

**FORM NCR 103**

**SPECIFIC REQUIREMENTS  
OF  
NORTH CAROLINA RAILROAD COMPANY  
FOR  
WORK ON ITS RIGHT OF WAY**

**SEPTEMBER 1, 2003**

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## **1. SCOPE**

It must be clearly understood that North Carolina Railroad Company (NCRR) owns and uses its right of way for the primary purpose of railroad operations. 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 the railroad will have unrestricted use of its property for current and future operations. The sponsor of the project is ultimately responsible for assuring that its agents, consultants, contractors and sub-contractors fully comply with the specifications contained herein and with specifications of the operating railroad. 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 property of NCRR.

It should also be understood that while the property and facilities are owned by The NCRR, the railroad is presently operated by the Norfolk Southern Corporation and the CSX Transportation, Inc. by agreement with The NCRR. Therefore, all work on the property must comply with various safety and operating rules set forth by these railroads, or any subsequent operating companies. Any reference in this Form 103 to The NCRR will also apply to the operating company unless exception is permitted by the NCRR.

## **2. RIGHT OF ENTRY ON NCRR PROPERTY**

No entry upon NCRR property will be permitted without the proper authorization by NCRR, and/or the operating railroad, to the sponsor in the form of an agreement or a proper permit-to-enter. The applicant must pay the associated fees and execute the permit-to-enter prior to entering NCRR property. The Applicant must also meet all right of entry requirements of the operating railroad.

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 is executed by NCRR and the sponsor, and the sponsor receives permission from the designated inspection agency of NCRR to proceed with the work. Approval must also be received from the designated operator of the NCRR.

## **3. INSURANCE**

In addition to any other forms of insurance or bonds required under the terms of the contract and specifications, Contractor will be required to carry insurance of the following kinds and amounts:

### **A. Public Liability Insurance**

Contractor shall furnish evidence that, with respect to the operations it performs, it carries Public Liability Insurance, including contractual liability insurance with a limit of not less than \$5,000,000 single limit, bodily injury and/or property damage combined, 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.

### **B. Automobile Public Liability Insurance**

When any motor vehicles are used in connection with the work to be performed, Contractor shall furnish evidence that it carries Automobile Public Liability Insurance and Property Damage Liability Insurance with a limit of not less than \$5,000,000 covering bodily injury and/or property damage for each occurrence.

**C. Workers' Compensation in Statutory Amounts**

Contractor shall furnish evidence that it carries 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.

**D. Railroad's Protective Public Liability Insurance**

In addition to Items I and 2 shown above, Contractor shall furnish evidence that, with respect to the operations it or any of its subcontractors perform, it has provided Railroad Protective Public Liability Insurance (ISO-RIMA form) in the name of North Carolina Railroad Company, and/or its operating railroad, providing for a limit of not less than \$2,000,000 single limit, bodily injury and/or property damage combined, 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. Such insurance shall be furnished with an aggregate of not less than \$6,000,000 for all damages as a result of more than one occurrence.

The insurance hereinbefore specified shall be carried until all work required to be performed under the terms of the contract is satisfactorily completed and formally accepted. Failure to carry or keep such insurance in force until all work is satisfactorily completed shall constitute a breach of contract. The aforesaid insurance protection 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 periods of time for which such insurance was obtained. Contractor shall furnish to NCCR at the address listed below, certificates evidencing the insurance outlined in sections 1, 2 & 3 above, and shall furnish the original ISO-RIMA policy for the Railroad Protective Public Liability Insurance referred to in section 4. NCCR and/or operating railroad must be named as additional insured under insurances outlined in sections I & 2 above. Each insurance policy shall be endorsed to provide that the insurance company shall notify the following via registered or certified mail at least thirty (30) days in advance of termination of or any change in the policy:

Property and Public Affairs Manager  
North Carolina Railroad Company  
2809 Highwoods Blvd., Suite 100  
Raleigh, NC 27604

**4. 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 will be made or caused to be made by NCCR, or its designated operating railroad, at the sole cost and expense of the sponsor in accordance with NCCR, or operating railroad, force account estimate. Any other changes made or services furnished by NCCR at the request of the sponsor shall be the sole cost and expense of the sponsor.

