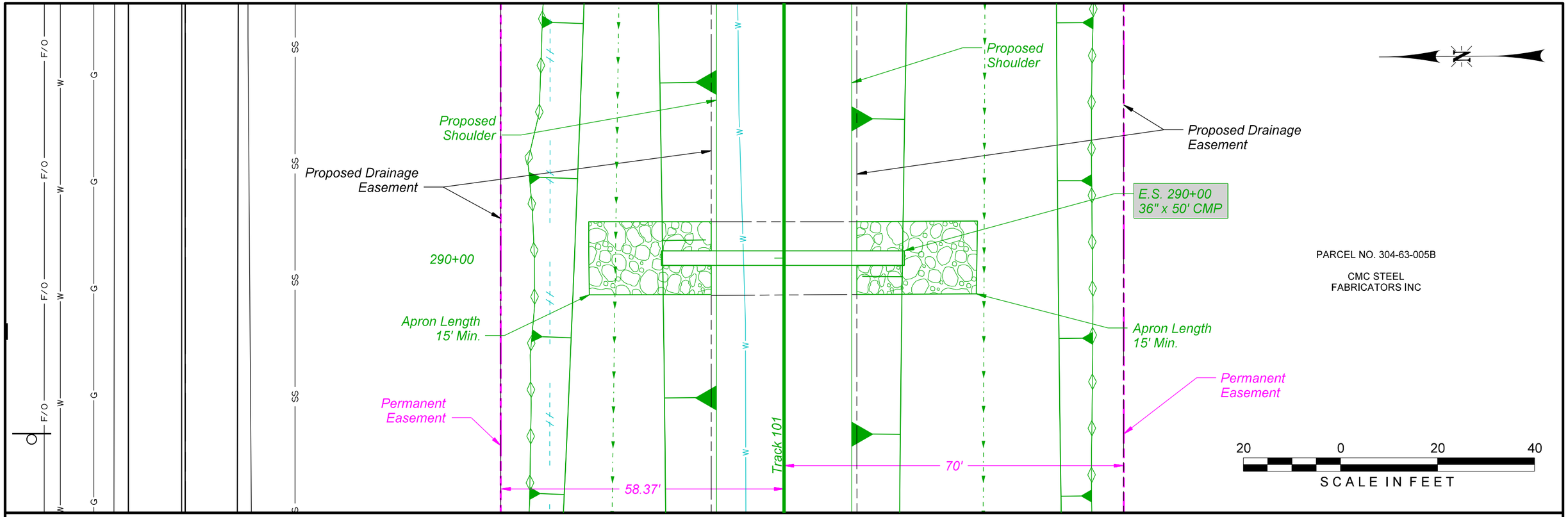
DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: C017 of 019

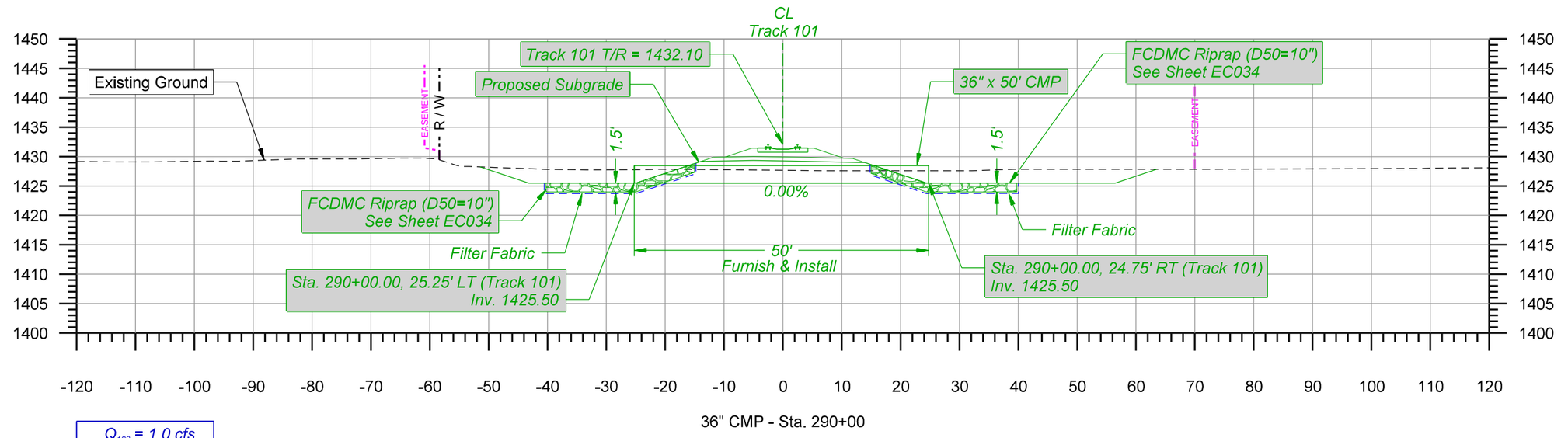
UNION PACIFIC RAILROAD
Sheet 078 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CULVERT STA. 282+00 - 36" CMP

Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Drainage\T_DR_16_EQ_282+00_200927.dgn
Default
3/9/2026





Q_{100} = 1.0 cfs
WSE_{100} = 1426.07
EGL_{100} = 1426.07
VEL_{100} = 2.60 fps

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

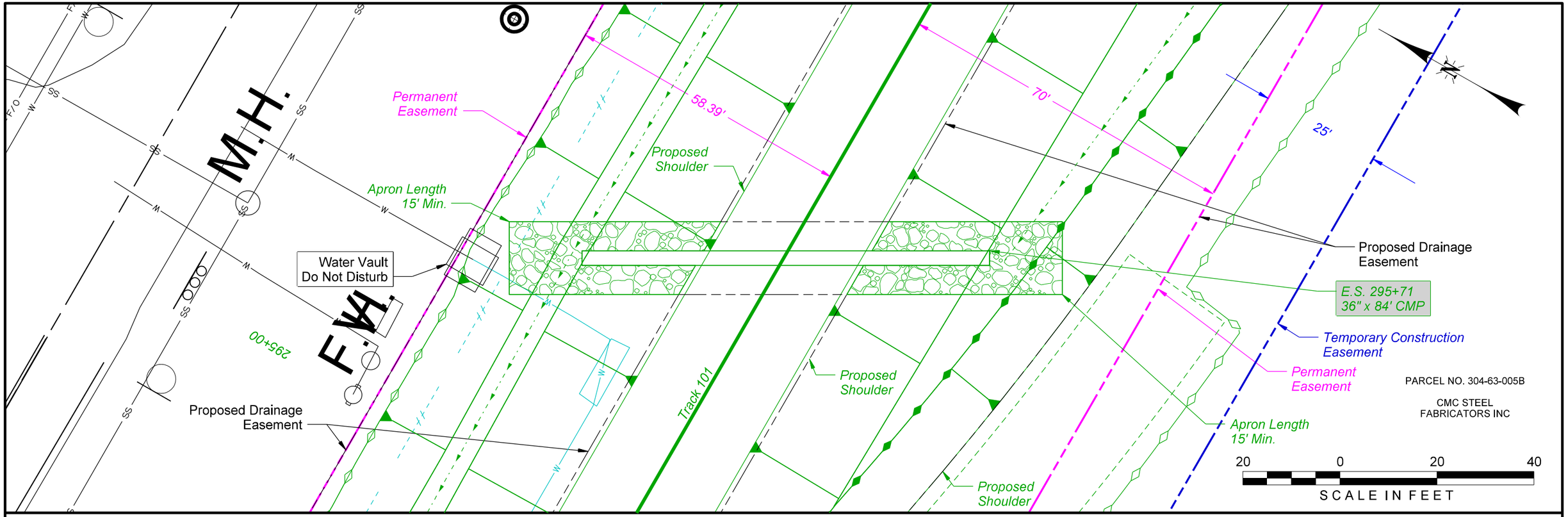
DRAWN BY: MHD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: C018 of 019

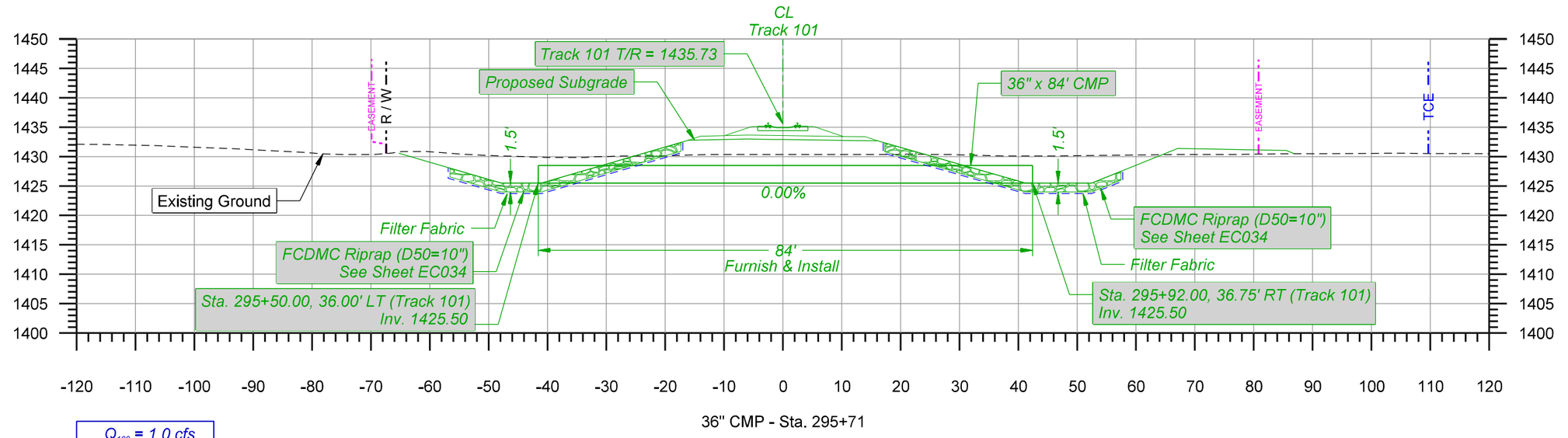
UNION PACIFIC RAILROAD
Sheet 079 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CULVERT STA. 290+00 - 36" CMP

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04-Drainage\T_DR_17_EQ_290+00_200927.dgn
Default
3/9/2026





Q_{100} = 1.0 cfs
WSE_{100} = 1426.12
EGL_{100} = 1426.14
VEL_{100} = 2.60 fps

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: MHD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: C019 of 019

UNION PACIFIC RAILROAD
Sheet 080 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CULVERT STA. 295+71 - 36" CMP

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Drainage\T_DR_18_EQ_295+71_200927.dgn
Default
3/9/2026

*See Sheet R001 for Superelevation & Cross-Slope

South Sossaman Road Alignment Information

Ⓐ P.O.B. Sta. 9+50
Track Sta. 1527+91.12 - 40.22' LT
N=828980.87, E=775684.20

Ⓑ P.O.E. Sta. 15+00.00
Track Sta. 1531+17.88 - 402.19' RT
N=828430.88, E=775685.01

SUPERELEVATION CALCULATIONS

Posted Speed = 45 MPH
Design Speed = 50 MPH

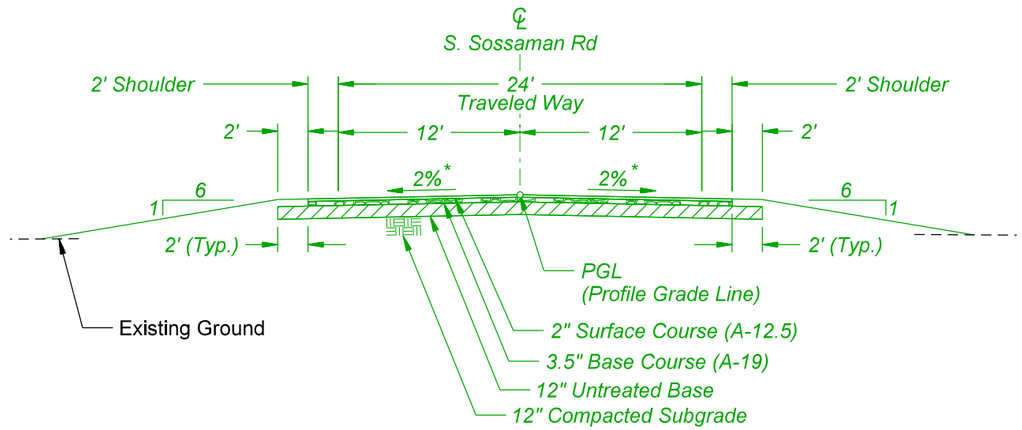
$L = \frac{(wn_l)e_d}{\blacktriangle} \times (b_w)$ (AASHTO Equation 3-23)

Where:
- L = total min. length of superelevation runoff and runout (ft)
- ▲ = maximum relative gradient (%) = 0.50% (AASHTO 3.3.8.2.1)
- n_l = number of lanes rotated = 1.0
- w = width of one traffic lane (ft) = 12.0 ft
- e_d = total change of cross-slope (%) = 2.34% (Lt.), 1.66% (Rt.)
- b_w = adjustment factor for number of lanes rotated
- $b_w = (1 + 0.50 \times (n_l - 1)) / n_l$ (NCHRP Report 439, Table 23)
- $b_w = (1 + 0.50 \times (1.0 - 1)) / 1.0 = 1.00$

Therefore,

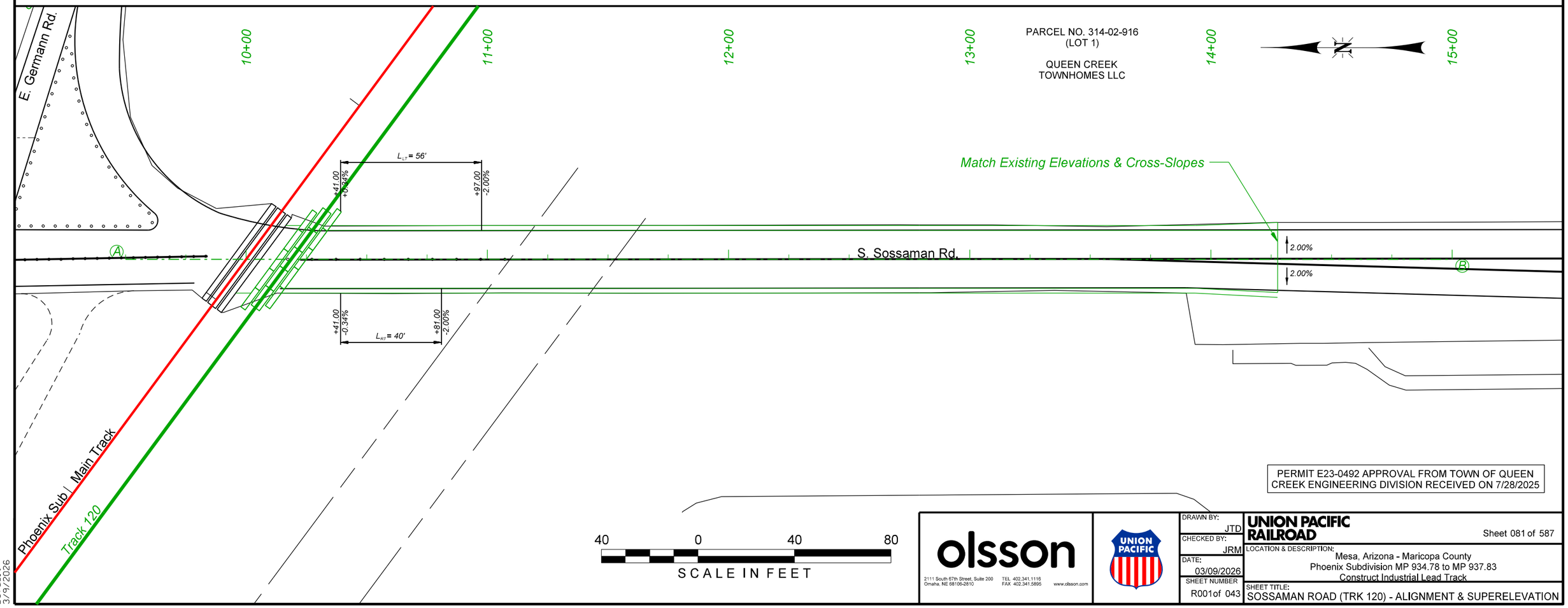
$L_{LT} = \frac{(12 \times 1.0) \times 2.34 \times (1.00)}{0.50} = 56$ ft (Lt.)

$L_{RT} = \frac{(12 \times 1.0) \times 1.66 \times (1.00)}{0.50} = 40$ ft (Rt.)



South Sossaman Road Typical Section

Scale 1" = 10'



PERMIT E23-0492 APPROVAL FROM TOWN OF QUEEN CREEK ENGINEERING DIVISION RECEIVED ON 7/28/2025

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	R001of 043

UNION PACIFIC RAILROAD — Sheet 081 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SOSSAMAN ROAD (TRK 120) - ALIGNMENT & SUPERELEVATION

Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T_R001_MLAlgn_200927.dgn
Default
3/9/2026

PARCEL NO. 314-02-916
(LOT 1)

QUEEN CREEK
TOWNHOMES LLC

10+00 11+00 12+00 13+00 14+00 15+00

S. Sossaman Rd

Phoenix Sub | Main Track

Track 120

Edge of Road Geometrics

① Sta. 10+14.61 - 14.00' RT
② Sta. 10+35.30 - 14.00' LT
③ Sta. 13+93.45 - 14.00' LT
④ Sta. 14+27.64 - 15.28' LT
⑤ Sta. 13+89.78 - 14.00' RT
⑥ Sta. 14+27.64 - 15.80' RT

PERMIT E23-0492 APPROVAL FROM TOWN OF QUEEN CREEK ENGINEERING DIVISION RECEIVED ON 7/28/2025

40 0 40 80
SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

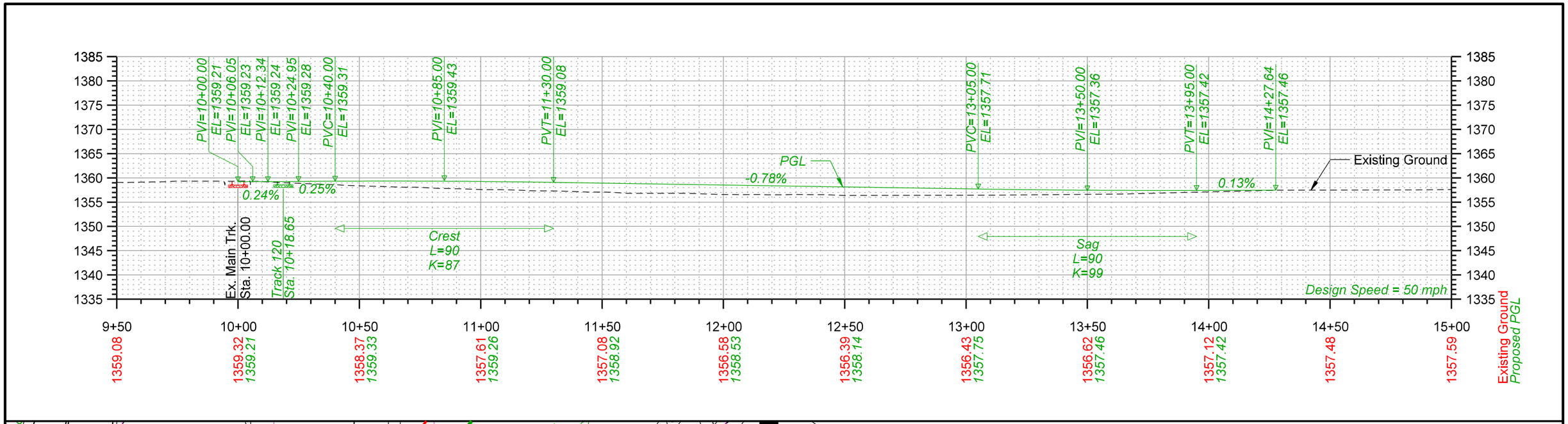
DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: R002 of 043

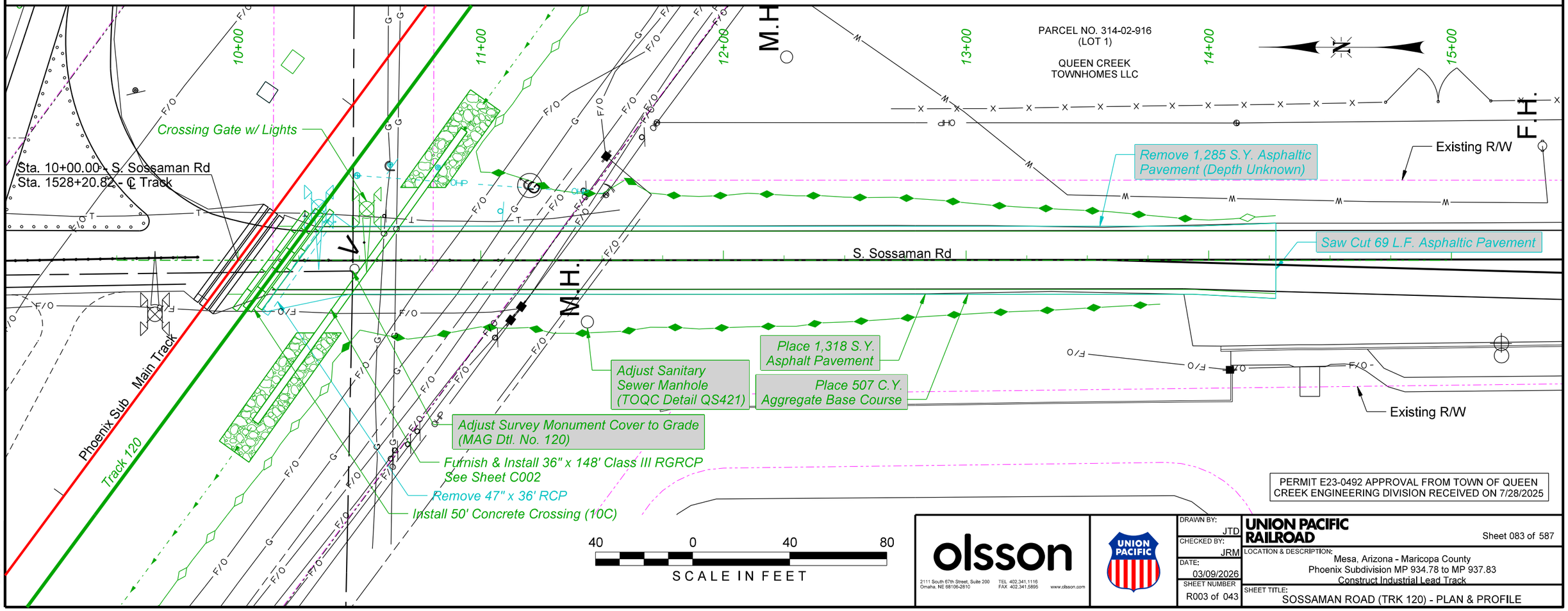
UNION PACIFIC RAILROAD
Sheet 082 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SOSSAMAN ROAD (TRK 120) - GEOMETRICS

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T_R002_MLGeo_200927.dgn
Default
3/9/2026





PERMIT E23-0492 APPROVAL FROM TOWN OF QUEEN CREEK ENGINEERING DIVISION RECEIVED ON 7/28/2025

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	R003 of 043

UNION PACIFIC RAILROAD Sheet 083 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SOSSAMAN ROAD (TRK 120) - PLAN & PROFILE

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04.Road Details\T_R003_MLP1_200927.dgn
Default
3/9/2026

PARCEL NO. 314-02-916
(LOT 1)

QUEEN CREEK
TOWNHOMES LLC

N

10+00 11+00 12+00 13+00 14+00 15+00

M.H. M.H. M.H.

F.H.

Existing R/W

S. Sossaman Rd

Existing R/W

Phoenix Sub Main Track

Track T20

PERMIT E23-0492 APPROVAL FROM TOWN OF QUEEN CREEK ENGINEERING DIVISION RECEIVED ON 7/28/2025

LEGEND

- Existing Ground Minor Contour (1 ft)
- Existing Ground Major Contour (5 ft)
- Proposed Subgrade Minor Contour (0.5 ft)
- Proposed Subgrade Major Contour (5 ft)

40 0 40 80

SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: R004 of 043

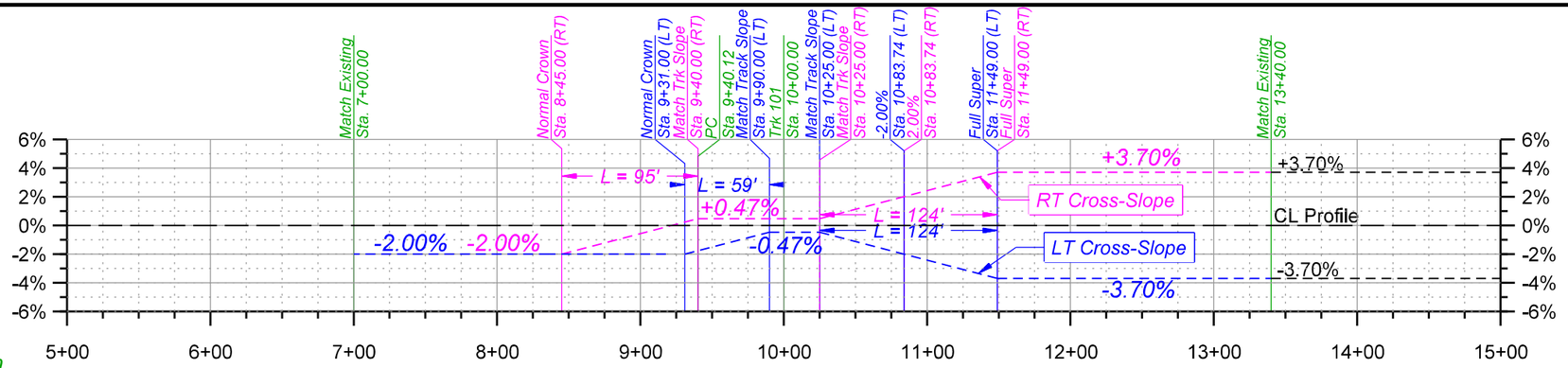
UNION PACIFIC RAILROAD

Sheet 084 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SOSSAMAN ROAD (TRK 120) - GRADING PLAN

Color tables: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T
Default
3/9/2026



Superelevation Diagram

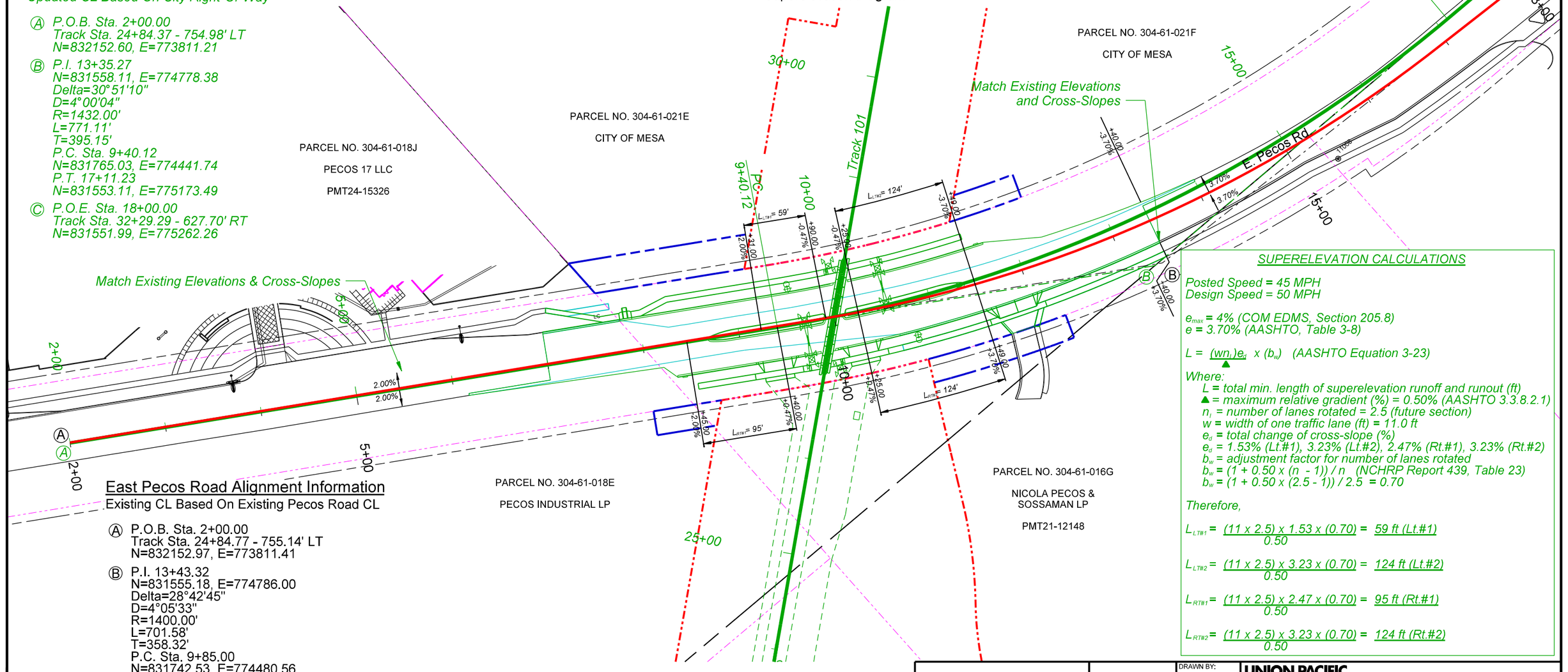
East Pecos Road Alignment Information

Updated CL Based On City Right-Of-Way

Ⓐ *P.O.B. Sta. 2+00.00*
Track Sta. 24+84.37 - 754.98' LT
N=832152.60, E=773811.21

Ⓑ *P.I. 13+35.27*
N=831558.11, E=774778.38
Delta=30°51'10"
D=4°00'04"
R=1432.00'
L=771.11'
T=395.15'
P.C. Sta. 9+40.12
N=831765.03, E=774441.74
P.T. 17+11.23
N=831553.11, E=775173.49

Ⓒ *P.O.E. Sta. 18+00.00*
Track Sta. 32+29.29 - 627.70' RT
N=831551.99, E=775262.26



East Pecos Road Alignment Information

Existing CL Based On Existing Pecos Road CL

Ⓐ P.O.B. Sta. 2+00.00
Track Sta. 24+84.77 - 755.14' LT
N=832152.97, E=773811.41

Ⓑ P.I. 13+43.32
N=831555.18, E=774786.00
Delta=28°42'45"
D=4°05'33"
R=1400.00'
L=701.58'
T=358.32'
P.C. Sta. 9+85.00
N=831742.53, E=774480.56
P.T. 16+86.58
N=831537.60, E=775143.89

Ⓒ P.O.E. Sta. 18+00.00
Track Sta. 32+12.63 - 639.85' RT
N=831532.03, E=775257.17

100 0 100 200
SCALE IN FEET

SUPERELEVATION CALCULATIONS

Posted Speed = 45 MPH
Design Speed = 50 MPH

e_{max} = 4% (COM EDMS, Section 205.8)
e = 3.70% (AASHTO, Table 3-8)

$L = \frac{(wn_1)e_d}{\blacktriangle} \times (b_w)$ (AASHTO Equation 3-23)

Where:
L = total min. length of superelevation runoff and runout (ft)
▲ = maximum relative gradient (%) = 0.50% (AASHTO 3.3.8.2.1)
n_1 = number of lanes rotated = 2.5 (future section)
w = width of one traffic lane (ft) = 11.0 ft
e_d = total change of cross-slope (%)
e_d = 1.53% (Lt.#1), 3.23% (Lt.#2), 2.47% (Rt.#1), 3.23% (Rt.#2)
b_w = adjustment factor for number of lanes rotated
$b_w = (1 + 0.50 \times (n - 1)) / n$ (NCHRP Report 439, Table 23)
$b_w = (1 + 0.50 \times (2.5 - 1)) / 2.5 = 0.70$

Therefore,

$L_{LTH1} = \frac{(11 \times 2.5) \times 1.53 \times (0.70)}{0.50} =$ 59 ft (Lt.#1)

$L_{LTH2} = \frac{(11 \times 2.5) \times 3.23 \times (0.70)}{0.50} =$ 124 ft (Lt.#2)

$L_{RTH1} = \frac{(11 \times 2.5) \times 2.47 \times (0.70)}{0.50} =$ 95 ft (Rt.#1)

$L_{RTH2} = \frac{(11 \times 2.5) \times 3.23 \times (0.70)}{0.50} =$ 124 ft (Rt.#2)

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	R005 of 043

UNION PACIFIC RAILROAD — Sheet 085 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EAST PECOS ROAD (Trk 101) - ALIGNMENT & SUPERELEVATION

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T_RDxx_23A1
Default
3/9/2026

Pavement Geometrics (Data to Face of Curb)

1. Sta. 6+14.82 - 18.00' RT
2. Sta. 7+00.00 - 34.00' LT
3. Sta. 7+06.23 - 53.24' LT
4. Sta. 7+07.04 - 58.24' LT
5. Sta. 7+60.71 - 40.50' LT
6. Sta. 7+62.93 - 34.50' LT
7. Sta. 8+02.26 - 40.50' LT
8. Sta. 8+03.24 - 34.50' LT
9. Sta. 8+17.98 - 21.98' RT
10. Sta. 8+30.50 - 34.00' RT
11. Sta. 8+30.76 - 50.00' LT
12. Sta. 8+31.74 - 44.00' LT
13. Sta. 8+50.00 - 44.00' RT
14. Sta. 8+50.00 - 50.00' RT
15. 2' R.P. Sta. 8+70.70 - 0.00' LT
    P.C. Sta. 8+70.17 - 1.93' LT
    P.T. Sta. 8+70.30 - 1.96' RT
16. 100' R.P. Sta. 8+83.17 - 5.50' LT
    P.C. Sta. 8+70.17 - 1.93' LT
    P.T. Sta. 8+96.65 - 5.50' LT
17. 100' R.P. Sta. 8+80.24 - 4.00' RT
    P.C. Sta. 8+70.30 - 1.96' RT
    P.T. Sta. 8+90.40 - 4.00' RT
18. Sta. 9+19.78 - 34.00' RT
19. Sta. 9+19.78 - 44.00' RT
20. Sta. 9+49.57 - 34.00' RT
21. Sta. 9+49.57 - 44.00' RT
22. Sta. 9+59.39 - 44.00' RT
23. Sta. 9+59.39 - 50.00' RT
24. Sta. 9+65.22 - 44.25' RT
25. Sta. 9+65.22 - 50.25' RT
26. Sta. 9+75.57 - 50.25' RT
27. Sta. 9+77.77 - 44.25' RT
28. Sta. 9+81.37 - 34.50' RT
29. 2' R.P. Sta. 9+86.34 - 2.00' RT
    P.C. Sta. 9+86.34 - 4.00' RT
    P.T. Sta. 9+88.21 - 2.72' RT
30. 2' R.P. Sta. 9+88.47 - 3.50' LT
    P.C. Sta. 9+88.47 - 5.50' LT
    P.T. Sta. 9+90.34 - 2.78' LT
31. Sta. 9+94.53 - 44.00' LT
32. Sta. 9+94.53 - 50.00' LT
33. Sta. 10+00.72 - 44.25' LT
34. Sta. 10+00.72 - 50.25' LT
35. Sta. 10+08.43 - 34.50' LT
36. Sta. 10+12.48 - 44.25' LT
37. Sta. 10+15.01 - 50.25' LT

PARCEL NO. 304-61-018J
PECOS 17 LLC
PMT24-15326

PARCEL NO. 304-61-021E
CITY OF MESA

PARCEL NO. 304-61-021F
CITY OF MESA

PARCEL NO. 304-61-018E
PECOS INDUSTRIAL LP

PARCEL NO. 304-61-016G
NICOLA PECOS & SOSSAMAN LP
PMT21-12148

Track 101

E. Pecos Rd.

5+00

10+00

Pavement Geometrics (Data to Face of Curb)

38. Sta. 9+86.06 - 50.25' RT
39. Sta. 9+88.30 - 44.25' RT
40. Sta. 9+91.99 - 34.50' RT
41. Sta. 9+99.38 - 50.25' RT
42. Sta. 9+99.38 - 44.25' RT
43. Sta. 10+05.16 - 50.00' RT
44. 2' R.P. Sta. 10+12.12 - 2.00' RT
    P.C. Sta. 10+10.27 - 1.25' RT
    P.T. Sta. 10+12.12 - 4.00' RT
45. 2' R.P. Sta. 10+14.36 - 3.50' LT
    P.C. Sta. 10+12.50 - 4.25' LT
    P.T. Sta. 10+14.36 - 5.50' LT
46. Sta. 10+19.65 - 34.50' LT
47. Sta. 10+23.80 - 44.25' LT
48. Sta. 10+26.39 - 50.25' LT
49. Sta. 10+07.13 - 44.00' RT
50. Sta. 10+07.13 - 34.00' RT
51. Sta. 10+36.46 - 44.00' RT
52. Sta. 10+36.46 - 34.00' RT
53. Sta. 10+59.49 - 50.25' LT
54. Sta. 10+59.49 - 44.25' LT
55. Sta. 10+65.68 - 50.00' LT
56. Sta. 10+65.68 - 44.00' LT
57. 100' R.P. Sta. 11+25.19 - 4.04' RT
    P.C. Sta. 11+14.54 - 4.00' RT
    P.T. Sta. 11+35.63 - 1.90' RT
58. 100' R.P. Sta. 11+23.29 - 5.44' LT
    P.C. Sta. 11+10.31 - 5.50' LT
    P.T. Sta. 11+35.78 - 1.99' LT
59. 2' R.P. Sta. 11+35.24 - 0.06' LT
    P.C. Sta. 11+35.63 - 1.90' RT
    P.T. Sta. 11+35.78 - 1.99' LT
60. Sta. 11+50.00 - 50.00' LT
61. Sta. 11+50.00 - 44.00' LT
62. Sta. 11+69.97 - 34.00' LT
63. Sta. 12+30.06 - 19.09' LT
64. Sta. 11+62.25 - 34.00' RT
65. Sta. 11+62.41 - 46.00' RT
66. Sta. 12+01.33 - 34.00' RT
67. Sta. 12+01.17 - 46.00' RT
68. Sta. 12+85.80 - 15.58' LT
69. Sta. 13+40.00 - 34.50' RT
70. Sta. 13+40.00 - 44.00' RT
71. Sta. 13+40.00 - 50.00' RT
72. Sta. 14+00.00 - 8.75' LT

60 0 60 120
SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: R006 of 043

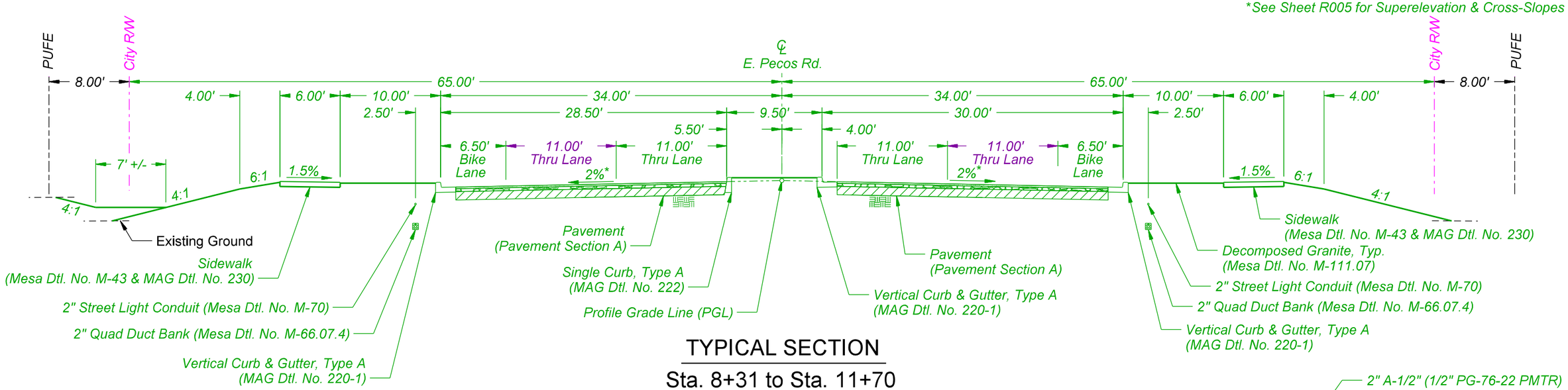
UNION PACIFIC RAILROAD
Sheet 086 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

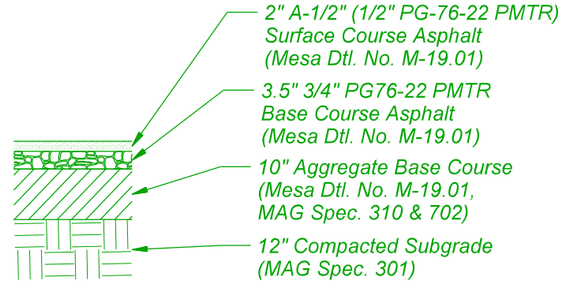
SHEET TITLE:
EAST PECOS ROAD (TRK 101) - GEOMETRICS

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T_
Default
3/9/2026

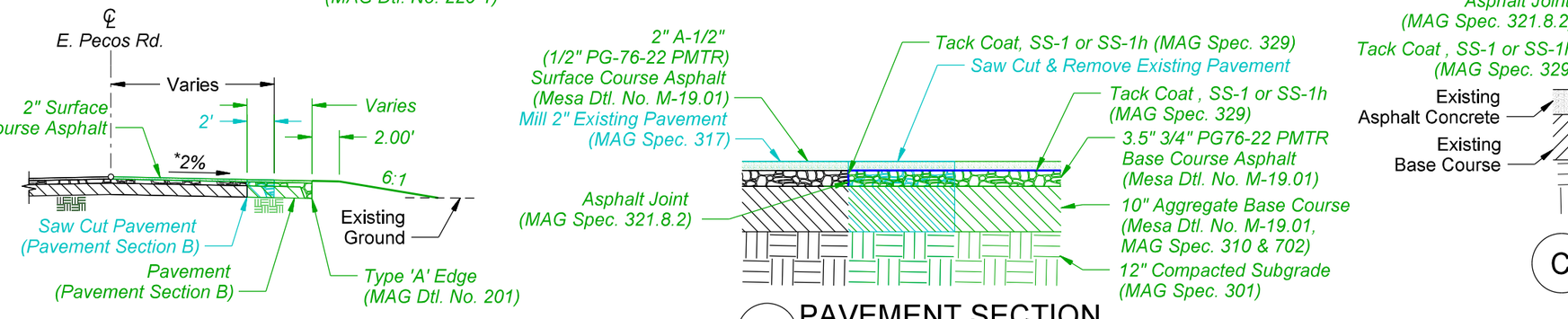
*See Sheet R005 for Superelevation & Cross-Slopes



TYPICAL SECTION
Sta. 8+31 to Sta. 11+70



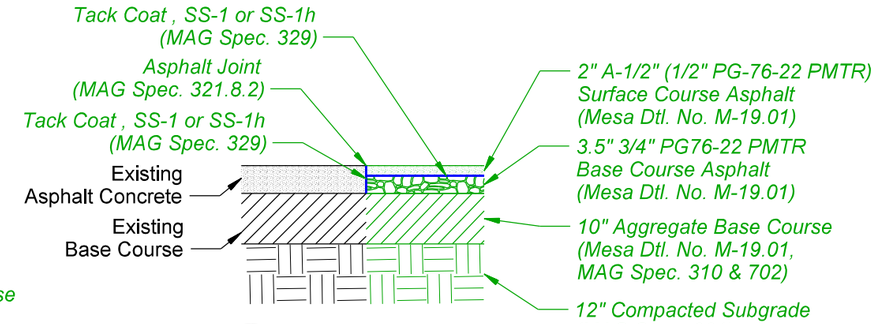
A PAVEMENT SECTION
NOT TO SCALE



TYPICAL SECTION
Sta. 7+00 to Sta. 8+31

TYPICAL SECTION
Sta. 6+15 to Sta. 7+00

B PAVEMENT SECTION
NOT TO SCALE



C JOINT DETAIL
NOT TO SCALE

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	R007 of 043

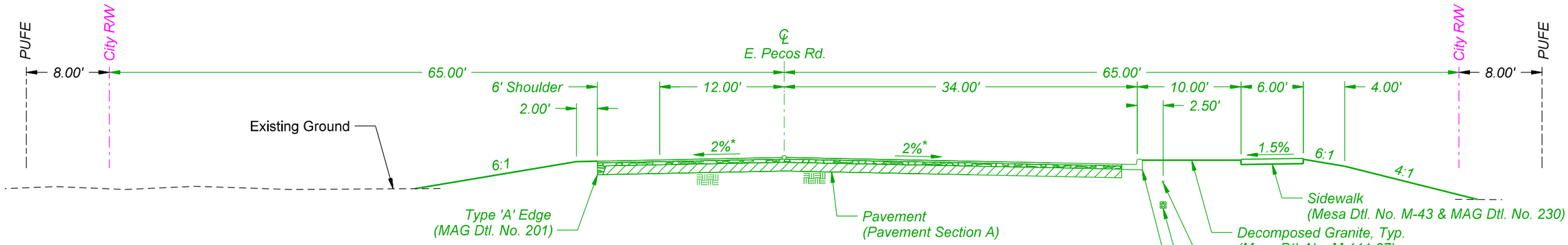
UNION PACIFIC RAILROAD — Sheet 087 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

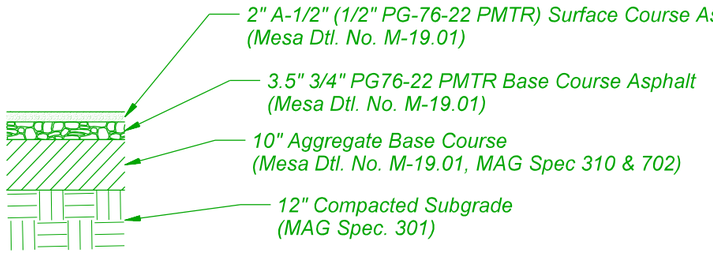
SHEET TITLE:
EAST PECOS ROAD (TRK 101) - TYPICAL SECTIONS

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T_RDxx_23Typ_200927.dgn
Default
3/9/2026

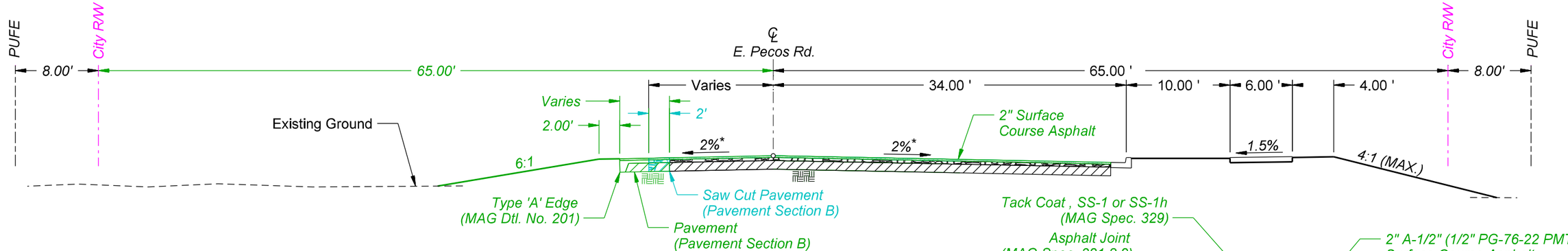
*See Sheet R005 for Superelevation & Cross-Slope



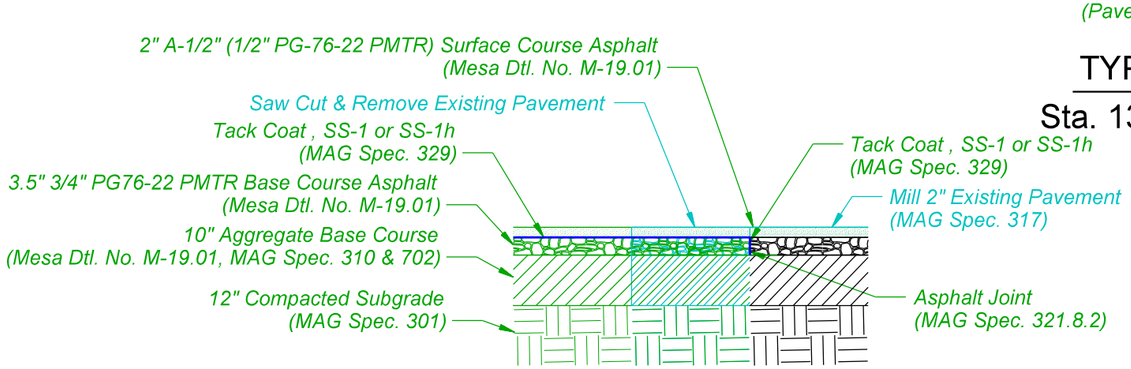
TYPICAL SECTION
Sta. 11+70 to Sta. 13+40



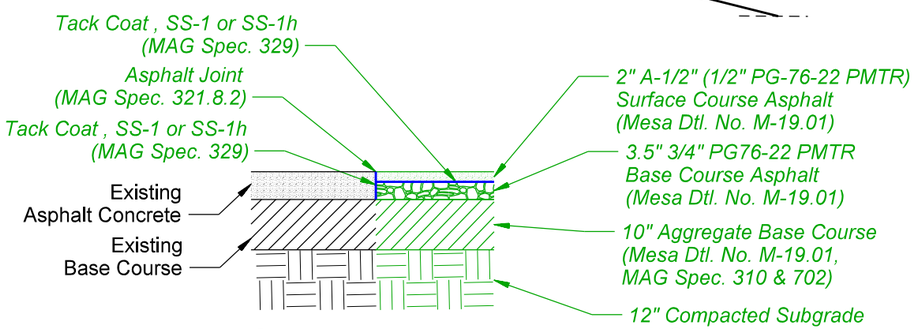
A PAVEMENT SECTION
NOT TO SCALE



TYPICAL SECTION
Sta. 13+40 to Sta. 14+00



B PAVEMENT SECTION
NOT TO SCALE



C JOINT DETAIL
NOT TO SCALE

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	R008 of 043

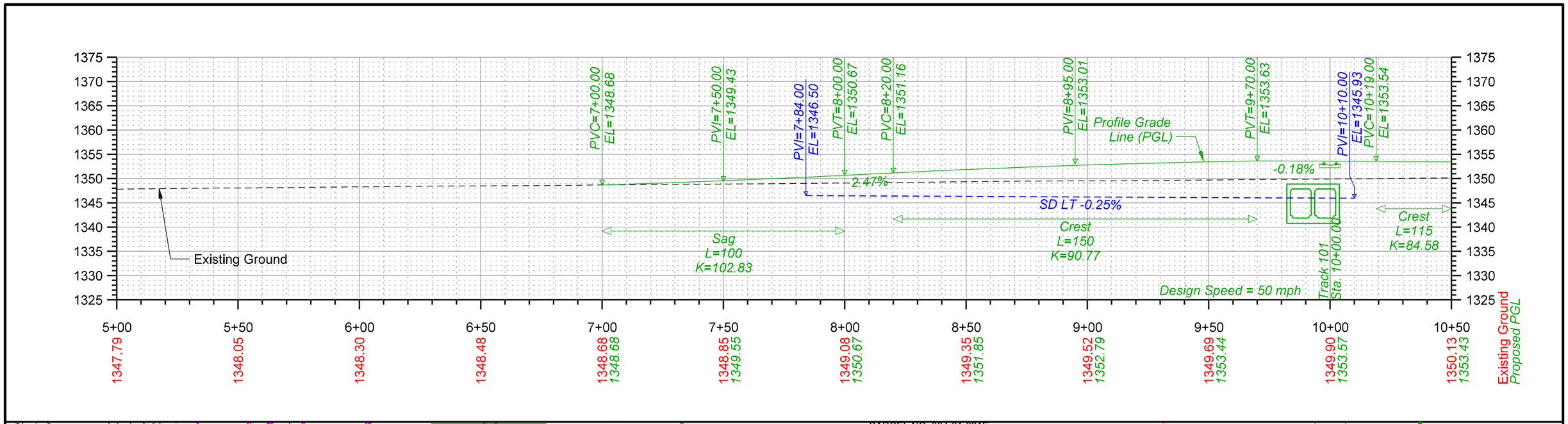
UNION PACIFIC RAILROAD

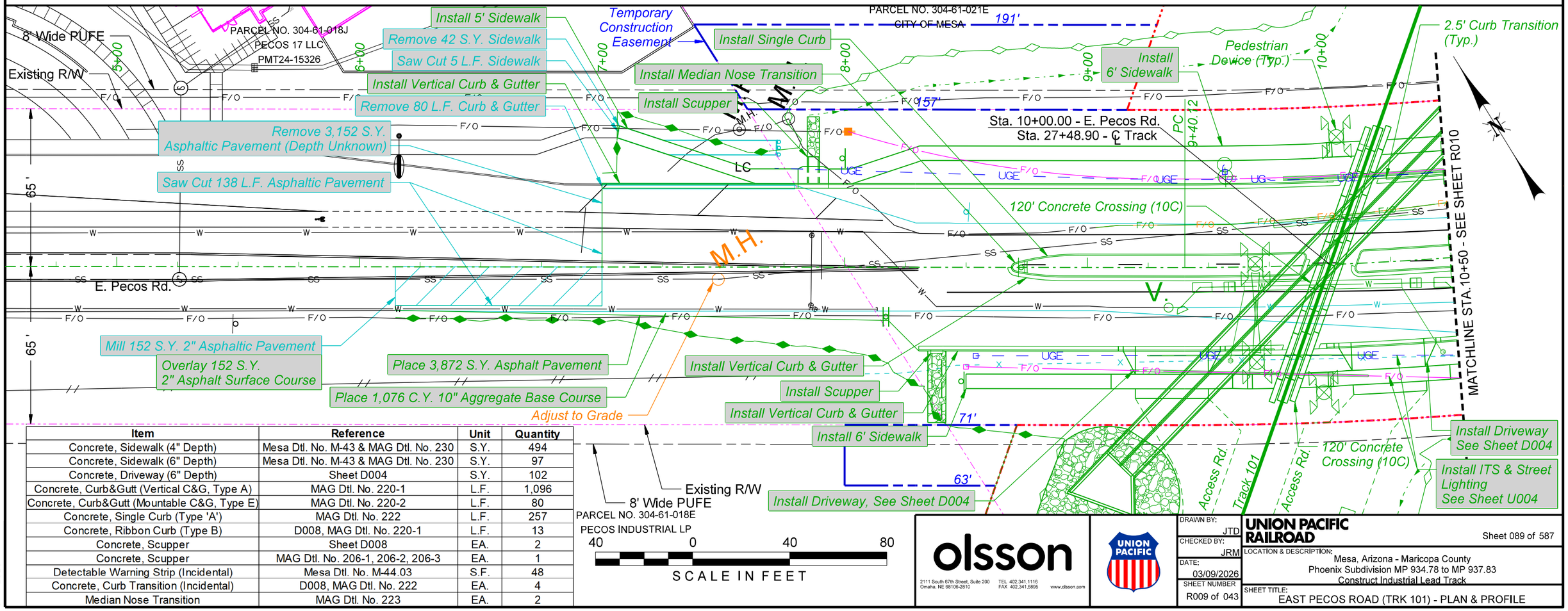
Sheet 088 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EAST PECOS ROAD (TRK 101) - TYPICAL SECTIONS

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T_RDxx_23Typ2_200927.dgn
Default
3/9/2026





Item	Reference	Unit	Quantity
Concrete, Sidewalk (4" Depth)	Mesa Dtl. No. M-43 & MAG Dtl. No. 230	S.Y.	494
Concrete, Sidewalk (6" Depth)	Mesa Dtl. No. M-43 & MAG Dtl. No. 230	S.Y.	97
Concrete, Driveway (6" Depth)	Sheet D004	S.Y.	102
Concrete, Curb&Gutt (Vertical C&G, Type A)	MAG Dtl. No. 220-1	L.F.	1,096
Concrete, Curb&Gutt (Mountable C&G, Type E)	MAG Dtl. No. 220-2	L.F.	80
Concrete, Single Curb (Type 'A')	MAG Dtl. No. 222	L.F.	257
Concrete, Ribbon Curb (Type B)	D008, MAG Dtl. No. 220-1	L.F.	13
Concrete, Scupper	Sheet D008	EA.	2
Concrete, Scupper	MAG Dtl. No. 206-1, 206-2, 206-3	EA.	1
Detectable Warning Strip (Incidental)	Mesa Dtl. No. M-44.03	S.F.	48
Concrete, Curb Transition (Incidental)	D008, MAG Dtl. No. 222	EA.	4
Median Nose Transition	MAG Dtl. No. 223	EA.	2

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

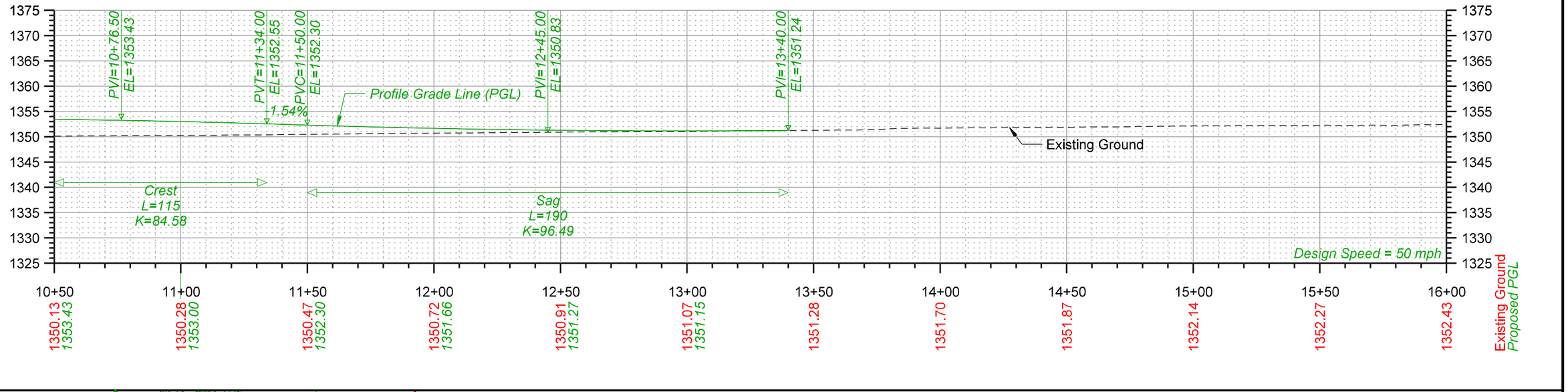
DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: R009 of 043

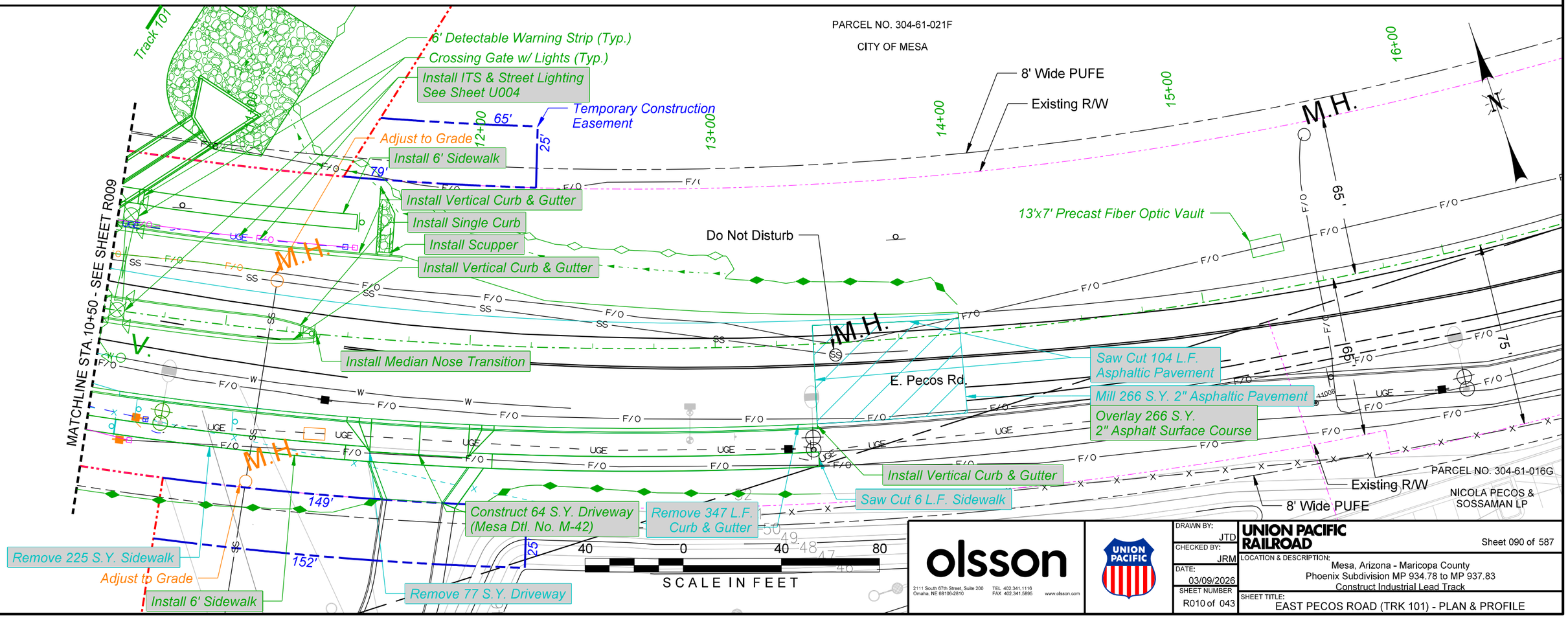
UNION PACIFIC RAILROAD
Sheet 089 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EAST PECOS ROAD (TRK 101) - PLAN & PROFILE

Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927.40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927.40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T_RDxx_23P1_200927.dgn
Default
3/9/2026





olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	R010 of 043

UNION PACIFIC RAILROAD Sheet 090 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EAST PECOS ROAD (TRK 101) - PLAN & PROFILE

Color_table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04.Road Details\T_RDxx_23P2_200927.dgn
Default
3/9/2026

PARCEL NO. 304-61-018J

PECOS 17 LLC

PMT24-15326

PARCEL NO. 304-61-021E

CITY OF MESA

Temporary Construction Easement

191'

UPRR R/W

Existing R/W

42'

M.H.

M.H.

M.H.

157'

5+00

6+00

7+00

8+00

9+00

10+00

65'

F. Pecos Rd.

MATCHLINE STA.10+50 - SEE SHEET R012

71'

25'

63'

PARCEL NO. 304-61-018E

PECOS INDUSTRIAL LP

Existing R/W

8' Wide PUFE

Temporary Construction Easement

UPRR R/W

Access Rd.

Track 101

Access Rd.

LEGEND

- Existing Ground Minor Contour (1 ft)
- 1335 Existing Ground Major Contour (5 ft)
- Proposed Subgrade Minor Contour (0.5 ft)
- 1335 Proposed Subgrade Major Contour (5 ft)

40 0 40 80

SCALE IN FEET

olsson

2111 South 67th Street, Suite 200
Omaha, NE 68106-2810

TEL 402.341.1116
FAX 402.341.5895

www.olsson.com

UNION PACIFIC

DRAWN BY: RSP

CHECKED BY: JRM

DATE: 03/09/2026

SHEET NUMBER R011 of 043

UNION PACIFIC RAILROAD

Sheet 091 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EAST PECOS ROAD (TRK 101) - GRADING PLAN

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T
Default
3/9/2026

PARCEL NO. 304-61-021F

CITY OF MESA

UPRR R/W

Track 101

Temporary Construction Easement

65'

25'

79'

12+00

13+00

14+00

15+00

16+00

8' Wide PUFE

Existing R/W

M.H.

SEE SHEET R011

MATCHLINE STA 10+50 - SEE SHEET R012

E. Pecos Rd.

17008

149'

152'

PARCEL NO. 304-61-016G

NICOLA PECOS & SOSSAMAN LP

PMT21-12148

8' Wide PUFE

Existing R/W

UPRR R/W

40 0 40 80

SCALE IN FEET

LEGEND

Existing Ground Minor Contour (1 ft)

Existing Ground Major Contour (5 ft)

Proposed Subgrade Minor Contour (0.5 ft)

Proposed Subgrade Major Contour (5 ft)

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP

CHECKED BY: JRM

DATE: 03/09/2026

SHEET NUMBER: R012 of 043

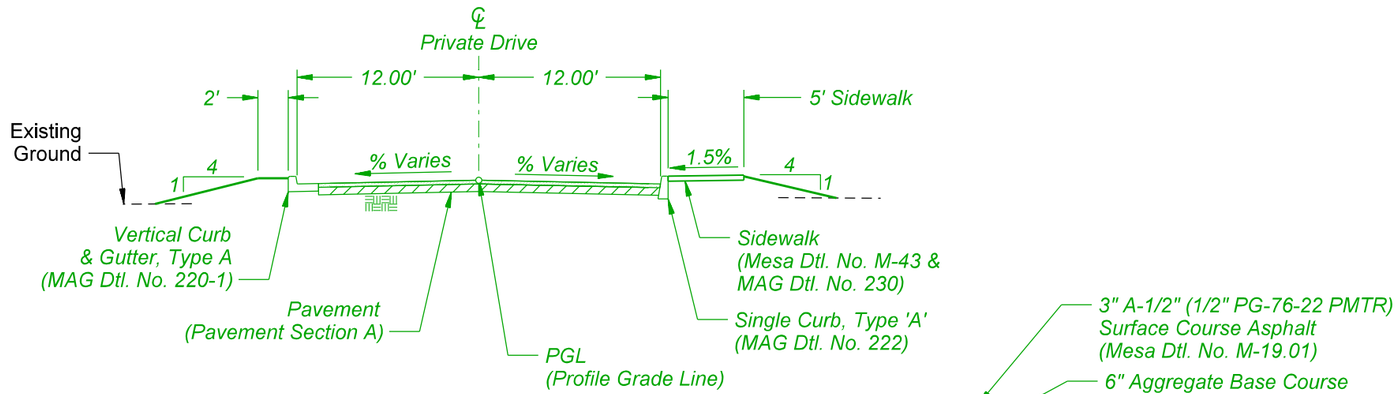
UNION PACIFIC RAILROAD

Sheet 092 of 587

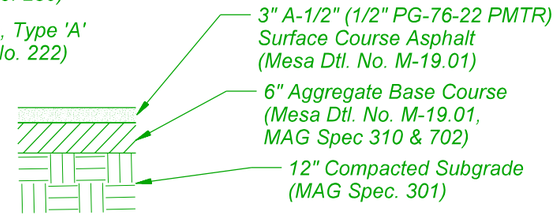
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EAST PECOS ROAD (TRK 101) - GRADING PLAN

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\V40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\V40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T_RDxx_23GR2_200927.dgn
Default
3/9/2026

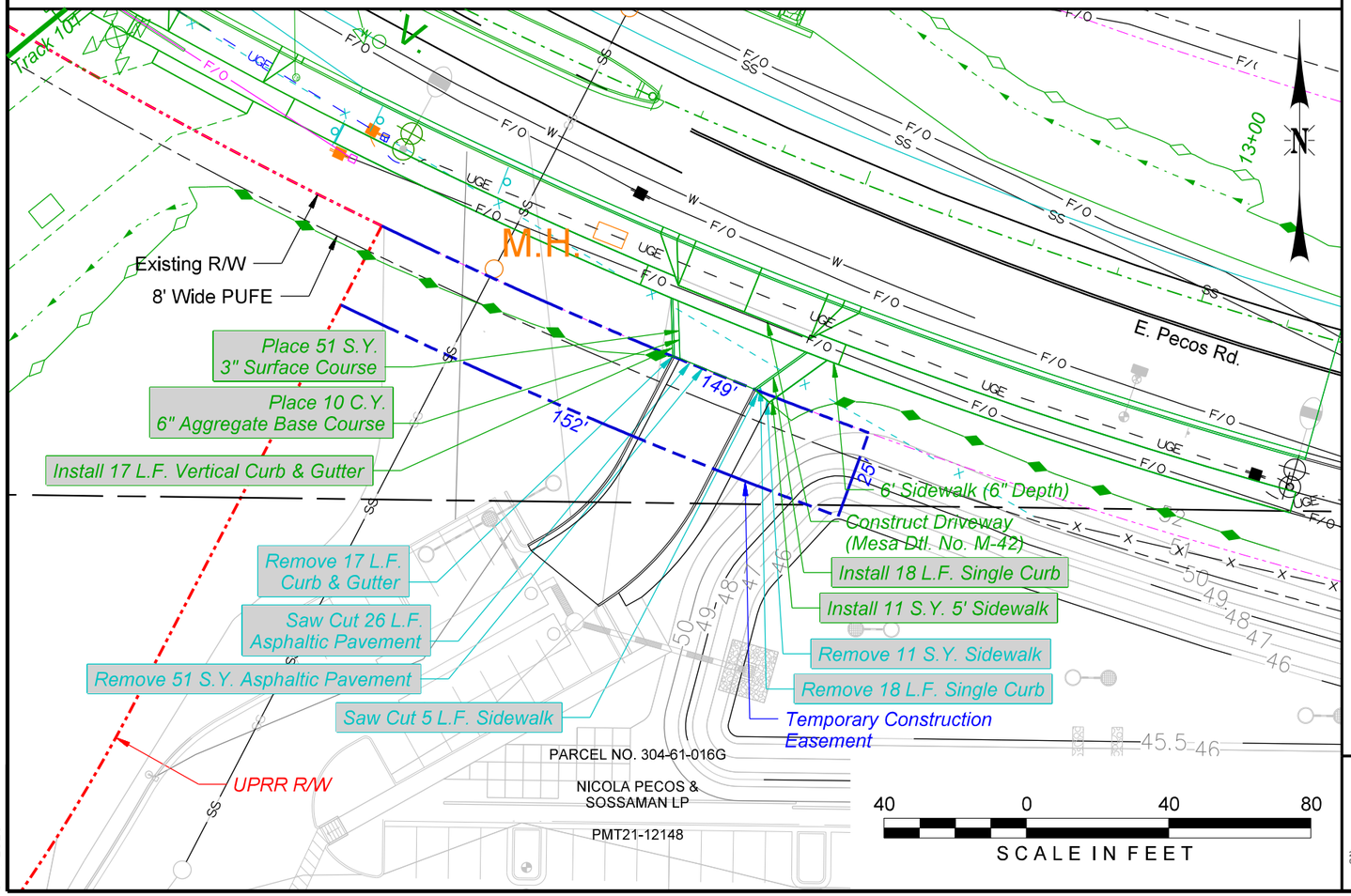


TYPICAL SECTION



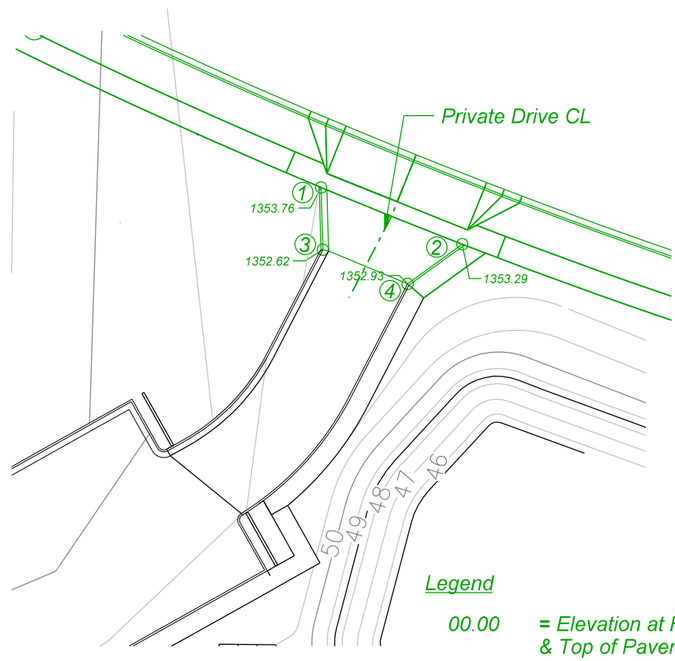
A PAVEMENT SECTION

NOT TO SCALE



Pavement Geometrics (Data to Face of Curb)

① P.I. N=831617.63, E=774620.09, Curb Termination per MAG Dtl. No. 222
② P.I. N=831602.64, E=774657.38, Curb Termination per MAG Dtl. No. 222
③ P.I. N=831601.19, E=774620.57
④ P.I. N=831592.17, E=774642.93



Legend

00.00 = Elevation at Face of Curb & Top of Pavement

* = Field Verify Elevation (See Note 1)

Notes:

1. Contractor Shall Field Verify Existing Elevations and Adjust Proposed Elevations as Necessary to Match Existing. If Necessary, Report Discrepancies for Resolution Prior to Construction.

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: R013 of 043

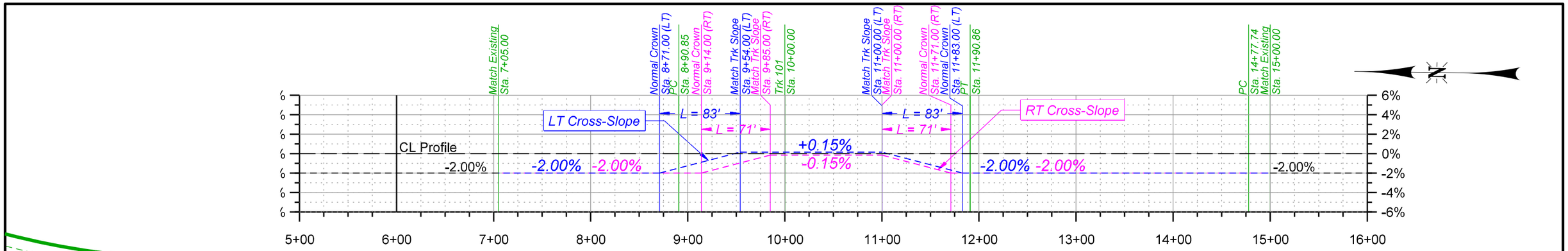
UNION PACIFIC RAILROAD

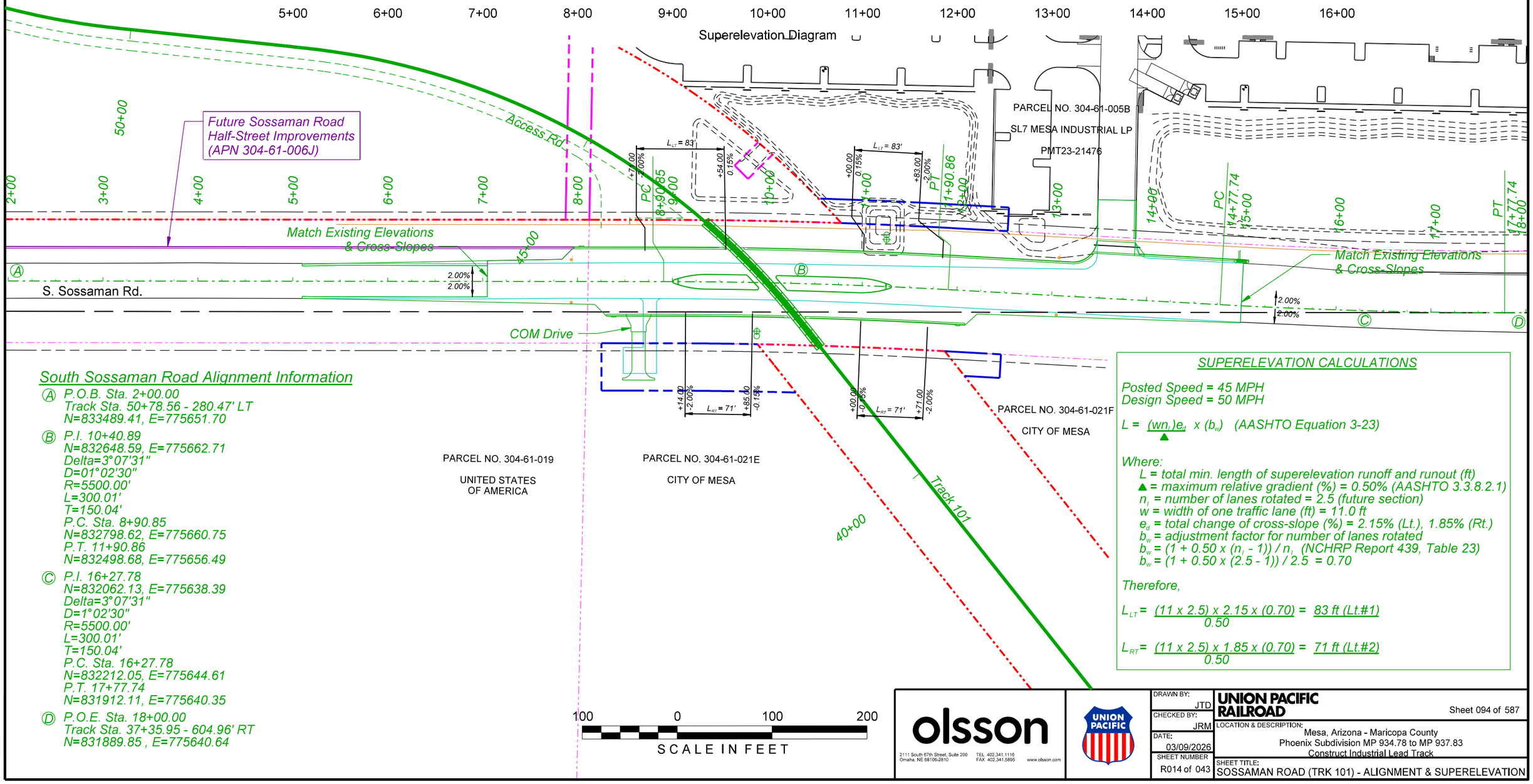
Sheet 093 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EAST PECOS ROAD (TRK 101) - ACCESS DRIVE

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927.RLTK\DGN\Sheets\04_Road Details\T_RDxx_23P3_200927.dgn
Default
3/9/2026





South Sossaman Road Alignment Information

Ⓐ *P.O.B. Sta. 2+00.00*
Track Sta. 50+78.56 - 280.47' LT
N=833489.41, E=775651.70

Ⓑ *P.I. 10+40.89*
N=832648.59, E=775662.71
Delta=3°07'31"
D=01°02'30"
R=5500.00'
L=300.01'
T=150.04'
P.C. Sta. 8+90.85
N=832798.62, E=775660.75
P.T. 11+90.86
N=832498.68, E=775656.49

Ⓒ *P.I. 16+27.78*
N=832062.13, E=775638.39
Delta=3°07'31"
D=1°02'30"
R=5500.00'
L=300.01'
T=150.04'
P.C. Sta. 16+27.78
N=832212.05, E=775644.61
P.T. 17+77.74
N=831912.11, E=775640.35

Ⓓ *P.O.E. Sta. 18+00.00*
Track Sta. 37+35.95 - 604.96' RT
N=831889.85 , E=775640.64

100 0 100 200
SCALE IN FEET

SUPERELEVATION CALCULATIONS

Posted Speed = 45 MPH
Design Speed = 50 MPH

$L = \frac{(wn_1)e_d}{\blacktriangle} \times (b_w)$ *(AASHTO Equation 3-23)*

Where:
- *L = total min. length of superelevation runoff and runout (ft)*
- *▲ = maximum relative gradient (%) = 0.50% (AASHTO 3.3.8.2.1)*
- *n_1 = number of lanes rotated = 2.5 (future section)*
- *w = width of one traffic lane (ft) = 11.0 ft*
- *e_d = total change of cross-slope (%) = 2.15% (Lt.), 1.85% (Rt.)*
- *b_w = adjustment factor for number of lanes rotated*
- *$b_w = (1 + 0.50 \times (n_1 - 1)) / n_1$ (NCHRP Report 439, Table 23)*
- *$b_w = (1 + 0.50 \times (2.5 - 1)) / 2.5 = 0.70$*

Therefore,

$L_{LT} = \frac{(11 \times 2.5) \times 2.15 \times (0.70)}{0.50} =$ *83 ft (Lt.#1)*

$L_{RT} = \frac{(11 \times 2.5) \times 1.85 \times (0.70)}{0.50} =$ *71 ft (Lt.#2)*

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	R014 of 043

UNION PACIFIC RAILROAD Sheet 094 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SOSSAMAN ROAD (TRK 101) - ALIGNMENT & SUPERELEVATION

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T_RDxx_39Align_200927.dgn
Default
3/9/2026

PARCEL NO. 304-61-995

GATEWAY GRAND ASSOCIATION

PMT22-05054

PARCEL NO. 304-61-005B

SL7 MESA INDUSTRIAL LP

PMT23-21476

Refer to PMT23-21476 for Pavement Geometrics

Future Sossaman Road Half-Street Improvements (APN 304-61-006J)

Access Rd

S. Sossaman Rd.

Track 101

PARCEL NO. 304-61-019

UNITED STATES OF AMERICA

PARCEL NO. 304-61-021E

CITY OF MESA

PARCEL NO. 304-61-021F

CITY OF MESA

Pavement Geometrics (Data to Face of Curb)

1. Sta. 5+10.00 - 18.00' LT
2. Sta. 5+10.00 - 18.00' RT
3. Sta. 7+83.48 - 23.36' LT
4. Sta. 8+12.13 - 52.00' LT
5. Sta. 8+12.13 - 46.00' LT
6. Sta. 7+96.63 - 36.00' LT
7. Sta. 8+24.90 - 46.00' LT
8. Sta. 8+24.90 - 36.00' LT
9. Sta. 8+38.02 - 24.52' RT
10. Sta. 8+50.00 - 36.00' RT
11. Sta. 8+50.00 - 46.00' RT
12. Sta. 8+50.00 - 52.00' RT
13. Sta. 8+54.90 - 46.00' LT
14. Sta. 8+54.90 - 36.00' LT
15. 2' R.P. Sta. 8+82.90 - 0.00'
    P.C. Sta. 8+82.22 - 1.88' LT
    P.T. Sta. 8+82.21 - 1.88' RT
16. 100' R.P. Sta. 8+98.98 - 8.03' LT
    P.C. Sta. 8+82.22 - 1.88' LT
    Sta. 9+16.94 - 8.00' LT
17. 100' R.P. Sta. 8+98.76 - 7.97' RT
    P.C. Sta. 8+82.21 - 1.88' RT
    P.T. Sta. 9+16.41 - 8.00' RT
18. Sta. 9+22.27 - 52.00' LT
19. Sta. 9+23.24 - 46.00' LT
20. Sta. 9+34.38 - 56.10' LT
21. Sta. 9+39.57 - 51.54' LT
22. Sta. 9+56.11 - 36.50' LT
23. Sta. 9+72.83 - 46.00' RT
24. Sta. 9+72.38 - 52.00' RT
25. 2' R.P. Sta. 9+77.55 - 6.00 ' LT
    P.C. Sta. 9+77.55 - 8.00' LT
    P.T. Sta. 9+78.97 - 7.41' LT
26. 2' R.P. Sta. 9+89.15 - 6.00' RT
    P.C. Sta. 9+89.15 - 8.00' RT
    P.T. Sta. 9+90.61 - 4.62' RT
27. Sta. 10+25.95 - 36.50' RT
28. Sta. 10+29.49 - 54.04' RT
29. Sta. 10+29.60 - 60.11' RT
30. Sta. 10+39.43 - 52.31' RT
31. Sta. 10+43.94 - 57.61' RT

Pavement Geometrics (Data to Face of Curb)

32. Sta. 9+45.40 - 59.87' LT
33. Sta. 9+50.54 - 55.29' LT
34. Sta. 9+59.42 - 64.69' LT
35. Sta. 9+59.87 - 58.51' LT
36. Sta. 9+70.84 - 36.50' LT
37. 2' R.P. Sta. 10+10.83 - 6.00 ' LT
    P.C. Sta. 10+09.37 - 4.63' LT
    P.T. Sta. 10+10.83 - 8.00' LT
38. 2' R.P. Sta. 10+21.90 - 6.00 ' RT
    P.C. Sta. 10+20.41 - 7.34' RT
    P.T. Sta. 10+21.90 - 8.00' RT
39. Sta. 10+39.36 - 36.50' RT
40. Sta. 10+51.08 - 50.26' RT
41. Sta. 10+55.59 - 55.56' RT
42. Sta. 10+74.87 - 46.00' RT
43. Sta. 10+75.42 - 52.00' RT
44. Sta. 10+30.05 - 52.00' LT
45. Sta. 10+29.55 - 46.00' LT
46. 100' R.P. Sta. 11+13.15 - 8.03' LT
    P.C. Sta. 10+95.07 - 8.00' LT
    P.T. Sta. 11+29.80 - 1.88' LT
47. 100' R.P. Sta. 11+13.10 - 7.97' RT
    P.C. Sta. 10+95.63 - 8.00' RT
    P.T. Sta. 11+29.81 - 1.88' RT
48. 2' R.P. Sta. 11+29.12 - 0.00'
    P.C. Sta. 11+29.80 - 1.88' LT
    P.T. Sta. 11+29.81 - 1.88' RT
49. Sta. 11+90.79 - 46.00' RT
50. Sta. 11+90.79 - 52.00' RT
51. Sta. 12+10.29 - 46.00' LT
52. Sta. 12+10.29 - 52.00' LT
53. Sta. 12+10.29 - 36.00' RT
54. Sta. 12+22.75 - 24.04' RT
55. Sta. 15+00.00 - 18.00' RT

80 0 80 160

SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: R015 of 043

UNION PACIFIC RAILROAD

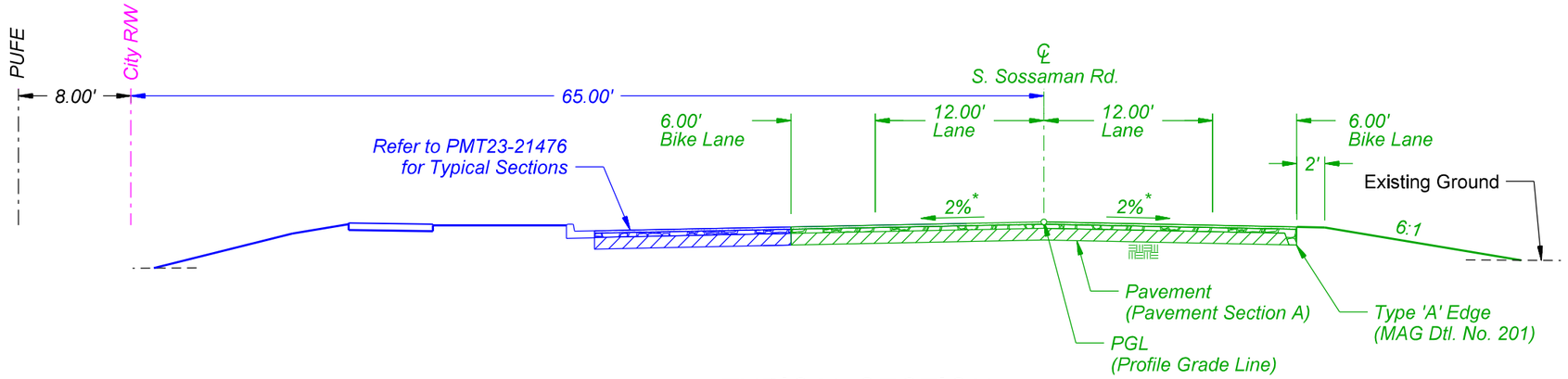
Sheet 095 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SOSSAMAN ROAD (TRK 101) - GEOMETRICS

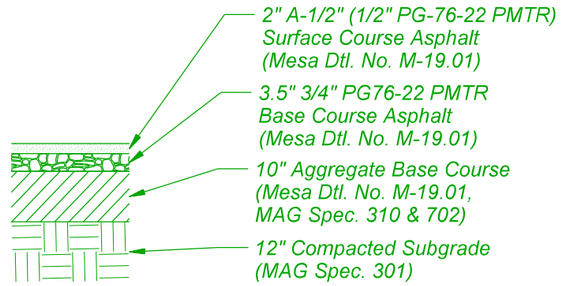
Color_table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04.Road Details\T_ROxx_39Geo_200927.dgn
Default
3/9/2026

*See Sheet R014 for Superelevation & Cross-Slopes



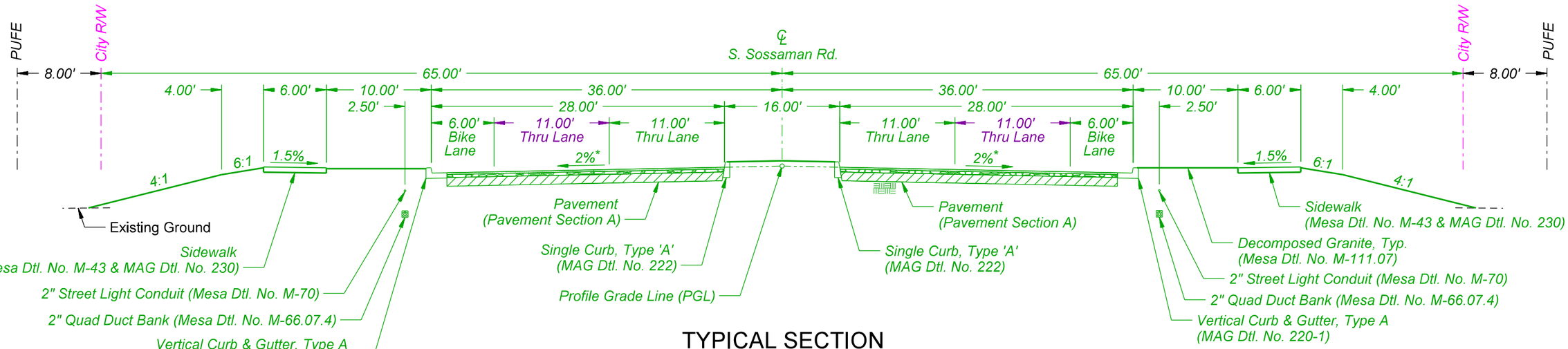
TYPICAL SECTION

Sta. 12+10 to Sta. 15+00



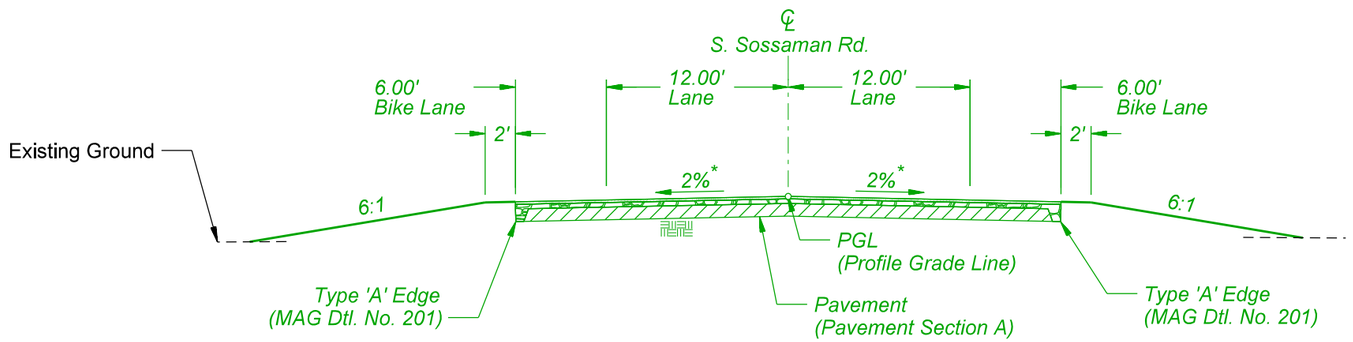
A PAVEMENT SECTION

NOT TO SCALE



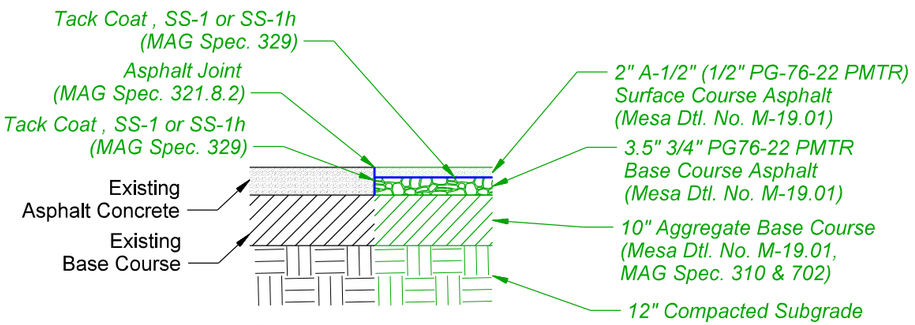
TYPICAL SECTION

Sta. 8+30 to Sta. 12+10



TYPICAL SECTION

Sta. 7+05 to Sta. 7+96



C JOINT DETAIL

NOT TO SCALE

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	R016 of 043

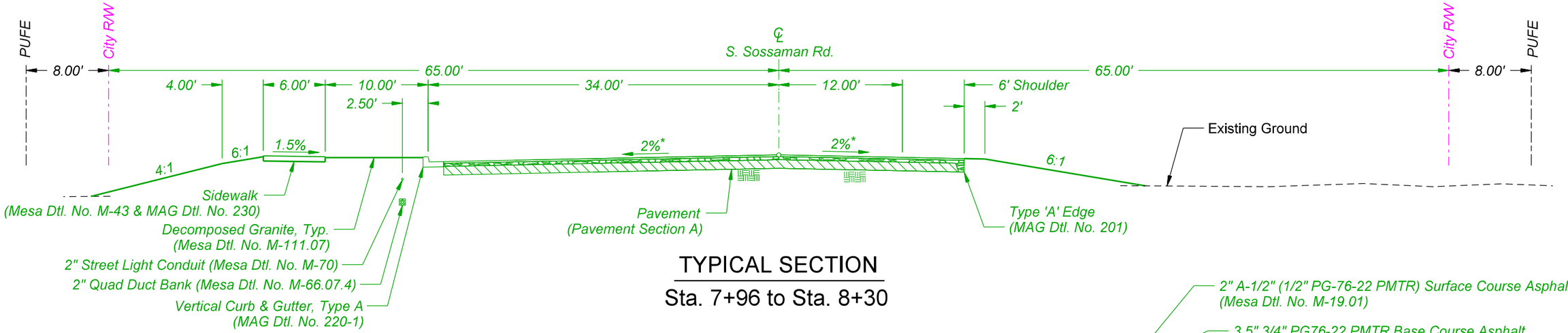
UNION PACIFIC RAILROAD — Sheet 096 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

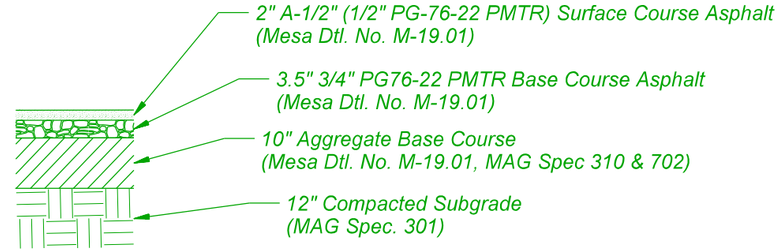
SHEET TITLE:
SOSSAMAN ROAD (TRK 101) - TYPICAL SECTIONS

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04.Road Details\Default
3/9/2026

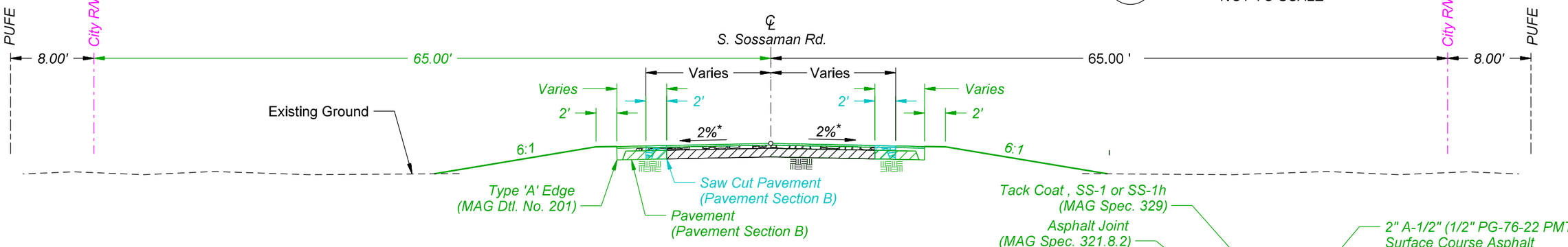
*See Sheet R014 for Superelevation & Cross-Slopes



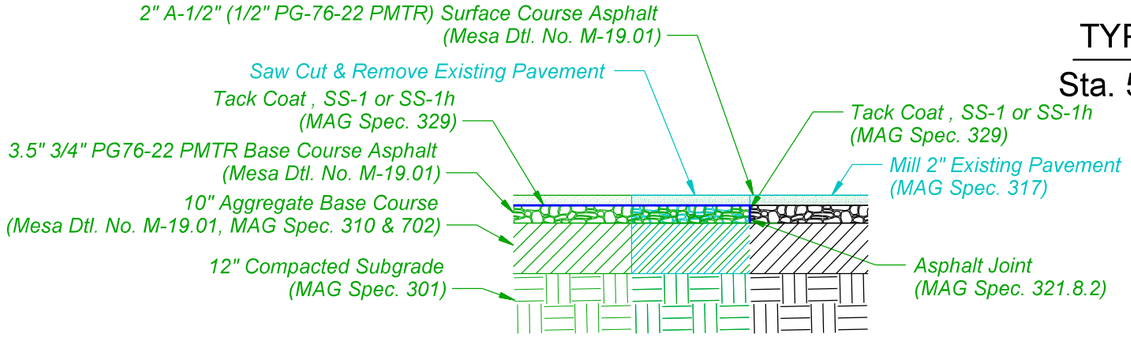
TYPICAL SECTION
Sta. 7+96 to Sta. 8+30



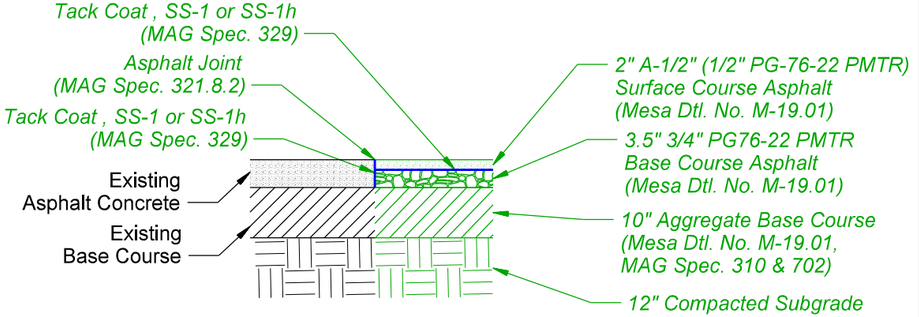
A PAVEMENT SECTION
NOT TO SCALE



TYPICAL SECTION
Sta. 5+10 to Sta. 7+05



B PAVEMENT SECTION
NOT TO SCALE



C JOINT DETAIL
NOT TO SCALE

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

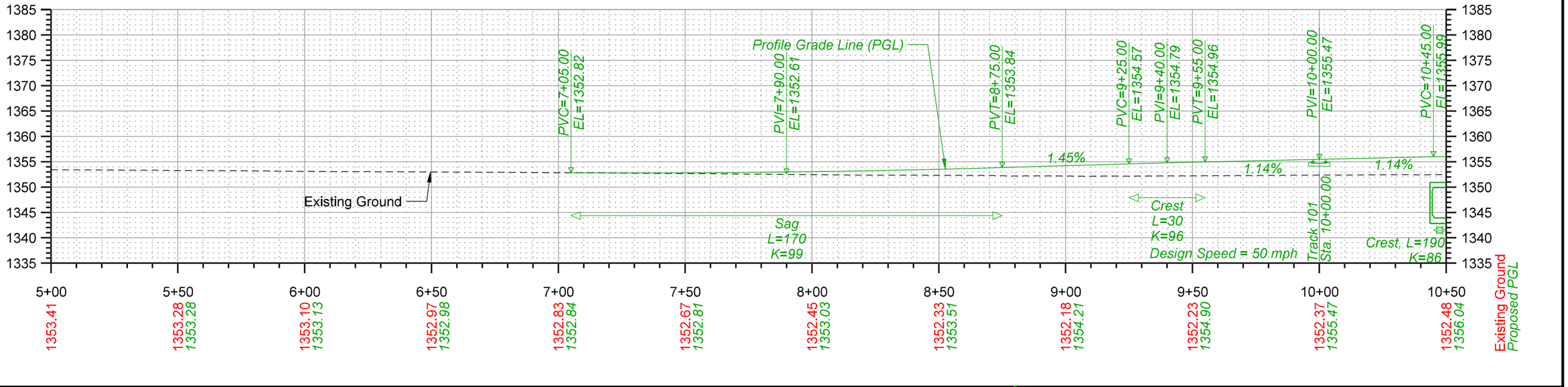
DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	R017 of 043

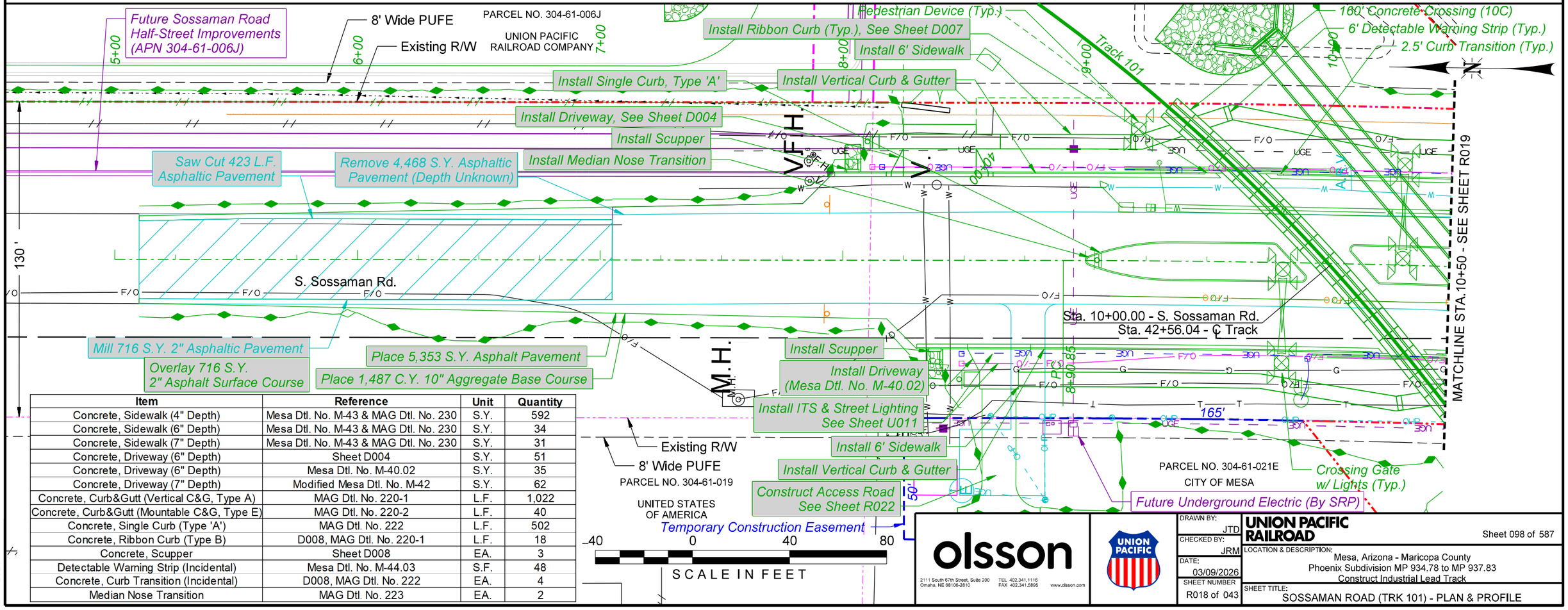
UNION PACIFIC RAILROAD — Sheet 097 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SOSSAMAN ROAD (TRK 101) - TYPICAL SECTIONS

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T
Default
3/9/2026





Item	Reference	Unit	Quantity
Concrete, Sidewalk (4" Depth)	Mesa Dtl. No. M-43 & MAG Dtl. No. 230	S.Y.	592
Concrete, Sidewalk (6" Depth)	Mesa Dtl. No. M-43 & MAG Dtl. No. 230	S.Y.	34
Concrete, Sidewalk (7" Depth)	Mesa Dtl. No. M-43 & MAG Dtl. No. 230	S.Y.	31
Concrete, Driveway (6" Depth)	Sheet D004	S.Y.	51
Concrete, Driveway (6" Depth)	Mesa Dtl. No. M-40.02	S.Y.	35
Concrete, Driveway (7" Depth)	Modified Mesa Dtl. No. M-42	S.Y.	62
Concrete, Curb&Gutt (Vertical C&G, Type A)	MAG Dtl. No. 220-1	L.F.	1,022
Concrete, Curb&Gutt (Mountable C&G, Type E)	MAG Dtl. No. 220-2	L.F.	40
Concrete, Single Curb (Type 'A')	MAG Dtl. No. 222	L.F.	502
Concrete, Ribbon Curb (Type B)	D008, MAG Dtl. No. 220-1	L.F.	18
Concrete, Scupper	Sheet D008	EA.	3
Detectable Warning Strip (Incidental)	Mesa Dtl. No. M-44.03	S.F.	48
Concrete, Curb Transition (Incidental)	D008, MAG Dtl. No. 222	EA.	4
Median Nose Transition	MAG Dtl. No. 223	EA.	2

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: R018 of 043

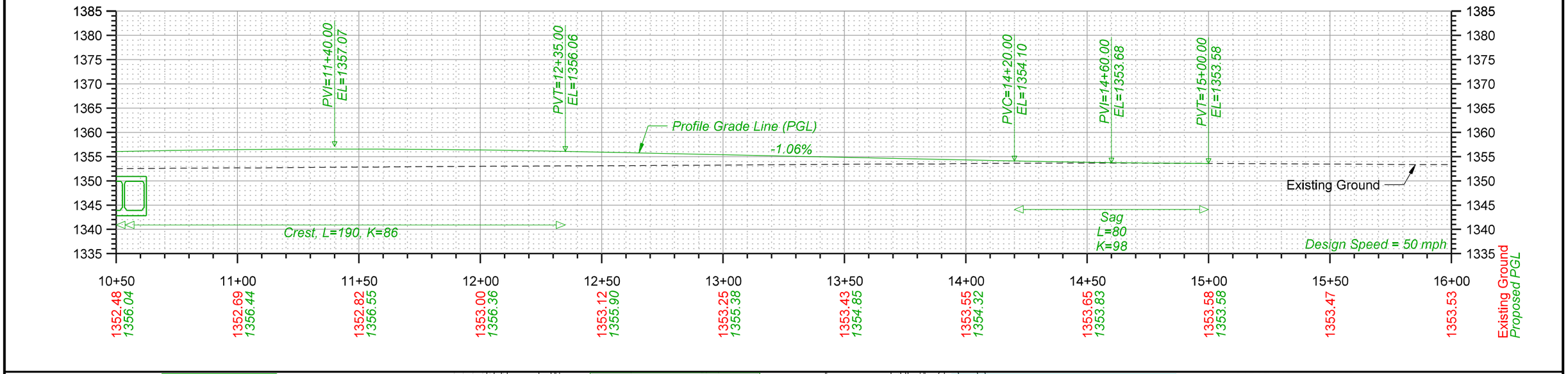
UNION PACIFIC RAILROAD

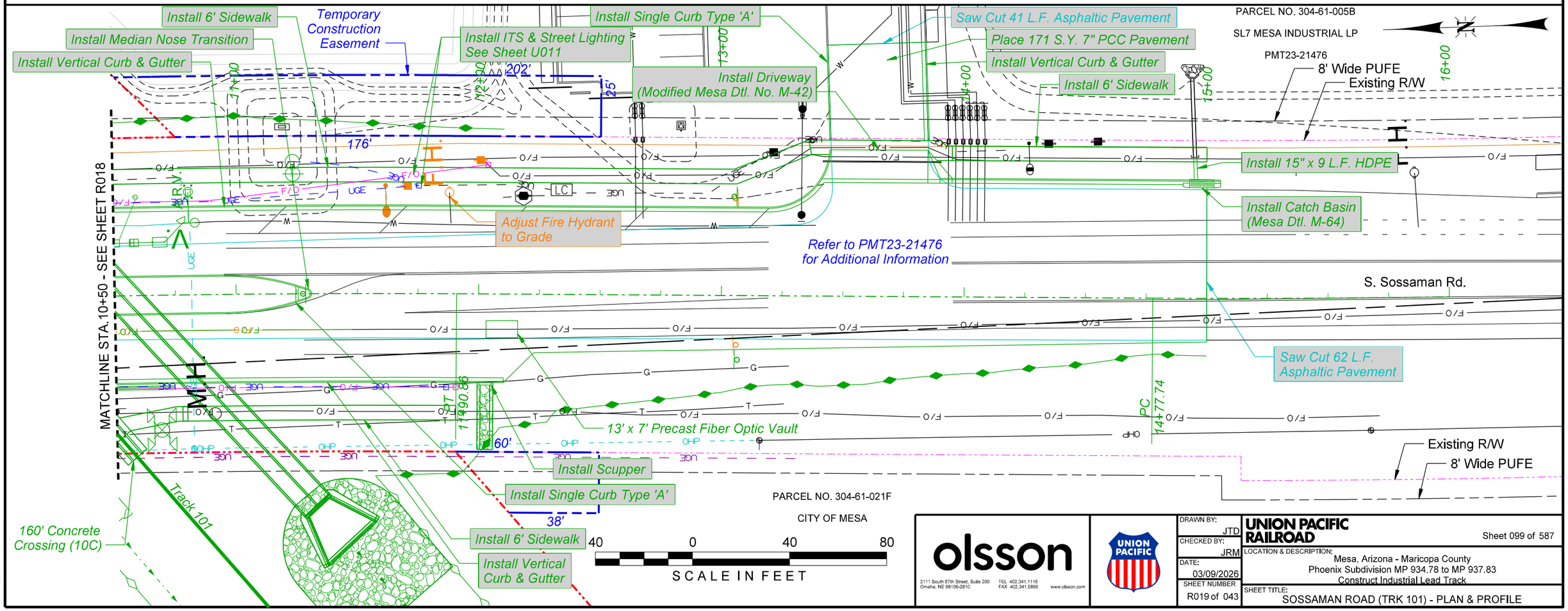
Sheet 098 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SOSSAMAN ROAD (TRK 101) - PLAN & PROFILE

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T_RDxx_39P1_200927.dgn
Default
3/9/2026





olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	R019 of 043

UNION PACIFIC RAILROAD Sheet 099 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SOSSAMAN ROAD (TRK 101) - PLAN & PROFILE

Color tables: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T_RDxx_39P2_200927.dgn
Default
3/9/2026

Max Pump Discharge = 10 cfs
Received by UPRR Trackside Ditch

PARCEL NO. 304-61-005B
SL7 MESA INDUSTRIAL LP
PMT23-21476

UPRR R/W

35'
136.3'

Drainage Easement

North Detention Cell
See Sheet GD002

PARCEL NO. 304-61-006J

UNION PACIFIC
RAILROAD COMPANY

5+00
6+00
7+00
8+00
9+00
10+00

Track 101

8' Wide PUFE

Existing R/W

V.F.H.

S. Sossaman Rd.

103

Future Sossaman Road
Half-Street Improvements
(APN 304-61-006J)

M.H.

8+69.85

165'

50'

Future Underground
Electric (By SRP)

205'

Temporary Construction
Easement

PARCEL NO. 304-61-019

UNITED STATES
OF AMERICA

Existing R/W

8' Wide PUFE

PARCEL NO. 304-61-021E

CITY OF MESA

MATCHLINE STA.10+50 - SEE SHEET R021

LEGEND

- Existing Ground Minor Contour (1 ft)
- Existing Ground Major Contour (5 ft)
- Proposed Subgrade Minor Contour (0.5 ft)
- Proposed Subgrade Major Contour (5 ft)

40 0 40 80
SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: R020 of 043

UNION PACIFIC RAILROAD

Sheet 100 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SOSSAMAN ROAD (TRK 101) - GRADING PLAN

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T_RDxx_39GR1_200327.dgn
Default
3/9/2026

PARCEL NO. 304-61-005B

SL7 MESA INDUSTRIAL LP

PMT23-21476

Temporary Construction Easement

202'

176'

25'

60'

38'

8' Wide PUFE

Existing R/W

Existing R/W

8' Wide PUFE

PARCEL NO. 304-61-021F

CITY OF MESA

MATCHLINE STA.10+50 - SEE SHEET R020

S. Sossaman Rd.

Track 101

PC 14+77.74

11+00 12+00 13+00 14+00 15+00 16+00

LEGEND

Existing Ground Minor Contour (1 ft)

Existing Ground Major Contour (5 ft)

Proposed Subgrade Minor Contour (0.5 ft)

Proposed Subgrade Major Contour (5 ft)

40 0 40 80

SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: R021 of 043

UNION PACIFIC RAILROAD

Sheet 101 of 587

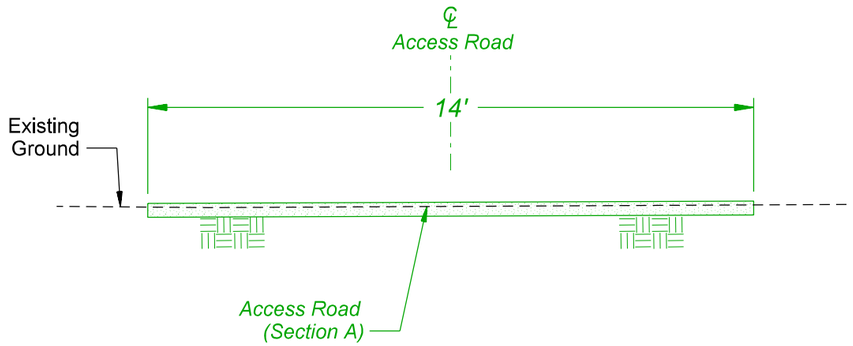
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SOSSAMAN ROAD (TRK. 101) - GRADING PLAN

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T_RDxx_39GR2_200927.dgn
Default
3/9/2026

Access Road Geometrics

1. P.I. N=832870.69, E=775557.89
2. 10' R.P. N=832840.82, E=775568.28
   P.C. N=832840.69, E=775558.28
   P.T. N=832830.82, E=775568.41
3. P.I. N=832831.33, E=775607.31
4. P.I. N=832817.33, E=775607.49
5. 10' R.P. N=832806.82, E=775568.73
   P.C. N=832816.82, E=775568.60
   P.T. N=832806.69, E=775558.73
6. P.I. N=832806.66, E=775556.73



TYPICAL SECTION

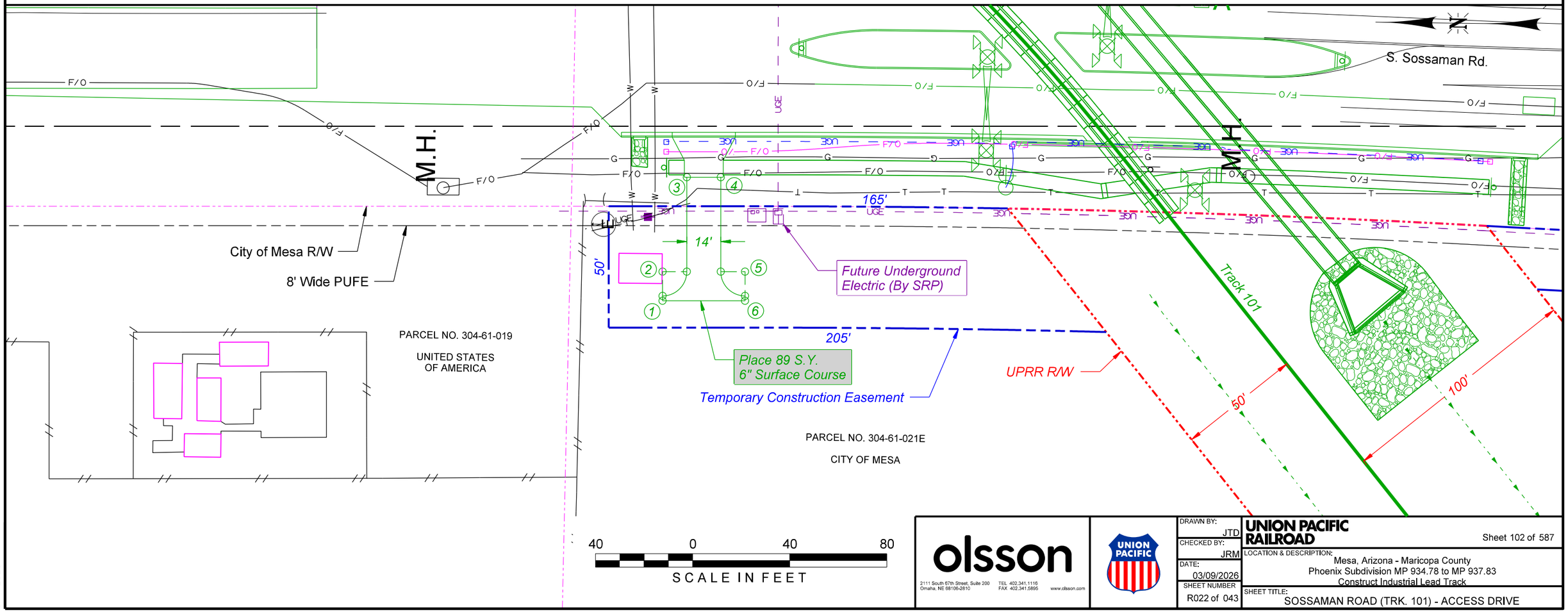


A ACCESS ROAD SECTION

NOT TO SCALE

NOTES:

1. FINISH GRADES, ELEVATIONS, AND SLOPES SHALL MAINTAIN POSITIVE DRAINAGE.
2. MAXIMUM CROSS-SLOPES SHALL NOT EXCEED 2%.
3. 6" SURFACE COURSE SHALL INCLUDE EXCAVATION, REMOVAL OF EXISTING MATERIAL, GRADING, SUBGRADE PREPARATION, COMPACTION, PRIME COAT, SURFACE COURSE MATERIAL (ASPHALT MILLINGS), FOG SEAL, AND OTHER RELATED ITEMS, WHICH SHALL ALL BE CONSIDERED INCIDENTAL.



olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	R022 of 043

UNION PACIFIC RAILROAD

Sheet 102 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SOSSAMAN ROAD (TRK. 101) - ACCESS DRIVE

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04.Road Details\T_RDxx_39P3_200927.dgn
Default
3/9/2026

SUPERELEVATION CALCULATIONS
(Existing to Normal Crown)

Posted Speed = 45 MPH
Design Speed = 50 MPH

$L = \frac{(wn_1)e_d}{\blacktriangle} \times (b_w)$ (AASHTO Equation 3-23)

Where:
- L = total min. length of superelevation runoff and runout (ft)
- ▲ = maximum relative gradient (%) = 0.50% (AASHTO 3.3.8.2.1)
- n_1 = number of lanes rotated = 2.0 (rotated about PGL)
- w = width of one traffic lane (ft) = 11.0 ft
- e_d = total change of cross-slope (%) = 2.00% (Lt.#2 & Rt.#2)
- e_d = 2.37% (Lt.#1), 1.87% (Rt.#1), 2.80% (Lt.#3), 3.02% (Rt.#3)
- b_w = adjustment factor for number of lanes rotated
- $b_w = (1 + 0.50 \times (n_1 - 1)) / n_1$ (NCHRP Report 439, Table 23)
- $b_w = (1 + 0.50 \times (2.0 - 1)) / 2.0 = 0.75$

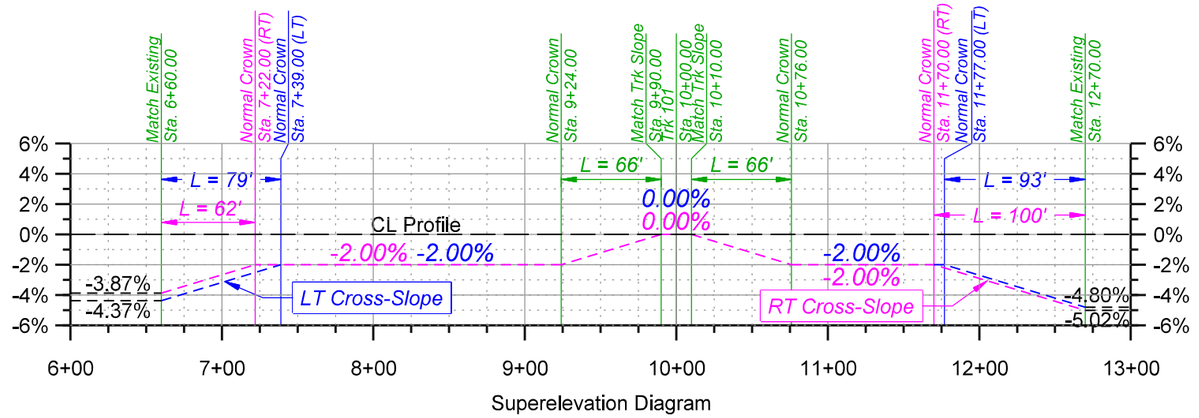
Therefore,

$L_{LT\#1} = \frac{(11 \times 2.0) \times 2.37 \times (0.75)}{0.50} =$ 79 ft (Lt.#1)

$L_{RT\#1} = \frac{(11 \times 2.0) \times 1.87 \times (0.75)}{0.50} =$ 62 ft (Rt.#1)

$L_{LT\#3} = \frac{(11 \times 2.0) \times 2.80 \times (0.75)}{0.50} =$ 93 ft (Lt.#3)

$L_{RT\#3} = \frac{(11 \times 2.0) \times 3.02 \times (0.75)}{0.50} =$ 100 ft (Rt.#3)



SUPERELEVATION CALCULATIONS
(Normal Crown to Rail Crossing)

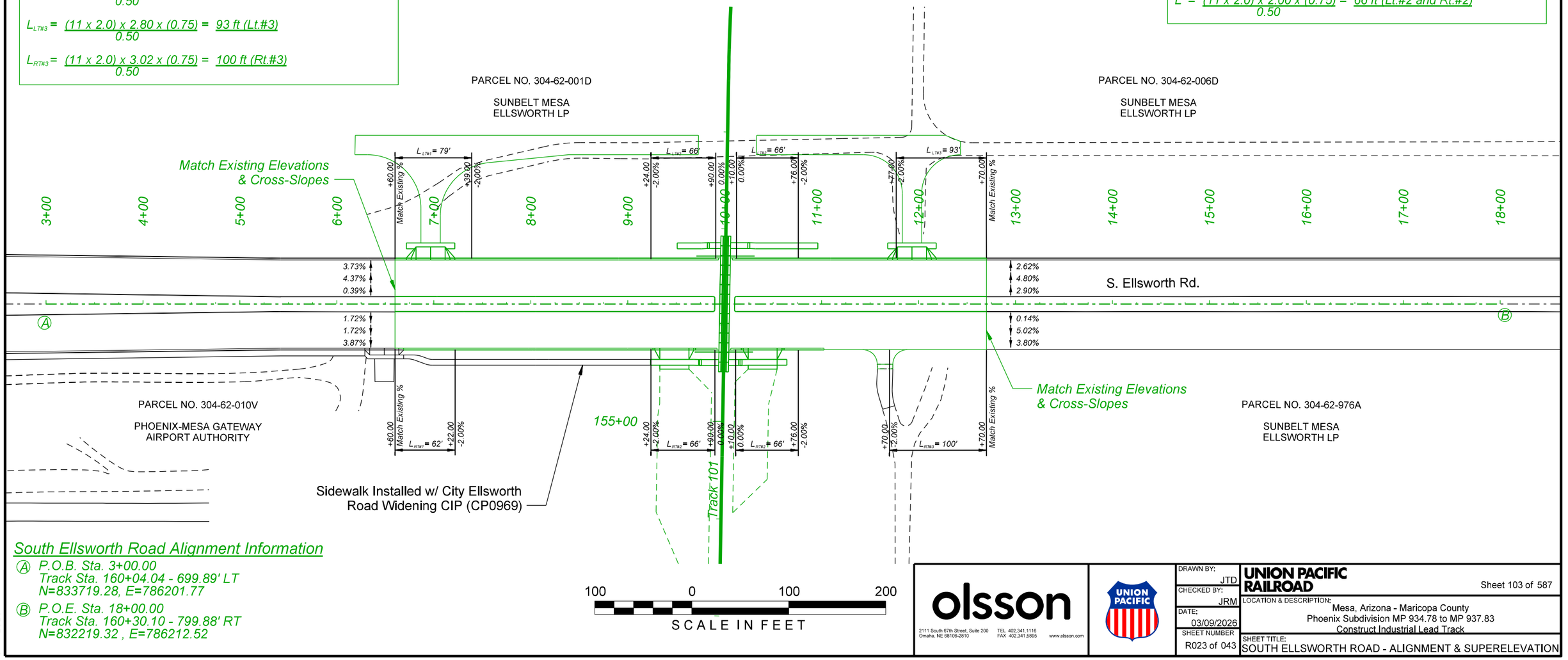
Posted Speed = 45 MPH
Design Speed = 50 MPH

$L = \frac{(wn_1)e_d}{\blacktriangle} \times (b_w)$ (AASHTO Equation 3-23)

Where:
- L = total min. length of superelevation runoff and runout (ft)
- ▲ = maximum relative gradient (%) = 0.50% (AASHTO 3.3.8.2.1)
- n_1 = number of lanes rotated = 2.0 (rotated about PGL)
- w = width of one traffic lane (ft) = 11.0 ft
- e_d = total change of cross-slope (%) = 2.00% (Lt.#2 & Rt.#2)
- b_w = adjustment factor for number of lanes rotated
- $b_w = (1 + 0.50 \times (n_1 - 1)) / n_1$ (NCHRP Report 439, Table 23)
- $b_w = (1 + 0.50 \times (2.0 - 1)) / 2.0 = 0.75$

Therefore,

$L = \frac{(11 \times 2.0) \times 2.00 \times (0.75)}{0.50} =$ 66 ft (Lt.#2 and Rt.#2)



South Ellsworth Road Alignment Information

Ⓐ P.O.B. Sta. 3+00.00
Track Sta. 160+04.04 - 699.89' LT
N=833719.28, E=786201.77

Ⓑ P.O.E. Sta. 18+00.00
Track Sta. 160+30.10 - 799.88' RT
N=832219.32 , E=786212.52

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	R023 of 043

UNION PACIFIC RAILROAD — Sheet 103 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SOUTH ELLSWORTH ROAD - ALIGNMENT & SUPERELEVATION

Color table:K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T_RDxx.156Align_200927.dgn
Default
3/9/2026

PARCEL NO. 304-62-003L

PHOENIX-MESA GATEWAY AIRPORT AUTHORITY

PARCEL NO. 304-62-001D

SUNBELT MESA ELLSWORTH LP

PARCEL NO. 304-62-006D

SUNBELT MESA ELLSWORTH LP

6+00 7+00 8+00 9+00 10+00 11+00 12+00 13+00 14+00

S. Ellsworth Rd.

Track 101

PARCEL NO. 304-62-010V

PHOENIX-MESA GATEWAY AIRPORT AUTHORITY

PARCEL NO. 304-62-976A

SUNBELT MESA ELLSWORTH LP

Pavement Geometrics (Data to Face of Curb)

1. Sta. 6+60.00 - 47.00' LT
2. Sta. 6+60.00 - 45.50' RT
3. Sta. 6+68.85 - 47.00' RT
4. Sta. 6+81.66 - 59.00' LT
5. Sta. 6+81.66 - 47.00' LT
6. Sta. 7+11.66 - 59.00' LT
7. Sta. 7+11.66 - 47.00' LT
8. Sta. 8+35.00 - 47.00' LT
9. Sta. 9+23.57 - 57.00' RT
10. Sta. 9+23.57 - 63.00' RT
11. Sta. 9+33.08 - 47.00' RT
12. Sta. 9+33.08 - 57.00' RT
13. Sta. 9+51.12 - 63.00' LT
14. Sta. 9+51.12 - 57.00' LT
15. Sta. 9+33.08 - 47.00' RT
16. Sta. 9+33.08 - 57.00' RT
17. Sta. 9+68.08 - 57.00' RT
18. Sta. 9+67.96 - 63.00' RT
19. Sta. 9+74.08 - 57.25' RT
20. Sta. 9+73.96 - 63.25' RT
21. Sta. 9+76.01 - 63.00' LT
22. Sta. 9+76.14 - 57.00' LT
23. Sta. 9+82.01 - 63.25' LT
24. Sta. 9+82.14 - 57.25' LT
25. 2' R.P. Sta. 9+88.10 - 6.00 ' LT
    P.C. Sta. 9+88.10 - 8.00' LT
    P.T. Sta. 9+90.10 - 5.97' LT
26. 2' R.P. Sta. 9+87.90 - 6.00 ' RT
    P.C. Sta. 9+87.90 - 8.00' RT
    P.T. Sta. 9+89.90 - 6.03' RT
27. Sta. 9+96.03 - 63.25' LT
28. Sta. 9+95.92 - 57.25' LT
29. Sta. 9+95.75 - 47.50' LT
30. Sta. 9+94.10 - 47.50' RT
31. Sta. 9+93.93 - 57.25' RT
32. Sta. 9+93.83 - 63.25' RT

Pavement Geometrics (Data to Face of Curb)

33. Sta. 10+06.17 - 63.25' LT
34. Sta. 10+06.07 - 57.25' LT
35. Sta. 10+05.90 - 47.50' LT
36. Sta. 10+04.25 - 47.50' RT
37. Sta. 10+04.08 - 57.25' RT
38. Sta. 10+03.97 - 63.25' RT
39. 2' R.P. Sta. 10+12.10 - 6.00 ' LT
    P.C. Sta. 10+10.10 - 6.03' LT
    P.T. Sta. 10+12.10 - 8.00' LT
40. 2' R.P. Sta. 10+11.90 - 6.00 ' RT
    P.C. Sta. 10+09.90 - 5.97' RT
    P.T. Sta. 10+11.90 - 8.00' RT
41. Sta. 10+17.86 - 57.25' RT
42. Sta. 10+17.99- 63.25' LT
43. Sta. 10+24.21 - 47.00' RT
44. Sta. 10+24.21 - 57.00' RT
45. Sta. 10+23.99 - 63.00' RT
46. Sta. 10+26.04 - 63.25' LT
47. Sta. 10+25.92 - 57.25' LT
48. Sta. 10+32.04 - 63.00' LT
49. Sta. 10+31.92 - 57.00' LT
50. Sta. 10+54.21 - 47.00' RT
51. Sta. 10+54.21 - 57.00' RT
52. Sta. 10+64.21 - 57.00' RT
53. Sta. 10+64.21 - 63.00' RT
54. Sta. 10+96.14 - 63.00' LT
55. Sta. 10+96.14 - 57.00' LT
56. Sta. 11+02.50 - 47.00' RT
57. Sta. 11+40.00 - 47.00' LT
58. 15' R.P. Sta. 11+42.42 - 62.00 ' RT
    P.C. Sta. 11+42.42 - 47.00' RT
    P.T. Sta. 11+57.42 - 62.00' RT
59. Sta. 11+78.21 - 59.00' LT
60. Sta. 11+78.21 - 47.00' LT
61. 15' R.P. Sta. 11+88.42 - 62.00 ' RT
    P.C. Sta. 11+88.42 - 47.00' RT
    P.T. Sta. 11+73.42 - 62.00' RT
62. Sta. 12+08.21 - 59.00' LT
63. Sta. 12+08.21 - 47.00' RT
64. Sta. 12+70.00 - 47.00' LT
65. Sta. 12+70.00 - 47.00' RT

60 0 60 80

SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: R024 of 043

UNION PACIFIC RAILROAD

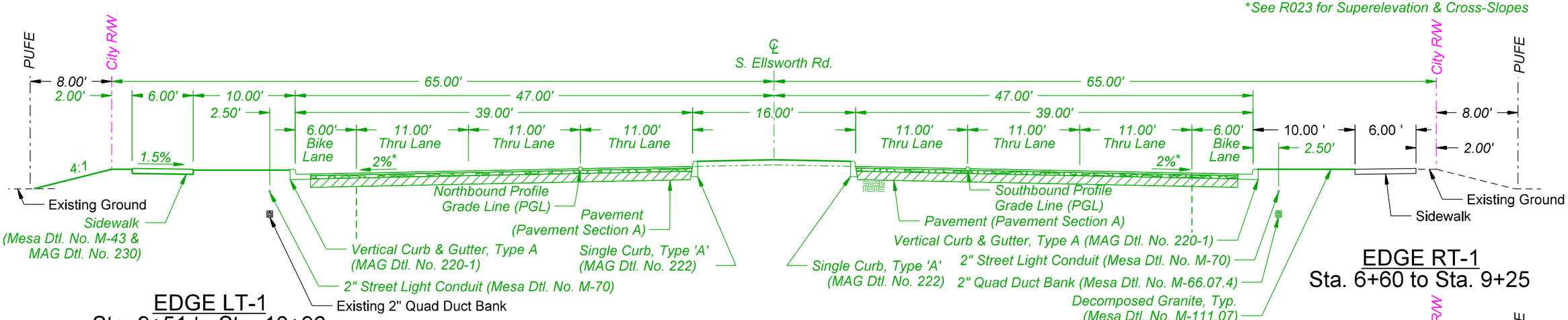
Sheet 104 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SOUTH ELLSWORTH ROAD - GEOMETRICS

Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T_RDxx_156Geo_200927.dgn
Default
3/9/2026

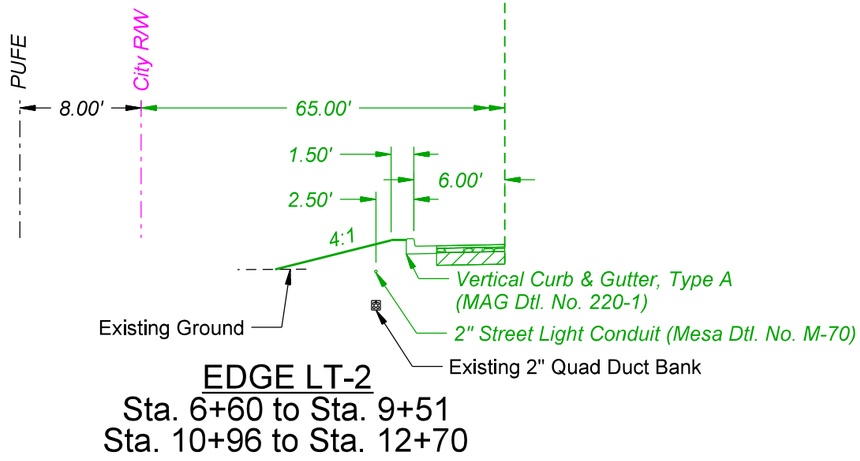
*See R023 for Superelevation & Cross-Slopes



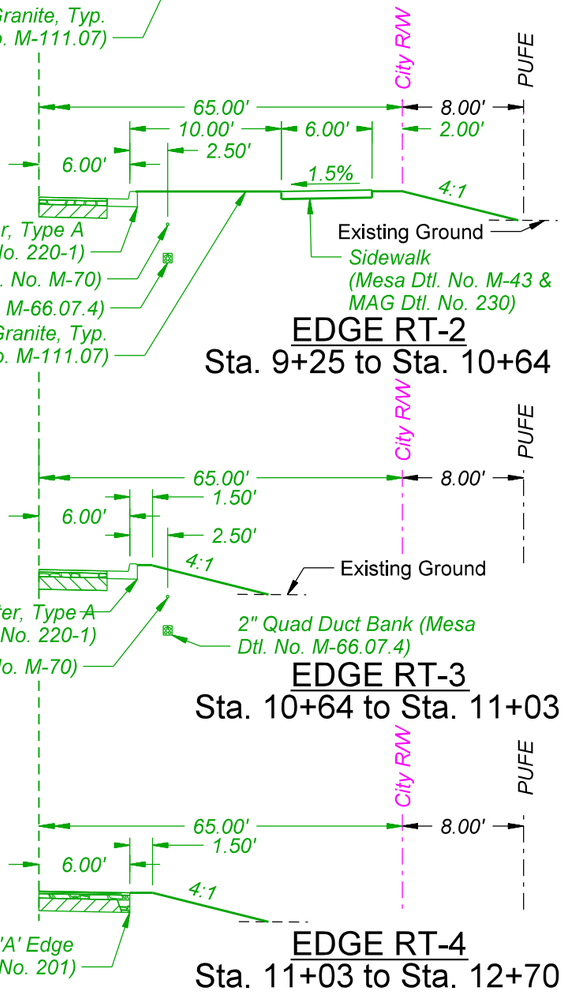
EDGE LT-1
Sta. 9+51 to Sta. 10+96

TYPICAL SECTION
Sta. 6+60 to Sta. 12+70

EDGE RT-1
Sta. 6+60 to Sta. 9+25



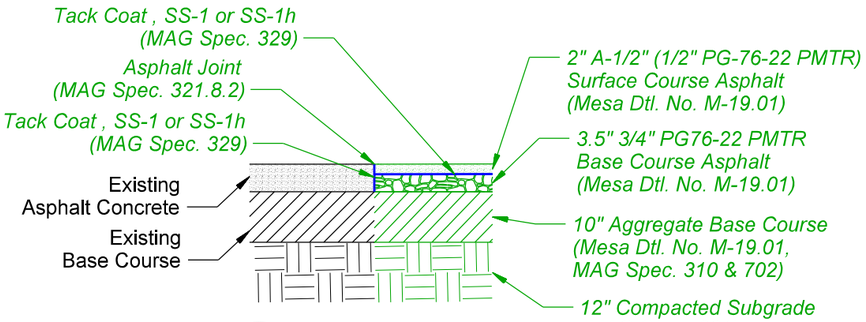
EDGE LT-2
Sta. 6+60 to Sta. 9+51
Sta. 10+96 to Sta. 12+70



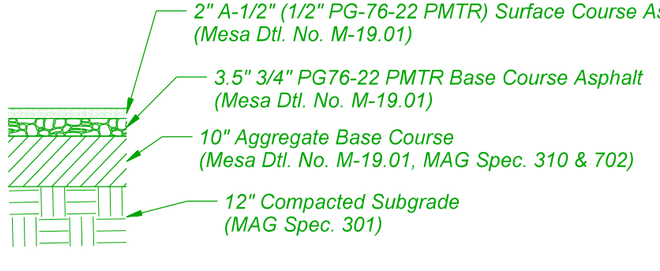
EDGE RT-2
Sta. 9+25 to Sta. 10+64

EDGE RT-3
Sta. 10+64 to Sta. 11+03

EDGE RT-4
Sta. 11+03 to Sta. 12+70



C JOINT DETAIL
NOT TO SCALE



A PAVEMENT SECTION
NOT TO SCALE

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

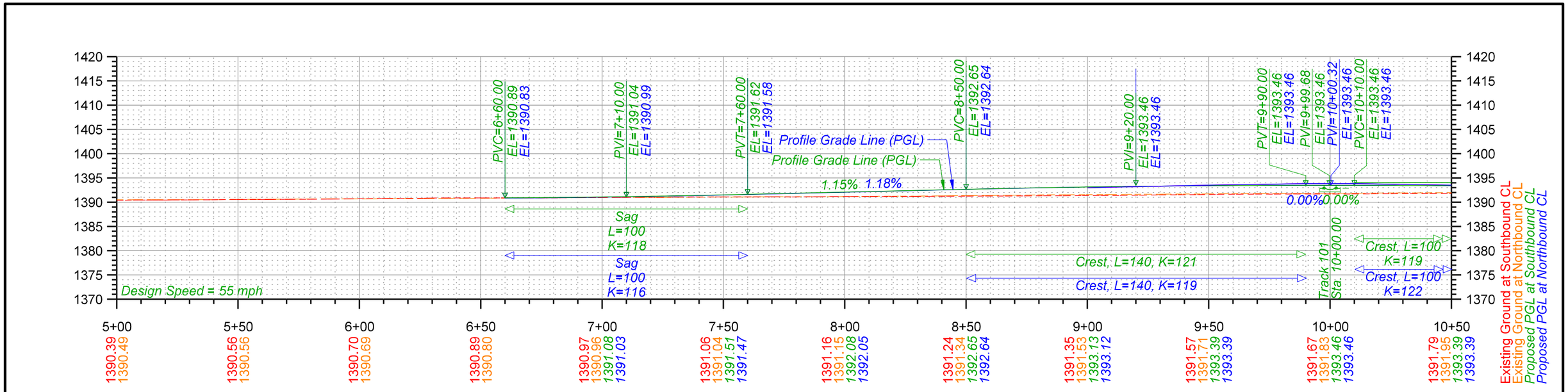
DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: R025 of 043

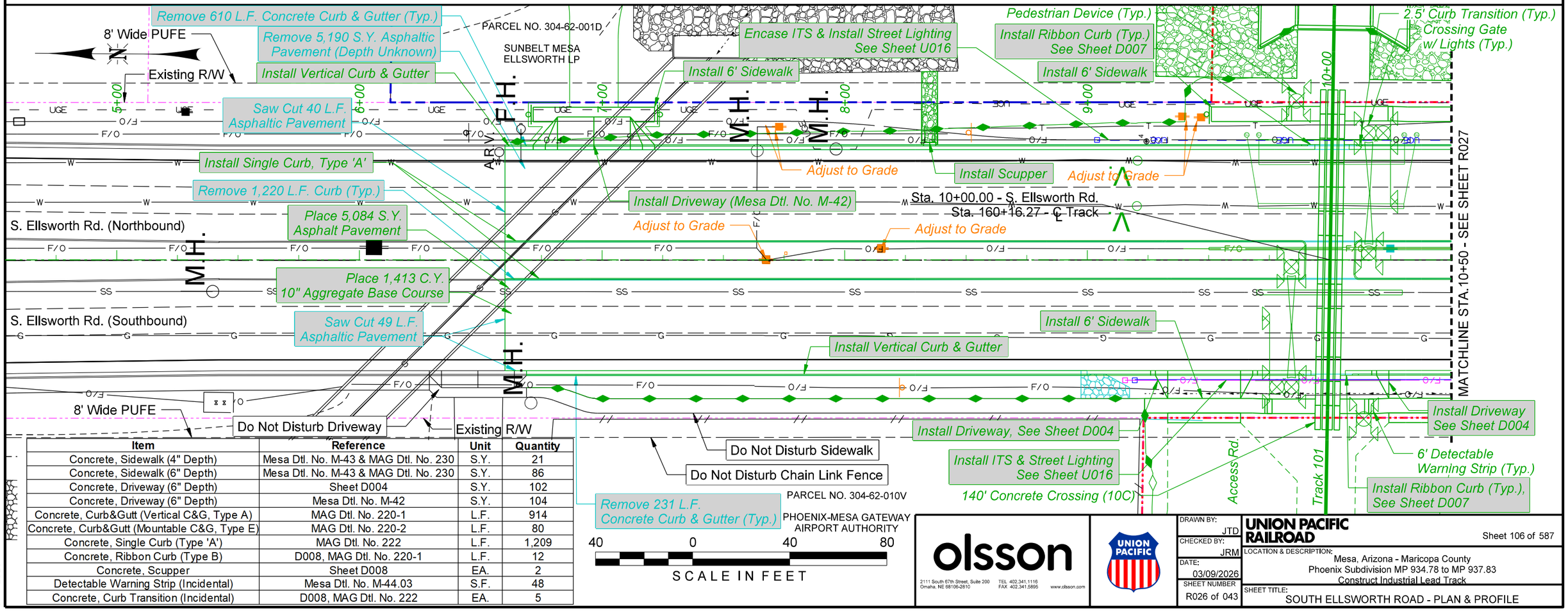
UNION PACIFIC RAILROAD
Sheet 105 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SOUTH ELLSWORTH ROAD - TYPICAL SECTIONS

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\D6N\Sheets\04_Road Details\T_RDxx_156Typ_200927.dgn
Default
3/9/2026





Item	Reference	Unit	Quantity
Concrete, Sidewalk (4" Depth)	Mesa Dtl. No. M-43 & MAG Dtl. No. 230	S.Y.	21
Concrete, Sidewalk (6" Depth)	Mesa Dtl. No. M-43 & MAG Dtl. No. 230	S.Y.	86
Concrete, Driveway (6" Depth)	Sheet D004	S.Y.	102
Concrete, Driveway (6" Depth)	Mesa Dtl. No. M-42	S.Y.	104
Concrete, Curb&Gutt (Vertical C&G, Type A)	MAG Dtl. No. 220-1	L.F.	914
Concrete, Curb&Gutt (Mountable C&G, Type E)	MAG Dtl. No. 220-2	L.F.	80
Concrete, Single Curb (Type 'A')	MAG Dtl. No. 222	L.F.	1,209
Concrete, Ribbon Curb (Type B)	D008, MAG Dtl. No. 220-1	L.F.	12
Concrete, Scupper	Sheet D008	EA.	2
Detectable Warning Strip (Incidental)	Mesa Dtl. No. M-44.03	S.F.	48
Concrete, Curb Transition (Incidental)	D008, MAG Dtl. No. 222	EA.	5

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	R026 of 043

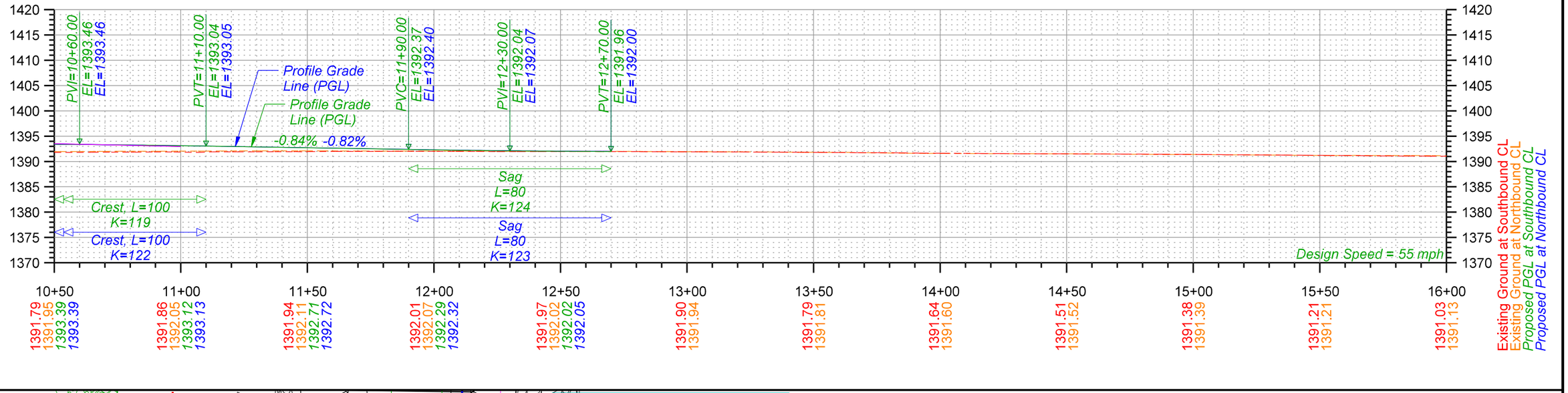
UNION PACIFIC RAILROAD

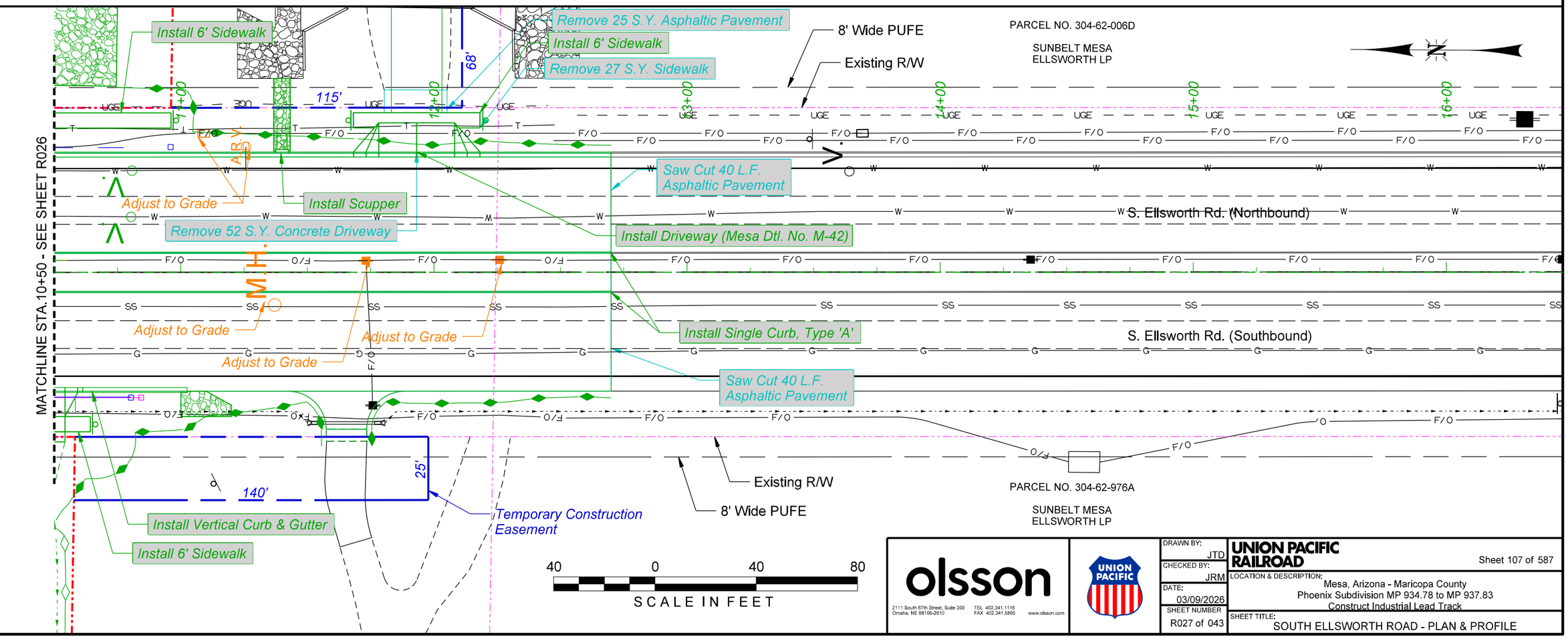
Sheet 106 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SOUTH ELLSWORTH ROAD - PLAN & PROFILE

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T_RDxx.156P1_200927.dgn
Default
3/9/2026





olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	R027 of 043

UNION PACIFIC RAILROAD Sheet 107 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SOUTH ELLSWORTH ROAD - PLAN & PROFILE

Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T_RDxx.156P2_200927.dgn
Default
3/9/2026

PARCEL NO. 304-62-001D

SUNBELT MESA
ELLSWORTH LP

PARCEL NO. 304-62-003L

PHOENIX-MESA GATEWAY
AIRPORT AUTHORITY

Temporary Construction Easement

UPRR R/W

UPRR R/W

339'

160'

PARCEL NO. 304-62-006D

SUNBELT MESA
ELLSWORTH LP

C.B.

32'

119'

8' Wide PUFE

Existing R/W

Ellsworth Channel

6+00

7+00

9+00

10+00

11+00

12+00

13+00

68'

29'

115'

M.H.

M.H.

M.H.

S. Ellsworth Rd. (Northbound)

S. Ellsworth Rd. (Southbound)

M.H.

8' Wide PUFE

Existing R/W

PARCEL NO. 304-62-010V

PHOENIX-MESA GATEWAY
AIRPORT AUTHORITY

Access Rd.

Track 101

140'

25'

Temporary Construction Easement

PARCEL NO. 304-62-976A

SUNBELT MESA
ELLSWORTH LP

LEGEND

Existing Ground Minor Contour (1 ft)

Existing Ground Major Contour (5 ft)

Proposed Subgrade Minor Contour (0.5 ft)

Proposed Subgrade Major Contour (5 ft)

50 0 50 100

SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP

CHECKED BY: JRM

DATE: 03/09/2026

SHEET NUMBER R028 of 043

UNION PACIFIC RAILROAD

Sheet 108 of 587

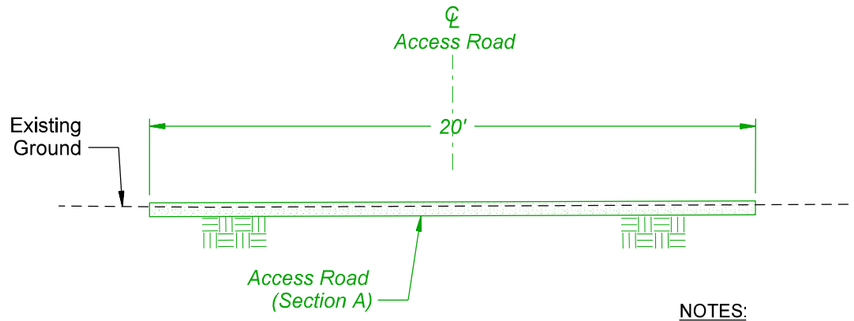
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SOUTH ELLSWORTH ROAD - GRADING PLAN

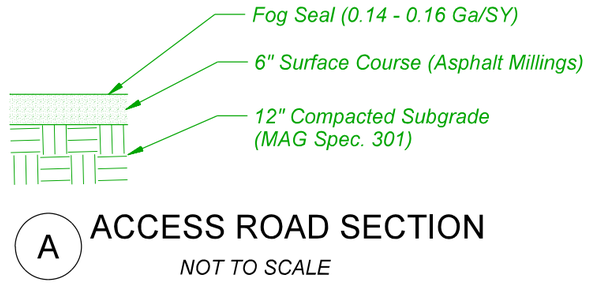
Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927.40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927.40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04.Road Details\T_RDxx.156GR_200927.dgn
Default
3/9/2026

Access Road Geometrics

1. P.I. N=833401.57, E=786378.05
2. P.I. N=833401.78, E=786358.05
3. 55' R.P. N=833388.34, E=786303.14
   P.C. N=833388.73, E=786358.14
   P.T. N=833333.34, E=786303.53
4. P.I. N=833333.08, E=786267.54
5. P.I. N=833313.08, E=786267.68
6. 55' R.P. N=833258.28, E=786296.08
   P.C. N=833264.15, E=786350.77
   P.T. N=833313.28, E=786295.69
7. P.I. N=833181.60, E=786359.62
8. P.I. N=833047.53, E=786380.59
9. P.I. N=833047.73, E=786360.58
10. P.I. N=832987.52, E=786381.02
11. P.I. N=832987.72, E=786361.01
12. 40' R.P. N=832876.91, E=786321.81
    P.C. N=832877.20, E=786361.81
    P.T. N=832836.91, E=786322.09
13. P.I. N=832836.54, E=786271.09
14. P.I. N=832816.55, E=786271.24
15. P.I. N=832792.93, E=786382.41
16. 40' R.P. N=832776.91, E=786322.52
    P.C. N=832777.20, E=786362.52
    P.T. N=832816.91, E=786322.24
17. P.I. N=832777.30, E=786376.30



TYPICAL SECTION

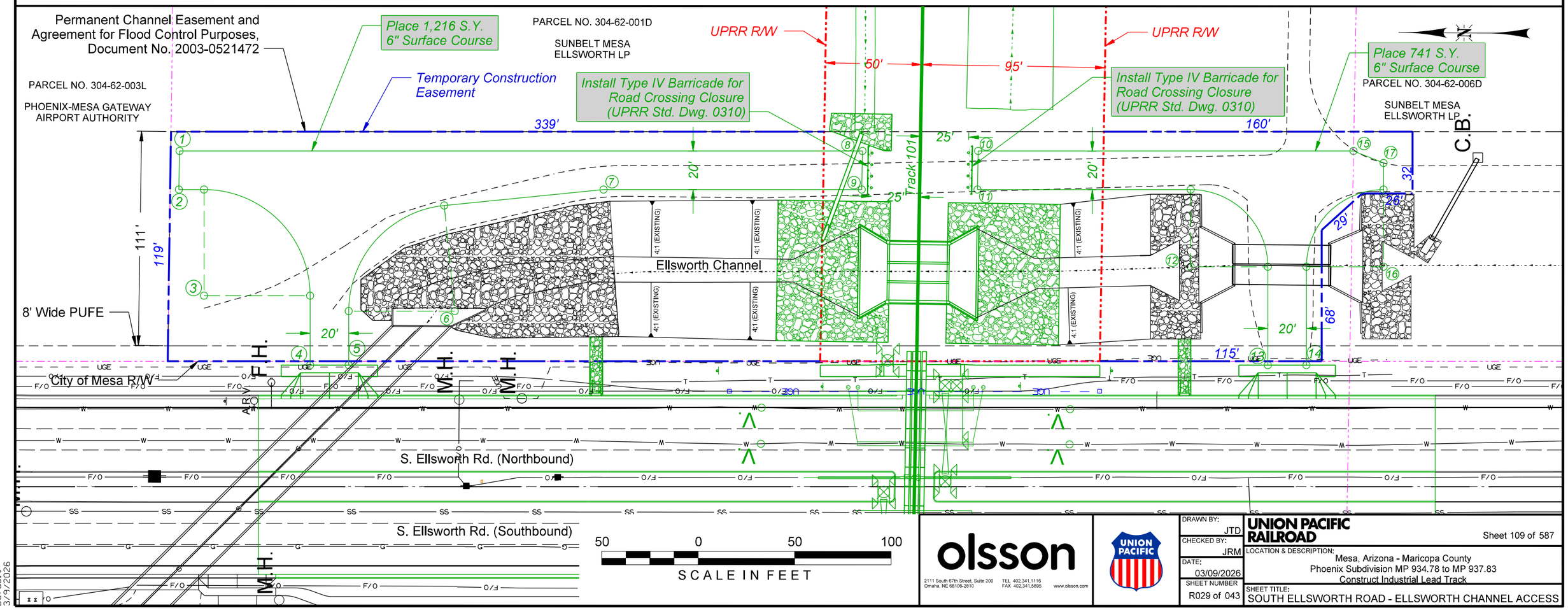


A ACCESS ROAD SECTION

NOT TO SCALE

NOTES:

1. FINISH GRADES, ELEVATIONS, AND SLOPES SHALL MAINTAIN POSITIVE DRAINAGE.
2. MAXIMUM CROSS-SLOPES SHALL NOT EXCEED 2%.
3. 6" SURFACE COURSE SHALL INCLUDE EXCAVATION, REMOVAL OF EXISTING MATERIAL, GRADING, SUBGRADE PREPARATION, COMPACTION, PRIME COAT, SURFACE COURSE MATERIAL (ASPHALT MILLINGS), FOG SEAL, AND OTHER RELATED ITEMS, WHICH SHALL ALL BE CONSIDERED INCIDENTAL
4. TYPE IV BARRICADES SHALL BE INSTALLED PER UPRR STD. DWG. 0310 WITH EACH W-BEAM GUARDRAIL HAVING MINIMUM LENGTH OF 24 L.F., MOUNTED ON WOOD POSTS, AND SHALL INCLUDE MOUNTING BLOCKS, HARDWARE, END TREATMENTS, OM4 SIGNING, AND OTHER RELATED ITEMS, WHICH SHALL ALL BE CONSIDERED INCIDENTAL.
5. ALL GRADING AND CONSTRUCTION ACTIVITIES SHALL OCCUR WITHIN RAILROAD PROPERTY AND TEMPORARY CONSTRUCTION EASEMENTS.



olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	R029 of 043

UNION PACIFIC RAILROAD Sheet 109 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SOUTH ELLSWORTH ROAD - ELLSWORTH CHANNEL ACCESS

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T_RDxx_156P3_200927.dgn
Default
3/9/2026

Crismon Road Alignment Information

Ⓐ P.O.B. Sta. 5+00.00
Track Sta. 212+72.31 - 499.90' LT
N=833196.55, E=791445.99

Ⓑ P.O.E. Sta. 16+00.00
Track Sta. 212+94.79 - 599.87' RT
N=832096.61, E=791457.63

PARCEL NO. 304-63-976
(LOT 2)

CUBES AT MESA GATEWAY
BUILDING B LLC

PMT21-14903

PARCEL NO. 304-63-977B
(LOT 3)

CUBES AT MESA GATEWAY
BUILDING C LLC

PMT21-14903

215+00

Access Rd

5+00 6+00 7+00 8+00 9+00 10+00 11+00 12+00 13+00 14+00 15+00 16+00

Crismon Rd.

Ⓐ Ⓑ

PARCEL NO. 304-62-001F

KOMATSU AMERICA CORP

PMT25-02775

PARCEL NO. 304-62-006D

SUNBELT MESA
ELLSWORTH LP

Future Rail Crossing Improvements

Track 101
Track 752
Access Rd

210+00

100 0 100 200
SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: R030 of 043

UNION PACIFIC RAILROAD

Sheet 110 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CRISMON ROAD - ALIGNMENT

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04.Road Details\T_RDxx_209Align_200927.dgn
Default
3/9/2026

PARCEL NO. 304-63-976
(LOT 2)

CUBES AT MESA GATEWAY
BUILDING B LLC

PMT21-14903

PARCEL NO. 304-63-977B
(LOT 3)

CUBES AT MESA GATEWAY
BUILDING C LLC

PMT21-14903

7+00 8+00 9+00 10+00 11+00 12+00 13+00

Crismon Road

PARCEL NO. 304-62-001F

KOMATSU AMERICA CORP

PMT25-02775

PARCEL NO. 304-62-006D

SUNBELT MESA
ELLSWORTH LP

Track 101

Track 752

Future Rail Crossing Improvements

Pavement Geometrics (Data to Face of Curb)

1. 2.75' R.P. Sta. 8+87.07 - 17.25 ' LT
   P.C. Sta. 8+87.07 - 20.00' LT
   P.T. Sta. 8+87.07 - 14.50' LT
2. Sta. 9+68.02 - 50.00' LT
3. Sta. 9+67.89 - 44.00' LT
4. Sta. 9+67.70 - 34.00' LT
5. Sta. 9+66.99 - 0.00'
6. Sta. 9+75.77 - 50.00' LT
7. Sta. 9+75.89 - 44.00' LT
8. Sta. 9+81.78 - 50.25' LT
9. Sta. 9+81.90 - 44.25' LT
10. 2' R.P. Sta. 9+88.37 - 18.00 ' LT
    P.C. Sta. 9+88.37 - 20.00' LT
    P.T. Sta. 9+90.37 - 17.96' LT
11. 2' R.P. Sta. 9+88.33 - 16.50 ' LT
    P.C. Sta. 9+88.33 - 14.50' LT
    P.T. Sta. 9+90.33 - 16.46' LT
12. Sta. 9+95.95 - 50.25' LT
13. Sta. 9+95.83 - 44.25' LT
14. Sta. 9+95.63 - 34.50' LT
15. Sta. 9+94.93 - 0.00'
16. Sta. 10+21.10 - 50.25' LT
17. Sta. 10+20.98 - 44.25' LT
18. Sta. 10+20.78 - 34.59' LT
19. Sta. 10+20.08 - 0.00'
20. 2' R.P. Sta. 10+27.37 - 18.00 ' LT
    P.C. Sta. 10+25.37 - 18.04' LT
    P.T. Sta. 10+27.37 - 20.00' LT
21. 2' R.P. Sta. 10+27.34 - 16.50 ' LT
    P.C. Sta. 10+25.34 - 16.54' LT
    P.T. Sta. 10+27.40 - 14.50' LT
22. Sta. 10+27.05 - 0.00'
23. Sta. 10+27.05 - 9.50' RT
24. Sta. 10+35.03 - 50.25' LT
25. Sta. 10+34.91 - 44.25' LT
26. Sta. 10+41.03 - 50.00' LT
27. Sta. 10+40.91 - 44.00' LT
28. Sta. 10+45.82 - 44.00' LT
29. Sta. 10+45.82 - 34.00' LT
30. Sta. 10+57.05 - 0.00'
31. Sta. 10+57.05 - 9.50' RT
32. Sta. 10+65.82 - 44.00' LT
33. Sta. 10+65.82 - 34.00' LT
34. 2' R.P. Sta. 10+78.45 - 21.00 ' LT
    P.C. Sta. 10+78.45 - 23.00' LT
    P.T. Sta. 10+78.72 - 19.02' LT
35. Sta. 10+82.04 - 50.00' LT
36. Sta. 10+81.92 - 44.00' LT
37. Sta. 10+81.72 - 34.00' LT
38. Sta. 10+81.02 - 0.00'

40 0 40 80
SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	R031 of 043

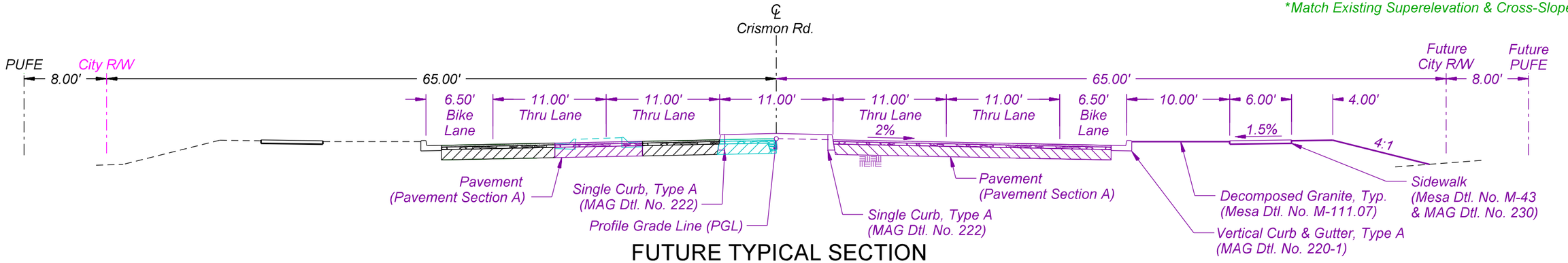
UNION PACIFIC RAILROAD — Sheet 111 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

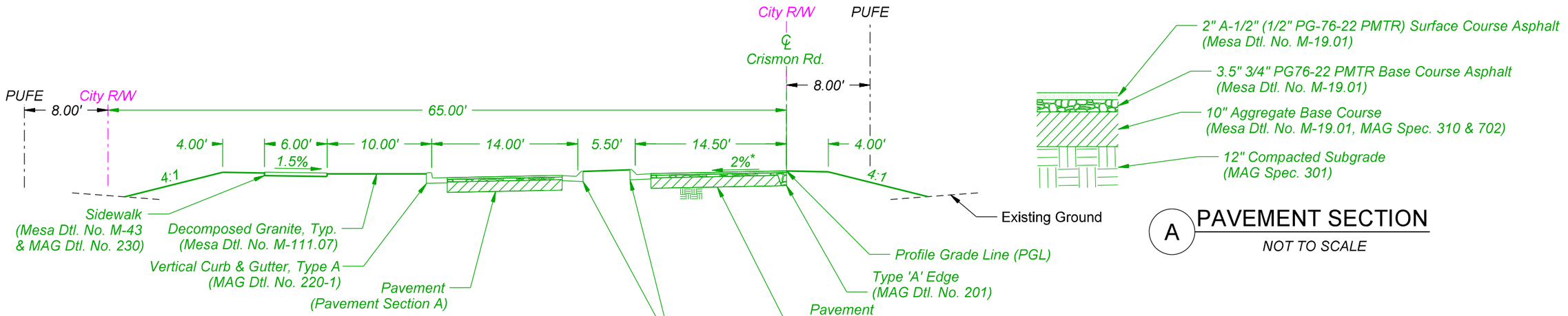
SHEET TITLE:
CRISMON ROAD - GEOMETRICS

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T_RDxx_209Geo_200927.dgn
Default
3/9/2026

*Match Existing Superelevation & Cross-Slopes



FUTURE TYPICAL SECTION

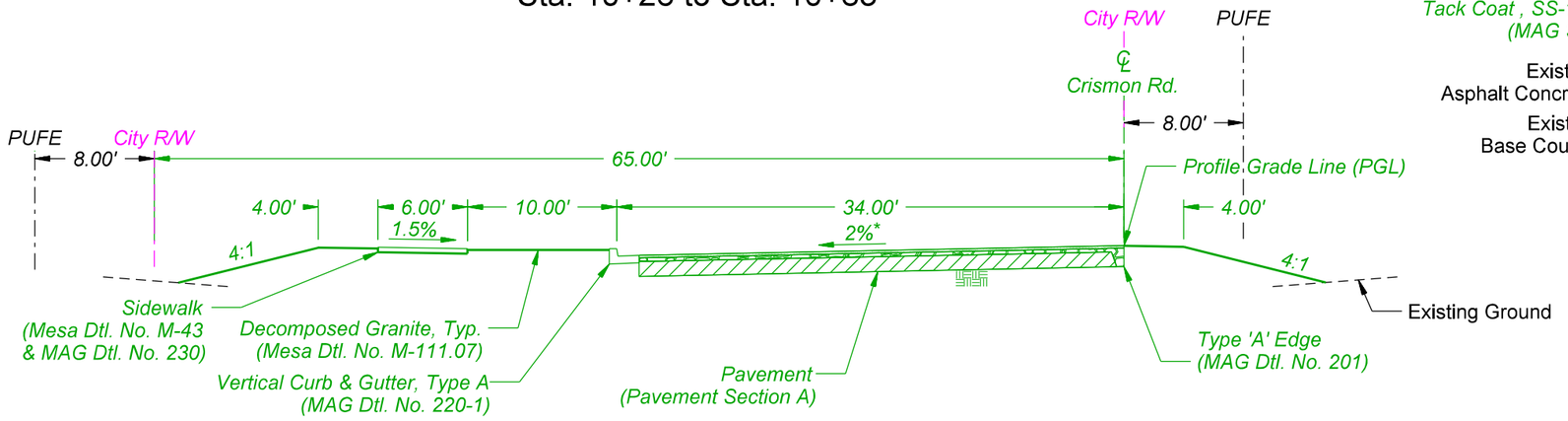


TYPICAL SECTION

Sta. 9+67 to Sta. 9+90
Sta. 10+26 to Sta. 10+83

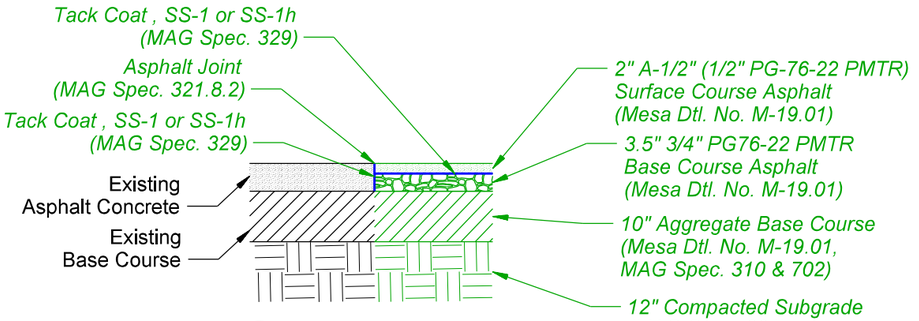
A PAVEMENT SECTION

NOT TO SCALE



TYPICAL SECTION

Sta. 9+90 to Sta. 10+26



B JOINT DETAIL

NOT TO SCALE

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

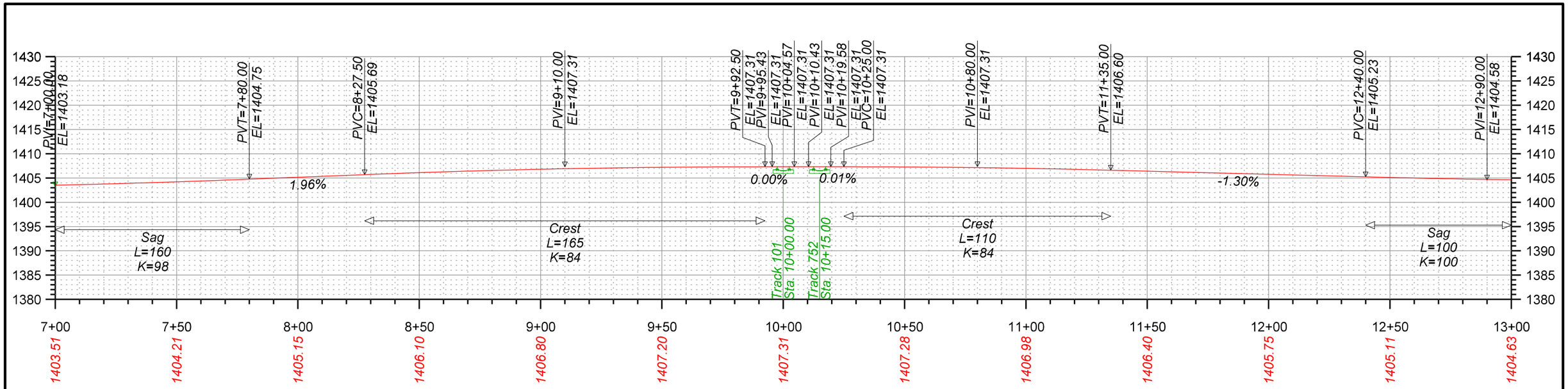
DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	R032 of 043

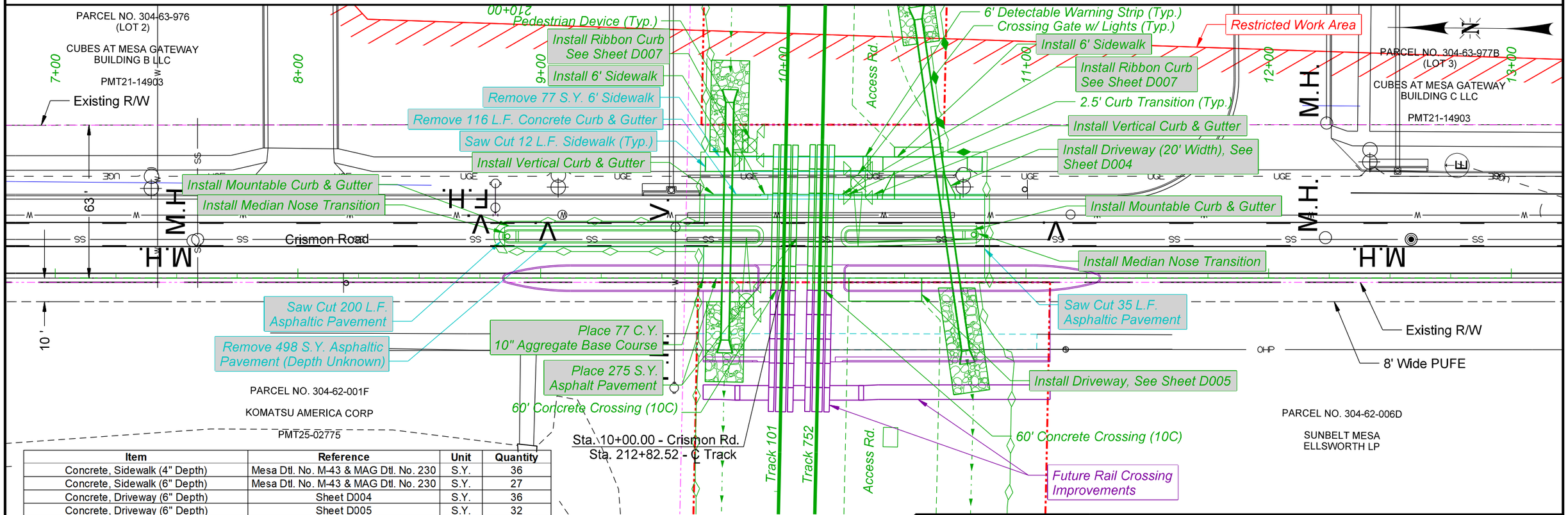
UNION PACIFIC RAILROAD — Sheet 112 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CRISMON ROAD - TYPICAL SECTIONS

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T_RDxx_209Typ_200927.dgn
Default
3/10/2026





Item	Reference	Unit	Quantity
Concrete, Sidewalk (4" Depth)	Mesa Dtl. No. M-43 & MAG Dtl. No. 230	S.Y.	36
Concrete, Sidewalk (6" Depth)	Mesa Dtl. No. M-43 & MAG Dtl. No. 230	S.Y.	27
Concrete, Driveway (6" Depth)	Sheet D004	S.Y.	36
Concrete, Driveway (6" Depth)	Sheet D005	S.Y.	32
Concrete, Curb&Gutt (Vertical C&G, Type A)	MAG Dtl. No. 220-1	L.F.	51
Concrete, Curb&Gutt (Mountable C&G, Type E)	MAG Dtl. No. 220-2	L.F.	366
Concrete, Ribbon Curb, Type A)	D008, MAG Dtl. No. 220-1	L.F.	6
Detectable Warning Strip (Incidental)	Mesa Dtl. No. M-44.03	S.F.	24
Concrete, Curb Transition (Incidental)	D008, MAG Dtl. No. 222	EA.	2
Median Nose Transition	MAG Dtl. No. 223	EA.	2

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

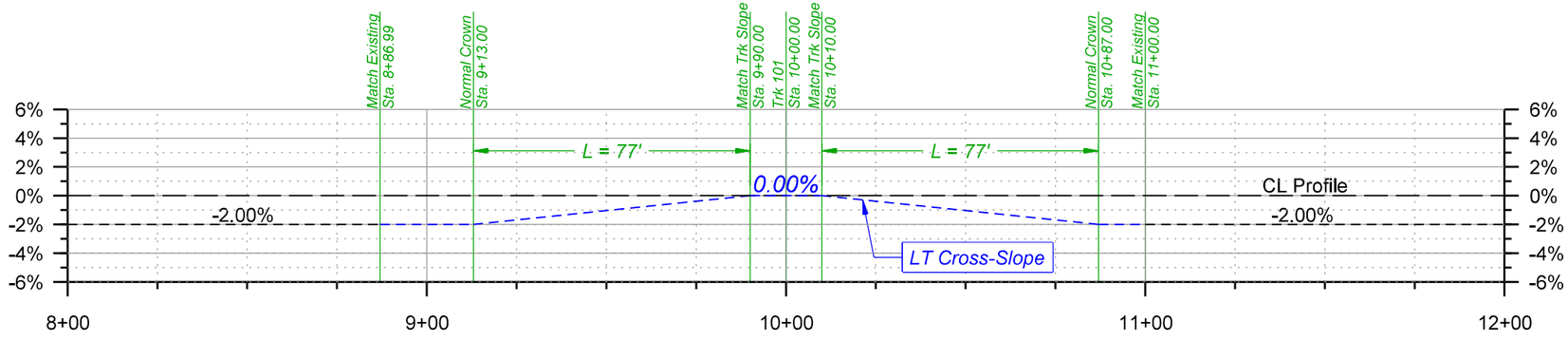
DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: R033 of 043

UNION PACIFIC RAILROAD
Sheet 113 of 587

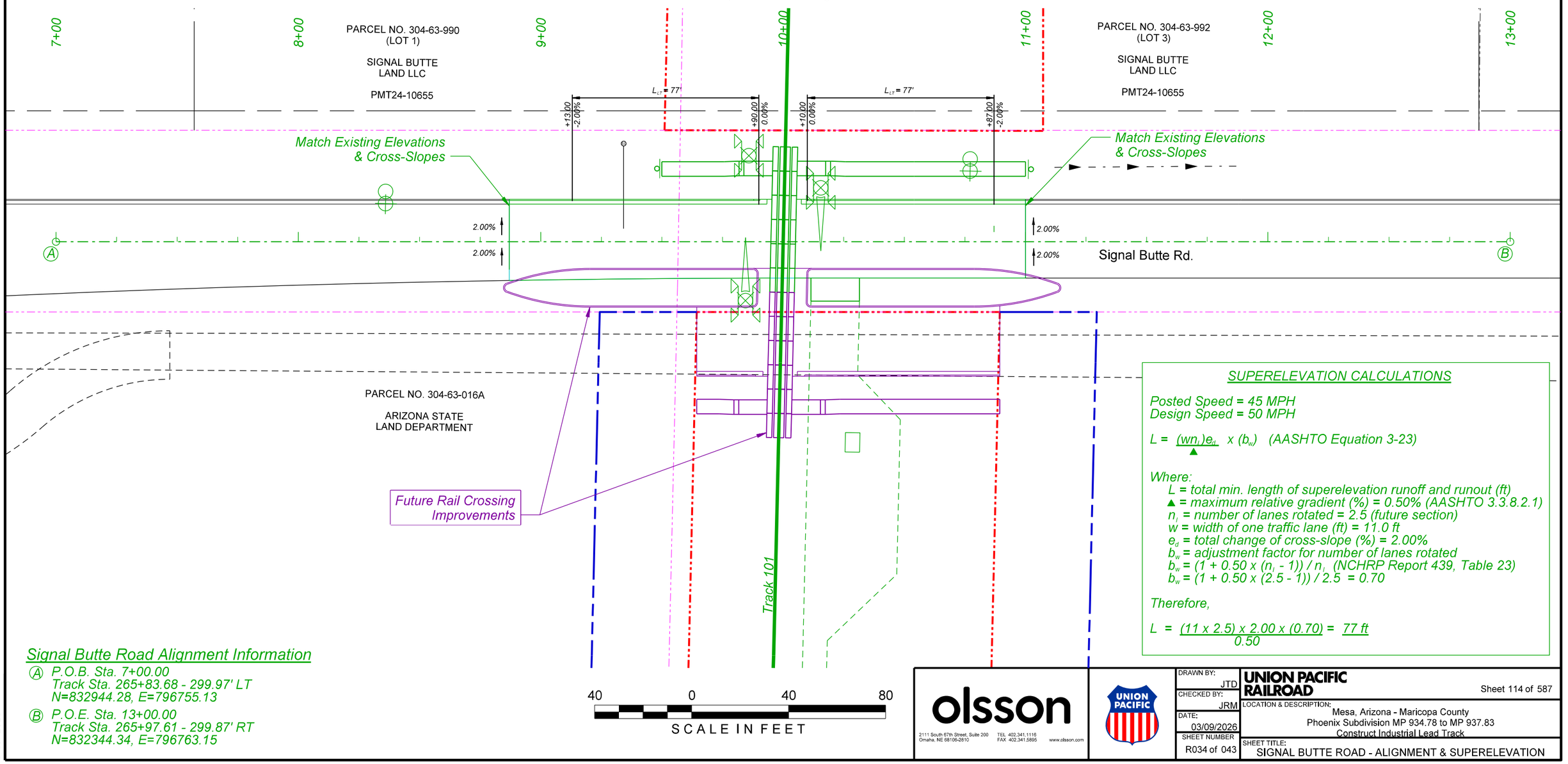
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CRISMON ROAD - PLAN & PROFILE

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04.Road Details\T_RDxx_209P1_200927.dgn
Default
3/10/2026



Superelevation Diagram



Signal Butte Road Alignment Information

Ⓐ P.O.B. Sta. 7+00.00
Track Sta. 265+83.68 - 299.97' LT
N=832944.28, E=796755.13

Ⓑ P.O.E. Sta. 13+00.00
Track Sta. 265+97.61 - 299.87' RT
N=832344.34, E=796763.15

40 0 40 80
SCALE IN FEET

SUPERELEVATION CALCULATIONS

Posted Speed = 45 MPH
Design Speed = 50 MPH

$L = \frac{(wn_l)e_d}{\blacktriangle} \times (b_w)$ (AASHTO Equation 3-23)

Where:
- L = total min. length of superelevation runoff and runout (ft)
- ▲ = maximum relative gradient (%) = 0.50% (AASHTO 3.3.8.2.1)
- n_l = number of lanes rotated = 2.5 (future section)
- w = width of one traffic lane (ft) = 11.0 ft
- e_d = total change of cross-slope (%) = 2.00%
- b_w = adjustment factor for number of lanes rotated
- $b_w = (1 + 0.50 \times (n_l - 1)) / n_l$ (NCHRP Report 439, Table 23)
- $b_w = (1 + 0.50 \times (2.5 - 1)) / 2.5 = 0.70$

Therefore,

$L = \frac{(11 \times 2.5) \times 2.00 \times (0.70)}{0.50} = 77$ ft

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: R034 of 043

UNION PACIFIC RAILROAD
Sheet 114 of 587
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track
SHEET TITLE:
SIGNAL BUTTE ROAD - ALIGNMENT & SUPERELEVATION

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T_RDxx_261Align_200927.dgn
Default
3/10/2026

PARCEL NO. 304-63-990
(LOT 1)

SIGNAL BUTTE
LAND LLC

PMT24-10655

PARCEL NO. 304-63-992
(LOT 3)

SIGNAL BUTTE
LAND LLC

PMT24-10655

7+00 8+00 9+00 10+00 11+00 12+00 13+00

Signal Butte Rd.

PARCEL NO. 304-63-016A

ARIZONA STATE
LAND DEPARTMENT

PARCEL NO. 304-63-016A

ARIZONA STATE
LAND DEPARTMENT

Track 101

Future Rail Crossing Improvements

Pavement Geometrics (Data to Face of Curb)

1. Sta. 8+86.99 - 17.00' LT
2. Sta. 8+86.99 - 15.97' RT
3. Sta. 9+95.33 - 17.50' LT
4. Sta. 9+94.57 - 15.01' RT
5. Sta. 10+05.48 - 17.50' LT
6. Sta. 10+04.72 - 15.00' RT
7. Sta. 10+11.48 - 15.00' RT
8. Sta. 10+11.48 - 24.50' RT
9. Sta. 10+31.48 - 15.00' RT
10. Sta. 10+31.48 - 24.50' RT
11. Sta. 11+00.00 - 17.00' LT
12. Sta. 11+00.00- 15.00' RT
13. Sta. 9+50.00 - 33.00' LT
14. Sta. 9+50.00 - 27.00' LT
15. Sta. 9+75.69 - 33.00' LT
16. Sta. 9+75.82 - 27.00' LT
17. Sta. 9+81.69 - 33.25' LT
18. Sta. 9+81.82 - 27.25' LT
19. Sta. 9+95.75 - 33.25' LT
20. Sta. 9+95.61 - 27.25' LT
21. Sta. 10+05.90 - 33.25' LT
22. Sta. 10+05.76 - 27.25' LT
23. Sta. 10+19.66 - 33.25' LT
24. Sta. 10+19.53 - 27.25' LT
25. Sta. 10+25.65 - 33.00' LT
26. Sta. 10+25.53 - 27.00' LT
27. Sta. 11+00.00 - 33.00' LT
28. Sta. 11+00.00 - 27.00' LT

40 0 40 80
SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: R035 of 043

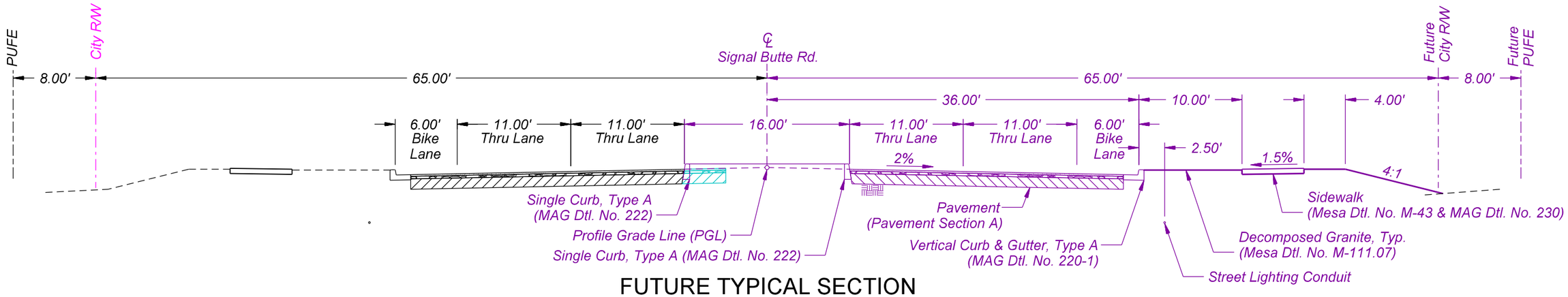
UNION PACIFIC RAILROAD
Sheet 115 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

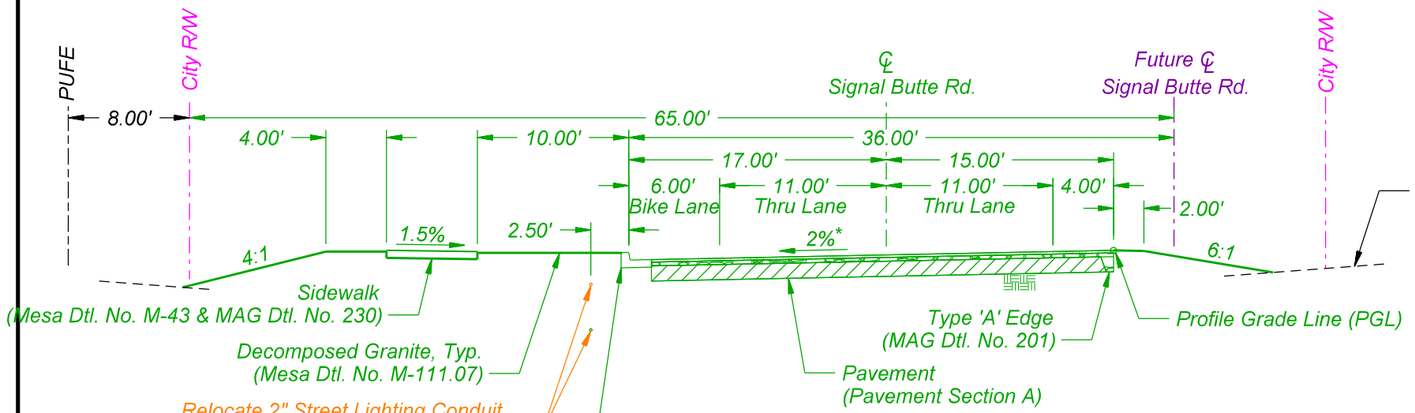
SHEET TITLE:
SIGNAL BUTTE ROAD - GEOMETRICS

Color table:K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T_RDxx_261Geo_200927.dgn
Default
3/10/2026

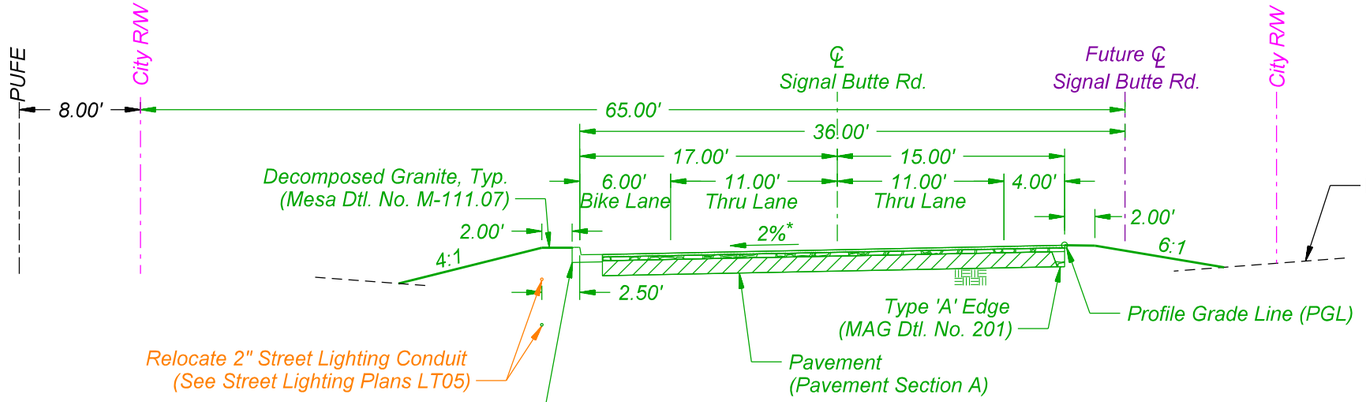
*See R034 for Superelevation & Cross-Slopes



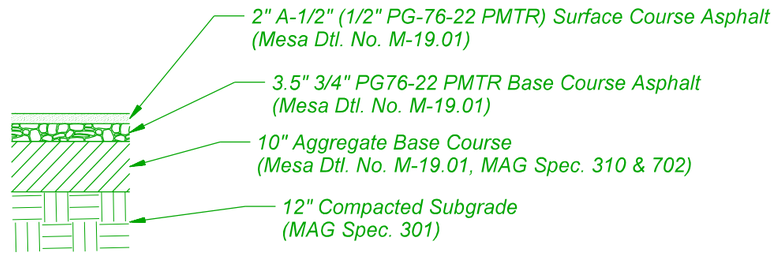
FUTURE TYPICAL SECTION



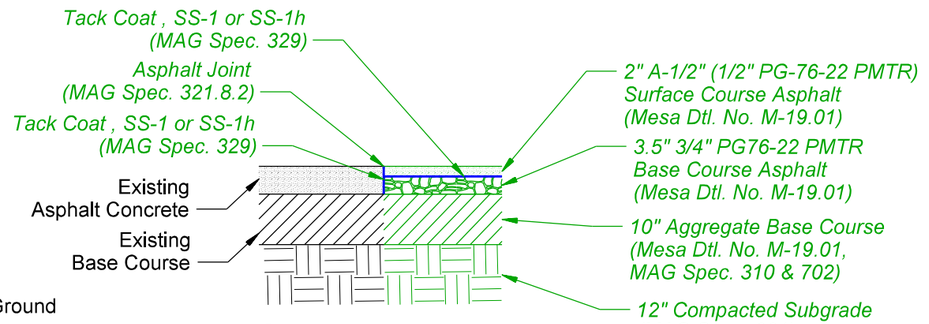
TYPICAL SECTION
Sta. 9+50 to Sta. 11+00



TYPICAL SECTION
Sta. 8+87 to Sta. 9+50



A PAVEMENT SECTION
NOT TO SCALE



B JOINT DETAIL
NOT TO SCALE

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

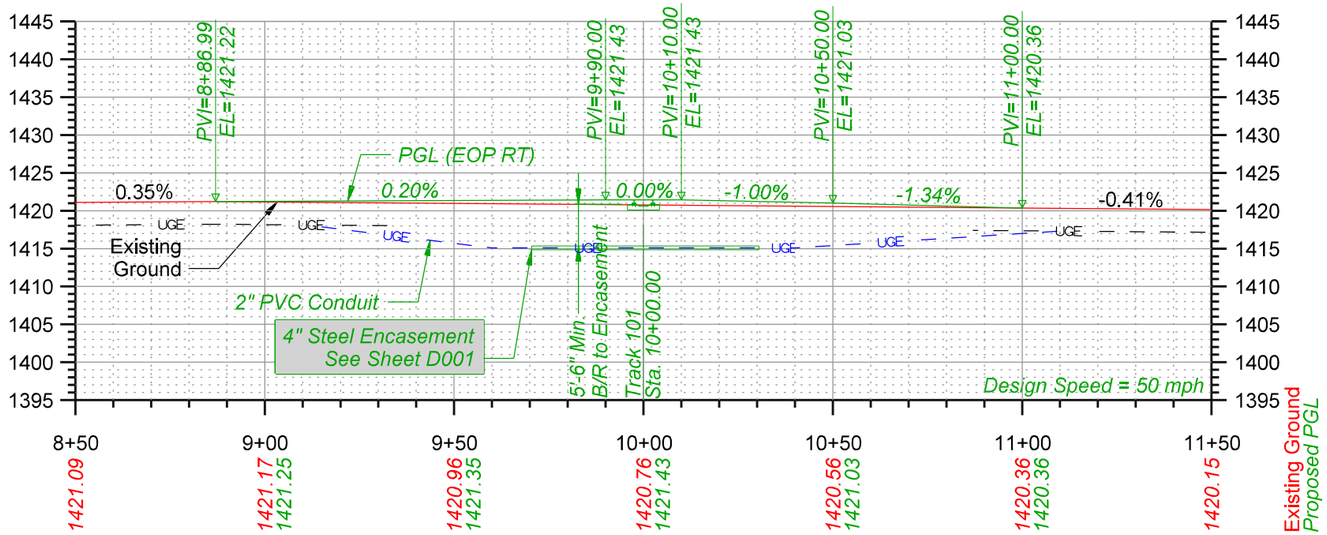
DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	R036 of 043

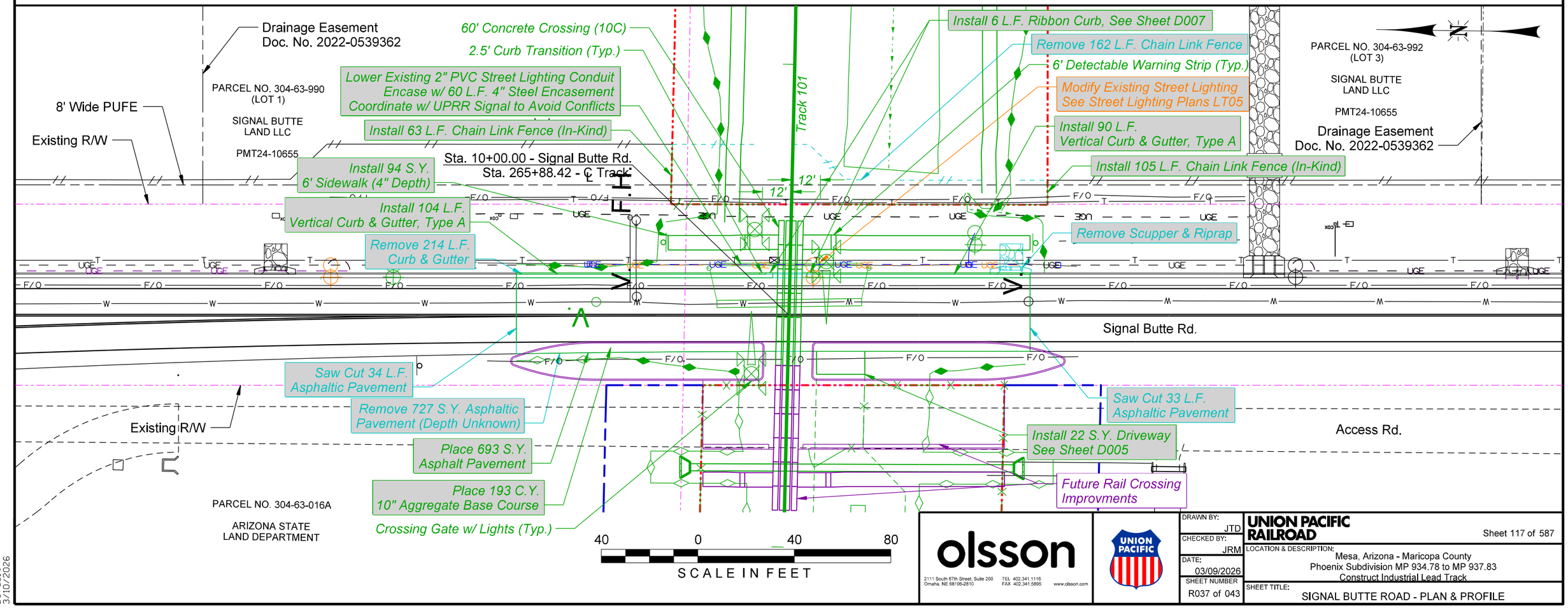
UNION PACIFIC RAILROAD — Sheet 116 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SIGNAL BUTTE ROAD - TYPICAL SECTIONS

Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T_R
Default
3/10/2026





olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	R037 of 043

UNION PACIFIC RAILROAD Sheet 117 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SIGNAL BUTTE ROAD - PLAN & PROFILE

Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T_RDxx_261P1_200927.dgn
Default
3/10/2026

PARCEL NO. 304-63-990
(LOT 1)

SIGNAL BUTTE
LAND LLC

PMT24-10655

Top of Berm
Elev. = 1421.50

UPRR R/W

Drainage Easement
Doc. No. 2022-0539362

8' Wide PUFE

Existing R/W

7+00

8+00

9+00

10+00

Track 101

11+00

12+00

13+00

Top of Berm
Elev. = 1421.50

UPRR R/W

PARCEL NO. 304-63-992
(LOT 3)

SIGNAL BUTTE
LAND LLC

PMT24-10655

Drainage Easement
Doc. No. 2022-0539362

Retention Area 5
$WSE_{100\text{-}YR/2\text{-}HR}$ = 1416.50

Retention Area 5
Outfall Elev. = 1419.41

Signal Butte Rd.

Existing R/W

PARCEL NO. 304-63-016A

ARIZONA STATE
LAND DEPARTMENT

Temporary Construction
Easement

Future Rail Crossing
Improvements

40'

40'

150'

150'

36" x 135' SSP

Temporary Construction
Easement

18" x 0.03125" x 135' SSP

UPRR R/W

UPRR R/W

LEGEND

- Existing Ground Minor Contour (1 ft)
- Existing Ground Major Contour (5 ft)
- Proposed Subgrade Minor Contour (0.5 ft)
- Proposed Subgrade Major Contour (5 ft)

40 0 40 80

SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: R038 of 043

UNION PACIFIC RAILROAD

Sheet 118 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SIGNAL BUTTE ROAD - GRADING PLAN

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RL_TK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T_RDxx_26IGR_200927.dgn
Default
3/10/2026

SUPERELEVATION CALCULATIONS

Posted Speed = 45 MPH
Design Speed = 50 MPH

$L = \frac{(wn_1)e_d}{\blacktriangle} \times (b_w)$ (AASHTO Equation 3-23)

Where:
- *L = total min. length of superelevation runoff and runout (ft)*
- *▲ = maximum relative gradient (%) = 0.50% (AASHTO 3.3.8.2.1)*
- *n_l = number of lanes rotated = 1 (existing section)*
- *w = width of one traffic lane (ft) = 12.0 ft*
- *e_d = total change of cross-slope (%)*
- *e_d = 2.18% (Rt.#1), 2.01% (Rt.#2)*
- *b_w = adjustment factor for number of lanes rotated*
- *$b_w = (1 + 0.50 \times (n_l - 1)) / n_l$ (NCHRP Report 439, Table 23)*
- *$b_w = 1$*

Therefore,

$L_{RT\#1} = \frac{(12 \times 1) \times 2.18 \times (1)}{0.50} = 53\text{ ft} = 55\text{ ft (Rt.\#1)}$

$L_{RT\#2} = \frac{(12 \times 1) \times 2.01 \times (1)}{0.50} = 49\text{ ft} = 55\text{ ft (Rt.\#2)}$

Private Rd.

340+00 341+00 342+00 343+00 344+00 345+00 346+00 347+00

"T" Top Trench Repair
See Sheet U030

E. Pecos Rd.

Ⓐ 0.18% 0.01% Ⓑ

+0.18% +89.24 $L_{RT\#1}$= 55' -2.00% +44.24 -2.00% +07.01 $L_{RT\#2}$= 55' +0.01% +62.01

PARCEL NO. 304-63-991
(LOT 2)

SIGNAL BUTTE
LAND LLC

PMT24-10655

East Pecos Road Alignment Information

Existing CL Based On Existing Pecos Road CL

Ⓐ P.O.B. Sta. 340+00.00
Track Sta. 285+33.87 - 229.72' LT
N=834008.03, E=798078.56

Ⓑ P.O.E. Sta. 347+00.00
Track Sta. 291+42.82 - 123.38' LT
N=834003.19, E=798778.54

Track 101

PARCEL NO. 304-63-005B

CMC STEEL
FABRICATORS INC

PARCEL NO. 304-63-992
(LOT 3)

SIGNAL BUTTE
LAND LLC

50 0 50 100
SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: R039 of 043

UNION PACIFIC RAILROAD
Sheet 119 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EAST PECOS ROAD - ALIGNMENT & SUPERELEVATION

Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T_RDxx_287Align_200927.dgn
Default
3/10/2026

340+00

341+00

342+00

343+00

344+00

345+00

346+00

"T" Top Trench Repair
See Sheet U030

E. Pecos Rd.

1

2

9

10

3

4

5

6

7

8

Pavement Geometrics (Data to Face of Curb)

1. Sta. 341+89.24 - 0.00'
2. Sta. 341+89.24 - 14.18' RT
3. Sta. 342+44.24 - 36.00' RT
4. Sta. 342+44.24 - 46.00' RT
5. Sta. 342+44.24 - 52.00' RT
6. Sta. 344+07.01 - 36.00' RT
7. Sta. 344+07.01 - 46.00' RT
8. Sta. 344+07.01 - 52.00' RT
9. Sta. 344+62.01 - 0.00'
10. Sta. 344+62.01 - 14.01' RT

PARCEL NO. 304-63-991
(LOT 2)

SIGNAL BUTTE
LAND LLC

PMT24-10655

Track 101

PARCEL NO. 304-63-005B

CMC STEEL
FABRICATORS INC

40 0 40 80

SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: R040 of 043

UNION PACIFIC RAILROAD

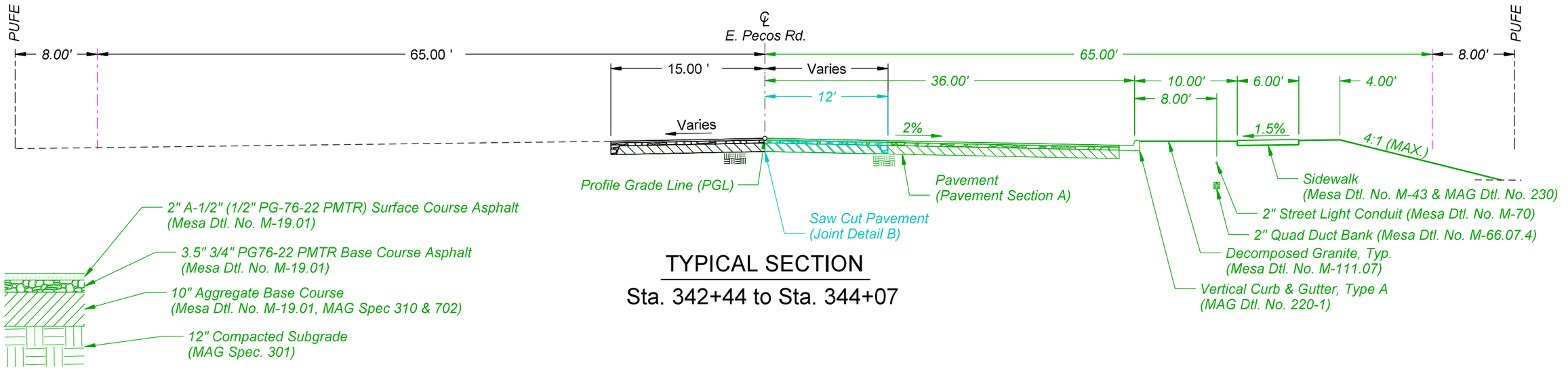
Sheet 120 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EAST PECOS ROAD - GEOMETRICS

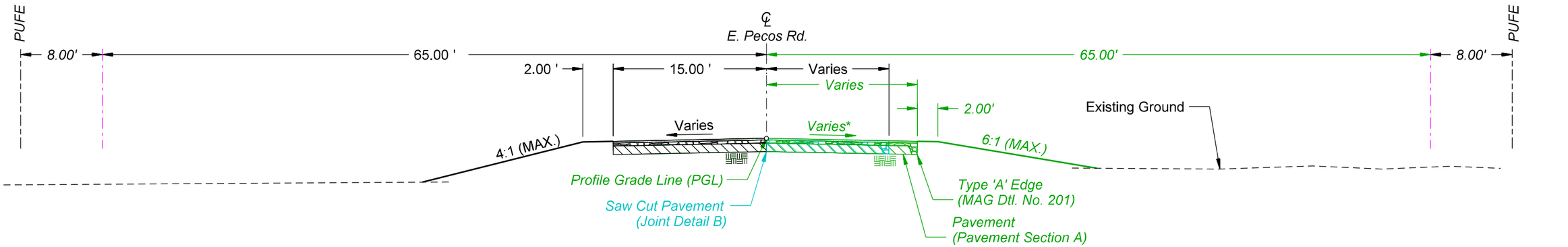
Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T_ROxx_287Geo_200927.dgn
Default
3/10/2026

*See Sheet R039 for Superelevation & Cross-Slopes

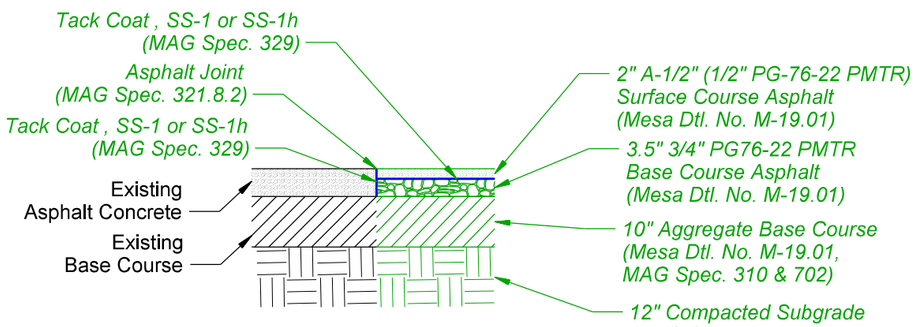


TYPICAL SECTION
Sta. 342+44 to Sta. 344+07

A PAVEMENT SECTION
NOT TO SCALE



TYPICAL SECTION
Sta. 341+89 to Sta. 342+44
Sta. 344+07 to Sta. 344+62



B JOINT DETAIL
NOT TO SCALE

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

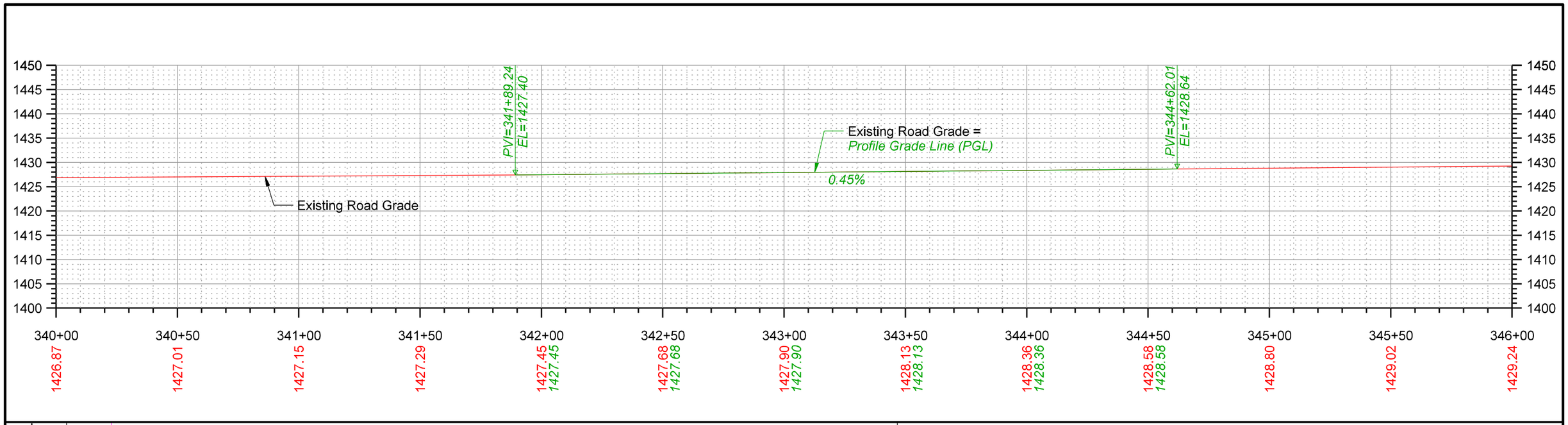
DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	R041of 043

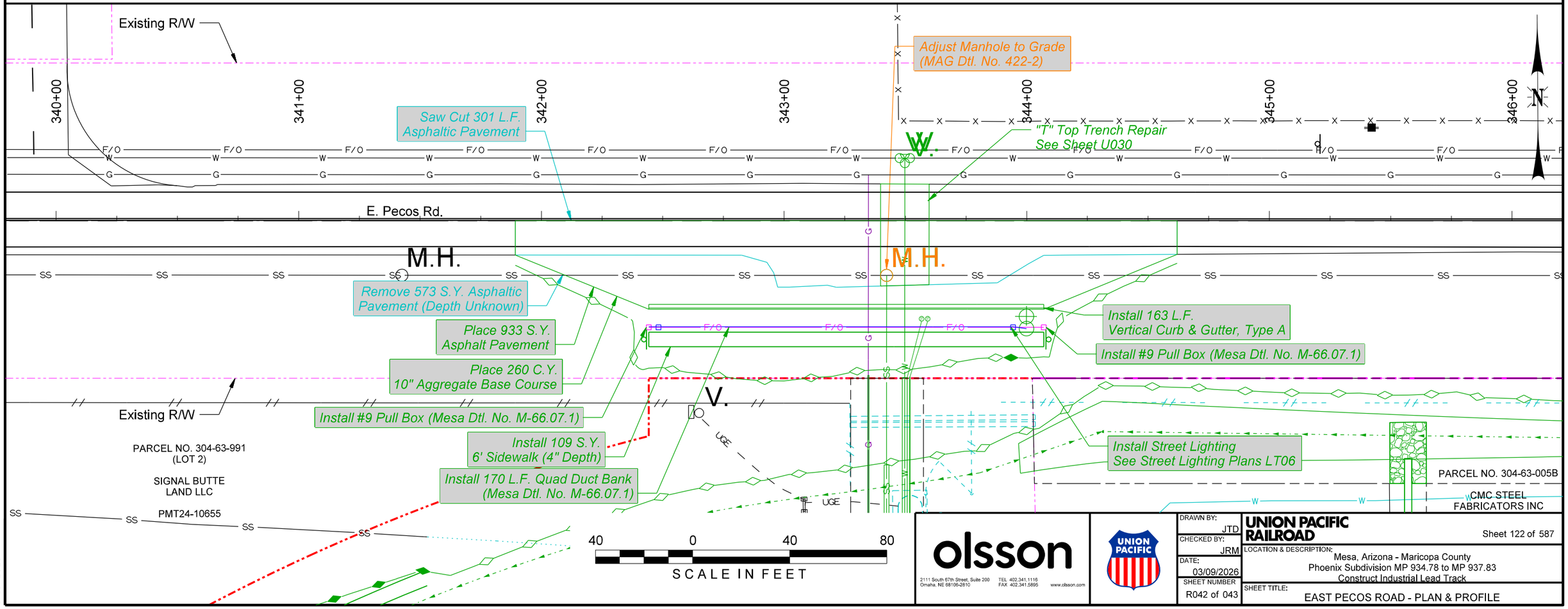
UNION PACIFIC RAILROAD — Sheet 121 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EAST PECOS ROAD - TYPICAL SECTIONS

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T_RDxx_287Typ_200927.dgn
Default
3/10/2026





Color table:K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T_RDxx_287P1_200927.dgn
Default
3/10/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	R042 of 043

UNION PACIFIC RAILROAD

Sheet 122 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EAST PECOS ROAD - PLAN & PROFILE

LEGEND

Existing Ground Minor Contour (1 ft)

1335 Existing Ground Major Contour (5 ft)

Proposed Subgrade Minor Contour (0.5 ft)

1335 Proposed Subgrade Major Contour (5 ft)

N

Existing R/W

"T" Top Trench Repair
See Sheet U030

340+00 341+00 342+00 343+00 344+00 345+00 346+00

F/O W G SS UGE

E. Pecos Rd.

M.H.

M.H.

V.

Retention Area 6
Outfall Elev. = 1427.00

Retention Area 6
WSE 100-YR/2-HR = 1426.50

Existing R/W

1425

PARCEL NO. 304-63-991
(LOT 2)

SIGNAL BUTTE
LAND LLC

PMT24-10655

UPRR R/W

Track 101

1430

PARCEL NO. 304-63-005B

CMC STEEL
FABRICATORS INC

40 0 40 80
SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: R043 of 043

UNION PACIFIC RAILROAD

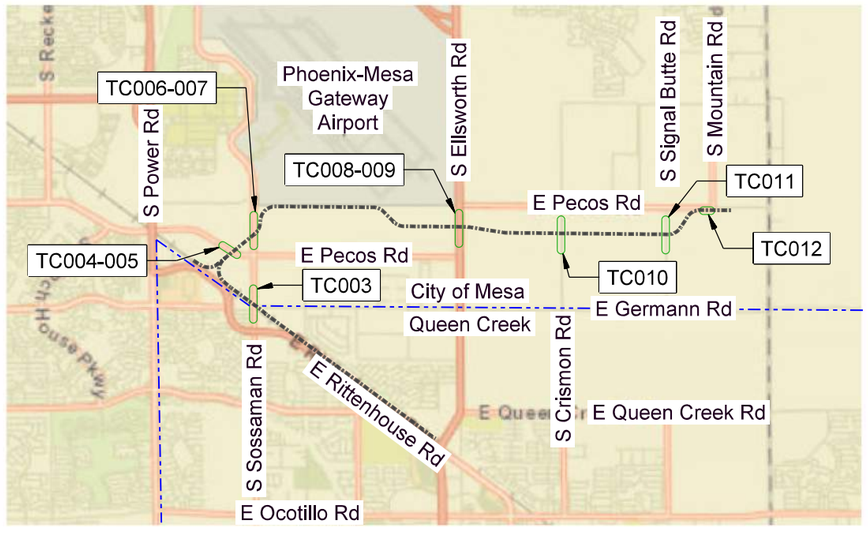
Sheet 123 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EAST PECOS ROAD - GRADING PLAN

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T_RDxx.287GR1.200927.dgn
Default
3/10/2026

ENGINEERING DESIGN



Project Location Map

PROJECT CONTACTS

CONTACT	PHONE NUMBER	UPRR
Carlos Mendoza	(209) 663-5406	Civil Construction Project Manager
Levi Hawkins	(402) 544-3304	Project Design Manager
Justin Mohlman	(402) 938-2420	Project Design Sr. Project Designer
Ajmal Stanigzai	(402) 544-7164	Structures Design Sr. Manager
Marla Cox	(402) 544-2253	Information Technology - Fiber
Mark Mentele	(402) 544-8532	Real Estate - Utilities
Kris Anderson	(402) 544-3162	Real Estate - Acquisitions
Greg Brigham	(402) 544-8568	Real Estate - Acquisitions

SHEET NO.	DESCRIPTION
TC001	COVER SHEET WITH PROJECT LOCATION MAP & CONTACTS
TC002	GENERAL NOTES
TC003	S SOSSAMAN RD - PAVEMENT MARKINGS & SIGNING
TC004 to TC005	E PECOS RD - PAVEMENT MARKINGS & SIGNING
TC006 to TC007	S SOSSAMAN RD - PAVEMENT MARKINGS & SIGNING
TC008 to TC009	S ELLSWORTH RD - PAVEMENT MARKINGS & SIGNING
TC010	S CRISMON RD - PAVEMENT MARKINGS & SIGNING
TC011	S SIGNAL BUTTE RD - PAVEMENT MARKINGS & SIGNING
TC012	E PECOS RD - PAVEMENT MARKINGS & SIGNING

DESIGN NOTES

ROAD	EXISTING SPEED	DESIGN SPEED
S SOSSAMAN RD	45 MPH	50 MPH
E PECOS RD	45 MPH	50 MPH
S ELLSWORTH RD	45 MPH	50 MPH
S CRISMON RD	45 MPH	50 MPH
S SIGNAL BUTTE RD	45 MPH	50 MPH

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

MESA, ARIZONA
PHOENIX SUBDIVISION
MP 934.78 TO MP 937.83
PAVEMENT MARKINGS & SIGNING

100% PLANS
ISSUED FOR BID

WORK ORDER: 54975
PROJECT NUMBER: 115884
BUDGET REFERENCE: 20CF060

LAST REVISED
03/09/2026

CITY OF MESA (SHEETS TC004 - TC012)

SIGNING GENERAL NOTES

(2025 VERSION, REVISED 06-23-22)

1. ALL REFLECTIVE SHEETING MATERIAL(S) SHALL BE PRESSURE SENSITIVE ASTM TYPE IV WIDE ANGLE WHITE PRISMATIC SHEETING OR APPROVED EQUAL WITH THE FOLLOWING EXCEPTIONS:
   A. ALL WARNING SIGNS (YELLOW SERIES) SHALL BE ASTM XI (FLUORESCENT YELLOW SHEETING).
   B. ALL REGULATORY SIGNS SHALL BE ASTM TYPE IV SHEETING.
   C. STREET NAME SIGNS:
      I. ANY ARTERIAL INTERSECTION (ALL BLADES) SHALL BE ASTM TYPE XI SHEETING.
      II. ALL OTHER INTERSECTIONS SHALL BE ASTM TYPE IV SHEETING.
   D. ALL PEDESTRIAN AND SCHOOL AREA SIGNING SHALL BE ASTM TYPE XI SHEETING (FLUORESCENT YELLOW-GREEN).
   E. ALL SHEETING SHALL BE IN VERTICAL ORIENTATION.
2. SIGN IMAGING SHALL BE IN COMPLIANCE WITH THE REFELECTIVE SHEETING MANUFACTURERS MATCHED COMPONENT SYSTEM. SIGN IMAGING SHALL CONSIST OF A TRANSPARENT ACRYLIC BASED ELECTRONIC CUTTABLE FILM (3M 1170 SERIES OR EQUIVALENT) OR SILK SCREENED (DEPENDING ON THE QUANTITY OF SIGNAGE) WITH STANDARD HIGHWAY COLORS.
3. STREET NAME SIGNS:
   A. PUBLIC STREETS SHALL BE PRESSURE SENSITIVE 3M #1177 GREEN ELECTRO CUT FILM OR APPROVED EQUAL.
   B. PRIVATE STREETS SHALL BE PRESSURE SENSITIVE 3M #1175 BLUE ELECTRO CUT FILM OR APPROVED EQUAL.
4. ANY REQUEST TO USE SHEETING OTHER THAN THAT SPECIFIED ABOVE SHALL BE MADE IN WRITING TO THE CITY TRAFFIC ENGINEER 30 DAYS IN ADVANCE OF INSTALLATION.
5. THE DEVELOPER IS RESPONSIBLE FOR THE INSTALLATION OF ALL SIGNS. SEE MESA STANDARD DETAILS M-1204 (FORMERLY M-20.01) THRU M-1207.5 (FORMERLY M-23.07). SIGN POST INSTALLATION SHALL BE PER M-1210 (FORMERLY M-39).
   A. ALL SIGN LAYOUTS ARE SUBJECT TO APPROVAL BY THE CITY OF MESA. SHOP DRAWINGS SHALL BE SUBMITTED TO THE CITY OF MESA TRANSPORTATION DEPARTMENT FOR ALL NEW SIGNING PRIOR TO SIGN FABRICATION AND INSTALLATION. CONTACT THE SIGN SHOP AT 480-644-3175 OR 480-644-2160 TO SUBMIT SHOP DRAWINGS AND FOR APPROVAL.
   B. PRIVATE STREET NAME SIGNS AND TRAFFIC CONTROL SIGNS INSTALLED ON PRIVATE STREETS SHALL BE THE RESPONSIBILITY OF THE HOMEOWNER'S ASSOCIATION (PROPERTY OWNER(S)) IN PERPETUITY.
6. ALL SIGNING SHALL CONFORM TO THE REQUIREMENTS CONTAINED IN THE LATEST APPROVED EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), THE LATEST APPROVED EDITION OF THE STANDARD HIGHWAY SIGNS BOOK AND THE LATEST APPROVED EDITION OF THE ARIZONA SUPPLEMENT PUBLISHED BY THE ARIZONA DEPARTMENT OF TRANSPORTATION (ADOT).
7. SIGNS THAT ARE REQUIRED TO BE REMOVED OR RELOCATED DURING CONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. ANY SIGNING THAT IS TO BE RELOCATED OR REMOVED DUE TO CONSTRUCTION SHALL BE REINSTALLED IN ITS FINAL LOCATION PER CITY OF MESA STANDARDS. SIGNS NOT BEING RELOCATED SHALL BE RETURNED TO THE CITY OF MESA SIGN SHOP (300 E SIXTH ST).
8. THE CONTRACTOR SHALL ENSURE THAT AT NO TIME A TRAFFIC SIGN IS INSTALLED IN SUCH A MANNER AS TO BE BLOCKED BY A TREE OR ANY TYPE OF VEGETATION. IN THESE CASES, THE CONTRACTOR SHALL CONTACT THE TRANSPORTATION DEPARTMENT AT 480-644-2160 TO PROVIDE AN ALTERNATE LOCATION PRIOR TO INSTALLATION.
9. ANY SIGNING INSTALLED WITHIN THE CITY OF MESA'S RIGHT-OF-WAY SHALL BE INSTALLED BY AN INDIVIDUAL THAT HAS CURRENT CERTIFICATION IN SIGNING INSTALLATION OR INSPECTION FROM AMERICAN TRAFFIC SAFETY SERVICES ASSOCIATION (ATSSA) OR THE INTERNATIONAL MUNICIPAL SIGNAL ASSOCIATION (IMSA). EQUIVALENTS WILL BE CONSIDERED BUT MUST BE APPROVED BY THE CITY TRAFFIC ENGINEER 30 DAYS PRIOR TO INSTALLATION OF ANY SIGNING.
10. SIGNING QUANTITIES AND INSTALLATION LOCATIONS ARE SUBJECT TO CHANGE AT THE TIME OF INSTALLATION BASED UPON CURRENT ACCEPTED PRACTICE.

PAVEMENT MARKINGS GENERAL NOTES

(2025 VERSION, REVISED 07-10-25

1. ALL SIGNING AND PAVEMENT MARKING MATERIALS AND EQUIPMENT SHALL CONFORM TO THE CITY OF MESA STANDARD DETAILS, MUTCD AND ADOT STANDARD SPECIFICATIONS AND STANDARD DRAWINGS, LATEST APPROVED EDITIONS.
2. WHEN STRIPING OBLITERATION IS NECESSARY, IT SHALL BE ACCOMPLISHED IN CONFORMANCE WITH ADOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, CURRENT EDITION, SECTION 701-3.06. IF PAID FOR PER FOOT, REFER TO SECTION 701-5.05. GRINDING IS NOT AN ACCEPTABLE FORM OF OBLITERATION. PAINTING OVER STRIPING DOES NOT CONSTITUTE STRIPE OBLITERATION.
3. FOLLOWING THE OBLITERATION OF THE PAVEMENT MARKINGS, THE CONTRACTOR SHALL APPLY 2 COATS OF POLYMER MODIFIED MASTERSEAL (PMM) OR EQUIVALENT (AS APPROVED BY THE PAVEMENT MANAGEMENT SUPERVISOR IN THE CITY OF MESA TRANSPORTATION DEPARTMENT) TO THE OBLITERATED PORTION OF THE ROADWAY IN ACCORDANCE WITH MATERIAL SUPPLIER SPECIFICATIONS FOR APPLICATION. THE PMM WILL BE APPLIED AT A WIDTH EQUAL TO 3 TIMES THE WIDTH OF THE PAVEMENT MARKING BEING OBLITERATED. FOR EXAMPLE, A 4-INCH STRIPE WILL HAVE A 12-INCH WIDE STRIP OF PMM APPLIED IN THE OBLITERATED AREA, CENTERED ON THE OBLITERATED LINE. FOR PAVEMENT MARKING SYMBOLS, SUCH AS ARROWS OR TEXT, THE PMM MUST COVER THE ENTIRE WIDTH AND HEIGHT OF THE PAVEMENT MARKING SYMBOL, CREATING A SQUARE OR RECTANGULAR TREATED AREA.
4. ALL LANE LINES, EDGE LINES, BIKE LANE LINES, CENTERLINES, AND PAINTED MEDIANS SHALL BE REFLECTORIZED HIGH-BUILD PAINT PER MESA AMENDMENTS TO MAG SPECIFICATIONS SECTION 402.
5. ALL STOP BARS AND CROSSWALKS SHALL BE 90 MIL THICK EXTRUDED ALKYD THERMOPLASTIC MARKING MATERIAL PER ADOT STANDARD SPECIFICATIONS SECTION 704.
6. ALL SYMBOLS AND WORD LEGENDS SHALL BE TYPE IV 90 MIL PREFORMED THERMOPLASTIC PER ADOT STANDARD SPECIFICATIONS SECTION 705 UNLESS OTHERWISE NOTED.
7. THE CONTRACTOR SHALL PAINT ALL RAISED MEDIAN ISLAND NOSES REFLECTORIZED YELLOW, 10 L.F. BEYOND THE RADIUS POINTS.
8. THE LANE WIDTH DIMENSIONS FOR ALL PAVEMENT MARKINGS SHALL BE FROM THE FACE OF CURB TO CENTER OF STRIPE OR CENTER OF STRIPE TO CENTER OF STRIPE UNLESS NOTED OTHERWISE.
9. THE CONTRACTOR SHALL CONTACT THE TRANSPORTATION DEPARTMENT AT 480-644-2160 FOR SCHEDULING AT LEAST TWO WEEKS BEFORE THE LAYOUT. THE CONTACTOR SHALL SET LAYOUT POINTS NO MORE THAN 50 FEET APART ALONG THE LINES TO BE STRIPED, INCLUDING AT ALL TRANSITION POINTS, BEGINNINGS, ENDS, BREAKS, AND CHANGES IN THE STRIPING. THE LAYOUT SHALL BE APPROVED BY THE TRANSPORTATION DEPARTMENT PRIOR TO PAVEMENT MARKING INSTALLATION.
10. THE CONTRACTOR SHALL COORDINATE PAVEMENT MARKING INSTALLATION TO ALLOW THE TRANSPORTATION DEPARTMENT TO OBSERVE THE INSTALLATION. TRANSPORTATION DEPARTMENT NORMAL WORKDAYS ARE MONDAY THRU THURSDAY.

TOWN OF QUEEN CREEK (SHEET TC003)

SIGNING GENERAL NOTES

1. THE TOWN TRAFFIC ENGINEER SHALL BE NOTIFIED AT LEAST FIVE BUSINESS DAYS PRIOR TO BEGINNING ANY ROADWAY SIGNING WORK ASSOCIATED WITH THESE PLANS.
2. THE TOWN TRAFFIC ENGINEER MAY REQUIRE THE CONTRACTOR TO ADJUST ROADWAY SIGNING LOCATIONS, OFFSETS AND TYPES OF SIGNS AT THE TIME OF INSTALLATION.
3. ALL ROADWAY SIGNING MATERIALS AND INSTALLATION SHALL CONFORM TO TOWN REQUIREMENTS. WHERE TOWN REQUIREMENTS DO NOT PROVIDE THE NECESSARY INFORMATION, ARIZONA DEPARTMENT OF TRANSPORTATION STANDARD DRAWINGS AND SPECIFICATIONS, THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (LATEST ADOT APPROVED EDITION) AND DIRECTION FROM THE TOWN TRAFFIC ENGINEER SHOULD BE UTILIZED.
4. THE CONTRACTOR SHALL COORDINATE WITH THE TOWN TRAFFIC ENGINEERING DIVISION PRIOR TO ORDERING ANY MATERIALS TO OBTAIN THE LATEST ROADWAY SIGNING REQUIREMENTS AND SPECIFICATIONS.
5. THE CONTRACTOR SHALL NOTIFY THE TRAFFIC ENGINEERING DIVISION UPON COMPLETION OF ALL SIGNING WORK TO SCHEDULE A FINAL INSPECTION. THE CONTRACTOR SHALL SUPPLY ALL REQUIRED WARRANTY DOCUMENTS TO THE TOWN TRAFFIC ENGINEERING DIVISION PRIOR TO FINAL JOB ACCEPTANCE.
6. ALL EXISTING ROADWAY SIGNS TEMPORARILY REMOVED BY THE CONTRACTOR SHALL BE SALVAGED FOR REINSTALLATION BY THE CONTRACTOR. ALL ROADWAY SIGNS PERMANENTLY REMOVED BY THE CONTRACTOR SHALL BE SALVAGED AND RETURNED TO THE TOWN. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR MAINTAINING EACH SIGN THAT IS REMOVED AND ENSURING THAT THE SIGN'S INTEGRITY IS MAINTAINED. IN THE EVENT THE SIGN IS DAMAGED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ITS REPLACEMENT.
7. ALL ROADWAY SIGNS AND SIGN POSTS SHALL BE INSTALLED PER TOWN OF QUEEN CREEK STANDARD DRAWINGS.
8. FINAL ACCEPTANCE OF ALL ROADWAY SIGNING SHALL BE PROVIDED BY THE TRAFFIC ENGINEERING DIVISION.
9. THE CONTRACTOR SHALL ENSURE THAT AT NO TIME A TRAFFIC SIGN IS INSTALLED IN SUCH A WAY AS TO BE BLOCKED BY TREES OR ANY TYPE OF VEGETATION. IN SUCH CASES, THE CONTRACTOR SHALL CONTACT THE TOWN'S TRAFFIC ENGINEERING SECTION TO PROVIDE AN ALTERNATIVE LOCATION FOR THE INSTALLATION OF SIGNING IN QUESTION.
10. ANY SIGNING THAT IS TO BE AFFIXED TO A STREET LIGHT POLE SHALL BE DONE SO USING A MINIMUM ¾ INCH STAINLESS STEEL BANDING WITH APPROPRIATE FASTENERS.
11. ANY SIGNING INSTALLED WITHIN THE TOWN'S RIGHT OF WAY SHALL BE INSTALLED BY AN INDIVIDUAL WHO HAS A CURRENT CERTIFICATION IN SIGNING INSTALLATION OR INSPECTION FROM THE AMERICAN TRAFFIC SAFETY SERVICES ASSOCIATION (ATSSA) OR INTERNATIONAL MUNICIPAL SIGNAL ASSOCIATION (IMSA). EQUIVALENTS WILL BE CONSIDERED BUT MUST BE SUBMITTED IN WRITING TO THE TOWN'S TRAFFIC ENGINEER 30 DAYS PRIOR TO INSTALLATION OF ANY SIGNING.

REQUIREMENTS FOR SIGN DESIGN

1. ALL ROADWAY SIGNS SHALL BE FACED ON NEW 0.080 INCH THICK ALUMINUM BLANKS. SIGNS OVER 9 SQUARE FEET SHALL BE 0.125 INCHES THICK.
2. SHEETING SHALL BE ASTM TYPE XI FOR ALL PERMANENT REGULATORY, WARNING, GUIDE, INFORMATION, AND OBJECT MARKER SIGNS (INCLUDING SIGN LEGENDS AND BORDERS).
3. ALL WARNING SIGNS (YELLOW SERIES) SHALL BE MANUFACTURED WITH ASTM TYPE XI 3M FLUORESCENT YELLOW 4081 DIAMOND GRADE REFLECTIVE SHEETING OR APPROVED EQUAL.
4. ALL SCHOOL SIGNS SHALL BE MANUFACTURED WITH ASTM TYPE XI 3M FLUORESCENT YELLOW GREEN 4083 DIAMOND GRADE REFLECTIVE SHEETING OR APPROVED EQUAL.
5. SHEETING SHALL BE MANUFACTURED BY 3M CORPORATION OR AN APPROVED EQUAL WITH EQUAL OR GREATER WARRANTY PERIODS. ALL ROADWAY SIGNS SHALL BE MANUFACTURED USING MATCHING COMPONENTS APPROVED BY THE SHEETING MANUFACTURER.
6. ALL ROADWAY SIGN PANELS SHALL BE LABELED ON THE BACK BOTTOM RIGHT CORNER WITH A DECAL. THE DECAL SHALL STATE THE SIGN IS PROPERTY OF THE TOWN OF QUEEN CREEK AND IDENTIFY THE MANUFACTURER AND DATE OF INSTALLATION.

PAVEMENT MARKING GENERAL NOTES

1. THE CONTRACTOR SHALL COORDINATE WITH THE TOWN TRAFFIC ENGINEERING DIVISION FOR AN INSPECTION PRIOR TO THE APPLICATION OF ANY PAINT.
2. AFTER MEETING WITH THE TOWN TRAFFIC ENGINEER, THE CONTRACTOR SHALL SPOT MARK THE ENTIRE PROJECT AND HAVE THE LAYOUT APPROVED BY THE TOWN TRAFFIC ENGINEER PRIOR TO THE APPLICATION OF ANY PAINT. ONCE ALL PAVEMENT MARKINGS HAVE BEEN INSTALLED, THE CONTRACTOR SHALL NOTIFY THE TOWN TRAFFIC ENGINEER FOR A FINAL INSPECTION. AT COMPLETION OF THE FINAL INSPECTION, THE CONTRACTOR SHALL SUPPLY ALL REQUIRED WARRANTY DOCUMENTS TO THE TOWN TRAFFIC ENGINEER PRIOR TO FINAL JOB ACCEPTANCE.
3. THE TOWN TRAFFIC ENGINEER MAY REQUIRE THE CONTRACTOR TO ADJUST PAVEMENT MARKING LOCATIONS, OFFSETS AND TYPES OF MARKINGS PRIOR TO INSTALLATION.
4. ANY PAVEMENT MARKINGS APPLIED PRIOR TO INSPECTION AND APPROVAL BY THE TOWN TRAFFIC ENGINEERING DIVISION SHALL BE OBLITERATED, SEALED AND RESTRIPED AT THE CONTRACTOR'S EXPENSE.
5. ALL CONFLICTING PAVEMENT MARKINGS SHALL BE OBLITERATED BY MEANS OF WATER BLASTING TO BE COMPLETED BY THE CONTRACTOR.
6. CONTRACTOR TO APPLY A TYPE II MICROSURFACING MATERIAL PER MARICOPA ASSOCIATION OF GOVERNMENT (MAG), SECTION 714, OR AN APPROVED EQUAL TO COVER ALL AREAS OF PAVEMENT MARKING OBLITERATION.
7. ALL PAVEMENT MARKING MATERIALS AND INSTALLATION SHALL CONFORM TO TOWN REQUIREMENTS. THE ARIZONA DEPARTMENT OF TRANSPORTATION STANDARD DRAWINGS AND SPECIFICATIONS, THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, AND DIRECTION FROM THE TOWN TRAFFIC ENGINEER AT TIME OF INSTALLATION.
8. PAVEMENT MARKINGS SHALL REQUIRE TWO (2) SEPARATE APPLICATIONS. THE INITIAL APPLICATION SHALL BE ENTIRELY IN PAINT TO INCLUDE ALL LANE LINES, HOLDING BARS, CROSS WALKS, AND STOP BARS. ALL LEGENDS SHALL BE APPLIED WITH AN APPROVED TAPE PRODUCT AT THIS TIME. RAISED PAVEMENT MARKERS (RPM'S) SHALL BE INSTALLED WITH THE INITIAL PAINT INSTALLATION. THE CONTRACTOR SHALL RETURN 30-45 DAYS FOLLOWING THE INITIAL PAINT INSTALLATION AND RESTRIPE THE ENTIRE PROJECT IN THERMOPLASTIC OR AS DIRECTED BY THE TOWN TRAFFIC ENGINEER.

TOWN OF QUEEN CREEK (CONT.)

PAVEMENT MARKING GENERAL NOTES

9. ALL PERMANENT PAVEMENT MARKING MATERIALS ON MAJOR ARTERIALS SHALL BE EXTRUDED THERMOPLASTIC. ALL PERMANENT PAVEMENT MARKING MATERIALS ON COLLECTOR ROADWAYS SHALL BE PAINT. ALL OTHER ROADWAYS SHALL REQUIRE SPRAY THERMOPLASTIC FOR PERMANENT PAVEMENT MARKINGS, UNLESS OTHERWISE SPECIFIED BY THE TOWN TRAFFIC ENGINEER.
10. ALL PAVEMENT MARKING SYMBOLS AND LEGENDS SHALL BE 3M SERIES 380 TAPE OR APPROVED EQUIVALENT. THE TOWN TRAFFIC ENGINEER HAS THE RIGHT TO MODIFY THE PAVEMENT MARKING MATERIAL TO 3M SERIES 270 TAPE OR AN APPROVED EQUIVALENT.
11. ALL RAISED PAVEMENT MARKERS SHALL BE INSTALLED WITH CRAFCO PAVEMENT REFLECTOR ADHESIVE, OR AN APPROVED EQUIVALENT.
12. ALL MEDIAN ENDS SHALL BE PAINTED PER TOWN OF QUEEN CREEK STANDARD DETAILS.

NOTES

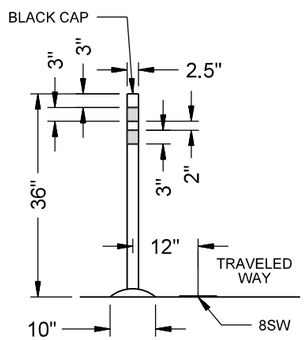
1. THE TOWN RESERVES THE RIGHT TO MODIFY THIS LIST, TO REJECT ITEMS INCLUDED ON THE LIST, OR TO ACCEPT ITEMS NOT INCLUDED ON THE LIST, AT ANY TIME, WITHOUT PRIOR NOTICE, IF DETERMINED NECESSARY IN THE BEST INTERESTS OF THE TOWN.
2. PRODUCTS NOT COVERED BY THIS LIST SHALL BE SUBMITTED TO THE TOWN TRAFFIC ENGINEERING DIVISION FOR REVIEW AND APPROVAL PRIOR TO ORDERING.
3. BRAND NAMES LISTED MAY BE REGISTERED TRADEMARKS OF THEIR RESPECTIVE MANUFACTURERS.

WARRANTY DOCUMENTS

THE MANUFACTURER OF THE SIGNING SHALL PROVIDE WARRANTY DOCUMENTS COVERING MATERIALS AND MANUFACTURING DEFECTS UP TO 10 YEARS. THESE DOCUMENTS SHALL BE ADDRESSED TO THE TOWN OF QUEEN CREEK AND SHALL PROVIDE THE NAME OF THE SHEETING MANUFACTURER, TYPE OF SHEETING (BRAND AND TYPE), TYPE OF OVERLAY FILM (BRAND, TYPE), AND NAME AND CONTACT INFORMATION OF THE RESPONSIBLE COMPANY MANUFACTURING THE SIGNS THAT SHALL BE RESPONSIBLE FOR ANY WARRANTY CLAIMS.

PAVEMENT MARKING LEGEND:

24SW	24" SOLID WHITE LINE	
8SW	8" SOLID WHITE LINE	
4SW	4" SOLID WHITE LINE	
4SY	4" SOLID YELLOW LINE	
4DY	4" DOUBLE YELLOW LINE	
4BW40	4" BROKEN WHITE LINE WITH A 10' LINE SEGMENT AND A 30' GAP	10' 30'
4BY40	4" BROKEN YELLOW LINE WITH A 10' LINE SEGMENT AND A 30' GAP	
8D6W	8" BROKEN WHITE LINE WITH A 2' LINE SEGMENT AND A 6' GAP	2' 6'



CITY OF MESA DELINEATOR DETAIL

CITY OF MESA DELINEATOR NOTES:

1. TRAFFIC DELINEATORS SHALL BE FLEXIBLE, WHITE, HAVE A MINIMUM OF TWO, THREE-INCH REFLECTIVE STRIPS, BE OF 36-INCH HEIGHT, AND INSTALLED WITH 10-INCH TUFF CURB BASES TO BE ANCHORED TO ASPHALT.
2. THE CONTRACTOR SHALL OBTAIN PRODUCT APPROVAL FROM THE CITY OF MESA PRIOR TO MATERIAL PROCUREMENT AND INSTALLATION.
3. DELINEATORS SHALL BE LOCATED A MIN. DISTANCE OF 12" FROM NEAREST ADJACENT TRAVELED WAY, A MIN. 10' FROM NEAREST ADJACENT TRACK CENTERLINE, AND MIN. 10' DISTANCE BETWEEN SIDE-BY-SIDE DELINEATORS TO ACCOMMODATE SWEEPING OPERATIONS. THE CONTRACTOR SHALL COORDINATE AND OBTAIN APPROVAL FROM CITY OF MESA FOR DELINEATOR LOCATIONS PRIOR TO INSTALLATION.
4. TUFF CURB XLP, WHITE, 2 REFLECTORS BY AMERICAN HIGHWAY SOLUTIONS OR APPROVED EQUAL. ANCHORED TO ASPHALT PAVEMENT WITH 5/8" LAG SHIELD (ZINC OR STAINLESS STEEL), 3/8" X 2-1/2" HEX HEAD LAG SCREW (ZINC), AND 5/8" WASHER (STAINLESS STEEL) FROM COPPER STATE BOLT & NUT CO. OR APPROVED EQUAL.

TOWN OF QUEEN CREEK DELINEATOR NOTES:

1. EXISTING TRAFFIC DELINEATORS SHALL BE REMOVED AND REINSTALLED AT LOCATIONS REPLICATING PRE-CONSTRUCTION CONDITIONS.

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	RSP
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	TC002 of 012

UNION PACIFIC RAILROAD Sheet 125 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
GENERAL NOTES

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927.40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927.40-Design\Microstation\020-0927.RLTK\DGN\Sheets\01.General\T_GEN-RD.200927.dgn
Default
3/9/2026

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04.Road Details\T_TC003_ML Pavement Markings and Signage_200927.dgn
Default
3/9/2026

Sta. 11+00 - See Matchline This Sheet

Town of Queen Creek

PARCEL NO. 314-02-916
(LOT 1)

QUEEN CREEK
TOWNHOMES LLC

Remove W10-1 Sign

4SW, Thermoplastic Sta. 10+34 to Sta. 14+38

36" W10-1 Sign Sta. 14+21

Match Existing

Remove Railroad Grade Xing Pavement Marking & Stop Bars

Remove W10-1 Sign

11+00 12+00 13+00 14+00 15+00 16+00 17+00 18+00

360'

2' 12' 12' 2'

S. Sossaman Rd

M.H.

Existing R/W

4SW, Thermoplastic Sta. 10+16 to Sta. 14+38

4DY, Thermoplastic Sta. 10+24 to Sta. 14+08

24SW, 12 L.F. Thermoplastic Sta. 13+86

4DY, Thermoplastic Sta. 14+08 to Sta. 14+38

RR Grade Crossing Thermoplastic Sta. 14+10

24SW, 12 L.F. Thermoplastic Sta. 14+38

PERMIT E23-0492 APPROVAL FROM TOWN OF OF QUEEN CREEK ENGINEERING DIVISION RECEIVED ON 7/28/2025

NOTES:
1. SEE SHEET TC002 FOR TOWN OF QUEEN CREEK SIGNING AND PAVEMENT MARKING REQUIREMENTS.
2. STOP BARS SHALL BE INSTALLED 8' UPSTREAM OF PROPOSED RAILROAD ACTIVE WARNING DEVICES OR CANTILEVER SIGNALS (2023 MUTCD, FIGURE 8C-1).
3. GRADE CROSSING ADVANCED WARNING SIGNS (W10-1) SHALL BE LOCATED 360' FROM STOP BAR (2023 MUTCD, TABLE 2C-3, 45 MPH, CONDITION B-0).

NOTES:
1. SEE SHEET TC002 FOR CITY OF MESA SIGNING AND PAVEMENT MARKING REQUIREMENTS.
2. STOP BARS SHALL BE INSTALLED 8' UPSTREAM OF PROPOSED RAILROAD ACTIVE WARNING DEVICES OR CANTILEVER SIGNALS (2023 MUTCD, FIGURE 8C-1).
3. GRADE CROSSING ADVANCED WARNING SIGNS (W10-1) SHALL BE LOCATED 360' FROM STOP BAR (2023 MUTCD, TABLE 2C-3, 45 MPH, CONDITION B-0).

SPEED LIMIT 45 R2-1 R8-3a

City of Mesa

BIKE LANE R3-17

PARCEL NO. 304-61-008H

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

W10-4R

36" x 36" W10-4R
100' From Intersection
Sta. 9+10

E. Germann Rd

City Limits

CROSS ROAD RAIL SIGNS R15-1 2 TRACKS R15-2P

Existing R2-1-45 & R8-3 Sta. 5+60

Match Existing

24SW, 12 L.F. Thermoplastic Sta. 5+80

24SW, 12 L.F. Thermoplastic Sta. 6+32

Existing R3-17 Sta. 7+12

Remove 2 - 48" Flexible Delineator

Phoenix Sub Main Track

Track 120

Crossing Gate w/ Lights 48" x 9" R15-1 & 27" x 18" R15-2P

24SW, 12 L.F. Thermoplastic Sta. 10+61

4+00 5+00 6+00 7+00 8+00 9+00 10+00

2' 12' 12' 2'

S. Sossaman Rd

360'

8'

360' 2' 12' 12' 8' 2'

Sta. 11+00 - See Matchline This Sheet

Remove W10-4R Sign

36" W10-1 Sta. 5+95

Remove W10-1 Sign

RR Grade Crossing Thermoplastic Sta. 6+05

4DY, Paint Sta. 5+78 to Sta. 6+33

Remove W10-1 Sign

Remove Railroad Grade Xing Pavement Marking & Stop Bars

24SW, 12 L.F. Thermoplastic Sta. 9+58

27" x 18" R15-2P Mounted Below Existing Cross Buck Sign

R15-2P 2 TRACKS

Adjust 21 - 36" Flexible Delineator to Grade

PARCEL NO. 304-61-0235

XPO LOGISTICS
FREIGHT INC

W10-4R

W10-1 W10-1 W10-1

50 0 50 100

SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: MHD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: TC003 of 012

UNION PACIFIC RAILROAD

Sheet 126 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
S SOSSAMAN RD - PAVEMENT MARKINGS & SIGNING

PARCEL NO. 304-61-021E

CITY OF MESA

PARCEL NO. 304-61-018J

PECOS 17 LLC

PMT24-15326

Existing R8-3
Sta. 2+92

R8-3a

Existing R/W

8' Wide PUFE

Match Existing

4DY, Paint
Sta. 5+30 to Sta. 8+95

Existing R3-5R
Sta. 6+16

R3-5R

Match Existing

8SW, Paint
Sta. 6+84 to Sta. 10+00

8SW, Paint

Relocate
R2-1-45 & R3-17
Sta. 8+00

Add 12" x 30" OM3-R
Sta. 8+00

R2-1

R3-17

OM3-R

Bike Lane,
Thermoplastic
Sta. 8+48

Sta. 8+97.42

Sta. 8+98.09

4SW, Paint
Sta. 6+84 to Sta. 9+67

Delineator
See Special Conditions

Sta. 9+66.57

Sta. 9+67.05

8SW, Paint

8SW, Paint
Sta. 8+98 to Sta. 10+06

3+00

4+00

5+00

6+00

7+00

8+00

9+00

10+00

11'

6.5'

11'

11'

11'

E. Pecos Rd.

11'

11'

6.5'

11'

8'

12.5'

6.5'

360'

LC

To Power Rd.

8' Wide PUFE

Existing R/W

Existing R8-3
Sta. 5+49

R8-3a

24SW, 12 L.F.
Thermoplastic
Sta. 5+84

36" W10-1
Sta. 6+00

W10-1

RR Grade Crossing
Thermoplastic
Sta. 6+10

24SW, 12 L.F.
Thermoplastic
Sta. 6+35

8SW, Paint
Sta. 5+30 to Sta. 9+88

4DY, Paint
Sta. 5+30 to Sta. 8+95

24" x 18" R3-17,
30" x 12" R3-9cP
24" x 18" R3-17,
30" x 12" R3-9dP
Sta. 8+18

R3-9cP

R3-17

R3-17

R3-9dP

Bike Lane, Thermoplastic
Sta. 8+47

Delineator
See Special Conditions

4SW, Paint
Sta. 8+19 to Sta. 9+52

End of Sidewalk Signing
(Mesa Dtl. M-23.04)
Sta. 8+48

OM1-3

24" x 30" R4-7
18" x 18" OM1-3
Sta. 8+73

R4-7

Sta. 8+98.09
Sta. 8+97.30

8SW, Paint

Sta. 9+52.26
Sta. 9+51.60

24SW, 11 L.F. Thermoplastic
Sta. 9+61

24SW, 6.5 L.F. Thermoplastic
Sta. 9+61

Crossing Gate
w/ Lights
48" x 9" R15-1

R15-1

8SW, Paint
Sta. 8+89 to Sta. 9+84

Pedestrian Signal

Track 101

Sheet TC005 - See Matchline Sheet

Sta. 10+00

PARCEL NO. 304-61-018E

PECOS INDUSTRIAL LP

NOTES:

1. SEE SHEET TC002 FOR CITY OF MESA SIGNING AND PAVEMENT MARKING REQUIREMENTS.
2. STOP BARS SHALL BE INSTALLED 8' UPSTREAM OF PROPOSED RAILROAD ACTIVE WARNING DEVICES OR CANTILEVER SIGNALS (2023 MUTCD, FIGURE 8C-1).
3. GRADE CROSSING ADVANCED WARNING SIGNS (W10-1) SHALL BE LOCATED 360' FROM STOP BAR (2023 MUTCD, TABLE 2C-3, 45 MPH, CONDITION B-0).

50 0 50 100

SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: MHD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: TC004 of 012

UNION PACIFIC RAILROAD

Sheet 127 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
E PECOS RD - PAVEMENT MARKINGS & SIGNING

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T_TC004.23 Pavement Marking and Signing_200927.dgn
Default
3/9/2026

LANE TAPER CALCULATION

Posted Speed = 45 MPH
Design Speed = 50 MPH

L = W x S (2023 MUTCD, Figure 3B-15)

Where:
S = design speed (mph)
W = offset distance (feet)

Therefore,

L = 5.5 x 50 = 275 ft

NOTES:
1. SEE SHEET TC002 FOR CITY OF MESA SIGNING AND PAVEMENT MARKING REQUIREMENTS.
2. STOP BARS SHALL BE INSTALLED 8' UPSTREAM OF PROPOSED RAILROAD ACTIVE WARNING DEVICES OR CANTILEVER SIGNALS (2023 MUTCD, FIGURE 8C-1).
3. GRADE CROSSING ADVANCED WARNING SIGNS (W10-1) SHALL BE LOCATED 360' FROM STOP BAR (2023 MUTCD, TABLE 2C-3, 45 MPH, CONDITION B-0).

Track 101

RAIL ROAD CROSSING R15-1

R4-7 OM1-3

W10-1

W3-3

Pedestrian Signal
8SW, Paint
Delineator See Special Conditions
Crossing Gate w/ Lights 48" x 9" R15-1
24SW, 6.5 L.F. Thermoplastic Sta. 10+63
24SW, 11 L.F. Thermoplastic Sta. 10+63
24" x 30" R4-7 18" x 18" OM1-3 Sta. 11+35
End of Sidewalk Signing (Mesa Dtl. M-23.04) Sta. 11+52
Bike Lane, Thermoplastic Sta. 11+50
8SW, Paint Sta. 10+16 to Sta. 12+29
4DY, Paint Sta. 11+16 to Sta. 14+00
Sta. 11+73
8SW, Paint Sta. 10+12 to Sta. 14+40
24SW, 12 L.F. Thermoplastic Sta. 13+90
RR Grade Crossing Thermoplastic Sta. 14+15
36" W10-1 Sta. 14+25 (See Note 3)
24SW, 12 L.F. Thermoplastic Sta. 14+40
Match Existing

PARCEL NO. 304-61-021F
CITY OF MESA

Existing R/W
8' Wide PUFE
Existing W3-3 Sta. 17+48

M.H.

Sta. 10+00 - See Matchline Sheet TC004

11+00 12+00 13+00 14+00 15+00 16+00 17+00

360'

6.5' 11' 8' 12.5' 6.5' 6' 6.5' 6' 12' 12' 12' E. Pecos Rd. 12' 6.5'

L = 275' L = 275'

To Sossaman Rd.

PT 17+23

17008

8SW, Paint Sta. 9+95 to Sta. 11+62
8SW, Paint
8SW, Paint Sta. 9+99 to Sta. 11+62
Remove End of Sidwalk Sign OM3-R
Remove OM-3R Sign
Delineator See Special Conditions
Remove R3-5R Sign R3-5R
R = 100'
4DY, Paint Sta. 11+12 to Sta. 14+00
8D6W, Paint Sta. 11+62 to Sta. 12+01
Bike Lane, Thermoplastic Sta. 12+07
8SW, Paint Sta. 12+01 to Sta. 15+07
8SW, Paint Sta. 12+01 to Sta. 15+07
Existing R2-1-45 & R3-17 Sta. 13+40
R3-17 R2-1 BIKE LANE SPEED LIMIT 45
4DY, Paint Sta. 14+00 to Sta. 14+40
Match Existing
Existing Airport Information Sign Sta. 15+45

PARCEL NO. 304-61-016G
NICOLA PECOS & SOSSAMAN LP
PMT21-12148

Existing R/W
8' Wide PUFE
Existing W3-3 Sta. 17+47

W3-3

50 0 50 100
SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: MHD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: TC005 of 012

UNION PACIFIC RAILROAD
Sheet 128 of 587
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track
SHEET TITLE:
E PECOS RD - PAVEMENT MARKINGS & SIGNING

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501:1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501:1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T_TC005.23 Pavement Marking and Signing_200927.dgn
Default
3/9/2026

PARCEL NO. 304-61-005B

SL7 MESA INDUSTRIAL LP

PMT23-21476

Track 101

Access Rd.

LANE TAPER CALCULATION

Posted Speed = 45 MPH
Design Speed = 50 MPH

L = W x S (2023 MUTCD, Figure 3B-15)

Where:
S = design speed (mph)
W = offset distance (feet)

Therefore,

L = 8.0 x 50 = 400 ft

SPEED LIMIT 45 R2-1

R8-3a

Existing R2-1-45 & R8-3 Sta. 3+08

Future Sossaman Road Half-Street Improvements (APN 304-61-006J)

Existing R/W

8' Wide PUFE

Match Existing

4DY, Paint Sta. 5+10 to Sta. 5+27

8SW, Paint Sta. 5+10 to Sta. 9+74

Relocate R8-3 Sta. 7+00

R8-3a

4DY, Paint Sta. 5+27 to Sta. 9+35

Bike Lane, Thermoplastic Sta. 8+16

End of Sidewalk Signing (Mesa Dtl. M-23.04) Sta. 8+10

Sta. 8+44.93

Sta. 8+45.12

4SW, Paint Sta. 7+84 to Sta. 9+27

Delineator See Special Conditions

Sta. 9+26.81

Pedestrian Signal

Sta. 9+27.25

8SW, Paint

8SW, Paint Sta. 8+45 to Sta. 9+64

3+00 4+00 5+00 6+00 7+00 8+00 9+00 10+00

6' 12' 12' 6' 6' 6' 11' 8' 11' 6'

S. Sossaman Rd.

L = 400' L = 400' 360'

Sta. 10+20 - See Matchline Sheet TC007

Existing R8-3 Sta. 3+07

R8-3a

8' Wide PUFE

Existing R/W

PARCEL NO. 304-61-019

UNITED STATES OF AMERICA

24SW, 12 L.F. Thermoplastic Sta. 5+95

36" W10-1 Sta. 4+22

W10-1

RR Grade Crossing Thermoplastic Sta. 6+21

24SW, 12 L.F. Thermoplastic Sta. 6+45

8SW, Paint Sta. 5+10 to Sta. 10+11

Relocate R2-1-45 & R3-17 Sta. 7+00

R3-17

R2-1

4DY, Paint Sta. 9+35 to Sta. 5+27

Delineator See Special Conditions

Bike Lane, Thermoplastic Sta. 8+46

End of Sidewalk Signing (Mesa Dtl. M-23.04) Sta. 8+48

4SW, Paint Sta. 8+18 to Sta. 9+62

Sta. 8+93.55

Sta. 8+94.22

24" x 30" R4-7 18" x 18" OM1-3 Sta. 8+86

OM1-3

R4-7

Sta. 9+61.90

Sta. 9+62.39

24SW, 11 L.F. Thermoplastic Sta. 9+73

24SW, 6.5 L.F. Thermoplastic Sta. 9+61

Crossing Gate w/ Lights 48" x 9" R15-1

R15-1

8SW, Paint

8SW, Paint Sta. 8+94 to Sta. 10+20

PARCEL NO. 304-61-021E

CITY OF MESA

NOTES:

1. SEE SHEET TC002 FOR CITY OF MESA SIGNING AND PAVEMENT MARKING REQUIREMENTS.
2. STOP BARS SHALL BE INSTALLED 8' UPSTREAM OF PROPOSED RAILROAD ACTIVE WARNING DEVICES OR CANTILEVER SIGNALS (2023 MUTCD, FIGURE 8C-1).
3. GRADE CROSSING ADVANCED WARNING SIGNS (W10-1) SHALL BE LOCATED 360' FROM STOP BAR (2023 MUTCD, TABLE 2C-3, 45 MPH, CONDITION B-0).

50 0 50 100

SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: MHD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: TC006 of 012

UNION PACIFIC RAILROAD

Sheet 129 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
S SOSSAMAN RD - PAVEMENT MARKINGS & SIGNING

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T_TC006_39 Pavement Marking and Signing_200927.dgn
Default
3/9/2026

PARCEL NO. 304-61-005B

SL7 MESA INDUSTRIAL LP

PMT23-21476

RAIL ROAD CROSSING R15-1

Crossing Gate w/ Lights 48" x 9" R15-1

24SW, 6.5 L.F. Thermoplastic Sta. 10+39

Sta. 10+45.75

Sta. 10+46.44

24SW, 11 L.F. Thermoplastic Sta. 10+39

8SW, Paint Sta. 9+78 to Sta. 10+95

8SW, Paint Sta. 10+95.31

Sta. 10+98.46

R4-7

OMI-3

24" x 30" R4-7

18" x 18" OM1-3

Sta. 11+28

Delineator See Special Conditions

4SW, Paint Sta. 10+46 to Sta. 13+19

Bike Lane, Thermoplastic Sta. 11+98

4DY, Paint Sta. 9+89 to Sta. 13+19

4DY, Paint Sta. 10+95 to Sta. 13+19

24SW, 11 L.F. Thermoplastic Sta. 12+85

TERMINAL

PARKING

CAR RENTAL

Relocate Airport Information Sign Sta. 13+05

RR Grade Crossing Thermoplastic Sta. 13+10

W10-1

36" W10-1 Sta. 13+20

24SW, 11 L.F. Thermoplastic Sta. 13+35

8SW, Paint Sta. 13+95 to Sta. 15+00

8SW, Paint Sta. 13+95 to Sta. 15+00

4DY, Paint Sta. 13+95 to Sta. 15+00

Match Existing

ONLY

R3-5R

Existing W3-3 Sta. 15+36

Existing R/W

8' Wide PUFE

Sta. 10+20 - See Matchline Sheet TC006

279'

11+00

12+00

13+00

14+00

15+00

16+00

17+00

6'

11'

8'

16'

S. Sossaman Rd.

To E. Pecos Rd.

Existing W3-3 Sta. 17+52

W3-3

Delineator See Special Conditions

8SW, Paint Sta. 10+54.06

Sta. 10+54.52

Pedestrian Signal

8SW, Paint Sta. 10+33 to Sta. 11+25

4SW, Paint Sta. 10+55 to Sta. 12+22

Sta. 11+25.13

Sta. 11+25.64

R = 120'

4SY, Paint Sta. 10+95 to Sta. 11+70

R = 60'

End of Sidewalk Signing (Mesa Dtl. M-23.04) Sta. 11+92

Bike Lane, Thermoplastic Sta. 12+03

4SW, Paint Sta. 11+70 to Sta. 13+20

4SW, Paint Sta. 11+70 to Sta. 13+20

Add 12" x 30" OM3-R Sta. 13+06

Relocate R8-3 Sta. 13+06

OM3-R

R8-3a

8SW, Paint Sta. 10+24 to Sta. 15+00

4DY, Paint Sta. 13+95 to Sta. 15+00

Track 101

PARCEL NO. 304-61-021E

CITY OF MESA

PARCEL NO. 304-61-021F

CITY OF MESA

NOTES:

1. SEE SHEET TC002 FOR CITY OF MESA SIGNING AND PAVEMENT MARKING REQUIREMENTS.
2. STOP BARS SHALL BE INSTALLED 8' UPSTREAM OF PROPOSED RAILROAD ACTIVE WARNING DEVICES OR CANTILEVER SIGNALS (2023 MUTCD, FIGURE 8C-1).
3. PER GUIDANCE FROM MUTCD, GRADE CROSSING ADVANCED WARNING SIGN TO BE LOCATED 360' FROM STOP BAR (2023 MUTCD, TABLE 2C-3, 45 MPH, CONDITION B-0); HOWEVER, DISTANCE IS REDUCED TO 279' TO STAY CLEAR OF INTERSECTION AND PROVIDE ADVANCE WARNING FOR NORTHBOUND TRAFFIC FROM ACCESS DRIVE.

50 0 50 100

SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	MHD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	TC007 of 012

UNION PACIFIC RAILROAD

Sheet 130 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
S SOSSAMAN RD - PAVEMENT MARKINGS & SIGNING

Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927.RLTK\DGN\Sheets\04.Road Details\T_TC007_39 Pavement Marking and Signing_200927.dgn
Default
03/09/2026

NOTES:
1. SEE SHEET TC002 FOR CITY OF MESA SIGNING AND PAVEMENT MARKING REQUIREMENTS.
2. STOP BARS SHALL BE INSTALLED 8' UPSTREAM OF PROPOSED RAILROAD ACTIVE WARNING DEVICES OR CANTILEVER SIGNALS (2023 MUTCD, FIGURE 8C-1).
3. GRADE CROSSING ADVANCED WARNING SIGNS (W10-1) SHALL BE LOCATED 360' FROM STOP BAR (2023 MUTCD, TABLE 2C-3, 45 MPH, CONDITION B-0).

PARCEL NO. 304-62-003L
PHOENIX-MESA GATEWAY AIRPORT AUTHORITY

PARCEL NO. 304-62-001D
SUNBELT MESA ELLSWORTH LP

Existing R10-18 Sta. 2+70
Existing R8-3 Sta. 4+44
Existing R10-18 Sta. 6+43
Existing R2-1-45 & R8-3 Sta. 2+70
Existing R/W
8' Wide PUFE
Match Existing
To Pecos Rd.
S. Ellsworth Rd.
3+00
4+00
5+00
6+00
7+00
8+00
9+00
10+00
End of Sidewalk Signing (Mesa Dtl. M-23.04) Sta. 6+69
End of Sidewalk Signing (Mesa Dtl. M-23.04) Sta. 7+24
8SW, Paint Sta. 6+60 to Sta. 9+95
4BW40, Paint Sta. 6+60 to Sta. 9+95
4BW40, Paint Sta. 6+60 to Sta. 9+95
Reset Existing R2-1-45 & R3-17 Sta. 6+44
4SY, Paint Sta. 6+60 to Sta. 9+95
Bike Lane, Thermoplastic Sta. 9+03
8SW, Paint
End of Sidewalk Signing (Mesa Dtl. M-23.04) Sta. 9+49
Pedestrian Signal
24SW, 33 L.F. Thermoplastic Sta. 5+93
36" W10-1 Sta. 6+08
3 EA. RR Grade Crossing Thermoplastic Sta. 6+18
24SW, 33 L.F. Thermoplastic Sta. 6+43
8SW, Paint Sta. 5+93 to Sta. 9+94
4BW40, Paint Sta. 5+93 to Sta. 8+95
4BW40, Paint Sta. 5+93 to Sta. 8+95
4SY, Paint Sta. 5+93 to Sta. 9+95
Reset Existing R8-3 Sta. 8+25
4SW, Paint Sta. 8+95 to Sta. 9+70
4SW, Paint Sta. 8+95 to Sta. 9+70
Bike Lane, Thermoplastic Sta. 9+04
24SW, 39 L.F. Thermoplastic Sta. 9+70
Crossing Gate w/ Lights 48" x 9" R15-1
Track 101
Sta. 6+75 - See Matchline Sheet TC009
6'
11'
14'
8'
360'
PARCEL NO. 304-62-010V
PHOENIX-MESA GATEWAY AIRPORT AUTHORITY

50 0 50 100
SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: MHD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: TC008 of 012

UNION PACIFIC RAILROAD
Sheet 131 of 587
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track
SHEET TITLE:
S ELLSWORTH RD - PAVEMENT MARKINGS & SIGNING

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T_TC008-10.156 Pavement Marking and Signing_200927.dgn
Default
03/09/2026

NOTES:
1. SEE SHEET TC002 FOR CITY OF MESA SIGNING AND PAVEMENT MARKING REQUIREMENTS.
2. STOP BARS SHALL BE INSTALLED 8' UPSTREAM OF PROPOSED RAILROAD ACTIVE WARNING DEVICES OR CANTILEVER SIGNALS (2023 MUTCD, FIGURE 8C-1).
3. GRADE CROSSING ADVANCED WARNING SIGNS (W10-1) SHALL BE LOCATED 360' FROM STOP BAR (2023 MUTCD, TABLE 2C-3, 45 MPH, CONDITION B-0).

Track 101

PARCEL NO. 304-62-006D

SUNBELT MESA
ELLSWORTH LP

Crossing Gate w/ Lights 48" x 9" R15-1

R15-1

24SW, 39 L.F. Thermoplastic Sta. 10+32

4SW, Paint Sta. 10+30 to Sta. 11+05

4SW, Paint Sta. 10+30 to Sta. 11+05

End of Sidewalk Signing (Mesa Dtl. M-23.04) Sta. 10+98

Bike Lane, Thermoplastic Sta. 10+96

8SW, Paint Sta. 10+06 to Sta. 14+08

End of Sidewalk Signing (Mesa Dtl. M-23.04) Sta. 11+66

End of Sidewalk Signing (Mesa Dtl. M-23.04) Sta. 12+20

4BW40, Paint Sta. 11+05 to Sta. 14+08

4BW40, Paint Sta. 11+05 to Sta. 14+08

4SY, Paint Sta. 10+05 to Sta. 14+08

R8-3

Existing R8-3 Sta. 13+50

24SW, 33 L.F. Thermoplastic Sta. 13+58

3 EA. RR Grade Crossing Thermoplastic Sta. 13+82

W10-1

36" W10-1 Sta. 13+92

24SW, 33 L.F. Thermoplastic Sta. 14+08

12+00 13+00 14+00 15+00 16+00 17+00

Existing R/W

8' Wide PUFE

To Germann Rd.

360'

8'

14'

S. Ellsworth Rd.

S. Ellsworth Rd.

6'
11'
11'
11'
11'
11'
11'
6'

Sta. 6+75 - See Matchline Sheet TC008

Pedestrian Signal

End of Sidewalk Signing (Mesa Dtl. M-23.04) Sta. 10+66

Bike Lane, Thermoplastic Sta. 10+97

8SW, Paint Sta. 10+05 to Sta. 12+70

4BW40, Paint Sta. 10+05 to Sta. 12+70

4BW40, Paint Sta. 10+05 to Sta. 12+70

4SY, Paint Sta. 10+05 to Sta. 12+70

Match Existing

Match Existing

8' Wide PUFE

Existing R/W

Existing R2-1-45 & R3-17 Sta. 16+45

BIKE LANE R3-17

SPEED LIMIT 45 R2-1

PARCEL NO. 304-62-976A

SUNBELT MESA
ELLSWORTH LP

50 0 50 100
SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: MHD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: TC009 of 012

UNION PACIFIC RAILROAD

Sheet 132 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
S ELLSWORTH RD - PAVEMENT MARKINGS & SIGNING

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T_TC
Default
3/9/2026

Track 101
Track 752
Access Rd.
Crossing Gate w/ Lights 48" x 9" R15-1 & 27" x 18" R15-2P
R15-1
2 TRACKS
R15-2P
R4-7
OM1-3
R8-3
Existing R3-9b & R8-3 Sta. 11+00
Existing R/W
24SW, 11 L.F. Thermoplastic Sta. 10+39
24" x 30" R4-7 18" x 18" OM1-3 Sta. 10+78
24SW, 11 L.F. Thermoplastic Sta. 13+66
RR Grade Crossing Thermoplastic Sta. 13+90
W10-1
36" W10-1 Sta. 14+00
24SW, 11 L.F. Thermoplastic Sta. 14+16
11+00
12+00
13+00
14+00
15+00
16+00
360'
Sta. 10+00 - See Matchline This Sheet
PARCEL NO. 304-63-977B
(LOT 3)
CUBES AT MESA GATEWAY
BUILDING C LLC
PMT21-14903
Crismon Road
11'
10'
11'
2'
To E. Germann Rd.
8' Wide PUFE
Existing R/W
4SW, Paint Sta. 10+20 to Sta. 10+81
4SY, Paint Sta. 10+20 to Sta. 10+81
Match Existing
4BY40, Paint Sta. 10+78 to Sta.14+16
4SY, Paint Sta. 10+39 to Sta. 14+16
Future Rail Crossing Improvements
Existing R2-1-45 Sta. 13+64
R2-1
SPEED LIMIT 45
Existing R8-3 Sta. 15+64
PARCEL NO. 304-62-006D
SUNBELT MESA
ELLSWORTH LP

PARCEL NO. 304-63-976
(LOT 2)
CUBES AT MESA GATEWAY
BUILDING B LLC
PMT21-14903
Existing R/W
Existing R2-1-45 Sta. 6+63
4BY40, Paint Sta. 6+00 to Sta. 8+86
4SY, Paint Sta. 6+00 to Sta. 9+77
Future Rail Crossing Improvements
4BY40, Paint Sta. 8+80 to Sta. 9+95
4SY, Paint Sta. 8+80 to Sta. 9+95
Pedestrian Signal
5+00
6+00
7+00
8+00
9+00
10+00
11'
10'
11'
2'
Crismon Road
8'
360'
To E. Pecos Rd.
PARCEL NO. 304-62-001F
KOMATSU AMERICA CORP
PMT25-02775
Existing R/W
8' Wide PUFE
24SW, 11 L.F. Thermoplastic Sta. 6+00
36" W10-1 Sta. 6+15
RR Grade Crossing Thermoplastic Sta. 6+25
24SW, 11 L.F. Thermoplastic Sta. 6+49
4SW, Paint Sta. 6+00 to Sta. 9+95
R8-3
Existing R3-9b & R8-3 Sta. 8+20
24" x 30" R4-7 18" x 18" OM1-3 Sta. 8+86
OM1-3
R4-7
Match Existing
24SW, 11 L.F. Thermoplastic Sta. 9+77
Crossing Gate w/ Lights 48" x 9" R15-1 & 27" x 18" R15-2P
2 TRACKS
R15-2P
R15-1
Track 101
Sta. 10+00 - See Matchline This Sheet

NOTES:
1. SEE SHEET TC002 FOR CITY OF MESA SIGNING AND PAVEMENT MARKING REQUIREMENTS.
2. STOP BARS SHALL BE INSTALLED 8' UPSTREAM OF PROPOSED RAILROAD ACTIVE WARNING DEVICES OR CANTILEVER SIGNALS (2023 MUTCD, FIGURE 8C-1).
3. GRADE CROSSING ADVANCED WARNING SIGNS (W10-1) SHALL BE LOCATED 360' FROM STOP BAR (2023 MUTCD, TABLE 2C-3, 45 MPH, CONDITION B-0).

50 0 50 100
SCALE IN FEET

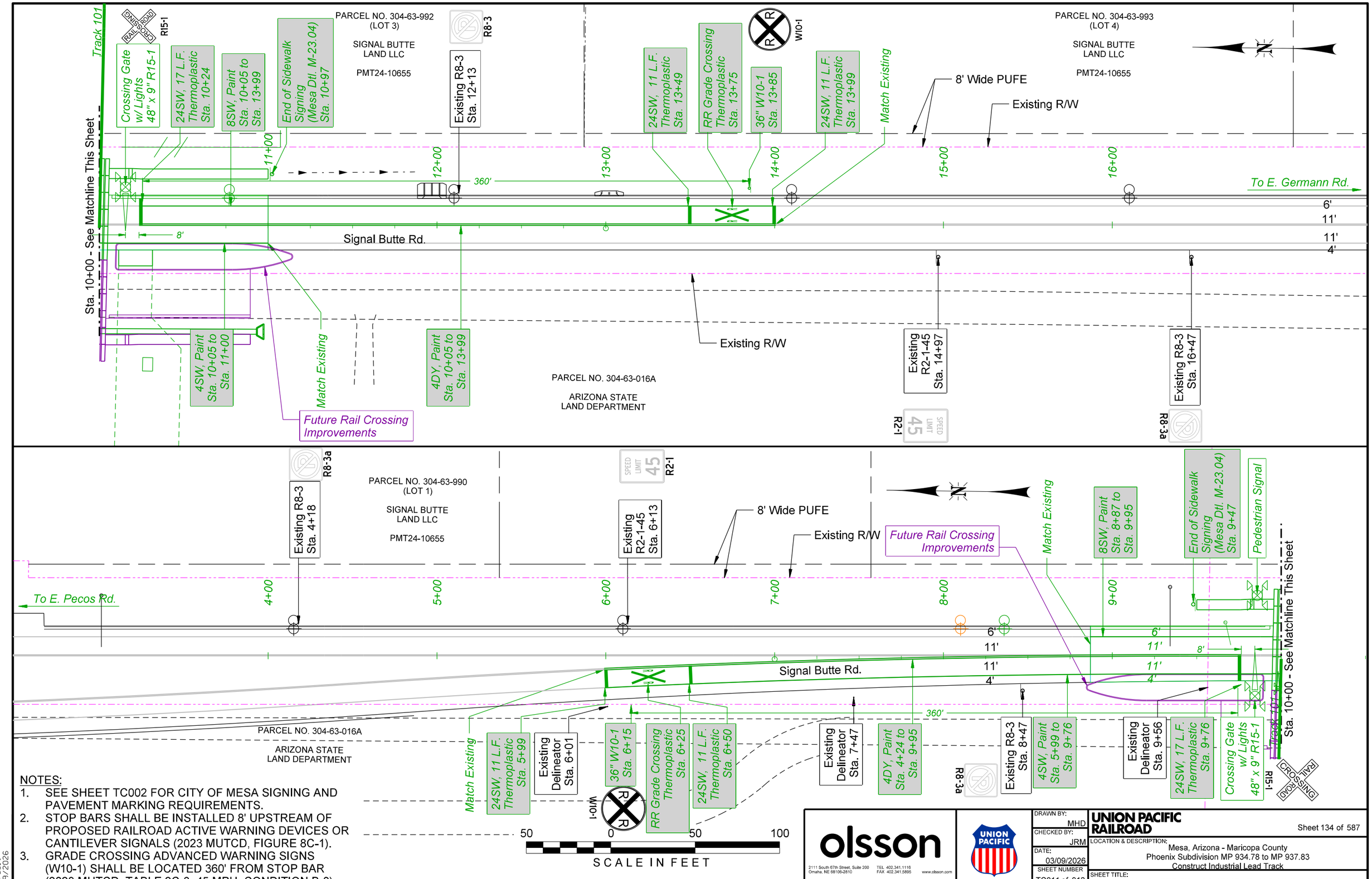
olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: MHD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: TC010 of 012

UNION PACIFIC RAILROAD
Sheet 133 of 587
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track
SHEET TITLE:
S CRISMON RD - PAVEMENT MARKINGS & SIGNING

Color table:K:\BentleyWorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color_UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T_TC011.209 Pavement Marking and Signing_200927.dgn
Default
3/9/2026



NOTES:

1. SEE SHEET TC002 FOR CITY OF MESA SIGNING AND PAVEMENT MARKING REQUIREMENTS.
2. STOP BARS SHALL BE INSTALLED 8' UPSTREAM OF PROPOSED RAILROAD ACTIVE WARNING DEVICES OR CANTILEVER SIGNALS (2023 MUTCD, FIGURE 8C-1).
3. GRADE CROSSING ADVANCED WARNING SIGNS (W10-1) SHALL BE LOCATED 360' FROM STOP BAR (2023 MUTCD, TABLE 2C-3, 45 MPH, CONDITION B-0).

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

DRAWN BY:	MHD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	TC011 of 012

UNION PACIFIC RAILROAD

Sheet 134 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
S SIGNAL BUTTE RD - PAVEMENT MARKINGS & SIGNING

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T_TC012_261 Pavement Marking and Signing_200927.dgn
Default
3/9/2026

PARCEL NO. 304-34-037D

MGC PURE CHEMICALS
AMERICA INC

PARCEL NO. 304-34-037A

MGC PURE CHEMICALS
AMERICA INC

Private Rd.

Existing R/W

4DY, Paint
Sta. 341+89 to Sta. 344+62

4SW, Paint
Sta. 343+39 to Sta. 343+60

"T" Top Trench Repair
See Sheet U030

SPEED LIMIT 45 R2-1

R8-3a

Existing
R2-1 & R8-3
Sta. 345+20

340+00 341+00 342+00 343+00 344+00 345+00 346+00 347+00

To S Mountain Rd

4'
E. Pecos Rd. 12'
12'
4'

PARCEL NO. 304-63-991
(LOT 2)

SIGNAL BUTTE
LAND LLC

PMT24-10655

Existing R/W

End of Sidewalk Signing
(Mesa Dtl. M-23.04)
Sta. 342+42

4SW, Paint
Sta. 341+89 to Sta. 344+62

8SW, Paint

End of Sidewalk Signing
(Mesa Dtl. M-23.04)
Sta. 344+09

Track 101

PARCEL NO. 304-63-005B

CMC STEEL
FABRICATORS INC

PARCEL NO. 304-63-992
(LOT 3)

SIGNAL BUTTE
LAND LLC

NOTES:
1. SEE SHEET TC002 FOR CITY OF MESA SIGNING AND PAVEMENT MARKING REQUIREMENTS.

50 0 50 100
SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: MHD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: TC012 of 012

UNION PACIFIC RAILROAD
Sheet 135 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
E PECOS RD - PAVEMENT MARKINGS & SIGNING

Color_table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\T_TC013.287
Default
3/9/2026
013_287 Pavement Marking and Signing_200927.dgn

MARICOPA COUNTY ENVIRONMENTAL SERVICES NOTES

1. PRESSURE TESTING OF WATER LINES SHALL BE IN ACCORDANCE WITH AWWA C600 OR MAG STANDARD 611.2.
2. ALL NEW ELEMENTS OF A DISTRIBUTION SYSTEM SHALL BE DISINFECTED IN ACCORDANCE WITH ADEQ ENGINEERING BULLETIN 8 OR AWWA C651. (MAG 611.3)
3. ALL MATERIALS INSTALLED AFTER JANUARY 1, 1993, WHICH MAY COME INTO CONTACT WITH DRINKING WATER, SHALL CONFORM TO ANSI/NSF STANDARDS 60 AND 61. (R18-4-213.A AND B)
4. ALL VALVES SHALL CONFORM TO AWWA STANDARDS AWWA C-600 OR C-603. (MAG 610-7 & 630 / MAG DETAIL 391-1 & 391-2.
5. ALL POTABLE WATERLINES AND FITTINGS SHALL HAVE A NSF-PW SEAL.
6. ALL MATERIALS AND PRODUCTS USED IN THE POTABLE WATER SYSTEM SHALL CONFORM TO NSF STANDARDS 60 AND 61 IN ACCORDANCE WITH AAC R18-4-213.
7. ALL MATERIALS SHALL BE LEAD FREE AS DEFINED IN AAC R18-5-504 AND R18-4-101.
8. PERFORM A DEFLECTION TEST OF THE TOTAL LENGTH OF ALL SEWER LINES MADE OF FLEXIBLE MATERIALS TO ENSURE THAT THE INSTALLATION MEETS OR EXCEEDS THE MANUFACTURER'S RECOMMENDATIONS AND RECORD THE RESULTS. (R18-9-E301.D.2.i / MAG 611.4)
9. TEST EACH SEGMENT OF THE SEWER LINE FOR LEAKAGE USING THE APPROPRIATE ASTM TEST FOR THE PIPE MATERIAL. (R18-9-E301.D.2.j / MAG 611.4)
10. EACH MANHOLE WILL BE TESTED ACCORDING TO R18-9-E301.D.3.e AND f / MAG 611.5.
11. ALL PIPES, FITTINGS, VALVES, FIRE HYDRANTS, AND OTHER APPURTENANCES SHALL CONFORM TO CURRENT AWWA, ASTM, AND NSF STANDARDS. (ENGINEERING BULLETIN 10, CHAPTER. 7, SECTION B)
12. ALL MATERIAL THAT COMES INTO CONTACT WITH WATER SHALL CONFORM TO ANSI/NSF STANDARD 61. (PER R18-4-213.B)
13. ALL MATERIALS MUST BE ABLE TO WITHSTAND A MINIMUM WORKING PRESSURE OF 150 PSI PLUS AN ALLOWANCE FOR WATER HAMMER PER ENGINEERING BULLETIN 10, CHAPTER 7, SECTION C, PART 2/MAG SECTION 610.3a / MAG SECTION 611.
14. INSTALLATION OF WATERLINES, PRESSURE TESTING, LEAKAGE TESTING, AND DISINFECTION SHALL BE PER ENGINEERING BULLETIN 10, CHAPTER 7, SECTION L / AWWA C600/ MAG SECTIONS 611.1, 611.2 & 611.3.
15. ALL CONSTRUCTION SHALL CONFORM TO THE LATEST EDITION(S) OF THE MARICOPAASSOCIATION OF GOVERNMENTS (MAG) UNIFORM OF STANDARD SPECIFICATIONS AND DETAILS FOR PUBLIC WORKS CONSTRUCTION AND THE LATEST EDITION OF CITY/LOCAL AGENCY ENGINEERING DESIGN AND CONSTRUCTION STANDARDS.

ITS/TRAFFIC SIGNAL GENERAL NOTES

(REVISED 07-17-25) (2025 VERSION)

THE CITY OF MESA REQUIRES AT LEAST TWO INTERNATIONAL MUNICIPAL SIGNAL ASSOCIATION (IMSA) CERTIFIED TRAFFIC SIGNAL TECHNICIANS ON SITE DURING ALL PHASES OF ANY TRAFFIC SIGNAL WORK. AT LEAST ONE TECHNICIAN MUST LEVEL II CERTIFICATION OR HIGHER. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE VERIFICATION OF CERTIFICATION. IF A JOB SITE IS INSPECTED AND CERTIFIED TECHNICIAN IS NOT ON SITE, A STOP WORK ORDER WILL BE ISSUED. TEMPORARY AND CONTRACT EMPLOYEES DO NOT SATISFY THIS REQUIREMENT; THEY MUST BE FULL-TIME PERMANENT EMPLOYEES.

1. ALL TRAFFIC SIGNAL EQUIPMENT SHALL COMPLY WITH THE RELATED CITY OF MESA APPROVED PRODUCTS LISTS AND SPECIFICATIONS. THESE APPROVED PRODUCTS LISTS CAN BE FOUND ELECTRONICALLY AT HTTPS://WWW.MESAAZ.GOV/BUSINESSDEVELOPMENT/ENGINEERING/MESA-DESIGN-STANDARDS#SECTION-5
2. TOP OF SIGNAL POLE FOUNDATIONS AND PULL BOXES SHALL BE AT THE SAME ELEVATION AS THE BACK OF SIDEWALK PER M-1226.2 AND M-1227 (OLD M-92.03 AND M-93.01). SEE M-1227 FOR PULLBOX INSTALLATIONS IN MEDIANS.
3. WHEN NEW CONDUIT IS TO BE PLACED UNDER EXISTING ROADWAYS THE CONTRACTOR SHALL USE DIRECTIONAL BORING PER MESA STD DETAILS M-1700 AND M-1700.1 (OLD M-18 AND M-18.01)
4. ALL NEW VEHICLE AND PEDESTRIAN INDICATIONS SHALL HAVE LED INDICATIONS. ALL NEW PEDESTRIAN INDICATIONS SHALL BE COUNTDOWN TYPE. SPECIFICATIONS FOR LED MODULES ARE AVAILABLE AT: HTTPS://WWW.MESAAZ.GOV/BUSINESSDEVELOPMENT/ENGINEERING/MESA-DESIGN-STANDARDS#SECTION-5
5. ACCESS PADS TO PEDESTRIAN PUSH BUTTONS SHALL BE PROVIDED TO MEET ALL ADA ACCESSIBILITY REQUIREMENTS; SEE M-1214 (OLD M-44.01).
6. MOUNTING LOCATION AND ORIENTATION OF ALL PEDESTRIAN INDICATIONS AND SIDE MOUNT SIGNAL INDICATIONS SHALL BE CONFIRMED WITH THE CITY TRAFFIC SIGNAL INSPECTOR IN THE FIELD PRIOR TO DRILLING POLES.
7. EXISTING VEHICLE DETECTION SHALL BE RESTORED WITHIN TWO WEEKS OF ITS REMOVAL OR DAMAGE. LONGER OUTAGES OR EXCEPTIONS WILL REQUIRE SPECIAL APPROVAL FROM THE CITY.
8. TRAFFIC SIGNAL DETECTOR LOOPS SHALL BE INSTALLED IN PAVEMENT BEFORE THE SURFACE COURSE. THE LOOP CONDUCTORS SHALL BE INSTALLED PER MESA STD DETAIL M-1230 (OLD M-96.1).
9. THE CONTRACTOR SHALL CONTACT THE CITY'S TRANSPORTATION MANAGEMENT CENTER AT 480-644-5888 AT LEAST 48 HOURS PRIOR TO ANY WORK WITHIN THE VICINITY OF OR THROUGH A SIGNALIZED INTERSECTION WHICH WILL CHANGE TRAFFIC LANE PATTERNS.
10. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING CONSTRUCTION AND TEMPORARY TRAFFIC CONTROL PERMITS FROM THE CITY OF MESA. INTERSECTIONS NEAR STATE HIGHWAYS, FREEWAYS OR UNINCORPORATED COUNTY AREAS MAY BE UNDER OTHER JURISDICTION. CONTRACTOR IS ALSO RESPONSIBLE FOR OBTAINING CONSTRUCTION AND TEMPORARY TRAFFIC CONTROL PERMITS FROM THE ARIZONA DEPARTMENT OF TRANSPORTATION AND FROM THE MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION WHEN APPLICABLE.

ITS/TRAFFIC SIGNAL GENERAL NOTES (CONTINUED)

11. THE CONTRACTOR SHALL IMMEDIATELY REPORT ANY TRAFFIC SIGNAL DAMAGE TO THE ENGINEERING INSPECTOR OR ITS OPERATIONS SUPERVISOR AT 480-644-3129. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO REPAIR DAMAGE TO ANY TRAFFIC SIGNAL EQUIPMENT SUCH AS CONTROLLER CABINET AND EQUIPMENT, DETECTOR LOOPS, PULL BOXES, CONDUIT, POLES, MAST ARMS, HEADS OR RELATED EQUIPMENT AS A RESULT OF THIS PROJECT. A CITY OF MESA TECHNICIAN SHALL INSPECT THESE REPAIRS.
    A. A TRAFFIC SIGNAL CANNOT BE DARK OR IN FLASH FOR MORE THAN TWO HOURS.
    B. A LOSS OF COMMUNICATION SHALL BE REPAIRED WITHIN 24 HOURS.
    C. DETECTOR LOOPS SHALL BE REPLACED IN TWO WEEKS UNLESS THE TRAFFIC SIGNAL FOREMAN AGREES IN WRITING TO A DIFFERENT SCHEDULE.
12. IF THE CONTRACTOR CANNOT RESPOND OR MAKE THE REPAIRS WITHIN ABOVE NOTED TIME FRAMES, THE CITY TRAFFIC SIGNAL GROUP WILL MAKE THE NECESSARY REPAIRS AND CHARGE THE CONTRACTOR USING A "REPAIR ORDER FORM".
13. THE CONTRACTOR IS ADVISED THAT ANY COSTS RELATED TO REPAIR OR REPLACEMENT OF DAMAGED TRAFFIC SIGNAL EQUIPMENT AS A RESULT OF THE CONTRACTOR'S NEGLIGENCE SHALL BE BORNE BY THE CONTRACTOR.
14. IF THERE IS A TRAFFIC SIGNAL PROBLEM (INDICATION OUTAGES, KNOCKDOWNS, UTILITY POWER OUTAGES, ETC.) THAT IS NOT A DIRECT RESULT OF THE CONTRACTOR'S OR SUBCONTRACTOR'S WORK, AN ITS TECHNICIAN SHALL BE CALLED TO RESPOND. IF IT IS DETERMINED THE CONTRACTOR'S OR SUBCONTRACTOR'S WORK CAUSED THE TRAFFIC SIGNAL MALFUNCTION, THE CONTRACTOR THROUGH A "REPAIR ORDER FORM" SHALL PAY ALL COSTS OF REPAIRS.

ITD FIBER OPTIC GENERAL NOTES

(2025 VERSION, REVISED 07-15-25)

1. FIBER OPTIC DUCT WORK MAY BE INSTALLED BY EITHER OPEN CUT OR GUIDED BORE UNLESS OTHERWISE NOTED. ANY SURFACE RESTORATION RELATED TO EITHER METHOD IS A NON-PAY ITEM AND SHALL BE INCIDENTAL TO THE CORRESPONDING BID ITEM FOR CONDUIT INSTALLATION UNLESS OTHERWISE NOTED. SURFACE RESTORATION SHALL BE COMPLETED IN ACCORDANCE WITH CITY OF MESA AND MAG STANDARD SPECIFICATIONS. ASPHALT DRIVEWAY OR PARKING LOT RESTORATION SHALL COMPLY WITH MAG STD DETAIL 200, TYPE B; AND MAG SPECIFICATION SECTION 336 UNLESS OTHERWISE NOTED.
2. FOR NON-CAPITAL (PRIVATE) PROJECTS, NO COMPONENT OR PART OF THE CONDUIT FIBER SYSTEM SHALL BE INSTALLED, CONSTRUCTED, LOCATED ON, OR ATTACHED TO ANY PROPERTY WITHIN THE CITY'S PUBLIC RIGHT-OF-WAY UNTIL CONTRACTOR HAS APPLIED FOR AND RECEIVED APPROVAL FOR RIGHT-OF-WAY PERMITS AND/OR RIGHT-OF-WAY ENCROACHMENT PERMITS FOR SUCH WORK ON THE CONDUIT FIBER SYSTEM.
3. ALTHOUGH THE EXACT PLACEMENT AND LOCATIONS OF CONDUIT FIBER SYSTEM MAY BE REVISED DURING THE PERMIT PROCESS, IT IS THE CITY'S EXPRESSED DESIRE TO HAVE THE CONDUIT FIBER SYSTEM INSTALLED OUTSIDE PAVED AREAS WHENEVER FEASIBLE. FURTHERMORE, WHEN NECESSARY FOR THE CONDUIT FIBER SYSTEM TO CROSS UNDER CITY STREETS OR PAVED AREAS, THE CONTRACTOR SHALL USE DIRECTIONAL BORING PER MESA STD DETAILS M-1700 AND M-1700.1 (OLD M-18 AND M-18.1).
4. PULL BOXES AND VAULTS ARE SHOWN ACCORDING TO AVAILABLE DATA. FIELD ADJUSTMENTS MAY BE NECESSARY TO AVOID CONFLICTS AND INTERCEPT EXISTING CONDUIT. CONFIRM FINAL LOCATION OF ALL NEW PULL BOXES AND VAULTS WITH CITY OF MESA REPRESENTATIVE.
5. WIDTH OF PLAN SYMBOLS MAY BE GREATER THAN ACTUAL DISTURBED AREAS. ITEMS DEPICTED ON THE PLANS ARE TO BE INSTALLED WITHIN THE RIGHT-OF-WAY OR PERMANENT EASEMENT WHERE NOTED ON THE PLANS.
6. THE CITY REQUIRES AT LEAST ONE CERTIFIED TECHNICIAN ON SITE DURING ALL PHASES OF ANY TELECOMMUNICATIONS WORK. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE VERIFICATION OF CERTIFICATION. IF A JOB SITE IS INSPECTED AND A CERTIFIED TECHNICIAN IS NOT ON SITE, THE JOB WILL BE SHUT DOWN.
7. THE CONTRACTOR SHALL CONTACT THE CITY'S ITS DEPARTMENT AT 480-644-3129, 48 BUSINESS HOURS PRIOR TO ANY WORK WITHIN THE VICINITY OF OR THROUGH A SIGNALIZED INTERSECTION WHICH WILL CHANGE TRAFFIC LANE PATTERNS.
8. THE CONTRACTOR SHALL IMMEDIATELY REPORT ANY TRAFFIC SIGNAL DAMAGE TO THE ENGINEERING INSPECTOR. DAMAGE TO ANY TRAFFIC SIGNAL EQUIPMENT SUCH AS CONTROLLER CABINET AND EQUIPMENT, DETECTOR LOOPS, PULL BOXES, CONDUIT, POLES, MAST ARMS, HEADS OR RELATED EQUIPMENT AS A RESULT OF THIS PROJECT IS THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE REPAIRED BY THE APPROPRIATE IMSA LEVEL CERTIFIED TRAFFIC SIGNAL TECHNICIAN ACCORDING TO CITY OF MESA TRAFFIC SIGNAL SPECIFICATION. A CITY OF MESA TRAFFIC SIGNAL TECHNICIAN SHALL INSPECT THESE REPAIRS.
    A. A TRAFFIC SIGNAL CANNOT BE DARK OR IN FLASH FOR MORE THAN TWO HOURS.
    B. A LOSS OF COMMUNICATION SHALL BE REPAIRED WITHIN 24 HOURS.
    C. DETECTOR LOOPS SHALL BE REPLACED IN TWO WEEKS UNLESS THE ITS FOREMAN AGREES IN WRITING TO A DIFFERENT SCHEDULE.
    D. IF THE CONTRACTOR CANNOT RESPOND OR MAKE THE REPAIRS WITHIN ABOVE NOTED TIME FRAMES, THE CITY OF MESA WILL MAKE THE NECESSARY REPAIRS AND CHARGE THE CONTRACTOR.
    E. IF THERE IS AN OUTAGE(S) THAT IS NOT A DIRECT RESULT OF THE CONTRACTOR'S OR SUBCONTRACTOR'S WORK, CITY OF MESA SHALL BE CALLED TO RESPOND. IF IT IS DETERMINED THE CONTRACTOR'S OR SUBCONTRACTOR'S WORK CAUSED THE OUTAGE, THE CONTRACTOR SHALL PAY ALL COSTS OF REPAIRS.
9. ALL SIDEWALK REPLACEMENT SHALL BE PER MAG STD DETAIL 230.
10. THE CONTRACTOR SHALL VIDEOTAPE THE ENTIRE PROJECT AREA PRIOR TO START OF CONSTRUCTION. THE VIDEOTAPE SHALL INCLUDE THE ENTIRE PROJECT AREA WHERE THE CONTRACTOR WILL BE PERFORMING THE WORK AND SHALL BE SUBMITTED TO THE CITY FOR APPROVAL PRIOR TO STARTING WORK.

ITD FIBER OPTIC GENERAL NOTES (CONTINUED)

11. THE CONTRACTOR SHALL COORDINATE WITH THE CITY OF MESA TO ATTAIN ANY NECESSARY PERMITS FROM ADOT.
12. RIGHTS-OF-WAY FOR ALL WORK SPECIFIED IN THIS CONTRACT MAY NOT BE SHOWN ON THE PLANS, AND THE CONTRACTOR SHALL NOT ENTER OR OCCUPY WITH PERSONNEL, TOOLS, EQUIPMENT, OR MATERIALS ANY PRIVATE GROUND OUTSIDE THE RIGHT-OF-WAY WITHOUT THE CONSENT OF THE OWNER.
13. POTHOLING AND RELATED SURFACE RESTORATION SHALL BE COMPLETED IN ACCORDANCE WITH CITY OF MESA STD DETAILS M-1700 THRU M-1700.3 (OLD M-18 THRU M-18.3), MAG STD DETAIL 212, AND SPECIFICATION SECTION 335. IN THE CASE OF A CONFLICT BETWEEN THE TWO SPECIFICATIONS THE CITY OF MESA'S REQUIREMENTS SHALL PREVAIL.

ITD FIBER SPLICING AND INSTALLATION NOTES

(2025 VERSIONS, REVISED 07-15-25)

1. THE CONTRACTOR SHALL NOTIFY THE ITD REPRESENTATIVE 48 HOURS IN ADVANCE OF FIBER OPTIC CABLE INSTALLATION INTO ANY NEW CONDUIT AND 72 HOURS IN ADVANCE OF FIBER OPTIC CABLE INSTALLATION OR FUSION SPLICING IN EXISTING INFRASTRUCTURE.
2. DISTANCES SHOWN ON THE PLANS ARE APPROXIMATE. CONTRACTOR SHALL CAREFULLY MEASURE DISTANCES AND MAKE ALLOWANCES FOR SLACK BEFORE ORDERING AND CUTTING CABLE.
3. FUSION SPLICES SHALL BE PERFORMED WITH EQUIPMENT HAVING THE FOLLOWING FEATURES: AUTOMATIC FIBER ALIGNMENT AND AUTOMATIC LIGHT INJECTION WITH DETECTION DEVICES OR PROFILE ALIGNMENT ALGORITHMS TO PROPERLY ALIGN THE FIBER CORES AND ESTIMATE SPLICE LOSSES. "V" GROOVE ALIGNMENT SHALL NOT BE PERMITTED.
4. ALL FIBER OPTIC WORK SHALL BE PERFORMED IN OFFICE TYPE ENVIRONMENTS IN BUILDINGS, SPLICE TRAILERS AND SPLICING TENTS WITH FLOORS.
5. AT THE TIME OF FIBER OPTIC CABLE INSTALLATION, LIVE 120/240 VAC AND/OR 280 VAC POWER CONDUCTORS SERVING TRAFFIC CONTROL EQUIPMENT AND LIGHTING MAY BE PRESENT IN JUNCTION BOXES, WHERE FIBER IS TO BE INSTALLED. THE CONTRACTOR SHALL TAKE ALL NECESSARY SAFETY PRECAUTIONS.
6. CABLE SHALL BE INSTALLED AS ONE CONTINUOUS PIECE WITH NO SPLICES, EXCEPT WHERE INDICATED ON PLANS.
7. ALL CONDUITS TO BE UTILIZED FOR THE FIBER SYSTEM SHALL BE BLOWN OUT WITH COMPRESSED AIR AND HAVE A METAL DISK MANDREL PULLED THROUGH. AN ITD REPRESENTATIVE SHALL BE ON SITE DURING MANDREL PROCEDURE.
8. INSTALL ONE (1) NO.12 XHHW COPPER STRANDED IN 1" PVC ABOVE FIBER CONDUIT.
9. THE CONTRACTOR SHALL USE LUBRICANT OF THE TYPE AND QUANTITY AS RECOMMENDED BY THE CABLE MANUFACTURER WHEN PULLING CABLE.
10. DURING PULLING, A FIBER OPTIC BREAK AWAY SWIVEL SHALL BE USED.
11. THE CONTRACTOR SHALL ENSURE THAT THE TENSILE LOAD ON THE CABLE DOES NOT EXCEED MANUFACTURER SPECIFICATIONS BY USING A SUITABLE RATED SHEAR PIN AND A SYSTEM WHICH INCLUDES A MEANS OF ALERTING THE INSTALLER WHEN PULLING TENSION APPROACHES THE LIMIT AND DISPLAYS THE ACTUAL TENSION ON THE CABLE.
12. DURING PULLING, THE CABLE SHALL BE CONTINUOUSLY LUBRICATED.
13. MANUFACTURER RECOMMENDED PULLING SPEEDS SHALL NOT BE EXCEEDED.
14. FIBER OPTIC SPLICING SHALL BE PERFORMED ONLY AT THE DESIGNATED LOCATIONS SHOWN ON THE PLANS.
15. THE CONTRACTOR SHALL CERTIFY THAT THE INSTALLATION OF THE COMMUNICATIONS CABLE SUB-SYSTEM IS IN ACCORDANCE WITH THE CABLE AND SPLICE MANUFACTURER'S RECOMMENDATIONS AND THE PROJECT SPECIFICATIONS.
16. THE CONTRACTOR SHALL NOT CAUSE THE CABLE TO VIOLATE THE MINIMUM BENDING RADIUS FOR WHICH THE CABLE WAS DESIGNED.
17. IF THE CABLE IS DAMAGED DURING INSTALLATION, THE ENTIRE LENGTH OF CABLE BETWEEN THE NEAREST SPLICE POINTS SHOWN ON THE PLANS SHALL BE REMOVED AND REPLACED AT THE CONTRACTOR'S EXPENSE.
18. ONE HUNDRED (100) FEET OF EACH CABLE SHALL BE LOOSELY LOOPED AND COILED IN EACH FIBER OPTIC 4' X 4' MANHOLE.
19. SIXTY (60) FEET OF EACH CABLE SHALL BE LOOSELY LOOPED AND COILED IN EACH FIBER OPTIC NO. 9 PULL BOX.
20. TWENTY-FIVE (25) FEET OF EACH CABLE SHALL BE LOOSELY LOOPED AND COILED IN EACH FIBER OPTIC NO. 7 PULL BOX.
21. TWENTY-FIVE (25) FEET OF EACH CABLE SHALL BE LOOSELY COILED AND RACKED INSIDE EQUIPMENT ROOMS.
22. THE SLACK LENGTH REQUIREMENTS ARE MINIMUMS. THE CONTRACTOR MAY PROVIDE EXTRA SLACK, NOT TO EXCEED THREE TIMES THE MINIMUM AMOUNT, FOR CONTRACTOR'S SPLICING CONVENIENCE, AT NO ADDITIONAL COST TO THE CITY.
23. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL EMPTY REELS AND RESIDUAL MATERIALS.
24. A PERMANENT HIGH-QUALITY LABEL IDENTIFYING EACH CABLE SHALL BE APPLIED TO THE CABLE WITHIN TWO (2) FEET OF THE SPLICE CLOSURE AND/OR PATCH PANEL.

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: U001 of 030

UNION PACIFIC RAILROAD
Sheet 136 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
UTILITY NOTES

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Utilities\T_UT01_Notes_Default
3/9/2026
T_UT01_Notes_200927.dgn

ITD FIBER OPTIC TESTING NOTES

(2025 VERSION, REVISED 07-15-25)

1. ALL FIBER OPTIC TESTING SHALL BE PERFORMED WITH AN OTDR CAPABLE OF PRODUCING PC COMPATIBLE OUTPUT FILES.
2. ELECTRONIC SUBMITTAL ON CD SHALL BE REQUIRED. TEST RESULTS SUPPLIED ELECTRONICALLY SHALL BE IN PDF FORMAT, OTDR NATIVE FORMAT, AND INCLUDE OTDR SOFTWARE FOR VIEWING.
3. FIBERS SHALL BE IDENTIFIED BY STRAND NUMBER.
4. EACH BINDER SHALL HAVE A COVER SHEET INDICATING WHICH CABLE(S) WERE TESTED, THE OTDR USER'S NAME, THE REVIEWER'S NAME, THE TYPE OF TEST PERFORMED, AND THE DATE(S) OF THE TEST. FOR INTERMEDIATE RESULTS, AN INDEX OF SHEETS THAT CONTAIN ANY DISCREPANCIES WITH THE SPECIFICATIONS SHALL BE PROVIDED IMMEDIATELY FOLLOWING THE COVER SHEET.
5. COVER SHEETS FOR FINAL TEST RESULTS SHALL BEAR THE REVIEWER'S SIGNATURE, THE DATE, AND A STATEMENT INDICATING THAT THE INSTALLATION COMPLIES WITH THE REQUIREMENTS OF THE PROJECT SPECIFICATIONS.
6. ALL OTDR TRACES SHALL BEAR THE SIGNATURE OR INITIALS AND PRINTED NAME OF THE CONTRACTOR'S EMPLOYEE WHO HAS REVIEWED THE TRACES. THE CONTRACTOR SHALL PLACE A CHECK MARK ON ALL TRACES THAT SATISFY THE REQUIREMENTS IDENTIFIED HEREIN. FOR INTERMEDIATE TEST RESULTS, THE CONTRACTOR SHALL HIGH LIGHT ANY DISCREPANCIES WHICH MAY EXIST AND PLACE A POST-IT FLAG ON THE SUBJECT PAGE. THE PAGE SHALL BEAR A SHORT DESCRIPTION OF THE PROPOSED CORRECTIVE ACTION (E.G. RE-SPLICE).
7. SINGLE-MODE FIBER OPTIC CABLE SHALL BE TESTED IN ACCORDANCE WITH EIA-455-61 OR ANY SUBSEQUENT REVISIONS OR REPLACEMENTS. CABLE SEGMENTS HAVING ATTENUATION GREATER THAN 0.4 DB/KM AT 1310 NM AND 0.3 DB/KM AT 1550 NM SHALL BE REJECTED. CABLE SEGMENT LOSS EVENTS GREATER THAN 0.20 DB SHALL BE REJECTED.
8. MULTI-MODE FIBER OPTIC CABLE ATTENUATION SHALL BE LESS THAN OR EQUAL TO 0.35 DB PER KM AT 850 NM AND 0.25 DB PER KM AT 1310 NM.
9. THE MAXIMUM INSERTION LOSS FOR CONNECTORS SHALL BE 0.50 DB. THE CONNECTORS SHALL BE POLISHED TO ENSURE THAT BACK REFLECTION DOES NOT EXCEED 30 DB.
10. POST INSTALLATION TESTING: THE FIBER OPTIC CABLE SHALL BE TESTED AFTER INSTALLATION TO VERIFY THE INTEGRITY OF THE FIBER OPTIC CABLE PLANT AND ITS PERFORMANCE. THE CONTRACTOR SHALL PERFORM AN INSERTION LOSS TEST ON EACH OUTSIDE PLANT CABLE USING THE ATTENUATION TEST SETS IN ACCORDANCE WITH EIA-455-171. OTDR TESTING IN ACCORDANCE WITH EIA-455-59 AND EIA-455-61 SHALL ALSO BE REQUIRED. SPLICES TESTING 0.1 DB OR GREATER SHALL BE RESPLICED BY CONTRACTOR AT NO ADDITIONAL COST TO THE CITY. CONNECTORS TEST GREATER THAN 0.5 DB SHALL BE REPLACED BY CONTRACTOR AT NO ADDITIONAL COST TO THE CITY.
11. THE CONTRACTOR SHALL PERFORM BIDIRECTIONAL OTDR TESTING ON ALL FIBERS. BARE FIBER ADAPTERS SHALL BE USED FOR OTDR TESTING. THE CONTRACTOR SHALL USE A POWER METER TO PERFORM ATTENUATION MEASUREMENTS.
12. THE CONTRACTOR SHALL PERFORM OTDR TESTING ON ALL FIBERS WITH THE ITD REPRESENTATIVE PRESENT BEFORE FINAL ACCEPTANCE. THE CONTRACTOR PROVIDED OPERATOR SHALL BE QUALIFIED TO PERFORM THE TEST. WRITTEN TEST RESULTS SHALL BE PROVIDED TO THE CITY OF MESA FIELD INSPECTOR FOR EACH FIBER TESTED. UNACCEPTABLE RESULTS SHALL REQUIRE THE CONTRACTOR TO REINSTALL NECESSARY SECTIONS OF CABLE, SPLICING ONLY AT POINTS INDICATED ON PLANS, AND AT THE CONTRACTOR'S EXPENSE.
13. THE CONTRACTOR SHALL COMPLETE A FIBER OPTIC CONTINUITY TEST WITH A MODULATED LIGHT SOURCE AND POWER METER TO VERIFY THAT SPLICES HAVE BEEN COMPLETED IN ACCORDANCE WITH THE PLANS.
14. RE-TESTING SHALL BE REQUIRED IF ANY SPLICE CLOSURE IS OPENED AFTER TESTING. AFTER COMPLETING THE REWORK, THE CONTRACTOR SHALL USE AN OTDR IN ACCORDANCE WITH EIA-455-59 AND EIA-455-61 TO TEST EACH AND EVERY FIBER STRAND PASSING THROUGH ANY SPLICE TRAY THAT WAS OPENED BY THE CONTRACTOR.

ITD FIBER OPTIC MATERIALS

(2025 VERSION, REVISED 07-15-25)

1. REFERENCES TO A MANUFACTURER'S TRADE NAME OR CATALOG NUMBER ARE FOR THE PURPOSE OF IDENTIFICATION TO ESTABLISH A LEVEL OF QUALITY, AND THE CONTRACTOR WILL NOT BE PERMITTED TO FURNISH LIKE MATERIALS OF OTHER MANUFACTURERS, EXCEPT WHERE MANUFACTURER NAME IS NOT INDICATED, PROVIDED IF THEY ARE OF EQUAL QUALITY, COMPLETE WITH SPECIFICATIONS FOR THIS PROJECT, AND ARE APPROVED BY THE ENGINEER.
2. SEE TECHNICAL SPECIFICATIONS FOR FIBER OPTIC MATERIAL INFORMATION.
3. SEE TECHNICAL SPECIFICATIONS FOR PULL BOX MATERIALS INFORMATION. PULL BOX COVER LETTERING SHALL BE 1" LETTERS CAST IN STANDARD MARKINGS CITY OF MESA ITS FIBER OPTICS. PULL BOX COVER WILL BE SECURED WITH A 5-POINT SECURITY BOLT.
4. EACH FIBER SHALL BE DISTINGUISHABLE BY MEANS OF A COLOR CODE IN ACCORDANCE WITH TIA/EIA-598.
5. THE CABLE MANUFACTURER SHALL CERTIFY THAT THE CABLE IS IN CONFORMANCE WITH THE SPECIFICATIONS.
6. THE CONTRACTOR SHALL FURNISH AND INSTALL OUTDOOR RATED SPLICE CLOSURE IN MANHOLES AND SPLICE FIBER CABLE. THE CONTRACTOR SHALL FURNISH AND INSTALL FIBER PATCH PANEL IN CABINETS AND TERMINATE FIBER. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL COUPLERS AND CONNECTORS.
7. ALL PATCH PANEL CONNECTORS SHALL BE LC, APC TYPE CONNECTORS OR APPROVED EQUAL.

WATER, WASTEWATER AND STORM DRAIN GENERAL NOTES

(2025 VERSION, REVISED 07-10-25)

1. MATERIALS AND INSTALLATION OF WATER AND SEWER MAINS, WATER METERS AND SERVICE LINE CONNECTIONS SHALL CONFORM TO CURRENT CITY DETAILS, MESA AMENDMENTS TO MAG SPECIFICATIONS, AND THE APPROVED PRODUCTS LIST. SEE BELOW FOR APPROVED PRODUCT LISTS FOR WATER AND WASTEWATER.
   - HTTPS://WWW.MESAAZ.GOV/BUSINESS-DEVELOPMENT/ENGINEERING/APPROVED-PRODUCTS-EQUIPMENT-CONTRACTORS
2. IN ACCORDANCE WITH ARIZONA ADMINISTRATIVE CODE (A.A.C). R18-4-213, ALL MATERIALS WHICH MAY COME INTO CONTACT WITH DRINKING WATER SHALL CONFORM TO NATIONAL SANITATION FOUNDATION (NSF) STANDARDS 60, 61, AND 372 AND SHALL BE LEAD-FREE AS DEFINED IN A.A.C. R18-5-504 AND R18-4-101.
3. THE CONTRACTOR IS RESPONSIBLE TO PROVIDE ALL NECESSARY FITTINGS AND ADAPTERS REQUIRED TO CONNECT DIFFERENT TYPES OF WATER MAIN MATERIALS.
4. PER MESA AMENDMENTS 610.4.2 ALL MINOR VERTICAL OR HORIZONTAL DEFLECTIONS SHALL BE BY PIPE JOINT DEFLECTION UNLESS OTHERWISE NOTED. PIPE JOINT DEFLECTION SHALL NOT EXCEED 3 DEGREES OR 2/3 OF PIPE MANUFACTURER'S RECOMMENDATIONS WHICHEVER IS LESS.
5. PER MAG AND MESA AMENDMENTS 610.11 ALL WATER LINE TESTS SHALL BE COMPLETED SO THAT NO EXISTING LINES, EXISTING VALVES, OR NEWLY INSTALLED VALVES WHICH ARE CONNECTED TO THE OPERATING WATER SYSTEM ARE INCLUDED IN THE TESTS. ALLOWABLE TIMEFRAMES SHOULD FOLLOW MESA AMENDMENTS TO MAG AND MUST BE COORDINATED WITH THE CITY INSPECTOR. FOR A DAYTIME TIE-IN, THE CONTRACTOR SHALL COMPLETE ALL WORK NECESSARY TO RESTORE UTILITY SERVICE AND FULLY OPEN THE TIE-IN AREA TO TRAFFIC WITHIN THE TIME ALLOWED.
6. WATER LINE FLUSHING, PRESSURE TESTING, AND DISINFECTION SHALL BE COMPLETED PER MAG SPECIFICATION SECTION 611, MESA AMENDMENTS TO MAG SPECIFICATION SECTION 611, AND AWWA C651 (CURRENT VERSION).
7. SOURCE WATER UTILIZED FOR FILLING, FLUSHING AND TESTING SHALL BE OBTAINED FROM A HYDRANT METER ORDERED THROUGH PERMIT SERVICES AND SET BY CITY OF MESA WATER RESOURCES STAFF. IT IS PROHIBITED TO OPEN A VALVE TO THE EXISTING WATER SYSTEM TO FILL A NEWLY CONSTRUCTED OR REPAIRED PIPELINE AS OUTLINED IN THE MESA AMENDMENTS TO MAG SECTION 610.11 AND 611.
8. WATER METERS, METER BOXES, LIDS, ETC. IN CONFLICT WITH NEW CONSTRUCTION SHALL BE RELOCATED PER CITY OF MESA STANDARD DETAIL M-1308.2 (OLD M-49.03) BY THE CONTRACTOR. THE RELOCATION SHALL INCLUDE ALL MATERIALS NECESSARY TO RECONNECT THE METER TO THE CITY DISTRIBUTION SYSTEM. SERVICE LINE EXTENSIONS, IF APPROVED IN WRITING BY MESA WATER RESOURCES DEPARTMENT, SHALL CONFORM TO MESA STANDARD DETAIL M-1308.1 (OLD M-49.01). WHEN SERVICE LINE EXTENSIONS ARE APPROVED PER MESA STANDARD DETAIL M-1308.1 (OLD M-49.01), SERVICE LINE COUPLINGS SHALL NOT BE PLACED UNDER ROADWAY SURFACES, CONCRETE GUTTERS, CURB AND GUTTER, OR CONCRETE DRIVEWAYS.
9. VALVES SHALL BE INSTALLED WITH VALVE BOX AND COVER PER MAG STD DETAILS 391-1, TYPE C WITH A DEEP-SKIRTED LID (4-INCHES MINIMUM) AS NOTED IN THE APPROVED PRODUCTS LIST.
10. ALL WATER LINE ABANDONMENT CUT AND PLUGS FOR ACTIVE LINES SHALL CONFORM TO THE FOLLOWING:

    A. 12" AND SMALLER DIAMETER PER MESA STANDARD DETAIL M-50.

    B. 16" DIAMETER PER M.A.G. STANDARD DETAIL 390, TYPE B.

    C. GREATER THAN 16" DIAMETER, AS DESIGNED PER PLAN.
11. LIME-TREATED AGGREGATE BASE COURSE (ABC) MATERIAL, RECLAIMED CONCRETE MATERIAL (RCM), AND RECLAIMED ASPHALT PAVEMENT (RAP) MATERIALS ARE PROHIBITED FOR USE IN THE PIPE EMBEDMENT ZONE (BEDDING, HAUNCHING, INITIAL BACKFILL) FOR WATERLINE CONSTRUCTION PER MESA AMENDMENTS 601.4.2.
12. PER MESA AMENDMENTS 610.11, APPLICATIONS TO THE CITY OF MESA ENGINEERING INSPECTOR AND REVIEWED AND APPROVED BY THE WATER RESOURCES DEPARTMENT FOR WATER SYSTEM SHUTDOWN FOR THE PURPOSES OF CONSTRUCTION-RELATED ACTIVITIES SHALL BE MADE A MINIMUM OF FIVE (5) BUSINESS DAYS PRIOR TO THE SCHEDULED SHUTDOWN DATE. THE REQUEST SHALL INCLUDE PRIMARY AND SECONDARY VALVE NUMBERS, WHETHER A TEST SHUTDOWN IS REQUESTED, AND THE DATE AND DURATION OF THE REQUESTED SHUTDOWN. PER MAG 610.11, THE CITY OF MESA DOES NOT GUARANTEE A COMPLETE SHUTDOWN.
13. REQUIRED BACK FLOW PREVENTION ASSEMBLIES SHALL INCLUDE MANUFACTURERS AND MODELS DESIGNATED IN THE CURRENT "LIST OF APPROVED BACKFLOW PREVENTION ASSEMBLIES" AS PUBLISHED BY THE FOUNDATION FOR CROSS-CONNECTION CONTROL AND HYDRAULIC RESEARCH, UNIVERSITY OF SOUTHERN CALIFORNIA.
14. BACKFLOW PREVENTION ASSEMBLIES SHALL BE TESTED AND APPROVED BY A CERTIFIED TECHNICIAN DESIGNATED IN THE CURRENT CITY OF MESA "LIST OF APPROVED INSPECTORS" PRIOR TO THE REQUEST FOR FINAL INSPECTION.
15. ALL WATER METERS ARE TO BE SUPPLIED BY THE CITY OF MESA. CHARGES FOR INSTALLING NEW SERVICES AND METERS WILL BE IN ACCORDANCE WITH THE CURRENT UTILITY SERVICE FEE SCHEDULE. METERS TWO INCHES OR LESS WILL BE DELIVERED AND INSTALLED BY CITY FORCES. METERS LARGER THAN TWO INCHES WILL BE DELIVERED BY THE CITY AND INSTALLED BY THE CONTRACTOR AND REQUIRE SCHEDULING AND INSPECTIONS WITH CITY FORCES. CONTACT THE DEVELOPMENT SERVICES DEPARTMENT AT 480-644-4273 FOR THE SPECIFIC PROCEDURE. SEE M-1301 SERIES (OLD M-27.01 SERIES) FOR MORE INFORMATION.

WATER, WASTEWATER AND STORM DRAIN GENERAL NOTES (CONTINUED)

16. FOR PROJECTS INVOLVING PUBLIC WATER MAINS WITH DIAMETERS 20" AND LARGER, THE FOLLOWING SHALL APPLY:

    A. PROCUREMENT OF PIPES AND APPURTENANCES SHALL NOT COMMENCE UNTIL SHOP DRAWINGS AND PRODUCT DATA SUBMITTALS HAVE BEEN REVIEWED AND ACCEPTED IN WRITING BY THE CITY OF MESA WATER RESOURCES DEPARTMENT.

    B. SUBMITTALS AND SHOP DRAWINGS SHALL INCLUDE, BUT ARE NOT LIMITED TO THE FOLLOWING:

        I. PIPE AND FITTINGS

        II. PIPE APPURTENANCES (ISOLATION VALVES, AIR RELEASE VALVES, HYDRANTS, ETC.)

        III. CORROSION MONITORING AND PROTECTION SYSTEMS (WHERE APPLICABLE)

        IV. FABRICATION/LAY DRAWINGS (FOR C200 STEEL OR C303 CONCRETE CYLINDER PIPE)

        V. VALID WELDER'S CERTIFICATIONS (FOR C200 OR C303 CONCRETE CYLINDER PIPE)

    C. ALL FIELD WELDS SHALL BE MADE AVAILABLE FOR INSPECTION BY THE CITY OR THE CITY'S REPRESENTATIVE PRIOR TO GROUTING.

    D. ADDITIONAL REQUIREMENTS FOR C200 STEEL AND C303 CONCRETE CYLINDER PIPE WITH DIAMETERS 30" AND LARGER ARE AS FOLLOWS:

        I. EACH PIPE SECTION SHALL BE MADE AVAILABLE FOR VISUAL AND SOUNDING INSPECTION BY CITY STAFF OR THE CITY'S REPRESENTATIVE PRIOR TO INSTALLATION. PIPES FAILING INSPECTIONS SHALL BE REPAIRED OR REPLACED AS DETERMINED BY THE CITY.

        II. INSTALLED PIPE SHALL BE MADE AVAILABLE FOR INTERNAL VISUAL AND SOUNDING INSPECTIONS BY CITY STAFF OR THE CITY'S REPRESENTATIVE PRIOR TO FILLING. PIPES FAILING INSPECTIONS SHALL BE REPAIRED OR REPLACED AS DETERMINED BY THE CITY.
17. WHEN GROUTING OR CASTING CONCRETE AROUND PVC SEWER PIPE, SUCH AS AT MANHOLE OR VAULT PENETRATIONS, THE CONTRACTOR SHALL INSTALL WATER STOPS PER MESA AMENDMENTS TO MAG SPECIFICATION 625 AND MANUFACTURERS RECOMMENDATIONS.
18. SEWER BUILDING CONNECTION LATERALS SHALL BE INSTALLED PER MAG STANDARD DETAIL 440. LATERAL WYES SHALL BE INSTALLED AT NO GREATER THAN A 45 DEGREE ANGLE FROM HORIZONTAL. SEWER LATERAL SLOPES SHALL BE AS INDICATED ON MAG STANDARD DETAIL 440 AND IN NO CIRCUMSTANCE SHALL SEWER LATERAL SLOPES EXCEED 7/8" PER FOOT FOR 6" LATERALS AND 1-1/2" PER FOOT FOR 4" LATERALS. FITTINGS SHALL BE INSTALLED WITH NO ANGULAR JOINT DEFLECTION AND ALL CONNECTIONS SHALL BE GASKETED OR SEALED PER MAG SPECIFICATIONS.
19. SEWER MANHOLE BASES, BENCHES, SHELVES, AND CHANNELS SHALL BE CONSTRUCTED PER MAG STANDARD DETAIL 420. EACH INLET PIPE SHALL HAVE A DESIGNATED, FORMED CHANNEL AND BENCHING. THE DIMENSIONS OF CHANNELS, SHELF SLOPE, AND MINIMUM INLET PIPE ANGLES SHALL BE CONSTRUCTED PER MAG STANDARD DETAIL 420-3.
20. PER MESA DESIGN STANDARDS, SEWER MANHOLES SHALL BE CONSTRUCTED PER MAG STANDARD DETAILS 420-1, TYPE 'A' TOP; AND 423-2 EXCEPT THAT:

    A. MANHOLE SHAFT DIAMETERS SHALL BE 5 FEET.

    B. MANHOLE RINGS AND COVERS SHALL HAVE 30-INCH DIAMETERS.

    C. STEPS SHALL NOT BE INCLUDED.

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

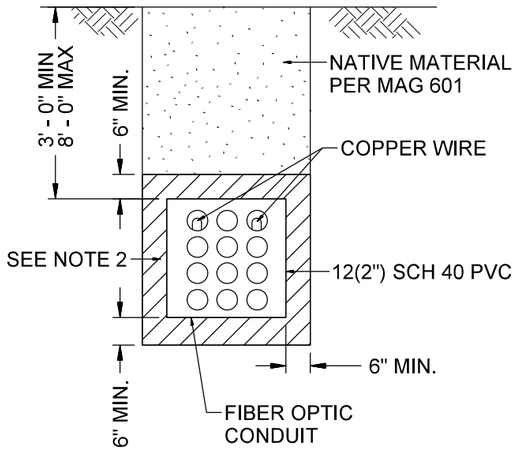
DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	U002 of 030

UNION PACIFIC RAILROAD — Sheet 137 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
UTILITY NOTES

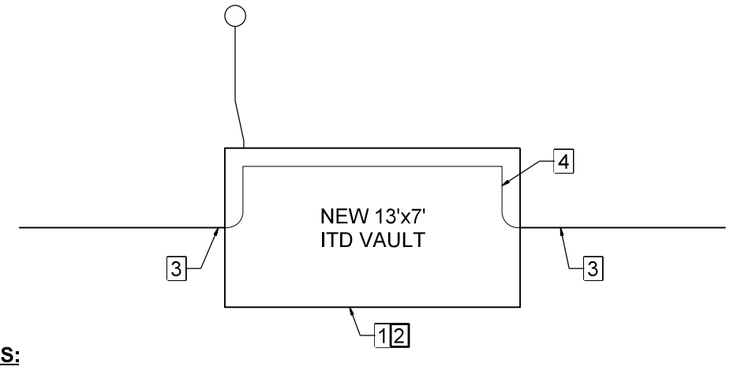
Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable_020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Utilities\T_UT01_Notes_200927.dgn
Default
3/9/2026



NOTES:

1. REFERENCE CITY OF MESA DETAIL NO. M-66.07.5 FOR CONDUIT CONFIGURATION AND ALLOCATION.
2. TRENCH WIDTHS SHALL BE IN ACCORDANCE WITH MAG UNIFORM STANDARD SPECIFICATIONS SECTION 601.2.2.
3. BEDDING OR SHADING MATERIAL ADJACENT TO THE CITY OF MESA FIBER CONDUIT SHALL BE SELECT SANDY TYPE SOIL FREE OF ROCK OR DEBRIS THAT WILL PASS THROUGH 3/8" SCREEN AS INSPECTED AND APPROVED BY THE CITY OF MESA INSPECTION PERSONNEL. SEE SPECIAL PROVISION "BEDDING AND SHADING MATERIAL" INCLUDED IN THE SPECIFICATIONS.

EXISTING COM E-STREETS
NOT TO SCALE



NOTES:

1. CONTRACTOR SHALL PROVIDE AND INSTALL NEW VAULT PER DETAIL 612-LA.
2. CONTRACTOR SHALL INSTALL CONDUIT & FIBER OPTIC CABLE PER CITY OF MESA STANDARD DETAILS M-66.01.1, M-66.02, M-66.03, M-66.04, M-66.05, & M-66.06.
3. CONTRACTOR SHALL INTERCEPT EXISTING 12 2" CONDUITS AND EXTEND INTO NEWLY INSTALLED VAULT. USE CAUTION AS FIBER CABLE IS ACTIVE.
4. RETRIEVE EQUALLY ENOUGH FIBER, MULE TAPE, & TRACER WIRE CABLE SLACK FROM UPSTREAM AND DOWNSTREAM VAULTS IN ORDER TO ROUTE CABLE AND LOOSELY ATTACH TO VAULT OUTER BOUNDARY WALLS.

PRE-CAST FIBER OPTIC VAULT
NOT TO SCALE

144 SMFO OUTER RING CABLE – SEWRP TO SBWTP

DoIT
144 SMFO – 145312
OR – WP TO TN

FIBER CABLE LABEL FOR VAULT AT S. SOSSAMAN RD

RED TEXT IS EXAMPLE ONLY AND SHALL REFLECT ACTUAL FOOTAGE ON EACH CABLE

144 SMFO OUTER RING CABLE – SEWRP TO SBWTP

DoIT
144 SMFO – 145312
OR – WP TO TN

48 SMFO LATERAL CABLE – OUTER RING TO FS215

DoIT
48 SMFO – 145312
LAT – OR TO SL

FIBER CABLE LABEL FOR VAULT AT E. PECOS RD

RED TEXT IS EXAMPLE ONLY AND SHALL REFLECT ACTUAL FOOTAGE ON EACH CABLE

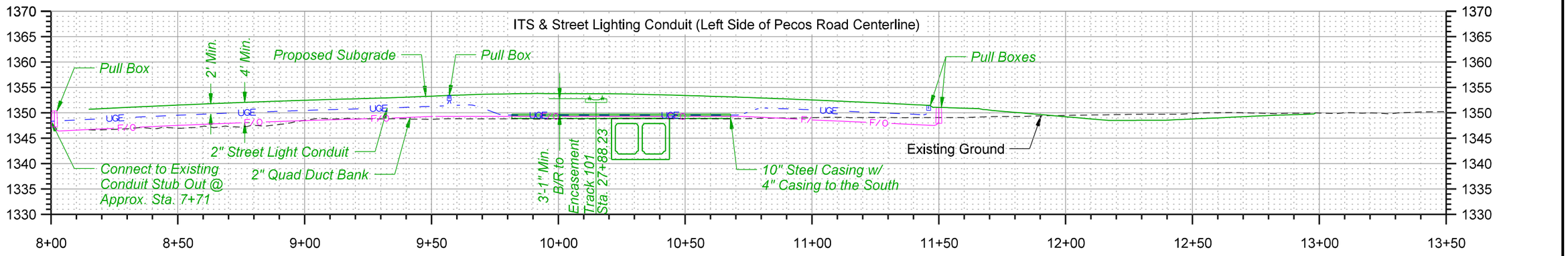
The contractor shall submit permanent identification tags or labels, and the method of attachment for approval by the Engineer. The cables shall be labeled at all boxes where cable is exposed and within two feet of the conduit entrance. As a minimum, the labels shall state (see tags above). The cabling label shall include the distance markings on all fiber optic cables at the ingress and egress points of the pull boxes, at the splice enclosures, entry to cabinets and termination points.

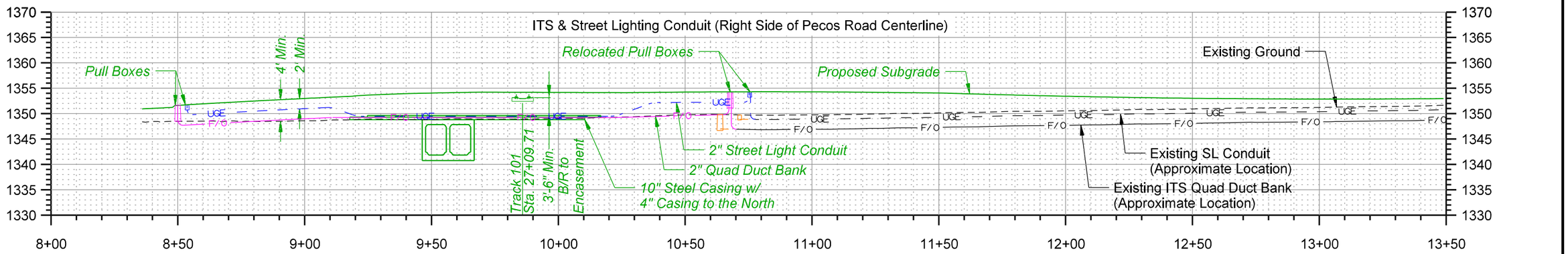
olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

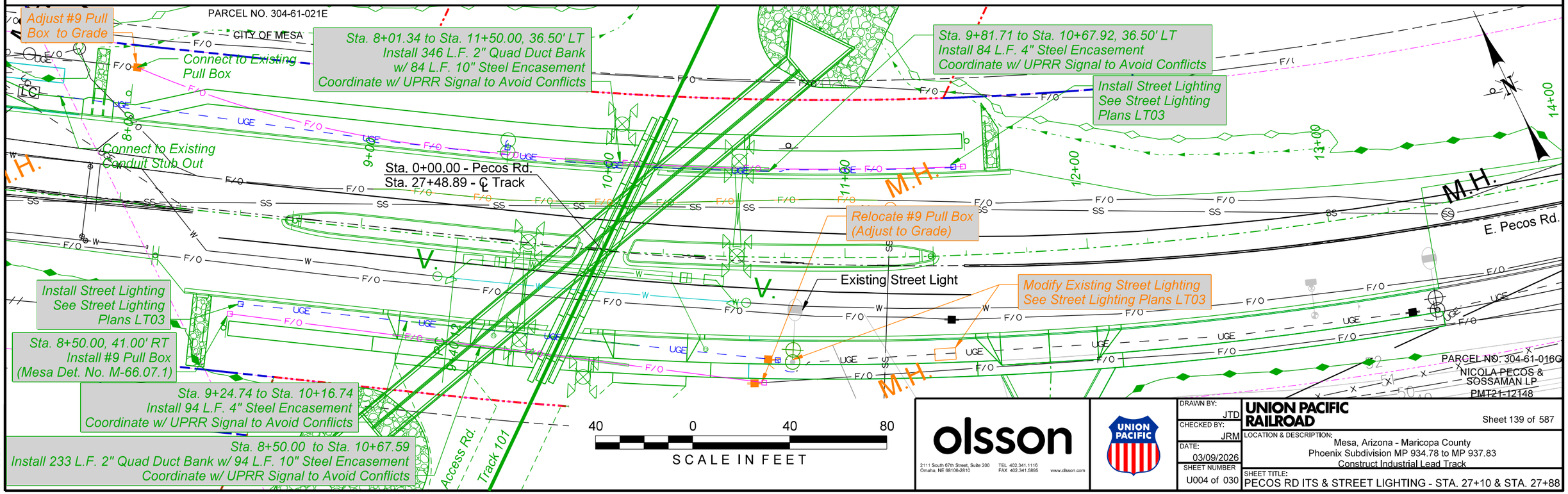
DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: U003 of 030

UNION PACIFIC RAILROAD
Sheet 138 of 587
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track
SHEET TITLE:
UTILITY DETAILS

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Utilities\T_UT01_Notes_200927.dgn
Default
3/9/2026







olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	U004 of 030

UNION PACIFIC RAILROAD Sheet 139 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
PECOS RD ITS & STREET LIGHTING - STA. 27+10 & STA. 27+88

Color_table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04.Utilities\T_UT01_Street-ITS 27+10_200927.dgn
Default
3/9/2026

WATER MAIN NOTES:

1. UTILITY INSTALLATION, MATERIALS, AND TESTING SHALL COMPLY WITH MAG AND CITY OF MESA STANDARDS, SPECIFICATIONS, DETAILS, AND AMENDMENTS.
2. THE CONTRACTOR SHALL COORDINATE WITH CITY OF MESA FOR ALL UTILITY CONSTRUCTION PHASING, OUTAGES, TESTING, AND INSPECTIONS.
3. THE CONTRACTOR SHALL BUILD TEMPORARY SEDIMENT BASINS AND EROSION MAT FOR DISCHARGE DURING FLUSHING AS NECESSARY TO MINIMIZE EROSION AND TO PREVENT DISCHARGE OF SEDIMENT OFF SITE (INCIDENTAL). AS AN ALTERNATE TO THE TEMPORARY SEDIMENT BASIN THE CONTRACTOR MAY DISCHARGE INTO AN EXISTING DRAINAGEWAY OR DITCH WITH ESTABLISHED VEGETATION AS APPROVED BY CITY OF MESA.
4. BACKFILL SHALL COMPLY WITH CITY OF MESA DETAIL M-19.04.
5. SEE CITY OF MESA DETAIL M-38.04 FOR REFERENCE.
6. THE CONTRACTOR SHALL INSTALL TRACER WIRE AND IDENTIFICATION (I.D.) TAPE PER MAG DETAIL NO. 399.

INFORMATIONAL SUMMARY OF QUANTITIES:*

135 L.F. - 20" DIP WATERLINE W/ RESTRAINED JOINTS
8 EA. - 20" X 45° BEND
2 EA. - GATE VALVE W/ BLOCKING
65 L.F. - 42" STEEL CASING
THRUST BLOCKS & ANCHORAGES
DISINFECTION AND PRESSURE TESTING
CONNECT TO EXISTING 20" WATER SERVICE
CATHODIC PROTECTION
128 L.F. - REMOVE 20" WATERLINE
MOBILIZATION
EXCAVATION AND BACKFILL
TEMPORARY SHORING AS REQUIRED
TRAFFIC CONTROL
ONE-YEAR MAINTENANCE BOND

*THE QUANTITIES SHOWN ABOVE ARE FOR INFORMATIONAL PURPOSES ONLY AND MAY NOT INCLUDE ALL ITEMS, LABOR, AND INCIDENTALS REQUIRED TO COMPLETE THE WORK AS SHOWN.

	CARRIER PIPE	CASING PIPE
CONTENT TO BE HANDLED	POTABLE WATER	-
NOMINAL DIAMETER	20"	42"
PIPE MATERIAL	DUCTILE IRON PIPE	STEEL
SPECIFICATION AND GRADE	CL250 DIP	ASTM A53
WALL THICKNESS	-	0.5625"
ACTUAL WORKING PRESSURE	UNKNOWN	NA
PRESSURE RATING	250 PSI	NA
MIN. TENSILE STRENGTH	-	35,000 PSI
TYPE OF JOINT	RESTRAINED JOINT	WELDED PER AWS D1.1
COATING	POLYETHYLENE WRAP	NA
METHOD OF INSTALLATION	OPEN CUT	OPEN CUT
SEALS: BOTH ENDS TYPE: RUBBER W/ S.S. BANDS		
BURY: BASE OF RAIL TO TOP OF CASING: 16 FT. 5 IN.		
BURY: 4 FT. 0 IN. MIN. (ROADWAY DITCHES)		
BURY: 4 FT. 0 IN. MIN. (NOT BENEATH TRACKS)		
TYPE, SIZE & SPACING OF INSULATORS OR SUPPORTS: SEE PROJECT SPECS.		
DISTANCE C.L. TRACK TO FACE OF JACKING/RECEIVING PITS FT. IN. NA		
BURY: BASE OF RAIL TO BOTTOM JACKING/RECEIVING PITS FT. IN. NA		
CATHODIC PROTECTION? YES ☒ NO ☐		

Existing 20" Water Main Alignment

Ⓐ POB Sta. -1+26.10
Pecos Rd. Sta. 8+67.91 - 16.15' RT
N = 831789.09, E = 774371.76

Ⓑ PI Sta. -0+83.74
Pecos Rd. Sta. 9+10.27 - 16.52' RT
N = 831766.59, E = 774407.66

Ⓒ PI Sta. -0+45.07
Pecos Rd. Sta. 9+48.84 - 16.60' RT
N = 831746.30, E = 774440.57

Ⓓ PI Sta. -0+00.81
Pecos Rd. Sta. 9+92.59 - 16.90' RT
N = 831723.67, E = 774478.61

Ⓔ PI Sta. 0+35.10
Pecos Rd. Sta. 10+28.07 - 17.58' RT
N = 831705.79, E = 774509.76

Ⓕ PI Sta. 0+63.60
Pecos Rd. Sta. 10+56.19 - 18.77' RT
N = 831691.59, E = 774534.47

Ⓖ PI Sta. 0+92.35
Pecos Rd. Sta. 10+84.52 - 20.02' RT
N = 831677.72, E = 774559.64

Ⓗ EOT Sta. 1+32.53
Pecos Rd. Sta. 11+24.11 - 21.24' RT
N = 831659.64, E = 774595.52

Proposed 20" Water Main Alignment

Ⓘ POB Sta. -0+60.56 - 0.00'
Pecos Rd. Sta. 9+33.45 - 16.55' RT
N = 831754.43, E = 774427.39

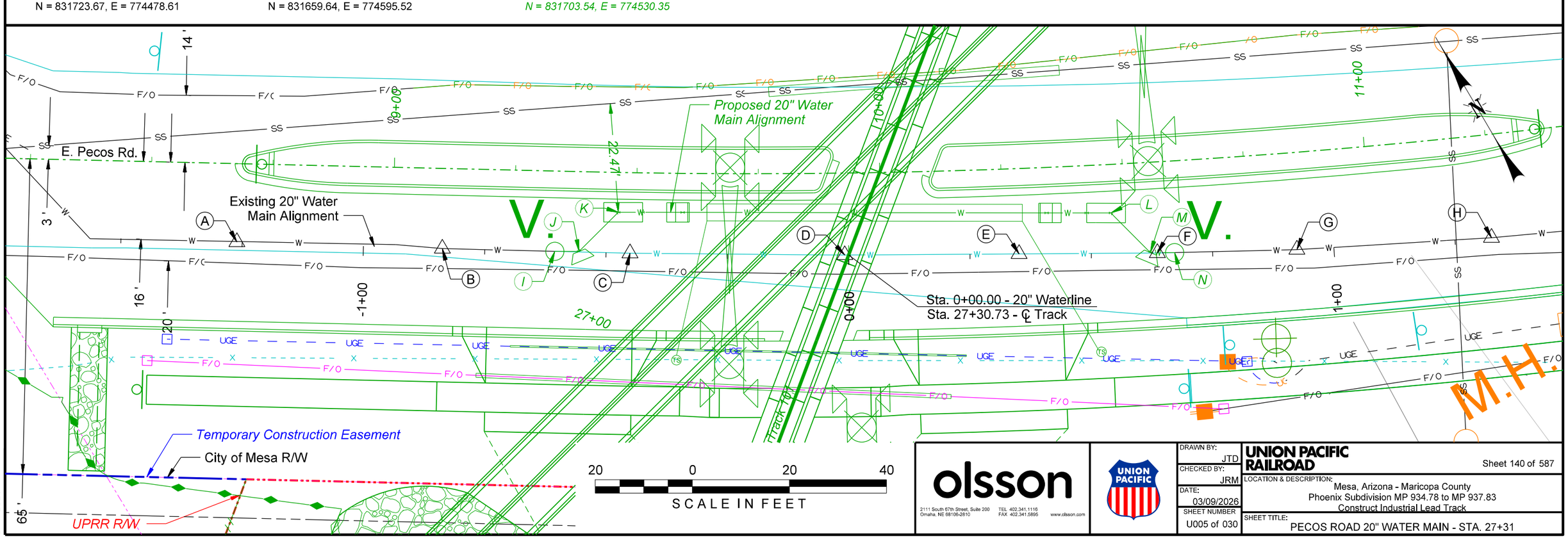
Ⓙ PI Sta. -0+55.56 - 0.12' LT
Pecos Rd. Sta. 9+38.45 - 16.44' RT
N = 831751.90, E = 774431.70

Ⓚ PI Sta. -0+47.67 - 8.38' LT
Pecos Rd. Sta. 9+46.31 - 8.21' RT
N = 831754.79, E = 774442.75

Ⓛ PI Sta. 0+54.08 - 8.31' LT
Pecos Rd. Sta. 10+47.16 - 10.01' RT
N = 831703.54, E = 774530.35

Ⓜ PI Sta. 0+62.16 - 0.10' LT
Pecos Rd. Sta. 10+54.77 - 18.59' RT
N = 831692.40, E = 774533.27

Ⓝ EOT Sta. 0+67.16 - 0.00'
Pecos Rd. Sta. 10+59.69 - 18.89' RT
N = 831689.88, E = 774537.58



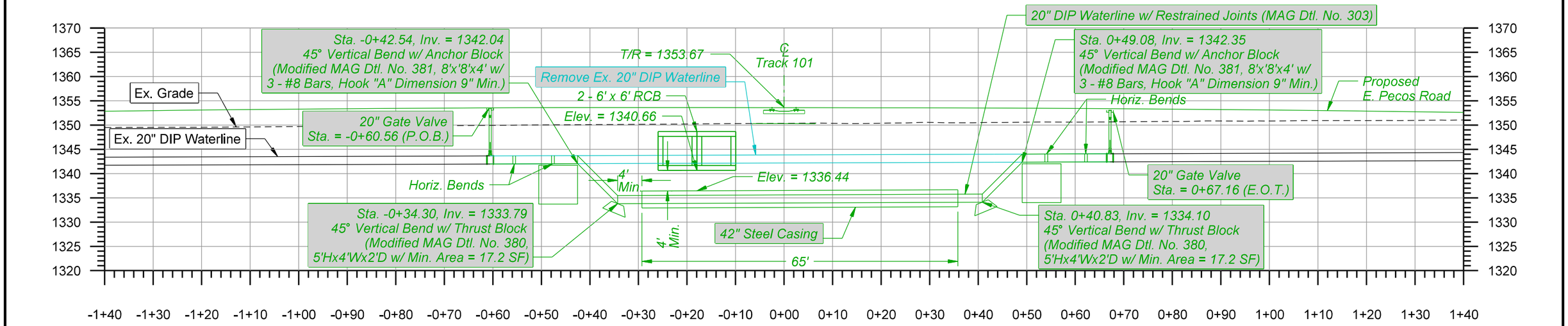
olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

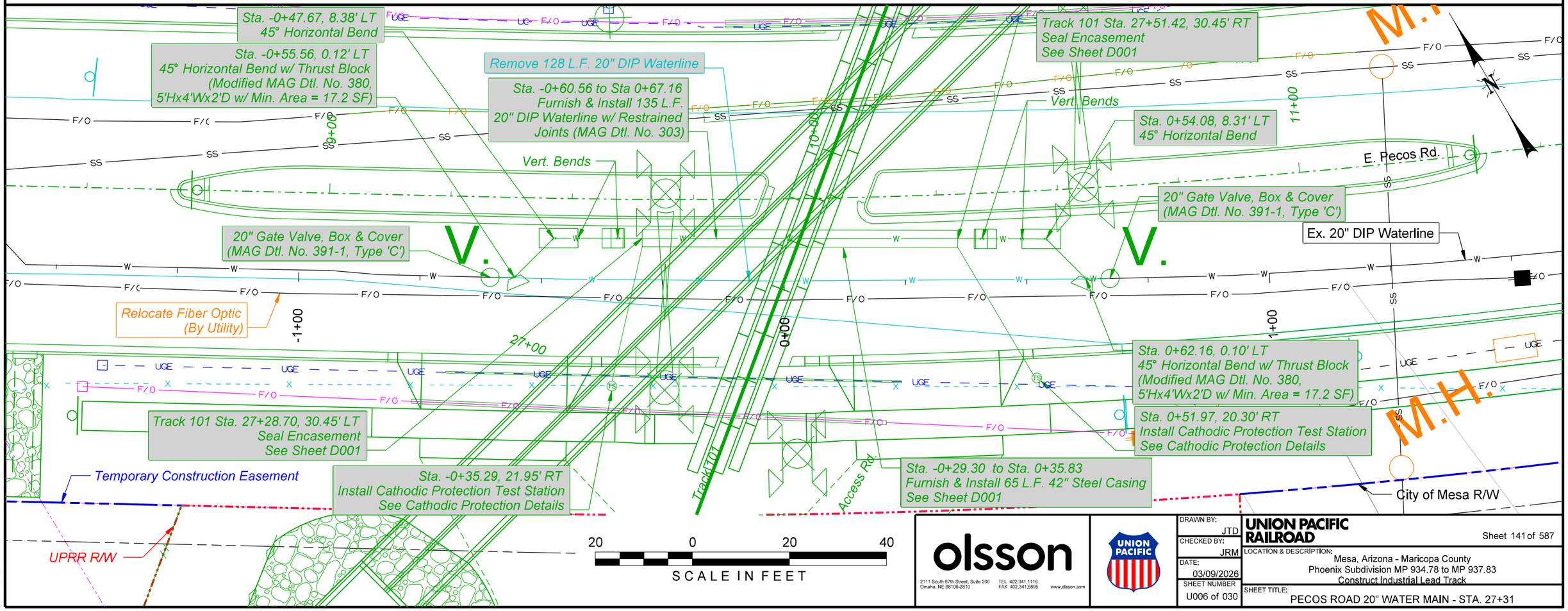
UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: U005 of 030

UNION PACIFIC RAILROAD
Sheet 140 of 587
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track
SHEET TITLE:
PECOS ROAD 20" WATER MAIN - STA. 27+31

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04.Utilities\T_UT02_w 27+31.200927.dgn
Default
3/9/2026





olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	U006 of 030

UNION PACIFIC RAILROAD Sheet 141 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
PECOS ROAD 20" WATER MAIN - STA. 27+31

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Utilities\T_UT03_W_27+31.200927.dgn
Default
3/9/2026

SANITARY SEWER NOTES:

1. UTILITY INSTALLATION, MATERIALS, AND TESTING SHALL COMPLY WITH MAG AND CITY OF MESA STANDARDS, SPECIFICATIONS, DETAILS, AND AMENDMENTS.
2. THE CONTRACTOR SHALL COORDINATE WITH CITY OF MESA FOR ALL UTILITY CONSTRUCTION PHASING, OUTAGES, TESTING, AND INSPECTIONS.
3. BACKFILL SHALL COMPLY WITH CITY OF MESA DETAIL M-19.04.
4. THE CONTRACTOR SHALL INSTALL TRACER WIRE AND IDENTIFICATION (I.D.) TAPE PER MAG DETAIL NO. 399.
5. THE CONTRACTOR SHALL MAINTAIN EXISTING SERVICE AND SUPPORT THE EXISTING UTILITY AS NECESSARY TO PRESERVE GRADES AND ELEVATIONS THROUGHOUT THE DURATION OF CONSTRUCTION. PRIOR TO CASING INSTALLATION, THE CONTRACTOR SHALL INSTALL SLINGS, CRIBBING, OR ADJUSTABLE SUPPORTS, WHICH SHALL CARRY THE FUL PIPE WEIGHT AND PREVENT DEFLECTION OR JOINT SEPARATION. COMPLETION OF WORK IS SUBJECT TO CITY INSPECTION AND, AS REQUIRED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY REMEDIATION TO THE SATISFACTION OF THE CITY.

INFORMATIONAL SUMMARY OF QUANTITIES:*

60 L.F. - 36" STEEL CASING
70 L.F. - RESTRAINED JOINTS (ALONG EXISTING)
3 EA. - ADJUST MANHOLE
MOBILIZATION
EXCAVATION AND BACKFILL
TEMPORARY SHORING AS REQUIRED
TRAFFIC CONTROL
ONE-YEAR MAINTENANCE BOND

*THE QUANTITIES SHOWN ABOVE ARE FOR INFORMATIONAL PURPOSES ONLY AND MAY NOT INCLUDE ALL ITEMS, LABOR, AND INCIDENTALS REQUIRED TO COMPLETE THE WORK AS SHOWN.

	CARRIER PIPE	CASING PIPE
CONTENT TO BE HANDLED	SANITARY SEWER	-
NOMINAL DIAMETER	18"	36"
PIPE MATERIAL	HDPE	STEEL
SPECIFICATION AND GRADE	-	ASTM A53
WALL THICKNESS	-	0.5625"
ACTUAL WORKING PRESSURE	NA	NA
MIN. TENSILE STRENGTH	-	35,000 PSI
TYPE OF JOINT	-	WELDED PER AWS D1.1
COATING	-	NA
METHOD OF INSTALLATION	PROTECT EXISTING	OPEN CUT
SEALS: BOTH ENDS TYPE: RUBBER W/ S.S. BANDS		
BURY: BASE OF RAIL TO TOP OF CASING: 18 FT. 9 IN.		
BURY: 3 FT. 0 IN. MIN. (ROADWAY DITCHES)		
BURY: 3 FT. 0 IN. MIN. (NOT BENEATH TRACKS)		
TYPE, SIZE & SPACING OF INSULATORS OR SUPPORTS: SEE PROJECT SPECS.		
DISTANCE C.L. TRACK TO FACE OF JACKING/RECEIVING PITS FT. IN. NA		
BURY: BASE OF RAIL TO BOTTOM JACKING/RECEIVING PITS FT. IN. NA		
CATHODIC PROTECTION? YES ☐ NO ☒		

Existing 18" Sanitary Alignment

Ⓐ Manhole Center Sta. -2+59.94
E. Pecos Rd. Sta. 7+47.91 - 5.01' RT
N = 831861.42, E = 774275.36

Ⓑ Manhole Center Sta. 1+10.01
E. Pecos Rd. Sta. 11+19.06 - 20.12' LT
N = 831699.40, E = 774607.95

Ⓒ Manhole Center Sta. 3+39.72
E. Pecos Rd. Sta. 13+48.89 - 4.84' RT
N = 831598.58, E = 774814.34

8' Wide PUFE
City of Mesa R/W
PARCEL NO. 304-61-021E
CITY OF MESA
Sta. 0+00.00 - Sanitary Sewer Line
Sta. 27+69.04 - ℄ Track
Ex. 18" HDPE Sanitary Sewer
UPRR R/W
PARCEL NO. 304-61-021F
CITY OF MESA
Ex. SSMH #100
Ex. SSMH #101
Ex. SSMH #102
M.H.
E. Pecos Rd.
20" Water Main
PARCEL NO. 304-61-016G
NICOLA PECOS & SOSSAMAN LP
PMT21-12148
8' Wide PUFE
City of Mesa R/W
Temporary Construction Easement
UPRR R/W
PARCEL NO. 304-61-018E
PECOS INDUSTRIAL LP
Access Rd.
Track 101
100'
65'
21'
17'
14'
SCALE IN FEET
50 0 50 100

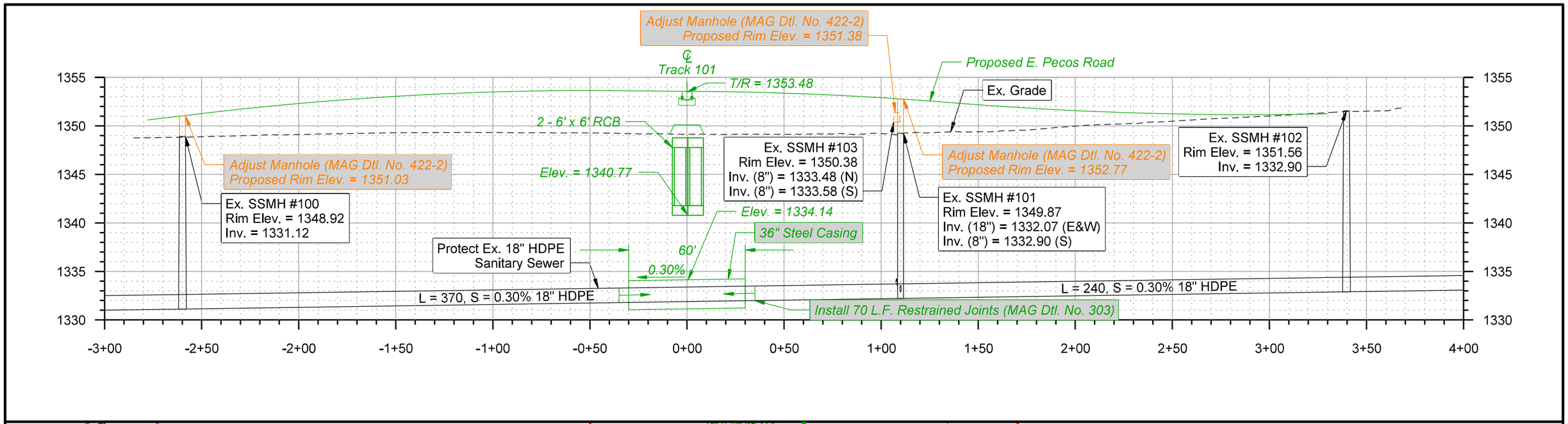
olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

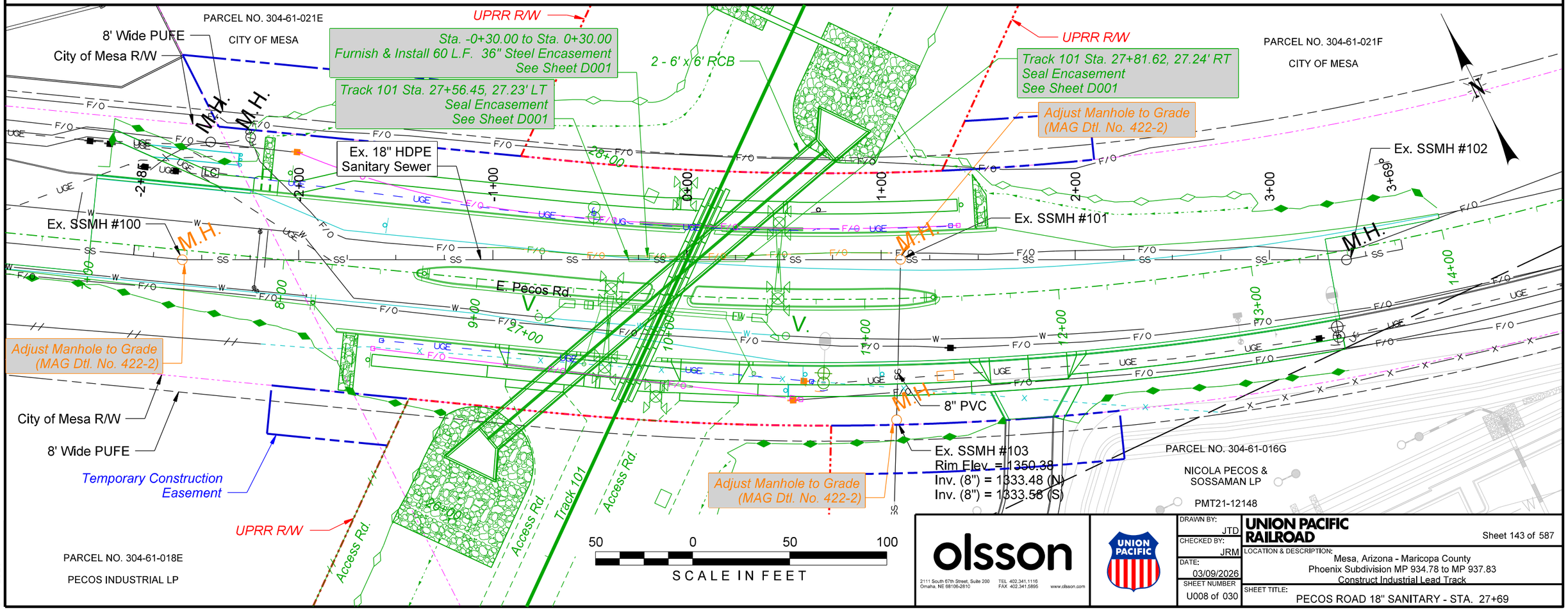
UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: U007 of 030

UNION PACIFIC RAILROAD
Sheet 142 of 587
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track
SHEET TITLE:
PECOS ROAD 18" SANITARY - STA. 27+69

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04.Utilities\T_UT04_S 27+69_200927.dgn
Default
3/9/2026





Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Utilities\T_UT05_S 27+69_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	U008 of 030

UNION PACIFIC RAILROAD

Sheet 143 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
PECOS ROAD 18" SANITARY - STA. 27+69

PARCEL NO. 304-61-021E

CITY OF MESA

PARCEL NO. 304-61-021F

CITY OF MESA

UPRR R/W

150'

UPRR R/W

35+00

30+00

Track 101

200'

Relocate COM E-Streets Fiber
See Sheet U010

Adjust Pull Box to Grade

Fiber Upper

Relocate Fiber
(By Centurylink)

Existing COM E-Streets Fiber
See Sheet U003

Install 13'x7' Precast Fiber Vault
See Sheet U003

City of Mesa R/W

8' Wide PUFE

S. Sossaman Rd.

E. Pecos Rd.

Fiber Upper

PARCEL NO. 304-61-016G

NICOLA PECOS &
SOSSAMAN LP

PMT21-12148

8' Wide PUFE

City of Mesa R/W

Temporary Construction
Easement

2 - 6' x 6' RCB

PARCEL NO. 304-61-018E

PECOS INDUSTRIAL LP

Access Rd

Access Rd

UPRR R/W

Relocate Fiber
(By Cox)

100 0 100 200

SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

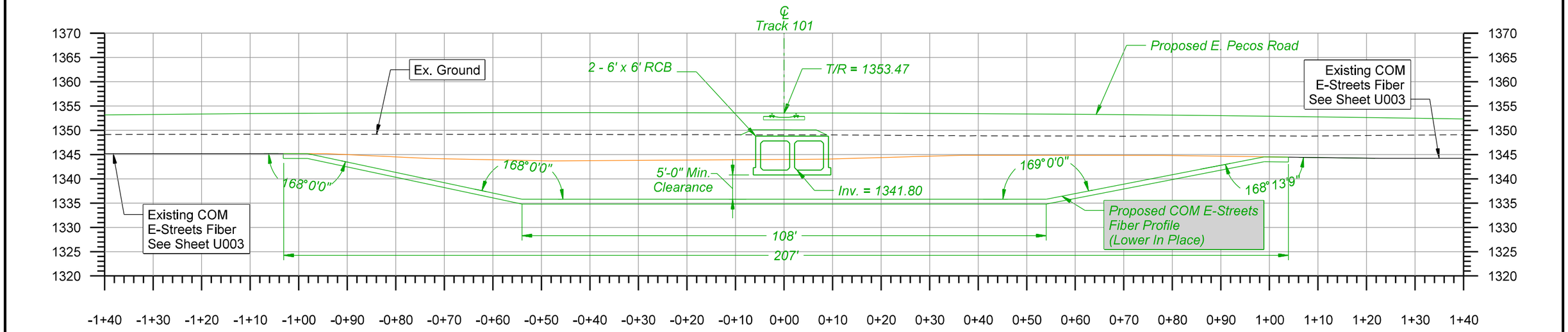
DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: U009 of 030

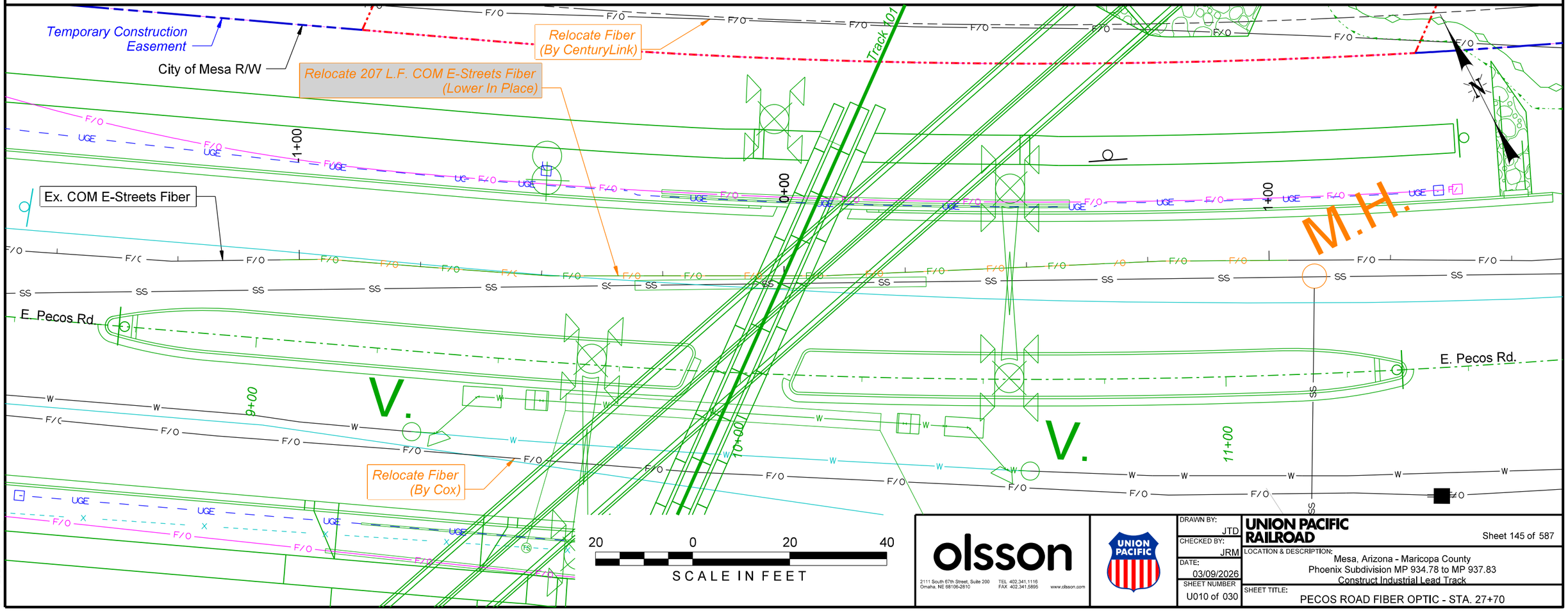
UNION PACIFIC RAILROAD Sheet 144 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
PECOS ROAD FIBER - STA. 27+70

Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927.40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927.40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Utilities\T_UT06_FO 27+70_200927.dgn
Default
3/9/2026





olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

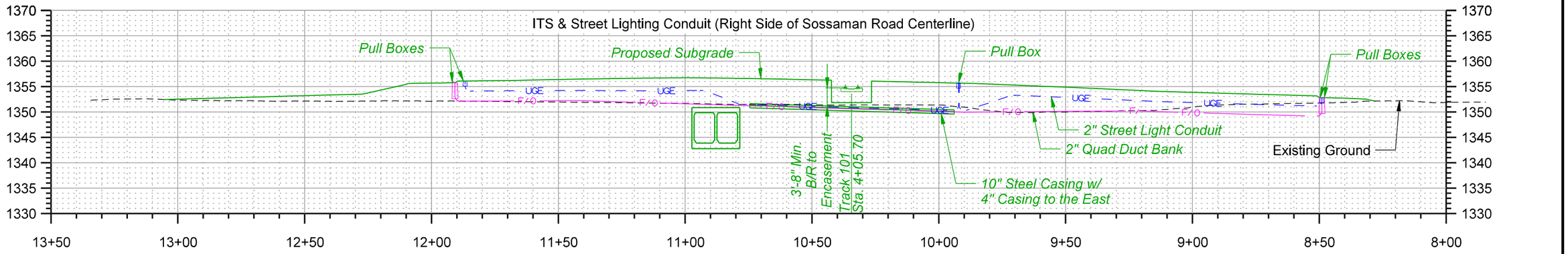
DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	U010 of 030

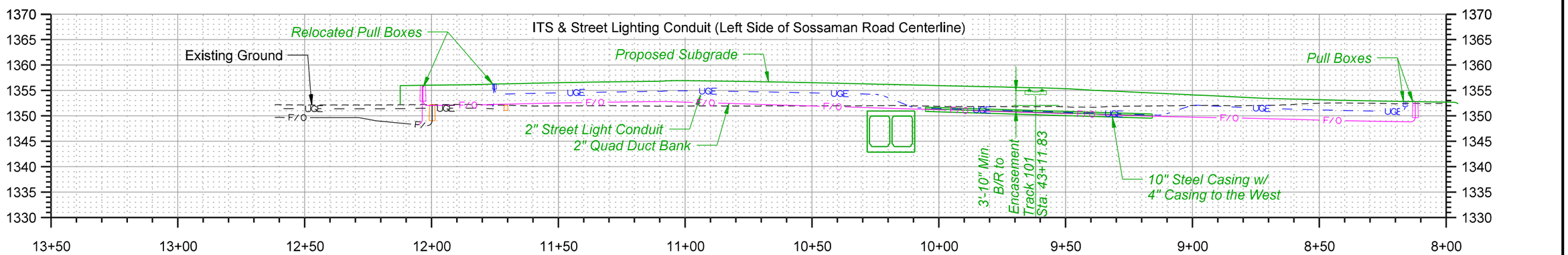
UNION PACIFIC RAILROAD — Sheet 145 of 587

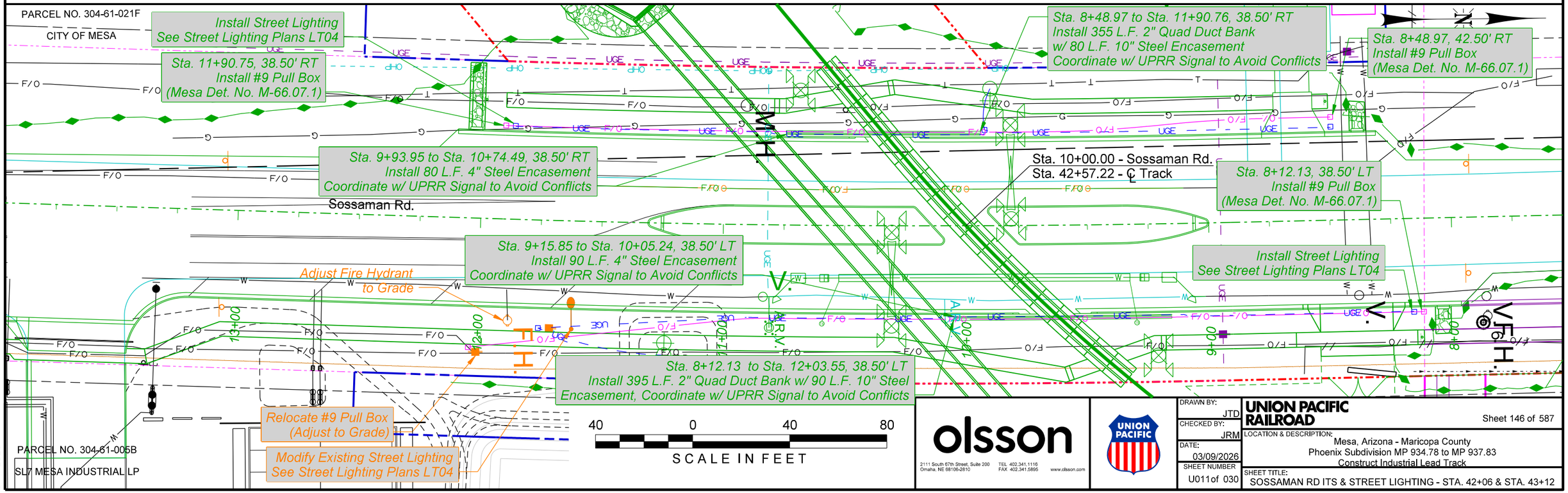
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
PECOS ROAD FIBER OPTIC - STA. 27+70

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Utilities\TJUT07_FO 27+70_200927.dgn
Default
3/9/2026







olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	U011of 030

UNION PACIFIC RAILROAD Sheet 146 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SOSSAMAN RD ITS & STREET LIGHTING - STA. 42+06 & STA. 43+12

Color table:K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Utilities\T_UT08_Street-ITS 42+06_200927.dgn
Default
3/9/2026

UPRR R/W

150'

UPRR R/W

Track 101

PARCEL NO. 304-61-021F

CITY OF MESA

PARCEL NO. 304-61-021E

CITY OF MESA

PARCEL NO. 304-61-019

UNITED STATES OF AMERICA

E Pecos Rd.

City of Mesa R/W

8' Wide PUFE

Relocate Fiber (By MCI)

Install 13'x7' Precast Fiber Vault See Sheet U003

Fiber Vault 13' x 7'

Existing Fiber

S. Sossaman Rd.

40+00

PS 41+85.08

PSC 42+20.08

2+65

2+00

1+00

0+00

-1+00

-1+13

Fiber Vault

18+00

17+00

16+00

15+00

14+00

13+00

12+00

11+00

10+00

50d+00

8+00

45+00

7+00

30'

City of Mesa R/W

8' Wide PUFE

Temporary Construction Easement

Relocate COM E-Streets Fiber See Sheet U013

Relocate Fiber (By Lumen Technologies)

2 - 6' x 6' RCB

UPRR R/W

Access Rd

PARCEL NO. 304-61-005B

SL7 MESA INDUSTRIAL LP

PMT23-21476

PARCEL NO. 304-61-995

GATEWAY GRAND ASSOCIATION

PMT22-05054

100 0 100 200

SCALE IN FEET

olsson

2111 South 67th Street, Suite 200
Omaha, NE 68105-2810

TEL 402.341.1116
FAX 402.341.5895

www.olsson.com

UNION PACIFIC

DRAWN BY: JTD

CHECKED BY: JRM

DATE: 03/09/2026

SHEET NUMBER U012 of 030

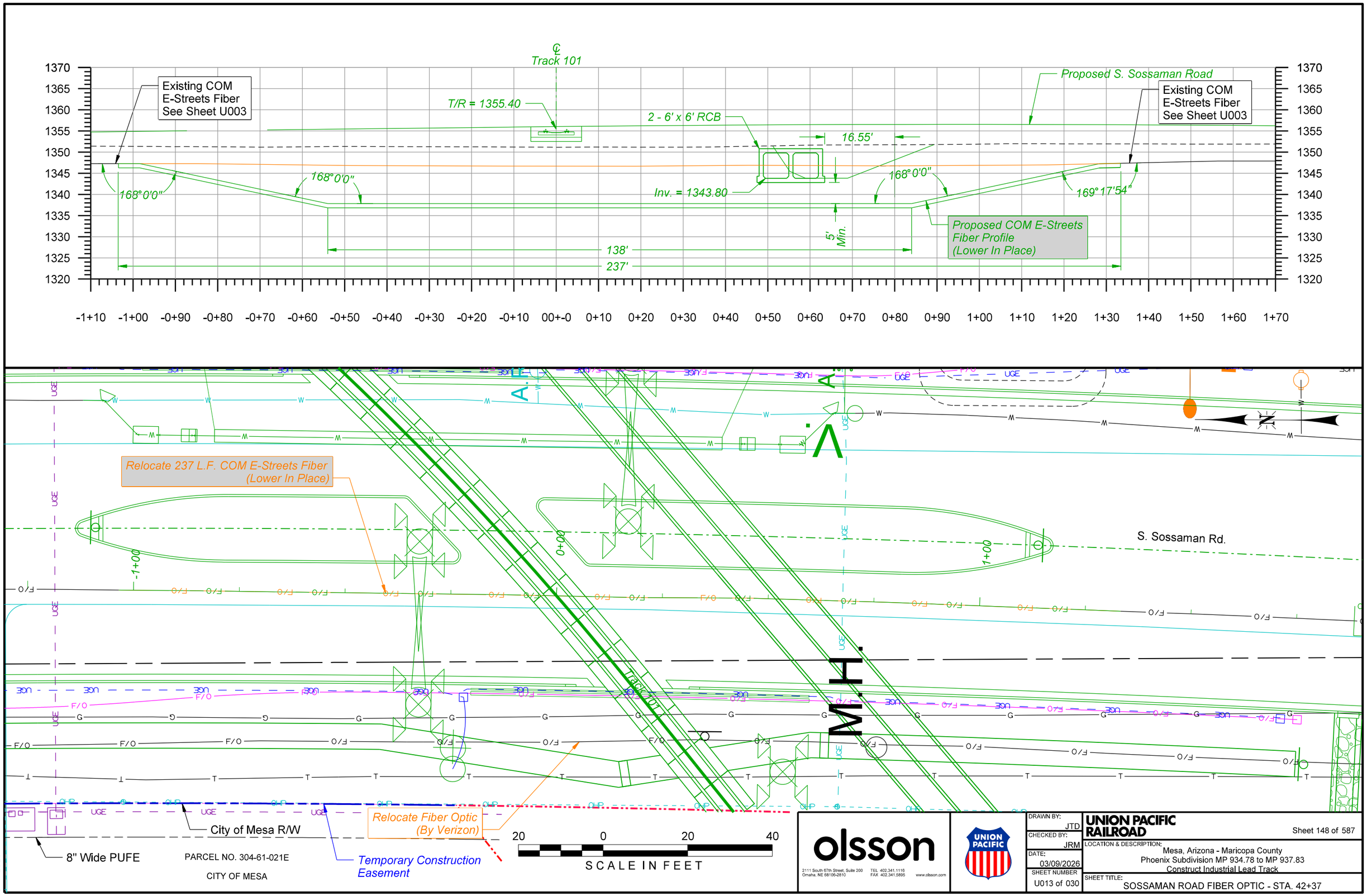
UNION PACIFIC RAILROAD

Sheet 147 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SOSSAMAN ROAD FIBER - STA. 42+37

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04.Utilities\T_UT09_Default
3/9/2026



olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	U013 of 030

UNION PACIFIC RAILROAD Sheet 148 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SOSSAMAN ROAD FIBER OPTIC - STA. 42+37

Color table:K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Utilities\T_UT010_F0 42+37_200927.dgn
Default
3/9/2026

WATER MAIN NOTES:

1. UTILITY INSTALLATION, MATERIALS, AND TESTING SHALL COMPLY WITH MAG AND CITY OF MESA STANDARDS, SPECIFICATIONS, DETAILS, AND AMENDMENTS.
2. THE CONTRACTOR SHALL COORDINATE WITH CITY OF MESA FOR ALL UTILITY CONSTRUCTION PHASING, OUTAGES, TESTING, AND INSPECTIONS.
3. THE CONTRACTOR SHALL BUILD TEMPORARY SEDIMENT BASINS AND EROSION MAT FOR DISCHARGE DURING FLUSHING AS NECESSARY TO MINIMIZE EROSION AND TO PREVENT DISCHARGE OF SEDIMENT OFF SITE (INCIDENTAL). AS AN ALTERNATE TO THE TEMPORARY SEDIMENT BASIN THE CONTRACTOR MAY DISCHARGE INTO AN EXISTING DRAINAGEWAY OR DITCH WITH ESTABLISHED VEGETATION AS APPROVED BY CITY OF MESA.
4. BACKFILL SHALL COMPLY WITH CITY OF MESA DETAILS M-19.04.
5. SEE CITY OF MESA DETAIL M-38.04 FOR REFERENCE.
6. THE CONTRACTOR SHALL INSTALL TRACER WIRE AND IDENTIFICATION (I.D.) TAPE PER MAG DETAIL NO. 399.

INFORMATIONAL SUMMARY OF QUANTITIES:*

196 L.F. - 16" DIP WATERLINE W/ RESTRAINED JOINTS
8 EA. - 16" X 45° BEND
1 EA. - GATE VALVE W/ BLOCKING
120 L.F. - 36" STEEL CASING
1 EA. - AIR RELEASE VALVE & MARKER
THRUST BLOCKS & ANCHORAGES
DISINFECTION AND PRESSURE TESTING
CONNECT TO EXISTING 16" WATER SERVICE
CATHODIC PROTECTION
183 L.F. - REMOVE 16" WATERLINE
1 EA. - REMOVE AIR RELEASE VALVE
MOBILIZATION
EXCAVATION AND BACKFILL
TEMPORARY SHORING AS REQUIRED
TRAFFIC CONTROL
ONE-YEAR MAINTENANCE BOND

*THE QUANTITIES SHOWN ABOVE ARE FOR INFORMATIONAL PURPOSES ONLY AND MAY NOT INCLUDE ALL ITEMS, LABOR, AND INCIDENTALS REQUIRED TO COMPLETE THE WORK AS SHOWN.

