



Scope of Work

Washington
Metropolitan
Area
Transit
Authority

Project Title:

Special Trackwork: Railbound Manganese Steel Frogs

1.0 SCOPE

1.1 The Washington Metropolitan Area Transit Authority (WMATA) requires the purchase of new railbound manganese steel frogs, hereinafter also referred to as railbound frogs or frogs, to be used in WMATA system-wide special trackwork.

2.0 APPLICABLE DOCUMENTS

2.1 The following standards and publications will apply to this work, as referenced in AREMA standards, these WMATA specifications, and associated contract drawings.

2.1.1 American Railway Engineering and Maintenance-of-Way Association, Manual for Railway Engineering, herein referred to as the AREMA Manual, latest edition.

2.1.2 American Railway Engineering and Maintenance-of-Way Association, Portfolio of Trackwork Plans, herein referred to as the AREMA Portfolio, latest edition.

2.1.3 American Society of Testing and Materials (ASTM)

2.1.4 Association of American Railroads (AAR) Signal Manual

2.1.5 American Council of Independent Laboratories Manual of Practice

2.1.6 American Welding Society (AWS)

2.1.7 Industrial Fastener Institute (IFI)

3.0 TECHNICAL SPECIFICATIONS

3.1 Contractor to Provide:

3.1.1 Railbound manganese steel frogs as per this SOW and the technical specifications contained herein.

- 3.1.2 All materials and equipment required for this procurement will be the responsibility of the Contractor.
- 3.1.3 The work specified in this Section as relates to the manufacturing, testing, shop assembly, inspection, packaging, and shipping of railbound manganese steel frogs. Drawings for the railbound manganese steel frogs are provided in Section 7.0 of this Scope of Work.
- 3.1.4 Furnish all test reports, drawings, and documentation as per this SOW and the technical specifications contained herein. Contractor will complete all specified tests and inspections prior to delivery.

3.2 Frogs – Contractor to Provide:

- 3.2.1 Fabrication methods for No. 6 (guarded), No. 8 (guarded), No. 10 turnout and No. 15 frogs conforming to the general configuration shown on the design plans.
- A. Alternative methods of frog fabrication will be considered and evaluated based on whether the method is capable of furnishing the finished product consistent with that shown on the design plans.
 - B. WMATA has the final decision regarding acceptance of alternate designs and methods of fabrication.
- 3.2.2 Solid manganese steel frog design with welded rail steel frog arms according to the basic layout on the design plans.
- 3.2.3 The complete frog with extended toes and heel arms of the approximate lengths shown on the design plans, having a minimum Brinell Hardness Number (BHN) of 352 BHN throughout the arm length, including the transition weld zone.
- 3.2.4 Furnish railbound manganese steel frogs consisting of one assembled piece providing a continuous top of rail running surface without connections and zero gaps.
- 3.2.5 To improve the wheel to frog Interface, cast or machine the running surfaces of the frog to simulate the top of rail head profile as shown on the design plans. Fabricate the rail heads to project 1/4 inch above the surrounding frog surface to provide clearance for false wheel flanges and facilitate future rail head grinding. The frog running surface rail head profile will match the abutting non-canted rail arms. Provide ramped surfaces on the rail head where the frog running surface projects to the edge of wheel tread, and where false flange conditions might damage the frog surface.
- 3.2.6 Recess the toe of the casting frog body to provide clearance for application of a rail clip connection.
- 3.2.7 Provide a base of rail profile similar to the 115 RE rail base configuration to permit the use of the same rail clip connection on the frog fastener plates.
- 3.2.8 Provide component heights matching the 6-5/8 inch height of 115 RE rail.

3.2.9 Frog Casting

- A. No wing wheel risers will be used, but frog inserts may be used if they have a depressed nose in accordance with AREMA Plan 6008-03 and 622-09.
- B. Depth-harden all running surfaces of the manganese steel frog castings using triple explosive depth hardening.

3.2.10 Frog Inserts

- A. Cast inserts of manganese steel in accordance with AREMA Specification M2.
 - 1. In accordance with AREMA Specification M2.2, Austenitic Manganese steel and ASTM A 128
- B. In accordance with AREMA Specification M2.5, radiographic testing and/or sectioning will be used to qualify castings for acceptance of internal soundness, by the manufacturer. To verify radiographic testing, the qualification process may include sectioning of the castings. The internal soundness severity levels must be compared to AREMA Plan 1012-03 to determine compliance.
- C. In accordance with AREMA Specification M2.5.4.2, radiographic testing will be done in conformance with the latest issue of the following ASTM specifications:
 - 1. E - 94- Recommended Practice for Radiographic Testing
 - 2. E - 446- Reference Radiographs up to 2 inches in Thickness, (OM - 2")
 - 3. E - 186- Reference Radiographs for Heavy Wall Steel Castings, (2" - 4-1/2")
 - 4. E - 280- Reference Radiographs for Heavy Wall Steel Castings, (4-1/2" - 12")
- D. Explosive depth -harden all running surfaces of the frog inserts in accordance with AREMA Specifications M2.7
- E. Inserts of one-piece construction.
- F. Inserts having full-face contacts conforming to the configuration for 115 RE rail.
- G. State the available bonding area per inch of length equivalent to that available for bonded standard joints where applicable. Adjust dimensions of bonded inserts to allow for glue and fabric.
- H. Ensure the inserts are smooth and straight and do not exceed the following permissible variations:
 - 1. Width between rail webs: Plus or minus 1/32-inch of that shown on design plans.
 - 2. Depth of flangeway groove: Plus or minus 1/16-inch of that shown on design plans.
 - 3. Length of Insert: Plus or minus 1/8-Inch of that shown on design plans.
 - 4. Straightness of all portions of inserts adjacent to rail using 36-inch straightedge: Plus or minus 1/32-Inch.
 - 5. Finishing height variance of Inserts from that required for bonding area: Plus or minus 1/64-Inch.

3.2.11 Assembly: Assemble frogs as indicated below.

- A. Bonding adhesive: As manufactured for bonded joint bars by applied as directed by the manufacturer to all contact surfaces between inserts and rail.
- B. Secure frog, except for insert, with 1-3/8 inch diameter high-strength bolts in accordance with AREMA requirements.
- C. Assemble inserts with 1-1/8 inch diameter high-strength bolts, ASTM A490, and lock nuts. Position bolt holes in accordance with AREMA Plans 621-09 and 1021-03 and as shown. Bolt holes 1-3/8 inches in diameter plus or minus 1/32- inch.
- D. Flat washers: ASTM F436.
- E. Equip bolts as shown with one beveled or flat headlock washer and one flat or beveled washer to provide square bearings and to permit tightening of nuts by wrench.
- F. Lock nuts: IFI-100 and IFI-101, ASTM A563, Grade C.
- G. Bolt tensions shall follow AREMA Section M 11.4, as appropriate for frog bolts. The tension applied to each frog bolt will be supplied to WMATA by the Contractor. Ascertain bolt tension by means of torque wrench.

3.2.12 Running Surface Finish

- A. Regardless of the fabrication method, materials used for frog running surfaces, must have a smooth ground surface to eliminate all mill scale and other surface impurities.
- B. All rail will have the rail head top and side surface finish ground smooth to remove all mill scale and manufacturing residue.
- C. Grind the head of rail to match the existing curved rail head contour and finish to a smooth light grinding pattern.
- D. Remove a minimum of 0.025 inch. If mill rail fabrication residue exceeds this depth, grind to establish a clean, finished surface.

3.2.13 Running Surface Hardness

- A. Regardless of construction, the materials used on all running surfaces of frogs, will meet the hardness requirements below. Any hardening that occurs while the frogs are in use will not be considered in determining compliance with this requirement.
- B. Running surface areas are defined as:
 - 1. The immediate rail head profile areas within 2-3/4 inches of the gauge lines.
 - 2. Flange-bearing areas of frogs, including ramps.
- C. Explosive depth hardened manganese steel castings in accordance with the AREMA Specifications for Special Trackwork, Paragraph M2.7, except that the minimum Brinell Hardness Number (BHN) will be 352 BHN and paragraph M2.7.5 does not apply.

- D. Specify in the shop drawings the procedures to be used in the depth hardening process, the portions of each frog that are to be depth hardened, and the BHN pattern normally achieved using such procedures
- E. When items are explosion depth hardened, inspect each item after processing as follows:
 - 1. Visually inspect for cracks, flaws, or porosity; and conduct dye penetrant testing where results of visual inspections are inconclusive.
 - 2. On manganese steel castings, test surface hardness in accordance with ASTM E10.
- F. Re-harden items that fall below the specified hardness range at no additional cost to WMATA.
- G. Items testing harder than the specified hardness range may only be accepted at the sole discretion of WMATA provided that proof is presented that the excess hardening has not created a martensite metallurgical microstructure.
- H. Repair or replace items found to be defective or damaged.
 - 1. Reject and do not repair items having defects detected in their immediate wheel running surfaces.
 - 2. Replace non-repairable items at no additional cost to WMATA.

4.0 INSPECTION AND ACCEPTANCE TESTING

4.1 WMATA Notification

- 4.1.1 Contractor will notify WMATA in writing not less than 14 days in advance of dates scheduled for any test required by AREMA Portfolio of Trackwork Plans, Section 100, subsections M1 and M2. WMATA retains the right to witness testing. Do not conduct any tests until authorized by the WMATA Contracting Officer's Technical Representative (COTR).

4.2 Testing Laboratory:

- 4.2.1 Perform qualification and production quality control tests using either an independent testing laboratory or a qualified manufacturer's laboratory reviewed by WMATA. If an independent testing laboratory is selected, it will be a member of the American Council of Independent Laboratories. If a manufacturer's laboratory is selected, it will satisfy the requirements of the American Council of Independent Laboratories' Manual of Practice - Quality Control System - Requirements for A Testing and Inspection Laboratory, and ASTM E329.
- 4.2.2 The selected laboratory will use the proper equipment and qualified personnel for the specified tests, as specified in this Section.

4.3 Testing Equipment: Provide equipment in good operating condition, of adequate capacity and range, and accurately calibrated. Use testing equipment that is in calibration with standards which are certified and traceable to the National Bureau of Standards within one year immediately preceding the test date. Submit copies of calibration certificates with test reports.

4.4 Documentation - In conjunction with the specified tests, submit the following documents for review:

4.4.1 Test program plan: In this plan, identify Contractor's approach for accomplishing each of the specified qualification and production quality control tests. Include the projected schedule for test procedure submittals, test executions, and test results report submittals.

4.4.2 Test procedures for each test, describing the objective, equipment, and instrumentation that will be used, procedure to be implemented, and the anticipated results. Include working drawings detailing test equipment and set-up of railbound frog that will be tested.

4.5 Test report:

4.5.1 A separate report of test results for each test which includes original data calculations, test procedure references, test equipment identification, test personnel, date of test, specified requirements, actual test results, nonconformance if any, and interpretation of the results. Highlight conformance or deviation in a report summary.

4.5.2 Accompany the written test reports with a photographic record of the tests. Include photographs of sufficient clarity to distinguish relevant details as described or referenced in the respective written report.

4.6 Quality Assurance/Control:

4.6.1 Contractor will adhere to the Quality Assurance Program submitted prior to contract award. Quality Assurance Program must be consistent with ISO 9001 (International Organization for Standardization).

4.6.2 Tolerances: Conform to the AREMA Portfolio - Plan No. 1021-03, Permissible Variations in Completed RBM Steel Frogs; the AREMA Manual, Chapter 5, in all aspects unless modified by the contract documents.

4.6.3 Frogs and other track material will be in accordance with AREMA dimensional requirements for 115 RE rail section except as modified on the contract drawings and specifications.

4.6.4 Codes, Regulations, Reference Standards and Specifications:

A. Except as stated in the contract documents, design, manufacture, test, assemble, inspect, stack, ship the frogs in accordance with the AREMA Portfolio plans and Chapter 5 of the AREMA Manual. After acceptance by WMATA, mark all components and packages as specified.

- B. Contractor's checklist/measurement report will be provided. The checklist will be completed and submitted to WMATA for approval prior to shipping any railbound frogs.

4.6.5 WMATA reserves the right to unscheduled visits to the Contractor's facility during typical business hours to:

- A. Observe sampling and testing procedures
- B. Obtain samples of the prepared material being produced and shipped
- C. Review plant inspection methods, quality control procedures, or equipment, and examine test results of current and previous tests.

