

CHAPTER 2

SYSTEMWIDE DESIGN CONSIDERATIONS



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I. GENERAL INTENT

I.A PURPOSE

One of the top priorities for TRI-RAIL is to present a coherent corporate identity. Railroad facilities, particularly stations, are highly visible elements of the railroad system as a whole, and by extension, the greater regional transportation network.

TRI-RAIL does not wish to impose a single, rigid standard design for all stations, but instead seeks to establish a consistent corporate identity, and to provide safe, functional, sustainable, efficient station facilities, while respecting the history, character, and surrounding environment of each station.

II. APPLICATION

The public areas within each station will represent the public image of TRI-RAIL. Station design shall clearly present the organization of public areas to allow passengers to find their way with ease. The image of the station public areas shall take their cues from station surroundings so that an identity suited to each station location is able to develop.

II.A PLANNING DATA

TRI-RAIL stations are located to best serve important centers of activity within the constraints of alignment, cost, and operation standards. These activity centers include various mixes of residential, industrial, and commercial development, as well as schools, shops, and recreational areas.

Depending on the type of intensity of each activity within the area of a particular station, possibly extended by bus interchange, patronage may vary in terms of daily ridership and directional split during peak periods. Ridership, peak demand, and directional characteristics are essential background to the layout and design of passenger stations and associated facilities.

II.A.1 Ridership Forecasts

Ridership forecasts projected through years 2015 and 2025 are included in the amended *Segment 5 Full Funding Grant Agreement* (April 2004), and *Tri-Rail Parking Needs and Opportunities Study* (November 2008). Evaluation of ridership forecasts shall be taken into consideration for future facilities or improvements to existing facilities, to be included to accommodate future ridership demands.

This study may be updated as often as SFRTA may deem necessary. Please refer to www.sfrta.fl.gov/planning.html for the latest version of SFRTA's studies.

II.B GENERAL DESIGN PRINCIPLES

II.B.1 Open Planning

Station designs shall utilize open planning concepts. Clear, unobstructed circulation routes are of utmost importance. Unobstructed sightlines for passengers and staff are essential. Placement of structural elements and enclosed sheltering elements shall not compromise passenger circulation and visibility, or the functional relationships of spaces.

II.B.2 Circulation and Waiting

Stations shall have adequate space for all circulation and waiting functions. Circulation routes and decision points shall be clear to all users.

II.B.3 Passenger Loads

Facility sizes and clearances shall be sufficient to accommodate the future ridership levels for TRI-RAIL.

II.B.4 Entrances

Station entrances shall integrate with the major circulation patterns of the surrounding areas.

II.B.5 Visual Connections

Where possible, station designs shall maintain a visual connection to the station’s location within the community, to help establish the stations as public spaces, and part of the community at large.

II.B.6 Public Areas

Station public areas shall be laid out as simply shaped spaces, without dead-ends, cul-de-sacs, or hidden recesses.

II.B.7 Security

Security provisions, as necessary, shall be unobtrusive as practicable, in keeping with the concept of openness.

II.B.8 Design Life

The minimum design life for the facilities subsystems shall be as follows:

New Structures	80 years
Rehabilitated Structures	20 years
New Stations and Buildings	40 years
New Roadways	40 years
Rehabilitated Roadways	20 years
Utility Installations	40 years

III. ARCHITECTURE

The purpose of this Section is to outline the design philosophy for TRI-RAIL architecture in terms of standardization, image, and response to context.

III.A DESIGN PHILOSOPHY

The design philosophy for TRI-RAIL stations is meant to produce safe, functional, efficient facilities which strike a balance between strength of individual character and relationships to local context, while maximizing standardization of components systemwide, minimizing operational impacts, and controlling costs.

The layout of TRI-RAIL stations shall be determined by site-specific constraints for each facility. In most cases, station layouts will be unique.

III.A.1 Continuity and Variability

Many station elements should be standardized with respect to form, materials, or layout to establish familiarity and a common basis for relating to the system for passengers and personnel who use and maintain the railway.

Conversely, a certain degree of variability of elements between stations will be necessary to maintain the relationship to local context mentioned earlier.

