


**CONSULTANTS:**

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ING /     STRUCTURAL:

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CODE

- |  |         |
|--|---------|
| 2. Floor Live Loads:                               |         |
| Boiler Room:                                       | 100 psf |
| Mezzanine Platform:                                | 175 psf |
| Wind Loads:  |         |
| Basic Wind Speed, V:                               | 95 mph  |
| Wind Importance Factor, I:                         | 1.0     |
| Building Category:                                 | II      |
| Wind Exposure Category:                            | B       |
| 1609.6 Simplified Provision for Low Rise Buildings |         |
| Seismic Load:                                      |         |
| 0.2s Spectral Response Acceleration:               | Sa=0.   |
| 1.0s Spectral Response Acceleration:               | S1=0.   |
| Seismic Use Group/Category:                        | IV      |
| Spectral Response Coefficient:                     | Sds=0.  |
| Spectral Response Coefficient:                     | Sd1=0.  |
| Site Class:  | C       |
| Seismic Design Category:                           | C       |

1. Foundations consist of continuous and spread footings bearing on compacted structural fill placed on undisturbed natural soil having an allowable bearing pressure of 3 kips per square foot.
2. Unless otherwise noted, foundations shall be centered under supported members.
3. The bottom perimeter foundations shall be at least 4'-0" below finished grade.
4. See geotechnical investigation for excavation, backfill and compaction of structural fill procedures for all footings and slabs.
5. The bottom 3 inches of footing excavations shall be finished by hand shovel.

- | SIEVE SIZE | PERCENT PASSING BY WEIGHT |
|------------|---------------------------|
| 6"         | 100                       |
| 6"         | --                        |
| 3"         | 70-100                    |
| 2"         | --                        |
| 1½"        | --                        |
| 1"         | --                        |
| ¾"         | 45-95                     |
| No. 4      | 30-90                     |
| No. 10     | 25-80                     |
| No. 40     | 10-50                     |
| No. 200    | 0-12                      |
- Note: ¾" maximum aggregate within 12" of slab on grade

1. Concrete shall be a mix designed for ultimate strength in accordance with the ACI 211.1 to achieve the following 28-day compressive strengths:  
Housekeeping pods:  
4000 PSI, Normal Weight  
Max Slump = 3" (without plant added water reducer)  
Max Slump = 4"-6" (with plant added water reducer)
2. Concrete shall not be cast in water or on frozen ground.
3. Top of foundation walls shall be smooth and level.
4. No pipe shall pass through concrete without permission of the engineer. Steel pipe sleeves shall be provided and spaced a minimum of three diameters apart.
5. All walls shall be 2'x4', with beveled sides, unless otherwise noted.
6. Horizontal construction joints shall be as indicated on the drawings. The engineer shall approve all vertical construction joints. Construction joints shall be formed with a key, and reinforcing shall be lapped to develop the full tension capacity of the (smaller) bar.
7. Concrete walls shall have contraction or construction joints spaced no more than 60'-0" on center. Foundation wall contraction joints shall be placed with masonry wall control joints, see Engineering drawings.
8. Column or pier dowels shall be set by template.
9. Exposed concrete shall be rubbed immediately after removal of forms.
10. Openings in concrete walls shall be located, sized and reinforced (with the exception of small openings and/or sleeves of a size that will not displace or interrupt the continuity of the reinforcing) as shown on respective details. Any alterations require approval of the structural engineer.
11. DO NOT BACKFILL FOUNDATION WALLS UNTIL THE CONCRETE HAS BEEN IN PLACE FOR SEVEN (7) DAYS AND ATTAINED 75% OF ITS DESIGN COMPRESSIVE STRENGTH.