4.6.6 If WMATA chooses to inspect the facility, the Contractor will provide WMATA, without charge, the facilities and assistance to examine the work during its progress, and when the product is finished, ensure the finished product will comply with the contract documents. Provide templates and one yard straight edge or longer, as necessary, to check flangeways, and other features of the work usually checked by templates. Contractor will:

- A. Notify WMATA of the dates when shop assembly will be completed a minimum of 14 days in advance of the dates.
- B. Confirm that the assembly will actually be complete and ready for inspection no later than 48 hours prior to the promised date and time for the commencement of inspection.
- C. Provide the WMATA inspector with a copy of all inspection reports, deviations noted, and re-inspection reports.
- D. Present material for inspection in a safe, dry, and covered area away from manufacturing activities and noise in excess of 75 dBA.
- E. Without additional charge to WMATA, provide all necessary facilities, tools, lighting, copies of shop drawings and other assistance required for WMATA to conduct an inspection:
- F. Provide labor and equipment required to facilitate inspection of the tops, sides, and bottoms of all materials, and to disassemble components as may be required to inspect concealed surfaces.
 - 1. Provide labor and equipment required to facilitate inspection of the tops, sides, and bottoms of all materials, and to disassemble components as may be required to inspect concealed surfaces.
 - 2. Design the templates for quick and easy use by only one person for the operation.
 - 3. Design the templates for quick and easy use by only one person for the operation.
- G. Contractor will provide a minimum of 8 hours during normal daylight working hours for WMATA to inspect each completely assembled layout before disassembly for shipment is scheduled to commence.
- H. WMATA inspection personnel have the authority to reject materials, work in progress, or finished work that fails to meet the stated requirements.
- I. WMATA inspection personnel have the authority to require corrective action.

- J. It is the Contractor's responsibility to develop the details of corrective action, but WMATA inspection personnel have the authority to accept or reject the proposed corrective methods.
- K. Notwithstanding the results of shop inspections, final acceptance of railbound frogs will not occur until after they have been delivered, unloaded, and stacked, and are then found to be acceptable.

4.7 Shop Drawings and Submittals – Contractor to Provide:

4.7.1 Drawings and submittals must be provided to the COTR for review and approval no later than 60 days after issuance of the NTP.

4.7.2 Produce all working drawings or shop drawings that will be required in addition to the furnished drawings; or in addition to other drawings that WMATA may issue in supplementing them. The shop drawings will be delivered to the COTR.

4.7.3 Product Data:

- A. Certification of the procedure used in the depth hardening of frog castings.
- B. Test data for the rail used in all fabrication for compliance with AREMA standards and these specifications.

4.7.4 The Contractor will submit following:

- A. Certificates of material compliance required by AREMA standards and this specification.
- B. Test reports of chemical analyses, Brinell hardness, electrical insulation, and other tests required by AREMA standards and this Specification.
- C. Frog depth hardening results.
- D. A certified copy of reports on the analyses and tests required by referenced ASTM specifications.
- E. Checklist or measurement report for all frogs approved by WMATA. This report will show the design size and allowable tolerances required by AREMA standards, or as shown and specified in these contract documents, as well as the actual size.
- F. Submit written description indicating how each frog will be broken down for shipment, and the packaging of each loose frog required for assembly into the complete item.

4.7.5 Variations from WMATA-approved shop drawings will constitute noncompliance and will not be accepted for shipment unless or until proper modifications are made and reviewed by WMATA.

5.0 WARRANTY

5.1 Contractor will provide a warranty for replacement of defective frogs or associated components in this specification, including labor, equipment, and materials associated with replacement of the defective part. Unless a longer time is specified in the manufacturer's warranty, all warranties will extend for one (1) year after delivery and acceptance.

6.0 PREPARATION, SHIPPING, AND DELIVERY

6.1 Identification Markings:

- 6.1.1 As shown on the drawing, each frog has an identification number. This number will be stamped on a metal tag and the tag affixed to the web section of each frog.**
- 6.1.2 Tags will be made of corrosive-resistant metal such as anodized aluminum or brass. Fastening hardware will be of the same material as the tags. Numbers will be stamped in characters 1/2" high, and plate will be of the 6" wide, 3" high plate dimensions.**
- 6.1.3 Paint the identification number on the web of all, frogs, on both ends clear of the welding zone and insulated joint bar area, according to the rail layout details included.**

6.2 Painting

- 6.2.1 Other than identification markings, do not paint frog components prior to shop assembly, and where applicable, WMATA Inspection.**
- 6.2.2 After frogs are assembled, items will be painted or coated with metal primer paint or an oil based coating to prevent immediate rusting or corrosion and to protect them from corrosion during shipping and storage.**
- 6.2.3 Do not conceal identification markings or inspector's marks by this painting or coating.**

6.3 Shipping Preparation

- 6.3.1 Load, handle, and store railbound frogs with care to prevent damage.**
- 6.3.2 While loading, do not drop special trackwork components, but place each length of rail with the head up and with sufficient support under the base.**
- 6.3.3 Do not subject frogs to excessive static loading.**
- 6.3.4 Avoid sudden impacts or dynamic loading, and prevent high stressing arising from point or line loading.**
- 6.3.5 Locate slinging points at uniform distances along the load so that components are in a horizontal position at all times.**

6.3.6 Use only slings that do not cause surface damage or notching.

- A. Terylene or nylon strapping is acceptable, with an additional sleeve where the sling is in contact with the rail or component.**
- B. Flat profile chain-link slings having a protective sleeve are also acceptable.**

6.3.7 Do not use chains and wires that may cause surface damage.

6.3.8 Use sufficient timber dunnage at all times, and take particular care when extracting slings from around component lifts In order to ensure they are not ripped out.

6.3.9 Submit method of packaging to WMATA for acceptance before shipping.

6.4 Delivery

6.4.1 Railbound frogs will be delivered to:

**WMATA Industrial Road Material Storage Facility
6851 Industrial Road
Springfield, VA 22151**

**WMATA Auth Road Material Storage Facility
4305 Auth Place
Suitland, MD 20746**

Alternate locations within the WMATA rail system (DC, MD, VA; if required by WMATA)

6.4.2 Delivery of diamond frogs shall be within 150 days of receipt of order. All other frogs shall be within 90 days of receipt of order. Hours of delivery will be between 7:00 am and 2:00 pm Monday through Friday, exclusive of legal holidays in the Washington, DC area. The Contractor will notify WMATA of material deliveries (48) hours in advance. The supplier will contact Ms. Kimberly Hammond at (202) 253-4127 for instructions.

6.4.3 All deliveries must include a detailed Bill of Lading.

6.4.4 WMATA staff will inspect railbound frogs deliveries upon receipt. The Contractor will replace railbound frogs within (14) calendar days of rejection notice when they are damaged, or if they do not meet specification at the contractor's expense. WMATA will not incur any additional cost for replacement of railbound frogs.

7.0 TECHNICAL DRAWINGS

The attached drawings are listed on the Bid/Price Schedule under the column titled "Drawing Number(s)".

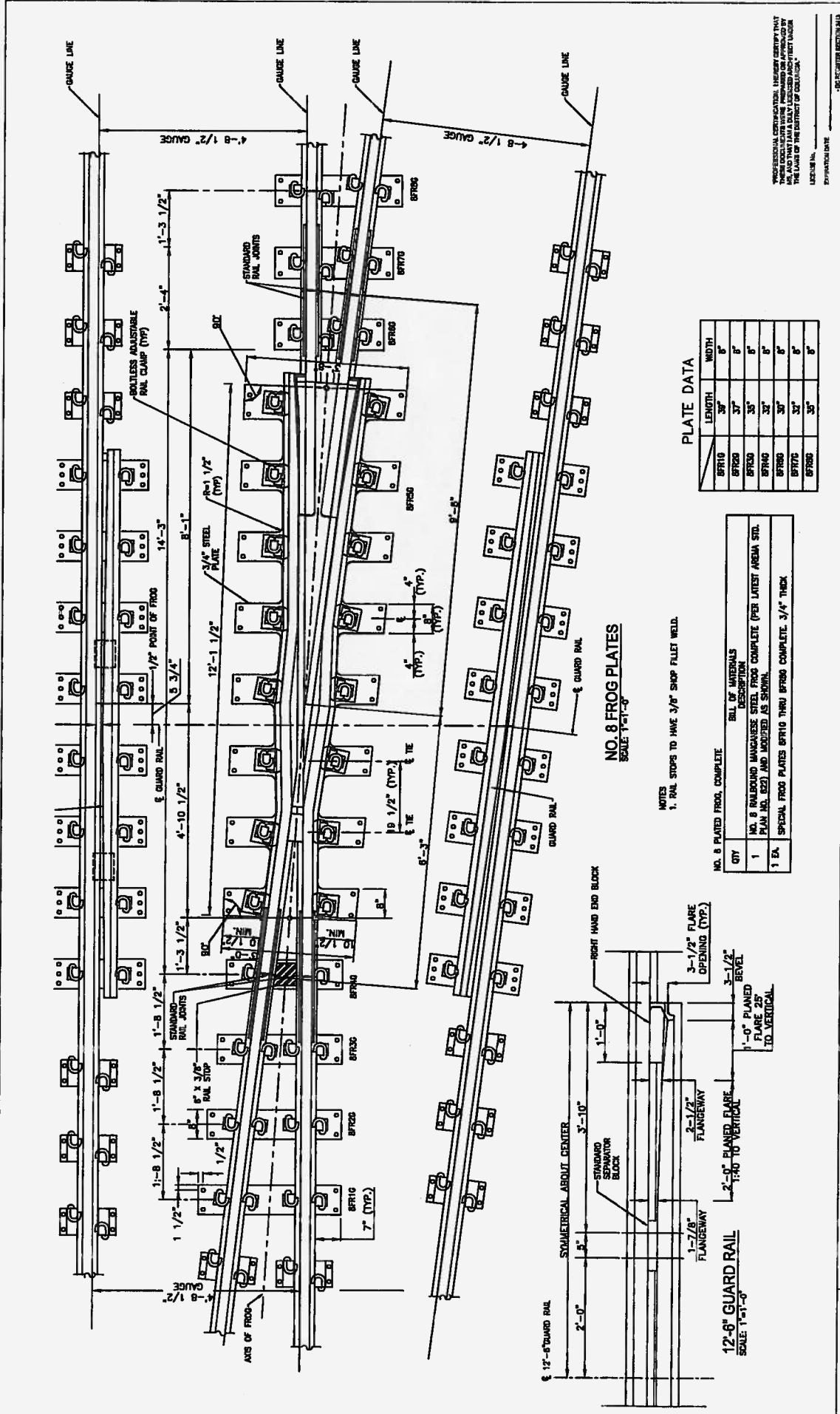


PLATE DATA

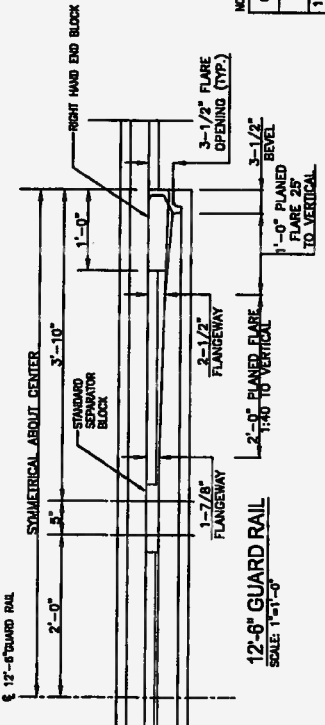
| TYPE | LENGTH | WIDTH |
|-------|--------|-------|
| BF710 | 30" | 8" |
| BF720 | 37" | 8" |
| BF730 | 35" | 8" |
| BF740 | 37" | 8" |
| BF750 | 30" | 8" |
| BF760 | 37" | 8" |

NO. 8 PLATED FROG, COMPLETE

| QTY | BILL OF MATERIALS DESCRIPTION |
|-------|---|
| 1 | NO. 8 RAILROAD MANGANESE STEEL FROG COMPLETE (PER LATEST AREA STD. PLAN NO. 822) AND ADJUSTED AS SHOWN. |
| 1 EA. | SPECIAL FROG PLATES BF710 THRU BF760 COMPLETE 3/4" THICK. |

NO. 8 FROG PLATES
SCALE 1"=1'-0"

- NOTES**
1. RAIL STOPS TO HAVE 3/8" SHOP FILET WELD.



12-8 GUARD RAIL
SCALE 1"=1'-0"

PROFESSIONAL CERTIFICATION: I HEREBY CERTIFY THAT I AM A LICENSED PROFESSIONAL ENGINEER IN THE STATE OF WASHINGTON AND THAT I AM A LICENSED PROFESSIONAL ENGINEER IN THE STATE OF WASHINGTON.