III.B STATION TYPES and CONFIGURATIONS

The generic TRI-RAIL station configuration is that of an outdoor, double-platform, at grade station. Platforms may be either free-standing structures, or enclosed within surrounding structures.

In double-tracked territory, the typical station configuration is two side platforms connected by an overpass or grade crossing.

III.C CODES, REGULATIONS and STANDARDS

Design of TRI-RAIL facilities shall be in accordance with the technical provisions of the codes, regulations, and standards listed below, except when superseded or amended by the requirements of these Guidelines. When making reference to any design code, standard, or regulation, the current edition of such code, standard or regulation shall be used:

- State of Florida Building Code
- Standard Building Code with amendments as implemented by local jurisdictions; Standard Plumbing Code and Standard Electrical Code
- National Fire Protection Association Codes
- Florida Department of Transportation (FDOT) Design Standards
- American Society of Testing Materials, (ASTM)
- National Electric Code
- American with Disabilities Act (ADA)
- Florida Accessibility Code for Building Construction
- South Florida Water Management District
- Corresponding County Standards
- Corresponding Municipality Standards
- Florida Department of Health Standards
- Florida Department of Environmental Protection (FDEP)
- United States Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED)

- Underwriter Laboratories
- Lightning Protection Institute

Building envelope components and assemblies (doors, windows, glazing, louvers, roofing, skylights, etc.) shall conform to the requirements of Miami-Dade County for product approval and control, where such designation exists.

Envelope components and assemblies shall be large missile impact resistant, without the use of shutters.

Where no provisions are made in the codes for particular features of the design, the best architectural/engineering practice shall be followed.

III.D PASSENGER MOVEMENT

The primary goal of TRI-RAIL is the safe, secure, and efficient movement of passengers. Accommodating the needs of passengers is the major criterion on determining the size and configuration of each station, as well as the amenities provided at each station.

- Station planning shall allow passengers to transfer simply and efficiently between trains, the surrounding environs, and other means of transportation.
- The circulation of passengers shall govern the placement of elements within stations.

III.D.1 General Considerations

- Entranceways:** Entranceways shall be as direct as possible, without hidden corners or unnecessary changes in direction. When turns occur, sightlines shall allow passengers to see the path ahead insofar as possible.
- Ticket Vending Machines:** Platform and concourse space shall be sufficient

to allow unimpeded circulation when long lines form at TVM's.

- Queuing Areas:** Formation of lines shall not impede passenger flow.
- Cross Flows:** Station Layout shall minimize the potential for confusion and congestion by avoiding cross flows in passenger movement.
- Decision Points:** Decision points, such as ticketing areas, vertical circulation elements, and diverging paths, shall be arranged so that they are clearly identifiable and perceived as part of a logical sequence of events.
- Passenger Distribution:** Station elements, including vertical circulation elements to the extent used, shall be arranged to encourage an even distribution of passengers throughout the station and, in particular, along the length of the platforms.
- Visual Connection:** Visual connections should maintain continuity between various circulation elements wherever practical. It should be possible to see the vertical circulation elements from TVM locations, and so forth, so that the path ahead is always apparent.

The station architecture itself should be a primary means of finding one's way, supported by signs and graphics.

III.E STATION ELEMENTS

Many TRI-RAIL elements shall be standardized with respect to form, materials, or layout. These elements establish familiarity and common basis for relating to the system for passengers and personnel who use and maintain the railway.

Conversely, since TRI-RAIL will be part of the landscape of South Florida, site specific responses to layout and appearance may be necessary. These responses will ensure that

TRI-RAIL facilities provide an image responsive to the needs and aspirations of the communities through which they will pass.