	CARRIER PIPE	CASING PIPE
CONTENT TO BE HANDLED	POTABLE WATER	-
NOMINAL DIAMETER	16"	36"
PIPE MATERIAL	DUCTILE IRON PIPE	STEEL
SPECIFICATION AND GRADE	CL250 DIP	ASTM A53
WALL THICKNESS	-	0.5625"
ACTUAL WORKING PRESSURE	UNKNOWN	NA
PRESSURE RATING	250 PSI	NA
MIN. TENSILE STRENGTH	-	35,000 PSI
TYPE OF JOINT	RESTRAINED JOINT	WELDED PER AWS D1.1
COATING	POLYETHYLENE WRAP	NA
METHOD OF INSTALLATION	OPEN CUT	OPEN CUT
SEALS: BOTH ENDS TYPE: RUBBER W/ S.S. BANDS		
BURY: BASE OF RAIL TO TOP OF CASING: 15 FT. 11 IN.		
BURY: 4 FT. 0 IN. MIN. (ROADWAY DITCHES)		
BURY: 4 FT. 0 IN. MIN. (NOT BENEATH TRACKS)		
TYPE, SIZE & SPACING OF INSULATORS OR SUPPORTS: SEE PROJECT SPECS.		
DISTANCE C.L. TRACK TO FACE OF JACKING/RECEIVING PITS FT. IN. NA		
BURY: BASE OF RAIL TO BOTTOM JACKING/RECEIVING PITS FT. IN. NA		
CATHODIC PROTECTION? YES ☒ NO ☐		

Existing 16" Water Main Alignment

Ⓐ POB Sta. -1+40.71
S. Sossaman Rd. Sta. 11+09.57 - 30.07' LT
N = 832579.11, E = 775689.32

Ⓑ PI Sta. -1+22.58
S. Sossaman Rd. Sta. 10+91.54 - 30.02' LT
N = 832597.24, E = 775689.73

Ⓒ PI Sta. -0+92.34
S. Sossaman Rd. Sta. 10+61.49 - 28.75' LT
N = 832627.47, E = 775689.08

Ⓓ PI Sta. -0+20.84
S. Sossaman Rd. Sta. 9+90.40 - 30.89' LT
N = 832698.91, E = 775692.04

Ⓔ PI Sta. 0+79.03
S. Sossaman Rd. Sta. 8+91.09 - 30.25' LT
N = 832798.77, E = 775691.00

Ⓕ POE / Ex. Water Valve Sta. 1+31.46
S. Sossaman Rd. Sta. 8+38.66 - 31.15' LT
N = 832851.21, E = 775691.22

Proposed 16" Water Main Alignment

Ⓖ POB Sta. -1+14.36 - 0.00'
S. Sossaman Rd. Sta. 10+83.38 - 29.66' LT
N = 832605.45, E = 775689.55

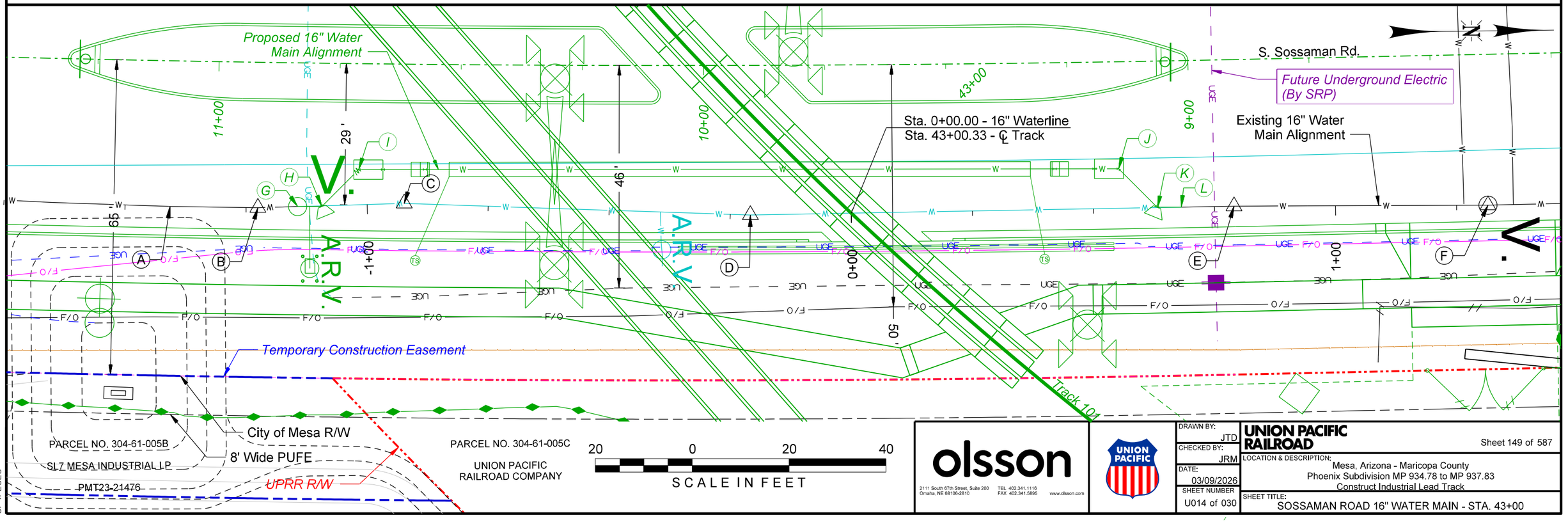
Ⓗ PI Sta. -1+09.37 - 0.14' RT
S. Sossaman Rd. Sta. 10+78.41 - 29.59' LT
N = 832610.45, E = 775689.59

Ⓘ PI Sta. -1+01.53 - 7.26' LT
S. Sossaman Rd. Sta. 10+70.92 - 21.87' LT
N = 832618.12, E = 775682.02

Ⓙ PI Sta. 0+55.36 - 8.14' LT
S. Sossaman Rd. Sta. 9+14.64 - 22.10' LT
N = 832775.02, E = 775683.11

Ⓚ PI Sta. 0+63.14 - 0.09' LT
S. Sossaman Rd. Sta. 9+06.89 - 30.14' LT
N = 832782.89, E = 775691.08

Ⓛ EOT Sta. 0+68.14 - 0.00'
S. Sossaman Rd. Sta. 9+01.92 - 30.23' LT
N = 832787.89, E = 775691.11



olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

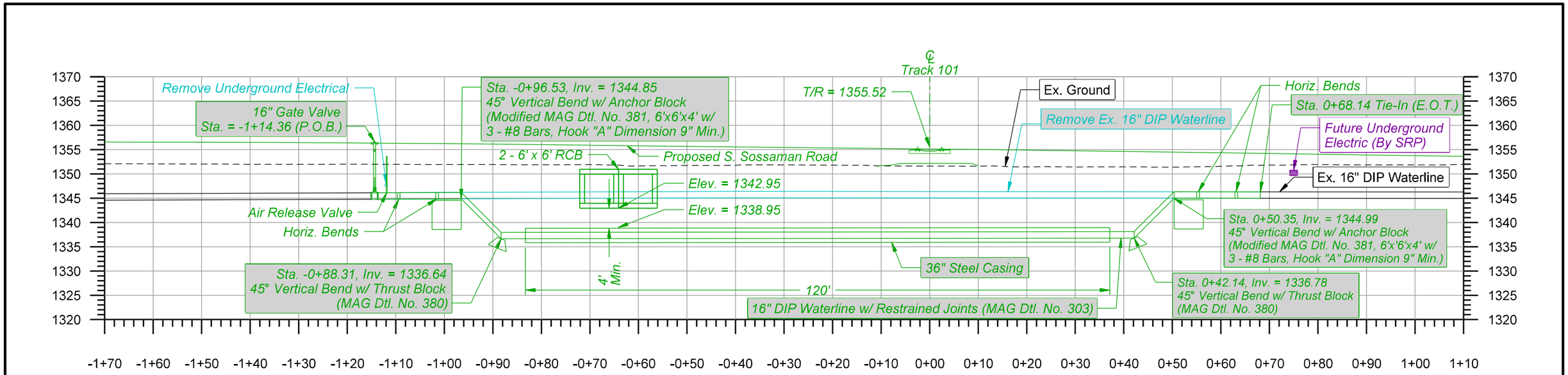
DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: U014 of 030

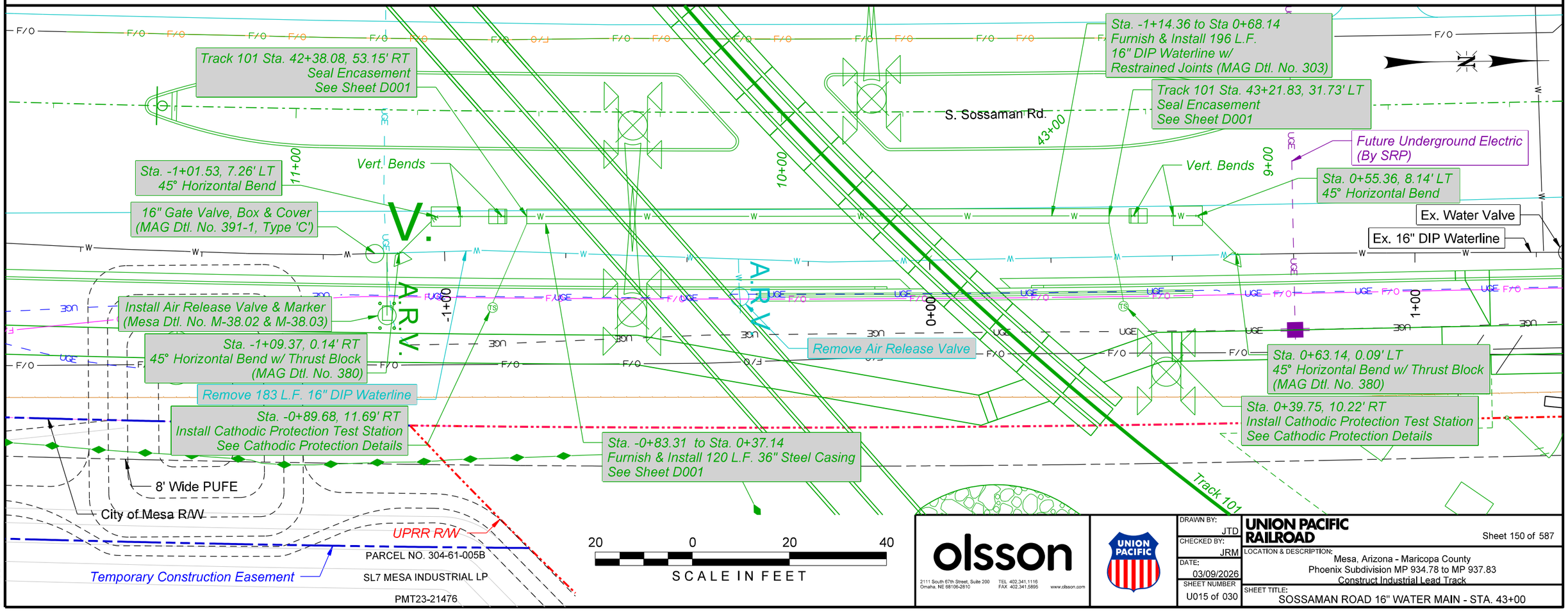
UNION PACIFIC RAILROAD
Sheet 149 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SOSSAMAN ROAD 16" WATER MAIN - STA. 43+00

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927.40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927.40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Utilities\T_UT011_W 42+99_200927.dgn
Default
3/9/2026





olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

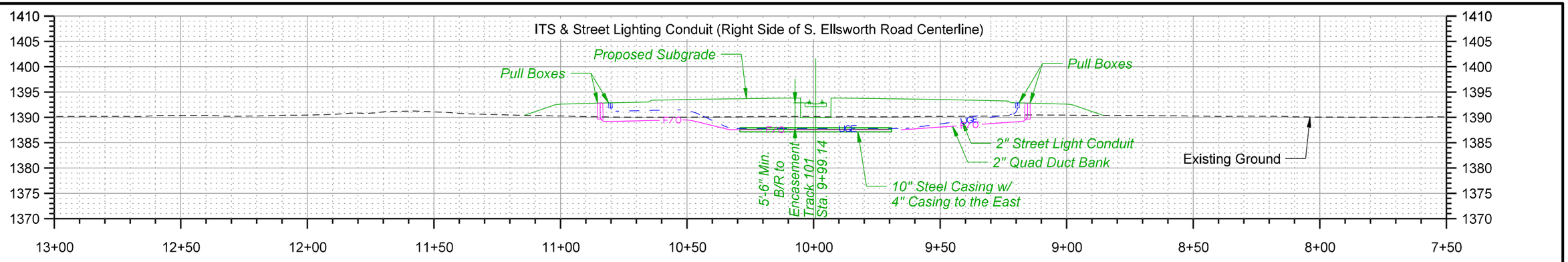
DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	U015 of 030

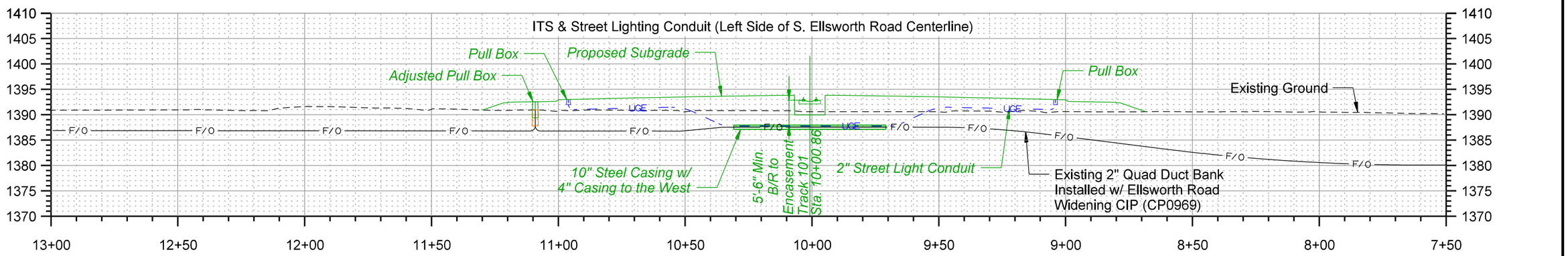
UNION PACIFIC RAILROAD — Sheet 150 of 587

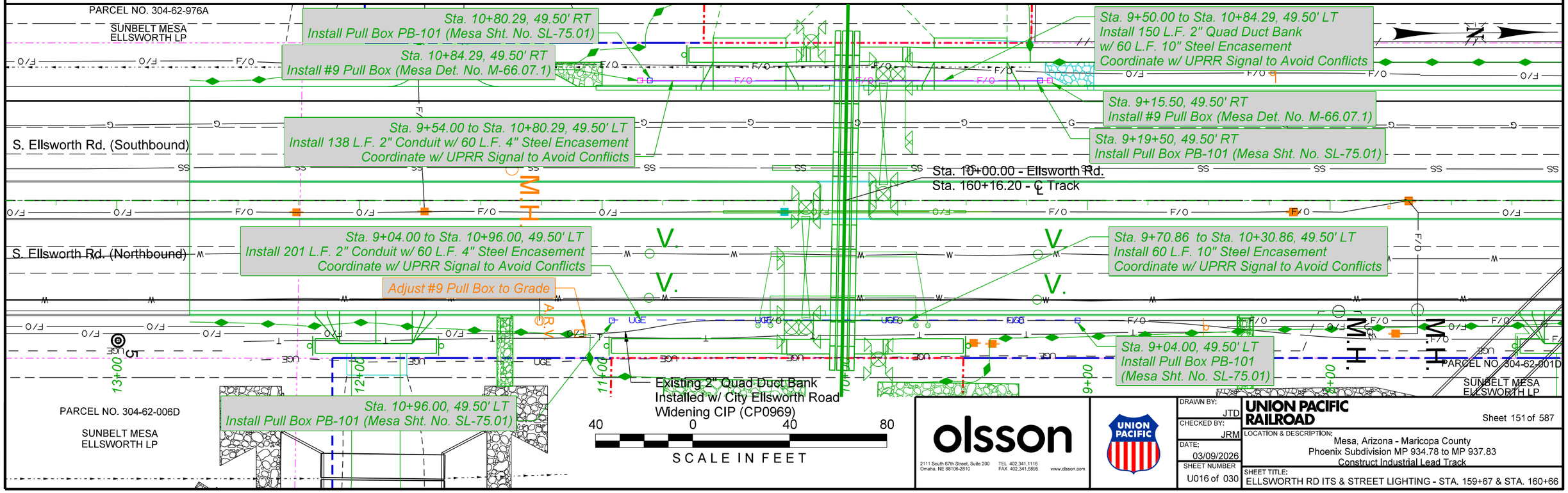
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SOSSAMAN ROAD 16" WATER MAIN - STA. 43+00

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Utilities\T_UT12_W_42+99_200927.dgn
Default
3/9/2026







olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: U016 of 030

UNION PACIFIC RAILROAD
Sheet 151 of 587
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track
SHEET TITLE:
ELLSWORTH RD ITS & STREET LIGHTING - STA. 159+67 & STA. 160+66

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Utilities\T_UT13_Street-ITS 159+67_200927.dgn
Default
3/9/2026

SANITARY SEWER NOTES:

1. UTILITY INSTALLATION, MATERIALS, AND TESTING SHALL COMPLY WITH MAG AND CITY OF MESA STANDARDS, SPECIFICATIONS, DETAILS, AND AMENDMENTS.
2. THE CONTRACTOR SHALL COORDINATE WITH CITY OF MESA FOR ALL UTILITY CONSTRUCTION PHASING, OUTAGES, TESTING, AND INSPECTIONS.
3. BACKFILL SHALL COMPLY WITH CITY OF MESA DETAIL M-19.04.
4. THE CONTRACTOR SHALL INSTALL TRACER WIRE AND IDENTIFICATION (I.D.) TAPE PER MAG DETAIL NO. 399.
5. THE CONTRACTOR SHALL MAINTAIN EXISTING SERVICE AND SUPPORT THE EXISTING UTILITY AS NECESSARY TO PRESERVE GRADES AND ELEVATIONS THROUGHOUT THE DURATION OF CONSTRUCTION. PRIOR TO CASING INSTALLATION, THE CONTRACTOR SHALL INSTALL SLINGS, CRIBBING, OR ADJUSTABLE SUPPORTS, WHICH SHALL CARRY THE FUL PIPE WEIGHT AND PREVENT DEFLECTION OR JOINT SEPARATION. COMPLETION OF WORK IS SUBJECT TO CITY INSPECTION AND, AS REQUIRED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY REMEDIATION TO THE SATISFACTION OF THE CITY.

INFORMATIONAL SUMMARY OF QUANTITIES:*

60 L.F. - 36" STEEL CASING
70 L.F. - RESTRAINED JOINTS (ALONG EXISTING)
1 EA. - ADJUST MANHOLE
MOBILIZATION
EXCAVATION AND BACKFILL
TEMPORARY SHORING AS REQUIRED
TRAFFIC CONTROL
ONE-YEAR MAINTENANCE BOND

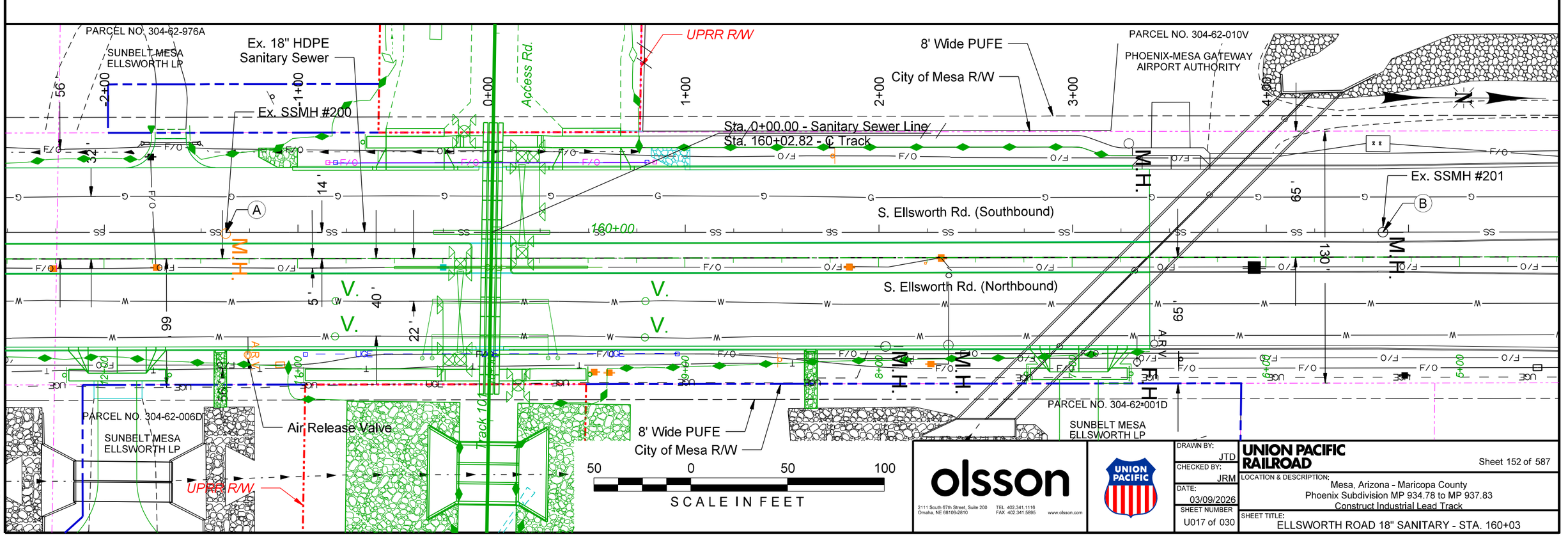
*THE QUANTITIES SHOWN ABOVE ARE FOR INFORMATIONAL PURPOSES ONLY AND MAY NOT INCLUDE ALL ITEMS, LABOR, AND INCIDENTALS REQUIRED TO COMPLETE THE WORK AS SHOWN.

	CARRIER PIPE	CASING PIPE
CONTENT TO BE HANDLED	SANITARY SEWER	-
NOMINAL DIAMETER	18"	36"
PIPE MATERIAL	HDPE	STEEL
SPECIFICATION AND GRADE	-	ASTM A53
WALL THICKNESS	-	0.5625"
ACTUAL WORKING PRESSURE	NA	NA
MIN. TENSILE STRENGTH	-	35,000 PSI
TYPE OF JOINT	-	WELDED PER AWS D1.1
COATING	-	NA
METHOD OF INSTALLATION	PROTECT EXISTING	OPEN CUT
SEALS: BOTH ENDS TYPE: RUBBER W/ S.S. BANDS		
BURY: BASE OF RAIL TO TOP OF CASING: 21 FT. 1 IN.		
BURY: 3 FT. 0 IN. MIN. (ROADWAY DITCHES)		
BURY: 3 FT. 0 IN. MIN. (NOT BENEATH TRACKS)		
TYPE, SIZE & SPACING OF INSULATORS OR SUPPORTS: SEE PROJECT SPECS.		
DISTANCE C.L. TRACK TO FACE OF JACKING/RECEIVING PITS FT. IN. NA		
BURY: BASE OF RAIL TO BOTTOM JACKING/RECEIVING PITS FT. IN. NA		
CATHODIC PROTECTION? YES ☐ NO ☒		

Existing 18" Sanitary Alignment

Ⓐ Manhole Center Sta. -1+37.34
S. Ellsworth Rd. Sta. 11+37.11 - 12.92' RT
N = 832882.10, E = 786194.84

Ⓑ Manhole Center Sta. 4+60.22
S. Ellsworth Rd. Sta. 5+39.55 - 12.81' RT
N = 833479.65, E = 786190.67



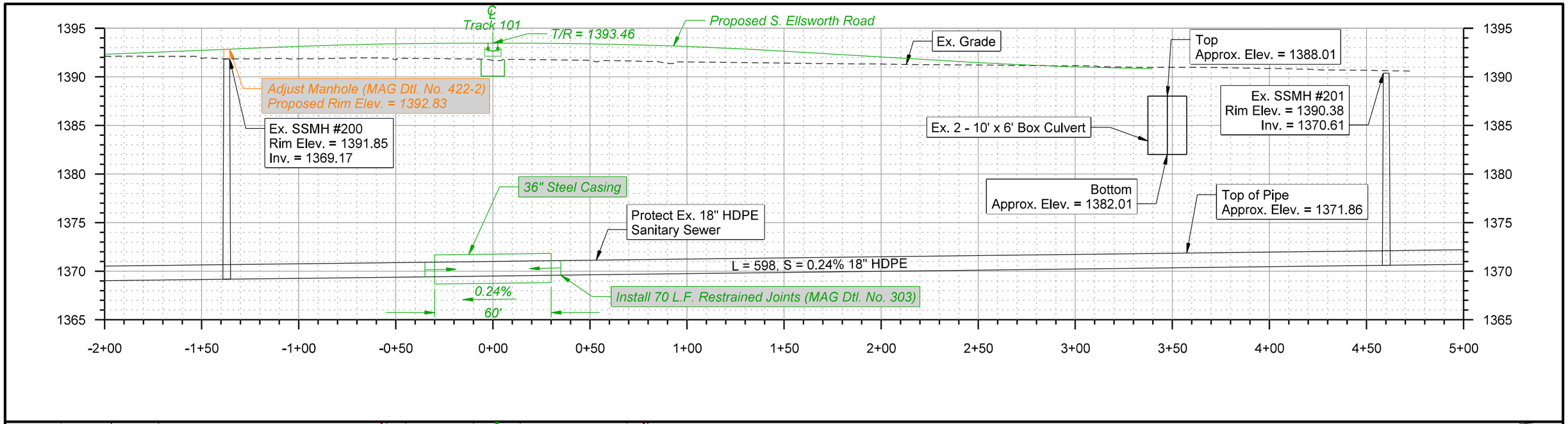
olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

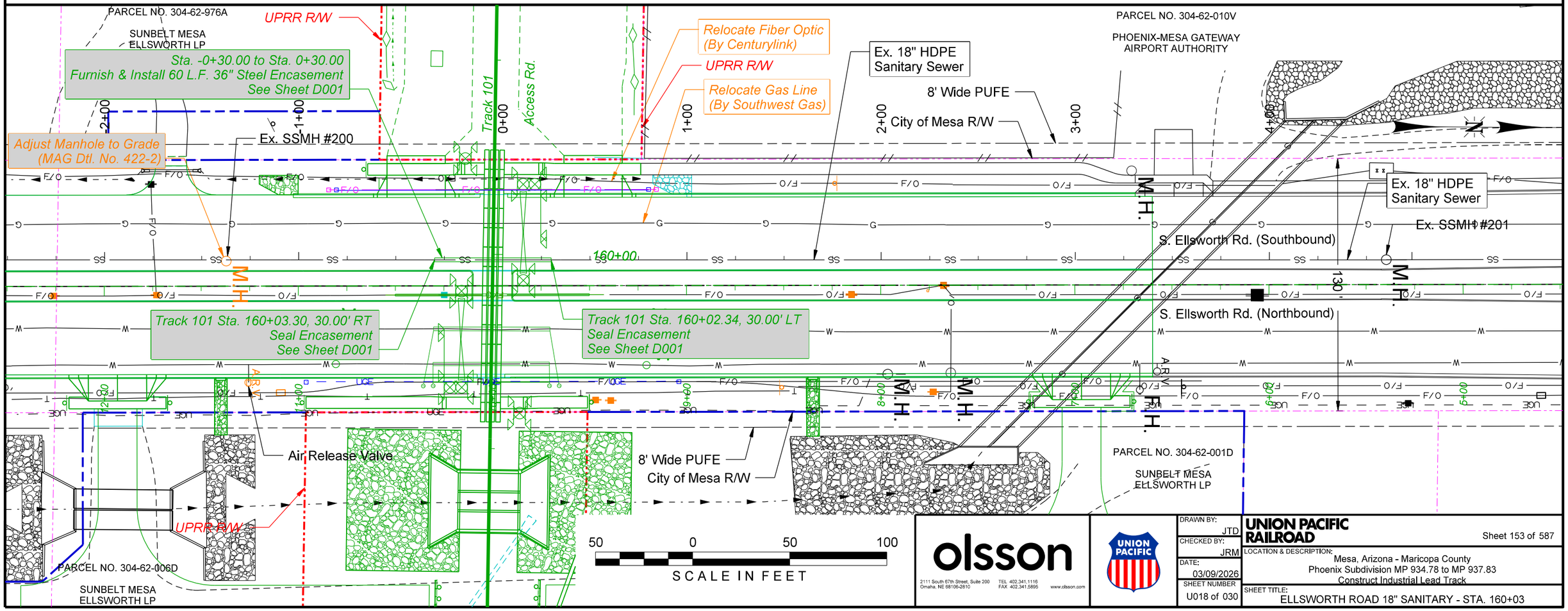
UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: U017 of 030

UNION PACIFIC RAILROAD
Sheet 152 of 587
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track
SHEET TITLE:
ELLSWORTH ROAD 18" SANITARY - STA. 160+03

Color tables: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Utilities\T_UT14_S 160+03_200927.dgn
Default
3/9/2026





olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: U018 of 030

UNION PACIFIC RAILROAD

Sheet 153 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
ELLSWORTH ROAD 18" SANITARY - STA. 160+03

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Utilities\TJT15_S 160+03.200927.dgn
Default
3/9/2026

PARCEL NO. 304-62-976A

SUNBELT MESA
ELLSWORTH LP

PARCEL NO. 304-62-010V

PHOENIX-MESA GATEWAY
AIRPORT AUTHORITY

PARCEL NO. 304-62-006D

SUNBELT MESA
ELLSWORTH LP

PARCEL NO. 304-62-001D

SUNBELT MESA
ELLSWORTH LP

PARCEL NO. 304-62-003L

PHOENIX-MESA GATEWAY
AIRPORT AUTHORITY

UPRR R/W

UPRR R/W

135'

Track 101

55+00

Remove Pull Box

Relocate COM E-Streets Fiber
See Sheet U020

Agjust Pull Box to Grade

Existing COM E-Streets Fiber

Agjust Pull Box to Grade

Fiber Upper

City of Mesa R/W

8' Wide PUFE

130'

58'

32'

18+00

17+00

16+00

15+00

14+00

13+00

12+00

11+00

10+00

9+00

8+00

7+00

6+00

5+00

4+00

3+00

160+00

Relocate Fiber Optic
(By Centurylink)

Agjust Pull Box to Grade

Agjust Pull Box to Grade

Fiber Upper

S. Ellsworth Rd. (Southbound)

S. Ellsworth Rd. (Northbound)

-2+00

36'

22'

0+00

1+00

54'

City of Mesa R/W

8' Wide PUFE

C.B.

C.B.

Agjust Pull Box to Grade

Agjust Pull Box to Grade

Agjust Pull Box to Grade

Agjust Pull Box to Grade

PS
162+46.32

PSC
162+79.32

145'

UPRR R/W

UPRR R/W

100 0 100 200

SCALE IN FEET

olsson

2111 South 67th Street, Suite 200
Omaha, NE 68106-2810

TEL 402.341.1116
FAX 402.341.5895

www.olsson.com

UNION PACIFIC

DRAWN BY: MHD
CHECKED BY: chk
DATE: 03/09/2026
SHEET NUMBER: U019 of 030

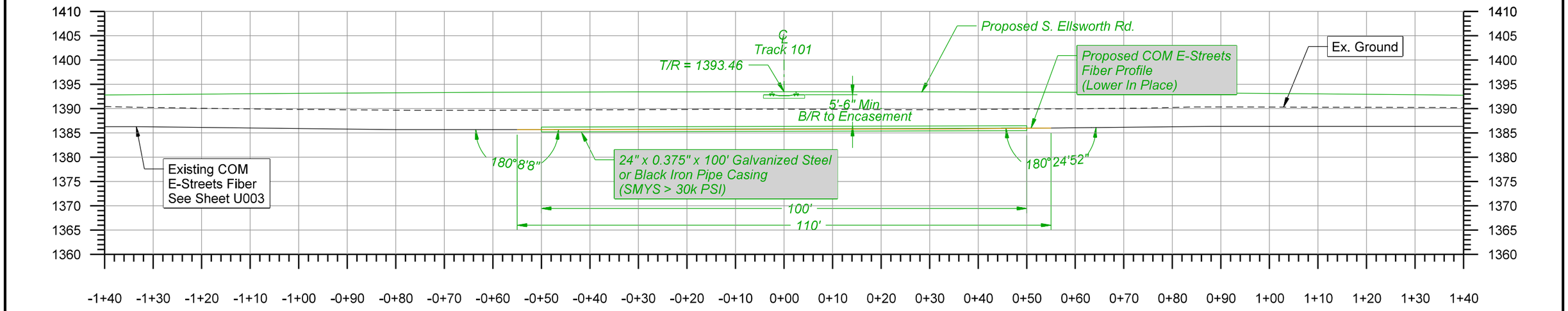
UNION PACIFIC RAILROAD

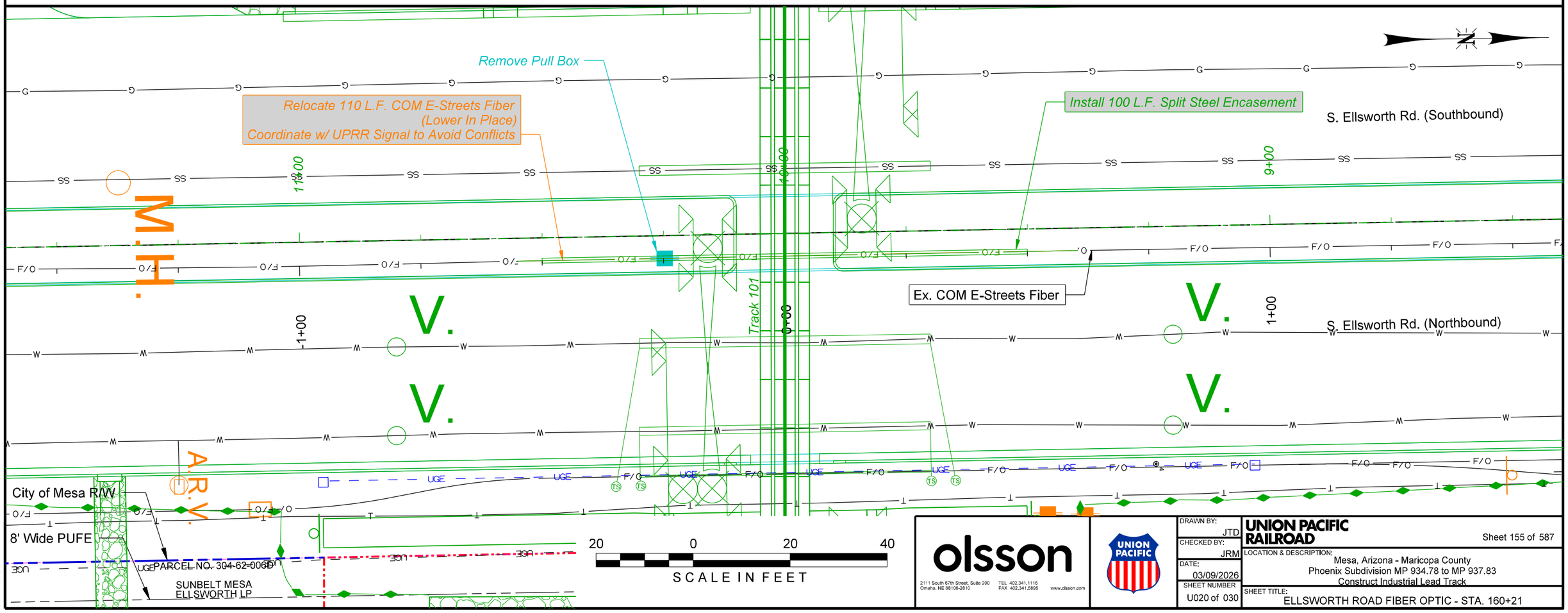
Sheet 154 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
ELLSWORTH ROAD FIBER OPTIC - STA. 160+21

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Utilities\T_UT16_FO 160+21_200927.dgn
Default
3/9/2026





olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	U020 of 030

UNION PACIFIC RAILROAD Sheet 155 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
ELLSWORTH ROAD FIBER OPTIC - STA. 160+21

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Utilities\T_UT17_F0 160+21_200927.dgn
Default
3/9/2026

WATER MAIN NOTES:

1. UTILITY INSTALLATION, MATERIALS, AND TESTING SHALL COMPLY WITH MAG AND CITY OF MESA STANDARDS, SPECIFICATIONS, DETAILS, AND AMENDMENTS.
2. THE CONTRACTOR SHALL COORDINATE WITH CITY OF MESA FOR ALL UTILITY CONSTRUCTION PHASING, OUTAGES, TESTING, AND INSPECTIONS.
3. THE CONTRACTOR SHALL BUILD TEMPORARY SEDIMENT BASINS AND EROSION MAT FOR DISCHARGE DURING FLUSHING AS NECESSARY TO MINIMIZE EROSION AND TO PREVENT DISCHARGE OF SEDIMENT OFF SITE (INCIDENTAL). AS AN ALTERNATE TO THE TEMPORARY SEDIMENT BASIN THE CONTRACTOR MAY DISCHARGE INTO AN EXISTING DRAINAGEWAY OR DITCH WITH ESTABLISHED VEGETATION AS APPROVED BY THE CITY OF MESA.
4. BACKFILL SHALL COMPLY WITH CITY OF MESA DETAIL M-19.04.
5. THE CONTRACTOR SHALL INSTALL TRACER WIRE AND IDENTIFICATION (I.D.) TAPE PER MAG DETAIL NO. 399.
6. THE CONTRACTOR SHALL MAINTAIN EXISTING SERVICE AND SUPPORT THE EXISTING UTILITY AS NECESSARY TO PRESERVE GRADES AND ELEVATIONS THROUGHOUT THE DURATION OF CONSTRUCTION. PRIOR TO CASING INSTALLATION, THE CONTRACTOR SHALL INSTALL SLINGS, CRIBBING, OR ADJUSTABLE SUPPORTS, WHICH SHALL CARRY THE FUL PIPE WEIGHT AND PREVENT DEFLECTION OR JOINT SEPARATION. COMPLETION OF WORK IS SUBJECT TO CITY INSPECTION AND, AS REQUIRED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY REMEDIATION TO THE SATISFACTION OF THE CITY.

INFORMATIONAL SUMMARY OF QUANTITIES:*

60 L.F. - 42" STEEL CASING
70 L.F. - RESTRAINED JOINTS (ALONG EXISTING)
2 EA. - GATE VALVE W/ BLOCKING
CATHODIC PROTECTION
MOBILIZATION
EXCAVATION AND BACKFILL
TEMPORARY SHORING AS REQUIRED
TRAFFIC CONTROL
ONE-YEAR MAINTENANCE BOND

*THE QUANTITIES SHOWN ABOVE ARE FOR INFORMATIONAL PURPOSES ONLY AND MAY NOT INCLUDE ALL ITEMS, LABOR, AND INCIDENTALS REQUIRED TO COMPLETE THE WORK AS SHOWN.

	CARRIER PIPE	CASING PIPE
CONTENT TO BE HANDLED	POTABLE WATER	-
NOMINAL DIAMETER	20"	42"
PIPE MATERIAL	DUCTILE IRON PIPE	STEEL
SPECIFICATION AND GRADE	CL250 DIP	ASTM A53
WALL THICKNESS	-	0.5625"
ACTUAL WORKING PRESSURE	UNKNOWN	NA
PRESSURE RATING	250 PSI	NA
MIN. TENSILE STRENGTH	-	35,000 PSI
TYPE OF JOINT	-	WELDED PER AWS D1.1
COATING	N/A	NA
METHOD OF INSTALLATION	PROTECT EXISTING	OPEN CUT
SEALS: BOTH ENDS TYPE: RUBBER W/ S.S. BANDS		
BURY: BASE OF RAIL TO TOP OF CASING: 9 FT. 5 IN.		
BURY: 4 FT. 0 IN. MIN. (ROADWAY DITCHES)		
BURY: 4 FT. 0 IN. MIN. (NOT BENEATH TRACKS)		
TYPE, SIZE & SPACING OF INSULATORS OR SUPPORTS: SEE PROJECT SPECS.		
DISTANCE C.L. TRACK TO FACE OF JACKING/RECEIVING PITS FT. IN. NA		
BURY: BASE OF RAIL TO BOTTOM JACKING/RECEIVING PITS FT. IN. NA		
CATHODIC PROTECTION? YES ☒ NO ☐		

Existing 20" Water Main Alignment

Ⓐ POB Sta. -1+11.84
S. Ellsworth Rd. Sta. 11+12.22 - 22.06' LT
N = 832907.24, E = 786229.65

Ⓑ PI Sta. -0+81.26
S. Ellsworth Rd. Sta. 10+81.65 - 21.90' LT
N = 832937.81, E = 786229.26

Ⓒ PI Sta. -0+55.06
S. Ellsworth Rd. Sta. 10+55.45 - 22.16' LT
N = 832964.01, E = 786229.34

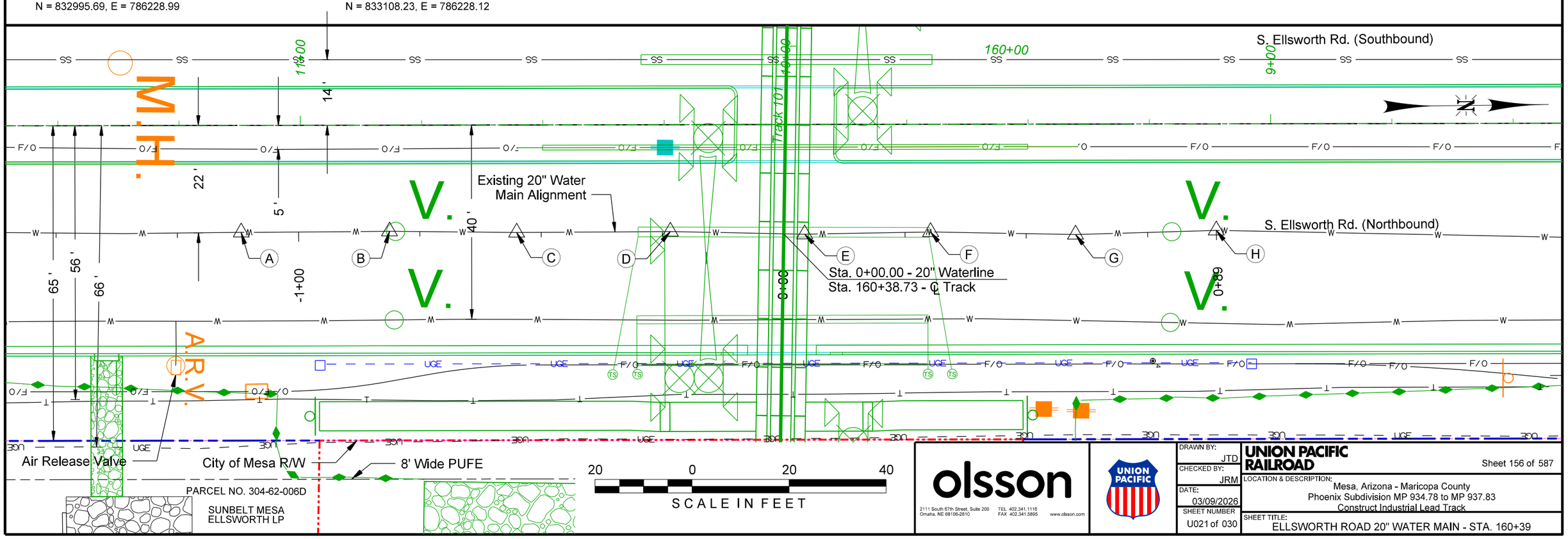
Ⓓ PI Sta. -0+23.38
S. Ellsworth Rd. Sta. 10+23.77 - 22.04' LT
N = 832995.69, E = 786228.99

Ⓔ PI Sta. 0+04.31
S. Ellsworth Rd. Sta. 9+96.09 -22.62' LT
N = 833023.38, E = 786229.37

Ⓕ PI Sta. 0+30.27
S. Ellsworth Rd. Sta. 9+70.13 - 22.20' LT
N = 833049.33, E = 786228.77

Ⓖ PI Sta. 0+60.16
S. Ellsworth Rd. Sta. 9+40.24 - 22.77' LT
N = 833079.22, E = 786229.13

Ⓗ EOT Sta. 0+89.19
S. Ellsworth Rd. Sta. 9+11.23 - 21.97' LT
N = 833108.23, E = 786228.12



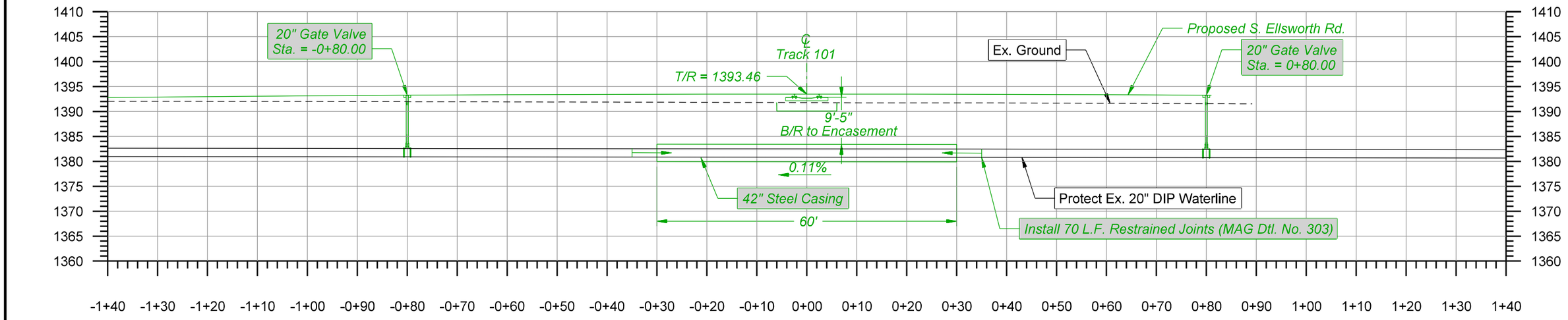
olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

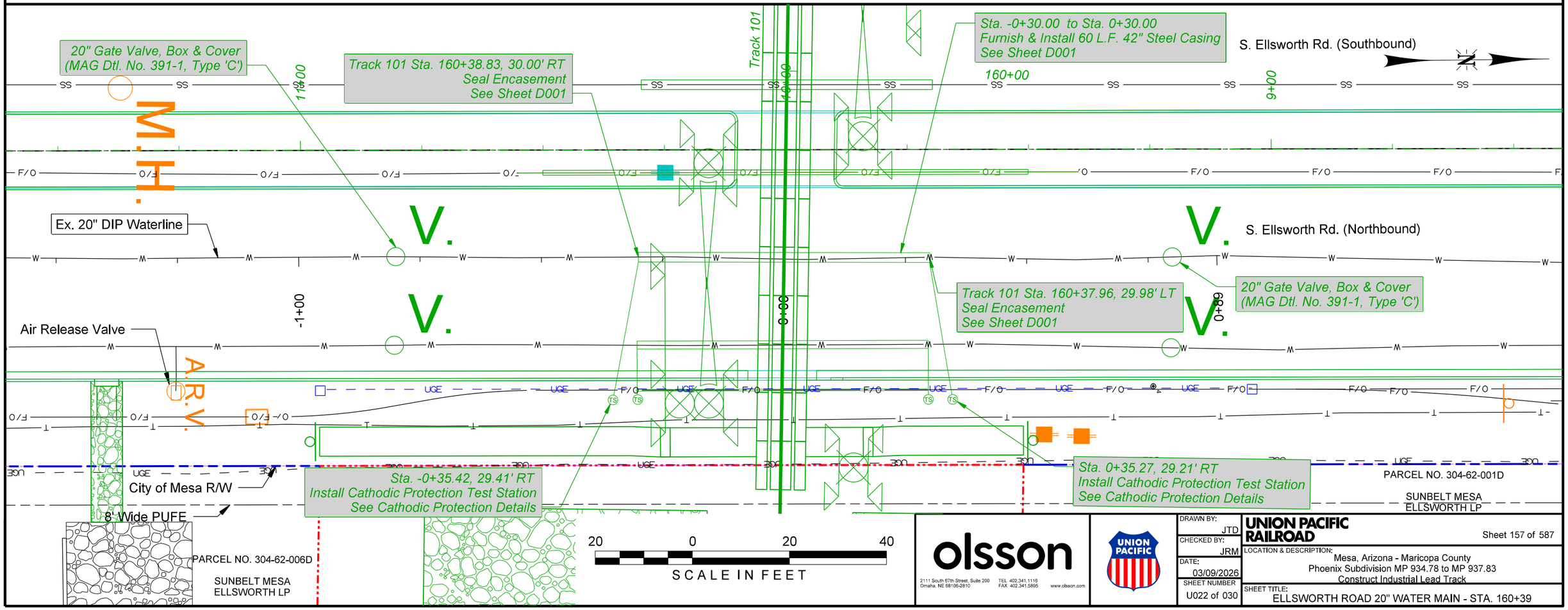
UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: U021 of 030

UNION PACIFIC RAILROAD
Sheet 156 of 587
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track
SHEET TITLE:
ELLSWORTH ROAD 20" WATER MAIN - STA. 160+39

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04.Utilities\T_UT18_w 160+38_200927.dgn
Default
3/9/2026





olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: U022 of 030

UNION PACIFIC RAILROAD
Sheet 157 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
ELLSWORTH ROAD 20" WATER MAIN - STA. 160+39

Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Utilities\T_UT19_w 160+38_200927.dgn
Default
3/9/2026

WATER MAIN NOTES:

1. UTILITY INSTALLATION, MATERIALS, AND TESTING SHALL COMPLY WITH MAG AND CITY OF MESA STANDARDS, SPECIFICATIONS, DETAILS, AND AMENDMENTS.
2. THE CONTRACTOR SHALL COORDINATE WITH CITY OF MESA FOR ALL UTILITY CONSTRUCTION PHASING, OUTAGES, TESTING, AND INSPECTIONS.
3. THE CONTRACTOR SHALL BUILD TEMPORARY SEDIMENT BASINS AND EROSION MAT FOR DISCHARGE DURING FLUSHING AS NECESSARY TO MINIMIZE EROSION AND TO PREVENT DISCHARGE OF SEDIMENT OFF SITE (INCIDENTAL). AS AN ALTERNATE TO THE TEMPORARY SEDIMENT BASIN THE CONTRACTOR MAY DISCHARGE INTO AN EXISTING DRAINAGEWAY OR DITCH WITH ESTABLISHED VEGETATION AS APPROVED BY THE CITY OF MESA.
4. BACKFILL SHALL COMPLY WITH CITY OF MESA DETAIL M-19.04.
5. THE CONTRACTOR SHALL INSTALL TRACER WIRE AND IDENTIFICATION (I.D.) TAPE PER MAG DETAIL NO. 399.
6. THE CONTRACTOR SHALL MAINTAIN EXISTING SERVICE AND SUPPORT THE EXISTING UTILITY AS NECESSARY TO PRESERVE GRADES AND ELEVATIONS THROUGHOUT THE DURATION OF CONSTRUCTION. PRIOR TO CASING INSTALLATION, THE CONTRACTOR SHALL INSTALL SLINGS, CRIBBING, OR ADJUSTABLE SUPPORTS, WHICH SHALL CARRY THE FUL PIPE WEIGHT AND PREVENT DEFLECTION OR JOINT SEPARATION. COMPLETION OF WORK IS SUBJECT TO CITY INSPECTION AND, AS REQUIRED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY REMEDIATION TO THE SATISFACTION OF THE CITY.

INFORMATIONAL SUMMARY OF QUANTITIES:*

60 L.F. - 36" STEEL CASING
70 L.F. - RESTRAINED JOINTS (ALONG EXISTING)
2 EA. - GATE VALVE W/ BLOCKING
1 EA. - RELOCATE AIR RELEASE VALVE & MARKER
CATHODIC PROTECTION
MOBILIZATION
EXCAVATION AND BACKFILL
TEMPORARY SHORING AS REQUIRED
TRAFFIC CONTROL
ONE-YEAR MAINTENANCE BOND

*THE QUANTITIES SHOWN ABOVE ARE FOR INFORMATIONAL PURPOSES ONLY AND MAY NOT INCLUDE ALL ITEMS, LABOR, AND INCIDENTALS REQUIRED TO COMPLETE THE WORK AS SHOWN.

	CARRIER PIPE	CASING PIPE
CONTENT TO BE HANDLED	POTABLE WATER	-
NOMINAL DIAMETER	16"	36"
PIPE MATERIAL	DUCTILE IRON PIPE	STEEL
SPECIFICATION AND GRADE	CL250 DIP	ASTM A53
WALL THICKNESS	-	0.5625"
ACTUAL WORKING PRESSURE	UNKNOWN	NA
PRESSURE RATING	250 PSI	NA
MIN. TENSILE STRENGTH	-	35,000 PSI
TYPE OF JOINT	-	WELDED PER AWS D1.1
COATING	NA	NA
METHOD OF INSTALLATION	PROTECT EXISTING	OPEN CUT
SEALS: BOTH ENDS TYPE: RUBBER W/ S.S. BANDS		
BURY: BASE OF RAIL TO TOP OF CASING: 5 FT. 2 IN.		
BURY: 4 FT. 0 IN. MIN. (ROADWAY DITCHES)		
BURY: 4 FT. 0 IN. MIN. (NOT BENEATH TRACKS)		
TYPE, SIZE & SPACING OF INSULATORS OR SUPPORTS: SEE PROJECT SPECS.		
DISTANCE C.L. TRACK TO FACE OF JACKING/RECEIVING PITS FT. IN. NA		
BURY: BASE OF RAIL TO BOTTOM JACKING/RECEIVING PITS FT. IN. NA		
CATHODIC PROTECTION? YES ☒ NO ☐		

Existing 16" Water Main Alignment

Ⓐ POB Sta. -1+17.81
S. Ellsworth Rd. Sta. 11+18.51 - 40.37' LT
N = 832901.08, E = 786248.00

Ⓑ PI Sta. -0+95.46
S. Ellsworth Rd. Sta. 10+96.16 - 40.31' LT
N = 832923.43, E = 786247.78

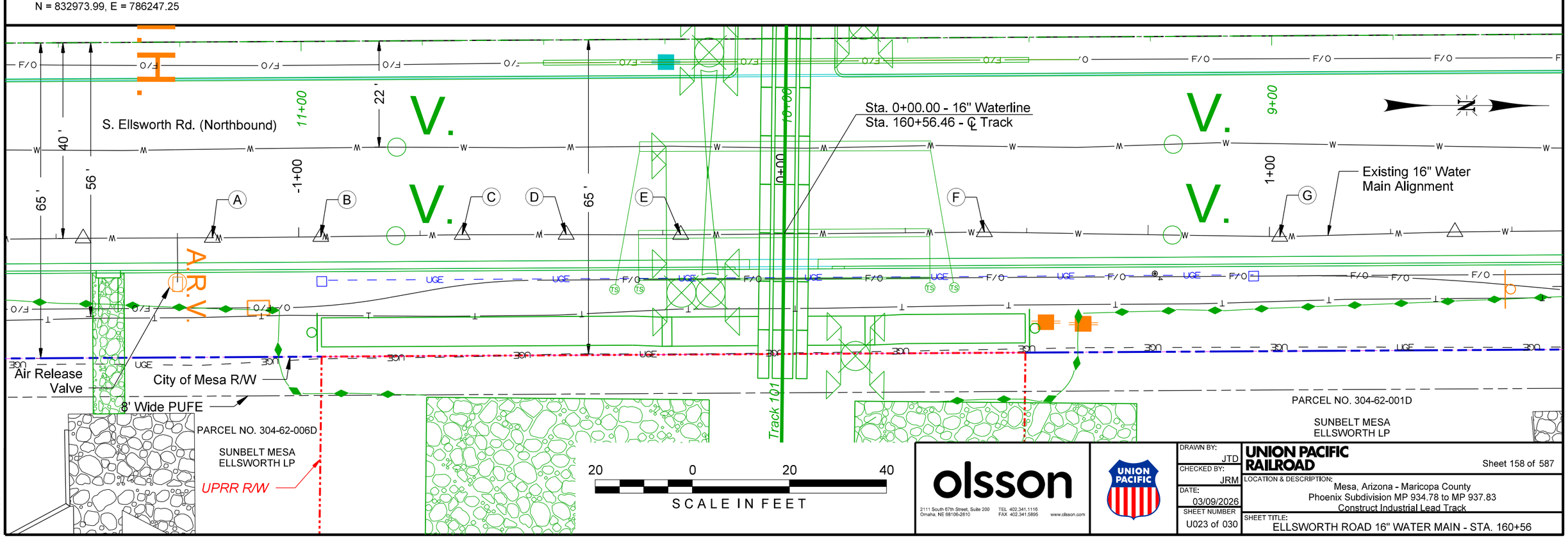
Ⓒ PI Sta. -0+66.32
S. Ellsworth Rd. Sta. 10+67.02 - 40.04' LT
N = 832952.57, E = 786247.30

Ⓓ PI Sta. -0+44.89
S. Ellsworth Rd. Sta. 10+45.59 - 40.14' LT
N = 832973.99, E = 786247.25

Ⓔ PI Sta. -0+21.29
S. Ellsworth Rd. Sta. 10+22.00 - 40.32' LT
N = 832997.59, E = 786247.26

Ⓕ PI Sta. 0+41.27
S. Ellsworth Rd. Sta. 9+59.44 - 40.12' LT
N = 833060.15, E = 786246.61

Ⓖ POE Sta. 1+02.14
S. Ellsworth Rd. Sta. 8+98.57 - 41.40' LT
N = 833121.02, E = 786247.46

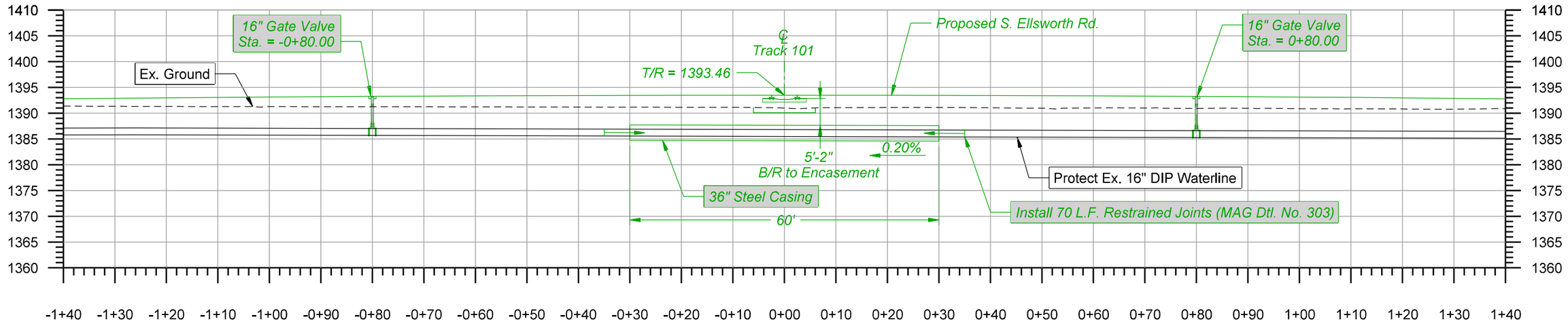


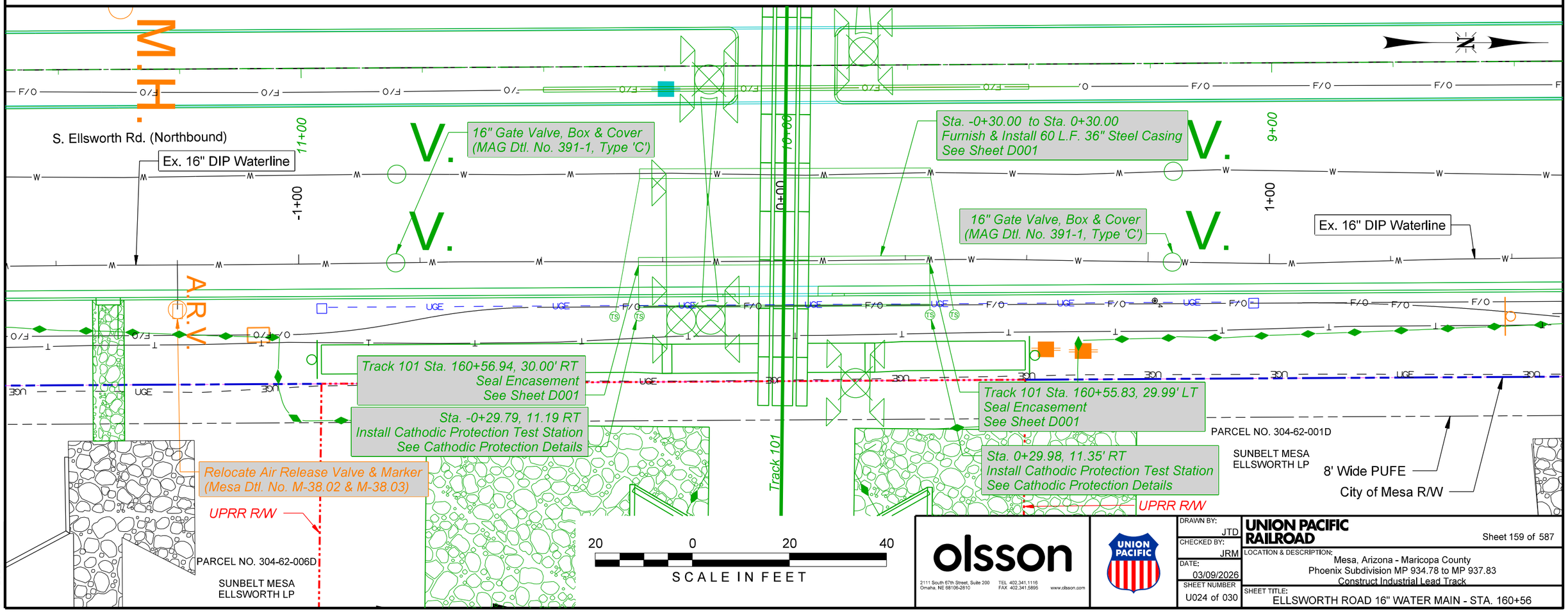
olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: U023 of 030

UNION PACIFIC RAILROAD
Sheet 158 of 587
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track
SHEET TITLE:
ELLSWORTH ROAD 16" WATER MAIN - STA. 160+56

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04.Utilities\T_UT20_w 160+56_200927.dgn
Default
3/9/2026





olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	U024 of 030

UNION PACIFIC RAILROAD — Sheet 159 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
ELLSWORTH ROAD 16" WATER MAIN - STA. 160+56

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Utilities\T_UT21.w 160+56_200927.dgn
Default
3/9/2026

WATER MAIN NOTES:

1. UTILITY INSTALLATION, MATERIALS, AND TESTING SHALL COMPLY WITH MAG AND CITY OF MESA STANDARDS, SPECIFICATIONS, DETAILS, AND AMENDMENTS.
2. THE CONTRACTOR SHALL COORDINATE WITH CITY OF MESA FOR ALL UTILITY CONSTRUCTION PHASING, OUTAGES, TESTING, AND INSPECTIONS.
3. THE CONTRACTOR SHALL BUILD TEMPORARY SEDIMENT BASINS AND EROSION MAT FOR DISCHARGE DURING FLUSHING AS NECESSARY TO MINIMIZE EROSION AND TO PREVENT DISCHARGE OF SEDIMENT OFF SITE (INCIDENTAL). AS AN ALTERNATE TO THE TEMPORARY SEDIMENT BASIN THE CONTRACTOR MAY DISCHARGE INTO AN EXISTING DRAINAGEWAY OR DITCH WITH ESTABLISHED VEGETATION AS APPROVED BY THE CITY OF MESA.
4. BACKFILL SHALL COMPLY WITH CITY OF MESA DETAIL M-19.04.
5. THE CONTRACTOR SHALL INSTALL TRACER WIRE AND IDENTIFICATION (I.D.) TAPE PER MAG DETAIL NO. 399.
6. THE CONTRACTOR SHALL MAINTAIN EXISTING SERVICE AND SUPPORT THE EXISTING UTILITY AS NECESSARY TO PRESERVE GRADES AND ELEVATIONS THROUGHOUT THE DURATION OF CONSTRUCTION. PRIOR TO CASING INSTALLATION, THE CONTRACTOR SHALL INSTALL SLINGS, CRIBBING, OR ADJUSTABLE SUPPORTS, WHICH SHALL CARRY THE FUL PIPE WEIGHT AND PREVENT DEFLECTION OR JOINT SEPARATION. COMPLETION OF WORK IS SUBJECT TO CITY INSPECTION AND, AS REQUIRED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY REMEDIATION TO THE SATISFACTION OF THE CITY.

INFORMATIONAL SUMMARY OF QUANTITIES:*

60 L.F. - 36" STEEL CASING
70 L.F. - RESTRAINED JOINTS (ALONG EXISTING)
1 EA. - GATE VALVE W/ BLOCKING
CATHODIC PROTECTION
MOBILIZATION
EXCAVATION AND BACKFILL
TEMPORARY SHORING AS REQUIRED
TRAFFIC CONTROL
ONE-YEAR MAINTENANCE BOND

*THE QUANTITIES SHOWN ABOVE ARE FOR INFORMATIONAL PURPOSES ONLY AND MAY NOT INCLUDE ALL ITEMS, LABOR, AND INCIDENTALS REQUIRED TO COMPLETE THE WORK AS SHOWN.

	CARRIER PIPE	CASING PIPE
CONTENT TO BE HANDLED	POTABLE WATER	-
NOMINAL DIAMETER	16"	36"
PIPE MATERIAL	DUCTILE IRON PIPE	STEEL
SPECIFICATION AND GRADE	CL350 DIP	ASTM A53
WALL THICKNESS	-	.5625"
ACTUAL WORKING PRESSURE	UNKNOWN	NA
PRESSURE RATING	250 PSI	NA
MIN. TENSILE STRENGTH	-	35,000 PSI
TYPE OF JOINT	-	WELDED PER AWS D1.1
COATING	NA	SEE PROJECT SPECS.
METHOD OF INSTALLATION	PROTECT EXISTING	OPEN CUT
SEALS: BOTH ENDS TYPE: RUBBER W/ S.S. BANDS		
BURY: BASE OF RAIL TO TOP OF CASING: 8 FT. 4 IN.		
BURY: 4 FT. 0 IN. MIN. (ROADWAY DITCHES)		
BURY: 4 FT. 0 IN. MIN. (NOT BENEATH TRACKS)		
TYPE, SIZE & SPACING OF INSULATORS OR SUPPORTS: SEE PROJECT SPECS.		
DISTANCE C.L. TRACK TO FACE OF JACKING/RECEIVING PITS FT. IN. NA		
BURY: BASE OF RAIL TO BOTTOM JACKING/RECEIVING PITS FT. IN. NA		
CATHODIC PROTECTION? YES ☒ NO ☐		

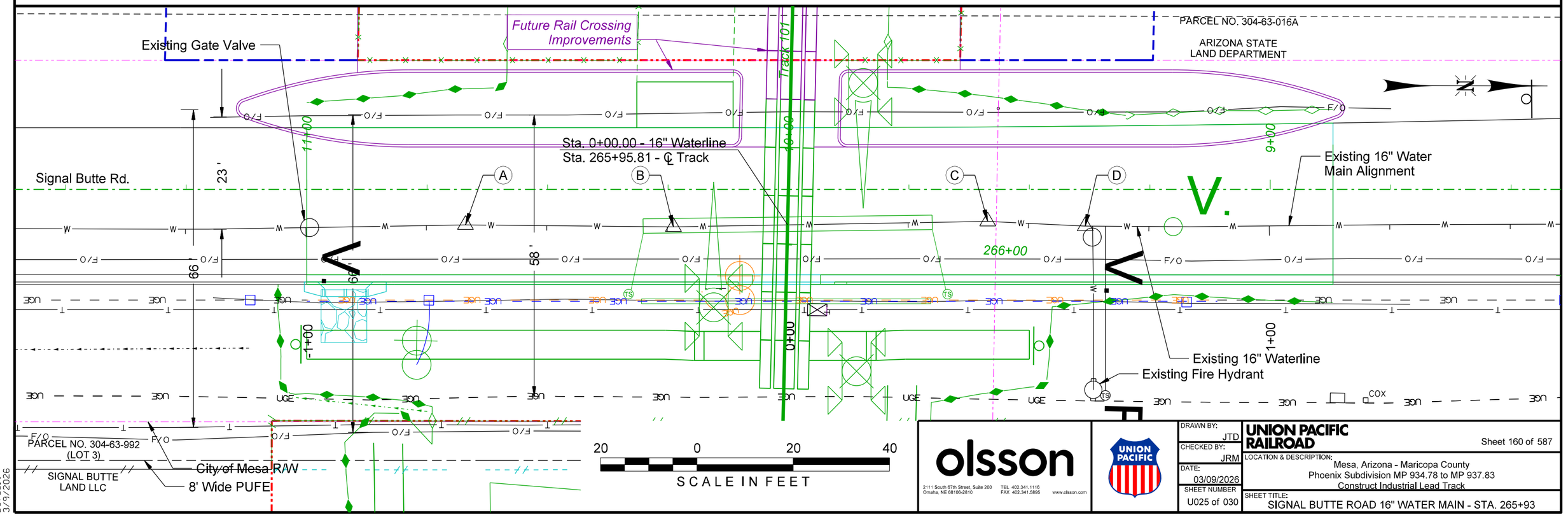
Existing 16" Water Main Alignment

Ⓐ PI Sta. -0+66.88
Signal Butte Rd. Sta. 10+67.04 - 7.38' LT
N=832577.34, E=796765.20

Ⓑ PI Sta. -0+23.71
Signal Butte Rd. Sta. 10+23.87 - 7.79' LT
N=832620.51, E=796765.02

Ⓒ PI Sta. 0+41.53
Signal Butte Rd. Sta. 9+58.64 - 6.66' LT
N=832685.72, E=796763.03

Ⓓ PI Sta. 0+61.78
Signal Butte Rd. Sta. 9+38.41 - 7.62' LT
N=832705.97, E=796763.72



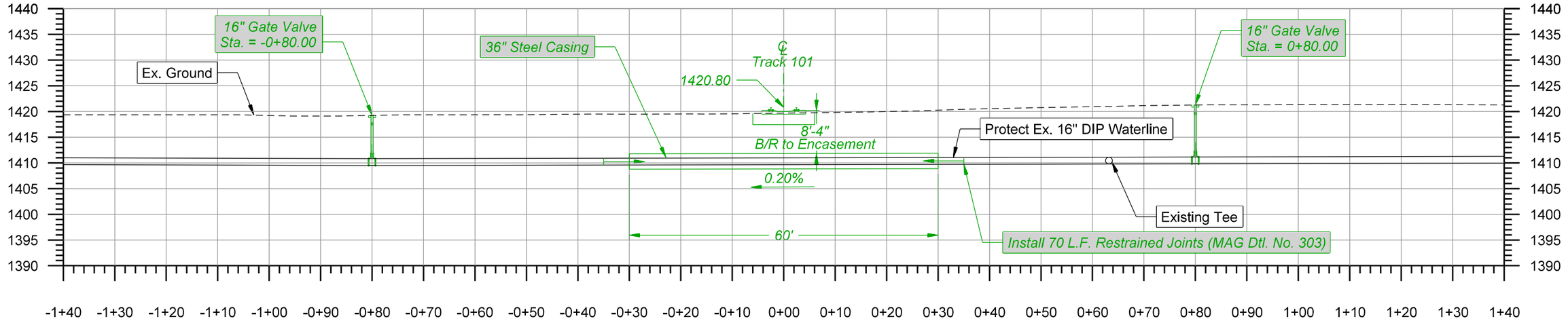
olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

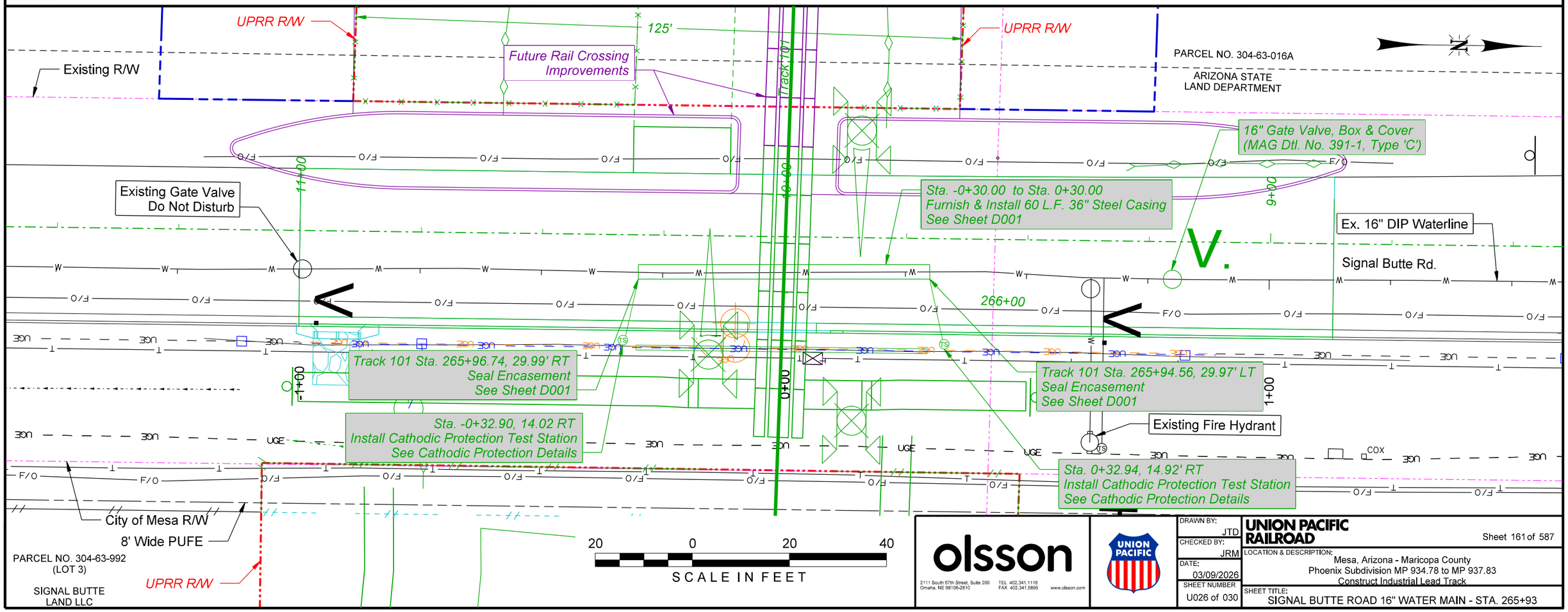
UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: U025 of 030

UNION PACIFIC RAILROAD
Sheet 160 of 587
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track
SHEET TITLE:
SIGNAL BUTTE ROAD 16" WATER MAIN - STA. 265+93

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04.Utilities\T_UT22_W 265+93.200927.dgn
Default
3/9/2026





olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

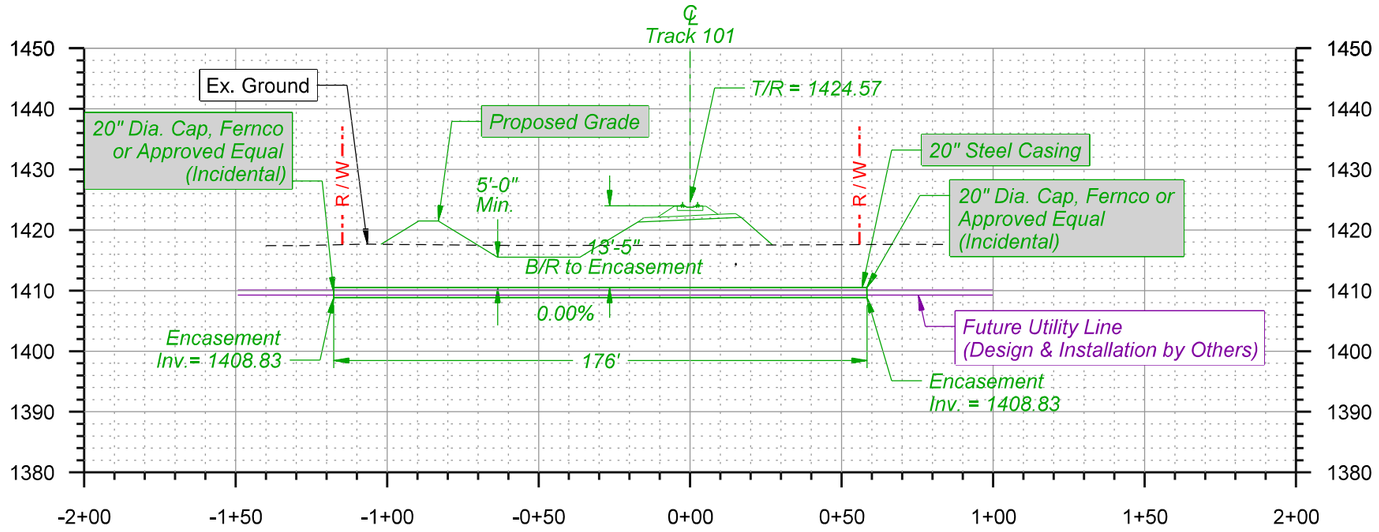
DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: U026 of 030

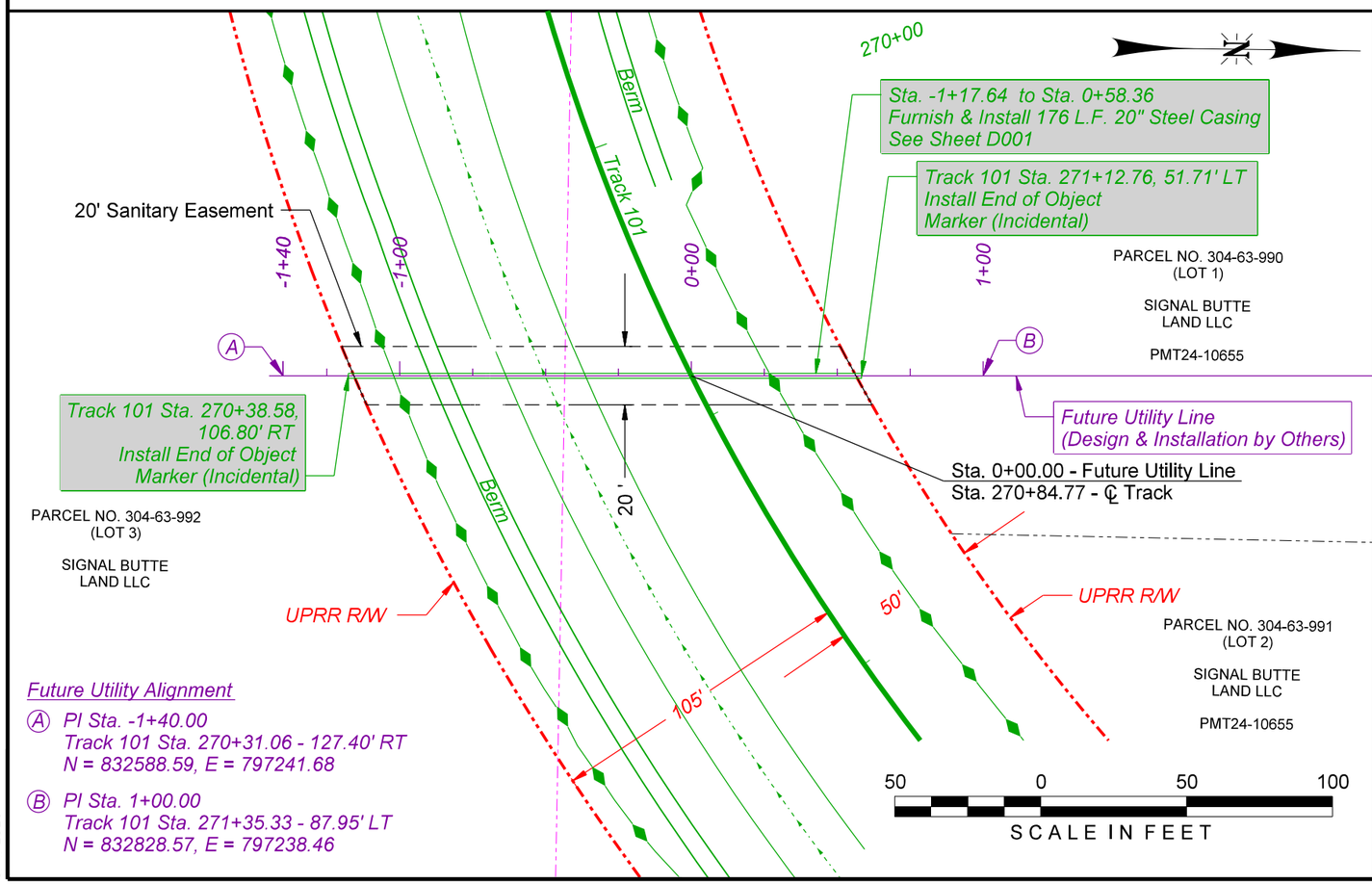
UNION PACIFIC RAILROAD Sheet 161 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SIGNAL BUTTE ROAD 16" WATER MAIN - STA. 265+93

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927.40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927.40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Utilities\T_UT23_W 265+93.200927.dgn
Default
3/9/2026





Future Utility Alignment

Ⓐ *PI Sta. -1+40.00*
Track 101 Sta. 270+31.06 - 127.40' RT
N = 832588.59, E = 797241.68

Ⓑ *PI Sta. 1+00.00*
Track 101 Sta. 271+35.33 - 87.95' LT
N = 832828.57, E = 797238.46

FUTURE UTILITY NOTES:

1. UTILITY INSTALLATION, MATERIALS, AND TESTING SHALL COMPLY WITH MAG AND CITY OF MESA STANDARDS, SPECIFICATIONS, DETAILS, AND AMENDMENTS.
2. THE CONTRACTOR SHALL COORDINATE WITH CITY OF MESA FOR ALL UTILITY CONSTRUCTION, TESTING, AND INSPECTIONS.
3. BACKFILL SHALL COMPLY WITH CITY OF MESA DETAIL M-19.04.
4. THE CONTRACTOR SHALL INSTALL TRACER WIRE AND IDENTIFICATION (I.D.) TAPE PER MAG DETAIL NO. 399.

INFORMATIONAL SUMMARY OF QUANTITIES:*

176 L.F. - 20" STEEL CASING
2 EA. - END CAP
MOBILIZATION
EXCAVATION AND BACKFILL
TEMPORARY SHORING AS REQUIRED
TEMPORARY BYPASS
TRAFFIC CONTROL
ONE-YEAR MAINTENANCE BOND

*THE QUANTITIES SHOWN ABOVE ARE FOR INFORMATIONAL PURPOSES ONLY AND MAY NOT INCLUDE ALL ITEMS, LABOR, AND INCIDENTALS REQUIRED TO COMPLETE THE WORK AS SHOWN.

	CARRIER PIPE	CASING PIPE
CONTENT TO BE HANDLED	FUTURE UTILITY	-
NOMINAL DIAMETER	UNKNOWN	20"
PIPE MATERIAL	UNKNOWN	STEEL
SPECIFICATION AND GRADE	UNKNOWN	ASTM A53
WALL THICKNESS	-	0.3750"
ACTUAL WORKING PRESSURE	UNKNOWN	NA
MIN. TENSILE STRENGTH	-	35,000 PSI
TYPE OF JOINT	-	WELDED PER AWS D1.1
COATING	NA	NA
METHOD OF INSTALLATION	-	OPEN CUT
SEALS: NA TYPE: NA		
BURY: BASE OF RAIL TO TOP OF CASING: 13 FT. 5 IN.		
BURY: 5 FT. 0 IN. MIN. (ROADWAY DITCHES)		
BURY: 3 FT. 0 IN. MIN. (NOT BENEATH TRACKS)		
TYPE, SIZE & SPACING OF INSULATORS OR SUPPORTS: SEE PROJECT SPECS.		
DISTANCE C.L. TRACK TO FACE OF JACKING/RECEIVING PITS FT. IN. NA		
BURY: BASE OF RAIL TO BOTTOM JACKING/RECEIVING PITS FT. IN. NA		
CATHODIC PROTECTION? YES ☐ NO ☒		

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

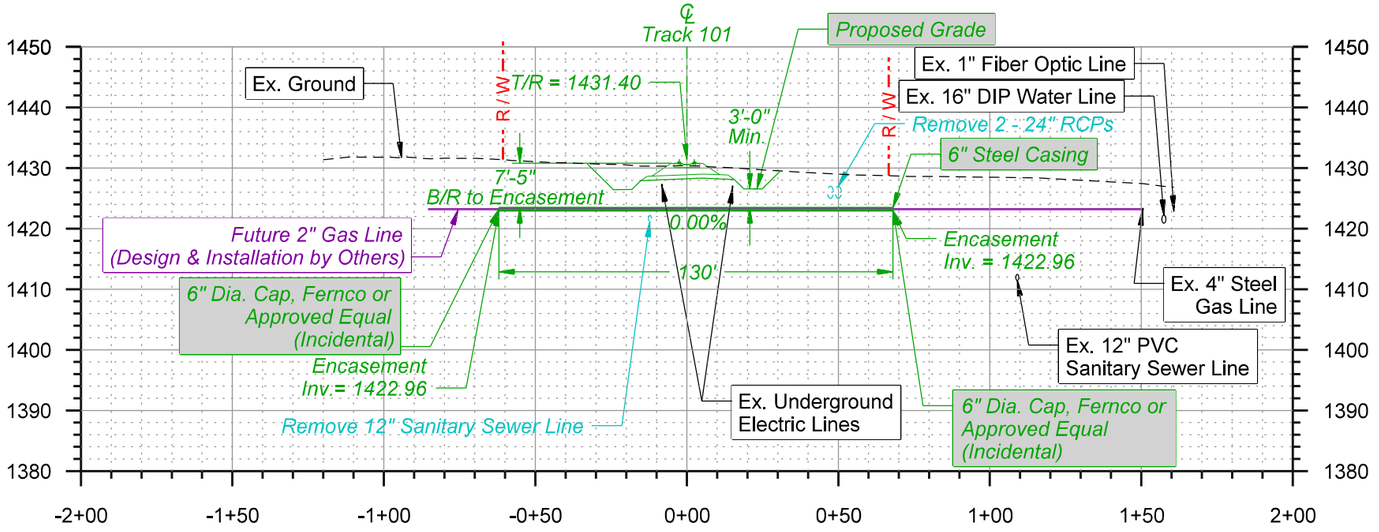
DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: U027 of 030

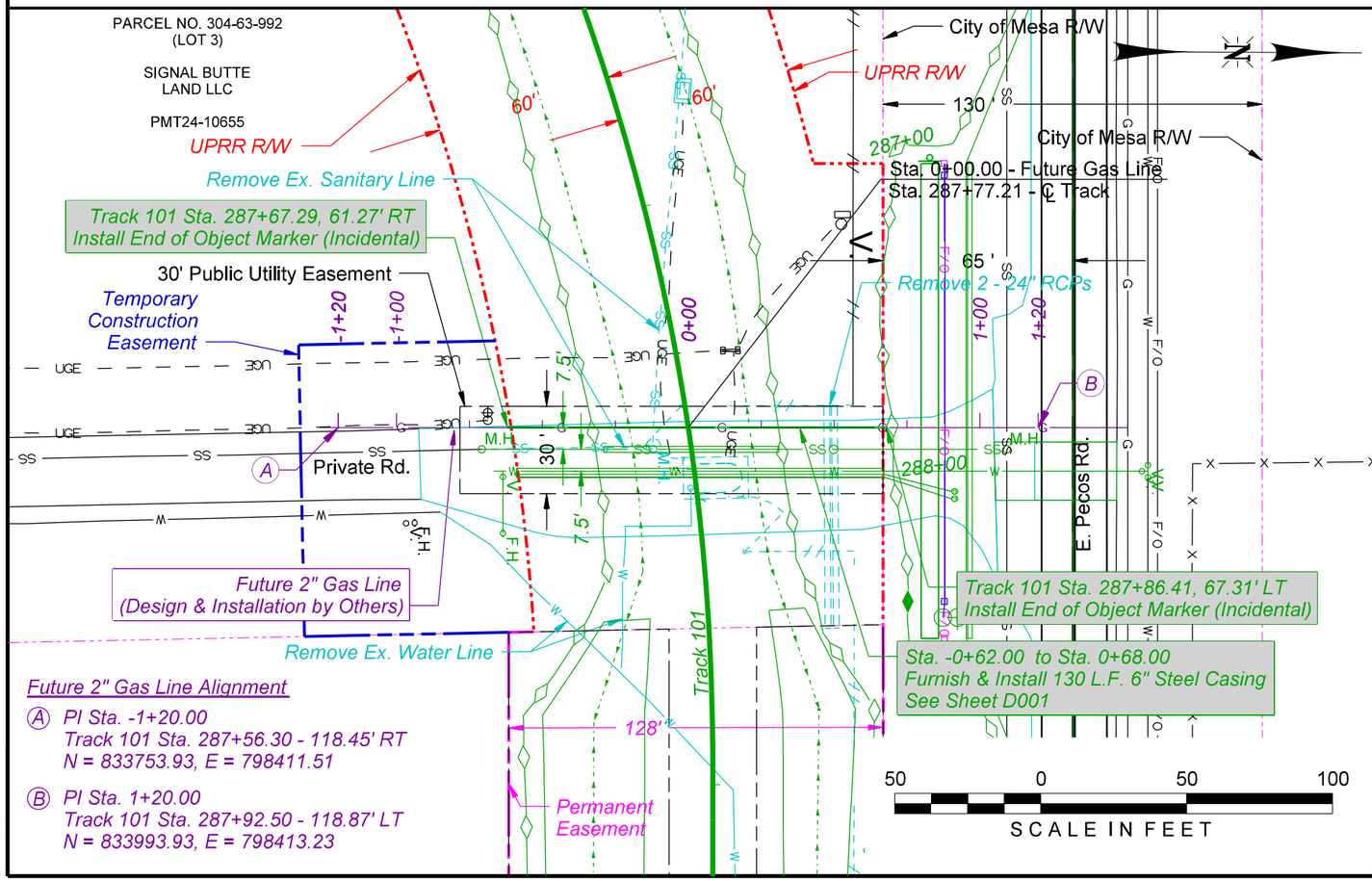
UNION PACIFIC RAILROAD
Sheet 162 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRAMMELL CROW FUTURE UTILITY - STA. 270+85

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Utilities\TJUT24_S 270+84_200927.dgn
Default
3/9/2026





SANITARY SEWER NOTES:

1. UTILITY INSTALLATION, MATERIALS, AND TESTING SHALL COMPLY WITH MAG AND CITY OF MESA STANDARDS, SPECIFICATIONS, DETAILS, AND AMENDMENTS.
2. THE CONTRACTOR SHALL COORDINATE WITH CITY OF MESA FOR ALL UTILITY CONSTRUCTION PHASING, OUTAGES, TESTING, AND INSPECTIONS.
3. BACKFILL SHALL COMPLY WITH CITY OF MESA DETAIL M-19.05.
4. THE CONTRACTOR SHALL INSTALL TRACER WIRE AND IDENTIFICATION (I.D.) TAPE PER MAG DETAIL NO. 399.

INFORMATIONAL SUMMARY OF QUANTITIES:*

130 L.F. - 6" STEEL CASING
2 EA. - END CAP
MOBILIZATION
EXCAVATION AND BACKFILL
TEMPORARY SHORING AS REQUIRED
TEMPORARY BYPASS
TRAFFIC CONTROL
ONE-YEAR MAINTENANCE BOND

*THE QUANTITIES SHOWN ABOVE ARE FOR INFORMATIONAL PURPOSES ONLY AND MAY NOT INCLUDE ALL ITEMS, LABOR, AND INCIDENTALS REQUIRED TO COMPLETE THE WORK AS SHOWN.

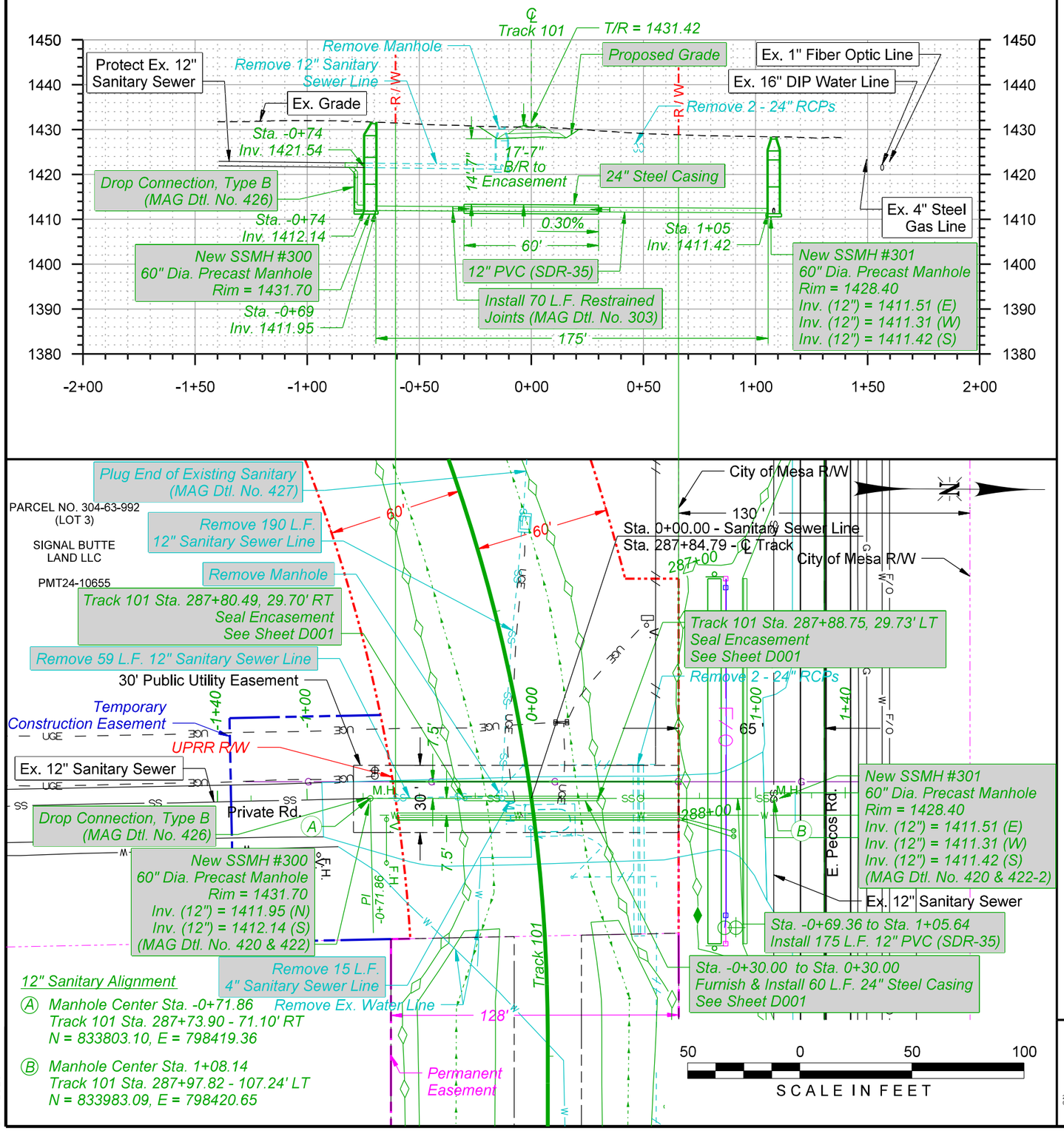
	CARRIER PIPE	CASING PIPE
CONTENT TO BE HANDLED	FUTURE GAS	-
NOMINAL DIAMETER	2"	6"
PIPE MATERIAL	UNKNOWN	STEEL
SPECIFICATION AND GRADE	UNKNOWN	ASTM A53
WALL THICKNESS	-	0.2500"
ACTUAL WORKING PRESSURE	UNKNOWN	NA
MIN. TENSILE STRENGTH	UNKNOWN	35,000 PSI
TYPE OF JOINT	-	WELDED PER AWS D1.1
COATING	NA	NA
METHOD OF INSTALLATION	-	OPEN CUT
SEALS: NA TYPE: NA		
BURY: BASE OF RAIL TO TOP OF CASING: 7 FT. 5 IN.		
BURY: 3 FT. 0 IN. MIN. (ROADWAY DITCHES)		
BURY: 3 FT. 0 IN. MIN. (NOT BENEATH TRACKS)		
TYPE, SIZE & SPACING OF INSULATORS OR SUPPORTS: SEE PROJECT SPECS.		
DISTANCE C.L. TRACK TO FACE OF JACKING/RECEIVING PITS FT. IN. NA		
BURY: BASE OF RAIL TO BOTTOM JACKING/RECEIVING PITS FT. IN. NA		
CATHODIC PROTECTION? YES ☐ NO ☒		

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: U028 of 030

UNION PACIFIC RAILROAD
LOCATION & DESCRIPTION: Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track
SHEET TITLE: TRAMMELL CROW FUTURE 2" GAS LINE - STA. 287+78

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Utilities\T_UT25_G 287+78_200927.dgn
Default
3/9/2026



SANITARY SEWER NOTES:

1. UTILITY INSTALLATION, MATERIALS, AND TESTING SHALL COMPLY WITH MAG AND CITY OF MESA STANDARDS, SPECIFICATIONS, DETAILS, AND AMENDMENTS.
2. THE CONTRACTOR SHALL COORDINATE WITH CITY OF MESA FOR ALL UTILITY CONSTRUCTION PHASING, OUTAGES, TESTING, AND INSPECTIONS.
3. THE CONTRACTOR SHALL VERIFY EXISTING SANITARY ELEVATIONS AND MAKE NECESSARY ADJUSTMENTS TO MEET DESIGN AND ELEVATION REQUIREMENTS PER MAG DETAIL NO. 426.
4. BACKFILL SHALL COMPLY WITH CITY OF MESA DETAIL M-19.04.
5. THE CONTRACTOR SHALL INSTALL TRACER WIRE AND IDENTIFICATION (I.D.) TAPE PER MAG DETAIL NO. 399.

INFORMATIONAL SUMMARY OF QUANTITIES:*

60 L.F. - 24" STEEL CASING
70 L.F. - RESTRAINED JOINTS (ALONG CASING)
175 L.F. - 12" PVC (SDR-35)
2 EA. - 60" DIA. PRECAST CONCRETE MANHOLE W/ MANHOLE COATING
DROP CONNECTION
249 L.F. - REMOVE 12" SANITARY SEWER LINE
15 L.F. - REMOVE 4" SANITARY SEWER LINE
1 EA. - REMOVE MANHOLE
1 EA. - END PLUG
MOBILIZATION
EXCAVATION AND BACKFILL
TEMPORARY SHORING AS REQUIRED
TRAFFIC CONTROL
ONE-YEAR MAINTENANCE BOND

*THE QUANTITIES SHOWN ABOVE ARE FOR INFORMATIONAL PURPOSES ONLY AND MAY NOT INCLUDE ALL ITEMS, LABOR, AND INCIDENTALS REQUIRED TO COMPLETE THE WORK AS SHOWN.

	CARRIER PIPE	CASING PIPE
CONTENT TO BE HANDLED	SANITARY SEWER	-
NOMINAL DIAMETER	12"	24"
PIPE MATERIAL	PVC (SDR-35)	STEEL
SPECIFICATION AND GRADE	-	ASTM A53
WALL THICKNESS	-	0.4375"
ACTUAL WORKING PRESSURE	NA	NA
MIN. TENSILE STRENGTH	-	35,000 PSI
TYPE OF JOINT	-	WELDED PER AWS D1.1
COATING	-	NA
METHOD OF INSTALLATION	OPEN CUT	OPEN CUT
SEALS: BOTH ENDS TYPE: RUBBER W/ S.S. BANDS		
BURY: BASE OF RAIL TO TOP OF CASING: 17 FT. 7 IN.		
BURY: 3 FT. 0 IN. MIN. (ROADWAY DITCHES)		
BURY: 3 FT. 0 IN. MIN. (NOT BENEATH TRACKS)		
TYPE, SIZE & SPACING OF INSULATORS OR SUPPORTS: SEE PROJECT SPECS.		
DISTANCE C.L. TRACK TO FACE OF JACKING/RECEIVING PITS FT. IN. NA		
BURY: BASE OF RAIL TO BOTTOM JACKING/RECEIVING PITS FT. IN. NA		
CATHODIC PROTECTION? YES ☐ NO ☒		

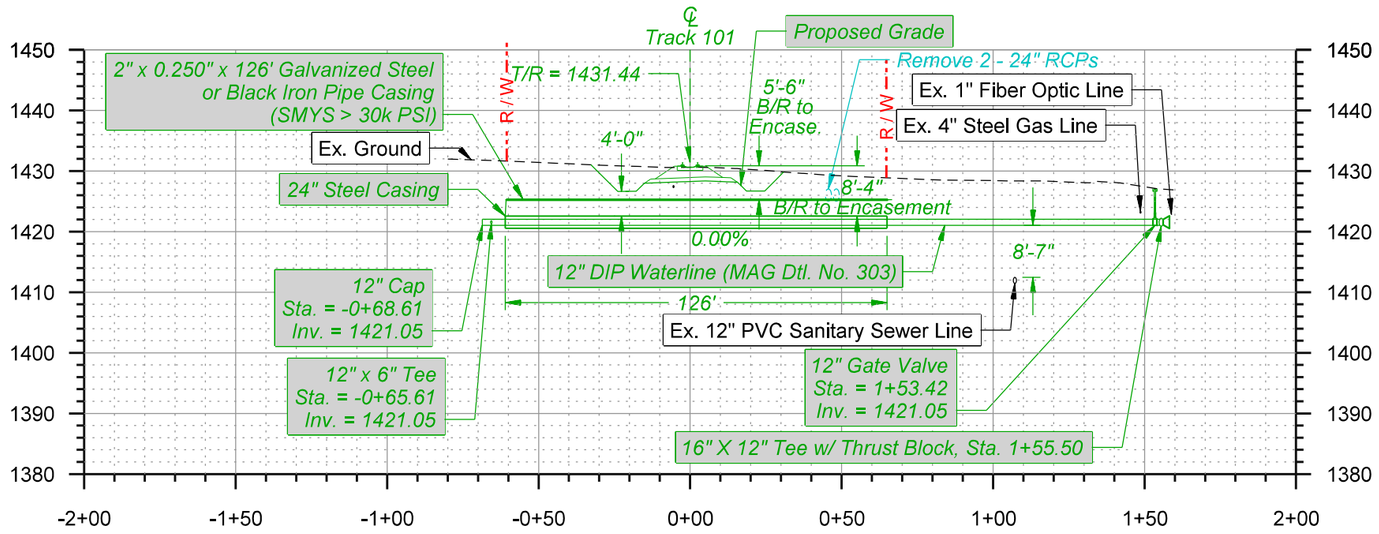
olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

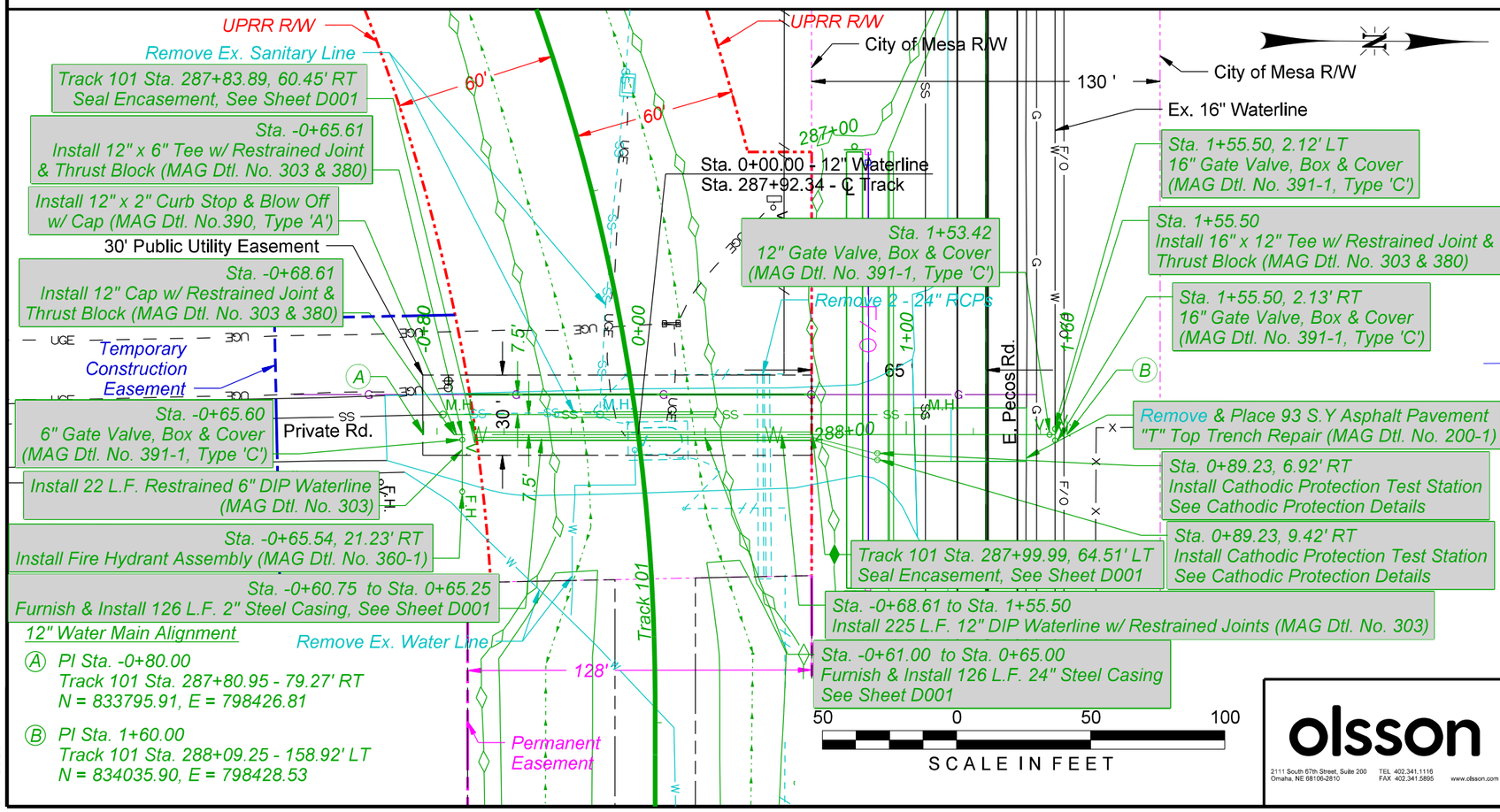
UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: U029 of 030

UNION PACIFIC RAILROAD
Sheet 164 of 587
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track
SHEET TITLE:
TRAMMELL CROW 12" SANITARY - STA. 287+85

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04.Utilities\T_UT26_S 287+84.2
Default
3/9/2026





WATER MAIN NOTES:

1. UTILITY INSTALLATION, MATERIALS, AND TESTING SHALL COMPLY WITH MAG AND CITY OF MESA STANDARDS, SPECIFICATIONS, DETAILS, AND AMENDMENTS.
2. THE CONTRACTOR SHALL COORDINATE WITH CITY OF MESA FOR ALL UTILITY CONSTRUCTION PHASING, OUTAGES, TESTING, AND INSPECTIONS.
3. THE CONTRACTOR SHALL BUILD TEMPORARY SEDIMENT BASINS AND EROSION MAT FOR DISCHARGE DURING FLUSHING AS NECESSARY TO MINIMIZE EROSION AND TO PREVENT DISCHARGE OF SEDIMENT OFF SITE (INCIDENTAL). AS AN ALTERNATE TO THE TEMPORARY SEDIMENT BASIN THE CONTRACTOR MAY DISCHARGE INTO AN EXISTING DRAINAGEWAY OR DITCH WITH ESTABLISHED VEGETATION AS APPROVED BY THE CITY OF MESA.
4. BACKFILL SHALL COMPLY WITH CITY OF MESA DETAIL M-19.04.
5. THE CONTRACTOR SHALL INSTALL TRACER WIRE AND IDENTIFICATION (I.D.) TAPE PER MAG DETAIL NO. 399.

INFORMATIONAL SUMMARY OF QUANTITIES:*

126 L.F. - 24" STEEL CASING
126 L.F. - 2" STEEL CASING
225 L.F. - 12" DIP WATERLINE W/ RESTRAINED JOINTS
22 L.F. - 6" DIP WATERLINE W/ RESTRAINED JOINTS
1 EA. - 16" X 12" RESTRAINED TEE
1 EA. - 12" X 6" RESTRAINED TEE
1 EA. - 12" CAP
2 EA. - 16" GATE VALVE W/ BLOCKING
1 EA. - 12" GATE VALVE W/ BLOCKING
1 EA. - 6" GATE VALVE W/ BLOCKING
1 EA. - FIRE HYDRANT
93 S.Y. - REMOVE PAVEMENT
93 S.Y. - PLACE ASPHALT PAVEMENT
THRUST BLOCKS & ANCHORAGES
DISINFECTION AND PRESSURE TESTING
CONNECT TO EXISTING 12" WATER SERVICE
CATHODIC PROTECTION
MOBILIZATION
EXCAVATION AND BACKFILL
TEMPORARY SHORING AS REQUIRED
TRAFFIC CONTROL
ONE-YEAR MAINTENANCE BOND

*THE QUANTITIES SHOWN ABOVE ARE FOR INFORMATIONAL PURPOSES ONLY AND MAY NOT INCLUDE ALL ITEMS, LABOR, AND INCIDENTALS REQUIRED TO COMPLETE THE WORK AS SHOWN.

	CARRIER PIPE	CASING PIPE
CONTENT TO BE HANDLED	POTABLE WATER	-
NOMINAL DIAMETER	12"	24"
PIPE MATERIAL	DUVTILE IRON PIPE	STEEL
SPECIFICATION AND GRADE	CL350 DIP	ASTM A53
WALL THICKNESS	-	0.4375"
ACTUAL WORKING PRESSURE	UNKNOWN	NA
PRESSURE RATING	250 PSI	NA
MIN. TENSILE STRENGTH	-	35,000 PSI
TYPE OF JOINT	RESTRAINED JOINT	WELDED PER AWS D1.1
COATING	NA	NA
METHOD OF INSTALLATION	OPEN CUT	OPEN CUT
SEALS: BOTH ENDS TYPE: RUBBER W/ S.S. BANDS		
BURY: BASE OF RAIL TO TOP OF CASING: 8 FT. 4 IN.		
BURY: 3 FT. 0 IN. MIN. (ROADWAY DITCHES)		
BURY: 3 FT. 0 IN. MIN. (NOT BENEATH TRACKS)		
TYPE, SIZE & SPACING OF INSULATORS OR SUPPORTS: SEE PROJECT SPECS.		
DISTANCE C.L. TRACK TO FACE OF JACKING/RECEIVING PITS FT. IN. NA		
BURY: BASE OF RAIL TO BOTTOM JACKING/RECEIVING PITS FT. IN. NA		
CATHODIC PROTECTION? YES ☒ NO ☐		

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: U030 of 030

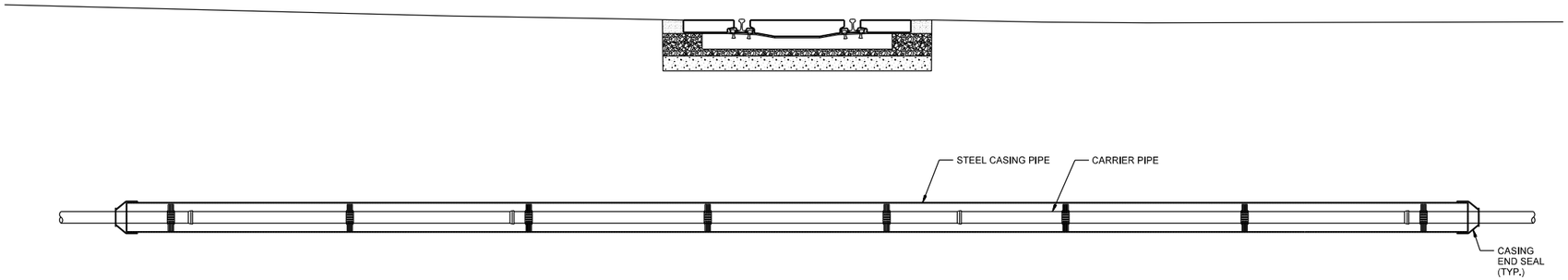
UNION PACIFIC RAILROAD

Sheet 165 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRAMMELL CROW 12" WATER MAIN - STA. 287+92

Color table: K:\Bentley\Workspace\Projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGNSheets\04_Utilities\T_UT27_W 287+91.200927.dgn
Default
3/9/2026



ELEVATION

NOTES:

1. CASING CONSTRUCTION SHALL COMPLY WITH CITY OF MESA DETAIL NO. M-55 OR UPRR SPECIFICATIONS AND REQUIREMENTS (https://www.up.com/real_estate/utilities/pipeline/pipespecs/index.htm). THE CONTRACTOR AND ALL AFFILIATES SHALL NOT TAKE ADVANTAGE OF ANY APPARENT ERRORS, OMISSIONS, OR DISCREPANCIES ENCOUNTERED. UPON SUCH DISCOVERY, THE APPROPRIATE REPRESENTATIVE SHALL BE IMMEDIATELY NOTIFIED TO PROVIDE FURTHER INTERPRETATION, CLARIFICATION, OR REMEDIATION TO HELP FULFILL INTENT OR APPLICATION. IN ALL CASES, THE MOST RESTRICTIVE SPECIFICATIONS AND PROVISIONS SHALL GOVERN WHEN DISCREPANCIES ARE ENCOUNTERED.
2. CASE CONSTRUCTION PER MAG 602, WITH CASE REPAIR PER AWWA C200-17.
3. ALL HORIZONTAL DISTANCES TO BE MEASURED AT RIGHT ANGLES FROM OUTSIDE RAIL OF TRACK.
4. CASING TO BE EXTENDED BEYOND THE CENTERLINE OF TRACK AT RIGHT ANGLES AS SHOWN ON PLANS.
5. CASING AND CARRIER PIPE MUST BE PLACED A MINIMUM OF 2 FEET BELOW EXISTING FIBER OPTIC CABLE IF ANY EXISTS. ANY EXCAVATION REQUIRED WITHIN 5 FEET OF ANY EXISTING FIBER OPTIC CABLE MUST BE HAND DUG.
6. MANUFACTURED ISOLATORS SHALL BE STAINLESS STEEL SHELL FOR DI CARRIER PIPE WITH ULTRA HIGH MOLECULAR WEIGHT POLYETHYLENE (UHMW PE) RUNNERS BY CASCADE, OR ENGINEER APPROVED EQUAL.
7. CARRIER AND CASING PIPE LOCATION, SIZES, AND DEPTHS PER PLAN AND PROFILES.
8. VIDEO DOCUMENTATION OF FINAL PLACEMENT SHALL BE PROVIDED TO CITY OF MESA.
9. CASING ACCEPTANCE IS CONTINGENT UPON THE WRITTEN APPROVAL FROM THE CITY ENGINEER OR DESIGNEE.

STEEL CASING WALL THICKNESS CHART		
MINIMUM THICKNESS		DIAMETER OF CASING PIPE
.2500"	1/4"	12" OR LESS
.3125"	5/16"	OVER 12"-18"
.3750"	3/8"	OVER 18"-22"
.4375"	7/16"	OVER 22"-28"
.5000"	1/2"	OVER 28"-34"
.5625"	9/16"	OVER 34"-42"
.6250"	5/8"	OVER 42"-48"
OVER 48" MUST BE APPROVED BY UPRR		
NOTE: THIS CHART IS ONLY FOR SMOOTH STEEL CASING PIPES WITH MINIMUM YIELD STRENGTH OF 35,000 PSI.		

CASING DETAIL
NOT TO SCALE

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: D001 of 008

UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
ENCASEMENT DETAILS

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Details\T_D001_Encasement Detail_200927.dgn
Default
3/9/2026

Place 192 C.Y.
Aggregate Base Course

Place
107 S.Y.
4" Asphaltic
Pavement

Place Private Roadway
Grade Crossing Signs
See Note 2

Place 126 S.Y.
4" Asphaltic
Pavement

Place 250 C.Y.
Aggregate Base Course

Place 107 S.Y.
4" Asphaltic Pavement

Place Private Roadway
Grade Crossing Signs
See Note 2

Place 125 S.Y.
4" Asphaltic Pavement

Place 159 C.Y.
Aggregate Base Course

Place Private Roadway
Grade Crossing Signs
See Note 2

Place 215 C.Y.
Aggregate Base Course

PSC
7+74.65

10+00

1495+00

1500+00

1505+00

5+00

Track 107

Track 751

Access Rd.

Access Rd.

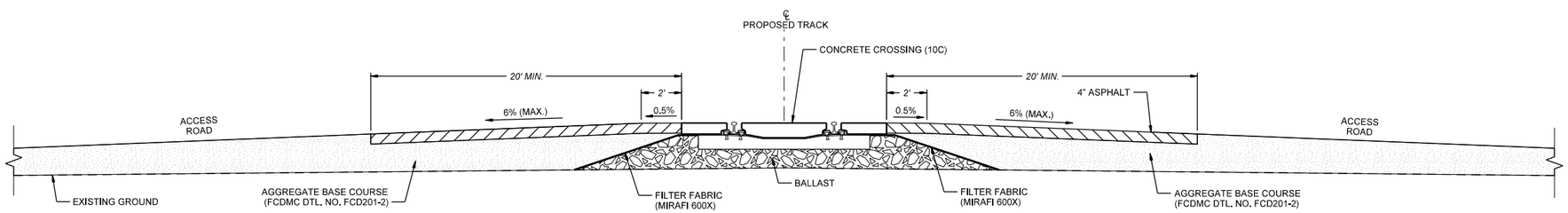
Phoenix Subdivision Main Track
Track 120

100 0 100 200
SCALE IN FEET

LEGEND

AGGREGATE BASE COURSE (FCDMC DTL. NO. FCD201-2)

4" ASPHALTIC PAVEMENT



PRIVATE ROAD CROSSING

NOT TO SCALE

NOTES:

1. CONTRACTOR SHALL FURNISH AND INSTALL AGGREGATE BASE COURSE, FILTER FABRIC, AND ASPHALT. UPRR WILL INSTALL CROSSING PANELS. CONTRACTOR TO COORDINATE WITH UPRR ON CROSSING PANEL INSTALLATION.
2. CONTRACTOR SHALL FURNISH AND INSTALL PRIVATE ROADWAY GRADE CROSSING SIGNS IN ACCORDANCE WITH UPRR STANDARD DRAWING 0521.

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

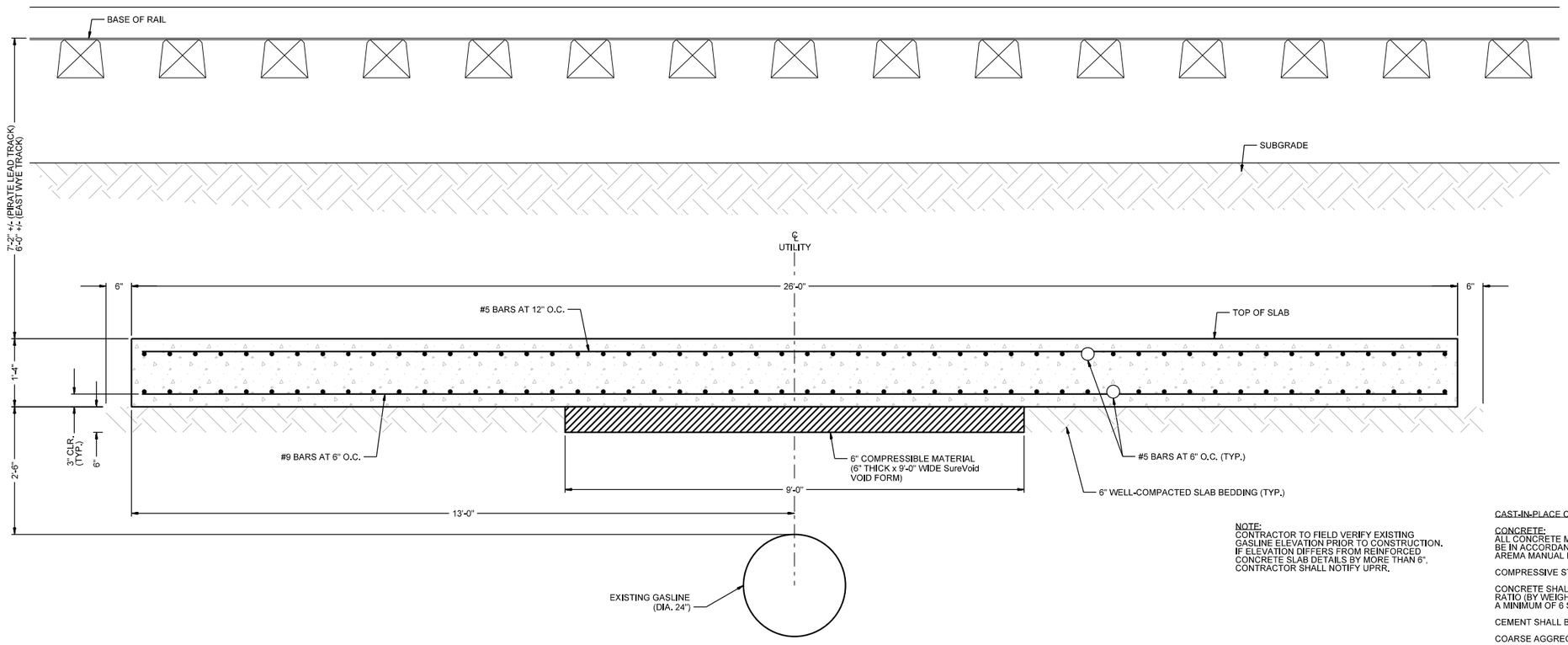
DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: D002 of 008

UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
PRIVATE CROSSING DETAILS

Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Details\T_D002_Private Crossing Detail_200927.dgn
Default
3/9/2026



REINFORCED CONCRETE SLAB DETAIL

NOT TO SCALE

NOTE:
CONTRACTOR TO FIELD VERIFY EXISTING GASLINE ELEVATION PRIOR TO CONSTRUCTION. IF ELEVATION DIFFERS FROM REINFORCED CONCRETE SLAB DETAILS BY MORE THAN 6", CONTRACTOR SHALL NOTIFY UPRR.

CAST-IN-PLACE CONCRETE SLAB NOTES:

CONCRETE:
ALL CONCRETE MATERIALS, PLACEMENT AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH PART 1, CHAPTER 8 OF THE CURRENT AREMA MANUAL FOR RAILWAY ENGINEERING.

COMPRESSIVE STRENGTH - 4000 LBS. PER SQUARE INCH AT 28 DAYS.

CONCRETE SHALL BE PROPORTIONED SUCH THAT THE WATER-CEMENT RATIO (BY WEIGHT) DOES NOT EXCEED 0.45. CONCRETE MUST CONTAIN A MINIMUM OF 6 SACKS OF CEMENT PER CUBIC YARD OF CONCRETE.

CEMENT SHALL BE EITHER TYPE I OR TYPE III PORTLAND CEMENT.

COARSE AGGREGATE SHALL BE SIZE NO. 67 PER ASTM C33.

FINE AGGREGATE SHALL BE NATURAL SAND.

AIR CONTENT SHALL BE BETWEEN 5% AND 7% BY VOLUME.

ADMIXTURES SHALL NOT BE USED WITHOUT APPROVAL OF ENGINEER.

CURING SHALL BE ACCOMPLISHED BY WET CURING OR THE APPLICATION OF A TYPE 2 MEMBRANE.

CONTROL JOINTS SHALL BE PLACED EVERY TWO SLAB WIDTHS MINIMUM.

REINFORCING STEEL:
REINFORCING STEEL SHALL BE DEFORMED, NEW BILLET BARS PER CURRENT ASTM A615 SPECIFICATIONS AND MEET GRADE 60 REQUIREMENTS.

FABRICATION OF REINFORCING STEEL SHALL BE PER CHAPTER 7 OF THE CRSI MANUAL OF STANDARD PRACTICE. DIMENSIONS OF BENDING DETAILS ARE OUT TO OUT OF BAR.

REINFORCING STEEL IS TO BE BLOCKED TO PROPER LOCATION AND SECURELY WIRED AGAINST DISPLACEMENT BEFORE CONCRETE IS POURED. TACK WELDING OF REINFORCING IS PROHIBITED. CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 3" UNLESS OTHERWISE NOTED OR SHOWN.

SLAB BEDDING:
SLAB BEDDING SHALL BE GRANULAR MATERIAL SUCH AS AGGREGATES ORDINARILY SPECIFIED AND USED IN THE CONSTRUCTION OF HIGHWAY BASE AND SUBBASE. THESE AGGREGATES INCLUDE CRUSHED STONE, NATURAL OR CRUSHED GRAVEL, NATURAL OR MANUFACTURED SANDS, CRUSHED SLAG OR A HOMOGENEOUS MIXTURE OF THESE MATERIALS. SLAB BEDDING SHALL BE COMPACTED TO 100% OF MAXIMUM DRY DENSITY AS DEFINED IN ASTM INTERNATIONAL D1557 (MODIFIED PROCTOR). IF 100% COMPACTION CANNOT BE ACHIEVED IN PROXIMITY OF EXISTING STRUCTURE, 95% COMPACTION MAY BE ACCEPTED. RECOMMENDED GRADATION IS AS FOLLOWS:

SCREEN SIZE	% PASSING (BY WEIGHT)
1 INCH	100
1/2 INCH	60-90
3/8 INCH	20-40
NO. 4	10-20
NO. 200	LESS THAN 5%

UNION PACIFIC SEALANT BALLAST, ITEM NO. 562-5428, MAY BE USED.

DESIGN NOTES:

1. THE CAST-IN-PLACE CONCRETE TRACK SLAB HAS BEEN DESIGNED FOR COOPER E-80 LIVE LOAD WITH IMPACT AND COVER DEPTH OF 6'-0".
2. SLAB BEARING SUBGRADE AREA SHOULD BE PREPARED PER THE GEOTECH REPORT. SPECIAL CARE SHOULD BE TAKEN DURING SURFACE PREP OVER THE UTILITIES.

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

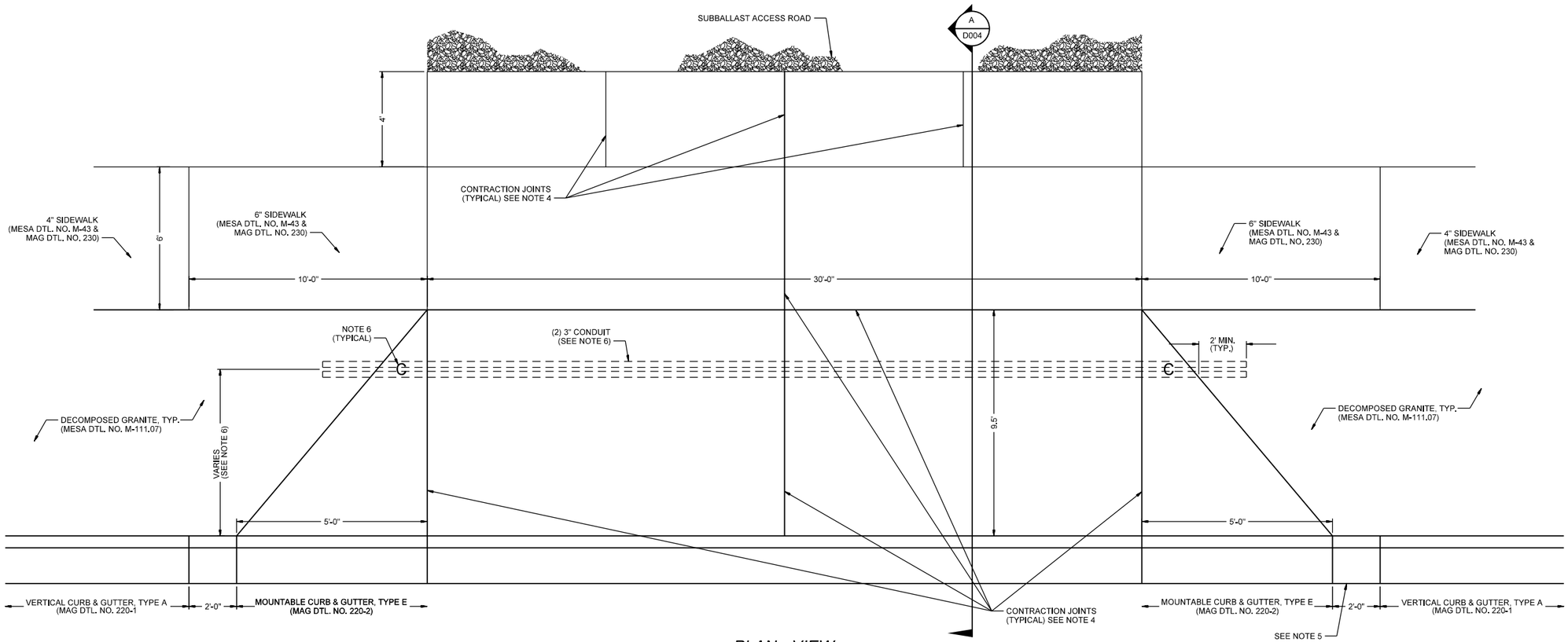
DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: D003 of 008

UNION PACIFIC RAILROAD Sheet 168 of 587

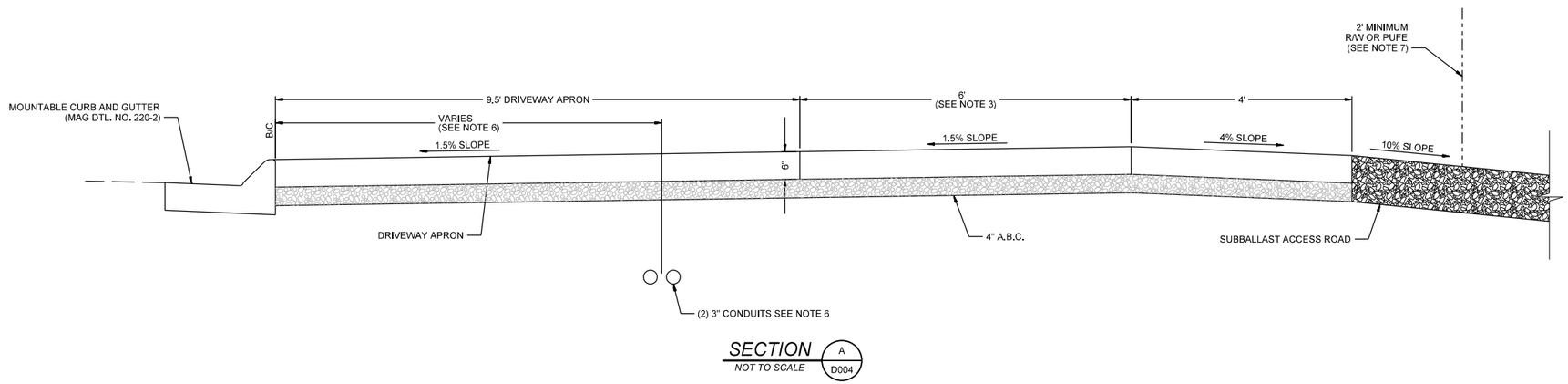
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
UTILITY PROTECTION SLAB DETAIL

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Details\T_D003_Utility Slab Protection Detail_200927.dgn
Default
3/9/2026



PLAN - VIEW
NOT TO SCALE



SECTION
NOT TO SCALE
A
D004

NOTES;

1. EXPANSION JOINTS SHALL BE CONSTRUCTED AT EACH SIDE OF DRIVEWAY DEPRESSION AT POINTS OF CURVATURE AND AT ALL RIGID STRUCTURES.
2. ALL CONCRETE SHALL BE CLASS "A" AS PER SECTION 725.
3. ALL DRIVEWAYS AND SIDEWALKS BEHIND DRIVEWAYS SHALL BE 6" THICK ON 4" A.B.C., SIDEWALK WIDTH AT BACK OF DRIVEWAY SHALL BE 6 FEET. SIDEWALK THICKNESS AND SECTION SHALL MATCH DRIVEWAY SECTION FOR 10' EACH SIDE OF DRIVEWAY.
4. ALL DRIVEWAYS HAVE CONTRACTION JOINTS AT THE DRIVEWAY CENTER LINE, AT BREAK BETWEEN SIDEWALK AND DRIVEWAY WINGS, AND FROM BACK CORNER OF APRON TO LIP OF GUTTER. THE CONTRACTION JOINTS MAY BE EITHER SCORED OR SAWCUT 1-INCH DEEP.
5. FINISH CURB ELEVATION SHALL TRANSITION UNIFORMLY FROM FULL HEIGHT CURB ELEVATION TO MOUNTABLE CURB ELEVATION.
6. LOCATION, GRADES, AND ELEVATIONS OF 3" COINDUITS SHALL ALIGN WITH PROPOSED 2" STREET LIGHTING CONDUIT. INSTALLATION OF CONDUIT AND STAMPS SHALL BE INCIDENTAL TO DRIVEWAY CONTSTRUCTION.
7. THE BACK OF R/W OR PUFE SHALL EXTEND 2' MINIMUM BEYOND THE BACK OF SIDEWALK. ALONG THE BACK OF DRIVEWAY, UNLESS OTHERWISE APPROVED BY THE CITY.
8. A DOUBLE DRIVEWAY WITH A RAISED MEDIAN ISLAND IS REQUIRED AT DRIVEWAYS OVER 40 FEET IN WIDTH.
9. FOR ACCEPTABLE DRIVEWAY GRADE BREAK USE ADOT DRAWING C-06.10.

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

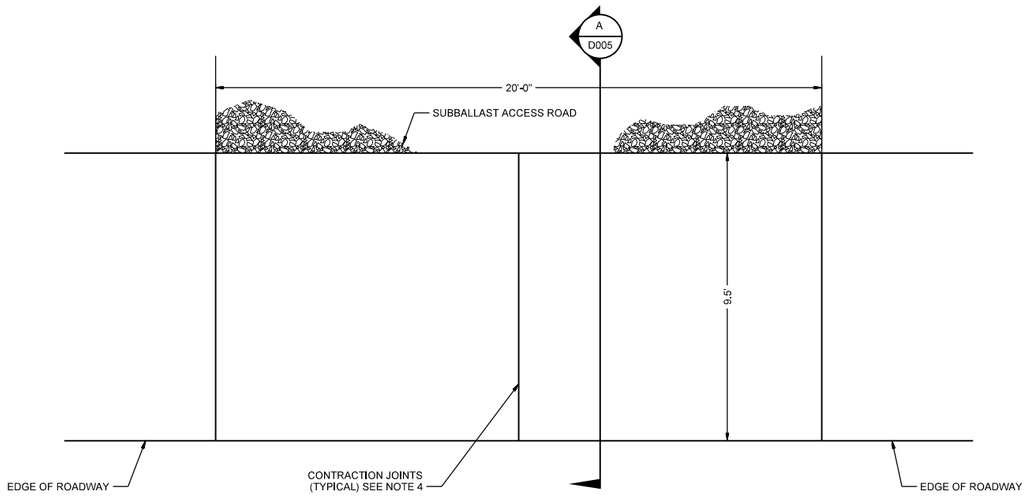
DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: D004 of 008

UNION PACIFIC RAILROAD
Sheet 169 of 587

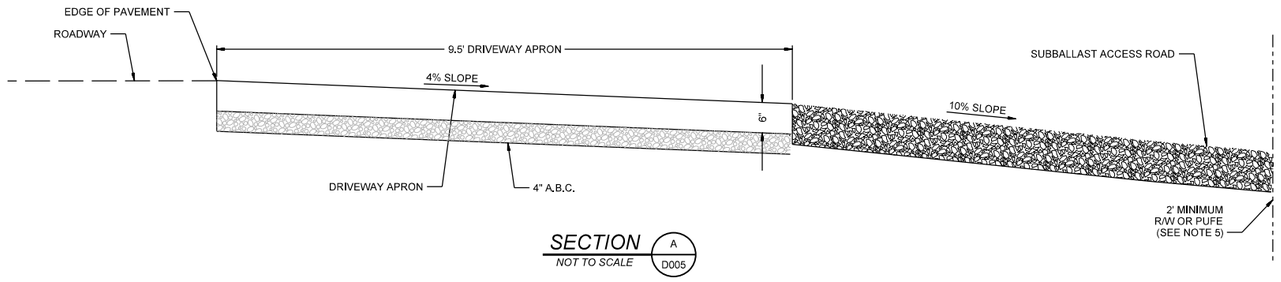
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
DRIVEWAY DETAIL

Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927_40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927_40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Details\T_D004_Driveway Detail - Curb_200927.dgn
Default
3/9/2026



PLAN - VIEW
NOT TO SCALE



SECTION A D005
NOT TO SCALE

NOTES:

1. EXPANSION JOINTS SHALL BE CONSTRUCTED AT EACH SIDE OF DRIVEWAY DEPRESSION AT POINTS OF CURVATURE AND AT ALL RIGID STRUCTURES.
2. ALL CONCRETE SHALL BE CLASS "A" AS PER SECTION 725.
3. ALL DRIVEWAYS AND SIDEWALKS BEHIND DRIVEWAYS SHALL BE 6" THICK ON 4" A.B.C.
4. ALL DRIVEWAYS HAVE CONTRACTION JOINTS AT THE DRIVEWAY CENTER LINE, AT BREAK BETWEEN SIDEWALK AND DRIVEWAY WINGS, AND FROM BACK CORNER OF APRON TO LIP OF GUTTER. THE CONTRACTION JOINTS MAY BE EITHER SCORED OR SAWCUT 1-INCH DEEP.
5. THE BACK OF R/W OR PUFE SHALL EXTEND 2' MINIMUM BEYOND THE BACK OF SIDEWALK, ALONG THE BACK OF DRIVEWAY, UNLESS OTHERWISE APPROVED BY THE CITY.
6. FOR ACCEPTABLE DRIVEWAY GRADE BREAK USE ADOT DRAWING C-06.10.

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

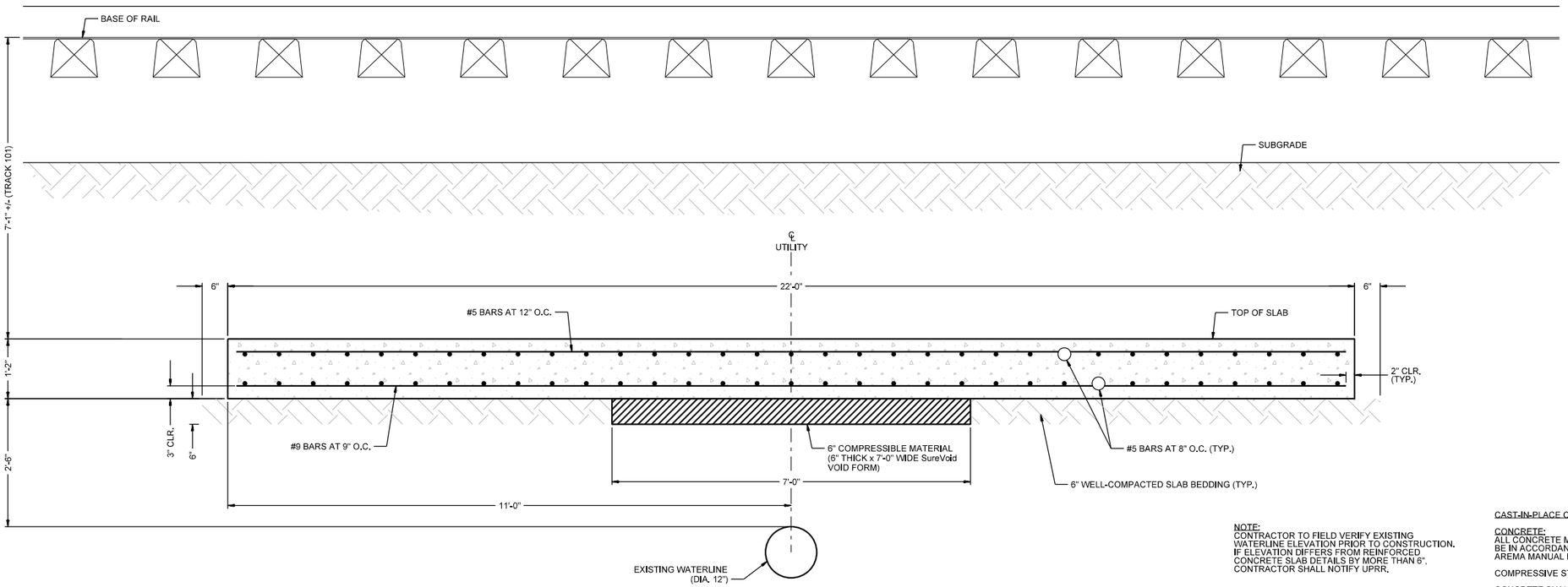
DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: D005 of 008

UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
DRIVEWAY DETAIL

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Details\T_D005_Driveway Detail - No Curb_200927.dgn
Default
3/9/2026



NOTE:
CONTRACTOR TO FIELD VERIFY EXISTING WATERLINE ELEVATION PRIOR TO CONSTRUCTION. IF ELEVATION DIFFERS FROM REINFORCED CONCRETE SLAB DETAILS BY MORE THAN 6", CONTRACTOR SHALL NOTIFY UPRR.

REINFORCED CONCRETE SLAB DETAIL

NOT TO SCALE

CAST-IN-PLACE CONCRETE SLAB NOTES:

CONCRETE:
ALL CONCRETE MATERIALS, PLACEMENT AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH PART 1, CHAPTER 8 OF THE CURRENT AREMA MANUAL FOR RAILWAY ENGINEERING.

COMPRESSIVE STRENGTH - 4000 LBS. PER SQUARE INCH AT 28 DAYS.

CONCRETE SHALL BE PROPORTIONED SUCH THAT THE WATER-CEMENT RATIO (BY WEIGHT) DOES NOT EXCEED 0.45. CONCRETE MUST CONTAIN A MINIMUM OF 6 SACKS OF CEMENT PER CUBIC YARD OF CONCRETE.

CEMENT SHALL BE EITHER TYPE I OR TYPE III PORTLAND CEMENT.

COARSE AGGREGATE SHALL BE SIZE NO. 67 PER ASTM C33.

FINE AGGREGATE SHALL BE NATURAL SAND.

AIR CONTENT SHALL BE BETWEEN 5% AND 7% BY VOLUME.

ADMIXTURES SHALL NOT BE USED WITHOUT APPROVAL OF ENGINEER.

CURING SHALL BE ACCOMPLISHED BY WET CURING OR THE APPLICATION OF A TYPE 2 MEMBRANE.

CONTROL JOINTS SHALL BE PLACED EVERY TWO SLAB WIDTHS MINIMUM.

REINFORCING STEEL:
REINFORCING STEEL SHALL BE DEFORMED, NEW BILLET BARS PER CURRENT ASTM A615 SPECIFICATIONS AND MEET GRADE 60 REQUIREMENTS.

FABRICATION OF REINFORCING STEEL SHALL BE PER CHAPTER 7 OF THE CRSI MANUAL OF STANDARD PRACTICE. DIMENSIONS OF BENDING DETAILS ARE OUT TO OUT OF BAR.

REINFORCING STEEL IS TO BE BLOCKED TO PROPER LOCATION AND SECURELY WIRED AGAINST DISPLACEMENT BEFORE CONCRETE IS POURED. TACK WELDING OF REINFORCING IS PROHIBITED. CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 3" UNLESS OTHERWISE NOTED OR SHOWN.

SLAB BEDDING:
SLAB BEDDING SHALL BE GRANULAR MATERIAL SUCH AS AGGREGATES ORDINARILY SPECIFIED AND USED IN THE CONSTRUCTION OF HIGHWAY BASE AND SUBBASE. THESE AGGREGATES INCLUDE CRUSHED STONE, NATURAL OR CRUSHED GRAVEL, NATURAL OR MANUFACTURED SANDS, CRUSHED SLAG OR A HOMOGENEOUS MIXTURE OF THESE MATERIALS. SLAB BEDDING SHALL BE COMPACTED TO 100% OF MAXIMUM DRY DENSITY AS DEFINED IN ASTM INTERNATIONAL D1557 (MODIFIED PROCTOR). IF 100% COMPACTION CANNOT BE ACHIEVED IN PROXIMITY OF EXISTING STRUCTURE, 95% COMPACTION MAY BE ACCEPTED. RECOMMENDED GRADATION IS AS FOLLOWS:

SCREEN SIZE	% PASSING (BY WEIGHT)
1 INCH	100
1/2 INCH	60-90
3/8 INCH	20-40
NO. 4	10-20
NO. 200	LESS THAN 5%

UNION PACIFIC SEALANT BALLAST, ITEM NO. 562-5428, MAY BE USED.

DESIGN NOTES:

1. THE CAST-IN-PLACE CONCRETE TRACK SLAB HAS BEEN DESIGNED FOR COOPER E-80 LIVE LOAD WITH IMPACT AND COVER DEPTH OF 7'-1".
2. SLAB BEARING SUBGRADE AREA SHOULD BE PREPARED PER THE GEOTECH REPORT. SPECIAL CARE SHOULD BE TAKEN DURING SURFACE PREP OVER THE UTILITIES.

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

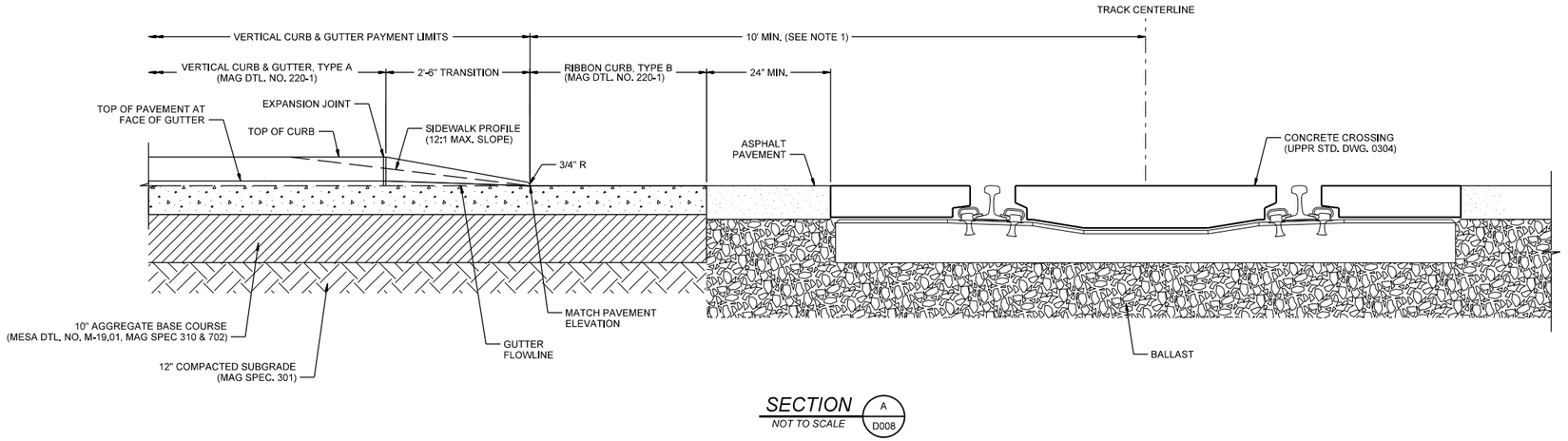
DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: D006 of 008

UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

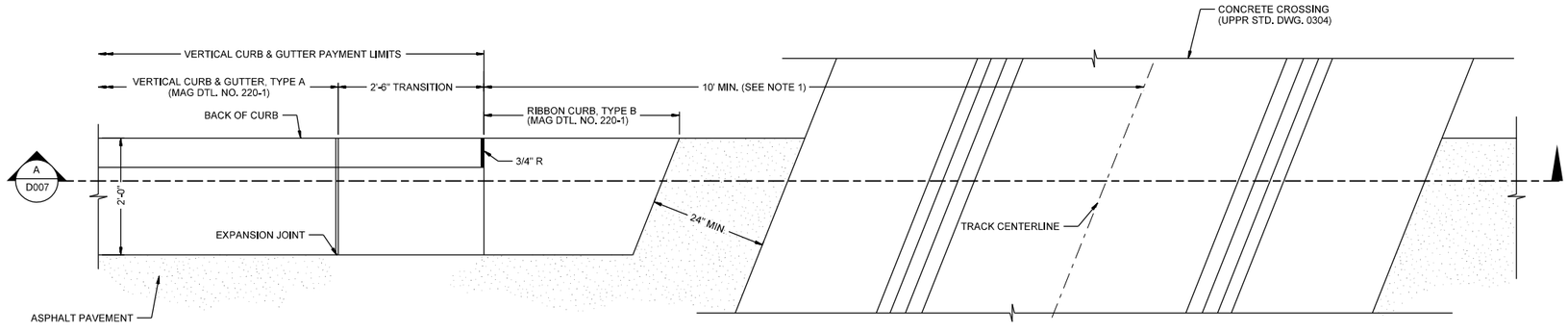
SHEET TITLE:
UTILITY PROTECTION SLAB DETAIL

Color_table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927.40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927.40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Details\T_D006_Utility Default
3/9/2026



SECTION A D008

NOT TO SCALE



PLAN

VERTICAL CURB & GUTTER TERMINATION

NOT TO SCALE

NOTES:

1. DISTANCE SHALL BE 10' MIN. AS MEASURED PERPENDICULARLY FROM ADJACENT TRACK CENTERLINE TO END OF CURB TERMINATON.
2. VERTICAL CURB & GUTTER, TYPE A AND RIBBON CURB, TYPE B SHALL COMPLY WITH MAG DTL. NO. 220-1.
3. CURB TERMINATION SHALL COMPLY WITH MAG DTL. NO. 222.
4. CURB TERMINATIONS SHALL BE INCIDENTAL TO VERTICAL CURB & GUTTER, TYPE A CONSTRUCTION.

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

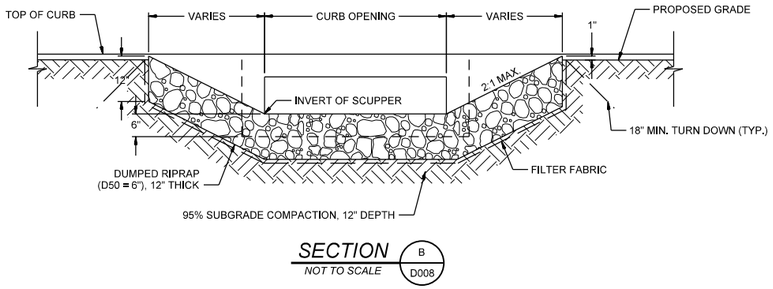
DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: D007 of 008

UNION PACIFIC RAILROAD

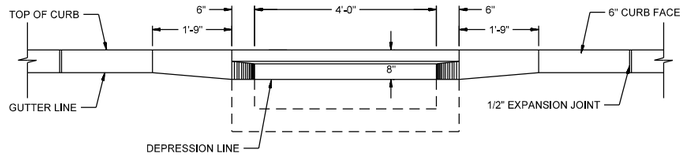
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
VERTICAL CURB & GUTTER TERMINATION DETAILS

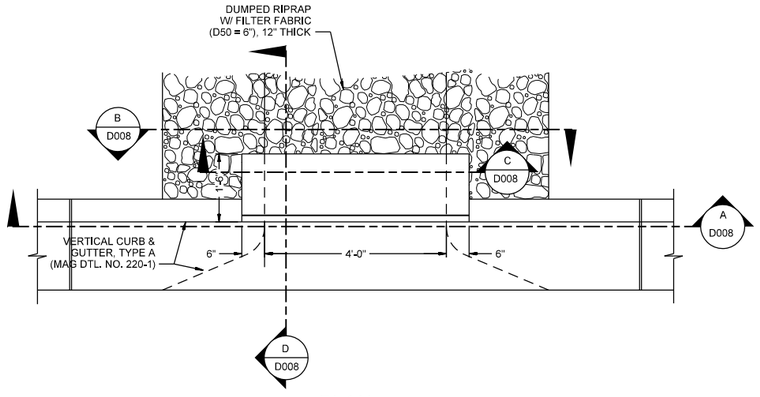
Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Details\T_D007_Curb and Gutter Detail.200927.dgn
Default
3/9/2026



SECTION B / D008
NOT TO SCALE



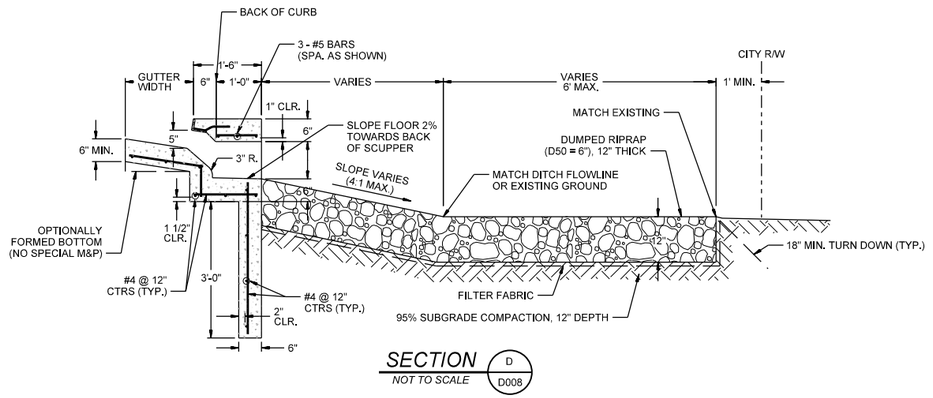
SECTION A / D008
NOT TO SCALE



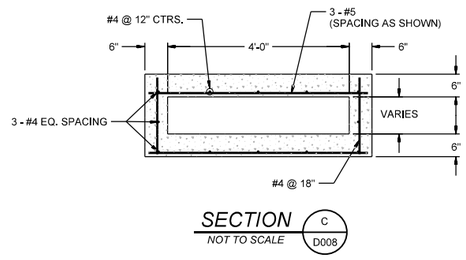
PLAN

CONCRETE SCUPPER & RIPRAP SPILLWAY

NOT TO SCALE



SECTION D / D008
NOT TO SCALE



SECTION C / D008
NOT TO SCALE

NOTES:

1. UNLESS OTHERWISE SPECIFIED IN THESE DETAILS, CONSTRUCTION SHALL COMPLY WITH MAG DTL. NO. 206.
2. ANY CONSTRUCTED SPILLWAYS OBSERVED TO NOT CONFORM TO THIS DETAIL SHALL BE RECONSTRUCTED AT THE CONTRACTOR'S EXPENSE.
3. CONTRACTOR SHALL IMPLEMENT STORMWATER BEST MANAGEMENT PRACTICES TO PREVENT EROSION DURING CONSTRUCTION AND SHALL TAKE IMMEDIATE CORRECTIVE MEASURES SHOULD EROSION BE OBSERVED.
4. 12" MIN. SUBGRADE UNDER THE SPILLWAY AND FINISH GRADE ADJACENT TO SPILLWAY SHALL BE COMPACTED TO 95%.
5. RIPRAP CONSTRUCTION SHALL CONFORM TO MAG SPEC. SECTION 220 & 703.
6. HORIZONTAL CONSTRUCTION JOINTS SHALL BE INTENTIONALLY ROUGHENED TO 1/4" AMPLITUDE.
7. REINFORCING STEEL SHALL BE EPOXY COATED, GRADE 60.

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: D008 of 008

UNION PACIFIC RAILROAD

Sheet 173 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SCUPPER DETAILS

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Details\T_D008_Scupper Detail_200927.dgn
Default
3/9/2026

PARCEL NO. 304-61-015V

POWER INDUSTRIAL OWNER LLC

PARCEL NO. 304-61-018F

PECOS INDUSTRIAL LP

PARCEL NO. 304-61-018E

PECOS INDUSTRIAL LP

Perimeter Berm Elev. = 1347.50

Construct 2,191 L.F. Chain Link Fence w/ Barbed Wire (MAG Dtl. No. 160)

MP 0.52, Sta. 27+60
2 - 6' x 6' x 230' RCB

Access Rd.

Access Rd.

1345

1345

1340

1345

1340

1345

1340

100-YR/6-HR WSE = 1343.20

MP 0.43, Sta. 22+53
2 - 60" x 132' CMP

1345

Low Flow Drainageway

PARCEL NO. 304-61-022N

POWER INDUSTRIAL OWNER LLC

1345

MP 0.20, Sta. 10+41
South Detention Cell Outfall to Rittenhouse Channel
2 - 6' x 6' x 140' RCB

Structure Weir Elev. = 1346.20

1340

Access Ramp
See Special Conditions

Overflow Spillway Elev. = 1347.00

1345

Construct 24' Wide Double Swing Gate (MAG Dtl. No. 160)

1340

1345

4:1 Slope (Typ.)

1340

1345

1345+00

Track 101

Track 120

Phoenix Sub Main Track 113# Wood, 60 MPH

50' Kinder Morgan Easement

Ex. Kinder Morgan Pipeline

Track 751

MP 0.23, Sta. 11+92
3 - 12' x 8' x 154' RCB

1+00

100 0 100 200

SCALE IN FEET

PARCEL NO. 304-61-016G

NICOLA PECOS & SOSSAMAN LP

PMT21-12148

SOUTH DETENTION CELL

100-YR/6-HR WSE = 1343.20

STRUCTURE WEIR OVERTOPPING ELEV. = 1346.20

OVERFLOW SPILLWAY ELEV. = 1347.00

PERIMETER BERM ELEV. = 1347.50

100-YR/6-HR VOL_{REQ} = 40.60 AC-FT

$VOL_{PROVIDED}$ = 66.5 AC-FT (UP TO WEIR OVERTOPPING ELEV. 1346.20)

LEGEND

- Existing Ground Minor Contour (1 ft)
- 1335 Existing Ground Major Contour (5 ft)
- Proposed Subgrade Minor Contour (1 ft)
- 1335 Proposed Subgrade Major Contour (5 ft)

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: GD001 of 002

UNION PACIFIC RAILROAD

Sheet 174 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SOUTH DETENTION CELL - GRADING PLAN

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Details\T_GD01_200927.dgn
Default
3/9/2026

LEGEND

Existing Ground Minor Contour (1 ft)

1335 Existing Ground Major Contour (5 ft)

Proposed Subgrade Minor Contour (1 ft)

1335 Proposed Subgrade Major Contour (5 ft)

Plug & Fill
24" x 105' RCP

Construct 24' Wide Double Swing Gate
(MAG Dtl. No. 160)

PARCEL NO. 304-36-002G

PHOENIX-MESA GATEWAY
AIRPORT AUTHORITY

PARCEL NO. 304-36-002C

WILLIAMS GATEWAY
AIRPORT AUTHORITY

Future Modular Building
(APN 304-61-006J)

N

S. SOSSAMAN RD.

Access Ramp
See Special Conditions

Remove Riprap

Low Flow
Drainageway

30'

Utility Easement

Restricted Work Area

Construct 1,316 L.F. Chain Link Fence w/ Barbed Wire
(MAG Dtl. No. 160)

4:1 Slope (Typ.)

MP 1.14, Sta. 59+80
4 - 60" x 144' CMP

Diversion Berm Ovetopping Elev. = 1351.00

Restricted Work Area

100-YR/6-HR WSE = 1349.10

PARCEL NO. 304-61-006G

GS UNBOUND PHASE II
PROPERTY OWNER LLC

Future Sossman Road
Half-Street Improvements
(APN 304-61-006J)

Sta. 45+00
North Detention Cell Outfall to Trackside Ditch
2 - 18" x 124' CMP

PARCEL NO. 304-61-019

UNITED STATES
OF AMERICA

PARCEL NO. 304-61-995

GATEWAY GRAND
ASSOCIATION

PMT22-05054

NORTH DETENTION CELL

100-YR/6-HR WSE = 1349.10

UPSTREAM DIVERSION BERM OVERTOPPING ELEV. = 1351.00

PERIMETER ELEV. = 1352.60

100-YR/6-HR VOL_{REQ} = 16.6 AC-FT

$VOL_{PROVIDED}$ = 34.4 AC-FT (UP TO ELEV. 1351.60, 1' FREEBOARD)

PMT22-05054
Greystar/UPRR Coordination Finalized
Max Discharge = 10 cfs
Received by UPRR Trackside Ditch

25'

Utility Easement

PTM23-21476
Stonelake/UPRR Coordination Finalized
Max Discharge = 10 cfs
Received by UPRR Trackside Ditch

PARCEL NO. 304-61-005B

SL7 MESA INDUSTRIAL LP

PMT23-21476

Construct 24' Wide Double Swing Gate
(MAG Dtl. No. 160)

PARCEL NO. 304-61-021E.

CITY OF MESA

Track 104

200 0 200 400

SCALE IN FEET

olsson

2111 South 67th Street, Suite 200
Omaha, NE 68106-2810

TEL 402.341.1116
FAX 402.341.5895

www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: GD002 of 002

UNION PACIFIC RAILROAD

Sheet 175 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
NORTH DETENTION CELL - GRADING PLAN

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Details\T_G002_200927.dgn
Default
3/9/2026

EROSION AND SEDIMENT CONTROL PLAN ENGINEER'S CERTIFICATION

"I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ENSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, TO THE BEST OF MY KNOWLEDGE AND BELIEF, THE INFORMATION SUBMITTED IS TRUE, ACCURATE, AND COMPLETE."

ENGINEER
JUSTIN MOHLMAN
OLSSON
2111 SOUTH 67TH ST, SUITE 200
OMAHA, NE 68106
(402) 938-2420

OWNER
LEVI HAWKINS
PROJECT DESIGN
UNION PACIFIC RAILROAD
1400 DOUGLAS STREET
OMAHA, NE 68179
(402) 544-3304

SITE CONTACT
CARLOS MENDOZA
UNION PACIFIC RAILROAD
(209) 663-5406

DISTURBED AREA
102.90 ACRES

PROJECT BOUNDARY
252.41 ACRES

LEGEND

- EXISTING TRACK
- PROPOSED TRACK
- UPRR R-O-W
- SILT FENCE
- WATTLE DITCH CHECK
- GRADING LIMITS - CUT
- GRADING LIMITS - FILL
- DITCH/FLOWLINE
- PROJECT BOUNDARY
- STAGING AREA
- GROUTED RIPRAP/DOWNDRAIN
- CULVERT/SCUPPER RIPRAP
- DECOMPOSED GRANITE
- RIPRAP SLOPE/CHANNEL PROTECTION
- ROCK MULCH SLOPE/CHANNEL PROTECTION
- WETLANDS

SUMMARY OF EROSION CONTROL QUANTITIES

ITEM	UNIT	QUANTITY
SILT FENCE	L.F.	35,398*
WATTLE DITCH CHECKS	EACH	453*
2" - 3" STONE FOR CONSTRUCTION ENTRANCES	C.Y.	256*
FILTER FABRIC FOR CONSTRUCTION ENTRANCES	S.Y.	1,600*
GROUTED RIPRAP/DOWNDRAIN	S.Y.	443
CULVERT/SCUPPER RIPRAP	TON	8,230
DECOMPOSED GRANITE	S.Y.	11,467
RIPRAP SLOPE/CHANNEL PROTECTION	TON	24,334
ROCK MULCH SLOPE PROTECTION	C.Y.	11,899

* NOTE: EROSION CONTROL QUANTITIES ARE SHOWN FOR INFORMATION ONLY. PAYMENT FOR THESE ITEMS SHALL BE MADE UNDER THE LUMP SUM LINE ITEM "EROS, POLLUTION PREVENTION PLAN, SWPPP".

SEDIMENT EROSION CONTROL NOTES

THIS SEDIMENT AND EROSION CONTROL PLAN IS INTENDED AS A GENERAL GUIDE FOR IMPLEMENTING EROSION CONTROL MEASURES FOR THE UNION PACIFIC RAILROAD TRACK 120 EXTENSION AND INDUSTRIAL LEAD TRACK 101 PROJECT AND SUGGESTED PRACTICE, STRUCTURES, AND MEASURES FOR COMPLIANCE WITH ANY APPLICABLE REGULATIONS AND GUIDELINES.

PROJECT DESCRIPTION

GENERALLY, THE LIMITS OF CONSTRUCTION FOR THE GERMANN SIDING EXTENSION AND INDUSTRIAL LEAD TRACK PROJECT ARE FROM MILEPOST 934.78 TO 937.83 FROM THE CENTERLINE OF THE EXISTING MAINLINE TRACK TO THE EXISTING AND PROPOSED RIGHT-OF-WAY ALONG UNION PACIFIC'S PHOENIX SUBDIVISION. THE PROJECT BOUNDARY IS APPROXIMATELY 252.41 ACRES, WITH A DISTURBED AREA OF APPROXIMATELY 102.90 ACRES. THE PROJECT IS LOCATED IN SECTION 01, 02, 03, 04, 05, 06, 08, 09, AND 16, TOWNSHIP 02 SOUTH, RANGE 7 EAST OR FROM LATITUDE 33°17'8" N AND LONGITUDE 111°40'54" W TO LATITUDE 33°17'30" N AND LONGITUDE 111°35'20" W IN MARICOPA COUNTY, ARIZONA.

CONSTRUCTION SEQUENCING

1. WATTLES, SILT FENCES, AND EROSION CONTROL MATS SHALL BE INSTALLED IN LOCATIONS SHOWN, AS WELL AS OTHER LOCATIONS AS DEEMED NECESSARY BY THE CONTRACTOR (I.E. DITCHES THAT DRAIN TO ANY DRAINAGE WAYS OR SWALES).
2. COMPLETE ALL CLEARING AND GRUBBING ON THE SITE. ANY VEGETATION IN AREAS THAT WILL NOT RECEIVE FILL OR THAT WILL NOT BE EXCAVATED SHALL NOT BE REMOVED.
3. CONSTRUCT IMPROVEMENTS AS SHOWN ON THE PLANS INCLUDING TRACK, DRAINAGE STRUCTURES, UTILITIES, ROAD ACCESS, AND ROADWAY IMPROVEMENTS.
4. ALL DISTURBED AREAS SHALL RECEIVE APPROPRIATE STABILIZATION MEASURES AND MULCHED AND THE WATTLES OR SILT FENCES REMOVED AFTER THE SITE IS STABILIZED.

SOIL SUMMARY

THE SOILS GENERALLY CONSISTS OF SOFT TO VERY STIFF, LEAN CLAY AND LOOSE TO MEDIUM CLAYEY SAND. OVERALL, THE RUNOFF POTENTIAL OF THIS SOIL WITHIN THE DRAINAGE AREA RANGES FROM LOW TO HIGH RUNOFF POTENTIAL WHEN THOROUGHLY WET (NRCS SOIL GROUPS CL AND SC).

NATIVE PLANT PROTECTION AND VEGETATION REMOVAL, AND STABILIZATION

THE DISTURBANCE OR REMOVAL OF VEGETATION MUST NOT EXCEED THE MINIMUM NECESSARY TO COMPLETE OPERATIONS AND MUST ONLY OCCUR WITHIN THE DEFINED WORK AREA.

STORMWATER POLLUTION PREVENTION MEASURES - EROSION AND SEDIMENT CONTROLS

SOIL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE IMPLEMENTED BEFORE INITIATING ANY CLEARING, GRADING, EXCAVATING, OR FILLING ACTIVITIES. ALL TEMPORARY AND PERMANENT SOIL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD AND UNTIL THE SITE IS STABILIZED. WORK WILL BE OUTSIDE THE ORDINARY HIGH WATER MARK.

THE WORK SHALL BE CONSTRUCTED WITH ADEQUATE EROSION CONTROL MEASURES (I.E., SILT FENCES) TO PREVENT TRANSPORT OF SEDIMENT AND MATERIALS TO THE ADJOINING WETLANDS AND/OR STREAMS. ALL AREAS AFFECTED BY CONSTRUCTION SHALL BE MULCHED AND SEEDED AS SOON AFTER CONSTRUCTION AS POSSIBLE. THE PERMITTEE SHALL UNDERTAKE NECESSARY MEASURES AND PROCEDURES TO REDUCE EROSION DURING CONSTRUCTION. INTERIM MEASURES TO PREVENT SOIL EROSION DURING CONSTRUCTION SHALL BE TAKEN AND MAY INCLUDE THE INSTALLATION OF STAKED STRAW BALES, SEDIMENTATION BASINS, SILT FENCE, WATTLES, AND TEMPORARY MULCHING. ALL CONSTRUCTION WITHIN THE WATERWAY SHALL BE CONDUCTED DURING ZERO TO LOW-FLOW CONDITIONS. THE FOLLOWING IS A MORE DETAILED SUMMARY OF CONTROLS:

1. DISTURBED AND STORED SOILS - ALL DISTURBED AREAS SHALL BE STABILIZED TO PREVENT SOIL FROM LEAVING THE SITE. IN THE NATURAL CONDITION, SOIL IS STABILIZED BY NATIVE VEGETATION. THE PRIMARY TECHNIQUE TO BE USED AT THIS PROJECT FOR STABILIZING SITE SOIL WILL BE TO PROVIDE A PROTECTIVE COVER OF TURF GRASS. FINAL SITE STABILIZATION IS ACHIEVED WHEN 70% OF PERMITTED CONSTRUCTION SITE HAS BEEN STABILIZED WITH PERENNIAL VEGETATION OR OTHER PERMANENT COVER.

   TEMPORARY SEEDING - WITHIN 14 DAYS AFTER CONSTRUCTION ACTIVITY CEASES ON ANY PARTICULAR AREA, ALL DISTURBED GROUND WHERE THERE WILL NOT BE CONSTRUCTION FOR LONGER THAN 21 DAYS MUST BE SEEDED WITH FAST-GERMINATING TEMPORARY SEED AND PROTECTED WITH MULCH.

   PERMANENT SEEDING - ALL AREAS AT FINAL GRADE MUST BE SEEDED WITHIN 14 DAYS AFTER COMPLETION OF THE MAJOR CONSTRUCTION ACTIVITY. EXCEPT FOR SMALL LEVEL SPOTS, SEEDED AREAS SHOULD GENERALLY BE PROTECTED WITH MULCH.

TO HELP PREVENT STORED SOILS, AND SOILS DURING CONSTRUCTION (BEFORE STABILIZATION) FROM LEAVING THE SITE, SEVERAL TEMPORARY STRUCTURES INCLUDING SILT FENCE, AND CONSTRUCTION ENTRANCE/EXITS ARE BEING IMPLEMENTED AS SHOWN ON THE EROSION AND SEDIMENT CONTROL PLAN. DETAILS OF THE PREVIOUSLY MENTIONED ITEMS ARE LOCATED WITHIN THIS EROSION AND SEDIMENT CONTROL PLAN. UNDER EXISTING CONDITIONS, A SERIES OF SEDIMENT BASINS, SEDIMENT TRAPS, INLET PROTECTION, WATTLES, AND SILT FENCE WILL BE INSTALLED TO CONTROL RUNOFF DURING CONSTRUCTION AND GRADING OPERATIONS.

CONSTRUCTION EXIT - ALL ACCESS POINTS FROM THE PUBLIC STREET INTO THE CONSTRUCTION SITE SHALL INCLUDE A CONSTRUCTION EXIT COMPOSED OF COURSE STONE TO THE DIMENSIONS SHOWN ON THE CONSTRUCTION DRAWINGS. THE ROUGH TEXTURE OF THE STONE HELPS TO REMOVE CLUMPS OF SOIL ADHERING TO CONSTRUCTION VEHICLE TIRES THROUGH THE ACTION OF VIBRATION AND JARRING OVER THE ROUGH SURFACE AND THE FRICTION OF THE STONE MATRIX AGAINST SOILS ATTACHED TO VEHICLE TIRES.

SILT FENCE - THE FENCE IS DESIGNED TO RETAIN SEDIMENT-LADEN WATER TO ALLOW SETTLEMENT OF SUSPENDED SOILS BEFORE FILTERING THROUGH THE MESH FABRIC FOR DISCHARGE DOWNSTREAM. SILT FENCE SHALL BE LOCATED TO CAPTURE OVERLAND, LOW-VELOCITY SHEET FLOWS SUCH THAT THE DRAINAGE AREA DOES NOT EXCEED 1/4 ACRE PER 100 FEET OF SILT FENCE LENGTH AND GRADIENT UPSTREAM OF SILT FENCE DOES NOT EXCEED 2% UNLESS OTHERWISE INDICATED. INSTALL SILT FENCES AT A FAIRLY LEVEL GRADE, ALONG THE CONTOUR, TO PROVIDE SUFFICIENT UPSTREAM STORAGE VOLUME FOR THE ANTICIPATED RUNOFF.

WATTLES - WATTLES ARE DESIGNED TO RETAIN SEDIMENT - LADEN WATER TO ALLOW SETTLEMENT OF SUSPENDED SOILS BEFORE FILTERING THROUGH THE FIBER FILLED WATTLE FOR DISCHARGE DOWNSTREAM. DURING HIGH FLOW WATTLES ACT AS A SPEED BUMP SLOWING THE VELOCITY OF THE WATER ALLOWING SEDIMENT PARTICLES TO SETTLE. WATTLES SHALL BE LOCATED TO CAPTURE LOW SURFACE FLOWS, NOT TO EXCEED 1 CFS FOR SMALL AREAS. WATTLES SHOULD BE INSTALLED ON CONTOUR WITH A SLIGHT DOWNWARD ANGLE AT THE END OF THE ROW IN ORDER TO PREVENT PONDING AT THE MID-SECTION. WATTLES SHOULD BE INSTALLED IN SHALLOW TRENCHES, TYPICALLY 3-5 INCHES DEEP FOR SOFT, LOAMY SOILS, AND 2-3 INCHES DEEP FOR HARD ROCKY SOILS. VERTICAL SPACING SHOULD BE DETERMINED BY SLOPE GRADIENT (TYPICALLY 1:1 SLOPES = 10 FT APART, 2:1 SLOPES = 20 FEET APART, AND 3:1 SLOPES = 30 FEET APART, ETC) AND SOIL TYPES (SOFT, LOAMY SOILS = ADJUST ROWS CLOSER TOGETHER, AND HARD, ROCKY SOILS = ADJUST ROWS FURTHER APART). CHECK THE MANUFACTURER GUIDELINES FOR MORE PRODUCT SPECIFIC GUIDELINES.

2. VEHICLE TRACKING OF SEDIMENTS - VEHICLES SHALL NOT BE DRIVEN, OR EQUIPMENT OPERATED, IN WATER-COVERED PORTIONS OF THE STREAM OR WHERE WETLAND VEGETATION, RIPARIAN VEGETATION, OR AQUATIC ORGANISMS MAY BE DESTROYED. ANY EQUIPMENT OR VEHICLES DRIVEN AND/OR OPERATED WITHIN OR ADJACENT TO THE STREAM SHALL BE CHECKED AND MAINTAINED DAILY TO PREVENT LEAKS OF MATERIALS THAT IF INTRODUCED TO WATER COULD BE DELETERIOUS TO AQUATIC LIFE. STAGING/STORAGE AREAS FOR EQUIPMENT AND MATERIALS SHALL BE LOCATED OUTSIDE OF THE STREAM.

STORMWATER POLLUTION PREVENTION MEASURES - OTHER POLLUTANT CONTROLS

1. HANDLING OF SUBSTANCES HAZARDOUS TO AQUATIC LIFE - THE LOADING, UNLOADING, STORING AND APPLICATION OF PESTICIDES, DETERGENTS, FUELS, SOLVENTS, OILS OR OTHER PETROLEUM PRODUCTS, OR ANY OTHER SUBSTANCES WHICH COULD BE HAZARDOUS TO AQUATIC LIFE, RESULTING FROM PROJECT RELATED ACTIVITIES, SHALL BE DONE IN A WAY THAT PREVENTS THEM FROM CONTAMINATING THE SOIL AND/OR ENTERING THE WATERS OF THE STATE. ANY OF THESE MATERIALS, PLACED WITHIN OR WHERE THEY MAY ENTER A STREAM OR LAKE, BY OPERATOR OR ANY PARTY WORKING UNDER CONTRACT, OR WITH THE PERMISSION OF THE OPERATOR, SHALL BE REMOVED IMMEDIATELY. ANY SPILLS OF HAZARDOUS MATERIALS, PETROLEUM PRODUCTS OR OTHER POLLUTANT SHALL BE REPORTED IMMEDIATELY TO THE APPROPRIATE AGENCIES WITHOUT DELAY.

2. VEHICLE AND EQUIPMENT MAINTENANCE AND FUELING FUEL TANKS - TEMPORARY ON-SITE FUEL TANKS FOR CONSTRUCTION VEHICLES SHALL MEET ALL STATE AND FEDERAL REGULATIONS. TANKS SHALL HAVE APPROVED SPILL CONTAINMENT WITH THE CAPACITY REQUIRED BY THE APPLICABLE REGULATIONS. THE TANK SHALL BE IN SOUND CONDITION FREE OF RUST OR OTHER DAMAGE WHICH MIGHT COMPROMISE CONTAINMENT. HOSES, VALVES, FITTINGS, CAPS, FILLER NOZZLES, AND ASSOCIATED HARDWARE SHALL BE MAINTAINED IN PROPER WORKING CONDITION AT ALL TIMES. THE LOCATION OF FUEL TANKS SHALL BE SHOWN ON THE SITE MAP.

3. CONCRETE TRUCK/EQUIPMENT WASHING - ALL CONCRETE WASHOUT LOCATIONS SHALL BE APPROVED BY THE ENGINEER AND IN ACCORDANCE WITH THE CONSTRUCTION GENERAL PERMIT.

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: EC001 of 036

UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EROSION & SEDIMENT CONTROL PLAN NOTES

Color table: K:\Bentley\Workspace\Projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable_020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Erosion Control\T_EC01-05_200927.dgn
Default
03/09/2026

4. FILL MATERIAL - ANY SPOIL MATERIAL EXCAVATED, DREDGED, OR OTHERWISE PRODUCED BY THE ACTIVITY WILL NOT BE RETURNED TO THE WATERWAY. THE MATERIAL SHALL BE DEPOSITED IN A SELF-CONTAINED AREA THAT IS IN COMPLIANCE WITH ALL STATE STATUTES, REGULATIONS, AND PERMIT REQUIREMENTS. ANY BACKFILLING SHALL BE DONE WITH CLEAN MATERIAL PLACED IN A MANNER TO PREVENT VIOLATION OF APPLICABLE WATER QUALITY STANDARDS.

5. ON-SITE WASTE MANAGEMENT PRACTICES - NO SOLID MATERIALS, INCLUDING BUILDING MATERIALS, ARE ALLOWED TO BE DISCHARGED FROM THE SITE WITH STORM WATER. ALL SOLID WASTE, INCLUDING DISPOSABLE MATERIALS INCIDENTAL TO THE MAJOR CONSTRUCTION ACTIVITIES, MUST BE COLLECTED AND PLACED IN CONTAINERS. THE CONTAINERS WILL BE EMPTIED AS NECESSARY BY A CONTRACT TRASH DISPOSAL SERVICE AND HAULED AWAY FROM THE SITE. THE LOCATION OF SOLID WASTE RECEPTACLES SHALL BE SHOWN ON THE SITE MAP.

   SUBSTANCES THAT HAVE THE POTENTIAL FOR POLLUTING SURFACE AND/OR GROUNDWATER MUST BE CONTROLLED BY WHATEVER MEANS NECESSARY IN ORDER TO ENSURE THAT THEY DO NOT DISCHARGE FROM THE SITE. AS AN EXAMPLE, SPECIAL CARE MUST BE EXERCISED DURING EQUIPMENT FUELING AND SERVICING OPERATIONS. IF A SPILL OCCURS, IT MUST BE CONTAINED AND DISPOSED, SO THAT IT WILL NOT FLOW FROM THE SITE OR ENTER GROUNDWATER, EVEN IF THIS REQUIRES REMOVAL, TREATMENT, AND DISPOSAL OF SOIL. IN THIS REGARD, POTENTIALLY POLLUTING SUBSTANCES SHOULD BE HANDLED IN A MANNER CONSISTENT WITH THE IMPACT THEY REPRESENT.

6. MANAGEMENT OF CONTAMINATED SOILS - IF CONTAMINATED SOILS ARE FOUND ON SITE THEY SHALL BE DISPOSED OF IN ACCORDANCE WITH THE ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY (AZDEQ).

7. WATER SOURCE - NON-STORMWATER COMPONENTS OF SITE DISCHARGE MUST BE CLEAN WATER. WATER USED FOR CONSTRUCTION WHICH DISCHARGES FROM THE SITE MUST ORIGINATE FROM A PUBLIC WATER SUPPLY OR PRIVATE WELL APPROVED BY THE STATE HEALTH DEPARTMENT. WATER USED FOR CONSTRUCTION THAT DOES NOT ORIGINATE FROM AN APPROVED PUBLIC SUPPLY MUST NOT DISCHARGE FROM THE SITE. IT CAN BE RETAINED IN THE PONDS UNTIL IT INFILTRATES AND EVAPORATES.

CONSTRUCTION PHASE "BEST MANAGEMENT PRACTICES (BMP)"

DURING THE CONSTRUCTION PHASE, THE GENERAL CONTRACTOR SHALL IMPLEMENT THE FOLLOWING MEASURES:

1. MATERIALS RESULTING FROM THE CLEARING AND GRUBBING OR EXCAVATION OPERATIONS SHALL BE STOCKPILED UPSLOPE FROM ADEQUATE SEDIMENTATION CONTROLS. MATERIALS REMOVED TO AN OFF-SITE LOCATION SHALL BE PROTECTED WITH APPROPRIATE CONTROLS AND PROPERLY PERMITTED.

2. THE GENERAL CONTRACTOR SHALL DESIGNATE AREAS FOR EQUIPMENT CLEANING, MAINTENANCE, AND REPAIR. THE GENERAL CONTRACTOR AND SUBCONTRACTORS SHALL UTILIZE SUCH DESIGNATED AREAS. CLEANING, MAINTENANCE, AND REPAIR AREAS SHALL BE PROTECTED BY A TEMPORARY PERIMETER BERM.

3. CHEMICALS, PAINTS, SOLVENTS, FERTILIZERS, AND OTHER TOXIC MATERIALS MUST BE STORED IN WEATHERPROOF CONTAINERS. EXCEPT DURING APPLICATION, THE CONTENTS MUST BE KEPT IN TRUCKS OR WITHIN STORAGE FACILITIES. RUNOFF CONTAINING SUCH MATERIAL MUST BE COLLECTED, REMOVED FROM THE SITE, TREATED, AND DISPOSED AT AN APPROVED SOLID WASTE OR CHEMICAL DISPOSAL FACILITY.

HAZARDOUS MATERIAL MANAGEMENT AND SPILL REPORTING PLAN

ANY HAZARDOUS OR POTENTIALLY HAZARDOUS MATERIAL THAT IS BROUGHT ONTO THE CONSTRUCTION SITE WILL BE HANDLED PROPERLY IN ORDER TO REDUCE THE POTENTIAL FOR STORMWATER POLLUTION. ALL MATERIALS USED ON THIS CONSTRUCTION SITE WILL BE PROPERLY STORED, HANDLED, DISPENSED, AND DISPOSED OF FOLLOWING ALL APPLICABLE LABEL DIRECTIONS. ONLY APPROVED CONTAINERS AND PORTABLE TANKS SHALL BE USED FOR STORAGE AND HANDLING OF FLAMMABLE AND COMBUSTIBLE LIQUIDS.

IN ORDER TO MINIMIZE THE POTENTIAL FOR A SPILL OF PETROLEUM PRODUCT OR HAZARDOUS MATERIALS TO COME IN CONTACT WITH STORMWATER, THE FOLLOWING STEPS WILL BE IMPLEMENTED:

1. ALL MATERIALS WITH HAZARDOUS PROPERTIES (SUCH AS PESTICIDES, PETROLEUM PRODUCTS, FERTILIZERS, DETERGENTS, CONSTRUCTION CHEMICALS, ACIDS, PAINTS, PAINT SOLVENTS, ADDITIVES FOR SOIL STABILIZATION, ETC.) WILL BE STORED IN A SECURE LOCATION, UNDER COVER, WHEN NOT IN USE.

2. THE MINIMUM PRACTICAL QUANTITY OF ALL SUCH MATERIALS WILL BE KEPT ON THE JOB SITE AND SCHEDULED FOR DELIVERY AS CLOSE TO TIME OF USE AS PRACTICAL.

3. A SPILL CONTROL AND CONTAINMENT KIT (CONTAINING FOR EXAMPLE, ABSORBENT MATERIAL SUCH AS KITTY LITTER OR SAWDUST, ACID NEUTRALIZING AGENT, BROOMS, DUST PANS, MOPS, RAGS, GLOVES, GOGGLES, PLASTIC AND METAL TRASH CONTAINERS, ETC.) WILL BE PROVIDED ON THE CONSTRUCTION SITE AND LOCATION(S) SHOWN ON SITE MAPS.

4. ALL PRODUCTS WILL BE STORED IN AND USED FROM THE ORIGINAL CONTAINER WITH THE ORIGINAL PRODUCT LABEL.

5. ALL PRODUCTS WILL BE USED IN STRICT COMPLIANCE WITH INSTRUCTIONS ON THE PRODUCT LABEL.

6. THE DISPOSAL OF EXCESS OR USED PRODUCTS WILL BE IN STRICT COMPLIANCE WITH INSTRUCTIONS ON THE PRODUCTS LABEL.

SPILL RESPONSE PLAN

CONSTRUCTION ACTIVITIES THAT HAVE THE POTENTIAL TO CONTRIBUTE TO POLLUTANTS, OTHER THAN SEDIMENT, TO STORMWATER RUNOFF INCLUDE: VEHICLE FLUIDS (OIL, GREASE, PETROLEUM, AND COOLANTS), CONCRETE MATERIALS (CEMENT, AGGREGATE, WASTE CONCRETE, JOINT AND CURING COMPOUNDS), PAINTING MATERIALS (PAINT, SOLVENTS, AND THINNERS), RAW LANDSCAPE MATERIALS (TOPSOIL, HERBICIDES, FERTILIZERS, AND MULCH), AND RAW MATERIALS (EMBANKMENT BACKFILL, OLD TIMBER TIES, AND OLD TRACK HARDWARE).

1. CONTAIN THE SPILL. KEEP IT FROM ENTERING SURFACE WATER BY USING SOCKS, PILLOWS, ABSORBENT MATS, AND DRAIN COVERS.

2. ONCE THE SPILL HAS BEEN CONTAINED IT MUST BE CLEANED UP IMMEDIATELY. ALL MATERIALS USED TO CLEAN THE SPILL SHALL BE DISPOSED OF AND HAULED OFF-SITE.

3. SPILL KITS WILL BE KEPT IN VARIOUS PLACES AROUND THE CONSTRUCTION SITE. EACH SPILL KIT SHOULD INCLUDE: NITRILE GLOVES, GOGGLES, SOCKS, PADS, PILLOWS, AND DISPOSAL BAGS WITH TIES. BELOW IS A LIST OF THE DIFFERENT KINDS OF SPILL KITS AND WHERE THEY CAN BE FOUND.

   A. GENERAL PURPOSE SPILL KITS - THESE KITS CONTAIN GREY ABSORBENTS WITH A CAPTURING AGENT TO PICK UP BOTH WATER BASED AND HYDROCARBON BASED FLUIDS. THERE SHOULD BE A LARGE GENERAL PURPOSE SPILL KIT KEPT IN THE STAGING AREA, AND A SMALL GENERAL PURPOSE SPILL KIT KEPT IN THE SUPERINTENDENT'S TRUCK.

   B. OIL SPILL KIT - THESE KITS CONTAIN WHITE ABSORBENTS THAT ARE MADE TO REPEL AND FLOAT ON WATER, THEREFORE THEY ARE USED ONLY FOR HYDROCARBON BASED FLUIDS ONLY. A SMALL SPILL OIL SPILL KITS SHOULD BE KEPT IN EACH VEHICLE BEING USED ON SITE, INCLUDING BUT NOT LIMITED TO: TRUCKS, CARS, GRADERS. SCRAPERS, EXCAVATORS, LOADERS, GENERATORS, COMPRESSORS, AND TRAFFIC CONTROL EQUIPMENT. IN ADDITION, THERE SHOULD BE A LARGE (50 GALLONS)SPILL KIT LOCATED IN THE STAGING AREA AND CONCRETE WASH AREA.

   C. HAZARDOUS WASTE SPILL KITS - THESE KITS CONTAIN YELLOW ABSORBENTS THAT ARE MADE TO CLEAN UP AGGRESSIVE FLUIDS SUCH AS ACIDS AND SOLVENTS, BUT THEY WILL ALSO ABSORB WATER BASED AND HYDROCARBON BASED FLUIDS. THESE SHOULD BE KEPT WITH ALL PAINTING AND CONCRETE SUPPLIES. THAT INCLUDES FROM WHEN THEY LEAVE THE STAGING AREA AND TRAVEL TO THE LOCATION OF NECESSITY.

RECEIVING WATERS

THE GENERAL TOPOGRAPHY OF THE SITE DRAINS TO TRACK SIDE DITCHES AND DISCHARGES INTO THE RITTENHOUSE OR ELLSWORTH CHANNEL.

INSPECTION AND MAINTENANCE REPORTS

BETWEEN THE TIME THE SWPPP IS IMPLEMENTED AND FINAL STABILIZATION, ALL DISTURBED AREAS AND POLLUTANT CONTROLS MUST BE INSPECTED AT LEAST ONCE EVERY FOURTEEN (14) CALENDAR DAYS AND WITHIN 24 HOURS FOLLOWING ANY PRECIPITATION OR SNOWMELT EVENT. THE PURPOSE OF SITE INSPECTIONS IS TO ASSESS PERFORMANCE OF EROSION AND SEDIMENT CONTROLS. THE INSPECTIONS WILL BE CONDUCTED BY THE CONTRACTOR. BASED ON THESE INSPECTIONS, THE CONTRACTOR WILL DECIDE WHETHER IT IS NECESSARY TO MODIFY THIS SWPPP, ADD OR RELOCATE CONTROLS, OR REVISE OR IMPLEMENT ADDITIONAL BEST MANAGEMENT PRACTICES IN ORDER TO PREVENT POLLUTANTS AND SEDIMENTS FROM LEAVING THE SITE VIA STORM WATER RUNOFF. THE CONTRACTOR SHALL BE RESPONSIBLE TO REPAIR, MODIFY, MAINTAIN, SUPPLEMENT, OR TAKE ADDITIONAL STEPS AS NECESSARY IN ORDER TO ACHIEVE EFFECTIVE POLLUTANT CONTROL.

EXAMPLES OF SPECIFIC ITEMS TO EVALUATE DURING SITE INSPECTIONS ARE LISTED BELOW. THIS LIST IS NOT INTENDED TO BE COMPREHENSIVE. DURING EACH INSPECTION, THE INSPECTOR MUST EVALUATE OVERALL POLLUTANT CONTROL SYSTEM PERFORMANCE AS WELL AS PARTICULAR DETAILS OF INDIVIDUAL SYSTEM COMPONENTS. ADDITIONAL FACTORS SHOULD BE CONSIDERED AS APPROPRIATE TO THE CIRCUMSTANCES.

1. LOCATIONS WHERE VEHICLES ENTER AND EXIT THE SITE MUST BE INSPECTED FOR EVIDENCE OF OFF-SITE SEDIMENT TRACKING. A STABILIZED CONSTRUCTION EXIT SHALL BE CONSTRUCTED WHERE VEHICLES ENTER AND EXIT. EXITS SHALL BE MAINTAINED OR SUPPLEMENTED AS NECESSARY TO PREVENT THE RELEASE OF SEDIMENT FROM VEHICLES LEAVING THE SITE.

2. SEDIMENT CONTROL BARRIERS MUST BE INSPECTED AND THEY MUST BE EXTENDED OR CLEANED AT SUCH TIME AS THEIR ORIGINAL CAPACITY HAS BEEN REDUCED BY 50 PERCENT. ALL MATERIAL EXCAVATED FROM BEHIND SEDIMENT CONTROL BARRIERS SHALL BE STOCKPILED ON THE UPSLOPE SIDE. ADDITIONAL SEDIMENT CONTROL BARRIERS MUST BE CONSTRUCTED AS NEEDED.

3. INSPECTIONS SHALL EVALUATE DISTURBED AREAS AND AREAS USED FOR STORING MATERIALS THAT ARE EXPOSED TO RAINFALL FOR EVIDENCE OF, OR THE POTENTIAL FOR, POLLUTANTS ENTERING THE DRAINAGE SYSTEM OR DISCHARGING FROM THE SITE. IF NECESSARY, THE MATERIALS MUST BE COVERED OR ORIGINAL COVERS MUST BE REPAIRED OR SUPPLEMENTED. ALSO, PROTECTIVE BERMS MUST BE CONSTRUCTED, IF NEEDED, IN ORDER TO CONTAIN RUNOFF FROM MATERIAL STORAGE AREAS.

4. GRASSED AREAS SHALL BE INSPECTED TO CONFIRM THAT A HEALTHY STAND OF GRASS IS MAINTAINED. THE SITE HAS ACHIEVED FINAL STABILIZATION ONCE ALL AREAS ARE COVERED WITH BUILDING FOUNDATION OR PAVEMENT, OR HAVE A STAND OF GRASS WITH AT LEAST SEVENTY PERCENT (70%) OF PRE-DISTURBED LEVELS, OR PERMANENT, PHYSICAL EROSION REDUCTION METHODS HAVE BEEN EMPLOYED. AREAS MUST BE WATERED, FERTILIZED, AND RESEEDED AS NEEDED TO ACHIEVE THIS REQUIREMENT. ALL APPROPRIATE BMPS MUST REMAIN IN PLACE, AND IN COMPLIANCE UNTIL FINAL STABILIZATION IS MET.

5. ALL DISCHARGE POINTS MUST BE INSPECTED TO DETERMINE WHETHER EROSION CONTROL MEASURES ARE EFFECTIVE IN PREVENTING SIGNIFICANT IMPACTS TO RECEIVING WATERS.

THE INSPECTION REPORT MUST IDENTIFY ALL DEFICIENCIES, ANY CORRECTIONS, WHETHER THEY ARE IDENTIFIED DURING THE CURRENT INSPECTION OR HAVE OCCURRED SINCE THE PREVIOUS INSPECTION, AND ANY ADDITIONAL COMMENTS. FOR INSPECTIONS FOLLOWING A PRECIPITATION EVENT, THE REPORT SHALL CLEARLY NOTE THE RAINFALL TOTAL AS MEASURED IN THE ON-SITE RAIN GAUGE. BASED ON INSPECTION RESULTS, ANY MODIFICATION NECESSARY TO INCREASE EFFECTIVENESS OF THIS SWPPP TO AN ACCEPTABLE LEVEL MUST BE MADE WITHIN SEVEN (7) CALENDAR DAYS OF THE INSPECTION. THE INSPECTION REPORTS MUST BE COMPLETE AND ADDITIONAL REMARKS SHOULD BE INCLUDED IF NEEDED TO FULLY DESCRIBE A SITUATION. AN IMPORTANT ASPECT OF THE INSPECTION REPORT IS THE DESCRIPTION OF ADDITIONAL MEASURES THAT NEED TO BE TAKEN TO ENHANCE PLAN EFFECTIVENESS. THE INSPECTION REPORT MUST IDENTIFY WHETHER THE SITE WAS IN COMPLIANCE WITH THE SWPPP AT THE TIME OF INSPECTION AND SPECIFICALLY IDENTIFY ALL INCIDENTS OF NON-COMPLIANCE

INSPECTOR'S QUALIFICATIONS MUST BE ENTERED ON THE INSPECTION REPORT. INSPECTION REPORTS MUST INCLUDE AN ORIGINAL, AUTHORIZED SIGNATURE AND DATE OF THE INSPECTION. INSPECTION REPORTS MUST BE RETAINED BY THE CONTRACTOR AS AN INTEGRAL PART OF THIS SWPPP FOR AT LEAST THREE (3) YEARS FROM THE EXPIRATION OR INACTIVATION OF PERMIT COVERAGE.

ULTIMATELY, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ASSURE THE ADEQUACY OF SITE POLLUTANT DISCHARGE CONTROLS. ACTUAL PHYSICAL SITE CONDITIONS OR CONTRACTOR PRACTICES COULD MAKE IT NECESSARY TO INSTALL MORE STRUCTURAL AND NON-STRUCTURAL CONTROLS THAN ARE SHOWN ON THE PLANS. (FOR EXAMPLE, LOCALIZED CONCENTRATIONS OF RUNOFF COULD MAKE IT NECESSARY TO INSTALL ADDITIONAL SEDIMENT CONTROL BARRIERS.) ASSESSING THE NEED FOR ADDITIONAL CONTROLS AND IMPLEMENTING THEM OR ADJUSTING EXISTING CONTROLS WILL BE A CONTINUING ASPECT OF THIS SWPPP UNTIL THE SITE ACHIEVES FINAL STABILIZATION.

NOTIFICATIONS AND ON-SITE DOCUMENTATION

A COPY OF ALL PERMITS SHALL BE PROVIDED TO ALL WORK CREW SUPERVISORS WHO WORK IN OR NEAR THE PROJECT SITE DURING CONSTRUCTION. A COPY OF ALL PERMITS MUST BE AVAILABLE UPON REQUEST AT THE WORK SITE. SUPERVISORS SHALL ENSURE THAT ALL EMPLOYEES WHO WORK IN OR NEAR THE PROJECT ARE COMPLETELY FAMILIAR WITH THE TERMS AND CONDITIONS OF THE PERMIT CONDITIONS AND SHALL ENSURE COMPLIANCE WITH ALL TERMS AND CONDITIONS.

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: EC002 of 036

UNION PACIFIC RAILROAD
Sheet 177 of 587
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track
SHEET TITLE:
EROSION & SEDIMENT CONTROL PLAN NOTES

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Erosion Control\T_EC01-05_200927.dgn
Default
3/9/2026

FAILURE TO PERFORM

FAILURE TO IMPLEMENT SWPPP PUTS THE PROJECT IN AUTOMATIC VIOLATION OF THE APPLICABLE PERMIT.

INSPECTION NOTES

1. STANDARD INSPECTIONS - A THOROUGH INSPECTION OF THE BEST MANAGEMENT PRACTICES (BMPS) SHALL BE PERFORMED EVERY FOURTEEN (14) CALENDAR DAYS AND WITHIN TWENTY-FOUR (24) HOURS AFTER ANY PRECIPITATION OR SNOWMELT EVENT THAT CAUSES SURFACE EROSION.

2. POST-STORM EVENT INSPECTIONS AT TEMPORARILY IDLE SITES - IF NO CONSTRUCTION ACTIVITIES WILL OCCUR FOLLOWING A STORM EVENT, POST-STORM EVENT INSPECTIONS SHALL BE CONDUCTED PRIOR TO RE-COMMENCING CONSTRUCTION ACTIVITIES, BUT NO LATER THAN SEVENTY-TWO (72) HOURS FOLLOWING THE STORM EVENT. THE OCCURRENCE OF ANY SUCH DELAYED INSPECTION MUST BE DOCUMENTED IN THE INSPECTION RECORD.

3. INSPECTIONS AT COMPLETED SITES/AREAS - FOR SITES OR PORTIONS OF SITES THAT MEET THE COMPLETED CONSTRUCTION CRITERIA, BUT FINAL STABILIZATION HAS NOT BEEN ACHIEVED DUE TO A VEGETATIVE COVER THAT HAS NOT BECOME ESTABLISHED, THE PERMITTEE SHALL INSPECT THE SITE AT LEAST ONCE EVERY MONTH IN COMPLIANCE WITH THE AZDEQ STORMWATER CONSTRUCTION PERMIT.

4. ALL INSPECTIONS AND MAINTENANCE MUST BE DOCUMENTED BY THE SWPPP ADMINISTRATOR AND MADE AVAILABLE TO THE AZDEQ UPON REQUEST. ANY BMP THAT HAS BEEN COMPROMISED OR HAS BEEN DISTURBED SHALL BE REPLACED OR RECONSTRUCTED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO HAVE ALL BMPS IN PLACE AND EFFECTIVE PRIOR TO A STORM EVENT.

5. THE CONTRACTOR SHALL KEEP A RECORD OF INSPECTIONS IN ACCORDANCE WITH THE AZDEQ STORMWATER CONSTRUCTION PERMIT. INSPECTION REPORTS MUST BE UPDATED EVERY FOURTEEN (14) DAYS AND SHALL REMAIN ON SITE AND AVAILABLE FOR REVIEW BY MARICOPA COUNTY AND THE AZDEQ UPON REQUEST.

EROSION AND SEDIMENT CONTROL AND OTHER POLLUTANT CONTROL NOTES

1. STOCKPILES INCLUDING LANDSCAPING MATERIALS, EARTH MATERIALS, AND DIRT FROM GRADING OR EXCAVATION SHALL NOT BE LOCATED ADJACENT TO WATERWAYS AND SHALL BE STABILIZED WITHIN 14 DAYS OF ESTABLISHMENT BY SURFACE ROUGHENING, SEEDING, AND MULCHING; AND SHALL NOT EXCEED TEN (10) FEET IN HEIGHT.

2. ALL STREETS AND ANY OTHER PAVED SURFACES WITHIN, AND IMMEDIATELY SURROUNDING A CONSTRUCTION SITE SHALL BE CLEANED OF DIRT AND DEBRIS ON A DAILY BASIS. STREETS SHALL BE CLEANED BY SCRAPING AND SWEEPING THE DIRT OFF THE ROADWAYS.

3. ALL CONSTRUCTION SITE OPERATORS SHALL CONTROL WASTE SUCH AS DISCARDED BUILDING MATERIALS, HAZARDOUS CHEMICALS (TO INCLUDE, BUT NOT LIMITED TO HEAVY EQUIPMENT MAINTENANCE FLUIDS, MOTOR OIL, ANTIFREEZE AND VEHICLE FUEL), LITTER, AND SANITARY WASTE AT THE CONSTRUCTION SITE THAT MAY CAUSE ADVERSE IMPACTS TO STORMWATER QUALITY.

4. ALL POTENTIAL ON-SITE POLLUTION SOURCES SHALL BE IDENTIFIED AND HAVE CONTROL MEASURES INSTALLED AND PRACTICED TO MINIMIZE THE LIKELIHOOD OF A RELEASE. REFER TO THE SPILL PREVENTION, CONTROL, AND COUNTERMEASURE (SPCC) PLAN FOR MEASURES TO RESPOND TO ANY SPILLS, LEAKS OR OTHER RELEASES.

5. ALL PORTABLE TOILET FACILITIES SHALL BE LOCATED A MINIMUM OF TWENTY (20) FEET AWAY FROM ALL DRAINAGE SYSTEMS, RECEIVING WATERS, AND AREAS SUSCEPTIBLE TO FLOODING, HIGH WINDS, HEAVY TRAFFIC AREAS, OR DAMAGE BY CONSTRUCTION EQUIPMENT. ALL PORTABLE TOILET FACILITIES SHALL BE SECURED IN PLACE BY STAKES SET INTO THE GROUND TO PREVENT TIPPING. IF THE MINIMUM DISTANCE FROM ALL DRAINAGE SYSTEMS CANNOT BE MET, THE PORTABLE TOILET FACILITY SHALL HAVE SECONDARY CONTAINMENT.

6. ALL MATERIAL IMPORTED TO OR EXPORTED FROM THE SITE SHALL BE PROPERLY COVERED TO PREVENT THE LOSS OF MATERIAL DURING TRANSPORT.

PERFORMANCE STANDARD NOTES

THE GENERAL PERFORMANCE REQUIREMENTS FOR EROSION CONTROL WORK SHALL BE AS FOLLOWS:

1. TEMPORARY AND/OR PERMANENT BMPS INTENDED TO CONTROL EROSION OF AN EARTH DISTURBANCE OPERATION SHALL BE INSTALLED BEFORE ANY EARTH DISTURBANCE OPERATIONS TAKE PLACE. ALL OTHER REQUIRED EROSION CONTROL MEASURES SHALL BE INSTALLED AT THE APPROPRIATE TIME IN THE CONSTRUCTION SEQUENCE AS INDICATED IN THE APPROVED PROJECT SCHEDULE, CONSTRUCTION PLANS, AND STORMWATER MANAGEMENT PLANS.

2. AT ALL TIMES DURING CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PREVENTING AND CONTROLLING ON-SITE EROSION INCLUDING KEEPING THE PROPERTY SUFFICIENTLY WATERED SO AS TO MINIMIZE WIND BLOWN SEDIMENT. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR INSTALLING AND MAINTAINING ALL EROSION CONTROL FACILITIES SHOWN WITHIN.

3. EARTH DISTURBANCES SHALL BE CONDUCTED IN SUCH A MANNER SO AS TO EFFECTIVELY REDUCE ACCELERATED SOIL EROSION AND RESULTING SEDIMENTATION.

4. PERSONS ENGAGED IN EARTH DISTURBANCES SHALL IMPLEMENT AND MAINTAIN ACCEPTABLE SOIL EROSION AND SEDIMENTATION CONTROL MEASURES, IN CONFORMANCE WITH AZDEQ STORMWATER CONSTRUCTION PERMIT.

5. EARTH DISTURBANCES SHALL BE DESIGNED, CONSTRUCTED, AND COMPLETED IN SUCH A MANNER SO THAT THE EXPOSED AREA OF ANY DISTURBED LAND SHALL BE LIMITED TO THE SHORTEST POSSIBLE PERIOD OF TIME.

6. SEDIMENT CAUSED BY ACCELERATED SOIL EROSION SHALL BE REMOVED FROM RUNOFF BEFORE LEAVING THE SITE OF THE EARTH DISTURBANCE.

7. ANY TEMPORARY OR PERMANENT FACILITY DESIGNED AND CONSTRUCTED FOR THE CONVEYANCE OF WATER AROUND, THROUGH, OR FROM THE EARTH DISTURBANCE AREA SHALL BE DESIGNED TO LIMIT THE WATER FLOW TO A NON-EROSIVE VELOCITY.

8. CONDITIONS IN THE FIELD MAY WARRANT EROSION CONTROL MEASURES IN ADDITION TO WHAT IS SHOWN ON THESE PLANS. THE CONTRACTOR SHALL IMPLEMENT WHATEVER MEASURES ARE DETERMINED NECESSARY, AS DIRECTED BY MARICOPA COUNTY AND AZDEQ.

9. EROSION AND SEDIMENT CONTROL MEASURES FOR ALL SLOPES, CHANNELS, DITCHES, OR ANY DISTURBED LAND AREA SHALL BE COMPLETED WITHIN FOURTEEN (14) CALENDAR DAYS AFTER FINAL GRADING.

10. DISTURBED AREAS AND STOCKPILES WHICH ARE NOT AT FINAL GRADE, BUT WILL REMAIN DORMANT FOR LONGER THAT FOURTEEN (14) DAYS, SHALL ALSO BE TEMPORARILY STABILIZED WITHIN FOURTEEN (14) DAYS AFTER INTERIM GRADING. AN AREA THAT IS GOING TO REMAIN IN AN INTERIM STATE FOR MORE THAN THIRTY (30) DAYS SHALL BE SEEDED.

11. SEDIMENT CONTROL MEASURES SHALL REMAIN IN PLACE UNTIL SUCH TIME AS ALL THE SURROUNDING DISTURBED AREAS ARE SUFFICIENTLY STABILIZED.

12. FINAL STABILIZATION IS REACHED WHEN ALL SOIL DISTURBING ACTIVITIES AT THE SITE HAVE BEEN COMPLETED, AND UNIFORM VEGETATIVE COVER HAS BEEN ESTABLISHED WITH A DENSITY OF AT LEAST SEVENTY PERCENT (70%) OF PRE-DISTURBANCE LEVELS OR EQUIVALENT PERMANENT, PHYSICAL EROSION REDUCTION METHODS HAS BEEN EMPLOYED.

13. SEDIMENT CONTROL MEASURES SHALL BE REMOVED WHEN THEY ARE NO LONGER FUNCTIONAL OR AFTER THE SITE HAS BEEN SUFFICIENTLY STABILIZED AS DETERMINED BY THE STORMWATER INSPECTOR.

14. WHEN TEMPORARY EROSION CONTROL MEASURES ARE REMOVED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CLEANUP AND REMOVAL OF ALL SEDIMENT AND DEBRIS FROM ALL DRAINAGE INFRASTRUCTURE AND OTHER PUBLIC FACILITIES.

15. RECORDS OF SPILLS, LEAKS, OR OVERFLOWS THAT RESULT IN THE DISCHARGE OF POLLUTANTS MUST BE DOCUMENTED AND MAINTAINED. SOME SPILLS MAY NEED TO BE REPORTED TO THE AZDEQ IMMEDIATELY; SPECIFICALLY, A RELEASE OF ANY CHEMICAL, OIL, PETROLEUM PRODUCT, SEWAGE, ETC., WHICH MAY ENTER WATERS OF THE STATE, MUST BE REPORTED.

BMP MAINTENANCE NOTES

THE GENERAL MAINTENANCE REQUIREMENTS FOR BMPS SHALL BE AS FOLLOWS:

1. IT IS ANTICIPATED THAT THE BMPS IMPLEMENTED AT THE SITE WILL HAVE TO BE MODIFIED TO ADAPT TO CHANGING CONDITIONS OR TO ENSURE THAT POTENTIAL POLLUTANTS ARE BEING PROPERLY MANAGED AT THE SITE. WHEN BMPS ARE MODIFIED, THE SWPPP MUST BE MODIFIED TO ACCURATELY REFLECT THE ACTUAL FIELD CONDITIONS.

2. THE CONTRACTOR SHALL CONTINUOUSLY MAINTAIN ALL SILT FENCING, SO THAT IT FUNCTIONS PROPERLY DURING CONSTRUCTION AND WORK SUSPENSIONS. ALL SILT FENCING SHALL BE REMOVED BY THE CONTRACTOR UPON SUBSTANTIAL PERMANENT STABILIZATION.

3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE VEHICLE TRACKING CONTROL DURING THE ENTIRE TIME THAT IT IS IN USE IN THE PROJECT. THE VEHICLE TRACKING CONTROL SHALL BE REMOVED AT THE COMPLETION OF THIS PROJECT.

4. ALL SPILLS SHALL BE CLEANED UP IMMEDIATELY AFTER DISCOVERY, OR CONTAINED UNTIL APPROPRIATE CLEANUP METHODS CAN BE EMPLOYED. MANUFACTURE'S RECOMMENDED METHODS FOR SPILL CLEANUP SHALL BE FOLLOWED, ALONG WITH PROPER DISPOSAL METHODS.

TOWN OF QUEEN CREEK SWPPP NOTES

1. A COPY OF THE APPROVED GRADING AND DRAINAGE PLAN FOR THIS PROJECT, TOGETHER WITH A COPY OF THE NOTICE OF INTENT (NOI) AND THE STORM WATER POLLUTION PREVENTION PLAN (SWPPP) SHALL BE MAINTAINED ON THE SITE AND AVAILABLE FOR REVIEW. THOSE ELEMENTS OF THE GRADING AND DRAINAGE PLAN PERTINENT TO OR REFERENCED ON THE SWPPP SHALL BE CONSIDERED PART OF THE SWPPP.

2. THE CONTRACTOR SHALL NOTIFY THE TOWN OF QUEEN CREEK PUBLIC WORKS DEPARTMENTAT LEAST 24 HOURS IN ADVANCE OF ANY INSPECTIONS.

3. THE OPERATOR SHALL OBTAIN A DUST CONTROL PERMIT FROM THE COUNTY AND PERFORM MEASURES AS REQUIRED BY THE PERMIT TO PREVENT EXCESS DUST.

4. THE OPERATOR SHALL PERFORM, AT A MINIMUM, A VISUAL INSPECTION OF THE CONSTRUCTION SITE ONCE EVERY MONTH AND WITHIN 24 HOURS OF RAINFALL GREATER THAN OR EQUAL TO ONE HALF INCH OR MORE. THE OPERATOR SHALL PREPARE A REPORT DOCUMENTING HIS/HER FINDINGS ON THE CONDITIONS OF THE SWPPP CONTROLS AND NOTE ANY EROSION PROBLEM AREAS. THE OPERATORS REPORT IS TO BE SUBMITTED TO THE PUBLIC WORKS DEPARTMENT FOR REVIEW AND APPROVAL. FACILITIES SHALL BE MAINTAINED AS NECESSARY TO ENSURE THERE CONTINUED FUNCTIONING. IN ADDITION, ALL TEMPORARY SILTATION CONTROLS SHALL BE MAINTAINED IN A SATISFACTORY CONDITION UNTIL SUCH TIME THAT CLEARING AND/OR CONSTRUCTION IS COMPLETED, AND THE POTENTIAL FOR EROSION HAS PASSED.

5. THE OPERATOR SHALL AMEND THIS PLAN AS NECESSARY DURING THE COARSE OR CONSTRUCTION TO RESOLVE ANY PROBLEM AREAS THAT BECOME EVIDENT DURING THE CONSTRUCTION AND/OR DURING RAINFALLS.

6. THE PERMITTEE SHALL FILE A NOTICE OF TERMINATION (NOT) AFTER COMPLETION OF CONSTRUCTION AND PLACEMENT OF FINAL LANDSCAPE MATERIALS. THE NOT IS TO BE SUBMITTED TO THE PUBLIC WORKS DEPARTMENT TO FINAL THE SWPPP PERMIT.

7. THE PERMITTEE SHALL SAVE ALL RECORDS, INCLUDING THE NOI, SWPPP, NOT, AND THE INSPECTION REPORTS, ON FILE FOR A MINIMUM OF THREE YEARS FROM THE DATE OF FILING THE NOT.

8. THE IMPLEMENTATION OF THESE PLANS AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPGRADING OF THESE FACILITIES IS THE RESPONSIBILITY OF THE PERMITTEE/CONTRACTOR UNTIL ALL CONSTRUCTION IS APPROVED AND THE NOT IS SUBMITTED TO THE PUBLIC WORKS DEPARTMENT.

9. THE FACILITIES SHOWN ON THIS PLAN MUST BE CONSTRUCTED IN CONJUNCTION WITH ALL CLEARING AND GRADING ACTIVITIES IN SUCH A MANNER AS TO INSURE THAT SEDIMENT-LADEN WATER DOES NOT ENTER THE DRAINAGE SYSTEM OR VIOLATE APPLICABLE WATER STANDARDS, AND MUST BE INSTALLED AND IN OPERATION PRIOR TO ANY GRADING OR LAND CLEARING. WHEREVER POSSIBLE, MAINTAIN NATURAL VEGETATION FOR SILT CONTROL.

10. THE CONTRACTOR'S NOI MUST BE RECEIVED PRIOR TO THE SWPPP PERMIT BEING ISSUED. THE CONTRACTOR THAT WILL BE PULLING THE G&D PERMIT MUST HAVE THE SWPPP PERMIT IN THEIR NAME.

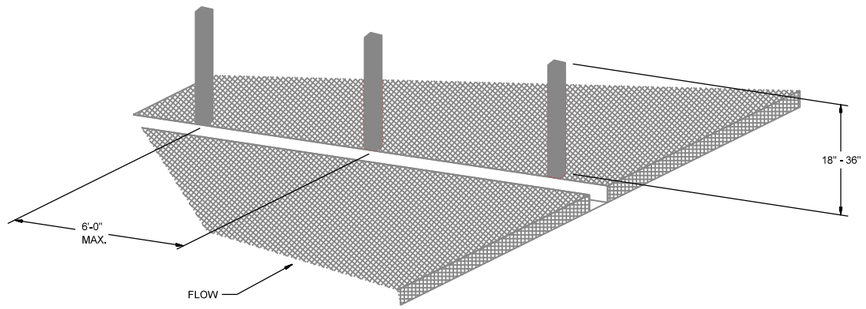
olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

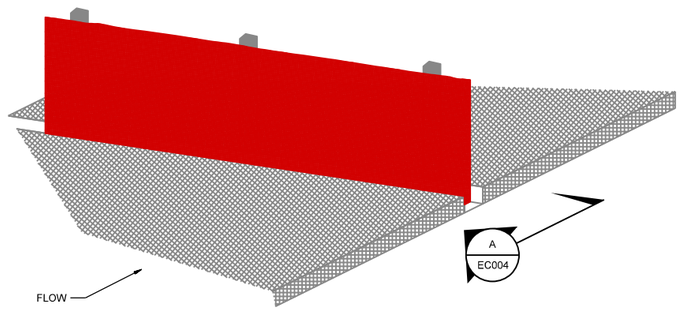
DRAWN BY: JTD	UNION PACIFIC RAILROAD — Sheet 178 of 587
CHECKED BY: JRM	LOCATION & DESCRIPTION: Mesa, Arizona - Maricopa County; Phoenix Subdivision MP 934.78 to MP 937.83; Construct Industrial Lead Track
DATE: 03/09/2026	
SHEET NUMBER: EC003 of 036	SHEET TITLE: EROSION & SEDIMENT CONTROL PLAN NOTES

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Erosion Control\EC01_EC01-05_200927.dgn
Default
3/9/2026

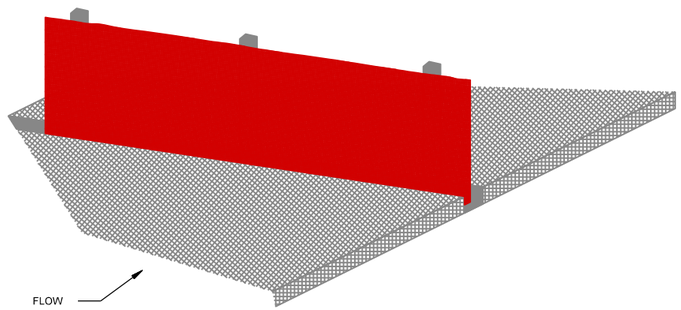
1. SET POSTS AND EXCAVATE 4" X 4" TRENCH UPSLOPE ALONG LINE OF POSTS.



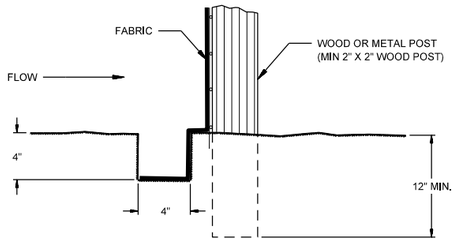
2. ATTACH EXTRA STRENGTH FILTER FABRIC TO POSTS AND EXTEND INTO TRENCH.



3. BACKFILL AND COMPACT TRENCH.



SILT FENCE
NOT TO SCALE

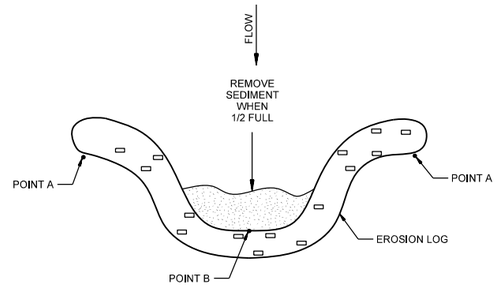


TRENCH INSTALLATION SECTION
NOT TO SCALE

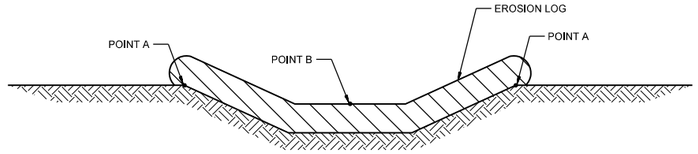
A
EC004

NOTES:

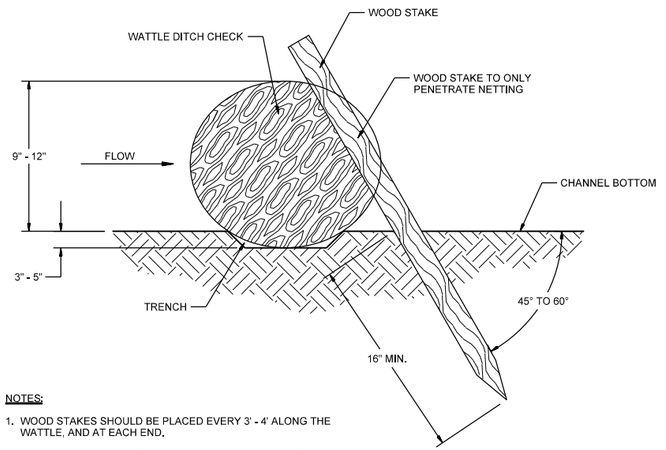
1. SET POSTS A MAX. OF 10' APART IF WIRE FENCE IS USED AND MAX. 6' APART IF EXTRA STRENGTH FABRIC IS USED ALONE. EMBED BOTH A MIN. OF 12".
2. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO POSTS WITH STAPLES.
3. FILTER FABRIC TO BE FASTENED TO WIRE FENCE, WITH TIES SPACED EVERY 24" AT TOP AND MIDSECTION.
4. MIN. HEIGHT OF FILTER FABRIC TO BE 18" AND MAX. OF 36" ABOVE NATURAL GROUND.
5. WHEN TWO SECTIONS OF FILTER FABRIC ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED 6" AT THE POSTS AND FOLDED.
6. SEE MANUFACTURER'S GUIDELINES FOR SPECIFIC INSTRUCTIONS.



PLAN



ELEVATION



NOTES:

1. WOOD STAKES SHOULD BE PLACED EVERY 3' - 4' ALONG THE WATTLE, AND AT EACH END.
2. WHEN TWO SECTIONS OF WATTLES ARE ADJOINED TOGETHER THEY SHOULD BE BUTTED TOGETHER AS TIGHT AS POSSIBLE.
3. SEE MANUFACTURER'S GUIDELINES FOR SPECIFIC INSTRUCTIONS.

WATTLE DITCH CHECK
NOT TO SCALE

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

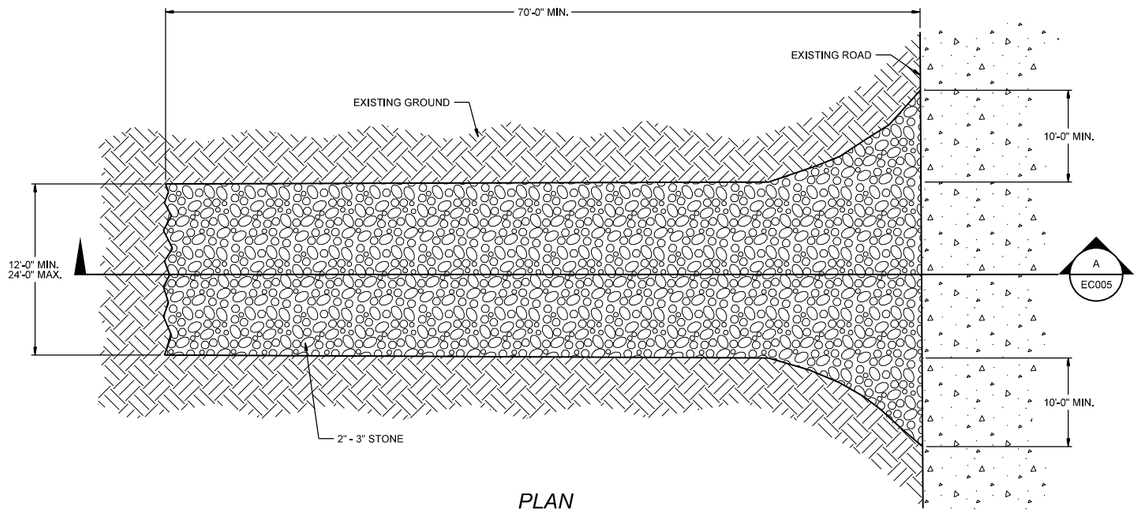
DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	EC004 of 036

UNION PACIFIC RAILROAD

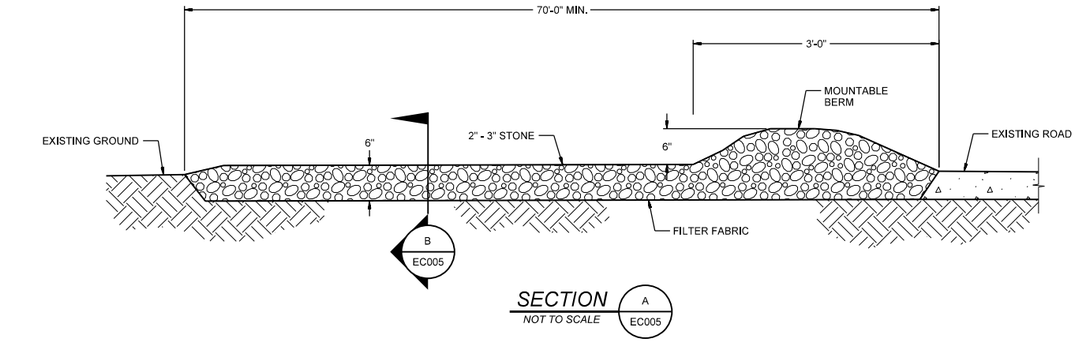
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EROSION CONTROL DETAILS

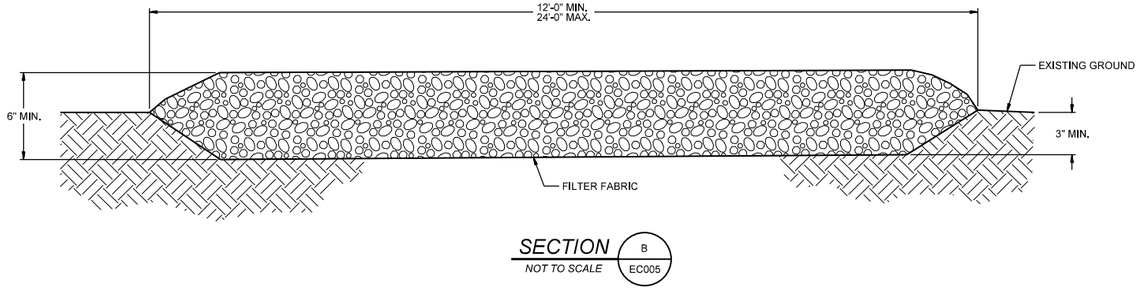
Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501:1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501:1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Erosion Control\T_EC01-05_200927.dgn
Default
3/9/2026



PLAN

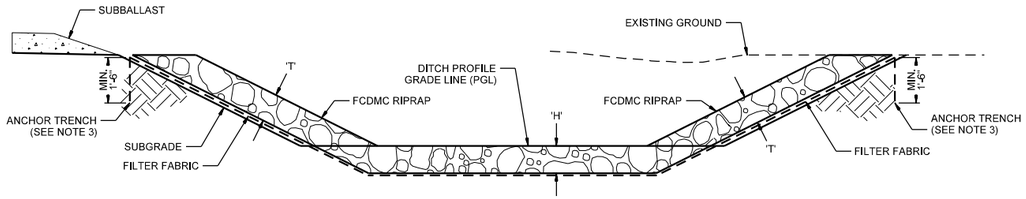


SECTION A EC005
NOT TO SCALE



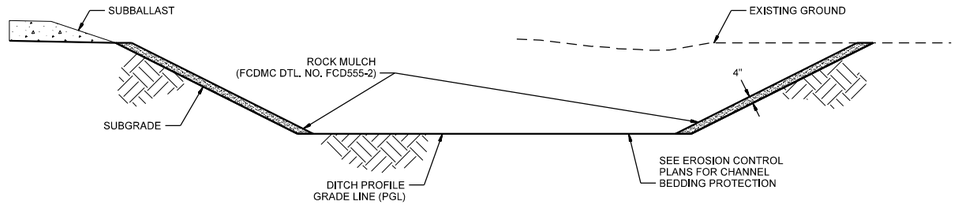
SECTION B EC005
NOT TO SCALE

CONSTRUCTION ENTRANCE
NOT TO SCALE

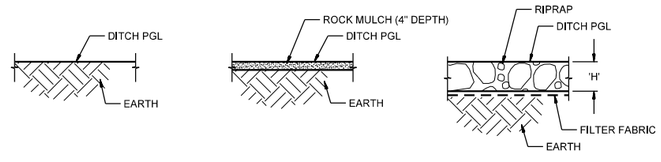


RIPRAP SLOPE PROTECTION
NOT TO SCALE

T = RIPRAP THICKNESS
(PERPENDICULAR TO SLOPE)
H = CHANNEL BED DEPTH



ROCK MULCH SLOPE PROTECTION
NOT TO SCALE



SECTION 1 SECTION 2 SECTION 3

CHANNEL BEDDING PROTECTION
NOT TO SCALE

NOTES:

1. FINISHED GRADES AND ELEVATIONS OF DITCH BOTTOMS SHALL CONFORM TO DITCH PROFILE GRADE LINES.
2. ROCK MULCH, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS AND DETAIL NO. FCD555-2.
3. ALL LOOSE RIPRAP SHALL HAVE FILTER FABRIC UNDERLAYMENT, WHICH SHALL BE INSTALLED PER MANUFACTURERS' RECOMMENDATIONS.
4. ALL RIPRAP SHALL MEET FCDMC GRADATIONS AND SPECIFICATIONS.
5. SLOPE PROTECTION AND CHANNEL BEDDING PROTECTION INCLUDES ALL MATERIALS, EQUIPMENT, TOOLS, LABOR, TRANSPORTATION, GRADING, EXCAVATION, HAULING, INSTALLATION OF FILTER FABRIC, PLACEMENT OF MATERIALS, BACKFILL, OR OTHER INCIDENTALS NECESSARY TO COMPLETE THE WORK.

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

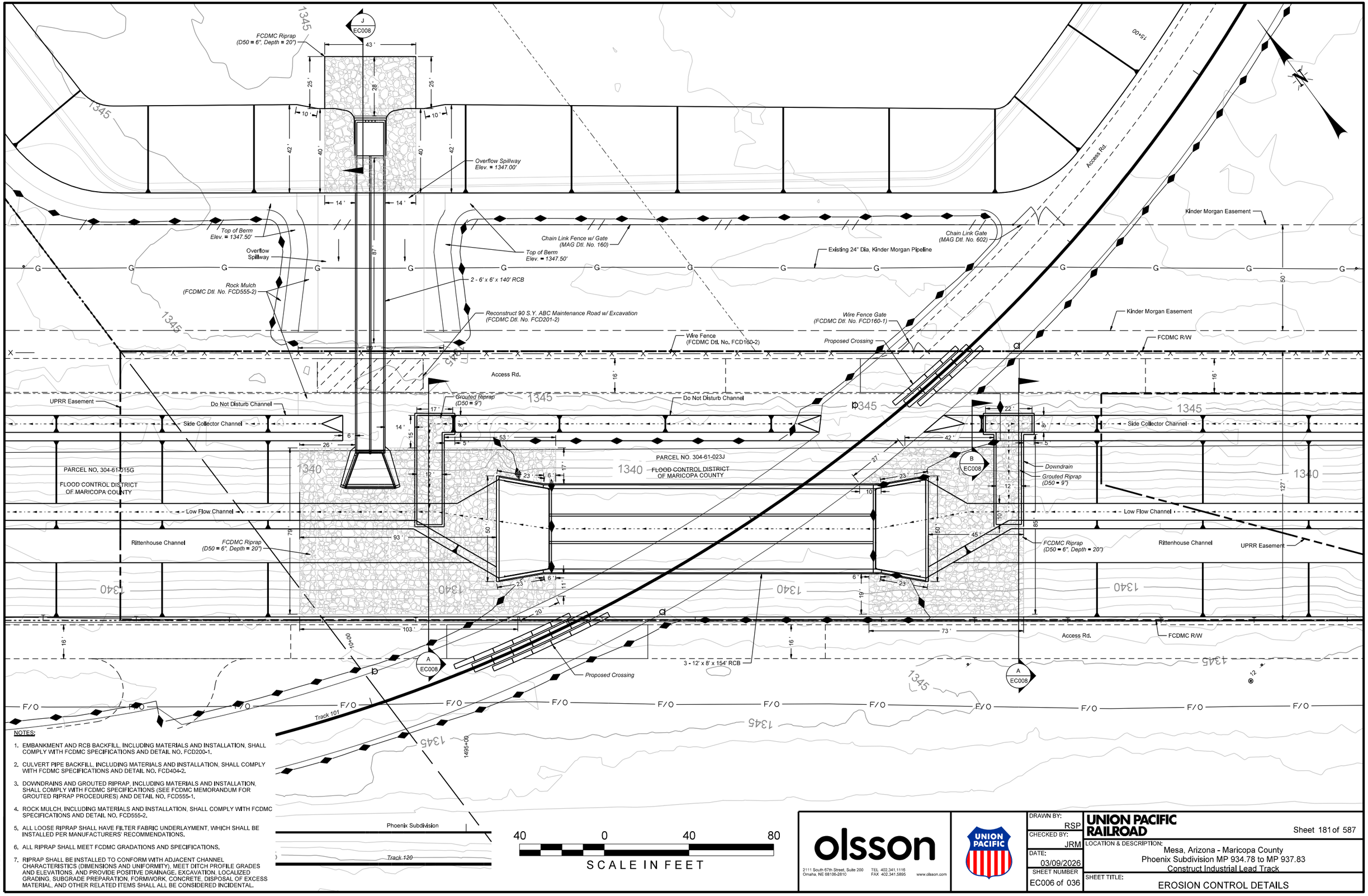
DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: EC005 of 036

UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EROSION CONTROL DETAILS

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Erosion Control\T_EC01-
Default
3/9/2026



NOTES:

1. EMBANKMENT AND RCB BACKFILL, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS AND DETAIL NO. FCD200-1.
2. CULVERT PIPE BACKFILL, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS AND DETAIL NO. FCD404-2.
3. DOWNDRAINS AND GROUTED RIPRAP, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS (SEE FCDMC MEMORANDUM FOR GROUTED RIPRAP PROCEDURES) AND DETAIL NO. FCD555-1.
4. ROCK MULCH, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS AND DETAIL NO. FCD555-2.
5. ALL LOOSE RIPRAP SHALL HAVE FILTER FABRIC UNDERLAYMENT, WHICH SHALL BE INSTALLED PER MANUFACTURERS' RECOMMENDATIONS.
6. ALL RIPRAP SHALL MEET FCDMC GRADATIONS AND SPECIFICATIONS.
7. RIPRAP SHALL BE INSTALLED TO CONFORM WITH ADJACENT CHANNEL CHARACTERISTICS (DIMENSIONS AND UNIFORMITY), MEET DITCH PROFILE GRADES AND ELEVATIONS, AND PROVIDE POSITIVE DRAINAGE. EXCAVATION, LOCALIZED GRADING, SUBGRADE PREPARATION, FORMWORK, CONCRETE, DISPOSAL OF EXCESS MATERIAL, AND OTHER RELATED ITEMS SHALL ALL BE CONSIDERED INCIDENTAL.

40 0 40 80
SCALE IN FEET

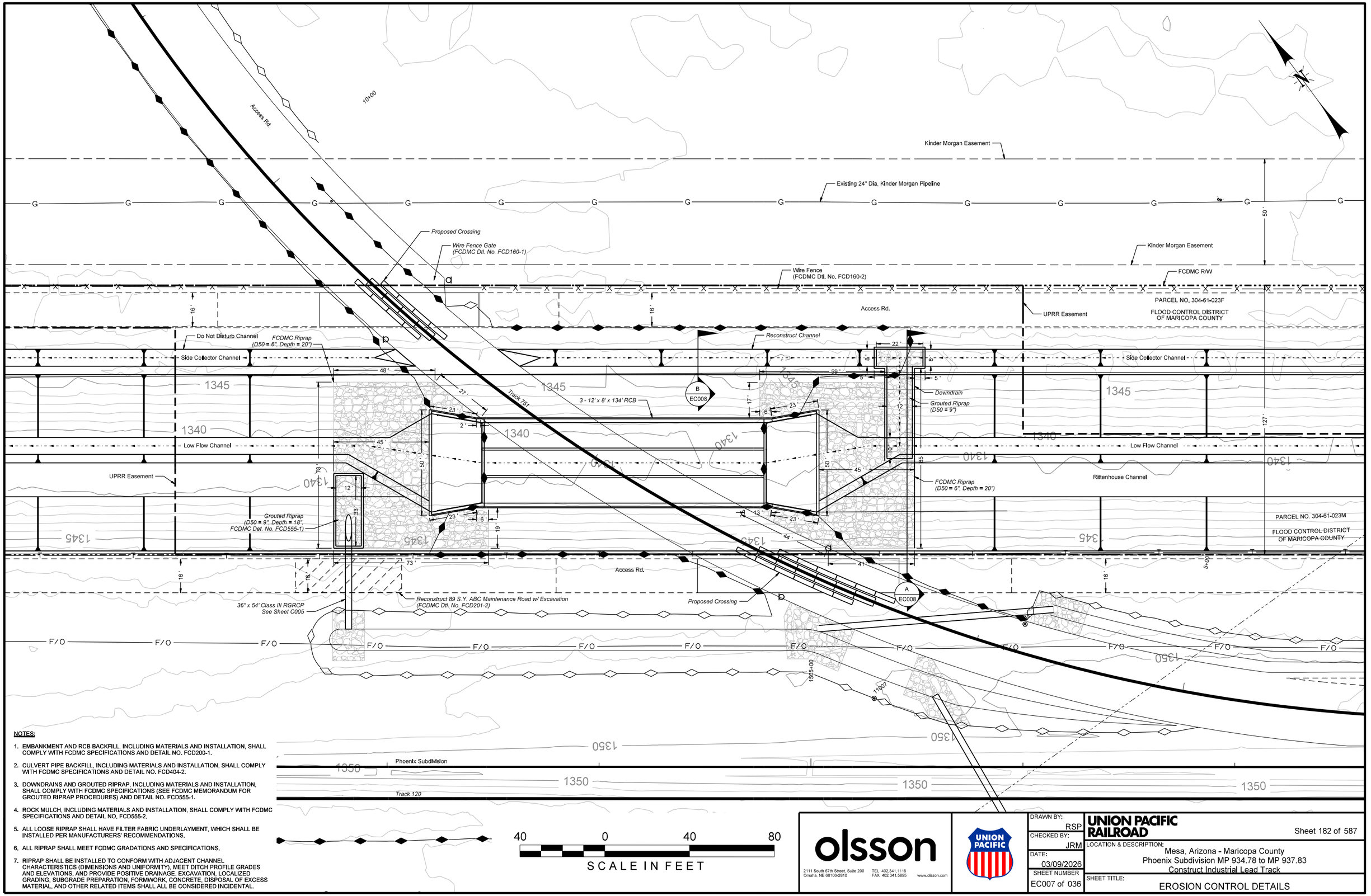
olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: EC006 of 036

UNION PACIFIC RAILROAD
Sheet 181 of 587
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track
SHEET TITLE:
EROSION CONTROL DETAILS

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Erosion Control\T_EC06_200927.dgn
Default
3/9/2026



NOTES:

1. EMBANKMENT AND RCB BACKFILL, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS AND DETAIL NO. FCD200-1.
2. CULVERT PIPE BACKFILL, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS AND DETAIL NO. FCD404-2.
3. DOWNDRAINS AND GROUTED RIPRAP, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS (SEE FCDMC MEMORANDUM FOR GROUTED RIPRAP PROCEDURES) AND DETAIL NO. FCD555-1.
4. ROCK MULCH, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS AND DETAIL NO. FCD555-2.
5. ALL LOOSE RIPRAP SHALL HAVE FILTER FABRIC UNDERLAYMENT, WHICH SHALL BE INSTALLED PER MANUFACTURERS' RECOMMENDATIONS.
6. ALL RIPRAP SHALL MEET FCDMC GRADATIONS AND SPECIFICATIONS.
7. RIPRAP SHALL BE INSTALLED TO CONFORM WITH ADJACENT CHANNEL CHARACTERISTICS (DIMENSIONS AND UNIFORMITY), MEET DITCH PROFILE GRADES AND ELEVATIONS, AND PROVIDE POSITIVE DRAINAGE. EXCAVATION, LOCALIZED GRADING, SUBGRADE PREPARATION, FORMWORK, CONCRETE, DISPOSAL OF EXCESS MATERIAL, AND OTHER RELATED ITEMS SHALL ALL BE CONSIDERED INCIDENTAL.

40 0 40 80
SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

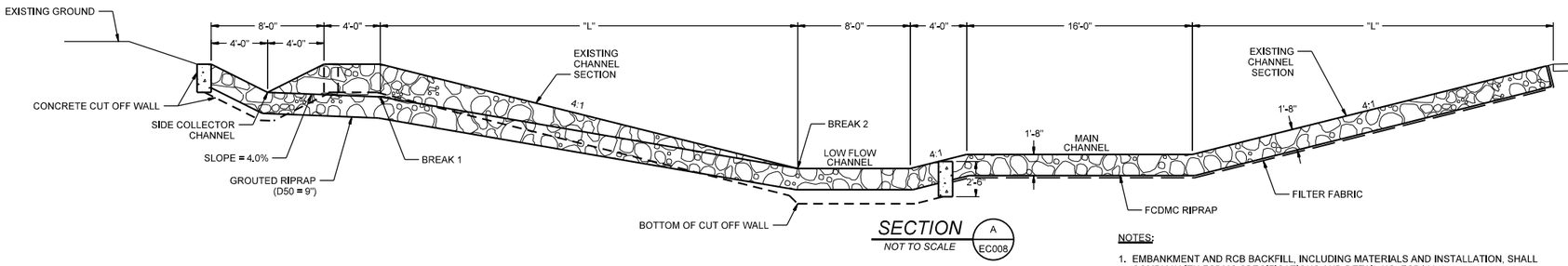
DRAWN BY:	RSP
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	EC007 of 036

UNION PACIFIC RAILROAD — Sheet 182 of 587

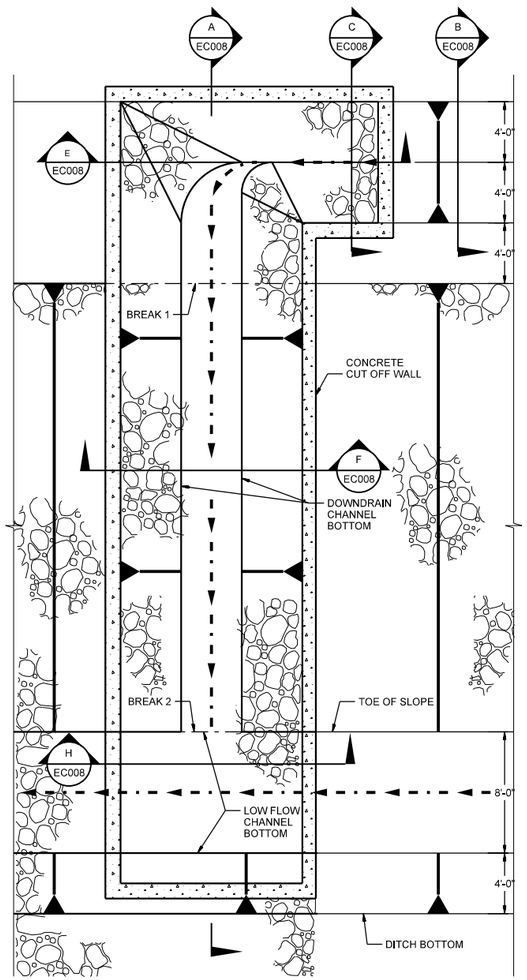
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EROSION CONTROL DETAILS

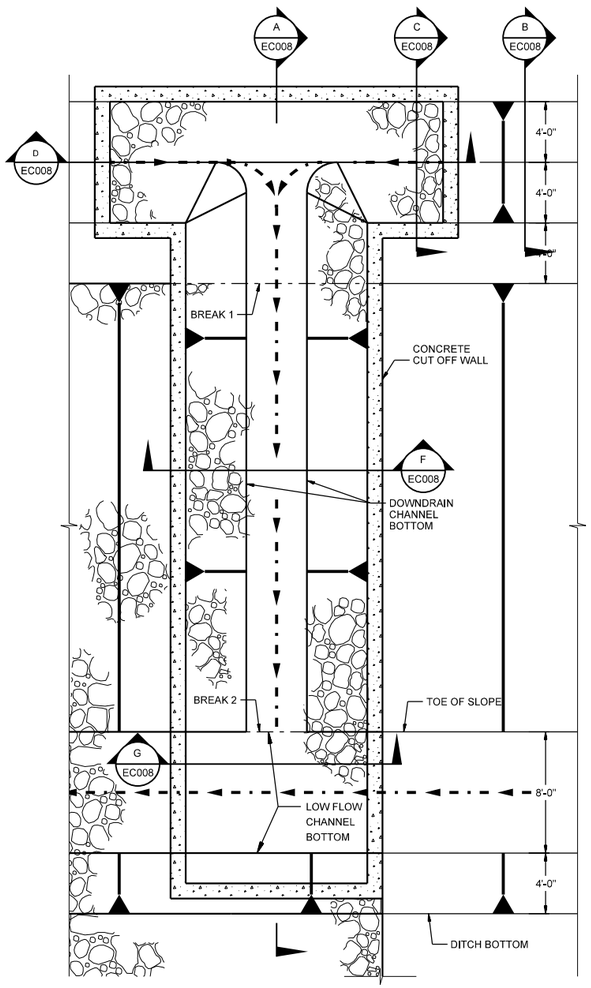
Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Erosion Control\EC007_200927.dgn
Default
3/9/2026



SECTION A EC008
NOT TO SCALE



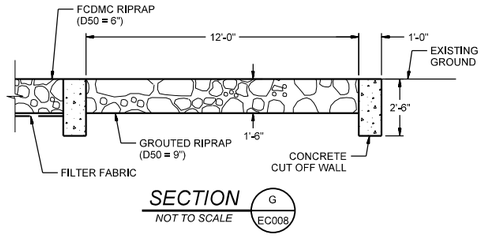
PLAN VIEW
NOT TO SCALE



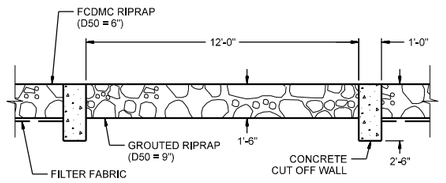
PLAN VIEW
NOT TO SCALE

NOTES:

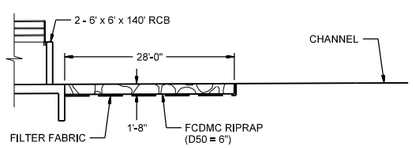
1. EMBANKMENT AND RCB BACKFILL, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS AND DETAIL NO. FCD200-1.
2. CULVERT PIPE BACKFILL, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS AND DETAIL NO. FCD404-2.
3. DOWNDRAINS AND GROUTED RIPRAP, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS (SEE FCDMC MEMORANDUM FOR GROUTED RIPRAP PROCEDURES) AND DETAIL NO. FCD555-1.
4. ROCK MULCH, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS AND DETAIL NO. FCD555-2.
5. ALL LOOSE RIPRAP SHALL HAVE FILTER FABRIC UNDERLAYMENT, WHICH SHALL BE INSTALLED PER MANUFACTURERS' RECOMMENDATIONS.
6. ALL RIPRAP SHALL MEET FCDMC GRADATIONS AND SPECIFICATIONS.
7. RIPRAP SHALL BE INSTALLED TO CONFORM WITH ADJACENT CHANNEL CHARACTERISTICS (DIMENSIONS AND UNIFORMITY), MEET DITCH PROFILE GRADES AND ELEVATIONS, AND PROVIDE POSITIVE DRAINAGE. EXCAVATION, LOCALIZED GRADING, SUBGRADE PREPARATION, FORMWORK, CONCRETE, DISPOSAL OF EXCESS MATERIAL, AND OTHER RELATED ITEMS SHALL ALL BE CONSIDERED INCIDENTAL.



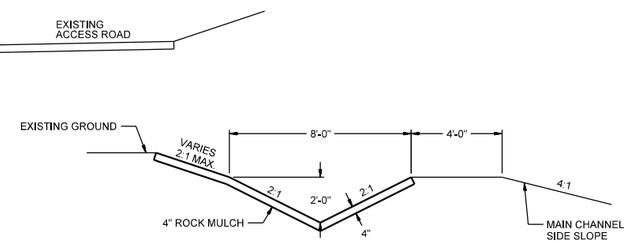
SECTION G EC008
NOT TO SCALE



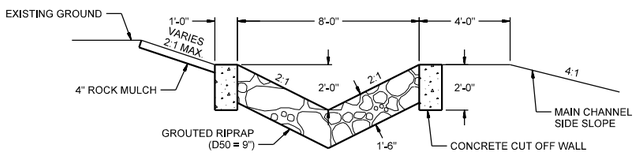
SECTION H EC008
NOT TO SCALE



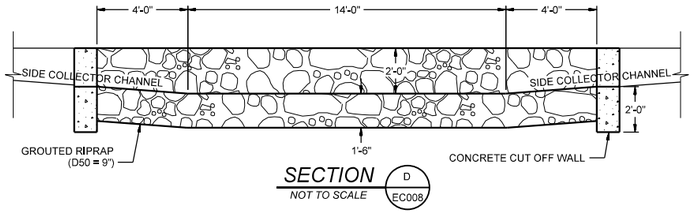
SECTION J EC006
NOT TO SCALE



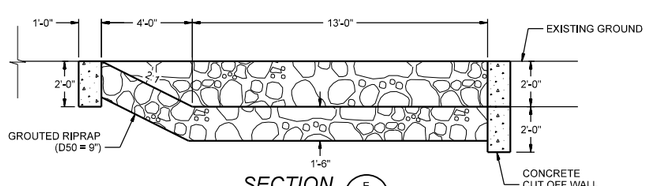
SECTION B EC008
NOT TO SCALE



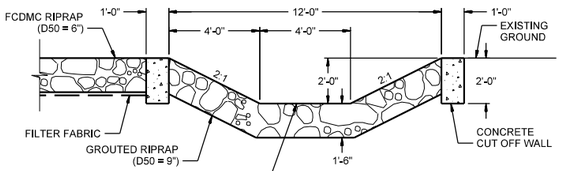
SECTION C EC008
NOT TO SCALE



SECTION D EC008
NOT TO SCALE



SECTION E EC008
NOT TO SCALE



SECTION F EC008
NOT TO SCALE

RIPRAP & DOWNDRAIN DETAILS
NOT TO SCALE

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	EC008 of 036

UNION PACIFIC RAILROAD

Sheet 183 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EROSION CONTROL DETAILS

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Erosion Control\T_EC08...200927.dgn
Default
3/9/2026

PARCEL NO. 304-61-018E

PECOS INDUSTRIAL LP

A EC009

FCDMC Riprap (D50 = 10")

49'

49'

29'

15'

42'

42'

10'

10'

UPRR R/W

Access Rd.

Track 101 136# Concrete 20 MPH

Track 751 136# Concrete 20 MPH

2 - 60" x 132' CMP

10'

10'

28'

24'

32'

45'

41'

B EC009

FCDMC Riprap (D50 = 10")

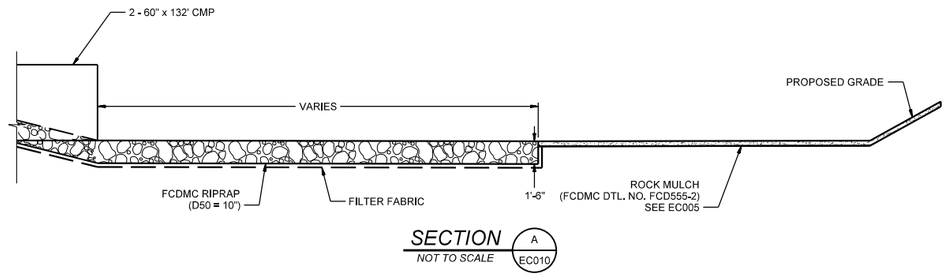
Access Rd.

40 0 40 80

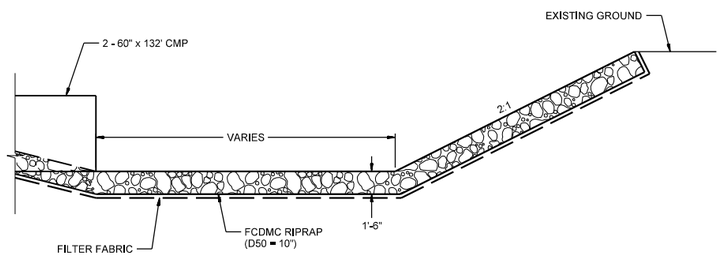
SCALE IN FEET

NOTES:

1. EMBANKMENT AND RCB BACKFILL, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS AND DETAIL NO. FCD200-1.
2. CULVERT PIPE BACKFILL, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS AND DETAIL NO. FCD404-2.
3. DOWNDRAINS AND GROUTED RIPRAP, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS (SEE FCDMC MEMORANDUM FOR GROUTED RIPRAP PROCEDURES) AND DETAIL NO. FCD555-1.
4. ROCK MULCH, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS AND DETAIL NO. FCD555-2.
5. ALL LOOSE RIPRAP SHALL HAVE FILTER FABRIC UNDERLAYMENT, WHICH SHALL BE INSTALLED PER MANUFACTURERS' RECOMMENDATIONS.
6. ALL RIPRAP SHALL MEET FCDMC GRADATIONS AND SPECIFICATIONS.



SECTION A EC010
NOT TO SCALE



SECTION B EC010
NOT TO SCALE

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: EC009 of 036

UNION PACIFIC RAILROAD

Sheet 184 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EROSION CONTROL DETAILS

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927.40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927.40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04.Erosion Control\T_EC09_200927.dgn
Default
3/9/2026

PARCEL NO. 304-61-021E

CITY OF MESA

PARCEL NO. 304-61-018E

PECOS INDUSTRIAL LP

E. Pecos Rd.

UPRR R/W

2 - 6' x 6' x 230' RCB

FCDMC Riprap (D50 = 14")

61'

36'

41'

30'

56'

16'

16'

46'

Access Rd.

Track 101 136# Concrete 20 MPH

38'

16'

41'

30'

52'

24'

20'

55'

A EC010

B EC010

8' Wide PUFE

Existing R/W

UPRR R/W

PARCEL NO. 304-61-021F

CITY OF MESA

8' Wide PUFE

Existing R/W

PARCEL NO. 304-61-016G

NICOLA PECOS & SOSSAMAN LP

PMT21-12148

1350

F/O

SS

W

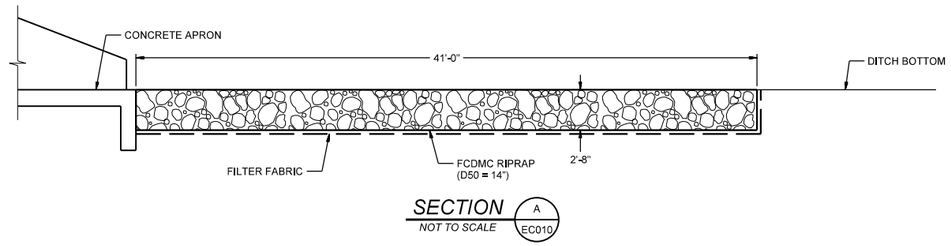
UGE

40 0 40 80

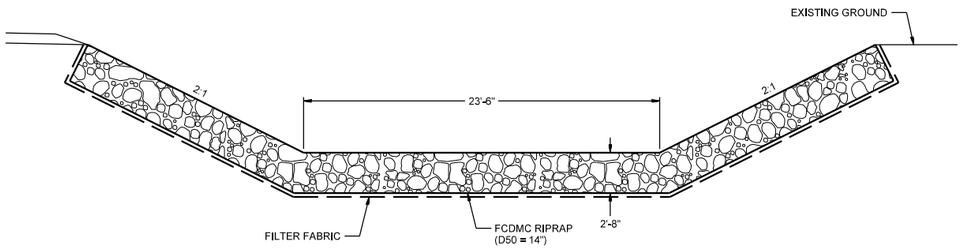
SCALE IN FEET

NOTES:

1. EMBANKMENT AND RCB BACKFILL, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS AND DETAIL NO. FCD200-1.
2. CULVERT PIPE BACKFILL, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS AND DETAIL NO. FCD404-2.
3. DOWNDRAINS AND GROUTED RIPRAP, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS (SEE FCDMC MEMORANDUM FOR GROUTED RIPRAP PROCEDURES) AND DETAIL NO. FCD555-1.
4. ROCK MULCH, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS AND DETAIL NO. FCD555-2.
5. ALL LOOSE RIPRAP SHALL HAVE FILTER FABRIC UNDERLAYMENT, WHICH SHALL BE INSTALLED PER MANUFACTURERS' RECOMMENDATIONS.
6. ALL RIPRAP SHALL MEET FCDMC GRADATIONS AND SPECIFICATIONS.



SECTION A — NOT TO SCALE — EC010



SECTION B — NOT TO SCALE — EC010

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: EC010 of 036

UNION PACIFIC RAILROAD — Sheet 185 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EROSION CONTROL DETAILS

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Erosion Control\T_EC10...
Default
3/9/2026

PARCEL NO. 304-61-021E

CITY OF MESA

Existing R/W

8' Wide PUFE

Temporary Construction Easement

UPRR R/W

Track 101 136# Concrete 20 MPH

35'

24'

34'

53'

C EC011

FCDMC Riprap (D50 = 10")

PARCEL NO. 304-61-021F

CITY OF MESA

S. Sossaman Rd.

PARCEL NO. 304-61-005B

SL7 MESA INDUSTRIAL LP

PMT23-21476

Temporary Construction Easement

2 - 6' x 6' x 242' RCB

8' Wide PUFE

Existing R/W

A EC011

B EC011

17'

15'

34'

55'

37'

30'

4'

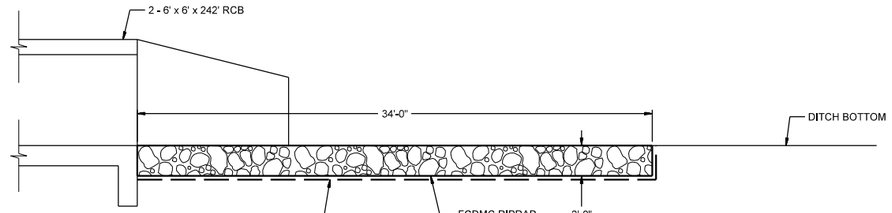
3'

40 0 40 80

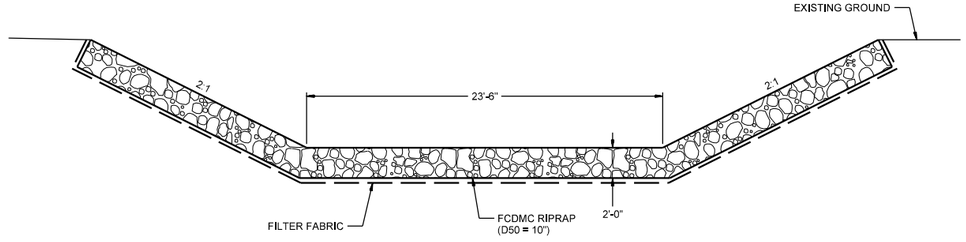
SCALE IN FEET

NOTES:

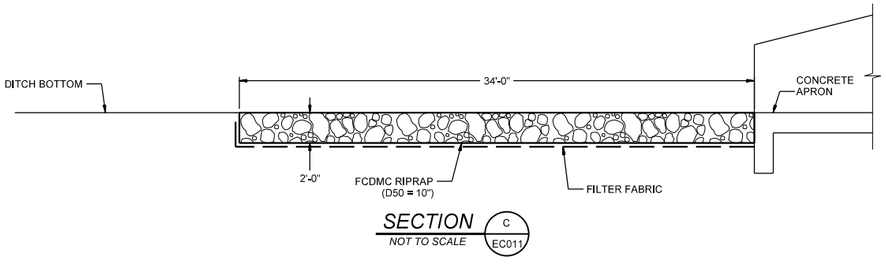
1. EMBANKMENT AND RCB BACKFILL, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS AND DETAIL NO. FCD200-1.
2. CULVERT PIPE BACKFILL, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS AND DETAIL NO. FCD404-2.
3. DOWNDRAINS AND GROUTED RIPRAP, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS (SEE FCDMC MEMORANDUM FOR GROUTED RIPRAP PROCEDURES) AND DETAIL NO. FCD555-1.
4. ROCK MULCH, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS AND DETAIL NO. FCD555-2.
5. ALL LOOSE RIPRAP SHALL HAVE FILTER FABRIC UNDERLAYMENT, WHICH SHALL BE INSTALLED PER MANUFACTURERS' RECOMMENDATIONS.
6. ALL RIPRAP SHALL MEET FCDMC GRADATIONS AND SPECIFICATIONS.



SECTION A EC011
NOT TO SCALE



SECTION B EC011
NOT TO SCALE



SECTION C EC011
NOT TO SCALE

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

DRAWN BY:	RSP
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	EC011 of 036

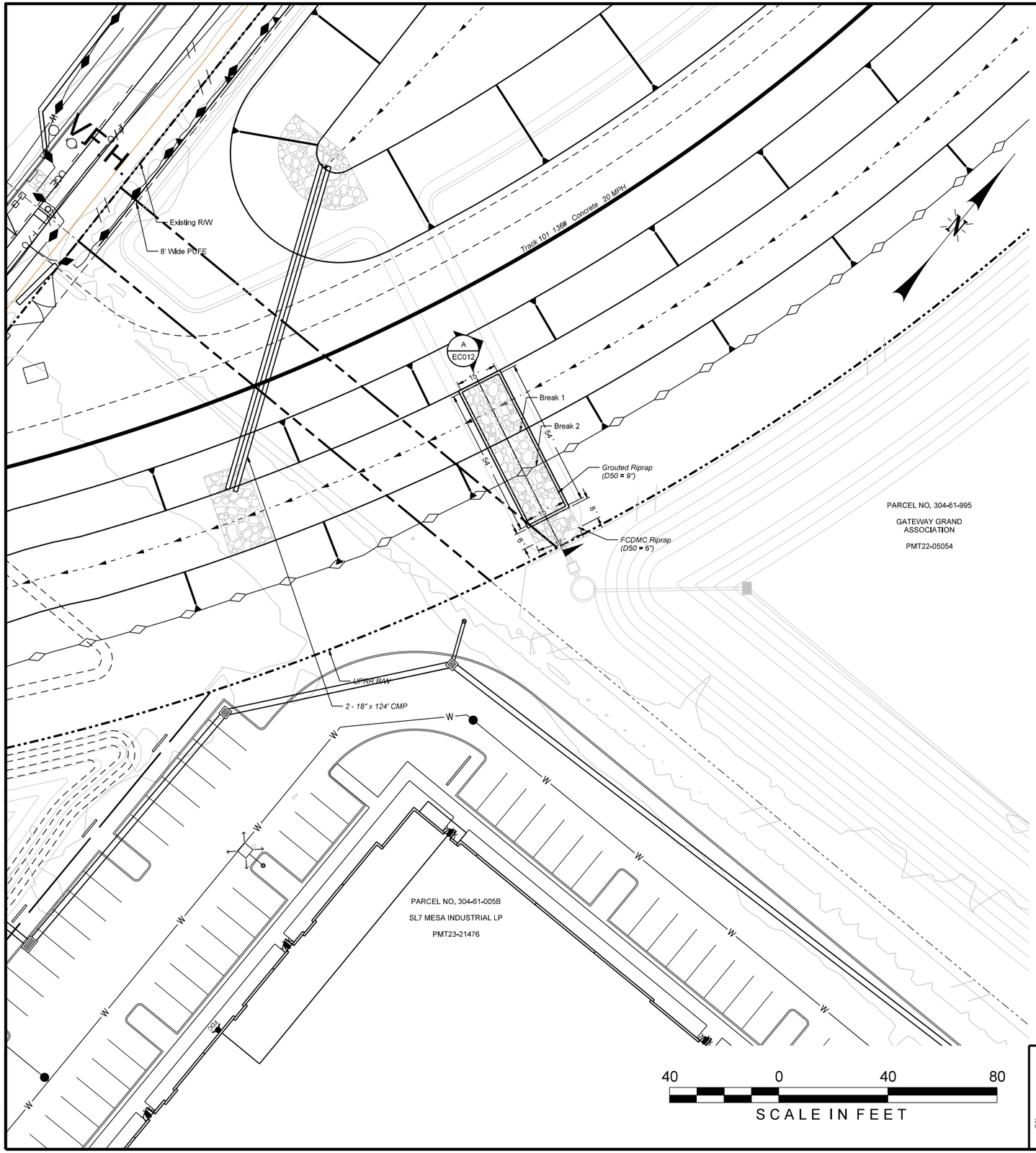
UNION PACIFIC RAILROAD

Sheet 186 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

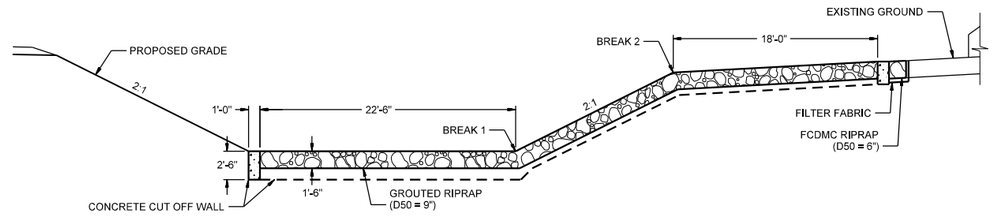
SHEET TITLE:
EROSION CONTROL DETAILS

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Erosion Control\T_EC11_200927.dgn
Default
3/9/2026



NOTES:

1. EMBANKMENT AND RCB BACKFILL, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS AND DETAIL NO. FCD200-1.
2. CULVERT PIPE BACKFILL, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS AND DETAIL NO. FCD404-2.
3. DOWNDRAINS AND GROUTED RIPRAP, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS (SEE FCDMC MEMORANDUM FOR GROUTED RIPRAP PROCEDURES) AND DETAIL NO. FCD555-1.
4. ROCK MULCH, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS AND DETAIL NO. FCD555-2.
5. ALL LOOSE RIPRAP SHALL HAVE FILTER FABRIC UNDERLAYMENT, WHICH SHALL BE INSTALLED PER MANUFACTURERS' RECOMMENDATIONS.
6. ALL RIPRAP SHALL MEET FCDMC GRADATIONS AND SPECIFICATIONS.



SECTION A / EC012
NOT TO SCALE

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: EC012 of 036

UNION PACIFIC RAILROAD

Sheet 187 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EROSION CONTROL DETAILS

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Erosion Control\T
Default
3/9/2026

PARCEL NO. 304-36-002G

PHOENIX-MESA GATEWAY
AIRPORT AUTHORITY

1345

1350

Proposed Permanent
Access Agreement

UPRR R/W

Access Rd.

68 '

17 '

35 '

89 '

16 '

6 '

6 '

31 '

19 '

FCDMC Riprap
(D50 = 10")

102 '

19 '

17 '

25 '

10 '

18 '

17 '

10 '

FCDMC Riprap
(D50 = 10")

Access Rd.

Track 101 136# Concrete 20 MPH

34 '

37 '

45 '

70 '

95 '

A
EC013

FCDMC Riprap
(D50 = 10")

99 '

B
EC013

4 - 60" x 144' CMP

UPRR R/W

PARCEL NO. 304-61-006G

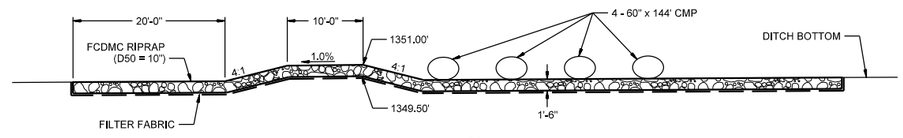
GS UNBOUND PHASE II
PROPERTY OWNER LLC

40 0 40 80

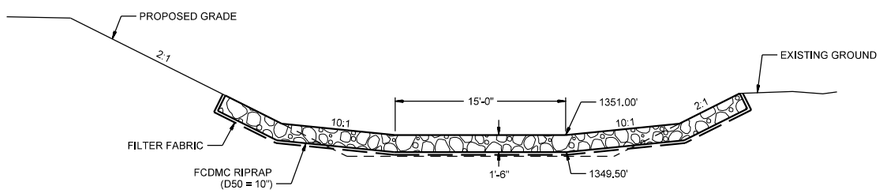
SCALE IN FEET

NOTES:

1. EMBANKMENT AND RCB BACKFILL, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS AND DETAIL NO. FCD200-1.
2. CULVERT PIPE BACKFILL, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS AND DETAIL NO. FCD404-2.
3. DOWNDRAINS AND GROUTED RIPRAP, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS (SEE FCDMC MEMORANDUM FOR GROUTED RIPRAP PROCEDURES) AND DETAIL NO. FCD555-1.
4. ROCK MULCH, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS AND DETAIL NO. FCD555-2.
5. ALL LOOSE RIPRAP SHALL HAVE FILTER FABRIC UNDERLAYMENT, WHICH SHALL BE INSTALLED PER MANUFACTURERS' RECOMMENDATIONS.
6. ALL RIPRAP SHALL MEET FCDMC GRADATIONS AND SPECIFICATIONS.



SECTION A
NOT TO SCALE
EC013



SECTION B
NOT TO SCALE
EC009

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: EC013 of 036

UNION PACIFIC RAILROAD

Sheet 188 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EROSION CONTROL DETAILS

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Erosion Control\T_EC13_200927.dgn
Default
3/9/2026

Existing R/W

8' Wide PUFE

PARCEL NO. 304-62-010V

PHOENIX-MESA GATEWAY AIRPORT AUTHORITY

UPRR R/W

Access Rd.

Track 101 136# Concrete 20 MPH

Proposed Permanent Access Agreement

PARCEL NO. 304-62-976A

SUNBELT MESA ELLSWORTH LP

Existing R/W

8' Wide PUFE

S. Ellsworth Rd. - Southbound

S. Ellsworth Rd. - Northbound

160+00

FCDMC Easement

4:1 (EXISTING)

4:1 (EXISTING)

PARCEL NO. 304-62-001D

SUNBELT MESA ELLSWORTH LP

A EC014

73'

FCDMC Riprap (D50 = 10")

24" x 60' Class III RGRCP See Sheet C009

UPRR R/W

49'

16'

20'

1'

2:1

58'

42'

B EC014

36" x 50' CMP

3 - 9' x 6' x 32' RCB

Remove Access Road

FCDMC Riprap (D50 = 10")

UPRR R/W

Ellsworth Channel

PARCEL NO. 304-62-006D

SUNBELT MESA ELLSWORTH LP

8' Wide PUFE

Existing R/W

Existing 2 - 10' x 6' x 50' CBC

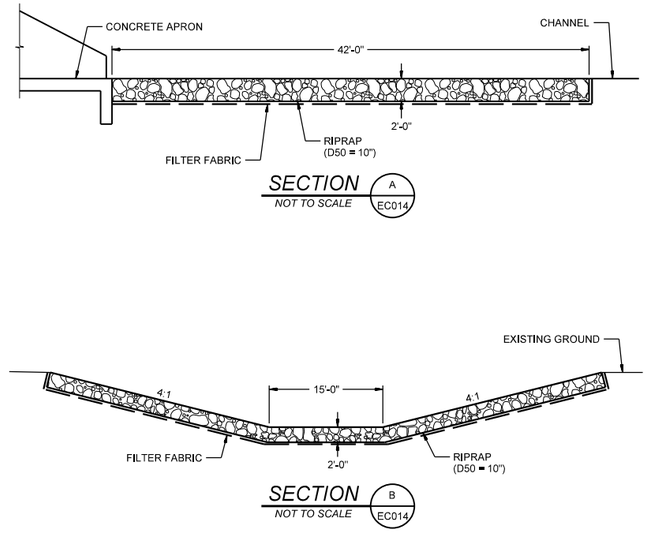
FCDMC Easement

40 0 40 80

SCALE IN FEET

NOTES:

1. EMBANKMENT AND RCB BACKFILL, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS AND DETAIL NO. FCD200-1.
2. CULVERT PIPE BACKFILL, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS AND DETAIL NO. FCD404-2.
3. DOWNDRAINS AND GROUTED RIPRAP, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS (SEE FCDMC MEMORANDUM FOR GROUTED RIPRAP PROCEDURES) AND DETAIL NO. FCD555-1.
4. ROCK MULCH, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS AND DETAIL NO. FCD555-2.
5. ALL LOOSE RIPRAP SHALL HAVE FILTER FABRIC UNDERLAYMENT, WHICH SHALL BE INSTALLED PER MANUFACTURERS' RECOMMENDATIONS.
6. ALL RIPRAP SHALL MEET FCDMC GRADATIONS AND SPECIFICATIONS.



olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: EC014 of 036

UNION PACIFIC RAILROAD

Sheet 189 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EROSION CONTROL DETAILS

Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Erosion Control\T_EC14_200927.dgn
Default
3/9/2026

PARCEL NO. 304-63-976
(LOT 2)

CUBES AT MESA GATEWAY
BUILDING B LLC

PMT21-14903

PARCEL NO. 304-63-006W

OLD DOMINION
FREIGHT LINE INC

E.H.

E.V.

W

N

Proposed Temporary
Construction Easement

A
EC015

UPRR R/W

FCDMC Riprap
(D50 = 10")

48 '

Existing R/W

42

30

42

12 '

12 '

Track 101 136# Concrete 20 MPH

Track 752 136# Concrete 10 MPH

Access Rd.

12 '

12 '

3 - 72" x 78' SSP

41'

30'

41'

W

W

W

W

UPRR R/W

48 '

Proposed Temporary
Construction Easement

FCDMC Riprap
(D50 = 10")

A
EC015

PARCEL NO. 304-63-977B
(LOT 3)

CUBES AT MESA GATEWAY
BUILDING C LLC

PMT21-14903

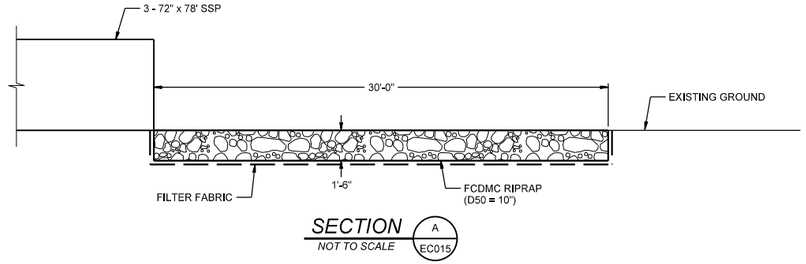
Access Rd.

40 0 40 80

SCALE IN FEET

NOTES:

1. EMBANKMENT AND RCB BACKFILL, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS AND DETAIL NO. FCD200-1.
2. CULVERT PIPE BACKFILL, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS AND DETAIL NO. FCD404-2.
3. DOWNDRAINS AND GROUTED RIPRAP, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS (SEE FCDMC MEMORANDUM FOR GROUTED RIPRAP PROCEDURES) AND DETAIL NO. FCD555-1.
4. ROCK MULCH, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS AND DETAIL NO. FCD555-2.
5. ALL LOOSE RIPRAP SHALL HAVE FILTER FABRIC UNDERLAYMENT, WHICH SHALL BE INSTALLED PER MANUFACTURERS' RECOMMENDATIONS.
6. ALL RIPRAP SHALL MEET FCDMC GRADATIONS AND SPECIFICATIONS.



SECTION A EC015
NOT TO SCALE

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: EC015 of 036

UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EROSION CONTROL DETAILS

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04.Erosion Control\T_EC15_
Default
3/9/2026

PARCEL NO. 304-63-006T

CITY OF MESA

PARCEL NO. 304-63-016A

ARIZONA STATE
LAND DEPARTMENT

Access Rd.

Existing R/W

Temporary Construction Easement

FCDMC Riprap (D50 = 10")

A
EC016

43 '

32 '

23 '

9 '

9 '

UPRR R/W

Track 101 136# Concrete 20 MPH

Track 752 136# Concrete 10 MPH

Access Rd.

22 '

22 '

43 '

FCDMC Riprap (D50 = 10")

4 - 54" x 70' SSP

B
EC016

W

F.H.V.

UPRR R/W

PARCEL NO. 304-63-977B
(LOT 3)

CUBES AT MESA GATEWAY
BUILDING C LLC

PMT21-14903

PARCEL NO. 304-63-016A

ARIZONA STATE
LAND DEPARTMENT

Temporary Construction Easement

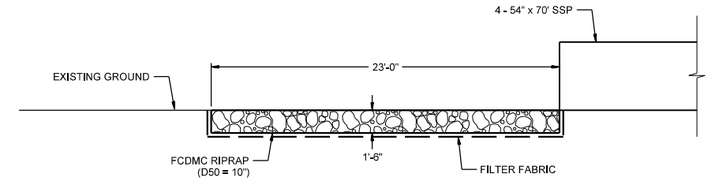
N

40 0 40 80

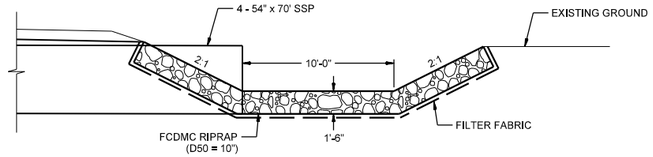
SCALE IN FEET

NOTES:

1. EMBANKMENT AND RCB BACKFILL, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS AND DETAIL NO. FCD200-1.
2. CULVERT PIPE BACKFILL, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS AND DETAIL NO. FCD404-2.
3. DOWNDRAINS AND GROUTED RIPRAP, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS (SEE FCDMC MEMORANDUM FOR GROUTED RIPRAP PROCEDURES) AND DETAIL NO. FCD555-1.
4. ROCK MULCH, INCLUDING MATERIALS AND INSTALLATION, SHALL COMPLY WITH FCDMC SPECIFICATIONS AND DETAIL NO. FCD555-2.
5. ALL LOOSE RIPRAP SHALL HAVE FILTER FABRIC UNDERLAYMENT, WHICH SHALL BE INSTALLED PER MANUFACTURERS' RECOMMENDATIONS.
6. ALL RIPRAP SHALL MEET FCDMC GRADATIONS AND SPECIFICATIONS.



SECTION A / EC016
NOT TO SCALE



SECTION B / EC016
NOT TO SCALE

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: EC016 of 036

UNION PACIFIC RAILROAD

Sheet 191 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EROSION CONTROL DETAILS

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Erosion Control\T_EC
Default
3/9/2026

Floodplain (Zone A)

Install 208 L.F. Silt Fence
Sta. 1502+20 to Sta. 1503+52
See Sheet EC004

PARCEL NO. 304-61-023M
FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

Install 292 L.F. Silt Fence
Sta. 1496+07 to Sta. 1498+21
See Sheet EC004

Install 128 L.F. Silt Fence
Sta. 1503+52 to Sta. 1504+79
See Sheet EC004

Install 35 Tons
FCDMC Riprap (D50=10")

Install 318 L.F. Silt Fence
Sta. 1493+62 to Sta. 1496+70
See Sheet EC004

Install 81 C.Y. Rock Mulch Slope Protection
See Sheet EC005
Sta. 4+99.02 to Sta. 8+47.95

Install 50 Tons
FCDMC Riprap (D50=10")

Phoenix Sub Main Track 113# Wood 60 MPH

Track 120 136# Concrete 30 MPH

S. Rittenhouse Rd.

Project Boundary

Install 35 Tons
FCDMC Riprap (D50=10")

Install Wattle Ditch Checks at 100' Intervals
Sta. 1503+99.89 to Sta. 1527+71.38
See Sheet EC004

Project Boundary

Floodplain (Zone A)

Install 27 C.Y. Rock Mulch Slope Protection
See Sheet EC005
Sta. 1481+47.90 to Sta. 1494+73.62

Install 88 L.F. Silt Fence
Sta. 1493+57 to Sta. 1494+17
See Sheet EC004

PARCEL NO. 304-61-015G
FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

Install 1,168 L.F. Silt Fence
Sta. 1482+02 to Sta. 1493+43
See Sheet EC004

Potential Construction Staging Area

Phoenix Sub Main Track 113# Wood 60 MPH

Track 120 136# Concrete 30 MPH

S. Rittenhouse Rd.

Install 2,198 L.F. Silt Fence
Sta. 1482+06 to Sta. 1503+90
See Sheet EC004

Install 551 C.Y. Rock Mulch Slope Protection
See Sheet EC005
Sta. 1481+09.90 to Sta. 1528+00.67

100 0 100 200
SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: EC017 of 036

UNION PACIFIC RAILROAD

Sheet 192 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EROSION CONTROL PLAN

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04.Erosion Control\T_EC17_ML_TRK_200927.dgn
Default
3/9/2026

Install Construction Entrance
16 C.Y. 2"-3" Stone
See Sheet EC005

Floodplain (Zone A)
PARCEL NO. 304-61-023M
FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

PARCEL NO. 304-61-008H
FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

Install Construction Entrance
16 C.Y. 2"-3" Stone
See Sheet EC005

Install Construction Entrance
16 C.Y. 2"-3" Stone
See Sheet EC005

Install 35 Tons
FCDMC Riprap (D50=10")

Project Boundary

Potential Construction Staging Area
PARCEL NO. 304-61-033R
REBECCA ESTRADA

PARCEL NO. 304-61-033Q
REBECCA ESTRADA

PARCEL NO. 304-61-033Y
FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

1525+00
1530+00
1535+00

Phoenix Sub | Main Track 113# Wood 60 MPH
Track 120 136# Concrete 30 MPH

Track 121

Install 100 Tons
FCDMC Riprap (D50=10")

851 S.Y. Decomposed Granite (Typ.)
(Mesa Dtl. No. M-111.07)

Install 333 L.F. Silt Fence
Sta. 1528+23 to Sta. 1530+29
See Sheet EC004

S. Sossaman Rd

Install 75 Tons
FCDMC Riprap (D50=10")

Install 308 L.F. Silt Fence
Sta. 1529+18 to Sta. 1530+75
See Sheet EC004

Install 35 Tons
FCDMC Riprap (D50=10")

Install 242 C.Y. Rock Mulch Slope Protection
See Sheet EC005
Sta. 1528+23.77 to Sta. 1540+01.26

Install Wattle Ditch Checks at 100' Intervals
Sta. 1529+19.37 to Sta. 1539+90.00
See Sheet EC004

Floodplain (Zone A)

Project Boundary

PARCEL NO. 304-61-023M
FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

1510+00
1515+00
1520+00

Phoenix Sub Main Track 113# Wood 60 MPH
Track 120 136# Concrete 30 MPH

SCALE IN FEET
100 0 100 200

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: EC018 of 036

UNION PACIFIC RAILROAD
Sheet 193 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EROSION CONTROL PLAN

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Erosion Control\T_EC
Default
3/9/2026

Floodplain (Zone A)

Project Boundary

1550+00

1555+00

1560+00

1565+00

PARCEL NO. 304-62-954

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

PARCEL NO. 304-61-040

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

PARCEL NO. 304-61-032U

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

PARCEL NO. 304-61-034T

SOUTH RITTENHOUSE ROAD
LIMITED PARTNERSHIP

Track 121
Phoenix Sub Main Track 113# Wood 60 MPH
Track 120 119# Wood 10 MPH

E. Rittenhouse Rd

1540+00

1545+00

1550+00

PARCEL NO. 304-61-033Y

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

PARCEL NO. 304-61-033W

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

PARCEL NO. 304-61-043

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

Track 121
Phoenix Sub Main Track 113# Wood 60 MPH
Track 120 136# Concrete 30 MPH

Install 1,811 L.F. Silt Fence
Sta. 1540+00 to Sta. 1557+94
See Sheet EC004

100 0 100 200
SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: EC019 of 036

UNION PACIFIC RAILROAD

Sheet 194 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EROSION CONTROL PLAN

Color table: K:\Bentley\Workspace\Projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Erosion Control\T_EC
Default
3/9/2026

1580+00

1585+00

1590+00

Floodplain (Zone A)

Project Boundary

PARCEL NO. 304-61-036C

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

Track 121
Phoenix Sub Main Track 113# Wood 60 MPH
Track 120 119# Wood 10 MPH

E. Rittenhouse Rd

1565+00

1570+00

1575+00

1580+00

Floodplain (Zone A)

Project Boundary

PARCEL NO. 304-61-034T

SOUTH RITTENHOUSE ROAD
LIMITED PARTNERSHIP

Track 121
Phoenix Sub Main Track 113# Wood 60 MPH
Track 120 119# Wood 10 MPH

E. Rittenhouse Rd

100 0 100 200

SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: EC020 of 036

UNION PACIFIC RAILROAD

Sheet 195 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EROSION CONTROL PLAN

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Erosion Control\T_EC20_ML_TRK_200927.dgn
Default
3/9/2026

1610+00

Project Boundary

1615+00

Floodplain (Zone A)

1620+00

PARCEL NO. 304-62-014A

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

Phoenix Sub Main Track 113# Wood 60 MPH
Track 120 119# Wood 10 MPH

E. Rittenhouse Rd

1595+00

Restricted Work Area

Project Boundary

1600+00

Floodplain (Zone A)

1605+00

PARCEL NO. 304-62-014A

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

Phoenix Sub Main Track 113# Wood 60 MPH
Track 120 119# Wood 10 MPH

E. Rittenhouse Rd

100 0 100 200

SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: EC021 of 036

UNION PACIFIC RAILROAD

Sheet 196 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EROSION CONTROL PLAN

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Erosion Control\T_EC21_ML_TRK_200927.dgn
Default
3/9/2026

1635+00

PARCEL NO. 304-66-010Q

ACERO QUEEN CREEK STATION LLC

1640+00

PARCEL NO. 304-89-681D

DANIEL W THELANDER TRUST / ETAL

1645+00

PARCEL NO. 304-89-680

TOWN OF QUEEN CREEK

1647+54

Phoenix Sub Main Track 113# Wood 60 MPH

Track 120 119# Wood 10 MPH

E. Ellsworth Loop

Potential Construction Staging Area

Project Boundary

E. Rittenhouse Rd

Install Construction Entrance
16 C.Y. 2"-3" Stone
See Sheet EC005

1620+00

PARCEL NO. 304-66-010F

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

1625+00

Floodplain (Zone A)

PARCEL NO. 304-66-010Q

ACERO QUEEN CREEK STATION LLC

1630+00

Project Boundary

1635+00

Phoenix Sub Main Track 113# Wood 60 MPH

Track 120 119# Wood 10 MPH

E. Rittenhouse Rd

100 0 100 200

SCALE IN FEET

olsson

2111 South 67th Street, Suite 200
Omaha, NE 68106-2810

TEL 402.341.1116
FAX 402.341.5895

www.olsson.com

UNION PACIFIC

DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	EC022 of 036

UNION PACIFIC RAILROAD

Sheet 197 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EROSION CONTROL PLAN

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04.Erosion Control\T_EC22_ML_TRK_200927.dgn
Default
3/9/2026

Install 275 Tons, FCDMC Riprap (D50=10")
See Sheet EC009

PARCEL NO. 304-61-018E

PECOS INDUSTRIAL LP

Install 20 Tons, Scupper Riprap
(2 Locations)
See Sheet D008

PARCEL NO. 304-61-021E

CITY OF MESA

Track 101 136# Concrete 20 MPH

Track 751 136# Concrete 20 MPH

Access Rd.

Access Rd.

Install 125 Tons
FCDMC Riprap (D50=10")
See Sheet EC009

Potential Construction Staging Area

Install 870 Tons, Riprap Slope Protection
(D50=4", T=6", H=6")
See Sheet EC005
Sta. 10+00.00 to Sta. 22+63.76

Install 464 Tons, Riprap Slope Protection
(D50=4", T=6", H=6")
See Sheet EC005
Sta. 22+84.30 to Sta. 26+20.00

Project Boundary

Install 10 Tons, Scupper Riprap
See Sheet D008

PARCEL NO. 304-61-023L

UNION PACIFIC
RAILROAD COMPANY

PARCEL NO. 304-61-016G

NICOLA PECOS &
SOSSAMAN LP

PMT21-12148

PARCEL NO. 304-61-021F

CITY OF MESA

Install 65 Tons
FCDMC Riprap (D50=10")

Install 55 S.Y. Grouted Riprap
See Sheet EC007

Track 120 136# Concrete 30 MPH

Phoenix Sub Main Track 113# Wood 60 MPH

Track 751 136# Concrete 20 MPH

Install 385 Tons
FCDMC Riprap (D50=6")
See Sheet EC007

Install 47 C.Y., Rock Mulch Slope Protection
See Sheet EC005
Sta. 6+99.44 to Sta. 9+22.15

Access Rd.

Install 310 L.F. Silt Fence
Sta. 6+96 to Sta. 9+88
See Sheet EC004

PARCEL NO. 304-61-023M

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

Install 385 Tons
FCDMC Riprap (D50=6")
See Sheet EC007

Install 96 S.Y. Downdrain
See Sheet EC007

Install 60 C.Y., Rock Mulch Slope Protection
See Sheet EC005
Sta. -1+22.74 to Sta. 5+53.76

Install Wattle Ditch Checks at 100' Intervals
Track 752 Sta. 10+02.47 to Sta. 19+77.80
Track 101 Sta. 23+85.34 to Sta. 26+84.37
See Sheet EC004

Install 40 Tons
FCDMC Riprap (D50=10")

Install 270 L.F. Silt Fence
Sta. 5+79 to Sta. 7+51
See Sheet EC004

Project Boundary

Install Wattle Ditch Checks at 100' Intervals
Sta. 0+00.00 to Sta. 5+69.22
See Sheet EC004

Floodplain
(Zone A)

100 0 100 200

SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: EC023 of 036

UNION PACIFIC RAILROAD

Sheet 198 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EROSION CONTROL PLAN

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927.X40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927.X40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04.Erosion Control\T_EC23.Wye_TRK_200927.dgn
Default
03/09/2026

Install 59 C.Y. Rock Mulch Slope Protection
See Sheet EC005
Sta. 12+89.21 to Sta. 20+39.27

South Detention Cell
See Sheet EC035

Low Flow Drainageway

PARCEL NO. 304-61-018E
PECOS INDUSTRIAL LP

Install 291 L.F. Silt Fence
Sta. 25+76 to Sta. 26+41
See Sheet EC004

Install 687 Tons, Riprap Slope Protection
(D50=4", T=6", H=6")
See Sheet EC005
Sta. 22+53.89 to Sta. 25+82.83

Install Construction Entrance
16 C.Y. 2"-3" Stone, See Sheet EC005

Install 109 L.F. Silt Fence
Sta. 26+89 to Sta. 27+25, See Sheet EC004

PARCEL NO. 304-61-021E
CITY OF MESA

Install 480 Tons
FCDMC Riprap (D50=14")
See Sheet EC010

Install 40 Tons
FCDMC Riprap
(D50=10")

Access Ramp

15+00
PCS 17+38.27
PT 17+82.27
20+00
25+00
30+00

Access Rd.
Access Rd.

Track 101 136# Concrete 20 MPH

Track 751 136# Concrete 20 MPH

Install 590 Tons, FCDMC Riprap (D50=14")
See Sheet EC010

Potential Construction Staging Area

3,964 S.Y. Decomposed Granite (Typ.)
(Mesa Dtl. No. M-111.07)

Install Construction Entrance
16 C.Y. 2"-3" Stone
See Sheet EC005

Install 104 L.F. Silt Fence
Sta. 29+17 to Sta. 29+60
See Sheet EC004

Project Boundary

Install 296 L.F. Silt Fence
Sta. 26+25 to Sta. 28+53
See Sheet EC004

Floodplain(Zone A)
Project Boundary

Install 35 Tons, Riprap Slope Protection
(D50=4", T=6")
See Sheet EC005

Low Flow Drainageway

Install 1,323 L.F. Silt Fence
Sta. 13+52 to Sta. 19+55
See Sheet EC004

South Detention Cell
See Sheet EC035

Install 20 C.Y. Rock Mulch Slope Protection
See Sheet EC005

Install 265 Tons
FCDMC Riprap (D50=6")

Install 750 Tons
FCDMC Riprap (D50=6")

Install 89 S.Y. Downdrain
See Sheet EC006

PARCEL NO. 304-61-015G
FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

Install 369 L.F. Silt Fence
Sta. 9+75 to Sta. 12+56
See Sheet EC004

PS 4+54.64
PSC 5+98.64
PCS 3+81.92
PT 4+25.92
5+00
PS 7+30.65
PSC 7+74.65
14+90.00
15+00
17+38.27 PCS
Access Rd.

Track 120 136# Concrete 30 MPH

Install 395 Tons
FCDMC Riprap (D50=6")

Install 96 S.Y. Downdrain
See Sheet EC006

100 0 100 200
SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: EC024 of 036

UNION PACIFIC RAILROAD
Sheet 199 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EROSION CONTROL PLAN

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Erosion Control\EC_Default
3/9/2026

F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Erosion Control\EC_Control_EC24_Pirate Lead_200927.dgn

PARCEL NO. 304-61-019

UNITED STATES OF AMERICA

PARCEL NO. 304-61-021E

CITY OF MESA

Install Construction Entrance
16 C.Y. 2"-3" Stone
See Sheet EC005

Install 65 Tons
FCDMC Riprap (D50=10")

North Detention Cell
See Sheet EC036

Low Flow Drainageway

Access Ramp

55+00

PCC 44+92.50

PT 45+36.50

PCC 46+59.98

50+00

PSC 49+99.98

Track 101 136# Concrete 20 MPH

Access Rd.

S. Sossaman Rd.

Project Boundary

Install 2,779 Tons, Riprap Slope Protection
(D50=4", T=6", H=6")
See Sheet EC005
Sta. 43+80.00 to Sta. 59+60.00

PARCEL NO. 304-61-995

GATEWAY GRAND ASSOCIATION

PMT22-05054

Restricted Work Area

PARCEL NO. 304-61-006G

GS UNBOUND PHASE II PROPERTY OWNER LLC

Install 107 S.Y. Grouted Riprap
See Sheet EC012

Install 10 Tons, FCDMC Riprap (D50=6")
See Sheet EC012

Install 265 Tons
FCDMC Riprap (D50=10")
See Sheet EC011

Install 55 Tons
FCDMC Riprap (D50=10")

Install Wattle Ditch Checks at 100' Intervals
Sta. 43+40.67 to Sta. 59+79.93
See Sheet EC004

Install 20 Tons, Scupper Riprap (3 Locations)
See Sheet D008

Install 649 L.F. Silt Fence
Sta. 41+64 to Sta. 47+77
See Sheet EC004

3,913 S.Y. Decomposed Granite (Typ.)
(Mesa Dtl. No. M-111.07)

Install Wattle Ditch Checks at 100' Intervals
Sta. 27+35.80 to Sta. 41+49.66
See Sheet EC004

Install 331 C.Y. Rock Mulch Slope Protection
See Sheet EC005
Sta. 27+25.34 to Sta. 41+67.08

PARCEL NO. 304-61-021E

CITY OF MESA

Project Boundary

Install Construction Entrance
16 C.Y. 2"-3" Stone, See Sheet EC005

Install 345 Tons, FCDMC Riprap (D50=10")
See Sheet EC011

30+00

35+00

40+00

PS 41+85.08

PSC 42+29.08

43+00

Track 101 136# Concrete 20 MPH

S. Sossaman Rd.

Install 356 L.F. Silt Fence
Sta. 39+07 to Sta. 40+95
See Sheet EC004

Install 253 L.F. Silt Fence
Sta. 41+73 to Sta. 43+36
See Sheet EC004

PARCEL NO. 304-61-021F

CITY OF MESA

Install Wattle Ditch Checks at 100' Intervals
Sta. 28+70.07 to Sta. 40+83.57
See Sheet EC004

Install 1,932 Tons, Riprap Slope Protection
(D50=4", T=6", H=6")
See Sheet EC005
Sta. 29+13.80 to Sta. 40+42.60

100 0 100 200

SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: EC025 of 036

UNION PACIFIC RAILROAD

Sheet 200 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EROSION CONTROL PLAN

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Erosion Control\T_EC25_Pirate Lead_200927.dgn
Default
3/9/2026

PARCEL NO. 304-36-002G

PHOENIX-MESA GATEWAY
AIRPORT AUTHORITY

OHP

75+00

80+00

85+00

11003

Support Track E
Support Track D
Support Track C
Track 750 136# Concrete 10 MPH
Track 749 136# Concrete 10 MPH
Track 101 136# Concrete 20 MPH

Access Rd.

PARCEL NO. 304-61-001J

LPC MESA GATEWAY LP

Project Boundary

Restricted Work Area

PARCEL NO. 304-61-006G

GS UNBOUND PHASE II
PROPERTY OWNER LLC

Install 550 Tons, FCDMC Riprap (D50=10")
See Sheet EC013

Install Wattle Ditch Checks at 100' Intervals
Sta. 61+03.78 to Sta. 62+38.34
See Sheet EC004

Install 502 C.Y. Rock Mulch Slope Protection
See Sheet EC005
Sta. 55+11.71 to Sta. 159+14.97

PARCEL NO. 304-36-002G

PHOENIX-MESA GATEWAY
AIRPORT AUTHORITY

Potential Construction Staging Area

Install 9,765 L.F. Silt Fence
Sta. 62+43 to Sta. 159+54
See Sheet EC004

61+32.86

61+76.86

60+00

65+00

70+00

Access Rd.

North Detention Cell
See Sheet EC036

Track 750 136# Concrete 10 MPH
Track 749 136# Concrete 10 MPH
Track 101 136# Concrete 20 MPH

Install Wattle Ditch Checks at 100' Intervals
Sta. 60+39.93 to Sta. 158+54.64
See Sheet EC004

Install 440 Tons, FCDMC Riprap (D50=10")
See Sheet EC013

Install 16,573 Tons, Riprap Slope Protection
(D50=6", T=9", H=9")
See Sheet EC005
Sta. 59+60.00 to Sta. 131+32.69

Project Boundary

Restricted Work Area

PARCEL NO. 304-61-006G

GS UNBOUND PHASE II
PROPERTY OWNER LLC

100 0 100 200

SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: EC026 of 036

UNION PACIFIC RAILROAD

Sheet 201 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EROSION CONTROL PLAN

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Erosion Control\T_EC
Default
3/9/2026

PARCEL NO. 304-36-002G

PHOENIX-MESA GATEWAY AIRPORT AUTHORITY

PARCEL NO. 304-35-024B

PHOENIX-MESA GATEWAY AIRPORT AUTHORITY

PARCEL NO. 304-35-024D

PHOENIX-MESA GATEWAY AIRPORT AUTHORITY

100+00

105+00

110+00

PCC 111+60.93

PCC 111+94.93

Access Rd.

Track 101 136# Concrete 20 MPH

Project Boundary

Restricted Work Area

PARCEL NO. 304-61-002Y

GATEWAY SOUTH LLC

PARCEL NO. 304-62-976A

SUNBELT MESA ELLSWORTH LP

PARCEL NO. 304-36-002G

PHOENIX-MESA GATEWAY AIRPORT AUTHORITY

90+00

95+00

100+00

Support Track E

Support Track D

Support Track C

Track 750 136# Concrete 10 MPH

Track 749 136# Concrete 10 MPH

Track 101 136# Concrete 20 MPH

Access Rd.

PARCEL NO. 304-61-001J

LPC MESA GATEWAY LP

PARCEL NO. 304-61-002Y

GATEWAY SOUTH LLC

Project Boundary

Restricted Work Area

100 0 100 200

SCALE IN FEET

olsson

2111 South 67th Street, Suite 200
Omaha, NE 68106-2810

TEL 402.341.1116
FAX 402.341.5895

www.olsson.com

UNION PACIFIC

DRAWN BY:	JTD
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	EC027 of 036

UNION PACIFIC RAILROAD

Sheet 202 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EROSION CONTROL PLAN

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Erosion Control\T_EC027_Pirate Lead_200927.dgn
Default
3/9/2026

PARCEL NO. 304-62-010V

PHOENIX-MESA GATEWAY
AIRPORT AUTHORITY

Potential Construction Staging Area

Project Boundary

130+00

PCS
130+88.69

PT
131+32.69

135+00

140+00

Access Rd.

Track 101 136# Concrete 20 MPH

Install 607 C.Y. Rock Mulch Slope Protection
See Sheet EC005
Sta. 131+32.69 to Sta. 159+15.78

PARCEL NO. 304-62-976A

SUNBELT MESA
ELLSWORTH LP

N

PARCEL NO. 304-62-010V

PHOENIX-MESA GATEWAY
AIRPORT AUTHORITY

Potential Construction Staging Area

115+00

PCS
117+49.00

PT
117+93.00

120+00

PS
124+91.65
125+00

PSC
125+35.65

Access Rd.

Track 101 136# Concrete 20 MPH

PARCEL NO. 304-62-976A

SUNBELT MESA
ELLSWORTH LP

Project Boundary

100 0 100 200

SCALE IN FEET

olsson

2111 South 67th Street, Suite 200
Omaha, NE 68106-2810

TEL 402.341.1116
FAX 402.341.5895

www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: EC028 of 036

UNION PACIFIC RAILROAD

Sheet 203 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EROSION CONTROL PLAN

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Erosion Control\T_EC28_Pirate Lead_200927.dgn
Default
3/9/2026

Install 445 Tons, FCDMC Riprap (D50=10")
See Sheet EC014

Install Construction Entrance
16 C.Y. 2"-3" Stone
See Sheet EC005

Access Rd.

Install 234 L.F. Silt Fence
Sta. 159+14 to Sta. 159+67
See Sheet EC004

Install 10 Tons Riprap
(D50=6", 12" Depth)

2,170 S.Y. Decomposed Granite (Typ.)
(Mesa Dtl. No. M-111.07)

Install 450 Tons, FCDMC Riprap (D50=10")
See Sheet EC014

PARCEL NO. 304-62-976A

SUNBELT MESA
ELLSWORTH LP

S. Ellsworth Rd.

Install 360 L.F. Silt Fence
Sta. 160+62 to Sta. 161+66, See Sheet EC004

Install 50 Tons
FCDMC Riprap (D50=10")

PS 162+46.32
PSC 162+79.32

Install 35 Tons
FCDMC Riprap
(D50=10")

Install 35 Tons
FCDMC Riprap (D50=10")

Install Construction Entrance
16 C.Y. 2"-3" Stone
See Sheet EC005

Install 25 Tons, Scupper Riprap
(2 Locations)
See Sheet D008

Install 291 L.F. Silt Fence
Sta. 160+75 to Sta. 161+66
See Sheet EC004

Install Wattle Ditch Checks at 100' Intervals
Sta. 162+08.09 to Sta. 212+51.54
See Sheet EC004

Install 531 C.Y. Rock Mulch Slope Protection
See Sheet EC005
Sta. 162+08.99 to Sta. 190+90.00

165+00 PCS 165+26.85 PT 165+59.85

Project Boundary

170+00

Track 101 136# Concrete 20 MPH

Install Wattle Ditch Checks at 100' Intervals
Sta. 162+01.01 to Sta. 212+48.94
See Sheet EC004

Install 349 C.Y. Rock Mulch Slope Protection
See Sheet EC005
Sta. 161+93.60 to Sta. 171+90.00

PARCEL NO. 304-62-001D

SUNBELT MESA
ELLSWORTH LP

PARCEL NO. 304-62-006D

SUNBELT MESA
ELLSWORTH LP

PARCEL NO. 304-62-010V

PHOENIX-MESA GATEWAY
AIRPORT AUTHORITY

Project Boundary

145+00 150+00 155+00

Access Rd.

Track 101 136# Concrete 20 MPH

PARCEL NO. 304-62-976A

SUNBELT MESA
ELLSWORTH LP

100 0 100 200
SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: EC029 of 036

UNION PACIFIC RAILROAD
Sheet 204 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EROSION CONTROL PLAN

Color table: K:\BentleyWorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Erosion Control\T_EC29_Pirate Lead_200927.dgn
Default
03/09/2026

PARCEL NO. 304-62-001D

SUNBELT MESA
ELLSWORTH LP

Install 50 Tons, Riprap Slope Protection
(D50=4", T=6", H=6")
See Sheet EC005
Sta. 190+90.00 to Sta. 192+10.00

Install 362 C.Y. Rock Mulch Slope Protection
See Sheet EC005
Sta. 192+10.00 to Sta. 212+76.89

Install 25 Tons
FCDMC Riprap
(D50=10")

Project Boundary

Access Rd.

PCS 183+73.14
PT 184+06.14
185+00
190+00
195+00

Track 101 136# Concrete 20 MPH

Access Rd.

Restricted Work Area

Install 82 Tons, Riprap Slope Protection
(D50=4", T=6", H=6")
See Sheet EC005
Sta. 189+90.00 to Sta. 191+10.00

Install 35 Tons
FCDMC Riprap (D50=10")

Install 493 C.Y. Rock Mulch Slope Protection
See Sheet EC005
Sta. 191+10.00 to Sta. 212+69.63

PARCEL NO. 304-62-006D

SUNBELT MESA
ELLSWORTH LP

PARCEL NO. 304-62-001D

SUNBELT MESA
ELLSWORTH LP

Project Boundary

170+00
175+00
180+00
PS 180+91.95
PSC 181+24.95
PCS 183+73.14
PT 184+06.14
185+00

Track 101 136# Concrete 20 MPH

Install 165 Tons, Riprap Slope Protection
(D50=4", T=6", H=6")
See Sheet EC005
Sta. 171+90.00 to Sta. 173+10.00

Install 312 C.Y. Rock Mulch Slope Protection
See Sheet EC005
Sta. 173+10.00 to Sta. 189+90.00

PARCEL NO. 304-62-006D

SUNBELT MESA
ELLSWORTH LP

100 0 100 200
SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: EC030 of 036

UNION PACIFIC RAILROAD
Sheet 205 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EROSION CONTROL PLAN

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Erosion Control\T_EC
Default
3/9/2026

Install 65 Tons FCDMC Riprap (D50=6")

Restricted Work Area

Install 60 Tons FCDMC Riprap (D50=6")

Install Wattle Ditch Checks at 100' Intervals
Sta. 213+60.54 to Sta. 224+10.00
See Sheet EC004

Install 159 C.Y. Rock Mulch Slope Protection
See Sheet EC005
Sta. 213+71.79 to Sta. 225+70.00

215+00

220+00

225+00

PARCEL NO. 304-63-976
(LOT 2)

CUBES AT MESA GATEWAY
BUILDING B LLC

PMT21-14903

Install 185 Tons, FCDMC Riprap (D50=10")
See Sheet EC015

Project Boundary

Track 101 136# Concrete 20 MPH
Track 752 136# Concrete 10 MPH

Install 45 Tons FCDMC Riprap (D50=6")

Install 70 Tons FCDMC Riprap (D50=6")

Install Construction Entrance
16 C.Y. 2"-3" Stone
See Sheet EC005

Install 174 C.Y. Rock Mulch Slope Protection
See Sheet EC005
Sta. 213+39.40 to Sta. 225+57.37

Install 74 L.F. Silt Fence
Sta. 213+40 to Sta. 213+94
See Sheet EC004

Install Wattle Ditch Checks at 100' Intervals
Sta. 213+79.25 to Sta. 225+70.31
See Sheet EC004

254 S.Y. Decomposed Granite (Typ.)
(Mesa Dtl. No. M-111.07)

PARCEL NO. 304-63-977B
(LOT 3)

CUBES AT MESA GATEWAY
BUILDING C LLC

PMT21-14903

Install 180 Tons, FCDMC Riprap (D50=10")
See Sheet EC015

Crismon Road

Access Rd.

M.H.

F.H.

PARCEL NO. 304-62-001D

SUNBELT MESA
ELLSWORTH LP

PARCEL NO. 304-62-001F

KOMATSU AMERICA CORP

PMT25-02775

Restricted Work Area

Project Boundary

200+00

205+00

210+00

Track 101 136# Concrete 20 MPH
Track 752 136# Concrete 10 MPH

Install Construction Entrance
16 C.Y. 2"-3" Stone
See Sheet EC005

Access Rd.

Crismon Road

PARCEL NO. 304-62-006D

SUNBELT MESA
ELLSWORTH LP

100 0 100 200

SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: EC031 of 036

UNION PACIFIC RAILROAD

Sheet 206 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EROSION CONTROL PLAN

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Erosion Control\T_EC31_Private Lead_200927.dgn
Default
3/9/2026

S. Merrill Rd.

240+00

245+00

250+00

255+00

Install 120 Tons, FCDMC Riprap (D50=10")
See Sheet EC016

Temporary Construction Easement

Install 78 C.Y. Rock Mulch Slope Protection
See Sheet EC005
Sta. 240+21.38 to Sta. 244+40.00

Install Wattle Ditch Checks at 100' Intervals
Sta. 241+20.00 to Sta. 265+00.00
See Sheet EC004

Install 36 Tons, Riprap Slope Protection
(D50=4", T=6", H=6")
See Sheet EC005
Sta. 248+40.00 to Sta. 249+10.00

Install 37 Tons, Riprap Slope Protection
(D50=4", T=6", H=6")
See Sheet EC005
Sta. 244+40.00 to Sta. 245+10.00

Install 59 C.Y. Rock Mulch Slope Protection
See Sheet EC005
Sta. 245+10.00 to Sta. 248+40.00

Install 38 Tons, Riprap Slope Protection
(D50=4", T=6", H=6")
See Sheet EC005
Sta. 252+40.00 to Sta. 253+10.00

Install 55 C.Y. Rock Mulch Slope Protection
See Sheet EC005
Sta. 249+10.00 to Sta. 252+40.00

Temporary Construction Easement

Track 101 136# Concrete 20 MPH
Track 752 136# Concrete 10 MPH

Access Rd.

Potential Construction Staging Area

Install 96 C.Y. Rock Mulch Slope Protection
See Sheet EC005
Sta. 247+10.00 to Sta. 251+90.00

Project Boundary

Install Wattle Ditch Checks at 100' Intervals
Sta. 240+00.10 to Sta. 264+89.77
See Sheet EC004

Temporary Construction Easement

Install 121 Tons, Riprap Slope Protection
(D50=4", T=6", H=6")
See Sheet EC005
Sta. 245+90.00 to Sta. 247+10.00

Install 112 Tons, Riprap Slope Protection
(D50=4", T=6", H=6")
See Sheet EC005
Sta. 251+90.00 to Sta. 253+10.00

Temporary Construction Easement

Install 85 Tons, FCDMC Riprap (D50=10")
See Sheet EC016

PARCEL NO. 304-63-016A

ARIZONA STATE
LAND DEPARTMENT

Install 117 C.Y. Rock Mulch Slope Protection
See Sheet EC005
Sta. 240+21.38 to Sta. 245+90.00

PARCEL NO. 304-63-006W

OLD DOMINION
FREIGHT LINE INC

Install 1,806 L.F. Silt Fence
Sta. 224+20 to Sta. 241+10
See Sheet EC004

Install 109 C.Y. Rock Mulch Slope Protection
See Sheet EC005
Sta. 226+18.31 to Sta. 239+78.63

PARCEL NO. 304-63-006T

CITY OF MESA

Install Construction Entrance
16 C.Y. 2"-3" Stone
See Sheet EC005

S. Merrill Rd.

230+00

235+00

240+00

Project Boundary

Track 101 , 136# Concrete 20 MPH
Track 752 136# Concrete 10 MPH

E.H.

E.H.

Install 1,408 L.F. Silt Fence
Sta. 225+50 to Sta. 238+90
See Sheet EC004

Install 80 C.Y. Rock Mulch Slope Protection
See Sheet EC005
Sta. 226+18.31 to Sta. 239+78.63

Access Rd.

PARCEL NO. 304-63-977B
(LOT 3)

CUBES AT MESA GATEWAY
BUILDING C LLC

PMT21-14903

100 0 100 200

SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: EC032 of 036

UNION PACIFIC RAILROAD

Sheet 207 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EROSION CONTROL PLAN

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Erosion Control\T_EC32_Pirate Lead_200927.dgn
Default
3/9/2026

PARCEL NO. 304-63-990
(LOT 1)

SIGNAL BUTTE
LAND LLC

PMT24-10655

PARCEL NO. 304-63-991
(LOT 2)

SIGNAL BUTTE
LAND LLC

PMT24-10655

Signal Butte Rd.

PS
266+90.56

PSC
267+34.56

Install 1,021 C.Y. Rock Mulch Slope Protection
See Sheet EC005
Sta. 266+28.53 to Sta. 305+76.97

Install Wattle Ditch Checks at 100' Intervals
Sta. 275+49.70 to Sta. 303+89.54
See Sheet EC004

Project Boundary

Install 803 L.F. Silt Fence
Sta. 278+77 to Sta. 286+12
See Sheet EC004

Install 35 Tons
FCDMC Riprap (D50=10")

Install 972 L.F. Silt Fence
Sta. 266+13 to Sta. 275+40
See Sheet EC004

270+00

280+00

PS
280+99.08

PSC
281+43.08

PCS
274+61.73

275+00
PT
275+05.73

Track 101 136# Concrete 20 MPH

Install 606 L.F. Silt Fence
Sta. 279+49 to Sta. 285+80
See Sheet EC004

Install 809 L.F. Silt Fence
Sta. 266+10 to Sta. 273+22
See Sheet EC004

Install 75 Tons
FCDMC Riprap (D50=10")

Install Wattle Ditch Checks at 100' Intervals
Sta. 266+29.58 to Sta. 287+37.82
See Sheet EC004

Install 158 Tons, Riprap Slope Protection
(D50=4", T=6", H=6")
See Sheet EC005
Sta. 275+93.00 to Sta. 277+10.00

Install 582 C.Y. Rock Mulch Slope Protection
See Sheet EC005
Sta. 266+31.46 to Sta. 275+93.00

PARCEL NO. 304-63-992
(LOT 3)

SIGNAL BUTTE
LAND LLC

Install 123 L.F. Silt Fence
Sta. 265+65 to Sta. 265+68
See Sheet EC004

Temporary Construction Easement

Project Boundary

255+00

260+00

265+00

Signal Butte Rd.

PS
266+90.56

PSC
267+34.56

Temporary
Construction
Easement

Install 204 C.Y. Rock Mulch Slope Protection
See Sheet EC005
Sta. 247+10.00 to Sta. 265+66.64

Track 101 136# Concrete 20 MPH
Track 752 136# Concrete 10 MPH

Install Construction Entrance
16 C.Y. 2"-3" Stone
See Sheet EC005

Temporary Construction Easement

672 S.Y. Decomposed Granite (Typ.)
(Mesa Dtl. No. M-111.07)

Install Construction Entrance
16 C.Y. 2"-3" Stone
See Sheet EC005

Install 251 C.Y. Rock Mulch Slope Protection
See Sheet EC005
Sta. 253+10.00 to Sta. 265+67.62

PARCEL NO. 304-63-016A

ARIZONA STATE
LAND DEPARTMENT

100 0 100 200
SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: EC033 of 036

UNION PACIFIC RAILROAD

Sheet 208 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EROSION CONTROL PLAN

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927.RLTK\DGN\Sheets\04_Erosion Control\T
Default
3/9/2026

PARCEL NO. 304-34-929A

DAWSON FAMILY TRUST

PARCEL NO. 304-34-929B

MOUNTAIN PECOS LLC

PARCEL NO. 304-34-930

CRM OF AMERICA HOLDINGS LLC

PARCEL NO. 304-34-020Y

CRM OF AMERICA HOLDINGS LLC

S. Mountain Rd.

E. Pecos Rd.

Install 398 L.F. Silt Fence
Sta. 304+00 to Sta. 305+81
See Sheet EC004

Install 55 Tons
FCDMC Riprap (D50=10")

295+00

300+00

305+00

Track 101 136# Concrete 20 MPH

Install 14 C.Y. Rock Mulch Slope Protection
See Sheet EC005
Sta. 303+75.00 to Sta. 305+66.67

Project Boundary

Potential Construction Staging Area

Install 195 Tons, Riprap Slope Protection
(D50=4", T=6", H=6")
See Sheet EC005
Sta. 302+50.00 to Sta. 303+75.00

Install 55 Tons
FCDMC Riprap (D50=10")

Future Grading &
Subballast for Industry
Track (By Others)

Install Wattle Ditch Checks at 100' Intervals
Sta. 295+93.24 to Sta. 303+89.92
See Sheet EC004

PARCEL NO. 304-63-005B

CMC STEEL FABRICATORS INC

PARCEL NO. 604-63-004E

COMMERCIAL METALS COMPANY

PARCEL NO. 304-63-991
(LOT 2)

SIGNAL BUTTE LAND LLC

PMT24-10655

430 S.Y. Decomposed Granite (Typ.)
(Mesa Dtl. No. M-111.07)

Install Construction Entrance
16 C.Y. 2"-3" Stone
See Sheet EC005

Install 35 Tons
FCDMC Riprap (D50=10")

PARCEL NO. 304-34-037A

MGC PURE CHEMICALS AMERICA INC

285+00

288+68.03 PCSC

289+14.03 PT

290+00

295+00

Install 45 Tons
FCDMC Riprap (D50=10")

281+43.08 PSC

280+99.08 PS

Track 101 136# Concrete 20 MPH

Project Boundary

Install Wattle Ditch Checks at 100' Intervals
Sta. 289+00.03 to Sta. 292+50.33
See Sheet EC004

Install 914 C.Y. Rock Mulch Slope Protection
See Sheet EC005
Sta. 277+10.00 to Sta. 302+50.00

Install 35 Tons
FCDMC Riprap (D50=10")

Install 35 Tons
FCDMC Riprap (D50=10")

PARCEL NO. 304-63-005B

CMC STEEL FABRICATORS INC

Future Grading &
Subballast for Industry
Track (By Others)

PARCEL NO. 304-63-992
(LOT 3)

SIGNAL BUTTE LAND LLC

100 0 100 200

SCALE IN FEET

olsson

2111 South 67th Street, Suite 200
Omaha, NE 68106-2810

TEL 402.341.1116
FAX 402.341.5895

www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: EC034 of 036

UNION PACIFIC RAILROAD

Sheet 209 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EROSION CONTROL PLAN

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Erosion Control\T_EC34_Pirate Lead_200927.dgn
Default
3/9/2026

PARCEL NO. 304-61-018F

PECOS INDUSTRIAL LP

PARCEL NO. 304-61-018E

PECOS INDUSTRIAL LP

Install 214 C.Y. Rock Mulch Slope Protection
See Sheet EC005

Install 2,250 L.F. Silt Fence
See Sheet EC004

Install Wattle Ditch Checks at 100' Intervals
See Sheet EC004

Install 1,152 C.Y. Rock Mulch Slope Protection
See Sheet EC005

Install 198 C.Y. Rock Mulch
20' Wide, Low Flow Drainageway
See Sheet EC005

Project Boundary

PARCEL NO. 304-61-022N

POWER INDUSTRIAL
OWNER LLC

PARCEL NO. 304-61-023R

UNION PACIFIC
RAILROAD COMPANY

South Detention Cell

Low Flow Drainageway

Do Not Disturb Existing Retention

Access Rd.

Access Rd.

Access Ramp

20+00

Concrete 20 MPH

PARCEL NO. 304-61-022R

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

PSC
7+74.65

PARCEL NO. 304-61-015G

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

PCS
17+38.27

PT
17+82.27

Track 101 136# Concrete

15+00

14+95+00

Phoenix Sub Main Track 113# Wood, 60 MPH

Track 120 136# Concrete 30 MPH

PARCEL NO. 304-61-023L

UNION PACIFIC
RAILROAD COMPANY

15+00

Potential Construction Staging Area

Track 151 136# Concrete 20 MPH

Potential Construction Staging Area

PARCEL NO. 304-61-016G

NICOLA PECOS &
SOSSAMAN LP

PMT21-12148

100 0 100 200

SCALE IN FEET

N

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: EC035 of 036

UNION PACIFIC RAILROAD

Sheet 210 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EROSION CONTROL PLAN

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Erosion Control\T_EC35_Pirate Lead.200927.dgn
Default
3/9/2026

Install 386 C.Y. Rock Mulch
20' Wide, Low Flow Drainageway
See Sheet EC005

Low Flow Drainageway

Access Ramp

PARCEL NO. 304-36-002G

PHOENIX-MESA GATEWAY
AIRPORT AUTHORITY

Potential Construction Staging Area

65+00

70+00

Access Rd.

North Detention Cell

Potential Construction Staging Area
(Do Not Disturb Existing Retention)

55+00

Install 1,462 C.Y. Rock Mulch Slope Protection
See Sheet EC005

Restricted Work Area

Install 2,561 L.F. Erosion Control Silt Fence
See Sheet EC004

PARCEL NO. 304-61-019

UNITED STATES
OF AMERICA

PARCEL NO. 304-61-006G

GS UNBOUND PHASE II
PROPERTY OWNER LLC

Project Boundary

Install Wattle Ditch Checks at 100' Intervals
See Sheet EC004

50+00

Track 101 - 136# - Concrete - 20 MPH

PARCEL NO. 304-61-995

GATEWAY GRAND
ASSOCIATION

PMT22-05054

Restricted Work Area

S. Sossaman Rd.

40+00

PARCEL NO. 304-61-005B

SL7 MESA INDUSTRIAL LP

PMT23-21476

PARCEL NO. 304-61-021E

CITY OF MESA

Track 101 - 136# - Concrete - 20 MPH

200 0 200 400

SCALE IN FEET

N

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: JTD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: EC036 of 036

UNION PACIFIC RAILROAD

Sheet 211 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
EROSION CONTROL PLAN

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Erosion Control\T_EC36_Private Lead_200927.dgn
Default
3/9/2026

Restricted Work Area

Phoenix-Mesa Gateway Airport

Williams Field Rd.

North Detention Cell

Restricted Work Area

National Weather Service Weather Radar Site

City of Mesa Utility Station

Track 749 & Track 750

Retention Area 1 Outfall to Ellsworth Channel

S. Power Rd.

E. Pecos Rd.

Pecos Road Crossing See Sheets PH005 to PH012

Sossaman Road Crossing See Sheets PH019 to PH027

South Detention Cell

Diversion to North Detention Cell

Track 101

Track 101

GILBERT

MESA

QUEEN CREEK

North Detention Cell Outfall to Trackside Ditch

Retention Area 1

Sossaman Road Crossing See Sheets PH013 to PH018

E. Pecos Rd.

Track 751

South Detention Cell to Rittenhouse Channel

E. Rittenhouse Rd.

S. Sossaman Rd.

S. 80th St.

S. Ellsworth Rd.

935

Sossaman Road Crossing See Sheet PH004

E. Germann Rd.

MESA

QUEEN CREEK

E. Germann Rd.

Rittenhouse Channel Outfall

Restricted Work Area

Track 120 Extension

Hawes Rd.

NOTES:
1. SEE SHEET PH002 FOR NOTES

936

1250 0 1250 2500

SCALE IN FEET

Phoenix Sub Main Track

N

olsson

2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: MHD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: PH001 of 029

UNION PACIFIC RAILROAD

Sheet 212 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CONSTRUCTION PHASING

Color table:K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04 Phasing\P_PH001.200927.dgn
Default
3/9/2026

Restricted Work Area

SR 24

S. 222nd St.

S. Mountain Rd.

MESA CITY LIMITS

Retention Area 6 Outfall to Trackside Ditch

E. Pecos Rd.

Track 101

Retention Areas 3 & 4 Outfall to Existing Retention

Retention Area 6

Track 752

Retention Area 2

Signal Butte Road Crossing See Sheet PH029

Retention Area 5

Retention Area 2 Outfall to Trackside Ditch

Crismon Road Crossing See Sheet PH028

Retention Area 5 Outfall to Signal Butte Road

S. Crismon Rd.

S. Merrill Rd.

S. Signal Butte Rd.

S. Meridian Rd.

E. Germann Rd.

MESA

QUEEN CREEK

MARICOPA COUNTY

PINAL COUNTY

N

1250 0 1250 2500

SCALE IN FEET

NOTES:

1. CONSTRUCTION ACTIVITIES SHALL GENERALLY BE PERFORMED AS DEPICTED IN THE PLANS, WITHIN DESIGNATED WORK AREAS, AND IN ACCORDANCE WITH ALL PERMITS. ALL CONSTRUCTION ACTIVITIES, INCLUDING CONTRACTOR ACCESS, MOBILIZATION, AND STORAGE OF MATERIALS/EQUIPMENT, WITHIN RESTRICTED WORK AREAS ARE STRICTLY PROHIBITED UNTIL OBTAINMENT OF AGENCY APPROVALS AND RECEIVING WRITTEN AUTHORIZATION FROM UPRR.
2. ALL WORK SHALL BE PERFORMED IN CLOSE COORDINATION WITH SRP POWER SUPPLY/DISTRIBUTION, UPRR SIGNAL INSTALLATIONS, AND UPRR TRACK FOR TLM CONSTRUCTION AND CROSSING PANEL INSTALLATIONS.
3. THE CONTRACTOR SHALL COORDINATE ALL ASPECTS OF CONSTRUCTION, INCLUDING MATERIAL STORAGE AND STAGING AREAS, TEMPORARY TRAFFIC CONTROL, ACCESS, HAUL ROUTES, SCHEDULES, NOTIFICATIONS, TESTING, INSPECTIONS, AND DOCUMENTATION WITH ALL RELEVANT ENTITIES INCLUDING UPRR, PUBLIC AGENCIES, JURISDICTIONS HAVING AUTHORITY (JHA), UTILITY OWNERS, ADJACENT LANDOWNERS, SUBCONTRACTORS, AND/OR OTHER THIRD-PARTIES.
4. CONSTRUCTION PHASING AND DETOUR PLANS ARE STRICTLY CONCEPTUAL. THE CONTRACTOR IS RESPONSIBLE FOR ENGINEERING DESIGN, APPLICATION, AND OBTAINMENT OF ALL TEMPORARY TRAFFIC CONTROL (TTC) PERMITS PRIOR TO ALL CONSTRUCTION.
5. EACH ROAD CROSSING WILL REQUIRE, AT A MINIMUM, TWO PHASES OF CONSTRUCTION. THE FIRST PHASE OF CONSTRUCTION INCLUDES CONTRACTOR WORK CONSISTING OF UTILITY RELOCATIONS, GRADING AND DRAINAGE IMPROVEMENTS, AND ROADWAY RECONSTRUCTION THROUGH THE TRACK CROSSING. THE SECOND PHASE INCLUDES CONTRACTOR PAVEMENT REMOVAL AND TRACKBED PREPARATION, UPRR INSTALLATION OF TRACK AND CROSSING PANELS, CONTRACTOR INSTALLATION OF UNDERDRAINS AND PAVING ALONG THE CROSSING PANELS, AND ALL OTHER ITEMS AS NECESSARY FOR COMPLETION OF WORK. ALL ROAD CROSSINGS ADJACENT TO FULL-CLOSURE CONSTRUCTION SHALL REMAIN OPEN TO TRAFFIC AT ALL TIMES. AS NECESSARY, AND AS ACCEPTABLE TO LOCAL ORDINANCES, THE CONTRACTOR WILL BE REQUIRED TO WORK EVENINGS AND WEEKENDS DURING FULL-CLOSURE CONSTRUCTION.
6. IN ACCORDANCE WITH AGENCY SPECIFICATIONS AND REQUIREMENTS, THE CONTRACTOR SHALL TEMPORARILY RELOCATE, MAINTAIN, OR RESTORE EXISTING FEATURES CONFLICTING WITH PROPOSED CONSTRUCTION SUCH AS UTILITIES, PAVEMENT MARKINGS AND SIGNING, OR OTHER CONFLICTS ENCOUNTERED.
7. ALL ASPECTS OF CONSTRUCTION PHASING, INCLUDING ENGINEERING DESIGN, ALL COORDINATION, TESTING, INSPECTIONS, HAUL ROUTES, PERMITTING, AND INSTALLATION, MAINTENANCE, AND REMOVAL OF ALL TEMPORARY PAVEMENTS, TEMPORARY TRAFFIC CONTROL, BARRICADES, DETOURS, TEMPORARY SHORING, DEWATERING, AND RESTORATIONS SHALL BE MADE UNDER THE LUMP SUM LINE ITEM "TRFC, TRAFFIC CONTROL" FOR EACH RESPECTIVE WORK AREA.
8. ALL TEMPORARY TRAFFIC CONTROL SHALL COMPLY WITH THE CITY OF MESA TEMPORARY TRAFFIC CONTROL MANUAL STANDARDS AND REQUIREMENTS.

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: MHD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: PH002 of 029

UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CONSTRUCTION PHASING

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color_UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04 Phasing\P_PH002_200927.dgn
Default
3/9/2026

E. Pecos Rd.

S. 80th St.

E. Germann Rd.

Hawes Rd.

Restricted Work Area

E. Ryan Rd.

E. Fulton Pkwy.

S. Ellsworth Loop

S. Sossaman Road Crossing
See Sheet PH004

MESA

QUEEN CREEK

936

Phoenix Sub Main Track

Track 744

E. Fulton Pkwy.

E. Rittenhouse Rd.

Track 120

Track 120

QUEEN CREEK

S. Sossaman Rd

Hawes Rd.

Google Earth

Legend

800 0 800 1600

SCALE IN FEET

NOTES:
1. SEE SHEET PH002 FOR NOTES

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: MHD
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: PH003 of 029

UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CONSTRUCTION PHASING

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04 Phasing\P_PH003_200927.dgn
Default
3/9/2026

DETOUR NOTES

1. DETOURS AND TEMPORARY TRAFFIC CONTROL SHOWN IS CONCEPTUAL. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY TRAFFIC CONTROL REQUIRED FOR MULTIPLE PHASES OF CONSTRUCTION NECESSARY TO ACCOMMODATE ALL ASPECTS OF ROADWAY AND RAILROAD CONSTRUCTION.

2. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINMENT OF TEMPORARY TRAFFIC CONTROL (TTC) PERMITS PER CONDITIONS SET FORTH IN THE CITY OF MESA TEMPORARY TRAFFIC CONTROL MANUAL (TTCM). TRAFFIC CONTROL PLANS (TCP) SHALL COMPLY WITH SECTION 1.5 OF THE CITY OF MESA TTCM. ROAD CLOSURES REQUIRE A MINIMUM LEAD TIME OF 30 CALENDAR DAYS FOR CITY OF MESA REVIEW AND COORDINATION.

3. CONTRACTOR SHALL COMPLY WITH THE TOWN OF QUEEN CREEK ROADWAY SIGNING AND PAVEMENT MARKING GUIDELINES DOCUMENT, SPECIFICATIONS, AND REQUIREMENTS. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH THE TOWN OF QUEEN CREEK, INCLUDING OBTAINMENT OF FULL ROAD CLOSURE PERMITS, NOTIFICATIONS, SCHEDULING, HAUL ROADS, AND INSPECTIONS. REQUESTS FOR FULL ROAD CLOSURES SHALL BE SUBMITTED TO THE TOWN OF QUEEN CREEK AT LEAST 21 DAYS PRIOR TO PROPOSED CLOSURES.

LEGEND

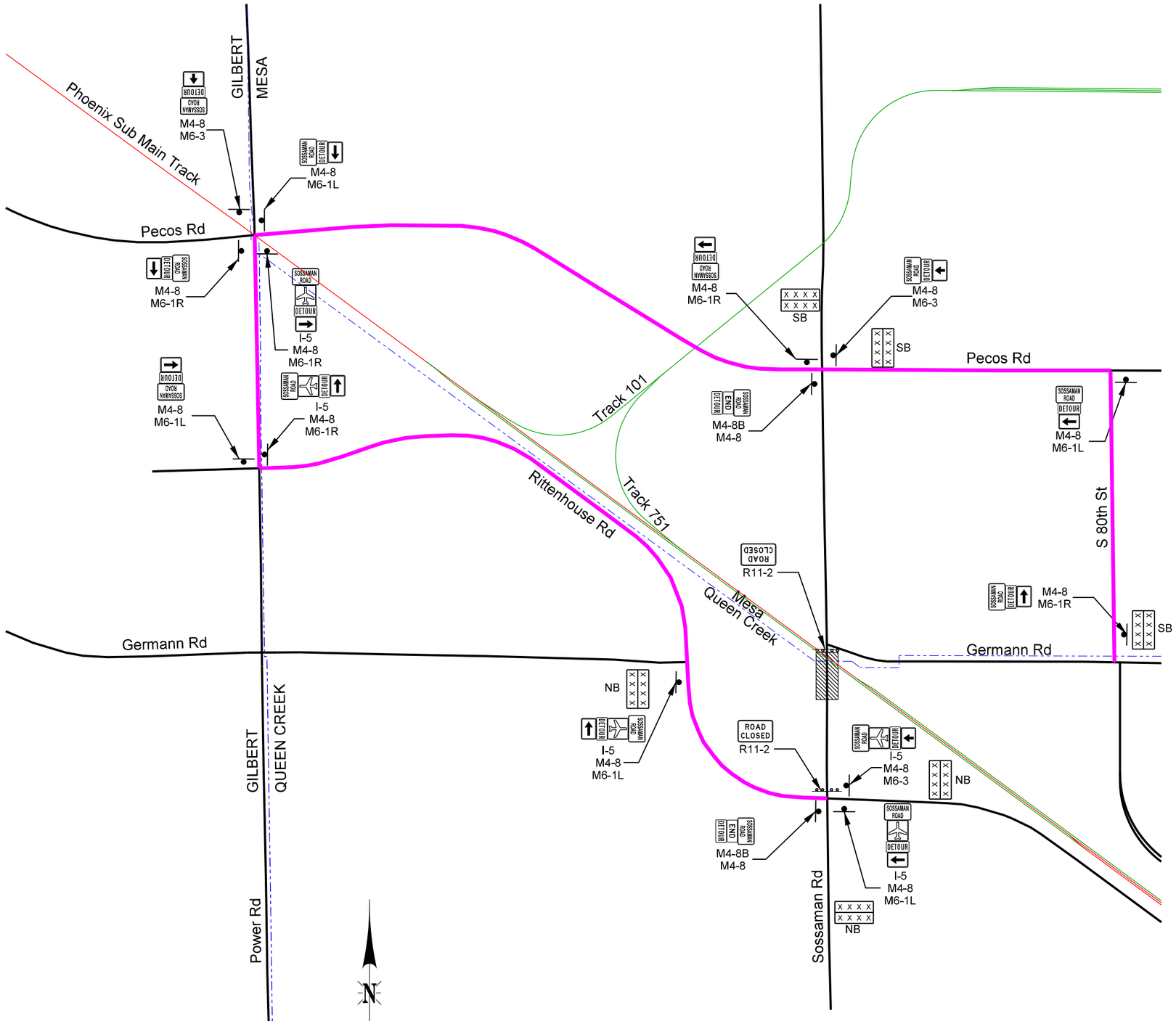
- VARIABLE MESSAGE BOARD
- CONSTRUCTION
- TYPE III BARRICADE
- SIGN
- DETOUR
- EXISTING TRACK
- PROPOSED TRACK

MESSAGE: PHASE I
LINE 1: SOSSAMAN
LINE 2: ROAD (NB/SB)
LINE 3: CLOSED

MESSAGE: PHASE II
LINE 1: XX/XX
LINE 2: TO
LINE 3: XX/XX
(XX/XX INDICATES THE DATES OF CLOSURE)

LIST OF TRAFFIC CONTROL DEVICES*			
ITEM	MUTCD DEVICE NO.	SIZE	QTY
ROAD CLOSED	R11-2	48" X 30"	2
ROAD CLOSED TO THRU TRAFFIC	R11-4	60" X 30"	-
'SOSSAMAN ROAD' PLAQUE			15
STRAIGHT ARROW AUXILIARY	M6-3	21" X 15"	3
LEFT ARROW AUXILIARY	M6-1L	21" X 15"	5
RIGHT ARROW AUXILIARY	M6-1R	21" X 15"	5
DETOUR (LEFT ARROW)	M4-10L	48" X 18"	-
DETOUR (RIGHT ARROW)	M4-10R	48" X 18"	-
DETOUR	M4-8	24" X 12"	15
END	M4-8B	24" X 12"	2
AIRPORT PLAQUE	I-5	24" X 24"	5
TYPE III BARRICADE		60" X 48"	4
VARIABLE MESSAGE BOARDS			6

*NOTE: TEMPORARY TRAFFIC CONTROL QUANTITIES ARE SHOWN FOR INFORMATION ONLY. PAYMENT FOR THESE ITEMS SHALL BE MADE UNDER THE LUMP SUM LINE ITEM "TRFC, TRAFFIC CONTROL".



olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: PH004 of 029

UNION PACIFIC RAILROAD

Sheet 215 of 587

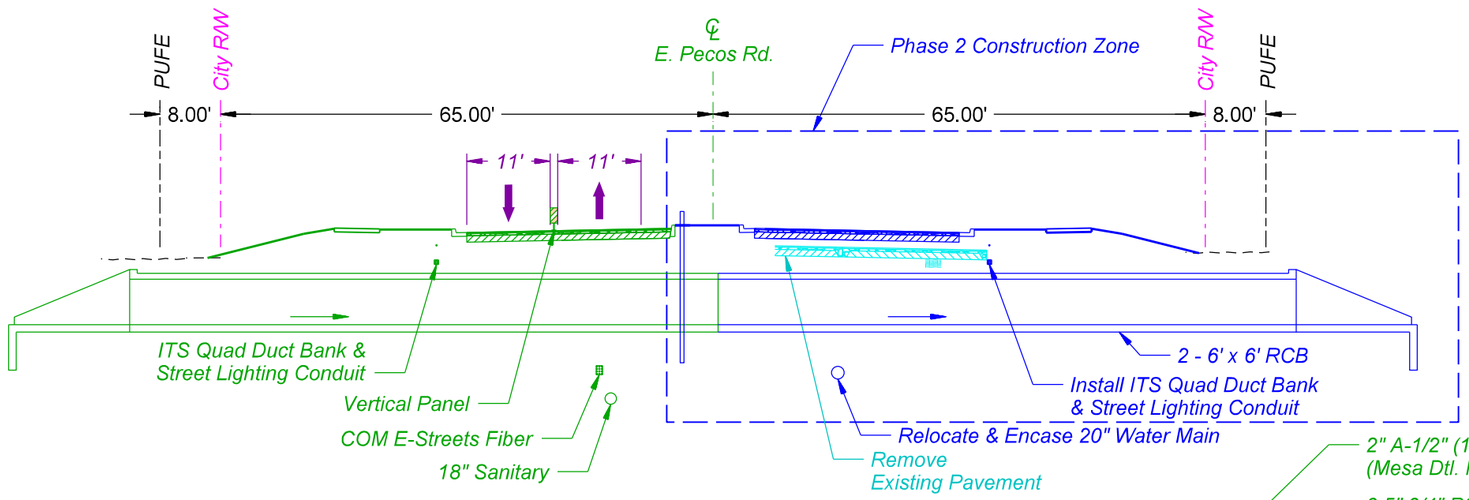
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CONSTRUCTION PHASING - SOSSAMAN CROSSING DETOUR

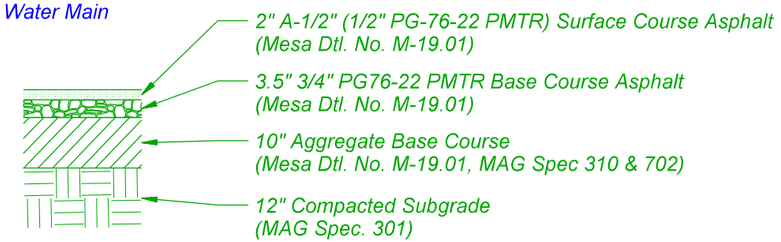
Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04 Phasing\P_PH004_01 Sossaman Detour_200927.dgn
Default
3/9/2026

NOTES:

1. CONSTRUCTION PHASING SHOWN IS CONCEPTUAL. CONTRACTOR SHALL DETERMINE DESIRED SEQUENCE OF WORK, LAYOUTS, LIMITS OF CONSTRUCTION, TEMPORARY TRAFFIC CONTROL, BARRICADING, SHORING SYSTEMS, LOCATIONS, DIMENSIONS, AND QUANTITIES.
2. WITH EXCEPTION TO TRACK INSTALLATION, TWO LANES OF TRAFFIC, ONE LANE IN EACH DIRECTION, SHALL BE MAINTAINED AT ALL TIMES THROUGHOUT CONSTRUCTION.
3. TRACK 101 AND CROSSING PANELS ARE SHOWN FOR REFERENCE ONLY AND ARE TO BE CONSTRUCTED UPON COMPLETION OF ALL OTHER CROSSING IMPROVEMENTS.
4. PER ADOT AND UPRR SPECIFICATIONS, CONSTRUCTION JOINTS SHALL BE PERPENDICULAR TO RCB STRUCTURE.

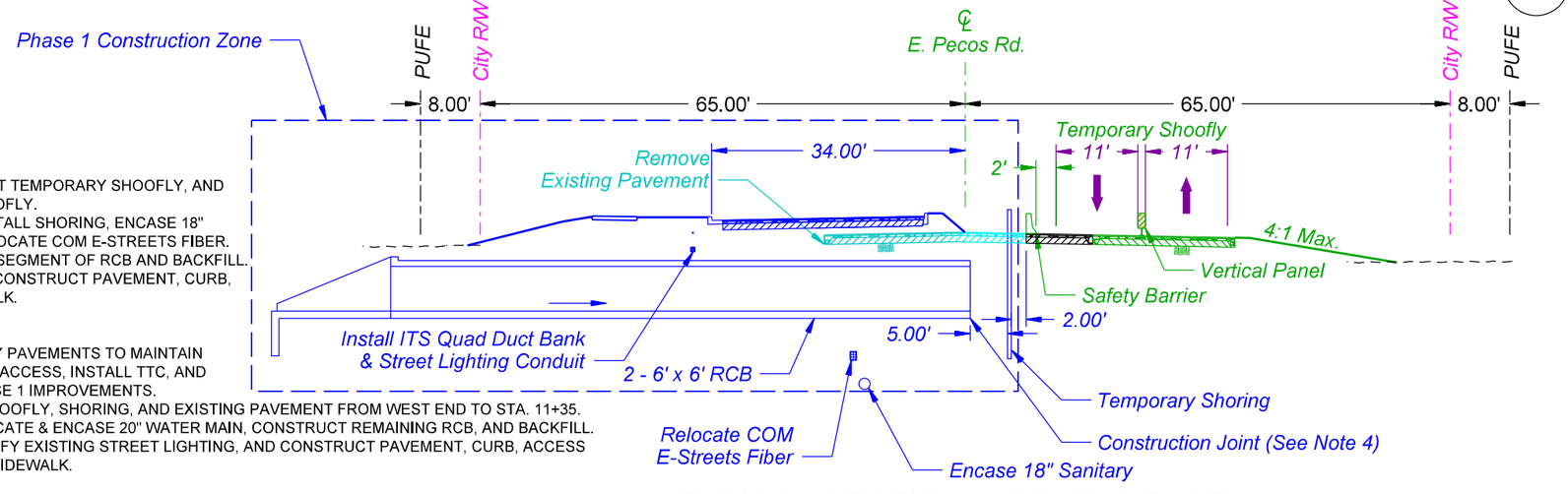


TYPICAL SECTION (LOOKING EAST)
PHASE 2 & 3 CONSTRUCTION



B TEMPORARY PAVEMENT SECTION

NOT TO SCALE



TYPICAL SECTION (LOOKING EAST)
PHASE 1 CONSTRUCTION

PHASE 1:

A. INSTALL TTC, CONSTRUCT TEMPORARY SHOOFLY, AND DIVERT TRAFFIC TO SHOOFLY.
B. REMOVE PAVEMENT, INSTALL SHORING, ENCASE 18" SANITARY LINE, AND RELOCATE COM E-STREETS FIBER.
C. CONSTRUCT UPSTREAM SEGMENT OF RCB AND BACKFILL.
D. INSTALL CONDUITS AND CONSTRUCT PAVEMENT, CURB, SCUPPERS, AND SIDEWALK.

PHASE 2:

A. CONSTRUCT TEMPORARY PAVEMENTS TO MAINTAIN TRAFFIC AND PROPERTY ACCESS, INSTALL TTC, AND DIVERT TRAFFIC TO PHASE 1 IMPROVEMENTS.
B. REMOVE TEMPORARY SHOOFLY, SHORING, AND EXISTING PAVEMENT FROM WEST END TO STA. 11+35.
C. INSTALL SHORING, RELOCATE & ENCASE 20" WATER MAIN, CONSTRUCT REMAINING RCB, AND BACKFILL.
D. INSTALL CONDUITS, MODIFY EXISTING STREET LIGHTING, AND CONSTRUCT PAVEMENT, CURB, ACCESS DRIVES, SCUPPER, AND SIDEWALK.

PHASE 3:

A. COORDINATE TEMPORARY CLOSURE OF DRIVEWAY ENTRANCE W/ PROPERTY OWNER.
B. REMOVE TEMPORARY PAVEMENTS, EXISTING DRIVEWAY ENTRANCE, AND EXISTING PAVEMENT FROM STA. 11+35 TO EAST END.
B. CONSTRUCT REMAINING ROAD, RECONSTRUCT DRIVEWAY ENTRANCE, CONSTRUCT CURB AND SIDEWALK, AND RESTORE PROPERTY ACCCESS.

PHASE 4 (FULL-CLOSURE):

A. INSTALL TEMPORARY TRAFFIC CONTROL (DETOUR).
B. REMOVE TEMPORARY PAVEMENT AND FINALIZE GRADING.
C. PREPARE TRACKBED FOR UPRR TRACK/CROSSING CONSTRUCTION (SAW CUT AND REMOVE PAVEMENT, PREPARE SUBGRADE, PLACE SUBBALLAST, AND INSTALL UNDERDRAINS).
D. UPRR TO INSTALL TRACK (TLM), LINE/LEVEL BALLAST, AND INSTALL CROSSING PANELS.
E. CONSTRUCT PAVEMENT ALONG CROSSING PANELS, MILL/OVERLAY PAVEMENT AT EACH END, FINALIZE PERMANENT TRAFFIC CONTROL, AND OPEN TO TRAFFIC.

LEGEND

- PROPOSED CONSTRUCTION
- PREVIOUSLY CONSTRUCTED
- TEMPORARY LANES

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	RSP
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	PH005 of 029

UNION PACIFIC RAILROAD — Sheet 216 of 587

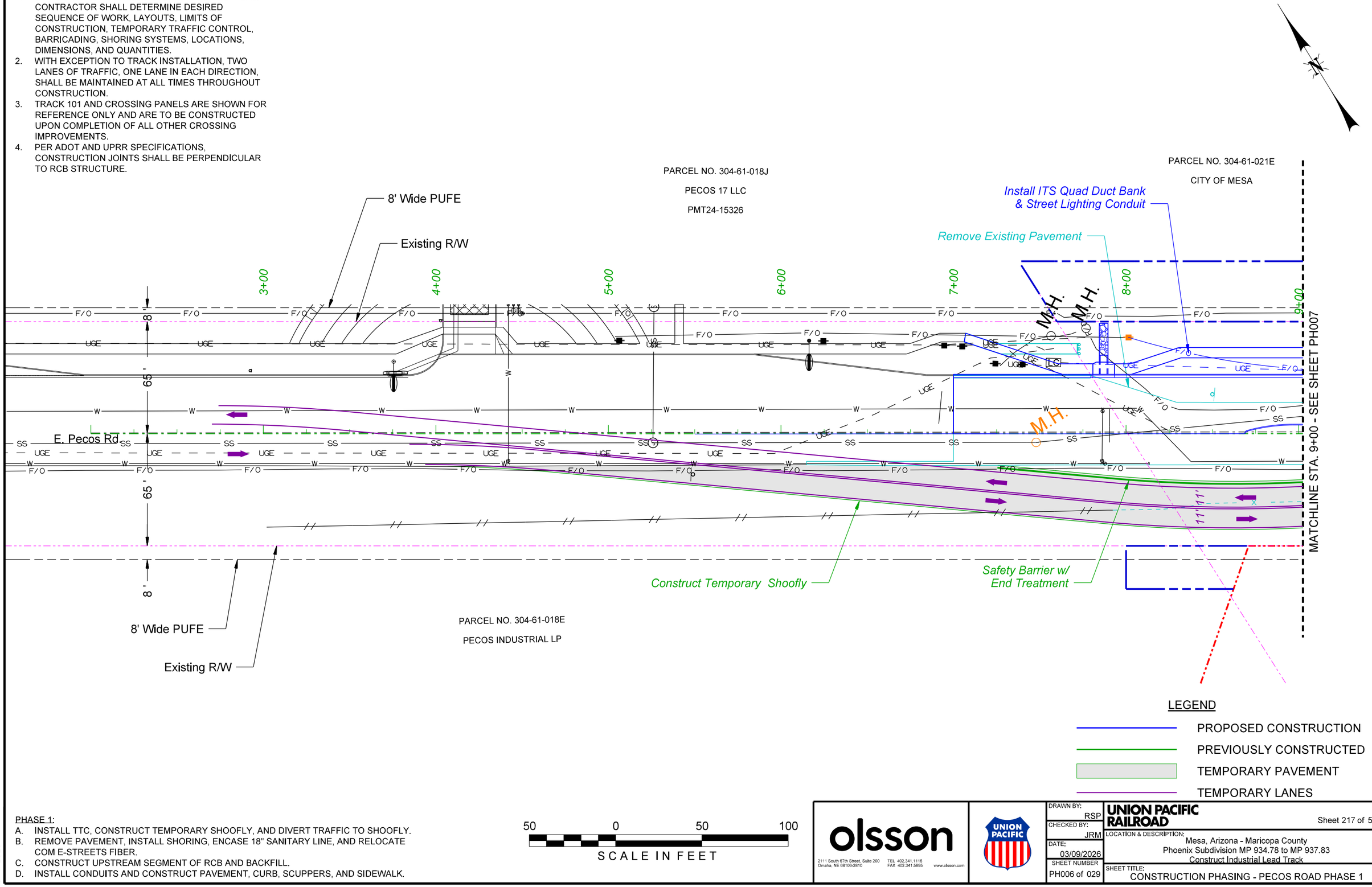
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CONSTRUCTION PHASING - PECOS ROAD TYPICALS

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04 Phasing\P_PH005_Pecos Typ_200927.dgn
Default
3/9/2026

NOTES:

1. CONSTRUCTION PHASING SHOWN IS CONCEPTUAL. CONTRACTOR SHALL DETERMINE DESIRED SEQUENCE OF WORK, LAYOUTS, LIMITS OF CONSTRUCTION, TEMPORARY TRAFFIC CONTROL, BARRICADING, SHORING SYSTEMS, LOCATIONS, DIMENSIONS, AND QUANTITIES.
2. WITH EXCEPTION TO TRACK INSTALLATION, TWO LANES OF TRAFFIC, ONE LANE IN EACH DIRECTION, SHALL BE MAINTAINED AT ALL TIMES THROUGHOUT CONSTRUCTION.
3. TRACK 101 AND CROSSING PANELS ARE SHOWN FOR REFERENCE ONLY AND ARE TO BE CONSTRUCTED UPON COMPLETION OF ALL OTHER CROSSING IMPROVEMENTS.
4. PER ADOT AND UPRR SPECIFICATIONS, CONSTRUCTION JOINTS SHALL BE PERPENDICULAR TO RCB STRUCTURE.



LEGEND

- PROPOSED CONSTRUCTION
- PREVIOUSLY CONSTRUCTED
- TEMPORARY PAVEMENT
- TEMPORARY LANES

PHASE 1:

A. INSTALL TTC, CONSTRUCT TEMPORARY SHOOFLY, AND DIVERT TRAFFIC TO SHOOFLY.
B. REMOVE PAVEMENT, INSTALL SHORING, ENCASE 18" SANITARY LINE, AND RELOCATE COM E-STREETS FIBER.
C. CONSTRUCT UPSTREAM SEGMENT OF RCB AND BACKFILL.
D. INSTALL CONDUITS AND CONSTRUCT PAVEMENT, CURB, SCUPPERS, AND SIDEWALK.

50 0 50 100
SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

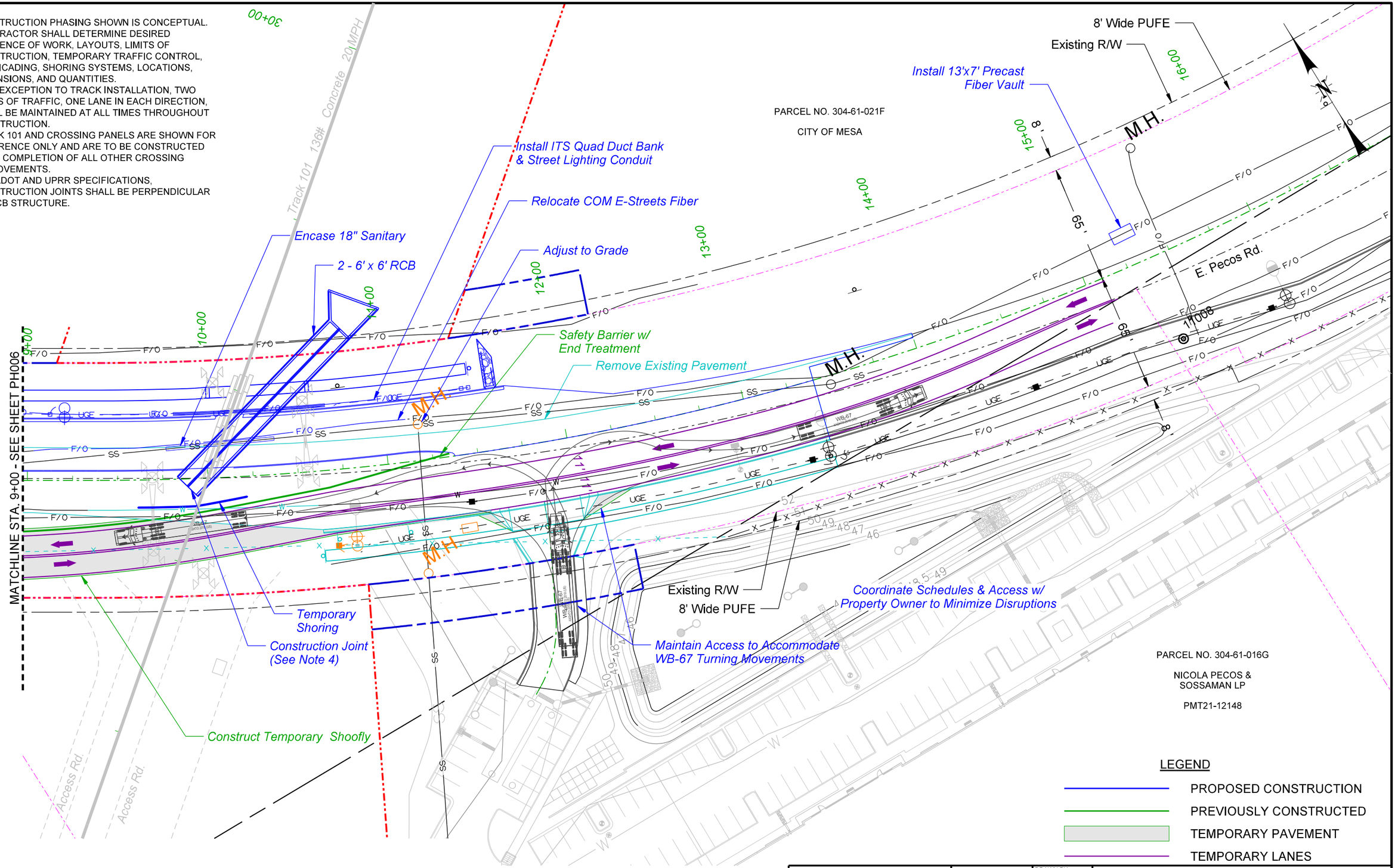
DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: PH006 of 029

UNION PACIFIC RAILROAD
Sheet 217 of 587
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track
SHEET TITLE:
CONSTRUCTION PHASING - PECOS ROAD PHASE 1

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04 Phasing\P_PH006_Pecos PH1_200927.dgn
Default
3/9/2026

NOTES:

1. CONSTRUCTION PHASING SHOWN IS CONCEPTUAL. CONTRACTOR SHALL DETERMINE DESIRED SEQUENCE OF WORK, LAYOUTS, LIMITS OF CONSTRUCTION, TEMPORARY TRAFFIC CONTROL, BARRICADING, SHORING SYSTEMS, LOCATIONS, DIMENSIONS, AND QUANTITIES.
2. WITH EXCEPTION TO TRACK INSTALLATION, TWO LANES OF TRAFFIC, ONE LANE IN EACH DIRECTION, SHALL BE MAINTAINED AT ALL TIMES THROUGHOUT CONSTRUCTION.
3. TRACK 101 AND CROSSING PANELS ARE SHOWN FOR REFERENCE ONLY AND ARE TO BE CONSTRUCTED UPON COMPLETION OF ALL OTHER CROSSING IMPROVEMENTS.
4. PER ADOT AND UPRR SPECIFICATIONS, CONSTRUCTION JOINTS SHALL BE PERPENDICULAR TO RCB STRUCTURE.



LEGEND

- PROPOSED CONSTRUCTION
- PREVIOUSLY CONSTRUCTED
- TEMPORARY PAVEMENT
- TEMPORARY LANES

PHASE 1:

A. INSTALL TTC, CONSTRUCT TEMPORARY SHOOFLY, AND DIVERT TRAFFIC TO SHOOFLY.
B. REMOVE PAVEMENT, INSTALL SHORING, ENCASE 18" SANITARY LINE, AND RELOCATE COM E-STREETS FIBER.
C. CONSTRUCT UPSTREAM SEGMENT OF RCB AND BACKFILL.
D. INSTALL CONDUITS AND CONSTRUCT PAVEMENT, CURB, SCUPPERS, AND SIDEWALK.

50 0 50 100
SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: PH007 of 029

UNION PACIFIC RAILROAD
Sheet 218 of 587

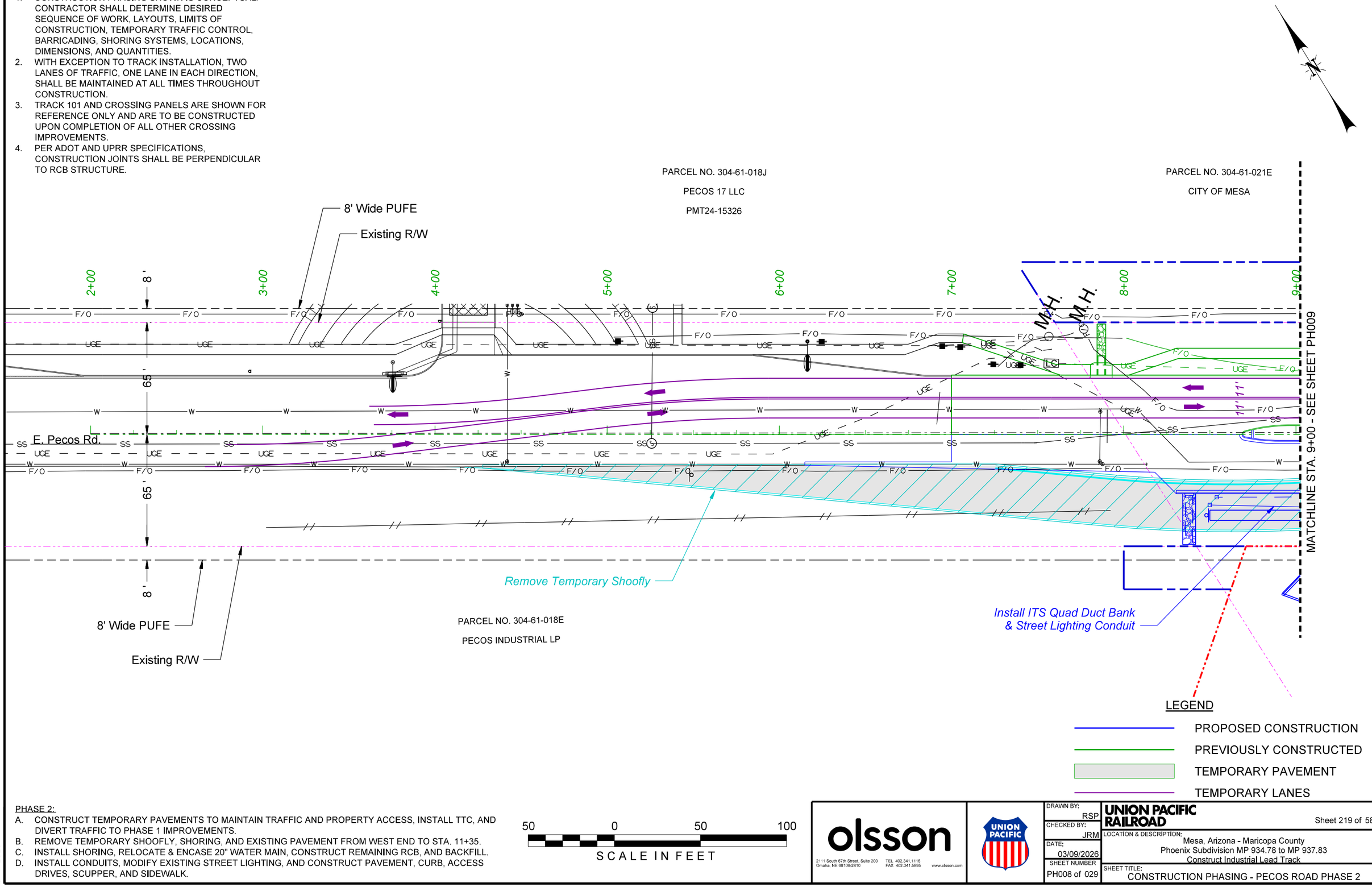
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CONSTRUCTION PHASING - PECOS ROAD PHASE 1

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04 Phasing\P_PH007_Pecos PH1_200927.dgn
Default
3/9/2026

NOTES:

1. CONSTRUCTION PHASING SHOWN IS CONCEPTUAL. CONTRACTOR SHALL DETERMINE DESIRED SEQUENCE OF WORK, LAYOUTS, LIMITS OF CONSTRUCTION, TEMPORARY TRAFFIC CONTROL, BARRICADING, SHORING SYSTEMS, LOCATIONS, DIMENSIONS, AND QUANTITIES.
2. WITH EXCEPTION TO TRACK INSTALLATION, TWO LANES OF TRAFFIC, ONE LANE IN EACH DIRECTION, SHALL BE MAINTAINED AT ALL TIMES THROUGHOUT CONSTRUCTION.
3. TRACK 101 AND CROSSING PANELS ARE SHOWN FOR REFERENCE ONLY AND ARE TO BE CONSTRUCTED UPON COMPLETION OF ALL OTHER CROSSING IMPROVEMENTS.
4. PER ADOT AND UPRR SPECIFICATIONS, CONSTRUCTION JOINTS SHALL BE PERPENDICULAR TO RCB STRUCTURE.



PHASE 2:

A. CONSTRUCT TEMPORARY PAVEMENTS TO MAINTAIN TRAFFIC AND PROPERTY ACCESS, INSTALL TTC, AND DIVERT TRAFFIC TO PHASE 1 IMPROVEMENTS.
B. REMOVE TEMPORARY SHOOFLY, SHORING, AND EXISTING PAVEMENT FROM WEST END TO STA. 11+35.
C. INSTALL SHORING, RELOCATE & ENCASE 20" WATER MAIN, CONSTRUCT REMAINING RCB, AND BACKFILL.
D. INSTALL CONDUITS, MODIFY EXISTING STREET LIGHTING, AND CONSTRUCT PAVEMENT, CURB, ACCESS DRIVES, SCUPPER, AND SIDEWALK.

50 0 50 100
SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: PH008 of 029

UNION PACIFIC RAILROAD
Sheet 219 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CONSTRUCTION PHASING - PECOS ROAD PHASE 2

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04 Phasing\P_PH008_Pecos PH2_200927.dgn
Default
3/9/2026

NOTES:

1. CONSTRUCTION PHASING SHOWN IS CONCEPTUAL. CONTRACTOR SHALL DETERMINE DESIRED SEQUENCE OF WORK, LAYOUTS, LIMITS OF CONSTRUCTION, TEMPORARY TRAFFIC CONTROL, BARRICADING, SHORING SYSTEMS, LOCATIONS, DIMENSIONS, AND QUANTITIES.
2. WITH EXCEPTION TO TRACK INSTALLATION, TWO LANES OF TRAFFIC, ONE LANE IN EACH DIRECTION, SHALL BE MAINTAINED AT ALL TIMES THROUGHOUT CONSTRUCTION.
3. TRACK 101 AND CROSSING PANELS ARE SHOWN FOR REFERENCE ONLY AND ARE TO BE CONSTRUCTED UPON COMPLETION OF ALL OTHER CROSSING IMPROVEMENTS.
4. PER ADOT AND UPRR SPECIFICATIONS, CONSTRUCTION JOINTS SHALL BE PERPENDICULAR TO RCB STRUCTURE.

Track 101 136# Concrete 20 MPH

MATCHLINE STA. 9+00 - SEE SHEET PH008

PARCEL NO. 304-61-021F

CITY OF MESA

8' Wide PUFE

Existing R/W

E. Pecos Rd.

Temporary Shoring

Construct Temporary Pavement

Relocate & Encase 20" Water Main

Adjust to Grade

Maintain Access to Accommodate WB-67 Turning Movements

Coordinate Schedules & Access w/ Property Owner to Minimize Disruptions

2 - 6' x 6' RCB

Install ITS Quad Duct Bank & Street Lighting Conduit

Modify Existing Street Lighting

Remove Temporary Shoofly

Access Rd.

PARCEL NO. 304-61-016G

NICOLA PECOS & SOSSAMAN LP

PMT21-12148

LEGEND

- PROPOSED CONSTRUCTION
- PREVIOUSLY CONSTRUCTED
- TEMPORARY PAVEMENT
- TEMPORARY LANES

PHASE 2:

A. CONSTRUCT TEMPORARY PAVEMENTS TO MAINTAIN TRAFFIC AND PROPERTY ACCESS, INSTALL TTC, AND DIVERT TRAFFIC TO PHASE 1 IMPROVEMENTS.
B. REMOVE TEMPORARY SHOOFLY, SHORING, AND EXISTING PAVEMENT FROM WEST END TO STA. 11+35.
C. INSTALL SHORING, RELOCATE & ENCASE 20" WATER MAIN, CONSTRUCT REMAINING RCB, AND BACKFILL.
D. INSTALL CONDUITS, MODIFY EXISTING STREET LIGHTING, AND CONSTRUCT PAVEMENT, CURB, ACCESS DRIVES, SCUPPER, AND SIDEWALK.

50 0 50 100

SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: PH009 of 029

UNION PACIFIC RAILROAD

Sheet 220 of 587

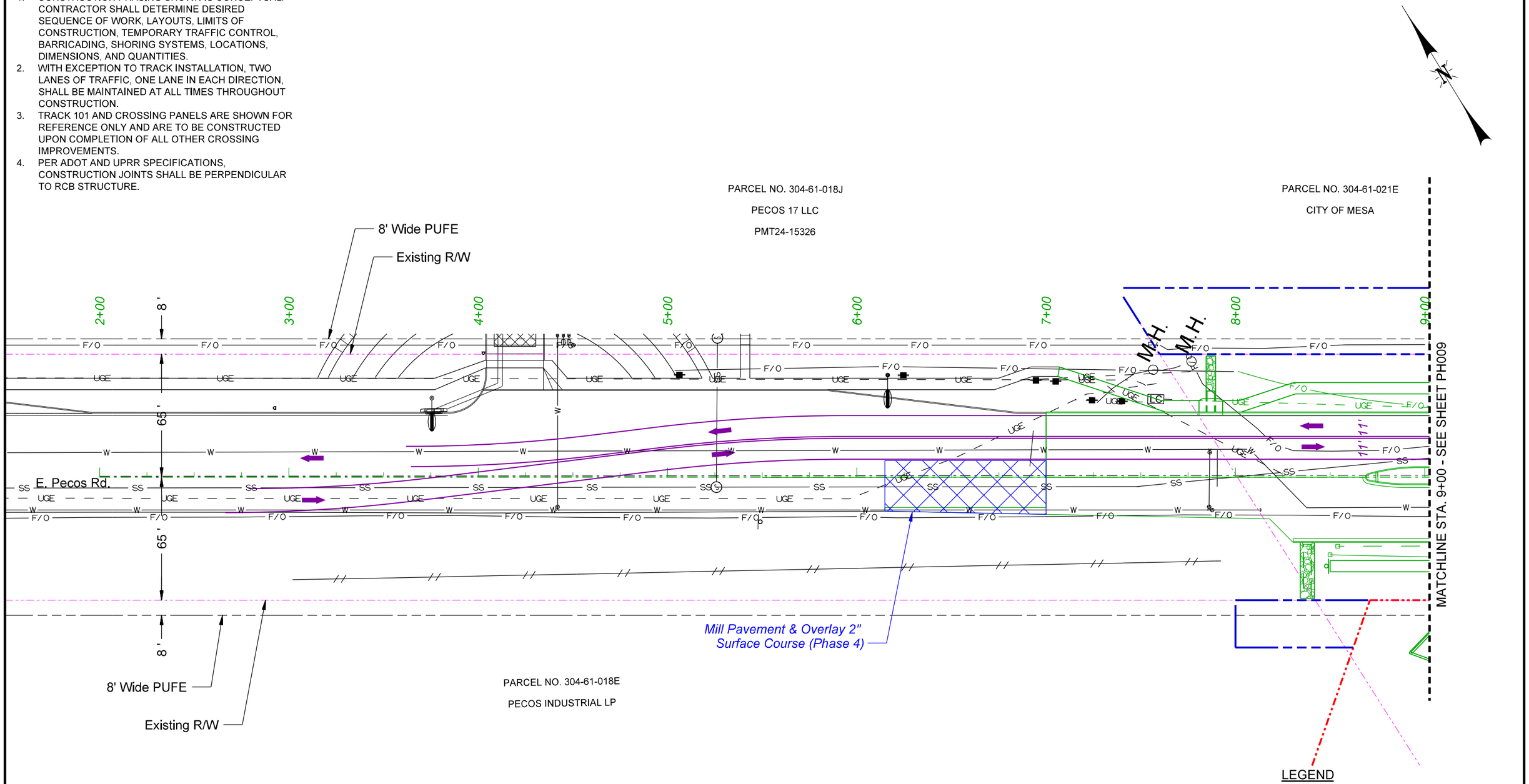
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CONSTRUCTION PHASING - PECOS ROAD PHASE 2

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable_020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04 Phasing\P_PH009_Pecos PH2_200927.dgn
Default
3/9/2026

NOTES:

1. CONSTRUCTION PHASING SHOWN IS CONCEPTUAL. CONTRACTOR SHALL DETERMINE DESIRED SEQUENCE OF WORK, LAYOUTS, LIMITS OF CONSTRUCTION, TEMPORARY TRAFFIC CONTROL, BARRICADING, SHORING SYSTEMS, LOCATIONS, DIMENSIONS, AND QUANTITIES.
2. WITH EXCEPTION TO TRACK INSTALLATION, TWO LANES OF TRAFFIC, ONE LANE IN EACH DIRECTION, SHALL BE MAINTAINED AT ALL TIMES THROUGHOUT CONSTRUCTION.
3. TRACK 101 AND CROSSING PANELS ARE SHOWN FOR REFERENCE ONLY AND ARE TO BE CONSTRUCTED UPON COMPLETION OF ALL OTHER CROSSING IMPROVEMENTS.
4. PER ADOT AND UPRR SPECIFICATIONS, CONSTRUCTION JOINTS SHALL BE PERPENDICULAR TO RCB STRUCTURE.



PHASE 3:

A. COORDINATE TEMPORARY CLOSURE OF DRIVEWAY ENTRANCE W/ PROPERTY OWNER.
B. REMOVE TEMPORARY PAVEMENTS, EXISTING DRIVEWAY ENTRANCE, AND EXISTING PAVEMENT FROM STA. 11+35 TO EAST END.
C. CONSTRUCT REMAINING ROAD, RECONSTRUCT DRIVEWAY ENTRANCE, CONSTRUCT CURB AND SIDEWALK, AND RESTORE PROPERTY ACCCESS.

PHASE 4 (FULL-CLOSURE):

A. INSTALL TEMPORARY TRAFFIC CONTROL (DETOUR).
B. REMOVE TEMPORARY PAVEMENT AND FINALIZE GRADING.
C. PREPARE TRACKBED FOR UPRR TRACK/CROSSING CONSTRUCTION (SAW CUT AND REMOVE PAVEMENT, PREPARE SUBGRADE, PLACE SUBBALLAST, AND INSTALL UNDERDRAINS).
D. UPRR TO INSTALL TRACK (TLM), LINE/LEVEL BALLAST, AND INSTALL CROSSING PANELS.
E. CONSTRUCT PAVEMENT ALONG CROSSING PANELS, MILL/OVERLAY PAVEMENT AT EACH END, FINALIZE PERMANENT TRAFFIC CONTROL, AND OPEN TO TRAFFIC.

LEGEND

- PROPOSED CONSTRUCTION
- PREVIOUSLY CONSTRUCTED
- TEMPORARY PAVEMENT
- TEMPORARY LANES

50 0 50 100

SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: PH010 of 029

UNION PACIFIC RAILROAD

Sheet 221 of 587

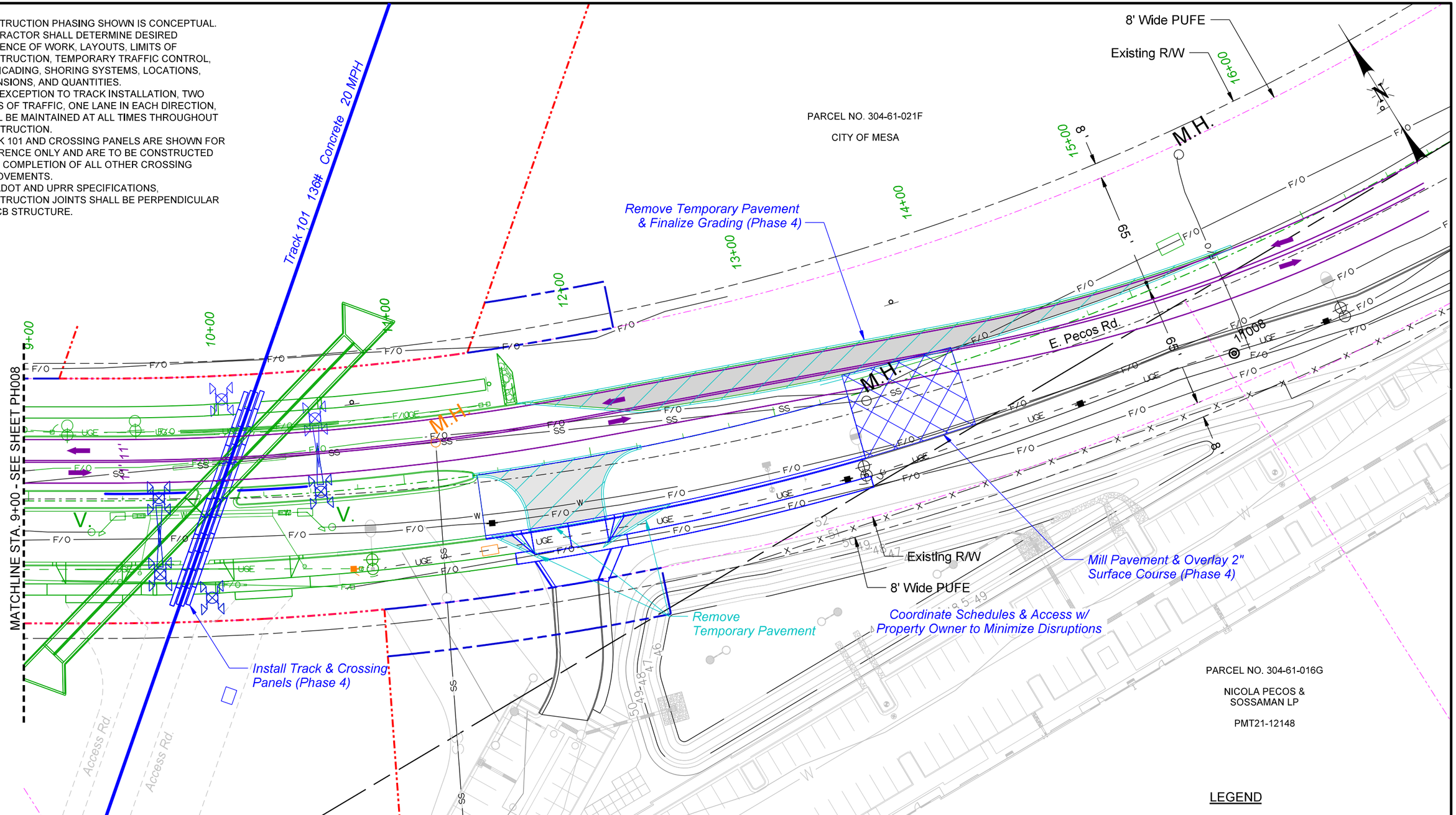
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CONSTRUCTION PHASING - PECOS ROAD PHASES 3 & 4

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04 Phasing\P_PH009a_Pecos PH3.200327.dgn
Default
3/9/2026

NOTES:

1. CONSTRUCTION PHASING SHOWN IS CONCEPTUAL. CONTRACTOR SHALL DETERMINE DESIRED SEQUENCE OF WORK, LAYOUTS, LIMITS OF CONSTRUCTION, TEMPORARY TRAFFIC CONTROL, BARRICADING, SHORING SYSTEMS, LOCATIONS, DIMENSIONS, AND QUANTITIES.
2. WITH EXCEPTION TO TRACK INSTALLATION, TWO LANES OF TRAFFIC, ONE LANE IN EACH DIRECTION, SHALL BE MAINTAINED AT ALL TIMES THROUGHOUT CONSTRUCTION.
3. TRACK 101 AND CROSSING PANELS ARE SHOWN FOR REFERENCE ONLY AND ARE TO BE CONSTRUCTED UPON COMPLETION OF ALL OTHER CROSSING IMPROVEMENTS.
4. PER ADOT AND UPRR SPECIFICATIONS, CONSTRUCTION JOINTS SHALL BE PERPENDICULAR TO RCB STRUCTURE.



PHASE 3:

A. COORDINATE TEMPORARY CLOSURE OF DRIVEWAY ENTRANCE W/ PROPERTY OWNER.
B. REMOVE TEMPORARY PAVEMENTS, EXISTING DRIVEWAY ENTRANCE, AND EXISTING PAVEMENT FROM STA. 11+35 TO EAST END.
C. CONSTRUCT REMAINING ROAD, RECONSTRUCT DRIVEWAY ENTRANCE, CONSTRUCT CURB AND SIDEWALK, AND RESTORE PROPERTY ACCCESS.

PHASE 4 (FULL-CLOSURE):

A. INSTALL TEMPORARY TRAFFIC CONTROL (DETOUR).
B. REMOVE TEMPORARY PAVEMENT AND FINALIZE GRADING.
C. PREPARE TRACKBED FOR UPRR TRACK/CROSSING CONSTRUCTION (SAW CUT AND REMOVE PAVEMENT, PREPARE SUBGRADE, PLACE SUBBALLAST, AND INSTALL UNDERDRAINS).
D. UPRR TO INSTALL TRACK (TLM), LINE/LEVEL BALLAST, AND INSTALL CROSSING PANELS.
E. CONSTRUCT PAVEMENT ALONG CROSSING PANELS, MILL/OVERLAY PAVEMENT AT EACH END, FINALIZE PERMANENT TRAFFIC CONTROL, AND OPEN TO TRAFFIC.

LEGEND

- PROPOSED CONSTRUCTION
- PREVIOUSLY CONSTRUCTED
- TEMPORARY PAVEMENT
- TEMPORARY LANES

50 0 50 100

SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	RSP
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	PH011 of 029

UNION PACIFIC RAILROAD — Sheet 222 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CONSTRUCTION PHASING - PECOS ROAD PHASES 3 & 4

Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927.40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927.40-Design\Microstation\020-0927.RLTK\DGN\Sheets\04 Phasing\P_PH009b_Pecos PH3_200327.dgn
Default
3/9/2026

DETOUR NOTES

1. DETOURS AND TEMPORARY TRAFFIC CONTROL SHOWN IS CONCEPTUAL. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY TRAFFIC CONTROL REQUIRED FOR MULTIPLE PHASES OF CONSTRUCTION NECESSARY TO ACCOMMODATE ALL ASPECTS OF ROADWAY AND RAILROAD CONSTRUCTION.

2. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINMENT OF TEMPORARY TRAFFIC CONTROL (TTC) PERMITS PER CONDITIONS SET FORTH IN THE CITY OF MESA TEMPORARY TRAFFIC CONTROL MANUAL (TTCM). TRAFFIC CONTROL PLANS (TCP) SHALL COMPLY WITH SECTIONS 1.5 OF THE CITY OF MESA TTCM. ROAD CLOSURES REQUIRE A MINIMUM LEAD TIME OF 30 CALENDAR DAYS FOR CITY OF MESA REVIEW AND COORDINATION.

3. CONTRACTOR SHALL COMPLY WITH THE TOWN OF QUEEN CREEK ROADWAY SIGNING AND PAVEMENT MARKING GUIDELINES DOCUMENT, SPECIFICATIONS, AND REQUIREMENTS. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH THE TOWN OF QUEEN CREEK, INCLUDING OBTAINMENT OF FULL ROAD CLOSURE PERMITS, NOTIFICATIONS, SCHEDULING, HAUL ROADS, AND INSPECTIONS. REQUESTS FOR FULL ROAD CLOSURES SHALL BE SUBMITTED TO THE TOWN OF QUEEN CREEK AT LEAST 21 DAYS PRIOR TO PROPOSED CLOSURES.

