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May 11, 2016

TO: PLANHOLDERS

SUBJECT: NORTH LEAD RAIL IMPROVEMENTS
PROJECT NO. 092938
CONTRACT NO. 070164

ADDENDUM NUMBER FOUR

This addendum is issued to amend the following:

SPECIFICATIONS

A. SECTION 01 35 43.19 – EXPORT SOIL MANAGEMENT

1. **1. REVISE** the last sentence of paragraph 1.02.G to read as follows:

   A. Type C ~~Regulated~~ soil will require disposal at an approved Subtitle C hazardous waste landfill or Subtitle D solid waste landfill if additional soil characterization indicates special handling is required, otherwise it shall be classified as Type D Soil.

B. SECTION 34 05 17 – RAILROAD WORK

1. DELETE and **REPLACE** the issued section with the attached Section 34 05 17 – Railroad Work. (Attachment A to this Addendum No. 4)

DRAWINGS

A. DRAWING R13 – DOUBLE DIAMOND CROSSING (SHEET 68)

1. DELETE and **REPLACE** entire sheet with attached sheet. (Attachment B to this Addendum No. 4)

Receipt for this addendum shall be indicated in the space provided in Section 00 41 00, Bid Form.

END OF SECTION

ATTACHMENTS:

ATTACHMENT A – SECTION 34 05 17 RAILROAD WORK

ATTACHMENT B – DRAWING R13 DOUBLE DIAMOND CROSSING

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. This Section specifies the material requirements and performance criteria for complete trackwork and special trackwork to be furnished and installed by the Contractor in accordance with the Contract Drawings.

B. Except as modified herein, special trackwork shall be designed, manufactured, tested, assembled, inspected, handled and shipped in accordance with the current edition of the American Railway Engineering and Maintenance-of-Way Association (AREMA) Portfolio of Trackwork Plans, and the AREMA Manual of Railway Engineering.

C. The extent and location of railroad work is indicated on the drawings. The work includes the requirements for providing railroad track and special trackwork complete with rail, ties and all appurtenances necessary for a complete, operable railway system.

1.02 REFERENCED STANDARDS:

A. American Railway Engineering and Maintenance-of-Way Association - Manual for Railway Engineering (AREMA) 2014.

B. American Railway Enginering and Maintenance-of-Way Association – Portfolio of Trackwork Plans (AREMA PORTFOLIO) 2014.

C. Code of Federal Regulations Title 49 – Transportation, Chapter II – Federal Railroad Administration, Department of Transportation, Part 213 – Track Safety Standards.

D. Code of Federal Regulations Title 49 – Transportation, Chapter II – Federal Railroad Administration, Department of Transportation, Part 214 – Railroad Workplace Safety.

E. American Wood Preservers Association (AWPA) – M4-98 Standard for the Care of Preservative Treated Wood Products.

1.03 CONTRACTOR FURNISHED MATERIAL:

A. Contractor shall provide all materials required for completion of the Work, except those materials identified on the Drawings as Port Furnished Material.

1.04 PORT FURNISHED MATERIAL:

A. The Port will provide the materials identified on the Drawings as Port Furnished Material. Quantity of Port Furnished Material items shall be as indicated on the Drawings.

B. Port furnished materials shall comply with product specifications of this Section and Section 34 11 23 – Special Trackwork.

C. Port Furnished Materials shall be delivered by material suppliers to Contractor Laydown Area identified on the Drawings. Contractor shall be responsible for unloading materials from trucks.

D. The Contractor shall receive products at the site and give written receipt for materials at the time of delivery, noting visible defects and omissions. If such declaration is not given, the Contractor shall assume responsibility for such defects and omissions.

E. The Contractor shall store materials until ready for installation and protect from loss and damage.

1.05 SUBMITTALS:

A. Rail Construction Sequencing Plans as described in Section 01 14 100, Work Restrictions

B. Certification of Rail

1. Contractor to provide Certifications of compliance from suppliers or manufacturers that Rail delivered to the site is in conformance with AREMA Specifications Chapter 4, Part 1 Design of Rail and Part 2 Manufacture of Rail.

2. The chemical analysis of the rails listed by heat number, and the specified chemical analysis elements.

3. The Brinell hardness of the rails shipped by heat numbers.

C. Certification of Other Track Material

1. Contractor to provide Certifications of compliance from suppliers or manufacturers that Joint Bars, Compromise Joints, Track Bolts, Nuts and Washers delivered to the site are in conformance with AREMA Specifications Chapter 4, Part 3 Joining of Rail.

D. Certification of Tie Plates

1. Contractor to provide Certifications of compliance from suppliers or manufacturers that Tie Plates delivered to the site are in conformance with AREMA Specifications Chapter 5, Part 1 Tie Plates and these specifications.

2. Contractor to provide shop drawing detailing all tie plates using elastic fasteners.

E. Certification of Elastic Fasteners on Timber Ties

1. Contractor to provide Certifications of compliance from suppliers or manufacturers that Elastic Fasteners delivered to the site are in conformance with AREMA Specifications Chapter 5, Part 9, Design Qualification Specifications for Elastic Fasteners of Timber Cross Ties.

2. Contractor to provide shop drawing detailing elastic fasteners and clamping force.

F. Certification of Screw Spikes

1. Contractor to provide Certifications of compliance from suppliers or manufacturers that Screw Spikes delivered to the site are in conformance with AREMA Specifications Chapter 5, Part 10, Section 10.1 Steel Screw Spikes.

