1. **DESCRIPTION:**
This work consists of preparing any necessary shop drawings, and manufacturing, testing, transporting, storing, and installing noise barrier components. It includes the construction of the noise barrier panels and posts in accordance with these provisions and a current revision of the ACI standard with the dimensions, lines, and grades shown on the project plans.

2. **DESIGN SPECIFICATIONS:**

**GOST BRIDGE DESIGN SPECIFICATIONS, 4TH EDITION, 2007**
AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 4TH EDITION, 2007

**FURNACE SLAG (GGBS).**

THE CONCRETE MIX DESIGN FOR PANELS SHALL CONTAIN A WATER REPELLENT COMPRESSIVE STRENGTH AT STRIPPING = 3,100 PSI (PANELS AND POSTS)

**DESIGN LOAD CASES:**

- Wind Load
- Ice Load
- Service Load
- Extreme Event Load
- PCI Stripping Load
- Design Load Case
- PCI Load Case

**MATERIAL SPECIFICATIONS:**

**REINFORCED COPING:**
Reinforced concrete shall be embedded in the foundation to support the noise barrier.

**CONCRETE:**

- After fabrication per ASTM A1060.
- Furnace slag (GGBS).

**ACOUSTICAL:**

- ASTM E90 and E443
- Minimum Stc sound transmission class = 30
- Freeze-thaw resistance of concrete (0.70)
- Maximum mass loss = 5% @ 300 cycles

**WASHERS:**

- Steel, 5/8" x 1 1/2" x 3/32"
- Grade DH

**ANCHOR BOLTS:**

- ASTM F1554, Grade 105

**FOAM BACKER ROD:**

- Expanded, closed cell polyethylene foam
- Not acceptable material

**IDENTITY AND DATE ALL REVISIONS ON SHOP DRAWINGS, DELAYS RESULTING FROM SHOP DRAWING ERRORS ON OMISSIONS FOUND AT ANY TIME ARE NON-EXCUSABLE ACCORDING TO ORC 4733 AND OAC 4733-10-01.

**ALL ELECTRONIC DOCUMENTS SHALL BE IN PORTABLE DOCUMENT FORMAT PDF. SHOP DRAWINGS SHALL BE SUBMITTED IN 8½" X 11″ SHEET SIZE AND ACCEPTANCE OF RESPONSIBILITY FOR INCORRECT FABRICATION AS A RESULT OF FAILURE TO COORDINATE OR PERFORM FIELD VERIFICATION, AS REQUIRED, AND DESCRIPTIONS OF ISSUES RESOLVED SHALL BE SUBMITTED IN 8½" X 11″ SHEET SIZE.

**CONCRETE NOISE BARRIER PANELS AND POSTS**

- Every precast concrete noise barrier component supplied to the project shall be precast according to the specifications, and all workmanship shall be executed to the satisfaction of the department. The department will not accept precast components from non-certified plants.

**CONSTRUCTION SPECIFICATIONS AND WORKMANSHIP:**

- Provide exact compliance with the current revision of the ACI standard with the dimensions, lines, and grades shown on the project plans.

**FASTENERS:**

- Concrete classes QC5 = 4,000 psi (drilled shafts)
- Concrete: After fabrication per ASTM A1060.
GENERAL, CONTINUED