III.E.1 Continuity

The following elements shall be standardized for continuity and applied systemwide:

- i. **Automatic Revenue Collection (ARC) Equipment:** Systemwide standard ARC equipment, such as TVM's shall be installed and placed in standard locations insofar as station plans allow.
- ii. **Door Hardware:** Door hardware selection shall be compatible with hardware at existing facilities to simplify keying and maintenance, and to minimize types and quantities required for replacement inventory. Keys shall be standard to match SFRTA's stations systemwide.
- iii. **Ticket Agent Office:** Where utilized, the Ticket Office shall be consistent from station to station, in terms of size, layout and location.
- iv. **Fire Hose Cabinets and Fire Extinguishers:** Architectural housings for fire-fighting equipment shall be uniform systemwide, except as necessary to conform to local fire service requirements. Cabinets shall be rust-proof. Keys shall be standard to match SFRTA's stations systemwide.
- v. **Lighting Fixtures:** Lighting fixtures for general use shall be selected from the palette included in Appendix D, to the extent possible.
- vi. **Non-Public Area Facilities:** Room sizes, space relationships, and equipment layouts shall be consistent systemwide, insofar as station layouts allow.
- vii. **Platform Edge:** The platform edge is a critical area for passenger safety. Materials and edge details shall be in

accordance with the requirements of Chapter 4 of these Guidelines.

- viii. **Platform Finish Materials:** Materials shall be consistent in color and texture, to ensure that circulation markings, tactile warning strips, and platform edges remain visible and recognizable at all times.
 - ix. **Signs and Graphics:** Signs and graphics shall be uniform throughout TRI-RAIL public areas. Sign messages and graphics shall be coordinated with station and facility locations.
 - x. **Specialty Equipment:** Equipment such as CCTV cameras and monitors, public address speakers, and emergency stop buttons, shall be of standard design and mounting. Locations of these components shall be as consistent as station plans allow.
 - xi. **Station Fixtures and Furnishings:** Station fixtures and furnishings such as benches, trash receptacles, and map holders shall be selected from the palette included in Appendix D to the extent possible. Location of fixtures and furnishings within stations shall be systemwide, to the extent stations allow. Map holders shall match existing acrylic thickness, and shall be mounted no more than 36" above ground.
 - xii. **Vertical Circulation Elements:** Stairs and elevators shall use standard construction and interface details to reduce costs and simplify maintenance procedures. Stair railings, materials, and details shall be uniform systemwide, unless otherwise required.
- Elevator enclosures shall be uniform in terms of overall form, materials, and details, but may vary in configuration or other characteristics to suit the particular requirements of each station.

III.E.2 Variability

The elements listed below may vary as needed to suit a particular location:

- i. **Artwork:** Artwork may be placed at certain TRI-RAIL locations. Site layouts, facility plans, and community input may influence the choice and placement of artwork.
- ii. **Exterior Finishes:** Materials and finishes for exterior structures shall be selected to be compatible with the surrounding site.
- iii. **Finishes for Public Space:** While finishes and materials for public spaces may be limited to a somewhat restricted palette, materials may vary in color, texture, and scale from location, to reflect a station's unique architectural character.
- iv. **Lighting Fixture Location:** The location of lighting fixtures in public areas and station sites may vary according to architectural intent and functional design requirements. Location must have access to maintain fixtures via a bucket, ladder, or lift.
- v. **Platform Configurations:** While platform lengths and total areas should be consistent, station to station, platform widths and layouts may be influenced by a combination of criteria, including ridership, passenger movement, physical clearances, and safety. The location of vertical circulation elements may vary from station to station.

The presence of freight and other "non-stop" trains passing through some stations may also affect the final platform configuration.
- vi. **Site Furniture:** Where site furnishings are thoroughly integrated with landscape and site design, they shall match color, material, and form

systemwide, and shall suit the architecture, design intent, and site planning. Where furniture is being added, it shall match existing to the extent possible. Benches shall not be anchored in concrete. Bolted benches are preferred.

- vii. **Site Layouts:** While site layouts will generally follow the design principles outlined herein, site constraints will tend to produce a unique layout for each facility. Locations and configurations of pedestrian footpaths, service access drives, and parking areas, for instance, will be determined by the characteristics of each individual site.
- viii. **Station Entrances:** The form and configuration of station entrances may be determined by projected ridership demand, capacity circulations, and site planning considerations. Shapes, sizes, materials, and finishes may vary as required.

III.F PROVISIONS FOR PERSONS WITH SPECIAL NEEDS



TRI-RAIL is committed to providing access to public transportation services for all passengers, including persons with disabilities and other special needs.

