SPECIFIC REQUIREMENTS

OF

CONSOLIDATED RAIL CORPORATION

FOR

WORK ON ITS RIGHT OF WAY

APPROVED:

2/1/97

G. A Thelen - Assistant Vice President Engineering

SCOPE

It must be clearly understood that Conrail owns and uses its right of way for the primary purpose of operating a railroad. All work shall therefore be done in a manner such that the rail operations and facilities are not interfered with, interrupted or endangered. In addition, any facilities that are a result of the proposed work shall be located to minimize encumbrance to the right of way so that Conrail will have unrestricted use of its property for current and future operations.
The sponsor of the project shall be ultimately responsible for assuring that its agents, consultants, contractors and sub-contractors fully comply with the specifications contained herein. The term 'sponsor' used throughout these specifications shall mean the sponsor, its employees, its agents, consultants, contractors, sub-contractors, etc.
The following terms and conditions shall apply to any project which requires performance of work on the right of way or other property of Conrail.

RIGHT OF ENTRY ON CONRAIL PROPERTY

No entry upon Conrail property shall be permitted without the proper authorization by Conrail to the sponsor in the form of an agreement or a proper permit-to-enter prepared by Conrail. The applicant shall pay the associated fees and execute the permit-to-enter prior to entering Conrail property. The location and design of that portion of the access route to the project site that is on Conrail property shall be shown clearly on any plans for the project and approved by Conrail.
It is to be clearly understood that the issuance of a permit-to-enter does not constitute authority to proceed with any construction work. Construction cannot begin until a formal agreement between Conrail and the sponsor is executed, and the sponsor receives permission from Conrail's representative to proceed with the work.

INSURANCE

In addition to any other forms of insurance or bonds required under the terms of any contract or specifications and except to the extent that any of the requirements of this section are expressly waived or revised in writing by Conrail, prior to the commencement of any work, contractor, at his own cost and expense, shall maintain insurance of the following kinds and amounts and deliver to Conrail satisfactory evidence of such insurance as indicated herein:

1. Public Liability Insurance
Public Liability Insurance, including contractual liability insurance of not less than $5,000,000 combined single limit for bodily injury and/or property damage for damages arising out of bodily injuries to or death of all persons in any one occurrence and for damage to or destruction of property, including the loss of use thereof, in any one occurrence. Conrail shall be named as an additional insured under this insurance.
2. Automobile Liability Insurance
Automobile Liability Insurance with a limit of not less than $5,000,000 combined single limit for bodily injury and/or property damage per occurrence. Conrail shall be named as an additional insured under this insurance.
3. Workers' Compensation / Employers' Liability Insurance
Employers' Liability and Occupational Disease Insurance with limits of $1,000,000 each accident, $1,000,000 policy limit and $1,000,000 each employee. Such policy shall include a waiver of subrogation in favor of Conrail.

4. General Contractors Pollution Legal Liability Insurance
General Contractor's Pollution Liability Insurance with limits of not less than $5,000,000 per occurrence / $5,000,000 aggregate bodily injury, property damage and cleanup expenses resulting from pollution conditions. Conrail shall be named as an additional insured under this insurance.

5. Railroad Protective Liability Insurance
With respect to the operations performed by it or any of its' subcontractors, contractor shall provide Railroad Protective Liability Insurance (ISO-RIMA FORM) in the name of Consolidated Rail Corporation *, with a limit of not less than $2,000,000 per occurrence, combined single limit for bodily injury and/or property damage, for damages arising out of bodily injuries to or death of all persons and for damage to or destruction of property, including the loss of use thereof. Such insurance shall also contain an aggregate of not less than $6,000,000 for damages arising out of more than one occurrence. * Conrail shall be the "Named Insured" on this policy.

The insurance specified above shall be carried until the project is satisfactorily completed and formally accepted by Conrail. The above indicated insurance coverages shall be effected under standard form policies issued by insurers of financial responsibility that are rated "A" or better by Best's Insurance Reports, "AA" or better by Standard & Poor's Insurance Rating Service, and "Aa" or better by Moody's Investors Service. Conrail reserves the right to reject as inadequate any insurance coverage provided by an insurance company that is rated less than the ratings above by any of the aforementioned rating services. The above indicated insurance coverages shall be enforceable by any legitimate claimant after the termination or cancellation of the project, whether by expiration of time, by operation of law or otherwise, so long as the basis of the claim against the insurance company occurred during the project and when the insurance was in force. Contractor shall furnish Conrail with certificates of insurance evidencing the insurance coverages required in sections 1, 2, 3, & 4, and shall also furnish the original Railroad Protective Liability Insurance policy referred to in section 5 at least thirty (30) days prior to commencement of the project. All insurance policies shall be endorsed to provide that the insurance company shall give thirty (30) days prior written notice to Conrail if the policies are to be terminated or if any changes are to be made which shall in any way affect the insurance requirements of the project. Certificates, policies or notices should be sent to Manager - Insurance, Consolidated Rail Corporation, 2001 Market Street - 6A, PO Box 41406, Philadelphia, PA 19101-1406.

CHANGES IN RAILROAD FACILITIES

Temporary and permanent changes of signal, communication, power transmission lines, trailers, drainage and other railroad facilities required in connection with the project to clear temporary and/or permanent work of the sponsor as shown on the approved construction plans, shall be made or caused to be made by Conrail at the sole cost and expense of the sponsor in accordance with Conrail's force account estimate. Any other changes made or services furnished by Conrail at the request of the sponsor shall be the sole cost and expense of the sponsor.

PROTECTION OF RAILROAD OPERATIONS

The sponsor shall conduct the work in such a manner as to safeguard the operations, facilities, right of way and property of Conrail. All work affecting the above items shall be subject to the approval of Conrail. The sponsor's operations adjacent to, over or under Conrail's tracks,

facilities, right of way, and property shall be governed by Conrail's standards and by such other requirements as specified by Conrail's representative so as to insure the safe operation of trains, prevent delay to trains and insure the safety of all concerned, including the sponsor's forces.