2. CROWN VETCH TYPE SEED MIXTURE AS DEFINED IN SECTION 659.09. THE DEPARTMENT BY THE NOISE BARRIER CONSTRUCTION TO THEIR ORIGINAL CONDITION. RESTORATION UPON COMPLETION OF NOISE BARRIER INSTALLATION, RESTORE ALL AREAS DISTURBED THAN 3 MONTHS PRIOR TO THE COMPLETED INSTALLATION OF THE NOISE BARRIER NYLON CONSTRUCTION FENCE OR EXISTING FENCE FABRIC MOUNTED ON DRIVEN POSTS. INSTALL TEMPORARY FENCE WHEN THE TIME BETWEEN THE REMOVAL OF THE BERRMS OF EMBANKMENT MATERIAL IN ACCORDANCE WITH ITEM 203 OF THE CMS. FOR NOISE BARRIERS THAT ARE BUILT ON TOP OF EARTH BERRMS, CONSTRUCT THE PROTECTION OF EXISTING SEWERS AND CULVERTS: NOISE BARRIERS SHALL MATCH THE TOP OF WALL DESIGN ELEVATIONS, WITH NO VARIATION SUFFICIENT SUPPORT TO THE NOISE PANELS, AND BE SECURED TO THE POST OR IN ACCORDANCE WITH C&MS 105.11. NOISE BARRIERS BY THE ENGINEER PRIOR TO FINAL ACCEPTANCE AS DEFECTIVE WORK.

METHOD OF MEASUREMENT

The department will measure the noise barrier by the number of square feet.
The department will determine the area of individual noise barrier segments from project plan dimensions using a rule from the bottom of the rightmost panel, to the top of the cap on the top panel, and span lengths measured as shown in post details on sheets 8 & 13.
The calculated noise barrier area in the project plans is based upon 1" INCREMENTAL PANEL HEIGHTS. THE DEPARTMENT WILL NOT ADJUST PAY QUANTITIES FOR NOISE BARRIER HEIGHTS LESS THAN PROJECT PLAN REQUIREMENTS.

BASIS OF PAYMENT

PAYMENT FOR NOISE BARRIERS IS FULL COMPENSATION FOR FUNISHING AND INSTALLING THE FENCE, AND ALL RELATED ITEM 606 REQUIREMENTS. NON-CONFORMITY OF ANY KIND, INCLUDING MATERIALS AND WORK, IS TO BE DEFINED AS NON-COMPLIANCE WITH THIS SECTION AND WILL BE CHARGED TO THE CONTRACTOR. THE DEPARTMENT WILL PAY FOR LAYING OUT AND STAKING THE NOISE BARRIER UNDER ITEM 603 - EMBANKMENT. THE DEPARTMENT WILL PAY FOR LAYING OUT AND STAKING THE NOISE BARRIER UNDER ITEM 603 - EMBANKMENT. THE DEPARTMENT WILL PAY FOR THE ADDITIONAL LENGTH OF DRILLED SHAFTS CONSTRUCTED AT THE DIRECTION OF THE ENGINEER IN UNEXPECTED AREAS OF POOR SOIL AS EXTRA WORK IN ACCORDANCE WITH CMS 109.05. THE DEPARTMENT WILL PAY FOR CLEAVING AND GRUBBING AND TRIMMING TREES UNDER ITEM 203 - CLEARING AND GRUBBING. THE DEPARTMENT WILL PAY FOR CONSTRUCTING EARTH EMBANKMENT UNDER ITEM 203 - EMBANKMENT. THE DEPARTMENT WILL PAY FOR FURING, ERECTING, MOUNTING, AND REMOVING TEMPORARY FENCE UNDER ITEM 607 - FENCE, MISC.

ACCEPTANCE REQUIREMENTS

IN ADDITION TO CONFORMING WITH THE STRUCTURAL REQUIREMENTS, AS SHOWN ON THE STANDARDS, THE BARRIERS SHALL ALSO COMPLY WITH THE FOLLOWING AESTHETIC REQUIREMENTS:

ITEM | UNIT | SPECIFICATION
--- | --- | ---
606B0200 SQ. FT. | SPECIAL - NOISE BARRIER (REFLECTIVE) | 606B0300 SQ. FT. | SPECIAL - NOISE BARRIER (ABSORBENT)
ONE COAT OF ANY OF THE APPROVED SEALERS SHALL MEET THE FOLLOWING PERFORMANCE REQUIREMENTS:

1. FREEZE-THAW TEST: SUBJECT THE APPLIED FINISH COATING TO FREEZE-THAW CYCLE TESTS AS FOLLOWS:
   a. CAST THREE CONCRETE SPECIMENTS, NOT LESS THAN 4" X 4" X 16" IN SIZE, FOR FREEZE-THAW TEST. CHECK SPECIMENTS FOR CRACKS AFTER 30 DAYS. REMOVE GERMINATION MATERIALS AND IMMORTEM MATERIA AT 60 DEGREES F. FOR 24 HOURS BEFORE COATING THE SPECIMENTS WITH THE APPROVED SEALER. COMPLETE THE TEST AS SPECIFIED IN THE MANUFACTURER'S INSTRUCTIONS. APPLY THE FINISH COATING TO THE SIDES OF SPECIMENS AT A SPREADING RATE OF 50 +/- 10 SQUARE FEET PER GALLON. BRUSH APPLICATION IS RECOMMENDED. CLEAN CONCRETE SPECIMENTS WITH FRESH WATER BEFORE SEALING TO REMOVE EXCESS CONCRETE. AFTER A 5% SALT SOLUTION IN SPRAYING 5% SALT SOLUTION THROUGH THE APPLIED COATING. AT THE END OF THE TEST, REMOVE.
   b. ACCELERATED WEATHERING: SUBJECT THE APPLIED FINISH COATING TO FREEZE-THAW CYCLE TEST AS FOLLOWS: PLACE THE SPECIMENS IN COLD STORAGE AT -15 DEGREES F FOR ONE HOUR, THEN REMOVE.
   c. IMPACT RESISTANCE: APPLY THE APPLIED FINISH COATING TO THE SIDES OF SPECIMENS AT A SPREADING RATE OF 50 +/- 10 SQUARE FEET PER GALLON. APPLY THE COATING TO CONCRETE PANELS OR SURFACES AT A RATE OF 50 +/- 10 SQ FEET PER GALLON. BRUSH APPLICATION IS RECOMMENDED. PROVIDE THE ENGINEER SANDPAPER FOR COMPARISON: PRODUCE A SURFACE THAT FEELS AND LOOKS LIKE 100 GRIT SANDPAPER OR COARSER.

2. SURFACE PREPARATION: FOR BOTH ABSORPTIVE AND NON-ABSORPTIVE SURFACES, AFTER COMPLETE DRYING PERIOD, THE APPLIED FINISH COATING SHALL PASS THE FOLLOWING REQUIREMENTS.
   a. SCALING RESISTANCE: TREATED CONCRETE SHALL PASS ASTM C642, SCALING RESISTANCE TEST, WITH A PASS RATING OF NO SCALING, AFTER 50 CYCLES OF FIVE-TWO-CYCLE CYCLES.
   b. FREEZE-THAW TEST: SUBJECT THE APPLIED FINISH COATING TO FREEZE-THAW CYCLE TESTS AS FOLLOWS: PLACE THE SPECIMENS IN COLD STORAGE AT -15 DEGREES F FOR ONE HOUR, THEN REMOVE.
   c. IMPACT RESISTANCE: APPLY THE APPLIED FINISH COATING TO THE SIDES OF SPECIMENS AT A SPREADING RATE OF 50 +/- 10 SQUARE FEET PER GALLON. BRUSH APPLICATION IS RECOMMENDED. PROVIDE THE ENGINEER SANDPAPER FOR COMPARISON: PRODUCE A SURFACE THAT FEELS AND LOOKS LIKE 100 GRIT SANDPAPER OR COARSER.
   d. SURFACE PREPARATION: FOR BOTH ABSORPTIVE AND NON-ABSORPTIVE SURFACES, AFTER COMPLETE DRYING PERIOD, THE APPLIED FINISH COATING SHALL PASS THE FOLLOWING REQUIREMENTS.

