Section X - Miscellaneous

A. Introduction – This section provides design criteria, specific requests/recommendations and preferences related to specifying and constructing systems and materials used in HRSD facilities for items not discussed in the other sections. HRSD plant sites are harsh and aggressive industrial environments and the information provided is based on experience within these environments. HRSD expects the FIRM to evaluate all conditions and criteria related to environmental conditions of each project and to recommend and design suitable systems and materials for the specific project conditions. This section includes site work, concrete, masonry, metals and plastics, thermal and moisture protection, doors, windows and glass, finishes sections of the technical specifications, and architectural standards.

B. Site

1. Site Drainage

   a. Refer to HRSD's Master Specification "01560 – Environmental Protection and Special Controls" within this manual.

   b. Design site grading and surface paving to enhance natural stormwater sheet flow/runoff. Minimize underground storm piping systems to minimize maintenance.

   c. Require removal of all rocks, debris, etc. from finished grade soil.

   d. Ensure that drawings and or specifications define the finish grade material.

   e. Construction methods to comply with State and locality stormwater requirements.

2. Landscaping

   a. Specify grass seed appropriate for the specific times/seasons of year anticipated for planting.

   b. Specify grass seed mixtures that will initially develop and grow without supplemental watering.

   c. Provide a general stand of grass unless otherwise directed for specific locations. Do not specify elaborate grass planting plans with exotic fertilizers, mulches and other requirements.

   d. Provide for compliance with the *Virginia Erosion and Sedimentation Control Manual*, latest edition.

   e. Require/specify stabilization matting in all drainage swales/ditches.

3. Plant Material - Specify minimum plant material required by local municipalities, unless directed by HRSD.

4. Concrete Curb and Gutter

    a. Specify only where required by municipalities or for other specific design/containment reasons.

    b. Specify curb and /or gutter as drive over similar to VDOT CG-3 or 7, when required.

5. Sidewalks

    a. Provide minimum width of three feet.

    b. Specify specific compaction under sidewalks to allow plant maintenance equipment to cross without cracking.

C. Concrete

1. Provide chamfered edges on all vertical and horizontal exposed edges. Prefer three-quarters to one inch chamfered edges.

2. Specify and detail water stop material to insure its proper installation and effectiveness.

3. Specify and detail expansion and construction joints to ensure proper installation and effectiveness against water leaking.

4. Design all plant and pump station concrete using ACI 350R.

5. The FIRM shall conduct a pre-construction meeting specifically related to concrete. This meeting will be held separately and in addition to the traditional Project Pre-Construction Meeting.

    a. The following individuals should attend this meeting:

        i. FIRM’s structural design engineer
        ii. Inspectors
        iii. General and appropriate sub-contractors
        iv. Supplier's field quality control representative
        v. Concrete testing company representative
        vi. HRSD Project Manager

    b. Minimum issues to be discussed at the meeting include:

        i. Concrete placement schedule and sequencing

ii. Review of appropriate codes
iii. Cold/warm weather issues
iv. Workmanship and aesthetic issues
v. Approval and rejection of work
vi. Test panel as standard for approval of future work

D. Masonry

1. Specify and detail rubberized asphalt flashing over all required openings in non-corrosive environments.

2. Specify and detail stainless steel flashing over all required openings in corrosive environments.

3. Specify and detail flashing material and installation to ensure correct installation and effectiveness.

4. Provide galvanized steel lintels over all exterior openings in non-corrosive environments

5. Provide 316 stainless steel lintels over all exterior and interior openings in corrosive environments.

6. Do not use precast concrete or stone copings.

E. Metals and Plastics

1. Hand/Guard Rails, Stair Systems: Specify and design all materials and systems to meet the criteria and conditions of the specific application and environment considering the following.

   a. Provide aluminum or fiberglass materials for all corrosive interior and exterior environments.

   b. Provide galvanized steel, aluminum or fiberglass materials for all interior and exterior non-corrosive environments.

2. Hatches (including all pre-manufactured hinged systems solid cover plates and assemblies). Design and specify all materials and systems to meet the criteria and conditions of the specific application and environment.

   a. Specify anodized aluminum, fiberglass or stainless steel materials for all corrosive interior and exterior environments.

   b. Specify galvanized steel, anodized aluminum or fiberglass materials for all interior and exterior non-corrosive environments.

c. Design to be flush with surrounding surface (unless conditions require otherwise and design is approved by HRSD).

d. Provide hatches with opening and hold open hardware integral with the hatch assembly.

e. Provide 316 stainless steel hardware.

f. Provide a minimum two inches of bearing surface along all sides of the hatch cover.

g. Specify and or design hatch covers to not exceed a maximum deflection of 1/150th of the span when loaded.

h. Provide post and chain or OSHA approved fall protection systems around all hatch openings.

i. Indicate design loading on the drawings.

3. Grating

a. Provide anodized aluminum, fiberglass or stainless steel materials for all corrosive interior and exterior environments.

b. Provide galvanized steel, anodized aluminum or fiberglass materials for all interior and exterior non-corrosive environments.

c. Provide hardware compatible with the grating system material and environment.

d. Design to be flush with surrounding surfaces (unless conditions require otherwise and design is approved by HRSD).

e. Provide continuous perimeter banding. All openings within the grating shall have continuous banding.

f. Design grating to not exceed a maximum deflection of 1/150th of the span when loaded.

g. Indicate the design loading on the drawings.

