

GENERAL:

1. THE SPECIFICATIONS ARE MINIMUM REQUIREMENTS. THE PIPELINES SHALL BE DESIGNED AND CONSTRUCTED SO THAT CALTRAIN OPERATIONS, MAINTENANCE, AND THE FACILITIES ARE NOT INTERFERED WITH, INTERRUPTED, OR SAFETY COMPROMISED.
2. ANY REPLACEMENT OR MODIFICATIONS TO THE EXISTING PIPE (CARRIER OR CASING) SHALL BE CONSIDERED AS A NEW INSTALLATION SUBJECT TO THESE SPECIFICATIONS.
3. ALL DESIGN SHALL BE SIGNED AND SEALED BY A CIVIL ENGINEER LICENSED IN THE STATE OF CALIFORNIA.
4. PIPELINES SHALL CROSS TRACKS AT RIGHT ANGLES; IF NOT FEASIBLE, AT MAXIMUM 45 DEGREES. THE PIPELINES SHALL NOT BE PLACED INSIDE CULVERTS, NOR UNDER RAIL BRIDGES, NOR CLOSER THAN 100 FEET IN ANY PORTION OF ANY RAIL BRIDGE, CULVERT, BUILDING, OR OTHER IMPORTANT STRUCTURE.
5. CROSSING PIPELINES SHALL NOT BE LOCATED WITHIN THE LIMITS OF A TURNOUT. THE LIMIT OF A TURNOUT IS 25 FEET FROM THE SWITCH POINT.
6. LONGITUDINAL PIPELINES SHALL BE LOCATED AS FAR AS PRACTICABLE FROM ANY TRACKS OR OTHER IMPORTANT STRUCTURES.
7. LONGITUDINAL PIPELINES SHALL NOT BE LOCATED WITHIN EARTH EMBANKMENT OR WITHIN DITCHES.
8. THE DEPTH OF THE PIPELINES (CARRIER AND CASING PIPES) SHALL BE SUCH TO WITHSTAND RIGOROUS RAILROAD OPERATING CONDITIONS AND SHALL ALLOW FOR FUTURE INSTALLATIONS (SUCH AS CONDUIT, PIPES, STRUCTURES, ETC.) BY CALTRAIN.
9. THE DEPTH OF THE PIPELINES SHALL BE THE GREATER OF THE FOLLOWINGS MEASURED VERTICALLY TO THE TOP OF THE CASING (DEPTHS IN PARENTHESIS ARE FOR FLAMMABLE OR HAZARDOUS SUBSTANCES):
 - A. 6 FT MINIMUM FROM THE TOP OF THE TIE (8 FT MINIMUM)
 - B. 4 FT MINIMUM FROM THE BOTTOM OF THE TRACK SIDE DRAINAGE DITCH (5 FT MINIMUM).
 - C. 4 FT MINIMUM FROM THE LOWEST GROUND LEVEL (5 FT MINIMUM).
10. BOTH CARRIER AND CASING PIPES SHALL BE INSTALLED WITH SUFFICIENT SLACK SO THAT THE PIPES ARE NOT IN TENSION.
11. SIGNS TO INDICATE LOCATION OF PIPELINE OR DUCT BANK SHALL BE INSTALLED AND MAINTAINED BY OWNER OF THE UTILITIES. THE SIGNS SHALL HAVE DURABLE WEATHERPROOF AND BE ON BOTH SIDES OF THE TRACKS OVER THE CENTERLINE OF THE UTILITIES WITH THE FOLLOWING INFORMATION:
 - A. NAME AND ADDRESS OF OWNER
 - B. CONTENTS AND PRESSURE IN PIPE
 - C. SOIL DEPTH BELOW THE SURFACE
 - D. EMERGENCY PHONE NUMBER IN THE EVENT OF DAMAGE (PIPE RUPTURE, ETC).
12. WARNING TAPE SHALL BE PLACED WITHIN 2 FEET FROM GROUND SURFACE FOR OPEN CUT INSTALLATION.