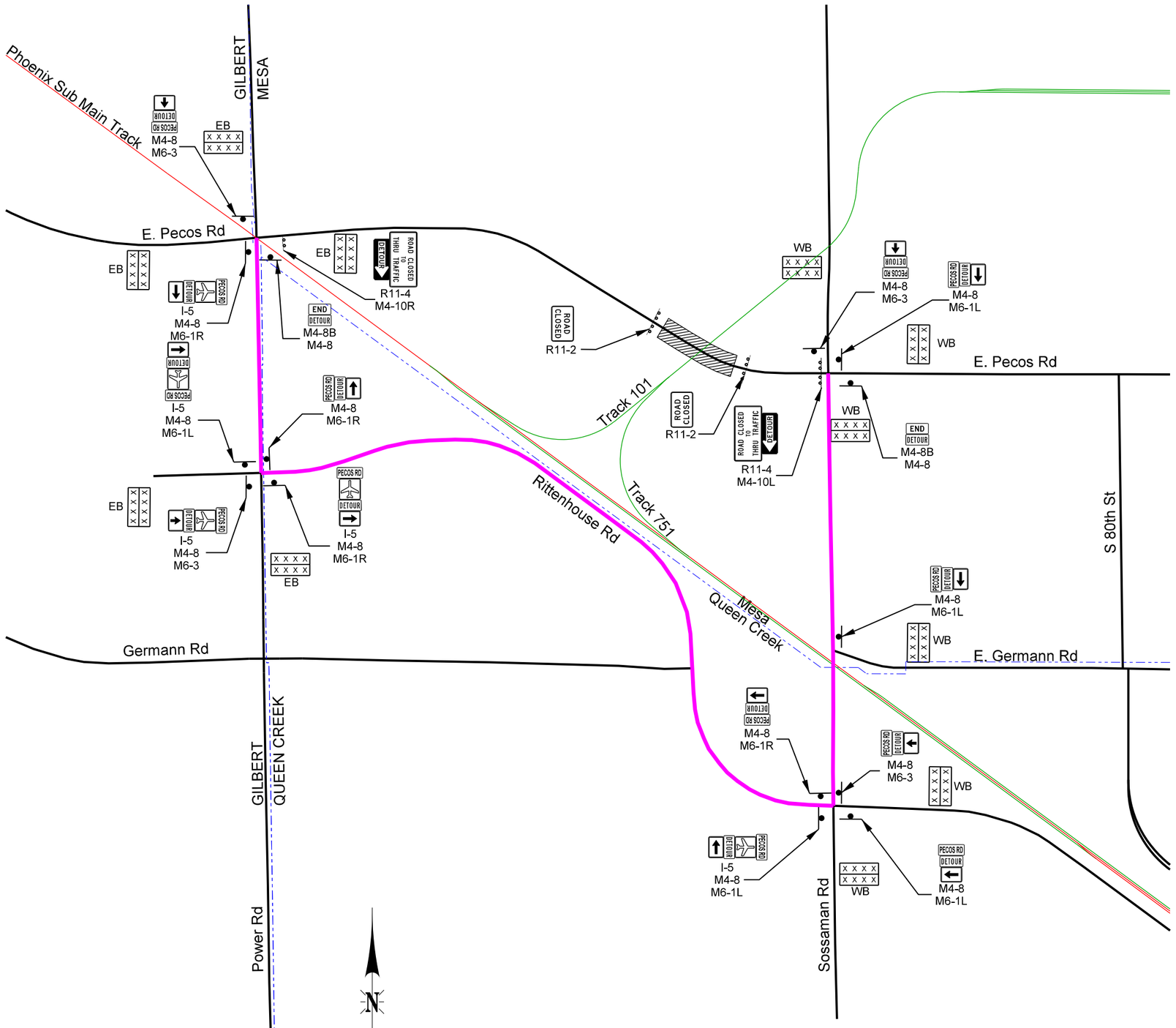
LEGEND

- VARIABLE MESSAGE BOARD (VMS)
- CONSTRUCTION
- TYPE III BARRICADE
- SIGN
- DETOUR
- EXISTING TRACK
- PROPOSED TRACK

MESSAGE: PHASE I	MESSAGE: PHASE II
LINE 1: PECOS	LINE 1: XX/XX
LINE 2: ROAD (EB/WB)	LINE 2: TO
LINE 3: CLOSED	LINE 3: XX/XX
	(XX/XX INDICATES THE DATES OF CLOSURE)

LIST OF TRAFFIC CONTROL DEVICES*			
ITEM	MUTCD DEVICE NO.	SIZE	QTY
ROAD CLOSED	R11-2	48" X 30"	2
ROAD CLOSED TO THRU TRAFFIC	R11-4	60" X 30"	2
'PECOS ROAD' PLAQUE			13
STRAIGHT ARROW AUXILIARY	M6-3	21" X 15"	4
LEFT ARROW AUXILIARY	M6-1L	21" X 15"	5
RIGHT ARROW AUXILIARY	M6-1R	21" X 15"	4
DETOUR (LEFT ARROW)	M4-10L	48" X 18"	1
DETOUR (RIGHT ARROW)	M4-10R	48" X 18"	1
DETOUR	M4-8	24" X 12"	15
END	M4-8B	24" X 12"	2
AIRPORT PLAQUE	I-5	24" X 24"	5
TYPE III BARRICADE		60" X 48"	7
VARIABLE MESSAGE BOARDS			9

*NOTE: TEMPORARY TRAFFIC CONTROL QUANTITIES ARE SHOWN FOR INFORMATION ONLY. PAYMENT FOR THESE ITEMS SHALL BE MADE UNDER THE LUMP SUM LINE ITEM "TRFC, TRAFFIC CONTROL".



olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: PH012 of 029

UNION PACIFIC RAILROAD — Sheet 223 of 587

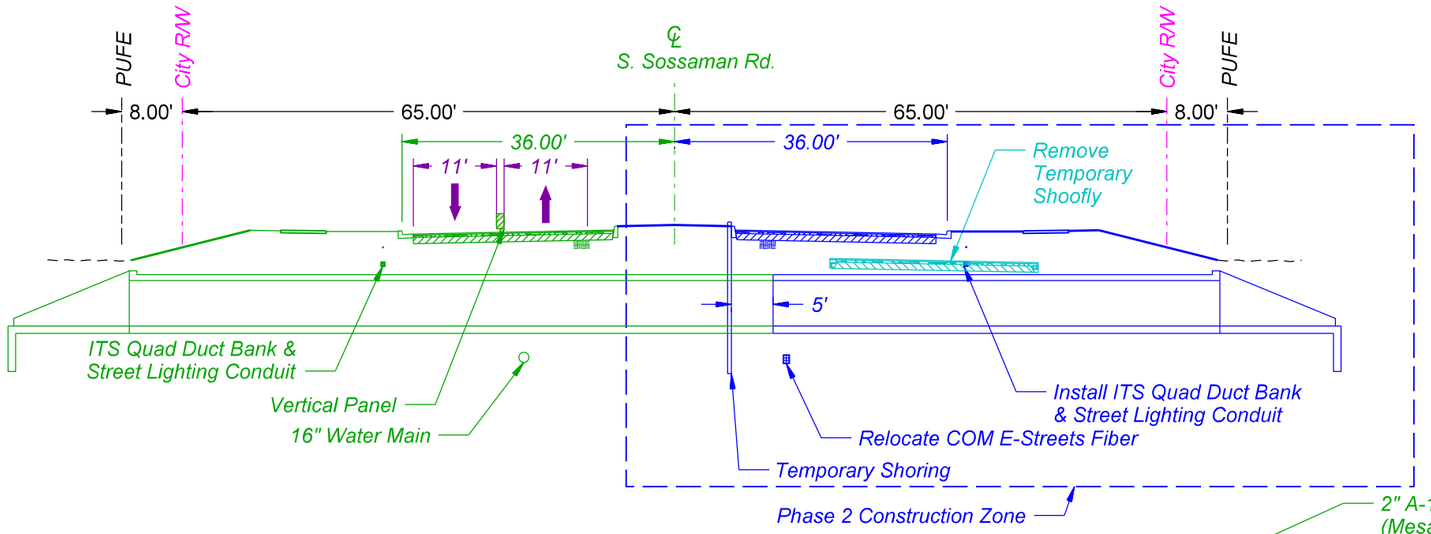
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CONSTRUCTION PHASING - PECOS CROSSING DETOUR

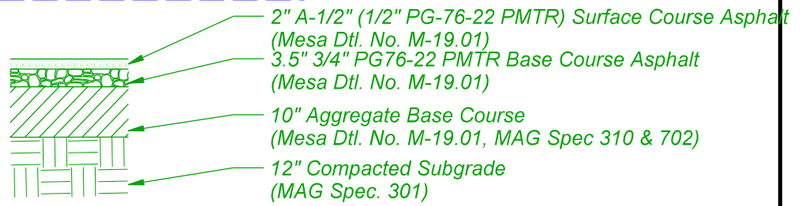
Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04 Phasing\P_PH010_05 Default 3/9/2026
P_PH010_05 Pecos Detour_200927.dgn

NOTES:

1. CONSTRUCTION PHASING SHOWN IS CONCEPTUAL. CONTRACTOR SHALL DETERMINE DESIRED SEQUENCE OF WORK, LAYOUTS, LIMITS OF CONSTRUCTION, TEMPORARY TRAFFIC CONTROL, BARRICADING, SHORING SYSTEMS, LOCATIONS, DIMENSIONS, AND QUANTITIES.
2. WITH EXCEPTION TO TRACK INSTALLATION, TWO LANES OF TRAFFIC, ONE LANE IN EACH DIRECTION, SHALL BE MAINTAINED AT ALL TIMES THROUGHOUT CONSTRUCTION.
3. TRACK 101 AND CROSSING PANELS ARE SHOWN FOR REFERENCE ONLY AND ARE TO BE CONSTRUCTED UPON COMPLETION OF ALL OTHER CROSSING IMPROVEMENTS.
4. PER ADOT AND UPRR SPECIFICATIONS, CONSTRUCTION JOINTS SHALL BE PERPENDICULAR TO RCB STRUCTURE.

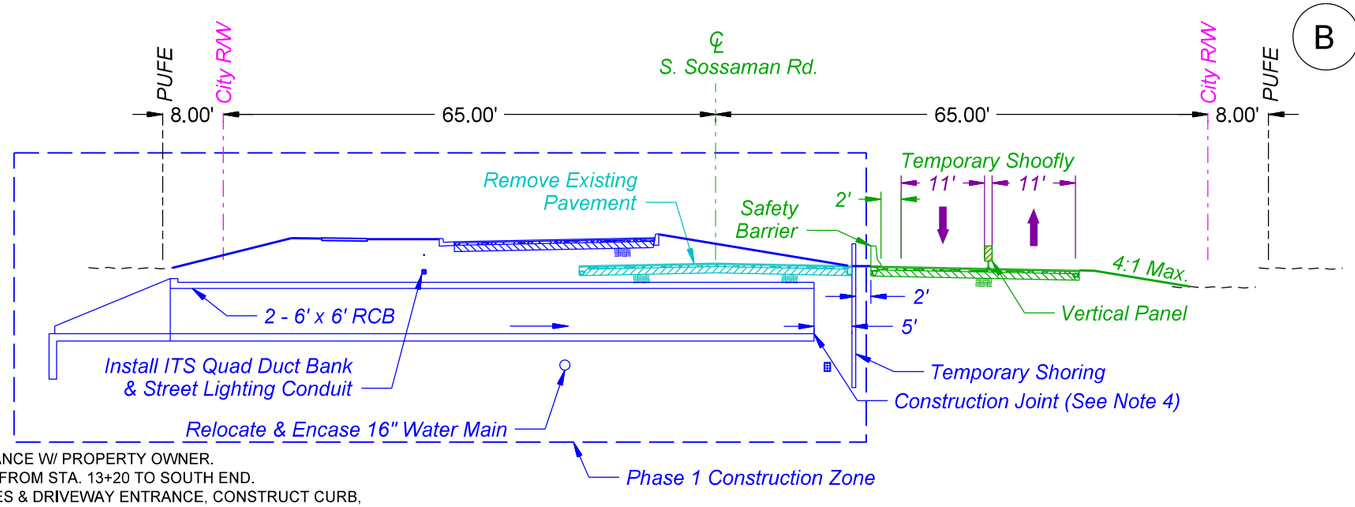


TYPICAL SECTION (LOOKING SOUTH)
PHASE 2 CONSTRUCTION



B TEMPORARY PAVEMENT SECTION

NOT TO SCALE



TYPICAL SECTION (LOOKING SOUTH)
PHASE 1 CONSTRUCTION

PHASE 1A:

A. INSTALL TTC, CONSTRUCT TEMPORARY SHOOFLY, AND DIVERT TRAFFIC TO SHOOFLY.
B. REMOVE PAVEMENT FROM NORTH END TO STA. 13+20, INSTALL SHORING, AND RELOCATE & ENCASE 16" WATER MAIN.
C. CONSTRUCT UPSTREAM SEGMENT OF RCB AND BACKFILL.
D. INSTALL CONDUITS, MODIFY EXISTING STREET LIGHTING, AND CONSTRUCT PAVEMENT, CURB, ACCESS DRIVE, SCUPPER, AND SIDEWALK.

PHASE 1B:

A. COORDINATE TEMPORARY CLOSURE OF DRIVEWAY ENTRANCE W/ PROPERTY OWNER.
B. REMOVE EXISTING DRIVEWAY ENTRANCE AND PAVEMENT FROM STA. 13+20 TO SOUTH END.
C. CONSTRUCT REMAINING SEGMENT OF NORTHBOUND LANES & DRIVEWAY ENTRANCE, CONSTRUCT CURB, SIDEWALK, CATCH BASIN & 15" HDPE CULVERT, AND RESTORE PROPERTY ACCESS.

PHASE 2:

A. CONSTRUCT TEMPORARY PAVEMENT AT NORTH END, INSTALL TTC, AND DIVERT TRAFFIC TO PHASE 1 IMPROVEMENTS.
B. REMOVE TEMPORARY SHOOFLY, SHORING, AND EXISTING PAVEMENT.
C. INSTALL SHORING, RELOCATE COM E-STREETS FIBER, CONSTRUCT REMAINING RCB, AND BACKFILL.
D. INSTALL CONDUITS, AND CONSTRUCT PAVEMENT, CURB, ACCESS DRIVE, SCUPPERS, AND SIDEWALK.

PHASE 3 (FULL-CLOSURE):

A. INSTALL TEMPORARY TRAFFIC CONTROL (DETOUR).
B. REMOVE TEMPORARY PAVEMENT AND FINALIZE GRADING.
C. PREPARE TRACKBED FOR UPRR TRACK/CROSSING CONSTRUCTION (SAW CUT AND REMOVE PAVEMENT, PREPARE SUBGRADE, PLACE SUBBALLAST, AND INSTALL UNDERDRAINS).
D. UPRR TO INSTALL TRACK (TLM), LINE/LEVEL BALLAST, AND INSTALL CROSSING PANELS.
E. CONSTRUCT PAVEMENT ALONG CROSSING PANELS, MILL/OVERLAY PAVEMENT AT NORTH END, FINALIZE PERMANENT TRAFFIC CONTROL, AND OPEN TO TRAFFIC.

LEGEND

- PROPOSED CONSTRUCTION
- PREVIOUSLY CONSTRUCTED
- TEMPORARY LANES

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: PH013 of 029

UNION PACIFIC RAILROAD

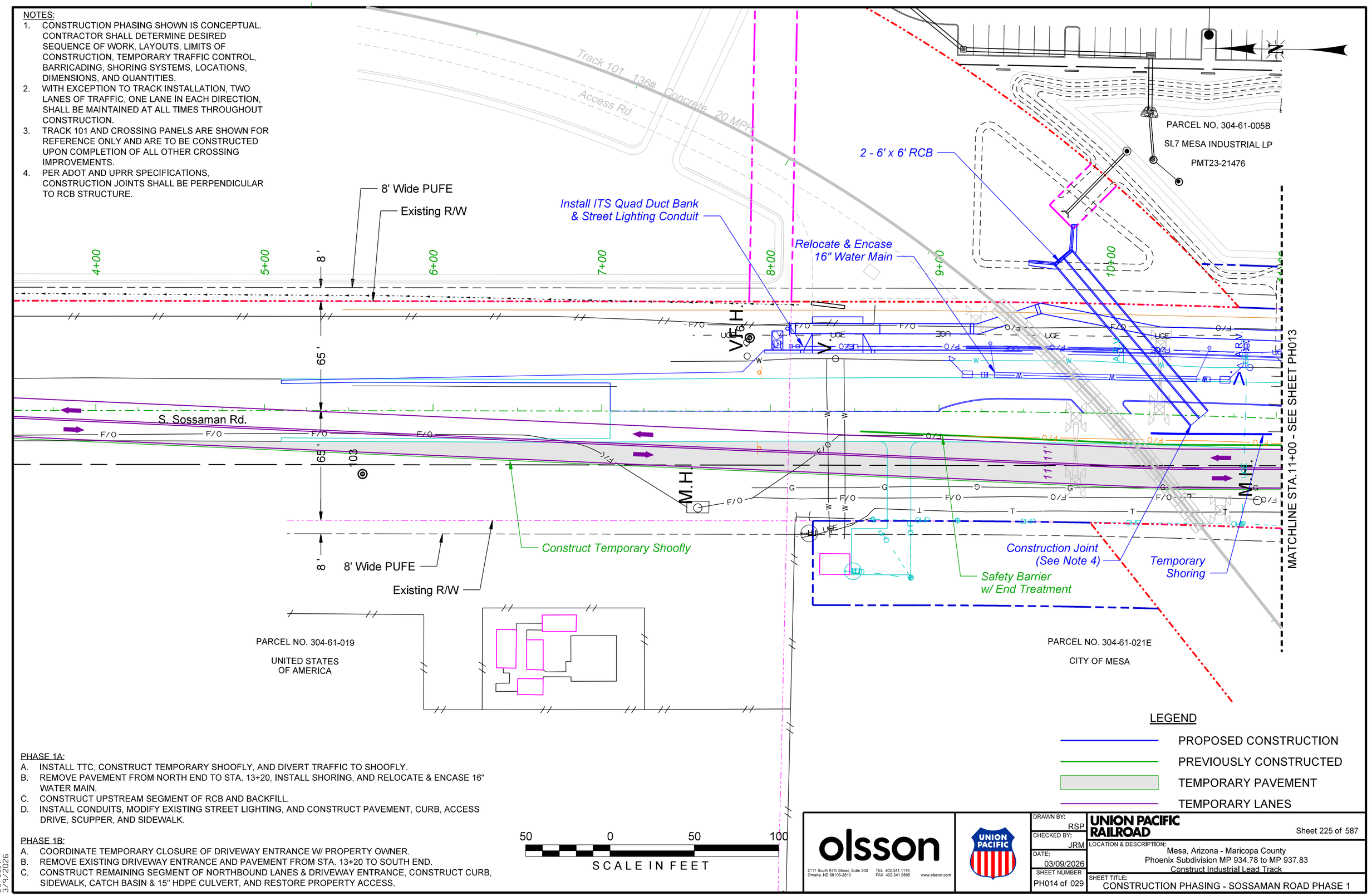
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CONSTRUCTION PHASING - SOSSAMAN ROAD TYPICALS

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04 Phasing\P_PH011_Sossaman Typ_200927.dgn
Default
3/9/2026

NOTES:

1. CONSTRUCTION PHASING SHOWN IS CONCEPTUAL. CONTRACTOR SHALL DETERMINE DESIRED SEQUENCE OF WORK, LAYOUTS, LIMITS OF CONSTRUCTION, TEMPORARY TRAFFIC CONTROL, BARRICADING, SHORING SYSTEMS, LOCATIONS, DIMENSIONS, AND QUANTITIES.
2. WITH EXCEPTION TO TRACK INSTALLATION, TWO LANES OF TRAFFIC, ONE LANE IN EACH DIRECTION, SHALL BE MAINTAINED AT ALL TIMES THROUGHOUT CONSTRUCTION.
3. TRACK 101 AND CROSSING PANELS ARE SHOWN FOR REFERENCE ONLY AND ARE TO BE CONSTRUCTED UPON COMPLETION OF ALL OTHER CROSSING IMPROVEMENTS.
4. PER ADOT AND UPRR SPECIFICATIONS, CONSTRUCTION JOINTS SHALL BE PERPENDICULAR TO RCB STRUCTURE.



PHASE 1A:

A. INSTALL TTC, CONSTRUCT TEMPORARY SHOOFLY, AND DIVERT TRAFFIC TO SHOOFLY.
B. REMOVE PAVEMENT FROM NORTH END TO STA. 13+20, INSTALL SHORING, AND RELOCATE & ENCASE 16" WATER MAIN.
C. CONSTRUCT UPSTREAM SEGMENT OF RCB AND BACKFILL.
D. INSTALL CONDUITS, MODIFY EXISTING STREET LIGHTING, AND CONSTRUCT PAVEMENT, CURB, ACCESS DRIVE, SCUPPER, AND SIDEWALK.

PHASE 1B:

A. COORDINATE TEMPORARY CLOSURE OF DRIVEWAY ENTRANCE W/ PROPERTY OWNER.
B. REMOVE EXISTING DRIVEWAY ENTRANCE AND PAVEMENT FROM STA. 13+20 TO SOUTH END.
C. CONSTRUCT REMAINING SEGMENT OF NORTHBOUND LANES & DRIVEWAY ENTRANCE, CONSTRUCT CURB, SIDEWALK, CATCH BASIN & 15" HDPE CULVERT, AND RESTORE PROPERTY ACCESS.

50 0 50 100
SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

DRAWN BY:	RSP
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	PH014 of 029

UNION PACIFIC RAILROAD — Sheet 225 of 587

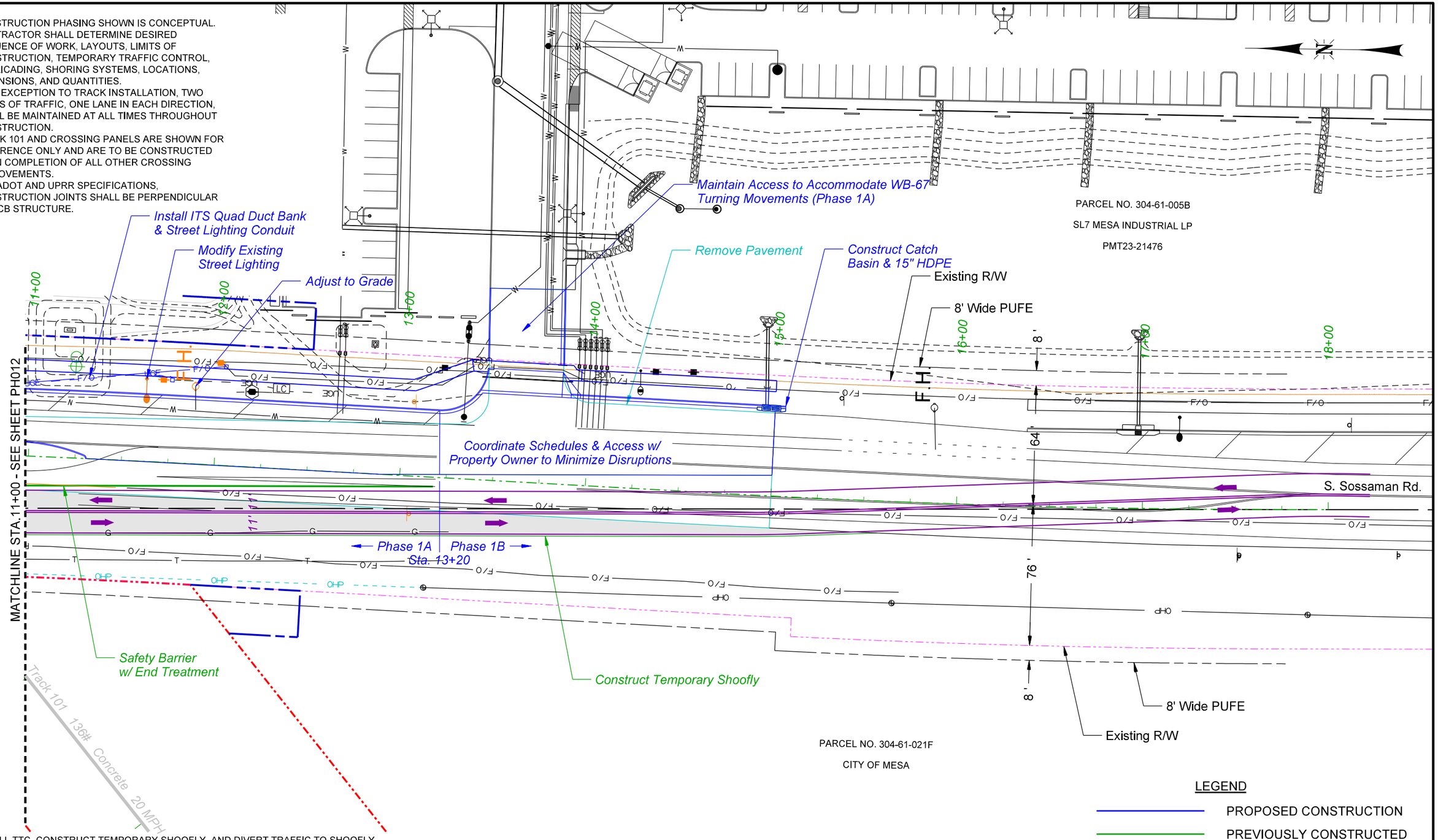
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CONSTRUCTION PHASING - SOSSAMAN ROAD PHASE 1

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04 Phasing\P_PH012_Sossaman PH1_200927.dgn
Default
3/9/2026

NOTES:

1. CONSTRUCTION PHASING SHOWN IS CONCEPTUAL. CONTRACTOR SHALL DETERMINE DESIRED SEQUENCE OF WORK, LAYOUTS, LIMITS OF CONSTRUCTION, TEMPORARY TRAFFIC CONTROL, BARRICADING, SHORING SYSTEMS, LOCATIONS, DIMENSIONS, AND QUANTITIES.
2. WITH EXCEPTION TO TRACK INSTALLATION, TWO LANES OF TRAFFIC, ONE LANE IN EACH DIRECTION, SHALL BE MAINTAINED AT ALL TIMES THROUGHOUT CONSTRUCTION.
3. TRACK 101 AND CROSSING PANELS ARE SHOWN FOR REFERENCE ONLY AND ARE TO BE CONSTRUCTED UPON COMPLETION OF ALL OTHER CROSSING IMPROVEMENTS.
4. PER ADOT AND UPRR SPECIFICATIONS, CONSTRUCTION JOINTS SHALL BE PERPENDICULAR TO RCB STRUCTURE.



PHASE 1A:

A. INSTALL TTC, CONSTRUCT TEMPORARY SHOOFLY, AND DIVERT TRAFFIC TO SHOOFLY.
B. REMOVE PAVEMENT FROM NORTH END TO STA. 13+20, INSTALL SHORING, AND RELOCATE & ENCASE 16" WATER MAIN.
C. CONSTRUCT UPSTREAM SEGMENT OF RCB AND BACKFILL.
D. INSTALL CONDUITS, MODIFY EXISTING STREET LIGHTING, AND CONSTRUCT PAVEMENT, CURB, ACCESS DRIVE, SCUPPER, AND SIDEWALK.

PHASE 1B:

A. COORDINATE TEMPORARY CLOSURE OF DRIVEWAY ENTRANCE W/ PROPERTY OWNER.
B. REMOVE EXISTING DRIVEWAY ENTRANCE AND PAVEMENT FROM STA. 13+20 TO SOUTH END.
C. CONSTRUCT REMAINING SEGMENT OF NORTHBOUND LANES & DRIVEWAY ENTRANCE, CONSTRUCT CURB, SIDEWALK, CATCH BASIN & 15" HDPE CULVERT, AND RESTORE PROPERTY ACCESS.

LEGEND

- PROPOSED CONSTRUCTION
- PREVIOUSLY CONSTRUCTED
- TEMPORARY PAVEMENT
- TEMPORARY LANES

50 0 50 100
SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: PH015 of 029

UNION PACIFIC RAILROAD
Sheet 226 of 587

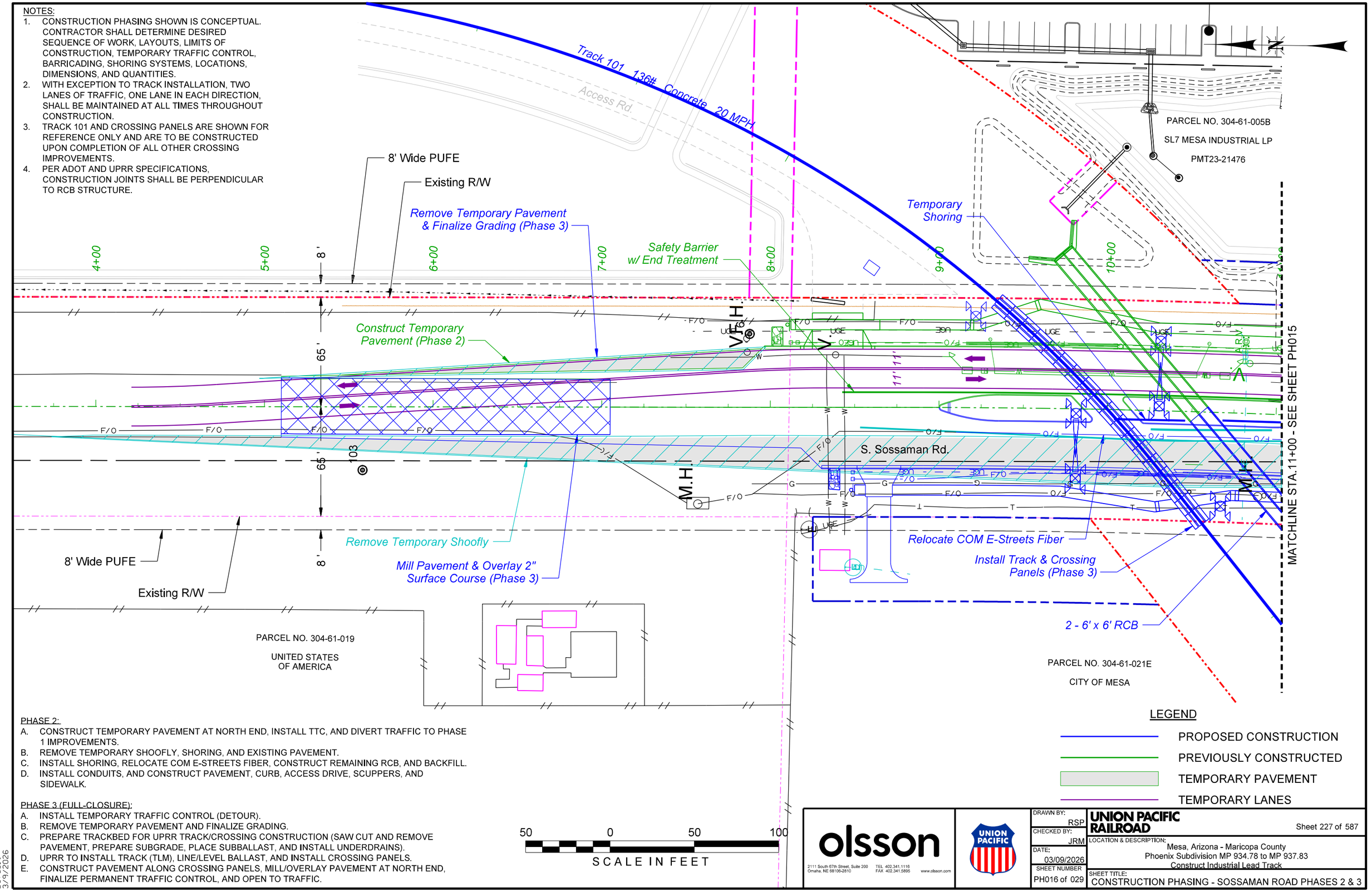
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CONSTRUCTION PHASING - SOSSAMAN ROAD PHASE 1

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04 Phasing\P_PH013_Sossaman PH1_200927.dgn
Default
3/9/2026

NOTES:

1. CONSTRUCTION PHASING SHOWN IS CONCEPTUAL. CONTRACTOR SHALL DETERMINE DESIRED SEQUENCE OF WORK, LAYOUTS, LIMITS OF CONSTRUCTION, TEMPORARY TRAFFIC CONTROL, BARRICADING, SHORING SYSTEMS, LOCATIONS, DIMENSIONS, AND QUANTITIES.
2. WITH EXCEPTION TO TRACK INSTALLATION, TWO LANES OF TRAFFIC, ONE LANE IN EACH DIRECTION, SHALL BE MAINTAINED AT ALL TIMES THROUGHOUT CONSTRUCTION.
3. TRACK 101 AND CROSSING PANELS ARE SHOWN FOR REFERENCE ONLY AND ARE TO BE CONSTRUCTED UPON COMPLETION OF ALL OTHER CROSSING IMPROVEMENTS.
4. PER ADOT AND UPRR SPECIFICATIONS, CONSTRUCTION JOINTS SHALL BE PERPENDICULAR TO RCB STRUCTURE.



PHASE 2:

A. CONSTRUCT TEMPORARY PAVEMENT AT NORTH END, INSTALL TTC, AND DIVERT TRAFFIC TO PHASE 1 IMPROVEMENTS.
B. REMOVE TEMPORARY SHOOFLY, SHORING, AND EXISTING PAVEMENT.
C. INSTALL SHORING, RELOCATE COM E-STREETS FIBER, CONSTRUCT REMAINING RCB, AND BACKFILL.
D. INSTALL CONDUITS, AND CONSTRUCT PAVEMENT, CURB, ACCESS DRIVE, SCUPPERS, AND SIDEWALK.

PHASE 3 (FULL-CLOSURE):

A. INSTALL TEMPORARY TRAFFIC CONTROL (DETOUR).
B. REMOVE TEMPORARY PAVEMENT AND FINALIZE GRADING.
C. PREPARE TRACKBED FOR UPRR TRACK/CROSSING CONSTRUCTION (SAW CUT AND REMOVE PAVEMENT, PREPARE SUBGRADE, PLACE SUBBALLAST, AND INSTALL UNDERDRAINS).
D. UPRR TO INSTALL TRACK (TLM), LINE/LEVEL BALLAST, AND INSTALL CROSSING PANELS.
E. CONSTRUCT PAVEMENT ALONG CROSSING PANELS, MILL/OVERLAY PAVEMENT AT NORTH END, FINALIZE PERMANENT TRAFFIC CONTROL, AND OPEN TO TRAFFIC.

50 0 50 100
SCALE IN FEET

LEGEND

- PROPOSED CONSTRUCTION
- PREVIOUSLY CONSTRUCTED
- TEMPORARY PAVEMENT
- TEMPORARY LANES

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	RSP
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	PH016 of 029

UNION PACIFIC RAILROAD — Sheet 227 of 587

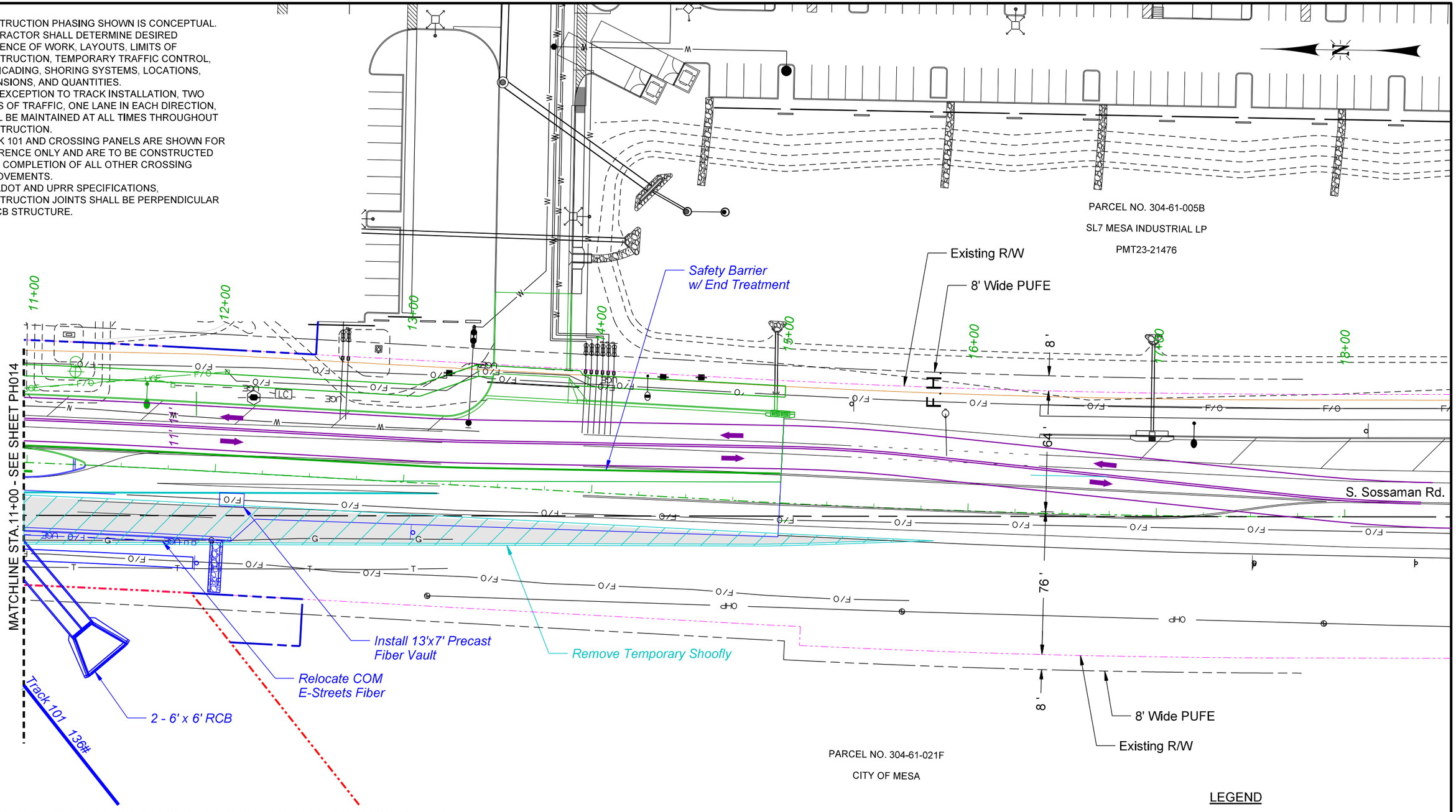
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CONSTRUCTION PHASING - SOSSAMAN ROAD PHASES 2 & 3

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04 Phasing\P_PH014_Sossaman PH2_200927.dgn
Default
3/9/2026

NOTES:

1. CONSTRUCTION PHASING SHOWN IS CONCEPTUAL. CONTRACTOR SHALL DETERMINE DESIRED SEQUENCE OF WORK, LAYOUTS, LIMITS OF CONSTRUCTION, TEMPORARY TRAFFIC CONTROL, BARRICADING, SHORING SYSTEMS, LOCATIONS, DIMENSIONS, AND QUANTITIES.
2. WITH EXCEPTION TO TRACK INSTALLATION, TWO LANES OF TRAFFIC, ONE LANE IN EACH DIRECTION, SHALL BE MAINTAINED AT ALL TIMES THROUGHOUT CONSTRUCTION.
3. TRACK 101 AND CROSSING PANELS ARE SHOWN FOR REFERENCE ONLY AND ARE TO BE CONSTRUCTED UPON COMPLETION OF ALL OTHER CROSSING IMPROVEMENTS.
4. PER ADOT AND UPRR SPECIFICATIONS, CONSTRUCTION JOINTS SHALL BE PERPENDICULAR TO RCB STRUCTURE.



PHASE 2:

A. CONSTRUCT TEMPORARY PAVEMENT AT NORTH END, INSTALL TTC, AND DIVERT TRAFFIC TO PHASE 1 IMPROVEMENTS.
B. REMOVE TEMPORARY SHOOFLY, SHORING, AND EXISTING PAVEMENT.
C. INSTALL SHORING, RELOCATE COM E-STREETS FIBER, CONSTRUCT REMAINING RCB, AND BACKFILL.
D. INSTALL CONDUITS, AND CONSTRUCT PAVEMENT, CURB, ACCESS DRIVE, SCUPPERS, AND SIDEWALK.

PHASE 3 (FULL-CLOSURE):

A. INSTALL TEMPORARY TRAFFIC CONTROL (DETOUR).
B. REMOVE TEMPORARY PAVEMENT AND FINALIZE GRADING.
C. PREPARE TRACKBED FOR UPRR TRACK/CROSSING CONSTRUCTION (SAW CUT AND REMOVE PAVEMENT, PREPARE SUBGRADE, PLACE SUBBALLAST, AND INSTALL UNDERDRAINS).
D. UPRR TO INSTALL TRACK (TLM), LINE/LEVEL BALLAST, AND INSTALL CROSSING PANELS.
E. CONSTRUCT PAVEMENT ALONG CROSSING PANELS, MILL/OVERLAY PAVEMENT AT NORTH END, FINALIZE PERMANENT TRAFFIC CONTROL, AND OPEN TO TRAFFIC.

LEGEND

- PROPOSED CONSTRUCTION
- PREVIOUSLY CONSTRUCTED
- TEMPORARY PAVEMENT
- TEMPORARY LANES

50 0 50 100
SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	RSP
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	PH017 of 029

UNION PACIFIC RAILROAD — Sheet 228 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CONSTRUCTION PHASING - SOSSAMAN ROAD PHASES 2 & 3

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04 Phasing\P_PH015_Sossaman_PH2_200927.dgn
Default
3/9/2026

DETOUR NOTES

1. DETOURS AND TEMPORARY TRAFFIC CONTROL SHOWN IS CONCEPTUAL. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY TRAFFIC CONTROL REQUIRED FOR MULTIPLE PHASES OF CONSTRUCTION NECESSARY TO ACCOMMODATE ALL ASPECTS OF ROADWAY AND RAILROAD CONSTRUCTION.

2. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINMENT OF TEMPORARY TRAFFIC CONTROL (TTC) PERMITS PER CONDITIONS SET FORTH IN THE CITY OF MESA TEMPORARY TRAFFIC CONTROL MANUAL (TTCM). TRAFFIC CONTROL PLANS (TCP) SHALL COMPLY WITH SECTIONS 1.5 OF THE CITY OF MESA TTCM. ROAD CLOSURES REQUIRE A MINIMUM LEAD TIME OF 30 CALENDAR DAYS FOR CITY OF MESA REVIEW AND COORDINATION.

3. CONTRACTOR SHALL COMPLY WITH THE TOWN OF QUEEN CREEK ROADWAY SIGNING AND PAVEMENT MARKING GUIDELINES DOCUMENT, SPECIFICATIONS, AND REQUIREMENTS. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH THE TOWN OF QUEEN CREEK, INCLUDING OBTAINMENT OF FULL ROAD CLOSURE PERMITS, NOTIFICATIONS, SCHEDULING, HAUL ROADS, AND INSPECTIONS. REQUESTS FOR FULL ROAD CLOSURES SHALL BE SUBMITTED TO THE TOWN OF QUEEN CREEK AT LEAST 21 DAYS PRIOR TO PROPOSED CLOSURES.

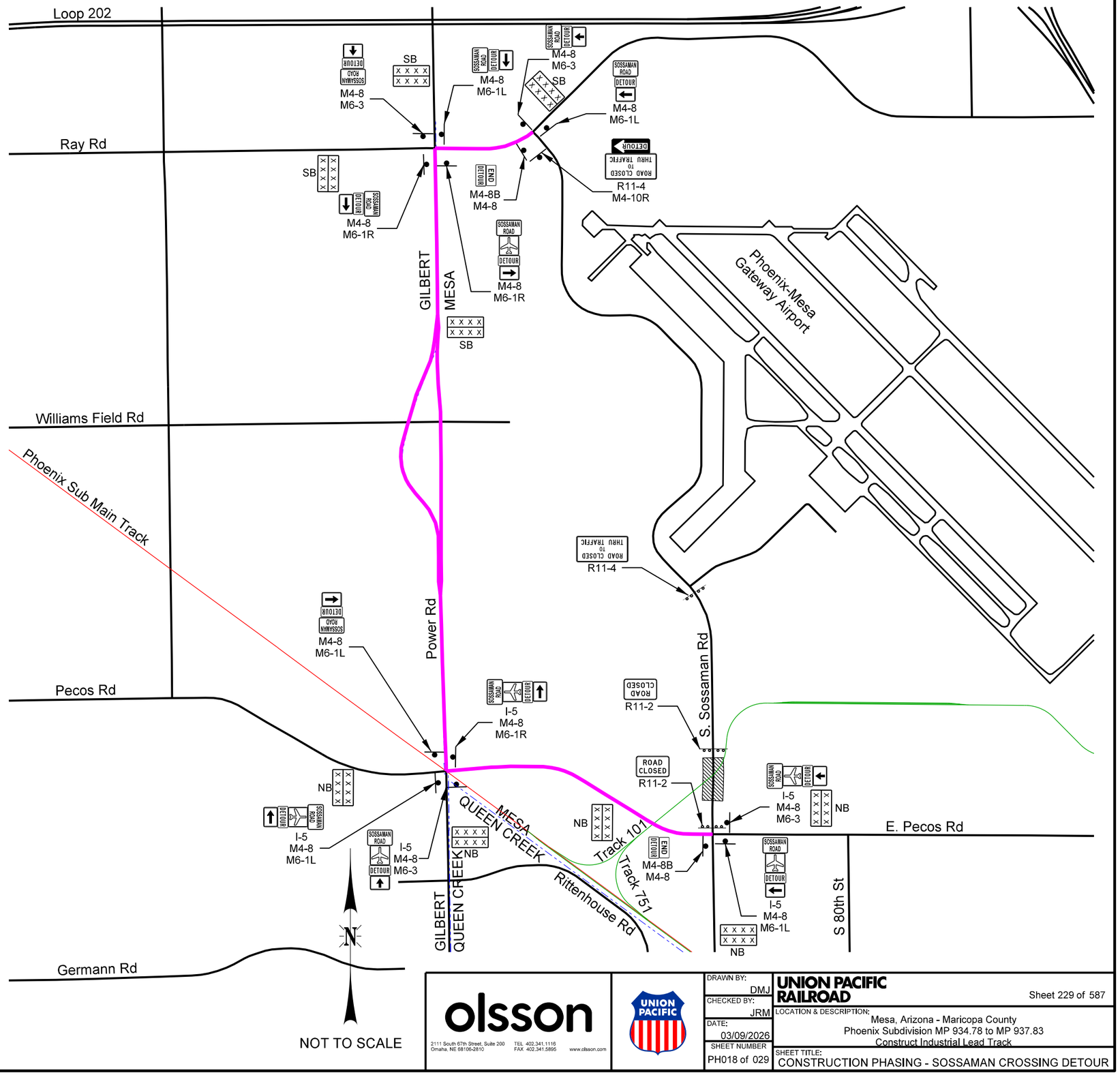
LEGEND

- VARIABLE MESSAGE BOARD (VMS)
- CONSTRUCTION
- TYPE III BARRICADE
- SIGN
- DETOUR
- EXISTING TRACK
- PROPOSED TRACK

	MESSAGE: PHASE I	MESSAGE: PHASE II
X X X X X X X X	LINE 1: SOSSAMAN LINE 2: ROAD (NB/SB) LINE 3: CLOSED	LINE 1: XX/XX LINE 2: TO LINE 3: XX/XX (XX/XX INDICATES THE DATES OF CLOSURE)

LIST OF TRAFFIC CONTROL DEVICES*			
ITEM	MUTCD DEVICE NO.	SIZE	QTY
ROAD CLOSED	R11-2	48" X 30"	2
ROAD CLOSED TO THRU TRAFFIC	R11-4	60" X 30"	2
'SOSSAMAN ROAD' PLAQUE			12
STRAIGHT ARROW AUXILIARY	M6-3	21" X 15"	4
LEFT ARROW AUXILIARY	M6-1L	21" X 15"	5
RIGHT ARROW AUXILIARY	M6-1R	21" X 15"	3
DETOUR (LEFT ARROW)	M4-10L	48" X 18"	-
DETOUR (RIGHT ARROW)	M4-10R	48" X 18"	1
DETOUR	M4-8	24" X 12"	14
END	M4-8B	24" X 12"	2
AIRPORT PLAQUE	I-5	24" X 24"	6
TYPE III BARRICADE		60" X 48"	6
VARIABLE MESSAGE BOARDS			7

*NOTE: TEMPORARY TRAFFIC CONTROL QUANTITIES ARE SHOWN FOR INFORMATION ONLY. PAYMENT FOR THESE ITEMS SHALL BE MADE UNDER THE LUMP SUM LINE ITEM "TRFC, TRAFFIC CONTROL".



olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

DRAWN BY:	DMJ
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	PH018 of 029

UNION PACIFIC RAILROAD

Sheet 229 of 587

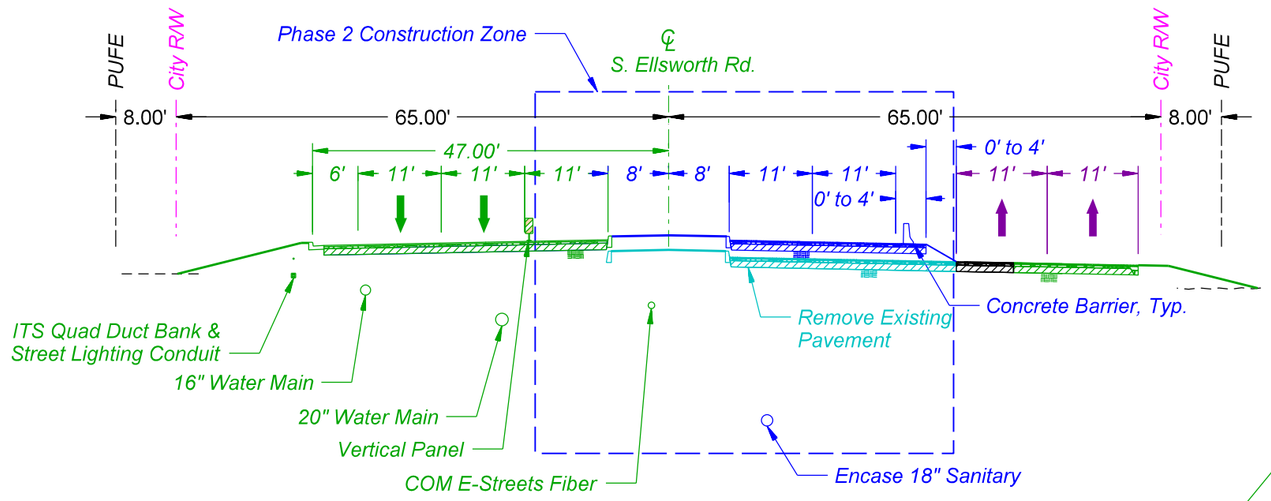
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CONSTRUCTION PHASING - SOSSAMAN CROSSING DETOUR

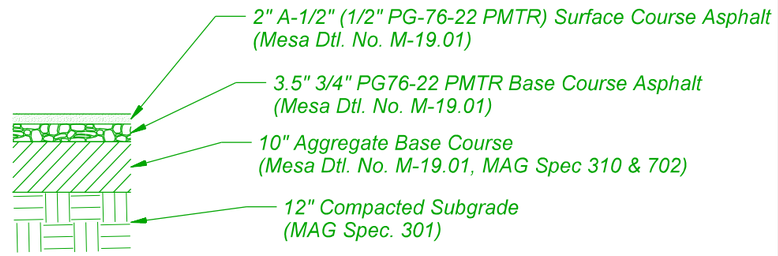
Color_table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927.40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927.40-Design\Microstation\020-0927.RLTK\DGN\Sheets\04 Phasing\P_PH016_09 Sossaman Detour_200927.dgn
Default
3/9/2026

NOTES:

1. CONSTRUCTION PHASING SHOWN IS CONCEPTUAL. CONTRACTOR SHALL DETERMINE DESIRED SEQUENCE OF WORK, LAYOUTS, LIMITS OF CONSTRUCTION, TEMPORARY TRAFFIC CONTROL, BARRICADING, SHORING SYSTEMS, LOCATIONS, DIMENSIONS, AND QUANTITIES.
2. WITH EXCEPTION TO TRACK INSTALLATION, FOUR LANES OF TRAFFIC, TWO LANES IN EACH DIRECTION, SHALL BE MAINTAINED AT ALL TIMES THROUGHOUT CONSTRUCTION.
3. TRACK 101 AND CROSSING PANELS ARE SHOWN FOR REFERENCE ONLY AND ARE TO BE CONSTRUCTED UPON COMPLETION OF ALL OTHER CROSSING IMPROVEMENTS.

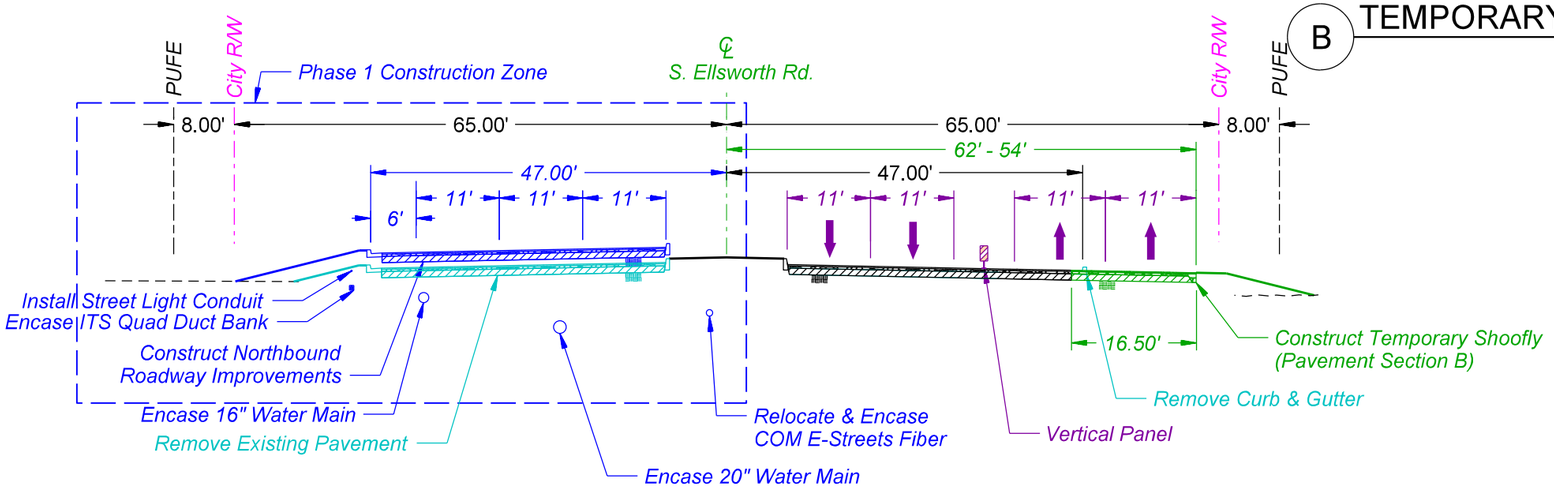


TYPICAL SECTION (LOOKING SOUTH)
PHASE 2 CONSTRUCTION



B TEMPORARY PAVEMENT SECTION

NOT TO SCALE



TYPICAL SECTION (LOOKING SOUTH)
PHASE 1 CONSTRUCTION

PHASE 1:

A. INSTALL TTC, CONSTRUCT TEMPORARY SHOOFLY AND MEDIAN PAVEMENT.
B. INSTALL TEMPORARY TRAFFIC CONTROL AND DIVERT TRAFFIC TO TEMPORARY SHOOFLY.
C. REMOVE EXISTING PAVEMENT, ENCASE WATER MAINS, RELOCATE & ENCASE COM E-STREETS FIBER, AND BACKFILL.
D. INSTALL CONDUITS AND CONSTRUCT PAVEMENT, CURB, ACCESS DRIVES, SCUPPERS, ELLSWORTH CHANNEL ACCESS, AND SIDEWALK.

PHASE 2:

A. INSTALL TTC AND DIVERT NORTHBOUND TRAFFIC (TWO LANES) TO PHASE 1 IMPROVEMENTS.
B. REMOVE TEMPORARY MEDIAN PAVEMENT, RECONSTRUCT MEDIAN CURB, AND BACKFILL.
C. ENCASE 18" SANITARY LINE, BACKFILL, AND CONSTRUCT PAVEMENT AND CURB.

LEGEND

- PROPOSED CONSTRUCTION
- PREVIOUSLY CONSTRUCTED
- TEMPORARY LANES

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	RSP
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	PH019 of 029

UNION PACIFIC RAILROAD

Sheet 230 of 587

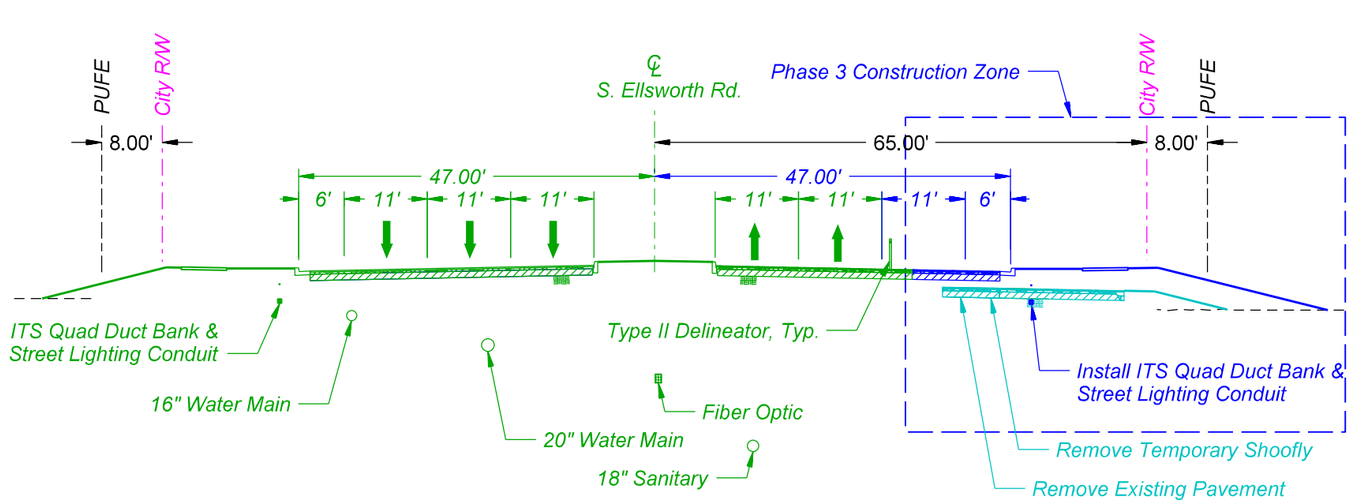
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CONSTRUCTION PHASING - ELLSWORTH ROAD TYPICALS

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04 Phasing\P_PH017-18_Ellsworth Typ_200927.dgn
Default
3/9/2026

NOTES:

1. CONSTRUCTION PHASING SHOWN IS CONCEPTUAL. CONTRACTOR SHALL DETERMINE DESIRED SEQUENCE OF WORK, LAYOUTS, LIMITS OF CONSTRUCTION, TEMPORARY TRAFFIC CONTROL, BARRICADING, SHORING SYSTEMS, LOCATIONS, DIMENSIONS, AND QUANTITIES.
2. WITH EXCEPTION TO TRACK INSTALLATION, FOUR LANES OF TRAFFIC, TWO LANES IN EACH DIRECTION, SHALL BE MAINTAINED AT ALL TIMES THROUGHOUT CONSTRUCTION.
3. TRACK 101 AND CROSSING PANELS ARE SHOWN FOR REFERENCE ONLY AND ARE TO BE CONSTRUCTED UPON COMPLETION OF ALL OTHER CROSSING IMPROVEMENTS.



TYPICAL SECTION (LOOKING SOUTH)

PHASE 3 CONSTRUCTION

PHASE 3:

A. INSTALL TTC, DIVERT NORTHBOUND TRAFFIC (THREE LANES) TO FINAL CONDITION, AND DIVERT SOUTHBOUND TRAFFIC (TWO LANES) TO PHASE 2 IMPROVEMENTS.
B. REMOVE TEMPORARY SHOOFLY, INSTALL CONDUITS, AND CONSTRUCT REMAINING PAVEMENT, CURB, ACCESS DRIVES, AND SIDEWALK.

PHASE 4 (FULL-CLOSURE):

A. INSTALL TEMPORARY TRAFFIC CONTROL (DETOUR).
B. REMOVE TEMPORARY PAVEMENT AND FINALIZE GRADING.
C. PREPARE TRACKBED FOR UPRR TRACK/CROSSING CONSTRUCTION (SAW CUT AND REMOVE PAVEMENT, PREPARE SUBGRADE, PLACE SUBBALLAST, AND INSTALL UNDERDRAINS).
D. UPRR TO INSTALL TRACK (TLM), LINE/LEVEL BALLAST, AND INSTALL CROSSING PANELS.
E. CONSTRUCT PAVEMENT ALONG CROSSING PANELS, FINALIZE PERMANENT TRAFFIC CONTROL, AND OPEN TO TRAFFIC.

LEGEND

PROPOSED CONSTRUCTION

PREVIOUSLY CONSTRUCTED

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: PH020 of 029

UNION PACIFIC RAILROAD

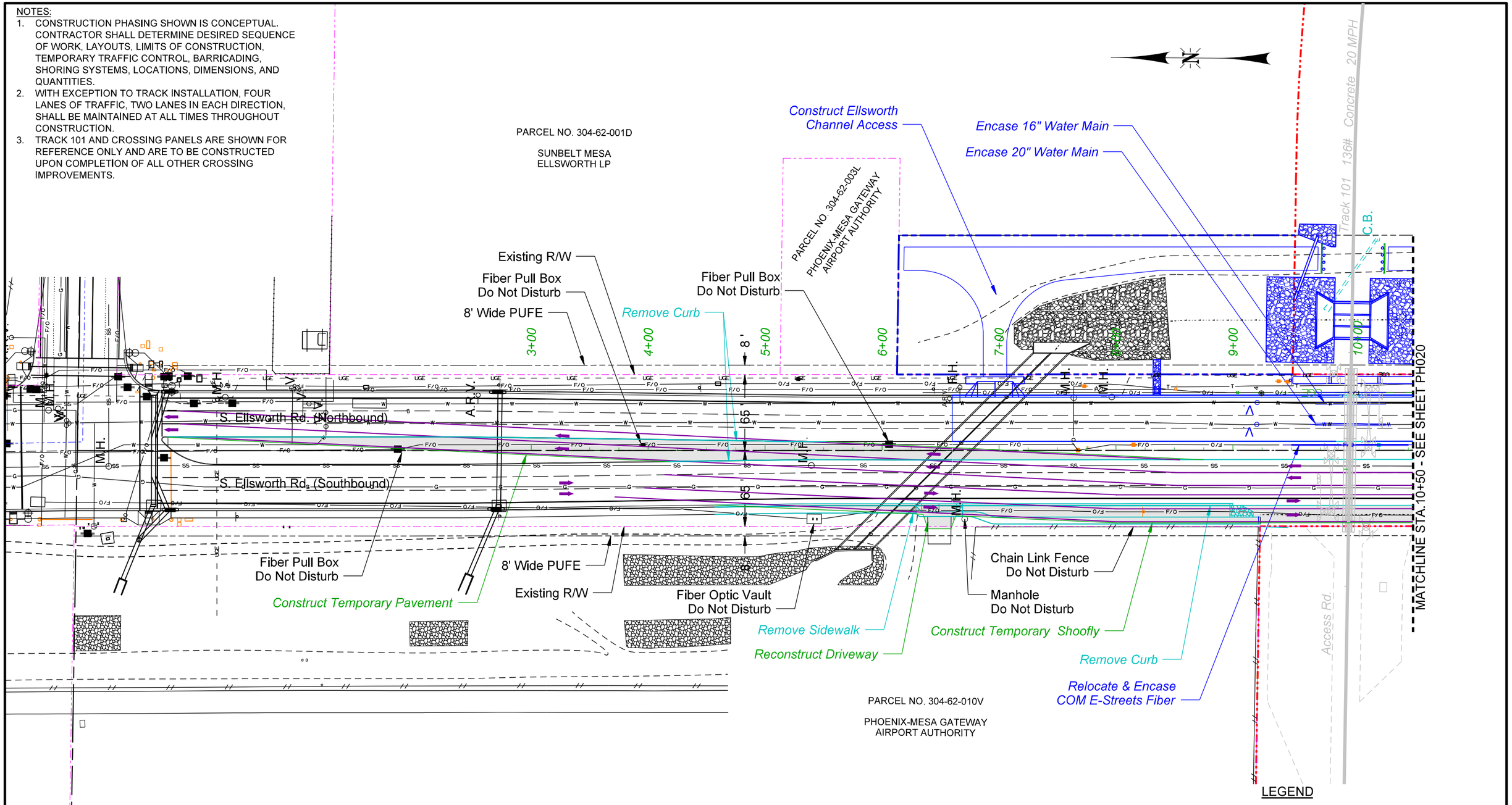
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CONSTRUCTION PHASING - ELLSWORTH ROAD TYPICALS

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04 Phasing\P_PH017-18_Ellsworth Typ_200927.dgn
Default
3/9/2026

NOTES:

1. CONSTRUCTION PHASING SHOWN IS CONCEPTUAL. CONTRACTOR SHALL DETERMINE DESIRED SEQUENCE OF WORK, LAYOUTS, LIMITS OF CONSTRUCTION, TEMPORARY TRAFFIC CONTROL, BARRICADING, SHORING SYSTEMS, LOCATIONS, DIMENSIONS, AND QUANTITIES.
2. WITH EXCEPTION TO TRACK INSTALLATION, FOUR LANES OF TRAFFIC, TWO LANES IN EACH DIRECTION, SHALL BE MAINTAINED AT ALL TIMES THROUGHOUT CONSTRUCTION.
3. TRACK 101 AND CROSSING PANELS ARE SHOWN FOR REFERENCE ONLY AND ARE TO BE CONSTRUCTED UPON COMPLETION OF ALL OTHER CROSSING IMPROVEMENTS.



LEGEND

- PROPOSED CONSTRUCTION
- PREVIOUSLY CONSTRUCTED
- TEMPORARY PAVEMENT
- TEMPORARY LANES

PHASE 1:

A. INSTALL TTC, CONSTRUCT TEMPORARY SHOOFLY AND MEDIAN PAVEMENT.
B. INSTALL TEMPORARY TRAFFIC CONTROL AND DIVERT TRAFFIC TO TEMPORARY SHOOFLY.
C. REMOVE EXISTING PAVEMENT, ENCASE WATER MAINS, RELOCATE & ENCASE COM E-STREETS FIBER, AND BACKFILL.
D. INSTALL CONDUITS AND CONSTRUCT PAVEMENT, CURB, ACCESS DRIVES, SCUPPERS, ELLSWORTH CHANNEL ACCESS, AND SIDEWALK.

80 0 80 160
SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

DRAWN BY:	RSP
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	PH021 of 029

UNION PACIFIC RAILROAD — Sheet 232 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CONSTRUCTION PHASING - ELLSWORTH ROAD PHASE 1

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color_UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04 Phasing\P_PH019_Ellsworth PH1_200927.dgn
Default
3/9/2026

NOTES:
1. CONSTRUCTION PHASING SHOWN IS CONCEPTUAL. CONTRACTOR SHALL DETERMINE DESIRED SEQUENCE OF WORK, LAYOUTS, LIMITS OF CONSTRUCTION, TEMPORARY TRAFFIC CONTROL, BARRICADING, SHORING SYSTEMS, LOCATIONS, DIMENSIONS, AND QUANTITIES.
2. WITH EXCEPTION TO TRACK INSTALLATION, FOUR LANES OF TRAFFIC, TWO LANES IN EACH DIRECTION, SHALL BE MAINTAINED AT ALL TIMES THROUGHOUT CONSTRUCTION.
3. TRACK 101 AND CROSSING PANELS ARE SHOWN FOR REFERENCE ONLY AND ARE TO BE CONSTRUCTED UPON COMPLETION OF ALL OTHER CROSSING IMPROVEMENTS.

PARCEL NO. 304-62-006D

SUNBELT MESA
ELLSWORTH LP

Construct Ellsworth Channel Access

C.B.

Fiber Pull Box
Do Not Disturb

8' Wide PUFE

Existing R/W

Fiber Pull Box
Adjust to Grade

11+00 12+00 13+00 14+00 15+00 16+00 17+00 18+00

V.G.

M.H.

A.R.V.

S. Ellsworth Rd. (Northbound)

S. Ellsworth Rd. (Southbound)

MATCHLINE STA.10+50 - SEE SHEET PH019

Remove Curb

Construct Temporary Shoofly

Reconstruct Access Drive
& Culvert

Construct Temporary Pavement

8' Wide PUFE

Existing R/W

Storm Inlet
Do Not Disturb

PARCEL NO. 304-62-976A

SUNBELT MESA
ELLSWORTH LP

LEGEND

- PROPOSED CONSTRUCTION
- PREVIOUSLY CONSTRUCTED
- TEMPORARY PAVEMENT
- TEMPORARY LANES

PHASE 1:
A. INSTALL TTC, CONSTRUCT TEMPORARY SHOOFLY AND MEDIAN PAVEMENT.
B. INSTALL TEMPORARY TRAFFIC CONTROL AND DIVERT TRAFFIC TO TEMPORARY SHOOFLY.
C. REMOVE EXISTING PAVEMENT, ENCASE WATER MAINS, RELOCATE & ENCASE COM E-STREETS FIBER, AND BACKFILL.
D. INSTALL CONDUITS AND CONSTRUCT PAVEMENT, CURB, ACCESS DRIVES, SCUPPERS, ELLSWORTH CHANNEL ACCESS, AND SIDEWALK.

80 0 80 160
SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: PH022 of 029

UNION PACIFIC RAILROAD
Sheet 233 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CONSTRUCTION PHASING - ELLSWORTH ROAD PHASE 1

Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927.40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927.40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04 Phasing\P_PH020_Ellsworth PH1_200927.dgn
Default
3/9/2026

NOTES:

1. CONSTRUCTION PHASING SHOWN IS CONCEPTUAL. CONTRACTOR SHALL DETERMINE DESIRED SEQUENCE OF WORK, LAYOUTS, LIMITS OF CONSTRUCTION, TEMPORARY TRAFFIC CONTROL, BARRICADING, SHORING SYSTEMS, LOCATIONS, DIMENSIONS, AND QUANTITIES.
2. WITH EXCEPTION TO TRACK INSTALLATION, FOUR LANES OF TRAFFIC, TWO LANES IN EACH DIRECTION, SHALL BE MAINTAINED AT ALL TIMES THROUGHOUT CONSTRUCTION.
3. TRACK 101 AND CROSSING PANELS ARE SHOWN FOR REFERENCE ONLY AND ARE TO BE CONSTRUCTED UPON COMPLETION OF ALL OTHER CROSSING IMPROVEMENTS.

PARCEL NO. 304-62-001D

SUNBELT MESA
ELLSWORTH LP

PARCEL NO. 304-62-003L
PHOENIX-MESA GATEWAY
AIRPORT AUTHORITY

Reconstruct Curb
Fiber Pull Box
Adjust to Grade
Remove Temporary
Pavement
Fiber Pull Box
Do Not Disturb
Existing R/W
8' Wide PUFE
Fiber Pull Box
Do Not Disturb

3+00
4+00
5+00
6+00
7+00
9+00
10+00

S. Ellsworth Rd. (Northbound)
S. Ellsworth Rd. (Southbound)

8' Wide PUFE
Existing R/W
Fiber Optic Vault
Do Not Disturb
Chain Link Fence
Do Not Disturb
Manhole
Do Not Disturb
Remove Pavement
Encase 18" Sanitary

160+00

Track 101 136# Concrete 20 MPH
Access Rd.
MATCHLINE STA.10+50 - SEE SHEET PH022

PARCEL NO. 304-62-010V

PHOENIX-MESA GATEWAY
AIRPORT AUTHORITY

LEGEND

- PROPOSED CONSTRUCTION
- PREVIOUSLY CONSTRUCTED
- TEMPORARY PAVEMENT
- TEMPORARY LANES

PHASE 2:

A. INSTALL TTC AND DIVERT NORTHBOUND TRAFFIC (TWO LANES) TO PHASE 1 IMPROVEMENTS.
B. REMOVE TEMPORARY MEDIAN PAVEMENT, RECONSTRUCT MEDIAN CURB, AND BACKFILL.
C. ENCASE 18" SANITARY LINE, BACKFILL, AND CONSTRUCT PAVEMENT AND CURB.

80 0 80 160
SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: PH023 of 029

UNION PACIFIC RAILROAD
Sheet 234 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

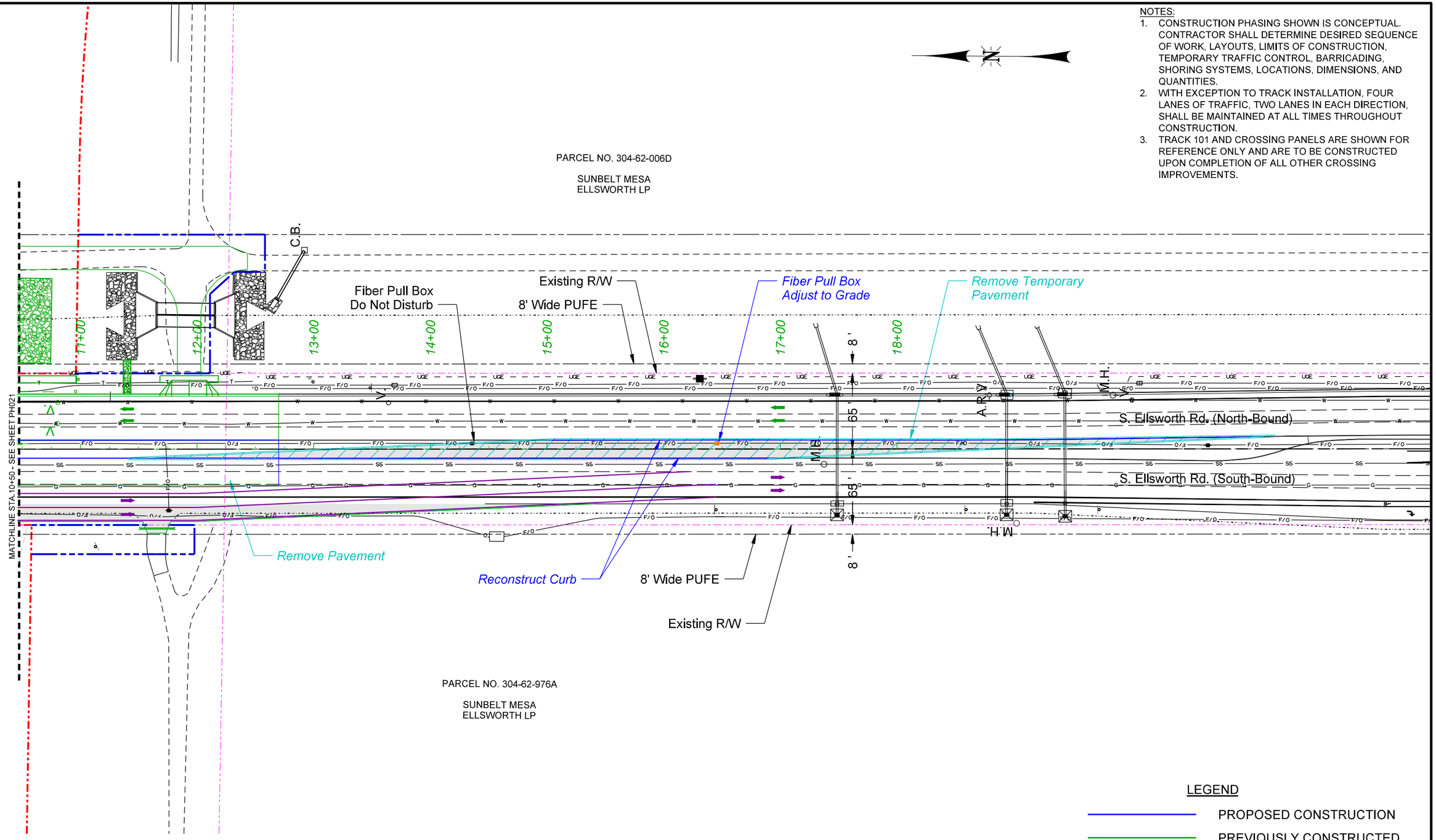
SHEET TITLE:
CONSTRUCTION PHASING - ELLSWORTH ROAD PHASE 2

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04 Phasing\P_PH021_Ellsworth PH2_200927.dgn
Default
3/9/2026

NOTES:
1. CONSTRUCTION PHASING SHOWN IS CONCEPTUAL. CONTRACTOR SHALL DETERMINE DESIRED SEQUENCE OF WORK, LAYOUTS, LIMITS OF CONSTRUCTION, TEMPORARY TRAFFIC CONTROL, BARRICADING, SHORING SYSTEMS, LOCATIONS, DIMENSIONS, AND QUANTITIES.
2. WITH EXCEPTION TO TRACK INSTALLATION, FOUR LANES OF TRAFFIC, TWO LANES IN EACH DIRECTION, SHALL BE MAINTAINED AT ALL TIMES THROUGHOUT CONSTRUCTION.
3. TRACK 101 AND CROSSING PANELS ARE SHOWN FOR REFERENCE ONLY AND ARE TO BE CONSTRUCTED UPON COMPLETION OF ALL OTHER CROSSING IMPROVEMENTS.

PARCEL NO. 304-62-006D

SUNBELT MESA
ELLSWORTH LP



PARCEL NO. 304-62-976A

SUNBELT MESA
ELLSWORTH LP

LEGEND

- PROPOSED CONSTRUCTION
- PREVIOUSLY CONSTRUCTED
- TEMPORARY PAVEMENT
- TEMPORARY LANES

PHASE 2:
A. INSTALL TTC AND DIVERT NORTHBOUND TRAFFIC (TWO LANES) TO PHASE 1 IMPROVEMENTS.
B. REMOVE TEMPORARY MEDIAN PAVEMENT, RECONSTRUCT MEDIAN CURB, AND BACKFILL.
C. ENCASE 18" SANITARY LINE, BACKFILL, AND CONSTRUCT PAVEMENT AND CURB.

80 0 80 160
SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: PH024 of 029

UNION PACIFIC RAILROAD
Sheet 235 of 587

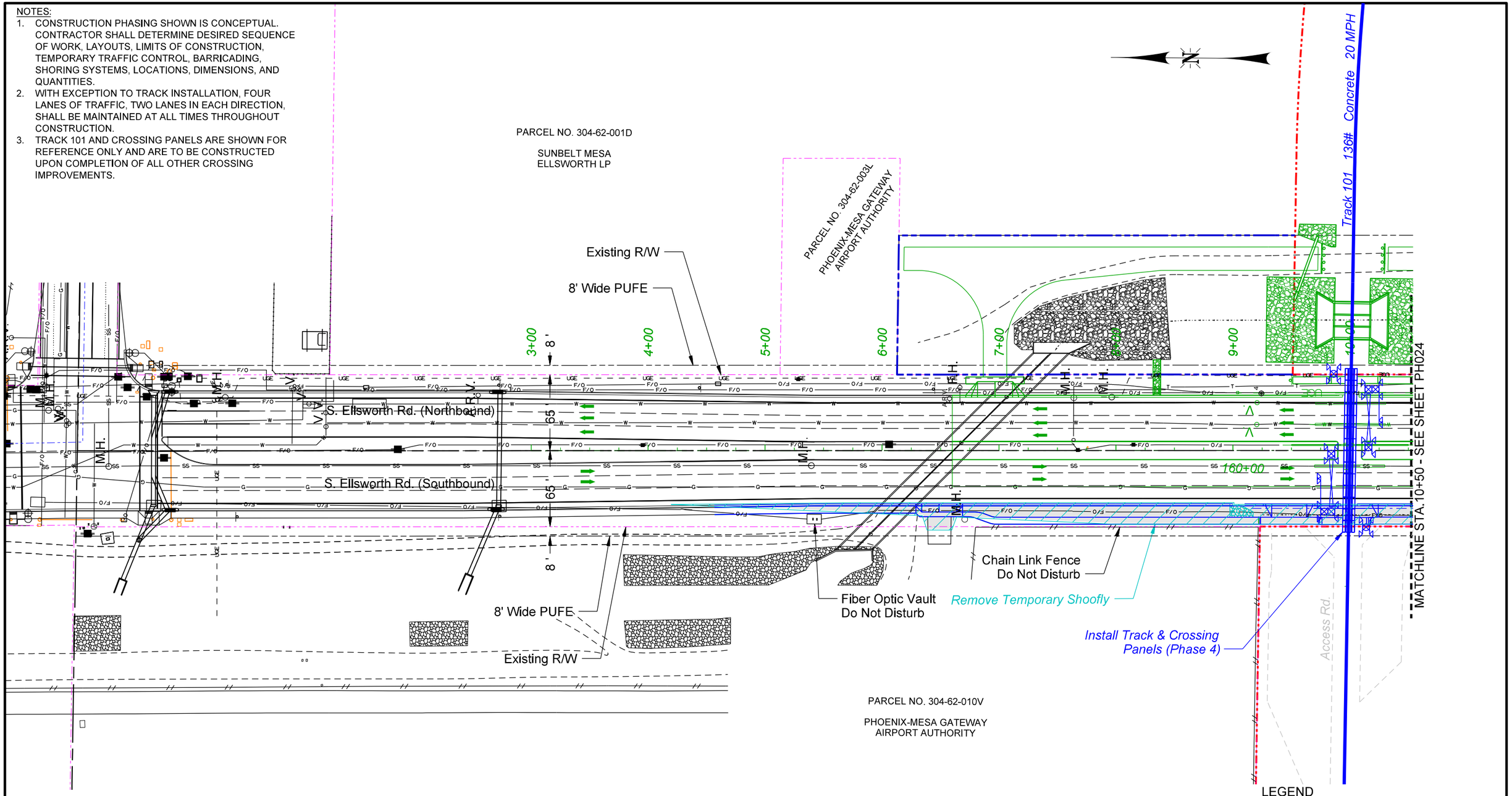
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CONSTRUCTION PHASING - ELLSWORTH ROAD PHASE 2

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04 Phasing\P_PH022_Ellsworth PH2_200927.dgn
Default
3/9/2026

NOTES:

1. CONSTRUCTION PHASING SHOWN IS CONCEPTUAL. CONTRACTOR SHALL DETERMINE DESIRED SEQUENCE OF WORK, LAYOUTS, LIMITS OF CONSTRUCTION, TEMPORARY TRAFFIC CONTROL, BARRICADING, SHORING SYSTEMS, LOCATIONS, DIMENSIONS, AND QUANTITIES.
2. WITH EXCEPTION TO TRACK INSTALLATION, FOUR LANES OF TRAFFIC, TWO LANES IN EACH DIRECTION, SHALL BE MAINTAINED AT ALL TIMES THROUGHOUT CONSTRUCTION.
3. TRACK 101 AND CROSSING PANELS ARE SHOWN FOR REFERENCE ONLY AND ARE TO BE CONSTRUCTED UPON COMPLETION OF ALL OTHER CROSSING IMPROVEMENTS.



PHASE 3:

A. INSTALL TTC, DIVERT NORTHBOUND TRAFFIC (THREE LANES) TO FINAL CONDITION, AND DIVERT SOUTHBOUND TRAFFIC (TWO LANES) TO PHASE 2 IMPROVEMENTS.
B. REMOVE TEMPORARY SHOOFLY, INSTALL CONDUITS, AND CONSTRUCT REMAINING PAVEMENT, CURB, ACCESS DRIVES, AND SIDEWALK.

PHASE 4 (FULL-CLOSURE):

A. INSTALL TEMPORARY TRAFFIC CONTROL (DETOUR).
B. REMOVE TEMPORARY PAVEMENT AND FINALIZE GRADING.
C. PREPARE TRACKBED FOR UPRR TRACK/CROSSING CONSTRUCTION (SAW CUT AND REMOVE PAVEMENT, PREPARE SUBGRADE, PLACE SUBBALLAST, AND INSTALL UNDERDRAINS).
D. UPRR TO INSTALL TRACK (TLM), LINE/LEVEL BALLAST, AND INSTALL CROSSING PANELS.
E. CONSTRUCT PAVEMENT ALONG CROSSING PANELS, FINALIZE PERMANENT TRAFFIC CONTROL, AND OPEN TO TRAFFIC.

LEGEND

- PROPOSED CONSTRUCTION
- PREVIOUSLY CONSTRUCTED
- TEMPORARY PAVEMENT

80 0 80 160
SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: PH025 of 029

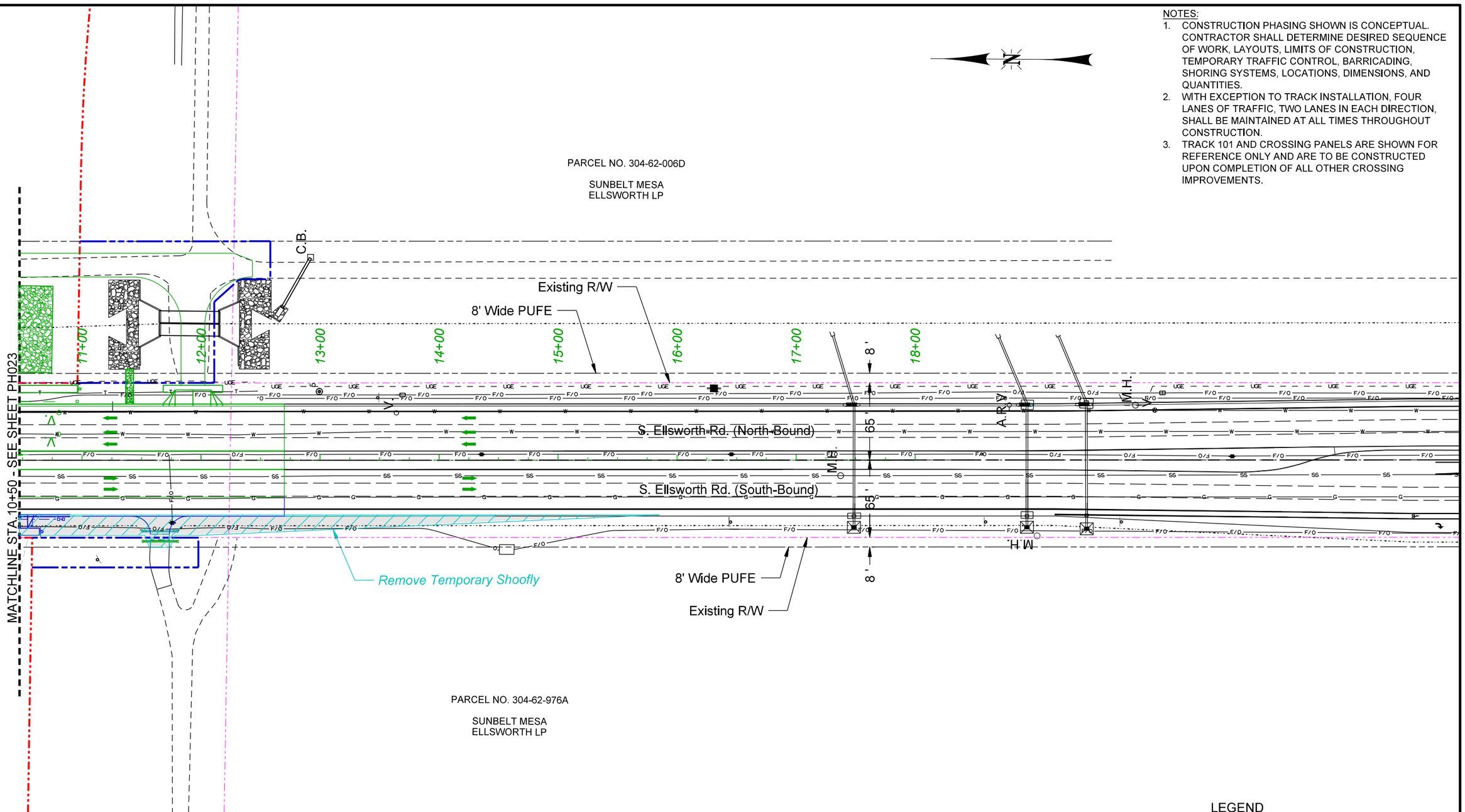
UNION PACIFIC RAILROAD
Sheet 236 of 587
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track
SHEET TITLE:
CONSTRUCTION PHASING - ELLSWORTH ROAD PHASES 3 & 4

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04 Phasing\P_PH023_Ellsworth PH3_200927.dgn
Default
3/9/2026

NOTES:
1. CONSTRUCTION PHASING SHOWN IS CONCEPTUAL. CONTRACTOR SHALL DETERMINE DESIRED SEQUENCE OF WORK, LAYOUTS, LIMITS OF CONSTRUCTION, TEMPORARY TRAFFIC CONTROL, BARRICADING, SHORING SYSTEMS, LOCATIONS, DIMENSIONS, AND QUANTITIES.
2. WITH EXCEPTION TO TRACK INSTALLATION, FOUR LANES OF TRAFFIC, TWO LANES IN EACH DIRECTION, SHALL BE MAINTAINED AT ALL TIMES THROUGHOUT CONSTRUCTION.
3. TRACK 101 AND CROSSING PANELS ARE SHOWN FOR REFERENCE ONLY AND ARE TO BE CONSTRUCTED UPON COMPLETION OF ALL OTHER CROSSING IMPROVEMENTS.

PARCEL NO. 304-62-006D

SUNBELT MESA
ELLSWORTH LP



PARCEL NO. 304-62-976A

SUNBELT MESA
ELLSWORTH LP

PHASE 3:
A. INSTALL TTC, DIVERT NORTHBOUND TRAFFIC (THREE LANES) TO FINAL CONDITION, AND DIVERT SOUTHBOUND TRAFFIC (TWO LANES) TO PHASE 2 IMPROVEMENTS.
B. REMOVE TEMPORARY SHOOFLY, INSTALL CONDUITS, AND CONSTRUCT REMAINING PAVEMENT, CURB, ACCESS DRIVES, AND SIDEWALK.

PHASE 4 (FULL-CLOSURE):
A. INSTALL TEMPORARY TRAFFIC CONTROL (DETOUR).
B. REMOVE TEMPORARY PAVEMENT AND FINALIZE GRADING.
C. PREPARE TRACKBED FOR UPRR TRACK/CROSSING CONSTRUCTION (SAW CUT AND REMOVE PAVEMENT, PREPARE SUBGRADE, PLACE SUBBALLAST, AND INSTALL UNDERDRAINS).
D. UPRR TO INSTALL TRACK (TLM), LINE/LEVEL BALLAST, AND INSTALL CROSSING PANELS.
E. CONSTRUCT PAVEMENT ALONG CROSSING PANELS, FINALIZE PERMANENT TRAFFIC CONTROL, AND OPEN TO TRAFFIC.

LEGEND
- PROPOSED CONSTRUCTION
- PREVIOUSLY CONSTRUCTED
- TEMPORARY PAVEMENT

80 0 80 160
SCALE IN FEET

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

DRAWN BY: RSP
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: PH026 of 029

UNION PACIFIC RAILROAD
Sheet 237 of 587
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track
SHEET TITLE:
CONSTRUCTION PHASING - ELLSWORTH ROAD PHASES 3 & 4

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04 Phasing\P_PH024_Ellsworth PH3_200927.dgn
Default
3/9/2026

DETOUR NOTES

1. DETOURS AND TEMPORARY TRAFFIC CONTROL SHOWN IS CONCEPTUAL. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY TRAFFIC CONTROL REQUIRED FOR MULTIPLE PHASES OF CONSTRUCTION NECESSARY TO ACCOMMODATE ALL ASPECTS OF ROADWAY AND RAILROAD CONSTRUCTION.

2. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINMENT OF TEMPORARY TRAFFIC CONTROL (TTC) PERMITS PER CONDITIONS SET FORTH IN THE CITY OF MESA TEMPORARY TRAFFIC CONTROL MANUAL (TTCM). TRAFFIC CONTROL PLANS (TCP) SHALL COMPLY WITH SECTIONS 1.5 OF THE CITY OF MESA TTCM. ROAD CLOSURES REQUIRE A MINIMUM LEAD TIME OF 30 CALENDAR DAYS FOR CITY OF MESA REVIEW AND COORDINATION.

3. CONTRACTOR SHALL COMPLY WITH THE TOWN OF QUEEN CREEK ROADWAY SIGNING AND PAVEMENT MARKING GUIDELINES DOCUMENT, SPECIFICATIONS, AND REQUIREMENTS. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH THE TOWN OF QUEEN CREEK, INCLUDING OBTAINMENT OF FULL ROAD CLOSURE PERMITS, NOTIFICATIONS, SCHEDULING, HAUL ROADS, AND INSPECTIONS. REQUESTS FOR FULL ROAD CLOSURES SHALL BE SUBMITTED TO THE TOWN OF QUEEN CREEK AT LEAST 21 DAYS PRIOR TO PROPOSED CLOSURES.

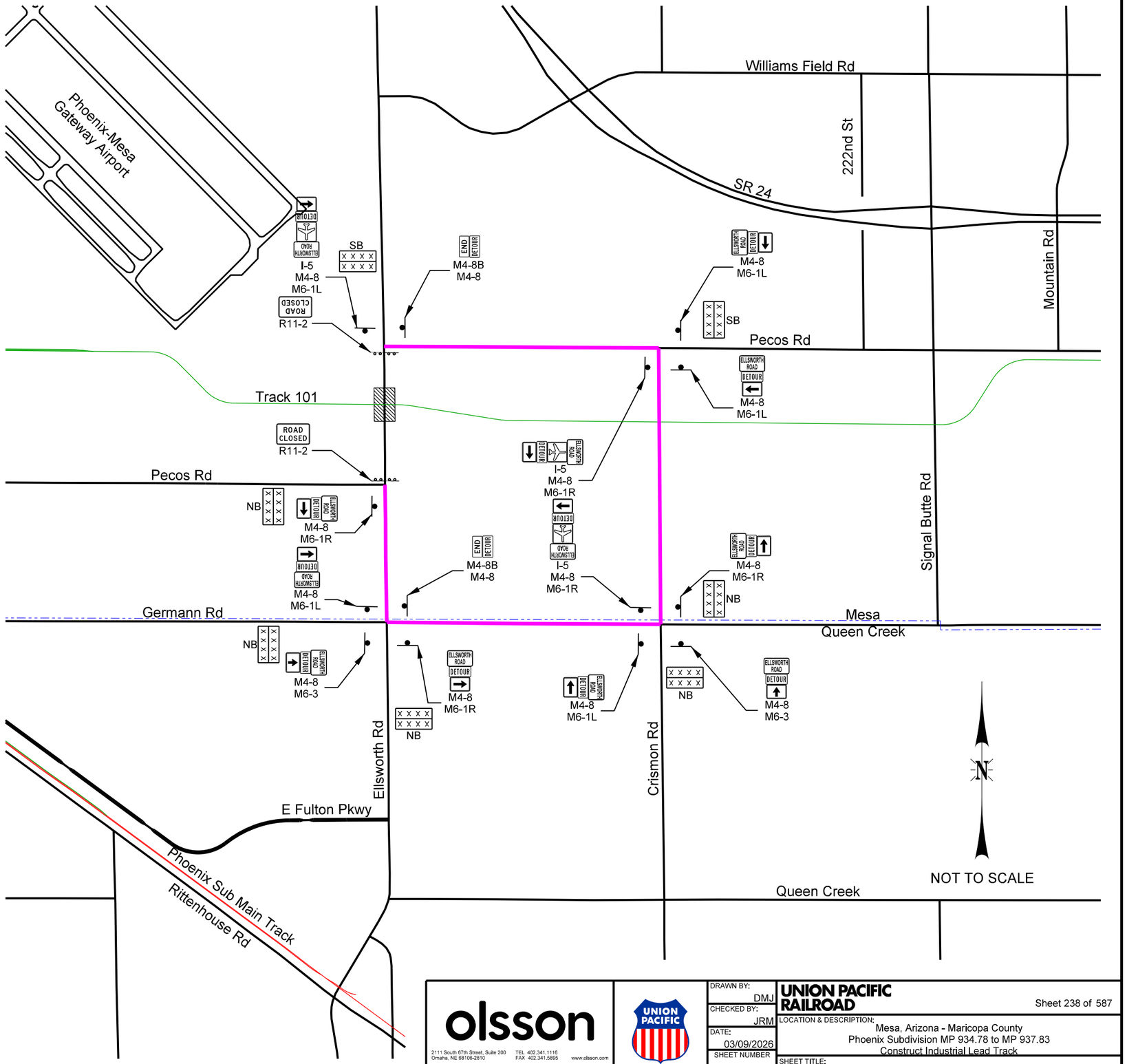
LEGEND

- VARIABLE MESSAGE BOARD (VMS)
- CONSTRUCTION
- TYPE III BARRICADE
- SIGN
- DETOUR
- EXISTING TRACK
- PROPOSED TRACK

MESSAGE: PHASE I	MESSAGE: PHASE II
LINE 1: ELLSWORTH	LINE 1: XX/XX
LINE 2: ROAD (NB/SB)	LINE 2: TO
LINE 3: CLOSED	LINE 3: XX/XX
	(XX/XX INDICATES THE DATES OF CLOSURE)

LIST OF TRAFFIC CONTROL DEVICES*			
ITEM	MUTCD DEVICE NO.	SIZE	QTY
ROAD CLOSED	R11-2	48" X 30"	2
ROAD CLOSED TO THRU TRAFFIC	R11-4	60" X 30"	-
'ELLSWORTH ROAD' PLAQUE			12
STRAIGHT ARROW AUXILIARY	M6-3	21" X 15"	2
LEFT ARROW AUXILIARY	M6-1L	21" X 15"	5
RIGHT ARROW AUXILIARY	M6-1R	21" X 15"	5
DETOUR (LEFT ARROW)	M4-10L	48" X 18"	-
DETOUR (RIGHT ARROW)	M4-10R	48" X 18"	-
DETOUR	M4-8	24" X 12"	14
END	M4-8B	24" X 12"	2
AIRPORT PLAQUE	I-5	24" X 24"	3
TYPE III BARRICADE		60" X 48"	6
VARIABLE MESSAGE BOARDS			7

* NOTE: TEMPORARY TRAFFIC CONTROL QUANTITIES ARE SHOWN FOR INFORMATION ONLY. PAYMENT FOR THESE ITEMS SHALL BE MADE UNDER THE LUMP SUM LINE ITEM "TRFC, TRAFFIC CONTROL".



olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

DRAWN BY:	DMJ
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	PH027 of 029

UNION PACIFIC RAILROAD Sheet 238 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CONSTRUCTION PHASING - ELLSWORTH CROSSING DETOUR

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04 Phasing\P_PH025_13 Ellsworth Detour_200927.dgn
Default
3/9/2026

DETOUR NOTES

1. DETOURS AND TEMPORARY TRAFFIC CONTROL SHOWN IS CONCEPTUAL. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY TRAFFIC CONTROL REQUIRED FOR MULTIPLE PHASES OF CONSTRUCTION NECESSARY TO ACCOMMODATE ALL ASPECTS OF ROADWAY AND RAILROAD CONSTRUCTION.

2. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINMENT OF TEMPORARY TRAFFIC CONTROL (TTC) PERMITS PER CONDITIONS SET FORTH IN THE CITY OF MESA TEMPORARY TRAFFIC CONTROL MANUAL (TTCM). TRAFFIC CONTROL PLANS (TCP) SHALL COMPLY WITH SECTIONS 1.5 OF THE CITY OF MESA TTCM. ROAD CLOSURES REQUIRE A MINIMUM LEAD TIME OF 30 CALENDAR DAYS FOR CITY OF MESA REVIEW AND COORDINATION.

3. CONTRACTOR SHALL COMPLY WITH THE TOWN OF QUEEN CREEK ROADWAY SIGNING AND PAVEMENT MARKING GUIDELINES DOCUMENT, SPECIFICATIONS, AND REQUIREMENTS. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH THE TOWN OF QUEEN CREEK, INCLUDING OBTAINMENT OF FULL ROAD CLOSURE PERMITS, NOTIFICATIONS, SCHEDULING, HAUL ROADS, AND INSPECTIONS. REQUESTS FOR FULL ROAD CLOSURES SHALL BE SUBMITTED TO THE TOWN OF QUEEN CREEK AT LEAST 21 DAYS PRIOR TO PROPOSED CLOSURES.

LEGEND

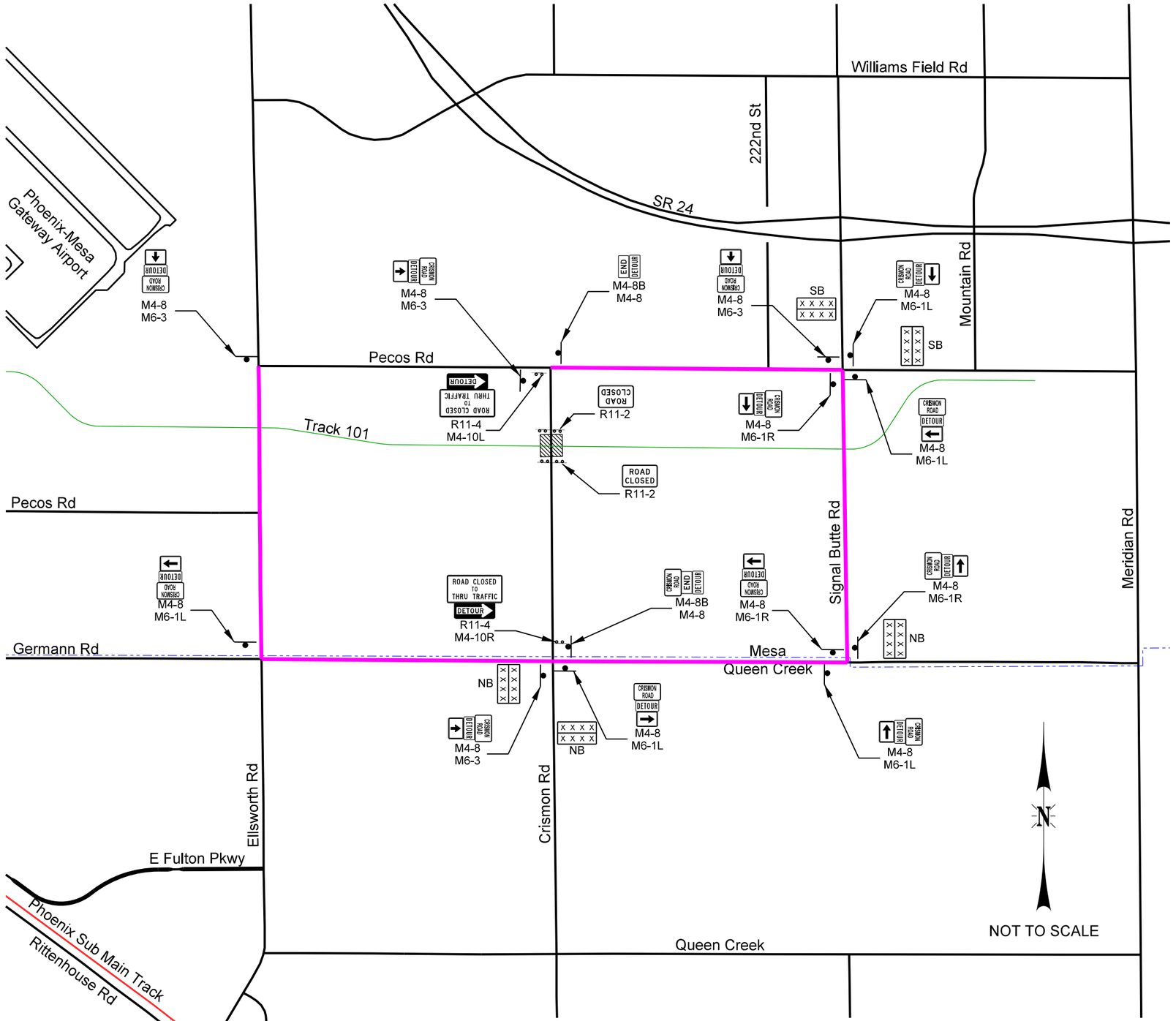
- VARIABLE MESSAGE BOARD (VMS)
- CONSTRUCTION
- TYPE III BARRICADE
- SIGN
- DETOUR
- EXISTING TRACK
- PROPOSED TRACK

MESSAGE: PHASE I
LINE 1: CRISMON
LINE 2: ROAD (NB/SB)
LINE 3: CLOSED

MESSAGE: PHASE II
LINE 1: XX/XX
LINE 2: TO
LINE 3: XX/XX
(XX/XX INDICATES THE DATES OF CLOSURE)

LIST OF TRAFFIC CONTROL DEVICES*			
ITEM	MUTCD DEVICE NO.	SIZE	QTY
ROAD CLOSED	R11-2	48" X 30"	2
ROAD CLOSED TO THRU TRAFFIC	R11-4	60" X 30"	2
'CRISMON ROAD' PLAQUE			11
STRAIGHT ARROW AUXILIARY	M6-3	21" X 15"	3
LEFT ARROW AUXILIARY	M6-1L	21" X 15"	4
RIGHT ARROW AUXILIARY	M6-1R	21" X 15"	3
DETOUR (LEFT ARROW)	M4-10L	48" X 18"	1
DETOUR (RIGHT ARROW)	M4-10R	48" X 18"	1
DETOUR	M4-8	24" X 12"	12
END	M4-8B	24" X 12"	2
TYPE III BARRICADE		60" X 48"	6
VARIABLE MESSAGE BOARDS			5

*NOTE: TEMPORARY TRAFFIC CONTROL QUANTITIES ARE SHOWN FOR INFORMATION ONLY. PAYMENT FOR THESE ITEMS SHALL BE MADE UNDER THE LUMP SUM LINE ITEM "TRFC, TRAFFIC CONTROL".



olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

DRAWN BY:	DMJ
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	PH028 of 029

UNION PACIFIC RAILROAD — Sheet 239 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CONSTRUCTION PHASING - CRISMON CROSSING DETOUR

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04 Phasing\P_PH026_14 Crismon Detour_200927.dgn
Default
3/9/2026

DETOUR NOTES

1. DETOURS AND TEMPORARY TRAFFIC CONTROL SHOWN IS CONCEPTUAL. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY TRAFFIC CONTROL REQUIRED FOR MULTIPLE PHASES OF CONSTRUCTION NECESSARY TO ACCOMMODATE ALL ASPECTS OF ROADWAY AND RAILROAD CONSTRUCTION.

2. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINMENT OF TEMPORARY TRAFFIC CONTROL (TTC) PERMITS PER CONDITIONS SET FORTH IN THE CITY OF MESA TEMPORARY TRAFFIC CONTROL MANUAL (TTCM). TRAFFIC CONTROL PLANS (TCP) SHALL COMPLY WITH SECTIONS 1.5 OF THE CITY OF MESA TTCM. ROAD CLOSURES REQUIRE A MINIMUM LEAD TIME OF 30 CALENDAR DAYS FOR CITY OF MESA REVIEW AND COORDINATION.

3. CONTRACTOR SHALL COMPLY WITH THE TOWN OF QUEEN CREEK ROADWAY SIGNING AND PAVEMENT MARKING GUIDELINES DOCUMENT, SPECIFICATIONS, AND REQUIREMENTS. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH THE TOWN OF QUEEN CREEK, INCLUDING OBTAINMENT OF FULL ROAD CLOSURE PERMITS, NOTIFICATIONS, SCHEDULING, HAUL ROADS, AND INSPECTIONS. REQUESTS FOR FULL ROAD CLOSURES SHALL BE SUBMITTED TO THE TOWN OF QUEEN CREEK AT LEAST 21 DAYS PRIOR TO PROPOSED CLOSURES.

LEGEND

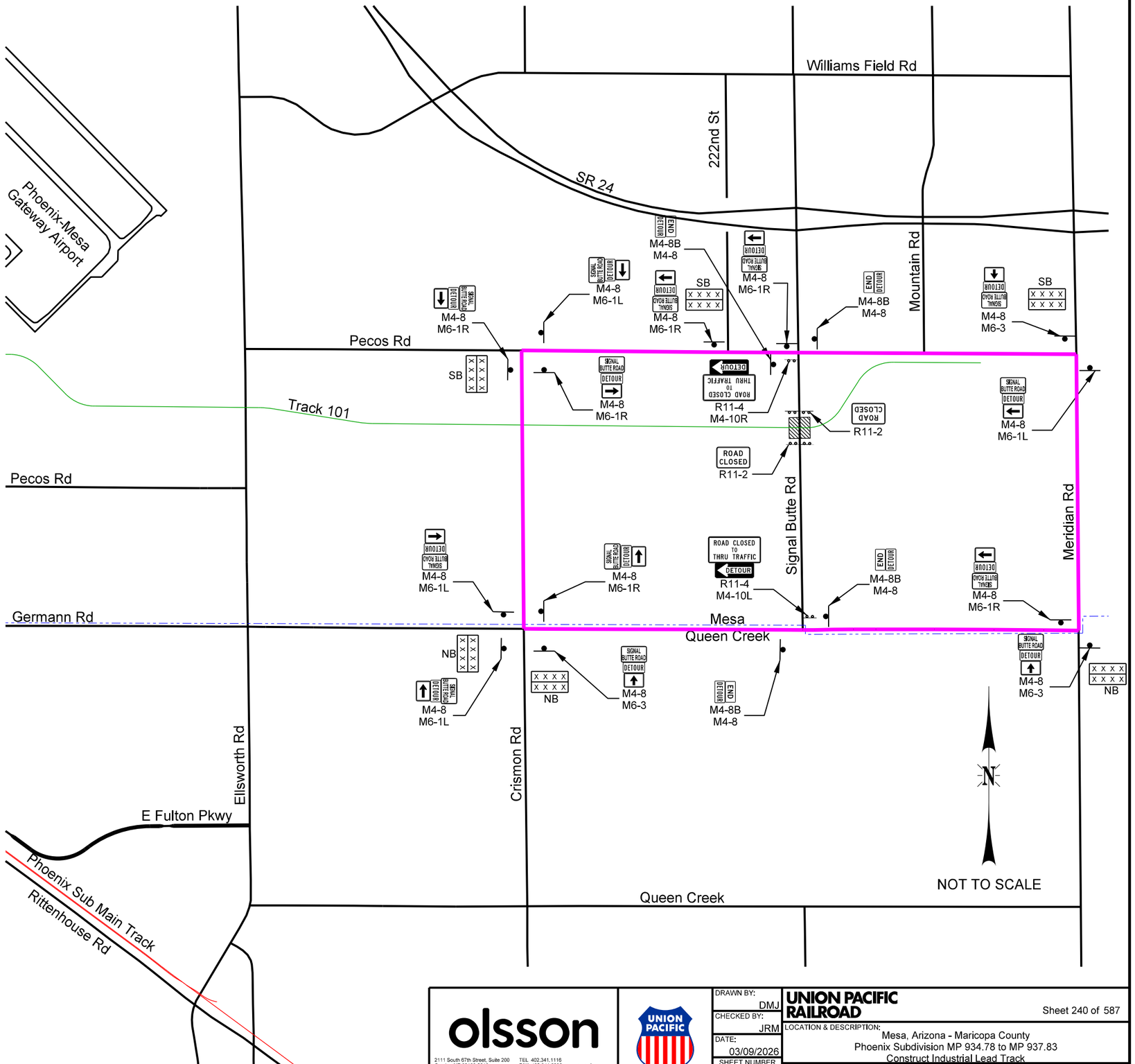
- VARIABLE MESSAGE BOARD (VMS)
- CONSTRUCTION
- TYPE III BARRICADE
- SIGN
- DETOUR
- EXISTING TRACK
- PROPOSED TRACK

MESSAGE: PHASE I
LINE 1: SIGNAL
LINE 2: BUTTE RD (NB/SB)
LINE 3: CLOSED

MESSAGE: PHASE II
LINE 1: XX/XX
LINE 2: TO
LINE 3: XX/XX
(XX/XX INDICATES THE DATES OF CLOSURE)

LIST OF TRAFFIC CONTROL DEVICES*			
ITEM	MUTCD DEVICE NO.	SIZE	QTY
ROAD CLOSED	R11-2	48" X 30"	2
ROAD CLOSED TO THRU TRAFFIC	R11-4	60" X 30"	2
'SOSSAMAN ROAD' PLAQUE			13
STRAIGHT ARROW AUXILIARY	M6-3	21" X 15"	3
LEFT ARROW AUXILIARY	M6-1L	21" X 15"	4
RIGHT ARROW AUXILIARY	M6-1R	21" X 15"	6
DETOUR (LEFT ARROW)	M4-10L	48" X 18"	1
DETOUR (RIGHT ARROW)	M4-10R	48" X 18"	1
DETOUR	M4-8	24" X 12"	17
END	M4-8B	24" X 12"	4
TYPE III BARRICADE		60" X 48"	6
VARIABLE MESSAGE BOARDS			6

* NOTE: TEMPORARY TRAFFIC CONTROL QUANTITIES ARE SHOWN FOR INFORMATION ONLY. PAYMENT FOR THESE ITEMS SHALL BE MADE UNDER THE LUMP SUM LINE ITEM "TRFC, TRAFFIC CONTROL".



olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: PH029 of 029

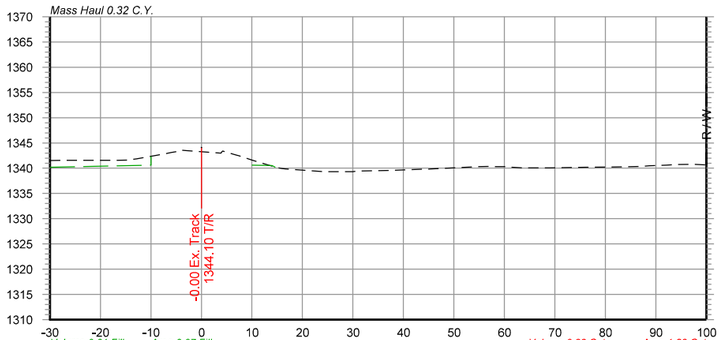
UNION PACIFIC RAILROAD
Sheet 240 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
CONSTRUCTION PHASING - SIGNAL BUTTE CROSSING DETOUR

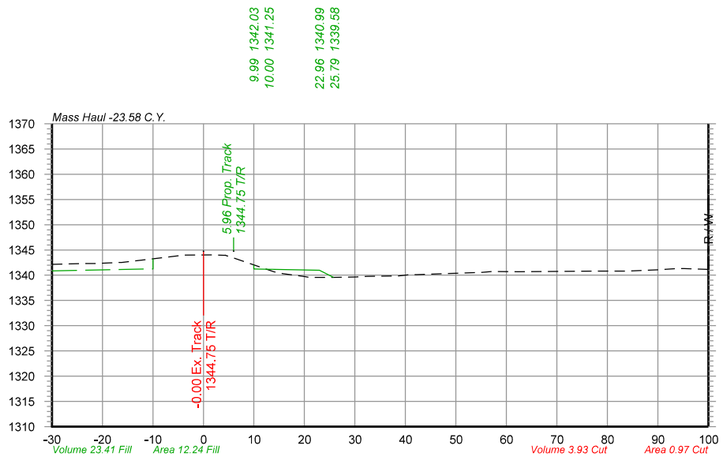
Color_table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04 Phasing\P_PH027_15 Signal Butte Detour_200927.dgn
Default
3/9/2026

10.00 1340.60
14.00 1340.52
14.65 1340.20



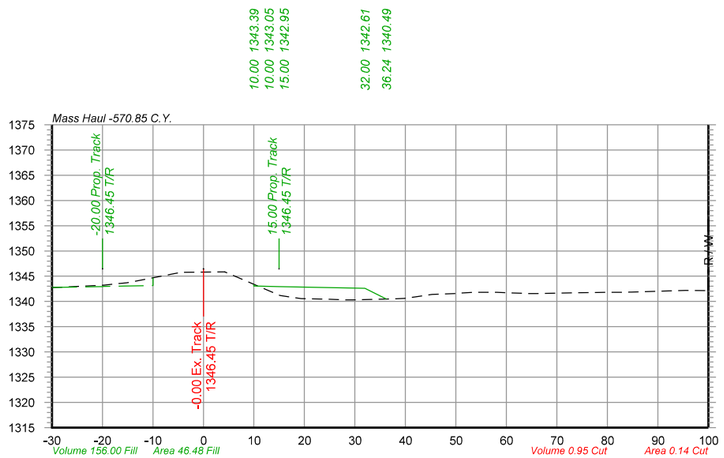
1482+10

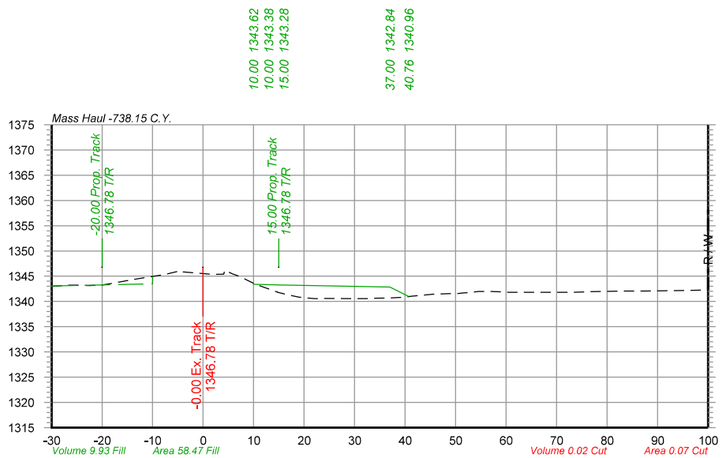
| | | |

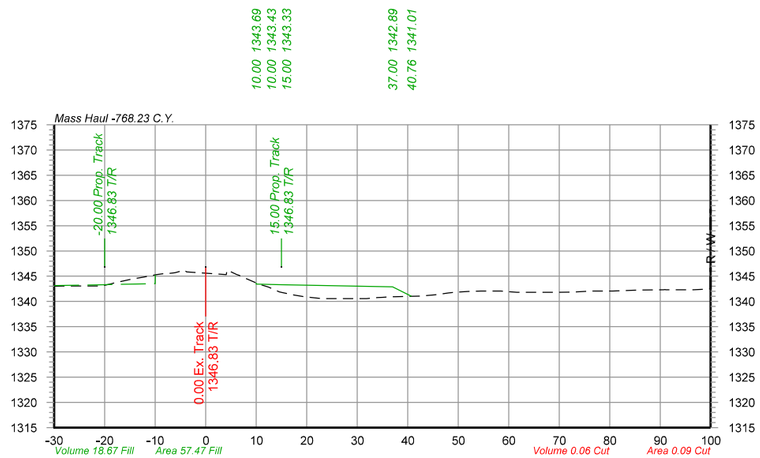

Mass Haul -23.58 C.Y.
9.99 1342.03
10.00 1341.25
22.96 1340.99
25.79 1339.58
0.00 Ex. Track
1344.75 T/R
5.96 Prop. Track
1344.75 T/R
R/W
Volume 23.41 Fill
Area 12.24 Fill
Volume 3.93 Cut
Area 0.97 Cut

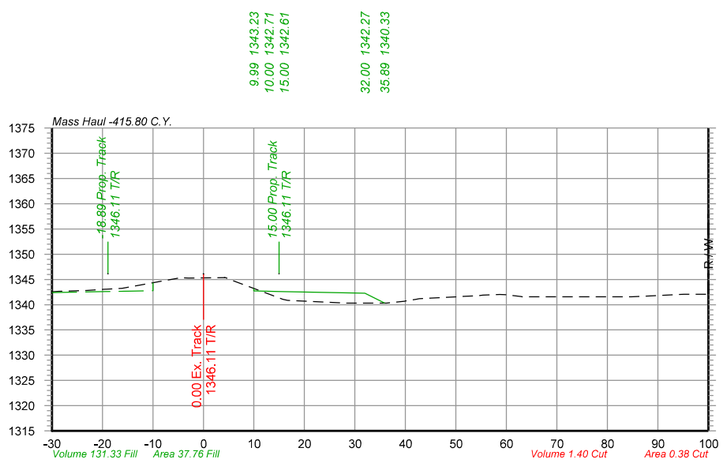
1484+00

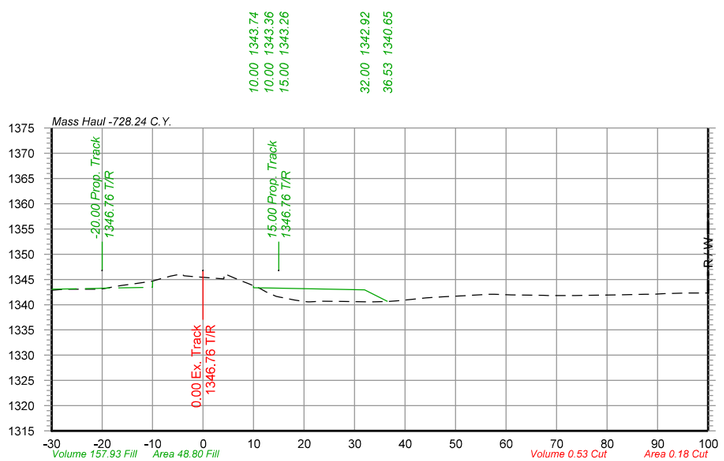
| | | |

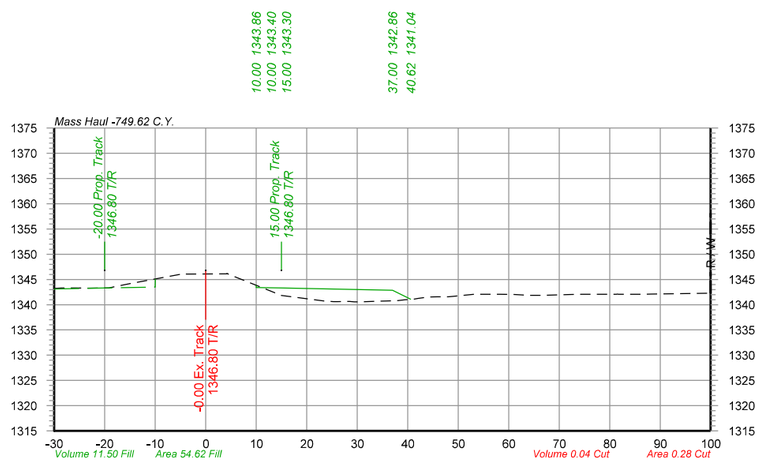

Mass Haul -570.85 C.Y.
10.00 1343.39
10.00 1343.05
15.00 1342.95
32.00 1342.61
36.24 1340.49
20.00 Prop. Track
1346.45 T/R
15.00 Prop. Track
1346.45 T/R
0.00 Ex. Track
1346.45 T/R
R.I.W.
Volume 156.00 Fill
Area 46.48 Fill
Volume 0.95 Cut
Area 0.14 Cut
1489+00


Mass Haul -738.15 C.Y.
10.00 1343.62
10.00 1343.38
15.00 1343.28
37.00 1342.84
40.76 1340.96
20.00 Prop. Track
1346.78 T/R
15.00 Prop. Track
1346.78 T/R
0.00 Ex. Track
1346.78 T/R
R.I.W.
Volume 9.93 Fill
Area 58.47 Fill
Volume 0.02 Cut
Area 0.07 Cut
1489+95


Mass Haul -768.23 C.Y.
10.00 1343.69
10.00 1343.43
15.00 1343.33
37.00 1342.89
40.76 1341.01
20.00 Prop. Track
1346.83 T/R
15.00 Prop. Track
1346.83 T/R
0.00 Ex. Track
1346.83 T/R
R.I.W.
Volume 18.67 Fill
Area 57.47 Fill
Volume 0.06 Cut
Area 0.09 Cut
1490+09


Mass Haul -415.80 C.Y.
9.99 1343.23
10.00 1342.71
15.00 1342.61
32.00 1342.27
35.89 1340.33
18.89 Prop. Track
1346.11 T/R
15.00 Prop. Track
1346.11 T/R
0.00 Ex. Track
1346.11 T/R
R.I.W.
Volume 131.33 Fill
Area 37.76 Fill
Volume 1.40 Cut
Area 0.38 Cut
1488+00

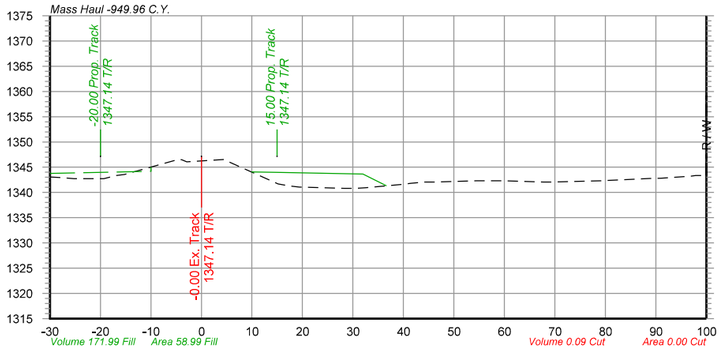

Mass Haul -728.24 C.Y.
10.00 1343.74
10.00 1343.36
15.00 1343.26
32.00 1342.92
36.53 1340.65
20.00 Prop. Track
1346.76 T/R
15.00 Prop. Track
1346.76 T/R
0.00 Ex. Track
1346.76 T/R
R.I.W.
Volume 157.93 Fill
Area 48.80 Fill
Volume 0.53 Cut
Area 0.18 Cut
1489+90


Mass Haul -749.62 C.Y.
10.00 1343.86
10.00 1343.40
15.00 1343.30
37.00 1342.86
40.62 1341.04
20.00 Prop. Track
1346.80 T/R
15.00 Prop. Track
1346.80 T/R
0.00 Ex. Track
1346.80 T/R
R.I.W.
Volume 11.50 Fill
Area 54.62 Fill
Volume 0.04 Cut
Area 0.28 Cut
1490+00

| | | |

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

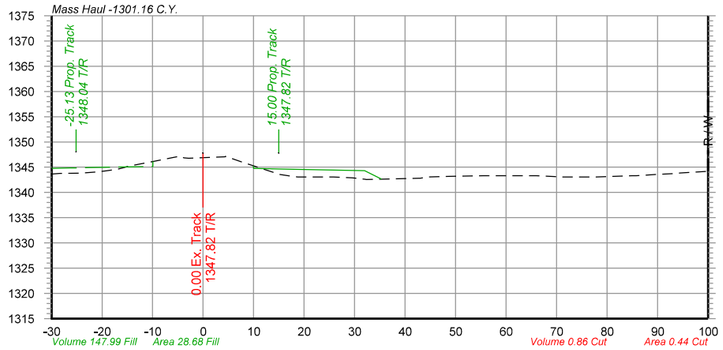
9.89 1344.07
10.00 1344.07
15.00 1343.97
32.00 1343.63
36.65 1341.31



1491+00

-30.00	1343.07
-27.70	1342.93
-25.24	1342.74
-19.81	1342.74
-16.86	1343.34
-5.22	1346.34
-2.89	1346.04
4.39	1346.52
15.21	1341.69
17.62	1341.29
21.19	1341.01
24.08	1340.94
28.27	1340.83
30.55	1340.83
32.57	1340.94
39.34	1341.55
41.50	1341.83
44.18	1342.07
46.21	1342.08
49.00	1342.15
54.50	1342.33
57.27	1342.33
59.87	1342.33
63.88	1342.20
67.73	1342.08
77.36	1342.28
79.89	1342.37
84.50	1342.58
88.79	1342.76
90.98	1342.83
96.98	1343.24
100.00	1343.34

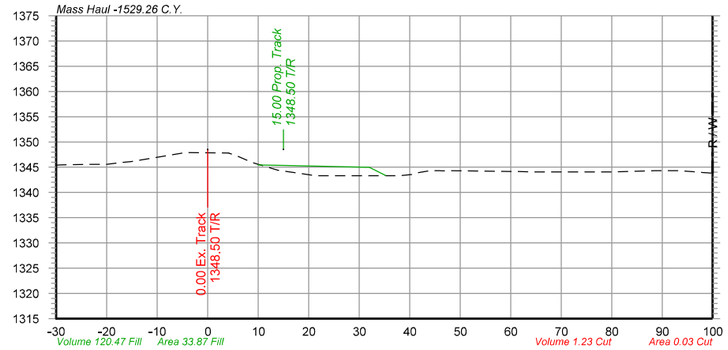
9.99 1345.28
10.00 1344.75
15.00 1344.65
32.00 1344.31
35.33 1342.65



1493+00

-30.00	1343.65
-24.83	1343.83
-21.02	1344.08
-16.92	1344.62
-14.80	1345.19
-9.38	1346.23
-5.84	1346.96
-3.80	1346.85
4.38	1347.06
7.67	1346.04
15.21	1343.56
17.40	1343.22
25.82	1343.08
29.55	1342.90
32.17	1342.59
35.94	1342.66
42.72	1342.82
48.86	1343.20
55.56	1343.32
59.14	1343.33
65.33	1343.33
71.26	1343.08
76.08	1343.07
84.96	1343.30
87.20	1343.41
89.64	1343.58
93.12	1343.75
95.16	1343.88
97.98	1344.08
100.00	1344.20

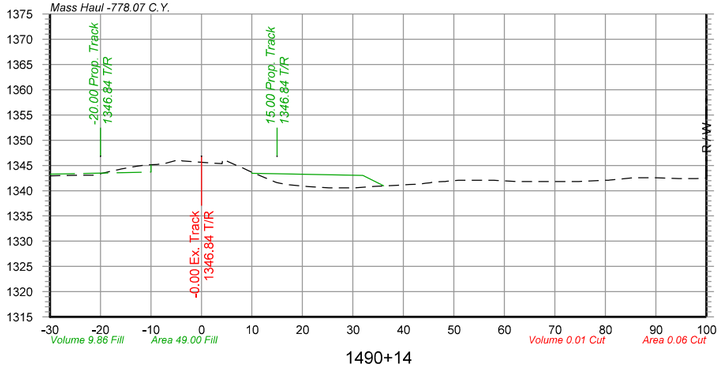
10.00 1345.57
10.00 1345.44
15.00 1345.34
32.00 1345.00
35.34 1343.33



1495+00

-30.00	1345.41
-23.30	1345.58
-20.94	1345.57
-17.04	1345.93
-14.91	1346.16
-4.92	1347.80
3.79	1347.82
8.78	1345.94
13.90	1344.39
18.58	1343.74
21.34	1343.33
23.48	1343.33
28.42	1343.33
28.50	1343.33
32.04	1343.33
34.97	1343.33
37.12	1343.33
39.24	1343.42
44.02	1344.33
46.63	1344.28
51.38	1344.28
60.38	1344.15
64.33	1344.08
67.79	1344.08
69.80	1344.08
71.96	1344.07
76.45	1344.08
80.19	1344.08
88.63	1344.30
91.38	1344.33
93.66	1344.33
96.82	1344.08
98.82	1343.90

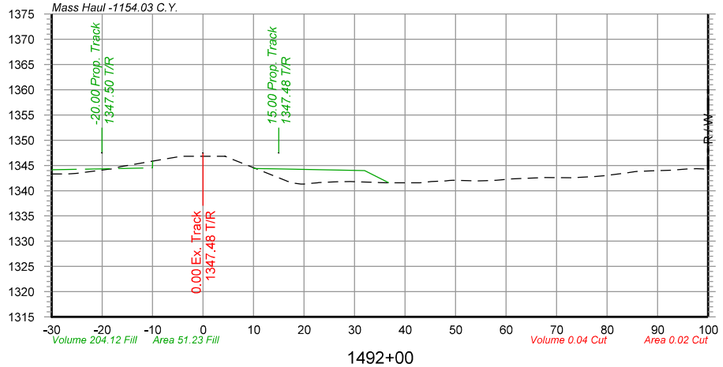
10.00 1343.66
10.00 1343.44
15.00 1343.34
32.00 1343.00
36.14 1340.93



1490+14

-30.00	1342.94
-24.00	1343.08
-21.47	1343.08
-18.96	1343.61
-16.34	1344.19
-13.00	1344.83
-11.00	1345.11
-8.84	1345.20
-4.26	1346.19
2.59	1345.46
7.18	1344.88
9.36	1343.93
12.41	1342.64
14.68	1341.69
17.15	1341.18
21.11	1340.80
25.22	1340.58
29.92	1340.58
34.33	1340.83
38.69	1341.08
41.18	1341.24
43.29	1341.33
45.29	1341.58
47.95	1341.83
50.92	1342.08
54.05	1342.08
56.82	1342.08
59.48	1341.99
62.41	1341.82
65.76	1341.83
68.42	1341.83
70.73	1341.83
74.77	1341.83
79.95	1342.05
83.13	1342.33
85.13	1342.53
89.59	1342.58
94.54	1342.38
97.96	1342.39
100.00	1342.46

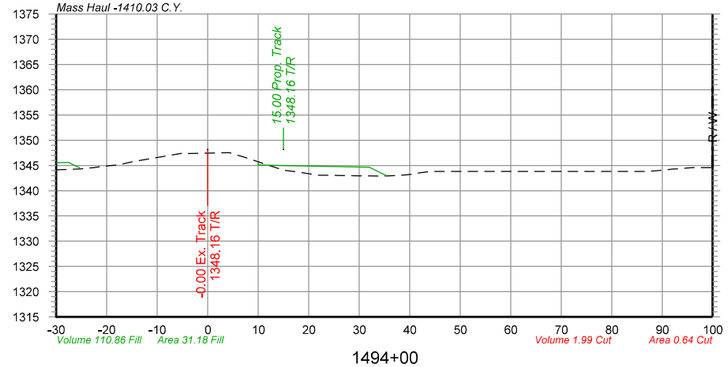
10.00 1344.55
10.00 1344.41
15.00 1344.31
32.00 1343.97
36.79 1341.58



1492+00

-30.00	1343.33
-26.87	1343.33
-18.56	1344.26
-16.21	1344.79
-9.01	1346.03
-5.05	1346.68
4.31	1346.81
10.08	1344.52
16.11	1342.09
19.38	1341.33
22.68	1341.58
26.60	1341.78
29.16	1341.81
31.39	1341.73
34.42	1341.63
36.44	1341.58
39.89	1341.58
42.94	1341.57
45.22	1341.83
48.06	1341.93
54.36	1341.95
58.08	1342.08
60.66	1342.33
63.61	1342.46
66.79	1342.58
73.00	1342.58
77.76	1342.83
83.89	1343.53
85.86	1343.83
88.99	1343.95
92.99	1344.08
96.07	1344.33
98.38	1344.33

9.99 1345.72
10.00 1345.09
15.00 1344.99
32.00 1344.65
35.47 1342.92



1494+00

-30.00	1344.13
-25.10	1344.33
-22.56	1344.58
-19.58	1344.93
-17.53	1345.16
-15.08	1345.70
-5.14	1347.42
3.96	1347.51
7.19	1346.64
14.51	1344.24
17.67	1343.74
21.89	1343.08
30.14	1342.96
34.06	1342.90
36.88	1342.99
38.90	1343.12
41.54	1343.47
44.08	1343.83
47.65	1343.83
50.67	1343.83
53.56	1343.83
56.16	1343.83
60.26	1343.83
67.72	1343.83
84.49	1343.83
86.56	1343.83
89.14	1343.99
92.34	1344.30
94.82	1344.47
99.11	1344.58

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

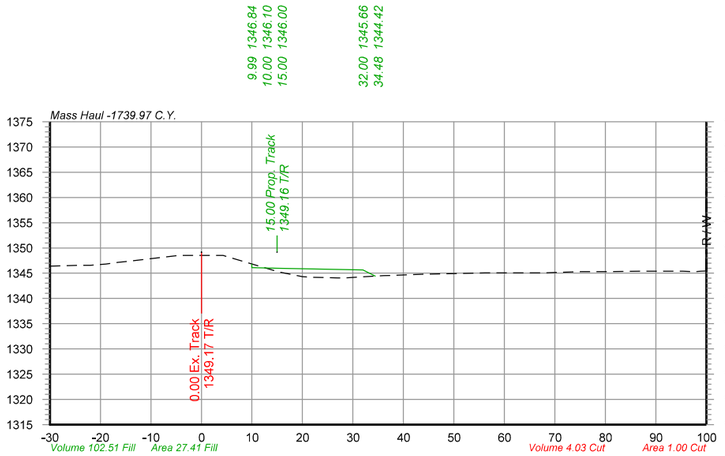
DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X004 of 195

UNION PACIFIC RAILROAD

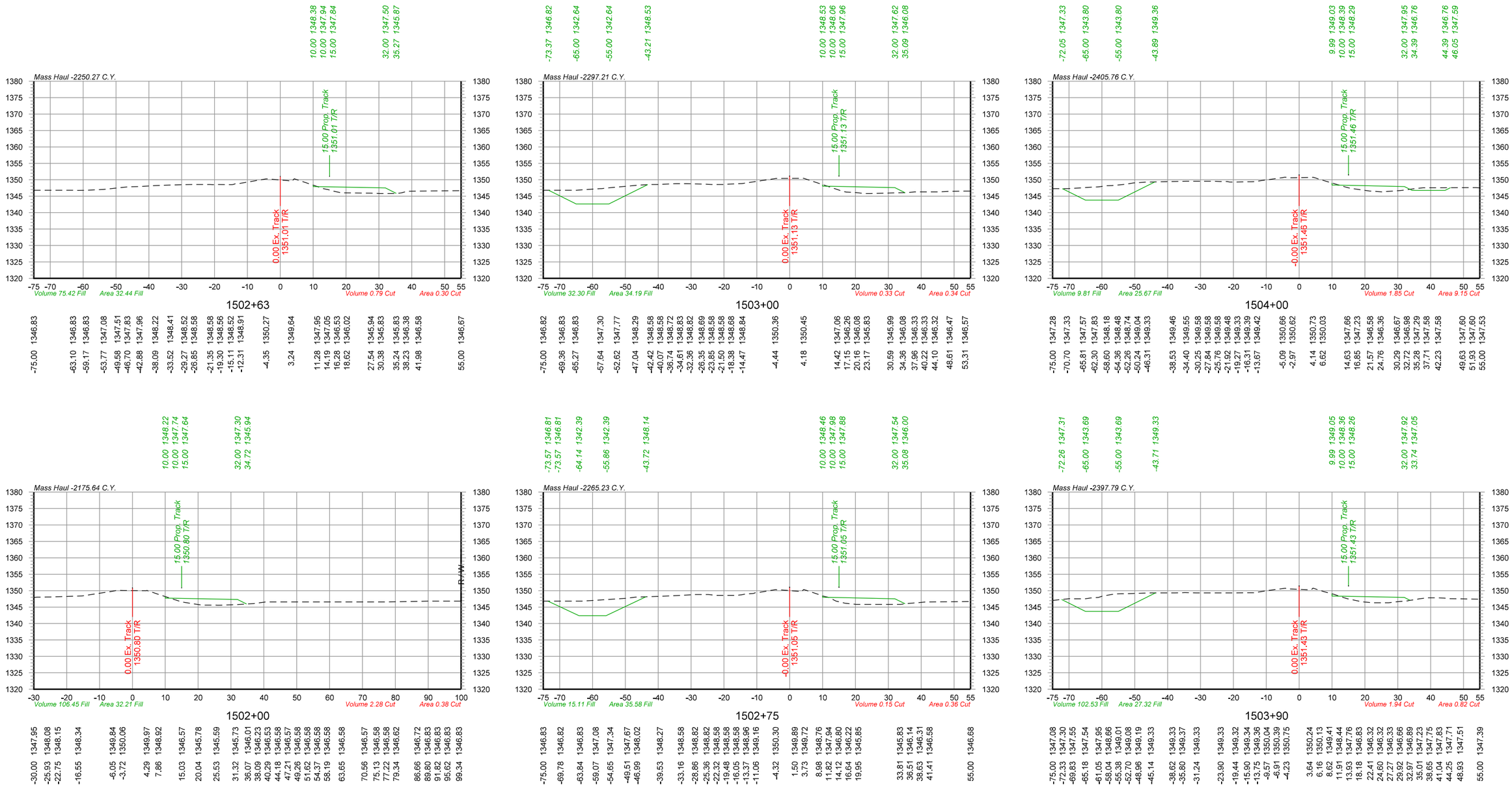
Sheet 244 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
MAIN TRACK CROSS SECTIONS STA.1490+14 TO STA.1495+00


Mass Haul -1739.97 C.Y.
9.99 1346.84
10.00 1346.10
15.00 1346.00
32.00 1345.66
34.48 1344.42
15.00 Prop. Track
1349.16 T/R
0.00 Ex. Track
1349.17 T/R
R-I-W
Volume 102.51 Fill
Area 27.41 Fill
Volume 4.03 Cut
Area 1.00 Cut
1497+00

| | | |



Color table: K:\Bentley\Workspace\V8\projects\Clients\UPRR_Track\UPRR_Track_V8\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

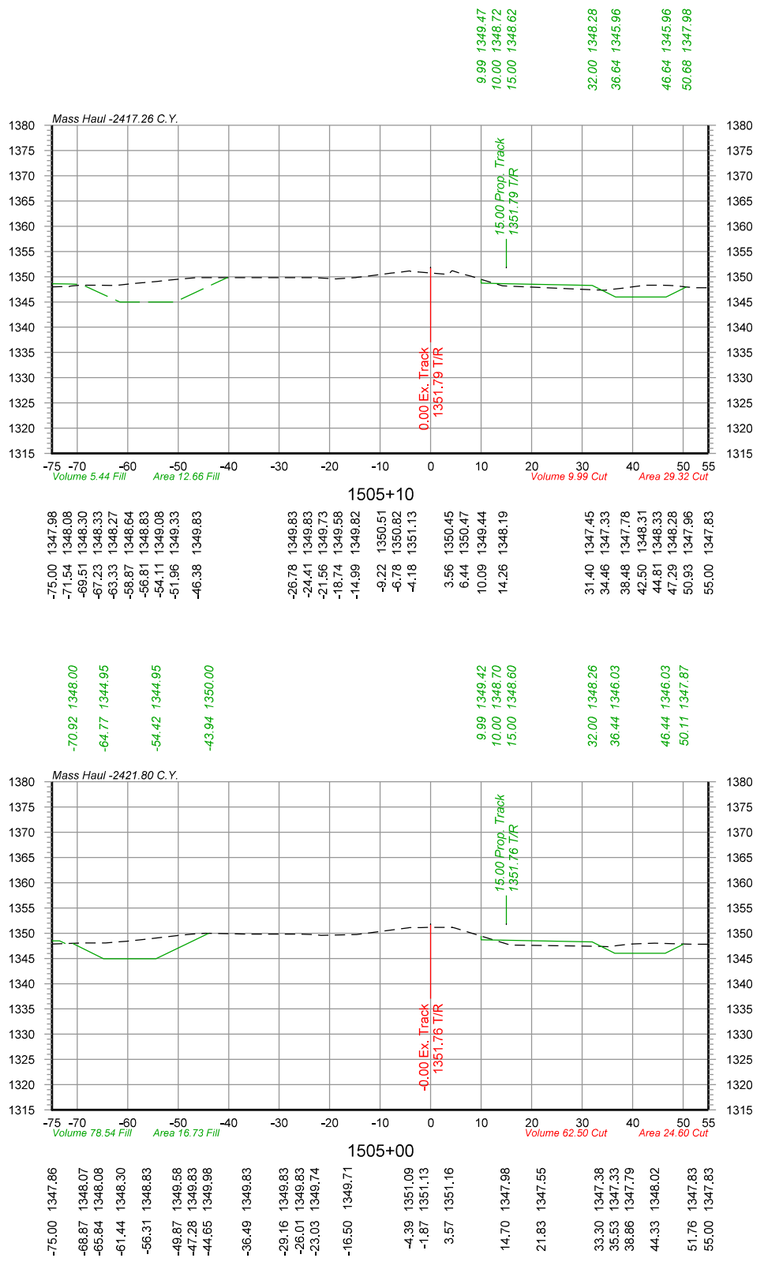
DRAWN BY:	DMJ
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	X006 of 195

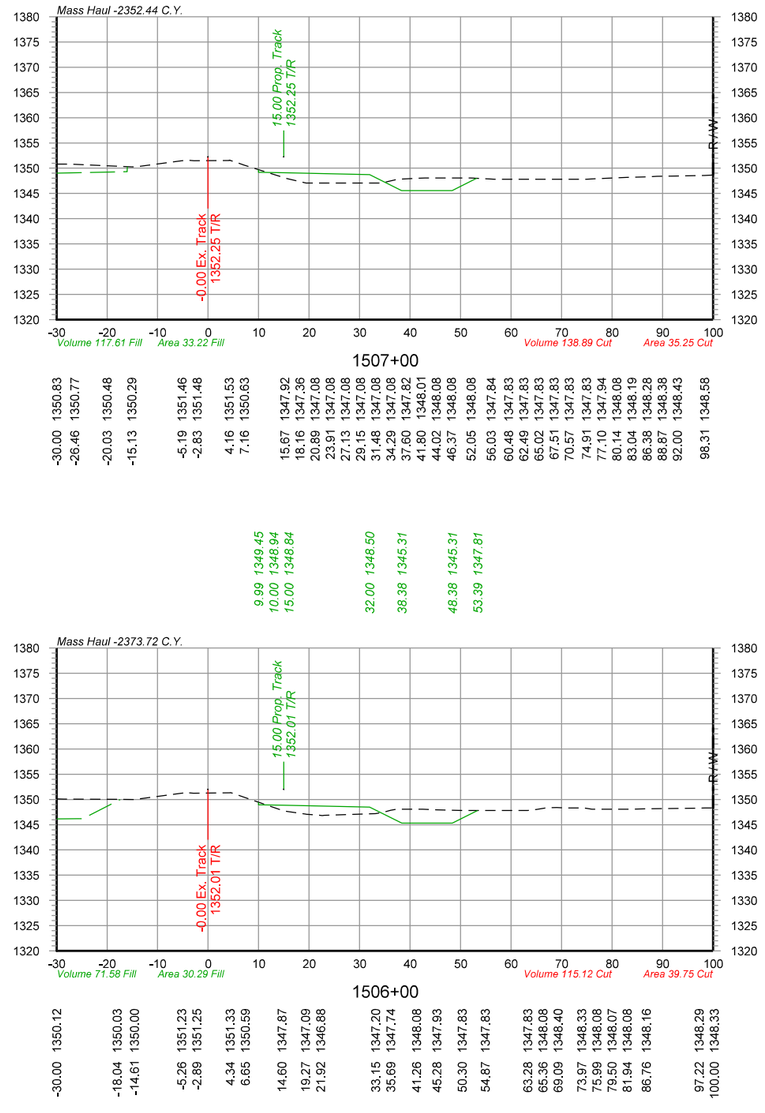
UNION PACIFIC RAILROAD

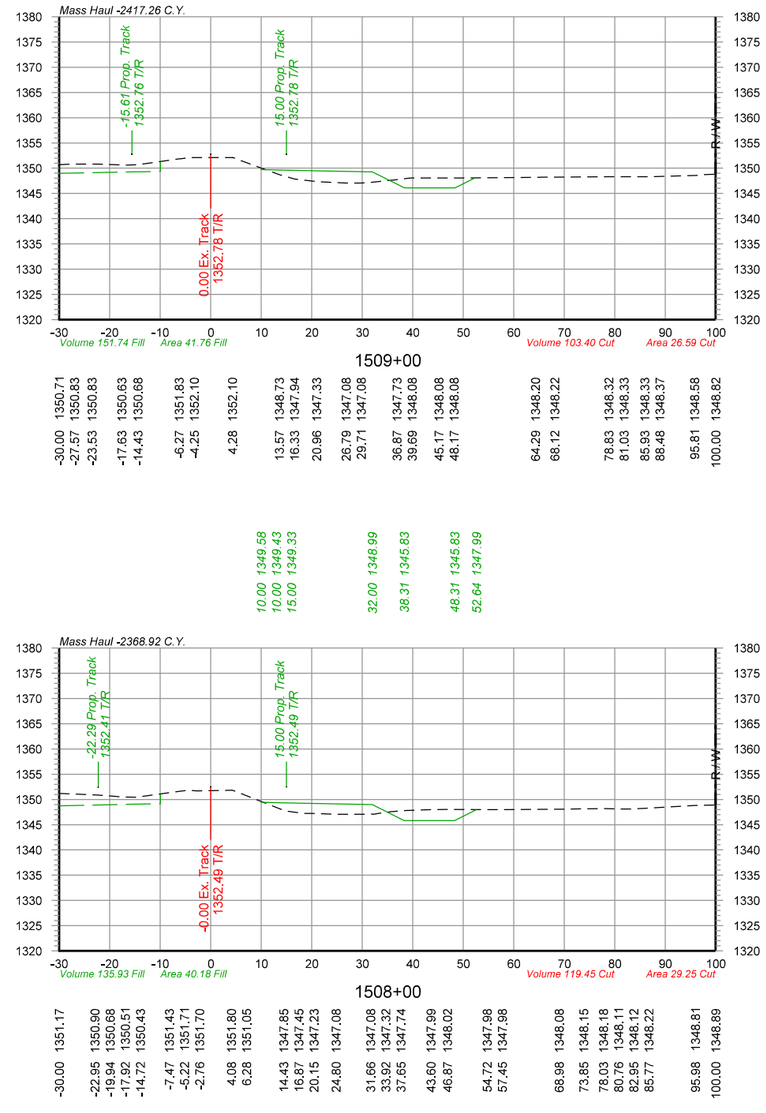
Sheet 246 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
MAIN TRACK CROSS SECTIONS STA.1502+00 TO STA.1504+00







Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

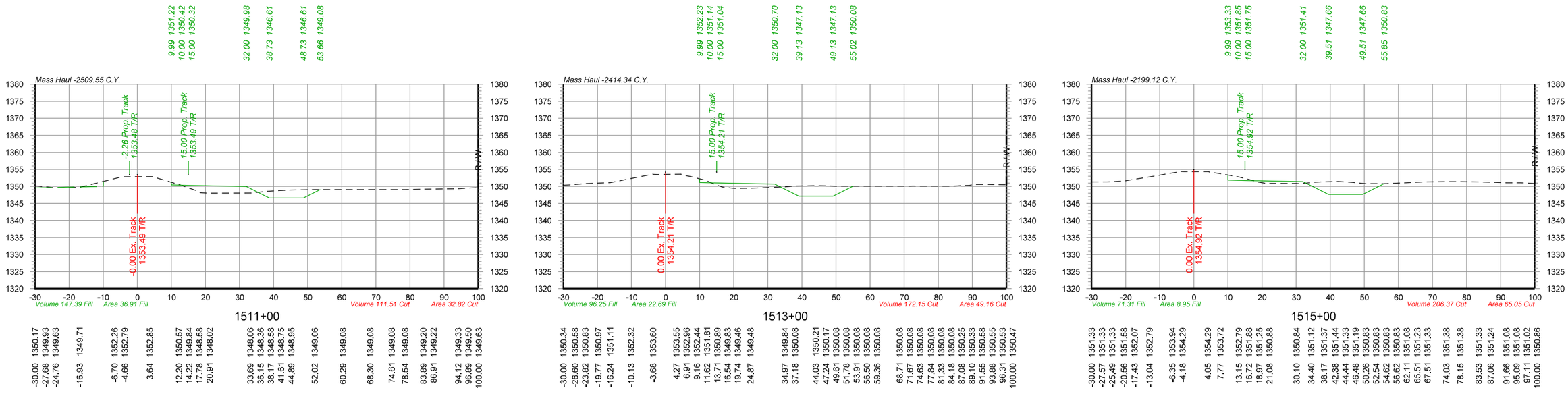
DRAWN BY:	DMJ
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	X007 of 195

UNION PACIFIC RAILROAD

Sheet 247 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
MAIN TRACK CROSS SECTIONS STA.1505+00 TO STA.1509+00



Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

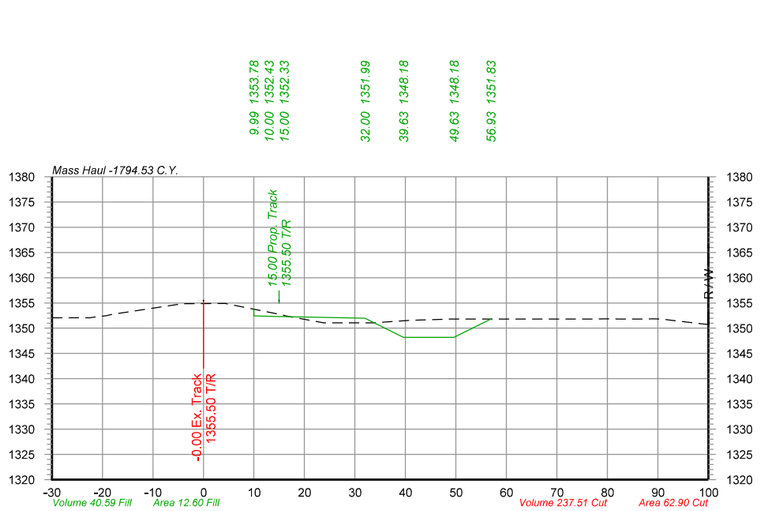
DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X008 of 195

UNION PACIFIC RAILROAD

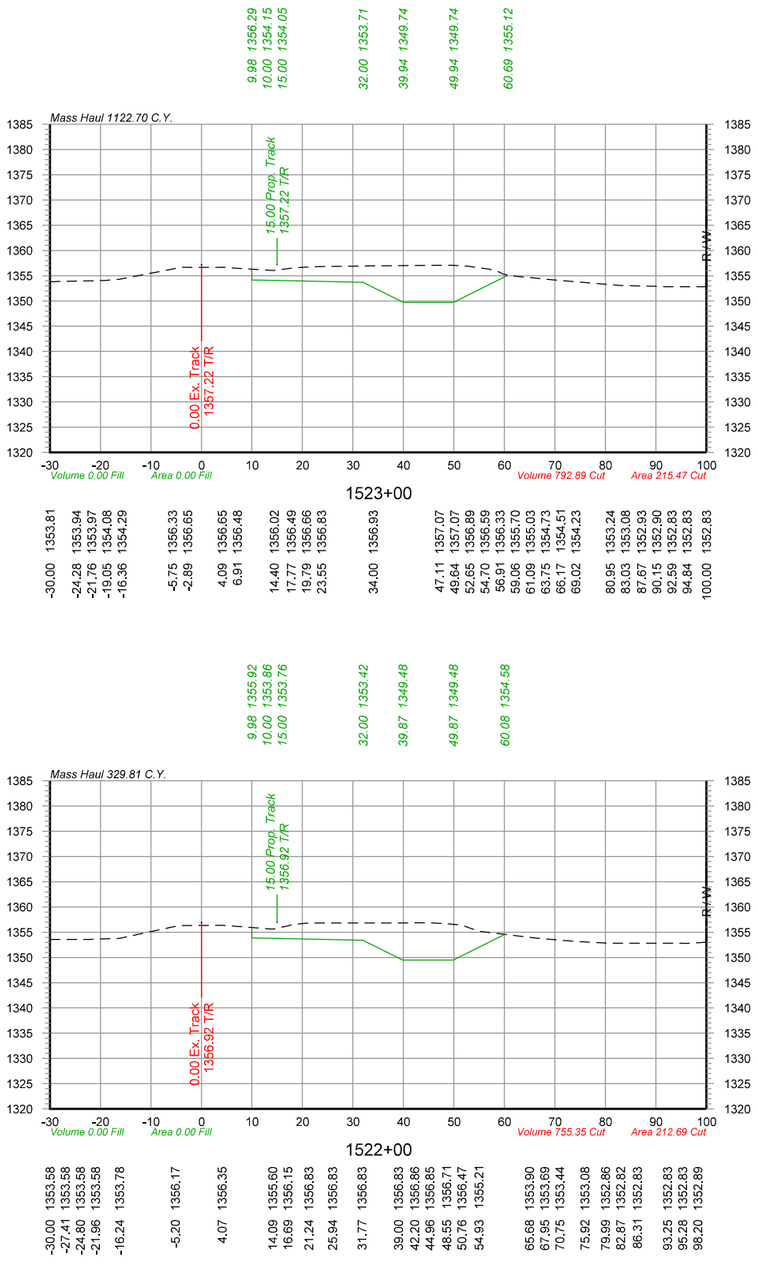
Sheet 248 of 587

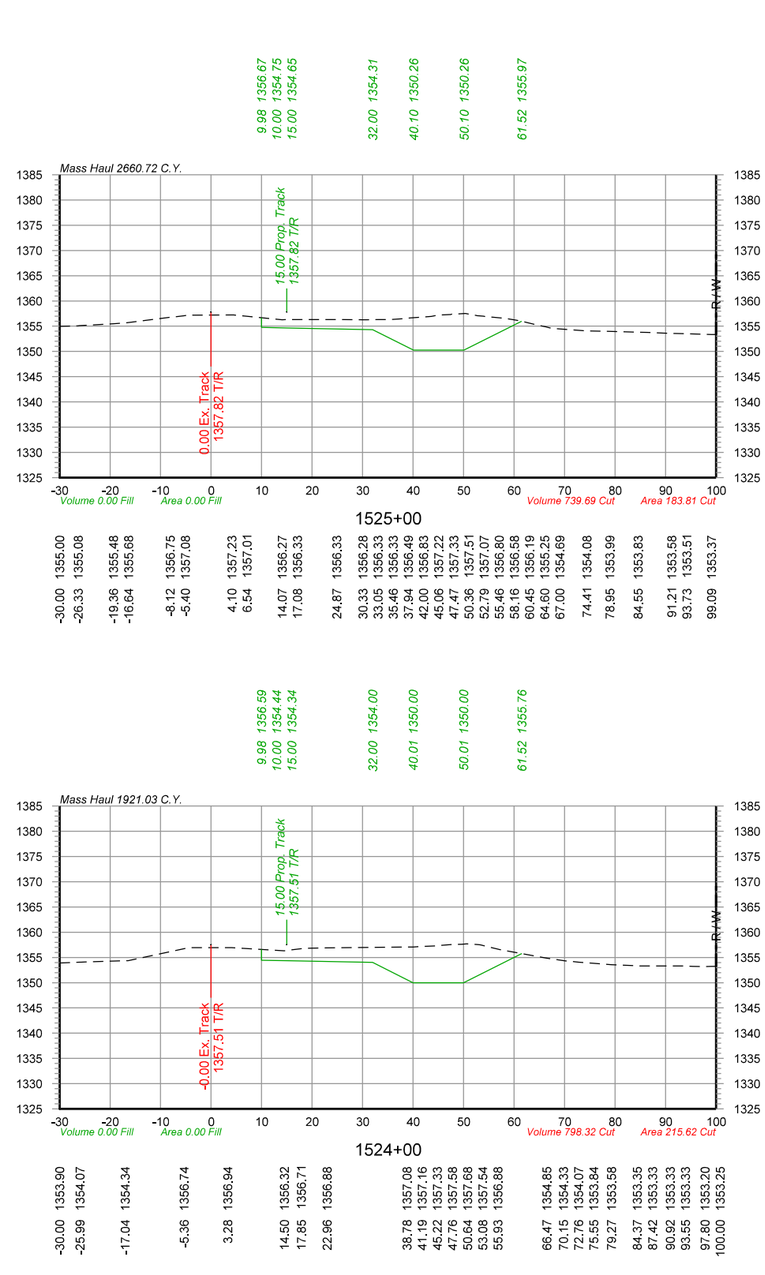
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

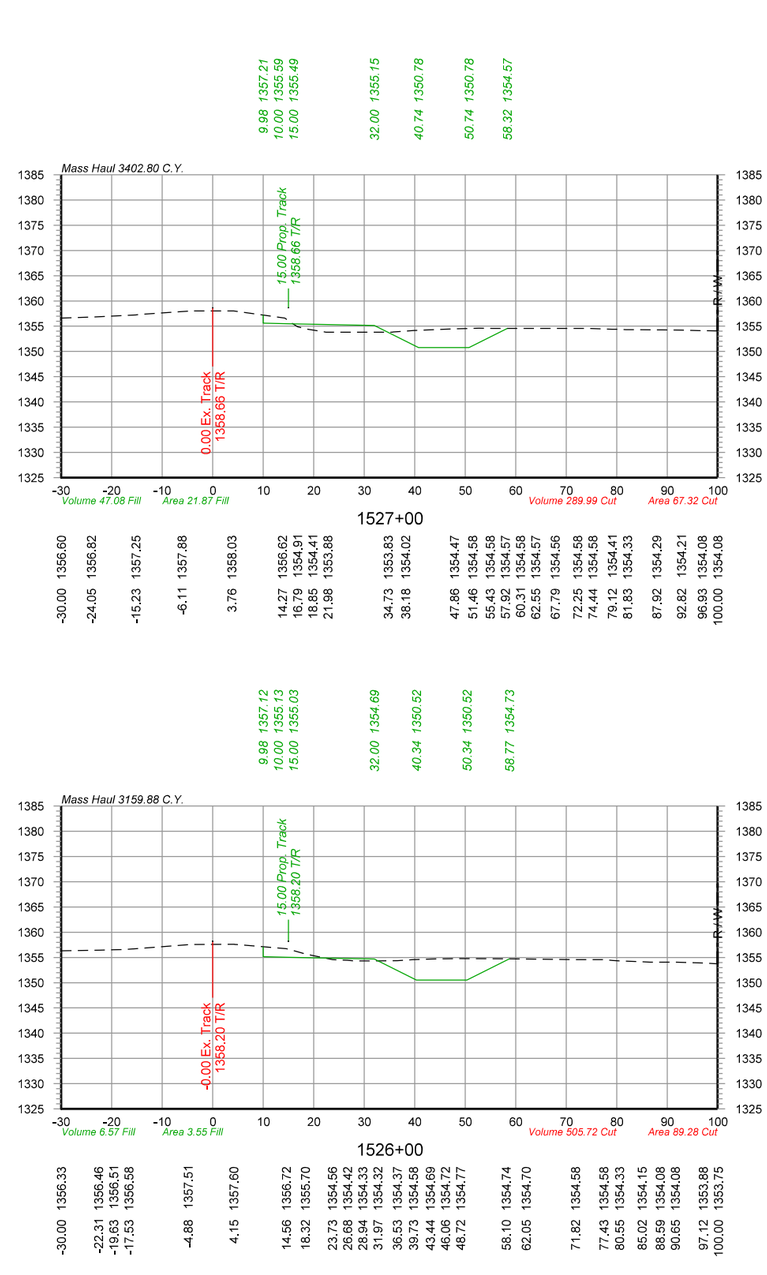
SHEET TITLE:
MAIN TRACK CROSS SECTIONS STA.1510+00 TO STA.1515+00


9.99 1353.78
10.00 1352.43
15.00 1352.33
32.00 1351.99
39.63 1348.18
49.63 1348.18
56.93 1351.83
Mass Haul -1794.53 C.Y.
15.00 Prop. Track
1355.50 T/R
0.00 Ex. Track
1355.50 T/R
R/W
Volume 40.59 Fill
Area 12.60 Fill
Volume 237.51 Cut
Area 62.90 Cut
1517+00

| | | |







olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

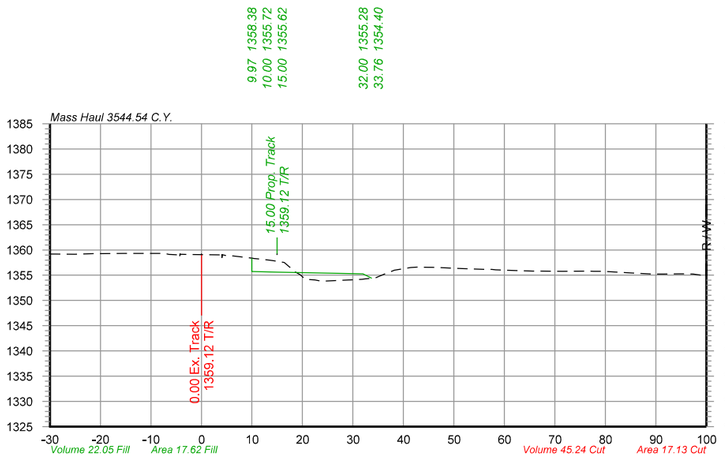
DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X010 of 195

UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
MAIN TRACK CROSS SECTIONS STA.1522+00 TO STA.1527+00

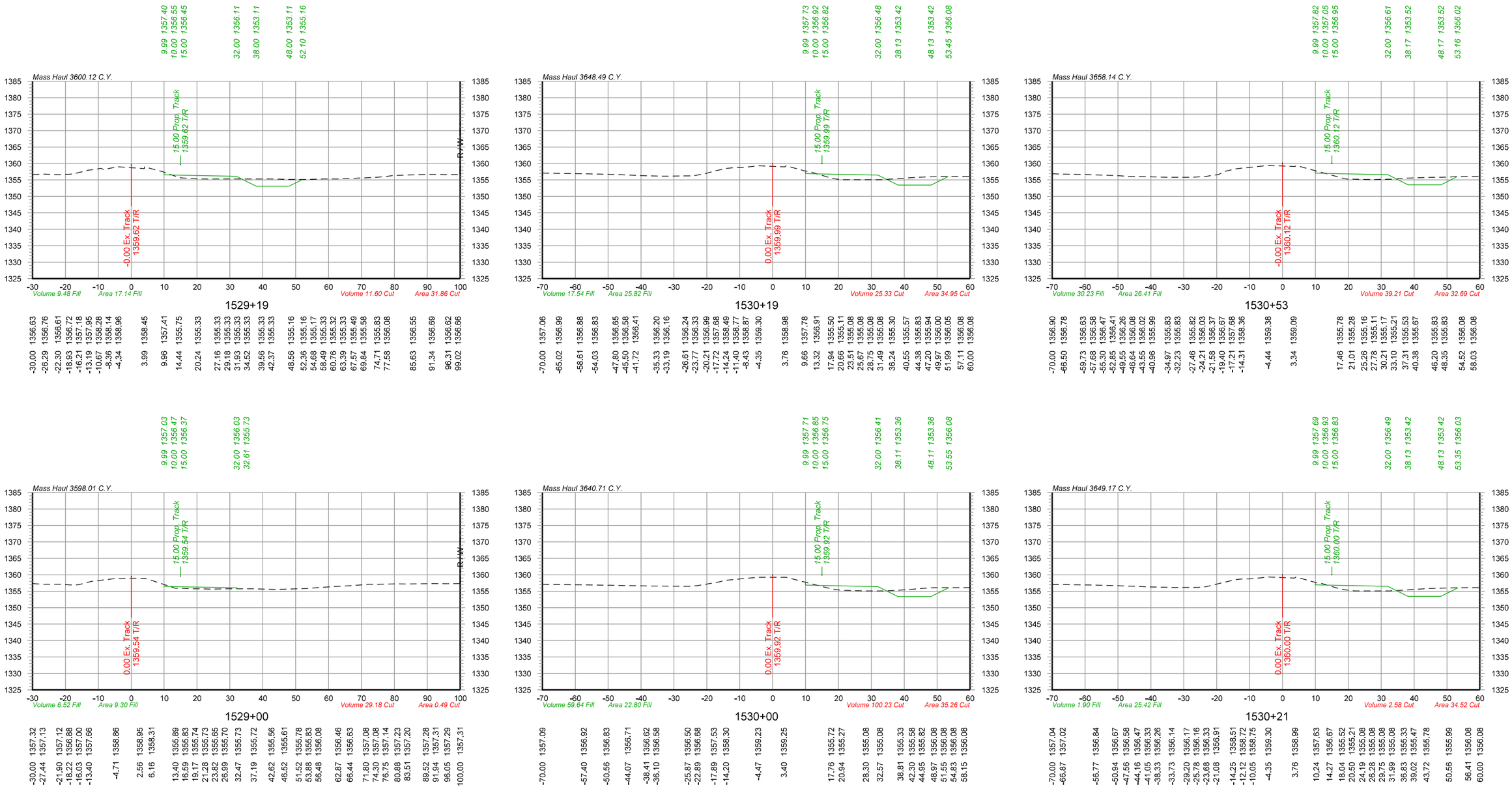
Color table: K:\Bentley\Workspace\Projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026



9.97	1358.38		
10.00	1355.72		
15.00	1355.62		
		32.00	1355.28
		33.76	1354.40

1528+00

| | | |



Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

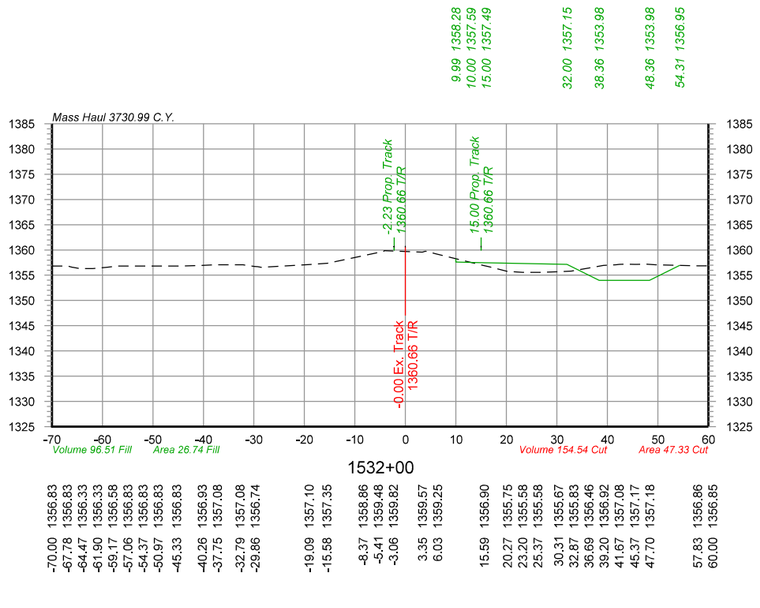
DRAWN BY:	DMJ
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	X012 of 195

UNION PACIFIC RAILROAD

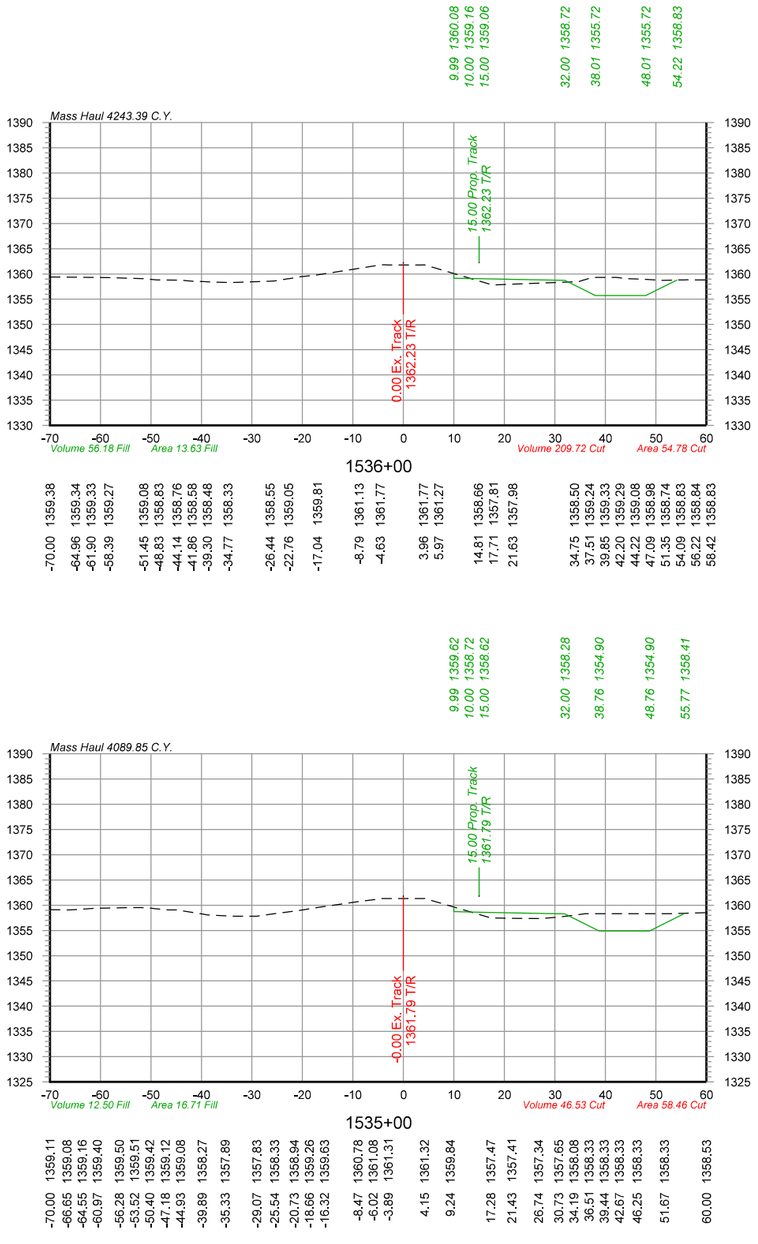
Sheet 252 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
MAIN TRACK CROSS SECTIONS STA.1529+00 TO STA.1530+53


Mass Haul 3730.99 C.Y.
9.99 1358.28
10.00 1357.59
15.00 1357.49
32.00 1357.15
38.36 1353.98
48.36 1353.98
54.31 1356.95
-2.23 Prop. Track
1360.66 T/R
15.00 Prop. Track
1360.66 T/R
-0.00 Ex. Track
1360.66 T/R
Volume 96.51 Fill
Area 26.74 Fill
Volume 154.54 Cut
Area 47.33 Cut
1532+00

| | | |



Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

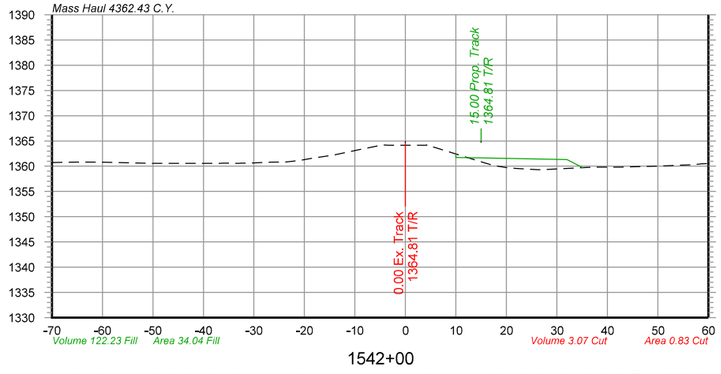
DRAWN BY:	DMJ
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	X014 of 195

UNION PACIFIC RAILROAD

Sheet 254 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
MAIN TRACK CROSS SECTIONS STA.1535+00 TO STA.1540+00

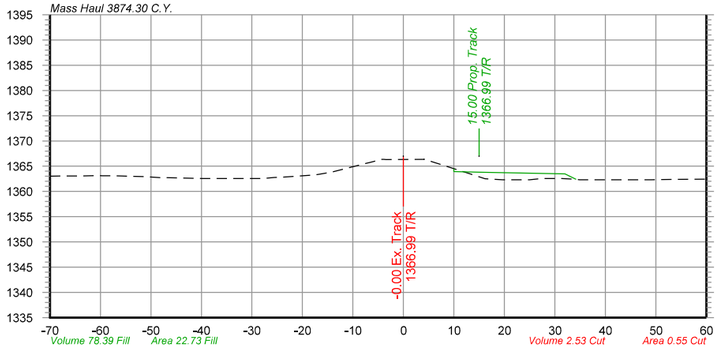

9.99 1362.43
10.00 1361.74
15.00 1361.64
32.00 1361.30
35.19 1359.71
Mass Haul 4362.43 C.Y.
15.00 Prop. Track
1364.81 T/R
0.00 Ex. Track
1364.81 T/R
Volume 122.23 Fill
Area 34.04 Fill
Volume 3.07 Cut
Area 0.83 Cut
1542+00

| | | |

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

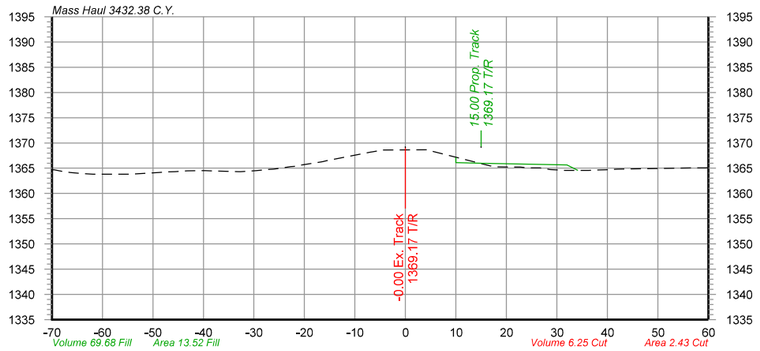
9.99 1364.50
10.00 1363.92
15.00 1363.82

32.00 1363.48
34.20 1362.38

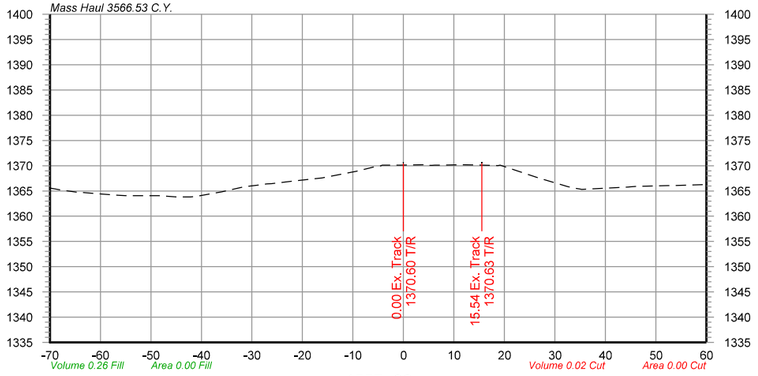


1548+00

| | | |

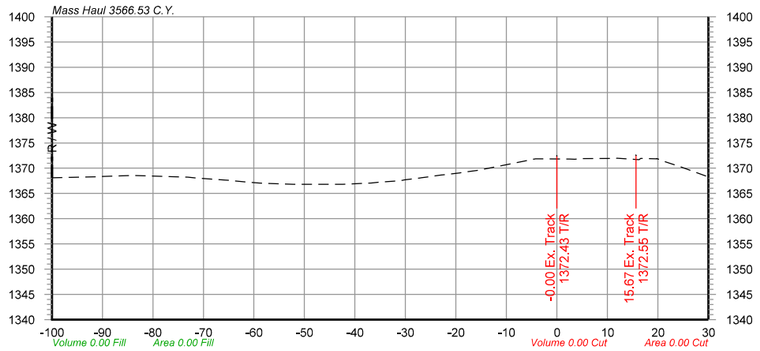

Mass Haul 3432.38 C.Y.
15.00 Prop. Track
1369.17 T/R
-0.00 Ex. Track
1369.17 T/R
Volume 69.68 Fill
Area 13.52 Fill
Volume 6.25 Cut
Area 2.43 Cut

| | | |


Mass Haul 3566.53 C.Y.
0.00 Ex. Track
1370.60 T/R
15.54 Ex. Track
1370.65 T/R
Volume 0.26 Fill
Area 0.00 Fill
Volume 0.02 Cut
Area 0.00 Cut

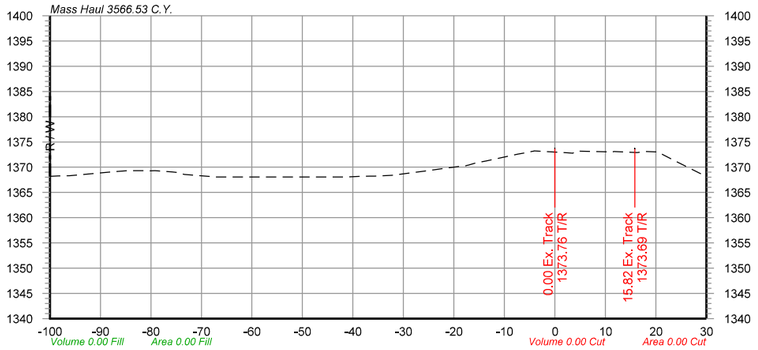
1557+96

| | | |


Mass Haul 3566.53 C.Y.
R/W
-0.00 Ex. Track
13/2.43 T/R
15.67 Ex. Track
13/2.55 T/R
Volume 0.00 Fill
Area 0.00 Fill
Volume 0.00 Cut
Area 0.00 Cut

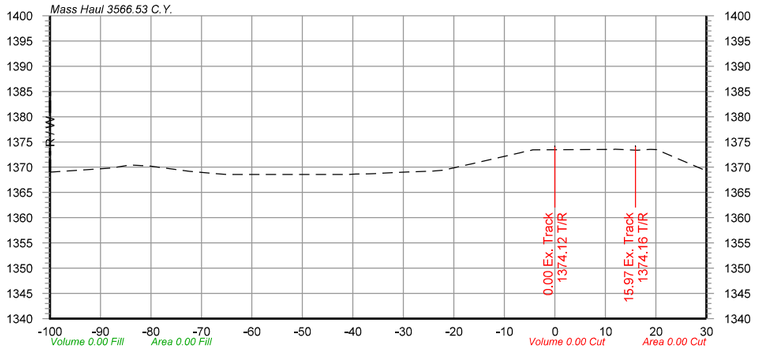
1563+00

| | | |


Mass Haul 3566.53 C.Y.
R/W
0.00 Ex. Track
13/3.76 T/R
15.82 Ex. Track
13/3.69 T/R
Volume 0.00 Fill
Area 0.00 Fill
Volume 0.00 Cut
Area 0.00 Cut

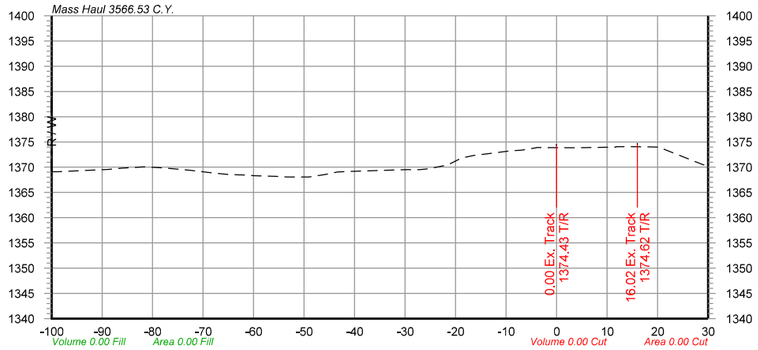
1569+00

| | | |



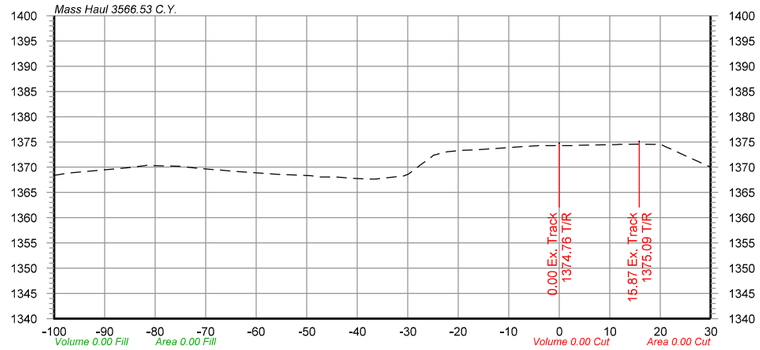
1575+00

-100.00	-88.09	-84.18	-81.72	-72.41	-67.22	-65.04	-60.71	-57.59	-55.05	-52.72	-48.62	-45.62	-43.41	-41.24	-36.86	-34.41	-29.06	-24.22	-20.05	-16.18	-6.88	-4.67	4.13	11.70	16.28	18.78	21.71	30.00
1369.03	1369.81	1370.45	1370.33	1369.20	1368.74	1368.58	1368.58	1368.58	1368.58	1368.58	1368.58	1368.58	1368.58	1368.58	1368.67	1368.83	1369.05	1369.23	1369.87	1370.73	1372.86	1373.37	1373.48	1373.52	1373.36	1373.52	1372.83	1369.26



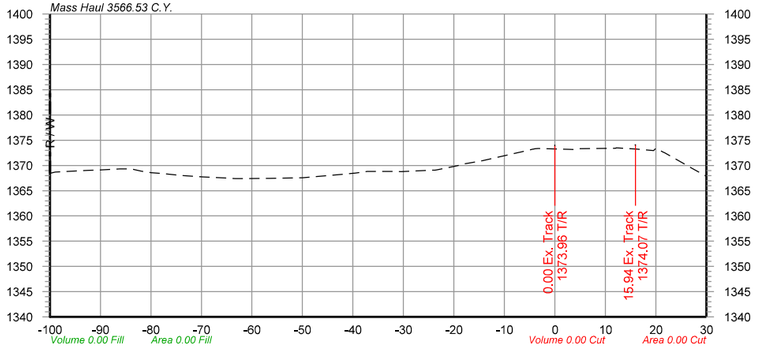
1577+00

-100.00	-88.75	-86.04	-82.50	-79.76	-75.83	-72.63	-69.09	-65.00	-62.31	-59.86	-57.12	-53.34	-49.01	-45.79	-43.35	-29.76	-27.10	-22.06	-19.27	-16.44	-12.13	-8.93	-5.91	1.92	4.05	11.68	15.60	18.62	20.84	24.21	27.25	30.00
1369.09	1369.57	1369.82	1370.02	1369.96	1369.67	1369.38	1368.99	1368.58	1368.47	1368.33	1368.21	1368.08	1368.08	1368.58	1369.05	1369.53	1369.51	1370.36	1371.59	1372.32	1372.87	1373.26	1373.54	1373.84	1373.86	1374.00	1374.07	1374.01	1373.74	1372.40	1371.19	1370.11



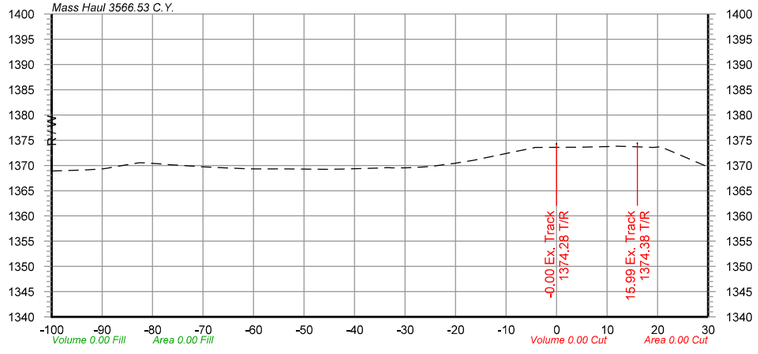
1579+00

-100.00	-97.42	-85.37	-82.37	-80.26	-75.11	-72.27	-68.92	-64.42	-57.73	-55.27	-51.86	-49.14	-47.12	-44.50	-41.14	-38.49	-36.43	-31.25	-29.03	-26.75	-24.24	-22.17	-19.50	-16.46	-6.88	-4.75	3.31	11.61	15.79	18.51	20.56	24.06	30.00
1368.38	1368.83	1369.89	1370.28	1370.33	1370.20	1369.86	1369.58	1369.20	1368.73	1368.58	1368.45	1368.33	1368.08	1368.08	1367.83	1367.69	1367.65	1368.24	1369.27	1370.96	1372.51	1373.08	1373.31	1373.44	1374.09	1374.23	1374.27	1374.46	1374.55	1374.54	1374.31	1372.69	1370.03



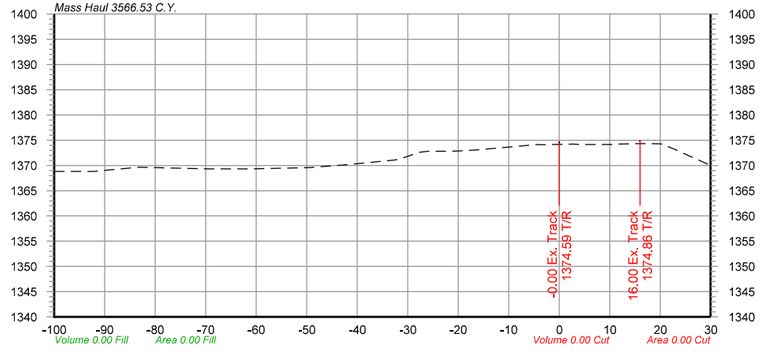
1574+00

-100.00	-92.55	-90.07	-86.12	-83.97	-81.87	-77.19	-74.51	-69.79	-65.39	-63.34	-61.02	-57.76	-49.94	-41.23	-37.43	-33.82	-31.77	-29.62	-24.25	-19.91	-17.16	-14.33	-7.00	-4.69	2.76	12.01	16.25	19.56	21.73	26.12	30.00
1368.45	1369.03	1369.12	1369.33	1369.31	1368.85	1368.34	1368.05	1367.73	1367.54	1367.41	1367.40	1367.43	1367.58	1368.31	1368.79	1368.83	1368.83	1368.83	1369.06	1369.83	1370.46	1370.96	1372.63	1373.14	1373.17	1373.41	1373.21	1372.95	1372.51	1370.03	1367.84



1576+00

-100.00	-94.75	-92.02	-89.90	-86.78	-82.73	-77.97	-75.07	-70.09	-65.73	-63.55	-60.14	-57.04	-54.63	-45.30	-43.21	-35.26	-32.62	-30.03	-27.15	-24.67	-20.31	-16.42	-7.23	-5.13	4.21	11.53	15.99	19.16	21.17	24.17	30.00
1368.88	1369.05	1369.20	1369.31	1369.86	1370.54	1370.26	1370.05	1369.73	1369.53	1369.42	1369.33	1369.33	1369.33	1369.24	1369.27	1369.49	1369.52	1369.52	1369.65	1369.83	1370.42	1371.02	1372.95	1373.37	1373.59	1373.77	1373.70	1373.55	1373.44	1372.17	1369.68



1578+00

-100.00	-92.73	-83.72	-81.51	-78.21	-69.38	-64.13	-61.18	-57.49	-49.61	-43.13	-40.82	-35.71	-32.55	-30.50	-27.87	-25.36	-21.36	-19.12	-16.49	-8.88	-4.33	2.77	11.23	15.45	18.20	20.25	22.62	25.72	30.00
1368.83	1368.83	1369.60	1369.59	1369.52	1369.33	1369.33	1369.33	1369.41	1369.58	1370.06	1370.28	1370.79	1371.08	1371.63	1372.56	1372.83	1372.83	1372.91	1373.05	1373.72	1374.16	1374.22	1374.15	1374.33	1374.32	1374.25	1373.30	1371.89	1370.04

Color table: K:\Bentley\Workspace\Projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

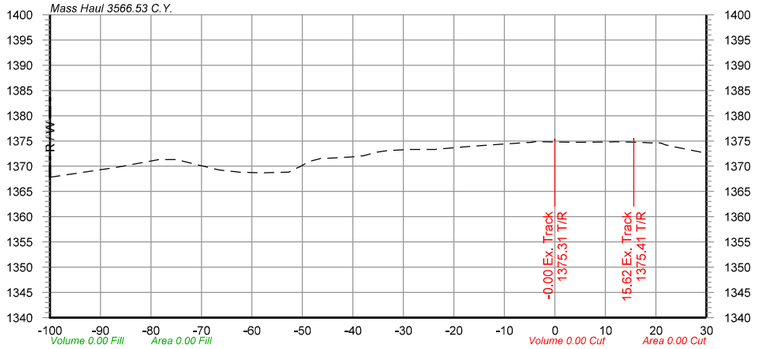
DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X021 of 195

UNION PACIFIC RAILROAD

Sheet 261 of 587

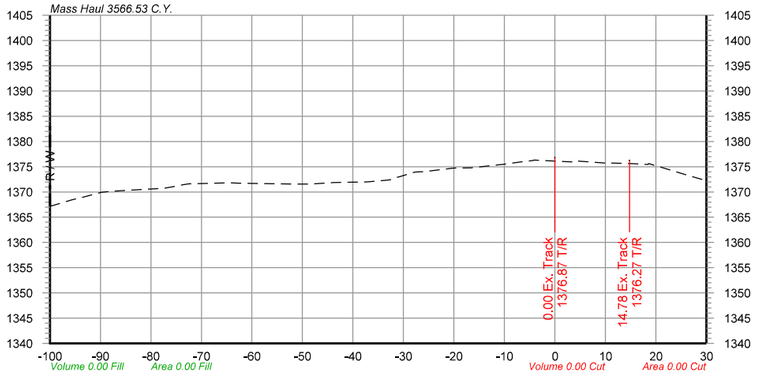
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
MAIN TRACK CROSS SECTIONS STA.1574+00 TO STA.1579+00


Mass Haul 3566.53 C.Y.
R/W
-0.00 Ex. Track
13/5.31 T/R
15.62 Ex. Track
13/5.41 T/R
Volume 0.00 Fill
Area 0.00 Fill
Volume 0.00 Cut
Area 0.00 Cut

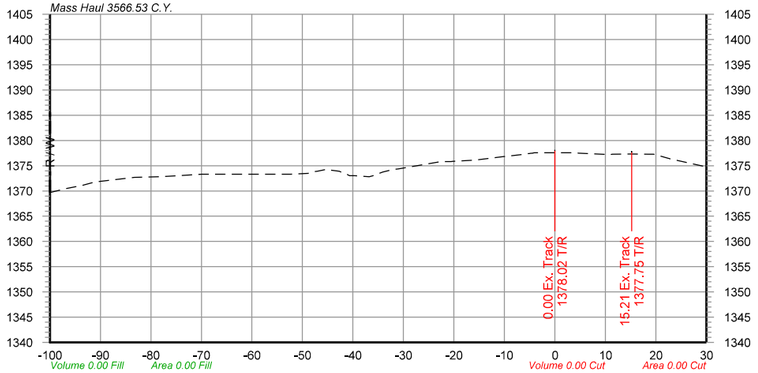
1581+00

| | | |


Mass Haul 3566.53 C.Y.
R/W
0.00 Ex. Track
1376.87 T/R
14.78 Ex. Track
1376.27 T/R
Volume 0.00 Fill
Area 0.00 Fill
Volume 0.00 Cut
Area 0.00 Cut

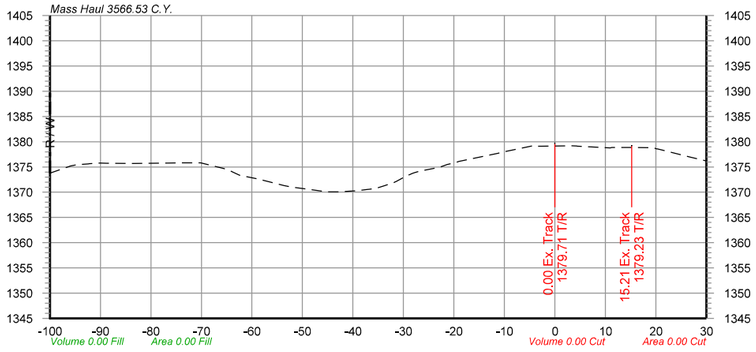
1585+00

| | | |


Mass Haul 3566.53 C.Y.
R/W
0.00 Ex. Track
13'8.02 T/R
15.21 Ex. Track
13'7.75 T/R
Volume 0.00 Fill
Area 0.00 Fill
Volume 0.00 Cut
Area 0.00 Cut

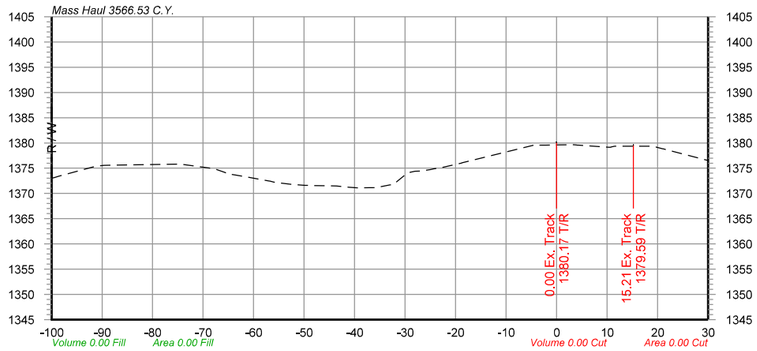
1589+00

| | | |



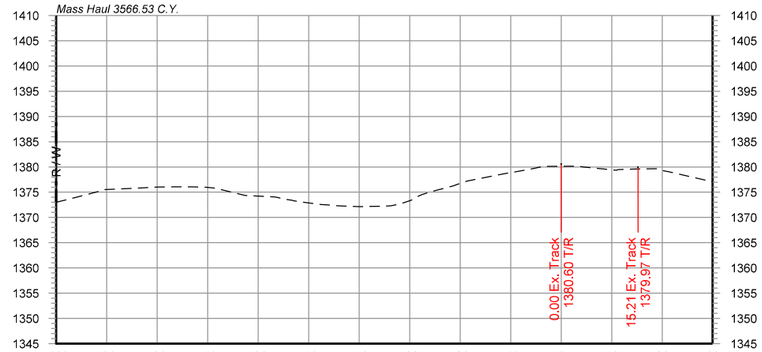
1593+00

-100.00	1373.75
-96.27	1375.05
-92.37	1375.60
-90.06	1375.76
-83.62	1375.70
-76.35	1375.76
-74.32	1375.83
-70.33	1375.83
-65.56	1374.68
-62.45	1373.34
-58.92	1372.63
-53.62	1371.30
-50.28	1370.76
-45.07	1370.08
-43.01	1370.07
-39.01	1370.33
-36.98	1370.55
-33.93	1371.24
-31.92	1371.88
-29.09	1373.37
-26.28	1374.23
-23.46	1374.82
-21.35	1375.48
-18.95	1376.10
-11.32	1377.67
-4.37	1379.20
3.40	1379.20
10.87	1378.77
15.19	1378.87
18.81	1378.83
21.03	1378.39
26.83	1376.96
30.00	1376.17



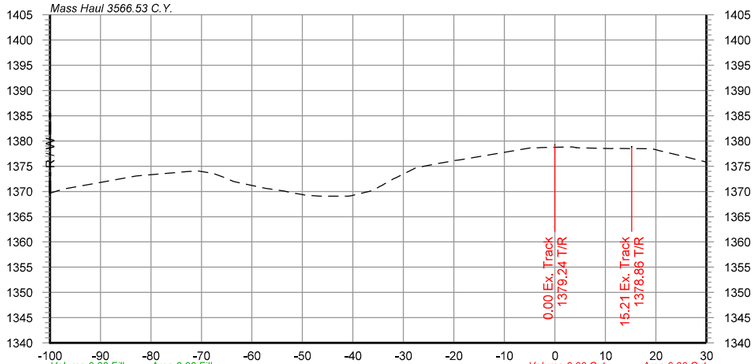
1593+97

-100.00	1373.00
-91.87	1375.23
-89.66	1375.58
-74.50	1375.83
-69.91	1375.19
-67.74	1374.90
-65.51	1374.09
-63.30	1373.59
-60.20	1373.08
-57.02	1372.50
-52.61	1371.83
-49.82	1371.62
-45.16	1371.51
-41.12	1371.25
-37.09	1371.13
-33.05	1371.69
-30.57	1373.21
-28.03	1374.40
-24.95	1374.72
-22.83	1375.12
-18.98	1375.99
-4.18	1379.64
-2.12	1379.56
3.36	1379.64
10.35	1379.16
12.78	1379.36
18.88	1379.36
20.97	1378.85
24.54	1377.94
30.00	1376.52



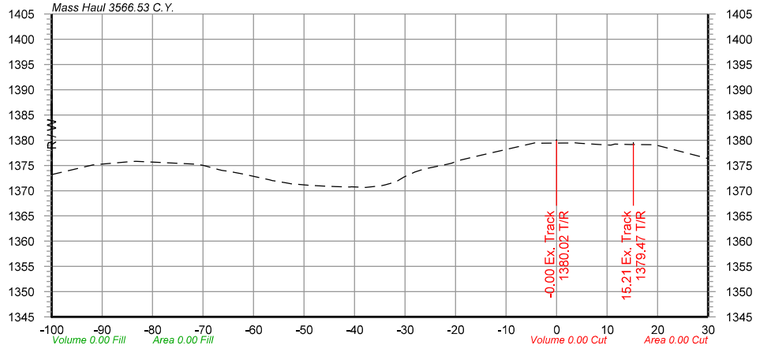
1595+00

-100.00	1373.00
-93.69	1374.62
-90.58	1375.45
-83.76	1375.82
-79.94	1376.00
-76.62	1376.08
-73.65	1376.08
-70.28	1376.00
-66.52	1375.30
-62.57	1374.35
-60.00	1374.25
-56.77	1374.08
-53.83	1373.49
-48.56	1372.69
-44.84	1372.38
-42.36	1372.21
-39.99	1372.13
-37.78	1372.17
-35.12	1372.24
-32.01	1372.64
-29.88	1373.36
-27.60	1374.51
-21.45	1376.21
-18.54	1377.25
-10.71	1378.76
-6.13	1379.57
-4.01	1380.01
2.15	1380.16
4.27	1380.01
10.86	1379.36
15.18	1379.60
18.91	1379.66
20.95	1379.12
26.13	1377.93
30.00	1377.07



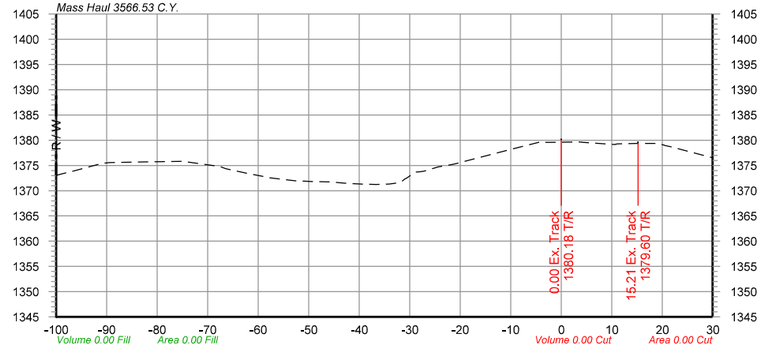
1592+00

-100.00	1368.64
-97.27	1370.49
-91.92	1371.44
-82.88	1373.08
-75.09	1373.72
-72.76	1373.92
-70.72	1374.08
-67.88	1373.62
-65.39	1372.74
-62.94	1371.83
-57.47	1370.67
-53.86	1370.12
-51.45	1369.60
-49.43	1369.28
-46.55	1369.08
-40.93	1369.08
-36.91	1369.97
-34.90	1370.87
-32.50	1372.20
-27.53	1374.71
-23.16	1375.51
-20.24	1376.02
-9.82	1377.78
-4.20	1378.74
3.43	1378.81
11.35	1378.48
15.16	1378.46
19.27	1378.42
25.68	1376.88
30.00	1375.83



1593+66

-100.00	1373.17
-91.82	1375.13
-84.23	1375.79
-80.53	1375.69
-71.03	1375.25
-66.79	1374.16
-63.26	1373.52
-60.64	1372.99
-56.82	1372.15
-53.37	1371.52
-51.32	1371.28
-48.95	1371.08
-45.84	1370.90
-43.81	1370.83
-40.94	1370.74
-37.80	1370.68
-34.71	1370.98
-31.83	1371.74
-28.70	1373.41
-26.42	1374.24
-24.09	1374.75
-21.65	1375.23
-19.51	1375.95
-14.95	1377.04
-4.26	1379.48
1.33	1379.46
3.37	1379.45
8.44	1379.15
10.73	1379.03
14.34	1379.16
18.85	1379.09
30.00	1376.37



1594+00

-100.00	1373.01
-97.33	1373.68
-90.96	1375.39
-83.06	1375.70
-74.91	1375.83
-68.98	1375.00
-66.54	1374.40
-61.86	1373.37
-59.63	1372.92
-56.44	1372.41
-52.51	1371.92
-49.41	1371.83
-47.16	1371.75
-43.78	1371.58
-38.77	1371.25
-36.70	1371.24
-34.07	1371.33
-32.03	1371.65
-29.67	1373.13
-27.19	1373.85
-24.31	1374.72
-22.24	1375.08
-20.15	1375.51
-9.80	1378.25
-4.17	1379.65
3.36	1379.65
10.51	1379.16
15.19	1379.37
18.88	1379.37
21.54	1378.72
27.26	1377.24
30.00	1376.53

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X025 of 195

UNION PACIFIC RAILROAD

Sheet 265 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
MAIN TRACK CROSS SECTIONS STA.1592+00 TO STA.1595+00

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

End Area Volume Report

Alignment Name: Ex Main

Baseline Station	Station Quantities - Cut - Area	Station Quantities - Cut - Volume	Station Quantities - Fill - Area	Station Quantities - Fill - Volume	Mass Ordinate
1482+00.00	0.00	0.00	0.00	0.00	0.00
1482+09.90	1.82	0.33	0.07	0.01	0.32
1482+13.64					0.00
1482+18.40	1.94	0.59	8.33	1.32	-0.41
1482+32.89	1.77	0.99	5.76	3.78	-3.20
1482+38.39	1.80	0.36	2.30	0.82	-3.65
1483+00.00	2.23	4.59	2.06	4.97	-4.03
1483+10.63	1.41	0.72	1.91	0.78	-4.10
1484+00.00	0.97	3.93	12.24	23.41	-23.58
1484+60.49	0.76	1.93	16.54	32.24	-53.89
1485+00.00	0.63	1.01	23.71	29.45	-82.33
1486+00.00	1.27	3.50	28.29	96.30	-175.12
1487+00.00	0.38	3.04	33.16	113.78	-285.86
1488+00.00	0.38	1.40	37.76	131.33	-415.80
1489+00.00	0.14	0.95	46.48	156.00	-570.85
1489+89.51	0.18	0.53	48.80	157.93	-728.24
1489+94.51	0.07	0.02	58.47	9.93	-738.15
1490+00.00	0.28	0.04	54.62	11.50	-749.62
1490+09.00	0.09	0.06	57.47	18.67	-768.23
1490+13.99	0.06	0.01	49.00	9.86	-778.07
1491+00.00	0.00	0.09	58.99	171.99	-949.96
1492+00.00	0.02	0.04	51.23	204.12	-1154.03
1493+00.00	0.44	0.86	28.68	147.99	-1301.16
1494+00.00	0.64	1.99	31.18	110.86	-1410.03
1495+00.00	0.03	1.23	33.87	120.47	-1529.26
1496+00.00	1.18	2.24	27.94	114.47	-1641.49
1497+00.00	1.00	4.03	27.41	102.51	-1739.97
1498+00.00	0.91	3.53	24.47	96.09	-1832.54
1499+00.00	1.06	3.65	19.76	81.92	-1910.81
1500+00.00	0.50	2.89	22.32	77.92	-1985.84
1501+00.00	0.85	2.50	25.27	88.12	-2071.47
1502+00.00	0.38	2.28	32.21	106.45	-2175.64
1502+63.00	0.30	0.79	32.44	75.42	-2250.27
1502+75.00	0.36	0.15	35.58	15.11	-2265.23
1503+00.00	0.34	0.33	34.19	32.30	-2297.21
1503+90.00	0.82	1.94	27.32	102.53	-2397.79
1504+00.00	9.15	1.85	25.67	9.81	-2405.76
1505+00.00	24.60	62.50	16.73	78.54	-2421.80
1505+10.00	29.32	9.99	12.66	5.44	-2417.26
1506+00.00	39.75	115.12	30.29	71.58	-2373.72
1507+00.00	35.25	138.89	33.22	117.61	-2352.44
1508+00.00	29.25	119.45	40.18	135.93	-2368.92
1509+00.00	26.59	103.40	41.76	151.74	-2417.26
1510+00.00	27.40	99.97	42.68	156.37	-2473.66
1511+00.00	32.82	111.51	36.91	147.39	-2509.55
1512+00.00	43.80	141.88	29.28	122.57	-2490.25
1513+00.00	49.16	172.15	22.69	96.25	-2414.34
1514+00.00	46.39	176.95	29.56	96.77	-2334.17
1515+00.00	65.05	206.37	8.95	71.31	-2199.12
1516+00.00	65.36	241.50	9.32	33.83	-1991.46
1517+00.00	62.90	237.51	12.60	40.59	-1794.53
1518+00.00	47.50	204.44	19.50	59.44	-1649.53
1519+00.00	63.13	204.86	4.09	43.70	-1488.37
1520+00.00	159.85	412.92	0.00	7.58	-1083.03
1521+00.00	195.20	657.50	0.00	0.00	-425.54
1521+56.34					0.00
1522+00.00	212.69	755.35	0.00	0.00	329.81

End Area Volume Report

Alignment Name: Ex Main

Baseline Station	Station Quantities - Cut - Area	Station Quantities - Cut - Volume	Station Quantities - Fill - Area	Station Quantities - Fill - Volume	Mass Ordinate
1523+00.00	215.47	792.89	0.00	0.00	1122.70
1524+00.00	215.62	798.32	0.00	0.00	1921.03
1525+00.00	183.81	739.69	0.00	0.00	2660.72
1526+00.00	89.28	505.72	3.55	6.57	3159.88
1527+00.00	67.32	289.99	21.87	47.08	3402.80
1527+71.38	68.22	179.17	23.98	60.61	3521.35
1528+00.00	17.13	45.24	17.62	22.05	3544.54
1528+01.65	16.21	1.02	18.14	1.09	3544.47
1528+03.65	18.20	1.28	7.06	0.93	3544.81
1528+60.15	16.03	35.82	0.00	7.39	3573.23
1528+62.15	41.14	2.12	0.00	0.00	3575.35
1529+00.00	0.49	29.18	9.30	6.52	3598.01
1529+19.37	31.86	11.60	17.14	9.48	3600.12
1530+00.00	35.26	100.23	22.80	59.64	3640.71
1530+19.48	34.95	25.33	25.82	17.54	3648.49
1530+21.48	34.52	2.58	25.42	1.90	3649.17
1530+52.98	32.69	39.21	26.41	30.23	3658.14
1531+00.00	36.12	59.92	25.38	45.10	3672.97
1532+00.00	47.33	154.54	26.74	96.51	3730.99
1533+00.00	49.82	179.90	23.39	92.83	3818.06
1534+00.00	52.71	189.87	16.37	73.63	3934.31
1534+65.51	59.36	135.95	13.36	36.06	4034.21
1534+78.51	58.46	28.36	14.70	6.75	4055.81
1535+00.00	58.46	46.53	16.71	12.50	4089.85
1536+00.00	54.78	209.72	13.63	56.18	4243.39
1537+00.00	47.78	189.93	16.97	56.65	4376.66
1538+00.00	50.73	182.43	17.36	63.56	4495.53
1539+00.00	44.91	177.12	22.74	74.26	4598.39
1540+00.00	0.83	84.70	27.88	93.75	4589.34
1541+00.00	0.83	3.08	31.96	110.83	4481.59
1542+00.00	0.83	3.07	34.04	122.23	4362.43
1543+00.00	9.16	18.49	5.80	73.78	4307.14
1544+00.00	0.20	17.33	35.29	76.10	4248.37
1545+00.00	0.22	0.78	33.94	128.21	4120.93
1546+00.00	0.57	1.46	20.43	100.68	4021.71
1547+00.00	0.81	2.56	19.60	74.12	3950.16
1548+00.00	0.55	2.53	22.73	78.39	3874.30
1549+00.00	0.39	1.75	27.10	92.28	3783.76
1550+00.00	0.84	2.27	20.72	88.55	3697.49
1551+00.00	1.50	4.33	13.58	63.52	3638.29
1552+00.00	0.63	3.94	21.47	64.92	3577.31
1553+00.00	0.94	2.91	24.11	84.41	3495.81
1554+00.00	2.43	6.25	13.52	69.68	3432.38
1555+00.00	20.47	42.41	9.97	43.49	3431.29
1556+00.00	17.10	69.58	0.00	18.46	3482.41
1556+20.99	25.75	16.66	0.00	0.00	3499.07
1557+00.00	12.92	56.58	0.00	0.00	3555.65
1557+93.87	0.49	23.31	7.01	12.19	3566.77
1557+95.87	0.00	0.02	0.00	0.26	3566.53
1558+00.00	0.00	0.00	0.00	0.00	3566.53
1559+00.00	0.00	0.00	0.00	0.00	3566.53
1560+00.00	0.00	0.00	0.00	0.00	3566.53
1561+00.00	0.00	0.00	0.00	0.00	3566.53
1562+00.00	0.00	0.00	0.00	0.00	3566.53
1563+00.00	0.00	0.00	0.00	0.00	3566.53
1564+00.00	0.00	0.00	0.00	0.00	3566.53
1565+00.00	0.00	0.00	0.00	0.00	3566.53

End Area Volume Report

Alignment Name: Ex Main

Baseline Station	Station Quantities - Cut - Area	Station Quantities - Cut - Volume	Station Quantities - Fill - Area	Station Quantities - Fill - Volume	Mass Ordinate
1566+00.00	0.00	0.00	0.00	0.00	3566.53
1567+00.00	0.00	0.00	0.00	0.00	3566.53
1568+00.00	0.00	0.00	0.00	0.00	3566.53
1569+00.00	0.00	0.00	0.00	0.00	3566.53
1570+00.00	0.00	0.00	0.00	0.00	3566.53
1571+00.00	0.00	0.00	0.00	0.00	3566.53
1572+00.00	0.00	0.00	0.00	0.00	3566.53
1573+00.00	0.00	0.00	0.00	0.00	3566.53
1574+00.00	0.00	0.00	0.00	0.00	3566.53
1575+00.00	0.00	0.00	0.00	0.00	3566.53
1576+00.00	0.00	0.00	0.00	0.00	3566.53
1577+00.00	0.00	0.00	0.00	0.00	3566.53
1578+00.00	0.00	0.00	0.00	0.00	3566.53
1579+00.00	0.00	0.00	0.00	0.00	3566.53
1580+00.00	0.00	0.00	0.00	0.00	3566.53
1581+00.00	0.00	0.00	0.00	0.00	3566.53
1582+00.00	0.00	0.00	0.00	0.00	3566.53
1582+62.22	0.00	0.00	0.00	0.00	3566.53
1583+00.00	0.00	0.00	0.00	0.00	3566.53
1583+09.20	0.00	0.00	0.00	0.00	3566.53
1584+00.00	0.00	0.00	0.00	0.00	3566.53
1585+00.00	0.00	0.00	0.00	0.00	3566.53
1586+00.00	0.00	0.00	0.00	0.00	3566.53
1586+67.50	0.00	0.00	0.00	0.00	3566.53
1587+00.00	0.00	0.00	0.00	0.00	3566.53
1587+14.48	0.00	0.00	0.00	0.00	3566.53
1588+00.00	0.00	0.00	0.00	0.00	3566.53
1589+00.00	0.00	0.00	0.00	0.00	3566.53
1589+00.32	0.00	0.00	0.00	0.00	3566.53
1589+13.32	0.00	0.00	0.00	0.00	3566.53
1590+00.00	0.00	0.00	0.00	0.00	3566.53
1591+00.00	0.00	0.00	0.00	0.00	3566.53
1592+00.00	0.00	0.00	0.00	0.00	3566.53
1593+00.00	0.00	0.00	0.00	0.00	3566.53
1593+65.83	0.00	0.00	0.00	0.00	3566.53
1593+97.33	0.00	0.00	0.00	0.00	3566.53
1594+00.00	0.00	0.00	0.00	0.00	3566.53
1595+00.00	0.00	0.00	0.00	0.00	3566.53
Grand Total:		**9744.30**		**6177.77**	

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

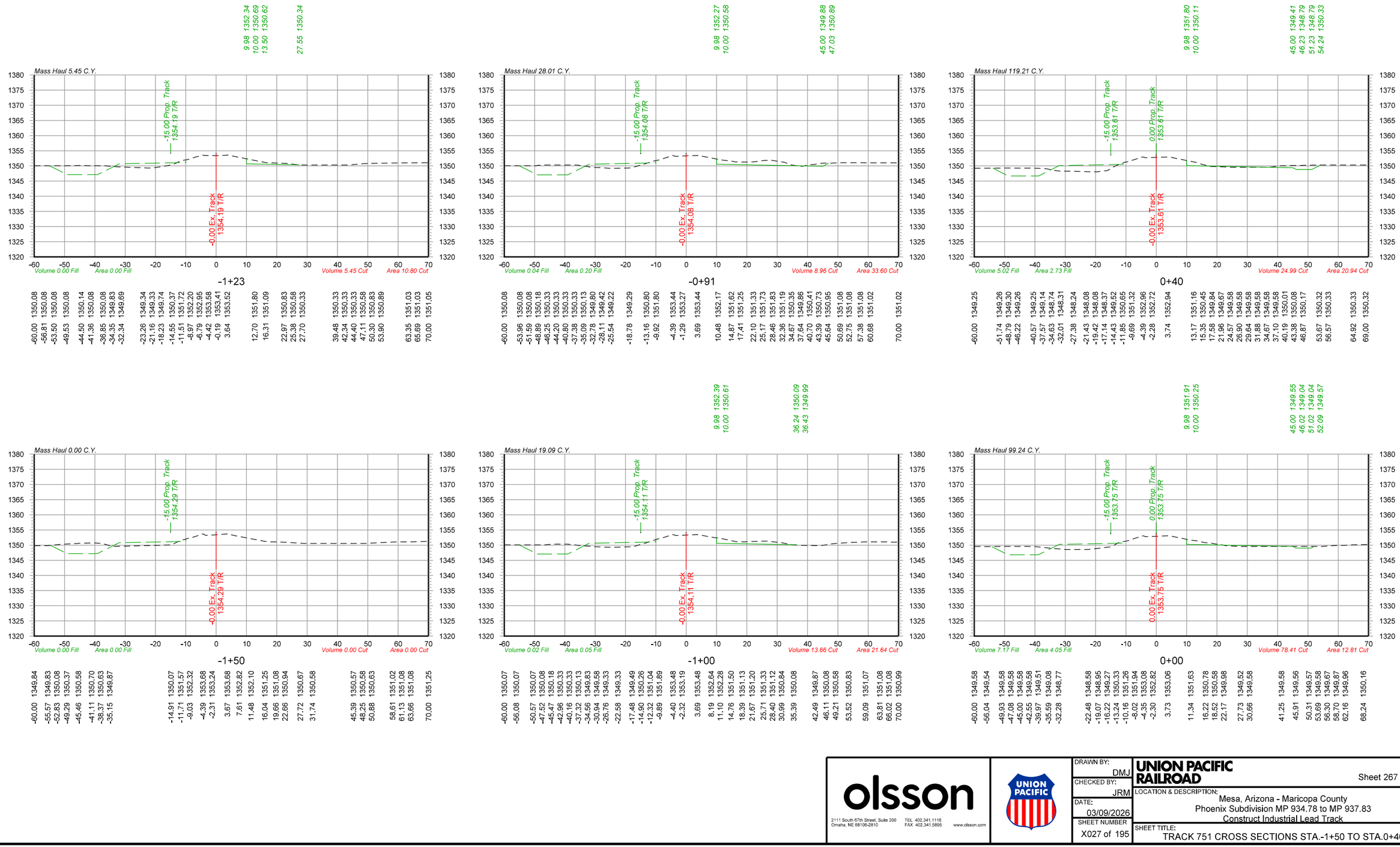
DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X026 of 195

UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
MAIN TRACK EARTHWORK SUMMARY

Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05.Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026



Color table: K:\Bentley\Workspace\V8\projects\Clients\UPRR_Track\UPRR_Track_V8\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

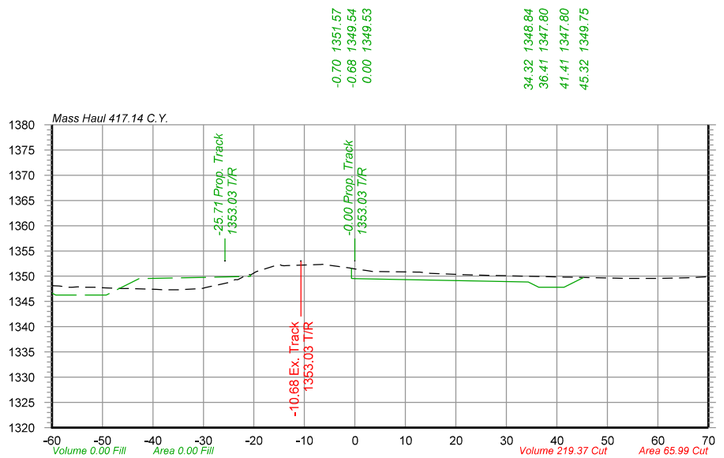
DRAWN BY:	DMJ
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	X027 of 195

UNION PACIFIC RAILROAD

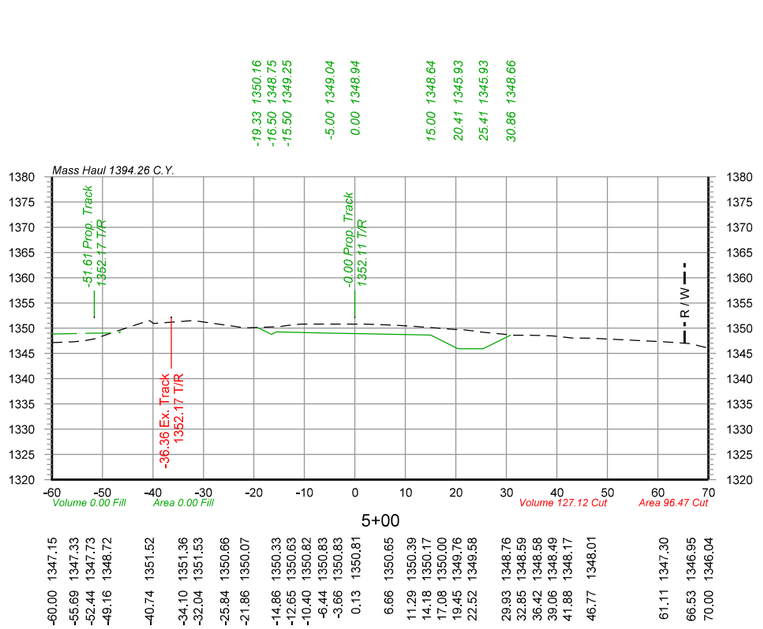
Sheet 267 of 587

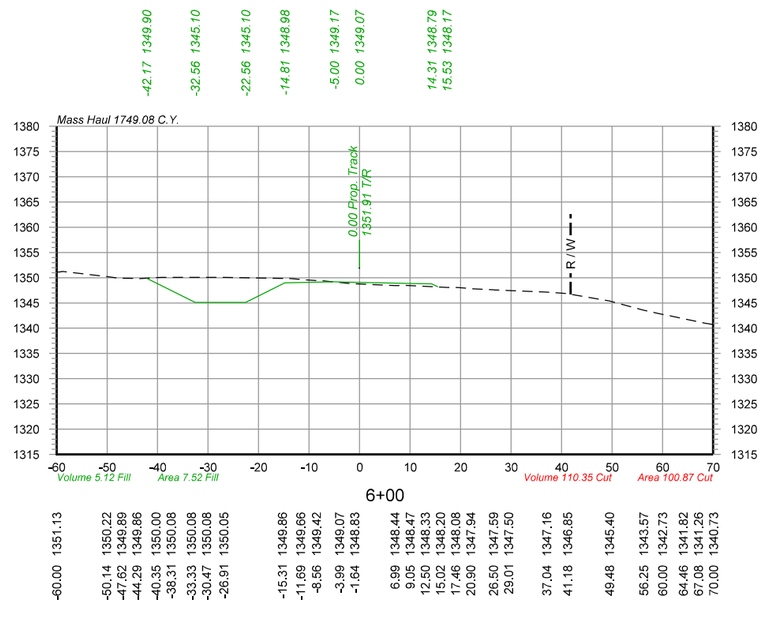
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

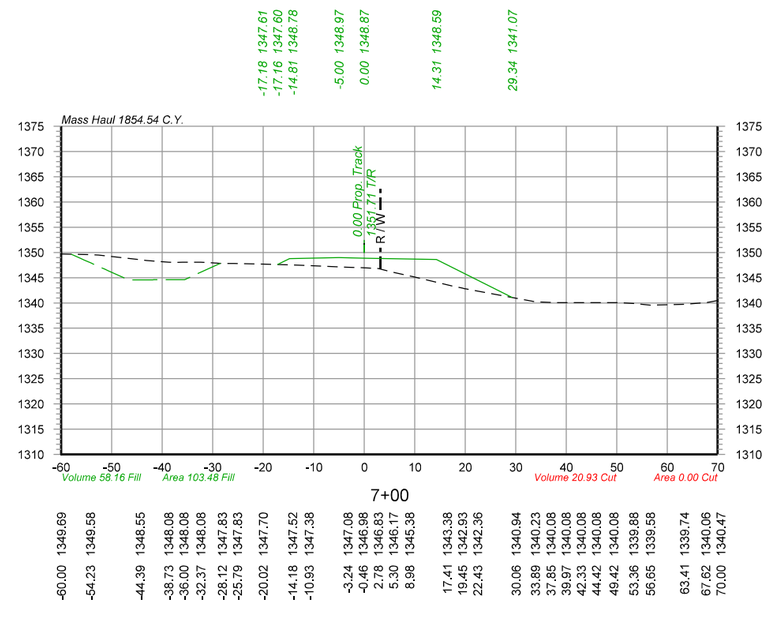
SHEET TITLE:
TRACK 751 CROSS SECTIONS STA.-1+50 TO STA.0+40

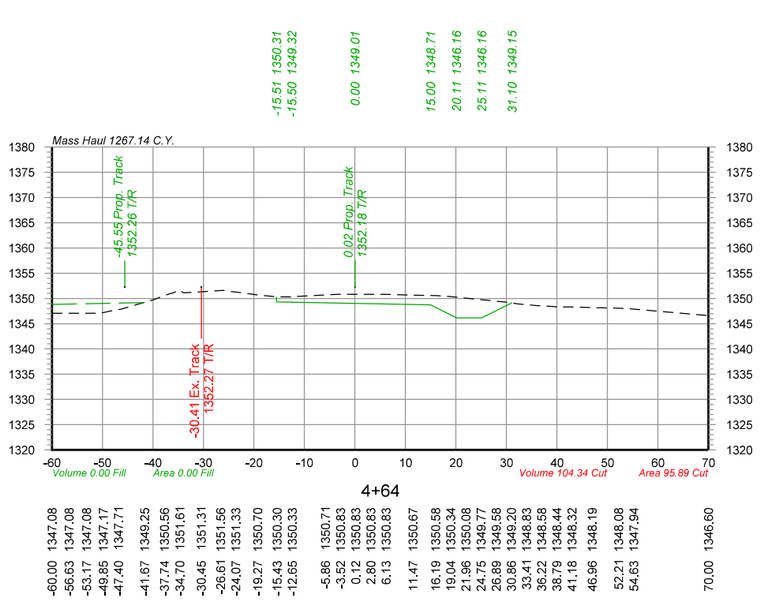

Mass Haul 417.14 C.Y.
-25.71 Prop. Track
1353.03 T/R
-0.00 Prop. Track
1353.03 T/R
-10.68 Ex. Track
1353.03 T/R
Volume 0.00 Fill
Area 0.00 Fill
Volume 219.37 Cut
Area 65.99 Cut

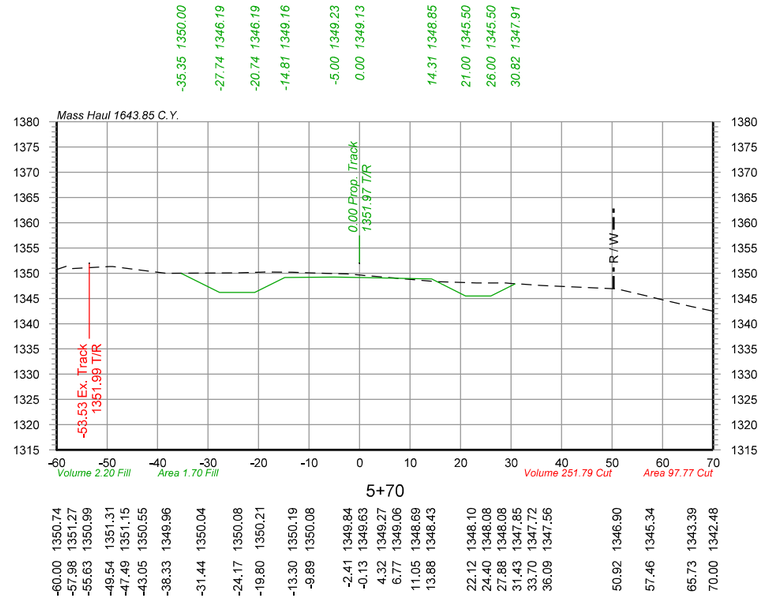
| | | |

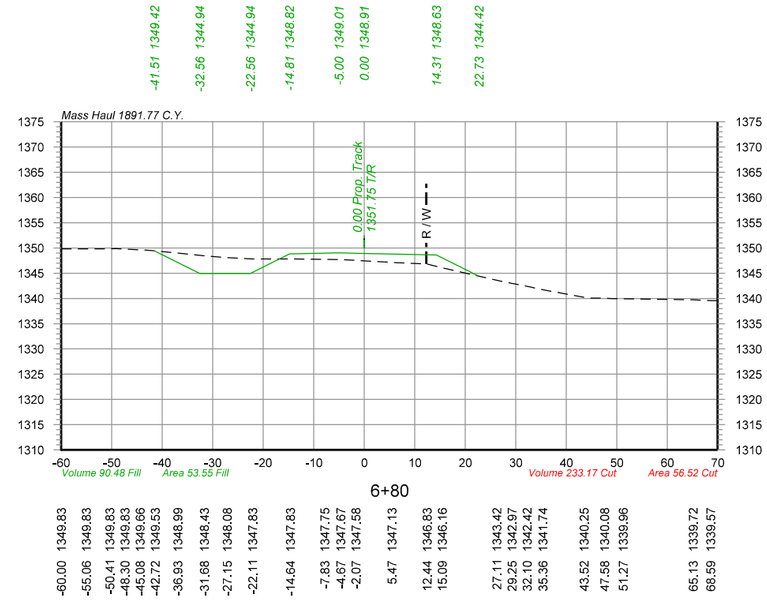












Color table: K:\Bentley\Workspace\V8\projects\Clients\UPRR_Track\UPRR_Track_V8\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

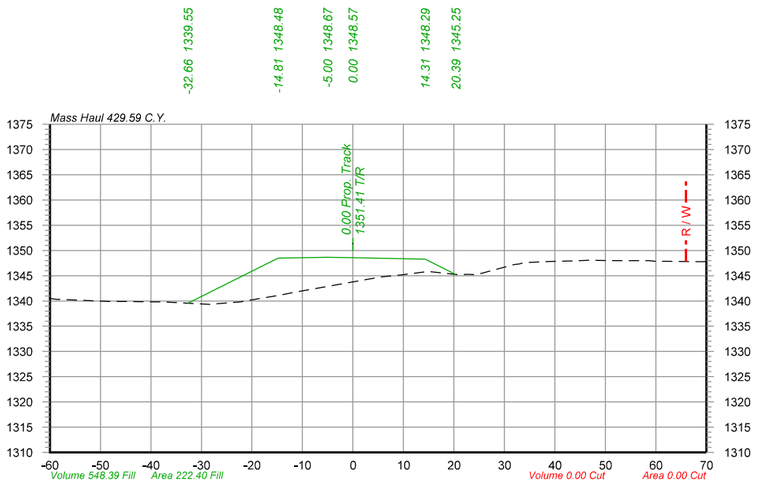
DRAWN BY:	DMJ
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	X029 of 195

UNION PACIFIC RAILROAD

Sheet 269 of 587

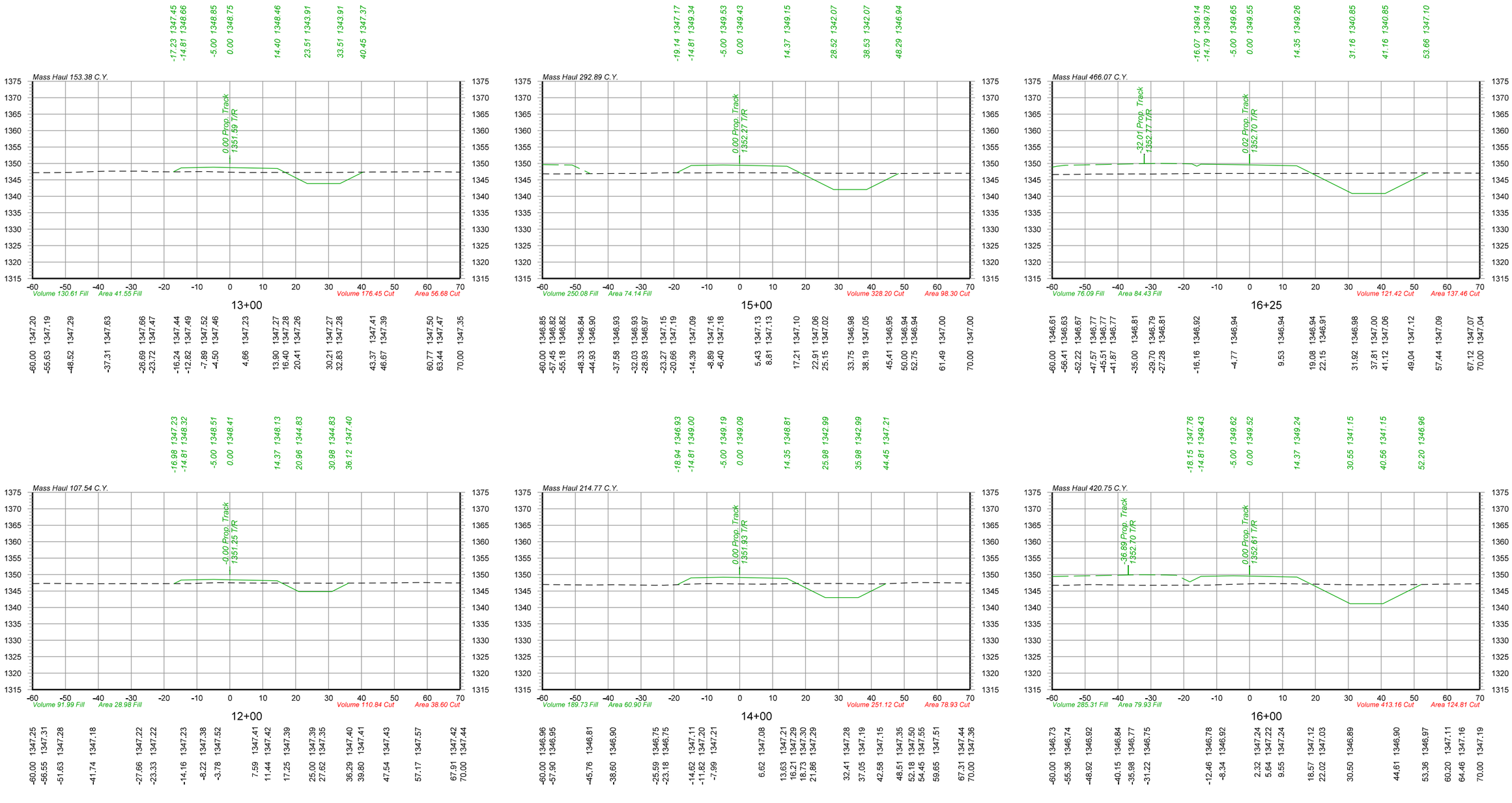
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 751 CROSS SECTIONS STA.4+64 TO STA.7+00


-32.66 1339.55
-14.81 1348.48
-5.00 1348.67
0.00 1348.57
14.31 1348.29
20.39 1345.25
Mass Haul 429.59 C.Y.
0.00 Prop. Track
1351.41 T/R
R / W
Volume 548.39 Fill
Area 222.40 Fill
Volume 0.00 Cut
Area 0.00 Cut

8+50

| | | |



Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X031 of 195

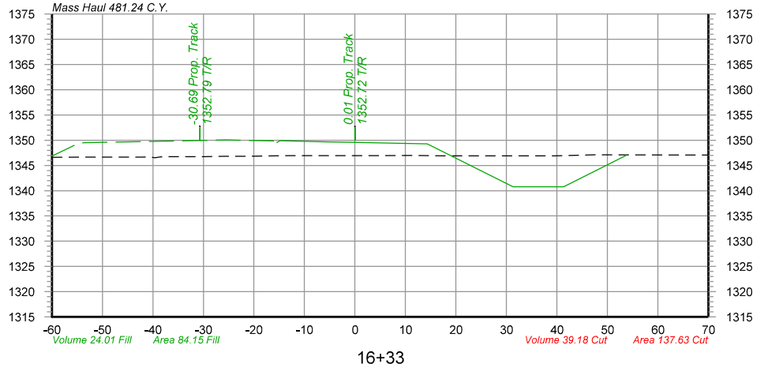
UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 751 CROSS SECTIONS STA.12+00 TO STA.16+25

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

-15.50 1349.53
-14.81 1349.88
-5.00 1349.65
0.00 1349.55
14.34 1349.28
31.32 1340.79
41.33 1340.79
53.89 1347.06



16+33

-60.00	1346.63	-44.72	1346.65	-31.87	1346.74	-13.10	1346.94	4.51	1346.93	39.64	1346.92	65.57	1347.06
-53.67	1346.64	-42.16	1346.67	-25.82	1346.80	-7.60	1346.93	11.56	1346.97	44.34	1347.01	70.00	1347.06
		-39.58	1346.54	-21.47	1346.81			17.60	1346.91	47.52	1347.09		
		-36.94	1346.72					20.27	1346.89				
								25.14	1346.88				

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X032 of 195

UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 751 CROSS SECTIONS STA.16+33 TO STA.16+33

End Area Volume Report

Alignment Name: Track 751

Baseline Station	Station Quantities				Mass Ordinate
	Cut		Fill		
	Area	Volume	Area	Volume	
49.00	0.00	0.00	0.00	0.00	0.00
21.74	10.80	5.45	0.00	0.00	5.45
-1.00	21.64	13.66	0.05	0.02	19.09
91.24	33.60	8.96	0.20	0.04	28.01
0+00.00	12.81	78.41	4.05	7.17	99.24
0+39.98	20.94	24.99	2.73	5.02	119.21
1+00.00	52.47	81.60	0.00	3.04	197.77
2+00.00	65.99	219.37	0.00	0.00	417.14
3+00.00	87.97	285.11	0.00	0.00	702.25
4+00.00	96.06	340.81	0.00	0.00	1043.06
4+20.12	95.13	71.23	0.00	0.00	1114.29
4+34.18	91.09	48.50	0.00	0.00	1162.79
4+64.32	95.89	104.34	0.00	0.00	1267.14
5+00.00	96.47	127.12	0.00	0.00	1394.26
5+70.00	97.77	251.79	1.70	2.20	1643.85
6+00.00	100.87	110.35	7.52	5.12	1749.08
6+80.00	56.52	233.17	53.55	90.48	1891.77
7+00.00	0.00	20.93	103.48	58.16	1854.54
8+00.00	0.00	0.00	369.86	876.56	977.99
8+50.00	0.00	0.00	222.40	548.39	429.59
9+00.00	0.00	0.00	48.32	250.66	178.93
9+10.00	0.00	0.00	30.51	14.60	164.34
10+00.00	11.03	18.38	18.36	81.46	101.26
11+00.00	21.25	59.78	20.70	72.34	88.69
12+00.00	38.60	110.84	28.98	91.99	107.54
13+00.00	56.68	176.45	41.55	130.61	153.38
14+00.00	78.93	251.12	60.90	189.73	214.77
15+00.00	98.30	328.20	74.14	250.08	292.89
16+00.00	124.81	413.16	79.93	285.31	420.75
16+25.00	137.46	121.42	84.43	76.09	466.07
16+32.69	137.63	39.18	84.15	24.01	481.24
Grand Total:		**3544.31**		**3063.07**	

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

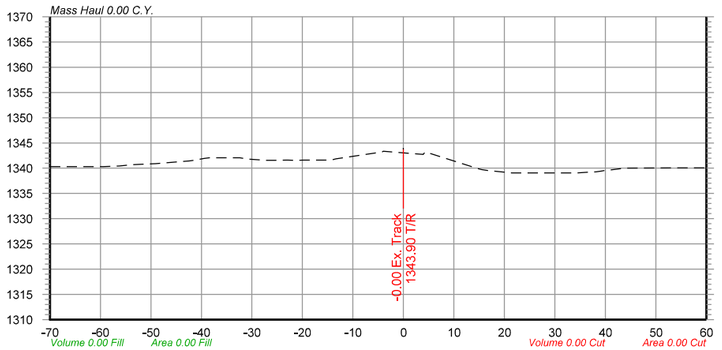
olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X033 of 195

UNION PACIFIC RAILROAD

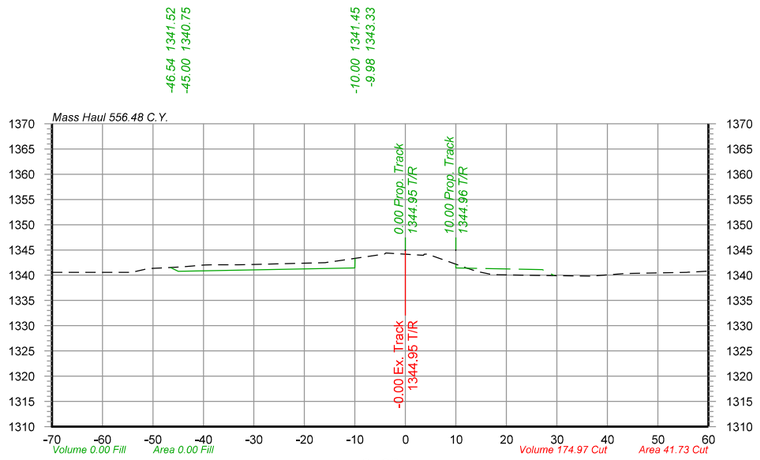
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 751 EARTHWORK SUMMARY


Mass Haul 0.00 C.Y.
-0.00 Ex. Track
1343.90 T/R
Volume 0.00 Fill
Area 0.00 Fill
Volume 0.00 Cut
Area 0.00 Cut

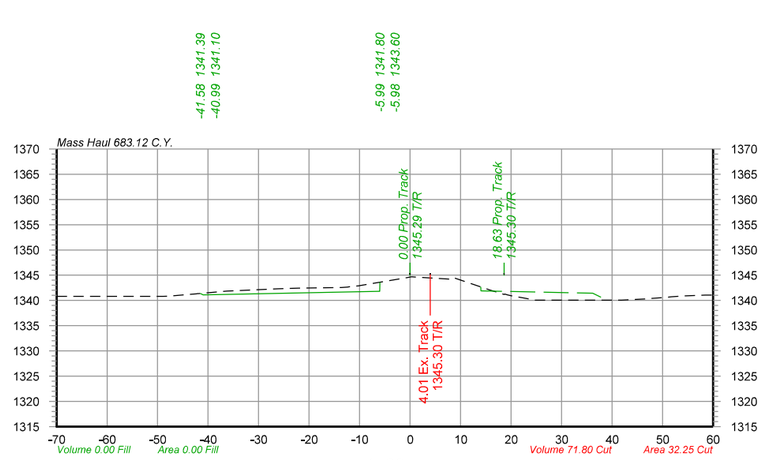
-3+15

| | | |



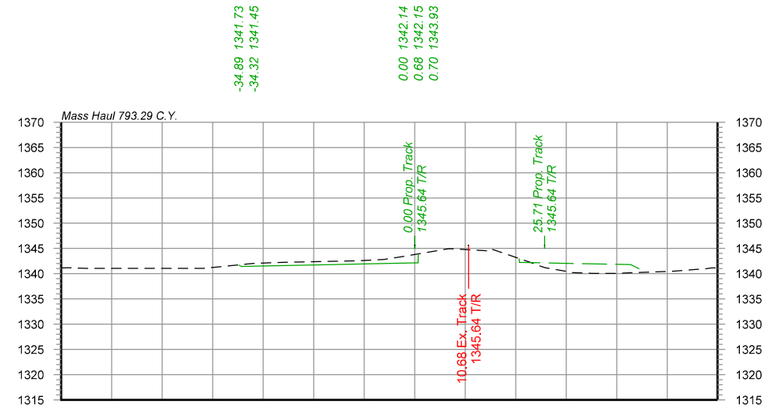
0+00

-70.00	1340.58
-67.74	1340.58
-54.21	1340.58
-50.93	1341.33
-47.38	1341.47
-44.31	1341.66
-42.22	1341.83
-39.68	1342.02
-35.15	1342.08
-33.08	1342.08
-30.90	1342.12
-21.16	1342.37
-15.84	1342.48
-13.55	1342.81
-4.14	1344.18
3.57	1343.93
11.60	1341.59
14.04	1340.75
17.09	1340.16
19.88	1340.05
25.28	1339.97
36.72	1339.83
41.11	1340.15
43.19	1340.30
55.74	1340.58
60.00	1340.80



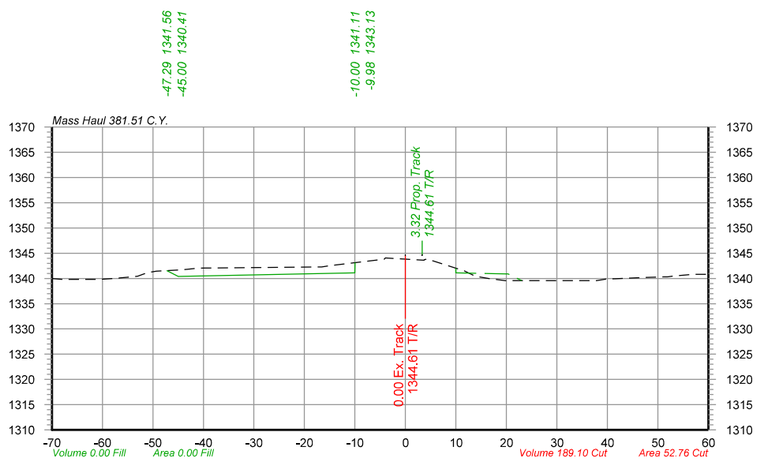
1+00

-70.00	1340.83
-58.21	1340.83
-53.12	1340.83
-50.63	1340.83
-47.74	1340.86
-43.89	1341.19
-41.87	1341.36
-37.73	1341.75
-33.48	1341.98
-26.08	1342.33
-22.15	1342.43
-13.59	1342.58
-10.16	1342.91
-0.34	1344.56
7.76	1344.21
15.82	1342.06
18.63	1341.20
24.40	1340.15
40.11	1340.08
45.11	1340.24
47.26	1340.35
50.66	1340.61
54.23	1340.91
57.44	1341.01
59.92	1341.08



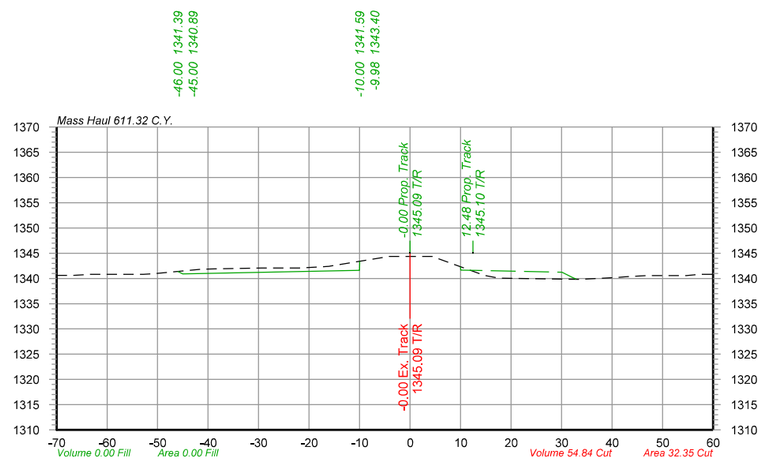
2+00

-70.00	1341.15
-65.21	1341.08
-62.92	1341.07
-59.21	1341.07
-53.75	1341.07
-49.35	1341.06
-47.23	1341.06
-43.65	1341.07
-41.18	1341.10
-38.79	1341.35
-32.17	1342.00
-28.13	1342.20
-23.64	1342.33
-19.29	1342.40
-11.14	1342.58
-6.40	1342.81
-2.92	1343.31
6.41	1344.90
14.62	1344.53
22.83	1342.27
25.84	1341.17
30.22	1340.42
34.46	1340.11
36.94	1340.08
39.87	1340.08
50.95	1340.47
53.76	1340.70
57.58	1341.00
60.00	1341.16



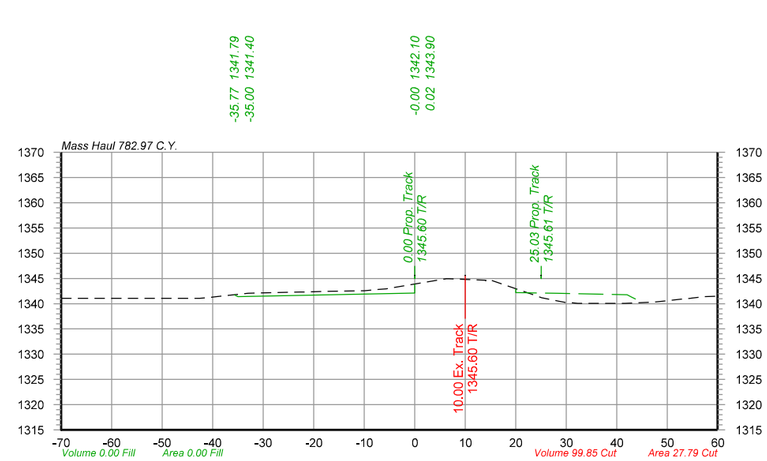
-1+00

-70.00	1338.97
-67.99	1339.83
-60.47	1339.83
-56.75	1340.07
-54.14	1340.33
-51.76	1340.88
-49.33	1341.43
-47.00	1341.58
-44.55	1341.71
-41.20	1342.00
-38.57	1342.08
-21.52	1342.21
-17.60	1342.26
-14.48	1342.59
-4.17	1343.82
3.69	1343.60
11.70	1341.50
14.13	1340.42
16.56	1340.00
19.79	1339.58
28.99	1339.58
37.82	1339.58
39.92	1339.89
44.28	1340.08
47.16	1340.20
50.13	1340.27
53.13	1340.47
56.95	1340.83
60.00	1340.83



0+40

-70.00	1340.60
-66.67	1340.62
-64.58	1340.74
-60.58	1340.83
-56.19	1340.82
-52.82	1340.83
-50.71	1340.96
-43.69	1341.60
-41.41	1341.82
-38.59	1341.88
-29.39	1342.08
-26.39	1342.08
-22.80	1342.07
-17.20	1342.32
-4.89	1344.24
4.30	1344.37
14.71	1340.61
17.56	1340.08
19.65	1340.02
28.33	1339.91
33.67	1338.83
35.89	1338.96
38.51	1340.08
41.46	1340.23
46.88	1340.58
51.33	1340.56
54.49	1340.57
57.37	1340.83
60.00	1340.83



1+90

-70.00	1341.06
-65.73	1341.08
-55.82	1341.06
-52.05	1341.06
-42.59	1341.08
-39.26	1341.40
-35.40	1341.83
-33.01	1342.05
-22.69	1342.33
-17.75	1342.42
-9.95	1342.58
-7.32	1342.79
-5.22	1343.00
5.69	1344.87
13.92	1344.63
24.21	1341.54
28.41	1340.52
31.15	1340.19
33.95	1340.08
37.79	1340.08
41.58	1340.08
46.24	1340.28
48.58	1340.45
52.74	1340.89
54.85	1341.11
57.36	1341.41
59.92	1341.49

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

DRAWN BY:	DMJ
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	X035 of 195

UNION PACIFIC RAILROAD

Sheet 275 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

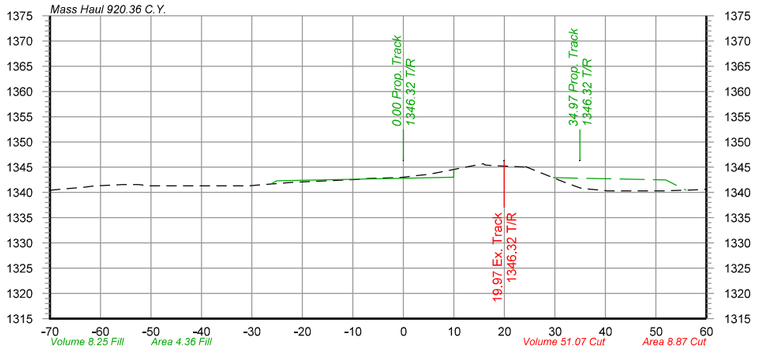
SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.-1+00 TO STA.2+00

Color table: K:\Bentley\Workspace\Projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-
Default
3/9/2026

-26.34 1341.66
-25.03 1342.32

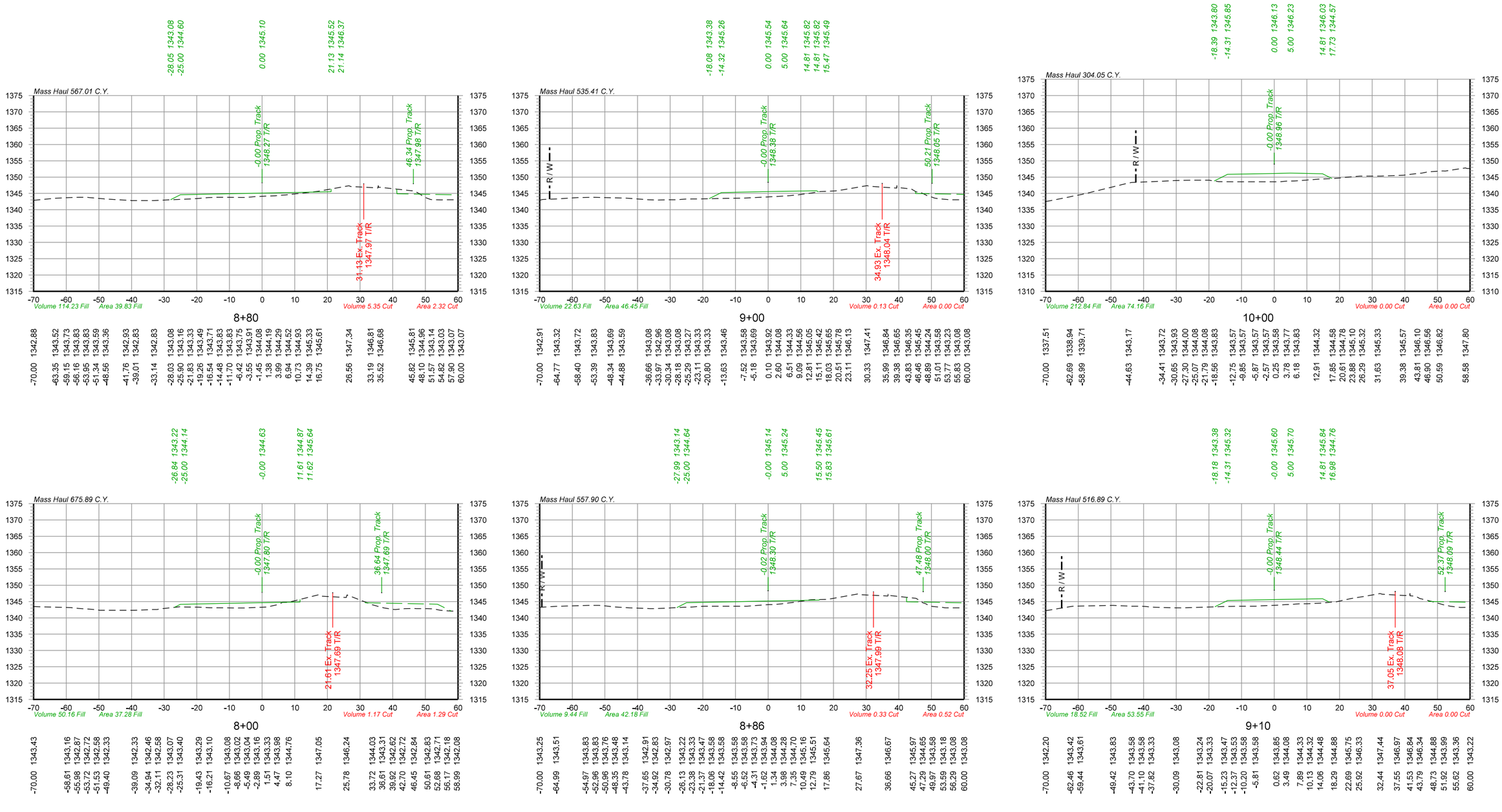
0.00 1342.82

9.97 1343.02
9.98 1344.55



4+00

| | | |



Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

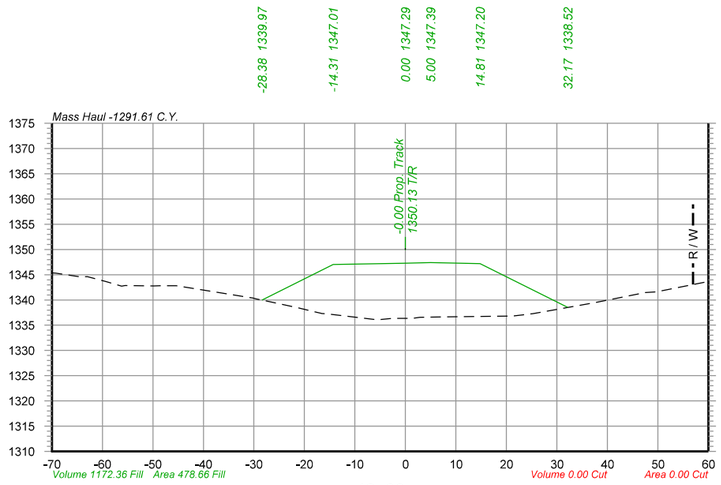
UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X037 of 195

UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

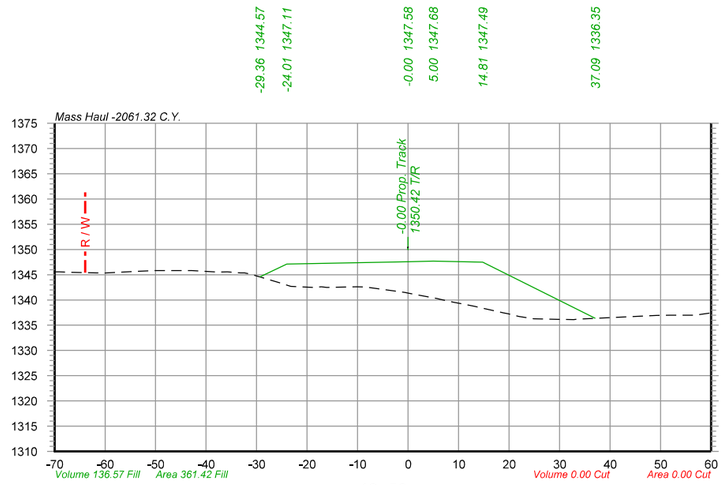
SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.8+00 TO STA.10+00



-28.38	1339.97
-14.31	1347.01
0.00	1347.29
5.00	1347.39
14.81	1347.20
32.17	1338.52

12+00

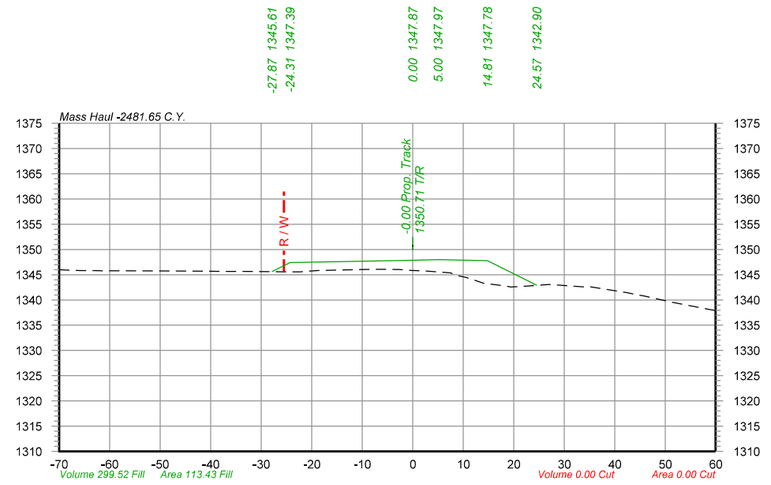
-70.00	1345.35
-64.63	1344.62
-59.32	1343.65
-56.18	1342.73
-49.85	1342.78
-45.37	1342.83
-34.99	1341.13
-30.88	1340.47
-27.79	1339.85
-21.81	1338.57
-17.59	1337.58
-15.40	1337.23
-7.97	1336.37
-5.57	1336.08
-2.54	1336.37
1.43	1336.36
7.57	1336.64
21.26	1336.83
23.40	1337.07
26.82	1337.55
37.58	1339.49
46.13	1341.20
49.70	1341.59
59.11	1343.48



-29.36	1344.57
-24.01	1347.11
-0.00	1347.58
5.00	1347.68
14.81	1347.49
37.09	1336.35

12+50

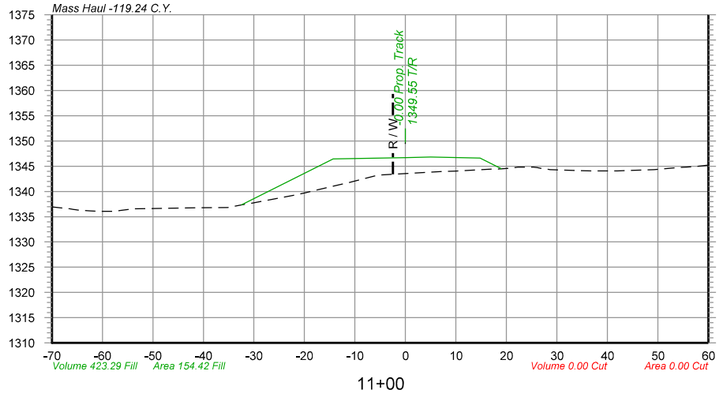
-70.00	1345.58
-67.11	1345.47
-61.70	1345.36
-54.01	1345.65
-50.17	1345.83
-44.83	1345.83
-42.82	1345.80
-37.71	1345.54
-33.24	1345.36
-30.33	1344.86
-25.43	1343.40
-23.22	1342.69
-20.61	1342.58
-17.16	1342.60
-10.23	1342.61
-1.77	1341.63
5.34	1340.37
9.14	1339.51
13.20	1338.72
18.91	1337.46
21.94	1336.74
24.87	1336.28
30.05	1336.13
32.79	1336.11
49.28	1336.94
51.85	1336.96
56.79	1336.97
60.00	1337.42



-27.87	1345.61
-24.31	1347.39
0.00	1347.87
5.00	1347.97
14.81	1347.78
24.57	1342.90

13+00

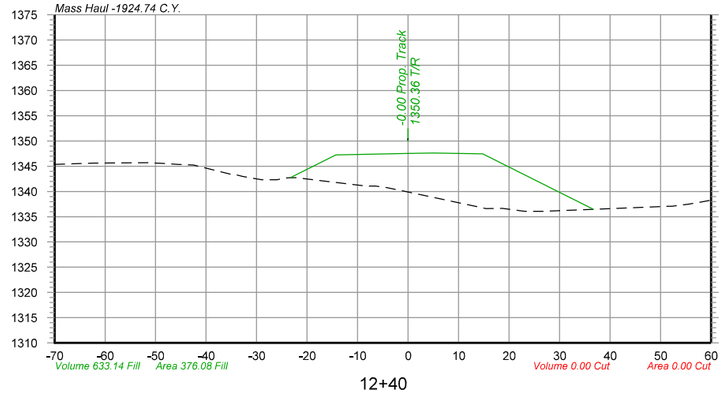
-70.00	1345.98
-65.76	1345.83
-63.05	1345.80
-57.13	1345.76
-47.19	1345.74
-40.56	1345.69
-37.77	1345.63
-33.10	1345.64
-28.47	1345.61
-25.14	1345.58
-22.30	1345.58
-20.17	1345.71
-17.44	1345.85
-8.17	1346.08
-5.33	1346.08
-2.62	1346.03
-0.61	1345.87
2.53	1345.74
7.05	1345.39
10.66	1344.43
14.15	1343.28
17.92	1342.84
22.44	1342.74
27.05	1343.08
33.56	1342.62
35.66	1342.52
42.45	1341.45
45.89	1340.77
49.81	1339.90
59.04	1338.08



-32.52	1337.32
-14.31	1346.43
-0.00	1346.71
5.00	1346.81
14.81	1346.62
19.05	1344.49

11+00

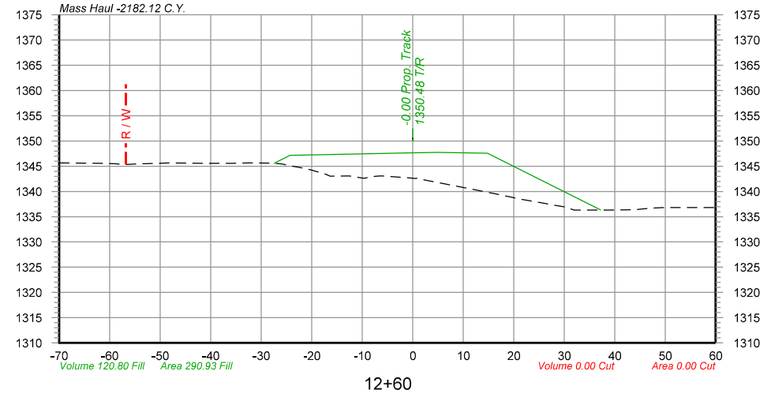
-70.00	1338.95
-67.34	1338.64
-64.86	1338.33
-62.40	1338.14
-57.61	1338.08
-55.15	1338.42
-50.53	1338.62
-41.25	1336.75
-35.19	1336.83
-31.68	1337.48
-21.74	1339.33
-18.96	1339.95
-13.16	1341.30
-10.95	1341.80
-5.42	1343.25
7.11	1343.93
9.81	1344.02
17.38	1344.44
20.23	1344.57
22.28	1344.82
24.39	1344.83
26.83	1344.58
35.00	1344.13
37.13	1344.08
40.22	1344.08
44.10	1344.15
49.27	1344.33
54.10	1344.75
56.87	1344.92
59.79	1345.19



-23.39	1342.70
-14.31	1347.24
0.00	1347.52
5.00	1347.62
14.81	1347.43
36.76	1336.45

12+40

-70.00	1345.35
-64.93	1345.52
-62.54	1345.59
-51.62	1345.70
-48.81	1345.58
-45.64	1345.34
-42.49	1345.25
-34.91	1343.34
-32.81	1342.97
-30.21	1342.51
-27.64	1342.31
-24.98	1342.51
-22.21	1342.74
-16.73	1342.06
-8.31	1341.05
-4.31	1340.77
-1.22	1340.14
14.08	1336.89
18.67	1336.67
23.14	1336.08
25.48	1336.08
34.15	1336.35
51.54	1337.05
55.55	1337.47
57.78	1337.86
60.00	1338.26



-27.48	1345.57
-24.31	1347.16
0.00	1347.64
5.00	1347.74
14.81	1347.55
37.25	1336.33

12+60

-70.00	1345.65
-61.38	1345.58
-58.93	1345.47
-54.84	1345.43
-51.96	1345.50
-47.99	1345.67
-41.52	1345.58
-35.88	1345.58
-32.52	1345.67
-28.02	1345.61
-25.93	1345.44
-23.47	1344.92
-20.19	1344.27
-17.32	1343.44
-12.59	1343.05
-9.66	1342.60
-7.57	1342.96
-0.26	1342.65
2.95	1342.17
5.41	1341.68
7.92	1341.20
11.11	1340.56
16.82	1339.46
21.29	1338.49
26.53	1337.56
29.83	1336.97
31.98	1336.33
38.96	1336.33
42.09	1336.35
44.19	1336.41
47.08	1336.71
49.84	1336.83
55.97	1336.82
58.54	1336.82

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X038 of 195

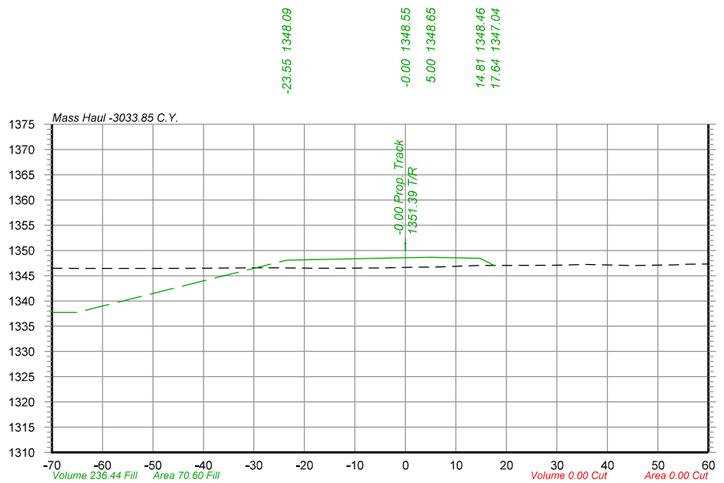
UNION PACIFIC RAILROAD

Sheet 278 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

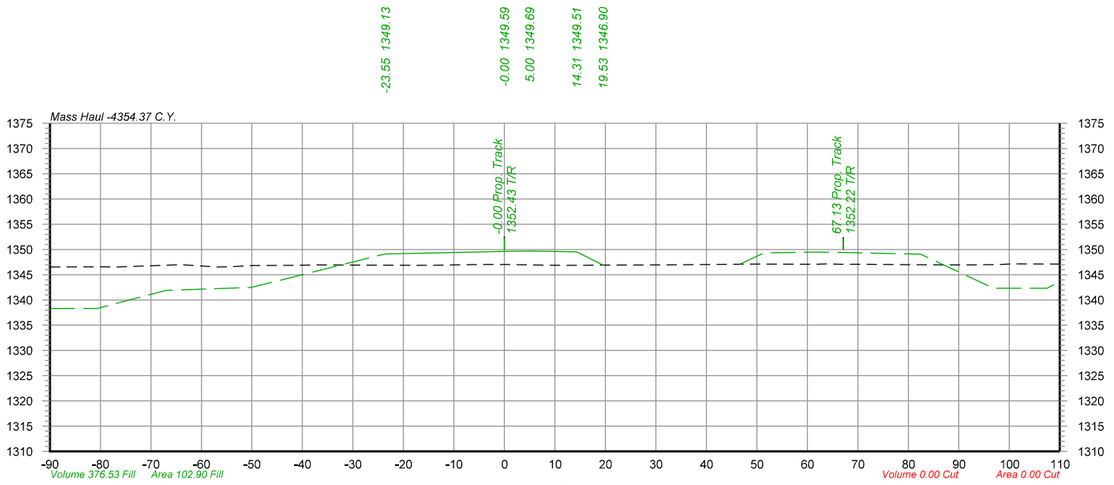
SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.11+00 TO STA.13+00

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-
Default
3/9/2026


-23.55 1348.09
-0.00 1348.55
5.00 1348.65
14.81 1348.46
17.64 1347.04
Mass Haul -3033.85 C.Y.
-0.00 Prop. Track
1351.39 T/R
Volume 236.44 Fill
Area 70.60 Fill
Volume 0.00 Cut
Area 0.00 Cut

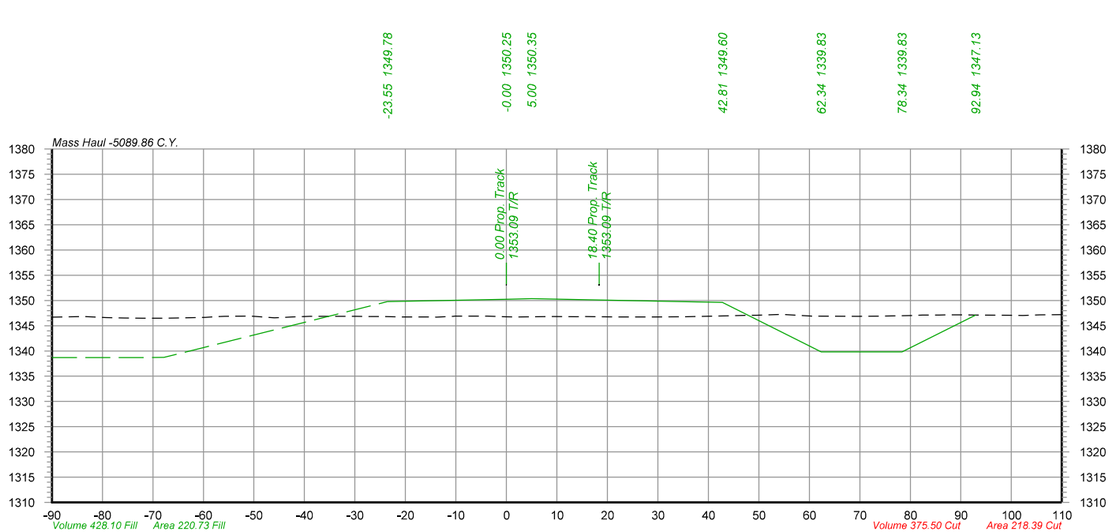
15+00

| | | |


-23.55 1349.13
-0.00 1349.59
5.00 1349.69
14.31 1349.51
19.53 1346.90
Mass Haul -4354.37 C.Y.
-0.00 Prop. Track
1352.43 T/R
67.13 Prop. Track
1352.22 T/R
Volume 376.53 Fill
Area 102.90 Fill
Volume 0.00 Cut
Area 0.00 Cut

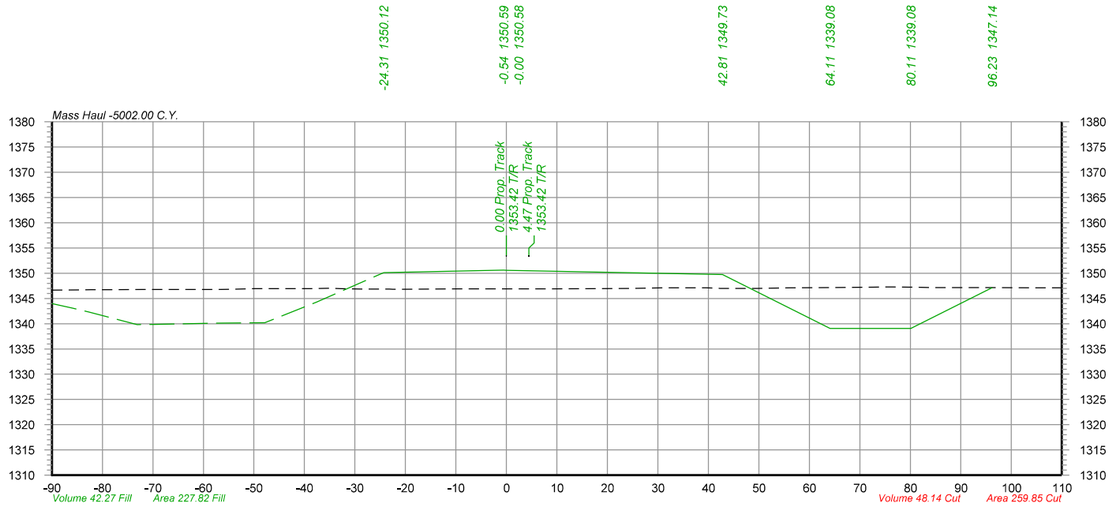
19+00

| | | |


-23.55 1349.78
-0.00 1350.25
5.00 1350.35
42.81 1349.60
62.34 1339.83
78.34 1339.83
92.94 1347.13
Mass Haul -5089.86 C.Y.
0.00 Prop. Track
1353.09 T/R
18.40 Prop. Track
1353.09 T/R
Volume 428.10 Fill
Area 220.73 Fill
Volume 375.50 Cut
Area 218.39 Cut

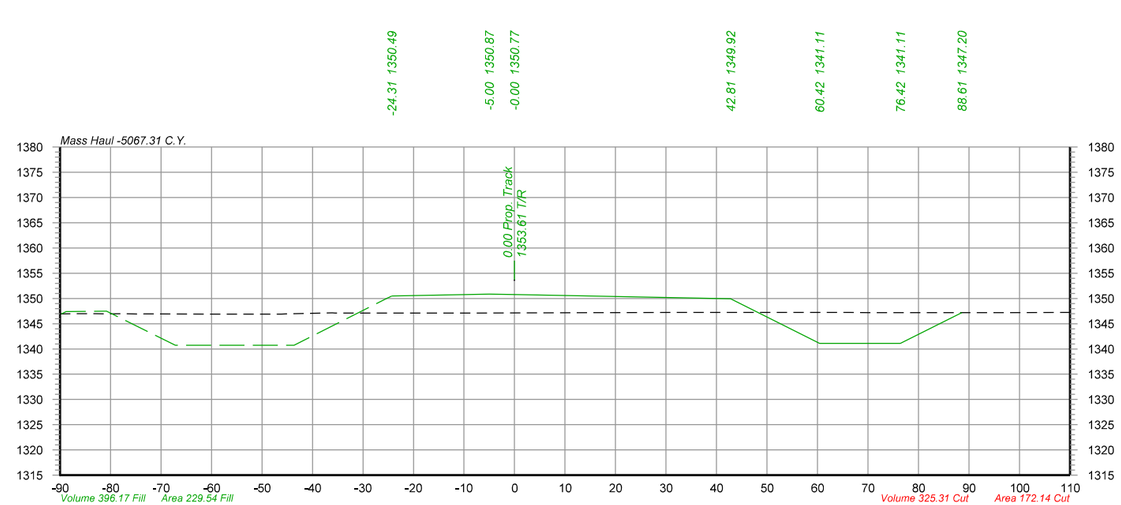
21+52

| | | |



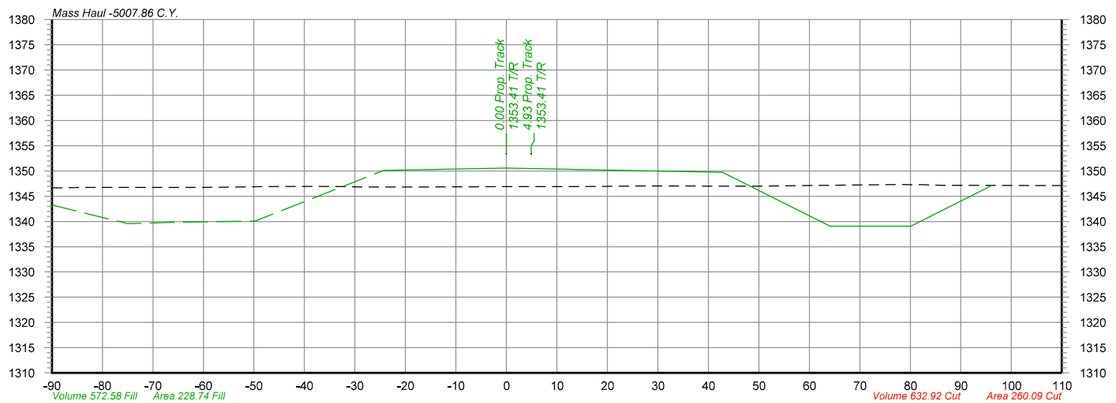
-90.00	-84.27	-82.27	-78.34	-72.03	-59.12	-57.02	-54.44	-49.91	-46.22	-38.62	-34.90	-32.89	-28.70	-23.18	-20.41	-9.82	-7.50	-0.16	5.40	8.84	18.30	24.66	31.21	36.19	39.50	42.03	49.59	56.30	63.80	72.60	75.15	79.84	84.18	92.23	95.73	103.77	108.64
1346.64	1346.67	1346.73	1346.73	1346.76	1346.78	1346.79	1346.83	1346.96	1346.94	1346.96	1347.01	1346.93	1346.87	1346.84	1346.83	1346.89	1346.90	1346.90	1346.91	1346.91	1346.93	1347.00	1347.10	1347.11	1347.12	1347.02	1347.00	1347.11	1347.15	1347.24	1347.27	1347.25	1347.17	1347.15	1347.14	1347.13	1347.13

23+05



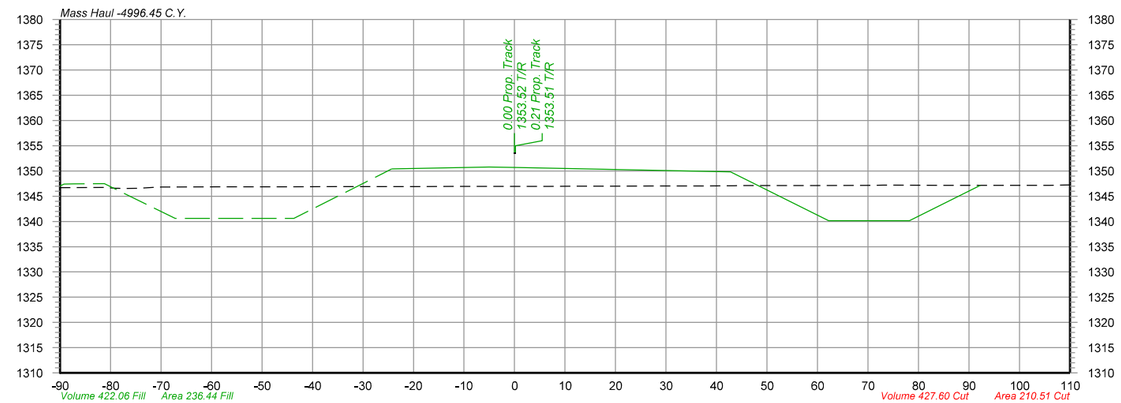
-90.00	-86.50	-84.01	-80.65	-77.47	-73.99	-60.29	-54.18	-46.16	-43.53	-36.08	-32.10	-28.54	-25.29	-20.35	-12.70	-7.44	3.12	5.46	15.82	18.36	31.27	34.76	44.17	50.58	57.08	66.40	69.98	75.48	82.22	90.00	95.79	98.04	108.70
1346.95	1346.96	1346.97	1346.96	1346.99	1346.91	1346.91	1346.91	1346.92	1346.97	1347.14	1347.11	1347.13	1347.09	1347.09	1347.12	1347.13	1347.13	1347.14	1347.17	1347.18	1347.23	1347.25	1347.24	1347.22	1347.23	1347.22	1347.21	1347.21	1347.20	1347.20	1347.20	1347.20	1347.22

24+00



-90.00	-86.32	-77.84	-64.14	-56.51	-50.30	-37.39	-32.49	-28.13	-24.49	-16.67	-11.58	-6.76	-0.85	1.32	10.93	14.23	27.13	30.79	37.84	47.22	50.10	52.94	62.43	66.51	74.43	78.51	82.83	86.18	91.06	94.08	104.56	106.96	110.00
1346.63	1346.69	1346.74	1346.75	1346.78	1346.88	1346.95	1346.89	1346.83	1346.81	1346.82	1346.84	1346.87	1346.90	1346.91	1346.91	1346.91	1347.01	1347.01	1347.02	1346.99	1346.99	1347.04	1347.15	1347.18	1347.28	1347.30	1347.27	1347.13	1347.14	1347.14	1347.12	1347.11	1347.12

23+00



-90.00	-81.34	-78.84	-74.51	-71.05	-68.43	-58.27	-56.21	-51.35	-44.89	-35.52	-31.99	-19.70	-12.25	-6.18	-3.88	6.73	11.94	19.63	27.76	32.54	37.50	43.58	53.67	58.35	71.25	75.22	84.16	87.25	91.04	97.06	103.00	105.92	110.00
1346.71	1346.75	1346.57	1346.58	1346.78	1346.83	1346.84	1346.85	1346.85	1346.86	1346.88	1346.89	1346.92	1346.94	1346.94	1346.94	1346.96	1346.97	1347.00	1347.02	1347.03	1347.04	1347.08	1347.10	1347.10	1347.17	1347.18	1347.16	1347.17	1347.16	1347.15	1347.16	1347.17	1347.22

23+54

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RL_TK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05.Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

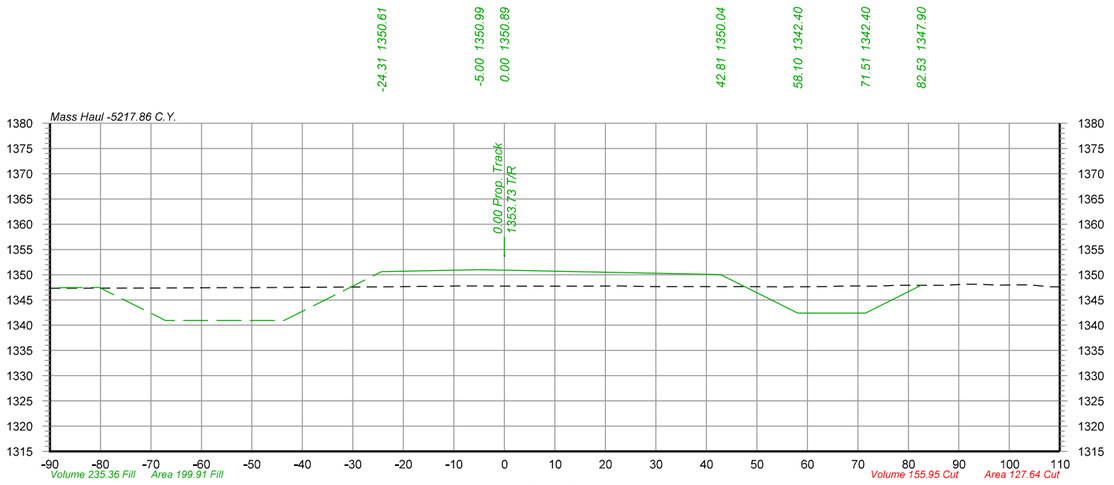
DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X042 of 195

UNION PACIFIC RAILROAD

Sheet 282 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.23+00 TO STA.24+00

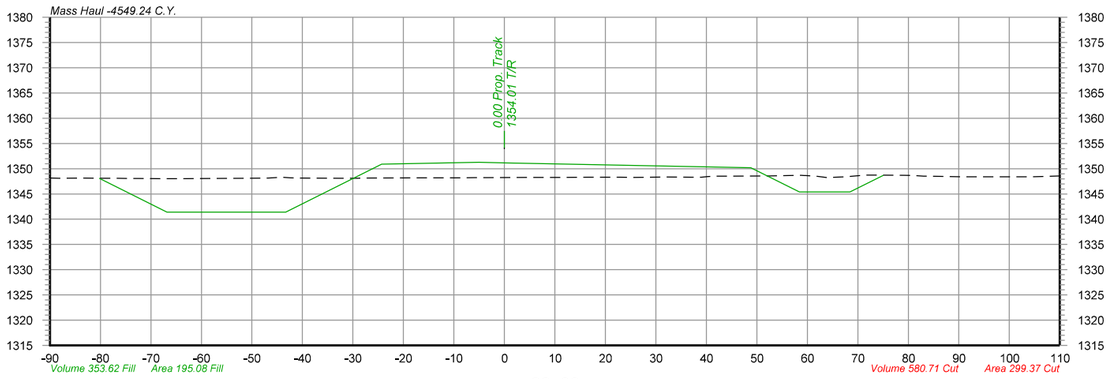

-24.31 1350.61
-5.00 1350.99
0.00 1350.89
42.81 1350.04
58.10 1342.40
71.51 1342.40
82.53 1347.90
Mass Haul -5217.86 C.Y.
0.00 Prop. Track
1353.73 T/R
Volume 235.36 Fill
Area 199.91 Fill
Volume 155.95 Cut
Area 127.64 Cut

24+60

| | | |

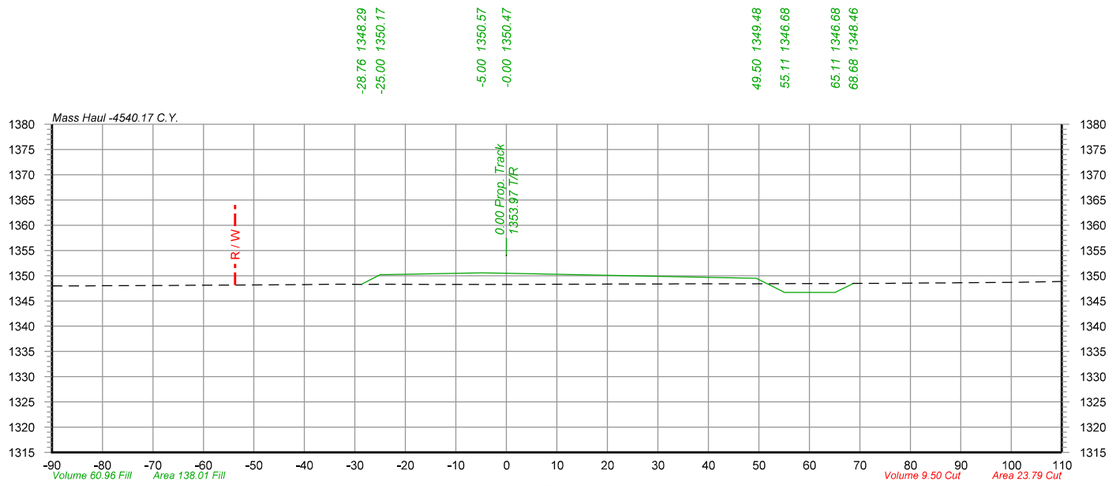
Color table: K:\Bentley\Workspace\V8\projects\Clients\UPRR_Track\UPRR_Track_V8\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

-80.26 1348.11 | -66.81 1341.39 | -43.31 1341.39 | -24.31 1350.89 | -5.00 1351.27 | -0.00 1351.17 | 48.81 1350.20 | 58.42 1345.39 | 68.42 1345.39 | 75.06 1348.71



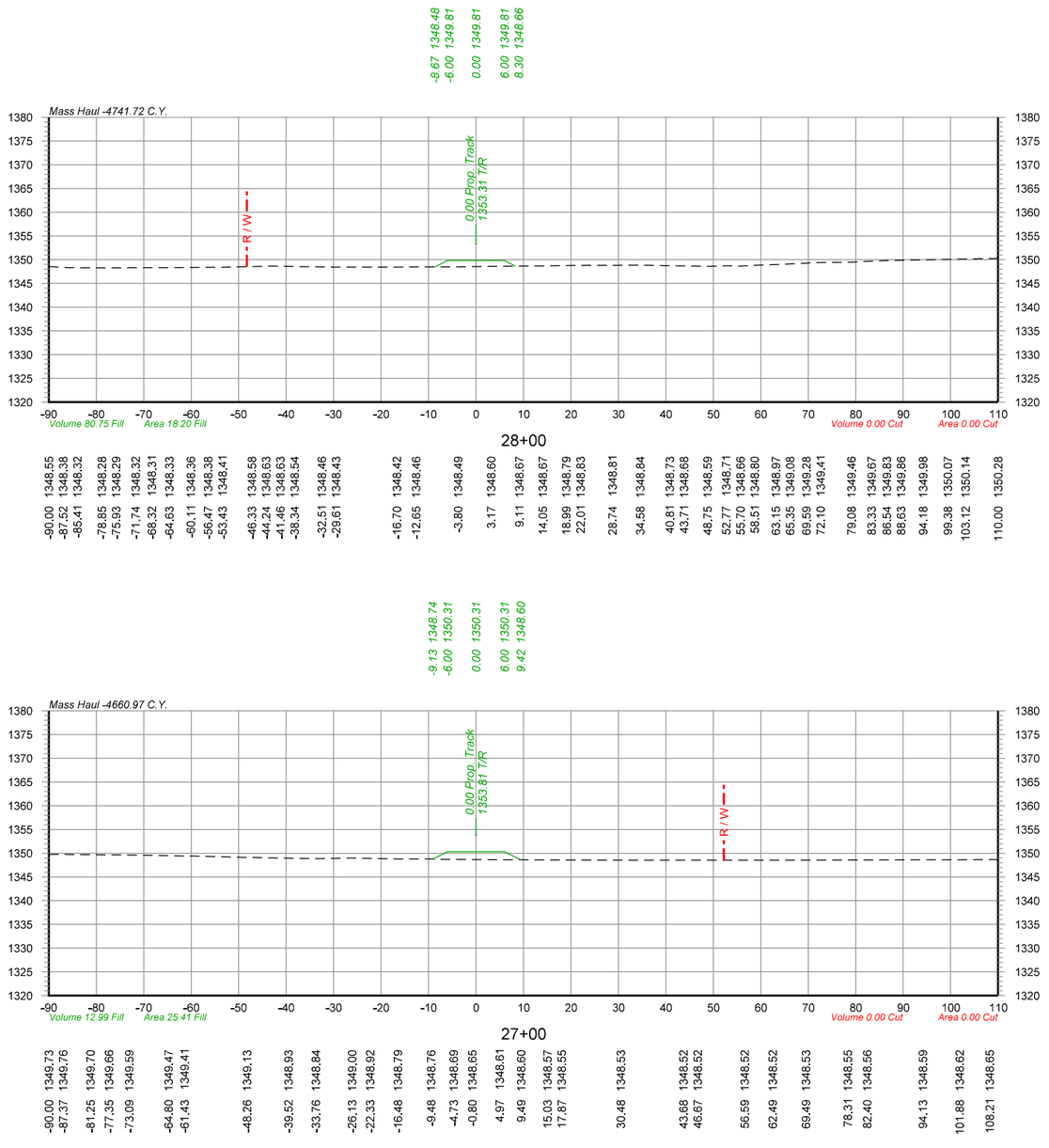
26+00

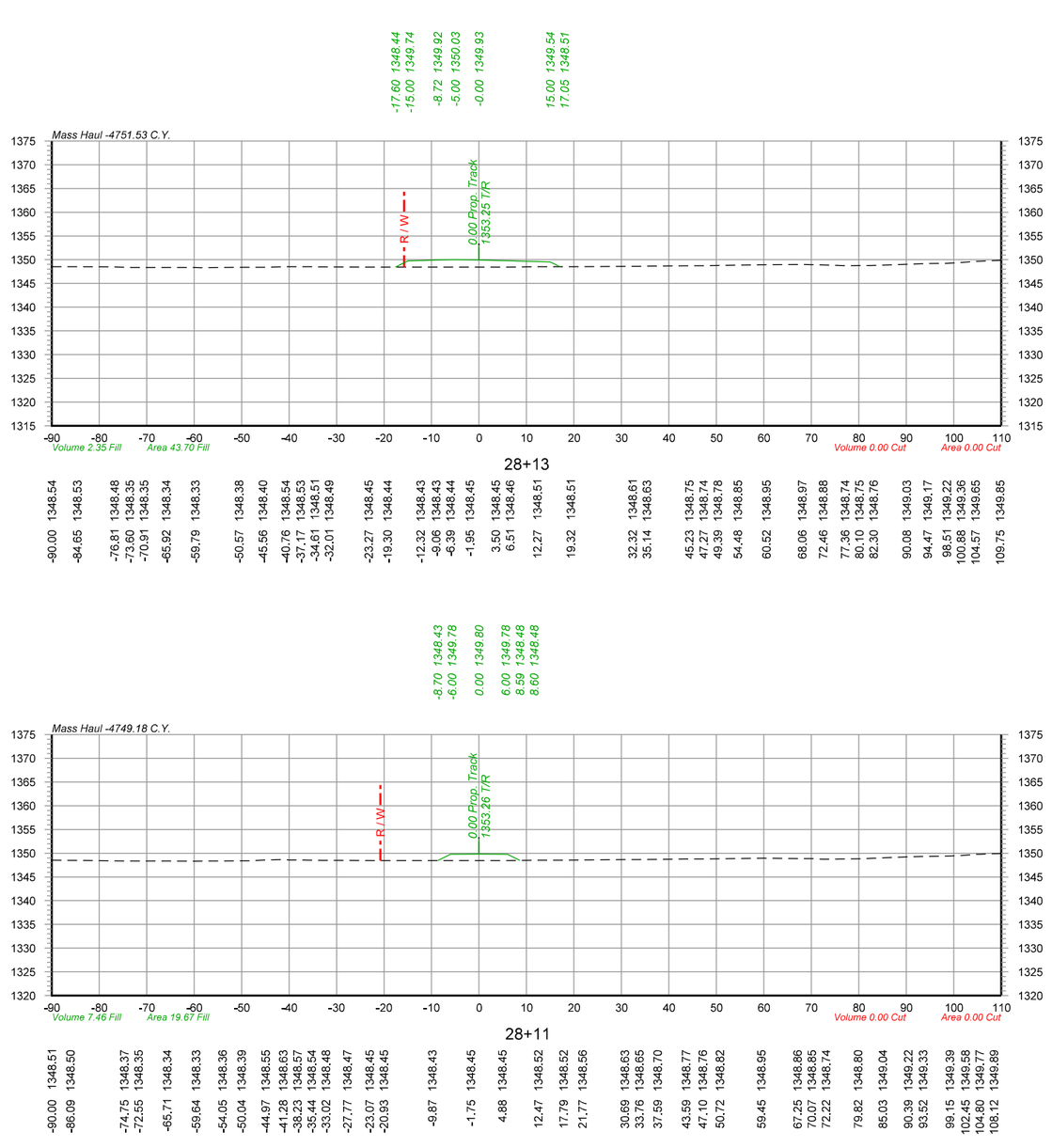
| | | |


-28.76 1348.29
-25.00 1350.17
-5.00 1350.57
-0.00 1350.47
49.50 1349.48
55.11 1346.68
65.11 1346.68
68.68 1348.46
Mass Haul -4540.17 C.Y.
R / W
0.00 Prop. Track
1353.97 T/R
Volume 60.96 Fill
Area 138.01 Fill
Volume 9.50 Cut
Area 23.79 Cut

26+60

| | | |





olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

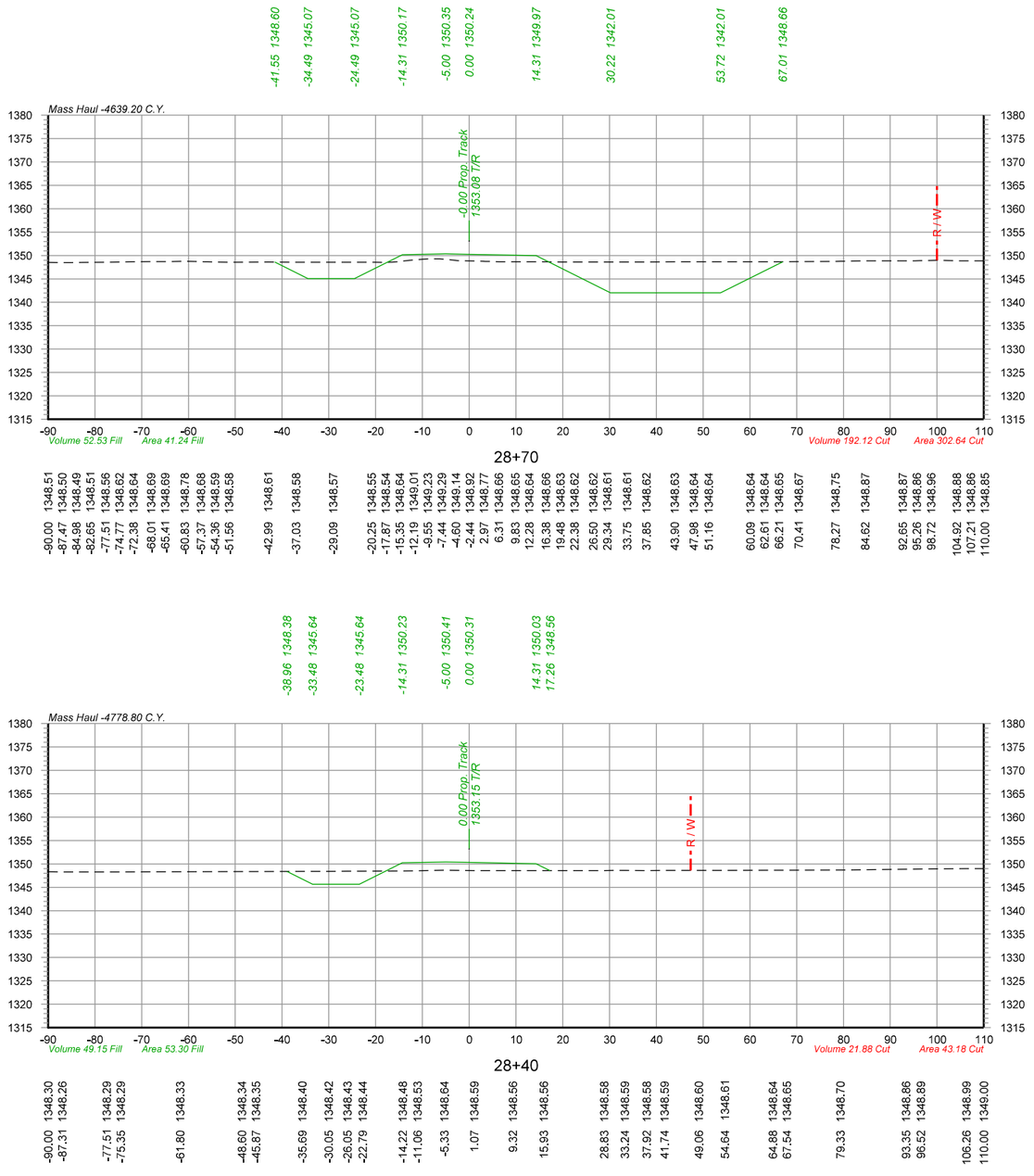
DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X046 of 195

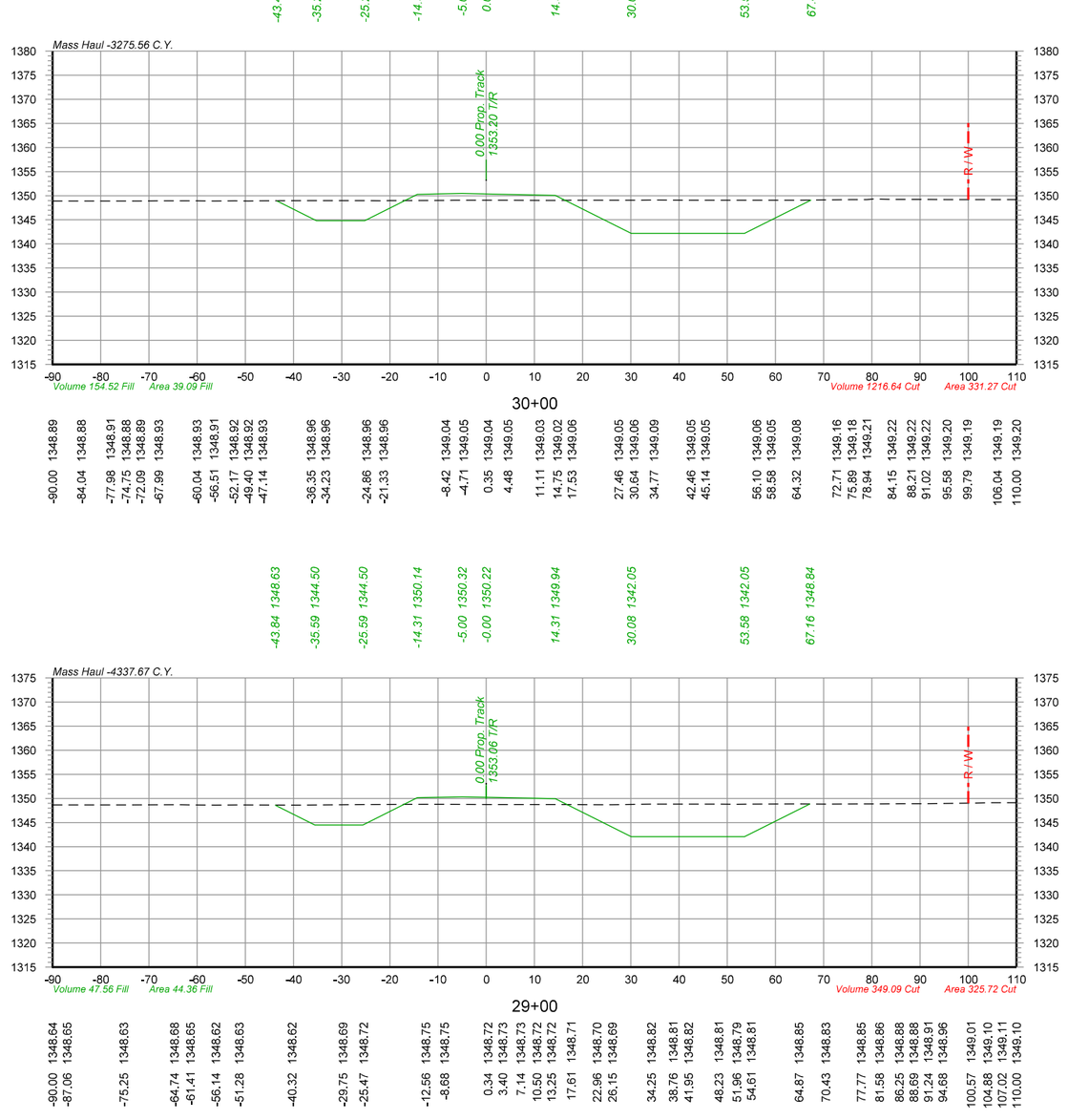
UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.27+00 TO STA.28+13

Color table: K:\Bentley\Workspace\Projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026





olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	DMJ
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	X047 of 195

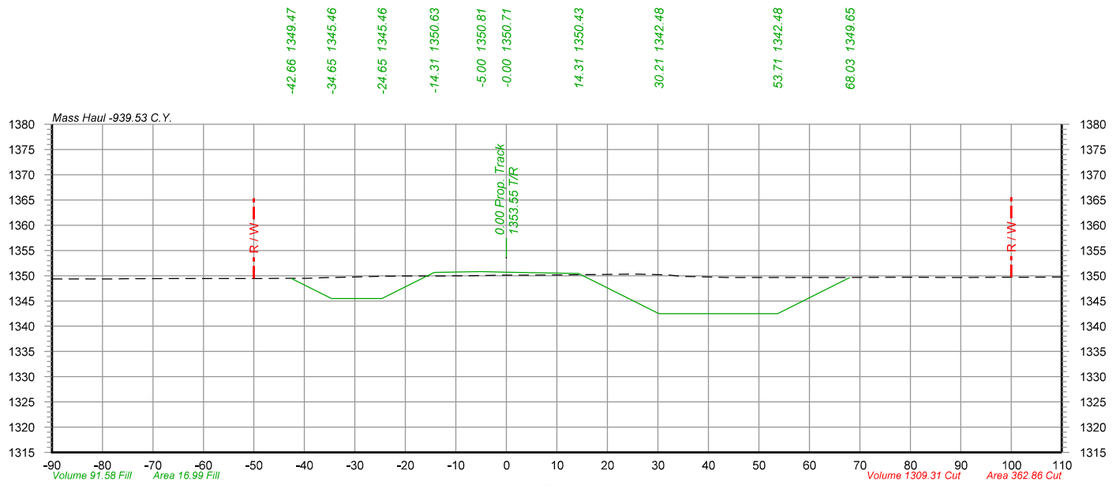
UNION PACIFIC RAILROAD

Sheet 287 of 587

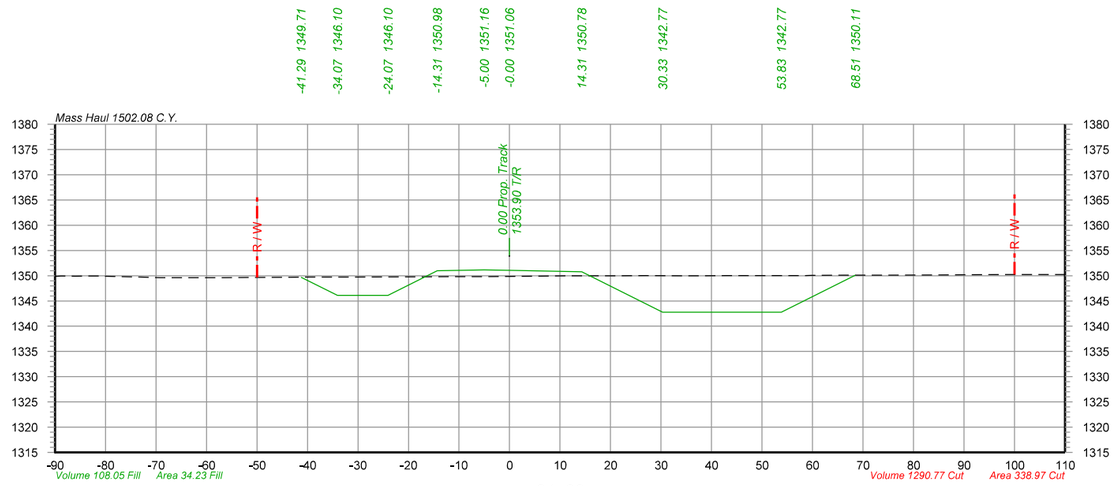
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.28+40 TO STA.30+00

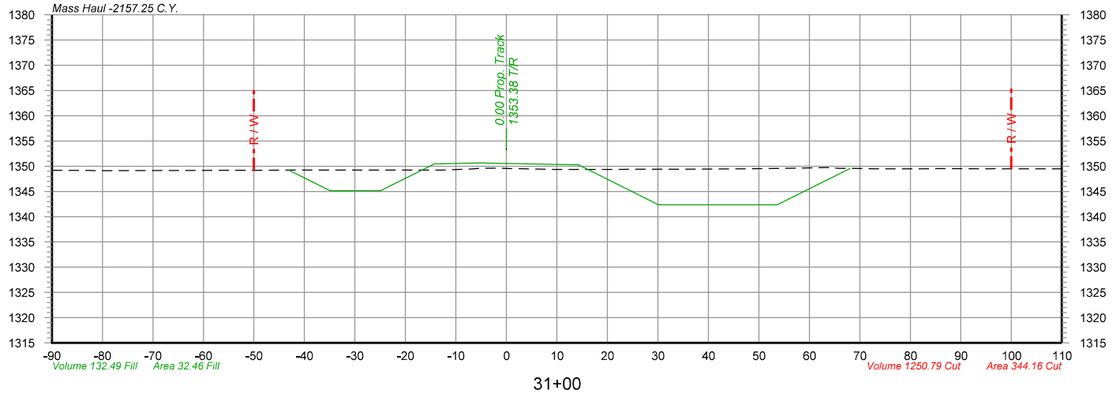
Color table: K:\Bentley\Workspace\Projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026



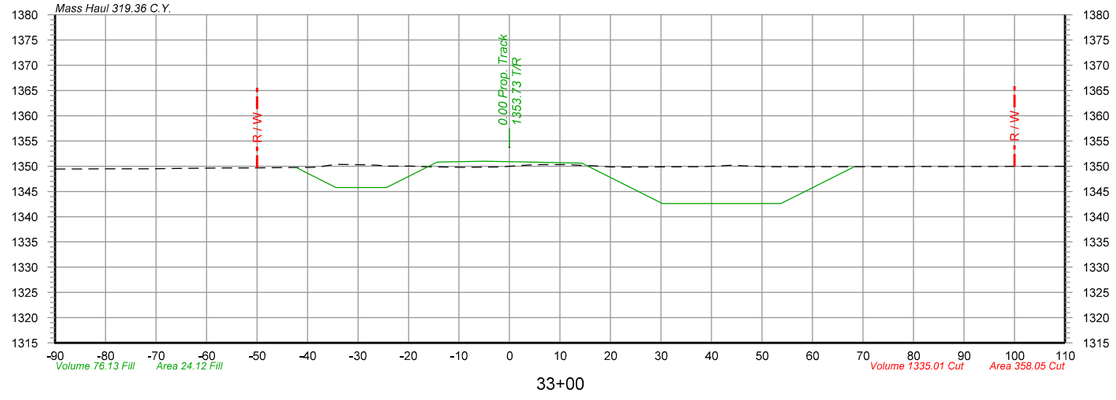
Station	Offset	Elevation	Cut	Fill
32+00	-90.00	1349.35		
	-85.09	1349.35		
	-77.58	1349.37		
	-64.67	1349.44		
	-60.06	1349.45		
	-51.77	1349.46		
	-48.38	1349.46		
	-44.23	1349.46		
	-40.26	1349.47		
	-36.24	1349.61		
	-30.73	1349.72		
	-26.19	1349.86		
	-22.47	1349.90		
	-20.43	1349.92		
	-18.11	1349.93		
	-15.87	1349.93		
	-13.50	1349.92		
	-11.27	1349.97		
	-8.88	1349.98		
	-5.98	1350.03		
	-3.25	1350.07		
	-0.62	1350.12		
	3.83	1350.13		
	9.15	1350.14		
	11.41	1350.16		
	21.79	1350.27		
	24.67	1350.31		
	30.90	1350.21		
	34.45	1349.90		
	37.47	1349.82		
	43.83	1349.66		
	51.12	1349.66		
	54.92	1349.65		
	64.38	1349.64		
	66.51	1349.64		
	77.28	1349.67		
	82.33	1349.68		
	86.66	1349.66		
	90.19	1349.66		
	98.16	1349.67		
	103.09	1349.69		
	107.98	1349.75		
	110.00	1349.74		



Station	Offset	Elevation	Cut	Fill
34+00	-90.00	1349.87		
	-85.96	1349.90		
	-83.30	1349.96		
	-80.92	1349.93		
	-73.17	1349.73		
	-69.30	1349.62		
	-56.39	1349.61		
	-52.12	1349.64		
	-43.49	1349.70		
	-40.26	1349.71		
	-36.30	1349.73		
	-33.15	1349.75		
	-30.58	1349.75		
	-20.47	1349.78		
	-17.68	1349.78		
	-11.83	1349.81		
	-4.78	1349.81		
	4.87	1349.92		
	8.13	1349.95		
	11.17	1349.98		
	21.03	1350.00		
	26.99	1350.00		
	33.94	1350.00		
	37.92	1349.99		
	42.81	1350.00		
	46.84	1350.02		
	58.63	1350.04		
	66.35	1350.11		
	72.65	1350.11		
	85.56	1350.17		
	90.27	1350.19		
	98.46	1350.23		
	106.09	1350.25		
	110.00	1350.25		



Station	Offset	Elevation	Cut	Fill
31+00	-90.00	1349.19		
	-82.04	1349.14		
	-79.85	1349.12		
	-68.81	1349.15		
	-64.02	1349.17		
	-55.90	1349.19		
	-48.20	1349.20		
	-43.00	1349.23		
	-32.38	1349.25		
	-30.10	1349.25		
	-19.97	1349.23		
	-17.19	1349.23		
	-12.20	1349.25		
	-7.11	1349.44		
	-2.25	1349.59		
	0.63	1349.52		
	9.59	1349.34		
	15.08	1349.34		
	21.52	1349.37		
	25.74	1349.39		
	30.90	1349.39		
	34.43	1349.39		
	46.72	1349.48		
	57.78	1349.59		
	61.29	1349.68		
	63.39	1349.72		
	65.67	1349.58		
	68.53	1349.56		
	73.14	1349.50		
	75.49	1349.48		
	78.37	1349.48		
	82.60	1349.50		
	85.51	1349.50		
	87.70	1349.51		
	95.79	1349.50		
	98.95	1349.48		
	110.00	1349.49		



Station	Offset	Elevation	Cut	Fill
33+00	-90.00	1349.45		
	-87.73	1349.46		
	-79.86	1349.50		
	-73.44	1349.48		
	-60.53	1349.62		
	-56.09	1349.63		
	-51.43	1349.63		
	-47.71	1349.69		
	-44.48	1349.75		
	-38.95	1349.77		
	-35.33	1350.22		
	-31.27	1350.30		
	-28.20	1350.28		
	-23.83	1350.03		
	-19.76	1350.01		
	-16.42	1349.89		
	-9.05	1349.77		
	-1.46	1349.84		
	2.45	1350.14		
	4.62	1350.26		
	6.70	1350.30		
	9.69	1350.33		
	12.37	1350.26		
	15.51	1350.12		
	20.04	1349.85		
	23.00	1349.83		
	29.20	1349.85		
	36.84	1349.90		
	40.82	1350.04		
	43.26	1350.16		
	47.40	1350.03		
	49.88	1349.93		
	53.02	1349.91		
	62.29	1349.90		
	68.51	1349.90		
	76.51	1349.92		
	81.42	1349.92		
	86.30	1349.93		
	94.32	1349.95		
	102.12	1349.96		
	107.23	1349.98		
	110.00	1349.98		

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X048 of 195

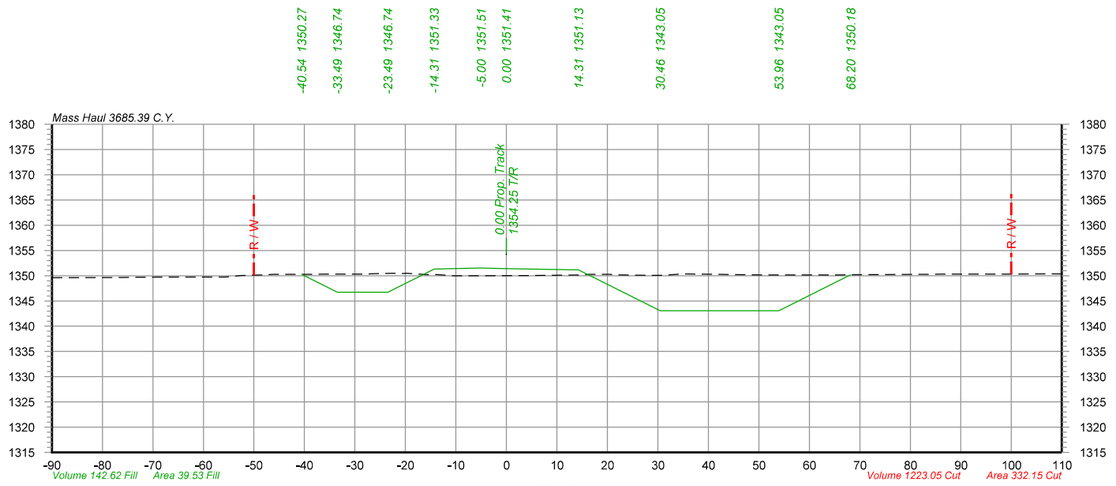
UNION PACIFIC RAILROAD

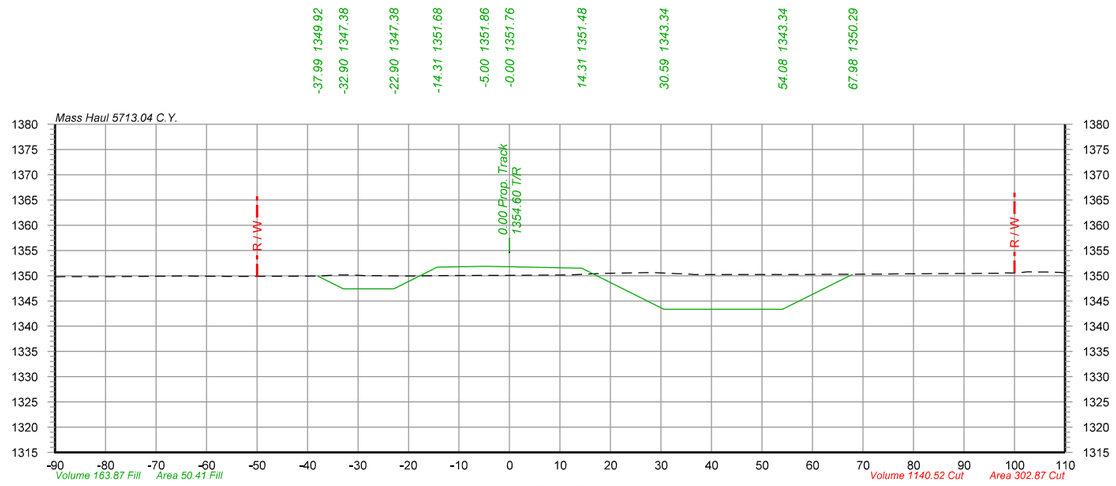
Sheet 288 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.31+00 TO STA.34+00

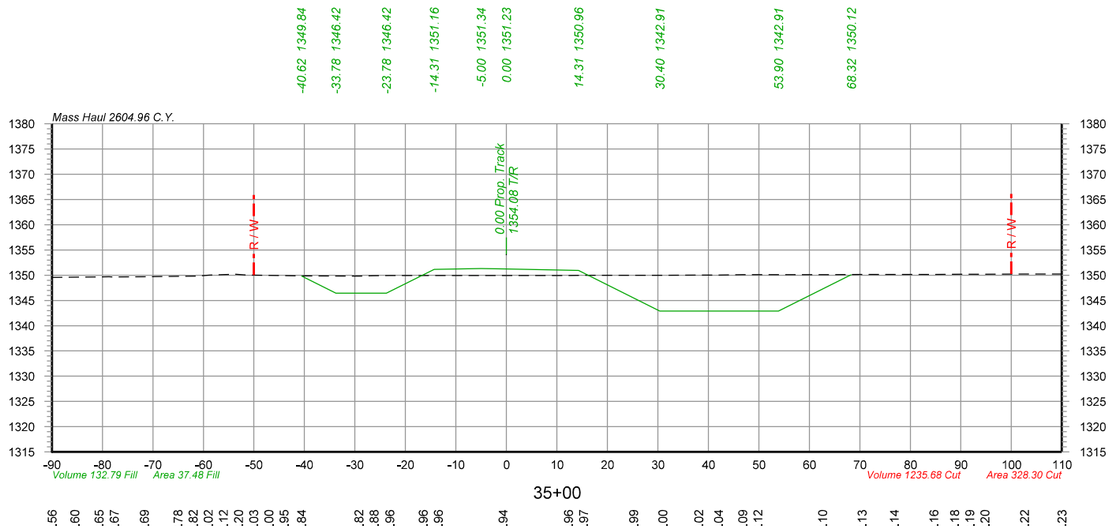
Color table: K:\Bentley\Workspace\Projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-
Default
3/9/2026

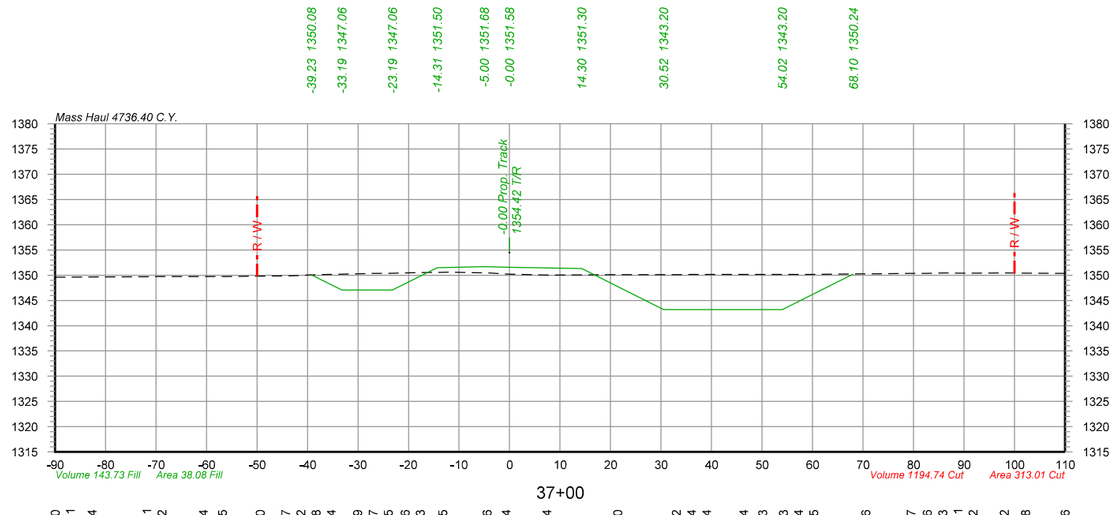




-90.00	1349.61
-86.83	1349.62
-75.82	1349.67
-67.67	1349.72
-56.36	1349.74
-53.04	1350.00
-49.92	1350.11
-46.77	1350.22
-42.38	1350.26
-38.91	1350.28
-35.90	1350.31
-31.56	1350.31
-27.71	1350.32
-24.13	1350.46
-20.48	1350.45
-17.43	1350.33
-15.22	1350.20
-11.67	1350.07
-8.83	1349.97
3.15	1350.03
14.92	1350.13
17.01	1350.28
20.30	1350.27
22.46	1350.16
25.16	1350.10
29.10	1350.08
31.65	1350.12
34.88	1350.36
37.68	1350.32
42.21	1350.26
50.75	1350.17
55.12	1350.16
60.26	1350.14
66.57	1350.17
76.22	1350.22
82.36	1350.26
85.79	1350.30
90.64	1350.30
93.48	1350.30
95.80	1350.30
98.21	1350.31
106.74	1350.34
110.00	1350.36

-90.00	1349.78
-84.35	1349.81
-80.87	1349.81
-78.55	1349.81
-67.88	1349.92
-65.65	1349.93
-55.77	1349.87
-52.92	1349.85
-42.74	1349.90
-37.82	1349.93
-35.66	1350.05
-33.63	1350.15
-31.53	1350.17
-28.92	1350.04
-20.42	1349.95
-16.90	1349.97
-14.03	1350.01
-4.60	1350.06
-1.13	1350.07
11.22	1350.14
18.03	1350.46
27.17	1350.61
29.83	1350.56
33.34	1350.41
35.36	1350.31
40.44	1350.22
43.27	1350.23
50.96	1350.23
58.69	1350.24
63.40	1350.26
74.51	1350.33
82.60	1350.39
89.94	1350.43
92.09	1350.45
95.67	1350.48
98.20	1350.55
101.47	1350.67
103.99	1350.74
106.49	1350.71
109.15	1350.63





-90.00	1349.56
-85.50	1349.60
-80.70	1349.65
-78.07	1349.67
-71.73	1349.69
-65.07	1349.78
-61.02	1349.82
-58.72	1350.02
-56.33	1350.12
-53.66	1350.20
-51.35	1350.03
-48.06	1350.00
-45.02	1349.95
-40.61	1349.84
-29.24	1349.82
-26.45	1349.88
-23.11	1349.96
-16.51	1349.96
-13.54	1349.96
-0.68	1349.94
12.27	1349.96
15.14	1349.97
25.17	1349.99
30.96	1350.00
38.08	1350.02
41.99	1350.04
46.78	1350.09
49.09	1350.12
62.60	1350.10
70.42	1350.13
76.79	1350.14
84.63	1350.16
89.70	1350.18
91.74	1350.19
94.24	1350.20
102.60	1350.22
110.00	1350.23

-90.00	1349.60
-87.67	1349.61
-82.69	1349.64
-71.85	1349.71
-69.79	1349.72
-60.66	1349.74
-56.88	1349.75
-49.39	1349.80
-43.95	1349.87
-41.34	1349.92
-39.26	1350.08
-35.78	1350.14
-30.11	1350.29
-27.04	1350.37
-24.67	1350.35
-20.69	1350.46
-18.10	1350.53
-13.25	1350.55
-4.46	1350.46
-0.69	1350.24
7.36	1350.04
21.41	1350.10
33.45	1350.12
36.02	1350.14
38.90	1350.14
46.35	1350.14
50.11	1350.13
54.72	1350.13
57.22	1350.14
59.26	1350.15
70.54	1350.26
79.49	1350.37
82.71	1350.36
86.40	1350.43
88.78	1350.41
91.69	1350.42
97.97	1350.42
102.18	1350.38
110.00	1350.36

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X049 of 195

UNION PACIFIC RAILROAD

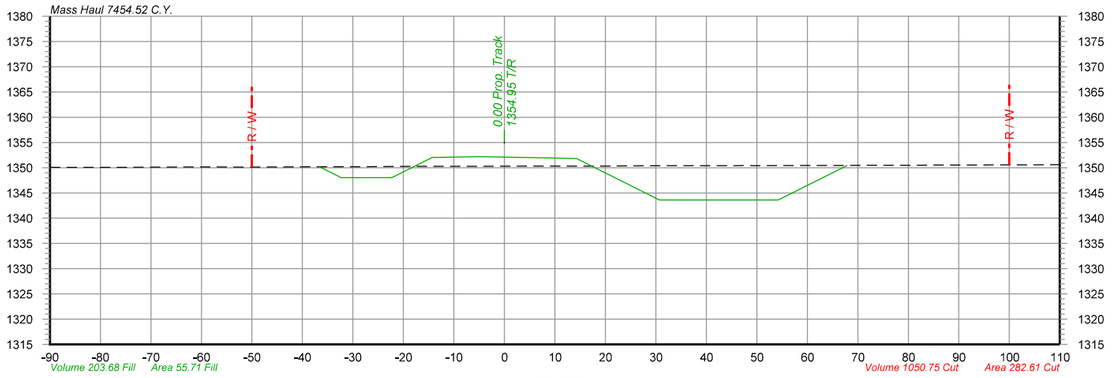
Sheet 289 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.35+00 TO STA.38+00

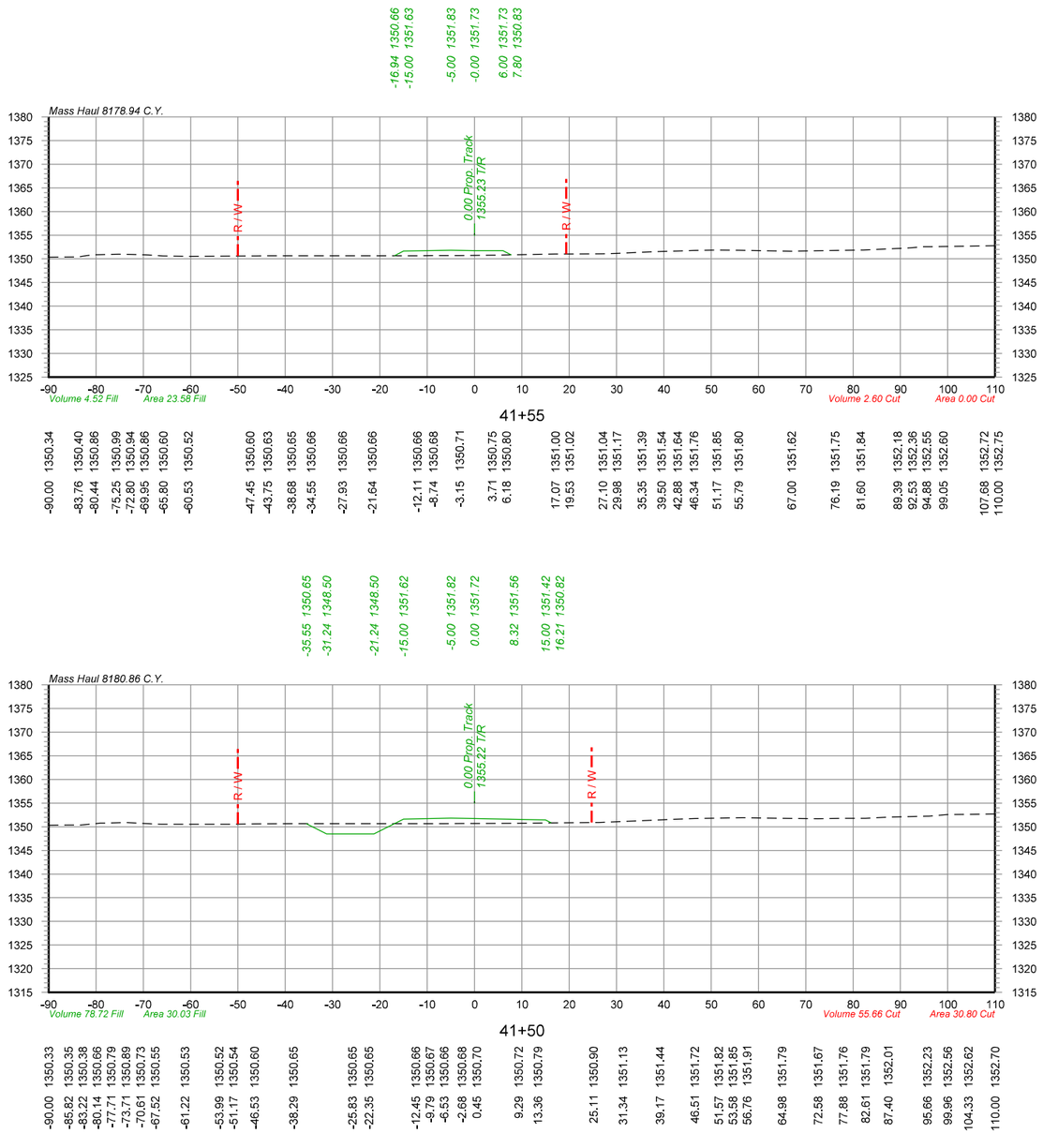
Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

-36.63 1350.17
-32.32 1348.02
-22.32 1348.02
-14.31 1352.03
-5.00 1352.21
-0.00 1352.11
14.31 1351.83
30.71 1343.63
54.21 1343.63
67.88 1350.46



40+00

| | | |



olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

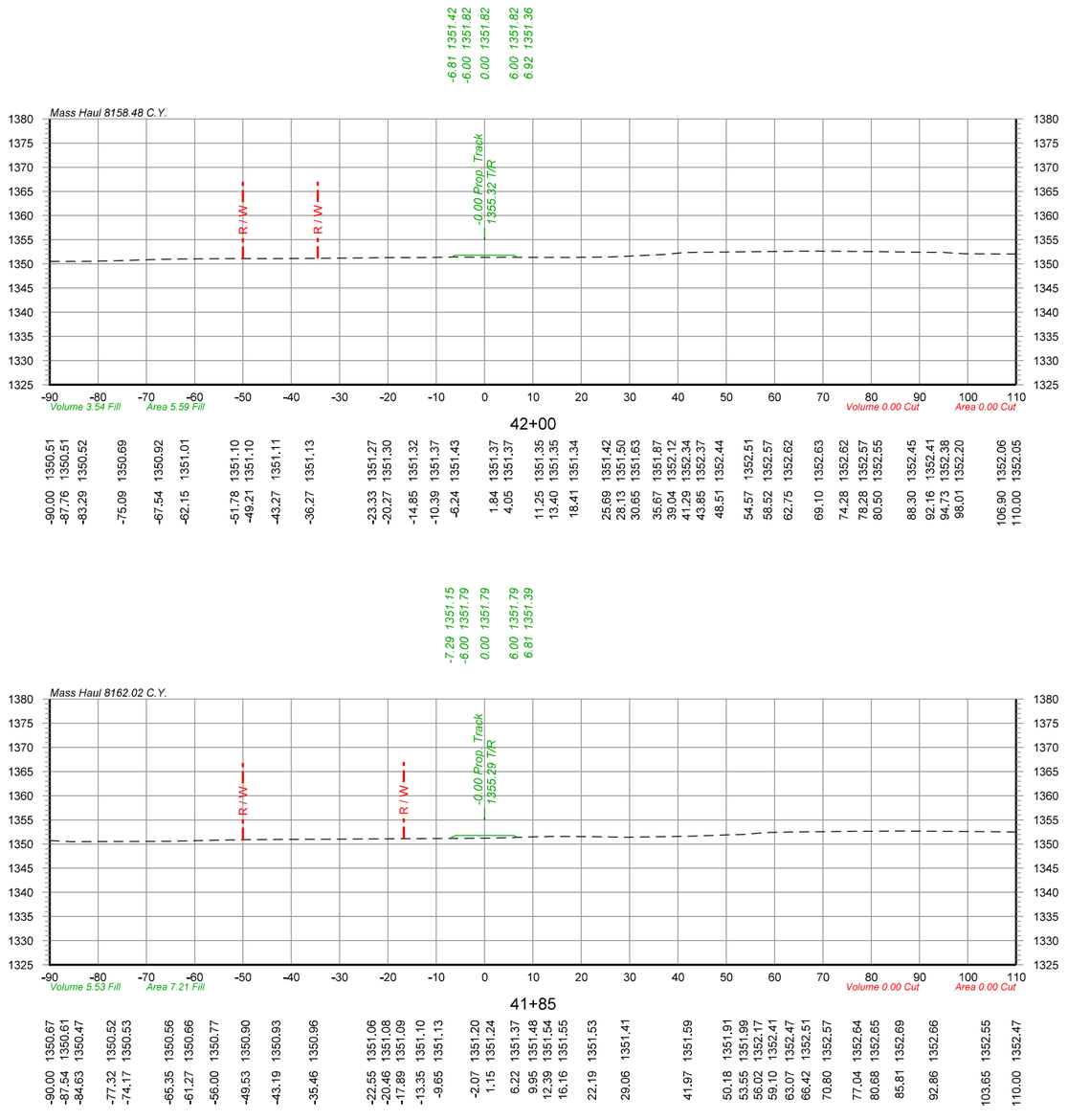
DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X051 of 195

UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.41+50 TO STA.41+69

Color table: K:\Bentley\Workspace\Projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026



Color table: K:\Bentley\Workspace\V8\projects\Clients\UPRR_Track\UPRR_Track_V8\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

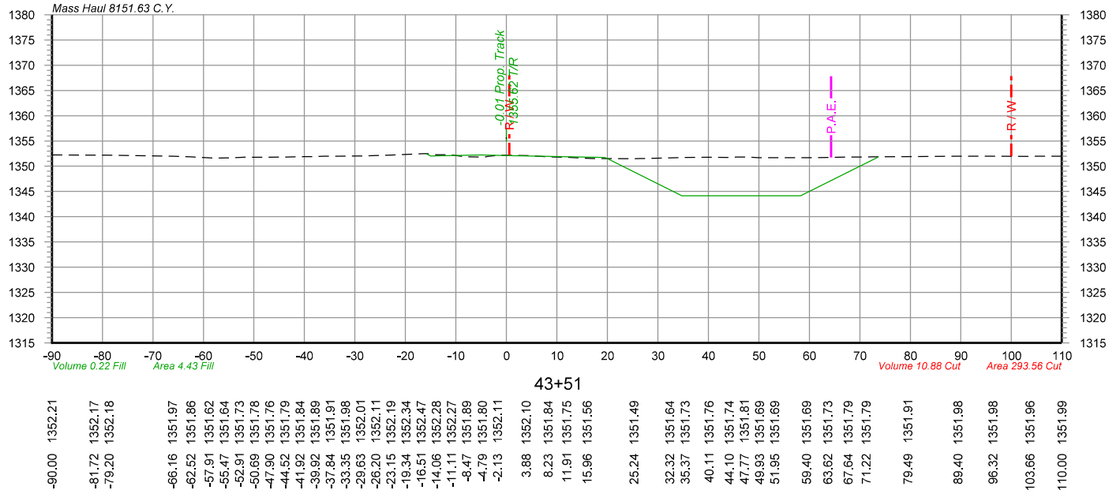
UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X052 of 195

UNION PACIFIC RAILROAD

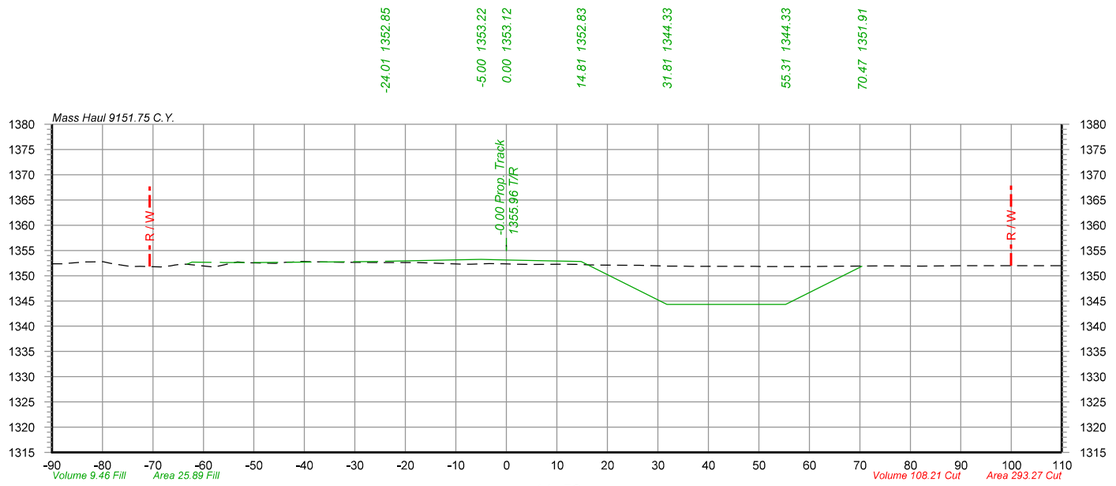
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.41+85 TO STA.43+00


Mass Haul 8151.63 C.Y.
-15.90 1352.48
-15.00 1352.02
-5.00 1352.22
0.00 1352.12
19.56 1351.73
34.76 1344.13
58.26 1344.13
73.73 1351.86
-0.01 Prop. Track
1355.62 T/R
R / W
P.A.E.
R / W
Volume 0.22 Fill
Area 4.43 Fill
Volume 10.88 Cut
Area 293.56 Cut

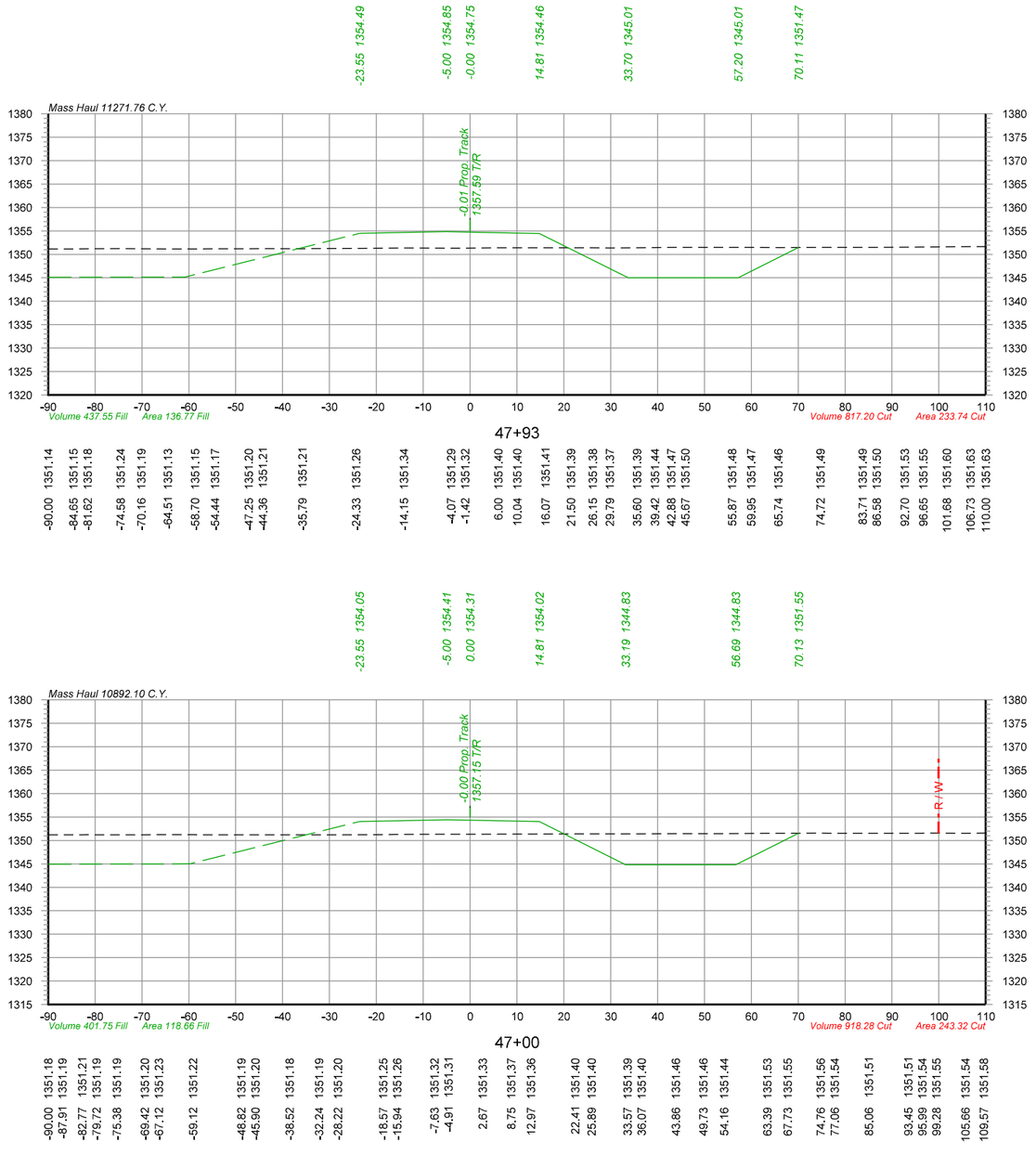
43+51

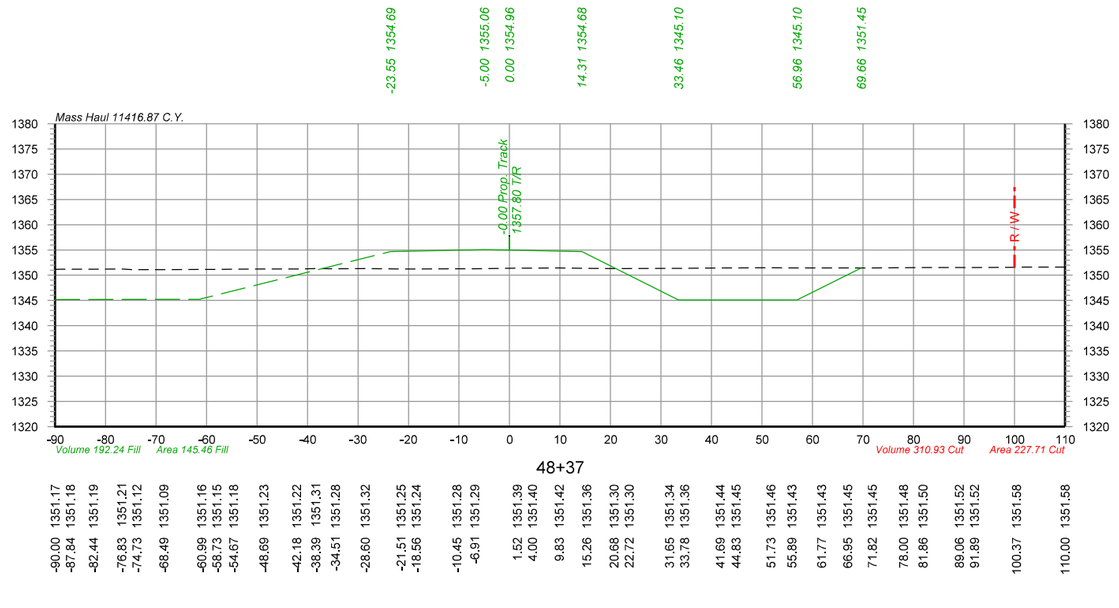
| | | |

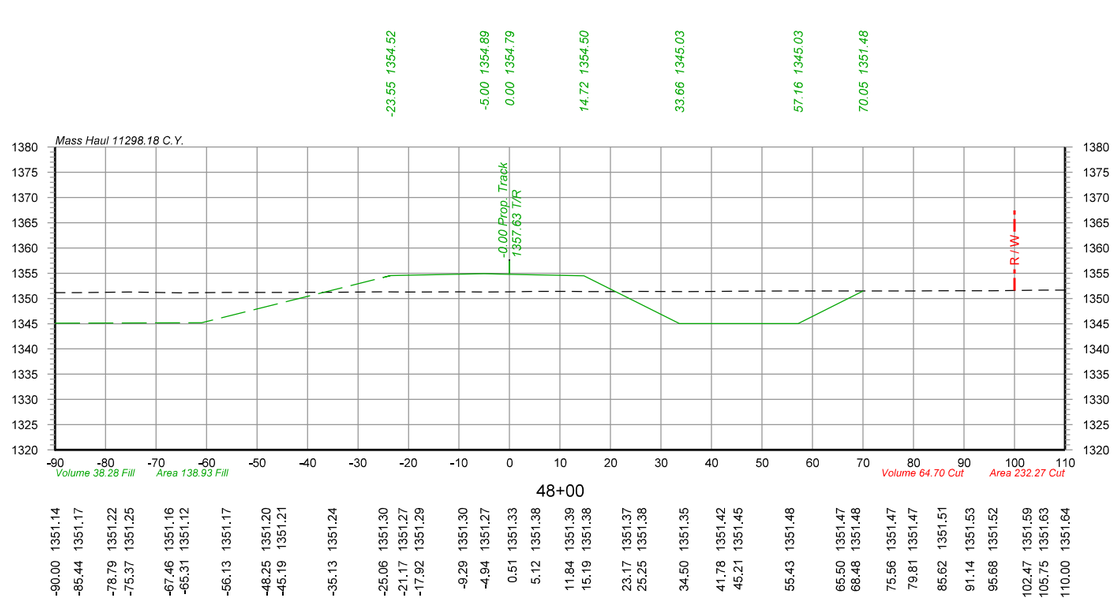

Mass Haul 9151.75 C.Y.
-24.01 1352.85
-5.00 1353.22
0.00 1353.12
14.81 1352.83
31.81 1344.33
55.31 1344.33
70.47 1351.91
R/W
-0.00 Prop. Track
1355.96 T/R
R/W
Volume 9.46 Fill
Area 25.89 Fill
Volume 108.21 Cut
Area 293.27 Cut

44+50

| | | |







olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

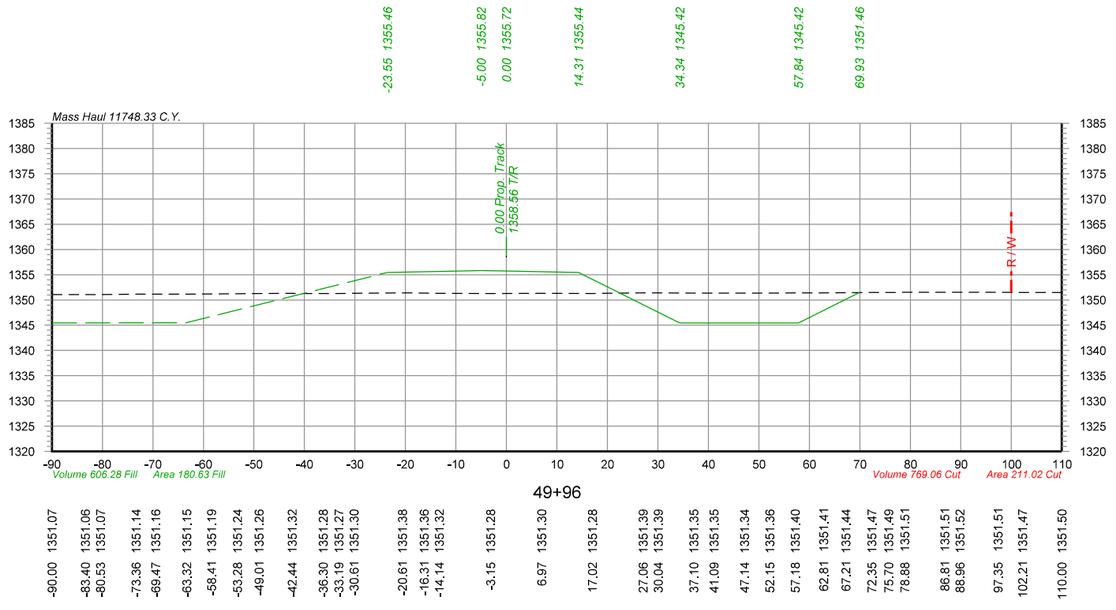
DRAWN BY:	DMJ
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	X055 of 195

UNION PACIFIC RAILROAD

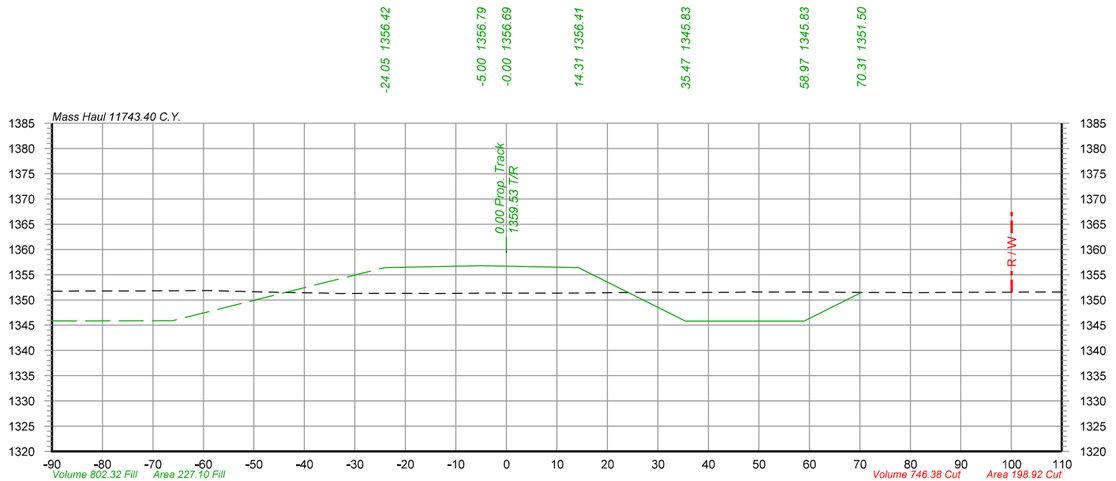
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.47+00 TO STA.48+37

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026


-23.55 1355.46
-5.00 1355.82
0.00 1355.72
14.31 1355.44
34.34 1345.42
57.84 1345.42
69.93 1351.46
Mass Haul 11748.33 C.Y.
0.00 Prop. Track
1358.56 T/R
R/W
Volume 606.28 Fill
Area 180.63 Fill
Volume 769.06 Cut
Area 211.02 Cut
49+96

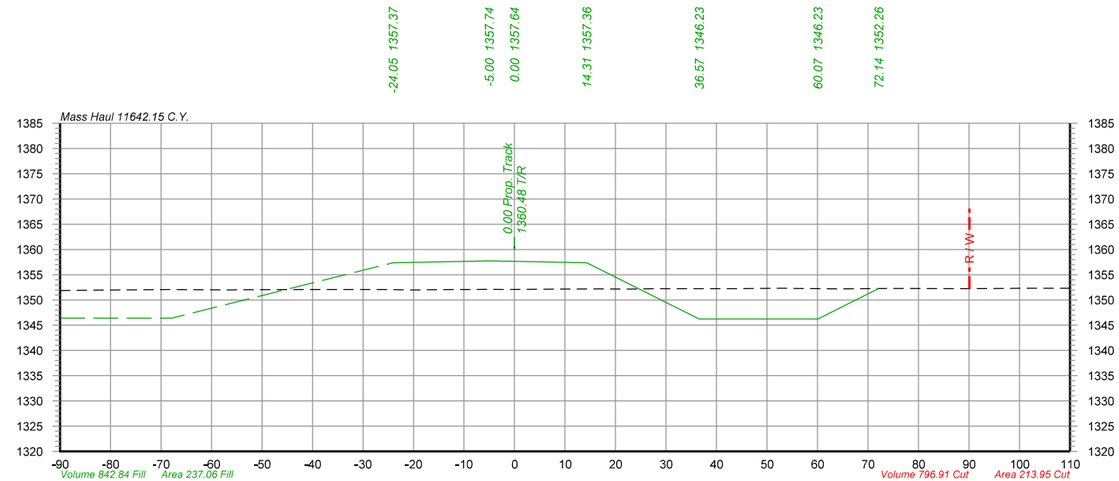
| | | |



52+00

-90.00	1351.74
-83.83	1351.77
-74.84	1351.77
-72.21	1351.78
-70.19	1351.79
-66.06	1351.83
-61.54	1351.84
-58.73	1351.84
-49.35	1351.60
-45.52	1351.52
-35.63	1351.34
-32.85	1351.29
-24.48	1351.30
-20.12	1351.30
-13.91	1351.27
-4.05	1351.34
-1.97	1351.35
4.88	1351.36
7.23	1351.36
12.76	1351.37
17.80	1351.41
20.63	1351.44
28.37	1351.53
36.38	1351.47
38.94	1351.49
45.92	1351.52
47.95	1351.62
59.80	1351.56
70.65	1351.50
75.75	1351.48
81.22	1351.43
90.68	1351.52
99.38	1351.54
102.96	1351.55
108.43	1351.57

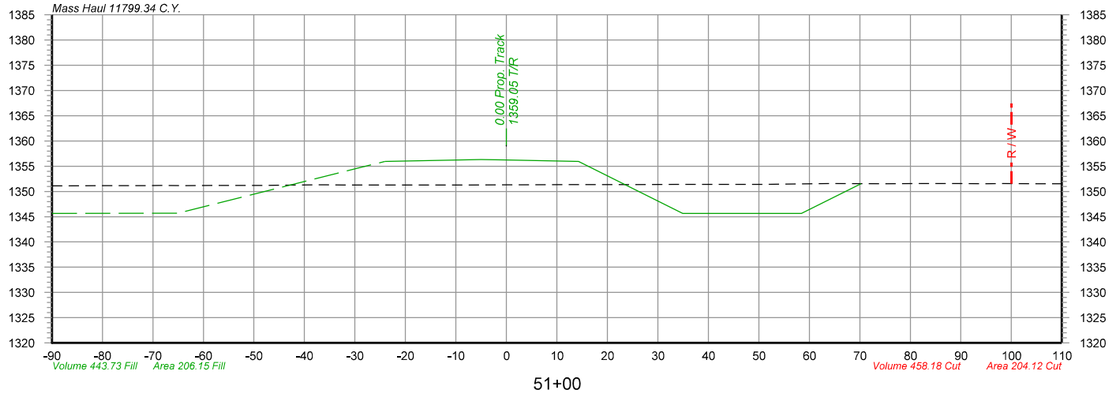
-24.05	1356.42
-5.00	1356.79
-0.00	1356.69
14.31	1356.41
35.47	1345.83
58.97	1345.83
70.31	1351.50



54+00

-90.00	1351.87
-77.96	1351.99
-68.33	1352.05
-56.46	1352.00
-53.67	1352.00
-41.65	1352.07
-38.69	1352.07
-34.71	1352.08
-26.06	1352.08
-20.28	1352.00
-16.64	1352.02
-11.59	1352.06
-8.22	1352.09
-5.23	1352.09
-1.42	1352.07
8.71	1352.14
17.04	1352.18
22.55	1352.15
28.10	1352.22
31.10	1352.23
33.44	1352.25
43.83	1352.25
52.14	1352.31
55.64	1352.28
60.76	1352.24
63.92	1352.21
74.36	1352.28
77.83	1352.27
88.03	1352.22
97.03	1352.29
100.20	1352.33
110.00	1352.30

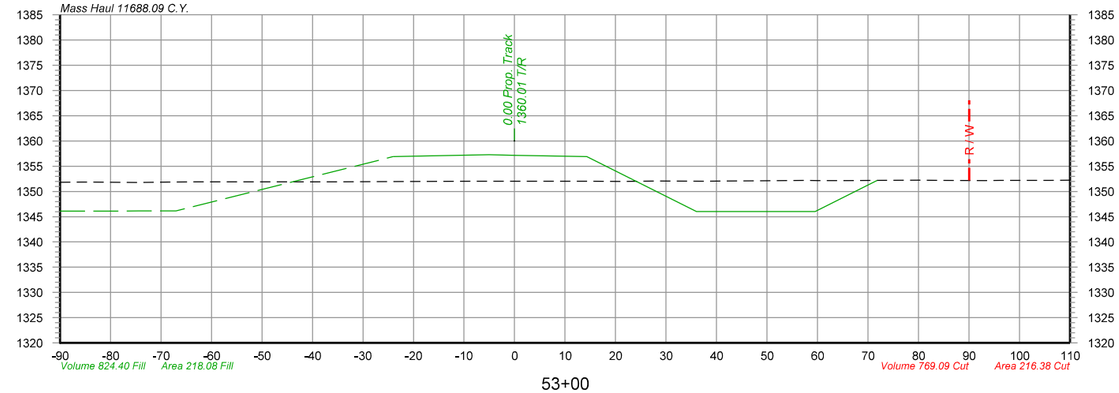
-24.05	1357.37
-5.00	1357.74
0.00	1357.64
14.31	1357.36
36.57	1346.23
60.07	1346.23
72.14	1352.26



51+00

-90.00	1351.12
-88.89	1351.12
-79.98	1351.16
-77.26	1351.14
-71.58	1351.13
-68.38	1351.19
-63.71	1351.17
-58.18	1351.19
-54.51	1351.18
-47.98	1351.20
-45.32	1351.23
-37.11	1351.30
-32.30	1351.29
-29.01	1351.28
-17.38	1351.27
-12.61	1351.27
-7.18	1351.26
0.16	1351.31
3.02	1351.33
12.94	1351.35
23.42	1351.37
25.71	1351.36
33.63	1351.39
38.49	1351.41
43.83	1351.41
51.26	1351.42
54.03	1351.43
64.04	1351.56
75.14	1351.53
81.33	1351.58
84.63	1351.58
89.59	1351.57
94.83	1351.54
98.31	1351.55
105.03	1351.53
110.00	1351.51

-24.05	1355.94
-5.00	1356.31
-0.00	1356.22
14.31	1355.94
34.92	1345.63
58.42	1345.63
70.24	1351.54



53+00

-90.00	1351.82
-85.79	1351.85
-83.64	1351.85
-79.40	1351.81
-74.55	1351.79
-68.66	1351.86
-62.66	1351.89
-54.88	1351.89
-48.42	1351.89
-44.11	1351.88
-40.79	1351.88
-35.43	1351.90
-27.69	1351.92
-18.22	1351.96
-8.80	1352.04
-4.83	1352.04
3.72	1352.04
6.21	1352.03
11.27	1352.03
14.90	1352.03
21.19	1351.99
24.93	1352.01
28.58	1352.04
37.62	1352.04
41.87	1352.06
48.45	1352.10
57.83	1352.17
60.00	1352.16
66.12	1352.15
71.48	1352.19
80.10	1352.21
84.19	1352.20
93.10	1352.17
96.22	1352.20
106.06	1352.17
110.00	1352.22

-24.05	1356.89
-5.00	1357.27
-0.00	1357.17
14.31	1356.89
36.02	1346.03
59.52	1346.03
71.84	1352.19

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X057 of 195

UNION PACIFIC RAILROAD

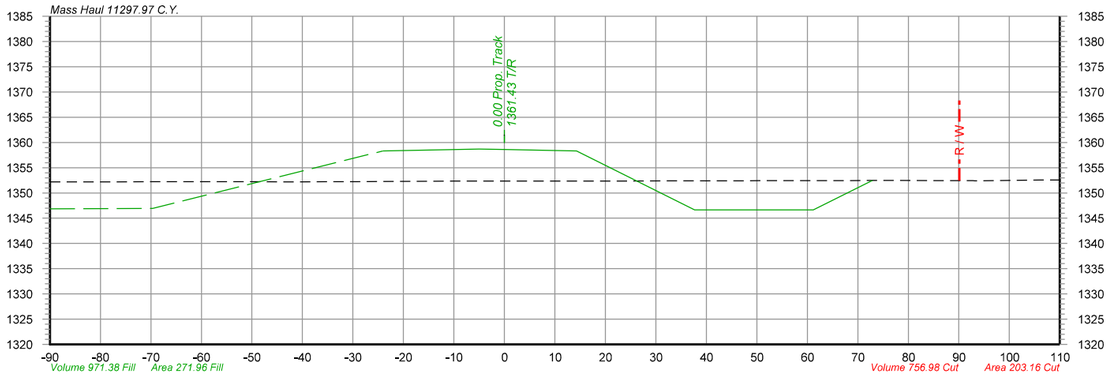
Sheet 297 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.51+00 TO STA.54+00

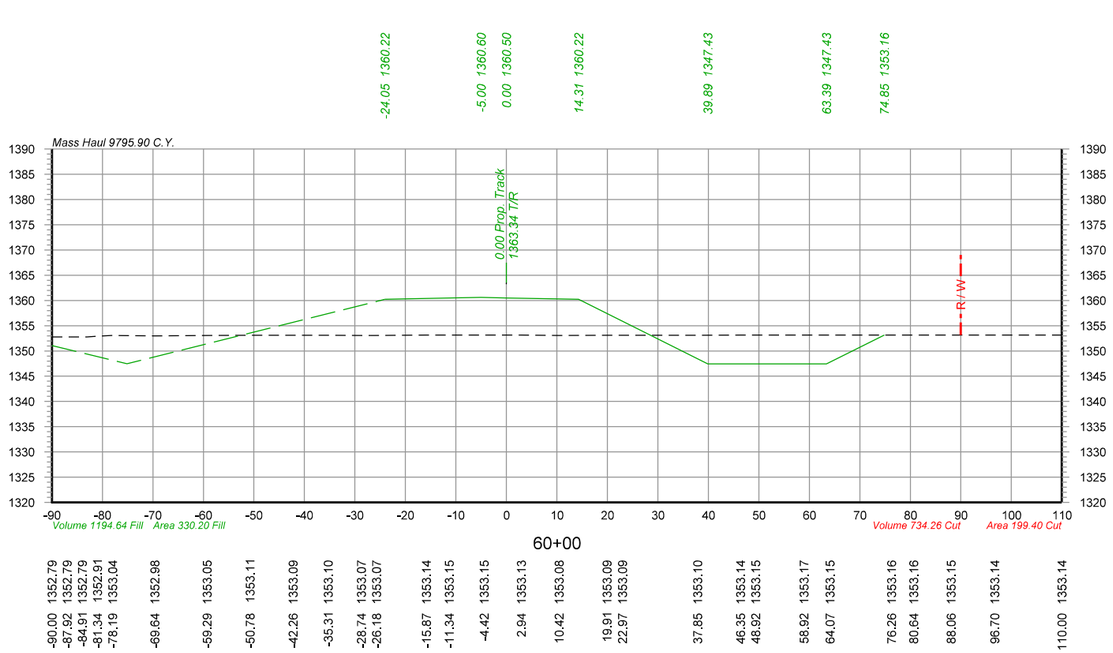
Color table: K:\Bentley\Workspace\Projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

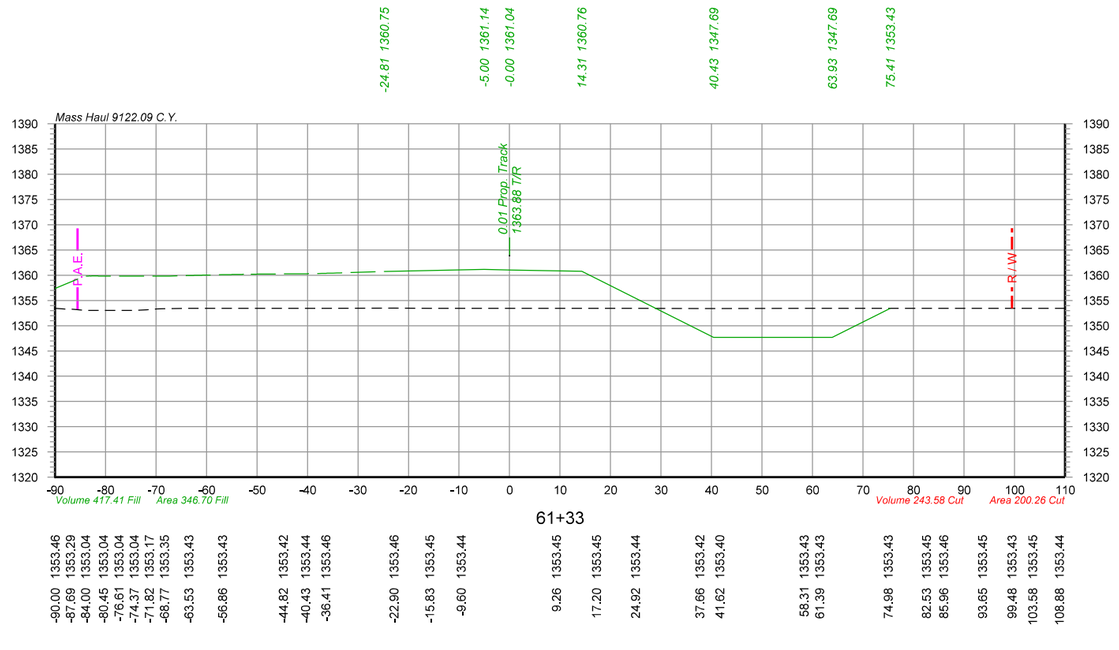
-24.05 1358.32
-5.00 1358.69
0.00 1358.60
14.31 1358.31
37.68 1346.63
61.18 1346.63
72.89 1352.49

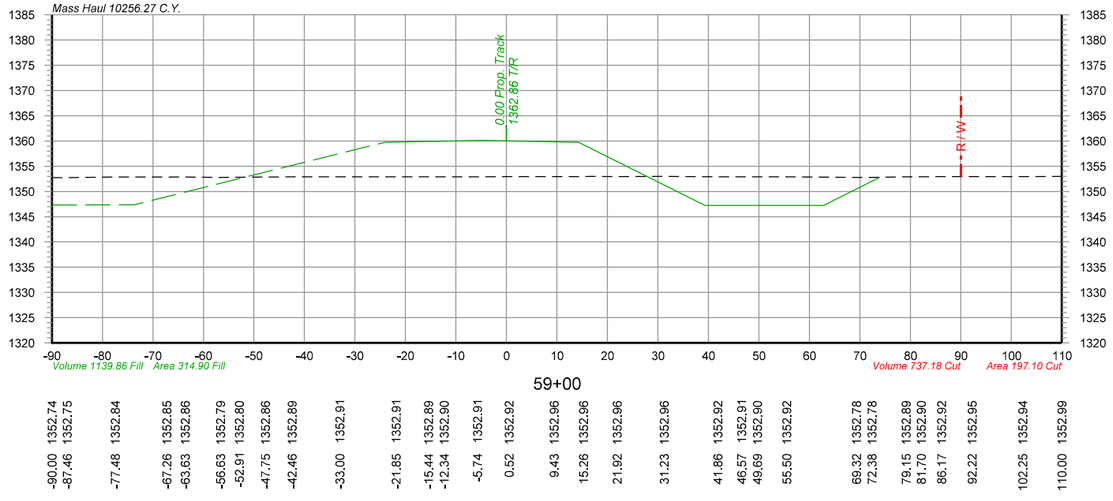


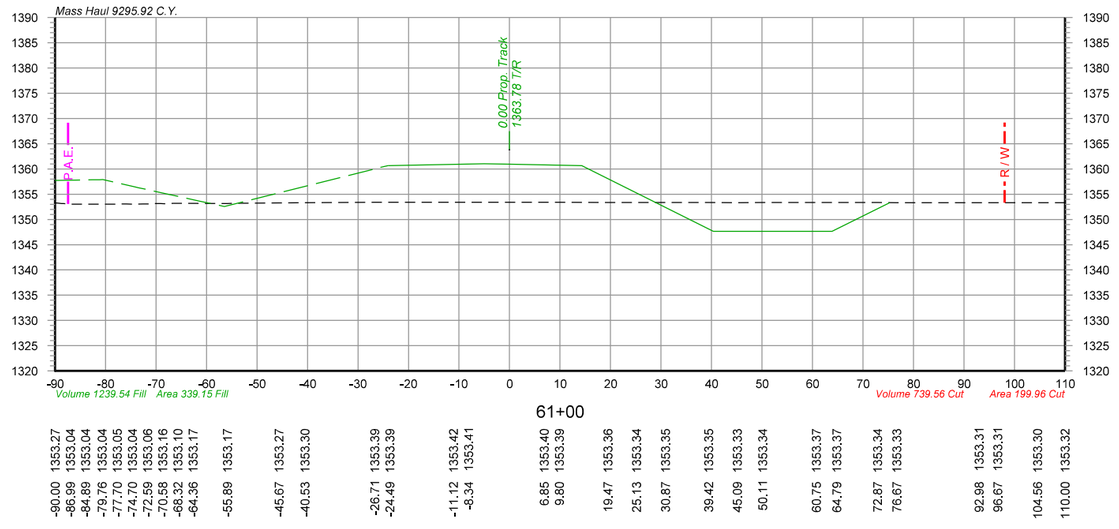
56+00

| | | |









olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X059 of 195

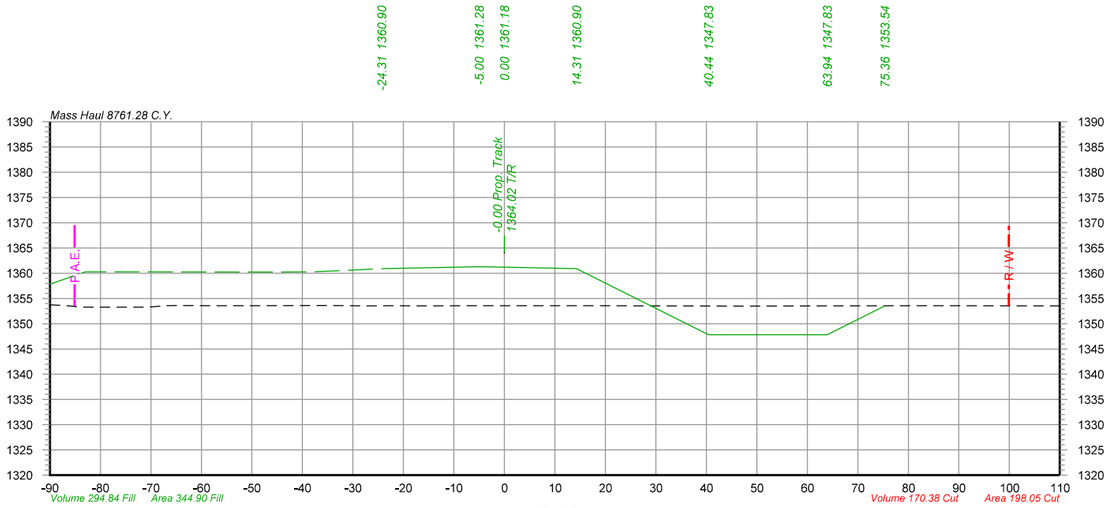
UNION PACIFIC RAILROAD

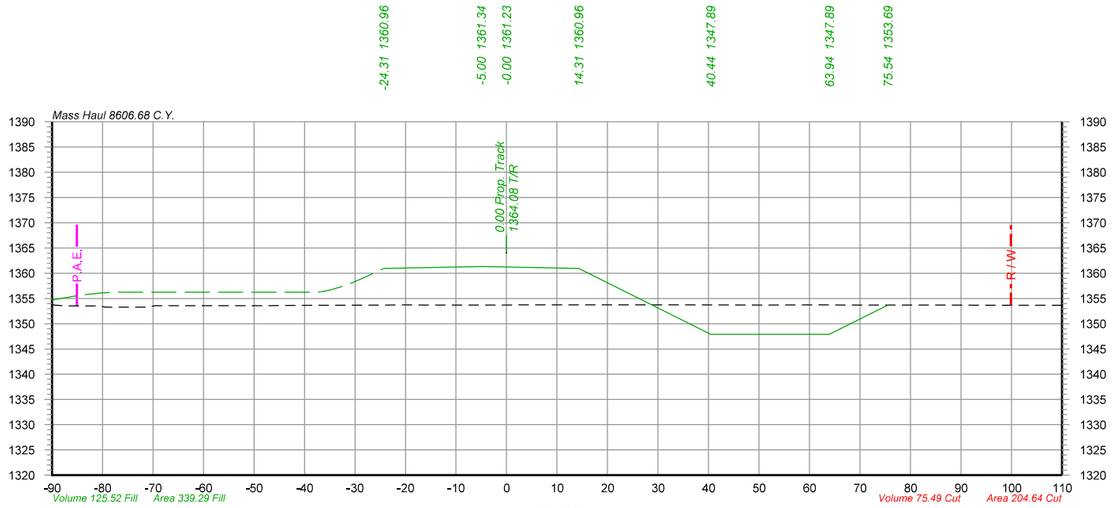
Sheet 299 of 587

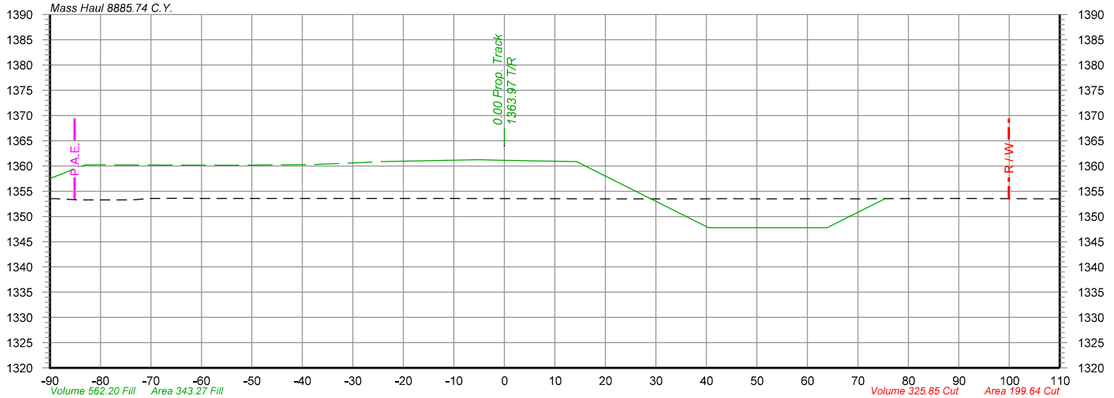
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

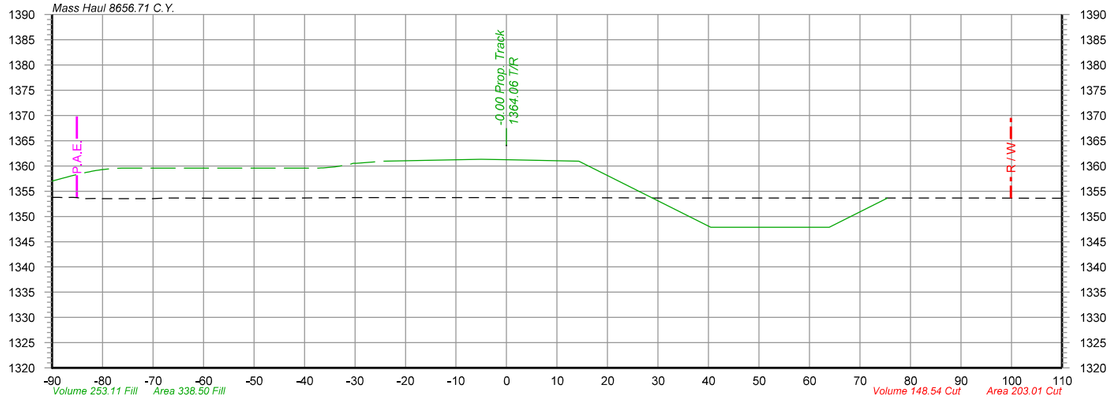
SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.59+00 TO STA.61+33

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026









olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X060 of 195

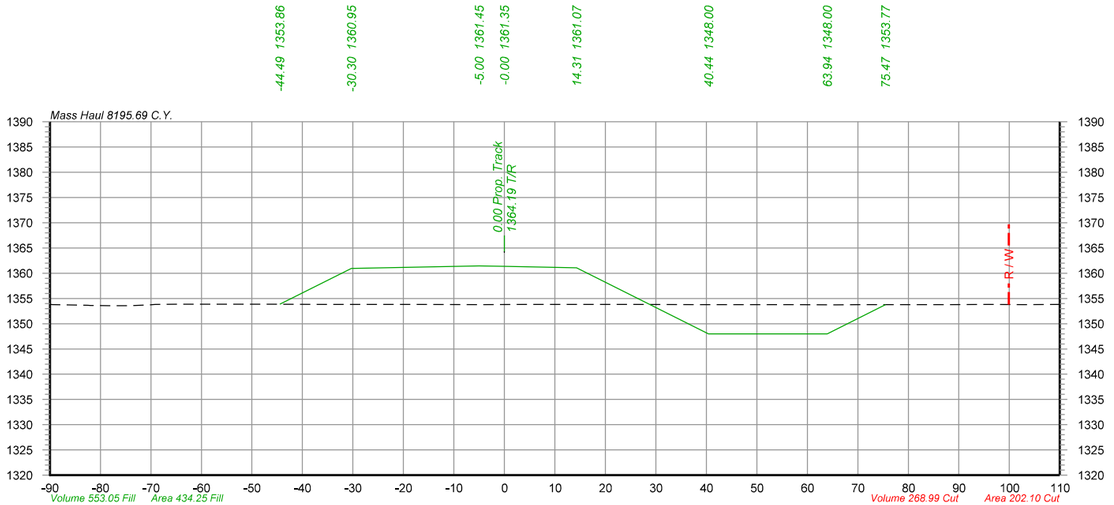
UNION PACIFIC RAILROAD

Sheet 300 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

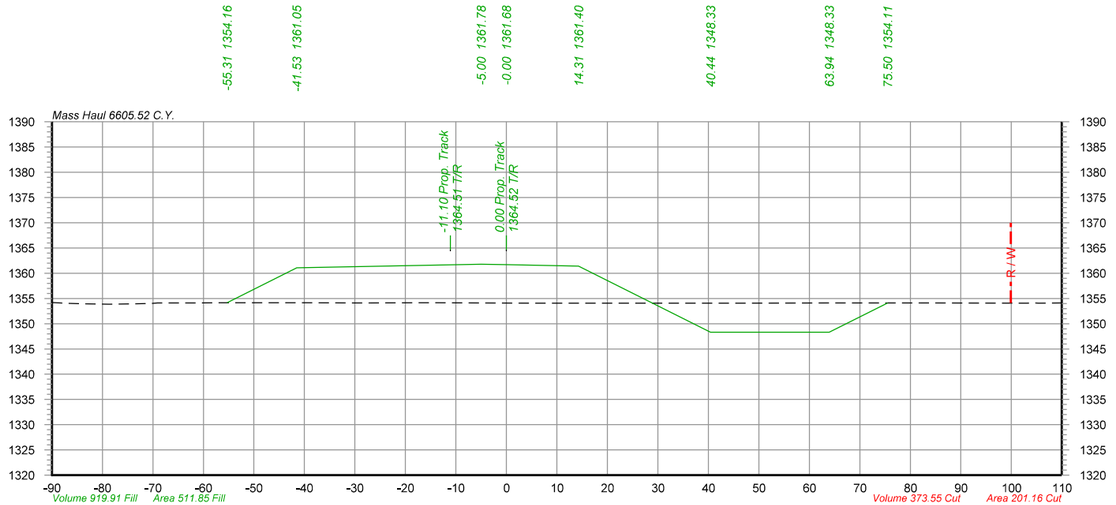
SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.61+77 TO STA.62+30

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RL_TK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05.Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026


Mass Haul 8195.69 C.Y.
0.00 Prop. Track
1364.19 T/R
R / W
Volume 553.05 Fill
Area 434.25 Fill
Volume 268.99 Cut
Area 202.10 Cut