**5. 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 NCCR and its designated operating railroad. All work affecting the above items shall be subject to the approval of the railroad's designated representative. The sponsor's operations adjacent to, over or under NCCR tracks, facilities, right of way, and property shall be governed by NCCR standards and by such other requirements as specified by NCCR'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 horizontally from the centerline of track and projects above the top of tie or as determined by the NCCR

representative. A power line shall be considered fouled when any object is brought to a point less than eight (8) feet therefrom. A signal line shall be considered fouled when any object is brought nearer than six (6) feet 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 NCRR facilities.

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

In general, a hazard occurs and a flagman is necessary during (1) the driving of sheeting or piles within twenty five (25) feet 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 NCRR or the operating railroad as determined by NCRR's representative and the appropriate representative from the operating railroad.

Minimum overhead and lateral clearances as specified by NCRR are to be maintained during the performance of the work. Existing overhead and lateral clearances are to be maintained during construction unless a temporary reduction in clearance for construction purposes is approved, in writing, by NCRR. The sponsor shall erect a highly visible construction fence no closer than fifteen (15) feet 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 the NCRR 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 from men working over the wires to men on the ground. The sponsor shall be responsible for locating and protecting all underground facilities.

Painting and paint removal procedures must be approved by the NCRR Engineering Representative and installed and inspected by the representative prior to beginning the work over railroad right of way. The sponsor will be required to protect the track structure and railroad property from any material used in conjunction with performing the work. A flagman will be required whenever the above described work fouls the track as previously defined.

The sponsor shall give notice to NCRR and/or the operating railroad fourteen (14) days in advance of the time work is to be commenced. NCRR or the operating railroad will assign at the sole cost and expense of the sponsor, conductors and/or flagmen, or other similar qualified employees to protect its trains and facilities when in the opinion of its representative, the construction work will cause or may cause a hazard to NCRR 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, inspectors or 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 NCRR or operating railroad facilities or property arising out of the execution of its work. NCRR or the operating railroad shall undertake any necessary repair work at the sole cost and expense of the sponsor. Billing for the work shall be in accordance with NCRR or operating railroad standard billing procedures.

Labor will 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 and overhead in accordance with railroad's standard billing procedures. Materials will be charged to the sponsor at actual cost to railroad plus transportation costs, handling expense and applicable taxes.

## **6. RAILROAD ENGINEERING AND INSPECTION**

NCRR or the operating railroad, 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 will be supplied at the sole cost and expense of the sponsor.

## **7. PAYMENT OF RAILROAD SERVICES**

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

## **8. TEMPORARY GRADE CROSSING**

Under most circumstances, a grade crossing of NCRR tracks will not be permitted; however, the creation of such a crossing will be at the sole discretion of the NCRR and the operating railroad. Should the sponsor demonstrate a necessity for a temporary grade crossing of NCRR tracks, the sponsor will 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 NCRR at least twelve (12) weeks before the crossing is required and addressed to:

Property and Public Affairs Manager  
North Carolina Railroad Company  
2809 Highwoods Blvd., Suite 100  
Raleigh, NC 27604

A letter size plan showing the location, size, construction details, and access to the requested crossing should accompany the letter of application. The plan should be fully detailed and dimensioned with all NCRR facilities shown and referenced. The letter should 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 will be at the sole cost and expense of the sponsor. The roadbed and all other NCRR facilities will be restored to the original condition subject to the approval of NCRR's designated representative. The operating railroad must also approve crossing requests.