An operating track shall be considered obstructed or fouled when any object is brought closer than fifteen (15) feet (4.6 m) horizontally from the centerline of track and projects above the top of tie or as determined by Conrail's representative. A power line shall be considered fouled when any object is brought to a point less than eight (8) feet (2.5 m) therefrom. A signal line shall be considered fouled when any object is brought nearer than six (6) feet (1.8 m) to any wire or cable. Cranes, trucks and other equipment shall be considered as fouling the track, power line or signal line when failure of equipment, whether working or idle, with or without load, will obstruct the track or other Conrail facilities.

Equipment used by the sponsor shall be in first-class condition to preclude any failure that would cause interference with the operation of Conrail trains or damage to its facilities. The sponsor's equipment shall not be placed or put in operation adjacent to the tracks or facilities of Conrail without obtaining clearance from Conrail's representative. All such equipment shall be operated by the sponsor in a manner satisfactory to Conrail. No equipment or material shall be stored on Conrail property.

In general, a hazard occurs and a flagman is necessary in the following circumstances: (1) the driving of sheeting or piles within twenty five (25) feet (7.6 m) of the tracks, (2) the removal or demolition of all or part of an overhead or adjacent structure, (3) the erection of any structural material, or (4) the performance of any other operation that could obstruct or foul (as described above) the tracks or other facilities of Conrail as determined by Conrail's representative.

Minimum overhead and lateral clearances as specified by Conrail, shall be maintained during the performance of all work. Existing overhead and lateral clearances shall be maintained during construction unless a temporary reduction in clearance for construction purposes is approved, in writing, by Conrail. The sponsor shall erect a highly visible construction fence no closer than fifteen (15) feet (4.6 m) from the centerline of the track through the work area to insure that the lateral clearance requirement is being met.

All wire and attachments shall be treated as live unless notified by Conrail's representative that same have been grounded and de-energized. Particular attention shall be given to the use of hand lines containing metal strands which cannot be used when working near or above exposed live wires. When working over wires, tools and materials not in use shall be stored in a manner to prevent them from falling. Tools or materials shall not be thrown to or by men working over the wires. The sponsor shall be responsible for locating and protecting all underground facilities.

Painting and paint removal procedures shall be approved by the Conrail and inspected by Conrail's representative prior to beginning the work over railroad right of way. The sponsor shall protect the track structure and railroad property from any material used in conjunction with performing the work. A flagman shall be required whenever the above described work fouls or is likely to foul the track, as previously defined.

The sponsor shall give notice to Conrail's representative at least fourteen (14) days in advance of the time work is to be commenced. Conrail shall assign, at the sole cost and expense of the

sponsor, conductors and/or flagmen, or other similar qualified employees to protect Conrail's trains and facilities when in the opinion of its representative, the construction work will cause or may cause a hazard to Conrail facilities and the safe operation of trains. No operations of the sponsor shall be carried out without all the necessary protection to properly safeguard the work.

The minimum hours per day for railroad employees engaged in flagging service shall be eight (8) hours. The overtime rate will be charged for all time in excess of eight (8) hours. Flagmen are paid from the time they leave headquarters until they arrive back at headquarters. The travel time to and from project site is known as "deadheading" and is paid at full rate of pay, plus travel expenses. No conductor or flagman may remain on duty longer than twelve (12) hours in any twenty-four (24) hour period.

The providing of flagmen or inspectors or the taking of other precautionary measures, shall not, however, relieve the sponsor from liability for payment of damages caused by their operations. The sponsor must obtain permission from the flagman before fouling or obstructing any track.

The sponsor shall be responsible for damage to Conrail facilities or property arising out of the execution of its work. Conrail shall undertake any necessary repair work at the sole cost and expense of the sponsor. Billing for the work shall be in accordance with Conrail's standard billing procedures.

Conrail labor shall be charged to sponsor at actual rate plus amount paid for insurance, railroad retirement, excise tax, vacation allowance, holidays, health and welfare benefits, small tools, 401k payment and overhead in accordance with Conrail's standard billing procedures. Materials shall be charged to the sponsor at actual cost to Conrail plus transportation costs, handling expense and applicable taxes.

RAILROAD ENGINEERING AND INSPECTION

Conrail, at its sole discretion, may assign an engineer or inspector for the general protection of railroad property and operations during the construction of the project. This inspection service shall be supplied at the sole cost and expense of the sponsor.

PAYMENT OF RAILROAD SERVICES

It is a requirement that the sponsor shall reimburse Conrail in full for work undertaken by Conrail in accordance with any provision of these special requirements. Final contract payment shall not be made by the sponsor to its contractor, sub-contractor, consultant or agent, until Conrail certifies that all railroad bills against them, if any, have been paid in full.

TEMPORARY GRADE CROSSING

Under most circumstances, a grade crossing of our track will not be permitted. Should the sponsor demonstrate a necessity for a temporary grade crossing of Conrail's tracks, the sponsor shall be required to apply for and execute the standard private grade crossing agreement for each crossing required. Application for the crossing shall be made to Conrail at least twelve (12) weeks before the crossing is required and addressed to:

Consolidated Rail Corporation
2001 Market Street -12B
PO Box 41412
Philadelphia, Pennsylvania 19101-1412

A letter size plan showing the location, size, construction details, and access to the requested crossing should accompany the letter of application. The plan shall be fully detailed and dimensioned with all Conrail facilities shown and referenced. The sponsor shall state the purpose for which the crossing is needed and the expected life of the crossing. All application fees, construction, maintenance, protection and removal costs shall be at the sole cost and expense of the sponsor. The roadbed and all other Conrail facilities will be restored to the original condition subject to the approval of Conrail's designated representative.