This group of potential passengers includes, but is not limited to:

- The wheelchair users and mobility-impaired
- The blind and partially-sighted
- The deaf and hard of hearing

- The elderly, persons with disability and infirm
- Pregnant women, and
- Those travelling with baby strollers, small children, baggage, or other bulky items

Taken together, this group is estimated to comprise approximately 20% of the general population in South Florida.

III.F.1 General Considerations

Access to station facilities must be unsupervised, obstruction-free, and suitable to use by all. The design of facilities for persons with disabilities and/or special needs shall not, however, draw unnecessary attention to those users, nor shall these facilities have an inordinate impact upon station operations, maintenance, or appearance.

The general goal is to design TRI-RAIL facilities so that all passengers, whether with or without special needs, have equitable, comparable access to the system.

III.F.2 Provisions for the Non-Ambulatory

From the public way to the platform, each station shall have at least one clearly marked access route for the non-ambulatory. In some stations, if required by site constraints, it may be necessary to provide more than one access route, i.e., from either side of a major roadway, to ensure adequate access.

i. Specific Directives:

- **Connections:** Access shall be provided to public station areas from selected entrances within easy reach of other transportation.
- **Elevators:** Elevator structures, equipment, and controls shall be designed in accordance with the requirements of Chapter 7 of these Guidelines.

- **Ramps:** Where changes in elevation less than 6 feet occur, ramps may be provided in place of elevators.
- **Drop-Off Areas:** Passenger drop-off areas for non-ambulatory users, with curb cuts for access clearly indicated, shall be provided at all stations.

III.F.3 Provisions for the Blind and Partially Sighted

Stations shall be designed to minimize hazards to the blind or partially sighted. Station layouts shall allow circulation by these passengers to take place in clearly defined zones.

i. Specific Directives:

- Routing Information:** Maps with routing information in Braille or tactile text shall be judiciously placed at critical locations to be determined and will comply with current ADA regulations.
- Tactile Access Route:** At least one station access route shall be designated with tactile floor pavers leading from the passenger drop-off area to an accessible entrance, and continuing through the platforms via stairs and elevators.
- Tactile Hazard Markings:** Tactile hazard markings shall be provided at danger areas such as elevator landings and stair wells. Any obstructions such as freestanding signs, drinking fountains, telephone enclosures, or fire hose cabinets shall be cane detectable and protected, either by horizontal bars set 4" above floor level, or a wing wall around the obstructions.
- Tactile Warning Strip:** a 24" deep tactile warning strip shall be provided the full width of each stair at 12" from the top and bottom step.

Platform edges shall be provided with tactile warning strips in accordance to Chapter 4 of these Guidelines.

- e. **Handrail Extension:** Handrails shall extend 12" minimum beyond the top and bottom nosing of every flight of steps or beyond the ends of any ramp. Handrail extensions shall be finished with a textured area, tactile message, and high-contrast color bands to assist partially sighted passengers.

Above Directives shall comply with current ADA regulations and local building codes.

III.F.4 Provisions for the Deaf and People who are Hard of Hearing

- i. **Signs:** Appropriate visible messages shall be provided at all stations public areas.
- ii. **Coordination with Passenger Information Display System:** Announcements made over the station's public address system shall also appear on the passenger information display system.
- iii. **Enhanced Volume:** Adjustable volume handsets shall be provided for telephones. All pay phones shall be equipped with TTY units.

III.F.5 Miscellaneous Requirements

Where provided, other facilities such as station buildings, customer service kiosks, telephone booths, signs and graphics, shall include suitable provisions for persons with special needs.

- i. **Handrails:** Kick plates shall be installed at the bottom of the railings. Handrails shall be of a design that discourages skateboarding.

III.G FINISHES

Finishes will be among the most visible aspects of TRI-RAIL facilities and as such, will form a significant part of public perception of the system as a whole. Finishes shall be non-combustible, long wearing, easily cleaned, and replaceable with minimum disruption to operations. Finishes which can produce harmful gases, smoke, or dust shall not be allowed.

