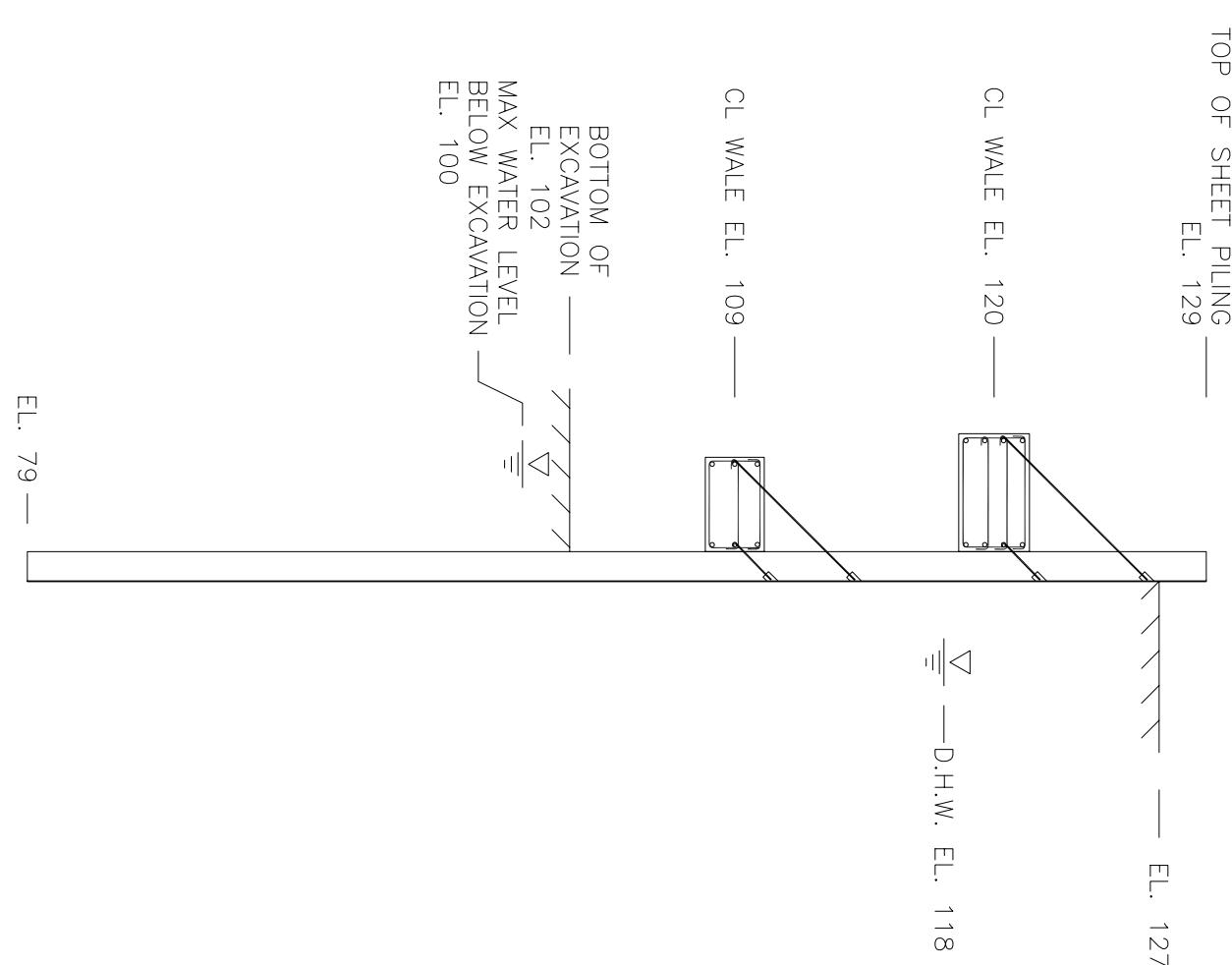
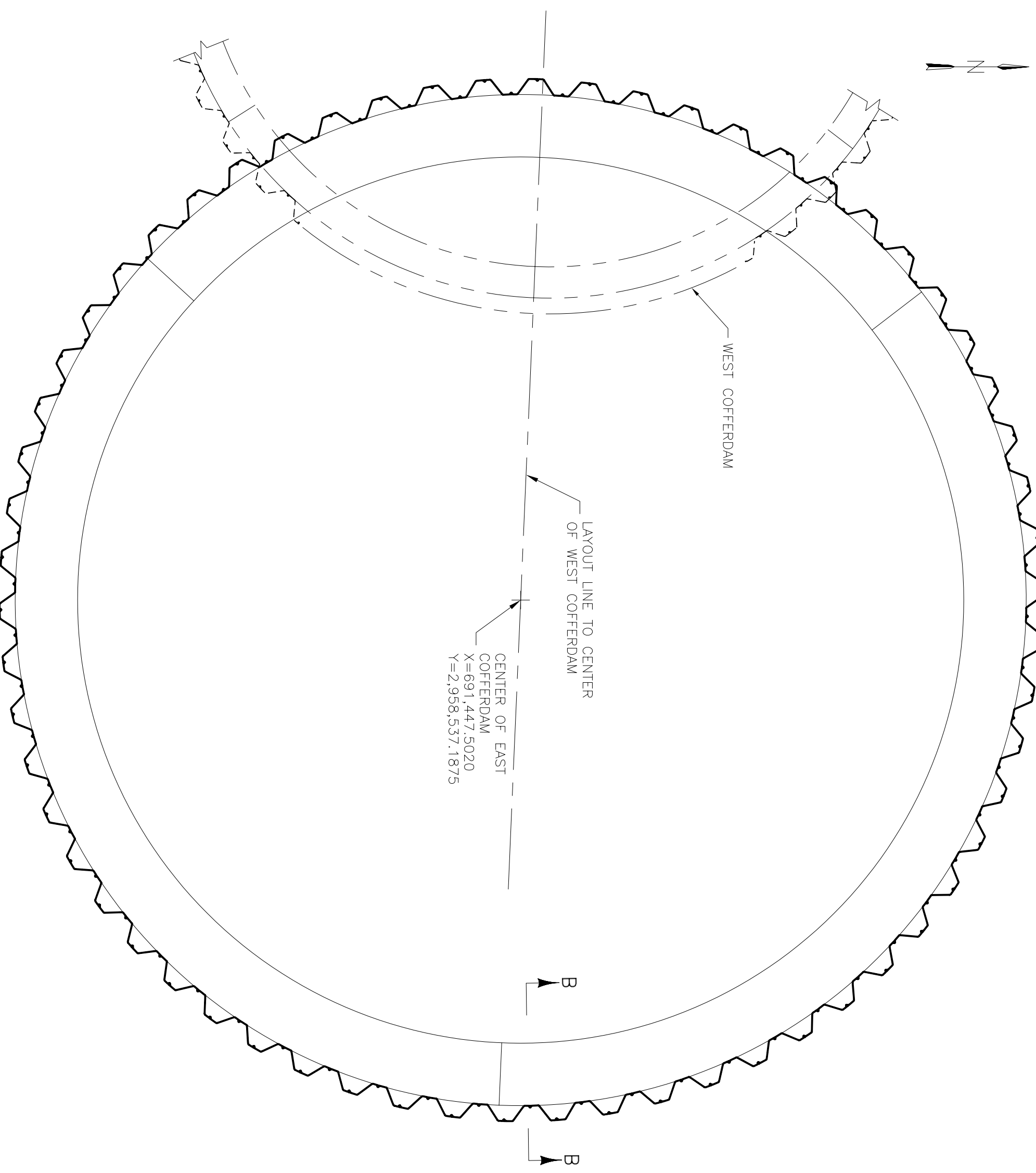


WEST COFFERDAM FOR EXCAVATION OF AREA 2

SECTION A-A



EAST COFFERDAM FOR EXCAVATION OF AREA 1

SECTION B-B

**GENERAL NOTES**

- 1) The cofferdam portion of the project involves the construction of two cofferdams to allow excavation and removal of contaminated soil. The cofferdams will be constructed sequentially because there is an area where they overlap. Either cofferdam may be constructed first.
 