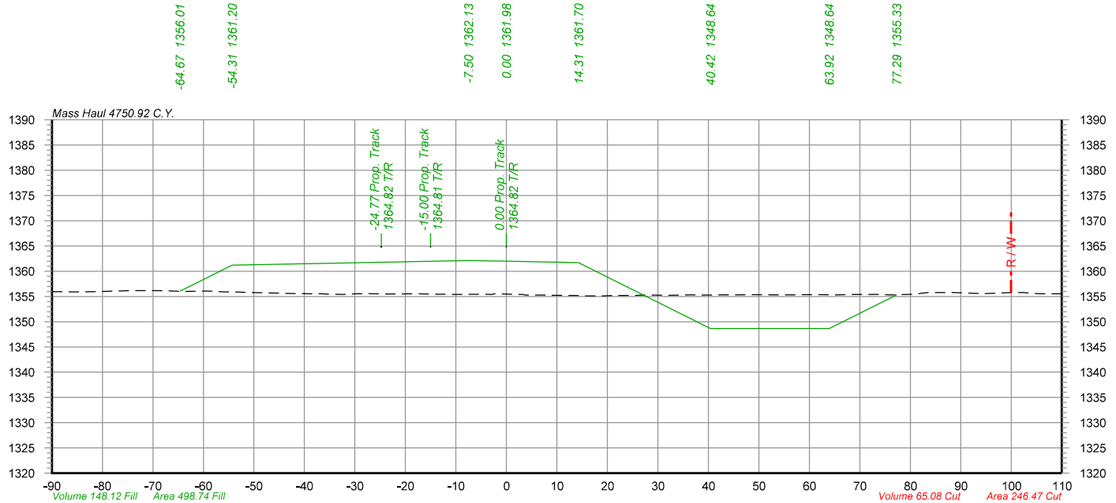
62+87

| | | |


Mass Haul 6605.52 C.Y.
-11.10 Prop. Track
1364.51 T/R
0.00 Prop. Track
1364.52 T/R
R / W
Volume 919.91 Fill
Area 511.85 Fill
Volume 373.55 Cut
Area 201.16 Cut

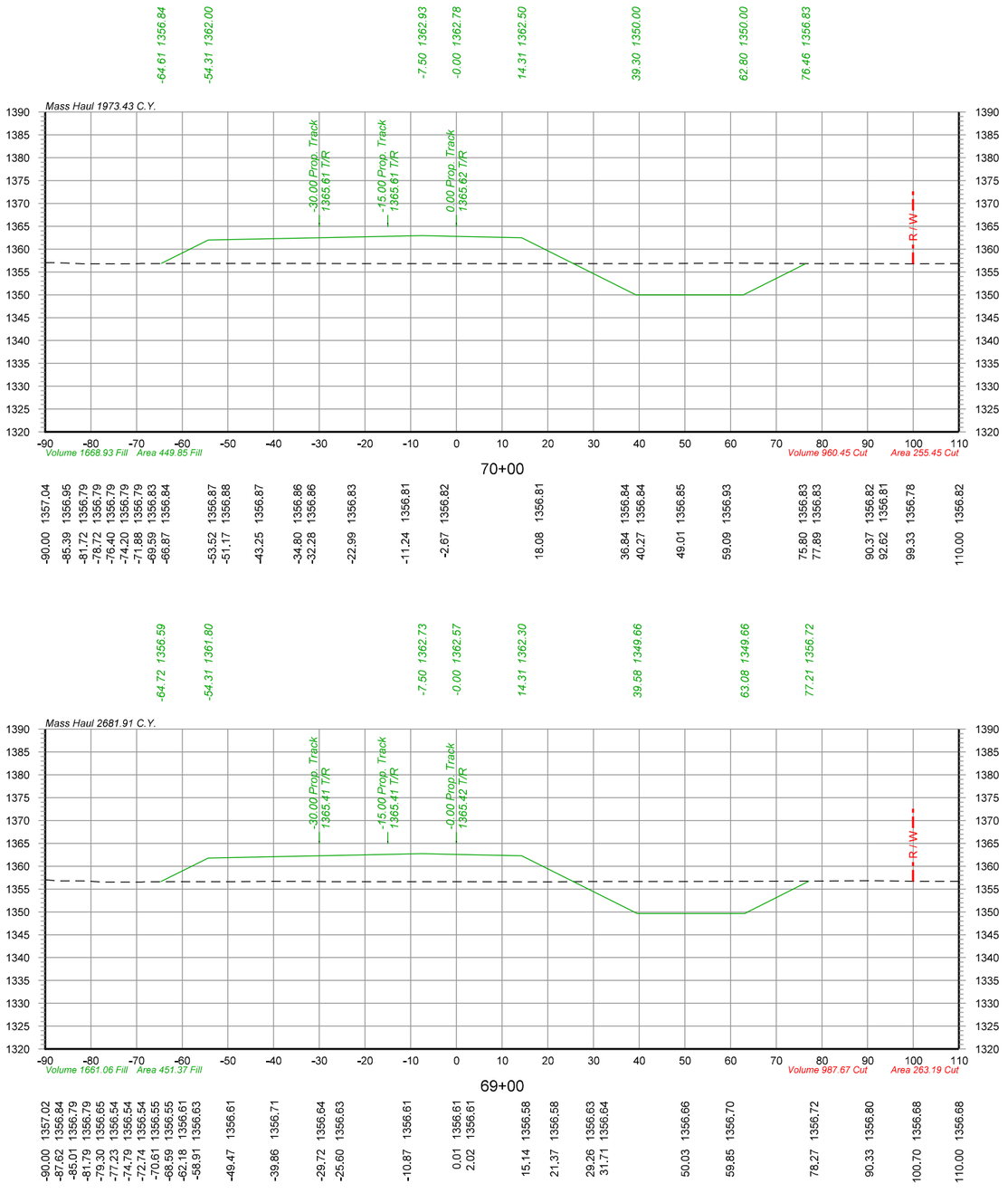
64+50

| | | |

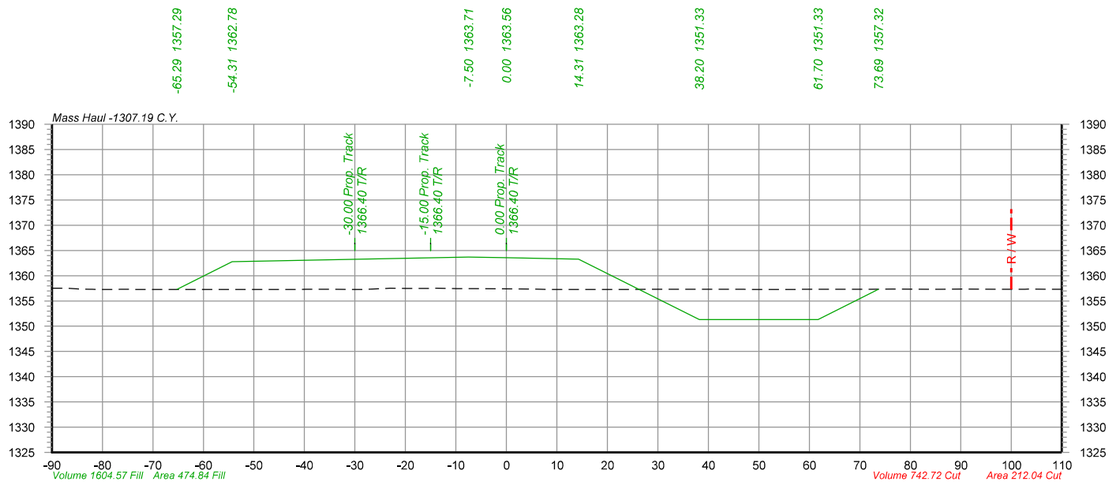

Mass Haul 4750.92 C.Y.
-24.77 Prop. Track
1364.82 T/R
-15.00 Prop. Track
1364.81 T/R
0.00 Prop. Track
1364.82 T/R
R/W
Volume 148.12 Fill
Area 498.74 Fill
Volume 65.08 Cut
Area 246.47 Cut

66+00

| | | |

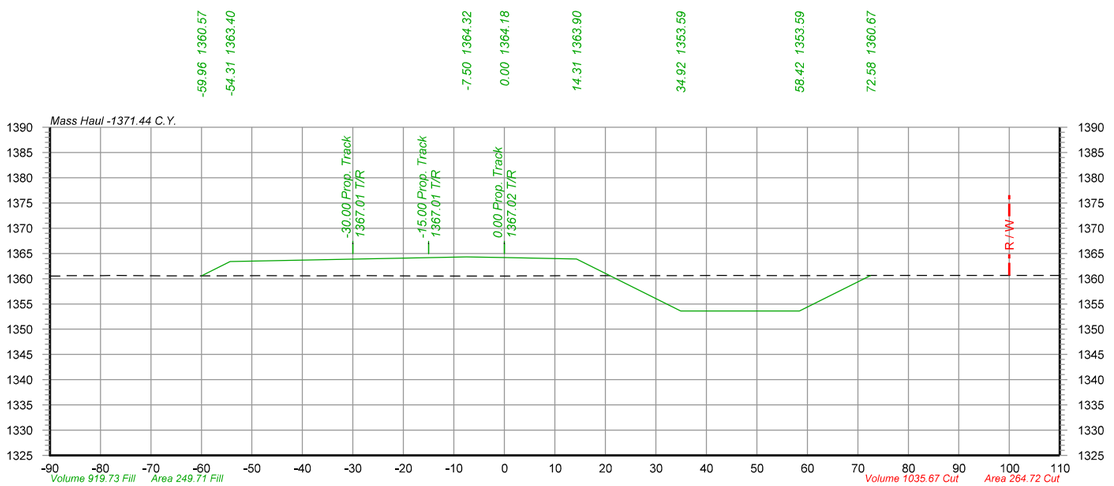

-64.61 1356.84
-54.31 1362.00
-7.50 1362.93
-0.00 1362.78
14.31 1362.50
39.30 1350.00
62.80 1350.00
76.46 1356.83
Mass Haul 1973.43 C.Y.
-30.00 Prop. Track
1365.61 T/R
-15.00 Prop. Track
1365.61 T/R
0.00 Prop. Track
1365.62 T/R
R/W
Volume 1668.93 Fill
Area 449.85 Fill
Volume 960.45 Cut
Area 255.45 Cut
70+00

| | | |

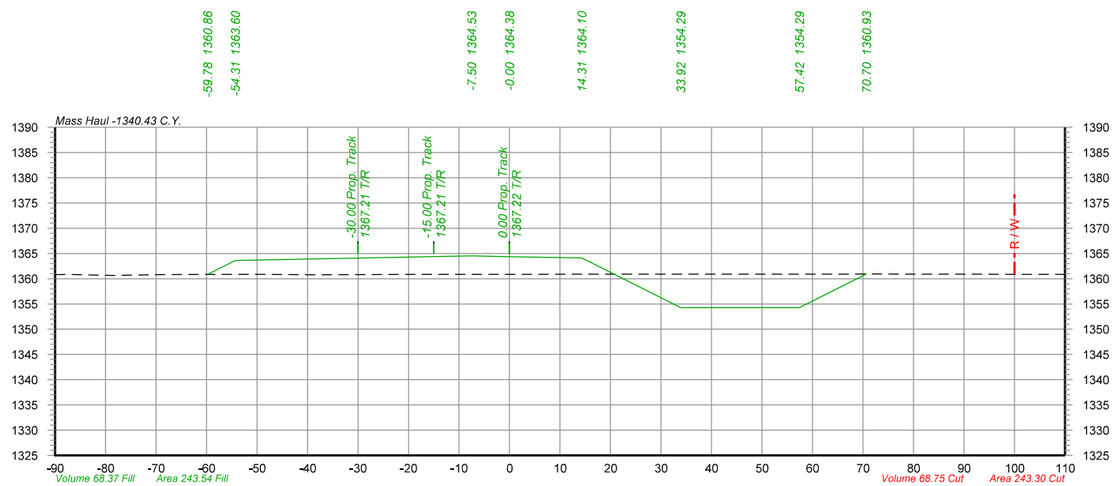

-65.29 1357.29
-54.31 1362.78
-7.50 1363.71
0.00 1363.56
14.31 1363.28
38.20 1351.33
61.70 1351.33
73.69 1357.32
Mass Haul -1307.19 C.Y.
-30.00 Prop. Track
1366.40 T/R
-15.00 Prop. Track
1366.40 T/R
0.00 Prop. Track
1366.40 T/R
R/W
Volume 1604.57 Fill
Area 474.84 Fill
Volume 742.72 Cut
Area 212.04 Cut

73+92

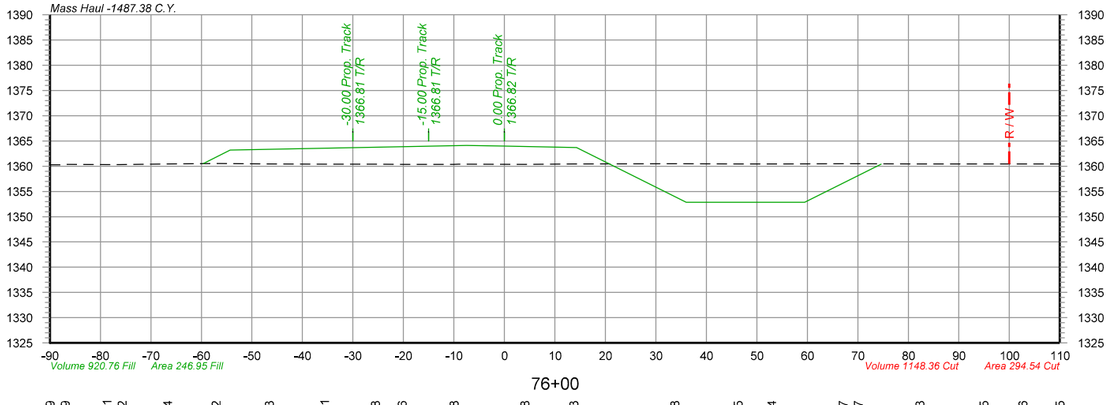
| | | |



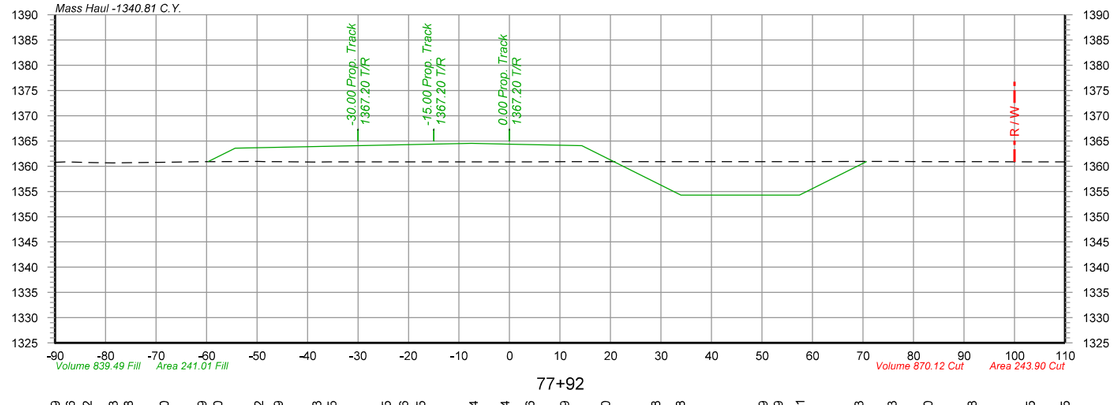
-90.00	1360.54
-87.67	1360.54
-79.39	1360.62
-77.20	1360.63
-67.61	1360.56
-57.84	1360.57
-47.67	1360.59
-37.51	1360.57
-27.30	1360.60
-15.17	1360.54
-11.95	1360.54
2.48	1360.54
7.99	1360.59
12.12	1360.62
19.45	1360.62
33.76	1360.62
42.69	1360.67
57.23	1360.60
72.38	1360.67
82.27	1360.64
100.29	1360.66
110.00	1360.64



-90.00	1360.81
-87.96	1360.84
-78.99	1360.65
-68.49	1360.82
-56.19	1360.87
-54.12	1360.88
-48.77	1360.87
-38.28	1360.76
-28.30	1360.83
-18.18	1360.86
-8.38	1360.85
1.90	1360.86
13.83	1360.91
37.54	1360.91
52.43	1360.90
55.73	1360.91
68.29	1360.91
70.80	1360.93
79.78	1360.90
82.68	1360.89
93.18	1360.88
98.94	1360.87
108.16	1360.84



-90.00	1360.29
-87.91	1360.29
-78.73	1360.31
-76.16	1360.32
-66.72	1360.44
-57.11	1360.52
-46.57	1360.43
-35.62	1360.41
-25.57	1360.38
-20.27	1360.36
-9.99	1360.38
4.03	1360.38
13.72	1360.43
33.73	1360.48
46.27	1360.45
52.91	1360.44
67.07	1360.47
69.83	1360.47
82.26	1360.43
94.94	1360.45
102.66	1360.46
110.00	1360.45



-90.00	1360.79
-87.84	1360.86
-83.64	1360.72
-78.50	1360.63
-75.78	1360.68
-68.42	1360.80
-60.93	1360.89
-57.79	1360.90
-49.68	1360.92
-45.82	1360.89
-38.19	1360.83
-35.83	1360.85
-24.43	1360.85
-20.99	1360.86
-17.60	1360.85
-7.15	1360.84
-0.92	1360.84
4.01	1360.86
10.88	1360.89
18.99	1360.90
28.92	1360.88
33.80	1360.88
50.19	1360.89
52.50	1360.89
57.52	1360.91
69.17	1360.93
75.74	1360.93
82.85	1360.90
91.58	1360.88
103.12	1360.85
110.00	1360.85

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X066 of 195

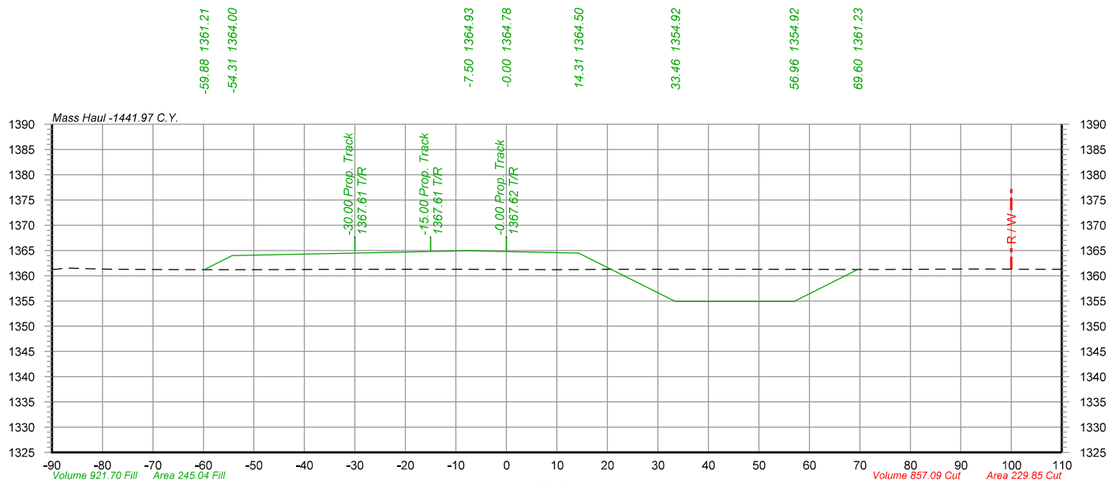
UNION PACIFIC RAILROAD

Sheet 306 of 587

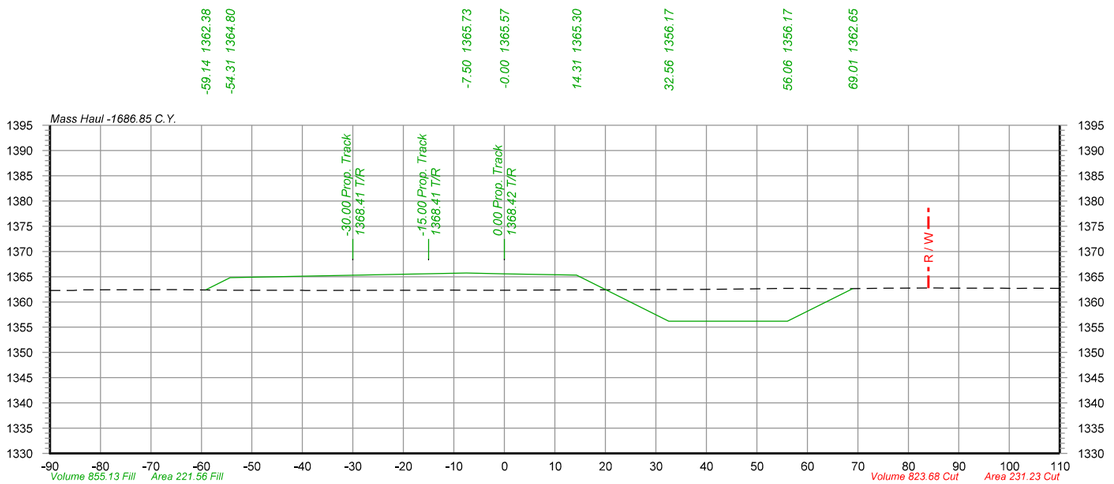
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.76+00 TO STA.78+00

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026


-59.88 1361.21
-54.31 1364.00
-7.50 1364.93
-0.00 1364.78
14.31 1364.50
33.46 1354.92
56.96 1354.92
69.60 1361.23
Mass Haul -1441.97 C.Y.
-30.00 Prop. Track
1367.61 T/R
-15.00 Prop. Track
1367.61 T/R
-0.00 Prop. Track
1367.62 T/R
R/W
Volume 921.70 Fill
Area 245.04 Fill
Volume 857.09 Cut
Area 229.85 Cut
80+00

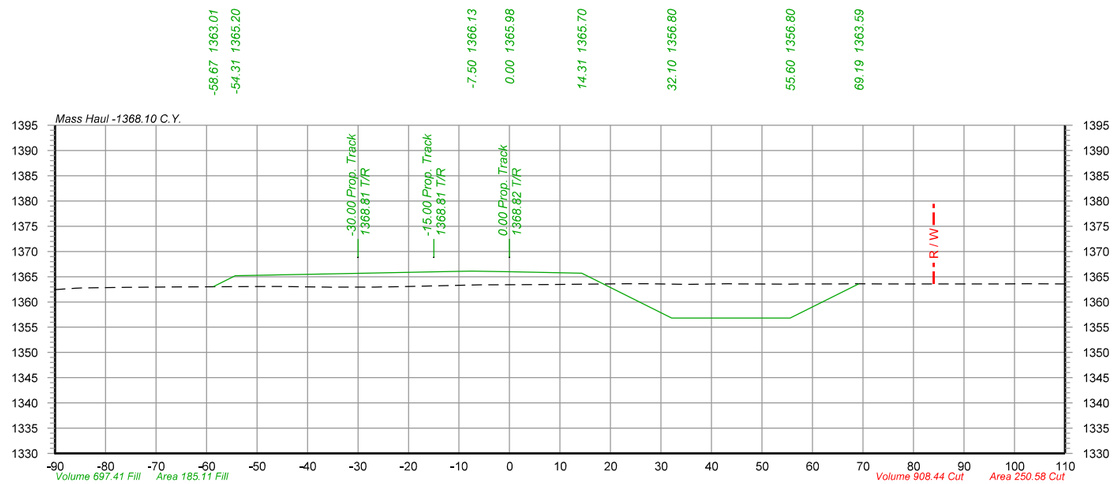
| | | |



-59.14	-54.31	-7.50	-0.00	14.31	32.56	56.06	69.01
1362.38	1364.80	1365.73	1365.57	1365.30	1356.17	1356.17	1362.65

84+00

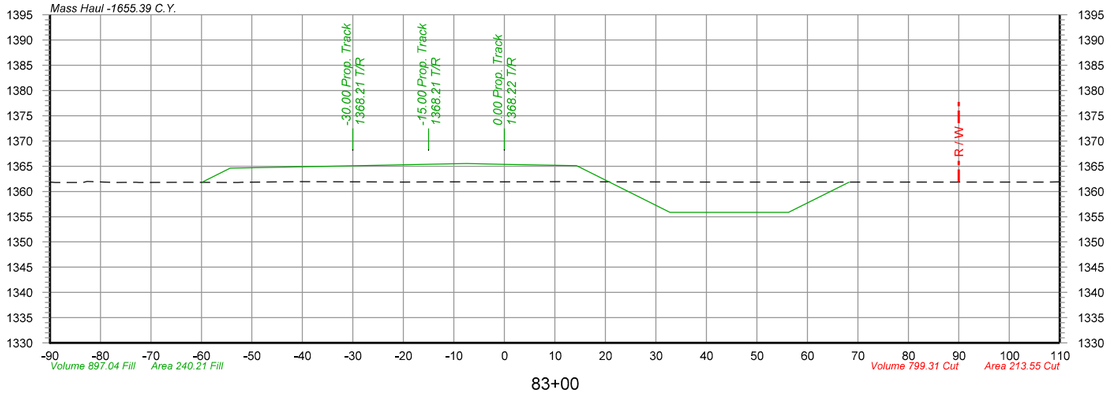
-90.00	-86.44	-83.52	-80.46	-65.95	-54.50	-40.14	-23.66	-14.79	-5.24	-0.97	6.82	15.42	18.40	26.97	37.05	47.13	55.37	59.07	66.71	75.93	78.02	85.34	88.34	98.49	102.03	104.62	110.00
1362.29	1362.29	1362.39	1362.42	1362.43	1362.33	1362.29	1362.29	1362.33	1362.33	1362.33	1362.34	1362.41	1362.41	1362.42	1362.48	1362.57	1362.68	1362.69	1362.62	1362.73	1362.74	1362.75	1362.74	1362.72	1362.70	1362.71	1362.69



-58.67	-54.31	-7.50	0.00	14.31	32.10	55.60	69.19
1363.01	1365.20	1366.13	1365.98	1365.70	1356.80	1356.80	1363.59

86+00

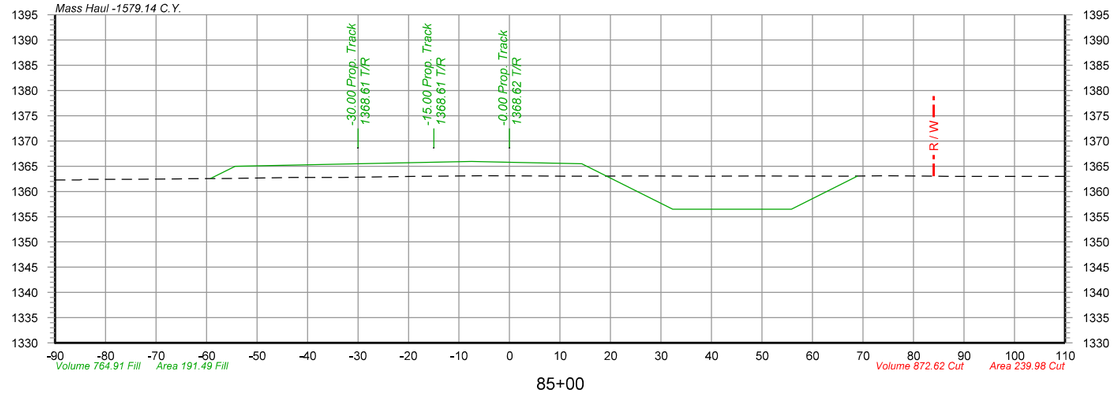
-90.00	-86.32	-75.56	-65.49	-46.68	-36.06	-26.61	-24.46	-21.81	-5.58	-3.39	5.05	15.13	23.33	27.11	35.28	43.31	45.36	47.45	55.44	57.61	65.51	67.78	73.78	78.58	88.15	96.72	102.70	110.00
1362.43	1362.70	1362.89	1363.00	1363.07	1362.93	1362.96	1362.99	1363.04	1363.38	1363.41	1363.43	1363.54	1363.61	1363.60	1363.48	1363.59	1363.58	1363.59	1363.54	1363.55	1363.59	1363.60	1363.57	1363.56	1363.57	1363.58	1363.59	1363.58



-59.90	-54.31	-7.50	0.00	14.31	32.78	56.28	68.30
1361.80	1364.60	1365.53	1365.38	1365.10	1355.86	1355.86	1361.86

83+00

-90.00	-87.96	-83.45	-77.09	-72.91	-62.83	-53.46	-40.40	-28.03	-20.06	-13.01	-1.21	11.47	21.51	40.90	45.61	59.95	63.24	78.24	87.73	89.95	93.05	107.69	110.00
1361.86	1361.79	1361.79	1361.79	1361.79	1361.81	1361.79	1361.95	1361.90	1361.87	1361.91	1361.89	1361.94	1361.90	1361.87	1361.86	1361.85	1361.86	1361.88	1361.86	1361.86	1361.86	1361.88	1361.88



-59.20	-54.31	-7.50	-0.00	14.31	32.33	55.83	68.97
1362.55	1365.00	1365.93	1365.78	1365.50	1356.48	1356.48	1363.05

85+00

-90.00	-87.93	-85.15	-76.10	-65.52	-54.92	-44.45	-34.44	-24.77	-19.18	-13.97	-5.59	5.64	10.38	15.34	26.09	37.77	39.90	49.05	61.06	64.10	66.68	74.53	84.55	87.32	90.55	104.17	109.02
1362.28	1362.29	1362.29	1362.41	1362.48	1362.58	1362.74	1362.76	1362.92	1362.98	1363.04	1363.12	1363.07	1363.04	1363.04	1363.05	1363.02	1363.02	1363.07	1363.02	1363.01	1363.03	1363.10	1363.01	1362.97	1363.00	1362.97	1362.99

olsson

2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	DMJ
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	X068 of 195

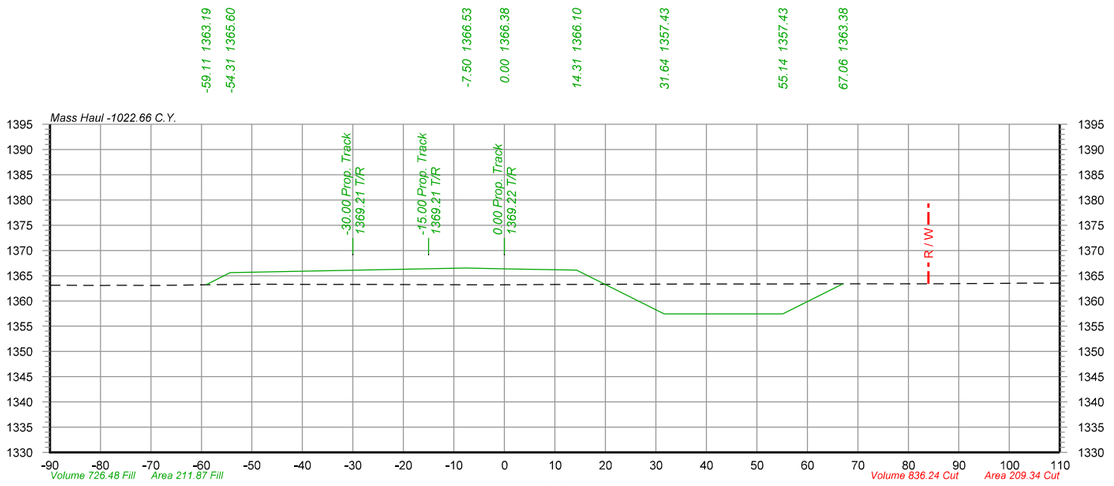
UNION PACIFIC RAILROAD

Sheet 308 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

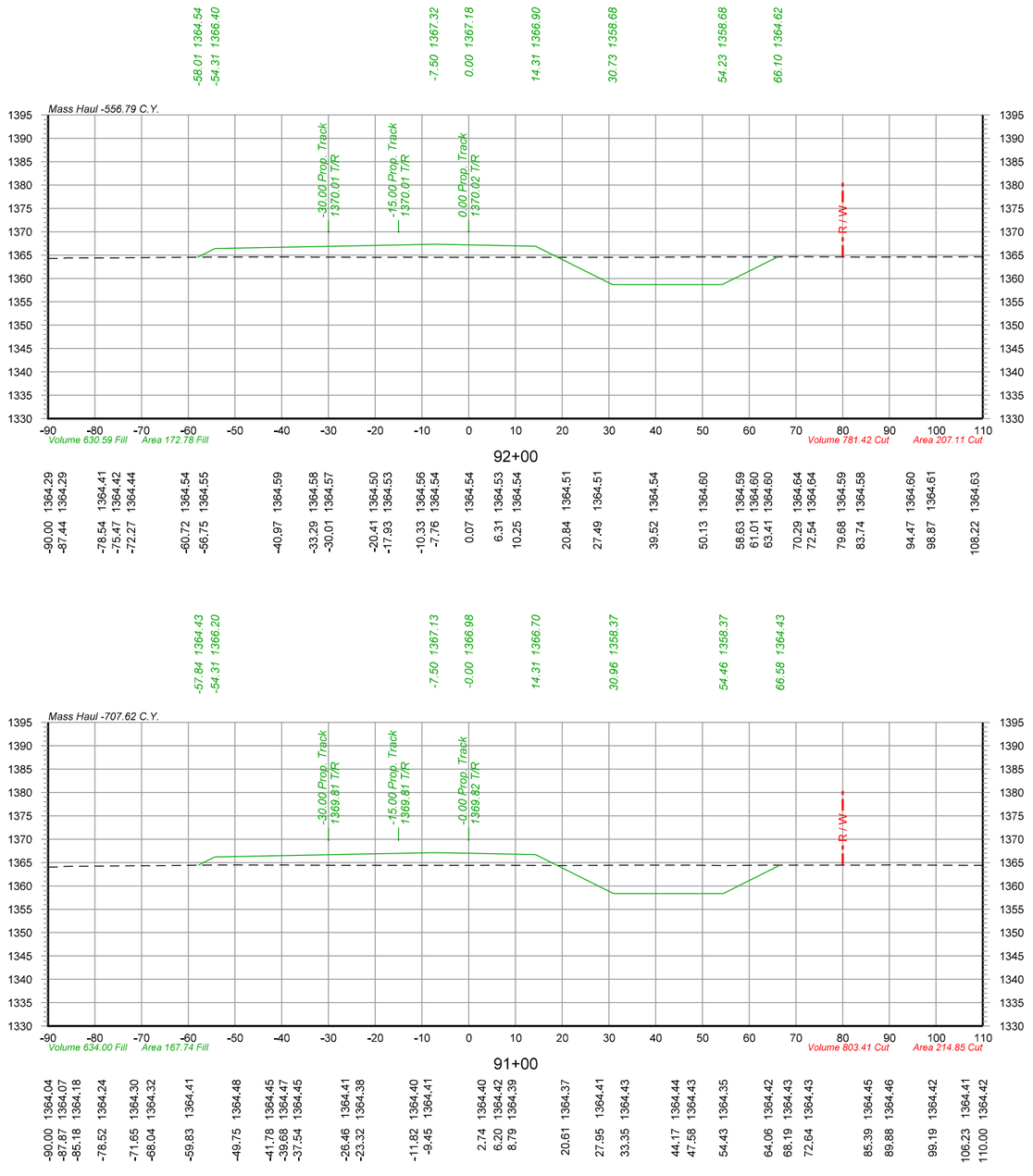
SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.83+00 TO STA.86+00

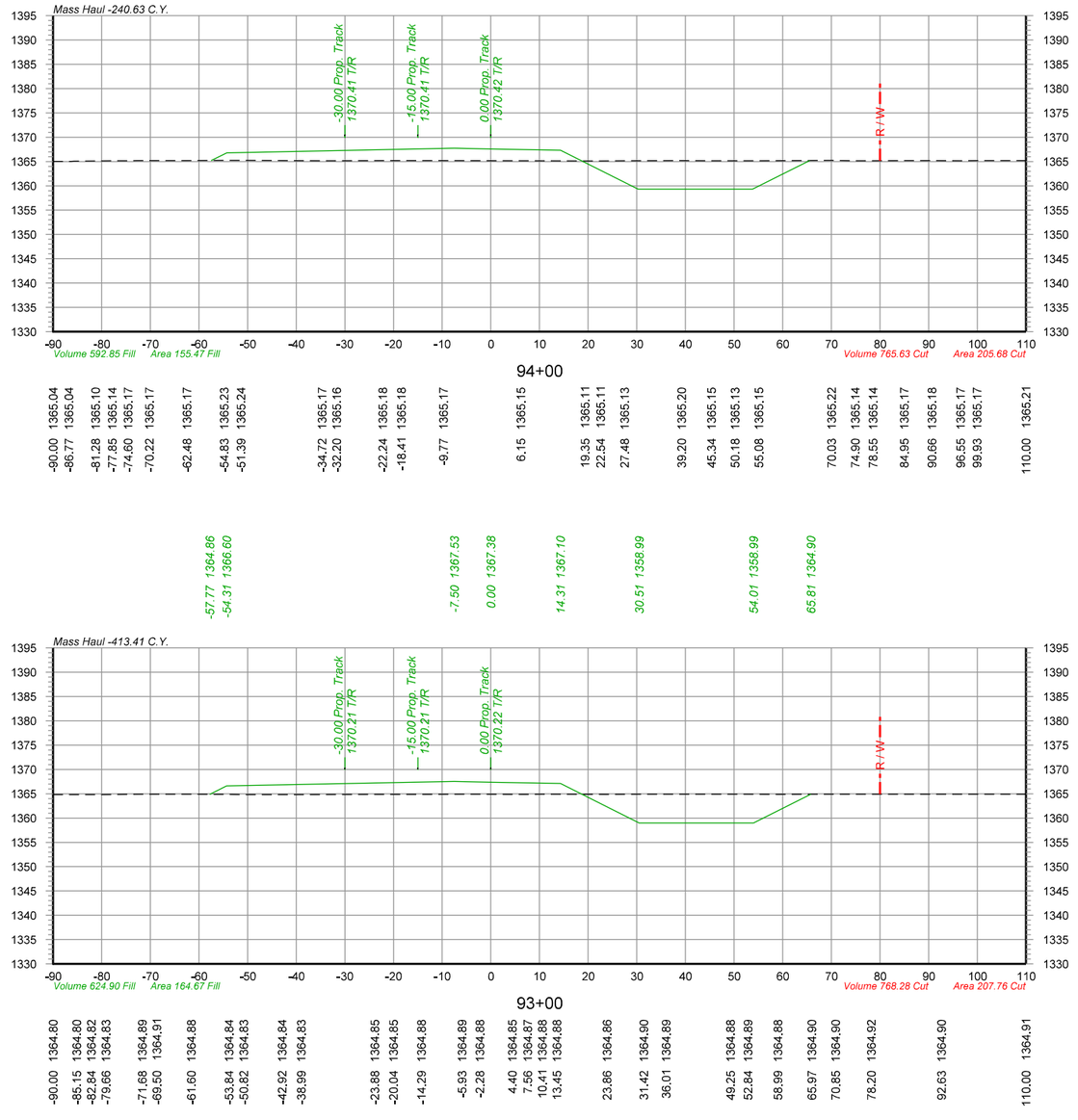
Color table: K:\Bentley\Workspace\V8\projects\Clients\UPRR_Track\UPRR_Track_V8\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-
Default
3/9/2026


Mass Haul -1022.66 C.Y.
-30.00 Prop. Track
1369.21 T/R
-15.00 Prop. Track
1369.21 T/R
0.00 Prop. Track
1369.22 T/R
R / W
Volume 726.48 Fill
Area 211.87 Fill
Volume 836.24 Cut
Area 209.34 Cut

88+00

| | | |





olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X070 of 195

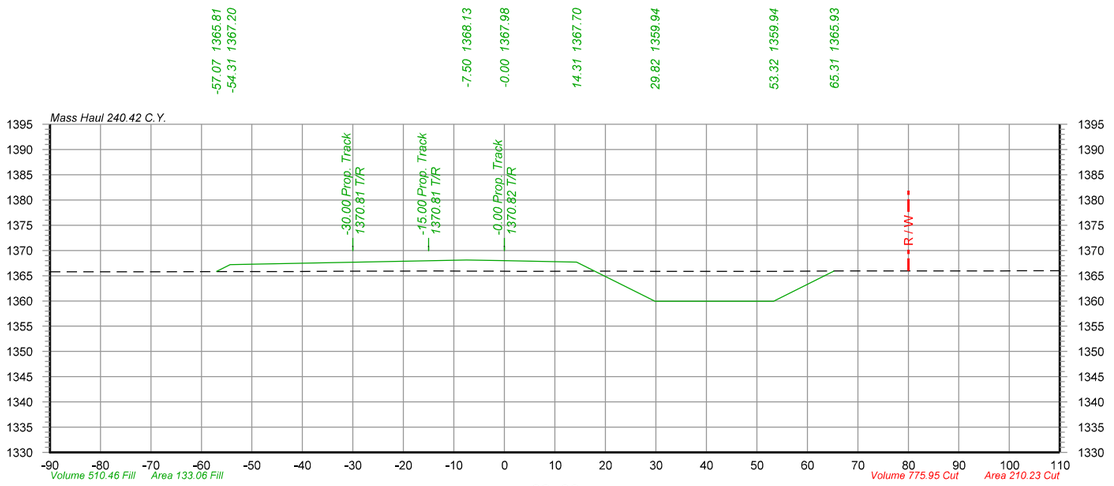
UNION PACIFIC RAILROAD

Sheet 310 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

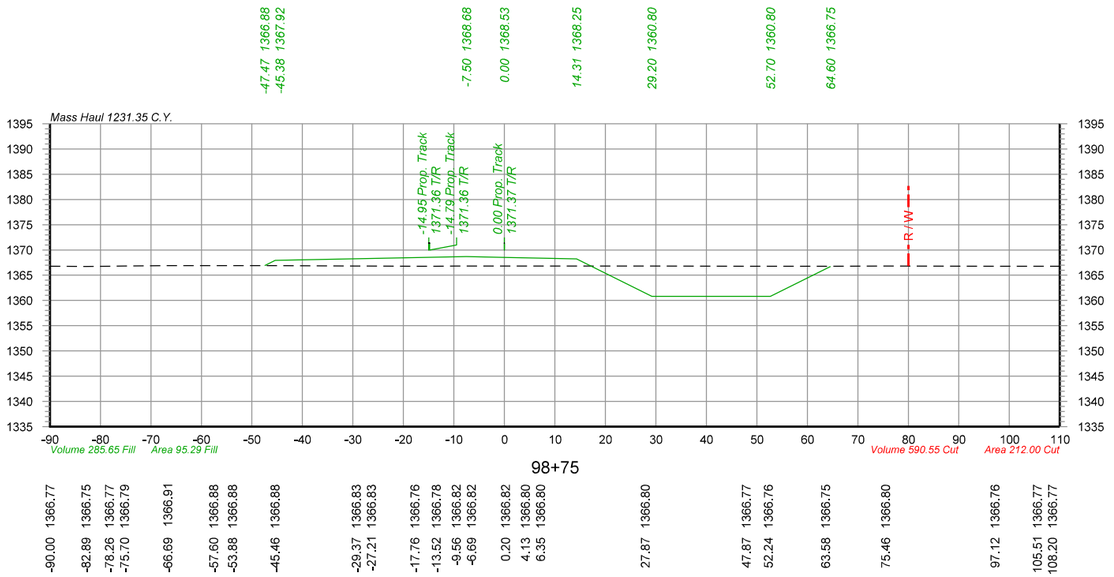
SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.91+00 TO STA.94+00

Color table: K:\Bentley\Workspace\Projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-
Default
3/9/2026


Mass Haul 240.42 C.Y.
-30.00 Prop. Track
1370.81 T/R
-15.00 Prop. Track
1370.81 T/R
-0.00 Prop. Track
1370.82 T/R
R/W
Volume 510.46 Fill
Area 133.06 Fill
Volume 775.95 Cut
Area 210.23 Cut

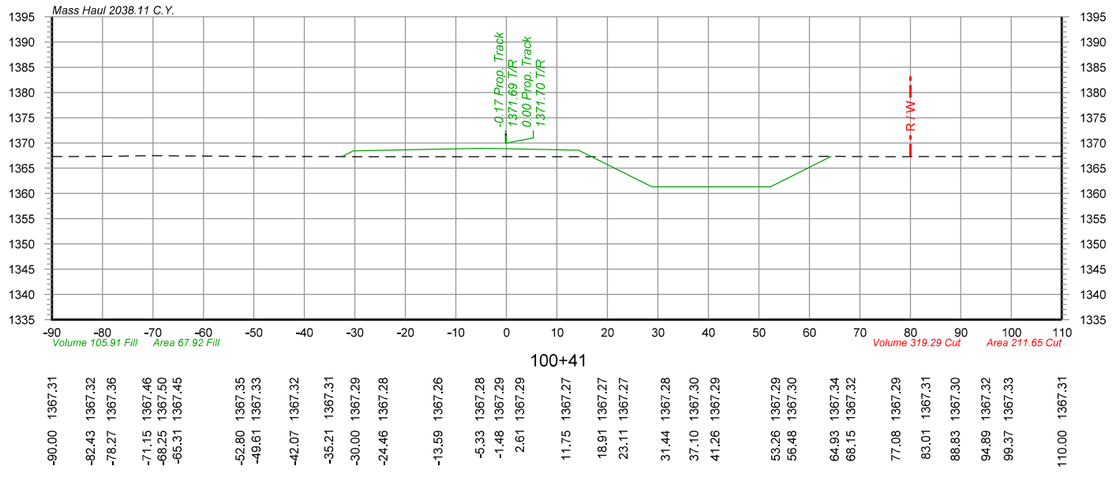
96+00

| | | |

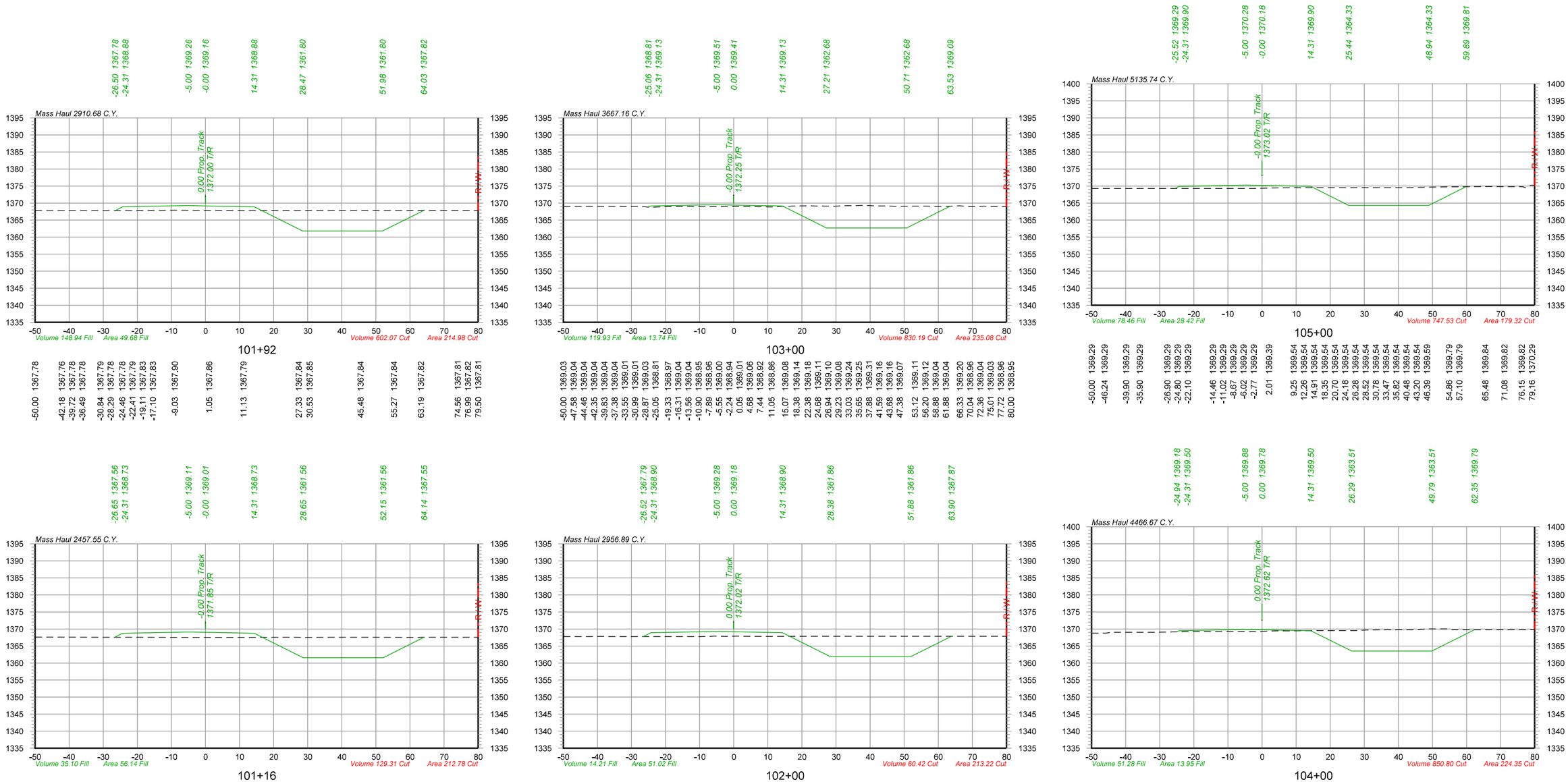

-47.47 1366.88
-45.38 1367.92
-7.50 1368.68
0.00 1368.53
14.31 1368.25
29.20 1360.80
52.70 1360.80
64.60 1366.75
Mass Haul 1231.35 C.Y.
-14.95 Prop. Track
1371.36 T/R
-14.79 Prop. Track
1371.36 T/R
0.00 Prop. Track
1371.37 T/R
R/W
Volume 285.65 Fill
Area 95.29 Fill
Volume 590.55 Cut
Area 212.00 Cut

98+75

| | | |


-32.62 1367.30
-30.31 1368.46
-5.00 1368.96
0.00 1368.86
14.31 1368.58
28.82 1361.32
52.32 1361.32
64.36 1367.34
Mass Haul 2038.11 C.Y.
-0.17 Prop. Track
1371.69 T/R
0.00 Prop. Track
1371.70 T/R
R.I.W.
Volume 105.91 Fill
Area 67.92 Fill
Volume 319.29 Cut
Area 211.65 Cut
100+41

| | | |



Color table: K:\Bentley\Workspace\V8\projects\Clients\UPRR_Track\UPRR_Track_V8\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

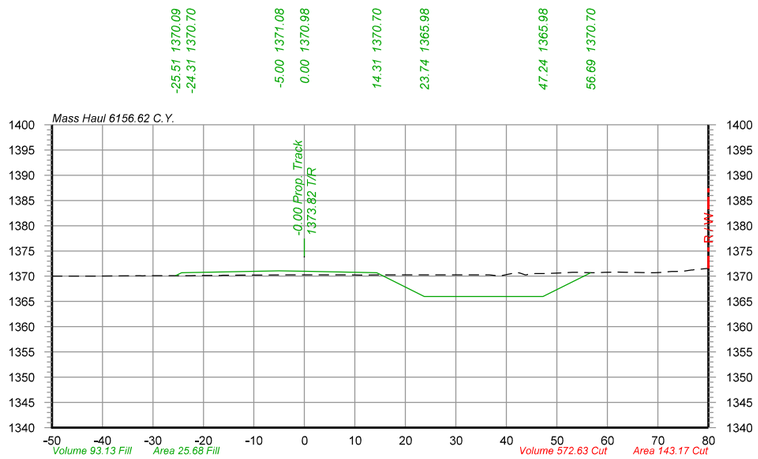
UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X074 of 195

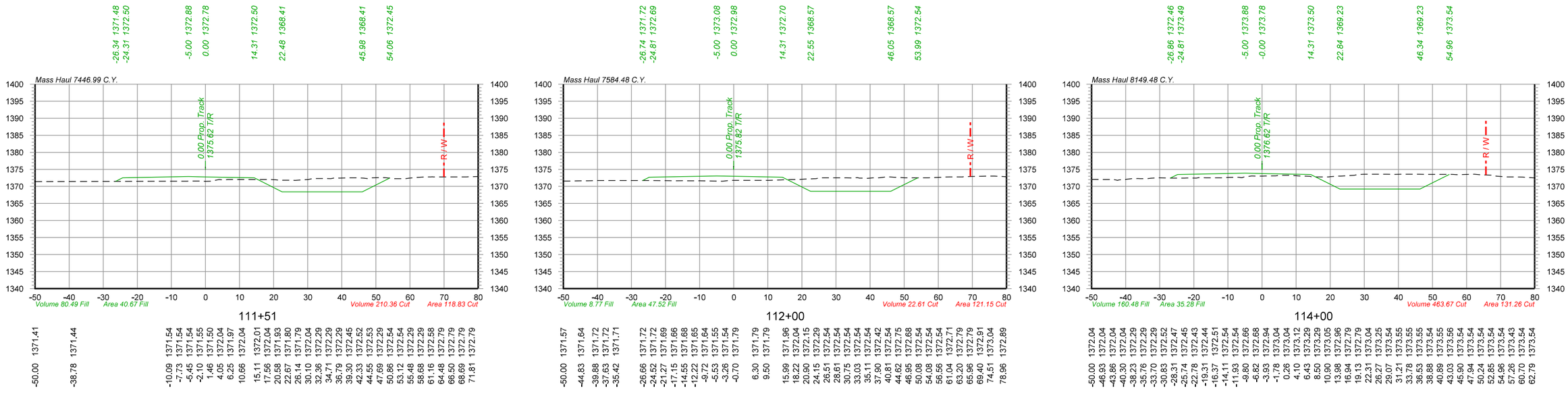
UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.101+16 TO STA.105+00


-25.51 1370.09
-24.31 1370.70
-5.00 1371.08
0.00 1370.98
14.31 1370.70
23.74 1365.98
47.24 1365.98
56.69 1370.70
Mass Haul 6156.62 C.Y.
0.00 Prop. Track
1373.82 T/R
R.I.W.
Volume 93.13 Fill
Area 25.68 Fill
Volume 572.63 Cut
Area 143.17 Cut
107+00

| | | |



Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

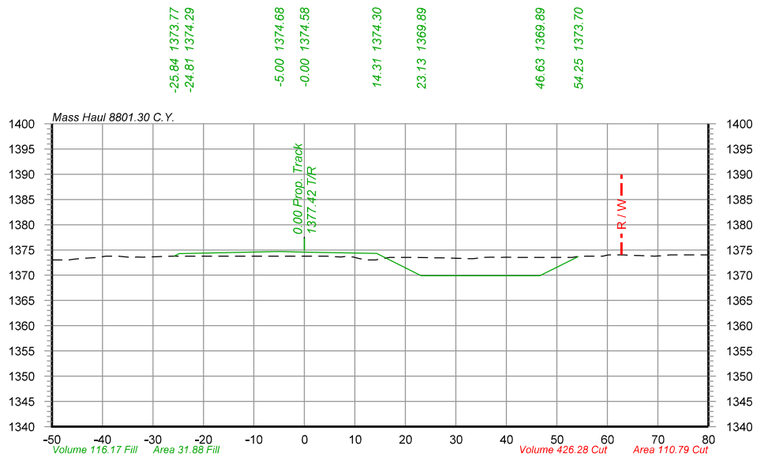
DRAWN BY:	DMJ
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	X076 of 195

UNION PACIFIC RAILROAD

Sheet 316 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.111+00 TO STA.114+00


-25.84 1373.77
-24.81 1374.29
-5.00 1374.68
-0.00 1374.58
14.31 1374.30
23.13 1369.89
46.63 1369.89
54.25 1373.70
Mass Haul 8801.30 C.Y.
0.00 Prop. Track
1377.42 T/R
R / W
Volume 116.17 Fill
Area 31.88 Fill
Volume 426.28 Cut
Area 110.79 Cut

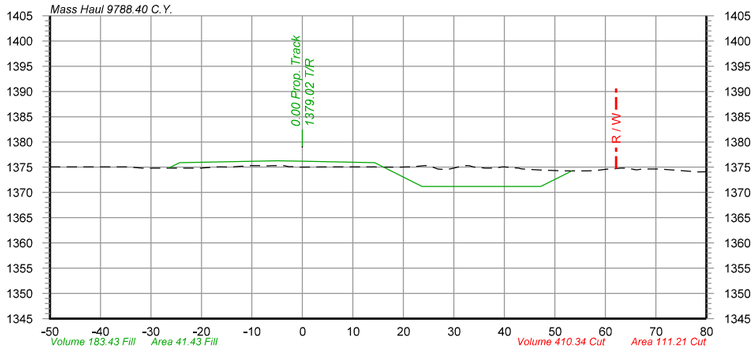
116+00

| | | |

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

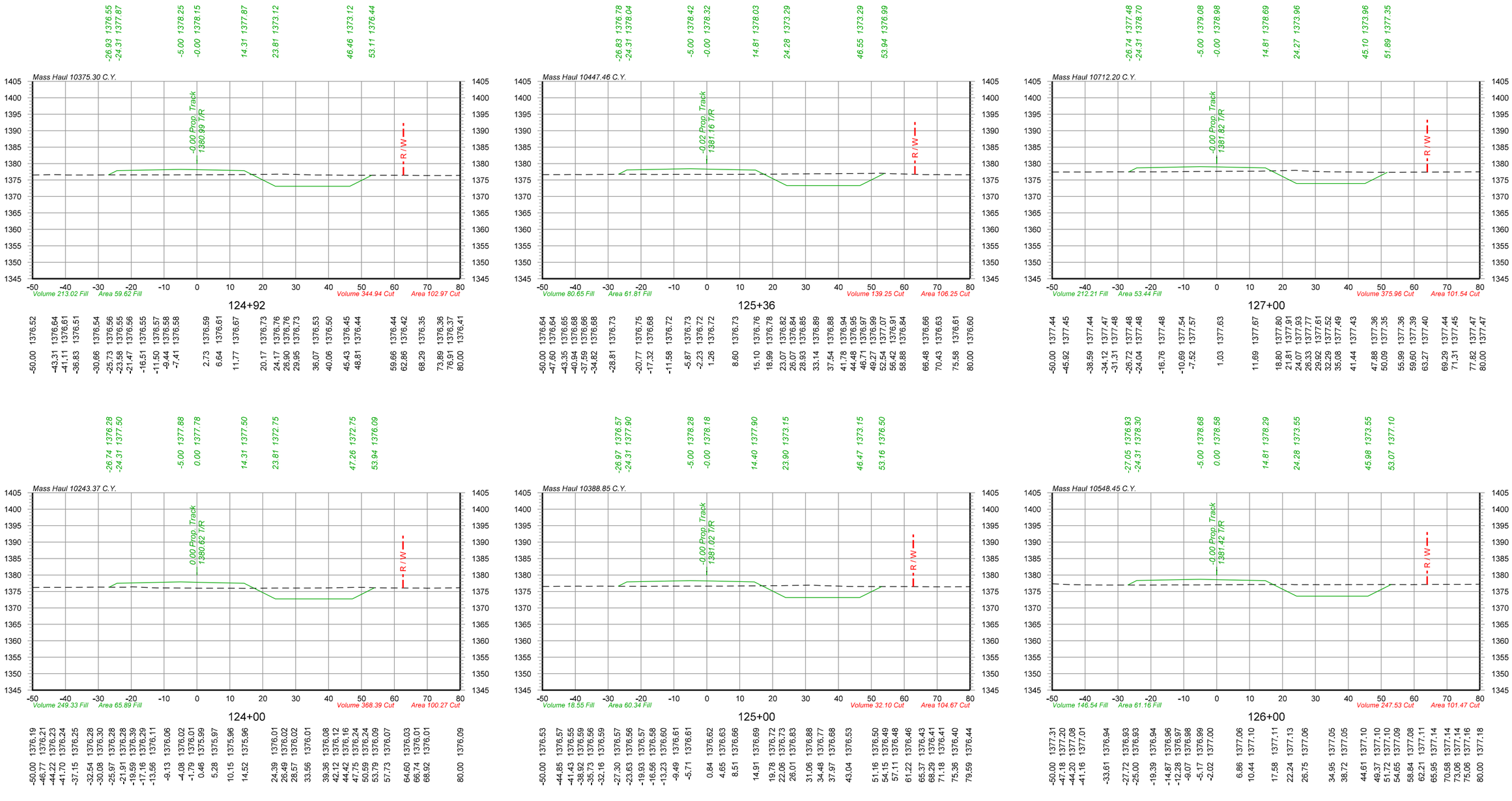
-26.52 1374.79
-24.31 1375.90
-5.00 1376.28
0.00 1376.18
14.31 1375.90
23.70 1371.20
47.20 1371.20
53.37 1374.29

Mass Haul 9788.40 C.Y.



120+00

| | | |



olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	DMJ
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	X079 of 195

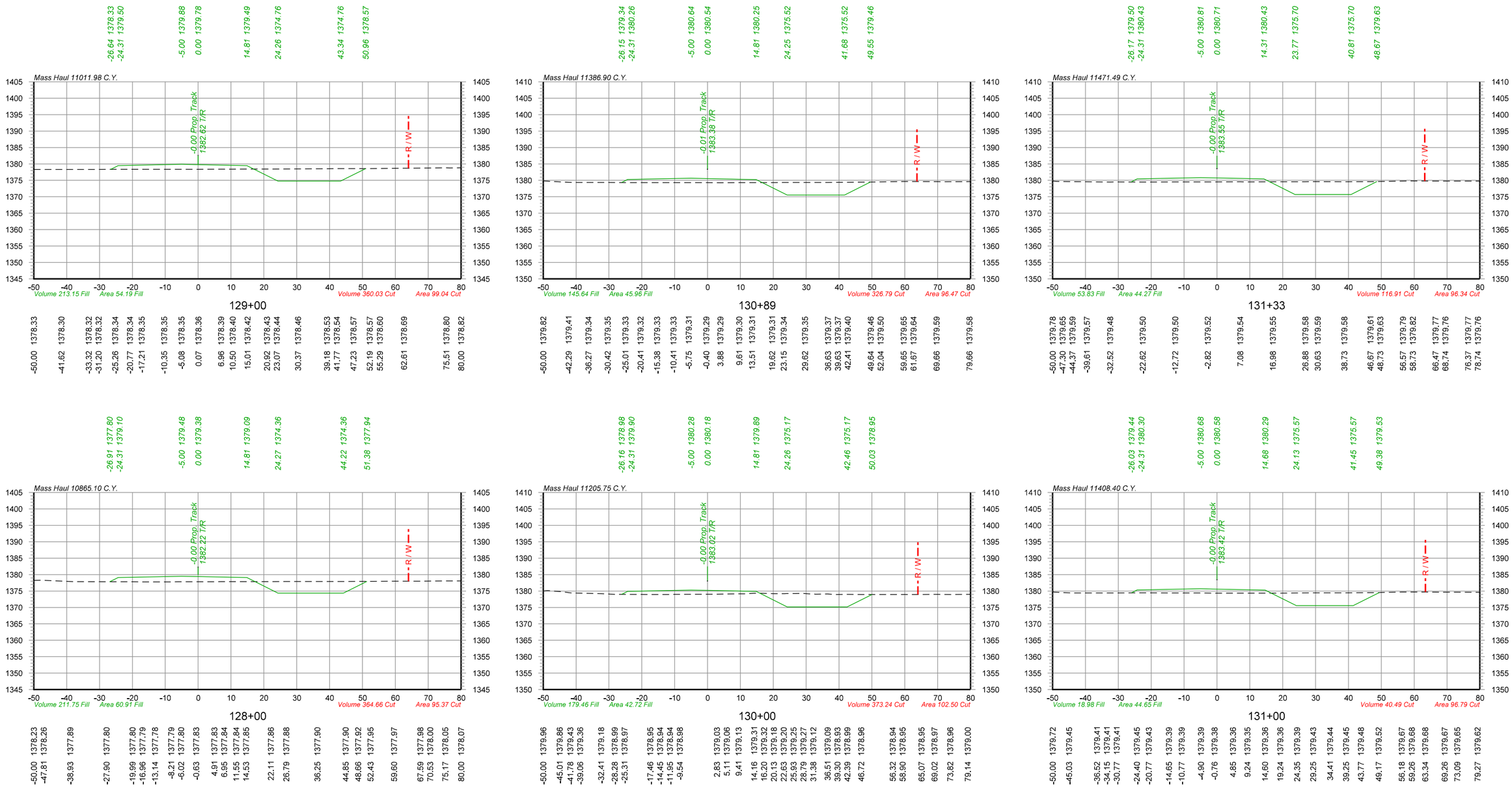
UNION PACIFIC RAILROAD

Sheet 319 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.124+00 TO STA.127+00

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-
Default
3/9/2026



Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

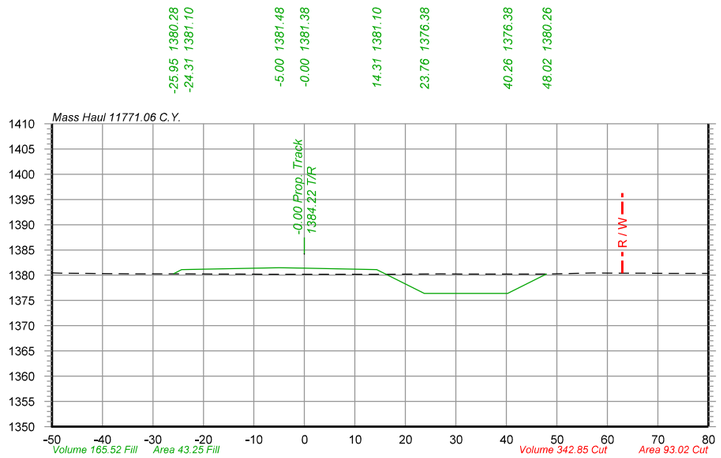
UNION PACIFIC

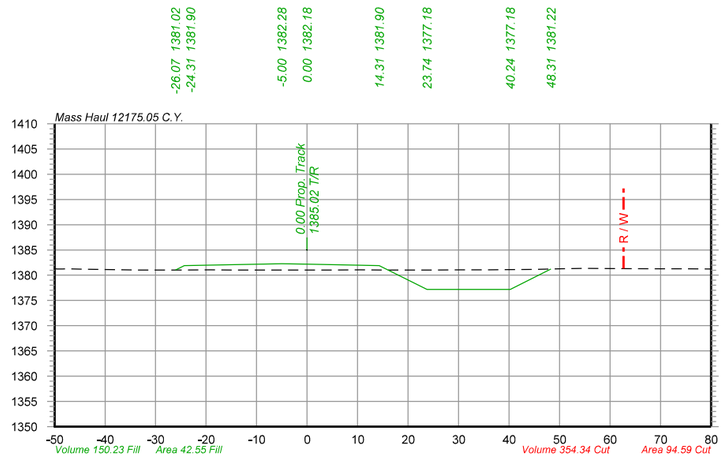
DRAWN BY:	DMJ
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	X080 of 195

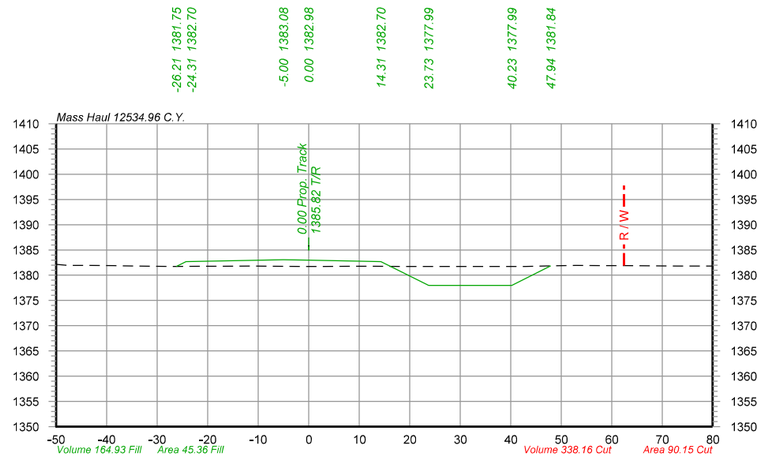
UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.128+00 TO STA.131+33



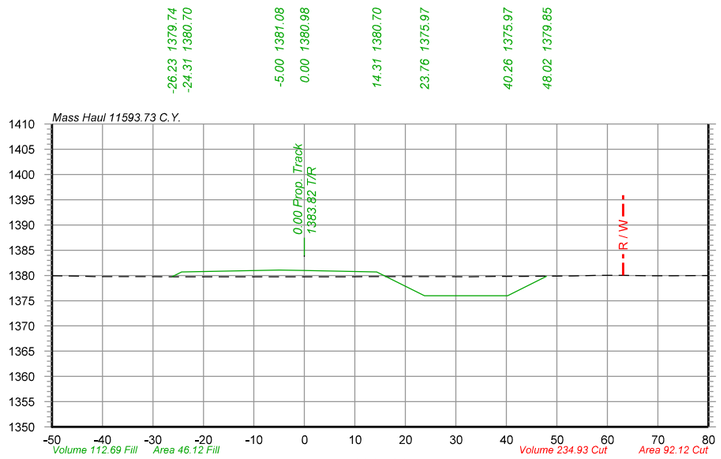


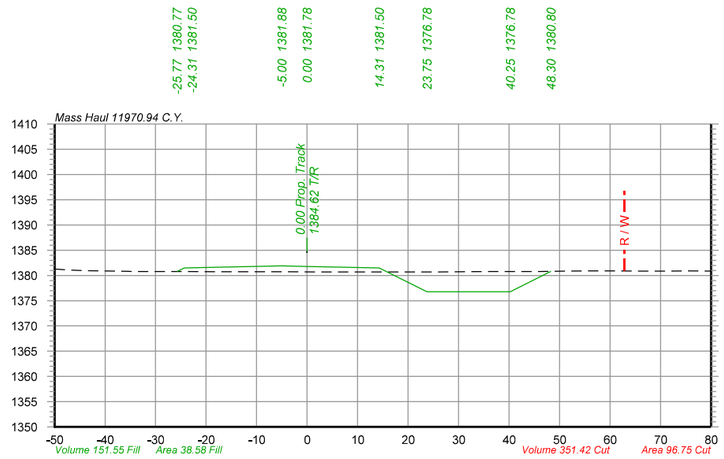


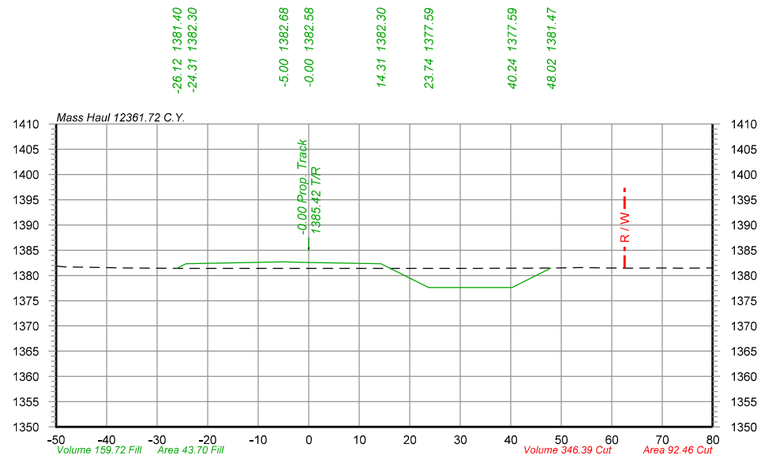
-50.00	1380.49
-42.98	1380.36
-39.10	1380.33
-32.98	1380.28
-26.98	1380.29
-22.98	1380.27
-17.08	1380.25
-12.98	1380.25
-7.18	1380.20
-2.98	1380.18
2.72	1380.19
7.02	1380.18
12.62	1380.19
17.02	1380.18
22.52	1380.21
27.03	1380.25
31.63	1380.23
37.03	1380.21
43.38	1380.23
47.50	1380.25
51.71	1380.32
57.03	1380.43
62.11	1380.41
67.03	1380.38
72.01	1380.37
77.03	1380.36
80.00	1380.36

-50.00	1381.28
-47.53	1381.26
-44.33	1381.19
-38.59	1381.10
-33.44	1381.02
-26.75	1381.02
-19.11	1381.05
-15.02	1381.01
-9.21	1381.02
-5.02	1381.04
0.69	1381.02
4.98	1381.04
10.59	1381.04
14.98	1381.02
20.49	1381.04
24.98	1381.04
30.39	1381.05
35.99	1381.07
39.68	1381.12
44.98	1381.14
50.18	1381.26
54.99	1381.34
59.89	1381.31
69.02	1381.26
74.99	1381.27
79.88	1381.25

-50.00	1382.16
-47.71	1381.94
-43.50	1381.94
-38.55	1381.90
-31.04	1381.78
-27.06	1381.75
-21.14	1381.75
-17.06	1381.77
-11.24	1381.80
-7.06	1381.78
-1.34	1381.75
2.94	1381.75
8.56	1381.75
12.94	1381.76
18.45	1381.75
22.94	1381.74
27.52	1381.74
32.94	1381.73
38.25	1381.73
42.94	1381.73
48.15	1381.84
52.94	1381.93
58.05	1381.91
62.94	1381.88
67.95	1381.84
72.94	1381.82
77.85	1381.81
80.00	1381.80







-50.00	1379.95
-44.24	1379.86
-41.65	1379.78
-35.54	1379.79
-31.96	1379.76
-25.96	1379.74
-21.96	1379.73
-16.07	1379.74
-11.96	1379.75
-6.17	1379.73
-1.96	1379.73
3.73	1379.74
8.04	1379.74
13.63	1379.76
18.05	1379.78
23.53	1379.77
28.05	1379.77
32.65	1379.75
38.05	1379.80
43.33	1379.83
48.05	1379.85
53.23	1379.91
58.05	1380.02
63.13	1380.00
68.05	1379.96
73.03	1379.96
78.05	1379.98

-50.00	1381.26
-47.10	1381.08
-43.65	1380.95
-37.97	1380.86
-35.56	1380.83
-30.02	1380.76
-24.00	1380.77
-18.10	1380.75
-14.00	1380.73
-8.20	1380.73
-4.00	1380.72
1.70	1380.69
6.00	1380.70
11.60	1380.71
16.00	1380.71
21.50	1380.70
26.00	1380.71
30.60	1380.74
36.00	1380.76
41.30	1380.77
46.01	1380.76
51.20	1380.85
56.01	1380.91
61.10	1380.89
66.01	1380.87
71.00	1380.87
76.01	1380.88
80.00	1380.87

-50.00	1381.85
-42.98	1381.59
-36.04	1381.50
-30.03	1381.43
-26.04	1381.40
-20.13	1381.41
-16.04	1381.41
-10.23	1381.42
-6.04	1381.41
-0.33	1381.39
3.96	1381.38
9.57	1381.40
13.96	1381.40
19.47	1381.39
23.96	1381.39
28.55	1381.41
33.96	1381.40
39.27	1381.42
43.96	1381.43
49.17	1381.49
53.96	1381.55
59.07	1381.50
63.97	1381.46
68.97	1381.47
73.97	1381.46
79.07	1381.49

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X081 of 195

UNION PACIFIC RAILROAD

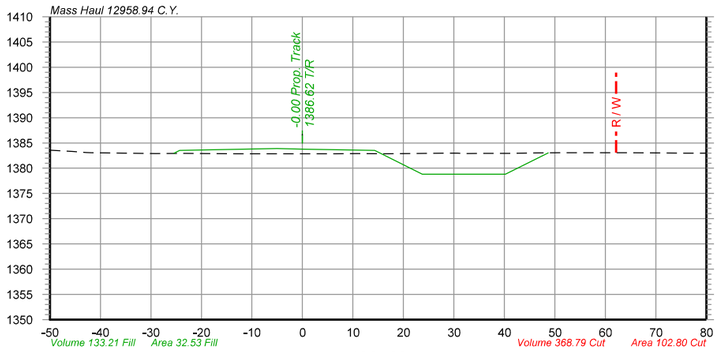
Sheet 321 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.132+00 TO STA.137+00

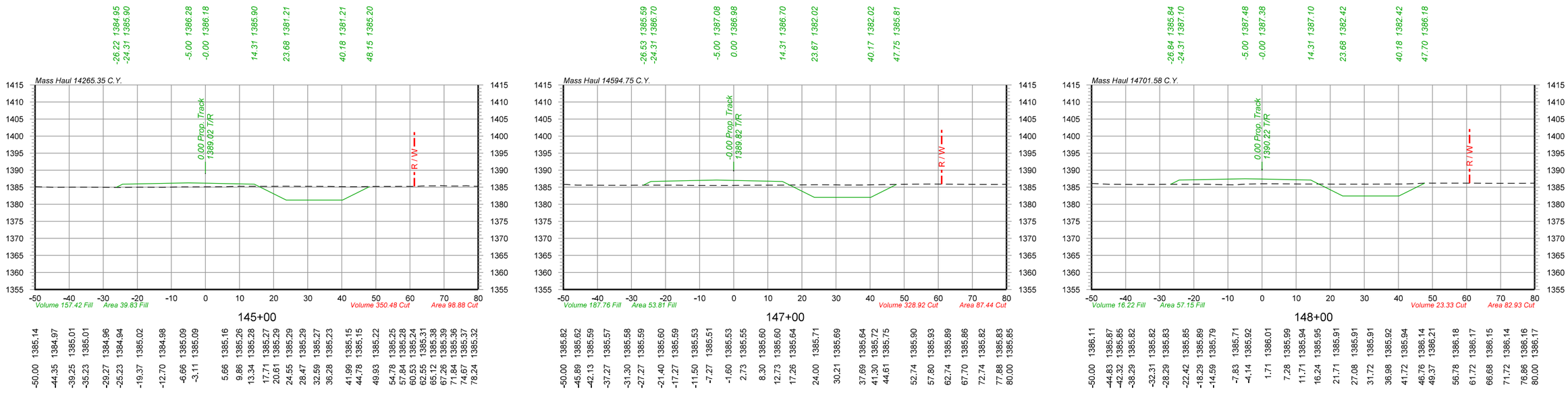
Color table: K:\Bentley\Workspace\V8\projects\Clients\UPRR_Track\UPRR_Track_V8\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-
Default
3/9/2026

-25.47 1382.92
-24.31 1383.50
-5.00 1383.88
-0.00 1383.78
14.31 1383.50
23.72 1378.80
40.22 1378.80
48.74 1383.06



139+00

| | | |



Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	DMJ
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	X083 of 195

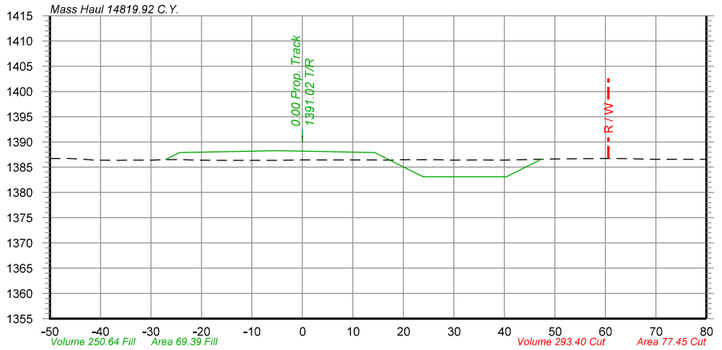
UNION PACIFIC RAILROAD

Sheet 323 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

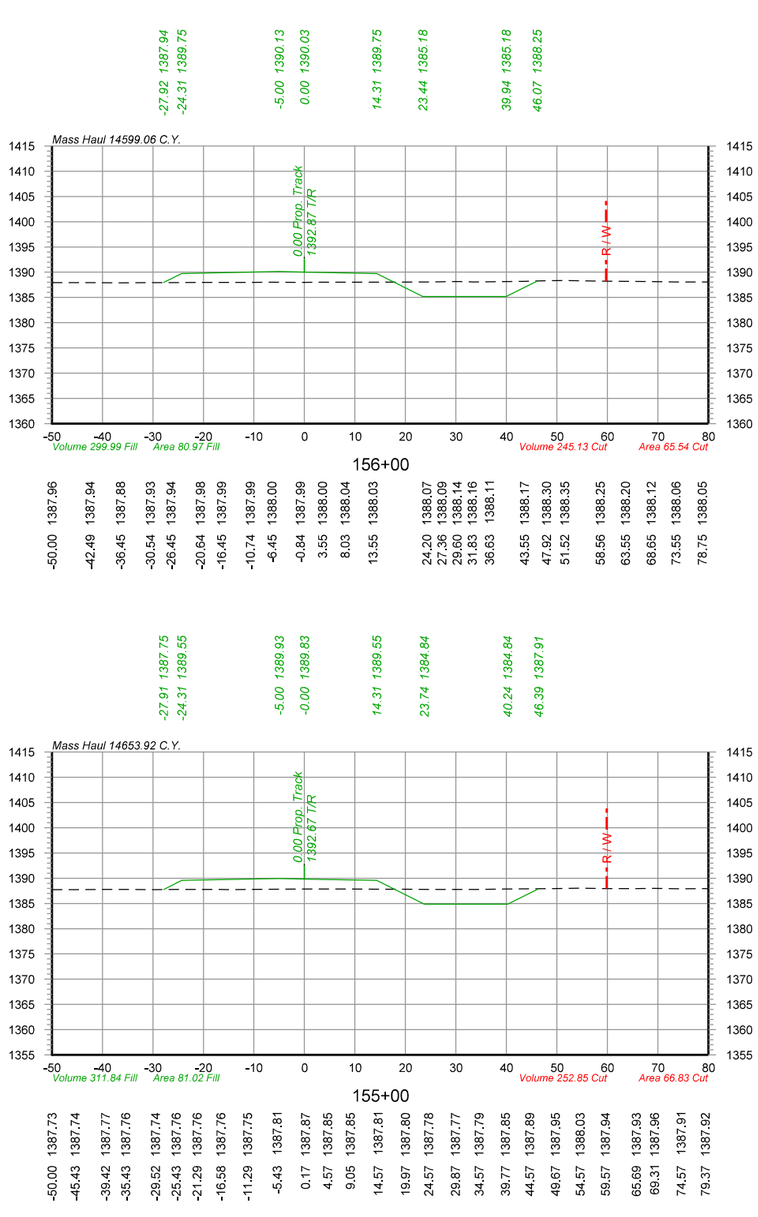
SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.144+00 TO STA.148+00

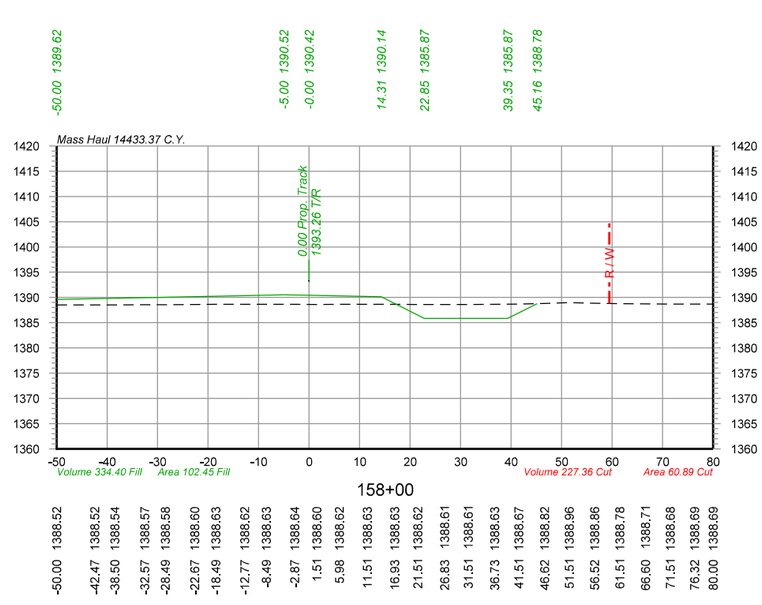
-27.11 1386.50
-24.31 1387.90
-5.00 1388.29
0.00 1388.19
14.31 1387.90
23.90 1383.11
40.40 1383.11
47.37 1386.60

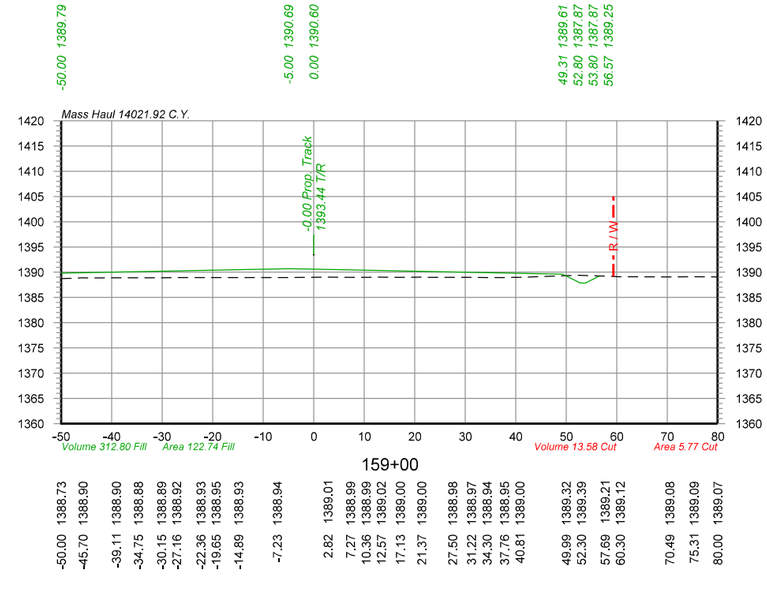


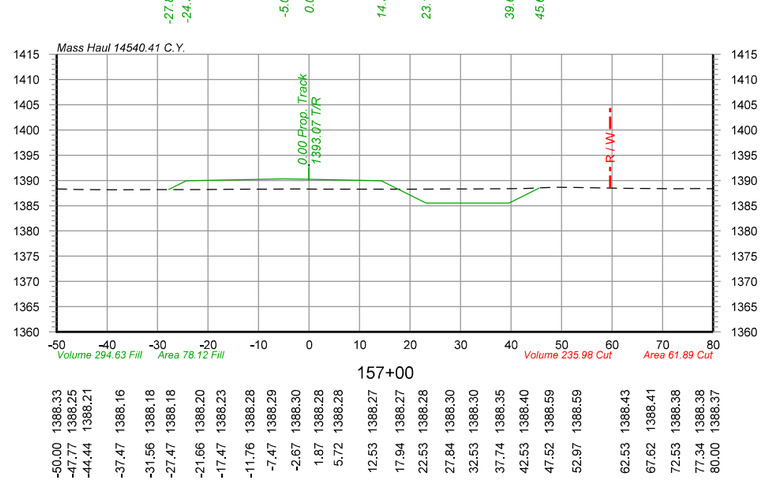
150+00

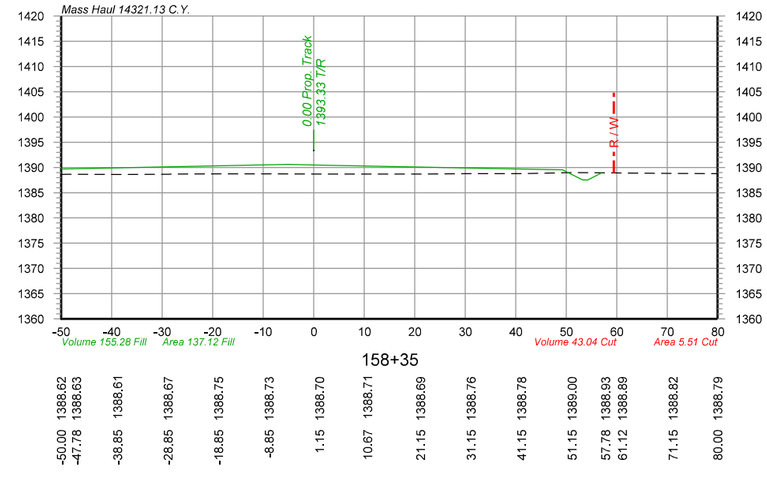
| | | |











olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

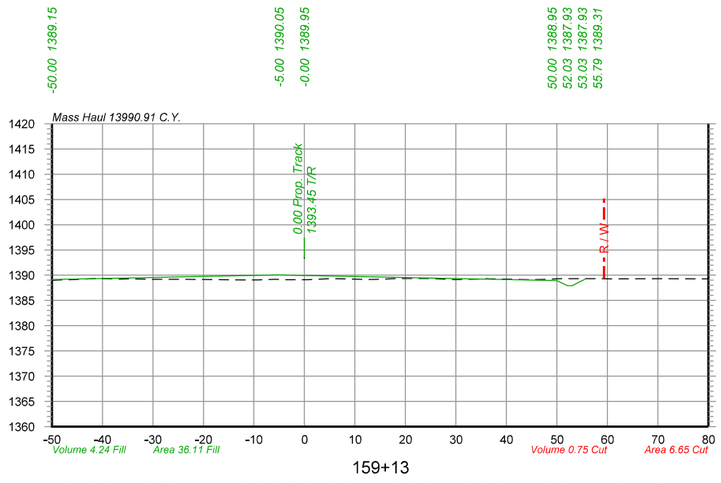
DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X085 of 195

UNION PACIFIC RAILROAD

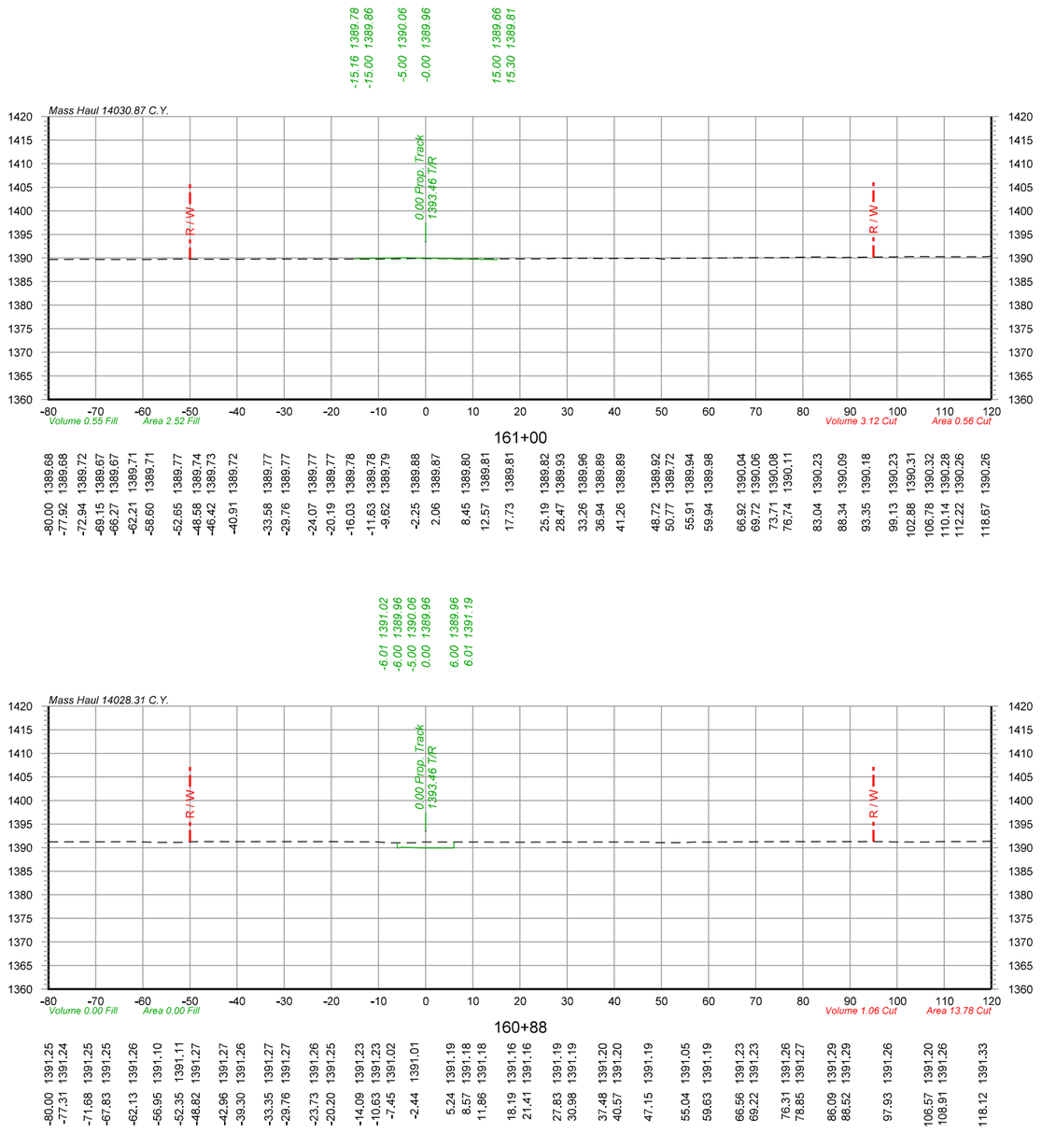
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.155+00 TO STA.159+00

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026


-50.00 1389.15
-5.00 1390.05
-0.00 1389.95
50.00 1388.95
52.03 1387.93
53.03 1387.93
55.79 1389.31
Mass Haul 13990.91 C.Y.
0.00 Prop. Track
1393.45 T/R
R / W
Volume 4.24 Fill
Area 36.11 Fill
Volume 0.75 Cut
Area 6.65 Cut
159+13

| | | |



Color table: K:\Bentley\Workspace\Projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

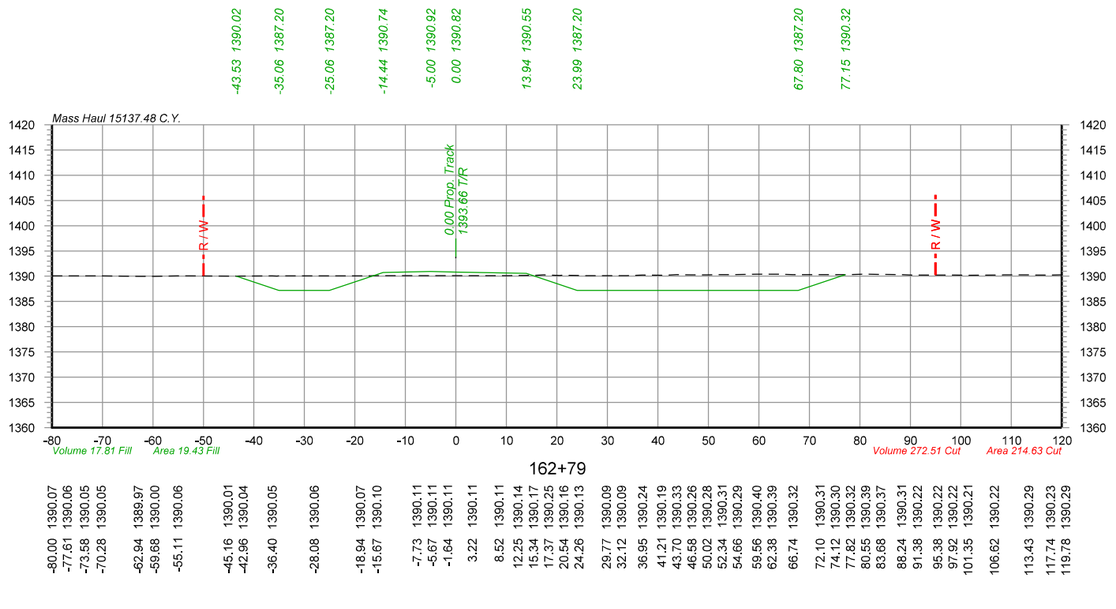
UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X087 of 195

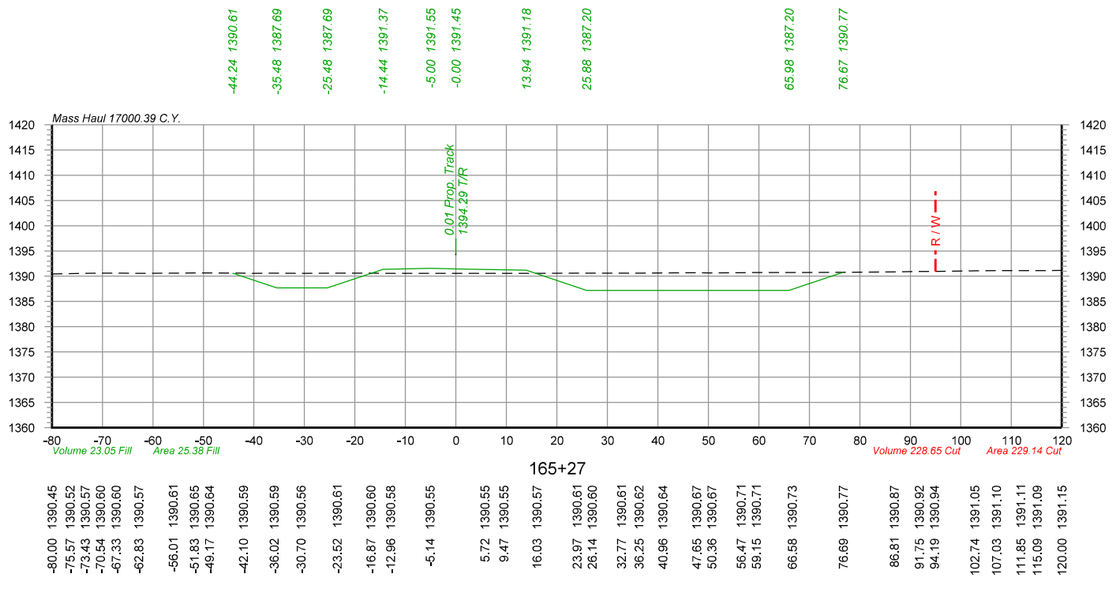
UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.160+88 TO STA.162+00


-43.53 1390.02
-35.06 1387.20
-25.06 1387.20
-14.44 1390.74
-5.00 1390.92
0.00 1390.82
13.94 1390.55
23.99 1387.20
67.80 1387.20
77.15 1390.32
Mass Haul 15137.48 C.Y.
0.00 Prop. Track
1393.66 T/R
R / W
R / W
Volume 17.81 Fill
Area 19.43 Fill
Volume 272.51 Cut
Area 214.63 Cut
162+79

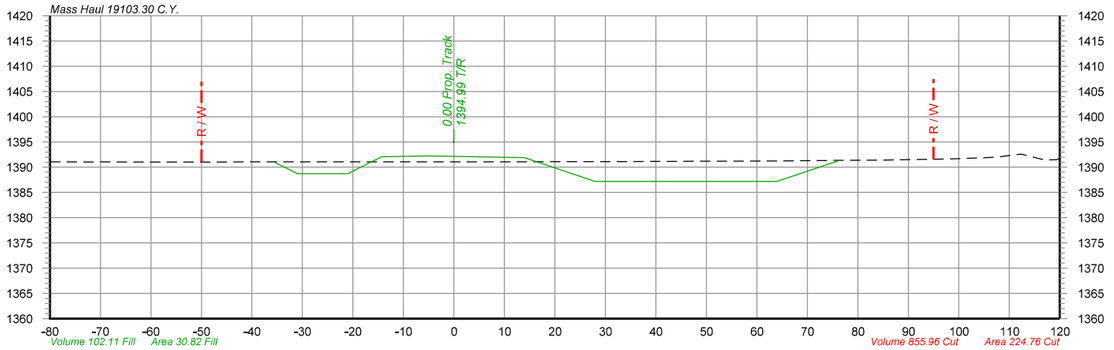
| | | |


-44.24 1390.61
-35.48 1387.69
-25.48 1387.69
-14.44 1391.37
-5.00 1391.55
-0.00 1391.45
13.94 1391.18
25.88 1387.20
65.98 1387.20
76.67 1390.77
Mass Haul 17000.39 C.Y.
0.01 Prop. Track
1394.29 T/R
R / W
R / W
Volume 23.05 Fill
Area 25.38 Fill
Volume 228.65 Cut
Area 229.14 Cut
165+27

| | | |

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-
Default
3/9/2026

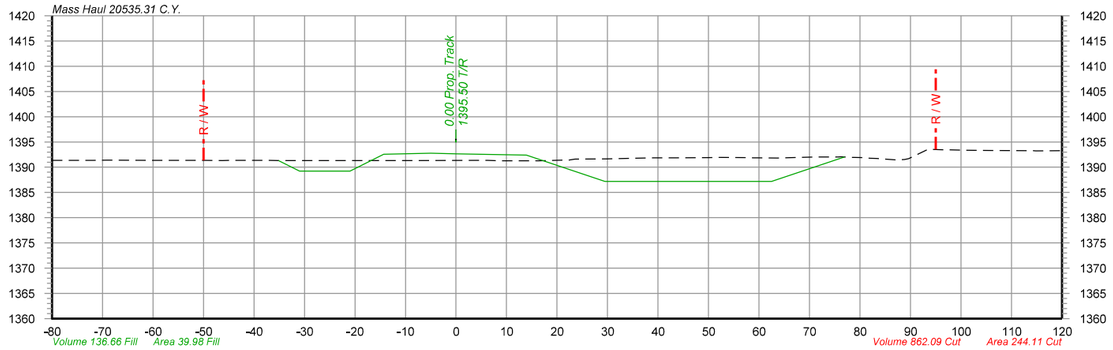
-35.69 1391.06 -30.99 1388.72 -21.00 1388.72 -14.31 1392.07 -5.00 1392.25 -0.00 1392.15 13.94 1391.88 27.97 1387.20 63.97 1387.20 76.41 1391.35



168+00

-80.00	1391.05	-71.74	1391.04	-63.61	1391.04	-60.90	1391.04	-55.18	1391.03	-51.45	1391.04	-46.43	1391.03	-39.84	1391.06	-37.25	1391.06	-31.10	1391.06	-27.12	1391.05	-21.65	1391.05	-18.23	1391.05	-13.62	1391.06	-6.87	1391.08
2.41	1391.08	7.71	1391.07	12.60	1391.06	21.34	1391.09	23.50	1391.10	30.08	1391.11	33.63	1391.12	38.82	1391.15	43.75	1391.16	47.56	1391.17	53.88	1391.17	62.56	1391.23	71.64	1391.30	74.05	1391.32	84.25	1391.40
91.26	1391.51	94.37	1391.56	98.54	1391.66	105.55	1391.89	108.02	1392.07	110.67	1392.40	112.98	1392.44	116.96	1391.42	119.26	1391.48												

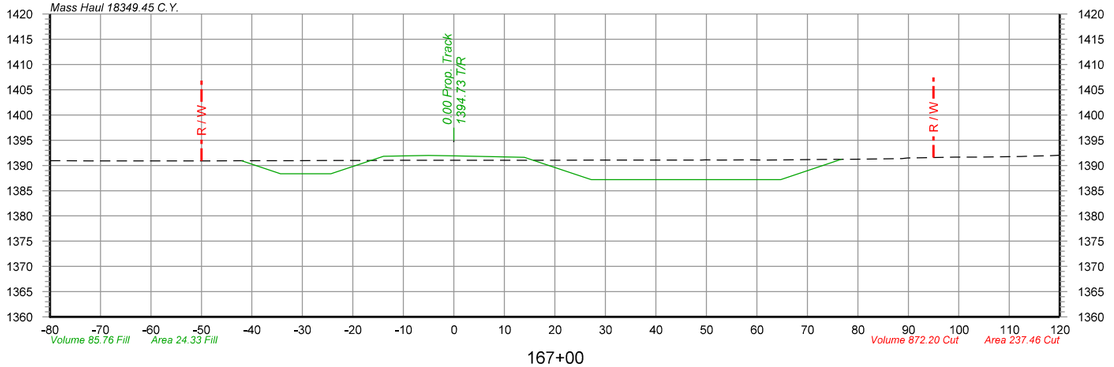
-35.17 1391.32 -31.00 1389.23 -21.00 1389.23 -14.31 1392.58 -5.00 1392.76 -0.00 1392.66 13.94 1392.39 29.49 1387.20 62.49 1387.20 76.92 1392.01



170+00

-80.00	1391.34	-71.95	1391.37	-69.13	1391.38	-60.34	1391.36	-57.72	1391.36	-50.44	1391.36	-46.23	1391.31	-38.64	1391.34	-35.17	1391.32	-31.13	1391.31	-28.55	1391.32	-24.02	1391.31	-21.63	1391.30	-18.46	1391.30	-8.21	1391.31
4.06	1391.34	6.23	1391.34	8.56	1391.28	11.30	1391.26	14.62	1391.27	21.00	1391.38	23.58	1391.60	29.77	1391.66	35.17	1391.75	39.17	1391.85	41.35	1391.86	43.65	1391.87	49.90	1391.90	52.41	1391.92	57.67	1391.90
59.87	1391.86	63.69	1391.80	66.39	1391.91	71.27	1392.00	75.67	1392.02	78.46	1391.93	80.69	1391.88	83.36	1391.72	87.21	1391.43	89.62	1391.69	92.99	1393.31	96.74	1393.46	101.12	1393.37	105.47	1393.33	113.32	1393.27
119.82	1393.26																												

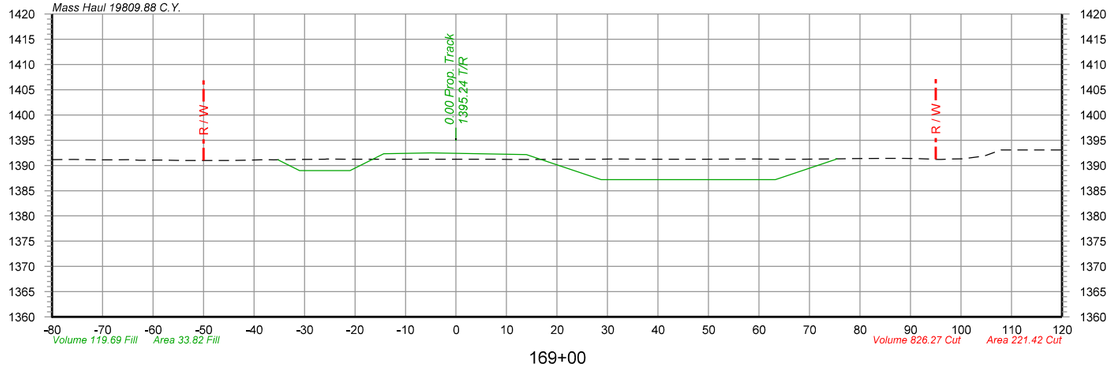
-42.06 1390.93 -34.34 1388.36 -24.34 1388.36 -13.94 1391.82 -5.00 1391.99 0.00 1391.89 13.94 1391.62 27.20 1387.20 64.70 1387.20 76.75 1391.21



167+00

-80.00	1390.92	-77.53	1390.92	-72.03	1390.91	-68.79	1390.91	-61.91	1390.91	-51.78	1390.91	-48.34	1390.92	-41.66	1390.93	-33.83	1390.95	-31.53	1390.96	-25.09	1390.97	-21.41	1390.99	-16.34	1391.00	-11.28	1391.02	-7.61	1391.01
-1.16	1391.02	1.13	1391.02	8.97	1391.03	15.58	1391.04	18.83	1391.04	28.36	1391.04	37.82	1391.07	40.60	1391.07	47.35	1391.07	49.78	1391.09	52.74	1391.07	58.53	1391.09	61.57	1391.09	66.18	1391.12	69.28	1391.15
73.08	1391.18	79.77	1391.24	88.71	1391.37	92.93	1391.54	99.24	1391.65	103.96	1391.66	112.37	1391.77	114.86	1391.84	116.83	1391.90	120.00	1392.03										

-35.31 1391.13 -31.00 1388.98 -21.00 1388.98 -14.31 1392.32 -5.00 1392.50 -0.00 1392.40 13.94 1392.13 28.73 1387.20 63.23 1387.20 75.56 1391.31



169+00

-80.00	1391.14	-75.65	1391.19	-71.40	1391.12	-67.95	1391.11	-64.35	1391.14	-59.31	1391.07	-56.36	1391.04	-54.20	1391.00	-50.49	1390.99	-48.31	1390.97	-44.75	1391.01	-42.27	1391.01	-37.61	1391.16	-32.02	1391.17	-25.94	1391.25
-21.92	1391.25	-15.27	1391.25	-7.87	1391.25	-5.76	1391.25	-0.07	1391.25	3.06	1391.24	8.17	1391.24	10.91	1391.19	15.66	1391.20	19.45	1391.22	25.19	1391.22	28.36	1391.24	31.17	1391.25	37.69	1391.25	46.56	1391.25
48.77	1391.24	57.99	1391.27	63.77	1391.25	67.77	1391.25	76.52	1391.32	78.53	1391.34	85.12	1391.40	87.55	1391.40	91.33	1391.34	93.61	1391.25	96.08	1391.21	100.38	1391.33	104.57	1391.84	107.92	1393.06	116.47	1393.07
119.03	1393.06																												

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

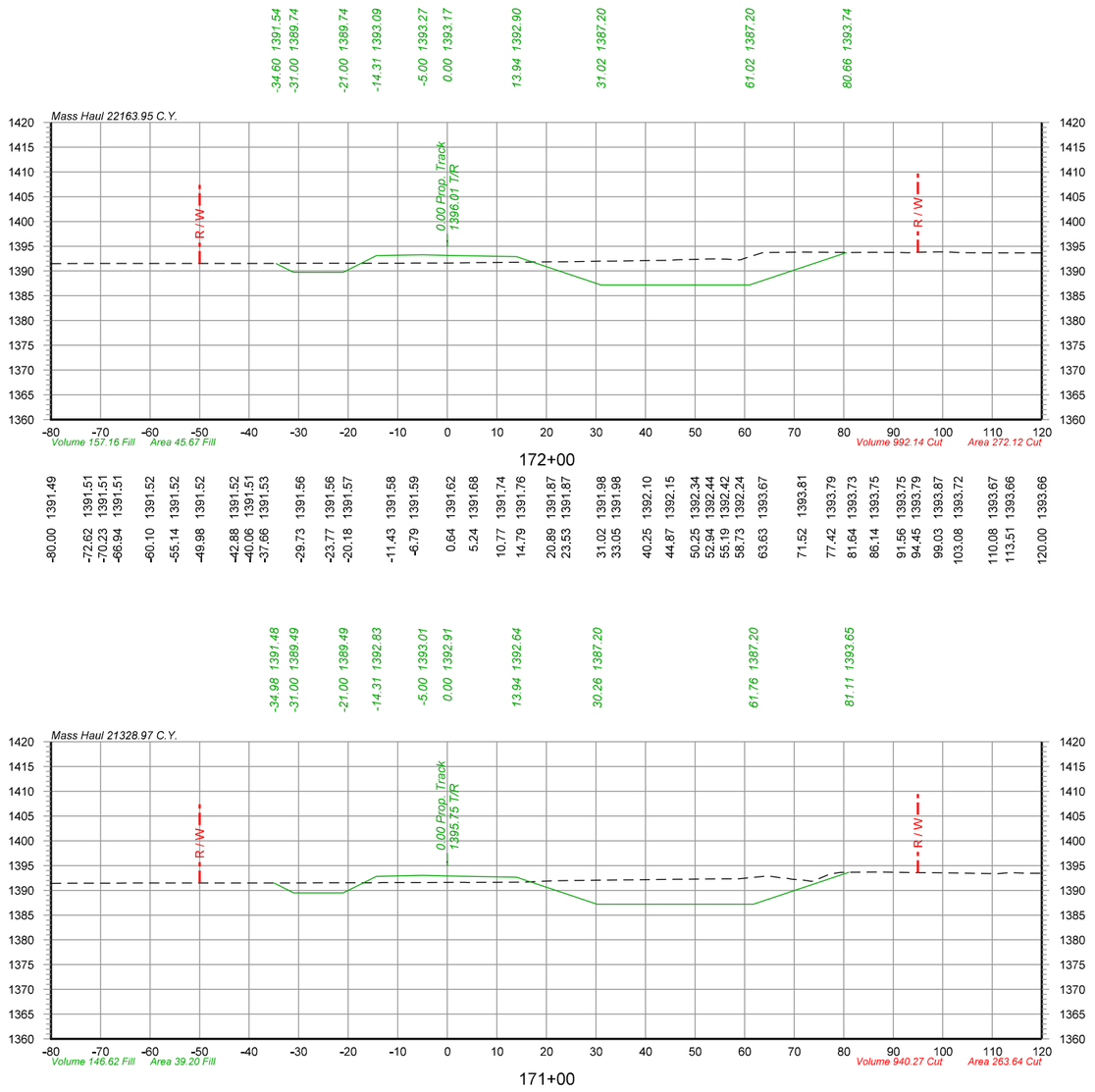
DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X090 of 195

UNION PACIFIC RAILROAD

Sheet 330 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.167+00 TO STA.170+00



Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	DMJ
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	X091 of 195

UNION PACIFIC RAILROAD

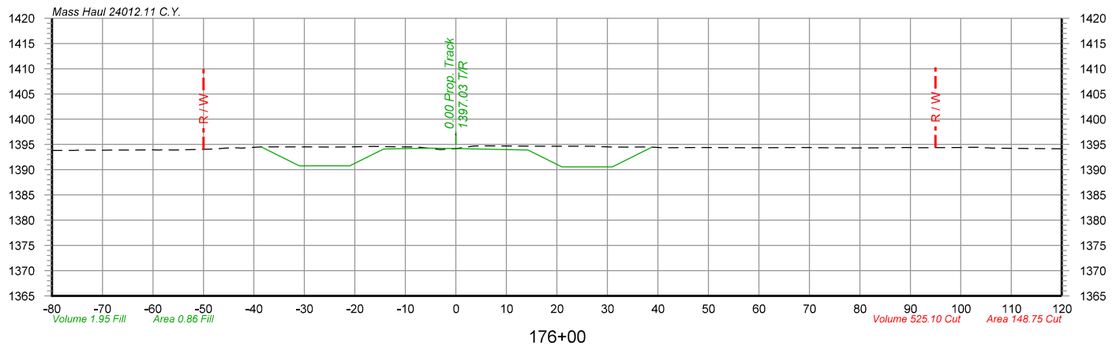
Sheet 331 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.171+00 TO STA.174+00

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

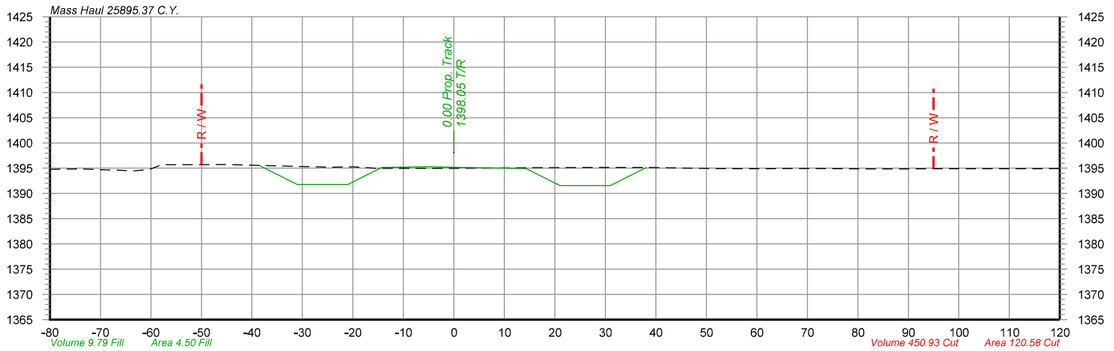
-38.47 1394.49 | -31.00 1390.76 | -21.00 1390.76 | -14.31 1394.11 | -5.00 1394.29 | -0.00 1394.19 | 14.31 1393.91 | 21.00 1390.56 | 31.00 1390.56 | 38.83 1394.48



176+00

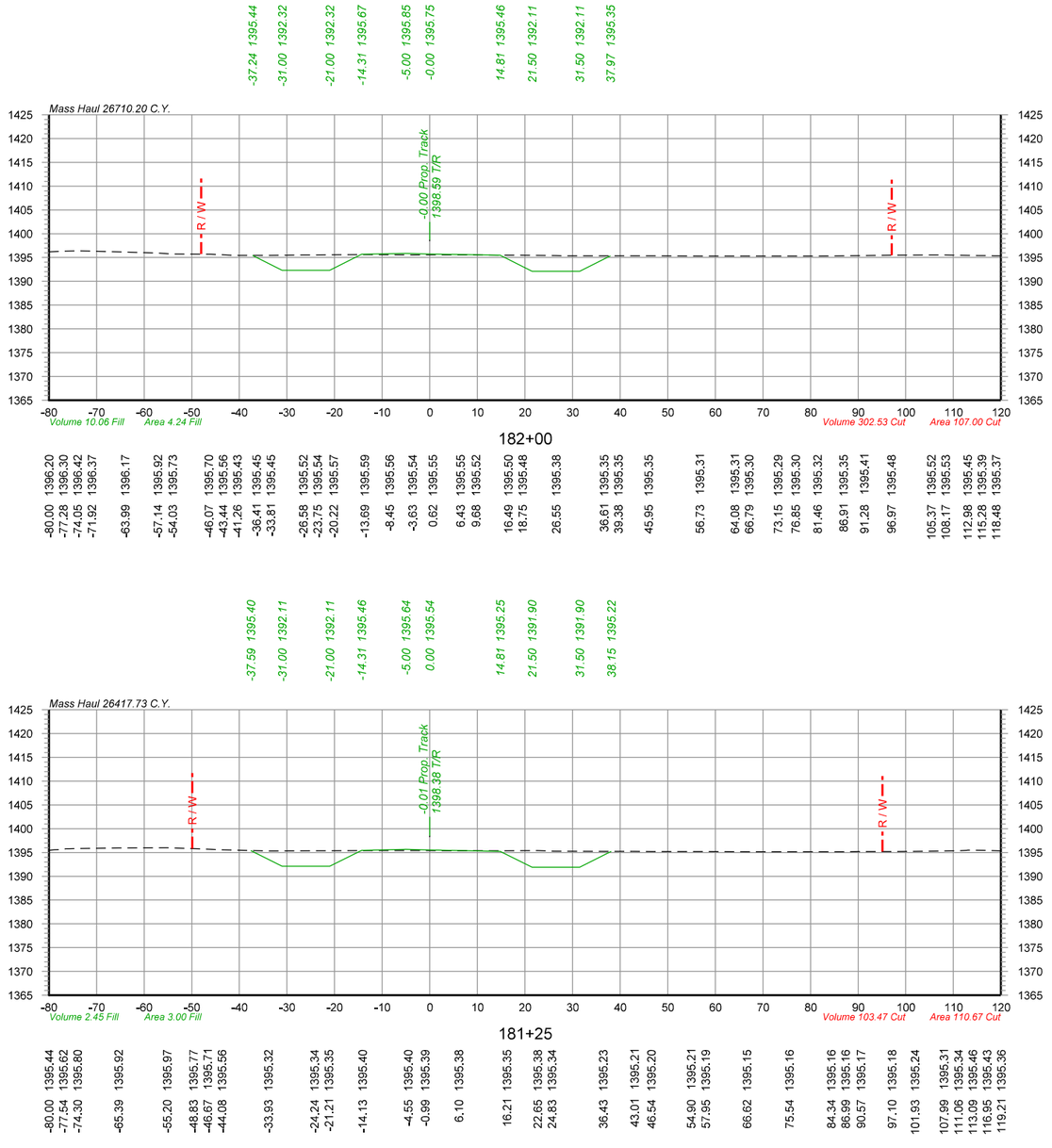
| | | |

-38.57 1395.56 | -31.00 1391.78 | -21.00 1391.78 | -14.31 1395.13 | -5.00 1395.31 | 0.00 1395.21 | 14.31 1394.93 | 21.00 1391.58 | 31.00 1391.58 | 38.15 1395.15



180+00

| | | |



olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X094 of 195

UNION PACIFIC RAILROAD

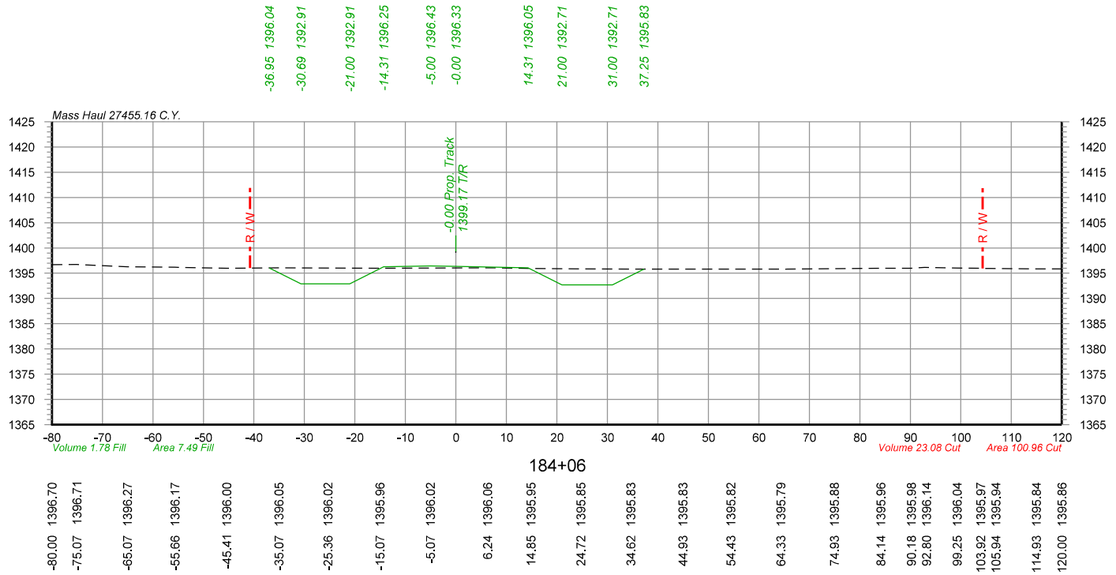
Sheet 334 of 587

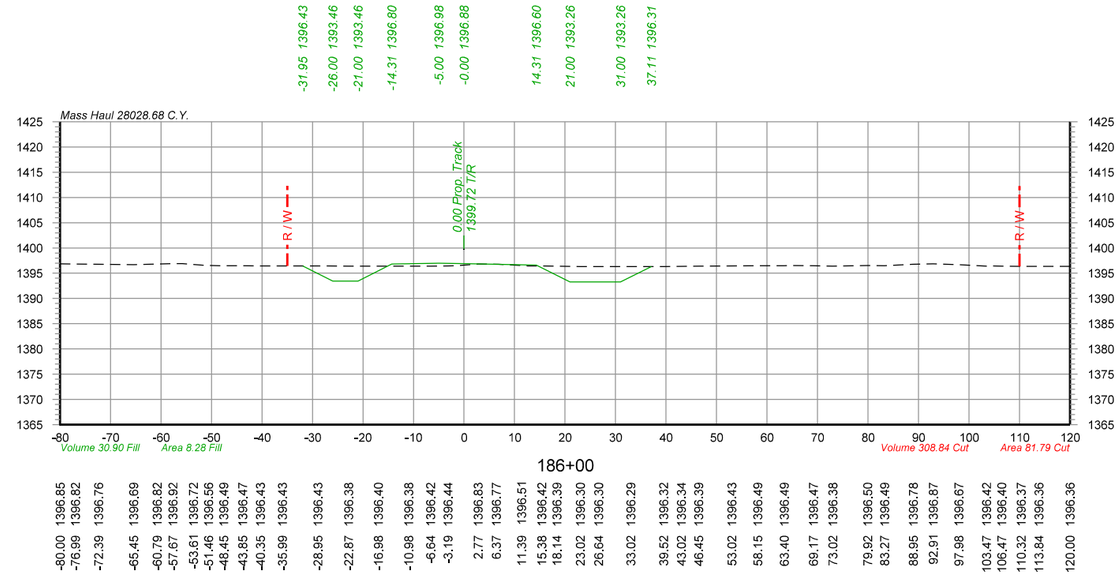
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

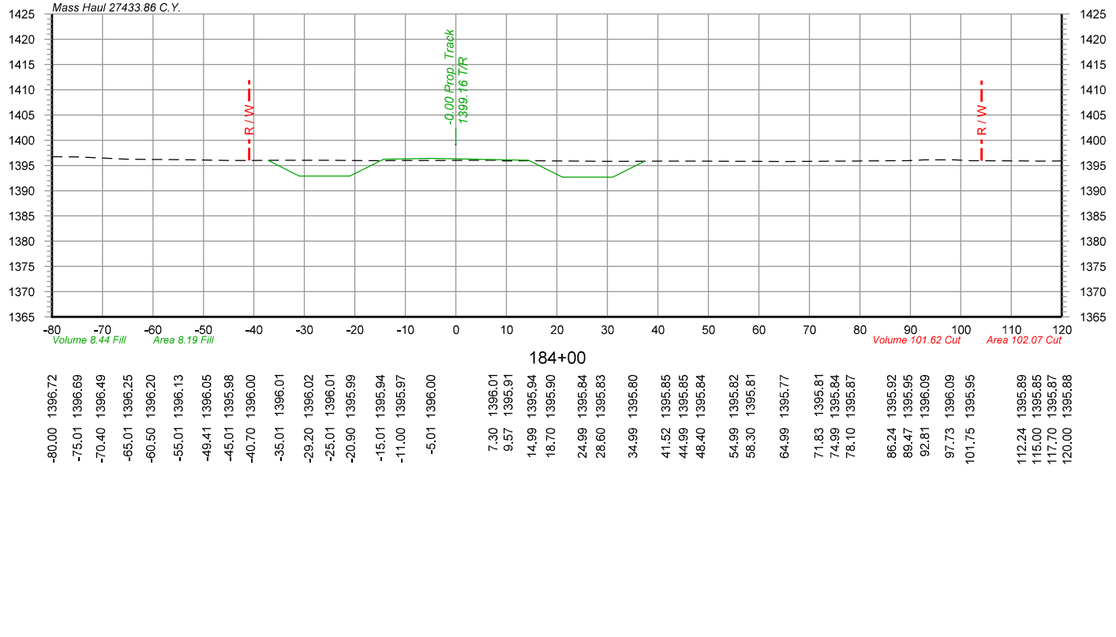
SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.181+25 TO STA.183+73

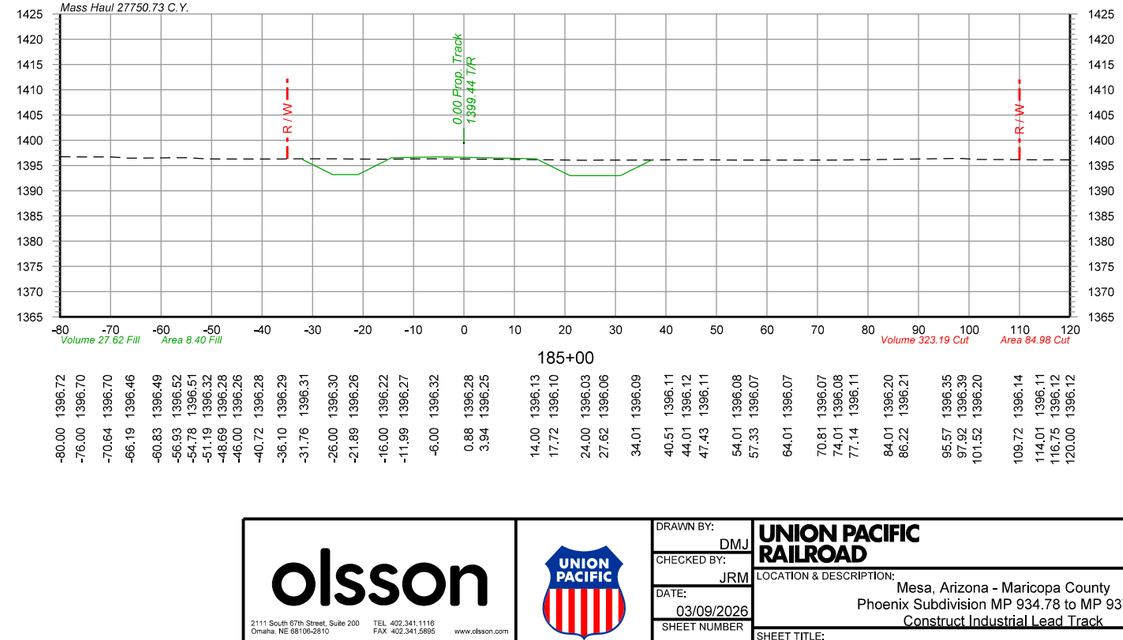
Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-
Default
3/9/2026

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-
Default
3/9/2026









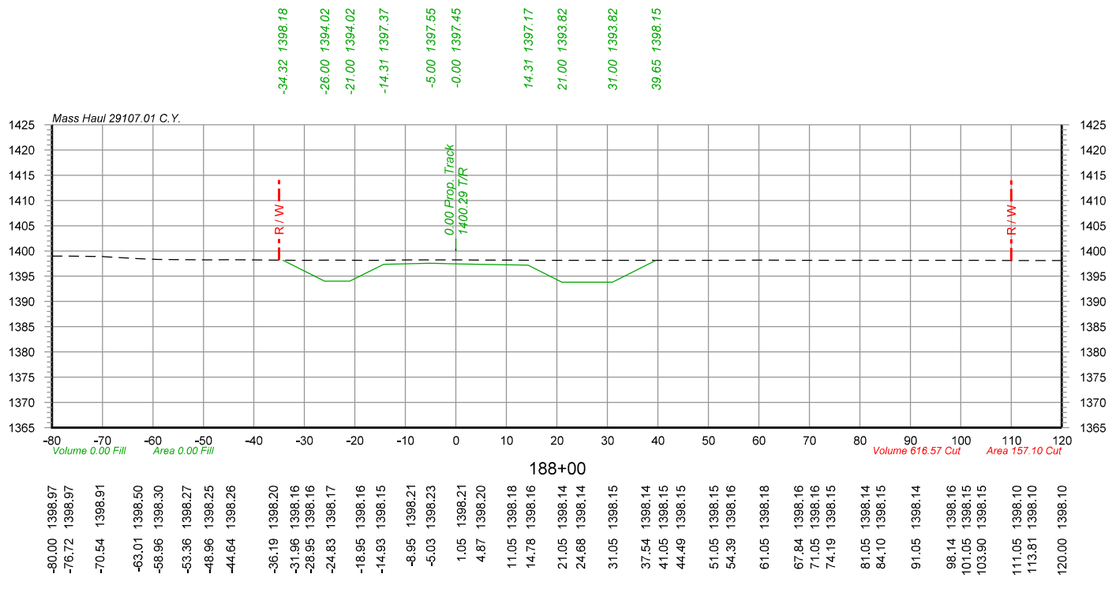
olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

DRAWN BY:	DMJ
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	X095 of 195

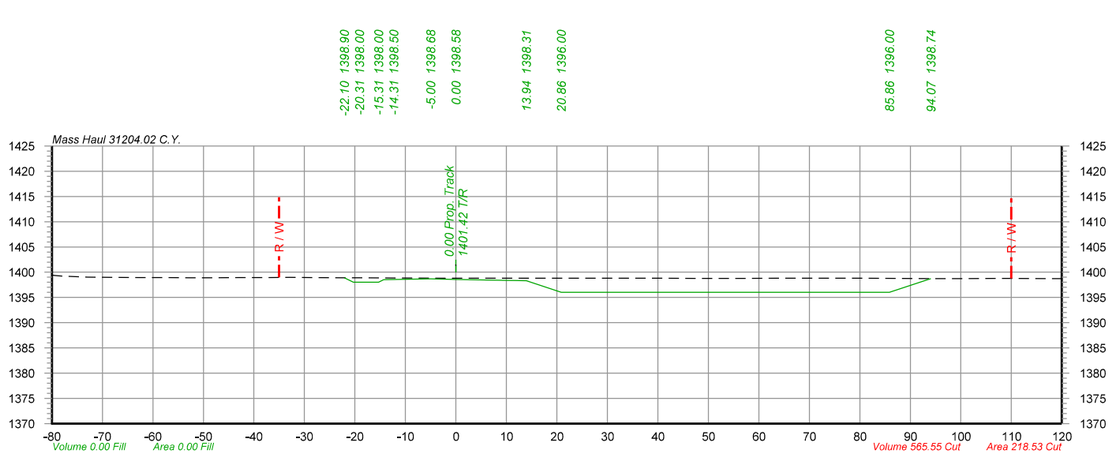
UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.184+00 TO STA.186+00

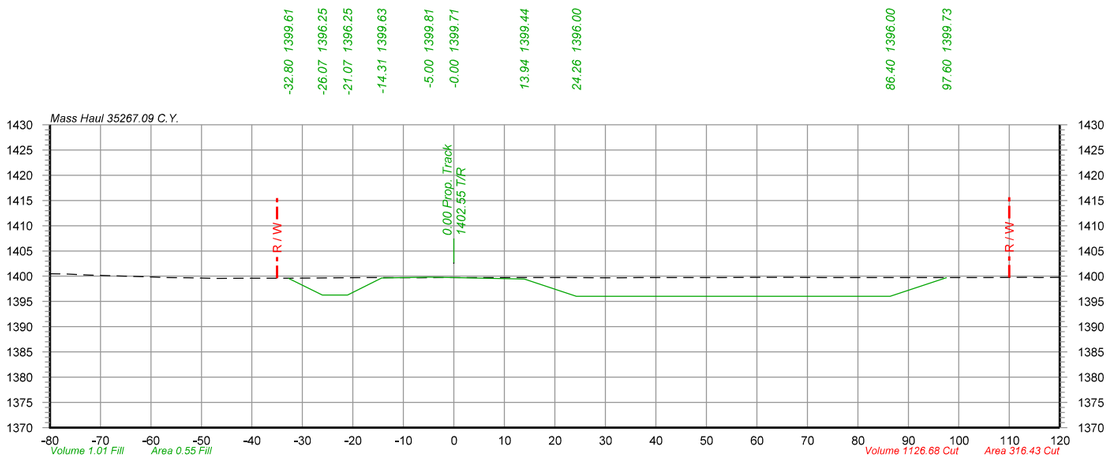

-34.32 1398.18
-26.00 1394.02
-21.00 1394.02
-14.31 1397.37
-5.00 1397.55
-0.00 1397.45
14.31 1397.17
21.00 1393.82
31.00 1393.82
39.65 1398.15
Mass Haul 29107.01 C.Y.
R / W
0.00 Prop. Track
1400.29 T/R
R / W
Volume 0.00 Fill
Area 0.00 Fill
Volume 616.57 Cut
Area 157.10 Cut
188+00

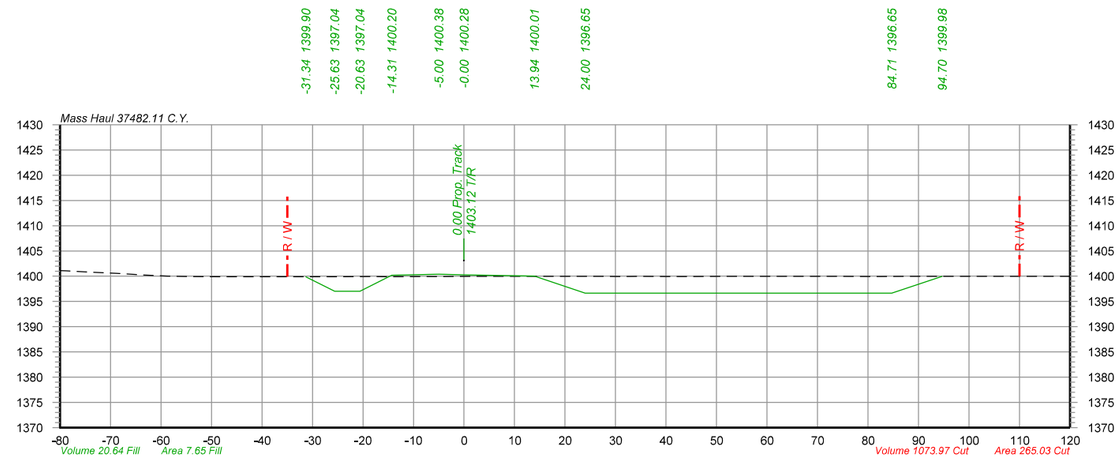
| | | |

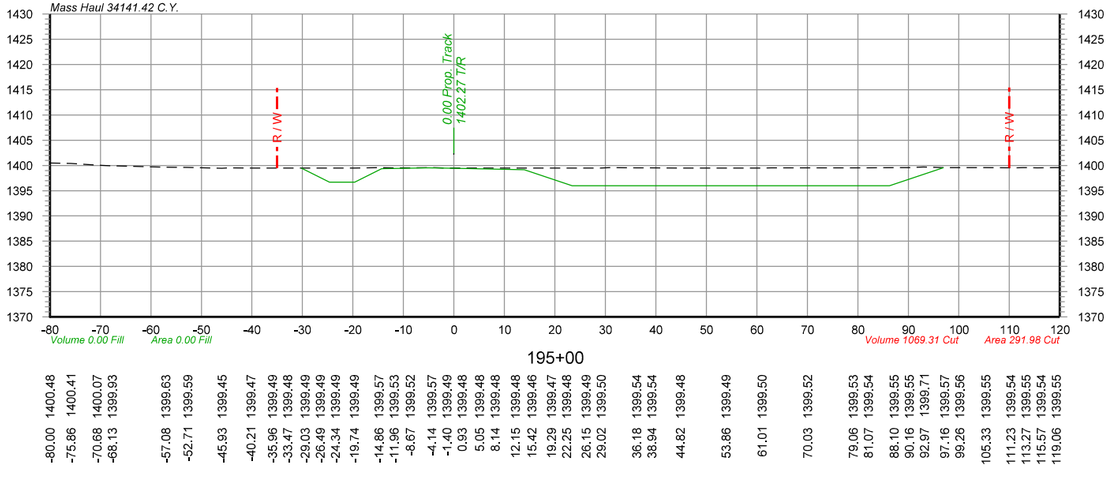

-22.10 1398.90
-20.31 1398.00
-15.31 1398.00
-14.31 1398.50
-5.00 1398.68
0.00 1398.58
13.94 1398.31
20.86 1396.00
85.86 1396.00
94.07 1398.74
Mass Haul 31204.02 C.Y.
R / W
0.00 Prop. Track
1401.42 T/R
R / W
Volume 0.00 Fill
Area 0.00 Fill
Volume 565.55 Cut
Area 218.53 Cut

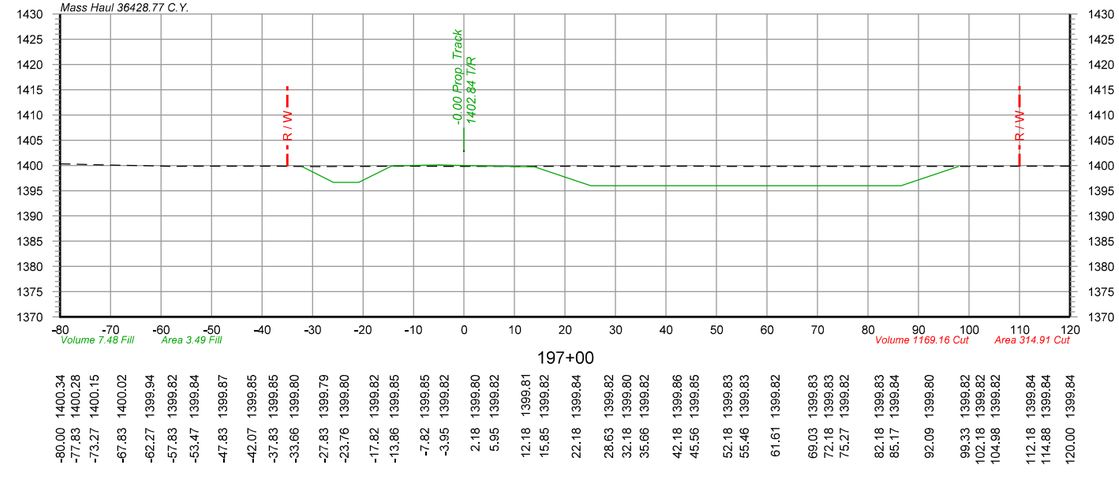
192+00

| | | |









olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X098 of 195

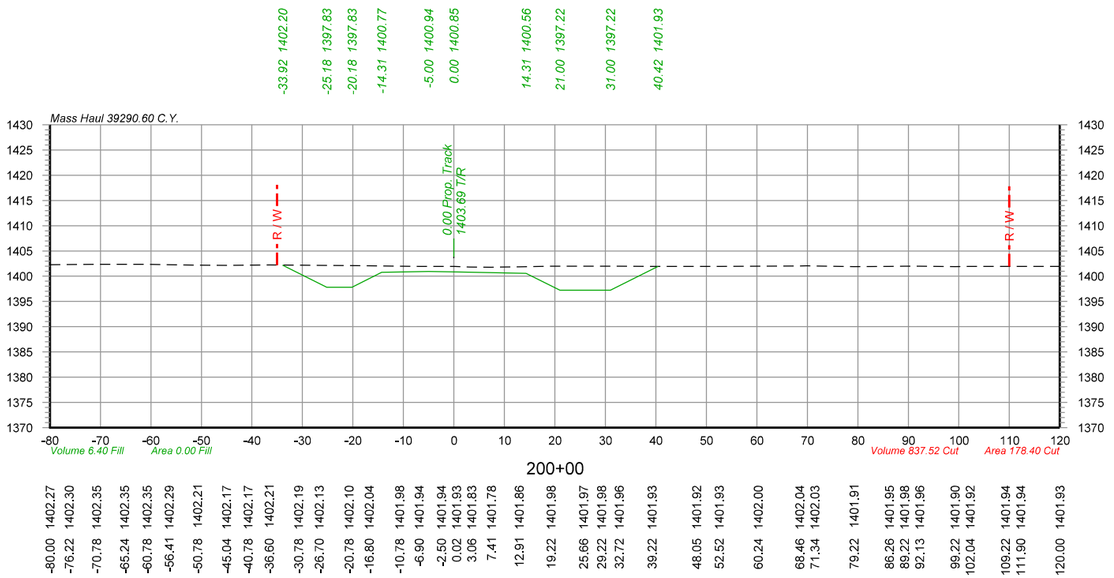
UNION PACIFIC RAILROAD

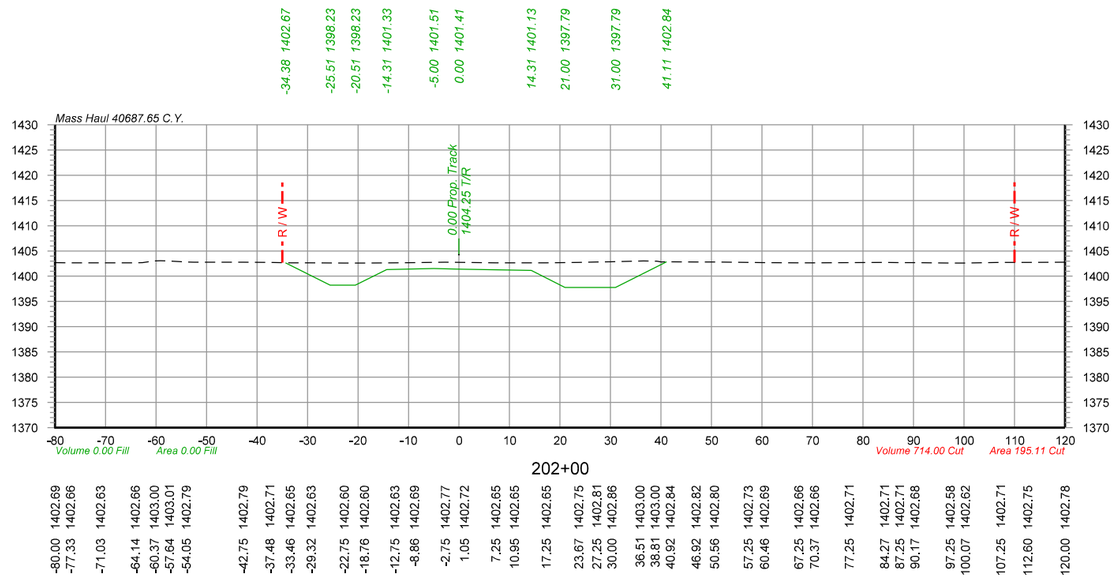
Sheet 338 of 587

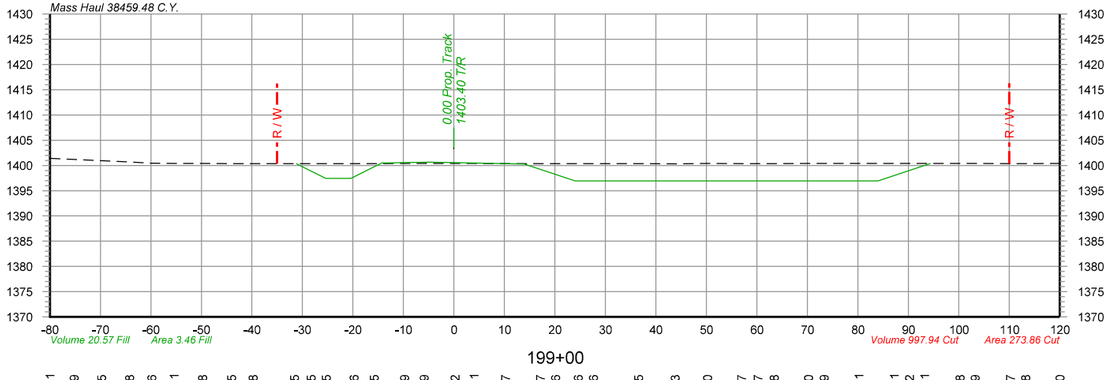
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

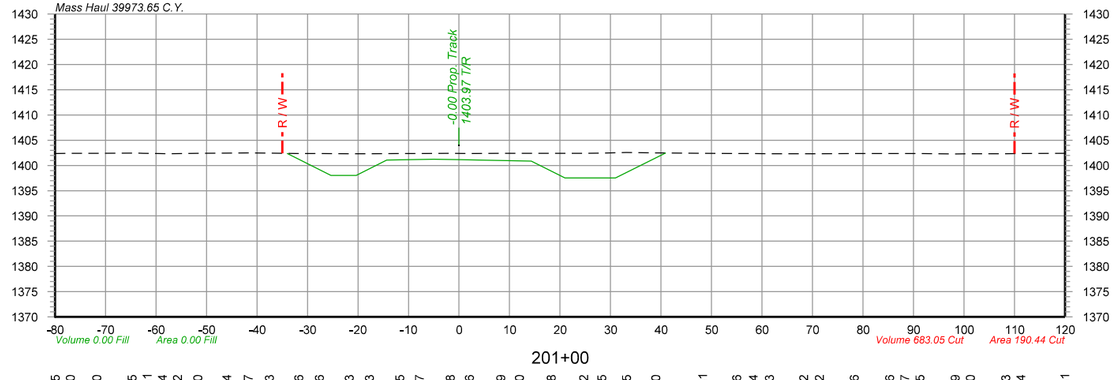
SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.195+00 TO STA.198+00

Color table: K:\Bentley\Workspace\Projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026









Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

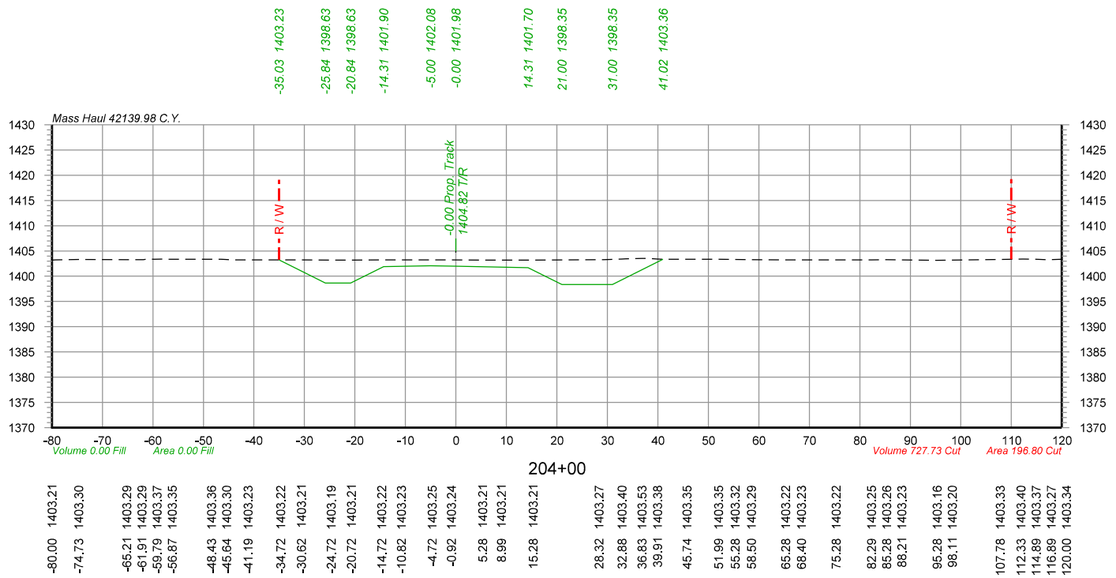
DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X099 of 195

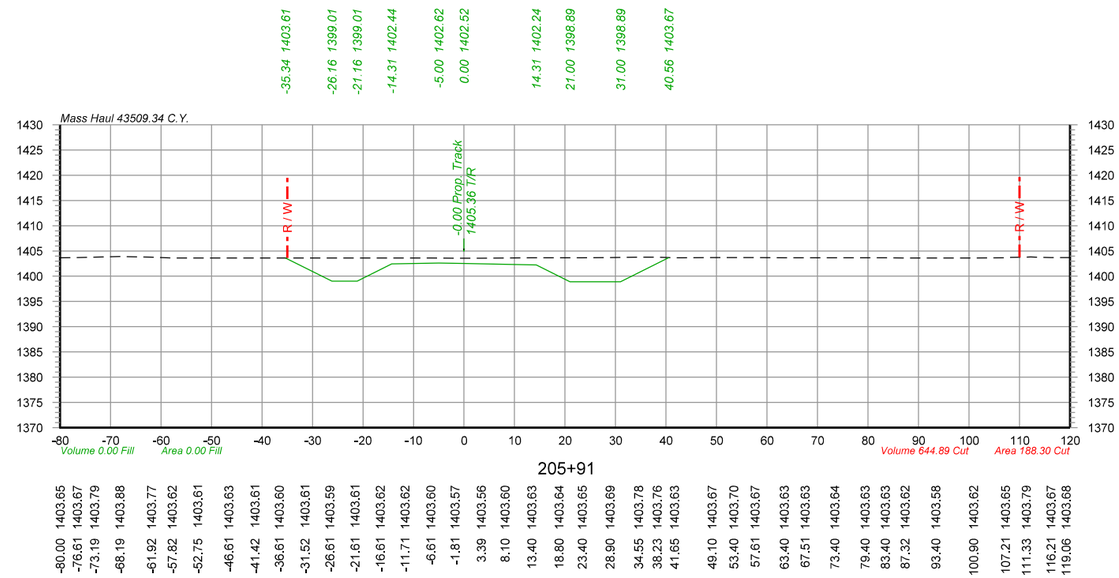
UNION PACIFIC RAILROAD

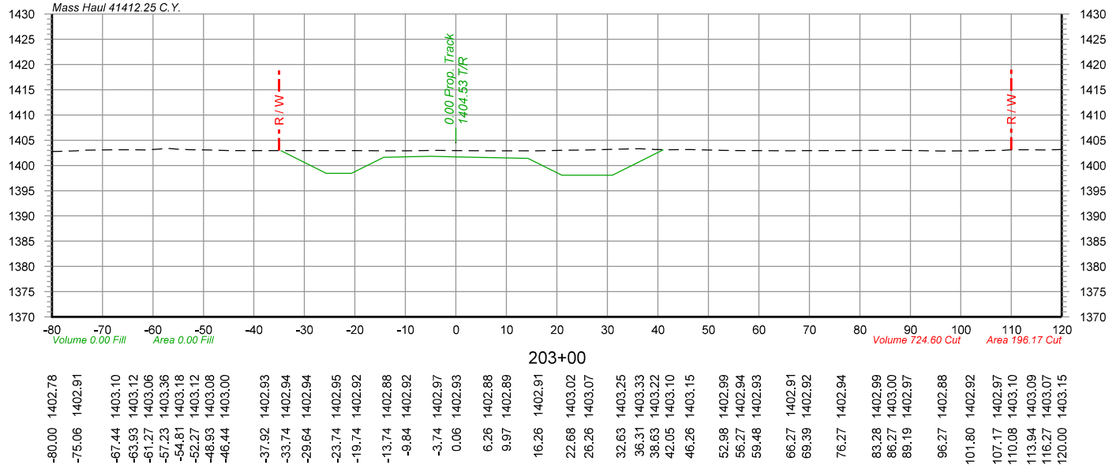
Sheet 339 of 587

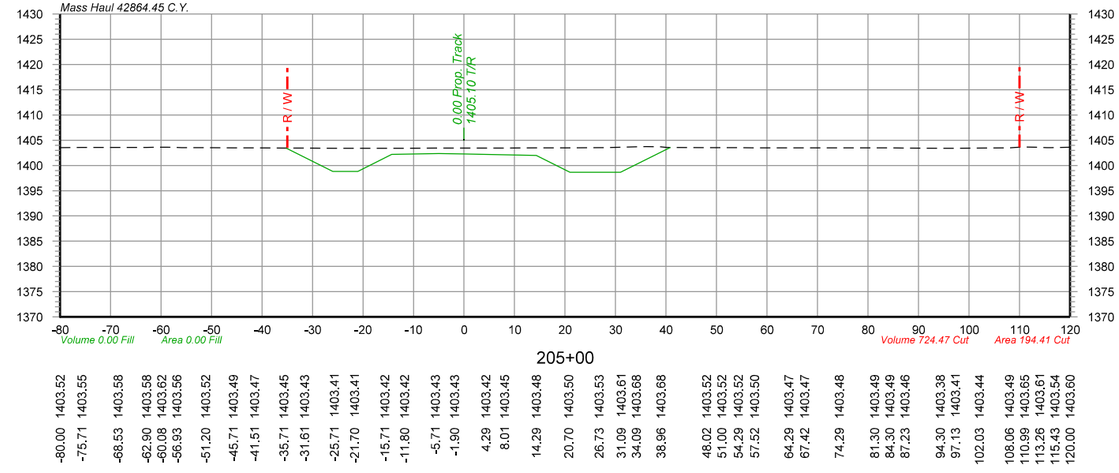
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.199+00 TO STA.202+00









olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	DMJ
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	X100 of 195

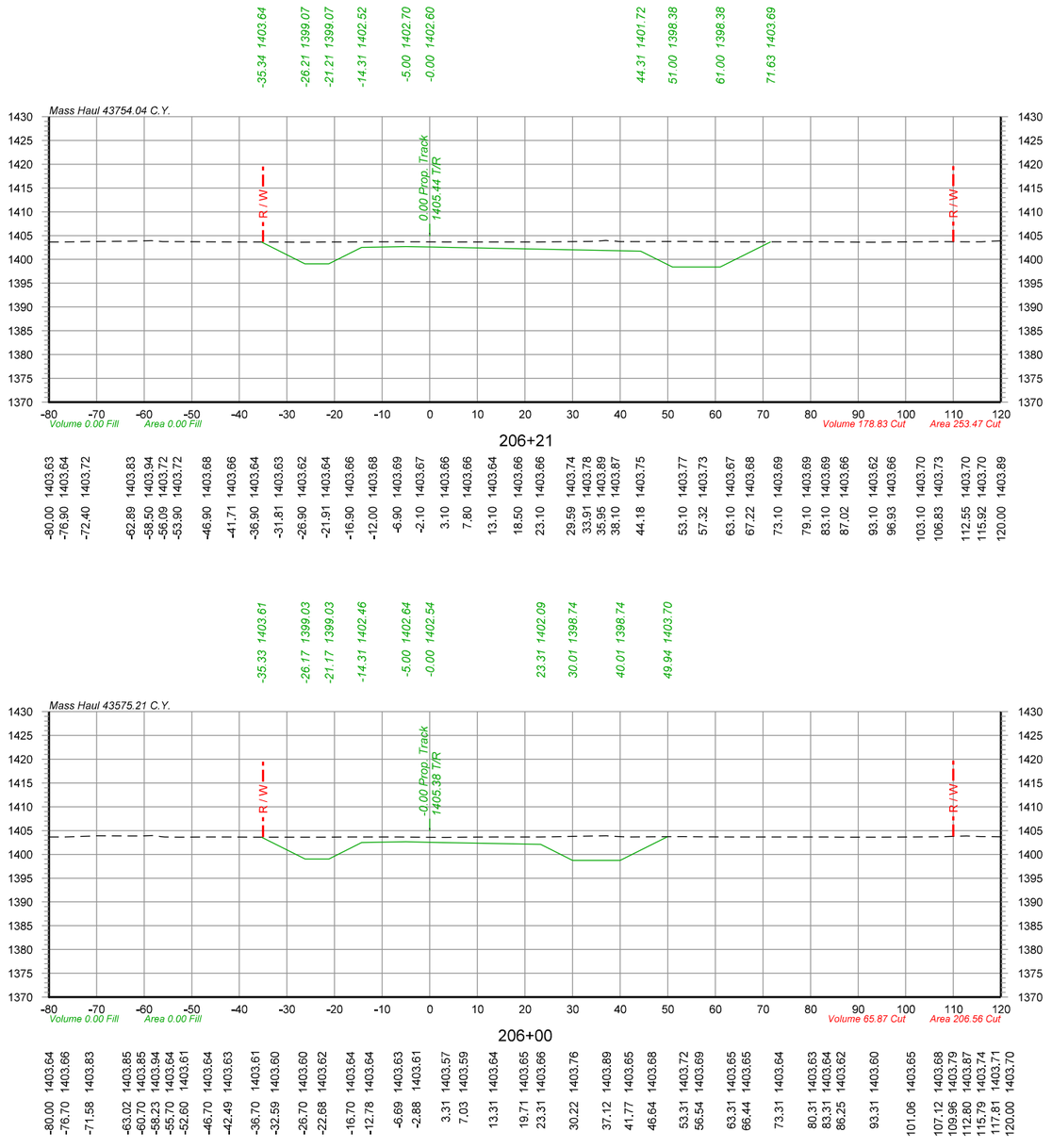
UNION PACIFIC RAILROAD

Sheet 340 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.203+00 TO STA.205+91

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026



Color table: K:\Bentley\Workspace\V8\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

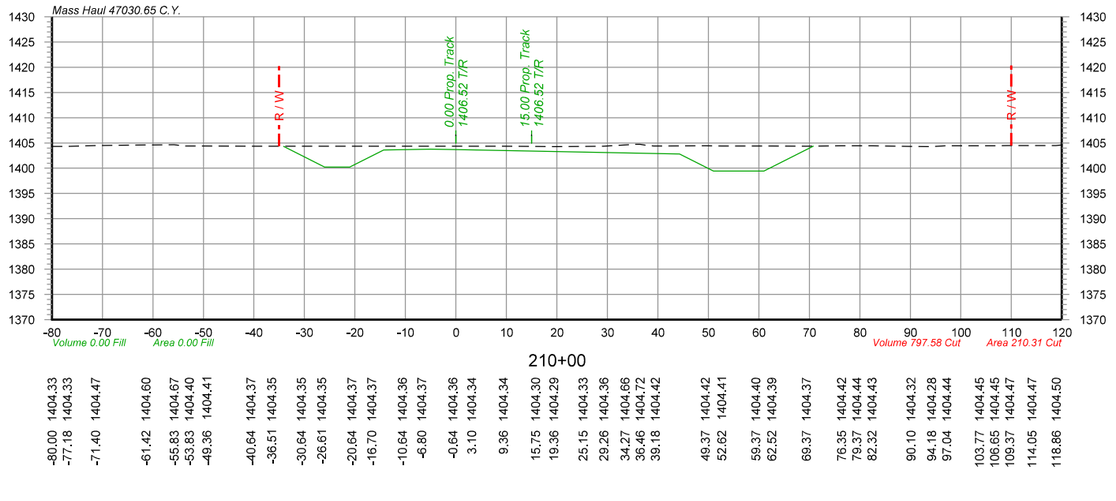
DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X101 of 195

UNION PACIFIC RAILROAD

Sheet 341 of 587

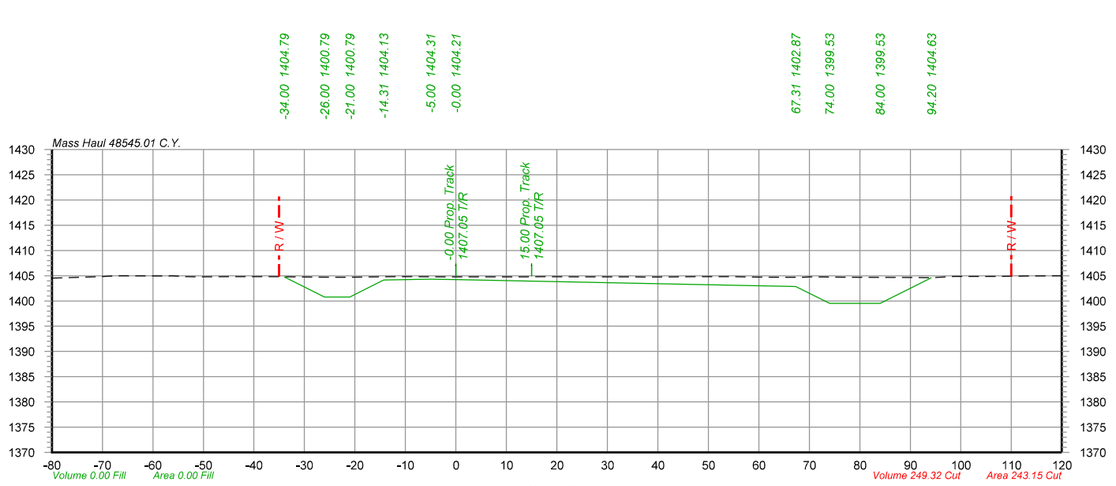
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.206+00 TO STA.208+00


-34.20 1404.35
-26.00 1400.25
-21.00 1400.25
-14.31 1403.60
-5.00 1403.78
0.00 1403.68
44.31 1402.80
51.00 1399.45
61.00 1399.45
70.86 1404.38
Mass Haul 47030.65 C.Y.
R / W
0.00 Prop. Track
1406.52 T/R
15.00 Prop. Track
1406.52 T/R
R / W
Volume 0.00 Fill
Area 0.00 Fill
Volume 797.58 Cut
Area 210.31 Cut

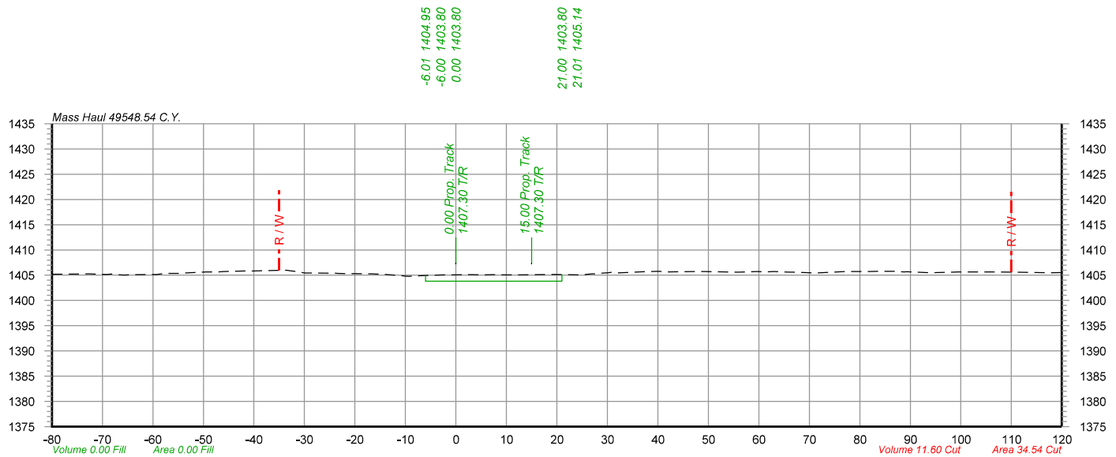
210+00

| | | |


-34.00 1404.79
-26.00 1400.79
-21.00 1400.79
-14.31 1404.13
-5.00 1404.31
-0.00 1404.21
67.31 1402.87
74.00 1399.53
84.00 1399.53
94.20 1404.63
Mass Haul 48545.01 C.Y.
R / W
0.00 Prop. Track
1407.05 T/R
15.00 Prop. Track
1407.05 T/R
R / W
Volume 0.00 Fill
Area 0.00 Fill
Volume 249.32 Cut
Area 243.15 Cut

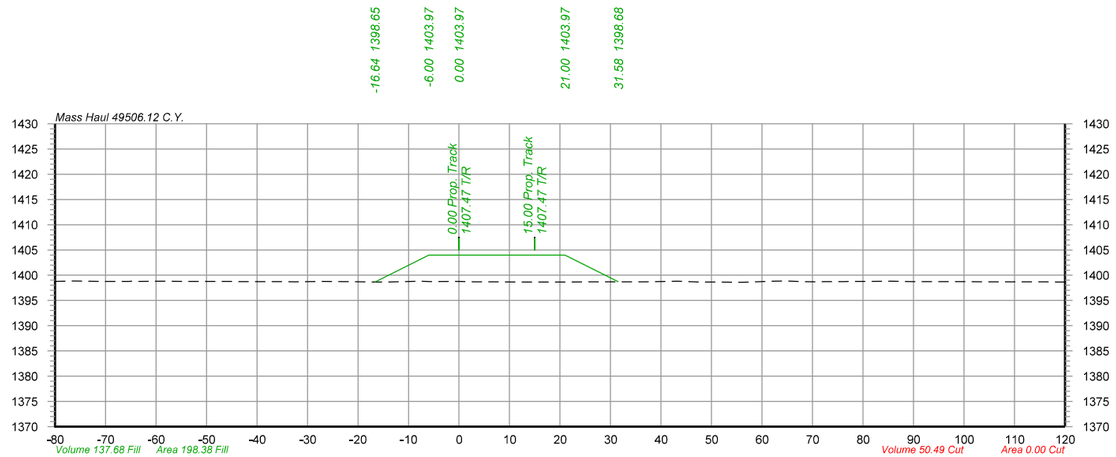
211+90

| | | |



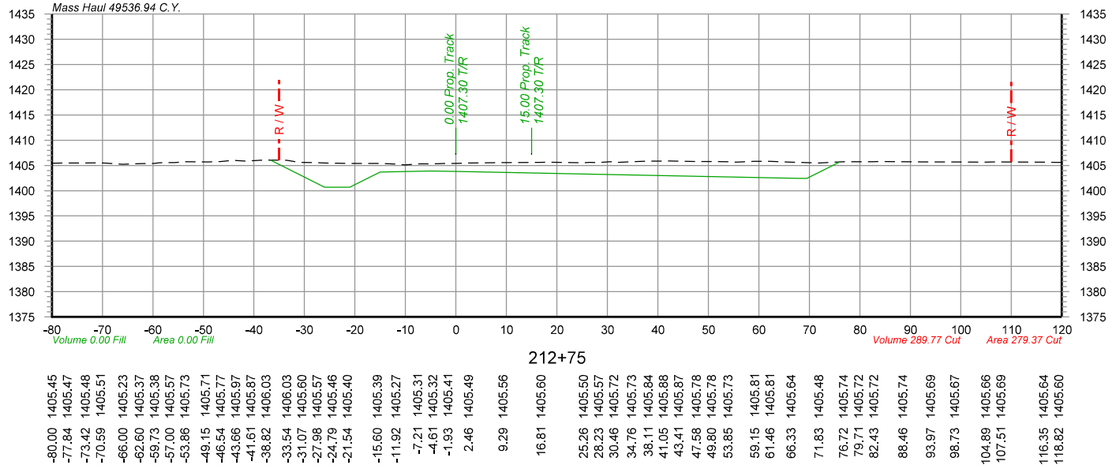
212+77

-80.00	1405.20	-75.23	1405.23	-72.80	1405.25	-69.09	1405.15	-65.79	1405.04	-59.18	1405.13	-54.66	1405.37	-49.50	1405.66	-47.07	1405.65	-41.14	1405.84	-34.24	1405.97	-31.00	1405.65
-24.47	1405.40	-21.56	1405.33	-16.50	1405.28	-13.95	1405.15	-11.82	1404.99	-9.33	1404.78	-6.22	1404.94	-2.37	1405.07	1.73	1405.10	5.38	1405.07	10.18	1405.05	12.57	1405.06
15.58	1405.09	19.28	1405.17	24.84	1405.07	26.95	1405.28	30.12	1405.49	37.11	1405.69	40.16	1405.79	47.35	1405.75	55.41	1405.61	59.78	1405.73	62.87	1405.75	66.09	1405.60
71.31	1405.42	77.12	1405.73	81.87	1405.72	86.75	1405.76	88.83	1405.66	94.11	1405.49	98.45	1405.62	105.17	1405.63	110.59	1405.62	117.60	1405.49	120.00	1405.51		



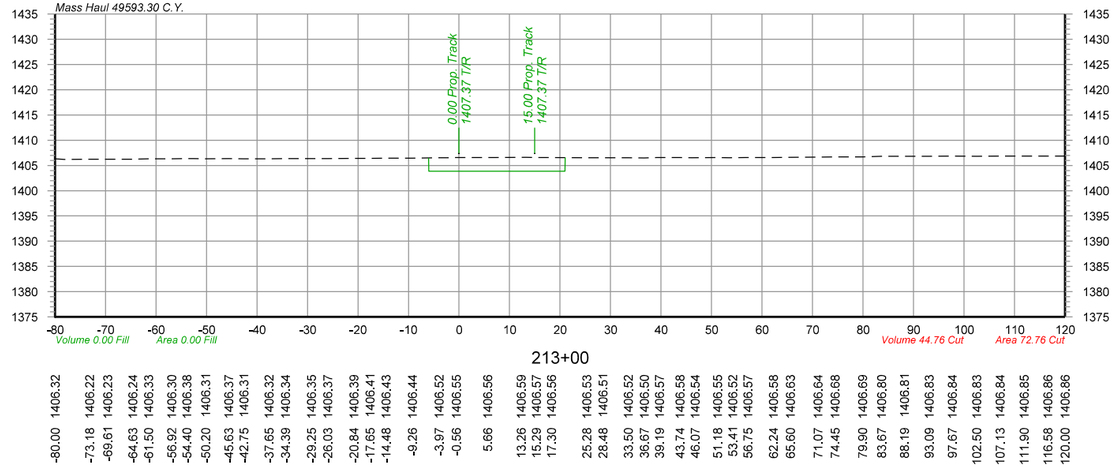
213+37

-80.00	1398.75	-76.15	1398.86	-71.19	1398.75	-65.77	1398.77	-63.40	1398.78	-58.74	1398.80	-54.43	1398.77	-52.06	1398.77	-45.70	1398.78	-41.82	1398.73	-34.54	1398.71	-32.46	1398.69
-27.03	1398.77	-22.91	1398.72	-16.83	1398.65	-14.29	1398.66	-7.76	1398.80	-5.33	1398.74	-1.67	1398.75	3.17	1398.68	7.40	1398.68	11.49	1398.63	15.31	1398.66	18.22	1398.66
22.21	1398.66	25.62	1398.68	29.85	1398.68	34.19	1398.67	36.88	1398.70	43.30	1398.81	47.68	1398.65	51.05	1398.66	54.84	1398.59	62.17	1398.81	64.85	1398.86	68.06	1398.73
70.85	1398.69	76.35	1398.75	81.13	1398.78	85.66	1398.82	89.75	1398.73	92.03	1398.71	94.38	1398.74	100.62	1398.74	103.87	1398.69	108.46	1398.69	112.63	1398.68	116.30	1398.68
118.35	1398.65																						



212+75

-80.00	1405.45	-77.84	1405.47	-73.42	1405.48	-70.59	1405.51	-66.00	1405.23	-62.60	1405.37	-59.73	1405.38	-57.00	1405.57	-53.86	1405.73	-49.15	1405.71	-46.54	1405.77	-43.66	1405.97
-41.61	1405.87	-38.82	1406.03	-33.54	1406.03	-31.07	1405.60	-27.98	1405.57	-24.79	1405.46	-21.54	1405.40	-15.60	1405.39	-11.92	1405.27	-7.21	1405.31	-4.61	1405.32	-1.93	1405.41
2.46	1405.49	9.29	1405.56	16.81	1405.60	25.26	1405.50	28.23	1405.57	30.46	1405.72	34.76	1405.73	38.11	1405.84	41.05	1405.88	43.41	1405.87	47.58	1405.78	49.80	1405.78
53.85	1405.73	59.15	1405.81	61.46	1405.81	66.33	1405.64	71.83	1405.48	76.72	1405.74	79.71	1405.72	82.43	1405.72	88.46	1405.74	93.97	1405.69	98.73	1405.67	104.89	1405.66
107.51	1405.69	116.35	1405.64	118.82	1405.60																		



213+00

-80.00	1406.32	-73.18	1406.22	-69.61	1406.23	-64.63	1406.24	-61.50	1406.33	-56.92	1406.30	-54.40	1406.38	-50.20	1406.31	-45.63	1406.37	-42.75	1406.31	-37.65	1406.32	-34.39	1406.34
-29.25	1406.35	-26.03	1406.37	-20.84	1406.39	-17.65	1406.41	-14.48	1406.43	-9.26	1406.44	-3.97	1406.52	-0.56	1406.55	5.66	1406.56	13.26	1406.59	15.29	1406.57	17.30	1406.56
25.28	1406.53	28.48	1406.51	33.50	1406.52	36.67	1406.50	39.19	1406.57	43.74	1406.58	46.07	1406.54	51.18	1406.55	53.41	1406.52	56.75	1406.57	62.24	1406.58	65.60	1406.63
71.07	1406.64	74.45	1406.68	79.90	1406.69	83.67	1406.80	88.19	1406.81	93.09	1406.83	97.67	1406.84	102.50	1406.83	107.13	1406.84	111.90	1406.85	116.58	1406.86	120.00	1406.86

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X104 of 195

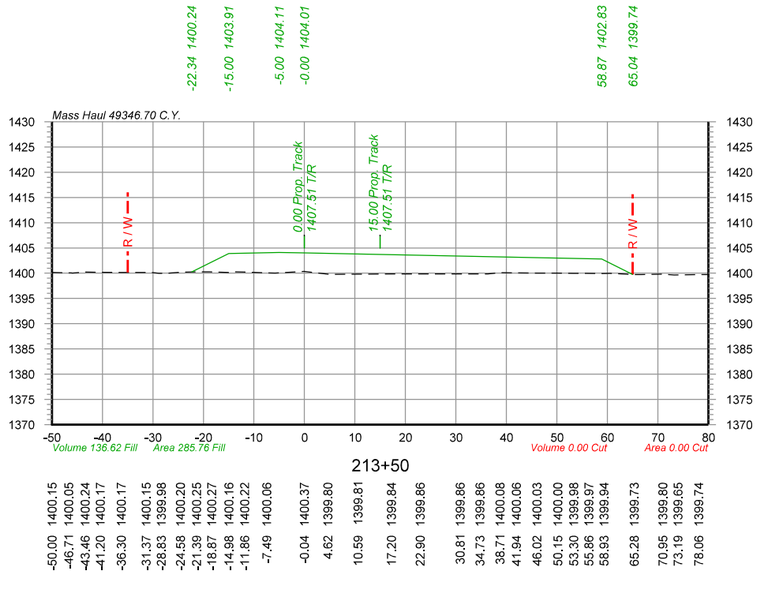
UNION PACIFIC RAILROAD

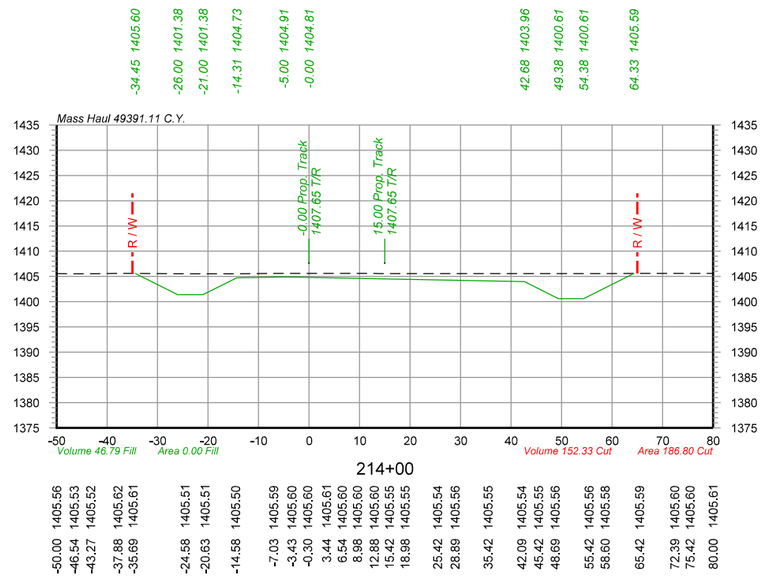
Sheet 344 of 587

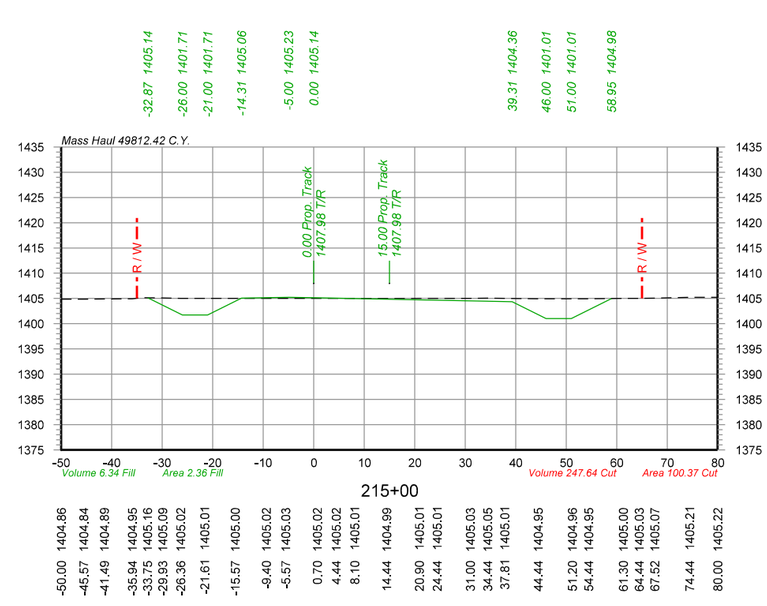
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

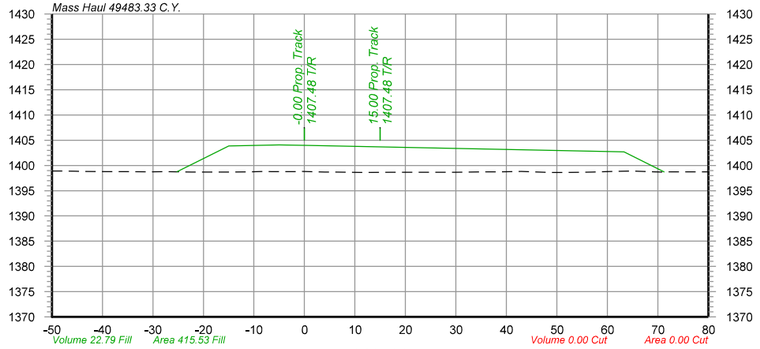
SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.212+75 TO STA.213+37

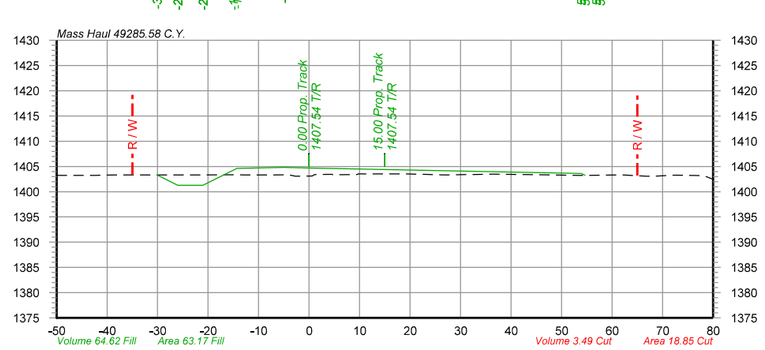
Color table: K:\Bentley\Workspace\V8\projects\Clients\UPRR_Track\UPRR_Track_V8\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-
Default
3/9/2026

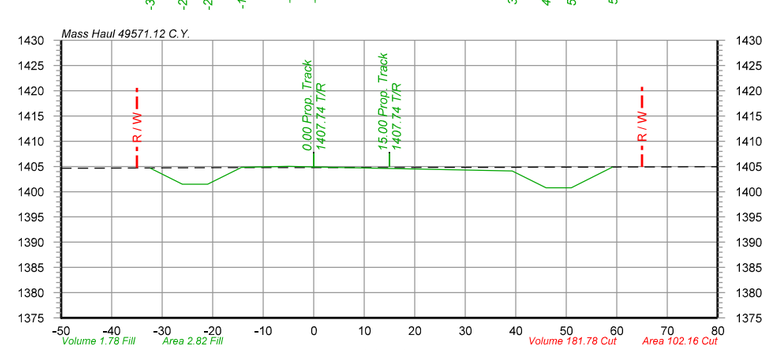












olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	DMJ
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	X105 of 195

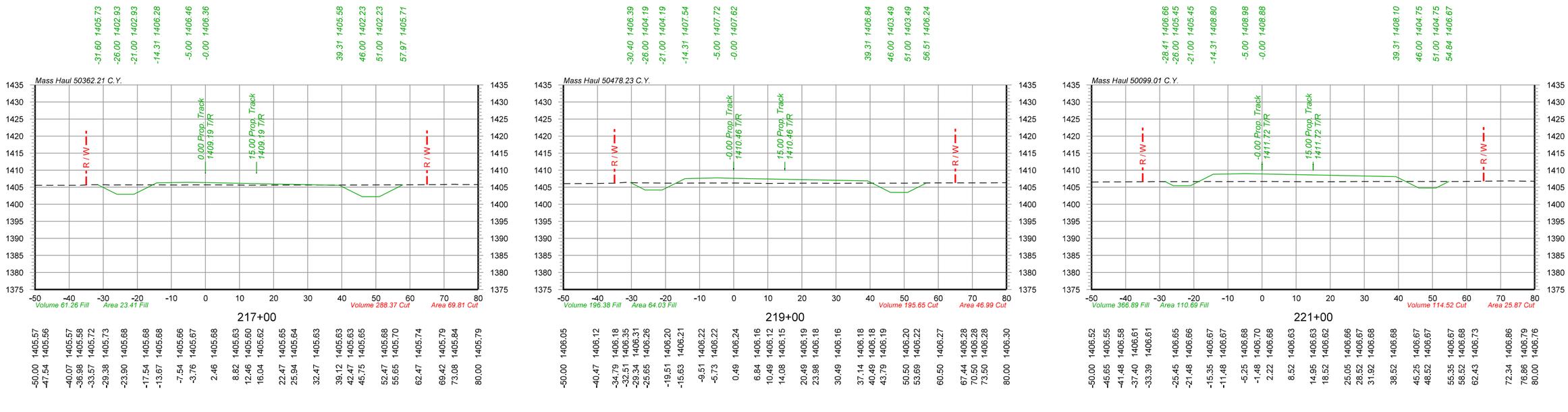
UNION PACIFIC RAILROAD

Sheet 345 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.213+39 TO STA.215+00

Color table: K:\Bentley\Workspace\V8\projects\Clients\UPRR_Track\UPRR_Track_V8\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026



Color table: K:\Bentley\Workspace\V8\projects\Clients\UPRR_Track\UPRR_Track_V8\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

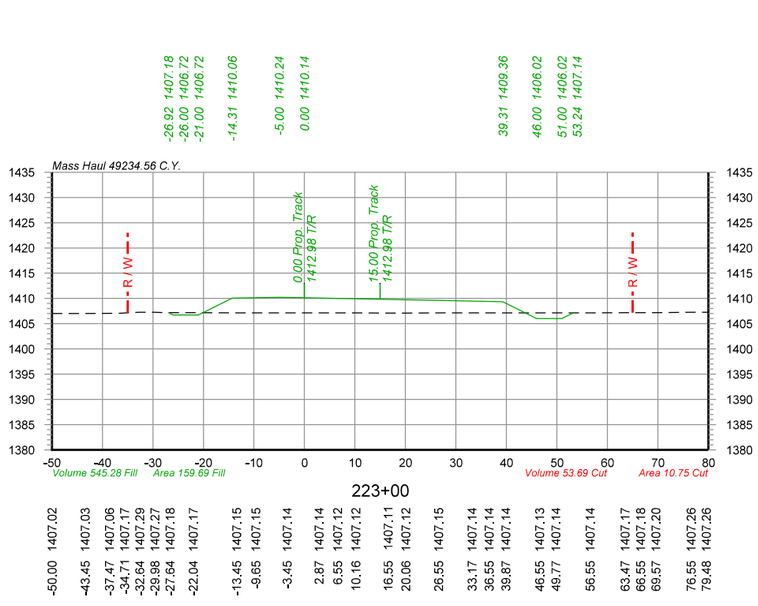
UNION PACIFIC

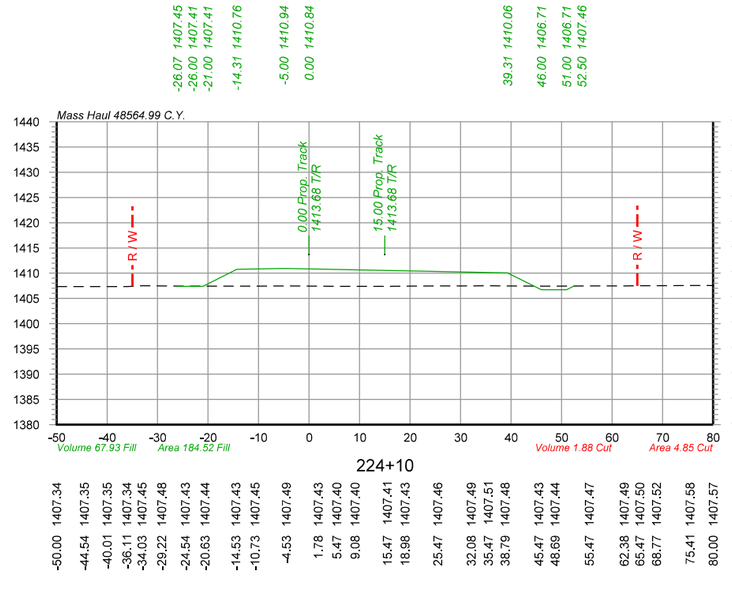
DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X106 of 195

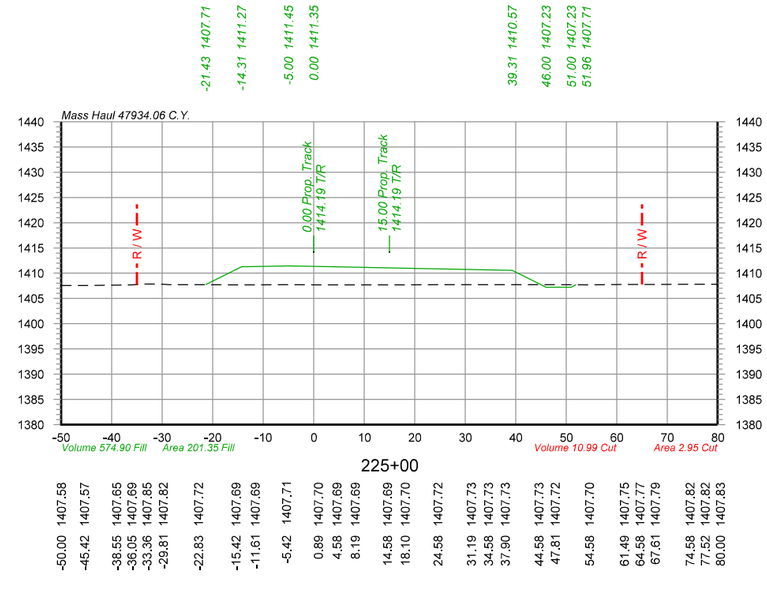
UNION PACIFIC RAILROAD

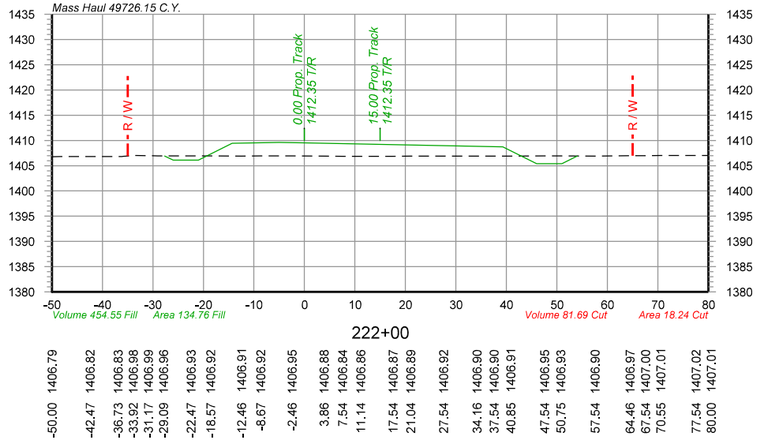
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

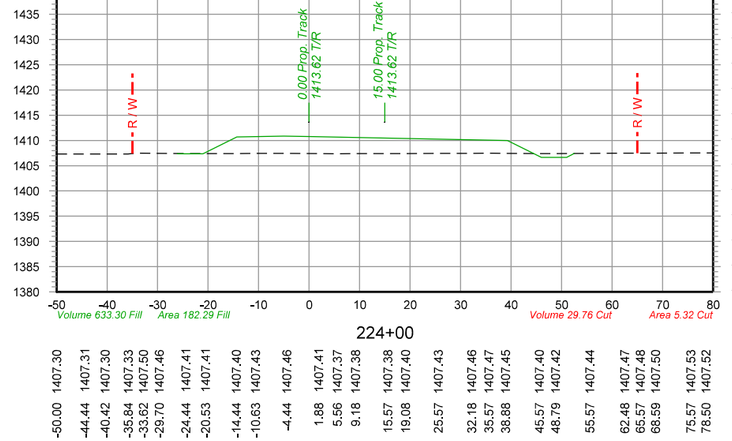
SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.216+00 TO STA.221+00

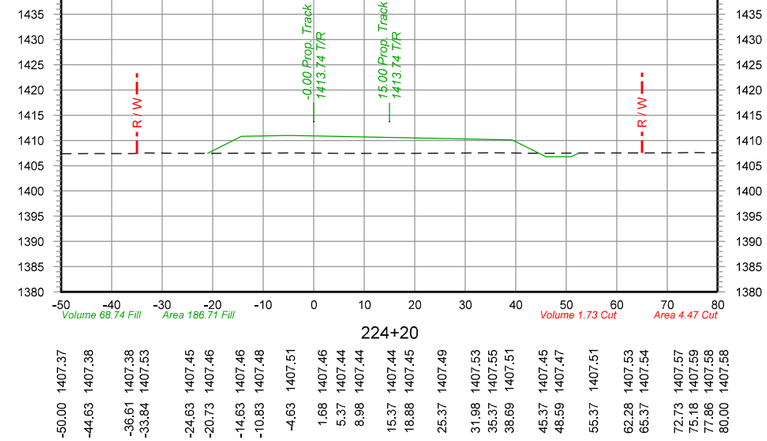












olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	DMJ
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	X107 of 195

UNION PACIFIC RAILROAD

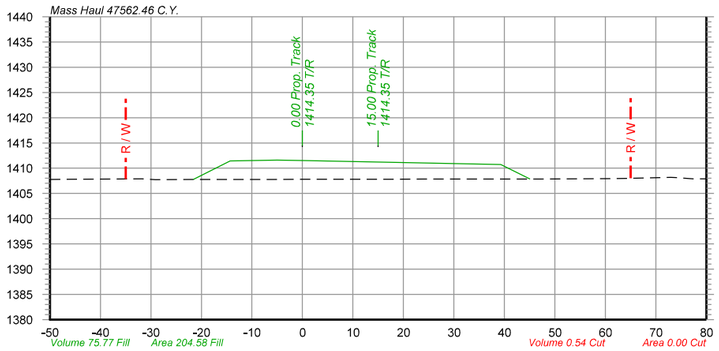
Sheet 347 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.222+00 TO STA.225+00

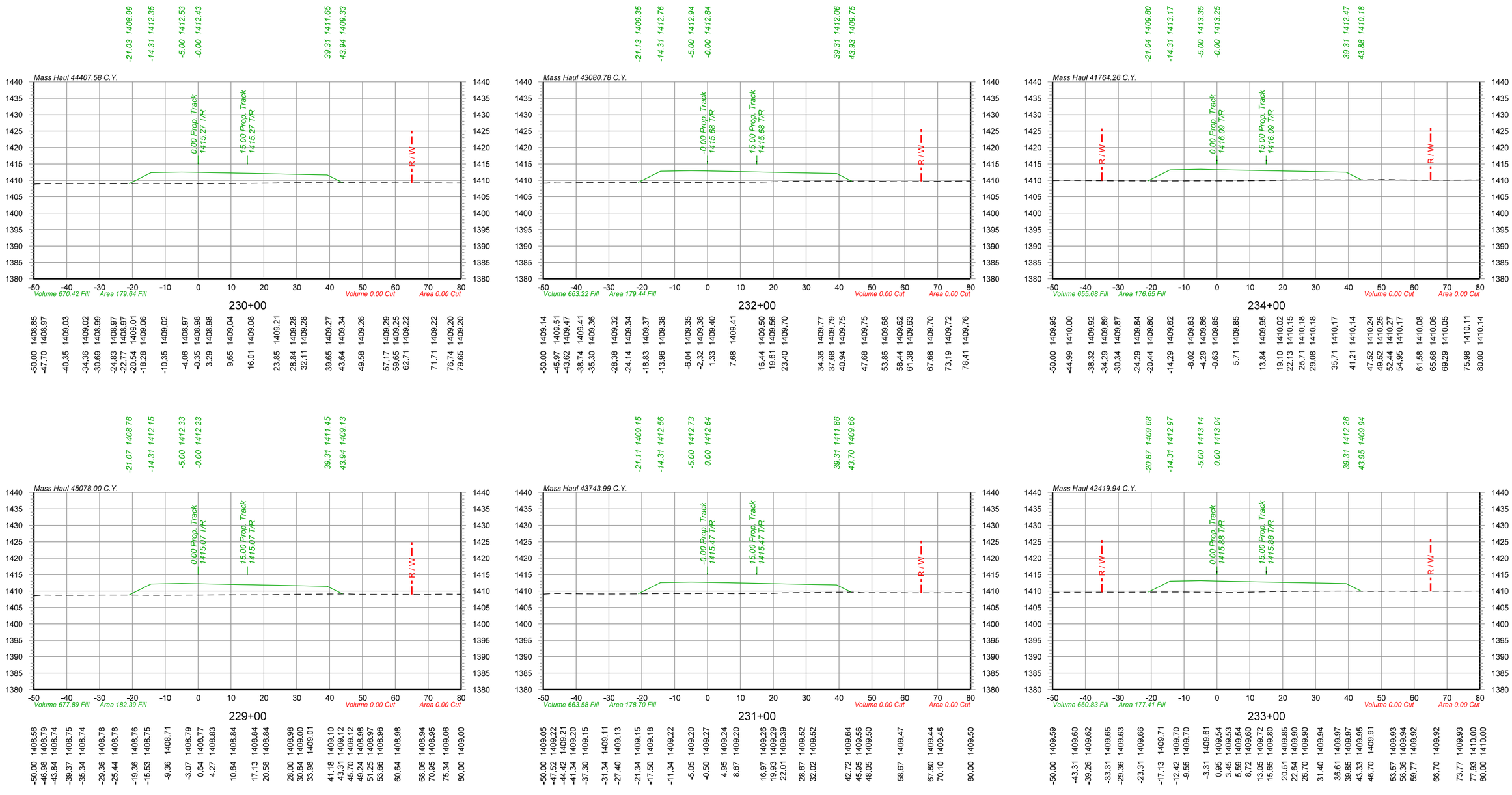
Color table: K:\Bentley\Workspace\Projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

-21.61 1407.78 | -14.31 1411.43 | -5.00 1411.61 | 0.00 1411.51 | 39.31 1410.73 | 45.08 1407.84



225+50

| | | |



Color table: K:\Bentley\Workspace\V8\projects\Clients\UPRR_Track\UPRR_Track_V8\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

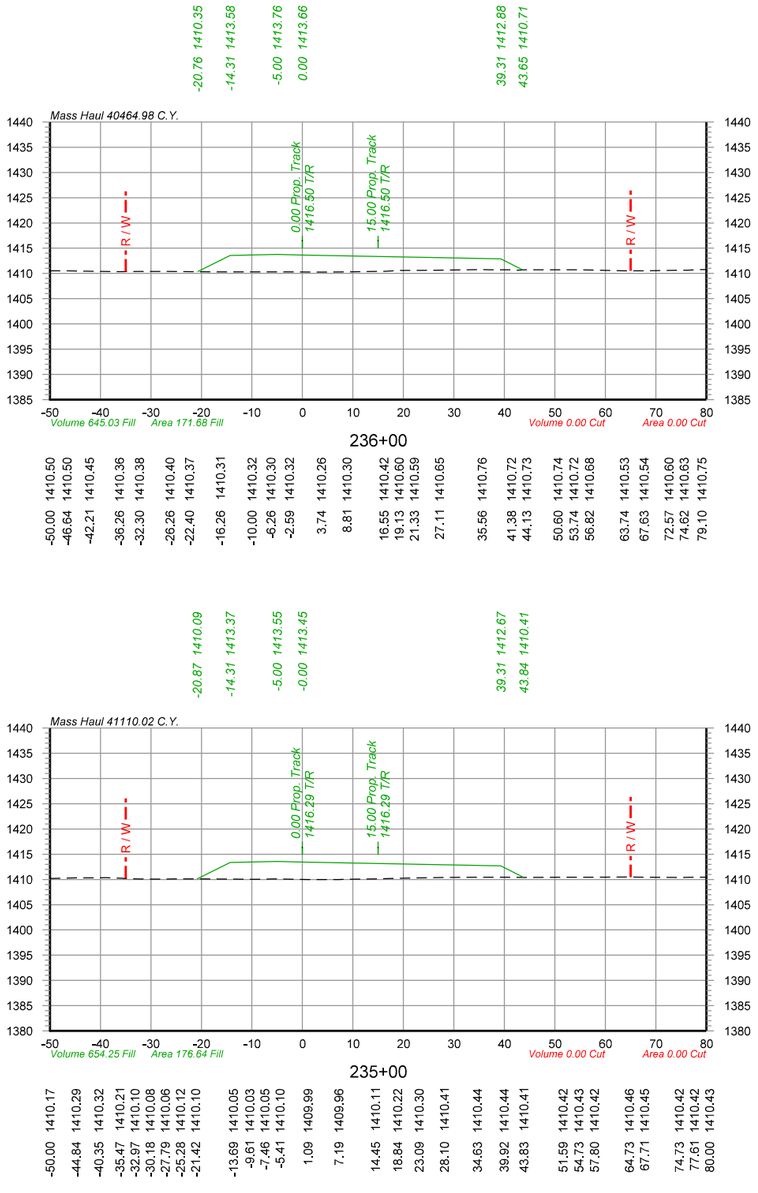
UNION PACIFIC

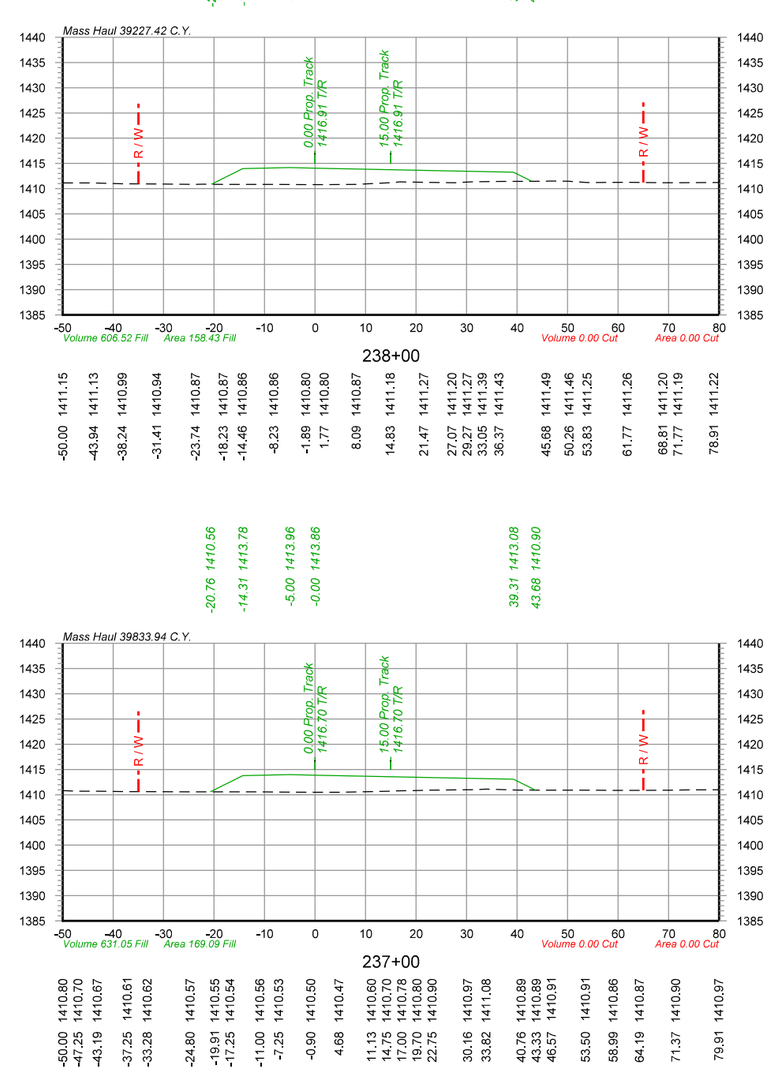
DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X109 of 195

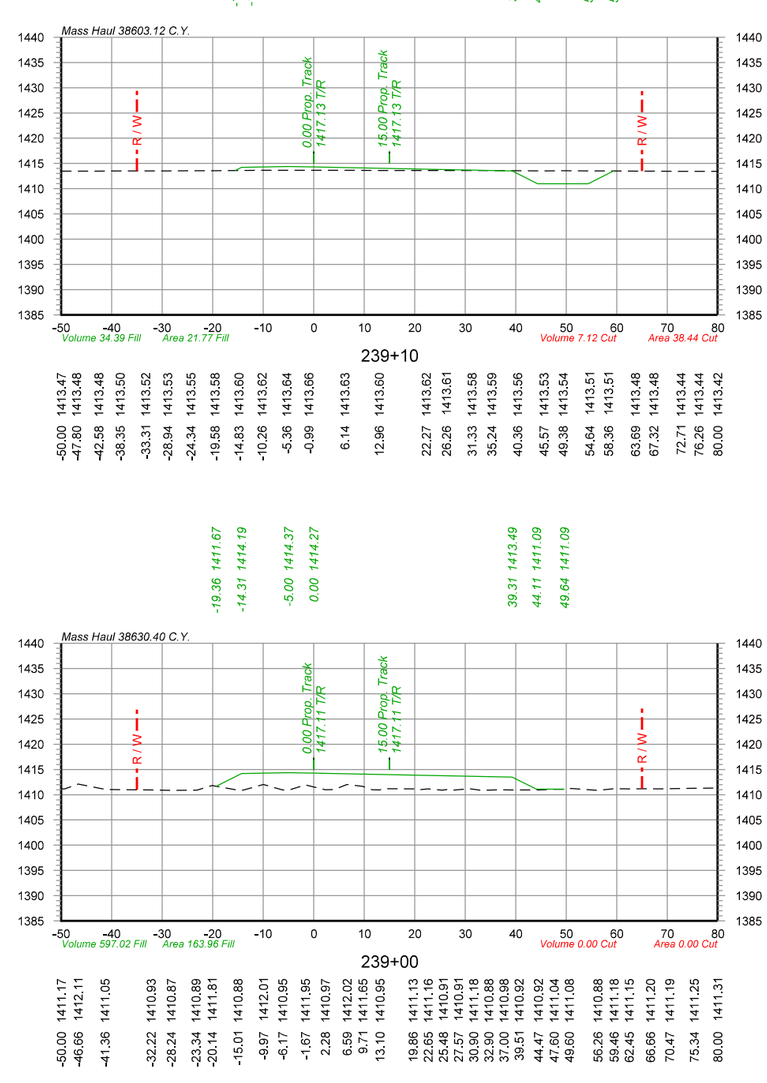
UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.229+00 TO STA.234+00







olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	DMJ
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	X110 of 195

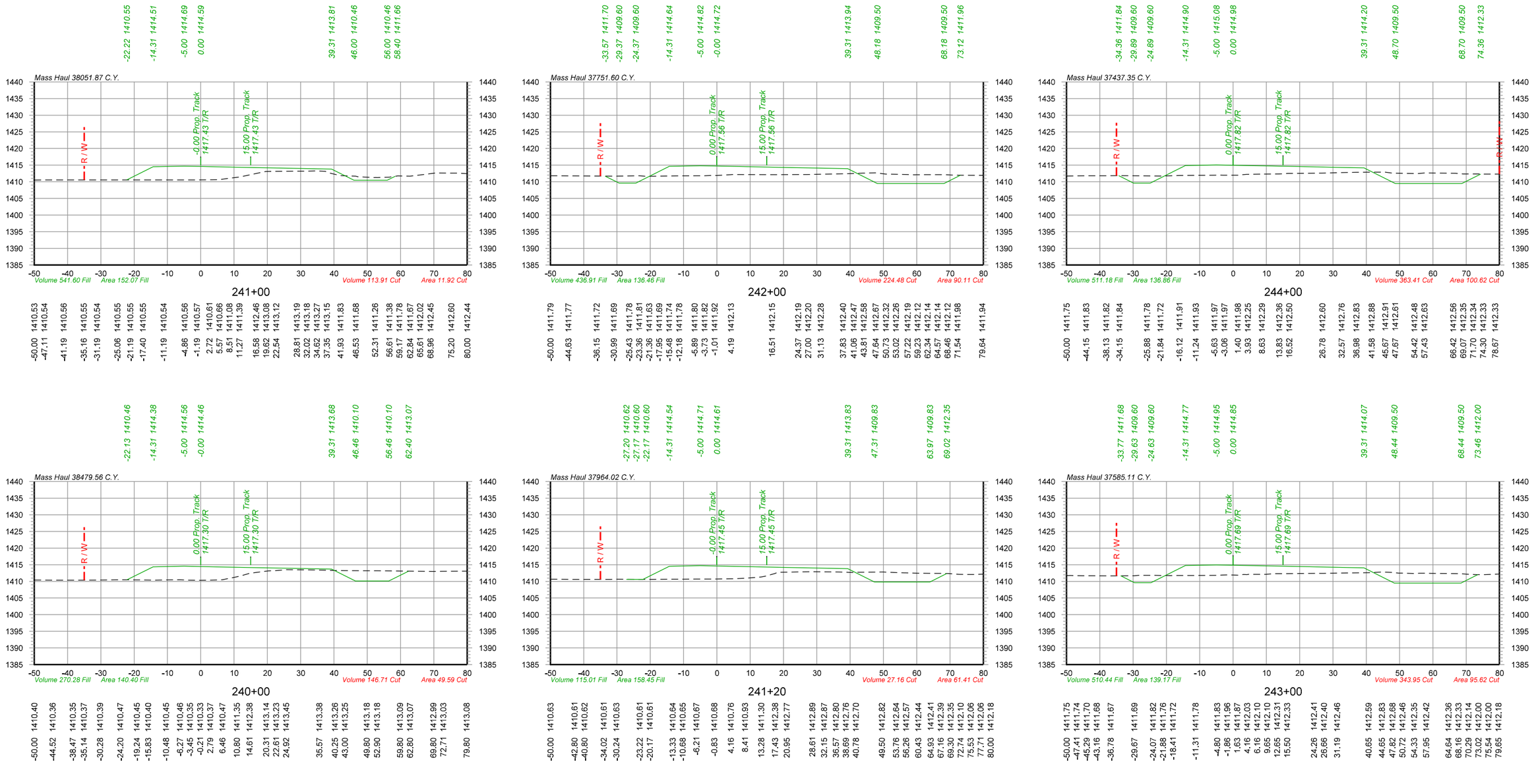
UNION PACIFIC RAILROAD

Sheet 350 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.235+00 TO STA.239+10

Color table: K:\Bentley\Workspace\Projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026



Color table: K:\Bentley\Workspace\V8\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

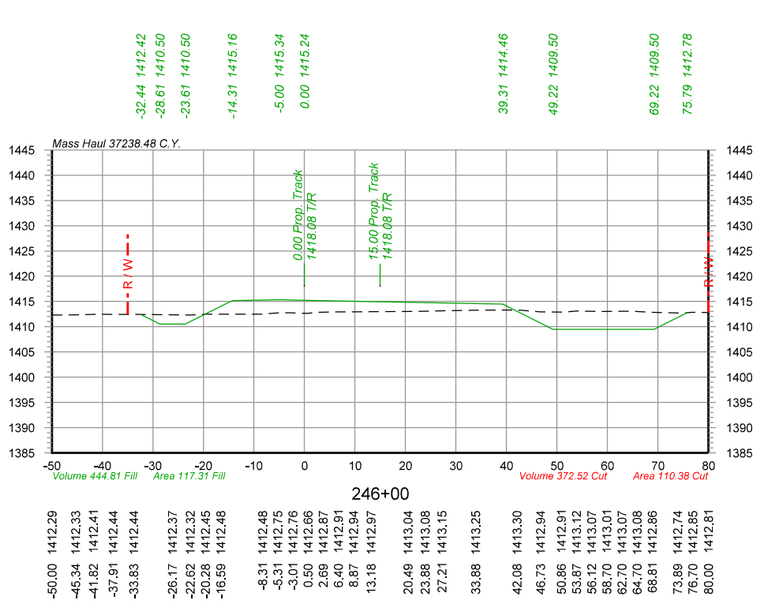
DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X111 of 195

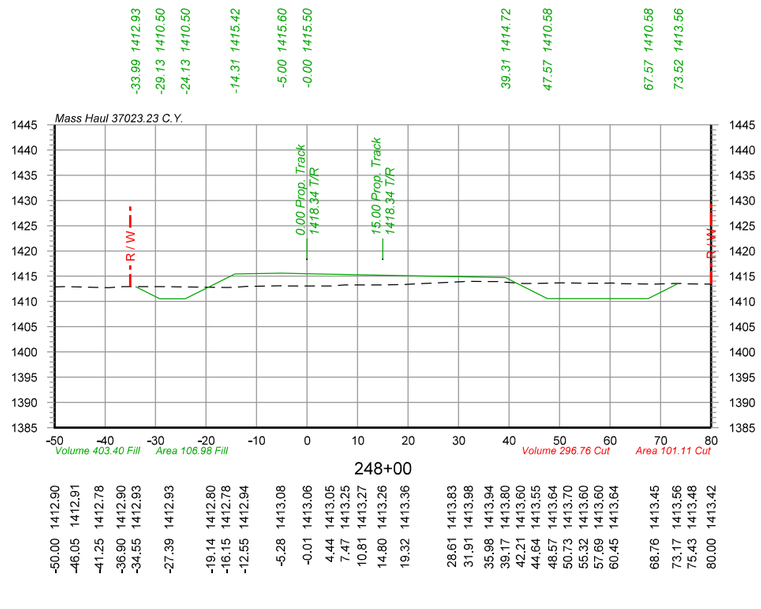
UNION PACIFIC RAILROAD

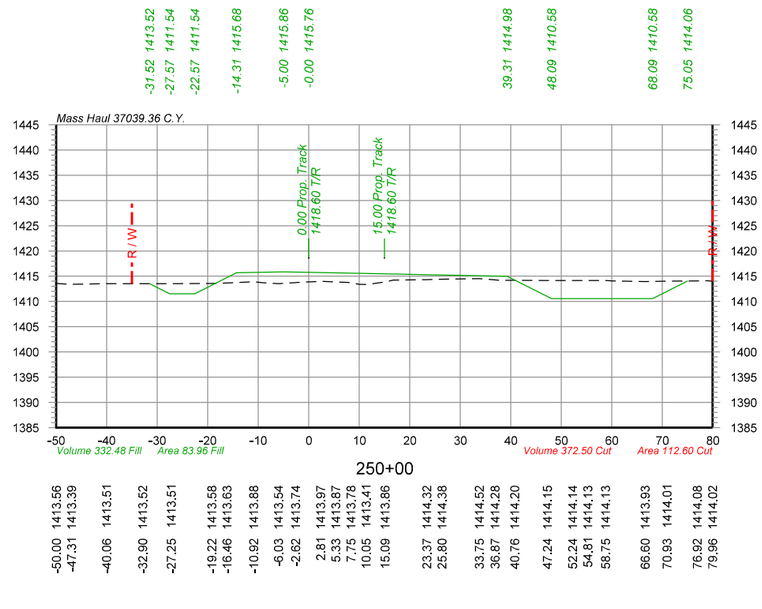
Sheet 351 of 587

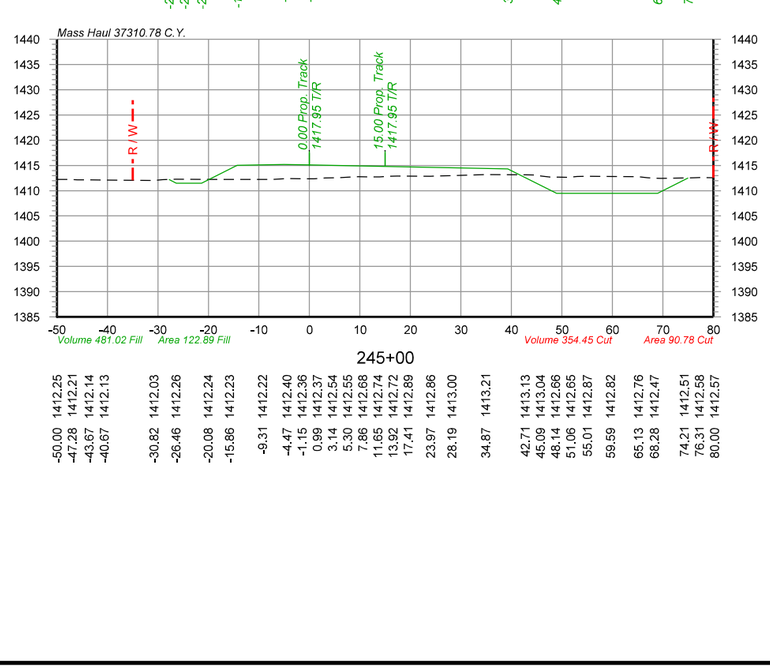
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

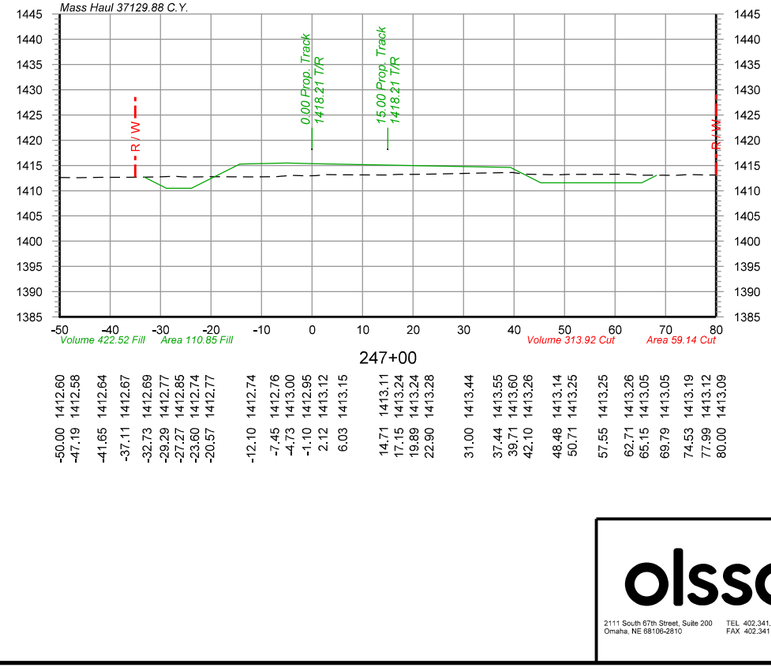
SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.240+00 TO STA.244+00

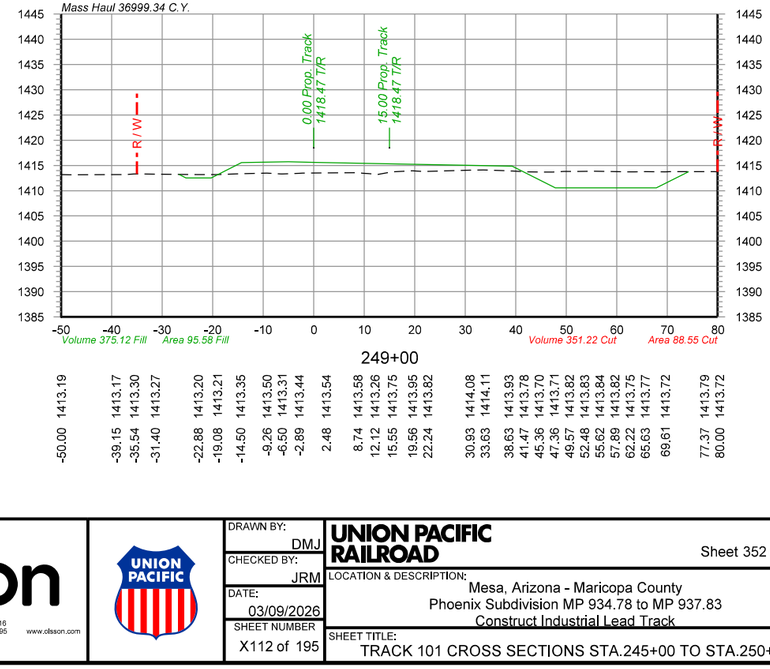












Color table: K:\Bentley\Workspace\V8\projects\Clients\UPRR_Track\UPRR_Track_V8\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X112 of 195

UNION PACIFIC RAILROAD

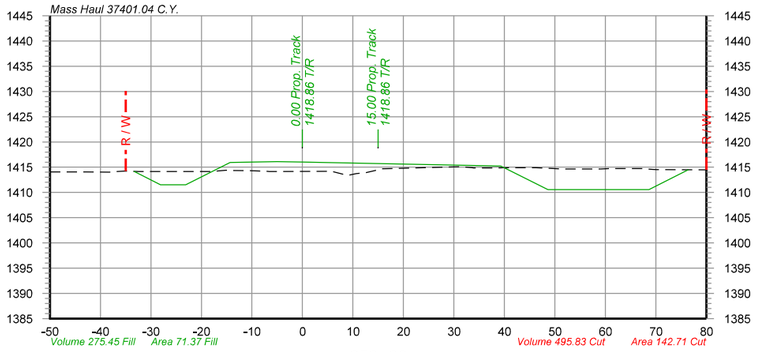
Sheet 352 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.245+00 TO STA.250+00

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-
Default
3/9/2026

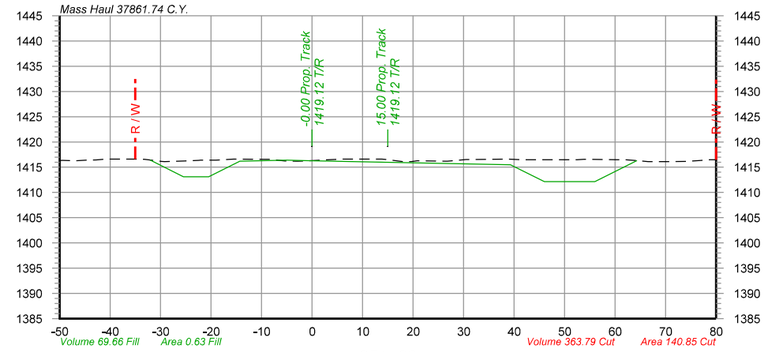
-33.35 1414.17 | -28.09 1411.54 | -23.09 1411.54 | -14.31 1415.94 | -5.00 1416.12 | -0.00 1416.02 | 39.31 1415.24 | 48.61 1410.58 | 68.61 1410.58 | 76.46 1414.51



252+00

-50.00	1414.07	5.78	1414.17	31.37	1415.12	58.03	1414.27	80.00	1414.50
-42.82	1414.06	8.08	1413.59	33.74	1414.88	59.07	1414.63		
-38.22	1414.03	10.64	1413.72	38.58	1414.86	63.46	1414.74		
-35.22	1414.24	12.67	1413.95	46.30	1414.89	64.91	1414.74		
-32.36	1414.13	14.99	1414.48	49.88	1414.71	69.35	1414.56		
-26.57	1414.14	17.60	1414.73	51.89	1414.66	71.65	1414.52		
-19.44	1414.16								
-15.18	1414.38								
-10.37	1414.29								
-7.02	1414.20								
-4.76	1414.16								

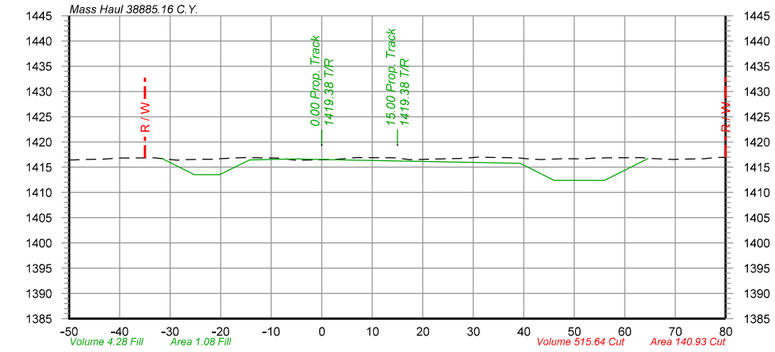
-32.12 1416.44 | -25.47 1413.11 | -20.47 1413.11 | -14.31 1416.20 | -5.00 1416.38 | 0.00 1416.28 | 39.31 1415.50 | 46.00 1412.15 | 56.00 1412.15 | 64.32 1416.31



254+00

-50.00	1416.33	-10.36	1416.57	3.29	1416.46	38.81	1416.61	52.50	1416.49
-46.88	1416.28	-8.34	1416.55	6.09	1416.60	41.49	1416.49	54.79	1416.55
-44.75	1416.41	-5.37	1416.24	13.08	1416.61	43.98	1416.48	60.44	1416.50
-40.86	1416.62	-3.19	1416.19	18.33	1416.06			63.71	1416.37
-35.71	1416.60			20.81	1416.26			66.55	1416.10
-33.19	1416.57			26.33	1416.20			70.49	1416.12
-29.81	1416.16			30.04	1416.49			74.06	1416.13
-25.31	1416.21							76.64	1416.32
-22.42	1416.37							78.81	1416.48
-19.02	1416.42								
-15.52	1416.61								

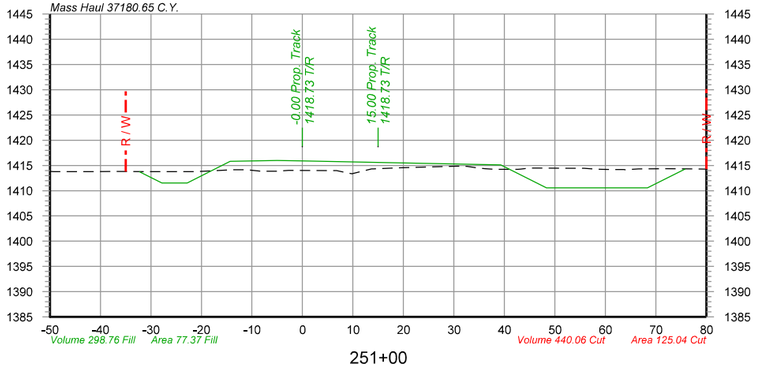
-31.62 1416.71 | -25.21 1413.51 | -20.21 1413.51 | -14.31 1416.46 | -5.00 1416.64 | 0.00 1416.54 | 39.31 1415.76 | 46.00 1412.41 | 56.00 1412.41 | 64.68 1416.75



256+00

-50.00	1416.45	-33.33	1416.87	-11.56	1416.85	14.57	1416.84	38.40	1416.88
-47.16	1416.52	-28.74	1416.40	-8.61	1416.81	17.19	1416.54	38.84	1416.84
-43.17	1416.59	-26.34	1416.52	-6.30	1416.53	21.84	1416.61	43.22	1416.52
-40.20	1416.80	-23.46	1416.54	-3.85	1416.41	27.37	1416.72	47.74	1416.69
		-20.00	1416.68	0.62	1416.49	30.84	1416.97	51.72	1416.64
		-15.74	1416.89	4.94	1416.72			54.11	1416.83
				8.27	1416.89			56.68	1416.86

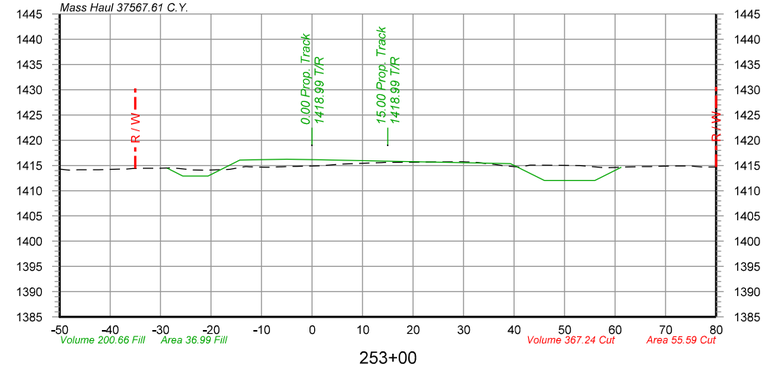
-32.31 1413.78 | -27.83 1411.54 | -22.83 1411.54 | -14.31 1415.81 | -5.00 1415.99 | 0.00 1415.89 | 39.31 1415.11 | 48.35 1410.58 | 68.35 1410.58 | 75.85 1414.33



251+00

-50.00	1413.80	-13.77	1414.13	4.89	1413.99	29.80	1415.72	52.84	1414.45
-41.05	1413.79	-11.17	1414.14	9.07	1413.50	31.80	1415.68	55.77	1414.46
-37.11	1413.80	-8.23	1413.86	13.70	1414.30	34.30	1415.39	58.03	1414.27
-31.05	1413.78	-6.01	1413.85	18.95	1414.51	37.88	1414.96	61.30	1414.19
-24.86	1413.79	-2.72	1414.03	24.59	1414.67	40.59	1414.71	63.61	1414.17
-21.05	1413.77			30.77	1414.85	43.21	1415.06	66.58	1414.30
				34.52	1414.50	48.95	1415.04	72.09	1414.37
				38.10	1414.25	53.09	1414.99	77.30	1414.31
				42.66	1414.24	55.86	1414.71	80.00	1414.27
				45.34	1414.49	58.79	1414.54		
						61.46	1414.66		
						63.89	1414.72		
						66.95	1414.78		
						69.47	1414.88		
						72.31	1414.91		
						74.80	1414.88		
						77.29	1414.69		
						80.00	1414.69		

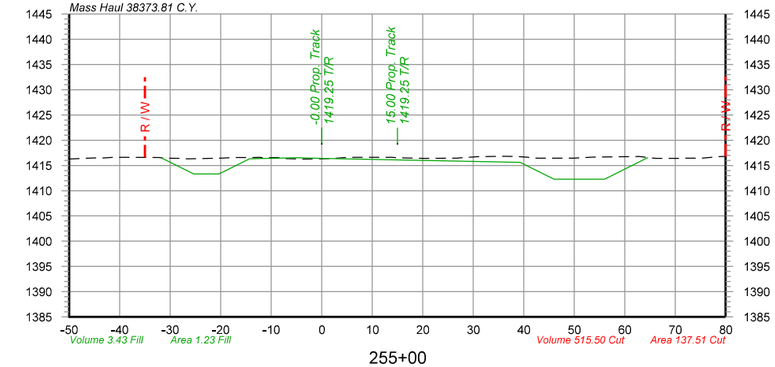
-28.74 1414.48 | -25.61 1412.92 | -20.61 1412.92 | -14.31 1416.07 | -5.00 1416.25 | -0.00 1416.15 | 39.31 1415.37 | 46.00 1412.02 | 56.00 1412.02 | 61.26 1414.65



253+00

-50.00	1414.28	-16.27	1414.23	1.80	1414.94	37.88	1414.96	60.59	1414.72
-47.89	1414.07	-13.21	1414.77	5.80	1415.27	40.59	1414.71	63.89	1414.72
-42.21	1414.15	-9.21	1414.65	10.28	1415.46	43.21	1415.06	66.95	1414.78
-38.11	1414.26	-6.32	1414.72	13.80	1415.56	48.95	1415.04	69.47	1414.88
-35.47	1414.39	-4.21	1414.81	21.76	1415.65	53.09	1414.99	72.31	1414.91
-33.37	1414.43					55.86	1414.71	74.80	1414.88
-30.21	1414.45					58.79	1414.54	77.29	1414.69
-27.85	1414.50					61.46	1414.66	80.00	1414.69
-23.66	1414.11								
-21.41	1414.07								
-18.82	1414.14								

-31.79 1416.53 | -25.34 1413.31 | -20.34 1413.31 | -14.31 1416.33 | -5.00 1416.51 | -0.00 1416.41 | 39.31 1415.63 | 46.00 1412.28 | 56.00 1412.28 | 64.59 1416.57



255+00

-50.00	1416.26	-32.18	1416.57	-13.42	1416.57	12.18	1416.61	39.00	1416.81
-45.20	1416.49	-28.05	1416.40	-8.76	1416.55	14.97	1416.54	38.63	1416.79
-43.18	1416.48	-22.08	1416.39	-4.25	1416.28	20.26	1416.40	41.00	1416.63
-38.67	1416.59	-19.04	1416.48	-0.34	1416.32	26.16	1416.45	45.64	1416.44
		-15.48	1416.57	2.56	1416.38	30.83	1416.74	49.80	1416.45
				5.18	1416.60			53.75	1416.65
								62.94	1416.79
								65.13	1416.50
								71.17	1416.41
								75.26	1416.44
								78.20	1416.70

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X113 of 195

UNION PACIFIC RAILROAD

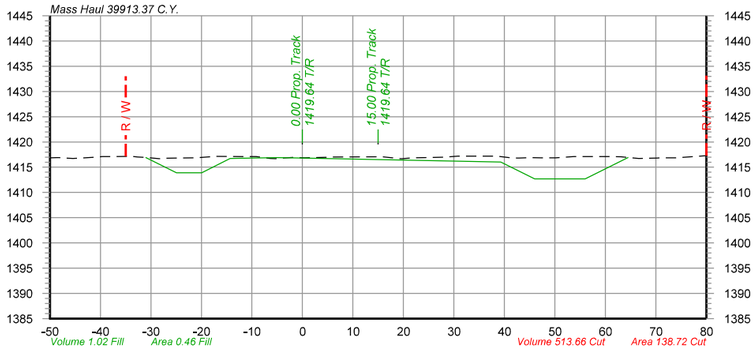
Sheet 353 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.251+00 TO STA.256+00

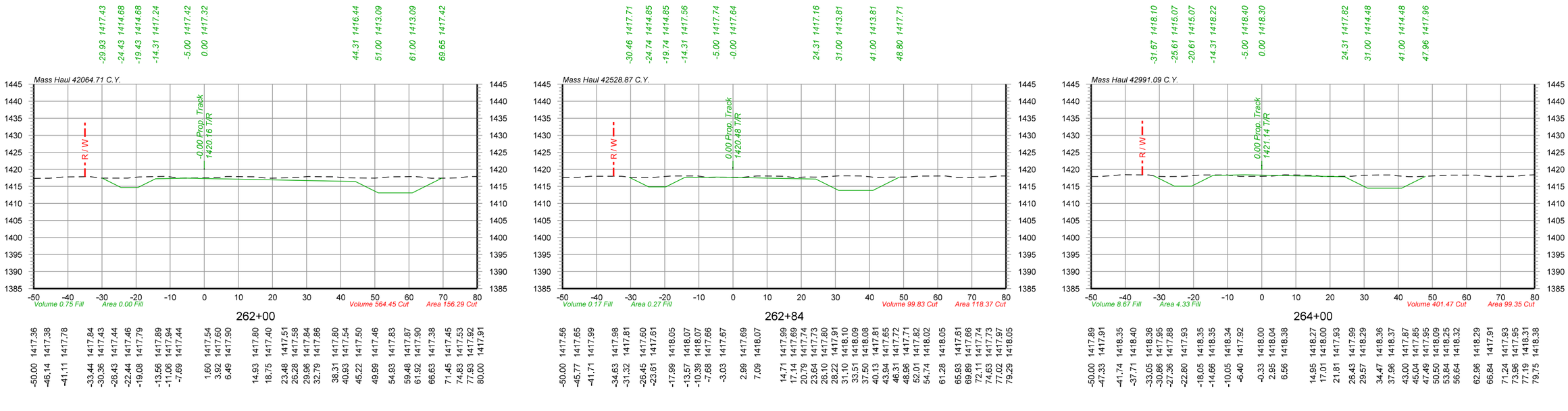
Color table: K:\Bentley\Workspace\V8\projects\Clients\UPRR_Track\UPRR_Track_V8\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

-31.06 1416.95 | -24.94 1413.90 | -19.95 1413.90 | -14.31 1416.72 | -5.00 1416.90 | -0.00 1416.80 | 39.31 1416.02 | 46.00 1412.67 | 56.00 1412.67 | 64.54 1416.94



258+00

| | | |



Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

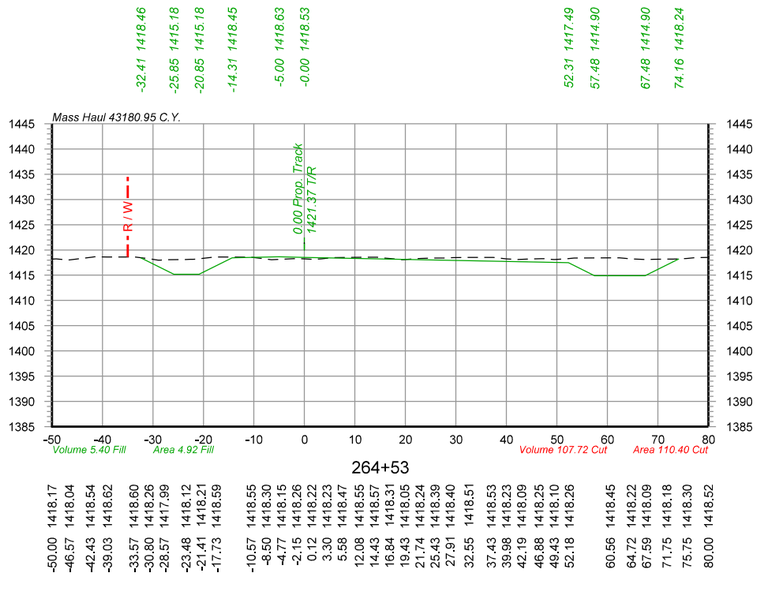
DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X115 of 195

UNION PACIFIC RAILROAD

Sheet 355 of 587

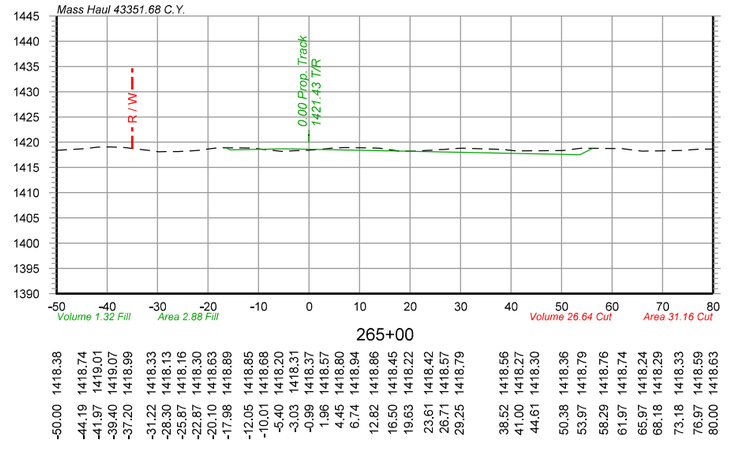
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.261+00 TO STA.264+00



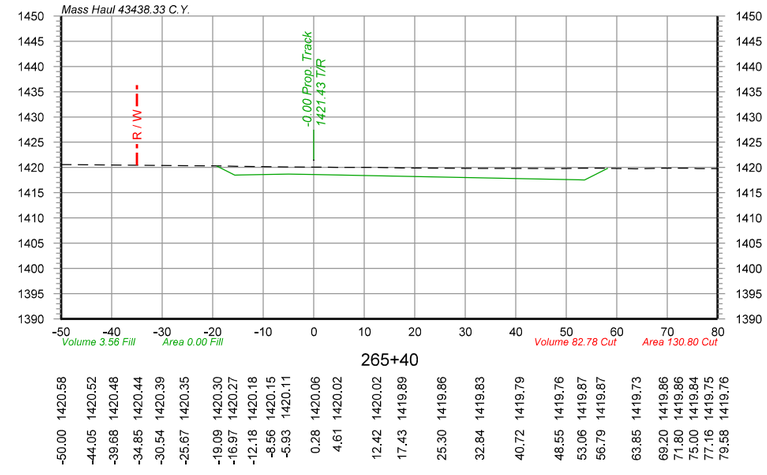
-50.00	1418.17	-10.57	1418.55	60.56	1418.45
-46.57	1418.04	-8.50	1418.30	64.72	1418.22
-42.43	1418.54	-4.77	1418.15	67.59	1418.09
-39.03	1418.62	-2.15	1418.26	71.75	1418.18
-33.57	1418.60	0.12	1418.22	75.75	1418.30
-30.80	1418.26	3.30	1418.23	80.00	1418.52
-28.57	1417.99	5.58	1418.47		
-23.48	1418.12	12.08	1418.55		
-21.41	1418.21	14.43	1418.57		
-17.73	1418.59	16.84	1418.31		
		19.43	1418.05		
		21.74	1418.24		
		25.43	1418.39		
		27.91	1418.40		
		32.55	1418.51		
		37.43	1418.53		
		39.98	1418.23		
		42.19	1418.09		
		46.88	1418.25		
		49.43	1418.10		
		52.18	1418.26		

264+53



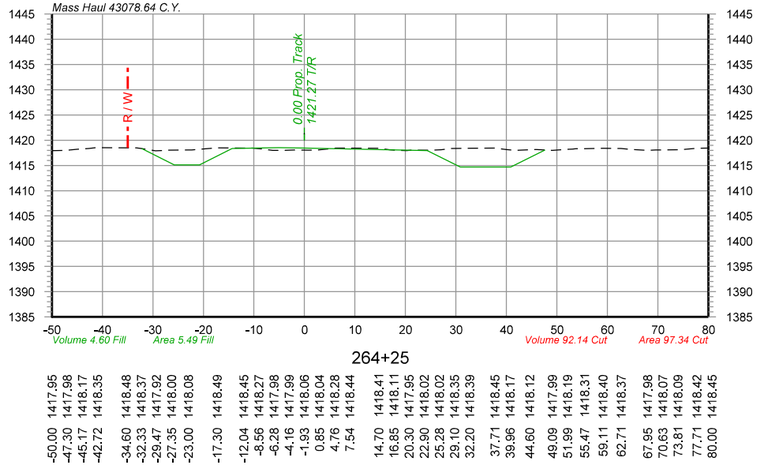
-50.00	1418.38	38.52	1418.56
-44.19	1418.74	41.00	1418.27
-41.97	1419.01	44.61	1418.30
-39.40	1419.07	50.38	1418.36
-37.20	1418.99	53.97	1418.79
-31.22	1418.33	58.29	1418.76
-28.30	1418.13	61.97	1418.74
-25.87	1418.16	65.97	1418.24
-22.87	1418.30	68.18	1418.29
-20.10	1418.63	73.18	1418.33
-17.98	1418.89	76.97	1418.59
-12.05	1418.85	80.00	1418.63
-10.01	1418.68		
-5.40	1418.20		
-3.03	1418.31		
-0.99	1418.37		
1.96	1418.57		
4.45	1418.80		
6.74	1418.94		
12.82	1418.86		
16.50	1418.45		
19.63	1418.22		
23.61	1418.42		
26.71	1418.57		
29.25	1418.79		

265+00



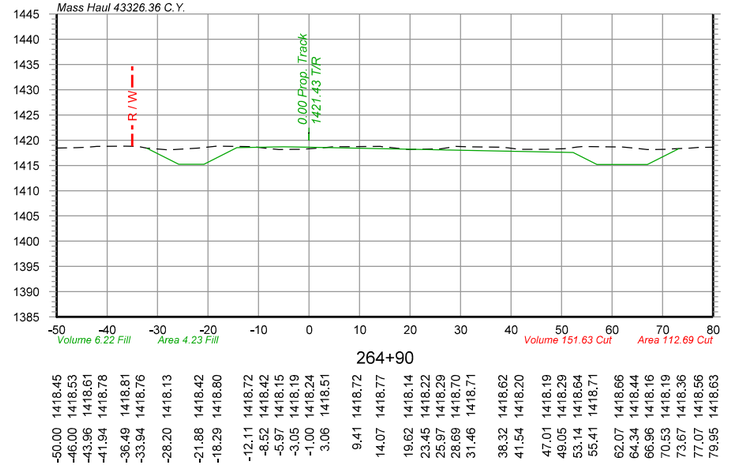
-50.00	1420.58	-19.09	1420.30	48.55	1419.76
-44.05	1420.52	-16.97	1420.27	53.06	1419.87
-39.68	1420.48	-12.18	1420.18	56.79	1419.87
-34.85	1420.44	-8.56	1420.15	63.85	1419.73
-30.54	1420.39	-5.93	1420.11	69.20	1419.86
-25.67	1420.35	0.28	1420.06	71.80	1419.86
		4.61	1420.02	75.00	1419.84
		12.42	1420.02	77.16	1419.75
		17.43	1419.89	79.58	1419.76
		25.30	1419.86		
		32.84	1419.83		
		40.72	1419.79		

265+40



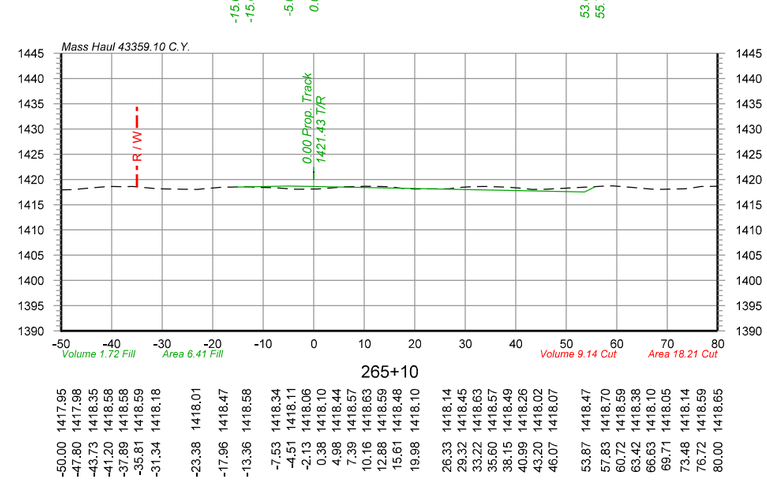
-50.00	1417.95	-34.60	1418.48	-17.30	1418.49
-47.30	1417.98	-32.33	1418.37	-12.04	1418.45
-45.17	1418.17	-29.47	1417.92	-8.56	1418.27
-42.72	1418.35	-27.35	1418.00	-6.28	1417.98
		-23.00	1418.08	-4.16	1417.99
				-1.93	1418.06
				0.85	1418.04
				4.76	1418.28
				7.54	1418.44
				14.70	1418.41
				16.85	1418.11
				20.30	1417.95
				22.90	1418.02
				25.28	1418.02
				29.10	1418.35
				32.20	1418.39
				37.71	1418.45
				39.96	1418.17
				44.60	1418.12
				49.09	1417.99
				51.99	1418.19
				55.47	1418.31
				59.11	1418.40
				62.71	1418.37
				67.95	1417.98
				70.63	1418.07
				73.81	1418.09
				77.71	1418.42
				80.00	1418.45

264+25



-50.00	1418.45	-12.11	1418.72	38.32	1418.62
-46.00	1418.53	-8.52	1418.42	41.54	1418.20
-43.96	1418.61	-5.97	1418.15	47.01	1418.19
-41.94	1418.78	-3.05	1418.19	49.05	1418.29
-36.49	1418.81	-1.00	1418.24	53.14	1418.64
-33.94	1418.76	3.06	1418.51	55.41	1418.71
-28.20	1418.13	9.41	1418.72	62.07	1418.66
-21.88	1418.42	14.07	1418.77	64.34	1418.44
-18.29	1418.80	19.62	1418.14	66.96	1418.16
		23.45	1418.22	70.53	1418.19
		25.97	1418.29	73.67	1418.36
		28.69	1418.70	77.07	1418.56
		31.46	1418.71	79.95	1418.63

264+90



-50.00	1417.95	-23.38	1418.01	26.33	1418.14
-47.80	1417.98	-17.96	1418.47	29.32	1418.45
-43.73	1418.35	-13.36	1418.58	33.22	1418.63
-41.20	1418.58	-7.53	1418.34	35.60	1418.57
-37.89	1418.58	-4.51	1418.11	38.15	1418.49
-35.81	1418.59	-2.13	1418.06	40.99	1418.26
-31.34	1418.18	0.38	1418.10	43.20	1418.02
		4.98	1418.44	46.07	1418.07
		7.39	1418.57	53.87	1418.47
		10.16	1418.63	57.83	1418.70
		12.88	1418.59	60.72	1418.59
		15.61	1418.48	63.42	1418.38
		19.98	1418.10	66.63	1418.10
				69.71	1418.05
				73.48	1418.14
				76.72	1418.59
				80.00	1418.65

265+10

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X116 of 195

UNION PACIFIC RAILROAD

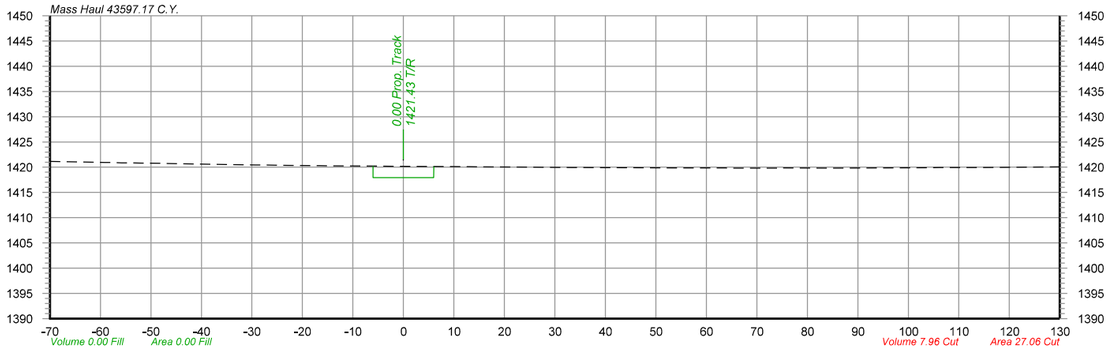
Sheet 356 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.264+25 TO STA.265+40

Color table: K:\Bentley\Workspace\Projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

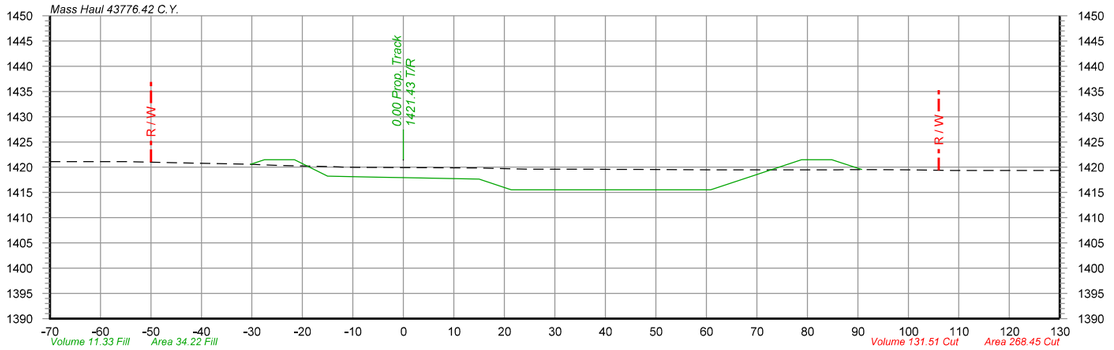
-6.02 1420.21
-6.00 1417.93
-0.00 1417.93
6.00 1417.93
6.02 1420.14



265+68

| | | |

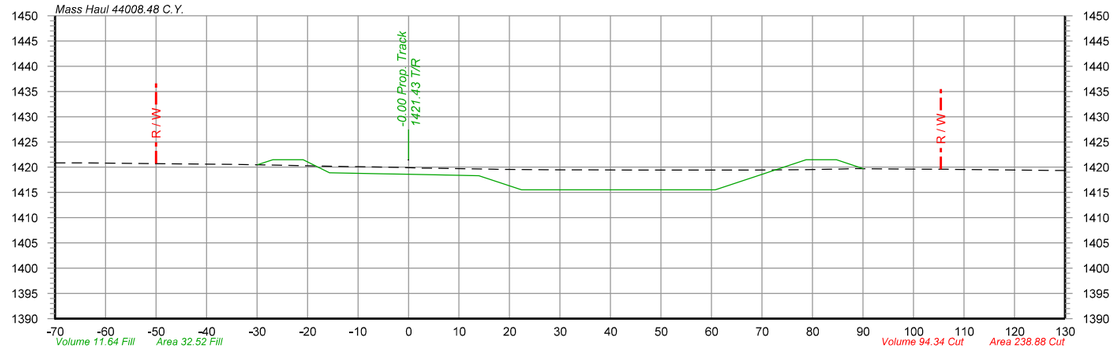
-30.33 1420.57
-27.54 1421.50
-21.54 1421.50
-15.00 1418.23
-5.00 1418.03
0.00 1417.93
15.00 1417.63
21.39 1415.50
60.85 1415.50
78.85 1421.50
84.85 1421.50
90.83 1419.50



266+43

-70.00	1421.11	-60.36	1421.11	-55.42	1421.11	-53.15	1421.07	-43.69	1420.86	-31.21	1420.61	-24.97	1420.36	-13.74	1420.11	-9.16	1419.97	13.44	1419.86	24.70	1419.61	29.23	1419.61	34.29	1419.61
37.80	1419.61	41.00	1419.57	46.32	1419.55	61.20	1419.48	65.06	1419.47	71.11	1419.46	84.67	1419.48	87.59	1419.50	93.65	1419.51	100.23	1419.49	108.72	1419.36	113.73	1419.36	128.17	1419.36

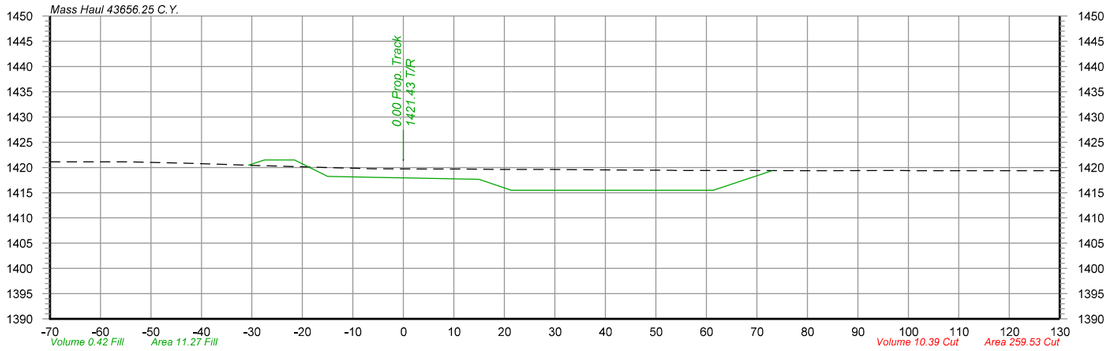
-29.96 1420.47
-26.87 1421.50
-20.87 1421.50
-15.64 1418.88
-5.00 1418.69
0.00 1418.59
13.94 1418.32
22.39 1415.50
60.75 1415.50
78.75 1421.50
84.75 1421.50
90.14 1419.70



266+70

-70.00	1420.87	-64.76	1420.87	-44.76	1420.66	-39.93	1420.61	-35.08	1420.55	-32.57	1420.51	-25.58	1420.40	-11.06	1420.11	-2.42	1419.99	1.69	1419.86	4.04	1419.82	16.94	1419.61	19.48	1419.57
29.98	1419.48	36.07	1419.49	43.97	1419.43	51.23	1419.43	58.99	1419.44	68.74	1419.45	79.21	1419.52	83.55	1419.60	88.78	1419.73	90.96	1419.69	102.14	1419.61	106.12	1419.59	112.99	1419.52
128.09	1419.36																								

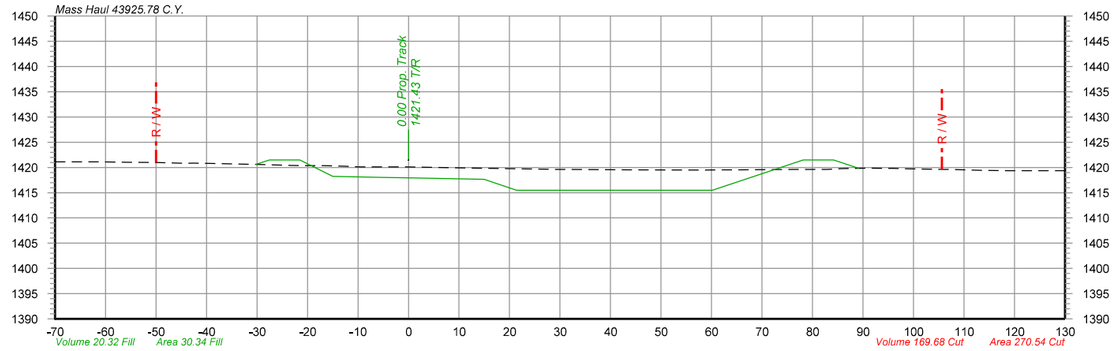
-30.73 1420.44
-27.54 1421.50
-21.54 1421.50
-15.00 1418.23
-5.00 1418.03
-0.00 1417.93
15.00 1417.63
21.39 1415.50
61.39 1415.50
73.00 1419.37



266+30

-70.00	1421.11	-68.28	1421.11	-59.46	1421.11	-55.79	1421.11	-47.59	1420.95	-43.72	1420.86	-35.40	1420.61	-28.45	1420.36	-19.22	1420.11	-12.01	1419.90	-10.00	1419.84	-6.10	1419.72	-4.09	1419.73
4.47	1419.67	11.73	1419.67	18.76	1419.61	22.51	1419.61	26.76	1419.61	28.83	1419.61	43.85	1419.46	53.01	1419.42	58.83	1419.39	67.44	1419.38	79.35	1419.36	83.95	1419.37	97.50	1419.38
100.38	1419.36	111.00	1419.36	115.84	1419.36	126.55	1419.36	130.00	1419.36																

-30.22 1420.61
-27.54 1421.50
-21.54 1421.50
-15.00 1418.23
-5.00 1418.03
-0.00 1417.93
15.00 1417.63
21.39 1415.50
60.16 1415.50
78.16 1421.50
84.16 1421.50
89.23 1419.81



266+60

-70.00	1421.11	-64.46	1421.11	-60.82	1421.11	-55.62	1421.03	-49.96	1420.98	-44.20	1420.82	-40.12	1420.81	-32.52	1420.65	-30.10	1420.61	-23.20	1420.40	-20.90	1420.36	-16.76	1420.36	-12.33	1420.24
-9.67	1420.11	-6.06	1420.11	-1.77	1420.11	13.74	1419.86	27.31	1419.65	29.69	1419.61	43.74	1419.51	58.62	1419.50	61.56	1419.51	65.25	1419.51	76.12	1419.59	82.74	1419.61	85.89	1419.76
91.17	1419.84	94.27	1419.83	98.74	1419.71	106.10	1419.63	112.90	1419.43	118.41	1419.36	123.72	1419.36	126.17	1419.36	129.01	1419.36								

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X118 of 195

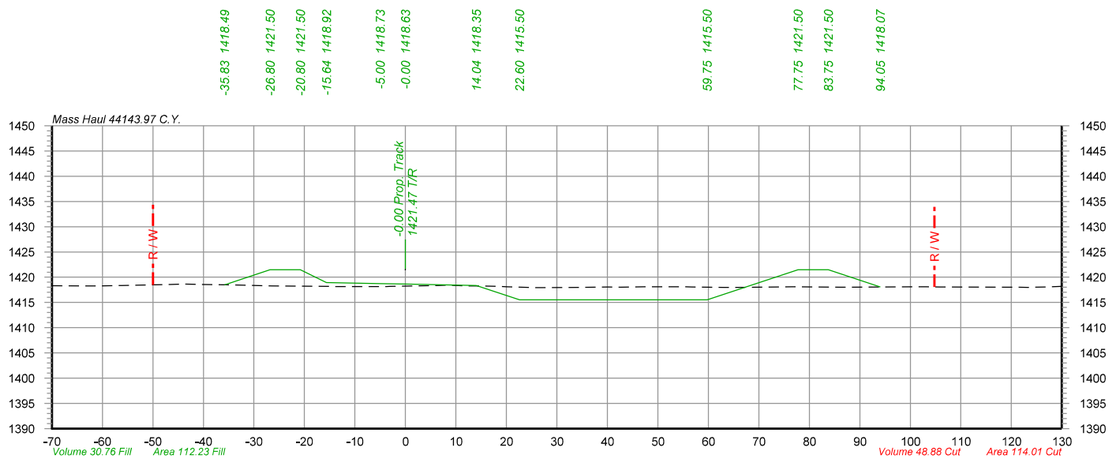
UNION PACIFIC RAILROAD

Sheet 358 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

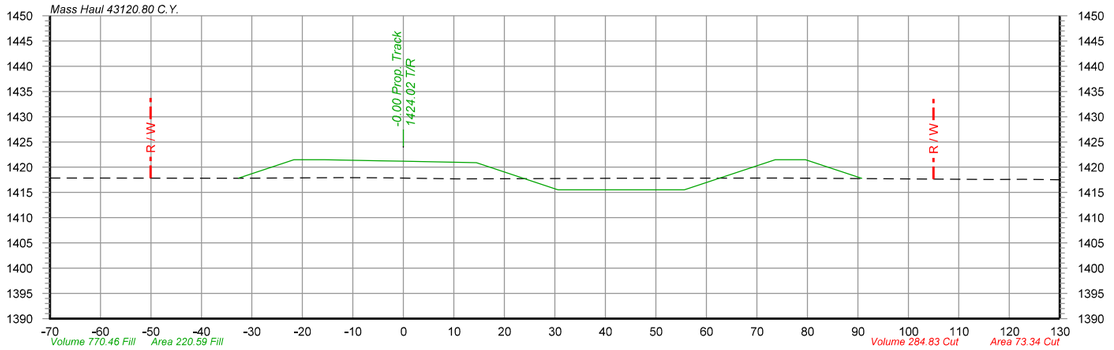
SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.266+30 TO STA.266+70

Color table: K:\Bentley\Workspace\Projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026


-35.83 1418.49
-26.80 1421.50
-20.80 1421.50
-15.64 1418.92
-5.00 1418.73
-0.00 1418.63
14.04 1418.35
22.60 1415.50
59.75 1415.50
77.75 1421.50
83.75 1421.50
94.05 1418.07
Mass Haul 44143.97 C.Y.
-0.00 Prop. Track
1421.47 T/R
R / W
R / W
Volume 30.76 Fill
Area 112.23 Fill
Volume 48.88 Cut
Area 114.01 Cut
267+00

| | | |

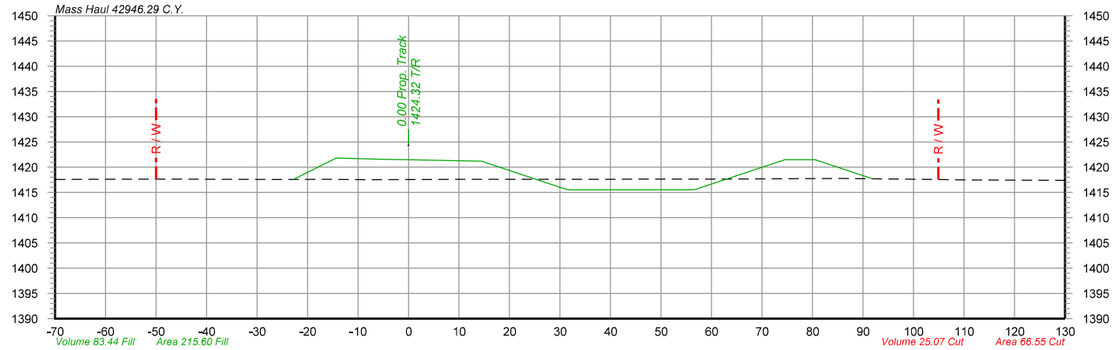
-32.75 1417.82 | -21.70 1421.50 | -15.70 1421.50 | -15.64 1421.47 | -5.00 1421.28 | 0.00 1421.18 | 14.44 1420.90 | 30.63 1415.50 | 55.63 1415.50 | 73.63 1421.50 | 79.63 1421.50 | 90.86 1417.76



270+00

-70.00 1417.84 | -60.71 1417.85 | -32.80 1417.82 | -12.01 1417.93 | -3.31 1417.89 | 10.59 1417.68 | 24.40 1417.74 | 42.32 1417.80 | 74.82 1417.87 | 116.99 1417.56 | 122.78 1417.61 | 129.38 1417.51

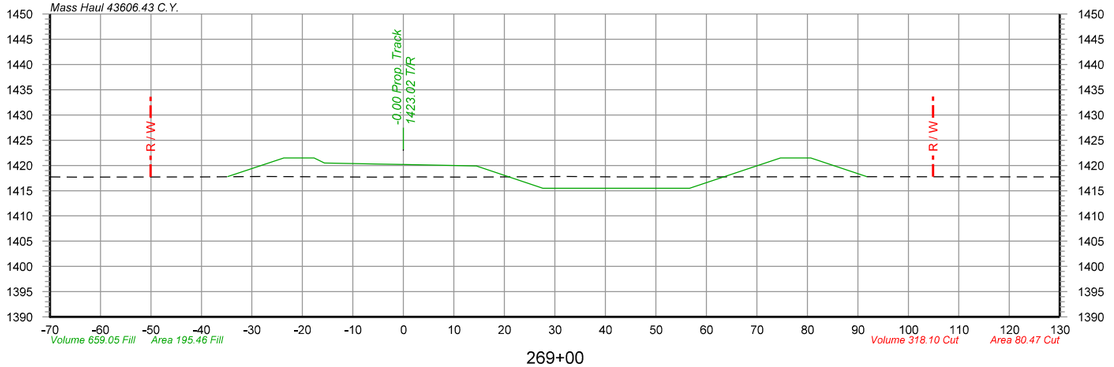
-22.73 1417.59 | -14.31 1421.80 | -5.00 1421.58 | -0.00 1421.48 | 14.44 1421.20 | 31.53 1415.50 | 56.53 1415.50 | 62.97 1417.65 | 74.53 1421.50 | 80.53 1421.50 | 91.91 1417.71



270+30

-70.00 1417.58 | -64.35 1417.58 | -47.77 1417.64 | -25.26 1417.57 | -16.67 1417.61 | -8.01 1417.53 | 11.39 1417.59 | 31.80 1417.59 | 40.62 1417.62 | 45.44 1417.63 | 58.20 1417.64 | 63.66 1417.65 | 69.44 1417.67 | 85.81 1417.78 | 105.00 1417.54 | 110.20 1417.46 | 130.00 1417.40

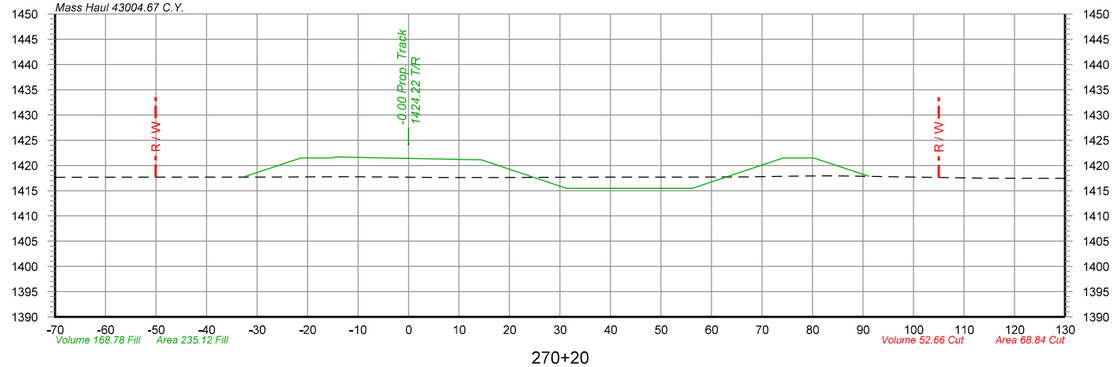
-34.88 1417.77 | -23.70 1421.50 | -17.70 1421.50 | -15.64 1420.47 | -5.00 1420.28 | 0.00 1420.18 | 14.44 1419.90 | 27.62 1415.50 | 56.67 1415.50 | 74.67 1421.50 | 80.67 1421.50 | 91.80 1417.79



269+00

-70.00 1417.71 | -65.06 1417.70 | -38.98 1417.75 | -27.85 1417.81 | -5.69 1417.70 | 3.21 1417.72 | 12.74 1417.68 | 32.45 1417.81 | 42.54 1417.71 | 61.05 1417.74 | 90.60 1417.79 | 94.48 1417.79 | 128.06 1417.72

-32.73 1417.69 | -21.30 1421.50 | -15.30 1421.50 | -14.31 1421.70 | -5.00 1421.48 | 0.00 1421.38 | 14.44 1421.10 | 31.23 1415.50 | 56.23 1415.50 | 74.23 1421.50 | 80.23 1421.50 | 91.21 1417.84



270+20

-70.00 1417.67 | -47.35 1417.68 | -39.95 1417.71 | -30.20 1417.68 | -11.87 1417.76 | 7.12 1417.59 | 11.71 1417.60 | 16.36 1417.60 | 41.05 1417.68 | 54.98 1417.71 | 66.87 1417.72 | 77.48 1417.91 | 83.17 1417.95 | 87.41 1417.90 | 113.70 1417.48 | 130.00 1417.44

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

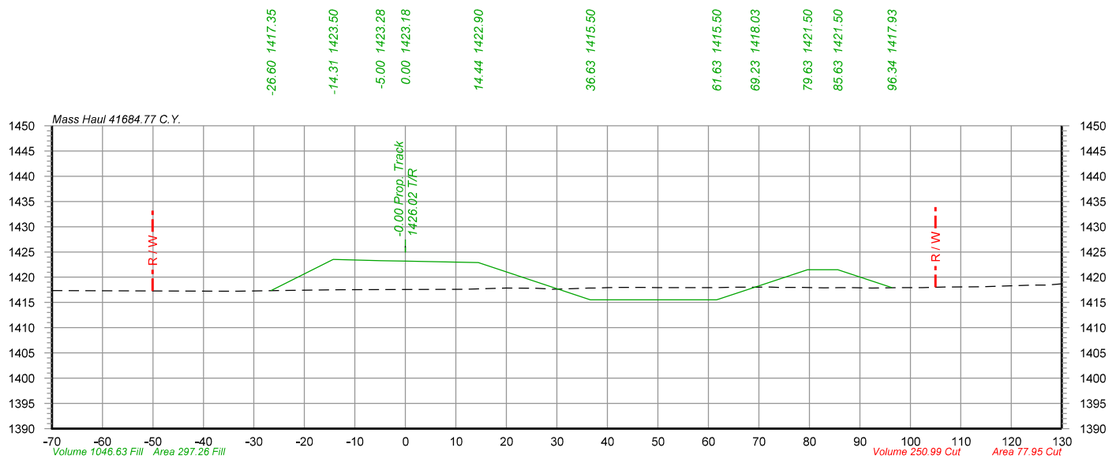
DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X120 of 195

UNION PACIFIC RAILROAD

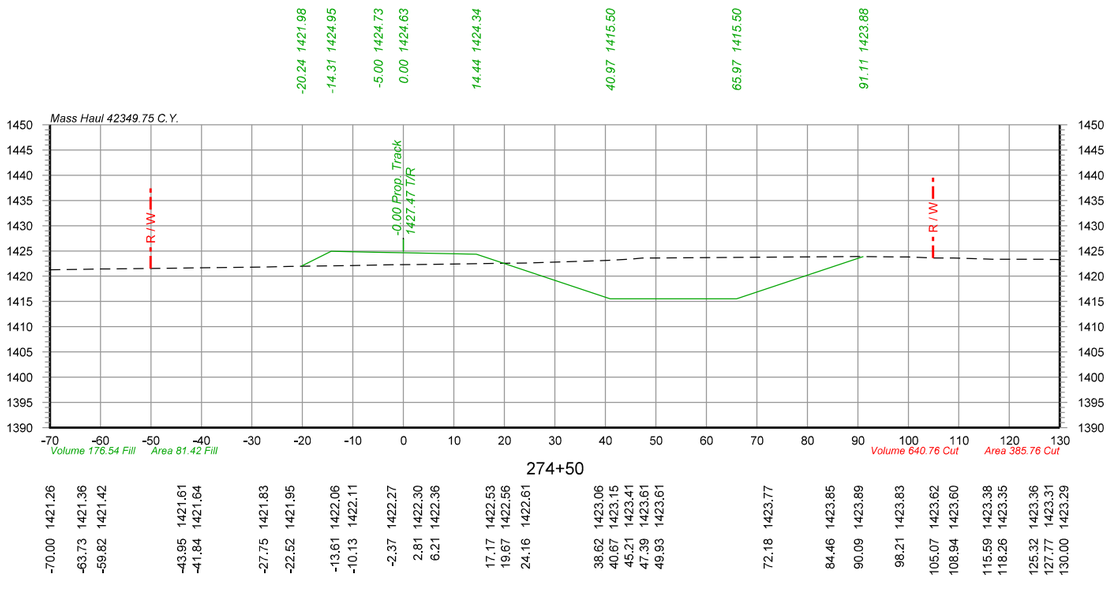
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.269+00 TO STA.270+30

Color table: K:\Bentley\Workspace\Projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

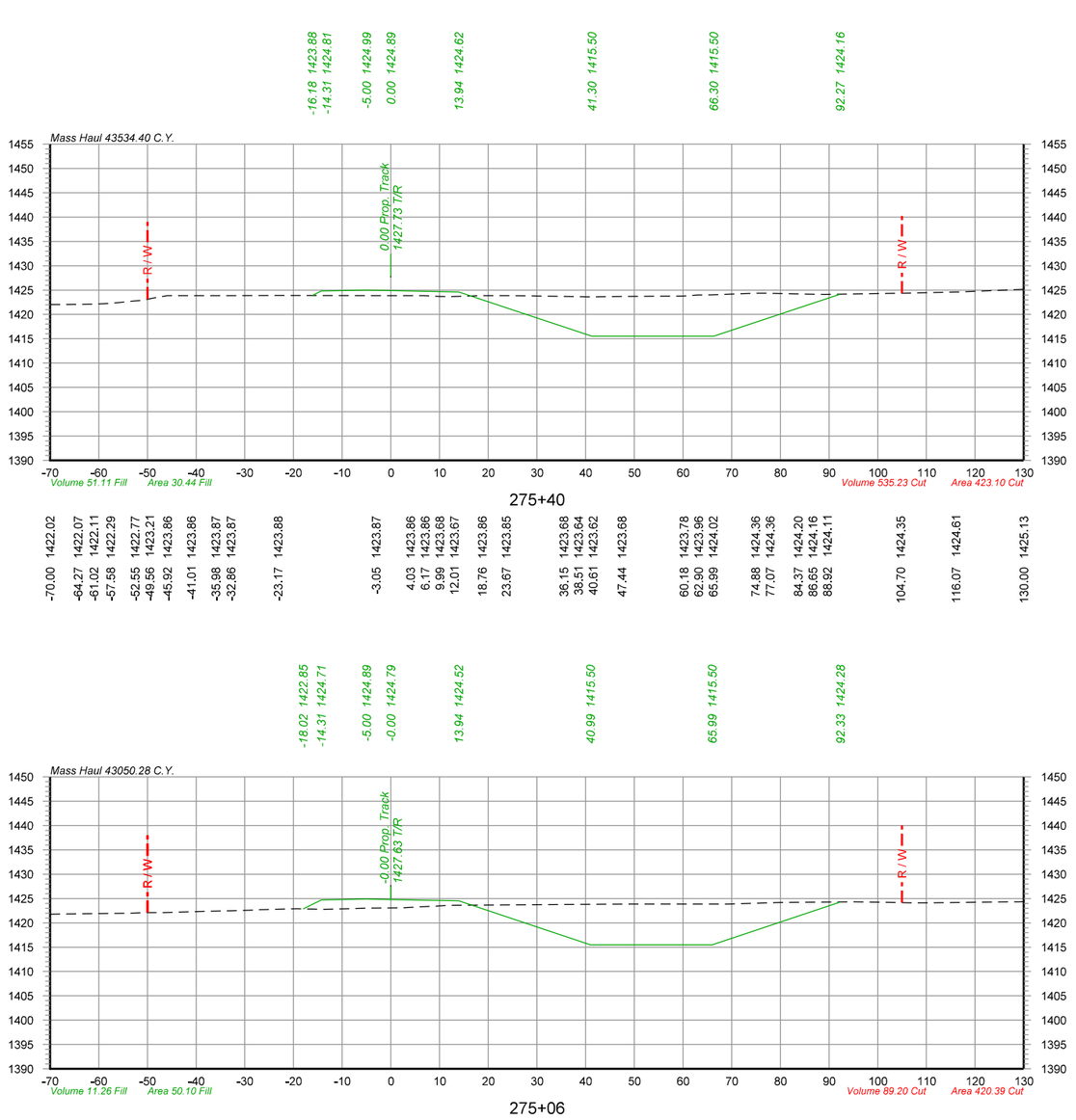

-26.60 1417.35
-14.31 1423.50
-5.00 1423.28
0.00 1423.18
14.44 1422.90
36.63 1415.50
61.63 1415.50
69.23 1418.03
79.63 1421.50
85.63 1421.50
96.34 1417.93
Mass Haul 41684.77 C.Y.
-0.00 Prop. Track
1426.02 T/R
R / W
R / W
Volume 1046.63 Fill
Area 297.26 Fill
Volume 250.99 Cut
Area 77.95 Cut
272+00

| | | |


-20.24 1421.98
-14.31 1424.95
-5.00 1424.73
0.00 1424.63
14.44 1424.34
40.97 1415.50
65.97 1415.50
91.11 1423.88
Mass Haul 42349.75 C.Y.
-0.00 Prop. Track
1427.47 T/R
R / W
R / W
Volume 176.54 Fill
Area 81.42 Fill
Volume 640.76 Cut
Area 385.76 Cut

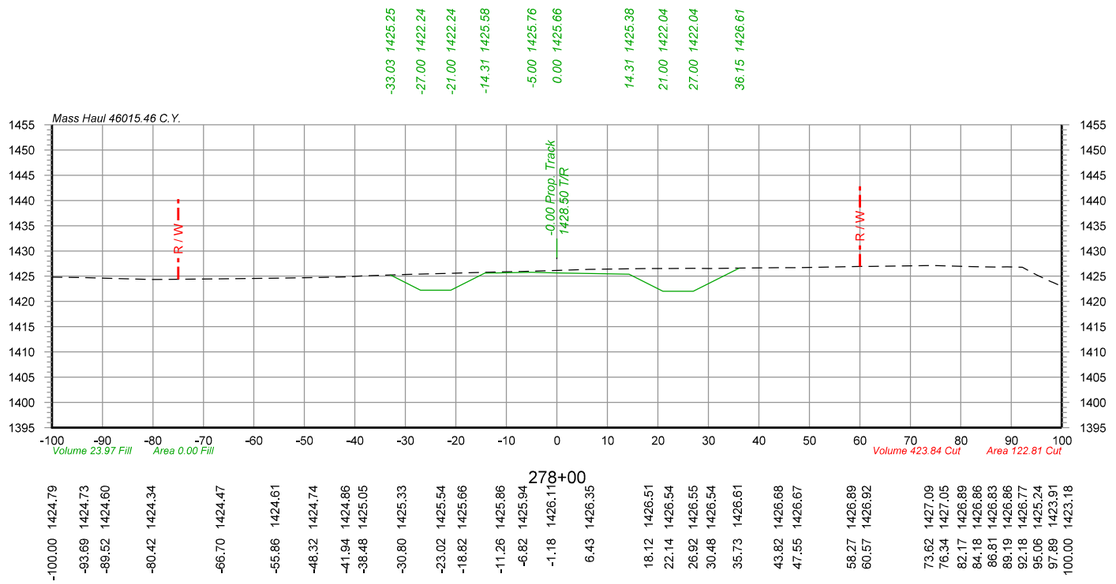
274+50

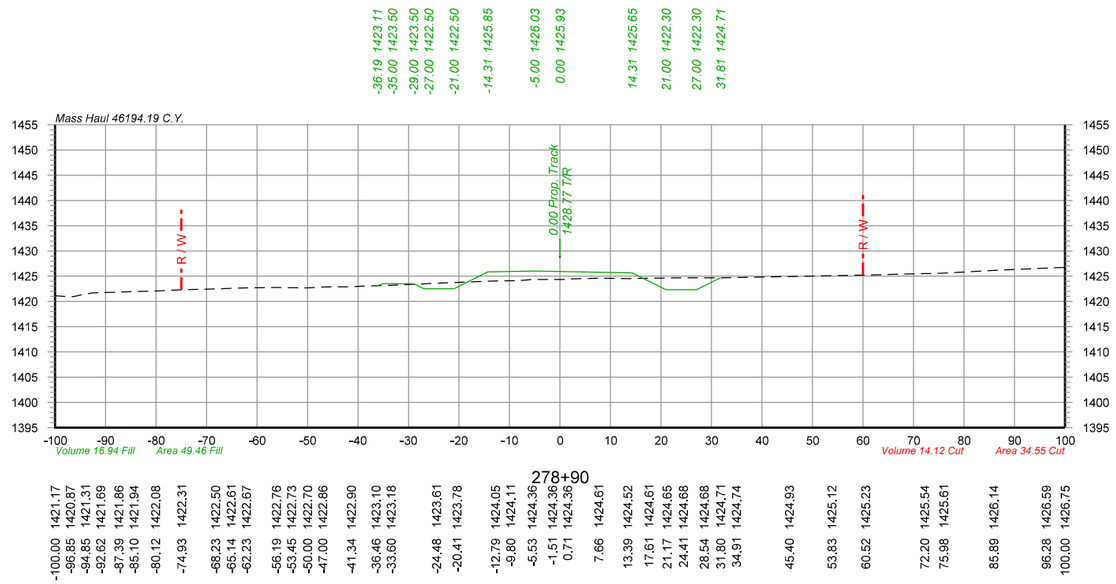
| | | |

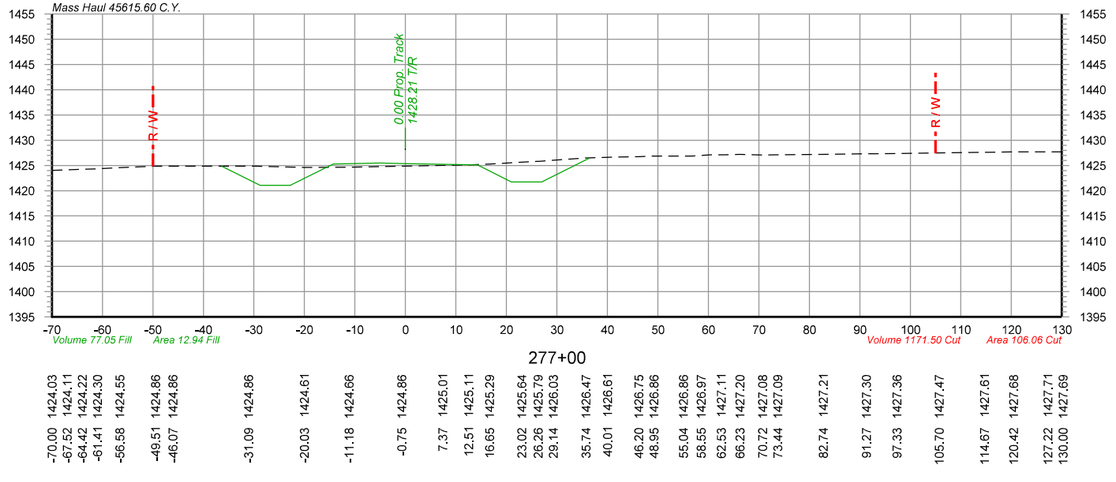

-16.18 1423.88
-14.31 1424.81
-5.00 1424.99
0.00 1424.89
13.94 1424.62
41.30 1415.50
66.30 1415.50
92.27 1424.16
Mass Haul 43534.40 C.Y.
R / W
0.00 Prop. Track
1427.13 T/R
R / W
Volume 51.11 Fill
Area 30.44 Fill
Volume 535.23 Cut
Area 423.10 Cut

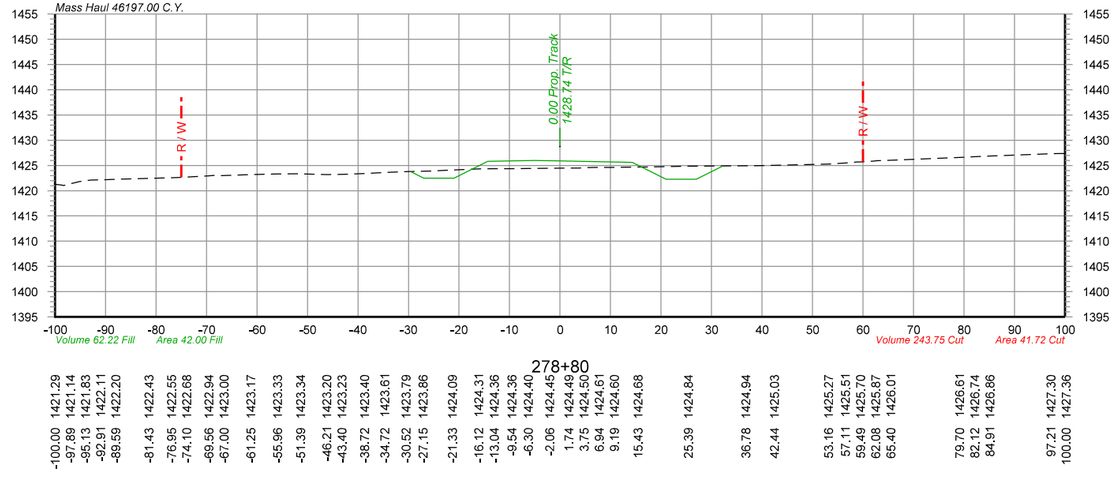
275+40

| | | |









olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

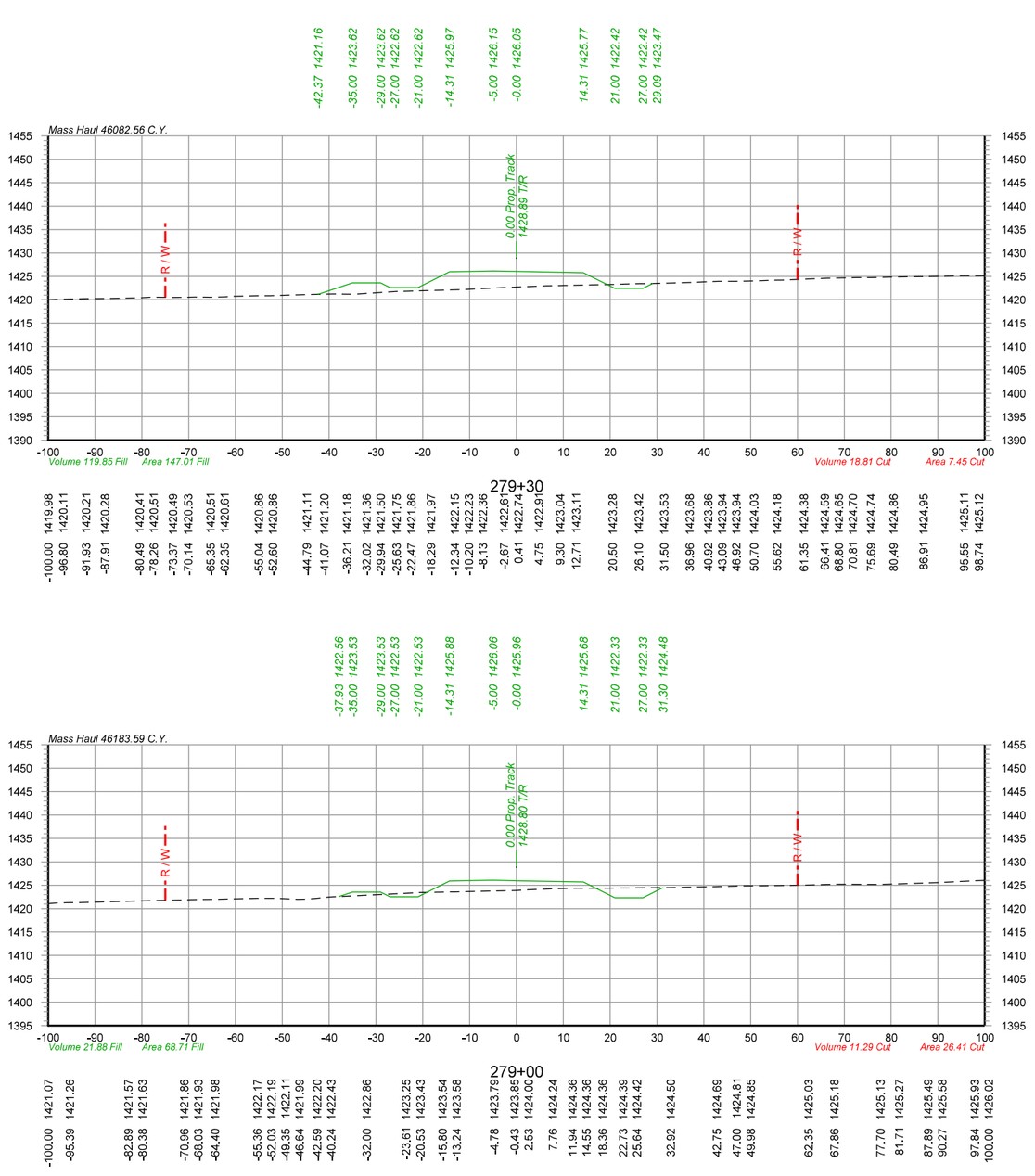
DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X124 of 195

UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.277+00 TO STA.278+90

Color table: K:\Bentley\Workspace\Projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026



olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X125 of 195

UNION PACIFIC RAILROAD

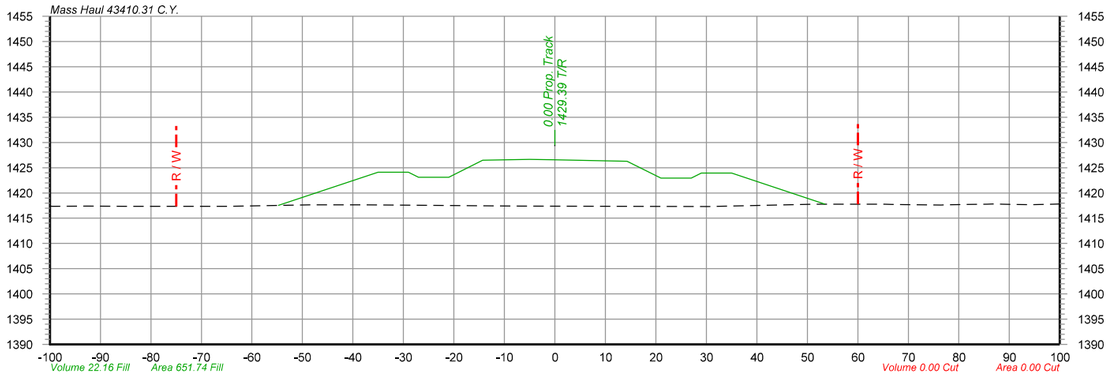
Sheet 125 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.279+00 TO STA.280+00

Color table: K:\Bentley\Workspace\V8\projects\Clients\UPRR_Track\UPRR_Track_V8\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-
Default
3/9/2026

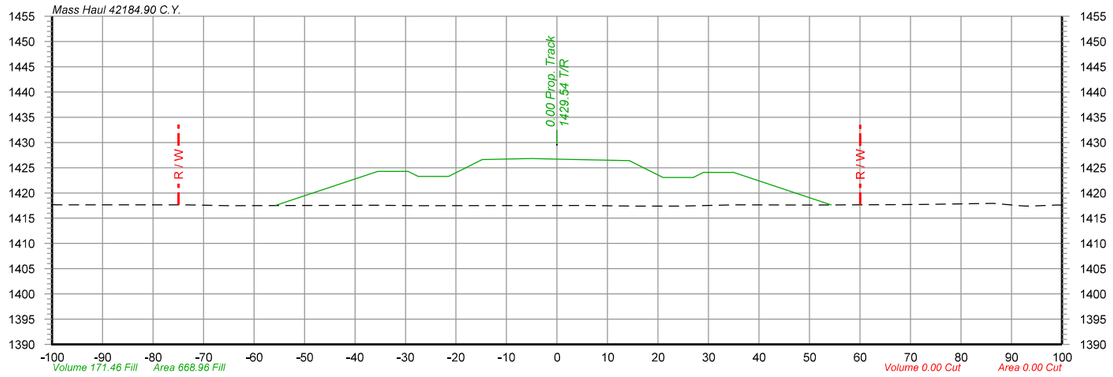
-54.81 1417.53 | -35.01 1424.13 | -29.01 1424.13 | -27.01 1423.13 | -21.01 1423.13 | -14.32 1426.47 | -5.00 1426.65 | 0.00 1426.55 | 14.31 1426.27 | 21.00 1422.93 | 27.00 1422.93 | 29.00 1423.93 | 35.00 1423.93 | 53.50 1417.76



281+00

-100.00 1417.38 | -92.58 1417.38 | -84.88 1417.37 | -64.54 1417.37 | -48.45 1417.63 | -37.90 1417.65 | -26.90 1417.57 | -6.88 1417.41 | 13.22 1417.34 | 30.49 1417.31 | 51.38 1417.75 | 64.77 1417.78 | 69.30 1417.70 | 76.47 1417.61 | 81.98 1417.71 | 85.60 1417.79 | 88.59 1417.79 | 93.52 1417.68 | 98.62 1417.76

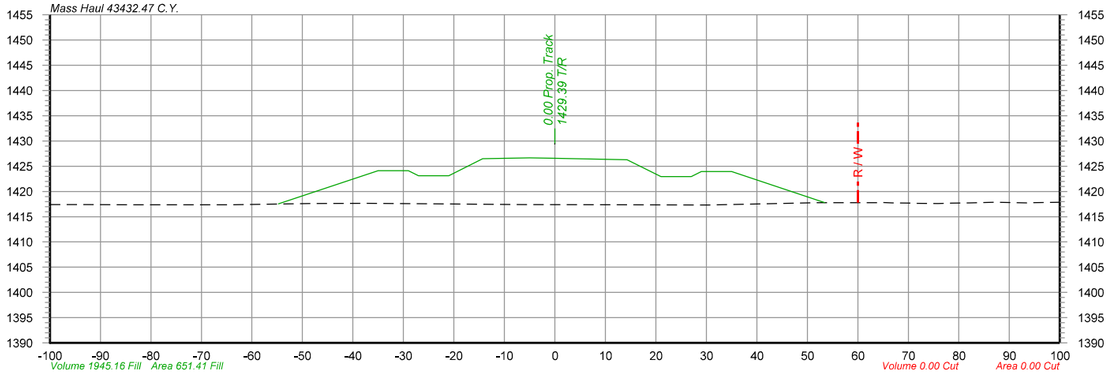
-55.78 1417.51 | -35.50 1424.26 | -29.50 1424.26 | -27.50 1423.26 | -21.50 1423.26 | -14.81 1426.61 | -5.00 1426.80 | 0.00 1426.70 | 14.31 1426.42 | 21.00 1423.07 | 27.00 1423.07 | 29.00 1424.07 | 35.00 1424.07 | 54.36 1417.62



281+50

-100.00 1417.68 | -73.81 1417.66 | -65.14 1417.50 | -49.46 1417.51 | -35.97 1417.55 | -27.58 1417.49 | 5.87 1417.51 | 15.48 1417.40 | 24.38 1417.39 | 35.41 1417.64 | 50.31 1417.59 | 67.65 1417.70 | 73.08 1417.74 | 86.37 1417.92 | 92.17 1417.42 | 94.63 1417.42 | 98.95 1417.61

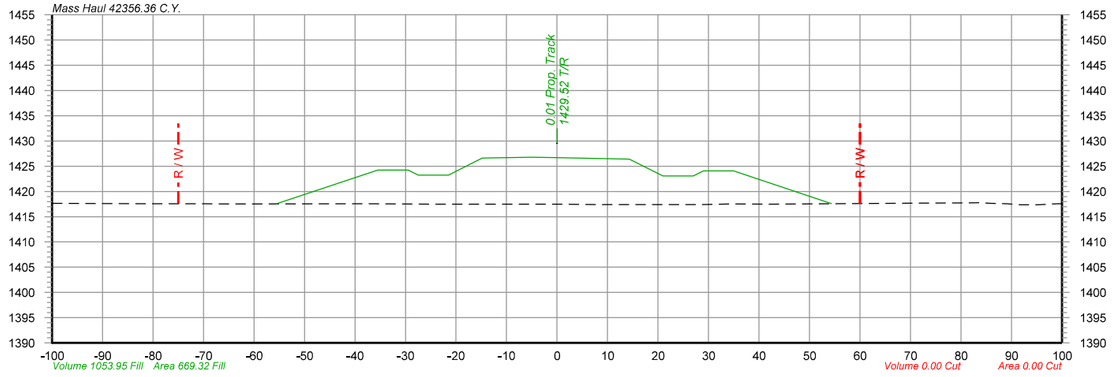
-54.79 1417.53 | -35.00 1424.12 | -29.00 1424.12 | -27.00 1423.12 | -21.00 1423.12 | -14.31 1426.47 | -5.00 1426.65 | 0.00 1426.55 | 14.31 1426.27 | 21.00 1422.92 | 27.00 1422.92 | 29.00 1423.92 | 35.00 1423.92 | 53.47 1417.77



280+99

-100.00 1417.38 | -92.93 1417.39 | -84.04 1417.37 | -64.27 1417.38 | -48.64 1417.62 | -37.49 1417.64 | -25.87 1417.56 | -6.51 1417.40 | 14.40 1417.34 | 30.41 1417.30 | 51.85 1417.76 | 64.09 1417.78 | 66.82 1417.71 | 70.82 1417.67 | 75.89 1417.61 | 78.59 1417.68 | 82.20 1417.75 | 86.94 1417.85 | 93.47 1417.75 | 100.00 1417.85

-55.65 1417.53 | -35.50 1424.24 | -29.50 1424.24 | -27.50 1423.24 | -21.50 1423.24 | -14.81 1426.59 | -5.00 1426.78 | -0.00 1426.68 | 14.31 1426.40 | 21.00 1423.05 | 27.00 1423.05 | 29.00 1424.05 | 35.00 1424.05 | 54.43 1417.57



281+43

-100.00 1417.64 | -81.22 1417.58 | -69.75 1417.58 | -66.07 1417.51 | -59.31 1417.52 | -37.74 1417.58 | -24.54 1417.48 | 0.51 1417.50 | 7.81 1417.41 | 28.71 1417.39 | 34.52 1417.52 | 42.49 1417.50 | 72.11 1417.69 | 81.17 1417.74 | 83.76 1417.78 | 85.81 1417.64 | 89.08 1417.55 | 91.70 1417.35 | 95.24 1417.36 | 99.18 1417.56

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X126 of 195

UNION PACIFIC RAILROAD

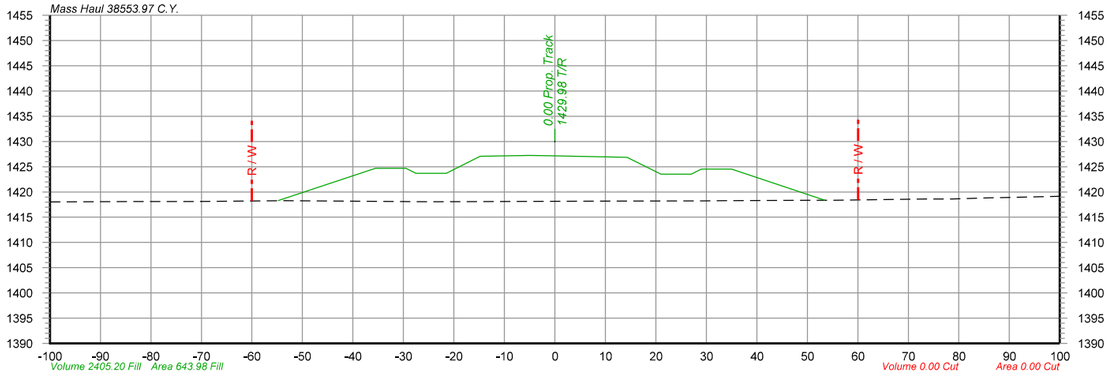
Sheet 366 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.280+99 TO STA.281+50

Color table: K:\Bentley\Workspace\Projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

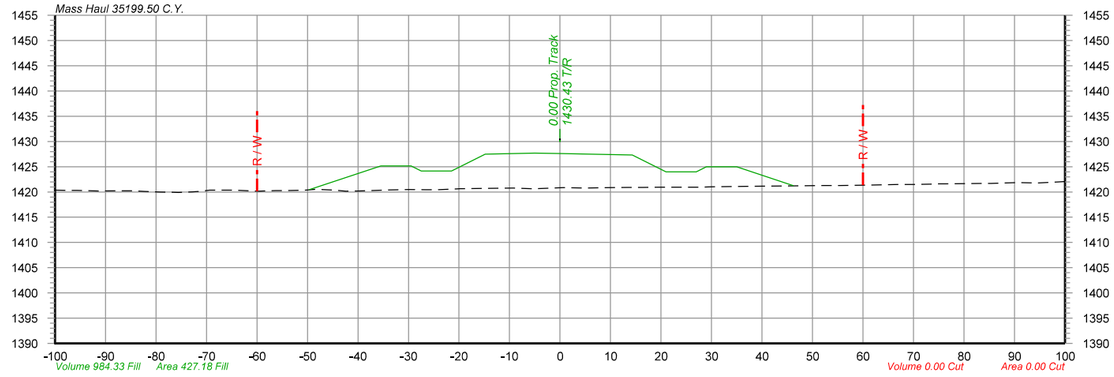
-54.85 1418.26 | -35.50 1424.71 | -29.50 1424.71 | -27.50 1423.71 | -21.50 1423.71 | -14.81 1427.06 | -5.00 1427.24 | 0.00 1427.14 | 14.31 1426.86 | 21.00 1423.52 | 27.00 1423.52 | 29.00 1424.52 | 35.00 1424.52 | 53.49 1418.36



283+00

-100.00 1418.03 | -83.41 1418.10 | -71.28 1418.11 | -53.54 1418.27 | -25.44 1418.05 | -22.82 1418.05 | 10.99 1418.18 | 28.86 1418.25 | 33.22 1418.26 | 51.60 1418.36 | 53.65 1418.36 | 73.53 1418.61 | 76.39 1418.61 | 78.60 1418.61 | 86.57 1418.84 | 98.56 1419.10

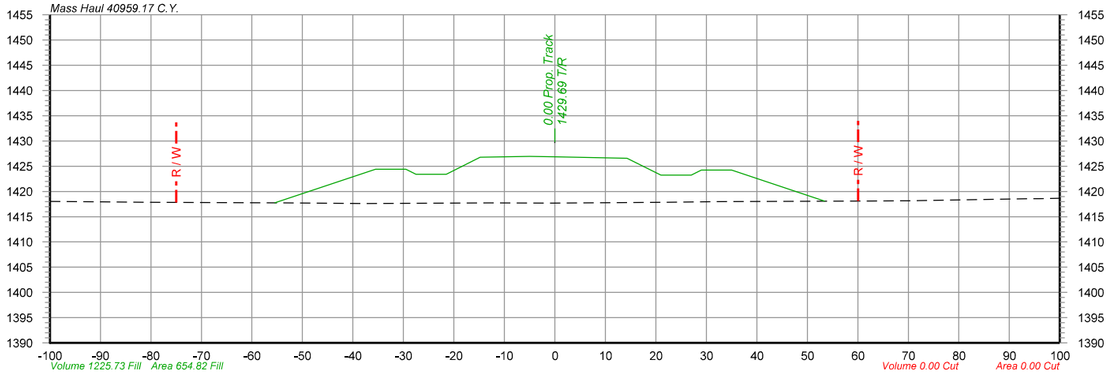
-54.71 1418.60 | -35.50 1425.00 | -29.50 1425.00 | -27.50 1424.00 | -21.50 1424.00 | -14.81 1427.35 | -5.00 1427.54 | -0.00 1427.44 | 14.31 1427.16 | 21.00 1423.81 | 27.00 1423.81 | 29.00 1424.81 | 35.00 1424.81 | 52.26 1419.06



284+00

-100.00 1420.35 | -97.72 1420.32 | -95.65 1420.29 | -91.38 1420.19 | -88.02 1420.22 | -85.78 1420.25 | -82.32 1420.11 | -79.12 1419.97 | -76.68 1419.93 | -72.71 1420.04 | -69.39 1420.34 | -64.48 1420.35 | -59.82 1420.13 | -56.30 1420.25 | -50.46 1420.38 | -48.33 1420.51 | -44.62 1420.36 | -42.36 1420.15 | -40.08 1420.18 | -33.79 1420.40 | -31.61 1420.45 | -26.56 1420.45 | -24.25 1420.42 | -20.41 1420.61 | -16.22 1420.71 | -12.62 1420.74 | -9.28 1420.76 | -5.78 1420.65 | -1.46 1420.76 | 0.58 1420.85 | 4.97 1420.78 | 9.55 1420.86 | 13.53 1420.90 | 16.38 1420.91 | 19.54 1420.93 | 27.79 1420.96 | 30.11 1421.01 | 36.63 1421.11 | 40.25 1421.15 | 45.12 1421.21 | 52.04 1421.27 | 55.46 1421.28 | 61.17 1421.36 | 66.97 1421.46 | 69.94 1421.47 | 74.36 1421.58 | 76.36 1421.61 | 83.71 1421.68 | 90.62 1421.85 | 94.51 1421.77 | 98.64 1421.97

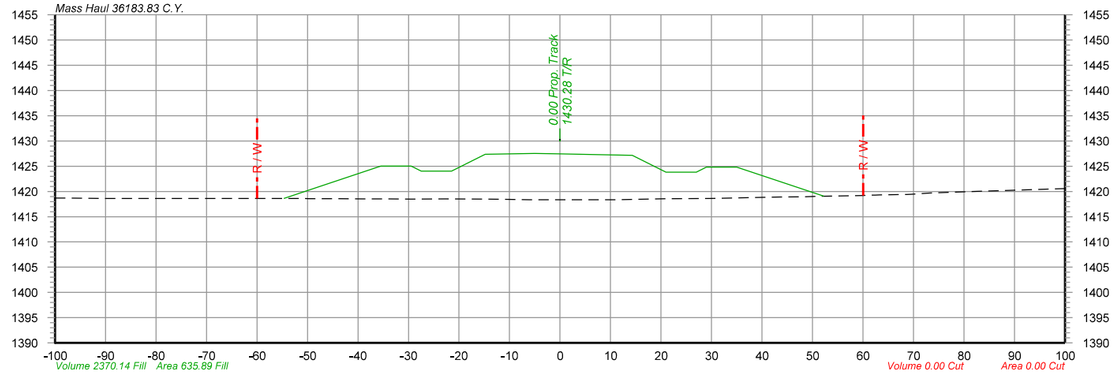
-55.53 1417.73 | -35.50 1424.41 | -29.50 1424.41 | -27.50 1423.41 | -21.50 1423.41 | -14.81 1426.76 | -5.00 1426.95 | 0.00 1426.85 | 14.31 1426.57 | 21.00 1423.22 | 27.00 1423.22 | 29.00 1424.22 | 35.00 1424.22 | 53.49 1418.06



282+00

-100.00 1418.02 | -89.45 1417.94 | -81.32 1417.85 | -52.92 1417.72 | -37.67 1417.61 | -12.70 1417.74 | -0.56 1417.71 | 22.32 1417.86 | 31.94 1417.96 | 62.77 1418.10 | 68.83 1418.13 | 70.96 1418.15 | 94.07 1418.56 | 100.00 1418.63

-54.71 1418.60 | -35.50 1425.00 | -29.50 1425.00 | -27.50 1424.00 | -21.50 1424.00 | -14.81 1427.35 | -5.00 1427.54 | -0.00 1427.44 | 14.31 1427.16 | 21.00 1423.81 | 27.00 1423.81 | 29.00 1424.81 | 35.00 1424.81 | 52.26 1419.06



284+00

-100.00 1418.69 | -97.55 1418.69 | -90.37 1418.61 | -87.28 1418.61 | -82.49 1418.61 | -76.15 1418.61 | -70.93 1418.61 | -67.98 1418.59 | -59.68 1418.60 | -56.83 1418.61 | -50.70 1418.59 | -43.88 1418.55 | -39.25 1418.54 | -36.01 1418.52 | -33.89 1418.51 | -29.51 1418.47 | -22.68 1418.50 | -14.46 1418.47 | -10.96 1418.45 | -6.07 1418.36 | 9.53 1418.36 | 21.31 1418.58 | 29.31 1418.59 | 31.82 1418.65 | 41.27 1418.86 | 43.52 1418.92 | 48.33 1418.92 | 50.58 1419.04 | 60.06 1419.17 | 62.44 1419.28 | 65.82 1419.36 | 68.88 1419.39 | 73.31 1419.69 | 82.72 1420.02 | 86.98 1420.15 | 89.61 1420.22 | 93.49 1420.36 | 97.19 1420.48 | 100.00 1420.56

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X127 of 195

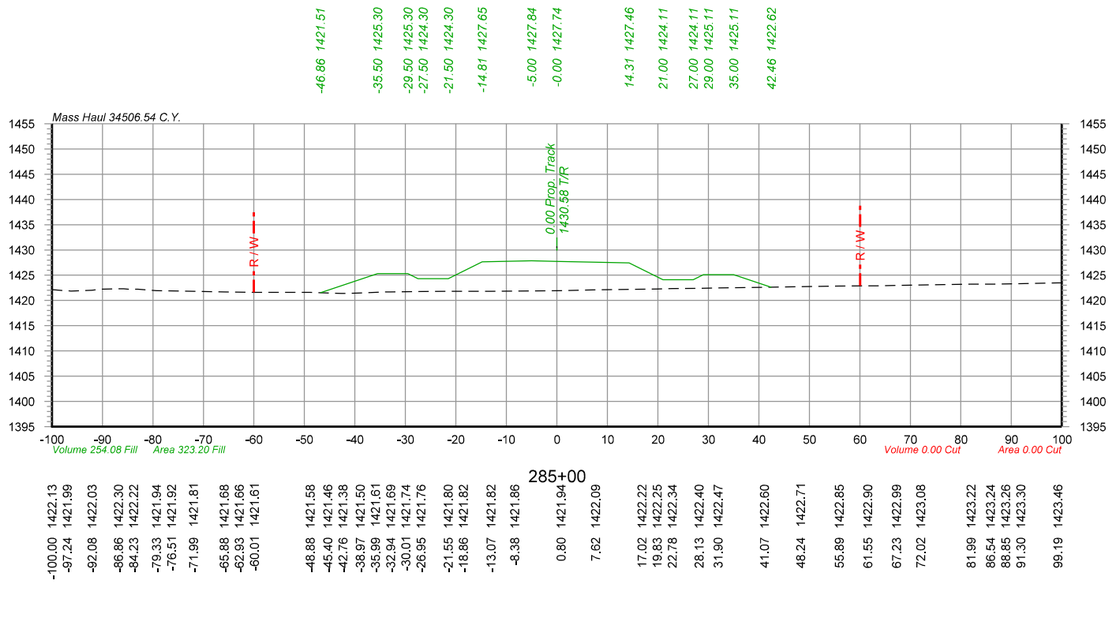
UNION PACIFIC RAILROAD

Sheet 367 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.282+00 TO STA.284+50

Color table: K:\Bentley\Workspace\V8\projects\Clients\UPRR_Track\UPRR_Track_V8\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026



olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X128 of 195

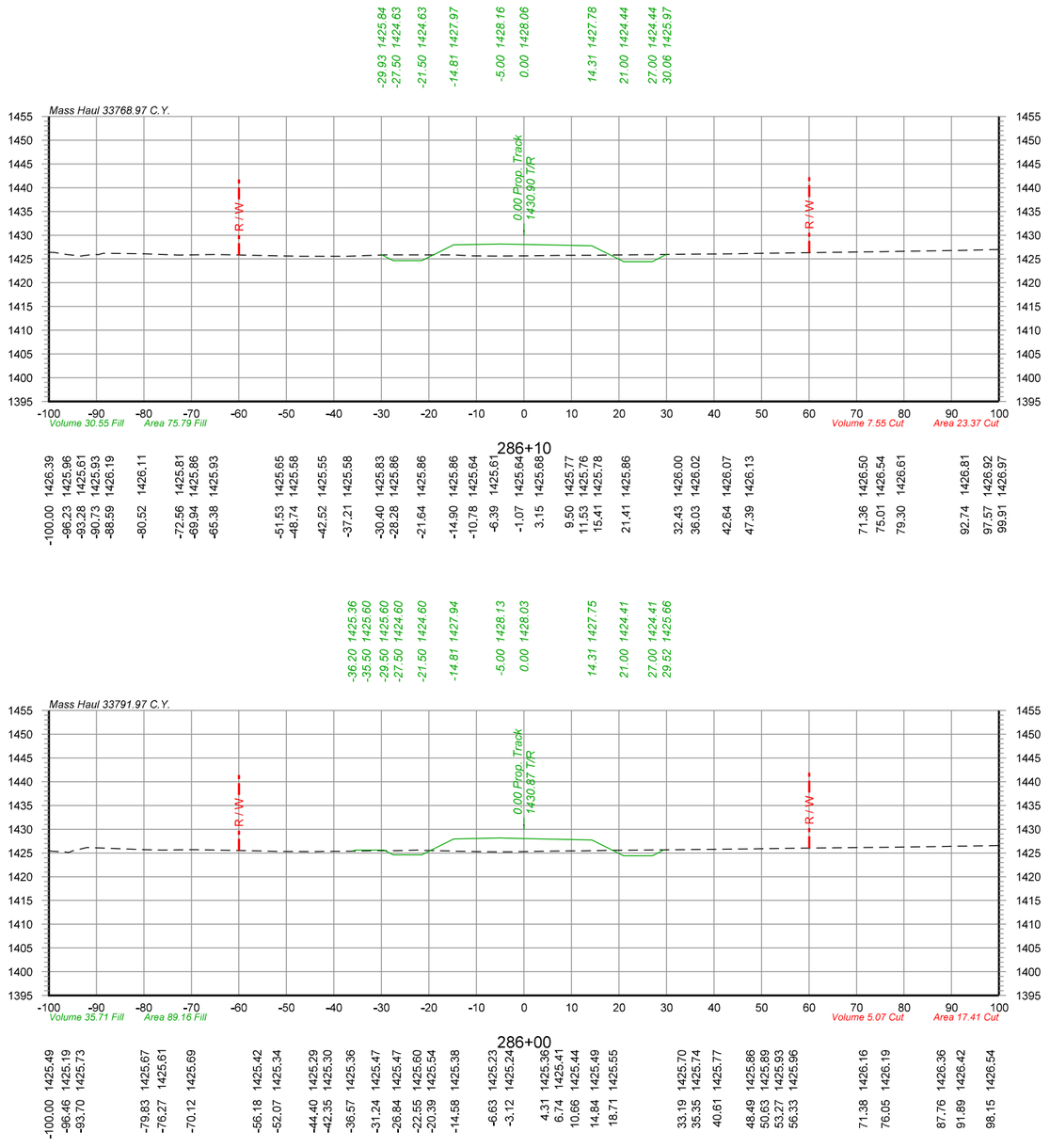
UNION PACIFIC RAILROAD

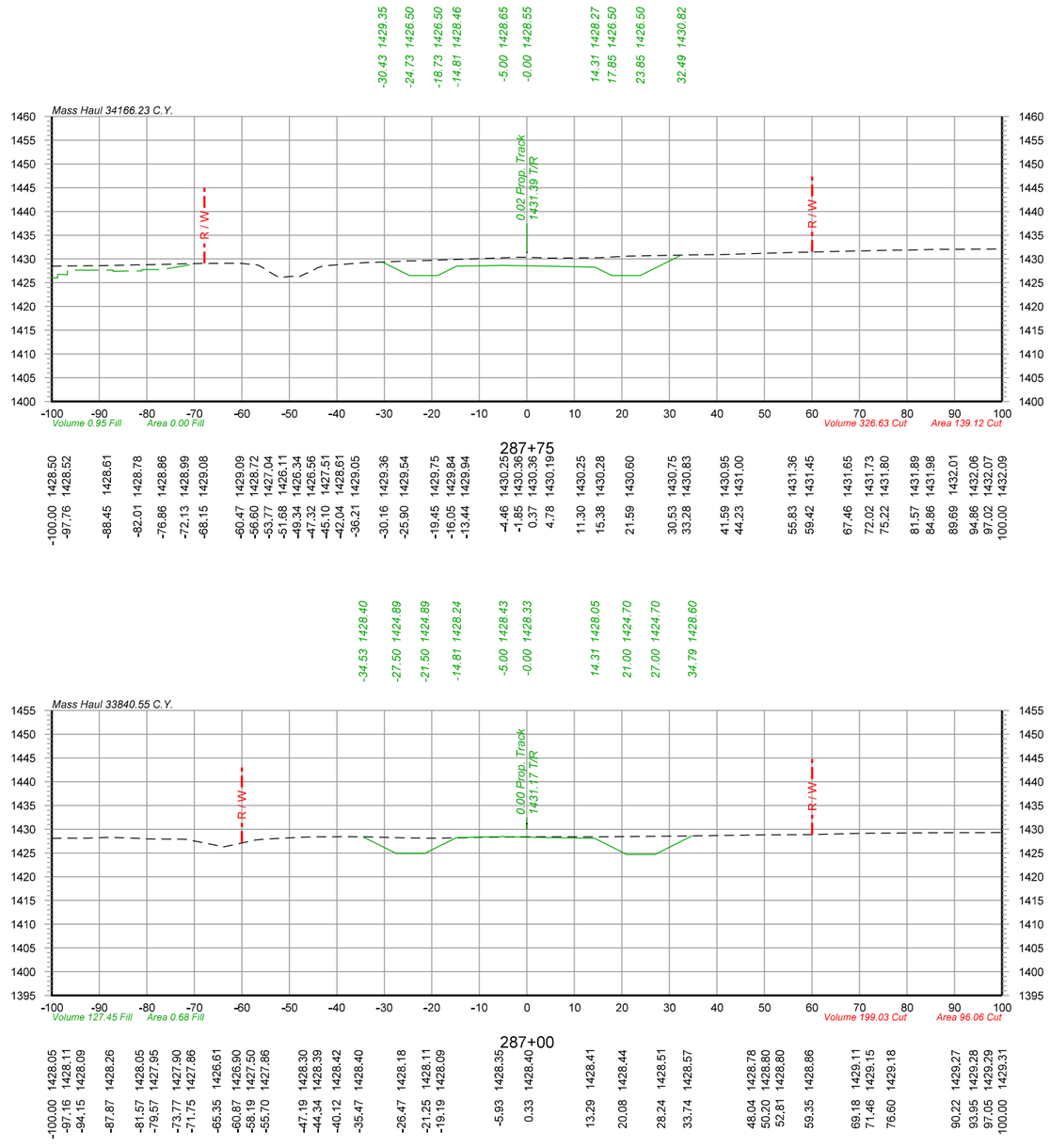
Sheet 368 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.284+80 TO STA.285+90

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026





olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	DMJ
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	X129 of 195

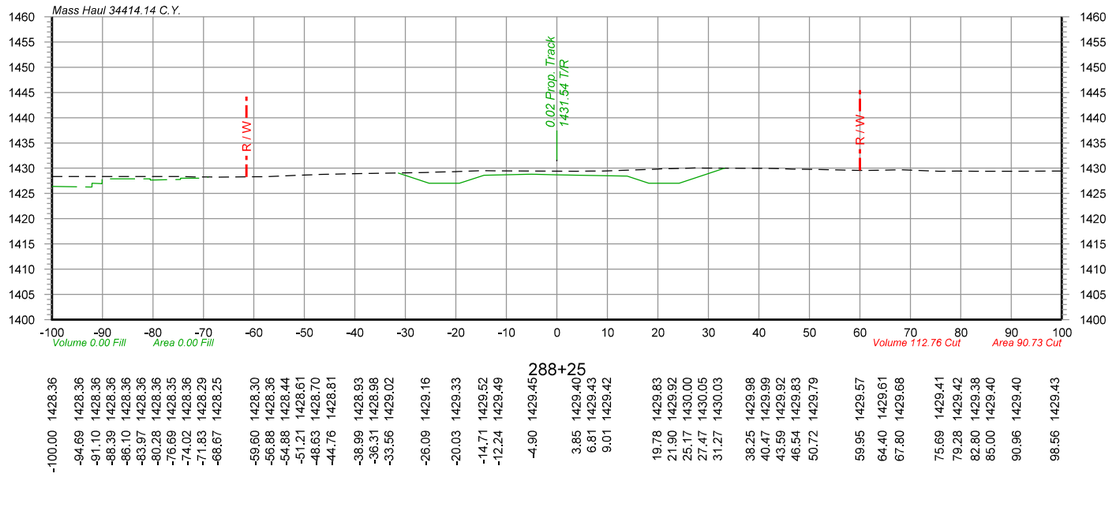
UNION PACIFIC RAILROAD

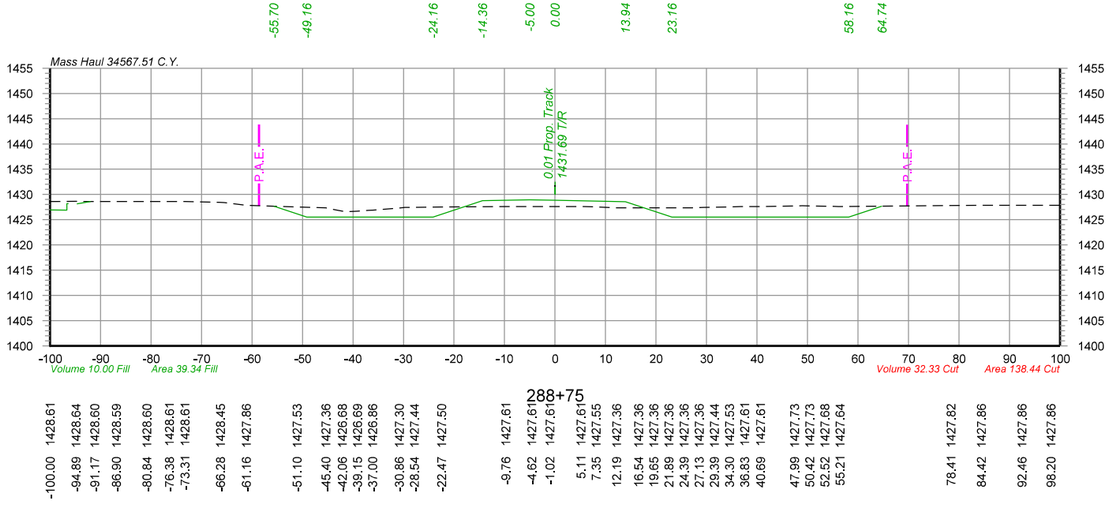
Sheet 369 of 587

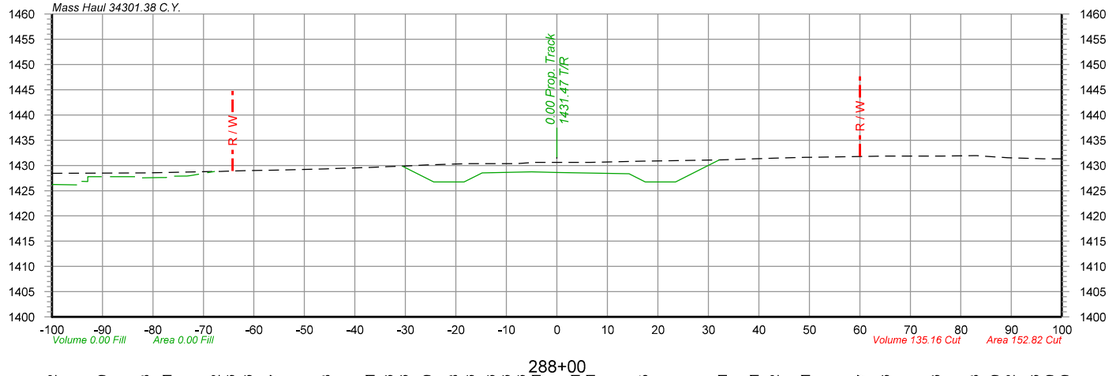
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

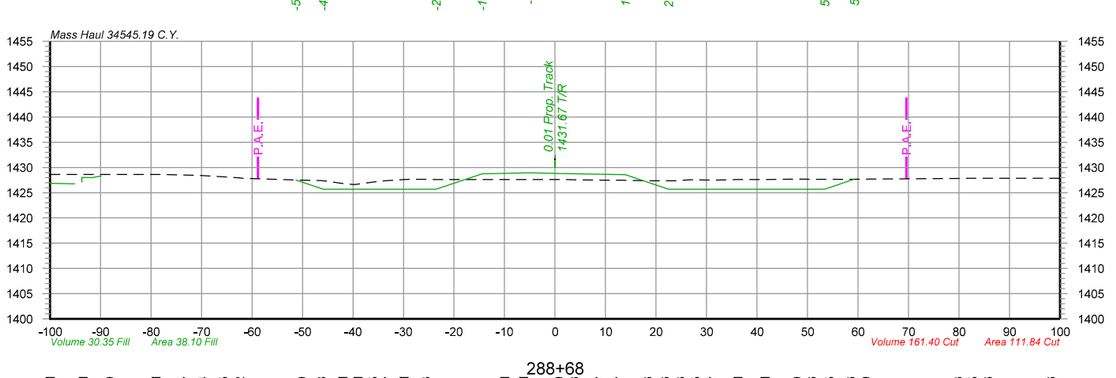
SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.286+00 TO STA.287+75

Color table: K:\Bentley\Workspace\Projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026









olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X130 of 195

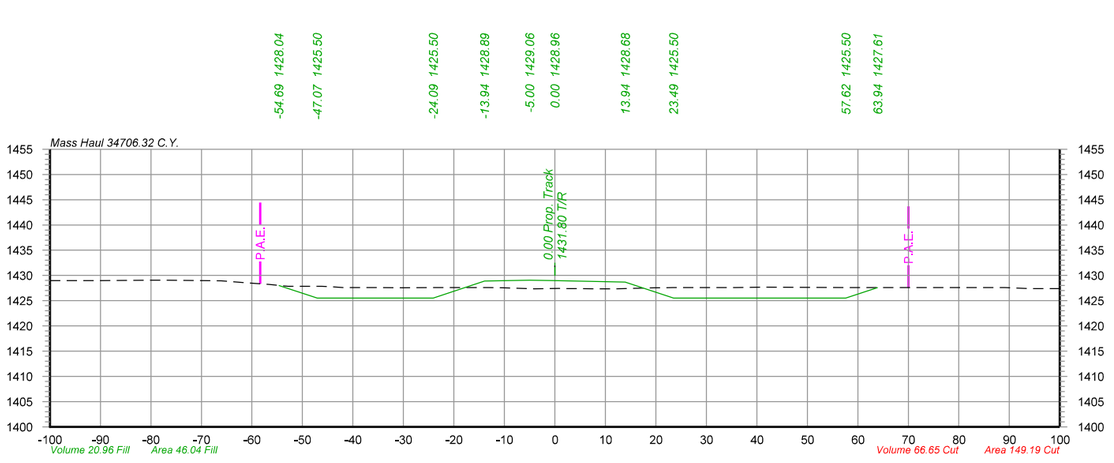
UNION PACIFIC RAILROAD

Sheet 370 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

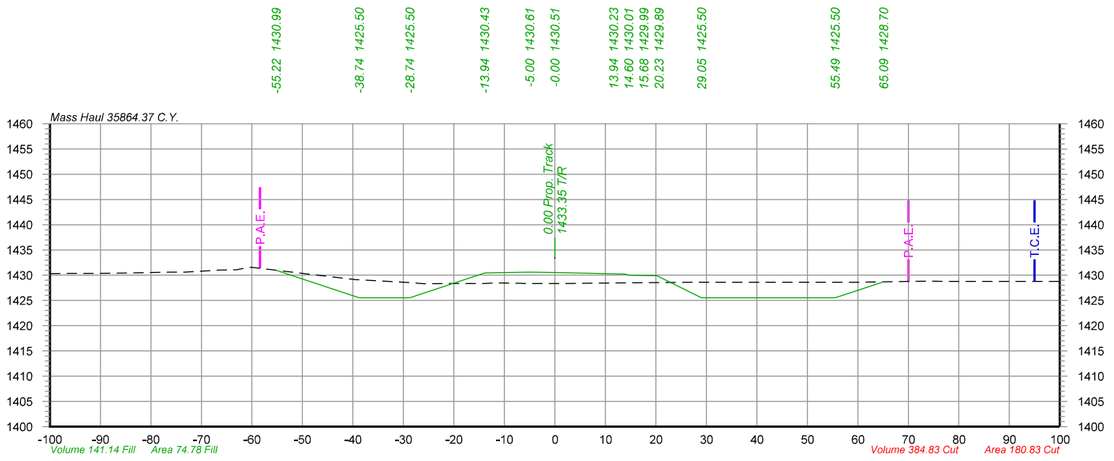
SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.288+00 TO STA.288+75

Color table: K:\Bentley\Workspace\Projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026


-54.69 1428.04
-47.07 1425.50
-24.09 1425.50
-13.94 1428.89
-5.00 1429.06
0.00 1428.96
13.94 1428.68
23.49 1425.50
57.62 1425.50
63.94 1427.61
Mass Haul 34706.32 C.Y.
P.A.E.
0.00 Prop. Track
1431.80 T/R
P.A.E.
Volume 20.96 Fill
Area 46.04 Fill
Volume 66.65 Cut
Area 149.19 Cut

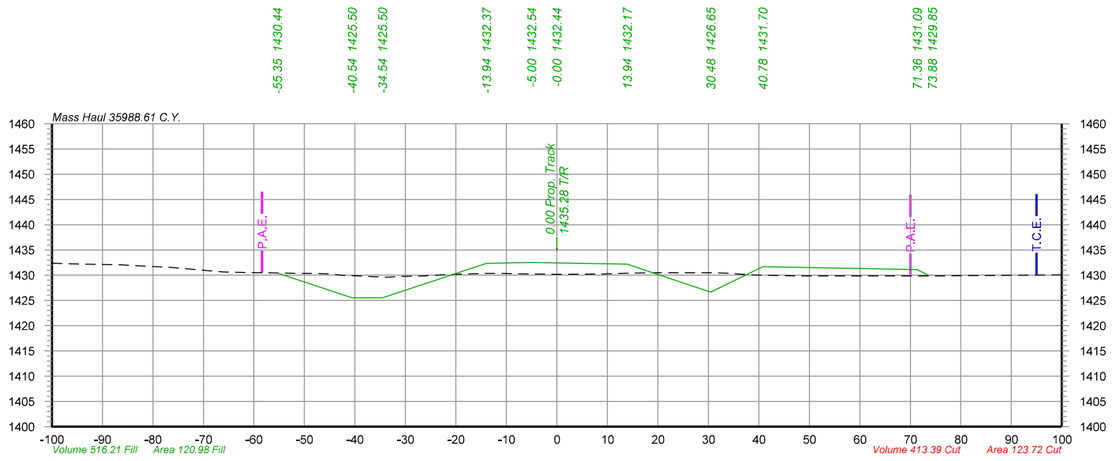
289+12

| | | |


-55.22 1430.99
-38.74 1425.50
-28.74 1425.50
-13.94 1430.43
-5.00 1430.61
-0.00 1430.51
13.94 1430.23
14.60 1430.01
15.68 1429.99
20.23 1429.89
29.05 1425.50
55.49 1425.50
65.09 1428.70
Mass Haul 35864.37 C.Y.
0.00 Prop. Track
1433.35 T/R
P.A.E.
P.A.E.
T.C.E.
Volume 141.14 Fill
Area 74.78 Fill
Volume 384.83 Cut
Area 180.83 Cut

292+00

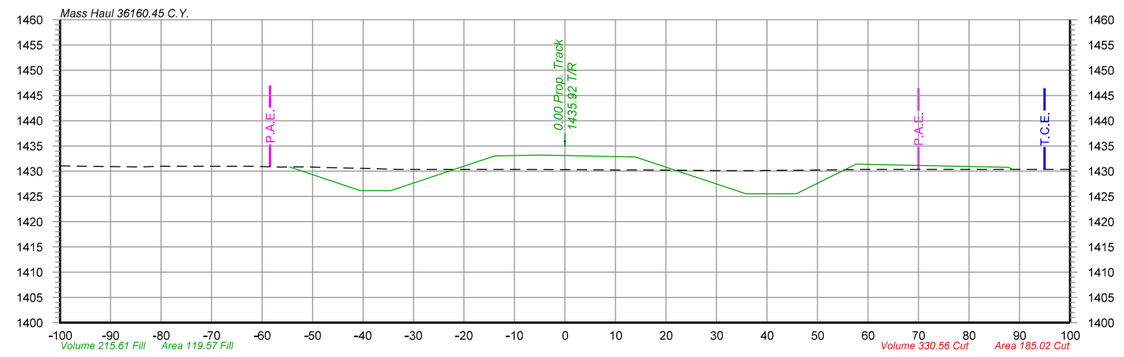
| | | |



-55.35	-40.54	-34.54	-13.94	-5.00	-0.00	13.94	30.48	40.78	71.36	73.88
1430.44	1425.50	1425.50	1432.37	1432.54	1432.44	1432.17	1426.65	1431.70	1431.09	1429.85

295+00

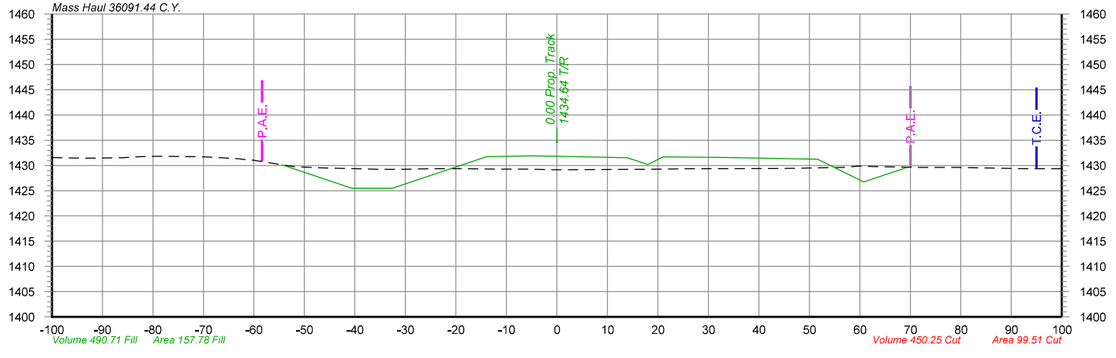
-100.00	-97.55	-89.16	-86.40	-83.78	-76.51	-67.60	-63.20	-58.15	-50.61	-47.77	-45.26	-42.44	-39.12	-37.01	-33.25	-26.12	-21.82	-18.83	-15.89	-10.56	-0.56	8.42	12.62	16.42	18.77	25.52	31.00	33.64	38.46	47.37	50.05	70.97	77.42	100.00
1432.36	1432.28	1432.11	1432.06	1431.90	1431.56	1430.77	1430.55	1430.48	1430.36	1430.36	1430.26	1429.97	1429.86	1429.74	1429.61	1429.86	1430.11	1430.24	1430.31	1430.34	1430.18	1430.24	1430.36	1430.46	1430.49	1430.49	1430.46	1430.40	1430.07	1429.86	1429.86	1429.86	1429.86	1430.06



-54.58	-40.51	-34.51	-13.94	-5.00	0.00	13.94	35.88	45.78	57.64	87.81	88.67
1430.84	1426.15	1426.15	1433.01	1433.19	1433.09	1432.81	1425.50	1425.50	1431.39	1430.78	1430.36

296+00

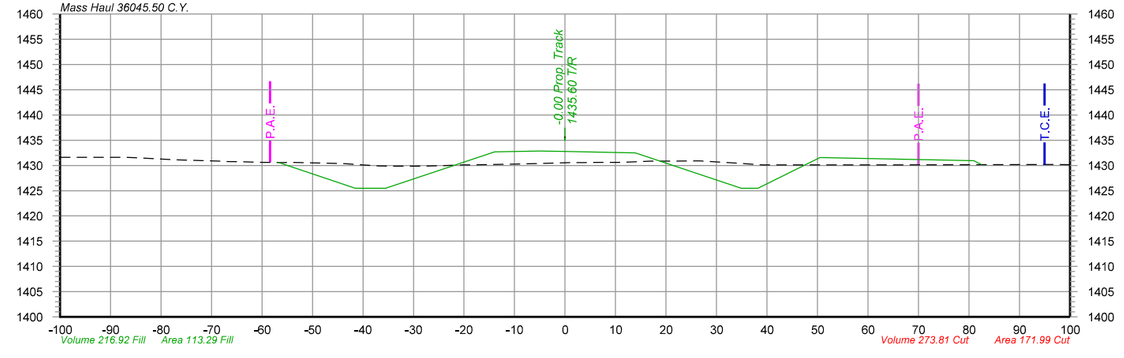
-100.00	-97.85	-95.63	-91.45	-84.87	-80.42	-61.78	-56.47	-54.18	-51.80	-45.96	-38.46	-33.24	-22.72	-12.76	-9.70	3.64	11.73	13.77	28.35	31.11	35.74	41.39	45.75	59.06	62.42	64.59	71.52	79.75	82.57	86.23	100.00
1431.07	1431.02	1431.00	1430.95	1430.86	1430.96	1430.99	1430.83	1430.85	1430.86	1430.70	1430.51	1430.36	1430.36	1430.36	1430.36	1430.31	1430.25	1430.28	1430.13	1430.11	1430.10	1430.17	1430.19	1430.36	1430.36	1430.36	1430.36	1430.36	1430.36	1430.36	1430.36



-54.53	-40.61	-32.61	-13.94	-5.00	0.00	13.94	17.99	21.04	31.23	51.62	60.76	69.50
1430.14	1425.50	1425.50	1431.72	1431.90	1431.80	1431.52	1430.17	1431.68	1431.60	1431.22	1426.75	1429.66

294+00

-100.00	-96.43	-92.33	-86.02	-81.82	-78.27	-71.62	-62.88	-60.31	-52.13	-46.71	-39.91	-35.12	-30.98	-28.69	-23.96	-18.59	-11.74	-6.47	-0.49	14.58	17.76	26.72	33.43	43.53	47.96	56.61	58.69	60.83	62.85	72.59	75.70	79.61	81.63	86.12	92.42	95.48	100.00
1431.57	1431.47	1431.44	1431.52	1431.78	1431.80	1431.75	1431.33	1431.07	1429.75	1429.54	1429.36	1429.23	1429.24	1429.29	1429.36	1429.36	1429.27	1429.26	1429.17	1429.22	1429.24	1429.36	1429.36	1429.39	1429.45	1429.61	1429.79	1429.86	1429.79	1429.61	1429.60	1429.60	1429.58	1429.50	1429.36	1429.36	1429.36



-56.78	-41.51	-35.51	-13.94	-5.00	0.00	13.94	34.91	38.20	50.51	80.95	82.55
1430.59	1425.50	1425.50	1432.69	1432.86	1432.76	1432.49	1425.50	1425.50	1431.55	1430.93	1430.14

295+50

-100.00	-86.89	-84.06	-77.76	-68.51	-64.09	-59.73	-56.08	-44.99	-40.11	-36.76	-31.33	-28.31	-23.65	-20.04	-9.67	-6.25	1.05	3.86	6.54	11.06	15.17	20.95	26.33	34.34	39.13	65.63	97.06	100.00
1431.61	1431.61	1431.50	1431.14	1430.86	1430.74	1430.61	1430.59	1430.38	1430.11	1429.91	1429.86	1429.86	1429.99	1430.11	1430.29	1430.35	1430.56	1430.58	1430.61	1430.61	1430.76	1430.86	1430.90	1430.44	1430.11	1430.11	1430.17	1430.17

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X133 of 195

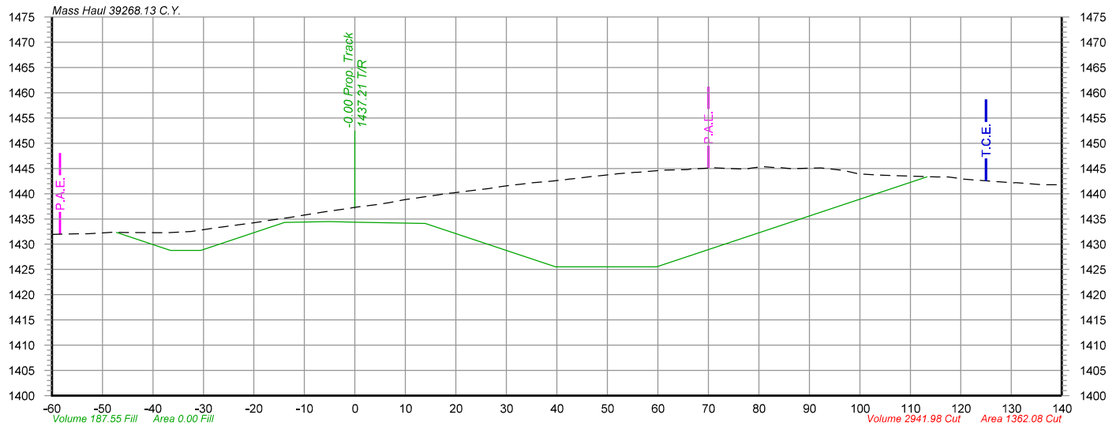
UNION PACIFIC RAILROAD

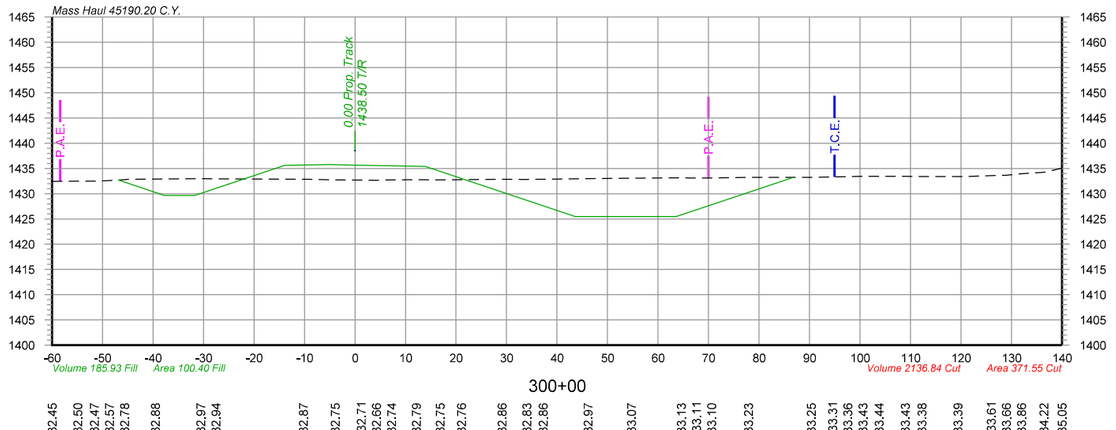
Sheet 373 of 587

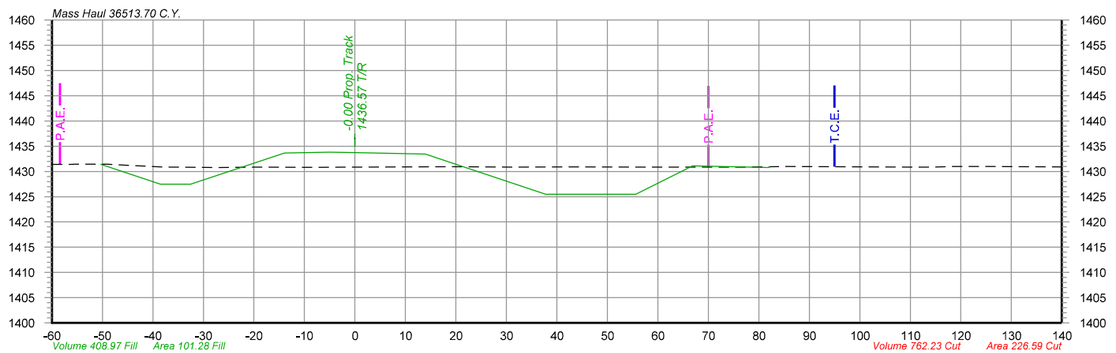
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

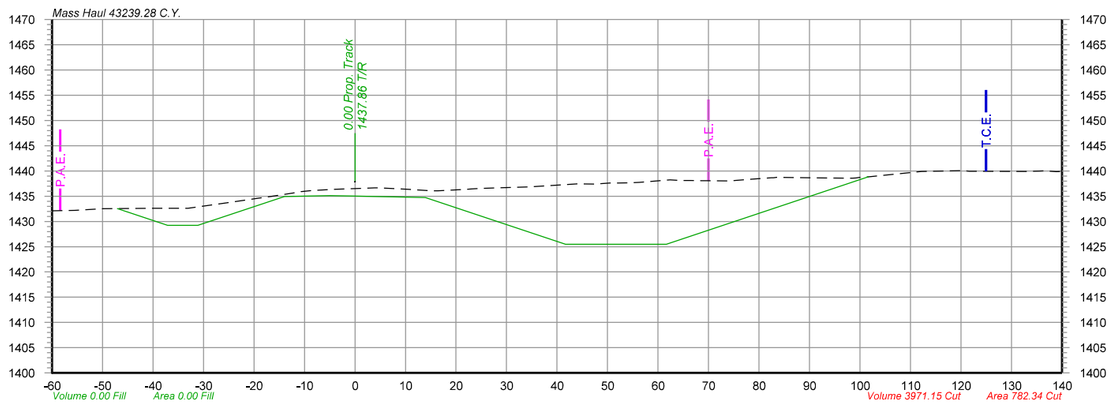
SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.294+00 TO STA.296+00

Color table: K:\Bentley\Workspace\V8\projects\Clients\UPRR_Track\UPRR_Track_V8\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC
Default
3/9/2026









Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RL_TK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05.Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

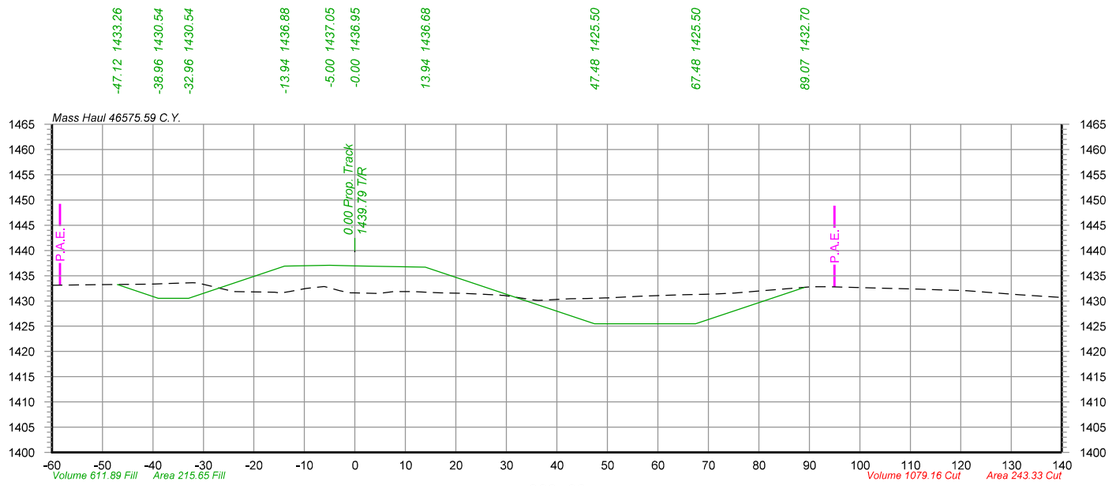
UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X134 of 195

UNION PACIFIC RAILROAD

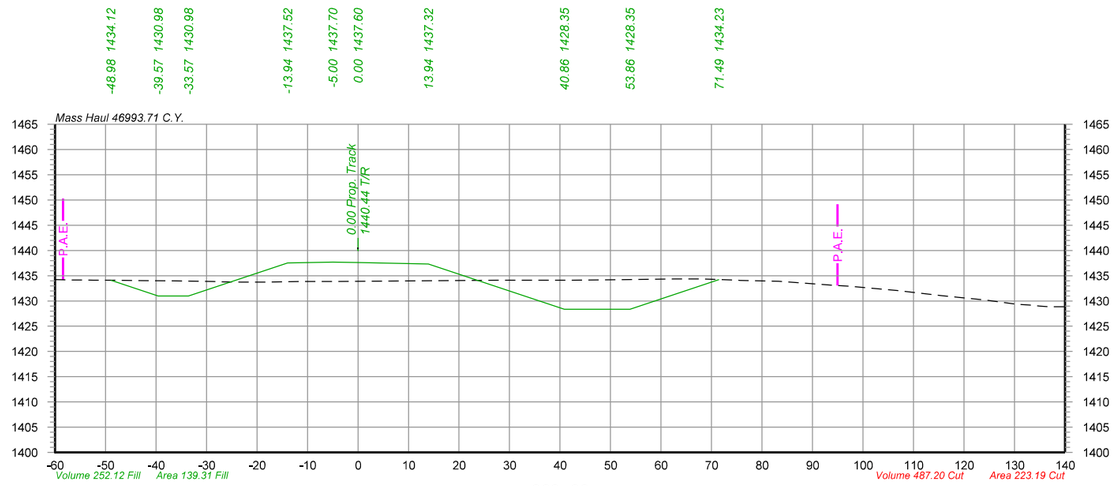
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.297+00 TO STA.300+00



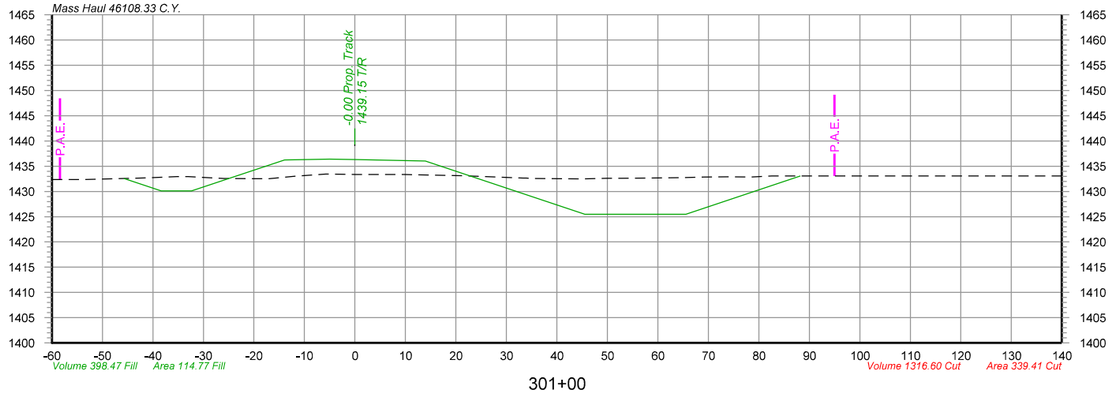
302+00

-60.00	-50.55	-41.73	-39.56	-37.53	-32.13	-23.99	-15.90	-12.98	-9.63	-6.09	-3.73	-0.91	4.76	7.65	10.15	14.88	16.89	20.84	24.81	28.32	35.51	42.68	45.94	49.57	56.55	64.93	69.13	71.73	75.18	79.14	90.44	92.48	101.59	104.52	111.21	115.98	118.98	121.24	131.54	140.00
1433.11	1433.22	1433.33	1433.36	1433.45	1433.61	1431.86	1431.74	1431.86	1432.48	1432.86	1432.23	1431.63	1431.49	1431.84	1431.86	1431.67	1431.61	1431.52	1431.37	1431.17	1430.20	1430.43	1430.47	1430.59	1430.94	1431.22	1431.33	1431.41	1431.56	1431.88	1432.81	1432.82	1432.61	1432.51	1432.36	1432.21	1432.11	1432.01	1431.22	1430.68



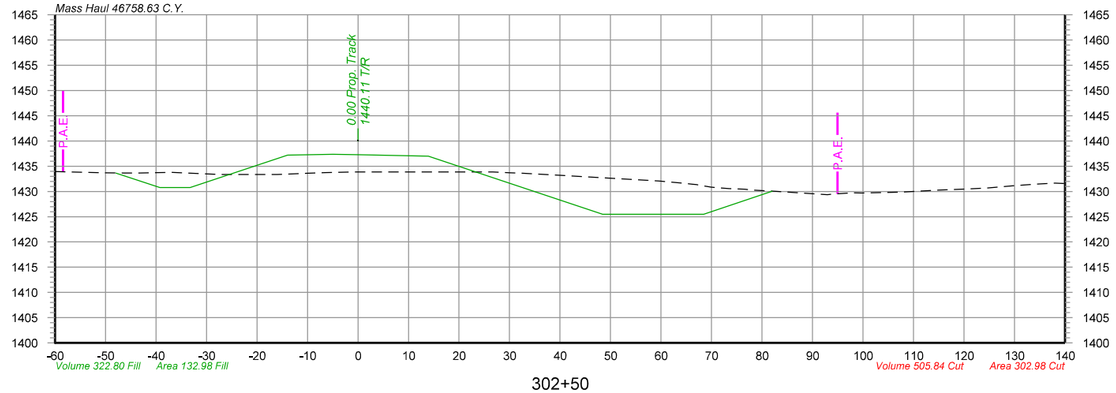
303+00

-60.00	-56.78	-54.06	-48.34	-42.74	-36.81	-28.71	-26.52	-23.19	-18.33	-11.17	-8.11	-4.40	27.94	30.89	38.15	42.49	53.62	62.69	64.96	68.04	71.84	75.29	83.30	92.37	96.90	100.29	106.81	115.79	118.03	124.22	130.36	133.02	136.81	140.00
1434.24	1434.14	1434.14	1434.12	1434.04	1433.98	1433.86	1433.76	1433.72	1433.72	1433.86	1433.86	1433.86	1434.09	1434.11	1434.11	1434.11	1434.25	1434.36	1434.36	1434.36	1434.22	1434.09	1433.89	1433.23	1432.95	1432.66	1432.06	1431.04	1430.81	1430.17	1429.36	1429.17	1428.86	1428.86



301+00

-60.00	-57.05	-53.63	-45.85	-43.84	-41.24	-35.21	-33.02	-27.64	-24.97	-20.31	-16.96	-11.34	-5.78	0.23	9.80	21.59	25.88	33.29	35.57	44.99	49.99	52.75	57.79	64.78	69.32	73.96	78.47	82.57	93.48	96.14	131.36	134.38	140.00
1432.35	1432.35	1432.35	1432.55	1432.59	1432.68	1432.92	1432.94	1432.66	1432.57	1432.50	1432.53	1433.06	1433.44	1433.36	1433.36	1433.11	1432.96	1432.65	1432.58	1432.48	1432.60	1432.60	1432.63	1432.72	1432.86	1432.90	1432.87	1433.05	1433.07	1433.08	1433.08	1433.06	1433.08



302+50

-60.00	-57.00	-50.18	-46.40	-43.29	-39.42	-36.78	-27.33	-25.29	-20.29	-17.83	-13.74	-9.87	-6.36	-0.88	9.03	11.96	19.77	26.71	30.20	32.58	41.67	58.20	64.66	67.03	69.41	71.82	74.52	76.82	82.75	92.98	97.96	107.28	115.06	120.51	124.73	129.56	134.13	138.01
1433.94	1433.88	1433.67	1433.66	1433.66	1433.73	1433.77	1433.38	1433.36	1433.36	1433.36	1433.43	1433.61	1433.73	1433.86	1433.86	1433.86	1433.86	1433.86	1433.70	1433.61	1433.11	1432.15	1431.59	1431.36	1430.92	1430.68	1430.52	1430.43	1430.01	1429.36	1429.73	1429.86	1430.27	1430.49	1430.69	1431.09	1431.44	1431.64

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X135 of 195

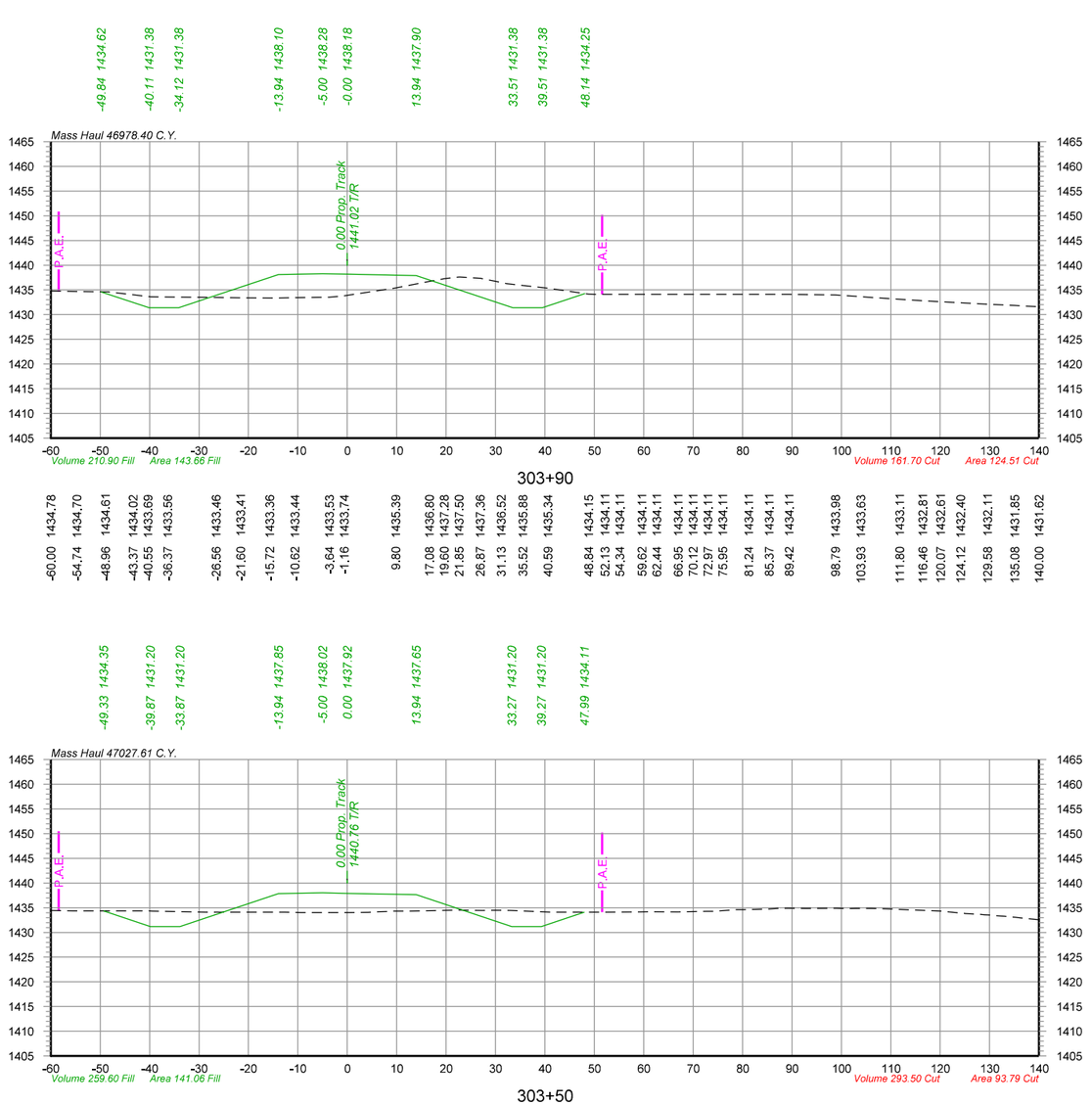
UNION PACIFIC RAILROAD

Sheet 375 of 587

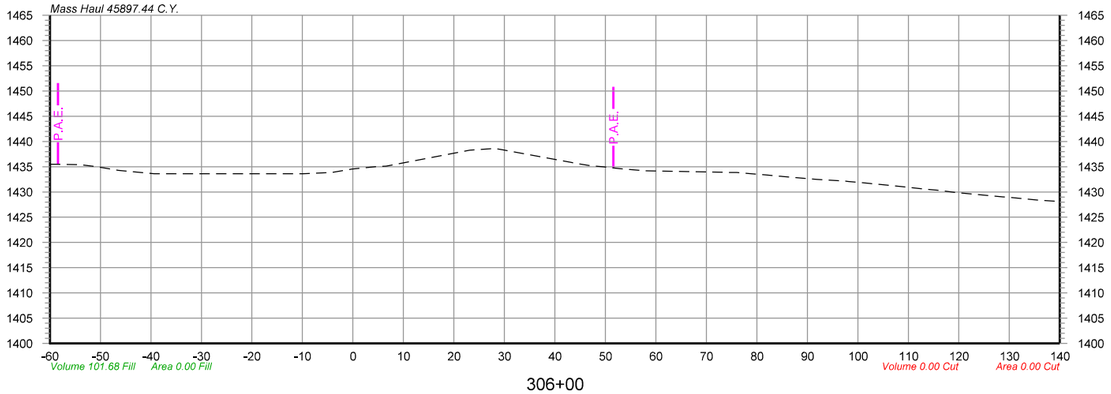
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 CROSS SECTIONS STA.301+00 TO STA.303+00

Color table: K:\Bentley\Workspace\Projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-
Default
3/9/2026


-49.84 1434.62
-40.11 1431.38
-34.12 1431.38
-13.94 1438.10
-5.00 1438.28
-0.00 1438.18
13.94 1437.90
33.51 1431.38
39.51 1431.38
48.14 1434.25
Mass Haul 46978.40 C.Y.
P.A.E.
0.00 Prop. Track
1441.02 T/R
P.A.E.
Volume 210.90 Fill
Area 143.66 Fill
Volume 161.70 Cut
Area 124.51 Cut
303+90

| | | |


Mass Haul 45897.44 C.Y.
P.A.E.
P.A.E.
Volume 101.68 Fill
Area 0.00 Fill
Volume 0.00 Cut
Area 0.00 Cut

306+00

| | | |

End Area Volume Report

Alignment Name: Track 101

Baseline Station	Station Quantities				Mass Ordinate
	Cut		Fill		
	Area	Volume	Area	Volume	
47.00	0.00	0.00	0.00	0.00	0.00
11.53	0.00	0.00	0.00	0.00	0.00
9.53	7.96	0.29	0.00	0.00	0.29
-3.00	26.80	8.07	0.00	0.00	8.36
79.03	54.30	28.49	0.00	0.00	36.85
-2.00	49.36	155.56	0.00	0.00	192.41
-1.00	52.76	189.10	0.00	0.00	381.51
0+00.00	41.73	174.97	0.00	0.00	556.48
0+39.98	32.35	54.84	0.00	0.00	611.32
1+00.00	32.25	71.80	0.00	0.00	683.12
1+89.81	27.79	99.85	0.00	0.00	782.97
2+00.00	26.88	10.31	0.00	0.00	793.29
3+00.00	18.71	84.43	0.10	0.18	877.54
4+00.00	8.87	51.07	4.36	8.25	920.36
5+00.00	6.18	27.86	6.67	20.42	927.80
6+00.00	1.36	13.96	19.13	47.76	893.99
7+00.00	2.78	7.67	15.69	64.48	837.19
7+74.65	1.21	5.52	69.55	117.84	724.87
8+00.00	1.29	1.17	37.28	50.16	675.89
8+80.00	2.32	5.35	39.83	114.23	567.01
8+86.21	0.52	0.33	42.18	9.44	557.90
9+00.00	0.00	0.13	46.45	22.63	535.41
9+10.00	0.00	0.00	53.55	18.52	516.89
10+00.00	0.00	0.00	74.16	212.84	304.05
10+71.83					0.00
11+00.00	0.00	0.00	154.42	423.29	-119.24
12+00.00	0.00	0.00	478.66	1172.36	-1291.61
12+40.00	0.00	0.00	376.08	633.14	-1924.74
12+50.00	0.00	0.00	361.42	136.57	-2061.32
12+60.00	0.00	0.00	290.93	120.80	-2182.12
13+00.00	0.00	0.00	113.43	299.52	-2481.65
14+00.00	0.00	0.00	57.08	315.76	-2797.40
15+00.00	0.00	0.00	70.60	236.44	-3033.85
16+00.00	0.00	0.00	84.88	287.94	-3321.78
17+00.00	0.00	0.00	83.22	311.31	-3633.09
17+38.27	0.00	0.00	93.40	125.17	-3758.26
17+82.27	0.00	0.00	96.68	154.88	-3913.14
18+00.00	0.00	0.00	100.42	64.71	-3977.85
19+00.00	0.00	0.00	102.90	376.53	-4354.37
20+00.00	0.00	0.00	118.83	410.62	-4764.99
20+39.35	136.33	99.35	204.97	235.95	-4901.60
21+00.00	170.48	344.60	222.62	480.26	-5037.26
21+52.14	218.39	375.50	220.73	428.10	-5089.86
22+00.00	233.31	400.31	224.54	394.61	-5084.16
22+33.04	250.33	295.91	233.02	279.96	-5068.20
23+00.00	260.09	632.92	228.74	572.58	-5007.86
23+05.00	259.85	48.14	227.82	42.27	-5002.00
23+54.09	210.51	427.60	236.44	422.06	-4996.45
24+00.00	172.14	325.31	229.54	396.17	-5067.31
24+30.00	153.07	180.67	223.73	251.82	-5138.46
24+60.00	127.64	155.95	199.91	235.36	-5217.86
24+70.00	363.26	90.91	202.52	74.53	-5201.48
25+00.00	332.81	386.71	194.22	220.41	-5035.19
25+50.00	327.80	611.67	186.83	352.82	-4776.33
26+00.00	299.37	580.71	195.08	353.62	-4549.24
26+25.00	282.98	269.61	188.77	177.71	-4457.34
26+25.19	282.86	2.00	188.87	1.33	-4456.67

End Area Volume Report

Alignment Name: Track 101

Baseline Station	Station Quantities				Mass Ordinate
	Cut		Fill		
	Area	Volume	Area	Volume	
26+50.00	27.50	142.59	191.20	174.62	-4488.70
26+60.00	23.79	9.50	138.01	60.96	-4540.17
26+85.38	15.94	18.67	120.44	121.47	-4642.97
26+87.39	0.00	0.59	30.23	5.60	-4647.98
27+00.00	0.00	0.00	25.41	12.99	-4660.97
28+00.00	0.00	0.00	18.20	80.75	-4741.72
28+10.64	0.00	0.00	19.67	7.46	-4749.18
28+12.64	0.00	0.00	43.70	2.35	-4751.53
28+40.00	43.18	21.88	53.30	49.15	-4778.80
28+70.00	302.64	192.12	41.24	52.53	-4639.20
29+00.00	325.72	349.09	44.36	47.56	-4337.67
30+00.00	331.27	1216.64	39.09	154.52	-3275.56
31+00.00	344.16	1250.79	32.46	132.49	-2157.25
32+00.00	362.86	1309.31	16.99	91.58	-939.53
32+74.63					0.00
33+00.00	358.05	1335.01	24.12	76.13	319.36
34+00.00	338.97	1290.77	34.23	108.05	1502.08
35+00.00	328.30	1235.68	37.48	132.79	2604.96
36+00.00	332.15	1223.05	39.53	142.62	3685.39
37+00.00	313.01	1194.74	38.08	143.73	4736.40
38+00.00	302.87	1140.52	50.41	163.87	5713.04
39+00.00	284.80	1088.27	54.28	193.86	6607.45
40+00.00	282.61	1050.75	55.71	203.68	7454.52
40+80.00	284.25	839.80	55.96	165.43	8128.88
41+00.00	29.31	116.13	54.98	41.09	8203.92
41+50.00	30.80	55.66	30.03	78.72	8180.86
41+54.55	0.00	2.60	23.58	4.52	8178.94
41+67.08	0.00	0.00	20.44	10.21	8168.73
41+69.08	0.00	0.00	11.46	1.18	8167.55
41+85.08	0.00	0.00	7.21	5.53	8162.02
42+00.00	0.00	0.00	5.59	3.54	8158.48
42+29.08	0.33	0.18	2.23	4.21	8154.45
43+00.00	0.00	0.43	4.44	8.75	8146.13
43+48.99	0.14	0.13	1.41	5.30	8140.96
43+50.99	293.56	10.88	4.43	0.22	8151.63
44+00.00	290.51	530.10	15.79	18.36	8663.36
44+20.00	288.61	214.49	32.90	18.04	8859.82
44+40.00	291.06	214.69	25.17	21.51	9053.00
44+50.00	293.27	108.21	25.89	9.46	9151.75
45+00.00	322.36	570.03	73.75	92.26	9629.52
46+00.00	252.55	1064.64	98.29	318.59	10375.57
47+00.00	243.32	918.28	118.66	401.75	10892.10
47+92.50	233.74	817.20	136.77	437.55	11271.76
48+00.00	232.27	64.70	138.93	38.28	11298.18
48+36.50	227.71	310.93	145.46	192.24	11416.87
49+00.00	221.67	528.42	160.47	359.74	11585.55
49+95.98	211.02	769.06	180.63	606.28	11748.33
50+00.00	210.66	31.39	182.23	27.02	11752.71
50+39.98	208.10	310.04	193.07	277.85	11784.89
51+00.00	204.12	458.18	206.15	443.73	11799.34
52+00.00	198.92	746.38	227.10	802.32	11743.40
53+00.00	216.38	769.09	218.08	824.40	11688.09
54+00.00	213.95	796.91	237.06	842.84	11642.15
55+00.00	205.61	776.96	252.59	906.75	11512.37
56+00.00	203.16	756.98	271.96	971.38	11297.97
57+00.00	201.41	749.21	289.73	1040.15	11007.03
58+00.00	200.98	745.17	300.63	1093.24	10658.95

End Area Volume Report

Alignment Name: Track 101

Baseline Station	Station Quantities				Mass Ordinate
	Cut		Fill		
	Area	Volume	Area	Volume	
59+00.00	197.10	737.18	314.90	1139.86	10256.27
60+00.00	199.40	734.26	330.20	1194.64	9795.90
61+00.00	199.96	739.56	339.15	1239.54	9295.92
61+32.86	200.26	243.58	346.70	417.41	9122.09
61+76.86	199.64	325.85	343.27	562.20	8885.74
62+00.00	198.05	170.38	344.90	294.84	8761.28
62+20.00	203.01	148.54	338.50	253.11	8656.71
62+30.00	204.64	75.49	339.29	125.52	8606.68
62+50.86	201.39	156.86	395.32	283.80	8479.74
62+86.86	202.10	268.99	434.25	553.05	8195.69
63+00.00	202.76	98.51	436.48	211.85	8082.34
63+26.70	201.80	200.05	437.06	431.94	7850.44
64+00.00	202.28	548.48	481.66	1247.04	7151.88
64+50.00	201.16	373.55	511.85	919.91	6605.52
65+00.00	205.82	376.83	538.16	972.23	6010.13
65+90.16	209.63	693.65	564.71	1841.42	4862.36
65+92.38	214.73	17.43	550.93	45.83	4833.96
66+00.00	246.47	65.08	498.74	148.12	4750.92
67+00.00	279.83	974.62	442.78	1743.55	3981.98
68+00.00	270.15	1018.47	445.60	1645.15	3355.30
69+00.00	263.19	987.67	451.37	1661.06	2681.91
70+00.00	255.45	960.45	449.85	1668.93	1973.43
71+00.00	246.73	929.96	452.99	1671.93	1231.46
72+00.00	233.17	888.70	462.28	1694.95	425.21
72+48.84					0.00
73+00.00	222.11	843.11	463.10	1713.65	-445.34
73+92.38	212.04	742.72	474.84	1604.57	-1307.19
74+00.00	214.52	60.19	470.50	133.40	-1380.40
75+00.00	325.58	1000.18	250.26	1334.76	-1714.98
76+00.00	294.54	1148.36	246.95	920.76	-1487.38
77+00.00	264.72	1035.67	249.71	919.73	-1371.44
77+92.38	243.90	870.12	241.01	839.49	-1340.81
78+00.00	243.30	68.75	243.54	68.37	-1340.43
79+00.00	232.98	882.00	252.68	918.92	-1377.36
80+00.00	229.85	857.09	245.04	921.70	-1441.97
81+00.00	226.83	845.70	237.41	893.43	-1489.69
82+00.00	218.07	823.90	244.19	891.86	-1557.66
83+00.00	213.55	799.31	240.21	897.04	-1655.39
84+00.00	231.23	823.68	221.56	855.13	-1686.85
85+00.00	239.98	872.62	191.49	764.91	-1579.14
86+00.00	250.58	908.44	185.11	697.41	-1368.10
87+00.00	242.23	912.60	180.43	676.92	-1132.42
88+00.00	209.34	836.24	211.87	726.48	-1022.66
89+00.00	212.63	781.44	194.23	752.04	-993.27
90+00.00	218.99	799.30	174.62	683.06	-877.03
91+00.00	214.85	803.41	167.74	634.00	-707.62
92+00.00	207.11	781.42	172.78	630.59	-556.79
93+00.00	207.76	768.28	164.67	624.90	-413.41
94+00.00	205.68	765.63	155.47	592.85	-240.63
95+00.00	208.78	767.52	142.59	551.97	-25.08
95+09.45					0.00
96+00.00	210.23	775.95	133.06	510.46	240.42
97+00.00	214.51	786.56	116.82	462.72	564.25
97+77.07	211.67	608.27	114.95	330.79	841.73
98+00.00	213.20	180.39	110.39	95.67	926.45
98+75.00	212.00	590.55	95.29	285.65	1231.35
99+00.00	211.46	196.04	94.18	87.72	1339.67

End Area Volume Report

Alignment Name: Track 101

Baseline Station	Station Quantities				Mass Ordinate
	Cut		Fill		
	Area	Volume	Area	Volume	
99+25.00	212.64	196.34	85.43	83.15	1452.86
100+00.00	213.71	592.16	73.18	220.28	1824.73
100+40.53	211.65	319.29	67.92	105.91	2038.11
100+80.38	211.56	312.24	63.31	96.82	2253.52
101+00.00	213.55	154.47	59.57	44.65	2363.34
101+16.38	212.78	129.31	56.14	35.10	2457.55
101+92.38	214.98	602.07	49.68	148.94	2910.68
102+00.00	213.22	60.42	51.02	14.21	2956.89
103+00.00	235.08	830.19	13.74	119.93	3667.16
104+00.00	224.35	850.80	13.95	51.28	4466.67
105+00.00	179.32	747.53	28.42	78.46	5135.74
106+00.00	166.05	639.57	24.60	98.19	5677.12
107+00.00	143.17	572.63	25.68	93.13	6156.62
108+00.00	115.96	479.87	34.84	112.07	6524.42
108+92.38	107.08	381.57	37.54	123.81	6782.18
109+00.00	105.33	29.97	38.92	10.79	6801.36
110+00.00	116.71	411.20	40.44	146.97	7065.59
111+00.00	104.23	409.16	44.68	157.62	7317.12
111+50.93	118.83	210.36	40.67	80.49	7446.99
111+94.93	119.45	194.15	45.85	70.50	7570.64
112+00.00	121.15	22.61	47.52	8.77	7584.48
113+00.00	119.12	444.94	51.38	183.14	7846.28
114+00.00	131.26	463.67	35.28	160.48	8149.48
115+00.00	119.40	464.18	30.85	122.46	8491.20
116+00.00	110.79	426.28	31.88	116.17	8801.30
117+00.00	106.33	402.09	36.14	125.97	9077.42
117+49.00	107.44	193.99	41.51	70.47	9200.95
117+93.00	116.35	182.34	44.94	70.44	9312.85
118+00.00	115.92	30.09	44.40	11.57	9331.37
119+00.00	110.37	419.06	57.63	188.94	9561.50
120+00.00	111.21	410.34	41.43	183.43	9788.40
120+92.38	94.27	351.52	75.82	200.58	9939.35
121+00.00	93.72	26.53	75.69	21.38	9944.49
122+00.00	89.39	339.10	64.81	260.18	10023.41
123+00.00	98.66	348.25	68.75	247.34	10124.32
124+00.00	100.27	368.39	65.89	249.33	10243.37
124+91.65	102.97	344.94	59.62	213.02	10375.30
125+00.00	104.67	32.10	60.34	18.55	10388.85
125+35.65	106.25	139.25	61.81	80.65	10447.46
126+00.00	101.47	247.53	61.16	146.54	10548.45
127+00.00	101.54	375.96	53.44	212.21	10712.20
128+00.00	95.37	364.66	60.91	211.75	10865.10
129+00.00	99.04	360.03	54.19	213.15	11011.98
130+00.00	102.50	373.24	42.72	179.46	11205.75
130+88.69	96.47	326.79	45.96	145.64	11386.90
131+00.00	96.79	40.49	44.65	18.98	11408.40
131+32.69	96.34	116.91	44.27	53.83	11471.49
132+00.00	92.12	234.93	46.12	112.69	11593.73
133+00.00	93.02	342.85	43.25	165.52	11771.06
134+00.00	96.75	351.42	38.58	151.55	11970.94
135+00.00	94.59	354.34	42.55	150.23	12175.05
136+00.00	92.46	346.39	43.70	159.72	12361.72
137+00.00	90.15	338.16	45.36	164.93	12534.96
138+00.00	96.35	345.37	39.41	156.97	12723.35
139+00.00	102.80	368.79	32.53	133.21	12958.94
140+00.00	102.27	379.76	32.64	120.68	13218.02
141+00.00	98.35	371.51	35.11	125.47	13464.06

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X138 of 195

UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 EARTHWORK SUMMARY

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

End Area Volume Report

Alignment Name: Track 101

Baseline Station	Station Quantities				Mass Ordinate
	Cut		Fill		
	Area	Volume	Area	Volume	
142+00.00	95.62	359.19	39.59	138.33	13684.92
143+00.00	94.86	352.74	40.88	149.02	13888.63
144+00.00	90.38	343.04	45.18	159.37	14072.30
145+00.00	98.88	350.48	39.83	157.42	14265.35
146+00.00	90.18	350.11	47.58	161.87	14453.59
147+00.00	87.44	328.92	53.81	187.76	14594.75
147+92.38	82.43	290.61	57.78	190.90	14694.46
148+00.00	82.93	23.33	57.15	16.22	14701.58
149+00.00	80.99	303.56	65.96	227.98	14777.15
150+00.00	77.45	293.40	69.39	250.64	14819.92
151+00.00	75.65	283.51	71.89	261.62	14841.81
152+00.00	72.51	274.37	83.66	288.06	14828.12
153+00.00	72.39	268.34	89.09	319.91	14776.55
154+00.00	69.71	263.14	87.37	326.78	14712.91
155+00.00	66.83	252.85	81.02	311.84	14653.92
156+00.00	65.54	245.13	80.97	299.99	14599.06
157+00.00	61.89	235.98	78.12	294.63	14540.41
158+00.00	60.89	227.36	102.45	334.40	14433.37
158+35.00	5.51	43.04	137.12	155.28	14321.13
159+00.00	5.77	13.58	122.74	312.80	14021.92
159+10.00	6.49	2.27	38.15	29.79	13994.39
159+13.08	6.65	0.75	36.11	4.24	13990.91
159+44.27	4.87	6.65	31.09	38.82	13958.74
159+46.27	0.00	0.18	8.26	1.46	13957.46
160+00.00	20.93	20.83	0.00	8.22	13970.07
160+86.27	14.86	57.18	0.00	0.00	14027.25
160+88.27	13.78	1.06	0.00	0.00	14028.31
161+00.00	0.56	3.12	2.52	0.55	14030.87
161+80.00	66.38	99.17	0.00	3.74	14126.31
162+00.00	441.16	187.98	0.00	0.00	14314.28
162+46.32	231.29	576.84	9.72	8.34	14882.79
162+79.32	214.63	272.51	19.43	17.81	15137.48
163+00.00	210.55	162.81	21.08	15.51	15284.78
164+00.00	228.01	812.15	19.95	75.98	16020.96
165+00.00	230.80	849.64	20.99	75.81	16794.79
165+26.85	229.14	228.65	25.38	23.05	17000.39
165+59.85	231.27	281.36	23.99	30.17	17251.58
166+00.00	233.53	345.63	21.99	34.19	17563.02
167+00.00	237.46	872.20	24.33	85.76	18349.45
168+00.00	224.76	855.96	30.82	102.11	19103.30
169+00.00	221.42	826.27	33.82	119.69	19809.88
170+00.00	244.11	862.09	39.98	136.66	20535.31
171+00.00	263.64	940.27	39.20	146.62	21328.97
172+00.00	272.12	992.14	45.67	157.16	22163.95
173+00.00	93.84	677.69	18.29	118.45	22723.19
174+00.00	110.02	377.51	8.34	49.33	23051.37
175+00.00	134.81	453.38	0.19	15.80	23488.95
176+00.00	148.75	525.10	0.86	1.95	24012.11
177+00.00	124.82	506.60	0.01	1.61	24517.10
178+00.00	129.55	471.05	0.00	0.01	24988.14
179+00.00	122.93	467.55	0.79	1.46	25454.23
180+00.00	120.58	450.93	4.50	9.79	25895.37
180+91.95	114.62	400.47	2.77	12.37	26283.48
181+00.00	113.31	34.00	2.31	0.76	26316.72
181+24.95	110.67	103.47	3.00	2.45	26417.73
182+00.00	107.00	302.53	4.24	10.06	26710.20
183+00.00	105.03	392.64	7.20	21.20	27081.65

End Area Volume Report

Alignment Name: Track 101

Baseline Station	Station Quantities				Mass Ordinate
	Cut		Fill		
	Area	Volume	Area	Volume	
183+73.14	102.22	280.70	8.79	21.66	27340.69
184+00.00	102.07	101.62	8.19	8.44	27433.86
184+06.14	100.96	23.08	7.49	1.78	27455.16
185+00.00	84.98	323.19	8.40	27.62	27750.73
186+00.00	81.79	308.84	8.28	30.90	28028.68
187+00.00	175.85	477.11	0.00	15.34	28490.44
188+00.00	157.10	616.57	0.00	0.00	29107.01
189+00.00	153.57	575.32	0.00	0.00	29682.33
190+00.00	137.94	539.83	0.00	0.00	30222.17
191+00.00	86.87	416.31	0.00	0.00	30638.48
192+00.00	218.53	565.55	0.00	0.00	31204.02
193+00.00	252.40	872.08	0.00	0.00	32076.10
194+00.00	285.45	996.01	0.00	0.00	33072.11
195+00.00	291.98	1069.31	0.00	0.00	34141.42
196+00.00	316.43	1126.68	0.55	1.01	35267.09
197+00.00	314.91	1169.16	3.49	7.48	36428.77
198+00.00	265.03	1073.97	7.65	20.64	37482.11
199+00.00	273.86	997.94	3.46	20.57	38459.48
200+00.00	178.40	837.52	0.00	6.40	39290.60
201+00.00	190.44	683.05	0.00	0.00	39973.65
202+00.00	195.11	714.00	0.00	0.00	40687.65
203+00.00	196.17	724.60	0.00	0.00	41412.25
204+00.00	196.80	727.73	0.00	0.00	42139.98
205+00.00	194.41	724.47	0.00	0.00	42864.45
205+90.99	188.30	644.89	0.00	0.00	43509.34
206+00.00	206.56	65.87	0.00	0.00	43575.21
206+20.99	253.47	178.83	0.00	0.00	43754.04
207+00.00	247.47	732.93	0.00	0.00	44486.97
208+00.00	237.52	898.13	0.00	0.00	45385.09
209+00.00	220.38	847.97	0.00	0.00	46233.06
210+00.00	210.31	797.58	0.00	0.00	47030.65
211+00.00	208.46	775.51	0.00	0.00	47806.15
211+39.64	198.70	298.88	0.00	0.00	48105.03
211+62.64	248.91	190.65	0.00	0.00	48295.68
211+90.00	243.15	249.32	0.00	0.00	48545.01
212+00.00	312.55	102.91	0.00	0.00	48647.92
212+50.00	334.68	599.25	0.00	0.00	49247.17
212+75.48	279.37	289.77	0.00	0.00	49536.94
212+77.48	34.54	11.60	0.00	0.00	49548.54
213+00.00	72.76	44.76	0.00	0.00	49593.30
213+37.48	0.00	50.49	198.38	137.68	49506.12
213+39.48	0.00	0.00	415.53	22.79	49483.33
213+50.00	0.00	0.00	285.76	136.62	49346.70
213+60.00	18.85	3.49	63.17	64.62	49285.58
214+00.00	186.80	152.33	0.00	46.79	49391.11
214+33.97	102.16	181.78	2.82	1.78	49571.12
215+00.00	100.37	247.64	2.36	6.34	49812.42
216+00.00	85.91	344.96	9.67	22.29	50135.10
217+00.00	69.81	288.37	23.41	61.26	50362.21
218+00.00	58.66	237.90	42.01	121.15	50478.96
219+00.00	46.99	195.65	64.03	196.38	50478.23
220+00.00	35.97	153.63	87.43	280.47	50351.38
221+00.00	25.87	114.52	110.69	366.89	50099.01
222+00.00	18.24	81.69	134.76	454.55	49726.15
223+00.00	10.75	53.69	159.69	545.28	49234.56
224+00.00	5.32	29.76	182.29	633.30	48631.03
224+10.00	4.85	1.88	184.52	67.93	48564.99