G. Gage Rods: Provide catalog cut.

H. Ballast

1. The Contractor shall provide laboratory certification that the railroad ballast meets the Specifications of this Section.

2. Offsite borrow source characterization in accordance with Section 31 00 00, Earthwork.

I. Top of rail profile. Vertical control survey of finished top of rail. Submittal to consist of a table comparing proposed top of rail elevations to as constructed top of rail elevations at 50 foot intervals along the centerline of alignment. Submittal to be reviewed and approved by Engineer.

J. Flangeway detail. Shop drawing detailing method of providing flange way block out in asphalt placed around the rail. Plan to be approved by the Engineer before paving around rail begins.

K. Manufacturer's literature on air pits and track lubricators.

1.06 QUALITY ASSURANCE:

A. The Contractor performing railroad work shall be regularly engaged in the furnishing and installation of railroad trackwork, and shall employ at least one (1) supervisory person who is thoroughly trained and experienced in trackwork construction. The supervisor shall be completely familiar with the design and application of the work described in this Section and shall direct all work performed under this Section.

B. The Contractor shall own a copy of the American Railway Engineering and Maintenance-of- Way Association - Manual for Railway Engineering (AREMA) 2014, Chapters 1, 4, 5, and 30.

C. Welded Bonds and track connections shall be in accordance with the requirements of AREMA Signal Manual, Parts 8.1.20, 8.1.25, and 8.1.30, where the requirements of the AREMA Specifications do not conflict with those of these Specifications.

PART 2 - PRODUCTS

2.01 GENERAL:

A. Furnish and install all track materials and products to complete the railroad track and special trackwork, as shown on the Drawings. Completed railroad track shall conform in all regards to the AREMA Manual of Railway Engineering.

B. All materials shall be new, except those materials salvaged from demolition for relay or reinstallation as specified in Section 02 41 13, Selective Site Demolition. Use of relay materials shall only be permitted within the limits shown on the Drawings.

C. Trackwork will use a resilient fastening system, Pandrol type E, or approved equal.

2.02 RAIL:

A. All rail shall be 115 RE meeting the requirements of AREMA Manual, Chapter 4, Part 2, Specification Section “Specifications for Steel Rails”. The Contractor shall provide high strength head hardened rail. High strength head hardened rail shall have a minimum surface Brinell Hardness number of 370.

B. Rail shall be supplied in 80-foot lengths with not more than 10% short rail segments between 33 feet and 39 feet.

C. Bolt holes within the rail are not acceptable, except at the ends of the rail at locations where joint bars are used.

D. The rail section shall conform to the dimensions shown in AREMA Manual, Chapter 4, Part 1 for 115 RE.

2.03 RAILWAY SUBBALLAST:

A. Subballast shall be clean, open graded material removed from the excavation of existing ballast as approved by the Engineer.

2.04 RAILWAY BALLAST AND WALKWAY ROCK:

A. Railway ballast shall conform to the material requirements and be manufactured in accordance with AREMA Chapter 1, Part 2 Ballast. Ballast shall be manufactured by mechanical crushing from ledge rock, talus, or quarry rock and 100% of the material shall have at least one fractured face and 95% of the material retained on a 3/4-inch screen shall have three (3) fractured faces.

B. Railway Ballast material shall not contain more than a total of 1% by weight of wood wastes, clay lumps, dust, or other extraneous material. Carbonate rock and slag is prohibited for use as ballast.

C. The material from which railway ballast is manufactured shall meet the following test requirements:

1. Los Angeles, Wear, 500 Rev. 35% max.

2. Railway Ballast shall conform to AREMA No. 4 gradation requirements when sampled from stock pile to be loaded for shipment:

Table 34 05 17–A, AREMA No. 4 Gradation	
Sieve Size	Passing % by Weight

2 inch	100
1 1/2 inch	90-100
1 inch	20-55
¾ inch	0-15
½ inch	-
3/8 inch	0-5

3. Walkway rock shall be railway ballast conforming to AREMA No. 5 gradation requirements when sampled from stock pile to be loaded for shipment:

Table 34 05 17–B, AREMA No. 5 Gradation	
Sieve Size	Passing % by Weight
1 1/2 inch	100
1 inch	90-100
¾ inch	40-75
½ inch	15-35
3/8 inch	0-15
No. 4	0-5

4. Gradation test shall be determined in accordance to ASTM C-136, utilizing square opening sieves conforming to ASTM Specifications E-11.

5. Material qualities shall be as follows:

Table 34 05 17–C, Ballast Material Qualities			
Property	Minimum	Maximum	Test Method
Percent Passing No. 200 Sieve	-	1%	ASTM C117
Bulk Specific Gravity - Rock	2.6	-	ASTM C127
Absorption – Rock	-	1.3 %	ASTM C127

Clay Lumps and Friable Particles	-	0.5 %	ASTM C142
Degradation	-	35%	ASTM C535 ASTM C131
Flat and Elongated Particles	-	5%	ASTM D 4791 Test C, Length > 3 times avg thickness

2.05 JOINT BARS AND COMPROMISE JOINTS:

A. Joint bars shall conform with the AREMA Manual, Chapter 4, Part 3 "Joining of Rail", Section 3.1 and 3.2. Joint Bars shall be 6-hole, 36 inches long, conforming to the AREMA Manual for Railway Engineering, Section 3.2 “Joint Bars and Assemblies.”

B. The bars shall be smoothly rolled, or forged, true to template and shall accurately fit the rails for which they are intended and shall provide a true alignment of the gage and running surfaces of the two rails being connected. A variation of ±1/32 inch from the specified size of holes, or ±1/16 inch from the specified location of holes, and of ±1/8 inch from the specified length of joint bar will be permitted.

