



◀ (Left) Air conditioning and heating shafts should be on the roof of transit stations or hidden from view; (Right) Bike racks can be stationed on top of exposed ventilation grates on the ground.



◀ Stations can be designed to provide natural ventilation with minimal equipment, like this station in Tokyo, Japan.



2.2.2.21 MECHANICAL EQUIPMENT

This section outlines general criteria related to functional and design requirements for the Environmental Control Systems (ECS) to provide Heating, Ventilating and Air Conditioning (HVAC) for the rail system with the goal of promoting uniformity of design and to standardize mechanical components of the Metro rail system (see Fig. 12). Mechanical criteria will cover the design of the following ECS:

- Ventilating;
- Heating;
- Air conditioning;
- Drainage for track and inside structures;
- Gratings and miscellaneous metals;
- Fire protection systems;
- Plumbing;
- Escalators; and
- Elevators.

► GUIDELINES

- Ensure the design complies with local, state and national codes. The general standards for transit design are contained in the requirements of the National Fire Protection Association (NFPA) Standard 130, Fixed Guideway Transit Systems. Design will follow the most stringent of applicable codes and / or industry practices.
- Maintain an acceptable environment for patrons, operators and maintenance personnel by providing HVAC systems for ancillary rooms, subway station platforms, concourse areas, mezzanines and concession areas. These HVAC systems should also prolong the life of equipment through proper control of temperature, pressure and humidity.

- Design the ventilation system to not only offer a healthy and comfortable atmosphere for patrons, but also to provide environmental control in the event of an emergency. In achieving these ends, the system should not be intrusive at the surface level. Thus, the ventilation system should provide for the following:

- » Supply of fresh air.
- » Removal of heat and control of air temperatures.
- » Control and removal of heat, smoke and fumes during an emergency to provide safe evacuation and assist in fire control.
- » Minimum environmental impact at the surface.

FIG. 12

TECHNICAL CONSIDERATIONS

► ENVIRONMENTAL CONTROL SYSTEMS

Environmental control systems to control temperature, air velocity, rate of air pressure change, dust, odors and the spread of smoke during fire emergencies should be provided as prescribed here.

AT-GRADE STATIONS

HVAC systems should be provided for the ancillary rooms and for concession areas. ECS will not be provided for patron areas unless:

- The architecture of the station requires ventilation for smoke control; or
- The ECS is part of a joint development project.

SUBWAY STATIONS

HVAC systems for platform and mezzanine areas, concession areas, and the ancillary rooms should be provided. An under-platform exhaust (UPE) system could be provided to supplement emergency ventilation and to capture a portion of the heat released by the trains in stations during both normal and congested operations.

SUBWAY TUNNEL

Emergency ventilation shafts that terminate at or above grade at each end of the station and between two stations should be provided. The ventilation shafts should be equipped with reversible fans, fan dampers, sound attenuators and bypass dampers for forced ventilation during congested or emergency

operations. Tunnel booster fans should be provided so that the effects of airflow short-circuiting from tunnel to tunnel are reduced during both congested and emergency operations.

MISCELLANEOUS WAYSIDE STRUCTURES

HVAC systems should be provided for the ancillary rooms in miscellaneous wayside structures.

TRACTION POWER SUBSTATIONS

HVAC systems should be provided for traction power substation structures and rooms.



◀ Electrical systems must power standard lighting as well as emergency lighting.



2.2.2.22 ELECTRICAL

This section outlines general criteria related to functional and design requirements for the electrical systems required for underground and at-grade stations, as well as support facilities (see Fig. 13). These guidelines have the goal of promoting uniformity of design and standardization of electrical components in the system. Electrical criteria will cover the design of the following facilities:

- Electrical distribution (3 phase primary) system;
- Lighting;
- HVAC systems;
- Emergency power substation systems;
- Traction power subway substation auxiliary power connections;
- Maintenance yards and shops;
- Elevators and escalators;
- Fare vending;
- Illuminated signing;
- Public telephones;
- Grounding system;
- Lighting protection system;
- Supervisory and control systems;
- Raceway systems;
- Power to signal and communications facilities; and
- Provisions for future growth in the system.