End Area Volume Report

Alignment Name: Track 101

Baseline Station	Station Quantities				Mass Ordinate
	Cut		Fill		
	Area	Volume	Area	Volume	
224+20.00	4.47	1.73	186.71	68.74	48497.97
225+00.00	2.95	10.99	201.35	574.90	47934.06
225+40.00	2.89	4.33	204.58	300.69	47637.69
225+50.00	0.00	0.54	204.58	75.77	47562.46
225+94.31	0.00	0.00	208.17	338.69	47223.77
226+00.00	0.00	0.00	203.21	43.34	47180.43
227+00.00	0.00	0.00	191.19	730.37	46450.06
228+00.00	0.00	0.00	183.67	694.18	45755.89
229+00.00	0.00	0.00	182.39	677.89	45078.00
230+00.00	0.00	0.00	179.64	670.42	44407.58
231+00.00	0.00	0.00	178.70	663.58	43743.99
232+00.00	0.00	0.00	179.44	663.22	43080.78
233+00.00	0.00	0.00	177.41	660.83	42419.94
234+00.00	0.00	0.00	176.65	655.68	41764.26
235+00.00	0.00	0.00	176.64	654.25	41110.02
236+00.00	0.00	0.00	171.68	645.03	40464.98
237+00.00	0.00	0.00	169.09	631.05	39833.94
238+00.00	0.00	0.00	158.43	606.52	39227.42
239+00.00	0.00	0.00	163.96	597.02	38630.40
239+10.00	38.44	7.12	21.77	34.39	38603.12
240+00.00	49.59	146.71	140.40	270.28	38479.56
241+00.00	11.92	113.91	152.07	541.60	38051.87
241+20.00	61.41	27.16	158.45	115.01	37964.02
242+00.00	90.11	224.48	136.46	436.91	37751.60
243+00.00	95.62	343.95	139.17	510.44	37585.11
244+00.00	100.62	363.41	136.86	511.18	37437.35
245+00.00	90.78	354.45	122.89	481.02	37310.78
246+00.00	110.38	372.52	117.31	444.81	37238.48
247+00.00	59.14	313.92	110.85	422.52	37129.88
248+00.00	101.11	296.76	106.98	403.40	37023.23
249+00.00	88.55	351.22	95.58	375.12	36999.34
250+00.00	112.60	372.50	83.96	332.48	37039.36
251+00.00	125.04	440.06	77.37	298.76	37180.65
252+00.00	142.71	495.83	71.37	275.45	37401.04
253+00.00	55.59	367.24	36.99	200.66	37567.61
254+00.00	140.85	363.79	0.63	69.66	37861.74
255+00.00	137.51	515.50	1.23	3.43	38373.81
256+00.00	140.93	515.64	1.08	4.28	38885.16
257+00.00	138.65	517.75	0.09	2.18	39400.73
258+00.00	138.72	513.66	0.46	1.02	39913.37
259+00.00	141.59	519.10	0.52	1.82	40430.66
259+13.56	139.02	70.47	0.25	0.19	40500.93
259+18.56	145.73	26.37	0.43	0.06	40527.24
260+00.00	143.29	435.88	0.32	1.14	40961.98
261+00.00	148.51	540.38	0.40	1.35	41501.01
262+00.00	156.29	564.45	0.00	0.75	42064.71
262+64.06	151.17	364.74	0.20	0.24	42429.21
262+84.06	118.37	99.83	0.27	0.17	42528.87
263+00.00	117.45	69.60	0.35	0.18	42598.29
264+00.00	99.35	401.47	4.33	8.67	42991.09
264+25.30	97.34	92.14	5.49	4.60	43078.64
264+53.30	110.40	107.72	4.92	5.40	43180.95
264+90.00	112.69	151.63	4.23	6.22	43326.36
265+00.00	31.16	26.64	2.88	1.32	43351.68
265+10.00	18.21	9.14	6.41	1.72	43359.10
265+40.00	130.80	82.78	0.00	3.56	43438.33
265+65.55	188.11	150.89	0.00	0.00	43589.21

End Area Volume Report

Alignment Name: Track 101

Baseline Station	Station Quantities				Mass Ordinate
	Cut		Fill		
	Area	Volume	Area	Volume	
265+57.55	27.06	7.96	0.00	0.00	43597.17
266+00.00	20.15	28.37	0.00	0.00	43625.54
266+27.55	20.49	20.73	0.00	0.00	43646.28
266+29.55	259.53	10.39	11.27	0.42	43656.25
266+43.00	268.45	131.51	34.22	11.33	43776.42
266+50.00	270.54	169.68	30.34	20.32	43925.78
266+70.00	238.88	94.34	32.52	11.64	44008.48
266+90.56	165.60	153.99	63.70	36.63	44125.84
267+00.00	114.01	48.88	112.23	30.76	44143.97
267+34.56	94.10	133.19	155.64	171.44	44105.72
268+00.00	91.30	224.69	160.43	383.03	43947.38
269+00.00	80.47	318.10	195.46	659.05	43606.43
270+00.00	73.34	284.83	220.59	770.46	43120.80
270+20.00	68.84	52.66	235.12	168.78	43004.67
270+30.00	66.55	25.07	215.60	83.44	42946.29
271+00.00	57.58	160.92	267.92	626.81	42480.40
272+00.00	77.95	250.99	297.26	1046.63	41684.77
273+00.00	238.73	586.45	182.88	889.14	41382.07
273+10.00	244.49	89.49	155.53	62.67	41408.89
274+00.00	306.26	917.92	109.24	441.28	41885.53
274+50.00	385.76	640.76	81.42	176.54	42349.75
274+51.73	395.77	169.83	73.07	33.57	42486.01
275+00.00	419.56	577.76	55.95	91.42	42972.35
275+05.73	420.39	89.20	50.10	11.26	43050.28
275+40.00	423.10	535.23	30.44	51.11	43534.40
275+50.00	437.09	159.29	29.38	11.08	43682.62
276+00.00	526.57	892.28	28.67	53.75	44521.15
277+00.00	106.06	1171.50	12.94	77.05	45615.60
278+00.00	122.81	423.84	0.00	23.97	46015.46
278+80.00	41.72	243.75	42.00	62.22	46197.00
278+90.00	34.55	14.12	49.46	16.94	46194.19
279+00.00	26.41	11.29	68.71	21.88	46183.59
279+30.00	7.45	18.81	147.01	119.85	46082.56
279+40.00	3.96	2.11	177.49	60.09	46024.58
280+00.00	0.00	4.40	408.71	651.34	45377.64
280+99.08	0.00	0.00	651.41	1945.16	43432.47
281+00.00	0.00	0.00	651.74	22.16	43410.31
281+43.08	0.00	0.00	669.32	1053.95	42356.36
281+50.00	0.00	0.00	668.96	171.46	42184.90
282+00.00	0.00	0.00	654.82	1225.73	40959.17
283+00.00	0.00	0.00	643.98	2405.20	38553.97
284+00.00	0.00	0.00	635.89	2370.14	36183.83
284+50.00	0.00	0.00	427.18	984.33	35199.50
284+80.00	0.00	0.00	362.81	438.88	34760.62
285+00.00	0.00	0.00	323.20	254.08	34506.54
285+80.00	6.24	9.25	118.91	654.98	33860.81
285+90.00	9.99	3.01	103.67	41.22	33822.60
286+00.00	17.41	5.07	89.16	35.71	33791.97
286+10.00	23.37	7.55	75.79	30.55	33768.97
287+00.00	96.06	199.03	0.68	127.45	33840.55
287+75.00	139.12	326.63	0.00	0.95	34166.23
288+00.00	152.82	135.16	0.00	0.00	34301.38
288+25.00	90.73	112.76	0.00	0.00	34414.14
288+58.03	111.84	161.40	38.10	30.35	34545.19
288+75.00	138.44	32.33	39.34	10.00	34567.51
289+00.00	150.09	133.58	48.07	40.46	34660.63
289+12.03	149.19	66.65	46.04	20.96	34706.32

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X139 of 195

UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
TRACK 101 EARTHWORK SUMMARY

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

End Area Volume Report

Alignment Name: Track 101

Baseline Station	Station Quantities				Mass Ordinate
	Cut		Fill		
	Area	Volume	Area	Volume	
290+00.00	147.25	482.95	48.10	153.37	35035.89
291+00.00	165.07	578.37	51.91	185.20	35429.06
291+43.28	185.51	280.95	59.57	89.34	35620.68
292+00.00	180.83	384.83	74.78	141.14	35864.37
292+75.14	156.73	469.69	101.00	244.59	36089.46
293+00.00	143.63	138.30	107.21	95.87	36131.89
294+00.00	99.51	450.25	157.78	490.71	36091.44
295+00.00	123.72	413.39	120.98	516.21	35988.61
295+50.00	171.99	273.81	113.29	216.92	36045.50
296+00.00	185.02	330.56	119.57	215.61	36160.45
297+00.00	226.59	762.23	101.28	408.97	36513.70
298+00.00	1362.08	2941.98	0.00	187.55	39268.13
299+00.00	782.34	3971.15	0.00	0.00	43239.28
300+00.00	371.55	2136.84	100.40	185.93	45190.20
301+00.00	339.41	1316.60	114.77	398.47	46108.33
302+00.00	243.33	1079.16	215.65	611.89	46575.59
302+50.00	302.98	505.84	132.98	322.80	46758.63
303+00.00	223.19	487.20	139.31	252.12	46993.71
303+50.00	93.79	293.50	141.06	259.60	47027.61
303+90.00	124.51	161.70	143.66	210.90	46978.40
304+00.00	0.00	23.06	139.27	52.39	46949.06
305+00.00	0.00	0.00	158.34	551.13	46397.93
305+66.67	0.00	0.00	164.71	398.82	45999.11
306+00.00	0.00	0.00	0.00	101.68	45897.44
Grand Total:		**169829.26**		**123931.83**	

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-TRK_200927.dgn
Default
3/9/2026

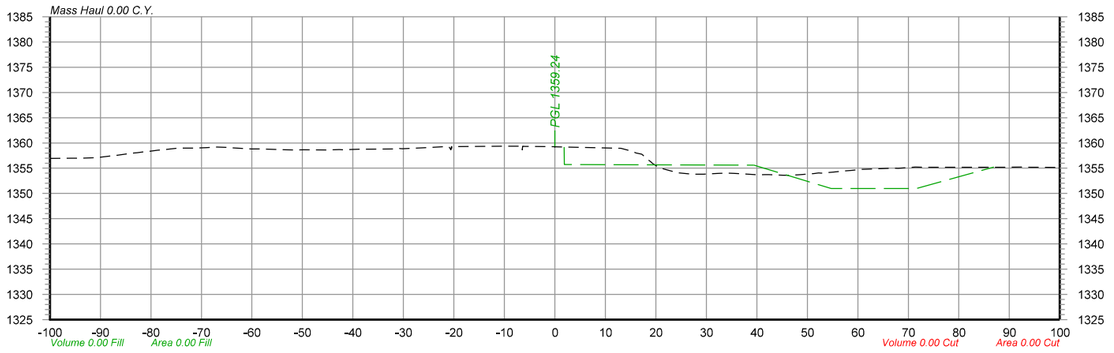
olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

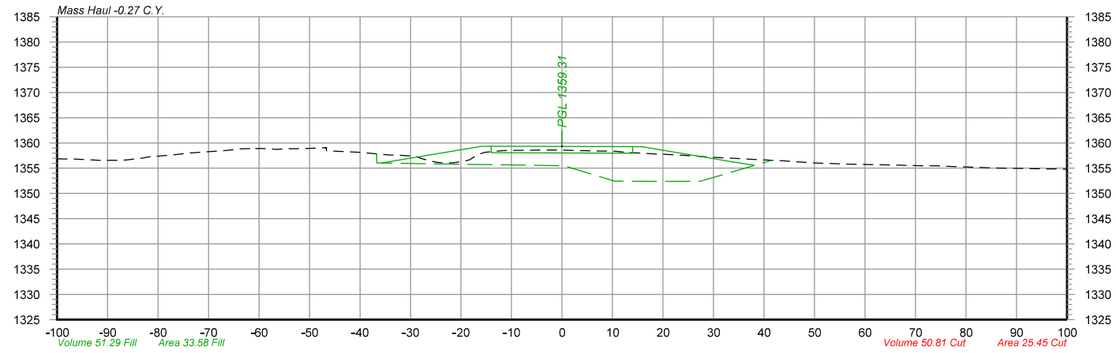
DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X140 of 195

UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

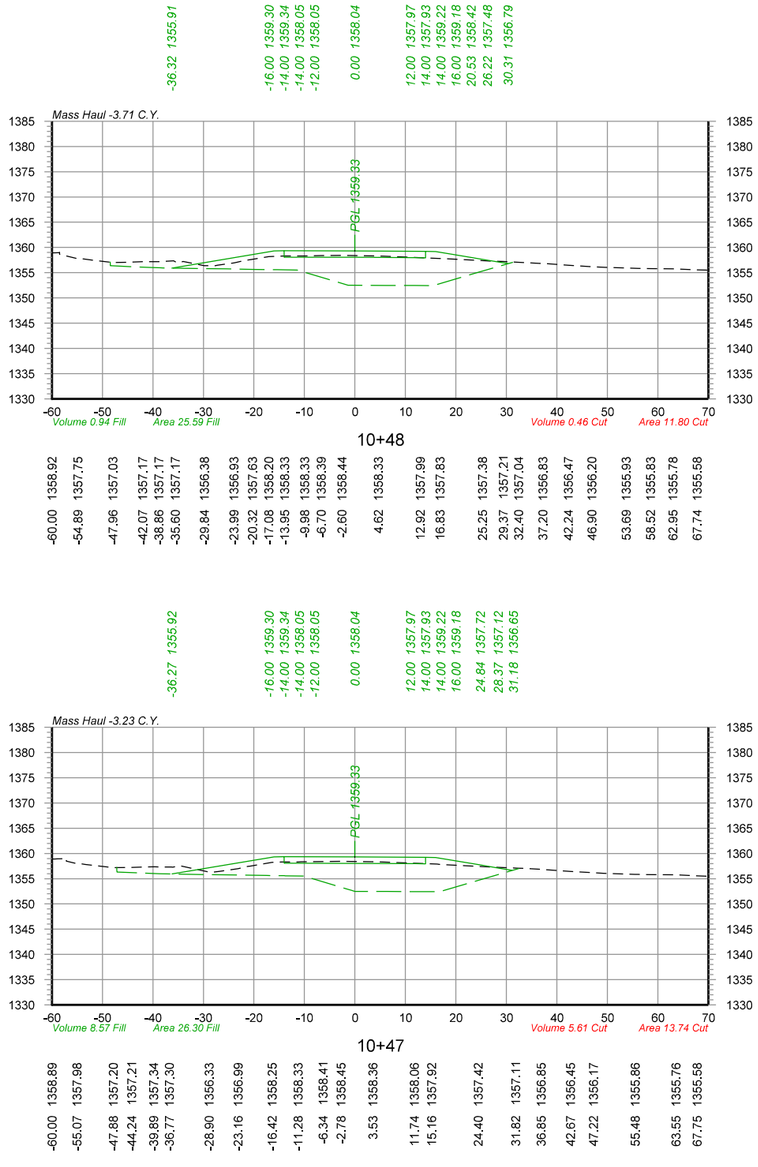
SHEET TITLE:
TRACK 101 EARTHWORK SUMMARY

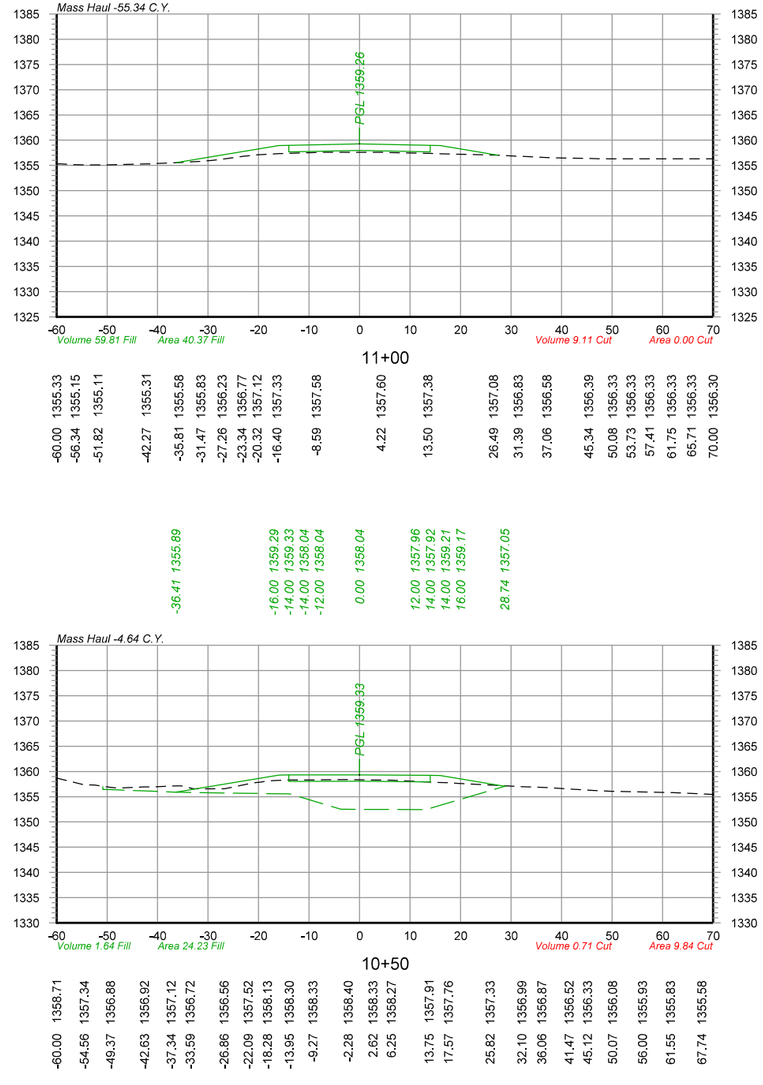

Mass Haul 0.00 C.Y.
PGL 1359.24
Volume 0.00 Fill
Area 0.00 Fill
Volume 0.00 Cut
Area 0.00 Cut

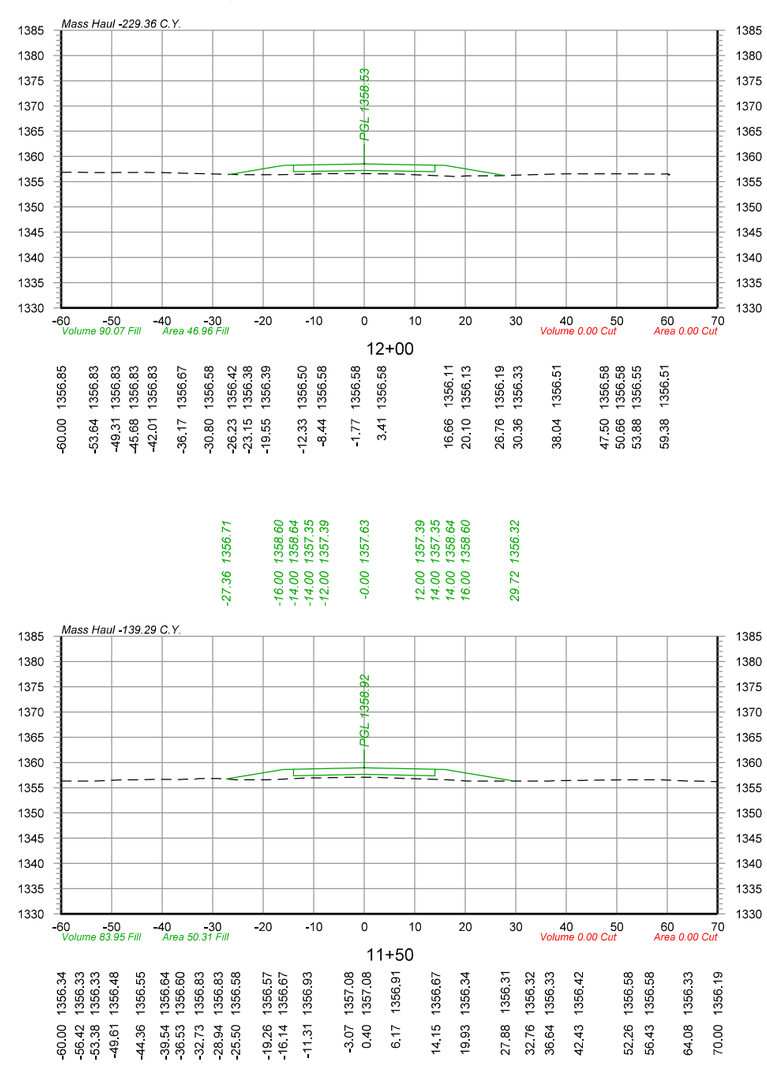

Mass Haul -0.27 C.Y.
PGL 1359.31
Volume 51.29 Fill
Area 33.58 Fill
Volume 50.81 Cut
Area 25.45 Cut

10+10

| | | |







olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	DMJ
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	X142 of 195

UNION PACIFIC RAILROAD

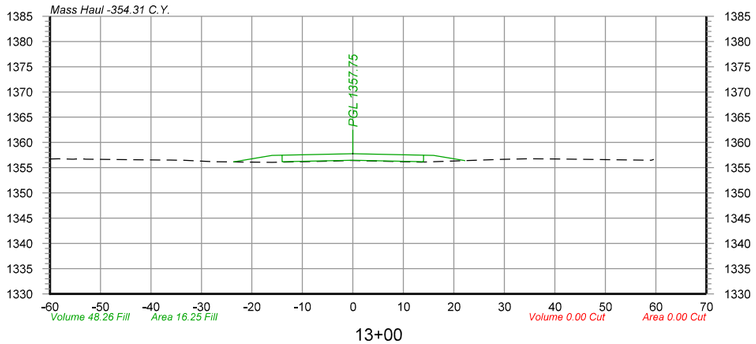
Sheet 382 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SOSS RD (TRK 120) CROSS SECTIONS STA.10+47 TO STA.12+00

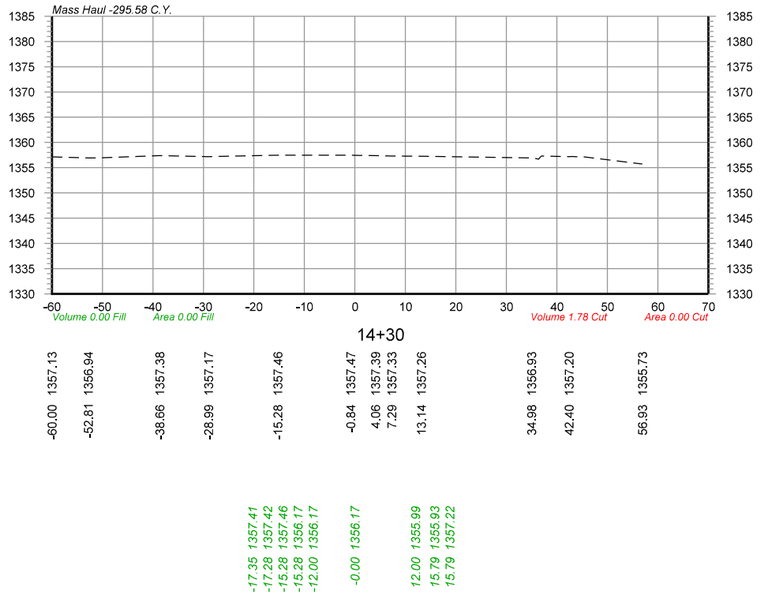
Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-RD_200927.dgn
Default
3/9/2026

-23.67 1356.15 | -16.00 1357.43 | -14.00 1357.47 | -14.00 1356.18 | -12.00 1356.22 | 0.00 1356.46 | 12.00 1356.22 | 14.00 1356.18 | 14.00 1357.47 | 16.00 1357.43 | 22.23 1356.39



13+00

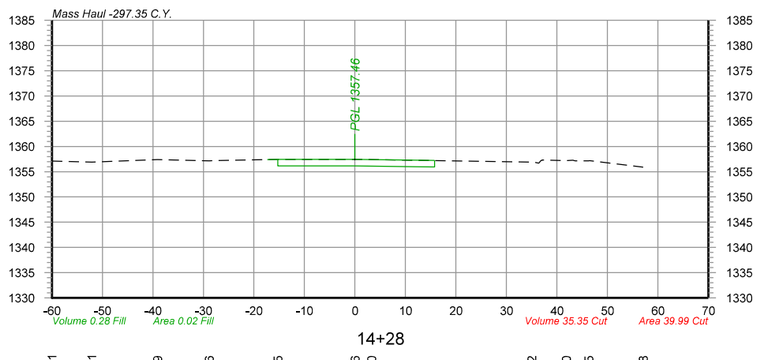
| | | |



14+30

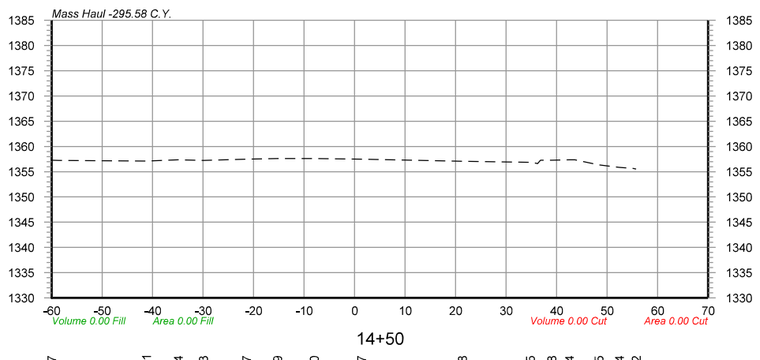
-60.00	1357.13	-52.81	1356.94	-38.66	1357.38	-28.99	1357.17	-15.28	1357.46	-0.84	1357.47	4.06	1357.39
7.29	1357.33	13.14	1357.26	34.98	1356.93	42.40	1357.20	56.93	1355.73				

-17.35	1357.41	-17.28	1357.42	-15.28	1357.46	-15.28	1356.17	-12.00	1356.17	-0.00	1356.17	12.00	1355.99
15.79	1355.93	15.79	1357.22										



14+28

-60.00	1357.11	-52.12	1356.91	-39.10	1357.39	-28.87	1357.16	-15.28	1357.45	0.01	1357.46	3.29	1357.40
35.02	1356.92	41.85	1357.20	46.31	1357.15	57.09	1355.88						



14+50

-60.00	1357.27	-41.23	1357.11	-34.92	1357.34	-29.95	1357.23	-21.40	1357.47	-15.27	1357.59	-8.00	1357.60
1.37	1357.47	21.34	1357.08	34.79	1356.85	39.04	1357.28	42.54	1357.34	48.36	1356.35	52.44	1355.84
55.76	1355.52												

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X144 of 195

UNION PACIFIC RAILROAD

Sheet 384 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SOSS RD (TRK 120) CROSS SECTIONS STA.14+28 TO STA.14+50

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-RD_200927.dgn
Default
3/9/2026

End Area Volume Report

Alignment Name: Rd - S. Sossaman Rd - 1528+20

Baseline Station	Station Quantities				
	Cut		Fill		Mass Ordinate
	Area	Volume	Area	Volume	
10+00.00	0.00	0.00	0.00	0.00	0.00
10+09.81	0.00	0.00	0.00	0.00	0.00
10+11.42	72.20	2.15	65.00	1.94	0.21
10+23.88					0.00
10+39.51	25.45	50.81	33.58	51.29	-0.27
10+47.24	13.74	5.61	26.30	8.57	-3.23
10+48.22	11.80	0.46	25.59	0.94	-3.71
10+50.00	9.84	0.71	24.23	1.64	-4.64
11+00.00	0.00	9.11	40.37	59.81	-55.34
11+50.00	0.00	0.00	50.31	83.95	-139.29
12+00.00	0.00	0.00	46.96	90.07	-229.36
12+50.00	0.00	0.00	35.86	76.69	-306.05
13+00.00	0.00	0.00	16.25	48.26	-354.31
13+50.00	11.86	10.98	6.46	21.03	-364.36
13+89.78	25.25	27.34	0.86	5.40	-342.42
13+93.45	26.45	3.52	0.74	0.11	-339.01
14+00.00	29.17	6.74	0.53	0.15	-332.42
14+27.60	39.99	35.35	0.02	0.28	-297.35
14+30.00	0.00	1.78	0.00	0.00	-295.58
14+50.00	0.00	0.00	0.00	0.00	-295.58
Grand Total:		**154.57**		**450.14**	

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-RD_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X145 of 195

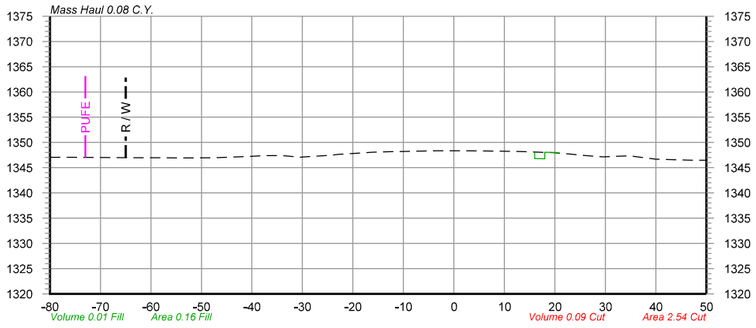
UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SOSS RD (TRK 120) EARTHWORK SUMMARY

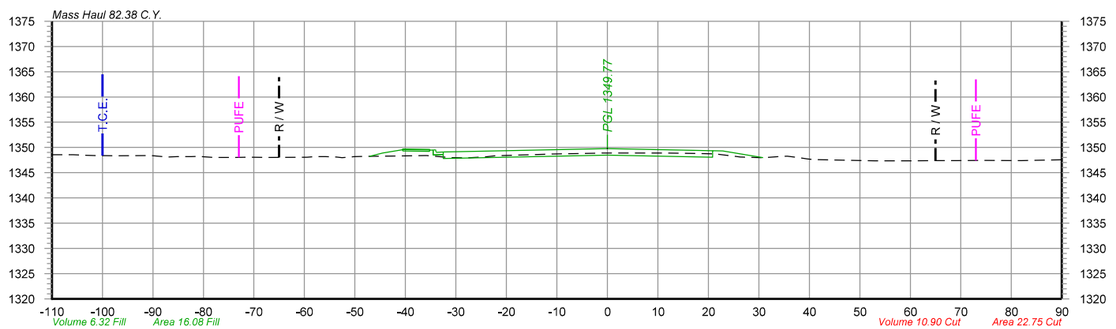
Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-RD_200927.dgn
Default
3/9/2026

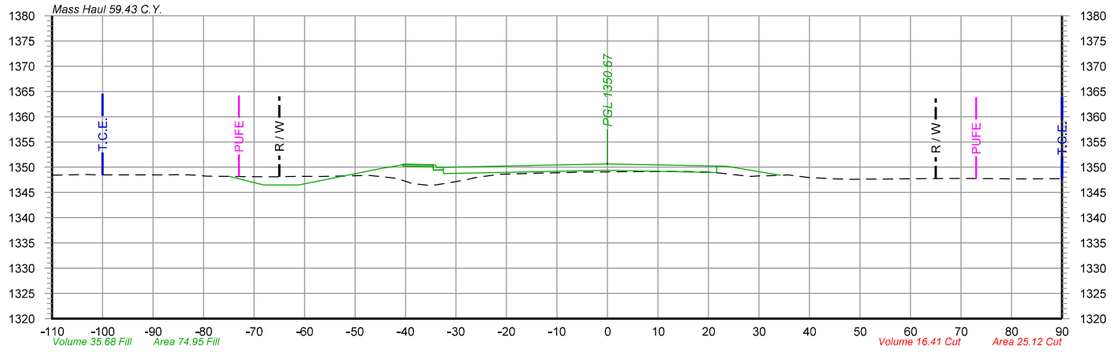
16.00 1348.11
16.01 1346.82
18.00 1346.78
18.01 1348.07
20.01 1348.03
20.86 1347.89

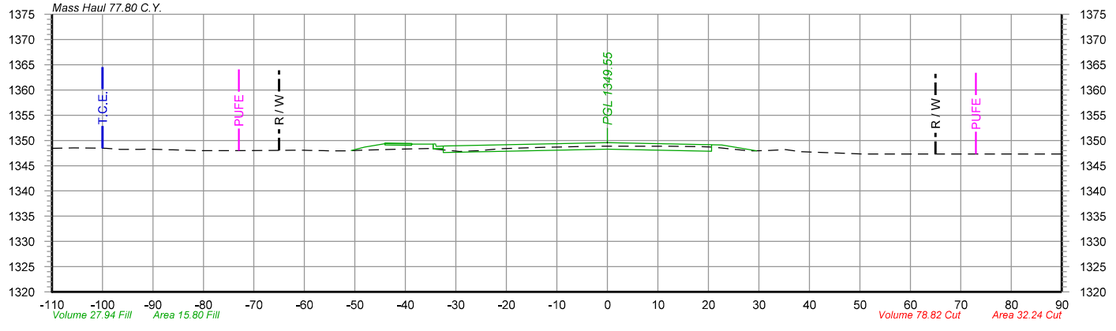


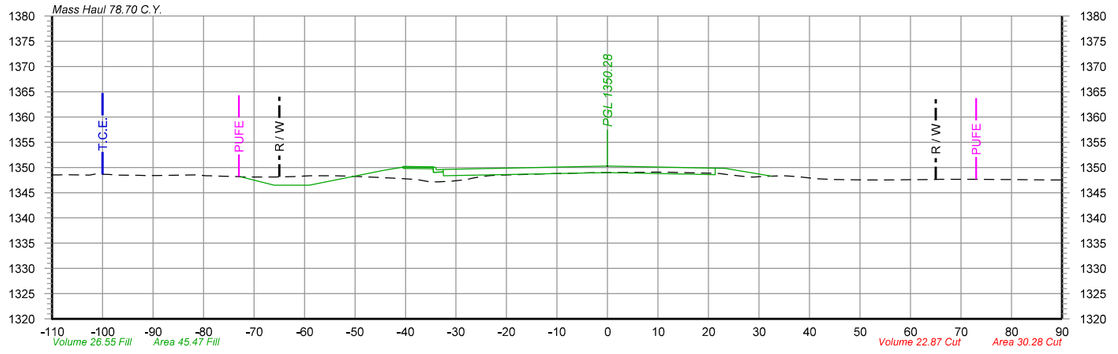
6+15

| | | |









olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X147 of 195

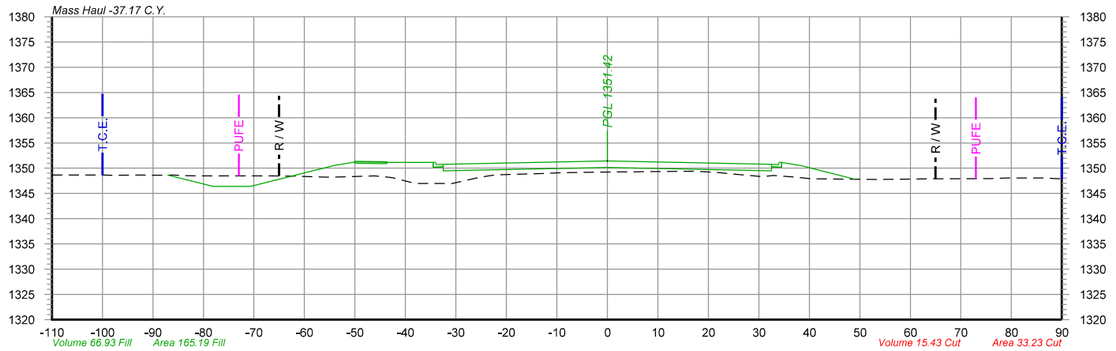
UNION PACIFIC RAILROAD

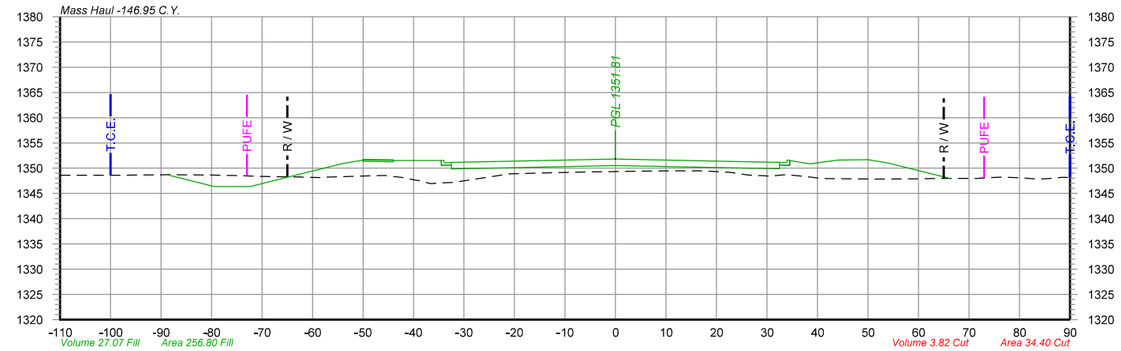
Sheet 387 of 587

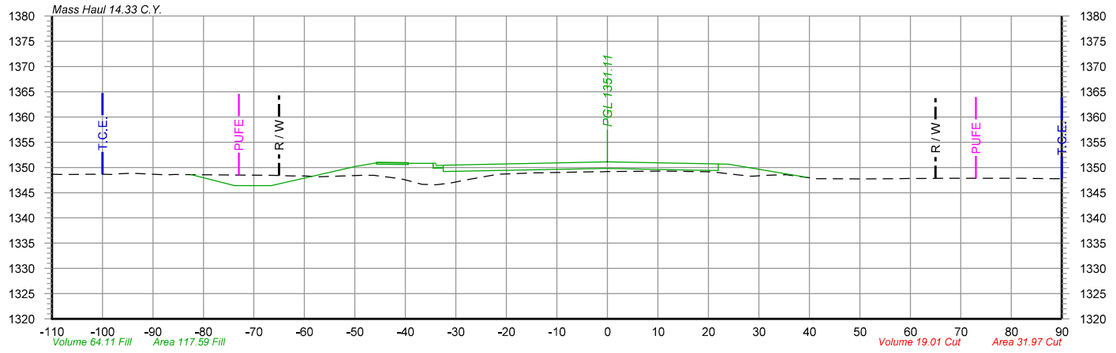
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

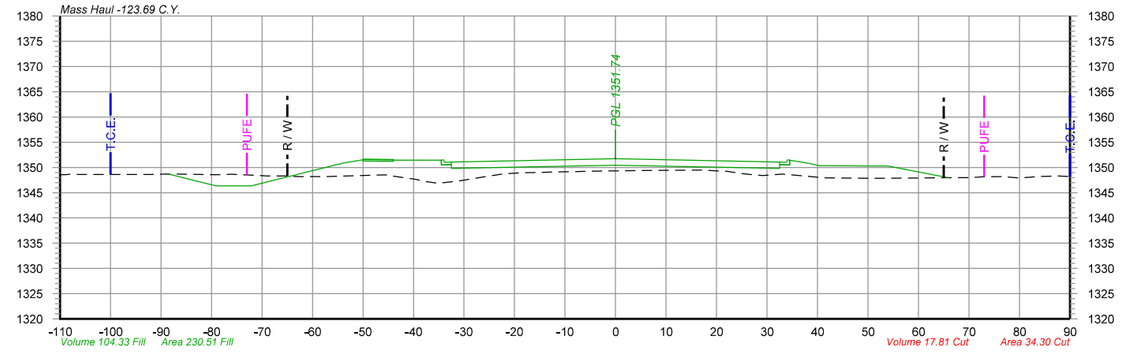
SHEET TITLE:
PECOS RD CROSS SECTIONS STA.7+50 TO STA.8+00

Color table: K:\Bentley\Workspace\V8\projects\Clients\UPRR_Track\UPRR_Track_V8\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-RD_200927.dgn
Default
3/9/2026









Color table: K:\Bentley\Workspace\Projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-RD_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

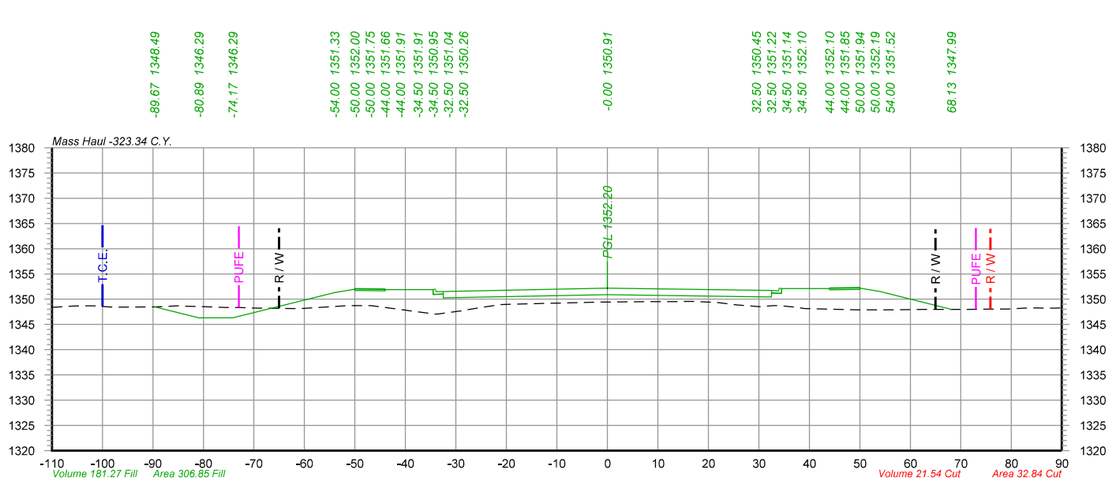
DRAWN BY:	DMJ
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	X148 of 195

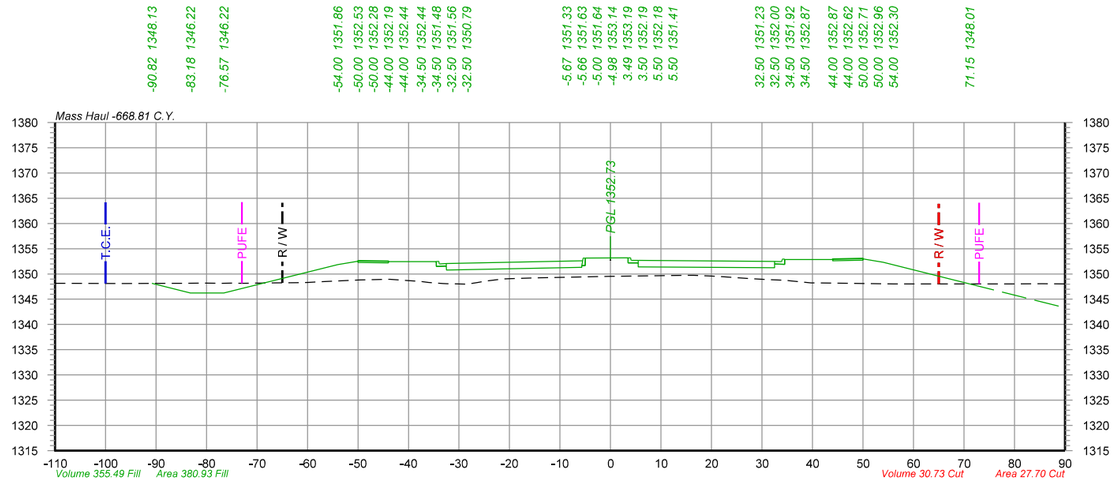
UNION PACIFIC RAILROAD

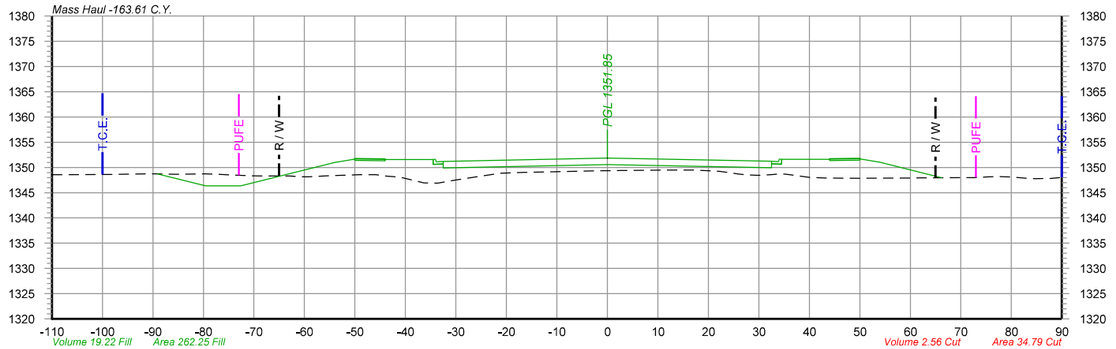
Sheet 388 of 587

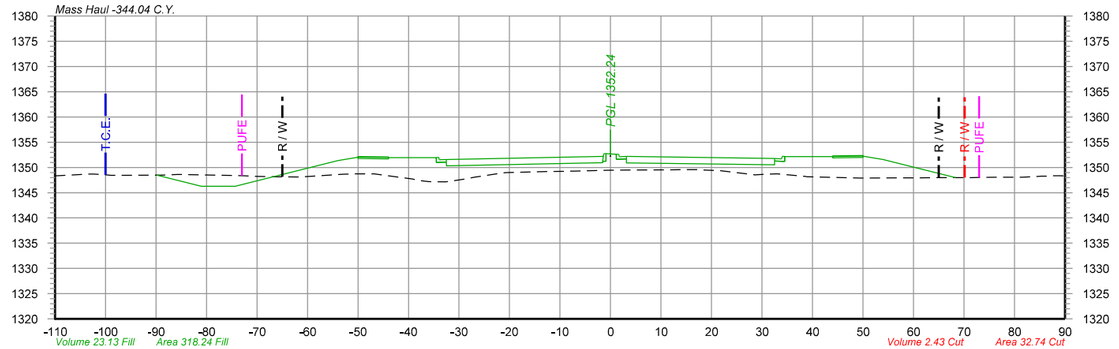
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
PECOS RD CROSS SECTIONS STA.8+18 TO STA.8+48









Color table: K:\Bentley\Workspace\V8\projects\Clients\UPRR_Track\UPRR_Track_V8\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-RD_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

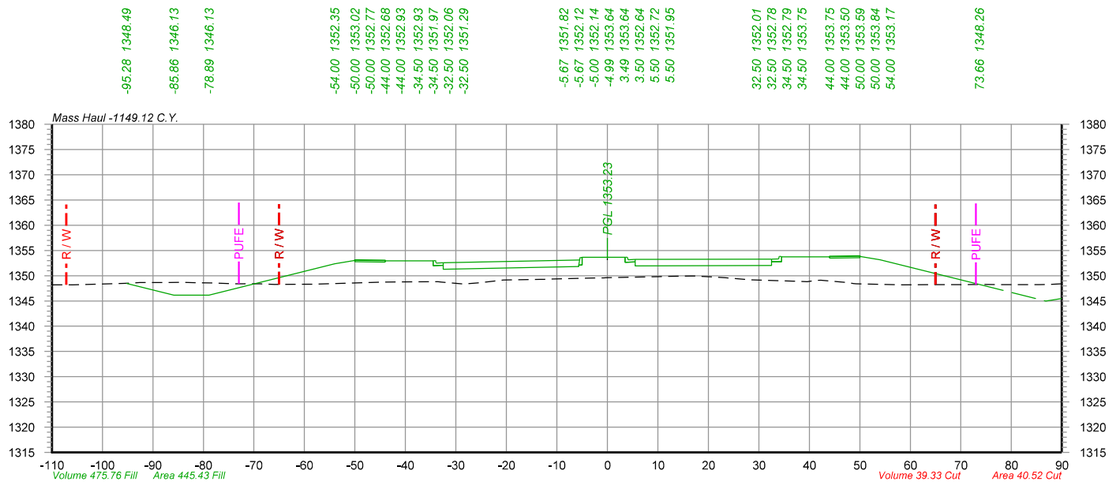
DRAWN BY:	DMJ
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	X149 of 195

UNION PACIFIC RAILROAD

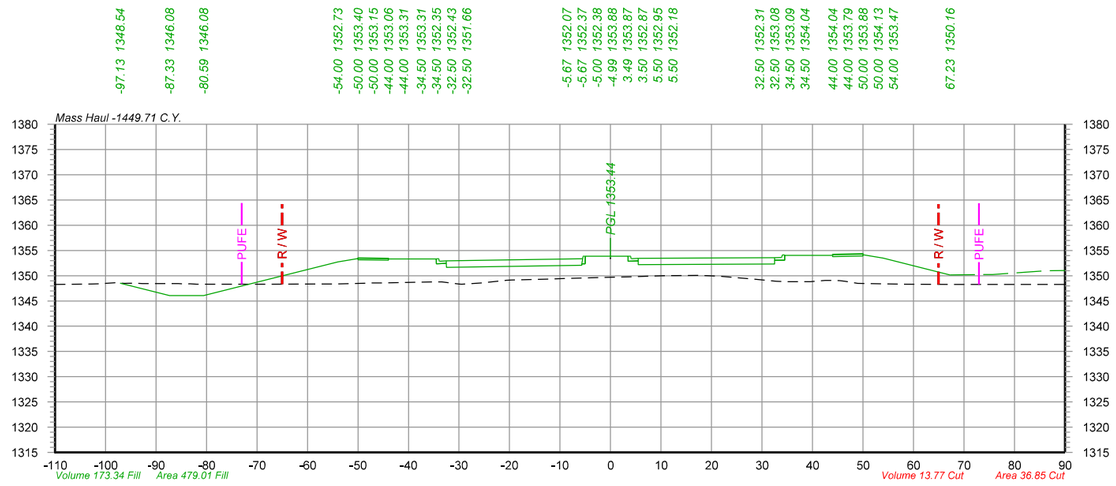
Sheet 389 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

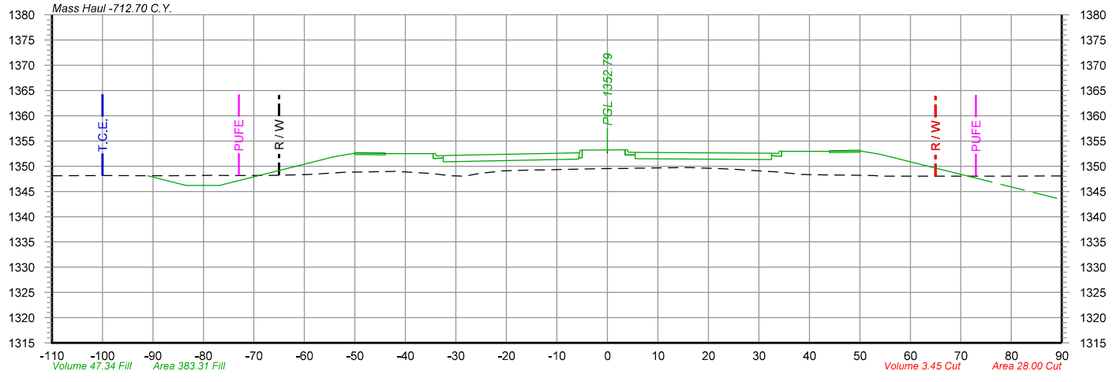
SHEET TITLE:
PECOS RD CROSS SECTIONS STA.8+50 TO STA.8+97



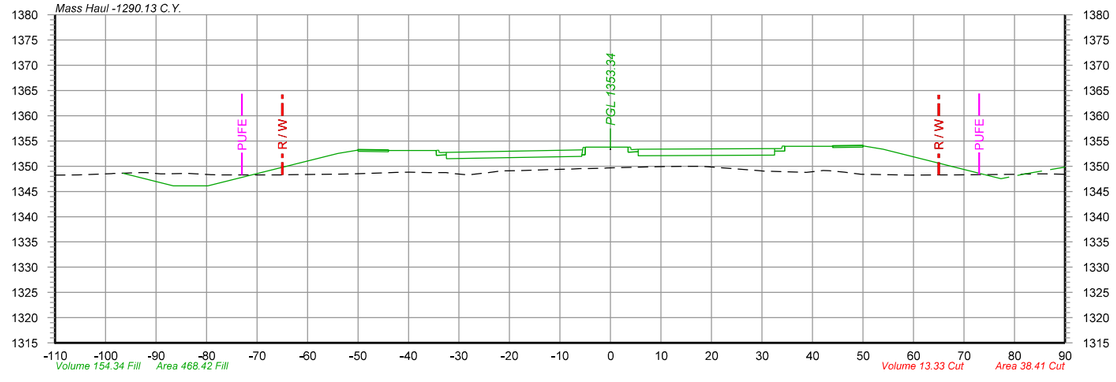
9+31



9+50



9+00



9+40

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X150 of 195

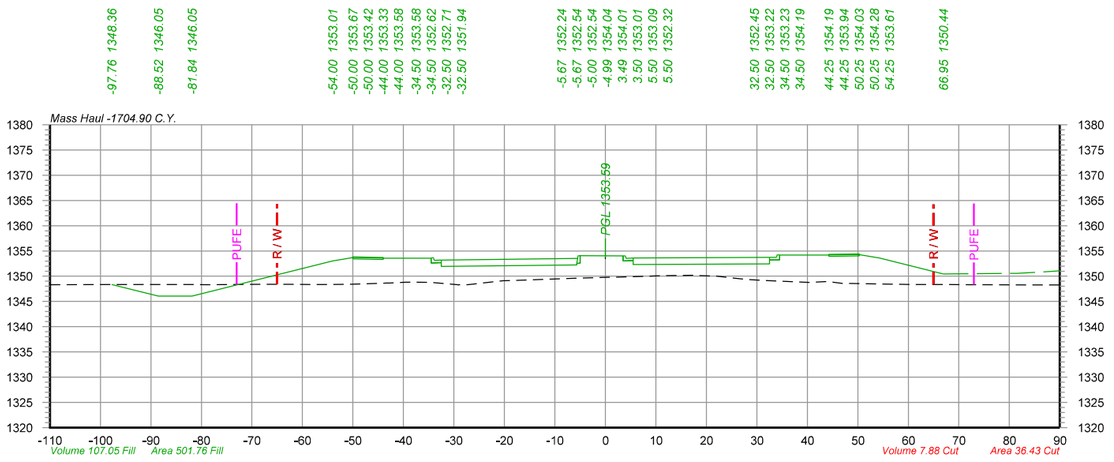
UNION PACIFIC RAILROAD

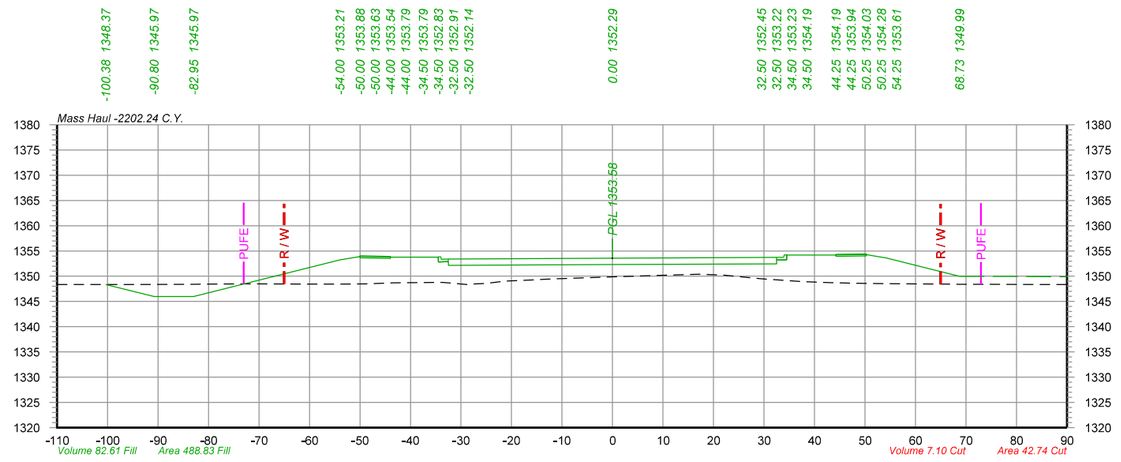
Sheet 390 of 587

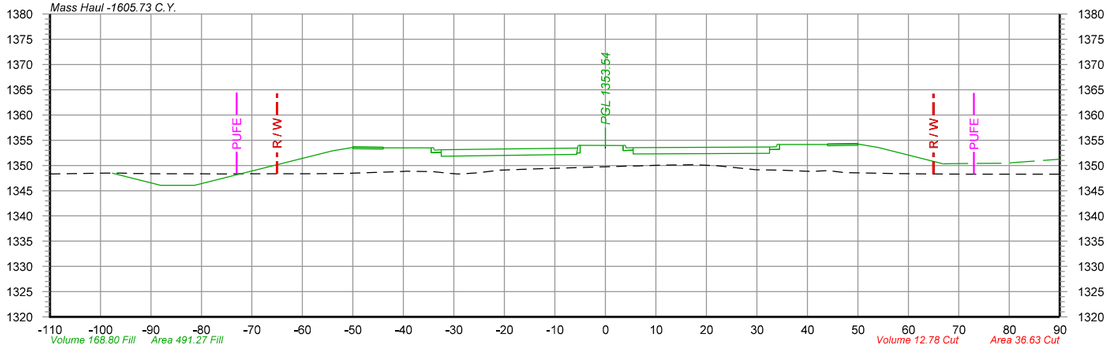
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

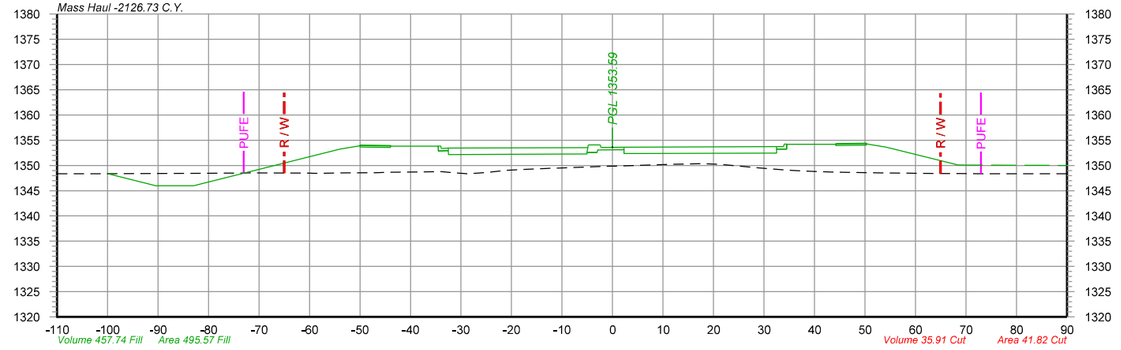
SHEET TITLE:
PECOS RD CROSS SECTIONS STA.9+00 TO STA.9+50

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-
Default
3/9/2026









Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-RD_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

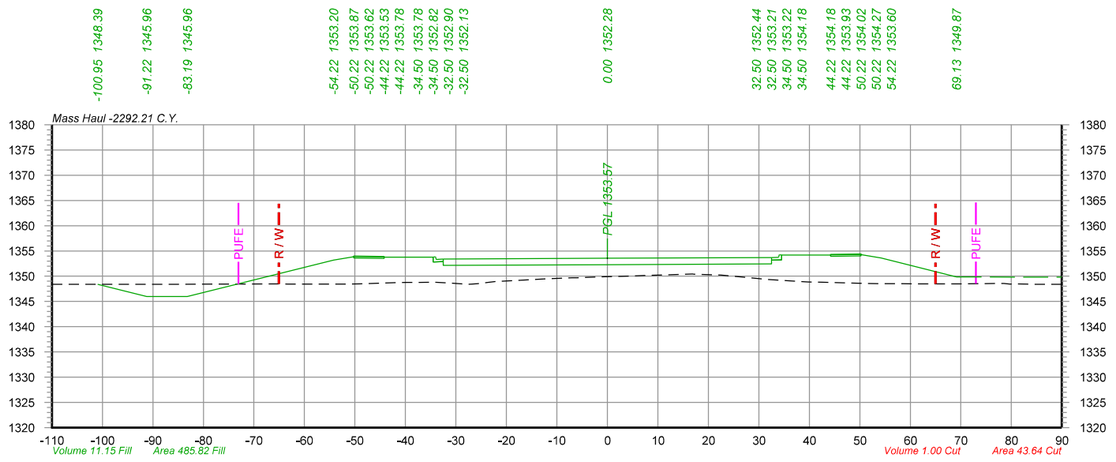
DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X151 of 195

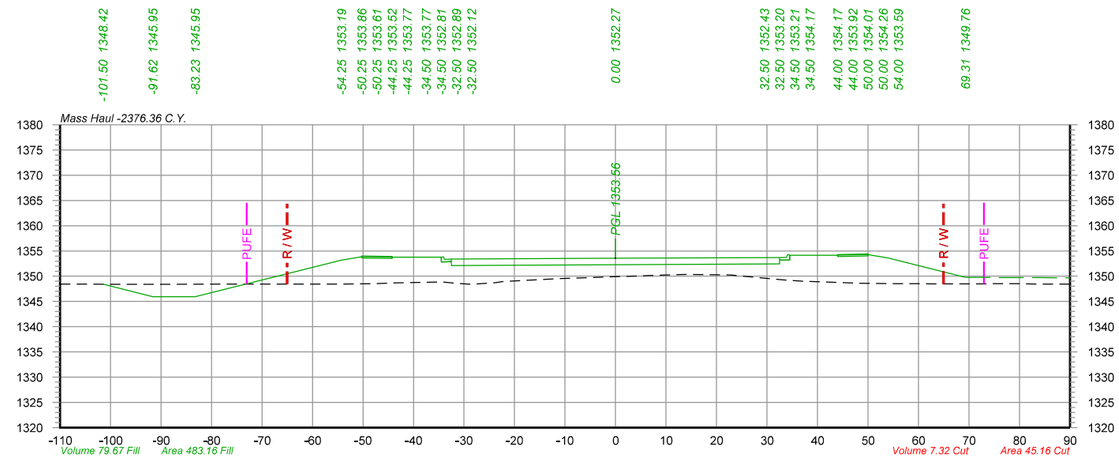
UNION PACIFIC RAILROAD

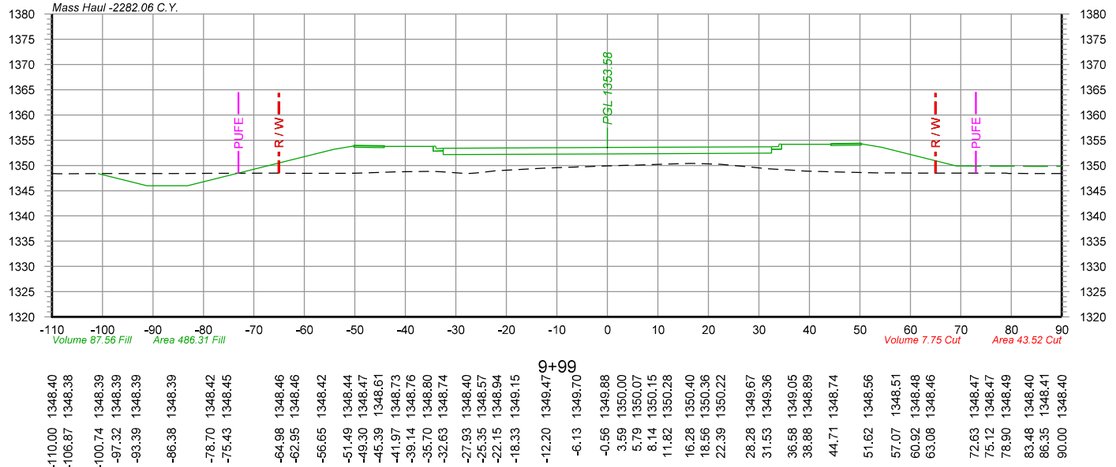
Sheet 391 of 587

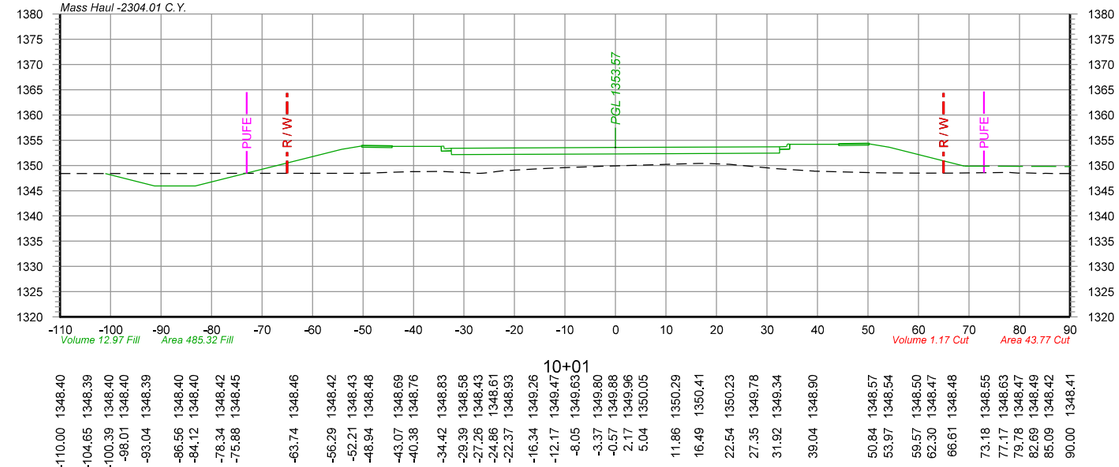
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
PECOS RD CROSS SECTIONS STA.9+59 TO STA.9+95









olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X152 of 195

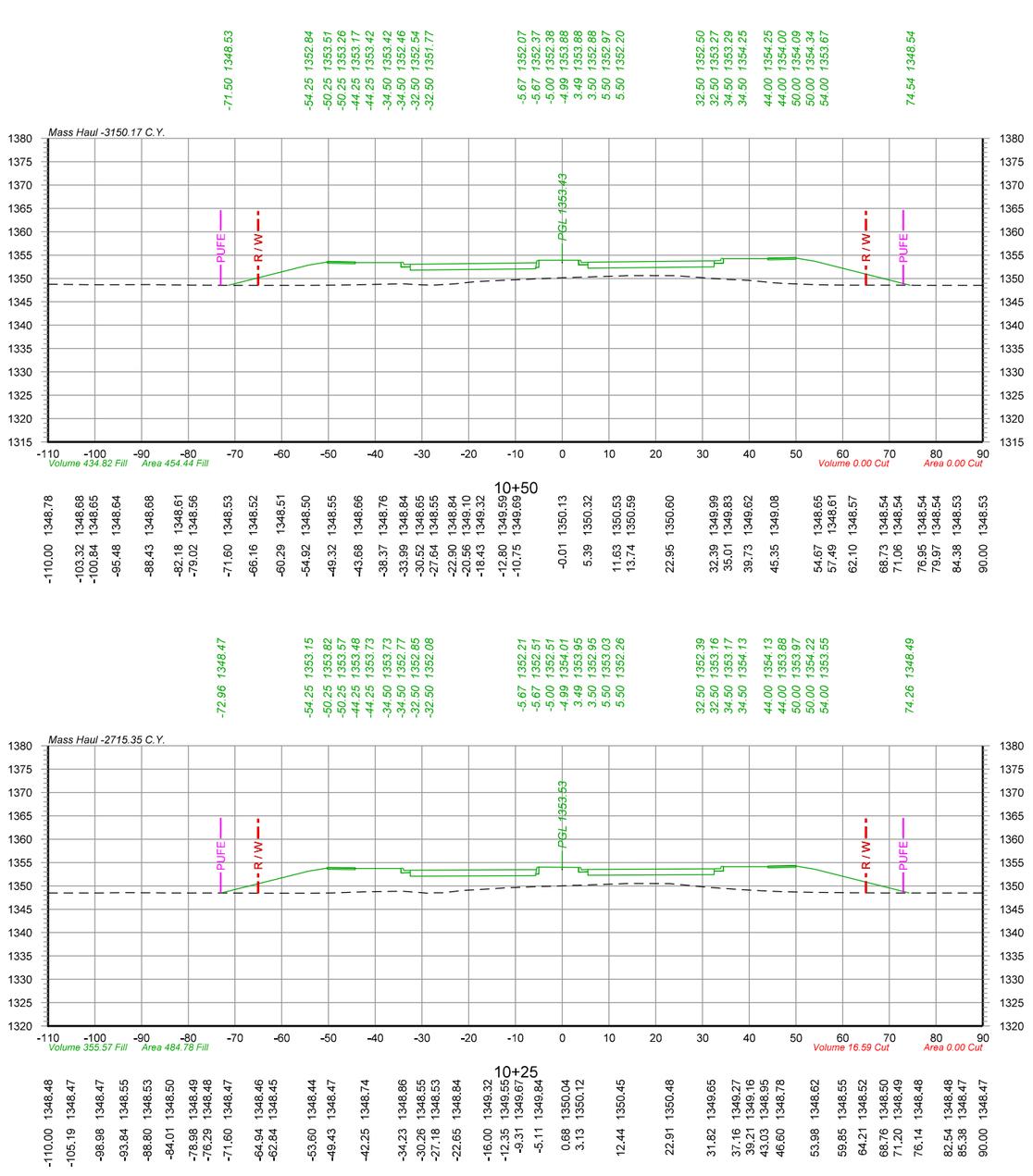
UNION PACIFIC RAILROAD

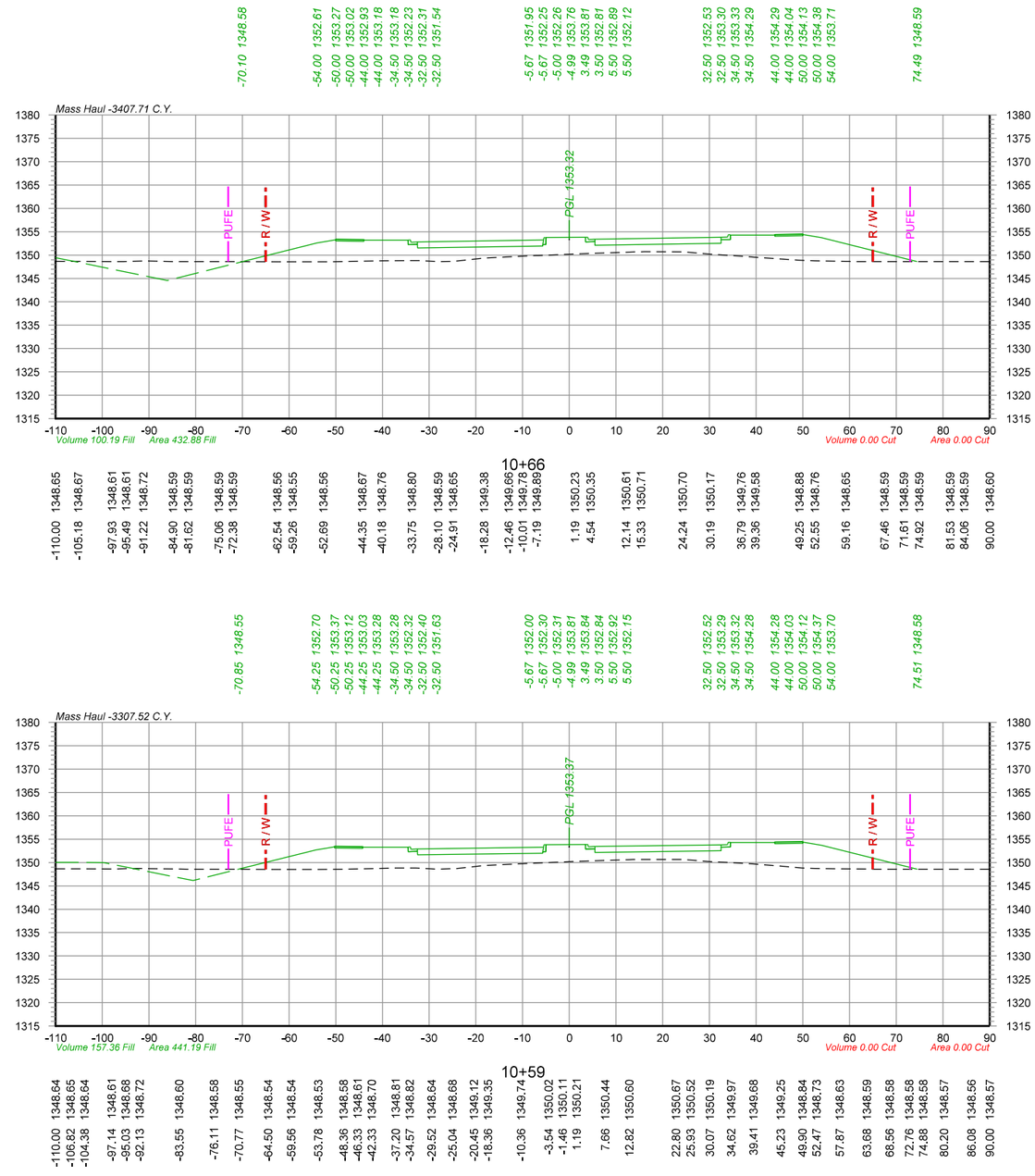
Sheet 392 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
PECOS RD CROSS SECTIONS STA.9+99 TO STA.10+05

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-RD_200927.dgn
Default
3/9/2026





olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X153 of 195

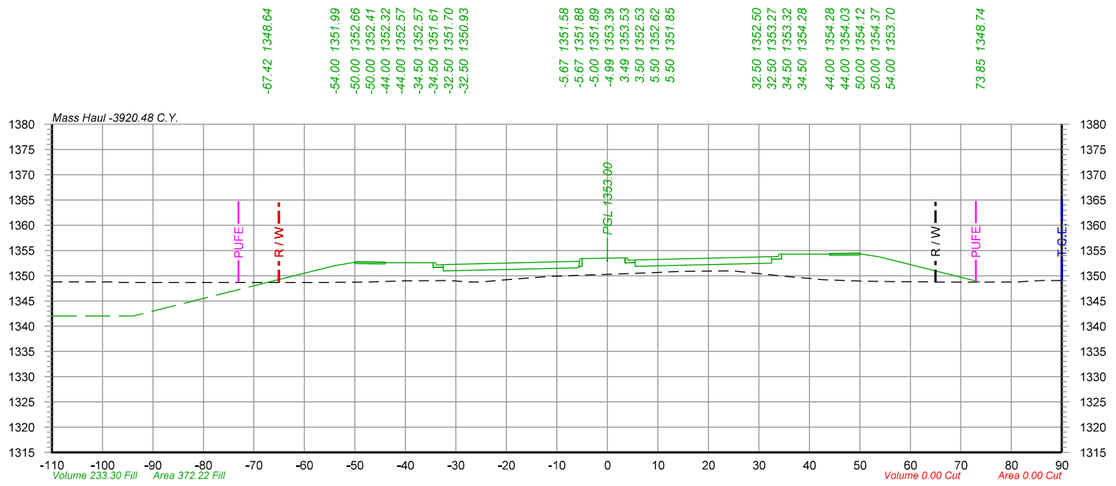
UNION PACIFIC RAILROAD

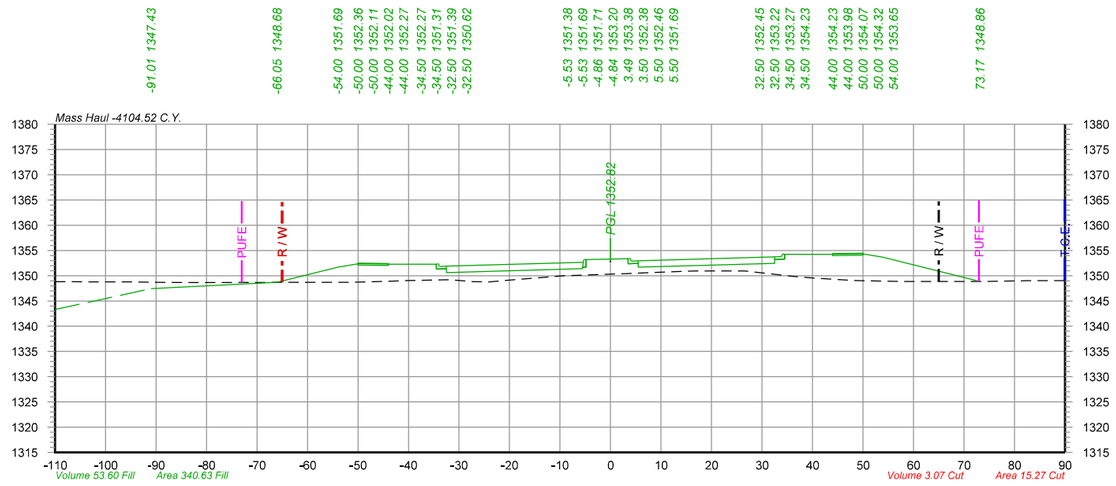
Sheet 393 of 587

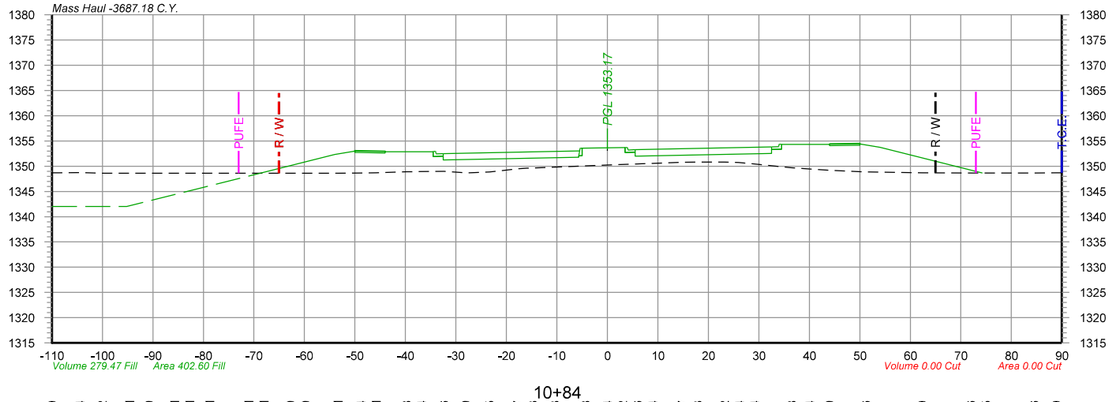
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

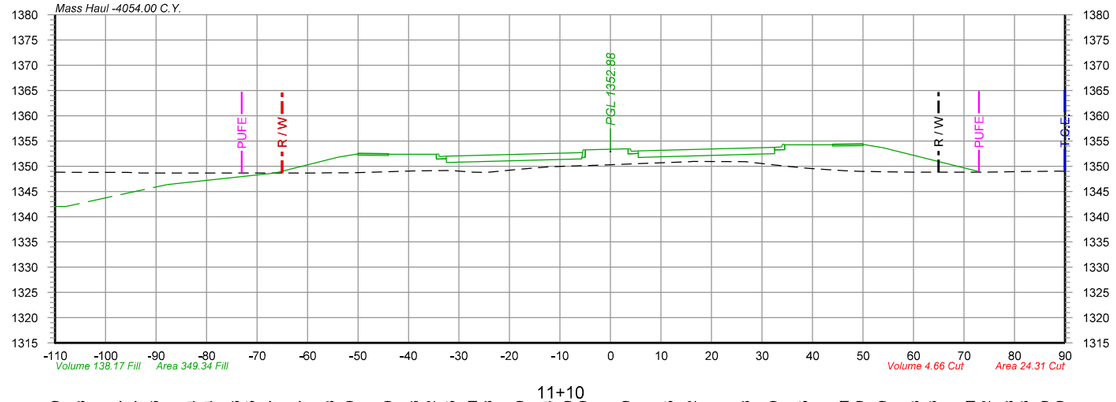
SHEET TITLE:
PECOS RD CROSS SECTIONS STA.10+25 TO STA.10+66

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-RD_200927.dgn
Default
3/9/2026









Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-RD_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

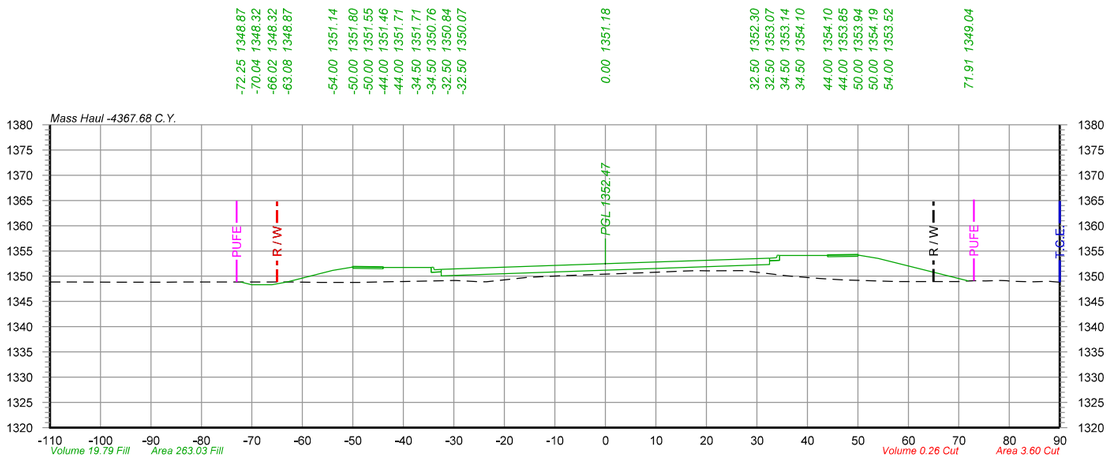
DRAWN BY:	DMJ
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	X154 of 195

UNION PACIFIC RAILROAD

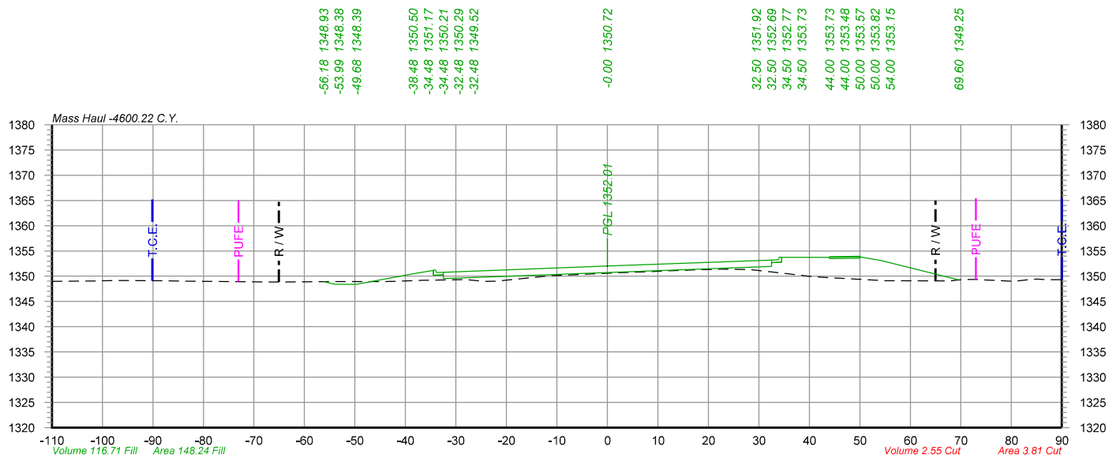
Sheet 394 of 587

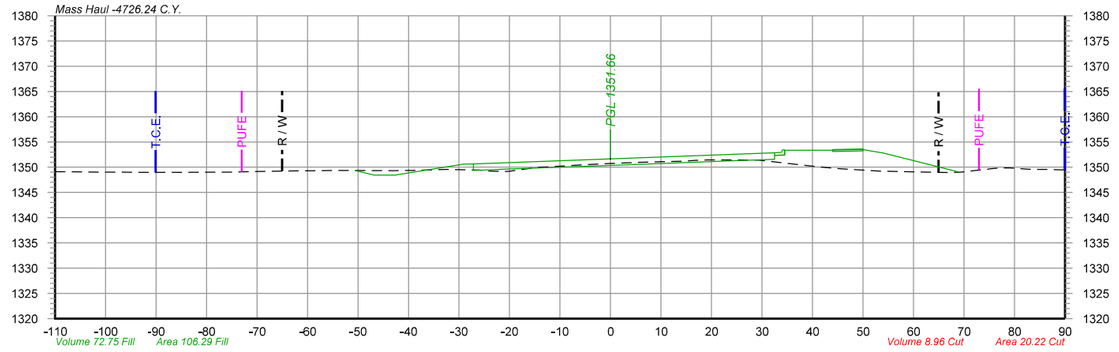
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
PECOS RD CROSS SECTIONS STA.10+84 TO STA.11+15


Mass Haul -4367.68 C.Y.
PUFE
R / W
PGL 1352.47
R / W
PUFE
T.O.E.
Volume 19.79 Fill
Area 263.03 Fill
Volume 0.26 Cut
Area 3.60 Cut

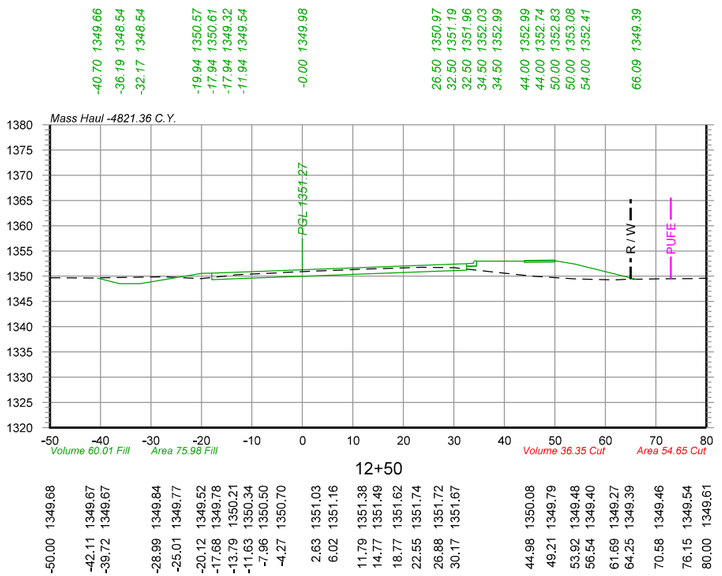
| | | |


Mass Haul -4600.22 C.Y.
T.C.E.
PUFE
R / W
PGL 1352.01
Volume 116.71 Fill
Area 148.24 Fill
Volume 2.55 Cut
Area 3.81 Cut


Mass Haul -4726.24 C.Y.
T.C.E.
PUFE
R / W
PGL 1351.66
Volume 72.75 Fill
Area 106.29 Fill
Volume 8.96 Cut
Area 20.22 Cut

11+70

| | | |



Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-RD_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

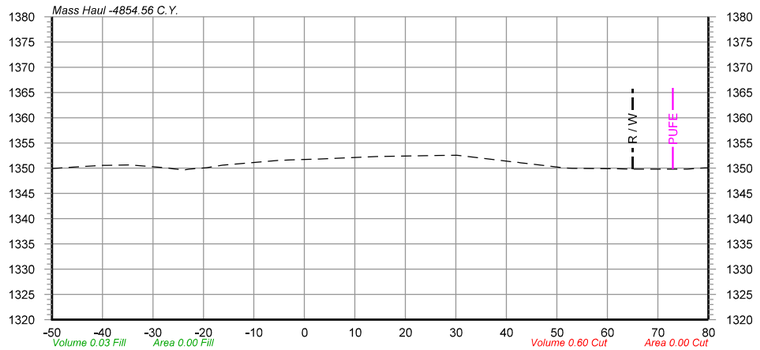
DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X157 of 195

UNION PACIFIC RAILROAD

Sheet 397 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
PECOS RD CROSS SECTIONS STA.12+30 TO STA.13+50


Mass Haul -4854.56 C.Y.
1380
1375
1370
1365
1360
1355
1350
1345
1340
1335
1330
1325
1320
-50 -40 -30 -20 -10 0 10 20 30 40 50 60 70 80
R / W
PUFE
Volume 0.03 Fill
Area 0.00 Fill
Volume 0.60 Cut
Area 0.00 Cut

14+10

| | | |

End Area Volume Report

Alignment Name: RD - E. Pecos Rd

Baseline Station	Station Quantities				Mass Ordinate
	Cut		Fill		
	Area	Volume	Area	Volume	
6+13.00	0.00	0.00	0.00	0.00	0.00
6+14.82	2.54	0.09	0.16	0.01	0.08
6+50.00	3.81	4.14	0.20	0.23	3.98
6+99.00	5.84	8.75	0.00	0.18	12.56
7+00.00	67.53	1.36	1.06	0.02	13.90
7+06.23	65.00	15.29	18.67	2.28	26.91
7+50.00	32.24	78.82	15.80	27.94	77.80
7+60.71	22.75	10.90	16.08	6.32	82.38
7+84.00	30.28	22.87	45.47	26.55	78.70
8+00.00	25.12	16.41	74.95	35.68	59.43
8+17.98	31.97	19.01	117.59	64.11	14.33
8+21.54					0.00
8+30.76	33.23	15.43	165.19	66.93	-37.17
8+45.00	34.30	17.81	230.51	104.33	-123.69
8+48.00	34.40	3.82	256.80	27.07	-146.95
8+50.00	34.79	2.56	262.25	19.22	-163.61
8+67.20	32.84	21.54	306.85	181.27	-323.34
8+69.20	32.74	2.43	318.24	23.13	-344.04
8+96.65	27.70	30.73	380.93	355.49	-668.81
9+00.00	28.00	3.45	383.31	47.34	-712.70
9+31.00	40.52	39.33	445.43	475.76	-1149.12
9+40.12	38.41	13.33	468.42	154.34	-1290.13
9+50.00	36.85	13.77	479.01	173.34	-1449.71
9+59.39	36.63	12.78	491.27	168.80	-1605.73
9+65.22	36.43	7.88	501.76	107.05	-1704.90
9+90.00	41.82	35.91	495.57	457.74	-2126.73
9+94.53	42.74	7.10	488.83	82.61	-2202.24
9+99.38	43.52	7.75	486.31	87.56	-2282.06
10+00.00	43.64	1.00	485.82	11.15	-2292.21
10+00.72	43.77	1.17	485.32	12.97	-2304.01
10+05.16	45.16	7.32	483.16	79.67	-2376.36
10+25.00	0.00	16.59	484.78	355.57	-2715.35
10+50.00	0.00	0.00	454.44	434.82	-3150.17
10+59.49	0.00	0.00	441.19	157.36	-3307.52
10+65.68	0.00	0.00	432.88	100.19	-3407.71
10+83.74	0.00	0.00	402.60	279.47	-3687.18
11+00.00	0.00	0.00	372.22	233.30	-3920.48
11+10.34	24.31	4.66	349.34	138.17	-4054.00
11+14.54	15.27	3.07	340.63	53.60	-4104.52
11+36.74	3.53	7.73	270.72	251.36	-4348.15
11+38.74	3.60	0.26	263.03	19.79	-4367.68
11+49.00	3.58	1.37	236.51	94.91	-4461.23
11+50.00	3.43	0.13	240.72	8.84	-4469.93
11+52.00	3.83	0.27	201.88	16.39	-4486.06
11+70.00	3.81	2.55	148.24	116.71	-4600.22
11+82.92	8.10	2.85	123.74	65.08	-4662.44
12+00.00	20.22	8.96	106.29	72.75	-4726.24
12+30.00	43.49	35.39	86.04	106.85	-4797.70
12+50.00	54.65	36.35	75.98	60.01	-4821.36
13+00.00	58.03	104.34	66.82	132.22	-4849.24
13+40.00	55.99	84.46	59.79	93.79	-4858.57
13+42.00	5.35	2.27	4.49	2.38	-4858.68
13+50.00	4.99	1.53	4.45	1.32	-4858.47
14+00.00	3.25	7.63	0.18	4.29	-4855.13
14+10.00	0.00	0.60	0.00	0.03	-4854.56
Grand Total:		**743.74**		**5598.30**	

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-RD_200927.dgn
Default
3/9/2026

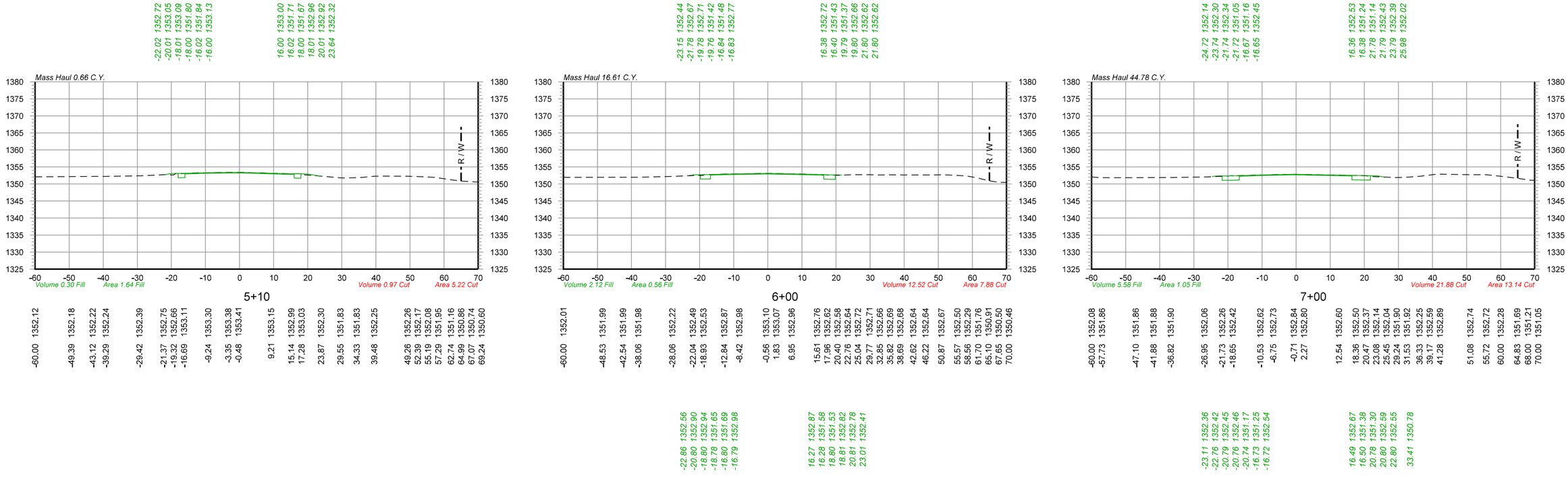
olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X159 of 195

UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
PECOS RD EARTHWORK SUMMARY



Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-RD_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	DMJ
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	X160 of 195

UNION PACIFIC RAILROAD

Sheet 400 of 587

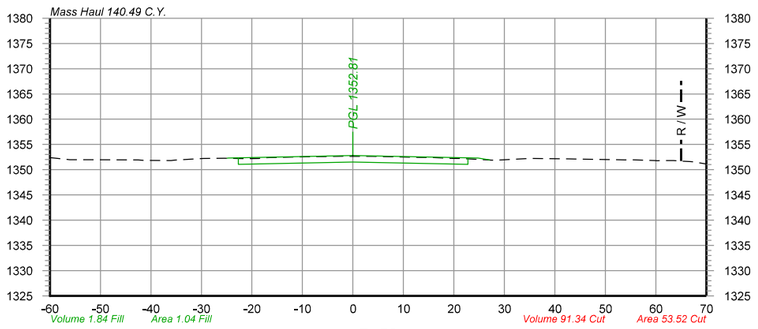
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SOSS RD (TRK 101) CROSS SECTIONS STA.5+00 TO STA.7+00

-25.00 1352.27
-24.70 1352.32
-22.70 1352.36
-22.70 1351.06
-16.70 1351.18

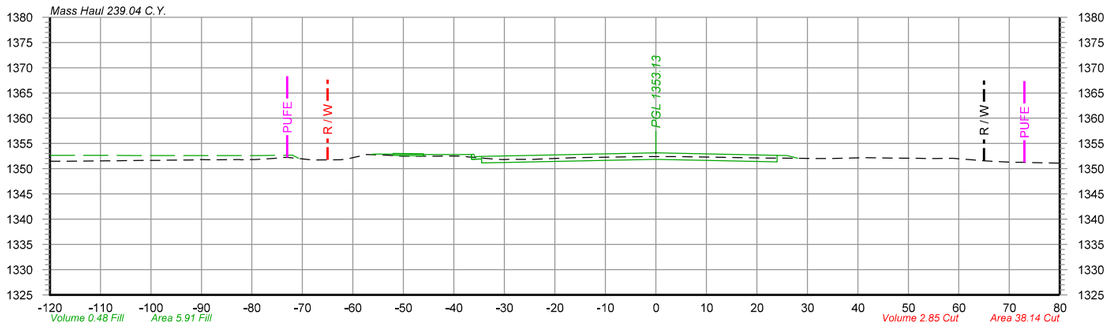
-0.00 1351.52

16.77 1351.18
22.77 1351.06
22.77 1352.35
24.77 1352.31
27.14 1351.92



7+50

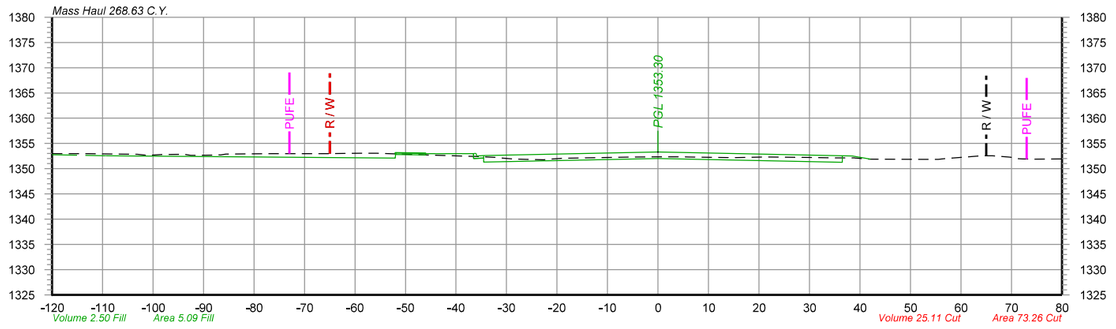
| | | |



-56.43	1352.78
-56.00	1352.88
-52.00	1352.88
-52.00	1352.63
-46.00	1352.54
-46.00	1352.79
-36.50	1352.79
-36.50	1351.83
-34.50	1351.92
-34.50	1351.15
0.00	1351.84
18.00	1351.48
24.00	1351.36
24.02	1352.65
26.02	1352.61
28.13	1352.08

8+12

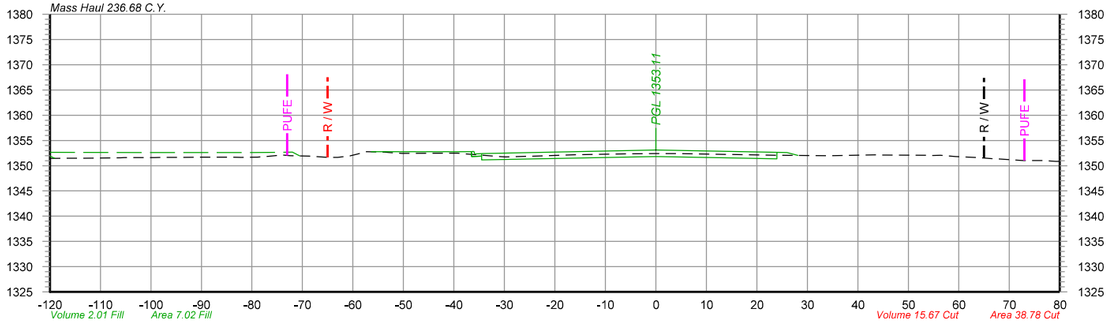
-120.00	1351.46	-116.78	1351.47	-112.65	1351.52	-108.39	1351.57	-105.06	1351.61	-101.59	1351.64	-99.37	1351.65	-91.92	1351.73	-88.30	1351.76	-86.27	1351.76	-82.73	1351.79	-79.87	1351.79	-75.35	1352.05	-72.82	1352.22	-68.35	1351.75	-62.44	1351.78	-57.45	1352.76	-53.26	1352.69	-50.26	1352.47	-43.95	1352.49	-40.13	1352.50	-35.56	1352.21	-31.15	1351.86	-28.87	1351.86	-25.71	1351.83	-23.40	1351.91	-16.11	1352.17	-12.78	1352.23	-5.28	1352.36	-2.20	1352.38	1.43	1352.39	4.72	1352.38	11.90	1352.25	14.72	1352.22	21.77	1352.11	24.72	1352.12	31.64	1352.03	34.72	1352.04	41.51	1352.17	44.22	1352.12	46.41	1352.11	52.16	1352.07	55.36	1352.03	58.77	1352.05	63.57	1351.69	66.38	1351.49	69.82	1351.33	72.75	1351.25	77.75	1351.13	80.00	1351.08



-109.32	1352.55
-52.00	1352.09
-52.00	1352.80
-46.00	1352.71
-46.00	1352.96
-36.50	1352.96
-36.50	1352.00
-34.50	1352.08
-34.50	1351.31
-0.00	1352.00
30.50	1351.39
36.50	1351.27
36.51	1352.56
38.51	1352.52
42.10	1351.89

8+31

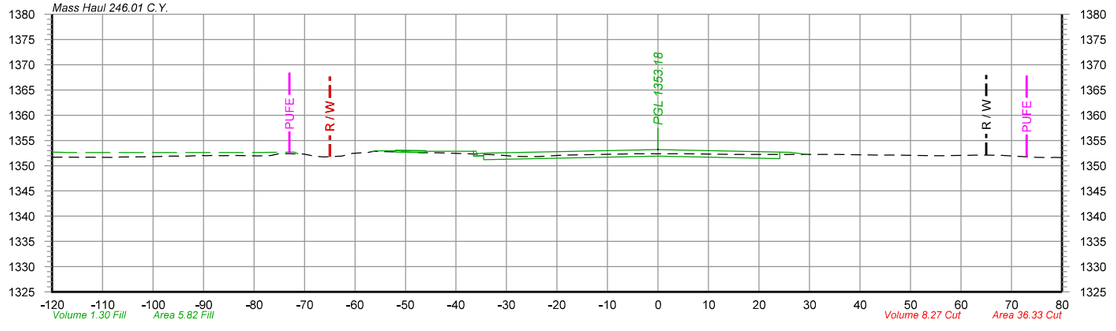
-120.00	1352.98	-112.86	1352.97	-106.92	1352.88	-103.09	1352.87	-101.04	1352.63	-98.32	1352.80	-93.79	1352.84	-91.57	1352.66	-88.43	1352.69	-85.59	1352.88	-81.55	1352.94	-76.46	1352.98	-70.87	1352.98	-65.57	1352.98	-62.69	1353.03	-59.07	1353.05	-55.67	1353.05	-45.95	1352.73	-35.10	1352.39	-32.78	1352.26	-28.79	1351.92	-26.19	1351.86	-22.63	1351.77	-19.02	1352.06	-7.31	1352.28	-5.04	1352.32	-0.25	1352.36	4.25	1352.34	14.96	1352.21	20.95	1352.31	26.06	1352.28	30.10	1352.21	34.98	1352.16	38.89	1352.13	41.73	1351.89	52.37	1351.84	54.74	1351.85	57.04	1352.04	60.99	1352.31	63.04	1352.49	65.53	1352.56	69.45	1352.29	72.23	1351.94	74.59	1351.89	80.00	1351.94



-56.41	1352.76
-40.50	1352.77
-36.50	1352.77
-36.50	1351.82
-34.50	1351.90
-34.50	1351.13
0.00	1351.82
17.96	1351.46
23.96	1351.34
23.98	1352.63
25.98	1352.59
28.19	1352.04

8+10

-120.00	1351.45	-116.54	1351.46	-113.15	1351.50	-106.04	1351.58	-99.23	1351.62	-97.19	1351.64	-93.72	1351.64	-89.97	1351.68	-86.57	1351.67	-84.43	1351.68	-82.15	1351.67	-79.24	1351.68	-76.72	1351.84	-74.14	1352.11	-68.67	1351.91	-64.97	1351.65	-60.58	1351.95	-57.29	1352.77	-53.71	1352.69	-50.29	1352.43	-40.78	1352.47	-37.93	1352.37	-31.03	1351.83	-25.83	1351.84	-15.47	1352.19	-5.31	1352.37	-0.41	1352.41	3.81	1352.39	13.84	1352.23	23.71	1352.08	33.59	1351.97	43.46	1352.14	53.65	1352.06	56.35	1352.05	59.33	1351.82	62.01	1351.70	66.52	1351.41	72.69	1351.00	76.74	1351.02	79.20	1350.88



-56.57	1352.79
-56.00	1352.93
-52.00	1352.93
-52.00	1352.68
-46.00	1352.59
-46.00	1352.84
-36.50	1352.84
-36.50	1351.88
-34.50	1351.97
-34.50	1351.20
0.00	1351.89
18.12	1351.52
24.12	1351.40
24.14	1352.69
26.14	1352.65
29.62	1352.22

8+18

-120.00	1351.67	-116.42	1351.70	-113.98	1351.66	-108.87	1351.64	-105.94	1351.72	-100.35	1351.79	-97.90	1351.86	-95.79	1351.91	-93.24	1351.90	-90.30	1352.02	-86.33	1352.00	-83.54	1352.00	-79.39	1351.94	-76.61	1352.01	-74.56	1352.38	-70.19	1352.30	-66.20	1351.72	-62.65	1351.89	-60.50	1352.44	-57.28	1352.66	-48.23	1352.63	-43.96	1352.56	-32.91	1352.20	-30.37	1352.01	-26.73	1351.83	-23.64	1351.80	-18.49	1352.10	-6.63	1352.32	-4.04	1352.36	-0.35	1352.37	3.66	1352.36	6.05	1352.34	14.80	1352.23	24.80	1352.23	34.80	1352.23	43.37	1352.12	47.06	1352.10	51.10	1352.02	54.43	1352.00	56.56	1351.99	58.89	1352.01	61.94	1352.08	67.09	1352.07	71.27	1351.86	75.11	1351.67	77.83	1351.62	79.83	1351.63

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-RD_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

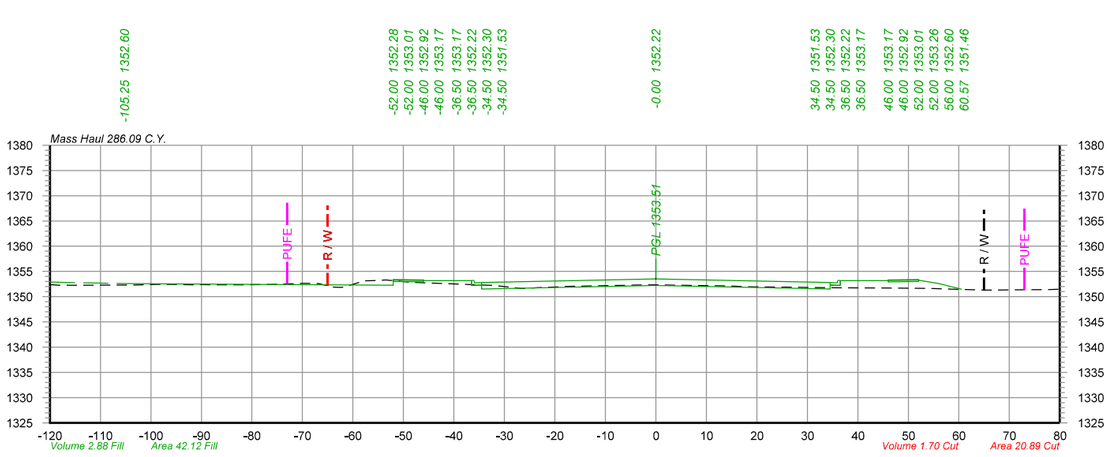
DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X162 of 195

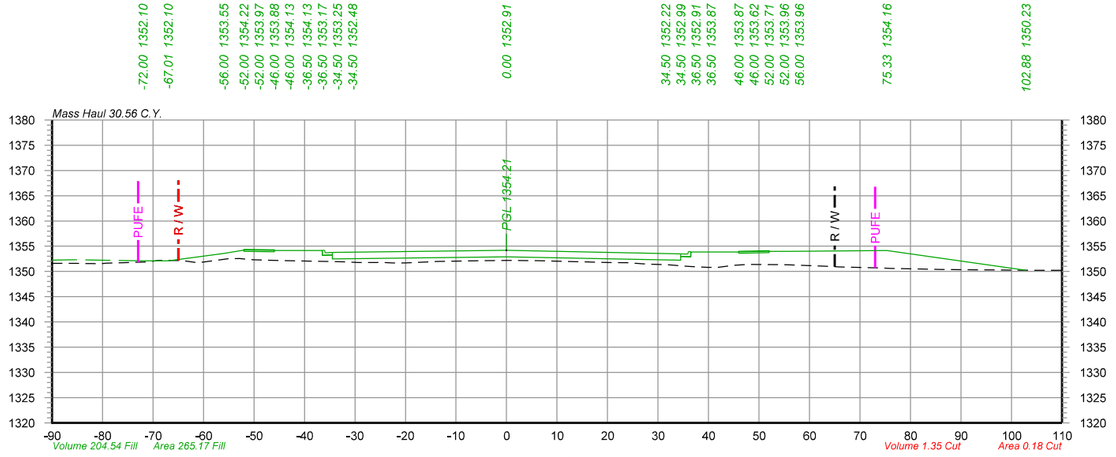
UNION PACIFIC RAILROAD

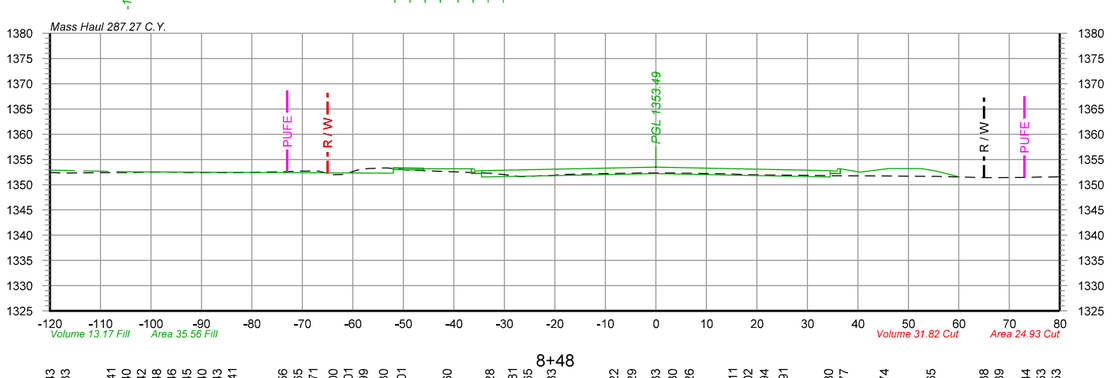
Sheet 402 of 587

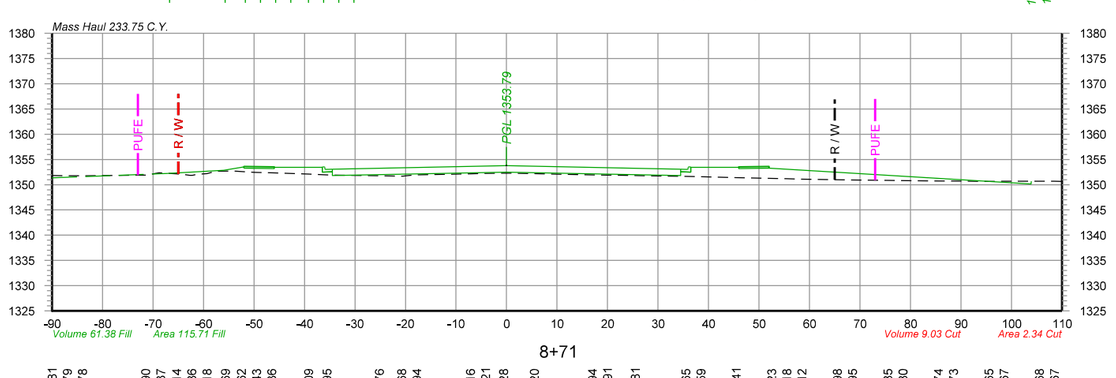
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SOSS RD (TRK 101) CROSS SECTIONS STA.8+10 TO STA.8+31









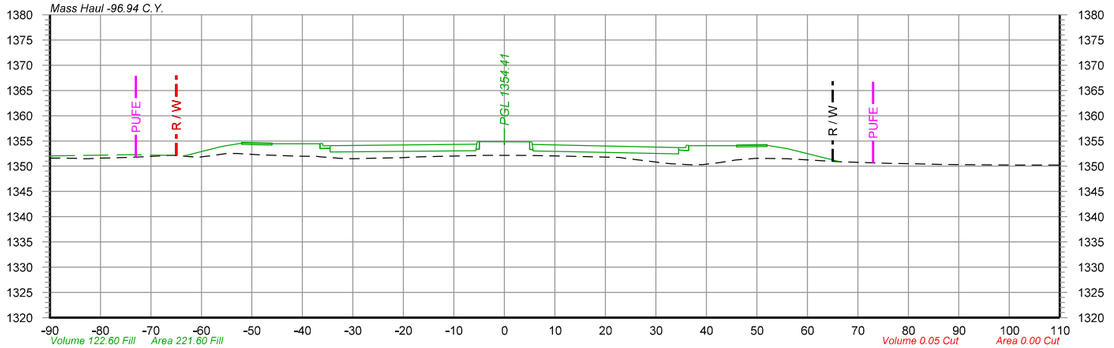
olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

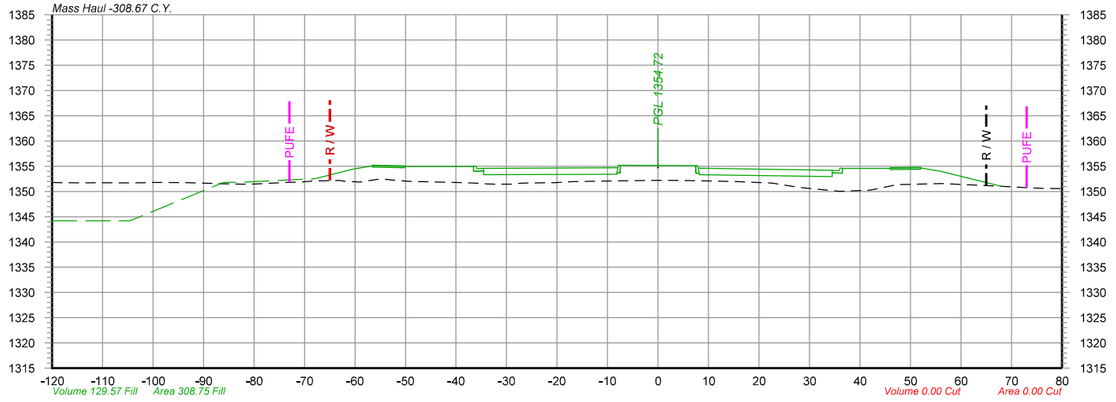
DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X163 of 195

UNION PACIFIC RAILROAD
Sheet 403 of 587
LOCATION & DESCRIPTION: Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track
SHEET TITLE: SOSS RD (TRK 101) CROSS SECTIONS STA.8+48 TO STA.9+00

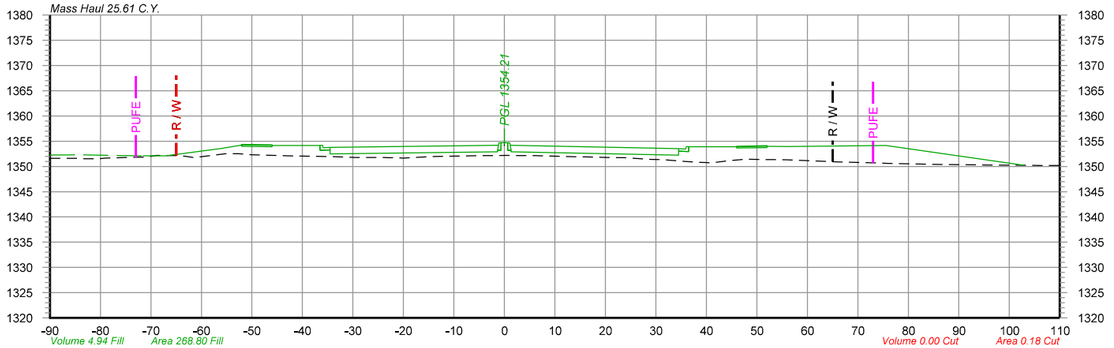
Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-RD_200927.dgn
Default
3/9/2026



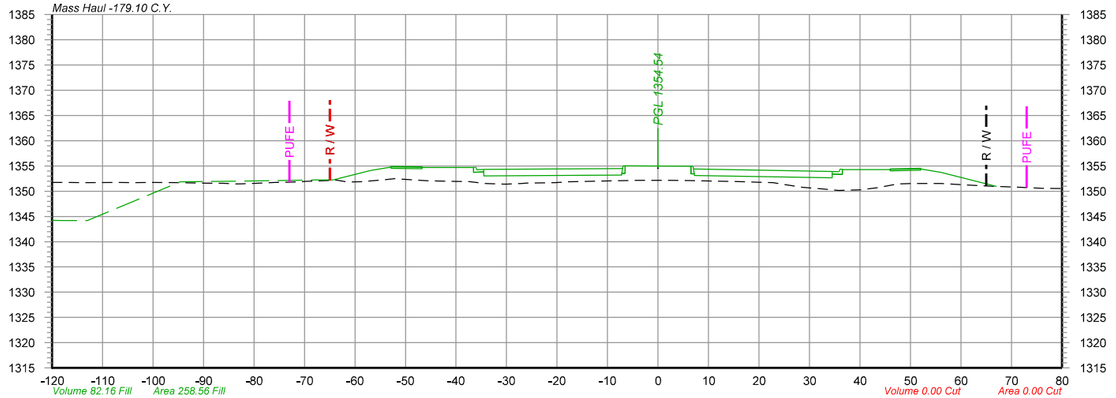
9+14



9+36



9+01



9+23

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	DMJ
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	X164 of 195

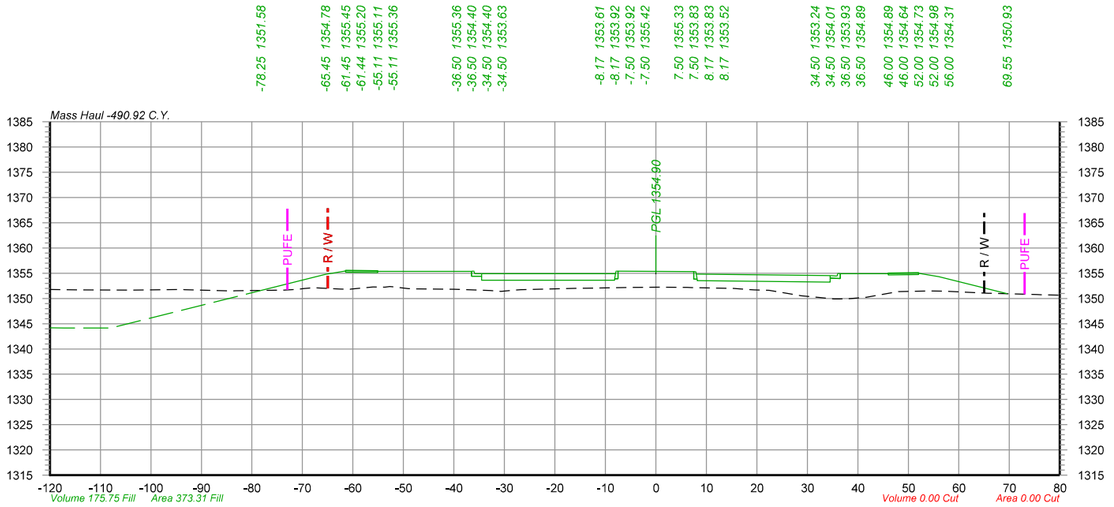
UNION PACIFIC RAILROAD

Sheet 404 of 587

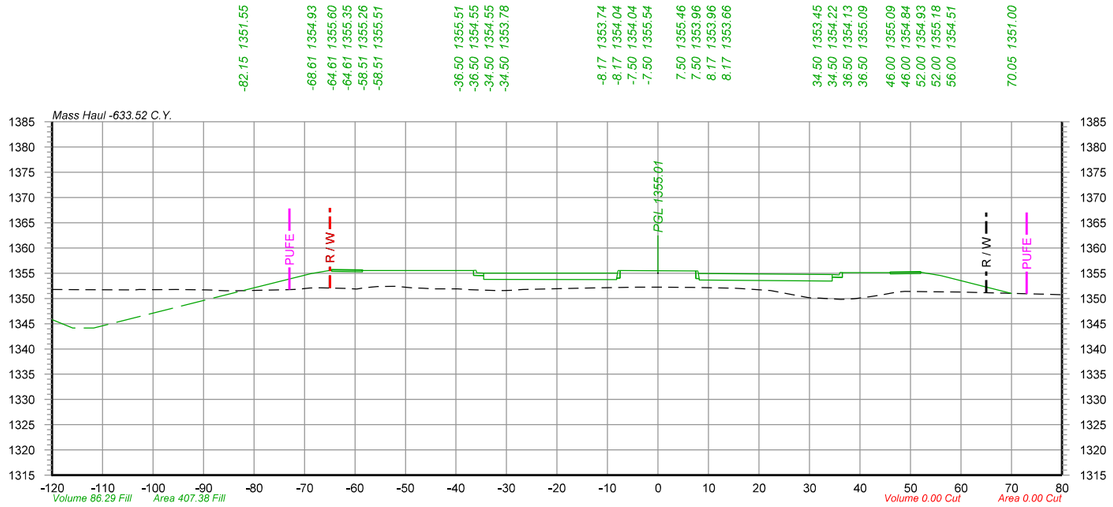
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SOSS RD (TRK 101) CROSS SECTIONS STA.9+01 TO STA.9+36

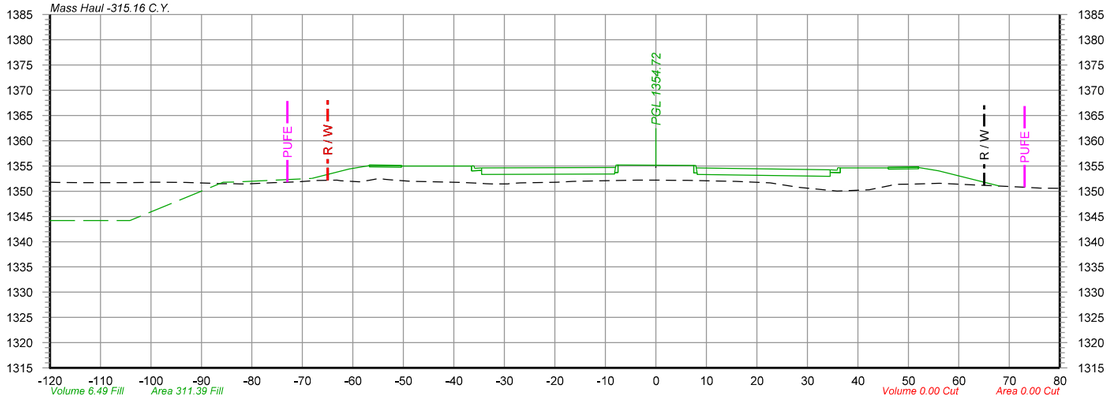
Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RL_TK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05.Cross Sections\T.X
Default
3/9/2026



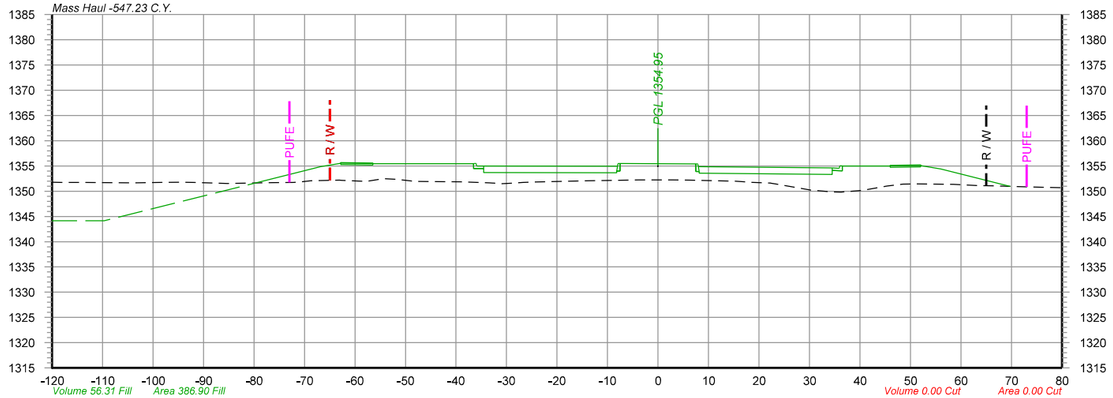
9+50



9+60



9+36



9+54

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X165 of 195

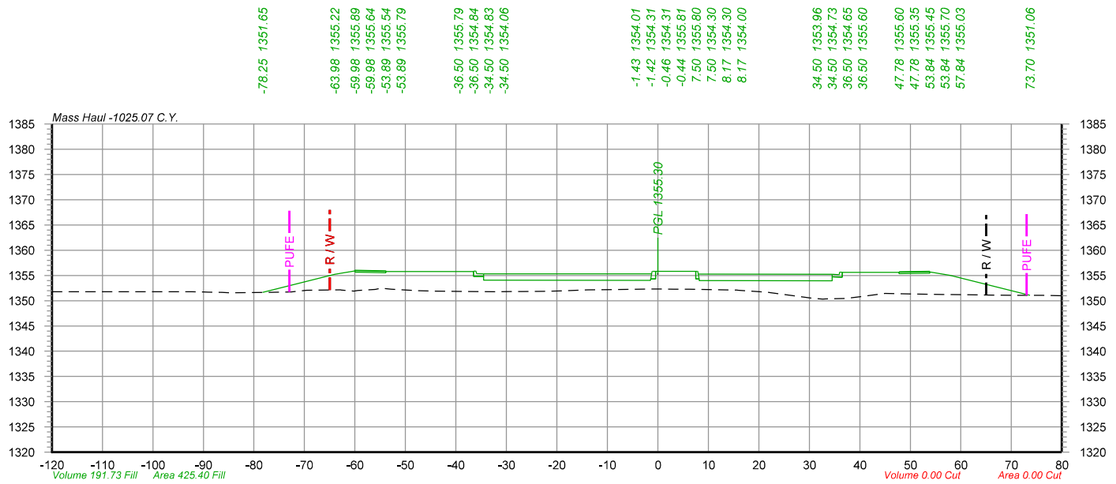
UNION PACIFIC RAILROAD

Sheet 405 of 587

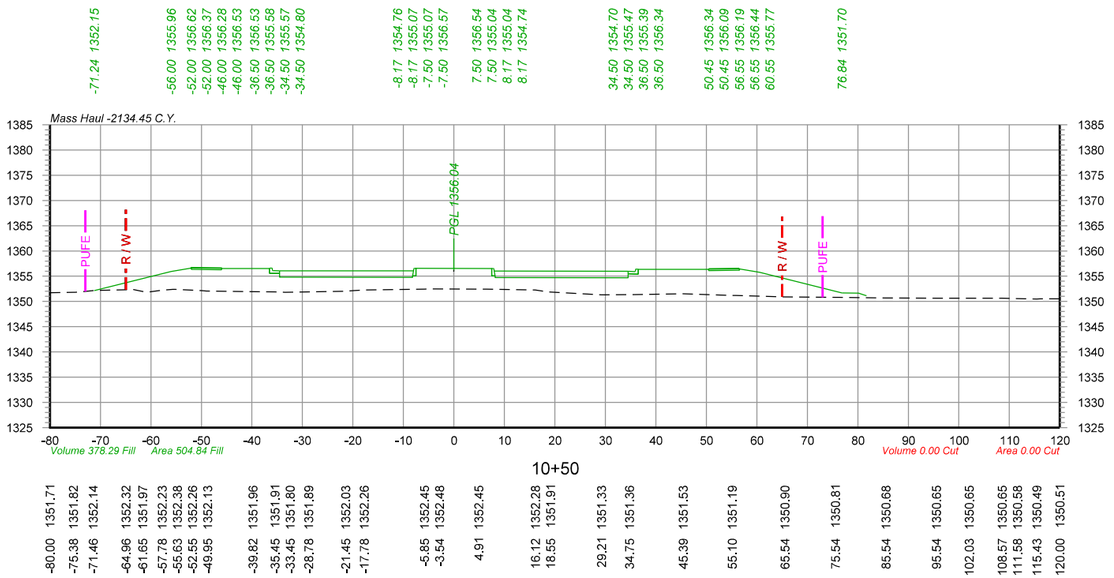
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SOSS RD (TRK 101) CROSS SECTIONS STA.9+36 TO STA.9+60

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RL_TK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05.Cross Sections\T_XSC-RD_200927.dgn
Default
3/9/2026


Mass Haul -1025.07 C.Y.
PUFE
R / W
PGL 1355.99
R / W
PUFE
Volume 191.73 Fill
Area 425.40 Fill
Volume 0.00 Cut
Area 0.00 Cut

| | | |



Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-RD_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

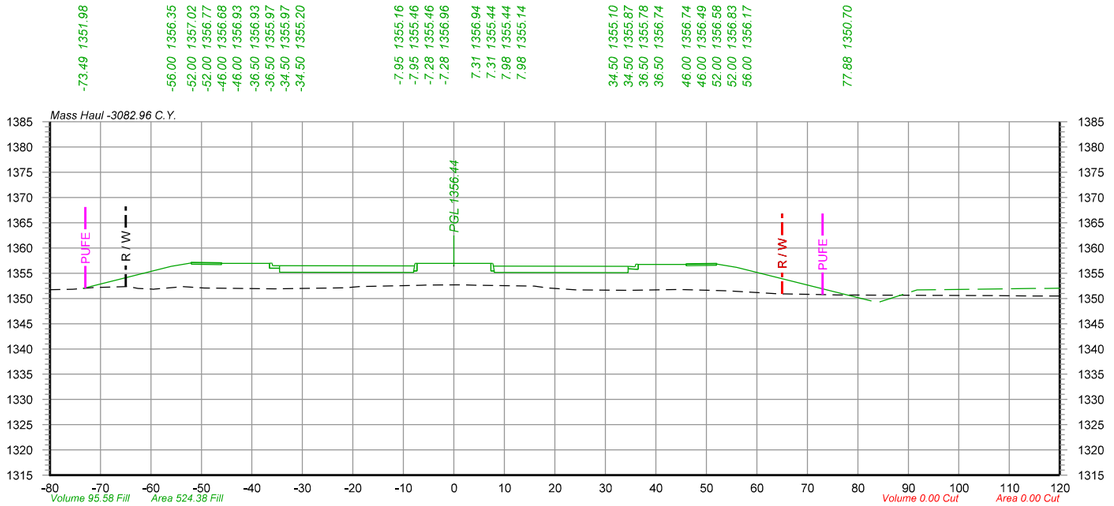
DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X167 of 195

UNION PACIFIC RAILROAD

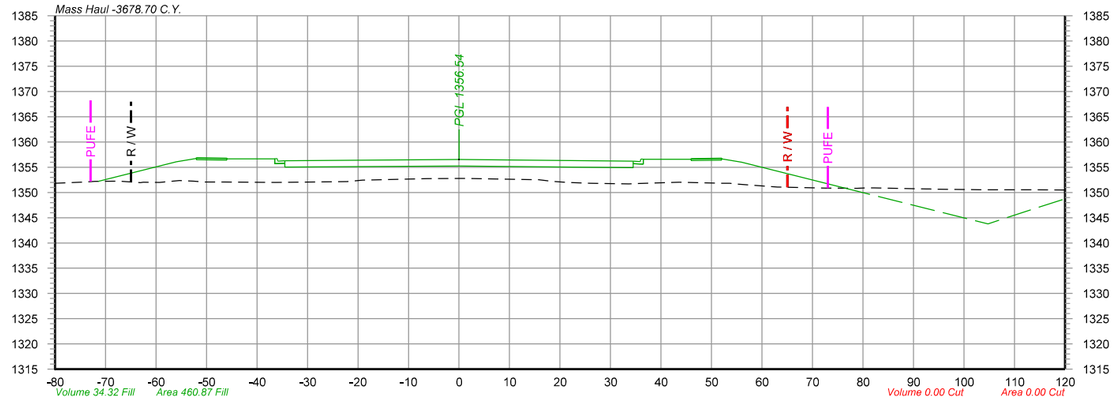
Sheet 407 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

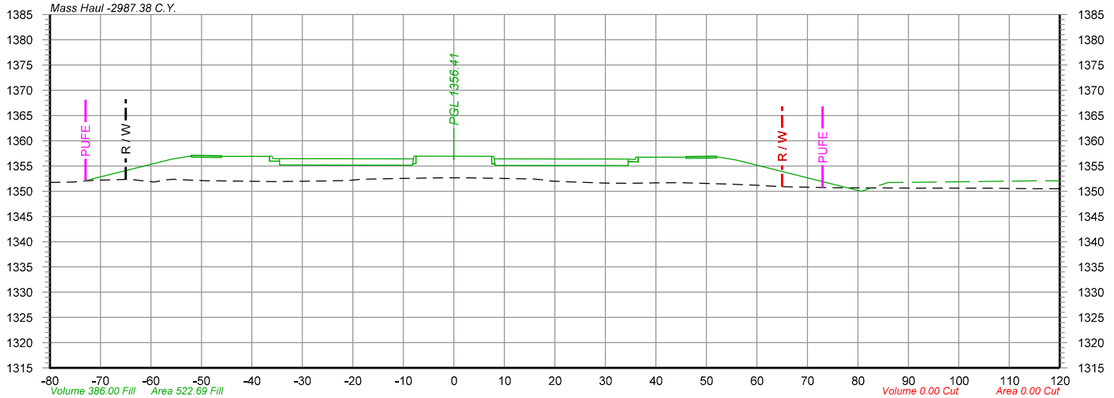
SHEET TITLE:
SOSS RD (TRK 101) CROSS SECTIONS STA.10+29 TO STA.10+75



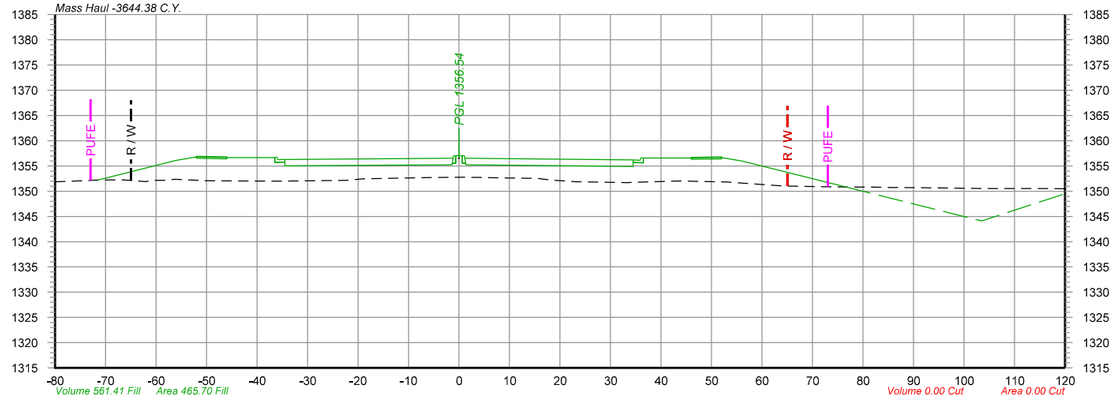
11+00



11+33



10+95



11+31

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X168 of 195

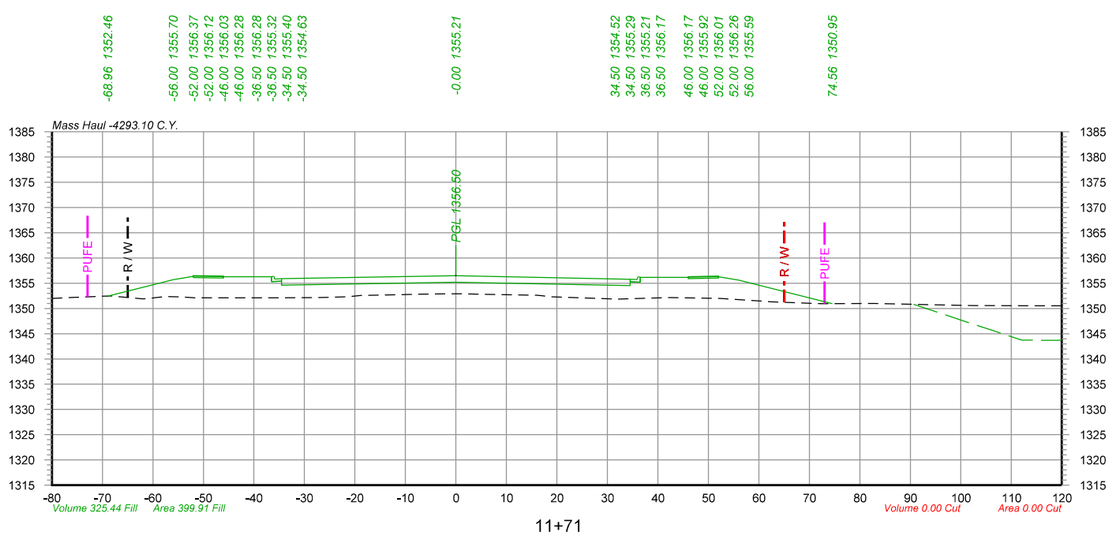
UNION PACIFIC RAILROAD

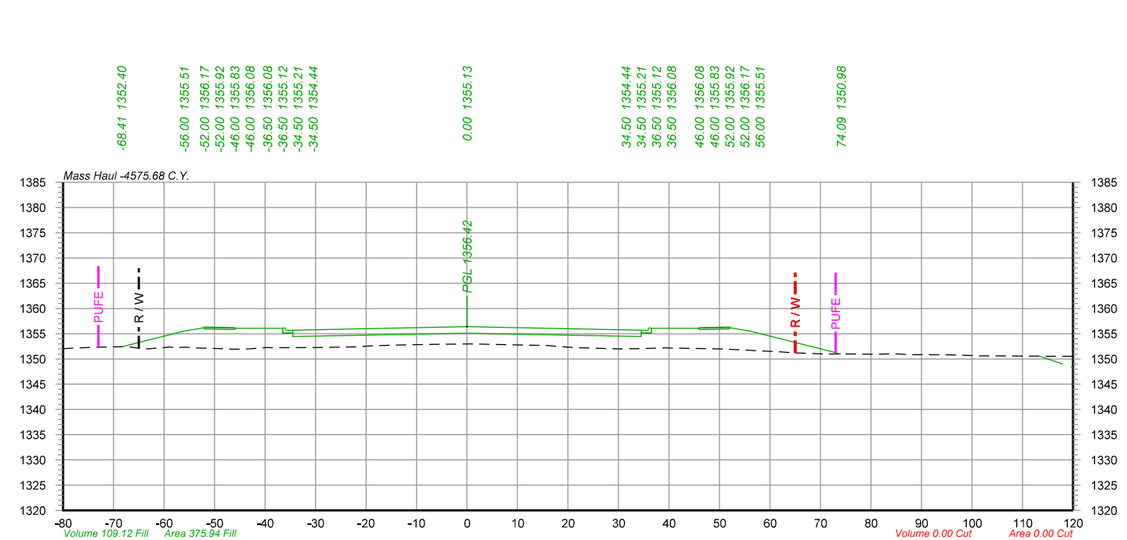
Sheet 408 of 587

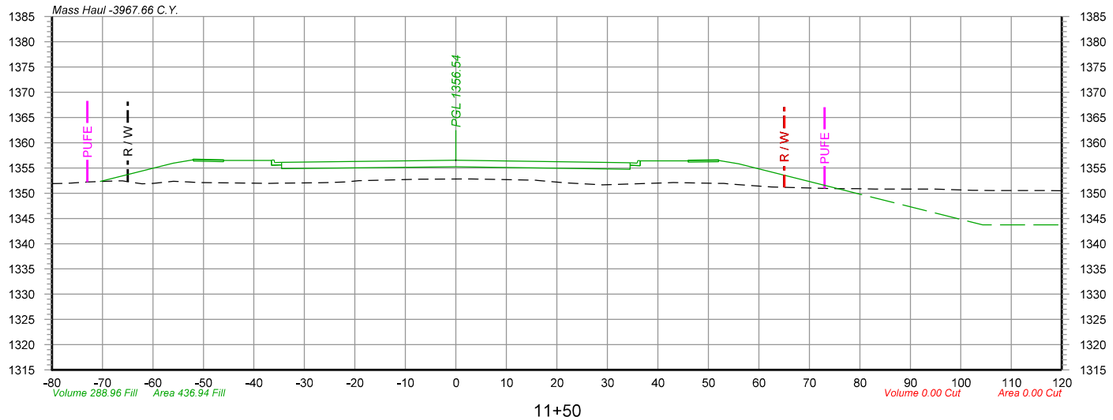
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

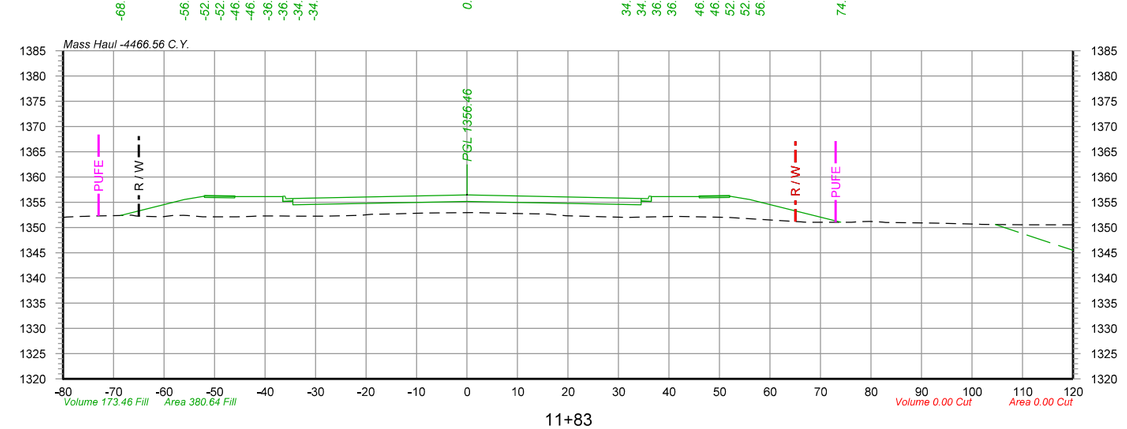
SHEET TITLE:
SOSS RD (TRK 101) CROSS SECTIONS STA.10+95 TO STA.11+33

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RL_TK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05.Cross Sections\T.XSC-RD_200927.dgn
Default
3/9/2026









olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X169 of 195

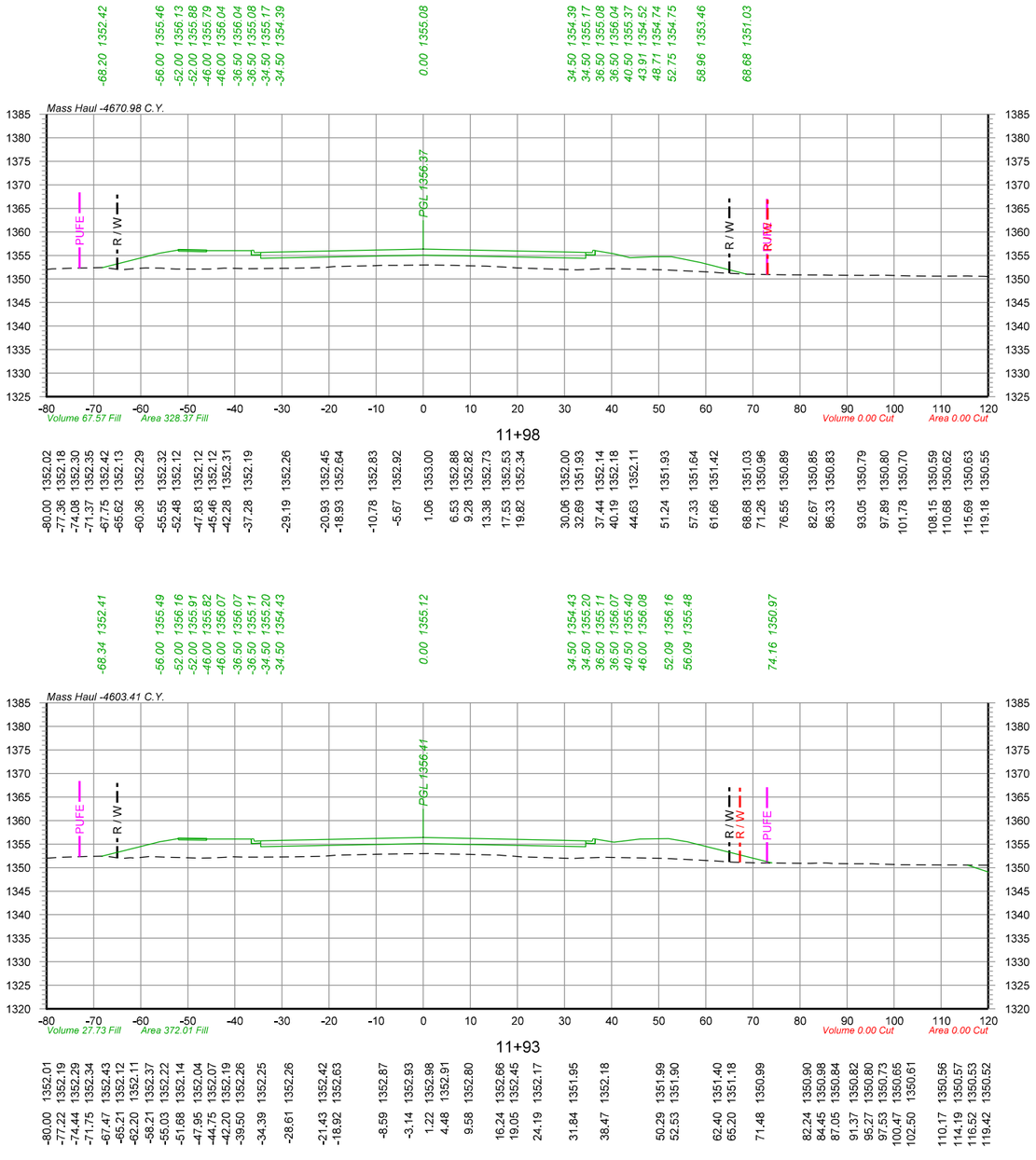
UNION PACIFIC RAILROAD

Sheet 409 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SOSS RD (TRK 101) CROSS SECTIONS STA.11+50 TO STA.11+91

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-RD_
Default
3/9/2026



Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-RD_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

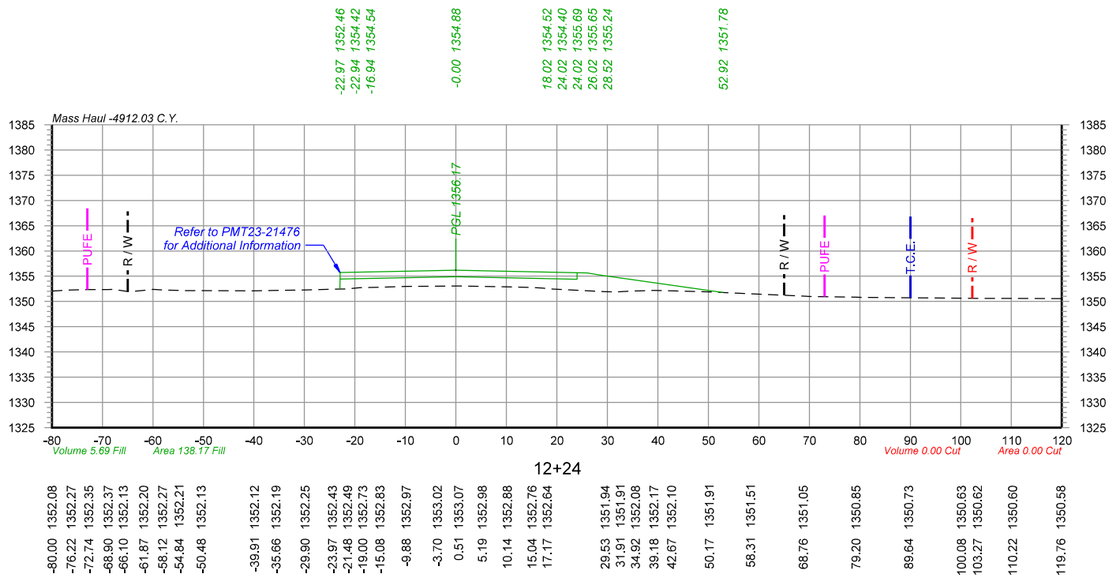
DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X170 of 195

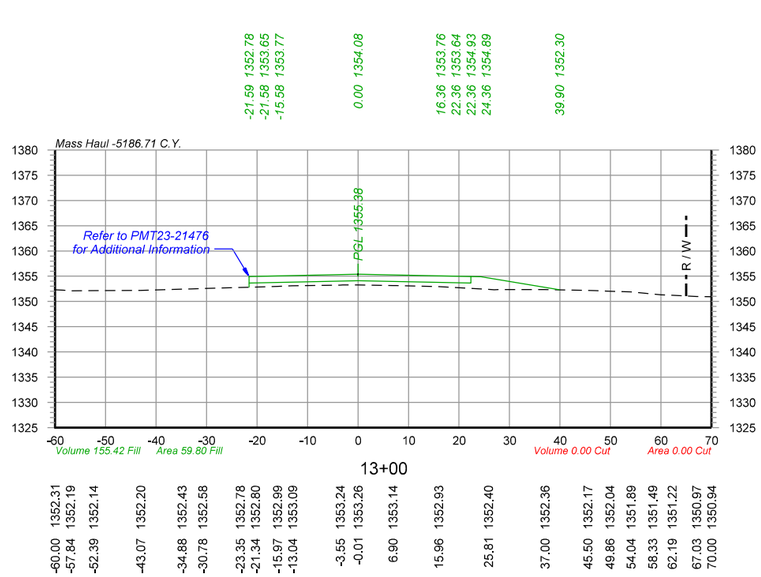
UNION PACIFIC RAILROAD

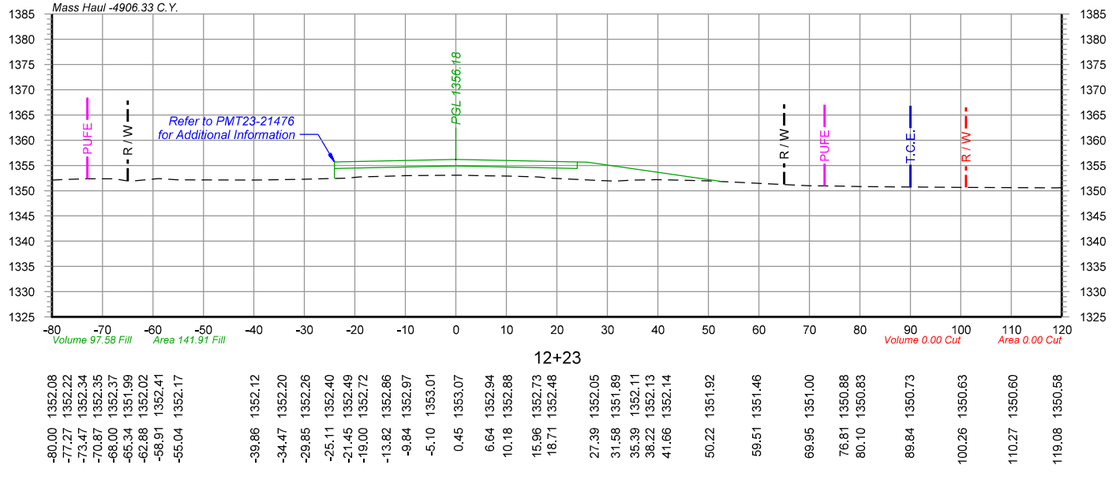
Sheet 410 of 587

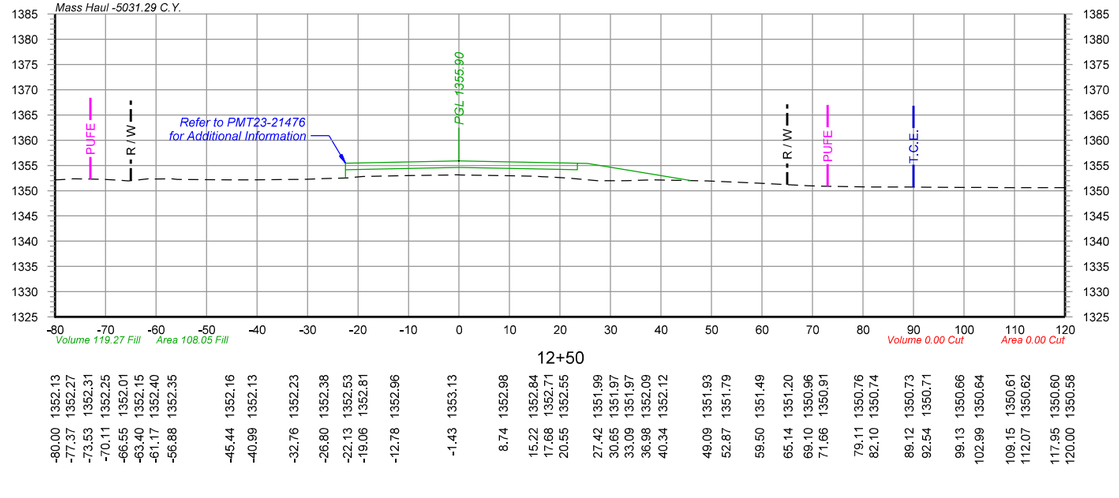
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SOSS RD (TRK 101) CROSS SECTIONS STA.11+93 TO STA.12+10









olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X171 of 195

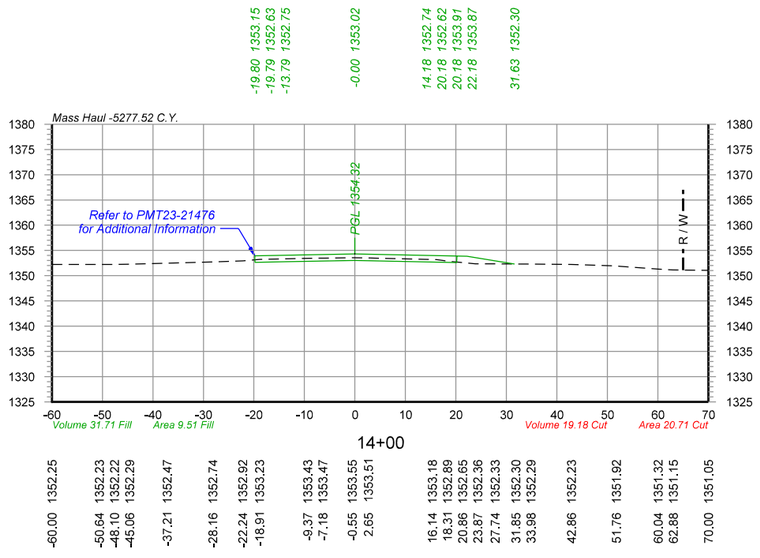
UNION PACIFIC RAILROAD

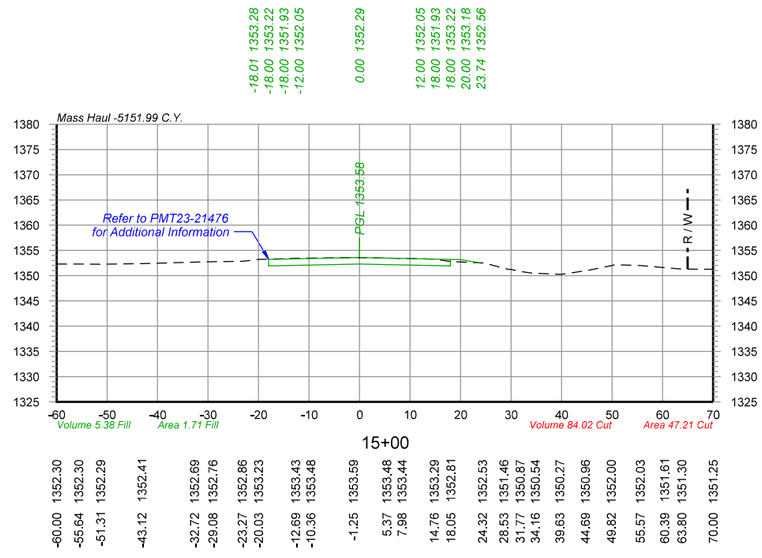
Sheet 411 of 587

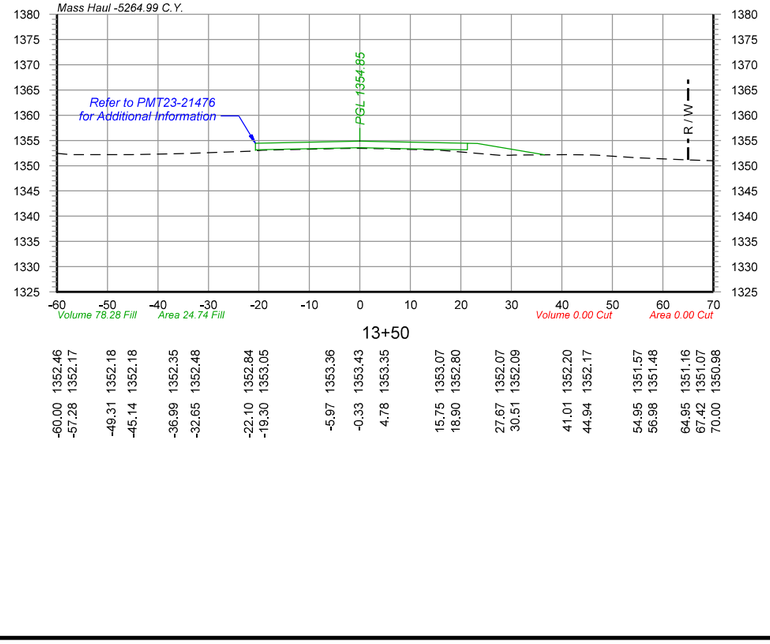
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

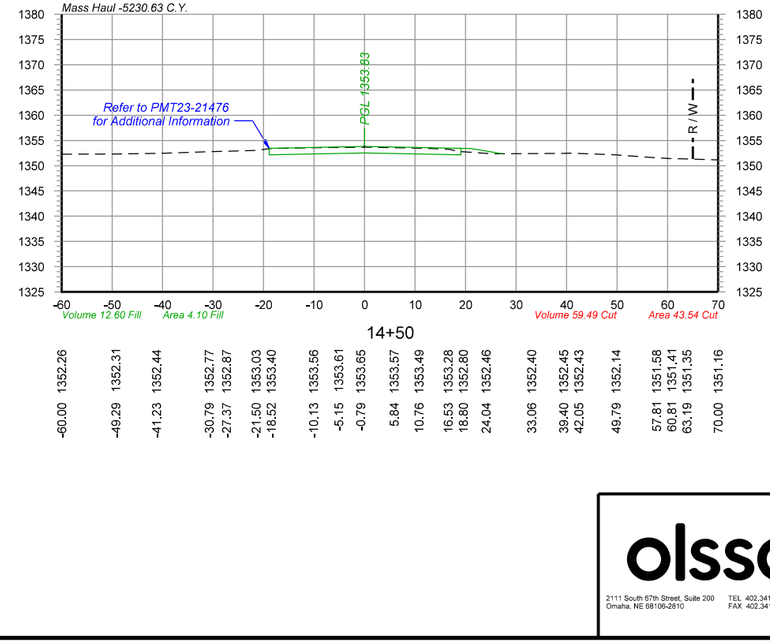
SHEET TITLE:
SOSS RD (TRK 101) CROSS SECTIONS STA.12+23 TO STA.13+00

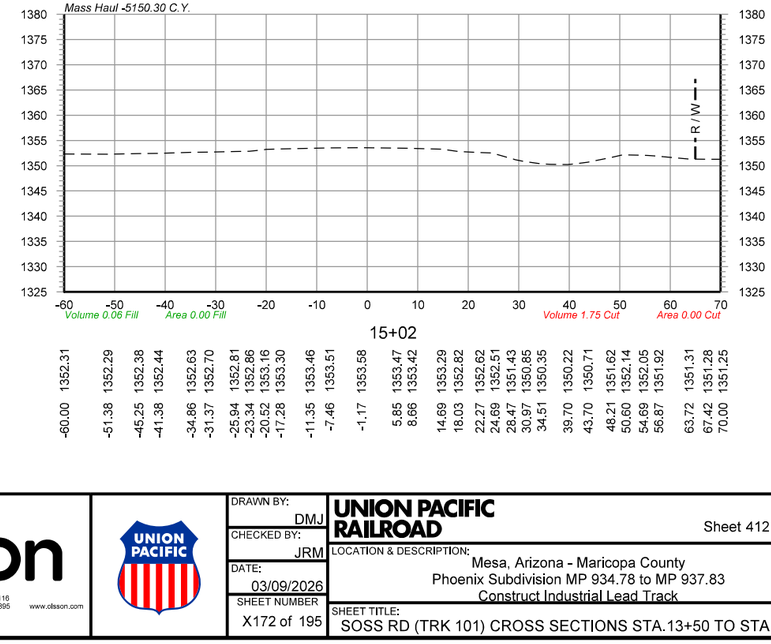
Color table: K:\Bentley\Workspace\Projects\Clients\UPRR_Track_V8\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-RD_200927.dgn
Default
3/9/2026











olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X172 of 195

UNION PACIFIC RAILROAD

Sheet 412 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SOSS RD (TRK 101) CROSS SECTIONS STA.13+50 TO STA.15+02

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-RD_200927.dgn
Default
3/9/2026

End Area Volume Report

Alignment Name: Rd - S. Sossaman Rd

Baseline Station	Station Quantities				Mass Ordinate
	Cut		Fill		
	Area	Volume	Area	Volume	
5+00.00	0.00	0.00	0.00	0.00	0.00
5+10.00	5.22	0.97	1.64	0.30	0.66
5+50.00	5.64	8.04	1.73	2.49	6.21
6+00.00	7.88	12.52	0.56	2.12	16.61
6+50.00	10.49	17.01	4.98	5.13	28.49
7+00.00	13.14	21.88	1.05	5.58	44.78
7+05.00	56.09	6.41	1.17	0.21	50.99
7+50.00	53.52	91.34	1.04	1.84	140.49
7+83.48	43.66	60.26	4.13	3.20	197.55
7+96.63	46.93	22.05	3.49	1.85	217.74
8+00.00	44.75	5.73	3.71	0.45	223.02
8+10.13	38.78	15.67	7.02	2.01	236.68
8+12.13	38.14	2.85	5.91	0.48	239.04
8+18.13	36.33	8.27	5.82	1.30	246.01
8+30.50	73.26	25.11	5.09	2.50	268.63
8+48.00	24.93	31.82	35.56	13.17	287.27
8+50.00	20.89	1.70	42.12	2.88	286.09
8+71.00	2.34	9.03	115.71	61.38	233.75
9+00.00	0.18	1.35	265.17	204.54	30.56
9+00.50	0.18	0.00	268.80	4.94	25.61
9+03.32					0.00
9+14.00	0.00	0.05	221.60	122.60	-96.94
9+23.24	0.00	0.00	258.56	82.16	-179.10
9+35.57	0.00	0.00	308.75	129.57	-308.67
9+36.14	0.00	0.00	311.39	6.49	-315.16
9+50.00	0.00	0.00	373.31	175.75	-490.92
9+54.00	0.00	0.00	386.90	56.31	-547.23
9+59.87	0.00	0.00	407.38	86.29	-633.52
9+72.83	0.00	0.00	425.16	199.82	-833.34
9+85.00	0.00	0.00	425.40	191.73	-1025.07
10+00.00	0.00	0.00	416.55	233.87	-1258.95
10+25.46	0.00	0.00	483.79	424.43	-1683.37
10+29.49	0.00	0.00	491.03	72.78	-1756.16
10+50.00	0.00	0.00	504.84	378.29	-2134.45
10+67.70	0.00	0.00	507.82	331.92	-2466.37
10+74.87	0.00	0.00	509.12	135.02	-2601.38
10+95.07	0.00	0.00	522.69	386.00	-2987.38
11+00.00	0.00	0.00	524.38	95.58	-3082.96
11+30.62	0.00	0.00	465.70	561.41	-3644.38
11+32.62	0.00	0.00	460.87	34.32	-3678.70
11+50.00	0.00	0.00	436.94	288.96	-3967.66
11+71.00	0.00	0.00	399.91	325.44	-4293.10
11+83.00	0.00	0.00	380.64	173.46	-4466.56
11+90.79	0.00	0.00	375.94	109.12	-4575.68
11+92.79	0.00	0.00	372.01	27.73	-4603.41
11+98.00	0.00	0.00	328.37	67.57	-4670.98
12+00.00	0.00	0.00	316.75	23.89	-4694.87
12+10.29	0.00	0.00	281.03	113.88	-4808.75
12+22.75	0.00	0.00	141.91	97.58	-4906.33
12+23.84	0.00	0.00	138.17	5.69	-4912.03
12+50.00	0.00	0.00	108.05	119.27	-5031.29
13+00.00	0.00	0.00	59.80	155.42	-5186.71
13+50.00	0.00	0.00	24.74	78.28	-5264.99
14+00.00	20.71	19.18	9.51	31.71	-5277.52
14+50.00	43.54	59.49	4.10	12.60	-5230.63
15+00.00	47.21	84.02	1.71	5.38	-5151.99
15+02.00	0.00	1.75	0.00	0.06	-5150.30
Grand Total:		**506.49**		**5656.79**	

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-RD_200927.dgn
Default
3/9/2026

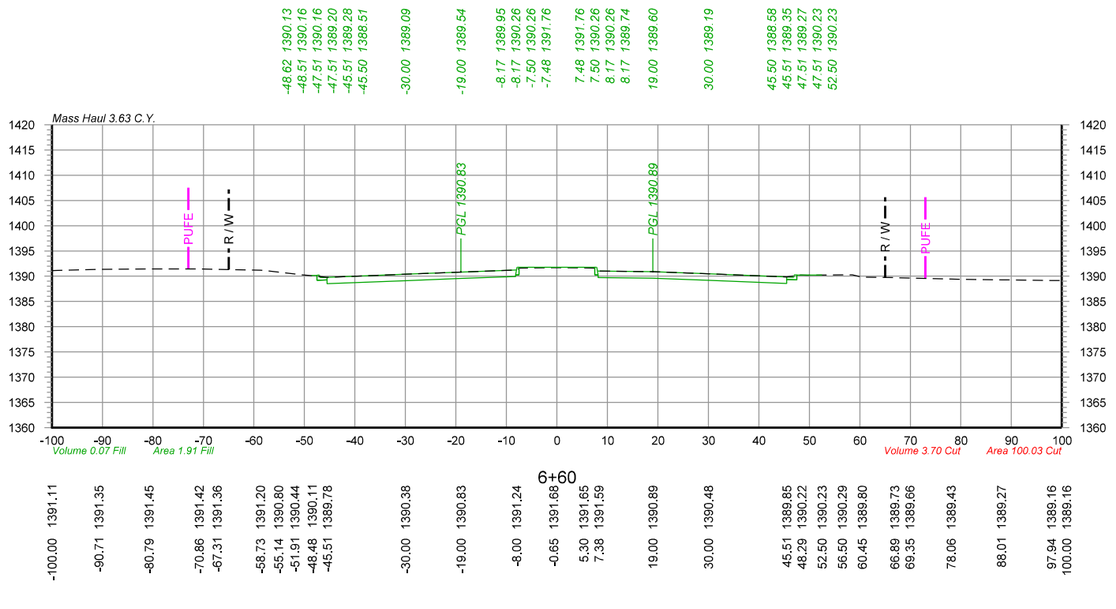
olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X173 of 195

UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SOSS RD (TRK 101) EARTHWORK SUMMARY



Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-RD_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

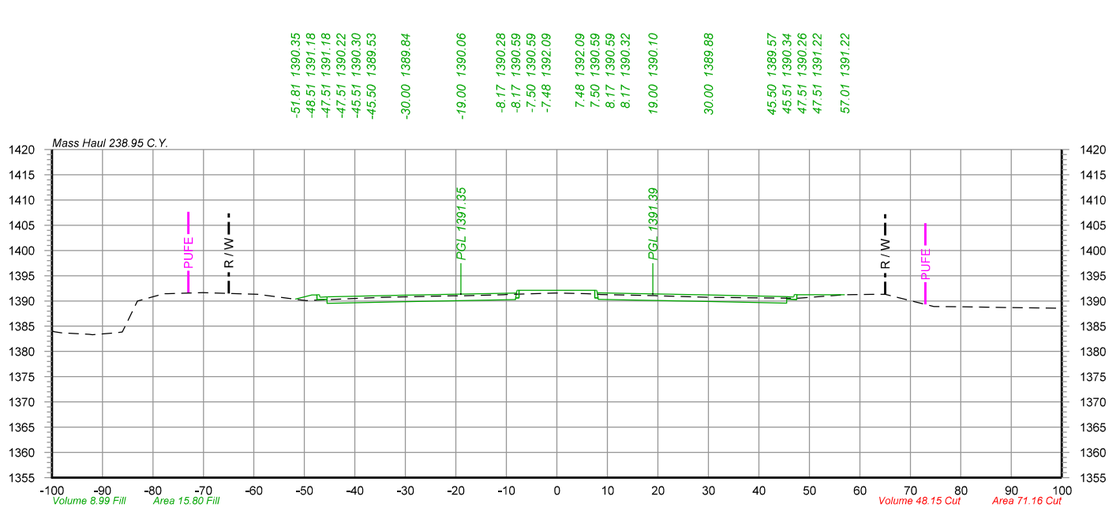
DRAWN BY:	DMJ
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	X174 of 195

UNION PACIFIC RAILROAD

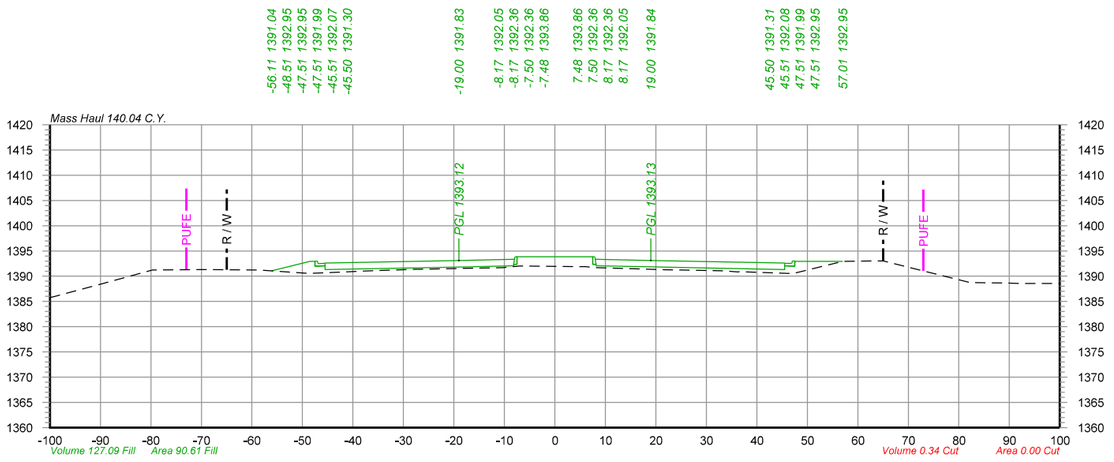
Sheet 414 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

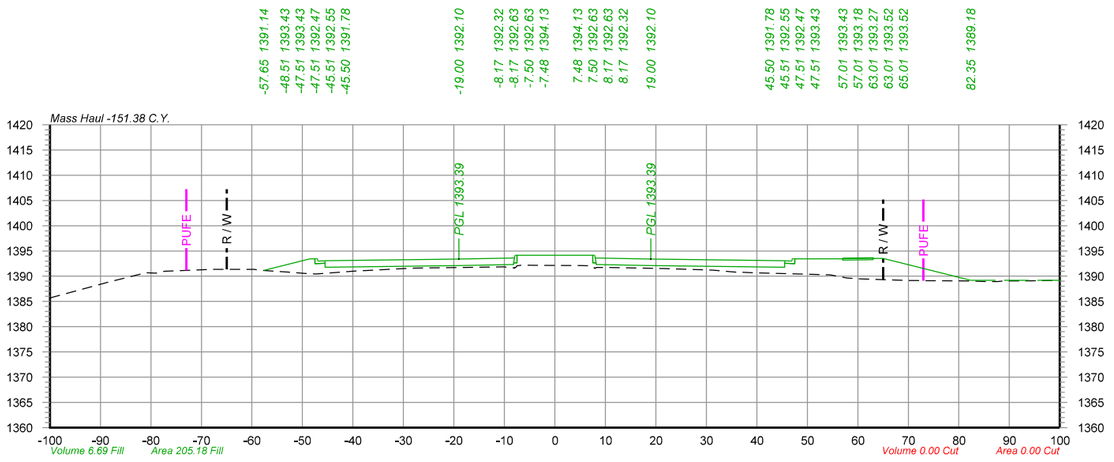
SHEET TITLE:
ELLSWORTH RD CROSS SECTIONS STA.6+58 TO STA.7+00


-51.81 1390.35
-48.51 1391.18
-47.51 1391.18
-47.51 1390.22
-45.51 1390.30
-45.50 1389.53
-30.00 1389.84
-19.00 1390.06
-8.17 1390.28
-8.17 1390.59
-7.50 1390.59
-7.48 1392.09
7.48 1392.09
7.50 1390.59
8.17 1390.59
8.17 1390.32
19.00 1390.10
30.00 1389.88
45.50 1389.57
45.51 1390.34
47.51 1390.26
47.51 1391.22
57.01 1391.22
Mass Haul 238.95 C.Y.
PUFE
R / W
PGL 1391.35
PGL 1391.39
R / W
PUFE
Volume 8.99 Fill
Area 15.80 Fill
Volume 48.15 Cut
Area 71.16 Cut
7+39

| | | |


Mass Haul 140.04 C.Y.
PUFE
R / W
PGL 1393.12
PGL 1393.13
R / W
PUFE
Volume 127.09 Fill
Area 90.61 Fill
Volume 0.34 Cut
Area 0.00 Cut

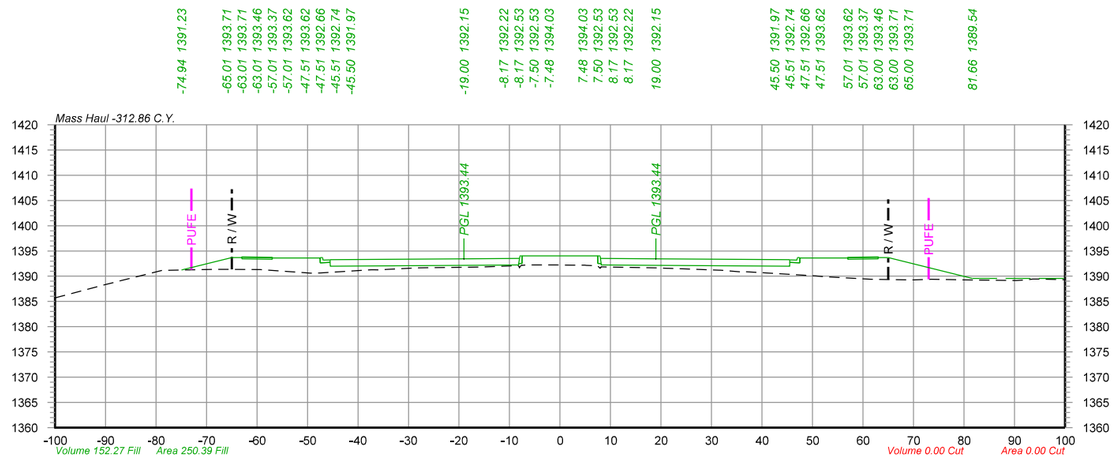
| | | |



-57.65	-48.51	-47.51	-47.51	-45.51	-45.50	-19.00	-8.17	-8.17	-7.50	-7.48	7.48	7.50	8.17	8.17	19.00	45.50	45.51	47.51	47.51	57.01	63.01	63.01	65.01	82.35
1391.14	1393.43	1393.43	1392.47	1392.55	1391.78	1392.10	1392.32	1392.63	1392.63	1394.13	1394.13	1392.63	1392.63	1392.32	1392.10	1391.78	1392.55	1392.47	1393.43	1393.43	1393.18	1393.27	1393.52	1389.18

9+50

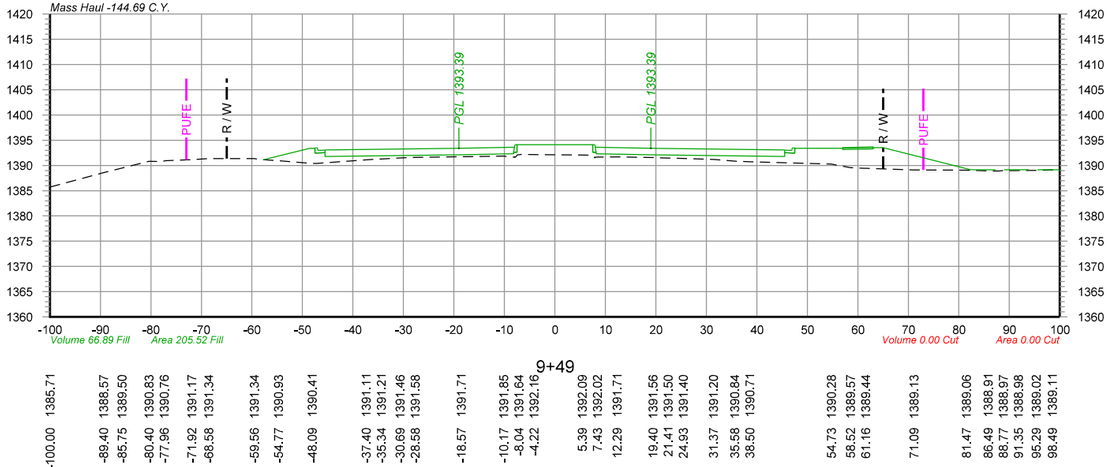
-100.00	-88.96	-81.00	-77.29	-68.92	-59.55	-52.81	-48.64	-39.57	-36.84	-34.54	-28.91	-18.57	-10.16	-8.05	-2.91	5.37	7.43	10.60	19.39	21.43	30.51	35.22	39.04	54.48	57.85	60.29	70.22	73.12	81.73	85.45	87.61	92.92	95.35	98.45
1385.71	1388.69	1390.67	1390.98	1391.33	1391.34	1390.81	1390.48	1391.01	1391.14	1391.29	1391.56	1391.72	1391.85	1391.66	1392.16	1392.09	1392.02	1391.75	1391.56	1391.50	1391.23	1390.87	1390.71	1390.28	1389.65	1389.49	1389.15	1389.11	1389.06	1388.95	1388.94	1389.07	1389.09	1389.18



-74.94	-65.01	-63.01	-63.01	-57.01	-57.01	-47.51	-45.51	-45.50	-19.00	-8.17	-8.17	-7.50	-7.48	7.48	7.50	8.17	8.17	19.00	45.50	45.51	47.51	47.51	57.01	57.01	63.00	63.00	65.00	81.66
1391.23	1393.71	1393.71	1393.46	1393.37	1393.62	1392.62	1392.66	1391.97	1392.15	1392.22	1392.53	1392.53	1394.03	1394.03	1392.53	1392.53	1392.22	1392.15	1391.97	1392.74	1392.66	1393.62	1393.62	1393.37	1393.46	1393.71	1393.71	1389.54

9+68

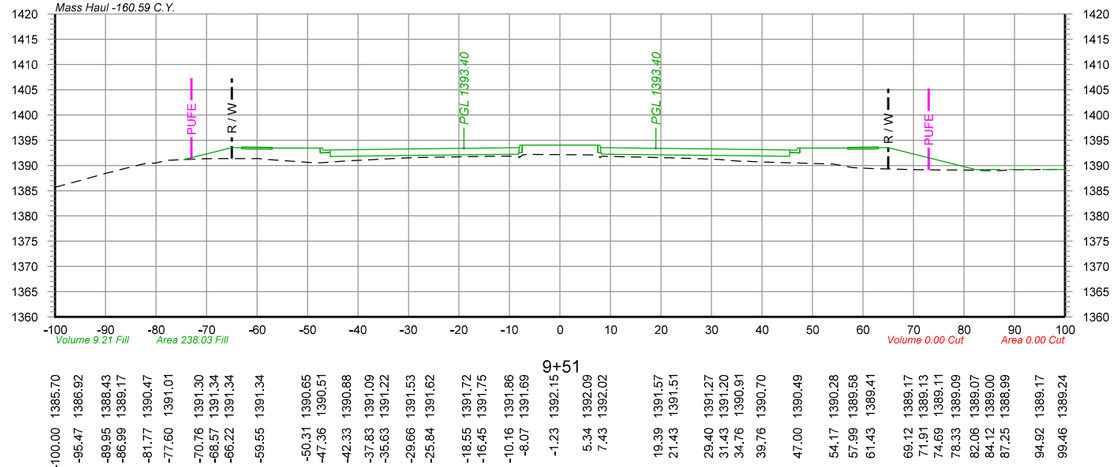
-100.00	-98.00	-90.18	-87.37	-84.52	-78.84	-72.52	-68.45	-65.98	-59.43	-52.23	-49.42	-47.42	-38.10	-35.31	-28.45	-25.89	-18.45	-15.76	-9.12	-5.78	-0.76	2.40	4.93	7.43	9.72	19.34	21.55	31.55	36.27	50.57	61.55	69.04	72.40	78.15	83.83	90.41	93.34	100.00
1385.72	1386.25	1388.30	1389.01	1389.73	1391.15	1391.27	1391.35	1391.34	1391.32	1390.79	1390.58	1390.64	1391.22	1391.25	1391.63	1391.67	1391.76	1391.81	1392.05	1392.21	1392.21	1392.19	1392.17	1392.08	1391.81	1391.63	1391.55	1391.21	1390.82	1390.04	1389.42	1389.27	1389.36	1389.30	1389.22	1389.16	1389.40	1389.32



-57.66	-48.51	-47.51	-47.51	-45.51	-45.50	-19.00	-8.17	-8.17	-7.50	-7.48	7.48	7.50	8.17	8.17	19.00	45.50	45.51	47.51	47.51	57.01	63.01	63.01	65.01	82.38
1391.13	1393.42	1393.42	1392.46	1392.54	1391.77	1392.10	1392.32	1392.63	1392.63	1394.13	1394.13	1392.63	1392.63	1392.32	1392.10	1391.77	1392.54	1392.46	1393.42	1393.42	1393.17	1393.26	1393.51	1389.17

9+49

-100.00	-89.40	-85.75	-80.40	-77.96	-71.92	-68.58	-59.56	-54.77	-48.09	-37.40	-35.34	-30.69	-28.58	-18.57	-10.17	-8.04	-4.22	5.39	7.43	12.29	19.40	21.41	24.93	31.37	35.58	38.50	54.73	58.52	61.16	71.09	81.47	86.49	88.77	91.35	95.29	98.49
1385.71	1388.57	1389.50	1390.83	1390.76	1391.17	1391.34	1391.34	1390.93	1390.41	1391.11	1391.21	1391.46	1391.58	1391.71	1391.85	1391.64	1392.16	1392.09	1392.02	1391.71	1391.56	1391.50	1391.40	1391.20	1390.84	1390.71	1390.28	1389.57	1389.44	1389.13	1389.06	1388.91	1388.97	1388.98	1389.02	1389.11



-74.58	-65.01	-63.01	-63.01	-57.01	-57.01	-47.51	-45.51	-45.50	-19.00	-8.17	-8.17	-7.50	-7.48	7.48	7.50	8.17	8.17	19.00	45.50	45.51	47.51	47.51	57.01	57.01	63.01	63.01	65.01	82.31
1391.14	1393.53	1393.53	1393.28	1393.19	1393.44	1392.44	1392.48	1391.79	1392.11	1392.23	1392.54	1392.54	1394.04	1394.04	1392.54	1392.54	1392.24	1392.11	1391.80	1392.57	1392.48	1393.44	1393.44	1393.19	1393.28	1393.53	1393.53	1389.21

9+51

-100.00	-95.47	-89.95	-86.99	-81.77	-77.60	-70.76	-68.57	-66.22	-59.55	-50.31	-47.36	-42.33	-37.83	-35.63	-29.66	-25.84	-18.55	-16.45	-10.16	-8.07	-1.23	5.34	7.43	19.39	21.43	29.40	31.43	34.76	39.76	47.00	54.17	57.99	61.43	69.12	71.91	74.69	78.33	82.06	84.12	87.25	94.92	99.46
1385.70	1386.92	1388.43	1389.17	1390.47	1391.01	1391.30	1391.34	1391.34	1391.34	1390.65	1390.51	1390.88	1391.09	1391.22	1391.53	1391.62	1391.72	1391.75	1391.86	1391.69	1392.15	1392.09	1392.02	1391.57	1391.51	1391.27	1391.20	1390.91	1390.70	1390.49	1390.28	1389.58	1389.41	1388.17	1388.13	1389.11	1389.09	1389.07	1389.00	1388.99	1389.17	1389.24

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X177 of 195

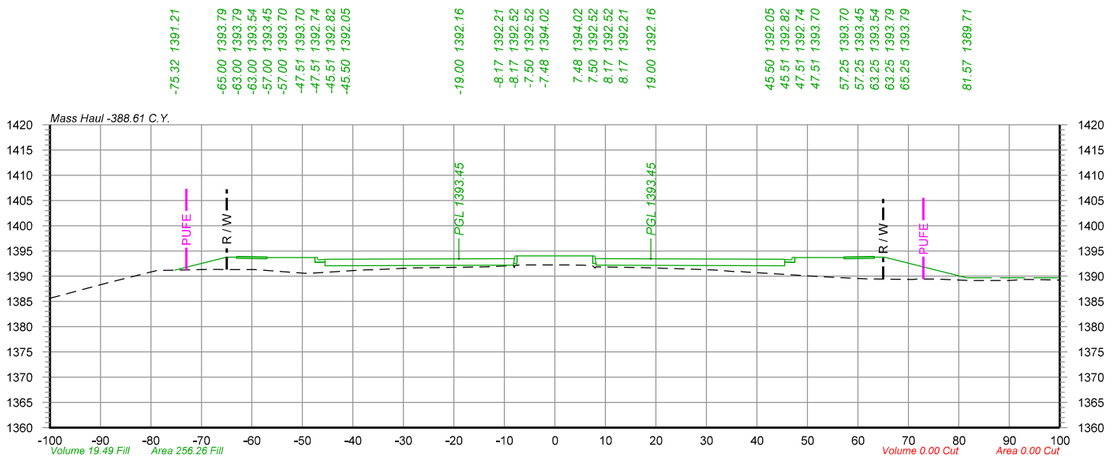
UNION PACIFIC RAILROAD

Sheet 417 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
ELLSWORTH RD CROSS SECTIONS STA.9+49 TO STA.9+68

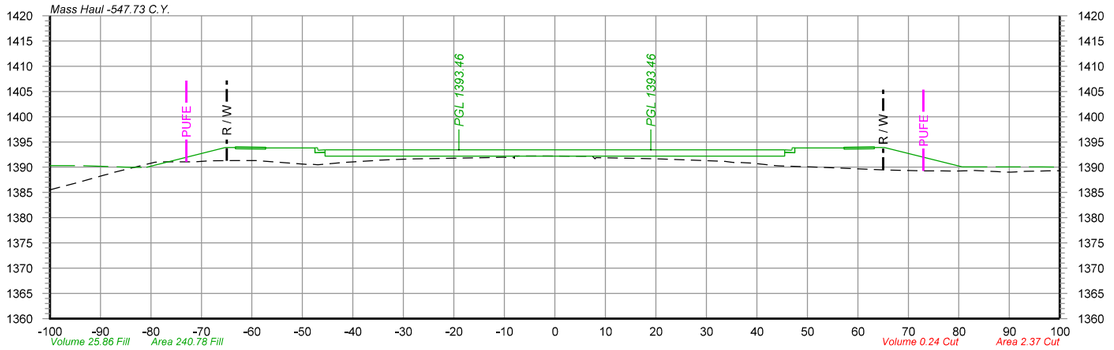
Color table: K:\Bentley\Workspace\Projects\Clients\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-RD_200927.dgn
Default
3/9/2026


Mass Haul -388.61 C.Y.
PUFE
R / W
PGL 1393.45
PGL 1393.45
R / W
PUFE
Volume 19.49 Fill
Area 256.26 Fill
Volume 0.00 Cut
Area 0.00 Cut

9+76

| | | |

-80.92 1389.99 | -65.25 1393.91 | -63.25 1393.91 | -63.25 1393.66 | -57.25 1393.57 | -57.25 1393.82 | -47.52 1393.82 | -47.51 1392.86 | -45.51 1392.94 | -45.50 1392.17 | -19.00 1392.17 | 0.00 1392.17 | 19.00 1392.17 | 45.50 1392.17 | 45.51 1392.94 | 47.51 1392.86 | 47.52 1393.82 | 57.25 1393.82 | 57.25 1393.57 | 63.25 1393.66 | 63.25 1393.91 | 65.25 1393.91 | 80.70 1390.04

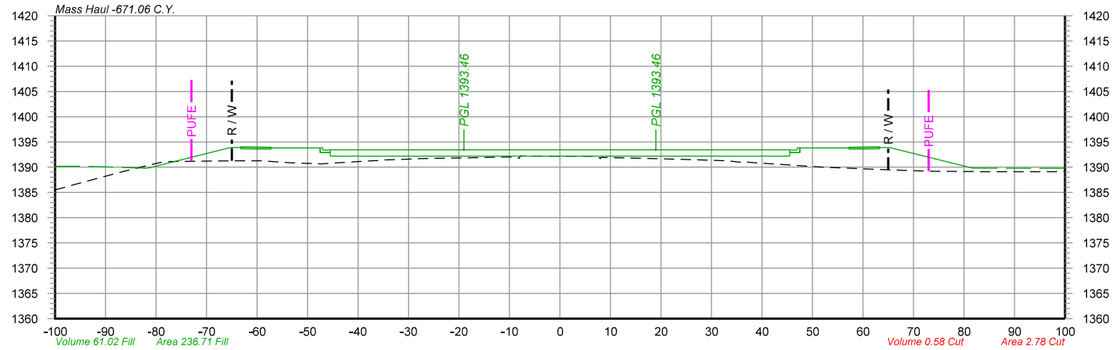


9+93

-100.00	-94.75	-89.10	-79.22	-71.30	-68.27	-63.62	-59.25	-54.64	-49.25	-46.94	-41.90	-35.73	-32.72	-28.27	-22.67	-18.39	-13.58	-10.02	-8.02	-4.30	-1.43	4.98	6.99	19.02
1385.51	1386.88	1388.46	1390.97	1391.08	1391.28	1391.29	1391.30	1390.96	1390.58	1390.49	1390.94	1391.30	1391.47	1391.66	1391.75	1391.80	1391.91	1391.98	1391.71	1392.22	1392.22	1392.21	1392.18	1391.68

21.73	29.60	33.76	36.16	38.97	42.46	51.73	57.73	61.73	65.87	73.37	75.76	79.10	82.39	85.64	89.34	92.28	95.94	99.43						
1391.60	1391.32	1391.16	1390.88	1390.80	1390.42	1390.03	1389.76	1389.59	1389.45	1389.28	1389.27	1389.24	1389.33	1389.23	1389.03	1388.14	1389.22	1389.30						

-81.73 1389.79 | -65.25 1393.91 | -63.25 1393.91 | -63.25 1393.66 | -57.25 1393.57 | -57.25 1393.82 | -47.52 1393.82 | -47.51 1392.86 | -45.51 1392.94 | -45.50 1392.17 | -19.00 1392.17 | 0.00 1392.17 | 19.00 1392.17 | 45.50 1392.17 | 45.51 1392.94 | 47.51 1392.86 | 47.52 1393.82 | 57.25 1393.82 | 57.25 1393.57 | 63.25 1393.66 | 63.25 1393.91 | 65.25 1393.91 | 81.71 1389.79

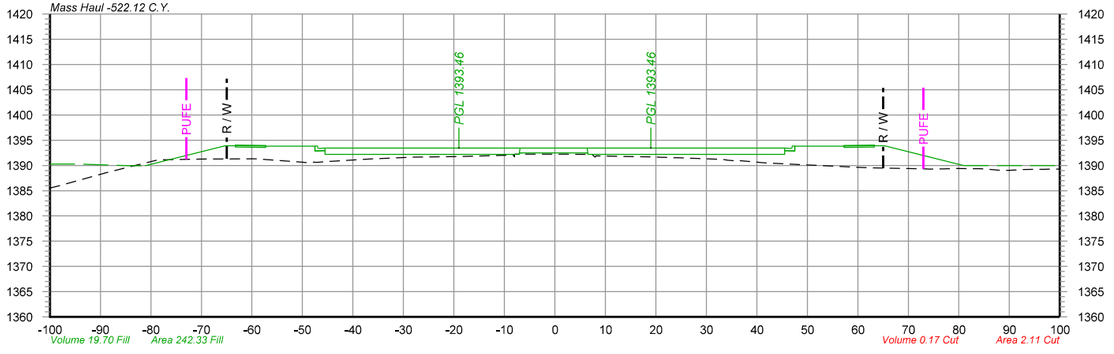


10+07

-100.00	-97.15	-94.77	-88.71	-88.21	-81.14	-78.35	-71.49	-68.17	-63.67	-59.15	-53.09	-47.87	-37.32	-35.26	-30.89	-28.17	-24.01	-18.28	-12.66	-9.97	-7.88	-0.15	5.31	7.44
1385.50	1386.32	1386.95	1388.54	1389.23	1390.46	1391.11	1391.19	1391.24	1391.26	1391.29	1390.85	1390.69	1391.28	1391.31	1391.58	1391.70	1391.77	1391.86	1391.98	1392.03	1392.23	1392.20	1392.19	1392.19

13.88	19.30	21.83	24.06	33.07	35.24	38.45	51.83	59.86	69.94	72.45	80.79	83.13	89.04	94.13	97.83	100.00								
1391.81	1391.68	1391.62	1391.54	1391.25	1391.04	1390.90	1390.02	1389.70	1389.30	1389.22	1389.13	1389.10	1389.11	1389.11	1389.11	1389.17								

-80.92 1389.99 | -65.25 1393.91 | -63.25 1393.91 | -63.25 1393.66 | -57.25 1393.57 | -57.25 1393.82 | -47.52 1393.82 | -47.51 1392.86 | -45.51 1392.94 | -45.50 1392.17 | -19.00 1392.17 | -7.06 1392.17 | -7.05 1392.48 | 6.53 1392.48 | 6.54 1392.17 | 19.00 1392.17 | 45.50 1392.17 | 45.51 1392.94 | 47.51 1392.86 | 47.52 1393.82 | 57.25 1393.82 | 57.25 1393.57 | 63.25 1393.66 | 63.25 1393.91 | 65.25 1393.91 | 80.93 1389.99

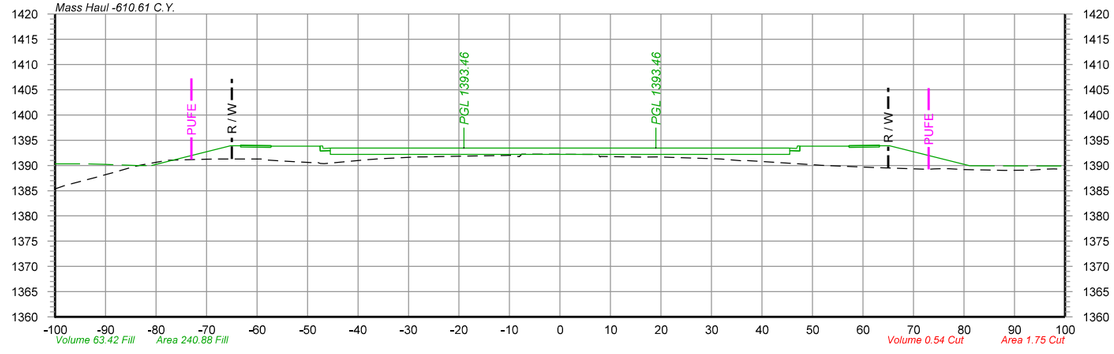


9+90

-100.00	-88.71	-83.55	-78.56	-69.29	-59.27	-50.11	-47.63	-36.00	-28.94	-18.31	-15.39	-12.48	-9.49	-7.46	-2.42	2.14	4.91	7.44	13.83	19.30	21.71	24.47	33.31	36.17
1385.53	1388.62	1389.89	1391.13	1391.28	1391.30	1390.63	1390.64	1391.30	1391.63	1391.79	1391.85	1391.92	1392.04	1392.21	1392.22	1392.21	1392.21	1392.15	1391.78	1391.68	1391.60	1391.50	1391.17	1390.87

41.43	49.71	51.71	60.58	62.89	73.61	75.74	79.69	82.32	85.04	87.83	92.19	95.01	97.97	100.00										
1390.51	1390.10	1390.03	1389.63	1389.54	1389.30	1389.31	1389.40	1389.38	1389.33	1389.08	1389.15	1389.23	1389.27	1389.28										

-80.92 1389.99 | -65.25 1393.91 | -63.25 1393.91 | -63.25 1393.66 | -57.25 1393.57 | -57.25 1393.82 | -47.52 1393.82 | -47.51 1392.86 | -45.51 1392.94 | -45.50 1392.17 | -19.00 1392.17 | 0.00 1392.17 | 19.00 1392.17 | 45.50 1392.17 | 45.51 1392.94 | 47.51 1392.86 | 47.52 1393.82 | 57.25 1393.82 | 57.25 1393.57 | 63.25 1393.66 | 63.25 1393.91 | 65.25 1393.91 | 81.15 1389.93



10+00

-100.00	-91.43	-88.69	-84.20	-77.74	-70.14	-67.77	-59.20	-54.71	-49.20	-46.68	-38.07	-35.72	-29.07	-26.98	-18.26	-10.50	-8.40	-5.68	-3.66	5.15	7.27	16.05	19.30	21.78
1385.36	1387.79	1388.52	1389.80	1391.01	1391.24	1391.27	1391.29	1390.84	1390.58	1390.38	1391.15	1391.30	1391.65	1391.70	1391.85	1392.00	1391.78	1392.22	1392.21	1392.20	1392.18	1391.67	1391.67	1391.61

30.86	35.75	49.99	52.86	61.78	65.47	72.94	75.52	77.70	79.88	84.20	88.00	92.15	95.67	97.81	100.00									
1391.31	1390.95	1390.15	1389.99	1389.62	1389.49	1389.24	1389.34	1389.33	1389.17	1389.11	1389.04	1389.07	1389.24	1389.30	1389.23									

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X179 of 195

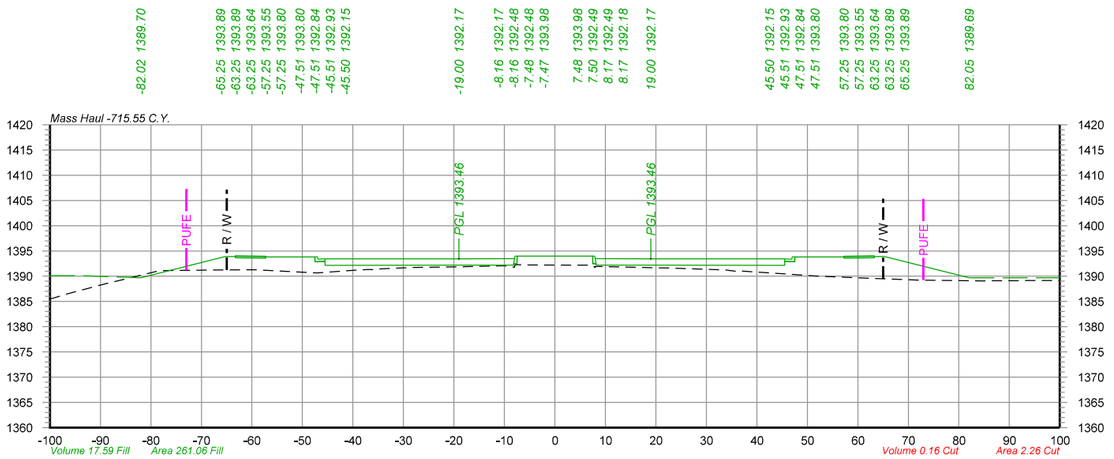
UNION PACIFIC RAILROAD

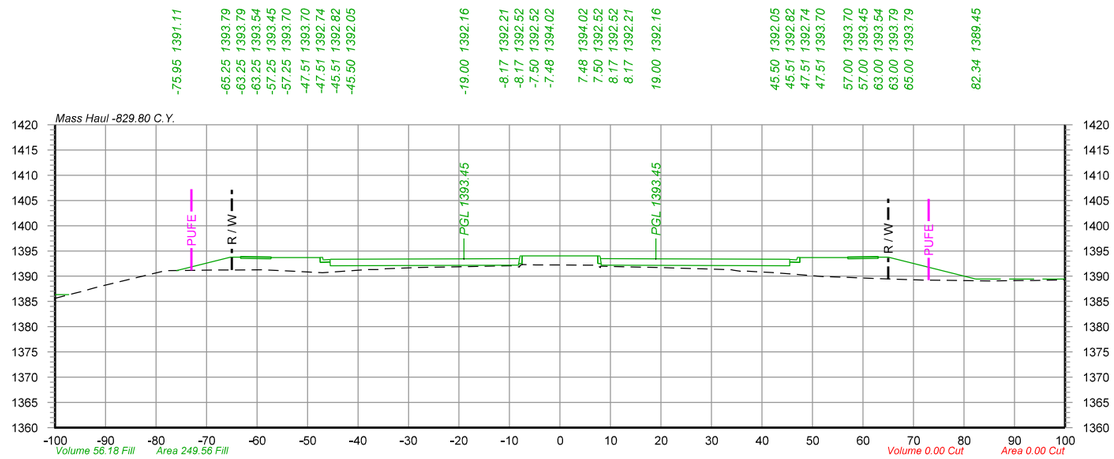
Sheet 419 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
ELLSWORTH RD CROSS SECTIONS STA.9+90 TO STA.10+07

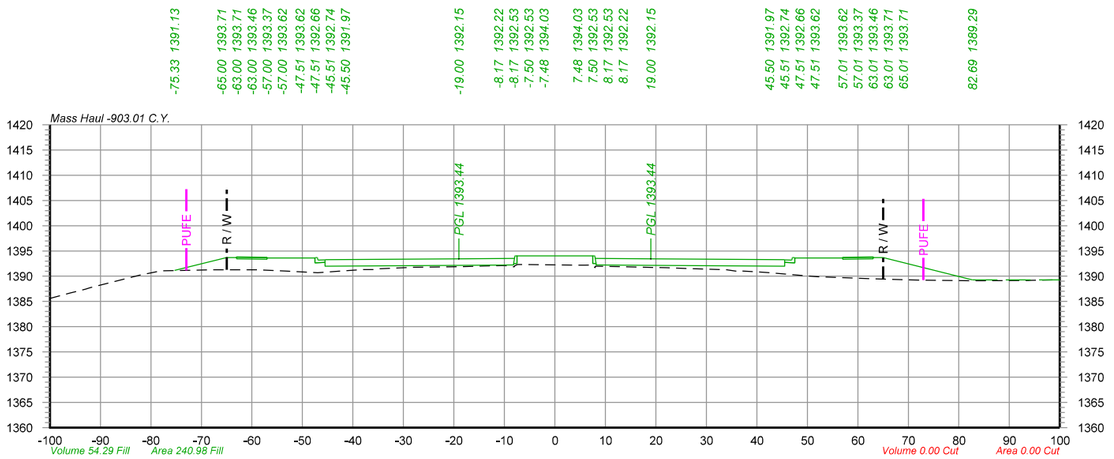
Color table: K:\Bentley\Workspace\Projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-RD_200927.dgn
Default
3/9/2026


Mass Haul -715.55 C.Y.
PUFE
R / W
PGL 1393.46
PGL 1393.46
R / W
PUFE
Volume 17.59 Fill
Area 261.06 Fill
Volume 0.16 Cut
Area 2.26 Cut


Mass Haul -829.80 C.Y.
PUFE
R / W
PGL 1393.45
PGL 1393.45
R / W
PUFE
Volume 56.18 Fill
Area 249.56 Fill
Volume 0.00 Cut
Area 0.00 Cut

10+12

| | | |

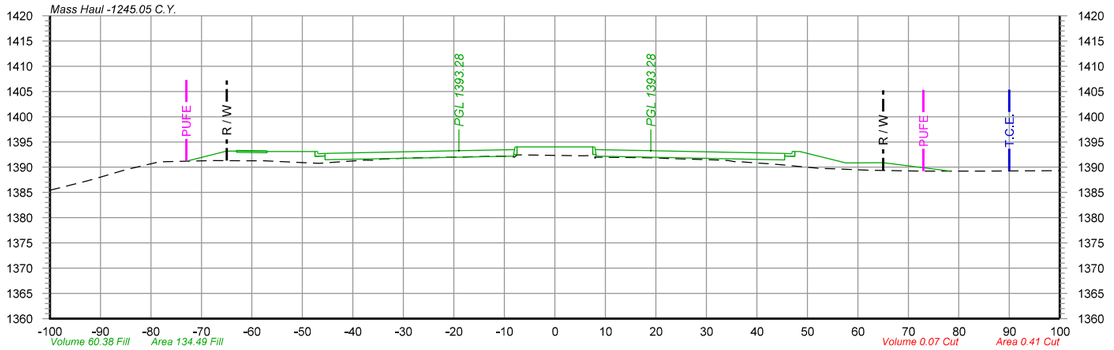

Mass Haul -903.01 C.Y.
PUFE
R / W
PGL 1393.44
PGL 1393.44
R / W
PUFE
Volume 54.29 Fill
Area 240.98 Fill
Volume 0.00 Cut
Area 0.00 Cut

10+32

| | | |

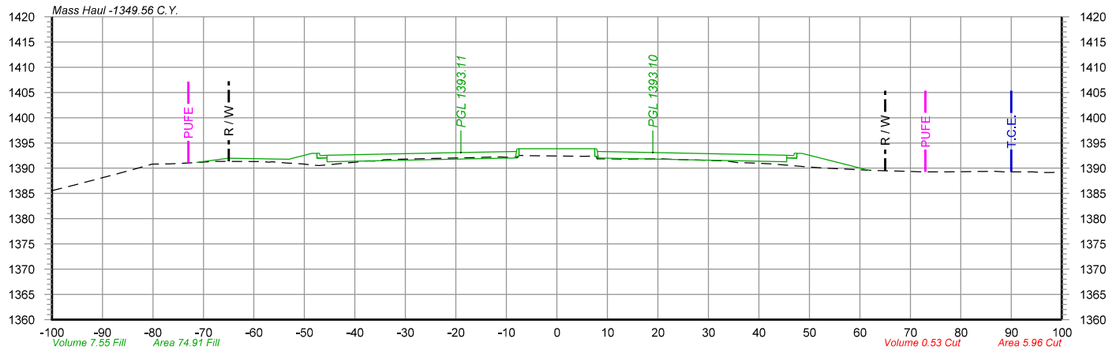
-73.00 1391.20
-65.02 1393.20
-63.02 1393.20
-63.02 1392.95
-57.02 1392.86
-57.02 1393.11
-47.52 1393.11
-47.51 1392.15
-45.51 1392.23
-45.50 1391.46
-19.00 1391.99
-8.17 1392.21
-8.17 1392.52
-7.50 1392.52
-7.48 1394.02
7.48 1394.02
7.50 1392.52
8.17 1392.52
8.17 1392.20
19.00 1391.99
45.50 1391.46
45.51 1392.23
47.51 1392.15
47.52 1393.10
48.52 1393.10
57.61 1390.86
65.01 1390.90
78.27 1389.22

Mass Haul -1245.05 C.Y.



10+76

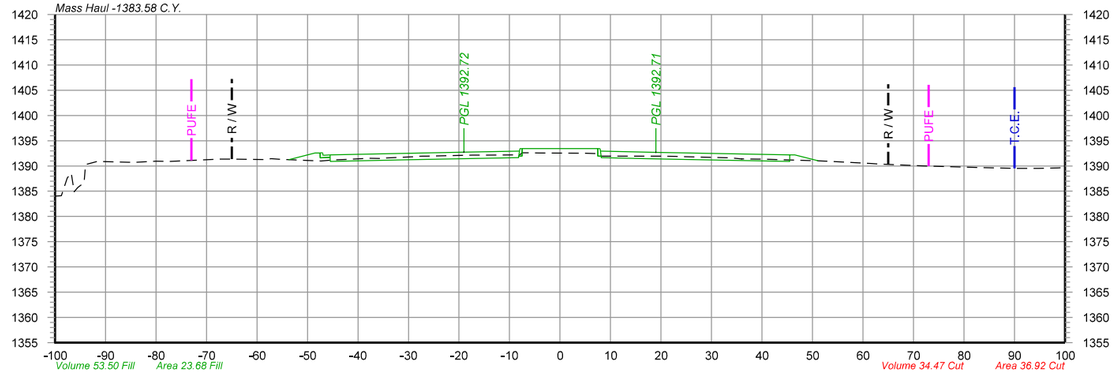
| | | |



-71.42	-65.02	-53.09	-48.51	-47.51	-47.51	-45.51	-45.50	-19.00	-8.17	-8.17	-7.50	-7.48	7.48	7.50	8.17	19.00	45.50	45.51	47.51	48.51	61.91
1391.14	1391.98	1391.79	1392.94	1392.94	1391.98	1392.06	1391.29	1391.82	1392.04	1392.35	1392.35	1393.85	1393.85	1392.35	1392.35	1391.81	1391.28	1392.05	1391.97	1392.93	1389.58

11+02

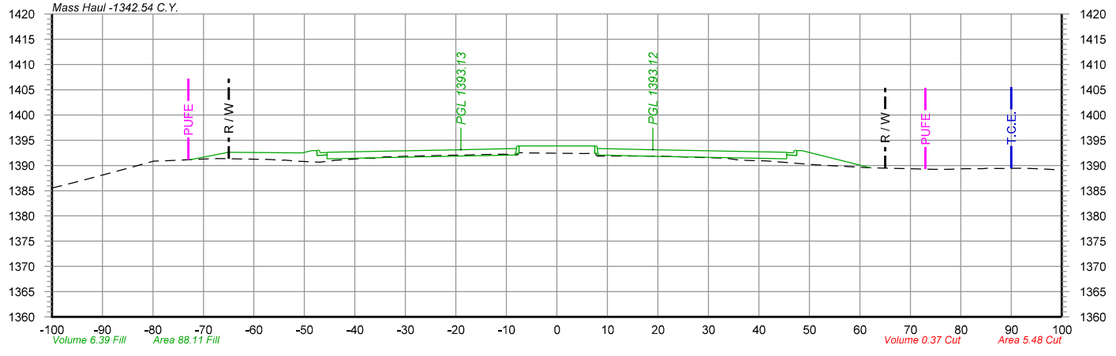
-100.00	-96.94	-87.19	-84.73	-80.17	-76.79	-74.02	-67.48	-58.29	-53.46	-50.44	-48.25	-38.65	-35.55	-33.08	-27.48	-24.01	-18.42	-13.60	-11.15	-8.09	-5.54	5.46	7.47	9.48	12.48	20.81	30.87	33.54	35.85	38.94	42.52	48.97	52.52	58.90	62.52	68.83	72.52	76.89	80.92	83.53	86.53	88.54	90.55	94.29	96.47	98.72
1385.58	1386.32	1388.86	1389.53	1390.80	1390.86	1390.98	1391.37	1391.31	1391.01	1390.84	1390.61	1391.33	1391.40	1391.71	1391.87	1391.95	1392.06	1392.18	1392.24	1392.14	1392.50	1392.36	1392.39	1391.86	1391.83	1391.84	1391.51	1391.43	1391.11	1391.03	1390.83	1390.33	1390.07	1389.73	1389.55	1389.39	1389.29	1389.26	1389.30	1389.36	1389.38	1389.27	1389.26	1389.26	1389.16	1389.17



-53.72	-48.51	-47.51	-47.51	-45.51	-45.50	-30.00	-19.00	-8.17	-8.17	-7.50	-7.48	7.48	7.50	8.17	19.00	30.00	45.50	45.51	46.51	51.14
1391.25	1392.55	1392.55	1391.59	1391.67	1390.90	1391.21	1391.43	1391.65	1391.96	1391.96	1393.46	1393.46	1393.46	1391.96	1391.63	1391.20	1390.89	1392.18	1392.18	1391.02

11+50

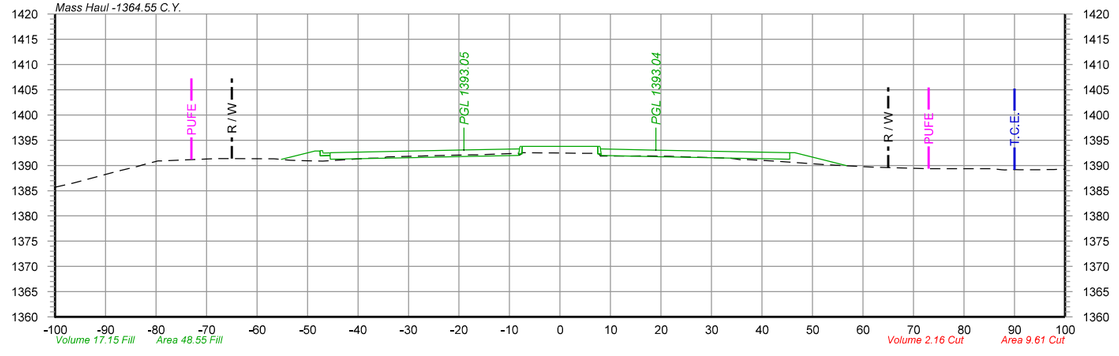
-100.00	-97.58	-95.50	-91.64	-85.47	-80.08	-77.30	-67.36	-65.03	-59.10	-55.40	-47.30	-45.05	-41.81	-37.81	-35.62	-29.10	-26.38	-17.27	-14.50	-8.87	-6.70	-4.12	4.97	7.47	10.30	20.15	22.60	33.69	35.81	39.05	50.86	52.86	61.72	71.65	81.58	88.30	90.56	92.88	98.62
1384.04	1387.59	1385.72	1390.91	1390.74	1390.93	1390.89	1391.37	1391.34	1391.26	1391.31	1390.99	1391.18	1391.33	1391.53	1391.49	1391.82	1391.95	1392.14	1392.14	1392.18	1392.60	1392.58	1392.51	1392.45	1391.92	1391.94	1391.88	1391.62	1391.39	1391.37	1391.03	1390.96	1390.47	1390.03	1389.75	1389.57	1389.50	1386.52	1389.60



-72.56	-65.02	-50.46	-48.51	-47.51	-47.51	-45.50	-19.00	-8.17	-8.17	-7.50	-7.48	7.48	7.50	8.17	19.00	45.50	45.51	47.51	47.51	48.51	62.17
1391.13	1392.61	1392.47	1392.95	1392.95	1392.00	1391.31	1391.84	1392.06	1392.37	1392.37	1393.87	1393.87	1392.37	1392.37	1391.83	1391.30	1392.07	1391.99	1392.95	1392.95	1389.53

11+00

-100.00	-96.34	-87.63	-83.62	-79.61	-69.07	-64.96	-56.63	-53.41	-50.71	-46.97	-37.62	-35.19	-27.80	-17.53	-9.56	-7.47	-3.34	-1.34	4.26	6.34	9.35	13.49	16.78	21.86	23.98	33.60	36.15	38.77	42.57	51.51	61.44	71.36	73.80	76.83	85.32	87.46	89.56	91.60	95.22	97.79	100.00
1385.54	1386.52	1387.34	1389.36	1390.34	1390.88	1391.34	1391.18	1391.03	1390.87	1390.66	1391.03	1391.45	1391.39	1391.80	1391.87	1392.06	1392.25	1392.28	1392.50	1392.35	1392.37	1391.86	1391.79	1391.54	1391.42	1391.08	1390.99	1390.88	1390.13	1389.57	1389.30	1389.25	1389.21	1389.35	1389.42	1389.45	1389.43	1389.26	1389.15	1389.40	1389.38	1389.35	1389.15	1389.17	1389.15	1389.13	1389.20	1389.25



-55.25	-48.51	-47.51	-47.51	-45.51	-45.50	-30.00	-19.00	-8.17	-8.17	-7.50	-7.48	7.48	7.50	8.17	19.00	30.00	45.50	45.51	46.51	56.85
1391.19	1392.88	1392.88	1391.92	1392.00	1391.23	1391.54	1391.76	1391.98	1392.29	1392.29	1393.79	1393.79	1392.29	1392.29	1391.97	1391.75	1391.53	1391.22	1392.51	1392.51	1389.93

11+10

-100.00	-96.34	-87.63	-83.62	-79.61	-69.07	-64.96	-56.63	-53.41	-50.71	-46.97	-37.62	-35.19	-27.80	-17.53	-9.56	-7.47	-3.34	-1.34	4.26	6.34	9.35	13.49	16.78	21.86	23.98	33.60	36.15	38.77	42.57	51.51	61.44	71.36	73.80	76.83	85.32	87.46	89.56	91.60	95.22	97.79	100.00
1385.69	1386.53	1388.86	1389.83	1390.88	1391.30	1391.35	1391.31	1391.02	1390.95	1390.87	1391.45	1391.41	1391.86	1392.09	1392.37	1392.54	1392.49	1392.47	1392.40	1392.40	1392.40	1391.84	1391.88	1391.81	1391.74	1391.44	1391.12	1391.07	1390.86	1390.21	1389.70	1389.40	1389.38	1389.35	1389.35	1389.15	1389.17	1389.15	1388.13	1388.20	1389.25

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-RD_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

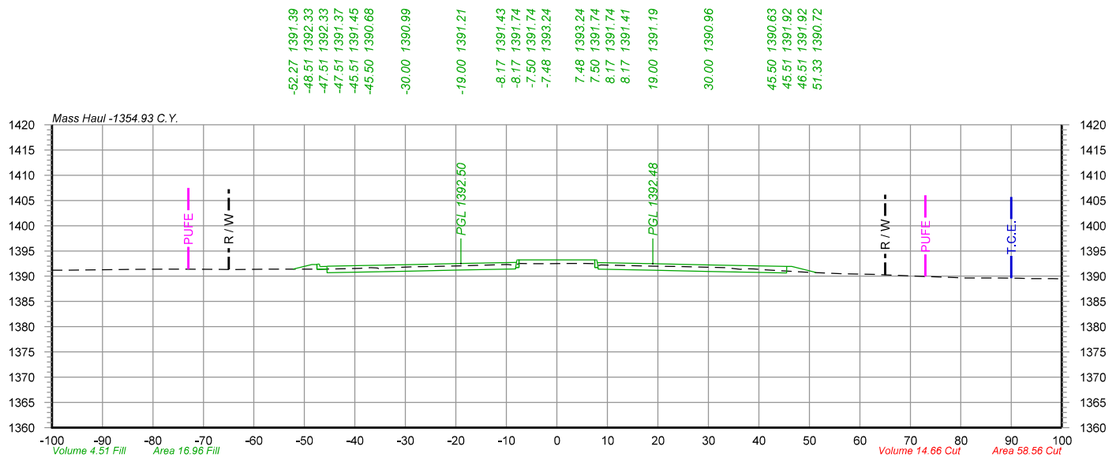
UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X183 of 195

UNION PACIFIC RAILROAD

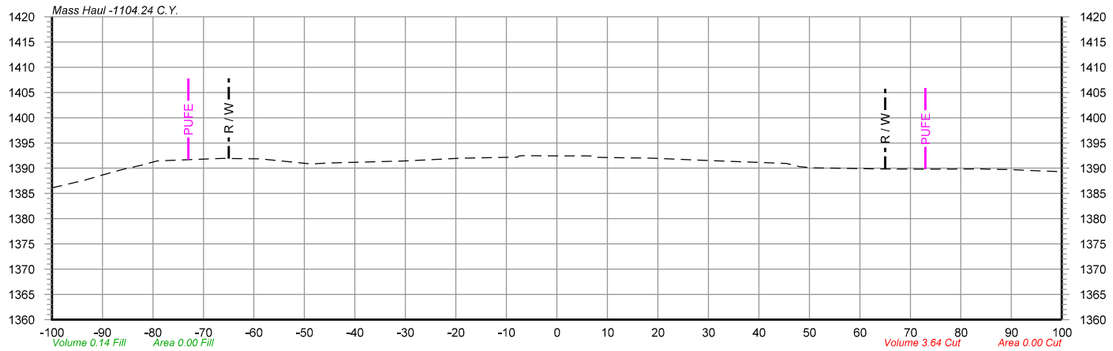
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
ELLSWORTH RD CROSS SECTIONS STA.11+00 TO STA.11+50


Mass Haul -1354.93 C.Y.
PUFE
R / W
PGL 1392.50
PGL 1392.48
PUFE
T.O.E.
Volume 4.51 Fill
Area 16.96 Fill
Volume 14.66 Cut
Area 58.56 Cut

11+77

| | | |


Mass Haul -1104.24 C.Y.
PUFE
R / W
R / W
PUFE
Volume 0.14 Fill
Area 0.00 Fill
Volume 3.64 Cut
Area 0.00 Cut

12+72

| | | |

End Area Volume Report

Alignment Name: Rd - S. Ellsworth Rd.

Baseline Station	Station Quantities				Mass Ordinate
	Cut		Fill		
	Area	Volume	Area	Volume	
6+58.00	0.00	0.00	0.00	0.00	0.00
6+60.00	100.03	3.70	1.91	0.07	3.63
6+73.23	106.22	50.54	8.05	2.44	51.73
7+00.00	91.51	98.01	12.57	10.22	139.52
7+22.00	81.77	70.59	12.76	10.32	199.79
7+39.00	71.16	48.15	15.80	8.99	238.95
7+50.00	64.18	27.57	17.63	6.81	259.71
8+00.00	31.40	88.49	27.70	41.98	306.23
8+50.00	0.36	29.41	46.64	68.84	266.79
9+00.00	0.00	0.34	90.61	127.09	140.04
9+24.00	0.00	0.00	163.51	112.94	27.10
9+28.13					0.00
9+40.00	0.00	0.00	190.53	104.90	-77.80
9+49.12	0.00	0.00	205.52	66.89	-144.69
9+50.00	0.00	0.00	205.18	6.69	-151.38
9+51.12	0.00	0.00	238.03	9.21	-160.59
9+67.96	0.00	0.00	250.39	152.27	-312.86
9+73.96	0.00	0.00	255.96	56.26	-369.12
9+76.01	0.00	0.00	256.26	19.49	-388.61
9+82.01	0.00	0.00	259.57	57.31	-445.92
9+87.89	2.24	0.24	262.80	56.91	-502.59
9+90.00	2.11	0.17	242.33	19.70	-522.12
9+92.89	2.37	0.24	240.78	25.86	-547.73
10+00.00	1.75	0.54	240.88	63.42	-610.61
10+06.90	2.78	0.58	236.71	61.02	-671.06
10+10.00	2.29	0.29	239.64	27.35	-698.11
10+11.90	2.26	0.16	261.06	17.59	-715.55
10+17.99	0.00	0.26	256.04	58.33	-773.62
10+23.99	0.00	0.00	249.56	56.18	-829.80
10+26.04	0.00	0.00	247.62	18.92	-848.72
10+32.04	0.00	0.00	240.98	54.29	-903.01
10+50.00	0.11	0.04	225.82	155.22	-1058.19
10+64.21	0.00	0.03	199.22	111.84	-1170.00
10+66.21	0.00	0.00	198.58	14.74	-1184.74
10+76.00	0.41	0.07	134.49	60.38	-1245.05
10+96.14	4.56	1.85	97.35	86.48	-1329.68
10+98.14	5.24	0.36	97.44	7.20	-1336.52
11+00.00	5.48	0.37	88.11	6.39	-1342.54
11+02.50	5.96	0.53	74.91	7.55	-1349.56
11+10.00	9.61	2.16	48.55	17.15	-1364.55
11+50.00	36.92	34.47	23.68	53.50	-1383.58
11+70.00	54.54	33.88	17.85	15.38	-1365.08
11+77.00	58.56	14.66	16.96	4.51	-1354.93
12+00.00	75.13	56.95	12.15	12.40	-1310.38
12+50.00	91.60	154.38	7.35	18.05	-1174.05
12+70.00	98.41	70.37	3.66	4.08	-1107.75
12+72.00	0.00	3.64	0.00	0.14	-1104.24
Grand Total:		**793.06**		**1897.30**	

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501:1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501:1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-RD_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

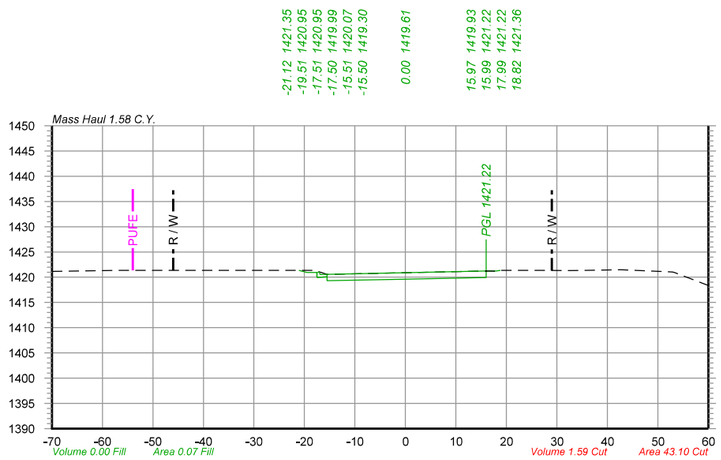
UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X186 of 195

UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

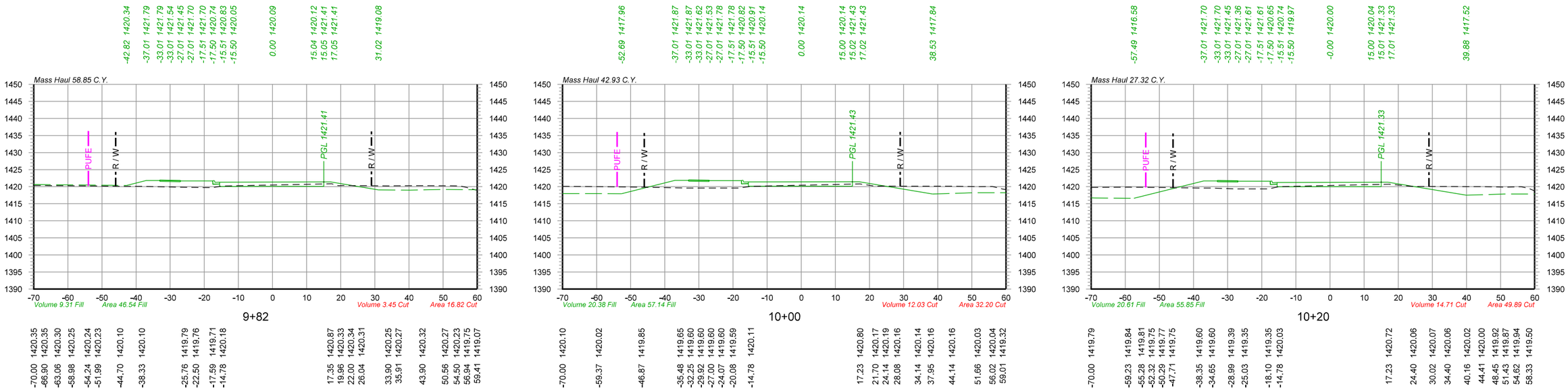
SHEET TITLE:
ELLSWORTH RD EARTHWORK SUMMARY



-21.12 1421.35
-19.51 1420.95
-17.51 1420.95
-17.50 1419.99
-15.51 1420.07
-15.50 1419.30
0.00 1419.61
15.97 1419.93
15.99 1421.22
17.99 1421.22
18.82 1421.36

8+87

| | | |



Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-RD_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

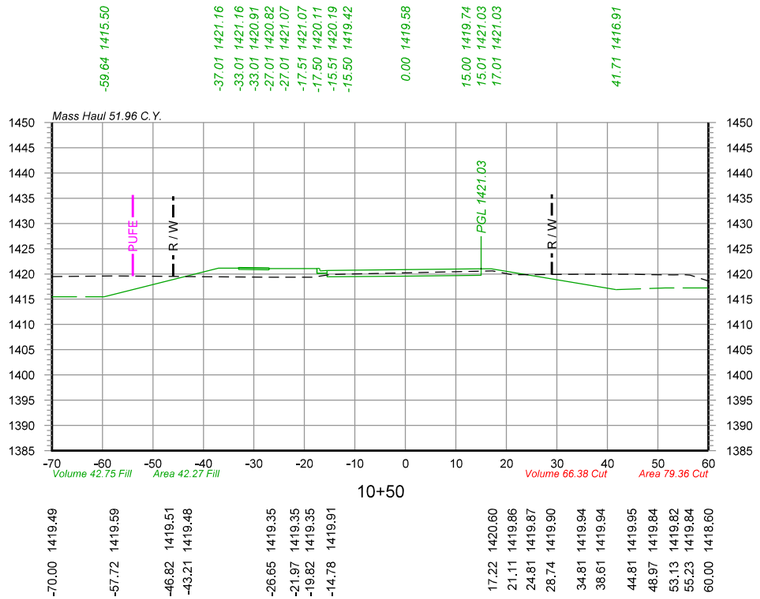
DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X188 of 195

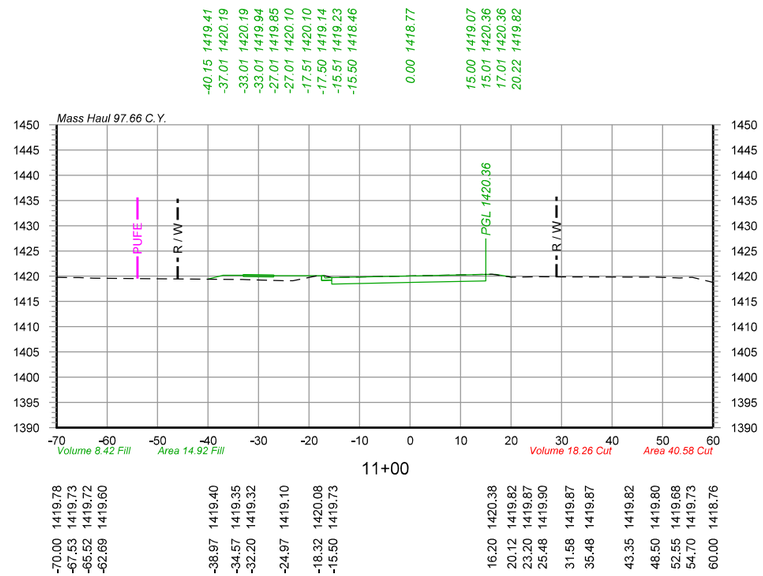
UNION PACIFIC RAILROAD

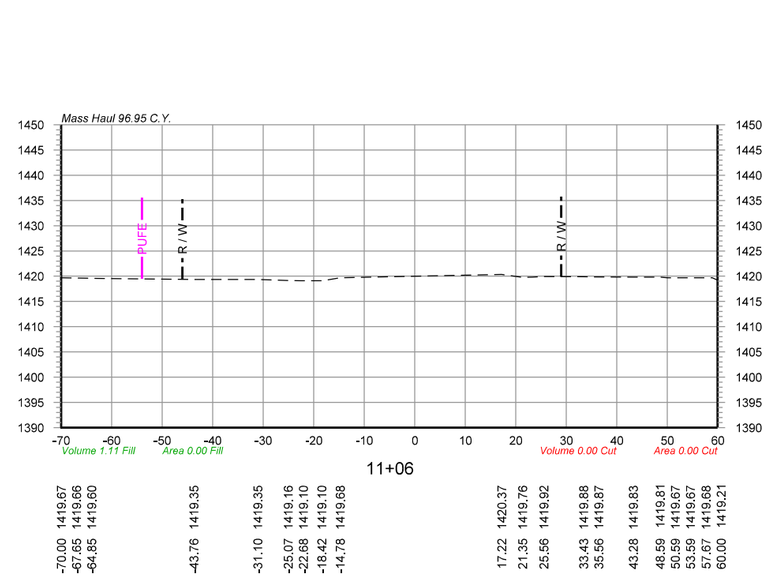
Sheet 428 of 587

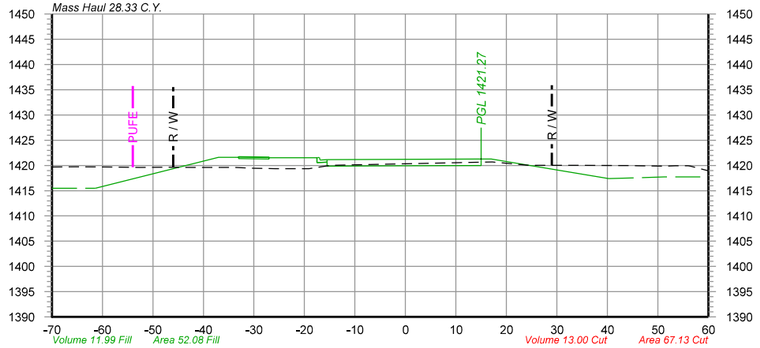
LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

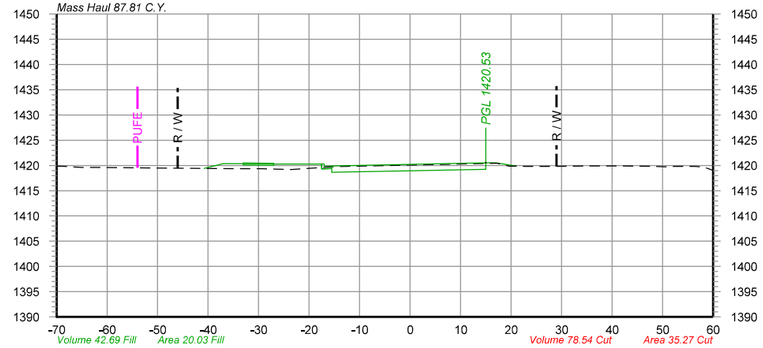
SHEET TITLE:
SIGNAL BUTTE CROSS SECTIONS STA.9+76 TO STA.10+20

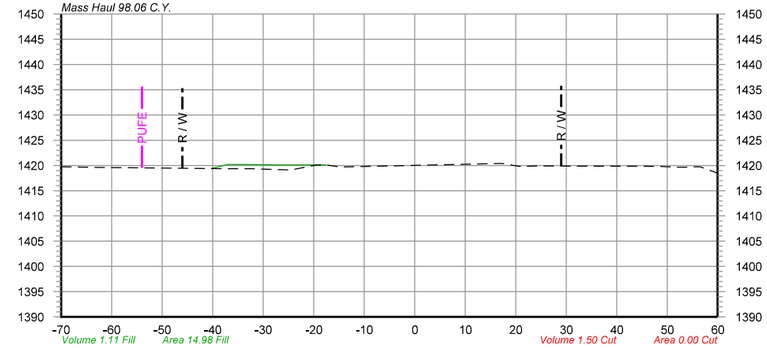












olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X189 of 195

UNION PACIFIC RAILROAD

Sheet 429 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SIGNAL BUTTE CROSS SECTIONS STA.10+26 TO STA.11+06

Color table: K:\Bentley\Workspace\Projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-RD_200927.dgn
Default
3/9/2026

End Area Volume Report

Alignment Name: Rd - Signal Butte Rd.

Baseline Station	Station Quantities				Mass Ordinate
	Cut		Fill		
	Area	Volume	Area	Volume	
8+85.00	0.00	0.00	0.00	0.00	0.00
8+86.99	43.10	1.59	0.07	0.00	1.58
9+00.00	41.53	20.39	0.00	0.02	21.96
9+13.00	37.89	19.12	0.15	0.04	41.04
9+48.00	23.43	39.74	14.40	9.43	71.36
9+50.00	22.07	1.69	14.19	1.06	71.98
9+75.82	14.21	17.34	37.29	24.61	64.71
9+81.82	16.82	3.45	46.54	9.31	58.85
9+90.00	32.75	7.51	52.93	15.07	51.29
10+00.00	32.20	12.03	57.14	20.38	42.93
10+10.00	33.46	12.16	60.95	21.87	33.22
10+19.53	49.89	14.71	55.85	20.61	27.32
10+25.53	67.13	13.00	52.08	11.99	28.33
10+50.00	79.36	66.38	42.27	42.75	51.96
10+87.00	35.27	78.54	20.03	42.69	87.81
11+00.00	40.58	18.26	14.92	8.42	97.66
11+02.00	0.00	1.50	14.98	1.11	98.06
11+06.00	0.00	0.00	0.00	1.11	96.95
Grand Total:		**327.42**		**230.48**	

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-RD_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

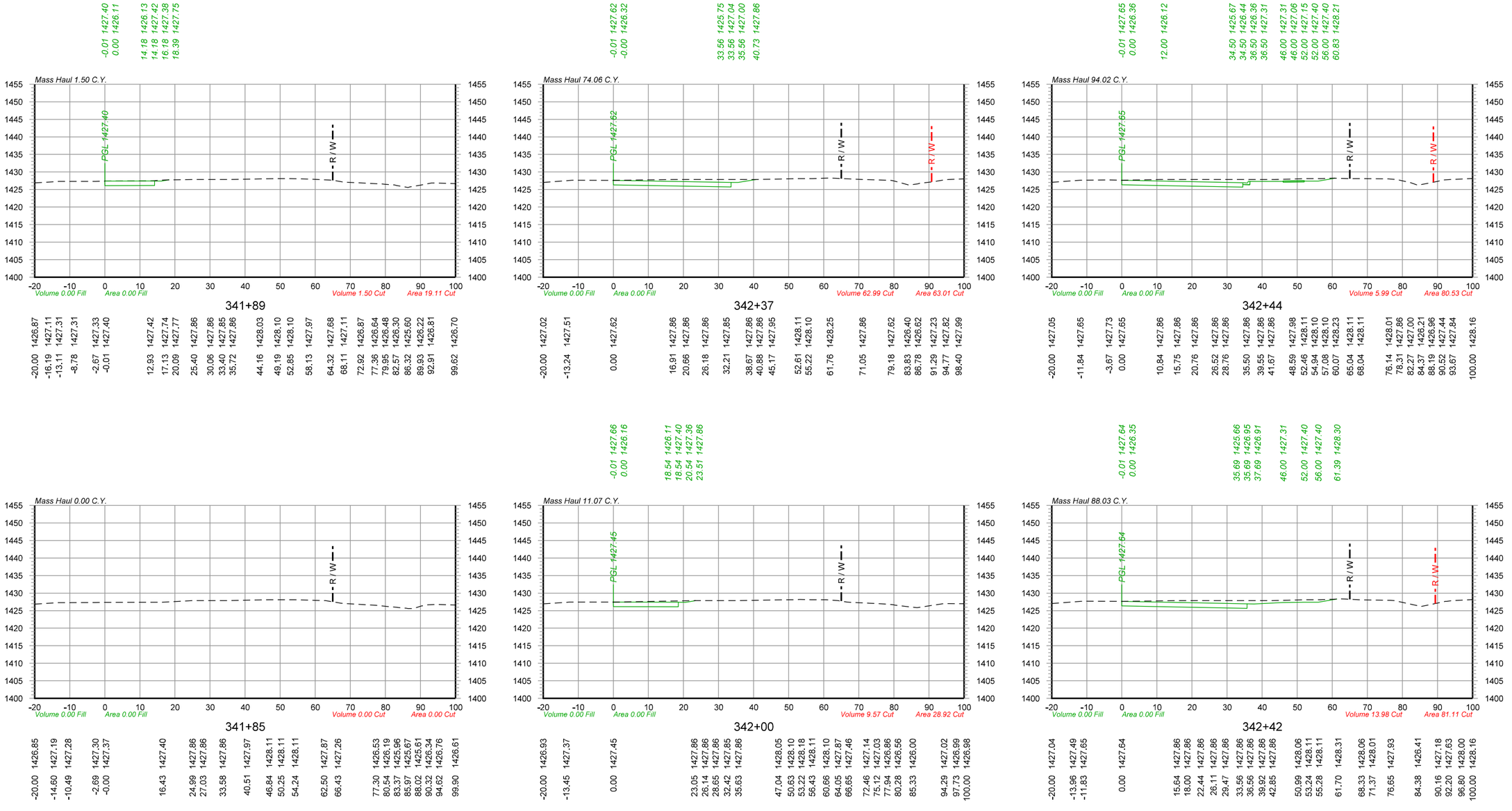
UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X190 of 195

UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
SIGNAL BUTTE EARTHWORK SUMMARY



Color table: K:\Bentley\Workspace\V8\projects\Clients\UPRR_Track\UPRR_Track_V8\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-RD_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	DMJ
CHECKED BY:	JRM
DATE:	03/09/2026
SHEET NUMBER	X191 of 195

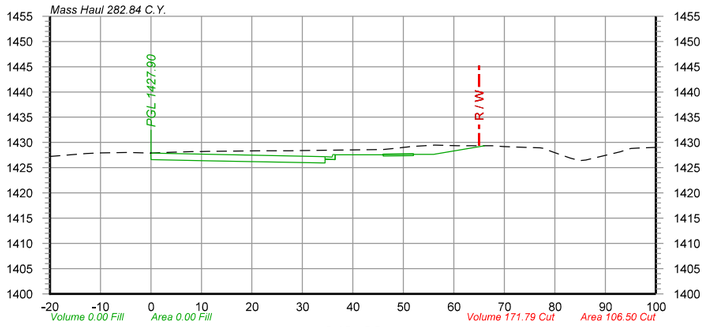
UNION PACIFIC RAILROAD

Sheet 431 of 587

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
PECOS RD (EAST) CROSS SECTIONS STA.341+85 TO STA.342+44

-0.01 1427.90
0.00 1426.61
12.00 1426.37
34.50 1425.92
34.50 1426.69
36.50 1426.61
36.50 1427.57
46.00 1427.57
46.00 1427.32
52.00 1427.41
52.00 1427.66
56.00 1427.66
66.11 1429.34

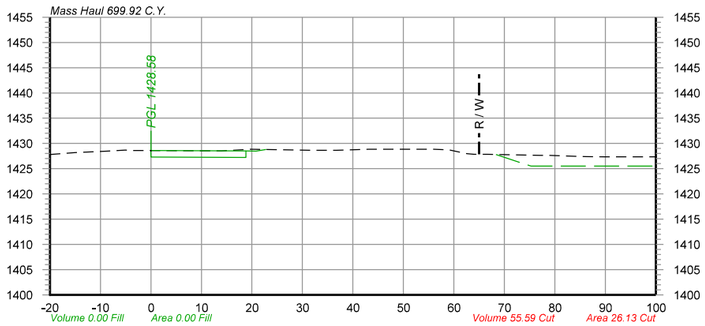


343+00

| | | |

-0.01 1428.58
0.00 1427.29

18.83 1427.21
18.83 1428.50
20.83 1428.46
22.83 1428.80



344+50

| | | |

End Area Volume Report

Alignment Name: RD - E. Pecos Rd.

Baseline Station	Station Quantities				Mass Ordinate
	Cut		Fill		
	Area	Volume	Area	Volume	
341+85.00	0.00	0.00	0.00	0.00	0.00
341+89.24	19.11	1.50	0.00	0.00	1.50
342+00.00	28.92	9.57	0.00	0.00	11.07
342+37.00	63.01	62.99	0.00	0.00	74.06
342+42.24	81.11	13.98	0.00	0.00	88.03
342+44.24	80.53	5.99	0.00	0.00	94.02
342+50.00	79.03	17.03	0.00	0.00	111.05
343+00.00	106.50	171.79	0.00	0.00	282.84
343+50.00	83.71	176.12	0.00	0.00	458.96
344+00.00	74.03	146.05	0.19	0.18	604.83
344+07.01	73.58	19.15	0.00	0.03	623.96
344+09.01	74.50	5.48	0.00	0.00	629.44
344+15.00	59.63	14.89	0.00	0.00	644.33
344+50.00	26.13	55.59	0.00	0.00	699.92
344+62.01	18.77	9.98	0.00	0.00	709.90
344+65.00	0.00	1.04	0.00	0.00	710.94
Grand Total:		**711.15**		**0.21**	

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-RD_200927.dgn
Default
3/9/2026

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X194 of 195

UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
PECOS RD (EAST) EARTHWORK SUMMARY

Track Quantities

Track 120
(Sta. 1482+00.00 to Sta. 1595+00.00)
Cut: 9,745 C.Y.
Fill: 6,178 C.Y.

Track 751
(Sta. -1+50.00 to Sta. 16+32.69)
Cut: 3,545 C.Y.
Fill: 3,064 C.Y.

Track 101
(Sta. -3+50.00 to Sta. 306+00.00)
Cut: 169,830 C.Y.
Fill: 123,932 C.Y.

*South Detention Cell **
Cut: 92,539 C.Y.
Fill: 3,557 C.Y.

*North Detention Cell **
Cut: 46,482 C.Y.
Fill: 7,290 C.Y.

** Volumes Calculated by Means of Surface Comparison and Account for Retention Basin Construction Recently Completed by Others*

Roadway Quantities

Sossaman Road (Trk 120)
Cut: 155 C.Y.
Fill: 451 C.Y.

Pecos Road
Cut: 744 C.Y.
Fill: 5,599 C.Y.

*Sossaman Road (Trk 101) ***
Cut: 507 C.Y.
Fill: 5,957 C.Y.

Ellsworth Road
Cut: 794 C.Y.
Fill: 1,898 C.Y.

Signal Butte Road
Cut: 328 C.Y.
Fill: 231 C.Y.

Pecos Road (East)
Cut: 712 C.Y.
Fill: 1 C.Y.

*** Volumes Include Additional 300 C.Y. Fill Estimated for Grading & Pavement Construction of PMT23-21476*

Total Project Quantities:

Cut: 325,381 C.Y.
Fill: 158,158 C.Y.
Net: 167,223 C.Y. (Cut)

Subballast: 37,750 C.Y.
Clearing & Grubbing: 102.90 AC.

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMJ
CHECKED BY: JRM
DATE: 03/09/2026
SHEET NUMBER: X195 of 195

UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona - Maricopa County
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
PROJECT EARTHWORK SUMMARY

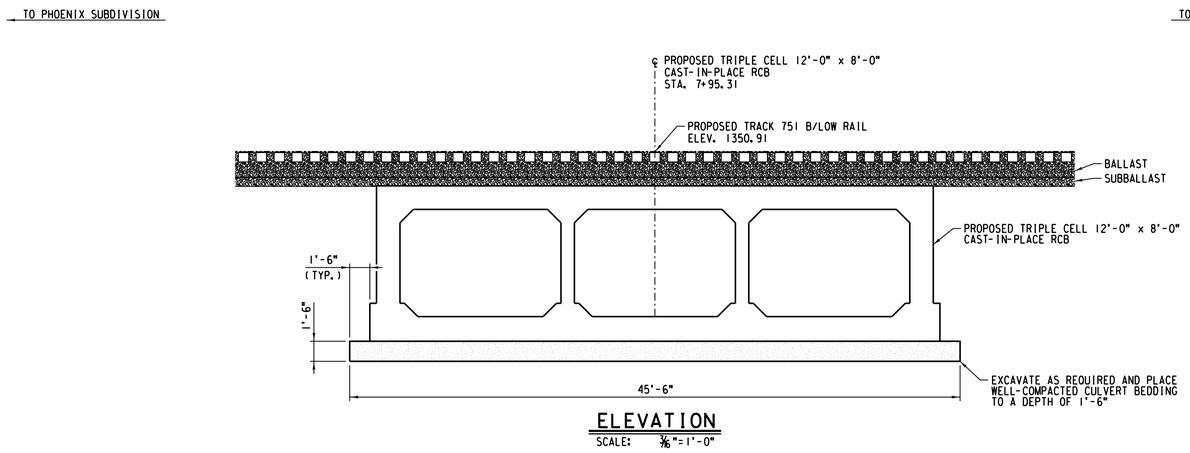
Color table:K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_RLTK.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\05_Cross Sections\T_XSC-RD_200927.dgn
Default
3/9/2026

DESIGN SHEET

DRAWING SCHEDULE

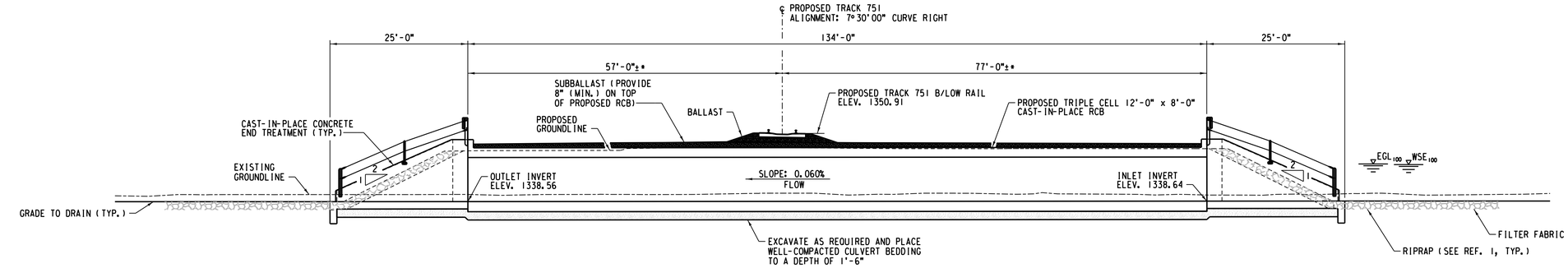
	SHEET NO.	PLAN NO.	DESCRIPTION	TYPE
THIS SET	S1	123084	GENERAL ARRANGEMENT (SHEET 1 OF 2)	DESIGN
	S2	123084	GENERAL ARRANGEMENT (SHEET 2 OF 2)	DESIGN
	S3	123084	END TREATMENT FRAMING DETAILS	DESIGN
	S4	123084	END TREATMENT REINFORCING DETAILS (SHEET 1 OF 2)	DESIGN
	S5	123084	END TREATMENT REINFORCING DETAILS (SHEET 2 OF 2)	DESIGN
	S6	123084	HANDRAIL DETAILS	DESIGN
	G1	680200	GENERAL NOTES	STANDARD
	G2	680200	GENERAL ARRANGEMENT FOR SINGLE CELL AND MULTI-CELL BOX CULVERTS	STANDARD
	G5	680200	CONSTRUCTION SEQUENCE	STANDARD
	MC27	680200	12'-0"x8'-0" MULTI-CELL BOX CULVERT DETAILS (SHEET 1 OF 3)	STANDARD

REF.	NO.	DWG. NO.	SHEET NO.	REV. NO.	DESCRIPTION	TYPE
	1	-	P013 OF 037 T006 OF 012 X028 OF 143 EC007 OF 036	-	MESA, ARIZONA, PHOENIX SUBDIVISION, MP 934.78 TO MP 937.83, CONSTRUCT INDUSTRIAL LEAD TRACK, 100% PLANS, ISSUED FOR BID, DATED MARCH 6, 2023	DESIGN



ELEVATION

SCALE: 3/16"=1'-0"



CROSS SECTION

RIGHT

SCALE: 1/2"=1'-0"

WSE_{100} = 1345.27
EGL_{100} = 1345.39
VEL_{100} = 3.80fps

MATERIAL NOTE:
CEMENT SHALL BE TYPE II OR TYPE III PORTLAND CEMENT IN ACCORDANCE WITH ASTM C150 SPECIFICATIONS.

NOTE:
SLOPES SHOWN ACCOUNT FOR CULVERT SKEW/ORIENTATION.

STANDARD VARIABLES:
L = 134 (FT)
NC = 3
NB = 269

TOTAL NUMBER OF BARS:
A = 538
B = 538
C = 334
D = 1076
E = 2152
F = 82
G = 128
H = 42
J = 42

LENGTH OF BARS:
P = 133'-8"
Q = 41'-2"
R = 29'-5"
S = 41'-10"
T = 63'-6"
U = 42'-5"
V = 63'-2"

FOR LIST OF VARIABLES, SEE STD. DWG. 680200, SHT. MC27.

CALCULATED BAR LENGTHS DO NOT INCLUDE LAP SPLICES, SEE BAR SPLICE NOTE ON STD. DWG. 680200 SHT. MC27 FOR LAP SPLICE REQUIREMENTS.

NOTES:
1. CROSS SECTION SHOWN ALONG CENTERLINE OF PROPOSED RCB.
2. * MEASURED ALONG RITTENHOUSE CHANNEL CENTERLINE.
3. RCB = REINFORCED CONCRETE BOX

BILL OF MATERIAL

REQ'D.	UNIT	DESCRIPTION	STORE ITEM NO.	ORDERED BY
134	FT	12'-0" X 8'-0" TRIPLE-CELL BOX CULVERT (BARREL ONLY) (PER STD. PLAN NO. 680200, SHT. MC27)		CONSTRUCTOR
164	CU. YD.	4000 PSI CONCRETE FOR END TREATMENTS ONLY (PER DETAILS, SHEET. NOS. S3-S5, AND NOTES, PER STD. DWG. 680200 SHT. G1)		
1	LOT	REINFORCING STEEL FOR END TREATMENTS ONLY (PER SCHEDULE, SHEET NO. S5)		
2	EA.	HANDRAIL POST HP-25R (PER STD. DWG. 680160 SHT. H1)	513-2077	
2	EA.	HANDRAIL POST HP-25L (PER STD. DWG. 680160 SHT. H1)	513-2075	
8	EA.	HANDRAIL POST HP-26 (PER STD. DWG. 680160 SHT. H1)	513-2080	
4	EA.	HANDRAIL POST HP-27 (PER STD. DWG. 680160 SHT. H1)	513-2085	
43	EA.	¾" DIA. x 14" A307 HEAVY HEX BOLT, TYPE I WITH HEAVY ELASTIC LOCK NUT (MIL-N-32258) AND FLAT CIRCULAR WASHER (ASTM F436), EACH COMPONENT HOT DIP OR MECHANICALLY ZINC COATED		
27	EA.	⅜" EYE TYPE STRANDVISE CABLE GRIP CARTRIDGE (MACLEAN POWER PRODUCTS NO. 5102)	098-6081	
400	LIN. FT.	⅜" NOMINAL DIAMETER WIRE ROPE, 7 WIRE, GALVANIZED STEEL STRAND, SIEMENS MARTINS GRADE, A-COATING	050-5394	
27	EA.	½" DIA. EYEBOLT, 2" LONG SHANK WITH 1" I.D. EYE, PLAIN PATTERN GALVANIZED DROP FORGED STEEL (ASTM A489), WITH ZINC PLATED HEX NYLON INSERT LOCKNUT (ASTM A563) AND ZINC PLATED FLAT CIRCULAR WASHER (ASTM F436)	130-0370	
19	EA.	GALVANIZED MALLEABLE IRON U-BOLT WITH 2 ELASTIC LOCKNUTS (MIL-N-25027), ZINC PLATED, FOR ⅜" DIA. WIRE ROPE	050-6370	
1	EA.	CULVERT MARKER SIGNS, MOUNTING POST AND MOUNTING HARDWARE (PER STD. DWG. 0502, 0507 AND 0599)	P00-2616	
1	LOT	RIPRAP (PER REF. 1)		
1	LOT	FILTER FABRIC (PER REF. 1)		
470	CU. YD.	CULVERT BEDDING (PER STD. DWG. 680200 SHT. G1)		
810	CU. YD.	FILL MATERIAL (PER STD. DWG. 680000 SHT. 3 AND REF. 1)**		
1	LOT	EPOGRIP MULTIPURPOSE STRUCTURAL BONDING AND GROUTING EPOXY ADHESIVE OR APPROVED ALTERNATE		
1	LOT	TEMPORARY FORMWORK MATERIAL		

CLSM MAY BE SUBSTITUTED FOR FILL MATERIAL.
BULK QUANTITIES ARE ESTIMATED.
FILL QUANTITY INCLUDES 30% FOR COMPACTION.

**NOTE:
FILL QUANTITY ON THESE PLANS INCLUDES EXCESS FILL REQUIRED FOR ADDITIONAL GRADING TO MEET NECESSARY COVER REQUIREMENTS ON SKEWED RCB.

DESIGN NOTES

RIGHT-OF-WAY

1. Right-of-way: Varies, per Ref. 1.

LAYOUT

1. Stationing: Per Ref. 1.
2. Elevation Datum: Per Ref. 1.
3. Temporary Benchmarks:
   TBM 1 (Olsson CP 11): Elev. 1347.99, NAVD 1988, ½" rebar located in ground Southeast of proposed Track 751 Culvert No. 7+95, 67.40' left of existing Phoenix Sub. Main Track centerline, Sta. 1506+01.02.
   TBM 2 (Olsson CP 12): Elev. 1345.52, NAVD 1988, ½" rebar located in ground West of proposed Track 751 Culvert No. 7+95, 71.58' left of existing Phoenix Sub. Main Track centerline, Sta. 1498+70.62.
4. Profile: Proposed Track 751 per Ref. 1.
5. Alignment: 7°30'00" curve right.
6. Information used to prepare this drawing in addition to reference drawings:
   Hydrologic & Hydraulic Evaluation prepared by Olsson, dated September 2022.

DESIGN

1. This structure has been designed for Cooper E80 Live Load with impact and cover depth ranging from 1'-6" to 18'-0".
2. Constructor shall be responsible for determining construction loads and providing necessary supplemental cover, or support of structural elements, to accommodate construction activities as required.

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 07-05-2023 ARIZONA, U.S.A.

POSTCONSTRUCTION COMPLIANCE

Constructor in charge of construction to provide to the office of the Senior Manager Structures Design as-built drawings confirming that the project was constructed in compliance with the plans and indicating any construction variances.

SIGNED

In Charge of Construction — Date

LETTER SERIES
SHEET NO. CUT ON — SHEET NO. SHOWN ON

SECTION DESIGNATION

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL — STATUS
07/05/2023 — DATE

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
Kyle Staub — CONSULTANT ENGINEER
01/13/2023 — DATE

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123084

LATITUDE: 33.28236°N LONGITUDE: 111.67547°W

UNION PACIFIC

DSN/CHK BY:	NAS/MJH
DRAWN/CHK BY:	NAS/KAS
UPRR ENGINEER:	ADS
SHT NO.:	S1 of S6

UNION PACIFIC RAILROAD

Office of Director Structures Design

LOCATION & DESCRIPTION: CULVERT 7+95, PHOENIX SUB
FURNISH & INSTALL
TRIPLE CELL 12'-0" x 8'-0" RCB x 134'

SHEET TITLE: GENERAL ARRANGEMENT (SHEET 1 OF 2)

FILE NAME: \\oa.ad.oaconsulting.com\fnts-na\projects\2020\0501\1000\020-0927.40\Design\Microstation\020-0927.40-Design\Microstation\020-0927_RLBRCul_Sta. 7+95 (East Wye Track)\Track 751_7+95.cadx.dgn

PLOTTED: 7/12/2023 1:26:53 PM

DESIGN SHEET

℄ EXISTING ACCESS ROAD

℄ PROPOSED TRACK 751 ALIGNMENT: 7°30'00" CURVE RIGHT

N

TO TRACK 101

PROPOSED TOP OF SUBGRADE (TYP.)

57'-0"±*

77'-0"±*

PROPOSED TRIPLE CELL 12'-0" x 8'-0" CAST-IN-PLACE RCB

FILTER FABRIC (SEE REF. 1)

RIPRAP (SEE REF. 1, TYP.)

℄ PROPOSED TRIPLE CELL 12'-0" x 8'-0" CAST-IN-PLACE RCB STA. 7+95.31

PROPOSED TOE OF SLOPE (TYP.)

ELEV. 1338.56

WP1

WP2

ELEV. 1338.64

FLOW
RITTENHOUSE CHANNEL

TO PHOENIX SUBDIVISION

TOP OF EXISTING ACCESS ROAD SHOULDER (TYP.)

℄ EXISTING ACCESS ROAD

PROPOSED 36" DIA. CMP (SEE REF. 1)

PROPOSED CONCRETE CROSSING (SEE REF. 1)

PROPOSED 36" DIA. CMP (SEE REF. 1)

RIGHT

PROPOSED 36" DIA. SSP (SEE REF. 1)

℄ EXISTING PHOENIX SUB MAIN TRACK ALIGNMENT: TANGENT

℄ PROPOSED GERMANN SIDING ALIGNMENT: TANGENT

EDGE OF S. RITTENHOUSE ROAD

PLAN
SCALE: 1/2 "=1'-0"

NOTE:
FOR DETAILS, SPECIFICATIONS, AND MATERIAL QUANTITIES OF RIPRAP AND GRADING, SEE REF. 1. GRADING AND RIPRAP LINEWORK SHOWN FOR INFORMATIONAL PURPOSES ONLY ON THESE PLANS.

WORK POINT TABLE		
WORK POINT	NORTHING	EASTING
WP1	830514.73	773775.67
WP2	830435.27	773883.56

F	= FIBER OPTIC LINE
G	= GAS PIPELINE
OHP	= OVERHEAD POWER LINE
T	= TELEPHONE LINE
UGE	= UNDERGROUND ELECTRIC

NOTES:
1. * MEASURED ALONG RITTENHOUSE CHANNEL CENTERLINE.
2. RCB = REINFORCED CONCRETE BOX
3. LOCATION OF KNOWN UTILITIES IS APPROXIMATE. LOCATION SHALL BE VERIFIED PRIOR TO CONSTRUCTION. NOTIFY ARIZONA 811, 1-800-782-5348, AT LEAST 48 HOURS PRIOR TO CONSTRUCTION.

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 07-7-2023 ARIZONA U.S.A.

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL — STATUS — 07/05/2023 DATE

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
CONSULTANT ENGINEER — 01/13/2023 DATE

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123084

LATITUDE: 33.28236°N LONGITUDE: 111.67547°W

DSN/CHK BY:	NAS/MJH
DRAWN/CHK BY:	NAS/KAS
UPRR ENGINEER:	ADS
SHT NO.:	S2 of S6

UNION PACIFIC RAILROAD
Office of Director Structures Design

LOCATION & DESCRIPTION: CULVERT 7+95, PHOENIX SUB

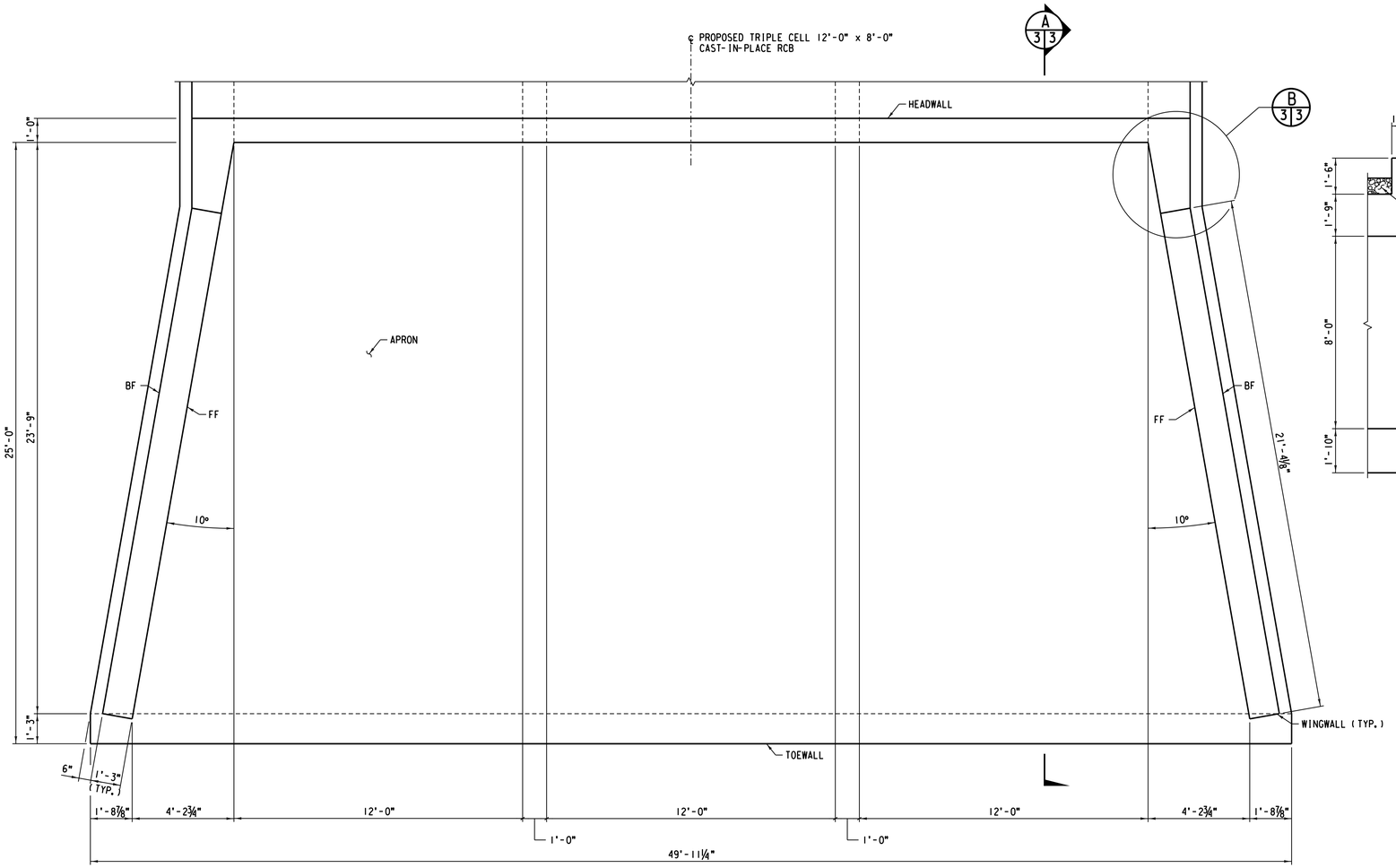
FURNISH & INSTALL
TRIPLE CELL 12'-0" x 8'-0" RCB x 134'

SHEET TITLE: GENERAL ARRANGEMENT (SHEET 2 OF 2)

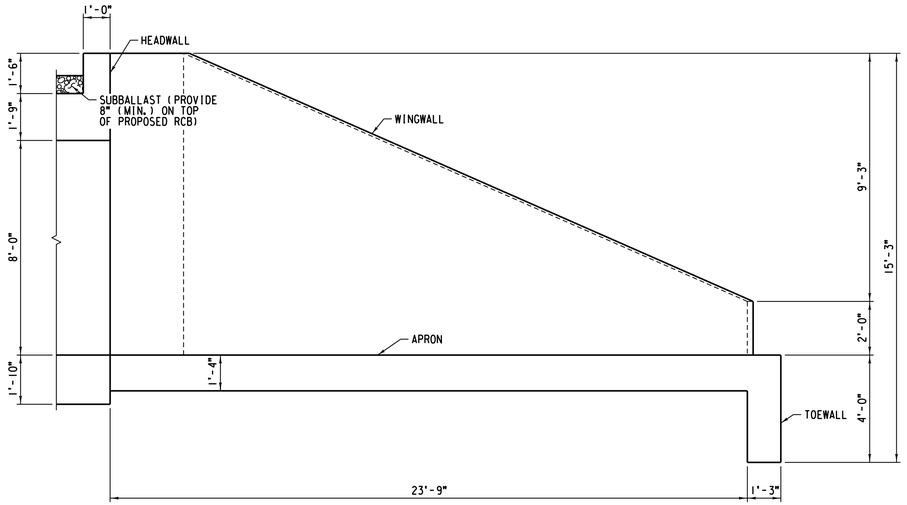
FILE NAME: \\oa.ad.oaconsulting.com\fnts-mp\projects\2020\0503\-1000\020-0927-40 Design\Microstation\020-0927.RLBR.Culv.Sta. 7-95 (East Wye Track\Track 751_7-95_cuaz.dgn

PLOTTED: 7/12/2023 1:26:53 PM

DESIGN SHEET

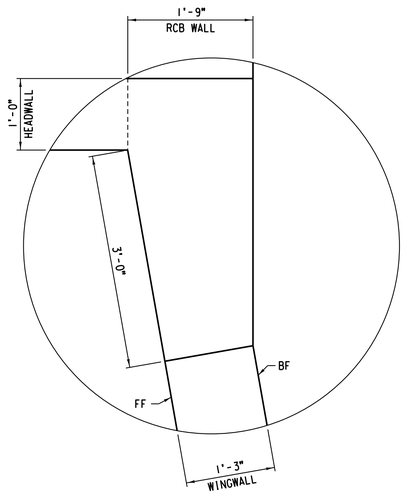


PLAN
SCALE: ⅜"=1'-0"



SECTION A 3|3
SCALE: ⅜"=1'-0"

ELEVATION
SCALE: ⅜"=1'-0"



DETAIL B 3|3
SCALE: 1"=1'-0"

NOTES:
1. FOR CAST-IN-PLACE CONCRETE NOTES, SEE STD. DWG. 680200 SHT. G1.
2. FOR REINFORCED CONCRETE BOX DETAILS, SEE STD. DWG. 680200 SHT. MC27.
3. FOR END TREATMENT REINFORCING DETAILS, SEE SHEET NO. S4.
4. BF = BACK FACE
   FF = FRONT FACE
   RCB = REINFORCED CONCRETE BOX

CONCRETE PLACEMENT QUANTITIES

ITEM	UNIT	QTY.
RCB BARREL (BOTTOM SLAB)	CU. YD.	444
RCB BARREL (WALLS & TOP SLAB)	CU. YD.	567
APRON & TOEWALL	CU. YD.	126
WINGWALLS & HEADWALL	CU. YD.	38.0

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL — STATUS
07/05/2023 — DATE

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 03-24-2023 ARIZONA U.S.A.

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
Kyle Stubs
CONSULTANT ENGINEER — 01/13/2023 DATE

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123084

LATITUDE: 33.28236°N LONGITUDE: 111.67547°W

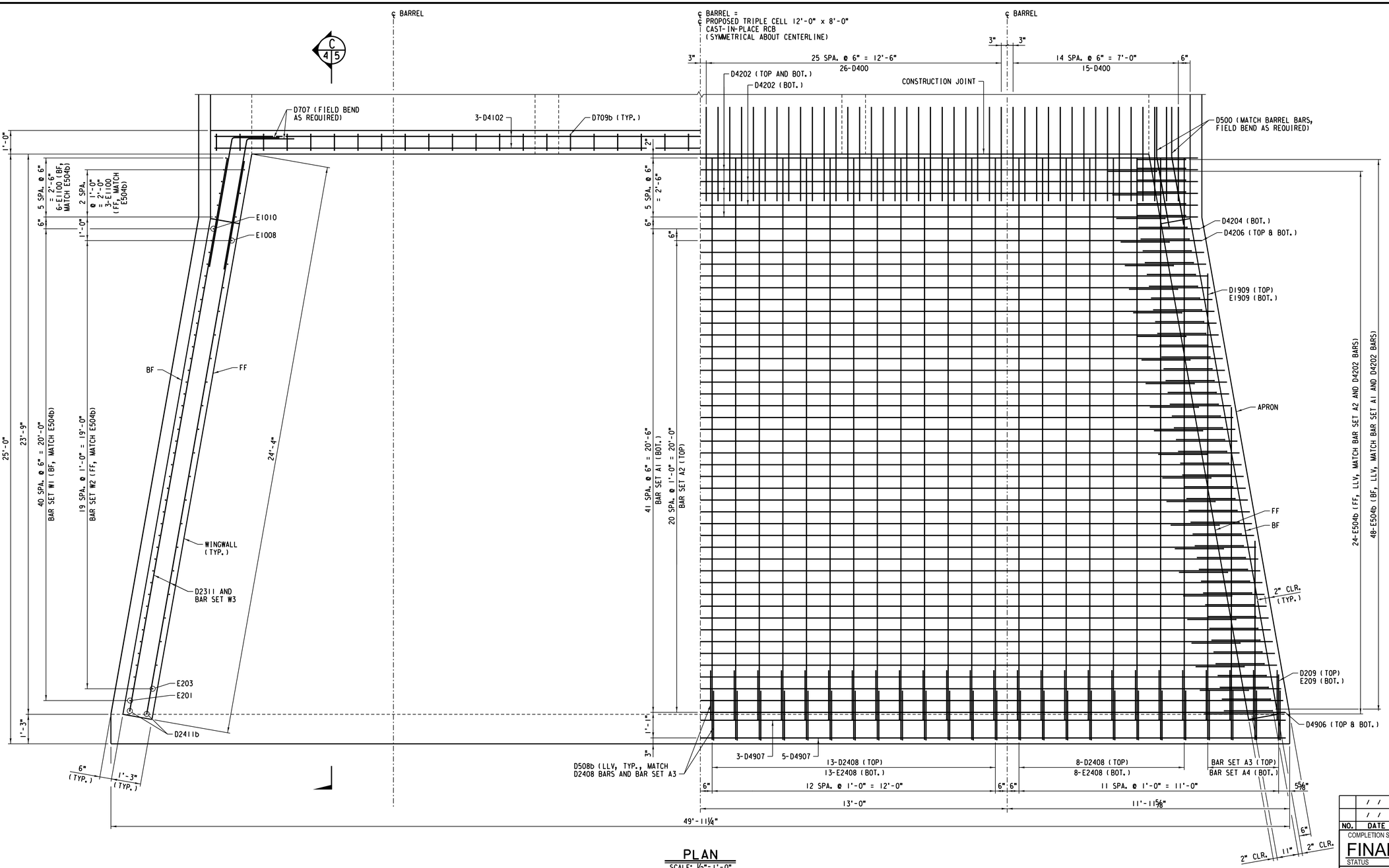
UNION PACIFIC

DSN/CHK BY: NAS/MJH	UNION PACIFIC RAILROAD
DRAWN/CHK BY: NAS/KAS	Office of Director Structures Design
UPRR ENGINEER: ADS	LOCATION & DESCRIPTION: CULVERT 7+95, PHOENIX SUB
SHT NO.: S3 of S6	FURNISH & INSTALL TRIPLE CELL 12'-0" x 8'-0" RCB x 134'
	SHEET TITLE: END TREATMENT FRAMING DETAILS

FILE NAME: \\oa.aol.oaconsulting.com\fnts-na1\projects\2020\050\1000\020\027\40\Design\Micronstation\020-0927-RLBR-Culv.Sta. 7-95 (East Wye Track\Track 751_7-95.catz.dgn

PLOTTED: 7/12/2023 1:26:53 PM

DESIGN SHEET



PLAN
SCALE: ½"=1'-0"

NOTES:
1. CONSTRUCTOR MAY SPLICE D4907 BARS WITH A 2'-9" MINIMUM LAP SPLICE IF PREFERRED.
2. FOR REINFORCING SCHEDULE, SEE SHEET NO. S5.
3. FOR CAST-IN-PLACE CONCRETE NOTES, SEE STD. DWG. 680200 SHT. G1.
4. FOR REINFORCED CONCRETE BOX DETAILS, SEE STD. DWG. 680200 SHT. MC27.
5. BF = BACK FACE
   FF = FRONT FACE
   LLV = LONG LEG VERTICAL
   RCB = REINFORCED CONCRETE BOX

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 03-24-2023 ARIZONA U.S.A.

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL — STATUS — 07/05/2023 DATE

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
CONSULTANT ENGINEER — 01/13/2023 DATE

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123084

LATITUDE: 33.28236°N LONGITUDE: 111.67547°W

DSN/CHK BY:	NAS/MJH
DRAWN/CHK BY:	NAS/KAS
UPRR ENGINEER:	ADS
SHT NO.:	S4 of S6

UNION PACIFIC RAILROAD
Office of Director Structures Design

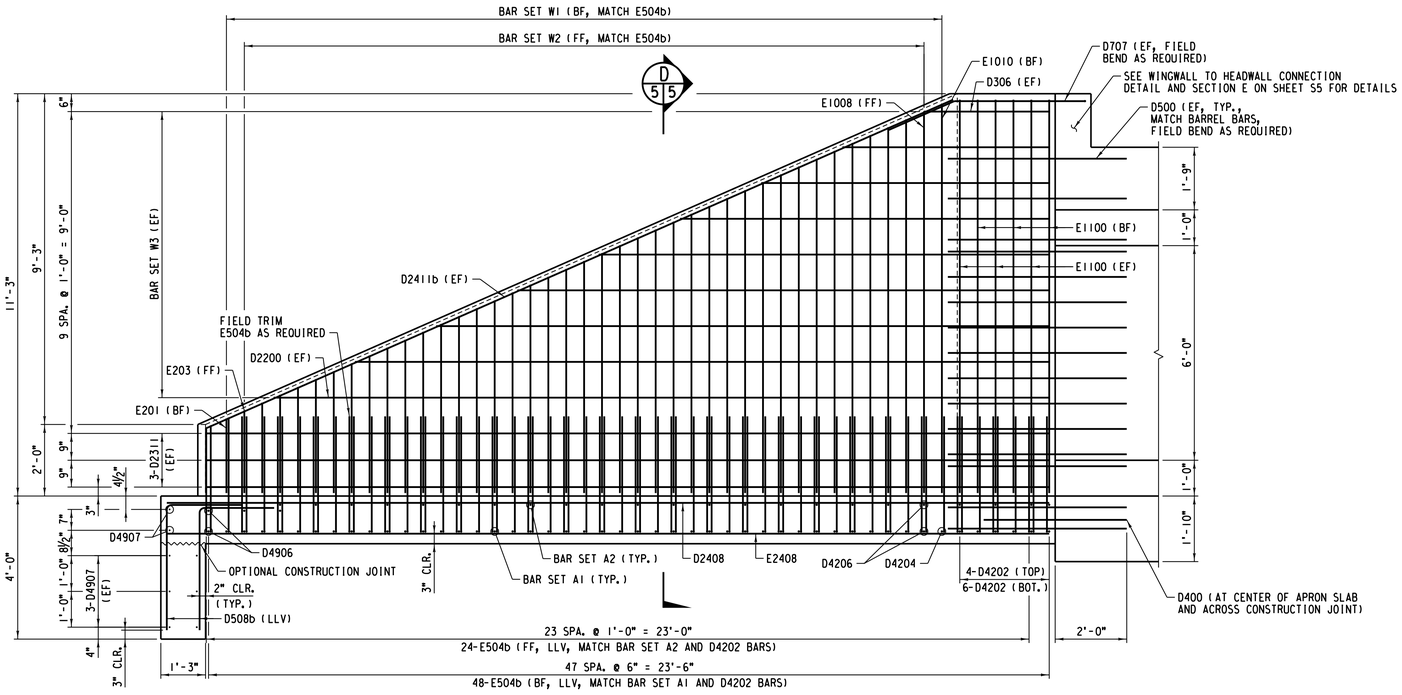
LOCATION & DESCRIPTION: CULVERT 7+95, PHOENIX SUB
FURNISH & INSTALL
TRIPLE CELL 12'-0" x 8'-0" RCB x 134'

SHEET TITLE: END TREATMENT REINFORCING DETAILS (SHEET 1 OF 2)

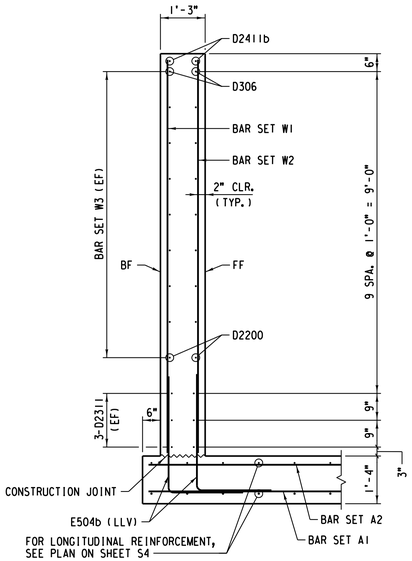
FILE NAME: \\oa.ad.oaconsulting.com\fnts-nd\projects\2020\0501-1000\020-0927-40 Design\Microstation\020-0927_RCBCulv_Sta. 7-95 (East Wye Track\Track 751_7-95_cad.dgn

PLOTTED: 7/12/2023 1:26:54 PM

DESIGN SHEET



SECTION C
SCALE: ½"=1'-0"

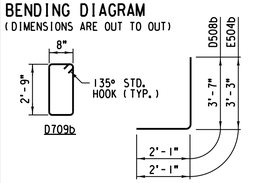


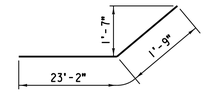
SECTION D
SCALE: ½"=1'-0"

REINFORCING SCHEDULE
(QUANTITY PER END TREATMENT)

TOTAL	MARK	SIZE	LENGTH	SHAPE
82	D400	#5	4'-0"	
60	D500	#5	5'-0"	
100	D508b	#5	5'-8"	
4	D707	#5	7'-7"	
42	D709b	#5	7'-9"	
12	D2311	#5	23'-11"	
4	D2411b	#5	24'-11"	
6	D4102	#5	41'-2"	
10	D4202	#5	42'-2"	
8	D4907	#5	49'-7"	
144	E504b	#6	5'-4"	
18	E1100	#6	11'-0"	
42	E2408	#6	24'-8"	

BENDING DIAGRAM
(DIMENSIONS ARE OUT TO OUT)



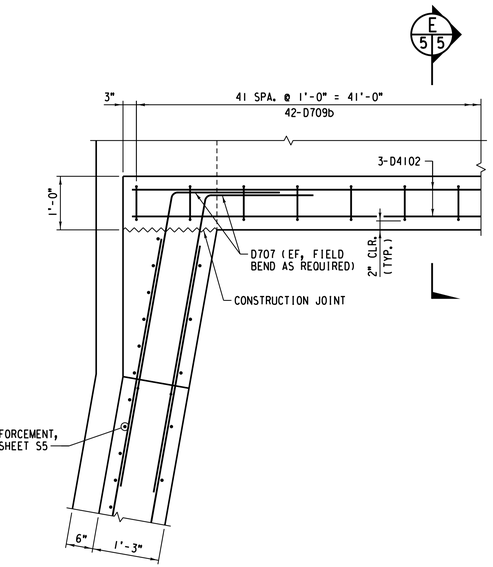


SET LIST

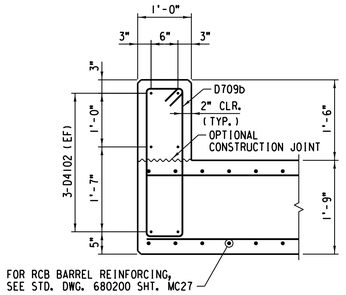
BAR SET DESIGNATION	MARK	SIZE	MIN. LENGTH	MAX. LENGTH	INCREMENT	NO. OF BARS/SET	NO. OF SETS	SHAPE	MIN. A	MAX. A
A1	D4204-D4906	#5	42'-4"	49'-6"	2⅛"(-)	42	1		-	-
A2	D4206-D4906	#5	42'-6"	49'-6"	4¼"(-)	21	1		-	-
A3	D209-D1909	#5	2'-9"	19'-9"	5'-8"	4	2		-	-
A4	E209-E1909	#6	2'-9"	19'-9"	5'-8"	4	2		-	-
W1	E201-E1010	#6	2'-1"	10'-10"	2⅝"	41	2		-	-
W2	E203-E1008	#6	2'-3"	10'-8"	5⅜" (-)	20	2		-	-
W3	D306-D2200	#5	3'-6"	22'-0"	2'-3¾"	9	4		-	-

EST. WT. OF REINFORCING STEEL = 11,050 LB.

NOTE:
BAR DESIGNATIONS CONSIST OF BAR SIZE & LENGTH FOLLOWED BY THE LETTER "b" IF BENT. BAR SIZES ARE REPRESENTED BY THE LETTERS A THROUGH L CORRESPONDING TO BAR SIZE #2 THROUGH #18. BAR LENGTHS ARE GIVEN IN FEET AND INCHES; THE LAST TWO DIGITS ARE INCHES.



WINGWALL TO HEADWALL CONNECTION DETAIL
SCALE: ¾"=1'-0"



SECTION E
SCALE: ¾"=1'-0"

NOTES:
1. FOR CAST-IN-PLACE CONCRETE NOTES, SEE STD. DWG. 680200 SHT. G1.
2. FOR REINFORCED CONCRETE BOX DETAILS, SEE STD. DWG. 680200 SHT. MC27.
3. BF = BACK FACE
   EF = EACH FACE
   FF = FRONT FACE
   LLV = LONG LEG VERTICAL
   RCB = REINFORCED CONCRETE BOX

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL — STATUS
07/05/2023 — DATE

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
CONSULTANT ENGINEER — DATE: 01/13/2023

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 03-24-2023 ARIZONA U.S.A.

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123084

LATITUDE: 33.28236°N LONGITUDE: 111.67547°W

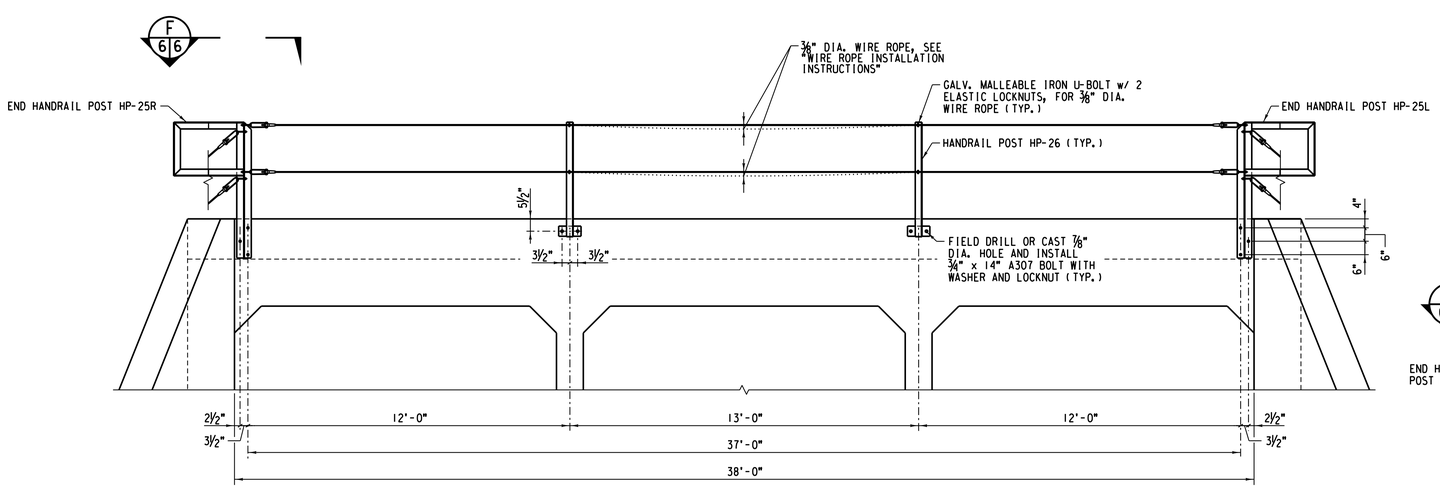
UNION PACIFIC

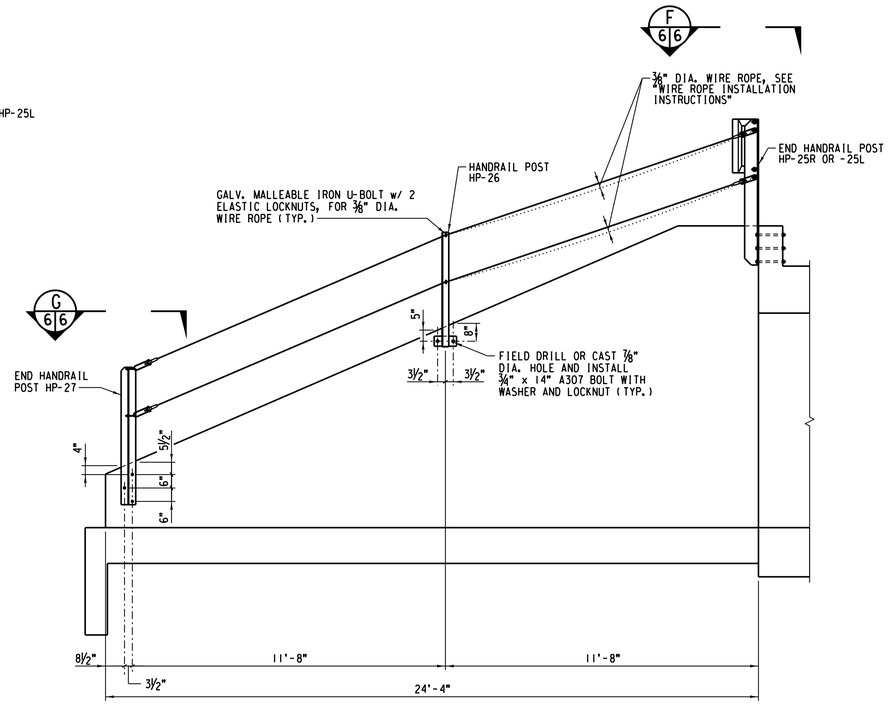
DSN/CHK BY: NAS/MJH	UNION PACIFIC RAILROAD
DRAWN/CHK BY: NAS/KAS	Office of Director Structures Design
UPRR ENGINEER: ADS	LOCATION & DESCRIPTION: CULVERT 7+95, PHOENIX SUB
SHT NO.: S5 of S6	FURNISH & INSTALL TRIPLE CELL 12'-0" x 8'-0" RCB x 134'
	SHEET TITLE: END TREATMENT REINFORCING DETAILS (SHEET 2 OF 2)

FILE NAME: \\oa.ad.oaconsulting.com\fnts-na1\projects\2020\0501.1000\020-0927-40\Design\Microstation\020-0927-40-Design-BRA.dgn, Div, Sta. 7+95 (East Wye Track)\Track 751_7+95_cap.dgn

PLOTTED: 7/12/2023 12:26:54 PM

DESIGN SHEET





NOTE:
WINGWALL HANDRAIL NOT SHOWN FOR CLARITY.

BOX CULVERT HANDRAIL LAYOUT

SCALE: 3/8"=1'-0"

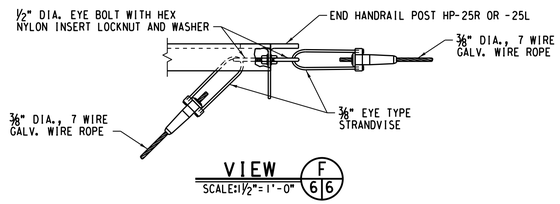
WIRE ROPE INSTALLATION INSTRUCTIONS:

1. THREAD WIRE ROPE THROUGH ALL CLIPS AND BARREL ANCHORS AND SEAT RETAINING WEDGES ON ONE END HANDRAIL POST.
2. STRETCH WIRE ROPE, HANG A MINIMUM OF 10 LB. ON CABLE BETWEEN TWO POSTS AND REMOVE ALL SAG TO A MAXIMUM OF 2 INCHES.
3. SEAT RETAINING WEDGES AT REMAINING END HANDRAIL POST.
4. REMOVE WEIGHTS.
5. TIGHTEN CLIPS AT INTERMEDIATE POSTS.
6. CUT & REMOVE EXCESS WIRE ROPE, COAT CUT PORTIONS OF WIRE ROPE WITH COLD GALVANIZING COMPOUND.

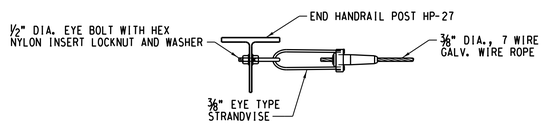
WINGWALL HANDRAIL LAYOUT

SCALE: 3/8"=1'-0"

(LOOKING PERPENDICULAR TO FACE OF WINGWALL)



VIEW F 6|6
SCALE: 1½"=1'-0"



VIEW G 6|6
SCALE: 1½"=1'-0"

NOTES:
1. FOR HANDRAIL POST DETAILS, SEE STD. DWG. 680160 SHT. H1.
2. RCB = REINFORCED CONCRETE BOX

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL — STATUS — 07/05/2023 DATE

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
CONSULTANT ENGINEER — 01/13/2023 DATE

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 12-26-2023 ARIZONA U.S.A.

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123084

LATITUDE: 33.28236°N LONGITUDE: 111.67547°W

UNION PACIFIC

DSN/CHK BY:	NAS/MJH
DRAWN/CHK BY:	NAS/KAS
UPRR ENGINEER:	ADS
SHT NO.:	S6 of S6

UNION PACIFIC RAILROAD
Office of Director Structures Design

LOCATION & DESCRIPTION: CULVERT 7+95, PHOENIX SUB
FURNISH & INSTALL
TRIPLE CELL 12'-0" x 8'-0" RCB x 134'

SHEET TITLE: HANDRAIL DETAILS

FILE NAME: \\oa.ad.oaconsulting.com\fnts-na1\projects\2020\0501-1000\020-0927-40 Design\Microstation\020-0927-RLBRCulv_Sta. 7+95 (East Wye Track\Track 751_7+95.cad.dgn

PLOTTED: 7/12/2023 1:26:54 PM

GENERAL NOTES

GENERAL

1. All work requirements shown on the design and not otherwise detailed shall be accomplished as specified in Union Pacific Railroad (UPRR) Specifications and the American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual for Railway Engineering. In the event of conflicts between specifications, the more restrictive shall apply.

2. All structures were designed in accordance with the AREMA Manual, Chapter 8 - Concrete Structures and Foundations.

3. Box culverts designed for a min. 1'-6" cover and a max. 18'-0" cover. Cover is measured from base of rail to top of the concrete box.

4. Construction means and methods shall comply with the All Permits Issued (API) package.

5. Field verify all dimensions, stations and elevations prior to start of construction.

6. Contact the Union Pacific "Call Before You Dig" number 90 days (not less than 60 days) prior to proposed construction start date. Prior to construction, confirm that all necessary relocations have been completed. The CBYD number is: 1-800-336-9193.

7. Location of known utilities is approximate. Location shall be verified prior to construction. Notify Call 811 "Call Before you Dig" number at least 48 hours prior to construction.

PRECAST CONCRETE:

1. All concrete materials, placement and workmanship shall be in accordance with Part 1, Chapter 8 of the current AREMA Manual for Railway Engineering.

2. Minimum compressive strength - 4000 psi at 28 days.

3. Exposed surfaces shall be formed in a manner which will produce a smooth and uniform appearance without rubbing or plastering. Exposed edges of 90 degrees or less are to be chamfered ¾" x ¾". Top surface to have a smooth finish, free of all float or trowel marks.

4. Concrete shall be proportioned such that the water - cement ratio (by weight) does not exceed 0.45. Concrete must contain a minimum of 6½ sacks of cement per cubic yard of concrete. Flyash replacement may account for up to 25% of the cement.

5. Cement shall be Type I, Type II or Type III Portland Cement in accordance with ASTM C150 specifications.

6. Aggregates shall be graded in accordance with ASTM C33 specifications. Coarse aggregate shall be no. 67. Fine aggregate shall be natural sand.

7. Air content shall be between 5% and 7% (by volume).

8. Admixtures shall not be used without approval by Engineer.

9. Curing shall be accomplished by wet curing or the application of a Type 2 membrane.

10. The fabricator shall stencil the item name, date manufactured, name of manufacturer and actual lifting weight at location shown.

11. Production procedures for the manufacture of precast members shall be in accordance with the AREMA Manual for Railway Engineering and the Precast/Prestressed Concrete Institute's Manual MNL 116 for Quality Control.

12. Dimensional tolerances governing the manufacture of precast members shall conform to Division VI, Section 6.4 of the Precast/Prestressed Concrete Institute's Manual MNL 116 for Quality Control. Tolerance for location of lifting devices shall be ½".

13. The fabricator will be responsible for loading and properly securing all precast concrete members for shipment. All concrete components shall be made available for inspection by the Railroad at the fabricator's plant prior to shipment, at the Railroad's discretion.

CAST-IN-PLACE CONCRETE:

1. All concrete materials, placement and workmanship shall be in accordance with Part 1, Chapter 8 of the current AREMA Manual for Railway Engineering.

2. Formwork tolerances shall be in accordance with ACI 347 specifications.

3. Minimum compressive strength - 4000 psi at 28 days.

4. Exposed surfaces shall be formed in a manner which will produce a smooth and uniform appearance without rubbing or plastering. Exposed edges of 90 degrees or less are to be chamfered ¾" x ¾". Top surface to have a smooth finish, free of all float or trowel marks.

5. Concrete shall be proportioned such that the water - cement ratio (by weight) does not exceed 0.45. Concrete must contain a minimum of 6½ sacks of cement per cubic yard of concrete. Flyash replacement may account for up to 25% of the cement.

6. Cement shall be Type I, Type II or Type III Portland Cement in accordance with ASTM C150 specifications.

7. Aggregates shall be graded in accordance with ASTM C33 specifications. Coarse aggregate shall be no. 67. Fine aggregate shall be natural sand.

8. Air content shall be between 5% and 7% (by volume).

9. Admixtures shall not be used without approval by Engineer.

10. Curing shall be accomplished by wet curing or the application of a Type 2 membrane.

REINFORCING STEEL:

1. Reinforcing steel shall be deformed, new billet bars per current ASTM A615 Specifications and to meet grade 60 requirements.

2. Fabrication of reinforcing steel shall be per Chapter 7 of the CRSI Manual of standard practice. Dimensions of bending details are out to out of bar.

3. Reinforcing steel is to be blocked to proper location and securely wired against displacement. Tie wires shall be installed at every other bar intersection so that at least 50% of the intersections are tied. Tack welding of reinforcing is prohibited. Minimum concrete cover on reinforcement not otherwise noted shall meet current AREMA Manual for Railway Engineering requirements.

LIFTING ANCHORS:

1. Swift lift anchors shall be Dayton Superior P-52 anchors or approved alternate with a minimum safe working load sufficient for the weight of the precast element including form removal. The safe working load shall provide a minimum safety factor of 4.

CONSTRUCTOR NOTES (WHEN APPLICABLE)

CONSTRUCTOR DEFINITION

CONSTRUCTOR DESIGNATES MANAGER BRIDGE CONSTRUCTION IF CONSTRUCTION BY UPRR AND CONTRACTOR IF CONSTRUCTION BY CONTRACTOR.

DIVISION OF RESPONSIBILITY

A. RAILROAD

1. Remove ties, rail and OTM from project area as required.

2. Provide and install ballast, ties, rail and OTM at proposed culvert.

3. Provide material as shown in the Bill of Material.

4. Provide and install Private Property/No Trespassing sign and culvert marker signs on right side at each end of culvert.

B. CONSTRUCTOR

1. Coordinate all construction activities with the Railroad.

2. Before ordering any material, Constructor shall make a detailed field inspection of the site verifying all pertinent dimensions and elevations. Any variations in dimensions or elevations from those shown on the drawings shall be reported immediately to the UPRR Project Manager.

3. Any modifications to this design shall be approved by the UPRR Office of Structures Design prior to construction.

4. Verify the location, relocation, abandonment, and/or temporary support of all utilities affected by the construction of the structure and embankment and coordinate these activities with the appropriate utility companies, agencies and/or authorities.

5. Apply for and obtain all construction permits necessary to perform the work.

6. Bill of Material and Schedules are provided for information only. Constructor shall be responsible for providing all material, not provided by the Railroad, required to complete the work.

7. Perform all work not performed by the Railroad.

8. Provide the Railroad with a detailed construction plan defining the activity, schedule and procedure for each aspect of the work. Construction shall not begin until the construction plan has been approved by the Railroad.

9. Provide all temporary structures (shoring, bracing and/or falsework) required to support and protect the existing embankments and structures affected by the work. Provide the Railroad with details, design and procedure for all temporary structures. All temporary structures shall be designed, signed and sealed by a professional engineer registered in the State that the structure is to be constructed. All temporary structures shall be approved by the UPRR Office of Structures Design prior to beginning construction.

10. Provide well-compacted bedding as required to establish grade of the culvert. Bedding for the box culvert shall consist of a minimum of 1'-6" of culvert bedding material. Over excavate 1'-6" each side of box. If loose, soft, or excessively wet soils are encountered at this depth, a 6" lift of granular bedding shall be placed on these soils and compressed into the subgrade. This procedure shall continue until a stable subgrade is produced. If a stable subgrade can not be achieved, the UPRR Office of Structures Design shall be notified.

11. Provide temporary guardrail system as directed by UPRR Project Manager. Guardrails on shoring shall include but not be limited to the following:

    The top edge height of the top rail shall be 42" +/- 3" above the walking/working surface.

    At least one midrail shall be provided, evenly spaced between walking/working surface and top rail.

    Metal or timber posts or uprights shall be spaced at maximum intervals of 10'-0".

    Entire guardrail system, including anchorages, shall be capable of withstanding without failure, a force of 200 lbs. applied in any outward or downward direction at any point.

    Guardrail system shall be surfaced to prevent injuries from punctures and lacerations and prevent snagging of clothing. The ends of top rails and midrails shall not extend past the posts or uprights.

    If conditions warrant, i.e. pedestrian traffic/weather, additional protection shall be provided such as screens or mesh to prevent slipping between the midrail and walking/working surface.

DIVISION OF RESPONSIBILITY

12. Direct channel flow as required to perform work.

13. Remove debris and ballst from channel as directed by the Railroad.

14. Accomplish activities within the schedule specified in the approved construction plan.

CULVERT BEDDING

Culvert bedding shall be granular material such as aggregates ordinarily specified and used in the construction of highway base and subbase. These aggregates include crushed stone, natural or crushed gravel, natural or manufactured sands, crushed slag or a homogeneous mixture of these materials. Culvert bedding shall be compacted to 95% of maximum dry density as defined in ASTM International D1557 (Modified Proctor). Recommended gradation is as follows:

SCREEN SIZE	% PASSING (BY WEIGHT)
1 inch	100
½ inch	60-90
⅜ inch	20-40
No. 4	10-20
No. 200	less than 5%

Union Pacific Sealant Ballast SB-2, item no. 562-5428, may be used.

BOX CULVERT OPENING AREA

CELL WIDTH (FT)	CELL HEIGHT (FT)	SINGLE CELL OPENING (FT^2)	DOUBLE CELL OPENING (FT^2)
6	4	23.1	46.2
6	6	35.1	70.2
8	4	30.6	61.2
8	6	46.6	93.2
8	8	62.6	125.2
10	4	38.0	76.0
10	6	58.0	116.0
10	8	78.0	156.0
10	10	98.0	196.0
10	12	118.0	236.0
12	8	93.3	186.6
12	10	117.3	234.6
12	12	141.3	282.6

REVISIONS		
DATE	LTR.	DESCRIPTION
/		
/		
/		
/		
/		
/		

DESIGN BY: HDR | DRAWN BY: HDR | CHECKED BY: UPRR

APPROVED:

01-03-2020

UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

CONCRETE BOX CULVERTS

GENERAL NOTES

FILE OWNER: UPRR | DATE: JANUARY, 2020

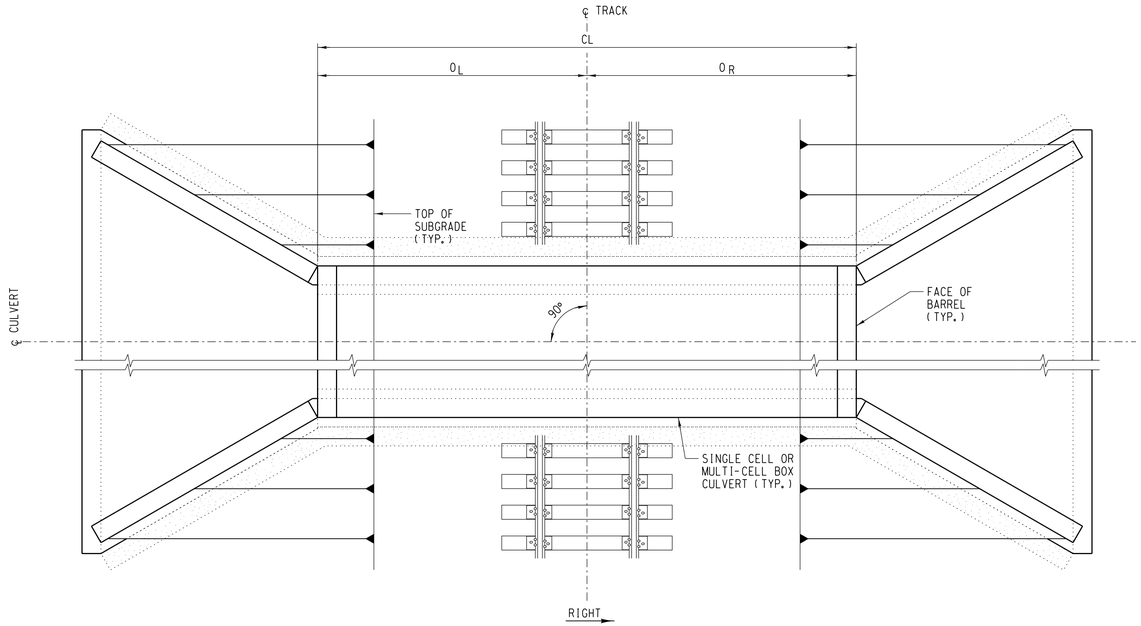
PLAN NO.: 680200 | SHEET: G1

Copyright © 2020 by Union Pacific Railroad

PLOTTED: 1/3/2020 3:30:45 PM

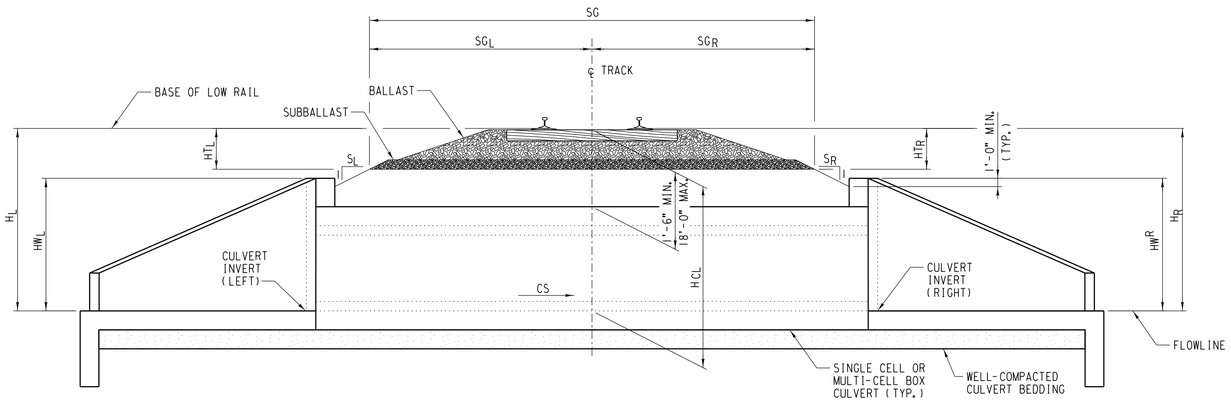
FILE NAME: pw://HDR.US.National.01/4195/10196897/680200_Concrete Box Culverts.dgn

INCHES 1 2 3 4 5 6 7 8 9 10 11 12



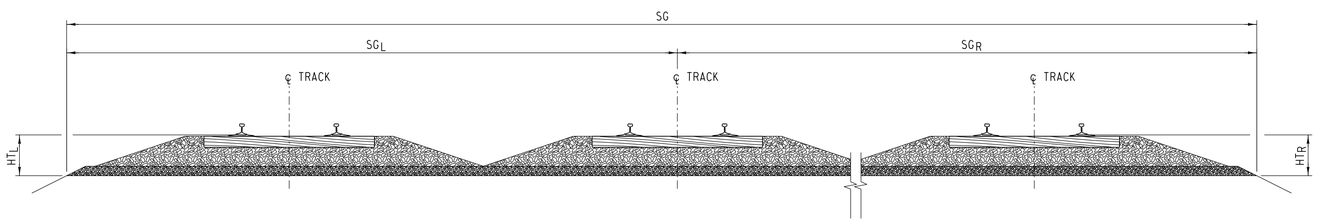
PLAN - SINGLE TRACK

SCALE: NONE



ELEVATION - SINGLE TRACK

SCALE: NONE



MULTIPLE TRACK DIAGRAM

SCALE: NONE

CULVERT LENGTH EQUATION:

$CL = O_L + O_R \geq SG + 2'$

$O_L = SG_L + S_L(H_L - HT_L + 1' - HW_L) + 1'$

$O_R = SG_R + S_R(H_R - HT_R + 1' - HW_R) + 1'$

$$H_L = \frac{H_{CL} + CS\,[SG_L - S_L(HT_L + HW_L - 1') + 1']}{[1 - CS(S_L)]}$$

$$H_R = \frac{H_{CL} - CS\,[SG_R - S_R(HT_R + HW_R - 1') + 1']}{[1 + CS(S_R)]}$$

$SG = SG_L + SG_R$

$H_{AVG} = (H_L + H_R) / 2$

KEY:

CL = CULVERT LENGTH
O_L = OFFSET LEFT
O_R = OFFSET RIGHT
H_{CL} = HEIGHT - BASE OF LOW RAIL TO FLOWLINE AT CENTERLINE OF TRACK
CS = CULVERT SLOPE (RISE/RUN) LEFT TO RIGHT (+ UP, - DOWN)
HT_L = BASE OF LOW RAIL TO TOP OF SUBGRADE LEFT EDGE
HT_R = BASE OF LOW RAIL TO TOP OF SUBGRADE RIGHT EDGE
H_L = HEIGHT - BASE OF LOW RAIL TO INVERT LEFT OF TRACK
H_R = HEIGHT - BASE OF LOW RAIL TO INVERT RIGHT OF TRACK
HW_L = HEIGHT OF WINGWALL LEFT OF TRACK
HW_R = HEIGHT OF WINGWALL RIGHT OF TRACK
SG = WIDTH OF SUBGRADE (24'-0" MINIMUM)
SG_R = WIDTH OF SUBGRADE RIGHT OF ℄ TRACK (12'-0" MINIMUM)
SG_L = WIDTH OF SUBGRADE LEFT OF ℄ TRACK (12'-0" MINIMUM)
S_L = SIDE SLOPE LEFT OF TRACK (RUN PER FOOT OF RISE)
S_R = SIDE SLOPE RIGHT OF TRACK (RUN PER FOOT OF RISE)

NOTE:
ALL DIMENSIONS ARE IN FEET.

REVISIONS		
DATE	LTR.	DESCRIPTION
/		
/		
/		
/		
/		
/		

DESIGN BY: HDR | DRAWN BY: HDR | CHECKED BY: UPRR

APPROVED:

01-03-2020

UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

CONCRETE BOX CULVERTS

GENERAL ARRANGEMENT FOR SINGLE CELL AND MULTI-CELL BOX CULVERTS

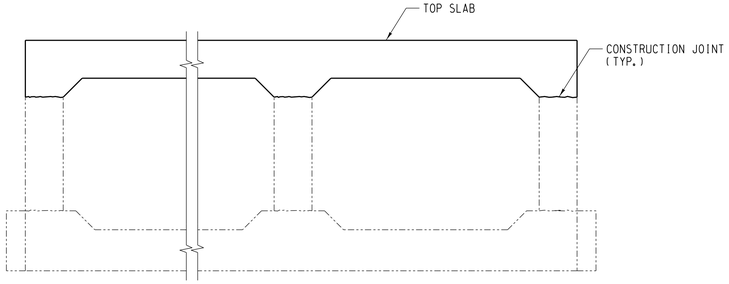
FILE OWNER: UPRR | DATE: JANUARY, 2020

PLAN NO.: 680200 | SHEET: G2

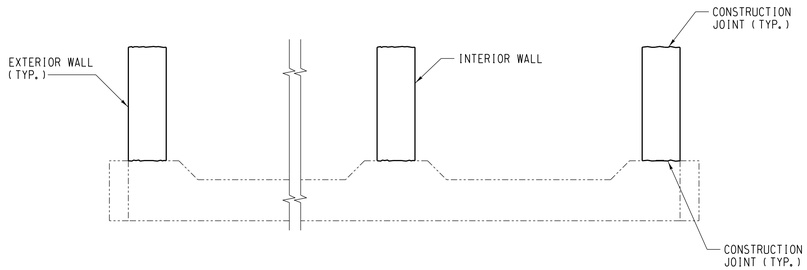
Copyright © 2020 by Union Pacific Railroad PLOTTED: 1/3/2020 3:30:46 PM

FILE NAME: pw://HDR_US_National.01/4195/10196897/680200_Concrete Box Culverts.dgn

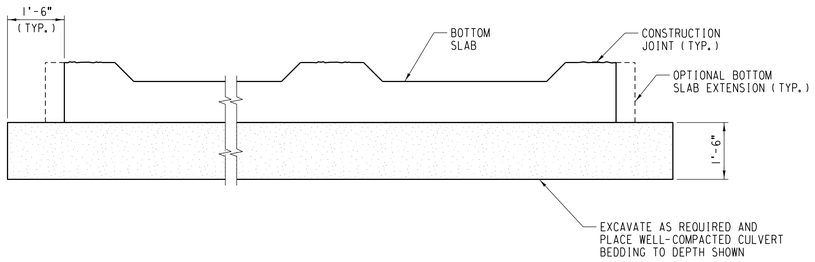
INCHES 1 2 3 4 5 6 7 8 9 10 11 12



PHASE THREE



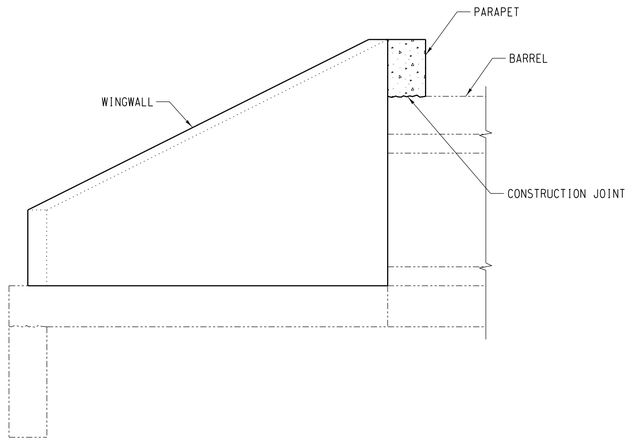
PHASE TWO



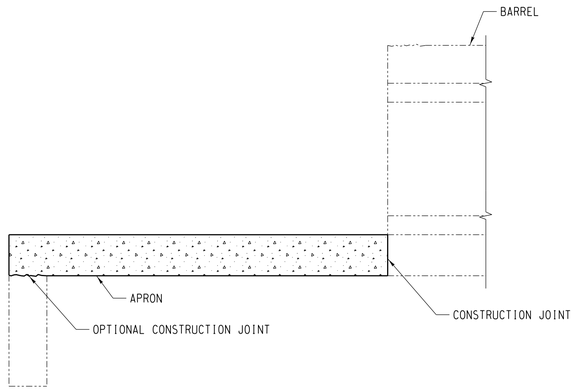
PHASE ONE

CONSTRUCTION SEQUENCE - BARREL

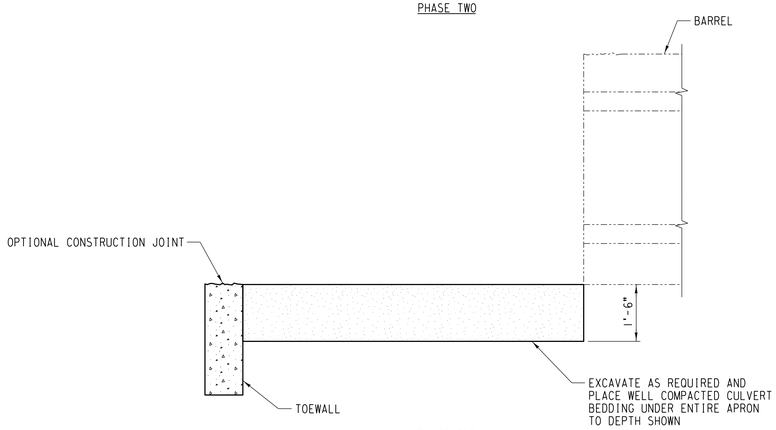
SCALE: ½"=1'-0"



PHASE THREE



PHASE TWO



PHASE ONE

CONSTRUCTION SEQUENCE - PARAPET, APRON, TOEWALL AND WINGWALLS

SCALE: ½"=1'-0"

(LOOKING PERPENDICULAR TO ℄ CULVERT)

REVISIONS		
DATE	LTR.	DESCRIPTION
/		
/		
/		
/		
/		
/		

DESIGN BY: HDR | DRAWN BY: HDR | CHECKED BY: UPRR

APPROVED:

01-03-2020

UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

CONCRETE BOX CULVERTS

CONSTRUCTION SEQUENCE

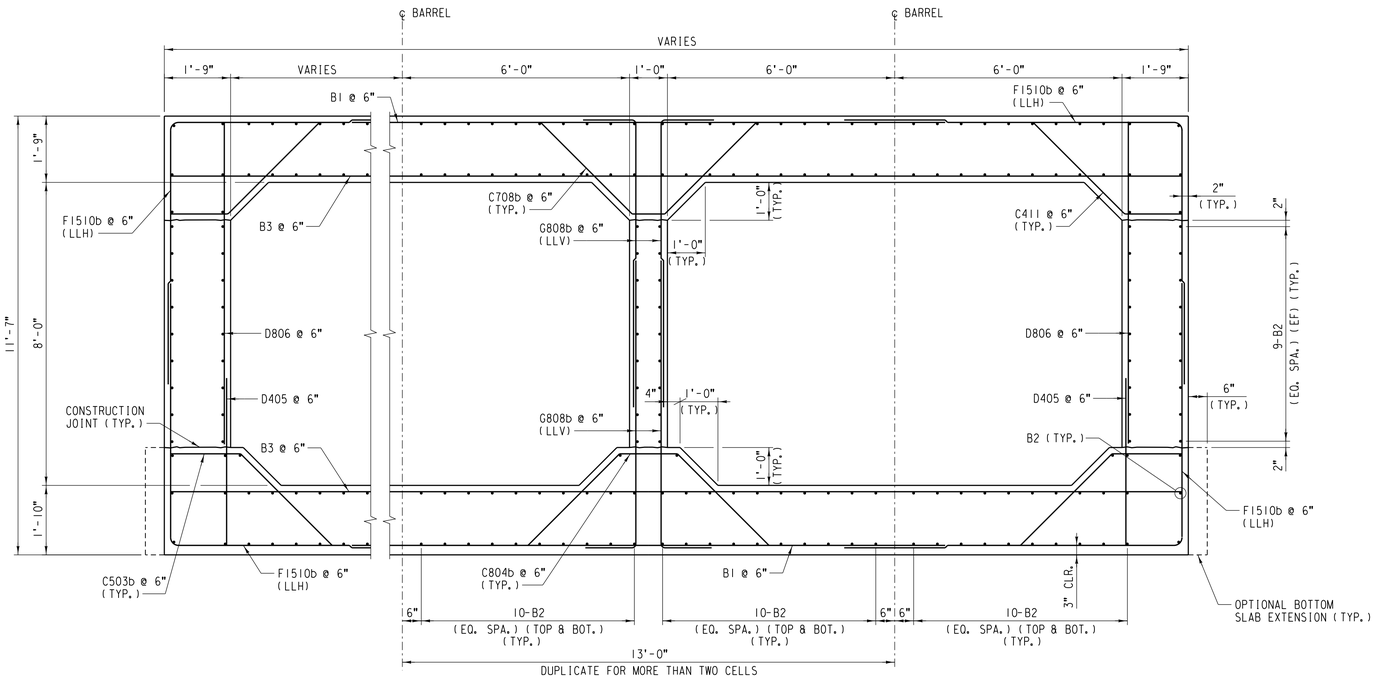
FILE OWNER: UPRR	DATE: JANUARY, 2020
PLAN NO.: 680200	SHEET: G5

Copyright © 2020 by Union Pacific Railroad

PLOTTED: 1/3/2020 3:30:48 PM

FILE NAME: pw://HDR_US_National.01/41951019698897/680200_Concrete Box Culverts.dgn

INCHES 1 2 3 4 5 6 7 8 9 10 11 12

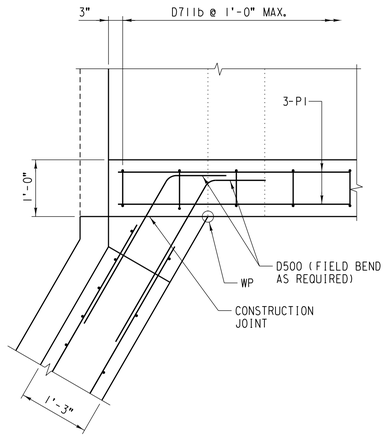


TYPICAL BARREL SECTION

SCALE: ½"=1'-0"

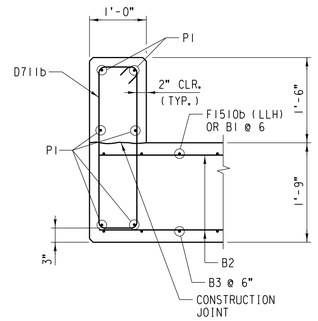
BAR SPLICE NOTE:

FOR B1 BAR USE 3'-5" MIN. LAP SPLICE WHEN NEEDED AND CENTER SPLICE AT MIDSPAN OF CULVERT OPENING, FOR B3 BAR USE 2'-7" MIN. LAP SPLICE WHEN NEEDED AND CENTER SPLICE OVER INTERIOR WALL, FOR B2 BAR USE 2'-1" MIN. LAP SPLICE WHEN NEEDED AND STAGGER SPLICE, FOR P1 BAR USE 1'-9" MIN. LAP SPLICE WHEN NEEDED AND STAGGER SPLICE.



WINGWALL TO PARAPET CONNECTION DETAIL

SCALE: ¾"=1'-0"



PARAPET DETAIL

SCALE: ¾"=1'-0"

NOTES:

1. FOR CAST-IN-PLACE CONCRETE NOTES AND REINFORCING STEEL NOTES, SEE SHEET NO. G1.
2. EF = EACH FACE
   FF = FAR FACE
   LLH = LONG LEG HORIZONTAL
   LLV = LONG LEG VERTICAL
   NF = NEAR FACE
   WP = WORKING POINT

CONCRETE QUANTITIES

	TOTAL	UNIT	DESCRIPTION
ONE END	AA	CU. YD./FT.	BARREL
	BB	CU. YD.	PARAPET
	CC	CU. YD.	TOEWALL
	DD	CU. YD.	APRON
	14.2	CU. YD.	TWO WINGWALLS

REINFORCING SCHEDULE

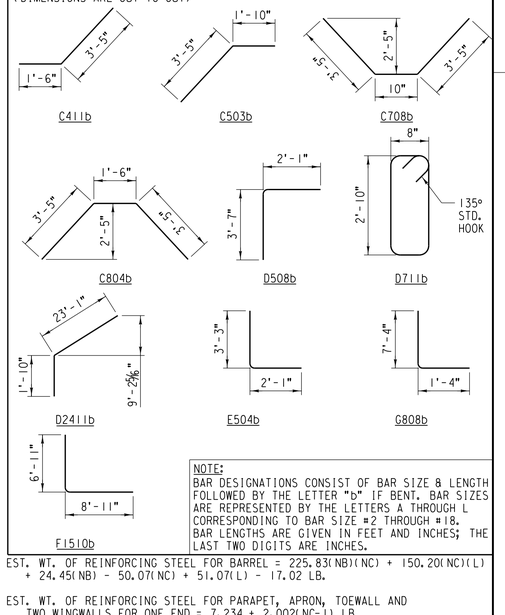
	TOTAL	MARK	SIZE	LENGTH	SHAPE
BARREL	A	C411b	#4	4'-11"	
	A	C503b	#4	5'-3"	
	B	C708b	#4	7'-8"	
	B	C804b	#4	8'-4"	
	A	D405	#5	4'-5"	
	A	D806	#5	8'-6"	
	C	B2	#6	P	
	D	F1510b	#7	15'-10"	
	A	B3	#7	Q	
	E	G808b	#8	8'-8"	
	A	B1	#8	R	
PARAPET, APRON, TOEWALL AND TWO WINGWALLS FOR ONE END	F	D400	#5	4'-0"	
	64	D500	#5	5'-0"	
	G	D508b	#5	5'-8"	
	H	D711b	#5	7'-11"	
	J	D1910	#5	19'-10"	
	12	D2109	#5	21'-9"	
	4	D2411b	#5	24'-11"	
	6	P1	#5	Q	
	2	A3	#5	S	
	8	T1	#5	T	
	114	E504b	#6	5'-4"	
	4	E1100	#6	11'-0"	
	J	E1910	#6	19'-10"	

SET LIST

MARK	SIZE	MIN. LENGTH	MAX. LENGTH	INCREMENT	NO. OF BARS/SET	NO. OF SETS	SHAPE
D103-D1909	#5	1'-3"	19'-9"	2'-3¾"	9	4	
D303-D1810	#5	3'-3"	18'-10"	1'-8¾"(+)	10	2	
A1	#5	U	V	6⅝"(-)	37	1	
A2	#5	U	V	1'-1⅞"(-)	19	1	
E203-E1009	#6	2'-3"	10'-9"	6"	18	2	
E203-E1100	#6	2'-3"	11'-0"	3"	36	2	
E303-E1810	#6	3'-3"	18'-10"	1'-8¾"(+)	10	2	

BENDING DIAGRAM

(DIMENSIONS ARE OUT TO OUT)



NOTE:

BAR DESIGNATIONS CONSIST OF BAR SIZE & LENGTH FOLLOWED BY THE LETTER "b" IF BENT. BAR SIZES ARE REPRESENTED BY THE LETTERS A THROUGH L CORRESPONDING TO BAR SIZE #2 THROUGH #18. BAR LENGTHS ARE GIVEN IN FEET AND INCHES; THE LAST TWO DIGITS ARE INCHES.

EQUATIONS FOR VARIABLES:

L = LENGTH OF BARREL (FT)
NC = NUMBER OF BOX CULVERT CELLS
NB = 2.0(L-0.33) + 1 (ROUND UP TO THE NEAREST INTEGER)

TOTAL NUMBER OF BARS

A = 2(NB)
B = NB(NC-1)
C = 134 + 100(NC-1)
D = 4(NB)
E = 4(NB)(NC-1)
F = 30 + 26(NC-1)
G = 76 + 26(NC-1)
H = 16 + 13(NC-1) (ROUND UP TO THE NEAREST INTEGER)
J = 16 + 13(NC-1)

LENGTH OF BARS

P = L - 0.33
Q = 15.17 + 13(NC-1)
R = 3.42 + 13(NC-1)
S = 15.83 + 13(NC-1)
T = 37.50 + 13(NC-1)
U = 16.42 + 13(NC-1)
V = 37.17 + 13(NC-1)

LENGTH OF BARS ARE CALCULATED IN FEET AND ROUNDED DOWN TO THE NEAREST WHOLE INCH.

CALCULATED BAR LENGTHS DO NOT INCLUDE LAP SPLICES, SEE BAR SPLICE NOTE FOR LAP SPLICE REQUIREMENTS.

CONCRETE QUANTITIES

AA = 3.19 + 2.12(NC-1)
BB = 0.86 + 0.72(NC-1)
CC = 4.68 + 1.6(NC-1)
DD = 27.53 + 12.95(NC-1)

ROUND CONCRETE QUANTITIES TO ONE DECIMAL PLACE.

EST. WT. OF REINFORCING STEEL FOR BARREL = 225.83(NB)(NC) + 150.20(NC)(L) + 24.45(NB) - 50.07(NC) + 51.07(L) - 17.02 LB.

EST. WT. OF REINFORCING STEEL FOR PARAPET, APRON, TOEWALL AND TWO WINGWALLS FOR ONE END = 7,234 + 2,002(NC-1) LB.

REVISIONS		
DATE	LTR.	DESCRIPTION
/		
/		
/		
/		
/		
/		

DESIGN BY: HDR | DRAWN BY: HDR | CHECKED BY: UPRR

APPROVED:

01-03-2020

UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

CONCRETE BOX CULVERTS

12'-0" x 8'-0" MULTI-CELL BOX CULVERT DETAILS (SHEET 1 OF 3)

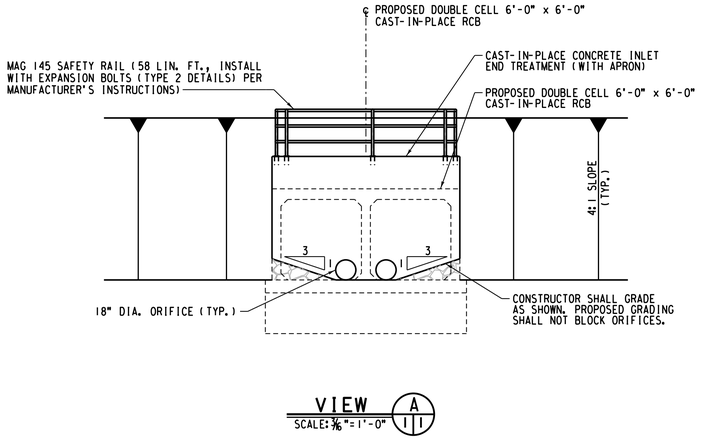
FILE OWNER: UPRR	DATE: JANUARY, 2020
PLAN NO.: 680200	SHEET: MC27

Copyright © 2020 by Union Pacific Railroad PLOTTED: 1/3/2020 3:31:30 PM

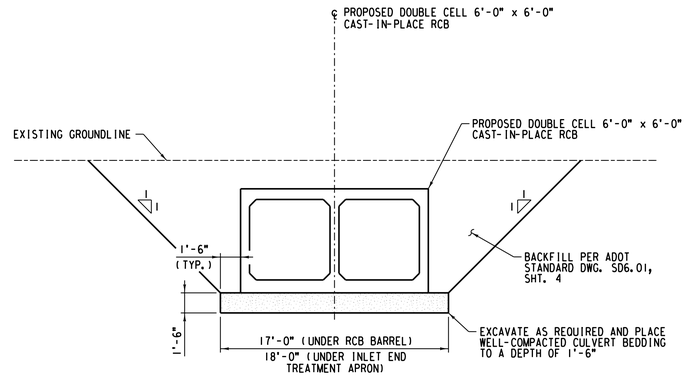
FILE NAME: pw://HDR_US_National.Oil/41190/10196897/680200_Concrete Box Culverts.dgn

INCHES 1 2 3 4 5 6 7 8 9 10 11 12

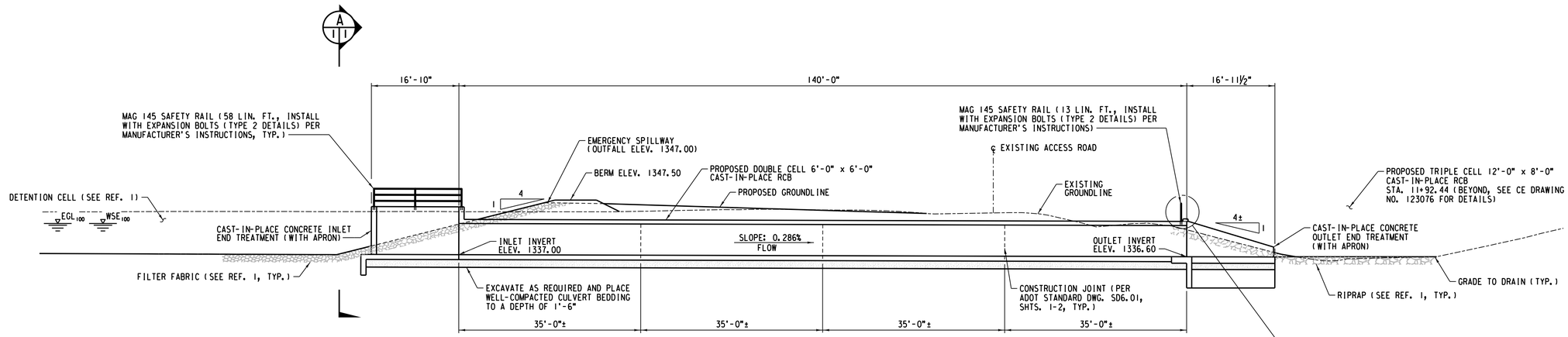
DESIGN SHEET



VIEW A
SCALE: 3/16"=1'-0"

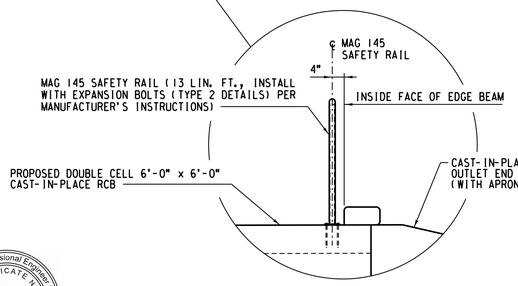


ELEVATION
SCALE: 3/16"=1'-0"

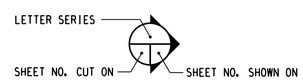


CROSS SECTION
SCALE: 1/32"=1'-0"

WSE_{50} = 1343.20
EGL_{100} = 1343.20
VEL_{100} = 1.00 fps



NOTES:
1. CROSS SECTION SHOWN ALONG CENTERLINE OF PROPOSED RCB.
2. RCB = REINFORCED CONCRETE BOX



SECTION DESIGNATION

MATERIAL NOTES:
1. ALL CAST-IN-PLACE CONCRETE SHALL BE PER STD. DWG. 680200 SHT. G1 (4000 PSI AT 28 DAYS).
2. CEMENT SHALL BE TYPE II OR TYPE III PORTLAND CEMENT IN ACCORDANCE WITH ASTM C150 SPECIFICATIONS.

BILL OF MATERIAL

REQ'D.	UNIT	DESCRIPTION	STORE ITEM NO.	ORDERED BY
140	FT	6'-0" X 6'-0" DOUBLE-CELL BOX CULVERT BARREL (PER ADOT STANDARD DRAWINGS, PLAN SD6.01 SHEET 1 AND PLAN SD6.02, SHEET 1)		CONSTRUCTOR
1	EA.	OUTLET END TREATMENT FOR 6'-0" X 6'-0" DOUBLE-CELL BOX CULVERT, SKEW = 0° (WITH APRON) (PER ADOT STANDARD DRAWINGS, PLAN SD6.01, SHEET 1 & 4, PLAN SD6.08, SHEET 1 AND PLAN SD6.11, SHEET 1 & 3)		
25.0	CU. YD.	4000 PSI CONCRETE FOR INLET END TREATMENT ONLY (PER DETAILS, SHEET NOS. S3-S4, AND NOTES, PER STD. DWG. 680200 SHT. G1)		
1	LOT	REINFORCING STEEL FOR INLET END TREATMENT (PER SCHEDULE, SHEET NO. S3 AND NOTES, PER STD. DWG. 680200 SHT. G1)		
71	LIN.FT.	MARICOPA ASSOCIATION OF GOVERNMENTS (MAG) 145 SAFETY RAIL (FOR END TREATMENTS) WITH EXPANSION BOLTS (TYPE 2 DETAILS) AND ALL OTHER ASSOCIATED HARDWARE) OR APPROVED ALTERNATE		
1	EA.	CULVERT MARKER SIGNS, MOUNTING POST AND MOUNTING HARDWARE (PER STD. DWG. 0502, 0507 AND 0599)	P00-2616	
1	LOT	RIPRAP, CLASS 1 (PER STD. DWG. 680000 SHT. 3 AND REF. 1)	562-2764	
1	LOT	FILTER FABRIC (PER REF. 1)		
180	CU. YD.	CULVERT BEDDING (PER STD. DWG. 680200 SHT. G1)		
275	CU. YD.	STRUCTURE BACKFILL (PER ADOT STANDARD DRAWINGS, PLAN SD6.01, SHEET 4)		
1	LOT	FILL MATERIAL (PER STD. DWG. 680000 SHT. 3 AND REF. 1)		
1	LOT	EPOGRIP MULTIPURPOSE STRUCTURAL BONDING AND GROUTING EPOXY ADHESIVE OR APPROVED ALTERNATE		
1	LOT	TEMPORARY FORMWORK MATERIAL		

CLSM MAY BE SUBSTITUTED FOR FILL MATERIAL.
BULK QUANTITIES ARE ESTIMATED.

DESIGN NOTES

LAYOUT

1. Stationing: Per Ref. 1.
2. Elevation Datum: Per Ref. 1.
3. Temporary Benchmarks:
   TBM 1 (Olsson CP 12): Elev. 1345.52, NAVD 1988, ½" rebar located in ground East of proposed Track 101 Culvert No. 0.20, 71.58' left of existing Phoenix Sub. Main Track centerline, Sta. 1498+70.62.
   TBM 2 (Olsson CP 13): Elev. 1342.79, NAVD 1988, ½" rebar located in ground West of proposed Track 101 Culvert No. 0.20, 62.38' left of existing Phoenix Sub. Main Track centerline, Sta. 1491+33.87.
4. Profile: Proposed Track 101 per Ref. 1.
5. Alignment: Not applicable.
6. Information used to prepare this drawing in addition to reference drawings:
   Hydrologic & Hydraulic Evaluation prepared by Olsson, dated September 2022.

DESIGN

1. The RCB and outlet end treatment have been designed for AASHTO HL-93 Live Load with impact and cover depth ranging from 0'-0" to 10'-0".
2. The inlet end treatment has been designed for full hydrostatic pressure on the walls, earth pressure and a 250 psf construction surcharge. No vehicular live load was considered in the design.
3. Constructor shall be responsible for determining construction loads and providing necessary supplemental cover, or support of structural elements, to accommodate construction activities as required.

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 08-31-2023 ARIZONA U.S.A.

POSTCONSTRUCTION COMPLIANCE

Constructor in charge of construction to provide to the office of the Senior Manager Structures Design as-built drawings confirming that the project was constructed in compliance with the plans and indicating any construction variances.

SIGNED

In Charge of Construction — Date

DRAWING SCHEDULE

THIS SET

SHEET NO.	PLAN NO.	DESCRIPTION	TYPE
S1	123075	GENERAL ARRANGEMENT (SHEET 1 OF 2)	DESIGN
S2	123075	GENERAL ARRANGEMENT (SHEET 2 OF 2)	DESIGN
S3	123075	INLET END TREATMENT DETAILS (SHEET 1 OF 2)	DESIGN
S4	123075	INLET END TREATMENT DETAILS (SHEET 2 OF 2)	DESIGN
G1	680200	GENERAL NOTES	STANDARD
1	SD6.01	REINFORCED CONCRETE BOX CULVERTS MISCELLANEOUS DETAILS (1 OF 5)	ADOT STANDARD
2	SD6.01	REINFORCED CONCRETE BOX CULVERTS MISCELLANEOUS DETAILS (2 OF 5)	ADOT STANDARD
4	SD6.01	REINFORCED CONCRETE BOX CULVERTS STRUCTURAL EXCAVATION & STRUCTURE BACKFILL	ADOT STANDARD
1	SD6.02	REINFORCED CONCRETE BOX CULVERTS DOUBLE BARREL (0'-15' FILLS)	ADOT STANDARD
1	SD6.08	REINFORCED CONCRETE BOX CULVERTS OUTLET WINGS - SKEW 0° TO 20° CULVERT HEIGHT 3' TO 7'	ADOT STANDARD
3	SD6.08	REINFORCED CONCRETE BOX CULVERTS INLET WINGS - SKEW 0° TO 20° CULVERT HEIGHT 3' TO 7'	ADOT STANDARD
1	SD6.11	REINFORCED CONCRETE BOX CULVERTS OUTLET APRON DETAILS	ADOT STANDARD
3	SD6.11	REINFORCED CONCRETE BOX CULVERTS OUTLET APRON - DIMENSIONS & QUANTITIES (4:1 SLOPE)	ADOT STANDARD
145	-	SAFETY RAIL	MAG STANDARD

REF.

NO.	DWG. NO.	SHEET NO.	REV. NO.	DESCRIPTION	TYPE
1	-	P016 OF 037 X037 OF 159 EC006 OF 036	-	MESA, ARIZONA, PHOENIX SUBDIVISION, MP 934.78 TO MP 937.83, CONSTRUCT INDUSTRIAL LEAD TRACK, 100% PLANS, ISSUED FOR BID, DATED MARCH 17, 2023	DESIGN

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL (STATUS) 09/01/2023 (DATE)

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
Kyle Stubl
CONSULTANT ENGINEER 08/18/2023 DATE

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123075

LATITUDE: 33.28409°N LONGITUDE: 111.67783°W

UNION PACIFIC

DSN/CHK BY:	NAS/MJH
DRAWN/CHK BY:	MEW/MJH
UPRR ENGINEER:	ADS
SHT NO.:	S1 of S4

UNION PACIFIC RAILROAD
Office of Director Structures Design

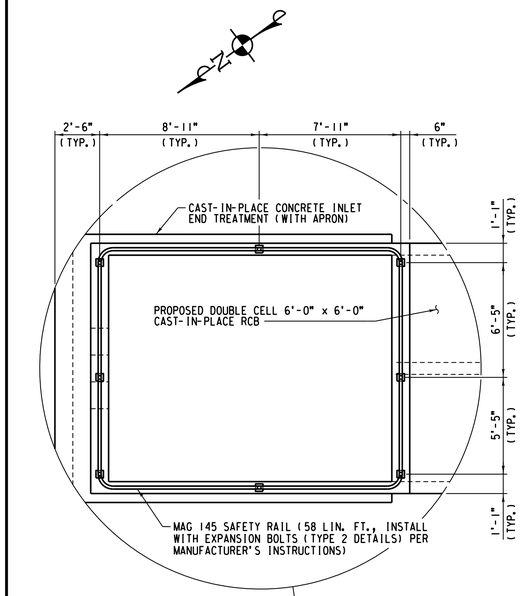
LOCATION & DESCRIPTION:
CULVERT 0.20, PIRATE IND LEAD
FURNISH & INSTALL
DOUBLE CELL 6'-0" x 6'-0" RCB x 140'

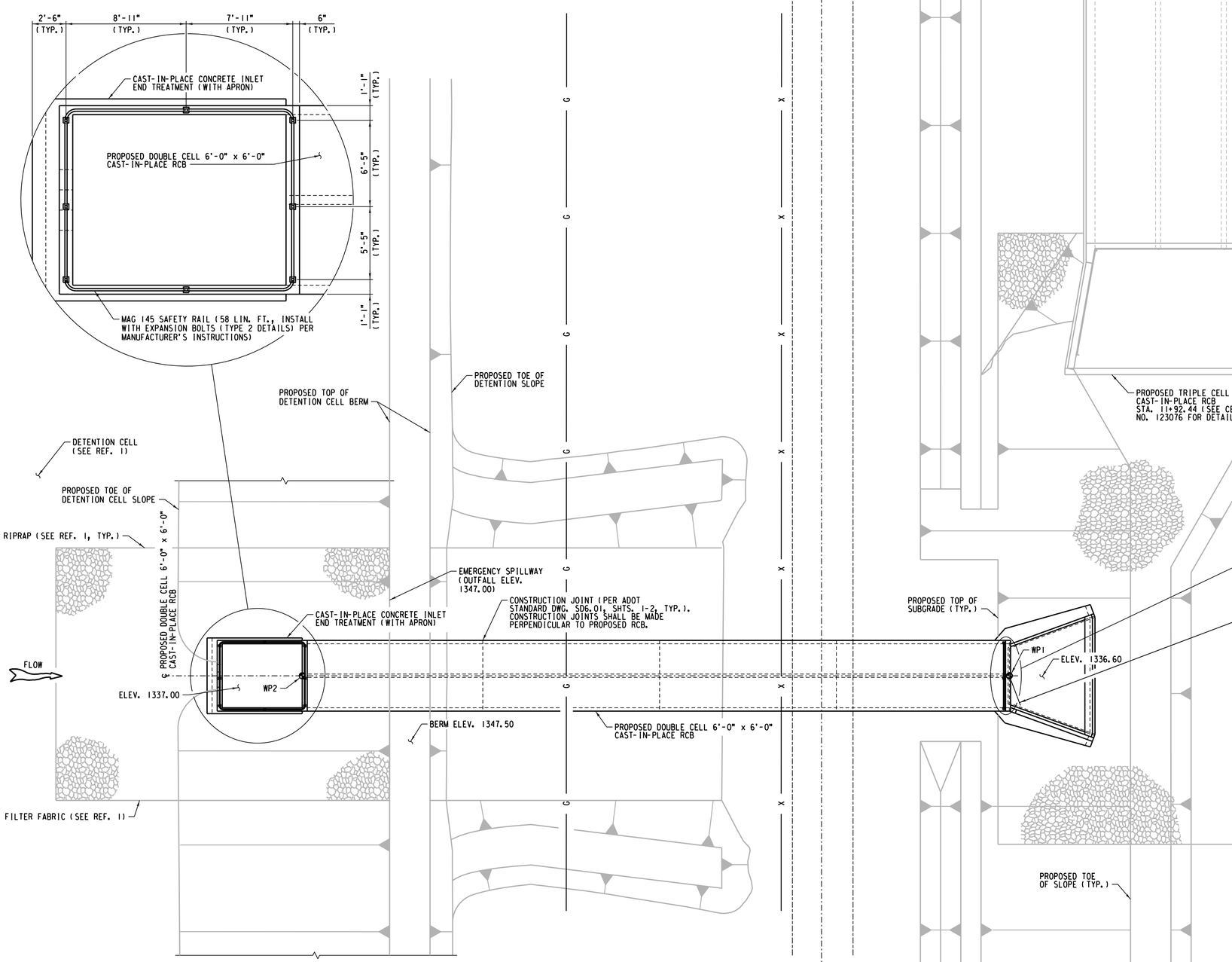
SHEET TITLE:
GENERAL ARRANGEMENT (SHEET 1 OF 2)

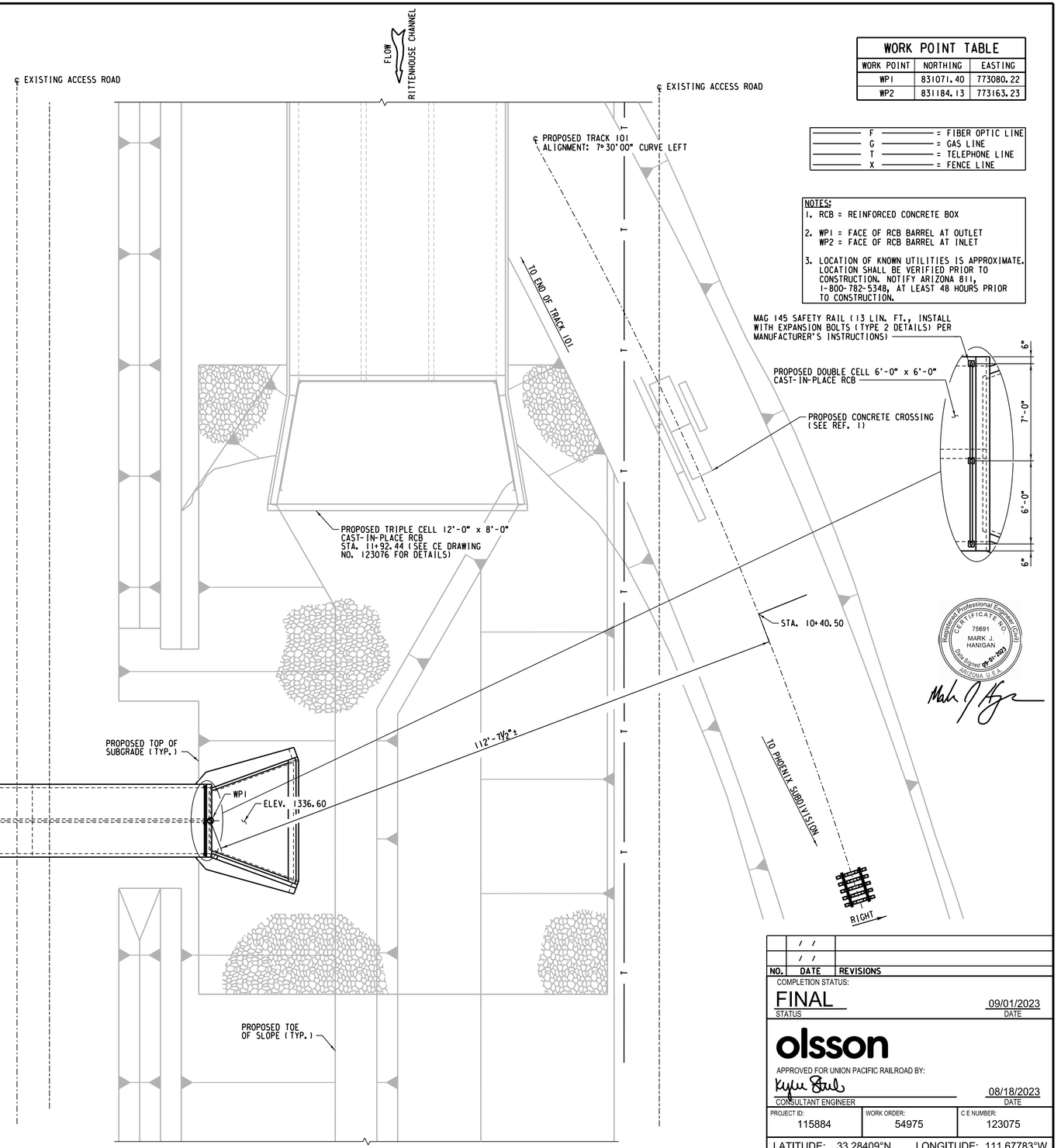
FILE NAME: \\oa.ad.oasconsulting.com\fnts-mal\projects\2020\050\1000\020\0920.70\Exchange\Dustin UPRR\UPRR_23-09-01_Final Submittal\Pirate Ind Lead 0.20.cadx.dgn

PLOTTED: 9/1/2023 8:37:12 AM

DESIGN SHEET







WORK POINT TABLE		
WORK POINT	NORTHING	EASTING
WP1	831071.40	773080.22
WP2	831184.13	773163.23

F = FIBER OPTIC LINE
G = GAS LINE
T = TELEPHONE LINE
X = FENCE LINE

NOTES:
1. RCB = REINFORCED CONCRETE BOX
2. WP1 = FACE OF RCB BARREL AT OUTLET
   WP2 = FACE OF RCB BARREL AT INLET
3. LOCATION OF KNOWN UTILITIES IS APPROXIMATE. LOCATION SHALL BE VERIFIED PRIOR TO CONSTRUCTION. NOTIFY ARIZONA 811, 1-800-782-5348, AT LEAST 48 HOURS PRIOR TO CONSTRUCTION.

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 09-01-2023 ARIZONA U.S.A.

PLAN
SCALE: 1/2 "=1'-0"

NOTE:
FOR DETAILS, SPECIFICATIONS, AND MATERIAL QUANTITIES OF RIPRAP AND GRADING, SEE REF. 1. GRADING AND RIPRAP LINEWORK SHOWN FOR INFORMATIONAL PURPOSES ONLY ON THESE PLANS.

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL — STATUS — 09/01/2023 DATE

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
Kylie Stubbs — CONSULTANT ENGINEER — 08/18/2023 DATE

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123075

LATITUDE: 33.28409°N LONGITUDE: 111.67783°W

DSN/CHK BY:	NAS/MJH
DRAWN/CHK BY:	MEW/MJH
UPRR ENGINEER:	ADS
SHT NO.:	S2 of S4

UNION PACIFIC RAILROAD

Office of Director Structures Design

LOCATION & DESCRIPTION: CULVERT 0.20, PIRATE IND LEAD

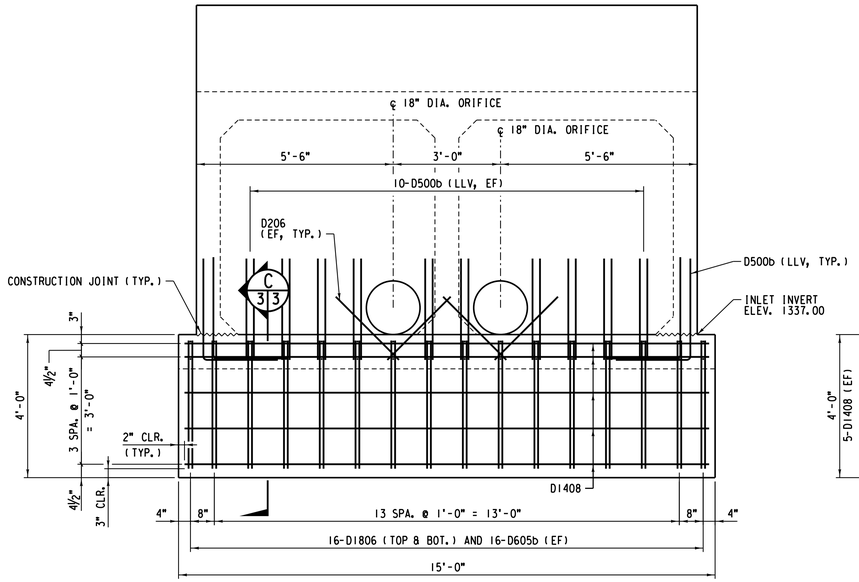
FURNISH & INSTALL
DOUBLE CELL 6'-0" x 6'-0" RCB x 140'

SHEET TITLE: GENERAL ARRANGEMENT (SHEET 2 OF 2)

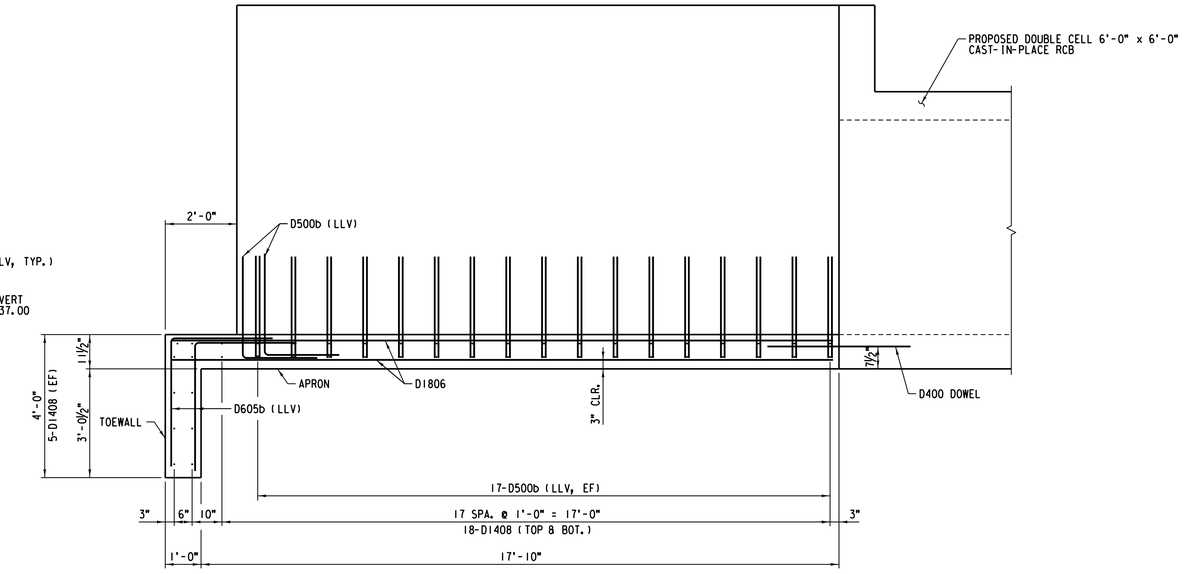
FILE NAME: \\oa.ad.oaconsulting.com\fnts-mail\projects\2020\0501-10000\020-0927\70-Exchange\Data\to UPRR\UPRR_23-09-01_Final Submittal\Pirate Ind Lead 0.20_cover.dgn

PLOTTED: 9/1/2023 8:37:13 AM

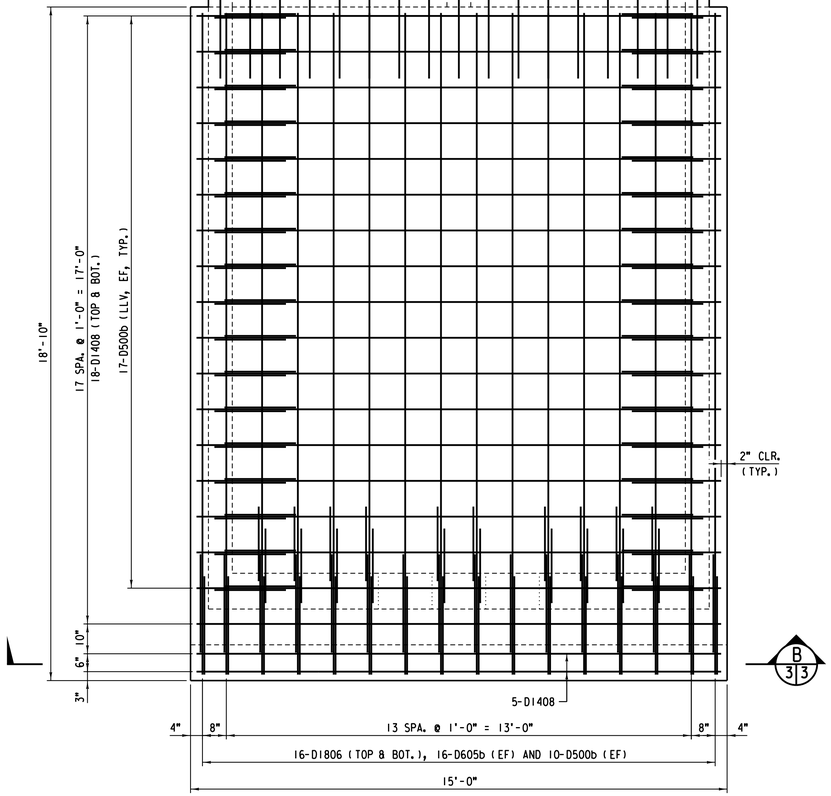
DESIGN SHEET



SECTION B
SCALE: ½"=1'-0" 3 3



SECTION C
SCALE: ½"=1'-0" 3 3

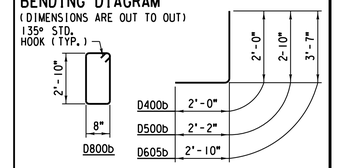


APRON PLAN
SCALE: ½"=1'-0"

REINFORCING SCHEDULE
(QUANTITY PER INLET END TREATMENT)

TOTAL	MARK	SIZE	LENGTH	SHAPE
84	C811	#4	8'-11"	——
44	C1606	#4	16'-6"	——
16	D206	#5	2'-6"	——
55	D400	#5	4'-0"	——
44	D400b	#5	4'-0"	⌊⌊
88	D500b	#5	5'-0"	⌊⌊
32	D605b	#5	6'-5"	⌊⌊
14	D800b	#5	8'-0"	⌊□⌋
32	D811	#5	8'-11"	——
30	D1308	#5	13'-8"	——
46	D1408	#5	14'-8"	——
32	D1806	#5	18'-6"	——

BENDING DIAGRAM
(DIMENSIONS ARE OUT TO OUT)



NOTE:
BAR DESIGNATIONS CONSIST OF BAR SIZE & LENGTH FOLLOWED BY THE LETTER "b" IF BENT. BAR SIZES ARE REPRESENTED BY THE LETTERS A THROUGH L CORRESPONDING TO BAR SIZE #2 THROUGH #18. BAR LENGTHS ARE GIVEN IN FEET AND INCHES; THE LAST TWO DIGITS ARE INCHES.

EST. WT. OF REINFORCING STEEL = 4,280 LB.

CONCRETE PLACEMENT QUANTITIES

ITEM	UNIT	QTY.
APRON & TOEWALL	CU. YD.	11.7
WALLS & HEADWALL	CU. YD.	13.1

NOTES:
1. FOR CAST-IN-PLACE CONCRETE NOTES, SEE STD. DWG. 680200 SHT. G1.
2. FOR REINFORCED CONCRETE BOX DETAILS, SEE ADOT STD. DWG. SD6.01 AND SD6.02.
3. CONSTRUCTOR SHALL MINIMALLY ADJUST REINFORCING LOCATIONS AS REQUIRED TO ACCOMMODATE INSTALLATION OF SAFETY RAIL EXPANSION ANCHORS.
4. EF = EACH FACE
   LLV = LONG LEG VERTICAL
   RCB = REINFORCED CONCRETE BOX

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL (STATUS) 09/01/2023 (DATE)

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
Kyle Stubs
CONSULTANT ENGINEER 08/18/2023 DATE

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123075

LATITUDE: 33.28409°N LONGITUDE: 111.67783°W

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 09-01-2023 ARIZONA U.S.A.

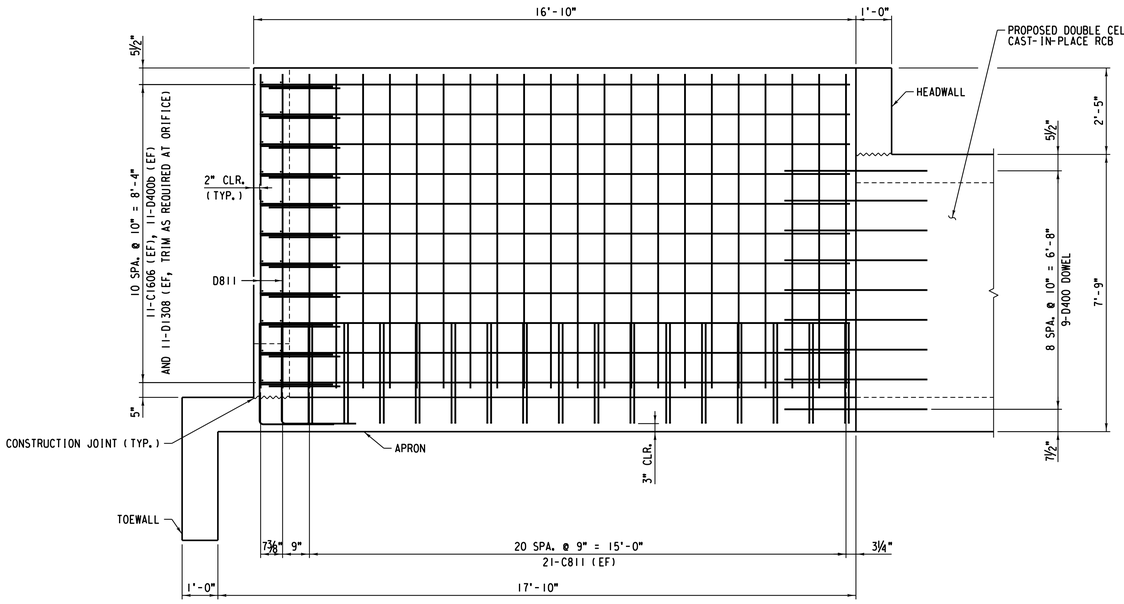
UNION PACIFIC

DSN/CHK BY: NAS/MJH	**UNION PACIFIC RAILROAD**
DRAWN/CHK BY: MEW/MJH	Office of Director Structures Design
UPRR ENGINEER: ADS	LOCATION & DESCRIPTION: CULVERT 0.20, PIRATE IND LEAD FURNISH & INSTALL DOUBLE CELL 6'-0" x 6'-0" RCB x 140'
SHT NO.: S3 of S4	SHEET TITLE: INLET END TREATMENT DETAILS (SHEET 1 OF 2)

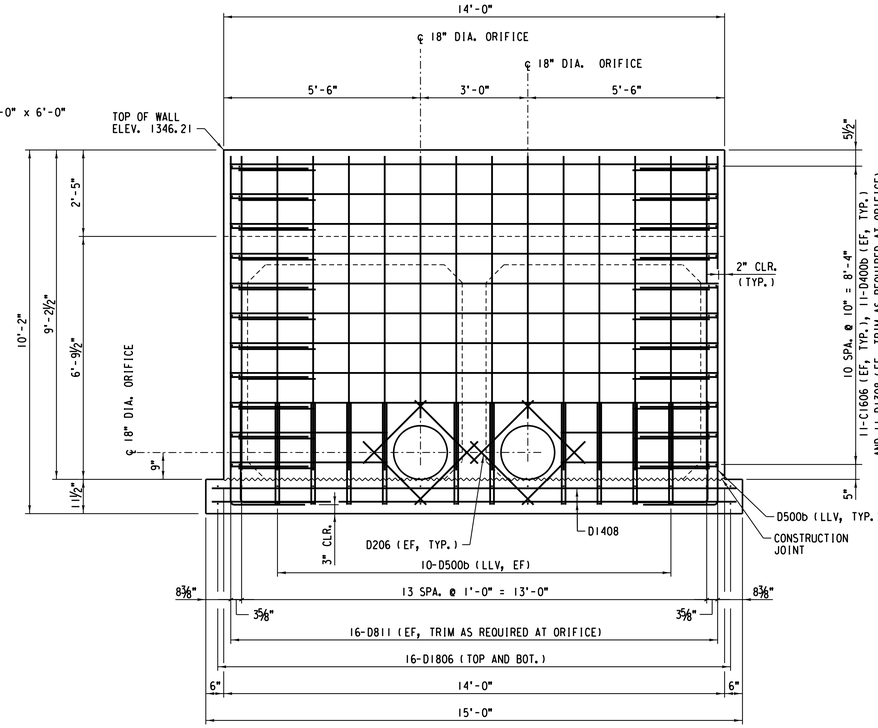
FILE NAME: \\oa.aecomultrng.com\fnts-na\projects\2020\0501:1000\020\0920.70-Exchange\Out\to UPRR\BR_2023-09-01_Final Submittal\Pirate Ind Lead_0.20_csaz.dgn

PLOTTED: 9/1/2023 8:37:13 AM

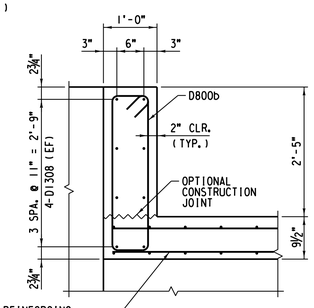
DESIGN SHEET



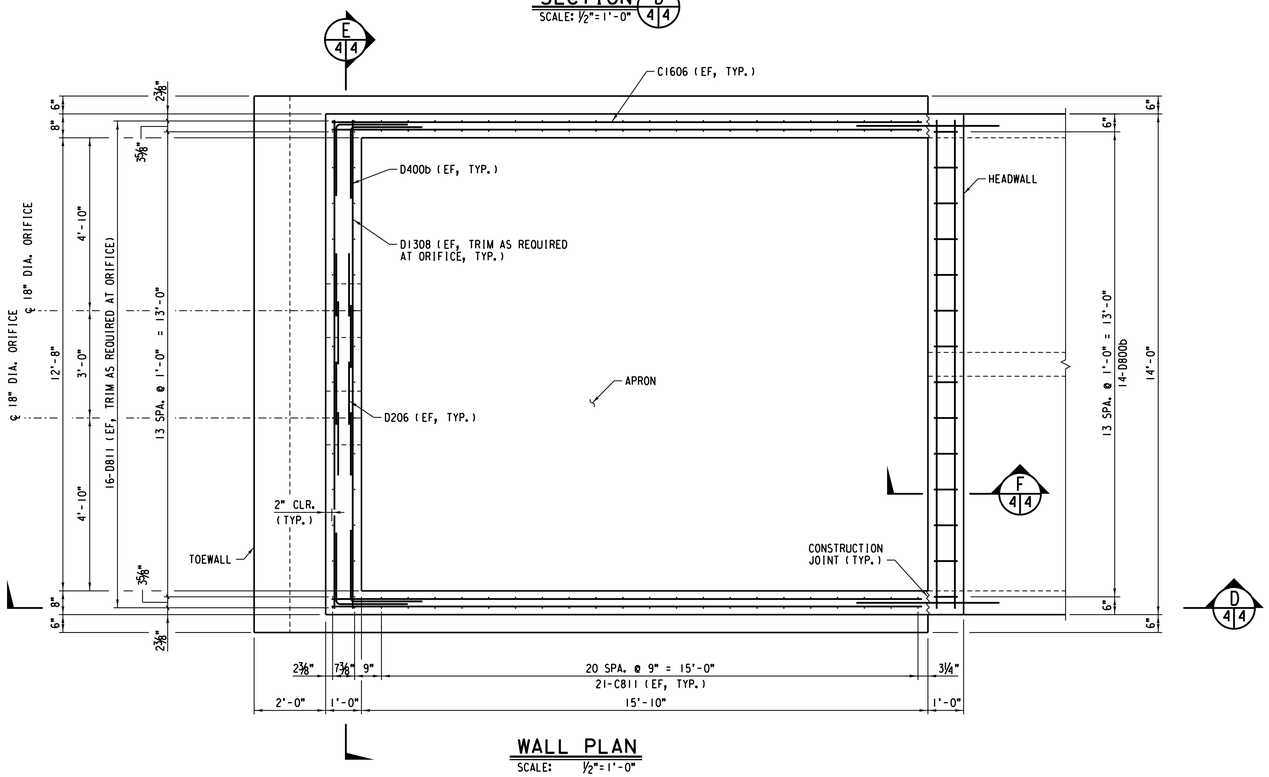
SECTION D
SCALE: ½"=1'-0"



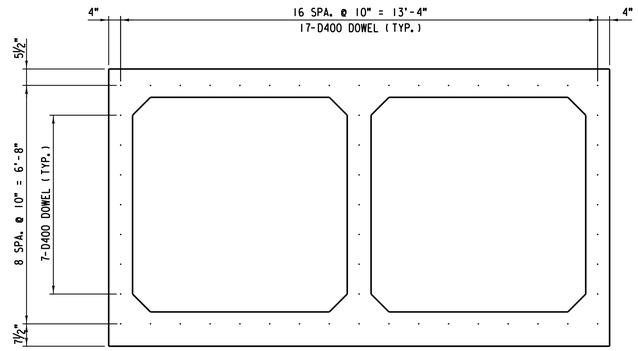
SECTION E
SCALE: ½"=1'-0"



SECTION F
SCALE: ¾"=1'-0"



WALL PLAN
SCALE: ½"=1'-0"



DOWEL ELEVATION
SCALE: ½"=1'-0"

NOTES:
1. FOR CAST-IN-PLACE CONCRETE NOTES, SEE STD. DWG. 680200 SHT. G1.
2. FOR REINFORCED CONCRETE BOX DETAILS, SEE ADOT STD. DWG. SD6.01 AND SD6.02.
3. CONSTRUCTOR SHALL MINIMALLY ADJUST REINFORCING LOCATIONS AS REQUIRED TO ACCOMMODATE INSTALLATION OF SAFETY RAIL EXPANSION ANCHORS.
4. EF = EACH FACE
   LLV = LONG LEG VERTICAL
   RCB = REINFORCED CONCRETE BOX

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL (STATUS) 09/01/2023 (DATE)

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
CONSULTANT ENGINEER 08/18/2023 DATE

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123075

LATITUDE: 33.28409°N LONGITUDE: 111.67783°W

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 08-21-2023 ARIZONA U.S.A.

UNION PACIFIC

DSN/CHK BY: NAS/MJH	UNION PACIFIC RAILROAD
DRAWN/CHK BY: MEW/MJH	Office of Director Structures Design
UPRR ENGINEER: ADS	LOCATION & DESCRIPTION: CULVERT 0.20, PIRATE IND LEAD
SHT NO.: S4 of S4	FURNISH & INSTALL DOUBLE CELL 6'-0" x 6'-0" RCB x 140'
	SHEET TITLE: INLET END TREATMENT DETAILS (SHEET 2 OF 2)

FILE NAME: \\vaa.ad.aecomcollab.com\fnts-na\projects\2020\0501-10000\020-0927\70-Exchange\Outlook\PRR-RLBR-2023-09-01_Final Submittal\Pirate Ind Lead_0.20_culv.dgn

PLOTTED: 9/1/2023 8:37:13 AM

GENERAL NOTES

GENERAL

1. All work requirements shown on the design and not otherwise detailed shall be accomplished as specified in Union Pacific Railroad (UPRR) Specifications and the American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual for Railway Engineering. In the event of conflicts between specifications, the more restrictive shall apply.

2. All structures were designed in accordance with the AREMA Manual, Chapter 8 - Concrete Structures and Foundations.

3. Box culverts designed for a min. 1'-6" cover and a max. 18'-0" cover. Cover is measured from base of rail to top of the concrete box.

4. Construction means and methods shall comply with the All Permits Issued (API) package.

5. Field verify all dimensions, stations and elevations prior to start of construction.

6. Contact the Union Pacific "Call Before You Dig" number 90 days (not less than 60 days) prior to proposed construction start date. Prior to construction, confirm that all necessary relocations have been completed. The CBYD number is: 1-800-336-9193.

7. Location of known utilities is approximate. Location shall be verified prior to construction. Notify Call 811 "Call Before you Dig" number at least 48 hours prior to construction.

PRECAST CONCRETE:

1. All concrete materials, placement and workmanship shall be in accordance with Part 1, Chapter 8 of the current AREMA Manual for Railway Engineering.

2. Minimum compressive strength - 4000 psi at 28 days.

3. Exposed surfaces shall be formed in a manner which will produce a smooth and uniform appearance without rubbing or plastering. Exposed edges of 90 degrees or less are to be chamfered ¾" x ¾". Top surface to have a smooth finish, free of all float or trowel marks.

4. Concrete shall be proportioned such that the water - cement ratio (by weight) does not exceed 0.45. Concrete must contain a minimum of 6½ sacks of cement per cubic yard of concrete. Flyash replacement may account for up to 25% of the cement.

5. Cement shall be Type I, Type II or Type III Portland Cement in accordance with ASTM C150 specifications.

6. Aggregates shall be graded in accordance with ASTM C33 specifications. Coarse aggregate shall be no. 67. Fine aggregate shall be natural sand.

7. Air content shall be between 5% and 7% (by volume).

8. Admixtures shall not be used without approval by Engineer.

9. Curing shall be accomplished by wet curing or the application of a Type 2 membrane.

10. The fabricator shall stencil the item name, date manufactured, name of manufacturer and actual lifting weight at location shown.

11. Production procedures for the manufacture of precast members shall be in accordance with the AREMA Manual for Railway Engineering and the Precast/Prestressed Concrete Institute's Manual MNL 116 for Quality Control.

12. Dimensional tolerances governing the manufacture of precast members shall conform to Division VI, Section 6.4 of the Precast/Prestressed Concrete Institute's Manual MNL 116 for Quality Control. Tolerance for location of lifting devices shall be ½".

13. The fabricator will be responsible for loading and properly securing all precast concrete members for shipment. All concrete components shall be made available for inspection by the Railroad at the fabricator's plant prior to shipment, at the Railroad's discretion.

CAST-IN-PLACE CONCRETE:

1. All concrete materials, placement and workmanship shall be in accordance with Part 1, Chapter 8 of the current AREMA Manual for Railway Engineering.

2. Formwork tolerances shall be in accordance with ACI 347 specifications.

3. Minimum compressive strength - 4000 psi at 28 days.

4. Exposed surfaces shall be formed in a manner which will produce a smooth and uniform appearance without rubbing or plastering. Exposed edges of 90 degrees or less are to be chamfered ¾" x ¾". Top surface to have a smooth finish, free of all float or trowel marks.

5. Concrete shall be proportioned such that the water - cement ratio (by weight) does not exceed 0.45. Concrete must contain a minimum of 6½ sacks of cement per cubic yard of concrete. Flyash replacement may account for up to 25% of the cement.

6. Cement shall be Type I, Type II or Type III Portland Cement in accordance with ASTM C150 specifications.

7. Aggregates shall be graded in accordance with ASTM C33 specifications. Coarse aggregate shall be no. 67. Fine aggregate shall be natural sand.

8. Air content shall be between 5% and 7% (by volume).

9. Admixtures shall not be used without approval by Engineer.

10. Curing shall be accomplished by wet curing or the application of a Type 2 membrane.

REINFORCING STEEL:

1. Reinforcing steel shall be deformed, new billet bars per current ASTM A615 Specifications and to meet grade 60 requirements.

2. Fabrication of reinforcing steel shall be per Chapter 7 of the CRSI Manual of standard practice. Dimensions of bending details are out to out of bar.

3. Reinforcing steel is to be blocked to proper location and securely wired against displacement. Tie wires shall be installed at every other bar intersection so that at least 50% of the intersections are tied. Tack welding of reinforcing is prohibited. Minimum concrete cover on reinforcement not otherwise noted shall meet current AREMA Manual for Railway Engineering requirements.

LIFTING ANCHORS:

1. Swift lift anchors shall be Dayton Superior P-52 anchors or approved alternate with a minimum safe working load sufficient for the weight of the precast element including form removal. The safe working load shall provide a minimum safety factor of 4.

CONSTRUCTOR NOTES (WHEN APPLICABLE)

CONSTRUCTOR DEFINITION

CONSTRUCTOR DESIGNATES MANAGER BRIDGE CONSTRUCTION IF CONSTRUCTION BY UPRR AND CONTRACTOR IF CONSTRUCTION BY CONTRACTOR.

DIVISION OF RESPONSIBILITY

A. RAILROAD

1. Remove ties, rail and OTM from project area as required.

2. Provide and install ballast, ties, rail and OTM at proposed culvert.

3. Provide material as shown in the Bill of Material.

4. Provide and install Private Property/No Trespassing sign and culvert marker signs on right side at each end of culvert.

B. CONSTRUCTOR

1. Coordinate all construction activities with the Railroad.

2. Before ordering any material, Constructor shall make a detailed field inspection of the site verifying all pertinent dimensions and elevations. Any variations in dimensions or elevations from those shown on the drawings shall be reported immediately to the UPRR Project Manager.

3. Any modifications to this design shall be approved by the UPRR Office of Structures Design prior to construction.

4. Verify the location, relocation, abandonment, and/or temporary support of all utilities affected by the construction of the structure and embankment and coordinate these activities with the appropriate utility companies, agencies and/or authorities.

5. Apply for and obtain all construction permits necessary to perform the work.

6. Bill of Material and Schedules are provided for information only. Constructor shall be responsible for providing all material, not provided by the Railroad, required to complete the work.

7. Perform all work not performed by the Railroad.

8. Provide the Railroad with a detailed construction plan defining the activity, schedule and procedure for each aspect of the work. Construction shall not begin until the construction plan has been approved by the Railroad.

9. Provide all temporary structures (shoring, bracing and/or falsework) required to support and protect the existing embankments and structures affected by the work. Provide the Railroad with details, design and procedure for all temporary structures. All temporary structures shall be designed, signed and sealed by a professional engineer registered in the State that the structure is to be constructed. All temporary structures shall be approved by the UPRR Office of Structures Design prior to beginning construction.

10. Provide well-compacted bedding as required to establish grade of the culvert. Bedding for the box culvert shall consist of a minimum of 1'-6" of culvert bedding material. Over excavate 1'-6" each side of box. If loose, soft, or excessively wet soils are encountered at this depth, a 6" lift of granular bedding shall be placed on these soils and compressed into the subgrade. This procedure shall continue until a stable subgrade is produced. If a stable subgrade can not be achieved, the UPRR Office of Structures Design shall be notified.

11. Provide temporary guardrail system as directed by UPRR Project Manager. Guardrails on shoring shall include but not be limited to the following:

    The top edge height of the top rail shall be 42" +/- 3" above the walking/working surface.

    At least one midrail shall be provided, evenly spaced between walking/working surface and top rail.

    Metal or timber posts or uprights shall be spaced at maximum intervals of 10'-0".

    Entire guardrail system, including anchorages, shall be capable of withstanding without failure, a force of 200 lbs. applied in any outward or downward direction at any point.

    Guardrail system shall be surfaced to prevent injuries from punctures and lacerations and prevent snagging of clothing. The ends of top rails and midrails shall not extend past the posts or uprights.

    If conditions warrant, i.e. pedestrian traffic/weather, additional protection shall be provided such as screens or mesh to prevent slipping between the midrail and walking/working surface.

DIVISION OF RESPONSIBILITY

12. Direct channel flow as required to perform work.

13. Remove debris and ballst from channel as directed by the Railroad.

14. Accomplish activities within the schedule specified in the approved construction plan.

CULVERT BEDDING

Culvert bedding shall be granular material such as aggregates ordinarily specified and used in the construction of highway base and subbase. These aggregates include crushed stone, natural or crushed gravel, natural or manufactured sands, crushed slag or a homogeneous mixture of these materials. Culvert bedding shall be compacted to 95% of maximum dry density as defined in ASTM International D1557 (Modified Proctor). Recommended gradation is as follows:

SCREEN SIZE	% PASSING (BY WEIGHT)
1 inch	100
½ inch	60-90
⅜ inch	20-40
No. 4	10-20
No. 200	less than 5%

Union Pacific Sealant Ballast SB-2, item no. 562-5428, may be used.