SHEETING AND SHORING REQUIREMENTS

The following items are to be included in the design and construction procedures for all permanent and temporary facilities adjacent to Conrail tracks:

1) Footings for all piers, columns, walls or other facilities shall be located and designed so that any temporary sheeting and shoring for support of adjacent track or tracks during construction shall not be closer than ten (10) feet (3.0 m) from the centerline of the nearest track.
2) When excavation for construction of the above mentioned facilities is within the theoretical railroad embankment line (see Conrail Drawing SK-1, attached), interlocking steel sheet piling, driven prior to excavation, must be used to protect track stability. The use of trench boxes or similar devices is not acceptable. Soldier piling and lagging will be considered for supporting adjacent track(s) only when its use is approved by Conrail. Consideration for the use of soldier piling and lagging shall be made if the required penetration of steel sheet piling cannot be obtained and when dry, non-running, stable material will be encountered.
3) The sheeting shall be designed to support all lateral forces caused by the earth, railroad and other surcharge loads. The railroad loading to be applied is an E-80 loading. This loading consists of 80 Kip (356 KN) axles spaced five (5) feet (1.5 m) on centers. The lateral forces acting on the sheeting shall be computed as follows:
   a. The Rankine Theory shall be used to compute the active earth pressure due to the weight of the soil.
   b. The Boussinesq analysis shall be used to determine the lateral pressure caused by the railroad loading. The load on the track shall be taken as a strip load with a width equal to the length of the ties (8'-6" or 2.6 m). The vertical surcharge, q (psf), caused by each axle, shall be uniform and equal to the axle weight divided by the tie length and the axle spacing (5'-0" or 1.5 m). For an E-80 loading, this results in: $q = 80{,}000 / (8.5 \times 5) = 1882$ psf (90.1 KPa). The horizontal pressure due to the live load surcharge at any point on the sheet piling wall is Ph and can be calculated by the following: $Ph = (2q/\pi)(\beta - \sin\beta \cos 2\alpha)$ (see Conrail Drawing SK-2, attached).
4) Deflection design criteria is as follows:
   a. 1/2" (1.27 cm) maximum deflection for sheet piling ten (10) feet (3.0 m) from centerline of the nearest track.
   b. 1" (2.54 cm) maximum deflection for sheet piling greater than ten (10) (3.0 m) feet from centerline of the nearest track.
   c. Use K (at-rest earth pressure) for design of all braced and tie-back excavations.

5) The allowable stresses for the sheet piling and other steel members (wales, struts, etc.) shall be in accordance with AREA Chapter 15, Part 1. These allowable stresses may be increased ten percent (10%) due to the temporary nature of the installations. A factor of safety of at least 1.5 must be used on temporary sheeting for the embedment length (i.e. multiply calculated embedment depth by 1.5).
6) Where soil or rock anchors are used, all anchors must be tested. Testing shall be in accordance with industry standards with ten percent (10%) of the anchors "Performance Tested" and all others "Proof Tested". All tie-back anchor stresses are to be in accordance with AREA Chapter 8, Part 20.5.7.
7) Exploratory trenches, three (3) feet (0.9 m) deep and fifteen (15) inches (0.4 m) wide in the form of an "H" with outside dimensions matching the outside of sheeting dimensions are to be hand dug, prior to placing and driving steel sheeting, in areas where railroad underground installations are known to exist. These trenches are for exploratory purposes only and are to be backfilled with the backfill compacted immediately. This work must be done in the presence of Conrail's representative.
8) Absolute use of track is required while driving sheeting within fifteen (15) feet (4.6 m) from centerline of a live track. The procedure for arranging the use of track shall be as outlined on pages Three and Four.
9)Cavities adjacent to the sheet piling, created by the driving of sheet piling, shall be filled with sand and any disturbed ballast must be restored and tamped immediately.
10)Sheet piling shall be cut off at the top of tie during construction. After construction and backfilling has been completed, piling within ten (10) feet (3.0 m) from centerline of track, or when bottom of excavation is below a line extending a 1:1 slope from end of tie to point of intersection with sheeting, shall be cut off eighteen (18) inches (0.5 m) below existing ground line and left in place.
11)Any excavation adjacent to track shall be covered and ramped and provided with barricades as required by Conrail. A lighted walkway with a handrail must be provided adjacent to the track for any excavation within ten (10) feet (3.0 m) of the centerline.
12)Final backfilling of excavation shall be as required by project specifications.
13)The sponsor is to advise Conrail of the time schedule of each operation and obtain approval of Conrail for all work to be performed adjacent to Conrail tracks so that it may be properly supervised by railroad personnel.
14)All drawings for temporary sheeting and shoring shall be prepared and stamped by a Registered Professional Engineer and shall be accompanied by complete design computations when submitted for approval.
15)Where physical conditions of design impose insurmountable restrictions requiring the placing of sheeting closer than specified above, the matter must be submitted to Conrail for approval of any modifications.
16)Five (5) copies of the submission are to be sent to Conrail's Area Engineer. The sponsor is advised to expect a minimum thirty (30) day review period from the day the submission is received by the Area Engineer.
17)Conrail's representative must be present at the site during the entire sheeting and shoring procedure period. The sponsor must notify the railroad representative at least seventy-two (72) hours in advance of the work. No changes will be accepted after that time.