The cofferdams consist of steel sheet piling walls and circular reinforced concrete wales. The wales are constructed of concrete with a diameter of approximately 37 feet of loose sand and silt, then underlain by various strata of more dense granular soil with silt. Groundwater is anticipated approximately 9 feet below existing ground level.

In the event that the soil actually encountered differs significantly from the descriptions above, or if unanticipated obstructions are encountered, Hartman Engineering will be notified immediately and construction operations the vicinity of the differing soil or obstruction will cease until the situation is evaluated.
- 2) Available geotechnical information indicates strata of granular soil with varying amounts of silt and minor amounts of clay. In general terms, the anticipated soil conditions are as follows:
  - a) Approximately 37 feet of loose sand and silt, then underlain by various strata of more dense granular soil with silt. Groundwater is anticipated approximately 9 feet below existing ground level.
- 3) Groundwater will enter the cofferdam through interlock leakage and through the soil at the bottom of the excavation. It is anticipated that pumps located inside the cofferdam will maintain the water at an acceptable level.
 

Special attention must be directed toward examining the excavation bottom for potential obstructions. The excavation bottom must be examined for obstructions (swelling or uplift of a portion of the excavation bottom). Either of these conditions is an indication of an unanticipated subsurface condition which may cause damage to the cofferdam. If piling or heave is detected or suspected, Hartman Engineering will be notified immediately and dewatering operations will be suspended until the condition is evaluated.
- 4) The Contractor will measure and record the length of each sheet pile prior to driving and will keep a record of all trimming, cutting, etc., such that the bottom elevation of individual sheet piles can be determined at any time. Refer to Monitoring Procedure Item 1A.
- 5) If, at any time, the bracing or monitoring system is damaged by construction operations, Hartman Engineering will be notified immediately. Until the severity of the damage can be evaluated, construction operations will cease and construction personnel will be evacuated from the excavation.

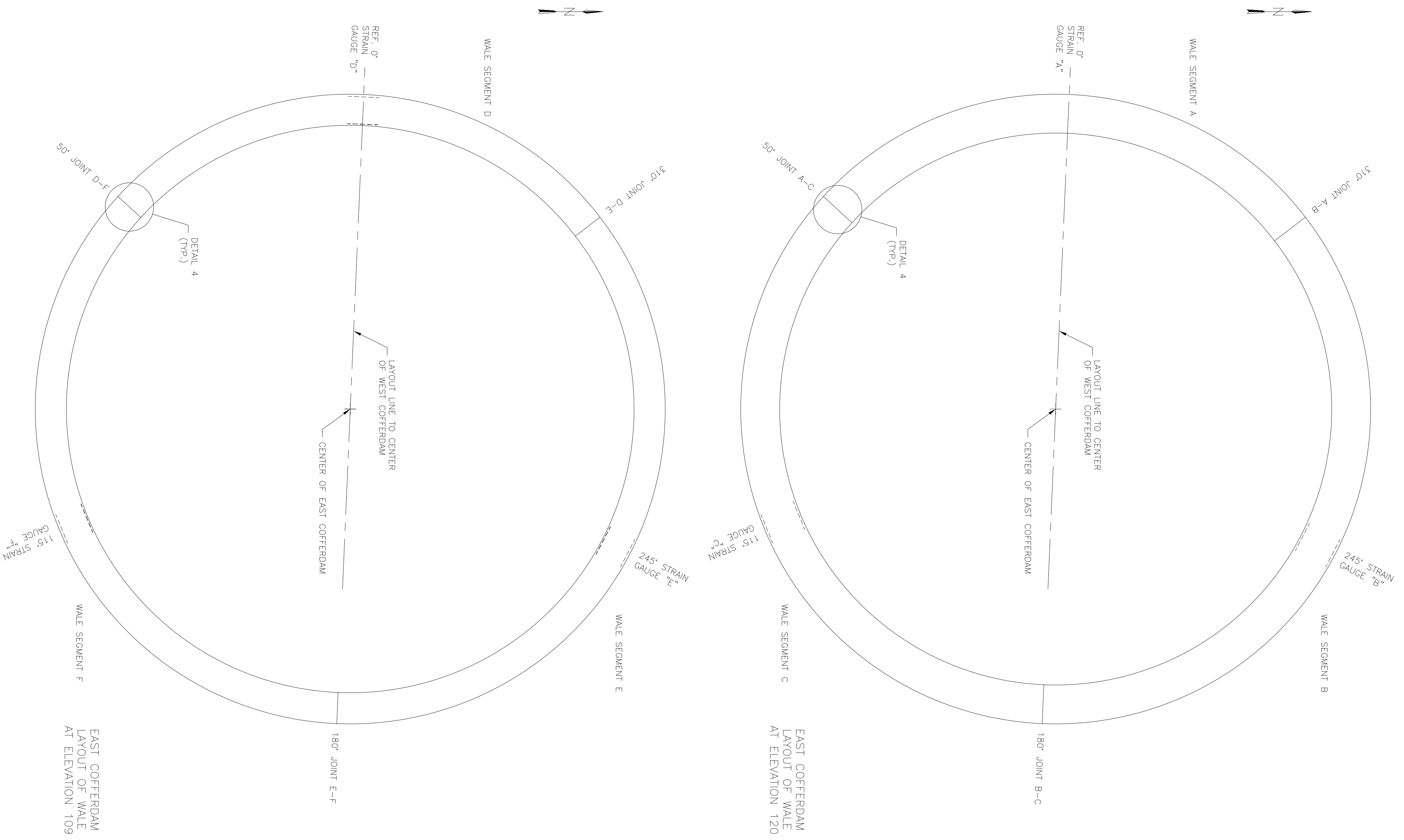
**MATERIAL SPECIFICATIONS**

- 1) Sheet Piling: Chaparral Steel Co. PZC18 Section, ASTM A572 Grade 50 Steel or approved equal. All sheet piling will be new at the start of the project.
- 2) Concrete: Use concrete meeting Project Specifications for Structural Concrete; additionally, concrete must develop 4000 psi ultimate strength after 7 days.
- 3) Concrete Reinforcement: Steel reinforcing bars for concrete will be ASTM A615 Grade 60 bars detailed in accordance with current ACI Specifications. Splices in the longitudinal reinforcement must be capable of developing the full tensile capacity of the reinforcement. Splices in adjacent bars will be separated 2'-6" minimum. The contractor shall submit shop drawings of the reinforcement to Hartman Engineering for approval.
- 4) Structural Steel:
  - (A) Plate and Miscellaneous Steel: ASTM Grade A36 or stronger steel.
  - (B) Welding Electrodes: E70XX
  - (C) Welder Qualifications: Each Welder, Welding Operator or Tacker who performs welding shall be qualified and certified in the position and for the construction. Qualification standards required are those stipulated in the Project Documents.