BOX CULVERT OPENING AREA

CELL WIDTH (FT)	CELL HEIGHT (FT)	SINGLE CELL OPENING (FT^2)	DOUBLE CELL OPENING (FT^2)
6	4	23.1	46.2
6	6	35.1	70.2
8	4	30.6	61.2
8	6	46.6	93.2
8	8	62.6	125.2
10	4	38.0	76.0
10	6	58.0	116.0
10	8	78.0	156.0
10	10	98.0	196.0
10	12	118.0	236.0
12	8	93.3	186.6
12	10	117.3	234.6
12	12	141.3	282.6

REVISIONS		
DATE	LTR.	DESCRIPTION
/		
/		
/		
/		
/		
/		

DESIGN BY: HDR | DRAWN BY: HDR | CHECKED BY: UPRR

APPROVED:

01-03-2020

UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

CONCRETE BOX CULVERTS

GENERAL NOTES

FILE OWNER: UPRR | DATE: JANUARY, 2020

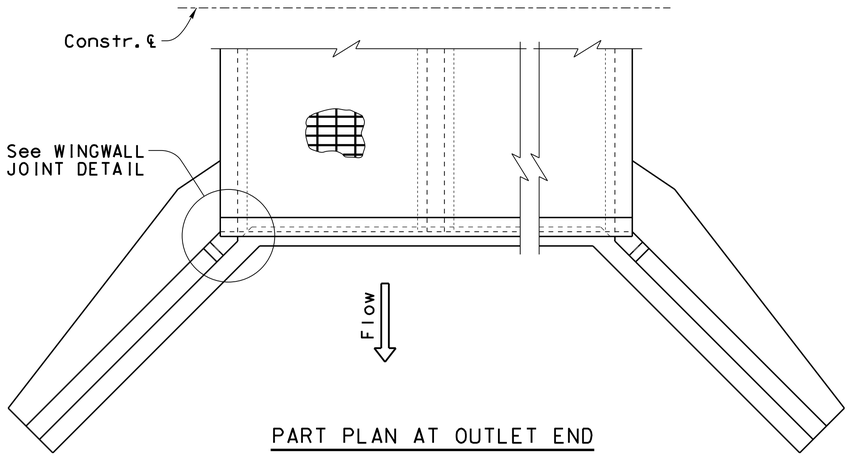
PLAN NO.: 680200 | SHEET: G1

Copyright © 2020 by Union Pacific Railroad

PLOTTED: 1/3/2020 3:30:45 PM

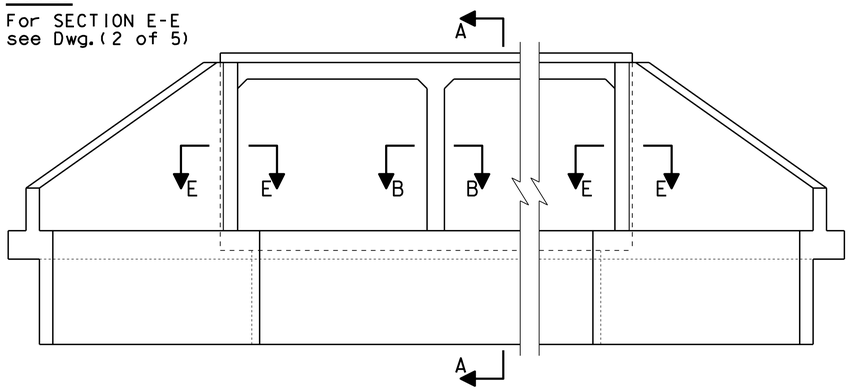
FILE NAME: pw://HDR.US.National.01/4195/10196897/680200_Concrete Box Culverts.dgn

INCHES 1 2 3 4 5 6 7 8 9 10 11 12



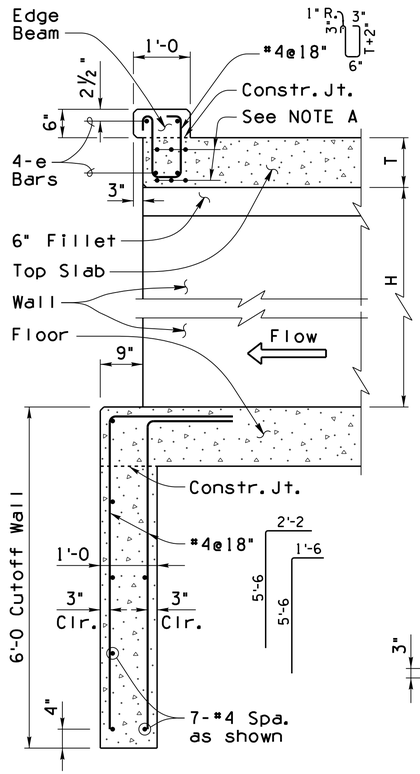
PART PLAN AT OUTLET END

NOTE:
For SECTION E-E see Dwg. (2 of 5)



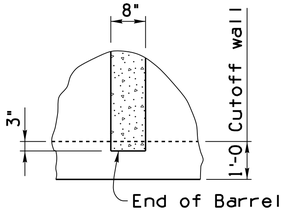
ELEVATION AT OUTLET END

NOTE A:
Use 3-#7 @3" spa. top and bott bars for culverts skewed 6° to 30°.
Use 3-#8 @3" spa. top and bott bars for culverts skewed 31° to 45°.
Culverts skewed over 45° require a special edge beam design.
Edge beam reinforcing quantity shall be added to table quantities.



SECTION A-A

e Bars			
Skew ∠	Span		
	6' & 8'	10'	12'
0° to 20°	#6	#6	#6
25° & 30°	#6	#6	#7
35°	#6	#7	#8
40° & 45°	#6	#7	#9



SECTION B-B

GENERAL NOTES:

Construction Specification - Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, latest Edition.

Design Specifications - AASHTO LRFD Bridge Design Specifications, 7th Edition 2014.

Loading Class - HL-93.

Design:
Soil weight = 120 p.c.f.

All Concrete shall be Class "S" (f'c = 3000 psi).

Reinforcing steel shall conform to ASTM Specification A615. All reinforcing shall be furnished as Grade 60.

All bends and hooks shall meet the requirements of AASHTO LRFD Article 5.10. All bend dimensions for reinforcing steel shall be out-to-out of bars. All placement dimensions for reinforcing steel shall be to center of bars unless noted otherwise.

All reinforcing steel shall have 2" clear cover unless noted otherwise.

Chamfer all exposed corners ¾" unless noted otherwise.

Compact backfill for footing and wing base minimum 100 percent of ASTM D698 maximum dry density.

All structures shall have formed Construction joints in the top slab and walls (optional in floor slab) and spaced not more than 38'-6" apart or as shown in Project Plans. Joints shall be perpendicular to the centerline of the box. Reinforcing steel shall project 1'-6 thru the joint. The joint shall be made with a ¼" plywood bulkhead which shall be left in place or the alternate joint detail shown on Dwg. (2 of 5) may be used.

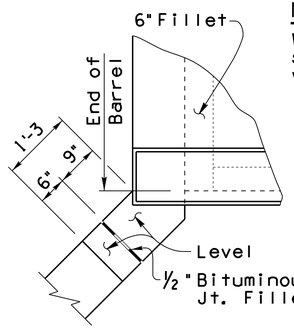
See Project Plans for culvert layout, invert elevations, finished grade elevations, headwall, apron, and other site specific details.

Dimensions shall not be scaled from drawings.

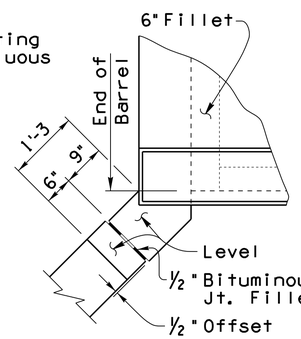
Pay item quantities of concrete and reinforcing steel include all labor and materials for box culvert, footing, headwalls, and aprons.
Total Quantities include Barrel and Headwall Quantities shown in Tables (plus added quantity for apron when used). Barrel Quantities Table is per linear foot of box (multiply by length of box to obtain barrel total). Headwall Quantities Table includes wings, edge beam, and cutoff wall.

Culverts measuring 20 ft and greater to the inside faces of exterior walls, along the roadway centerline, shall be assigned a structure number. The structure number shall be referenced in the culvert summary sheet and drainage details.

NOTE:
For Dimensions, Quantities and additional Details, see SD 6.01 (2 to 5).



NOTE:
Wing wall footing shall be contiuous with no joint.



WINGWALL JOINT DETAIL
(For Barrel Height < 8 Ft.)

WINGWALL JOINT DETAIL
(For Barrel Height ≥ 8 Ft.)

NOTE:
Special design sections shall be adjoined with standard barrels when necessary.

Culvert barrels always begin and end with Table No. I.

Thickness of top and bottom slabs vary with depths of fill as shown.

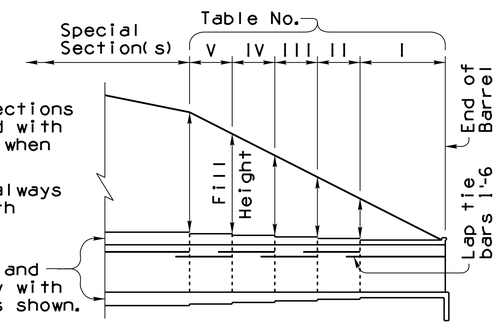


DIAGRAM SHOWING TABLE NO. TO BE USED FOR VARIOUS FILL HEIGHTS

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	S.U.H.	2-12
2	General updates	D.B.B.	5-15
3			
4			

Note to Designer:
The information presented in this Standard Detail has been prepared in accordance with recognized engineering principles and is for general use. It should not be used for specific application without competent professional examination and verification of its suitability by a licensed professional engineer. Contents within the inner border line shall not be altered.

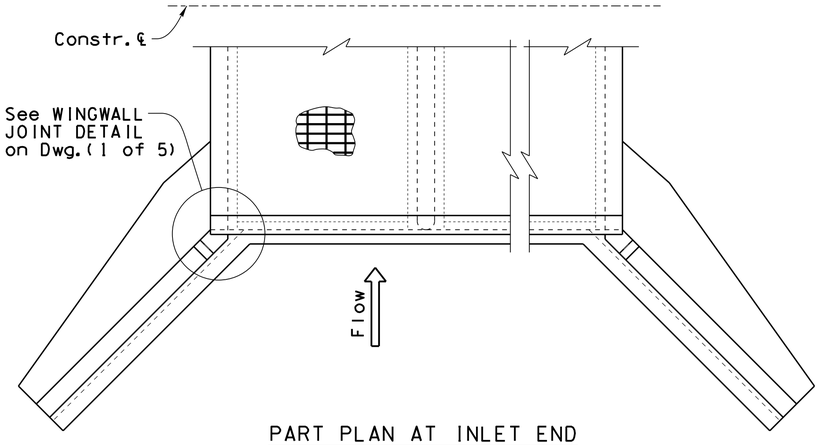
DESIGN APPROVED
APPROVED FOR DISTRIBUTION

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STRUCTURE DETAIL

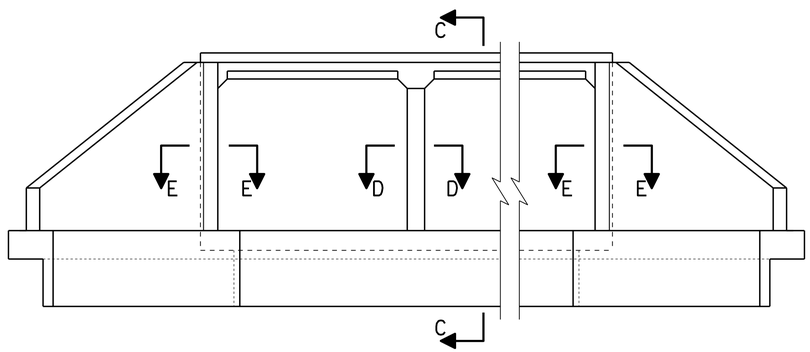
REINFORCED CONCRETE BOX CULVERTS
MISCELLANEOUS DETAILS

ROUTE	PROJECT NO.	FA NO.	DRAWING NO.
			SD 6.01 (1 of 5)
LOCATION			SHEET NO. OF

20-JAN-2016 16:26 G:\Bridge\CADD\Standards\SD_Sheets\SD 6 Drainage Stuctures\SD 6.01-6.11 Series\SD6.01-1 to 5\sd601-1_1916.dgn



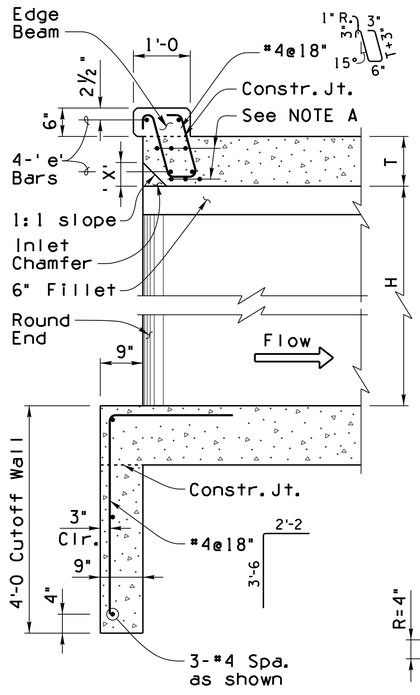
PART PLAN AT INLET END



ELEVATION AT INLET END

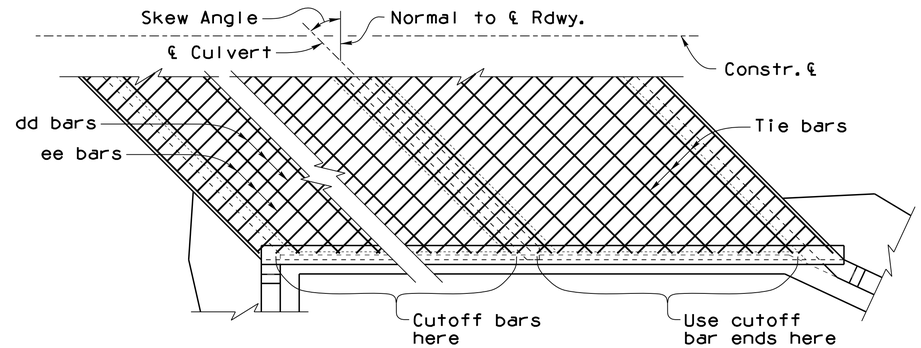
NOTE A:

Use 3-#7 @3" spa. top and bott bars for culverts skewed 6° to 30°.
Use 3-#8 @3" spa. top and bott bars for culverts skewed 31° to 45°.
Culverts skewed over 45° require a special edge beam design.
Edge beam reinforcing quantity shall be added to table quantities.



SECTION C-C

SECTION D-D



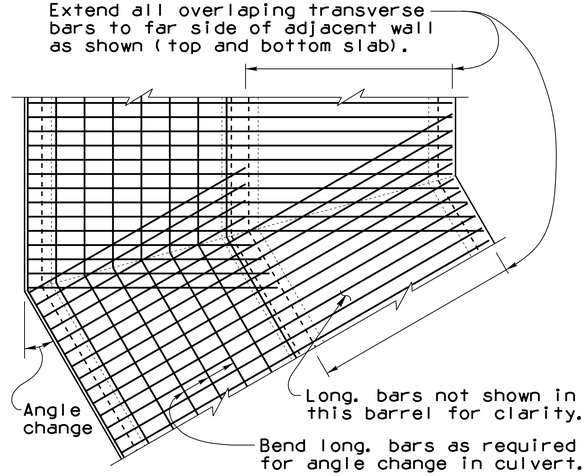
PART PLAN - SKEWED CULVERT

(Showing Reinf. Steel Placement)

NOTE:

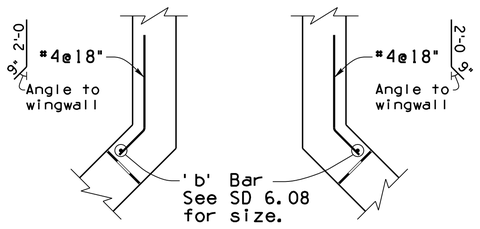
For 'e' Bars table, see Dwg. (1 of 5)

Span 'S'	Dim. 'X'
6'	3"
8'	4"
10'	5"
12'	6"

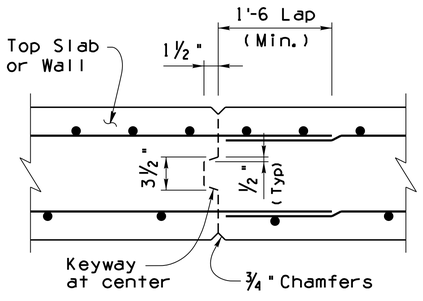


PART PLAN - ANGLED CULVERT

(Showing Reinf. Steel Placement)



SECTION E-E



ALT. CONSTRUCTION JOINT DETAIL

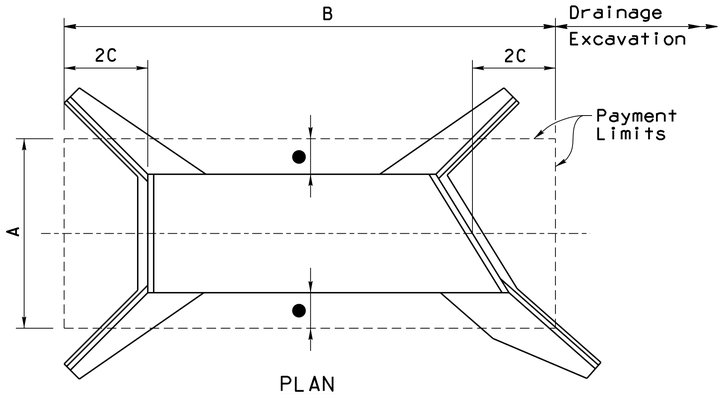
NOTE:

For General Notes, Dimensions, Quantities and additional Details, see SD 6.01 (1 & 3, 4, 5).

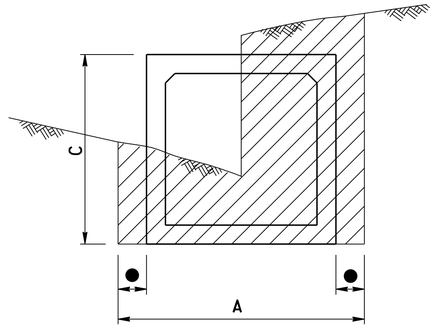
DESIGN APPROVED	ARIZONA DEPARTMENT OF TRANSPORTATION INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION BRIDGE GROUP STRUCTURE DETAIL
APPROVED FOR DISTRIBUTION	REINFORCED CONCRETE BOX CULVERTS MISCELLANEOUS DETAILS
ROUTE / PROJECT NO. / FA NO.	DRAWING NO. SD 6.01 (2 of 5)
LOCATION	SHEET NO. OF

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	S.U.H.	2-12
2			
3			
4			

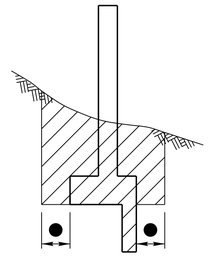
Note to Designer:
The information presented in this Standard Detail has been prepared in accordance with recognized engineering principles and for general use. It should not be used for specific application without competent professional examination and verification of its suitability by a licensed professional engineer. Contents within the inner border line shall not be altered.



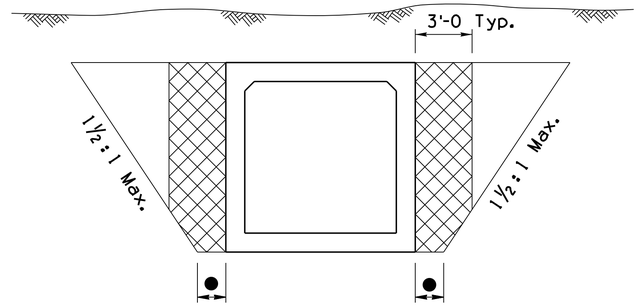
PLAN



SECTION



SECTION AT WING

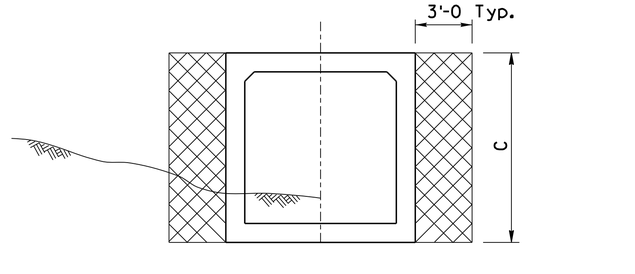


SECTION

STRUCTURAL EXCAVATION - PAYMENT LIMITS

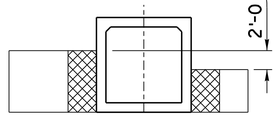
NOTE:

Payment limits shown include structural excavation for headwalls, cutoffwalls, wingwalls, end sections, etc.



SECTION

Placement and compaction of backfill shall not be more than 2 feet higher than other side (for any number of boxes).



PLACEMENT DETAIL

STRUCTURE BACKFILL - MEASUREMENT

NOTE:

Computation of structure backfill quantities is based on the area of a typical installation times the total length of structure plus 2C.
Use C for box extensions on each end extended.
No measurment is necessary for wing arms.

SECTION

NOTE:

Placement of structure backfill behind headwalls and wingwalls shall be the same as around structures.

VIEW OF WING

SECTION

VIEW OF WING

STRUCTURE BACKFILL - PLACEMENT

LEGEND

A = Width
B = Length
C = Height of barrel or headwall without cutoff wall.
● = 6" Max. in rock and trench, 1'-6 max. all others
◒ = 6" Min. in rock and trench, 1'-6 min. all others
Indicates Structural Excavation
Indicates Structure Backfill
Indicates Roadway Embankment

NOTE:

For General Notes, Dimensions, Quantities and additional Details, see SD 6.01 (1, 2, 3 & 5).

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	SAVK	2-12
2			
3			
4			

Note to Designer:
The information presented in this Standard Detail has been prepared in accordance with recognized engineering principles and is for general use. It should not be used for specific application without competent professional examination and verification of its suitability and applicability by a licensed professional engineer. Contents within the Inner border line shall not be altered.

DESIGN APPROVED: Shafi U. Hasan	ARIZONA DEPARTMENT OF TRANSPORTATION INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION BRIDGE GROUP STRUCTURE DETAIL
APPROVED FOR DISTRIBUTION: Jean A. Nehme	REINFORCED CONCRETE BOX CULVERTS STRUCTURAL EXCAVATION & STRUCTURE BACKFILL

ROUTE	PROJECT NO.	FA NO.	DRAWING NO.
			SD 6.01 (4 of 5)
LOCATION			SHEET NO. OF

20-JAN-2016 16:33 G:\Bridge\CADD\Standards\SD_Sheets\SD 6 Drainage Stuctures\SD 6.01-6.11 Series\SD6.01-1 to 5\sd601-4_1916.dgn

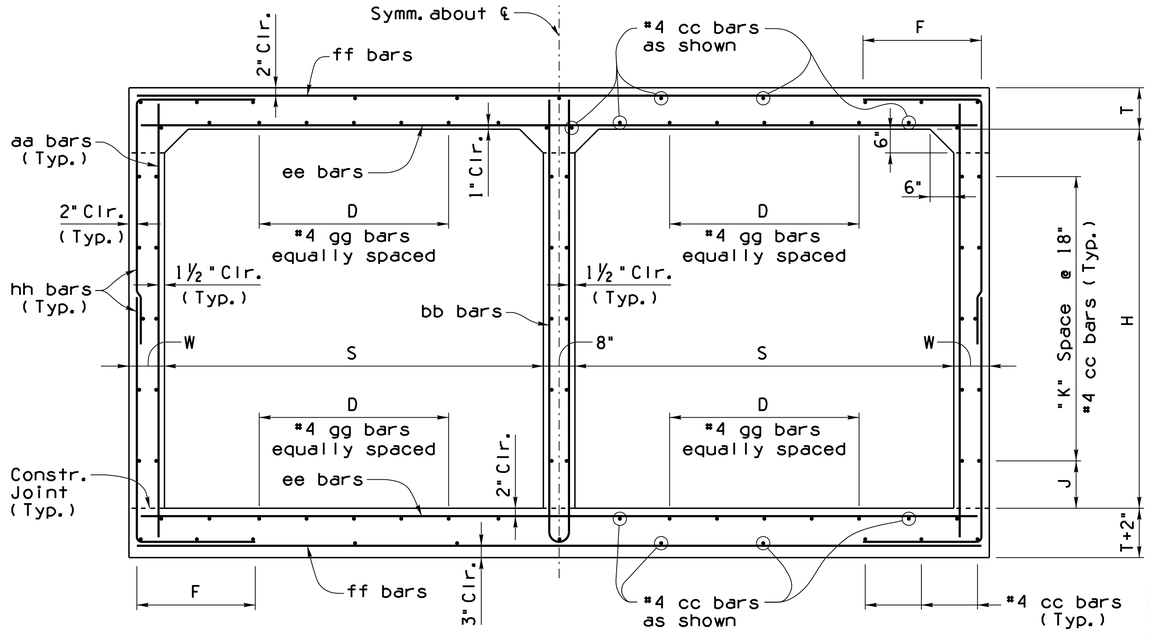
TABLE I
0'-10' FILL

Span "S"	Height "H"	Top Slab "T"	Walls "W"	aa Bar Size	aa Spacing	aa Length	bb Bar Size	bb Spacing	bb Length	cc Number ⌖	ee Bar Size	ee Spacing	ee Length	ff Bar Size	ff Spacing	ff Length	gg Number ⌖	gg D	hh Bar Size	hh Spacing	hh Length	hh F
6'	3'	9½"	8"	5	12"	4'-4	5	12"	8'-9	48	5	7"	13'-7	5	8"	13'-7	20	3'-0	5	8"	5'-1	2'-5
	4'	9½"	8"	5	12"	5'-4	5	12"	10'-9	54	5	7"	13'-7	5	8"	13'-7	20	3'-0	5	8"	5'-7	2'-5
	5'	9½"	8"	5	12"	6'-4	5	12"	12'-9	54	5	7"	13'-7	5	8"	13'-7	20	3'-0	5	8"	6'-1	2'-5
	6'	9½"	8"	5	12"	7'-4	5	12"	14'-9	60	5	7"	13'-7	5	8"	13'-7	20	3'-0	5	8"	6'-7	2'-5
	7'	9½"	8"	5	12"	8'-4	5	12"	16'-9	66	5	7"	13'-7	5	8"	13'-7	20	3'-0	5	8"	7'-1	2'-5
8'	3'	9½"	9"	5	12"	4'-4	5	12"	8'-8	48	5	6"	17'-9	6	8"	17'-9	28	4'-0	5	6"	5'-6	2'-6
	4'	9½"	9"	5	12"	5'-4	5	12"	10'-8	54	5	6"	17'-9	6	8"	17'-9	28	4'-0	5	6"	6'-0	2'-6
	5'	9½"	9"	5	12"	6'-4	5	12"	12'-8	54	5	6"	17'-9	6	8"	17'-9	28	4'-0	5	6"	6'-6	2'-6
	6'	9½"	9"	5	12"	7'-4	5	12"	14'-8	60	5	6	17'-9	6	8"	17'-9	28	4'-0	5	6"	7'-0	2'-6
	7'	9½"	9"	5	12"	8'-4	5	12"	16'-8	66	5	6"	17'-9	6	8"	17'-9	28	4'-0	5	6"	7'-5	2'-6
	8'	9½"	9"	5	12"	9'-4	5	12"	18'-8	66	5	6"	17'-9	6	8"	17'-9	28	4'-0	5	6"	8'-0	2'-6
10'	3'	10½"	11"	5	12"	4'-6	5	12"	8'-11	48	5	6"	22'-1	6	6"	22'-1	32	5'-0	5	6"	6'-0	2'-8
	4'	10½"	11"	5	12"	5'-6	5	12"	10'-11	54	5	6"	22'-1	6	6"	22'-1	32	5'-0	5	6"	6'-7	2'-8
	5'	10½"	11"	5	12"	6'-6	5	12"	12'-11	54	5	6"	22'-1	6	6"	22'-1	32	5'-0	5	6"	6'-8	2'-8
	6'	10½"	11"	5	12"	7'-6	5	12"	14'-11	60	5	6"	22'-1	6	6"	22'-1	32	5'-0	5	6"	7'-2	2'-8
	7'	10½"	11"	5	12"	8'-6	5	12"	16'-11	66	5	6"	22'-1	6	6"	22'-1	32	5'-0	5	6"	7'-9	2'-8
	8'	10½"	11"	5	12"	9'-6	5	12"	18'-11	66	5	6"	22'-1	6	6"	22'-1	32	5'-0	5	6"	8'-3	2'-8
	9'	10½"	11"	5	12"	10'-6	5	12"	20'-11	72	5	6"	22'-1	6	6"	22'-1	32	5'-0	5	6"	8'-9	2'-8
	10'	10½"	11"	5	12"	11'-6	5	12"	22'-11	78	5	6"	22'-1	6	6"	22'-1	32	5'-0	5	6"	9'-3	2'-8
12'	8'	12½"	13"	5	12"	9'-10	5	12"	19'-7	66	6	7"	26'-5	7	7"	26'-5	40	6'-0	6	7"	8'-6	2'-10
	9'	12½"	13"	5	12"	10'-10	5	12"	21'-7	72	6	7"	26'-5	7	7"	26'-5	40	6'-0	6	7"	9'-0	2'-10
	10'	12½"	13"	5	12"	11'-10	5	12"	23'-7	78	6	7"	26'-5	7	7"	26'-5	40	6'-0	6	7"	9'-6	2'-10
	11'	12½"	13"	5	12"	12'-10	5	12"	25'-7	78	6	7"	26'-5	7	7"	26'-5	40	6'-0	6	7"	10'-0	2'-10
	12'	12½"	13"	5	12"	13'-10	5	12"	27'-7	84	6	7"	26'-5	7	7"	26'-5	40	6'-0	6	7"	10'-6	2'-10

TABLE NO. II
10'-15' FILL

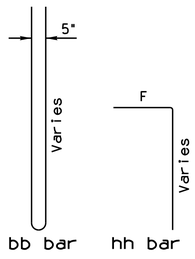
Span "S"	Height "H"	Top Slab "T"	Walls "W"	aa Bar Size	aa Spacing	aa Length	bb Bar Size	bb Spacing	bb Length	cc Number ⌖	ee Bar Size	ee Spacing	ee Length	ff Bar Size	ff Spacing	ff Length	gg Number ⌖	gg D	hh Bar Size	hh Spacing	hh Length	hh F
6'	3'	8"	8"	5	12"	4'-1	5	12"	8'-3	48	5	7"	13'-7	5	7"	13'-7	16	3'-0	5	8"	5'-0	2'-5
	4'	8"	8"	5	12"	5'-1	5	12"	10'-3	54	5	7"	13'-7	5	7"	13'-7	16	3'-0	5	8"	5'-6	2'-5
	5'	8"	8"	5	12"	6'-1	5	12"	12'-3	54	5	7"	13'-7	5	7"	13'-7	16	3'-0	5	8"	6'-0	2'-5
	6'	8"	8"	5	12"	7'-1	5	12"	14'-3	60	5	7"	13'-7	5	7"	13'-7	16	3'-0	5	8"	6'-6	2'-5
	7'	8"	8"	5	12"	8'-1	5	12"	16'-3	66	5	7"	13'-7	5	7"	13'-7	16	3'-0	5	8"	7'-0	2'-5
8'	3'	10½"	9"	5	12"	4'-6	5	12"	9'-1	48	5	6"	17'-9	6	7"	17'-9	20	4'-0	5	8"	5'-3	2'-6
	4'	10½"	9"	5	12"	5'-6	5	12"	11'-1	54	5	6"	17'-9	6	7"	17'-9	20	4'-0	5	8"	5'-9	2'-6
	5'	10½"	9"	5	12"	6'-6	5	12"	13'-1	54	5	6"	17'-9	6	7"	17'-9	20	4'-0	5	8"	6'-3	2'-6
	6'	10½"	9"	5	12"	7'-6	5	12"	15'-1	60	5	6"	17'-9	6	7"	17'-9	20	4'-0	5	8"	6'-9	2'-6
	7'	10½"	9"	5	12"	8'-6	5	12"	17'-1	66	5	6"	17'-9	6	7"	17'-9	20	4'-0	5	8"	7'-3	2'-6
	8'	10½"	9"	5	12"	9'-6	5	12"	19'-1	66	5	6"	17'-9	6	7"	17'-9	20	4'-0	5	7"	7'-9	2'-6
10'	3'	12½"	11"	5	12"	4'-10	5	12"	9'-7	48	5	6"	22'-1	7	7"	22'-1	24	5'-0	5	7"	5'-10	2'-8
	4'	12½"	11"	5	12"	5'-10	5	12"	11'-7	54	5	6"	22'-1	7	7"	22'-1	24	5'-0	5	7"	6'-4	2'-8
	5'	12½"	11"	5	12"	6'-10	5	12"	13'-7	54	5	6"	22'-1	7	7"	22'-1	24	5'-0	5	7"	6'-10	2'-8
	6'	12½"	11"	5	12"	7'-10	5	12"	15'-7	60	5	6"	22'-1	7	7"	22'-1	24	5'-0	5	7"	7'-4	2'-8
	7'	12½"	11"	5	12"	8'-10	5	12"	17'-7	66	5	6"	22'-1	7	7"	22'-1	24	5'-0	5	7"	7'-10	2'-8
	8'	12½"	11"	5	12"	9'-10	5	12"	19'-7	66	5	6"	22'-1	7	7"	22'-1	24	5'-0	5	7"	8'-4	2'-8
	9'	12½"	11"	5	12"	10'-10	5	12"	21'-7	72	5	6"	22'-1	7	7"	22'-1	24	5'-0	5	7"	8'-10	2'-8
	10'	12½"	11"	5	12"	11'-10	5	12"	23'-7	78	5	6"	22'-1	7	7"	22'-1	24	5'-0	5	7"	9'-4	2'-8
12'	8'	15"	13"	5	12"	10'-3	5	12"	20'-4	66	6	7"	26'-5	7	7"	26'-5	28	6'-0	5	7"	8'-9	2'-11
	9'	15"	13"	5	12"	11'-3	5	12"	22'-4	72	6	7"	26'-5	7	7"	26'-5	28	6'-0	5	7"	9'-3	2'-11
	10'	15"	13"	5	12"	12'-3	5	12"	24'-4	78	6	7"	26'-5	7	7"	26'-5	28	6'-0	6	7"	9'-9	2'-11
	11'	15"	13"	5	10"	13'-3	5	12"	26'-4	78	6	7"	26'-5	7	7"	26'-5	28	6'-0	6	7"	10'-9	3'-5
	12'	15"	13"	5	10"	14'-3	5	12"	28'-4	84	6	7"	26'-5	7	7"	26'-5	28	6'-0	6	7"	11'-3	3'-5

⌖ Total number of bars in the cross-section.



TYPICAL SECTION
(Shown as 8'-0 x 8'-0 Table II)

Height "H"	"J" Dim.	"K" Spaces
3'	9"	1
4'	6"	2
5'	12"	2
6'	9"	3
7'	6"	4
8'	12"	4
9'	9"	5
10'	6"	6
11'	12"	6
12'	9"	7



BENDS

NOTE:
Reinforcing shown for 8'-0 x 8'-0 Table II box. Use the appropriate table to determine the reinforcing requirements of selected box.

NOTE:
For General Notes, Dimensions, and additional Details, see SD 6.01 (1 to 4). For Quantities and Tables III thru V see SD 6.02 (2 of 2).

New box culverts shall not be constructed using 3' or 4' heights without special approval from ADOT Bridge Group. Tables referencing these sizes are provided for extension of existing box culverts only.

Note to Designer:
The information presented in this Standard Detail has been prepared in accordance with recognized engineering principles and is for general use. It should not be used for specific application without competent professional examination and verification of its suitability and applicability by a licensed professional engineer. Contents within the inner border line shall not be altered.

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original issue	S.U.H.	2-12
2	Added 3',4',5' height for existing box extensions only	D.B.B.	5-15
3			
4			

DESIGN APPROVED
APPROVED FOR DISTRIBUTION

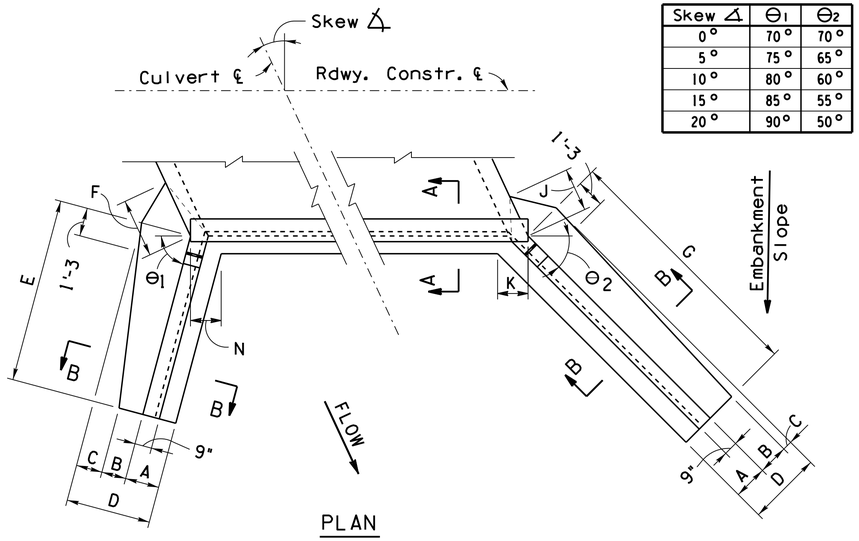
ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STRUCTURE DETAIL

REINFORCED CONCRETE BOX CULVERTS
DOUBLE BARREL
(0' - 15' FILLS)

ROUTE | PROJECT NO. | FA NO. | DRAWING NO. SD 6.02 (1 of 2)
LOCATION | SHEET NO. OF

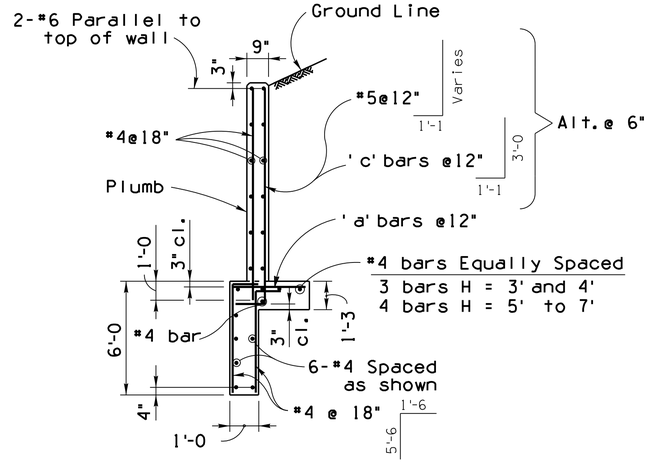
20-JAN-2016 16:47 G:\Bridge\CADD\Standards\SD_Sheets\SD 6 Drainage Stuctures\SD 6.01-6.11 Series\SD602-1 to 2\sd602-1_1916.dgn

Skew ∠	Θ1	Θ2
0°	70°	70°
5°	75°	65°
10°	80°	60°
15°	85°	55°
20°	90°	50°

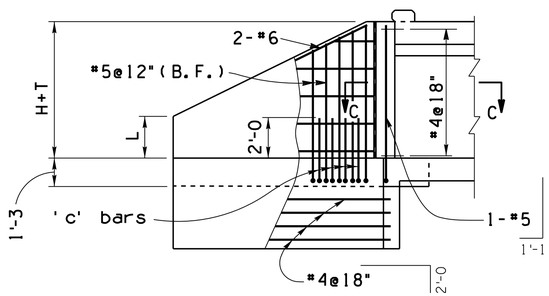


NOTE:

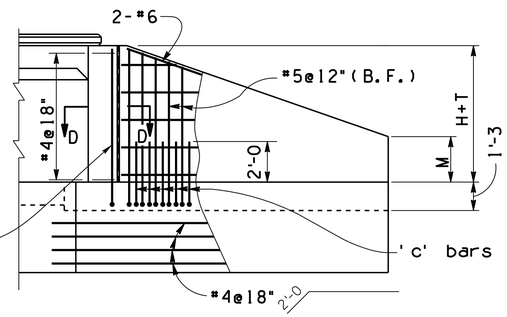
For SECTION A-A, see SD 6.01 (1 of 5).



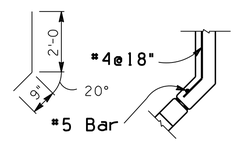
SECTION B-B



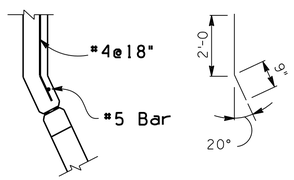
SHORT WING ELEVATION



LONG WING ELEVATION



SECTION C-C



SECTION D-D

2 : 1 Slope Dimensions	Skew ∠	0°					5°					10°					15°					20°				
	Height H	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'
	A	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6
	B	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3
	C	4"	7"	1'-0	1'-5	1'-10	4"	7"	1'-0	1'-5	1'-10	5"	8"	1'-1	1'-6	1'-11	5"	8"	1'-1	1'-7	2'-0	6"	9"	1'-2	1'-7	2'-1
	D	2'-7	3'-1	3'-7	4'-1	4'-7	2'-7	3'-1	3'-7	4'-1	4'-7	2'-8	3'-2	3'-8	4'-2	4'-8	2'-8	3'-2	3'-8	4'-3	4'-9	2'-9	3'-3	3'-9	4'-3	4'-10
	E	6'-6	8'-0	9'-6	11'-0	12'-6	6'-6	8'-0	9'-6	11'-0	12'-6	6'-6	8'-0	9'-6	11'-0	12'-6	6'-0	7'-6	9'-0	10'-6	12'-0	6'-0	7'-6	9'-0	10'-6	12'-0
	F	1'-1	1'-9	2'-4	3'-0	3'-8	1'-1	1'-9	2'-4	3'-0	3'-8	1'-2	1'-10	2'-6	3'-1	3'-9	1'-2	1'-10	2'-6	3'-3	3'-10	1'-3	1'-11	2'-7	3'-3	4'-0
	G	6'-6	8'-0	9'-6	11'-0	12'-6	6'-6	8'-0	10'-0	11'-6	13'-0	7'-0	8'-6	10'-0	12'-0	13'-6	7'-0	9'-0	10'-6	12'-6	14'-0	7'-6	9'-6	11'-0	13'-0	14'-6
	J	1'-1	1'-9	2'-4	3'-0	3'-8	1'-1	1'-9	2'-4	3'-0	3'-8	1'-2	1'-10	2'-6	3'-1	3'-9	1'-2	1'-10	2'-6	3'-3	3'-10	1'-3	1'-11	2'-7	3'-3	4'-0
	K	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-4	1'-4	1'-4	1'-4	1'-4
	L	1'-0	1'-4	1'-7	1'-11	2'-2	11"	1'-2	1'-6	1'-9	2'-0	10"	1'-1	1'-5	1'-8	1'-11	1'-1	1'-4	1'-7	1'-10	2'-1	1'-1	1'-4	1'-7	1'-10	2'-1
	M	1'-0	1'-4	1'-7	1'-11	2'-2	1'-1	1'-5	1'-6	1'-10	2'-2	1'-0	1'-5	1'-9	1'-10	2'-3	1'-2	1'-5	1'-9	1'-11	2'-4	1'-2	1'-5	1'-10	2'-1	2'-6
	N	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-4¼	1'-4¼	1'-4¼	1'-4¼	1'-4¼	1'-4¾	1'-4¾	1'-4¾	1'-4¾	1'-4¾	1'-5¼	1'-5¼	1'-5¼	1'-5¼	1'-5¼	1'-6	1'-6	1'-6	1'-6	1'-6

4 : 1 Slope Dimensions	Skew ∠	0°					5°					10°					15°					20°				
	Height H	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'
	A	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6
	B	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3
	C	4"	6"	11"	1'-4	1'-8	3"	6"	11"	1'-4	1'-9	3"	6"	11"	1'-4	1'-9	3"	6"	11"	1'-4	1'-9	3"	7"	1'-0	1'-5	1'-10
	D	2'-7	3'-0	3'-6	4'-0	4'-5	2'-6	3'-0	3'-6	4'-0	4'-6	2'-6	3'-0	3'-6	4'-0	4'-6	2'-6	3'-0	3'-6	4'-0	4'-6	2'-6	3'-1	3'-7	4'-1	4'-7
	E	10'-0	12'-6	15'-0	17'-6	20'-0	10'-0	12'-6	15'-0	17'-0	19'-6	10'-0	12'-6	14'-6	17'-0	19'-6	10'-0	12'-0	14'-6	17'-0	19'-6	10'-0	12'-0	14'-6	17'-0	19'-6
	F	1'-0	1'-7	2'-3	2'-11	3'-5	1'-0	1'-7	2'-3	2'-11	3'-6	1'-0	1'-7	2'-3	2'-11	3'-6	1'-0	1'-7	2'-3	2'-11	3'-6	1'-0	1'-9	2'-4	3'-0	3'-8
	G	10'-0	12'-6	15'-0	17'-6	20'-0	10'-6	13'-0	15'-6	18'-0	20'-6	10'-6	13'-0	16'-0	18'-6	21'-0	11'-0	13'-6	16'-0	19'-0	21'-6	11'-6	14'-0	17'-0	19'-6	22'-6
	J	1'-0	1'-7	2'-3	2'-11	3'-5	1'-0	1'-7	2'-3	2'-11	3'-6	1'-0	1'-7	2'-3	2'-11	3'-6	1'-0	1'-7	2'-3	2'-11	3'-6	1'-0	1'-9	2'-4	3'-0	3'-8
	K	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-4	1'-4	1'-4	1'-4	1'-4
	L	1'-9	2'-2	2'-6	2'-11	3'-4	1'-8	2'-1	2'-5	2'-11	3'-4	1'-7	2'-0	2'-6	2'-11	3'-3	1'-7	2'-1	2'-5	2'-10	3'-2	1'-7	2'-1	2'-5	2'-10	3'-2
	M	1'-9	2'-2	2'-6	2'-11	3'-4	1'-8	2'-1	2'-7	3'-0	3'-5	1'-9	2'-3	2'-7	3'-1	3'-6	1'-10	2'-4	2'-9	3'-2	3'-8	1'-10	2'-5	2'-10	3'-4	3'-9
	N	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-4¼	1'-4¼	1'-4¼	1'-4¼	1'-4¼	1'-4¾	1'-4¾	1'-4¾	1'-4¾	1'-4¾	1'-5¼	1'-5¼	1'-5¼	1'-5¼	1'-5¼	1'-6	1'-6	1'-6	1'-6	1'-6

6 : 1 Slope Dimensions	Skew ∠	0°					5°					10°					15°					20°				
	Height H	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'
	A	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6
	B	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3
	C	3"	6"	11"	1'-4	1'-8	3"	6"	11"	1'-4	1'-8	3"	6"	11"	1'-4	1'-8	3"	6"	11"	1'-4	1'-9	3"	6"	11"	1'-4	1'-9
	D	2'-6	3'-0	3'-6	4'-0	4'-5	2'-6	3'-0	3'-6	4'-0	4'-5	2'-6	3'-0	3'-6	4'-0	4'-5	2'-6	3'-0	3'-6	4'-0	4'-6	2'-6	3'-0	3'-6	4'-0	4'-6
	E	12'-6	15'-6	18'-6	21'-6	24'-6	12'-6	15'-6	18'-6	21'-6	24'-6	12'-0	15'-0	18'-0	21'-0	24'-0	12'-0	15'-0	18'-0	21'-0	24'-0	12'-0	15'-0	18'-0	21'-0	24'-0
	F	1'-0	1'-7	2'-3	2'-11	3'-5	1'-0	1'-7	2'-3	2'-11	3'-5	1'-0	1'-7	2'-3	2'-11	3'-5	1'-0	1'-7	2'-3	2'-11	3'-6	1'-0	1'-7	2'-3	2'-11	3'-6
	G	12'-6	15'-6	18'-6	21'-6	24'-6	12'-6	16'-0	19'-0	22'-0	25'-0	13'-0	16'-0	19'-6	22'-6	25'-6	13'-6	16'-6	20'-0	23'-0	26'-6	13'-6	17'-0	20'-6	23'-6	27'-0
	J	1'-0	1'-7	2'-3	2'-11	3'-5	1'-0	1'-7	2'-3	2'-11	3'-5	1'-0	1'-7	2'-3	2'-11	3'-5	1'-0	1'-7	2'-3	2'-11	3'-6	1'-0	1'-7	2'-3	2'-11	3'-6
	K	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-4	1'-4	1'-4	1'-4	1'-4
	L	2'-1	2'-8	3'-2	3'-8	4'-3	2'-1	2'-7	3'-1	3'-7	4'-1	2'-1	2'-7	3'-1	3'-7	4'-1	2'-1	2'-7	3'-1	3'-7	4'-1	2'-1	2'-7	3'-1	3'-7	4'-1
	M	2'-1	2'-8	3'-2	3'-8	4'-3	2'-2	2'-8	3'-2	3'-9	4'-3	2'-2	2'-9	3'-3	3'-10	4'-5	2'-3	2'-10	3'-4	3'-11	4'-5	2'-4	2'-11	3'-5	4'-1	4'-7
	N	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-4¼	1'-4¼	1'-4¼	1'-4¼	1'-4¼	1'-4¾	1'-4¾	1'-4¾	1'-4¾	1'-4¾	1'-5¼	1'-5¼	1'-5¼	1'-5¼	1'-5¼	1'-6	1'-6	1'-6	1'-6	1'-6

'c' bars			
Height H	Slope	Short Wing	Long Wing
		0° to 10°	0° to 20°
7'	2 : 1	3 - #5	3 - #5
	4 : 1	5 - #5	5 - #5

'a' bars			
Height H	Short Wing	Long Wing	
	0° to 20°	0° & 5°	10° to 20°
3'	#4	#4	#4
4'	#4	#4	#4
5'	#4	#4	#4
6'	#4	#4	#5
7'	#4	#4	#6

NOTE:

For General Notes, Dimensions, and additional Details, see SD 6.01 (1 of 5). For Headwall Quantities see SD 6.09 (1 to 3).

Note to Designer:
The information presented in this Standard Detail has been prepared in accordance with recognized engineering principles and is for general use. It should not be used for specific application without competent professional examination and verification of its suitability by a licensed professional engineer. Contents within the inner border line shall not be altered.

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	S.J.H.	2-12
2	Added 3'-6" height for existing box extensions only	D.B.B.	5-15
3			
4			

DESIGN APPROVED

APPROVED FOR DISTRIBUTION

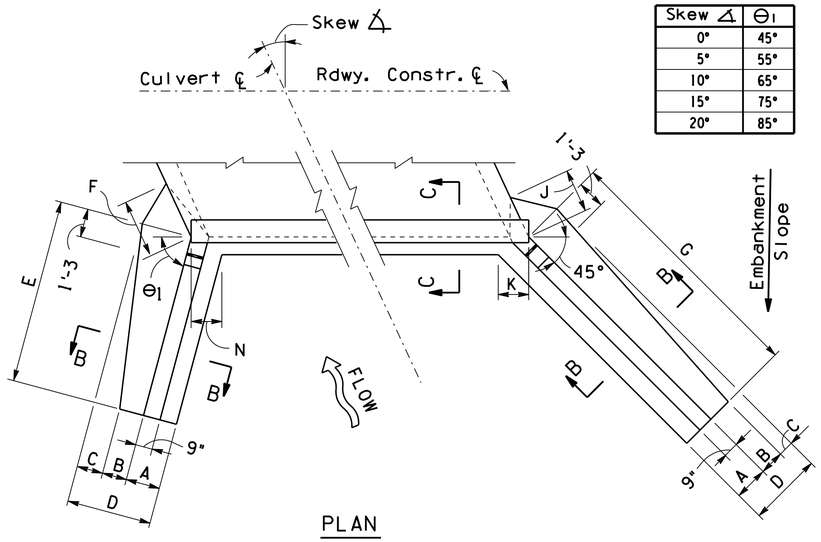
ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STRUCTURE DETAIL

REINFORCED CONCRETE BOX CULVERTS
OUTLET WINGS - SKEW 0° to 20°
CULVERT HEIGHT 3' to 7'

ROUTE	PROJECT NO.	FA NO.	DRAWING NO.
			SD 6.08 (1 of 8)
LOCATION			SHEET NO. OF

22-JAN-2016 09:55 G:\Bridge\CADD\Standards\SD_Sheets\SD 6 Drainage Stuctures\SD 6.01-6.11 Series\SD608-1 to 8\sd608-1_1916.dgn

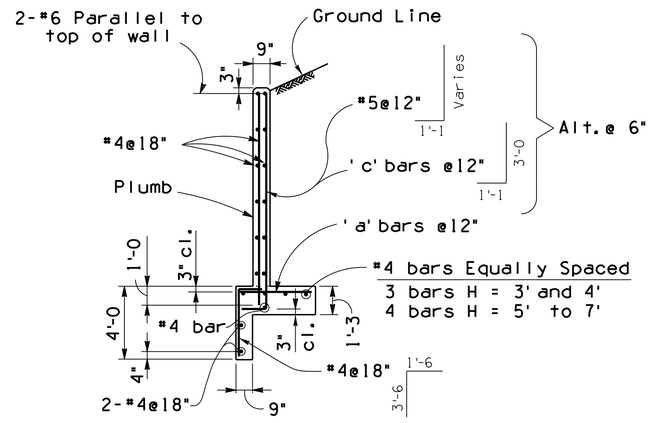
Skew ∠	Θ1
0°	45°
5°	55°
10°	65°
15°	75°
20°	85°



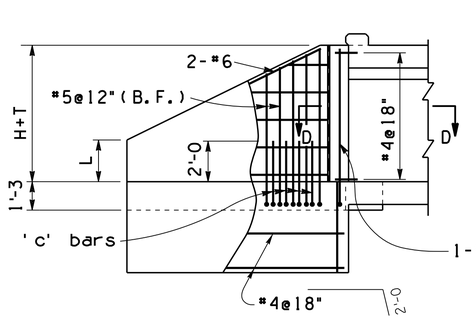
PLAN

NOTE:

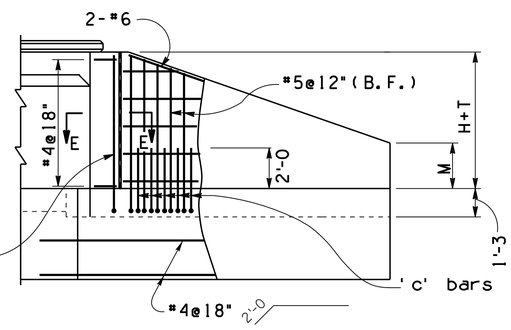
For SECTION C-C, see SD 6.01 (2 of 5).



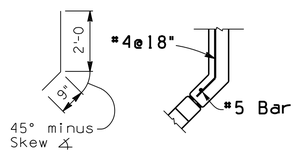
SECTION B-B



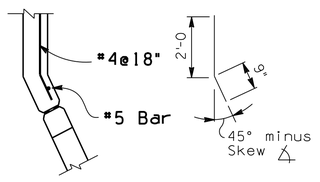
SHORT WING ELEVATION



LONG WING ELEVATION



SECTION D-D



SECTION E-E

	Skew ∠	0°					5°					10°					15°					20°				
2 : 1 Slope	Height H	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'
Dimensions	A	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6
	B	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3
	C	6"	9"	1'-3	1'-8	2'-1	6"	9"	1'-3	1'-8	2'-1	6"	9"	1'-3	1'-8	2'-1	6"	9"	1'-3	1'-8	2'-1	6"	9"	1'-3	1'-8	2'-1
	D	2'-9	3'-3	3'-10	4'-4	4'-10	2'-9	3'-3	3'-10	4'-4	4'-10	2'-9	3'-3	3'-10	4'-4	4'-10	2'-9	3'-3	3'-10	4'-4	4'-10	2'-9	3'-3	3'-10	4'-4	4'-10
	E	6'-0	7'-6	8'-6	10'-0	11'-6	5'-6	7'-0	8'-6	10'-0	11'-0	5'-6	7'-0	8'-6	9'-6	11'-0	5'-6	7'-0	8'-6	10'-0	11'-0	6'-0	7'-6	8'-6	10'-0	11'-6
	F	1'-5	2'-2	3'-0	3'-8	4'-5	1'-5	2'-2	3'-0	3'-8	4'-5	1'-5	2'-2	2'-11	3'-8	4'-4	1'-5	2'-1	2'-11	3'-7	4'-3	1'-4	2'-0	2'-9	3'-5	4'-1
	G	6'-0	7'-6	8'-6	10'-0	11'-6	6'-0	7'-6	9'-6	10'-6	12'-0	6'-6	8'-0	9'-6	11'-0	12'-6	7'-0	8'-6	10'-0	12'-0	13'-6	7'-6	9'-0	11'-0	12'-6	14'-6
	J	1'-5	2'-2	3'-0	3'-8	4'-5	1'-5	2'-2	3'-0	3'-8	4'-5	1'-5	2'-2	2'-11	3'-8	4'-4	1'-5	2'-1	2'-11	3'-7	4'-3	1'-4	2'-0	2'-9	3'-5	4'-1
	K	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½
	L	1'-11	2'-5	3'-1	3'-6	4'-0	1'-10	2'-2	2'-5	3'-0	3'-7	1'-7	1'-11	2'-3	2'-9	3'-1	1'-5	1'-8	1'-11	2'-3	2'-9	1'-1	1'-4	1'-10	2'-1	2'-4
	M	1'-11	2'-5	3'-1	3'-6	4'-0	1'-11	2'-5	2'-11	3'-4	3'-10	1'-9	2'-3	2'-8	3'-2	3'-8	1'-7	2'-1	2'-6	2'-10	3'-3	1'-5	1'-11	2'-2	2'-8	2'-11
	N	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-4¼	1'-4¼	1'-4¼	1'-4¼	1'-4¼	1'-5¼	1'-5¼	1'-5¼	1'-5¼	1'-5¼

	Skew ∠	0°					5°					10°					15°					20°				
4 : 1 Slope	Height H	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'
Dimensions	A	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6
	B	9"	1'-0	1'-1	1'-4	1'-8	9"	1'-0	1'-1	1'-3	1'-7	9"	1'-0	1'-1	1'-2	1'-6	9"	1'-0	1'-1	1'-2	1'-5	9"	1'-0	1'-1	1'-2	1'-3
	C	4"	7"	1'-0	1'-3	1'-5	4"	7"	1'-0	1'-4	1'-6	4"	7"	1'-0	1'-5	1'-7	4"	7"	1'-0	1'-5	1'-8	4"	7"	1'-0	1'-5	1'-10
	D	2'-7	3'-1	3'-7	4'-1	4'-7	2'-7	3'-1	3'-7	4'-1	4'-7	2'-7	3'-1	3'-7	4'-1	4'-7	2'-7	3'-1	3'-7	4'-1	4'-7	2'-7	3'-1	3'-7	4'-1	4'-7
	E	8'-0	9'-6	11'-6	13'-6	15'-6	8'-0	10'-0	11'-6	13'-6	15'-6	8'-0	10'-0	12'-0	14'-0	16'-0	8'-6	10'-6	12'-6	14'-6	16'-6	9'-0	11'-0	13'-6	15'-6	17'-6
	F	1'-3	1'-11	2'-8	3'-4	4'-1	1'-3	1'-11	2'-7	3'-4	4'-0	1'-2	1'-11	2'-7	3'-3	4'-0	1'-2	1'-10	2'-6	3'-3	3'-11	1'-2	1'-10	2'-5	3'-1	3'-9
	G	8'-0	9'-6	11'-6	13'-6	15'-6	8'-6	10'-6	12'-6	14'-6	16'-6	9'-0	11'-0	13'-0	15'-6	17'-6	9'-6	12'-0	14'-6	16'-6	19'-0	10'-6	13'-0	15'-6	18'-6	21'-0
	J	1'-3	1'-11	2'-8	3'-4	4'-1	1'-3	1'-11	2'-7	3'-4	4'-0	1'-2	1'-11	2'-7	3'-3	4'-0	1'-2	1'-10	2'-6	3'-3	3'-11	1'-2	1'-10	2'-5	3'-1	3'-9
	K	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½
	L	2'-8	3'-5	4'-0	4'-8	5'-4	2'-5	3'-0	3'-8	4'-4	4'-11	2'-3	2'-10	3'-4	3'-11	4'-5	2'-0	2'-6	3'-1	3'-7	4'-1	1'-10	2'-4	2'-8	3'-2	3'-8
	M	2'-8	3'-5	4'-0	4'-8	5'-4	2'-7	3'-2	3'-10	4'-6	5'-2	2'-6	3'-1	3'-9	4'-4	5'-0	2'-5	2'-11	3'-6	4'-2	4'-8	2'-2	2'-9	3'-4	3'-10	4'-4
	N	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-4¼	1'-4¼	1'-4¼	1'-4¼	1'-4¼	1'-5¼	1'-5¼	1'-5¼	1'-5¼	1'-5¼

	Skew ∠	0°					5°					10°					15°					20°				
6 : 1 Slope	Height H	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'
Dimensions	A	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6
	B	9"	1'-0	1'-3	1'-7	2'-0	9"	1'-0	1'-2	1'-7	1'-11	9"	1'-0	1'-1	1'-6	1'-10	9"	1'-0	1'-1	1'-4	1'-8	9"	1'-0	1'-1	1'-3	1'-7
	C	3"	6"	9"	11"	1'-0	3"	6"	10"	11"	1'-1	3"	6"	11"	1'-0	1'-2	3"	6"	11"	1'-2	1'-4	3"	6"	11"	1'-3	1'-5
	D	2'-6	3'-0	3'-6	4'-0	4'-6	2'-6	3'-0	3'-6	4'-0	4'-6	2'-6	3'-0	3'-6	4'-0	4'-6	2'-6	3'-0	3'-6	4'-0	4'-6	2'-6	3'-0	3'-6	4'-0	4'-6
	E	8'-6	11'-0	13'-0	15'-0	17'-0	9'-0	11'-0	13'-6	15'-6	17'-6	9'-6	11'-6	14'-0	16'-6	18'-6	10'-0	12'-6	15'-0	17'-6	19'-6	11'-0	13'-6	16'-0	19'-0	21'-6
	F	1'-1	1'-10	2'-6	3'-3	3'-11	1'-1	1'-10	2'-6	3'-3	3'-11	1'-1	1'-9	2'-6	3'-2	3'-10	1'-1	1'-9	2'-5	3'-1	3'-9	1'-0	1'-8	2'-4	3'-0	3'-8
	G	8'-6	11'-0	13'-0	15'-0	17'-0	9'-6	11'-6	14'-0	16'-0	18'-6	10'-0	12'-6	15'-0	17'-6	20'-0	11'-0	14'-0	16'-6	19'-6	22'-0	12'-6	15'-6	18'-6	21'-6	24'-6
	J	1'-1	1'-10	2'-6	3'-3	3'-11	1'-1	1'-10	2'-6	3'-3	3'-11	1'-1	1'-9	2'-6	3'-2	3'-10	1'-1	1'-9	2'-5	3'-1	3'-9	1'-0	1'-8	2'-4	3'-0	3'-8
	K	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½
	L	3'-1	3'-9	4'-6	5'-4	6'-1	2'-10	3'-7	4'-3	4'-11	5'-8	2'-8	3'-4	3'-11	4'-7	5'-3	2'-5	3'-1	3'-8	4'-3	4'-11	2'-3	2'-10	3'-5	3'-11	4'-6
	M	3'-1	3'-9	4'-6	5'-4	6'-1	2'-11	3'-8	4'-5	5'-2	5'-11	2'-11	3'-7	4'-4	5'-0	5'-8	2'-9	3'-5	4'-1	4'-9	5'-6	2'-7	3'-3	3'-11	4'-6	5'-2
	N	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-4¼	1'-4¼	1'-4¼	1'-4¼	1'-4¼	1'-5¼	1'-5¼	1'-5¼	1'-5¼	1'-5¼

'c' bars			
Height H	Slope	Short Wing	Long Wing
		0° to 10°	0° to 20°
7'	2 : 1	3 - #5	3 - #5
	2 : 1	5 - #5	5 - #5

'a' bars			
Height H	Short Wing		Long Wing
	0° to 10°	15° & 20°	0° to 20°
3'	#4	#4	#4
4'	#4	#4	#4
5'	#4	#4	#4
6'	#5	#4	#5
7'	#6	#4	#6

NOTE:

For General Notes, Dimensions, and additional Details, see SD 6.01 (2 of 5). For Headwall Quantities see SD 6.09 (1 to 3).

Note to Designer:
The information presented in this Standard Detail has been prepared in accordance with recognized engineering principles and is for general use. Users should be aware that it may not be used for specific application without competent professional examination and verification of its suitability by a licensed professional engineer. Contents within the inner border line shall not be altered.

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	S.U.H.	2-12
2	Added 3'-6" height for existing box extensions only	D.B.B.	5-15
3			
4			

DESIGN APPROVED

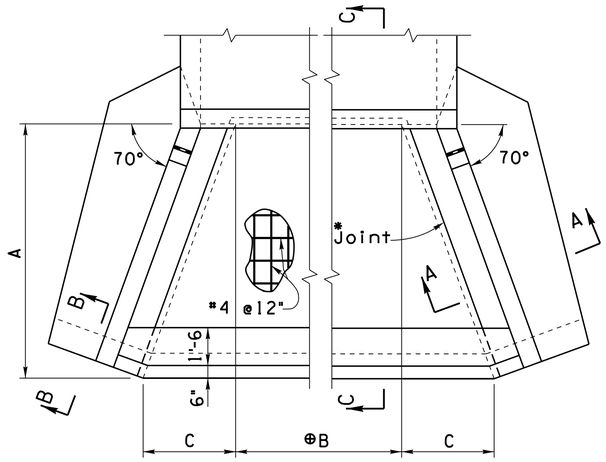
APPROVED FOR DISTRIBUTION

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STRUCTURE DETAIL

REINFORCED CONCRETE BOX CULVERTS
INLET WINGS - SKEW 0° to 20°
CULVERT HEIGHT 3' to 7'

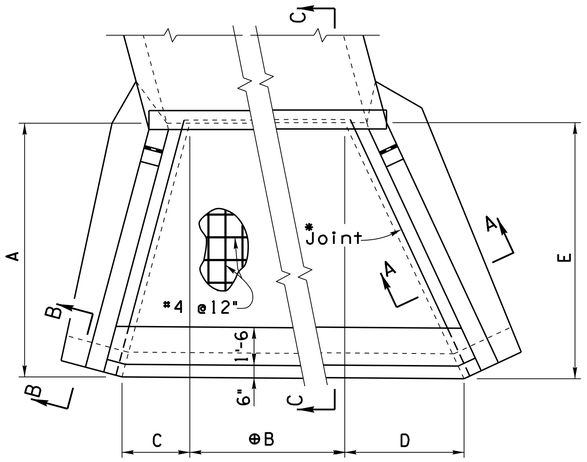
ROUTE | PROJECT NO. | FA NO. | DRAWING NO. SD 6.08 (3 of 8)

LOCATION | SHEET NO. OF



PLAN

Apron for 0° skew box culvert

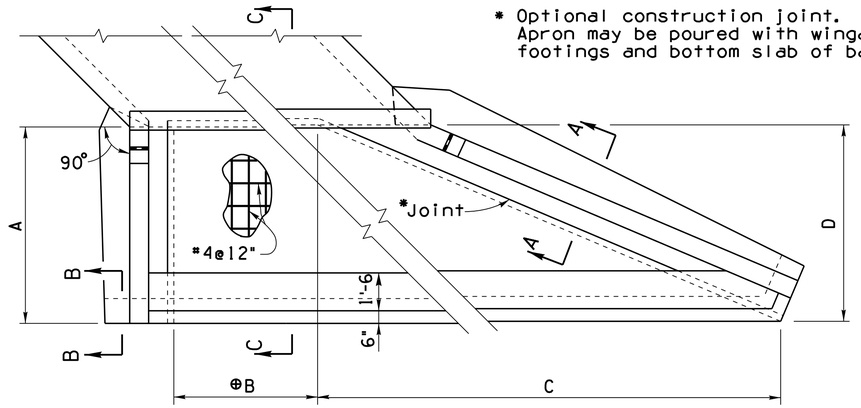


PLAN

Apron for 0° to 15° skew box culvert

Span	△									
	0° Skew	5° Skew	10° Skew	15° Skew	20° Skew	25° Skew	30° Skew	35° Skew	40° Skew	45° Skew
6'	6'-8	6'-8¼	6'-9¼	6'-10⅞	7'-1⅞	7'-4¼	7'-8⅜	8'-1⅝	8'-8⅜	9'-5⅛
8'	8'-9	8'-9⅜	8'-10⅝	9'-0¾	9'-3¾	9'-7⅞	10'-1¼	10'-8⅛	11'-5⅛	12'-4½
10'	10'-11	10'-11½	11'-1	11'-3⅝	11'-7⅜	12'-0½	12'-7¼	13'-3⅞	14'-3	15'-5¼
12'	13'-1	13'-1⅝	13'-3⅜	13'-6½	13'-11⅛	14'-5¼	15'-1¼	15'-11⅝	17'-1	18'-6

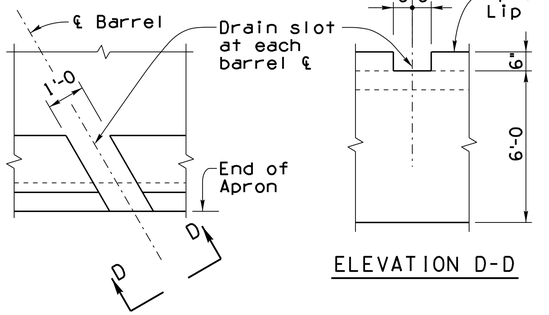
⊕Dimension varies with number of barrels. △equals length to be added to dimension 'B ' for each additional barrel.



PLAN

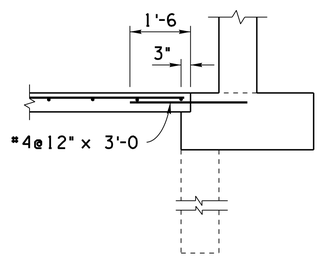
Apron for 20° to 45° skew box culvert

* Optional construction joint.
Apron may be poured with wingall footings and bottom slab of barrel.

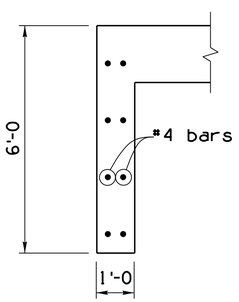


APRON DRAIN DETAIL

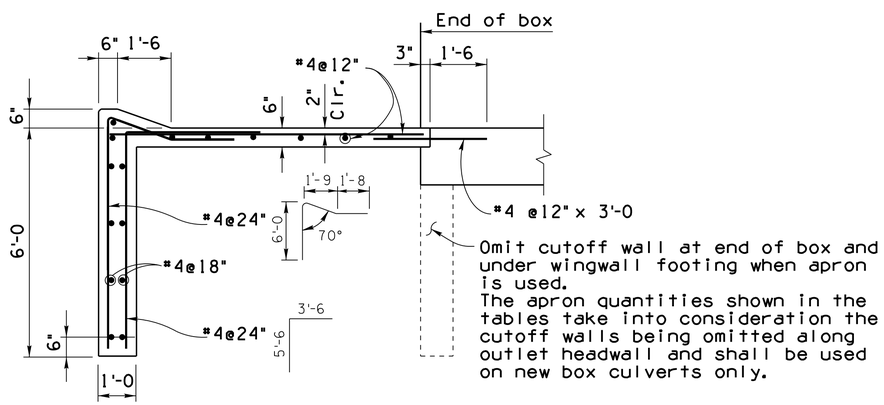
ELEVATION D-D



SECTION A-A



SECTION B-B



SECTION C-C

Omit cutoff wall at end of box and under wingwall footing when apron is used.
The apron quantities shown in the tables take into consideration the cutoff walls being omitted along outlet headwall and shall be used on new box culverts only.

NOTE:

For General Notes, Dimensions, and additional Details, see SD 6.01 (1 & 2 of 5). For Apron Dimensions and Quantities see SD 6.11 (2 to 4).

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	S.U.H.	2-12
2			
3			
4			

DESIGN APPROVED: Shafi U. Hasan

APPROVED FOR DISTRIBUTION: Jean A. Nehme

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STRUCTURE DETAIL

REINFORCED CONCRETE BOX CULVERTS
OUTLET APRON DETAILS

ROUTE | PROJECT NO. | FA NO. | DRAWING NO. SD 6.11 (1 of 4)

LOCATION | SHEET NO. OF

Note to Designer:
The information presented in this Standard Detail has been prepared in accordance with recognized engineering principles and is for general use. It should be used for specific application without competent professional examination and verification of its suitability and applicability by a licensed professional engineer. Contents within the inner border line shall not be altered.

Note to Designer:
The information presented in this Standard Detail has been prepared in accordance with recognized engineering principles and is for general use. It should not be used for specific application without competent professional examination and verification of its suitability by a licensed professional engineer. Contents within the Inner border line shall not be altered.

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	S.J.U.H.	2-12
2	Added 3'-4.5' height for existing box extensions only	D.B.B.	5-15
3			
4			

DIMENSIONS

Span	Hgt.	0° Skew			5° Skew					10° Skew					15° Skew					20° Skew				25° Skew				30° Skew				35° Skew				40° Skew				45° Skew			
		A	B	C	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
6'	3'	9'-10⅞	4'-8¼	3'-7⅛	10'-0⅝	4'-8½	3'-7¼	4'-8¾	10'-1¾	10'-1¼	4'-9⅛	1'-9⅜	5'-8¼	9'-10⅛	10'-1⅛	4'-10⅛	10⅝"	6'-11	9'-10½	10'-0	4'-11¾	8'-2⅝	9'-9¼	9'-0	5'-2⅝	9'-6½	9'-6½	8'-6	5'-6⅜	10'-11⅜	9'-2¼	7'-6	5'-10⅞	12'-4⅞	8'-8¼	7'-0	6'-4½	14'-4½	8'-3⅝	7'-0	6'-11⅞	16'-6⅛	7'-8⅜
	4'	12'-3⅛	4'-8¼	4'-5½	12'-5½	4'-8½	3'-4⅛	5'-9½	12'-5	12'-6⅞	4'-9⅛	2'-2⅝	6'-11¼	12'-0⅛	12'-1	4'-10⅛	1'-0⅝	8'-4⅛	11'-11	12'-0	4'-11¾	9'-9¾	11'-8¼	11'-0	5'-2⅝	11'-3¾	11'-3¾	10'-6	5'-6⅜	13'-2⅞	11'-1⅜	9'-6	5'-10⅞	14'-10⅜	10'-4⅞	9'-0	6'-4½	16'-11⅝	9'-9⅝	8'-6	6'-11⅛	19'-8⅛	9'-2⅛
	5'	14'-7¼	4'-8¼	5'-3⅜	14'-10½	4'-8½	3'-11⅞	6'-10⅛	14'-8⅛	14'-6½	4'-9⅛	2'-6¾	8'-5¼	14'-7¼	14'-6⅞	4'-10⅛	1'-3¼	9'-9⅜	13'-11⅝	14'-6	4'-11¾	11'-8⅞	13'-11⅞	13'-6	5'-2⅝	13'-5¼	13'-5¼	12'-6	5'-6⅜	15'-6½	13'-0½	11'-6	5'-10⅞	17'-8¾	12'-5	10'-6	6'-4½	20'-0	11'-6⅝	10'-0	6'-11⅛	22'-10¼	10'-7⅞
	6'	16'-11½	4'-8¼	6'-2⅛	16'-9¾	4'-8½	4'-6	7'-10⅛	16'-11⅜	17'-0	4'-9⅛	3'-0	9'-8¼	16'-9¼	17'-0⅜	4'-10⅛	1'-5⅞	11'-6	16'-5⅞	17'-0	4'-11¾	13'-4⅞	15'-10⅞	15'-6	5'-2⅝	15'-6⅝	15'-6⅝	14'-6	5'-6⅜	17'-10⅛	14'-11⅝	13'-6	5'-10⅞	20'-2¼	14'-1⅝	12'-6	6'-4½	23'-0⅜	13'-3⅝	12'-0	6'-11⅛	26'-0¼	12'-1⅝
	7'	19'-3⅝	4'-8¼	7'-0⅜	19'-2⅞	4'-8½	5'-1¾	8'-11½	19'-2½	19'-5⅝	4'-9⅛	3'-5½	10'-11¼	18'-11¼	19'-6⅝	4'-10⅛	1'-8½	12'-11¼	18'-5⅝	19'-6	4'-11¾	15'-3¼	18'-2⅝	17'-6	5'-2⅝	17'-8⅛	17'-8⅛	16'-6	5'-6⅜	20'-1⅝	16'-10¾	15'-0	5'-10⅞	22'-7¾	15'-10¼	14'-0	6'-4½	26'-0¾	15'-0⅝	13'-6	6'-11⅛	29'-2⅜	13'-7⅜
8'	3'	9'-10⅞	6'-10¼	3'-7¼	10'-0⅝	6'-10½	2'-8¼	4'-8¾	10'-1¾	10'-1¼	6'-11½	1'-9⅜	5'-8¼	9'-10⅛	10'-1⅛	7'-1⅛	10⅝"	6'-11	9'-10½	10'-0	7'-3⅜	8'-2⅝	9'-9¼	9'-0	7'-7⅛	9'-6½	9'-6½	8'-6	8'-0⅜	10'-11⅜	9'-2¼	7'-6	8'-6⅝	12'-4⅞	8'-8¼	7'-0	9'-2⅜	14'-4½	8'-3⅝	7'-0	9'-11⅞	16'-6⅛	7'-8⅜
	4'	12'-3⅛	6'-10¼	4'-5½	12'-5½	6'-10½	3'-4⅛	5'-9½	12'-5	12'-6⅞	6'-11½	2'-2⅝	6'-11¼	12'-0⅛	12'-1	7'-1⅛	1'-0⅝	8'-4⅛	11'-11	12'-0	7'-3⅜	9'-9¾	11'-8¼	11'-0	7'-7⅛	11'-3¾	11'-3¾	10'-6	8'-0⅜	13'-2⅞	11'-1⅜	9'-6	8'-6⅝	14'-10⅜	10'-4⅞	9'-0	9'-2⅜	16'-11⅝	9'-9⅝	8'-6	9'-11⅞	19'-8⅛	9'-2⅛
	5'	14'-7¼	6'-10¼	5'-3⅜	14'-10½	6'-10½	3'-11⅞	6'-10⅛	14'-8⅛	14'-6½	6'-11½	2'-6¾	8'-5¼	14'-7¼	14'-6⅞	7'-1⅛	1'-3¼	9'-9⅜	13'-11⅝	14'-6	7'-3⅜	11'-8⅞	13'-11⅞	13'-6	7'-7⅛	13'-5¼	13'-5¼	12'-6	8'-0⅜	15'-6½	13'-0½	11'-6	8'-6⅝	17'-8¾	12'-5	10'-6	9'-2⅜	20'-0	11'-6⅝	10'-0	9'-11⅞	22'-10¼	10'-7⅛
	6'	16'-11½	6'-10¼	6'-2⅛	16'-9¾	6'-10½	4'-6	7'-10⅛	16'-11⅜	17'-0	6'-11½	3'-0	9'-8¼	16'-9¼	17'-0⅜	7'-1⅛	1'-5⅞	11'-6	16'-5⅞	17'-0	7'-3⅜	13'-4⅞	15'-10⅞	15'-6	7'-7⅛	15'-6⅝	15'-6⅝	14'-6	8'-0⅜	17'-10⅛	14'-11⅝	13'-6	8'-6⅝	20'-2¼	14'-1⅝	12'-6	9'-2⅜	23'-0⅜	13'-3⅝	12'-0	9'-11⅞	26'-0¼	12'-1⅝
	7'	19'-3⅝	6'-10¼	7'-0⅜	19'-2⅞	6'-10½	5'-1¾	8'-11½	19'-2½	19'-5⅝	6'-11½	3'-5½	10'-11¼	18'-11¼	19'-6⅝	7'-1⅛	1'-8½	12'-11¼	18'-5⅝	19'-6	7'-3⅜	15'-3¼	18'-2⅝	17'-6	7'-7⅛	17'-8⅛	17'-8⅛	16'-6	8'-0⅜	20'-1⅝	16'-10¾	15'-0	8'-6⅝	22'-7¾	15'-10¼	14'-0	9'-2⅜	26'-0¾	15'-0⅝	13'-6	9'-11⅞	29'-2⅜	13'-7⅜
	8'	21'-9⅞	5'-9½	7'-11⅜	21'-9¼	5'-9¾	5'-10	10'-1⅜	21'-8¼	22'-0⅛	5'-10½	3'-10⅝	12'-3⅞	21'-4¼	21'-7⅛	5'-11¾	1'-10⅝	14'-6⅞	20'-9⅝	21'-6	6'-1½	17'-1¾	20'-5¼	20'-0	6'-4⅞	19'-9⅝	19'-9⅝	18'-6	6'-9	22'-10¾	19'-2½	17'-0	7'-2⅛	26'-1⅞	18'-3¼	16'-0	7'-8⅜	29'-5	16'-11⅞	15'-0	8'-3¾	33'-9½	15'-9⅛
10'	3'	9'-10⅞	9'-0¼	3'-7¼	10'-0⅝	9'-0⅝	2'-8¼	4'-8¾	10'-1¾	10'-1¼	9'-1⅞	1'-9⅜	5'-8¼	9'-10⅛	10'-1⅛	9'-4	10⅝"	6'-11	9'-10½	10'-0	9'-7	8'-2⅝	9'-9¼	9'-0	10'-0	9'-6½	9'-6½	8'-6	10'-6⅜	10'-11⅜	9'-2¼	7'-6	11'-2⅜	12'-4⅞	8'-8¼	7'-0	12'-0⅜	14'-4½	8'-3⅝	7'-0	13'-0¾	16'-6⅛	7'-8⅜
	4'	12'-3⅛	9'-0¼	4'-5½	12'-5½	9'-0⅝	3'-4⅛	5'-9½	12'-5	12'-6⅞	9'-1⅞	2'-2⅝	6'-11¼	12'-0⅛	12'-1	9'-4	1'-0⅝	8'-4⅛	11'-11	12'-0	9'-7	9'-9¾	11'-8¼	11'-0	10'-0	11'-3¾	11'-3¾	10'-6	10'-6⅜	13'-2⅞	11'-1⅜	9'-6	11'-2⅜	14'-10⅜	10'-4⅞	9'-0	12'-0⅜	16'-11⅝	9'-9⅝	8'-6	13'-0¾	19'-8⅛	9'-2⅛
	5'	14'-7¼	9'-0¼	5'-3⅜	14'-10½	9'-0⅝	3'-11⅞	6'-10⅛	14'-8⅛	14'-6½	9'-1⅞	2'-6¾	8'-5¼	14'-7¼	14'-6⅞	9'-4	1'-3¼	9'-9⅜	13'-11⅝	14'-6	9'-7	11'-8⅞	13'-11⅞	13'-6	10'-0	13'-5¼	13'-5¼	12'-6	10'-6⅜	15'-6½	13'-0½	11'-6	11'-2⅜	17'-8¾	12'-5	10'-6	12'-0⅜	20'-0	11'-6⅝	10'-0	13'-0¾	22'-10¼	10'-7⅛
	6'	16'-11½	9'-0¼	6'-2⅛	16'-9¾	9'-0⅝	4'-6	7'-10⅛	16'-11⅜	17'-0	9'-1⅞	3'-0	9'-8¼	16'-9¼	17'-0⅜	9'-4	1'-5⅞	11'-6	16'-5⅞	17'-0	9'-7	13'-4⅞	15'-10⅞	15'-6	10'-0	15'-6⅝	15'-6⅝	14'-6	10'-6⅜	17'-10⅛	14'-11⅝	13'-6	11'-2⅜	20'-2¼	14'-1⅝	12'-6	12'-0⅜	23'-0⅜	13'-3⅝	12'-0	13'-0¾	26'-0¼	12'-1⅝
	7'	19'-3⅝	9'-0¼	7'-0⅜	19'-2⅞	9'-0⅝	5'-1¾	8'-11½	19'-2½	19'-5⅝	9'-1⅞	3'-5½	10'-11¼	18'-11¼	19'-6⅝	9'-4	1'-8½	12'-11¼	18'-5⅝	19'-6	9'-7	15'-3¼	18'-2⅝	17'-6	10'-0	17'-8⅛	17'-8⅛	16'-6	10'-6⅜	20'-1⅝	16'-10¾	15'-0	11'-2⅜	22'-7¾	15'-10¼	14'-0	12'-0⅜	26'-0¾	15'-0⅝	13'-6	13'-0¾	29'-2⅜	13'-7⅜
	8'	21'-9⅞	7'-11½	7'-11⅜	21'-9¼	7'-11¾	5'-10	10'-1⅜	21'-8¼	22'-0⅛	8'-0⅝	3'-10⅝	12'-3⅞	21'-4¼	21'-7⅛	8'-2⅝	1'-10⅝	14'-6⅞	20'-9⅝	21'-6	8'-5¼	17'-1¾	20'-5¼	20'-0	8'-9½	19'-9⅝	19'-9⅝	18'-6	9'-3	22'-10¾	19'-2½	17'-0	9'-9⅞	26'-1⅞	18'-3¼	16'-0	10'-6⅜	29'-5	16'-11¾	15'-0	11'-4½	33'-9½	15'-9⅛
	9'	24'-2½	7'-9⅜	8'-9¾	24'-2½	7'-9⅝	6'-5⅞	11'-2¼	23'-11⅞	24'-0	7'-10¾	4'-2¾	13'-7¼	23'-6¾	24'-1⅛	8'-0⅜	2'-1¼	16'-3⅞	23'-3¾	24'-0	8'-2⅞	19'-1½	22'-9½	22'-0	8'-7⅛	21'-11⅞	21'-11⅞	20'-6	9'-0½	25'-3¼	21'-2⅜	19'-0	9'-7⅛	28'-7¾	20'-0¾	17'-6	10'-3⅜	32'-6⅞	18'-9⅝	17'-0	11'-1½	37'-1½	17'-3¾
	10'	26'-7	7'-7¼	9'-8⅛	26'-7⅞	7'-7½	7'-1⅝	12'-3⅛	26'-3½	26'-5¾	7'-8½	4'-8	14'-10½	25'-9⅛	26'-7	8'-10⅞	2'-1⅞	16'-6⅞	23'-3¾	24'-0	8'-5⅞	20'-9¼	24'-9⅛	24'-0	8'-4¾	24'-1⅞	24'-1⅞	22'-6	8'-9⅞	27'-7¾	23'-2⅛	20'-6	9'-4⅜	31'-7⅜	22'-1⅝	18'-6	10'-9¾	40'-5½	18'-10⅜
	11'	28'-11½	9'-9⅞	10'-6½	29'-0⅞	9'-9½	7'-9½	13'-4	28'-7⅛	28'-11⅜	9'-10¾	5'-1¼	16'-1¾	27'-11⅝	29'-1	10'-0⅛	2'-6½	19'-3⅛	27'-6	29'-0	10'-4⅛	20'-9	27'-1¼	26'-6	10'-9⅛	26'-4⅛	26'-4⅛	24'-6	11'-3¾	30'-0⅛	25'-2¼	22'-6	11'-11⅞	34'-2	23'-11⅛	21'-0	12'-9⅞	38'-10⅝	22'-5⅜	20'-0	13'-10	43'-9⅝	20'-5⅛
	12'	31'-4	9'-7	11'-4⅞	31'-6⅞	9'-7⅝	8'-5⅜	14'-4⅞	30'-10¾	31'-5⅛	9'-8⅝	5'-6½	17'-8⅛	30'-7⅜	31'-1	9'-10¾	2'-8⅝	21'-0⅛	30'-0⅛	31'-0	10'-1¾	24'-4¾	29'-0⅞	28'-6	10'-6¾	28'-2	28'-2	26'-6	11'-1⅞	32'-4⅝	27'-2⅛	24'-6	11'-9⅛	36'-8¾	25'-8⅝	23'-0	12'-6⅞	41'-7¼	24'-0¼	22'-0	13'-6⅝	47'-7	22'-2¼

QUANTITIES

Span	Hgt.	0° Skew				5° Skew				10° Skew				15° Skew				20° Skew				25° Skew				30° Skew				35° Skew				40° Skew				45° Skew			
		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.	
		lBbl.	Δc	lBbl.	Δs	lBbl.	Δc	lBbl.	Δs	lBbl.	Δc	lBbl.	Δs	lBbl.	Δc	lBbl.	Δs	lBbl.	Δc	lBbl.	Δs	lBbl.	Δc	lBbl.	Δs	lBbl.	Δc	lBbl.	Δs	lBbl.	Δc	lBbl.	Δs	lBbl.	Δc	lBbl.	Δs	lBbl.	Δc	lBbl.	Δs
6'	3'	0.41	1.46	46	122	0.42	1.49	48	124	0.42	1.49	42	124	0.45	1.52	52	126	0.50	1.55	57	128	0.88	1.52	86	128	1.23	1.53	113	129	1.59	1.51	140	128	1.97	1.54	173	132	2.36	1.62	206	139
	4'	0.56	1.75	69	143	0.57	1.78	72	145	0.58	1.78	71	146	0.62	1.78	75	146	0.67	1.81	79	148	1.11	1.78	112	147	1.59	1.81	150	150	2.00	1.79	181	149	2.45	1.82	217	152	2.96	1.88	260	158
	5'	0.72	2.04	98	165	0.75	2.07	101	167	0.77	2.07	103	167	0.78	2.07	102	167	0.97	2.12	112	172	1.41	2.10	150	170	1.97	2.09	194	171	2.51	2.09	236	171	3.01	2.08	275	172	3.59	2.14	320	177
	6'	1.78	3.13	192	243	1.79	3.12	193	243	1.84	3.16	198	246	1.90	3.20	202	249	1.96	3.24	206	252	2.62	3.19	256	249	3.27	3.19	305	249	3.89	3.19	351	250	4.55	3.22	403	253	5.27	3.30	454	260
	7'	1.28	2.62	172	208	1.29	2.62	173	208	1.34	2.65	176	210	1.39	2.67	179	212	1.50	2.73	188	217	2.25	2.66	245	212	2.99	2.65	300	212	3.65	2.61	349	210	4.47	2.65	412	214	5.30	2.70	463	219
8'	3'	0.93	1.98	85	158	0.95	2.02	88	161	0.96	2.03	88	161	1.00	2.07	93	164	1.06	2.11	98	167	1.43	2.07	126	166	1.79	2.09	154	167	2.14	2.06	180	166	2.54	2.11	215	171	2.96	2.22	251	180
	4'	1.18	2.36	115	186	1.20	2.40	119	189	1.21	2.42	118	189	1.25	2.40	121	190	1.31	2.44	127	193	1.75	2.41	159	191	2.24	2.46	198	195	2.65	2.43	288	193	3.11	2.48	266	198	3.65	2.56	311	205
	5'	1.44	2.75	151	214	1.47	2.78	155	217	1.50	2.78	157	217	1.51	2.78	156	218	1.62	2.86	167	224	2.15	2.83	205	221	2.71	2.83	249	222	3.25	2.83	291	223	3.76	2.82	330	224	4.36	2.90	377	230
	6'	1.78	3.13	192	243	1.79	3.12	193	243	1.84	3.16	198	246	1.90	3.20	202	249	1.96	3.24	206	252	2.62	3.19	256	249	3.27	3.19	305	249	3.89	3.19	351	250	4.55	3.22	403	253	5.27	3.30	454	260
	7'	2.19	3.51	239	271	2.19	3.51	239	271	2.25	3.54	244	274	2.31	3.58	247	277	2.44	3.65	258	283	3.17	3.56	314	276	3.92	3.56	368	277	4.56	3.51	416	274	5.41	3.56	481	279	6.26	3.64	534	285
	8'	2.77	3.51	239	271	2.19	3.51	239	271	2.25	3.54	244	274	2.31	3.58	247	277	2.44	3.65	258	283	3.17	3.56	314	276	3.92	3.56	368	277	4.56	3.51	467	306	6.50	3.98	528	310	7.54	4.06	603	316
10'	3'	1.52	2.54	128	197	1.55	2.59	132	200	1.56	2.60	133	201	1.61	2.65	138	205	1.68	2.70	145	206	2.05	2.66	172	206	2.42	2.69	201	209	2.76	2.65	227	207	3.18	2.72	262	212	3.64	2.86	301	224
	4'	1.87	3.02	166	232	1.90	3.07	171	236	1.91	3.07	170	236	1.95	3.07	174	236	2.02	3.12	180	240	2.46	3.08	212	236	2.96	3.14	252	243	3.36	3.11	282	241	3.85	3.18	321	247	4.41	3.29	368	255
	5'	2.23	3.49	210	267	2.27	3.54	214	271	2.30	3.54	216	271	2.31	3.54	216	271	2.44	3.64	228	279	2.96	3.60	266	276	3.53	3.60	310	277	4.08	3.61	352	278	4.59	3.61	392	279	5.21	3.71	441	287
	6'	2.67	3.97	258	303	2.68	3.97	259	303	2.74	4.01	265	306	2.81	4.06	270	310	2.89	4.11	275	314	3.53	4.06	324	310	4.19	4.06	374	311	4.81	4.07	420	312	5.48	4.11	473	315	6.23	4.21	525	324
	7'	3.18	4.44	313	338	3.19	4.44	313	338	3.25	4.49	319	341	3.33	4.54	323	345	3.48	4.63	335	352	4.19	4.52	389	344	4.93	4.52	444	345	5.57	4.46	491	341	6.43	4.54	557	347	7.31	4.64	612	356
	8'	3.87	4.95	332	376	3.88	4.95	333	376	3.95	5.00	338	379	3.99	4.99	338	379	4.16	5.08	351	386	5.02	5.03	415	383	5.93	5.02	486	382	6.77	5.01	551	382	7.63	5.06	613	386	8.69	5.16	690	394
	9'	4.48	5.43	387	411	4.49	5.43	388	411	4.51	5.43	388	411	4.68	5.52	400	418	4.87	5.60	412	425	5.79	5.50	482	417	6.80	5.49	560	417	7.74	5.48	630	417	8.73	5.49	704	418	10.04	5.67	789	432
	10'	5.15	5.91	447	447	5.16	5.91	447	447	5.18	5.91	446	447	5.36	6.00	458	454	5.55	6.08	468	461	6.62	5.97	554	452	7.75	5.96	639	452	8.81	5.92	723	449	10.05	6.00	806	456	11.34	6.10	889	465
12'	8'	5.01	6.04	414	450	5.02	6.03	415	450	5.10	6.09	420	454	5.14	6.09	421	454	5.33	6.20	435	463	6.19	6.14	499	458	7.10	6.14	570	458	7.94	6.13	635	457	8.82	6.19	698	462	9.91	6.33	776	472
	9'	5.72	6.61	477	493	5.73	6.61	477	493	5.75	6.61	477	493	5.94	6.72	492	501	6.15	6.82	505	509	7.05	6.70	573	500	8.07	6.70	651	499	9.01	6.69	635	457	10.01	6.72	795	501	11.37	6.94	884	518
	10'	6.49	7.19	544	536	6.50	7.19	544	536	6.52	7.18	543	536	6.72	7.29	557	544	6.93	7.40	569	552	7.99	7.26	653	541	9.11	7.25	737	541	10.17	7.22	821	538	11.44	7.32	905	546	12.76	7.46	991	557
	11'	7.33	7.76	615	579	7.33	7.76	615	578	7.35	7.76	614	578	7.56	7.87	626	587	7.89	8.02	648	598	9.07	7.89	741	588	10.23	7.81	829	582	11.44	7.78	919	580	12.78	7.85	1016	585	14.23	7.98	1103	595
	12'	8.22	8.34	692	621	8.23	8.34	691	621	8.35	8.39	699	625	8.49	8.43	707	628	8.72	8.54	717	636	10.02	8.40	818	626	11.49	8.37	927	624	12.77	8.34	1023	622	14.26	8.41	1124	627	16.08	8.16	1245	643

Δc = Apron concrete quantity per additional barrel. Δs = Apron steel quantity per additional barrel.

DESIGN APPROVED

APPROVED FOR DISTRIBUTION

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STRUCTURE DETAIL

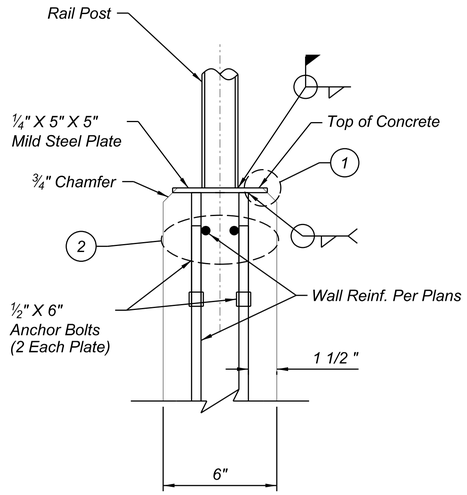
REINFORCED CONCRETE BOX CULVERTS
OUTLET APRON - DIMENSIONS & QUANTITIES (4 : 1 SLOPE)

ROUTE | PROJECT NO. | FA NO. | DRAWING NO. SD 6.11 (3 of 4)

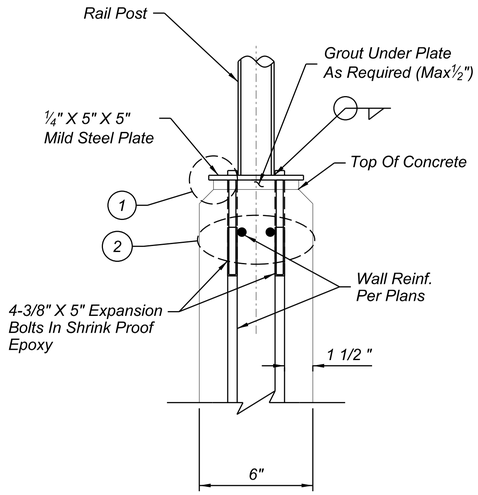
LOCATION | SHEET NO. OF

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	AZ	X	XXX	XX	

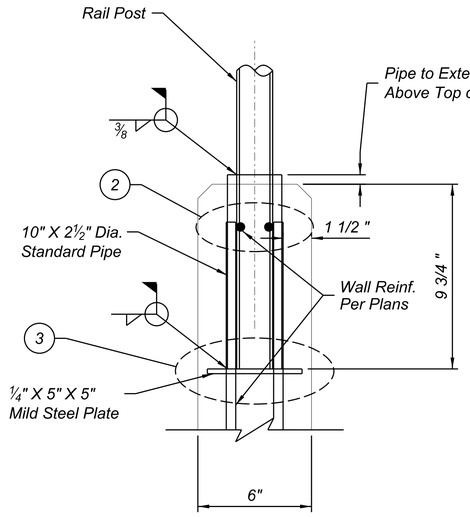
MAG DETAIL 145 EXISTING ISSUES



TYPE 1- (6" Wall)
Scale: 1"=0'-4"



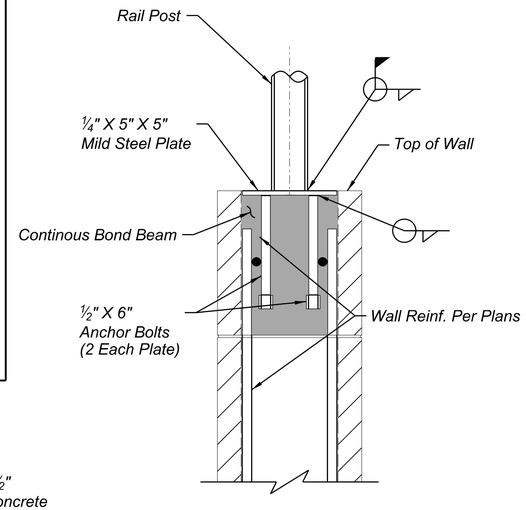
TYPE 2- (6" Wall)
Scale: 1"=0'-4"



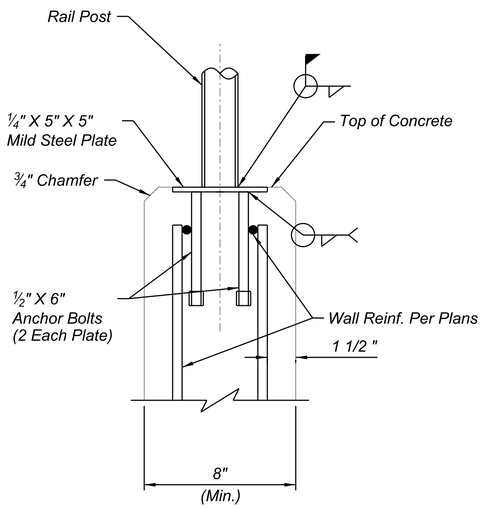
TYPE 3- (6" Wall)
Scale: 1"=0'-4"

STRUCTURAL PROBLEMS

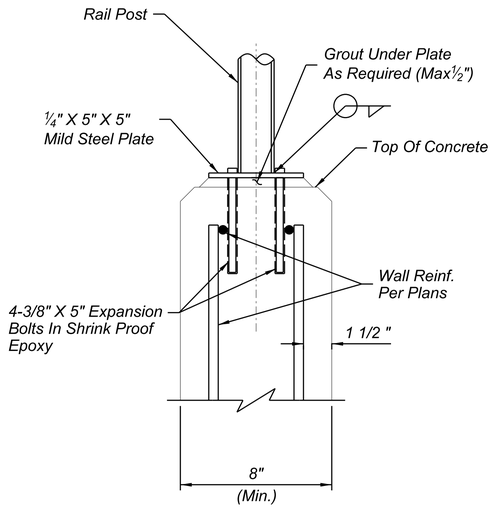
1. *STEEL PLATE CORNER EXPOSED*
2. *CONFLICTS WITH NOTE 6. "THE EMBEDMENT FOR ANCHOR TYPES 1,2, & 3 SHALL BE LOCATED INSIDE THE WALL REINFORCEMENT CAGE".*
3. *LESS THAN MINIMUM REQUIRED CONCRETE COVER.*



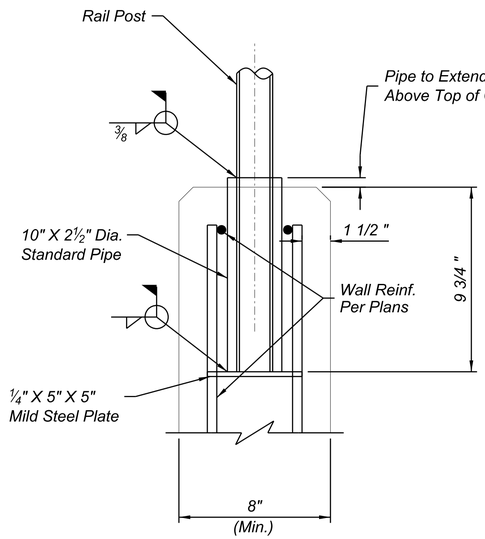
TYPE 5- (8" CMU Wall)
Scale: 1"=0'-4"



TYPE 1- (8" Wall)
Scale: 1"=0'-4"



TYPE 2- (8" Wall)
Scale: 1"=0'-4"



TYPE 3- (8" Wall)
Scale: 1"=0'-4"

MAG DETAIL 145 PROPOSED

NO.	REVISION	BY	DATE
3			
2			
1			

MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION

MAG DETAIL 145

		BY	DATE
PRELIMINARY NOT FOR CONSTRUCTION	DESIGNED	A.N. ENGINEER	XX/XX/XX
	DRAWN	A. TECHNICIAN	XX/XX/XX
	CHECKED	A.N. ENGINEER	XX/XX/XX

XXX

SHEET XXX OF XX

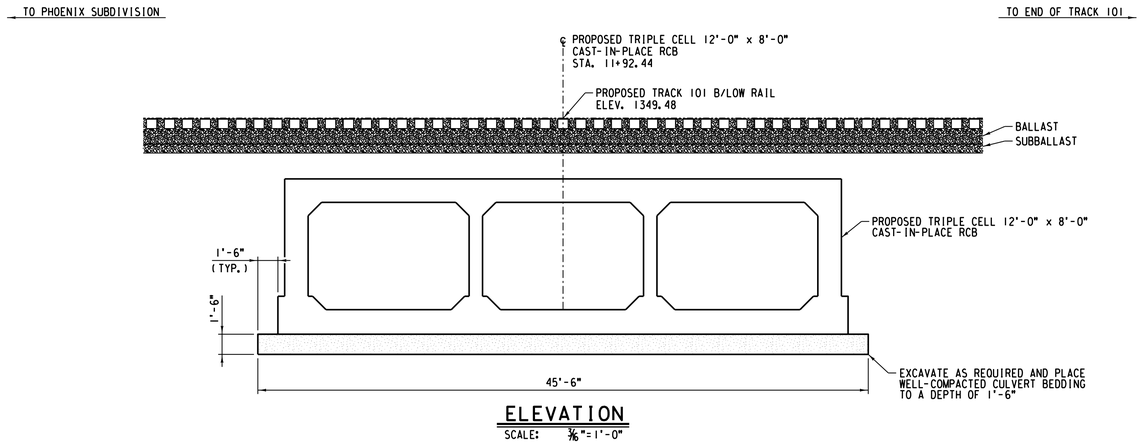
TRACS NO.

Contact Arizona 811 Two Working Days Before You Dig
Call 811 or Click Arizona811.com

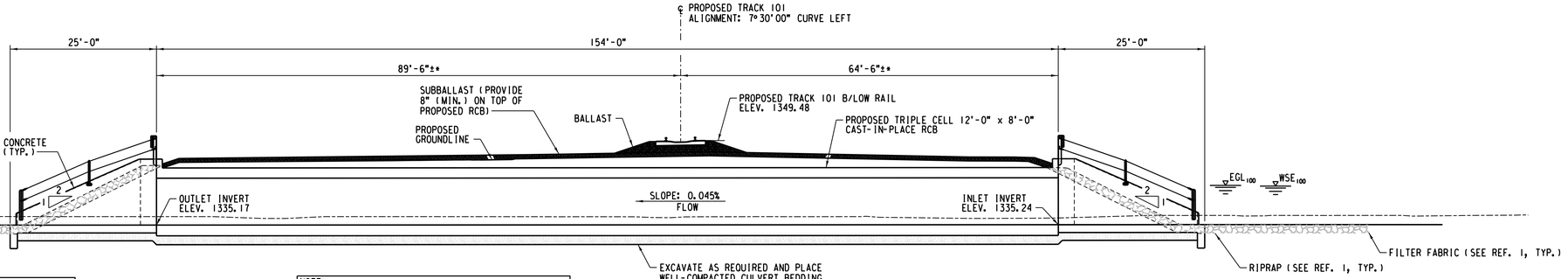
8:16:49 AM 3/8/2018

F:\Safety Rail\SD_Safety Rail Details.dgn

DESIGN SHEET



ELEVATION
SCALE: 3/8"=1'-0"



MATERIAL NOTE:
CEMENT SHALL BE TYPE II OR TYPE III PORTLAND CEMENT IN ACCORDANCE WITH ASTM C150 SPECIFICATIONS.

NOTE:
SLOPES SHOWN ACCOUNT FOR CULVERT SKEW/ORIENTATION.

RIGHT

CROSS SECTION
SCALE: 1/2"=1'-0"

WSE_{100} = 1341.82
EGL_{100} = 1341.94
VEL_{100} = 3.79fps

BILL OF MATERIAL

REQ'D.	UNIT	DESCRIPTION	STORE ITEM NO.	ORDERED BY
154	FT	12'-0" X 8'-0" TRIPLE-CELL BOX CULVERT (BARREL ONLY) (PER STD. PLAN NO. 680200, SHT. MC27)		CONSTRUCTOR
164	CU. YD.	4000 PSI CONCRETE FOR END TREATMENTS ONLY (PER DETAILS, SHEET. NOS. S3-S5, AND NOTES, PER STD. DWG. 680200 SHT. G1)		
1	LOT	REINFORCING STEEL FOR END TREATMENTS ONLY (PER SCHEDULE, SHEET NO. S5)		
2	EA.	HANDRAIL POST HP-25R (PER STD. DWG. 680160 SHT. H1)	513-2077	
2	EA.	HANDRAIL POST HP-25L (PER STD. DWG. 680160 SHT. H1)	513-2075	
8	EA.	HANDRAIL POST HP-26 (PER STD. DWG. 680160 SHT. H1)	513-2080	
4	EA.	HANDRAIL POST HP-27 (PER STD. DWG. 680160 SHT. H1)	513-2085	
43	EA.	3/4" DIA. x 14" A307 HEAVY HEX BOLT, TYPE 1 WITH HEAVY ELASTIC LOCK NUT (MIL-N-322581) AND FLAT CIRCULAR WASHER (ASTM F436), EACH COMPONENT HOT DIP OR MECHANICALLY ZINC COATED		
27	EA.	3/8" EYE TYPE STRANDVISE CABLE GRIP CARTRIDGE (MACLEAN POWER PRODUCTS NO. 5102)	098-6081	
400	LIN. FT.	3/8" NOMINAL DIAMETER WIRE ROPE, 7 WIRE, GALVANIZED STEEL STRAND, SIEMENS MARTINS GRADE, A-COATING	050-5394	
27	EA.	1/2" DIA. EYEBOLT, 2" LONG SHANK WITH 1" I.D. EYE, PLAIN PATTERN GALVANIZED DROP FORGED STEEL (ASTM A489), WITH ZINC PLATED HEX NYLON INSERT LOCKNUT (ASTM A563) AND ZINC PLATED FLAT CIRCULAR WASHER (ASTM F436)	130-0370	
19	EA.	GALVANIZED MALLEABLE IRON U-BOLT WITH 2 ELASTIC LOCKNUTS (MIL-N-25027), ZINC PLATED, FOR 3/8" DIA. WIRE ROPE	050-6370	
1	EA.	CULVERT MARKER SIGNS, MOUNTING POST AND MOUNTING HARDWARE (PER STD. DWG. 0502, 0507 AND 0599)	P00-2616	
1	LOT	RIPRAP (PER REF. 1)		
1	LOT	FILTER FABRIC (PER REF. 1)		
520	CU. YD.	CULVERT BEDDING (PER STD. DWG. 680200 SHT. G1)		
1260	CU. YD.	FILL MATERIAL (PER STD. DWG. 680000 SHT. 3 AND REF. 1)**		
1	LOT	EPOGRIP MULTIPURPOSE STRUCTURAL BONDING AND GROUTING EPOXY ADHESIVE OR APPROVED ALTERNATE		
1	LOT	TEMPORARY FORMWORK MATERIAL		

CLSM MAY BE SUBSTITUTED FOR FILL MATERIAL.
BULK QUANTITIES ARE ESTIMATED.
FILL QUANTITY INCLUDES 30% FOR COMPACTION.

**NOTE:
FILL QUANTITY ON THESE PLANS INCLUDES EXCESS FILL REQUIRED FOR ADDITIONAL GRADING TO MEET NECESSARY COVER REQUIREMENTS ON SKEWED RCB.

DESIGN NOTES

RIGHT-OF-WAY

1. Right-of-way: Varies, per Ref. 1.

LAYOUT

1. Stationing: Per Ref. 1.
2. Elevation Datum: Per Ref. 1.
3. Temporary Benchmarks:
   TBM 1 (Olsson CP 12): Elev. 1345.52, NAVD 1988, 1/2" rebar located in ground East of proposed Track 101 Culvert No. 0.23, 71.58' left of existing Phoenix Sub. Main Track centerline, Sta. 1498+70.62.
   TBM 2 (Olsson CP 13): Elev. 1342.79, NAVD 1988, 1/2" rebar located in ground West of proposed Track 101 Culvert No. 0.23, 62.38' left of existing Phoenix Sub. Main Track centerline, Sta. 1491+33.87.
4. Profile: Proposed Track 101 per Ref. 1.
5. Alignment: 7°30'00" curve left.
6. Information used to prepare this drawing in addition to reference drawings:
   Hydrologic & Hydraulic Evaluation prepared by Olsson, dated September 2022.

DESIGN

1. This structure has been designed for Cooper E80 Live Load with impact and cover depth ranging from 1'-6" to 18'-0".
2. Constructor shall be responsible for determining construction loads and providing necessary supplemental cover, or support of structural elements, to accommodate construction activities as required.

DRAWING SCHEDULE

THIS SET

SHEET NO.	PLAN NO.	DESCRIPTION	TYPE
S1	123076	GENERAL ARRANGEMENT (SHEET 1 OF 2)	DESIGN
S2	123076	GENERAL ARRANGEMENT (SHEET 2 OF 2)	DESIGN
S3	123076	END TREATMENT FRAMING DETAILS	DESIGN
S4	123076	END TREATMENT REINFORCING DETAILS (SHEET 1 OF 2)	DESIGN
S5	123076	END TREATMENT REINFORCING DETAILS (SHEET 2 OF 2)	DESIGN
S6	123076	HANDRAIL DETAILS	DESIGN
G1	680200	GENERAL NOTES	STANDARD
G2	680200	GENERAL ARRANGEMENT FOR SINGLE CELL AND MULTI-CELL BOX CULVERTS	STANDARD
G5	680200	CONSTRUCTION SEQUENCE	STANDARD
MC27	680200	12'-0"x8'-0" MULTI-CELL BOX CULVERT DETAILS (SHEET 1 OF 3)	STANDARD

REF.

NO.	DWG. NO.	SHEET NO.	REV. NO.	DESCRIPTION	TYPE
1	-	P016 OF 037 T006 OF 012 X036 OF 143 X037 OF 143 EC006 OF 036	-	MESA, ARIZONA, PHOENIX SUBDIVISION, MP 934.78 TO MP 937.83, CONSTRUCT INDUSTRIAL LEAD TRACK, 100% PLANS, ISSUED FOR BID, DATED MARCH 6, 2023	DESIGN

STANDARD VARIABLES:
L = 154 (FT)
NC = 3
NB = 309

TOTAL NUMBER OF BARS:
A = 618
B = 618
C = 334
D = 1236
E = 2472
F = 82
G = 128
H = 42
J = 42

LENGTH OF BARS:
P = 153'-8"
Q = 41'-2"
R = 29'-5"
S = 41'-10"
T = 63'-6"
U = 42'-5"
V = 63'-2"

FOR A LIST OF VARIABLES, SEE STD. DWG. 680200, SHT. MC27

CALCULATED BAR LENGTHS DO NOT INCLUDE LAP SPLICES, SEE BAR SPLICE NOTE ON STD. DWG. 680200 SHT. MC27 FOR LAP SPLICE REQUIREMENTS.

NOTES:
1. CROSS SECTION SHOWN ALONG CENTERLINE OF PROPOSED RCB.
2. * MEASURED ALONG RITTENHOUSE CHANNEL CENTERLINE.
3. RCB = REINFORCED CONCRETE BOX

LETTER SERIES
SHEET NO. CUT ON
SHEET NO. SHOWN ON

SECTION DESIGNATION

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 01-06-2023 ARIZONA U.S.A.

POSTCONSTRUCTION COMPLIANCE

Constructor in charge of construction to provide to the office of the Senior Manager Structures Design as-built drawings confirming that the project was constructed in compliance with the plans and indicating any construction variances.

SIGNED

In Charge of Construction — Date

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL — STATUS — 07/05/2023 DATE

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
CONSULTANT ENGINEER — 01/13/2023 DATE

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123076

LATITUDE: 33.28365°N LONGITUDE: 111.67754°W

DSN/CHK BY:	NAS/MJH
DRAWN/CHK BY:	NAS/KAS
UPRR ENGINEER:	ADS
SHT NO.:	S1 of S6

UNION PACIFIC RAILROAD
Office of Director Structures Design

LOCATION & DESCRIPTION: CULVERT 0.23, PIRATE IND LEAD

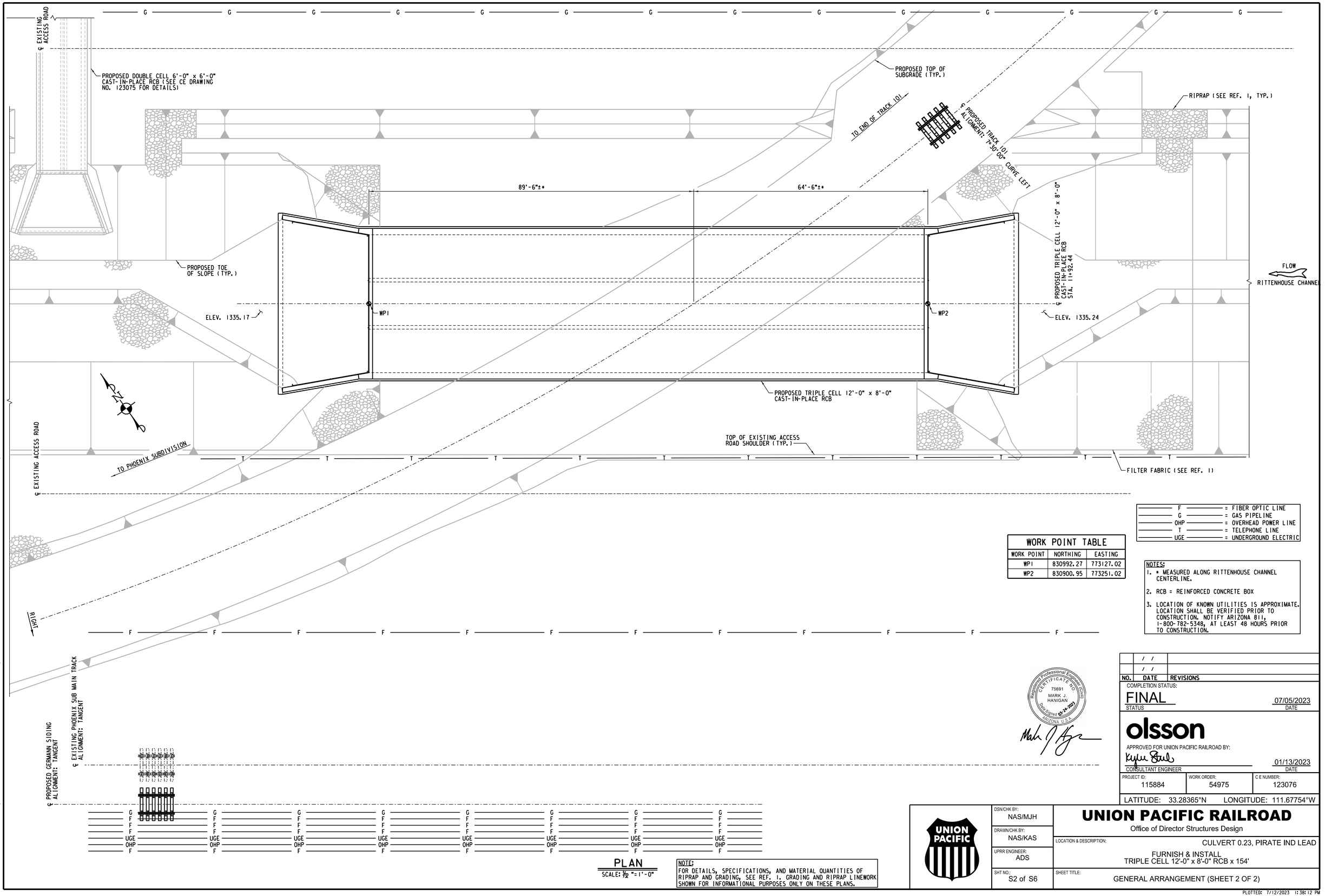
FURNISH & INSTALL
TRIPLE CELL 12'-0" x 8'-0" RCB x 154'

SHEET TITLE: GENERAL ARRANGEMENT (SHEET 1 OF 2)

FILE NAME: \\oa.ad.oaconsulting.com\fnts-na\projects\2020\0501-1000\020-0927.40-Design\Microstation\020-0927.BUPR\July 0.23 Sta. 11-92.00 Pirate Ind Lead 0.23.cat.dgn

PLOTTED: 7/12/2023 11:38:12 PM

DESIGN SHEET



PLAN
SCALE: 1/20 " = 1'-0"

F = FIBER OPTIC LINE
G = GAS PIPELINE
OHP = OVERHEAD POWER LINE
T = TELEPHONE LINE
UGE = UNDERGROUND ELECTRIC

WORK POINT TABLE		
WORK POINT	NORTHING	EASTING
WP1	830992.27	773127.02
WP2	830900.95	773251.02

NOTES:
1. * MEASURED ALONG RITTENHOUSE CHANNEL CENTERLINE.
2. RCB = REINFORCED CONCRETE BOX
3. LOCATION OF KNOWN UTILITIES IS APPROXIMATE. LOCATION SHALL BE VERIFIED PRIOR TO CONSTRUCTION. NOTIFY ARIZONA 811, 1-800-782-5348, AT LEAST 48 HOURS PRIOR TO CONSTRUCTION.

NOTE:
FOR DETAILS, SPECIFICATIONS, AND MATERIAL QUANTITIES OF RIPRAP AND GRADING, SEE REF. 1. GRADING AND RIPRAP LINEWORK SHOWN FOR INFORMATIONAL PURPOSES ONLY ON THESE PLANS.

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 03-24-2023 ARIZONA U.S.A.

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL — STATUS
07/05/2023 — DATE

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
CONSULTANT ENGINEER — DATE: 01/13/2023

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123076

LATITUDE: 33.28365°N LONGITUDE: 111.67754°W

UNION PACIFIC

DSN/CHK BY:	NAS/MJH
DRAWN/CHK BY:	NAS/KAS
UPRR ENGINEER:	ADS
SHT NO.:	S2 of S6

UNION PACIFIC RAILROAD
Office of Director Structures Design

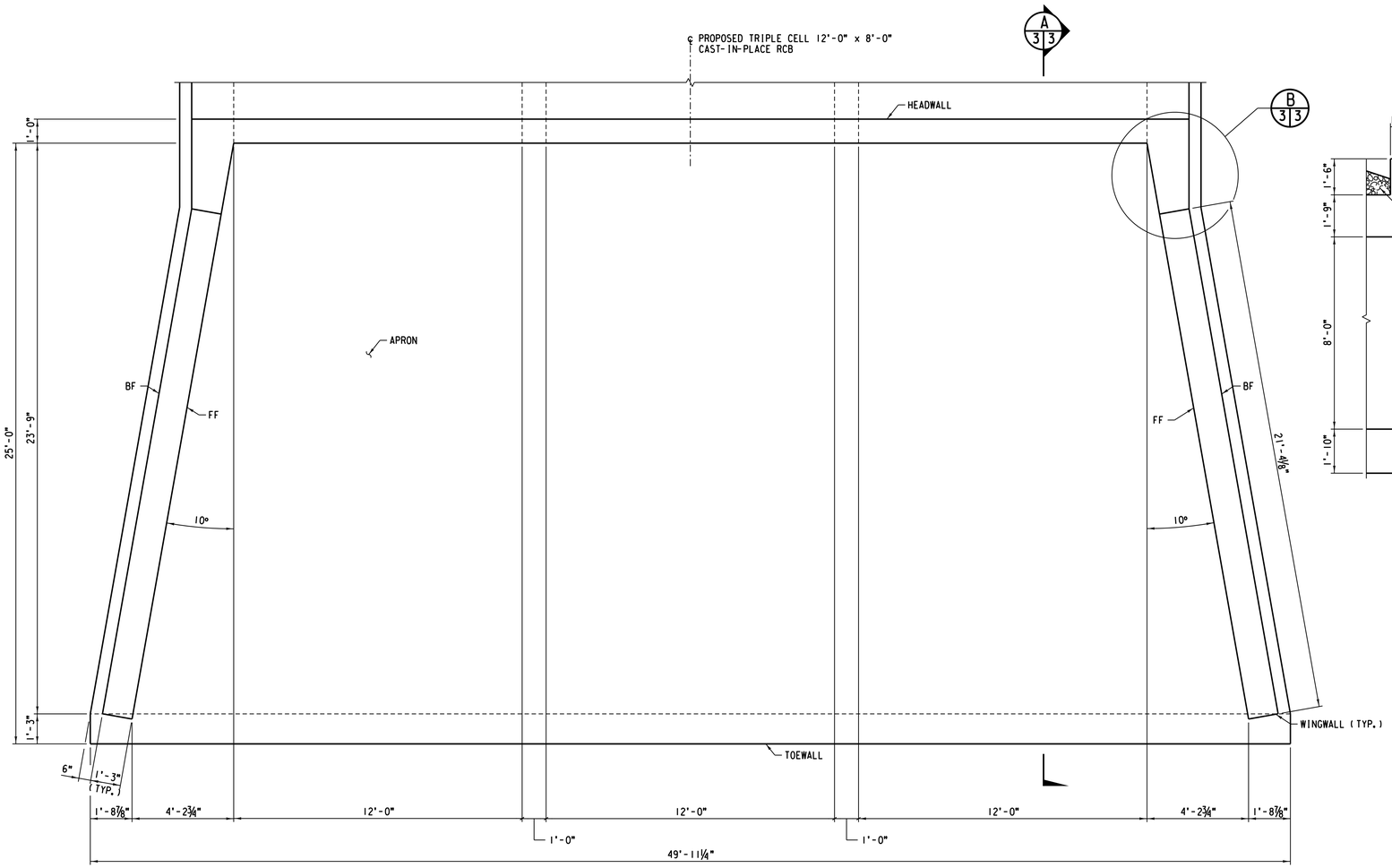
LOCATION & DESCRIPTION: CULVERT 0.23, PIRATE IND LEAD
FURNISH & INSTALL
TRIPLE CELL 12'-0" x 8'-0" RCB x 154'

SHEET TITLE: GENERAL ARRANGEMENT (SHEET 2 OF 2)

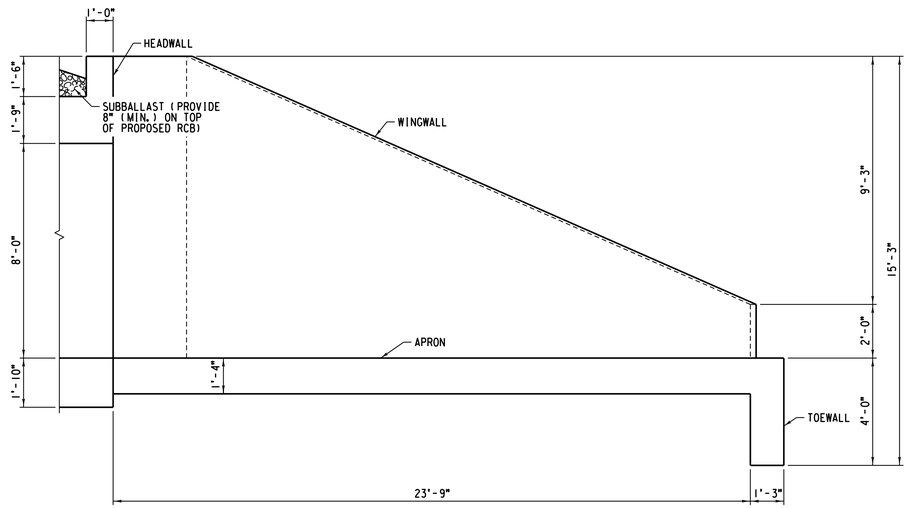
FILE NAME: \\oa.ad.oaconsulting.com\fnts-na\projects\2020\0503.1000\020-0927\40-Design\Microstation\020-0927.RJBR\July 0.23.Sta. 11-92.00-Pirate Ind Lead.0.23.cadx-dgn

PLOTTED: 7/12/2023 1:38:12 PM

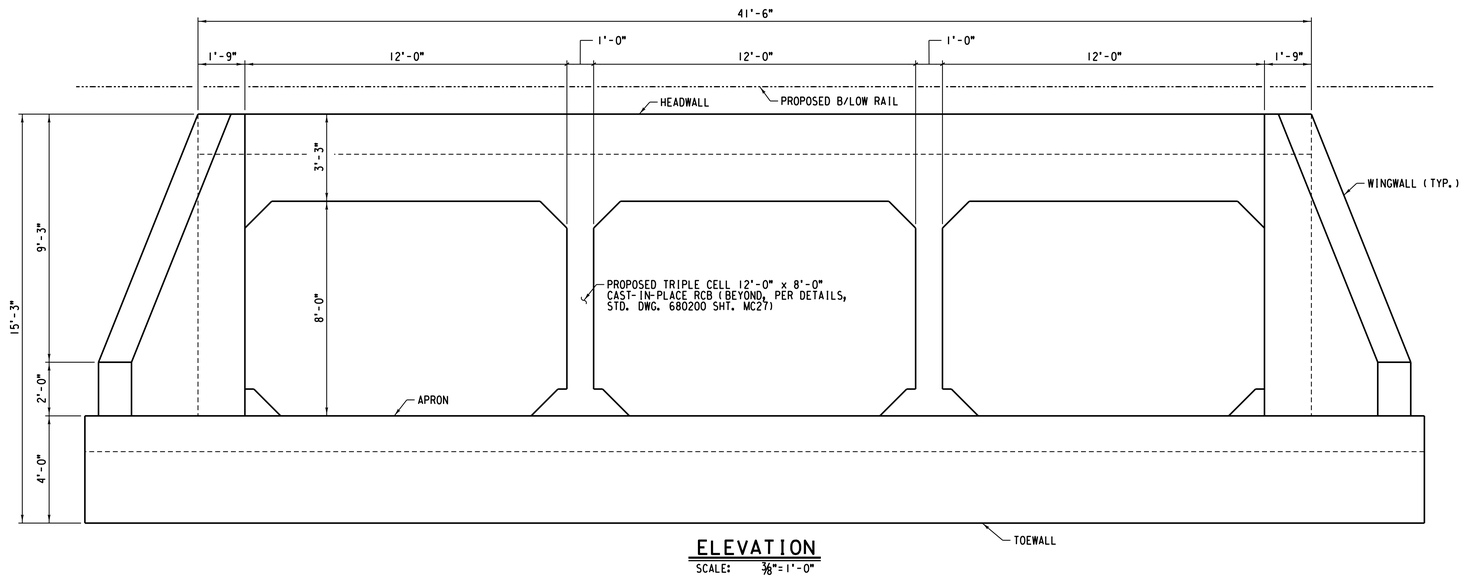
DESIGN SHEET



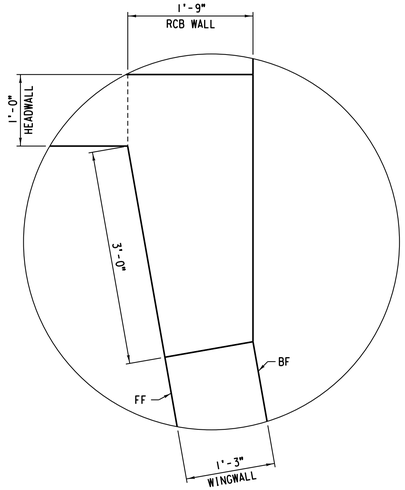
PLAN
SCALE: ⅜"=1'-0"



SECTION A 3|3
SCALE: ⅜"=1'-0"



ELEVATION
SCALE: ⅜"=1'-0"



DETAIL B 3|3
SCALE: 1"=1'-0"

NOTES:
1. FOR CAST-IN-PLACE CONCRETE NOTES, SEE STD. DWG. 680200 SHT. G1.
2. FOR REINFORCED CONCRETE BOX DETAILS, SEE STD. DWG. 680200 SHT. MC27.
3. FOR END TREATMENT REINFORCING DETAILS, SEE SHEET NO. S4.
4. BF = BACK FACE
   FF = FRONT FACE
   RCB = REINFORCED CONCRETE BOX

CONCRETE PLACEMENT QUANTITIES		
ITEM	UNIT	QTY.
RCB BARREL (BOTTOM SLAB)	CU. YD.	510
RCB BARREL (WALLS & TOP SLAB)	CU. YD.	651
APRON & TOEWALL	CU. YD.	126
WINGWALLS & HEADWALL	CU. YD.	38.0

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL — STATUS
07/05/2023 — DATE

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 03-24-2023 ARIZONA U.S.A.

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
Kylie Stubs
CONSULTANT ENGINEER
01/13/2023 — DATE

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123076

LATITUDE: 33.28365°N LONGITUDE: 111.67754°W

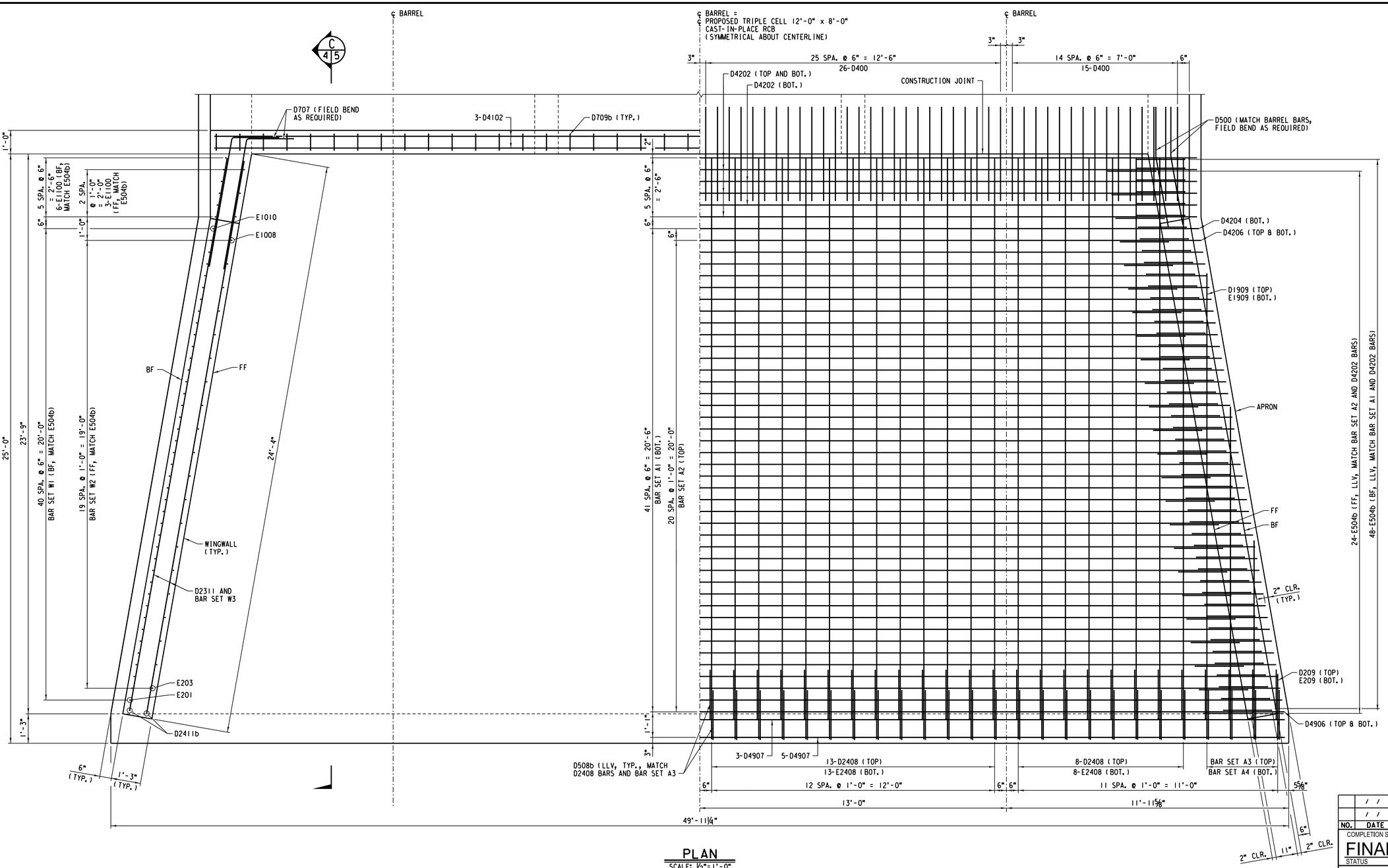
UNION PACIFIC

DSN/CHK BY: NAS/MJH	UNION PACIFIC RAILROAD
DRAWN/CHK BY: NAS/KAS	Office of Director Structures Design
UPRR ENGINEER: ADS	LOCATION & DESCRIPTION: CULVERT 0.23, PIRATE IND LEAD
SHT NO.: S3 of S6	FURNISH & INSTALL TRIPLE CELL 12'-0" x 8'-0" RCB x 154'
	SHEET TITLE: END TREATMENT FRAMING DETAILS

FILE NAME: \\oa.aol.oaconsulting.com\fnts-na1\projects\2020\050\1000\020\027\40\Design\Microstation\020-0927-RLBR-Culv 0.23.5ta. 11-92.00\Pirate Ind Lead 0.23.cad.dgn

PLOTTED: 7/12/2023 1:38:12 PM

DESIGN SHEET



PLAN

SCALE: ½"=1'-0"

NOTES:
1. CONSTRUCTOR MAY SPLICE D4907 BARS WITH A 2'-9" MINIMUM LAP SPLICE IF PREFERRED.
2. FOR REINFORCING SCHEDULE, SEE SHEET NO. S5.
3. FOR CAST-IN-PLACE CONCRETE NOTES, SEE STD. DWG. 680200 SHT. G1.
4. FOR REINFORCED CONCRETE BOX DETAILS, SEE STD. DWG. 680200 SHT. MC27.
5. BF = BACK FACE
   FF = FRONT FACE
   LLV = LONG LEG VERTICAL
   RCB = REINFORCED CONCRETE BOX

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 03-24-2023 ARIZONA U.S.A.

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS: FINAL (STATUS) 07/05/2023 (DATE)

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
CONSULTANT ENGINEER 01/13/2023 DATE

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123076

LATITUDE: 33.28365°N LONGITUDE: 111.67754°W

DSN/CHK BY:	NAS/MJH
DRAWN/CHK BY:	NAS/KAS
UPRR ENGINEER:	ADS
SHT NO.:	S4 of S6

UNION PACIFIC RAILROAD

Office of Director Structures Design

LOCATION & DESCRIPTION: CULVERT 0.23, PIRATE IND LEAD

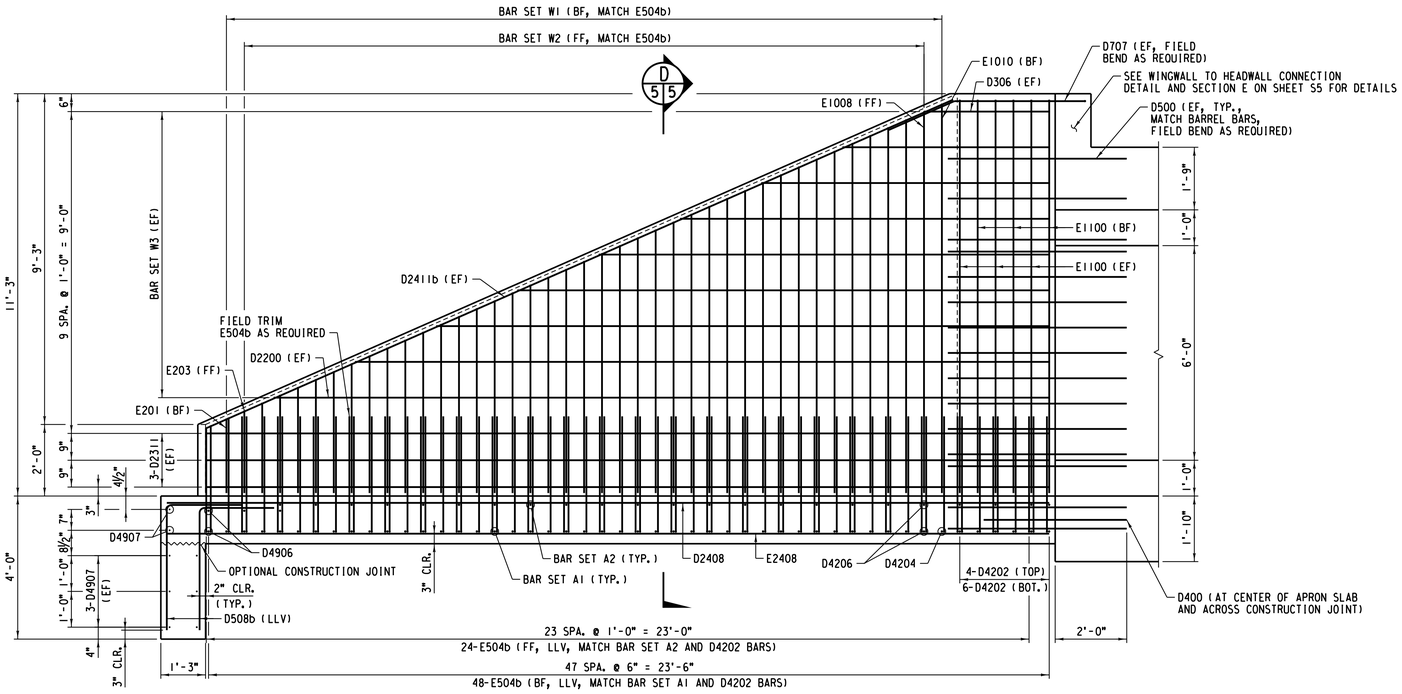
FURNISH & INSTALL
TRIPLE CELL 12'-0" x 8'-0" RCB x 154'

SHEET TITLE: END TREATMENT REINFORCING DETAILS (SHEET 1 OF 2)

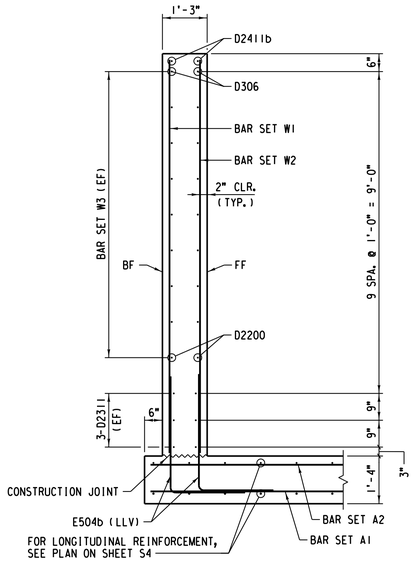
FILE NAME: \\oa.ad.oaconsulting.com\fnts-nd\projects\2020\0501-1000\020-0927-40 Design\Micrositation\020-0927_RCBCulv 0.23.Sta. 11+92.00\Pirate Ind Lead_0.23_csz.dgn

PLOTTED: 7/12/2023 1:38:13 PM

DESIGN SHEET



SECTION C
SCALE: ½"=1'-0"

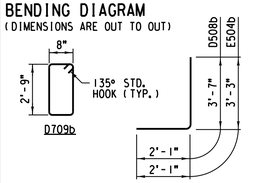


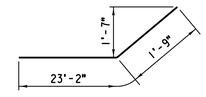
SECTION D
SCALE: ½"=1'-0"

REINFORCING SCHEDULE
(QUANTITY PER END TREATMENT)

TOTAL	MARK	SIZE	LENGTH	SHAPE
82	D400	#5	4'-0"	
60	D500	#5	5'-0"	
100	D508b	#5	5'-8"	
4	D707	#5	7'-7"	
42	D709b	#5	7'-9"	
12	D2311	#5	23'-11"	
4	D2411b	#5	24'-11"	
6	D4102	#5	41'-2"	
10	D4202	#5	42'-2"	
8	D4907	#5	49'-7"	
144	E504b	#6	5'-4"	
18	E1100	#6	11'-0"	
42	E2408	#6	24'-8"	

BENDING DIAGRAM
(DIMENSIONS ARE OUT TO OUT)



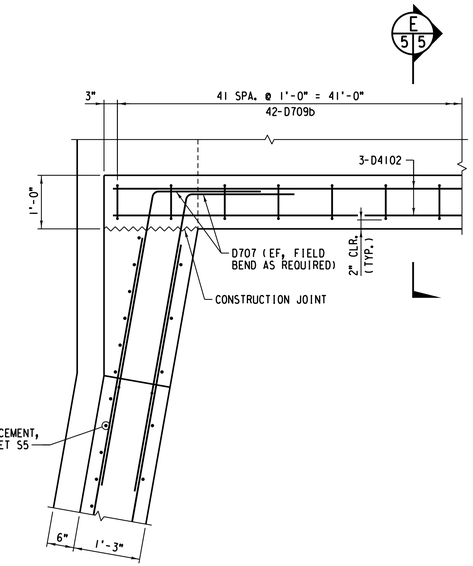


SET LIST

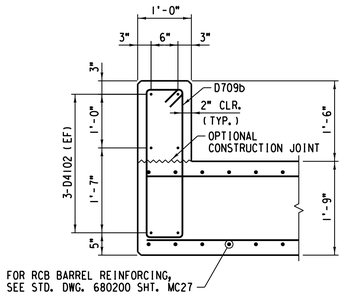
BAR SET DESIGNATION	MARK	SIZE	MIN. LENGTH	MAX. LENGTH	INCREMENT	NO. OF BARS/SET	NO. OF SETS	SHAPE	MIN. A	MAX. A
A1	D4204-D4906	#5	42'-4"	49'-6"	2⅛"(-)	42	1		-	-
A2	D4206-D4906	#5	42'-6"	49'-6"	4¼"(-)	21	1		-	-
A3	D209-D1909	#5	2'-9"	19'-9"	5'-8"	4	2		-	-
A4	E209-E1909	#6	2'-9"	19'-9"	5'-8"	4	2		-	-
W1	E201-E1010	#6	2'-1"	10'-10"	2⅝"	41	2		-	-
W2	E203-E1008	#6	2'-3"	10'-8"	5⅜" (-)	20	2		-	-
W3	D306-D2200	#5	3'-6"	22'-0"	2'-3¾"	9	4		-	-

EST. WT. OF REINFORCING STEEL = 11,050 LB.

NOTE:
BAR DESIGNATIONS CONSIST OF BAR SIZE & LENGTH FOLLOWED BY THE LETTER "b" IF BENT. BAR SIZES ARE REPRESENTED BY THE LETTERS A THROUGH L CORRESPONDING TO BAR SIZE #2 THROUGH #18. BAR LENGTHS ARE GIVEN IN FEET AND INCHES; THE LAST TWO DIGITS ARE INCHES.



WINGWALL TO HEADWALL CONNECTION DETAIL
SCALE: ¾"=1'-0"



SECTION E
SCALE: ¾"=1'-0"

NOTES:
1. FOR CAST-IN-PLACE CONCRETE NOTES, SEE STD. DWG. 680200 SHT. G1.
2. FOR REINFORCED CONCRETE BOX DETAILS, SEE STD. DWG. 680200 SHT. MC27.
3. BF = BACK FACE
   EF = EACH FACE
   FF = FRONT FACE
   LLV = LONG LEG VERTICAL
   RCB = REINFORCED CONCRETE BOX

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL — STATUS — 07/05/2023 DATE

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
CONSULTANT ENGINEER — 01/13/2023 DATE

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 01-24-2023 ARIZONA U.S.A.

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123076

LATITUDE: 33.28365°N LONGITUDE: 111.67754°W

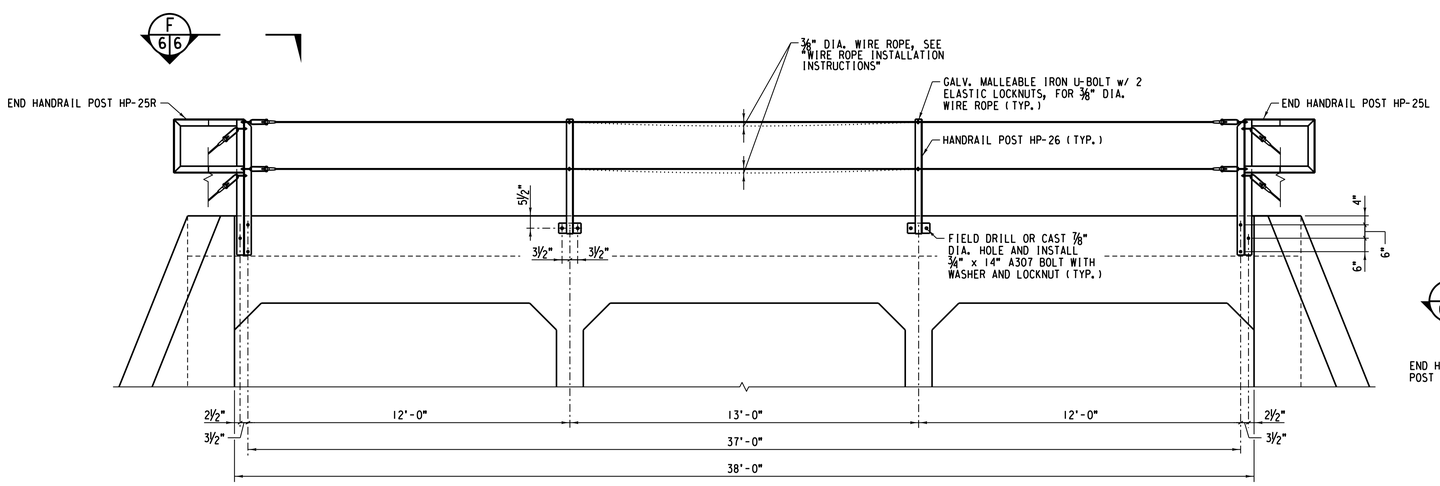
UNION PACIFIC

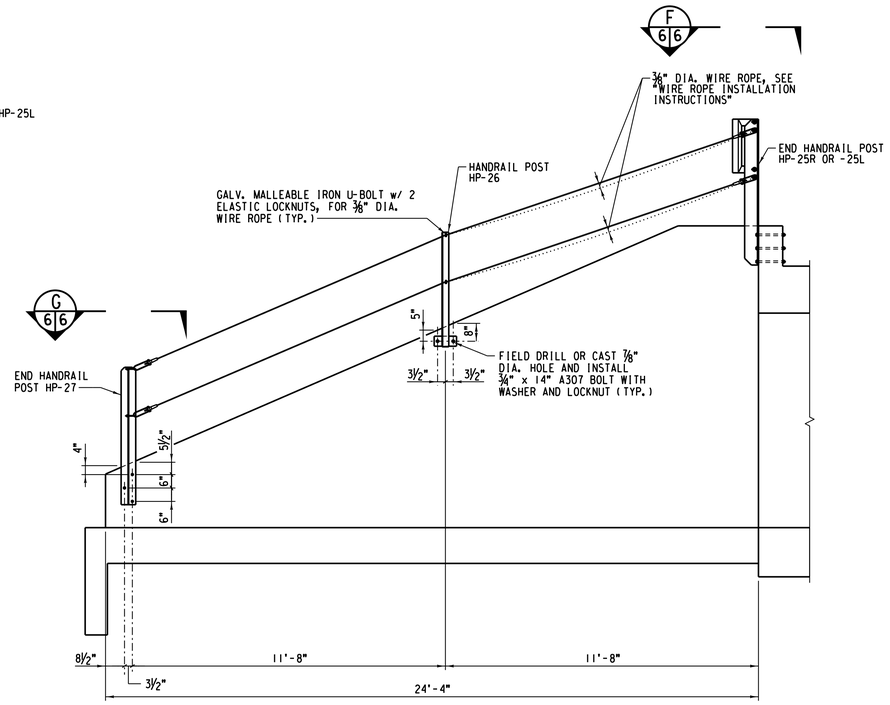
DSN/CHK BY: NAS/MJH	UNION PACIFIC RAILROAD
DRAWN/CHK BY: NAS/KAS	Office of Director Structures Design
UPRR ENGINEER: ADS	LOCATION & DESCRIPTION: CULVERT 0.23, PIRATE IND LEAD
SHT NO.: S5 of S6	FURNISH & INSTALL TRIPLE CELL 12'-0" x 8'-0" RCB x 154'
	SHEET TITLE: END TREATMENT REINFORCING DETAILS (SHEET 2 OF 2)

FILE NAME: \\oa.ad.oaconsulting.com\fnts-ndl\projects\2020\0501.1000\020-0927\40-Design\Microstation\020-0927_RLBRCulv 0.23,Sta. 11+92.00,Pirate Ind Lead,0.23,csz.dgn

PLOTTED: 7/12/2023 1:38:13 PM

DESIGN SHEET





NOTE:
WINGWALL HANDRAIL NOT SHOWN FOR CLARITY.

BOX CULVERT HANDRAIL LAYOUT

SCALE: 3/8"=1'-0"

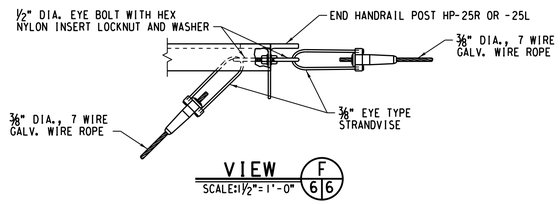
WINGWALL HANDRAIL LAYOUT

SCALE: 3/8"=1'-0"

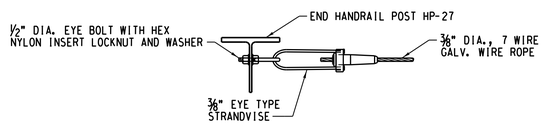
(LOOKING PERPENDICULAR TO FACE OF WINGWALL)

WIRE ROPE INSTALLATION INSTRUCTIONS:

1. THREAD WIRE ROPE THROUGH ALL CLIPS AND BARREL ANCHORS AND SEAT RETAINING WEDGES ON ONE END HANDRAIL POST.
2. STRETCH WIRE ROPE, HANG A MINIMUM OF 10 LB. ON CABLE BETWEEN TWO POSTS AND REMOVE ALL SAG TO A MAXIMUM OF 2 INCHES.
3. SEAT RETAINING WEDGES AT REMAINING END HANDRAIL POST.
4. REMOVE WEIGHTS.
5. TIGHTEN CLIPS AT INTERMEDIATE POSTS.
6. CUT & REMOVE EXCESS WIRE ROPE, COAT CUT PORTIONS OF WIRE ROPE WITH COLD GALVANIZING COMPOUND.



VIEW F 6 6
SCALE: 1½"=1'-0"



VIEW G 6 6
SCALE: 1½"=1'-0"

NOTES:
1. FOR HANDRAIL POST DETAILS, SEE STD. DWG. 680160 SHT. H1.
2. RCB = REINFORCED CONCRETE BOX

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL — STATUS — 07/05/2023 DATE

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
CONSULTANT ENGINEER — 01/13/2023 DATE

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 03-24-2023 ARIZONA, U.S.A.

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123076

LATITUDE: 33.28365°N LONGITUDE: 111.67754°W

UNION PACIFIC

DSN/CHK BY: NAS/MJH
DRAWN/CHK BY: NAS/KAS
UPRR ENGINEER: ADS
SHT NO.: S6 of S6

UNION PACIFIC RAILROAD
Office of Director Structures Design

LOCATION & DESCRIPTION:
CULVERT 0.23, PIRATE IND LEAD
FURNISH & INSTALL
TRIPLE CELL 12'-0" x 8'-0" RCB x 154'

SHEET TITLE:
HANDRAIL DETAILS

FILE NAME: \\oa.ad.oaconsulting.com\fnts-na1\projects\2020\0501-1000\020-0927-40 Design\Microstation\020-0927_RLBRO.dlv 0.23.5ta. 11-92.00\Pirate Ind Lead\0.23.cax.dgn

PLOTTED: 7/12/2023 1:38:13 PM

GENERAL NOTES

GENERAL

1. All work requirements shown on the design and not otherwise detailed shall be accomplished as specified in Union Pacific Railroad (UPRR) Specifications and the American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual for Railway Engineering. In the event of conflicts between specifications, the more restrictive shall apply.

2. All structures were designed in accordance with the AREMA Manual, Chapter 8 - Concrete Structures and Foundations.

3. Box culverts designed for a min. 1'-6" cover and a max. 18'-0" cover. Cover is measured from base of rail to top of the concrete box.

4. Construction means and methods shall comply with the All Permits Issued (API) package.

5. Field verify all dimensions, stations and elevations prior to start of construction.

6. Contact the Union Pacific "Call Before You Dig" number 90 days (not less than 60 days) prior to proposed construction start date. Prior to construction, confirm that all necessary relocations have been completed. The CBYD number is: 1-800-336-9193.

7. Location of known utilities is approximate. Location shall be verified prior to construction. Notify Call 811 "Call Before you Dig" number at least 48 hours prior to construction.

PRECAST CONCRETE:

1. All concrete materials, placement and workmanship shall be in accordance with Part 1, Chapter 8 of the current AREMA Manual for Railway Engineering.

2. Minimum compressive strength - 4000 psi at 28 days.

3. Exposed surfaces shall be formed in a manner which will produce a smooth and uniform appearance without rubbing or plastering. Exposed edges of 90 degrees or less are to be chamfered ¾" x ¾". Top surface to have a smooth finish, free of all float or trowel marks.

4. Concrete shall be proportioned such that the water - cement ratio (by weight) does not exceed 0.45. Concrete must contain a minimum of 6½ sacks of cement per cubic yard of concrete. Flyash replacement may account for up to 25% of the cement.

5. Cement shall be Type I, Type II or Type III Portland Cement in accordance with ASTM C150 specifications.

6. Aggregates shall be graded in accordance with ASTM C33 specifications. Coarse aggregate shall be no. 67. Fine aggregate shall be natural sand.

7. Air content shall be between 5% and 7% (by volume).

8. Admixtures shall not be used without approval by Engineer.

9. Curing shall be accomplished by wet curing or the application of a Type 2 membrane.

10. The fabricator shall stencil the item name, date manufactured, name of manufacturer and actual lifting weight at location shown.

11. Production procedures for the manufacture of precast members shall be in accordance with the AREMA Manual for Railway Engineering and the Precast/Prestressed Concrete Institute's Manual MNL 116 for Quality Control.

12. Dimensional tolerances governing the manufacture of precast members shall conform to Division VI, Section 6.4 of the Precast/Prestressed Concrete Institute's Manual MNL 116 for Quality Control. Tolerance for location of lifting devices shall be ½".

13. The fabricator will be responsible for loading and properly securing all precast concrete members for shipment. All concrete components shall be made available for inspection by the Railroad at the fabricator's plant prior to shipment, at the Railroad's discretion.

CAST-IN-PLACE CONCRETE:

1. All concrete materials, placement and workmanship shall be in accordance with Part 1, Chapter 8 of the current AREMA Manual for Railway Engineering.

2. Formwork tolerances shall be in accordance with ACI 347 specifications.

3. Minimum compressive strength - 4000 psi at 28 days.

4. Exposed surfaces shall be formed in a manner which will produce a smooth and uniform appearance without rubbing or plastering. Exposed edges of 90 degrees or less are to be chamfered ¾" x ¾". Top surface to have a smooth finish, free of all float or trowel marks.

5. Concrete shall be proportioned such that the water - cement ratio (by weight) does not exceed 0.45. Concrete must contain a minimum of 6½ sacks of cement per cubic yard of concrete. Flyash replacement may account for up to 25% of the cement.

6. Cement shall be Type I, Type II or Type III Portland Cement in accordance with ASTM C150 specifications.

7. Aggregates shall be graded in accordance with ASTM C33 specifications. Coarse aggregate shall be no. 67. Fine aggregate shall be natural sand.

8. Air content shall be between 5% and 7% (by volume).

9. Admixtures shall not be used without approval by Engineer.

10. Curing shall be accomplished by wet curing or the application of a Type 2 membrane.

REINFORCING STEEL:

1. Reinforcing steel shall be deformed, new billet bars per current ASTM A615 Specifications and to meet grade 60 requirements.

2. Fabrication of reinforcing steel shall be per Chapter 7 of the CRSI Manual of standard practice. Dimensions of bending details are out to out of bar.

3. Reinforcing steel is to be blocked to proper location and securely wired against displacement. Tie wires shall be installed at every other bar intersection so that at least 50% of the intersections are tied. Tack welding of reinforcing is prohibited. Minimum concrete cover on reinforcement not otherwise noted shall meet current AREMA Manual for Railway Engineering requirements.

LIFTING ANCHORS:

1. Swift lift anchors shall be Dayton Superior P-52 anchors or approved alternate with a minimum safe working load sufficient for the weight of the precast element including form removal. The safe working load shall provide a minimum safety factor of 4.

CONSTRUCTOR NOTES (WHEN APPLICABLE)

CONSTRUCTOR DEFINITION

CONSTRUCTOR DESIGNATES MANAGER BRIDGE CONSTRUCTION IF CONSTRUCTION BY UPRR AND CONTRACTOR IF CONSTRUCTION BY CONTRACTOR.

DIVISION OF RESPONSIBILITY

A. RAILROAD

1. Remove ties, rail and OTM from project area as required.

2. Provide and install ballast, ties, rail and OTM at proposed culvert.

3. Provide material as shown in the Bill of Material.

4. Provide and install Private Property/No Trespassing sign and culvert marker signs on right side at each end of culvert.

B. CONSTRUCTOR

1. Coordinate all construction activities with the Railroad.

2. Before ordering any material, Constructor shall make a detailed field inspection of the site verifying all pertinent dimensions and elevations. Any variations in dimensions or elevations from those shown on the drawings shall be reported immediately to the UPRR Project Manager.

3. Any modifications to this design shall be approved by the UPRR Office of Structures Design prior to construction.

4. Verify the location, relocation, abandonment, and/or temporary support of all utilities affected by the construction of the structure and embankment and coordinate these activities with the appropriate utility companies, agencies and/or authorities.

5. Apply for and obtain all construction permits necessary to perform the work.

6. Bill of Material and Schedules are provided for information only. Constructor shall be responsible for providing all material, not provided by the Railroad, required to complete the work.

7. Perform all work not performed by the Railroad.

8. Provide the Railroad with a detailed construction plan defining the activity, schedule and procedure for each aspect of the work. Construction shall not begin until the construction plan has been approved by the Railroad.

9. Provide all temporary structures (shoring, bracing and/or falsework) required to support and protect the existing embankments and structures affected by the work. Provide the Railroad with details, design and procedure for all temporary structures. All temporary structures shall be designed, signed and sealed by a professional engineer registered in the State that the structure is to be constructed. All temporary structures shall be approved by the UPRR Office of Structures Design prior to beginning construction.

10. Provide well-compacted bedding as required to establish grade of the culvert. Bedding for the box culvert shall consist of a minimum of 1'-6" of culvert bedding material. Over excavate 1'-6" each side of box. If loose, soft, or excessively wet soils are encountered at this depth, a 6" lift of granular bedding shall be placed on these soils and compressed into the subgrade. This procedure shall continue until a stable subgrade is produced. If a stable subgrade can not be achieved, the UPRR Office of Structures Design shall be notified.

11. Provide temporary guardrail system as directed by UPRR Project Manager. Guardrails on shoring shall include but not be limited to the following:

    The top edge height of the top rail shall be 42" +/- 3" above the walking/working surface.

    At least one midrail shall be provided, evenly spaced between walking/working surface and top rail.

    Metal or timber posts or uprights shall be spaced at maximum intervals of 10'-0".

    Entire guardrail system, including anchorages, shall be capable of withstanding without failure, a force of 200 lbs. applied in any outward or downward direction at any point.

    Guardrail system shall be surfaced to prevent injuries from punctures and lacerations and prevent snagging of clothing. The ends of top rails and midrails shall not extend past the posts or uprights.

    If conditions warrant, i.e. pedestrian traffic/weather, additional protection shall be provided such as screens or mesh to prevent slipping between the midrail and walking/working surface.

DIVISION OF RESPONSIBILITY

12. Direct channel flow as required to perform work.

13. Remove debris and ballst from channel as directed by the Railroad.

14. Accomplish activities within the schedule specified in the approved construction plan.

CULVERT BEDDING

Culvert bedding shall be granular material such as aggregates ordinarily specified and used in the construction of highway base and subbase. These aggregates include crushed stone, natural or crushed gravel, natural or manufactured sands, crushed slag or a homogeneous mixture of these materials. Culvert bedding shall be compacted to 95% of maximum dry density as defined in ASTM International D1557 (Modified Proctor). Recommended gradation is as follows:

SCREEN SIZE	% PASSING (BY WEIGHT)
1 inch	100
½ inch	60-90
⅜ inch	20-40
No. 4	10-20
No. 200	less than 5%

Union Pacific Sealant Ballast SB-2, item no. 562-5428, may be used.

BOX CULVERT OPENING AREA

CELL WIDTH (FT)	CELL HEIGHT (FT)	SINGLE CELL OPENING (FT^2)	DOUBLE CELL OPENING (FT^2)
6	4	23.1	46.2
6	6	35.1	70.2
8	4	30.6	61.2
8	6	46.6	93.2
8	8	62.6	125.2
10	4	38.0	76.0
10	6	58.0	116.0
10	8	78.0	156.0
10	10	98.0	196.0
10	12	118.0	236.0
12	8	93.3	186.6
12	10	117.3	234.6
12	12	141.3	282.6

REVISIONS		
DATE	LTR.	DESCRIPTION
/		
/		
/		
/		
/		
/		

DESIGN BY: HDR | DRAWN BY: HDR | CHECKED BY: UPRR

APPROVED:

01-03-2020

UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

CONCRETE BOX CULVERTS

GENERAL NOTES

FILE OWNER: UPRR | DATE: JANUARY, 2020

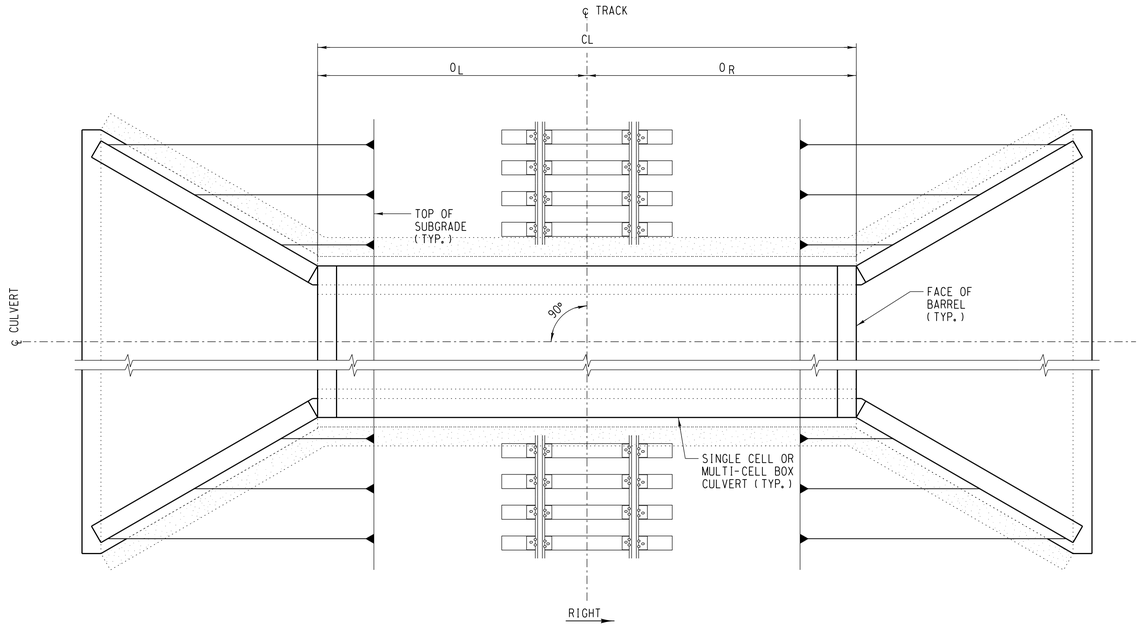
PLAN NO.: 680200 | SHEET: G1

Copyright © 2020 by Union Pacific Railroad

PLOTTED: 1/3/2020 3:30:45 PM

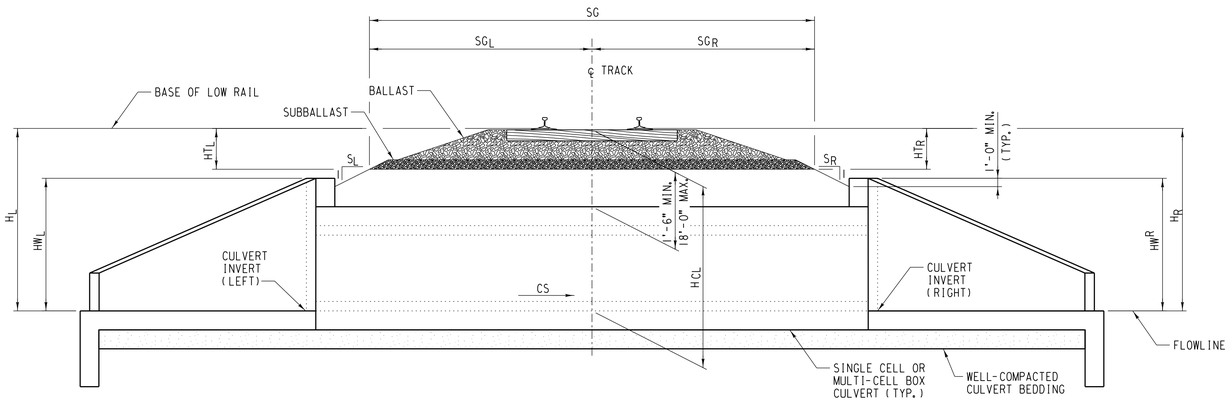
FILE NAME: pw://HDR.US.National.01/4195/10196897/680200_Concrete Box Culverts.dgn

INCHES 1 2 3 4 5 6 7 8 9 10 11 12



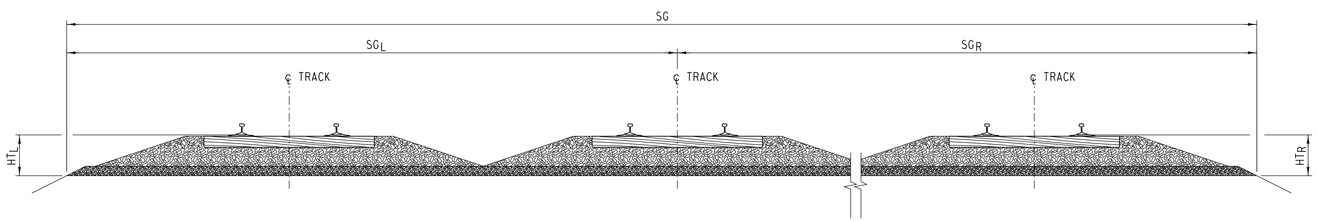
PLAN - SINGLE TRACK

SCALE: NONE



ELEVATION - SINGLE TRACK

SCALE: NONE



MULTIPLE TRACK DIAGRAM

SCALE: NONE

CULVERT LENGTH EQUATION:

$CL = O_L + O_R \geq SG + 2'$

$O_L = SG_L + S_L(H_L - HT_L + 1' - HW_L) + 1'$

$O_R = SG_R + S_R(H_R - HT_R + 1' - HW_R) + 1'$

$$H_L = \frac{H_{CL} + CS\,[SG_L - S_L(HT_L + HW_L - 1') + 1']}{[1 - CS(S_L)]}$$

$$H_R = \frac{H_{CL} - CS\,[SG_R - S_R(HT_R + HW_R - 1') + 1']}{[1 + CS(S_R)]}$$

$SG = SG_L + SG_R$

$H_{AVG} = (H_L + H_R) / 2$

KEY:

CL = CULVERT LENGTH
O_L = OFFSET LEFT
O_R = OFFSET RIGHT
H_{CL} = HEIGHT - BASE OF LOW RAIL TO FLOWLINE AT CENTERLINE OF TRACK
CS = CULVERT SLOPE (RISE/RUN) LEFT TO RIGHT (+ UP, - DOWN)
HT_L = BASE OF LOW RAIL TO TOP OF SUBGRADE LEFT EDGE
HT_R = BASE OF LOW RAIL TO TOP OF SUBGRADE RIGHT EDGE
H_L = HEIGHT - BASE OF LOW RAIL TO INVERT LEFT OF TRACK
H_R = HEIGHT - BASE OF LOW RAIL TO INVERT RIGHT OF TRACK
HW_L = HEIGHT OF WINGWALL LEFT OF TRACK
HW_R = HEIGHT OF WINGWALL RIGHT OF TRACK
SG = WIDTH OF SUBGRADE (24'-0" MINIMUM)
SG_R = WIDTH OF SUBGRADE RIGHT OF ℄ TRACK (12'-0" MINIMUM)
SG_L = WIDTH OF SUBGRADE LEFT OF ℄ TRACK (12'-0" MINIMUM)
S_L = SIDE SLOPE LEFT OF TRACK (RUN PER FOOT OF RISE)
S_R = SIDE SLOPE RIGHT OF TRACK (RUN PER FOOT OF RISE)

NOTE:
ALL DIMENSIONS ARE IN FEET.

REVISIONS		
DATE	LTR.	DESCRIPTION
/		
/		
/		
/		
/		
/		

DESIGN BY: HDR | DRAWN BY: HDR | CHECKED BY: UPRR

APPROVED:

01-03-2020

UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

CONCRETE BOX CULVERTS

GENERAL ARRANGEMENT FOR SINGLE CELL AND MULTI-CELL BOX CULVERTS

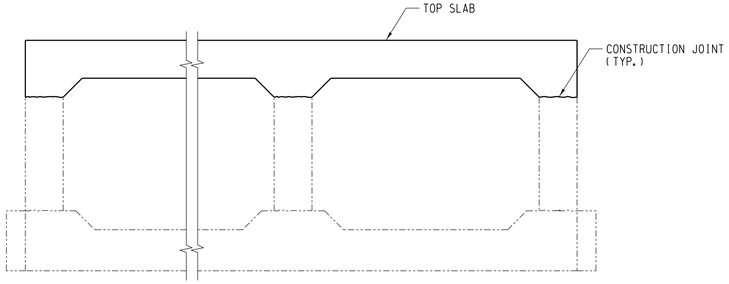
FILE OWNER: UPRR | DATE: JANUARY, 2020

PLAN NO.: 680200 | SHEET: G2

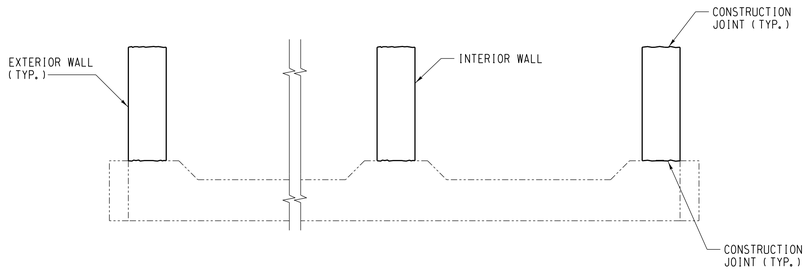
Copyright © 2020 by Union Pacific Railroad PLOTTED: 1/3/2020 3:30:46 PM

FILE NAME: pw://HDR_US_National.01/4195/10196897/680200_Concrete Box Culverts.dgn

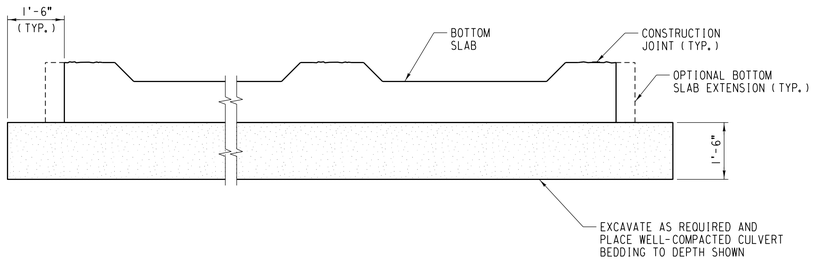
INCHES 1 2 3 4 5 6 7 8 9 10 11 12



PHASE THREE



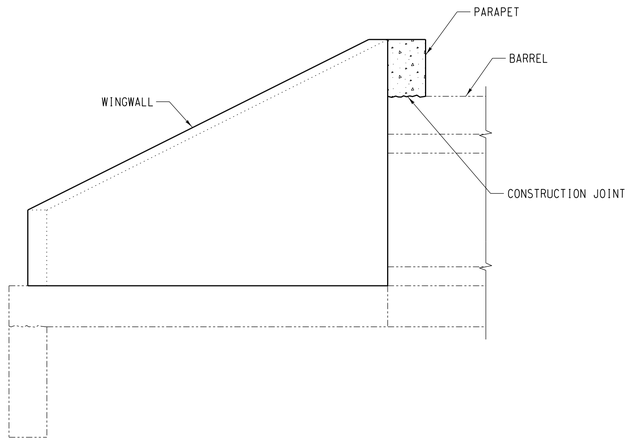
PHASE TWO



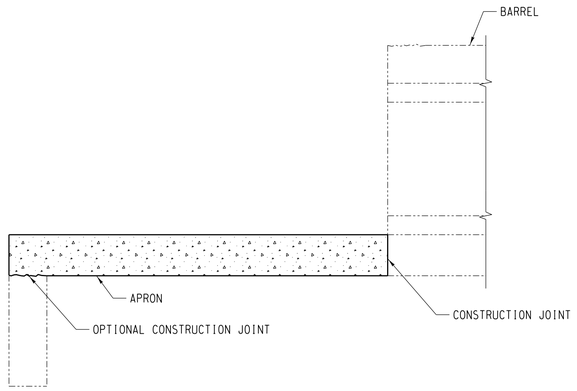
PHASE ONE

CONSTRUCTION SEQUENCE - BARREL

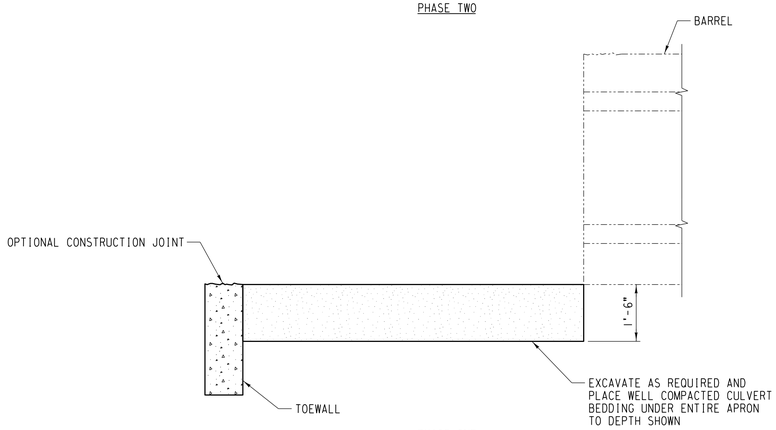
SCALE: ½"=1'-0"



PHASE THREE



PHASE TWO



PHASE ONE

CONSTRUCTION SEQUENCE - PARAPET, APRON, TOEWALL AND WINGWALLS

SCALE: ½"=1'-0"

(LOOKING PERPENDICULAR TO ℄ CULVERT)

REVISIONS		
DATE	LTR.	DESCRIPTION
/		
/		
/		
/		
/		
/		

DESIGN BY: HDR | DRAWN BY: HDR | CHECKED BY: UPRR

APPROVED:

01-03-2020

UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

CONCRETE BOX CULVERTS

CONSTRUCTION SEQUENCE

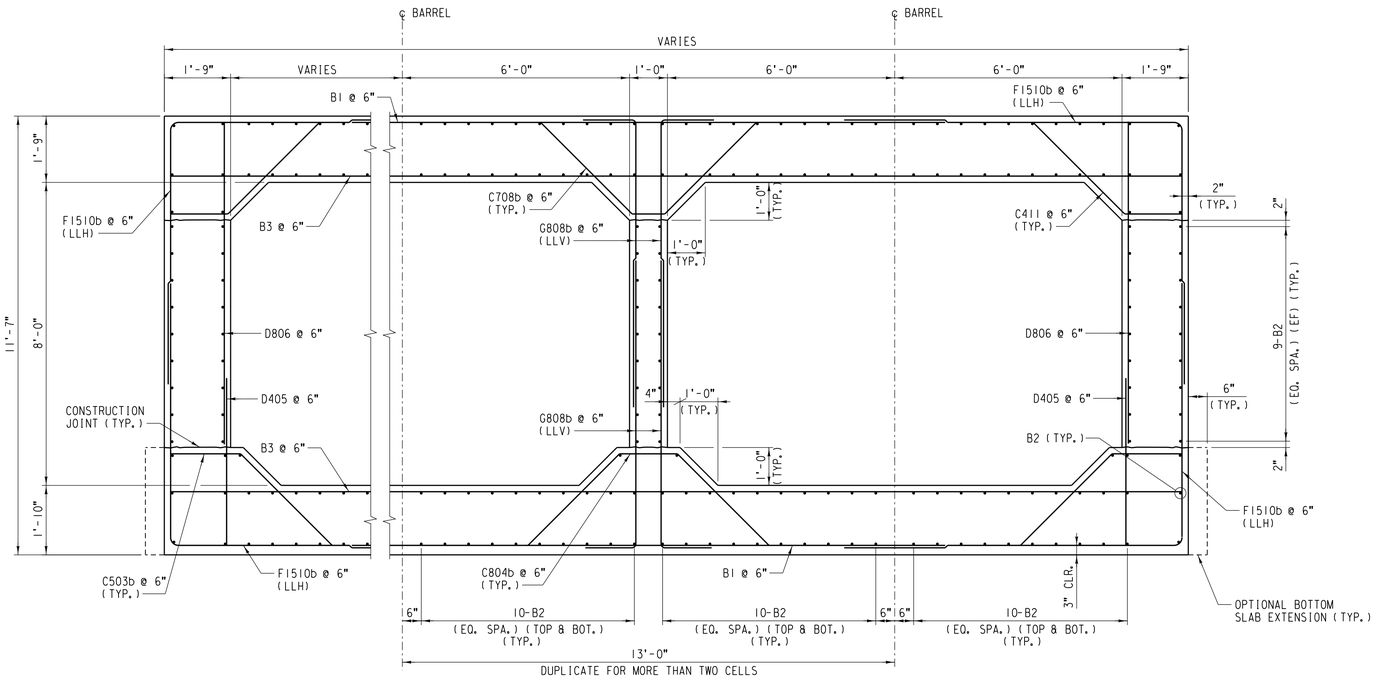
FILE OWNER: UPRR	DATE: JANUARY, 2020
PLAN NO.: 680200	SHEET: G5

Copyright © 2020 by Union Pacific Railroad

PLOTTED: 1/3/2020 3:30:48 PM

FILE NAME: pw://HDR_US_National.01/41951019698897/680200_Concrete Box Culverts.dgn

INCHES 1 2 3 4 5 6 7 8 9 10 11 12

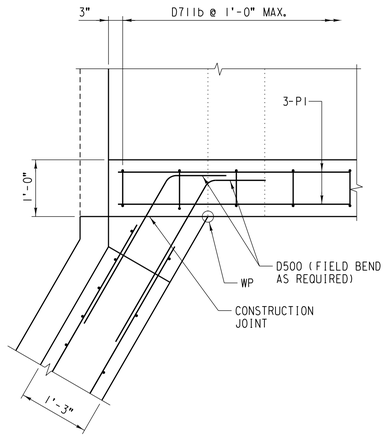


TYPICAL BARREL SECTION

SCALE: ½"=1'-0"

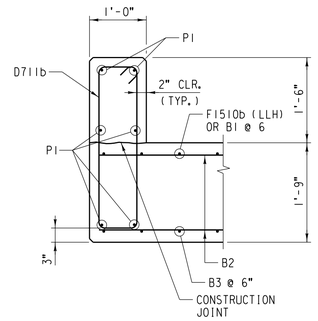
BAR SPLICE NOTE:

FOR B1 BAR USE 3'-5" MIN. LAP SPLICE WHEN NEEDED AND CENTER SPLICE AT MIDSPAN OF CULVERT OPENING, FOR B3 BAR USE 2'-7" MIN. LAP SPLICE WHEN NEEDED AND CENTER SPLICE OVER INTERIOR WALL, FOR B2 BAR USE 2'-1" MIN. LAP SPLICE WHEN NEEDED AND STAGGER SPLICE, FOR P1 BAR USE 1'-9" MIN. LAP SPLICE WHEN NEEDED AND STAGGER SPLICE.



WINGWALL TO PARAPET CONNECTION DETAIL

SCALE: ¾"=1'-0"



PARAPET DETAIL

SCALE: ¾"=1'-0"

NOTES:

1. FOR CAST-IN-PLACE CONCRETE NOTES AND REINFORCING STEEL NOTES, SEE SHEET NO. G1.
2. EF = EACH FACE
   FF = FAR FACE
   LLH = LONG LEG HORIZONTAL
   LLV = LONG LEG VERTICAL
   NF = NEAR FACE
   WP = WORKING POINT

CONCRETE QUANTITIES

	TOTAL	UNIT	DESCRIPTION
ONE END	AA	CU. YD./FT.	BARREL
	BB	CU. YD.	PARAPET
	CC	CU. YD.	TOEWALL
	DD	CU. YD.	APRON
	14.2	CU. YD.	TWO WINGWALLS

REINFORCING SCHEDULE

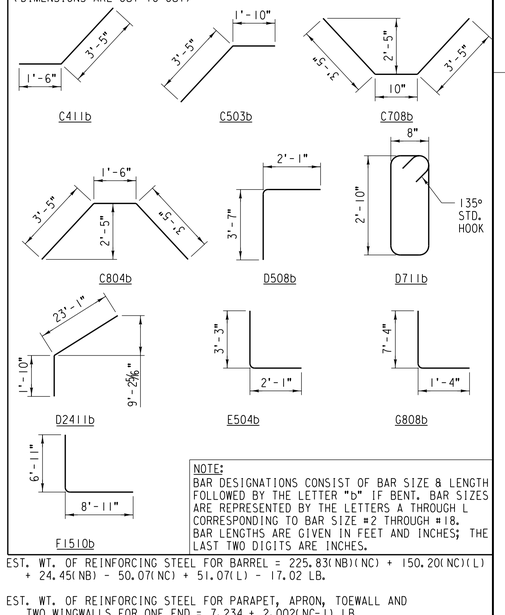
	TOTAL	MARK	SIZE	LENGTH	SHAPE
BARREL	A	C411b	#4	4'-11"	
	A	C503b	#4	5'-3"	
	B	C708b	#4	7'-8"	
	B	C804b	#4	8'-4"	
	A	D405	#5	4'-5"	
	A	D806	#5	8'-6"	
	C	B2	#6	P	
	D	F1510b	#7	15'-10"	
	A	B3	#7	Q	
	E	G808b	#8	8'-8"	
	A	B1	#8	R	
PARAPET, APRON, TOEWALL AND TWO WINGWALLS FOR ONE END	F	D400	#5	4'-0"	
	64	D500	#5	5'-0"	
	G	D508b	#5	5'-8"	
	H	D711b	#5	7'-11"	
	J	D1910	#5	19'-10"	
	12	D2109	#5	21'-9"	
	4	D2411b	#5	24'-11"	
	6	P1	#5	Q	
	2	A3	#5	S	
	8	T1	#5	T	
	114	E504b	#6	5'-4"	
	4	E1100	#6	11'-0"	
	J	E1910	#6	19'-10"	

SET LIST

MARK	SIZE	MIN. LENGTH	MAX. LENGTH	INCREMENT	NO. OF BARS/SET	NO. OF SETS	SHAPE
D103-D1909	#5	1'-3"	19'-9"	2'-3¾"	9	4	
D303-D1810	#5	3'-3"	18'-10"	1'-8¾"(+)	10	2	
A1	#5	U	V	6⅝"(-)	37	1	
A2	#5	U	V	1'-1⅞"(-)	19	1	
E203-E1009	#6	2'-3"	10'-9"	6"	18	2	
E203-E1100	#6	2'-3"	11'-0"	3"	36	2	
E303-E1810	#6	3'-3"	18'-10"	1'-8¾"(+)	10	2	

BENDING DIAGRAM

(DIMENSIONS ARE OUT TO OUT)



NOTE:

BAR DESIGNATIONS CONSIST OF BAR SIZE & LENGTH FOLLOWED BY THE LETTER "b" IF BENT. BAR SIZES ARE REPRESENTED BY THE LETTERS A THROUGH L CORRESPONDING TO BAR SIZE #2 THROUGH #18. BAR LENGTHS ARE GIVEN IN FEET AND INCHES; THE LAST TWO DIGITS ARE INCHES.

EQUATIONS FOR VARIABLES:

L = LENGTH OF BARREL (FT)
NC = NUMBER OF BOX CULVERT CELLS
NB = 2.0(L-0.33) + 1 (ROUND UP TO THE NEAREST INTEGER)

TOTAL NUMBER OF BARS

A = 2(NB)
B = NB(NC-1)
C = 134 + 100(NC-1)
D = 4(NB)
E = 4(NB)(NC-1)
F = 30 + 26(NC-1)
G = 76 + 26(NC-1)
H = 16 + 13(NC-1) (ROUND UP TO THE NEAREST INTEGER)
J = 16 + 13(NC-1)

LENGTH OF BARS

P = L - 0.33
Q = 15.17 + 13(NC-1)
R = 3.42 + 13(NC-1)
S = 15.83 + 13(NC-1)
T = 37.50 + 13(NC-1)
U = 16.42 + 13(NC-1)
V = 37.17 + 13(NC-1)

LENGTH OF BARS ARE CALCULATED IN FEET AND ROUNDED DOWN TO THE NEAREST WHOLE INCH.

CALCULATED BAR LENGTHS DO NOT INCLUDE LAP SPLICES, SEE BAR SPLICE NOTE FOR LAP SPLICE REQUIREMENTS.

CONCRETE QUANTITIES

AA = 3.19 + 2.12(NC-1)
BB = 0.86 + 0.72(NC-1)
CC = 4.68 + 1.6(NC-1)
DD = 27.53 + 12.95(NC-1)

ROUND CONCRETE QUANTITIES TO ONE DECIMAL PLACE.

EST. WT. OF REINFORCING STEEL FOR BARREL = 225.83(NB)(NC) + 150.20(NC)(L) + 24.45(NB) - 50.07(NC) + 51.07(L) - 17.02 LB.

EST. WT. OF REINFORCING STEEL FOR PARAPET, APRON, TOEWALL AND TWO WINGWALLS FOR ONE END = 7,234 + 2,002(NC-1) LB.

REVISIONS		
DATE	LTR.	DESCRIPTION
/		
/		
/		
/		
/		
/		

DESIGN BY: HDR | DRAWN BY: HDR | CHECKED BY: UPRR

APPROVED:

01-03-2020

UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

CONCRETE BOX CULVERTS

12'-0" x 8'-0" MULTI-CELL BOX CULVERT DETAILS (SHEET 1 OF 3)

FILE OWNER: UPRR	DATE: JANUARY, 2020
PLAN NO.: 680200	SHEET: MC27

Copyright © 2020 by Union Pacific Railroad PLOTTED: 1/3/2020 3:31:30 PM

FILE NAME: pw://HDR_US_National.Oil/41190/10196897/680200_Concrete Box Culverts.dgn

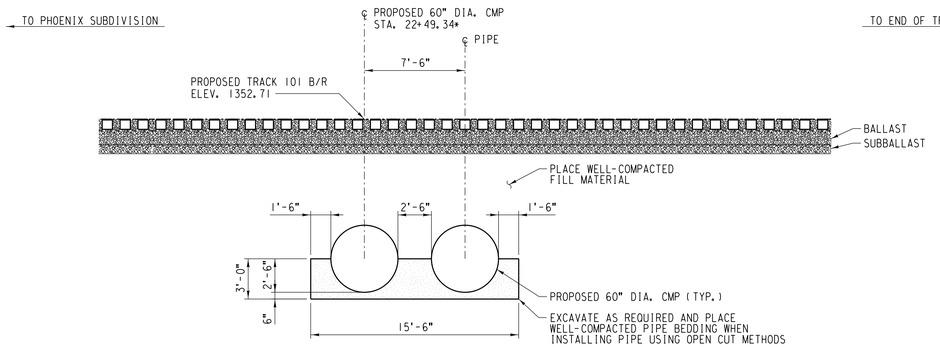
INCHES 1 2 3 4 5 6 7 8 9 10 11 12

DESIGN SHEET

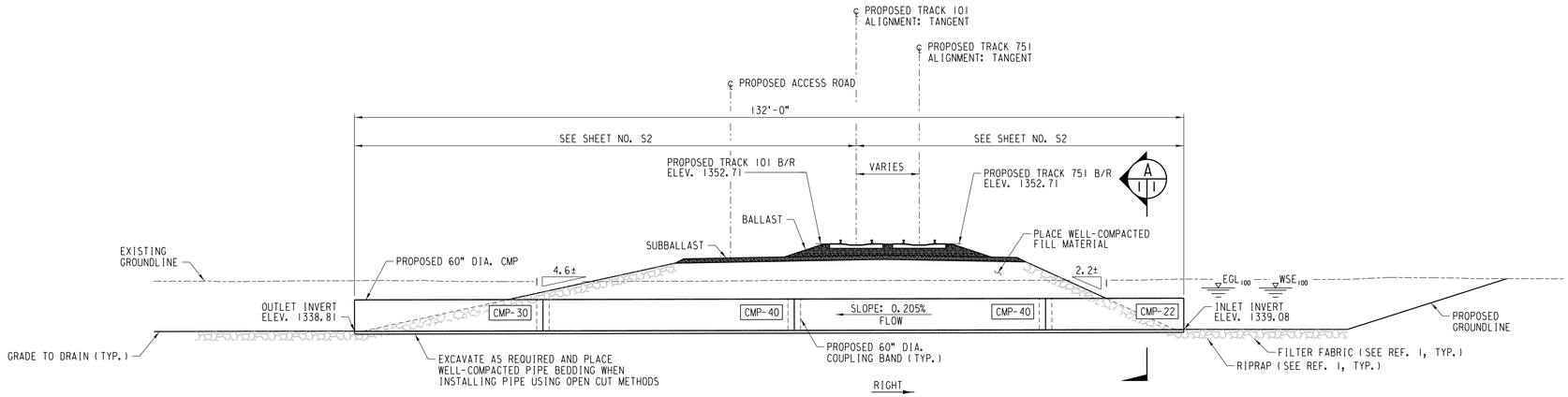
DRAWING SCHEDULE

	SHEET NO.	PLAN NO.	DESCRIPTION	TYPE
THIS SET	S1	123077	GENERAL ARRANGEMENT (SHEET 1 OF 2)	DESIGN
	S2	123077	GENERAL ARRANGEMENT (SHEET 2 OF 2)	DESIGN
	2	680000	DETAILS FOR ROUND STEEL PIPE CULVERTS	STANDARD
	3	680000	GENERAL NOTES FOR ROUND STEEL PIPE CULVERTS	STANDARD
	1	680021	CONSTRUCTION NOTES FOR CORRUGATED METAL PIPE CULVERTS	STANDARD
	2	680021	TABLES FOR CORRUGATED METAL PIPE CULVERTS	STANDARD

REF. NO.	DWG. NO.	SHEET NO.	REV. NO.	DESCRIPTION	TYPE
1	-	P017 OF 037 T008 OF 011 X041 OF 159 EC009 OF 036	-	MESA, ARIZONA, PHOENIX SUBDIVISION, MP 934.78 TO MP 937.83, CONSTRUCT INDUSTRIAL LEAD TRACK, 100% PLANS, ISSUED FOR BID	DESIGN



SECTION A
SCALE: 3/16"=1'-0"



NOTE:
SLOPES SHOWN ACCOUNT FOR CULVERT SKEW/ORIENTATION.

⚠ CROSS SECTION
SCALE: 1/2"=1'-0"

WSE_{100} = 1345.65
EGL_{100} = 1345.66
VEL_{100} = 7.66 fps

NOTE:
* = STATIONING IS TAKEN AT CENTERLINE OF PROPOSED TRACK 101.



SECTION DESIGNATION

BILL OF MATERIAL

REQ'D.	UNIT	DESCRIPTION	STORE ITEM NO.	ORDERED BY
⚠ 4	EA.	60" DIA. X 40'-0" LONG CORRUGATED STEEL PIPE, 12 GAGE (0.109"), 3" X 1" ANNULAR CORRUGATIONS, GALVANIZED AND POLYMERIC COATED (PER AASHTO M246 OR ASTM A742) (PER STD. PLAN NO. 680021, SHT. 1-2)	510-0215	CONSTRUCTOR
⚠ 2	EA.	60" DIA. X 30'-0" LONG CORRUGATED STEEL PIPE, 12 GAGE (0.109"), 3" X 1" ANNULAR CORRUGATIONS, GALVANIZED AND POLYMERIC COATED (PER AASHTO M246 OR ASTM A742) (PER STD. PLAN NO. 680021, SHT. 1-2)	510-0214	
⚠ 2	EA.	60" DIA. X 22'-0" LONG CORRUGATED STEEL PIPE, 12 GAGE (0.109"), 3" X 1" ANNULAR CORRUGATIONS, GALVANIZED AND POLYMERIC COATED (PER AASHTO M246 OR ASTM A742) (PER STD. PLAN NO. 680021, SHT. 1-2)	510-0212	
⚠ 6	EA.	COUPLING BAND, 60" DIA. LOCKING TYPE, 14 GAGE (0.079") x 24" WIDE, 3" x 1" ANNULAR CORRUGATIONS, GALVANIZED AND POLYMER COATED (PER AASHTO M246 OR ASTM A742) (PER STD. PLAN NO. 680021 SHTS 1-2)	510-0216	
⚠ 35	CU. YD.	PIPE BEDDING (PER STD. DWG. 680000 SHT. 2-3)		
1	EA.	CULVERT MARKER SIGNS, MOUNTING POST AND MOUNTING HARDWARE (PER STD. DWG. 0502, 0507 AND 0599)	P00-2616	
1	LOT	FILL MATERIAL (PER STD. DWG. 680000 SHT. 3 AND REF. 1)		
1	LOT	RIPRAP (PER REF. 1)		
1	LOT	FILTER FABRIC (PER REF. 1)		

CLSM MAY BE SUBSTITUTED FOR FILL MATERIAL.
BULK QUANTITIES ARE ESTIMATED.

DESIGN NOTES

RIGHT-OF-WAY

1. Right-of-way: Varies, per Ref. 1.

LAYOUT

1. Stationing: Per Ref. 1.
2. Elevation Datum: Per Ref. 1.
3. Temporary Benchmarks:
   TBM 1 (Olsson CP 11): Elev. 1347.99, NAVD 1988, ½" rebar located in ground South of proposed Track 101 Culvert No. 0.43, 67.40' left of existing Phoenix Sub. Main Track centerline, Sta. 1506+01.02.

   TBM 2 (Olsson CP 12): Elev. 1345.52, NAVD 1988, ½" rebar located in ground South of proposed Track 101 Culvert No. 0.43, 71.58' left of existing Phoenix Sub. Main Track centerline, Sta. 1498+70.62.
4. Profile: Proposed Track 101 and Proposed Track 751 per Ref. 1.
5. Alignment:
   Proposed Track 101: Tangent.
   Proposed Track 751: Tangent (within Turnout).
6. Information used to prepare this drawing in addition to reference drawings:

   Hydrologic & Hydraulic Evaluation prepared by Olsson, dated XX/XX/XXXX.

DESIGN

1. This structure has been designed for Cooper E80 Live Load with impact and cover depth ranging from 2'-6" to 18'-0".

Registered Professional Engineer (Civil)
CERTIFICATE NO.
75691
MARK J. HANIGAN
Date Signed 12-09-2025
ARIZONA U.S.A.

POSTCONSTRUCTION COMPLIANCE

Constructor in charge of construction to provide to the office of the Senior Manager Structures Design as-built drawings confirming that the project was constructed in compliance with the plans and indicating any construction variances.

SIGNED

In Charge of Construction — Date

NO.	DATE	REVISIONS
	/ /	
1	12/05/2025	REMOVE EAST ACCESS ROAD, REVISE PIPE LENGTH

COMPLETION STATUS:
FINAL — STATUS — 07/05/2023 DATE

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
CONSULTANT ENGINEER — 06/21/2023 DATE

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123077

LATITUDE: 33.28496°N LONGITUDE: 111.67453°W

DSN/CHK BY:	NAS/MJH
DRAWN/CHK BY:	NAS/JAS
UPRR ENGINEER:	DEH
SHT NO.:	S1 of S2

UNION PACIFIC RAILROAD
Office of Director Structures Design

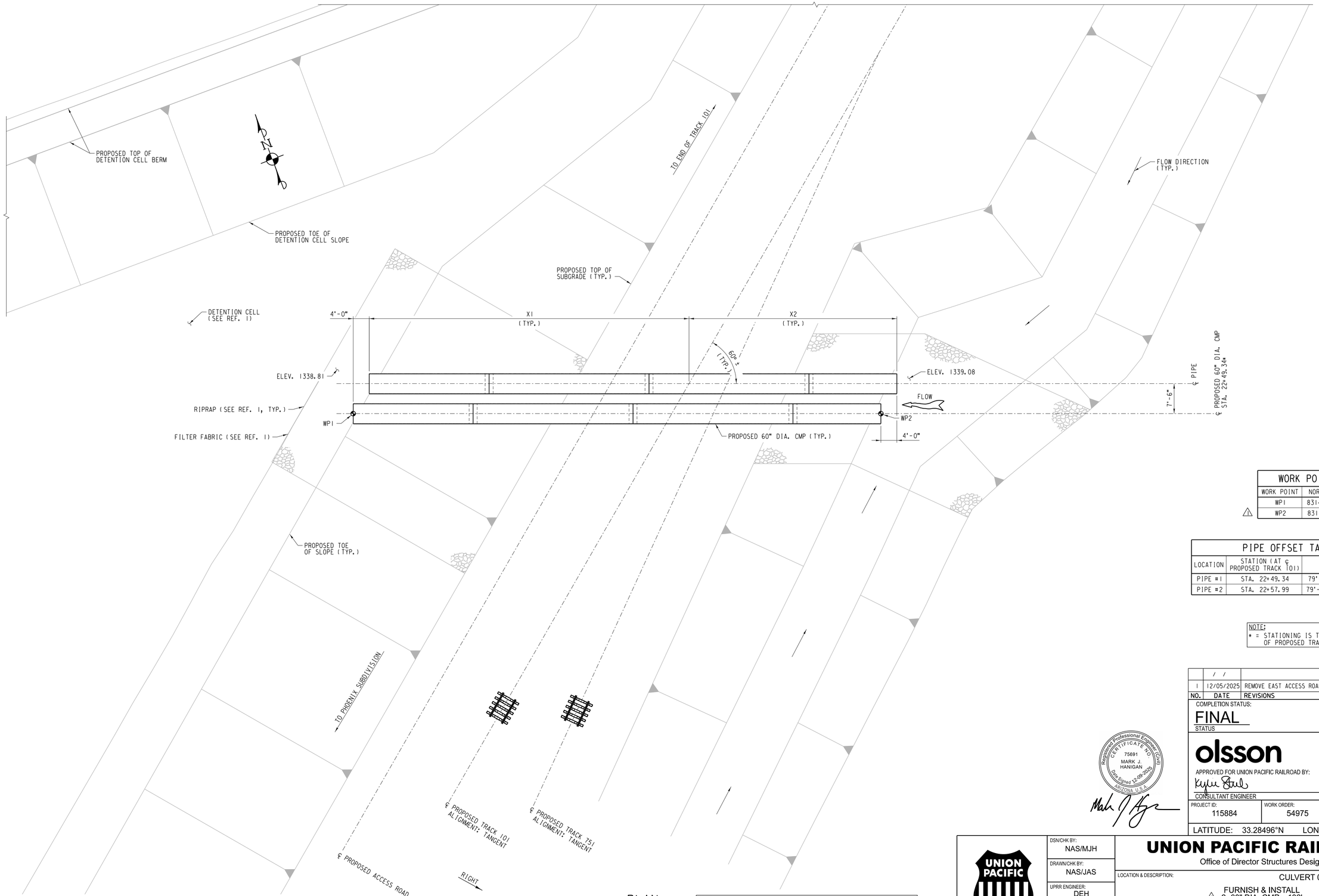
LOCATION & DESCRIPTION: CULVERT 0.43, PIRATE IND LEAD
⚠ FURNISH & INSTALL
2- 60" DIA. CMP x 132'

SHEET TITLE: GENERAL ARRANGEMENT (SHEET 1 OF 2)

FILE NAME: \\oa.ad.oasonsulting.com\fnts-nal\projects\2020\0501.1000\020-0927-40-Design\Microstation\020-0927.RJBPA.Culv 0.43.Station 22+53.60.Pirate Ind Lead.0.43.dgn

PLOTTED: 12/5/2025 8:50:38 AM

DESIGN SHEET



⚠ PLAN
SCALE: 1/2 "=1'-0"

NOTE:
FOR DETAILS, SPECIFICATIONS, AND MATERIAL QUANTITIES OF RIPRAP AND GRADING, SEE REF. 1. GRADING AND RIPRAP LINEWORK SHOWN FOR INFORMATIONAL PURPOSES ONLY ON THESE PLANS.

WORK POINT TABLE		
WORK POINT	NORTHING	EASTING
WP1	831447.47	774031.86
⚠ WP2	831400.31	774155.15

PIPE OFFSET TABLE			
LOCATION	STATION (AT ℄ PROPOSED TRACK 101)	X1	⚠ X2
PIPE #1	STA. 22+49.34	79'-8 1/8" ±	52'-3 7/8" ±
PIPE #2	STA. 22+57.99	79'-11 7/8" ±	52'-0 1/8" ±

NOTE:
* = STATIONING IS TAKEN AT CENTERLINE OF PROPOSED TRACK 101.

NO.	DATE	REVISIONS
	/ /	
1	12/05/2025	REMOVE EAST ACCESS ROAD, REVISE PIPE LENGTH

COMPLETION STATUS:
FINAL — STATUS — 07/05/2023 DATE

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
CONSULTANT ENGINEER — 06/21/2023 DATE

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123077

LATITUDE: 33.28496°N LONGITUDE: 111.67453°W

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 12/05/2025 ARIZONA U.S.A.

DSN/CHK BY:	NAS/MJH
DRAWN/CHK BY:	NAS/JAS
UPRR ENGINEER:	DEH
SHT NO.:	S2 of S2

UNION PACIFIC RAILROAD
Office of Director Structures Design

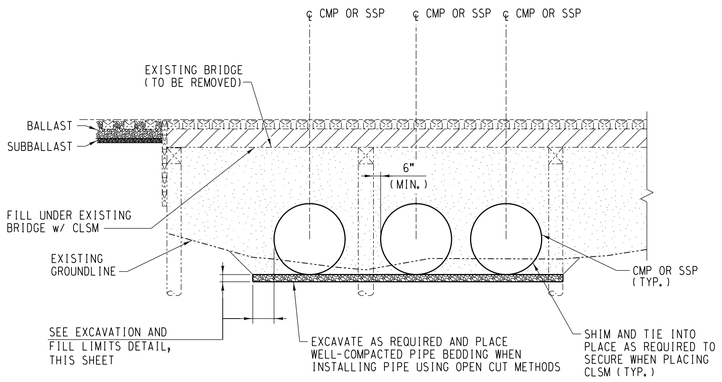
LOCATION & DESCRIPTION: CULVERT 0.43, PIRATE IND LEAD
⚠ FURNISH & INSTALL 2- 60" DIA. CMP x 132'

SHEET TITLE: GENERAL ARRANGEMENT (SHEET 2 OF 2)

FILE NAME: \\oa.ad.oaconsulting.com\fnts-na1\projects\2020\0501.1000\020-0927.40 Design\Microstation\020-0927.RLBR\July 0.43_Station 22+53.67\Pirate Ind Lead_0.43.dgn

PLOTTED: 12/5/2025 8:51:08 AM

STANDARD SHEET

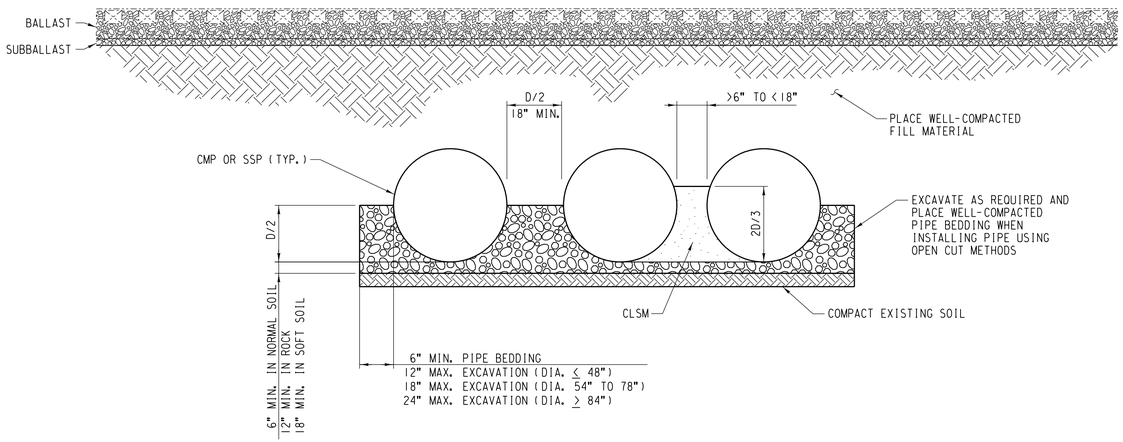


UNDER STRUCTURE - SECTION

SCALE: 3/16"=1'-0"

LIMITS OF REMOVAL

REMOVE EXISTING STRUCTURE TO 1'-0" (MIN.) BELOW PROPOSED EMBANKMENT SLOPE AND 2'-6" (MIN.) BELOW BASE OF RAIL.

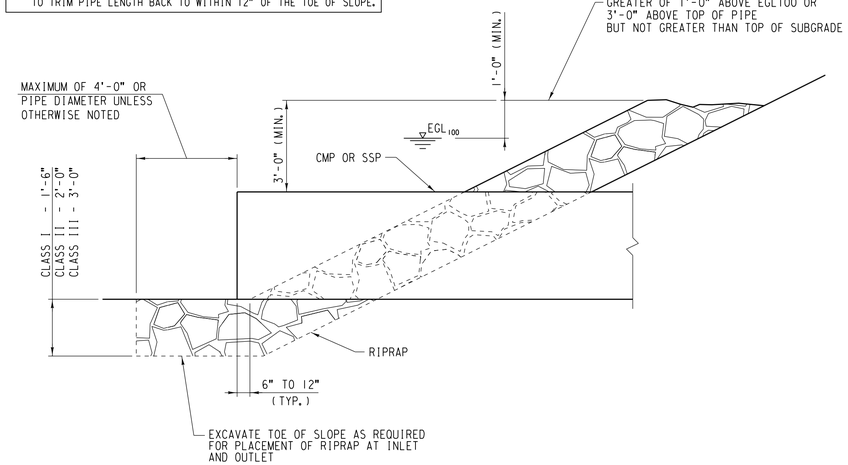


EXCAVATION AND FILL LIMITS

SCALE: NONE

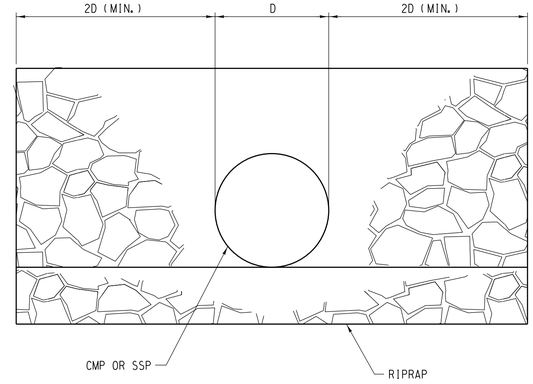
LONG PIPE FIELD MODIFICATION NOTE:

1. IF PIPE IS EXTENDING EXCESSIVELY BEYOND THE TOE OF SLOPE, FIRST VERIFY EMABNKMENT WAS PROPERLY CONSTRUCTED PER DESIGN TO ENSURE MAXIMUM COVER ON PIPE.
2. IF EMBANKMENT IS PROPERLY CONSTRUCTED, IT IS ACCEPTABLE TO TRIM PIPE LENGTH BACK TO WITHIN 12" OF THE TOE OF SLOPE.



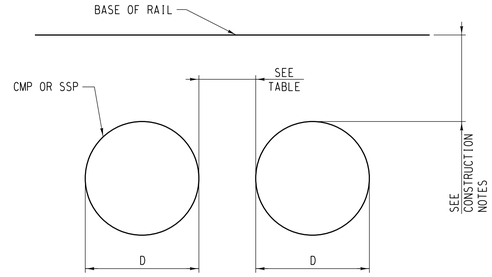
RIPRAP - SECTION

SCALE: NONE

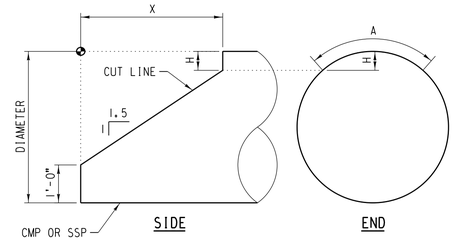


RIPRAP - ELEVATION

SCALE: NONE



SPACING CHART	
PIPE DIAMETER	MIN. SPACING BETWEEN PIPES
12" to 24"	12"
24" to 96"	D/2
96" OR MORE	48"



MITERED END DETAIL

SCALE: NONE

MITERED END GEOMETRY			
PIPE DIAMETER	X	H	A
30"	1'-9 3/8"	0'-3 3/4"	1'-9 1/2"
36"	2'-5 1/4"	0'-4 1/2"	2'-2"
42"	3'-1 1/8"	0'-5 1/4"	2'-6 1/4"
48"	3'-9"	0'-6"	2'-10 1/2"
54"	4'-4 7/8"	0'-6 3/4"	3'-3"
60"	5'-0 3/4"	0'-7 1/2"	3'-7 1/4"
72"	6'-4 1/2"	0'-9"	4'-4"
84"	7'-8 1/4"	0'-10 1/2"	5'-0 1/2"
96"	9'-0"	1'-0"	5'-9 1/4"
108"	10'-3 3/4"	1'-1 1/2"	6'-6"

REVISIONS		
DATE	LTR.	DESCRIPTION
02/12	A	ADDED RIPRAP SECTION
04/19	D	UPDATED DETAILS
09/23	E	TOP OF RIPRAP AND PIPE CUT NOTE
/		
/		
/		

DESIGN BY: CLJ | DRAWN BY: KDM | CHECKED BY: CLJ

APPROVED:

George J. Meyer 4/4/08

UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

BRIDGE STANDARDS

DETAILS FOR ROUND STEEL PIPE CULVERTS

FILE OWNER: UPRR | DATE:

PLAN NO.: 680000 | SHEET: 2 OF 3

Copyright © 2007 by Union Pacific Railroad PLOTTED: 5/20/2024 9:57:02 AM

FILE NAME: P:\Standards\1_Culverts (CMP and SSP)\1-Revisions in Progress\steelpip_std 2023 Revision.dgn

STANDARD SHEET

GENERAL NOTES

GENERAL

1. All work requirements shown on these drawings and not otherwise detailed shall be accomplished as specified in Union Pacific Railroad (UPRR) Specifications and the American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual for Railway Engineering. In the event of conflicts between specifications, the more restrictive shall apply.

2. Construction means and methods shall comply with the All Permits Issued (API) package.

3. Field verify all dimensions, stations and elevations prior to start of construction.

4. Visit www.UP.com/CBUD to create a dig ticket for fiber optic utility locates. This dig ticket must be ISSUED no less than 2 business days excavation can begin. Report emergency fiber optic issues to 1-800-336-9193.

5. Location of known utilities is approximate. Location shall be verified prior to construction. Notify Call811 "Call Before you Dig" number at least 48 hours prior to construction.

GRADING

1. Provide and place all fill and subballast material per UPRR Grading Specifications. Perform grading as required to drain and match existing embankments and upstream and downstream channel flowline.

2. Perform grading as required for construction of the new structure and replace areas removed and disturbed in the course of construction to a condition equal to or better than existing.

WELL COMPACTED FILL

1. Well compacted fill shall be well graded granular soil free of any organic material, stones larger than 1½ inches, frozen lumps, debris or excessive moisture. Fill shall be compacted to 95% of maximum dry density as defined in ASTM International D1557 (Modified Proctor). Fill shall be placed and compacted in layers not to exceed 6 inches. Fill shall be placed simultaneously on both sides of the pipe and between multiple pipes. CLSM may be used in lieu of well compacted fill.

CONTROLLED LOW-STRENGTH MATERIAL (CLSM) FILL

1. Controlled Low-Strength Material is a self-compacting, cementitious fill material with an unconfined compressive strength of 50 to 300 psi. The mixture shall consist of water, Portland cement, fly ash, and sound fine or coarse aggregate or both. The mix design shall allow adequate flowability without segregation of aggregates. Hardening time is of prime importance and CLSM should develop 50 psi in about one hour. The maximum layer of thickness for CLSM shall be 3 feet. Additional layers shall not be placed until the CLSM has lost sufficient moisture to be walked on without indenting more than two inches. Pipe spacing may be reduced to between 6" and 18" when using CLSM in lieu of well compacted pipe bedding between pipes.

PIPE BEDDING

1. Pipe bedding shall be granular material such as aggregates ordinarily specified and used in the construction of highway base and subbase. These aggregates include crushed stone, natural or crushed gravel, natural or manufactured sands, crushed slag or a homogeneous mixture of these materials. Pipe bedding shall be compacted to 95% of maximum dry density as defined in ASTM International D1557 (Modified Proctor). Recommended gradation is as follows:

SCREEN SIZE	% PASSING (BY WEIGHT)
1 inch	100
½ inch	60-90
⅜ inch	20-40
No. 4	10-20
No. 200	less than 5%

2. Union Pacific sealant ballast, item no. 562-5428, may be used.

RIPRAP:

1. Class of riprap shall be specified by the engineer. Riprap shall be placed in such a manner as to avoid segregation of various sizes of rock, and distributed so that there will be no large accumulation of either the larger or smaller sizes of stone. Individual rocks shall be placed in tight contact with one another in such a way to produce the least amount of void spaces. Riprap shall be solid, unfractured rock or concrete, bulky in shape with sharp angular edges.

2. Individual rocks shall vary as shown:

RIPRAP CLASS	AVERAGE WEIGHT PER STONE (LBS.)	DIMENSION (INCHES)	ITEM NO.	UNIT OF MEASURE	LAYER THICKNESS	TYPICAL VELOCITIES
I	50 to 200	9 to 14	562-2764	Ton	1'-6"	6 - 8 fps
II	200 to 1,000	14 to 24	562-3430	Ton	2'-0"	8 - 12 fps
III	1,000 to 4,000	24 to 38	562-4096	Ton	3'-0"	> 12 fps

3. The entire mass of riprap shall be well distributed within the limits specified. However, the following allowances shall be acceptable to produce the required riprap protection:

Riprap Class I - No allowances are permitted
Riprap Class II - 15% of Riprap Class I.
Riprap Class III - 15% of Riprap Class I and 15% of Riprap Class II.

CONSTRUCTOR NOTES (WHEN APPLICABLE)

CONSTRUCTOR DEFINITION

1. Constructor designates Manager Bridge Construction if construction by UPRR and Contractor if construction by Contractor.

DIVISION OF RESPONSIBILITY

A. RAILROAD

1. Provide material as shown in the Bill of Material.

2. Provide and install Private Property/No Trespassing sign and culvert marker sign on right side at low mile post end of culvert.

B. CONSTRUCTOR

1. Coordinate all construction activities with the Railroad.

2. Before ordering any material, Constructor shall make a detailed field inspection of the site verifying all pertinent dimensions and elevations. Any variations in dimensions or elevations from those shown on the drawings shall be reported immediately to the UPRR Project Manager.

3. Any modifications to this design shall be approved by the UPRR Office of Director Structures Design prior to construction.

4. Verify the location, relocation, abandonment, and/or temporary support of all utilities affected by the construction of the structure and embankment and coordinate these activities with the appropriate utility companies, agencies and/or authorities.

5. Apply for and obtain all construction permits necessary to perform the work.

6. Bill of Material and Schedules are provided for information only. Constructor shall be responsible for providing all material, not provided by the Railroad, required to complete the work.

7. Perform all work not performed by the Railroad.

8. Provide the Railroad with a detailed construction plan defining the activity, schedule and procedure for each aspect of the work. Construction shall not begin until the construction plan has been approved by the Railroad.

9. Provide all temporary structures (shoring, bracing and/or falsework) required to support and protect the existing embankments and structures affected by the work. Provide the Railroad with details, design and procedure for all temporary structures. All temporary structures shall be designed, signed and sealed by a professional engineer registered in the State that the structure is to be constructed. All temporary structures shall be approved by the UPRR Office of Director Structures Design prior to beginning construction.

10. Direct channel flow as required to perform work.

11. Accomplish activities within the schedule specified in the approved construction plan.

REVISIONS		
DATE	LTR.	DESCRIPTION
02/12	A	RELOCATED GENERAL NOTES
6/13	B	CHANGED FILL REQUIREMENTS
7/14	C	CHANGED FILL REQUIREMENTS
04/19	D	UPDATED NOTES
/		
/		

DESIGN BY: CLJ | DRAWN BY: KDM | CHECKED BY: CLJ

APPROVED:

George J. Meyn 4/4/08
UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

GENERAL NOTES FOR ROUND STEEL PIPE CULVERTS

FILE OWNER: UPRR | DATE:
PLAN NO.: 680000 | SHEET: 3 OF 3

FILE NAME: P:\Standards\1_Culverts (CMP and SSP)\1-Revisions in Progress\steelpip_std 2023 Revision.dgn

Copyright © 2007 by Union Pacific Railroad PLOTTED: 5/20/2024 9:57:03 AM

STANDARD SHEET

CMP FABRICATION NOTES

PIPE MATERIAL, FABRICATION, AND TOLERANCES

1. CMP material shall be steel in accordance with the current AREMA Manual for Railway Engineering, Chapter 1, Part 4, Section 3.

2. All exposed edges shall be ground smooth.

3. Permanently attach an identification plate inside the pipe near the end of the segment. The plate is to contain the following information in at least 1" high letters:
   Name of manufacturer and plant location
   Date assembled
   Gage
   Diameter
   Length

   The same information plus the lifting weight shall be stenciled on the outside face of the pipe.

4. The inside diameter of the circular pipe shall not vary more than ½ inch from the nominal diameter when measured on the inside crest of the corrugations for diameters through 48 inches, and 1% for diameters greater than 48 inches. In no case shall the difference in the diameter of the abutting pipe ends be more than ½ inch.

5. Locking coupling bands shall be in accordance with the provisions of the AREMA Manual for Railway Engineering Chapter 1, Part 4, Section 4.3.4. Coupling bands shall be of the same base metal and finish as the pipe. Coupling bands shall be 24 inches wide for pipes 30 inch diameter and larger. Smaller pipes may use 7 inch wide bands. Coupling band thickness is shown in Table 1 and 2, per Std. Dwg. 680021, Sht. 2.

6. All pipe ends to be cut square.

LIFTING AND HANDLING

1. Two lifting lugs shall be provided at the top of each preassembled section. The top of the pipe on elongated pipe shall be the crown of the pipe in the direction of the elongation.

2. Lifting hardware for erection and installation shall be provided.

3. Max spacing of lifting lugs = 16'.

COATING

1. Galvanized & Polymer coated per ASTM A742 or American Association of State Highway and Transportation Officials (AASHTO) M246.

2. Bruised, scaled, or broken coatings shall be repaird per ASTM A760 section 11.

SHIPPING

1. Pipe shall be loaded, shipped, and handled in such a manner as to prevent damage to the pipe or to the pipe coating. Strutting of pipes shall be provided as required to prevent permanent deformation from tie down straps applied for shipping.

RIVETED ANNULAR PIPE

1. Helical lockseam pipe may be substituted for rivited annular pipe with approval of UPRR Manager of Structures Design and entire length of pipe can be placed without joints. Entire pipe run must be all helical or all riveted annular CMP.

48" DIAMETER AND LESS

1. Class 1 with 2⅔" x ½" annular corrugations. Shape 1, vertical elongation is not required.

2. Single riveted longitudinal seams.

54" DIAMETER AND GREATER

1. Class 1 with 3" x 1" annular corrugations. Shape 2, factory elongated with vertical length 5% greater than the nominal diameter. The end 3' shall not be elongated and left round.

2. Double riveted seams.

RIVETED ANNULAR CMP DIAMETERS

1. The minimum width of the longitudinal lap is 1½ inches for all pipes with nominal inside diameter of 12 to 21 inches, 2 inches for pipes with nominal inside diameter of 24 inches or 30 inches, and 3 inches for all pipes with nominal inside diameter of 36 inches or greater.

2. All 14 gage pipe shall have at least 5/16 inch diameter rivets. All 12 gage and thicker pipe shall have at least 7/16 inch diameter rivets.

3. Longitudinal seams shall be riveted with one rivet in each corrugation valley for all pipes 24 inches in diameter and smaller. Longitudinal seams shall be riveted with two rivets in each corrugation valley for all pipes larger than 24 inches. Circumferential seams shall be riveted with a maximum rivet spacing of six inches.

4. All rivets shall be cold driven in such a manner that the metal shall be drawn tightly together throughout the entire lap. The center of each rivet shall not be closer than two rivet diameters from the edge of the sheet. All rivets shall have full hemispherical heads or heads of a form acceptable to the engineer. They shall be driven in a workmanlike manner to completely fill the hole without bending.

5. Rivets shall conform to the specifications of ASTM International A31, Grade A and shall be electroplated in accordance with the specifications of ASTM International A164, Type RS.

HELICAL LOCKSEAM PIPE

1. Helical lockseam pipe may be used in non-jointed applications.

48" DIAMETER AND LESS

1. Class 2 with 2⅔" x ½" helical corrugations. Shape 1, vertical elongation not required.

2. Ends to be rerolled with 2⅔" x ½" circumferential corrugations to accommodate the appropriate coupling band.

54" DIAMETER AND GREATER

1. Class 2 with 3" x 1" or 5" x 1" helical corrugations. Shape 1, factory elongated with vertical length 5% greater than the nominal diameter.

2. Ends to be rerolled with 2⅔" x ½" circumferential corrugations to accommodate the appropriate coupling band. The end 3' shall not be elongated and left round.

CMP CONSTRUCTION NOTES

GENERAL

1. These structures are designed for Cooper E80 live load with impact, and cover as shown in Tables 1 and 2, per Std. Dwg. 680021, Sht. 2.

2. 30 inch diameter and larger Corrugated Metal Pipe (CMP) is preferred for culverts transverse to tracks. Smaller pipes may be used for local drainage parallel to tracks.

3. Table 1, per Std. Dwg. 680021, Sht. 2, indicates the minimum required gage thickness for structural stability.

INSTALLATION

1. Installation of CMP shall conform to the current American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual for Railway Engineering, Chapter 1, Part 4.

2. Culvert lengths are to be based on existing roadbed sections with additional allowance for riprap.

3. These standards are for installation in soil with a pH of 5-9 and resistivity > 1,500 ohm-cm. Pipes located in soils outside this range shall have additional corrosion protection as specified by the engineer.

4. Wire or timber strutting used during installation must remain through the duration of backfilling pipe and then be removed immediately after backfill is complete.

5. CMP culverts will be joined using 2 foot wide locking corrugated metal connecting bands. The inside of corrugated connecting bands and the outside of pipe culverts to be joined by corrugated connecting bands shall be kept clean and free of all rust, dirt or gravel. The corrugations on the connecting bands and the pipe culvert shall fit snugly as the connecting bands are tightened.

6. CMP with annular corrugations must be placed with the inside circumferential laps pointing downstream.

7. Culverts resting on rock foundation need not be cambered. Unless otherwise specified by the engineer all other CMP culverts shall be cambered in accordance with the following:

   A. Embankments up to 8 feet high (measured base of rail to flowline) require a 1½ inch camber.

   B. Embankments 8 feet to 12 feet high require a 2½ inch camber.

   C. Embankments 12 feet to 18 feet high require a 4 inch camber.

8. In no case shall the culvert be cambered so high in the center that water will be pocketed at the inlet end of the pipe.

9. Camber shall be created in CMP by placing the proper profile in the native soil beneath the compacted, granular pipe bedding.

10. It is required to place joints in CMP offset from ℄ of tracks. Minimum horizontal offset between ℄ of track and ℄ of pipe joint shall be 6'.

REVISIONS		
DATE	LTR.	DESCRIPTION
/		
/		
/		
05/24	C	POLY COATING & RIVETED PREFERRED
07/23	B	ADDED NOTE TO GRIND HELICAL ENDS
04/19	A	UPDATED NOTES

DESIGN BY: CLJ | DRAWN BY: GVS | CHECKED BY: CLJ

APPROVED:

Michael R. Freeman

UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

CONSTRUCTION NOTES FOR CORRUGATED METAL PIPE CULVERTS

FILE OWNER: UPRR	DATE: 10/13/17
PLAN NO.: 680021	SHEET: 1 OF 2

Copyright © 2007 by Union Pacific Railroad

PLOTTED: 5/20/2024 9:57:03 AM

FILE NAME: P:\Standards\1_Culverts (CMP and SSP)\1-Revisions in Progress\steelpip_std 2023 Revision.dgn

STANDARD SHEET

TABLE 1 - ROUND CORRUGATED METAL PIPE (CMP) HELICAL LOCK SEAM

INSIDE PIPE DIAMETER	CORRUGATION DIMENSIONS	GAGE	THICKNESS (IN.)	WEIGHT (LB./FT.)	COVER * MIN. (FT.)	COVER * MAX. (FT.)
12"	2⅔" x ½"	14	0.079	12	1'-6"	18'-0"
18"	2⅔" x ½"	14	0.079	18	1'-6"	18'-0"
21"	2⅔" x ½"	14	0.079	21	1'-6"	18'-0"
24"	2⅔" x ½"	14	0.079	24	1'-6"	18'-0"
30"	2⅔" x ½"	14	0.079	30	1'-6"	18'-0"
36"	2⅔" x ½"	14	0.079	41	2'-6"	18'-0"
42"	2⅔" x ½"	14	0.079	47	2'-6"	18'-0"
48"	2⅔" x ½"	12	0.109	74	2'-6"	18'-0"
60"	5" x 1"	12	0.109	92	2'-6"	18'-0"
72"	5" x 1"	10	0.138	140	3'-6"	18'-0"
84"	5" x 1"	10	0.138	164	3'-6"	18'-0"

* COVER TO BE MEASURED FROM BASE OF RAIL TO TOP OF PIPE

TABLE 2 - ROUND CORRUGATED STEEL PIPE (CMP) ANNULAR RIVETED

INSIDE PIPE DIAMETER	CORRUGATION DIMENSIONS	GAGE	THICKNESS (IN.)	WEIGHT (LB./FT.)	COVER * MIN. (FT.)	COVER * MAX. (FT.)	10'-0" LENGTH ITEM NO.	10'-0" LENGTH WEIGHT (LB.)	12'-0" LENGTH ITEM NO.	12'-0" LENGTH WEIGHT (LB.)	14'-0" LENGTH ITEM NO.	14'-0" LENGTH WEIGHT (LB.)	16'-0" LENGTH ITEM NO.	16'-0" LENGTH WEIGHT (LB.)	18'-0" LENGTH ITEM NO.	18'-0" LENGTH WEIGHT (LB.)	20'-0" LENGTH ITEM NO.	20'-0" LENGTH WEIGHT (LB.)	22'-0" LENGTH ITEM NO.	22'-0" LENGTH WEIGHT (LB.)	24'-0" LENGTH ITEM NO.	24'-0" LENGTH WEIGHT (LB.)	30'-0" LENGTH ITEM NO.	30'-0" LENGTH WEIGHT (LB.)	40'-0" LENGTH ITEM NO.	40'-0" LENGTH WEIGHT (LB.)	CONNECTING BANDS ITEM NO.	CONNECTING BANDS GAGE
30"	2⅔" x ½"	14	0.079	30	1'-6"	18'-0"	510-0159	300	510-0160	360	510-0161	420	510-0162	480	510-0163	540	510-0164	600	510-0165	660	510-0166	720	510-0167	900	510-0168	1,200	510-0169	16
36"	2⅔" x ½"	14	0.079	41	2'-6"	18'-0"	510-0170	410	510-0171	492	510-0172	574	510-0173	656	510-0174	738	510-0175	820	510-0176	902	510-0177	984	510-0178	1,230	510-0179	1,640	510-0180	16
42"	2⅔" x ½"	14	0.079	47	2'-6"	18'-0"	510-0181	470	510-0182	564	510-0183	658	510-0184	752	510-0185	846	510-0186	940	510-0187	1,034	510-0188	1,128	510-0189	1,410	510-0190	1,880	510-0191	16
48"	2⅔" x ½"	12	0.109	74	2'-6"	18'-0"	510-0192	740	510-0193	888	510-0194	1,036	510-0195	1,184	510-0196	1,332	510-0197	1,480	510-0198	1,628	510-0199	1,776	510-0201	2,220	510-0202	2,960	510-0203	14
60"	3" x 1"	12	0.109	92	2'-6"	18'-0"	510-0204	920	510-0206	1,104	510-0207	1,288	510-0209	1,472	510-0210	1,656	510-0211	1,840	510-0212	2,024	510-0213	2,208	510-0214	2,760	510-0215	3,680	510-0216	14
72"	3" x 1"	10	0.138	140	3'-6"	18'-0"	510-0217	1,400	510-0218	1,680	510-0219	1,960	510-0220	2,240	510-0221	2,520	510-0222	2,800	510-0223	3,080	510-0224	3,360	510-0226	4,200	510-0227	5,600	510-0228	12
84"	3" x 1"	10	0.138	164	3'-6"	18'-0"	510-0229	1,640	510-0231	1,968	510-0232	2,296	510-0233	2,624	510-0234	2,952	510-0236	3,280	510-0237	3,608	510-0239	3,936	510-0241	4,920	510-0242	6,560	510-0243	12
96"	3" x 1"	8	0.168	228	3'-6"	18'-0"	-	2,280	-	2,736	510-3181	3,192	510-3182	3,648	510-3183	4,104	510-3184	4,560	510-3185	5,016	510-3186	5,472	-	6,840	-	9,120	510-3188	10
108"	3" x 1"	8	0.168	262	3'-6"	18'-0"	-	2,620	-	3,144	510-1000	3,668	510-1001	4,192	510-1002	4,716	510-1003	5,240	510-1004	5,764	510-1005	6,288	-	7,860	-	10,480	510-1006	10

* COVER TO BE MEASURED FROM BASE OF RAIL TO TOP OF PIPE

REVISIONS		
DATE	LTR.	DESCRIPTION
02/19	A	UPDATED TABLE
7/19	B	REMOVED COMMON ITEMS. ADDED 108"
05/24	C	CHNG ALL CMP TO POLY/METALIC
/		
/		
/		

DESIGN BY: CLJ | DRAWN BY: GVS | CHECKED BY: CLJ

APPROVED:

UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

TABLES FOR CORRUGATED METAL PIPE CULVERTS

FILE OWNER: UPRR | DATE: 10/13/17

PLAN NO.: 680021 | SHEET: 2 OF 2

Copyright © 2007 by Union Pacific Railroad PLOTTED: 5/20/2024 9:57:03 AM

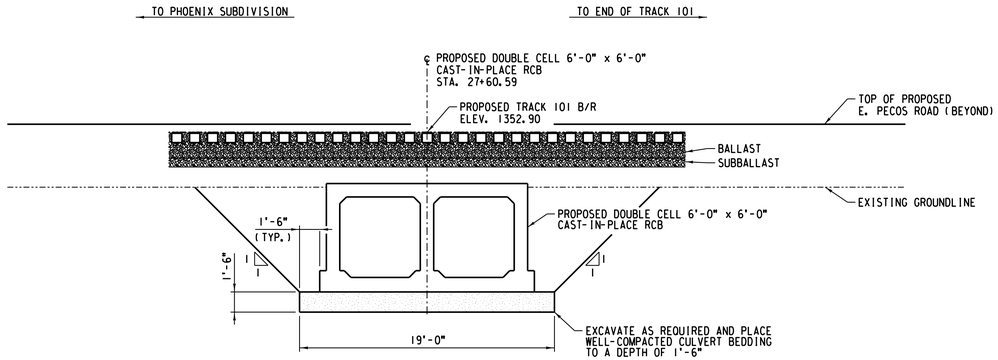
FILE NAME: P:\Standards\1_Culverts (CMP and SSP)\1-Revisions in Progress\steelpip_std 2023 Revision.dgn

DESIGN SHEET

DRAWING SCHEDULE

	SHEET NO.	PLAN NO.	DESCRIPTION	TYPE
THIS SET	S1	123078	GENERAL ARRANGEMENT (SHEET 1 OF 2)	DESIGN
	S2	123078	GENERAL ARRANGEMENT (SHEET 2 OF 2)	DESIGN
	S3	123078	END TREATMENT FRAMING DETAILS	DESIGN
	S4	123078	END TREATMENT REINFORCING DETAILS (SHEET 1 OF 3)	DESIGN
	S5	123078	END TREATMENT REINFORCING DETAILS (SHEET 2 OF 3)	DESIGN
	S6	123078	END TREATMENT REINFORCING DETAILS (SHEET 3 OF 3)	DESIGN
	S7	123078	HANDRAIL DETAILS	DESIGN
	G1	680200	GENERAL NOTES	STANDARD
	G2	680200	GENERAL ARRANGEMENT FOR SINGLE CELL AND MULTI-CELL BOX CULVERTS	STANDARD
	G5	680200	CONSTRUCTION SEQUENCE	STANDARD
	MC3	680200	6'-0"x6'-0" MULTI-CELL BOX CULVERT DETAILS (SHEET 1 OF 2)	STANDARD

	NO.	DWG. NO.	SHEET NO.	REV. NO.	DESCRIPTION	TYPE
REF.	1	-	P017 OF 037 T008 OF 012 X043 OF 143 EC010 OF 036 PH005 OF 024	-	MESA, ARIZONA, PHOENIX SUBDIVISION, MP 934.78 TO MP 937.83, CONSTRUCT INDUSTRIAL LEAD TRACK, 100% PLANS, ISSUED FOR BID, DATED MARCH 6, 2023	DESIGN



ELEVATION

SCALE: 3/8"=1'-0"

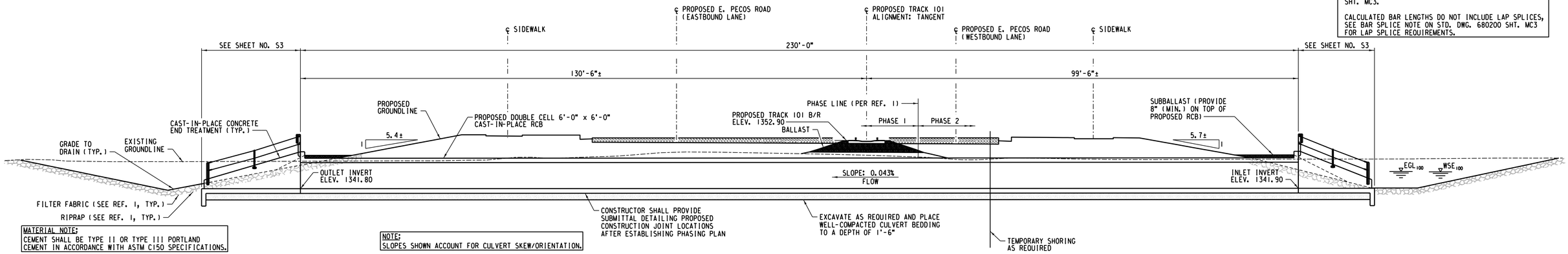
STANDARD VARIABLES:
L = 230 (FT)
NC = 2
NB = 307

TOTAL NUMBER OF BARS:
A = 614
B = 307
C = 1228
D = 112
E = 1228
F = 30
G = 62
H = 16

LENGTH OF BARS:
P = 229'-8"
Q = 14'-8"
R = 9'-7"
S = 16'-0"
T = 30'-10"
U = 16'-7"
V = 30'-6"

FOR A LIST OF VARIABLES, SEE STD. DWG. 680200, SHT. MC3.

CALCULATED BAR LENGTHS DO NOT INCLUDE LAP SPLICES, SEE BAR SPLICE NOTE ON STD. DWG. 680200 SHT. MC3 FOR LAP SPLICE REQUIREMENTS.



MATERIAL NOTE:
CEMENT SHALL BE TYPE II OR TYPE III PORTLAND CEMENT IN ACCORDANCE WITH ASTM C150 SPECIFICATIONS.

NOTE:
SLOPES SHOWN ACCOUNT FOR CULVERT SKEW/ORIENTATION.

BILL OF MATERIAL

REQ'D.	UNIT	DESCRIPTION	STORE ITEM NO.	ORDERED BY
230	FT	6'-0" X 6'-0" DOUBLE-CELL BOX CULVERT (BARREL ONLY) (PER STD. PLAN NO. 680200, SHT. MC3)		CONSTRUCTOR
63	CU. YD.	4000 PSI CONCRETE FOR END TREATMENTS ONLY (PER DETAILS, SHEET NOS. S3-S5, AND NOTES, PER STD. DWG. 680200 SHT. G1)		
1	LOT	REINFORCING STEEL FOR END TREATMENTS ONLY (PER SCHEDULE, SHEET NO. S5)		
2	EA.	HANDRAIL POST HP-25R (PER STD. DWG. 680160 SHT. H1)	513-2077	
2	EA.	HANDRAIL POST HP-25L (PER STD. DWG. 680160 SHT. H1)	513-2075	
6	EA.	HANDRAIL POST HP-26 (PER STD. DWG. 680160 SHT. H1)	513-2080	
4	EA.	HANDRAIL POST HP-27 (PER STD. DWG. 680160 SHT. H1)	513-2085	
39	EA.	3/4" DIA. x 14" A307 HEAVY HEX BOLT, TYPE 1 WITH HEAVY ELASTIC LOCK NUT (MIL-N-32258) AND FLAT CIRCULAR WASHER (ASTM F436), EACH COMPONENT HOT DIP OR MECHANICALLY ZINC COATED		
27	EA.	3/8" EYE TYPE STRANDVISE CABLE GRIP CARTRIDGE (MACLEAN POWER PRODUCTS NO. 5102)	098-6081	
280	LIN. FT.	3/8" NOMINAL DIAMETER WIRE ROPE, 7 WIRE, GALVANIZED STEEL STRAND, SIEMENS MARTINS GRADE, A-COATING	050-5394	
27	EA.	1/2" DIA. EYEBOLT, 2" LONG SHANK WITH 1" I.D. EYE, PLAIN PATTERN GALVANIZED DROP FORGED STEEL (ASTM A489), WITH ZINC PLATED HEX NYLON INSERT LOCKNUT (ASTM A563) AND ZINC PLATED FLAT CIRCULAR WASHER (ASTM F436)	130-0370	
15	EA.	GALVANIZED MALLEABLE IRON U-BOLT WITH 2 ELASTIC LOCKNUTS (MIL-N-25027), ZINC PLATED, FOR 3/8" DIA. WIRE ROPE	050-6370	
1	EA.	CULVERT MARKER SIGNS, MOUNTING POST AND MOUNTING HARDWARE (PER STD. DWG. 0502, 0507 AND 0599)	P00-2616	
1	LOT	RIPRAP (PER REF. 1)		
1	LOT	FILTER FABRIC (PER REF. 1)		
340	CU. YD.	CULVERT BEDDING (PER STD. DWG. 680200 SHT. G1)		
1	LOT	FILL MATERIAL (PER STD. DWG. 680000 SHT. 3 AND REF. 1)		
1	LOT	EPOGRIP MULTIPURPOSE STRUCTURAL BONDING AND GROUTING EPOXY ADHESIVE OR APPROVED ALTERNATE		
1	LOT	TEMPORARY SHORING		
1	LOT	TEMPORARY FORMWORK MATERIAL		

CLSM MAY BE SUBSTITUTED FOR FILL MATERIAL.
BULK QUANTITIES ARE ESTIMATED.

RIGHT →

CROSS SECTION

SCALE: 1/2"=1'-0"

WSE_{100} = 1345.67
EGL_{100} = 1345.77
VEL_{100} = 8.47 fps

NOTES:
1. FOR PROPOSED ROADWAY AND PHASING DETAILS, SEE REF. 1.
2. CROSS SECTION SHOWN ALONG CENTERLINE OF PROPOSED RCB.
3. RCB = REINFORCED CONCRETE BOX

LETTER SERIES
SHEET NO. CUT ON
SHEET NO. SHOWN ON

SECTION DESIGNATION

DESIGN NOTES

RIGHT-OF-WAY

1. Right-of-way: Varies, per Ref. 1.

LAYOUT

1. Stationing: Per Ref. 1.
2. Elevation Datum: Per Ref. 1.
3. Temporary Benchmarks:
   TBM 1 (Olsson CP 11): Elev. 1347.99, NAVD 1988, 1/2" rebar located in ground South of proposed Track 101 Culvert No. 0.52, 67.40' left of existing Phoenix Sub. Main Track centerline, Sta. 1506+01.02.
   TBM 2 (Olsson CP 12): Elev. 1345.52, NAVD 1988, 1/2" rebar located in ground South of proposed Track 101 Culvert No. 0.52, 71.58' left of existing Phoenix Sub. Main Track centerline, Sta. 1498+70.62.
4. Profile: Proposed Track 101 per Ref. 1.
   Proposed Pecos Road Profile per Ref. 1.
5. Alignment: Tangent.
6. Information used to prepare this drawing in addition to reference drawings:
   Hydrologic & Hydraulic Evaluation prepared by Olsson. dated September 2022.

DESIGN

1. This structure has been designed for Cooper E80 Live Load with impact, HS-20 Live Load and cover depth ranging from 1'-6" to 18'-0".
2. Constructor shall be responsible for determining construction loads and providing necessary supplemental cover, or support of structural elements, to accommodate construction activities as required.

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 07-05-2023 ARIZONA U.S.A.

POSTCONSTRUCTION COMPLIANCE

Constructor in charge of construction to provide to the office of the Senior Manager Structures Design as-built drawings confirming that the project was constructed in compliance with the plans and indicating any construction variances.

SIGNED

In Charge of Construction — Date

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL — STATUS — 07/05/2023 DATE

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
Kyle Stark — CONSULTANT ENGINEER — 03/01/2023 DATE

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123078

LATITUDE: 33.28584°N LONGITUDE: 111.67325°W

UNION PACIFIC

DSN/CHK BY:	MEW/NAS
DRAWN/CHK BY:	MEW/MJH
UPRR ENGINEER:	ADS
SHT NO.:	S1 of S7

UNION PACIFIC RAILROAD
Office of Director Structures Design

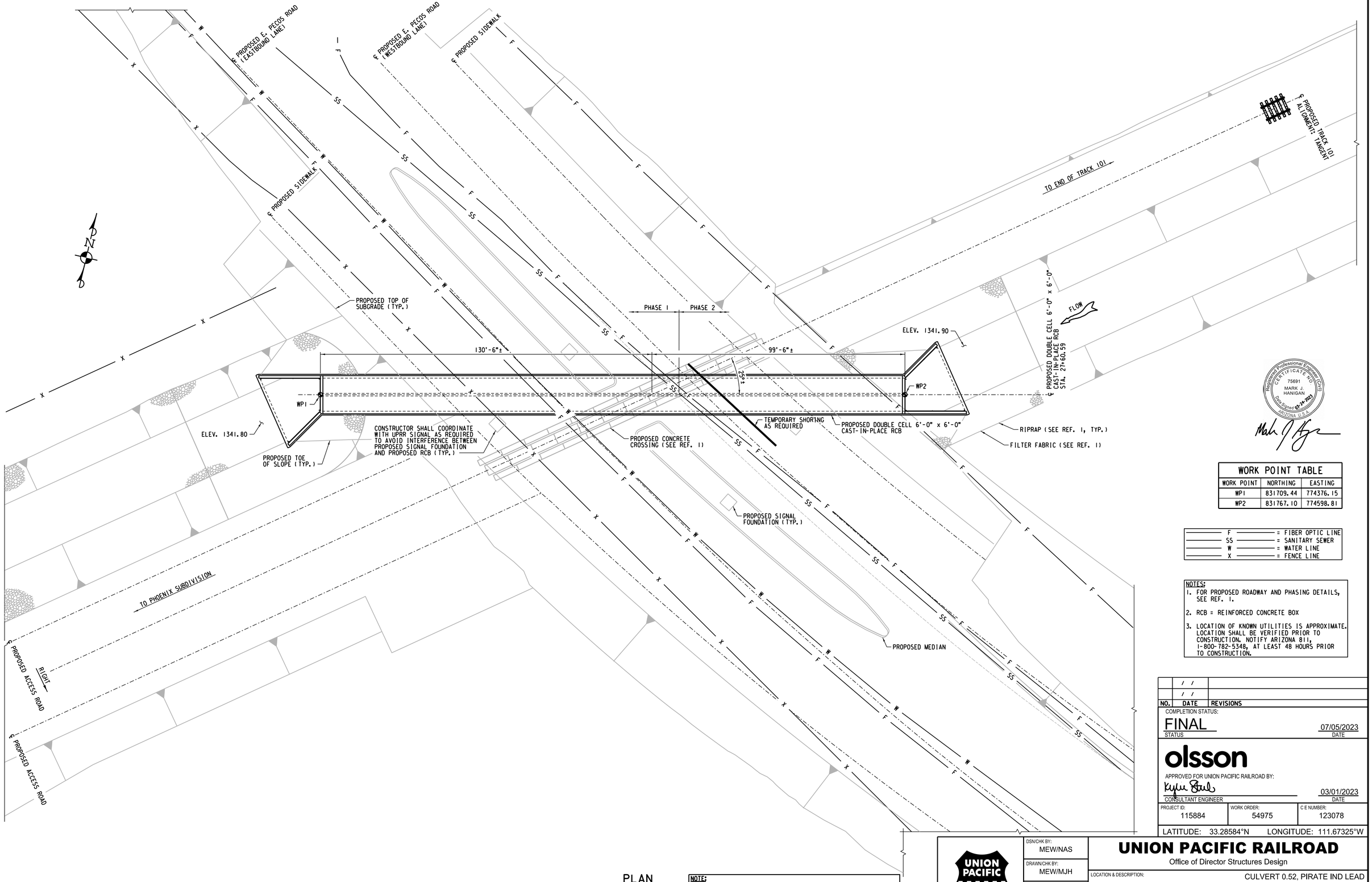
LOCATION & DESCRIPTION: CULVERT 0.52, PIRATE IND LEAD
FURNISH & INSTALL DOUBLE CELL 6'-0" x 6'-0" RCB x 230'

SHEET TITLE: GENERAL ARRANGEMENT (SHEET 1 OF 2)

FILE NAME: \\oa.ad.oasconsulting.com\fs-na1\projects\2020\0501.1000\020-0927-40-Design\Microstation\020-0927_RJBR.Cul v 0.52.Station 27+60.43\Pirate Ind Lead.0.52.dgn

PLOTTED: 7/7/2023 12:35:25 PM

DESIGN SHEET



PLAN
SCALE: 1/16"=1'-0"

NOTE:
FOR DETAILS, SPECIFICATIONS, AND MATERIAL QUANTITIES OF RIPRAP AND GRADING, SEE REF. 1. GRADING AND RIPRAP LINEWORK SHOWN FOR INFORMATIONAL PURPOSES ONLY ON THESE PLANS.

WORK POINT TABLE		
WORK POINT	NORTHING	EASTING
WP1	831709.44	774376.15
WP2	831767.10	774598.81

F = FIBER OPTIC LINE
SS = SANITARY SEWER
W = WATER LINE
X = FENCE LINE

NOTES:
1. FOR PROPOSED ROADWAY AND PHASING DETAILS, SEE REF. 1.
2. RCB = REINFORCED CONCRETE BOX
3. LOCATION OF KNOWN UTILITIES IS APPROXIMATE. LOCATION SHALL BE VERIFIED PRIOR TO CONSTRUCTION. NOTIFY ARIZONA 811, 1-800-782-5348, AT LEAST 48 HOURS PRIOR TO CONSTRUCTION.

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 03-24-2023 ARIZONA U.S.A.

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL (STATUS) 07/05/2023 (DATE)

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
CONSULTANT ENGINEER 03/01/2023 DATE

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123078

LATITUDE: 33.28584°N LONGITUDE: 111.67325°W

DSN/CHK BY:	MEW/NAS
DRAWN/CHK BY:	MEW/MJH
UPRR ENGINEER:	ADS
SHT NO.:	S2 of S7

UNION PACIFIC RAILROAD
Office of Director Structures Design

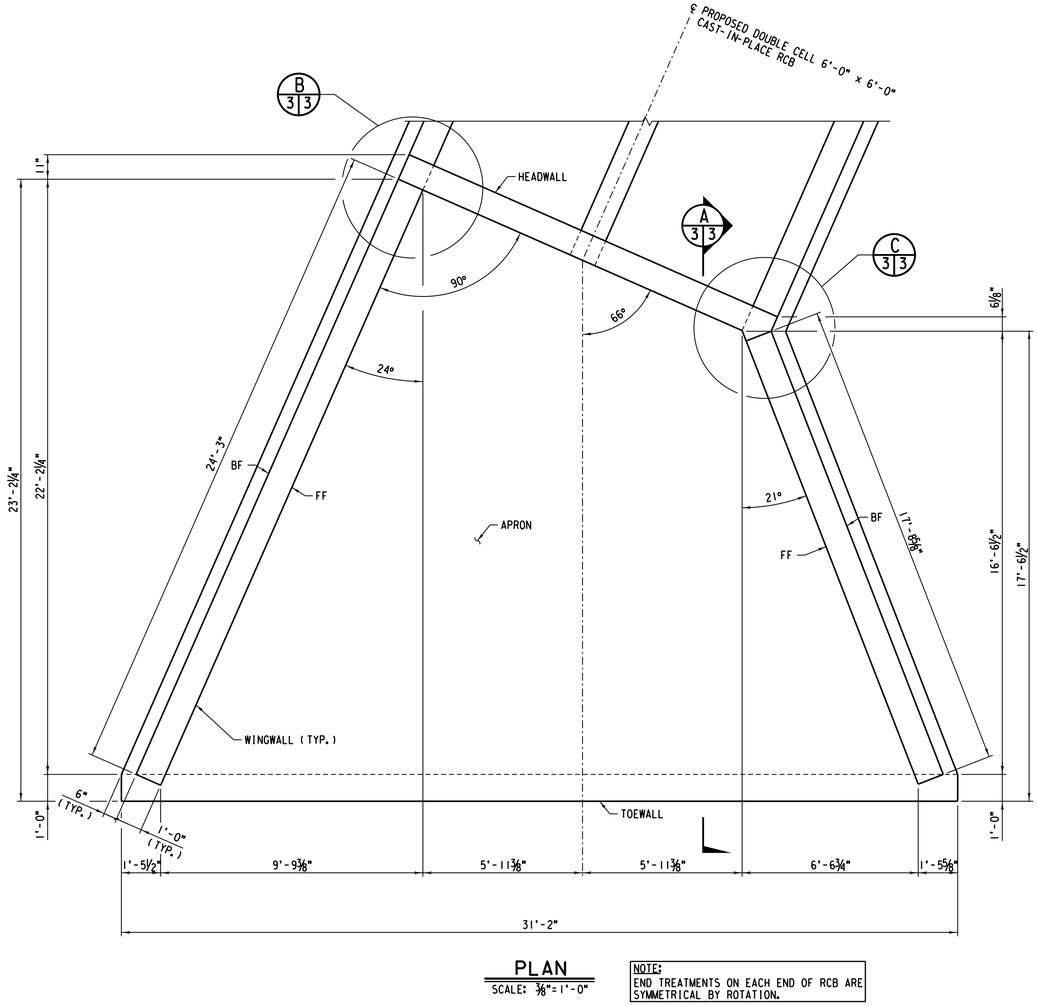
LOCATION & DESCRIPTION: CULVERT 0.52, PIRATE IND LEAD
FURNISH & INSTALL
DOUBLE CELL 6'-0" x 6'-0" RCB x 230'

SHEET TITLE: GENERAL ARRANGEMENT (SHEET 2 OF 2)

FILE NAME: \\oa.ad.oasconsulting.com\fnts-na1\projects\2220\050\-1000\020\-0927.40-Design\Microstation\020-0927-RLBR.Culv 0.52_Station 27-60.43Pirate Ind Lead.0.52.dgn

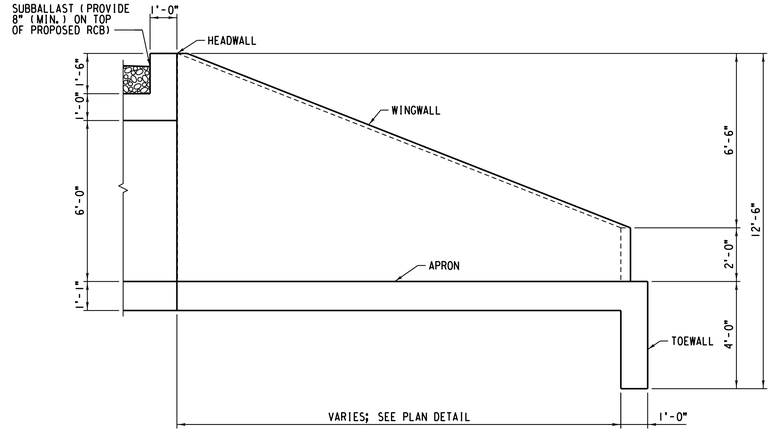
PLOTTED: 7/7/2023 12:35:26 PM

DESIGN SHEET

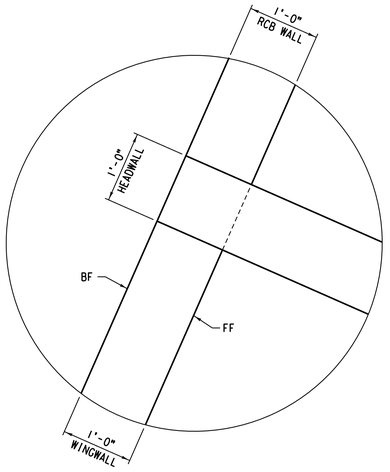


PLAN
SCALE: ⅜"=1'-0"

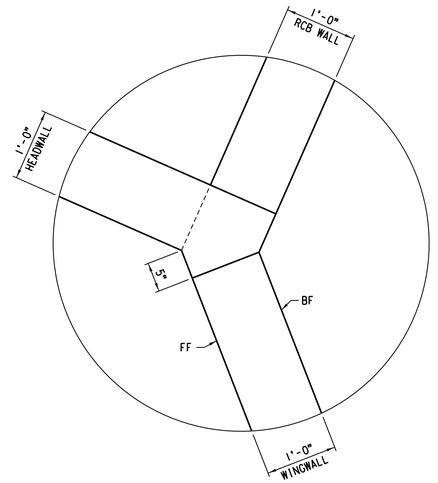
NOTE:
END TREATMENTS ON EACH END OF RCB ARE SYMMETRICAL BY ROTATION.



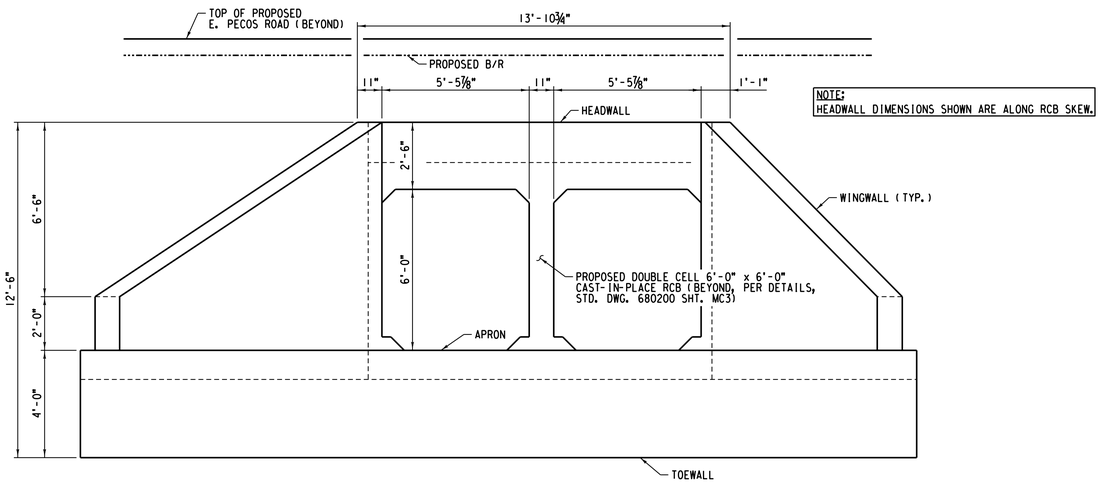
SECTION A 3|3
SCALE: ⅜"=1'-0"



DETAIL B 3|3
SCALE: 1"=1'-0"



DETAIL C 3|3
SCALE: 1"=1'-0"



NOTE:
HEADWALL DIMENSIONS SHOWN ARE ALONG RCB SKEW.

ELEVATION
SCALE: ⅜"=1'-0"

CONCRETE PLACEMENT QUANTITIES		
ITEM	UNIT	QTY.
RCB BARREL (BOTTOM SLAB)	CU. YD.	175
RCB BARREL (WALLS & TOP SLAB)	CU. YD.	273
APRON & TOEWALL	CU. YD.	44.9
WINGWALLS & HEADWALL	CU. YD.	18.0

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 03-24-2023 ARIZONA, U.S.A.

NOTES:
1. FOR CAST-IN-PLACE CONCRETE NOTES, SEE STD. DWG. 680200 SHT. G1.
2. FOR REINFORCED CONCRETE BOX DETAILS, SEE STD. DWG. 680200 SHT. MC3.
3. FOR END TREATMENT REINFORCING DETAILS, SEE SHEET NO. S4.
4. BF = BACK FACE
   FF = FRONT FACE
   RCB = REINFORCED CONCRETE BOX

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL (STATUS) 07/05/2023 (DATE)

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
Kylie Stubs
CONSULTANT ENGINEER 03/01/2023 DATE

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123078

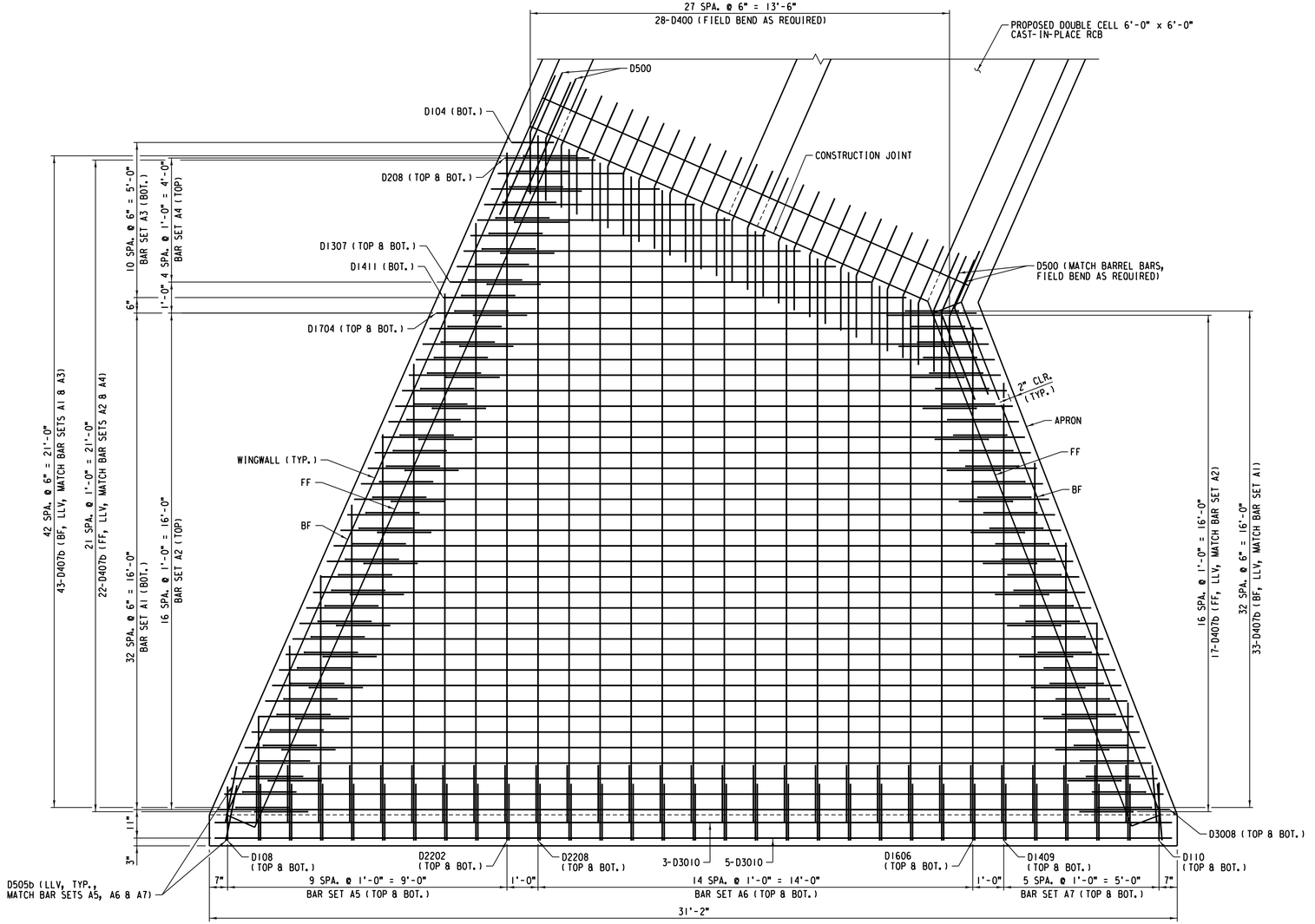
LATITUDE: 33.28584°N LONGITUDE: 111.67325°W

DSN/CHK BY: MEW/NAS	**UNION PACIFIC RAILROAD**
DRAWN/CHK BY: MEW/MJH	Office of Director Structures Design
UPRR ENGINEER: ADS	LOCATION & DESCRIPTION: CULVERT 0.52, PIRATE IND LEAD
SHT NO.: S3 of S7	FURNISH & INSTALL DOUBLE CELL 6'-0" x 6'-0" RCB x 230'
	SHEET TITLE: END TREATMENT FRAMING DETAILS

FILE NAME: \\oa.ad.oaconsulting.com\fnts-na1\projects\2220\050\1000\020\0927.40 Design\Microstation\020-0927 PLAN Culv 0.52_Station 27-60.43\Pirate Ind Lead_0.52.dgn

PLOTTED: 7/7/2023 12:35:26 PM

DESIGN SHEET



APRON PLAN

SCALE: 1/2"=1'-0"

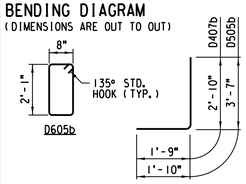
REINFORCING SCHEDULE

(QUANTITY PER END TREATMENT)

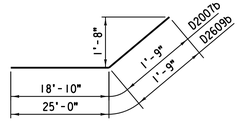
TOTAL	MARK	SIZE	LENGTH	SHAPE
28	D400	#5	4'-0"	
115	D407b	#5	4'-7"	
40	D500	#5	5'-0"	
62	D505b	#5	5'-5"	
15	D605b	#5	6'-5"	
4	D800	#5	8'-0"	
6	D1408	#5	14'-8"	
6	D1709	#5	17'-9"	
2	D2007b	#5	20'-7"	
6	D2311	#5	23'-11"	
2	D2609b	#5	26'-9"	
8	D3010	#5	30'-10"	

BENDING DIAGRAM

(DIMENSIONS ARE OUT TO OUT)



D407b, D505b



D2007b, D2609b

SET LIST

BAR SET DESIGNATION	MARK	SIZE	MIN. LENGTH	MAX. LENGTH	INCREMENT	NO. OF BARS/SET	NO. OF SETS	SHAPE
A1	D1704-D3008	#5	17'-4"	30'-8"	5"	33	1	
A2	D1704-D3008	#5	17'-4"	30'-8"	10"	17	1	
A3	D104-D1411	#5	1'-4"	14'-11"	1'-4 1/4"(+)	11	1	
A4	D208-D1307	#5	2'-8"	13'-7"	2'-8 3/4"	5	1	
A5	D108-D2202	#5	1'-8"	22'-2"	2'-3 3/8"(-)	10	2	
A6	D1606-D2208	#5	16'-6"	22'-8"	5 1/4"(+)	15	2	
A7	D110-D1409	#5	1'-10"	14'-9"	2'-7"	6	2	
W1	D110-D802	#5	1'-10"	8'-2"	1 3/4"(+)	44	1	
W2	D110-D800	#5	1'-10"	8'-0"	3 1/2"(+)	22	1	
W3	D111-D2007	#5	1'-11"	20'-7"	3'-8 3/4"(+)	6	2	
W4	D111-D802	#5	1'-11"	8'-2"	2 3/8"(-)	33	1	
W5	D111-D802	#5	1'-11"	8'-2"	4 3/4"(-)	17	1	
W6	D109-D1504	#5	1'-9"	15'-4"	2'-8 5/8"(-)	6	2	

EST. WT. OF REINFORCING STEEL = 5,275 LB.

NOTE:
BAR DESIGNATIONS CONSIST OF BAR SIZE & LENGTH FOLLOWED BY THE LETTER "b" IF BENT. BAR SIZES ARE REPRESENTED BY THE LETTERS A THROUGH L CORRESPONDING TO BAR SIZE #2 THROUGH #18. BAR LENGTHS ARE GIVEN IN FEET AND INCHES; THE LAST TWO DIGITS ARE INCHES.

NOTES:
1. FOR CAST-IN-PLACE CONCRETE NOTES, SEE STD. DWG. 680200 SHT. G1.
2. FOR REINFORCED CONCRETE BOX DETAILS, SEE STD. DWG. 680200 SHT. MC3.
3. BF = BACK FACE
   FF = FRONT FACE
   LLV = LONG LEG VERTICAL
   RCB = REINFORCED CONCRETE BOX

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL — STATUS
07/05/2023 — DATE

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 03-24-2023 ARIZONA U.S.A.

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
CONSULTANT ENGINEER — 03/01/2023 DATE

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123078

LATITUDE: 33.28584°N LONGITUDE: 111.67325°W

UNION PACIFIC

DSN/CHK BY: MEW/NAS
DRAWN/CHK BY: MEW/MJH
UPRR ENGINEER: ADS
SHT NO.: S4 of S7

UNION PACIFIC RAILROAD
Office of Director Structures Design

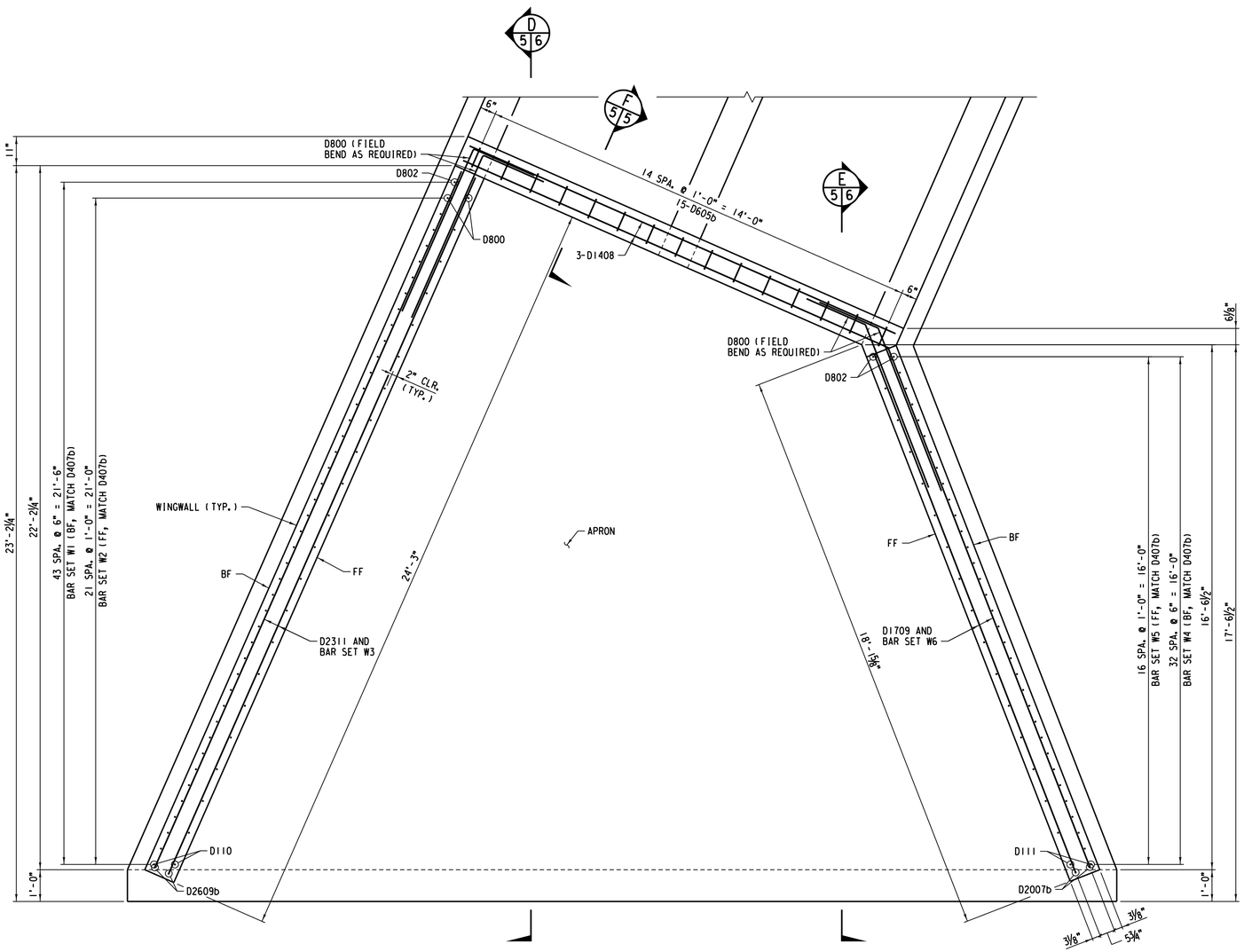
LOCATION & DESCRIPTION:
CULVERT 0.52, PIRATE IND LEAD
FURNISH & INSTALL
DOUBLE CELL 6'-0" x 6'-0" RCB x 230'

SHEET TITLE:
END TREATMENT REINFORCING DETAILS (SHEET 1 OF 3)

FILE NAME: \\oa.ad.oaconsulting.com\fnts-na\projects\2020\0501-1000\020-0927-A0-Design\Microstation\020-0927_RLBRA.u.v 0.52_Station 27+60.43\Pirate Ind Lead_0.52.dgn

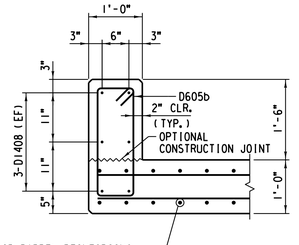
PLOTTED: 7/7/2023 12:35:26 PM

DESIGN SHEET



PLAN THROUGH WINGWALL AND HEADWALL

SCALE: ½"=1'-0"



SECTION F 5 5

SCALE: ¾"=1'-0"

NOTES:
1. FOR REINFORCING SCHEDULE, SEE SHEET NO. S4.
2. FOR CAST-IN-PLACE CONCRETE NOTES, SEE STD. DWG. 680200 SHT. G1.
3. FOR REINFORCED CONCRETE BOX DETAILS, SEE STD. DWG. 680200 SHT. MC3.
4. BF = BACK FACE
   FF = FRONT FACE
   LLV = LONG LEG VERTICAL
   RCB = REINFORCED CONCRETE BOX

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:

FINAL — STATUS — 07/05/2023 DATE

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:

CONSULTANT ENGINEER — 03/01/2023 DATE

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123078

LATITUDE: 33.28584°N LONGITUDE: 111.67325°W

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 02-24-2023 ARIZONA, U.S.A.

UNION PACIFIC

DSN/CHK BY:	MEW/NAS
DRAWN/CHK BY:	MEW/MJH
UPRR ENGINEER:	ADS
SHT NO.:	S5 of S7

UNION PACIFIC RAILROAD

Office of Director Structures Design

LOCATION & DESCRIPTION: CULVERT 0.52, PIRATE IND LEAD

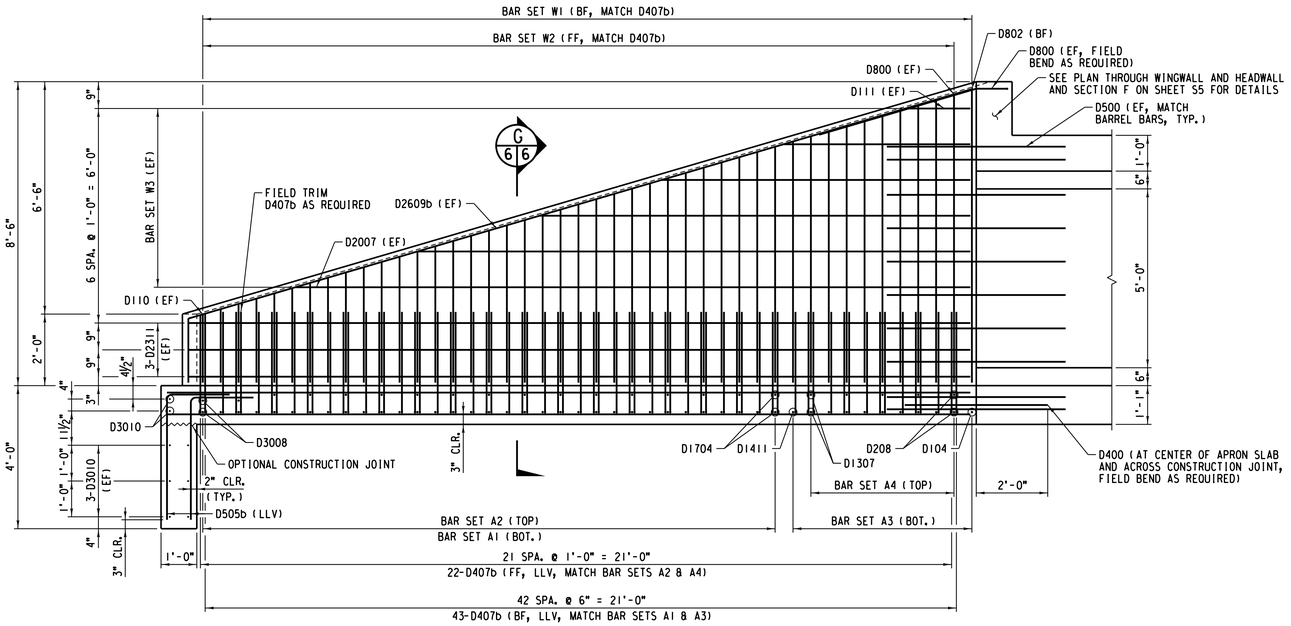
FURNISH & INSTALL
DOUBLE CELL 6'-0" x 6'-0" RCB x 230'

SHEET TITLE: END TREATMENT REINFORCING DETAILS (SHEET 2 OF 3)

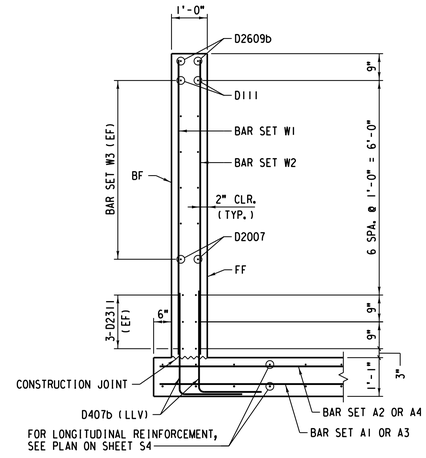
FILE NAME: \\oa.ad.oasconsulting.com\fnto-na1\projects\2020\0501.1000\020-0927.40\Design\Microstation\020-0927.40-Design-Culvert 0.52_Station 27-60_43-Pirate Ind Lead_0.52.dgn

PLOTTED: 7/7/2023 12:35:26 PM

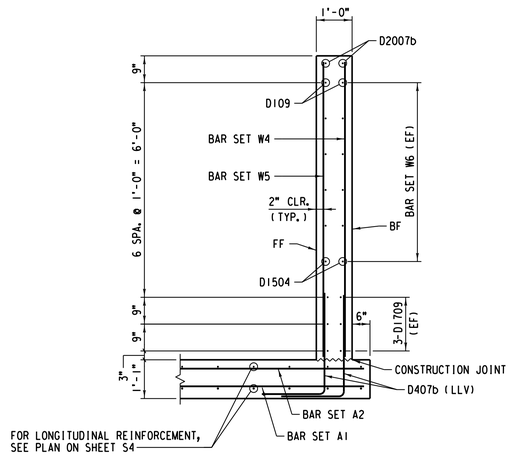
DESIGN SHEET



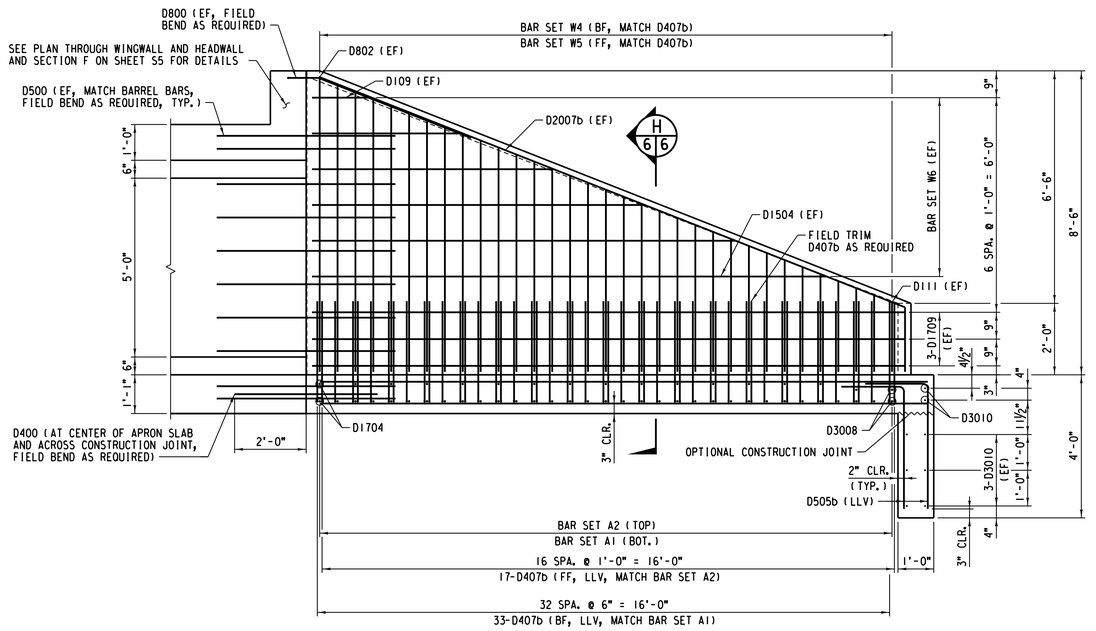
SECTION D
SCALE: ½"=1'-0" 5 6



SECTION G
SCALE: ½"=1'-0" 6 6



SECTION H
SCALE: ½"=1'-0" 6 6



SECTION E
SCALE: ½"=1'-0" 5 6

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 03-24-2023 ARIZONA U.S.A.

NOTES:
1. FOR REINFORCING SCHEDULE, SEE SHEET NO. S4.
2. FOR CAST-IN-PLACE CONCRETE NOTES, SEE STD. DWG. 680200 SHT. G1.
3. FOR REINFORCED CONCRETE BOX DETAILS, SEE STD. DWG. 680200 SHT. WC3.
4. BF = BACK FACE
   FF = FRONT FACE
   LLV = LONG LEG VERTICAL
   RCB = REINFORCED CONCRETE BOX

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL — STATUS — 07/05/2023 DATE

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
CONSULTANT ENGINEER — 03/01/2023 DATE

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123078

LATITUDE: 33.28584°N LONGITUDE: 111.67325°W

DSN/CHK BY:	MEW/NAS
DRAWN/CHK BY:	MEW/MJH
UPRR ENGINEER:	ADS
SHT NO.:	S6 of S7

UNION PACIFIC RAILROAD
Office of Director Structures Design

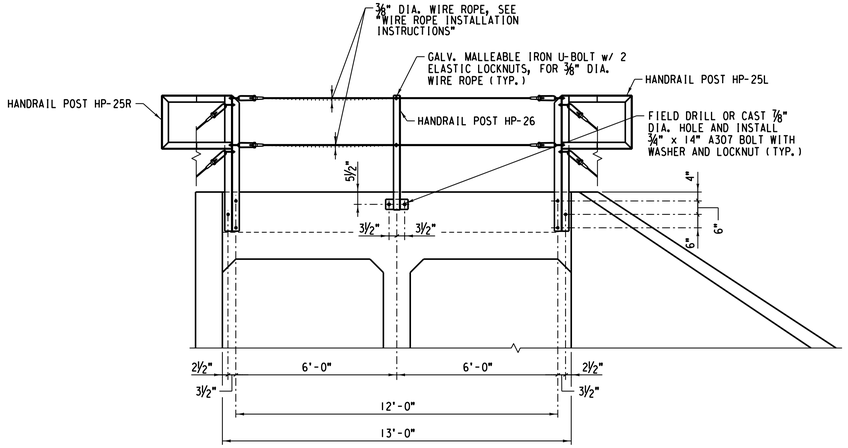
LOCATION & DESCRIPTION: CULVERT 0.52, PIRATE IND LEAD
FURNISH & INSTALL
DOUBLE CELL 6'-0" x 6'-0" RCB x 230'

SHEET TITLE: END TREATMENT REINFORCING DETAILS (SHEET 3 OF 3)

FILE NAME: \\oa.ad.oaconsulting.com\fnte-na\Projects\2020\0501.1000\020-0927-40-Design\Microstation\020-0927_RLBR.Culv 0.52,Station 27-60,43-Pirate Ind Lead.0.52.dgn

PLOTTED: 7/7/2023 12:35:27 PM

DESIGN SHEET



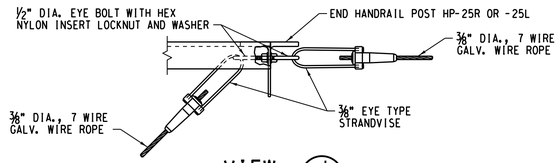
NOTE:
WINGWALL HANDRAIL NOT SHOWN FOR CLARITY.

BOX CULVERT HANDRAIL LAYOUT

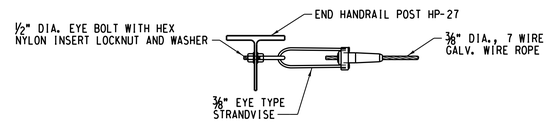
SCALE: 3/8"=1'-0"

WIRE ROPE INSTALLATION INSTRUCTIONS:

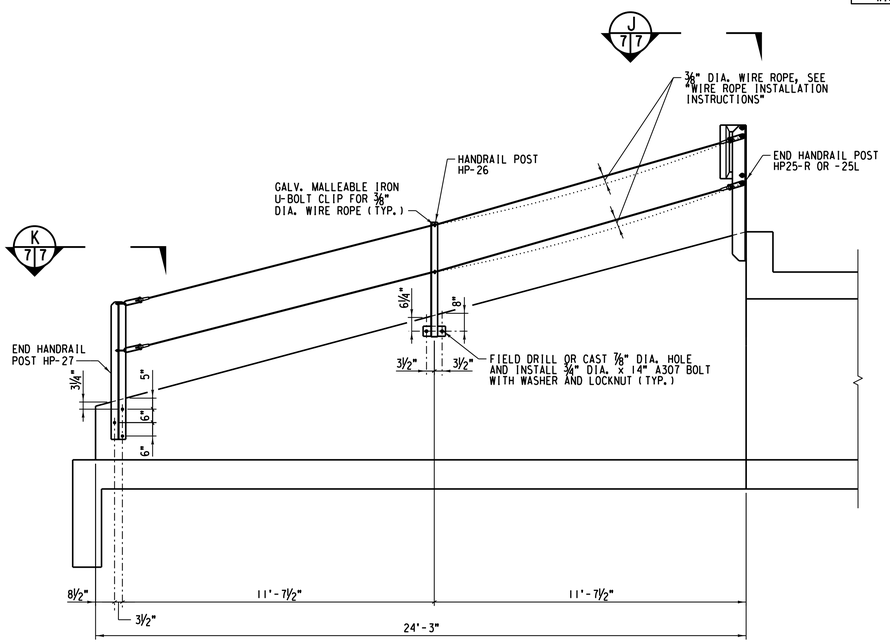
1. THREAD WIRE ROPE THROUGH ALL CLIPS AND BARREL ANCHORS AND SEAT RETAINING WEDGES ON ONE END HANDRAIL POST.
2. STRETCH WIRE ROPE, HANG A MINIMUM OF 10 LB. ON CABLE BETWEEN TWO POSTS AND REMOVE ALL SAG TO A MAXIMUM OF 2 INCHES.
3. SEAT RETAINING WEDGES AT REMAINING END HANDRAIL POST.
4. REMOVE WEIGHTS.
5. TIGHTEN CLIPS AT INTERMEDIATE POSTS.
6. CUT & REMOVE EXCESS WIRE ROPE, COAT CUT PORTIONS OF WIRE ROPE WITH COLD GALVANIZING COMPOUND.



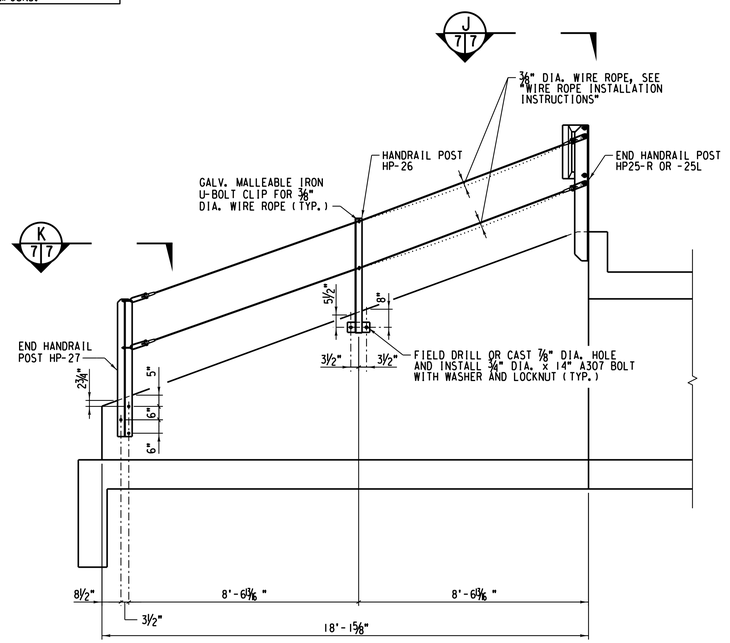
VIEW J 7|7
SCALE: 1 1/2"=1'-0"



VIEW K 7|7
SCALE: 1 1/2"=1'-0"



24'-3" WINGWALL



18'-1 5/8" WINGWALL

WINGWALL HANDRAIL LAYOUT

SCALE: 3/8"=1'-0"

(LOOKING PERPENDICULAR TO FACE OF WINGWALL)

NOTES:
1. FOR HANDRAIL POST DETAILS, SEE STD. DWG. 680160 SHT. H1.
2. RCB = REINFORCED CONCRETE BOX

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL
STATUS
07/05/2023
DATE

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
CONSULTANT ENGINEER
03/01/2023
DATE

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123078

LATITUDE: 33.28584°N LONGITUDE: 111.67325°W

Registered Professional Engineer CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 03-14-2023 ARIZONA, U.S.A.

DSN/CHK BY: MEW/NAS	UNION PACIFIC RAILROAD
DRAWN/CHK BY: MEW/MJH	Office of Director Structures Design
UPRR ENGINEER: ADS	LOCATION & DESCRIPTION: CULVERT 0.52, PIRATE IND LEAD
SHT NO.: S7 of S7	FURNISH & INSTALL DOUBLE CELL 6'-0" x 6'-0" RCB x 230'
	SHEET TITLE: HANDRAIL DETAILS

PLOTTED: 7/7/2023 12:35:27 PM

FILE NAME: \\oa.ad.oaconsulting.com\fnts-na1\projects\2020\0501.1000\020-0927\40-Design\Microstation\020-0927_RLBR.GU\v 0.52,Station 27+60,43+Pirate Ind Lead,0.52.dgn

GENERAL NOTES

GENERAL

1. All work requirements shown on the design and not otherwise detailed shall be accomplished as specified in Union Pacific Railroad (UPRR) Specifications and the American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual for Railway Engineering. In the event of conflicts between specifications, the more restrictive shall apply.

2. All structures were designed in accordance with the AREMA Manual, Chapter 8 - Concrete Structures and Foundations.

3. Box culverts designed for a min. 1'-6" cover and a max. 18'-0" cover. Cover is measured from base of rail to top of the concrete box.

4. Construction means and methods shall comply with the All Permits Issued (API) package.

5. Field verify all dimensions, stations and elevations prior to start of construction.

6. Contact the Union Pacific "Call Before You Dig" number 90 days (not less than 60 days) prior to proposed construction start date. Prior to construction, confirm that all necessary relocations have been completed. The CBYD number is: 1-800-336-9193.

7. Location of known utilities is approximate. Location shall be verified prior to construction. Notify Call 811 "Call Before you Dig" number at least 48 hours prior to construction.

PRECAST CONCRETE:

1. All concrete materials, placement and workmanship shall be in accordance with Part 1, Chapter 8 of the current AREMA Manual for Railway Engineering.

2. Minimum compressive strength - 4000 psi at 28 days.

3. Exposed surfaces shall be formed in a manner which will produce a smooth and uniform appearance without rubbing or plastering. Exposed edges of 90 degrees or less are to be chamfered ¾" x ¾". Top surface to have a smooth finish, free of all float or trowel marks.

4. Concrete shall be proportioned such that the water - cement ratio (by weight) does not exceed 0.45. Concrete must contain a minimum of 6½ sacks of cement per cubic yard of concrete. Flyash replacement may account for up to 25% of the cement.

5. Cement shall be Type I, Type II or Type III Portland Cement in accordance with ASTM C150 specifications.

6. Aggregates shall be graded in accordance with ASTM C33 specifications. Coarse aggregate shall be no. 67. Fine aggregate shall be natural sand.

7. Air content shall be between 5% and 7% (by volume).

8. Admixtures shall not be used without approval by Engineer.

9. Curing shall be accomplished by wet curing or the application of a Type 2 membrane.

10. The fabricator shall stencil the item name, date manufactured, name of manufacturer and actual lifting weight at location shown.

11. Production procedures for the manufacture of precast members shall be in accordance with the AREMA Manual for Railway Engineering and the Precast/Prestressed Concrete Institute's Manual MNL 116 for Quality Control.

12. Dimensional tolerances governing the manufacture of precast members shall conform to Division VI, Section 6.4 of the Precast/Prestressed Concrete Institute's Manual MNL 116 for Quality Control. Tolerance for location of lifting devices shall be ½".

13. The fabricator will be responsible for loading and properly securing all precast concrete members for shipment. All concrete components shall be made available for inspection by the Railroad at the fabricator's plant prior to shipment, at the Railroad's discretion.

CAST-IN-PLACE CONCRETE:

1. All concrete materials, placement and workmanship shall be in accordance with Part 1, Chapter 8 of the current AREMA Manual for Railway Engineering.

2. Formwork tolerances shall be in accordance with ACI 347 specifications.

3. Minimum compressive strength - 4000 psi at 28 days.

4. Exposed surfaces shall be formed in a manner which will produce a smooth and uniform appearance without rubbing or plastering. Exposed edges of 90 degrees or less are to be chamfered ¾" x ¾". Top surface to have a smooth finish, free of all float or trowel marks.

5. Concrete shall be proportioned such that the water - cement ratio (by weight) does not exceed 0.45. Concrete must contain a minimum of 6½ sacks of cement per cubic yard of concrete. Flyash replacement may account for up to 25% of the cement.

6. Cement shall be Type I, Type II or Type III Portland Cement in accordance with ASTM C150 specifications.

7. Aggregates shall be graded in accordance with ASTM C33 specifications. Coarse aggregate shall be no. 67. Fine aggregate shall be natural sand.

8. Air content shall be between 5% and 7% (by volume).

9. Admixtures shall not be used without approval by Engineer.

10. Curing shall be accomplished by wet curing or the application of a Type 2 membrane.

REINFORCING STEEL:

1. Reinforcing steel shall be deformed, new billet bars per current ASTM A615 Specifications and to meet grade 60 requirements.

2. Fabrication of reinforcing steel shall be per Chapter 7 of the CRSI Manual of standard practice. Dimensions of bending details are out to out of bar.

3. Reinforcing steel is to be blocked to proper location and securely wired against displacement. Tie wires shall be installed at every other bar intersection so that at least 50% of the intersections are tied. Tack welding of reinforcing is prohibited. Minimum concrete cover on reinforcement not otherwise noted shall meet current AREMA Manual for Railway Engineering requirements.

LIFTING ANCHORS:

1. Swift lift anchors shall be Dayton Superior P-52 anchors or approved alternate with a minimum safe working load sufficient for the weight of the precast element including form removal. The safe working load shall provide a minimum safety factor of 4.

CONSTRUCTOR NOTES (WHEN APPLICABLE)

CONSTRUCTOR DEFINITION

CONSTRUCTOR DESIGNATES MANAGER BRIDGE CONSTRUCTION IF CONSTRUCTION BY UPRR AND CONTRACTOR IF CONSTRUCTION BY CONTRACTOR.

DIVISION OF RESPONSIBILITY

A. RAILROAD

1. Remove ties, rail and OTM from project area as required.

2. Provide and install ballast, ties, rail and OTM at proposed culvert.

3. Provide material as shown in the Bill of Material.

4. Provide and install Private Property/No Trespassing sign and culvert marker signs on right side at each end of culvert.

B. CONSTRUCTOR

1. Coordinate all construction activities with the Railroad.

2. Before ordering any material, Constructor shall make a detailed field inspection of the site verifying all pertinent dimensions and elevations. Any variations in dimensions or elevations from those shown on the drawings shall be reported immediately to the UPRR Project Manager.

3. Any modifications to this design shall be approved by the UPRR Office of Structures Design prior to construction.

4. Verify the location, relocation, abandonment, and/or temporary support of all utilities affected by the construction of the structure and embankment and coordinate these activities with the appropriate utility companies, agencies and/or authorities.

5. Apply for and obtain all construction permits necessary to perform the work.

6. Bill of Material and Schedules are provided for information only. Constructor shall be responsible for providing all material, not provided by the Railroad, required to complete the work.

7. Perform all work not performed by the Railroad.

8. Provide the Railroad with a detailed construction plan defining the activity, schedule and procedure for each aspect of the work. Construction shall not begin until the construction plan has been approved by the Railroad.

9. Provide all temporary structures (shoring, bracing and/or falsework) required to support and protect the existing embankments and structures affected by the work. Provide the Railroad with details, design and procedure for all temporary structures. All temporary structures shall be designed, signed and sealed by a professional engineer registered in the State that the structure is to be constructed. All temporary structures shall be approved by the UPRR Office of Structures Design prior to beginning construction.

10. Provide well-compacted bedding as required to establish grade of the culvert. Bedding for the box culvert shall consist of a minimum of 1'-6" of culvert bedding material. Over excavate 1'-6" each side of box. If loose, soft, or excessively wet soils are encountered at this depth, a 6" lift of granular bedding shall be placed on these soils and compressed into the subgrade. This procedure shall continue until a stable subgrade is produced. If a stable subgrade can not be achieved, the UPRR Office of Structures Design shall be notified.

11. Provide temporary guardrail system as directed by UPRR Project Manager. Guardrails on shoring shall include but not be limited to the following:

    The top edge height of the top rail shall be 42" +/- 3" above the walking/working surface.

    At least one midrail shall be provided, evenly spaced between walking/working surface and top rail.

    Metal or timber posts or uprights shall be spaced at maximum intervals of 10'-0".

    Entire guardrail system, including anchorages, shall be capable of withstanding without failure, a force of 200 lbs. applied in any outward or downward direction at any point.

    Guardrail system shall be surfaced to prevent injuries from punctures and lacerations and prevent snagging of clothing. The ends of top rails and midrails shall not extend past the posts or uprights.

    If conditions warrant, i.e. pedestrian traffic/weather, additional protection shall be provided such as screens or mesh to prevent slipping between the midrail and walking/working surface.

DIVISION OF RESPONSIBILITY

12. Direct channel flow as required to perform work.

13. Remove debris and ballst from channel as directed by the Railroad.

14. Accomplish activities within the schedule specified in the approved construction plan.

CULVERT BEDDING

Culvert bedding shall be granular material such as aggregates ordinarily specified and used in the construction of highway base and subbase. These aggregates include crushed stone, natural or crushed gravel, natural or manufactured sands, crushed slag or a homogeneous mixture of these materials. Culvert bedding shall be compacted to 95% of maximum dry density as defined in ASTM International D1557 (Modified Proctor). Recommended gradation is as follows:

SCREEN SIZE	% PASSING (BY WEIGHT)
1 inch	100
½ inch	60-90
⅜ inch	20-40
No. 4	10-20
No. 200	less than 5%

Union Pacific Sealant Ballast SB-2, item no. 562-5428, may be used.

BOX CULVERT OPENING AREA

CELL WIDTH (FT)	CELL HEIGHT (FT)	SINGLE CELL OPENING (FT^2)	DOUBLE CELL OPENING (FT^2)
6	4	23.1	46.2
6	6	35.1	70.2
8	4	30.6	61.2
8	6	46.6	93.2
8	8	62.6	125.2
10	4	38.0	76.0
10	6	58.0	116.0
10	8	78.0	156.0
10	10	98.0	196.0
10	12	118.0	236.0
12	8	93.3	186.6
12	10	117.3	234.6
12	12	141.3	282.6

REVISIONS		
DATE	LTR.	DESCRIPTION
/		
/		
/		
/		
/		
/		

DESIGN BY: HDR | DRAWN BY: HDR | CHECKED BY: UPRR

APPROVED:

01-03-2020

UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

CONCRETE BOX CULVERTS

GENERAL NOTES

FILE OWNER: UPRR | DATE: JANUARY, 2020

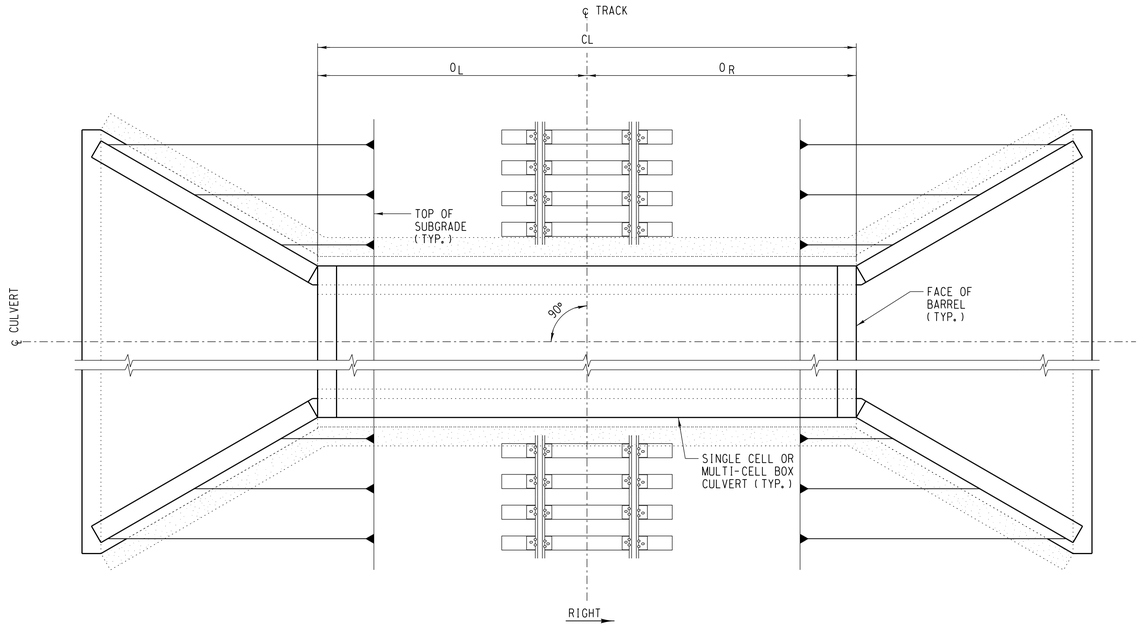
PLAN NO.: 680200 | SHEET: G1

Copyright © 2020 by Union Pacific Railroad

PLOTTED: 1/3/2020 3:30:45 PM

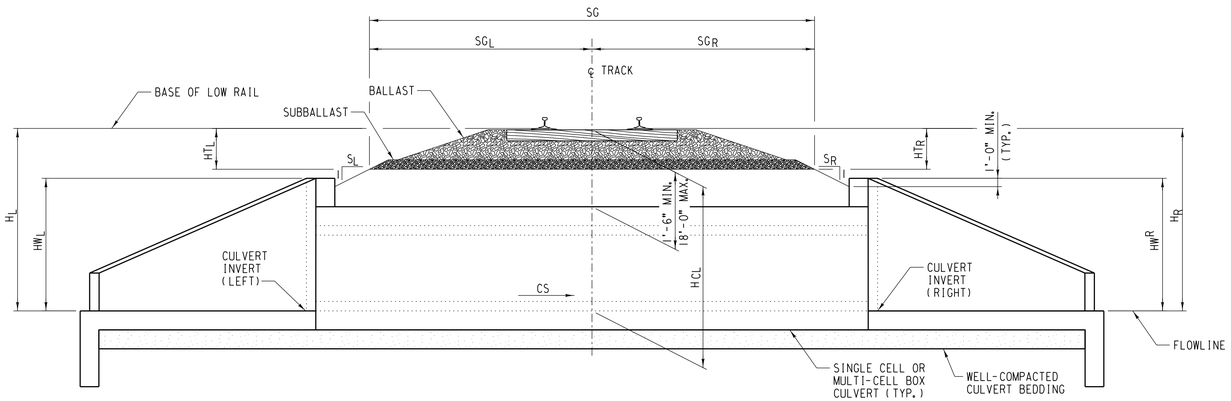
FILE NAME: pw://HDR.US.National.01/4195/10196897/680200_Concrete Box Culverts.dgn

INCHES 1 2 3 4 5 6 7 8 9 10 11 12



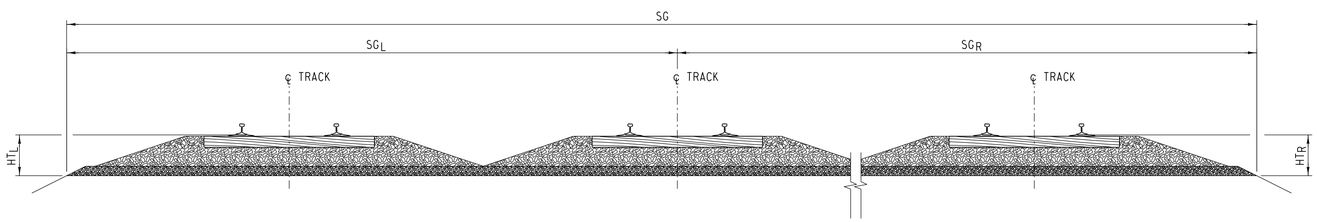
PLAN - SINGLE TRACK

SCALE: NONE



ELEVATION - SINGLE TRACK

SCALE: NONE



MULTIPLE TRACK DIAGRAM

SCALE: NONE

CULVERT LENGTH EQUATION:

$CL = O_L + O_R \geq SG + 2'$

$O_L = SG_L + S_L(H_L - HT_L + 1' - HW_L) + 1'$

$O_R = SG_R + S_R(H_R - HT_R + 1' - HW_R) + 1'$

$$H_L = \frac{H_{CL} + CS\,[SG_L - S_L(HT_L + HW_L - 1') + 1']}{[1 - CS(S_L)]}$$

$$H_R = \frac{H_{CL} - CS\,[SG_R - S_R(HT_R + HW_R - 1') + 1']}{[1 + CS(S_R)]}$$

$SG = SG_L + SG_R$

$H_{AVG} = (H_L + H_R) / 2$

KEY:

CL = CULVERT LENGTH
O_L = OFFSET LEFT
O_R = OFFSET RIGHT
H_{CL} = HEIGHT - BASE OF LOW RAIL TO FLOWLINE AT CENTERLINE OF TRACK
CS = CULVERT SLOPE (RISE/RUN) LEFT TO RIGHT (+ UP, - DOWN)
HT_L = BASE OF LOW RAIL TO TOP OF SUBGRADE LEFT EDGE
HT_R = BASE OF LOW RAIL TO TOP OF SUBGRADE RIGHT EDGE
H_L = HEIGHT - BASE OF LOW RAIL TO INVERT LEFT OF TRACK
H_R = HEIGHT - BASE OF LOW RAIL TO INVERT RIGHT OF TRACK
HW_L = HEIGHT OF WINGWALL LEFT OF TRACK
HW_R = HEIGHT OF WINGWALL RIGHT OF TRACK
SG = WIDTH OF SUBGRADE (24'-0" MINIMUM)
SG_R = WIDTH OF SUBGRADE RIGHT OF ℄ TRACK (12'-0" MINIMUM)
SG_L = WIDTH OF SUBGRADE LEFT OF ℄ TRACK (12'-0" MINIMUM)
S_L = SIDE SLOPE LEFT OF TRACK (RUN PER FOOT OF RISE)
S_R = SIDE SLOPE RIGHT OF TRACK (RUN PER FOOT OF RISE)

NOTE:
ALL DIMENSIONS ARE IN FEET.

REVISIONS		
DATE	LTR.	DESCRIPTION
/		
/		
/		
/		
/		
/		

DESIGN BY: HDR | DRAWN BY: HDR | CHECKED BY: UPRR

APPROVED:

01-03-2020

UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

CONCRETE BOX CULVERTS

GENERAL ARRANGEMENT FOR SINGLE CELL AND MULTI-CELL BOX CULVERTS

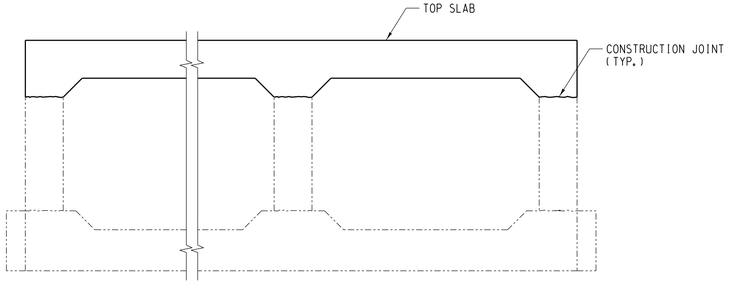
FILE OWNER: UPRR | DATE: JANUARY, 2020

PLAN NO.: 680200 | SHEET: G2

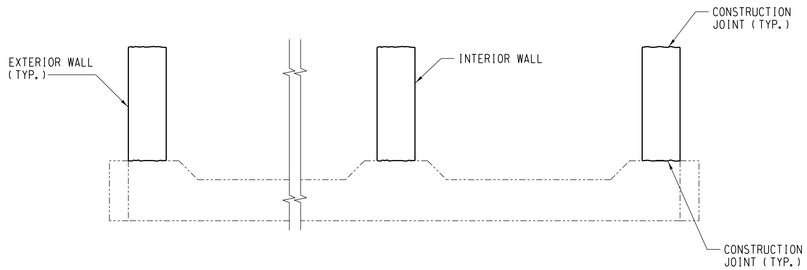
Copyright © 2020 by Union Pacific Railroad PLOTTED: 1/3/2020 3:30:46 PM

FILE NAME: pw://HDR_US_National.01/4195/10196897/680200_Concrete Box Culverts.dgn

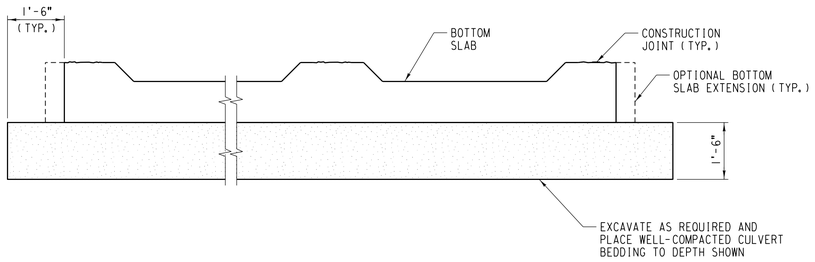
INCHES 1 2 3 4 5 6 7 8 9 10 11 12



PHASE THREE



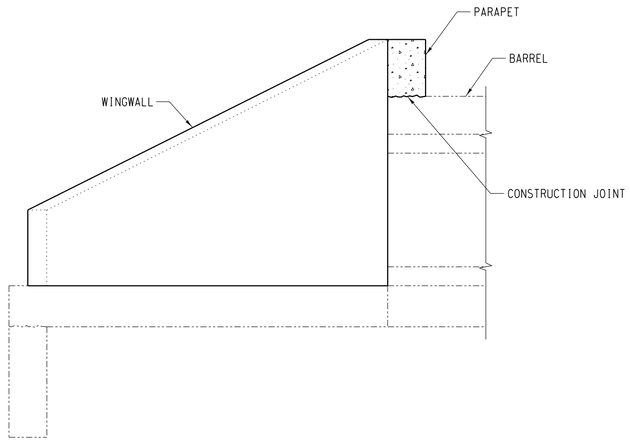
PHASE TWO



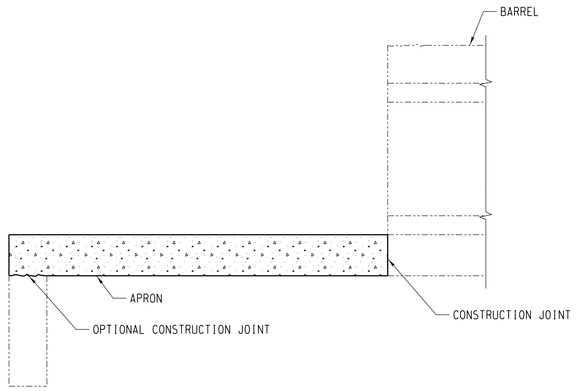
PHASE ONE

CONSTRUCTION SEQUENCE - BARREL

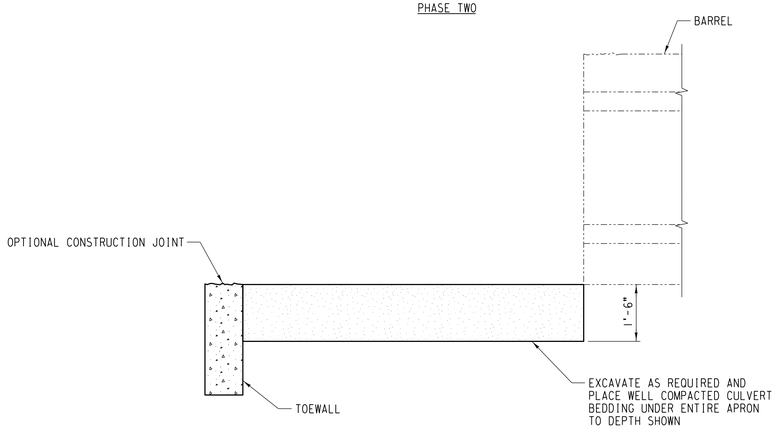
SCALE: ½"=1'-0"



PHASE THREE



PHASE TWO



PHASE ONE

CONSTRUCTION SEQUENCE - PARAPET, APRON, TOEWALL AND WINGWALLS

SCALE: ½"=1'-0"

(LOOKING PERPENDICULAR TO ℄ CULVERT)

REVISIONS		
DATE	LTR.	DESCRIPTION
/		
/		
/		
/		
/		
/		

DESIGN BY: HDR | DRAWN BY: HDR | CHECKED BY: UPRR

APPROVED:

01-03-2020

UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

CONCRETE BOX CULVERTS

CONSTRUCTION SEQUENCE

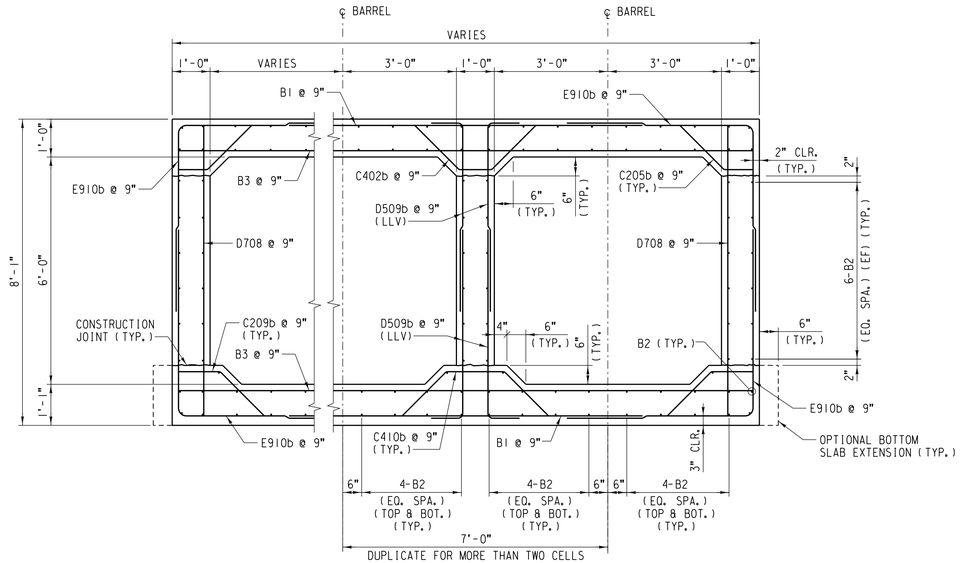
FILE OWNER: UPRR	DATE: JANUARY, 2020
PLAN NO.: 680200	SHEET: G5

Copyright © 2020 by Union Pacific Railroad

PLOTTED: 1/3/2020 3:30:48 PM

FILE NAME: pw://HDR_US_National.01/41951019698897/680200_Concrete Box Culverts.dgn

INCHES 1 2 3 4 5 6 7 8 9 10 11 12

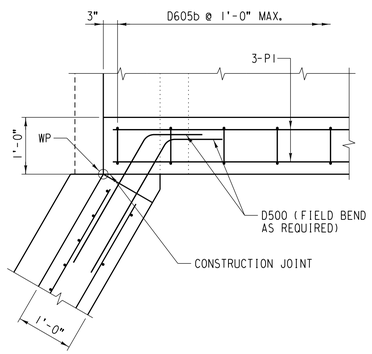


TYPICAL BARREL SECTION

SCALE: 1/2"=1'-0"

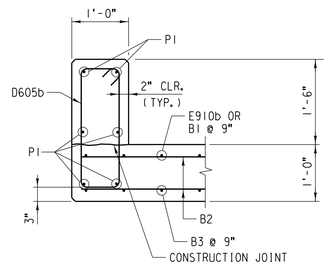
BAR SPLICE NOTE:

FOR B1 BAR USE 2'-7" MIN. LAP SPLICE WHEN NEEDED AND CENTER SPLICE AT MIDSPAN OF CULVERT OPENING, FOR B3 BAR USE 2'-1" MIN. LAP SPLICE WHEN NEEDED AND CENTER SPLICE OVER INTERIOR WALL, FOR B2 AND P1 BARS USE 1'-9" MIN. LAP SPLICE WHEN NEEDED AND STAGGER SPLICE.



WINGWALL TO PARAPET CONNECTION DETAIL

SCALE: 3/4"=1'-0"



PARAPET DETAIL

SCALE: 3/4"=1'-0"

NOTES:

1. FOR CAST-IN-PLACE CONCRETE NOTES AND REINFORCING STEEL NOTES, SEE SHEET NO. G1.
2. EF = EACH FACE
   FF = FAR FACE
   LLH = LONG LEG HORIZONTAL
   LLV = LONG LEG VERTICAL
   NF = NEAR FACE
   WP = WORKING POINT

CONCRETE QUANTITIES

	TOTAL	UNIT	DESCRIPTION
ONE END	AA	CU. YD./FT.	BARREL
	BB	CU. YD.	PARAPET
	CC	CU. YD.	TOEWALL
	DD	CU. YD.	APRON
	6.0	CU. YD.	TWO WINGWALLS

EQUATIONS FOR VARIABLES:

L = LENGTH OF BARREL (FT)
NC = NUMBER OF BOX CULVERT CELLS
NB = 1.33(L-0.33) + 1 (ROUND UP TO THE NEAREST INTEGER)

TOTAL NUMBER OF BARS

A = 2(NB)
B = NB(NC-1)
C = 4(NB)(NC-1)
D = 66 + 46(NC-1)
E = 4(NB)
F = 16 + 14(NC-1)
G = 48 + 14(NC-1)
H = 8.5 + 7(NC-1) (ROUND UP TO THE NEAREST INTEGER)

LENGTH OF BARS

P = L - 0.33
Q = 7.67 + 7(NC-1)
R = 2.58 + 7(NC-1)
S = 9 + 7(NC-1)
T = 23.83 + 7(NC-1)
U = 9.58 + 7(NC-1)
V = 23.50 + 7(NC-1)

LENGTH OF BARS ARE CALCULATED IN FEET AND ROUNDED DOWN TO THE NEAREST WHOLE INCH.

CALCULATED BAR LENGTHS DO NOT INCLUDE LAP SPLICES, SEE BAR SPLICE NOTE FOR LAP SPLICE REQUIREMENTS.

CONCRETE QUANTITIES

AA = 1.09 + 0.79(NC-1)
BB = 0.44 + 0.39(NC-1)
CC = 2.61 + 0.76(NC-1)
DD = 9.66 + 3.93(NC-1)

ROUND CONCRETE QUANTITIES TO ONE DECIMAL PLACE.

REINFORCING SCHEDULE

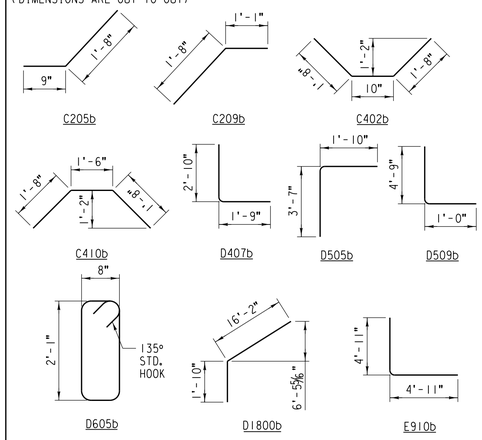
	TOTAL	MARK	SIZE	LENGTH	SHAPE
BARREL	A	C205b	#4	2'-5"	
	A	C209b	#4	2'-9"	
	B	C402b	#4	4'-2"	
	B	C410b	#4	4'-10"	
	C	D509b	#5	5'-9"	
	A	D708	#5	7'-8"	
	D	B2	#5	P	
	E	E910b	#6	9'-10"	
	A	B3	#6	Q	
	A	B1	#7	R	
PARAPET, APRON, TOEWALL AND TWO WINGWALLS FOR ONE END	F	D400	#5	4'-0"	
	78	D407b	#5	4'-7"	
	44	D500	#5	5'-0"	
	G	D505b	#5	5'-5"	
	H	D605b	#5	6'-5"	
	F	D1308	#5	13'-8"	
	12	D1409	#5	14'-9"	
	4	D1800b	#5	18'-0"	
	6	P1	#5	Q	
	2	A3	#5	S	
	8	T1	#5	T	

SET LIST

MARK	SIZE	MIN. LENGTH	MAX. LENGTH	INCREMENT	NO. OF BARS/SET	NO. OF SETS	SHAPE
D103-D1209	#5	1'-3"	12'-9"	2'-3 5/16"(+)	6	4	
D201-D801	#5	2'-1"	8'-1"	6"	13	2	
D202-D802	#5	2'-2"	8'-2"	3"	25	2	
D303-D1307	#5	3'-3"	13'-7"	1'-8 5/16"(+)	7	4	
A1	#5	U	V	6 5/16"(+)	25	1	
A2	#5	U	V	1'-1 1/8"(+)	13	1	

BENDING DIAGRAM

(DIMENSIONS ARE OUT TO OUT)



NOTE:

BAR DESIGNATIONS CONSIST OF BAR SIZE & LENGTH FOLLOWED BY THE LETTER "b" IF BENT. BAR SIZES ARE REPRESENTED BY THE LETTERS A THROUGH L CORRESPONDING TO BAR SIZE #2 THROUGH #18. BAR LENGTHS ARE GIVEN IN FEET AND INCHES; THE LAST TWO DIGITS ARE INCHES.

EST. WT. OF REINFORCING STEEL FOR BARREL = 79.63(NB)(NC) + 47.98(NC)(L) + 35.90(NB) - 15.99(NC) + 20.86(L) - 6.95 LB.

EST. WT. OF REINFORCING STEEL FOR PARAPET, APRON, TOEWALL AND TWO WINGWALLS FOR ONE END = 3,238 + 779(NC-1) LB.

REVISIONS		
DATE	LTR.	DESCRIPTION
/		
/		
/		
/		
/		
/		

DESIGN BY: HDR | DRAWN BY: HDR | CHECKED BY: UPRR

APPROVED:

01-03-2020

UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

CONCRETE BOX CULVERTS

6'-0" x 6'-0" MULTI-CELL BOX CULVERT DETAILS (SHEET 1 OF 2)

FILE OWNER: UPRR | DATE: JANUARY, 2020

PLAN NO.: 680200 | SHEET: MC3

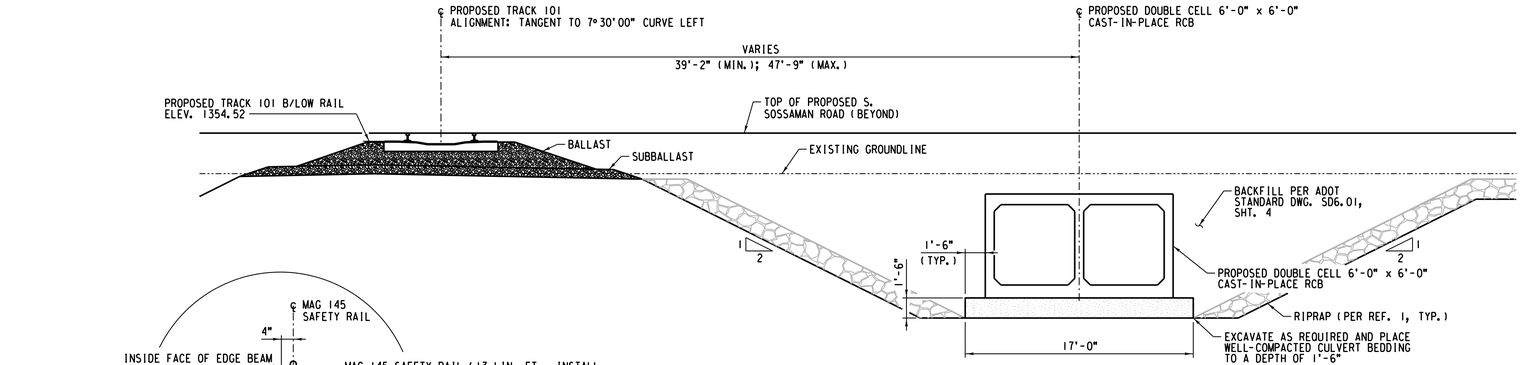
Copyright © 2020 by Union Pacific Railroad

PLOTTED: 1/3/2020 3:31:06 PM

FILE NAME: pw://HDR_US_National.01/4195/10196897/680200_Concrete Box Culverts.dgn

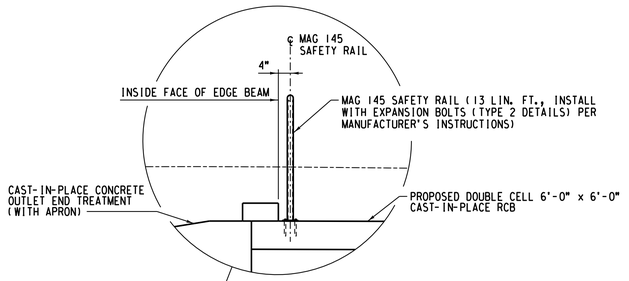
INCHES 1 2 3 4 5 6 7 8 9 10 11 12

DESIGN SHEET



ELEVATION

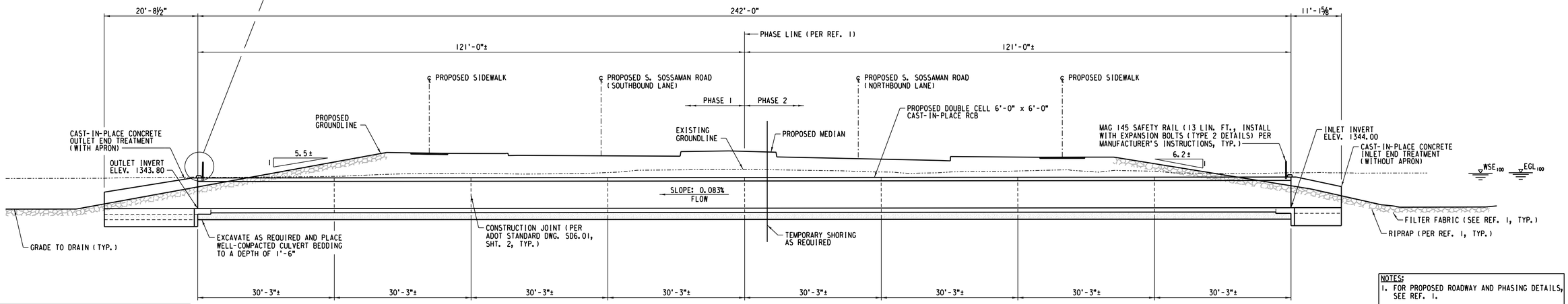
SCALE: 1/32"=1'-0"



NOTES:
1. SECTION SHOWN AT STA. 41+00. S. SOSSAMAN ROAD AND CROSSING DETAILS (BEYOND) NOT SHOWN FOR CLARITY.
2. CONSTRUCTOR MAY PROPOSE STEEPER TEMPORARY OPEN CUT IF REQUIRED FOR CONSTRUCTION (1:1 MAX).

TO PHOENIX SUBDIVISION

TO END OF TRACK 101



MATERIAL NOTES:
1. ALL CAST-IN-PLACE CONCRETE SHALL BE PER STD. DWG. 680200 SHT. G1.
2. CEMENT SHALL BE TYPE II OR TYPE III PORTLAND CEMENT IN ACCORDANCE WITH ASTM C150 SPECIFICATIONS.

NOTES:
1. FOR PROPOSED ROADWAY AND PHASING DETAILS, SEE REF. 1.
2. CROSS SECTION SHOWN ALONG CENTERLINE OF PROPOSED RCB.
3. RCB = REINFORCED CONCRETE BOX

CROSS SECTION

SCALE: 3/16"=1'-0"

WSE_{100} = 1347.81
EGL_{100} = 1347.87
VEL_{100} = 6.80 fps

BILL OF MATERIAL

REQ'D.	UNIT	DESCRIPTION	STORE ITEM NO.	ORDERED BY
242	FT	6'-0" X 6'-0" DOUBLE-CELL BOX CULVERT BARREL (PER ADOT STANDARD DRAWINGS, PLAN SD6.01 SHEET 1 AND PLAN SD6.02, SHEET 1)		CONSTRUCTOR
1	EA.	OUTLET END TREATMENT FOR 6'-0" X 6'-0" DOUBLE-CELL BOX CULVERT, SKEW = 0° (WITH APRON) (PER ADOT STANDARD DRAWINGS, PLAN SD6.01, SHEET 1 & 4, PLAN SD6.08, SHEET 1 AND PLAN SD6.11, SHEET 1 & 3)		
1	EA.	INLET END TREATMENT FOR 6'-0" X 6'-0" DOUBLE-CELL BOX CULVERT, SKEW = 0° (WITHOUT APRON) (PER ADOT STANDARD DRAWINGS, PLAN SD6.01, SHEET 2 & 4, AND PLAN SD6.08, SHEET 3)		
26	LIN.FT.	MARICOPA ASSOCIATION OF GOVERNMENTS (MAG) 145 SAFETY RAIL (TWO HEADWALLS, WITH EXPANSION BOLTS (TYPE 2 DETAILS) AND ALL OTHER ASSOCIATED HARDWARE) OR APPROVED ALTERNATE		
1	EA.	CULVERT MARKER SIGNS, MOUNTING POST AND MOUNTING HARDWARE (PER STD. DWG. 0502, 0507 AND 0599)	P00-2616	
1	LOT	RIPRAP (PER REF. 1)		
1	LOT	FILTER FABRIC (PER REF. 1)		
265	CU. YD.	CULVERT BEDDING (PER STD. DWG. 680200 SHT. G1)		
445	CU. YD.	STRUCTURE BACKFILL (PER ADOT STANDARD DRAWINGS, PLAN SD6.01, SHEET 4)		
1	LOT	FILL MATERIAL (PER STD. DWG. 680000 SHT. 3 AND REF. 1)		
1	LOT	EPOGRIP MULTIPURPOSE STRUCTURAL BONDING AND GROUTING EPOXY ADHESIVE OR APPROVED ALTERNATE		
1	LOT	TEMPORARY SHORING		
1	LOT	TEMPORARY FORMWORK MATERIAL		

CLSM MAY BE SUBSTITUTED FOR FILL MATERIAL.
BULK QUANTITIES ARE ESTIMATED.

DESIGN NOTES

LAYOUT

1. Stationing: Per Ref. 1.
2. Elevation Datum: Per Ref. 1.
3. Temporary Benchmarks:
   TBM 1 (Olsson CP 6): Elev. 1352.34, NAVD 1988, ½" rebar located in ground North of proposed Track 101 Culvert No. 0.80, 3208.83' left of existing Phoenix Sub. Main Track centerline, Sta. 1504+80.52.
   TBM 2 (Olsson CP 103): Elev. 1352.47, NAVD 1988, ½" rebar located in ground North of proposed Track 101 Culvert No. 0.80, 3342.95' left of existing Phoenix Sub. Main Track centerline, Sta. 1502+77.39.
4. Profile: Proposed Track 101 per Ref. 1.
5. Alignment: Not applicable.
6. Information used to prepare this drawing in addition to reference drawings:
   Hydrologic & Hydraulic Evaluation prepared by Olsson, dated September 2022.

DESIGN

1. This structure has been designed for AASHTO HL-93 Live Load with impact and cover depth ranging from 0'-0" to 10'-0".
2. Constructor shall be responsible for determining construction loads and providing necessary supplemental cover, or support of structural elements, to accommodate construction activities as required.

DRAWING SCHEDULE

THIS SET

SHEET NO.	PLAN NO.	DESCRIPTION	TYPE
S1	123079	GENERAL ARRANGEMENT (SHEET 1 OF 2)	DESIGN
S2	123079	GENERAL ARRANGEMENT (SHEET 2 OF 2)	DESIGN
G1	680200	GENERAL NOTES	STANDARD
1	SD6.01	REINFORCED CONCRETE BOX CULVERTS MISCELLANEOUS DETAILS (1 OF 5)	ADOT STANDARD
2	SD6.01	REINFORCED CONCRETE BOX CULVERTS MISCELLANEOUS DETAILS (2 OF 5)	ADOT STANDARD
4	SD6.01	REINFORCED CONCRETE BOX CULVERTS STRUCTURAL EXCAVATION & STRUCTURE BACKFILL	ADOT STANDARD
1	SD6.02	REINFORCED CONCRETE BOX CULVERTS DOUBLE BARREL (0'-15' FILLS)	ADOT STANDARD
1	SD6.08	REINFORCED CONCRETE BOX CULVERTS OUTLET WINGS - SKEW 0° TO 20° CULVERT HEIGHT 3' TO 7'	ADOT STANDARD
3	SD6.08	REINFORCED CONCRETE BOX CULVERTS INLET WINGS - SKEW 0° TO 20° CULVERT HEIGHT 3' TO 7'	ADOT STANDARD
1	SD6.11	REINFORCED CONCRETE BOX CULVERTS OUTLET APRON DETAILS	ADOT STANDARD
3	SD6.11	REINFORCED CONCRETE BOX CULVERTS OUTLET APRON - DIMENSIONS & QUANTITIES (6:1 SLOPE)	ADOT STANDARD
145	-	SAFETY RAIL	MAG STANDARD

REF.

NO.	DWG. NO.	SHEET NO.	REV. NO.	DESCRIPTION	TYPE
1	-	P018 OF 037 T008 OF 012 X045 OF 143 X046 OF 143 EC011 OF 036 PH011 OF 024	-	MESA, ARIZONA, PHOENIX SUBDIVISION, MP 934.78 TO MP 937.83, CONSTRUCT INDUSTRIAL LEAD TRACK, 100% PLANS, ISSUED FOR BID, DATED MARCH 6, 2023	DESIGN

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 07-05-2023 ARIZONA U.S.A.

POSTCONSTRUCTION COMPLIANCE

Constructor in charge of construction to provide to the office of the Senior Manager Structures Design as-built drawings confirming that the project was constructed in compliance with the plans and indicating any construction variances.

SIGNED

In Charge of Construction — Date

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL — STATUS — 07/05/2023 DATE

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
CONSULTANT ENGINEER — 02/08/2023 DATE

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123079

LATITUDE: 33.28826°N LONGITUDE: 111.66946°W

UNION PACIFIC

DSN/CHK BY:	NAS/MJH
DRAWN/CHK BY:	NAS/MJH
UPRR ENGINEER:	ADS
SHT NO.:	S1 of S2

UNION PACIFIC RAILROAD

Office of Director Structures Design

LOCATION & DESCRIPTION: CULVERT 0.80, PIRATE IND LEAD

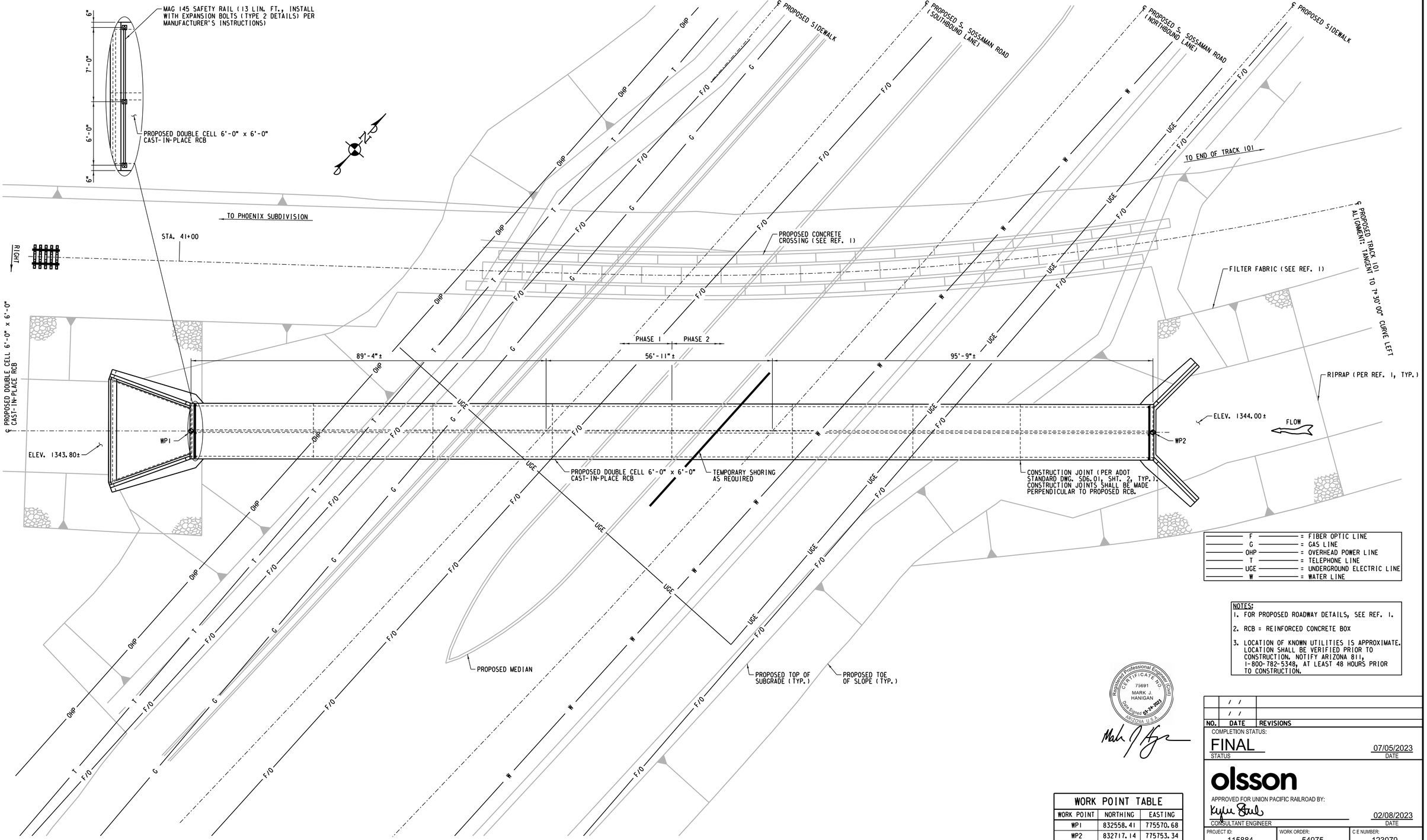
FURNISH & INSTALL
DOUBLE CELL 6'-0" x 6'-0" RCB x 242'

SHEET TITLE: GENERAL ARRANGEMENT (SHEET 1 OF 2)

PLOTTED: 7/5/2023 12:15:52 PM

FILE NAME: \\oa.ad.oaconsulting.com\fnts-na\projects\20201\0501.1000\020-0927\40-Design\Microstation\020-0927_RLBRA.dgn,v 0.80,Station 40-86.59,pir-r00080.cas.dgn

DESIGN SHEET



F	= FIBER OPTIC LINE
G	= GAS LINE
OHP	= OVERHEAD POWER LINE
T	= TELEPHONE LINE
UGE	= UNDERGROUND ELECTRIC LINE
W	= WATER LINE

NOTES:
1. FOR PROPOSED ROADWAY DETAILS, SEE REF. 1.
2. RCB = REINFORCED CONCRETE BOX
3. LOCATION OF KNOWN UTILITIES IS APPROXIMATE. LOCATION SHALL BE VERIFIED PRIOR TO CONSTRUCTION. NOTIFY ARIZONA 811, 1-800-782-5348, AT LEAST 48 HOURS PRIOR TO CONSTRUCTION.

PLAN
SCALE: 1/2 "=1'-0"

NOTE:
FOR DETAILS, SPECIFICATIONS, AND MATERIAL QUANTITIES OF RIPRAP AND GRADING, SEE REF. 1. GRADING AND RIPRAP LINEWORK SHOWN FOR INFORMATIONAL PURPOSES ONLY ON THESE PLANS.

WORK POINT TABLE		
WORK POINT	NORTHING	EASTING
WP1	832558.41	775570.68
WP2	832717.14	775753.34

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 02-24-2023 ARIZONA U.S.A.

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL (STATUS) 07/05/2023 (DATE)

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
CONSULTANT ENGINEER 02/08/2023 DATE

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123079

LATITUDE: 33.28826°N LONGITUDE: 111.66946°W

DSN/CHK BY:	NAS/MJH
DRAWN/CHK BY:	NAS/MJH
UPRR ENGINEER:	ADS
SHT NO.:	S2 of S2

UNION PACIFIC RAILROAD
Office of Director Structures Design

LOCATION & DESCRIPTION: CULVERT 0.80, PIRATE IND LEAD
FURNISH & INSTALL DOUBLE CELL 6'-0" x 6'-0" RCB x 242'

SHEET TITLE: GENERAL ARRANGEMENT (SHEET 2 OF 2)

FILE NAME: \\oa.ad.oasonsulting.com\rtc-nal\projects\2020\0501.1000\020-0927\40-Design\Microstation\020-0927.RLBPA.July 0.80.Station 40+86.59.pri-r00080.cadx.dgn

PLOTTED: 7/5/2023 12:15:53 PM

GENERAL NOTES

GENERAL

1. All work requirements shown on the design and not otherwise detailed shall be accomplished as specified in Union Pacific Railroad (UPRR) Specifications and the American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual for Railway Engineering. In the event of conflicts between specifications, the more restrictive shall apply.

2. All structures were designed in accordance with the AREMA Manual, Chapter 8 - Concrete Structures and Foundations.

3. Box culverts designed for a min. 1'-6" cover and a max. 18'-0" cover. Cover is measured from base of rail to top of the concrete box.

4. Construction means and methods shall comply with the All Permits Issued (API) package.

5. Field verify all dimensions, stations and elevations prior to start of construction.

6. Contact the Union Pacific "Call Before You Dig" number 90 days (not less than 60 days) prior to proposed construction start date. Prior to construction, confirm that all necessary relocations have been completed. The CBYD number is: 1-800-336-9193.

7. Location of known utilities is approximate. Location shall be verified prior to construction. Notify Call 811 "Call Before you Dig" number at least 48 hours prior to construction.

PRECAST CONCRETE:

1. All concrete materials, placement and workmanship shall be in accordance with Part 1, Chapter 8 of the current AREMA Manual for Railway Engineering.

2. Minimum compressive strength - 4000 psi at 28 days.

3. Exposed surfaces shall be formed in a manner which will produce a smooth and uniform appearance without rubbing or plastering. Exposed edges of 90 degrees or less are to be chamfered ¾" x ¾". Top surface to have a smooth finish, free of all float or trowel marks.

4. Concrete shall be proportioned such that the water - cement ratio (by weight) does not exceed 0.45. Concrete must contain a minimum of 6½ sacks of cement per cubic yard of concrete. Flyash replacement may account for up to 25% of the cement.

5. Cement shall be Type I, Type II or Type III Portland Cement in accordance with ASTM C150 specifications.

6. Aggregates shall be graded in accordance with ASTM C33 specifications. Coarse aggregate shall be no. 67. Fine aggregate shall be natural sand.

7. Air content shall be between 5% and 7% (by volume).

8. Admixtures shall not be used without approval by Engineer.

9. Curing shall be accomplished by wet curing or the application of a Type 2 membrane.

10. The fabricator shall stencil the item name, date manufactured, name of manufacturer and actual lifting weight at location shown.

11. Production procedures for the manufacture of precast members shall be in accordance with the AREMA Manual for Railway Engineering and the Precast/Prestressed Concrete Institute's Manual MNL 116 for Quality Control.

12. Dimensional tolerances governing the manufacture of precast members shall conform to Division VI, Section 6.4 of the Precast/Prestressed Concrete Institute's Manual MNL 116 for Quality Control. Tolerance for location of lifting devices shall be ½".

13. The fabricator will be responsible for loading and properly securing all precast concrete members for shipment. All concrete components shall be made available for inspection by the Railroad at the fabricator's plant prior to shipment, at the Railroad's discretion.

CAST-IN-PLACE CONCRETE:

1. All concrete materials, placement and workmanship shall be in accordance with Part 1, Chapter 8 of the current AREMA Manual for Railway Engineering.

2. Formwork tolerances shall be in accordance with ACI 347 specifications.

3. Minimum compressive strength - 4000 psi at 28 days.

4. Exposed surfaces shall be formed in a manner which will produce a smooth and uniform appearance without rubbing or plastering. Exposed edges of 90 degrees or less are to be chamfered ¾" x ¾". Top surface to have a smooth finish, free of all float or trowel marks.

5. Concrete shall be proportioned such that the water - cement ratio (by weight) does not exceed 0.45. Concrete must contain a minimum of 6½ sacks of cement per cubic yard of concrete. Flyash replacement may account for up to 25% of the cement.

6. Cement shall be Type I, Type II or Type III Portland Cement in accordance with ASTM C150 specifications.

7. Aggregates shall be graded in accordance with ASTM C33 specifications. Coarse aggregate shall be no. 67. Fine aggregate shall be natural sand.

8. Air content shall be between 5% and 7% (by volume).

9. Admixtures shall not be used without approval by Engineer.

10. Curing shall be accomplished by wet curing or the application of a Type 2 membrane.

REINFORCING STEEL:

1. Reinforcing steel shall be deformed, new billet bars per current ASTM A615 Specifications and to meet grade 60 requirements.

2. Fabrication of reinforcing steel shall be per Chapter 7 of the CRSI Manual of standard practice. Dimensions of bending details are out to out of bar.

3. Reinforcing steel is to be blocked to proper location and securely wired against displacement. Tie wires shall be installed at every other bar intersection so that at least 50% of the intersections are tied. Tack welding of reinforcing is prohibited. Minimum concrete cover on reinforcement not otherwise noted shall meet current AREMA Manual for Railway Engineering requirements.

LIFTING ANCHORS:

1. Swift lift anchors shall be Dayton Superior P-52 anchors or approved alternate with a minimum safe working load sufficient for the weight of the precast element including form removal. The safe working load shall provide a minimum safety factor of 4.

CONSTRUCTOR NOTES (WHEN APPLICABLE)

CONSTRUCTOR DEFINITION

CONSTRUCTOR DESIGNATES MANAGER BRIDGE CONSTRUCTION IF CONSTRUCTION BY UPRR AND CONTRACTOR IF CONSTRUCTION BY CONTRACTOR.

DIVISION OF RESPONSIBILITY

A. RAILROAD

1. Remove ties, rail and OTM from project area as required.

2. Provide and install ballast, ties, rail and OTM at proposed culvert.

3. Provide material as shown in the Bill of Material.

4. Provide and install Private Property/No Trespassing sign and culvert marker signs on right side at each end of culvert.

B. CONSTRUCTOR

1. Coordinate all construction activities with the Railroad.

2. Before ordering any material, Constructor shall make a detailed field inspection of the site verifying all pertinent dimensions and elevations. Any variations in dimensions or elevations from those shown on the drawings shall be reported immediately to the UPRR Project Manager.

3. Any modifications to this design shall be approved by the UPRR Office of Structures Design prior to construction.

4. Verify the location, relocation, abandonment, and/or temporary support of all utilities affected by the construction of the structure and embankment and coordinate these activities with the appropriate utility companies, agencies and/or authorities.

5. Apply for and obtain all construction permits necessary to perform the work.

6. Bill of Material and Schedules are provided for information only. Constructor shall be responsible for providing all material, not provided by the Railroad, required to complete the work.

7. Perform all work not performed by the Railroad.

8. Provide the Railroad with a detailed construction plan defining the activity, schedule and procedure for each aspect of the work. Construction shall not begin until the construction plan has been approved by the Railroad.

9. Provide all temporary structures (shoring, bracing and/or falsework) required to support and protect the existing embankments and structures affected by the work. Provide the Railroad with details, design and procedure for all temporary structures. All temporary structures shall be designed, signed and sealed by a professional engineer registered in the State that the structure is to be constructed. All temporary structures shall be approved by the UPRR Office of Structures Design prior to beginning construction.

10. Provide well-compacted bedding as required to establish grade of the culvert. Bedding for the box culvert shall consist of a minimum of 1'-6" of culvert bedding material. Over excavate 1'-6" each side of box. If loose, soft, or excessively wet soils are encountered at this depth, a 6" lift of granular bedding shall be placed on these soils and compressed into the subgrade. This procedure shall continue until a stable subgrade is produced. If a stable subgrade can not be achieved, the UPRR Office of Structures Design shall be notified.

11. Provide temporary guardrail system as directed by UPRR Project Manager. Guardrails on shoring shall include but not be limited to the following:

    The top edge height of the top rail shall be 42" +/- 3" above the walking/working surface.

    At least one midrail shall be provided, evenly spaced between walking/working surface and top rail.

    Metal or timber posts or uprights shall be spaced at maximum intervals of 10'-0".

    Entire guardrail system, including anchorages, shall be capable of withstanding without failure, a force of 200 lbs. applied in any outward or downward direction at any point.

    Guardrail system shall be surfaced to prevent injuries from punctures and lacerations and prevent snagging of clothing. The ends of top rails and midrails shall not extend past the posts or uprights.

    If conditions warrant, i.e. pedestrian traffic/weather, additional protection shall be provided such as screens or mesh to prevent slipping between the midrail and walking/working surface.

DIVISION OF RESPONSIBILITY

12. Direct channel flow as required to perform work.

13. Remove debris and ballst from channel as directed by the Railroad.

14. Accomplish activities within the schedule specified in the approved construction plan.

CULVERT BEDDING

Culvert bedding shall be granular material such as aggregates ordinarily specified and used in the construction of highway base and subbase. These aggregates include crushed stone, natural or crushed gravel, natural or manufactured sands, crushed slag or a homogeneous mixture of these materials. Culvert bedding shall be compacted to 95% of maximum dry density as defined in ASTM International D1557 (Modified Proctor). Recommended gradation is as follows:

SCREEN SIZE	% PASSING (BY WEIGHT)
1 inch	100
½ inch	60-90
⅜ inch	20-40
No. 4	10-20
No. 200	less than 5%

Union Pacific Sealant Ballast SB-2, item no. 562-5428, may be used.

BOX CULVERT OPENING AREA

CELL WIDTH (FT)	CELL HEIGHT (FT)	SINGLE CELL OPENING (FT^2)	DOUBLE CELL OPENING (FT^2)
6	4	23.1	46.2
6	6	35.1	70.2
8	4	30.6	61.2
8	6	46.6	93.2
8	8	62.6	125.2
10	4	38.0	76.0
10	6	58.0	116.0
10	8	78.0	156.0
10	10	98.0	196.0
10	12	118.0	236.0
12	8	93.3	186.6
12	10	117.3	234.6
12	12	141.3	282.6

REVISIONS		
DATE	LTR.	DESCRIPTION
/		
/		
/		
/		
/		
/		

DESIGN BY: HDR | DRAWN BY: HDR | CHECKED BY: UPRR

APPROVED:

01-03-2020

UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

CONCRETE BOX CULVERTS

GENERAL NOTES

FILE OWNER: UPRR | DATE: JANUARY, 2020

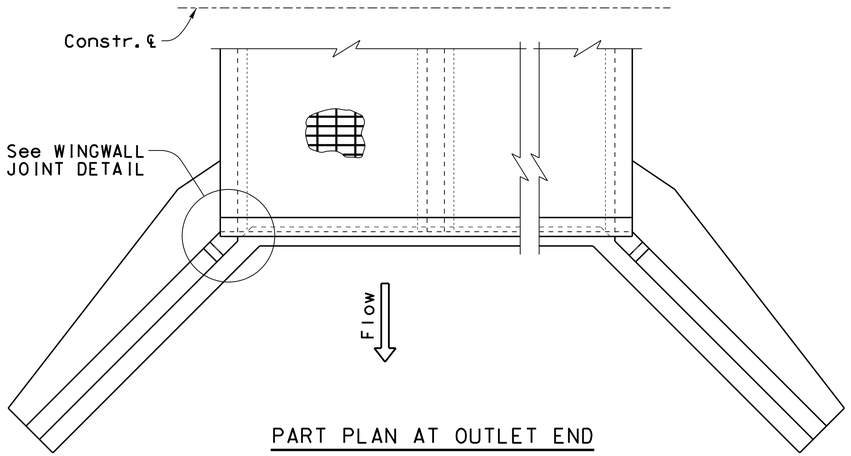
PLAN NO.: 680200 | SHEET: G1

Copyright © 2020 by Union Pacific Railroad

PLOTTED: 1/3/2020 3:30:45 PM

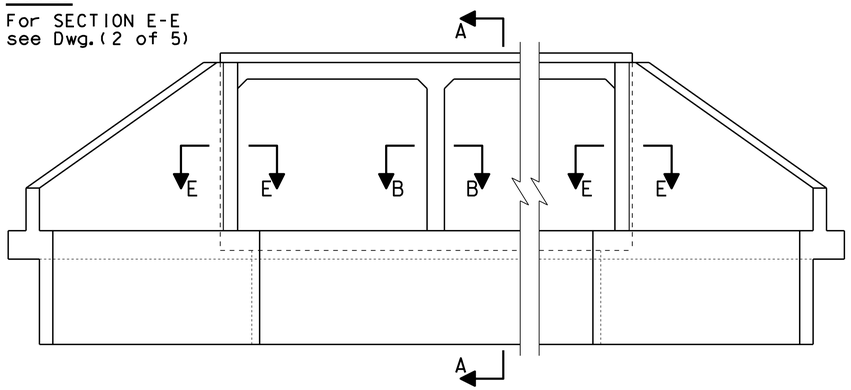
FILE NAME: pw://HDR.US.National.01/4195/10196897/680200_Concrete Box Culverts.dgn

INCHES 1 2 3 4 5 6 7 8 9 10 11 12



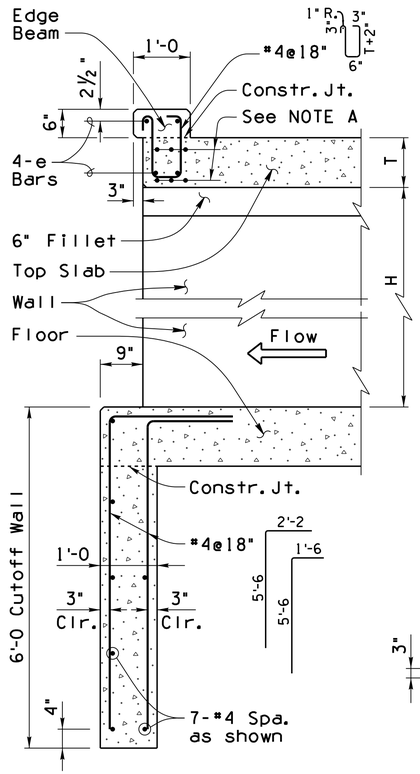
PART PLAN AT OUTLET END

NOTE:
For SECTION E-E see Dwg. (2 of 5)



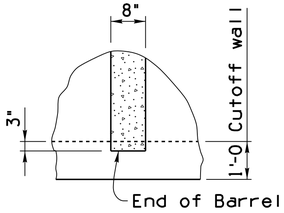
ELEVATION AT OUTLET END

NOTE A:
Use 3-#7 @3" spa. top and bott bars for culverts skewed 6° to 30°.
Use 3-#8 @3" spa. top and bott bars for culverts skewed 31° to 45°.
Culverts skewed over 45° require a special edge beam design.
Edge beam reinforcing quantity shall be added to table quantities.



SECTION A-A

e Bars			
Skew ∠	Span		
	6' & 8'	10'	12'
0° to 20°	#6	#6	#6
25° & 30°	#6	#6	#7
35°	#6	#7	#8
40° & 45°	#6	#7	#9



SECTION B-B

GENERAL NOTES:

Construction Specification - Arizona Department of Transportation Standard Specifications for Road and Bridge Construction, latest Edition.

Design Specifications - AASHTO LRFD Bridge Design Specifications, 7th Edition 2014.

Loading Class - HL-93.

Design:
Soil weight = 120 p.c.f.

All Concrete shall be Class "S" (f'c = 3000 psi).

Reinforcing steel shall conform to ASTM Specification A615. All reinforcing shall be furnished as Grade 60.

All bends and hooks shall meet the requirements of AASHTO LRFD Article 5.10. All bend dimensions for reinforcing steel shall be out-to-out of bars. All placement dimensions for reinforcing steel shall be to center of bars unless noted otherwise.

All reinforcing steel shall have 2" clear cover unless noted otherwise.

Chamfer all exposed corners ¾" unless noted otherwise.

Compact backfill for footing and wing base minimum 100 percent of ASTM D698 maximum dry density.

All structures shall have formed Construction joints in the top slab and walls (optional in floor slab) and spaced not more than 38'-6" apart or as shown in Project Plans. Joints shall be perpendicular to the centerline of the box. Reinforcing steel shall project 1'-6 thru the joint. The joint shall be made with a ¼" plywood bulkhead which shall be left in place or the alternate joint detail shown on Dwg. (2 of 5) may be used.

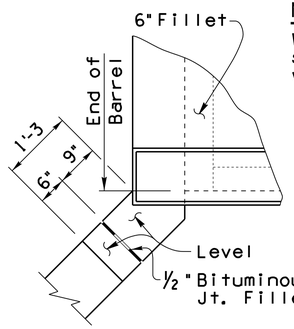
See Project Plans for culvert layout, invert elevations, finished grade elevations, headwall, apron, and other site specific details.

Dimensions shall not be scaled from drawings.

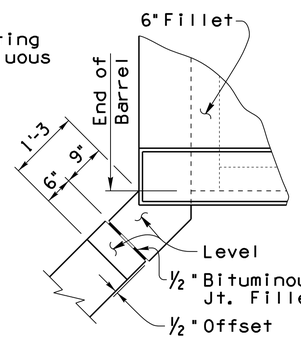
Pay item quantities of concrete and reinforcing steel include all labor and materials for box culvert, footing, headwalls, and aprons.
Total Quantities include Barrel and Headwall Quantities shown in Tables (plus added quantity for apron when used). Barrel Quantities Table is per linear foot of box (multiply by length of box to obtain barrel total). Headwall Quantities Table includes wings, edge beam, and cutoff wall.

Culverts measuring 20 ft and greater to the inside faces of exterior walls, along the roadway centerline, shall be assigned a structure number. The structure number shall be referenced in the culvert summary sheet and drainage details.

NOTE:
For Dimensions, Quantities and additional Details, see SD 6.01 (2 to 5).



NOTE:
Wing wall footing shall be contiuous with no joint.



WINGWALL JOINT DETAIL
(For Barrel Height < 8 Ft.)

WINGWALL JOINT DETAIL
(For Barrel Height ≥ 8 Ft.)

NOTE:
Special design sections shall be adjoined with standard barrels when necessary.

Culvert barrels always begin and end with Table No. I.

Thickness of top and bottom slabs vary with depths of fill as shown.

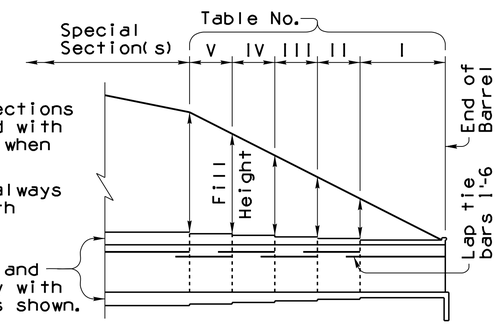


DIAGRAM SHOWING TABLE NO. TO BE USED FOR VARIOUS FILL HEIGHTS

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	S.U.H.	2-12
2	General updates	D.B.B.	5-15
3			
4			

Note to Designer:
The information presented in this Standard Detail has been prepared in accordance with recognized engineering principles and is for general use. It should not be used for specific application without competent professional examination and verification of its suitability by a licensed professional engineer. Contents within the inner border line shall not be altered.

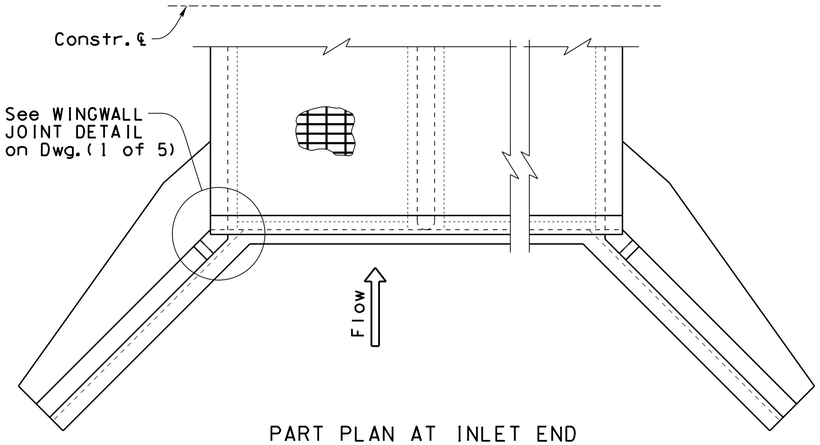
DESIGN APPROVED
APPROVED FOR DISTRIBUTION

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STRUCTURE DETAIL

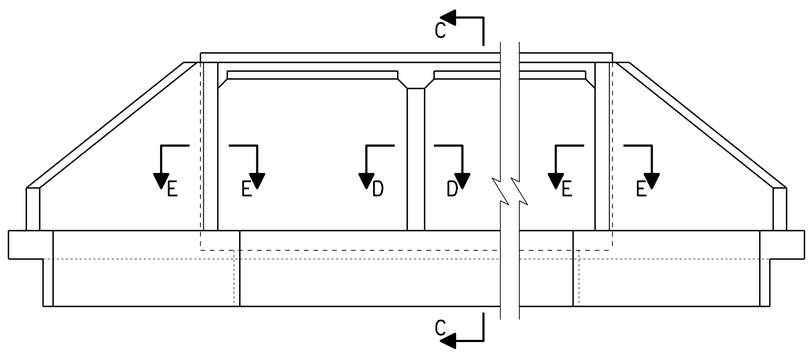
REINFORCED CONCRETE BOX CULVERTS
MISCELLANEOUS DETAILS

ROUTE	PROJECT NO.	FA NO.	DRAWING NO.
			SD 6.01 (1 of 5)
LOCATION			SHEET NO. OF

20-JAN-2016 16:26 G:\Bridge\CADD\Standards\SD_Sheets\SD 6 Drainage Stuctures\SD 6.01-6.11 Series\SD6.01-1 to 5\sd601-1_1916.dgn



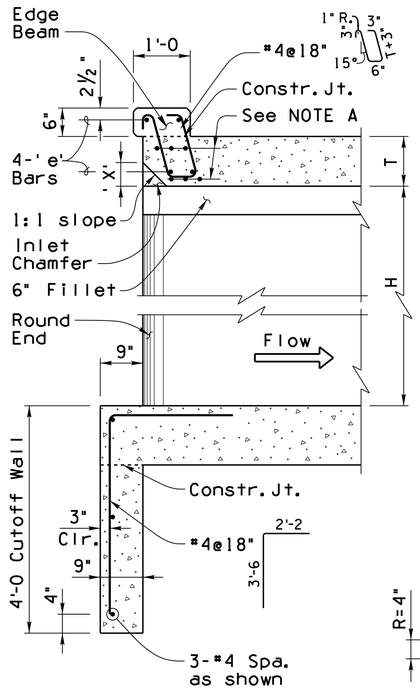
PART PLAN AT INLET END



ELEVATION AT INLET END

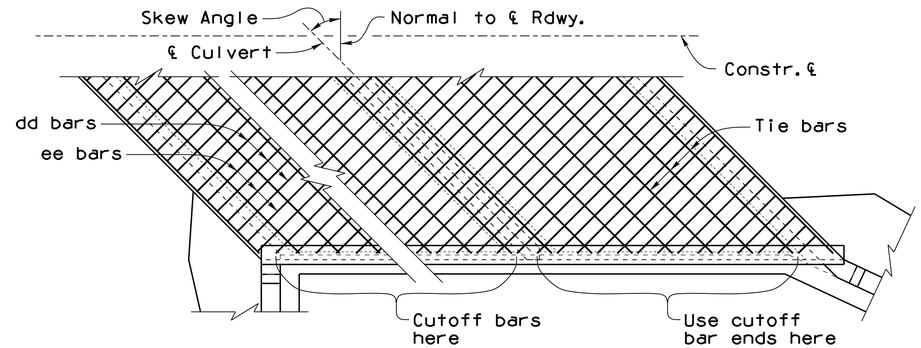
NOTE A:

Use 3-#7 @3" spa. top and bott bars for culverts skewed 6° to 30°.
Use 3-#8 @3" spa. top and bott bars for culverts skewed 31° to 45°.
Culverts skewed over 45° require a special edge beam design.
Edge beam reinforcing quantity shall be added to table quantities.



SECTION C-C

SECTION D-D



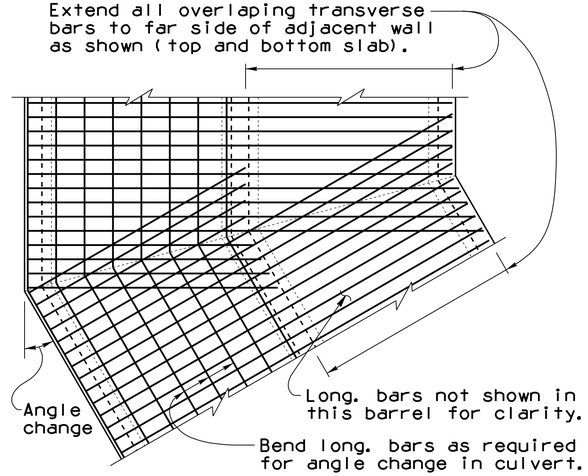
PART PLAN - SKEWED CULVERT

(Showing Reinf. Steel Placement)

NOTE:

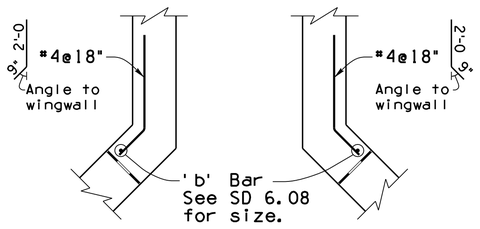
For 'e' Bars table, see Dwg. (1 of 5)

Span 'S'	Dim. 'X'
6'	3"
8'	4"
10'	5"
12'	6"

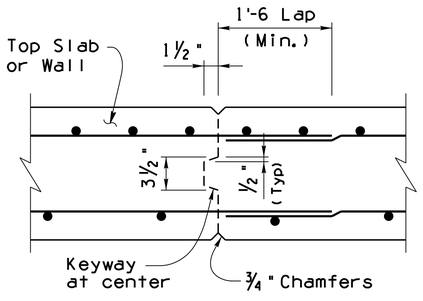


PART PLAN - ANGLED CULVERT

(Showing Reinf. Steel Placement)



SECTION E-E



ALT. CONSTRUCTION JOINT DETAIL

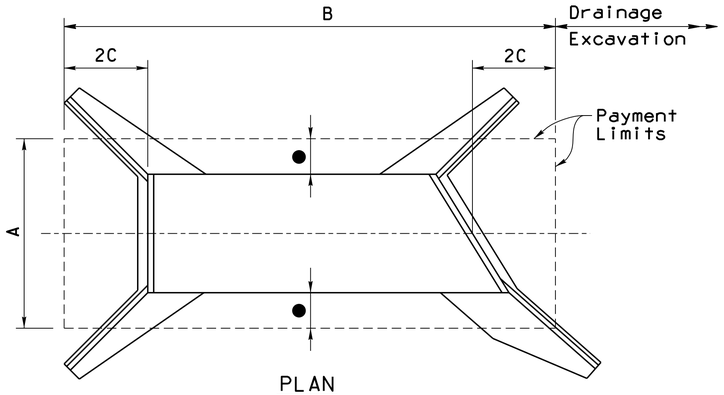
NOTE:

For General Notes, Dimensions, Quantities and additional Details, see SD 6.01 (1 & 3, 4, 5).

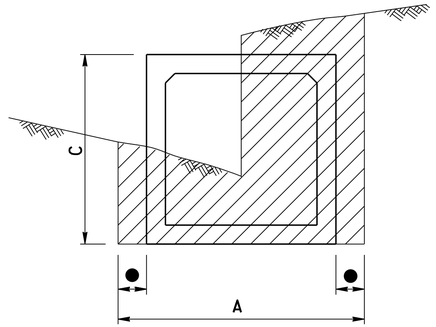
DESIGN APPROVED	ARIZONA DEPARTMENT OF TRANSPORTATION INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION BRIDGE GROUP STRUCTURE DETAIL
APPROVED FOR DISTRIBUTION	REINFORCED CONCRETE BOX CULVERTS MISCELLANEOUS DETAILS
ROUTE / PROJECT NO. / FA NO.	DRAWING NO. SD 6.01 (2 of 5)
LOCATION	SHEET NO. OF

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	S.U.H.	2-12
2			
3			
4			

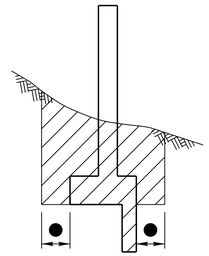
Note to Designer:
The information presented in this Standard Detail has been prepared in accordance with recognized engineering principles and for general use. It should not be used for specific application without competent professional examination and verification of its suitability by a licensed professional engineer. Contents within the inner border line shall not be altered.



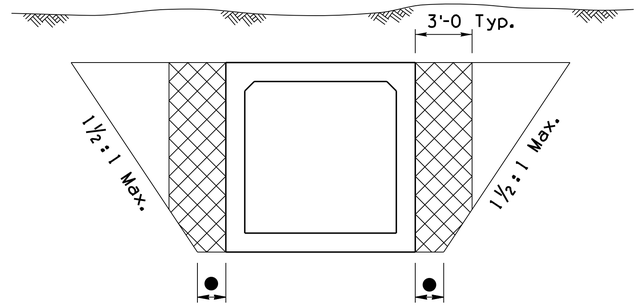
PLAN



SECTION



SECTION AT WING

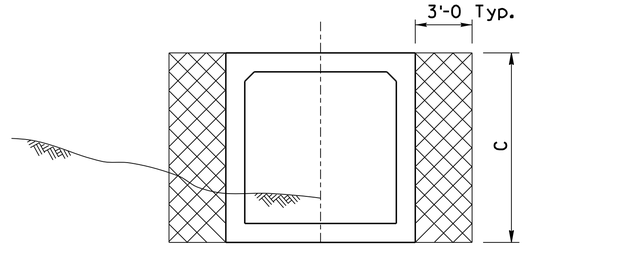


SECTION

STRUCTURAL EXCAVATION - PAYMENT LIMITS

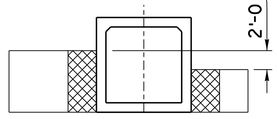
NOTE:

Payment limits shown include structural excavation for headwalls, cutoffwalls, wingwalls, end sections, etc.



SECTION

Placement and compaction of backfill shall not be more than 2 feet higher than other side (for any number of boxes).



PLACEMENT DETAIL

STRUCTURE BACKFILL - MEASUREMENT

NOTE:

Computation of structure backfill quantities is based on the area of a typical installation times the total length of structure plus 2C.
Use C for box extensions on each end extended.
No measurment is necessary for wing arms.

SECTION

NOTE:

Placement of structure backfill behind headwalls and wingwalls shall be the same as around structures.

VIEW OF WING

SECTION

VIEW OF WING

STRUCTURE BACKFILL - PLACEMENT

LEGEND

A = Width
B = Length
C = Height of barrel or headwall without cutoff wall.
● = 6" Max. in rock and trench, 1'-6 max. all others
◒ = 6" Min. in rock and trench, 1'-6 min. all others
Indicates Structural Excavation
Indicates Structure Backfill
Indicates Roadway Embankment

NOTE:

For General Notes, Dimensions, Quantities and additional Details, see SD 6.01 (1, 2, 3 & 5).

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	SAVK	2-12
2			
3			
4			

Note to Designer:
The information presented in this Standard Detail has been prepared in accordance with recognized engineering principles and is for general use. It should not be used for specific application without competent professional examination and verification of its suitability and applicability by a licensed professional engineer. Contents within the Inner border line shall not be altered.

DESIGN APPROVED: Shafi U. Hasan	ARIZONA DEPARTMENT OF TRANSPORTATION INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION BRIDGE GROUP STRUCTURE DETAIL
APPROVED FOR DISTRIBUTION: Jean A. Nehme	REINFORCED CONCRETE BOX CULVERTS STRUCTURAL EXCAVATION & STRUCTURE BACKFILL

ROUTE	PROJECT NO.	FA NO.	DRAWING NO.
			SD 6.01 (4 of 5)
LOCATION			SHEET NO. OF

20-JAN-2016 16:33 G:\Bridge\CADD\Standards\SD_Sheets\SD 6 Drainage Stuctures\SD 6.01-6.11 Series\SD6.01-1 to 5\sd601-4_1916.dgn

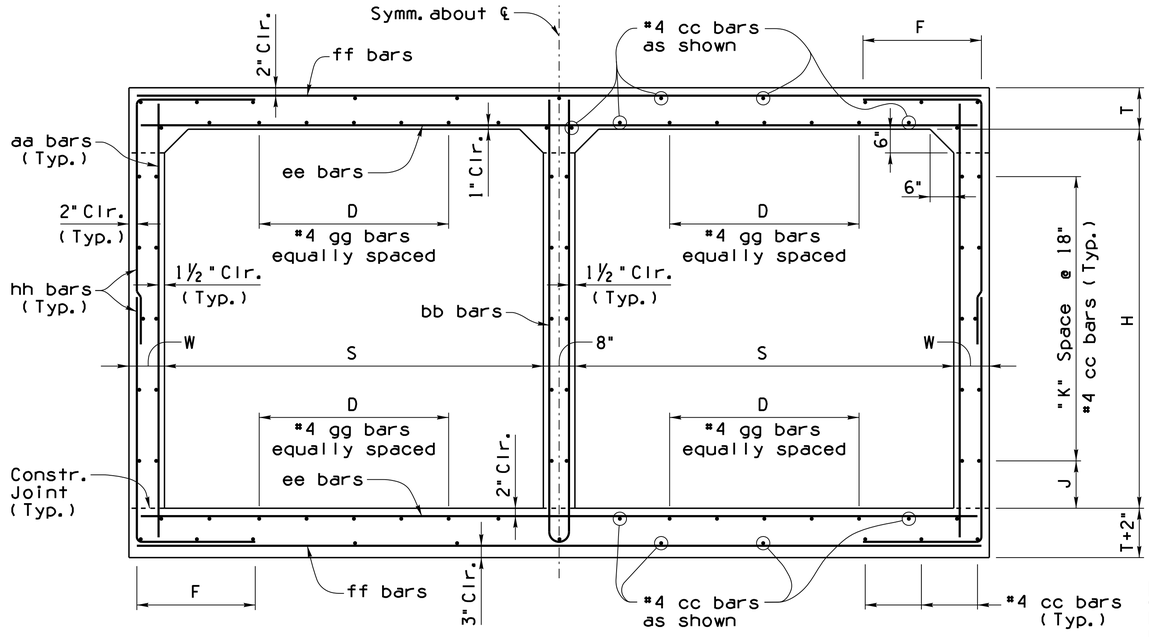
TABLE I
0'-10' FILL

Span "S"	Height "H"	Top Slab "T"	Walls "W"	aa Bar Size	aa Spacing	aa Length	bb Bar Size	bb Spacing	bb Length	cc Number ⌖	ee Bar Size	ee Spacing	ee Length	ff Bar Size	ff Spacing	ff Length	gg Number ⌖	gg D	hh Bar Size	hh Spacing	hh Length	hh F
6'	3'	9½"	8"	5	12"	4'-4	5	12"	8'-9	48	5	7"	13'-7	5	8"	13'-7	20	3'-0	5	8"	5'-1	2'-5
	4'	9½"	8"	5	12"	5'-4	5	12"	10'-9	54	5	7"	13'-7	5	8"	13'-7	20	3'-0	5	8"	5'-7	2'-5
	5'	9½"	8"	5	12"	6'-4	5	12"	12'-9	54	5	7"	13'-7	5	8"	13'-7	20	3'-0	5	8"	6'-1	2'-5
	6'	9½"	8"	5	12"	7'-4	5	12"	14'-9	60	5	7"	13'-7	5	8"	13'-7	20	3'-0	5	8"	6'-7	2'-5
	7'	9½"	8"	5	12"	8'-4	5	12"	16'-9	66	5	7"	13'-7	5	8"	13'-7	20	3'-0	5	8"	7'-1	2'-5
8'	3'	9½"	9"	5	12"	4'-4	5	12"	8'-8	48	5	6"	17'-9	6	8"	17'-9	28	4'-0	5	6"	5'-6	2'-6
	4'	9½"	9"	5	12"	5'-4	5	12"	10'-8	54	5	6"	17'-9	6	8"	17'-9	28	4'-0	5	6"	6'-0	2'-6
	5'	9½"	9"	5	12"	6'-4	5	12"	12'-8	54	5	6"	17'-9	6	8"	17'-9	28	4'-0	5	6"	6'-6	2'-6
	6'	9½"	9"	5	12"	7'-4	5	12"	14'-8	60	5	6	17'-9	6	8"	17'-9	28	4'-0	5	6"	7'-0	2'-6
	7'	9½"	9"	5	12"	8'-4	5	12"	16'-8	66	5	6"	17'-9	6	8"	17'-9	28	4'-0	5	6"	7'-5	2'-6
	8'	9½"	9"	5	12"	9'-4	5	12"	18'-8	66	5	6"	17'-9	6	8"	17'-9	28	4'-0	5	6"	8'-0	2'-6
10'	3'	10½"	11"	5	12"	4'-6	5	12"	8'-11	48	5	6"	22'-1	6	6"	22'-1	32	5'-0	5	6"	6'-0	2'-8
	4'	10½"	11"	5	12"	5'-6	5	12"	10'-11	54	5	6"	22'-1	6	6"	22'-1	32	5'-0	5	6"	6'-7	2'-8
	5'	10½"	11"	5	12"	6'-6	5	12"	12'-11	54	5	6"	22'-1	6	6"	22'-1	32	5'-0	5	6"	6'-8	2'-8
	6'	10½"	11"	5	12"	7'-6	5	12"	14'-11	60	5	6"	22'-1	6	6"	22'-1	32	5'-0	5	6"	7'-2	2'-8
	7'	10½"	11"	5	12"	8'-6	5	12"	16'-11	66	5	6"	22'-1	6	6"	22'-1	32	5'-0	5	6"	7'-9	2'-8
	8'	10½"	11"	5	12"	9'-6	5	12"	18'-11	66	5	6"	22'-1	6	6"	22'-1	32	5'-0	5	6"	8'-3	2'-8
	9'	10½"	11"	5	12"	10'-6	5	12"	20'-11	72	5	6"	22'-1	6	6"	22'-1	32	5'-0	5	6"	8'-9	2'-8
	10'	10½"	11"	5	12"	11'-6	5	12"	22'-11	78	5	6"	22'-1	6	6"	22'-1	32	5'-0	5	6"	9'-3	2'-8
12'	8'	12½"	13"	5	12"	9'-10	5	12"	19'-7	66	6	7"	26'-5	7	7"	26'-5	40	6'-0	6	7"	8'-6	2'-10
	9'	12½"	13"	5	12"	10'-10	5	12"	21'-7	72	6	7"	26'-5	7	7"	26'-5	40	6'-0	6	7"	9'-0	2'-10
	10'	12½"	13"	5	12"	11'-10	5	12"	23'-7	78	6	7"	26'-5	7	7"	26'-5	40	6'-0	6	7"	9'-6	2'-10
	11'	12½"	13"	5	12"	12'-10	5	12"	25'-7	78	6	7"	26'-5	7	7"	26'-5	40	6'-0	6	7"	10'-0	2'-10
	12'	12½"	13"	5	12"	13'-10	5	12"	27'-7	84	6	7"	26'-5	7	7"	26'-5	40	6'-0	6	7"	10'-6	2'-10

TABLE NO. II
10'-15' FILL

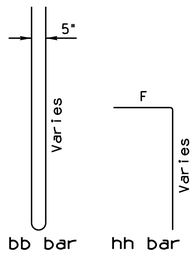
Span "S"	Height "H"	Top Slab "T"	Walls "W"	aa Bar Size	aa Spacing	aa Length	bb Bar Size	bb Spacing	bb Length	cc Number ⌖	ee Bar Size	ee Spacing	ee Length	ff Bar Size	ff Spacing	ff Length	gg Number ⌖	gg D	hh Bar Size	hh Spacing	hh Length	hh F
6'	3'	8"	8"	5	12"	4'-1	5	12"	8'-3	48	5	7"	13'-7	5	7"	13'-7	16	3'-0	5	8"	5'-0	2'-5
	4'	8"	8"	5	12"	5'-1	5	12"	10'-3	54	5	7"	13'-7	5	7"	13'-7	16	3'-0	5	8"	5'-6	2'-5
	5'	8"	8"	5	12"	6'-1	5	12"	12'-3	54	5	7"	13'-7	5	7"	13'-7	16	3'-0	5	8"	6'-0	2'-5
	6'	8"	8"	5	12"	7'-1	5	12"	14'-3	60	5	7"	13'-7	5	7"	13'-7	16	3'-0	5	8"	6'-6	2'-5
	7'	8"	8"	5	12"	8'-1	5	12"	16'-3	66	5	7"	13'-7	5	7"	13'-7	16	3'-0	5	8"	7'-0	2'-5
8'	3'	10½"	9"	5	12"	4'-6	5	12"	9'-1	48	5	6"	17'-9	6	7"	17'-9	20	4'-0	5	8"	5'-3	2'-6
	4'	10½"	9"	5	12"	5'-6	5	12"	11'-1	54	5	6"	17'-9	6	7"	17'-9	20	4'-0	5	8"	5'-9	2'-6
	5'	10½"	9"	5	12"	6'-6	5	12"	13'-1	54	5	6"	17'-9	6	7"	17'-9	20	4'-0	5	8"	6'-3	2'-6
	6'	10½"	9"	5	12"	7'-6	5	12"	15'-1	60	5	6"	17'-9	6	7"	17'-9	20	4'-0	5	8"	6'-9	2'-6
	7'	10½"	9"	5	12"	8'-6	5	12"	17'-1	66	5	6"	17'-9	6	7"	17'-9	20	4'-0	5	8"	7'-3	2'-6
	8'	10½"	9"	5	12"	9'-6	5	12"	19'-1	66	5	6"	17'-9	6	7"	17'-9	20	4'-0	5	7"	7'-9	2'-6
10'	3'	12½"	11"	5	12"	4'-10	5	12"	9'-7	48	5	6"	22'-1	7	7"	22'-1	24	5'-0	5	7"	5'-10	2'-8
	4'	12½"	11"	5	12"	5'-10	5	12"	11'-7	54	5	6"	22'-1	7	7"	22'-1	24	5'-0	5	7"	6'-4	2'-8
	5'	12½"	11"	5	12"	6'-10	5	12"	13'-7	54	5	6"	22'-1	7	7"	22'-1	24	5'-0	5	7"	6'-10	2'-8
	6'	12½"	11"	5	12"	7'-10	5	12"	15'-7	60	5	6"	22'-1	7	7"	22'-1	24	5'-0	5	7"	7'-4	2'-8
	7'	12½"	11"	5	12"	8'-10	5	12"	17'-7	66	5	6"	22'-1	7	7"	22'-1	24	5'-0	5	7"	7'-10	2'-8
	8'	12½"	11"	5	12"	9'-10	5	12"	19'-7	66	5	6"	22'-1	7	7"	22'-1	24	5'-0	5	7"	8'-4	2'-8
	9'	12½"	11"	5	12"	10'-10	5	12"	21'-7	72	5	6"	22'-1	7	7"	22'-1	24	5'-0	5	7"	8'-10	2'-8
	10'	12½"	11"	5	12"	11'-10	5	12"	23'-7	78	5	6"	22'-1	7	7"	22'-1	24	5'-0	5	7"	9'-4	2'-8
12'	8'	15"	13"	5	12"	10'-3	5	12"	20'-4	66	6	7"	26'-5	7	7"	26'-5	28	6'-0	5	7"	8'-9	2'-11
	9'	15"	13"	5	12"	11'-3	5	12"	22'-4	72	6	7"	26'-5	7	7"	26'-5	28	6'-0	5	7"	9'-3	2'-11
	10'	15"	13"	5	12"	12'-3	5	12"	24'-4	78	6	7"	26'-5	7	7"	26'-5	28	6'-0	6	7"	9'-9	2'-11
	11'	15"	13"	5	10"	13'-3	5	12"	26'-4	78	6	7"	26'-5	7	7"	26'-5	28	6'-0	6	7"	10'-9	3'-5
	12'	15"	13"	5	10"	14'-3	5	12"	28'-4	84	6	7"	26'-5	7	7"	26'-5	28	6'-0	6	7"	11'-3	3'-5

⌖ Total number of bars in the cross-section.