DATE: _____
 LICENSE NO.: _____
 EXPIRATION DATE: _____

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY
DEPARTMENT OF TRANSIT INFRASTRUCTURE AND ENGINEERING SERVICES
CENI - TRACK STRUCTURES & FACILITIES

TRACKWORK STANDARD DRAWING
PLAN NO. 8 TURNOUT
PLATED FROG, BALLASTED TRACK

DESIGNED BY: _____
 DRAWING NO.: ST-70-404
 SCALE: 1"=1'-0"
 CONTRACT NO.: _____
 SHEET NO.: 88 of 88

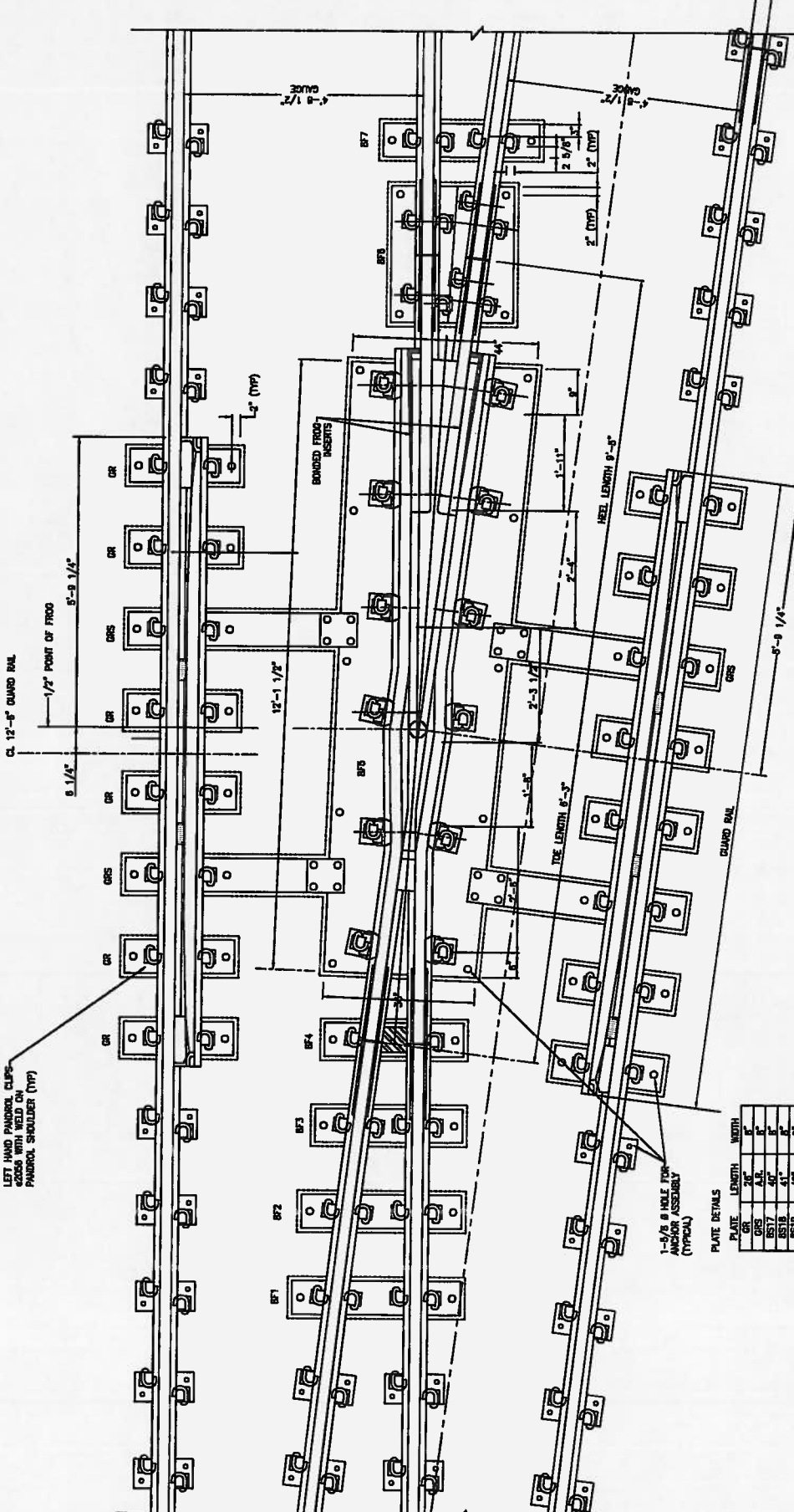
DATE: _____
 APPROVED: _____
 SENIOR CIVIL ENGINEER

THOMAS ROBINSON

| REVISIONS | DATE | BY | DESCRIPTION |
|-----------|------|----|-------------|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

| REFERENCE DRAWINGS | TITLE |
|--------------------|-------|
| | |
| | |
| | |
| | |

LEFT HAND PANOROL CLIPS-
G2556 WITH WELD ON
PANOROL SHOULDER (TYP)



NO. 8 PLATED FROG
SCALE 1"=1'-0"

PROFESSIONAL ENGINEER'S LICENSE NO. 115077
REGISTERED PROFESSIONAL ENGINEER
ALL DIMENSIONS UNLESS OTHERWISE NOTED ARE IN INCHES
UNLESS OTHERWISE NOTED UNDER THE LABEL OF THE
UNIT OF MEASUREMENT.

DESIGNER: J. A. ...
CHECKED: ...
DATE: ...

CONTRACT NO. ...
SCALE AS NOTED ...
DRAWING NO. ...

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY
DEPARTMENT OF TRANSIT INFRASTRUCTURE AND ENGINEERING SERVICES
CEN - TRACK STRUCTURES & FACILITIES

TRACKWORK STANDARD DRAWING
NO. 8 PLATED TURNOUT FROG
DIRECT FIXATION

APPROVED: ...
DATE: ...

REVISIONS
DATE DESCRIPTION

REFERENCE DRAWINGS

DESIGNED: ...
DRAWN: ...
CHECKED: ...

REVISIONS
DATE DESCRIPTION

REFERENCE DRAWINGS

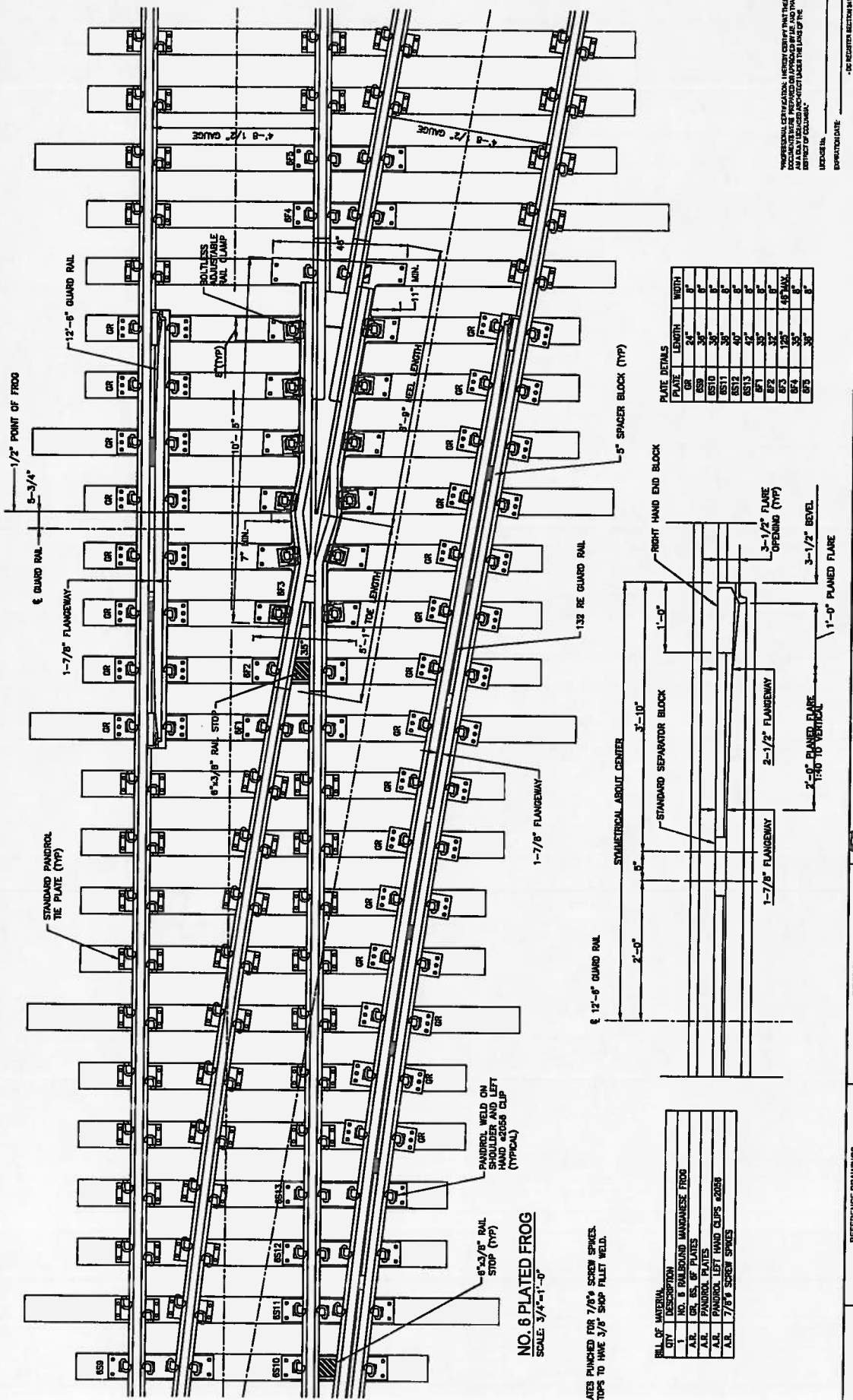
DESIGNED: ...
DRAWN: ...
CHECKED: ...

PLATE DETAILS

| PLATE | LENGTH | WIDTH |
|-------|--------|-------|
| G1 | 24" | 6" |
| G2 | 48" | 6" |
| G3 | 48" | 6" |
| G4 | 48" | 6" |
| G5 | 48" | 6" |
| G6 | 48" | 6" |
| G7 | 48" | 6" |
| G8 | 48" | 6" |
| G9 | 48" | 6" |
| G10 | 48" | 6" |
| G11 | 48" | 6" |
| G12 | 48" | 6" |
| G13 | 48" | 6" |
| G14 | 48" | 6" |
| G15 | 48" | 6" |
| G16 | 48" | 6" |
| G17 | 48" | 6" |
| G18 | 48" | 6" |
| G19 | 48" | 6" |
| G20 | 48" | 6" |
| G21 | 48" | 6" |
| G22 | 48" | 6" |
| G23 | 48" | 6" |
| G24 | 48" | 6" |
| G25 | 48" | 6" |
| G26 | 48" | 6" |
| G27 | 48" | 6" |
| G28 | 48" | 6" |
| G29 | 48" | 6" |
| G30 | 48" | 6" |

NOTE: DIMENSIONS ON THE CHART
ARE IN INCHES UNLESS OTHERWISE NOTED
UNLESS OTHERWISE NOTED UNDER THE LABEL
OF THE UNIT OF MEASUREMENT.

1-5/8" Ø HOLE FOR
ANCHOR ASSEMBLY
(TYPICAL)



- NOTE:
1. ALL PLATES PUNCHED FOR 7/8" SCREW SPACES.
 2. RAIL STOPS TO HAVE 3/8" SHOP FILED WELD.