C. Where compromise joints are shown, Contractor shall field verify the type of existing rail to select proper compromise joint bars.

D. Each compromise joint bar shall also have the rail sections shown at each end along with the word “Gage” or “Out” to indicate on which side of the rail the bar is to be used. (If the compromise joint bars are interchangeable, the words gage and out will be omitted.)

2.06 TIE PLATES:

A. Tie plates shall conform to AREMA Manual Chapter 5, Part 1, "Specifications for Steel Tie Plates".

B. Either low carbon or high carbon steel tie plates may be furnished.

C. Tie plates shall accommodate two elastic spring clips and at least four screw spikes to secure the plates to the timber ties. Tie plates to have a minimum length of 16” for 136 RE and minimum length of 15" for 115 RE. Tie plates shall have minimum width of 7-3/4" and minimum thickness of 5/8" under the rail in base section.

D. Tie plates to have 1" diameter holes to accommodate 15/16" diameter screw spikes.

E. Tie plate section to be canted 1:40,+/-5, toward the center line of track.

F. Tie plates shall have smooth flat bases with no ridges or indentations.

2.07 TRACK BOLTS, NUTS, AND SPRING WASHERS:

A. Track bolts and square nuts shall be new, conforming to the current AREMA Manual, Chapter 4, Part 3, "Specifications for Heated Treated Carbon Steel Track Bolts and Carbon Steel Nuts". Spring washers shall be new conforming to the current AREMA manual Chapter 4, Part 2, "Specification for Spring Washers". For each track bolt, provide a square nut and spring washer of proper size for each bolt.

2.08 ELASTIC RAIL CLIPS:

A. The elastic rail clips to be used shall be one piece, threadless fasteners of spring steel Pandrol e-2055 Rail or approved equal, which must meet all the following requirements:

B. An easy to install one piece elastic spring steel rail clip without threaded elements which can be easily removed from its housing without any possible damage to or the loss of the lateral support provided by the shoulder. The design and configuration of the clips, their housing and their area in contact with the rail should be such that a nominal rail seat clamping force of 2500 pounds per clip is provided and frequent rail slippage can be allowed without stressing, bending, twisting or damaging the clips or their housing.

2.09 SCREW SPIKES:

A. Screw spikes shall be new, conforming to the current AREMA Manual, Chapter 5, Part 10, Section 10.1.

B. Screw spikes used to fasten the plates to the timber ties shall be one piece with reinforced throat, 3/4" by 1-1/8” rectangular head, 15/16-inch diameter, 6-1/2-inches long per AREMA Plan 1S-12 AREMA Rectangle Head Screw Spike.

C. The head shall be concentric with and firmly joined to the body of the screw. The material shall be free from injurious defects and shall have a workmanlike finish. Screws shall be provided with plain finish.

D. Finished screws shall conform to the following minimum requirements for tensile properties:

1. High Strength

a. Tensile Strength, psi 120,000 Min

b. Yield Strength, psi 80,000 Min

c. Elongation, % 18 Min

E. Except for heat-treated screws, steel mill cert data may be used for tensile strength with approval of the Port.

F. A letter or brand indicating the manufacturer shall be located on the top of the washer of each screw.

G. High strength screws shall be marked with an “H” of the top of the washer.

2.10 GAGE RODS:

A. Gage rods shall be manufactured to fit the specified rail, shall be manufactured from 1-1/4-inch diameter steel bar with double adjustable clamps at both ends to grip both sides of the rail, and shall be set for standard gage track. Gage rods to be installed on 13’ centers within the curves.

B. All gage rods within the limits of grade crossing signal circuit limits shall be insulated.

2.11 AIR CONNECTION PITS

A. Air connection pits shall be cast-in-place concrete with fiberglass pit liner and cast aluminum double hinge cover assembly. Fiberglass pit liner shall have integral concrete anchors and top flange. Cover shall have an overall diameter of 23.5-inches and hinged concentric access lid of 18-inch diameter. Cover shall have “AIR” cast in two directions. Pits shall be DABICO Model DAB-24DHS-VA or approved equal.

2.12 TRACK LUBRICATORS

A. Track lubricators shall an assembly of lubricant tank, pumping components, hoses, applicators, controls, sensors, protective mats, foundation and all associated hardware designed for the delivery of friction management lubricants to the ~~top of rail and~~ gauge face of rail and designed for freight rail applications. Track lubricators shall be a proven effective design with a minimum of 2,500 units currently in service.

B. Track lubricators shall deliver lubricants at a controllable rate, delivering grease at a rate of 0.75 pounds per 1000 axle passages, and deliver other lubricants at a rate of 0.5 liters per 1000 axle passages. Wheel sensors shall be non-contact and shall activate lubricant delivery upon bi-directional passage of train rolling stock.

C. Lubricator pumps, hoses and applicators shall deliver consistent and balanced amounts of lubricant to each rail. Lubricator pump shall be gear type and shall be suitable for delivering greases and oils. Lubricant applicators shall apply lubricant to the gauge face of each rail and shall be of aluminum construction. Each applicator shall be a minimum of 48~~55~~ inches in length with a minimum of 16~~48~~ ports for the distribution of lubricant across the gauge face of the rail. Applicators shall be designed for installation without grinding or cutting of rail. Each track lubricator shall be furnished with six applicators, two applicators for each rail and two spares, and lubricant hoses and fittings conforming to the manufacturer’s recommendations.