► GUIDELINES

Electrical design should conform to the latest editions of all appropriate applicable standards and codes (refer to the International Building Code [IBC] and local and state regulations for more information).

FIG. 13

TECHNICAL CONSIDERATIONS

► INCOMING ELECTRICAL SERVICE REQUIREMENTS

The required electrical energy for the auxiliary power and lighting systems of Metro facilities will be furnished by a single power source. Two primary feeders should serve each subway station and the train control center. One primary feeder should serve each aerial and at-grade facility (see Support Facilities). Each

passenger station should have a facility power supply room. Traction power substations will have separate utility power sources.

ELECTRICAL LOADS

Electrical loads connected to auxiliary power equipment should be defined as either non-essential or emergency.

Non-Essential Loads: Non-essential loads are loads which,

if de-energized, would have minor effect on patron safety and no effects on system safety.

Essential Loads: Essential loads are loads which, if lost, would have a detrimental effect on patron and / or system safety. See National Fire Protection Association (NFPA) Standard 130 for more information.

ELECTRICAL DISTRIBUTION

General: Primary feeder power should be transformed where

required to the nominal A80/277 volts for distribution.

Unit Substation Service: Entry from the utility company should contain a primary-fused disconnect switch or a circuit breaker for the utility primary at 0480/277 volt dry-type transformer. Where it is feasible, 480/277 volt three-phase power can be supplied from the utility company directly to the switchgear without the need of transformers.

EMERGENCY POWER SYSTEMS

Train Control Center: The emergency power system for the train control center should meet the requirements of station Signaling Systems (NFPA 71) and utilize an uninterruptible power supply (UPS).

Subway Stations: Subway stations should include emergency power systems:

- An uninterruptible power supply.

- An uninterruptible power supply for a part of the emergency lighting (in the public areas of station only), including emergency exit stair lights and exit signs.
- A standby engine-generator capable of supplying essential power loads and all emergency lighting in the station as well as emergency functions (eg. sump station for tunnel) normally supplied from that station.



Physical cues, materials and textures help create successful urban environments.



Landscaped intersection.

2.3 LANDSCAPE ARCHITECTURE

Landscape architecture is a synthesis of arts, sciences, technical philosophies and practices that seek to care for people in a holistic, creative and sustainable manner. While these guidelines attempt to address all of the philosophies and practices to some degree, the 'tool kit' emphasizes the design of the urban environment in regard to the health, safety and welfare of the citizens and visitors of Los Angeles. The ultimate goal is to improve the pedestrian environment by defining a safe, contextually integrated transportation system that is efficient, convenient and facilitates the concept of stimulating and creating an extraordinary downtown urban environment.

2.3.1 LANDSCAPE ARCHITECTURE PRINCIPLES

2.3.1.1 IMPROVED VISUAL CUES & WAYFINDING

Many physical elements are orchestrated to improve visual cues, wayfinding and create a successful urban environment. Street trees, sidewalks, lighting, comfortable seating, legible signage and other amenities are components of the composition that create a safe, well-defined and enjoyable environment for people. Several of the basic design concepts considered when creating such an environment include line, form, texture, color, variety, rhythm, harmony, balance, emphasis and light.

2.3.1.2 SUSTAINABILITY

Sustainable design is the philosophy and practice of designing the built environment and planning for public services to comply with the principles of economic, social and ecological sustainability.

The values of sustainable design include:

- Meet the needs of the present without compromising the quality of life of future generations.

- Maintain economic growth while producing an absolute minimum of pollution, repairing environmental damages of the past, producing less waste and extending opportunities to live in a pleasant and healthy environment.
- Meet human needs by maintaining a balance between development, social equality, ecology, and economics.
- Demand systematic consideration to a project's environmental impacts, energy use, natural resource consumption and economic and social implications.
- Realize that sustainability is best addressed at the inception of a project and continues to be relevant throughout the planning, programming, design, construction, and ownership phases.