## **9. 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 NCRR tracks.

- A. 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 will not be closer than toe of ballast slope.
- B. When excavation for construction of the above mentioned facilities is within the theoretical railroad embankment line (see drawing Page 11), 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 the railroad's engineer. Consideration for the use of soldier piling and lagging will be made if the required penetration of steel sheet piling cannot be obtained and when dry, non-running, stable material will be encountered.
- C. 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 axles spaced five (5) feet on centers. The lateral forces acting on the sheeting shall be computed as follows:
1. The active earth pressure due to the weight of the soil is to be computed by the Rankine theory.
  2. 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"). 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"). For an E-80 loading, this results in:  $q = 80,000 / (8.5 \times 5) = 1882$  psf.
- 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 drawing Page 12).
- D. The allowable stresses for the sheet piling and other steel members (wales, struts, etc.) shall be in accordance with AREMA Chapter 15, Parts I and 2. These allowable stresses may be increased ten percent (10%) due to the temporary nature of the installations.
- E. 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".
- F. Exploratory trenches, three (3) feet deep and fifteen (15) inches 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 a railroad representative.
- G. Absolute use of track is required while driving sheeting within fifteen (15) feet from centerline of a live track. The procedure for arranging the use of track shall be as outlined on Pages Three and Four.
- H. 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.
- I. 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 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 below existing ground line and left in place.

- J. Any excavation adjacent to track shall be covered and ramped and provided with barricades as required by NCCR representative. A lighted walkway with a handrail must be provided adjacent to the track for any excavation within ten (10) feet of the centerline.
- K. Final backfilling of excavation shall be as required by project specifications.
- L. The sponsor is to advise railroad of the time schedule of each operation and obtain approval of railroad for all work to be performed adjacent to NCCR tracks so that it may be properly supervised by railroad personnel.
- M. 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.
- N. Where physical conditions of design impose insurmountable restrictions requiring the placing of sheeting closer than specified above, the matter must be submitted to the railroad for approval of any modifications.
- O. Five (5) copies of the submission are to be sent to NCCR's designated engineer. The sponsor is advised to expect a minimum thirty (30) day review period from the day the submission is received by the railroad's engineer.
- P. NCCR'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.

## **10. ERECTION, HOISTING AND DEMOLITION REQUIREMENTS**

- A. A plan showing the locations of cranes, horizontally and vertically, operating radii, with delivery or disposal locations shown is required. The location of all tracks and other railroad facilities should also be shown.
- B. 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.
- C. Plans and computations showing weight of picks must be submitted. Where beams are being removed over NCCR 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.
- D. If 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. Weights shall include the weight of concrete, or other material, that will be included in the lifts.
- E. If the procedure involves either the cutting of steel or the bolting of joints which would affect railroad operations, a detailed staging plan with estimated durations will be required.
- F. 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.



- G. 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.
- H. A complete procedure is to be included, indicating the order of lifts and any repositioning or rehitching of the crane or cranes.
- I. 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. plus the weight of the equipment, debris and any other load to be carried.
- J. 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 from the centerline of that track.
- K. A time schedule of the various stages must be shown as well as a schedule for the entire lifting procedure.
- L. All bridge erection or demolition procedures submitted will be prepared, signed and sealed by a Registered Professional Engineer.
- M. Five (5) copies of the lifting procedures are to be sent to NCRRR's designated engineer. The sponsor is to expect a minimum thirty (30) day review period from the day the submission is received by the railroad's engineer.
- N. NCRRR's field 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.
- O. The name and experience of the employee supervising the operation must be supplied to NCRRR.

## **11. OVERGRADE BRIDGE REQUIREMENTS**

- A. Clearances
  - 1. The minimum vertical clearance above the top of the higher rail shall be twenty three (23) feet at all times. In areas which are likely to be electrified, the minimum vertical clearance must be twenty four (24) feet, six (6) inches 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 for tangent track and twenty one (21) feet for curves.
  - 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 from the centerline of track require a crashwall designed in accordance with specifications outlined in the current AREMA 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 NCRRR and the operating railroad.
  - 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 NCRR and the operating railroad.
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 NCRR for review and must be approved by NCRR and the operating railroad prior to construction.