ERECTION, HOISTING AND DEMOLITION REQUIREMENTS

1) A plan showing the locations of cranes, horizontally and vertically, operating radii, with delivery or disposal locations shown. The location of all tracks and other railroad facilities should also be shown.
2) Crane rating sheets showing cranes to be adequate for 150% of the actual weight of the pick. A complete set of crane charts, including crane, counterweight, and boom nomenclature is to be submitted.
3) Plans and computations showing weight of picks must be submitted. Where beams are being removed over Conrail facilities, the weight shall include the weight of concrete or other material that will be included in each pick. Calculations shall be made from plans of the existing and/or proposed structure showing complete and sufficient details with supporting data for the demolition or erection of the structure.
4) If the sponsor can prove to Conrail that plans do not exist and weights must be calculated from field measurements, the field measurements are to be made under the supervision of the Registered Professional Engineer submitting the procedure and he shall include sketches and estimated weight calculations with his procedure. If possible, field measurements shall be taken with a Conrail representative present. Weights shall include the weight of concrete, or other material, that will be included in the lifts.
5) If the procedure involves either the cutting of steel or the bolting of joints which would affect Conrail operations, a detailed staging plan with estimated durations will be required.
6) A location plan showing all obstructions such as wires, poles, adjacent structures, etc., must be provided to show that the proposed lifts are clear of these obstructions.
7) A data sheet shall be prepared listing the type, size and arrangements of slings, shackles, or other connecting equipment. Include copies of a catalog or information sheets for specialized equipment.
8) A complete procedure is to be included, indicating the order of lifts and any repositioning or rehitching of the crane or cranes.
9) Demolition shield submittals must include a plan showing the details of the shield, a written installation and removal procedure and design calculations verifying the capacity of the shield. The shield should be designed for a minimum load of fifty (50) pounds/sq.ft (245 kgs./sq.m) plus the weight of the equipment, debris and any other load to be carried.
10) Temporary support of any components (overhead or undergrade) or intermediate stages is to be shown and detailed. A guardrail (railroad) will be required to be installed in a track where a temporary bent is located within twelve (12) feet (3.7 m) from the centerline of that track.
11) A time schedule of the various stages must be shown as well as a schedule for the entire lifting procedure.
12) All bridge erection or demolition procedures submitted will be prepared, signed and sealed by a Registered Professional Engineer.
13) Five (5) copies of the lifting procedures are to be sent to Conrail's Area Engineer. The sponsor is to expect a minimum thirty (30) day review period from the day the submission is received by The Area Engineer.
14) Conrail's representative must be present at the site during the entire demolition and erection procedure period. The sponsor must notify the railroad representative at least seventy-two (72) hours in advance of the work. No changes will be accepted after that time.
15) The name and experience of the employee supervising the operation must be supplied to Conrail.

OVERGRADE BRIDGE REQUIREMENTS

CLEARANCES

1) The minimum vertical clearance above the top of the higher rail shall be twenty three (23) feet (7 m) at all times. In areas where the railroad has been electrified with a catenary wire, and areas which are likely to be electrified, the minimum vertical clearance must be twenty four (24) feet, six (6) inches (7.5 m) above the top of the higher rail.
2) The minimum horizontal clearance measured from the centerline of track to the near face of the obstruction must be twenty (20) feet (6.1 m) for tangent track and twenty one (21) feet (6.4 m) for curves. See Conrail Standard Plan 48754-B, attached.
3) Whenever practicable, bridge structures must have the piers and abutments located outside of the railroad right of way. All piers located less than twenty five (25) feet (7.6 m) from the centerline of track require a crashwall designed in accordance with specifications outlined in the current AREA manual.
4) All piers should be located so that they do not interfere with ditches. Where special conditions make this impossible, an explanation of these conditions must be submitted with the drainage plans for review by Conrail.
5) The permanent clearances should be correlated with the methods of construction so that temporary construction clearances will not be less than the minimum allowed.
6) Bridge structures shall provide sufficient lateral and vertical clearance for anticipated future tracks, changes in track centers and raising of tracks for maintenance purposes. The locations of these tracks shall be determined by inquiry to Conrail.
7) The profile of the top of rail should be examined to determine if the track is in a sag at the location of the bridge. If the track is in a sag, the vertical clearance from the track to the bridge should be increased sufficiently to allow raising the track to remove the sag.
8) Plans for bridges must show dimensioned locations of all utilities which might be located on the railroad right of way.
9) Vertical and horizontal clearances must be adjusted so that the sight distance to railroad signals is not reduced from what is existing.
10) All proposed temporary clearances which are less than those listed above must be submitted to Conrail for review and must be approved by Conrail prior to construction.
11) Clearances are subject to the requirements of the state in which the construction takes place and must be approved by the State and Conrail if less than those prescribed by law.

DRAINAGE

1) Maintaining the existing drainage and providing for future drainage improvements is of the utmost importance. Conrail will give special attention to reviewing drainage details.
2) Drainage plans must be included with the general plans submitted to Conrail for approval. These plans must include hydrologic and hydraulic studies and computations showing the frequency and duration of the design storm used, as well as the method of analysis such as Soil Conservation Service or the Rational method. Conrail uses storms with a 100-year recurrence interval as the minimum design storm.
3) Lateral clearances must provide sufficient space for construction of the required track ditch parallel to the standard roadbed section. If the ditch cannot be provided, or the

pier will interfere with the ditch, then a culvert of sufficient size must be provided. See Conrail Standard Plans 48754-B and 48747, attached.

4) Ditches and culverts must be sized to accommodate all increased run-off due to the construction and the increased size must continue to the natural outlet of the ditch. Ditches must be designed in accordance with good drainage engineering practices and must meet all local codes and ordinances.
5) No scuppers or other deck drains, roadway drainage, catch basins, inlets or outlets are permitted to drain onto Conrail property. Any variation of this policy must have the prior approval of Conrail. If an exception is ultimately granted, maintenance of such should not be Conrail's. Drainage from scuppers and deck drains must be conveyed through pipes, preferably to a point which is off Conrail property. If the drainage must be conveyed into a railroad ditch, calculations must be provided to Conrail which indicate the ability of the ditch to carry the additional run-off.
6) Additional drainage may require the installation of a pipe or pipes, new ditch or reprofiling of the existing ditch.