D. Lubricator shall be designed for use DC Solar power ~~at 120 or 240 volts and 60Hz. So~~and all DC solar power components for a fully functional power system shall be furnished with each track lubricator. Solar panels shall include vandal resistant shielding and aluminum frame and support. Battery shall be non-spillable, deep cycle battery.

E. Control systems shall be enclosed in a watertight enclosure on the exterior of the lubricant tank and shall provide fuse and surge protection, and manual test function. Controls shall be solid state and shall allow for adjustment of lubricant pump activation interval and duration.

F. Lubricant tank shall provide capacity for 800 pounds of grease and a minimum volume of 100 gallons. Lubricant tank shall be sloped to drain to pump intake and shall have a watertight locking lid.

G. Protective mats shall be puncture and solvent resistant fabric manufactured from recycled materials and resistant to UV deterioration. Mats shall contain dripping lubricants while allowing water to pass through. Protective mats shall cover the full width of the track ties at the lubricator installation site and shall extend a minimum of 30 feet along the track beyond each end of the applicators, a total minimum length of ~~70~~ 60 feet.

H. Lubricator tank, pump and controls shall be mounted on timber ties in accordance with manufacturers recommendations.

2.13 LUBRICANT

A. Lubricant shall be high performance grease conforming to the following characteristics:

Operating Temperature Range (°C)	-40 to 120
NLGI Grade	2~~0~~
Drop Point (°C)	200 to 2~~1~~65
Base Oil Viscosity, cSt (@40°C)	200 to 220~~68~~

2.14 Rail Bonds

A. Rail Head Bonds: Railhead bonds shall be 3/16 inch in diameter with steel terminals welded to the conductors. They shall have a nominal length of 6-1/2 inches.

B. Web Bonds: Web bonds shall be 3/16 inch, bare, performed conductors with 3/8-inch tapered plug on each end.

C. Track Circuit Rail Connectors: Track circuit connectors shall be 3/8-inch stranded bronze conductor, with 1-inch tap on each end and compression sleeve on the other end for a direct crimp type connection to the track wire, and shall have a nominal length of 4-inches.

D. Bond Strand: Bond strand for fouling wires shall be 3/16-inch single strand with 4/64-inch black PVC insulation.

E. Acceptable Manufacturers:

1. Erico Products or accepted equal

PART 3 - EXECUTION

3.01 GENERAL:

A. The track will be constructed using timber ties and bolted rail. In general, the track is to be constructed using 80-foot rail lengths. Burned or sheared rail will not be accepted. Tie spacing will be 21 inches on center for tangent track and 19-1/2 inches on center for curved track.

B. Track construction shall be in conformance with the standards of the American Railway Engineering and Maintenance-of-Way Association and the requirements set forth below.

C. Track construction shall be performed in conformance with CFR 49 Chapter II, Part 214.

D. When power is

3.02 RAILWAY BALLAST:

A. Subballast and ballast sections shall conform to typical cross sections shown in the Drawings.

B. Subballast and ballast shall be unloaded at required locations in a manner to minimize redistribution and handling.

C. Ballast shall be placed before the ties are laid. Raise both rails uniformly to the designed grade.

D. Care shall be taken when distributing materials from trucks and off-track equipment to prevent forming of ruts that would impair proper drainage of subgrade surface.

E. Ballast shall only be installed over subgrade which has been prepared in accordance with this Specification and has been approved by the Engineer.

F. Place ballast in lifts not more than 6 inches in thickness before compaction. Layers shall extend beyond the edge of the ties as shown on the Contract Drawings before compaction. Compact ballast thoroughly to form a stable section able to support the subsequent layers and loads.

G. Compaction of ballast shall be by means of vibratory compaction equipment or specifically manufactured for compaction purposes. Self-propelled, pneumatic-tired roller shall have a gross weight of 10 to 15 tons, and the vibratory compactor shall have a weight of not less than 10 tons and shall be capable of applying a dynamic load of not less than 18,000 pounds at 1300 to 1500 cycles per minute. Proposed compaction equipment shall be approved by Engineer.

H. Engineer will approve the compacted ballast prior to installation of track and appurtenant work over ballast. Each lift of ballast within initial layer shall be uniformly spread and compacted with not less than four passes of either a self-propelled, pneumatic-tired roller or vibratory compactor.

I. Track shall be assembled on compacted ballast to permit placement of additional ballast for subsequent raising and tamping and to provide full depth under ties.

J. Final track raise shall not exceed 2 inches, and ballast shall be compacted with a 16 tool vibrating squeeze-type mechanical tamper making one full tamping insertion per tie for each inch of raise. Ballast in crib areas shall be compacted by a means approved by Engineer. Track shall be raised, aligned and tamped to within the specified tolerances.

K. Ballast shall be thoroughly tamped within a space from 15 inches inside each rail to ends of ties. In tamping ties within above described limits, simultaneous tamping shall be performed under each rail. Tamping is not permitted at center of tie except within limits of turnouts and crossings.

L. Pneumatic or electric tamping tools, either hand held or machine mounted, shall be used. Hand tamping with shovels or picks is not permitted.

M. Two tamping tools shall always be used opposite each other on same tie. Tamping tools shall be started from a nearly vertical position and worked downward past bottom of tie, after which tool should be slanted downward to force ballast under tie. Double tamp every joint tie;

N. Ballast shall be mechanically dressed to provide proper section as shown on Drawings.

O. Excess ballast shall be removed, or may, at Contractor’s option, be placed as directed by Engineer. Payment will not be made for ballast in excess of dimensions shown on Drawings.