III.G.1 Standards

Finish specifications shall conform to applicable requirements from Local Building Codes, and shall minimize required maintenance.

III.G.2 Life Cycle

Finish materials shall have a minimum design service life of 30 years or as indicated in Section II.B.8, without requiring replacement or major refurbishment. Materials that require extensive or proprietary maintenance procedures shall not be used.

III.G.3 Joints

While expansion joints may be required in materials, design of finish patterns should strive to minimize the number of joints.

Placement of expansion and modular joints shall follow the recommendations of material manufacturers.

III.G.4 Corrosion and Vibration

Consideration shall be given to the resistance of materials to the corrosive effects of high humidity, proximity to seaside air, and possible exposure to stray electrical currents. The effects of vibrations due to train movements shall also be considered in choice of materials, fastening devices, and support systems.

III.H FLOORS

Floor surfaces will be the most heavily used of all station finishes. A key characteristic

of finish floor material, therefore, is the durability of the wearing surface. Platforms shall have a concrete floor, with no paint coats. Ticket agent floors or other ancillary structures shall have a floor that is easy to maintain.

The following points shall be considered in the choice of floor materials:

III.H.1 Texture

Non-slip, especially in areas where water may be present, such as platforms and entrances.

III.H.2 Color

Materials with integral color are preferred over those with surface finish color only.

III.H.3 Dimensions

Finish floor material thickness will vary according to the nature and properties of the materials chosen. Where special services are to be installed, finish floor-to-structure dimensions may need to be adjusted.

III.H.4 Joints

Finish floor materials shall be chosen to minimize the number and size of joints between individual units. Finish materials capable of providing large slabs are preferred. Floor designs shall align movement joints in floor finishes with those of the structural floor slabs, wall, and wall finishes.

III.H.5 Maintenance

Floor finishes shall require minimum maintenance, be easily cleaned, and resistant to staining and the effects of commonly used cleaning agents.

III.I WALL AND COLUMNS

Wall and column finishes shall comply with the following criteria:

III.I.1 Durability

Finishes within reach of the public shall be highly resistant to vandalism, including graffiti, and wear.

III.I.2 Appearance

Finishes and locations where routine-cleaning cannot easily be carried out shall have surface characteristics that do not easily show accumulated dirt.

III.I.3 Construction

Columns walls, and partitions may have finishes integral with their structure (such as architectural concrete), or applied finishes, such as tile.

III.I.4 External Elements

External elements subject to seepage, such as the external wall of retaining structures may have attached finish panels that allow water seepage to drain behind. Attached panels may also be used where services run behind wall finishes. Attached panels shall be fastened to the structure with corrosion-resistant fasteners, shall be individually removable, and shall be designed to prevent retention and leakage of seepage into finished spaces.

III.I.5 Exposed Structures

When used as finishes in public or support areas, exposed structures shall include provisions for cleaning and dust control, which may include applied materials or coatings. Drainage elements shall be concealed.

Vertical surfaces, such as walls and columns, up to a height of 10'-0" shall be considered as within reach of the public.

III.I.6 Maintenance

Hose bibs shall be located in close proximity to stair towers to allow for easy access for cleaning. Installation of kickboards or tile on the bottom of the walls shall be considered to reduce shoe marks.

III.J CEILINGS

Ceiling design requires a high degree of coordination between station architecture and station support services. A modular ceiling system shall be used, to keep the number of special panel sizes to a minimum.

Ceiling finishes shall conform to the following criteria:

III.J.1 Fasteners of Suspended Ceilings

Suspended ceilings shall use mechanical fastenings that allow panels to be individually removed and shall be securely fastened to withstand wind uplift and downdraft loadings.

III.J.2 Coordination with Other Design Elements

The design of ceilings shall consider the placement lighting, signs, and access to mechanical and telecommunications systems. Coordination with these elements shall not require the use of extensive special fittings within the suspended ceiling.

III.J.3 Exposed Finishes

Exposed undersides of structures, when used in support or public areas, shall be finished to allow for cleaning and dust control. This finish may consist of applied materials or a finish coating.