F. Thermal and Moisture Protection

1. Roofing

a. Provide a minimum of 1/4 inch of slope per foot.

b. Provide sumps around all roof drains.

c. Direct all roof surface water toward drains by built-up roof sections, crickets, etc.

d. Extend roof membrane up the backside of parapets.

e. Locate HVAC and other equipment off the roofs if feasible. If equipment is to be located on the roof, placement of equipment shall be more than 10 feet from any leading roof edge.

f. Provide minimum 36 inch wide walkway protection pads from the roof access point to all roof top equipment.

g. Provide minimum 36 inch walkway protection pads around all four sides of all roof mounted equipment.

h. Provide roof access by roof hatch with ladder or by an exterior wall mounted ladder for all plant buildings.

i. Provide A-frame type construction with composite type roof shingles for Pump Station roofs that are not on Plant sites.

j. Specify 40-year composite type Architectural shingle for pump station A-frame roofs.

k. Install fall protection per OSHA Guidelines

2. Specify pre-finished aluminum coping or gravel stop system.

G. Doors and Hardware

1. General

a. Provide entry doors with threshold elevation high enough to avoid concerns with potential flooding at 100-year flood elevation.

b. Provide non-removable hinge pins on outward swinging exterior doors.

c. Provide heavy duty industrial grade hardware.

d. Install kickplates on all exterior doors and all doors with closers.

e. Provide heavy duty industrial grade hardware on all overhead doors.

f. Provide overhead doors designed for 110 MPH wind load.

2. Pump Stations

    a. Provide fiberglass doors and frames with stainless steel hardware in corrosive areas (i.e. wet wells).

    b. Provide pre-finished aluminum doors in all other locations.

    c. Provide double leaf (each three feet wide) entry doors.

    d. Provide continuous hinge on entry doors.

    e. Specify that locksets shall be supplied by HRSD and installed by the Contractor.

3. Plants

    a. Provide anodized aluminum exterior doors and frames in maintenance and process areas.

    b. Provide aluminum doors with continuous hinges in maintenance and process areas.

    c. Provide a vision glass in all exterior doors.

    d. Provide hardware that is compatible with the door and frame material and the environment.

    e. Provide locksets only on Administration and Storage spaces.

H. Painting and Coatings

1. Painting and Coatings Systems

    a. Evaluate the various environments and recommend painting and coatings systems considering lifecycle costs and accessibility for re-coating. The FIRMs shall carefully review the information in HRSD Coating Manual (latest edition) and discuss how and or why they anticipate complying with or deviating from the recommendation of the manual.

    b. Provide a painting and coating schedule for the project.

2. Piping and Equipment Identification – Utilize the HRSD Piping Identification and Color Code. The identification specification for all piping and equipment shall include the color and labeling as detailed below.

    a. Piping Identification Color Shades – Utilize identifying color shades listed below:

Color Shade	U.S. Government Register 595 Paint Color Number
Aluminum	17178
Black	17038
Blue	15050
Brown	10091
Gray	16473
Green, Dark	14062
Green, Light	14533
Orange	12246
Red	11105
White	17875
Yellow	13655
Purple	17100

b. Piping Identification and Color Code – Reference the HRSD's Coating Manual for colors, product flows and abbreviations.

c. Piping and Equipment Identification

i. Provide stenciled markings that include pipe unit process abbreviation and directional flow arrows.

ii. Place stenciled markings on each side of wall penetrations, at the suction and discharge sides of pumps and both sides of valves, at intersections, and at regular intervals along pipe runs (not to exceed 20 feet). Provide color coding and stenciled markings on piping or tank insulation jackets as required.

iii. Provide black or white stenciled markings to contrast with the pipe background color.

iv. Use capital letters sized as follows:

Pipe Size		Letter size
Up to 1-1/2 inch		1/2 inch
2 to 6 inches		1-1/2 inch
8 inches and up		2-1/2 inch

v. Locate stenciled identification markings to facilitate easy viewing from the floor. Specify that the Contractor, the FIRM, and HRSD must agree on locations of markings.

3. Limits of Coatings in Covered Tanks

a. When covered tanks require coatings for corrosion protection, the coatings shall cover all surfaces in the vapor space and extending to one (1) foot below the minimum water surface and a minimum of four (4) inches beyond the edge of the cover.

b. Pay special attention to the coatings termination details to prevent deterioration and undercutting.

4. Pump Stations

   a. Minimize surfaces to be painted.

   b. Do not paint concrete floors

   c. Do not paint interior CMU walls. Specify that the certain materials unfinished face shall be the final finish and workmanship is critical.

I. Architectural/Structural

1. Shall be designed and constructed to Building Code requirements per locality where facilities are being built.

2. Ride-out space at Treatment Plants and administrative buildings to be designed to withstand a Category I hurricane / wind event and to be functional at that corresponding flood level.

3. Indicate the use classifications for all building spaces.

4. Indicate design floor loads.

5. Pumping stations and other buildings and sites constructed in public areas shall be designed and configured to be in harmony with the surrounding setting. Architectural and landscaping designs and renderings will be submitted to and approved by HRSD at the PER stage.

   a. Refer to the Pump Station Architectural Guidelines in the “Pump Stations” section of this manual.

End of Section