#### B. Drainage

1. Maintaining the existing drainage and providing for future drainage improvements is of the utmost importance. NCRR will give special attention to reviewing the drainage details.
2. Drainage plans must be included with the general plans submitted to NCRR 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. NCRR 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.
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 NCRR property. Any variation of this policy must have the prior approval of the railroad. If an exception is ultimately granted, maintenance of such should not be NCRR's. Drainage from scuppers and deck drains must be conveyed through pipes, preferably to a point which is off NCRR property. If the drainage must be conveyed into a railroad ditch, calculations must be provided to NCRR, and the operating railroad that indicate the ability of the ditch to carry the additional run-off.
6. Additional drainage may require the installation of a pipe, new ditch or reprofiling of the existing ditch.

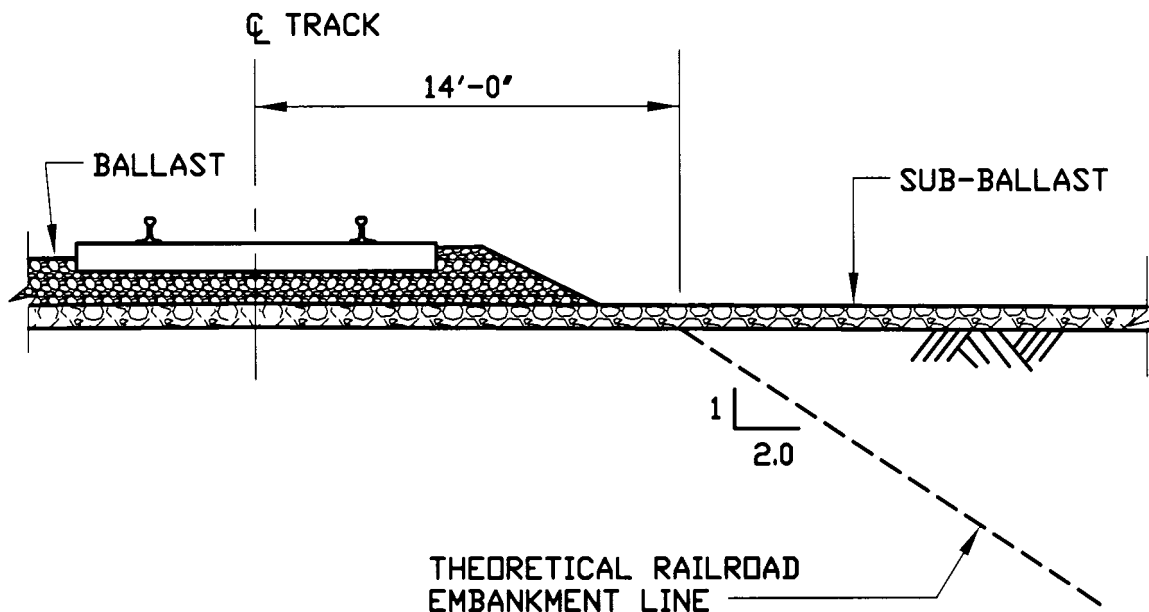
#### C. Erosion Control

1. Embankment slopes adjacent to the track must be paved for a minimum of two (2) feet 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 NCRR and the operating railroad 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. NCRR's approval of drainage and erosion control plans will not relieve the sponsor submitting these plans from ultimate responsibility for a satisfactory plan.