III.J.4 Maintenance

Ceilings shall require minimum maintenance, be easily cleaned, and resistant to staining and the effects of commonly used cleaning agents. A sealant shall be considered to reduce staining from train exhaust. In addition, access shall be provided to easily clean ceilings.

III.K EXTERIOR SURFACES

Finishes chosen for use on exterior surfaces need to withstand the extreme of climatic conditions and the effects of environmental pollution. Materials that retain good

appearance without periodic cleaning are preferred.

Consideration shall be given to the following:

III.K.1 Movement Joints

Thermal movement joints in finishes shall be coordinated with other construction joints.

III.K.2 Modular Panels

Panel cladding systems shall allow individual panels to be removed to facilitate repair.

III.K.3 Rainwater

Detailing shall minimize the possibility of rainwater ponding and staining, especially on stairs and landings.

III.K.4 Local Context

TRI-RAIL should be seen as an asset that strengthens and contributes to the existing community. In locations with strong local character, therefore, design of finishes shall consider materials that complement the existing context.

III.L VENTILATION AND CLIMATE CONDITION PROVISIONS

All enclosed areas and mechanical equipment spaces shall have a ventilation system that minimizes heat build-up. Airflow shall not be dependent on operable windows or doors. No operable windows and suspended paddle-type ceiling fans shall be used.

III.L.1 Design Considerations and Guidelines

- i. Air circulation shall be maintained via natural or forced air ventilation in non-air conditioned areas. Climate conditioning is recommended only when other means of maintaining room temperatures are insufficient. The climate conditioning equipment shall be located so that they do not protrude

- from the wall or discharge exhaust air into public areas. All climate conditioning equipment shall use CFC-free refrigerants and be of standard commercial design.
- ii. All climate conditioning equipment shall be mounted with vibration isolators, flexible connections and have acoustical treatment where required.
 - iii. All shelters, freestanding waiting areas and crossover pedestrian bridges shall have a natural ventilation system that allows the flow of air through and to minimize heat build-up.
 - iv. In those areas requiring air conditioning, a stand-alone air conditioning unit shall be provided sized to meet the cooling needs of that space.
 - v. Fire, smoke or combination of fire and smoke dampers shall be installed as required by all applicable Governmental Rules at all duct penetrations or vent openings in rated assemblies.
 - vi. All exhaust fans that discharge into attic or power-driven attic fans shall be equipped with a fire rated automatic temperature shut-off device.
 - vii. Climate conditioning shall be provided for all Ticket Agents' Offices as well as enclosed public waiting areas. All climate conditioning equipment shall be easily accessible for ease of maintenance and servicing. Equipment shall be reliable, energy efficient and of sufficient size for each facility. Heat pumps that can handle both heating and climate conditioning shall be considered.
 - viii. Climate conditioning equipment shall be concealed as much as possible. Equipment shall be located discretely or concealed as much as possible.

- ix. Meet LEED Indoor Environmental Quality Pre-requisites and credits in Section IV of this Chapter and Chapter 4.

III.M MAINTENANCE

Station facilities shall be designed with appropriate consideration of the ongoing maintenance that will be required. The design of the station should permit normal maintenance to be performed without extensive use of specialized equipment, and shall be designed in a way that access does not require flagging or special permission from any property owner or jurisdiction. The following criteria shall be given due consideration in the development of station design and detailing:

- **Cleanliness:** To facilitate and maintain cleanliness throughout TRI-RAIL, inspiring pride in the system, encouraging use of the system, and discouraging vandalism.
- **Efficiency:** To provide for an efficient, cost-effective maintenance program.
- **Integration:** To incorporate appropriate maintenance provisions into basic station design, without distracting from the appearance or operation of the stations.
- **Standardization:** To provide standardized facilities within each station, to enhance maintainability and minimize the required inventory of replacement of items.

III.M.1 Architectural Considerations

Architectural considerations for maintenance fall into two general categories: mitigation of obstacles and maintenance provisions.