12) For additional information related to the cofferdams, see Drawings No. 06-602-LS-1, 06-602-LS-2, and 06-602-DE-1.

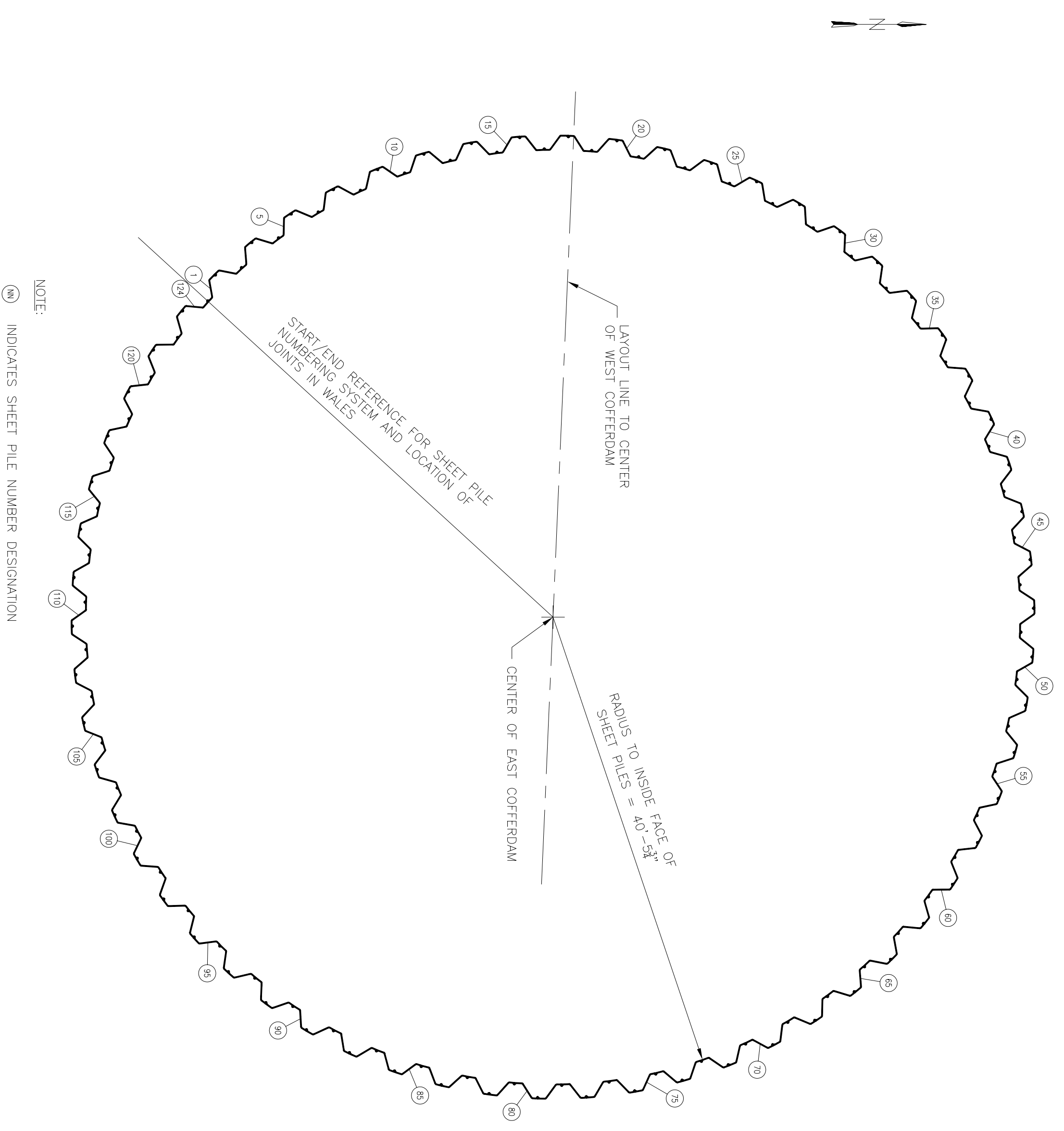
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<b>HARTMAN ENGINEERING</b>	
4910 RANSON ROAD CLARENCE, NEW YORK 14031	DATE: MAY 25, 2006 DRAWN BY: DMJ CHECKED BY: RHM
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SCALE: 1"=1'-0"	DRAWING NUMBER: 06-602-CP-1
SHEET 1 OF 4	