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY
 DEPARTMENT OF TRANSIT INFRASTRUCTURE AND ENGINEERING SERVICES
 CENI - TRACK STRUCTURES & FACILITIES

TRACKWORK STANDARD DRAWING
 NO. 6 GUARDED TURNOUT
 PLATED FROG, BALLASTED TRACK

DESIGNED BY: _____ DATE: _____
 DRAWN BY: _____ DATE: _____
 CHECKED BY: _____ DATE: _____

| REV. NO. | DATE | DESCRIPTION |
|----------|----------|-------------------------------------|
| 1 | 12/1/83 | ISSUED FOR BIDDING |
| 2 | 1/17/84 | REVISED TO SHOW PLATED FROG |
| 3 | 2/22/84 | REVISED TO SHOW 1-7/8" FLANGEWAY |
| 4 | 3/29/84 | REVISED TO SHOW RAMPED WELD |
| 5 | 4/26/84 | REVISED TO SHOW 3-1/2" BEVEL |
| 6 | 5/23/84 | REVISED TO SHOW 2'-0" PLAINED FLARE |
| 7 | 6/20/84 | REVISED TO SHOW 1-7/8" FLANGEWAY |
| 8 | 7/18/84 | REVISED TO SHOW 2'-1/2" FLANGEWAY |
| 9 | 8/15/84 | REVISED TO SHOW 3-10" TOTAL LENGTH |
| 10 | 9/12/84 | REVISED TO SHOW 1-0" SEPARATOR |
| 11 | 10/10/84 | REVISED TO SHOW 3-1/2" BEVEL |
| 12 | 11/7/84 | REVISED TO SHOW 1-7/8" FLANGEWAY |

| REV. NO. | DATE | DESCRIPTION |
|----------|----------|-------------------------------------|
| 1 | 12/1/83 | ISSUED FOR BIDDING |
| 2 | 1/17/84 | REVISED TO SHOW PLATED FROG |
| 3 | 2/22/84 | REVISED TO SHOW 1-7/8" FLANGEWAY |
| 4 | 3/29/84 | REVISED TO SHOW RAMPED WELD |
| 5 | 4/26/84 | REVISED TO SHOW 3-1/2" BEVEL |
| 6 | 5/23/84 | REVISED TO SHOW 2'-0" PLAINED FLARE |
| 7 | 6/20/84 | REVISED TO SHOW 1-7/8" FLANGEWAY |
| 8 | 7/18/84 | REVISED TO SHOW 2'-1/2" FLANGEWAY |
| 9 | 8/15/84 | REVISED TO SHOW 3-10" TOTAL LENGTH |
| 10 | 9/12/84 | REVISED TO SHOW 1-0" SEPARATOR |
| 11 | 10/10/84 | REVISED TO SHOW 3-1/2" BEVEL |
| 12 | 11/7/84 | REVISED TO SHOW 1-7/8" FLANGEWAY |

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|----------|----------|-------------------------------------|
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| 5 | 4/26/84 | REVISED TO SHOW 3-1/2" BEVEL |
| 6 | 5/23/84 | REVISED TO SHOW 2'-0" PLAINED FLARE |
| 7 | 6/20/84 | REVISED TO SHOW 1-7/8" FLANGEWAY |
| 8 | 7/18/84 | REVISED TO SHOW 2'-1/2" FLANGEWAY |
| 9 | 8/15/84 | REVISED TO SHOW 3-10" TOTAL LENGTH |
| 10 | 9/12/84 | REVISED TO SHOW 1-0" SEPARATOR |
| 11 | 10/10/84 | REVISED TO SHOW 3-1/2" BEVEL |
| 12 | 11/7/84 | REVISED TO SHOW 1-7/8" FLANGEWAY |

| REV. NO. | DATE | DESCRIPTION |
|----------|----------|-------------------------------------|
| 1 | 12/1/83 | ISSUED FOR BIDDING |
| 2 | 1/17/84 | REVISED TO SHOW PLATED FROG |
| 3 | 2/22/84 | REVISED TO SHOW 1-7/8" FLANGEWAY |
| 4 | 3/29/84 | REVISED TO SHOW RAMPED WELD |
| 5 | 4/26/84 | REVISED TO SHOW 3-1/2" BEVEL |
| 6 | 5/23/84 | REVISED TO SHOW 2'-0" PLAINED FLARE |
| 7 | 6/20/84 | REVISED TO SHOW 1-7/8" FLANGEWAY |
| 8 | 7/18/84 | REVISED TO SHOW 2'-1/2" FLANGEWAY |
| 9 | 8/15/84 | REVISED TO SHOW 3-10" TOTAL LENGTH |
| 10 | 9/12/84 | REVISED TO SHOW 1-0" SEPARATOR |
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| 12 | 11/7/84 | REVISED TO SHOW 1-7/8" FLANGEWAY |

| PLATE NO. | LENGTH | WIDTH |
|-----------|--------|-------|
| B8 | 24" | 8" |
| B9 | 36" | 8" |
| B10 | 36" | 8" |
| B11 | 36" | 8" |
| B12 | 40" | 8" |
| B13 | 42" | 8" |
| B14 | 42" | 8" |
| B15 | 42" | 8" |
| B16 | 36" | 8" |
| B17 | 36" | 8" |
| B18 | 36" | 8" |
| B19 | 36" | 8" |
| B20 | 48" | 8" |

PROFESSIONAL CERTIFICATION: I HEREBY CERTIFY THAT THESE DRAWINGS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE DISTRICT OF COLUMBIA.

DESIGNER: _____
 ENGINEER: _____
 CHECKED BY: _____

DATE: _____

PROJECT NO.: _____

SCALE: AS NOTED

CONTRACT NO.: _____

DRAWING NO.: ST-TN-018

DATE: _____

BY: _____

DATE: _____

BY: _____

DATE: _____

BY: _____

DATE: _____

BY: _____

DATE: _____

BY: _____

DATE: _____

BY: _____

DATE: _____

BY: _____

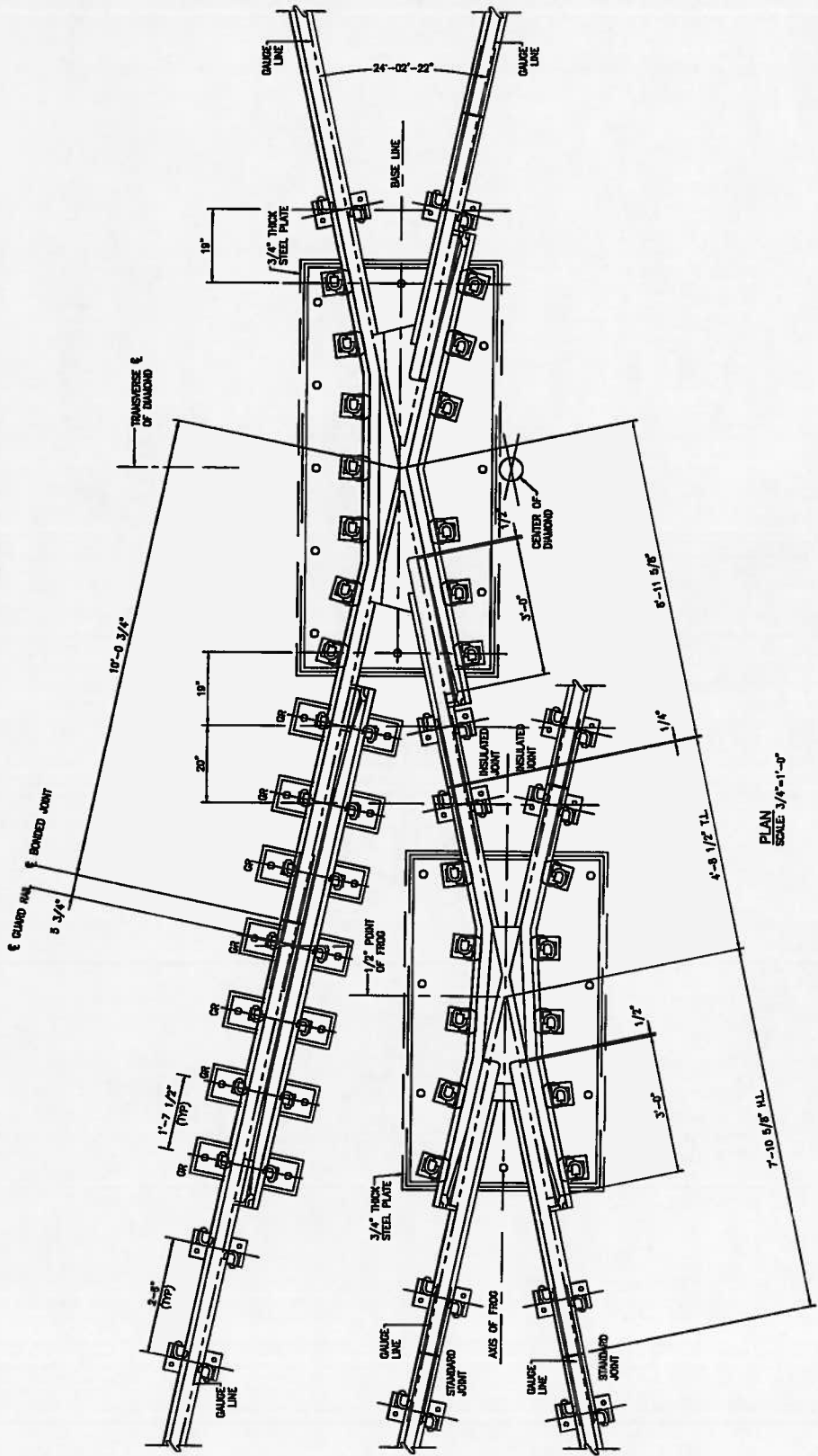
DATE: _____

BY: _____

DATE: _____

BY: _____

DATE: _____



PLAN SCALE: 3/4" = 1'-0"

PROFESSIONAL CERTIFICATION: I HEREBY CERTIFY THAT THE DESIGN AND CONSTRUCTION OF THIS DRAWING ARE THE SOLE PROPERTY OF THE ENGINEER AND ARCHITECT AND THAT I AM A duly Licensed Professional Engineer in the State of Maryland and a duly Licensed Professional Engineer in the State of Pennsylvania.

EXPIRATION DATE: _____

AS REGISTERED ARCHITECT

**TRACKWORK STANDARD DRAWING
NO. 8 GUARDED DOUBLE CROSSOVER, DIAMOND
PLATE, 40'-8" TRACK CENTERS, PLAN
DIRECT FIXATION TRACK**

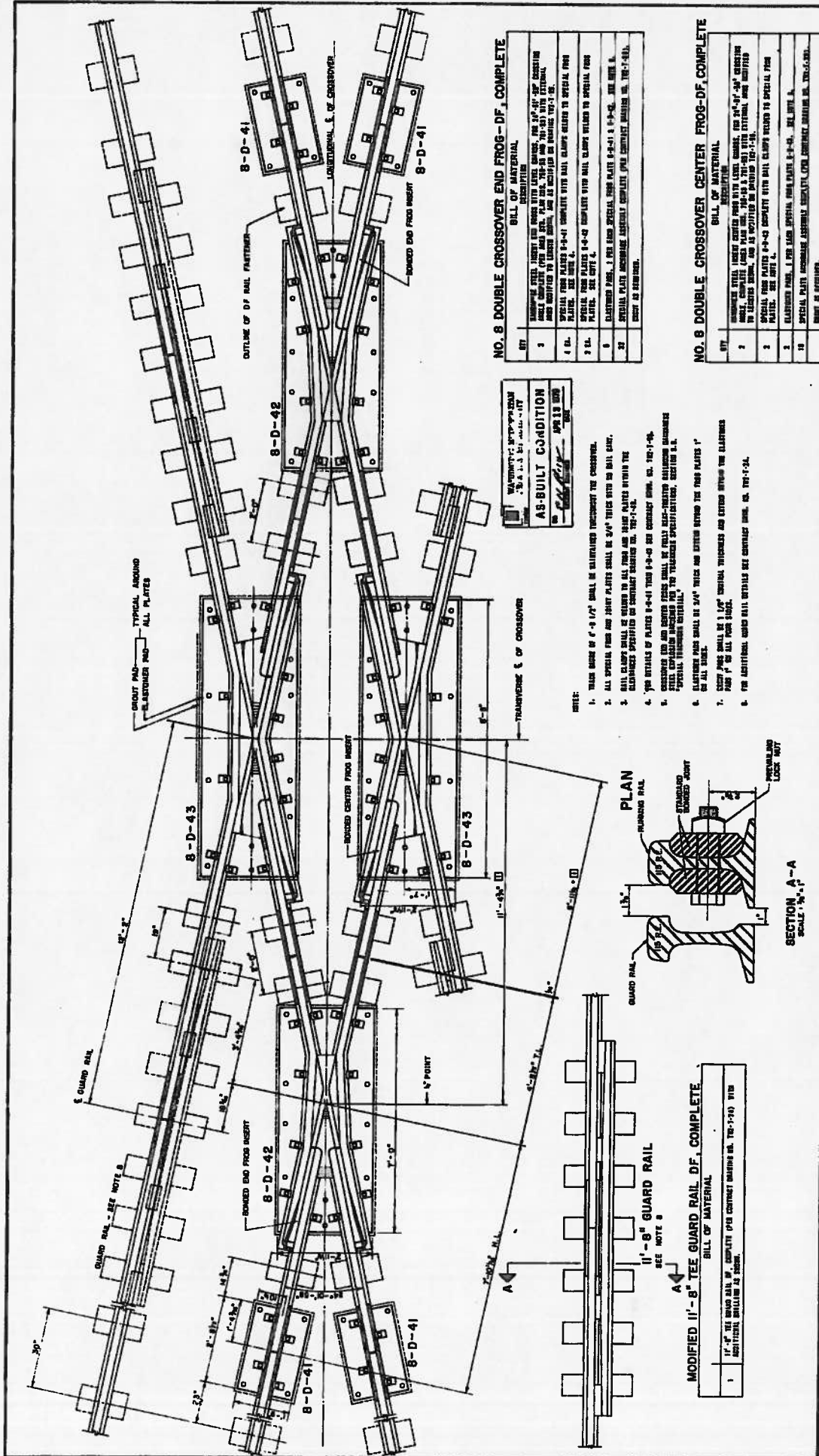
**WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY
DEPARTMENT OF TRANSIT INFRASTRUCTURE AND ENGINEERING SERVICES
CENI - TRACK STRUCTURES & FACILITIES**

| REVISIONS | DATE | BY | DESCRIPTION |
|-----------|------|----|-------------|
| | | | |
| | | | |
| | | | |

| DESIGNED & DRAWN | DATE | CHECKED | DATE |
|------------------|------|---------|------|
| | | | |
| | | | |
| | | | |

| CONTRACT NO. | SCALE | DRAWING NO. | SHEET NO. |
|--------------|--------------|-------------|-----------|
| | 3/4" = 1'-0" | | |
| | | | |
| | | | |