- i. **Mitigation of Obstacles:** ensures that the design of stations does not preclude or inhibit necessary maintenance

procedures. The following shall be considered during design:

- a. **Horizontal Ledges:** Horizontal ledges should be avoided to minimize the collection of dust and debris, and the discouragement of birds from roosting. Exposed top surfaces of beams, parapets, and window ledges shall have a minimum slope of 30° to horizontal.
- b. **Wall Bases:** Wall base shall be 6" high at all points of intersection between floors and walls, partitions, columns, and other surfaces in public areas, as well as in all toilet rooms, cleaner's rooms, and wherever wash down and wet mopping occurs.
- c. **Bases:** Bases shall be flush with the wall or recessed. If recessed, the configuration shall allow the use of a vacuum scrubber to clean the floor within the recess.
- d. **Signs:** Signs and advertising panels shall be designed and located in a manner to require minimal maintenance.
- e. **Equipment Bases:** Where equipment is free standing, dedicated housekeeping bases shall be provided integral with the floor. Where equipment is grouped, bases shall either be continuous, or flush closure strips shall be provided close the spaces between units.
- f. **Projecting Elements:** Handrails, door pulls, and other necessary projecting elements shall have adequate clear space to allow for cleaning behind them. Other structural and architectural elements that project from walls should be avoided.
- g. Where an element projects more than 3" from a wall, the designer shall ensure that floor and wall surfaces below or adjacent to the projecting

element are easily accessible for cleaning.

- h. **Enclosed Areas Under Stairs:** Areas under stairs and escalators up to 7'-0" minimum headroom height shall be enclosed to prevent the collection of debris.
- i. **Sanitation:** Where sanitation is of particular concern, such as at public toilets, care shall be taken to keep joints to a minimum and pipes concealed to prevent the collection of dirt, debris, and bacteria. All fixtures shall be stainless steel. In areas where hose bibs are provided for wash downs, appropriate drainage shall be provided.
- ii. **Maintenance Provisions:** Architectural and other design features shall be specifically intended to facilitate maintenance.

A program of routine maintenance requires access to all areas of stations and their sites, including those areas not accessible to the general public. The design of each station shall include features to enable access to isolated areas, and to uncover concealed items as necessary. Features shall include concrete pads, or level compacted areas to support maintenance equipment. The following shall be considered during design:

- a. **Ladders and Catwalks:** Elevated areas of stations shall be made accessible for maintenance by fixed installations such as ladders and catwalks.
- b. **Mechanical Lifts:** Access to high ceilings or soffits for maintenance of lighting fixtures and other ceiling-mounted equipment may require portable, mechanically operated lifts.
- c. **Portable Maintenance Equipment:** may be shared between stations and

shall therefore fit into station elevators.

- d. **Truck-mounted Hydraulic Elevators:** may be used for maintenance of pole-mounted station site lighting, and to reach normally inaccessible portions of stations for non-routine maintenance.
- e. **Access to Voids:** access panels shall be provided into voids such as ceilings plenums, pipe chases, attics, crawlspaces, etc. to facilitate inspection and maintenance. Access panels and clean-outs shall be inconspicuously located in non-public areas wherever possible. Access panels shall be finished to match surrounding surfaces.

All voids shall additionally be provided with means to ensure ventilation in accordance with applicable standards.

III.M.2 Anchoring

Signs, handrails, and benches shall be securely anchored with tamper-proof screws or bolts.

- i. If heads are exposed to public view, flush spanner-head screws shall be used.
- ii. If heads are concealed from public view, socket-head screws shall be used.

III.N PLUMBING AND FIRE PROTECTION

III.N.1 Considerations and Design Guidelines

Fire sprinklers shall be provided where required by applicable Governmental Rules. The sprinkler system shall be connected to a separate water supply that is insulated. The sprinkler heads shall be of the quick response type. The sprinkler annunciator panel shall be located as approved by the Fire Marshal

Piping for both hot and cold water shall be copper.

Fire extinguisher type and locations shall be as required by the Fire Marshall and shall be in addition to the above requirements. Standpipe connections shall be recessed into wall construction where possible. Where possible, fire extinguisher cabinets shall be recessed in the wall and painted red. Standpipe systems shall be manual dry type, unless specific conditions require otherwise. Hose connection treads and reducers shall be compatible with those of neighboring fire departments. Fire department connection (i.e. Siamese connection) shall be within reach of fire fighting vehicle and as approved by Fire Marshall.