EAST COFFERDAM LAYOUT OF WALE AT ELEVATION 109

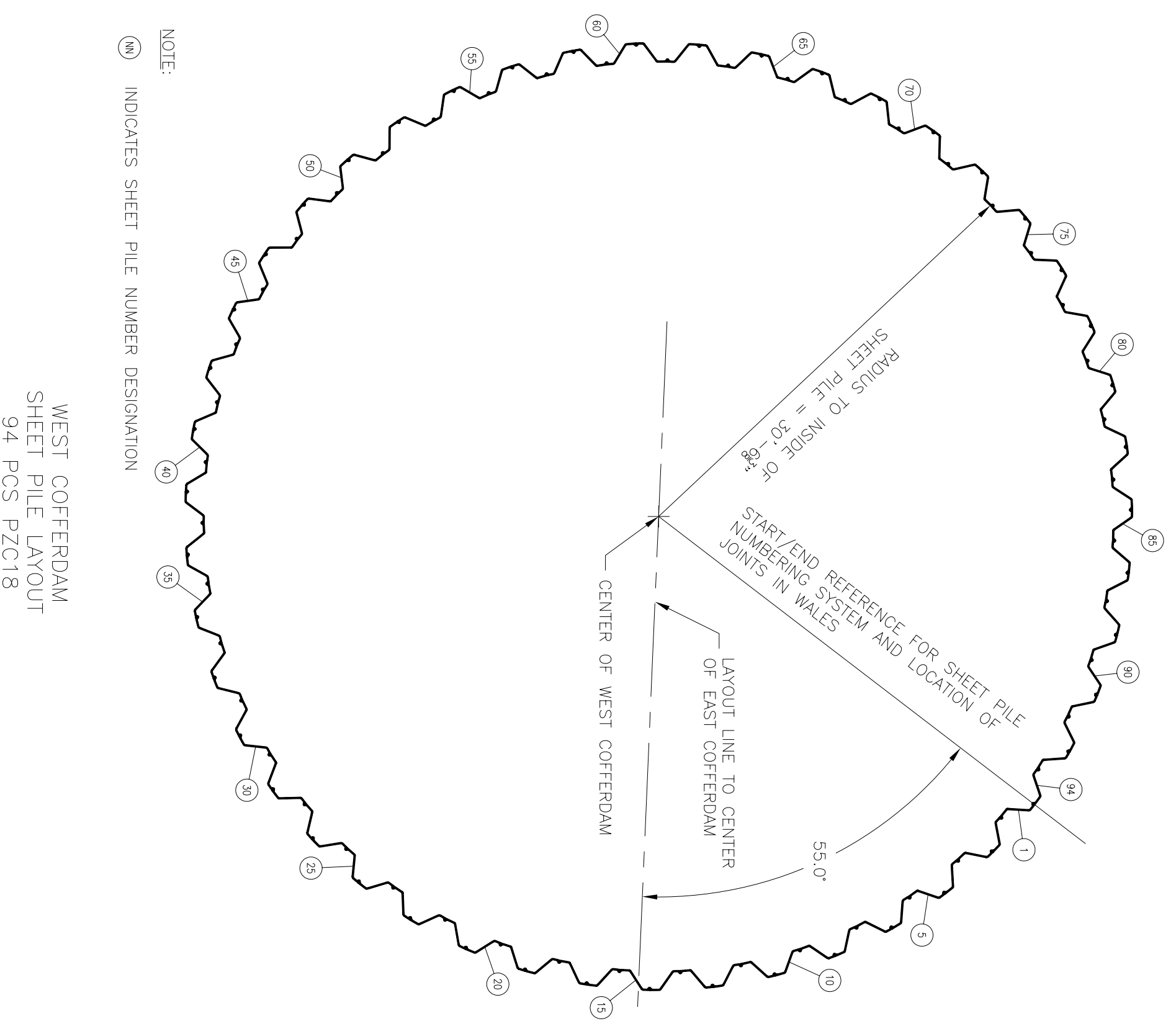
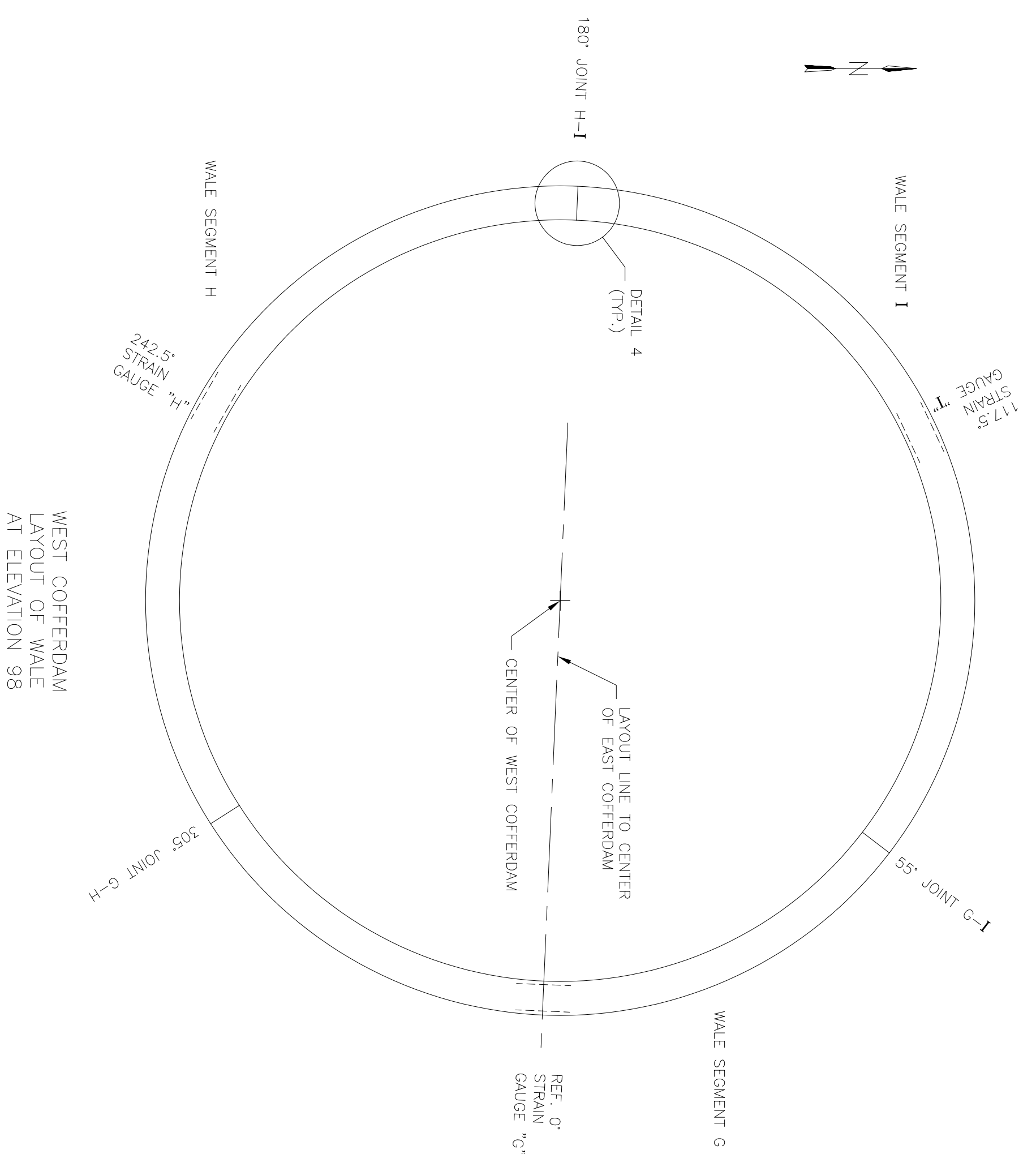