P. Overworked and excessively tamped ballast shall be removed and replaced at Contractor's expense.

3.03 TRACK CONSTRUCTION:

A. Trackwork: Lay rails on timber tie track with staggered joints such that joints in opposite rails shall be staggered not less than 12 feet apart. Use temporary shims to secure proper spacing between the ends of rails. The rail temperature, at the time of laying, shall determine the number and thickness of shims required. Shim thickness shall be in accordance with table 5.2 in AREMA Section 5.1.4.

B. Space timber ties 21 inches on center for tangent track and 19-1/2 inches on center for curved track, unless otherwise noted. Any deviation from the specified spacing shall be approved by the Engineer prior to installation of spikes or hold down devices.

C. Care shall be taken in handling or spacing ties to not damage them with picks or spiking hammers. Ties shall be lifted and supported during storage, transportation, and placed in such a manner as to prevent damage. Ties shall not be dropped to the roadbed. Tie tongs, lining bars, other suitable tools or tie spacing equipment shall be used.

D. Place wood ties with heartwood face down and square to the rail, except as otherwise shown in the Drawings.

E. Ties shall be placed within 0.5 inches of perpendicular to the opposite rail.

F. Cribs shall be filled to full height unless otherwise directed by the Engineer.

G. Tie Plates: Set tie plates in correct position on the ties, true to gage, and with shoulders in full contact with the rail. Place one tie plate under each rail at each tie.

H. Joint Bars: Secure joint bars in place with the full number of bolts, nuts and lockwashers. Stagger bolts, with heads placed inside and outside alternately, and draw tight before fastening rail to tie.

1. A lubricant shall be applied on the rail within the area of the joint bar at time of installation.

2. Rail joints shall be applied so that bars are not cocked between base and head of rail. Bars are to be properly seated in rail.

3. Rail joints are not to be placed in limits of paving on asphalt crossing.

I. Screw Spikes: Two screw spikes to be provided each side of rail for a total of four screw spikes per plate.

J. Gage Rods: Gage rods shall be provided in all curves and spaced at 13-foot centers along the centerline of track.

3.04 TRACK LAYING:

A. The Contractor shall construct the track in conformance with the alignment and profile data shown on the Drawings. Alignment is based on the center line of track, equidistant between gage sides of the rails.

B. The Contractor shall perform final surfacing and tamping following all other track construction items affecting the track structure. The ballast to conform to the ballast section shown on the Drawings.

C. The Contractor shall place the track in good alignment before the final ballast lift is made. The maximum throw for final lining shall not exceed 1 inch. Contractor shall set hubs for the alignment before the final lift is made and final alignment shall conform to the hubs.

D. Gage of Track:

1. Gage of track is the inside dimension between running rails, measured at right angles to the alignment of the track 5/8" below top of rail. The standard gage of track is 4'-8 1/2".

E. Track Tolerances:

1. The final gage, cross level, and horizontal and vertical alignment of all track shall be within the tolerance shown below:

2. Gage variation:

   a. Gage variation shall not exceed 1/8"(+/-) in new track construction.

   b. New track will be laid to 4'-8 1/2" gage.

3. Cross Level:

   a. Deviation from cross level: No reverse cross level on curves will be allowed. A maximum deviation of minus 1/2 inch cross level on inside rail of curve will be allowed. A maximum of 1/4" cross level deviation will be allowed on tangent track.

4. Horizontal Track Alignment:

   a. Maximum allowable deviation of the middle ordinate from a 62-foot chord,

   b. On curves: 3/8 inch

   c. On tangents: 1/4 inch

F. Vertical Track Profile:

   1. The maximum permissible variation from profile elevation detailed on profile drawings shall be + 1/2 inch, -0 inch

G. Maximum permissible runoff per 40 feet in any interim raise shall not exceed: 1 inch

H. The maximum permissible variation from a uniform profile on either rail at the mid-ordinate of a 62-foot chord shall not exceed: 1/4 inch

3.05 ASSEMBLE AND INSTALL SPECIAL TRACKWORK:

A. Install turnouts and crossovers as shown on Drawings.

B. Installation of frog plates, switch plates, and plates under closure rails shall conform with AREMA trackwork standards, and Shop Drawings.

C. Following installation of special trackwork on initial layer of ballast, special trackwork shall be lifted, aligned and supported prior to placement of final ballast.

D. Ballast shall be uniformly placed and spread. Turnout shall then be raised and ballast tamped under both sides of each tie for the full length of tie. Tamp ballast thoroughly throughout length of all ties in turnout. Hand-held power tamping tools shall be used where workheads of tampers cannot reach tie cribs in Special Trackwork. Final top of ballast shall conform to the ballast section as indicated except in cribs between point of switch and heel of switch where it shall be three inches below base of rail to allow clearance for switch rods.

E. When installing various components of Special Trackwork, particular attention shall be given to the following:

1. Check alignment, gage, and surface through turnout.
2. See that bolts, nuts, cotter pins, and other fastenings are m place, in good condition, and properly tightened.
3. See that switch points fit snugly against rail when switch is thrown in either position.
4. See that connecting rod and switch rod bolts are equipped with coner pins properly spread.

F. Test operate switches for lost motion and loose connections and adjust as necessary.

G. Examine rod and fastenings which connect switch point to switch stand to see that they are in place and in good condition.

H. Switch stands shall be so installed as to hold switch point tightly against the stock rail when stand is in normal position. Switch rods shall be adjusted to hold opposite point tightly against rail when stand is in reverse position.

