

7 Implementation Consideration and Environmental Requirements

7.1 Implementation Time Frame

While some of the proposed improvements detailed in this study can be implemented immediately, others will require continued coordination between stakeholders. To aid in identifying issues that may arise when implementing improvements, this section is intended to provide a brief overview of improvements by the timeframe in which they can be implemented.

The bulk of the improvements can be implemented within 2-10 years, the primary timeframe of the study. These include substantial structural changes to the station intended to improve pedestrian flow and capacity for various modes of transportation.

Several system-wide improvements are policy-based, and could be implemented quickly: within 24 months. These include implementation of TOD guidelines encouraging transit supportive development around the station, as well as development of a program for improved signage within and around the station. Also included within this timeframe are improvements already in progress, such as construction of the Bikestation and revision of Columbus Plaza.

Finally, some improvements are categorized as long-term improvements, requiring 10-20 years to implement. These improvements require substantial coordination with stakeholders, or rely on other policies, programs or projects. An example of this would be the Northeast Corridor electrification south of Union Station, which would require substantial coordination before realization, but is a key element of the needs identified in this study.

Improvements by phase are identified in **Figures 7-1 through 7-4** at the end of this chapter.

7.2 Implementation of TOD Principles

In response to a study in 2001 showing that more than three square miles of property near Metro stations in D.C. were abandoned or vacant, Mayor Anthony Williams convened a task force to study how development and design could be used to leverage the assets that Metro provides D.C. That group, the Mayor's Task Force on Transit-Oriented Development, came up with the following definition for TOD as it is conceived in the D.C.:

Transit-oriented development (TOD) in the District of Columbia is a land use strategy to accommodate new growth, strengthen neighborhoods, and expand choices and opportunities by capitalizing on bus and rail assets to stimulate and support vibrant, compact, diverse, and accessible neighborhood centers within an easy walk of transit.

Like sustainability, TOD is not a single principle, but instead a broad spectrum of principles and activities that can lead to successful transit areas and neighborhoods. TOD principles include:

- Urban design
- Mixed land use
- Enhanced streetscapes and pedestrian amenities
- Enhanced transit

TOD principles are an integral part of the recommendations presented in this report — every improvement works to enhance the capacity of transportation service at Union Station. Several proposed improvements in particular support TOD principles:

- Connection of the Union Station Metrorail station to H Street via pedestrian walkway. This improvement would expand the catchment area of the existing Metrorail station by creating what would effectively be an additional station entrance at H Street.
- Connection to the H Street streetcar. Incorporating streetcar facilities would add an additional transportation mode connection to Union Station and connect the H Street corridor to the facilities at Union Station. Additionally, street-level transit would activate and improve the pedestrian environment of H Street.

7.3 Environmental Analysis

The improvement recommendations for the Union Station ITC have been subject to a preliminary review of the types of environmental and socioeconomic factors that may require further analysis as part of the planning process. This environmental overview serves as an initial checklist of potential impacts and environmental issues associated with transportation

recommendations. More detailed assessments of impacts would be determined as part of the project developments and design process. The overview included the following environmental and socioeconomic considerations:

Land Use. No significant impacts are anticipated as there will be no change in existing land use or changes will improve existing land use.

Geology and Soil. No significant impacts are anticipated. The current station and associated structures are built on land that has been subject to extensive grading and filling.

Vegetation. No significant impacts are anticipated. The majority of vegetation surrounding Union Station is in the form of heavy landscape.

Wildlife and Aquatic Resources. No significant impacts are anticipated.

Threatened and Endangered Species. No significant impacts are anticipated.

Hydrology and Groundwater. No significant impacts are anticipated.

Surface Waters and Waters of the U.S. No significant impacts are anticipated.

Floodplains. No significant impacts are anticipated.

Air Quality. No significant impacts are anticipated.

Noise and Vibration. Potential impacts to historic properties and other buildings in the area may occur during construction activities. A Noise and Vibration Monitoring and Protection Plan designed by the construction contractor would likely be required and be subject to review and approval by adjacent property owners (e.g., National Park Service, USRC) and the D.C. State Historic Preservation Office (DCHPO) to avoid damage to important and historic properties in the area.