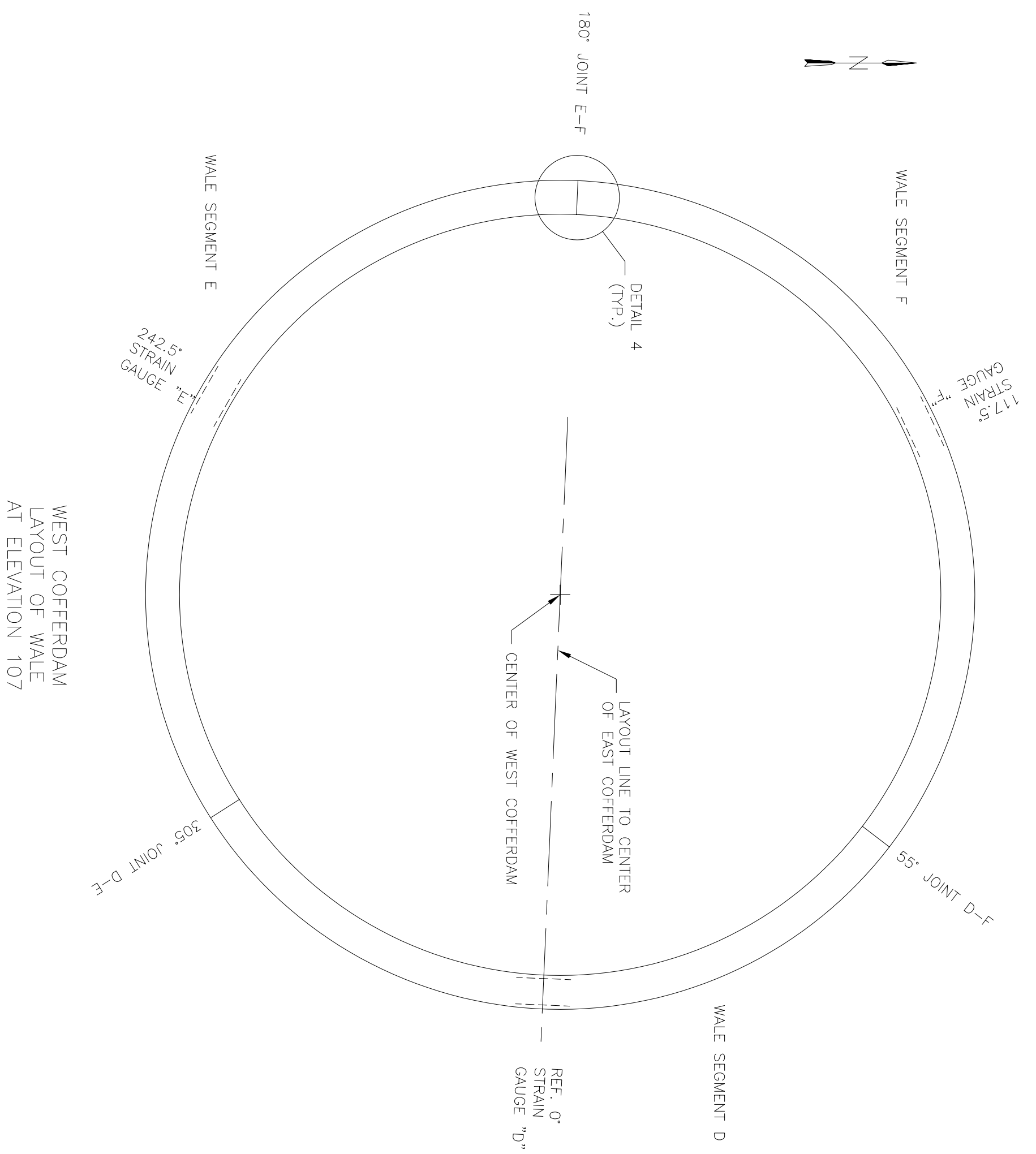
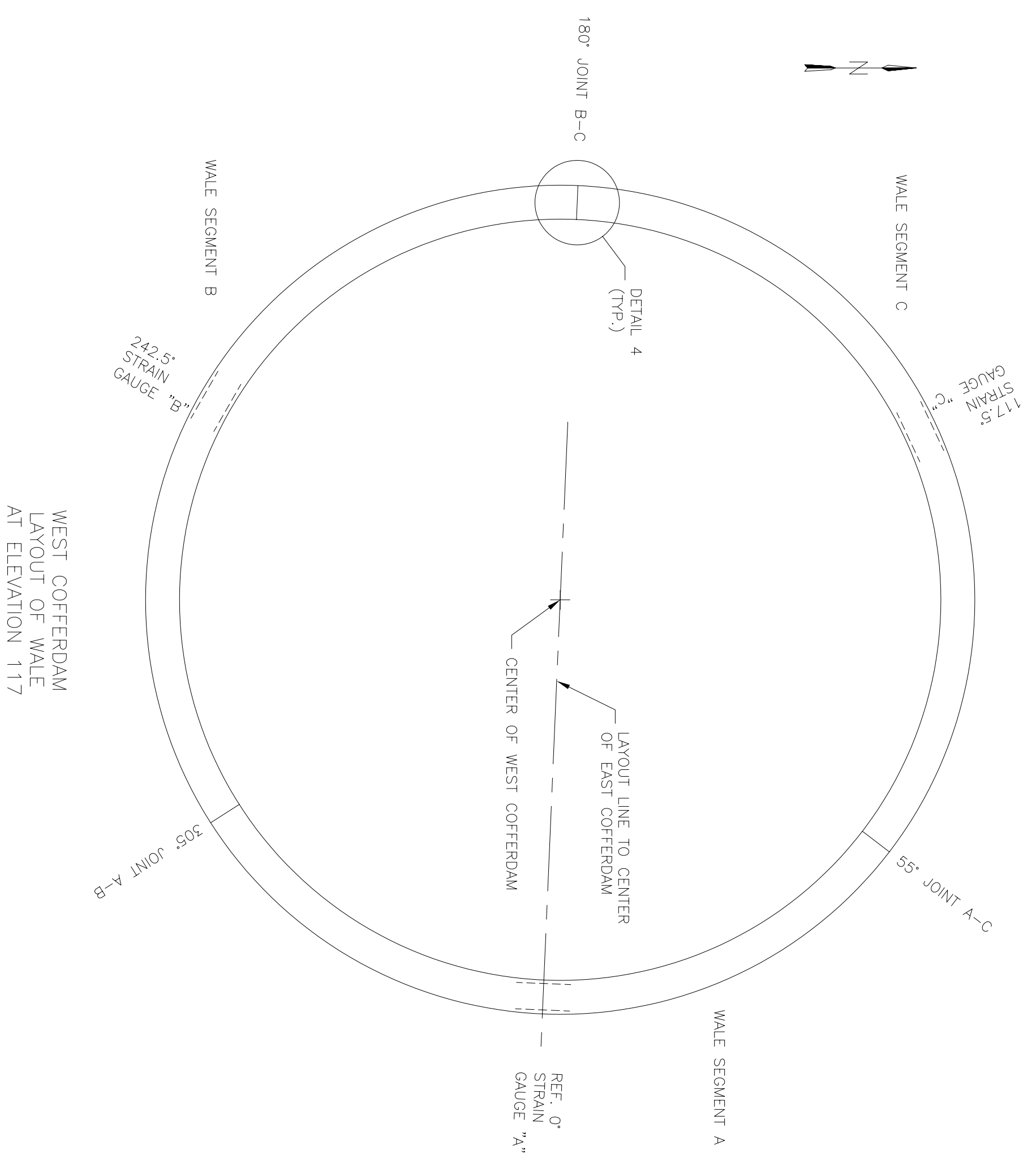
EAST COFFERDAM LAYOUT OF WALE AT ELEVATION 120