I. Switch stands shall be kept securely spiked to switch ties. Switch ties shall be set square with track and kept firmly tamped.

J. At time of installation, all sliding surfaces of special trackwork assemblies shall be lubricated with a dry film graphite lubricant in accordance with manufacturer's recommendations.

K. Tamping shall be as per Article 3.08.B of this Section.

L. No closed point switch point shall be installed in the main track unless it has the proper point protection in place and tested.

3.06 DRILLING:

A. Rail ends for bolted joints shall be drilled in accordance with AREMA standards. Any additional holes in rail will be sufficient cause for rejection.

B. Hole in rail shall be drilled to proper size and not punched, slotted, or cut with a torch, and holes shall be chamfered to remove sharp edges.

C. A variation of 1/32 inch in size and location of bolt holes shall be allowed.

D. Holes shall be located with proper size rail drilling template and marked with a center punch prior to drilling. Drilling through joint bars is prohibited.

3.07 RAIL ENDS:

A. Rail shall be cut with rail saw to a tolerance of 1/32 inch from square. All burrs shall be removed and ends made smooth. Torch cut rails will be rejected.

B. Battered or mismatched ends shall be built up or ground off

3.08 SURFACE, LINE AND GRADE

A. Contractor shall perform all surfacing as specified to bring line and surface into compliance within track geometry tolerances specified in this section.

B. Contractor shall surface track to zero crosslevel.

C. Ballast shall be spread and track raised in a series of lifts as indicated in Contract Drawings. No single lift shall be higher than 2 inches except in crossings and turnouts. In raising track, jacks or equipment shall be regulated to avoid bending of angle bars or straining of joints. When jacks are used they shall be simultaneously used and properly spaced at not more than quarter points of rail to avoid breaks or bends in rail when track is raised. Both rails shall be raised simultaneously and to proper crosslevel by raising jacks.

D. Each tie shall be tamped from 15 inches inside rail to end of tie. Tamping shall not be permitted at middle of tie. Both ends of a tie shall be tamped simultaneously and tamping inside and outside rail shall be done at same time. Equipment used for surfacing truck shall be subject to approval by Engineer.

E. Ties that become loose during track raising shall be unfastened realigned, and re-fastened before tamping. During each track raise, track is to be uniformly tamped.

F. After ballasting is completed and track is surfaced and lined, according to tolerances, ballast shall be trimmed neatly and surplus material shall be spread evenly along ballast shoulder.

G. Contractor shall perform necessary operations to assure that all ties are at right angles to track.

H. Contractor shall perform two tamping squeezes per tie up to 1-1/2 inches of raise with one additional insertion and squeeze for each additional 1 inch of raise. Joint ties shall be given one additional squeeze than other ties. The maximum allowable raise per surfacing pass shall be 2 inches.

I. In locations where squeeze tampers cannot fill and compact ballast, such as at frogs, guard rails, switch points of turnouts and headblocks, etc., mechanically tamp with air tools or other hand-held power tamping tools.

J. On curves, high rail shall be used as line rail and low rail shall be used as grade rail.

K. When surfacing turnouts, the straight side of turnout shall be used as the line rail.

L. After ballast regulating in turnouts, Contractor shall immediately clean excess ballast from switch point area, including switch points, switch rods, connecting rods, and guardrail and frog area.

M. After ballast is regulated and dressed, Contractor shall ensure that resilient fasteners, track bolts and rail anchors are tight and in proper alignment.

N. Contractor caused damage to signal equipment, shall be repaired at Contractor's sole expense.

3.09 TRACK 13 RAIL RELAY

A. Salvaged 115RE rail shall be used to replace existing 90RE rail along Track 13 as shown in the drawings. All other track materials shall be salvaged from the project site, including but not limited to spikes, plates, clips, bolts, nuts and washers.

B. Approximately 200 ties within the limits of the Track 13 Rail Relay will be replaced with new. New 8'-6" hardwood ties will be furnished by the Port. Locations of tie replacement will be marked in the field by the Tacoma Rail prior to installation.

C. Contractor shall ensure salvaged tie plates for the larger 115RE rail sit evenly on the existing ties. Adzing of the ties may be necessary to properly install the plates and lay the track. Minimum tie depth at rail seat of adzed ties shall not be less than 6 inches. The contractor shall adze the ties if necessary. When adzing the ties the contractor shall use a mechanical adzing device. Hand adzing of the ties is not allowed. All newly adzed ties shall be coated with an approved preservative.

3.10 INSTALLATION OF WELDED BONDS

A. Welded bonds shall be installed on all track, turnouts and crossings within 440 feet of the~~at all~~ locations indicated on the plans to maintain existing functionality of all at grade crossing signal systems adjacent to the project site.

B. The surfaces of the rails where the bond is to be applied shall be ground clean with a vitrified grinding wheel. After grinding, the surface shall be cleaned with an approved nontoxic solvent to remove all traces of grease and dirt. After the surface has been ground and cleaned, the bond wire shall then be welded to the rail in a manner that will ensure a thorough mechanical and electrical connection.

C. Ensure that each bond connection is thoroughly welded to the rail. The Engineer reserves the right to require a test of each weld by hammer and striker, or in any manner which in the opinion of the Engineer is reasonable.

D. Any welded bond installed by the Contractor that is found to be defective prior to acceptance, shall be removed and a new bond shall be installed at no additional cost of the Port.