CARRIER PIPES:

1. CARRIER PIPE MATERIAL UNDER AND ADJACENT TO TRACKS MUST BE CAPABLE OF SUPPORTING A MINIMUM OF 3,600 POUNDS PER SQUARE FOOT FOR COVER HEIGHTS OF 30 FEET OR LESS. FOR HEIGHTS GREATER THAN 30 FEET, SUPPORTING WEIGHT SHALL BE INCREASED PROPORTIONALLY.
2. CARRIER PIPELINE SHALL BE SLOPED ONE PERCENT (1%).
3. UNCASSED CARRIER PIPES SHALL HAVE THE PIPE WALL THICKNESS IN ACCORDANCE WITH TABLE 1-5-3 (AREMA, PART 1).

CASINGS:

1. CASING REQUIREMENTS APPLY TO PIPELINES THAT CARRY LIQUID OR GASEOUS SUBSTANCES AS FOLLOWS:
 - A. OIL, GAS, PETROLEUM PRODUCTS OR OTHER FLAMMABLE, HIGHLY VOLATILE OR HAZARDOUS SUBSTANCES UNDER PRESSURE.
 - B. STEAM, WATER OR ANY NON-FLAMMABLE SUBSTANCE WHICH FROM ITS NATURE OR PRESSURE, MAY CAUSE DAMAGE IF ESCAPING ON OR IN THE VICINITY OF THE CALTRAIN CORRIDOR.
2. CASING PIPE SHALL BE INSTALLED TO PREVENT THE FORMATION OF STANDING WATER UNDER THE TRACKS, AND SHALL SLOPE TO ONE END SIMILAR TO THE CARRIER PIPES (EXCEPT FOR LONGITUDINAL PIPELINE).
3. CASING PIPE SHALL BE SIZED SUCH THAT THERE IS AT LEAST 2 INCHES CLEARANCE TO THE LARGEST OUTSIDE DIAMETER OF CARRIER PIPE, JOINTS OR COUPLINGS.
4. BOTH ENDS OF THE CASING SHALL BE SUITABLY SEALED AGAINST THE ENTRANCE OF FOREIGN MATERIAL, BUT ALLOWING LEAKAGE TO PASS THROUGH IN THE EVENT OF CARRIER BREAK.
5. CASING PIPE AND JOINTS SHALL BE OF LEAK PROOF CONSTRUCTION, CAPABLE OF WITHSTANDING RAILROAD LOADING (COOPER E-80).
6. CASING PIPE SHALL HAVE A MINIMUM YIELD STRENGTH OF 35,000 PSI. WHEN CASING IS WITHOUT PROTECTIVE COATING, AND NOT CATHODICALLY PROTECTED, THE WALL THICKNESS SHOWN IN TABLE 1-5-1 (AREMA, PART 1) SHALL BE INCREASED TO THE NEAREST STANDARD SIZE WHICH IS A MINIMUM OF 1/16" GREATER THAN THE THICKNESS SHOWN EXCEPT FOR DIAMETERS LESS THAN 12".
7. CASING SHALL COVER THE ENTIRE WIDTH OF THE CALTRAIN ROW.

VENTING:

1. CASING PIPE SHALL BE PROPERLY VENTED. VENT PIPES SHALL BE MINIMUM 2 INCHES IN DIAMETER AND SHALL BE INSTALLED NEAR THE END OF CASING.
2. VENT PIPE SHALL BE VERTICAL AND SHALL EXTEND NOT LESS THAN 4 FEET ABOVE GROUND SURFACE. TOP OF VENT PIPE SHALL BE FITTED WITH DOWNTURNED ELBOW PROPERLY SCREENED, OR A RELIEF VALVE.
3. VENTS IN LOCATIONS SUBJECT TO HIGH WATER SHALL BE EXTENDED ABOVE MAXIMUM ELEVATION OF HIGH WATER AND SHALL BE SUPPORTED AND PROTECTED.

MANHOLES:




1. MANHOLES ARE NOT ALLOWED WITHIN CALTRAIN CORRIDOR, EXCEPT FOR LONGITUDINAL PIPELINES WHERE MANHOLES SHALL BE PRECAST CONCRETE, FLUSH WITH TOP OF GROUND.