APPROVED: _____
TAMARA WOODSON
SENIOR CIVIL ENGINEER



NO. 8 DOUBLE CROSSOVER END FROG-DF, COMPLETE

BILL OF MATERIAL

| | |
|---|--|
| 1 | STANDARD STEEL LIGHT END CROSS WITH LEVEL GRASS, FOR 1'-8" TEE GUARD RAIL AND 1'-8" TRACK CENTER, 11'-0" TO 11'-10" WITH INTERNAL AND EXTERNAL |
| 2 | PLATE FOR PLATES 8-D-41 COMPLETE WITH RAIL CLAMP BELONG TO SPECIAL FROG |
| 3 | SPECIAL FROG PLATE 8-D-42 COMPLETE WITH RAIL CLAMP BELONG TO SPECIAL FROG |
| 4 | EXTERIOR FROG, 1 FOR EACH SPECIAL FROG PLATE 8-D-41 & 8-D-42, SEE NOTE 1. |
| 5 | SPECIAL PLATE INCREASE ASSEMBLY COMPLETE (FOR CONTACT BUSHING OR, TR-1-41), SEE NOTE 2. |

NO. 8 DOUBLE CROSSOVER CENTER FROG-DF, COMPLETE

BILL OF MATERIAL

| | |
|---|--|
| 1 | STANDARD STEEL LIGHT CENTER FROG WITH LEVEL GRASS, FOR 1'-8" TEE GUARD RAIL AND 1'-8" TRACK CENTER, 11'-0" TO 11'-10" WITH INTERNAL AND EXTERNAL |
| 2 | SPECIAL FROG PLATE 8-D-43 COMPLETE WITH RAIL CLAMP BELONG TO SPECIAL FROG |
| 3 | EXTERIOR FROG, 1 FOR EACH SPECIAL FROG PLATE 8-D-43, SEE NOTE 1. |
| 4 | SPECIAL PLATE INCREASE ASSEMBLY COMPLETE (FOR CONTACT BUSHING OR, TR-1-41), SEE NOTE 2. |

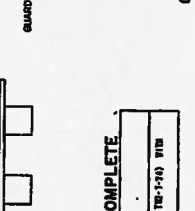
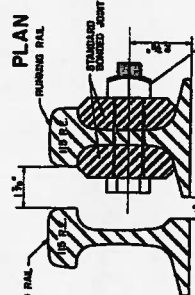
AS-BUILT CONDITION

DATE: APR 13 1950

BY: [Signature]

NOTES:

1. TOLERANCE OF 1/8" SHALL BE MAINTAINED THROUGHOUT THE CROSSOVER.
2. ALL SPECIAL FROG AND SHORT PLATES SHALL BE 3/4" THICK UNLESS OTHERWISE SPECIFIED.
3. RAIL CLAMP SHALL BE WELDED TO ALL FROG AND SHORT PLATES WITHIN THE CLEARANCE SPECIFIED ON CONTACT BUSHING OR, TR-1-41.
4. THE DETAILS OF PLATES 8-D-41 THROUGH 8-D-43 ARE SHOWN ON SHEET NO. TR-1-41.
5. CROSSOVER AND END CENTER FROGS SHALL BE FULLY AS-BUILT AS SHOWN ON SHEET NO. TR-1-41.
6. EXTERIOR FROG SHALL BE 3/4" THICK AND CENTER FROG THE FROG PLATES 1" AT ALL TIMES.
7. CENTER FROG SHALL BE 1 1/4" INTERNAL THICKNESS AND CENTER WITHIN THE CLEARANCE FROG 1" TO ALL FOUR SIDES.
8. FOR ADDITIONAL CROSS RAIL DETAILS SEE CONTACT BUSHING OR, TR-1-41.



MODIFIED 1'-8" TEE GUARD RAIL DF, COMPLETE

BILL OF MATERIAL

| | |
|---|--|
| 1 | 1'-8" TEE GUARD RAIL, 11'-0" TO 11'-10" (FOR CONTACT BUSHING OR, TR-1-41) WITH INTERNAL BRASSING AS SHOWN. |
|---|--|

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

TRACKWORK - PHASE 2

NO. 8 PLAYED DOUBLE CROSSOVER - DIAMOND DIRECT FINATION, 4D'-6" TRACK CENTERS

SCALE: 1/8" = 1'-0"

DATE: APR 13 1950

BY: [Signature]

APPROVED: [Signature]

PROJECT NO. TW 2-T-95

DATE: APR 13 1950

BY: [Signature]

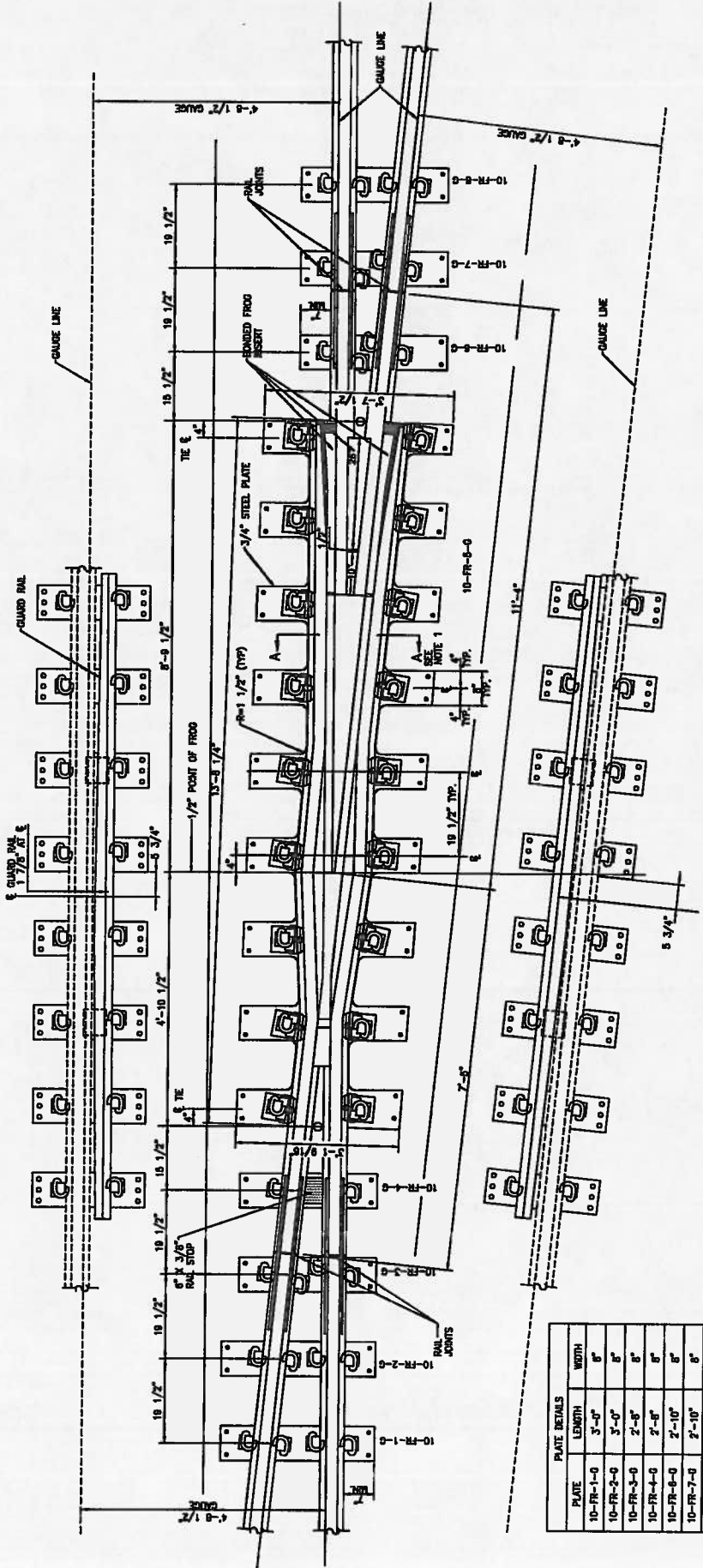
APPROVED: [Signature]

PROJECT NO. TW 2-T-95

DATE: APR 13 1950

BY: [Signature]

APPROVED: [Signature]



| QTY | DESCRIPTION |
|-------|---|
| 1 | NO. 10 RAILBOUND MANGANESE STEEL FROG, COMPLETE (PER LATEST ARMA STA. PLAN NO. 625) AND MODIFIED AS SHOWN |
| 1 EA | SPECIAL FROG PLATES 10-FR-1-0 THRU 10-FR-8-0, COMPLETE |
| 3 | ROUNDED FROG INSERTS |
| 18 EA | GUARD RAIL PLATES (OFT.) |

INDEXES
 1. SEE DRAWING NO. 02-TM-547 FOR FROG AND GUARD RAIL DETAILS AND SECTIONS.

APPROVED: _____
 LICENSE NO. _____
 EXPIRES DATE: _____
 -DC RECORDER SECTION 413

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY
 DEPARTMENT OF TRANSIT INFRASTRUCTURE AND ENGINEERING SERVICES
 CEN - TRACK STRUCTURES & FACILITIES