3.11 INSTALLATION OF TRACK CIRCUIT CONNECTIONS

A. Track circuit connections disturbed during construction of new track near Alexander Avenue and Milwaukee Avenue shall be reinstalled to maintain functionality of existing at grade crossing signal system.

~~A.~~B. The web end of the track circuit connector shall be welded at a maximum of 3 inches from the end of the insulated joint.

~~B.~~C. The underground cable shall be stripped back a sufficient distance for the exposed conductor to be fully inserted into the compression sleeve. The sleeve shall then be compressed with the type of compression tool designed for that purpose.

~~C.~~D. All track circuit connections shall be installed by the Contractor, and any found to be defective prior to acceptance shall be removed, and a new track circuit connection installed at no additional cost of the Port.

~~D.~~E. Bond testing: Test all track circuits for continuity of circuit and ensure main line track circuit is de-energized with 0.06 ohm shunt at any point on the track block.

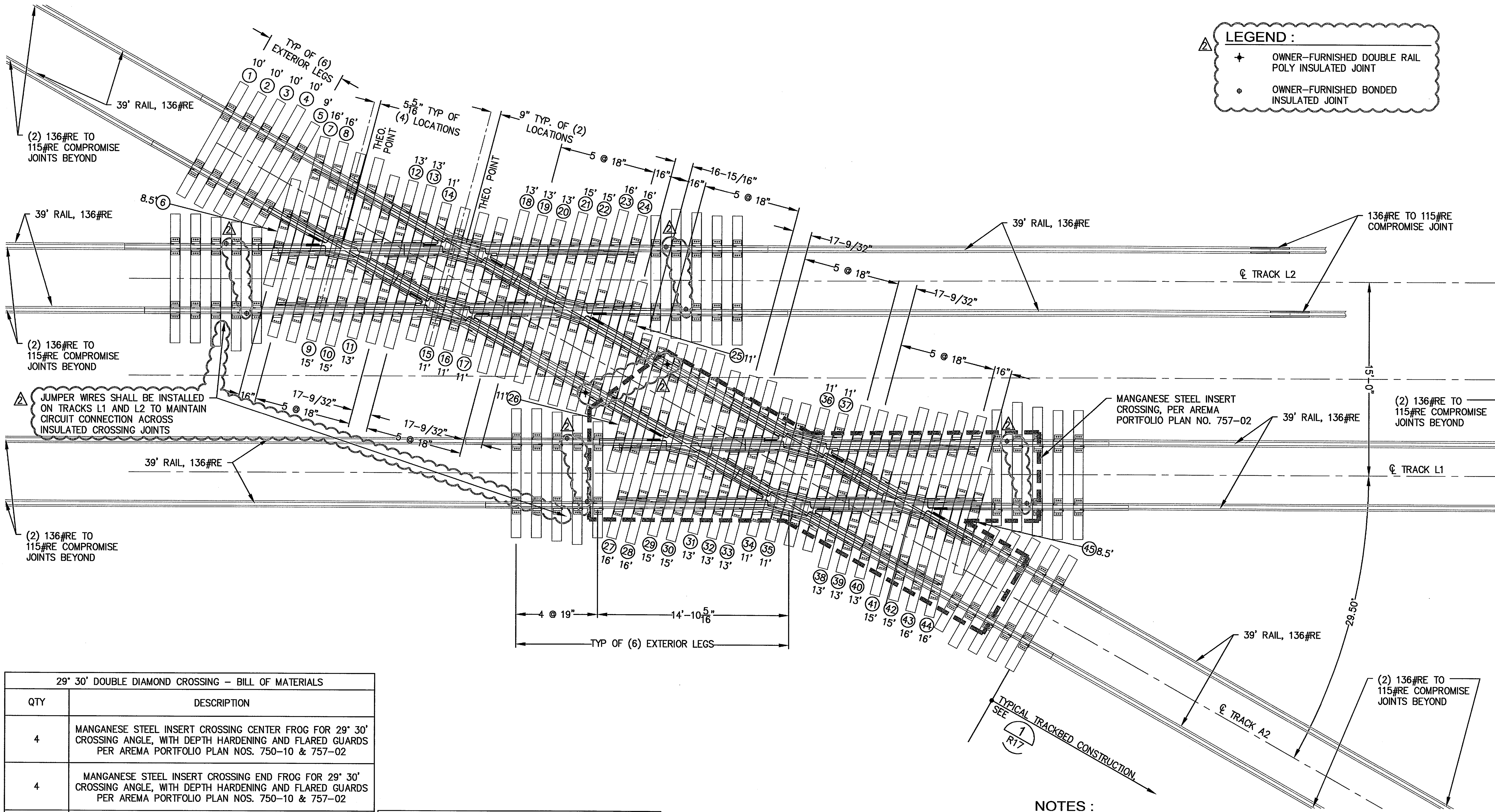
3.12 TESTING:

A. Before final acceptance of trackwork, the Port will provide for a suitable test locomotive to be run over the entire length of new trackage in the presence of the Engineer. There shall be no noticeable settlement or deflection of ties and rail during the test. The Contractor shall re-line, surface, tamp, or otherwise correct any and all deficiencies as directed by the Engineer.