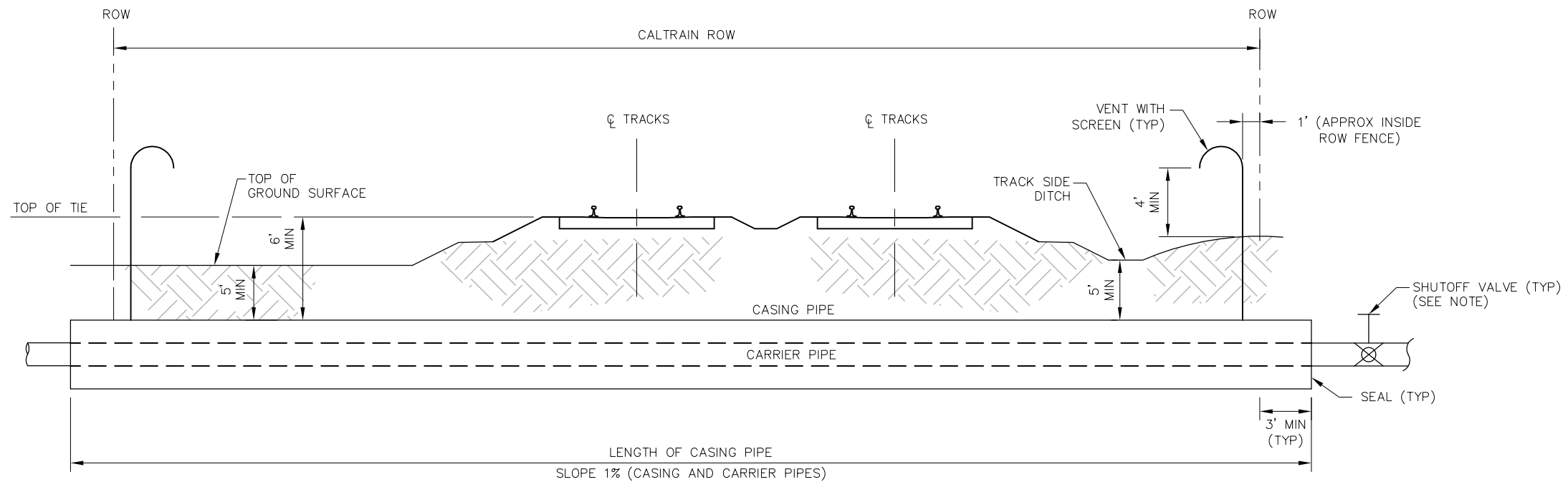
ABANDONED FACILITIES:

1. THE OWNER OF ALL CROSSING OR LONGITUDINAL PIPELINES PROPOSED FOR ABANDONMENT SHALL NOTIFY CALTRAIN, IN WRITING, OF THE INTENTION TO ABANDON.
2. AS DIRECTED BY CALTRAIN, ABANDONED PIPELINES SHALL BE EITHER REMOVED OR COMPLETELY FILLED WITH CEMENT GROUT, COMPACTED SAND, OR OTHER METHODS, AS APPROVED BY CALTRAIN.
3. ABANDONED MANHOLES SHALL BE REMOVED TO A MINIMUM DEPTH OF 6 FEET BELOW FINISHED GRADE AND COMPLETELY FILLED WITH CEMENT GROUT, COMPACTED SAND, OR OTHER METHODS AS APPROVED BY CALTRAIN.

NOTES:

1. AREMA: AMERICAN RAILWAY ENGINEERING AND MAINTENANCE-OF-WAY ASSOCIATION
2. FIBER OPTICS OR ELECTRICAL INSTALLATIONS MAY USE PVC OR HDPE PIPE SCHEDULE 80, AS A CONDUIT.