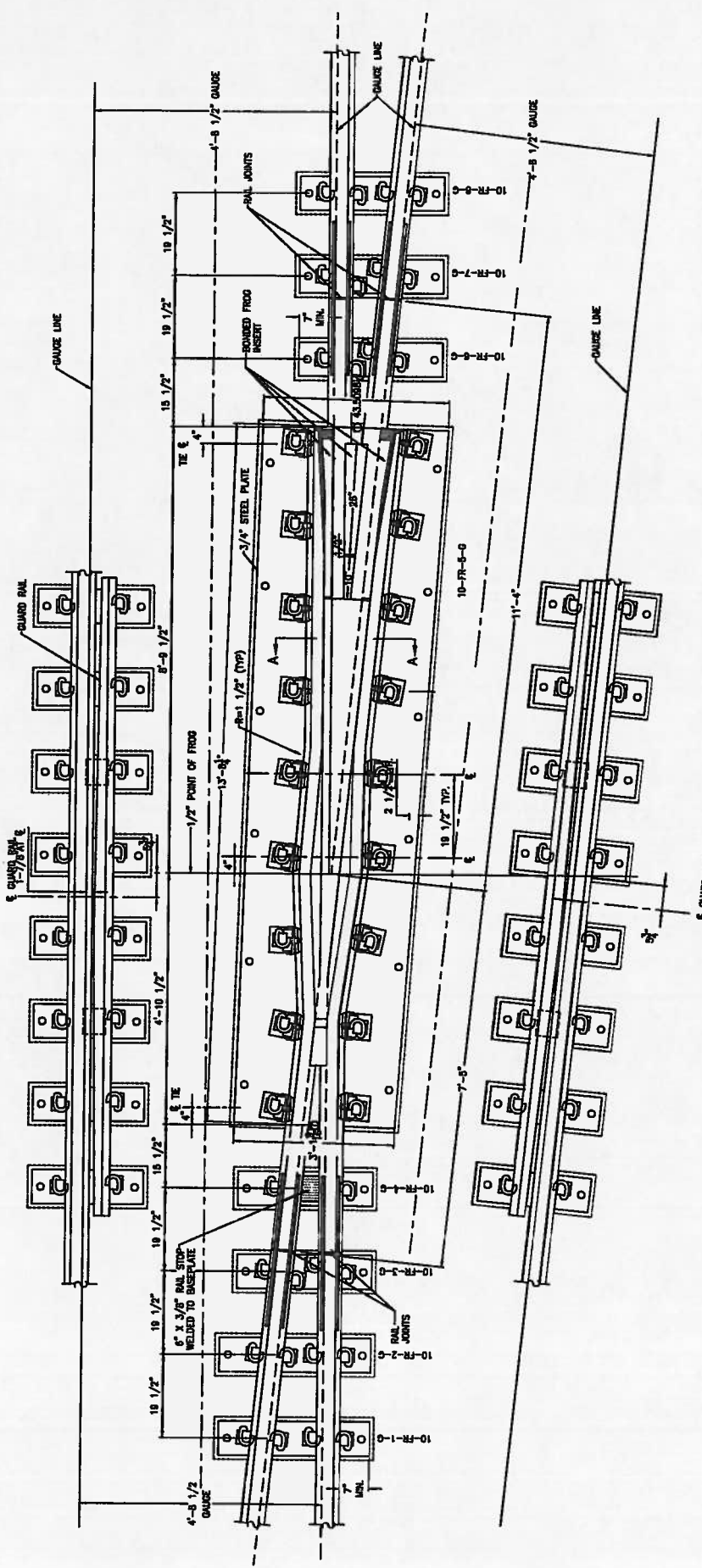
TRACKWORK STANDARD DRAWING
 NO. 10 TURNOUT, PLATED FROG
 BALLASTED TRACK

| REVISIONS | DATE | BY | DESCRIPTION |
|-----------|------|----|-------------|
| | | | |
| | | | |
| | | | |
| | | | |

| PLATE | LENGTH | WIDTH |
|-----------|--------|-------|
| 10-FR-1-0 | 3'-0" | 6" |
| 10-FR-2-0 | 3'-0" | 6" |
| 10-FR-3-0 | 2'-8" | 6" |
| 10-FR-4-0 | 2'-8" | 6" |
| 10-FR-5-0 | 2'-10" | 6" |
| 10-FR-6-0 | 2'-10" | 6" |
| 10-FR-7-0 | 2'-10" | 6" |
| 10-FR-8-0 | 2'-10" | 6" |

DESIGNED: A. BEVIE DATE: _____
 DRAWN: A. BEVIE DATE: _____
 CHECKED: BALLAST DATE: _____

SCALE: 1" = 1'-0"
 CONTRACT NO. FD- _____
 DRAWING NO. ST-TM-045
 SHEET NO. 88 OF 88



- NOTES:
1. DIMENSIONS INDICATED IN THIS DRAWING FOR FROG AND GUARD RAIL SHALL BE TO THE CENTER OF COLUMN.
 2. RAIL STOPS TO BE 3/4" STOP FLEET WELD.

PROVISIONAL DRAWING. IT IS THE USER'S RESPONSIBILITY TO VERIFY THE ACCURACY OF THE INFORMATION PROVIDED HEREIN. THE USER SHALL BE RESPONSIBLE FOR THE CORRECTNESS OF THE INFORMATION PROVIDED HEREIN.

DATE: _____

BY: _____

FOR: _____

| QTY | DESCRIPTION - FURNISHED THIS CONTRACT |
|------|---|
| 1 | NO. 10 RAILROAD WASHINGTON STEEL FROG, COMPLETE (PER LATEST AREA STD. PLAN NO. 652) |
| 2 | SPECIAL FROG PLATES 10-FR-1-0 THRU 10-FR-4-0, COMPLETE |
| 18 | BONDED FROG INSERTS |
| A.R. | BONDED FROG INSERTS |

| PLATE DETAILS | LENGTH | WIDTH |
|---------------|--------|-------|
| 10-FR-1-0 | 3'-0" | 8" |
| 10-FR-2-0 | 3'-0" | 8" |
| 10-FR-3-0 | 2'-8" | 8" |
| 10-FR-4-0 | 2'-8" | 8" |
| 10-FR-6-0 | 2'-10" | 8" |
| 10-FR-7-0 | 2'-10" | 8" |
| 10-FR-8-0 | 2'-10" | 8" |

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY
 DEPARTMENT OF TRANSIT INFRASTRUCTURE AND ENGINEERING SERVICES
 GENI - TRACK STRUCTURES & FACILITIES

REVISIONS

| NO. | DATE | BY | DESCRIPTION |
|-----|------|----|-------------|
| | | | |

REFERENCE DRAWINGS

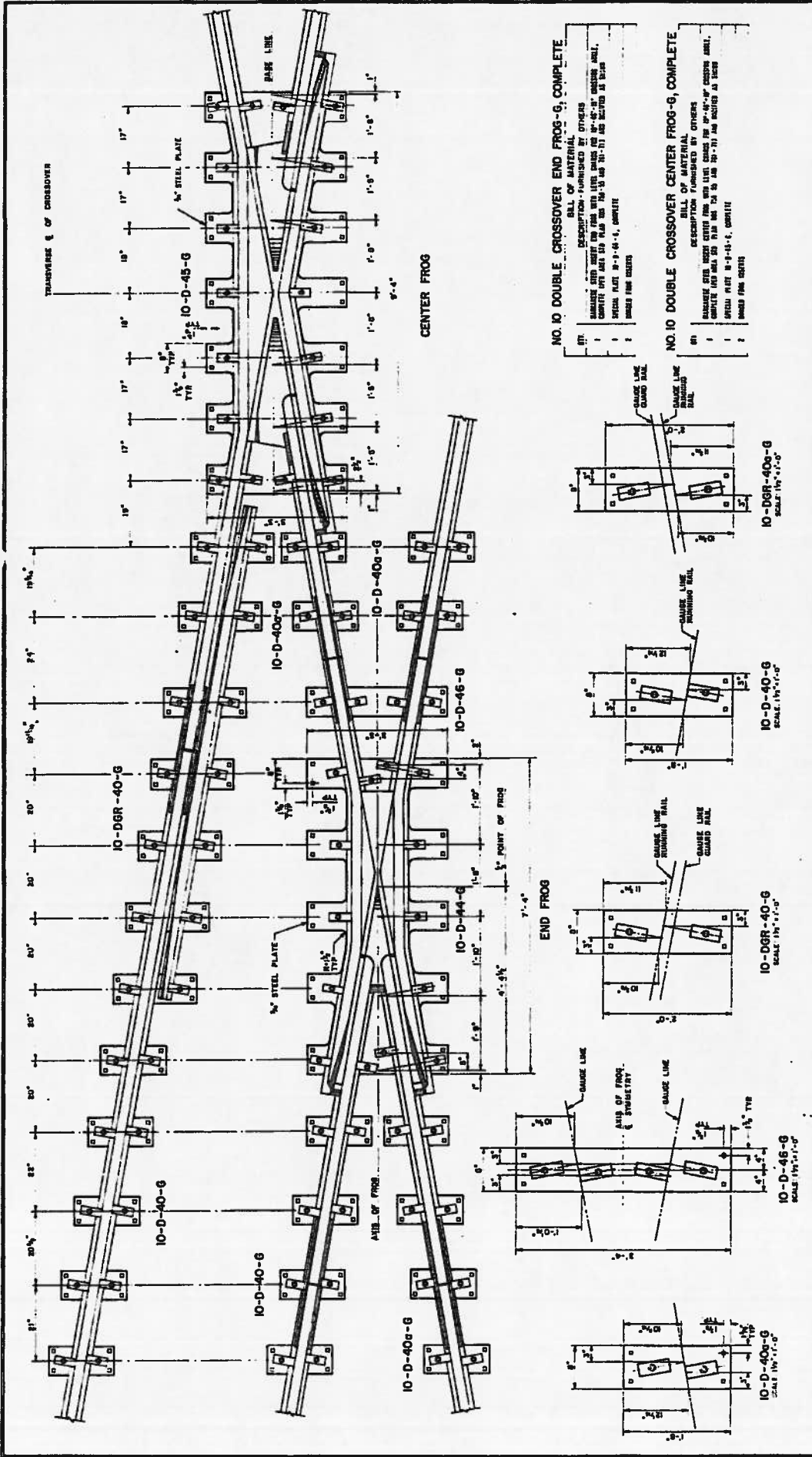
| NUMBER | TITLE |
|--------|-------|
| | |

DESIGNED: _____ DATE: _____
 DRAWN: _____ DATE: _____
 CHECKED: _____ DATE: _____

APPROVED: _____ DATE: _____
 TITLE: _____

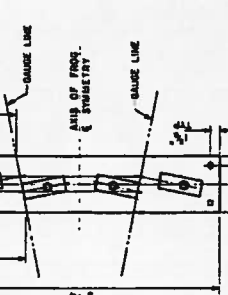
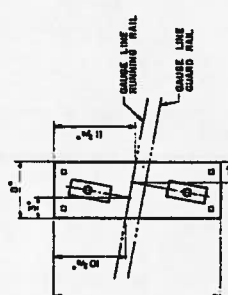
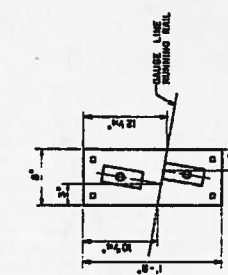
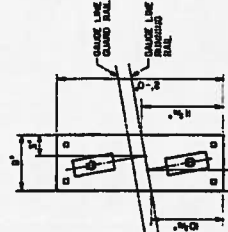
CONTRACT NO. _____ DATE: _____
 SCALE: 1"=1'-0" PROJECT: _____

DRAWING NO. _____ SHEET NO. _____ OF _____
 ST-714-001



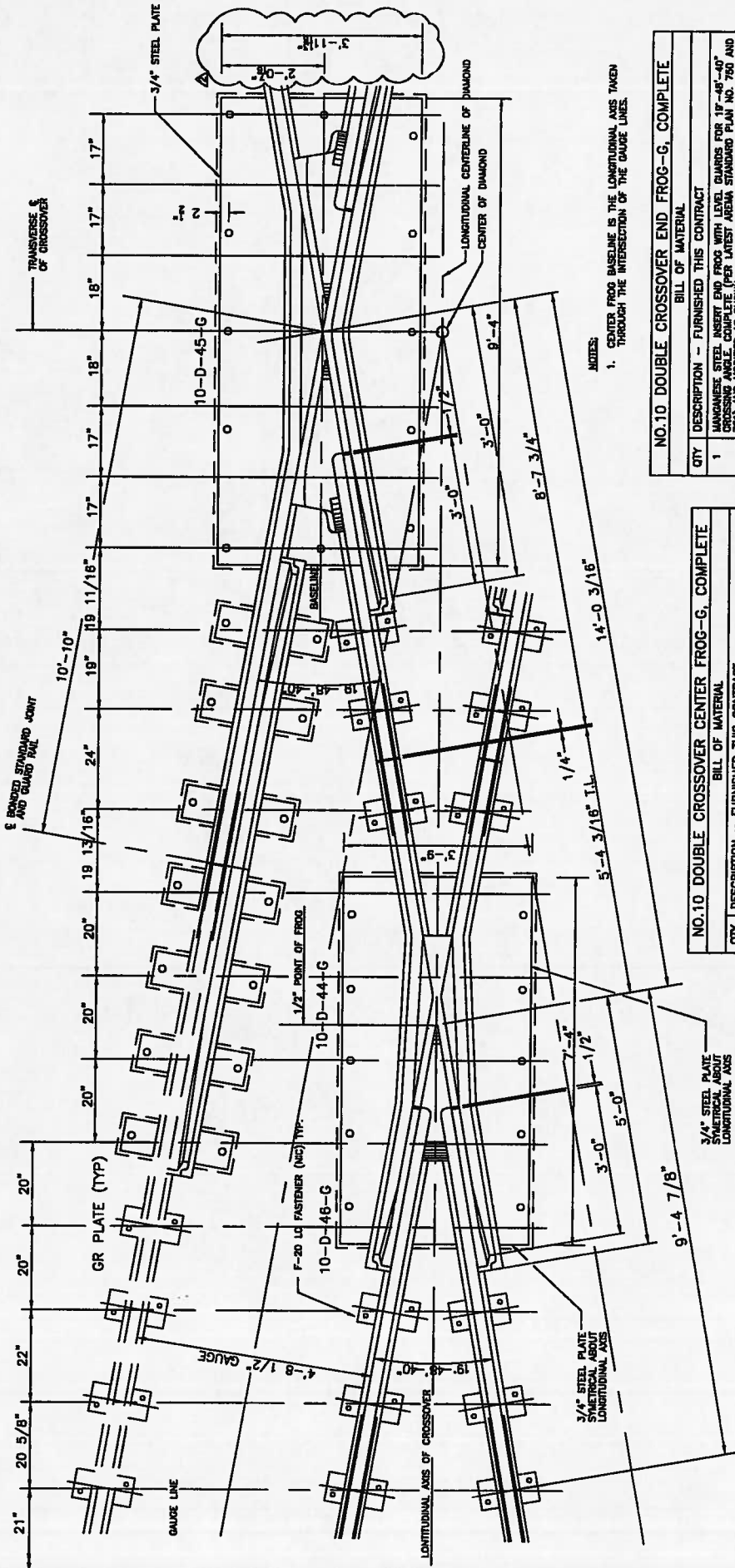
NO. 10 DOUBLE CROSSOVER END FROG-G, COMPLETE
 BILL OF MATERIAL
 DESCRIPTION - FURNISHED BY OTHERS
 GAUGE LINE SET WITH END FROG WITH LINES CENTER FOR 19'-0"-10" CROSSOVER ANGLE.
 COMPLETE SET AND END FROG FOR 19'-0" AND 19'-10" AND NOTED AS SHOWN.
 SPECIAL PLAT 10-D-45-G, COMPLETE
 DIMENSIONS FROM DIMENSIONS

