

Section 34 - 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 (3) 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 (3/4 – 1) 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, anodized 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 (2) 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. At the annular space around penetrations through gratings, install a cover-plate over the annular space (or otherwise close the opening) in compliance with OSHA.
- 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 ten (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. Refer to Section 2 – “Architectural and Landscaping Design and Review Process”, Attachment A – Pump Station Architectural Guidelines for roof design.
 - j. Specify 40-year composite type Architectural shingle for pump station A-frame roofs or as indicated in Section 2 – “Architectural and Landscaping Design and Review Process” and as selected by HRSD Architectural Review Committee.
 - 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 as referenced in Section 10 – “Flood Elevation Requirements” in this standards manual.
 - 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 (3) 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. Treatment Plants (See also: Ride-Out Space requirements.)

- 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. At all office spaces provide a vision glass in the office entry door, unless a door sidelight or a borrowed light (interior window) is provided.
- e. Provide hardware that is compatible with the door and frame material and the environment.
- f. Provide locksets only on administration and storage spaces.

4. Electronic Entry-Access Control

- a. Entry access control needs at HRSD facilities (at interior doors, exterior doors, site gates, etc.) shall be coordinated with HRSD for the specific requirements of the facility.
- b. Across HRSD, a certified security vendor/company named CTSI is currently used to purchase and install HRSD's security system equipment for entry access control. The primary method of electronic entry-access control is via employee-assigned ID proximity cards which operate card/badge readers (aka: proximity readers). The

model prox reader that HRSD currently uses is HID Corp PN 5365EGP00-N 1001, with an 8- reader controller board that interfaces with their rack-mounted CCURE Security System. HRSD's I.T. services office coordinates electronic access control systems.

- c. See the typical door access-control diagram at the end of this section.

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 Master Specification 09900 Protective Coatings in Section 40 of this standards manual 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. 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.

3. 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.
- d. Do not paint electrical conduit.

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.
 - a. Design Wind Loads: Comply with requirements of ASCE 7-10 for the locality's Ultimate Wind Speed and the facility's Risk Category. Structural design drawings shall show the Ultimate Wind Speed and the Components and Cladding design pressure local to the facility.
 - b. Wind-Borne-Debris Resistance: Exterior window and door assemblies shall show (without use of auxiliary protection) Florida Building Code "FLA (PAD)" approval for Large (D) and Small Missile impact and pressure cycling at design wind pressure. Windows shall pass the Wind-Borne Resistance test: ASTM E1996 Wind Zone 1, Enhanced Protection, for Large (D) Missile Impact.
 - c. Flood: At a minimum, comply with current flood zone (FIRM) map and Design Flood Elevation (DFE) for the locality of the facility. Consideration shall be given to climate-change flooding projections for the region. Design recommendation shall be reviewed with HRSD.
3. Indicate the use classifications for all building spaces.
4. Indicate design floor loads.
5. Post the design live load limit on the perimeter of storage mezzanines, in locations easily visible from the ground floor.
6. 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's Architectural Review Committee at the PER stage.
 - a. Refer to the Pump Station Architectural Guidelines in Section 2 – "Architectural and Landscaping Design and Review Process" in this manual.

J. Interior Finishes

1. Epoxy/Urethane Flooring: In administrative, shop, and lab facilities, regular cleaning maintenance is typically performed by staff and not by outside contractors. As a result, highly durable, easily cleanable, monolithic floor finishes are preferred in all areas normally accessible to Operations personnel. Such spaces can include corridors, offices, lab areas, breakrooms, toilet/locker/shower rooms, maintenance shops, and other support spaces (housekeeping, workrooms, plans rooms, tools/supplies storage). Integral coved wall base is preferred. Products frequently specified for these areas include the following:

- a. Flooring Type [Epx-1]: A decorative, colored-quartz, self-levelling fluid-applied flooring system having 100%-solids epoxy base coat(s), with broadcast aggregate, and clear-gloss top wear coat.
 - i. Locations Used: Corridors, offices, and other non-wet areas.
 - ii. Appearance: Multi-colored aggregate, with clear gloss topcoat and orange-peel texture (meets ADA friction standards).
 - iii. Nominal Dry Thickness: 3/16"
 - iv. Basis of Design Product: Dur-A-Flex "Dur-A-Quartz" epoxy flooring system (www.dur-a-flex.com). Apply quartz granules in a double-broadcast method. Utilize manufacturer's fine aggregates for broadcast. Provide Armor-Top clear gloss topcoat. Achieve an orange-peel surface texture. VOC-compliant. Primer required.

- b. Flooring Type [Epx-2]: A decorative, colored-quartz,, self-levelling fluid-applied hybrid flooring system having a urethane base coat with a 100%-solids epoxy overcoat(s), a urethane topcoat with broadcast aggregate, and a clear gloss top wear coat.
 - i. Locations Used: Formulated with high moisture tolerance for use in shower, locker, and toilet areas.
 - ii. Appearance: Multi-colored aggregate, with clear gloss topcoat and orange-peel texture (meets ADA friction standards).
 - iii. Nominal Dry Thickness: 3/16"-to-1/4"
 - iv. Basis of Design Product: Dur-A-Flex; "Dur-A-Quartz Hybri-Flex EQ" epoxy flooring system: www.dur-a-flex.com. Apply quartz granules in a double- broadcast method, Utilize manufacturer's fine aggregates for broadcast. Provide Armor-Top clear gloss topcoat. Achieve an orange-peel surface texture. VOC- compliant. Self-priming.
 - v. EPX-1 and EPX-2 can be made identical in appearance. Floor thickness transition taper to be made at doorways.

- c. Flooring Type [Epx-3]: A solid-colored self-levelling hybrid fluid-applied flooring system having a surface-prep scratch coat, a urethane base coat with 100%-solids epoxy overcoat(s), a urethane topcoat with broadcast aggregate, and a pigmented gloss top wear coat.
 - i. Locations Used: Maintenance shops and tool/parts storage areas at shops.
 - ii. Appearance: Opaque single-color gloss topcoat and orange-peel texture (meets ADA friction standards).
 - iii. Nominal Dry Thickness: 3/ 16"
 - iv. Basis of Design Product: Dur-A-Flex; "Polycrete SLB" urethane base coat with "Dur-A-Glaze Shop Floor" epoxy overcoat and "Armor-Top" pigmented gloss urethane topcoat, for a system with superior bond over concrete or tile surfaces; www.dur-a-flex.com. Apply in a double-broadcast method utilizing manufacturer's flintshot aggregates, to achieve 3/16" dry finished thickness. Achieve an orange-peel surface texture. Provide Armor-Top pigmented gloss topcoat. VOC-compliant.

K. Miscellaneous Accessories

1. Lockers: Lockers at Treatment Plants shall be single-high (6') x 18" x 18", on 4" curb, of heavy-duty (16-ga) steel construction, standard ventilated type. ... Provide two adjacent lockers per person, with one locker used for street gear and the other for work gear. See diagram of a typical 2-locker configuration at end of this section.
2. Locker Room Benches: Provide benches convenient to lockers. Bench seats shall be of 1-1/2" thick solid polymer material.
3. Locker Room Coat-hook Racks: Provide coat-hook rack(s) in Locker Rooms. Used for hanging of full-length work coveralls, they shall be located convenient to locker users. Ideal hook spacing of 6" to 9" on center. See example coat-hook rack detail at end of this section.
4. Locker Room Lavatories (Wash Sinks) at Treatment Plant Locker Rooms: In addition to accommodating accessibility requirements, where possible the washroom should include a lavatory having a larger basin for forearm washing. This may be in the form of a stainless-steel scullery-type sink. Provide gooseneck faucet with wrist-blade.

End of Section