The 'Green Street' concept is an instrumental element of the proposed Regional Connector Transit Corridor project. 'Green Streets' are a sustainable stormwater strategy that meets regulatory compliance and resource protection goals by using a natural systems approach to manage stormwater, reduce flows, improve water quality and enhance watershed health (Source: Portland Bureau of Environmental Services).

2.3.1.3 CLIMATE-APPROPRIATENESS

Los Angeles' favorable marine climate encourages the indoor-outdoor relationship of people, their dwelling spaces and their environment. The Sunset Western Garden Book defines the Los Angeles Downtown area as Zone 23 and is one of the most favored garden climates in North America for the growing of subtropical plants. The climate is characterized by an air-drained thermal belt with 85% of the seasonal conditions being influenced by the Pacific Ocean and 15% from the Interior (Santa Ana winds). The winter season includes minimal frost and low temperatures range from 38 – 23°F. The USDA Plant Hardiness Zone Map defines the area as zone 9A with an average annual minimum temperature of 20 – 26°F. The lowest recorded temperature at the Los Angeles Civic Center is 28°F.

The 'Green Street' concept is an instrumental element of the proposed Regional Connector Transit Corridor project.



◀ Streetscape



◀ Station Entrance



◀ Train Portal Structure

2.3.2 LANDSCAPE ARCHITECTURE COMPONENTS

2.3.2.1 STATION AREAS & STREETSCAPES

The three major components of the Regional Connector are: (1) Stations and Station Entrances; (2) Train Portal Structures; and (3) Streetscapes.

► STATIONS & STATION ENTRANCES

Landscape architectural spaces that are typically associated with stations and station entrances include plazas and pocket parks. Plazas are typically an open urban public space, similar to a city square or a large courtyard and are usually surrounded by buildings. Plazas adjacent to stations are a gathering or focal point for human activity and the primary use is to safely and efficiently facilitate the circulation of pedestrians to and from the station. Additional uses may include retail sales, passive recreation and cultural events. Pocket parks are small parks accessible to the public that provide greenery, passive recreation and sometimes a children's playground. Parks may be created to enhance a monument, historic marker or an art project. Parks also provide areas for wildlife habitat.

LAYOUT

The recommended layout of a pedestrian area (sidewalk or plaza adjacent to the street) at the street level includes an access zone, a continuous 'walkway zone', a parkway zone and depending on adjacent land uses may include a 'transitional or amenity zone'.

The access zone is 18" – 24" from the face of the curb including a 6" curb and a masonry, often granite or brick band. The parkway zone is adjacent to the access zone and is ideally a continuous 'green street' stormwater treatment system designed to collect, retain or treat runoff. The parkway zone may integrate and include site furnishings. The 'transition or amenity zone' may include landscape planting and site furnishings depending on adjacent land uses.

STATION & STATION PORTAL PLANTING MATERIAL GUIDELINES

The following are guidelines unique to stations and are in addition to the General Landscape Planting Material Guidelines:

- Trees may be planted with regular spacing and / or in straight rows to define and direct pedestrian routes, draw attention to the plaza and frame views out of the plaza.
- Extend the plaza tree configuration into the adjacent right of way (ROW) or streetscape for continuity.
- Plant trees in quantity to provide shade and cool the area.
- Plant trees to define the public space or spaces.
- Plant a single species or trees that are similar in character for definition and special effect.
- Some variety in the selection of species may be appropriate to provide additional color, texture and fragrance.

► TRAIN PORTAL STRUCTURES

The train portal structure defines the transitional space of the train tunnel from below-grade to above-grade. Landscape design for these areas is both ornamental and functional. Safety is the greatest concern around portals and ultimately deterring pedestrian circulation away from a train portal is preferable.

LAYOUT

The recommended landscape layout of a train portal structure is primarily a landscape zone. Formal geometry that creates a bold statement is recommended to harmonize with the urban landscape.

PLANTING MATERIAL GUIDELINES

The following are guidelines unique to train portal structures and are in addition to the General Landscape Planting Material Guidelines:

- Trees should be formally planted in a bosque and draw attention to the presence of the portal.
- Trees may relate to adjacent street trees in regard to layout but vary significantly in shape, color and texture to draw attention.