NO. 10 DOUBLE CROSSOVER CENTER FROG-G, COMPLETE
 DESCRIPTION - FURNISHED BY OTHERS
 GAUGE LINE SET WITH END FROG WITH LINES CENTER FOR 19'-0"-10" CROSSOVER ANGLE.
 COMPLETE SET AND END FROG FOR 19'-0" AND 19'-10" AND NOTED AS SHOWN.
 SPECIAL PLAT 10-D-45-G, COMPLETE
 DIMENSIONS FROM DIMENSIONS



| | | | |
|--|--|---|---------------------|
| WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY DE LEUW, CATHER & COMPANY SECTION ENGINEER APPROVED: <i>[Signature]</i> | | TRACKWORK - 6 NO. 10 PLATED DOUBLE CROSSOVER - DIAMOND 19° - 46' - 10" ANGLE SCALE: 1" = 1'-0" EXCEPT AS NOTED DRAWING NO: TWG-T-287 M3932-88 | |
| REVISIONS NO. DATE BY DESCRIPTION | | REFERENCE DRAWINGS NUMBER DESCRIPTION TWG-T-287 NO. 10 PLATED DOUBLE CROSSOVER TWG-T-287 BALLASTED TRACK 42'-0" TRACK CENTERS | |
| DESIGNED: J.M. MALCOLM DATE: 4-2-77 CHECKED: <i>[Signature]</i> APPROVED: <i>[Signature]</i> | DRAWN: <i>[Signature]</i> CHECKED: <i>[Signature]</i> APPROVED: <i>[Signature]</i> | DATE: 4-2-77 BY: <i>[Signature]</i> DESCRIPTION: NO. 10 PLATED DOUBLE CROSSOVER 19° - 46' - 10" ANGLE | SCALE: 1/4" = 1'-0" |

WARRANTY CONFIDENTIAL INFORMATION - DO NOT DISCLOSE WITHOUT EXPRESS WRITTEN APPROVAL OF THE GENERAL MANAGER OF THE AUTHORITY



NOTES:
1. CENTER FROG BASELINE IS THE LONGITUDINAL AXIS TAKEN THROUGH THE INTERSECTION OF THE GAUGE LINES.

NO.10 DOUBLE CROSSOVER END FROG-G, COMPLETE

| BILL OF MATERIAL | |
|------------------|--|
| QTY | DESCRIPTION - FURNISHED THIS CONTRACT |
| 1 | MANGANESE STEEL INSERT END FROG WITH LEVEL GUARDS FOR 18'-4 1/2"-40" CROSSING ANGLE COMPLETE (PER LATEST AREA STANDARD PLAN NO. 700 AND 701) AND MODIFIED AS SHOWN |
| 1 EA | SPECIAL PLATE 10-D-44-G AND 10-D-46-G, COMPLETE |
| 2 | BONDED FROG INSERTS |
| 10 | BOLTLESS ADJUSTABLE BRACE WITH LEFT HAND PANDROL CLIPS 62056 |

NO.10 DOUBLE CROSSOVER CENTER FROG-G, COMPLETE

| BILL OF MATERIAL | |
|------------------|--|
| QTY | DESCRIPTION - FURNISHED THIS CONTRACT |
| 1 | MANGANESE STEEL INSERT CENTER FROG WITH LEVEL GUARDS FOR 18'-4 1/2"-40" CROSSING ANGLE COMPLETE (PER LATEST AREA STANDARD PLAN NOS. 700 AND 701) AND MODIFIED AS SHOWN |
| 1 | SPECIAL PLATE 10-D-44-G, COMPLETE |
| 2 | BONDED FROG INSERTS |
| A.R. | ELASTOMER PADS AT EVERY PLATE |
| 13 | BOLTLESS ADJUSTABLE BRACE WITH LEFT HAND PANDROL CLIPS 62056 |

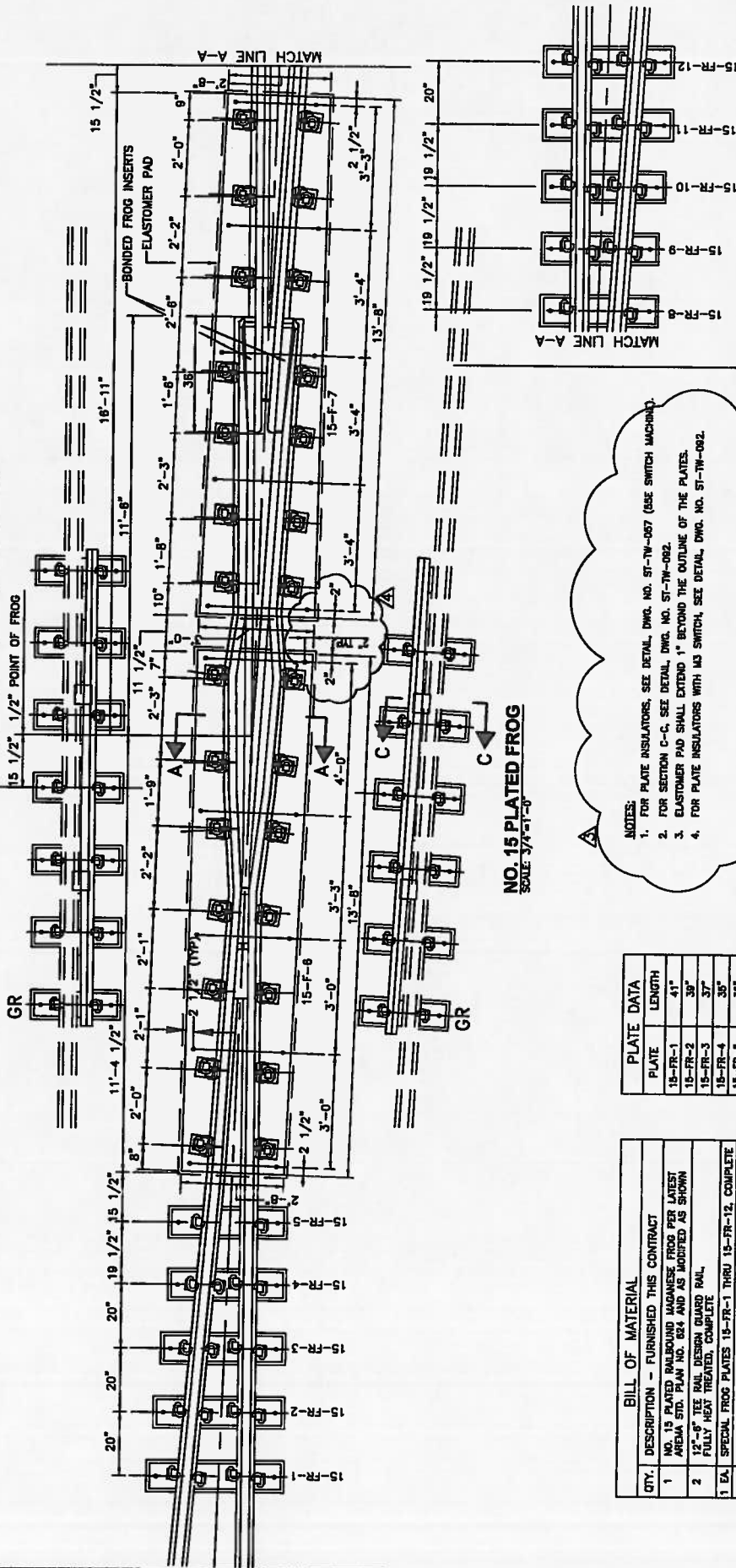
THIS DRAWING IS THE PROPERTY OF THE METROPOLITAN AREA TRANSIT AUTHORITY. IT IS TO BE USED ONLY FOR THE PROJECT AND NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF THE AUTHORITY.

DATE: _____
DRAWN BY: _____
CHECKED BY: _____

| <p>REVISIONS</p> <table border="1"> <thead> <tr> <th>NO.</th> <th>DATE</th> <th>BY</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table> | NO. | DATE | BY | DESCRIPTION | | | | | <p>WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY DEPARTMENT OF TRANSIT INFRASTRUCTURE AND ENGINEERING SERVICES CEN - TRACK STRUCTURES & FACILITIES</p> | <p>NO. 10 DOUBLE CROSSOVER END FROG-G, COMPLETE</p> |
|--|--------------------------|------------------------|-------------|-------------|--|--|--|--|---|---|
| NO. | DATE | BY | DESCRIPTION | | | | | | | |
| | | | | | | | | | | |
| <p>APPROVED: _____ DEPUTY CHIEF ENGINEER</p> | <p>DATE: _____</p> | <p>SCALE: AS SHOWN</p> | | | | | | | | |
| <p>CONTRACT NO. _____</p> | <p>PROJECT NO. _____</p> | <p>SHEET NO. _____</p> | | | | | | | | |

WMAA CONFIDENTIAL INFORMATION - DO NOT DISCLOSE WITHOUT EXPRESS WRITTEN APPROVAL OF THE GENERAL MANAGER OF THE AUTHORITY

§ GUARD RAIL, SEE DETAIL, DWG. NO. TW2003-5



NO. 15 PLATED FROG
SCALE: 3/4" = 1'-0"

BILL OF MATERIAL

| QTY. | DESCRIPTION |
|-------|---|
| 1 | NO. 15 PLATED RAILBOUND JAPANESE FROG PER LATEST AREMA STD. PLAN NO. 824 AND AS MODIFIED AS SHOWN |
| 2 | 12"-8" TEE RAIL DESIGN GUARD RAIL, FULLY HEAT TREATED, COMPLETE |
| 1 EA. | SPECIAL FROG PLATES, 15-FR-1 THRU 15-FR-12, COMPLETE |
| 2 | BONDED FROG INSERTS, COMPLETE |

PLATE DATA

| PLATE | LENGTH |
|----------|--------|
| 15-FR-1 | 41" |
| 15-FR-2 | 39" |
| 15-FR-3 | 37" |
| 15-FR-4 | 35" |
| 15-FR-5 | 35" |
| 15-FR-6 | 35" |
| 15-FR-7 | 35" |
| 15-FR-8 | 35" |
| 15-FR-9 | 35" |
| 15-FR-10 | 37" |
| 15-FR-11 | 39" |
| 15-FR-12 | 39" |

NOTES:

- FOR PLATE INSULATORS, SEE DETAIL, DWG. NO. 5T-7W-087 (SEE SWITCH MACHING).
- FOR SECTION C-C, SEE DETAIL, DWG. NO. 5T-7W-082.
- ELASTOMER PAD SHALL EXTEND 1" BEYOND THE OUTLINE OF THE PLATES.
- FOR PLATE INSULATORS WITH A3 SWITCH, SEE DETAIL, DWG. NO. 5T-7W-082.