## **12. REFERENCES**

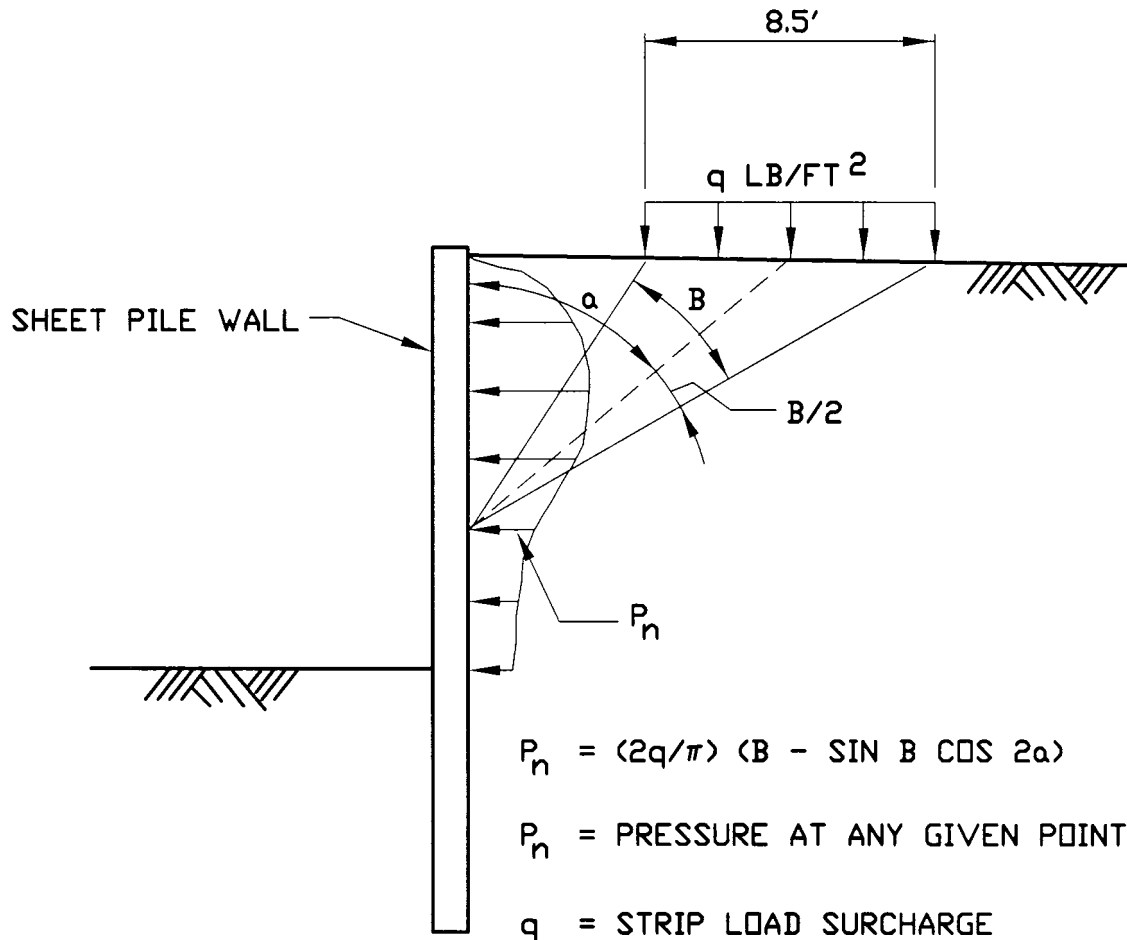
- A. In areas where underground utilities may be affected, NCR 102, "Specifications for Pipeline Occupancy of North Carolina Railroad Property" will govern.
- B. In areas where power or communication lines will be affected, NCR 101, "Specifications for Wire, Conduit and Cable Occupations of North Carolina Railroad Property " will govern.



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.
4. NO EXCAVATION WILL BE ALLOWED WITHIN A HORIZONTAL DISTANCE OF 8'-6" FROM THE  $\text{CL}$  TRACK.
5. THE 14'-0" DIMENSION TO THE THEORETICAL RAILROAD EMBANKMENT LINE IS MEASURED 19 INCHES BELOW THE BASE OF RAIL.

# LATERAL PRESSURE DIAGRAM



$$P_n = (2q/\pi) (B - \sin B \cos 2\alpha)$$

$P_n$  = PRESSURE AT ANY GIVEN POINT

$q$  = STRIP LOAD SURCHARGE

$\alpha$  = ANGLE IN DEGREES

$B$  = ANGLE IN RADIANS

LATERAL PRESSURE DUE TO STRIP LOAD