NOTE:  
 (N) INDICATES SHEET PILE NUMBER DESIGNATION

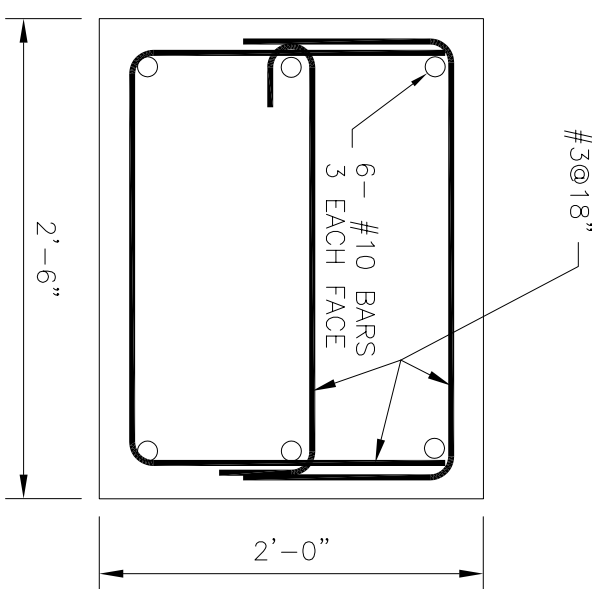
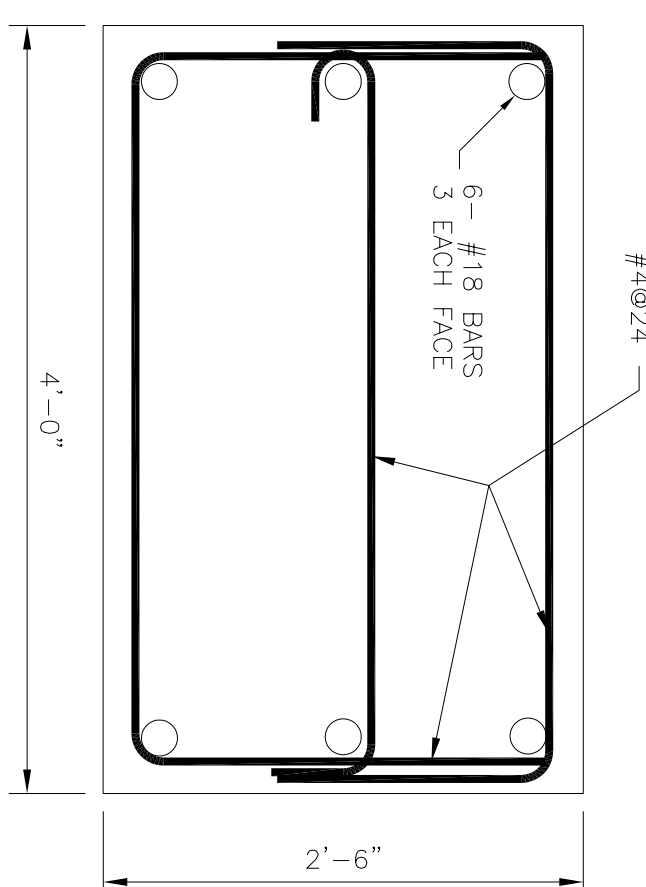
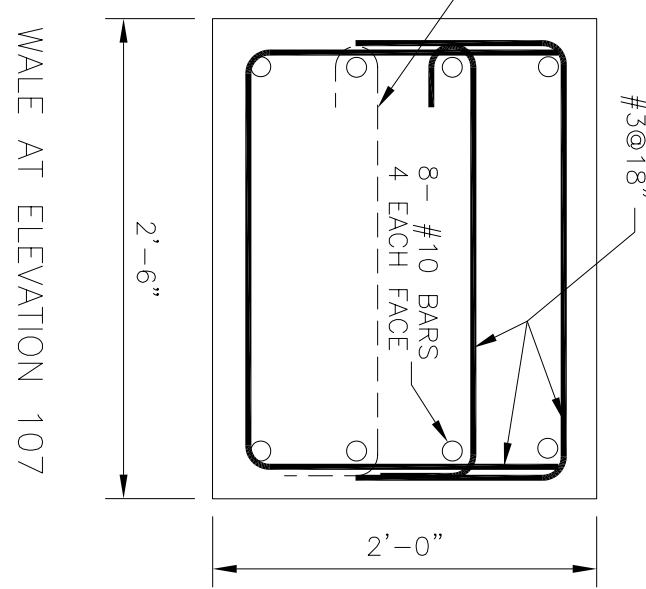
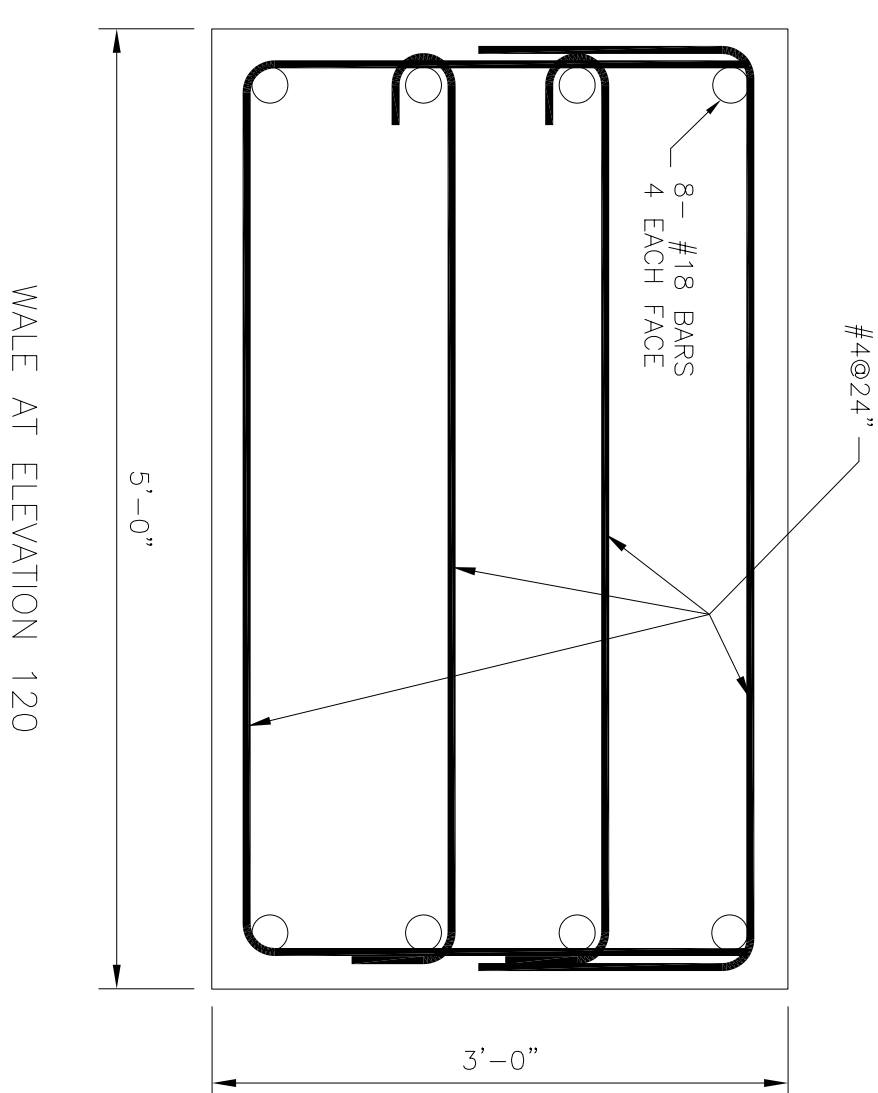
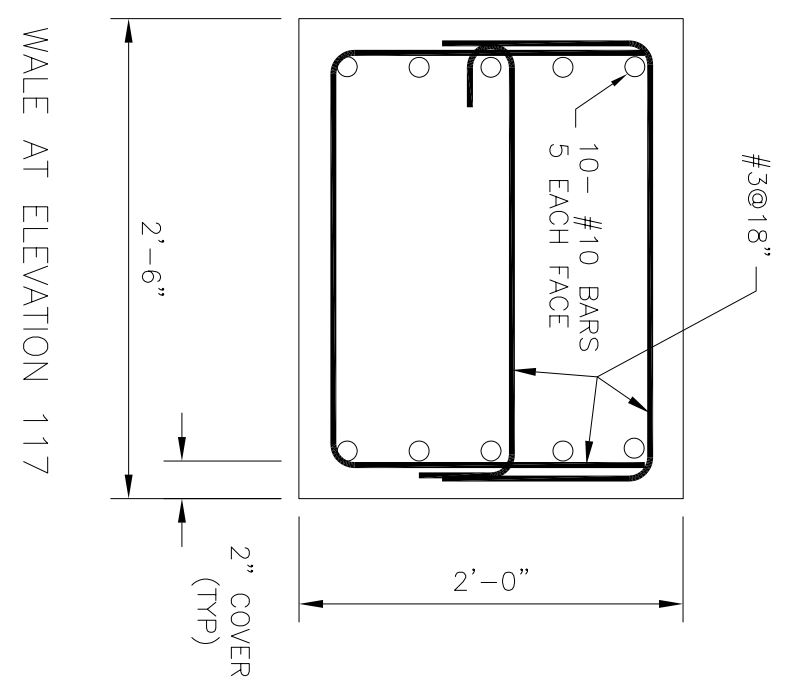
EAST COFFERDAM  
 SHEET PILE LAYOUT  
 124 PCS PZC18