										PENINSULA CORRIDOR JOINT POWERS BOARD			STANDARD DRAWINGS			CADD FILE NO.: SD-8000	
										APPROVED BY:			 CIVIL ENGINEERING CROSSING UTILITIES PIPELINES GENERAL REQUIREMENTS			REV	DATE
										 ENGINEERING MANAGER						 DEPUTY DIRECTOR OF ENGINEERING	
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CARRIER PIPES:

1. CLASS IV RCP SHALL BE USED FOR STORM WATER OR OTHER LIQUIDS THAT COULD CAUSE CORROSION, WHERE THE OPERATING PRESSURE IS UNDER 40 PSI
2. DUCTILE IRON PIPE IN A CASING IS ACCEPTABLE AS FOLLOWS:
 - CLASS 52 FOR DIAMETERS OF 4" THRU 10"
 - CLASS 53 FOR DIAMETERS OF 12" THRU 14"
 - CLASS 54 FOR DIAMETERS OF 16" THRU 18"
 - CLASS 56 FOR DIAMETERS OF 20" THRU 24"
3. PLASTIC PIPE SHALL BE IN A CASING. THE PLASTIC PIPE SHALL BE PVC OR HIGH DENSITY POLYETHYLENE (HDPE) AND MINIMUM SCHEDULE 80, WHERE THE OPERATING PRESSURE UNDER 20 PSI

CASING PIPE:

1. CASING PIPE MAY BE OMITTED FOR NON-PRESSURE (GRAVITY) SEWER AND STORM DRAIN CROSSINGS UNDER TRACKS WHERE THE PIPE STRENGTH IS CAPABLE OF WITHSTANDING RAILROAD LOADING
2. VOID BETWEEN CASING AND CARRIER PIPE SHALL BE FILLED WITH CLEAN SAND IN ALL PRESSURE ABOVE 20 PSI INSTALLATIONS. VOID MAY BE PARTIALLY FILLED IN OTHERS AS DIRECTED

NOTES:

1. ACCESSIBLE EMERGENCY SHUTOFF VALVES MAY BE REQUIRED BY THE FEDERAL, STATE, OR LOCAL AUTHORITIES. IF INSTALLED, THE VALVES SHALL BE LOCATED OUTSIDE OF CALTRAIN RIGHT-OF-WAY
2. SEE SD-8000 FOR GENERAL REQUIREMENTS
3. SIGNS NOT SHOWN FOR CLARITY

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

Bernad Anzures *Steph Chen*

ENGINEERING MANAGER

DEPUTY DIRECTOR OF ENGINEERING



1250 San Carlos Avenue
San Carlos, CA 94070

STANDARD DRAWINGS

CIVIL ENGINEERING
CROSSING UTILITIES
PIPELINES FOR
NON-FLAMMABLE SUBSTANCES

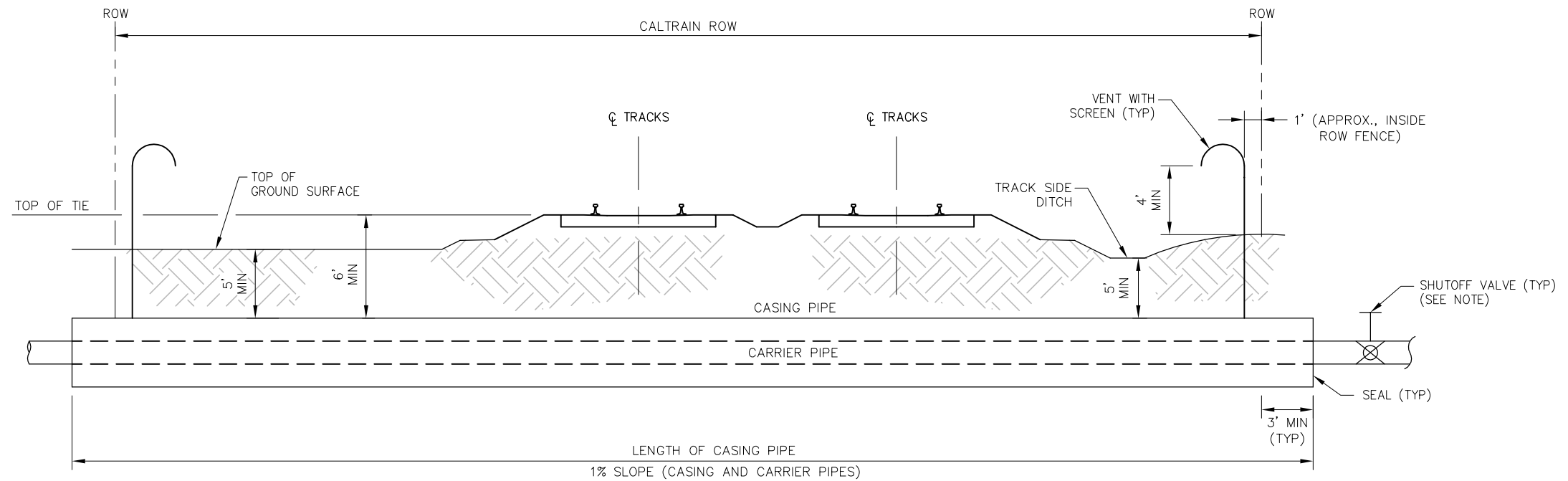
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CARRIER PIPES:

THE FOLLOWING REQUIREMENTS ARE IN ACCORDANCE WITH AREMA, PART 1:

PIPELINES CARRYING OIL, LIQUEFIED PETROLEUM GAS, NATURAL OR MANUFACTURED GAS AND OTHER FLAMMABLE PRODUCTS SHALL CONFORM TO THE REQUIREMENTS OF ANSI B-31.8 AND ANSI B-31.4 AND OTHER APPLICABLE CODES, EXCEPT THAT THE MAXIMUM ALLOWABLE STRESSES FOR DESIGN OF STEEL PIPE SHALL NOT EXCEED THE SPECIFIED MINIMUM YIELD STRENGTH, WHICH IS DETERMINED BY A PERCENTAGE OF THE HOOP STRESS DUE TO INTERNAL PRESSURE AS LISTED BELOW:

1. STEEL WELDED PIPE UNDER TRACKS THAT IS PROTECTED WITH A STEEL CASING. THE FOLLOWING PERCENTAGES APPLY TO HOOP STRESS:
 - A. 72% FOR INSTALLATION ON OIL PIPELINES
 - B. 50% FOR PIPELINES CARRYING LIQUEFIED PETROLEUM, GAS AND OTHER FLAMMABLE LIQUIDS WITH LOW FLASH POINT
 - C. 60% FOR INSTALLATIONS ON GAS PIPELINES
2. STEEL PIPE WITHOUT A CASING UNDER SECONDARY OR INDUSTRY TRACKS. THE FOLLOWING PERCENTAGES APPLY TO THE SUM OF THE HOOP STRESS DUE TO THE MAXIMUM ANTICIPATED INTERNAL PRESSURE AND THE FLEXURAL RING STRESS DUE TO EXTERNAL LOADS:
 - A. 60% FOR INSTALLATION ON OIL PIPELINES
 - B. 40% FOR PIPELINES CARRYING LIQUEFIED PETROLEUM, GAS AND OTHER FLAMMABLE LIQUIDS WITH LOW FLASH POINT
 - C. 50% FOR INSTALLATIONS ON GAS PIPELINES
3. STEEL PIPE LAID LONGITUDINALLY ON CALTRAIN ROW WITHOUT THE PROTECTION OF A CASING. THE FOLLOWING PERCENTAGES APPLY TO HOOP STRESS:
 - A. 60% FOR INSTALLATION ON OIL PIPELINES
 - B. 40% FOR PIPELINES CARRYING LIQUEFIED PETROLEUM, GAS AND OTHER FLAMMABLE LIQUIDS WITH LOW FLASH POINT
 - C. 40% FOR INSTALLATIONS ON GAS PIPELINES
4. ALL JOINTS OR COUPLINGS SHALL BE WELDED
5. GAS LINE SHALL BE ALLOYED CARBON STEEL WITH A FACTORY-APPLIED CORROSION PROTECTION COATING

CASING PIPES:

1. CASING PIPE AND JOINTS SHALL BE WELDED, CAPABLE OF WITHSTANDING RAILROAD LOADING (COOPER E-80)
2. CASING PIPE MAY BE OMITTED FOR GAS PIPELINES

NOTES:

1. SHUTOFF VALVES MAY BE REQUIRED BY THE FEDERAL, STATE, OR LOCAL AUTHORITIES. IF INSTALLED, THE VALVES SHALL BE LOCATED OUTSIDE OF CALTRAIN RIGHT-OF-WAY.
2. SEE SD-8000 FOR GENERAL REQUIREMENTS

PENINSULA CORRIDOR JOINT POWERS BOARD

APPROVED BY:

Bernard Anagnostis *Stephen Chen*

ENGINEERING MANAGER

DEPUTY DIRECTOR OF ENGINEERING



1250 San Carlos Avenue
San Carlos, CA 94070

STANDARD DRAWINGS

CIVIL ENGINEERING
CROSSING UTILITIES
PIPELINES FOR FLAMMABLE
AND HAZARDOUS SUBSTANCES

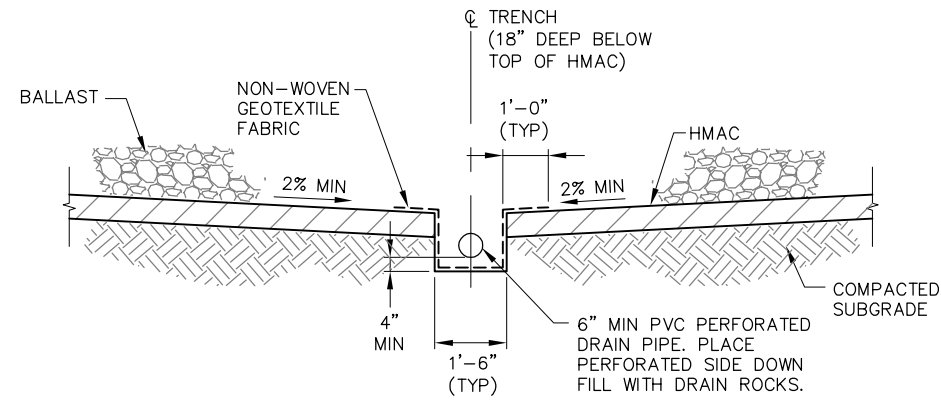
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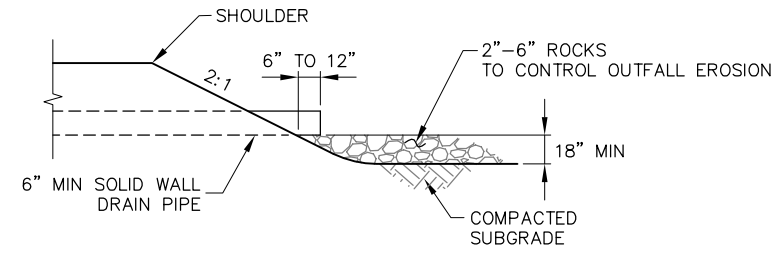