1. Concrete masonry units (CMU) shall be 8 inch nominal thickness unless noted otherwise on the contract drawings.
2. Masonry construction shall conform to Building Code Requirements for Masonry Structures ( ACI 318-99/ASCE 5-99/MS 7-99/TS 402-99).
3. Specified masonry compressive strength,  $f'm = 1500$  psi - Inspected.
4. Hollow load bearing concrete masonry units shall have the following properties: ASTM C90, Type 1, Grade N-1 (normal weight) with a minimum compressive strength of 2000 psi according to ASTM C90, even though the maximum moisture absorption of 13 percent is not required.
5. Mortar shall be ASTM C270, Type M with 28 day compressive strength of 2500 psi. Mix mortar materials to produce mortar cubes having a 2,500 psi compressive strength when tested in accordance with compressive strength test ASTM C780.
6. Grout shall be ASTM 4746, fine grout with minimum 28 day compressive strength of 2500 psi.
7. Vertical and horizontal deformed reinforcement shall be ASTM A615 grade 60 and horizontal joint reinforcement shall be ASTM A82, galvanized according to ASTM A641 Class 1 as specified.
8. Prior tests according to ASTM A447 are required prior to work.
9. Grout/solid at expansion anchor.
10. Cores and bond beams with reinforcing shall be filled solidly with grout. Filling such cores and bond beams with mortar is strictly prohibited. In addition, care shall be exercised in keeping cores free from mortar droppings.
11. Minimum reinforcing requirements for reinforced CMU walls shall conform to the schedule shown in detail sheet S-2.
12. Grout shall be placed using low or high lift grouting procedures conforming to ACI/ASCE. Terminate grout pours 12 inches below top course of placement. Reinforcing shall be spliced a minimum of 40 bar diameters.
13. Reinforcing shall conform to ASTM Specifications A615, Grade 60.
14. Vertical reinforcing shall be securely held in proper alignment and position during grouting operations by using "Rebar Positions", as manufactured by Wire Bond or approved equal. The product, in addition, shall allow for guiding the spliced reinforcing dropped from the top of the wall.
15. Masonry shall be braced during construction. Brace spacing shall not exceed ten times the wall thickness but not less than the procedures listed under NCMA-TEK 72.
16. Provide full height vertical reinforcement at each side of control joints, window and door openings, all eave walls and corners. Reinforcing shall be grouted solid and match the diameter of vertical reinforcing.

Project Title			
<b>BOILER PLANT MODIFICATIONS VETERANS INTEGRATED SERVICE NETWORK 1</b>			
Location			
<b>MANCHESTER, N.H.</b>			
Building #	Scale	Checked	Drawn
7		<b>PFK</b>	<b>NDC</b>

1. Reinforcing steel shall be deformed bars, free from loose rust and scale, and conforming to ASTM A615, Grade 60.
2. Welded wire fabric shall conform to ASTM A185. Lap two squares at joints and tie at 3"-0".
3. Welded wire fabric in flat sheets.
4. Welded wire fabric shall be supported on elevated deck with continuous bolsters located over joists and beams.
5. Clear concrete cover over bars shall be as follows (see ACI 318 for conditions not noted):

Footings:	3 Inches (bottom), 2inches (top and side)
Walls and Piers:	2 Inches (side)
Elevated slabs:	1 inch (top)
Slab on grade:	2 Inches (top) U.O.N.
6. Accessories shall have upturned legs and be plastic-dipped after fabrication.
7. Accessories for reinforcing shall be in accordance with ACI current edition.
8. Lap reinforcing to develop the full tension capacity of the (smaller) bar.
9. No bars shall be cut or omitted in the field because of sleeves, duct openings or recesses. Bars may be moved aside without change in level with the prior approval of the engineer.

1. Fabricate and erect structural steel in accordance with the "Specification for Structural Steel Buildings – Allowable Stress Design and Plastic Design," and the "Code of Standard Practice" of the AISC. Welding shall conform to the requirements of the "Structural Welding Code" of the American Welding Society.
2. Structural steel wide flange shapes shall conform to ASTM A992. Structural steel channels shall conform to ASTM A572, Grade 50. Structural tube columns shall be ASTM A500, Grade B. Structural steel plates, channels, and angles shall conform to ASTM A36, unless otherwise noted.
3. Structural steel members without written approval of the engineer shall be the standard A36.
4. Bolted connections shall be made with high-strength low-alloy steel bolts, ASTM A325-N.