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<p>EAST COFFERDAM SHEET PILE LAYOUT AND WALE LAYOUTS</p>	
<p>SCALE: 3/8"=1'-0"</p>	<p>DRAWING NUMBER: 06-602-LS-1                  SHEET 2 OF 4</p>



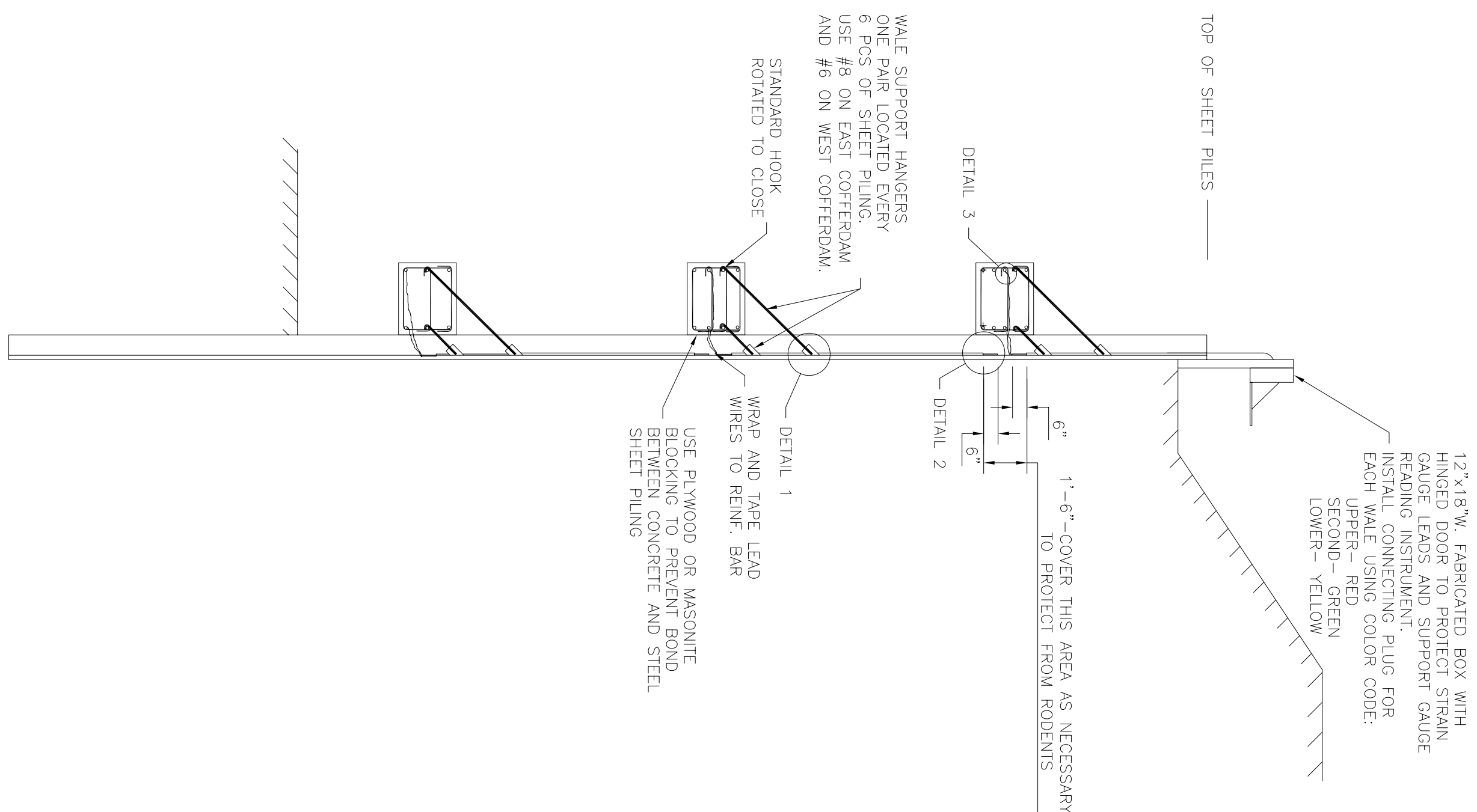
NOTE:  
INDICATES SHEET PILE NUMBER DESIGNATION

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<p><b>HARTMAN ENGINEERING</b> 4910 BANSOM ROAD CLARENCE, NEW YORK 14031</p>		<p>COFFERDAMS FOR REMEDIATION OF FORMER RAYTHEON FACILITY SITE IN WATLAND, MA</p>	
DATE: JUN 25, 2006	DRAWN BY: DMJ	CHECKED BY: BSH	
WEST COFFERDAM SHEET PILE LAYOUT AND WALE LAYOUTS		DRAWING NUMBER: 06-602-LS-2	SHEET 3 OF 4
SCALE: 3/8" = 1'-0"			

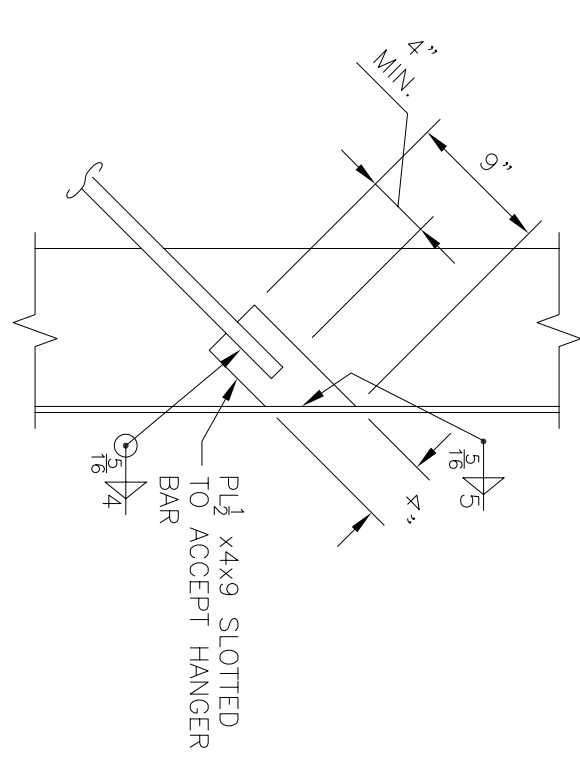


WEST COFFERDAM  
WALE SECTIONS  
SCALE: 1"=1'-0"

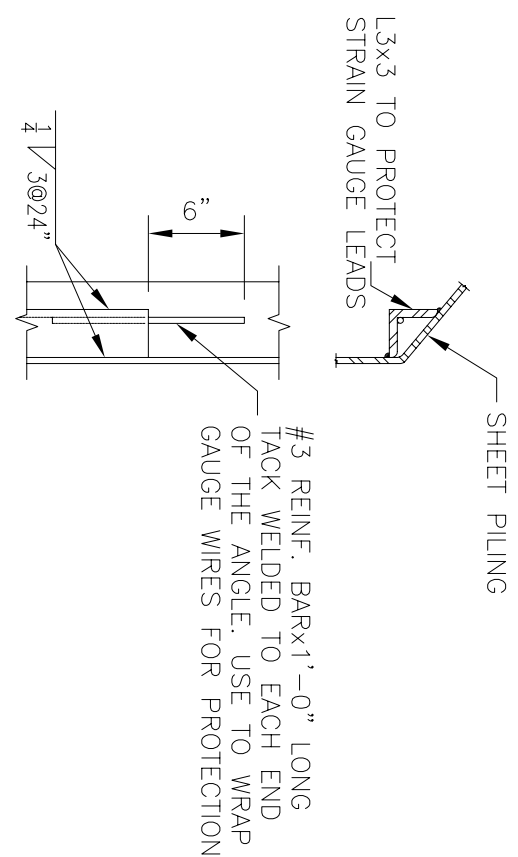
EAST COFFERDAM  
WALE SECTIONS  
SCALE: 1"=1'-0"