Cultural Resources. Potential significant impacts (i.e., “adverse effects” under the National Historic Preservation Act (NHPA) to cultural resources are likely in the project area. The project proponent(s) will initiate consultation with the DCHPO under Section 106 of the NHPA, which may be coordinated with the National Environmental Policy Act (NEPA) compliance.

Several resources have already been identified and determined eligible for or listed on the National Register of Historic Places (NRHP), the D.C. Inventory

of Historic Sites, or designated National Historic Landmarks (NHL). There are additional unevaluated historic-age re-sources that may be eligible for the NRHP and require identification and evaluation. Intensive cultural resources surveys will be required to identify and evaluate historic properties that could be affected by the proposed improvements. Surveys for architectural/engineering as well as archaeological resources should be conducted as part of the planning process. Proposed developments must also be conducted in compliance with the Secretary of Interior’s Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings to preserve the integrity of eligible for or listed local and national registers. Design plans must be reviewed and approved by DCHPO prior to implementation.

Parklands and Section 4(f)/Section 6(f) Resources. If the Union Station ITC project is funded for implementation, Section 4(f) analysis in accordance with the Department of Transportation Act will be conducted. Section 4(f) analysis will be initiated concurrently with NEPA and Section 106 once an undertaking is defined and alternatives selected.

Utilities and Infrastructure. Potential impacts may be anticipated.

Roadways and Traffic. Potential beneficial impacts may be anticipated. Additional traffic planning studies may be required.

Aesthetic and Visual Resources. Potential impacts may be anticipated. Viewshed studies may be required to reduce or eliminate encroachment from Union Station ITC elements on the existing view to and from important vistas and historic properties.

Hazardous Materials. Potential impacts may be anticipated. The current and historic use of the area surrounding Union Station suggests the potential for contamination associated with the property’s use as a rail yard. Excavation of contaminated soils for construction (e.g., underground tunnel) may require monitoring studies and analysis in addition to the potential removal and disposal of contaminated soil.

Socioeconomics. Potential impacts may be anticipated. Any increased expenses to users anticipated from improvements (e.g., more expensive parking or transit costs) may negatively impact socioeconomics. Higher costs of living in the immediate vicinity as a result of improvements to Union Station could result in changes to neighborhood demographics.

Environmental Justice and Protection of Children. No significant impacts are anticipated.

Human Health and Safety. No significant impacts are anticipated.

Sustainability and Greening. No significant impacts are anticipated.

Cumulative Impacts. There is the potential for significant cumulative effects of the Union Station ITC combined with associated projects in the area (e.g., Burnham Place construction, Columbus Circle/Plaza improvements, Union Station Bikestation).

7.4 Public Outreach

An extensive and ongoing public participation program for the Union Station Intermodal Transportation Center Feasibility Study began at project inception. This program will ensure that the public may engage fully in the development of the alternatives and the decision-making processes.

Opportunities for public participation were provided throughout the study and at key decision points. The goal is to ensure that all issues of concern are addressed and that the results are presented to the general public, interested groups, neighborhood committees, and government agencies before decisions are made. The scheduling of public involvement activities will ensure timely consideration of public input with respect to the technical work and will provide ample opportunity for an open exchange of ideas and views.

The public involvement program comprises different elements targeted to specific audiences. These elements include: a local project hotline for public inquiries and comments; a project webpage, which will be maintained throughout the study; community meetings; the creation of technical advisory and community leaders committees; two public meetings (conducted at Union Station); the distribution of project materials to public libraries and community centers within the corridor; and the preparation of visual materials.

Local Hotline

A local project hotline (202-561-3700) is active for public inquiries and comments about the study. The hotline is staffed from 9 a.m. to 5 p.m., Monday through Friday. An answering machine accepts recorded messages at all other times.