TYPICAL SECTION
(Shown as 8'-0 x 8'-0 Table II)

Height "H"	"J" Dim.	"K" Spaces
3'	9"	1
4'	6"	2
5'	12"	2
6'	9"	3
7'	6"	4
8'	12"	4
9'	9"	5
10'	6"	6
11'	12"	6
12'	9"	7



BENDS

NOTE:
Reinforcing shown for 8'-0 x 8'-0 Table II box. Use the appropriate table to determine the reinforcing requirements of selected box.

NOTE:
For General Notes, Dimensions, and additional Details, see SD 6.01 (1 to 4). For Quantities and Tables III thru V see SD 6.02 (2 of 2).

New box culverts shall not be constructed using 3' or 4' heights without special approval from ADOT Bridge Group. Tables referencing these sizes are provided for extension of existing box culverts only.

Note to Designer:
The information presented in this Standard Detail has been prepared in accordance with recognized engineering principles and is for general use. It should not be used for specific application without competent professional examination and verification of its suitability and applicability by a licensed professional engineer. Contents within the inner border line shall not be altered.

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original issue	S.U.H.	2-12
2	Added 3',4',5' height for existing box extensions only	D.B.B.	5-15
3			
4			

DESIGN APPROVED
APPROVED FOR DISTRIBUTION

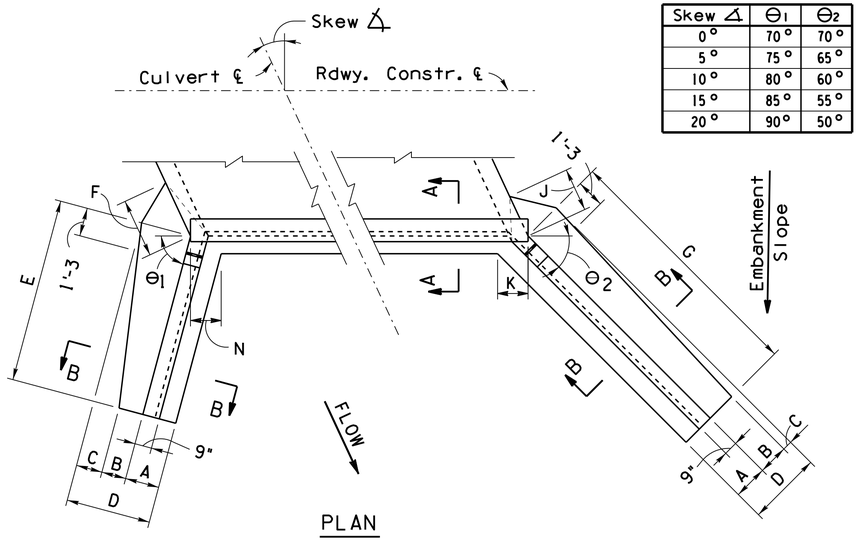
ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STRUCTURE DETAIL

REINFORCED CONCRETE BOX CULVERTS
DOUBLE BARREL
(0' - 15' FILLS)

ROUTE | PROJECT NO. | FA NO. | DRAWING NO. SD 6.02 (1 of 2)
LOCATION | SHEET NO. OF

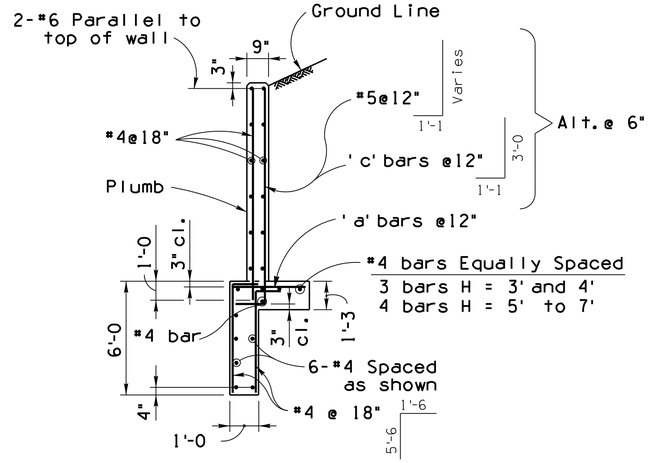
20-JAN-2016 16:47 G:\Bridge\CADD\Standards\SD_Sheets\SD 6 Drainage Stuctures\SD 6.01-6.11 Series\SD602-1 to 2\sd602-1_1916.dgn

Skew ∠	Θ1	Θ2
0°	70°	70°
5°	75°	65°
10°	80°	60°
15°	85°	55°
20°	90°	50°

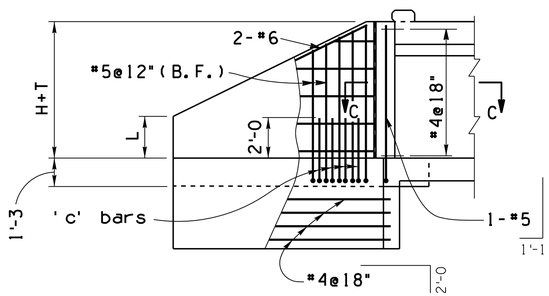


NOTE:

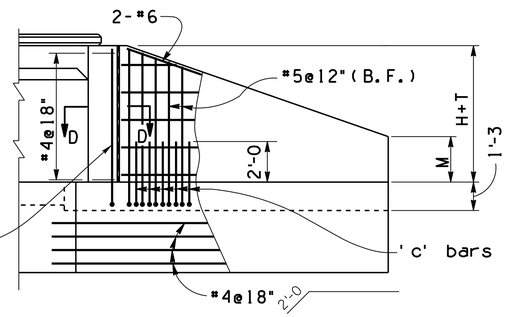
For SECTION A-A, see SD 6.01 (1 of 5).



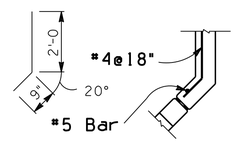
SECTION B-B



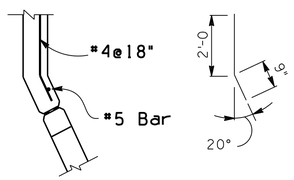
SHORT WING ELEVATION



LONG WING ELEVATION



SECTION C-C



SECTION D-D

2 : 1 Slope Dimensions	Skew ∠	0°					5°					10°					15°					20°				
	Height H	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'
	A	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6
	B	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3
	C	4"	7"	1'-0	1'-5	1'-10	4"	7"	1'-0	1'-5	1'-10	5"	8"	1'-1	1'-6	1'-11	5"	8"	1'-1	1'-7	2'-0	6"	9"	1'-2	1'-7	2'-1
	D	2'-7	3'-1	3'-7	4'-1	4'-7	2'-7	3'-1	3'-7	4'-1	4'-7	2'-8	3'-2	3'-8	4'-2	4'-8	2'-8	3'-2	3'-8	4'-3	4'-9	2'-9	3'-3	3'-9	4'-3	4'-10
	E	6'-6	8'-0	9'-6	11'-0	12'-6	6'-6	8'-0	9'-6	11'-0	12'-6	6'-6	8'-0	9'-6	11'-0	12'-6	6'-0	7'-6	9'-0	10'-6	12'-0	6'-0	7'-6	9'-0	10'-6	12'-0
	F	1'-1	1'-9	2'-4	3'-0	3'-8	1'-1	1'-9	2'-4	3'-0	3'-8	1'-2	1'-10	2'-6	3'-1	3'-9	1'-2	1'-10	2'-6	3'-3	3'-10	1'-3	1'-11	2'-7	3'-3	4'-0
	G	6'-6	8'-0	9'-6	11'-0	12'-6	6'-6	8'-0	10'-0	11'-6	13'-0	7'-0	8'-6	10'-0	12'-0	13'-6	7'-0	9'-0	10'-6	12'-6	14'-0	7'-6	9'-6	11'-0	13'-0	14'-6
	J	1'-1	1'-9	2'-4	3'-0	3'-8	1'-1	1'-9	2'-4	3'-0	3'-8	1'-2	1'-10	2'-6	3'-1	3'-9	1'-2	1'-10	2'-6	3'-3	3'-10	1'-3	1'-11	2'-7	3'-3	4'-0
	K	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-4	1'-4	1'-4	1'-4	1'-4
	L	1'-0	1'-4	1'-7	1'-11	2'-2	11"	1'-2	1'-6	1'-9	2'-0	10"	1'-1	1'-5	1'-8	1'-11	1'-1	1'-4	1'-7	1'-10	2'-1	1'-1	1'-4	1'-7	1'-10	2'-1
	M	1'-0	1'-4	1'-7	1'-11	2'-2	1'-1	1'-5	1'-6	1'-10	2'-2	1'-0	1'-5	1'-9	1'-10	2'-3	1'-2	1'-5	1'-9	1'-11	2'-4	1'-2	1'-5	1'-10	2'-1	2'-6
	N	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-4¼	1'-4¼	1'-4¼	1'-4¼	1'-4¼	1'-4¾	1'-4¾	1'-4¾	1'-4¾	1'-4¾	1'-5¼	1'-5¼	1'-5¼	1'-5¼	1'-5¼	1'-6	1'-6	1'-6	1'-6	1'-6

4 : 1 Slope Dimensions	Skew ∠	0°					5°					10°					15°					20°				
	Height H	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'
	A	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6
	B	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3
	C	4"	6"	11"	1'-4	1'-8	3"	6"	11"	1'-4	1'-9	3"	6"	11"	1'-4	1'-9	3"	6"	11"	1'-4	1'-9	3"	7"	1'-0	1'-5	1'-10
	D	2'-7	3'-0	3'-6	4'-0	4'-5	2'-6	3'-0	3'-6	4'-0	4'-6	2'-6	3'-0	3'-6	4'-0	4'-6	2'-6	3'-0	3'-6	4'-0	4'-6	2'-6	3'-1	3'-7	4'-1	4'-7
	E	10'-0	12'-6	15'-0	17'-6	20'-0	10'-0	12'-6	15'-0	17'-0	19'-6	10'-0	12'-6	14'-6	17'-0	19'-6	10'-0	12'-0	14'-6	17'-0	19'-6	10'-0	12'-0	14'-6	17'-0	19'-6
	F	1'-0	1'-7	2'-3	2'-11	3'-5	1'-0	1'-7	2'-3	2'-11	3'-6	1'-0	1'-7	2'-3	2'-11	3'-6	1'-0	1'-7	2'-3	2'-11	3'-6	1'-0	1'-9	2'-4	3'-0	3'-8
	G	10'-0	12'-6	15'-0	17'-6	20'-0	10'-6	13'-0	15'-6	18'-0	20'-6	10'-6	13'-0	16'-0	18'-6	21'-0	11'-0	13'-6	16'-0	19'-0	21'-6	11'-6	14'-0	17'-0	19'-6	22'-6
	J	1'-0	1'-7	2'-3	2'-11	3'-5	1'-0	1'-7	2'-3	2'-11	3'-6	1'-0	1'-7	2'-3	2'-11	3'-6	1'-0	1'-7	2'-3	2'-11	3'-6	1'-0	1'-9	2'-4	3'-0	3'-8
	K	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-4	1'-4	1'-4	1'-4	1'-4
	L	1'-9	2'-2	2'-6	2'-11	3'-4	1'-8	2'-1	2'-5	2'-11	3'-4	1'-7	2'-0	2'-6	2'-11	3'-3	1'-7	2'-1	2'-5	2'-10	3'-2	1'-7	2'-1	2'-5	2'-10	3'-2
	M	1'-9	2'-2	2'-6	2'-11	3'-4	1'-8	2'-1	2'-7	3'-0	3'-5	1'-9	2'-3	2'-7	3'-1	3'-6	1'-10	2'-4	2'-9	3'-2	3'-8	1'-10	2'-5	2'-10	3'-4	3'-9
	N	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-4¼	1'-4¼	1'-4¼	1'-4¼	1'-4¼	1'-4¾	1'-4¾	1'-4¾	1'-4¾	1'-4¾	1'-5¼	1'-5¼	1'-5¼	1'-5¼	1'-5¼	1'-6	1'-6	1'-6	1'-6	1'-6

6 : 1 Slope Dimensions	Skew ∠	0°					5°					10°					15°					20°				
	Height H	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'
	A	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6
	B	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3
	C	3"	6"	11"	1'-4	1'-8	3"	6"	11"	1'-4	1'-8	3"	6"	11"	1'-4	1'-8	3"	6"	11"	1'-4	1'-9	3"	6"	11"	1'-4	1'-9
	D	2'-6	3'-0	3'-6	4'-0	4'-5	2'-6	3'-0	3'-6	4'-0	4'-5	2'-6	3'-0	3'-6	4'-0	4'-5	2'-6	3'-0	3'-6	4'-0	4'-6	2'-6	3'-0	3'-6	4'-0	4'-6
	E	12'-6	15'-6	18'-6	21'-6	24'-6	12'-6	15'-6	18'-6	21'-6	24'-6	12'-0	15'-0	18'-0	21'-0	24'-0	12'-0	15'-0	18'-0	21'-0	24'-0	12'-0	15'-0	18'-0	21'-0	24'-0
	F	1'-0	1'-7	2'-3	2'-11	3'-5	1'-0	1'-7	2'-3	2'-11	3'-5	1'-0	1'-7	2'-3	2'-11	3'-5	1'-0	1'-7	2'-3	2'-11	3'-6	1'-0	1'-7	2'-3	2'-11	3'-6
	G	12'-6	15'-6	18'-6	21'-6	24'-6	12'-6	16'-0	19'-0	22'-0	25'-0	13'-0	16'-0	19'-6	22'-6	25'-6	13'-6	16'-6	20'-0	23'-0	26'-6	13'-6	17'-0	20'-6	23'-6	27'-0
	J	1'-0	1'-7	2'-3	2'-11	3'-5	1'-0	1'-7	2'-3	2'-11	3'-5	1'-0	1'-7	2'-3	2'-11	3'-5	1'-0	1'-7	2'-3	2'-11	3'-6	1'-0	1'-7	2'-3	2'-11	3'-6
	K	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-4	1'-4	1'-4	1'-4	1'-4
	L	2'-1	2'-8	3'-2	3'-8	4'-3	2'-1	2'-7	3'-1	3'-7	4'-1	2'-1	2'-7	3'-1	3'-7	4'-1	2'-1	2'-7	3'-1	3'-7	4'-1	2'-1	2'-7	3'-1	3'-7	4'-1
	M	2'-1	2'-8	3'-2	3'-8	4'-3	2'-2	2'-8	3'-2	3'-9	4'-3	2'-2	2'-9	3'-3	3'-10	4'-5	2'-3	2'-10	3'-4	3'-11	4'-5	2'-4	2'-11	3'-5	4'-1	4'-7
	N	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-3⅞	1'-4¼	1'-4¼	1'-4¼	1'-4¼	1'-4¼	1'-4¾	1'-4¾	1'-4¾	1'-4¾	1'-4¾	1'-5¼	1'-5¼	1'-5¼	1'-5¼	1'-5¼	1'-6	1'-6	1'-6	1'-6	1'-6

'c' bars			
Height H	Slope	Short Wing	Long Wing
		0° to 10°	0° to 20°
7'	2 : 1	3 - #5	3 - #5
	4 : 1	5 - #5	5 - #5

'a' bars			
Height H	Short Wing	Long Wing	
	0° to 20°	0° & 5°	10° to 20°
3'	#4	#4	#4
4'	#4	#4	#4
5'	#4	#4	#4
6'	#4	#4	#5
7'	#4	#4	#6

NOTE:

For General Notes, Dimensions, and additional Details, see SD 6.01 (1 of 5). For Headwall Quantities see SD 6.09 (1 to 3).

Note to Designer:
The information presented in this Standard Detail has been prepared in accordance with recognized engineering principles and is for general use. It should not be used for specific application without competent professional examination and verification of its suitability by a licensed professional engineer. Contents within the inner border line shall not be altered.

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	S.J.H.	2-12
2	Added 3'-6" height for existing box extensions only	D.B.B.	5-15
3			
4			

DESIGN APPROVED

APPROVED FOR DISTRIBUTION

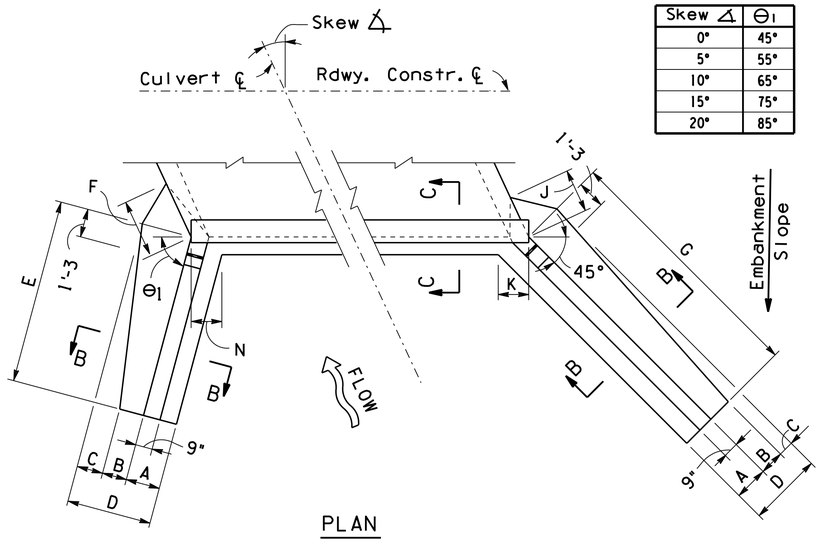
ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STRUCTURE DETAIL

REINFORCED CONCRETE BOX CULVERTS
OUTLET WINGS - SKEW 0° to 20°
CULVERT HEIGHT 3' to 7'

ROUTE	PROJECT NO.	FA NO.	DRAWING NO.
			SD 6.08 (1 of 8)
LOCATION			SHEET NO. OF

22-JAN-2016 09:55 G:\Bridge\CADD\Standards\SD_Sheets\SD 6 Drainage Stuctures\SD 6.01-6.11 Series\SD608-1 to 8\sd608-1_1916.dgn

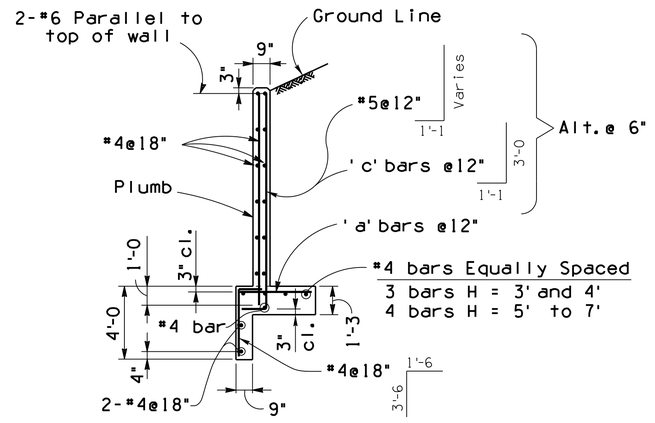
Skew ∠	Θ1
0°	45°
5°	55°
10°	65°
15°	75°
20°	85°



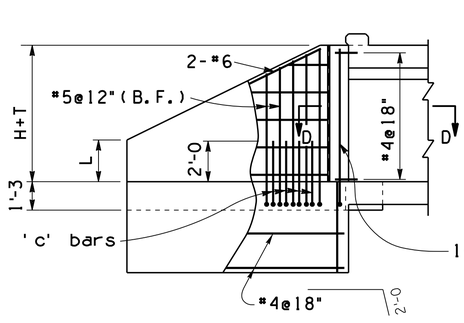
PLAN

NOTE:

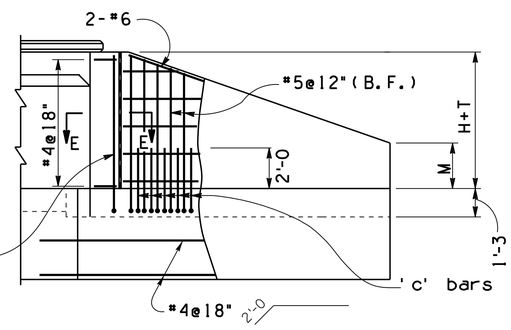
For SECTION C-C, see SD 6.01 (2 of 5).



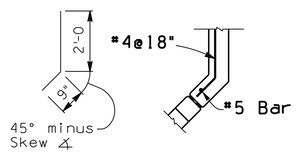
SECTION B-B



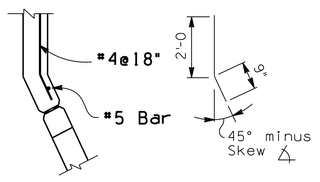
SHORT WING ELEVATION



LONG WING ELEVATION



SECTION D-D



SECTION E-E

	Skew ∠	0°					5°					10°					15°					20°				
	Height H	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'
2 : 1 Slope	A	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6
	B	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3	9"	1'-0	1'-1	1'-2	1'-3
	C	6"	9"	1'-3	1'-8	2'-1	6"	9"	1'-3	1'-8	2'-1	6"	9"	1'-3	1'-8	2'-1	6"	9"	1'-3	1'-8	2'-1	6"	9"	1'-3	1'-8	2'-1
	D	2'-9	3'-3	3'-10	4'-4	4'-10	2'-9	3'-3	3'-10	4'-4	4'-10	2'-9	3'-3	3'-10	4'-4	4'-10	2'-9	3'-3	3'-10	4'-4	4'-10	2'-9	3'-3	3'-10	4'-4	4'-10
	E	6'-0	7'-6	8'-6	10'-0	11'-6	5'-6	7'-0	8'-6	10'-0	11'-0	5'-6	7'-0	8'-6	9'-6	11'-0	5'-6	7'-0	8'-6	10'-0	11'-0	6'-0	7'-6	8'-6	10'-0	11'-6
	F	1'-5	2'-2	3'-0	3'-8	4'-5	1'-5	2'-2	3'-0	3'-8	4'-5	1'-5	2'-2	2'-11	3'-8	4'-4	1'-5	2'-1	2'-11	3'-7	4'-3	1'-4	2'-0	2'-9	3'-5	4'-1
	G	6'-0	7'-6	8'-6	10'-0	11'-6	6'-0	7'-6	9'-6	10'-6	12'-0	6'-6	8'-0	9'-6	11'-0	12'-6	7'-0	8'-6	10'-0	12'-0	13'-6	7'-6	9'-0	11'-0	12'-6	14'-6
	J	1'-5	2'-2	3'-0	3'-8	4'-5	1'-5	2'-2	3'-0	3'-8	4'-5	1'-5	2'-2	2'-11	3'-8	4'-4	1'-5	2'-1	2'-11	3'-7	4'-3	1'-4	2'-0	2'-9	3'-5	4'-1
	K	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½
	L	1'-11	2'-5	3'-1	3'-6	4'-0	1'-10	2'-2	2'-5	3'-0	3'-7	1'-7	1'-11	2'-3	2'-9	3'-1	1'-5	1'-8	1'-11	2'-3	2'-9	1'-1	1'-4	1'-10	2'-1	2'-4
	M	1'-11	2'-5	3'-1	3'-6	4'-0	1'-11	2'-5	2'-11	3'-4	3'-10	1'-9	2'-3	2'-8	3'-2	3'-8	1'-7	2'-1	2'-6	2'-10	3'-3	1'-5	1'-11	2'-2	2'-8	2'-11
	N	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-4¼	1'-4¼	1'-4¼	1'-4¼	1'-4¼	1'-5¼	1'-5¼	1'-5¼	1'-5¼	1'-5¼

	Skew ∠	0°					5°					10°					15°					20°				
	Height H	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'
4 : 1 Slope	A	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6
	B	9"	1'-0	1'-1	1'-4	1'-8	9"	1'-0	1'-1	1'-3	1'-7	9"	1'-0	1'-1	1'-2	1'-6	9"	1'-0	1'-1	1'-2	1'-5	9"	1'-0	1'-1	1'-2	1'-3
	C	4"	7"	1'-0	1'-3	1'-5	4"	7"	1'-0	1'-4	1'-6	4"	7"	1'-0	1'-5	1'-7	4"	7"	1'-0	1'-5	1'-8	4"	7"	1'-0	1'-5	1'-10
	D	2'-7	3'-1	3'-7	4'-1	4'-7	2'-7	3'-1	3'-7	4'-1	4'-7	2'-7	3'-1	3'-7	4'-1	4'-7	2'-7	3'-1	3'-7	4'-1	4'-7	2'-7	3'-1	3'-7	4'-1	4'-7
	E	8'-0	9'-6	11'-6	13'-6	15'-6	8'-0	10'-0	11'-6	13'-6	15'-6	8'-0	10'-0	12'-0	14'-0	16'-0	8'-6	10'-6	12'-6	14'-6	16'-6	9'-0	11'-0	13'-6	15'-6	17'-6
	F	1'-3	1'-11	2'-8	3'-4	4'-1	1'-3	1'-11	2'-7	3'-4	4'-0	1'-2	1'-11	2'-7	3'-3	4'-0	1'-2	1'-10	2'-6	3'-3	3'-11	1'-2	1'-10	2'-5	3'-1	3'-9
	G	8'-0	9'-6	11'-6	13'-6	15'-6	8'-6	10'-6	12'-6	14'-6	16'-6	9'-0	11'-0	13'-0	15'-6	17'-6	9'-6	12'-0	14'-6	16'-6	19'-0	10'-6	13'-0	15'-6	18'-6	21'-0
	J	1'-3	1'-11	2'-8	3'-4	4'-1	1'-3	1'-11	2'-7	3'-4	4'-0	1'-2	1'-11	2'-7	3'-3	4'-0	1'-2	1'-10	2'-6	3'-3	3'-11	1'-2	1'-10	2'-5	3'-1	3'-9
	K	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½
	L	2'-8	3'-5	4'-0	4'-8	5'-4	2'-5	3'-0	3'-8	4'-4	4'-11	2'-3	2'-10	3'-4	3'-11	4'-5	2'-0	2'-6	3'-1	3'-7	4'-1	1'-10	2'-4	2'-8	3'-2	3'-8
	M	2'-8	3'-5	4'-0	4'-8	5'-4	2'-7	3'-2	3'-10	4'-6	5'-2	2'-6	3'-1	3'-9	4'-4	5'-0	2'-5	2'-11	3'-6	4'-2	4'-8	2'-2	2'-9	3'-4	3'-10	4'-4
	N	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-4¼	1'-4¼	1'-4¼	1'-4¼	1'-4¼	1'-5¼	1'-5¼	1'-5¼	1'-5¼	1'-5¼

	Skew ∠	0°					5°					10°					15°					20°				
	Height H	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'	3'	4'	5'	6'	7'
6 : 1 Slope	A	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6	1'-6
	B	9"	1'-0	1'-3	1'-7	2'-0	9"	1'-0	1'-2	1'-7	1'-11	9"	1'-0	1'-1	1'-6	1'-10	9"	1'-0	1'-1	1'-4	1'-8	9"	1'-0	1'-1	1'-3	1'-7
	C	3"	6"	9"	11"	1'-0	3"	6"	10"	11"	1'-1	3"	6"	11"	1'-0	1'-2	3"	6"	11"	1'-2	1'-4	3"	6"	11"	1'-3	1'-5
	D	2'-6	3'-0	3'-6	4'-0	4'-6	2'-6	3'-0	3'-6	4'-0	4'-6	2'-6	3'-0	3'-6	4'-0	4'-6	2'-6	3'-0	3'-6	4'-0	4'-6	2'-6	3'-0	3'-6	4'-0	4'-6
	E	8'-6	11'-0	13'-0	15'-0	17'-0	9'-0	11'-0	13'-6	15'-6	17'-6	9'-6	11'-6	14'-0	16'-6	18'-6	10'-0	12'-6	15'-0	17'-6	19'-6	11'-0	13'-6	16'-0	19'-0	21'-6
	F	1'-1	1'-10	2'-6	3'-3	3'-11	1'-1	1'-10	2'-6	3'-3	3'-11	1'-1	1'-9	2'-6	3'-2	3'-10	1'-1	1'-9	2'-5	3'-1	3'-9	1'-0	1'-8	2'-4	3'-0	3'-8
	G	8'-6	11'-0	13'-0	15'-0	17'-0	9'-6	11'-6	14'-0	16'-0	18'-6	10'-0	12'-6	15'-0	17'-6	20'-0	11'-0	14'-0	16'-6	19'-6	22'-0	12'-6	15'-6	18'-6	21'-6	24'-6
	J	1'-1	1'-10	2'-6	3'-3	3'-11	1'-1	1'-10	2'-6	3'-3	3'-11	1'-1	1'-9	2'-6	3'-2	3'-10	1'-1	1'-9	2'-5	3'-1	3'-9	1'-0	1'-8	2'-4	3'-0	3'-8
	K	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½
	L	3'-1	3'-9	4'-6	5'-4	6'-1	2'-10	3'-7	4'-3	4'-11	5'-8	2'-8	3'-4	3'-11	4'-7	5'-3	2'-5	3'-1	3'-8	4'-3	4'-11	2'-3	2'-10	3'-5	3'-11	4'-6
	M	3'-1	3'-9	4'-6	5'-4	6'-1	2'-11	3'-8	4'-5	5'-2	5'-11	2'-11	3'-7	4'-4	5'-0	5'-8	2'-9	3'-5	4'-1	4'-9	5'-6	2'-7	3'-3	3'-11	4'-6	5'-2
	N	1'-4½	1'-4½	1'-4½	1'-4½	1'-4½	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-3⅝	1'-4¼	1'-4¼	1'-4¼	1'-4¼	1'-4¼	1'-5¼	1'-5¼	1'-5¼	1'-5¼	1'-5¼

'c' bars			
Height H	Slope	Short Wing	Long Wing
		0° to 10°	0° to 20°
7'	2 : 1	3 - #5	3 - #5
	2 : 1	5 - #5	5 - #5

'a' bars			
Height H	Short Wing		Long Wing
	0° to 10°	15° & 20°	0° to 20°
3'	#4	#4	#4
4'	#4	#4	#4
5'	#4	#4	#4
6'	#5	#4	#5
7'	#6	#4	#6

NOTE:

For General Notes, Dimensions, and additional Details, see SD 6.01 (2 of 5). For Headwall Quantities see SD 6.09 (1 to 3).

Note to Designer:
The information presented in this Standard Detail has been prepared in accordance with recognized engineering principles and is for general use. Users should be aware that it may not be used for specific application without competent professional examination and verification of its suitability by a licensed professional engineer. Contents within the inner border line shall not be altered.

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	S.U.H.	2-12
2	Added 3'-6" height for existing box extensions only	D.B.B.	5-15
3			
4			

DESIGN APPROVED

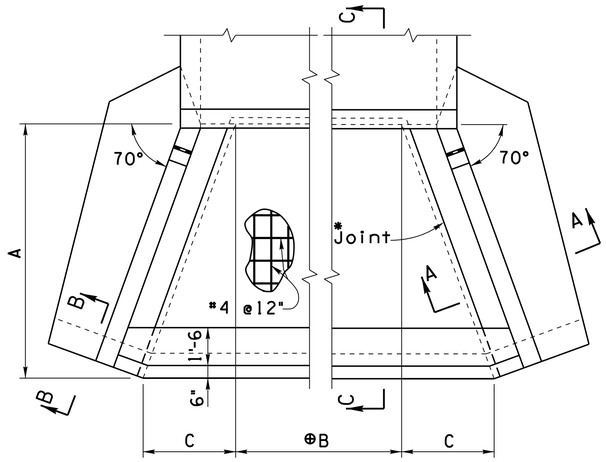
APPROVED FOR DISTRIBUTION

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STRUCTURE DETAIL

REINFORCED CONCRETE BOX CULVERTS
INLET WINGS - SKEW 0° to 20°
CULVERT HEIGHT 3' to 7'

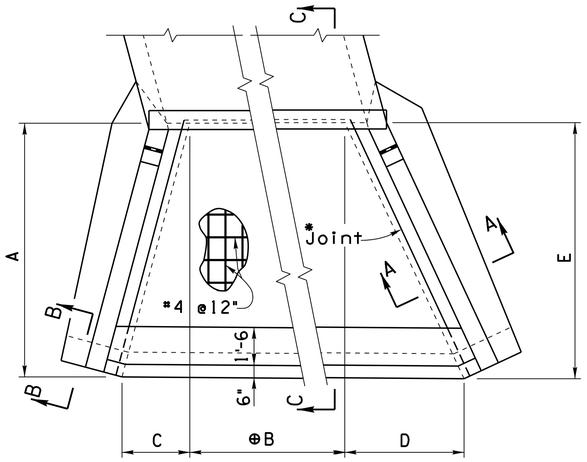
ROUTE | PROJECT NO. | FA NO. | DRAWING NO. SD 6.08 (3 of 8)

LOCATION | SHEET NO. OF



PLAN

Apron for 0° skew box culvert

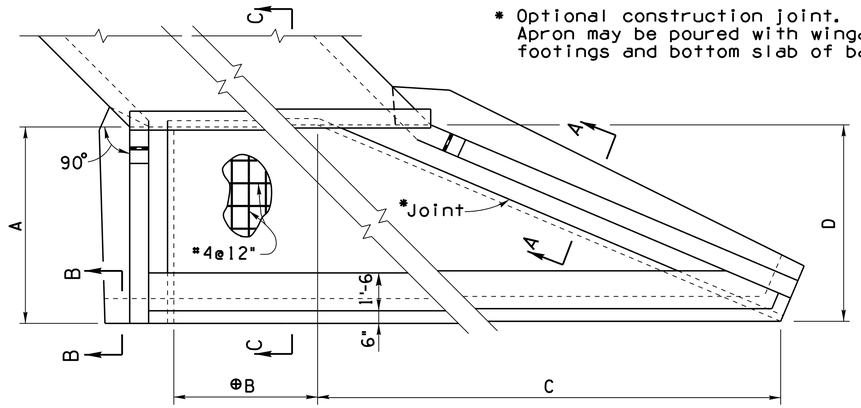


PLAN

Apron for 0° to 15° skew box culvert

Span	△									
	0° Skew	5° Skew	10° Skew	15° Skew	20° Skew	25° Skew	30° Skew	35° Skew	40° Skew	45° Skew
6'	6'-8	6'-8¼	6'-9¼	6'-10⅞	7'-1⅞	7'-4¼	7'-8⅜	8'-1⅝	8'-8⅜	9'-5⅛
8'	8'-9	8'-9⅜	8'-10⅝	9'-0¾	9'-3¾	9'-7⅞	10'-1¼	10'-8⅛	11'-5⅛	12'-4½
10'	10'-11	10'-11½	11'-1	11'-3⅝	11'-7⅜	12'-0½	12'-7¼	13'-3⅞	14'-3	15'-5¼
12'	13'-1	13'-1⅝	13'-3⅜	13'-6½	13'-11⅛	14'-5¼	15'-1¼	15'-11⅝	17'-1	18'-6

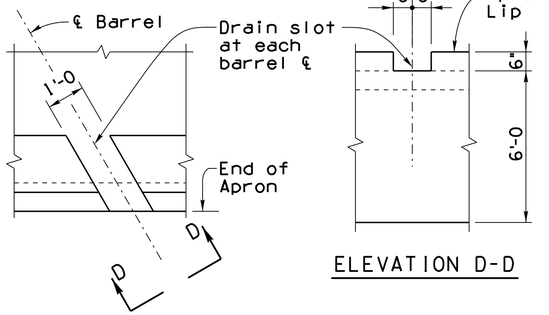
⊕Dimension varies with number of barrels. △equals length to be added to dimension 'B ' for each additional barrel.



PLAN

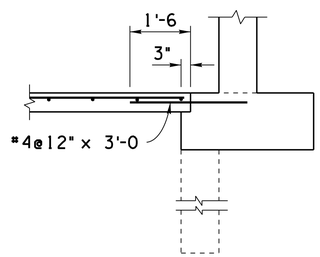
Apron for 20° to 45° skew box culvert

* Optional construction joint.
Apron may be poured with wingall footings and bottom slab of barrel.

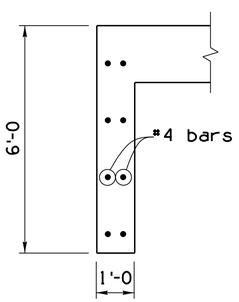


APRON DRAIN DETAIL

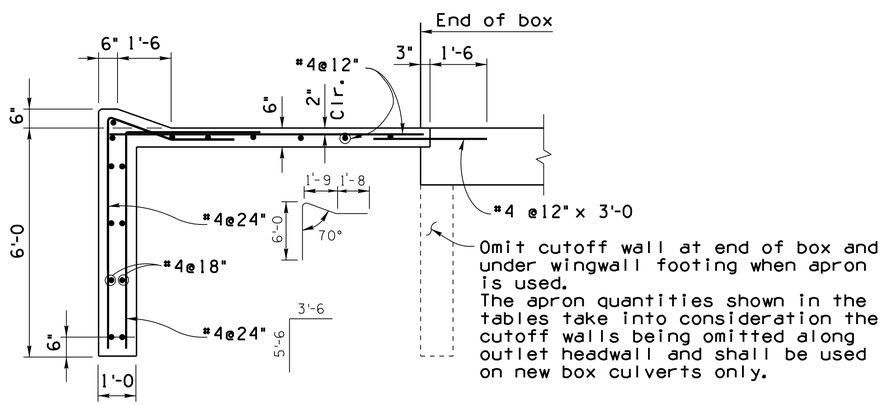
ELEVATION D-D



SECTION A-A



SECTION B-B



SECTION C-C

Omit cutoff wall at end of box and under wingwall footing when apron is used.
The apron quantities shown in the tables take into consideration the cutoff walls being omitted along outlet headwall and shall be used on new box culverts only.

NOTE:

For General Notes, Dimensions, and additional Details, see SD 6.01 (1 & 2 of 5). For Apron Dimensions and Quantities see SD 6.11 (2 to 4).

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	S.U.H.	2-12
2			
3			
4			

DESIGN APPROVED: Shafi U. Hasan

APPROVED FOR DISTRIBUTION: Jean A. Nehme

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STRUCTURE DETAIL

REINFORCED CONCRETE BOX CULVERTS
OUTLET APRON DETAILS

ROUTE | PROJECT NO. | FA NO. | DRAWING NO. SD 6.11 (1 of 4)

LOCATION | SHEET NO. OF

Note to Designer:
The information presented in this Standard Detail has been prepared in accordance with recognized engineering principles and is for general use. It should be used for specific application without competent professional examination and verification of its suitability and applicability by a licensed professional engineer. Contents within the inner border line shall not be altered.

Note to Designer:
The information presented in this Standard Detail has been prepared in accordance with recognized engineering principles and is for general use. It should not be used for specific application without competent professional examination and verification of its suitability by a licensed professional engineer. Contents within the Inner border line shall not be altered.

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	Original Issue	S.J.U.H.	2-12
2	Added 3'-4.5' height for existing box extensions only	D.B.B.	5-15
3			
4			

DIMENSIONS

Span	Hgt.	0° Skew			5° Skew					10° Skew					15° Skew					20° Skew				25° Skew				30° Skew				35° Skew				40° Skew				45° Skew			
		A	B	C	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
6'	3'	9'-10⅞	4'-8¼	3'-7⅛	10'-0⅝	4'-8½	3'-7¼	4'-8¾	10'-1¾	10'-1¼	4'-9⅛	1'-9⅜	5'-8¼	9'-10⅛	10'-1⅛	4'-10⅛	10⅝"	6'-11	9'-10½	10'-0	4'-11¾	8'-2⅝	9'-9¼	9'-0	5'-2⅝	9'-6½	9'-6½	8'-6	5'-6⅜	10'-11⅜	9'-2¼	7'-6	5'-10⅞	12'-4⅞	8'-8¼	7'-0	6'-4½	14'-4½	8'-3⅝	7'-0	6'-11⅞	16'-6⅛	7'-8⅜
	4'	12'-3⅛	4'-8¼	4'-5½	12'-5½	4'-8½	3'-4⅛	5'-9½	12'-5	12'-6⅞	4'-9⅛	2'-2⅝	6'-11¼	12'-0⅛	12'-1	4'-10⅛	1'-0⅝	8'-4⅛	11'-11	12'-0	4'-11¾	9'-9¾	11'-8¼	11'-0	5'-2⅝	11'-3¾	11'-3¾	10'-6	5'-6⅜	13'-2⅞	11'-1⅜	9'-6	5'-10⅞	14'-10⅜	10'-4⅞	9'-0	6'-4½	16'-11⅝	9'-9⅝	8'-6	6'-11⅛	19'-8⅛	9'-2⅛
	5'	14'-7¼	4'-8¼	5'-3⅜	14'-10½	4'-8½	3'-11⅞	6'-10⅛	14'-8⅛	14'-6½	4'-9⅛	2'-6¾	8'-5¼	14'-7¼	14'-6⅞	4'-10⅛	1'-3¼	9'-9⅜	13'-11⅝	14'-6	4'-11¾	11'-8⅞	13'-11⅞	13'-6	5'-2⅝	13'-5¼	13'-5¼	12'-6	5'-6⅜	15'-6½	13'-0½	11'-6	5'-10⅞	17'-8¾	12'-5	10'-6	6'-4½	20'-0	11'-6⅝	10'-0	6'-11⅛	22'-10¼	10'-7⅞
	6'	16'-11½	4'-8¼	6'-2⅛	16'-9¾	4'-8½	4'-6	7'-10⅛	16'-11⅜	17'-0	4'-9⅛	3'-0	9'-8¼	16'-9¼	17'-0⅜	4'-10⅛	1'-5⅞	11'-6	16'-5⅞	17'-0	4'-11¾	13'-4⅞	15'-10⅞	15'-6	5'-2⅝	15'-6⅝	15'-6⅝	14'-6	5'-6⅜	17'-10⅛	14'-11⅝	13'-6	5'-10⅞	20'-2¼	14'-1⅝	12'-6	6'-4½	23'-0⅜	13'-3⅝	12'-0	6'-11⅛	26'-0¼	12'-1⅝
	7'	19'-3⅝	4'-8¼	7'-0⅜	19'-2⅞	4'-8½	5'-1¾	8'-11½	19'-2½	19'-5⅝	4'-9⅛	3'-5½	10'-11¼	18'-11¼	19'-6⅝	4'-10⅛	1'-8½	12'-11¼	18'-5⅝	19'-6	4'-11¾	15'-3¼	18'-2⅝	17'-6	5'-2⅝	17'-8⅛	17'-8⅛	16'-6	5'-6⅜	20'-1⅝	16'-10¾	15'-0	5'-10⅞	22'-7¾	15'-10¼	14'-0	6'-4½	26'-0¾	15'-0⅝	13'-6	6'-11⅛	29'-2⅜	13'-7⅜
8'	3'	9'-10⅞	6'-10¼	3'-7¼	10'-0⅝	6'-10½	2'-8¼	4'-8¾	10'-1¾	10'-1¼	6'-11½	1'-9⅜	5'-8¼	9'-10⅛	10'-1⅛	7'-1⅛	10⅝"	6'-11	9'-10½	10'-0	7'-3⅜	8'-2⅝	9'-9¼	9'-0	7'-7⅛	9'-6½	9'-6½	8'-6	8'-0⅜	10'-11⅜	9'-2¼	7'-6	8'-6⅝	12'-4⅞	8'-8¼	7'-0	9'-2⅜	14'-4½	8'-3⅝	7'-0	9'-11⅞	16'-6⅛	7'-8⅜
	4'	12'-3⅛	6'-10¼	4'-5½	12'-5½	6'-10½	3'-4⅛	5'-9½	12'-5	12'-6⅞	6'-11½	2'-2⅝	6'-11¼	12'-0⅛	12'-1	7'-1⅛	1'-0⅝	8'-4⅛	11'-11	12'-0	7'-3⅜	9'-9¾	11'-8¼	11'-0	7'-7⅛	11'-3¾	11'-3¾	10'-6	8'-0⅜	13'-2⅞	11'-1⅜	9'-6	8'-6⅝	14'-10⅜	10'-4⅞	9'-0	9'-2⅜	16'-11⅝	9'-9⅝	8'-6	9'-11⅞	19'-8⅛	9'-2⅛
	5'	14'-7¼	6'-10¼	5'-3⅜	14'-10½	6'-10½	3'-11⅞	6'-10⅛	14'-8⅛	14'-6½	6'-11½	2'-6¾	8'-5¼	14'-7¼	14'-6⅞	7'-1⅛	1'-3¼	9'-9⅜	13'-11⅝	14'-6	7'-3⅜	11'-8⅞	13'-11⅞	13'-6	7'-7⅛	13'-5¼	13'-5¼	12'-6	8'-0⅜	15'-6½	13'-0½	11'-6	8'-6⅝	17'-8¾	12'-5	10'-6	9'-2⅜	20'-0	11'-6⅝	10'-0	9'-11⅞	22'-10¼	10'-7⅛
	6'	16'-11½	6'-10¼	6'-2⅛	16'-9¾	6'-10½	4'-6	7'-10⅛	16'-11⅜	17'-0	6'-11½	3'-0	9'-8¼	16'-9¼	17'-0⅜	7'-1⅛	1'-5⅞	11'-6	16'-5⅞	17'-0	7'-3⅜	13'-4⅞	15'-10⅞	15'-6	7'-7⅛	15'-6⅝	15'-6⅝	14'-6	8'-0⅜	17'-10⅛	14'-11⅝	13'-6	8'-6⅝	20'-2¼	14'-1⅝	12'-6	9'-2⅜	23'-0⅜	13'-3⅝	12'-0	9'-11⅞	26'-0¼	12'-1⅝
	7'	19'-3⅝	6'-10¼	7'-0⅜	19'-2⅞	6'-10½	5'-1¾	8'-11½	19'-2½	19'-5⅝	6'-11½	3'-5½	10'-11¼	18'-11¼	19'-6⅝	7'-1⅛	1'-8½	12'-11¼	18'-5⅝	19'-6	7'-3⅜	15'-3¼	18'-2⅝	17'-6	7'-7⅛	17'-8⅛	17'-8⅛	16'-6	8'-0⅜	20'-1⅝	16'-10¾	15'-0	8'-6⅝	22'-7¾	15'-10¼	14'-0	9'-2⅜	26'-0¾	15'-0⅝	13'-6	9'-11⅞	29'-2⅜	13'-7⅜
	8'	21'-9⅞	5'-9½	7'-11⅜	21'-9¼	5'-9¾	5'-10	10'-1⅜	21'-8¼	22'-0⅛	5'-10½	3'-10⅝	12'-3⅞	21'-4¼	21'-7⅛	5'-11¾	1'-10⅝	14'-6⅞	20'-9⅝	21'-6	6'-1½	17'-1¾	20'-5¼	20'-0	6'-4⅞	19'-9⅝	19'-9⅝	18'-6	6'-9	22'-10¾	19'-2½	17'-0	7'-2⅛	26'-1⅞	18'-3¼	16'-0	7'-8⅜	29'-5	16'-11⅞	15'-0	8'-3¾	33'-9½	15'-9⅛
10'	3'	9'-10⅞	9'-0¼	3'-7¼	10'-0⅝	9'-0⅝	2'-8¼	4'-8¾	10'-1¾	10'-1¼	9'-1⅞	1'-9⅜	5'-8¼	9'-10⅛	10'-1⅛	9'-4	10⅝"	6'-11	9'-10½	10'-0	9'-7	8'-2⅝	9'-9¼	9'-0	10'-0	9'-6½	9'-6½	8'-6	10'-6⅜	10'-11⅜	9'-2¼	7'-6	11'-2⅜	12'-4⅞	8'-8¼	7'-0	12'-0⅜	14'-4½	8'-3⅝	7'-0	13'-0¾	16'-6⅛	7'-8⅜
	4'	12'-3⅛	9'-0¼	4'-5½	12'-5½	9'-0⅝	3'-4⅛	5'-9½	12'-5	12'-6⅞	9'-1⅞	2'-2⅝	6'-11¼	12'-0⅛	12'-1	9'-4	1'-0⅝	8'-4⅛	11'-11	12'-0	9'-7	9'-9¾	11'-8¼	11'-0	10'-0	11'-3¾	11'-3¾	10'-6	10'-6⅜	13'-2⅞	11'-1⅜	9'-6	11'-2⅜	14'-10⅜	10'-4⅞	9'-0	12'-0⅜	16'-11⅝	9'-9⅝	8'-6	13'-0¾	19'-8⅛	9'-2⅛
	5'	14'-7¼	9'-0¼	5'-3⅜	14'-10½	9'-0⅝	3'-11⅞	6'-10⅛	14'-8⅛	14'-6½	9'-1⅞	2'-6¾	8'-5¼	14'-7¼	14'-6⅞	9'-4	1'-3¼	9'-9⅜	13'-11⅝	14'-6	9'-7	11'-8⅞	13'-11⅞	13'-6	10'-0	13'-5¼	13'-5¼	12'-6	10'-6⅜	15'-6½	13'-0½	11'-6	11'-2⅜	17'-8¾	12'-5	10'-6	12'-0⅜	20'-0	11'-6⅝	10'-0	13'-0¾	22'-10¼	10'-7⅛
	6'	16'-11½	9'-0¼	6'-2⅛	16'-9¾	9'-0⅝	4'-6	7'-10⅛	16'-11⅜	17'-0	9'-1⅞	3'-0	9'-8¼	16'-9¼	17'-0⅜	9'-4	1'-5⅞	11'-6	16'-5⅞	17'-0	9'-7	13'-4⅞	15'-10⅞	15'-6	10'-0	15'-6⅝	15'-6⅝	14'-6	10'-6⅜	17'-10⅛	14'-11⅝	13'-6	11'-2⅜	20'-2¼	14'-1⅝	12'-6	12'-0⅜	23'-0⅜	13'-3⅝	12'-0	13'-0¾	26'-0¼	12'-1⅝
	7'	19'-3⅝	9'-0¼	7'-0⅜	19'-2⅞	9'-0⅝	5'-1¾	8'-11½	19'-2½	19'-5⅝	9'-1⅞	3'-5½	10'-11¼	18'-11¼	19'-6⅝	9'-4	1'-8½	12'-11¼	18'-5⅝	19'-6	9'-7	15'-3¼	18'-2⅝	17'-6	10'-0	17'-8⅛	17'-8⅛	16'-6	10'-6⅜	20'-1⅝	16'-10¾	15'-0	11'-2⅜	22'-7¾	15'-10¼	14'-0	12'-0⅜	26'-0¾	15'-0⅝	13'-6	13'-0¾	29'-2⅜	13'-7⅜
	8'	21'-9⅞	7'-11½	7'-11⅜	21'-9¼	7'-11¾	5'-10	10'-1⅜	21'-8¼	22'-0⅛	8'-0⅝	3'-10⅝	12'-3⅞	21'-4¼	21'-7⅛	8'-2⅝	1'-10⅝	14'-6⅞	20'-9⅝	21'-6	8'-5¼	17'-1¾	20'-5¼	20'-0	8'-9½	19'-9⅝	19'-9⅝	18'-6	9'-3	22'-10¾	19'-2½	17'-0	9'-9⅞	26'-1⅞	18'-3¼	16'-0	10'-6⅜	29'-5	16'-11¾	15'-0	11'-4½	33'-9½	15'-9⅛
	9'	24'-2½	7'-9⅜	8'-9¾	24'-2½	7'-9⅝	6'-5⅞	11'-2¼	23'-11⅞	24'-0	7'-10¾	4'-2¾	13'-7¼	23'-6¾	24'-1⅛	8'-0⅜	2'-1¼	16'-3⅞	23'-3¾	24'-0	8'-2⅞	19'-1½	22'-9½	22'-0	8'-7⅛	21'-11⅞	21'-11⅞	20'-6	9'-0½	25'-3¼	21'-2⅜	19'-0	9'-7⅛	28'-7¾	20'-0¾	17'-6	10'-3⅜	32'-6⅞	18'-9⅝	17'-0	11'-1½	37'-1½	17'-3¾
	10'	26'-7	7'-7¼	9'-8⅛	26'-7⅞	7'-7½	7'-1⅝	12'-3⅛	26'-3½	26'-5¾	7'-8½	4'-8	14'-10½	25'-9⅛	26'-7	8'-10⅞	2'-1⅞	16'-6⅞	23'-3¾	24'-0	8'-5⅞	20'-9¼	24'-9⅛	24'-0	8'-4¾	24'-1⅞	24'-1⅞	22'-6	8'-9⅞	27'-7¾	23'-2⅛	20'-6	9'-4⅜	31'-7⅜	22'-1⅝	18'-6	10'-9¾	40'-5½	18'-10⅜
	11'	28'-11½	9'-9⅞	10'-6½	29'-0⅞	9'-9½	7'-9½	13'-4	28'-7⅛	28'-11⅜	9'-10¾	5'-1¼	16'-1¾	27'-11⅝	29'-1	10'-0⅛	2'-6½	19'-3⅛	27'-6	29'-0	10'-4⅛	20'-9	27'-1¼	26'-6	10'-9⅛	26'-4⅛	26'-4⅛	24'-6	11'-3¾	30'-0⅛	25'-2¼	22'-6	11'-11⅞	34'-2	23'-11⅛	21'-0	12'-9⅞	38'-10⅝	22'-5⅜	20'-0	13'-10	43'-9⅝	20'-5⅛
	12'	31'-4	9'-7	11'-4⅞	31'-6⅞	9'-7⅝	8'-5⅜	14'-4⅞	30'-10¾	31'-5⅛	9'-8⅝	5'-6½	17'-8⅛	30'-7⅜	31'-1	9'-10¾	2'-8⅝	21'-0⅛	30'-0⅛	31'-0	10'-1¾	24'-4¾	29'-0⅞	28'-6	10'-6¾	28'-2	28'-2	26'-6	11'-1⅞	32'-4⅝	27'-2⅛	24'-6	11'-9⅛	36'-8¾	25'-8⅝	23'-0	12'-6⅞	41'-7¼	24'-0¼	22'-0	13'-6⅝	47'-7	22'-2¼

QUANTITIES

Span	Hgt.	0° Skew				5° Skew				10° Skew				15° Skew				20° Skew				25° Skew				30° Skew				35° Skew				40° Skew				45° Skew			
		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.		Conc. C.Y.		Steel lbs.	
		lBbl.	Δc	lBbl.	Δs	lBbl.	Δc	lBbl.	Δs	lBbl.	Δc	lBbl.	Δs	lBbl.	Δc	lBbl.	Δs	lBbl.	Δc	lBbl.	Δs	lBbl.	Δc	lBbl.	Δs	lBbl.	Δc	lBbl.	Δs	lBbl.	Δc	lBbl.	Δs	lBbl.	Δc	lBbl.	Δs	lBbl.	Δc	lBbl.	Δs
6'	3'	0.41	1.46	46	122	0.42	1.49	48	124	0.42	1.49	42	124	0.45	1.52	52	126	0.50	1.55	57	128	0.88	1.52	86	128	1.23	1.53	113	129	1.59	1.51	140	128	1.97	1.54	173	132	2.36	1.62	206	139
	4'	0.56	1.75	69	143	0.57	1.78	72	145	0.58	1.78	71	146	0.62	1.78	75	146	0.67	1.81	79	148	1.11	1.78	112	147	1.59	1.81	150	150	2.00	1.79	181	149	2.45	1.82	217	152	2.96	1.88	260	158
	5'	0.72	2.04	98	165	0.75	2.07	101	167	0.77	2.07	103	167	0.78	2.07	102	167	0.97	2.12	112	172	1.41	2.10	150	170	1.97	2.09	194	171	2.51	2.09	236	171	3.01	2.08	275	172	3.59	2.14	320	177
	6'	1.78	3.13	192	243	1.79	3.12	193	243	1.84	3.16	198	246	1.90	3.20	202	249	1.96	3.24	206	252	2.62	3.19	256	249	3.27	3.19	305	249	3.89	3.19	351	250	4.55	3.22	403	253	5.27	3.30	454	260
	7'	1.28	2.62	172	208	1.29	2.62	173	208	1.34	2.65	176	210	1.39	2.67	179	212	1.50	2.73	188	217	2.25	2.66	245	212	2.99	2.65	300	212	3.65	2.61	349	210	4.47	2.65	412	214	5.30	2.70	463	219
8'	3'	0.93	1.98	85	158	0.95	2.02	88	161	0.96	2.03	88	161	1.00	2.07	93	164	1.06	2.11	98	167	1.43	2.07	126	166	1.79	2.09	154	167	2.14	2.06	180	166	2.54	2.11	215	171	2.96	2.22	251	180
	4'	1.18	2.36	115	186	1.20	2.40	119	189	1.21	2.42	118	189	1.25	2.40	121	190	1.31	2.44	127	193	1.75	2.41	159	191	2.24	2.46	198	195	2.65	2.43	288	193	3.11	2.48	266	198	3.65	2.56	311	205
	5'	1.44	2.75	151	214	1.47	2.78	155	217	1.50	2.78	157	217	1.51	2.78	156	218	1.62	2.86	167	224	2.15	2.83	205	221	2.71	2.83	249	222	3.25	2.83	291	223	3.76	2.82	330	224	4.36	2.90	377	230
	6'	1.78	3.13	192	243	1.79	3.12	193	243	1.84	3.16	198	246	1.90	3.20	202	249	1.96	3.24	206	252	2.62	3.19	256	249	3.27	3.19	305	249	3.89	3.19	351	250	4.55	3.22	403	253	5.27	3.30	454	260
	7'	2.19	3.51	239	271	2.19	3.51	239	271	2.25	3.54	244	274	2.31	3.58	247	277	2.44	3.65	258	283	3.17	3.56	314	276	3.92	3.56	368	277	4.56	3.51	416	274	5.41	3.56	481	279	6.26	3.64	534	285
	8'	2.77	3.51	239	271	2.19	3.51	239	271	2.25	3.54	244	274	2.31	3.58	247	277	2.44	3.65	258	283	3.17	3.56	314	276	3.92	3.56	368	277	4.56	3.51	467	306	6.50	3.98	528	310	7.54	4.06	603	316
10'	3'	1.52	2.54	128	197	1.55	2.59	132	200	1.56	2.60	133	201	1.61	2.65	138	205	1.68	2.70	145	206	2.05	2.66	172	206	2.42	2.69	201	209	2.76	2.65	227	207	3.18	2.72	262	212	3.64	2.86	301	224
	4'	1.87	3.02	166	232	1.90	3.07	171	236	1.91	3.07	170	236	1.95	3.07	174	236	2.02	3.12	180	240	2.46	3.08	212	236	2.96	3.14	252	243	3.36	3.11	282	241	3.85	3.18	321	247	4.41	3.29	368	255
	5'	2.23	3.49	210	267	2.27	3.54	214	271	2.30	3.54	216	271	2.31	3.54	216	271	2.44	3.64	228	279	2.96	3.60	266	276	3.53	3.60	310	277	4.08	3.61	352	278	4.59	3.61	392	279	5.21	3.71	441	287
	6'	2.67	3.97	258	303	2.68	3.97	259	303	2.74	4.01	265	306	2.81	4.06	270	310	2.89	4.11	275	314	3.53	4.06	324	310	4.19	4.06	374	311	4.81	4.07	420	312	5.48	4.11	473	315	6.23	4.21	525	324
	7'	3.18	4.44	313	338	3.19	4.44	313	338	3.25	4.49	319	341	3.33	4.54	323	345	3.48	4.63	335	352	4.19	4.52	389	344	4.93	4.52	444	345	5.57	4.46	491	341	6.43	4.54	557	347	7.31	4.64	612	356
	8'	3.87	4.95	332	376	3.88	4.95	333	376	3.95	5.00	338	379	3.99	4.99	338	379	4.16	5.08	351	386	5.02	5.03	415	383	5.93	5.02	486	382	6.77	5.01	551	382	7.63	5.06	613	386	8.69	5.16	690	394
	9'	4.48	5.43	387	411	4.49	5.43	388	411	4.51	5.43	388	411	4.68	5.52	400	418	4.87	5.60	412	425	5.79	5.50	482	417	6.80	5.49	560	417	7.74	5.48	630	417	8.73	5.49	704	418	10.04	5.67	789	432
	10'	5.15	5.91	447	447	5.16	5.91	447	447	5.18	5.91	446	447	5.36	6.00	458	454	5.55	6.08	468	461	6.62	5.97	554	452	7.75	5.96	639	452	8.81	5.92	723	449	10.05	6.00	806	456	11.34	6.10	889	465
12'	8'	5.01	6.04	414	450	5.02	6.03	415	450	5.10	6.09	420	454	5.14	6.09	421	454	5.33	6.20	435	463	6.19	6.14	499	458	7.10	6.14	570	458	7.94	6.13	635	457	8.82	6.19	698	462	9.91	6.33	776	472
	9'	5.72	6.61	477	493	5.73	6.61	477	493	5.75	6.61	477	493	5.94	6.72	492	501	6.15	6.82	505	509	7.05	6.70	573	500	8.07	6.70	651	499	9.01	6.69	635	457	10.01	6.72	795	501	11.37	6.94	884	518
	10'	6.49	7.19	544	536	6.50	7.19	544	536	6.52	7.18	543	536	6.72	7.29	557	544	6.93	7.40	569	552	7.99	7.26	653	541	9.11	7.25	737	541	10.17	7.22	821	538	11.44	7.32	905	546	12.76	7.46	991	557
	11'	7.33	7.76	615	579	7.33	7.76	615	578	7.35	7.76	614	578	7.56	7.87	626	587	7.89	8.02	648	598	9.07	7.89	741	588	10.23	7.81	829	582	11.44	7.78	919	580	12.78	7.85	1016	585	14.23	7.98	1103	595
	12'	8.22	8.34	692	621	8.23	8.34	691	621	8.35	8.39	699	625	8.49	8.43	707	628	8.72	8.54	717	636	10.02	8.40	818	626	11.49	8.37	927	624	12.77	8.34	1023	622	14.26	8.41	1124	627	16.08	8.16	1245	643

Δc = Apron concrete quantity per additional barrel. Δs = Apron steel quantity per additional barrel.

DESIGN APPROVED

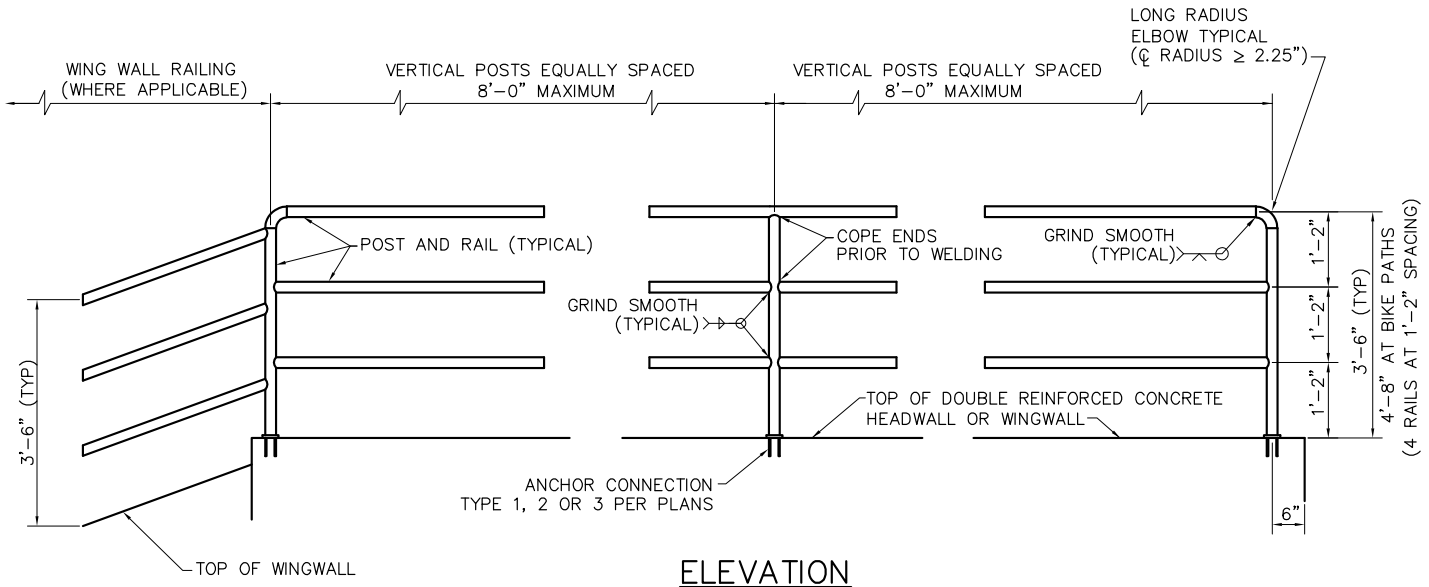
APPROVED FOR DISTRIBUTION

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
BRIDGE GROUP STRUCTURE DETAIL

REINFORCED CONCRETE BOX CULVERTS
OUTLET APRON - DIMENSIONS & QUANTITIES (4 : 1 SLOPE)

ROUTE | PROJECT NO. | FA NO. | DRAWING NO. SD 6.11 (3 of 4)

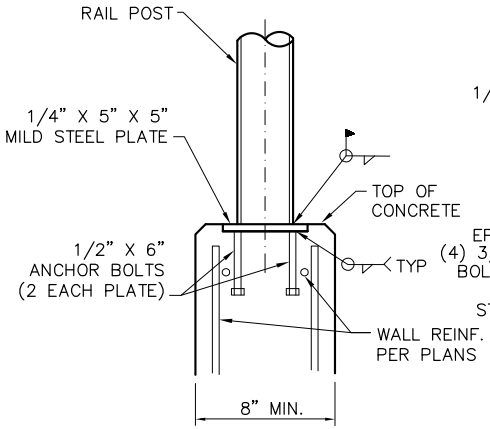
LOCATION | SHEET NO. OF



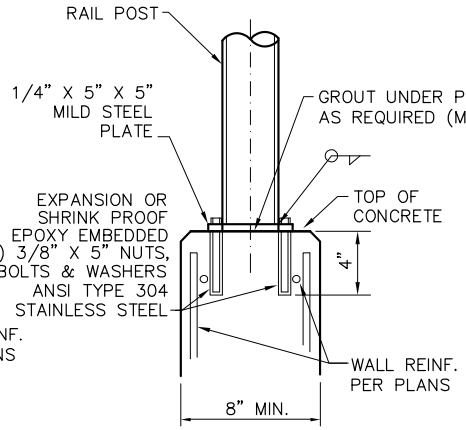
ELEVATION

NOTES:

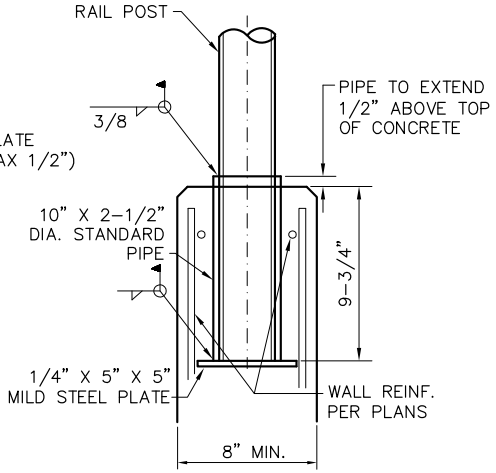
1. POSTS AND RAILS SHALL BE 1.90 INCH OUTSIDE DIAMETER, HIGH STRENGTH HEAVY INDUSTRIAL STEEL PIPE CONFORMING TO ASTM F1043 MATERIAL GROUP IA-2 (2.72 LB/FT, MINIMUM YIELD STRENGTH=50 KSI) OR MATERIAL GROUP IC GALVANIZED AFTER FORMING (2.28 LB/FT, MINIMUM YIELD STRENGTH=50 KSI)
2. PAINT RAIL PER MAG SPECIFICATIONS SECTION 530 WHEN REQUIRED BY PLANS, SHOP PRIME WITH RUST INHIBITING PRIMER (FIELD REPAIR PRIMER AS NEEDED). COLOR PER PLANS.
3. VERTICAL POSTS TO BE EVENLY SPACED.
4. REMOVE ALL SHARP EDGES.
5. INSTALL SAFETY RAIL AS REQUIRED BY PLANS OR SPECIFICATIONS.
6. THE EMBEDMENT FOR ANCHOR TYPES 1, 2, AND 3 SHALL BE LOCATED INSIDE THE WALL REINFORCEMENT CAGE.
7. SAFETY RAIL IS NOT TO BE USED AS A PEDESTRIAN BRIDGE RAIL.
8. FOR SAFETY RAIL ON 8" BLOCK (CMU) WALLS, THE TOP COURSE SHALL BE A BOND BEAM WITH 2-#4 LONGITUDINAL REBAR AND GROUT.



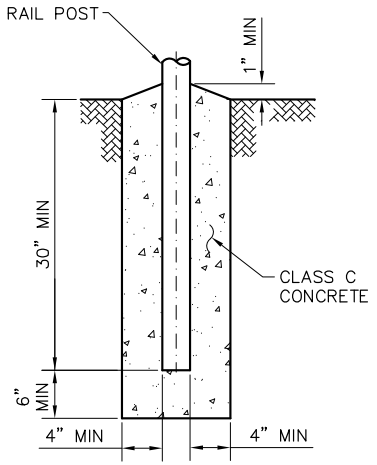
TYPE 1
ANCHOR PLATE DETAIL



TYPE 2
EXPANSION BOLT DETAIL



TYPE 3
PIPE SLEEVE DETAIL



TYPE 4
GROUND INSTALLATION DETAIL

NOTE: SEE PLANS FOR ANCHORAGE DETAILS FOR ATTACHMENT TO SINGULARLY REINFORCED AND NON-REINFORCED WALLS.

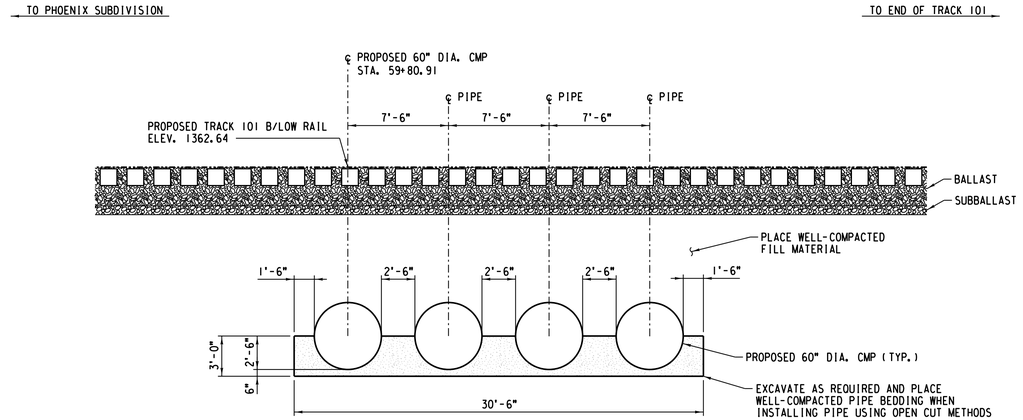
DETAIL NO.			REVISED	DETAIL NO.
145	MARICOPA ASSOCIATION of GOVERNMENTS — STANDARD DETAIL ENGLISH	SAFETY RAIL	01-01-2020	145

DESIGN SHEET

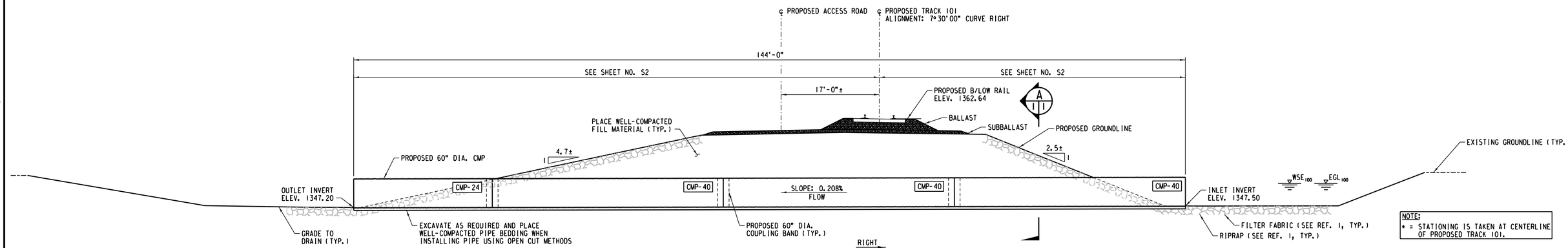
DRAWING SCHEDULE

	SHEET NO.	PLAN NO.	DESCRIPTION	TYPE
THIS SET	S1	123080	GENERAL ARRANGEMENT (SHEET 1 OF 2)	DESIGN
	S2	123080	GENERAL ARRANGEMENT (SHEET 2 OF 2)	DESIGN
	2	680000	DETAILS FOR ROUND STEEL PIPE CULVERTS	STANDARD
	3	680000	GENERAL NOTES FOR ROUND STEEL PIPE CULVERTS	STANDARD
	1	680021	CONSTRUCTION NOTES FOR CORRUGATED METAL PIPE CULVERTS	STANDARD
	2	680021	TABLES FOR CORRUGATED METAL PIPE CULVERTS	STANDARD

REF.	NO.	DWG. NO.	SHEET NO.	REV. NO.	DESCRIPTION	TYPE
	1	-	P020 OF 037 T008 OF 012 X053 OF 143 EC013 OF 036	-	MESA, ARIZONA, PHOENIX SUBDIVISION, MP 934.78 TO MP 937.83, CONSTRUCT INDUSTRIAL LEAD TRACK, 100% PLANS, ISSUED FOR BID, DATED MARCH 6, 2023	DESIGN



SECTION A
SCALE: 3/8"=1'-0"



NOTE:
SLOPES SHOWN ACCOUNT FOR PIPE SKEW/ORIENTATION.

CROSS SECTION
SCALE: 1/8"=1'-0"

WSE_{100} = 1351.38
EGL_{100} = 1351.38
VEL_{100} = 3.10 fps

NOTE:
• = STATIONING IS TAKEN AT CENTERLINE OF PROPOSED TRACK 101.

BILL OF MATERIAL

REQ'D.	UNIT	DESCRIPTION	STORE ITEM NO.	ORDERED BY
12	EA.	60" DIA. X 40'-0" LONG CORRUGATED STEEL PIPE, 12 GAGE (0.109"), 3" X 1" HELICAL CORRUGATIONS, ALUMINIZED (PER STD. PLAN NO. 680021, SHT. 1-2)	510-0077	CONSTRUCTOR
4	EA.	60" DIA. X 24'-0" LONG CORRUGATED STEEL PIPE, 12 GAGE (0.109"), 3" X 1" HELICAL CORRUGATIONS, ALUMINIZED (PER STD. PLAN NO. 680021, SHT. 1-2)	510-0075	
12	EA.	COUPLING BAND, 60" DIA. LOCKING TYPE, 14 GAGE (0.079") X 24" WIDE, 2 2/3" X ½" CORRUGATIONS, ALUMINIZED WITH ACCOMPANYING HARDWARE	510-0018	
280	CU. YD.	PIPE BEDDING (PER STD. DWG. 680000 SHT. 2-3)		
1	EA.	CULVERT MARKER SIGNS, MOUNTING POST AND MOUNTING HARDWARE (PER STD. DWG. 0502, 0507 AND 0599)	P00-2616	
1	LOT	FILL MATERIAL (PER STD. DWG. 680000 SHT. 3 AND REF. 1)		
1	LOT	RIPRAP (PER REF. 1)		
1	LOT	FILTER FABRIC (PER REF. 1)		

CLSM MAY BE SUBSTITUTED FOR FILL MATERIAL.
BULK QUANTITIES ARE ESTIMATED.

DESIGN NOTES

RIGHT-OF-WAY

1. Right-of-way: Varies, per Ref. 1.

LAYOUT

1. Stationing: Per Ref. 1.
2. Elevation Datum: Per Ref. 1.
3. Temporary Benchmarks:
   TBM 1 (Olsson CP 6): Elev. 1352.34, NAVD 1988, located in ground Southwest of proposed Track 101 Culvert No. 1.14, 3,208.83' left of existing Phoenix Sub. Main Track centerline, Sta. 1504+80.52.

   TBM 2 (Olsson CP 7): Elev. 1352.02, NAVD 1988, located in ground Southwest of proposed Track 101 Culvert No. 1.14, 3,598.24' left of existing Phoenix Sub. Main Track centerline, Sta. 1501+96.60.
4. Profile: Proposed Track 101 per Ref. 1.
5. Alignment: 7°30'00" curve right.
6. Information used to prepare this drawing in addition to reference drawings:

   Hydrologic & Hydraulic Evaluation prepared by Olsson, dated September 2022.

DESIGN

1. This structure has been designed for Cooper E80 Live Load with impact and cover depth ranging from 2'-6" to 18'-0".

POSTCONSTRUCTION COMPLIANCE

Constructor in charge of construction to provide to the office of the Senior Manager Structures Design as-built drawings confirming that the project was constructed in compliance with the plans and indicating any construction variances.

SIGNED

In Charge of Construction — Date

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 01-07-2021 ARIZONA U.S.A.

LETTER SERIES
SHEET NO. CUT ON — SHEET NO. SHOWN ON

SECTION DESIGNATION

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL — STATUS — 07/05/2023 DATE

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
Kyle Stubs — CONSULTANT ENGINEER — 02/17/2023 DATE

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123080

LATITUDE: 33.29219°N LONGITUDE: 111.66665°W

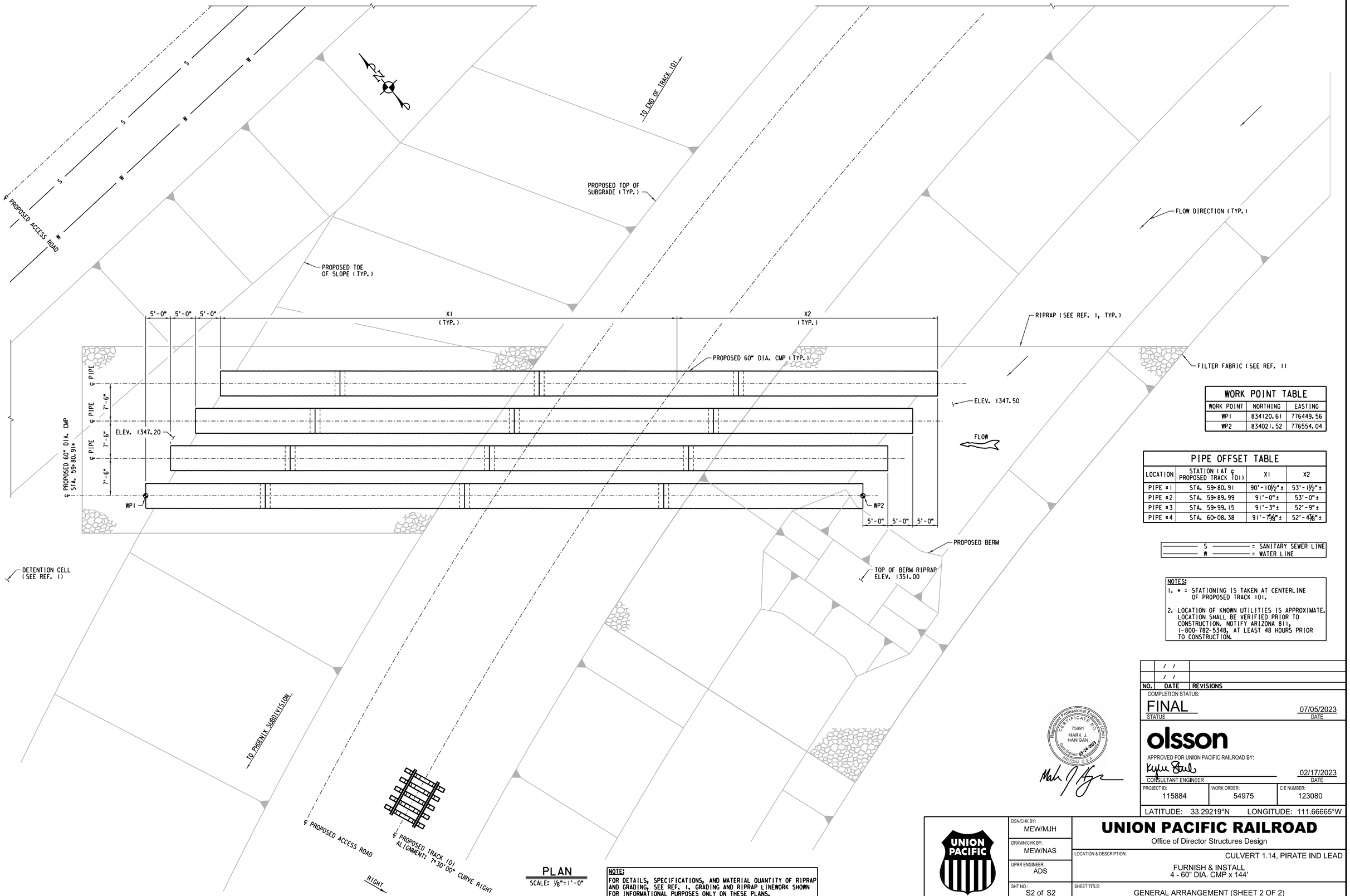
UNION PACIFIC

DSN/CHK BY: MEW/MJH	UNION PACIFIC RAILROAD Office of Director Structures Design
DRAWN/CHK BY: MEW/NAS	LOCATION & DESCRIPTION: CULVERT 1.14, PIRATE IND LEAD FURNISH & INSTALL 4 - 60" DIA. CMP x 144'
UPRR ENGINEER: ADS	
SHT NO.: S1 of S2	SHEET TITLE: GENERAL ARRANGEMENT (SHEET 1 OF 2)

FILE NAME: \\oa.ad.oasconsulting.com\fnts-na\projects\2020\050\1000\020\0927-40\Design\Microstation\020-0927-RLBR-Culv 1.14_Station 59+80\Pirate Ind Lead_1.14.cas.dgn

PLOTTED: 7/7/2023 12:39:50 PM

DESIGN SHEET



PLAN

SCALE: 1/8"=1'-0"

NOTE:
FOR DETAILS, SPECIFICATIONS, AND MATERIAL QUANTITY OF RIPRAP AND GRADING, SEE REF. 1. GRADING AND RIPRAP LINEWORK SHOWN FOR INFORMATIONAL PURPOSES ONLY ON THESE PLANS.

WORK POINT TABLE

WORK POINT	NORTHING	EASTING
WP1	834120.61	776449.56
WP2	834021.52	776554.04

PIPE OFFSET TABLE

LOCATION	STATION (AT ℄ PROPOSED TRACK 101)	X1	X2
PIPE #1	STA. 59+80.91	90'-10½"±	53'-1½"±
PIPE #2	STA. 59+89.99	91'-0"±	53'-0"±
PIPE #3	STA. 59+99.15	91'-3"±	52'-9"±
PIPE #4	STA. 60+08.38	91'-7 5/16"±	52'-4 3/16"±

S = SANITARY SEWER LINE
W = WATER LINE

NOTES:
1. * = STATIONING IS TAKEN AT CENTERLINE OF PROPOSED TRACK 101.
2. LOCATION OF KNOWN UTILITIES IS APPROXIMATE. LOCATION SHALL BE VERIFIED PRIOR TO CONSTRUCTION. NOTIFY ARIZONA 811, 1-800-782-5348, AT LEAST 48 HOURS PRIOR TO CONSTRUCTION.

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL — STATUS — 07/05/2023 — DATE

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 02-24-2023 ARIZONA U.S.A.

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
CONSULTANT ENGINEER — 02/17/2023 — DATE

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123080

LATITUDE: 33.29219°N LONGITUDE: 111.66665°W

UNION PACIFIC

DSN/CHK BY:	MEW/MJH
DRAWN/CHK BY:	MEW/NAS
UPRR ENGINEER:	ADS
SHT NO.:	S2 of S2

UNION PACIFIC RAILROAD
Office of Director Structures Design

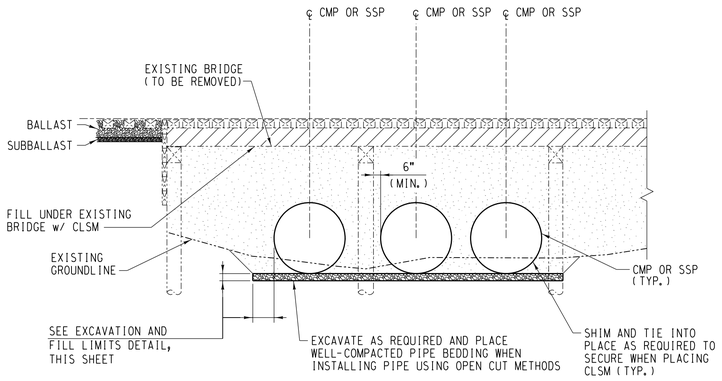
LOCATION & DESCRIPTION: CULVERT 1.14, PIRATE IND LEAD
FURNISH & INSTALL
4 - 60" DIA. CMP x 144'

SHEET TITLE: GENERAL ARRANGEMENT (SHEET 2 OF 2)

FILE NAME: \\oa.ad.oasconsulting.com\fnts-na1\projects\2020\050\1000\020\027\40\Design\Microstation\020-0927-RLBR Culv 1.14 Station 59+80\Pirate Ind Lead 1.14.cadr.dgn

PLOTTED: 7/7/2023 12:39:51 PM

STANDARD SHEET

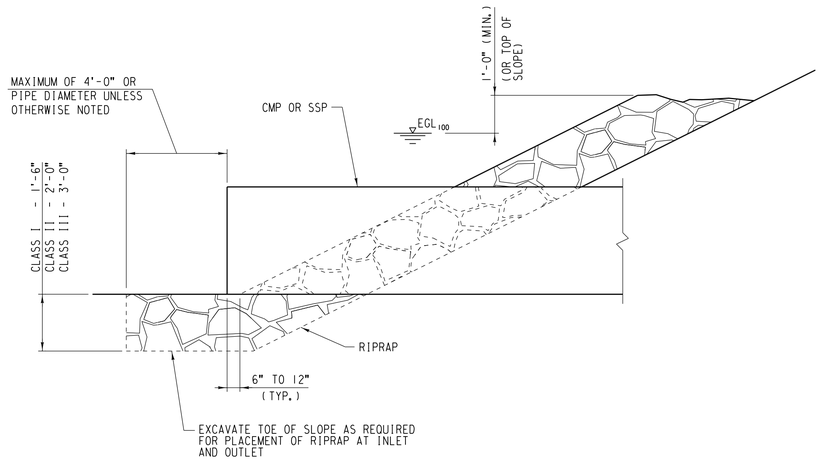


UNDER STRUCTURE - SECTION

SCALE: 3/16"=1'-0"

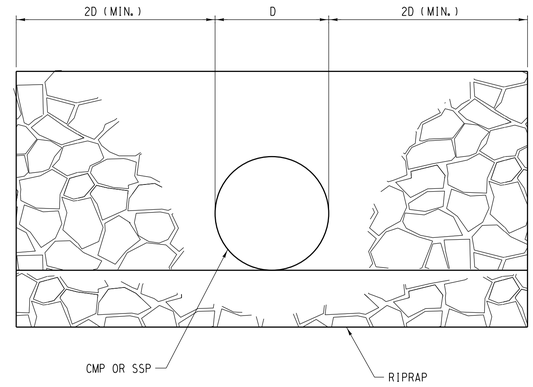
LIMITS OF REMOVAL

REMOVE EXISTING STRUCTURE TO 1'-0" (MIN.) BELOW PROPOSED EMBANKMENT SLOPE AND 2'-6" (MIN.) BELOW BASE OF RAIL.



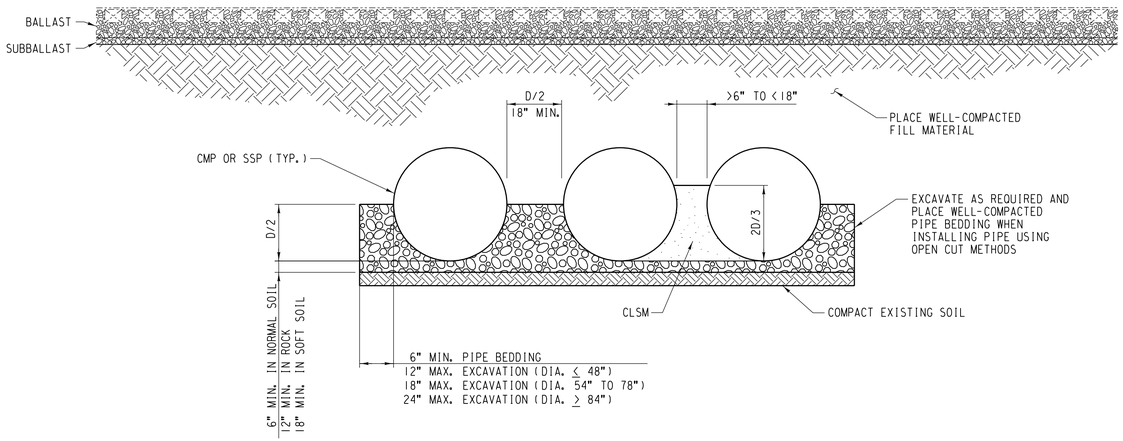
RIPRAP - SECTION

SCALE: NONE



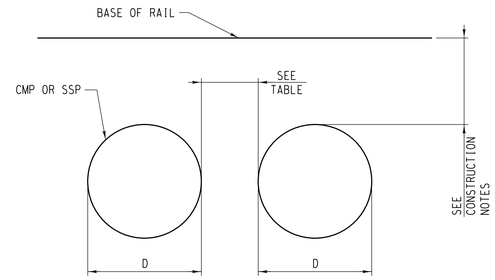
RIPRAP - ELEVATION

SCALE: NONE



EXCAVATION AND FILL LIMITS

SCALE: NONE



SPACING CHART	
PIPE DIAMETER	MIN. SPACING BETWEEN PIPES
12" to 24"	12"
24" to 96"	D/2
96" OR MORE	48"

MINIMUM PIPE SPACING AND COVER

SCALE: NONE

REVISIONS		
DATE	LTR.	DESCRIPTION
02/12	A	ADDED RIPRAP SECTION
04/19	D	UPDATED DETAILS
/		
/		
/		
/		

DESIGN BY: CLJ | DRAWN BY: KDM | CHECKED BY: CLJ

APPROVED:

George J. Meyn 4/4/08

UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

DETAILS FOR ROUND STEEL PIPE CULVERTS

FILE OWNER: UPRR | DATE:

PLAN NO.: 680000 | SHEET: 2 OF 3

Copyright © 2007 by Union Pacific Railroad PLOTTED: 8/12/2021 10:04:26 AM

FILE NAME: P:\Standards\Culverts (CMP&SSP)\0-Active\steelpip_std.dgn

STANDARD SHEET

GENERAL NOTES

GENERAL

1. All work requirements shown on these drawings and not otherwise detailed shall be accomplished as specified in Union Pacific Railroad (UPRR) Specifications and the American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual for Railway Engineering. In the event of conflicts between specifications, the more restrictive shall apply.

2. **Construction means and methods shall comply with the All Permits Issued (API) package.**

3. Field verify all dimensions, stations and elevations prior to start of construction.

4. **Contact the Union Pacific "Call Before You Dig" number 90 days (not less than 60 days) prior to proposed construction start date. Prior to construction, confirm that all necessary relocations have been completed. The CBYD number is: 1-800-336-9193.**

5. **Location of known utilities is approximate. Location shall be verified prior to construction. Notify Call811 "Call Before you Dig" number at least 48 hours prior to construction.**

GRADING

1. Provide and place all fill and subballast material per UPRR Grading Specifications. Perform grading as required to drain and match existing embankments and upstream and downstream channel flowline.

2. Perform grading as required for construction of the new structure and replace areas removed and disturbed in the course of construction to a condition equal to or better than existing.

WELL COMPACTED FILL

1. Well compacted fill shall be well graded granular soil free of any organic material, stones larger than 1½ inches, frozen lumps, debris or excessive moisture. Fill shall be compacted to 95% of maximum dry density as defined in ASTM International D1557 (Modified Proctor). Fill shall be placed and compacted in layers not to exceed 6 inches. Fill shall be placed simultaneously on both sides of the pipe and between multiple pipes. CLSM may be used in lieu of well compacted fill.

CONTROLLED LOW-STRENGTH MATERIAL (CLSM) FILL

1. Controlled Low-Strength Material is a self-compacting, cementitious fill material with an unconfined compressive strength of 50 to 300 psi. The mixture shall consist of water, Portland cement, fly ash, and sound fine or coarse aggregate or both. The mix design shall allow adequate flowability without segregation of aggregates. Hardening time is of prime importance and CLSM should develop 50 psi in about one hour. The maximum layer of thickness for CLSM shall be 3 feet. Additional layers shall not be placed until the CLSM has lost sufficient moisture to be walked on without indenting more than two inches. Pipe spacing may be reduced to between 6" and 18" when using CLSM in lieu of well compacted pipe bedding between pipes.

PIPE BEDDING

1. Pipe bedding shall be granular material such as aggregates ordinarily specified and used in the construction of highway base and subbase. These aggregates include crushed stone, natural or crushed gravel, natural or manufactured sands, crushed slag or a homogeneous mixture of these materials. Pipe bedding shall be compacted to 95% of maximum dry density as defined in ASTM International D1557 (Modified Proctor). Recommended gradation is as follows:

SCREEN SIZE	% PASSING (BY WEIGHT)
1 inch	100
½ inch	60-90
⅜ inch	20-40
No. 4	10-20
No. 200	less than 5%

2. Union Pacific sealant ballast, item no. 562-5428, may be used.

RIPRAP:

1. Class of riprap shall be specified by the engineer. Riprap shall be placed in such a manner as to avoid segregation of various sizes of rock, and distributed so that there will be no large accumulation of either the larger or smaller sizes of stone. Individual rocks shall be placed in tight contact with one another in such a way to produce the least amount of void spaces. Riprap shall be solid, unfractured rock or concrete, bulky in shape with sharp angular edges.

2. Individual rocks shall vary as shown:

RIPRAP CLASS	AVERAGE WEIGHT PER STONE (LBS.)	DIMENSION (INCHES)	ITEM NO.	UNIT OF MEASURE	LAYER THICKNESS	TYPICAL VELOCITIES
I	50 to 200	9 to 14	562-2764	Ton	1'-6"	6 - 8 fps
II	200 to 1,000	14 to 24	562-3430	Ton	2'-0"	8 - 12 fps
III	1,000 to 4,000	24 to 38	562-4096	Ton	3'-0"	> 12 fps

3. The entire mass of riprap shall be well distributed within the limits specified. However, the following allowances shall be acceptable to produce the required riprap protection:

   Riprap Class I - No allowances are permitted
   Riprap Class II - 15% of Riprap Class I.
   Riprap Class III - 15% of Riprap Class I and 15% of Riprap Class II.

CONSTRUCTOR NOTES (WHEN APPLICABLE)

CONSTRUCTOR DEFINITION

1. Constructor designates Manager Bridge Construction if construction by UPRR and Contractor if construction by Contractor.

DIVISION OF RESPONSIBILITY

A. RAILROAD

1. Provide material as shown in the Bill of Material.

2. Provide and install Private Property/No Trespassing sign and culvert marker sign on right side at low mile post end of culvert.

B. CONSTRUCTOR

1. Coordinate all construction activities with the Railroad.

2. **Before ordering any material, Constructor shall make a detailed field inspection of the site verifying all pertinent dimensions and elevations. Any variations in dimensions or elevations from those shown on the drawings shall be reported immediately to the UPRR Project Manager.**

3. Any modifications to this design shall be approved by the UPRR Office of Director Structures Design prior to construction.

4. **Verify the location, relocation, abandonment, and/or temporary support of all utilities affected by the construction of the structure and embankment and coordinate these activities with the appropriate utility companies, agencies and/or authorities.**

5. Apply for and obtain all construction permits necessary to perform the work.

6. Bill of Material and Schedules are provided for information only. Constructor shall be responsible for providing all material, not provided by the Railroad, required to complete the work.

7. Perform all work not performed by the Railroad.

8. Provide the Railroad with a detailed construction plan defining the activity, schedule and procedure for each aspect of the work. Construction shall not begin until the construction plan has been approved by the Railroad.

9. Provide all temporary structures (shoring, bracing and/or falsework) required to support and protect the existing embankments and structures affected by the work. Provide the Railroad with details, design and procedure for all temporary structures. All temporary structures shall be designed, signed and sealed by a professional engineer registered in the State that the structure is to be constructed. All temporary structures shall be approved by the UPRR Office of Director Structures Design prior to beginning construction.

10. Direct channel flow as required to perform work.

11. Accomplish activities within the schedule specified in the approved construction plan.

REVISIONS		
DATE	LTR.	DESCRIPTION
02/12	A	RELOCATED GENERAL NOTES
6/13	B	CHANGED FILL REQUIREMENTS
7/14	C	CHANGED FILL REQUIREMENTS
04/19	D	UPDATED NOTES
/		
/		

DESIGN BY: CLJ | DRAWN BY: KDM | CHECKED BY: CLJ

APPROVED:

George J. Meyn 4/4/08

UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

GENERAL NOTES FOR ROUND STEEL PIPE CULVERTS

FILE OWNER: UPRR | DATE:

PLAN NO.: 680000 | SHEET: 3 OF 3

FILE NAME: P:\!Standards\Culverts (CMP&SSP)\0-Active\steelpip_std.dgn

Copyright © 2007 by Union Pacific Railroad PLOTTED: 8/12/2021 10:04:39 AM

STANDARD SHEET

CMP FABRICATION NOTES

PIPE MATERIAL SPECIFICATIONS, FABRICATION AND TOLERANCE

1. CMP material shall be steel in accordance with the current AREMA Manual for Railway Engineering, Chapter 1, Part 4, Section 3.

2. All exposed edges shall be ground smooth.

3. Permanently attach an identification plate inside the pipe near the end of the segment. The plate is to contain the following information in at least 1" high letters:
   Name of manufacturer and plant location
   Date assembled
   Gage
   Diameter
   Length

   The same information plus the lifting weight shall be stenciled on the outside face of the pipe.

4. The inside diameter of the circular pipe shall not vary more than ½ inch from the nominal diameter when measured on the inside crest of the corrugations for diameters through 48 inches, and 1% for diameters greater than 48 inches. In no case shall the difference in the diameter of the abutting pipe ends be more than ½ inch.

5. Locking coupling bands shall be in accordance with the provisions of the AREMA Manual for Railway Engineering Chapter 1, Part 4, Section 4.3.4. Coupling bands shall be of the same base metal and finish as the pipe. Coupling bands shall be 24 inches wide for pipes 30 inch diameter and larger. Smaller pipes may use 7 inch wide bands. Coupling band thickness is shown in Table 1 and 2, per Std. Dwg. 680021, Sht. 2.

6. All pipe ends to be cut square.

LIFTING AND HANDLING

1. Two lifting lugs shall be provided at the top of each preassembled section.

2. Lifting hardware for erection and installation shall be provided.

3. Max spacing of lifting lugs = 16'.

COATING

1. 10 GAGE AND THINNER: Aluminized Type 2 per American Association of State Highway and Transportation Officials (AASHTO) M274.

2. 8 GAGE OR THICKER: Metallic & Polymer coated per ASTM A742 or American Association of State Highway and Transportation Officials (AASHTO) M246.

HELICAL LOCKSEAM PIPE (PREFERRED)

48" DIAMETER AND LESS

1. Class 2 with 2 2/3" x ½" helical corrugations. Shape 1, vertical elongation not required.

2. Ends to be rerolled with 2 2/3" x ½" circumferential corrugations to accommodate the appropriate coupling band.

54" DIAMETER AND GREATER

1. Class 2 with 3" x 1" helical corrugations. Shape 1, factory elongated with vertical length 5% greater than the nominal diameter.

2. Ends to be rerolled with 2 2/3" x ½" circumferential corrugations to accommodate the appropriate coupling band.

RIVETED ANNULAR PIPE (ALTERNATE)

1. Riveted annular pipe may be substituted for helical lockseam pipe with approval of UPRR Manager of Structures Design. Unless noted in Tables 1 and 2, entire pipe run must be all helical or all annular CMP.

30" DIAMETER AND LESS

1. Class 1 with 2 2/3" x ½" annular corrugations. Shape 1, vertical elongation is not required.

2. Single riveted longitudinal seams.

36" DIAMETER AND GREATER

1. Class 1 with 3" x 1" annular corrugations. Shape 2, factory elongated with vertical length 5% greater than the nominal diameter.

2. Double riveted seams.

RIVETED ANNULAR CMP DIAMETERS

1. The minimum width of the longitudinal lap is 1½ inches for all pipes with nominal inside diameter of 12 to 21 inches, 2 inches for pipes with nominal inside diameter of 24 inches or 30 inches, and 3 inches for all pipes with nominal inside diameter of 36 inches or greater.

2. All 14 gage pipe shall have at least 5/16 inch diameter rivets. All 12 gage and thicker pipe shall have at least 7/16 inch diameter rivets.

3. Longitudinal seams shall be riveted with one rivet in each corrugation valley for all pipes 24 inches in diameter and smaller. Longitudinal seams shall be riveted with two rivets in each corrugation valley for all pipes larger than 24 inches. Circumferential seams shall be riveted with a maximum rivet spacing of six inches.

4. All rivets shall be cold driven in such a manner that the metal shall be drawn tightly together throughout the entire lap. The center of each rivet shall not be closer than two rivet diameters from the edge of the sheet. All rivets shall have full hemispherical heads or heads of a form acceptable to the engineer. They shall be driven in a workmanlike manner to completely fill the hole without bending.

5. Rivets shall conform to the specifications of ASTM International A31, Grade A and shall be electroplated in accordance with the specifications of ASTM International A164, Type RS.

CMP CONSTRUCTION NOTES

GENERAL

1. These structures are designed for Cooper E80 live load with impact, and cover as shown in Tables 1 and 2, per Std. Dwg. 680021, Sht. 2.

2. 30 inch diameter and larger Corrugated Metal Pipe (CMP) is preferred for mainline culverts. Smaller pipes are to be used for local drainage.

3. Table 1, per Std. Dwg. 680021, Sht. 2, indicates the minimum required gage thickness for structural stability.

INSTALLATION

1. Installation of CMP shall conform to the current American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual for Railway Engineering, Chapter 1, Part 4.

2. Culvert lengths are to be based on existing roadbed sections with additional allowance for riprap.

3. These standards are for installation in soil with a pH of 5-9 and resistivity > 1,500 ohm-cm. Pipes located in soils outside this range shall have additional corrosion protection as specified by the engineer.

4. Wire or timber strutting used during installation must remain through the duration of backfilling pipe and then be removed immediately after backfill is complete.

5. CMP culverts will be joined using 2 foot wide locking corrugated metal connecting bands. The inside of corrugated connecting bands and the outside of pipe culverts to be joined by corrugated connecting bands shall be kept clean and free of all rust, dirt or gravel. The corrugations on the connecting bands and the pipe culvert shall fit snugly as the connecting bands are tightened.

6. CMP with annular corrugations must be placed with the inside circumferential laps pointing downstream.

7. Culverts resting on rock foundation need not be cambered. Unless otherwise specified by the engineer all other CMP culverts shall be cambered in accordance with the following:

   A. Embankments up to 8 feet high (measured base of rail to flowline) require a 1½ inch camber.

   B. Embankments 8 feet to 12 feet high require a 2½ inch camber.

   C. Embankments 12 feet to 18 feet high require a 4 inch camber.

8. In no case shall the culvert be cambered so high in the center that water will be pocketed at the inlet end of the pipe.

9. Camber shall be created in CMP by placing the proper profile in the native soil beneath the compacted, granular pipe bedding.

10. It is required to place joints in CMP offset from ℄ of tracks. Minimum horizontal offset between ℄ of track and ℄ of pipe joint shall be 6'.

REVISIONS		
DATE	LTR.	DESCRIPTION
04/19	A	UPDATED NOTES
/		
/		
/		
/		
/		

DESIGN BY: CLJ | DRAWN BY: GVS | CHECKED BY: CLJ

APPROVED:

UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

CONSTRUCTION NOTES FOR CORRUGATED METAL PIPE CULVERTS

FILE OWNER: UPRR | DATE: 10/13/17

PLAN NO.: 680021 | SHEET: 1 OF 2

FILE NAME: P:\!Standards\Culverts (CMP&SSP)\0-Active\steelpip_std.dgn

Copyright © 2007 by Union Pacific Railroad PLOTTED: 8/12/2021 10:05:23 AM

STANDARD SHEET

TABLE 1 - ROUND CORRUGATED METAL PIPE (CMP) HELICAL LOCK SEAM

INSIDE PIPE DIAMETER	CORRUGATION DIMENSIONS	GAGE	THICKNESS (IN.)	WEIGHT (LB./FT.)	COVER * MIN. (FT.)	COVER * MAX. (FT.)	10'-0" LENGTH ITEM NO.	10'-0" LENGTH WEIGHT (LB.)	12'-0" LENGTH ITEM NO.	12'-0" LENGTH WEIGHT (LB.)	14'-0" LENGTH ITEM NO.	14'-0" LENGTH WEIGHT (LB.)	16'-0" LENGTH ITEM NO.	16'-0" LENGTH WEIGHT (LB.)	18'-0" LENGTH ITEM NO.	18'-0" LENGTH WEIGHT (LB.)	20'-0" LENGTH ITEM NO.	20'-0" LENGTH WEIGHT (LB.)	22'-0" LENGTH ITEM NO.	22'-0" LENGTH WEIGHT (LB.)	24'-0" LENGTH ITEM NO.	24'-0" LENGTH WEIGHT (LB.)	30'-0" LENGTH ITEM NO.	30'-0" LENGTH WEIGHT (LB.)	40'-0" LENGTH ITEM NO.	40'-0" LENGTH WEIGHT (LB.)	CONNECTING BANDS ITEM NO.	CONNECTING BANDS GAGE
12"	2 2/3" x ½"	14	0.079	12	1'-6"	18'-0"	510-0022	120	510-0023	144	-	168	-	192	-	216	510-0024	240	-	264	510-0025	288	-	360	-	480	-	16
18"	2 2/3" x ½"	14	0.079	18	1'-6"	18'-0"	510-0026	180	510-0027	216	-	252	-	288	-	324	510-0028	360	-	396	510-0029	432	-	540	-	720	-	16
21"	2 2/3" x ½"	14	0.079	21	1'-6"	18'-0"	510-0030	210	510-0031	252	-	294	-	336	-	378	510-0032	420	-	462	510-0033	504	-	630	-	840	-	16
24"	2 2/3" x ½"	14	0.079	24	1'-6"	18'-0"	510-0034	240	510-0035	288	-	336	-	384	-	432	510-0036	480	-	528	510-0037	576	-	720	-	960	510-3123	16
30"	2 2/3" x ½"	14	0.079	30	1'-6"	18'-0"	-	300	-	360	510-0038	420	510-0039	480	510-0040	540	510-0041	600	510-0042	660	510-0043	720	510-0044	900	510-0045	1,200	510-3124	16
36"	2 2/3" x ½"	14	0.079	41	2'-6"	18'-0"	-	410	-	492	510-0046	574	510-0047	656	510-0048	738	510-0049	820	510-0050	902	510-0051	984	510-0052	1,230	510-0053	1,640	510-0015	16
42"	2 2/3" x ½"	14	0.079	47	2'-6"	18'-0"	-	470	-	564	510-0054	658	510-0055	752	510-0056	846	510-0057	940	510-0058	1,034	510-0059	1,128	510-0060	1,410	510-0061	1,880	510-0016	16
48"	2 2/3" x ½"	12	0.109	74	2'-6"	18'-0"	-	740	-	888	510-0062	1,036	510-0063	1,184	510-0064	1,332	510-0065	1,480	510-0066	1,628	510-0067	1,776	510-0068	2,220	510-0069	2,960	510-0017	14
60"	3" x 1"	12	0.109	92	2'-6"	18'-0"	-	920	-	1,104	510-0070	1,288	510-0071	1,472	510-0072	1,656	510-0073	1,840	510-0074	2,024	510-0075	2,208	510-0076	2,760	510-0077	3,680	510-0018	14

* COVER TO BE MEASURED FROM BASE OF RAIL TO TOP OF PIPE

TABLE 2 - ROUND CORRUGATED STEEL PIPE (CMP) ANNULAR RIVETED

INSIDE PIPE DIAMETER	CORRUGATION DIMENSIONS	GAGE	THICKNESS (IN.)	WEIGHT (LB./FT.)	COVER * MIN. (FT.)	COVER * MAX. (FT.)	10'-0" LENGTH ITEM NO.	10'-0" LENGTH WEIGHT (LB.)	12'-0" LENGTH ITEM NO.	12'-0" LENGTH WEIGHT (LB.)	14'-0" LENGTH ITEM NO.	14'-0" LENGTH WEIGHT (LB.)	16'-0" LENGTH ITEM NO.	16'-0" LENGTH WEIGHT (LB.)	18'-0" LENGTH ITEM NO.	18'-0" LENGTH WEIGHT (LB.)	20'-0" LENGTH ITEM NO.	20'-0" LENGTH WEIGHT (LB.)	22'-0" LENGTH ITEM NO.	22'-0" LENGTH WEIGHT (LB.)	24'-0" LENGTH ITEM NO.	24'-0" LENGTH WEIGHT (LB.)	30'-0" LENGTH ITEM NO.	30'-0" LENGTH WEIGHT (LB.)	40'-0" LENGTH ITEM NO.	40'-0" LENGTH WEIGHT (LB.)	CONNECTING BANDS ITEM NO.	CONNECTING BANDS GAGE
72"	3" x 1"	10	0.138	140	3'-6"	18'-0"	-	1,400	-	1,680	510-3100	1,960	510-3101	2,240	510-3102	2,520	510-3103	2,800	510-3104	3,080	510-3105	3,360	-	4,200	-	5,600	510-3158	12
84"	3" x 1"	10	0.138	164	3'-6"	18'-0"	-	1,640	-	1,968	510-3114	2,296	510-3115	2,624	510-3116	2,952	510-3117	3,280	510-3118	3,608	510-3113	3,936	-	4,920	-	6,560	510-3176	12
96"	3" x 1"	8	0.168	228	3'-6"	18'-0"	-	2,280	-	2,736	510-3181	3,192	510-3182	3,648	510-3183	4,104	510-3184	4,560	510-3185	5,016	510-3186	5,472	-	6,840	-	9,120	510-3188	10
108"	3" x 1"	8	0.168	262	3'-6"	18'-0"	-	2,620	-	3,144	510-1000	3,668	510-1001	4,192	510-1002	4,716	510-1003	5,240	510-1004	5,764	510-1005	6,288	-	7,860	-	10,480	510-1006	10

* COVER TO BE MEASURED FROM BASE OF RAIL TO TOP OF PIPE

NOTE:

SHADED ITEMS INDICATE A DIFFERENCE BETWEEN HELICAL AND ANNULAR PIPES.
THE ENTIRE PIPE RUN MUST BE ALL HELICAL OR ALL ANNULAR CMP FOR SHADED ITEMS.
NON-SHADED ITEMS ARE INTERCHANGEABLE WITHIN THE SAME PIPE RUN.

REVISIONS		
DATE	LTR.	DESCRIPTION
02/19	A	UPDATED TABLE
7/19	B	REMOVED COMMON ITEMS. ADDED 108"
/		
/		
/		
/		

DESIGN BY: CLJ | DRAWN BY: GVS | CHECKED BY: CLJ

APPROVED:

UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

TABLES FOR CORRUGATED METAL PIPE CULVERTS

FILE OWNER: UPRR | DATE: 10/13/17

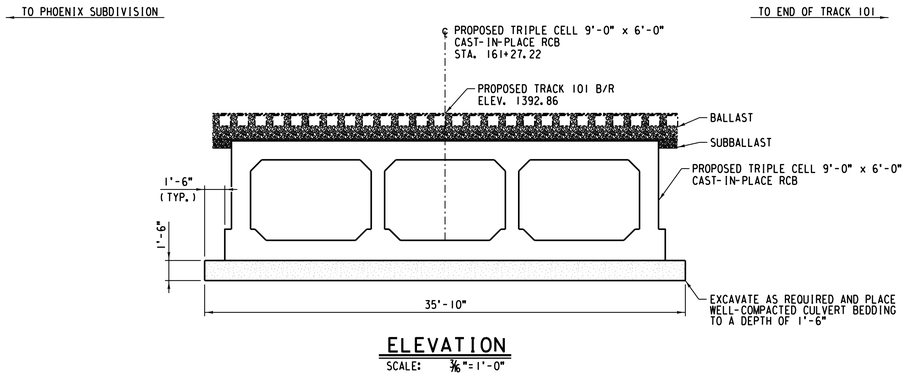
PLAN NO.: 680021 | SHEET: 2 OF 2

Copyright © 2007 by Union Pacific Railroad

PLOTTED: 8/12/2021 10:05:37 AM

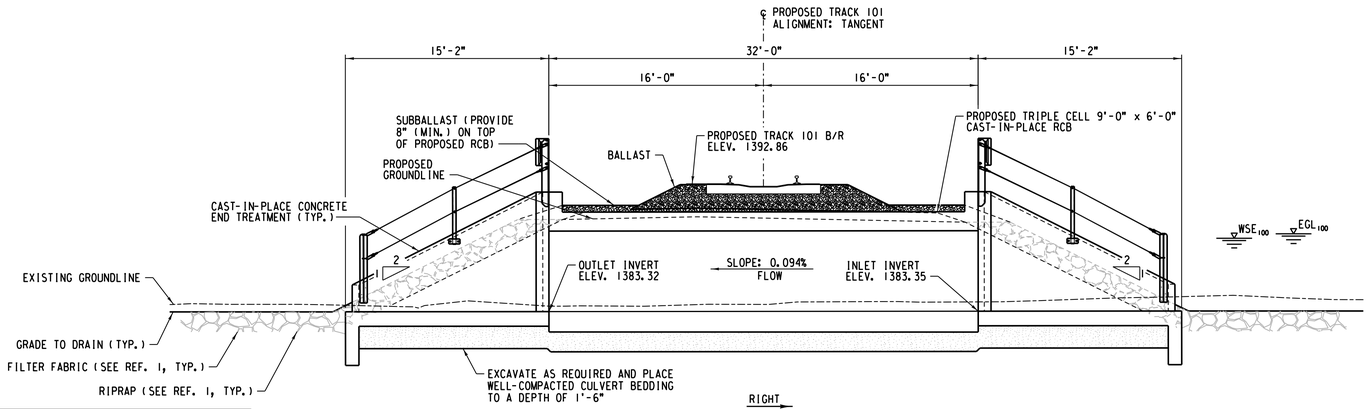
FILE NAME: P:\Standards\Culverts (CMP&SSP)\0-Active\steelpip_std.dgn

DESIGN SHEET



ELEVATION

SCALE: 3/8"=1'-0"



RIGHT →

CROSS SECTION

SCALE: 3/8"=1'-0"

WSE_{100} = 1388.79
EGL_{100} = 1389.12
VEL_{100} = 5.20 fps

MATERIAL NOTE:
CEMENT SHALL BE TYPE II OR TYPE III PORTLAND CEMENT IN ACCORDANCE WITH ASTM C150 SPECIFICATIONS.

BILL OF MATERIAL

REQ'D.	UNIT	DESCRIPTION	STORE ITEM NO.	ORDERED BY
155	CU. YD.	4000 PSI CONCRETE FOR TRIPLE CELL 9'-0" X 6'-0" BOX CULVERT (BARREL ONLY) (PER DETAILS, SHEET NO. S3 AND NOTES, PER STD. DWG. 680200 SHT. G1)		CONSTRUCTOR
1	LOT	REINFORCING STEEL FOR BARREL (PER SCHEDULE, SHEET NO. S3)		
79	CU. YD.	4000 PSI CONCRETE FOR END TREATMENTS ONLY (PER DETAILS, SHEET. NOS. S4-S6, AND NOTES, PER STD. DWG. 680200 SHT. G1)		
1	LOT	REINFORCING STEEL FOR END TREATMENTS ONLY (PER SCHEDULE, SHEET NO. S6)		
2	EA.	HANDRAIL POST HP-25R (PER STD. DWG. 680160 SHT. H1)	513-2077	
2	EA.	HANDRAIL POST HP-25L (PER STD. DWG. 680160 SHT. H1)	513-2075	
8	EA.	HANDRAIL POST HP-26 (PER STD. DWG. 680160 SHT. H1)	513-2080	
4	EA.	HANDRAIL POST HP-27 (PER STD. DWG. 680160 SHT. H1)	513-2085	
43	EA.	¾" DIA. x 14" A307 HEAVY HEX BOLT, TYPE 1 WITH HEAVY ELASTIC LOCK NUT (MIL-N-32258) AND FLAT CIRCULAR WASHER (ASTM F436), EACH COMPONENT HOT DIP OR MECHANICALLY ZINC COATED		
27	EA.	⅜" EYE TYPE STRANDVISE CABLE GRIP CARTRIDGE (MACLEAN POWER PRODUCTS NO. 5102)	098-6081	
330	LIN. FT.	⅜" NOMINAL DIAMETER WIRE ROPE, 7 WIRE, GALVANIZED STEEL STRAND, SIEMENS MARTINS GRADE, A-COATING	050-5394	
27	EA.	½" DIA. EYEBOLT, 2" LONG SHANK WITH 1" I.D. EYE, PLAIN PATTERN GALVANIZED DROP FORGED STEEL (ASTM A489), WITH ZINC PLATED HEX NYLON INSERT LOCKNUT (ASTM A563) AND ZINC PLATED FLAT CIRCULAR WASHER (ASTM F436)	130-0370	
19	EA.	GALVANIZED MALLEABLE IRON U-BOLT WITH 2 ELASTIC LOCKNUTS (MIL-N-25027), ZINC PLATED, FOR ⅜" DIA. WIRE ROPE	050-6370	
1	EA.	CULVERT MARKER SIGNS, MOUNTING POST AND MOUNTING HARDWARE (PER STD. DWG. 0502, 0507 AND 0599)	P00-2616	
1	LOT	RIPRAP (PER REF. 1)		
1	LOT	FILTER FABRIC (PER REF. 1)		
135	CU. YD.	CULVERT BEDDING (PER STD. DWG. 680200 SHT. G1)		
1	LOT	FILL MATERIAL (PER STD. DWG. 680000 SHT. 3 AND REF. 1)		
1	LOT	EPOGRIP MULTIPURPOSE STRUCTURAL BONDING AND GROUTING EPOXY ADHESIVE OR APPROVED ALTERNATE		
1	LOT	TEMPORARY FORMWORK MATERIAL		

CLSM MAY BE SUBSTITUTED FOR FILL MATERIAL.
BULK QUANTITIES ARE ESTIMATED.

DESIGN NOTES

RIGHT-OF-WAY

1. Right-of-way: Varies, per Ref. 1.

LAYOUT

1. Stationing: Per Ref. 1.
2. Elevation Datum: Per Ref. 1.
3. Temporary Benchmarks:
   TBM 1 (Olsson CP 4): Elev. 1390.42, NAVD 1988, established by ½" rebar located in ground Northwest of proposed Track 101 Culvert No. 3.05, 9,606.96' left of existing Phoenix Sub. Main Track centerline, Sta. 1588+58.48.

   TBM 2 (Olsson CP 5): Elev. 1391.63, NAVD 1988, established by ½" rebar located in ground Southwest of proposed Track 101 Culvert No. 3.05, 9,311.99' left of existing Phoenix Sub. Main Track centerline, Sta. 1590+90.31.
4. Profile: Proposed Track 101 per Ref. 1.
5. Alignment: Tangent.
6. Information used to prepare this drawing in addition to reference drawings:

   Hydrologic & Hydraulic Evaluation prepared by Olsson, dated September 2022.

DESIGN

1. This structure has been designed for Cooper E80 Live Load with impact and cover depth ranging from 1'-6" to 18'-0".
2. Constructor shall be responsible for determining construction loads and providing necessary supplemental cover, or support of structural elements, to accommodate construction activities as required.

DRAWING SCHEDULE

	SHEET NO.	PLAN NO.	DESCRIPTION	TYPE
THIS SET	S1	123081	GENERAL ARRANGEMENT (SHEET 1 OF 2)	DESIGN
	S2	123081	GENERAL ARRANGEMENT (SHEET 2 OF 2)	DESIGN
	S3	123081	RCB BARREL DETAILS	DESIGN
	S4	123081	END TREATMENT FRAMING DETAILS	DESIGN
	S5	123081	END TREATMENT REINFORCING DETAILS (SHEET 1 OF 2)	DESIGN
	S6	123081	END TREATMENT REINFORCING DETAILS (SHEET 2 OF 2)	DESIGN
	S7	123081	HANDRAIL DETAILS	DESIGN
	G1	680200	GENERAL NOTES	STANDARD
	G2	680200	GENERAL ARRANGEMENT FOR SINGLE CELL AND MULTI-CELL BOX CULVERTS	STANDARD
	G5	680200	CONSTRUCTION SEQUENCE	STANDARD

	NO.	DWG. NO.	SHEET NO.	REV. NO.	DESCRIPTION	TYPE
REF.	1	-	P027 OF 037 T010 OF 012 X078 OF 143 EC014 OF 036	-	MESA, ARIZONA, PHOENIX SUBDIVISION, MP 934.78 TO MP 937.83, CONSTRUCT INDUSTRIAL LEAD TRACK, 100% PLANS, ISSUED FOR BID, DATED MARCH 6, 2023	DESIGN

NOTES:
1. CROSS SECTION SHOWN ALONG CENTERLINE OF PROPOSED RCB.
2. RCB = REINFORCED CONCRETE BOX

LETTER SERIES
SHEET NO. CUT ON
SHEET NO. SHOWN ON

SECTION DESIGNATION

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 01-05-2023 ARIZONA U.S.A.

POSTCONSTRUCTION COMPLIANCE

Constructor in charge of construction to provide to the office of the Senior Manager Structures Design as-built drawings confirming that the project was constructed in compliance with the plans and indicating any construction variances.

SIGNED

In Charge of Construction — Date

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL (STATUS) 07/05/2023 (DATE)

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
Kyle Stahl
CONSULTANT ENGINEER 02/17/2023 DATE

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123081

LATITUDE: 33.28926°N LONGITUDE: 111.63457°W

DSN/CHK BY:	MEW/NAS
DRAWN/CHK BY:	MEW/MJH
UPRR ENGINEER:	ADS
SHT NO.:	S1 of S7

UNION PACIFIC RAILROAD
Office of Director Structures Design

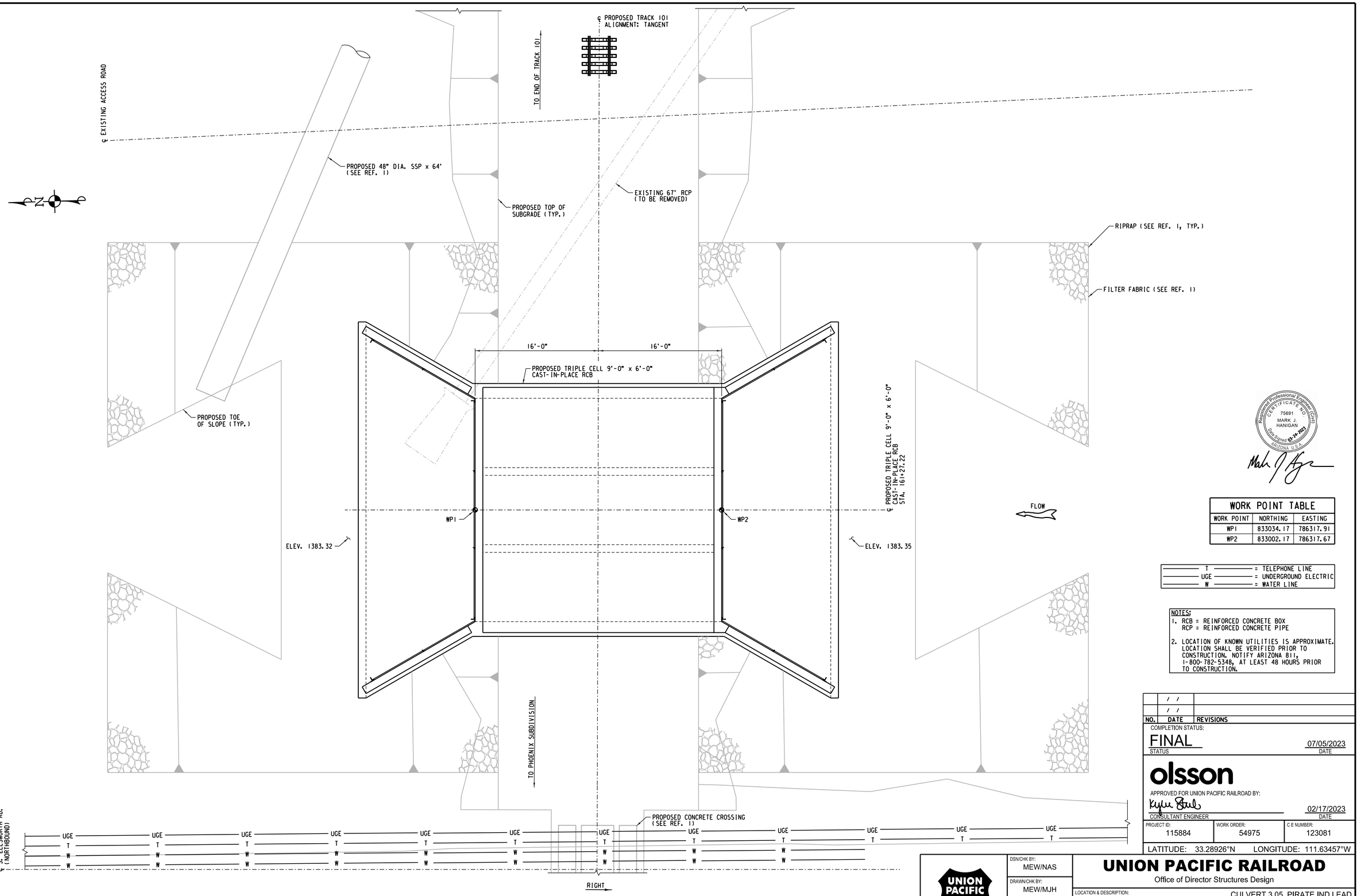
LOCATION & DESCRIPTION: CULVERT 3.05, PIRATE IND LEAD
FURNISH & INSTALL
TRIPLE CELL 9'-0" x 6'-0" RCB x 32'

SHEET TITLE: GENERAL ARRANGEMENT (SHEET 1 OF 2)

FILE NAME: \\oa.ad.oacconsulting.com\fnts-na\projects\2020\050\1-1000\020-0927\40-Design\Microstation\020-0927-RLBR.Culv 3.05.Sta. 161+27\Pirate Ind Lead 3.05.dgn

PLOTTED: 7/5/2023 12:25:33 PM

DESIGN SHEET



PLAN
SCALE: 3/16"=1'-0"

WORK POINT TABLE		
WORK POINT	NORTHING	EASTING
WP1	833034.17	786317.91
WP2	833002.17	786317.67

T = TELEPHONE LINE
UGE = UNDERGROUND ELECTRIC
W = WATER LINE

NOTES:
1. RCB = REINFORCED CONCRETE BOX
RCP = REINFORCED CONCRETE PIPE

2. LOCATION OF KNOWN UTILITIES IS APPROXIMATE. LOCATION SHALL BE VERIFIED PRIOR TO CONSTRUCTION. NOTIFY ARIZONA 811, 1-800-782-5348, AT LEAST 48 HOURS PRIOR TO CONSTRUCTION.

NOTE:
FOR DETAILS, SPECIFICATIONS, AND MATERIAL QUANTITIES OF RIPRAP AND GRADING, SEE REF. 1. GRADING AND RIPRAP LINEWORK SHOWN FOR INFORMATIONAL PURPOSES ONLY ON THESE PLANS.

Registered Professional Engineer (Civil)
CERTIFICATE NO. 75691
MARK J. HANIGAN
Date Signed 02-24-2023
ARIZONA U.S.A.

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL — STATUS — 07/05/2023 — DATE

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
CONSULTANT ENGINEER — 02/17/2023 — DATE

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123081

LATITUDE: 33.28926°N LONGITUDE: 111.63457°W

UNION PACIFIC

DSN/CHK BY:	MEW/NAS
DRAWN/CHK BY:	MEW/MJH
UPRR ENGINEER:	ADS
SHT NO.:	S2 of S7

UNION PACIFIC RAILROAD
Office of Director Structures Design

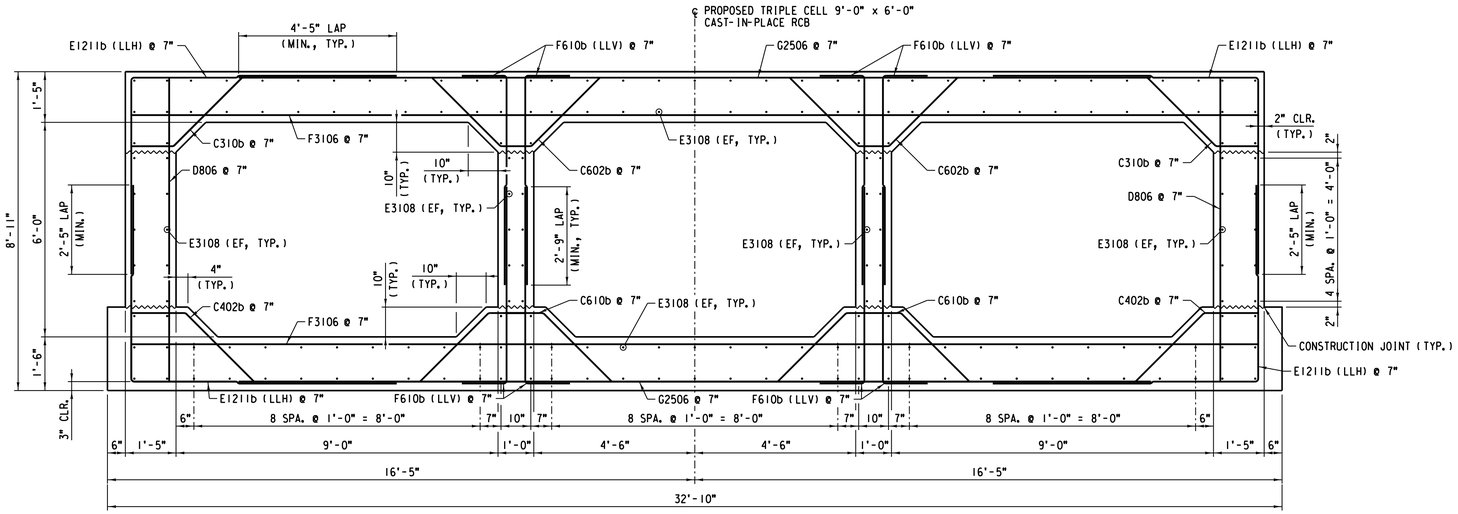
LOCATION & DESCRIPTION:
CULVERT 3.05, PIRATE IND LEAD
FURNISH & INSTALL
TRIPLE CELL 9'-0" x 6'-0" RCB x 32'

SHEET TITLE:
GENERAL ARRANGEMENT (SHEET 2 OF 2)

FILE NAME: \\vau.ad.oacomsulting.com\fnts-na\projects\2020\0501.1000\020-0927-40 Design\Microstation\020-0927.RUBR\July 3.05_Sta. 161-27\Pirate Ind Lead_3.05.dgn

PLOTTED: 7/5/2023 12:25:33 PM

DESIGN SHEET



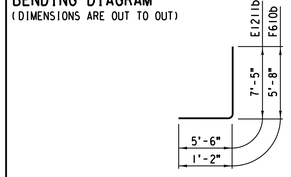
TYPICAL RCB BARREL SECTION

SCALE: ½"=1'-0"

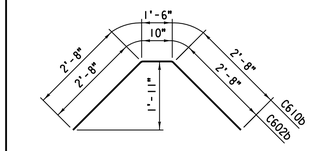
REINFORCING SCHEDULE
(QUANTITY PER BARREL ONLY)

TOTAL	MARK	SIZE	LENGTH	SHAPE
110	C310b	#4	3'-10"	
110	C402b	#4	4'-2"	
110	C602b	#4	6'-2"	
110	C610b	#4	6'-10"	
110	D806	#5	8'-6"	
220	E1211b	#6	12'-11"	
196	E3108	#6	31'-8"	
440	F610b	#7	6'-10"	
110	F3106	#7	31'-6"	
110	G2506	#8	25'-6"	

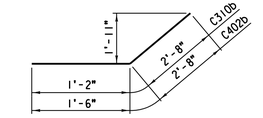
BENDING DIAGRAM
(DIMENSIONS ARE OUT TO OUT)



E1211b, F610b



C602b, C610b



C310b, C402b

NOTE:
BAR DESIGNATIONS CONSIST OF BAR SIZE & LENGTH FOLLOWED BY THE LETTER "b" IF BENT. BAR SIZES ARE REPRESENTED BY THE LETTERS A THROUGH L CORRESPONDING TO BAR SIZE #2 THROUGH #18. BAR LENGTHS ARE GIVEN IN FEET AND INCHES; THE LAST TWO DIGITS ARE INCHES.

EST. WT. OF REINFORCING STEEL = 36,830 LB.

CONCRETE PLACEMENT QUANTITIES

ITEM	UNIT	QTY.
RCB BARREL (BOTTOM SLAB)	CU. YD.	68.6
RCB BARREL (WALLS & TOP SLAB)	CU. YD.	85.5
APRON & TOEWALL	CU. YD.	60.7
WINGWALLS & HEADWALL	CU. YD.	17.5

NOTES:
1. FOR CAST-IN-PLACE CONCRETE NOTES, SEE STD. DWG. 680200 SHT. G1.
2. EF = EACH FACE
   LLH = LONG LEG HORIZONTAL
   LLV = LONG LEG VERTICAL

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL (STATUS) 07/05/2023 (DATE)

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 12-26-2023 ARIZONA U.S.A.

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
Kyle Stark
CONSULTANT ENGINEER 02/17/2023 DATE

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123081

LATITUDE: 33.28926°N LONGITUDE: 111.63457°W

DSN/CHK BY:	MEW/NAS
DRAWN/CHK BY:	MEW/MJH
UPRR ENGINEER:	ADS
SHT NO.:	S3 of S7

UNION PACIFIC RAILROAD
Office of Director Structures Design

LOCATION & DESCRIPTION: CULVERT 3.05, PIRATE IND LEAD

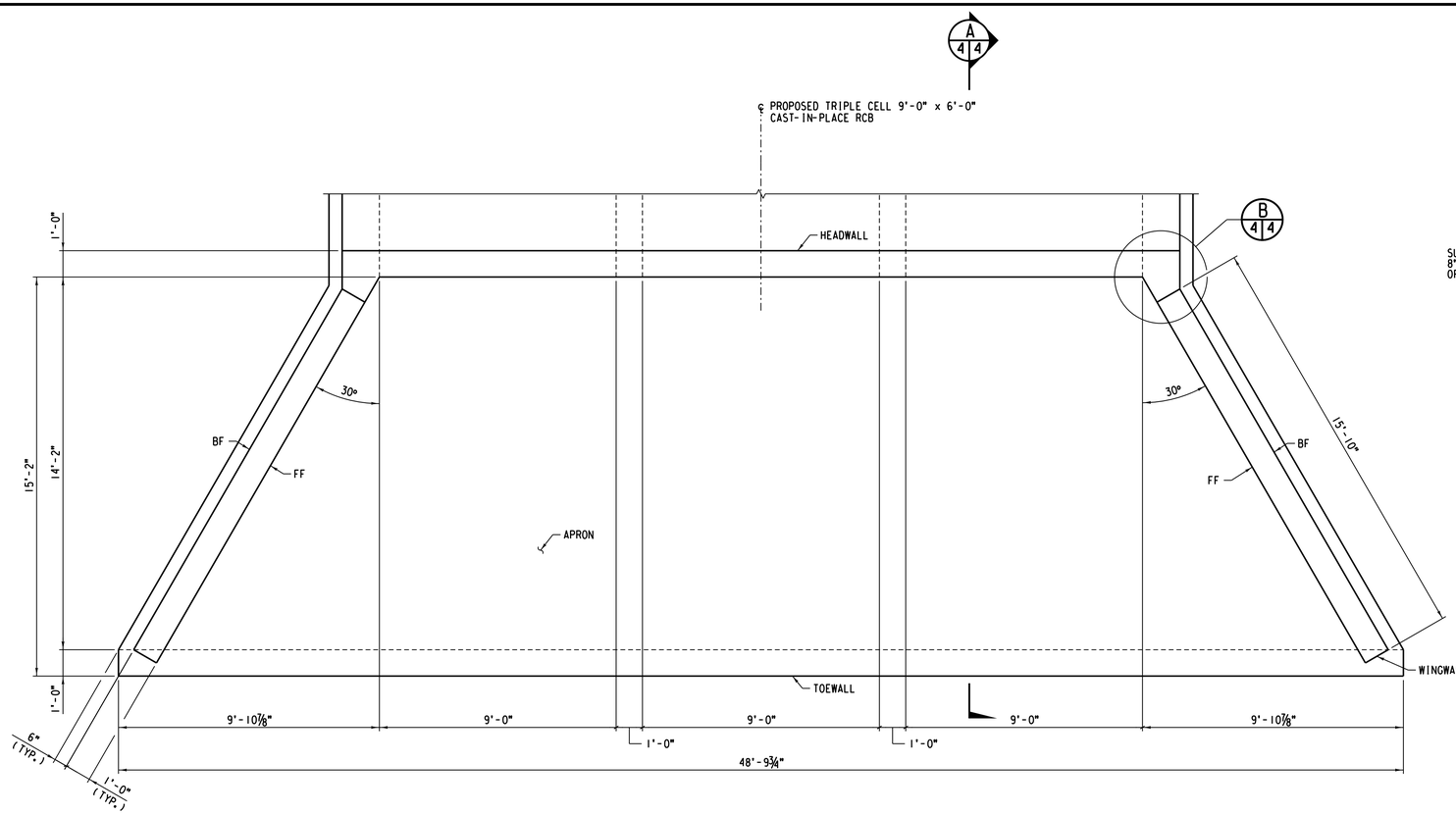
FURNISH & INSTALL
TRIPLE CELL 9'-0" x 6'-0" RCB x 32'

SHEET TITLE: RCB BARREL DETAILS

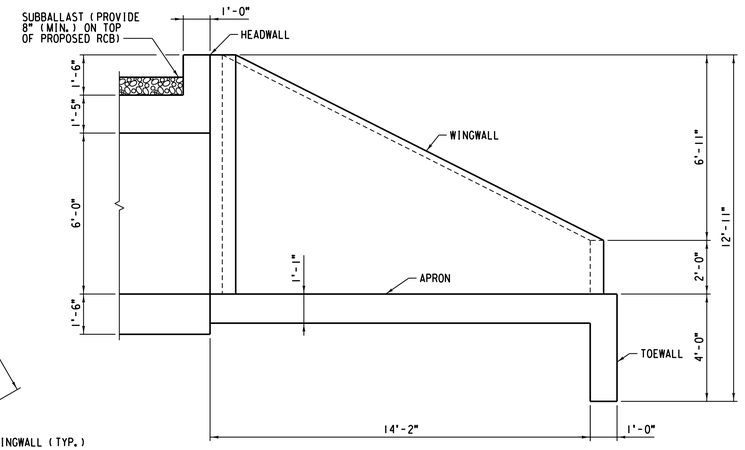
FILE NAME: \\oa.ad.oasconsulting.com\fnts-mp\projects\2020\0501-10000\020-0927\40-Design\Microstation\020-0927_RLBR.Calv 3.05.Sta 161+27\Pirate Ind Lead_3.05.dgn

PLOTTED: 7/5/2023 12:25:33 PM

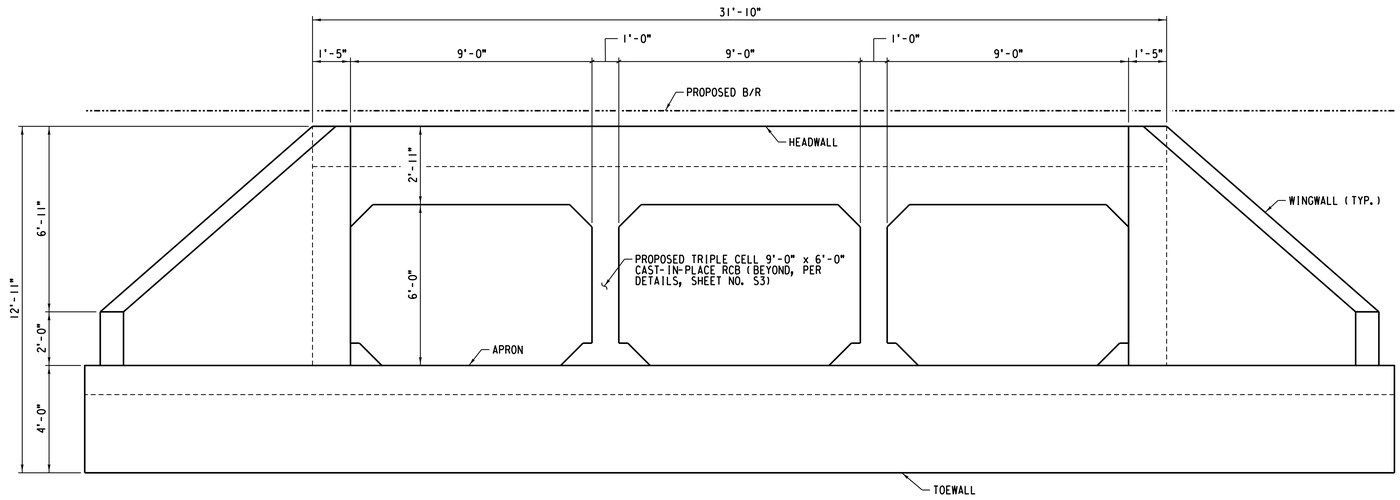
DESIGN SHEET



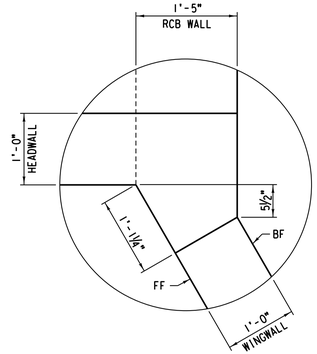
PLAN
SCALE: 3/8"=1'-0"



SECTION A 4 4
SCALE: 3/8"=1'-0"



ELEVATION
SCALE: 3/8"=1'-0"



DETAIL B 4 4
SCALE: 1"=1'-0"

NOTES:
1. FOR CAST-IN-PLACE CONCRETE NOTES, SEE STD. DWG. 680200 SHT. G1.
2. FOR REINFORCED CONCRETE BOX DETAILS, SEE SHEET NO. S3.
3. FOR END TREATMENT REINFORCING DETAILS, SEE SHEET NO. S5.
4. BF = BACK FACE
   FF = FRONT FACE
   RCB = REINFORCED CONCRETE BOX

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL — STATUS — 07/05/2023 DATE

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 02-24-2023 ARIZONA U.S.A.

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
CONSULTANT ENGINEER — 02/17/2023 DATE

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123081

LATITUDE: 33.28926°N LONGITUDE: 111.63457°W

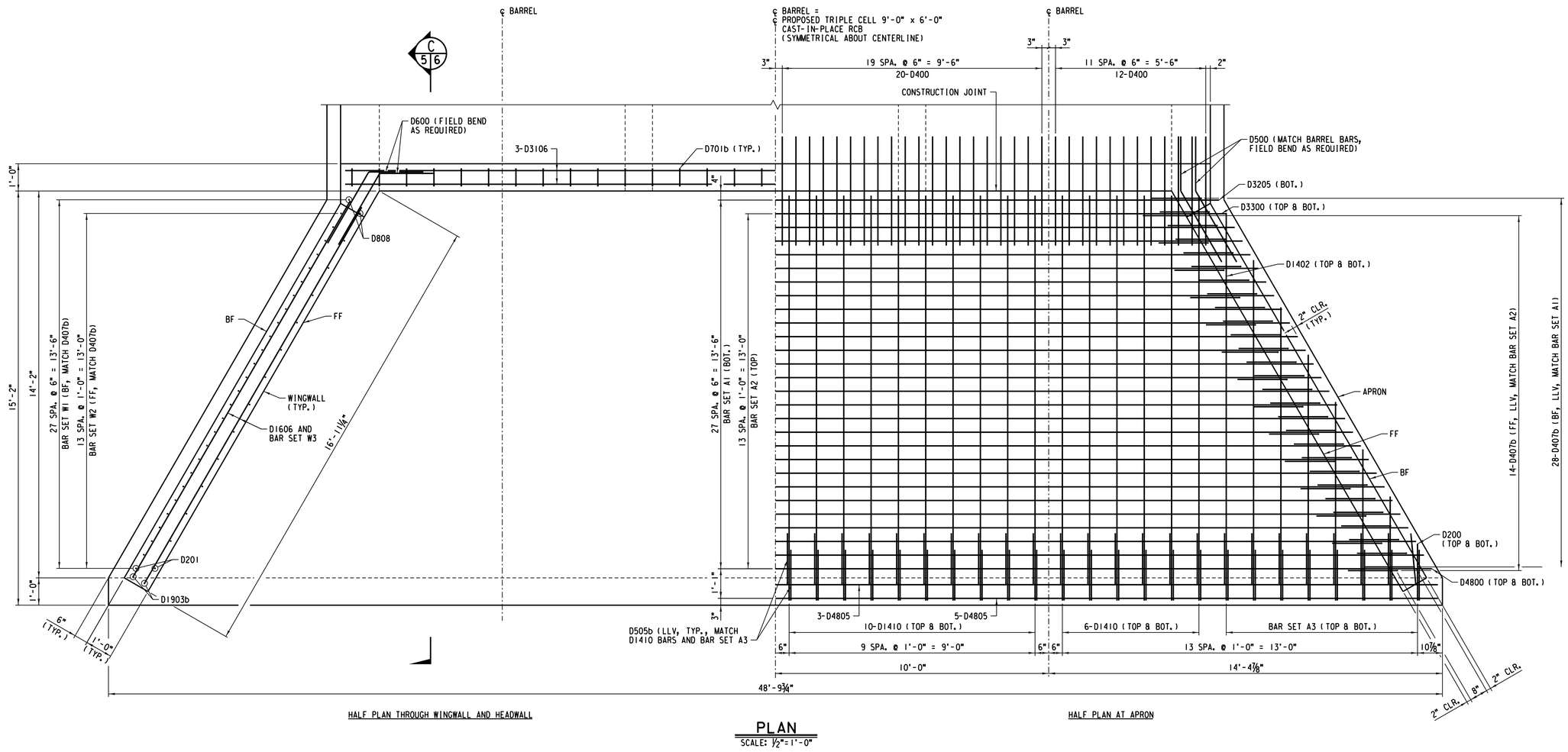
UNION PACIFIC

DSN/CHK BY: MEW/NAS	**UNION PACIFIC RAILROAD**
DRAWN/CHK BY: MEW/MJH	Office of Director Structures Design
UPRR ENGINEER: ADS	LOCATION & DESCRIPTION: CULVERT 3.05, PIRATE IND LEAD
SHT NO.: S4 of S7	FURNISH & INSTALL TRIPLE CELL 9'-0" x 6'-0" RCB x 32'
	SHEET TITLE: END TREATMENT FRAMING DETAILS

FILE NAME: \\oa.ad.oaconsulting.com\fnts-na\projects\2020\0501-1000\020-0927-40 Design\Microstation\020-0927_RLBRA.dgn\v 3.05_Sta. 161-22\Pirate Ind Lead_3.05.dgn

PLOTTED: 7/5/2023 12:25:33 PM

DESIGN SHEET



HALF PLAN THROUGH WINGWALL AND HEADWALL

HALF PLAN AT APRON

PLAN
SCALE: ½"=1'-0"

NOTES:
1. CONSTRUCTOR MAY SPLICE D BARS WITH A 2'-9" MINIMUM LAP SPLICE IF PREFERRED.
2. FOR REINFORCING SCHEDULE, SEE SHEET NO. S6.
3. FOR CAST-IN-PLACE CONCRETE NOTES, SEE STD. DWG. 680200 SHT. G1.
4. FOR REINFORCED CONCRETE BOX DETAILS, SEE SHEET NO. S3.
5. BF = BACK FACE
   FF = FRONT FACE
   LLV = LONG LEG VERTICAL
   RCB = REINFORCED CONCRETE BOX

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 02-24-2023 ARIZONA U.S.A.

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL — STATUS — 07/05/2023 DATE

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
Kyle Stubs — CONSULTANT ENGINEER — 02/17/2023 DATE

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123081

LATITUDE: 33.28926°N LONGITUDE: 111.63457°W

UNION PACIFIC

DSN/CHK BY:	MEW/NAS
DRAWN/CHK BY:	MEW/MJH
UPRR ENGINEER:	ADS
SHT NO.:	S5 of S7

UNION PACIFIC RAILROAD
Office of Director Structures Design

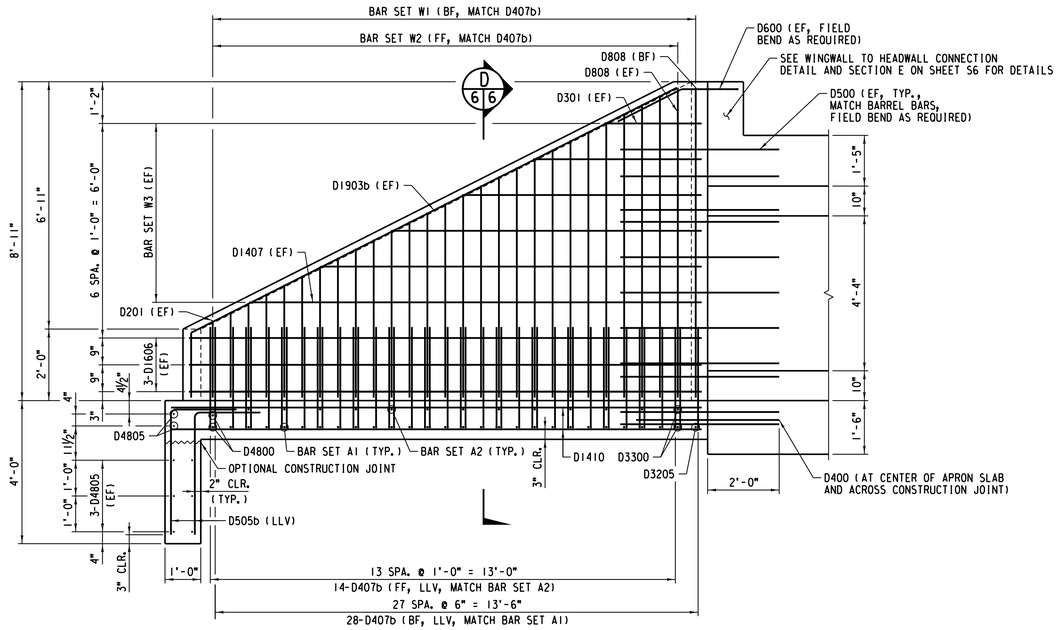
LOCATION & DESCRIPTION: CULVERT 3.05, PIRATE IND LEAD
FURNISH & INSTALL
TRIPLE CELL 9'-0" x 6'-0" RCB x 32'

SHEET TITLE: END TREATMENT REINFORCING DETAILS (SHEET 1 OF 2)

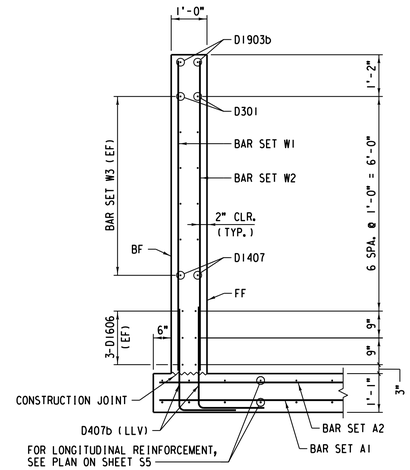
FILE NAME: \\oa.ad.oasconsulting.com\fnts-na\projects\2020\050\1000\020\0920\02\Design\Microstation\020-0927-RLBRO.civ 3.05.5ta. 161:27\Pirate Ind Lead_3.05.dgn

PLOTTED: 7/5/2023 12:25:34 PM

DESIGN SHEET



SECTION C (5/6)
SCALE: ½"=1'-0"

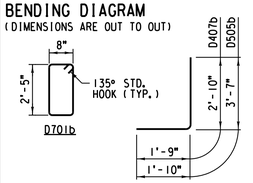


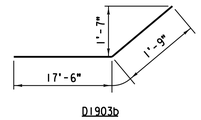
SECTION D (6/6)
SCALE: ½"=1'-0"

REINFORCING SCHEDULE
(QUANTITY PER END TREATMENT)

TOTAL	MARK	SIZE	LENGTH	SHAPE
64	D400	#5	4'-0"	
84	D407b	#5	4'-7"	
44	D500	#5	5'-0"	
96	D505b	#5	5'-5"	
4	D600	#5	6'-0"	
32	D701b	#5	7'-1"	
64	D1410	#5	14'-10"	
12	D1606	#5	16'-6"	
4	D1903b	#5	19'-3"	
6	D3106	#5	31'-6"	
8	D4805	#5	48'-5"	

BENDING DIAGRAM
(DIMENSIONS ARE OUT TO OUT)



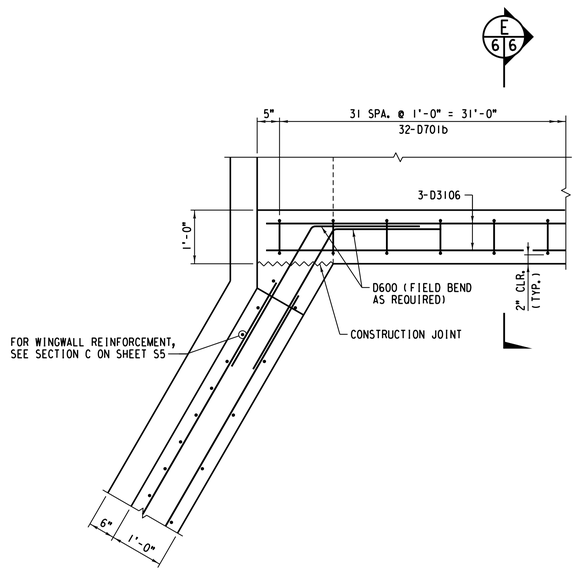


SET LIST

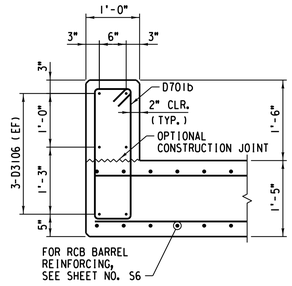
BAR SET DESIGNATION	MARK	SIZE	MIN. LENGTH	MAX. LENGTH	INCREMENT	NO. OF BARS/SET	NO. OF SETS	SHAPE
A1	D3205-D4800	#5	32'-5"	48'-0"	6⅞"(+)	28	1	
A2	D3300-D4800	#5	33'-0"	48'-0"	1'-1⅞"(-)	14	1	
A3	D200-D1402	#5	2'-0"	14'-2"	1'-8⅛"(-)	8	4	
W1	D201-D808	#5	2'-1"	8'-8"	2⅞"(+)	28	2	
W2	D201-D808	#5	2'-1"	8'-8"	6⅛"(-)	14	2	
W3	D301-D1407	#5	3'-1"	14'-7"	2'-3⅝"(-)	6	4	

EST. WT. OF REINFORCING STEEL = 6,310 LB.

NOTE:
BAR DESIGNATIONS CONSIST OF BAR SIZE & LENGTH FOLLOWED BY THE LETTER "b" IF BENT. BAR SIZES ARE REPRESENTED BY THE LETTERS A THROUGH L CORRESPONDING TO BAR SIZE #2 THROUGH #18. BAR LENGTHS ARE GIVEN IN FEET AND INCHES; THE LAST TWO DIGITS ARE INCHES.



WINGWALL TO HEADWALL CONNECTION DETAIL
SCALE: ¾"=1'-0"



SECTION E (6/6)
SCALE: ¾"=1'-0"

NOTES:
1. FOR CAST-IN-PLACE CONCRETE NOTES, SEE STD. DWG. 680200 SHT. G1.
2. FOR REINFORCED CONCRETE BOX DETAILS, SEE SHEET NO. S3.
3. BF = BACK FACE
   EF = EACH FACE
   FF = FRONT FACE
   LLV = LONG LEG VERTICAL
   RCB = REINFORCED CONCRETE BOX

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL — STATUS
07/05/2023 — DATE

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 03-24-2023 ARIZONA U.S.A.

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
CONSULTANT ENGINEER — 02/17/2023 DATE

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123081

LATITUDE: 33.28926°N LONGITUDE: 111.63457°W

UNION PACIFIC

DSN/CHK BY: MEW/NAS
DRAWN/CHK BY: MEW/MJH
UPRR ENGINEER: ADS
SHT NO.: S6 of S7

UNION PACIFIC RAILROAD
Office of Director Structures Design

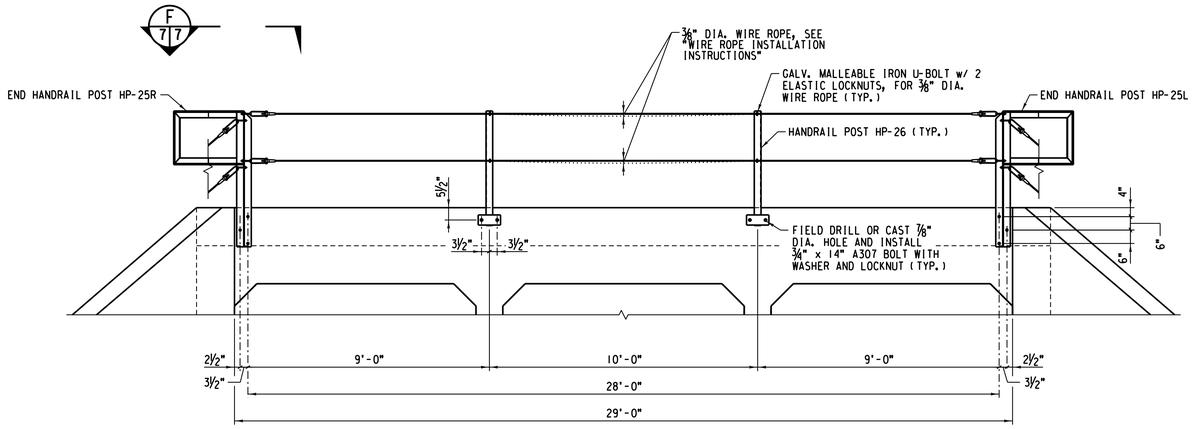
LOCATION & DESCRIPTION: CULVERT 3.05, PIRATE IND LEAD
FURNISH & INSTALL
TRIPLE CELL 9'-0" x 6'-0" RCB x 32'

SHEET TITLE: END TREATMENT REINFORCING DETAILS (SHEET 2 OF 2)

FILE NAME: \\oa.ad.oaconsulting.com\fnts-na1\projects\2020\0501.1000\020-0927\40-Design\Microstation\020-0927.RLBRA.July 3.05.Sta. 161+27\Pirate Ind Lead_3.05.dgn

PLOTTED: 7/5/2023 12:25:34 PM

DESIGN SHEET



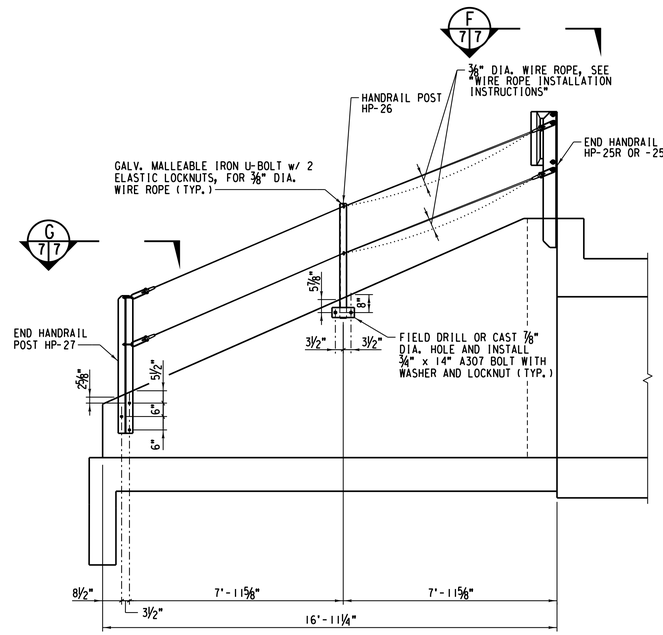
NOTE:
WINGWALL HANDRAIL NOT SHOWN FOR CLARITY.

BOX CULVERT HANDRAIL LAYOUT

SCALE: 3/8"=1'-0"

WIRE ROPE INSTALLATION INSTRUCTIONS:

1. THREAD WIRE ROPE THROUGH ALL CLIPS AND BARREL ANCHORS AND SEAT RETAINING WEDGES ON ONE END HANDRAIL POST.
2. STRETCH WIRE ROPE, HANG A MINIMUM OF 10 LB. ON CABLE BETWEEN TWO POSTS AND REMOVE ALL SAG TO A MAXIMUM OF 2 INCHES.
3. SEAT RETAINING WEDGES AT REMAINING END HANDRAIL POST.
4. REMOVE WEIGHTS.
5. TIGHTEN CLIPS AT INTERMEDIATE POSTS.
6. CUT & REMOVE EXCESS WIRE ROPE, COAT CUT PORTIONS OF WIRE ROPE WITH COLD GALVANIZING COMPOUND.

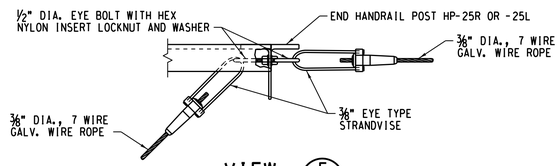


WINGWALL HANDRAIL LAYOUT

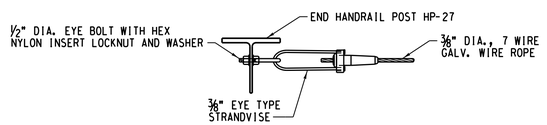
SCALE: 3/8"=1'-0"

(LOOKING PERPENDICULAR TO FACE OF WINGWALL)

NOTES:
1. FOR HANDRAIL POST DETAILS, SEE STD. DWG. 680160 SHT. H1.
2. RCB = REINFORCED CONCRETE BOX



VIEW F 7 7
SCALE: 1½"=1'-0"



VIEW G 7 7
SCALE: 1½"=1'-0"

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 02-24-2023 ARIZONA U.S.A.

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS: 95% STATUS — / / DATE

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
CONSULTANT ENGINEER — 02/17/2023 DATE

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123081

LATITUDE: 33.28926°N LONGITUDE: 111.63457°W

UNION PACIFIC	DSN/CHK BY: MEW/NAS	**UNION PACIFIC RAILROAD** Office of Director Structures Design
	DRAWN/CHK BY: MEW/MJH	LOCATION & DESCRIPTION: CULVERT 3.05, PIRATE IND LEAD
	UPRR ENGINEER:	FURNISH & INSTALL TRIPLE CELL 9'-0" x 6'-0" RCB x 32'
	SHT NO.: S7 of S7	SHEET TITLE: HANDRAIL DETAILS

FILE NAME: \\oa.ad.oaconsulting.com\rtc-nal\projects\2020\0501.1000\020-0927\40-Design\Microstation\020-0927.R.UPR.Culv 3.05.Sta. 161.27\Pirate Ind Lead 3.05.dgn

PLOTTED: 7/5/2023 12:25:34 PM

GENERAL NOTES

GENERAL

1. All work requirements shown on the design and not otherwise detailed shall be accomplished as specified in Union Pacific Railroad (UPRR) Specifications and the American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual for Railway Engineering. In the event of conflicts between specifications, the more restrictive shall apply.

2. All structures were designed in accordance with the AREMA Manual, Chapter 8 - Concrete Structures and Foundations.

3. Box culverts designed for a min. 1'-6" cover and a max. 18'-0" cover. Cover is measured from base of rail to top of the concrete box.

4. Construction means and methods shall comply with the All Permits Issued (API) package.

5. Field verify all dimensions, stations and elevations prior to start of construction.

6. Contact the Union Pacific "Call Before You Dig" number 90 days (not less than 60 days) prior to proposed construction start date. Prior to construction, confirm that all necessary relocations have been completed. The CBYD number is: 1-800-336-9193.

7. Location of known utilities is approximate. Location shall be verified prior to construction. Notify Call 811 "Call Before you Dig" number at least 48 hours prior to construction.

PRECAST CONCRETE:

1. All concrete materials, placement and workmanship shall be in accordance with Part 1, Chapter 8 of the current AREMA Manual for Railway Engineering.

2. Minimum compressive strength - 4000 psi at 28 days.

3. Exposed surfaces shall be formed in a manner which will produce a smooth and uniform appearance without rubbing or plastering. Exposed edges of 90 degrees or less are to be chamfered ¾" x ¾". Top surface to have a smooth finish, free of all float or trowel marks.

4. Concrete shall be proportioned such that the water - cement ratio (by weight) does not exceed 0.45. Concrete must contain a minimum of 6½ sacks of cement per cubic yard of concrete. Flyash replacement may account for up to 25% of the cement.

5. Cement shall be Type I, Type II or Type III Portland Cement in accordance with ASTM C150 specifications.

6. Aggregates shall be graded in accordance with ASTM C33 specifications. Coarse aggregate shall be no. 67. Fine aggregate shall be natural sand.

7. Air content shall be between 5% and 7% (by volume).

8. Admixtures shall not be used without approval by Engineer.

9. Curing shall be accomplished by wet curing or the application of a Type 2 membrane.

10. The fabricator shall stencil the item name, date manufactured, name of manufacturer and actual lifting weight at location shown.

11. Production procedures for the manufacture of precast members shall be in accordance with the AREMA Manual for Railway Engineering and the Precast/Prestressed Concrete Institute's Manual MNL 116 for Quality Control.

12. Dimensional tolerances governing the manufacture of precast members shall conform to Division VI, Section 6.4 of the Precast/Prestressed Concrete Institute's Manual MNL 116 for Quality Control. Tolerance for location of lifting devices shall be ½".

13. The fabricator will be responsible for loading and properly securing all precast concrete members for shipment. All concrete components shall be made available for inspection by the Railroad at the fabricator's plant prior to shipment, at the Railroad's discretion.

CAST-IN-PLACE CONCRETE:

1. All concrete materials, placement and workmanship shall be in accordance with Part 1, Chapter 8 of the current AREMA Manual for Railway Engineering.

2. Formwork tolerances shall be in accordance with ACI 347 specifications.

3. Minimum compressive strength - 4000 psi at 28 days.

4. Exposed surfaces shall be formed in a manner which will produce a smooth and uniform appearance without rubbing or plastering. Exposed edges of 90 degrees or less are to be chamfered ¾" x ¾". Top surface to have a smooth finish, free of all float or trowel marks.

5. Concrete shall be proportioned such that the water - cement ratio (by weight) does not exceed 0.45. Concrete must contain a minimum of 6½ sacks of cement per cubic yard of concrete. Flyash replacement may account for up to 25% of the cement.

6. Cement shall be Type I, Type II or Type III Portland Cement in accordance with ASTM C150 specifications.

7. Aggregates shall be graded in accordance with ASTM C33 specifications. Coarse aggregate shall be no. 67. Fine aggregate shall be natural sand.

8. Air content shall be between 5% and 7% (by volume).

9. Admixtures shall not be used without approval by Engineer.

10. Curing shall be accomplished by wet curing or the application of a Type 2 membrane.

REINFORCING STEEL:

1. Reinforcing steel shall be deformed, new billet bars per current ASTM A615 Specifications and to meet grade 60 requirements.

2. Fabrication of reinforcing steel shall be per Chapter 7 of the CRSI Manual of standard practice. Dimensions of bending details are out to out of bar.

3. Reinforcing steel is to be blocked to proper location and securely wired against displacement. Tie wires shall be installed at every other bar intersection so that at least 50% of the intersections are tied. Tack welding of reinforcing is prohibited. Minimum concrete cover on reinforcement not otherwise noted shall meet current AREMA Manual for Railway Engineering requirements.

LIFTING ANCHORS:

1. Swift lift anchors shall be Dayton Superior P-52 anchors or approved alternate with a minimum safe working load sufficient for the weight of the precast element including form removal. The safe working load shall provide a minimum safety factor of 4.

CONSTRUCTOR NOTES (WHEN APPLICABLE)

CONSTRUCTOR DEFINITION

CONSTRUCTOR DESIGNATES MANAGER BRIDGE CONSTRUCTION IF CONSTRUCTION BY UPRR AND CONTRACTOR IF CONSTRUCTION BY CONTRACTOR.

DIVISION OF RESPONSIBILITY

A. RAILROAD

1. Remove ties, rail and OTM from project area as required.

2. Provide and install ballast, ties, rail and OTM at proposed culvert.

3. Provide material as shown in the Bill of Material.

4. Provide and install Private Property/No Trespassing sign and culvert marker signs on right side at each end of culvert.

B. CONSTRUCTOR

1. Coordinate all construction activities with the Railroad.

2. Before ordering any material, Constructor shall make a detailed field inspection of the site verifying all pertinent dimensions and elevations. Any variations in dimensions or elevations from those shown on the drawings shall be reported immediately to the UPRR Project Manager.

3. Any modifications to this design shall be approved by the UPRR Office of Structures Design prior to construction.

4. Verify the location, relocation, abandonment, and/or temporary support of all utilities affected by the construction of the structure and embankment and coordinate these activities with the appropriate utility companies, agencies and/or authorities.

5. Apply for and obtain all construction permits necessary to perform the work.

6. Bill of Material and Schedules are provided for information only. Constructor shall be responsible for providing all material, not provided by the Railroad, required to complete the work.

7. Perform all work not performed by the Railroad.

8. Provide the Railroad with a detailed construction plan defining the activity, schedule and procedure for each aspect of the work. Construction shall not begin until the construction plan has been approved by the Railroad.

9. Provide all temporary structures (shoring, bracing and/or falsework) required to support and protect the existing embankments and structures affected by the work. Provide the Railroad with details, design and procedure for all temporary structures. All temporary structures shall be designed, signed and sealed by a professional engineer registered in the State that the structure is to be constructed. All temporary structures shall be approved by the UPRR Office of Structures Design prior to beginning construction.

10. Provide well-compacted bedding as required to establish grade of the culvert. Bedding for the box culvert shall consist of a minimum of 1'-6" of culvert bedding material. Over excavate 1'-6" each side of box. If loose, soft, or excessively wet soils are encountered at this depth, a 6" lift of granular bedding shall be placed on these soils and compressed into the subgrade. This procedure shall continue until a stable subgrade is produced. If a stable subgrade can not be achieved, the UPRR Office of Structures Design shall be notified.

11. Provide temporary guardrail system as directed by UPRR Project Manager. Guardrails on shoring shall include but not be limited to the following:

    The top edge height of the top rail shall be 42" +/- 3" above the walking/working surface.

    At least one midrail shall be provided, evenly spaced between walking/working surface and top rail.

    Metal or timber posts or uprights shall be spaced at maximum intervals of 10'-0".

    Entire guardrail system, including anchorages, shall be capable of withstanding without failure, a force of 200 lbs. applied in any outward or downward direction at any point.

    Guardrail system shall be surfaced to prevent injuries from punctures and lacerations and prevent snagging of clothing. The ends of top rails and midrails shall not extend past the posts or uprights.

    If conditions warrant, i.e. pedestrian traffic/weather, additional protection shall be provided such as screens or mesh to prevent slipping between the midrail and walking/working surface.

DIVISION OF RESPONSIBILITY

12. Direct channel flow as required to perform work.

13. Remove debris and ballst from channel as directed by the Railroad.

14. Accomplish activities within the schedule specified in the approved construction plan.

CULVERT BEDDING

Culvert bedding shall be granular material such as aggregates ordinarily specified and used in the construction of highway base and subbase. These aggregates include crushed stone, natural or crushed gravel, natural or manufactured sands, crushed slag or a homogeneous mixture of these materials. Culvert bedding shall be compacted to 95% of maximum dry density as defined in ASTM International D1557 (Modified Proctor). Recommended gradation is as follows:

SCREEN SIZE	% PASSING (BY WEIGHT)
1 inch	100
½ inch	60-90
⅜ inch	20-40
No. 4	10-20
No. 200	less than 5%

Union Pacific Sealant Ballast SB-2, item no. 562-5428, may be used.

BOX CULVERT OPENING AREA

CELL WIDTH (FT)	CELL HEIGHT (FT)	SINGLE CELL OPENING (FT^2)	DOUBLE CELL OPENING (FT^2)
6	4	23.1	46.2
6	6	35.1	70.2
8	4	30.6	61.2
8	6	46.6	93.2
8	8	62.6	125.2
10	4	38.0	76.0
10	6	58.0	116.0
10	8	78.0	156.0
10	10	98.0	196.0
10	12	118.0	236.0
12	8	93.3	186.6
12	10	117.3	234.6
12	12	141.3	282.6

REVISIONS		
DATE	LTR.	DESCRIPTION
/		
/		
/		
/		
/		
/		

DESIGN BY: HDR | DRAWN BY: HDR | CHECKED BY: UPRR

APPROVED:

01-03-2020

UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

CONCRETE BOX CULVERTS

GENERAL NOTES

FILE OWNER: UPRR | DATE: JANUARY, 2020

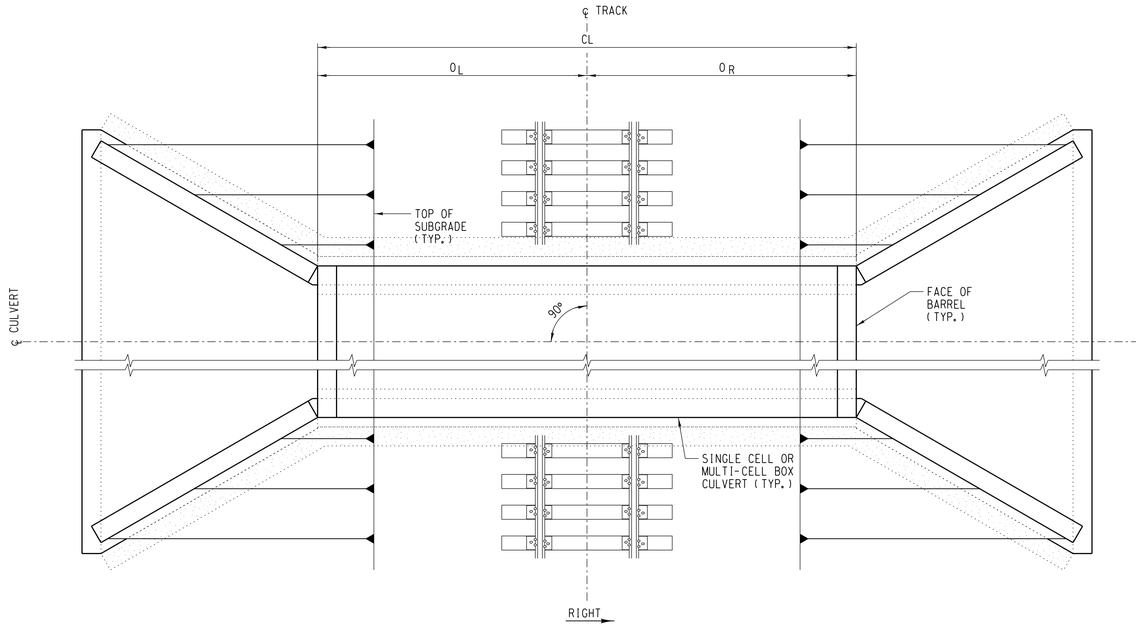
PLAN NO.: 680200 | SHEET: G1

Copyright © 2020 by Union Pacific Railroad

PLOTTED: 1/3/2020 3:30:45 PM

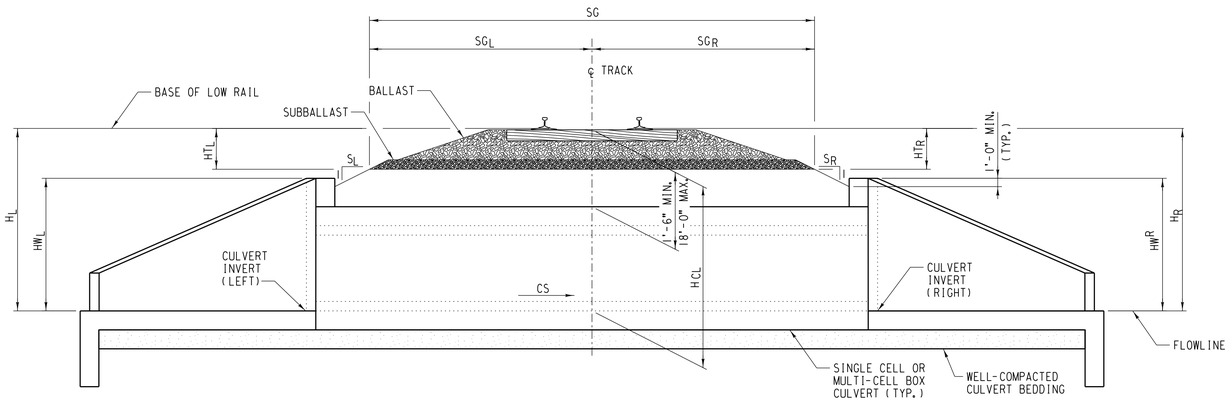
FILE NAME: pw://HDR.US.National.01/4195/10196897/680200_Concrete Box Culverts.dgn

INCHES 1 2 3 4 5 6 7 8 9 10 11 12



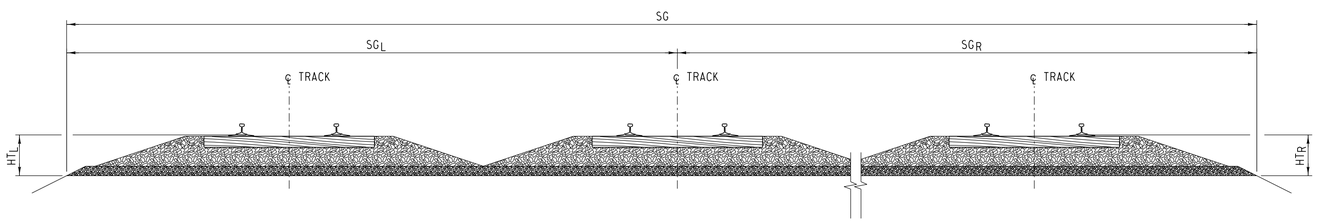
PLAN - SINGLE TRACK

SCALE: NONE



ELEVATION - SINGLE TRACK

SCALE: NONE



MULTIPLE TRACK DIAGRAM

SCALE: NONE

CULVERT LENGTH EQUATION:

$CL = O_L + O_R \geq SG + 2'$

$O_L = SG_L + S_L(H_L - HT_L + 1' - HW_L) + 1'$

$O_R = SG_R + S_R(H_R - HT_R + 1' - HW_R) + 1'$

$$H_L = \frac{H_{CL} + CS\,[SG_L - S_L(HT_L + HW_L - 1') + 1']}{[1 - CS(S_L)]}$$

$$H_R = \frac{H_{CL} - CS\,[SG_R - S_R(HT_R + HW_R - 1') + 1']}{[1 + CS(S_R)]}$$

$SG = SG_L + SG_R$

$H_{AVG} = (H_L + H_R) / 2$

KEY:

CL = CULVERT LENGTH
O_L = OFFSET LEFT
O_R = OFFSET RIGHT
H_{CL} = HEIGHT - BASE OF LOW RAIL TO FLOWLINE AT CENTERLINE OF TRACK
CS = CULVERT SLOPE (RISE/RUN) LEFT TO RIGHT (+ UP, - DOWN)
HT_L = BASE OF LOW RAIL TO TOP OF SUBGRADE LEFT EDGE
HT_R = BASE OF LOW RAIL TO TOP OF SUBGRADE RIGHT EDGE
H_L = HEIGHT - BASE OF LOW RAIL TO INVERT LEFT OF TRACK
H_R = HEIGHT - BASE OF LOW RAIL TO INVERT RIGHT OF TRACK
HW_L = HEIGHT OF WINGWALL LEFT OF TRACK
HW_R = HEIGHT OF WINGWALL RIGHT OF TRACK
SG = WIDTH OF SUBGRADE (24'-0" MINIMUM)
SG_R = WIDTH OF SUBGRADE RIGHT OF ℄ TRACK (12'-0" MINIMUM)
SG_L = WIDTH OF SUBGRADE LEFT OF ℄ TRACK (12'-0" MINIMUM)
S_L = SIDE SLOPE LEFT OF TRACK (RUN PER FOOT OF RISE)
S_R = SIDE SLOPE RIGHT OF TRACK (RUN PER FOOT OF RISE)

NOTE:
ALL DIMENSIONS ARE IN FEET.

REVISIONS		
DATE	LTR.	DESCRIPTION
/		
/		
/		
/		
/		
/		

DESIGN BY: HDR | DRAWN BY: HDR | CHECKED BY: UPRR

APPROVED:

01-03-2020

UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

CONCRETE BOX CULVERTS

GENERAL ARRANGEMENT FOR SINGLE CELL AND MULTI-CELL BOX CULVERTS

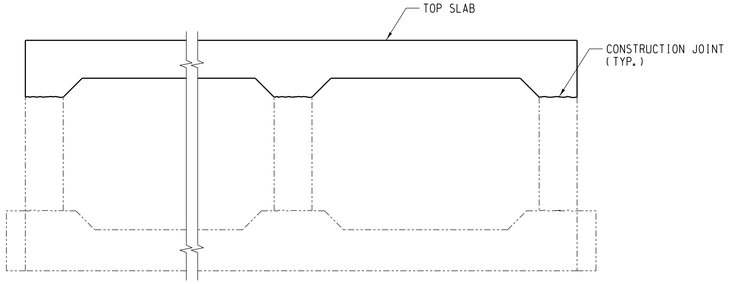
FILE OWNER: UPRR | DATE: JANUARY, 2020

PLAN NO.: 680200 | SHEET: G2

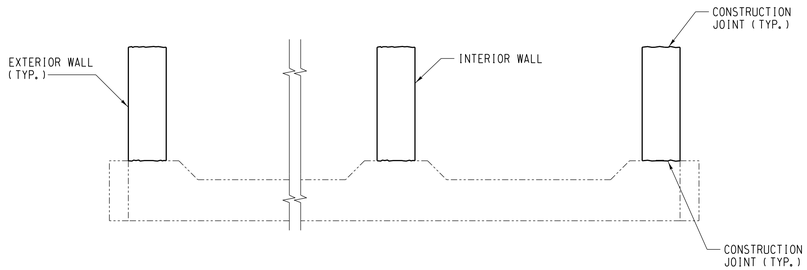
Copyright © 2020 by Union Pacific Railroad PLOTTED: 1/3/2020 3:30:46 PM

FILE NAME: pw://HDR_US_National.01/4195/10196897/680200_Concrete Box Culverts.dgn

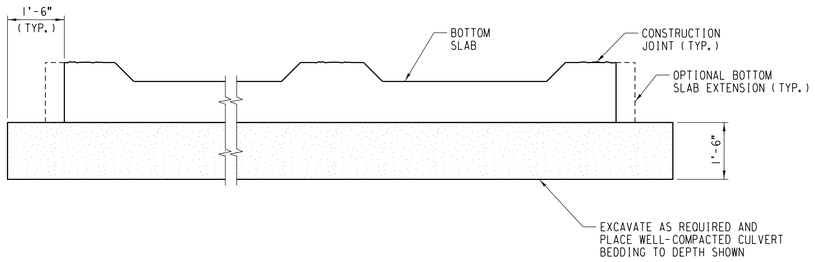
INCHES 1 2 3 4 5 6 7 8 9 10 11 12



PHASE THREE



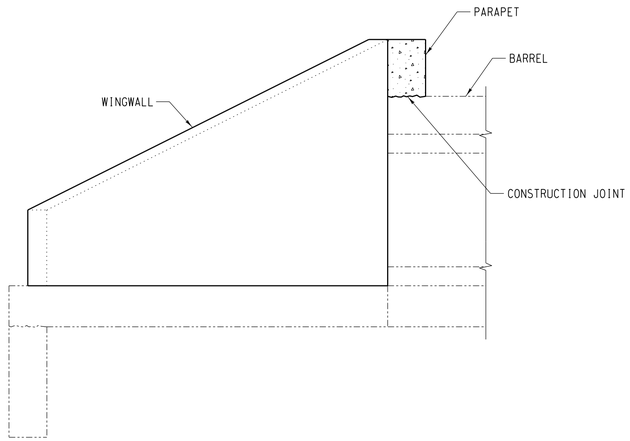
PHASE TWO



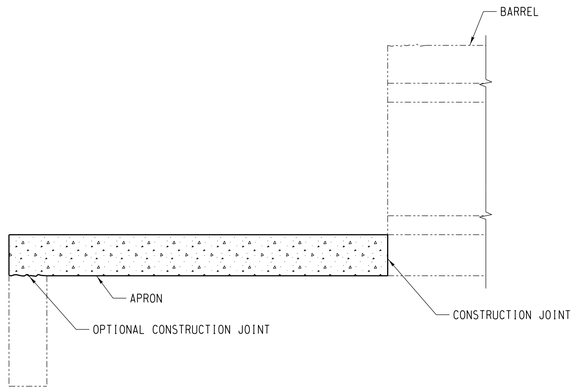
PHASE ONE

CONSTRUCTION SEQUENCE - BARREL

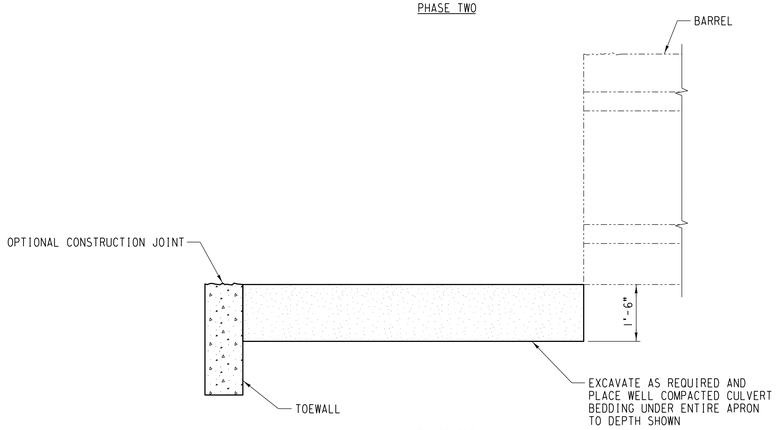
SCALE: ½"=1'-0"



PHASE THREE



PHASE TWO



PHASE ONE

CONSTRUCTION SEQUENCE - PARAPET, APRON, TOEWALL AND WINGWALLS

SCALE: ½"=1'-0"

(LOOKING PERPENDICULAR TO ℄ CULVERT)

REVISIONS		
DATE	LTR.	DESCRIPTION
/		
/		
/		
/		
/		
/		

DESIGN BY: HDR | DRAWN BY: HDR | CHECKED BY: UPRR

APPROVED:

01-03-2020

UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

CONCRETE BOX CULVERTS

CONSTRUCTION SEQUENCE

FILE OWNER: UPRR	DATE: JANUARY, 2020
PLAN NO.: 680200	SHEET: G5

Copyright © 2020 by Union Pacific Railroad

PLOTTED: 1/3/2020 3:30:48 PM

FILE NAME: pw://HDR_US_National.01/41951019698897/680200_Concrete Box Culverts.dgn

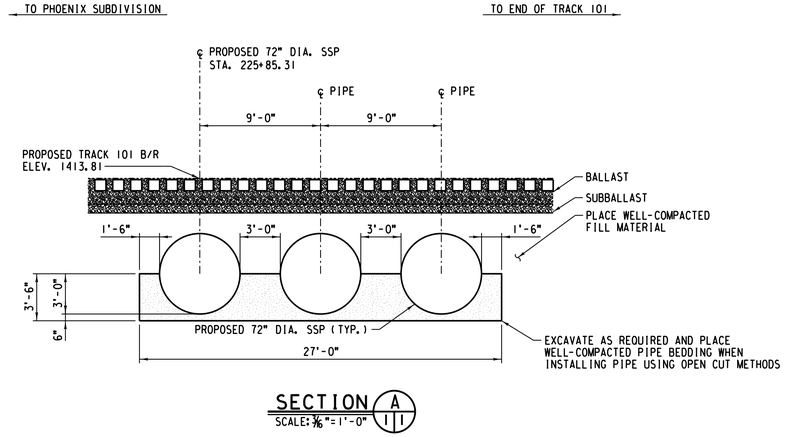
INCHES 1 2 3 4 5 6 7 8 9 10 11 12

DESIGN SHEET

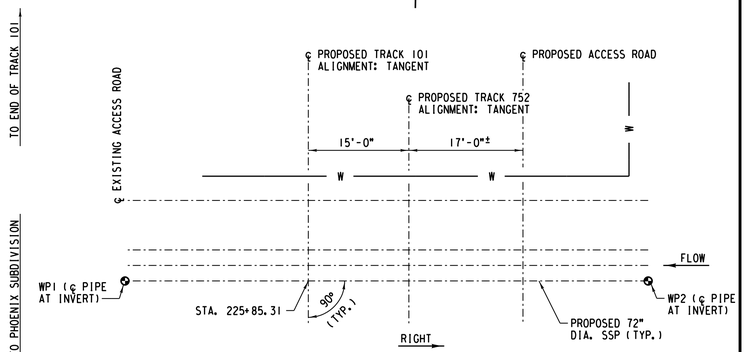
DRAWING SCHEDULE

	SHEET NO.	PLAN NO.	DESCRIPTION	TYPE
THIS SET	S1	123082	GENERAL ARRANGEMENT	DESIGN
	2	680000	DETAILS FOR ROUND STEEL PIPE CULVERTS	STANDARD
	3	680000	GENERAL NOTES FOR ROUND STEEL PIPE CULVERTS	STANDARD
	1	680010	CONSTRUCTION NOTES AND TABLE FOR SMOOTH STEEL PIPE CULVERTS	STANDARD

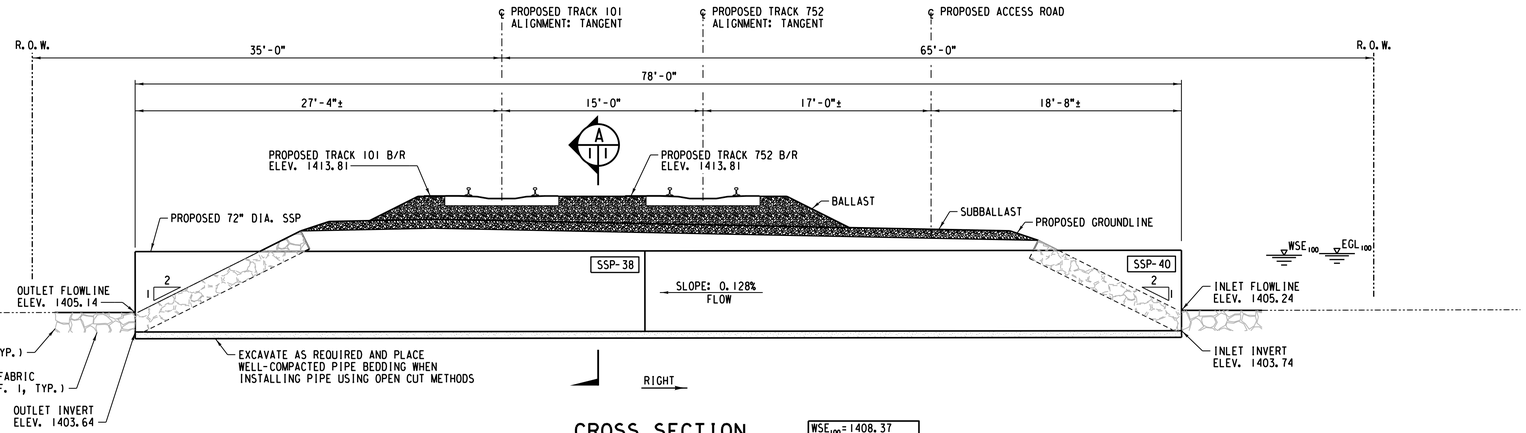
REF.	NO.	DWG. NO.	SHEET NO.	REV. NO.	DESCRIPTION	TYPE
	1	-	P031 OF 037 T011 OF 012 X092 OF 143 X093 OF 143 EC015 OF 036	-	MESA, ARIZONA, PHOENIX SUBDIVISION, MP 934.78 TO MP 937.83, CONSTRUCT INDUSTRIAL LEAD TRACK, 100% PLANS, ISSUED FOR BID, DATED MARCH 6, 2023	DESIGN



SECTION A
SCALE: 3/16"=1'-0"



KEY PLAN
SCALE: NONE



CROSS SECTION
SCALE: 3/16"=1'-0"

WSE_{100} = 1408.37
EGL_{100} = 1408.46
VEL_{100} = 4.15 fps

NOTE:
PROPOSED SSP CULVERTS ARE DESIGNED FOR 1.5' DEPRESSION.

WORK POINT TABLE

WORK POINT	NORTHING	EASTING
WP1	832711.07	792754.27
WP2	832633.08	792753.50

W = WATER LINE

NOTE:
LOCATION OF UTILITIES IS APPROXIMATE. UTILITIES SHALL BE VERIFIED PRIOR TO CONSTRUCTION. NOTIFY ARIZONA 811, 1-800-782-5348, AT LEAST 48 HOURS PRIOR TO CONSTRUCTION.

LETTER SERIES
SHEET NO. CUT ON
SHEET NO. SHOWN ON

SECTION DESIGNATION

BILL OF MATERIAL

REQ'D.	UNIT	DESCRIPTION	STORE ITEM NO.	ORDERED BY
3	EA	CULVERT, SMOOTH STEEL PIPE 72" DIA. X 7/8" WALL X 40' LONG, ASTM A139, GR. B OR ASTM A252, GR. 3 (PER STD PLAN NO. 680010)	510-3043	CONSTRUCTOR
3	EA	CULVERT, SMOOTH STEEL PIPE 72" DIA. X 7/8" WALL X 38' LONG, ASTM A139, GR. B OR ASTM A252, GR. 3 (PER STD PLAN NO. 680010)		
155	CU. YD.	PIPE BEDDING (PER STD. DWG. 680000 SHT. 3)		
1	EA.	CULVERT MARKER SIGNS, MOUNTING POST AND MOUNTING HARDWARE (PER STD. DWG. 0502, 0507 AND 0599)	P00-2616	
1	LOT	FILL MATERIAL (PER STD. DWG. 680000 SHT. 3 AND REF. 1)		
1	LOT	RIPRAP (PER REF. 1)		
1	LOT	FILTER FABRIC (PER REF. 1)		

CLSM MAY BE SUBSTITUTED FOR FILL MATERIAL.
BULK QUANTITIES ARE ESTIMATED.

DESIGN NOTES

LAYOUT

1. Stationing: Per Ref. 1.
2. Elevation Datum: Per Ref. 1.
3. Temporary Benchmarks:
   TBM 1 (Olsson CP 4): Elev. 1390.42, NAVD 1988, established by ½" rebar located in ground West of proposed Culvert No. 4.28, 9,606.96' left of existing Phoenix Sub. Main Track centerline, Sta. 1588+58.48.
   TBM 2 (Olsson CP 5): Elev. 1391.63, NAVD 1988, established by ½" rebar located in ground West of proposed Culvert No. 4.28, 9,311.99' left of existing Phoenix Sub. Main Track centerline, Sta. 1590+90.31.
4. Profile: Proposed Track 101 per Ref. 1.
   Proposed Track 752 per Ref. 1.
5. Alignment: Tangent.
6. Information used to prepare this drawing in addition to reference drawings:
   Hydrologic & Hydraulic Evaluation prepared by Olsson, dated September 2022.

DESIGN

1. This structure has been designed for Cooper E80 Live Load with impact and cover depth ranging from 1'-6" to 18'-0".

POSTCONSTRUCTION COMPLIANCE

Constructor in charge of construction to provide to the office of the Senior Manager Structures Design as-built drawings confirming that the project was constructed in compliance with the plans and indicating any construction variances.

SIGNED

In Charge of Construction — Date

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 01-05-2023 ARIZONA U.S.A.

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL (STATUS) — 07/05/2023 (DATE)

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
CONSULTANT ENGINEER — 01/13/2023 (DATE)

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123082

LATITUDE: 33.28830°N LONGITUDE: 111.61349°W

UNION PACIFIC

DSN/CHK BY:	MEW/MJH
DRAWN/CHK BY:	MEW/NAS
UPRR ENGINEER:	ADS
SHT NO.:	S1 of S1

UNION PACIFIC RAILROAD
Office of Director Structures Design

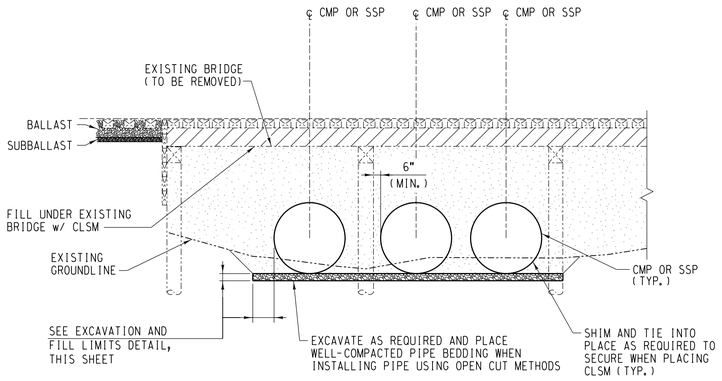
LOCATION & DESCRIPTION: CULVERT 4.28, PIRATE IND LEAD
FURNISH & INSTALL
3-72" DIA. SSP x 78'

SHEET TITLE: GENERAL ARRANGEMENT

FILE NAME: \\oa.ad.oaconsulting.com\fnts-na1\projects\2020\050\-1000\020\-0927.40\Design\Microstation\020-0927.40-RLBR Culv 4.28 Sta. 225+00.00 Pirate Ind Lead 4.28.cau.dgn

PLOTTED: 7/7/2023 12:42:52 PM

STANDARD SHEET

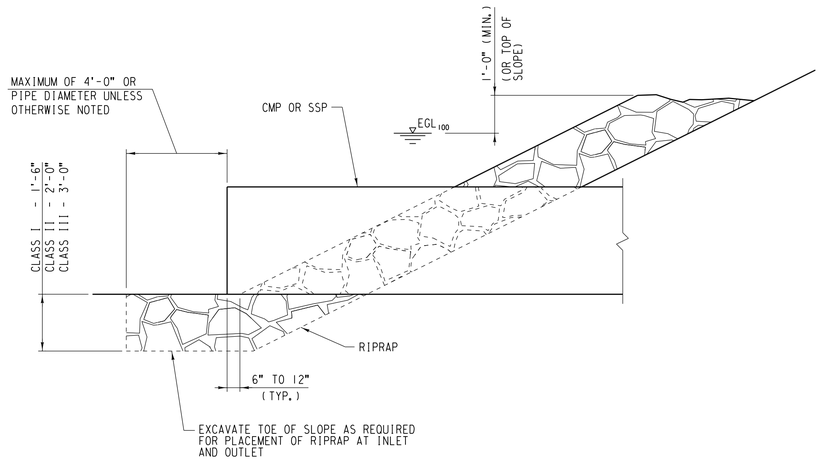


UNDER STRUCTURE - SECTION

SCALE: 3/16"=1'-0"

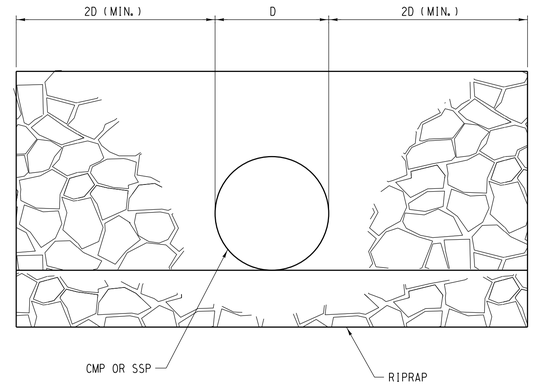
LIMITS OF REMOVAL

REMOVE EXISTING STRUCTURE TO 1'-0" (MIN.) BELOW PROPOSED EMBANKMENT SLOPE AND 2'-6" (MIN.) BELOW BASE OF RAIL.



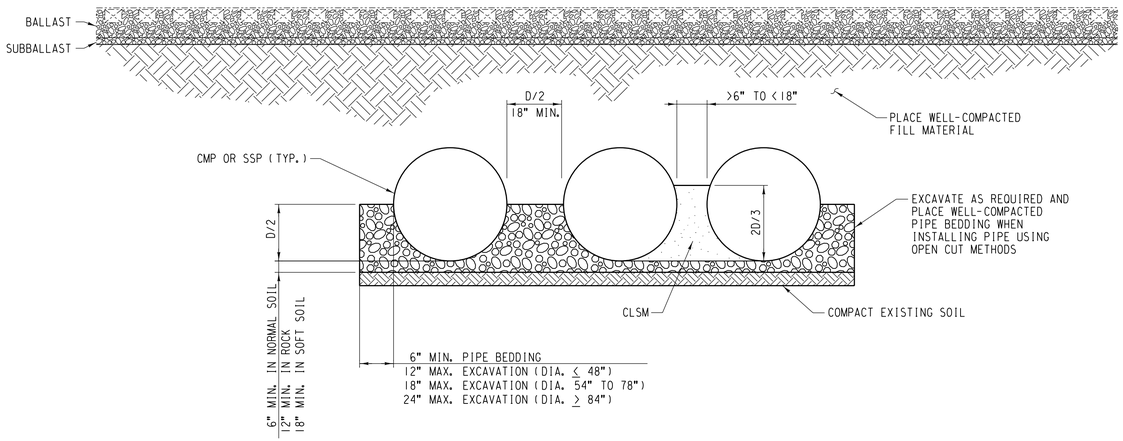
RIPRAP - SECTION

SCALE: NONE



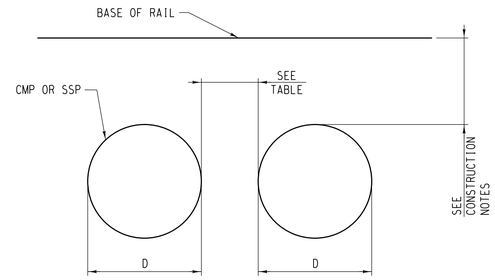
RIPRAP - ELEVATION

SCALE: NONE



EXCAVATION AND FILL LIMITS

SCALE: NONE



SPACING CHART	
PIPE DIAMETER	MIN. SPACING BETWEEN PIPES
12" to 24"	12"
24" to 96"	D/2
96" OR MORE	48"

MINIMUM PIPE SPACING AND COVER

SCALE: NONE

REVISIONS		
DATE	LTR.	DESCRIPTION
02/12	A	ADDED RIPRAP SECTION
04/19	D	UPDATED DETAILS
/		
/		
/		
/		

DESIGN BY: CLJ | DRAWN BY: KDM | CHECKED BY: CLJ

APPROVED:

George J. Meyn 4/4/08

UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

DETAILS FOR ROUND STEEL PIPE CULVERTS

FILE OWNER: UPRR | DATE:

PLAN NO.: 680000 | SHEET: 2 OF 3

Copyright © 2007 by Union Pacific Railroad PLOTTED: 8/12/2021 10:04:26 AM

FILE NAME: P:\Standards\Culverts (CMP&SSP)\0-Active\steelpip_std.dgn

STANDARD SHEET

GENERAL NOTES

GENERAL

1. All work requirements shown on these drawings and not otherwise detailed shall be accomplished as specified in Union Pacific Railroad (UPRR) Specifications and the American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual for Railway Engineering. In the event of conflicts between specifications, the more restrictive shall apply.

2. **Construction means and methods shall comply with the All Permits Issued (API) package.**

3. Field verify all dimensions, stations and elevations prior to start of construction.

4. **Contact the Union Pacific "Call Before You Dig" number 90 days (not less than 60 days) prior to proposed construction start date. Prior to construction, confirm that all necessary relocations have been completed. The CBYD number is: 1-800-336-9193.**

5. **Location of known utilities is approximate. Location shall be verified prior to construction. Notify Call811 "Call Before you Dig" number at least 48 hours prior to construction.**

GRADING

1. Provide and place all fill and subballast material per UPRR Grading Specifications. Perform grading as required to drain and match existing embankments and upstream and downstream channel flowline.

2. Perform grading as required for construction of the new structure and replace areas removed and disturbed in the course of construction to a condition equal to or better than existing.

WELL COMPACTED FILL

1. Well compacted fill shall be well graded granular soil free of any organic material, stones larger than 1½ inches, frozen lumps, debris or excessive moisture. Fill shall be compacted to 95% of maximum dry density as defined in ASTM International D1557 (Modified Proctor). Fill shall be placed and compacted in layers not to exceed 6 inches. Fill shall be placed simultaneously on both sides of the pipe and between multiple pipes. CLSM may be used in lieu of well compacted fill.

CONTROLLED LOW-STRENGTH MATERIAL (CLSM) FILL

1. Controlled Low-Strength Material is a self-compacting, cementitious fill material with an unconfined compressive strength of 50 to 300 psi. The mixture shall consist of water, Portland cement, fly ash, and sound fine or coarse aggregate or both. The mix design shall allow adequate flowability without segregation of aggregates. Hardening time is of prime importance and CLSM should develop 50 psi in about one hour. The maximum layer of thickness for CLSM shall be 3 feet. Additional layers shall not be placed until the CLSM has lost sufficient moisture to be walked on without indenting more than two inches. Pipe spacing may be reduced to between 6" and 18" when using CLSM in lieu of well compacted pipe bedding between pipes.

PIPE BEDDING

1. Pipe bedding shall be granular material such as aggregates ordinarily specified and used in the construction of highway base and subbase. These aggregates include crushed stone, natural or crushed gravel, natural or manufactured sands, crushed slag or a homogeneous mixture of these materials. Pipe bedding shall be compacted to 95% of maximum dry density as defined in ASTM International D1557 (Modified Proctor). Recommended gradation is as follows:

SCREEN SIZE	% PASSING (BY WEIGHT)
1 inch	100
½ inch	60-90
⅜ inch	20-40
No. 4	10-20
No. 200	less than 5%

2. Union Pacific sealant ballast, item no. 562-5428, may be used.

RIPRAP:

1. Class of riprap shall be specified by the engineer. Riprap shall be placed in such a manner as to avoid segregation of various sizes of rock, and distributed so that there will be no large accumulation of either the larger or smaller sizes of stone. Individual rocks shall be placed in tight contact with one another in such a way to produce the least amount of void spaces. Riprap shall be solid, unfractured rock or concrete, bulky in shape with sharp angular edges.

2. Individual rocks shall vary as shown:

RIPRAP CLASS	AVERAGE WEIGHT PER STONE (LBS.)	DIMENSION (INCHES)	ITEM NO.	UNIT OF MEASURE	LAYER THICKNESS	TYPICAL VELOCITIES
I	50 to 200	9 to 14	562-2764	Ton	1'-6"	6 - 8 fps
II	200 to 1,000	14 to 24	562-3430	Ton	2'-0"	8 - 12 fps
III	1,000 to 4,000	24 to 38	562-4096	Ton	3'-0"	> 12 fps

3. The entire mass of riprap shall be well distributed within the limits specified. However, the following allowances shall be acceptable to produce the required riprap protection:

   Riprap Class I - No allowances are permitted
   Riprap Class II - 15% of Riprap Class I.
   Riprap Class III - 15% of Riprap Class I and 15% of Riprap Class II.

CONSTRUCTOR NOTES (WHEN APPLICABLE)

CONSTRUCTOR DEFINITION

1. Constructor designates Manager Bridge Construction if construction by UPRR and Contractor if construction by Contractor.

DIVISION OF RESPONSIBILITY

A. RAILROAD

1. Provide material as shown in the Bill of Material.

2. Provide and install Private Property/No Trespassing sign and culvert marker sign on right side at low mile post end of culvert.

B. CONSTRUCTOR

1. Coordinate all construction activities with the Railroad.

2. **Before ordering any material, Constructor shall make a detailed field inspection of the site verifying all pertinent dimensions and elevations. Any variations in dimensions or elevations from those shown on the drawings shall be reported immediately to the UPRR Project Manager.**

3. Any modifications to this design shall be approved by the UPRR Office of Director Structures Design prior to construction.

4. **Verify the location, relocation, abandonment, and/or temporary support of all utilities affected by the construction of the structure and embankment and coordinate these activities with the appropriate utility companies, agencies and/or authorities.**

5. Apply for and obtain all construction permits necessary to perform the work.

6. Bill of Material and Schedules are provided for information only. Constructor shall be responsible for providing all material, not provided by the Railroad, required to complete the work.

7. Perform all work not performed by the Railroad.

8. Provide the Railroad with a detailed construction plan defining the activity, schedule and procedure for each aspect of the work. Construction shall not begin until the construction plan has been approved by the Railroad.

9. Provide all temporary structures (shoring, bracing and/or falsework) required to support and protect the existing embankments and structures affected by the work. Provide the Railroad with details, design and procedure for all temporary structures. All temporary structures shall be designed, signed and sealed by a professional engineer registered in the State that the structure is to be constructed. All temporary structures shall be approved by the UPRR Office of Director Structures Design prior to beginning construction.

10. Direct channel flow as required to perform work.

11. Accomplish activities within the schedule specified in the approved construction plan.

REVISIONS		
DATE	LTR.	DESCRIPTION
02/12	A	RELOCATED GENERAL NOTES
6/13	B	CHANGED FILL REQUIREMENTS
7/14	C	CHANGED FILL REQUIREMENTS
04/19	D	UPDATED NOTES
/		
/		

DESIGN BY: CLJ | DRAWN BY: KDM | CHECKED BY: CLJ

APPROVED:

George J. Meyn 4/4/08

UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

GENERAL NOTES FOR ROUND STEEL PIPE CULVERTS

FILE OWNER: UPRR | DATE:

PLAN NO.: 680000 | SHEET: 3 OF 3

FILE NAME: P:\!Standards\Culverts (CMP&SSP)\0-Active\steelpip_std.dgn

Copyright © 2007 by Union Pacific Railroad PLOTTED: 8/12/2021 10:04:39 AM

STANDARD SHEET

TABLE 1 - SMOOTH STEEL PIPE																								
OUTSIDE PIPE DIAMETER	THICKNESS (IN.)	WEIGHT (LB./FT.)	COVER * MIN. (FT.)	COVER * MAX. (FT.)	10'-0" LENGTH ITEM NO.	10'-0" LENGTH WEIGHT (LB.)	12'-0" LENGTH ITEM NO.	12'-0" LENGTH WEIGHT (LB.)	14'-0" LENGTH ITEM NO.	14'-0" LENGTH WEIGHT (LB.)	16'-0" LENGTH ITEM NO.	16'-0" LENGTH WEIGHT (LB.)	18'-0" LENGTH ITEM NO.	18'-0" LENGTH WEIGHT (LB.)	20'-0" LENGTH ITEM NO.	20'-0" LENGTH WEIGHT (LB.)	22'-0" LENGTH ITEM NO.	22'-0" LENGTH WEIGHT (LB.)	24'-0" LENGTH ITEM NO.	24'-0" LENGTH WEIGHT (LB.)	30'-0" LENGTH ITEM NO.	30'-0" LENGTH WEIGHT (LB.)	40'-0" LENGTH ITEM NO.	40'-0" LENGTH WEIGHT (LB.)	STORE ITEMS PER L.F.
36"	3/8	190	1'-6"	18'-0"	510-3000	1,900	510-3001	2,280	510-3002	2,660	510-3003	3,040	510-3004	3,420	510-3006	3,800	510-3007	4,180	510-3008	4,560	510-3009	5,700	510-3010	7,600	510-3285
42"	1/2	222	1'-6"	18'-0"	510-3011	2,280	510-3012	2,664	510-3013	3,108	510-3014	3,552	510-3015	3,996	510-3016	4,440	510-3017	4,884	510-3018	5,328	510-3019	6,660	510-3020	8,880	-
48"	5/8	317	1'-6"	18'-0"	510-3021	3,170	510-3022	3,804	510-3024	4,438	510-3025	5,072	510-3026	5,706	510-3027	6,340	510-3028	6,974	510-3029	7,608	510-3030	9,510	510-3031	12,680	510-3293
60"	3/4	475	1'-6"	18'-0"	510-3032	4,750	510-3033	5,700	510-3034	6,650	510-3035	7,600	510-3036	8,550	510-3037	9,500	510-3038	10,450	510-3040	11,400	510-3041	14,250	510-3042	19,000	510-9526
72"	7/8	667	1'-6"	18'-0"	510-3044	6,670	510-3050	8,004	510-3051	9,338	510-3052	10,672	510-3053	12,006	510-3054	13,340	510-3056	14,674	510-3057	16,008	510-3058	20,010	510-3043	26,680	510-3305
84"	1	888	1'-6"	18'-0"	510-3059	8,880	510-3060	10,656	510-3061	12,432	510-3062	14,208	510-3063	15,984	510-3064	17,760	510-3070	19,536	510-3071	21,312	510-3072	26,640	510-3080	35,520	510-3310
96"	1 1/4	1,267	1'-6"	18'-0"	510-3090	12,670	510-3094	15,204	510-3095	17,738	510-3096	20,272	510-3097	22,806	510-3098	25,340	510-3099	27,874	510-3106	30,408	510-3107	38,010	510-3108	50,680	510-3315

* COVER TO BE MEASURED FROM BASE OF RAIL TO TOP OF PIPE

SMOOTH STEEL PIPE (SSP) CONSTRUCTION NOTES

GENERAL:

SSP structures are designed for Cooper E80 Live Load with impact, and cover as shown in Table 3.

Table 3 indicates the minimum required thickness.

INSTALLATION:

Installation of Smooth Steel Pipe (SSP) shall conform to the current American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual for Railway Engineering, Chapter 1, Part 4. Culvert lengths are to be based on existing mainline roadbed sections.

JACKING:

Where indicated, pipe to be bored and jacked into place. Bore hole diameter shall be essentially the same as the outside diameter of the pipe. If voids should develop or if the bored hole diameter is greater than the outside diameter of the pipe by more than 1 inch, notify the Office of Director structures Design. Boring operations shall not be stopped if such a stoppage would be detrimental to the railroad. A survey crew shall continually monitor the elevation and alignment of the railroad track(s) above during the jacking procedures. If track movement or loss of ballast exceeds 1/4 inch during jacking or boring operations, all work must stop and the Railroad must be notified. The Railroad may take any action necessary to ensure safe passage of train. The contractor must immediately submit a corrective plan of action to the Railroad for review and approval. The Railroad must review and approve the proposed repair procedure. The finished repair must be inspected and accepted by the Railroad before the track can be placed back into service, and construction is allowed to proceed.

BORED AND JACKED TOLERANCE:

The permitted tolerance of a true line for pipe positioning is +/- 2". Adjustment to the line and level should be gradual to ensure that the pipe manufacturer's stated angular deflection is not exceeded at any joint.

FIELD WELDING:

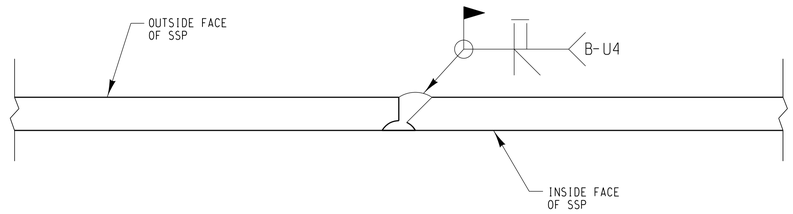
Welders shall posses valid qualifications.
All welding per AWS D1.1, Structural Welding Code.

MATERIALS:

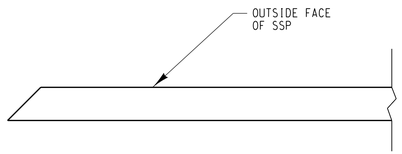
ASTM A139, Grade B, FY = 35 ksi
or
ASTM A252, Grade 3, FY = 45 ksi

Smooth steel pipe shall have a welded straight longitudinal seam. Spiral seam is acceptable if 25% of weld is ultrasonically tested in addition to required tensile tests of weld. A hydrostatic test is not required.

The ends of each section of pipe shall be square cut. One end shall be suitably beveled for field welding sections together.



PIPE END WELD DETAIL



PIPE END BEVEL DETAIL

REVISIONS		
DATE	LTR.	DESCRIPTION
11/16	A	CHANGED NOTES AND TABLE 1
04/19	B	UPDATED NOTES
10/21	C	UPDATED NOTES & ADD ITEM NUMBERS
/		
/		
/		

DESIGN BY: CLJ | DRAWN BY: KDM | CHECKED BY: CLJ

APPROVED:

George J. Meyn 4/4/08
UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

CONSTRUCTION NOTES AND TABLE FOR SMOOTH STEEL PIPE CULVERTS

FILE OWNER: UPRR | DATE:
PLAN NO.: 680010 | SHEET: 1 OF 1

Copyright © 2007 by Union Pacific Railroad PLOTTED: 10/14/2021 3:41:08 PM

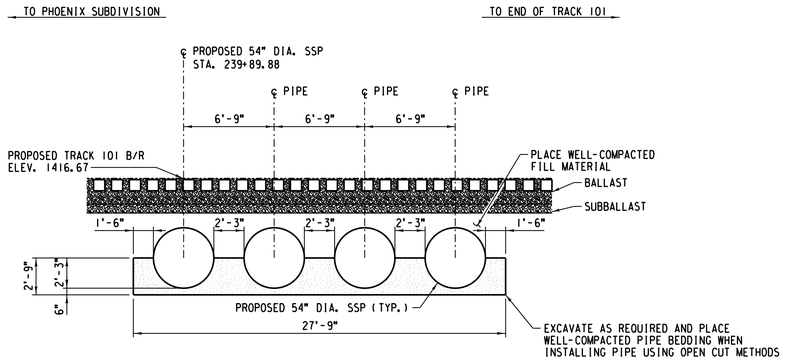
FILE NAME: \\upcorp.ad.uprr.com\engcad\bridge\Standards\Culverts (CMP and SSP)\0-Active\steelpip_std.dgn

DESIGN SHEET

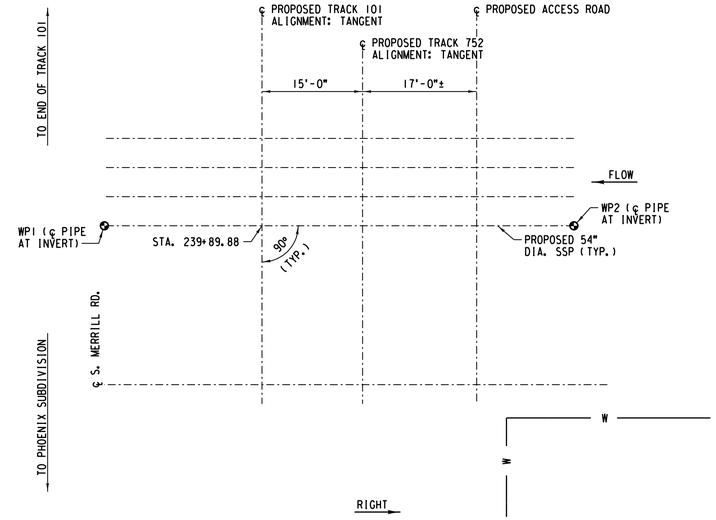
DRAWING SCHEDULE

	SHEET NO.	PLAN NO.	DESCRIPTION	TYPE
THIS SET	S1	123083	GENERAL ARRANGEMENT	DESIGN
	2	680000	DETAILS FOR ROUND STEEL PIPE CULVERTS	STANDARD
	3	680000	GENERAL NOTES FOR ROUND STEEL PIPE CULVERTS	STANDARD
	1	680010	CONSTRUCTION NOTES AND TABLE FOR SMOOTH STEEL PIPE CULVERTS	STANDARD

REF.	NO.	DWG. NO.	SHEET NO.	REV. NO.	DESCRIPTION	TYPE
	1	-	P032 OF 037 T011 OF 012 X095 OF 143 EC016 OF 036	-	MESA, ARIZONA, PHOENIX SUBDIVISION, MP 934.78 TO MP 937.83, CONSTRUCT INDUSTRIAL LEAD TRACK, 100% PLANS, ISSUED FOR BID, DATED MARCH 6, 2023	DESIGN

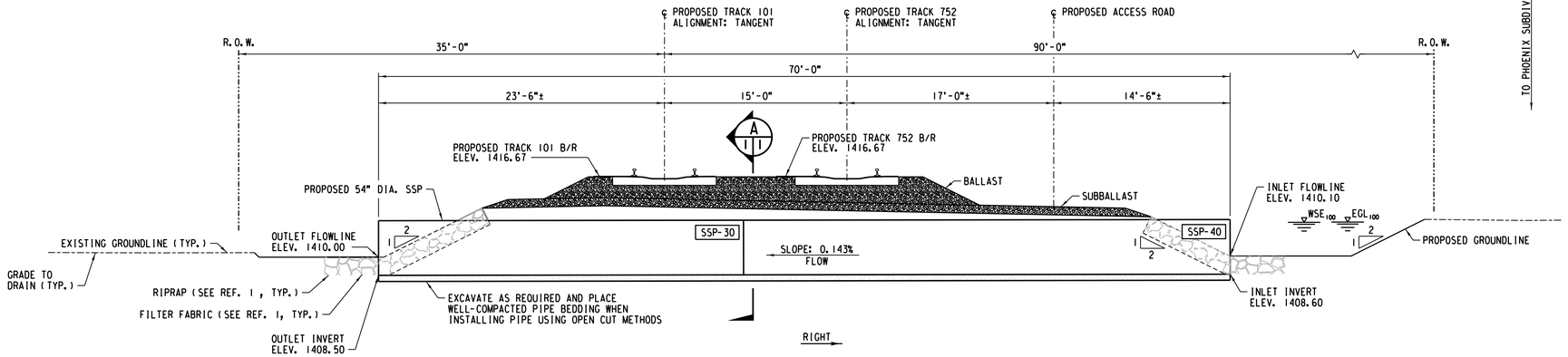


SECTION A
SCALE: 3/16"=1'-0"



KEY PLAN
SCALE: NONE

W = WATER LINE



CROSS SECTION
SCALE: 3/16"=1'-0"

WSE_{100} = 1412.87
EGL_{100} = 1412.89
VEL_{100} = 5.24 fps

NOTE:
PROPOSED SSP CULVERTS ARE DESIGNED FOR 1.5' DEPRESSION.

WORK POINT TABLE

WORK POINT	NORTHING	EASTING
WP1	832693.39	794158.73
WP2	832623.40	794158.04

NOTE:
LOCATION OF UTILITIES IS APPROXIMATE. UTILITIES SHALL BE VERIFIED PRIOR TO CONSTRUCTION. NOTIFY ARIZONA 811, 1-800-782-5348, AT LEAST 48 HOURS PRIOR TO CONSTRUCTION.

BILL OF MATERIAL

REQ'D.	UNIT	DESCRIPTION	STORE ITEM NO.	ORDERED BY
4	EA	CULVERT, SMOOTH STEEL PIPE 54" DIA. X ¾" WALL X 40' LONG, ASTM A139, GR. B OR ASTM A252, GR. 3 (PER STD PLAN NO. 680010)		CONSTRUCTOR
4	EA	CULVERT, SMOOTH STEEL PIPE 54" DIA. X ¾" WALL X 30' LONG, ASTM A139, GR. B OR ASTM A252, GR. 3 (PER STD PLAN NO. 680010)		
120	CU. YD.	PIPE BEDDING (PER STD. DWG. 680000 SHT. 3)		
1	EA.	CULVERT MARKER SIGNS, MOUNTING POST AND MOUNTING HARDWARE (PER STD. DWG. 0502, 0507 AND 0599)	P00-2616	
1	LOT	FILL MATERIAL (PER STD. DWG. 680000 SHT. 3 AND REF. 1)		
1	LOT	RIPRAP (PER REF. 1)		
1	LOT	FILTER FABRIC (PER REF. 1)		

CLSM MAY BE SUBSTITUTED FOR FILL MATERIAL.
BULK QUANTITIES ARE ESTIMATED.

DESIGN NOTES

LAYOUT

1. Stationing: Per Ref. 1.
2. Elevation Datum: Per Ref. 1.
3. Temporary Benchmarks:
   TBM 1 (Olsson CP 4): Elev. 1390.42, NAVD 1988, established by ½" rebar located in ground West of proposed Culvert No. 4.55, 9,606.96' left of existing Phoenix Sub. Main Track centerline, Sta. 1588+58.48.
   TBM 2 (Olsson CP 5): Elev. 1391.63, NAVD 1988, established by ½" rebar located in ground West of proposed Culvert No. 4.55, 9,311.99' left of existing Phoenix Sub. Main Track centerline, Sta. 1590+90.31.
4. Profile: Proposed Track 101 per Ref. 1.
   Proposed Track 752 per Ref. 1.
5. Alignment: Tangent.
6. Information used to prepare this drawing in addition to reference drawings:
   Hydrologic & Hydraulic Evaluation prepared by Olsson, dated September 2022.

DESIGN

1. This structure has been designed for Cooper E80 Live Load with impact and cover depth ranging from 1'-6" to 18'-0".

LETTER SERIES
SHEET NO. CUT ON
SHEET NO. SHOWN ON

SECTION DESIGNATION

POSTCONSTRUCTION COMPLIANCE

Constructor in charge of construction to provide to the office of the Senior Manager Structures Design as-built drawings confirming that the project was constructed in compliance with the plans and indicating any construction variances.

SIGNED

In Charge of Construction — Date

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 01-05-2023 ARIZONA U.S.A.

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL (STATUS) — 07/05/2023 (DATE)

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
CONSULTANT ENGINEER — 01/13/2023 (DATE)

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123083

LATITUDE: 33.28825°N LONGITUDE: 111.60893°W

UNION PACIFIC

DSN/CHK BY:	MEW/MJH
DRAWN/CHK BY:	MEW/MJH
UPRR ENGINEER:	ADS
SHT NO.:	S1 of S1

UNION PACIFIC RAILROAD
Office of Director Structures Design

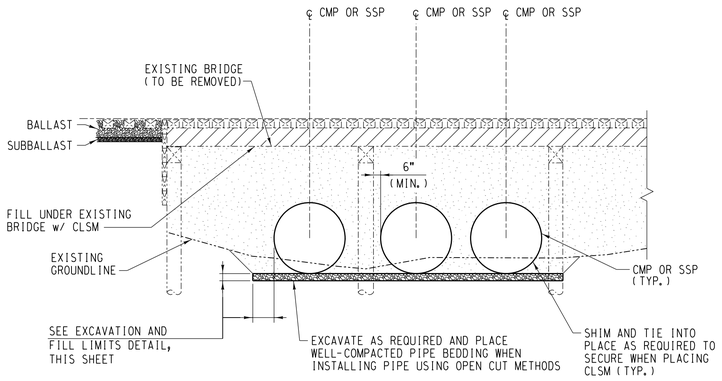
LOCATION & DESCRIPTION: CULVERT 4.55, PIRATE IND LEAD
FURNISH & INSTALL 4 - 54" DIA. SSP x 70'

SHEET TITLE: GENERAL ARRANGEMENT

FILE NAME: \\oa.ad.oaconsulting.com\fnts-na\projects\2020\0501.1000\020-0927.40-Design\Microstation\020-0927.40_BRR.dgn 4.55.Sta. 240-00.00-Pirate Ind Lead 4.55.cac.dgn

PLOTTED: 7/7/2023 12:45:15 PM

STANDARD SHEET

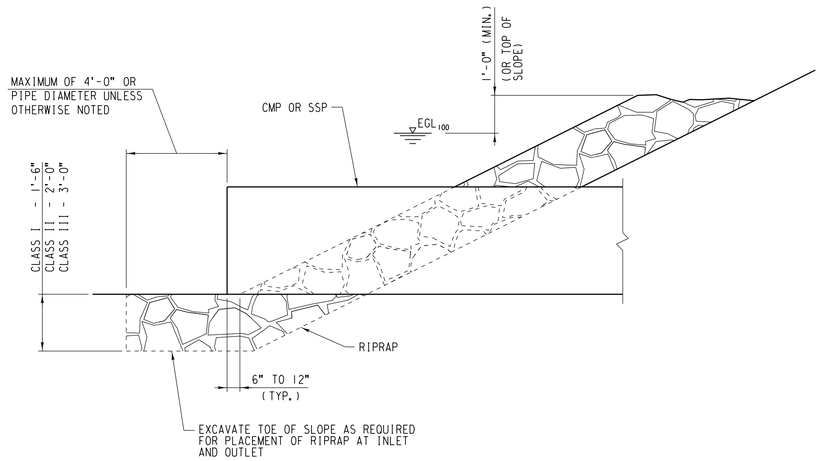


UNDER STRUCTURE - SECTION

SCALE: 3/16"=1'-0"

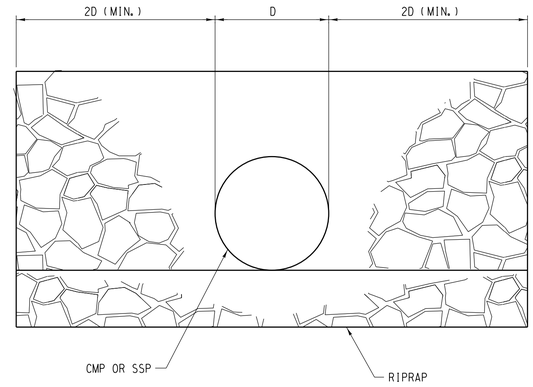
LIMITS OF REMOVAL

REMOVE EXISTING STRUCTURE TO 1'-0" (MIN.) BELOW PROPOSED EMBANKMENT SLOPE AND 2'-6" (MIN.) BELOW BASE OF RAIL.



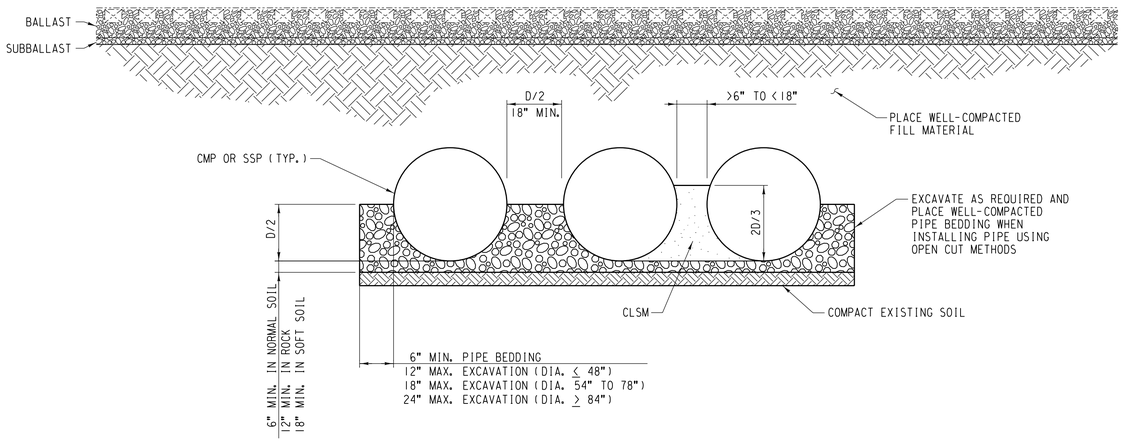
RIPRAP - SECTION

SCALE: NONE



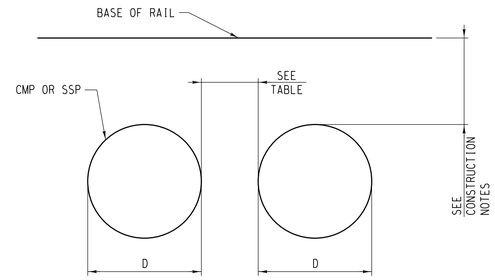
RIPRAP - ELEVATION

SCALE: NONE



EXCAVATION AND FILL LIMITS

SCALE: NONE



SPACING CHART	
PIPE DIAMETER	MIN. SPACING BETWEEN PIPES
12" to 24"	12"
24" to 96"	D/2
96" OR MORE	48"

MINIMUM PIPE SPACING AND COVER

SCALE: NONE

REVISIONS		
DATE	LTR.	DESCRIPTION
02/12	A	ADDED RIPRAP SECTION
04/19	D	UPDATED DETAILS
/		
/		
/		
/		

DESIGN BY: CLJ | DRAWN BY: KDM | CHECKED BY: CLJ

APPROVED:

George J. Meyn 4/4/08

UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

DETAILS FOR ROUND STEEL PIPE CULVERTS

FILE OWNER: UPRR | DATE:

PLAN NO.: 680000 | SHEET: 2 OF 3

Copyright © 2007 by Union Pacific Railroad PLOTTED: 8/12/2021 10:04:26 AM

FILE NAME: P:\Standards\Culverts (CMP&SSP)\0-Active\steelpip_std.dgn

STANDARD SHEET

GENERAL NOTES

GENERAL

1. All work requirements shown on these drawings and not otherwise detailed shall be accomplished as specified in Union Pacific Railroad (UPRR) Specifications and the American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual for Railway Engineering. In the event of conflicts between specifications, the more restrictive shall apply.

2. **Construction means and methods shall comply with the All Permits Issued (API) package.**

3. Field verify all dimensions, stations and elevations prior to start of construction.

4. **Contact the Union Pacific "Call Before You Dig" number 90 days (not less than 60 days) prior to proposed construction start date. Prior to construction, confirm that all necessary relocations have been completed. The CBYD number is: 1-800-336-9193.**

5. **Location of known utilities is approximate. Location shall be verified prior to construction. Notify Call811 "Call Before you Dig" number at least 48 hours prior to construction.**

GRADING

1. Provide and place all fill and subballast material per UPRR Grading Specifications. Perform grading as required to drain and match existing embankments and upstream and downstream channel flowline.

2. Perform grading as required for construction of the new structure and replace areas removed and disturbed in the course of construction to a condition equal to or better than existing.

WELL COMPACTED FILL

1. Well compacted fill shall be well graded granular soil free of any organic material, stones larger than 1½ inches, frozen lumps, debris or excessive moisture. Fill shall be compacted to 95% of maximum dry density as defined in ASTM International D1557 (Modified Proctor). Fill shall be placed and compacted in layers not to exceed 6 inches. Fill shall be placed simultaneously on both sides of the pipe and between multiple pipes. CLSM may be used in lieu of well compacted fill.

CONTROLLED LOW-STRENGTH MATERIAL (CLSM) FILL

1. Controlled Low-Strength Material is a self-compacting, cementitious fill material with an unconfined compressive strength of 50 to 300 psi. The mixture shall consist of water, Portland cement, fly ash, and sound fine or coarse aggregate or both. The mix design shall allow adequate flowability without segregation of aggregates. Hardening time is of prime importance and CLSM should develop 50 psi in about one hour. The maximum layer of thickness for CLSM shall be 3 feet. Additional layers shall not be placed until the CLSM has lost sufficient moisture to be walked on without indenting more than two inches. Pipe spacing may be reduced to between 6" and 18" when using CLSM in lieu of well compacted pipe bedding between pipes.

PIPE BEDDING

1. Pipe bedding shall be granular material such as aggregates ordinarily specified and used in the construction of highway base and subbase. These aggregates include crushed stone, natural or crushed gravel, natural or manufactured sands, crushed slag or a homogeneous mixture of these materials. Pipe bedding shall be compacted to 95% of maximum dry density as defined in ASTM International D1557 (Modified Proctor). Recommended gradation is as follows:

SCREEN SIZE	% PASSING (BY WEIGHT)
1 inch	100
½ inch	60-90
⅜ inch	20-40
No. 4	10-20
No. 200	less than 5%

2. Union Pacific sealant ballast, item no. 562-5428, may be used.

RIPRAP:

1. Class of riprap shall be specified by the engineer. Riprap shall be placed in such a manner as to avoid segregation of various sizes of rock, and distributed so that there will be no large accumulation of either the larger or smaller sizes of stone. Individual rocks shall be placed in tight contact with one another in such a way to produce the least amount of void spaces. Riprap shall be solid, unfractured rock or concrete, bulky in shape with sharp angular edges.

2. Individual rocks shall vary as shown:

RIPRAP CLASS	AVERAGE WEIGHT PER STONE (LBS.)	DIMENSION (INCHES)	ITEM NO.	UNIT OF MEASURE	LAYER THICKNESS	TYPICAL VELOCITIES
I	50 to 200	9 to 14	562-2764	Ton	1'-6"	6 - 8 fps
II	200 to 1,000	14 to 24	562-3430	Ton	2'-0"	8 - 12 fps
III	1,000 to 4,000	24 to 38	562-4096	Ton	3'-0"	> 12 fps

3. The entire mass of riprap shall be well distributed within the limits specified. However, the following allowances shall be acceptable to produce the required riprap protection:

   Riprap Class I - No allowances are permitted
   Riprap Class II - 15% of Riprap Class I.
   Riprap Class III - 15% of Riprap Class I and 15% of Riprap Class II.

CONSTRUCTOR NOTES (WHEN APPLICABLE)

CONSTRUCTOR DEFINITION

1. Constructor designates Manager Bridge Construction if construction by UPRR and Contractor if construction by Contractor.

DIVISION OF RESPONSIBILITY

A. RAILROAD

1. Provide material as shown in the Bill of Material.

2. Provide and install Private Property/No Trespassing sign and culvert marker sign on right side at low mile post end of culvert.

B. CONSTRUCTOR

1. Coordinate all construction activities with the Railroad.

2. **Before ordering any material, Constructor shall make a detailed field inspection of the site verifying all pertinent dimensions and elevations. Any variations in dimensions or elevations from those shown on the drawings shall be reported immediately to the UPRR Project Manager.**

3. Any modifications to this design shall be approved by the UPRR Office of Director Structures Design prior to construction.

4. **Verify the location, relocation, abandonment, and/or temporary support of all utilities affected by the construction of the structure and embankment and coordinate these activities with the appropriate utility companies, agencies and/or authorities.**

5. Apply for and obtain all construction permits necessary to perform the work.

6. Bill of Material and Schedules are provided for information only. Constructor shall be responsible for providing all material, not provided by the Railroad, required to complete the work.

7. Perform all work not performed by the Railroad.

8. Provide the Railroad with a detailed construction plan defining the activity, schedule and procedure for each aspect of the work. Construction shall not begin until the construction plan has been approved by the Railroad.

9. Provide all temporary structures (shoring, bracing and/or falsework) required to support and protect the existing embankments and structures affected by the work. Provide the Railroad with details, design and procedure for all temporary structures. All temporary structures shall be designed, signed and sealed by a professional engineer registered in the State that the structure is to be constructed. All temporary structures shall be approved by the UPRR Office of Director Structures Design prior to beginning construction.

10. Direct channel flow as required to perform work.

11. Accomplish activities within the schedule specified in the approved construction plan.

REVISIONS		
DATE	LTR.	DESCRIPTION
02/12	A	RELOCATED GENERAL NOTES
6/13	B	CHANGED FILL REQUIREMENTS
7/14	C	CHANGED FILL REQUIREMENTS
04/19	D	UPDATED NOTES
/		
/		

DESIGN BY: CLJ | DRAWN BY: KDM | CHECKED BY: CLJ

APPROVED:

George J. Meyn 4/4/08

UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

GENERAL NOTES FOR ROUND STEEL PIPE CULVERTS

FILE OWNER: UPRR | DATE:

PLAN NO.: 680000 | SHEET: 3 OF 3

FILE NAME: P:\!Standards\Culverts (CMP&SSP)\0-Active\steelpip_std.dgn

Copyright © 2007 by Union Pacific Railroad PLOTTED: 8/12/2021 10:04:39 AM

STANDARD SHEET

TABLE 1 - SMOOTH STEEL PIPE																								
OUTSIDE PIPE DIAMETER	THICKNESS (IN.)	WEIGHT (LB./FT.)	COVER * MIN. (FT.)	COVER * MAX. (FT.)	10'-0" LENGTH ITEM NO.	10'-0" LENGTH WEIGHT (LB.)	12'-0" LENGTH ITEM NO.	12'-0" LENGTH WEIGHT (LB.)	14'-0" LENGTH ITEM NO.	14'-0" LENGTH WEIGHT (LB.)	16'-0" LENGTH ITEM NO.	16'-0" LENGTH WEIGHT (LB.)	18'-0" LENGTH ITEM NO.	18'-0" LENGTH WEIGHT (LB.)	20'-0" LENGTH ITEM NO.	20'-0" LENGTH WEIGHT (LB.)	22'-0" LENGTH ITEM NO.	22'-0" LENGTH WEIGHT (LB.)	24'-0" LENGTH ITEM NO.	24'-0" LENGTH WEIGHT (LB.)	30'-0" LENGTH ITEM NO.	30'-0" LENGTH WEIGHT (LB.)	40'-0" LENGTH ITEM NO.	40'-0" LENGTH WEIGHT (LB.)	STORE ITEMS PER L.F.
36"	3/8	190	1'-6"	18'-0"	510-3000	1,900	510-3001	2,280	510-3002	2,660	510-3003	3,040	510-3004	3,420	510-3006	3,800	510-3007	4,180	510-3008	4,560	510-3009	5,700	510-3010	7,600	510-3285
42"	1/2	222	1'-6"	18'-0"	510-3011	2,280	510-3012	2,664	510-3013	3,108	510-3014	3,552	510-3015	3,996	510-3016	4,440	510-3017	4,884	510-3018	5,328	510-3019	6,660	510-3020	8,880	-
48"	5/8	317	1'-6"	18'-0"	510-3021	3,170	510-3022	3,804	510-3024	4,438	510-3025	5,072	510-3026	5,706	510-3027	6,340	510-3028	6,974	510-3029	7,608	510-3030	9,510	510-3031	12,680	510-3293
60"	3/4	475	1'-6"	18'-0"	510-3032	4,750	510-3033	5,700	510-3034	6,650	510-3035	7,600	510-3036	8,550	510-3037	9,500	510-3038	10,450	510-3040	11,400	510-3041	14,250	510-3042	19,000	510-9526
72"	7/8	667	1'-6"	18'-0"	510-3044	6,670	510-3050	8,004	510-3051	9,338	510-3052	10,672	510-3053	12,006	510-3054	13,340	510-3056	14,674	510-3057	16,008	510-3058	20,010	510-3043	26,680	510-3305
84"	1	888	1'-6"	18'-0"	510-3059	8,880	510-3060	10,656	510-3061	12,432	510-3062	14,208	510-3063	15,984	510-3064	17,760	510-3070	19,536	510-3071	21,312	510-3072	26,640	510-3080	35,520	510-3310
96"	1 1/4	1,267	1'-6"	18'-0"	510-3090	12,670	510-3094	15,204	510-3095	17,738	510-3096	20,272	510-3097	22,806	510-3098	25,340	510-3099	27,874	510-3106	30,408	510-3107	38,010	510-3108	50,680	510-3315

* COVER TO BE MEASURED FROM BASE OF RAIL TO TOP OF PIPE

SMOOTH STEEL PIPE (SSP) CONSTRUCTION NOTES

GENERAL:

SSP structures are designed for Cooper E80 Live Load with impact, and cover as shown in Table 3.

Table 3 indicates the minimum required thickness.

INSTALLATION:

Installation of Smooth Steel Pipe (SSP) shall conform to the current American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual for Railway Engineering, Chapter 1, Part 4. Culvert lengths are to be based on existing mainline roadbed sections.

JACKING:

Where indicated, pipe to be bored and jacked into place. Bore hole diameter shall be essentially the same as the outside diameter of the pipe. If voids should develop or if the bored hole diameter is greater than the outside diameter of the pipe by more than 1 inch, notify the Office of Director structures Design. Boring operations shall not be stopped if such a stoppage would be detrimental to the railroad. A survey crew shall continually monitor the elevation and alignment of the railroad track(s) above during the jacking procedures. If track movement or loss of ballast exceeds 1/4 inch during jacking or boring operations, all work must stop and the Railroad must be notified. The Railroad may take any action necessary to ensure safe passage of train. The contractor must immediately submit a corrective plan of action to the Railroad for review and approval. The Railroad must review and approve the proposed repair procedure. The finished repair must be inspected and accepted by the Railroad before the track can be placed back into service, and construction is allowed to proceed.

BORED AND JACKED TOLERANCE:

The permitted tolerance of a true line for pipe positioning is +/- 2". Adjustment to the line and level should be gradual to ensure that the pipe manufacturer's stated angular deflection is not exceeded at any joint.

FIELD WELDING:

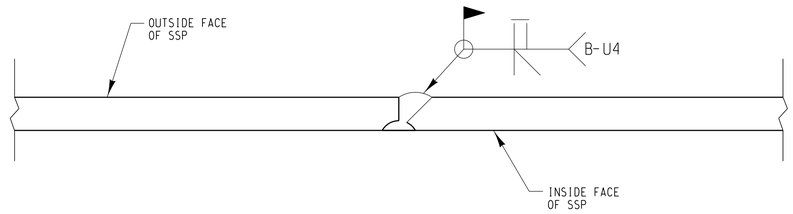
Welders shall posses valid qualifications.
All welding per AWS D1.1, Structural Welding Code.

MATERIALS:

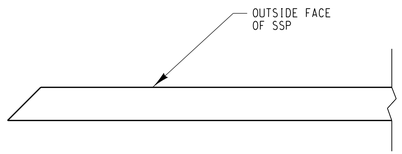
ASTM A139, Grade B, FY = 35 ksi
or
ASTM A252, Grade 3, FY = 45 ksi

Smooth steel pipe shall have a welded straight longitudinal seam. Spiral seam is acceptable if 25% of weld is ultrasonically tested in addition to required tensile tests of weld. A hydrostatic test is not required.

The ends of each section of pipe shall be square cut. One end shall be suitably beveled for field welding sections together.



PIPE END WELD DETAIL



PIPE END BEVEL DETAIL

REVISIONS		
DATE	LTR.	DESCRIPTION
11/16	A	CHANGED NOTES AND TABLE 1
04/19	B	UPDATED NOTES
10/21	C	UPDATED NOTES & ADD ITEM NUMBERS
/		
/		
/		

DESIGN BY: CLJ | DRAWN BY: KDM | CHECKED BY: CLJ

APPROVED:

George J. Meyn 4/4/08
UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

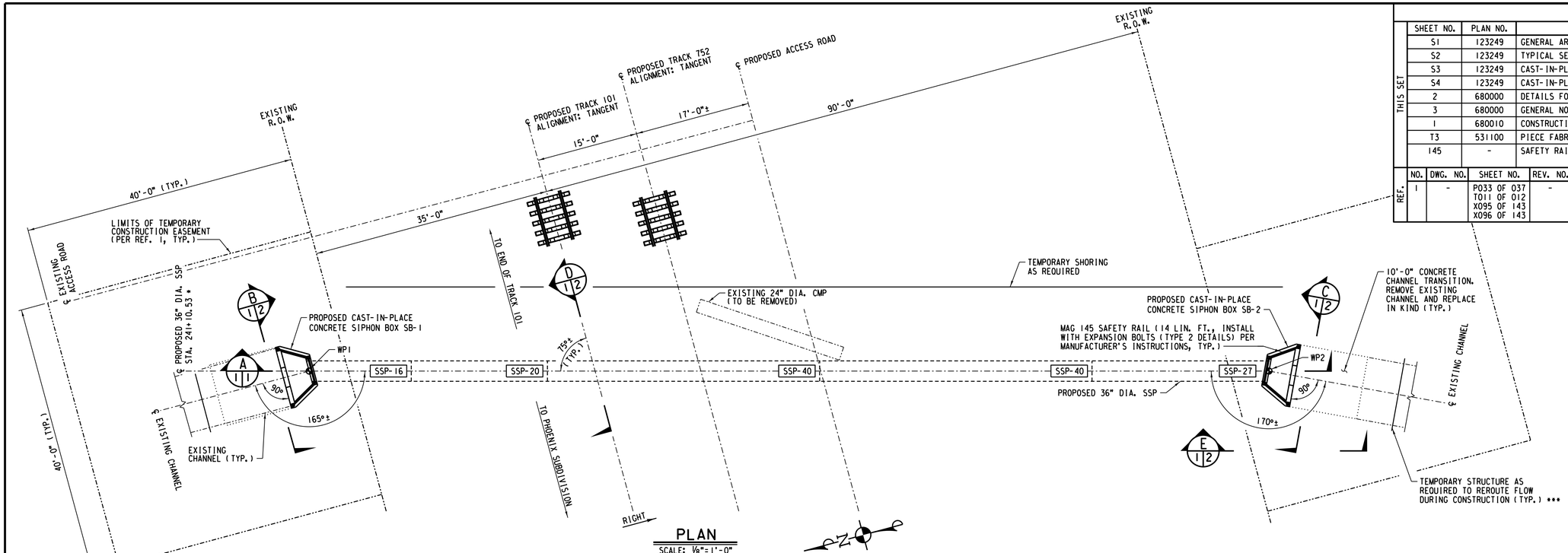
CONSTRUCTION NOTES AND TABLE FOR SMOOTH STEEL PIPE CULVERTS

FILE OWNER: UPRR | DATE:
PLAN NO.: 680010 | SHEET: 1 OF 1

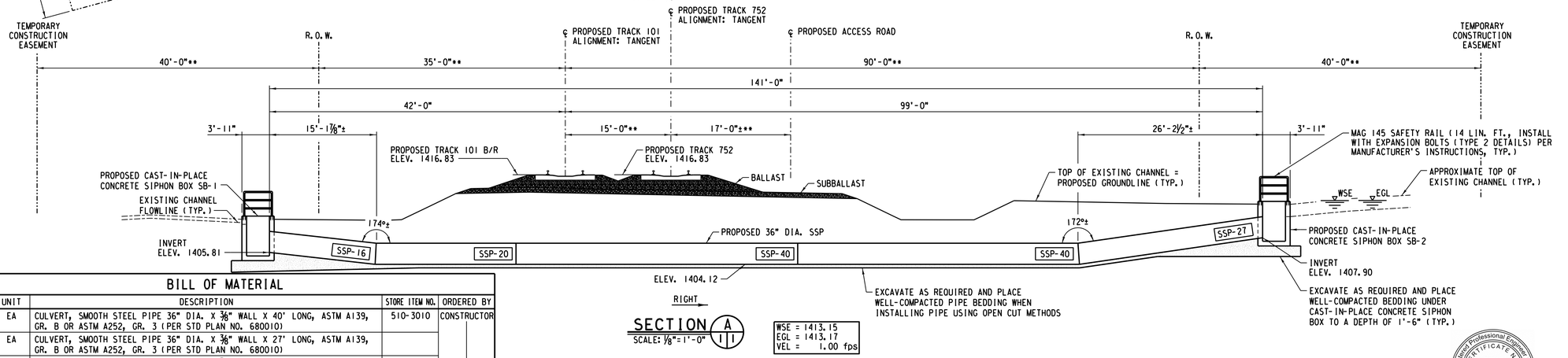
Copyright © 2007 by Union Pacific Railroad PLOTTED: 10/14/2021 3:41:08 PM

FILE NAME: \\upcorp.ad.uprr.com\engcad\bridge\Standards\Culverts (CMP and SSP)\0-Active\steelpip_std.dgn

DESIGN SHEET



PLAN
SCALE: 1/8"=1'-0"



RIGHT

SECTION A
SCALE: 1/8"=1'-0"

WSE = 1413.15
EGL = 1413.17
VEL = 1.00 fps

DRAWING SCHEDULE

	SHEET NO.	PLAN NO.	DESCRIPTION	TYPE
THIS SET	S1	123249	GENERAL ARRANGEMENT	DESIGN
	S2	123249	TYPICAL SECTIONS AND CONSTRUCTION DETAILS	DESIGN
	S3	123249	CAST-IN-PLACE CONCRETE SIPHON BOX DETAILS (SHEET 1 OF 2)	DESIGN
	S4	123249	CAST-IN-PLACE CONCRETE SIPHON BOX DETAILS (SHEET 2 OF 2)	DESIGN
	2	680000	DETAILS FOR ROUND STEEL PIPE CULVERTS	STANDARD
	3	680000	GENERAL NOTES FOR ROUND STEEL PIPE CULVERTS	STANDARD
	1	680010	CONSTRUCTION NOTES AND TABLE FOR SMOOTH STEEL PIPE CULVERTS	STANDARD
	T3	531100	PIECE FABRICATION NOTES	STANDARD
	145	-	SAFETY RAIL	MAG STANDARD

REF.	NO.	DWG. NO.	SHEET NO.	REV. NO.	DESCRIPTION	TYPE
	1	-	P033 OF 037 T011 OF 012 X095 OF 143 X096 OF 143	-	MESA, ARIZONA, PHOENIX SUBDIVISION, MP 934.78 TO MP 937.83, CONSTRUCT INDUSTRIAL LEAD TRACK, 100% PLANS, ISSUED FOR BID, DATED MARCH 6, 2023	DESIGN

***NOTES:
1. FLOW SHALL BE REROUTED TEMPORARILY AS REQUIRED FOR CONSTRUCTION. CONSTRUCTOR IS RESPONSIBLE FOR ANY TEMPORARY STRUCTURES REQUIRED AND SHALL SUBMIT PLANS AND CALCULATIONS TO UPRR FOR APPROVAL AT LEAST 2 WEEKS PRIOR TO CONSTRUCTION.
2. AFTER CONSTRUCTION, CONSTRUCTOR SHALL REROUTE FLOW BACK TO ORIGINAL ALIGNMENT AND RESTORE AREA TO ORIGINAL CONDITION OR BETTER.

WORK POINT TABLE

WORK POINT	NORTHING	EASTING
WP1	832709.14	794290.52
WP2	832573.40	794252.36

NOTES:
1. * = STATIONING IS TAKEN AT CENTERLINE OF PROPOSED TRACK 101.
2. ** = MEASURED PERPENDICULAR TO PROPOSED TRACK 101.
3. CONSTRUCTOR TO FIELD VERIFY ALL STATIONS ELEVATIONS AND DIMENSIONS PRIOR TO CONSTRUCTION. IF CONFLICTS OR INCONSISTENCIES ARE ANTICIPATED, NOTIFY UPRR.

BILL OF MATERIAL

REQ'D.	UNIT	DESCRIPTION	STORE ITEM NO.	ORDERED BY
2	EA	CULVERT, SMOOTH STEEL PIPE 36" DIA. X 3/8" WALL X 40' LONG, ASTM A139, GR. B OR ASTM A252, GR. 3 (PER STD PLAN NO. 680010)	510-3010	CONSTRUCTOR
1	EA	CULVERT, SMOOTH STEEL PIPE 36" DIA. X 3/8" WALL X 27' LONG, ASTM A139, GR. B OR ASTM A252, GR. 3 (PER STD PLAN NO. 680010)		
1	EA	CULVERT, SMOOTH STEEL PIPE 36" DIA. X 3/8" WALL X 20' LONG, ASTM A139, GR. B OR ASTM A252, GR. 3 (PER STD PLAN NO. 680010)	510-3006	
1	EA	CULVERT, SMOOTH STEEL PIPE 36" DIA. X 3/8" WALL X 16' LONG, ASTM A139, GR. B OR ASTM A252, GR. 3 (PER STD PLAN NO. 680010)	510-3003	
28	LIN. FT.	MARICOPA ASSOCIATION OF GOVERNMENTS (MAG) 145 SAFETY RAIL (TWO LOCATIONS, WITH EXPANSION BOLTS (TYPE 2 DETAILS) AND ALL OTHER ASSOCIATED HARDWARE) OR APPROVED ALTERNATE		
8	EA	3/4" DIA. x 8" WELDED STUD (PER DETAILS, SHEET NO. S2)		
45	CU. YD.	PIPE BEDDING (PER STD. DWG. 680000 SHT. 3)		
1	LOT	REINFORCING STEEL FOR CONCRETE SIPHON BOX SB-1 (PER NOTES, STD. DWG. 531100, SHT. NO. T3 AND SCHEDULE, SHEET NO. S3)		
5	CU. YD.	4000 PSI CONCRETE FOR CONCRETE SIPHON BOX SB-1 (PER NOTES, STD. DWG. 531100, SHT. NO. T3 AND DETAILS, SHEET NO. S3)		
1	LOT	REINFORCING STEEL FOR CONCRETE SIPHON BOX SB-2 (PER NOTES, STD. DWG. 531100, SHT. NO. T3 AND SCHEDULE, SHEET NO. S4)		
5	CU. YD.	4000 PSI CONCRETE FOR CONCRETE SIPHON BOX SB-2 (PER NOTES, STD. DWG. 531100, SHT. NO. T3 AND DETAILS, SHEET NO. S4)		
20	LIN. FT.	SIKA HYDROTITE WATERSTOP, PROFILE CJ-0725-3K, OR APPROVED ALTERNATE		
1	LOT	EPOGRIP MULTIPURPOSE STRUCTURAL BONDING AND GROUTING EPOXY ADHESIVE OR APPROVED ALTERNATE		
1	EA.	CULVERT MARKER SIGNS, MOUNTING POST AND MOUNTING HARDWARE (PER STD. DWG. 0502, 0507 AND 0599)	P00-2616	
1	LOT	CHANNEL TRANSITION MATERIAL		
1	LOT	FILL MATERIAL (PER STD. DWG. 680000 SHT. 3 AND REF. 1)		
1	LOT	TEMPORARY FORMWORK MATERIAL		
1	LOT	TEMPORARY SHORING		
1	LOT	TEMPORARY STRUCTURE TO REROUTE FLOW		

CLSM MAY BE SUBSTITUTED FOR FILL MATERIAL.
BULK QUANTITIES ARE ESTIMATED.

MATERIAL NOTE:
CEMENT SHALL BE TYPE II OR TYPE III PORTLAND CEMENT IN ACCORDANCE WITH ASTM C150 SPECIFICATIONS.

DESIGN NOTES

LAYOUT

1. Stationing: Per Ref. 1.
2. Elevation Datum: Per Ref. 1.
3. Temporary Benchmarks:
   TBM 1 (Olsson CP 4): Elev. 1390.42, NAVD 1988, established by 1/2" rebar located in ground West of proposed Culvert No. 4.57, 9,606.96' left of existing Phoenix Sub. Main Track centerline, Sta. 1588+58.48.
   TBM 2 (Olsson CP 5): Elev. 1391.63, NAVD 1988, established by 1/2" rebar located in ground West of proposed Culvert No. 4.57, 9,311.99' left of existing Phoenix Sub. Main Track centerline, Sta. 1590+90.31
4. Profile: Proposed Track 101 per Ref. 1.
   Proposed Track 752 per Ref. 1.
5. Alignment: Tangent.
6. Information used to prepare this drawing in addition to reference drawings:
   Hydrologic & Hydraulic Evaluation prepared by Olsson, dated September 2022.

DESIGN

1. The proposed cast-in-place concrete siphon box has been designed in accordance with the AREMA Manual for Railway Engineering, Chapter 8: Concrete Structures and Foundations The proposed cast-in-place concrete siphon box has been designed for railroad surcharge, lateral earth pressure and a construction surcharge of 250 psf.
2. The SSP has been designed for Cooper E80 Live Load with impact and cover depth ranging from 1'-6" to 18'-0".

POSTCONSTRUCTION COMPLIANCE

Constructor in charge of construction to provide to the office of the Senior Manager Structures Design as-built drawings confirming that the project was constructed in compliance with the plans and indicating any construction variances.

SIGNED

In Charge of Construction — Date

LETTER SERIES
SHEET NO. CUT ON — SHEET NO. SHOWN ON

SECTION DESIGNATION

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL — STATUS — 07/05/2023 DATE

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
CONSULTANT ENGINEER — 04/04/2023 DATE

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123249

LATITUDE: 33.28824°N LONGITUDE: 111.60853°W

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 07-05-2023 ARIZONA U.S.A.

DSN/CHK BY: JAS/MJH
DRAWN/CHK BY: FAM/JAS
UPRR ENGINEER: ADS
SHT NO.: S1 of S4

UNION PACIFIC RAILROAD

Office of Director Structures Design

LOCATION & DESCRIPTION: CULVERT 4.57, PIRATE IND LEAD

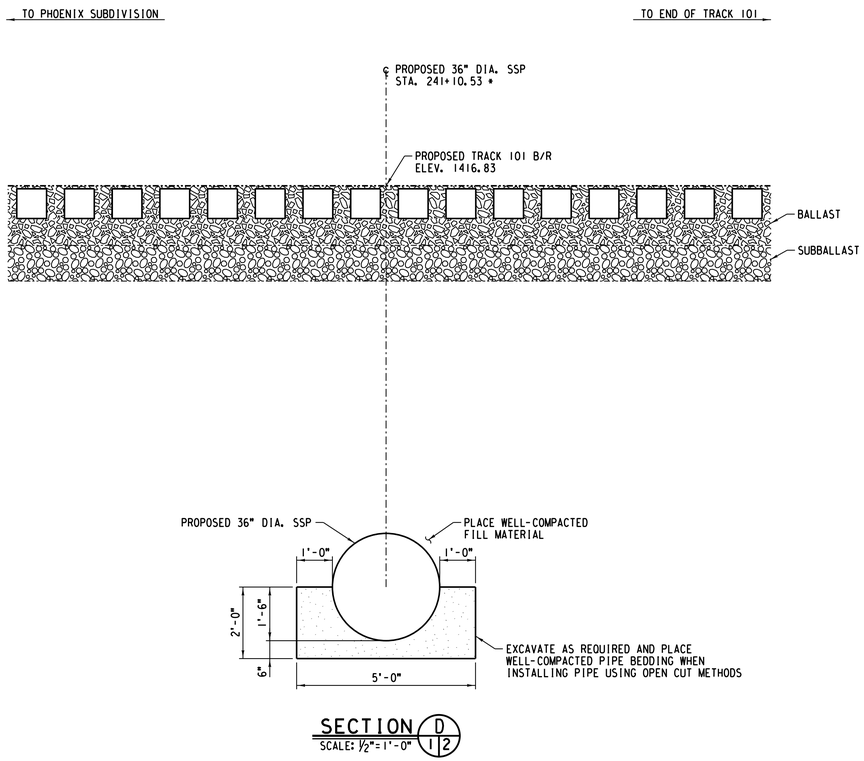
FURNISH & INSTALL
1-36" DIA. SSP x 141' AND SIPHON BOXES

SHEET TITLE: GENERAL ARRANGEMENT

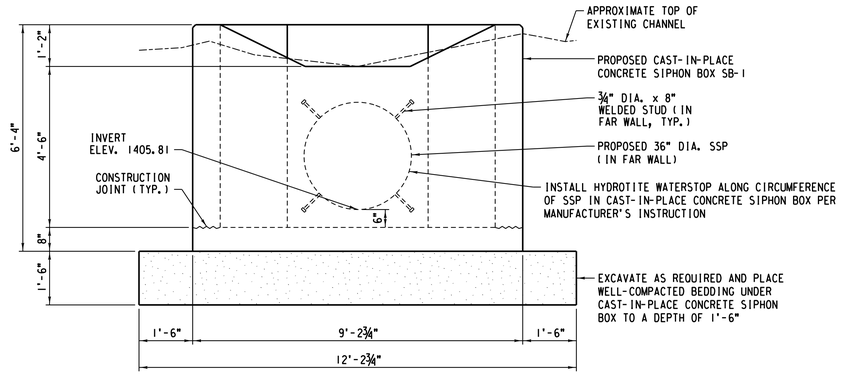
FILE NAME: \\oa.ad.oasconsulting.com\rfts-na1\projects\2020\0501-1000\020-0927\40-Design\Microstation\020-0927-RLBRA.dgn 4.57_5.ka. 241-10.00 Pirate Ind Lead 4.57_cadd.dgn

PLOTTED: 7/7/2023 12:48:00 PM

DESIGN SHEET

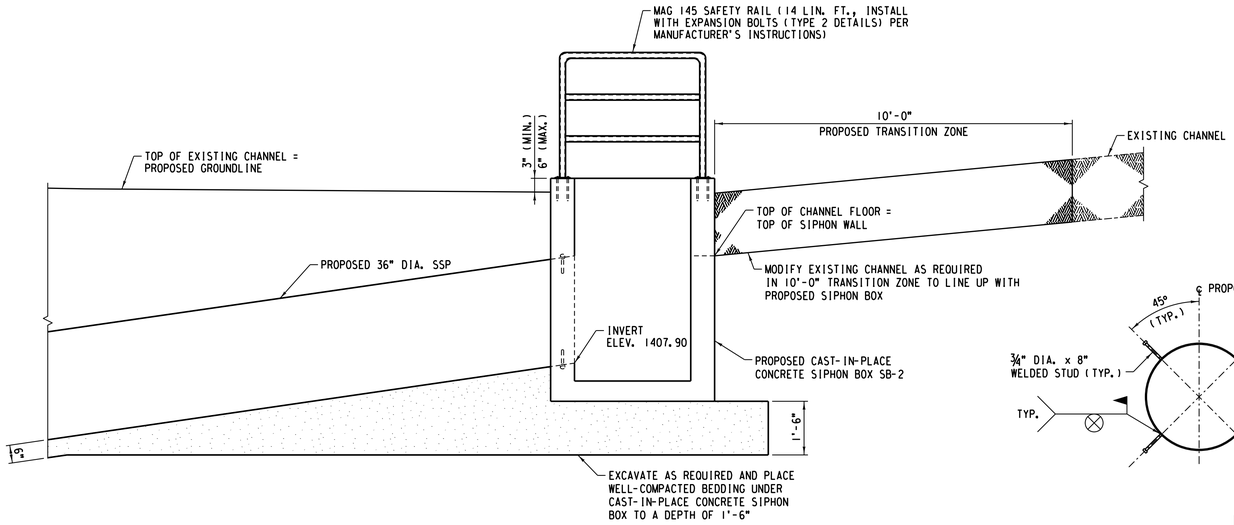


SECTION D
SCALE: ½"=1'-0"



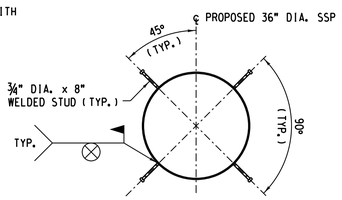
SECTION B
SCALE: ½"=1'-0"

NOTES:
1. PROPOSED MAG 145 SAFETY RAIL NOT SHOWN FOR CLARITY.
2. CONSTRUCTOR SHALL COORDINATE TEMPORARY OPEN CUT AND/OR SHORING WITH UPRR AND ARIZONA STATE LAND DEPARTMENT PRIOR TO CONSTRUCTION.



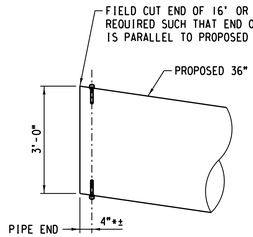
SECTION E
SCALE: ½"=1'-0"

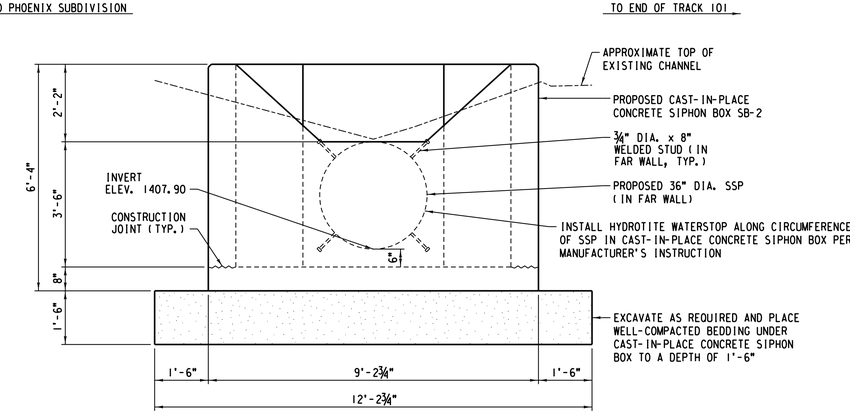
SIPHON BOX SB-2 SHOWN,
SIPHON BOX SB-1 SIMILAR



NOTES:
1. INSTALL STUDS AFTER PIPE IS IN PLACE.
2. * MINIMALLY ADJUST OFFSET FROM PIPE END AS REQUIRED SUCH THAT WELDED STUDS ARE CENTERED WITHIN THE PROPOSED HEADWALL. 3" (MIN.) CLEARANCE TO HEADWALL FACE (EACH WAY) SHALL BE MAINTAINED.
3. STUDS SHALL BE C1015, C1017 OR C1020 COLD DRAWN STEEL WHICH CONFORMS TO ASTM A108 SPECIFICATIONS.

ANCHOR LOCATION DETAIL
SCALE: ½"=1'-0"





SECTION C
SCALE: ½"=1'-0"

NOTES:
1. PROPOSED MAG 145 SAFETY RAIL NOT SHOWN FOR CLARITY.
2. CONSTRUCTOR SHALL COORDINATE TEMPORARY OPEN CUT AND/OR SHORING WITH UPRR AND ARIZONA STATE LAND DEPARTMENT PRIOR TO CONSTRUCTION.

NOTE:
* = STATIONING IS TAKEN AT CENTERLINE OF PROPOSED TRACK 101.

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL (STATUS) 07/05/2023 (DATE)

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
Kylie Stults
CONSULTANT ENGINEER 04/04/2023 DATE

Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 07-05-2023 ARIZONA U.S.A.

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123249

LATITUDE: 33.28824°N LONGITUDE: 111.60853°W

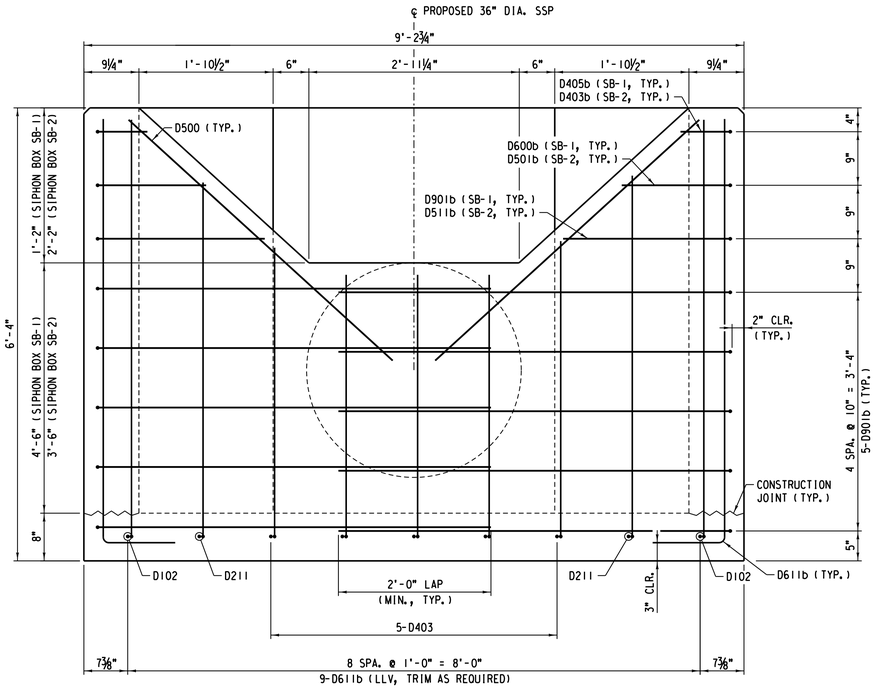
UNION PACIFIC

DSN/CHK BY: JAS/MJH	UNION PACIFIC RAILROAD
DRAWN/CHK BY: FAM/JAS	Office of Director Structures Design
UPRR ENGINEER: ADS	LOCATION & DESCRIPTION: CULVERT 4.57, PIRATE IND LEAD
SHT NO.: S2 of S4	FURNISH & INSTALL 1-36" DIA. SSP x 141' AND SIPHON BOXES
	SHEET TITLE: TYPICAL SECTIONS AND CONSTRUCTION DETAILS

FILE NAME: \\oa.ad.oaconsulting.com\fnts-mn\projects\2020\050\1000\020-0927.40-Design\Microstation\020-0927.RLBR.Culv 4.57.Sta. 241+10.00\Pirate Ind Lead.4.57_cadz.dgn

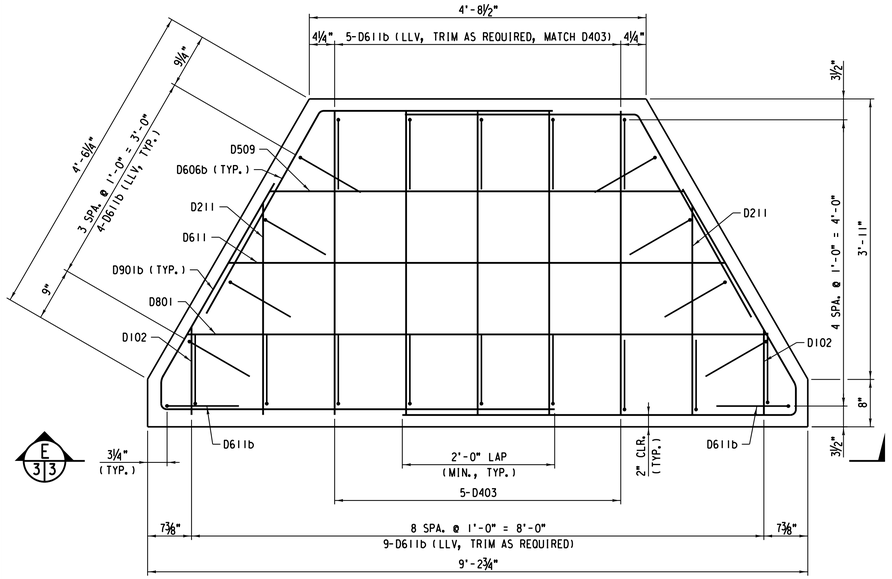
PLOTTED: 7/7/2023 12:48:00 PM

DESIGN SHEET

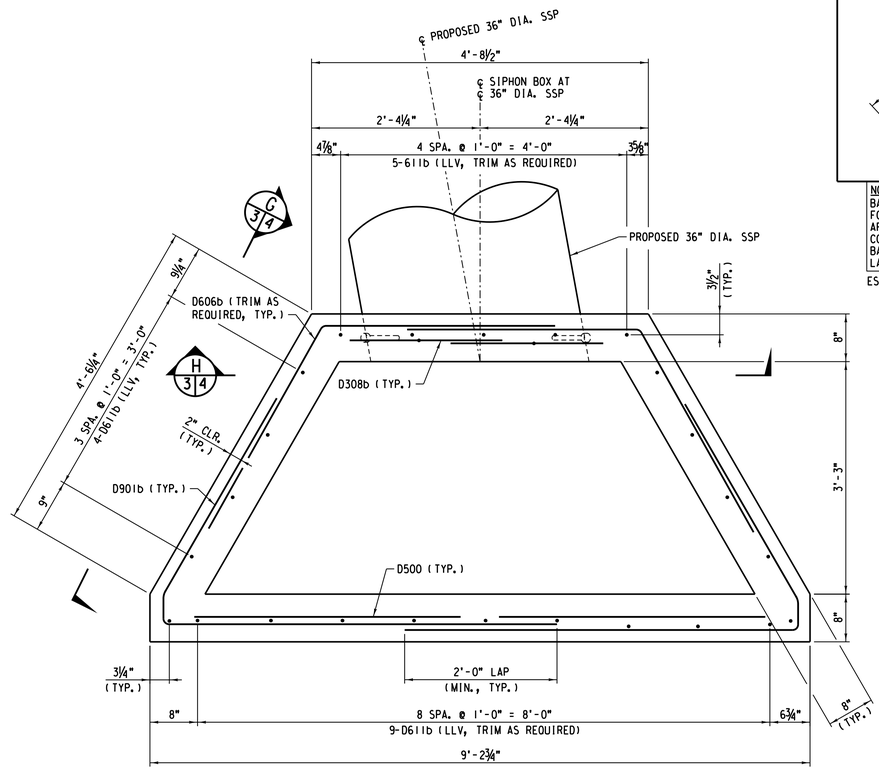


F 3|3

VIEW E 3|3
SCALE: 1"=1'-0"



REINFORCING PLAN AT APRON
SCALE: 1"=1'-0"



SECTION F 3|3
SCALE: 1"=1'-0"
SIPHON BOX SB-2 SHOWN,
SIPHON BOX SB-1 SIMILAR

CONCRETE PLACEMENT QUANTITIES
(PER SIPHON BOX SB-1)

ITEM	UNIT	QTY.
BOTTOM SLAB	CU. YD.	0.9
WALLS	CU. YD.	3.0

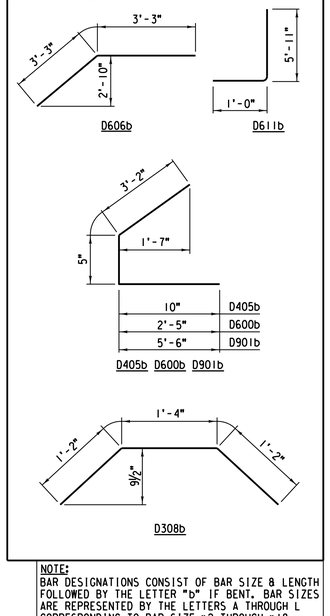
CONCRETE PLACEMENT QUANTITIES
(PER SIPHON BOX SB-2)

ITEM	UNIT	QTY.
BOTTOM SLAB	CU. YD.	0.9
WALLS	CU. YD.	2.8

REINFORCING SCHEDULE
(QUANTITY PER SIPHON BOX SB-1)

TOTAL	MARK	SIZE	LENGTH	SHAPE
2	D102	#5	1'-2"	—
2	D211	#5	2'-11"	—
4	D308b	#5	3'-8"	⌒
5	D403	#5	4'-3"	—
2	D405b	#5	4'-5"	∠
2	D500	#5	5'-0"	—
1	D509	#5	5'-9"	—
2	D600b	#5	6'-0"	∠
16	D606b	#5	6'-6"	∠
1	D611	#5	6'-11"	—
24	D611b	#5	6'-11"	⌊
1	D801	#5	8'-1"	—
12	D901b	#5	9'-1"	∠

BENDING DIAGRAM
(DIMENSIONS ARE OUT TO OUT)



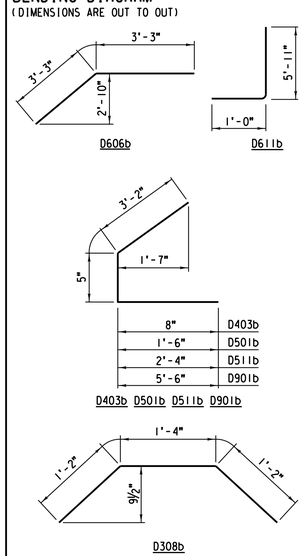
NOTE:
BAR DESIGNATIONS CONSIST OF BAR SIZE & LENGTH FOLLOWED BY THE LETTER "b" IF BENT. BAR SIZES ARE REPRESENTED BY THE LETTERS A THROUGH L CORRESPONDING TO BAR SIZE #2 THROUGH #18. BAR LENGTHS ARE GIVEN IN FEET AND INCHES; THE LAST TWO DIGITS ARE INCHES.

EST. WT. OF REINFORCING STEEL = 500 LB.

REINFORCING SCHEDULE
(QUANTITY PER SIPHON BOX SB-2)

TOTAL	MARK	SIZE	LENGTH	SHAPE
2	D102	#5	1'-2"	—
2	D211	#5	2'-11"	—
4	D308b	#5	3'-8"	⌒
5	D403	#5	4'-3"	—
2	D403b	#5	4'-3"	∠
2	D500	#5	5'-0"	—
2	D501b	#5	5'-1"	∠
1	D509	#5	5'-9"	—
2	D511b	#5	5'-11"	∠
16	D606b	#5	6'-6"	∠
1	D611	#5	6'-11"	—
24	D611b	#5	6'-11"	⌊
1	D801	#5	8'-1"	—
10	D901b	#5	9'-1"	∠

BENDING DIAGRAM
(DIMENSIONS ARE OUT TO OUT)



NOTE:
BAR DESIGNATIONS CONSIST OF BAR SIZE & LENGTH FOLLOWED BY THE LETTER "b" IF BENT. BAR SIZES ARE REPRESENTED BY THE LETTERS A THROUGH L CORRESPONDING TO BAR SIZE #2 THROUGH #18. BAR LENGTHS ARE GIVEN IN FEET AND INCHES; THE LAST TWO DIGITS ARE INCHES.

EST. WT. OF REINFORCING STEEL = 490 LB.

NOTES:
1. CONSTRUCTOR SHALL MINIMALLY ADJUST REINFORCING LOCATIONS AS REQUIRED TO ACCOMMODATE INSTALLATION OF SAFETY RAIL EXPANSION ANCHORS.
2. LLV = LONG LEG VERTICAL

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL — STATUS
07/05/2023 — DATE

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 07-05-2023 ARIZONA U.S.A.

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
CONSULTANT ENGINEER — 04/04/2023 DATE

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123249

LATITUDE: 33.28824°N LONGITUDE: 111.60853°W

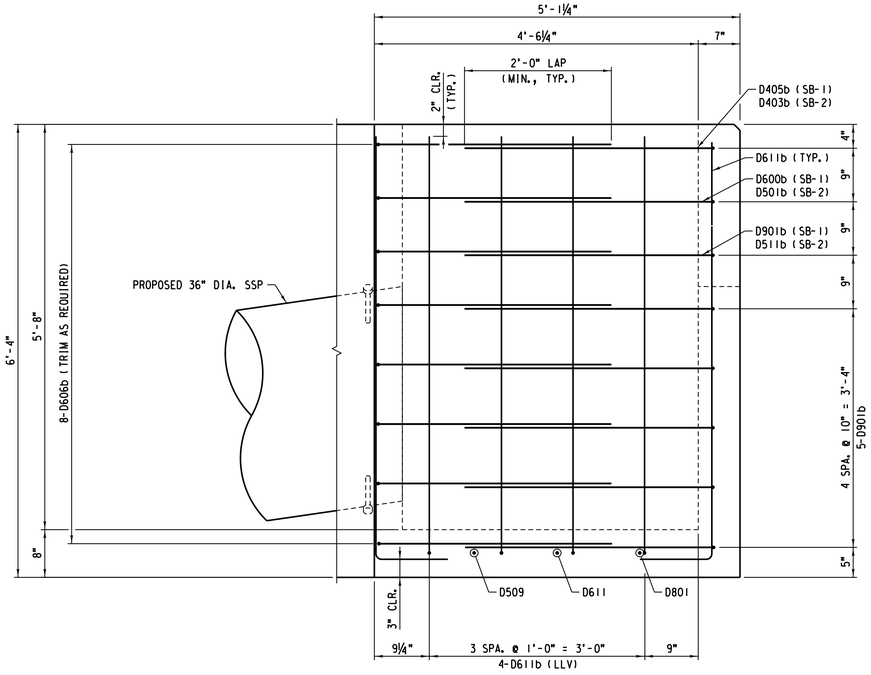
UNION PACIFIC

DSN/CHK BY: JAS/MJH	**UNION PACIFIC RAILROAD**
DRAWN/CHK BY: FAM/JAS	Office of Director Structures Design
UPRR ENGINEER: ADS	LOCATION & DESCRIPTION: CULVERT 4.57, PIRATE IND LEAD
SHT NO.: S3 of S4	FURNISH & INSTALL 1-36" DIA. SSP x 141' AND SIPHON BOXES
	SHEET TITLE: CAST-IN-PLACE CONCRETE SIPHON BOX DETAILS (SHEET 1 OF 2)

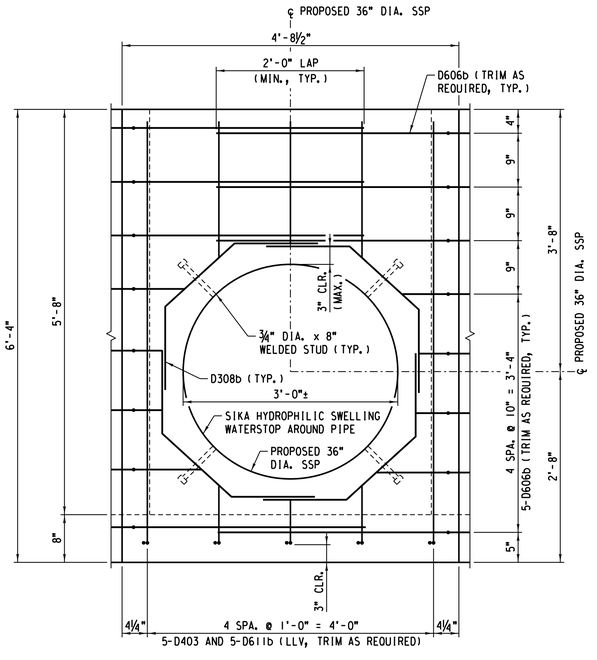
FILE NAME: \\oa.aecomnet.com\fnts-na\Projects\2020\0501-1000\020-0927\40-Design\Microstation\020-0927-RLBRA.dlv 4.57.Sta. 241-10.00.Pirate Ind Lead 4.57.caz.dgn

PLOTTED: 7/7/2023 12:48:00 PM

DESIGN SHEET



VIEW G
SCALE: 1"=1'-0" 3|4



SECTION H
SCALE: 1"=1'-0" 3|4

NOTES:
1. CONSTRUCTOR SHALL MINIMALLY ADJUST REINFORCING LOCATIONS AS REQUIRED TO ACCOMMODATE INSTALLATION OF SAFETY RAIL EXPANSION ANCHORS.
2. LLV = LONG LEG VERTICAL

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL (STATUS) 07/05/2023 (DATE)

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
Kyle Stubs 04/04/2023
CONSULTANT ENGINEER DATE

Registered Professional Engineer (Cert)
CERTIFICATE NO.
75691
MARK J. HANIGAN
Date Signed 07-05-2023
ARIZONA U.S.A.

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123249

LATITUDE: 33.28824°N LONGITUDE: 111.60853°W

UNION PACIFIC

DSN/CHK BY: JAS/MJH
DRAWN/CHK BY: FAM/JAS
UPRR ENGINEER: ADS
SHT NO.: S4 of S4

UNION PACIFIC RAILROAD
Office of Director Structures Design

LOCATION & DESCRIPTION: CULVERT 4.57, PIRATE IND LEAD

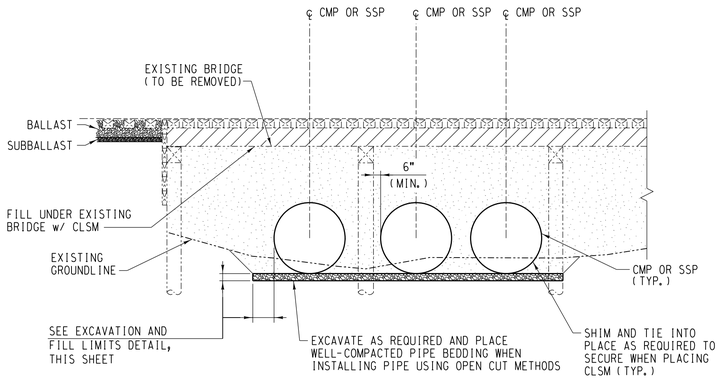
FURNISH & INSTALL
1-36" DIA. SSP x 141' AND SIPHON BOXES

SHEET TITLE: CAST-IN-PLACE CONCRETE SIPHON BOX DETAILS (SHEET 2 OF 2)

PLOTTED: 7/7/2023 12:48:01 PM

FILE NAME: \\oa.ad.oaconsulting.com\fnts-na1\projects\2220\050\11000\020\0927.40\Design\Microstation\020-0927-RLSPA Culv 4.57-Sta. 241+10.00 Pirate Ind Lead 4.57_csz.dgn

STANDARD SHEET

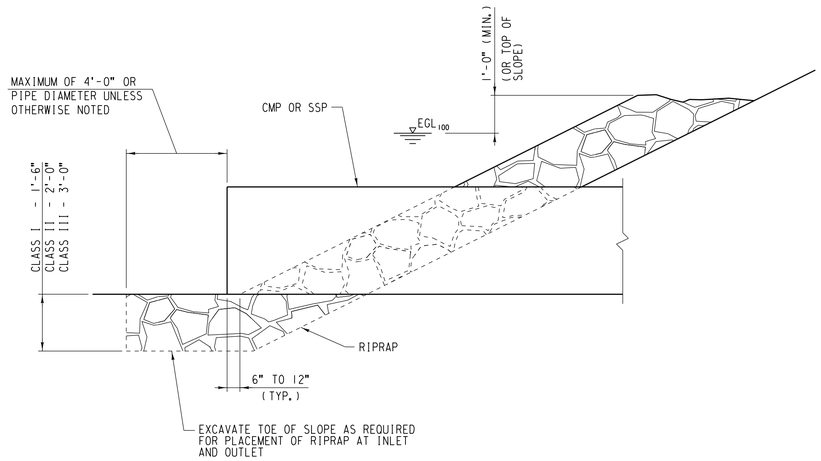


UNDER STRUCTURE - SECTION

SCALE: 3/16"=1'-0"

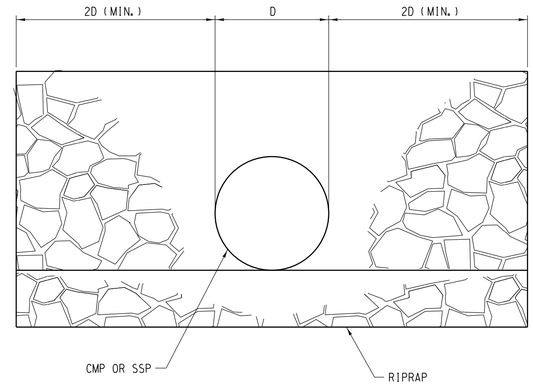
LIMITS OF REMOVAL

REMOVE EXISTING STRUCTURE TO 1'-0" (MIN.) BELOW PROPOSED EMBANKMENT SLOPE AND 2'-6" (MIN.) BELOW BASE OF RAIL.



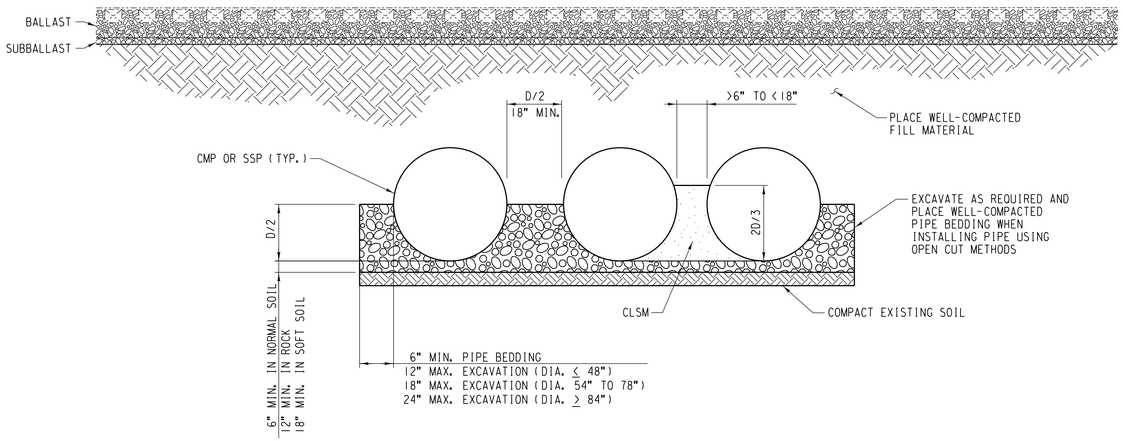
RIPRAP - SECTION

SCALE: NONE



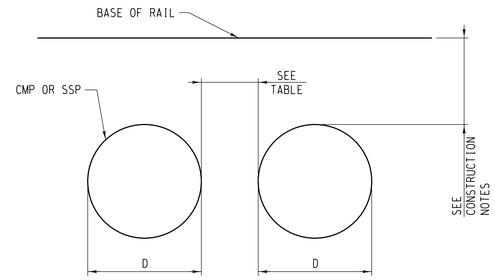
RIPRAP - ELEVATION

SCALE: NONE



EXCAVATION AND FILL LIMITS

SCALE: NONE



SPACING CHART	
PIPE DIAMETER	MIN. SPACING BETWEEN PIPES
12" to 24"	12"
24" to 96"	D/2
96" OR MORE	48"

MINIMUM PIPE SPACING AND COVER

SCALE: NONE

REVISIONS		
DATE	LTR.	DESCRIPTION
02/12	A	ADDED RIPRAP SECTION
04/19	D	UPDATED DETAILS
/		
/		
/		
/		

DESIGN BY: CLJ | DRAWN BY: KDM | CHECKED BY: CLJ

APPROVED:

George J. Meyn 4/4/08

UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

DETAILS FOR ROUND STEEL PIPE CULVERTS

FILE OWNER: UPRR | DATE:

PLAN NO.: 680000 | SHEET: 2 OF 3

Copyright © 2007 by Union Pacific Railroad PLOTTED: 8/12/2021 10:04:26 AM

FILE NAME: P:\Standards\Culverts (CMP&SSP)\0-Active\steelpip_std.dgn

STANDARD SHEET

GENERAL NOTES

GENERAL

1. All work requirements shown on these drawings and not otherwise detailed shall be accomplished as specified in Union Pacific Railroad (UPRR) Specifications and the American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual for Railway Engineering. In the event of conflicts between specifications, the more restrictive shall apply.

2. **Construction means and methods shall comply with the All Permits Issued (API) package.**

3. Field verify all dimensions, stations and elevations prior to start of construction.

4. **Contact the Union Pacific "Call Before You Dig" number 90 days (not less than 60 days) prior to proposed construction start date. Prior to construction, confirm that all necessary relocations have been completed. The CBYD number is: 1-800-336-9193.**

5. **Location of known utilities is approximate. Location shall be verified prior to construction. Notify Call811 "Call Before you Dig" number at least 48 hours prior to construction.**

GRADING

1. Provide and place all fill and subballast material per UPRR Grading Specifications. Perform grading as required to drain and match existing embankments and upstream and downstream channel flowline.

2. Perform grading as required for construction of the new structure and replace areas removed and disturbed in the course of construction to a condition equal to or better than existing.

WELL COMPACTED FILL

1. Well compacted fill shall be well graded granular soil free of any organic material, stones larger than 1½ inches, frozen lumps, debris or excessive moisture. Fill shall be compacted to 95% of maximum dry density as defined in ASTM International D1557 (Modified Proctor). Fill shall be placed and compacted in layers not to exceed 6 inches. Fill shall be placed simultaneously on both sides of the pipe and between multiple pipes. CLSM may be used in lieu of well compacted fill.

CONTROLLED LOW-STRENGTH MATERIAL (CLSM) FILL

1. Controlled Low-Strength Material is a self-compacting, cementitious fill material with an unconfined compressive strength of 50 to 300 psi. The mixture shall consist of water, Portland cement, fly ash, and sound fine or coarse aggregate or both. The mix design shall allow adequate flowability without segregation of aggregates. Hardening time is of prime importance and CLSM should develop 50 psi in about one hour. The maximum layer of thickness for CLSM shall be 3 feet. Additional layers shall not be placed until the CLSM has lost sufficient moisture to be walked on without indenting more than two inches. Pipe spacing may be reduced to between 6" and 18" when using CLSM in lieu of well compacted pipe bedding between pipes.

PIPE BEDDING

1. Pipe bedding shall be granular material such as aggregates ordinarily specified and used in the construction of highway base and subbase. These aggregates include crushed stone, natural or crushed gravel, natural or manufactured sands, crushed slag or a homogeneous mixture of these materials. Pipe bedding shall be compacted to 95% of maximum dry density as defined in ASTM International D1557 (Modified Proctor). Recommended gradation is as follows:

SCREEN SIZE	% PASSING (BY WEIGHT)
1 inch	100
½ inch	60-90
⅜ inch	20-40
No. 4	10-20
No. 200	less than 5%

2. Union Pacific sealant ballast, item no. 562-5428, may be used.

RIPRAP:

1. Class of riprap shall be specified by the engineer. Riprap shall be placed in such a manner as to avoid segregation of various sizes of rock, and distributed so that there will be no large accumulation of either the larger or smaller sizes of stone. Individual rocks shall be placed in tight contact with one another in such a way to produce the least amount of void spaces. Riprap shall be solid, unfractured rock or concrete, bulky in shape with sharp angular edges.

2. Individual rocks shall vary as shown:

RIPRAP CLASS	AVERAGE WEIGHT PER STONE (LBS.)	DIMENSION (INCHES)	ITEM NO.	UNIT OF MEASURE	LAYER THICKNESS	TYPICAL VELOCITIES
I	50 to 200	9 to 14	562-2764	Ton	1'-6"	6 - 8 fps
II	200 to 1,000	14 to 24	562-3430	Ton	2'-0"	8 - 12 fps
III	1,000 to 4,000	24 to 38	562-4096	Ton	3'-0"	> 12 fps

3. The entire mass of riprap shall be well distributed within the limits specified. However, the following allowances shall be acceptable to produce the required riprap protection:

   Riprap Class I - No allowances are permitted
   Riprap Class II - 15% of Riprap Class I.
   Riprap Class III - 15% of Riprap Class I and 15% of Riprap Class II.

CONSTRUCTOR NOTES (WHEN APPLICABLE)

CONSTRUCTOR DEFINITION

1. Constructor designates Manager Bridge Construction if construction by UPRR and Contractor if construction by Contractor.

DIVISION OF RESPONSIBILITY

A. RAILROAD

1. Provide material as shown in the Bill of Material.

2. Provide and install Private Property/No Trespassing sign and culvert marker sign on right side at low mile post end of culvert.

B. CONSTRUCTOR

1. Coordinate all construction activities with the Railroad.

2. **Before ordering any material, Constructor shall make a detailed field inspection of the site verifying all pertinent dimensions and elevations. Any variations in dimensions or elevations from those shown on the drawings shall be reported immediately to the UPRR Project Manager.**

3. Any modifications to this design shall be approved by the UPRR Office of Director Structures Design prior to construction.

4. **Verify the location, relocation, abandonment, and/or temporary support of all utilities affected by the construction of the structure and embankment and coordinate these activities with the appropriate utility companies, agencies and/or authorities.**

5. Apply for and obtain all construction permits necessary to perform the work.

6. Bill of Material and Schedules are provided for information only. Constructor shall be responsible for providing all material, not provided by the Railroad, required to complete the work.

7. Perform all work not performed by the Railroad.

8. Provide the Railroad with a detailed construction plan defining the activity, schedule and procedure for each aspect of the work. Construction shall not begin until the construction plan has been approved by the Railroad.

9. Provide all temporary structures (shoring, bracing and/or falsework) required to support and protect the existing embankments and structures affected by the work. Provide the Railroad with details, design and procedure for all temporary structures. All temporary structures shall be designed, signed and sealed by a professional engineer registered in the State that the structure is to be constructed. All temporary structures shall be approved by the UPRR Office of Director Structures Design prior to beginning construction.

10. Direct channel flow as required to perform work.

11. Accomplish activities within the schedule specified in the approved construction plan.

REVISIONS		
DATE	LTR.	DESCRIPTION
02/12	A	RELOCATED GENERAL NOTES
6/13	B	CHANGED FILL REQUIREMENTS
7/14	C	CHANGED FILL REQUIREMENTS
04/19	D	UPDATED NOTES
/		
/		

DESIGN BY: CLJ | DRAWN BY: KDM | CHECKED BY: CLJ

APPROVED:

George J. Meyn 4/4/08

UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

GENERAL NOTES FOR ROUND STEEL PIPE CULVERTS

FILE OWNER: UPRR | DATE:

PLAN NO.: 680000 | SHEET: 3 OF 3

FILE NAME: P:\!Standards\Culverts (CMP&SSP)\0-Active\steelpip_std.dgn

Copyright © 2007 by Union Pacific Railroad PLOTTED: 8/12/2021 10:04:39 AM

STANDARD SHEET

TABLE 1 - SMOOTH STEEL PIPE																								
OUTSIDE PIPE DIAMETER	THICKNESS (IN.)	WEIGHT (LB./FT.)	COVER * MIN. (FT.)	COVER * MAX. (FT.)	10'-0" LENGTH ITEM NO.	10'-0" LENGTH WEIGHT (LB.)	12'-0" LENGTH ITEM NO.	12'-0" LENGTH WEIGHT (LB.)	14'-0" LENGTH ITEM NO.	14'-0" LENGTH WEIGHT (LB.)	16'-0" LENGTH ITEM NO.	16'-0" LENGTH WEIGHT (LB.)	18'-0" LENGTH ITEM NO.	18'-0" LENGTH WEIGHT (LB.)	20'-0" LENGTH ITEM NO.	20'-0" LENGTH WEIGHT (LB.)	22'-0" LENGTH ITEM NO.	22'-0" LENGTH WEIGHT (LB.)	24'-0" LENGTH ITEM NO.	24'-0" LENGTH WEIGHT (LB.)	30'-0" LENGTH ITEM NO.	30'-0" LENGTH WEIGHT (LB.)	40'-0" LENGTH ITEM NO.	40'-0" LENGTH WEIGHT (LB.)	STORE ITEMS PER L.F.
36"	3/8	190	1'-6"	18'-0"	510-3000	1,900	510-3001	2,280	510-3002	2,660	510-3003	3,040	510-3004	3,420	510-3006	3,800	510-3007	4,180	510-3008	4,560	510-3009	5,700	510-3010	7,600	510-3285
42"	1/2	222	1'-6"	18'-0"	510-3011	2,280	510-3012	2,664	510-3013	3,108	510-3014	3,552	510-3015	3,996	510-3016	4,440	510-3017	4,884	510-3018	5,328	510-3019	6,660	510-3020	8,880	-
48"	5/8	317	1'-6"	18'-0"	510-3021	3,170	510-3022	3,804	510-3024	4,438	510-3025	5,072	510-3026	5,706	510-3027	6,340	510-3028	6,974	510-3029	7,608	510-3030	9,510	510-3031	12,680	510-3293
60"	3/4	475	1'-6"	18'-0"	510-3032	4,750	510-3033	5,700	510-3034	6,650	510-3035	7,600	510-3036	8,550	510-3037	9,500	510-3038	10,450	510-3040	11,400	510-3041	14,250	510-3042	19,000	510-9526
72"	7/8	667	1'-6"	18'-0"	510-3044	6,670	510-3050	8,004	510-3051	9,338	510-3052	10,672	510-3053	12,006	510-3054	13,340	510-3056	14,674	510-3057	16,008	510-3058	20,010	510-3043	26,680	510-3305
84"	1	888	1'-6"	18'-0"	510-3059	8,880	510-3060	10,656	510-3061	12,432	510-3062	14,208	510-3063	15,984	510-3064	17,760	510-3070	19,536	510-3071	21,312	510-3072	26,640	510-3080	35,520	510-3310
96"	1 1/4	1,267	1'-6"	18'-0"	510-3090	12,670	510-3094	15,204	510-3095	17,738	510-3096	20,272	510-3097	22,806	510-3098	25,340	510-3099	27,874	510-3106	30,408	510-3107	38,010	510-3108	50,680	510-3315

* COVER TO BE MEASURED FROM BASE OF RAIL TO TOP OF PIPE

SMOOTH STEEL PIPE (SSP) CONSTRUCTION NOTES

GENERAL:

SSP structures are designed for Cooper E80 Live Load with impact, and cover as shown in Table 3.

Table 3 indicates the minimum required thickness.

INSTALLATION:

Installation of Smooth Steel Pipe (SSP) shall conform to the current American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual for Railway Engineering, Chapter 1, Part 4. Culvert lengths are to be based on existing mainline roadbed sections.

JACKING:

Where indicated, pipe to be bored and jacked into place. Bore hole diameter shall be essentially the same as the outside diameter of the pipe. If voids should develop or if the bored hole diameter is greater than the outside diameter of the pipe by more than 1 inch, notify the Office of Director structures Design. Boring operations shall not be stopped if such a stoppage would be detrimental to the railroad. A survey crew shall continually monitor the elevation and alignment of the railroad track(s) above during the jacking procedures. If track movement or loss of ballast exceeds 1/4 inch during jacking or boring operations, all work must stop and the Railroad must be notified. The Railroad may take any action necessary to ensure safe passage of train. The contractor must immediately submit a corrective plan of action to the Railroad for review and approval. The Railroad must review and approve the proposed repair procedure. The finished repair must be inspected and accepted by the Railroad before the track can be placed back into service, and construction is allowed to proceed.

BORED AND JACKED TOLERANCE:

The permitted tolerance of a true line for pipe positioning is +/- 2". Adjustment to the line and level should be gradual to ensure that the pipe manufacturer's stated angular deflection is not exceeded at any joint.

FIELD WELDING:

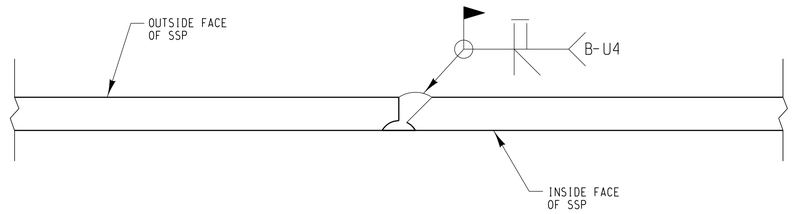
Welders shall posses valid qualifications.
All welding per AWS D1.1, Structural Welding Code.

MATERIALS:

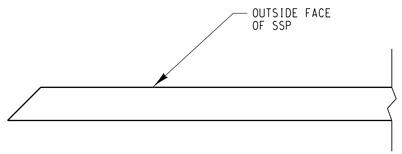
ASTM A139, Grade B, FY = 35 ksi
or
ASTM A252, Grade 3, FY = 45 ksi

Smooth steel pipe shall have a welded straight longitudinal seam. Spiral seam is acceptable if 25% of weld is ultrasonically tested in addition to required tensile tests of weld. A hydrostatic test is not required.

The ends of each section of pipe shall be square cut. One end shall be suitably beveled for field welding sections together.



PIPE END WELD DETAIL



PIPE END BEVEL DETAIL

REVISIONS		
DATE	LTR.	DESCRIPTION
11/16	A	CHANGED NOTES AND TABLE 1
04/19	B	UPDATED NOTES
10/21	C	UPDATED NOTES & ADD ITEM NUMBERS
/		
/		
/		

DESIGN BY: CLJ | DRAWN BY: KDM | CHECKED BY: CLJ

APPROVED:

George J. Meyn 4/4/08
UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

CONSTRUCTION NOTES AND TABLE FOR SMOOTH STEEL PIPE CULVERTS

FILE OWNER: UPRR | DATE:
PLAN NO.: 680010 | SHEET: 1 OF 1

Copyright © 2007 by Union Pacific Railroad PLOTTED: 10/14/2021 3:41:08 PM

FILE NAME: \\upcorp.ad.uprr.com\engcad\bridge\Standards\Culverts (CMP and SSP)\0-Active\steelpip_std.dgn

STANDARD SHEET

PRECAST CONCRETE NOTES:

CONCRETE:

1. All concrete materials, placement and workmanship shall be in accordance with Part 1, Chapter 8 of the current AREMA Manual for Railway Engineering.
2. Minimum compressive strength - 4000 Lb. per square inch at 28 days.
3. Exposed surfaces shall be formed in a manner which will produce a smooth and uniform appearance without rubbing or plastering. Exposed edges of 90 degrees or less are to be chamfered ¾" x ¾". Top surface to have a smooth finish, free of all float or trowel marks.
4. Concrete shall be proportioned such that the water - cement ratio (by weight) does not exceed 0.45. Concrete must contain a minimum of 6½ sacks of cement per cubic yard of concrete. Flyash replacement may account for up to 25% of the cement.
5. Cement shall be Type I, Type II or Type III Portland Cement in accordance with ASTM C150 specifications.
6. Aggregates shall be graded in accordance with ASTM C33 specifications. Coarse aggregate shall be no. 67. Fine aggregate shall be natural sand.
7. Air content shall be between 5% and 7% (by volume).
8. Admixtures shall not be used without approval by Engineer.
9. Curing shall be accomplished by wet curing or the application of a Type 2 membrane.
10. The fabricator shall stencil the item name, date manufactured, name of manufacturer and actual lifting weight at location shown.
11. Production procedures for the manufacture of precast members shall be in accordance with the AREMA Manual for Railway Engineering and the Precast/Prestressed Concrete Institute's Manual MNL 116 for Quality Control.
12. Dimensional tolerances governing the manufacture of precast members shall conform to Division VI, Section 6.4 of the Precast/Prestressed Concrete Institute's Manual MNL 116 for Quality Control. Tolerance for location of lifting devices shall be ±½".
13. The fabricator will be responsible for loading and properly securing all precast concrete members for shipment. All concrete components shall be made available for inspection by the Railroad at the fabricator's plant prior to shipment, at the Railroad's discretion.

REINFORCING STEEL:

1. Reinforcing steel shall be deformed, new billet bars per current ASTM A615 Specifications and to meet grade 60 requirements.
2. Fabrication of reinforcing steel shall be per Chapter 7 of the CRSI Manual of standard practice. Dimensions of bending details are out to out of bar.
3. Reinforcing steel is to be blocked to proper location and securely wired against displacement. Tie wires shall be installed at every other bar intersection so that at least 50% of the intersections are tied. Tack welding of reinforcing is prohibited. Minimum concrete cover on reinforcement not otherwise noted shall meet current AREMA Manual for Railway Engineering requirements.

EMBEDDED STEEL:

1. Steel plate shall conform to ASTM A36 OR A709-Grade 36 Specifications. Studs shall be C1015, C1017 or C1020 cold drawn steel which conform to ASTM A108 Specifications.
2. Deformed bar anchors shall conform to ASTM A706 specifications. Welding of deformed bar anchors shall conform to AWS D1.4. Welding shall be performed by certified welder.
3. Where galvanizing is not indicated, material shall be plain.

LIFTING ANCHORS:

1. Swift lift anchors shall be Dayton Superior P-52 anchors or approved alternate with a minimum safe working load sufficient for the weight of the precast element including form removal. The safe working load shall provide a minimum safety factor of 4.

MISCELLANEOUS HARDWARE:

1. 8" T-Bar Anchors as manufactured by Meadow Burke Company, or approved alternate.

BEARING PAD SPECIFICATIONS:

1. Bearing pads shall be Random Oriented Fiber elastomeric material comprised of high-quality ozone-resistant virgin elastomer and synthetic fibers. Pads shall conform to the following minimum material properties:

Hardness (Shore A, ASTM D2240)	80 ± 5
Tensile Strength, psi (ASTM D412, Die C)	1000 ± 100
Ultimate Elongation, minimum %	40
Heat Aging (ASTM D573, 70 Hrs. @ noted temperature):	
Durometer, 212 °F, maximum point change	± 10
Tensile Strength, 158 °F, maximum % change	± 25
Ultimate Elongation, 212 °F, maximum % change	± 25
Compression, minimum ultimate strength, psi	8000
Apparent Shear Modulus (GA), psi, based on tests conducted at 70 °F to 80 °F under uniform compressive stresses of 500, 1000, and 1500 psi and at applied horizontal shear plus slip strain of 50%. GA is constant in all directions parallel to the bearing plane.	230 ± 30

2. Bearing pads shall be Voss Engineering, Inc., "Fiberlast" expansion bearing pads or approved equal.
3. Cutting of the pads shall be done so that the edges have no tears or other jagged areas.
4. Permissible tolerances of the pad shall be as stated in Chapter 15, Section 5.12.6 of the 2019 AREMA Manual for Railway Engineering.
5. The cap fabricator shall fasten the bearing pads to the cap by using the following procedure: clean pads according to manufacturer's recommendations; prime contact surface and glue to cap with Sikadur 31 Hi-Mod Gel (1:1 mix ratio) or approved equal.

MISCELLANEOUS STEEL NOTES:

1. Materials, fabrication, workmanship and erection per the current AREMA Manual for Railway Engineering, Chapter 15, Steel Structures.
2. Material shall conform to the following requirements:

Rolled Shapes & Plates	ASTM A36
Pipe	ASTM A53 Gr. B
Bolts	ASTM A307 Gr. A
Elastic Locknut	MIL-DTL-32258
Steel Washer	ASTM F436

3. Grating panels and fasteners shall conform to the following requirements:

Grating Fasteners:	
Saddle Clips	F-10 Galvanized Saddle Clips
Socket Cap Screws	SAE J429, Gr. 8, Zinc Coated
Elastic Locknut	MIL-DTL-32258
Steel Washer	ASTM F436
Nylon Washer	Nylon G16

Grating Panels:
Material shall comply with NAAMM Standard MBG 531-17
Size = W-19-4 (1¾ x 3/16 Serrated) Steel Galvanized.

4. Welding requirements:
   A. All welding shall be with the SAW, SMAW, or FCAW process.
   B. All welding per AWS D1.1, Structural Welding Code.
   C. Welders shall possess valid qualifications, including a Procedure Qualification Report (PQR) and Weld Procedure Specification (WPS) for each weld type to be performed as well as documentation verifying that they have performed the specific weld(s) within the prior six months.
5. Miscellaneous steel shall be plain unless noted otherwise.
6. Pieces or assemblies designated as galvanized shall be galvanized after fabrication in accordance with ASTM A123. After galvanizing, all elements shall be free of fins, abrasions, rough or sharp edges, and other surface defects.
7. Bolts and nuts to be zinc plated in accordance with ASTM A153 unless noted otherwise.

CAST-IN-PLACE CONCRETE NOTES:

CONCRETE:

1. All concrete materials, placement, workmanship and testing shall be in accordance with Part 1, Chapter 8 of the current AREMA Manual for Railway Engineering.
2. Minimum compressive strength at 28 days shall be as indicated on the design plans.
3. Exposed surfaces shall be formed in a manner which will produce a smooth and uniform appearance without rubbing or plastering. Exposed edges of 90 degrees or less are to be chamfered ¾" x ¾". Top surface to have a smooth finish, free of all float or trowel marks.
4. Concrete shall be proportioned as follows:

Concrete Strength:	3,000 psi	4,000 psi	5,000 psi	6,000 psi
Max. Water/Cement Ratio (by weight):	0.50	0.45	0.42	0.40
Min. Sacks of Cement per Cu. Yd.:	5.5	6.0	6.5	7.0

5. Flyash replacement may account for up to 25% of the cement by substitution.
6. Cement shall be Type I, Type II or Type III Portland Cement in accordance with ASTM C150 specifications.
7. Aggregates shall be graded in accordance with ASTM C33 specifications. Coarse aggregate shall be no. 67. Fine aggregate shall be natural sand.
8. Allowable air content shall be indicated on the design plans based on the following guidelines:

   Severe Exposure - 5% to 7%
   Exposed to wet freeze-thaw, de-icers, or other aggressive agents.

   Moderate Exposure - 4% to 7%
   Exposed to dry freeze-thaw and no de-icers or other aggresive agents.

   Mild Exposure - 3% to 5%
   Not exposed to freezing, de-icers or other aggressive agents.

9. Admixtures shall not be used without approval by Engineer. Where multiple admixtures are used, it is recommended that all admixtures be obtained from the same company.
10. Where exposed to air, curing shall be accomplished by wet curing or membrane curing compound. Membrane curing compound shall conform to ASTM C309, Type 2.
11. Do not use calcium chloride or any admixture containing intentionally added chloride ions. Testing for chloride ions is not required.
12. Apply a structural bonding agent to construction joints or when placing new concrete against existing concrete. Submit bonding agent to the Engineer for approval.

[Note 13 applies only when specifically stated in the Bill of Material descriptions.]
13. DCI-S, as manufactured by W.R. Grace, or approved alternate shall be added at a quantity of 5 gallons per cubic yard. Calcium nitrite solution shall contain 30% solids and shall provide 15.0 lbs. per cubic yard chloride protection. Mix shall also include 7%, by weight of cement, force 10,000 microsilllica slurry by W.R. Grace or approved addendum shall be used. Adjust weight of concrete mix water for weight of DCI-S used.

REINFORCING STEEL:

1. Reinforcing steel shall be deformed, new billet bars per current ASTM A615 Specifications and to meet grade 60 requirements.
2. Fabrication of reinforcing steel shall be per Chapter 7 of the CRSI Manual of standard practice. Dimensions of bending details are out to out of bar.
3. Reinforcing steel is to be blocked to proper location and securely wired against displacement. Tie wires shall be installed at every other bar intersection so that at least 50% of the intersections are tied. Tack welding of reinforcing is prohibited. Minimum concrete cover on reinforcement not otherwise noted shall meet current AREMA Manual for Railway Engineering requirements.

[Note 4 applies only when specifically stated in the Bill of Material descriptions.]
4. Reinforcing steel shall be epoxy coated per ASTM A775 specifications meeting Annex A1 for epoxy coating.

EMBEDDED STEEL:

1. Steel plate shall conform to ASTM A36 OR A709-Grade 36 Specifications. Studs shall be C1015, C1017 or C1020 cold drawn steel which conform to ASTM A108 Specifications.
2. Deformed bar anchors shall conform to ASTM A706 specifications. Welding of deformed bar anchors shall conform to AWS D1.4. Welding shall be performed by certified welder.
3. Where galvanizing is not indicated, material shall be plain.

REVISIONS			DESIGN BY: HDR	DRAWN BY: HDR	CHECKED BY: AJB
DATE	LTR.	DESCRIPTION	APPROVED:		
/					
/					
/					
/					
/					
/					

05-04-2020
UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

CONCRETE BEAM BRIDGES

PIECE FABRICATION NOTES

FILE OWNER: UPRR	DATE: APRIL, 2020
PLAN NO.: 531100	SHEET: T3

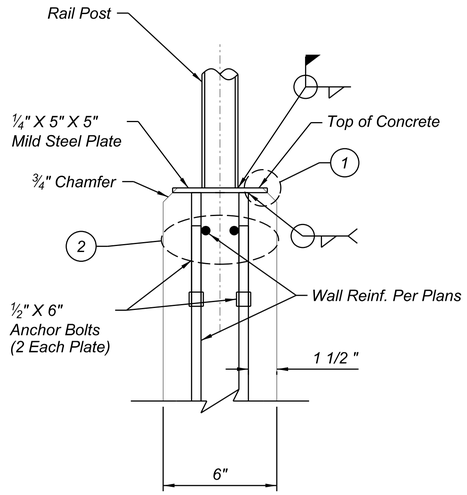
Copyright © 2020 by Union Pacific Railroad
PLOTTED: 5/26/2023 8:48:17 AM

FILE NAME: P:\Standards\0_Bridges (Concrete)\0-Active\531XX - Single Track - Deep Caps\Staging\531100 - Single Track Construction Drawings.dgn

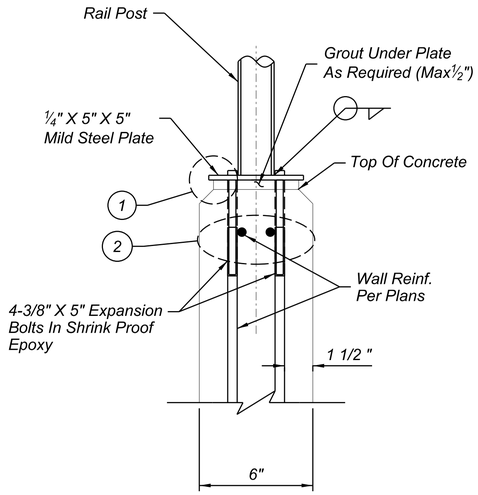
INCHES 1 2 3 4 5 6 7 8 9 10 11 12

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	AZ	X	XXX	XX	

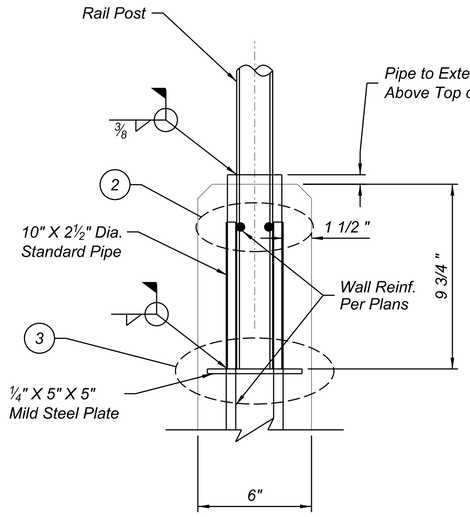
MAG DETAIL 145 EXISTING ISSUES



TYPE 1- (6" Wall)
Scale: 1"=0'-4"



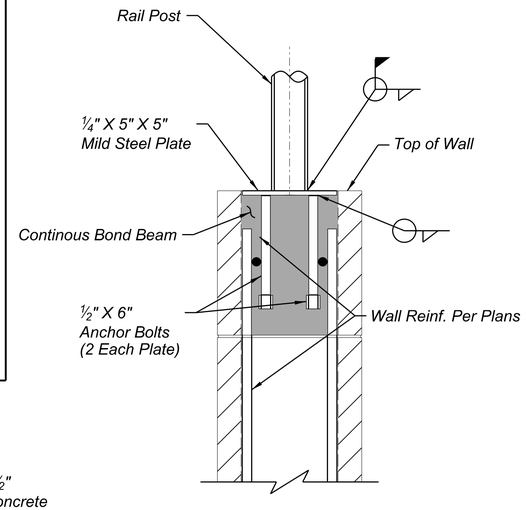
TYPE 2- (6" Wall)
Scale: 1"=0'-4"



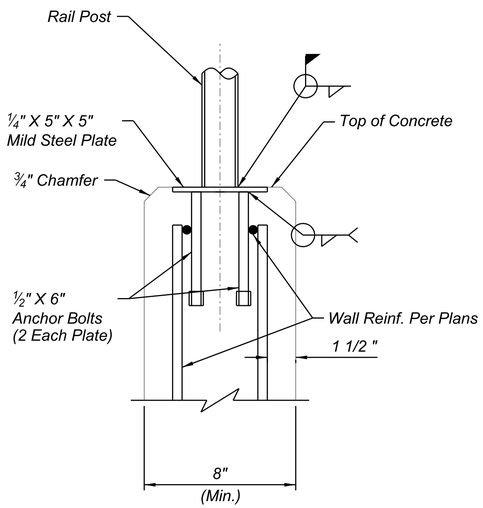
TYPE 3- (6" Wall)
Scale: 1"=0'-4"

STRUCTURAL PROBLEMS

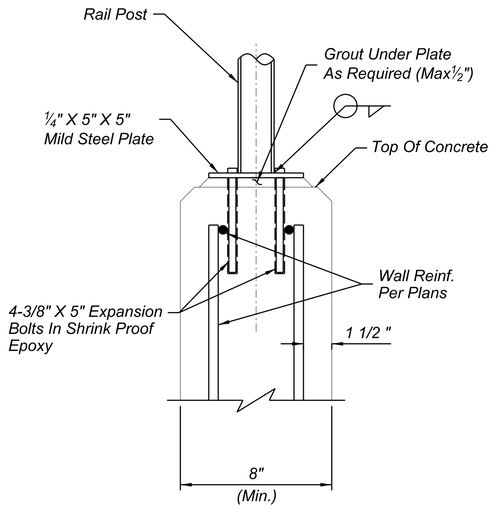
1. *STEEL PLATE CORNER EXPOSED*
2. *CONFLICTS WITH NOTE 6. "THE EMBEDMENT FOR ANCHOR TYPES 1,2, & 3 SHALL BE LOCATED INSIDE THE WALL REINFORCEMENT CAGE".*
3. *LESS THAN MINIMUM REQUIRED CONCRETE COVER.*



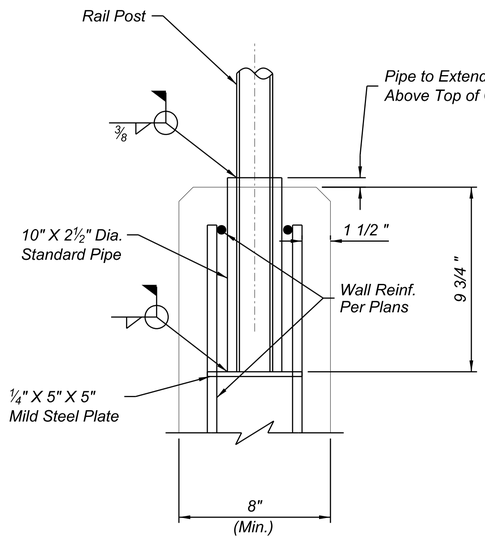
TYPE 5- (8" CMU Wall)
Scale: 1"=0'-4"



TYPE 1- (8" Wall)
Scale: 1"=0'-4"



TYPE 2- (8" Wall)
Scale: 1"=0'-4"



TYPE 3- (8" Wall)
Scale: 1"=0'-4"

MAG DETAIL 145 PROPOSED

NO.	REVISION	BY	DATE
3			
2			
1			

MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION

MAG DETAIL 145

		BY	DATE
PRELIMINARY NOT FOR CONSTRUCTION	DESIGNED	A.N. ENGINEER	XX/XX/XX
	DRAWN	A. TECHNICIAN	XX/XX/XX
	CHECKED	A.N. ENGINEER	XX/XX/XX

XXX

SHEET XXX OF XX

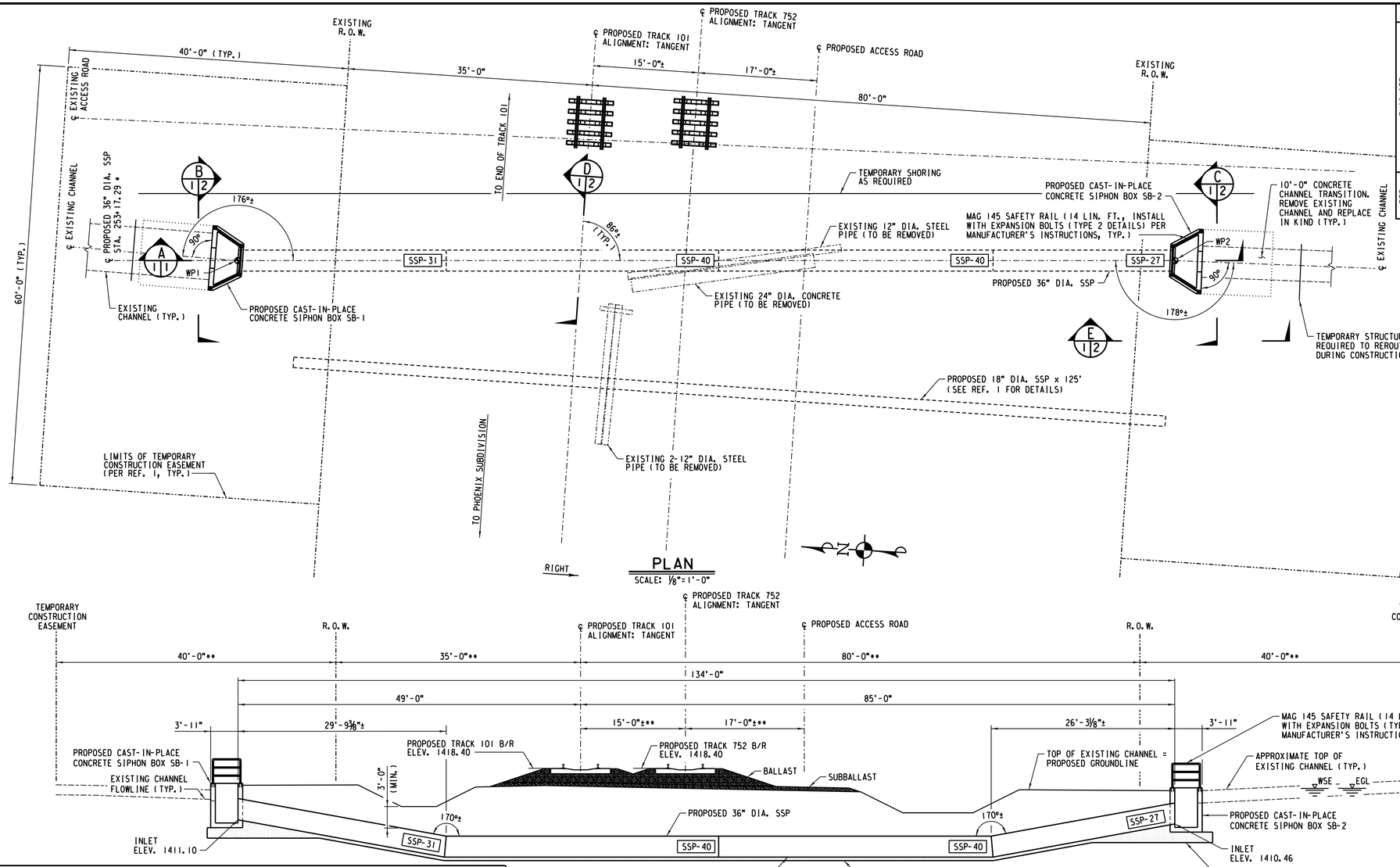
TRACS NO.

Contact Arizona 811 Two Working Days Before You Dig
Call 811 or Click Arizona811.com

8:16:49 AM 3/8/2018

F:\Safety Rail\SD_Safety Rail Details.dgn

DESIGN SHEET



PLAN
SCALE: 1/8"=1'-0"

SECTION A
SCALE: 1/8"=1'-0"

WSE = 1415.54
EGL = 1415.55
VEL = 0.85 fps

DRAWING SCHEDULE

	SHEET NO.	PLAN NO.	DESCRIPTION	TYPE
THIS SET	S1	123250	GENERAL ARRANGEMENT	DESIGN
	S2	123250	TYPICAL SECTIONS AND CONSTRUCTION DETAILS	DESIGN
	S3	123250	CAST-IN-PLACE CONCRETE SIPHON BOX DETAILS (SHEET 1 OF 2)	DESIGN
	S4	123250	CAST-IN-PLACE CONCRETE SIPHON BOX DETAILS (SHEET 2 OF 2)	DESIGN
	2	680000	DETAILS FOR ROUND STEEL PIPE CULVERTS	STANDARD
	3	680000	GENERAL NOTES FOR ROUND STEEL PIPE CULVERTS	STANDARD
	1	680010	CONSTRUCTION NOTES AND TABLE FOR SMOOTH STEEL PIPE CULVERTS	STANDARD
	T3	531100	PIECE FABRICATION NOTES	STANDARD
	145	-	SAFETY RAIL	MAG STANDARD

REF.	NO.	DWG. NO.	SHEET NO.	REV. NO.	DESCRIPTION	TYPE
	1	-	P033 OF 037 T012 OF 012 X098 OF 143	-	MESA, ARIZONA, PHOENIX SUBDIVISION, MP 934.78 TO MP 937.83, CONSTRUCT INDUSTRIAL LEAD TRACK, 100% PLANS, ISSUED FOR BID, DATED MARCH 6, 2023	DESIGN

***NOTES:
1. FLOW SHALL BE REROUTED TEMPORARILY AS REQUIRED FOR CONSTRUCTION. CONSTRUCTOR IS RESPONSIBLE FOR ANY TEMPORARY STRUCTURES REQUIRED AND SHALL SUBMIT PLANS AND CALCULATIONS TO UPRR FOR APPROVAL AT LEAST 2 WEEKS PRIOR TO CONSTRUCTION.
2. AFTER CONSTRUCTION, CONSTRUCTOR SHALL REROUTE FLOW BACK TO ORIGINAL ALIGNMENT AND RESTORE AREA TO ORIGINAL CONDITION OR BETTER.

WORK POINT TABLE

WORK POINT	NORTHING	EASTING
WP1	832705.75	795483.03
WP2	832571.95	795490.74

NOTES:
1. * = STATIONING IS TAKEN AT CENTERLINE OF PROPOSED TRACK 101.
2. ** = MEASURED PERPENDICULAR TO PROPOSED TRACK 101.
3. CONSTRUCTOR TO FIELD VERIFY ALL STATIONS ELEVATIONS AND DIMENSIONS PRIOR TO CONSTRUCTION. IF CONFLICTS OR INCONSISTENCIES ARE ANTICIPATED, NOTIFY UPRR.

BILL OF MATERIAL

REQ'D.	UNIT	DESCRIPTION	STORE ITEM NO.	ORDERED BY
2	EA	CULVERT, SMOOTH STEEL PIPE 36" DIA. X 3/8" WALL X 40' LONG, ASTM A139, GR. B OR ASTM A252, GR. 3 (PER STD PLAN NO. 680010)	510-3010	CONSTRUCTOR
1	EA	CULVERT, SMOOTH STEEL PIPE 36" DIA. X 3/8" WALL X 31' LONG, ASTM A139, GR. B OR ASTM A252, GR. 3 (PER STD PLAN NO. 680010)		
1	EA	CULVERT, SMOOTH STEEL PIPE 36" DIA. X 3/8" WALL X 27' LONG, ASTM A139, GR. B OR ASTM A252, GR. 3 (PER STD PLAN NO. 680010)		
28	LIN. FT.	MARICOPA ASSOCIATION OF GOVERNMENTS (MAG) 145 SAFETY RAIL (TWO LOCATIONS, WITH EXPANSION BOLTS (TYPE 2 DETAILS) AND ALL OTHER ASSOCIATED HARDWARE) OR APPROVED ALTERNATE		
8	EA	3/4" DIA. x 8" WELDED STUD (PER DETAILS, SHEET NO. S2)		
50	CU. YD.	PIPE BEDDING (PER STD. DWG. 680000 SHT. 3)		
1	LOT	REINFORCING STEEL FOR CONCRETE SIPHON BOX SB-1 (PER NOTES, STD. DWG. 531100, SHT. NO. T3 AND SCHEDULE, SHEET NO. S3)		
5	CU. YD.	4000 PSI CONCRETE FOR CONCRETE SIPHON BOX SB-1 (PER NOTES, STD. DWG. 531100, SHT. NO. T3 AND DETAILS, SHEET NO. S3)		
1	LOT	REINFORCING STEEL FOR CONCRETE SIPHON BOX SB-2 (PER NOTES, STD. DWG. 531100, SHT. NO. T3 AND SCHEDULE, SHEET NO. S4)		
5	CU. YD.	4000 PSI CONCRETE FOR CONCRETE SIPHON BOX SB-2 (PER NOTES, STD. DWG. 531100, SHT. NO. T3 AND DETAILS, SHEET NO. S4)		
20	LIN. FT.	SIKA HYDROTITE WATERSTOP, PROFILE CJ-0725-3K, OR APPROVED ALTERNATE		
1	LOT	EPOGRIP MULTIPURPOSE STRUCTURAL BONDING AND GROUTING EPOXY ADHESIVE OR APPROVED ALTERNATE		
1	EA.	CULVERT MARKER SIGNS, MOUNTING POST AND MOUNTING HARDWARE (PER STD. DWG. 0502, 0507 AND 0599)	P00-2616	
2	LOT	CHANNEL TRANSITION MATERIAL		
1	LOT	FILL MATERIAL (PER STD. DWG. 680000 SHT. 3 AND REF. 1)		
1	LOT	TEMPORARY FORMWORK MATERIAL		
1	LOT	TEMPORARY SHORING		
1	LOT	TEMPORARY STRUCTURE TO REROUTE FLOW		

CLSM MAY BE SUBSTITUTED FOR FILL MATERIAL.
BULK QUANTITIES ARE ESTIMATED.

MATERIAL NOTE:
CEMENT SHALL BE TYPE II OR TYPE III PORTLAND CEMENT IN ACCORDANCE WITH ASTM C150 SPECIFICATIONS.

DESIGN NOTES

LAYOUT

1. Stationing: Per Ref. 1.
2. Elevation Datum: Per Ref. 1.
3. Temporary Benchmarks:
   TBM 1 (Olsson CP 4): Elev. 1390.42, NAVD 1988, established by 1/2" rebar located in ground West of proposed Culvert No. 4.80, 9,606.96' left of existing Phoenix Sub. Main Track centerline, Sta. 1588+58.48.
   TBM 2 (Olsson CP 5): Elev. 1391.63, NAVD 1988, established by 1/2" rebar located in ground West of proposed Culvert No. 4.80, 9,311.99' left of existing Phoenix Sub. Main Track centerline, Sta. 1590+90.31.
4. Profile: Proposed Track 101 per Ref. 1.
   Proposed Track 752 per Ref. 1.
5. Alignment: Tangent.
6. Information used to prepare this drawing in addition to reference drawings:
   Hydrologic & Hydraulic Evaluation prepared by Olsson, dated September 2022.

DESIGN

1. The proposed cast-in-place concrete siphon box has been designed in accordance with the AREMA Manual for Railway Engineering, Chapter 8: Concrete Structures and Foundations The proposed cast-in-place concrete siphon box has been designed for railroad surcharge, lateral earth pressure and a construction surcharge of 250 psf.
2. The SSP has been designed for Cooper E80 Live Load with impact and cover depth ranging from 1'-6" to 18'-0".

POSTCONSTRUCTION COMPLIANCE

Constructor in charge of construction to provide to the office of the Senior Manager Structures Design as-built drawings confirming that the project was constructed in compliance with the plans and indicating any construction variances.

SIGNED

In Charge of Construction — Date

LETTER SERIES
SHEET NO. CUT ON — SHEET NO. SHOWN ON

SECTION DESIGNATION

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL — STATUS — 07/05/2023 DATE

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 07-05-2023 ARIZONA U.S.A.

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
CONSULTANT ENGINEER — 04/05/2023 DATE

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123250

LATITUDE: 33.28820°N LONGITUDE: 111.60458°W

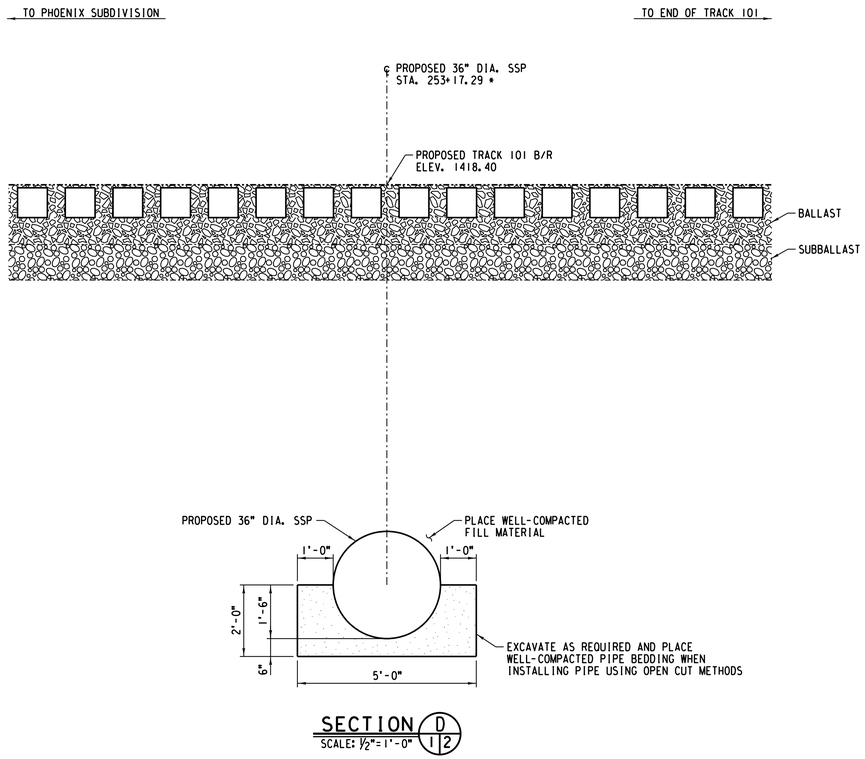
UNION PACIFIC

DSN/CHK BY:	UNION PACIFIC RAILROAD
JAS/MJH	Office of Director Structures Design
DRAWN/CHK BY: FAM/JAS	LOCATION & DESCRIPTION: CULVERT 4.80, PIRATE IND LEAD
UPRR ENGINEER: ADS	FURNISH & INSTALL 1-36" DIA. SSP x 134' AND SIPHON BOXES
SHT NO.: S1 of S4	SHEET TITLE: GENERAL ARRANGEMENT

FILE NAME: \\oa.ad.oasconsulting.com\fnts-nal\projects\2020\0501.1000\020-0920.40-Design\Micronstation\020-0920.40-Design_RLBRA.dgn 4.80,5ta. 253+17.00,Pirate Ind Lead 4.80,cat.dgn

PLOTTED: 7/11/2023 8:38:53 AM

DESIGN SHEET



NOTES:
1. PROPOSED MAG 145 SAFETY RAIL NOT SHOWN FOR CLARITY.
2. CONSTRUCTOR SHALL COORDINATE TEMPORARY OPEN CUT AND/OR SHORING WITH UPRR AND ARIZONA STATE LAND DEPARTMENT PRIOR TO CONSTRUCTION.

NOTES:
1. PROPOSED MAG 145 SAFETY RAIL NOT SHOWN FOR CLARITY.
2. CONSTRUCTOR SHALL COORDINATE TEMPORARY OPEN CUT AND/OR SHORING WITH UPRR AND ARIZONA STATE LAND DEPARTMENT PRIOR TO CONSTRUCTION.

NOTES:
1. INSTALL STUDS AFTER PIPE IS IN PLACE.
2. * MINIMALLY ADJUST OFFSET FROM PIPE END AS REQUIRED SUCH THAT WELDED STUDS ARE CENTERED WITHIN THE PROPOSED HEADWALL. 3" (MIN.) CLEARANCE TO HEADWALL FACE (EACH WAY) SHALL BE MAINTAINED.
3. STUDS SHALL BE C1015, C1017 OR C1020 COLD DRAWN STEEL WHICH CONFORMS TO ASTM A108 SPECIFICATIONS.

ANCHOR LOCATION DETAIL
SCALE: ½"=1'-0"

NOTE:
* = STATIONING IS TAKEN AT CENTERLINE OF PROPOSED TRACK 101.

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL (STATUS) 07/05/2023 (DATE)

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
Kylie Stark
CONSULTANT ENGINEER 04/05/2023 (DATE)

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 07-05-2023 ARIZONA U.S.A.

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123250

LATITUDE: 33.28820°N LONGITUDE: 111.60458°W

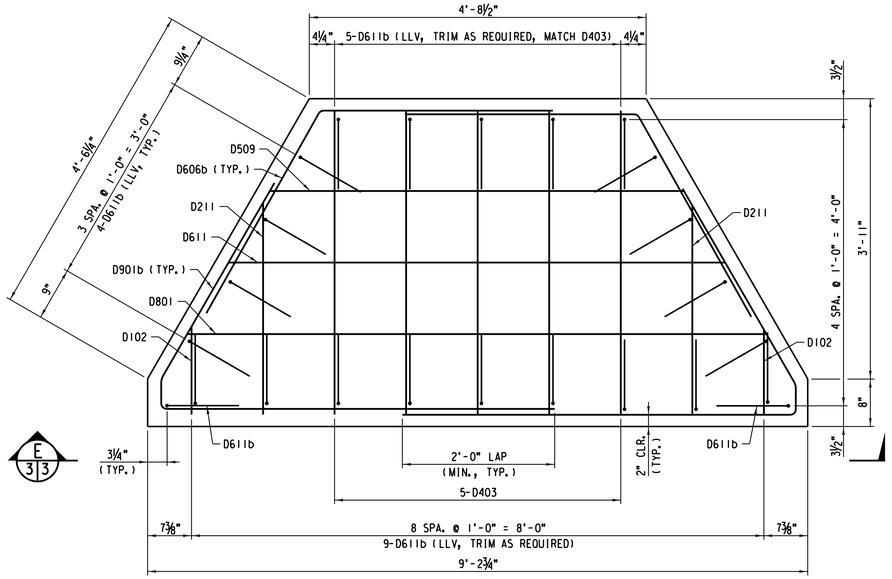
UNION PACIFIC

DSN/CHK BY: JAS/MJH	UNION PACIFIC RAILROAD
DRAWN/CHK BY: FAM/JAS	Office of Director Structures Design
UPRR ENGINEER: ADS	LOCATION & DESCRIPTION: CULVERT 4.80, PIRATE IND LEAD
SHT NO.: S2 of S4	FURNISH & INSTALL 1-36" DIA. SSP x 134' AND SIPHON BOXES
	SHEET TITLE: TYPICAL SECTIONS AND CONSTRUCTION DETAILS

FILE NAME: \\oa.ad.oaconsulting.com\fnts-mal\projects\2020\050\1000\020-0927.40-Design\Microstation\020-0927.RLBR.Culv 4.80.Sta. 253+17.00\Pirate Ind Lead 4.80.csaz.dgn

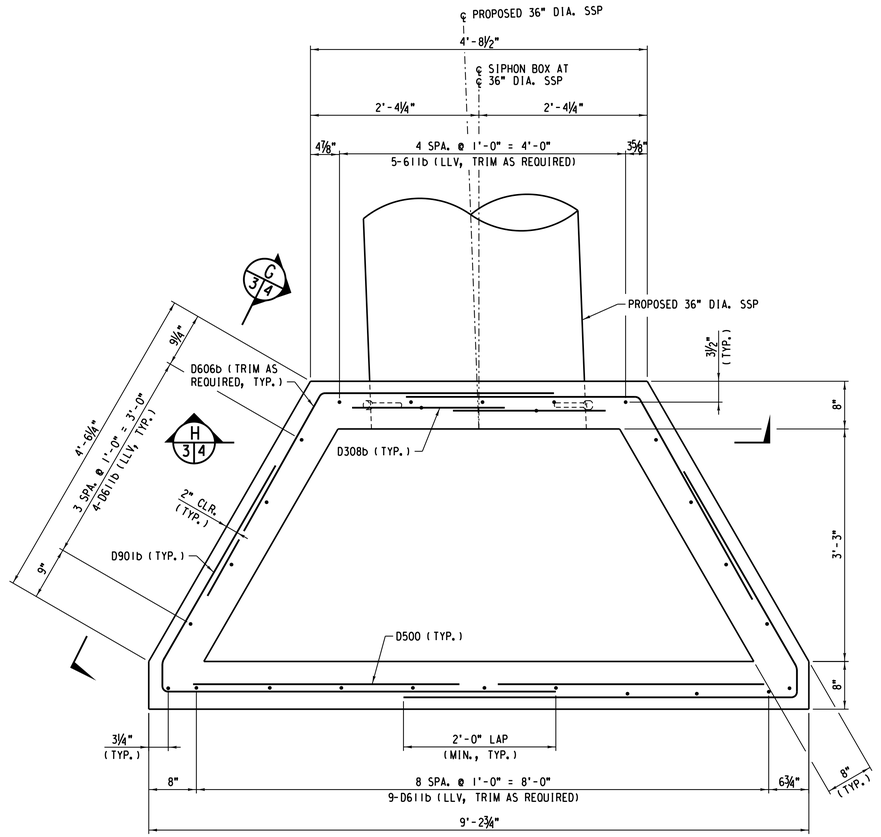
PLOTTED: 7/11/2023 8:38:53 AM

DESIGN SHEET



REINFORCING PLAN AT APRON

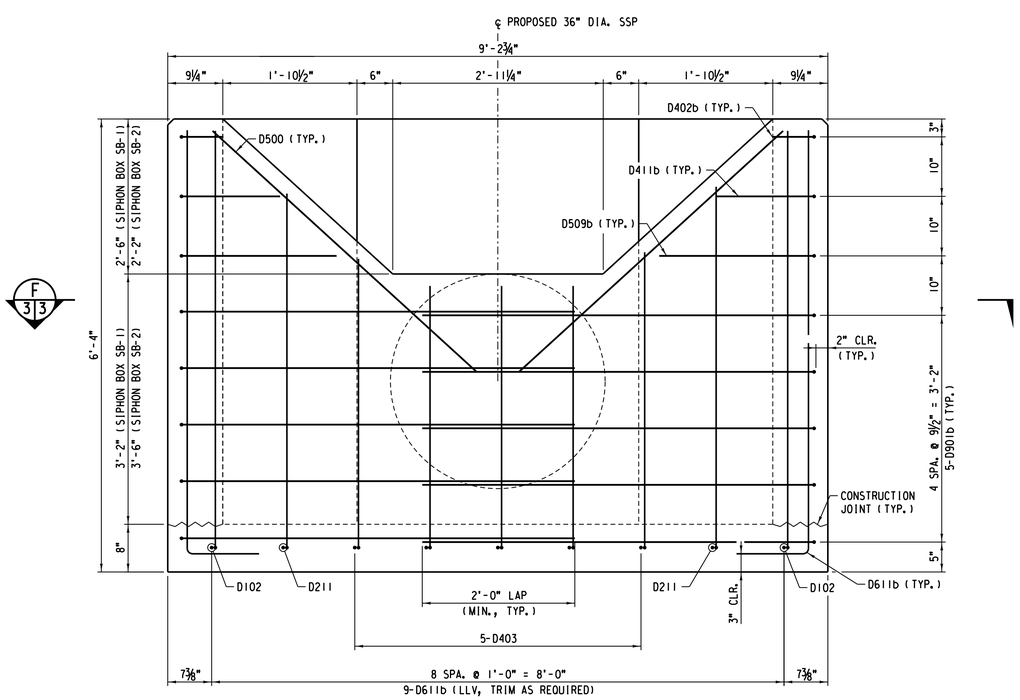
SCALE: 1"=1'-0"



SECTION F

SCALE: 1"=1'-0" (3|3)

SIPHON BOX SB-2 SHOWN,
SIPHON BOX SB-1 SIMILAR



VIEW E

SCALE: 1"=1'-0" (3|3)

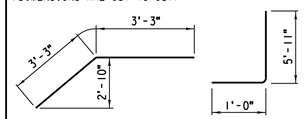
REINFORCING SCHEDULE

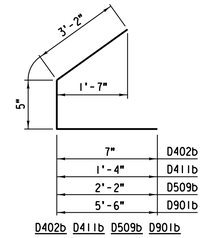
(QUANTITY PER SIPHON BOX)

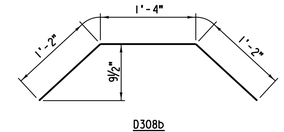
TOTAL	MARK	SIZE	LENGTH	SHAPE
2	D102	#5	1'-2"	—
2	D211	#5	2'-11"	—
4	D308b	#5	3'-8"	⌒
2	D402b	#5	4'-2"	⌐
5	D403	#5	4'-3"	—
2	D411b	#5	4'-11"	⌐
2	D500	#5	5'-0"	—
1	D509	#5	5'-9"	—
2	D509b	#5	5'-9"	⌐
16	D606b	#5	6'-6"	⌐
1	D611	#5	6'-11"	—
24	D611b	#5	6'-11"	⌐
1	D801	#5	8'-1"	—
10	D901b	#5	9'-1"	⌐

BENDING DIAGRAM

(DIMENSIONS ARE OUT TO OUT)







NOTE:
BAR DESIGNATIONS CONSIST OF BAR SIZE & LENGTH FOLLOWED BY THE LETTER "b" IF BENT. BAR SIZES ARE REPRESENTED BY THE LETTERS A THROUGH L CORRESPONDING TO BAR SIZE #2 THROUGH #18. BAR LENGTHS ARE GIVEN IN FEET AND INCHES; THE LAST TWO DIGITS ARE INCHES.

EST. WT. OF REINFORCING STEEL = 490 LB.

NOTES:
1. CONSTRUCTOR SHALL MINIMALLY ADJUST REINFORCING LOCATIONS AS REQUIRED TO ACCOMMODATE INSTALLATION OF SAFETY RAIL EXPANSION ANCHORS.
2. LLV = LONG LEG VERTICAL

CONCRETE PLACEMENT QUANTITIES

(PER SIPHON BOX SB-1)

ITEM	UNIT	QTY.
BOTTOM SLAB	CU. YD.	0.9
WALLS	CU. YD.	2.9

CONCRETE PLACEMENT QUANTITIES

(PER SIPHON BOX SB-2)

ITEM	UNIT	QTY.
BOTTOM SLAB	CU. YD.	0.9
WALLS	CU. YD.	2.8

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL (STATUS) 07/05/2023 (DATE)

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
CONSULTANT ENGINEER 04/04/2023 (DATE)

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 07-05-2023 ARIZONA U.S.A.

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123250

LATITUDE: 33.28820°N LONGITUDE: 111.60458°W

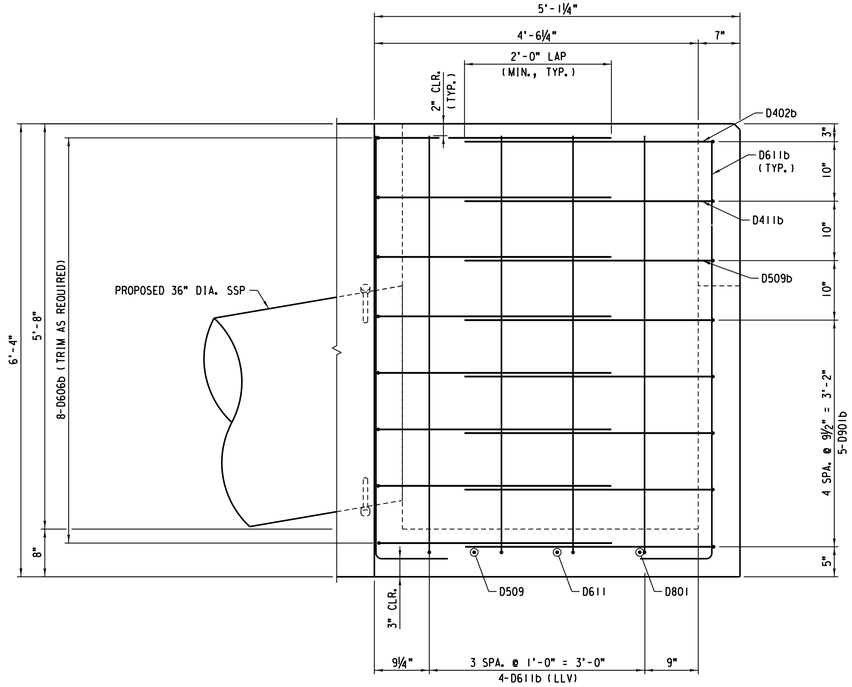
UNION PACIFIC

DSN/CHK BY: JAS/MJH	**UNION PACIFIC RAILROAD**
DRAWN/CHK BY: FAM/JAS	Office of Director Structures Design
UPRR ENGINEER: ADS	LOCATION & DESCRIPTION: CULVERT 4.80, PIRATE IND LEAD
SHT NO.: S3 of S4	FURNISH & INSTALL 1-36" DIA. SSP x 134' AND SIPHON BOXES
	SHEET TITLE: CAST-IN-PLACE CONCRETE SIPHON BOX DETAILS (SHEET 1 OF 2)

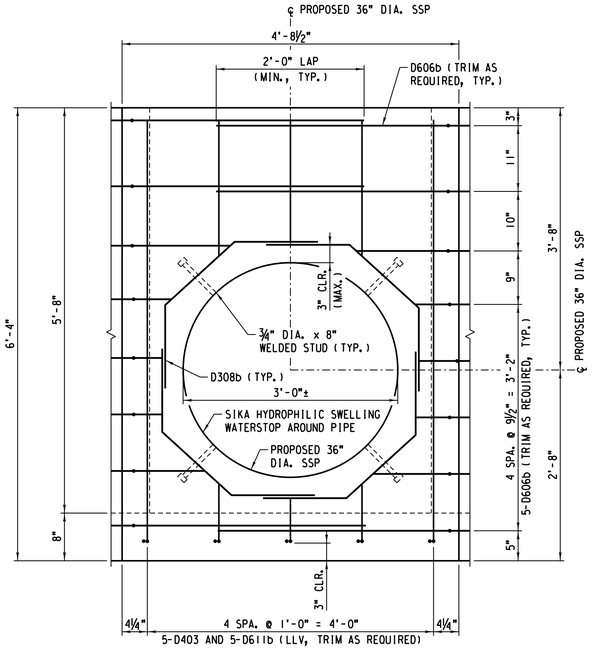
FILE NAME: \\oa.ad.oacomulting.com\fnts-mal\projects\2020\050\-1000\020-0927\40-Design\Microstation\020-0927-RLBR.Culv 4.80.Sta. 253-17.00\Pirate Ind Lead 4.80.caz.dgn

PLOTTED: 7/11/2023 8:38:54 AM

DESIGN SHEET



VIEW G
SCALE: 1"=1'-0" 3|4



SECTION H
SCALE: 1"=1'-0" 3|4

NOTES:
1. CONSTRUCTOR SHALL MINIMALLY ADJUST REINFORCING LOCATIONS AS REQUIRED TO ACCOMMODATE INSTALLATION OF SAFETY RAIL EXPANSION ANCHORS.
2. LLV = LONG LEG VERTICAL

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL (STATUS) 07/05/2023 (DATE)

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
CONSULTANT ENGINEER 04/05/2023 DATE

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123250

LATITUDE: 33.28820°N LONGITUDE: 111.60458°W

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 07-05-2023 ARIZONA U.S.A.

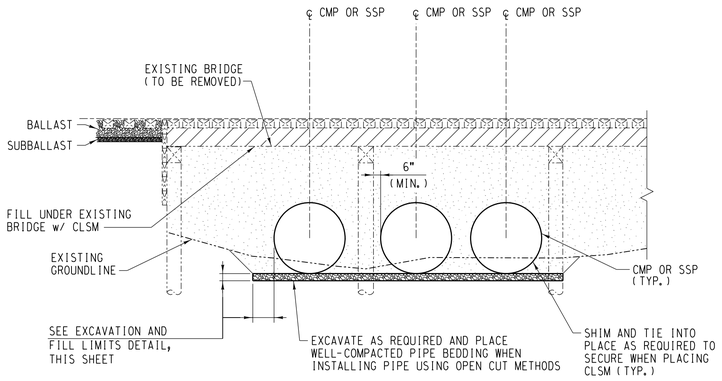
UNION PACIFIC

DSN/CHK BY: JAS/MJH	UNION PACIFIC RAILROAD
DRAWN/CHK BY: FAM/JAS	Office of Director Structures Design
UPRR ENGINEER: ADS	LOCATION & DESCRIPTION: CULVERT 4.80, PIRATE IND LEAD
SHT NO.: S4 of S4	FURNISH & INSTALL 1-36" DIA. SSP x 134' AND SIPHON BOXES
	SHEET TITLE: CAST-IN-PLACE CONCRETE SIPHON BOX DETAILS (SHEET 2 OF 2)

FILE NAME: \\oa.aol.oaconsulting.com\fnts-na1\projects\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLBRA.Culv 4.80_Sta. 253+17.00_Pirate Ind Lead_4.80_cas.dgn

PLOTTED: 7/11/2023 8:38:54 AM

STANDARD SHEET

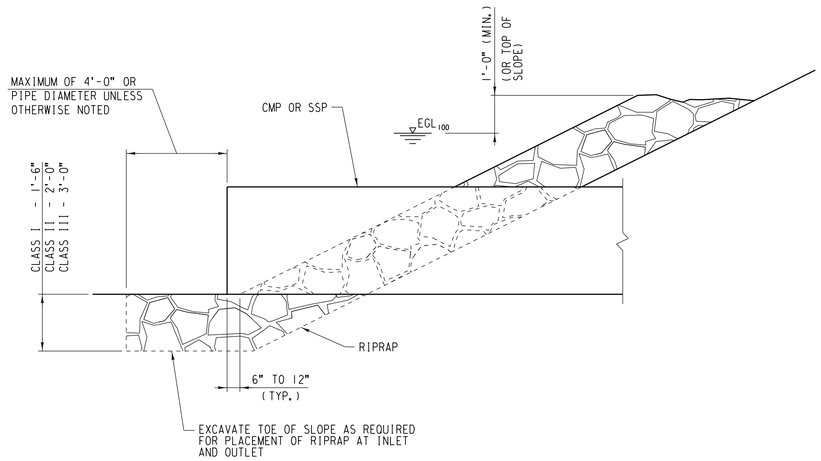


UNDER STRUCTURE - SECTION

SCALE: 3/16"=1'-0"

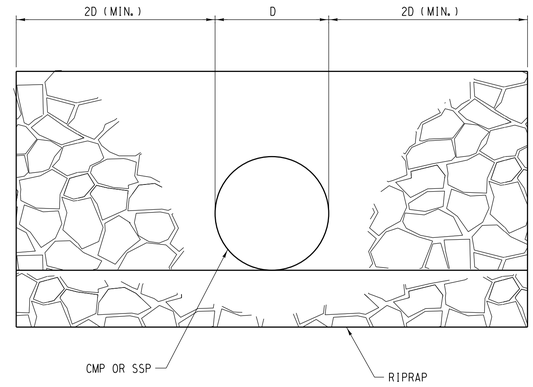
LIMITS OF REMOVAL

REMOVE EXISTING STRUCTURE TO 1'-0" (MIN.) BELOW PROPOSED EMBANKMENT SLOPE AND 2'-6" (MIN.) BELOW BASE OF RAIL.



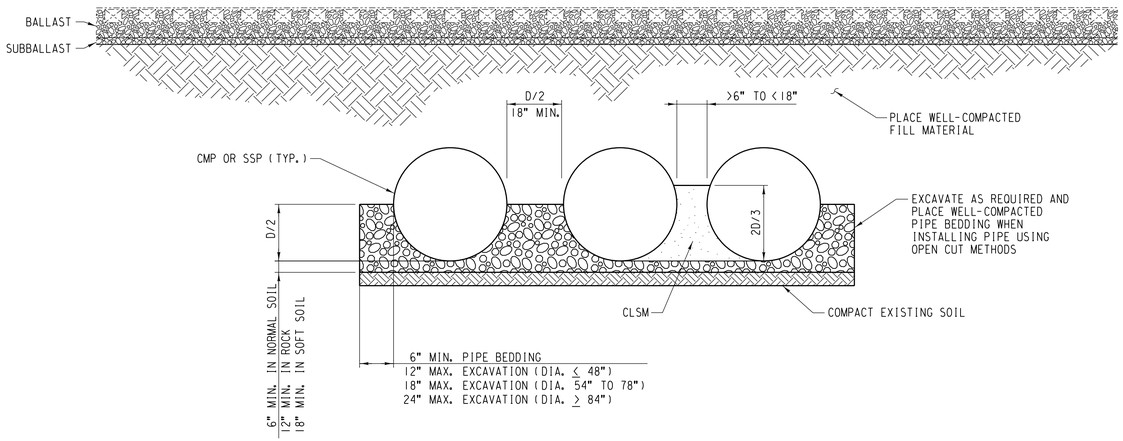
RIPRAP - SECTION

SCALE: NONE



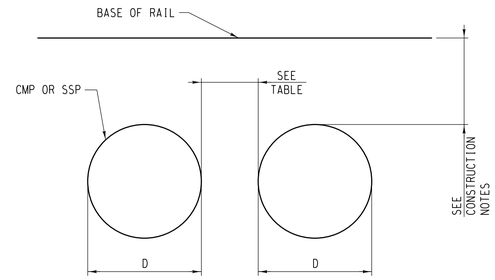
RIPRAP - ELEVATION

SCALE: NONE



EXCAVATION AND FILL LIMITS

SCALE: NONE



SPACING CHART	
PIPE DIAMETER	MIN. SPACING BETWEEN PIPES
12" to 24"	12"
24" to 96"	D/2
96" OR MORE	48"

MINIMUM PIPE SPACING AND COVER

SCALE: NONE

REVISIONS		
DATE	LTR.	DESCRIPTION
02/12	A	ADDED RIPRAP SECTION
04/19	D	UPDATED DETAILS
/		
/		
/		
/		

DESIGN BY: CLJ | DRAWN BY: KDM | CHECKED BY: CLJ

APPROVED:

George J. Meyn 4/4/08

UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

DETAILS FOR ROUND STEEL PIPE CULVERTS

FILE OWNER: UPRR | DATE:

PLAN NO.: 680000 | SHEET: 2 OF 3

Copyright © 2007 by Union Pacific Railroad PLOTTED: 8/12/2021 10:04:26 AM

FILE NAME: P:\Standards\Culverts (CMP&SSP)\0-Active\steelpip_std.dgn

STANDARD SHEET

GENERAL NOTES

GENERAL

1. All work requirements shown on these drawings and not otherwise detailed shall be accomplished as specified in Union Pacific Railroad (UPRR) Specifications and the American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual for Railway Engineering. In the event of conflicts between specifications, the more restrictive shall apply.

2. **Construction means and methods shall comply with the All Permits Issued (API) package.**

3. Field verify all dimensions, stations and elevations prior to start of construction.

4. **Contact the Union Pacific "Call Before You Dig" number 90 days (not less than 60 days) prior to proposed construction start date. Prior to construction, confirm that all necessary relocations have been completed. The CBYD number is: 1-800-336-9193.**

5. **Location of known utilities is approximate. Location shall be verified prior to construction. Notify Call811 "Call Before you Dig" number at least 48 hours prior to construction.**

GRADING

1. Provide and place all fill and subballast material per UPRR Grading Specifications. Perform grading as required to drain and match existing embankments and upstream and downstream channel flowline.

2. Perform grading as required for construction of the new structure and replace areas removed and disturbed in the course of construction to a condition equal to or better than existing.

WELL COMPACTED FILL

1. Well compacted fill shall be well graded granular soil free of any organic material, stones larger than 1½ inches, frozen lumps, debris or excessive moisture. Fill shall be compacted to 95% of maximum dry density as defined in ASTM International D1557 (Modified Proctor). Fill shall be placed and compacted in layers not to exceed 6 inches. Fill shall be placed simultaneously on both sides of the pipe and between multiple pipes. CLSM may be used in lieu of well compacted fill.

CONTROLLED LOW-STRENGTH MATERIAL (CLSM) FILL

1. Controlled Low-Strength Material is a self-compacting, cementitious fill material with an unconfined compressive strength of 50 to 300 psi. The mixture shall consist of water, Portland cement, fly ash, and sound fine or coarse aggregate or both. The mix design shall allow adequate flowability without segregation of aggregates. Hardening time is of prime importance and CLSM should develop 50 psi in about one hour. The maximum layer of thickness for CLSM shall be 3 feet. Additional layers shall not be placed until the CLSM has lost sufficient moisture to be walked on without indenting more than two inches. Pipe spacing may be reduced to between 6" and 18" when using CLSM in lieu of well compacted pipe bedding between pipes.

PIPE BEDDING

1. Pipe bedding shall be granular material such as aggregates ordinarily specified and used in the construction of highway base and subbase. These aggregates include crushed stone, natural or crushed gravel, natural or manufactured sands, crushed slag or a homogeneous mixture of these materials. Pipe bedding shall be compacted to 95% of maximum dry density as defined in ASTM International D1557 (Modified Proctor). Recommended gradation is as follows:

SCREEN SIZE	% PASSING (BY WEIGHT)
1 inch	100
½ inch	60-90
⅜ inch	20-40
No. 4	10-20
No. 200	less than 5%

2. Union Pacific sealant ballast, item no. 562-5428, may be used.

RIPRAP:

1. Class of riprap shall be specified by the engineer. Riprap shall be placed in such a manner as to avoid segregation of various sizes of rock, and distributed so that there will be no large accumulation of either the larger or smaller sizes of stone. Individual rocks shall be placed in tight contact with one another in such a way to produce the least amount of void spaces. Riprap shall be solid, unfractured rock or concrete, bulky in shape with sharp angular edges.

2. Individual rocks shall vary as shown:

RIPRAP CLASS	AVERAGE WEIGHT PER STONE (LBS.)	DIMENSION (INCHES)	ITEM NO.	UNIT OF MEASURE	LAYER THICKNESS	TYPICAL VELOCITIES
I	50 to 200	9 to 14	562-2764	Ton	1'-6"	6 - 8 fps
II	200 to 1,000	14 to 24	562-3430	Ton	2'-0"	8 - 12 fps
III	1,000 to 4,000	24 to 38	562-4096	Ton	3'-0"	> 12 fps

3. The entire mass of riprap shall be well distributed within the limits specified. However, the following allowances shall be acceptable to produce the required riprap protection:

   Riprap Class I - No allowances are permitted
   Riprap Class II - 15% of Riprap Class I.
   Riprap Class III - 15% of Riprap Class I and 15% of Riprap Class II.

CONSTRUCTOR NOTES (WHEN APPLICABLE)

CONSTRUCTOR DEFINITION

1. Constructor designates Manager Bridge Construction if construction by UPRR and Contractor if construction by Contractor.

DIVISION OF RESPONSIBILITY

A. RAILROAD

1. Provide material as shown in the Bill of Material.

2. Provide and install Private Property/No Trespassing sign and culvert marker sign on right side at low mile post end of culvert.

B. CONSTRUCTOR

1. Coordinate all construction activities with the Railroad.

2. **Before ordering any material, Constructor shall make a detailed field inspection of the site verifying all pertinent dimensions and elevations. Any variations in dimensions or elevations from those shown on the drawings shall be reported immediately to the UPRR Project Manager.**

3. Any modifications to this design shall be approved by the UPRR Office of Director Structures Design prior to construction.

4. **Verify the location, relocation, abandonment, and/or temporary support of all utilities affected by the construction of the structure and embankment and coordinate these activities with the appropriate utility companies, agencies and/or authorities.**

5. Apply for and obtain all construction permits necessary to perform the work.

6. Bill of Material and Schedules are provided for information only. Constructor shall be responsible for providing all material, not provided by the Railroad, required to complete the work.

7. Perform all work not performed by the Railroad.

8. Provide the Railroad with a detailed construction plan defining the activity, schedule and procedure for each aspect of the work. Construction shall not begin until the construction plan has been approved by the Railroad.

9. Provide all temporary structures (shoring, bracing and/or falsework) required to support and protect the existing embankments and structures affected by the work. Provide the Railroad with details, design and procedure for all temporary structures. All temporary structures shall be designed, signed and sealed by a professional engineer registered in the State that the structure is to be constructed. All temporary structures shall be approved by the UPRR Office of Director Structures Design prior to beginning construction.

10. Direct channel flow as required to perform work.

11. Accomplish activities within the schedule specified in the approved construction plan.

REVISIONS		
DATE	LTR.	DESCRIPTION
02/12	A	RELOCATED GENERAL NOTES
6/13	B	CHANGED FILL REQUIREMENTS
7/14	C	CHANGED FILL REQUIREMENTS
04/19	D	UPDATED NOTES
/		
/		

DESIGN BY: CLJ | DRAWN BY: KDM | CHECKED BY: CLJ

APPROVED:

George J. Meyn 4/4/08

UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

GENERAL NOTES FOR ROUND STEEL PIPE CULVERTS

FILE OWNER: UPRR | DATE:

PLAN NO.: 680000 | SHEET: 3 OF 3

FILE NAME: P:\!Standards\Culverts (CMP&SSP)\0-Active\steelpip_std.dgn

Copyright © 2007 by Union Pacific Railroad PLOTTED: 8/12/2021 10:04:39 AM

STANDARD SHEET

TABLE 1 - SMOOTH STEEL PIPE																								
OUTSIDE PIPE DIAMETER	THICKNESS (IN.)	WEIGHT (LB./FT.)	COVER * MIN. (FT.)	COVER * MAX. (FT.)	10'-0" LENGTH ITEM NO.	10'-0" LENGTH WEIGHT (LB.)	12'-0" LENGTH ITEM NO.	12'-0" LENGTH WEIGHT (LB.)	14'-0" LENGTH ITEM NO.	14'-0" LENGTH WEIGHT (LB.)	16'-0" LENGTH ITEM NO.	16'-0" LENGTH WEIGHT (LB.)	18'-0" LENGTH ITEM NO.	18'-0" LENGTH WEIGHT (LB.)	20'-0" LENGTH ITEM NO.	20'-0" LENGTH WEIGHT (LB.)	22'-0" LENGTH ITEM NO.	22'-0" LENGTH WEIGHT (LB.)	24'-0" LENGTH ITEM NO.	24'-0" LENGTH WEIGHT (LB.)	30'-0" LENGTH ITEM NO.	30'-0" LENGTH WEIGHT (LB.)	40'-0" LENGTH ITEM NO.	40'-0" LENGTH WEIGHT (LB.)	STORE ITEMS PER L.F.
36"	3/8	190	1'-6"	18'-0"	510-3000	1,900	510-3001	2,280	510-3002	2,660	510-3003	3,040	510-3004	3,420	510-3006	3,800	510-3007	4,180	510-3008	4,560	510-3009	5,700	510-3010	7,600	510-3285
42"	1/2	222	1'-6"	18'-0"	510-3011	2,280	510-3012	2,664	510-3013	3,108	510-3014	3,552	510-3015	3,996	510-3016	4,440	510-3017	4,884	510-3018	5,328	510-3019	6,660	510-3020	8,880	-
48"	5/8	317	1'-6"	18'-0"	510-3021	3,170	510-3022	3,804	510-3024	4,438	510-3025	5,072	510-3026	5,706	510-3027	6,340	510-3028	6,974	510-3029	7,608	510-3030	9,510	510-3031	12,680	510-3293
60"	3/4	475	1'-6"	18'-0"	510-3032	4,750	510-3033	5,700	510-3034	6,650	510-3035	7,600	510-3036	8,550	510-3037	9,500	510-3038	10,450	510-3040	11,400	510-3041	14,250	510-3042	19,000	510-9526
72"	7/8	667	1'-6"	18'-0"	510-3044	6,670	510-3050	8,004	510-3051	9,338	510-3052	10,672	510-3053	12,006	510-3054	13,340	510-3056	14,674	510-3057	16,008	510-3058	20,010	510-3043	26,680	510-3305
84"	1	888	1'-6"	18'-0"	510-3059	8,880	510-3060	10,656	510-3061	12,432	510-3062	14,208	510-3063	15,984	510-3064	17,760	510-3070	19,536	510-3071	21,312	510-3072	26,640	510-3080	35,520	510-3310
96"	1 1/4	1,267	1'-6"	18'-0"	510-3090	12,670	510-3094	15,204	510-3095	17,738	510-3096	20,272	510-3097	22,806	510-3098	25,340	510-3099	27,874	510-3106	30,408	510-3107	38,010	510-3108	50,680	510-3315

* COVER TO BE MEASURED FROM BASE OF RAIL TO TOP OF PIPE

SMOOTH STEEL PIPE (SSP) CONSTRUCTION NOTES

GENERAL:

SSP structures are designed for Cooper E80 Live Load with impact, and cover as shown in Table 3.

Table 3 indicates the minimum required thickness.

INSTALLATION:

Installation of Smooth Steel Pipe (SSP) shall conform to the current American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual for Railway Engineering, Chapter 1, Part 4. Culvert lengths are to be based on existing mainline roadbed sections.

JACKING:

Where indicated, pipe to be bored and jacked into place. Bore hole diameter shall be essentially the same as the outside diameter of the pipe. If voids should develop or if the bored hole diameter is greater than the outside diameter of the pipe by more than 1 inch, notify the Office of Director structures Design. Boring operations shall not be stopped if such a stoppage would be detrimental to the railroad. A survey crew shall continually monitor the elevation and alignment of the railroad track(s) above during the jacking procedures. If track movement or loss of ballast exceeds 1/4 inch during jacking or boring operations, all work must stop and the Railroad must be notified. The Railroad may take any action necessary to ensure safe passage of train. The contractor must immediately submit a corrective plan of action to the Railroad for review and approval. The Railroad must review and approve the proposed repair procedure. The finished repair must be inspected and accepted by the Railroad before the track can be placed back into service, and construction is allowed to proceed.

BORED AND JACKED TOLERANCE:

The permitted tolerance of a true line for pipe positioning is +/- 2". Adjustment to the line and level should be gradual to ensure that the pipe manufacturer's stated angular deflection is not exceeded at any joint.

FIELD WELDING:

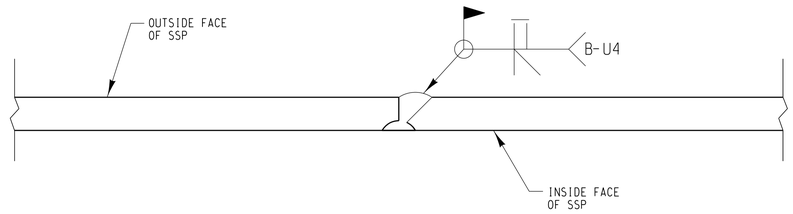
Welders shall posses valid qualifications.
All welding per AWS D1.1, Structural Welding Code.