3. MATERIALS APPROVALS: SUBMIT CERTIFIED TEST DATA TO THE ENGINEER THAT SHOWS THE SEALER MEETS THE MATERIALS REQUIREMENTS.
   a. SALT SPRAY TEST: APPLY A SPRAYING RATE OF 50 +/- 10 SQUARE FEET PER GALLON. BRUSH APPLICATION IS RECOMMENDED. PROVIDE THE ENGINEER SANDPAPER FOR COMPARISON: PRODUCE A SURFACE THAT FEELS AND LOOKS LIKE 100 GRIT SANDPAPER OR COARSER.
   b. ACCELERATED WEATHERING: SUBJECT THE APPLIED FINISH COATING TO FREEZE-THAW CYCLE TEST AS FOLLOWS: PLACE THE SPECIMENS IN COLD STORAGE AT -15 DEGREES F FOR ONE HOUR, THEN REMOVE.
   c. IMPACT RESISTANCE: APPLY THE APPLIED FINISH COATING TO THE SIDES OF SPECIMENS AT A SPREADING RATE OF 50 +/- 10 SQUARE FEET PER GALLON. BRUSH APPLICATION IS RECOMMENDED. PROVIDE THE ENGINEER SANDPAPER FOR COMPARISON: PRODUCE A SURFACE THAT FEELS AND LOOKS LIKE 100 GRIT SANDPAPER OR COARSER.

4. STORAGE: STORE SEALER IN DRY, SHADY AREAS. DO NOT FREEZE. STORE SEALER AT A TEMPERATURE OVER A PERIOD OF AT LEAST 12 HOURS.
   a. IMPACT RESISTANCE: APPLY THE APPLIED FINISH COATING TO THE SIDES OF SPECIMENS AT A SPREADING RATE OF 50 +/- 10 SQUARE FEET PER GALLON. BRUSH APPLICATION IS RECOMMENDED. PROVIDE THE ENGINEER SANDPAPER FOR COMPARISON: PRODUCE A SURFACE THAT FEELS AND LOOKS LIKE 100 GRIT SANDPAPER OR COARSER.
   b. SURFACE PREPARATION: FOR BOTH ABSORPTIVE AND NON-ABSORPTIVE SURFACES, AFTER COMPLETE DRYING PERIOD, THE APPLIED FINISH COATING SHALL PASS THE FOLLOWING REQUIREMENTS.

5. QUALITY CONTROL: COMPLETE THE APPLIED FINISH COATING IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. USE APPLICATION EQUIPMENT RECOMMENDED BY THE SEALER MANUFACTURER. DISCARD SEALER MEETS THE MATERIALS REQUIREMENTS.
   a. MATERIALS APPROVALS: SUBMIT CERTIFIED TEST DATA TO THE ENGINEER THAT SHOWS THE SEALER MEETS THE MATERIALS REQUIREMENTS.
   b. SALT SPRAY TEST: APPLY A SPRAYING RATE OF 50 +/- 10 SQUARE FEET PER GALLON. BRUSH APPLICATION IS RECOMMENDED. PROVIDE THE ENGINEER SANDPAPER FOR COMPARISON: PRODUCE A SURFACE THAT FEELS AND LOOKS LIKE 100 GRIT SANDPAPER OR COARSER.
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6. QUALITY CONTROL: COMPLETE THE APPLIED FINISH COATING IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. USE APPLICATION EQUIPMENT RECOMMENDED BY THE SEALER MANUFACTURER. DISCARD SEALER MEETS THE MATERIALS REQUIREMENTS.
   a. MATERIALS APPROVALS: SUBMIT CERTIFIED TEST DATA TO THE ENGINEER THAT SHOWS THE SEALER MEETS THE MATERIALS REQUIREMENTS.
   b. SALT SPRAY TEST: APPLY A SPRAYING RATE OF 50 +/- 10 SQUARE FEET PER GALLON. BRUSH APPLICATION IS RECOMMENDED. PROVIDE THE ENGINEER SANDPAPER FOR COMPARISON: PRODUCE A SURFACE THAT FEELS AND LOOKS LIKE 100 GRIT SANDPAPER OR COARSER.
   c. ACCELERATED WEATHERING: SUBJECT THE APPLIED FINISH COATING TO FREEZE-THAW CYCLE TEST AS FOLLOWS: PLACE THE SPECIMENS IN COLD STORAGE AT -15 DEGREES F FOR ONE HOUR, THEN REMOVE.
   d. IMPACT RESISTANCE: APPLY THE APPLIED FINISH COATING TO THE SIDES OF SPECIMENS AT A SPREADING RATE OF 50 +/- 10 SQUARE FEET PER GALLON. BRUSH APPLICATION IS RECOMMENDED. PROVIDE THE ENGINEER SANDPAPER FOR COMPARISON: PRODUCE A SURFACE THAT FEELS AND LOOKS LIKE 100 GRIT SANDPAPER OR COARSER.