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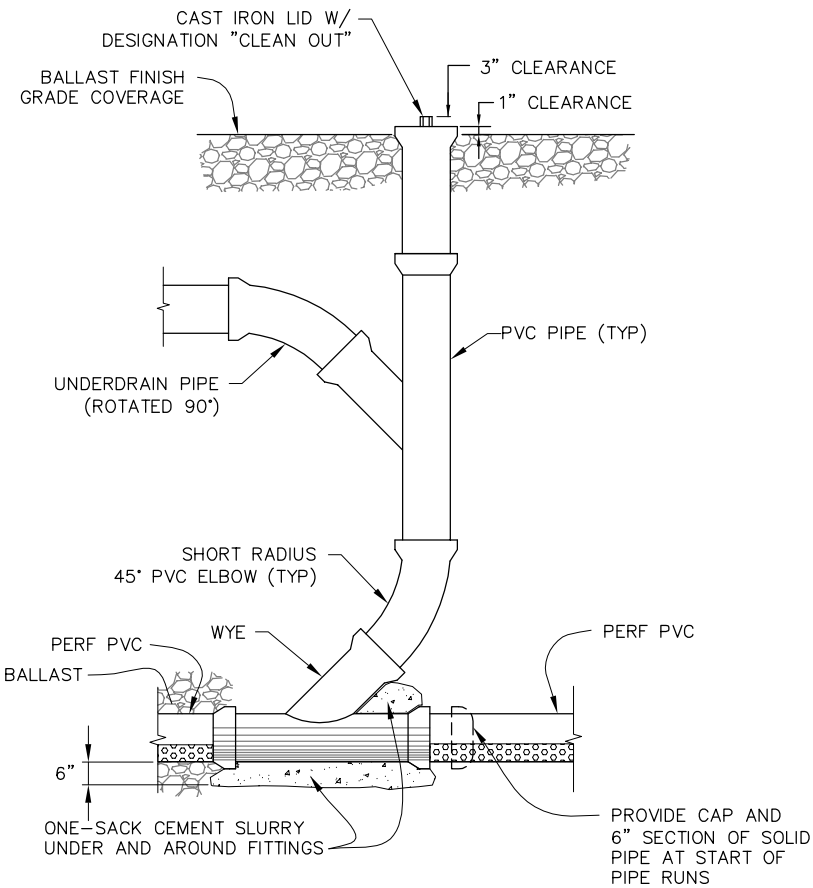
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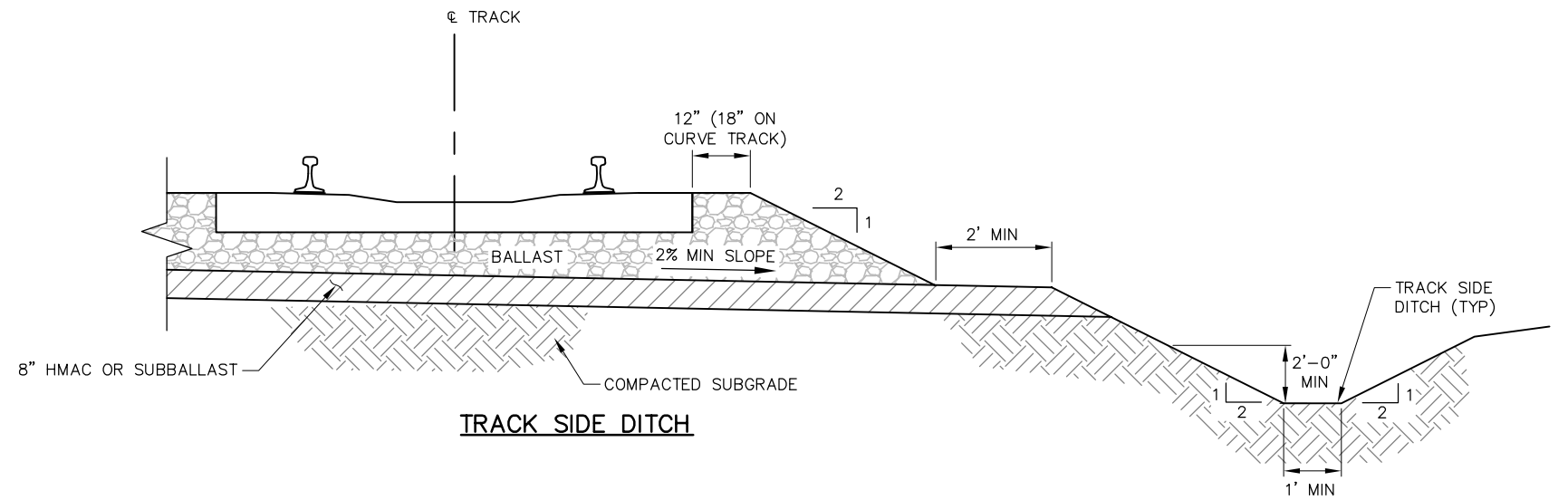
**TRACK UNDERDRAIN
(STATIONS & AT-GRADE CROSSINGS)**



UNDERDRAIN OUTFALL



TYPICAL PERFORATED DRAIN CLEANOUT

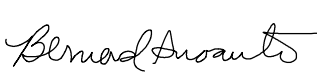




TRACK SIDE DITCH

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1250 San Carlos Avenue
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STANDARD DRAWINGS

CIVIL ENGINEERING
DRAINAGE
TRACK UNDERDRAIN AND
TRACK SIDE DITCH DETAILS

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