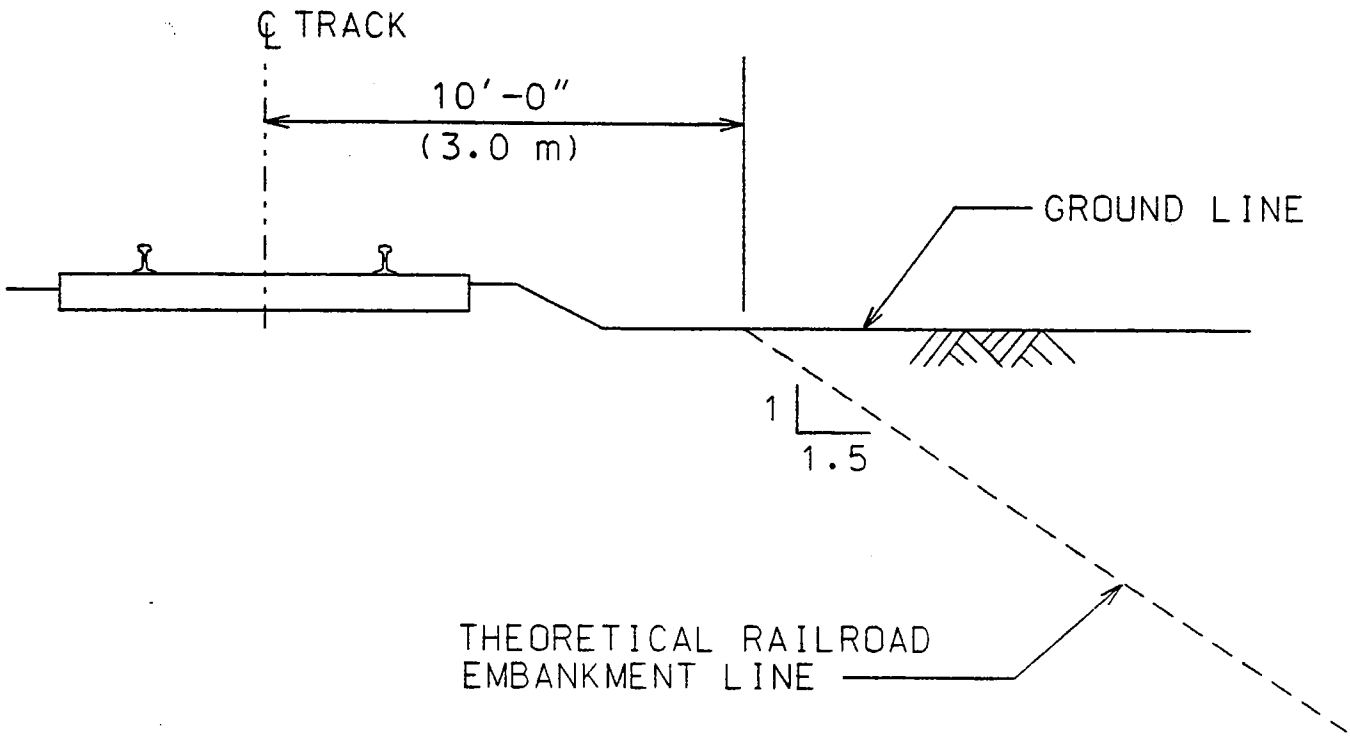
EROSION CONTROL

1) Embankment slopes on Conrail property adjacent to the track must have a slope of 2:1 or less and be paved for a minimum of two (2) feet (0.6 m) beyond the outside edge of the bridge foundation structure. The purpose of the pavement is to minimize erosion of the embankment material and to reduce deterioration of the sub-grade material by drainage water. The pavement shall consist of a prepared sub-base and/or filter fabric with grouted rip-rap on the surface.
2) The general plans for the bridge should indicate the proposed methods of erosion control during construction and must specifically address means to prevent silt accumulation in ditches and culverts and to prevent fouling the track ballast and sub-ballast. If the plans do not show erosion control, the contractor must submit a proposed method of erosion control and must have this method approved by Conrail prior to beginning any grading on the site.
3) Existing track ditches must be maintained at all times throughout the construction period. After the construction has been completed, all erosion and siltation must be removed and the ditches must be restored.
4) Conrail's approval of drainage and erosion control plans will not relieve the sponsor submitting these plans from ultimate responsibility for a satisfactory plan.

REFERENCES

1) In areas where underground utilities may be affected, Conrail's C.E. 8, "Specifications for Pipeline Occupancy" will govern.
2) In areas where power or communication lines will be affected, Conrail's C.E. 4, "Specifications for Wire, Conduit and Cable Occupations" will govern.

CE-6 prepared by F. X. Giacoma, Civil Engineer, Conrail Engineering Department.



REQUIREMENTS FOR TEMPORARY SHEET PILING ADJACENT TO TRACK

1. STEEL SHEET PILING FOR TRACK SUPPORT IS NOT REQUIRED FOR EXCAVATION OUTSIDE THE THEORETICAL RAILROAD EMBANKMENT LINE. SHORING IN ACCORDANCE WITH OSHA REQUIREMENTS SHALL BE USED IN THIS AREA.

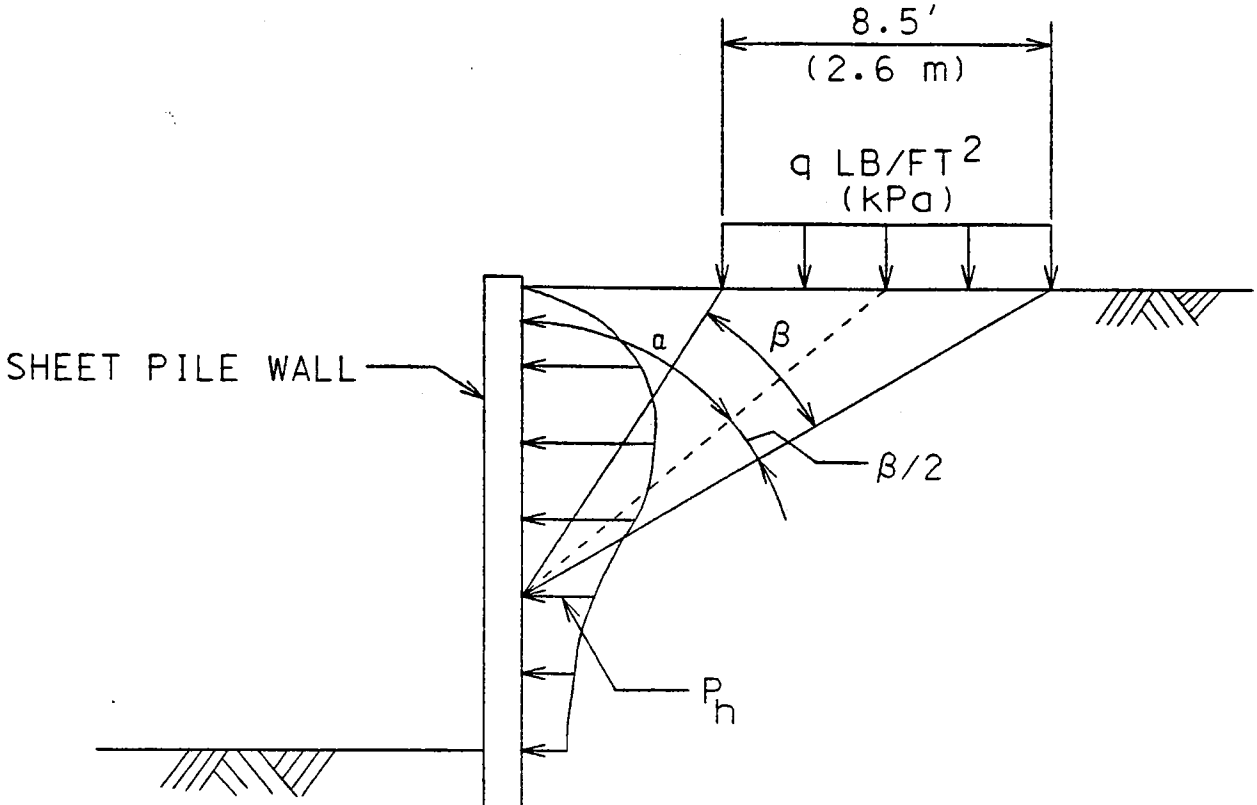
2. STEEL SHEET PILING, DRIVEN PRIOR TO EXCAVATION, IS REQUIRED WHEN EXCAVATION IS WITHIN THE THEORETICAL RAILROAD EMBANKMENT LINE.