7. QUALITY CONTROL: COMPLETE THE APPLIED FINISH COATING IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. USE APPLICATION EQUIPMENT RECOMMENDED BY THE SEALER MANUFACTURER. DISCARD SEALER MEETS THE MATERIALS REQUIREMENTS.
   a. MATERIALS APPROVALS: SUBMIT CERTIFIED TEST DATA TO THE ENGINEER THAT SHOWS THE SEALER MEETS THE MATERIALS REQUIREMENTS.
   b. SALT SPRAY TEST: APPLY A SPRAYING RATE OF 50 +/- 10 SQUARE FEET PER GALLON. BRUSH APPLICATION IS RECOMMENDED. PROVIDE THE ENGINEER SANDPAPER FOR COMPARISON: PRODUCE A SURFACE THAT FEELS AND LOOKS LIKE 100 GRIT SANDPAPER OR COARSER.
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ELEVATION, REINFORCING, AND STORAGE PLAN

TYPICAL POST

TOP VIEW

DETAIL C - INTEGRAL POST CAP DETAIL

1. 16" TYPE A POST SHOWN, OTHERS SIMILAR

2. 2-TON CAPACITY SWIVEL LIFT ANCHOR AND RECESS (TYPE D REMOVED FROM OTHER VIEWS FOR CLARITY)

3. NON-INTEGRAL CAP ANCHOR BOLT SHALL BE GALVANIZED ASTM A325; 1" £ THRU HOLE (CAST INTO CAP) FOR 1" £ ANCHOR BOLT INTO THE FERRULE LOOP INSERT.

4. BOTTOM OF INTEGRAL CAP MUST HAVE RUSTICATION (TYP)

NOTES:

1. FOR GENERAL NOTES REFER TO SHEETS 1-3/13.

2. FASTEN THE NON-INTEGRAL CAP ATOP THE POST BY THREADING 3" STIRRUPS @ 6" ALONG #3 PERIMETER REINFORCING (TYP).

3. NON-INTEGRAL CAP ANCHOR BOLT SHALL BE GALVANIZED ASTM A325; 1" £ ANCHOR BOLT INTO THE FERRULE LOOP INSERT.

4. CENTER OF DRILLED SHAFT & INSERTS

LEGEND:

# * DIMENSION VARIES WITH CAP DETAIL

#H = BARRIER HEIGHT

TBE = TOP OF BARRIER ELEVATION

FPH = FINISHED POST HEIGHT

NIC = NON-INTEGRAL CAP ADDITION

TBE = TOP OF INTEGRAL POST CAP (TYP)

(SEE NOTE 4)

TOP OF INTEGRAL PANEL CAP (TYP)

515.19 (TYP)

GROUT AS PER CMS WITH NON-SHRINK GROUT

RECESS TO BE FILLED SWIFT LIFT ANCHOR; 2-TON CAPACITY (STEPPED PANEL)

VIEW E-E

SECTION G-G

SECTION H-H

TOP VIEW

TOP VIEW

VIEW F-F

DETAIL D - NON-INTEGRAL POST CAP DETAIL

(16" TYPE A POST SHOWN, OTHERS SIMILAR)