3.13 TRACK LUBRICATORS

A. Install track lubricators in accordance with manufacturer's recommendations.

END OF SECTION



29° 30' DOUBLE DIAMOND CROSSING – BILL OF MATERIALS	
QTY	DESCRIPTION
4	MANGANESE STEEL INSERT CROSSING CENTER FROG FOR 29° 30' CROSSING ANGLE, WITH DEPTH HARDENING AND FLARED GUARDS PER AREMA PORTFOLIO PLAN NOS. 750–10 & 757–02
4	MANGANESE STEEL INSERT CROSSING END FROG FOR 29° 30' CROSSING ANGLE, WITH DEPTH HARDENING AND FLARED GUARDS PER AREMA PORTFOLIO PLAN NOS. 750–10 & 757–02
8 PR	FROG JOINT BARS
6	FLARED CENTER FROG GUARDS, PER AREMA PORTFOLIO PLAN BASIC NO. 350
6	FLARED END FROG GUARDS, PER AREMA PORTFOLIO PLAN BASIC NO. 350
A/R	INTERTRACK RUNNING RAIL AND GUARD RAIL
A/R	ARM RUNNING RAIL AND JOINT BARS, PER AREMA PORTFOLIO PLAN BASIC NO. 757–02
A/R	FLANGEWAY FILLERS AND SPACER BLOCKS
A/R	TRACK BOLTS AND TRACK BOLT NUTS
A/R	SPECIAL PLATES WITH PANDROL CLIPS, SEE NOTES 8, 9, AND 12

29° 30' DOUBLE DIAMOND CROSSING – BILL OF TIMBER TIES	
QTY	DESCRIPTION
2	7" X 9" X 8'–6" TIE
6	7" X 9" X 9'–0" TIE
24	7" X 9" X 10'–0" TIE
10	7" X 9" X 11'–0" TIE
12	7" X 9" X 13'–0" TIE
8	7" X 9" X 15'–0" TIE
8	7" X 9" X 16'–0" TIE

DETAIL 1 (R1) DOUBLE DIAMOND CROSSING

SCALE: 1"=4'

NOTE: SEE PROJECT SPECIFICATIONS FOR SPECIAL TRACKWORK MATERIALS PROVIDED BY THE PORT. ALL ITEMS NOT INCLUDED IN SPECIAL TRACKWORK SHOP DRAWINGS (SEE SPECIFICATION SECTION 00 31 00) SHALL BE PROVIDED BY THE CONTRACTOR.

NOTES :

1. CROSSINGS SHALL CONFORM TO AREA PORTFOLIO PLAN 757–02.
2. RAIL AND COMPONENTS SHALL CONFORM TO 136 RE RAIL SECTION.
3. RAIL DRILLINGS, BAR PUNCHINGS, OVAL NECK TRACK BOLTS AND TRACK BOLT NUTS SHALL BE IN ACCORDANCE WITH AREMA MANUAL, VOL. 1, CHAPTER 4, SECTION 3.3 THROUGH SECTION 3.5 FOR 36", 6 HOLE JOINT BAR, 136 RE RAIL SECTION.
4. IMPACT AREAS SHALL BE DEPTH HARDENED IN ACCORDANCE WITH AREMA PORTFOLIO PLAN NO. 771–02.
5. GUARDING OF INTERTRACK CONNECTION SHALL BE CONTINUOUS, FLARED GUARDS SHALL BE PROVIDED FOR EXTERNAL ARMS.
6. RUNNING RAIL SHALL BE FURNISHED BETWEEN CROSSINGS.
7. LOCATE INTERTRACK JOINT APPROXIMATELY AT THE MIDPOINT BETWEEN CROSSINGS.
8. ALL SPECIAL PLATES SHALL BE 1 1/4" THICK WITH 1/4" DEEP MILL SEAT AND NO RAIL CANT.
9. MULTI–TIE PLATES SHALL BE USED UNDER ALL CASTING AREAS.
10. FLANGEWAY FILLER SHALL BE OF ROLLED STEEL, PER AREMA PORTFOLIO PLAN BASIC NO. 325 AND SHALL MAINTAIN THE REQUIRED FLANGEWAY THROUGHOUT. SPACER BLOCKS MAY BE OF CAST IRON.
11. GAGES AND WIDTHS OF FLANGEWAYS FOR TANGENT TRACK PER AREMA PORTFOLIO PLAN BASIC NO. 790. FOR PERMISSIBLE VARIATIONS IN MANUFACTURE SEE AREMA PORTFOLIO PLAN BASIC NO. 100, SECTION 7.
12. PANDROL TIE PLATES SHALL BE USED AT ALL LOCATIONS NOT OTHERWISE MENTIONED, SEE DETAIL 5 ON SHEET R11.

Port of Tacoma — P.O. BOX 1837 TACOMA, WA 98401-1837

kpff — 2407 North 31st Street, Suite 100, Tacoma, Washington 98407, (253) 396-0150 Fax (253) 396-0162

MARK:	REVISION:	BY:	APPR:	DATE:
1	ADDENDUM #2	RLO	SWK	05/03/16
2	ADDENDUM #4	RLO	SWK	05/10/16

APPROVED: 5-11-16 DIRECTOR ENG. DATE

SWK 03/17/16 CHECKED BY DATE
SWK 03/17/16 PROJ. ENGR DATE
PRINTED BY: bosterhaus May 10, 2016
PORT ADDRESS: ONE SITCUM PLAZA TACOMA, WA 98401–1837

NORTH LEAD
DOUBLE DIAMOND CROSSING

TOWNSHIP: 20N	RANGE: 03E	SECTION: 1, 2, 3
DAT–HRZ: W83–SF	VERT: PORT OF TACOMA BM #846	
PARCEL: MULTIPLE	DRAWING SCALE: AS NOTED	

6555
R13
SHEET 68 OF 134
CONT/CONS: 070164
M. ID: 092938
PHASE: BID