Fire valve cabinets shall be vandal resistant and locked with a fire department standard key.

III.N.2 Materials and Performance

- i. Hangers for hot and cold water lines shall be copper clad. Pipe size 1-1/2" or smaller shall be soldered with lead free solder. Pipe size 2" and above shall be silver brazed.
- ii. Sprinkler piping shall be Schedule 40 black steel pipe with grooves and coupling.
- iii. Fire extinguishers shall be ten pound dry chemical extinguishers and be provided in each of the following areas:
 - Janitor closets
 - Electrical closets
 - Elevator machine room
 - Ambassador's Office
 - Mechanical equipment room
 - Other locations identified by Fire Marshal

IV. GREEN DESIGN

The following LEED prerequisites and credits apply to this Chapter. These criteria shall be implemented on each project as applicable, and as far as the budget allows. Criteria to meet each prerequisite and credit shall be in accordance to the latest version of LEED New Construction and Major Renovations.

IV.A SUSTAINABLE SITES (SS)

IV.A.1 SS Prerequisite 1: Construction Activity Pollution Prevention

The intent of this prerequisite is to reduce pollution during construction activities. This prerequisite shall be easily met with every project by means of providing a pollution prevention plan, as required by EPA's NPDES.

IV.B ENERGY & ATMOSPHERE (EA)

IV.B.1 EA Prerequisite 1: Fundamental Commissioning of Building Energy Systems

The intent of this prerequisite is to verify that reduced energy initiatives are installed. Calibrated and performing as designed.

IV.B.2 EA Prerequisite 2: Minimum Energy Performance

The intent of this prerequisite is to establish the minimum level of energy efficiency of a station or ancillary structures.

IV.B.3 EA Prerequisite 3: Fundamental Refrigeration Management

The intent of this prerequisite is to reduce stratospheric ozone depletion by using zero chlorofluorocarbon (CFC).

IV.B.4 EA Credit 1: Optimize Energy Performance

The intent of this credit is to increase energy efficiency performance.

IV.C MATERIALS & RESOURCES (MR)

IV.C.1 MR Prerequisite 1: Storage and Collection of Recyclables

The intent of this prerequisite is to reduce the amount of waste generated by a building and hauled to a landfill.

IV.C.2 MR Credit 4: Recycled Content

The intent of this credit is to incorporate the requirement to use recycled materials, or the recycled material content in the design and specifications.

IV.C.3 MR Credit 5: Regional Materials

The intent of this credit is to encourage and increase the use of local materials by reducing impacts due to transportation.

IV.C.4 MR Credit 6: Rapidly Renewable Materials

The intent of this credit is to encourage the use of rapidly renewable materials, such as bamboo, cotton, linoleum, and cork.

IV.D INDOOR ENVIRONMENTAL QUALITY (IEQ)

IV.D.1 IEQ Prerequisite 1: Minimum Indoor Air Quality Performance

The intent of this prerequisite is to establish a minimum indoor air quality performance.

IV.D.2 IEQ Prerequisite 2: Environmental Tobacco Smoke (ETS) Control

The intent of this prerequisite is to minimize building occupants to ETS through ventilation.

IV.D.3 IEQ Credit 4.1: Low-Emitting Materials – Adhesives and Sealants

The intent of this credit is to reduce the use of adhesives and sealants that have

contaminants that are odorous, irritating, or harmful to occupants.

IV.D.4 IEQ Credit 4.2: Low-Emitting Materials – Paints and Coatings

The intent of this credit is to reduce the use of paints and coatings that have contaminants that are odorous, irritating, or harmful to occupants.

IV.D.5 IEQ Credit 4.3: Low-Emitting Materials – Flooring Systems

The intent of this credit is to reduce the use of flooring systems that have contaminants that are odorous, irritating, or harmful to occupants.

IV.D.6 IEQ Credit 4.4: Low-Emitting Materials – Composite Wood and Agrifiber Products

The intent of this credit is to reduce the use of composite wood and agrifiber products that have contaminants that are odorous, irritating, or harmful to occupants.

END OF CHAPTER