NOTES:

1. FOR GENERAL NOTES REFER TO SHEETS 1-3/13.

2. FASTEN THE NON-INTEGRAL CAP ATOP THE POST BY THREADING 3" STIRRUPS @ 6" ALONG #3 PERIMETER REINFORCING (TYP).

3. NON-INTEGRAL CAP ANCHOR BOLT SHALL BE GALVANIZED ASTM A325; 1" £ ANCHOR BOLT INTO THE FERRULE LOOP INSERT.

4. BOTTOM OF INTEGRAL CAP MUST HAVE RUSTICATION

DROOVES OR OVERHANGS; PAINTED LINES ARE NOT ALLOWED.

TYPICAL POST

ELEVATION, REINFORCING, AND STORAGE PLAN

POST STORAGE AND SHIPPING SUPPORT LOCATION (TYP)

# REBARS

# THREAD ROD EMBEDMENT

VIEW E-E

SECTION G-G

SECTION H-H

TOP VIEW

TOP VIEW

VIEW F-F

DETAIL D - NON-INTEGRAL POST CAP DETAIL

(16" TYPE A POST SHOWN, OTHERS SIMILAR)

NOTES:

1. FOR GENERAL NOTES REFER TO SHEETS 1-3/13.

2. FASTEN THE NON-INTEGRAL CAP ATOP THE POST BY THREADING 3" STIRRUPS @ 6" ALONG #3 PERIMETER REINFORCING (TYP).

3. NON-INTEGRAL CAP ANCHOR BOLT SHALL BE GALVANIZED ASTM A325; 1" £ ANCHOR BOLT INTO THE FERRULE LOOP INSERT.

4. BOTTOM OF INTEGRAL CAP MUST HAVE RUSTICATION

DROOVES OR OVERHANGS; PAINTED LINES ARE NOT ALLOWED.
# BENDING DIAGRAMS

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<td>19-18</td>
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## NOTES:

1. FOR GENERAL NOTES REFER TO SHEETS 1-3/13.


3. INSTALL REINFORCING STEEL WITH A MINIMUM CLEARANCE OF 5/8" FROM ALL CONCRETE SURFACES UNLESS NOTED OTHERWISE.

4. FOR ADDITIONAL POST DETAILS REFER TO SHEET 7/13.


## #3 STIRRUP SCHEDULE

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## "B" PRECAST CONCRETE PANELS

### POST & DRILLED SHAFT AXIS

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**Panel Seat Elevation (Threaded Rods Not Shown For Clarity)**

- **Legend:**
  - \( + \) Center of Drilled Shaft

**Panel Seat Plan With Integral Step Block**

*16", Type E Post Shown, Other Posts Similar*

- **Notes:**
  1. For General Notes Refer to Sheets 1-3/13.
  2. Non-Integral Precast Concrete Step Blocks Shall Be Used From a Minimum Height of 3' to a Maximum Height of 4' for Ground Mounted Applications.
  3. Integral Precast Concrete Step Blocks Shall Be Used for Heights Over 4' to Reduce Loading Forces and Minimize Excavation on This Sheet.

**Details:**

- **Detail E - Integral Step Block**
  - Preformed Bearing Pad
  - Panel Seat Plan With Non-Integral Step Block
  - Panel Seat Plan With Integral Step Block
LEGEND:

- Center of Drilled Shaft

NOTES:

1. For general notes refer to sheets 1-3/13.

2. Refer to the reinforcing steel list in the project plans for the reinforcing steel details for each drilled shaft design.
1. Construct a trench with a minimum longitudinal slope of 1.0% under the noise barrier panels as shown in the typical elevation.

2. Provide underdrain slope of ≥1% minimum or as specified in project plans. Install in accordance with Item 605.

3. Outlet conduit to be spaced at 500' max.; install in accordance with Item 605.

4. At sag points, specify raised panel section.