MATERIALS:

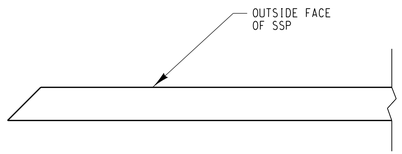
ASTM A139, Grade B, FY = 35 ksi
or
ASTM A252, Grade 3, FY = 45 ksi

Smooth steel pipe shall have a welded straight longitudinal seam. Spiral seam is acceptable if 25% of weld is ultrasonically tested in addition to required tensile tests of weld. A hydrostatic test is not required.

The ends of each section of pipe shall be square cut. One end shall be suitably beveled for field welding sections together.



PIPE END WELD DETAIL



PIPE END BEVEL DETAIL

REVISIONS		
DATE	LTR.	DESCRIPTION
11/16	A	CHANGED NOTES AND TABLE 1
04/19	B	UPDATED NOTES
10/21	C	UPDATED NOTES & ADD ITEM NUMBERS
/		
/		
/		

DESIGN BY: CLJ | DRAWN BY: KDM | CHECKED BY: CLJ

APPROVED:

George J. Meyn 4/4/08
UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

CONSTRUCTION NOTES AND TABLE FOR SMOOTH STEEL PIPE CULVERTS

FILE OWNER: UPRR | DATE:
PLAN NO.: 680010 | SHEET: 1 OF 1

Copyright © 2007 by Union Pacific Railroad PLOTTED: 10/14/2021 3:41:08 PM

FILE NAME: \\upcorp.ad.uprr.com\engcad\bridge\Standards\Culverts (CMP and SSP)\0-Active\steelpip_std.dgn

STANDARD SHEET

PRECAST CONCRETE NOTES:

CONCRETE:

1. All concrete materials, placement and workmanship shall be in accordance with Part 1, Chapter 8 of the current AREMA Manual for Railway Engineering.
2. Minimum compressive strength - 4000 Lb. per square inch at 28 days.
3. Exposed surfaces shall be formed in a manner which will produce a smooth and uniform appearance without rubbing or plastering. Exposed edges of 90 degrees or less are to be chamfered ¾" x ¾". Top surface to have a smooth finish, free of all float or trowel marks.
4. Concrete shall be proportioned such that the water - cement ratio (by weight) does not exceed 0.45. Concrete must contain a minimum of 6½ sacks of cement per cubic yard of concrete. Flyash replacement may account for up to 25% of the cement.
5. Cement shall be Type I, Type II or Type III Portland Cement in accordance with ASTM C150 specifications.
6. Aggregates shall be graded in accordance with ASTM C33 specifications. Coarse aggregate shall be no. 67. Fine aggregate shall be natural sand.
7. Air content shall be between 5% and 7% (by volume).
8. Admixtures shall not be used without approval by Engineer.
9. Curing shall be accomplished by wet curing or the application of a Type 2 membrane.
10. The fabricator shall stencil the item name, date manufactured, name of manufacturer and actual lifting weight at location shown.
11. Production procedures for the manufacture of precast members shall be in accordance with the AREMA Manual for Railway Engineering and the Precast/Prestressed Concrete Institute's Manual MNL 116 for Quality Control.
12. Dimensional tolerances governing the manufacture of precast members shall conform to Division VI, Section 6.4 of the Precast/Prestressed Concrete Institute's Manual MNL 116 for Quality Control. Tolerance for location of lifting devices shall be ±½".
13. The fabricator will be responsible for loading and properly securing all precast concrete members for shipment. All concrete components shall be made available for inspection by the Railroad at the fabricator's plant prior to shipment, at the Railroad's discretion.

REINFORCING STEEL:

1. Reinforcing steel shall be deformed, new billet bars per current ASTM A615 Specifications and to meet grade 60 requirements.
2. Fabrication of reinforcing steel shall be per Chapter 7 of the CRSI Manual of standard practice. Dimensions of bending details are out to out of bar.
3. Reinforcing steel is to be blocked to proper location and securely wired against displacement. Tie wires shall be installed at every other bar intersection so that at least 50% of the intersections are tied. Tack welding of reinforcing is prohibited. Minimum concrete cover on reinforcement not otherwise noted shall meet current AREMA Manual for Railway Engineering requirements.

EMBEDDED STEEL:

1. Steel plate shall conform to ASTM A36 OR A709-Grade 36 Specifications. Studs shall be C1015, C1017 or C1020 cold drawn steel which conform to ASTM A108 Specifications.
2. Deformed bar anchors shall conform to ASTM A706 specifications. Welding of deformed bar anchors shall conform to AWS D1.4. Welding shall be performed by certified welder.
3. Where galvanizing is not indicated, material shall be plain.

LIFTING ANCHORS:

1. Swift lift anchors shall be Dayton Superior P-52 anchors or approved alternate with a minimum safe working load sufficient for the weight of the precast element including form removal. The safe working load shall provide a minimum safety factor of 4.

MISCELLANEOUS HARDWARE:

1. 8" T-Bar Anchors as manufactured by Meadow Burke Company, or approved alternate.

BEARING PAD SPECIFICATIONS:

1. Bearing pads shall be Random Oriented Fiber elastomeric material comprised of high-quality ozone-resistant virgin elastomer and synthetic fibers. Pads shall conform to the following minimum material properties:

Hardness (Shore A, ASTM D2240)	80 ± 5
Tensile Strength, psi (ASTM D412, Die C)	1000 ± 100
Ultimate Elongation, minimum %	40
Heat Aging (ASTM D573, 70 Hrs. @ noted temperature):	
Durometer, 212 °F, maximum point change	± 10
Tensile Strength, 158 °F, maximum % change	± 25
Ultimate Elongation, 212 °F, maximum % change	± 25
Compression, minimum ultimate strength, psi	8000
Apparent Shear Modulus (GA), psi, based on tests conducted at 70 °F to 80 °F under uniform compressive stresses of 500, 1000, and 1500 psi and at applied horizontal shear plus slip strain of 50%. GA is constant in all directions parallel to the bearing plane.	230 ± 30

2. Bearing pads shall be Voss Engineering, Inc., "Fiberlast" expansion bearing pads or approved equal.
3. Cutting of the pads shall be done so that the edges have no tears or other jagged areas.
4. Permissible tolerances of the pad shall be as stated in Chapter 15, Section 5.12.6 of the 2019 AREMA Manual for Railway Engineering.
5. The cap fabricator shall fasten the bearing pads to the cap by using the following procedure: clean pads according to manufacturer's recommendations; prime contact surface and glue to cap with Sikadur 31 Hi-Mod Gel (1:1 mix ratio) or approved equal.

MISCELLANEOUS STEEL NOTES:

1. Materials, fabrication, workmanship and erection per the current AREMA Manual for Railway Engineering, Chapter 15, Steel Structures.
2. Material shall conform to the following requirements:

Rolled Shapes & Plates	ASTM A36
Pipe	ASTM A53 Gr. B
Bolts	ASTM A307 Gr. A
Elastic Locknut	MIL-DTL-32258
Steel Washer	ASTM F436

3. Grating panels and fasteners shall conform to the following requirements:

Grating Fasteners:	
Saddle Clips	F-10 Galvanized Saddle Clips
Socket Cap Screws	SAE J429, Gr. 8, Zinc Coated
Elastic Locknut	MIL-DTL-32258
Steel Washer	ASTM F436
Nylon Washer	Nylon G16

Grating Panels:
Material shall comply with NAAMM Standard MBG 531-17
Size = W-19-4 (1¾ x 3/16 Serrated) Steel Galvanized.

4. Welding requirements:
   A. All welding shall be with the SAW, SMAW, or FCAW process.
   B. All welding per AWS D1.1, Structural Welding Code.
   C. Welders shall possess valid qualifications, including a Procedure Qualification Report (PQR) and Weld Procedure Specification (WPS) for each weld type to be performed as well as documentation verifying that they have performed the specific weld(s) within the prior six months.
5. Miscellaneous steel shall be plain unless noted otherwise.
6. Pieces or assemblies designated as galvanized shall be galvanized after fabrication in accordance with ASTM A123. After galvanizing, all elements shall be free of fins, abrasions, rough or sharp edges, and other surface defects.
7. Bolts and nuts to be zinc plated in accordance with ASTM A153 unless noted otherwise.

CAST-IN-PLACE CONCRETE NOTES:

CONCRETE:

1. All concrete materials, placement, workmanship and testing shall be in accordance with Part 1, Chapter 8 of the current AREMA Manual for Railway Engineering.
2. Minimum compressive strength at 28 days shall be as indicated on the design plans.
3. Exposed surfaces shall be formed in a manner which will produce a smooth and uniform appearance without rubbing or plastering. Exposed edges of 90 degrees or less are to be chamfered ¾" x ¾". Top surface to have a smooth finish, free of all float or trowel marks.
4. Concrete shall be proportioned as follows:

Concrete Strength:	3,000 psi	4,000 psi	5,000 psi	6,000 psi
Max. Water/Cement Ratio (by weight):	0.50	0.45	0.42	0.40
Min. Sacks of Cement per Cu. Yd.:	5.5	6.0	6.5	7.0

5. Flyash replacement may account for up to 25% of the cement by substitution.
6. Cement shall be Type I, Type II or Type III Portland Cement in accordance with ASTM C150 specifications.
7. Aggregates shall be graded in accordance with ASTM C33 specifications. Coarse aggregate shall be no. 67. Fine aggregate shall be natural sand.
8. Allowable air content shall be indicated on the design plans based on the following guidelines:

   Severe Exposure - 5% to 7%
   Exposed to wet freeze-thaw, de-icers, or other aggressive agents.

   Moderate Exposure - 4% to 7%
   Exposed to dry freeze-thaw and no de-icers or other aggresive agents.

   Mild Exposure - 3% to 5%
   Not exposed to freezing, de-icers or other aggressive agents.

9. Admixtures shall not be used without approval by Engineer. Where multiple admixtures are used, it is recommended that all admixtures be obtained from the same company.
10. Where exposed to air, curing shall be accomplished by wet curing or membrane curing compound. Membrane curing compound shall conform to ASTM C309, Type 2.
11. Do not use calcium chloride or any admixture containing intentionally added chloride ions. Testing for chloride ions is not required.
12. Apply a structural bonding agent to construction joints or when placing new concrete against existing concrete. Submit bonding agent to the Engineer for approval.

[Note 13 applies only when specifically stated in the Bill of Material descriptions.]
13. DCI-S, as manufactured by W.R. Grace, or approved alternate shall be added at a quantity of 5 gallons per cubic yard. Calcium nitrite solution shall contain 30% solids and shall provide 15.0 lbs. per cubic yard chloride protection. Mix shall also include 7%, by weight of cement, force 10,000 microsilllica slurry by W.R. Grace or approved addendum shall be used. Adjust weight of concrete mix water for weight of DCI-S used.

REINFORCING STEEL:

1. Reinforcing steel shall be deformed, new billet bars per current ASTM A615 Specifications and to meet grade 60 requirements.
2. Fabrication of reinforcing steel shall be per Chapter 7 of the CRSI Manual of standard practice. Dimensions of bending details are out to out of bar.
3. Reinforcing steel is to be blocked to proper location and securely wired against displacement. Tie wires shall be installed at every other bar intersection so that at least 50% of the intersections are tied. Tack welding of reinforcing is prohibited. Minimum concrete cover on reinforcement not otherwise noted shall meet current AREMA Manual for Railway Engineering requirements.

[Note 4 applies only when specifically stated in the Bill of Material descriptions.]
4. Reinforcing steel shall be epoxy coated per ASTM A775 specifications meeting Annex A1 for epoxy coating.

EMBEDDED STEEL:

1. Steel plate shall conform to ASTM A36 OR A709-Grade 36 Specifications. Studs shall be C1015, C1017 or C1020 cold drawn steel which conform to ASTM A108 Specifications.
2. Deformed bar anchors shall conform to ASTM A706 specifications. Welding of deformed bar anchors shall conform to AWS D1.4. Welding shall be performed by certified welder.
3. Where galvanizing is not indicated, material shall be plain.

REVISIONS			DESIGN BY: HDR	DRAWN BY: HDR	CHECKED BY: AJB
DATE	LTR.	DESCRIPTION	APPROVED:		
/					
/					
/					
/					
/					
/					

05-04-2020
UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

CONCRETE BEAM BRIDGES

PIECE FABRICATION NOTES

FILE OWNER: UPRR	DATE: APRIL, 2020
PLAN NO.: 531100	SHEET: T3

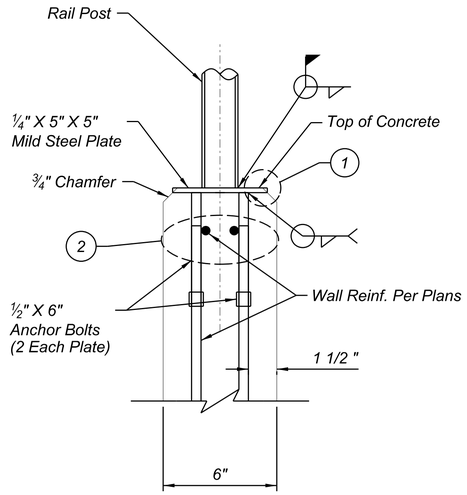
Copyright © 2020 by Union Pacific Railroad
PLOTTED: 5/26/2023 8:48:17 AM

FILE NAME: P:\Standards\0_Bridges (Concrete)\0-Active\531XX - Single Track - Deep Caps\Staging\531100 - Single Track Construction Drawings.dgn

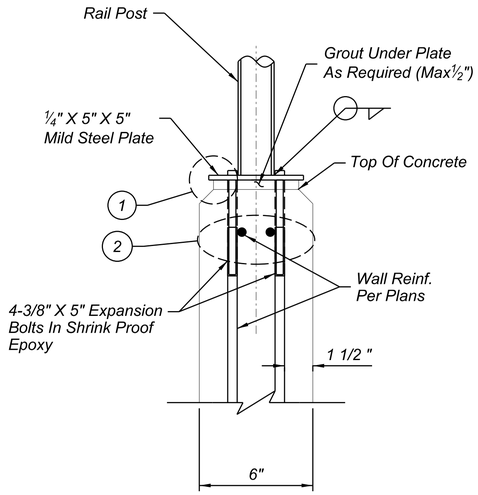
INCHES 1 2 3 4 5 6 7 8 9 10 11 12

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	AZ	X	XXX	XX	

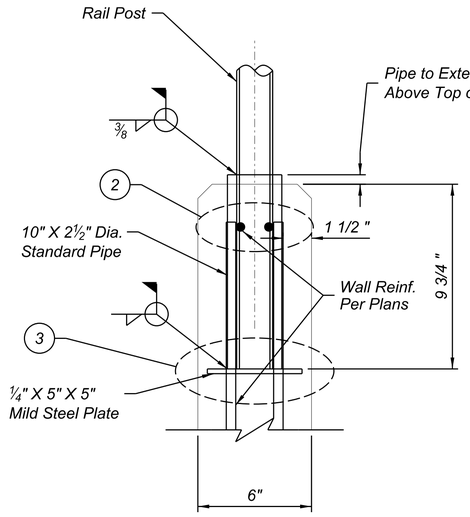
MAG DETAIL 145 EXISTING ISSUES



TYPE 1- (6" Wall)
Scale: 1"=0'-4"



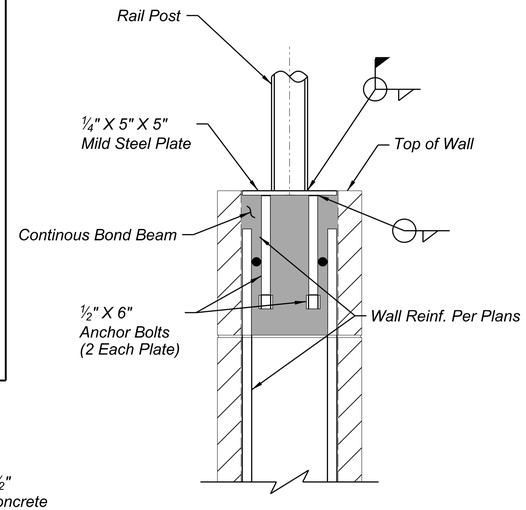
TYPE 2- (6" Wall)
Scale: 1"=0'-4"



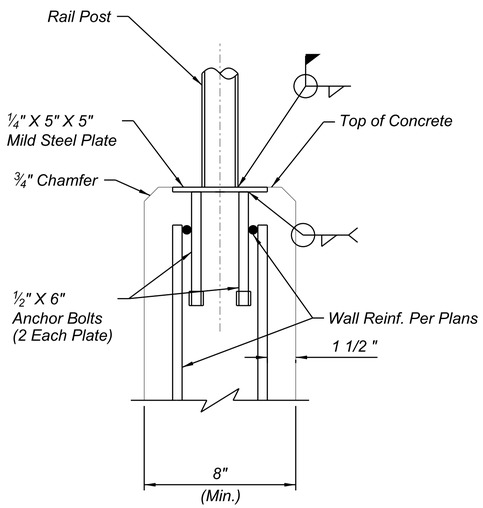
TYPE 3- (6" Wall)
Scale: 1"=0'-4"

STRUCTURAL PROBLEMS

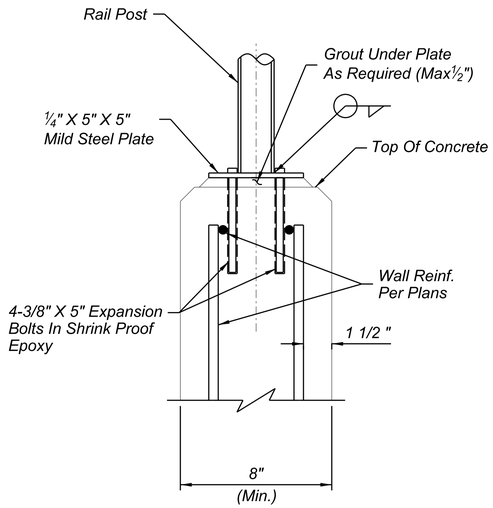
1. *STEEL PLATE CORNER EXPOSED*
2. *CONFLICTS WITH NOTE 6. "THE EMBEDMENT FOR ANCHOR TYPES 1,2, & 3 SHALL BE LOCATED INSIDE THE WALL REINFORCEMENT CAGE".*
3. *LESS THAN MINIMUM REQUIRED CONCRETE COVER.*



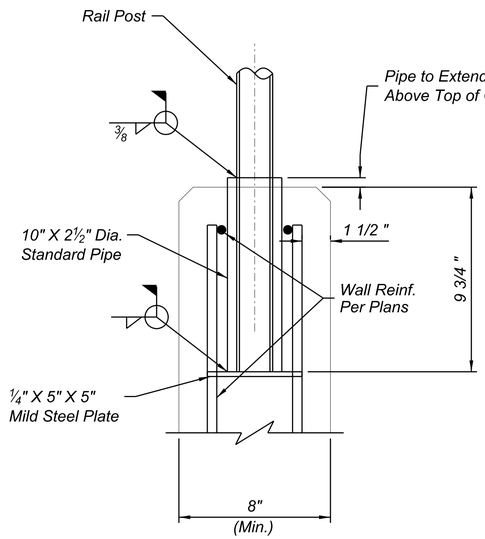
TYPE 5- (8" CMU Wall)
Scale: 1"=0'-4"



TYPE 1- (8" Wall)
Scale: 1"=0'-4"



TYPE 2- (8" Wall)
Scale: 1"=0'-4"



TYPE 3- (8" Wall)
Scale: 1"=0'-4"

MAG DETAIL 145 PROPOSED

NO.	REVISION	BY	DATE
3			
2			
1			

MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION

MAG DETAIL 145

		BY	DATE
PRELIMINARY NOT FOR CONSTRUCTION	DESIGNED	A.N. ENGINEER	XX/XX/XX
	DRAWN	A. TECHNICIAN	XX/XX/XX
	CHECKED	A.N. ENGINEER	XX/XX/XX

XXX

SHEET XXX OF XX

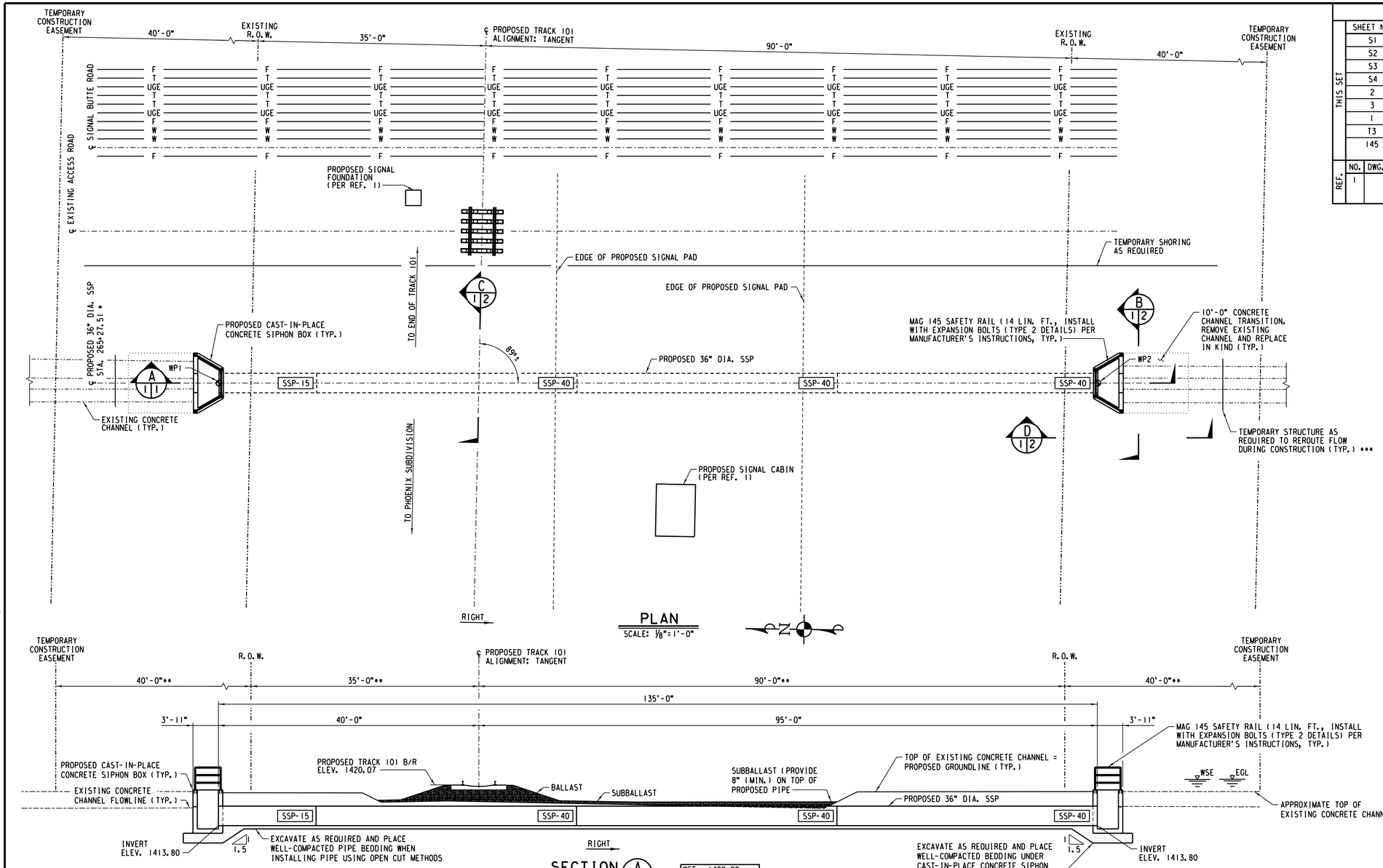
TRACS NO.

Contact Arizona 811 Two Working Days Before You Dig
Call 811 or Click Arizona811.com

8:16:49 AM 3/8/2018

F:\Safety Rail\SD_Safety Rail Details.dgn

DESIGN SHEET



WSE = 1420.90
EGL = 1420.93
VEL = 1.41 fps

MATERIAL NOTE:
CEMENT SHALL BE TYPE II OR TYPE III PORTLAND CEMENT IN ACCORDANCE WITH ASTM C150 SPECIFICATIONS.

DRAWING SCHEDULE

	SHEET NO.	PLAN NO.	DESCRIPTION	TYPE
THIS SET	S1	123251	GENERAL ARRANGEMENT	DESIGN
	S2	123251	TYPICAL SECTIONS AND CONSTRUCTION DETAILS	DESIGN
	S3	123251	CAST-IN-PLACE CONCRETE SIPHON BOX DETAILS (SHEET 1 OF 2)	DESIGN
	S4	123251	CAST-IN-PLACE CONCRETE SIPHON BOX DETAILS (SHEET 2 OF 2)	DESIGN
	2	680000	DETAILS FOR ROUND STEEL PIPE CULVERTS	STANDARD
	3	680000	GENERAL NOTES FOR ROUND STEEL PIPE CULVERTS	STANDARD
	1	680010	CONSTRUCTION NOTES AND TABLE FOR SMOOTH STEEL PIPE CULVERTS	STANDARD
	T3	531100	PIECE FABRICATION NOTES	STANDARD
	145	-	SAFETY RAIL	MAG STANDARD

REF.	NO.	DWG. NO.	SHEET NO.	REV. NO.	DESCRIPTION	TYPE
	1	-	P033 OF 037 T012 OF 012 X101 OF 143	-	MESA, ARIZONA, PHOENIX SUBDIVISION, MP 934.78 TO MP 937.83, CONSTRUCT INDUSTRIAL LEAD TRACK, 100% PLANS, ISSUED FOR BID, DATED MARCH 6, 2023	DESIGN

***NOTES:
1. FLOW SHALL BE REROUTED TEMPORARILY AS REQUIRED FOR CONSTRUCTION. CONSTRUCTOR IS RESPONSIBLE FOR ANY TEMPORARY STRUCTURES REQUIRED AND SHALL SUBMIT PLANS AND CALCULATIONS TO UPRR FOR APPROVAL AT LEAST 2 WEEKS PRIOR TO CONSTRUCTION.
2. AFTER CONSTRUCTION, CONSTRUCTOR SHALL REROUTE FLOW BACK TO ORIGINAL ALIGNMENT AND RESTORE AREA TO ORIGINAL CONDITION OR BETTER.

WORK POINT TABLE

WORK POINT	NORTHING	EASTING
WP1	832684.80	796695.62
WP2	832549.80	796696.94

F = FIBER OPTIC LINE
T = TELEPHONE LINE
UGE = UNDERGROUND ELECTRIC LINE
W = WATER LINE

NOTES:
1. * = STATIONING IS TAKEN AT CENTERLINE OF PROPOSED TRACK 101.
2. ** = MEASURED PERPENDICULAR TO PROPOSED TRACK 101.
3. CONSTRUCTOR TO FIELD VERIFY ALL STATIONS ELEVATIONS AND DIMENSIONS PRIOR TO CONSTRUCTION. IF CONFLICTS OR INCONSISTENCIES ARE ANTICIPATED, NOTIFY UPRR.
4. LOCATION OF UTILITIES IS APPROXIMATE. UTILITIES SHALL BE VERIFIED PRIOR TO CONSTRUCTION. NOTIFY ARIZONA 811, 1-800-782-5348, AT LEAST 48 HOURS PRIOR TO CONSTRUCTION.

LETTER SERIES
SHEET NO. CUT ON
SHEET NO. SHOWN ON

SECTION DESIGNATION

BILL OF MATERIAL

REQ'D.	UNIT	DESCRIPTION	STORE ITEM NO.	ORDERED BY
3	EA	CULVERT, SMOOTH STEEL PIPE 36" DIA. X 3/8" WALL X 40' LONG, ASTM A139, GR. B OR ASTM A252, GR. 3 (PER STD PLAN NO. 680010)	510-3010	CONSTRUCTOR
1	EA	CULVERT, SMOOTH STEEL PIPE 36" DIA. X 3/8" WALL X 15' LONG, ASTM A139, GR. B OR ASTM A252, GR. 3 (PER STD PLAN NO. 680010)		
28	LIN. FT.	MARICOPA ASSOCIATION OF GOVERNMENTS (MAG) 145 SAFETY RAIL (TWO LOCATIONS, WITH EXPANSION BOLTS (TYPE 2 DETAILS) AND ALL OTHER ASSOCIATED HARDWARE) OR APPROVED ALTERNATE		
8	EA	3/4" DIA. x 8" WELDED STUD (PER DETAILS, SHEET NO. S2)		
45	CU. YD.	PIPE BEDDING (PER STD. DWG. 680000 SHT. 3)		
2	LOT	REINFORCING STEEL FOR CONCRETE SIPHON BOX (PER NOTES, STD. DWG. 531100, SHT. NO. T3 AND SCHEDULE, SHEET NO. S3)		
10	CU. YD.	4000 PSI CONCRETE FOR CONCRETE SIPHON BOX PER NOTES, STD. DWG. 531100, SHT. NO. T3 AND DETAILS, SHEET NOS. S3-S4)		
20	LIN. FT.	SIKA HYDROTITE WATERSTOP, PROFILE CJ-0725-3K, OR APPROVED ALTERNATE		
1	LOT	EPOGRIP MULTIPURPOSE STRUCTURAL BONDING AND GROUTING EPOXY ADHESIVE OR APPROVED ALTERNATE		
1	EA.	CULVERT MARKER SIGNS, MOUNTING POST AND MOUNTING HARDWARE (PER STD. DWG. 0502, 0507 AND 0599)	P00-2616	
2	LOT	CONCRETE CHANNEL TRANSITION MATERIAL		
1	LOT	FILL MATERIAL (PER STD. DWG. 680000 SHT. 3 AND REF. 1)		
1	LOT	TEMPORARY FORMWORK MATERIAL		
1	LOT	TEMPORARY SHORING		
1	LOT	TEMPORARY STRUCTURE TO REROUTE FLOW		

CLSM MAY BE SUBSTITUTED FOR FILL MATERIAL.
BULK QUANTITIES ARE ESTIMATED.

DESIGN NOTES

LAYOUT

1. Stationing: Per Ref. 1.
2. Elevation Datum: Per Ref. 1.
3. Temporary Benchmarks:
   TBM 1 (Olsson CP 4): Elev. 1390.42, NAVD 1988, established by 1/2" rebar located in ground West of proposed Culvert No. 5.02, 9,606.96' left of existing Phoenix Sub. Main Track centerline, Sta. 1588+58.48.
   TBM 2 (Olsson CP 5): Elev. 1391.63, NAVD 1988, established by 1/2" rebar located in ground West of proposed Culvert No. 5.02, 9,311.99' left of existing Phoenix Sub. Main Track centerline, Sta. 1590+90.31.
4. Profile: Proposed Track 101 per Ref. 1.
5. Alignment: Tangent.
6. Information used to prepare this drawing in addition to reference drawings:
   Hydrologic & Hydraulic Evaluation prepared by Olsson, dated September 2022.

DESIGN

1. The proposed cast-in-place concrete siphon box has been designed in accordance with the AREMA Manual for Railway Engineering, Chapter 8: Concrete Structures and Foundations The proposed cast-in-place concrete siphon box has been designed for lateral earth pressure and a construction surcharge of 250 psf.
2. The SSP has been designed for Cooper E80 Live Load with impact and cover depth ranging from 1'-6" to 18'-0" and HS-20 loading with cover depth ranging from 0'-8" to 18'-0".

POSTCONSTRUCTION COMPLIANCE

Constructor in charge of construction to provide to the office of the Senior Manager Structures Design as-built drawings confirming that the project was constructed in compliance with the plans and indicating any construction variances.

SIGNED

In Charge of Construction — Date

Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 07-05-2023 ARIZONA, U.S.A.

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL — STATUS
07/05/2023 — DATE

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
CONSULTANT ENGINEER — 04/03/2023 DATE

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123251

LATITUDE: 33.28816°N LONGITUDE: 111.60062°W

DSN/CHK BY:	JAS/MJH
DRAWN/CHK BY:	FAM/JAS
UPRR ENGINEER:	ADS
SHT NO.:	S1 of S4

UNION PACIFIC RAILROAD

Office of Director Structures Design

LOCATION & DESCRIPTION: CULVERT 5.02, PIRATE IND LEAD

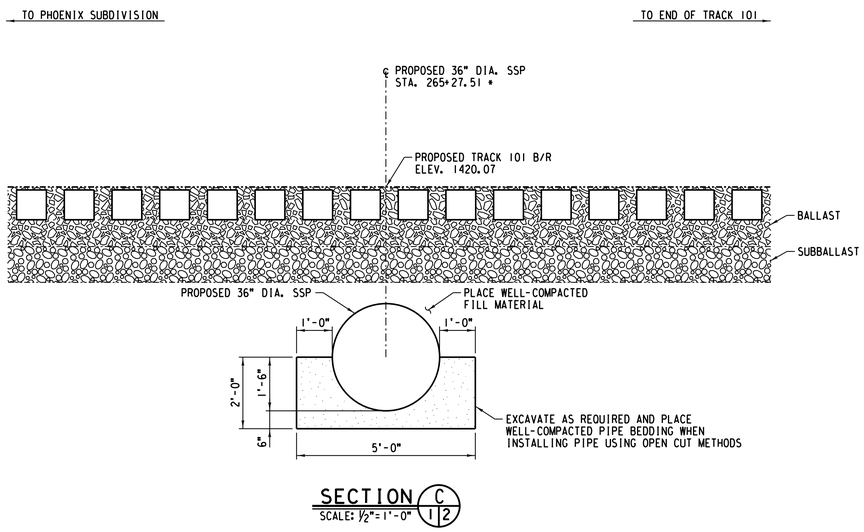
FURNISH & INSTALL
1-36" DIA. SSP x 135' AND SIPHON BOXES

SHEET TITLE: GENERAL ARRANGEMENT

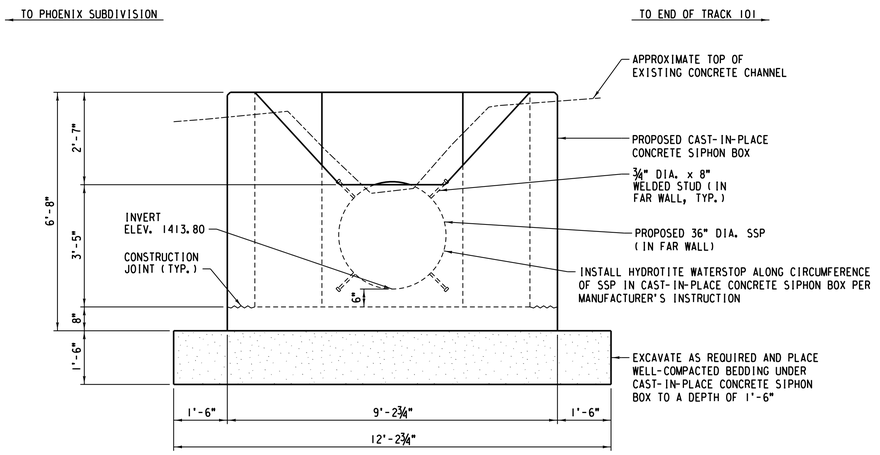
FILE NAME: \\oa.ad.oaconsulting.com\fnts-na\projects\2020\0503-10000\020-0927.40 Design\Microstation\020-0927.PLER.July 5, 02 Sta. 265+27.00\Pirate Ind Lead_5.02.cad.dgn

PLOTTED: 7/7/2023 12:53:28 PM

DESIGN SHEET

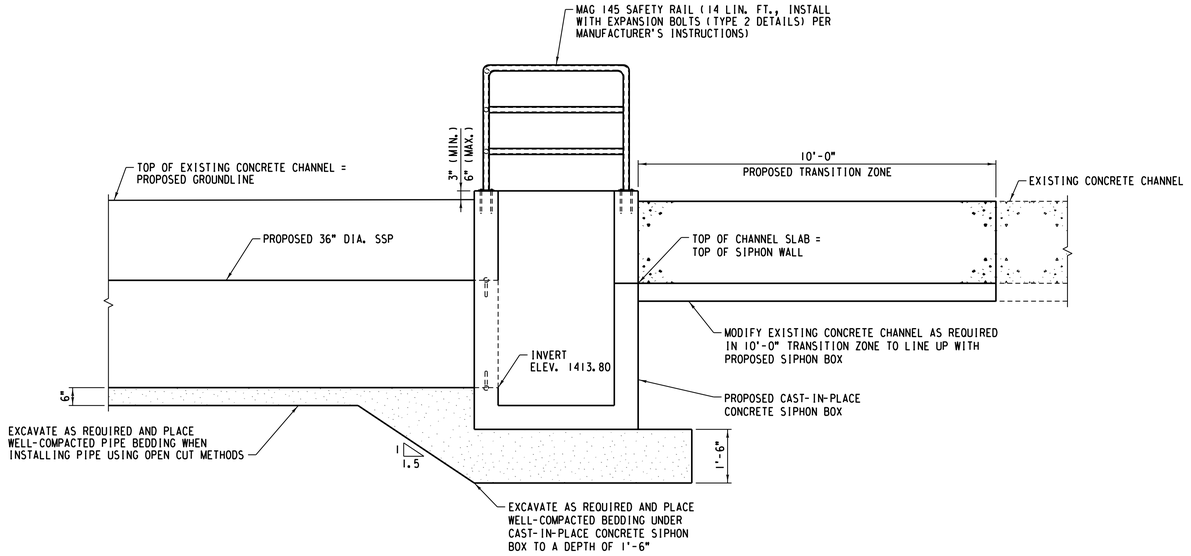


SECTION C
SCALE: ½"=1'-0" 1|2



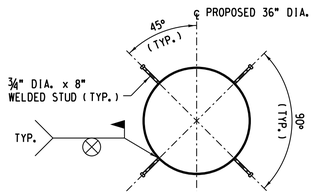
NOTES:
1. PROPOSED MAG 145 SAFETY RAIL NOT SHOWN FOR CLARITY.
2. CONSTRUCTOR SHALL COORDINATE TEMPORARY OPEN CUT AND/OR SHORING WITH UPRR AND ARIZONA STATE LAND DEPARTMENT PRIOR TO CONSTRUCTION.

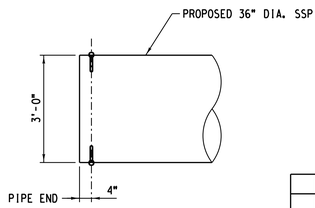
SECTION B
SCALE: ½"=1'-0" 1|2
SOUTH SIPHON BOX SHOWN,
NORTH SIPHON BOX SIMILAR



SECTION D
SCALE: ½"=1'-0" 1|2
SOUTH SIPHON BOX SHOWN,
NORTH SIPHON BOX SIMILAR

NOTE:
CONSTRUCTOR SHALL SUBMIT PLANS FOR PROPOSED CONCRETE CHANNEL TRANSITION ZONE TO UPRR FOR APPROVAL PRIOR TO CONSTRUCTION.





NOTES:
1. INSTALL STUDS AFTER PIPE IS IN PLACE.
2. STUDS SHALL BE C1015, C1017 OR C1020 COLD DRAWN STEEL WHICH CONFORMS TO ASTM A108 SPECIFICATIONS.

ANCHOR LOCATION DETAIL
SCALE: ½"=1'-0"

NOTE:
* = STATIONING IS TAKEN AT CENTERLINE OF PROPOSED TRACK 101.

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL — STATUS — 07/05/2023 DATE

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
Kyle Stubs — CONSULTANT ENGINEER — 04/03/2023 DATE

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123251

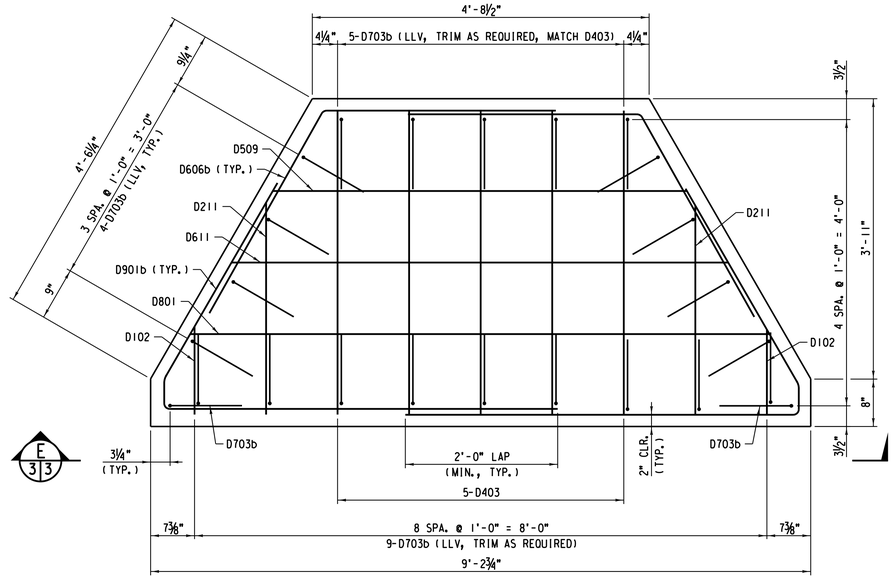
LATITUDE: 33.28816°N LONGITUDE: 111.60062°W

DSN/CHK BY: JAS/MJH	UNION PACIFIC RAILROAD
DRAWN/CHK BY: FAM/JAS	Office of Director Structures Design
UPRR ENGINEER: ADS	LOCATION & DESCRIPTION: CULVERT 5.02, PIRATE IND LEAD
SHT NO.: S2 of S4	FURNISH & INSTALL 1-36" DIA. SSP x 135' AND SIPHON BOXES
	SHEET TITLE: TYPICAL SECTIONS AND CONSTRUCTION DETAILS

FILE NAME: \\oa.ad.oaconsulting.com\fnts-na1\projects\2020\050\10000\020\0927\40\Design\Microstation\020-0927-RLBR_Culv 5.02_Sta. 265+27.00_Pirate Ind Lead_5.02_cas.dgn

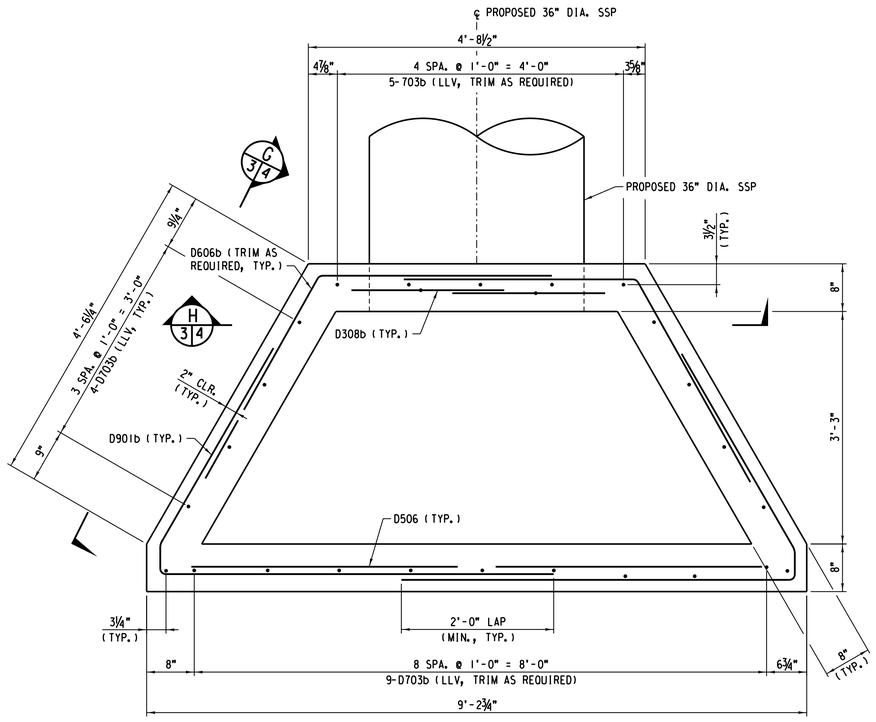
PLOTTED: 7/7/2023 12:53:28 PM

DESIGN SHEET



REINFORCING PLAN AT APRON

SCALE: 1"=1'-0"



SECTION F

SCALE: 1"=1'-0" F 3|3

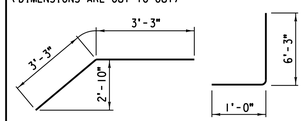
REINFORCING SCHEDULE

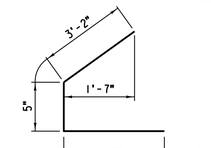
(QUANTITY PER SIPHON BOX)

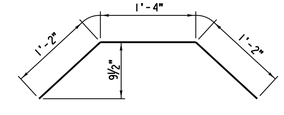
TOTAL	MARK	SIZE	LENGTH	SHAPE
2	D102	#5	1'-2"	
2	D211	#5	2'-11"	
4	D308b	#5	3'-8"	
5	D403	#5	4'-3"	
2	D404b	#5	4'-4"	
2	D501b	#5	5'-1"	
2	D506	#5	5'-6"	
1	D509	#5	5'-9"	
2	D510b	#5	5'-10"	
16	D606b	#5	6'-6"	
1	D611	#5	6'-11"	
24	D703b	#5	7'-3"	
1	D801	#5	8'-1"	
10	D901b	#5	9'-1"	

BENDING DIAGRAM

(DIMENSIONS ARE OUT TO OUT)

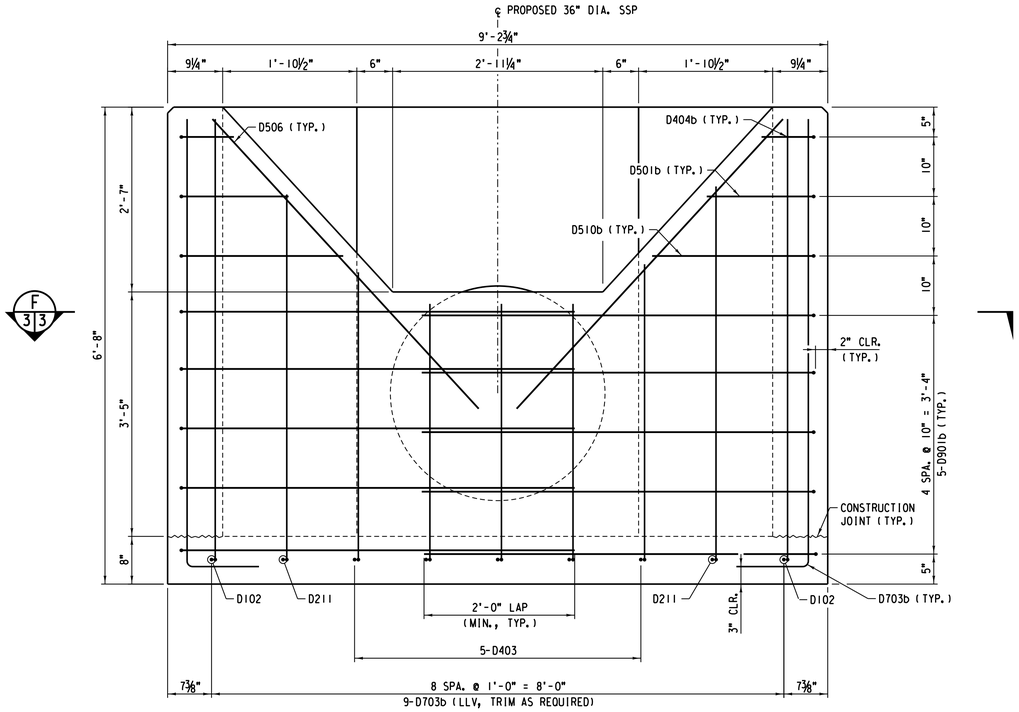






NOTE:
BAR DESIGNATIONS CONSIST OF BAR SIZE & LENGTH FOLLOWED BY THE LETTER "b" IF BENT. BAR SIZES ARE REPRESENTED BY THE LETTERS A THROUGH L CORRESPONDING TO BAR SIZE #2 THROUGH #18. BAR LENGTHS ARE GIVEN IN FEET AND INCHES; THE LAST TWO DIGITS ARE INCHES.

EST. WT. OF REINFORCING STEEL = 500 LB.



VIEW E

SCALE: 1"=1'-0" E 3|3

NOTES:
1. CONSTRUCTOR SHALL MINIMALLY ADJUST REINFORCING LOCATIONS AS REQUIRED TO ACCOMMODATE INSTALLATION OF SAFETY RAIL EXPANSION ANCHORS.
2. LLV = LONG LEG VERTICAL

CONCRETE PLACEMENT QUANTITIES

(PER SIPHON BOX)

ITEM	UNIT	QTY.
BOTTOM SLAB	CU. YD.	0.9
WALLS	CU. YD.	2.9

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL — STATUS
07/05/2023 — DATE

Registered Professional Engineer (Civil) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 07-05-2023 ARIZONA U.S.A.

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
Kyle Stubs
CONSULTANT ENGINEER — 04/03/2023 DATE

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123251

LATITUDE: 33.28816°N LONGITUDE: 111.60062°W

DSN/CHK BY:	JAS/MJH
DRAWN/CHK BY:	FAM/JAS
UPRR ENGINEER:	ADS
SHT NO.:	S3 of S4

UNION PACIFIC RAILROAD

Office of Director Structures Design

LOCATION & DESCRIPTION: CULVERT 5.02, PIRATE IND LEAD

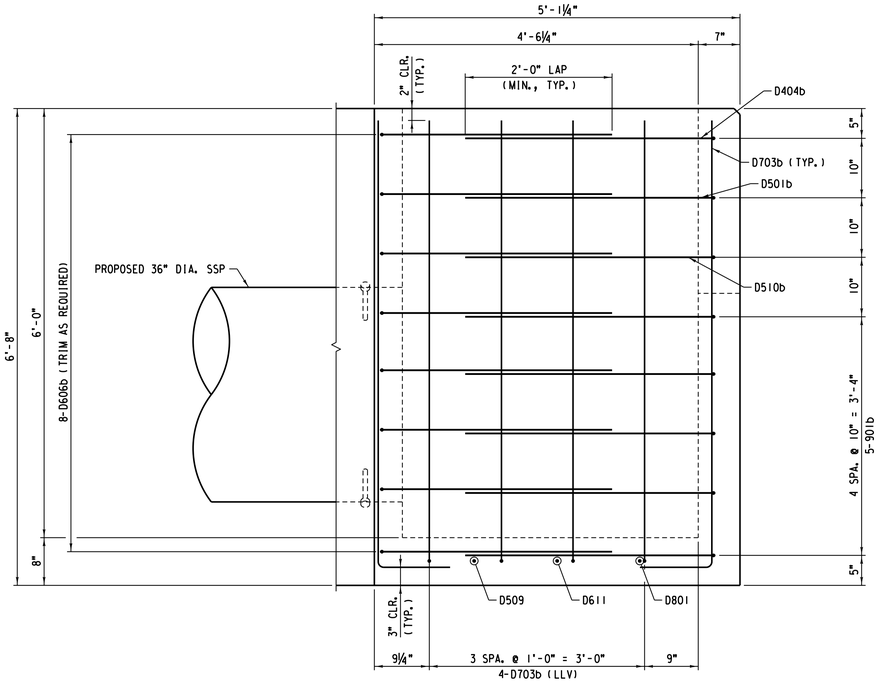
FURNISH & INSTALL
1-36" DIA. SSP x 135' AND SIPHON BOXES

SHEET TITLE: CAST-IN-PLACE CONCRETE SIPHON BOX DETAILS (SHEET 1 OF 2)

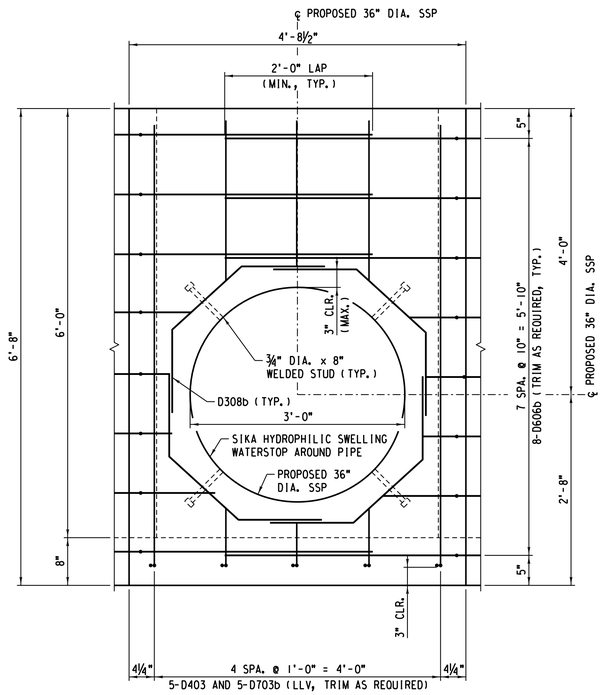
FILE NAME: \\oa.ad.oaconsulting.com\fnts-mail\projects\2020\0501-10000\020-0927\40-Design\Microstation\020-0927-RLBR Culv 5.02 Sta. 265+27.00 Pirate Ind Lead 5.02_cas.dgn

PLOTTED: 7/7/2023 12:53:28 PM

DESIGN SHEET



VIEW G (3|4)
SCALE: 1"=1'-0"



SECTION H (3|4)
SCALE: 1"=1'-0"

NOTES:
1. CONSTRUCTOR SHALL MINIMALLY ADJUST REINFORCING LOCATIONS AS REQUIRED TO ACCOMMODATE INSTALLATION OF SAFETY RAIL EXPANSION ANCHORS.
2. LLV = LONG LEG VERTICAL

NO.	DATE	REVISIONS
	/ /	
	/ /	

COMPLETION STATUS:
FINAL (STATUS) 07/05/2023 (DATE)

olsson

APPROVED FOR UNION PACIFIC RAILROAD BY:
CONSULTANT ENGINEER 04/03/2023 (DATE)

Registered Professional Engineer (Cont'd) CERTIFICATE NO. 75691 MARK J. HANIGAN Date Signed 07-05-2023 ARIZONA U.S.A.

PROJECT ID:	WORK ORDER:	C E NUMBER:
115884	54975	123251

LATITUDE: 33.28816°N LONGITUDE: 111.60062°W

UNION PACIFIC

DSN/CHK BY: JAS/MJH
DRAWN/CHK BY: FAM/JAS
UPRR ENGINEER: ADS
SHT NO.: S4 of S4

UNION PACIFIC RAILROAD
Office of Director Structures Design

LOCATION & DESCRIPTION: CULVERT 5.02, PIRATE IND LEAD

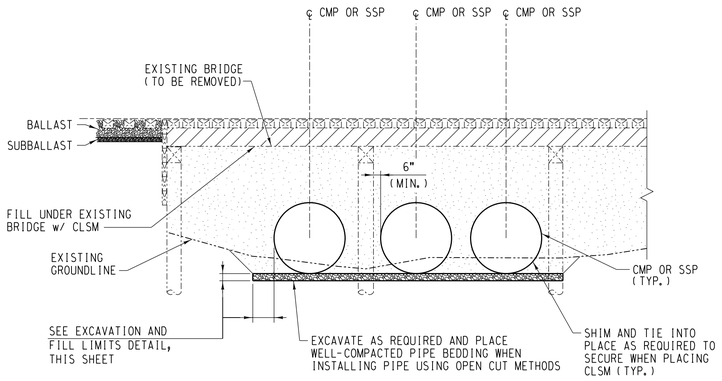
FURNISH & INSTALL
1-36" DIA. SSP x 135' AND SIPHON BOXES

SHEET TITLE: CAST-IN-PLACE CONCRETE SIPHON BOX DETAILS (SHEET 2 OF 2)

FILE NAME: \\oa.ad.oaconsulting.com\fnts-na1\projects\2220\050\11000\020\0927\40-Design\Microstation\020-0927-RLBR Culv 5.02 Sta. 265+27.00 Pirate Ind Lead 5.02_cnst_dgn

PLOTTED: 7/7/2023 12:53:29 PM

STANDARD SHEET

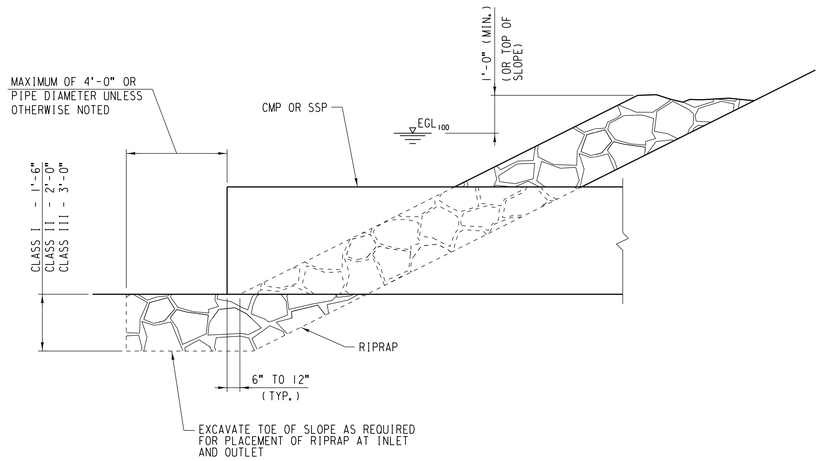


UNDER STRUCTURE - SECTION

SCALE: 3/16"=1'-0"

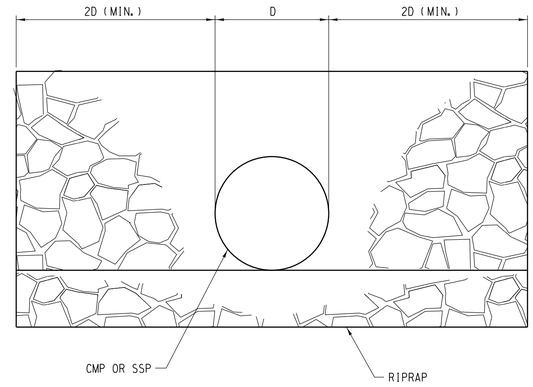
LIMITS OF REMOVAL

REMOVE EXISTING STRUCTURE TO 1'-0" (MIN.) BELOW PROPOSED EMBANKMENT SLOPE AND 2'-6" (MIN.) BELOW BASE OF RAIL.



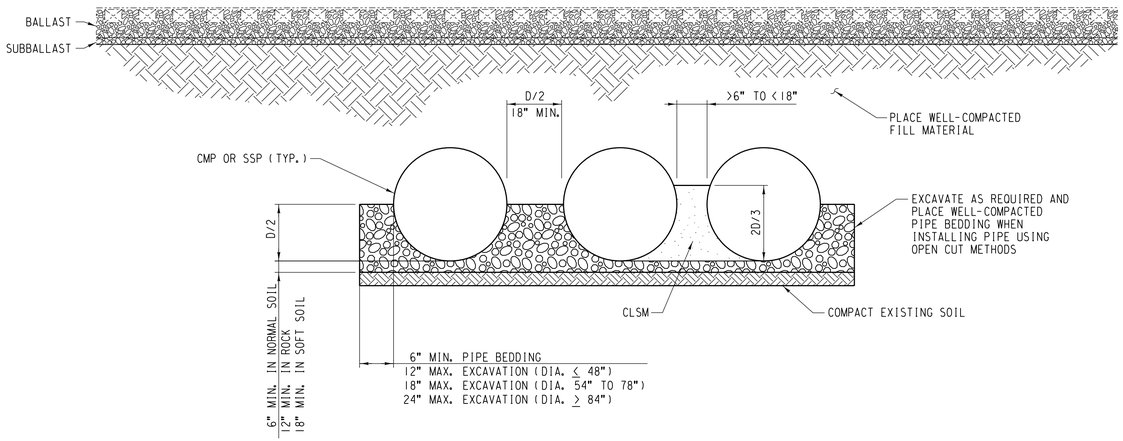
RIPRAP - SECTION

SCALE: NONE



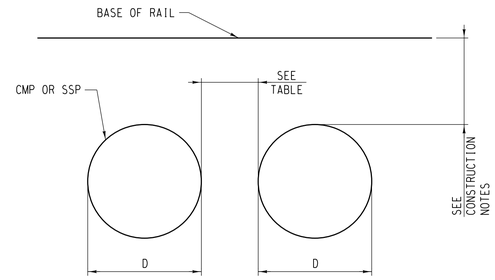
RIPRAP - ELEVATION

SCALE: NONE



EXCAVATION AND FILL LIMITS

SCALE: NONE



SPACING CHART	
PIPE DIAMETER	MIN. SPACING BETWEEN PIPES
12" to 24"	12"
24" to 96"	D/2
96" OR MORE	48"

MINIMUM PIPE SPACING AND COVER

SCALE: NONE

REVISIONS		
DATE	LTR.	DESCRIPTION
02/12	A	ADDED RIPRAP SECTION
04/19	D	UPDATED DETAILS
/		
/		
/		
/		

DESIGN BY: CLJ | DRAWN BY: KDM | CHECKED BY: CLJ

APPROVED:

George J. Meyn 4/4/08

UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

DETAILS FOR ROUND STEEL PIPE CULVERTS

FILE OWNER: UPRR | DATE:

PLAN NO.: 680000 | SHEET: 2 OF 3

Copyright © 2007 by Union Pacific Railroad PLOTTED: 8/12/2021 10:04:26 AM

FILE NAME: P:\Standards\Culverts (CMP&SSP)\0-Active\steelpip_std.dgn

STANDARD SHEET

GENERAL NOTES

GENERAL

1. All work requirements shown on these drawings and not otherwise detailed shall be accomplished as specified in Union Pacific Railroad (UPRR) Specifications and the American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual for Railway Engineering. In the event of conflicts between specifications, the more restrictive shall apply.

2. **Construction means and methods shall comply with the All Permits Issued (API) package.**

3. Field verify all dimensions, stations and elevations prior to start of construction.

4. **Contact the Union Pacific "Call Before You Dig" number 90 days (not less than 60 days) prior to proposed construction start date. Prior to construction, confirm that all necessary relocations have been completed. The CBYD number is: 1-800-336-9193.**

5. **Location of known utilities is approximate. Location shall be verified prior to construction. Notify Call811 "Call Before you Dig" number at least 48 hours prior to construction.**

GRADING

1. Provide and place all fill and subballast material per UPRR Grading Specifications. Perform grading as required to drain and match existing embankments and upstream and downstream channel flowline.

2. Perform grading as required for construction of the new structure and replace areas removed and disturbed in the course of construction to a condition equal to or better than existing.

WELL COMPACTED FILL

1. Well compacted fill shall be well graded granular soil free of any organic material, stones larger than 1½ inches, frozen lumps, debris or excessive moisture. Fill shall be compacted to 95% of maximum dry density as defined in ASTM International D1557 (Modified Proctor). Fill shall be placed and compacted in layers not to exceed 6 inches. Fill shall be placed simultaneously on both sides of the pipe and between multiple pipes. CLSM may be used in lieu of well compacted fill.

CONTROLLED LOW-STRENGTH MATERIAL (CLSM) FILL

1. Controlled Low-Strength Material is a self-compacting, cementitious fill material with an unconfined compressive strength of 50 to 300 psi. The mixture shall consist of water, Portland cement, fly ash, and sound fine or coarse aggregate or both. The mix design shall allow adequate flowability without segregation of aggregates. Hardening time is of prime importance and CLSM should develop 50 psi in about one hour. The maximum layer of thickness for CLSM shall be 3 feet. Additional layers shall not be placed until the CLSM has lost sufficient moisture to be walked on without indenting more than two inches. Pipe spacing may be reduced to between 6" and 18" when using CLSM in lieu of well compacted pipe bedding between pipes.

PIPE BEDDING

1. Pipe bedding shall be granular material such as aggregates ordinarily specified and used in the construction of highway base and subbase. These aggregates include crushed stone, natural or crushed gravel, natural or manufactured sands, crushed slag or a homogeneous mixture of these materials. Pipe bedding shall be compacted to 95% of maximum dry density as defined in ASTM International D1557 (Modified Proctor). Recommended gradation is as follows:

SCREEN SIZE	% PASSING (BY WEIGHT)
1 inch	100
½ inch	60-90
⅜ inch	20-40
No. 4	10-20
No. 200	less than 5%

2. Union Pacific sealant ballast, item no. 562-5428, may be used.

RIPRAP:

1. Class of riprap shall be specified by the engineer. Riprap shall be placed in such a manner as to avoid segregation of various sizes of rock, and distributed so that there will be no large accumulation of either the larger or smaller sizes of stone. Individual rocks shall be placed in tight contact with one another in such a way to produce the least amount of void spaces. Riprap shall be solid, unfractured rock or concrete, bulky in shape with sharp angular edges.

2. Individual rocks shall vary as shown:

RIPRAP CLASS	AVERAGE WEIGHT PER STONE (LBS.)	DIMENSION (INCHES)	ITEM NO.	UNIT OF MEASURE	LAYER THICKNESS	TYPICAL VELOCITIES
I	50 to 200	9 to 14	562-2764	Ton	1'-6"	6 - 8 fps
II	200 to 1,000	14 to 24	562-3430	Ton	2'-0"	8 - 12 fps
III	1,000 to 4,000	24 to 38	562-4096	Ton	3'-0"	> 12 fps

3. The entire mass of riprap shall be well distributed within the limits specified. However, the following allowances shall be acceptable to produce the required riprap protection:

   Riprap Class I - No allowances are permitted
   Riprap Class II - 15% of Riprap Class I.
   Riprap Class III - 15% of Riprap Class I and 15% of Riprap Class II.

CONSTRUCTOR NOTES (WHEN APPLICABLE)

CONSTRUCTOR DEFINITION

1. Constructor designates Manager Bridge Construction if construction by UPRR and Contractor if construction by Contractor.

DIVISION OF RESPONSIBILITY

A. RAILROAD

1. Provide material as shown in the Bill of Material.

2. Provide and install Private Property/No Trespassing sign and culvert marker sign on right side at low mile post end of culvert.

B. CONSTRUCTOR

1. Coordinate all construction activities with the Railroad.

2. **Before ordering any material, Constructor shall make a detailed field inspection of the site verifying all pertinent dimensions and elevations. Any variations in dimensions or elevations from those shown on the drawings shall be reported immediately to the UPRR Project Manager.**

3. Any modifications to this design shall be approved by the UPRR Office of Director Structures Design prior to construction.

4. **Verify the location, relocation, abandonment, and/or temporary support of all utilities affected by the construction of the structure and embankment and coordinate these activities with the appropriate utility companies, agencies and/or authorities.**

5. Apply for and obtain all construction permits necessary to perform the work.

6. Bill of Material and Schedules are provided for information only. Constructor shall be responsible for providing all material, not provided by the Railroad, required to complete the work.

7. Perform all work not performed by the Railroad.

8. Provide the Railroad with a detailed construction plan defining the activity, schedule and procedure for each aspect of the work. Construction shall not begin until the construction plan has been approved by the Railroad.

9. Provide all temporary structures (shoring, bracing and/or falsework) required to support and protect the existing embankments and structures affected by the work. Provide the Railroad with details, design and procedure for all temporary structures. All temporary structures shall be designed, signed and sealed by a professional engineer registered in the State that the structure is to be constructed. All temporary structures shall be approved by the UPRR Office of Director Structures Design prior to beginning construction.

10. Direct channel flow as required to perform work.

11. Accomplish activities within the schedule specified in the approved construction plan.

REVISIONS		
DATE	LTR.	DESCRIPTION
02/12	A	RELOCATED GENERAL NOTES
6/13	B	CHANGED FILL REQUIREMENTS
7/14	C	CHANGED FILL REQUIREMENTS
04/19	D	UPDATED NOTES
/		
/		

DESIGN BY: CLJ | DRAWN BY: KDM | CHECKED BY: CLJ

APPROVED:

George J. Meyn 4/4/08

UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

GENERAL NOTES FOR ROUND STEEL PIPE CULVERTS

FILE OWNER: UPRR | DATE:

PLAN NO.: 680000 | SHEET: 3 OF 3

FILE NAME: P:\!Standards\Culverts (CMP&SSP)\0-Active\steelpip_std.dgn

Copyright © 2007 by Union Pacific Railroad PLOTTED: 8/12/2021 10:04:39 AM

STANDARD SHEET

TABLE 1 - SMOOTH STEEL PIPE																								
OUTSIDE PIPE DIAMETER	THICKNESS (IN.)	WEIGHT (LB./FT.)	COVER * MIN. (FT.)	COVER * MAX. (FT.)	10'-0" LENGTH ITEM NO.	10'-0" LENGTH WEIGHT (LB.)	12'-0" LENGTH ITEM NO.	12'-0" LENGTH WEIGHT (LB.)	14'-0" LENGTH ITEM NO.	14'-0" LENGTH WEIGHT (LB.)	16'-0" LENGTH ITEM NO.	16'-0" LENGTH WEIGHT (LB.)	18'-0" LENGTH ITEM NO.	18'-0" LENGTH WEIGHT (LB.)	20'-0" LENGTH ITEM NO.	20'-0" LENGTH WEIGHT (LB.)	22'-0" LENGTH ITEM NO.	22'-0" LENGTH WEIGHT (LB.)	24'-0" LENGTH ITEM NO.	24'-0" LENGTH WEIGHT (LB.)	30'-0" LENGTH ITEM NO.	30'-0" LENGTH WEIGHT (LB.)	40'-0" LENGTH ITEM NO.	40'-0" LENGTH WEIGHT (LB.)	STORE ITEMS PER L.F.
36"	3/8	190	1'-6"	18'-0"	510-3000	1,900	510-3001	2,280	510-3002	2,660	510-3003	3,040	510-3004	3,420	510-3006	3,800	510-3007	4,180	510-3008	4,560	510-3009	5,700	510-3010	7,600	510-3285
42"	1/2	222	1'-6"	18'-0"	510-3011	2,280	510-3012	2,664	510-3013	3,108	510-3014	3,552	510-3015	3,996	510-3016	4,440	510-3017	4,884	510-3018	5,328	510-3019	6,660	510-3020	8,880	-
48"	5/8	317	1'-6"	18'-0"	510-3021	3,170	510-3022	3,804	510-3024	4,438	510-3025	5,072	510-3026	5,706	510-3027	6,340	510-3028	6,974	510-3029	7,608	510-3030	9,510	510-3031	12,680	510-3293
60"	3/4	475	1'-6"	18'-0"	510-3032	4,750	510-3033	5,700	510-3034	6,650	510-3035	7,600	510-3036	8,550	510-3037	9,500	510-3038	10,450	510-3040	11,400	510-3041	14,250	510-3042	19,000	510-9526
72"	7/8	667	1'-6"	18'-0"	510-3044	6,670	510-3050	8,004	510-3051	9,338	510-3052	10,672	510-3053	12,006	510-3054	13,340	510-3056	14,674	510-3057	16,008	510-3058	20,010	510-3043	26,680	510-3305
84"	1	888	1'-6"	18'-0"	510-3059	8,880	510-3060	10,656	510-3061	12,432	510-3062	14,208	510-3063	15,984	510-3064	17,760	510-3070	19,536	510-3071	21,312	510-3072	26,640	510-3080	35,520	510-3310
96"	1 1/4	1,267	1'-6"	18'-0"	510-3090	12,670	510-3094	15,204	510-3095	17,738	510-3096	20,272	510-3097	22,806	510-3098	25,340	510-3099	27,874	510-3106	30,408	510-3107	38,010	510-3108	50,680	510-3315

* COVER TO BE MEASURED FROM BASE OF RAIL TO TOP OF PIPE

SMOOTH STEEL PIPE (SSP) CONSTRUCTION NOTES

GENERAL:

SSP structures are designed for Cooper E80 Live Load with impact, and cover as shown in Table 3.

Table 3 indicates the minimum required thickness.

INSTALLATION:

Installation of Smooth Steel Pipe (SSP) shall conform to the current American Railway Engineering and Maintenance-of-Way Association (AREMA) Manual for Railway Engineering, Chapter 1, Part 4. Culvert lengths are to be based on existing mainline roadbed sections.

JACKING:

Where indicated, pipe to be bored and jacked into place. Bore hole diameter shall be essentially the same as the outside diameter of the pipe. If voids should develop or if the bored hole diameter is greater than the outside diameter of the pipe by more than 1 inch, notify the Office of Director structures Design. Boring operations shall not be stopped if such a stoppage would be detrimental to the railroad. A survey crew shall continually monitor the elevation and alignment of the railroad track(s) above during the jacking procedures. If track movement or loss of ballast exceeds 1/4 inch during jacking or boring operations, all work must stop and the Railroad must be notified. The Railroad may take any action necessary to ensure safe passage of train. The contractor must immediately submit a corrective plan of action to the Railroad for review and approval. The Railroad must review and approve the proposed repair procedure. The finished repair must be inspected and accepted by the Railroad before the track can be placed back into service, and construction is allowed to proceed.

BORED AND JACKED TOLERANCE:

The permitted tolerance of a true line for pipe positioning is +/- 2". Adjustment to the line and level should be gradual to ensure that the pipe manufacturer's stated angular deflection is not exceeded at any joint.

FIELD WELDING:

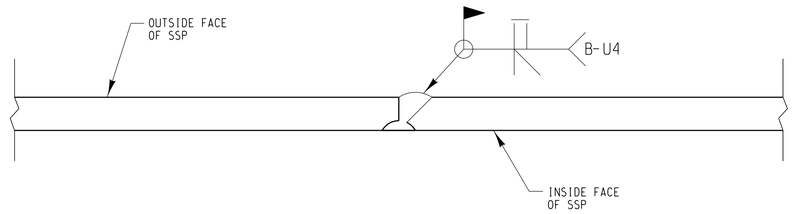
Welders shall posses valid qualifications.
All welding per AWS D1.1, Structural Welding Code.

MATERIALS:

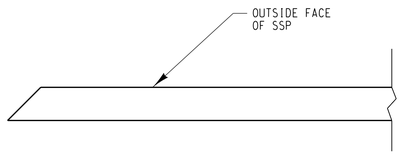
ASTM A139, Grade B, FY = 35 ksi
or
ASTM A252, Grade 3, FY = 45 ksi

Smooth steel pipe shall have a welded straight longitudinal seam. Spiral seam is acceptable if 25% of weld is ultrasonically tested in addition to required tensile tests of weld. A hydrostatic test is not required.

The ends of each section of pipe shall be square cut. One end shall be suitably beveled for field welding sections together.



PIPE END WELD DETAIL



PIPE END BEVEL DETAIL

REVISIONS		
DATE	LTR.	DESCRIPTION
11/16	A	CHANGED NOTES AND TABLE 1
04/19	B	UPDATED NOTES
10/21	C	UPDATED NOTES & ADD ITEM NUMBERS
/		
/		
/		

DESIGN BY: CLJ | DRAWN BY: KDM | CHECKED BY: CLJ

APPROVED:

George J. Meyn 4/4/08
UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

CONSTRUCTION NOTES AND TABLE FOR SMOOTH STEEL PIPE CULVERTS

FILE OWNER: UPRR | DATE:
PLAN NO.: 680010 | SHEET: 1 OF 1

Copyright © 2007 by Union Pacific Railroad PLOTTED: 10/14/2021 3:41:08 PM

FILE NAME: \\upcorp.ad.uprr.com\engcad\bridge\Standards\Culverts (CMP and SSP)\0-Active\steelpip_std.dgn

STANDARD SHEET

PRECAST CONCRETE NOTES:

CONCRETE:

1. All concrete materials, placement and workmanship shall be in accordance with Part 1, Chapter 8 of the current AREMA Manual for Railway Engineering.
2. Minimum compressive strength - 4000 Lb. per square inch at 28 days.
3. Exposed surfaces shall be formed in a manner which will produce a smooth and uniform appearance without rubbing or plastering. Exposed edges of 90 degrees or less are to be chamfered ¾" x ¾". Top surface to have a smooth finish, free of all float or trowel marks.
4. Concrete shall be proportioned such that the water - cement ratio (by weight) does not exceed 0.45. Concrete must contain a minimum of 6½ sacks of cement per cubic yard of concrete. Flyash replacement may account for up to 25% of the cement.
5. Cement shall be Type I, Type II or Type III Portland Cement in accordance with ASTM C150 specifications.
6. Aggregates shall be graded in accordance with ASTM C33 specifications. Coarse aggregate shall be no. 67. Fine aggregate shall be natural sand.
7. Air content shall be between 5% and 7% (by volume).
8. Admixtures shall not be used without approval by Engineer.
9. Curing shall be accomplished by wet curing or the application of a Type 2 membrane.
10. The fabricator shall stencil the item name, date manufactured, name of manufacturer and actual lifting weight at location shown.
11. Production procedures for the manufacture of precast members shall be in accordance with the AREMA Manual for Railway Engineering and the Precast/Prestressed Concrete Institute's Manual MNL 116 for Quality Control.
12. Dimensional tolerances governing the manufacture of precast members shall conform to Division VI, Section 6.4 of the Precast/Prestressed Concrete Institute's Manual MNL 116 for Quality Control. Tolerance for location of lifting devices shall be ±½".
13. The fabricator will be responsible for loading and properly securing all precast concrete members for shipment. All concrete components shall be made available for inspection by the Railroad at the fabricator's plant prior to shipment, at the Railroad's discretion.

REINFORCING STEEL:

1. Reinforcing steel shall be deformed, new billet bars per current ASTM A615 Specifications and to meet grade 60 requirements.
2. Fabrication of reinforcing steel shall be per Chapter 7 of the CRSI Manual of standard practice. Dimensions of bending details are out to out of bar.
3. Reinforcing steel is to be blocked to proper location and securely wired against displacement. Tie wires shall be installed at every other bar intersection so that at least 50% of the intersections are tied. Tack welding of reinforcing is prohibited. Minimum concrete cover on reinforcement not otherwise noted shall meet current AREMA Manual for Railway Engineering requirements.

EMBEDDED STEEL:

1. Steel plate shall conform to ASTM A36 OR A709-Grade 36 Specifications. Studs shall be C1015, C1017 or C1020 cold drawn steel which conform to ASTM A108 Specifications.
2. Deformed bar anchors shall conform to ASTM A706 specifications. Welding of deformed bar anchors shall conform to AWS D1.4. Welding shall be performed by certified welder.
3. Where galvanizing is not indicated, material shall be plain.

LIFTING ANCHORS:

1. Swift lift anchors shall be Dayton Superior P-52 anchors or approved alternate with a minimum safe working load sufficient for the weight of the precast element including form removal. The safe working load shall provide a minimum safety factor of 4.

MISCELLANEOUS HARDWARE:

1. 8" T-Bar Anchors as manufactured by Meadow Burke Company, or approved alternate.

BEARING PAD SPECIFICATIONS:

1. Bearing pads shall be Random Oriented Fiber elastomeric material comprised of high-quality ozone-resistant virgin elastomer and synthetic fibers. Pads shall conform to the following minimum material properties:

Hardness (Shore A, ASTM D2240)	80 ± 5
Tensile Strength, psi (ASTM D412, Die C)	1000 ± 100
Ultimate Elongation, minimum %	40
Heat Aging (ASTM D573, 70 Hrs. @ noted temperature):	
Durometer, 212 °F, maximum point change	± 10
Tensile Strength, 158 °F, maximum % change	± 25
Ultimate Elongation, 212 °F, maximum % change	± 25
Compression, minimum ultimate strength, psi	8000
Apparent Shear Modulus (GA), psi, based on tests conducted at 70 °F to 80 °F under uniform compressive stresses of 500, 1000, and 1500 psi and at applied horizontal shear plus slip strain of 50%. GA is constant in all directions parallel to the bearing plane.	230 ± 30

2. Bearing pads shall be Voss Engineering, Inc., "Fiberlast" expansion bearing pads or approved equal.
3. Cutting of the pads shall be done so that the edges have no tears or other jagged areas.
4. Permissible tolerances of the pad shall be as stated in Chapter 15, Section 5.12.6 of the 2019 AREMA Manual for Railway Engineering.
5. The cap fabricator shall fasten the bearing pads to the cap by using the following procedure: clean pads according to manufacturer's recommendations; prime contact surface and glue to cap with Sikadur 31 Hi-Mod Gel (1:1 mix ratio) or approved equal.

MISCELLANEOUS STEEL NOTES:

1. Materials, fabrication, workmanship and erection per the current AREMA Manual for Railway Engineering, Chapter 15, Steel Structures.
2. Material shall conform to the following requirements:

Rolled Shapes & Plates	ASTM A36
Pipe	ASTM A53 Gr. B
Bolts	ASTM A307 Gr. A
Elastic Locknut	MIL-DTL-32258
Steel Washer	ASTM F436

3. Grating panels and fasteners shall conform to the following requirements:

Grating Fasteners:	
Saddle Clips	F-10 Galvanized Saddle Clips
Socket Cap Screws	SAE J429, Gr. 8, Zinc Coated
Elastic Locknut	MIL-DTL-32258
Steel Washer	ASTM F436
Nylon Washer	Nylon G16

Grating Panels:
Material shall comply with NAAMM Standard MBG 531-17
Size = W-19-4 (1¾ x 3/16 Serrated) Steel Galvanized.

4. Welding requirements:
   A. All welding shall be with the SAW, SMAW, or FCAW process.
   B. All welding per AWS D1.1, Structural Welding Code.
   C. Welders shall possess valid qualifications, including a Procedure Qualification Report (PQR) and Weld Procedure Specification (WPS) for each weld type to be performed as well as documentation verifying that they have performed the specific weld(s) within the prior six months.
5. Miscellaneous steel shall be plain unless noted otherwise.
6. Pieces or assemblies designated as galvanized shall be galvanized after fabrication in accordance with ASTM A123. After galvanizing, all elements shall be free of fins, abrasions, rough or sharp edges, and other surface defects.
7. Bolts and nuts to be zinc plated in accordance with ASTM A153 unless noted otherwise.

CAST-IN-PLACE CONCRETE NOTES:

CONCRETE:

1. All concrete materials, placement, workmanship and testing shall be in accordance with Part 1, Chapter 8 of the current AREMA Manual for Railway Engineering.
2. Minimum compressive strength at 28 days shall be as indicated on the design plans.
3. Exposed surfaces shall be formed in a manner which will produce a smooth and uniform appearance without rubbing or plastering. Exposed edges of 90 degrees or less are to be chamfered ¾" x ¾". Top surface to have a smooth finish, free of all float or trowel marks.
4. Concrete shall be proportioned as follows:

Concrete Strength:	3,000 psi	4,000 psi	5,000 psi	6,000 psi
Max. Water/Cement Ratio (by weight):	0.50	0.45	0.42	0.40
Min. Sacks of Cement per Cu. Yd.:	5.5	6.0	6.5	7.0

5. Flyash replacement may account for up to 25% of the cement by substitution.
6. Cement shall be Type I, Type II or Type III Portland Cement in accordance with ASTM C150 specifications.
7. Aggregates shall be graded in accordance with ASTM C33 specifications. Coarse aggregate shall be no. 67. Fine aggregate shall be natural sand.
8. Allowable air content shall be indicated on the design plans based on the following guidelines:

   Severe Exposure - 5% to 7%
   Exposed to wet freeze-thaw, de-icers, or other aggressive agents.

   Moderate Exposure - 4% to 7%
   Exposed to dry freeze-thaw and no de-icers or other aggresive agents.

   Mild Exposure - 3% to 5%
   Not exposed to freezing, de-icers or other aggressive agents.

9. Admixtures shall not be used without approval by Engineer. Where multiple admixtures are used, it is recommended that all admixtures be obtained from the same company.
10. Where exposed to air, curing shall be accomplished by wet curing or membrane curing compound. Membrane curing compound shall conform to ASTM C309, Type 2.
11. Do not use calcium chloride or any admixture containing intentionally added chloride ions. Testing for chloride ions is not required.
12. Apply a structural bonding agent to construction joints or when placing new concrete against existing concrete. Submit bonding agent to the Engineer for approval.

[Note 13 applies only when specifically stated in the Bill of Material descriptions.]
13. DCI-S, as manufactured by W.R. Grace, or approved alternate shall be added at a quantity of 5 gallons per cubic yard. Calcium nitrite solution shall contain 30% solids and shall provide 15.0 lbs. per cubic yard chloride protection. Mix shall also include 7%, by weight of cement, force 10,000 microsilllica slurry by W.R. Grace or approved addendum shall be used. Adjust weight of concrete mix water for weight of DCI-S used.

REINFORCING STEEL:

1. Reinforcing steel shall be deformed, new billet bars per current ASTM A615 Specifications and to meet grade 60 requirements.
2. Fabrication of reinforcing steel shall be per Chapter 7 of the CRSI Manual of standard practice. Dimensions of bending details are out to out of bar.
3. Reinforcing steel is to be blocked to proper location and securely wired against displacement. Tie wires shall be installed at every other bar intersection so that at least 50% of the intersections are tied. Tack welding of reinforcing is prohibited. Minimum concrete cover on reinforcement not otherwise noted shall meet current AREMA Manual for Railway Engineering requirements.

[Note 4 applies only when specifically stated in the Bill of Material descriptions.]
4. Reinforcing steel shall be epoxy coated per ASTM A775 specifications meeting Annex A1 for epoxy coating.

EMBEDDED STEEL:

1. Steel plate shall conform to ASTM A36 OR A709-Grade 36 Specifications. Studs shall be C1015, C1017 or C1020 cold drawn steel which conform to ASTM A108 Specifications.
2. Deformed bar anchors shall conform to ASTM A706 specifications. Welding of deformed bar anchors shall conform to AWS D1.4. Welding shall be performed by certified welder.
3. Where galvanizing is not indicated, material shall be plain.

REVISIONS			DESIGN BY: HDR	DRAWN BY: HDR	CHECKED BY: AJB
DATE	LTR.	DESCRIPTION	APPROVED:		
/					
/					
/					
/					
/					
/					

05-04-2020
UPRR - MGR SPECIAL PROJECTS STRUCTURES DESIGN

UNION PACIFIC

BRIDGE STANDARDS

CONCRETE BEAM BRIDGES

PIECE FABRICATION NOTES

FILE OWNER: UPRR	DATE: APRIL, 2020
PLAN NO.: 531100	SHEET: T3

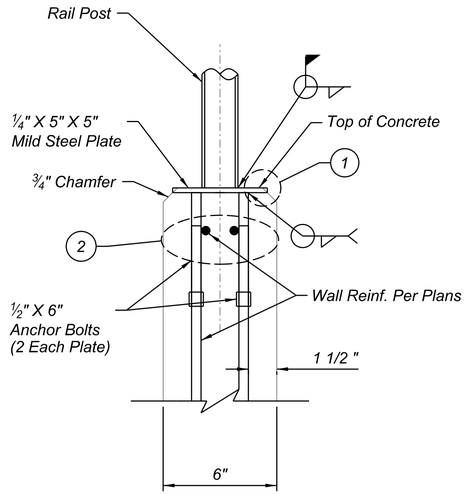
Copyright © 2020 by Union Pacific Railroad
PLOTTED: 5/26/2023 8:48:17 AM

FILE NAME: P:\Standards\0_Bridges (Concrete)\0-Active\531XX - Single Track - Deep Caps\Staging\531100 - Single Track Construction Drawings.dgn

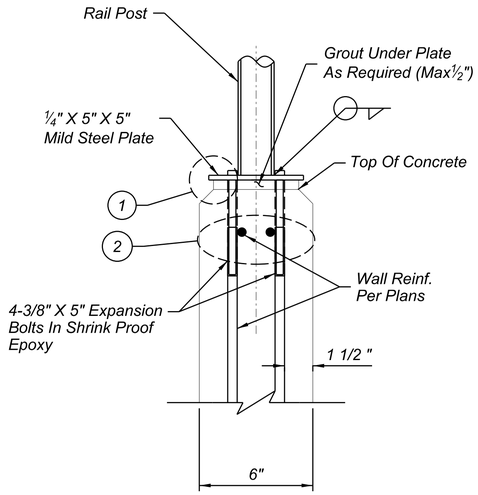
INCHES 1 2 3 4 5 6 7 8 9 10 11 12

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	AZ	X	XXX	XX	

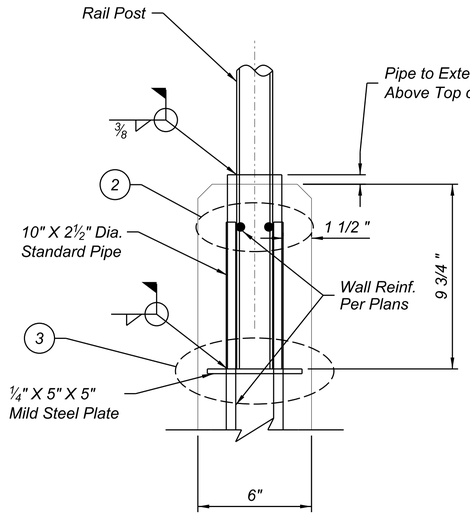
MAG DETAIL 145 EXISTING ISSUES



TYPE 1- (6" Wall)
Scale: 1"=0'-4"



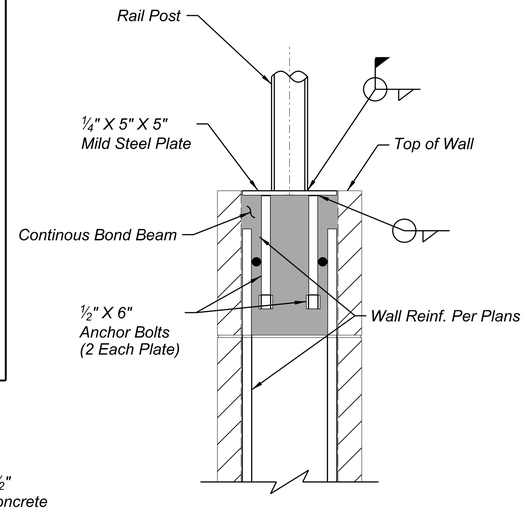
TYPE 2- (6" Wall)
Scale: 1"=0'-4"



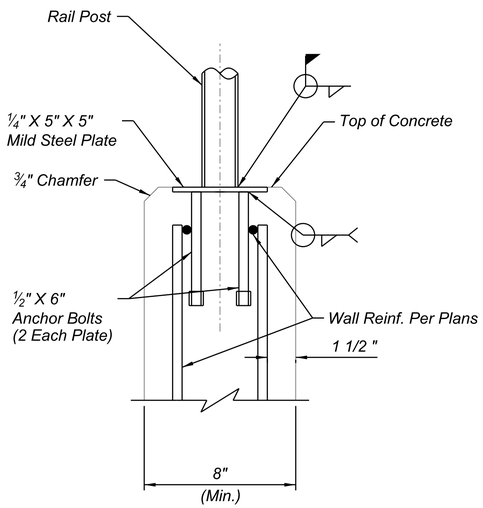
TYPE 3- (6" Wall)
Scale: 1"=0'-4"

STRUCTURAL PROBLEMS

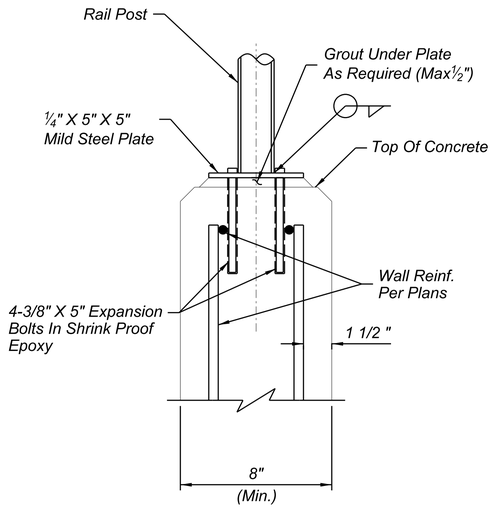
1. *STEEL PLATE CORNER EXPOSED*
2. *CONFLICTS WITH NOTE 6. "THE EMBEDMENT FOR ANCHOR TYPES 1,2, & 3 SHALL BE LOCATED INSIDE THE WALL REINFORCEMENT CAGE".*
3. *LESS THAN MINIMUM REQUIRED CONCRETE COVER.*



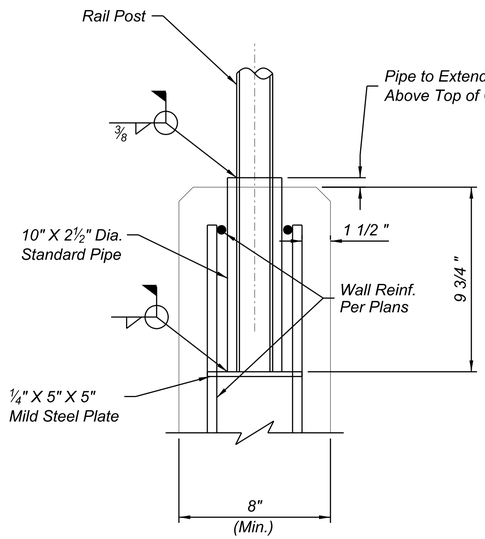
TYPE 5- (8" CMU Wall)
Scale: 1"=0'-4"



TYPE 1- (8" Wall)
Scale: 1"=0'-4"



TYPE 2- (8" Wall)
Scale: 1"=0'-4"



TYPE 3- (8" Wall)
Scale: 1"=0'-4"

MAG DETAIL 145 PROPOSED

NO.	REVISION	BY	DATE
3			
2			
1			

MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION

MAG DETAIL 145

		BY	DATE
PRELIMINARY NOT FOR CONSTRUCTION	DESIGNED	A.N. ENGINEER	XX/XX/XX
	DRAWN	A. TECHNICIAN	XX/XX/XX
	CHECKED	A.N. ENGINEER	XX/XX/XX

XXX

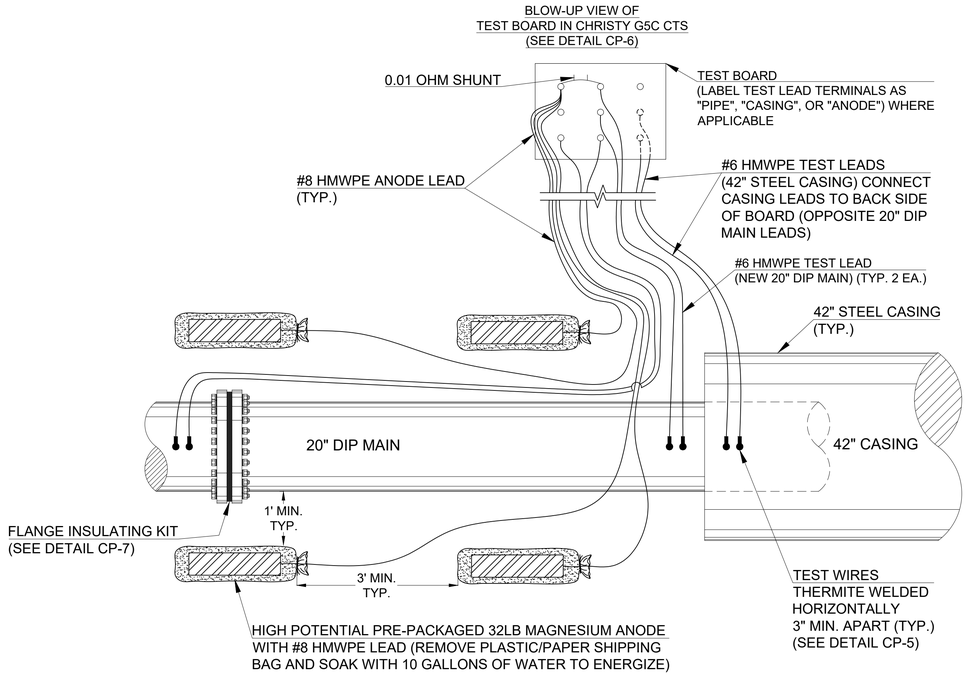
SHEET XXX OF XX

TRACS NO.

Contact Arizona 811 Two Working Days Before You Dig
Call 811 or Click Arizona811.com

8:16:49 AM 3/8/2018

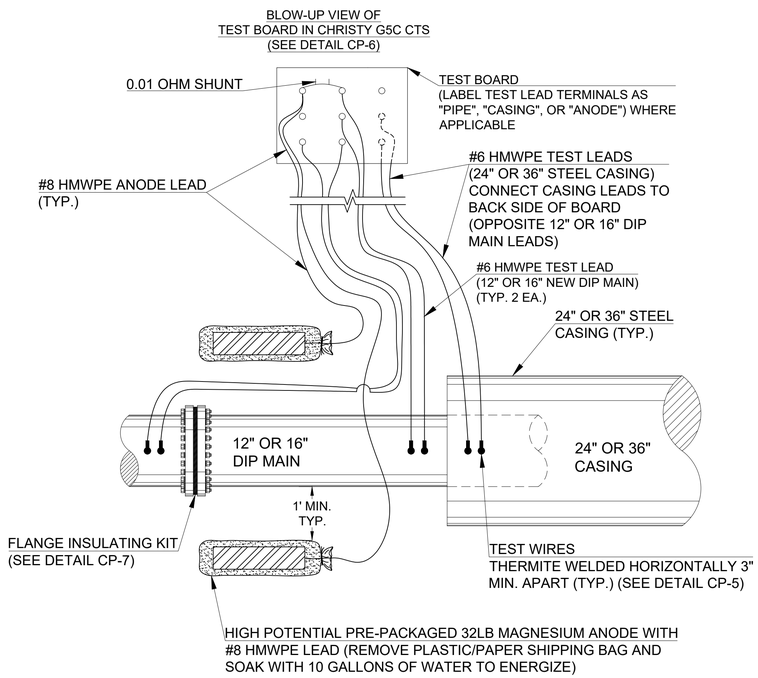
F:\Safety Rail\SD_Safety Rail Details.dgn



DETAIL CP-1 TYPE 2/4/5 CTS

3/4" = 1'–0"

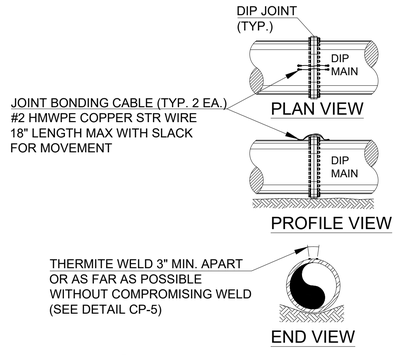
CORROSION TEST STATION AT 42" STEEL CASING



DETAIL CP-2 TYPE 2/4/5

3/4" = 1'–0"

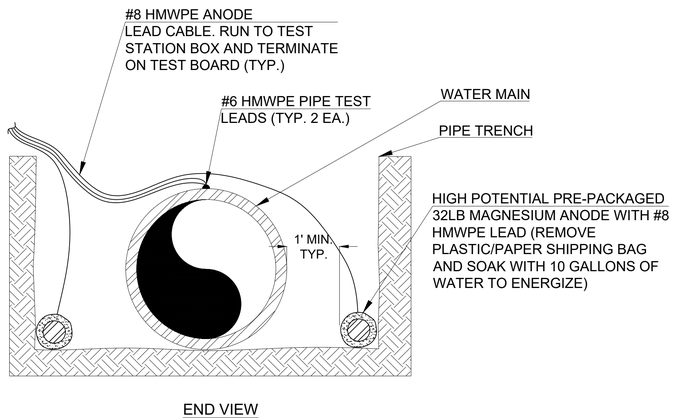
CORROSION TEST STATION AT 24" OR 36" STEEL CASING



DETAIL CP-3

JOINT BOND CONFIGURATION

N.T.S.



DETAIL CP-4

END VIEW OF PIPE AND ANODES IN TRENCH

N.T.S.

CITY OF MESA - UNION PACIFIC RAILROAD CROSSINGS - CATHODIC PROTECTION SYSTEM LOCATIONS									
REF	TRACK STATION	ENCASEMENT OFFSET*	DETAIL #	TEST LEAD PAIRS	ANODE QUANTITY	CTS TYPE	FIK SIZE	DESCRIPTION	CTS BOX LOCATION (AS-BUILT) GPS COORDINATES
1	27+28.70	-30.45	CP-1	3	4	2/4/5	20"	BEGINNING OF 42" CASING	
2	27+51.42	30.45	CP-1	3	4	2/4/5	20"	END OF 42" CASING	
3	42+38.08	53.15	CP-2	3	2	2/4/5	16"	BEGINNING OF 36" CASING	
4	43+21.83	-31.73	CP-2	3	2	2/4/5	16"	END OF 36" CASING	
5	160+37.96	-29.98	CP-1	3	4	2/4/5	20"	BEGINNING OF 42" CASING	
6	160+38.83	30.00	CP-1	3	4	2/4/5	20"	END OF 42" CASING	
7	160+55.83	-29.99	CP-2	3	2	2/4/5	16"	BEGINNING OF 36" CASING	
8	160+56.94	30.00	CP-2	3	2	2/4/5	16"	END OF 36" CASING	
9	265+94.56	-29.97	CP-2	3	2	2/4/5	16"	BEGINNING OF 36" CASING	
10	265+96.74	29.99	CP-2	3	2	2/4/5	16"	END OF 36" CASING	
11	287+99.99	-64.51	CP-2	3	2	2/4/5	12"	BEGINNING OF 24" CASING	
12	287+83.89	60.45	CP-2	3	2	2/4/5	12"	END OF 24" CASING	

* ENCASEMENT OFFSET SHOWN INDICATES LOCATION OF THE ACTUAL CONNECTION OF CATHODIC PROTECTION LEADS TO THE PIPE.

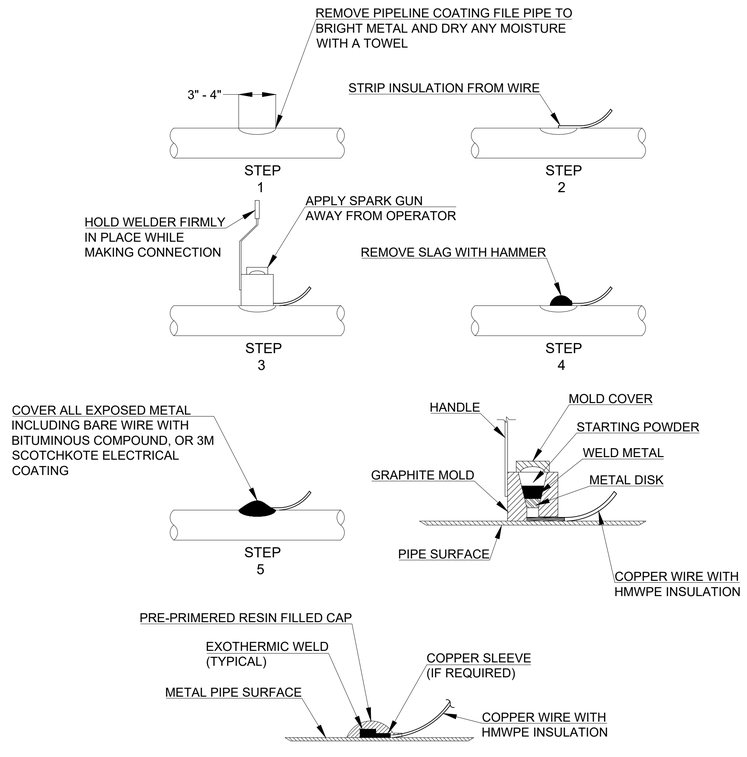
NOTES

1 FIELD LOCATE TEST STATIONS AND CATHODIC PROTECTION SYSTEM BASED UPON FINAL POSITION OF PIPE FITTINGS.

2 FUTURE CONNECTIONS TO WATER MAIN MUST BE ISOLATED WITH FLANGE INSULATING KIT.

3 ISOLATE ALL PIPE LESS THAN 16" IN DIAMETER FROM THE 16" AND 20" WATER MAINS INCLUDING ARV & FIRE HYDRANTS WITH FLANGE INSULATING KIT.

© DRAWINGS AND DESIGN ARE INTENDED ONLY FOR THE PROJECT SHOWN, AND FOR USE ONLY BY: PEAK CORROSION CONTROL, INC., OLSSON, AND THE CITY OF MESA.



DETAIL CP-5

THERMITE WELDING PROCEDURE

N.T.S.

NACE CATHODIC PROTECTION SPECIALIST
SHAWNA GOUDY
No. 3842
11/16/23
NACE INTERNATIONAL

PEAK CORROSION
520-722-7484 • 887 S. WARREN AVE. • TUCSON, AZ 85719

Call at least two full working days before you begin excavation.
ARIZONA 811
Arizona Blue Stake, Inc.
Dial 8-1-1 or 1-800-STAKE-IT (782-5348)
in Maricopa County: (602) 263-1100

Registered Professional Engineer (Civil)
CERTIFICATE NO.
57683
MATTHEW M. ELSNER
Date Signed 11-16-23
ARIZONA U.S.A.
Expires 06/30/26

CITY OF MESA
ENGINEERING DEPARTMENT

UNION PACIFIC RAILROAD
PIPELINE CROSSING

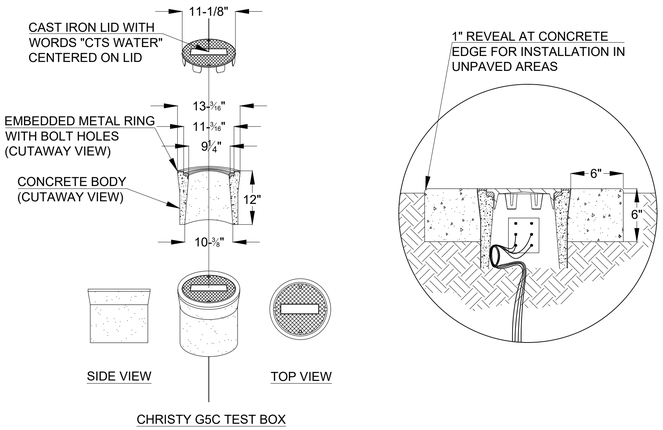
CATHODIC PROTECTION
DETAILS 1

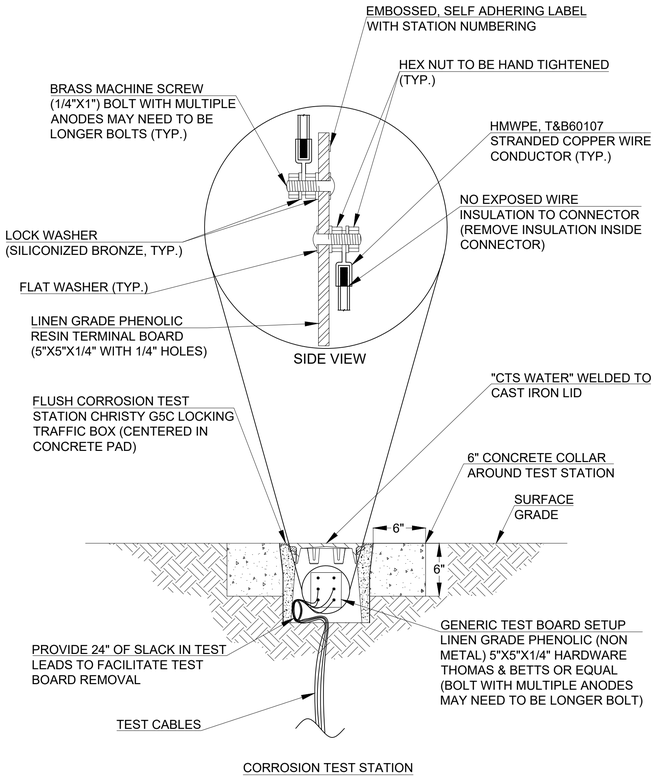
DRAWING
CP-1

DRAWN BY: DCC
ENGINEER: SMG
APPROVED BY: SMG

CATALOG NUMBER:

DATE SAVED: 9/22/25 B:\PEAK CORROSION CONTROL\PEAK-DESIGNS STUDIES\OLSSON - MESA UPRR ELLSWORTH GATEWAY MESA 2023\DESIGN\OLSSON_UPRR_CROSSINGS_CP_2023.DWG

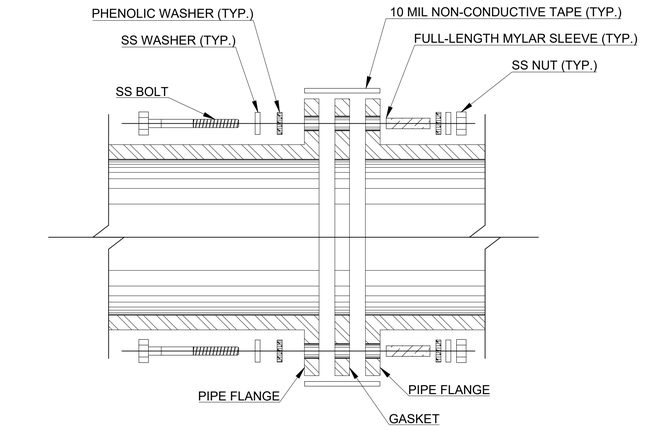


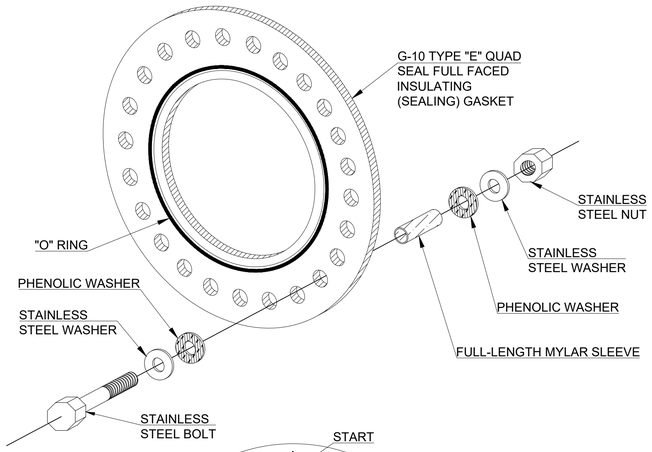


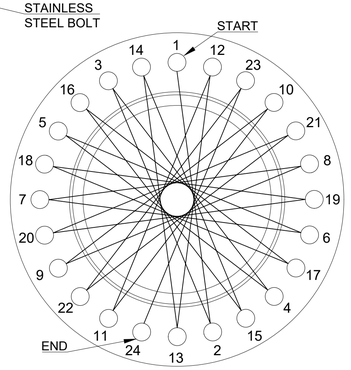
CORROSION TEST STATION

NOTE:
CRIMPING OF RING-TYPE TERMINAL CONNECTOR SHALL BE ACCOMPLISHED WITH A CRIMPING TOOL INTENDED FOR THIS USE. PLIERS OR OTHER SUBSTITUTES ARE NOT ACCEPTABLE. TO ENSURE A PROPER, NON-REMOVABLE MECHANICAL FASTENING BETWEEN THE WIRE AND RING-TYPE TERMINAL CONNECTOR(S), THE RECOMMENDED CRIMP TOOL IS THE THOMAS AND BETTS (T+B) #TBM25S OR PRE-APPROVED EQUAL. COMPRESSION CONNECTORS SHALL BE CONNECTED TO BOARD SO AS NOT TO TOUCH OTHER CONNECTORS. LEADS COMING FROM SOURCES OF DIFFERENT POTENTIALS SHALL BE LOCATED ON OPPOSING SIDES OF THE TERMINAL BOARD SO AS TO PREVENT SHORTING OUT.

DETAIL CP-6
N.T.S.
FLUSH GRADE CORROSION TEST STATION







FLANGE BOLT TIGHTENING SEQUENCE

DETAIL CP-7
N.T.S.
FLANGE INSULATING KIT CONFIGURATION

NOTES:

1. CATHODIC PROTECTION MATERIALS ARE TO BE LEFT IN MANUFACTURER'S BOXES, PACKAGES, ETC. UNTIL INSTALLATION.
2. THE SEAMLESS (ONE PIECE) G-10 GASKET (AS MANUFACTURED BY PSI, OR EQUAL) FULL FACED TYPE "E" FLANGE INSULATING GASKET SHALL HAVE A DIELECTRIC STRENGTH GREATER THAN OR EQUAL TO 400 VOLTS PER MIL.
3. PSI APPROVED MANUFACTURER OR EQUAL.
4. IF REQUIRED, BOLT HOLES SHALL BE REAMED AFTER FITTING FLANGES TOGETHER, BUT PRIOR TO INSERTING MYLAR INSULATING SLEEVES.
5. HARDWARE SHALL BE NON-CONDUCTIVE ANTI-SEIZE OR ANTI-SEIZE SS316 STAINLESS STEEL.
6. THE BOLT TORQUE REQUIREMENT SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATION.
7. TO PROVIDE EVEN SEALING ON A FLANGE GASKET THE CONTRACTOR SHALL HAND TIGHTEN THE BOLTS IN THE SEQUENCE SHOWN UNTIL THE FLANGE FACES ARE IN CONTACT WITH THE GASKET. AFTER THE FLANGE FACES ARE IN CONTACT WITH THE GASKET, THEY SHALL BE FIRMLY TIGHTENED IN THE SAME SEQUENCE, TO 30%, AND THEN AGAIN TO 60%, AND AGAIN TO 100% OF THE FINAL TORQUE VALUE.
8. IF APPLICABLE, THE CONTRACTOR SHALL CHECK ALL BOLTS AFTER OPERATING TEMPERATURE HAS BEEN REACHED, PREFERABLY AT ZERO LINE PRESSURE AND AMBIENT TEMPERATURE AND RE-TIGHTEN IF LOOSE. THE SYSTEM SHALL NOT BE ALLOWED TO RETURN TO OPERATING TEMPERATURE AFTER THE INITIAL CYCLING AT AMBIENT TEMPERATURE WITHOUT CHECKING AND RE-TIGHTENING BOLTS AS NECESSARY.
9. ALTHOUGH 24 BOLT HOLES ARE SHOWN, THE SAME BASIC PROCEDURE SHALL BE USED WITH FLANGES HAVING MORE OR LESS BOLT HOLES.
10. THE INSULATED FLANGE SHALL BE WRAPPED WITH A 10 MIL 2" OR 4" NON-CONDUCTIVE TAPE.
11. UPON COMPLETION AND TWENTY-FOUR HOURS PRIOR TO BURIAL, THE CONTRACTOR'S NACE TECHNICIAN/TECHNOLOGIST SHALL VERIFY THE EFFECTIVENESS OF THE FLANGE INSULATING KIT. VERIFICATION AND/OR TEST RESULTS SHALL BE INCLUDED IN THE FINAL CORROSION TEST REPORT. AN FIK WILL BE CONSIDERED EFFECTIVE IF THE RESISTANCE ACROSS THE FIK IS GREATER THAN 1 OHM.
12. DURING BACKFILLING, THE CONTRACTOR SHALL USE CAUTION TO PREVENT DISPLACEMENT OF ALL STRANDED COPPER CONDUCTORS AND BONDING CONDUCTORS. ANY DAMAGE TO THE BONDING CONDUCTORS SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
13. UPON COMPLETION OF THE BACKFILL THE CONTRACTOR'S NACE TECHNICIAN/TECHNOLOGIST SHALL VERIFY THE EFFECTIVENESS OF THE FLANGE INSULATING KIT. VERIFICATION AND/OR TEST RESULTS SHALL BE INCLUDED IN THE FINAL CORROSION TEST REPORT. AN FIK WILL BE CONSIDERED EFFECTIVE IF THE RESISTANCE ACROSS THE FIK IS GREATER THAN 1 OHM.

© DRAWINGS AND DESIGN ARE INTENDED ONLY FOR THE PROJECT SHOWN, AND FOR USE ONLY BY: PEAK CORROSION CONTROL, INC., OLSSON, AND THE CITY OF MESA.

NACE CATHODIC PROTECTION SPECIALIST — SHANNA GOUD — No. 3842 — 11/16/23 — NACE INTERNATIONAL

PEAK CORROSION
520-722-7484 • 887 S. WARREN AVE. • TUCSON, AZ 85719

Call at least two full working days before you begin excavation.
ARIZONA 811 Arizona Blue Stake, Inc.
Dial 8-1-1 or 1-800-STAKE-IT (782-5348)
In Maricopa County: (602) 263-1100

Registered Professional Engineer (Civil) — CERTIFICATE NO. 57683 — MATTHEW M. ELSNER — Date Signed 11-15-23 — ARIZONA, U.S.A. — Expires 06/30/26

DRAWN BY: DCC
ENGINEER: SMG
APPROVED BY: SMG

CITY OF MESA
ENGINEERING DEPARTMENT

UNION PACIFIC RAILROAD
PIPELINE CROSSING

CATHODIC PROTECTION DETAILS 2

DRAWING
CP-2

CATALOG NUMBER:

DATE SAVED: 9/22/25 B:\PEAK CORROSION CONTROL\PEAK-DESIGNS STUDIES\OLSSON - MESA UPRR ELLSWORTH GATEWAY MESA 2023\DESIGN\OLSSON_UPRR_CROSSINGS_CP_2023.DWG

ABBREVIATIONS

A	AMPERE	EA	EACH	K	KELVIN	R	RELAY
AC	ALTERNATING CURRENT	EC	EMPTY CONDUIT	KCMIL	THOUSAND CIRCULAR MILS	RE	RESET
ACB	AIR CIRCUIT BREAKER	EGC	EQUIPMENT GROUNDING CONDUCTOR	KI	KEY INTERLOCK	REC	RECESSED
ACSR	AL CABLE STEEL REIN.			KP	KEYPAD	RECP	RECEPTACLE
AFD	ADJ FREQUENCY DRIVE	EL	EMERGENCY LIGHT	KV	KILOVOLT	REF	REFERENCE
AFF	ABOVE FINISHED FLOOR	ELECT.	ELECTRICAL	KVA	KILOVOLT AMPERE	REFG	REFRIGERATOR
AFG	ABOVE FINISHED GRADE	EL	ELEVATION	KVAR	KILOVAR	REIN.	REINFORCE(D)
AFS	AIR FLOW SWITCH	ELEV	ELEVATION	KW	KILOWATT	REQ	REQUIRE(D)
ADJ	ADJUST/ADJUSTABLE	EMERG	EMERGENCY	KWH	KILOWATT HOUR	RES	RESISTOR
AL	ALUMINUM	EMF	ELECTROMOTIVE FORCE			RFI	RADIO FREQ INTERFERENCE
ALM	ALARM	EMH	ELECTRICAL MANHOLE	L	LOW	RS	RAPID START
AM	AMMETER	EP	ELECTRIC PNEUMATIC RELAY	LA	LIGHTING ARRESTER	RT	RAIN TIGHT
AMB	AMBER	EQUIP	EQUIPMENT	LB	POUNDS	RTM	RUNNING TIME METER
AMP	AMPERE	ES	EMERGENCY SWITCH	LC	LIGHTING CONTACTOR	RVNR	REDUCED VOLTAGE, NON-REVERSING, MAGNETIC MOTOR STARTER
ANN	ANNUNCIATOR	ES	END SWITCH	LD	LIGHTING DISTRIBUTION		
APPROX	APPROXIMATE	ETM	ELAPSED TIME METER	LLA	LOW LEVEL ALARM		
AQ	AQUASTAT	EWC	ELECTRIC WATER COOLER	LPA	LOW PRESSURE ALARM		
AR	ALARM RELAY	EWH	ELECTRIC WATER HEATER	LOR	LOCAL-OFF-REMOTE	S	SECONDARY
AS	AMP SWITCH	EX	EXISTING	LP	LIGHTING PANEL	S/N	SERIAL NUMBER
AS	AUXILIARY SWITCH	(E)	EXISTING	LS	LIMIT SWITCH	S/N	SOLID NEUTRAL
ATS	AUTO TRANSFER SWITCH			LT	LIGHT TOWER	SCH	SCHEDULE
AUTO	AUTOMATIC	FC	FOOT-CANDLE	LTG	LIGHTING	SECT.	SECTION
AUX	AUXILIARY	FD	FIRE DETECTOR	LTS	LOW TEMPERATURE SWITCH	SH	SHEET
AWG	AMERICAN WIRE GAGE	FIG	FIGURE	LV	LOW VOLTAGE	SP	SINGLE POLE
		FL	FLOOR	LWCO	LOW WATER CUT-OFF	SPD	SURGE PROTECTIVE DEVICE
BC	BATTERY CHARGER	FLA	FULL LOAD AMPERE	LLCO	LOW LEVEL CUT-OFF	SPDT	SINGLE POLE DOUBLE THROW
BLDG	BUILDING	FLEX	FLEXIBLE			SPST	SINGLE POLE SINGLE THROW
BFG	BELOW FINISHED GRADE	FLS	FLOW SWITCH	M	MOTOR	SS	SELECTOR SWITCH
BRK	BREAKER	FREQ	FREQUENCY	MAX	MAXIMUM	SSBJ	SUPPLY SIDE BONDING JUMPER
BSMT	BASEMENT	FS	FLOAT SWITCH	MCB	MAIN CIRCUIT BREAKER	ST	SINGLE THROW
BTU	BRITISH THERMAL UNIT			MCC	MOTOR CONTROL CENTER	STA	STATION
		FT	FEET	MCS	MOTOR CONTROL STAND	STD	STANDARD
C	CLOSE(D)	FU	FUSE	MDP	MAIN DISTRIBUTION PANEL	SW	SWITCH
C/C	CENTER TO CENTER	FVC	FULL VOLTAGE CONTACTOR (MAGNETIC)	MD	MOISTURE DETECTOR	SWGR	SWITCH GEAR
CAB.	CABINET			ME	METER	SYS	SYSTEM
CAP.	CAPACITOR	FVNR-2	MAGNETIC FULL VOLTAGE NON-REVERSING MOTOR STARTER (NUMBER DENOTES NEMA SIZE	MECH	MECHANICAL	SV	SOLENOID VALVE
CAT.	CATALOG			MFM	MAGNETIC FLOW METER		
CB	CIRCUIT BREAKER			MH	MANHOLE	TB	TERMINAL BLOCK
℄	CENTER LINE			MH	MOUNTING HEIGHT	TC	THERMOCOUPLE
CCT	DENOTES CIRCUIT(S)	FVR	MAGNETIC FULL VOLTAGE REVERSING STARTER	MIN	MINIMUM	TC	TIME CLOSED
CDT	CONDUIT			MISC	MISCELLANEOUS	TD	TIME DELAY RELAY
CDTR	CONDUCTOR	FVMS	MAGNETIC FULL VOLTAGE MULTI-SPEED STARTER	MLO	MAIN LUG ONLY	TEL	TELEPHONE
CKT	CIRCUIT			MOV	MOTOR OPERATED VALVE	TEMP	TEMPERATURE
CL	CLEARANCE			MS	MOTOR STARTER	TERM.	TERMINAL
CLC	COMBINATION LIGHTING CONTACTOR	G	GROUNDED	MSW	MAIN SWITCH	TH	THERMOSTAT
		GALV	GALVANIZED	MTD	MOUNTED	TMTR	TRANSMITTER
CLG	CEILING	GEC	GROUNDING ELECTRODE CONDUCTOR			TO	TIMED OPEN
COMB.	COMBINATION			N	NEUTRAL	TP	THREE POLE
COMM	COMMUNICATION	GEN	GENERATOR	(N)	NEW	TP	TWISTED PAIR
CONC	CONCRETE	GFCI	GROUND FAULT CIRCUIT INTERRUPTING	NC	NORMALLY CLOSED	TS	TIME SWITCH
COMP	COMPRESSOR			N.C.	NORMALLY CLOSED	TT	TELEPHONE TERMINAL
CP	CONTROL PANEL	GFI	GROUND FAULT INTERRUPTING	NEC	NATIONAL ELECTRICAL CODE	TTB	TELEPHONE TERMINAL BOX
CPT	CONTROL POWER TRANSFORMER			NESC	NATIONAL ELECTICAL SAFETY CODE	TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
		GND	GROUND				
CR	CONTROL RELAY			NEUT	NEUTRAL	TYP	TYPICAL
CRN	CRANE	HC	HOT CIRCUIT	NIC	NOT IN CONTRACT		
CS	CONTROL STATION	HH	HAND HOLE	N.O.	NORMALLY OPEN	UG	UNDERGROUND
CT	CURRENT TRANSFORMER	HI	HIGH	NO.	NUMBER	UNO	UNLESS NOTED OTHERWISE
CTP	CUSTOMER TERMINAL PANEL	HID	HIGH INTENSITY DISCHARGE	NTS	NOT TO SCALE	UPS	UNINTERUPTABLE POWER SUPPLY
CU	COPPER	HLA	HIGH LEVEL ALARM				
DET	DETAIL	HMT	HIGH MAST TOWER	O	OPEN		
DCU	DISTRIBUTED CONTROL UNIT	HOA	HAND-OFF-AUTOMATIC	OC	ON CENTER	V	VOLTS
DC	DIRECT CURRENT	HOR	HAND-OFF-REMOTE	OD	OUTSIDE DIAMETER	VA	VOLT AMPERE
	DOOR INTERLOCK	HP	HORSEPOWER	OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED	VAR	VARMETER
DIA	DIAMETER	HPS	HIGH PRESSURE SODIUM			VM	VOLTMETER
DIM.	DIMENSION	HPA	HIGH PRESSURE ALARM	OL	OVERLOAD	VS	VOLTMETER SWITCH
DISC.	DISCONNECT	HTR	HEATER	OPG	OPENING	VT	VAPOR TIGHT
DIV	DIVISION	HTS	HIGH TEMPERATURE SWITCH				
DM	DEMAND METER	HV	HIGH VOLTAGE	P	PRIMARY	W	WATTS
DN	DOWN	HZ	HERTZ	PA	PUBLIC ADDRESS	WM	WATT METER
DP	DISTRIBUTION PANEL	I/O	INPUT/OUTPUT	PB	PULL BOX	WHM	WATT HOUR METER
DPDT	DOUBLE POLE DOUBLE THROW	ID	INSIDE DIAMETER	PB	PUSH BUTTON	WH	WEATHERHEAD
		IN	INCHES	PC	PHOTO CELL	WP	WEATHER PROOF
DPST	DOUBLE POLE SINGLE THROW	INST	INSTANTANEOUS	PD	POWER DISTRIBUTION	WT	WATER TIGHT
		INSTR	INSTRUMENT	PE	PNEUMATIC ELECTRIC RELAY		
DS	DISCONNECT SWITCH			PEC	PHOTO ELECTRIC CELL	XFMR	TRANSFORMER
DT	DUST TIGHT	J	JOULE	P.E.R.	PHOTO ELECTRIC RELAY	XP	EXPLOSION PROOF
DWG	DRAWING	JB	JUNCTION BOX	PF	POWER FACTOR	XR	AUXILIARY RELAY
				PH	PHASE		
				PL	PILOT LIGHT	Y	YELLOW
				PRI	PRIMARY		
				PS	PRESSURE SWITCH		
				PSI	POUNDS PER SQUARE INCH		

SUBMITTAL REQUIREMENTS

NOT ALL SUBMITTAL REQUIREMENTS ARE SHOWN HERE. SEE SPECIFICATION SECTION 01 33 00 FOR ADDITIONAL INFORMATION.

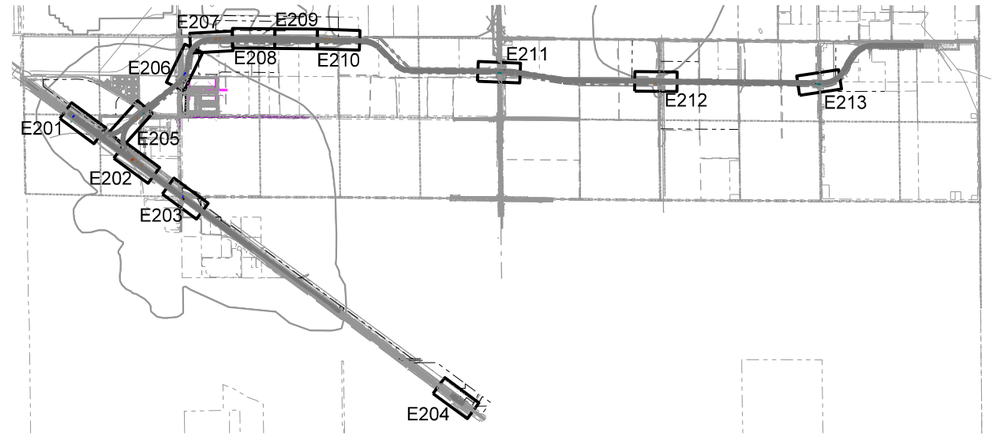
SECTION NUMBER	SECTION NAME	SHOP DRAWINGS	PRODUCT TECHNICAL DATA	O & M MANUAL	TEST REPORTS	FABRICATION AND/OR LAYOUT DRAWING
	SPECIAL CONDITIONS					
13 47 13	CATHODIC PROTECTION	X	X			
26 05 00	ELECTRICAL BASIC REQUIREMENTS	X	X	X		
26 05 09	MOTORS	X	X			
26 05 13	MEDIUM VOLTAGE CABLE	X	X			X
26 05 19	WIRE AND CABLE 600 VOLT & BELOW	X	X			
26 05 26	GROUNDING	X	X			
26 05 33	RACEWAYS AND BOXES	X	X			X
26 05 36	CABLE TRAYS	X	X			X
26 05 43	ELECTRICAL EXTERIOR UNDERGROUND	X	X			X
26 05 98	POWER DISTRIBUTION CENTER - GEAR HOUSES	X	X	X		X
26 08 13	ACCEPTANCE TESTING	X			X	
26 09 13	ELECTRICAL METERING DEVICES	X	X	X		
26 09 16	CONTROL EQUIPMENT ACCESSORIES	X	X	X		X
26 09 43	RADIO OPERATED LIGHTING CONTROL					X
26 10 00	MEDIUM VOLTAGE ELECTRICAL DISTRIBUTION	X	X	X	X	
26 12 13	POLE-MOUNTED DISTRIBUTION TRANSFORMERS	X	X	X	X	X
26 12 19	PAD-MOUNTED DISTRIBUTION TRANSFORMERS	X	X	X	X	X
26 13 13	MEDIUM VOLTAGE METAL-CLAD PARALLELING SWITCHGEAR	X	X	X	X	X
26 13 23	SECTIONALIZING EQUIPMENT		X		X	X
26 18 19	MEDIUM VOLTAGE LIGHTNING ARRESTERS	X	X			
26 22 13	DRY-TYPE TRANSFORMERS	X	X	X		X
26 24 13	SWITCHBOARDS	X	X	X		X
26 24 16	PANELBOARDS	X	X	X		X
26 24 19	MOTOR CONTROL EQUIPMENT	X	X	X		X
26 26 13	PACKAGE POWER SUPPLY	X	X	X		X
26 27 26	WIRING DEVICES	X	X			
26 28 00	OVERCURRENT AND SHORT CIRCUIT PROTECTIVE DEVICES	X	X	X	X	
26 28 16	SAFETY SWITCHES	X	X	X		
26 29 23	VARIABLE FREQUENCY DRIVES LOW VOLTAGE	X	X	X	X	X
26 32 13	ENGINE GENERATOR VAPOR OR LIQUID FUELED	X	X	X	X	X
26 32 14	ENGINE GENERATOR DIESEL	X	X	X	X	X
26 33 00	BATTERY AND BATTERY CHARGING SYSTEMS	X	X	X	X	X
26 36 13	MANUAL TRANSFER SWITCHES	X	X	X		X
26 36 23	AUTOMATIC TRANSFER SWITCHES	X	X	X		X
26 43 13	LOW VOLTAGE SURGE PROTECTION DEVICES	X	X	X	X	X
26 50 00	INTERIOR AND EXTERIOR LIGHTING	X		X	X	
26 51 00	HIGH MAST GENERAL AREA LIGHTING	X	X	X	X	X
26 99 00	POWER SYSTEM ANALYSIS				X	
27 11 13	COMMUNICATION ENTRANCE	X	X			
33 71 14	OVERHEAD ELECTRIC SERVICE	X	X	X		
40 63 43	PROGRAMMABLE LOGIC CONTROLLERS (PLC)	X	X			X

GENERAL ELECTRICAL DESCRIPTION

THE GENERAL SCOPE OF THIS PROJECT INCLUDES PROVIDING UTILITY POWER CONNECTIONS WHERE REQUIRED FOR SIGNAL CABINS AND DEVICES, SWITCH-LEAD LIGHTING, AND CREW BUILDINGS.

ALL SERVICES INSTALLATIONS WILL COMPLY WITH SALT RIVER PROJECT (SRP) ELECTRICAL CONSTRUCTION GUIDELINES, UPRR DESIGN STANDARDS, AND MEET LOCAL CODES AND INSTALLATION REQUIREMENTS. LIGHTING WILL COMPLY WITH LOCAL ADOPTED CODES. LIGHTING INSTALLATIONS NEAR REGIONAL AIRPORTS WILL COMPLY WITH FEDERAL AVIATION ASSOCIATION'S GUIDELINES FOR VERTICAL CLEARANCE.

CONFIRM NEW SERVICE LOCATIONS WITH UTILITY AND UPRR REPRESENTATIVE PRIOR TO START OF NEW WORK. UTILITY PLANS ARE PROVIDED AS AN APPENDIX FOR ADDITIONAL REFERENCE.



KEY MAP

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: DMS
DATE: 3/9/2026
SHEET NUMBER: E001of 003

UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
ELEC ABBREVIATIONS & SUBMITTAL REQUIREMENTS

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501:1000\020-0927\40-Design\Microstation\020-0927_MECH\Pentable\020-0927_MECH.tbl
F:\2020\0501:1000\020-0927\40-Design\Microstation\020-0927_MECH\DGN\Sheets\01.General\20ms_e001.dgn
Default
3/9/2026

ELECTRICAL GENERAL NOTES:

THESE NOTES APPLY TO ALL SUBSEQUENT SHEETS

A. ALL LOCATIONS TO BE FIELD VERIFIED BEFORE WORK IS STARTED.

B. REFER TO THE FOLLOWING DOCUMENTS FOR ADDITIONAL INFORMATION IF ITEMS LISTED BELOW ARE NOT INCLUDED ON THE DRAWINGS.
   1. PROJECT BID DOCUMENT INDEX FOR A LIST OF ALL CONTRACT DOCUMENTS.
   2. THE UPRR GENERAL CONDITIONS AND SPECIFICATIONS FOR CONSTRUCTION REQUIREMENTS.
   3. THE PROJECT SPECIAL CONDITIONS DOCUMENT FOR PROJECT SPECIFIC INFORMATION.
   4. PROJECT SCHEDULES AND DETAILS ARE LOCATED IN THE PLAN SET.
   5. UPRR ELECTRICAL CONSTRUCTION STANDARD DETAILS ARE LOCATED HERE: https://www.up.com/emp/engineering/apps/archives/standards/public/index.cfm

C. REFER TO ELECTRICAL LEGEND SHEET FOR SYMBOLOGY AND THE GENERAL NOTES SHEET FOR SUBMITTAL TABLE.

D. CONTRACTOR SHALL RESTORE ALL DISTURBED GROUND TO ITS ORIGINAL CONTOURS AND CONDITION. IN ADDITION, THE CONTRACTOR SHALL PLACE A FOUR INCH LAYER OF ROAD BASE ON ANY DISTURBED AREAS OF THE ACCESS ROADS. DISTURBANCES OCCURRING ON LOCAL, STATE, OR FEDERAL GOVERNMENT LANDS SHALL BE SEEDED WITH AN APPROVED NATIVE SEED MIX.

E. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MATERIAL STORAGE AND FOR THE DISPOSAL OF ALL REMOVED MATERIALS IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL LAWS. ALL DEMOLISHED EQUIPMENT NOT SPECIFICALLY REQUESTED TO BE TURNED OVER TO UPRR SHALL BE LEGALLY DISPOSED OF OFF THE SITE. DISTRIBUTION TRANSFORMERS SHALL BE TURNED OVER TO THE OWNER'S REPRESENTATIVE FOR ON SITE STORAGE AS DIRECTED BY OWNER'S REPRESENTATIVE.

F. ALL POWER OUTAGES SHALL BE COORDINATED BETWEEN THE CONTRACTOR, THE UTILITY COMPANY AND UPRR PRIOR TO THE OUTAGE. PROVIDE A MIN. OF 48 HOURS OF NOTICE PRIOR TO OUTAGES TO UTILITY OR LOCAL SERVICE DROPS FROM UPRR'S PRIMARY DISTRIBUTION. ELECTRICAL SERVICE RACKS AND DISTRIBUTION PANELS UNDER CONSTRUCTION SHALL HAVE A "DO NOT OPERATE" TAG APPLIED WITH THE NAME OF THE CONTRACTOR'S ELECTRICIAN ON THE TAG. THE TAG SHALL BE REMOVED WHEN THE EQUIPMENT IS READY FOR SERVICE BY FOLLOWING THE PROCEDURES IN UPRR ELECTRICAL SAFETY RULES 3.3.2.D, RE-ENERGIZING EQUIPMENT. IF ANY PORTION OF THE CIRCUIT IS ENERGIZED BUT NOT COMPLETE, TESTED, AND READY FOR LOAD CONNECTION, THE ENERGIZED PANEL OR CIRCUIT BREAKER SHALL BE PADLOCKED IN THE OFF POSITION FOLLOWING UPRR LOCK OUT TAG OUT POLICY.

G. WHEN INSTALLING POLES, POLELINES AND/OR UNDERGROUND CONDUIT RUNS, THE CONTRACTOR SHALL FOLLOW THE ROUTE AS DETAILED ON THE DESIGN DRAWINGS. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE EXACT POLE LOCATIONS, PROPER POLE SPACING AND/OR CONDUIT DEPTH REQUIRED TO AVOID ALL UNDERGROUND UTILITIES AND/OR OBSTACLES. CONDUIT DEPTHS SHALL ONLY VARY TO A GREATER DEPTH THAN DEFINED ON THE STANDARDS OR DRAWINGS.

H. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL UNDERGROUND LOCATES (REFER TO DIG NUMBERS PROVIDED). IN ADDITION TO THE DIG NUMBERS PROVIDED, CONTACT THE LOCAL UNION PACIFIC SIGNAL DEPARTMENT, WATER SERVICES DEPARTMENT, AND ELECTRICIAN TO LOCATE UNDERGROUND UNION PACIFIC FACILITIES. UPRR SITE REPRESENTATIVES MAY PROVIDE INFORMATION REGARDING LOCAL UPRR UTILITIES, BUT THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING THESE UTILITIES, IF LOCAL INFORMATION IS NOT AVAILABLE.

I. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ANY AND ALL REQUIRED PERMITS AND INSPECTIONS REQUIRED ASSOCIATED WITH NEW AND UPDATED ELECTRICAL SERVICES.

J. INSTALL NEW GROUNDS, IN ACCORDANCE WITH THE STANDARD DRAWINGS PROVIDED, ON ALL NEW PRIMARY POLES, NEW SECONDARY POLES WHERE NOTED, OR EXISTING PRIMARY POLES THAT HAVE WORK DONE ON THEM AND HAVE NO GROUND.

K. ALL NEW POLES, AND EXISTING POLES, INCLUDING SECONDARY POLES, WHICH HAVE WORK AS PART OF THIS PROJECT, SHALL BE BANDED AND NUMBERED ACCORDING TO THE SPECIFICATIONS FOR THIS PROJECT.

L. CONTRACTOR SHALL MARK ALL CHANGES TO THE DESIGN, WHEN NECESSARY, BY STAKING AND SHALL OBTAIN WRITTEN APPROVAL FROM UPRR BEFORE IMPLEMENTING THOSE CHANGES.

ELECTRICAL GENERAL NOTES (CONTINUED):

THESE NOTES APPLY TO ALL SUBSEQUENT SHEETS

M. THE CONTRACTOR SHALL BE RESPONSIBLE FOR STAKING THE PROPOSED CABLE ROUTE AND HAVING THE ROUTE APPROVED BY UPRR PRIOR TO DIGGING. THE CABLE SHALL BE A MINIMUM OF 5 FOOT INSIDE THE UPRR RIGHT-OF-WAY (R/W). THE CONTRACTOR SHALL PROVIDE AN AS-BUILT RECORD OF CONSTRUCTION INCLUDING MEASUREMENTS OF THE CABLE TO TRACK CENTER LINE DISTANCE, INDICATING THE POINT OF INFLECTION WHERE THE DISTANCE TO TRACK CHANGES. CONTRACTOR SHALL PROVIDE GPS LOCATIONS OF ALL TRANSFORMERS, REACTORS, SWITCHES, UNDERGROUND SPLICES AND SPLICE OR GROUNDING BOXES. ANY CHANGES TO THE ELECTRICAL DRAWINGS SHALL BE PROVIDED ON A MARKED UP SET FOR AS-BUILT RECORDS.

N. CONTRACTOR SHALL PROVIDE A CONTINUOUS ORANGE MESH FENCE OR TRAFFIC CONES 25 FEET FROM THE CENTERLINE OF THE NEAREST TRACKS. FENCE OR CONES SHALL BE MOVED FORWARD WITH CONSTRUCTION. CONTRACTOR SHALL WORK ON FIELD SIDE OF THIS FENCE. AT LOCATIONS WHERE CONTRACTOR WILL NEED TO WORK CLOSER THAN THE 25 FOOT BARRIER, THE CONTRACTOR SHALL COORDINATE WITH THE UPRR REPRESENTATIVE.

O. CONTRACTOR SHALL COORDINATE CABLE ROUTING WITH EXISTING UTILITIES. CABLE ROUTE SHALL BE FIVE (5) FEET (MIN) CLOSER TO THE TRACK THAN THE CLOSEST UTILITY. CABLE ROUTE SHALL BE STAKED AT AN INTERVAL NO MORE THAN 200 FEET BETWEEN STAKES. A STAKE AHEAD AND A STAKE BEHIND MUST BE VISIBLE AT EVERY STAKE LOCATION.

P. WHEN APPLICABLE ALTERNATE THE CONNECTION OF THE FIXTURES TO BALANCE THE PHASE TO PHASE LOADING.

Q. CONDUCTORS CROSSING TRACKS SHALL HAVE AERIAL CABLE MARKERS INSTALLED ON THEM. CONDUCTORS RUNNING PARALLEL TO THE TRACKS, IN CERTAIN CONDITIONS, SHALL ALSO HAVE AERIAL CABLE MARKERS INSTALLED ON THEM. REFER TO STD DWG 0039 ON UPRR'S SOURCEHUB WEBSITE FOR PRODUCT INFORMATION AND INSTALLATION INSTRUCTIONS.

R. ONE-LINE DIAGRAMS PROVIDED INDICATE SYSTEM VOLTAGES. CONTRACTOR SHALL REVIEW TRANSFORMER SCHEDULE FOR INDIVIDUAL TRANSFORMER VOLTAGE RATINGS AND NOTIFY UP PROJECT MANAGER OR ENGINEER OF ANY DISCREPANCIES PRIOR TO PLACING TRANSFORMER ORDERS.

S. UPRR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY STATE ISSUED NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES) SECTION 402 STORMWATER PERMITS. THE CONTRACTOR IS RESPONSIBLE FOR CONFORMING TO AND COMPLYING WITH THE REQUIREMENTS OF THE STATE(S) STORMWATER MANAGEMENT RULES, REGULATIONS AND REQUIREMENTS.

T. CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLYING WITH ALL FEDERAL, STATE AND LOCAL RULES, REGULATIONS, AND REQUIREMENTS PERTAINING TO DUST CONTROL. CONTRACTOR SHALL PROVIDE SUFFICIENT DUST CONTROLS TO AVOID OBSTRUCTING THE TRAIN CREW'S VIEW OF RAILROAD SIGNALS.

U. THE CONTRACTOR SHALL RAISE THE GRADE OF ANY PAD OR RACK MOUNTED EQUIPMENT IN WASH AREAS A MINIMUM OF ONE FOOT ABOVE THE HIGH WATER LEVEL. THE PRIMARY CABLES SHALL BE ROUTED AS REQUIRED TO PLACE PADS AT THE TOE OF THE RAILROAD EMBANKMENT OR AS DIRECTED BY UPRR PERSONNEL.

V. CONTRACTOR MUST BE AWARE OF ALL OVERHEAD SERVICE DROPS ALONG NEW CABLE ROUTE. CARE MUST BE TAKEN WHEN LIFTING SERVICE DROPS TO ACCOMMODATE CABLE INSTALLATION EQUIPMENT. ALL EXISTING SERVICES MUST BE RETURNED TO ORIGINAL STATE AFTER NEW INSTALLATION IS COMPLETE.

W. CONTRACTOR SHALL SUPPLY ALL ELECTRICAL MATERIAL TO COMPLETE THE PROJECT. ELECTRICAL MATERIAL INCLUDING BOX FOUNDATIONS FOR ANY PADMOUNT EQUIPMENT AND TRANSFORMER CONNECTORS SHALL BE FURNISHED BY THE CONTRACTOR.

ELECTRICAL GENERAL NOTES (CONTINUED):

THESE NOTES APPLY TO ALL SUBSEQUENT SHEETS

X. UNDERGROUND LOW VOLTAGE (<600V) CONDUCTORS SHALL BE INSTALL IN RIGID GALVANIZED STEEL (RGS) CONDUIT AT DEPTHS LESS THAN 42" OR IN RIGID PVC AT DEPTHS GREATER THAN 42".

Y. CAMPING IS NOT ALLOWED ON THE UNION PACIFIC RIGHT OF WAY.

Z. ALL EQUIPMENT EXPOSED TO ACCESS ROAD TRAFFIC SHALL BE PROTECTED WITH STEEL POST BOLLARD(S) OR WITH BOULDERS OF ADEQUATE SIZE TO DETER VEHICLE IMPACT. SEE PLANS FOR MINIMUM BOLLARD SIZE AND NUMBER OF BOLLARDS REQUIRED FOR EACH LOCATION.

AA. DRILL FLUIDS SHALL BE WATER BASED AND MANAGED USING AN EXCAVATED PERCOLATION SUMP OR EQUIVALENT IN THE IMMEDIATE VICINITY OF THE BORING LOCATION IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL WATER QUALITY LAWS. DRILL FLUIDS COLLECTED IN TANKS OR A TRUCK CANNOT BE DISCHARGED ON UPRR PROPERTY AND MUST BE DISPOSED OFF-SITE IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL REGULATIONS. CLEAN BORE CUTTINGS SHALL BE RE-USED IN AN UPLAND LOCATION OR BLENDED PLACEMENT OF ALL BORE CUTTINGS MUST OCCUR ON UPRR PROPERTY. BORE CUTTINGS MAY NOT BE PLACED IN AREAS HAVING POTENTIAL OFF-SITE SEDIMENT OR CUTTINGS TRANSPORT BY OVERLAND STORMWATER FLOW. BEST MANAGEMENT PRACTICES (BMPS) ACCEPTABLE TO UPRR AND MEETING STORMWATER PERMIT REQUIREMENTS SHALL BE IMPLEMENTED AROUND PERCOLATION SUMPS, BORING LOCATIONS, CUTTING PLACEMENT AREAS AND ALL OTHER DISTURBED AREAS HAVING STORMWATER RUNOFF POTENTIAL UNTIL PERMANENT SITE STABILIZATION IS ACHIEVED.

BB. ALL SPLICES IN 600V OR LESS SECONDARY CONDUCTORS SHALL BE MADE IN ABOVE-GROUND JUNCTION BOXES MOUNTED ON AN EQUIPMENT RACK.

CC. THE CONTRACTOR SHALL PROVIDE A LEVEL GRADED WORKING SURFACE ON THE OPERATING SIDE OF ALL OUTDOOR ELECTRICAL EQUIPMENT. THE WORKING SURFACE, AS A MINIMUM SHALL CONSIST OF 3/4" MINUS WELL TAMPED GRAVEL ADEQUATE TO PROVIDE SAFE FOOTING IN ALL WEATHER CONDITIONS AND SHALL EXTEND 4 FEET IN FRONT OF 600V OR LESS EQUIPMENT AND 10 FEET IN FRONT OF 15 KV CLASS PADMOUNT EQUIPMENT.

DD. FOR PRIMARY CABLE RUNS IN UNPAVED AREAS, PROVIDE AND INSTALL A FIBERGLASS CABLE MARKING POST NEXT TO EACH BELOW GROUND SPLICE/GROUNDING PULL BOX. THE POST SHALL BE RHINO 3 RAIL MARKER WITH UPRR MARKING AND SUN COAT OPTION. PROVIDE ADDITIONAL MARKERS AT THE MID-POINT BETWEEN SPLICES WITH A MAXIMUM 660 FEET CABLE MARKER SPACING. PROVIDE ADDITIONAL MARKERS AT EACH SIDE OF ALL UNDERTRACK CROSSINGS.

ELECTRICAL GENERAL NOTES (CONTINUED):

THESE NOTES APPLY TO ALL SUBSEQUENT SHEETS

EE. UPON COMPLETION OF THE INSTALLATION, ALL INSULATED CONDUCTORS SHALL TEST ENTIRELY FREE OF GROUNDS AND SHORT CIRCUITS. ALL INSULATION TESTING SHALL BE PERFORMED WITH A 500-VOLT "MEGGER" OR EQUIVALENT TESTING DEVICE, WHICH SHALL GIVE RESISTANCE READINGS BETWEEN CONDUCTORS AND FROM CONDUCTORS TO GROUND. THE TEST READINGS SHALL SHOW THAT THE INSULATION IS SOUND. SEE THE SPECIFICATION SECTION 26 08 13 FOR REQUIREMENTS.

FF. AT RACK LOCATIONS WHERE THE RIGID GALVANIZED CONDUIT GOES BELOW GRADE BEFORE TRANSITIONING TO PVC DUCT, THE GALVANIZED CONDUIT SHALL BE WRAPPED WITH 3M SCOTCHRAP ALL-WEATHER 10 MIL CORROSION PROTECTION TAPE TO PROTECT AGAINST CORROSION IN ALKALI SOIL. THIS WRAP WILL NOT BE REQUIRED WHERE RIGID CONDUIT IS USED TO PROTECT SHALLOW CABLE IN ROCKY GROUND.

GG. NOTIFY UPRR ELECTRICAL DESIGN GROUP WHEN NEW SERVICES ARE ACTIVATED OR REMOVED SERVICES ARE DEACTIVATED. PROVIDE THE ACTIVATION DATE(S) AND METER NUMBER(S) FOR SERVICE ACTIVATION. PROVIDE THE DEACTIVATION DATE(S) AND REMOVED METER NUMBER(S) FOR SERVICE DEACTIVATION.

HH. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING THE MAXIMUM AVAILABLE FAULT CURRENT AT EACH SERVICE FROM THE UTILITY, MARKING THE SERVICE IN ACCORDANCE WITH NEC 110.24, AND PROVIDING SERVICE ENTRANCE DISCONNECT SWITCHES OR CIRCUIT BREAKERS WITH ADEQUATE INTERRUPTING CAPABILITY, A MINIMUM OF 10 KAIC. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR OBTAINING THE UTILITY FUSE TYPE AND RATING FOR SERVICE TRANSFORMER PRIMARY PROTECTION FOR INCLUSION IN THE POWER SYSTEM STUDY.

JJ. CONDUIT AND LONG SWEEP 90 DEGREE ELBOWS ABOVE GRADE TO 42" BELOW GRADE SHALL BE RIGID GALVANIZED STEEL (RGS). CONDUIT 42" BELOW MAY BE SCHEDULE 80 PVC OR HDPE OF EQUIVALENT WALL THICKNESS. RGS LONG SWEEP 90 DEGREE ELBOWS SHALL BE USED FOR ALL UNDERGROUND BENDS AND TRANSITIONS FROM BELOW GRADE CONDUIT TO ABOVE GRADE CONDUIT. REFER TO SPECIFICATION 26 05 43 FOR MORE INFORMATION.

KK. INSULATION TYPE THWN AND THWN-2 IS PERMITTED FOR USE FOR NO. 10 AND NO. 12 AWG FOR EXTERIOR APPLICATIONS OTHERWISE INSULATION TYPE SHALL BE XHHW-2. REFER TO SPECIFICATION 26 05 19 3.01 FOR MORE INFORMATION.

WORK PRACTICES:

ENVIRONMENTAL IMPACT WORK

UPRR PROJECT MANAGER WITH THE UPRR ENVIRONMENTAL GROUP SHALL DETERMINE IF ENVIRONMENTAL REQUIREMENTS AND/OR PERMITS ARE REQUIRED FOR THE PROJECT. IF REQUIRED, UPRR IS RESPONSIBLE FOR OBTAINING THE AUTHORIZATIONS FOR ENVIRONMENTAL PERMITS. WITH OR WITHOUT ADDITIONAL ENVIRONMENTAL REQUIREMENTS AND/OR PERMITS, THE CONTRACTOR SHALL USE, AT A MINIMUM, THE FOLLOWING WORK PRACTICES:

1. KEEP ALL WORK WITHIN UPRR RIGHT OF WAY (ROW).

2. WORK IN PERIODS OF LOW AND NO FLOW WHEN POSSIBLE.

3. DOCUMENT ALL WATERWAY WORK AREAS WITH BEFORE AND AFTER PHOTOS.

4. MINIMIZE DISTURBANCE TO LESS THAN 0.10 ACRES AT EACH OF THE WASHES AND AVOID WETLAND-LIKE AREAS WHEN POSSIBLE.

5. DO NOT PLACE ANY FILL INTO OR REMOVE MATERIAL FROM THE WATERWAYS.

6. STOP WORK IF WATER BECOMES CLOUDY UNTIL IT CLEARS OR UNTIL ADDITIONAL BEST MANAGEMENT PRACTICES (BMPs) ARE EMPLOYED.

7. MINIMIZE ACCELERATING, SLOWING, OR OTHERWISE CHANGING WATER FLOW.

8. RESTORE/GRADE ALL DISTURBED AREAS TO ORIGINAL CONDITIONS.

9. EMPLOY BMPS (SUCH AS STRAW WATTLES) AS NEEDED TO PREVENT OFF-SITE TRANSPORT OF SEDIMENT OR COAL FINES FROM LEAVING THE PROJECT EXTENTS OR FROM ENTERING ANY POTENTIAL WATERWAYS. CONTRACTOR SHALL COMPLY WITH GENERAL STORMWATER PERMIT AND ALL LOCAL, STATE, AND FEDERAL REGULATIONS.

10. AVOID IMPACTING ANY KNOWN HISTORICAL AREAS (FEATURES MORE THAN 50 YEARS OLD). INFORM THE UPRR CONSTRUCTION MANAGER AND THE GENERAL DIRECTOR M/W - ENVIRONMENTAL IMMEDIATELY IF ANY HUMAN BONES OR OTHER ARTIFACTS ARE ENCOUNTERED.

11. AVOID DISTURBING ANY SPECIES OF CONCERN IF ENCOUNTERED. DIRECT ANY QUESTIONS TO UPRR ENVIRONMENTAL THROUGH THE UPRR CONSTRUCTION MANAGER.

12. WHERE REQUIRED BY ENVIRONMENTAL PERMITTING AND LOCAL OR SITE REQUIREMENTS, ALL EARTH AND VEGETATION DISTURBANCE ACTIVITIES SHALL BE DOCUMENTED BY AN ENVIRONMENTAL MONITOR. EXCAVATION SHALL BE MONITORED BY A CULTURAL RESOURCE SPECIALIST AND TRIBAL MONITOR IN AREAS LIKELY TO CONTAIN PRE-HISTORIC FEATURES. WORK ACTIVITIES AND SCHEDULES SHALL BE COORDINATED WITH UPRR'S ENGINEER AND THEIR ENVIRONMENTAL MONITOR. TWO-WEEK LOOK-AHEAD SCHEDULES SHALL BE PROVIDED FOR PLANNING PURPOSES.

WORK PRACTICES:

ELECTRICAL UTILITY LINE AND TELECOMMUNICATIONS ACTIVITIES -

THE PROJECT INCLUDES SEVERAL NEW ELECTRICAL UTILITY METERED SERVICES AND REQUIRES CONNECTION TO SRP DISTRIBUTIONS.

ENSURE ALL PERMITS AND/OR UTILITY ACCESS AGREEMENTS ARE IN PLACE PRIOR TO BEGINNING WORK.

THE CONTRACTOR IS RESPONSIBLE FOR MEETING THE UTILITY'S MATERIAL, INSTALLATION, AND INSPECTION REQUIREMENTS.

REFER TO APPENDIX # FOR MORE EACH PARTY'S RESPONSIBILITIES, SCOPE OF WORK, AND MINIMUM STANDARDS OF CONSTRUCTION.

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY:	DMS
CHECKED BY:	DMS
DATE:	3/9/2026
SHEET NUMBER	E002 of 003

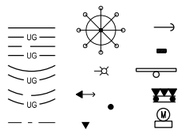
UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

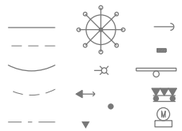
SHEET TITLE:
ELECTRICAL GENERAL NOTES

Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_MECH\Pentable\020-0927_MECH.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_MECH\DGN\Sheets\01.General\20msaa21.E002.dgn
Default
3/9/2026

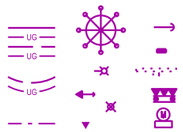
EXISTING LINES AND OBJECTS (EXAMPLES)



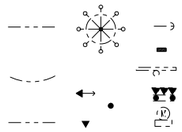
OR



ITEMS TO BE DEMOLISHED (EXAMPLES)



FUTURE ITEMS (EXAMPLES)



MISCELLANOUS

TREE

WINDSOCK, POLE MOUNTED

LINE DESIGNATION

PRIMARY CONDUCTOR (3 PHASE OVERHEAD)

PRIMARY CONDUCTOR (3 PHASE UNDERGROUND)

PRIMARY CONDUCTOR (2 PHASE OVERHEAD)

PRIMARY CONDUCTOR (2 PHASE UNDERGROUND)

PRIMARY CONDUCTOR (1 PHASE OVERHEAD)

PRIMARY CONDUCTOR (1 PHASE UNDERGROUND)

SECONDARY CONDUCTOR (3 PHASE OVERHEAD)

SECONDARY CONDUCTOR (3 PHASE UNDERGROUND)

SECONDARY CONDUCTOR (1 PHASE OVERHEAD)

SECONDARY CONDUCTOR (1 PHASE UNDERGROUND)

COMMUNICATIONS (OVERHEAD)

COMMUNICATIONS (UNDERGROUND)

SIGNAL (OVERHEAD)

SIGNAL (UNDERGROUND)

CONDUIT (ABOVE GROUND)

CONDUIT (BELOW GROUND)

HOMERUN (WITH CONDUCTOR INDICATION)

UTILITY (OVERHEAD)

UTILITY (UNDERGROUND)

ELECTRICAL EQUIPMENT NAMING CONVENTIONS

T## — TRANSFORMER(S): SEE SITE PLANS FOR LOCATIONS.

SECT## / S### — SECTIONALIZER (SECT) & PAD-MOUNTED SWITCH (S): SEE SITE PLANS FOR LOCATIONS.

SG## — FREE STANDING SWITCHGEAR.

PP## — PANELBOARD

G## — GENERATOR (STAND-BY).

M1007 / P1007 / C1007 — DUCT BANK TAG, SEE SCHEDULE FOR CONDUCTORS CONTAINED WITHIN.

SITE PLAN SYMBOLOGY

LIGHTING

HIGH MAST TOWER (RING TYPE)

HIGH MAST TOWER (SINGLE BASKET TYPE) (N) = NO. FIXTURES

HIGH MAST TOWER (DUAL BASKET TYPE) (N) = NO. FIXTURES

HIGH MAST TOWER (LATTICE TYPE) (N) = NO. FIXTURES

LUMINAIRE XX = PHASING (WHEN REQ'D)

FLOODLIGHT

GENERAL

AERIAL CABLE MARKER

BILLBOARD1

BILLBOARD2

BILLBOARD3

CUTOUT, FUSED XX = SIZE (T TYPE UNLESS NOTED OTHERWISE)

DOWN GUY

DOWN GUY (2 ANCHORS)

GENERATOR G-XX

LIGHTNING ARRESTER

METER (PAD MOUNTED)

METER (PEDESTAL MOUNTED)

METER (MOUNTED ON BUILDING)

PANEL: POWER OR COMBINATION LIGHTING CONTACTOR PPx CLCS-x

POLE, RADIO TOWER

POLE, METAL OR OTHER MATERIAL NOT WOOD, UPRR OWNED

POLE, TRANSMISSION, UTILITY

POLE, WOOD, UPRR OWNED

POLE, WOOD, UTILITY (NOT UPRR)

PULLBOX, MEDIUM-VOLTAGE >1000V

PULLBOX, POWER <600V

PULLBOX, COMMUNICATIONS

REACTOR, PAD MOUNTED

RECLOSER

REGULATOR, VOLTAGE, POLE-MOUNTED

SWITCH, GANG OPERATED, POLE MOUNTED GOS

SPLICE PEDESTAL, PRIMARY, PAD MOUNTED

SWITCHGEAR, PRIMARY, PAD MOUNTED

TOWER, TRANSMISSION, UTILITY

TRANSFORMER (H-STRUCTURE)

TRANSFORMER, PAD MOUNTED, SINGLE PHASE

TRANSFORMER, PAD MOUNTED, THREE PHASE - SITE PLANS

TRANSFORMER, PAD MOUNTED, THREE PHASE - ENLARGED DETAILS

TRANSFORMER, POLE MOUNTED

BOX, JUNCTION

BOX, JUNCTION; WALL MOUNTED

CLOCK, ELAPSED TIME

CLOCK, ELAPSED TIME WITH IT

CLOCK, PENDANT MOUNT

CLOCK, PENDANT MOUNT (C)

CLOCK, WALL MOUNT

CLOCK, WALL MOUNT (C)

DETECTOR, FLAME

DETECTOR, GAS

DETECTOR, SMOKE

LIGHT, EMERGENCY BATTERY POWERED (1)

LIGHT, EMERGENCY BATTERY POWERED (2)

LIGHT, EMERGENCY BATTERY POWERED (3)

LIGHT, EMERGENCY QUADRANT FILL

LIGHT, EXIT ARROW

LIGHT, EXIT, CEILING MOUNTED

LIGHT, EXIT, WALL MOUNTED

LIGHT, FLUORESCENT BARE TUBE

LIGHT, FLUORESCENT BARE TUBE (WALL MTD)

LIGHT, FLUORESCENT INDUSTRIAL

LIGHT, FLUORESCENT (2x2)

LIGHT, FLUORESCENT (2x4)

LIGHT, FLUORESCENT (1x4)

LIGHT, FLUORESCENT SURFACE MOUNT

LIGHT, FLUORESCENT WALL MOUNTED

LIGHT, DOWNLIGHT, RECESSED

LIGHT, DOWNLIGHT, SURFACE MOUNTED

LIGHT, WALL MOUNTED

LIGHT, INCANDESCENT EXPLOSION PROOF

LIGHT, WALL MOUNTED NIGHT/UNSWITCHED

FACILITIES SYMBOLOGY

PANEL, LIGHTING

PANEL, POWER

PANEL, FIRE ALARM CONTROL

PANEL, FIRE ALARM ANNUNC ATOR

SWITCH, SAFETY (FUSED)

SWITCH, SAFETY (NON-FUSED)

SWITCH, COMBINATION MOTOR CONTROLLER

SWITCH, COMBINATION MOTOR CONT. (FUSED)

SWITCH, COMBINATION MAGNETIC STARTER

SWITCH, MAGNETIC STARTER

METER, ELECTRIC

TRANSFORMER, DRY-TYPE

MOTOR

OUTLET, BOX BLANK COVER

OUTLET, FAN HANGER

OUTLET, TELEPHONE

OUTLET, DATA

OUTLET, TELEPHONE & DATA

OUTLET, FLOOR, TELEPHONE

OUTLET, FLOOR, DATA

OUTLET, FLOOR, TELEPHONE & DATA

OUTLET, TELEVISION ANTENNA

RECEPTACLE, SINGLE CLOCK HANGER

RECEPTACLE, DUPLEX

RECEPTACLE, DUPLEX SPECIAL MOUNT

RECEPTACLE, DUPLEX SPLIT WIRE

RECEPTACLE, FLOOR, DUPLEX

RECEPTACLE, FLOOR, SINGLE

RECEPTACLE, FLOOR, QUADRUPLEX

RECEPTACLE, FLOOR SPECIAL PURPOSE

RECEPTACLE, DUPLEX, GFCI

RECEPTACLE, QUADRUPLEX

RECEPTACLE, QUADRUPLEX, GFCI

RECEPTACLE, RANGE

RECEPTACLE, SINGLE

RECEPTACLE, SPECIAL PURPOSE (120)

RECEPTACLE, SPECIAL PURPOSE (240)

RECEPTACLE, SINGLE EXPLOSION PROOF (120)

RECEPTACLE, TRIPLE

RECEPTACLE, TRIPLE SPLIT WIRE

RECEPTACLE, DUPLEX TV POWER

LOAD POINT

LIGHT, INDICATOR

SENSOR, OCCUPANCY CEILING

SENSOR, OCCUPANCY CONTROL PACK

SENSOR, OCCUPANCY WALL SWITCH

SENSOR, OCCUPANCY WIDE VIEW

SPEAKER

SPEAKER, HORN

SPEAKER HORN, WITH INDICATOR

SPRINKLER HEAD

HOLDER, DOOR

INTERCOM

SECURITY CAMERA

PHOTO CELL

PULL STATION, FIRE ALARM

AIR TERMINAL

SWITCH, AUTOMATIC DOOR

SWITCH, CIRCUIT BREAKER

SWITCH, DUPLEX RECEPTACLE

SWITCH, FUSED

SWITCH, INTENSITY DIMMER

SWITCH, INTERVAL TIMER

SWITCH, KEY OPERATED

SWITCH, LOW VOLTAGE

SWITCH, LOW VOLTAGE MASTER

SWITCH, MOMENTARY CONTACT

SWITCH, MANUAL JOG

SWITCH, PUSH BUTTON

SWITCH, PUSH BUTTON (1)

SWITCH, PUSH BUTTON (2)

SWITCH, PILOT LAMP

SWITCH, REMOTE CONTROL

SWITCH, SINGLE RECEPTACLE

SWITCH, WEATHERPROOF

SWITCH, WEATHER-PROOF FUSED

SWITCH, SINGLE POLE

SWITCH, DOUBLE POLE

SWITCH, 3 WAY

SWITCH, 4 WAY

TELEPHONE, PUBLIC

TELEPHONE SWITCHBOARD

TELEPHONE, WALL MOUNTED

THERMOSTAT

THERMOSTAT, WALL MOUNTED

GROUND ROD

FLOW SWITCH

TAMPER SWITCH

SECTIONALIZER

PAD-MOUNTED SWITCH

FUSED PAD-MOUNTED SWITCH

CALLOUT SYMBOLS

CIRCLE NOTE INDICATOR

HEXAGON NOTE INDICATOR

OVAL NOTE INDICATOR

SQUARE NOTE INDICATOR

REVISION NOTE INDICATOR

ONE-LINE DIAGRAMS

CIRCUIT BREAKER

LIGHTNING ARRESTER

CONNECTION POINT WH = WEATHERHEAD

TRANSFORMER

TRANSFER SWITCH (AUTOMATIC OR MANUAL)

CABLE TERMINATOR

FUSED CUTOUT SWITCH

SWITCH, FUSED

FUSE

GROUNDING POINT

SWITCH, NON-FUSED

REACTOR

TRANSFORMER, CURRENT

TRANSFORMER, POTENTIAL

FAULT INDICATOR OR

FEEDTHRU BUSHING INSERT

DISCONNECTING DEVICE/ LOADBREAK ELBOW

JUNCTION BOX

GENERATOR

KIRK KEY

PANELBOARD MCB OR MLO

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

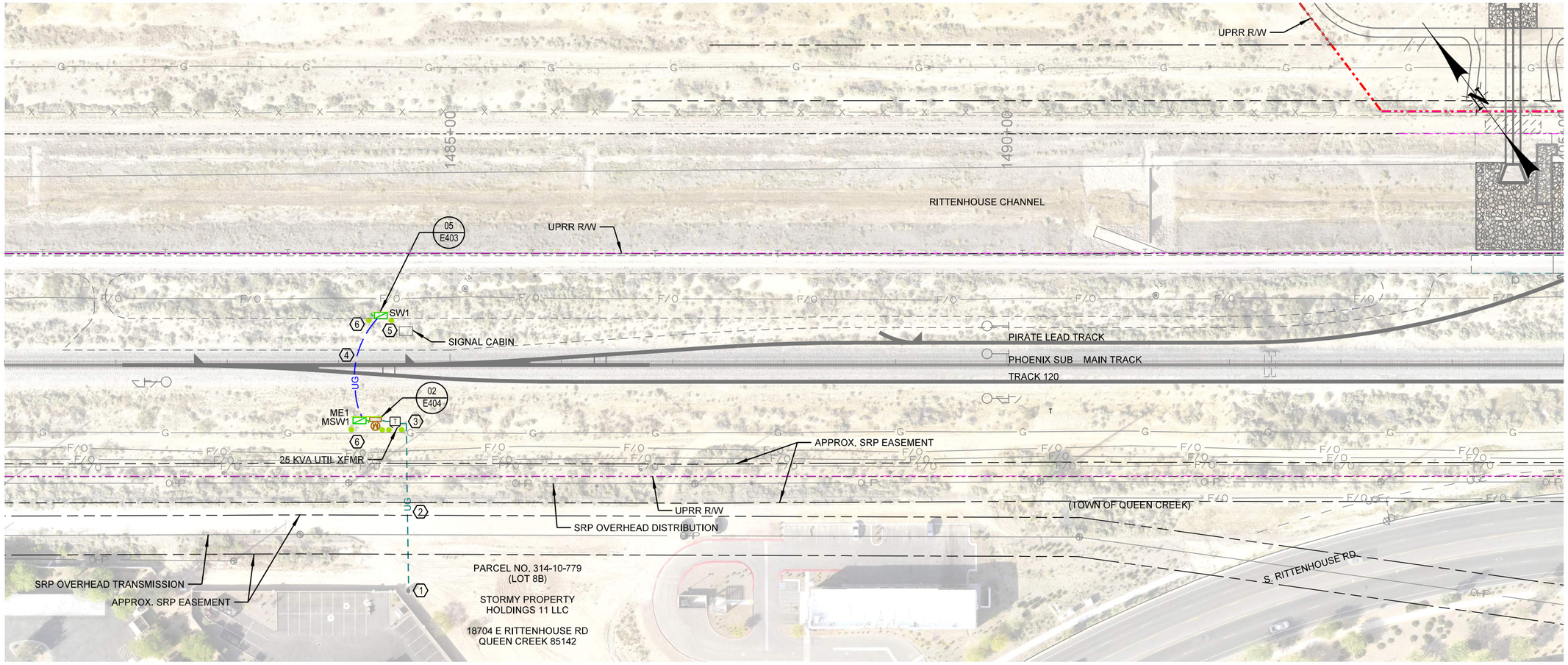
DRAWN BY: DMS
CHECKED BY: DMS
DATE: 3/9/2026
SHEET NUMBER: E003 of 003

UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
ELECTRICAL LEGEND

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color_UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_MECH\Pentable\020-0927_MECH.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_MECH\DGN\Sheets\01_General\20msea21_E003.dgn
Default
3/9/2026



01 / E201 ELECTRICAL SITE PLAN - MP 934.82
SEE SCALE

GENERAL ELECTRICAL NOTES:

SEE SHEET E002 FOR GENERAL ELECTRICAL NOTES.

A. ALL INSTALLATIONS FOR UTILITY MATERIALS AND EQUIPMENT MUST MEET MINIMUM CONSTRUCTION STANDARDS OF SRP ELECTRICAL SERVICE CONSTRUCTION. CONFIRM ALL UTILITY EQUIPMENT LOCATIONS WITH SRP PRIOR TO BEGINNING WORK.

B. ENSURE ALL BORING PERMITS OF PUBLIC ROADS AND CROSSING ARE APPROVED PRIOR TO BEGINNING WORK.

C. ALL UNDERGROUND AND ABOVE-GRADE WORK SHALL MEET UPRR REQUIREMENTS OUTLINED ON E002.

KEYED NOTES: (#)

1. AT EXISTING PADMOUNT SWITCH, PROVIDE WORK PIT, SPLICE CONDUIT, AND BACKFILL.
2. DIRECTIONAL BORE (1) 2-1/2" EMPTY CONDUIT FROM EXISTING PADMOUNT SWITCH TO NEW UTILITY TRANSFORMER AND TO METER AT EQUIPMENT RACK. BORE AT 48" BELOW GRADE. MAINTAIN 12" MIN. CLEARANCE TO ALL OTHER UG UTILITIES. SRP TO PROVIDE SINGLE-PHASE TRANSFORMER PAD. USE DISTANCE OF 212' FOR PURPOSES OF BIDDING.
3. PROVIDE FIBERGLASS UNDERGROUND UTILITY MARKER.
4. BORE (1) 2" CONDUIT FROM MSW1 TO SW1. CONDUIT TO BE A MINIMUM OF 15' BELOW BASE OF RAIL.
5. UPRR SIGNAL TO PROVIDE CONDUIT AND CONDUCTORS FROM JBOX AND MAKE FINAL CONNECTION TO SIGNAL CABIN.
6. PROVIDE (6) 8" BOLLARDS TO PROTECT EQUIPMENT RACKS FROM VEHICLE TRAFFIC. REFER TO DETAIL 03/401 FOR MORE INFORMATION.

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

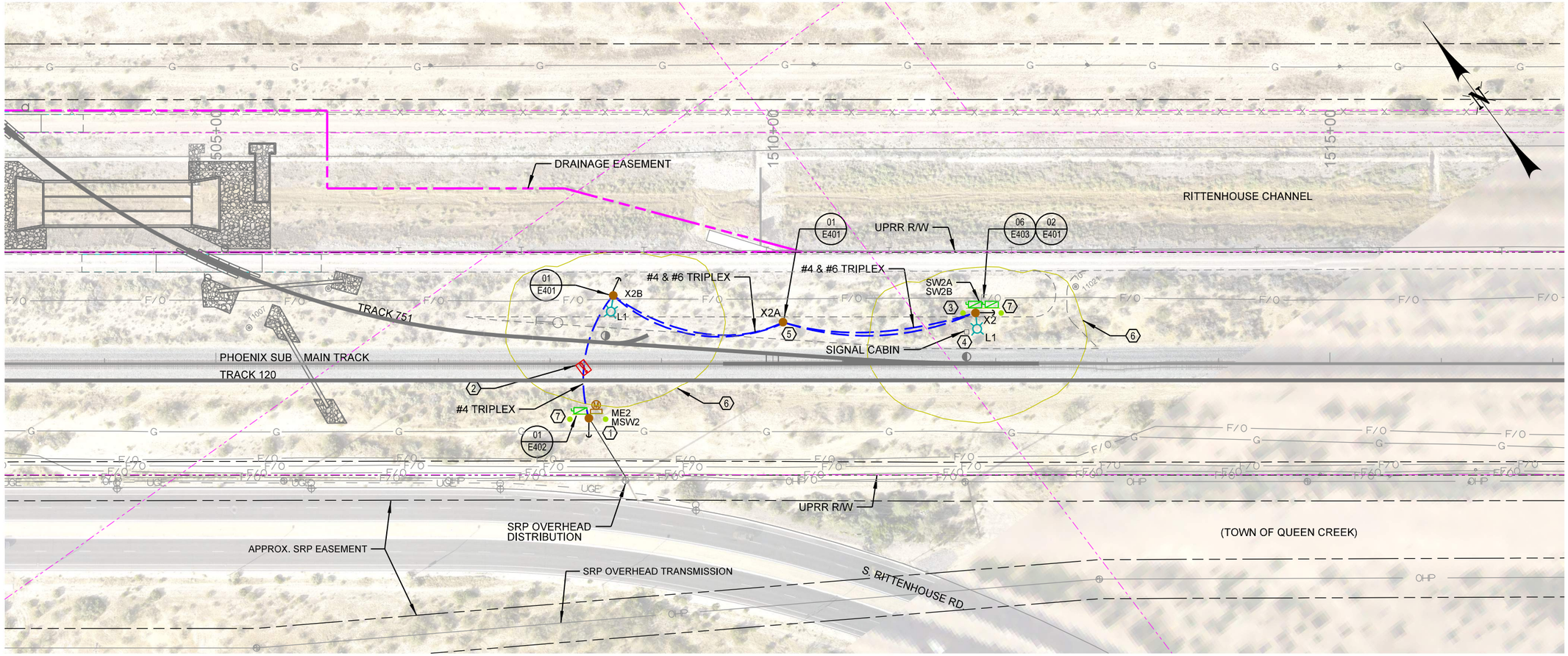
DRAWN BY:	RSP
CHECKED BY:	DMS
DATE:	3/9/2026
SHEET NUMBER	E201 of 213

UNION PACIFIC RAILROAD

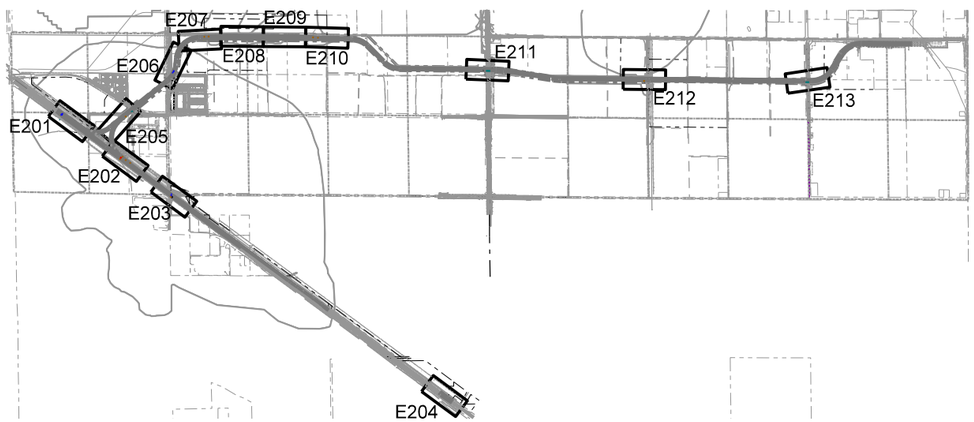
LOCATION & DESCRIPTION:
Mesa, Arizona
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
ELECTRICAL SITE PLAN

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_MECH\Pentable\020-0927_MECH.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_MECH\DGN\Sheets\02_Plans\20msaaz_E201.dgn
Default
3/9/2026



01 E202 ELECTRICAL SITE PLAN - MP 935.33
SEE SCALE



100 0 100 200
SCALE IN FEET

GENERAL ELECTRICAL NOTES:

SEE SHEET E002 FOR GENERAL ELECTRICAL NOTES.

A. ALL INSTALLATIONS FOR UTILITY MATERIALS AND EQUIPMENT MUST MEET MINIMUM CONSTRUCTION STANDARDS OF SRP ELECTRICAL SERVICE CONSTRUCTION. CONFIRM ALL UTILITY EQUIPMENT LOCATIONS WITH SRP PRIOR TO BEGINNING WORK.

B. ENSURE ALL BORING PERMITS OF PUBLIC ROADS AND CROSSING ARE APPROVED PRIOR TO BEGINNING WORK.

C. ALL UNDERGROUND AND ABOVE-GRADE WORK SHALL MEET UPRR REQUIREMENTS OUTLINED ON E002.

KEYED NOTES: (#)

1. PROVIDE 45' CLASS 3 WOOD POLE FOR SERVICE DROP FROM UTILITY. CONSTRUCT EQUIPMENT RACK FOR METER SOCKET AND SERVICE DISCONNECT. PROVIDE SIDEWALK GUY. COORDINATE INSTALLATION WITH LOCAL POWER UTILITY REPRESENTATIVE FOR FINAL POLE LOCATION, INSPECTION, AND SERVICE CONNECTION.
2. PROVIDE AERIAL CABLE MARKER. ENSURE NO PART OF INSTALLATION IS LESS THAN 27' ABOVE TOP OF RAIL. REFER TO STANDARD DRAWING 0039 ON UPRR'S SOURCEHUB WEBSITE FOR MATERIAL AND INSTALLATION INFORMATION.
3. PROVIDE 45' CLASS 3 WOOD POLE WITH GUYING AND EQUIPMENT RACK ADJACENT TO POLE. FURNISH AND INSTALL EQUIPMENT SHOWN. REFER TO DETAIL FOR TYPICAL RACK CONSTRUCTION. ENSURE ALL EQUIPMENT IS A MINIMUM OF 15' FROM CENTERLINE OF TRACK.
4. UPRR SIGNAL TO PROVIDE CONDUIT AND MAKE FINAL CONNECTIONS TO SIGNAL EQUIPMENT AND POWERED TRACK EQUIPMENT.
5. PROVIDE 45' CLASS 3 WOOD POLE FOR LIGHTING CIRCUIT.
6. DETAIL LINE REPRESENTS 0.1 FOOTCANDLE (FC) DISTRIBUTION FOR FIXTURE, L1. SEE DETAIL 04 ON E401 FOR MORE COMPLETE PHOTOMETRIC DISTRIBUTION.
7. PROVIDE (4) 8" BOLLARDS TO PROTECT EQUIPMENT RACKS FROM VEHICLE TRAFFIC. REFER TO DETAIL 03/401 FOR MORE INFORMATION.

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

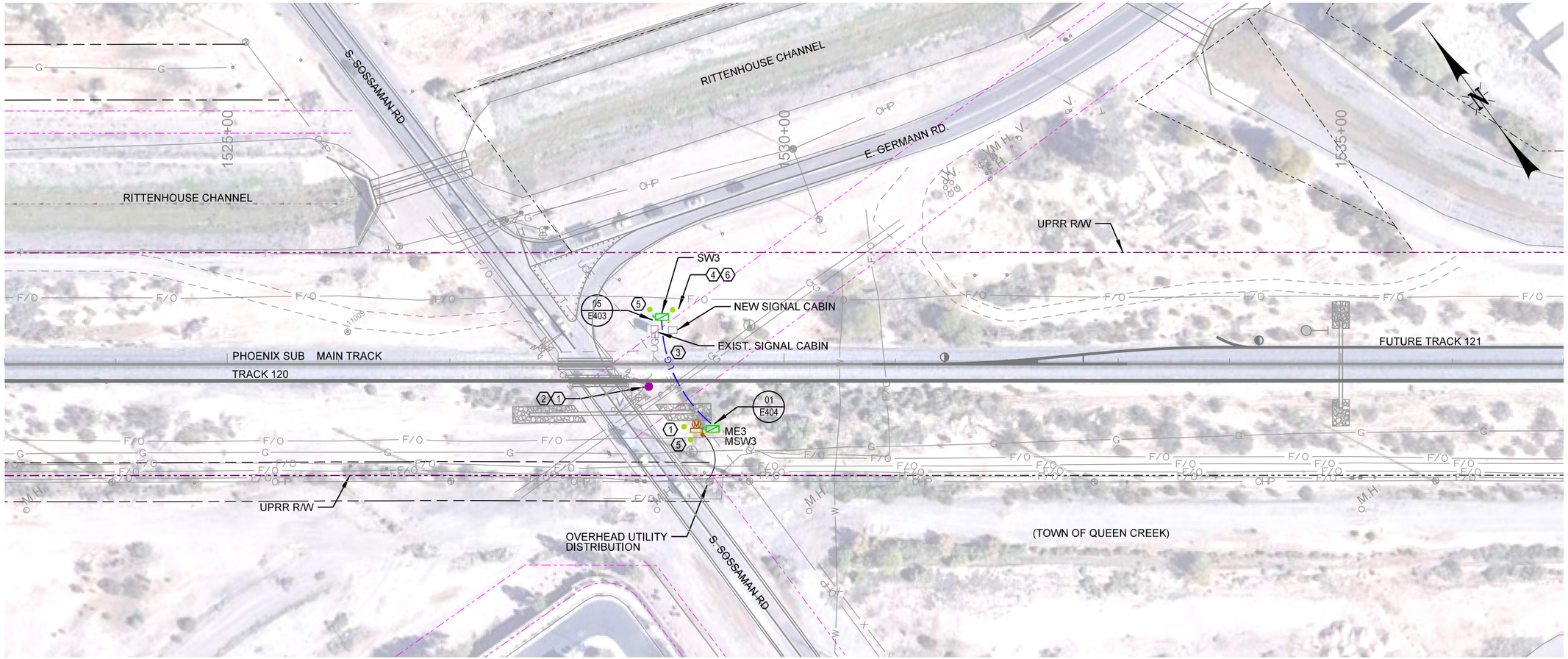
DRAWN BY:	RSP
CHECKED BY:	DMS
DATE:	3/9/2026
SHEET NUMBER	E202 of 213

UNION PACIFIC RAILROAD

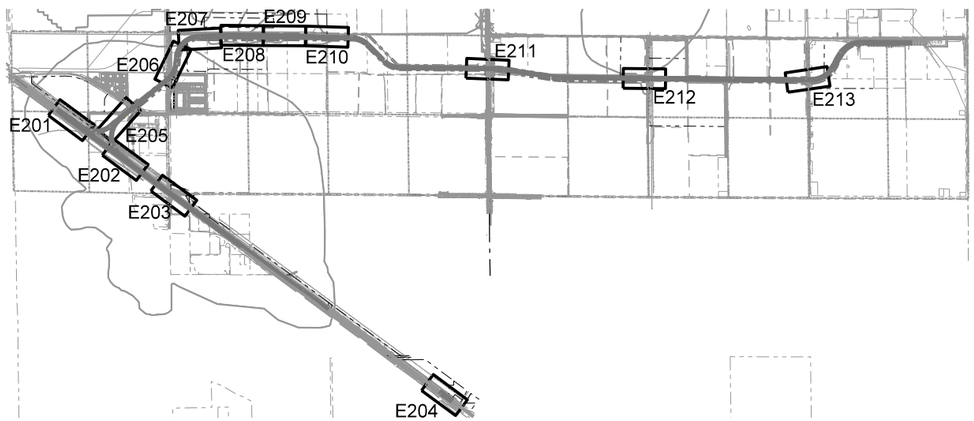
LOCATION & DESCRIPTION:
Mesa, Arizona
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
ELECTRICAL SITE PLAN

Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927.40-Design\Microstation\020-0927_MECH\Pentable\020-0927_MECH.tbl
F:\2020\0501-1000\020-0927.40-Design\Microstation\020-0927_MECH\DGN\Sheets\02_Plans\20mseaz_E202.dgn
Default
3/9/2026



01 / E203 ELECTRICAL SITE PLAN - MP 935.65
SEE SCALE



100 0 100 200
SCALE IN FEET

GENERAL ELECTRICAL NOTES:

SEE SHEET E002 FOR GENERAL ELECTRICAL NOTES.

A. ALL INSTALLATIONS FOR UTILITY MATERIALS AND EQUIPMENT MUST MEET MINIMUM CONSTRUCTION STANDARDS OF SRP ELECTRICAL SERVICE CONSTRUCTION. CONFIRM ALL UTILITY EQUIPMENT LOCATIONS WITH SRP PRIOR TO BEGINNING WORK.

B. ENSURE ALL BORING PERMITS OF PUBLIC ROADS AND CROSSING ARE APPROVED PRIOR TO BEGINNING WORK.

C. ALL UNDERGROUND AND ABOVE-GRADE WORK SHALL MEET UPRR REQUIREMENTS OUTLINED ON E002.

KEYED NOTES: (#)

1. COORDINATE RELOCATION OF METER WITH UTILITY REPRESENTATIVE. PROVIDE 45' WOOD POLE, EQUIPMENT RACK WITH NEW METER SOCKET AND DISCONNECT.
2. AFTER SERVICE HAS BEEN RELOCATED AND SIGNAL EQUIPMENT RE-ENERGIZED, REMOVE WOOD POLE, METER SOCKET, DISCONNECT AND CONDUIT TO A MIN. OF 2' BELOW GRADE.
3. BORE NEW 2" CONDUIT A MINIMUM OF 12' BELOW BOTTOM OF RAIL FROM NEW SERVICE LOCATION TO ELECTRICAL EQUIPMENT RACK.
4. PROVIDE EQUIPMENT RACK AND DISCONNECTS FOR SIGNAL CABIN.
5. PROVIDE (4) 8" BOLLARDS TO PROTECT EQUIPMENT RACKS FROM VEHICLE TRAFFIC. REFER TO DETAIL 03/401 FOR MORE INFORMATION.
6. UPRR SIGNAL TO PROVIDE CONDUIT AND CONDUCTORS FROM JBOX AND MAKE FINAL CONNECTION TO SIGNAL CABIN.

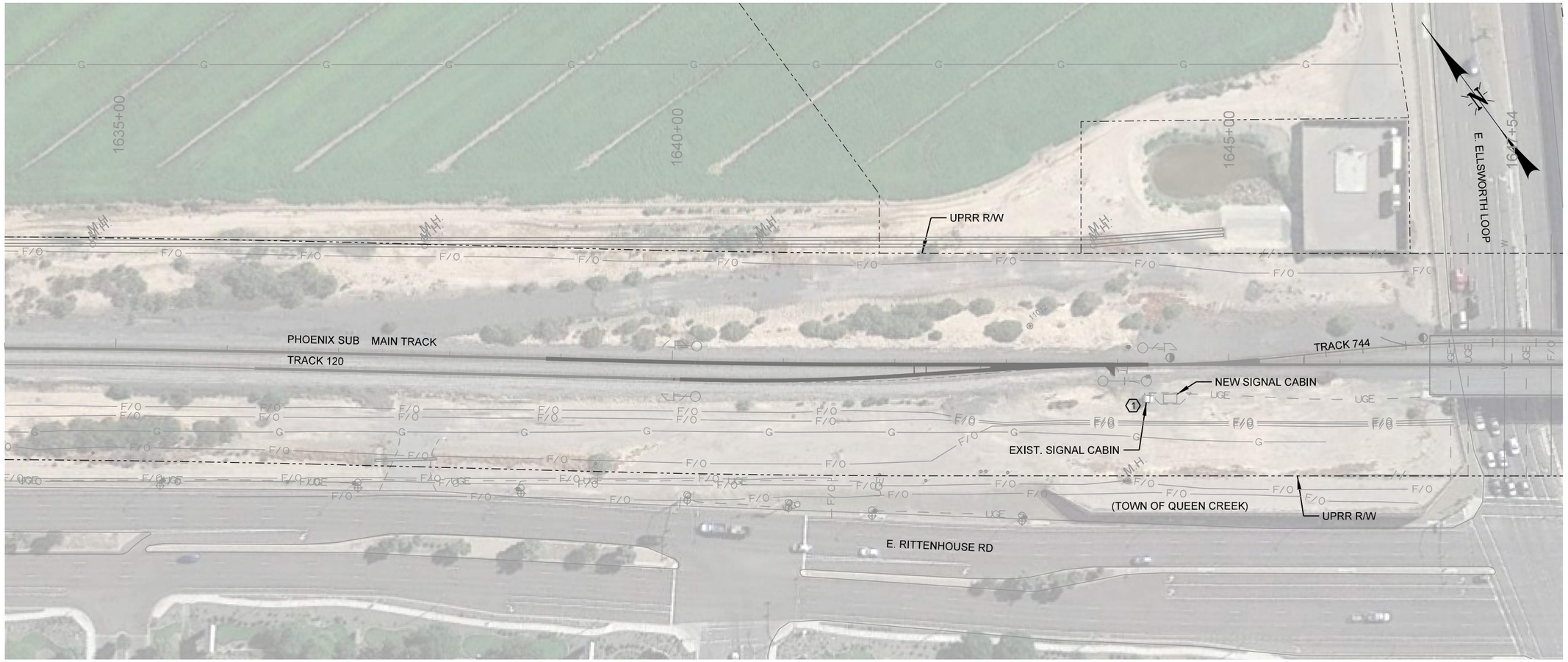
olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

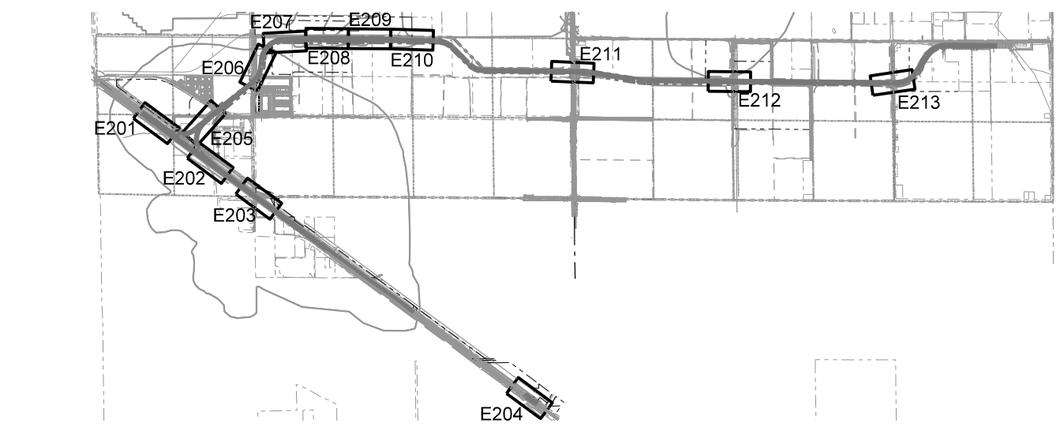
DRAWN BY: RSP
CHECKED BY: DMS
DATE: 3/9/2026
SHEET NUMBER: E203 of 213

UNION PACIFIC RAILROAD
LOCATION & DESCRIPTION:
Mesa, Arizona
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track
SHEET TITLE:
ELECTRICAL SITE PLAN

Color_table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_MECH\Pentable\020-0927_MECH.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_MECH\DGN\Sheets\02_Plans\20msaaz_E203.dgn
Default
3/9/2026



01 E204 ELECTRICAL SITE PLAN
SEE SCALE



100 0 100 200
SCALE IN FEET

GENERAL ELECTRICAL NOTES:

SEE SHEET E002 FOR GENERAL ELECTRICAL NOTES.

A. ALL INSTALLATIONS FOR UTILITY MATERIALS AND EQUIPMENT MUST MEET MINIMUM CONSTRUCTION STANDARDS OF SRP ELECTRICAL SERVICE CONSTRUCTION. CONFIRM ALL UTILITY EQUIPMENT LOCATIONS WITH SRP PRIOR TO BEGINNING WORK.

B. ENSURE ALL BORING PERMITS OF PUBLIC ROADS AND CROSSING ARE APPROVED PRIOR TO BEGINNING WORK.

C. ALL UNDERGROUND AND ABOVE-GRADE WORK SHALL MEET UPRR REQUIREMENTS OUTLINED ON E002.

KEYED NOTES: (#)

1. UPRR SIGNAL TEAM TO EXTEND EXISTING POWER TO NEW SIGNAL EQUIPMENT LOCATIONS. NO ELECTRICAL CONTRACTOR SCOPE AT THIS LOCATION.

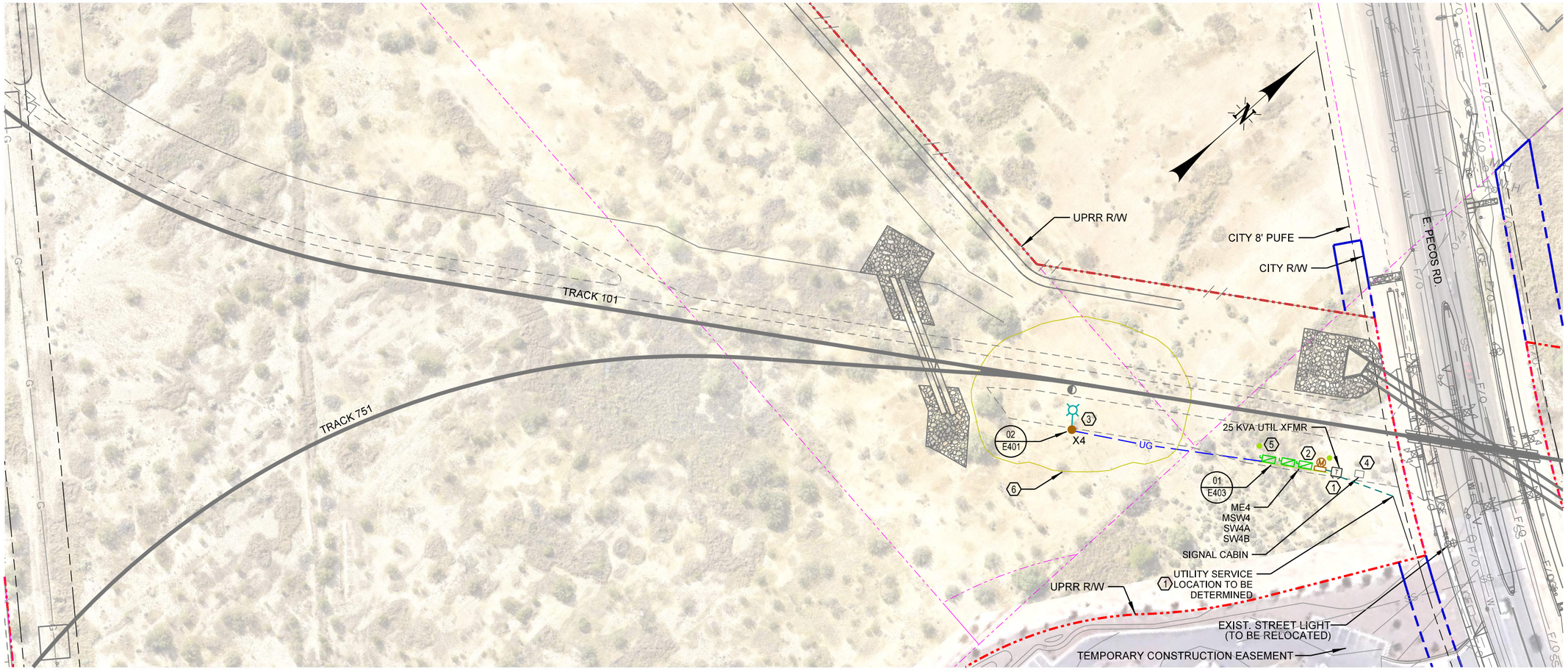
olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

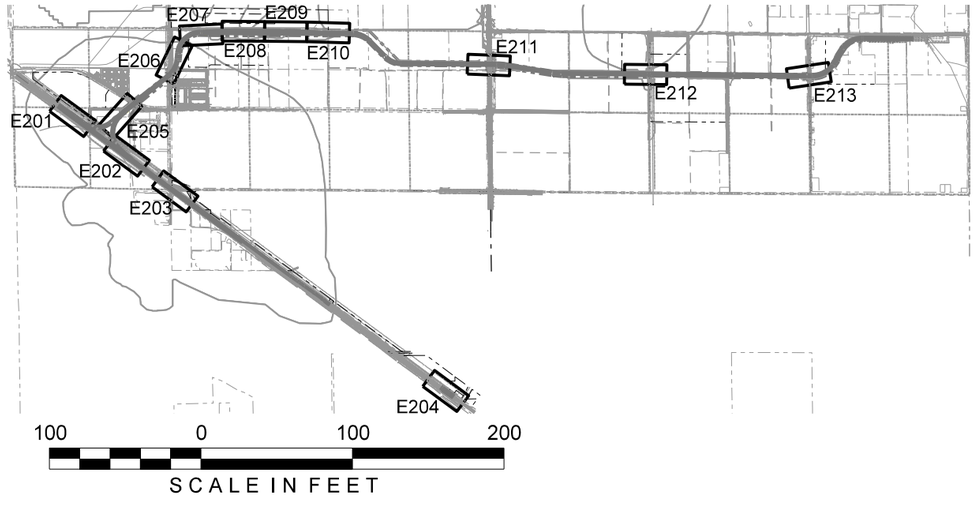
DRAWN BY: RSP
CHECKED BY: DMS
DATE: 3/9/2026
SHEET NUMBER: E204 of 213

UNION PACIFIC RAILROAD
LOCATION & DESCRIPTION:
Mesa, Arizona
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track
SHEET TITLE:
ELECTRICAL SITE PLAN

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_MECH\Pentable\020-0927_MECH.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_MECH\DGN\Sheets\02_Plans\20msaaz_E204.dgn
Default
3/9/2026



01 / E205 ELECTRICAL SITE PLAN - PIRATE LEAD STA 25+90
SEE SCALE



GENERAL ELECTRICAL NOTES:

SEE SHEET E002 FOR GENERAL ELECTRICAL NOTES.

A. ALL INSTALLATIONS FOR UTILITY MATERIALS AND EQUIPMENT MUST MEET MINIMUM CONSTRUCTION STANDARDS OF SRP ELECTRICAL SERVICE CONSTRUCTION. CONFIRM ALL UTILITY EQUIPMENT LOCATIONS WITH SRP PRIOR TO BEGINNING WORK.

B. ENSURE ALL BORING PERMITS OF PUBLIC ROADS AND CROSSING ARE APPROVED PRIOR TO BEGINNING WORK.

C. ALL UNDERGROUND AND ABOVE-GRADE WORK SHALL MEET UPRR REQUIREMENTS OUTLINED ON E002.

KEYED NOTES: (#)

1. SPLICE NEW 2-1/2" CONDUIT FROM EXISTING UTILITY CONDUIT TO NEW SERVICE TRANSFORMER. PROVIDE (1) 2-1/2" CONDUIT FROM TRANSFORMER TO METER SOCKET FOR UTILITY TO PULL CABLES.
2. PROVIDE EQUIPMENT RACK AND DISCONNECTS FOR SIGNAL CABIN AND LIGHTING. REFER TO DETAIL 01/E403 FOR TYPICAL RACK CONSTRUCTION.
3. PROVIDE 45' CLASS 3 WOOD POLE FOR LIGHTING CIRCUIT.
4. UPRR SIGNAL TO PROVIDE CONDUIT AND CONDUCTORS FROM JBOX AND MAKE FINAL CONNECTION TO SIGNAL CABIN.
5. PROVIDE (2) 8" BOLLARDS TO PROTECT EQUIPMENT RACK FROM VEHICLE TRAFFIC. REFER TO DETAIL 03/401 FOR MORE INFORMATION.
6. DETAIL LINE REPRESENTS 0.1 FOOTCANDLE (FC) DISTRIBUTION FOR FIXTURE, L1. SEE DETAIL 04 ON E401 FOR MORE COMPLETE PHOTOMETRIC DISTRIBUTION.

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

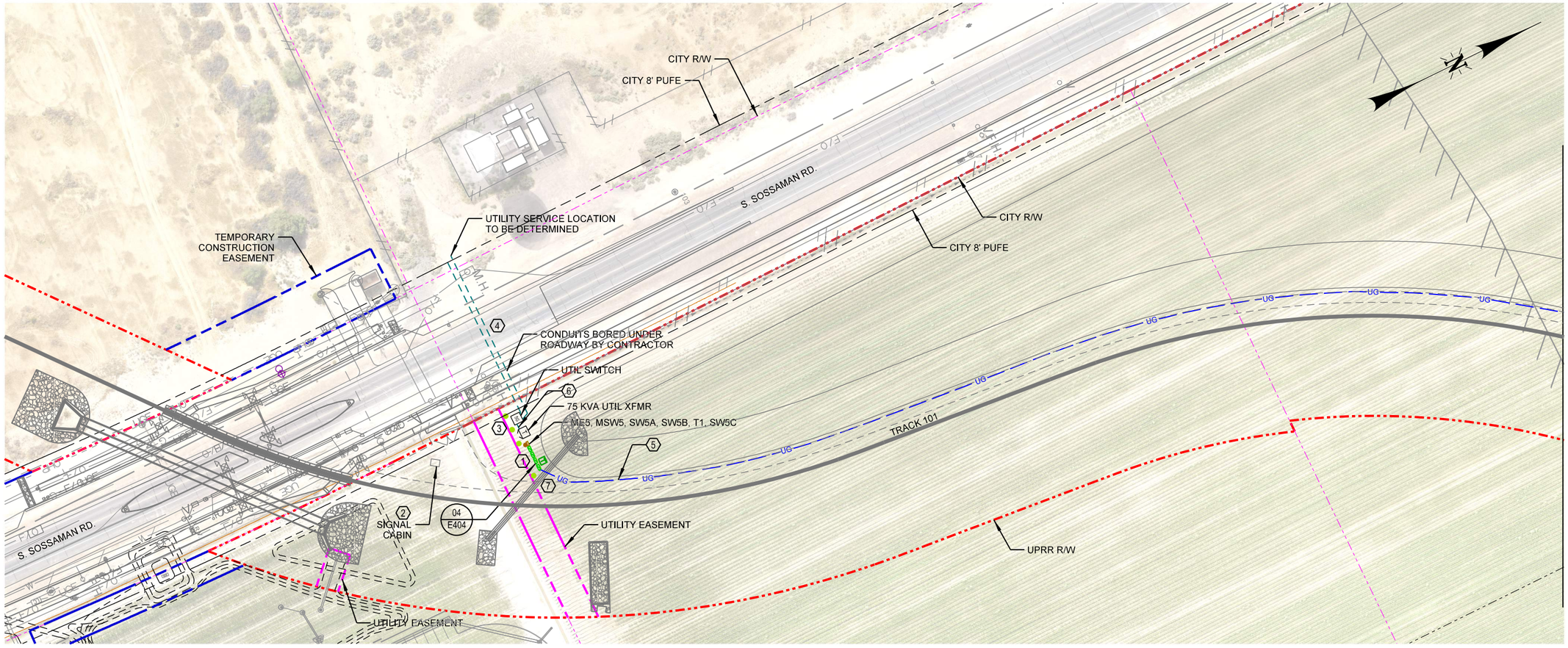
DRAWN BY:	RSP
CHECKED BY:	DMS
DATE:	3/9/2026
SHEET NUMBER	E205 of 213

UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

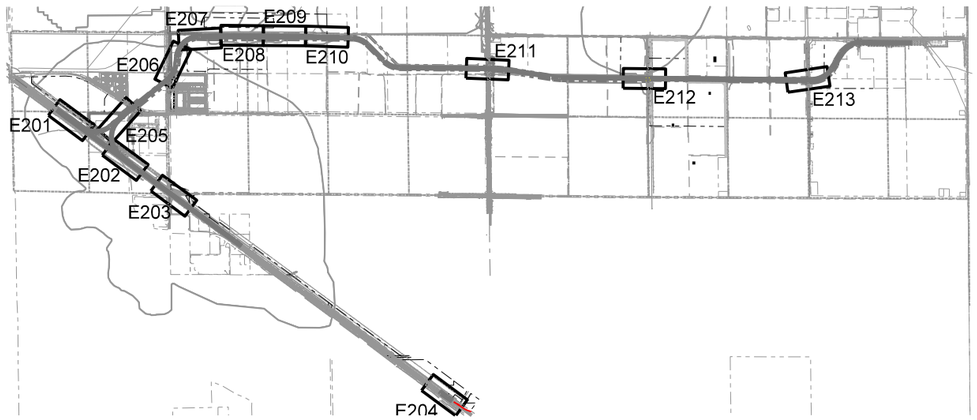
SHEET TITLE:
ELECTRICAL SITE PLAN

Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_MECH\Pentable\020-0927_MECH.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_MECH\DGN\Sheets\02_Plans\20mseaz_E205.dgn
Default
3/9/2026



01 E206 ELECTRICAL SITE PLAN - PIRATE LEAD STA 45+00

SEE SCALE



100 0 100 200

SCALE IN FEET

GENERAL ELECTRICAL NOTES:

SEE SHEET E002 FOR GENERAL ELECTRICAL NOTES.

A. ALL INSTALLATIONS FOR UTILITY MATERIALS AND EQUIPMENT MUST MEET MINIMUM CONSTRUCTION STANDARDS OF SRP ELECTRICAL SERVICE CONSTRUCTION. CONFIRM ALL UTILITY EQUIPMENT LOCATIONS WITH SRP PRIOR TO BEGINNING WORK.

B. ENSURE ALL BORING PERMITS OF PUBLIC ROADS AND CROSSING ARE APPROVED PRIOR TO BEGINNING WORK.

C. ALL UNDERGROUND AND ABOVE-GRADE WORK SHALL MEET UPRR REQUIREMENTS OUTLINED ON E002.

KEYED NOTES: (#)

1. CONSTRUCT EQUIPMENT RACK FOR METER SOCKET AND SERVICE DISCONNECT. COORDINATE INSTALLATION WITH LOCAL POWER UTILITY REPRESENTATIVE FOR UNDERGROUND INSTALLATION, INSPECTION, AND SERVICE CONNECTION. REFER TO DETAIL 3/E403 FOR RACK CONSTRUCTION.
2. UPRR SIGNAL TO PROVIDE CONDUIT AND CONDUCTORS FROM JBOX AND MAKE FINAL CONNECTION TO SIGNAL CABIN.
3. PROVIDE (4) 8" BOLLARDS TO PROTECT EQUIPMENT RACK FROM VEHICLE TRAFFIC. REFER TO DETAIL 03/401 FOR MORE INFORMATION.
4. PROVIDE (6) EMPTY 3" CONDUITS WITH PULL-STRINGS FOR UTILITY CABLING. CONTRACTOR MAY BORE OR TRENCH, RACK, AND ENCASE.
5. PROVIDE (3) EMPTY 3" CONDUITS WITH PULL-STRINGS FOR UTILITY CABLING. CONTRACTOR MAY BORE OR TRENCH, RACK, AND ENCASE. REFER TO DETAIL 5/E401 FOR TYPICAL ENCASED 3-CONDUIT PROFILE.
6. CONTRACTOR SHALL PROVIDE (1) 3" CONDUIT BETWEEN THE UTILITY'S PADMOUNT SWITCH AND PADMOUNT TRANSFORMER AND TO METER SOCKET.
7. MAINTAIN A MINIMUM OF 12" SEPARATION FROM SRP CONDUITS AND OTHER UNDERGROUND CULVERTS OR UTILITY PIPING.

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

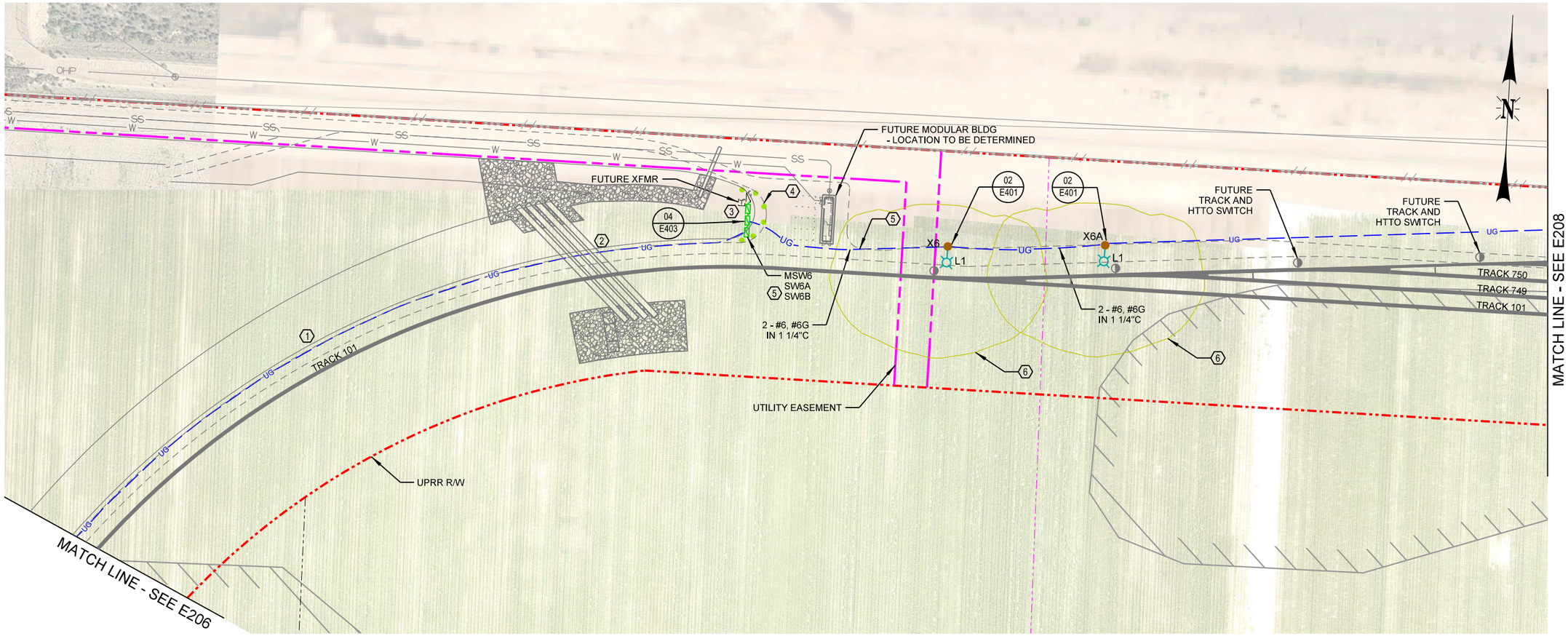
DRAWN BY: RSP
CHECKED BY: DMS
DATE: 3/9/2026
SHEET NUMBER: E206 of 213

UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

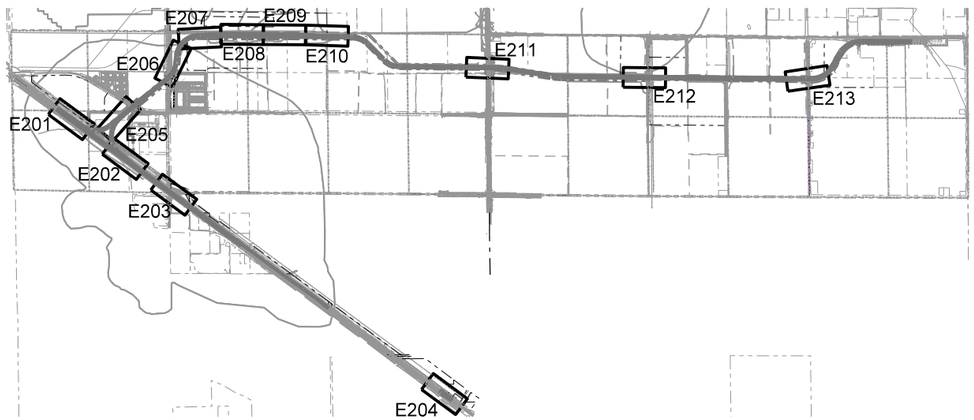
SHEET TITLE:
ELECTRICAL SITE PLAN

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_MECH\Pentable\020-0927_MECH.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_MECH\DGN\Sheets\02_Plans\20msaaz_E206.dgn
Default
3/9/2026



01 E207 ELECTRICAL SITE PLAN - PIRATE LEAD STA 61+25

SEE SCALE



100 0 100 200

SCALE IN FEET

GENERAL ELECTRICAL NOTES:

SEE SHEET E002 FOR GENERAL ELECTRICAL NOTES.

A. ALL INSTALLATIONS FOR UTILITY MATERIALS AND EQUIPMENT MUST MEET MINIMUM CONSTRUCTION STANDARDS OF SRP ELECTRICAL SERVICE CONSTRUCTION. CONFIRM ALL UTILITY EQUIPMENT LOCATIONS WITH SRP PRIOR TO BEGINNING WORK.

B. ENSURE ALL BORING PERMITS OF PUBLIC ROADS AND CROSSING ARE APPROVED PRIOR TO BEGINNING WORK.

C. ALL UNDERGROUND AND ABOVE-GRADE WORK SHALL MEET UPRR REQUIREMENTS OUTLINED ON E002.

KEYED NOTES: (#)

1. CONTRACTOR SHALL PROVIDE (3) EMPTY 3" CONDUITS WITH PULL-STRINGS FOR UTILITY CABLING. CONTRACTOR MAY BORE OR TRENCH, RACK, AND ENCASE. REFER TO DETAIL 5/E401 FOR TYPICAL ENCASED PROFILE.
2. MAINTAIN A MINIMUM OF 12" SEPARATION FROM SRP CONDUITS AND OTHER UNDERGROUND CULVERTS OR UTILITY PIPING.
3. DISCONNECT SW6A IS FOR FUTURE MODULAR OFFICE BUILDING.
4. PROVIDE (6) 8" BOLLARDS TO PROTECT EQUIPMENT RACK FROM VEHICLE TRAFFIC. REFER TO DETAIL 03/401 FOR MORE INFORMATION.
5. PROVIDE UNDERGROUND CIRCUIT IN MINIMUM 1 1/4" CONDUIT TO FIRST LIGHT POLE, X6. CONDUIT ROUTE SHALL CIRCUMVENT FOUNDATION OF MODULAR OFFICE.
6. DETAIL LINE REPRESENTS 0.1 FOOTCANDLE (FC) DISTRIBUTION FOR FIXTURE, L1. SEE DETAIL 04 ON E401 FOR MORE COMPLETE PHOTOMETRIC DISTRIBUTION.

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

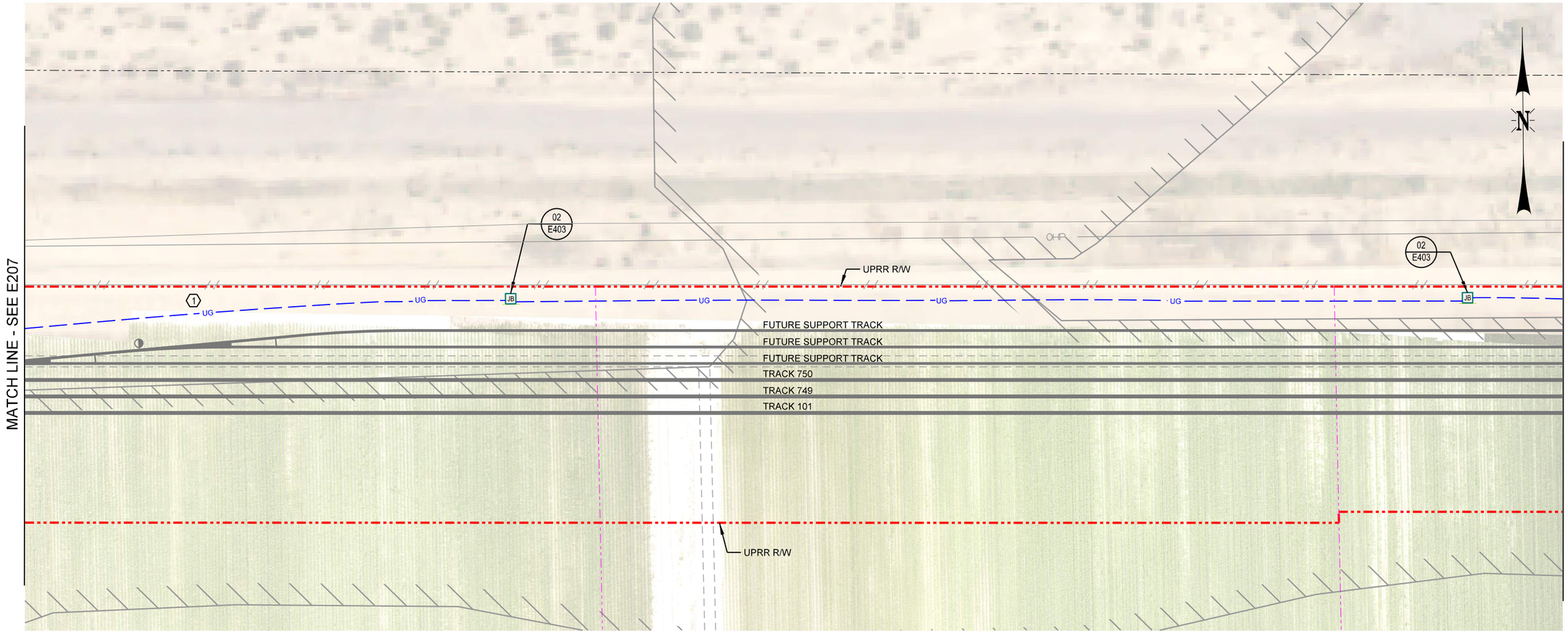
DRAWN BY:	RSP
CHECKED BY:	DMS
DATE:	3/9/2026
SHEET NUMBER	E207 of 213

UNION PACIFIC RAILROAD

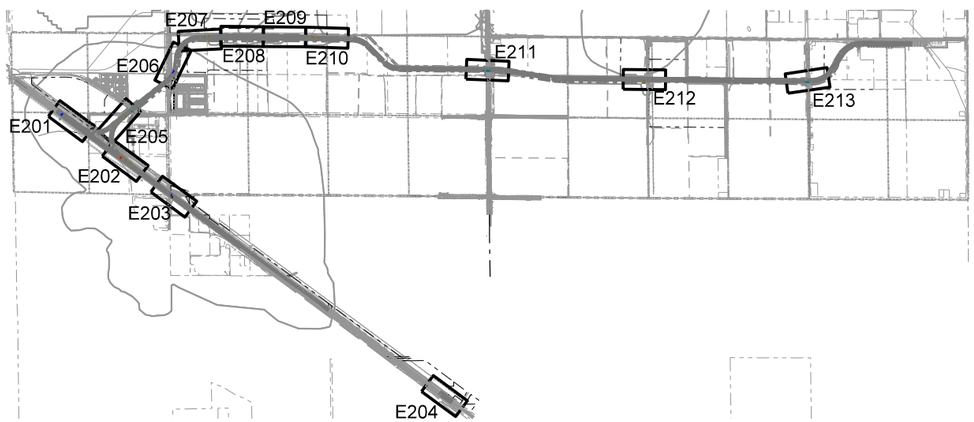
LOCATION & DESCRIPTION:
Mesa, Arizona
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
ELECTRICAL SITE PLAN

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_MECH\Pentable\020-0927_MECH.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_MECH\DGN\Sheets\02_Plans\20msaaz_E207.dgn
Default
3/9/2026



01 E208 ELECTRICAL SITE PLAN - PIRATE LEAD
SEE SCALE



100 0 100 200
SCALE IN FEET

GENERAL ELECTRICAL NOTES:

SEE SHEET E002 FOR GENERAL ELECTRICAL NOTES.

A. ALL INSTALLATIONS FOR UTILITY MATERIALS AND EQUIPMENT MUST MEET MINIMUM CONSTRUCTION STANDARDS OF SRP ELECTRICAL SERVICE CONSTRUCTION. CONFIRM ALL UTILITY EQUIPMENT LOCATIONS WITH SRP PRIOR TO BEGINNING WORK.

B. ENSURE ALL BORING PERMITS OF PUBLIC ROADS AND CROSSING ARE APPROVED PRIOR TO BEGINNING WORK.

C. ALL UNDERGROUND AND ABOVE-GRADE WORK SHALL MEET UPRR REQUIREMENTS OUTLINED ON E002.

KEYED NOTES: ⟨#⟩

1. PROVIDE UNDERGROUND CIRCUIT IN MINIMUM 1 1/4" CONDUIT TO LIGHT POLES.

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: DMS
DATE: 3/9/2026
SHEET NUMBER: E208 of 213

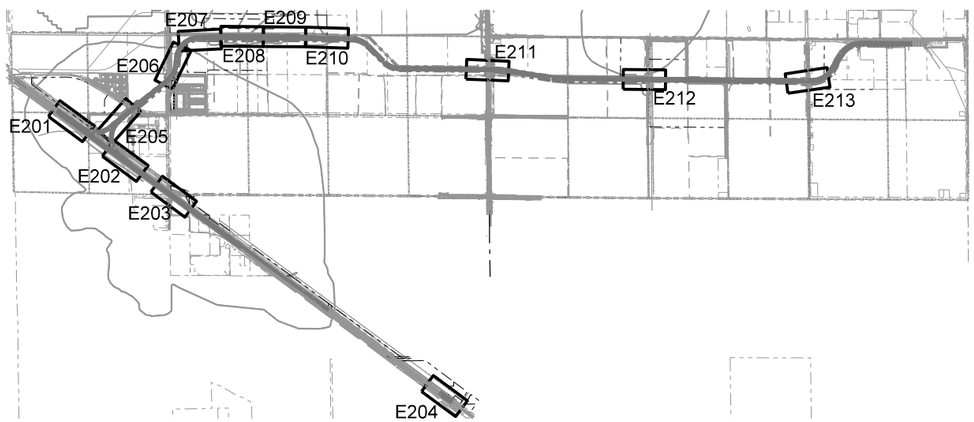
UNION PACIFIC RAILROAD
LOCATION & DESCRIPTION:
Mesa, Arizona
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track
SHEET TITLE:
ELECTRICAL SITE PLAN

Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927.40-Design\Microstation\020-0927_MECH\Pentable\020-0927_MECH.tbl
F:\2020\0501-1000\020-0927.40-Design\Microstation\020-0927_MECH\DGN\Sheets\02_Plans\20mseaz_E208.dgn
Default
3/9/2026



01 / E209 ELECTRICAL SITE PLAN - PIRATE LEAD STA 90+0

SEE SCALE



100 0 100 200

SCALE IN FEET

GENERAL ELECTRICAL NOTES:

SEE SHEET E002 FOR GENERAL ELECTRICAL NOTES.

A. ALL INSTALLATIONS FOR UTILITY MATERIALS AND EQUIPMENT MUST MEET MINIMUM CONSTRUCTION STANDARDS OF SRP ELECTRICAL SERVICE CONSTRUCTION. CONFIRM ALL UTILITY EQUIPMENT LOCATIONS WITH SRP PRIOR TO BEGINNING WORK.

B. ENSURE ALL BORING PERMITS OF PUBLIC ROADS AND CROSSING ARE APPROVED PRIOR TO BEGINNING WORK.

C. ALL UNDERGROUND AND ABOVE-GRADE WORK SHALL MEET UPRR REQUIREMENTS OUTLINED ON E002.

KEYED NOTES: (#)

1. PROVIDE UNDERGROUND CIRCUIT IN MINIMUM 1 1/4" CONDUIT TO LIGHT POLES.

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

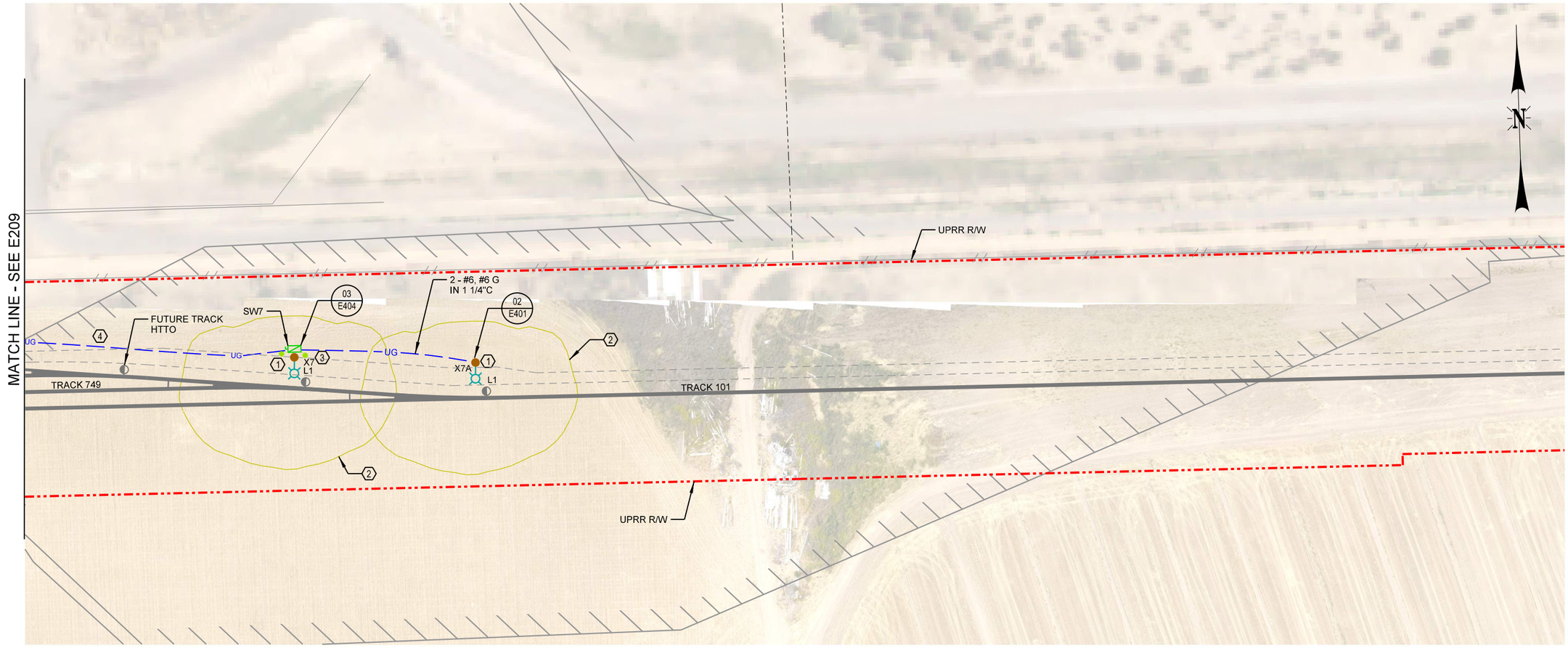
DRAWN BY: RSP
CHECKED BY: DMS
DATE: 3/9/2026
SHEET NUMBER: E209 of 213

UNION PACIFIC RAILROAD

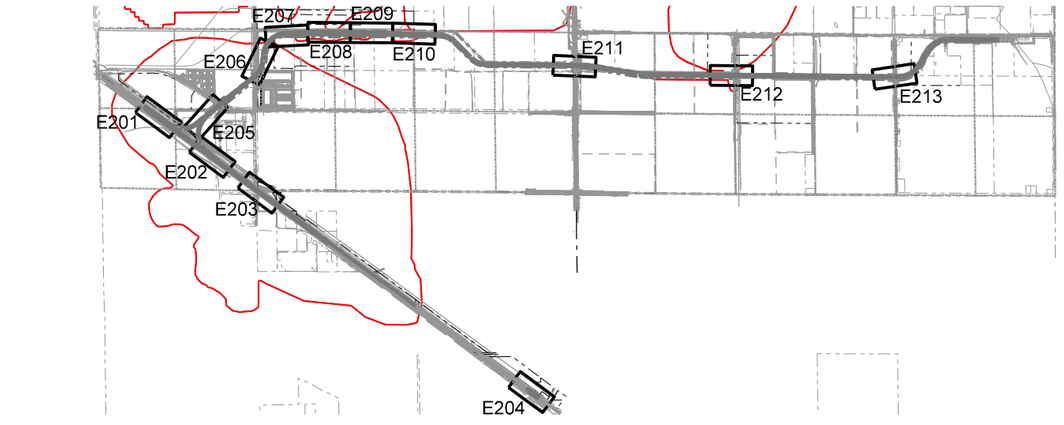
LOCATION & DESCRIPTION:
Mesa, Arizona
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
ELECTRICAL SITE PLAN

Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927.40-Design\Microstation\020-0927_MECH\Pentable\020-0927_MECH.tbl
F:\2020\0501-1000\020-0927.40-Design\Microstation\020-0927_MECH\DGN\Sheets\02_Plans\20mseaz_E209.dgn
Default
3/9/2026



01 / E210 ELECTRICAL SITE PLAN - PIRATE LEAD
SEE SCALE



100 0 100 200
SCALE IN FEET

GENERAL ELECTRICAL NOTES:

SEE SHEET E002 FOR GENERAL ELECTRICAL NOTES.

A. ALL INSTALLATIONS FOR UTILITY MATERIALS AND EQUIPMENT MUST MEET MINIMUM CONSTRUCTION STANDARDS OF SRP ELECTRICAL SERVICE CONSTRUCTION. CONFIRM ALL UTILITY EQUIPMENT LOCATIONS WITH SRP PRIOR TO BEGINNING WORK.

B. ENSURE ALL BORING PERMITS OF PUBLIC ROADS AND CROSSING ARE APPROVED PRIOR TO BEGINNING WORK.

C. ALL UNDERGROUND AND ABOVE-GRADE WORK SHALL MEET UPRR REQUIREMENTS OUTLINED ON E002.

KEYED NOTES: (#)

1. PROVIDE 45' CLASS 3 WOOD POLE FOR LIGHTING CIRCUIT.
2. DETAIL LINE REPRESENTS 0.1 FOOTCANDLE (FC) DISTRIBUTION FOR FIXTURE, L1. SEE DETAIL 04 ON E401 FOR MORE COMPLETE PHOTOMETRIC DISTRIBUTION.
3. PROVIDE (2) 8" BOLLARDS TO PROTECT EQUIPMENT RACK FROM VEHICLE TRAFFIC. REFER TO DETAIL 03/401 FOR MORE INFORMATION.
4. PROVIDE UNDERGROUND CIRCUIT IN MINIMUM 1 1/4" CONDUIT TO LIGHT POLE X7.

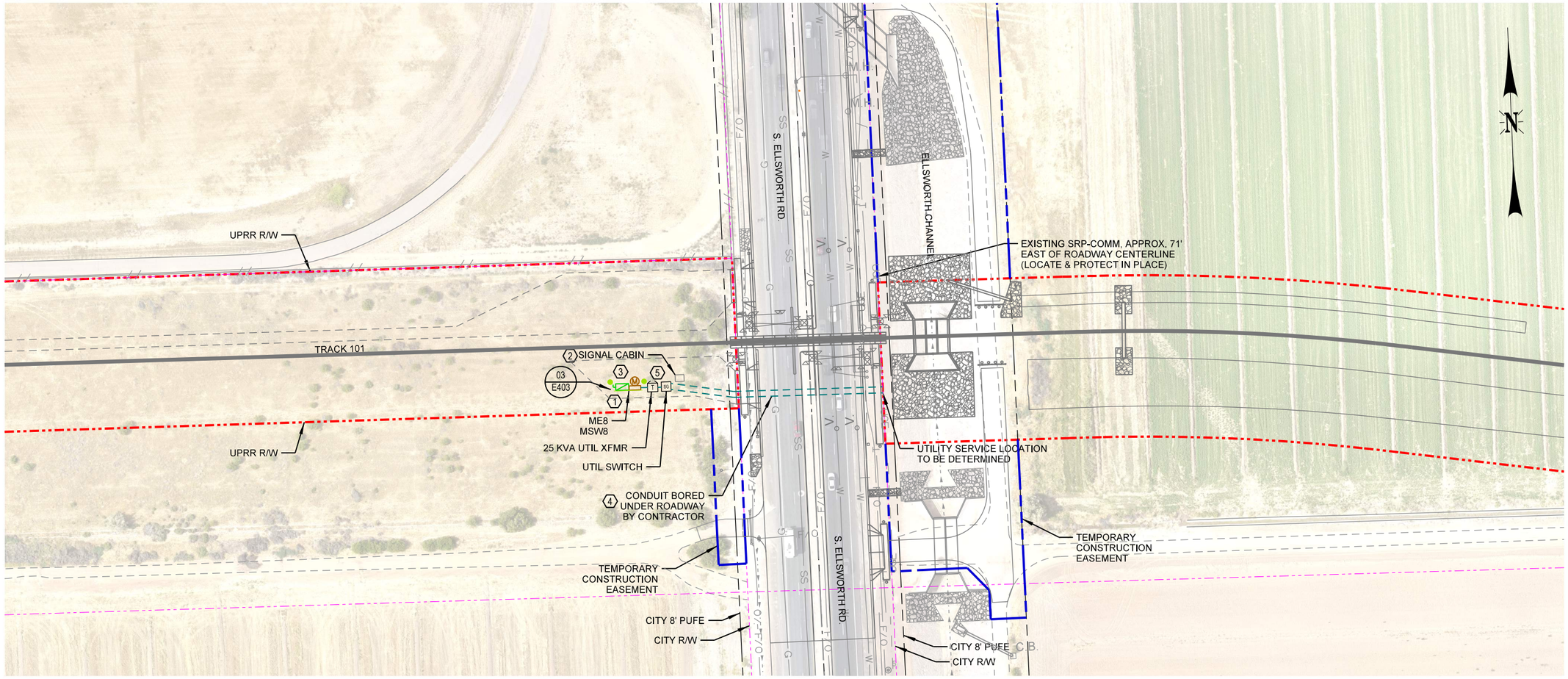
olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

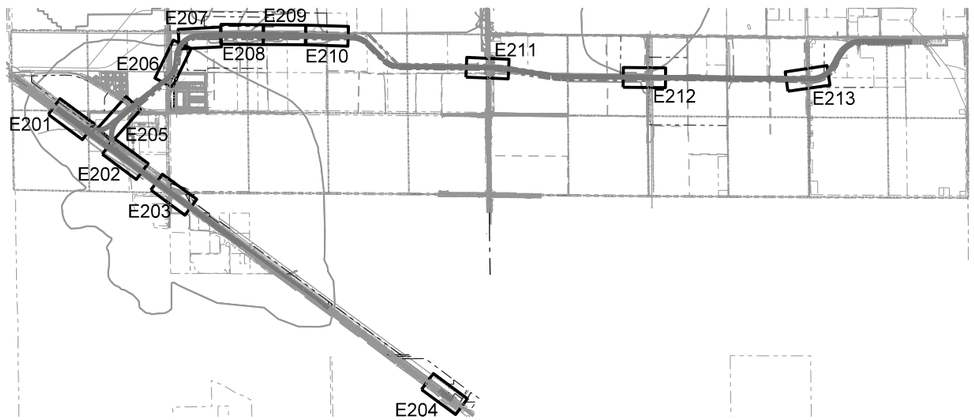
DRAWN BY: RSP
CHECKED BY: DMS
DATE: 3/9/2026
SHEET NUMBER: E210 of 213

UNION PACIFIC RAILROAD
LOCATION & DESCRIPTION:
Mesa, Arizona
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track
SHEET TITLE:
ELECTRICAL SITE PLAN

Color table: K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_MECH\Pentable\020-0927_MECH.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_MECH\DGN\Sheets\02_Plans\20msaaz_E210.dgn
Default
3/9/2026



01 E211 ELECTRICAL SITE PLAN - PIRATE LEAD STA 159+00
SEE SCALE



100 0 100 200
SCALE IN FEET

GENERAL ELECTRICAL NOTES:

SEE SHEET E002 FOR GENERAL ELECTRICAL NOTES.

A. ALL INSTALLATIONS FOR UTILITY MATERIALS AND EQUIPMENT MUST MEET MINIMUM CONSTRUCTION STANDARDS OF SRP ELECTRICAL SERVICE CONSTRUCTION. CONFIRM ALL UTILITY EQUIPMENT LOCATIONS WITH SRP PRIOR TO BEGINNING WORK.

B. ENSURE ALL BORING PERMITS OF PUBLIC ROADS AND CROSSING ARE APPROVED PRIOR TO BEGINNING WORK.

C. ALL UNDERGROUND AND ABOVE-GRADE WORK SHALL MEET UPRR REQUIREMENTS OUTLINED ON E002.

KEYED NOTES: (#)

1. CONSTRUCT EQUIPMENT RACK FOR METER SOCKET AND SERVICE DISCONNECT. COORDINATE INSTALLATION WITH LOCAL POWER UTILITY REPRESENTATIVE FOR UNDERGROUND SERVICE LOCATION, INSPECTION, AND SERVICE CONNECTION.
2. UPRR SIGNAL TO PROVIDE CONDUIT AND CONDUCTORS FROM JBOX AND MAKE FINAL CONNECTION TO SIGNAL CABIN.
3. PROVIDE (2) 8" BOLLARDS TO PROTECT EQUIPMENT RACK FROM VEHICLE TRAFFIC. REFER TO DETAIL 03/401 FOR MORE INFORMATION.
4. CONTRACTOR SHALL PROVIDE (2) BORES UNDER THE ROADWAY - EACH WITH (3) 3" CONDUITS AND WITH A MINIMUM OF 6' OF SEPARATION. PROVIDE EACH WITH PULL-STRINGS.
5. CONTRACTOR SHALL PROVIDE (1) 2-1/2" CONDUIT BETWEEN THE UTILITY'S PADMOUNT SWITCH AND PADMOUNT TRANSFORMER AND TO METER SOCKET.

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

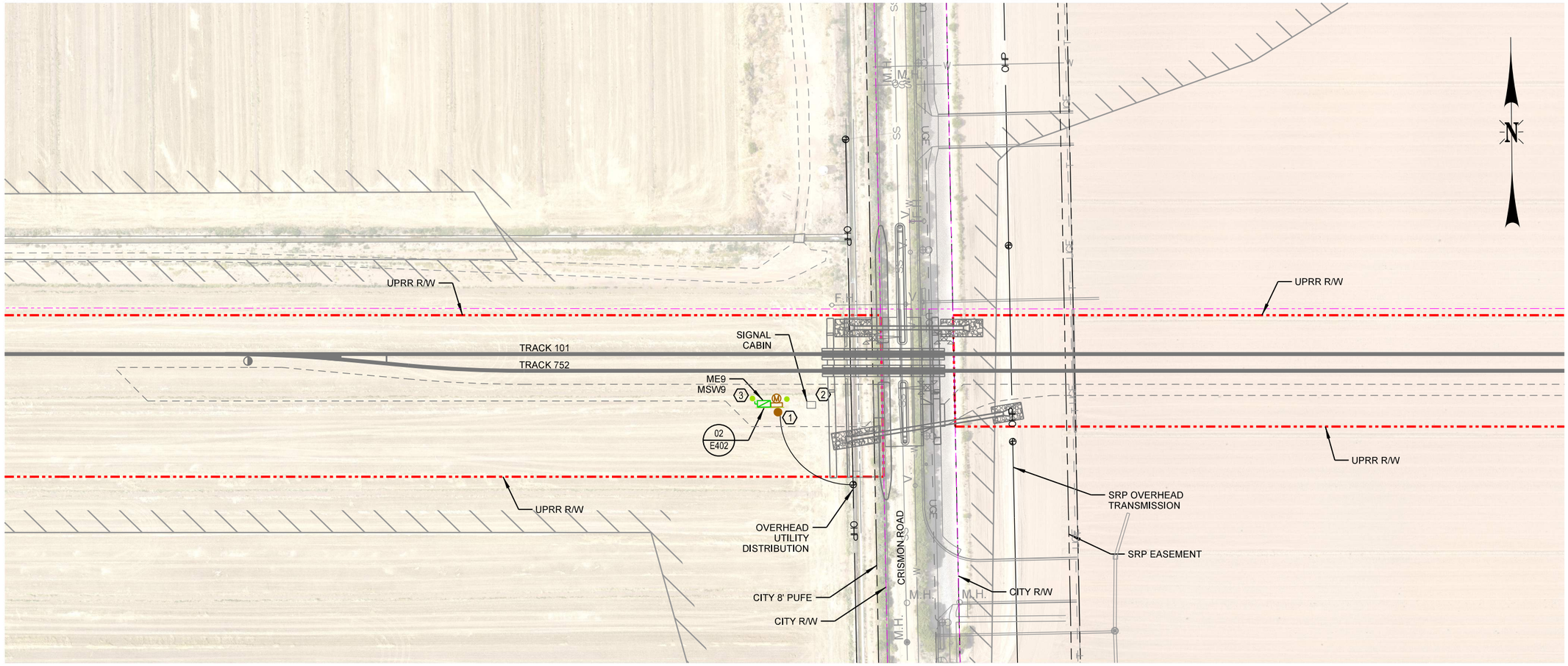
DRAWN BY:	RSP
CHECKED BY:	DMS
DATE:	3/9/2026
SHEET NUMBER	E211 of 213

UNION PACIFIC RAILROAD

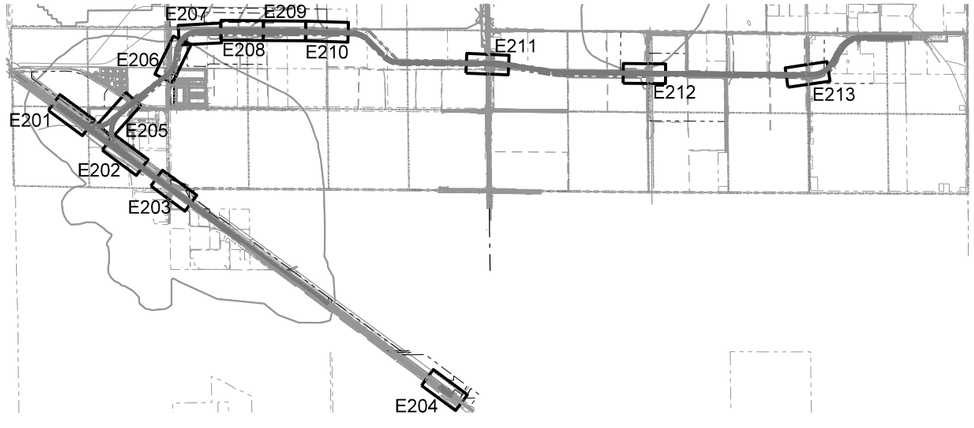
LOCATION & DESCRIPTION:
Mesa, Arizona
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
ELECTRICAL SITE PLAN

Color table:K:\Bentley\Workspace\V8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_MECH\Pentable\020-0927_MECH.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_MECH\DGN\Sheets\02_Plans\20msaaz_E211.dgn
Default
3/9/2026



01 E212 ELECTRICAL SITE PLAN - PIRATE LEAD STA 212+0
SEE SCALE



GENERAL ELECTRICAL NOTES:

SEE SHEET E002 FOR GENERAL ELECTRICAL NOTES.

A. ALL INSTALLATIONS FOR UTILITY MATERIALS AND EQUIPMENT MUST MEET MINIMUM CONSTRUCTION STANDARDS OF SRP ELECTRICAL SERVICE CONSTRUCTION. CONFIRM ALL UTILITY EQUIPMENT LOCATIONS WITH SRP PRIOR TO BEGINNING WORK.

B. ENSURE ALL BORING PERMITS OF PUBLIC ROADS AND CROSSING ARE APPROVED PRIOR TO BEGINNING WORK.

C. ALL UNDERGROUND AND ABOVE-GRADE WORK SHALL MEET UPRR REQUIREMENTS OUTLINED ON E002.

KEYED NOTES: (#)

1. PROVIDE 45' CLASS 3 WOOD POLE FOR SERVICE DROP FROM UTILITY. CONSTRUCT EQUIPMENT RACK FOR METER SOCKET AND SERVICE DISCONNECT. PROVIDE SIDEWALK GUY. COORDINATE INSTALLATION WITH LOCAL POWER UTILITY REPRESENTATIVE FOR FINAL POLE LOCATION, INSPECTION, AND SERVICE CONNECTION.
2. UPRR SIGNAL DEPT. TO INSTALL CONDUIT AND FINAL POWER CONNECTION TO SIGNAL CABIN AND CROSSING EQUIPMENT.
3. PROVIDE (2) 8" BOLLARDS TO PROTECT EQUIPMENT RACK FROM VEHICLE TRAFFIC. REFER TO DETAIL 03/401 FOR MORE INFORMATION.

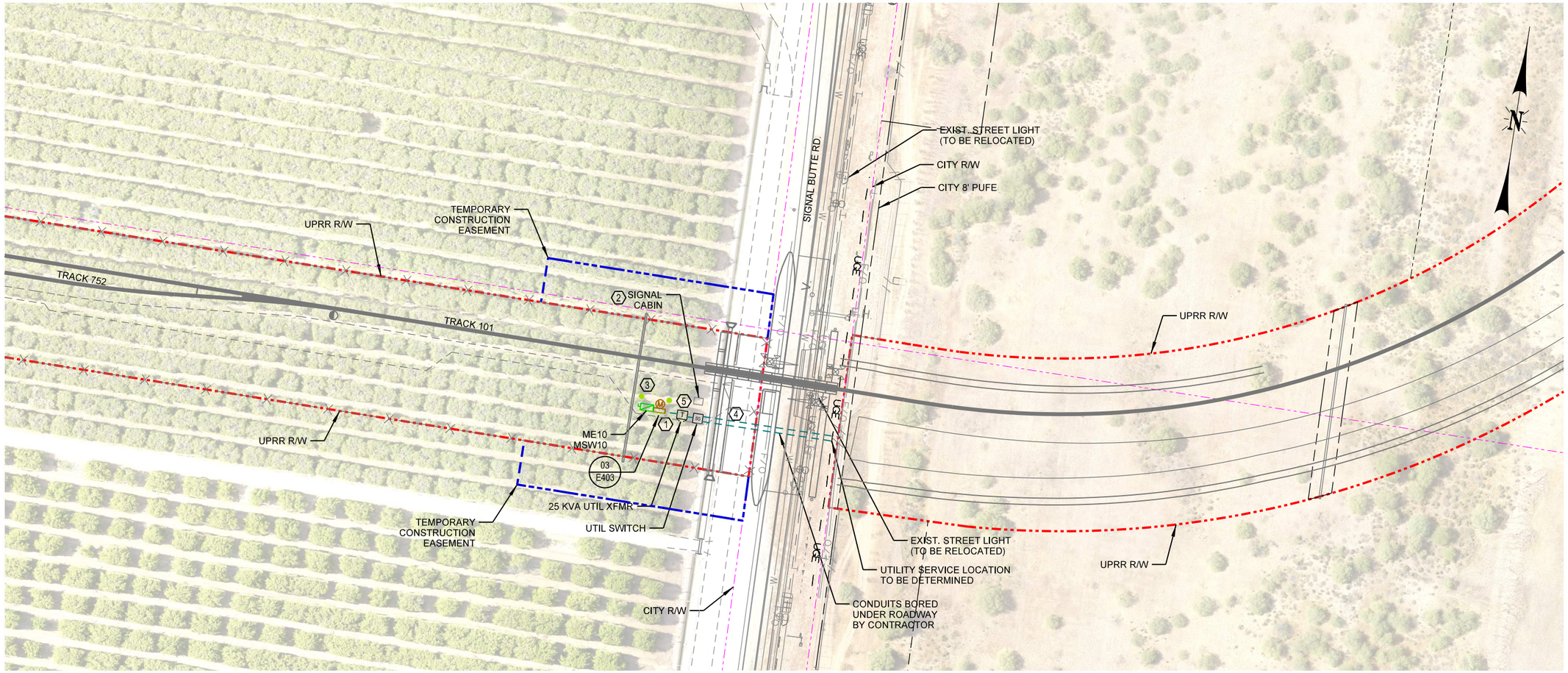
olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: DMS
DATE: 3/9/2026
SHEET NUMBER: E212 of 213

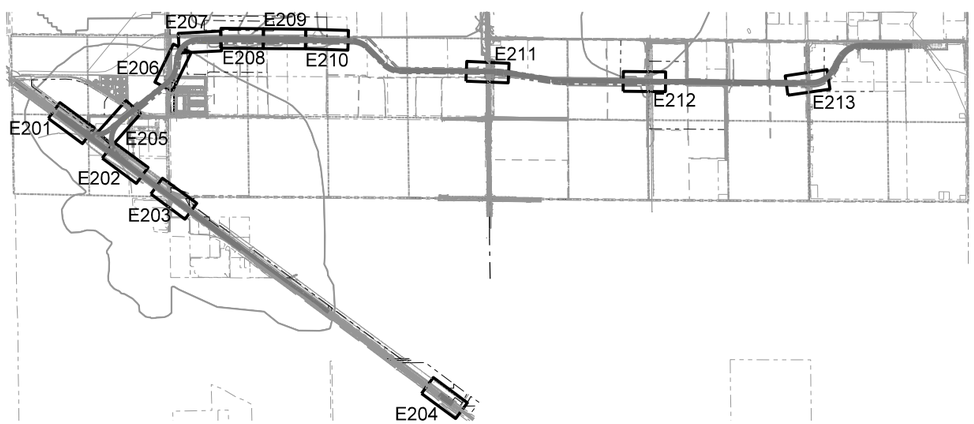
UNION PACIFIC RAILROAD
LOCATION & DESCRIPTION:
Mesa, Arizona
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track
SHEET TITLE:
ELECTRICAL SITE PLAN

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_MECH\Pentable\020-0927_MECH.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_MECH\DGN\Sheets\02_Plans\20msaaz_E212.dgn
Default
3/9/2026



01 / E213 ELECTRICAL SITE PLAN - PIRATE LEAD STA 265+0

SEE SCALE



100 0 100 200

SCALE IN FEET

GENERAL ELECTRICAL NOTES:

SEE SHEET E002 FOR GENERAL ELECTRICAL NOTES.

A. ALL INSTALLATIONS FOR UTILITY MATERIALS AND EQUIPMENT MUST MEET MINIMUM CONSTRUCTION STANDARDS OF SRP ELECTRICAL SERVICE CONSTRUCTION. CONFIRM ALL UTILITY EQUIPMENT LOCATIONS WITH SRP PRIOR TO BEGINNING WORK.

B. ENSURE ALL BORING PERMITS OF PUBLIC ROADS AND CROSSING ARE APPROVED PRIOR TO BEGINNING WORK.

C. ALL UNDERGROUND AND ABOVE-GRADE WORK SHALL MEET UPRR REQUIREMENTS OUTLINED ON E002.

KEYED NOTES: (#)

1. CONSTRUCT EQUIPMENT RACK FOR METER SOCKET AND SERVICE DISCONNECT. COORDINATE INSTALLATION WITH LOCAL POWER UTILITY REPRESENTATIVE FOR UNDERGROUND EQUIPMENT LOCATION, INSPECTION, AND SERVICE CONNECTION.
2. UPRR SIGNAL TO PROVIDE CONDUIT AND CONDUCTORS FROM JBOX AND FINAL CONNECTION TO SIGNAL CABIN.
3. PROVIDE (2) 8" BOLLARDS TO PROTECT EQUIPMENT RACK FROM VEHICLE TRAFFIC. REFER TO DETAIL 03/401 FOR MORE INFORMATION.
4. CONTRACTOR SHALL PROVIDE (2) BORES UNDER THE ROADWAY - EACH WITH (3) 3" CONDUITS AND WITH A MINIMUM OF 6' OF SEPARATION. PROVIDE EACH WITH PULL-STRINGS.
5. CONTRACTOR SHALL PROVIDE (1) 2-1/2" CONDUIT BETWEEN THE UTILITY'S PADMOUNT SWITCH AND PADMOUNT TRANSFORMER AND TO METER SOCKET.

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

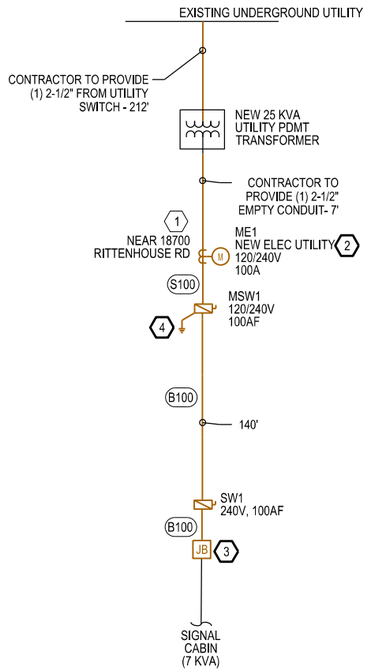
DRAWN BY:	RSP
CHECKED BY:	DMS
DATE:	3/9/2026
SHEET NUMBER	E213 of 213

UNION PACIFIC RAILROAD

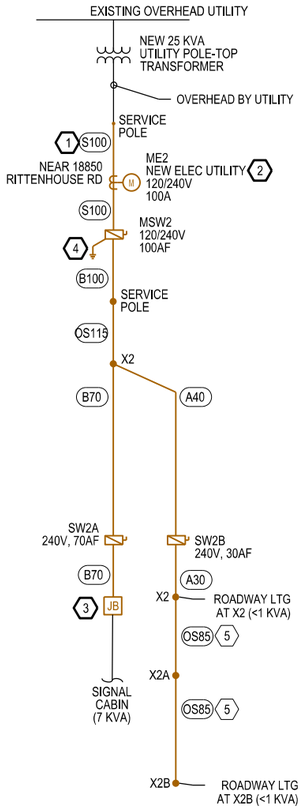
LOCATION & DESCRIPTION:
Mesa, Arizona
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
ELECTRICAL SITE PLAN

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_MECH\Pentable\020-0927_MECH.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_MECH\DGN\Sheets\02_Plans\20msaz_E213.dgn
Default
3/9/2026



01 E301 ELECTRICAL ONE-LINE - MP 934.82
NO SCALE



02 E301 ELECTRICAL ONE-LINE - MP 935.33
NO SCALE

KEYED NOTES: (#)

1. FOR CONDUIT AND CONDUCTORS AHEAD OF METER, SIZES SHOWN ARE A MINIMUM ALLOWABLE SIZE. UTILITY MINIMUM REQUIREMENTS TAKE PRECEDENCE.
2. REFER TO UTILITY SERVICE CONSTRUCTION REQUIREMENTS FOR OVERHEAD AND UNDERGROUND SERVICE INSTALLATIONS. COORDINATE WITH UTILITY REPRESENTATIVE FOR INSPECTION. PROVIDE UPRR PROJECT REPRESENTATIVE WITH METER NUMBER AND ACTIVATION DATE WHEN SERVICE IS ACTIVATED.
3. CONTRACTOR TO PROVIDE WIRE TO JUNCTION BOX AND TERMINATE ON WATERPROOF TERMINAL BLOCK. FINAL CONNECTION TO SIGNAL EQUIPMENT TO BE COMPLETED BY UPRR SIGNAL DEPARTMENT.
4. PROVIDE GROUNDING PER NEC AND LOCAL CODE REQUIREMENTS.
5. OVERHEAD LIGHTING CIRCUITS TO BE #6 TRIPLEX UNLESS NOTED OTHERWISE. TAPS AT LIGHT ARE #12 XHHW-2. REFER TO DETAIL 1/E401 FOR TYPICAL CONNECTION.

CABLE/CONDUIT SCHEDULE < 600V

MARK	CONDUCTORS	CONDUIT	COMMENTS
A30	2-#10 CU & 1-#10 CU EGC	3/4"	INCREASE CONDUIT SIZE TO 1" FOR UNDER TRACK BORE
A40	2-#8 CU & 1-#10 CU EGC	3/4"	INCREASE CONDUIT SIZE TO 1" FOR UNDER TRACK BORE
A55	2-#6 CU & 1-#10 CU EGC	3/4"	INCREASE CONDUIT SIZE TO 1" FOR UNDER TRACK BORE
B30	2-#10 CU, 1-#10 CU N, & 1-#10 CU EGC	3/4"	INCREASE CONDUIT SIZE TO 1" FOR UNDER TRACK BORE
B40	2-#8 CU, 1-#8 CU N, & 1-#10 CU EGC	1"	
B55	2-#6 CU, 1-#6 CU N, & 1-#10 CU EGC	1-1/4"	
B70	2-#4 CU, 1-#4 CU N, & 1-#8 CU EGC	1-1/4"	
B85	2-#3 CU, 1-#3 CU N, & 1-#8 CU EGC	1-1/4"	
B100	2-#1 CU, 1-#1 CU N, & 1-#6 CU EGC	2"	
B150	2-#1/0 CU, 1-#1 CU N, & 1-#6 CU EGC	2"	
B200	2-#3/0 CU, 1-#3/0 CU N, & 1-#6 CU EGC	2"	
OS85	#6 TRIPLEX XLP (VOLUTA)		
OS115	#4 TRIPLEX XLP (PERIWINKLE)		
OS200	#4 TRIPLEX XLP (PERIWINKLE)		
S100	2-#1 CU, 1-#1 CU N	2"	
S200	2-#3/0 CU, 1-#3/0 CU N.	2"	

NOTES:
1. CONDUCTORS ARE TO BE XHHW-2.
2. CONDUITS ARE RIGID GALVANIZED STEEL UNLESS OTHERWISE NOTED OR PERMITTED BY UPRR GENERAL SPECIFICATIONS.

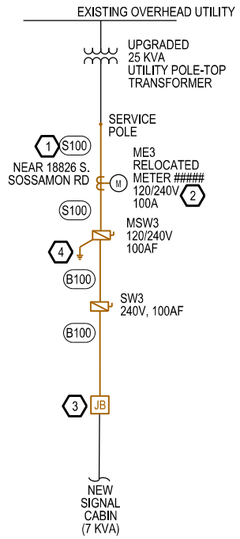
olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

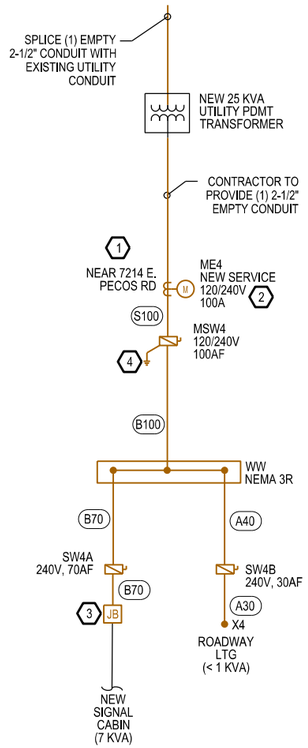
DRAWN BY: DMS
CHECKED BY: DMS
DATE: 3/9/2026
SHEET NUMBER: E301 of 304

UNION PACIFIC RAILROAD
LOCATION & DESCRIPTION:
Mesa, Arizona
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track
SHEET TITLE:
ELECTRICAL ONE-LINES

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_MECH\Pentable\020-0927_MECH.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_MECH\DGN\Sheets\04_One-Line\20msaaz1_E301.dgn
Default
3/9/2026



01 E302 ELECTRICAL ONE-LINE - MP 935.65
NO SCALE



02 E302 ELECTRICAL ONE-LINE - PIRATE LEAD STA 25+90
NO SCALE

KEYED NOTES: (#)

1. FOR CONDUIT AND CONDUCTORS AHEAD OF METER, SIZES SHOWN ARE A MINIMUM ALLOWABLE SIZE. UTILITY MINIMUM REQUIREMENTS TAKE PRECEDENCE.
2. REFER TO UTILITY SERVICE CONSTRUCTION REQUIREMENTS FOR OVERHEAD AND UNDERGROUND SERVICE INSTALLATIONS. COORDINATE WITH UTILITY REPRESENTATIVE FOR INSPECTION. PROVIDE UPRR PROJECT REPRESENTATIVE WITH METER NUMBER AND ACTIVATION DATE WHEN SERVICE IS ACTIVATED.
3. CONTRACTOR TO PROVIDE WIRE TO JUNCTION BOX AND TERMINATE ON WATERPROOF TERMINAL BLOCK. FINAL CONNECTION TO SIGNAL EQUIPMENT TO BE COMPLETED BY UPRR SIGNAL DEPARTMENT.
4. PROVIDE GROUNDING PER NEC AND LOCAL CODE REQUIREMENTS.

CABLE/CONDUIT SCHEDULE < 600V

MARK	CONDUCTORS	CONDUIT	COMMENTS
A30	2-#10 CU & 1-#10 CU EGC	3/4"	INCREASE CONDUIT SIZE TO 1" FOR UNDER TRACK BORE
A40	2-#8 CU & 1-#10 CU EGC	3/4"	INCREASE CONDUIT SIZE TO 1" FOR UNDER TRACK BORE
A55	2-#6 CU & 1-#10 CU EGC	3/4"	INCREASE CONDUIT SIZE TO 1" FOR UNDER TRACK BORE
B30	2-#10 CU, 1-#10 CU N, & 1-#10 CU EGC	3/4"	INCREASE CONDUIT SIZE TO 1" FOR UNDER TRACK BORE
B40	2-#8 CU, 1-#8 CU N, & 1-#10 CU EGC	1"	
B55	2-#6 CU, 1-#6 CU N, & 1-#10 CU EGC	1-1/4"	
B70	2-#4 CU, 1-#4 CU N, & 1-#8 CU EGC	1-1/4"	
B85	2-#3 CU, 1-#3 CU N, & 1-#8 CU EGC	1-1/4"	
B100	2-#1 CU, 1-#1 CU N, & 1-#6 CU EGC	2"	
B150	2-#1/0 CU, 1-#1 CU N, & 1-#6 CU EGC	2"	
B200	2-#3/0 CU, 1-#3/0 CU N, & 1-#6 CU EGC	2"	
OS85	#6 TRIPLEX XLP (VOLUTA)		
OS115	#4 TRIPLEX XLP (PERIWINKLE)		
OS200	#4 TRIPLEX XLP (PERIWINKLE)		
S100	2-#1 CU, 1-#1 CU N	2"	
S200	2-#3/0 CU, 1-#3/0 CU N.	2"	

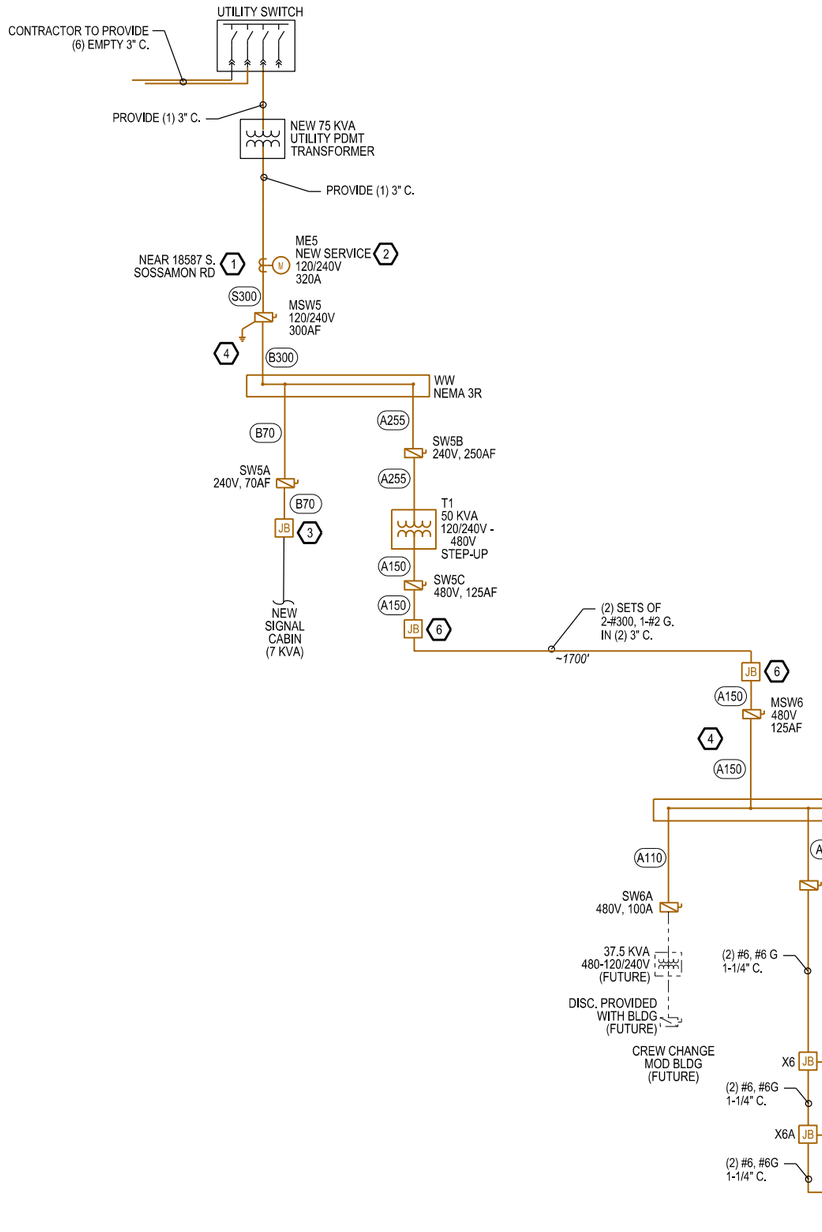
NOTES:
1. CONDUCTORS ARE TO BE XHHW-2.
2. CONDUITS ARE RIGID GALVANIZED STEEL UNLESS OTHERWISE NOTED OR PERMITTED BY UPRR GENERAL SPECIFICATIONS.

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

DRAWN BY: DMS
CHECKED BY: DMS
DATE: 3/9/2026
SHEET NUMBER: E302 of 304

UNION PACIFIC RAILROAD
LOCATION & DESCRIPTION:
Mesa, Arizona
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track
SHEET TITLE:
ELECTRICAL ONE-LINES

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_MECH\Pentable\020-0927_MECH.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_MECH\DGN\Sheets\04.One-Line\20msaa21.E302.dgn
Default
3/9/2026



01 E303 ELECTRICAL ONE-LINE - PIRATE LEAD STA 45+00

NO SCALE

KEYED NOTES: (#)

1. FOR CONDUIT AND CONDUCTORS AHEAD OF METER, SIZES SHOWN ARE A MINIMUM ALLOWABLE SIZE. UTILITY MINIMUM REQUIREMENTS TAKE PRECEDENCE.
2. REFER TO UTILITY SERVICE CONSTRUCTION REQUIREMENTS FOR OVERHEAD AND UNDERGROUND SERVICE INSTALLATIONS. COORDINATE WITH UTILITY REPRESENTATIVE FOR INSPECTION. PROVIDE UPRR PROJECT REPRESENTATIVE WITH METER NUMBER AND ACTIVATION DATE WHEN SERVICE IS ACTIVATED.
3. CONTRACTOR TO PROVIDE WIRE TO JUNCTION BOX AND TERMINATE ON WATERPROOF TERMINAL BLOCK. FINAL CONNECTION TO SIGNAL EQUIPMENT TO BE COMPLETED BY UPRR SIGNAL DEPARTMENT.
4. PROVIDE GROUNDING PER NEC AND LOCAL CODE REQUIREMENTS.
5. PROVIDE RACK-MOUNTED JUNCTION BOXES TO FACILITATE PULLING OF LOW VOLTAGE CABLES. SPLICES OF CONDUCTORS MUST BE MADE ON WATERPROOF TERMINAL BLOCKS.
6. PROVIDE JUNCTION BOX ADJACENT TO DISCONNECT TO SPLICE FEEDER TO PARALLEL SETS OF CONDUCTORS.

CABLE/CONDUIT SCHEDULE < 600V

MARK	CONDUCTORS	CONDUIT	COMMENTS
A30	2-#10 CU & 1-#10 CU EGC	3/4"	INCREASE CONDUIT SIZE TO 1" FOR UNDER TRACK BORE
A40	2-#8 CU & 1-#10 CU EGC	3/4"	INCREASE CONDUIT SIZE TO 1" FOR UNDER TRACK BORE
A55	2-#6 CU & 1-#10 CU EGC	3/4"	INCREASE CONDUIT SIZE TO 1" FOR UNDER TRACK BORE
A110	2-#1 CU & 1-#8 CU EGC	1-1/2"	
A150	2-#1/0 CU & 1-#6 CU EGC	1-1/2"	
A225	2–250 kCMIL CU & 1-#4 CU EGC	2-1/2"	
B30	2-#10 CU, 1-#10 CU N, & 1-#10 CU EGC	3/4"	INCREASE CONDUIT SIZE TO 1" FOR UNDER TRACK BORE
B40	2-#8 CU, 1-#8 CU N, & 1-#10 CU EGC	1"	
B55	2-#6 CU, 1-#6 CU N, & 1-#10 CU EGC	1-1/4"	
B70	2-#4 CU, 1-#4 CU N, & 1-#8 CU EGC	1-1/4"	
B85	2-#3 CU, 1-#3 CU N, & 1-#8 CU EGC	1-1/4"	
B100	2-#1 CU, 1-#1 CU N, & 1-#6 CU EGC	2"	
B150	2-#1/0 CU, 1-#1 CU N, & 1-#6 CU EGC	2"	
B200	2-#3/0 CU, 1-#3/0 CU N, & 1-#6 CU EGC	2-1/2"	
B250	2-#300 CU, 1-#300 CU N, & 1-#4 CU EGC	3"	
B300	2-#400 CU, 1-#400 CU N, & 1-#4 CU EGC	3"	
OS85	#6 TRIPLEX XLP (VOLUTA)		
OS115	#4 TRIPLEX XLP (PERIWINKLE)		
OS200	#4 TRIPLEX XLP (PERIWINKLE)		
S100	2-#1 CU, 1-#1 CU N	2"	
S200	2-#3/0 CU, 1-#3/0 CU N.	2-1/2"	
S300	2-#400 CU, 1-#400 CU N.	3"	

NOTES:
1. CONDUCTORS ARE TO BE XHHW-2.
2. CONDUITS ARE RIGID GALVANIZED STEEL UNLESS OTHERWISE NOTED OR PERMITTED BY UPRR GENERAL SPECIFICATIONS.

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

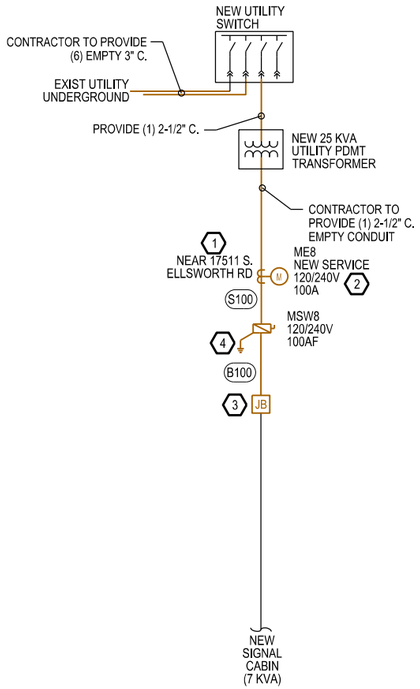
DRAWN BY: DMS
CHECKED BY: DMS
DATE: 3/9/2026
SHEET NUMBER: E303 of 304

UNION PACIFIC RAILROAD

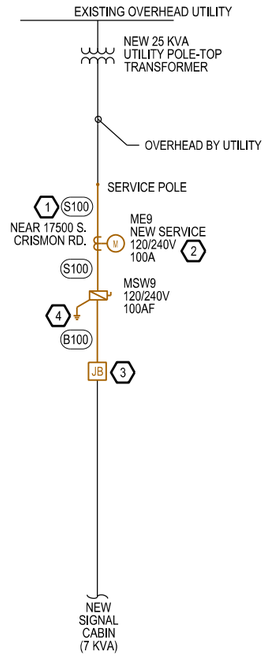
LOCATION & DESCRIPTION:
Mesa, Arizona
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE: ELECTRICAL ONE-LINE

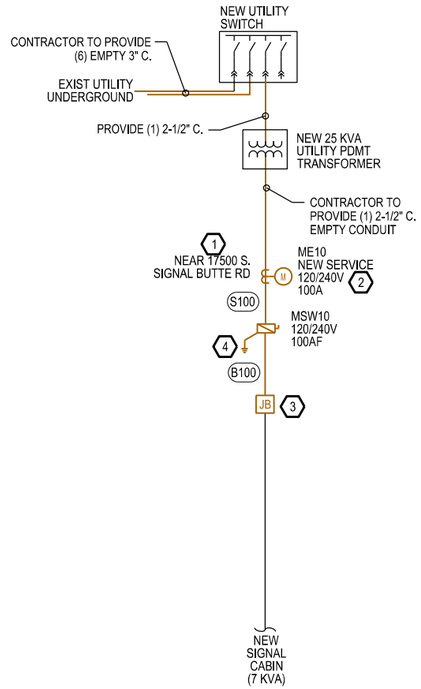
Color_table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927.40-Design\Microstation\020-0927_MECH\Pentable\020-0927_MECH.tbl
F:\2020\0501-1000\020-0927.40-Design\Microstation\020-0927_MECH\DGN\Sheets\04.One-Line\20msaaz1.E303.dgn
Default
3/9/2026



01 E304 ELECTRICAL ONE-LINE - PIRATE LEAD STA 159+00
NO SCALE



02 E304 ELECTRICAL ONE-LINE - PIRATE LEAD STA 212+00
NO SCALE



03 E304 ELECTRICAL ONE-LINE - PIRATE LEAD 265+00
NO SCALE

KEYED NOTES: (#)

1. FOR CONDUIT AND CONDUCTORS AHEAD OF METER, SIZES SHOWN ARE A MINIMUM ALLOWABLE SIZE. UTILITY MINIMUM REQUIREMENTS TAKE PRECEDENCE.
2. REFER TO UTILITY SERVICE CONSTRUCTION REQUIREMENTS FOR OVERHEAD AND UNDERGROUND SERVICE INSTALLATIONS. COORDINATE WITH UTILITY REPRESENTATIVE FOR INSPECTION. PROVIDE UPRR PROJECT REPRESENTATIVE WITH METER NUMBER AND ACTIVATION DATE WHEN SERVICE IS ACTIVATED.
3. CONTRACTOR TO PROVIDE WIRE TO JUNCTION BOX AND TERMINATE ON WATERPROOF TERMINAL BLOCK. FINAL CONNECTION TO SIGNAL EQUIPMENT TO BE COMPLETED BY UPRR SIGNAL DEPARTMENT.
4. PROVIDE GROUNDING PER NEC AND LOCAL CODE REQUIREMENTS.

CABLE/CONDUIT SCHEDULE < 600V

MARK	CONDUCTORS	CONDUIT	COMMENTS
A30	2-#10 CU & 1-#10 CU EGC	3/4"	INCREASE CONDUIT SIZE TO 1" FOR UNDER TRACK BORE
A40	2-#8 CU & 1-#10 CU EGC	3/4"	INCREASE CONDUIT SIZE TO 1" FOR UNDER TRACK BORE
A55	2-#6 CU & 1-#10 CU EGC	3/4"	INCREASE CONDUIT SIZE TO 1" FOR UNDER TRACK BORE
B30	2-#10 CU, 1-#10 CU N, & 1-#10 CU EGC	3/4"	INCREASE CONDUIT SIZE TO 1" FOR UNDER TRACK BORE
B40	2-#8 CU, 1-#8 CU N, & 1-#10 CU EGC	1"	
B55	2-#6 CU, 1-#6 CU N, & 1-#10 CU EGC	1-1/4"	
B70	2-#4 CU, 1-#4 CU N, & 1-#8 CU EGC	1-1/4"	
B85	2-#3 CU, 1-#3 CU N, & 1-#8 CU EGC	1-1/4"	
B100	2-#1 CU, 1-#1 CU N, & 1-#6 CU EGC	2"	
B150	2-#1/0 CU, 1-#1 CU N, & 1-#6 CU EGC	2"	
B200	2-#3/0 CU, 1-#3/0 CU N, & 1-#6 CU EGC	2"	
OS85	#6 TRIPLEX XLP (VOLUTA)		
OS115	#4 TRIPLEX XLP (PERIWINKLE)		
OS200	#4 TRIPLEX XLP (PERIWINKLE)		
S100	2-#1 CU, 1-#1 CU N	2"	
S200	2-#3/0 CU, 1-#3/0 CU N.	2"	

NOTES:
1. CONDUCTORS ARE TO BE XHHW-2.
2. CONDUITS ARE RIGID GALVANIZED STEEL UNLESS OTHERWISE NOTED OR PERMITTED BY UPRR GENERAL SPECIFICATIONS.

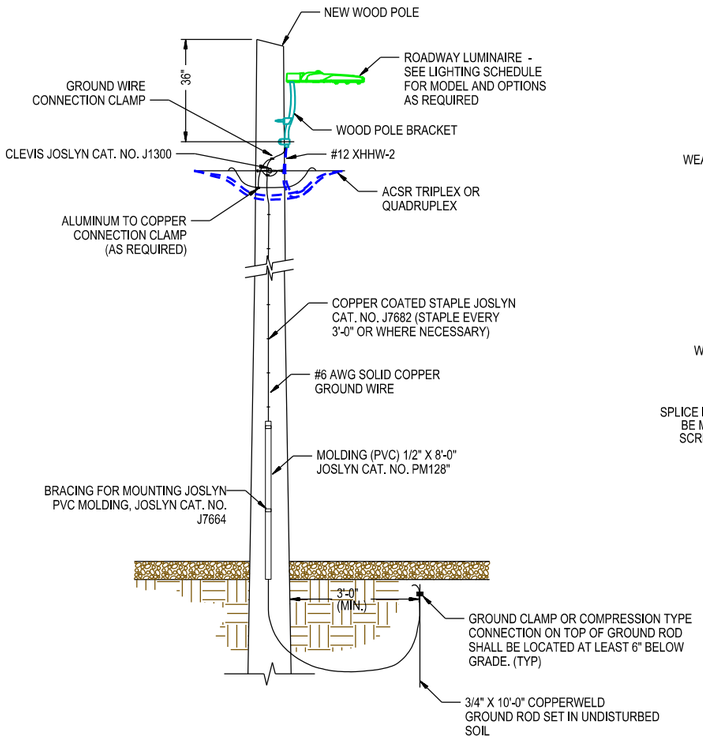
olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

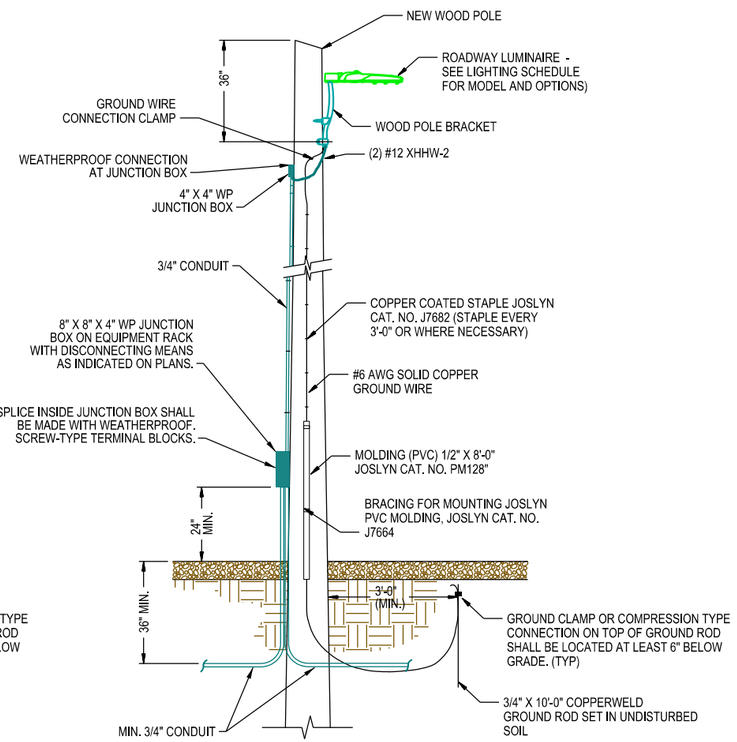
DRAWN BY: DMS
CHECKED BY: DMS
DATE: 3/9/2026
SHEET NUMBER: E304 of 304

UNION PACIFIC RAILROAD
LOCATION & DESCRIPTION:
Mesa, Arizona
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track
SHEET TITLE:
ELECTRICAL ONE-LINE

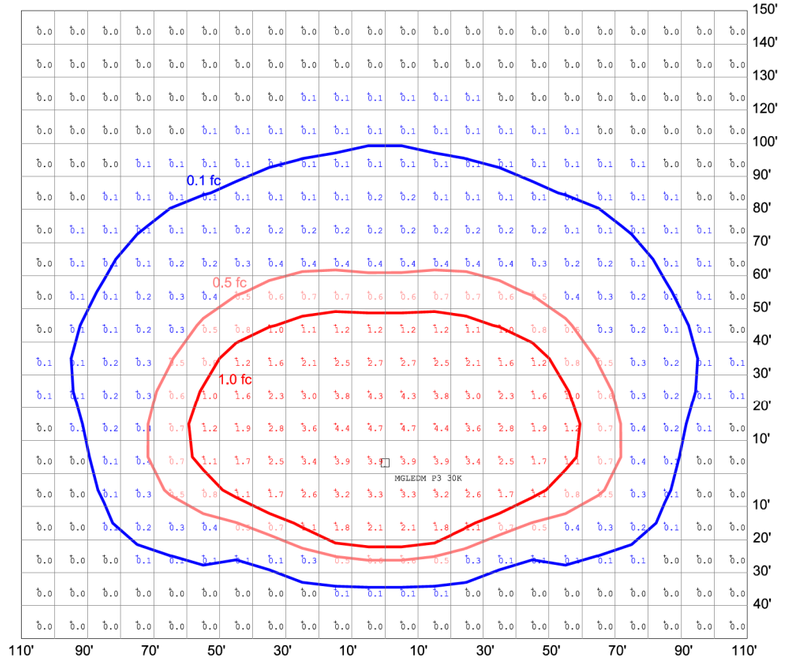
Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501:1000\020-0927\40-Design\Microstation\020-0927_MECH\Pentable\020-0927_MECH.tbl
F:\2020\0501:1000\020-0927\40-Design\Microstation\020-0927_MECH\DGN\Sheets\04_One-Line\20msaaz1_E304.dgn
Default
3/9/2026



01 E401 TYP. ROADWAY LIGHT POLE - OVERHEAD CONNECTION DETAIL
SCALE: NTS

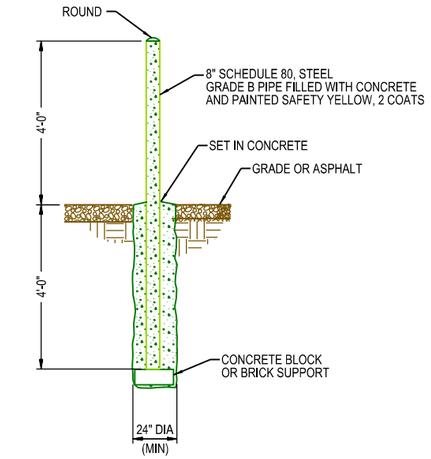


02 E401 TYP. ROADWAY LIGHT POLE - UNDERGROUND CONNECTION DETAIL
SCALE: NTS

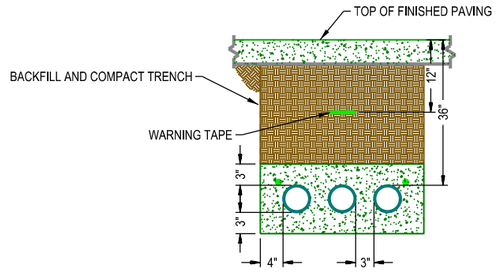


NOTE: PHOTOMETRIC DISTRIBUTION AND CURVES ARE FOR HOLOPHANE MONGOOSE MEDIUM LED ROADWAY LUMINAIRE, MODEL NUMBER MGLEDM-P3-30K-MR, INSTALLED AT 35' ABOVE GRADE. SEE FIXTURE L1 ON EQUIPMENT SCHEDULE ON E501 FOR COMPLETE PART NUMBER AND DESCRIPTION.

04 E401 PHOTOMETRIC DISTRIBUTION OF ROADWAY LIGHT
SCALE: NTS



03 E401 TYP 8" BOLLARD DETAIL
SCALE: NTS



GENERAL NOTES APPLICABLE TO THIS DETAIL:

A. CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3,500 PSI AT 28 DAYS.
B. PROVIDE #5 REBAR AT TOP CORNERS OF DUCTBANK. REBAR SHALL BE LOCATED 3" IN FROM THE SIDES AND 3" FROM THE TOP OF THE DUCTBANK. REBAR SHALL BE LAPPED A MINIMUM OF 24" AT ALL COLD JOINTS.
C. ALL CONDUIT BENDS WITHIN THE DUCT BANK MUST HAVE A 36" MINIMUM BENDING RADIUS.
D. AT NO TIME SHALL WIRE OF ANY KIND BE WRAPPED AROUND THE DUCTS TO ANCHOR THE DUCT BANK.
E. PLASTIC CABLE STRAPS WITH DUCT SPACERS SHALL BE USED TO SECURE THE DUCTS TO PREVENT SHIFTING AND FLOATING WHEN THE CONCRETE IS POURED.
F. PROVIDE DUCT SPACERS EVERY 5 TO 7 FEET AND DUCT ANCHORS EVERY 20 FEET.
G. PROVIDE WARNING TAPE ABOVE DUCT BANK PRIOR TO BACKFILLING.
H. UTILITY COMPANY REQUIREMENTS SHALL SUPERSEDE INFORMATION CONTAINED WITHIN THIS DETAIL.

05 E401 TYP. 3-CONDUIT DUCT PROFILE
SCALE: NTS

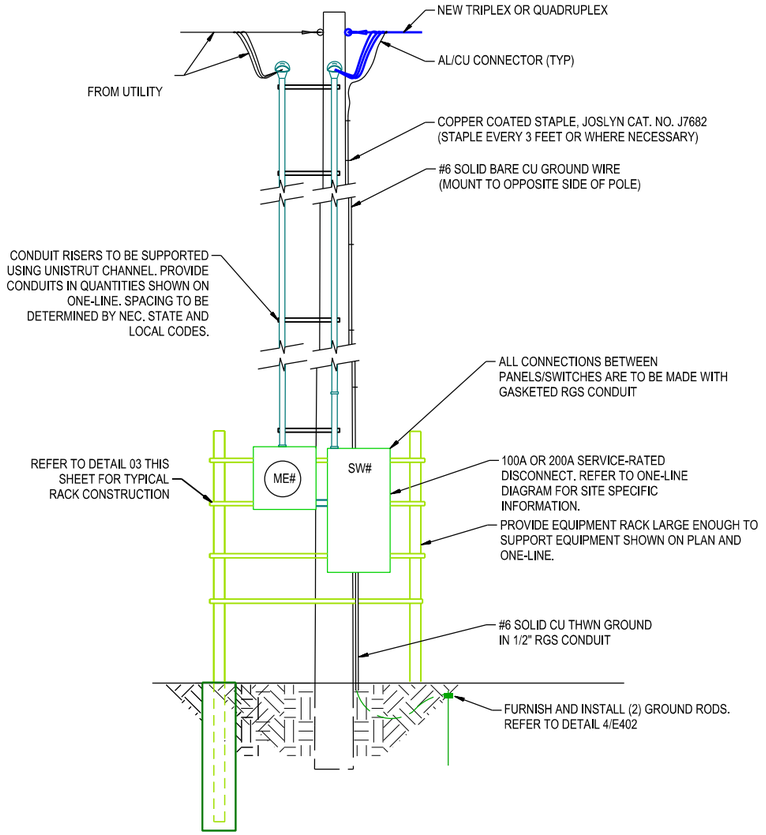
olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: RSP
CHECKED BY: DMS
DATE: 3/9/2026
SHEET NUMBER: E401 of 404

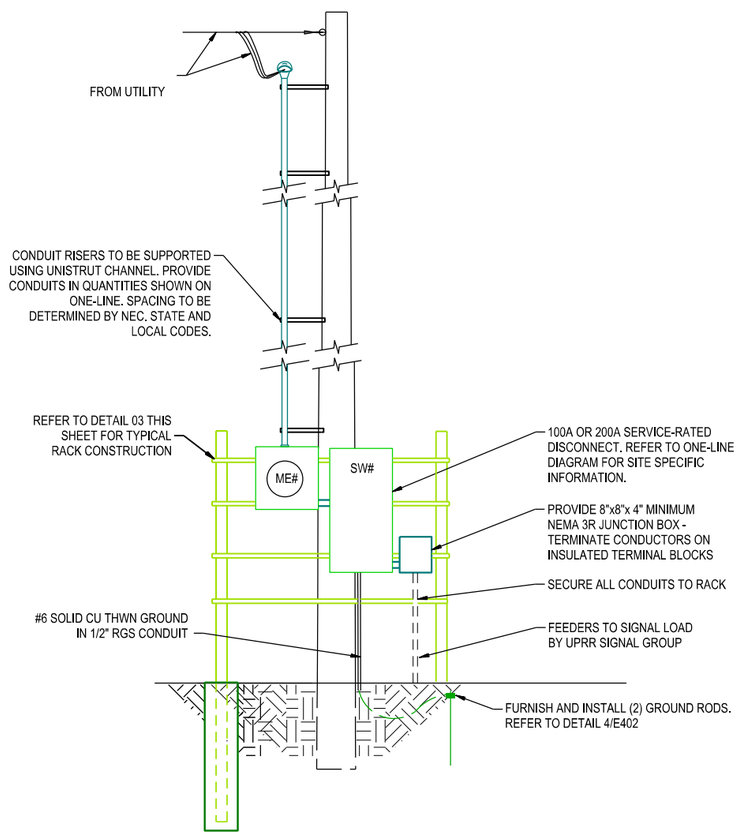
UNION PACIFIC RAILROAD
LOCATION & DESCRIPTION:
Mesa, Arizona
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track
SHEET TITLE:
ELECTRICAL DETAILS

Color table:K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_MECH\Pentable\020-0927_MECH.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_MECH\DGN\Sheets\03.Details\20ms@@z1.E401.dgn
Default
3/9/2026



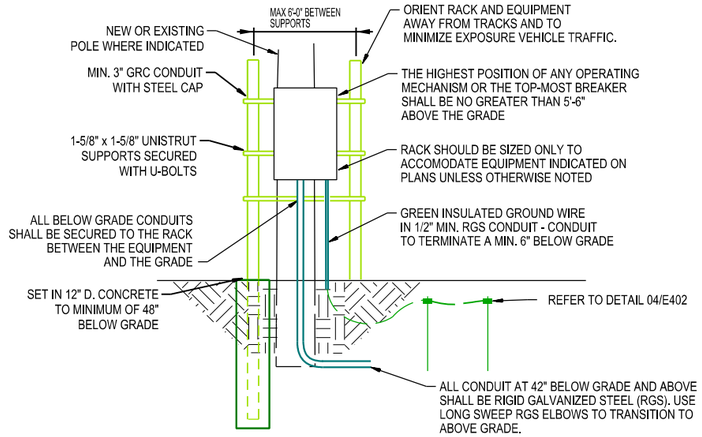
***NOTE:
ALL SIZES AND CIRCUITRY CONFIGURATIONS SUBJECT TO NEC. STATE AND LOCAL CODES.***

01 / E402 TYP. SERVICE DROP/OVERHEAD DETAIL
SCALE: NTS

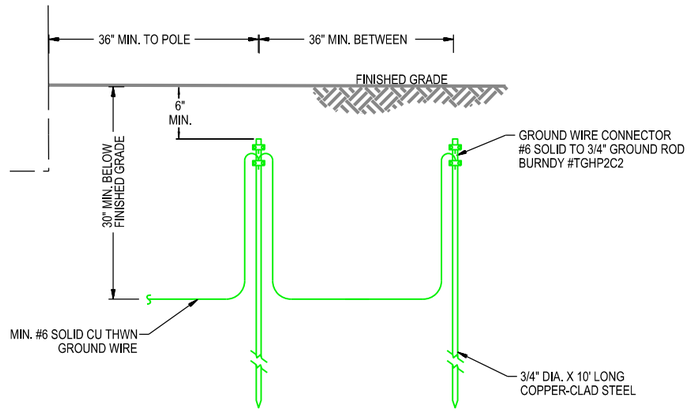


***NOTE:
ALL SIZES AND CIRCUITRY CONFIGURATIONS SUBJECT TO NEC. STATE AND LOCAL CODES.***

02 / E402 TYP. SERVICE DROP/UNDERGROUND DETAIL
SCALE: NTS



03 / E402 TYP EQUIPMENT RACK CONSTRUCTION
SCALE: NTS



04 / E402 TYP GROUND ROD INSTALLATION
SCALE: NTS

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2610
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

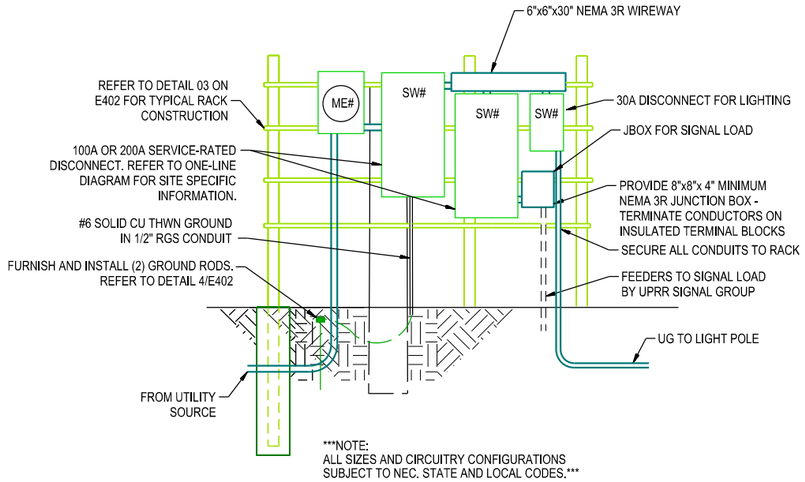
DRAWN BY:	RSP
CHECKED BY:	DMS
DATE:	3/9/2026
SHEET NUMBER	E402 of 404

UNION PACIFIC RAILROAD

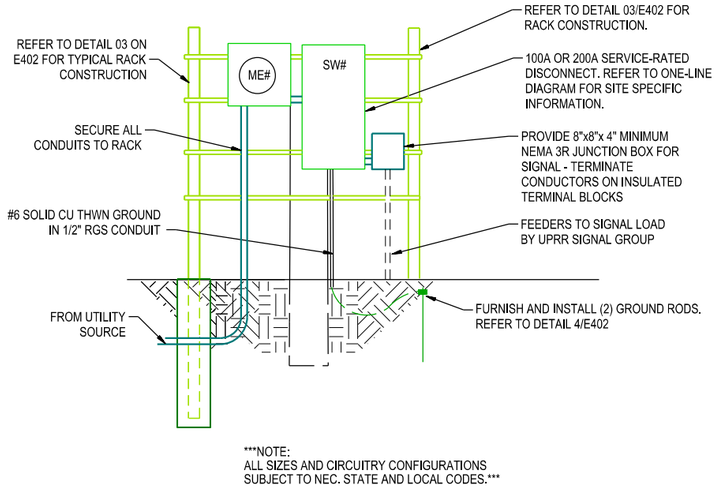
LOCATION & DESCRIPTION:
Mesa, Arizona
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
ELECTRICAL DETAILS

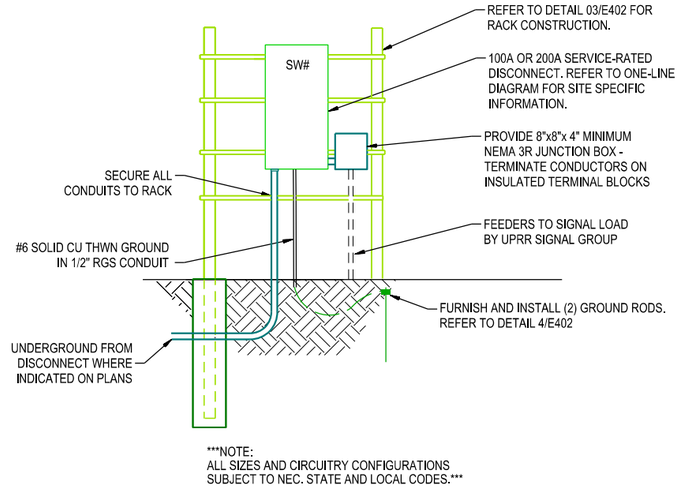
Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_MECH\Pentable\020-0927_MECH.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_MECH\DGN\Sheets\03_Details\20msaaz1_E402.dgn
Default
3/9/2026



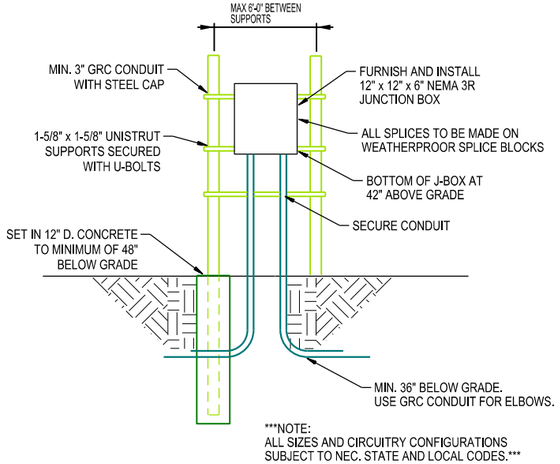
01 E403 SERVICE DROP - DETAIL
SCALE: NTS



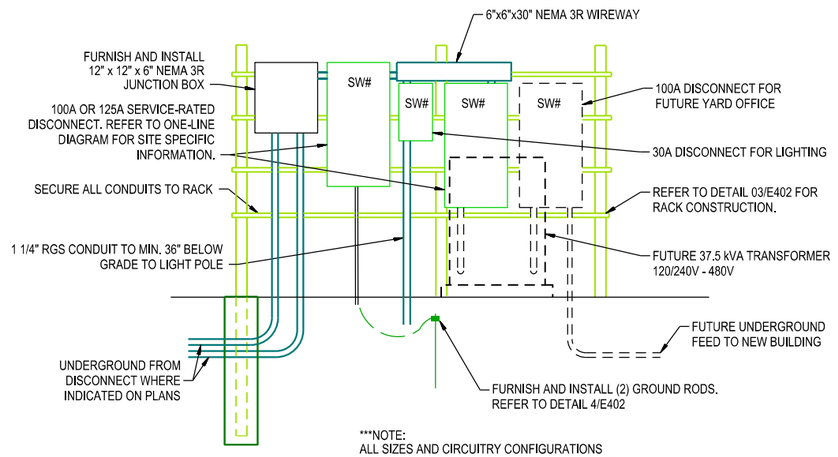
03 E403 TYP. SERVICE DROP/UNDERGROUND DETAIL
SCALE: NTS



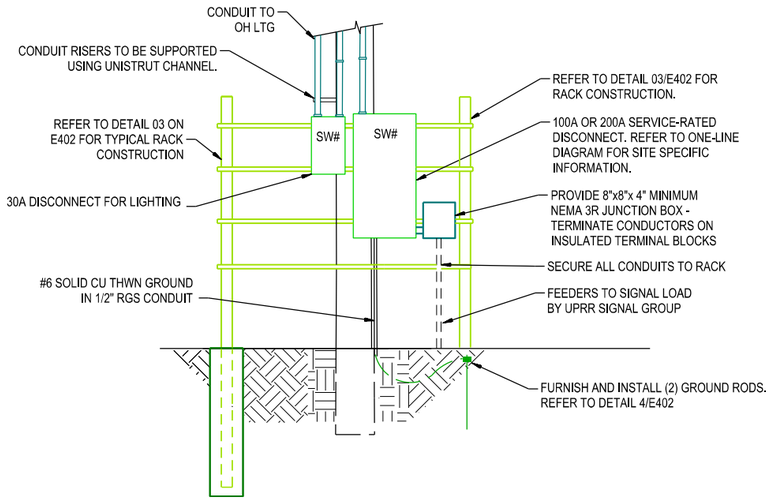
05 E403 TYP. EQUIPMENT RACK WITH DISCONNECT
SCALE: NTS



02 E403 TYP JUNCTION BOX - SPLICE BOX
SCALE: NTS



04 E403 TYP. MULTIPLE DISCONNECT RACK
SCALE: NTS



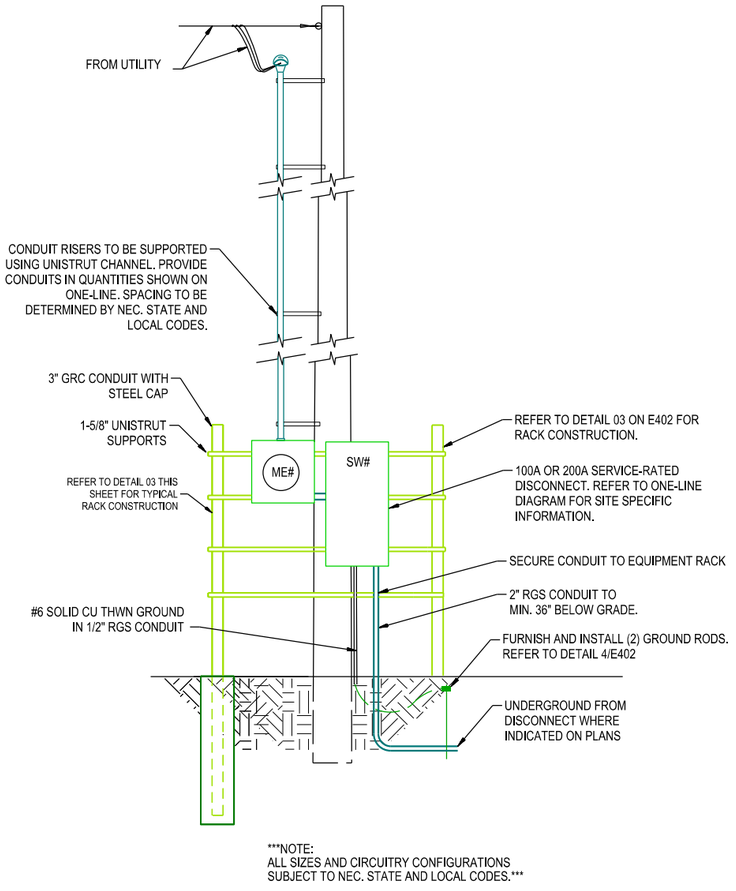
06 E403 TYP. RACK WITH MULTIPLE DISCONNECTS
SCALE: NTS

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

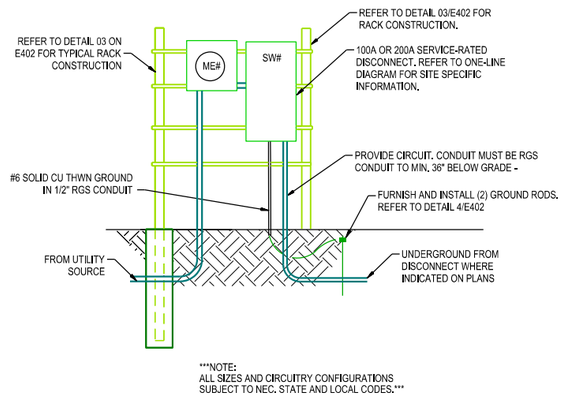
DRAWN BY: RSP
CHECKED BY: DMS
DATE: 3/9/2026
SHEET NUMBER: E403 of 404

UNION PACIFIC RAILROAD
LOCATION & DESCRIPTION:
Mesa, Arizona
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track
SHEET TITLE:
ELECTRICAL DETAILS

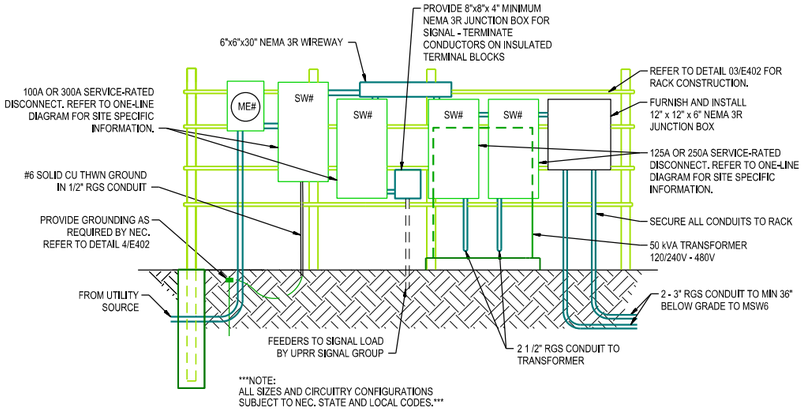
Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_MECH\Pentable\020-0927_MECH.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_MECH\DGN\Sheets\03_Details\20msaazi_E403.dgn
Default
3/9/2026



01 E404 TYP. SERVICE DROP/UNDERGROUND DETAIL
SCALE: NTS



02 E404 TYP. UG SERVICE DROP & SWITCH DETAIL
SCALE: NTS



04 E404 SERVICE - MULTIPLE SWITCH DETAIL
SCALE: NTS

03 E404 TYP. SERVICE DROP/UNDERGROUND DETAIL
SCALE: NTS

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMS
CHECKED BY: DMS
DATE: 3/9/2026
SHEET NUMBER: E404 of 404

UNION PACIFIC RAILROAD
LOCATION & DESCRIPTION:
Mesa, Arizona
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track
SHEET TITLE:
ELECTRICAL DETAILS

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_MECH\Pentable\020-0927_MECH.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_MECH\DGN\Sheets\03_Details\20msaazi_E404.dgn
Default
3/9/2026

MESA PIRATE LEAD LIGHTING AND EQUIPMENT SCHEDULE (LES) 3/2023

MARK	DESCRIPTION, STANDARD DETAILS
ME5	Meter socket, 120/240V, 320A min. SUSE and NEMA 3R rated. Refer to Utility for additional requirements
ME1, ME2, ME3, ME4, ME8, ME9, ME10	Meter socket, 120/240V, 100A min., SUSE and NEMA 3R rated. Refer to Utility for additional requirements
MSW1, MSW2, MSW3, MSW4, MSW8, MSW9, MSW10	Square D, heavy duty disconnect switch, 240V, 100A, single throw, 3 wire, SUSE rated. Provide with NEMA 3R enclosure, class R fuse kit, fuse sizes as shown on one-line, grounding kit, and provision for locking into the 'on' position.
MSW5	Square D, heavy duty disconnect switch, 480V, 300A, single throw, 3 wire, SUSE rated. Provide with NEMA 3R enclosure, class R fuse kit, fuse sizes as shown on one-line, grounding kit, and provision for locking into the 'on' position.
SW1, SW3	Square D, heavy duty disconnect switch, 240V, 100A, single throw, 3 wire. Provide with NEMA 3R enclosure, class R fuse kit, fuse sizes as shown on one-line, and provision for locking into the 'on' position.
SW2A, SW4A, SW5A	Square D, heavy duty disconnect switch, 240V, 70A, single throw, 3 wire. Provide with NEMA 3R enclosure, class R fuse kit, fuse sizes as shown on one-line, and provision for locking into the 'on' position.
SW2B, SW4B	Square D, heavy duty disconnect switch, 240V, 30A, single throw, 3 wire. Provide with NEMA 3R enclosure, class R fuse kit, fuse sizes as shown on one-line, and provision for locking into the 'on' position.
SW5B	Square D, heavy duty disconnect switch, 240V, 250A, single throw, 3 wire. Provide with NEMA 3R enclosure, class R fuse kit,fuse sizes as shown on one-line, and provision for locking into the 'on' position.
SW5C, MSW6	Square D, heavy duty disconnect switch, 480V, 125A, single throw, 3 wire. Provide with NEMA 3R enclosure, class R fuse kit, fuse sizes as shown on one-line, grounding kit, and provision for locking into the 'on' position.
SW6A	Square D, heavy duty disconnect switch, 480V, 100A, single throw, 3 wire. Provide with NEMA 3R enclosure, class R fuse kit, fuse sizes as shown on one-line, grounding kit, and provision for locking into the 'on' position.
SW6B, SW7	Square D, heavy duty disconnect switch, 480V, 30A, single throw, 3 wire. Provide with NEMA 3R enclosure, class R fuse kit, fuse sizes as shown on one-line, grounding kit, and provision for locking into the 'on' position.
L1	Holophane, Mongoose - Medium, LED roadway light with uplight skirt & photocell. Part no. MGLEDM-P3-30K-MVOLT-MR-VH-GRSD-PCLL-US. 22,400 Initial lumens, 30000K color temp, medium roadway distribution, vertical tenon, with uplight skirt. B3,U0,G3. Provide with wood-pole bracket
T1	120/240V-480V, 50 KVA Step Up Pad Mount Transformer

olsson
2111 South 67th Street, Suite 200
Omaha, NE 68106-2810
TEL 402.341.1116
FAX 402.341.5895
www.olsson.com

UNION PACIFIC

DRAWN BY: DMS
CHECKED BY: DMS
DATE: 3/9/2026
SHEET NUMBER: E501 of 501

UNION PACIFIC RAILROAD

LOCATION & DESCRIPTION:
Mesa, Arizona
Phoenix Subdivision MP 934.78 to MP 937.83
Construct Industrial Lead Track

SHEET TITLE:
ELECTRICAL SCHEDULES

Color table: K:\Bentley\WorkspaceV8i\projects\Clients\UPRR_Track\UPRR_Track_V8i\color\UPRR.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_MECH\Pentable\020-0927_MECH.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_MECH\DGN\Sheets\05_Schedules\20mseazi_E501.dgn
Default
3/9/2026

STREET LIGHTING GENERAL NOTES

1. ALL WORKMANSHIP, MATERIAL AND INSTALLATION SHALL COMPLY WITH THE CURRENT MAG UNIFORM STANDARD DETAILS AND SPECIFICATIONS AS AMENDED BY THE CITY OF MESA, THE CITY OF MESA ENGINEERING & DESIGN STANDARDS AND THE LATEST ADOPTED EDITION OF THE NATIONAL ELECTRIC CODE.

2. THE CITY OF MESA REQUIRES AT LEAST ONE IMSA CERTIFIED LEVEL I ROADWAY LIGHTING OR TRAFFIC SIGNAL TECHNICIAN ON SITE DURING ALL PHASES OF ANY STREET LIGHT WORK. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE VERIFICATION OF CURRENT CERTIFICATION. IF A JOB SITE IS INSPECTED AND A CERTIFIED TECHNICIAN IS NOT ON SITE, THE JOB WILL BE SHUT DOWN.

3. CONTRACTOR SHALL SUBMIT A LIST CONTAINING NAMES AND QUALIFIED STATUS OF PERSONNEL THAT WILL BE ON THE IMMEDIATE JOB SITE TO THE INSPECTOR PRIOR TO STARTING ANY TYPE OF CONSTRUCTION. ANY CHANGE IN THIS LIST WILL REQUIRE IMMEDIATE NOTIFICATION TO THE INSPECTOR.

4. DURING THE CONSTRUCTION OR WARRANTY PERIOD, IF THE CONTRACTOR FAILS TO OR IS UNABLE TO COMPLY WITHIN TWO (2) WORKING DAYS OF A REQUEST OF THE INSPECTOR OR IF A STREET LIGHT OUTAGE MAKES IT NECESSARY FOR CITY FORCES TO DO WORK THAT IS NORMALLY THE CONTRACTOR'S RESPONSIBILITY, THE CITY WILL BE JUSTIFIED IN BILLING THE CONTRACTOR. A SEPARATE BILLING SHALL COVER EACH INCIDENT REQUIRING WORK BY CITY FORCES. THE AMOUNT OF EACH BILLING SHALL BE EITHER $350.00 OR THE ACTUAL ACCUMULATED CHARGES FOR EMPLOYEES' TIME, MATERIALS, AND EQUIPMENT, WHICHEVER IS GREATER. EMPLOYEES' TIME WILL BE BILLED EACH INDIVIDUAL'S HOURLY RATE PLUS THE APPLICABLE CITY OVERHEAD RATE.

5. INSPECTIONS SHALL BE REQUESTED BY THE ELECTRICAL CONTRACTOR IN ACCORDANCE WITH THE FOLLOWING LIST:

   A. BEFORE STARTING PROJECT (PRE -JOB INSPECTION).
   B. BEFORE FILLING PULL BOX HOLES WITH AGGREGATE.
   C. BEFORE BACKFILLING TRENCH AND COVERING CONDUIT.
   D. WHEN THE POLE FOUNDATIONS ARE DUG, ANCHOR BOLTS, GROUND WIRE AND GROUND PLATE ARE READY AND IN PLACE, PRIOR TO POURING CONCRETE.
   E. BEFORE PULLING WIRE.
   F. BEFORE INSTALLATION OF FIXTURES AND PHOTOCELL.
   G. BEFORE MAKING SPLICES.
   H. WHEN PROJECT IS COMPLETED. IF NECESSARY, A LIST OF DISCREPANCIES WILL BE SUBMITTED TO THE CONTRACTOR FOR CORRECTIVE ACTION.

   FAILURE TO HAVE THESE ITEMS INSPECTED AND APPROVED BEFORE PROCEEDING WILL RESULT IN REJECTION OF THE WORK DONE, AND REMOVAL OF ALL SUCH WORK WILL BE REQUIRED.

6. ALL STREET LIGHTS SHALL BE CONNECTED TO THE PERMANENT POWER SUPPLY BY THE AGENCY SUPPLYING POWER. STREET LIGHT SYSTEMS WILL NOT BE ACCEPTED UNTIL THE SYSTEM HAS BEEN ENERGIZED AND FULLY OPERATIONAL FOR A MINIMUM ONE-HOUR TEST PERIOD AT RATED VOLTAGE.

7. WHERE LIGHTING CONTROL CABINETS ARE UTILIZED, STREET LIGHT CIRCUITS SHALL BE 240 VOLT. WHERE CABINETS ARE NOT USED, STREET LIGHT CIRCUITS SHALL BE 120 VOLT. ALL SERVICES SHALL BE 120/140 VOLT. ALL CONTROL CIRCUITS SHALL BE 120 VOLT.

8. BEFORE DISCONNECTING ANY EXISTING STREET LIGHTS, THE NEW LIGHT SYSTEM SHALL BE WORKING OR TEMPORARY LIGHTING INSTALLED. EXISTING STREET LIGHTS TO BE REMOVED AND NEW STREET LIGHTS SHALL NOT OPERATE AT THE SAME TIME.

9. POLES HAVING MULTIPLE LUMINAIRES SHALL HAVE TWO (2) CONDUCTORS AND ONE (1) BOND WIRE PER LUMINAIRE. THE CONDUCTORS SHALL BE MARKED AS PAIRS AT THE HAND HOLE.

10. ALL UNDERGROUND CIRCUIT CONDUCTORS SHALL BE BLACK, UNLESS OTHERWISE NOTED.

11. WHERE STREET LIGHTS OR CIRCUITS ARE 120 VOLT, ONE CONDUCTOR SHALL BE UNFUSED AND BE EITHER WHITE OR MARKED WHITE, AS REQUIRED.

12. ALL CIRCUIT CONDUCTORS IN CONDUIT SHALL BE XHHW/XHHW-2 INSULATION, EXCEPT PHOTOCELL CIRCUIT SHALL BE TRAY CABLE (SEE NOTE 13 THIS PAGE).

13. THE TRAY CABLE SHALL BE |ROME FR-EPR XHHW-2 CONDUCTORS, CPE JACKET, 600VOLTS| FRPC 4/3 (COLORS: BLACK-RED-WHITE) OR EQUIVALENT. RUN UNDERGROUND FROM THE LIGHTING CONTROL CABINET TO THE HANDHOLE OF THE PHOTOCELL LIGHT POLE. WHICH SHALL BE CONTINUOUS & WITHOUT SPLICES. FROM THE HANDHOLE UP, THREE (3) CONDUCTORS OF NO. 14 AWG THHN OR EQUIVALENT WILL BE SPLICED WITH BUTT SPLICES (NO WIRE NUTS) TO THE TERMINAL BLOCK OF THE PHOTOCELL CONTROLLED LUMINAIRE. BUTT SPLICES SHALL BE INSULATED AND THE CRIMP TYPE.

14. MINIMUM DEPTH FROM TOP OF CURB OR ROADWAY TO TOP OF CONDUIT SHALL BE TWENTY -FOUR (24) INCHES. MAXIMUM DEPTH SHALL BE FORTY -EIGHT (48) INCHES, UNLESS OTHERWISE APPROVED.

15. UNDERGROUND WIRING SHALL BE INSTALLED IN SCHEDULE 40 RIGID PVC CONDUIT, UL APPROVED FOR ABOVE GROUND AND UNDERGROUND USE WITH 90 DEGREE C WIRE. WHERE TWENTY -FOUR (24) INCHES COVER IS NOT POSSIBLE, GALVANIZED RIGID STEEL CONDUIT (GRS) SHALL BE USED. GALVANIZED RIGID STEEL CONDUIT (GRS) SHALL BE DOUBLE WRAPPED WITH 20-MIL TAPE TO SIX (6) INCHES PAST THE THREADED METAL COUPLING. COMPRESSION COUPLINGS ARE NOT ALLOWED. PRIOR APPROVAL IS NEEDED FOR ANY DESIGN USING GRS CONDUIT.

16. ALL CONDUITS SHALL BE BLOWN OUT USING 90-PSI AIR PRESSURE BEFORE PULLING WIRE.

17. A TWO- PIECE EXPANSION JOINT COUPLING SHALL BE INSTALLED IN PVC CONDUIT RUNS AT INTERVALS NOT TO EXCEED ONE -HUNDRED (100) FEET.

18. ALL FORTY -FIVE (45) AND NINETY (90) DEGREE BENDS OF CONDUIT SHALL HAVE A RADIUS OF NOT LESS THAN EIGHTEEN (18) INCHES. FACTORY BENDS ONLY SHALL BE USED.

19. ALL JOINTS BETWEEN PVC CONDUIT, COUPLINGS AND FITTINGS SHALL BE PREPARED WITH PURPLE PRIMER AND CEMENTED TOGETHER WITH GRAY PVC CEMENT.

20. THE CONDUIT LOCATIONS SHOWN ON PLANS ARE DIAGRAMMATIC REPRESENTATIONS ONLY. CONTRACTOR IS TO INSTALL CONDUIT TO AVOID CONFLICTS. THE CONTRACTOR MAY, AT HIS OPTION, BORE FOR THE PLACEMENT OF CONDUIT PER MESA STD DETAIL M-18. ALL CONDUITS SHALL BE PLACED WITHIN EXISTING RIGHT OF WAY UNLESS OTHERWISE APPROVED.

21. STREET LIGHT CONDUITS SHOULD BE INSTALLED PRIOR TO RESIDENTIAL DRIVEWAY INSTALLATIONS. IF STREET LIGHT CONDUIT IS INSTALLED AFTER RESIDENTIAL DRIVEWAY INSTALLATION, CONTRACTOR SHALL BORE CONDUIT UNDER DRIVEWAY. MEANDERING THE CONDUIT BEHIND THE ENTRANCE WILL NOT BE PERMITTED.

22. BACKFILL REQUIREMENTS FOR ALL TRENCHES SHALL CONFORM TO ARTICLE 300 OF THE NATIONAL ELECTRIC CODE, SECTION 601 OF THE UNIFORM STANDARD SPECIFICATIONS, AND MESA STD DETAIL M-19.4 FOR STREET TRENCH BACKFILL AND PAVEMENT REPLACEMENT.

23. WITH THE EXCEPTION OF DETACHED SIDEWALKS, PULL BOXES SHALL BE INSTALLED (SEE MESA STD DETAILS SL-75.01, SL-75.02 AND SL-75.03) FIVE (5) FEET (CENTER TO CENTER) BETWEEN STREET LIGHT POLES AND PULL BOXES.

24. PHOTOCELL RECEPTACLE SHALL BE POSITIONED ON LUMINAIRE SO THAT WHEN INSTALLED, THE PHOTOCELL WILL FACE NORTH.

25. ALL FIXTURES SHALL BE INSTALLED WITH A SIGNIFY CITY TOUCH NODE.

26. ALL SHORTING CAPS TO BE LOW PROFILE TYPE. NO HIGHER THAN 1-1/2" ABOVE SOCKET.

27. ALL PHOTO CELL CIRCUIT CONDUIT MUST BE 1-1/2" OR LARGER (TO INCLUDE CONDUIT STUBBING UP AT PHOTO CELL LIGHT POLE).

28. ALL RESIDENTIAL AND COLLECTOR CONDUIT SHALL BE 1 1/2" CONDUIT.

29. ALL ARTERIAL CONDUIT SHALL BE 2", 1 1/2" CONDUIT FROM PULL BOX TO POLE.

30. FUSING FOR HPS LUMINAIRE SHALL BE 5AMP FNM. LED LUMINAIRE TO BE FUSED ACCORDING TO WATTAGE USAGE.

31. ALL NON GALVANIZED POLES SHALL HAVE INTERIOR POLE COATED WITH AMERCOAT 78HB OR APPROVED EQUIVALENT FROM BASE TO TOP OF HAND HOLE. (5MILS)

32. ALL FUSE HOLDERS IN GROUND WILL BE WATERPROOF. (SEE APPROVED LIST).

HOUSING

1. LED FIXTURE SHALL HAVE A 10 YEAR WARRANTY ON LED MODULES, DRIVERS, AND FINISH.

2. HOUSING SHALL BE PRIMARILY CONSTRUCTED OF ALUMINUM WITH POWDER COAT GRAY FINISH. ALL MOUNTING HARDWARE SHALL BE NON-CORROSIVE OR SUITABLE PROTECTED METAL.

3. THE HOUSING SHALL BE ABLE TO WITHSTAND 1000 HOUR SALT SPRAY TEST ASTM 117.

4. LUMINAIRE SHALL MOUNT TO A HORIZONTAL 2.375" O.D. TENON WITH NO MORE THAN 4 BOLTS, WITH NO REARRANGEMENT OF PARTS OR SEPARATE PARTS NEEDED TO INSTALL AND HAVE STEP TYPE LEVELING.

5. WEIGHT SHALL NOT EXCEED 28 LBS. WITH AN EPA OF LESS THAN 1.2 SQ FT.

6. COOLING SHALL BE DONE WITH HEAT SINKS. NO FANS, PUMPS, OR LIQUIDS SHALL BE USED.

OPTICS

1. LUMINAIRE SHALL MEET THE IESNA FULL CUTOFF CLASSIFICATIONS (BUG RATING OF U0) AND HAVE IESNA TYPE II, TYPE III, OR TYPE IV DISTRIBUTION.

2. LUMINAIRE SHALL HAVE AN OPTION FOR A FILED INSTALLABLE HOUSE SIDE SHIELD FROM THE MANUFACTURER.

3. CORRELATED COLOR TEMPERATURE (CCT) SHALL BE ±3000K ±300K. COLOR RENDERING INDEX (CRI) OF 70 OR GREATER.

4. LUMEN MAINTENANCE AT 50,000 HRS AND 25°C BASED ON TM-21 TESTING SHALL BE 92% OR GREATER.

5. LUMINAIRE IES FILES MUST BE GENERATED IN ACCORDANCE WITH IESNA STANDARD LM-79-08 FOR ABSOLUTE PHOTOMETRY, BY NVLAP ACCREDITED LAB.

TERMINAL BOARD

1. THE TERMINAL SCREWS SHALL BE OF CAPTIVE TYPE AND EACH SCREW SHALL BE EQUIPPED WITH WIRE GRIPS WHICH WILL AUTOMATICALLY BE RAISED AND LOWERED AS THE TERMINAL SCREW IS OPERATED.

2. THE TERMINALS SHALL BE CAPABLE OF ACCEPTING #8 TO #14 AWG CONDUCTORS.

3. THE TERMINAL BOARD SHALL HAVE THREE TERMINALS; ONE OF THESE TERMINALS SHALL BE FOR THE SYSTEM GROUND AND SHALL BE CONNECTED TO THE LUMINAIRE HOUSING.

4. ALL LUMINAIRES SHALL HAVE PHOTOCELL RECEPTACLE, THREE ADDITIONAL TERMINALS SHALL BE PROVIDED FOR EXCLUSIVE PHOTOCELL OPERATION.

5. ALL UNITS ARE TO BE PREWIRED TO A SINGLE TERMINAL BOARD REQUIRING ONLY CUSTOMER CONNECTIONS TO CLEARLY IDENTIFIED TERMINALS.

DRIVER

1. DRIVER & LED MODULES SHALL BE REPLACEABLE AS SEPARATE UNITS, & HAVE PLUG CONNECTIONS.

2. LED DRIVER SHALL ACCEPT 120V THRU 277 60HZ INPUT, AND SHALL HAVE POWER FACTOR OF 0.90 MINIMUM.

3. LED DRIVER SHALL BE CAPABLE OF 0-10V DIMMING. DIMMING LEADS SHALL BE WIRED TO PINS 4 AND 5 OF PHOTOCELL RECEPTACLE.

4. POWER SUPPLIES SHALL MEET APPLICABLE FCC GUIDELINES FOR INTERFERENCE, WITH TOTAL HARMONIC DISTORTION LESS THAN 20%.

5. LUMINAIRE SHALL HAVE SURGE PROTECTION DEVICE (SPD) TO WITHSTAND HIGH REPETITION NOISE TRANSIENTS AS RESULT OF UTILITY LINE SWITCHING, NEARBY LIGHTNING STRIKES, AND OTHER INTERFERENCE. THE SPD SHALL PROTECT FROM DAMAGE AND FAILURE FOR COMMON AND DIFFERENTIAL MODE TRANSIENT PEAK CURRENT UP TO 10KA (MINIMUM). SPD CONFORMS TO UL 1449. SPD PERFORMANCE HAS BEEN TESTED PER PROCEDURES IN ANSI/ IEEE C62.41:2002 CATEGORY C HIGH EXPOSURE AND ANSI C136.2 10KV BIL. THE SPD SHALL FAIL IN SUCH A WAY AS THE LUMINAIRE WILL NO LONGER OPERATE. THE SPD SHALL BE FIELD REPLACEABLE.

GENERAL

1. UNIT SHALL BE UL1598 TESTED AND HAVE APPROVED REPORT SHOWING FIXTURE CAPABLE OF OPERATING IN AMBIENT TEMPERATURES OF -7°C TO 50°C.

2. LUMINAIRE HOUSING SHALL BE OR ETL LISTED FOR WET LOCATIONS. OPTICS/OPTICAL ENCLOSURE SHALL IP65 RATED.

3. LUMINAIRE SHALL HAVE BEEN TESTED FOR L70 LUMEN DEPRECIATION, EFFICACY AND CCT PER IESNA STANDARD LM-80-08.

4. ELECTRONIC IES FILES MUST BE READILY AVAILABLE FOR DOWNLOAD ON MANUFACTURER WEBSITE.

5. LUMINAIRE SHALL HAVE A 7-PIN LOCKING PHOTOCELL RECEPTACLE MEETING ANSI C136.41-2013. PROVIDE A 30 AMP LOW PROFILE SHORTING CAP FOR LUMINAIRES THAT DO NOT REQUIRE PHOTOCELL, PER APPROVED PRODUCTS LIST.

6. LUMINAIRE SHALL HAVE A MINIMUM EFFICACY OF 102 LUMENS PER WATT AT 3000K.

7. LUMINAIRE SHALL HAVE LUMEN OUTPUTS AT CCT OF 3000 KELVIN AS SHOWN IN THE TABLE BELOW.

TYPE	NOMINAL LUMENS	TOLERANCE
3KL	3300	±15%
5KL	5300	±15%
9KL	9100	±10%
13KL	13000	±10%
16KL	16500	±10%
21KL	21000	±10%
27KL	27000	±10%

LIGHT POLE NOTES

1. THE POLE DESIGN, MATERIALS, AND CONSTRUCTION SHALL CONFORM TO AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS, BASED ON A WIND SPEED OF 80 MILES PER HOUR.

2. THE POLE AND ALL PARTS SHALL BE STEEL.

3. THE POLE AND ALL POLE PARTS SHALL BE HOT DIPPED GALVANIZED PER M.A.G. STANDARD 771.

4. UNSTABLE SOIL MAY REQUIRE DEEPER FOUNDATION, AS DETERMINED BY THE ENGINEER.

5. THE 1 1/4" ANCHOR BOLT SHALL HAVE A LENGTH DETERMINED BY THE DEPTH OF THE FOUNDATION, AND SHALL EXTEND TO 6" +OR- 1" FROM THE BOTTOM OF THE FOUNDATION. (P-207, P-208, P-209 AND P-210 REQUIRE 44" ANCHOR BOLTS) SL-74.01.

6. ANCHOR BOLTS WITH (4) HEX NUTS, (2) FLAT WASHERS, AND (1) ANCHOR PLATE PER BOLT SHALL BE HOT DIPPED GALVANIZED PER M.A.G. STANDARD 771 SL-74.01.

7. ANCHOR BOLTS SHALL HAVE 1/4" TO 3/4" FULL THREAD ABOVE NUT SL-74.01.

8. CONDUIT SHALL PROJECT A MINIMUM OF 2" ABOVE THE FOUNDATION. MAXIMUM PROJECTION SHALL BE 4".

9. 3'-0" SQUARE, 4" THICK TROWELED FINISH SMOOTH CONCRETE CAP WITH 1/2" ROUND EDGE. POURED SEPARATELY FROM FOUNDATION.

10. FOUNDATION SHALL BE CLASS A CONCRETE PER M.A.G. STANDARD 725.

11. FOUNDATION GROUND SHALL BE #6 XHHW GREEN INSULATED COPPER STRANDED GROUNDING WIRE.

12. FOUNDATION SHALL HAVE 14" COPPER GROUND PLATE PER COM DETAIL SL-74.02.

13. P-207, P-208, P-209 AND P-210 FOUNDATIONS SHALL REQUIRE 8 EA. (#7 x 7' - 4") VERTICAL BARS WITH 3/8" ROUND COLD DRAWN STEEL WIRE SPIRAL CAGE WITH A 3" PITCH.

14. THE PIPE ON EACH SIDE OF A CIRCUMFERENTIAL WELD SHALL HAVE THE SAME OUTSIDE DIAMETER AT THE WELD.

15. A STAINLESS STEEL TAG SHALL BE PERMANENTLY ATTACHED TO THE POLE ABOVE THE HAND HOLE STATING THE MANUFACTURER'S NAME, C.O.M. POLE #, AND DATE MANUFACTURED.

FOUNDATION NOTES

1. ALL POLE FOUNDATIONS SHALL HAVE A 14" COPPER GROUNDING PLATE SL-74.02 6" BELOW BOTTOM OF POLE FOUNDATION.

2. ALL FINISHED POLE FOUNDATIONS SHALL BE AT SIDEWALK GRADE, UNLESS OTHERWISE NOTED.

3. ALL 45 DEGREE AND 90 DEGREE BENDS FOR CONDUIT SHALL HAVE A RADIUS OF NOT LESS THAN 18" (FACTORY BENDS ONLY SHALL BE USED).

4. UNDERGROUND WIRING CIRCUITS SHALL BE INSTALLED IN SCHEDULE 40 RIGID P.V.C. CONDUIT. IT SHALL BE U.L. APPROVED FOR ABOVE GROUND AND UNDERGROUND USE WITH 90 DEGREE C WIRE. MINIMUM DEPTH FROM TOP OF CURB TO TOP OF CONDUIT SHALL NOT BE LESS THAN 24" UNLESS OTHERWISE SPECIFIED.

5. INSPECTION BY ENGINEERING INSPECTOR SHALL BE REQUESTED BY THE ELECTRICAL CONTRACTOR WHEN THE POLE FOUNDATIONS ARE DUG, ANCHOR BOLTS, GROUND WIRE, AND GROUNDING PLATE ARE READY AND IN PLACE, PRIOR TO POURING CONCRETE.

6. WHILE CONCRETE FOUNDATIONS ARE POURED THEY SHALL BE VIBRATED WITH A MECHANICAL VIBRATOR.

7. POLE FOUNDATIONS SHALL CURE FOR 72-HOURS BEFORE INSTALLING LIGHT POLES.

8. IN IRRIGATED AREAS, POLES AND PULL BOXES SHALL BE INSTALLED IN SUCH A MANNER THAT THEY ARE KEPT OUT OF DIRECT CONTACT WITH IRRIGATION WATER.

9. IN AREAS THAT SLOPE AWAY FROM THE SIDEWALK, CURB, OR ROADWAY, THE GRADE AROUND THE POLES SHALL BE SUCH THAT SIDEWALK, CURB, OR ROADWAY CAN BE USED AS THE GRADE CONTROL POINT FOR THE POLE FOUNDATION ELEVATION.

10. UNSTABLE SOIL MAY REQUIRE DEEPER FOUNDATIONS AS DETERMINED BY THE ENGINEER.

TEMPORARY LIGHTING NOTE

ROADWAY LIGHTING MUST BE MAINTAINED THROUGHOUT THE DURATION OF THE PROJECT. THE NEW LIGHTING SYSTEM MUST BE OPERATIONAL BEFORE DE-ENERGIZING EXISTING STREETLIGHTS. IF THIS CONDITION CANNOT BE MET, THE INSTALLATION OF TEMPORARY STREET LIGHTING IS ACCEPTABLE IF THE FOLLOWING CRITERIA IS SATISFIED:

° TEMPORARY POLE SHALL BE INSTALLED WITHIN 5' (FIVE FEET) OF EXISTING STREETLIGHT POLE.
° TEMPORARY FIXTURE SHALL HAVE EQUIVALENT LUMEN OUTPUT.
° TEMPORARY FIXTURE SHALL HAVE SAME DISTRIBUTION TYPE.
° TEMPORARY FIXTURE SHALL BE INSTALLED AT THE SAME MOUNTING HEIGHT.
° TEMPORARY FIXTURE AND ARM SHALL MATCH EXISTING ORIENTATION TO THE ROADWAY.

IF TEMPORARY LIGHTING CANNOT BE INSTALLED TO MEET ALL CRITERIA, A TEMPORARY LIGHTING PLAN WITH PHOTOMETRIC CALCULATIONS SHALL BE PROVIDED DEMONSTRATING THAT EXISTING LIGHTING LEVELS ARE MET.

TEMPORARY LIGHTING, EXISTING LIGHTING AND NEW STREET LIGHTING SHALL NOT OPERATE CONCURRENTLY.

Contact Arizona 811 Two Working Days Before You Dig
ARIZONA811 BLUE STAKE, INC.
Call 811 or Click Arizona811.com

olsson

CITY OF MESA
ENGINEERING DEPARTMENT
ROAD IMPROVEMENTS
LIGHTING MODIFICATIONS

DRAWN BY: DW
ENGINEER: DW
APPROVED BY: KA

ROADWAY LIGHTING
GENERAL NOTES

DRAWING LT01

PROJ. NO.:

SHEET 1 OF 11

CATALOG NUMBER: X-######

Color table:
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_Lighting.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\Lighting
Default
3/9/2026

olsson

SUMMARY OF QUANTITIES

ADOT ITEM NO	CONSTRUCTION NOTE #	PLAN SHEET ITEM DESCRIPTION	ADOT ITEM DESCRIPTION	UNIT	QUANTITY
7310832	1	RELOCATE EXISTING STREET LIGHT POLE, INSTALL NEW RFM-135W40LED3K-G2-R2M, INSTALL NEW F-101 FOUNDATION (PER 2022 CITY OF MESA STREET LIGHT TECHNICAL MANUAL)	RELOCATE EXISTING LIGHT POLES	EACH	2
7360111			LUMINAIRE (RFM-135W40LED3K-G2-R2M)		
7310832	2	REMOVE AND RESET EXISTING STREET LIGHT POLE, INSTALL NEW F-101 FOUNDATION (PER 2022 CITY OF MESA STREET LIGHT TECHNICAL MANUAL)	RELOCATE EXISTING LIGHT POLES	EACH	2
7310371	3	INSTALL NEW P207 STREETLIGHT POLE, INSTALL NEW F-101 FOUNDATION (PER 2022 CITY OF MESA STREET LIGHT TECHNICAL MANUAL)	POLE FOUNDATION (F-101)	EACH	3
7360110			LUMINAIRE (ERL2-0-21-C3-30-A GRAY-L-X)	EACH	
7360131			STREET LIGHT (P-207)	EACH	
7320410	4	INSTALL NEW NO.5 PULL BOX (PER CITY OF MESA STREET LIGHT TECHNICAL MANUAL)	PULL BOX (NO.3)	EACH	17
7340210	5	RESET EXISTING C-113 LIGHTING CONTROL CABINET, INSTALL NEW C-105 LIGHTING CONTROL CABINET PAD (PER 2022 CITY OF MESA STREET LIGHT TECHNICAL MANUAL)	RELOCATE CONTROL CABINET	EACH	1
7320050	6	RELOCATE EXISTING 2" CONDUIT FOR STREET LIGHTING CONDUCTORS. CONTRACTOR TO PULL #6 XHHW CONDUCTORS AND #8 BARE 7-STRAND BONN WIRE AS NECESSARY	ELECTRICAL CONDUIT (2") - RELOCATE EXISTING	LF	192
7320040	7	INSTALL NEW 1 1/2' CONDUIT, #8 XHHW CONDUCTORS, #8 BARE 7-STRAND BOND WIRE (PER 2022 CITY OF MESA STREET LIGHT TECHNICAL MANUAL)	ELECTRICAL CONDUIT (1 1/2")	LF	101
7320050	8	INSTALL NEW 2" CONDUIT, #8 XHHW CONDUCTORS AND #8 BARE 7-STRAND BOND WIRE (PER 2022 CITY OF MESA STREET LIGHT TECHNICAL MANUAL)	ELECTRICAL CONDUIT (2")	LF	1437
7320050	9	INSTALL NEW 2" CONDUIT, ROUTE EXISTING #8 XHHW CONDUCTORS AND #8 BARE 7-STRAND BOND WIRE IN NEW CONDUIT. CONTRACTOR TO PULL NEW #8 XHHW CONDUCTORS AND BARE #8 BARE 7-STRAND BOND AS NECESSARY. UTILIZE A CONDUIT COUPLER TO CONNECT NEW CONDUIT TO EXISTING CONDUIT WHERE APPLICABLE.	ELECTRICAL CONDUIT (2") - EXISTING WIRE IN NEW CONDUIT	LF	15
7320050	10	INSTALL NEW 2" CONDUIT, ROUTE EXISTING CONDUCTOR WIRE THROUGH NEW CONDUIT TO CONNECT INTO RELOCATED LIGHTING CONTROL CABINET. CONTRACTOR TO PULL NEW CONDUCTOR WIRE AS NECESSARY.	ELECTRICAL CONDUIT (2") - EXISTING WIRE IN NEW CONDUIT	LF	15
7370100	11	EXISTING STREET LIGHT POLE AND LUMINAIRE TO REMAIN	MAINTAIN EXISTING LIGHTING SYSTEMS	EACH	3

POLE AND LUMINAIRE SCHEDULE (ROADWAY)

SHEET #	STREET	STATION	OFFSET	POLE TYPE	FOUNDATION TYPE	MAST ARM (LENGTH)	LUMINAIRE				LUM CATALOG NO	REMARKS
							TYPE	FIXTURES	W/LUMENS	DIST TYPE		
LT03	PECOS RD	9+57	42.0' LT	SL-73.02, P207	SL-74.03, F-101	20'-0"	LED	1	174/20100	III	ERL2-0-21-C3-30-A GRAY-L-X	
LT03	PECOS RD	10+79	43.0' RT	SL-73.02, P207	SL-74.03, F-101	20'-0"	LED	1	174/20100	III	ERL2-0-21-C3-30-A GRAY-L-X	Relocated Streetlight Pole
LT04	SOSSAMAN RD	9+90	56.0' RT	SL-73.02, P207	SL-74.03, F-101	20'-0"	LED	1	212/25900	III	ERL2-0-27-C5-30-A GRAY-L-X	
LT04	SOSSAMAN RD	11+25	54.0' LT	SL-73.02, P207	SL-74.03, F-101	20'-0"	LED	1	212/25900	III	ERL2-0-27-C5-30-A GRAY-L-X	Relocated Streetlight Pole
LT05	SIGNAL BUTTE	8+36	20.75' LT	SL-73.02, P207	SL-74.03, F-101	20'-0"	LED	1	135/15249	III	RFM-135W40LED3K-G2-R3M	Relocated Streetlight Pole
LT05	SIGNAL BUTTE	10+23	34.0' LT	SL-73.02, P207	SL-74.03, F-101	20'-0"	LED	1	135/15249	II	RFM-135W40LED3K-G2-R2M	Relocated Streetlight Pole
LT06	PECOS RD (HALF SECTION)	344+00	44.0' RT	SL-73.02, P207	SL-74.03, F-101	20'-0"	LED	1	120/15300	III	ERL2-0-16-C3-30-A-GRAY-L-X	

PHOTOMETRIC CRITERIA

Pecos Rd

	Minimum Average Foot Candles	Maximum Uniformity Ratio (Avg/Min)
City of Mesa Photometric Criteria	1.3	3.0
*Proposed Photometrics	1.32	1.89

Sossaman Rd

	Minimum Average Foot Candles	Maximum Uniformity Ratio (Avg/Min)
City of Mesa Photometric Criteria	1.3	3.0
*Proposed Photometrics	1.40	2.0

Signal Butte (Unimproved)

	Minimum Average Foot Candles	Maximum Uniformity Ratio (Avg/Min)
City of Mesa Photometric Criteria	1.3	3.0
*Proposed Photometrics	0.96	3.20

Pecos Rd (Half-Section)

	Minimum Average Foot Candles	Maximum Uniformity Ratio (Avg/Min)
City of Mesa Photometric Criteria	1.3	3.0
*Proposed Photometrics	1.41	1.76

Signal Butte (Improved)

	Minimum Average Foot Candles	Maximum Uniformity Ratio (Avg/Min)
City of Mesa Photometric Criteria	1.3	3.0
*Proposed Photometrics	1.29	3.23

Contact Arizona 811 Two Working Days Before You Dig
ARIZONA811
Call 811 or Click Arizona811.com

CITY OF MESA
ENGINEERING DEPARTMENT
ROAD IMPROVEMENTS
LIGHTING MODIFICATIONS

DRAWN BY: BW
ENGINEER: BW
APPROVED BY: KA
PROJ. NO.:

ROADWAY LIGHTING
SUMMARY OF QUANTITIES

DRAWING: LT02
SHEET: 2 OF 11
CATALOG NUMBER: X-######

Color table:
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_Lighting.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\Lighting\0_200927-LT02_SOQ.dgn
Default
3/9/2026

Color table:
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_Lighting.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\Lighting\0_200927-LT03_Pecos Rd West.dgn
Default
3/9/2026

olsson

NORTH

PECOS RD ALIGNMENT INFORMATION:
P.O.B. STA. 2+00.00
TRACK STA. 2+84.57 - 754.98' LT
N=832152.60, E=773811.21

8+00
9+00
10+00
11+00
12+00
12+10
13+00

EXISTING LIGHTING CONTROL CENTER

LOCATE EXISTING CONDUIT. UTILIZE CONDUIT COUPLER TO TIE PROPOSED CONDUIT TO EXISTING CONDUIT. ROUTE PROPOSED CONDUCTOR WIRE TO LIGHTING CONTROL CENTER

UPRR PROPOSED ALIGNMENT TRACK 101

EXISTING R.O.W.

PECOS RD CL ALIGNMENT

9+57, 42' LT

10+79, 43' RT

13+38, 43' RT

EAST PECOS RD

REMOVE EXISTING PULL BOX AND RESET NEW PULL BOX IN ITS PLACE

EXISTING PULL BOX TO REMAIN IN PLACE

EXISTING R.O.W.

CONSTRUCTION NOTES

		UNIT	QTY. (THIS SHEET)
1	RELOCATE EXISTING STREET LIGHT POLE. INSTALL NEW RFM-135W40LED3K-G2-R2M LED, INSTALL NEW F-101 FOUNDATION (PER 2022 CITY OF MESA STREET LIGHT TECHNICAL MANUAL)	EA	0
2	REMOVE AND RESET EXISTING STREET LIGHT POLE. INSTALL NEW F-101 FOUNDATION (PER 2022 CITY OF MESA STREET LIGHT TECHNICAL MANUAL)	EA	1
3	INSTALL NEW P207 STREETLIGHT POLE, INSTALL NEW F-101 FOUNDATION (PER 2022 CITY OF MESA STREET LIGHT TECHNICAL MANUAL)	EA	1
4	INSTALL NEW PB-101 PULL BOX (PER 2022 CITY OF MESA STREET LIGHT TECHNICAL MANUAL)	EA	6
5	RESET EXISTING C-113 LIGHTING CONTROL CABINET, INSTALL NEW C-105 LIGHTING CONTROL CABINET PAD (PER THE 2022 CITY OF MESA STREET LIGHT TECHNICAL MANUAL)	EA	1
6	RELOCATE EXISTING 2" CONDUIT FOR STREET LIGHTING CONDUCTORS. CONTRACTOR TO PULL #6 XHHW CONDUCTORS AND #8 BARE 7-STRAND BOND WIRE AS NECESSARY	LF	0
7	INSTALL NEW 1 1/2" CONDUIT, #8 XHHW CONDUCTORS, #8 BARE 7-STRAND BOND (PER 2022 CITY OF MESA STREET LIGHT TECHNICAL MANUAL)	LF	10

CONSTRUCTION NOTES

		UNIT	QTY. (THIS SHEET)
8	INSTALL NEW 2" CONDUIT, #8 XHHW CONDUCTORS AND #8 BARE 7-STRAND BOND (PER 2022 CITY OF MESA STREET LIGHT TECHNICAL MANUAL)	LF	595
9	INSTALL NEW 2" CONDUIT, ROUTE EXISTING #8 XHHW CONDUCTORS AND #8 BARE 7-STRAND BOND IN NEW CONDUIT. CONTRACTOR TO PULL NEW #8 XHHW CONDUCTORS AND #8 BARE 7-STRAND BOND AS NECESSARY. UTILIZE A CONDUIT COUPLER TO CONNECT NEW CONDUIT TO EXISTING CONDUIT WHERE APPLICABLE	LF	15
10	INSTALL NEW 2" CONDUIT, ROUTE EXISTING CONDUCTOR WIRE THROUGH NEW CONDUIT TO CONNECT INTO RELOCATED LIGHTING CONTROL CABINET. CONTRACTOR TO PULL NEW CONDUCTOR WIRE AS NECESSARY	LF	15
11	EXISTING STREET LIGHT POLE AND LUMINAIRE TO REMAIN	EA	1

LEGEND

- EXISTING LUMINAIRE
- PROPOSED LUMINAIRE
- FUTURE LUMINAIRE
- EXISTING UG ELECTRIC CONDUCTORS
- PROPOSED UG ELECTRIC CONDUCTORS
- EXISTING STREET LIGHTING PULL BOX NO.5
- PROPOSED STREET LIGHTING PULL BOX NO.5
- EXISTING C-113 LIGHTING CONTROL CABINET
- RESET C-113 LIGHTING CONTROL CABINET
- RESET C-113 LIGHTING CONTROL CABINET
- RESET C-113 LIGHTING CONTROL CABINET

40 0 40 80
SCALE IN FEET

Contact Arizona 811 Two Working Days Before You Dig
ARIZONA811 BLUE STAKE, INC.
Call 811 or Click Arizona811.com

CITY OF MESA
ENGINEERING DEPARTMENT

EAST PECOS ROAD IMPROVEMENTS
LIGHTING MODIFICATIONS

ROADWAY LIGHTING
STA. 7+00 TO 13+00

DRAWING: LT03

DRAWN BY: BW
ENGINEER: BW
APPROVED BY: KA

PROJ. NO.:

SHEET 3 OF 11

CATALOG NUMBER: X-######

olsson

NORTH

SOSSAMAN ALIGNMENT INFORMATION:
P.O.B. STA. 7+00.00
TRACK STA. 265+81.45 - 299.92' LT
N:832944.25, E:796752.98

8+00
9+00
10+00
11+00
12+00
13+00

SOSSAMAN RD

PC 8+90.86

PT 11+90.86

2 — 11+25, 54' LT

3 — 9+90, 56' RT

EXISTING R.O.W.

UPRR PROPOSED ALIGNMENT
TRACK 101

EXISTING R.O.W.

	CONSTRUCTION NOTES	UNIT	QTY. (THIS SHEET)
1	RELOCATE EXISTING STREET LIGHT POLE, INSTALL NEW RFM-135W40LED3K-G2-R2M LED. INSTALL NEW F-101 FOUNDATION (PER 2022 CITY OF MESA STREET LIGHT TECHNICAL MANUAL)	EA	0
2	RELOCATE EXISTING STREET LIGHT POLE, INSTALL NEW F-101 FOUNDATION (PER 2022 CITY OF MESA STREET LIGHT TECHNICAL MANUAL)	EA	1
3	INSTALL NEW P207 STREETLIGHT POLE, INSTALL NEW F-101 FOUNDATION (PER 2022 CITY OF MESA STREET LIGHT TECHNICAL MANUAL)	EA	1
4	INSTALL NEW PB-101 PULL BOX (PER 2022 CITY OF MESA STREET LIGHT TECHNICAL MANUAL)	EA	5
5	RESET EXISTING C-113 LIGHTING CONTROL CABINET, INSTALL NEW C-105 LIGHTING CONTROL CABINET PAD (PER THE 2022 CITY OF MESA STREET LIGHT TECHNICAL MANUAL)	EA	0
6	RELOCATE EXISTING 2" CONDUIT FOR STREET LIGHTING CONDUCTORS. CONTRACTOR TO PULL #6 XHHW CONDUCTORS AND #8 BARE 7-STRAND BOND WIRE AS NECESSARY	LF	0
7	INSTALL NEW 1 1/2" CONDUIT, #8 XHHW CONDUCTORS, #8 BARE 7-STRAND BOND (PER 2022 CITY OF MESA STREET LIGHT TECHNICAL MANUAL)	LF	70

	CONSTRUCTION NOTES	UNIT	QTY. (THIS SHEET)
8	INSTALL NEW 2" CONDUIT, #8 XHHW CONDUCTORS AND #8 BARE 7-STRAND BOND (PER 2022 CITY OF MESA STREET LIGHT TECHNICAL MANUAL)	LF	695
9	INSTALL NEW 2" CONDUIT, ROUTE EXISTING #8 XHHW CONDUCTORS AND #8 BARE 7-STRAND BOND IN NEW CONDUIT. CONTRACTOR TO PULL NEW #8 XHHW CONDUCTORS AND #8 BARE 7-STRAND BOND AS NECESSARY. UTILIZE A CONDUIT COUPLER TO CONNECT NEW CONDUIT TO EXISTING CONDUIT WHERE APPLICABLE.	LF	0
10	INSTALL NEW 2" CONDUIT ROUTE EXISTING CONDUCTOR WIRE THROUGH NEW CONDUIT TO CONNECT INTO RELOCATED LIGHTING CONTROL CABINET. CONTRACTOR TO PULL NEW CONDUCTOR WIRE AS NECESSARY	LF	0
11	EXISTING STREET LIGHT POLE AND LUMINAIRE TO REMAIN	EA	0

LEGEND

- EXISTING LUMINAIRE
- PROPOSED LUMINAIRE
- FUTURE LUMINAIRE
- EXISTING UG ELECTRIC CONDUCTORS
- PROPOSED UG ELECTRIC CONDUCTORS
- EXISTING STREET LIGHTING PULL BOX NO.5
- PROPOSED STREET LIGHTING PULL BOX NO.5
- EXISTING C-113 LIGHTING CONTROL CABINET
- RESET C-113 LIGHTING CONTROL CABINET

40 0 40 80
SCALE IN FEET

Contact Arizona 811 Two Working Days Before You Dig
ARIZONA811 BLUE STAKE, INC.
Call 811 or Click Arizona811.com

CITY OF MESA
ENGINEERING DEPARTMENT

SIGNAL BUTTE ROAD IMPROVEMENTS
LIGHTING MODIFICATIONS

ROADWAY LIGHTING
STA. 8+00 TO 13+00

DRAWING: LT04

DRAWN BY: BW
ENGINEER: BW
APPROVED BY: KA

PROJ. NO.:

SHEET 4 OF 11

CATALOG NUMBER: X-######

Color table:
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_Lighting.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\Lighting.tbl
Default
3/9/2026

olsson

NORTH

SIGNAL BUTTE ALIGNMENT INFORMATION:
P.O.B. STA. 7+00.00
TRACK STA. 265+81.45 - 299.92' LT
N:832944.25, E:796752.98

UPRR PROPOSED ALIGNMENT TRACK 101

7+00 8+00 9+00 10+00 11+00 12+00

REFER TO SHEET R037 FOR ADDITIONAL DETAILS RELATED TO EXISTING STREET LIGHTING CONDUIT (6)

EXISTING PULL BOX TO REMAIN IN PLACE (11)

RELOCATE EXISTING LIGHT POLE TO STA. 8+36.00, 20.75' LT (1) (7)

BURY PROPOSED PULLBOX 6" BELLOW GRADE. CITY TO PROVIDE LOCATE BALL (4)

EXISTING R.O.W.

EXISTING PULL BOX TO REMAIN IN PLACE

BURY PROPOSED PULLBOX 6" BELLOW GRADE. CITY TO PROVIDE LOCATE BALL (4)

RELOCATE EXISTING LIGHT POLE TO STA. 10+23, 34' LT (1) (7)

EXISTING R.O.W.

EXISTING PULL BOX TO REMAIN IN PLACE (11)

BURY PROPOSED PULLBOX 6" BELLOW GRADE. CITY TO PROVIDE LOCATE BALL (4)

SIGNAL BUTTE RD.

EXISTING R.O.W.

SIGNAL BUTTE RD CL ALIGNMENT

SIGNAL BUTTE RD.

EXISTING R.O.W.

BURY PROPOSED PULLBOX 6" BELLOW GRADE. CITY TO PROVIDE LOCATE BALL (4)

CONSTRUCTION NOTES		UNIT	QTY. (THIS SHEET)
1	RELOCATE EXISTING STREET LIGHT POLE, INSTALL NEW RFM-135W40LED3K-G2-R2M LED. INSTALL NEW F-101 FOUNDATION (PER 2022 CITY OF MESA STREET LIGHT TECHNICAL MANUAL)	EA	2
2	RELOCATE EXISTING STREET LIGHT POLE, INSTALL NEW F-101 FOUNDATION (PER 2022 CITY OF MESA STREET LIGHT TECHNICAL MANUAL)	EA	0
3	INSTALL NEW P207 STREETLIGHT POLE, INSTALL NEW F-101 FOUNDATION (PER 2022 CITY OF MESA STREET LIGHT TECHNICAL MANUAL)	EA	0
4	INSTALL NEW PB-101 PULL BOX (PER 2022 CITY OF MESA STREET LIGHT TECHNICAL MANUAL)	EA	4
5	RESET EXISTING C-113 LIGHTING CONTROL CABINET, INSTALL NEW C-105 LIGHTING CONTROL CABINET PAD (PER THE 2022 CITY OF MESA STREET LIGHT TECHNICAL MANUAL)	EA	0
6	RELOCATE EXISTING 2" CONDUIT FOR STREET LIGHTING CONDUCTORS. CONTRACTOR TO PULL #6 XHHW CONDUCTORS AND #8 BARE 7-STRAND BOND WIRE AS NECESSARY	LF	192
7	INSTALL NEW 1 1/2" CONDUIT, #8 XHHW CONDUCTORS, #6 BARE 7-STRAND BOND (PER 2022 CITY OF MESA STREET LIGHT TECHNICAL MANUAL)	LF	14

CONSTRUCTION NOTES		UNIT	QTY. (THIS SHEET)
8	INSTALL NEW 2" CONDUIT, #8 XHHW CONDUCTORS AND #8 BARE 7-STRAND BOND (PER 2022 CITY OF MESA STREET LIGHT TECHNICAL MANUAL)	LF	0
9	INSTALL NEW 2" CONDUIT, ROUTE EXISTING #8 XHHW CONDUCTORS AND #8 BARE 7-STRAND BOND IN EXISTING CONDUIT. CONTRACTOR TO PULL NEW #8 XHHW CONDUCTORS AND #8 BARE 7-STRAND BOND AS NECESSARY. UTILIZE A CONDUIT COUPLER TO CONNECT NEW CONDUIT TO EXISTING CONDUIT WHERE APPLICABLE.	LF	0
10	INSTALL NEW 2" CONDUIT ROUTE EXISTING CONDUCTOR WIRE THROUGH NEW CONDUIT TO CONNECT INTO RELOCATED LIGHTING CONTROL CABINET. CONTRACTOR TO PULL NEW CONDUCTOR WIRE AS NECESSARY	LF	0
11	EXISTING STREET LIGHT POLE AND LUMINAIRE TO REMAIN	EA	2

LEGEND

- EXISTING LUMINAIRE
- PROPOSED LUMINAIRE
- FUTURE LUMINAIRE
- EXISTING UG ELECTRIC CONDUCTORS
- PROPOSED UG ELECTRIC CONDUCTORS
- EXISTING STREET LIGHTING PULL BOX NO.5
- PROPOSED STREET LIGHTING PULL BOX NO.5
- EXISTING C-113 LIGHTING CONTROL CABINET
- RESET C-113 LIGHTING CONTROL CABINET

40 0 40 80

SCALE IN FEET

Contact Arizona 811 Two Working Days Before You Dig

ARIZONA811

Call 811 or Click Arizona811.com

CITY OF MESA
ENGINEERING DEPARTMENT

SIGNAL BUTTE ROAD IMPROVEMENTS
LIGHTING MODIFICATIONS

ROADWAY LIGHTING
STA. 7+00 TO 12+00

DRAWING: LT05

DRAWN BY: BW
ENGINEER: BW
APPROVED BY: KA

PROJ. NO.:

SHEET 5 OF 11

CATALOG NUMBER: X-######

Color table:
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_Lighting.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\Lighting\0.200927-LT05_Signal Butte.dgn
Default
3/9/2026

Color table:
F:\2020\0501-i1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_Lighting.tbl
F:\2020\0501-i1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\Lighting\0_200927-LT06_Pecos Rd East.dgn
Default
3/9/2026

olsson

NORTH

EAST PECOS RD EX ALIGNMENT INFORMATION:
P.O.B. STA. 340+00.00
TRACK STA. 285+33.59 - 229.72' LT
N=834008.03, E=798078.56

CONSTRUCTION NOTES

		UNIT	QTY. (THIS SHEET)
1	RELOCATE EXISTING STREET LIGHT POLE, INSTALL NEW RFM-135W40LED3K-G2-R2M LED, INSTALL NEW F-101 FOUNDATION (PER 2022 CITY OF MESA STREET LIGHT TECHNICAL MANUAL)	EA	0
2	REMOVE AND RESET EXISTING STREET LIGHT POLE, INSTALL NEW F-101 FOUNDATION (PER 2022 CITY OF MESA STREET LIGHT TECHNICAL MANUAL)	EA	0
3	INSTALL NEW P207 STREETLIGHT POLE, INSTALL NEW F-101 FOUNDATION (PER 2022 CITY OF MESA STREET LIGHT TECHNICAL MANUAL)	EA	1
4	INSTALL NEW PB-101 PULL BOX (PER 2022 CITY OF MESA STREET LIGHT TECHNICAL MANUAL)	EA	2
5	RESET EXISTING C-113 LIGHTING CONTROL CABINET, INSTALL NEW C-105 LIGHTING CONTROL CABINET PAD (PER THE 2022 CITY OF MESA STREET LIGHT TECHNICAL MANUAL)	EA	0
6	RELOCATE EXISTING 2" CONDUIT FOR STREET LIGHTING CONDUCTORS. CONTRACTOR TO PULL #6 XHHW CONDUCTORS AND #8 BARE 7-STRAND BOND WIRE AS NECESSARY	LF	0
7	INSTALL NEW 1 1/2" CONDUIT, #8 XHHW CONDUCTORS, #8 BARE 7-STRAND BOND (PER 2022 CITY OF MESA STREET LIGHT TECHNICAL MANUAL)	LF	7

CONSTRUCTION NOTES

		UNIT	QTY. (THIS SHEET)
8	INSTALL NEW 2" CONDUIT, #8 XHHW CONDUCTORS AND #8 BARE 7-STRAND BOND (PER 2022 CITY OF MESA STREET LIGHT TECHNICAL MANUAL)	LF	147
9	INSTALL NEW 2" CONDUIT, ROUTE EXISTING #8 XHHW CONDUCTORS AND #8 BARE 7-STRAND BOND IN EXISTING CONDUIT. CONTRACTOR TO PULL NEW #8 XHHW CONDUCTORS AND #8 BARE 7-STRAND BOND AS NECESSARY. UTILIZE A CONDUIT COUPLER TO CONNECT NEW CONDUIT TO EXISTING CONDUIT WHERE APPLICABLE	LF	0
10	INSTALL NEW 2" CONDUIT, ROUTE EXISTING CONDUCTOR WIRE THROUGH NEW CONDUIT TO CONNECT INTO RELOCATED LIGHTING CONTROL CABINET. CONTRACTOR TO PULL NEW CONDUCTOR WIRE AS NECESSARY	LF	0
11	EXISTING STREET LIGHT POLE AND LUMINAIRE TO REMAIN	EA	0

EXISTING R.O.W.

PECOS RD EX CL ALIGNMENT

EXISTING R.O.W.

340+00

341+00

342+00

343+00

344+00

345+00

346+00

E PECOS RD.

M.H.

M.H.

7

8

4

4

3 344+00, 44' RT

340+00

EXISTING R.O.W.

UPRR PROPOSED ALIGNMENT
TRACK 101

LEGEND

- EXISTING LUMINAIRE
- PROPOSED LUMINAIRE
- FUTURE LUMINAIRE
- EXISTING UG ELECTRIC CONDUCTORS
- PROPOSED UG ELECTRIC CONDUCTORS
- EXISTING STREET LIGHTING PULL BOX NO.5
- PROPOSED STREET LIGHTING PULL BOX NO.5
- EXISTING C-113 LIGHTING CONTROL CABINET
- RESET C-113 LIGHTING CONTROL CABINET

40 0 40 80
SCALE IN FEET

Contact Arizona 811 Two Working Days Before You Dig
ARIZONA811 BLUE STAKE, INC.
Call 811 or Click Arizona811.com

CITY OF MESA
ENGINEERING DEPARTMENT

EAST PECOS ROAD IMPROVEMENTS
LIGHTING IMPROVEMENTS

ROADWAY LIGHTING
STA. 340+00 TO 346+00

DRAWING: LT06

DRAWN BY: BW
ENGINEER: BW
APPROVED BY: KA

PROJ. NO.:

SHEET 6 OF 11

CATALOG NUMBER: X-######

	Minimum Average Foot Candles	Maximum Uniformity Ratio (Avg/Min)
City of Mesa Photometric Criteria	1.3	3.0
*Proposed Photometrics	1.32	1.89

*Note: Future Luminaires have been located based on City of Mesa criteria for spacing and offset. Photometrics have been modeled assuming that Future Luminaires shown on this sheet are type ERL2-0-21-C3-30-A-GRAY-L-X; calculations are for the completed roadway cross section including Future Luminaires.

olsson

NORTH

PECOS RD ALIGNMENT INFORMATION:
P.O.B. STA. 2+00.00
TRACK STA. 24+84.57 - 754.98' LT
N=832152.60, E=773811.21

UPRR PROPOSED ALIGNMENT
TRACK 101

8+00

9+00

10+00

11+00

13+00

EXISTING R.O.W.

EAST PECOS RD

EXISTING R.O.W.

LEGEND

- +X.X — *ILLUMINANCE (F.C.)*
- *EXISTING LUMINAIRE*
- *PROPOSED LUMINAIRE*
- *FUTURE LUMINAIRE*
- *EXISTING UG ELECTRIC CONDUCTORS*
- *PROPOSED UG ELECTRIC CONDUCTORS*
- *EXISTING STREET LIGHTING PULL BOX NO.5*
- *PROPOSED STREET LIGHTING PULL BOX NO.5*
- *EXISTING C-113 LIGHTING CONTROL CABINET*
- *RESET C-113 LIGHTING CONTROL CABINET*
- *EXISTING POWER SOURCE*
- *EXISTING POWER UTILITY PULL BOX*

40 0 40 80

SCALE IN FEET

Contact Arizona 811 Two Working Days Before You Dig
Call 811 or Click Arizona811.com

CITY OF MESA
ENGINEERING DEPARTMENT

EAST PECOS ROAD IMPROVEMENTS
LIGHTING MODIFICATIONS

PHOTOMETRIC PLAN SHEET
STA. 7+00 TO 13+00

DRAWING: LT07

DRAWN BY: BW
ENGINEER: BW
APPROVED BY: KA

PROJ. NO.:

SHEET 7 OF 11

CATALOG NUMBER: X-######

Color table:
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_Lighting.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\Lighting\0_200927-LT07_Pecos Rd West.dgn
Default
3/9/2026

olsson

NORTH

SOSSAMAN ALIGNMENT INFORMATION:
P.O.B. STA. 7+00.00
TRACK STA. 265+81.45 - 299.92' LT
N:832944.25, E:796752.98

8+00 9+00 10+00 11+00 12+00 13+00

EXISTING R.O.W.

SOSSAMAN RD

PC 8+90.86

PT 11+90.86

UPRR PROPOSED ALIGNMENT
TRACK 101

EXISTING R.O.W.

	Minimum Average Foot Candles	Maximum Uniformity Ratio (Avg/Min)
City of Mesa Photometric Criteria	1.3	3.0
*Proposed Photometrics	1.40	2.0

LEGEND

- +X.X ILLUMINANCE (F.C.)
- EXISTING LUMINAIRE
- PROPOSED LUMINAIRE
- FUTURE LUMINAIRE
- EXISTING UG ELECTRIC CONDUCTORS
- PROPOSED UG ELECTRIC CONDUCTORS
- EXISTING STREET LIGHTING PULL BOX NO.5
- PROPOSED STREET LIGHTING PULL BOX NO.5
- EXISTING C-113 LIGHTING CONTROL CABINET
- RESET C-113 LIGHTING CONTROL CABINET

40 0 40 80
SCALE IN FEET

Contact Arizona 811 Two Working Days Before You Dig
ARIZONA811 BLUE STAKE, INC.
Call 811 or Click Arizona811.com

CITY OF MESA
ENGINEERING DEPARTMENT

SIGNAL BUTTE ROAD IMPROVEMENTS
LIGHTING MODIFICATIONS

PHOTOMETRIC PLAN SHEET
STA. 8+00 TO 13+00

DRAWING: LT08

DRAWN BY: BW
ENGINEER: BW
APPROVED BY: KA

PROJ. NO.:

SHEET 8 OF 11

CATALOG NUMBER: X-######

Color table:
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_Lighting.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\Lighting\0_200927-LT08_Sossaman Rd.dgn
Default
3/9/2026

olsson

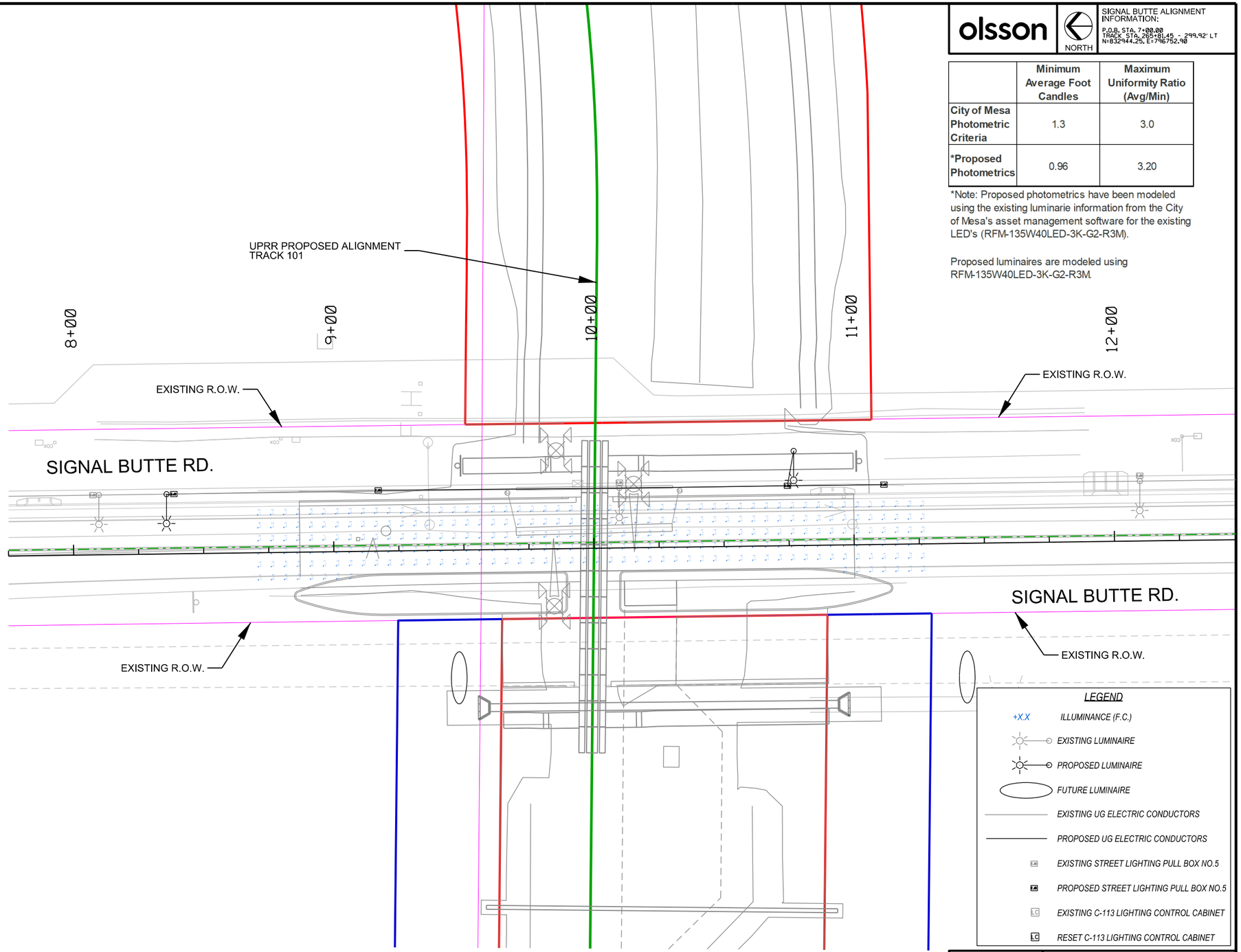
NORTH

SIGNAL BUTTE ALIGNMENT INFORMATION:
P.O.B. STA. 7+00.00
TRACK STA. 265+81.45 - 299.92' LT
N:832944.25, E:796752.98

	Minimum Average Foot Candles	Maximum Uniformity Ratio (Avg/Min)
City of Mesa Photometric Criteria	1.3	3.0
***Proposed Photometrics**	0.96	3.20

*Note: Proposed photometrics have been modeled using the existing luminarie information from the City of Mesa's asset management software for the existing LED's (RFM-135W40LED-3K-G2-R3M).

Proposed luminaires are modeled using RFM-135W40LED-3K-G2-R3M.



LEGEND

- +X.X — *ILLUMINANCE (F.C.)*
- *EXISTING LUMINAIRE*
- *PROPOSED LUMINAIRE*
- *FUTURE LUMINAIRE*
- *EXISTING UG ELECTRIC CONDUCTORS*
- *PROPOSED UG ELECTRIC CONDUCTORS*
- *EXISTING STREET LIGHTING PULL BOX NO.5*
- *PROPOSED STREET LIGHTING PULL BOX NO.5*
- *EXISTING C-113 LIGHTING CONTROL CABINET*
- *RESET C-113 LIGHTING CONTROL CABINET*

40 0 40 80

SCALE IN FEET

Contact Arizona 811 Two Working Days Before You Dig
ARIZONA811 Blue Stake, Inc.
Call 811 or Click Arizona811.com

CITY OF MESA
ENGINEERING DEPARTMENT

SIGNAL BUTTE ROAD IMPROVEMENTS
LIGHTING MODIFICATIONS

PHOTOMETRIC PLAN SHEET
STA. 8+00 TO 12+00

DRAWING LT09

DRAWN BY: BW
ENGINEER: BW
APPROVED BY: KA

PROJ. NO.:

SHEET 9 OF 11

CATALOG NUMBER: X-######

Color table:
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_Lighting.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\Lighting\0_200927-LT09_Signal Butte.dgn
Default
3/9/2026

olsson

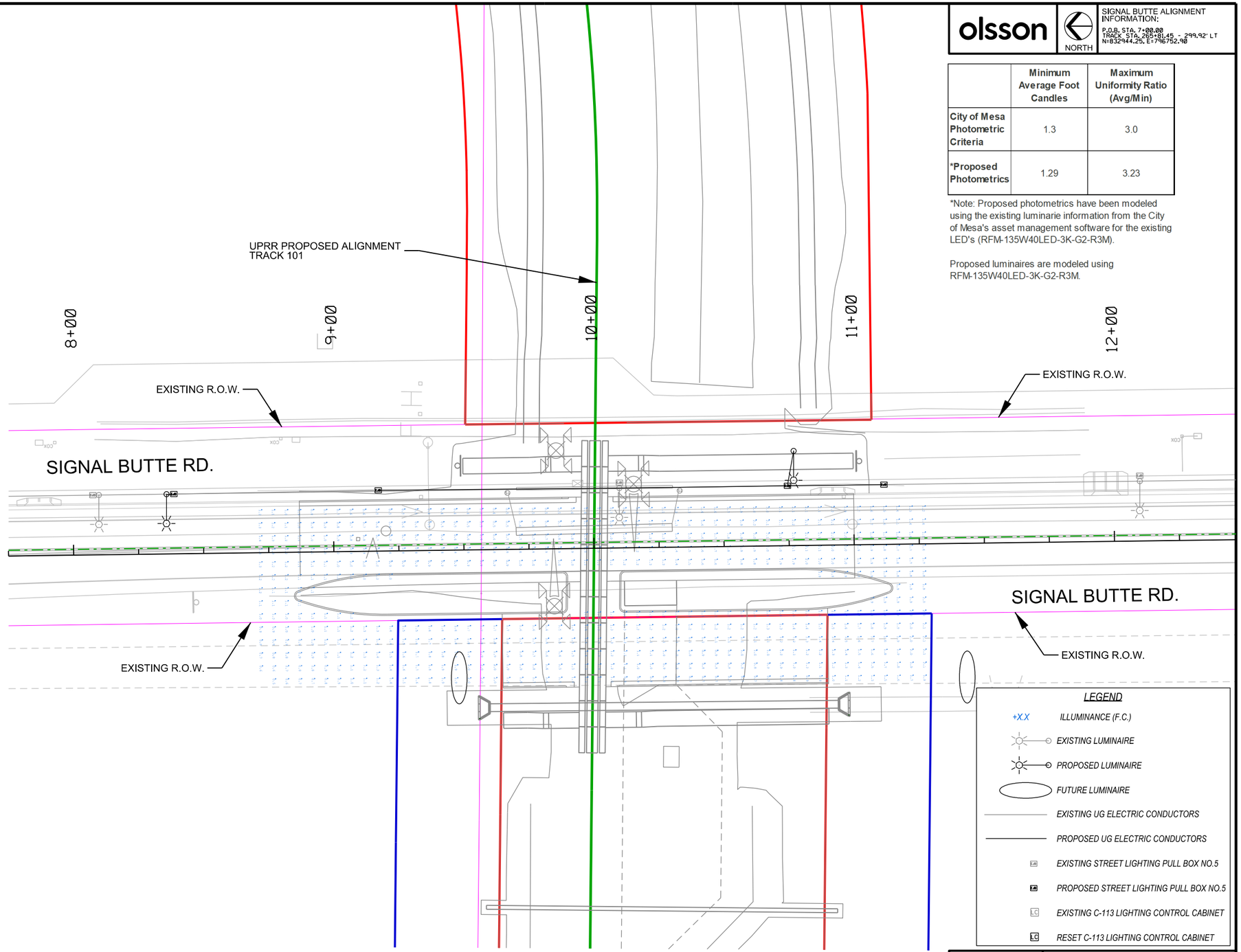
NORTH

SIGNAL BUTTE ALIGNMENT INFORMATION:
P.O.B. STA. 7+00.00
TRACK STA. 265+81.45 - 299.92' LT
N:832944.25, E:796752.98

	Minimum Average Foot Candles	Maximum Uniformity Ratio (Avg/Min)
City of Mesa Photometric Criteria	1.3	3.0
***Proposed Photometrics**	1.29	3.23

*Note: Proposed photometrics have been modeled using the existing luminarie information from the City of Mesa's asset management software for the existing LED's (RFM-135W40LED-3K-G2-R3M).

Proposed luminaires are modeled using RFM-135W40LED-3K-G2-R3M.



LEGEND

- +X.X — *ILLUMINANCE (F.C.)*
- *EXISTING LUMINAIRE*
- *PROPOSED LUMINAIRE*
- *FUTURE LUMINAIRE*
- *EXISTING UG ELECTRIC CONDUCTORS*
- *PROPOSED UG ELECTRIC CONDUCTORS*
- EP — *EXISTING STREET LIGHTING PULL BOX NO.5*
- EP — *PROPOSED STREET LIGHTING PULL BOX NO.5*
- LC — *EXISTING C-113 LIGHTING CONTROL CABINET*
- LC — *RESET C-113 LIGHTING CONTROL CABINET*

40 0 40 80

SCALE IN FEET

Contact Arizona 811 Two Working Days Before You Dig
ARIZONA811 BLUE STAKE, INC.
Call 811 or Click Arizona811.com

CITY OF MESA
ENGINEERING DEPARTMENT

SIGNAL BUTTE ROAD IMPROVEMENTS
LIGHTING MODIFICATIONS

PHOTOMETRIC PLAN SHEET
STA. 8+00 TO 12+00

DRAWING: LT10

DRAWN BY: BW
ENGINEER: BW
APPROVED BY: KA

PROJ. NO.:

SHEET 10 OF 11

CATALOG NUMBER: X-######

Color table:
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_Lighting.tbl
F:\2020\0501-1000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\Lighting\0_200927-LT10_Signal Butte.dgn
Default
3/9/2026

	Minimum Average Foot Candles	Maximum Uniformity Ratio (Avg/Min)
City of Mesa Photometric Criteria	1.3	3.0
***Proposed Photometrics**	1.41	1.76

*Note: Future Luminaires have been located based on City of Mesa criteria for spacing and offset. Photometrics have been modeled assuming that Future Luminaires shown on this sheet are type ERL2-0-21-C3-30-A-GRAY-L-X; calculations are for the completed roadway cross section including Future Luminaires.

olsson

NORTH

EAST PECOS RD EX ALIGNMENT INFORMATION:
P.O.B. STA. 340+00.00
TRACK STA. 285+33.59 - 229.72' LT
N=834006.03, E=798078.56

EXISTING R.O.W.

340+00 341+00 342+00 343+00 344+00 345+00 346+00

E PECOS RD.

EXISTING R.O.W.

UPRR PROPOSED ALIGNMENT
TRACK 101

M.H.

V.

LEGEND

- +X.X — *ILLUMINANCE (F.C.)*
- *EXISTING LUMINAIRE*
- *PROPOSED LUMINAIRE*
- *FUTURE LUMINAIRE*
- *EXISTING UG ELECTRIC CONDUCTORS*
- *PROPOSED UG ELECTRIC CONDUCTORS*
- *EXISTING STREET LIGHTING PULL BOX NO.5*
- *PROPOSED STREET LIGHTING PULL BOX NO.5*
- *EXISTING C-113 LIGHTING CONTROL CABINET*
- *RESET C-113 LIGHTING CONTROL CABINET*

40 0 40 80
SCALE IN FEET

Contact Arizona 811 Two Working Days Before You Dig
ARIZONA811 Arizona Blue Stake, Inc.
Call 811 or Click Arizona811.com

CITY OF MESA
ENGINEERING DEPARTMENT

EAST PECOS ROAD IMPROVEMENTS
LIGHTING MODIFICATIONS

PHOTOMETRIC PLAN SHEET
STA. 340+00 TO 346+00

DRAWING: LT11

DRAWN BY: BW
ENGINEER: KA
APPROVED BY:

PROJ. NO.:

SHEET 11 OF 11

CATALOG NUMBER: X-######

Color table:
F:\2020\0501-11000\020-0927\40-Design\Microstation\020-0927_RLTK\Pentable\020-0927_Lighting.tbl
F:\2020\0501-11000\020-0927\40-Design\Microstation\020-0927_RLTK\DGN\Sheets\04_Road Details\Lighting\0_200927-LT11_Pecos Rd East.dgn
Default
3/9/2026