Web Page

Visit the DDOT-MTA web page at <http://ddot.dc.gov/unionstation> or <http://www.ddot.dc.gov/unionstation> for information about the study or to be placed on the mailing list to receive further information as the study progresses. A map of the study area, details of the study scope, various project documents (as they become available for distribution), information on meetings, and related links can be accessed from this site. In addition, the “Contact” link opens to an e-mail address and the “Related Links” connect to Burnham Place, H Street Northeast Corridor Transportation Study, NoMa Business Improvement District (BID), North of Massachusetts Avenue Vision Plan and Development Strategy, and Greater Washington websites.

Committees

Technical Advisory Committee

The purpose of the Technical Advisory Committee (TAC) was to provide technical input on the study; involve diverse interest groups; serve as a conduit of information to its members’ respective organizations; and inform the study, based on its members’ organizational perspective.

The roles and responsibilities of the TAC members are to attend scheduled meetings; con-firm one primary point of contact; assign substitutes and bring additional technical staff as needed; respect differing opinions and points of view; be prepared to comment on the study products in advance of meeting, when possible; participate in discussions and activities; re-view and comment on technical analysis in a timely fashion; provide proactive, solution-oriented feedback; and engage in an open and honest dialogue.

The roles and responsibilities of the DDOT team regarding the TAC are to respect and adhere to TAC members’ schedules; engage TAC members in discussion at meetings; immediately respond to concerns identified during the TAC process; consider and in-corporate advice from TAC members into the study; and provide follow-up information (minutes, etc.) to TAC members.

Originally, the TAC for the study was composed of representatives from the following: Akridge Developers; Amtrak; Architect of the Capitol (AOC); Ashkenazy Acquisition Corporation (AAC); CSX Corporation; DDOT; D.C. Deputy Mayor for Planning and Economic Development (DMPED); D.C. Office of Planning; Federal Highway Administration; Federal Transit Administration; Greyhound Lines; Jones Lang LaSalle (JLL); MTA; MARC; Michael Baker Corporation; NCPC; National Park Service; NoMa BID; United States Capitol Police; United States Commission of Fine Arts (CFA); USRC; SEC; VRE; and WMATA.

The first TAC meeting was held on May 20, 2008. Twenty-eight individuals attended, representing the following entities: WMATA, CFA; NoMa BID; Shalom Baranes Architects; U.S. Capitol Police; D.C. Office of Planning; NCPC; D. H Burnham & Company; CSX Corporation; Akridge Development Corporation; Greyhound Lines; USRC; DMPED; VRE; Michael Baker Corporation; and AOC. The goal of this meeting was for committee members to learn about the feasibility study and how their organization could help DDOT produce a quality study and inform the development of an efficient transportation network around a vital historic, cultural, and essential transportation resource. Representatives from DDOT-MTA presented an overview of the project and information on how TAC members could become more engaged. Handouts of the presentation and evaluation/comment sheets were distributed to attendees. Next steps and action items from this first meeting directed that TAC members should brief their respective colleagues; review the scope of work provided by DDOT and contact DDOT with any questions, comments, or concerns; and provide the consultant team (composed of Parsons and Del Studio) with useful data, studies, reports, and other information to support the study.

DDOT-MTA hosted a tour of the Union Station facility on August 13, 2008. This tour identified the problem areas within the station; it was attended by representatives from the following entities: AOC, USRC, WMATA, Amtrak, Akridge, NoMa BID, Greyhound, MTA, VRE, D.C. State Historic Preservation Office (SHPO), Michael Baker Corporation, and Shalom Barrens Architects.

The final TAC meeting is planned to follow review of the Draft Feasibility Report prior to its being re-leased to the general public.

Community Leaders Committee

The purpose of the Community Leaders Committee (CLC) was to provide community input on the study; involve community residents and business interest groups; serve as a liaison between DDOT and the community; and inform the study, based on community concerns.

The roles and responsibilities of the CLC participants were to attend scheduled meetings; designate one primary point of contact; share issues and concerns of residents and businesses; respect differing opinions and points of view; be prepared to comment on study products in advance of meetings, when possible; participate in discussions and activities; provide proactive, solution-oriented feedback; engage in open and honest dialogue; and share project information with their organizations.

The roles and responsibilities of the DDOT team regarding the CLC are to en-gage community leaders in discussion at meetings; immediately respond to concerns identified by community leaders; consider and incorporate advice from community leaders into the study; and provide follow-up information (minutes, etc.) to community leaders.