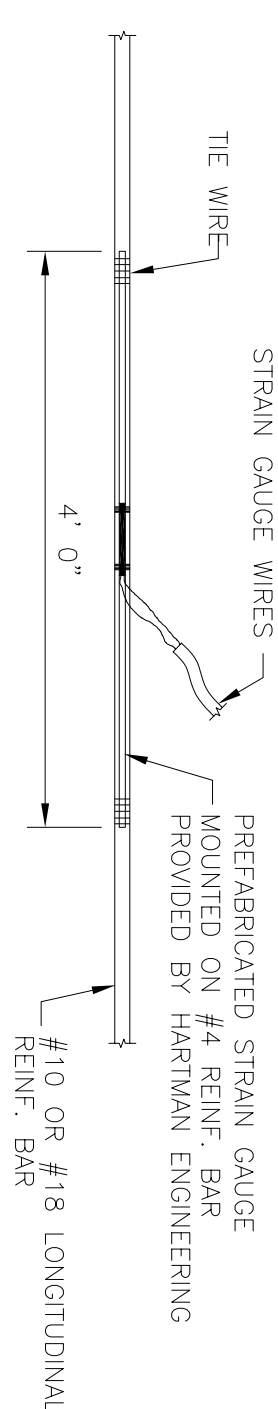
TYPICAL SECTION SHOWING STRAIN  
GAUGE MONITORING INSTRUMENTATION  
SCALE: 1/2"=1'-0"



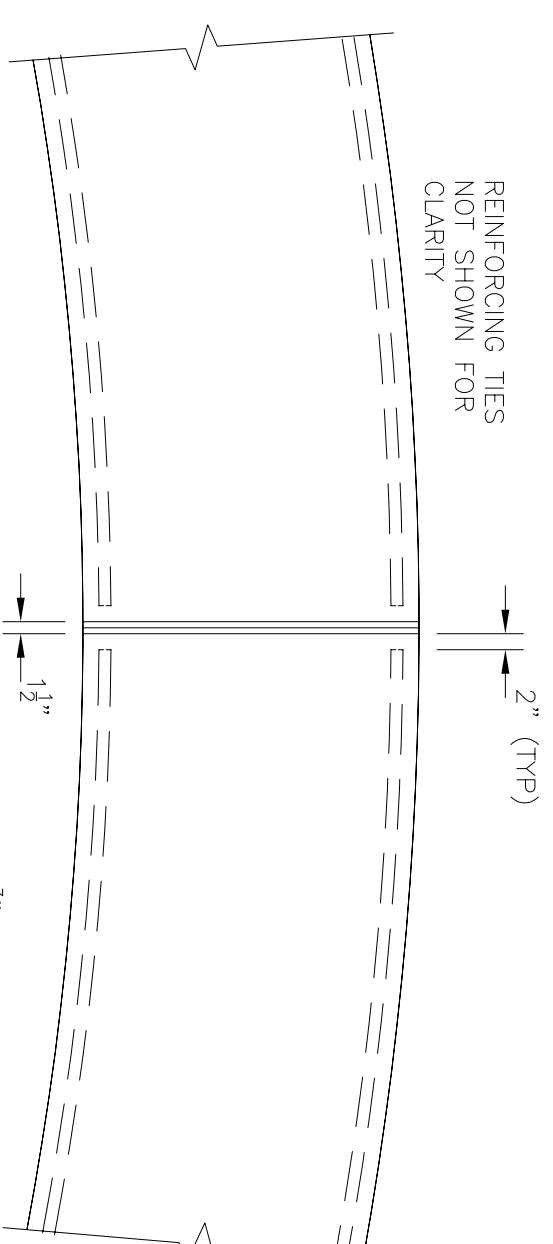
DETAIL 1  
WALE HANGER ATTACHMENT  
SCALE: 1"=1'-0"



DETAIL 2  
GAUGE WIRE PROTECTION  
SCALE: 1"=1'-0"



DETAIL 3  
INSTALLATION OF STRAIN  
GAUGE INSTRUMENTATION  
SCALE: 1"=1'-0"



DETAIL 4  
JOINT AT ENDS OF  
WALE SEGMENTS  
SCALE: 1/2"=1'-0"

- 1) **MONITORING PROCEDURE**
  - (A) **General Monitoring Procedure During Construction of the Circular Cofferdam**
    - (1) Prior to driving the sheet piling, check the length of the sheet piling to verify all sheets are the anticipated length. If under-length sheets are detected, they shall not be used without approval of Hartman Engineering. If over-length sheets are detected, they may be used provided:
      - (1) They are permanently identified.
      - (2) A permanent record of the length and exact location is established.
    - (2) Immediately after the sheet piling is driven, the location of the sheet pile line will be verified by survey and the results of the survey will be immediately forwarded to Hartman Engineering. In the event that sheet piles are located either:
      - (1) More than 3 inches off location toward the inside of the cofferdam, or
      - (2) More than 6 inches off location toward the outside of the cofferdam, Hartman Engineering will be contacted immediately.
  - (B) As construction of the cofferdam progresses, the location of the sheet pile will be determined by survey at the elevation of each wale and the results of the survey will be immediately forwarded to Hartman Engineering. In the event that the location of any sheet pile from the intended location exceeds the limits in part (B) above, Hartman Engineering will be contacted immediately.
  - (C) If any strain gauge readings exceed the ranges of strain reading specified on the data request sheet, the contractor shall immediately call Hartman Engineering. Otherwise, the data will be transmitted weekly by telephone facsimile to Hartman Engineering at 716-759-2888.
- 2) **Strain Gauge Monitoring Procedure**
  - (A) Electrical resistance type strain gauges will be incorporated into the concrete structure in accordance with the details shown on Drawings No. 06-602-LS-1 and 06-602-LS-2. See General Note Number 11.
  - (B) The gauges will be read by the Contractor in accordance with the following schedule:
    - (1) One day after the concrete is poured.
    - (2) Every working day from the start of construction of the cofferdam until the excavation is complete, then
    - (4) Twice weekly until the backfill operation is complete.
  - (C) If any strain gauge readings exceed the ranges of strain reading specified on the data request sheet, the contractor shall immediately call Hartman Engineering. Otherwise, the data will be transmitted weekly by telephone facsimile to Hartman Engineering at 716-759-2888.

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4910 RAMSON ROAD CLARENCE, NEW YORK 14031

DATE: MAY 23, 2006 DRAWN BY: JBC CHECKED BY: EJM

COFFERDAMS FOR RETREATMENT OF  
FORMER BARTHEON FACILITY SITE  
IN WAYLAND, MA

WALE REINFORCEMENT, TYPICAL SECTION SHOWING STRAIN GAUGE  
MONITORING INSTRUMENTATION, MONITORING PROCEDURE AND DETAILS 1 THROUGH 4  
SCALE: AS NOTED DRAWING NUMBER: 06-602-DE-1 SHEET 4 OF 4