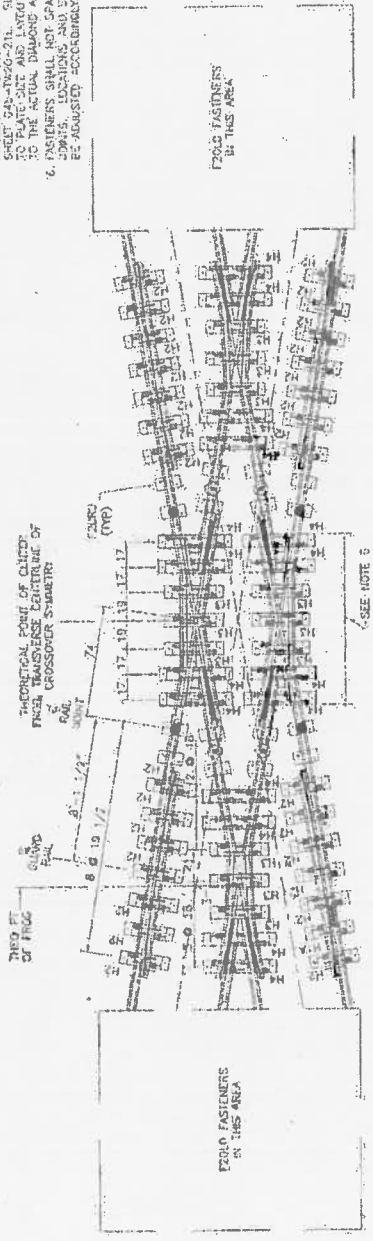
PROFESSIONAL CERTIFICATION: I HEREBY CERTIFY THAT I AM A LICENSED PROFESSIONAL ENGINEER IN THE STATE OF WASHINGTON AND THAT I AM A duly Licensed Architect Under THE LAWS OF THE DISTRICT OF COLUMBIA.

LICENSE NO. _____ EXPIRATION DATE _____

| <p>REVISIONS</p> <table border="1"> <thead> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table> | NO. | DATE | DESCRIPTION | | | | <p>REVISIONS</p> <table border="1"> <thead> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table> | NO. | DATE | DESCRIPTION | | | |
|---|---|-------------|-------------|--|--|--|---|-----|------|-------------|--|--|--|
| NO. | DATE | DESCRIPTION | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| NO. | DATE | DESCRIPTION | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| <p>REFERENCE DRAWINGS</p> <table border="1"> <thead> <tr> <th>NUMBER</th> <th>TITLE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> </tr> </tbody> </table> | | NUMBER | TITLE | | | <p>WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY DEPARTMENT OF TRANSIT INFRASTRUCTURE AND ENGINEERING SERVICES CENI - TRACK STRUCTURES & FACILITIES</p> | | | | | | | |
| NUMBER | TITLE | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| <p>DESIGNED BY: _____ DATE: _____</p> <p>DRAWN BY: _____ DATE: _____</p> <p>CHECKED BY: _____ DATE: _____</p> | <p>APPROVED BY: _____ DATE: _____</p> <p>INCHARGE ENGINEER: _____</p> <p>DESIGN CHECK ENGINEER: _____</p> | | | | | | | | | | | | |
| <p>SCALE: 3/4" = 1'-0"</p> | <p>CONTRACT NO. _____</p> <p>FO- _____</p> | | | | | | | | | | | | |
| <p>TRACKWORK STANDARD DRAWING NO. 15 TURNOUT, PLATED FROG, DIRECT FIXATION TRACK</p> | <p>REVISION SUBMITTED _____</p> <p>DATE _____</p> <p>APPROVED _____</p> <p>INCHARGE ENGINEER _____</p> <p>DESIGN CHECK ENGINEER _____</p> | | | | | | | | | | | | |
| <p>DESIGNED BY: _____ DATE: _____</p> <p>DRAWN BY: _____ DATE: _____</p> <p>CHECKED BY: _____ DATE: _____</p> | <p>APPROVED BY: _____ DATE: _____</p> <p>INCHARGE ENGINEER: _____</p> <p>DESIGN CHECK ENGINEER: _____</p> | | | | | | | | | | | | |
| <p>SCALE: 3/4" = 1'-0"</p> | <p>CONTRACT NO. _____</p> <p>FO- _____</p> | | | | | | | | | | | | |
| <p>TRACKWORK STANDARD DRAWING NO. 15 TURNOUT, PLATED FROG, DIRECT FIXATION TRACK</p> | <p>REVISION SUBMITTED _____</p> <p>DATE _____</p> <p>APPROVED _____</p> <p>INCHARGE ENGINEER _____</p> <p>DESIGN CHECK ENGINEER _____</p> | | | | | | | | | | | | |

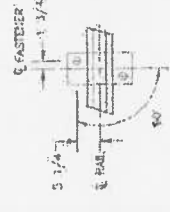
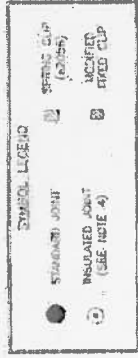
NOTES

1. ALL DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED.
2. USE WHOLE DIMENSIONS UNLESS NOTED OTHERWISE IN PRODUCTION.
3. LOCATIONS WHERE SPRING CLIP HOLDER WELLS NOT FIT, KNOWN LOCATIONS HAVE BEEN MARKED WITH AN ASTERISK AT THE END OF THE DIMENSION LINE.
4. MODIFIED SPRING CLIP WILL BE PREPARED.
5. SPECIAL NUMBER TO DRAWING SHALL BE SHOWN TO BE PROVIDED AS SHOWN ON SHEET 242-112-2-211. SLIGHT MARKINGS TO PLATE SIZE AND LAYOUT MAY RESULT DUE TO THE ACTUAL DRAWING ASPECT.
6. DIMENSIONS SHALL BE TO THE CENTERLINE OF TRACKS UNLESS OTHERWISE NOTED.



SPECIAL INSTALLATION INSTRUCTIONS

ANCHOR INSERT LOCATION DIMENSIONS ARE SHOWN FOR REFERENCE ONLY AND SHALL NOT BE USED FOR SPECIFIC INSERT INSTALLATION DUE TO CONSTRUCTION AND MANUFACTURING TOLERANCE ACCUMULATIONS THAT WILL AFFECT ACTUAL POSITIONS. ALL ANCHOR INSERT LOCATIONS MUST BE DETERMINED FROM ACTUAL FIELD LAYOUT PERFORMED UNDER THE GUIDANCE OF REFERENCED DIMENSIONS.



PROPERTY OF
 NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT PERMISSION IN WRITING FROM THE PROPERTY OWNER.



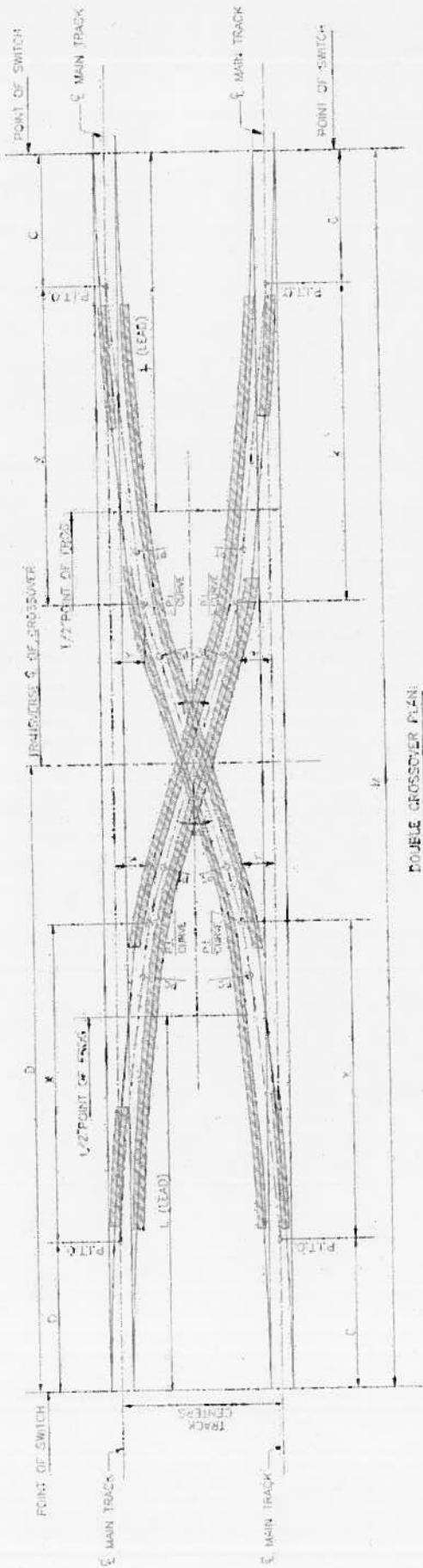
AS-BUILT CONTRACT NO. 160042

ADDISON ROUTE
 LINE, TRACKWORK AND SYSTEMS
 DIAMOND DIRECT FIXATION CROSSING DETAILS

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY
 JACOBS CRIE, INC.

| NO. | DATE | BY | REVISION |
|-----|----------|-----|-------------------------|
| 1 | 11/14/00 | JAC | ISSUED FOR CONSTRUCTION |
| 2 | 11/14/00 | JAC | ISSUED FOR CONSTRUCTION |
| 3 | 11/14/00 | JAC | ISSUED FOR CONSTRUCTION |
| 4 | 11/14/00 | JAC | ISSUED FOR CONSTRUCTION |
| 5 | 11/14/00 | JAC | ISSUED FOR CONSTRUCTION |
| 6 | 11/14/00 | JAC | ISSUED FOR CONSTRUCTION |
| 7 | 11/14/00 | JAC | ISSUED FOR CONSTRUCTION |
| 8 | 11/14/00 | JAC | ISSUED FOR CONSTRUCTION |
| 9 | 11/14/00 | JAC | ISSUED FOR CONSTRUCTION |
| 10 | 11/14/00 | JAC | ISSUED FOR CONSTRUCTION |

UNIVERSITY OF MARYLAND
 STATE COLLEGE
 ENGINEERING DEPARTMENT
 COLLEGE PARK, MARYLAND 20742



DOUBLE CROSSOVER PLAN
 SCHEDULE
 (S.3)

NOTES:
 1. EACH LINE IN THIS TABLE CONTAINS NECESSARY INFORMATION FOR A PARTICULAR DOUBLE CROSSOVER. THE CURVE DATA RELATES TO THE CURVE BETWEEN THE TURNOUT AND CROSSING.

| ITEM NO. | TRACK CTRS TURNOUT NO. | DATA TABLE | | | | | | | | | | CURVE DATA | | | |
|----------|------------------------|------------|-------|-------|--------|---------|-------|------|-------|----------|--------|------------|-------|------|----|
| | | L | T | D | K | Y | A | r | u | Δ | B | T | LC | E | SE |
| 1 | 45.00 | 10 | 78.84 | 21.42 | 161.85 | 2002.16 | 79.84 | 0.01 | 80.71 | 04.1610° | 413.64 | 10.54 | 41.04 | 0.93 | 0° |
| 2 | 44.50 | 10 | 78.00 | 31.42 | 162.23 | 2251.15 | 80.82 | 0.01 | 81.87 | 05.2210° | 412.54 | 20.70 | 74.54 | 0.80 | 0° |

AS-BUILT
 DATE: 08-21-2011
 DRAWN BY: J. B. BROWN
 CHECKED BY: J. B. BROWN
 APPROVED BY: J. B. BROWN
 PROJECT NO.: 150042

STREET DIRECT PROGRAM FOR TRACKS
 UNDER TRACKS AS TO CURVE WHERE SPECIAL
 FASTENERS ARE REQUIRED

AS-BUILT CONTRACT NO. 150042

ADDISON ROUTE
 LINE, TRACKWORK AND SYSTEMS
 DOUBLE CROSSOVER DATA TABLE
 CURVED TRACK BETWEEN TURNOUT AND CROSSING

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY
 JACOBS CIVIL INC.
 1000
 Safety Management System

| DATE | BY | PROVISIONS |
|----------|-------------|------------|
| 10/15/11 | J. B. BROWN | AS-BUILT |
| 10/15/11 | J. B. BROWN | AS-BUILT |
| 10/15/11 | J. B. BROWN | AS-BUILT |

| DATE | BY | DESCRIPTION |
|----------|-------------|-------------|
| 10/15/11 | J. B. BROWN | AS-BUILT |
| 10/15/11 | J. B. BROWN | AS-BUILT |
| 10/15/11 | J. B. BROWN | AS-BUILT |