Originally, the CLC was composed of representatives from the following: Advisory Neighbor-hood Commission (ANC) 6A; ANC 6B; ANC 6C; 1st District Citizens Advisory Council (CAC); Better Neighborhood Association; Capitol Hill Associations of Merchants and Professionals (CHAMPS); Capitol Hill Business Improvement District; H Street Community Development Corporation; Sursum Corda Resident Council; Ward 6 Democrats; H Street Main Street; H Street Merchants Association; Near Northeast Community Improvement Corporation; Near Northeast Citizens Against Crimes & Drugs; and the Stanton Park Neighborhood Association.

Over the course of the study, representatives from the following entities were added to the CLC, as requested: 5th & M Streets Council; ANC 6A03; ANC 6D; Capitol Hill Restoration Society (CHRS); Downtown Neighborhood Association of Washington, D.C.; Mount Vernon Square Neighborhood Association; Northwest One Council, Inc.; and the Office of Council-member Tommy Wells.

The first meeting of the CLC was held on May 27, 2008. Ten individuals attended, representing the following entities: 1st District CAC, CHRS, ANC 6A, and ANC 6b04. The goal of this meeting was to inform committee members about the feasibility study and address how their organization could help DDOT produce

a quality study and inform the development of an efficient transportation network around a vital historic, cultural, and essential transportation resource. Representatives from DDOT-MTA presented an overview of the project and information on how CLC members could become more engaged. Handouts of the presentation and evaluation/comment sheets were distributed to attendees. Next steps and action items from this first meeting directed that CLC members should brief their respective constituents; review the scope of work provided by DDOT and contact DDOT with any questions, comments, or concerns; and provide the consultant team with useful data and information to support the study.

DDOT-MTA hosted a tour of the Union Station facility on September 10, 2008. This tour identified the problem areas within the station; it was attended by representatives from 1st District CAC, CHRS, ANC 6A, and ANC 6b04.

The final CLC meeting is planned to follow review of the Draft Feasibility Report prior to its being re-leased to the general public.

General Public Meeting

The first meeting with the general public occurred on May 29, 2008 in the Columbus Club at Union Station. Attendees had an opportunity to talk with project team members during the open house portion of the event, which was followed by opening remarks by Congress-woman Eleanor Holmes Norton and MTA's Deputy Director Freddie Fuller, and a presentation by DDOT. A question-and-answer session concluded the meeting.

Representatives from the following entities attended: ANC6C05, ANC6C07, ANC6C09, ANC 6b01, ANC6C, Office of Congresswoman Norton, E-Park, Downtown BID, Parsons, Holland & Knight, Larry's Cookies, USRC, Stanton Park Neighborhood Association, CHRS, Northwest One, J Street Development, Sierra Club, Beyond D.C., JLL, WHD Government, Greater Washington, Akridge, H Street Main Street, Greyhound, and Better Neighborhood Association. In addition, 11 community members/residents also attended.

The recommendations from the Draft Feasibility Report will be presented at the final general public meeting.

Community Presentations

The feasibility study was presented at Perry School Community Services Center Roundtable Luncheon of Service Organizations on June 10, 2008; to Capitol Hill Restoration Society General Body on June 18, 2008; at the 1st District Citizens Advisory Council Center on July 1, 2008; and to ANC 6A on August 11, 2008.

Agency Meetings

Amtrak

The consultant team met with representatives from Amtrak on July 18, 2008; the purpose of this meeting was to establish the procedures for data exchange. This meeting was attended by 11 Amtrak personnel (four via teleconference) and four members of the consultant team.

Greyhound

Representatives from Greyhound hosted a design meeting on October 7, 2008 to discuss the proposed Greyhound layout for Union Station. This session was attended by representatives from AAC, Akridge, SBA, Baker Donelson, JLL, USRC, Amtrak, DDOT-MTA, Parsons, and Del Studio. Greyhound presented its revised plans at a follow-up meeting on November 12, 2008.