- bolts, unless otherwise noted. Connections at beam to column connections, moment connections, braced frames, column splices and hangers shall be made with three-quarters inch diameter A305-36 (Slip critical) bolts, unless otherwise noted.
- All beam to column connections shall be double angle connections.
- Shop connections, unless otherwise noted, shall be welded. Unless otherwise noted, beam connections shall provide shear capacity to support a reaction R equal to half the total uniform load capacity of the beam for given shape, span and steel specification (ASCS) taking account for the effect of concentrated loads.
- Shop camber steel beams as shown on the drawings. Camber tolerance shall be  $-0"$  or  $+1/8"$ . Cambered with beam web vertical (erected condition) under its own dead load.
- Anchor bolts shall be ASTM A307 headed bolts of the diameters and dimensions detailed, unless otherwise noted on the drawings. Anchor bolts shall be set by template. High strength (HS) anchor bolts shall be ASTM A449 headed bolts.
- Welding electrodes shall conform to AWS A5.1 E70XX series with proper rod to produce optimum weld (low hydrogen).
- Unless otherwise noted, bolted connections with slotted holes shall be field-welded with one-quarter inch filled welds at final field adjustment.
- Provide  $\frac{3}{8}$ " minimum stiffener plates each side at beams framing over columns and at beams supporting columns above.
- Provide  $\frac{1}{4}$ " thick leveling plate under all column base plates unless otherwise noted. Leveling plates shall be set and grouted prior to erecting columns.
- Provide all angles, plates, anchors, bolts, etc., shown on engineering drawings.
- Lintels for exterior masonry and structural steel exposed to weather shall be hot-dip galvanized according to ASTM A123.
- Provide  $4 \times 4 \times 1/2$  slip support angle as required at columns where structural members do not frame in at all four sides.
- Engineering exposed steel: Shop prime with Tnemec Series 90-1K97 Tnemec-Zinc at 2.5 - 3.5 mils DFT. Intermediate coat of Tnemec Series 23 Typoxy at 2-3 mils DFT. Topcoat of Tnemec Series 73 and 2-3 mils DFT. Tnemec shall be used as the standard of quality and performance.
- General Primer: Tnemec Series 10 Aklyd Primer (applied at 2.5 - 3.5 mil DFT) shall be used as the standard of quality and performance.

- A. Structural Tests, Inspections, and Reports for concrete construction, steel construction, masonry construction, soils, pier foundations, and other applicable construction shall be promptly submitted in writing to the Engineer and Contractor.
- B. Test inspection reports shall be completed in accordance to IBC 2006, Section 1704 Special Inspections. Refer to Statement of Special Inspections/Quality Assurance Plan issued with final construction documents for the required program of special inspections for each building material/system.
- C. Remove and replace work where test results indicate that it does not comply with specified requirements. Additional testing and inspecting of Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- D. Concrete Masonry Units (CMU), Mortar, Grout, and Prism Testing:
  - A. Make 3 specimens for each type of test for each 5,000 square feet of masonry wall.
  - B. Test each mortar type in conformance with ASTM C778.
  - C. Test one specimen at 7 days and the remaining two at 28 days.
  - D. Submit test results to the Engineer of Record and Structural Engineer within 7 days.
  - E. Report unacceptable results within 24 hours.
- E. Concrete Testing: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
  - A. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected pours, with each batch of fewer than five being used.
  - B. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
  - C. Air content: ASTM C 231, pressure method, for normal weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
  - D. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and within 80 deg F and above, and one test for each composite sample.
  - E. Compression Test Specimens: ASTM
    - 1) Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
    - 2) Cast and field cure two sets of two standard cylinder specimens for each composite sample.
  - F. Compressive-Strength Tests: ASTM C 39; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
  - G. Test results shall be reported in writing to the Engineer, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
  - H. Additional Tests: Testing and inspecting agency shall make additional tests of concrete where test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Engineer.
  - I. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
  - J. Concrete deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

**Office of  
Facilities  
Management**

 Department of  
Veterans Affairs