3. ALL SHEET PILING IS TO BE DESIGNED FOR AN E-80 LOADING. THE BOUSSINESQ ANALYSIS IS TO BE USED TO DETERMINE THE LATERAL PRESSURE CAUSED BY THE RAILROAD LOADING.

OFFICE OF CHIEF ENGINEER - D & C

FEB 1, 1995 DWG. NO.: SK-1

LATERAL PRESSURE DIAGRAM



$P_h = (2q/\pi)(\beta - \text{SIN } \beta \text{ COS } 2\alpha)$

P_h = PRESSURE AT ANY GIVEN POINT

q = STRIP LOAD SURCHARGE

α = ANGLE IN DEGREES

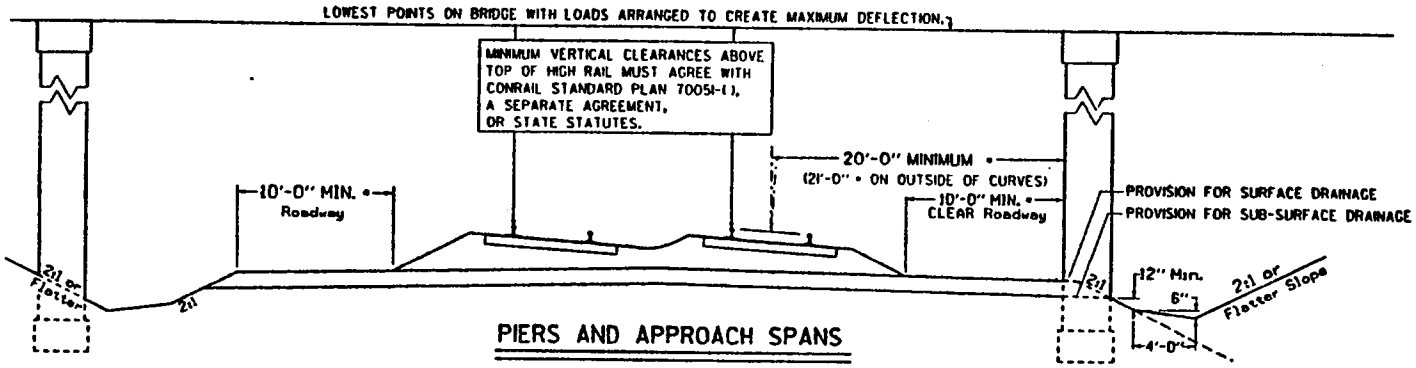
β = ANGLE IN RADIANS

LATERAL PRESSURE DUE TO STRIP LOAD

OFFICE OF CHIEF ENGINEER - D & C

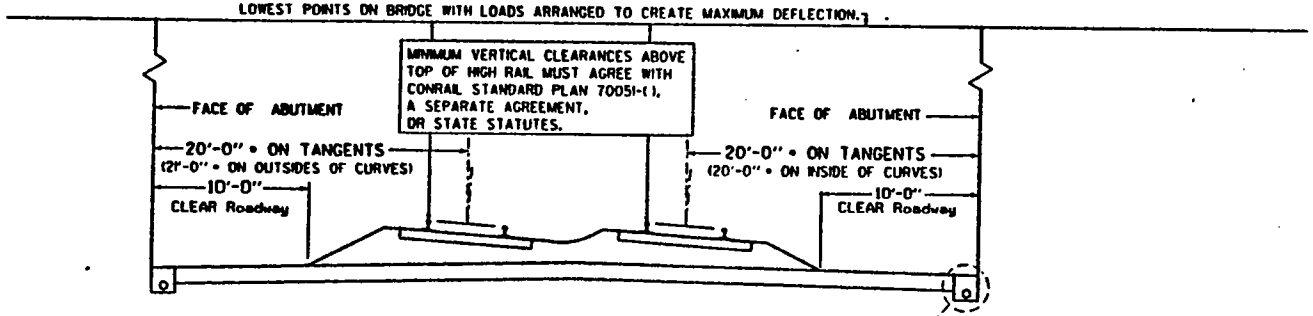
FEB 1, 1995 DWG. NO.: SK-2

RAIN WATER RUNOFF MUST NOT BE DEPOSITED ONTO THE RAILROAD RIGHT OF WAY.
DECK DRAINS AND SCUPPERS ARE PROHIBITED BETWEEN THE TRACK DITCHES.



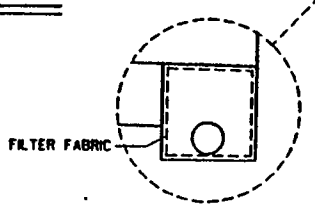
PIERS AND APPROACH SPANS

RAIN WATER RUNOFF MUST NOT BE DEPOSITED ONTO THE RAILROAD RIGHT OF WAY.
DECK DRAINS AND SCUPPERS ARE PROHIBITED BETWEEN THE TRACK DITCHES.
LOWEST POINTS ON BRIDGE WITH LOADS ARRANGED TO CREATE MAXIMUM DEFLECTION.



ABUTMENTS

DRAINAGE PIPE - 24" MINIMUM DIAMETER



18" X 18" DRAINAGE AREA WITH OPEN GRADED STONE AND 6" DIA. PERFORATED PIPE SLOPED TO DRAIN, (WITH FILTER FABRIC WHEN REQUIRED).

DRAINAGE PIPE - 24" MINIMUM DIAMETER PIPES SHOULD BE PROVIDED ON BOTH SIDES TO PERMIT CONTINUITY OF ROADBED DITCHES.

ALL SIDE SLOPES THROUGH THE BRIDGE AREA MUST BE COVERED WITH RIP-RAP.

DITCHES AND SLOPES THROUGH THE BRIDGE AREA MUST MEET THE EXISTING DRAINAGE FACILITIES AND MATCH OR EXCEED THEM IN HYDRAULIC CAPACITY.

PIERS LOCATED LESS THAN 25 FEET FROM THE CENTERLINE OF ANY TRACK MUST BE PROTECTED BY CRASH WALLS IN ACCORDANCE WITH THE SPECIFICATIONS IN CHAPTER 8, PART 2.1.5 OF THE A.R.E.A. MANUAL FOR RAILWAY ENGINEERING.

• - LATERAL CLEARANCES MARKED "•" MAY BE REDUCED BY 2 FEET IF A ROADWAY IS NOT REQUIRED.

ADDITIONAL CLEARANCE MAY BE REQUIRED TO ACCOMODATE COMMUNICATION AND SIGNAL POLE LINES, OR AS OTHER FIELD CONDITIONS REQUIRE.

FLAT BOTTOM DITCHES, AS SHOWN, ARE TO BE USED. "V" BOTTOM DITCHES ARE PERMITTED ONLY IN CONJUNCTION WITH A DRAINAGE PIPE. THE PIPE MUST HAVE AT LEAST 4 FEET OF COVER, OR BE AT AN ELEVATION MEETING THE EXISTING DITCHES, AND MUST BE AT LEAST 24" DIAMETER.

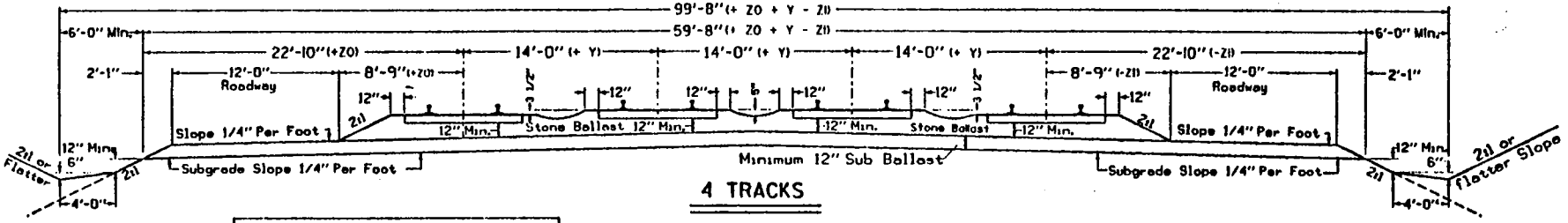
THE DITCH SECTION SHOWN IS THE MINIMUM ACCEPTABLE SECTION. DITCH SIZES MUST BE INCREASED WHEN NECESSARY AS DETERMINED BY HYDROLOGIC AND HYDRAULIC STUDIES, OR IF THE DRAINAGE PATTERN IS ALTERED BY CONSTRUCTION.

CONRAIL 48754-B

OVERHEAD BRIDGE MINIMUM CLEARANCE DIAGRAM

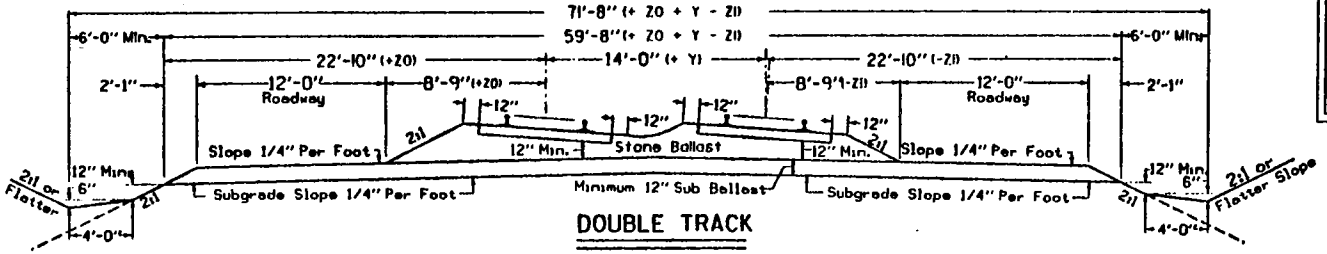
CHIEF ENGINEER D&C

FEBRUARY, 1990



4 TRACKS

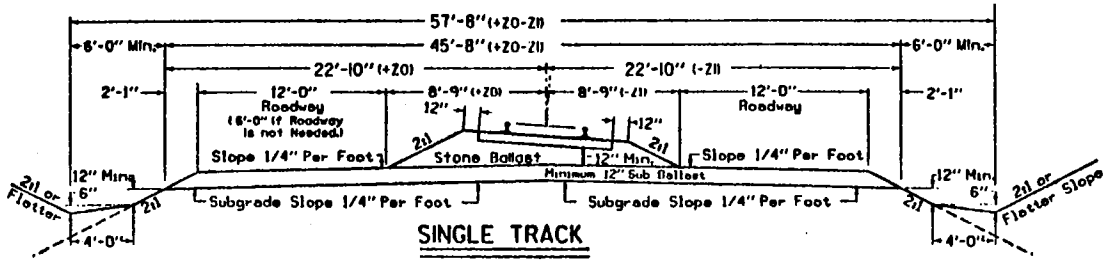
Note: Z0 and Z1 are indicated for tracks which curve to the right.



DOUBLE TRACK

Y DIMENSION
On adjacent tracks where the super-elevation is the same or the outer track has less, Y=2" per degree of curve.
Where super-elevation is greater on the outer track, Y = 2" per degree of curve added to 3 1/2 times the amount of difference in super-elevation.

Z Dimensions 2 or More Tracks		
Super-Elevation	Z0 - Outside of Curve	Z1- Inside of Curve
0"	0"	0"
1"	4"	1"
2"	7"	5"
3"	10"	6"
4"	1'-1"	7"
5"	1'-4"	8"
6"	1'-7"	10"



SINGLE TRACK

Z Dimensions Single Track		
Super-Elevation	Z0 - Outside of Curve	Z1- Inside of Curve
0"	0"	0"
1"	2"	2"
2"	5"	4"
3"	8"	5"
4"	11"	6"
5"	1'-3"	7"
6"	1'-6"	9"

CONRAIL

48747

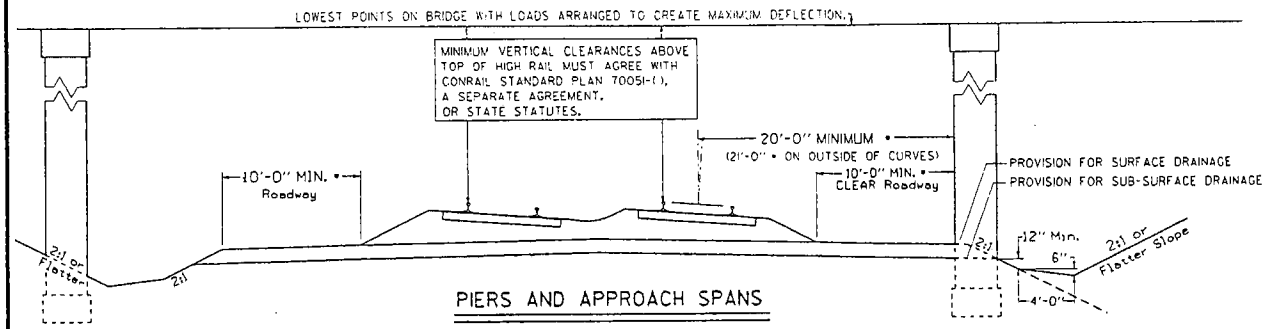
TYPICAL

ROADBED AND BALLAST SECTIONS

AUGUST, 1988

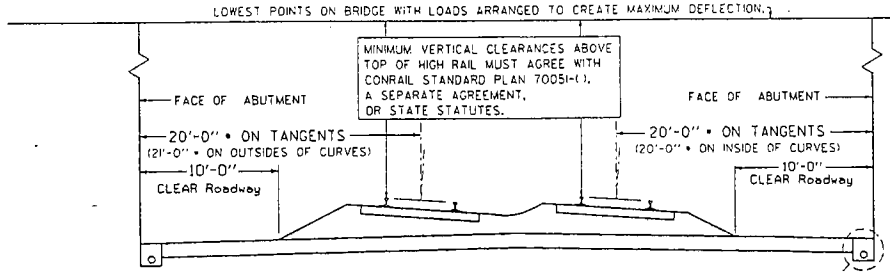
CHIEF ENGINEER D&C

RAIN WATER RUNOFF MUST NOT BE DEPOSITED ONTO THE RAILROAD RIGHT OF WAY.
DECK DRAINS AND SCUPPERS ARE PROHIBITED BETWEEN THE TRACK DITCHES.



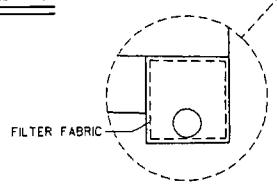
PIERS AND APPROACH SPANS

RAIN WATER RUNOFF MUST NOT BE DEPOSITED ONTO THE RAILROAD RIGHT OF WAY.
DECK DRAINS AND SCUPPERS ARE PROHIBITED BETWEEN THE TRACK DITCHES.
LOWEST POINTS ON BRIDGE WITH LOADS ARRANGED TO CREATE MAXIMUM DEFLECTION.



ABUTMENTS

DRAINAGE PIPE - 24" MINIMUM DIAMETER



18" X 18" DRAINAGE AREA WITH OPEN GRADED STONE AND 6" DIA. PERFORATED PIPE SLOPED TO DRAIN, (WITH FILTER FABRIC WHEN REQUIRED).

DRAINAGE PIPE - 24" MINIMUM DIAMETER PIPES SHOULD BE PROVIDED ON BOTH SIDES TO PERMIT CONTINUITY OF ROADBED DITCHES.

ALL SIDE SLOPES THROUGH THE BRIDGE AREA MUST BE COVERED WITH RIP-RAP.

DITCHES AND SLOPES THROUGH THE BRIDGE AREA MUST MEET THE EXISTING DRAINAGE FACILITIES AND MATCH OR EXCEED THEM IN HYDRAULIC CAPACITY.

PIERS LOCATED LESS THAN 25 FEET FROM THE CENTERLINE OF ANY TRACK MUST BE PROTECTED BY CRASH WALLS IN ACCORDANCE WITH THE SPECIFICATIONS IN CHAPTER 8, PART 2.1.5 OF THE A.R.E.A. MANUAL FOR RAILWAY ENGINEERING.

• - LATERAL CLEARANCES MARKED "•" MAY BE REDUCED BY 2 FEET IF A ROADWAY IS NOT REQUIRED.

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INTERGRAPH FILE SECTION.DGN