Akridge Coordination

The consultant team has met several times with the representatives of Akridge, the developer of Burnham Place, which will be immediately adjacent to Union Station. The first meeting occurred on March 27, 2008; the purpose was to share information on project schedule, scope, coordination, and process for the Union Station ITC and Burnham Place. This meeting was attended by representatives from Akridge; the architect for Burnham Place (Shalom Baranes Architects or SBA); DDOT-MTA; as well as Parsons and its traffic subconsultant, Precision Systems, Inc. (PSI).

The second meeting was held on April 2, 2008 between Akridge, SBA, Parsons, and PSI. The purpose of this meeting was to engage in an exchange of available information and data be-tween the parties in an effort to prevent duplication of data collection efforts already carried out by both the consultants and the Akridge team. The meeting also served as a “break-out” session to the March 27 meeting between MTA, Parsons, and the Akridge team, to dis-cuss in more detail data elements of the scope and the functionality of the ITC and Burnham Place.

The third meeting was held on August 19, 2008; the purpose was, following completion of Parsons' data collection efforts, to coordinate further and share information on Union Station and the proposed Burnham Place development. This meeting was attended by representatives from Akridge, SBA, DDOT-MTA, Parsons, and Del Studio.

The fourth meeting was held on August 27, 2008; the purpose was for Akridge to debrief Parsons and Del Studio on Akridge's meeting with Amtrak on August 21, 2008. This meeting was attended by representatives from Akridge, SBA, Parsons, and Del Studio.

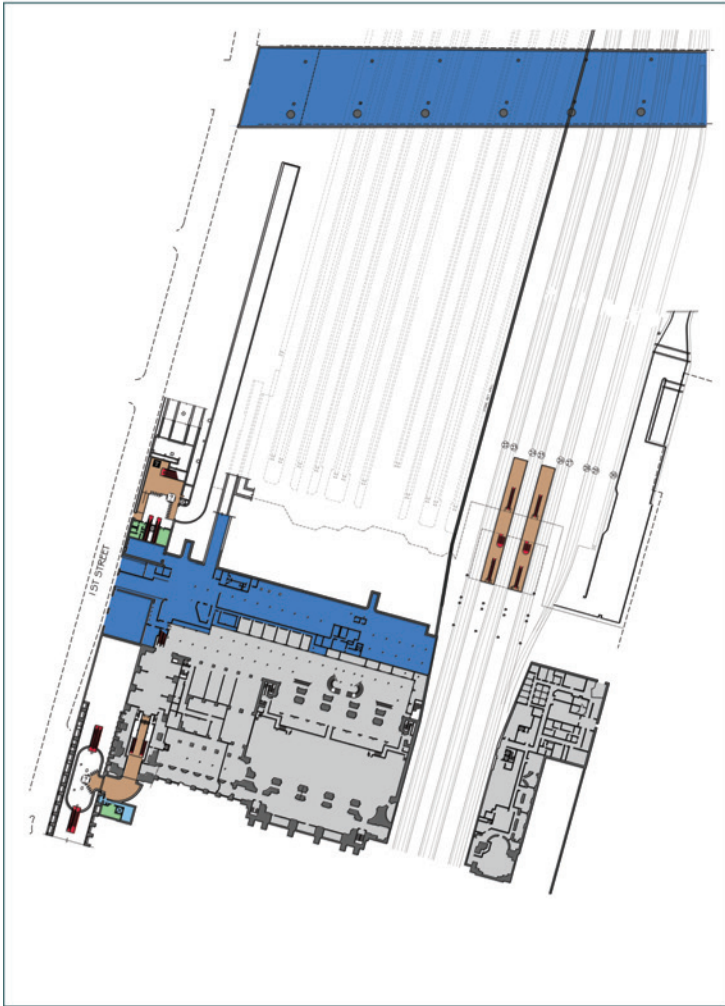
In addition, members of the consultant team attended a presentation by Gorove Slade at Akridge’s office about the Capitol Visitor Center study on June 12, 2008; and attended Akridge’s presentation to DDOT’s Transportation Policy and Planning Administration about Burnham Place on December 10, 2008.

Charrettes

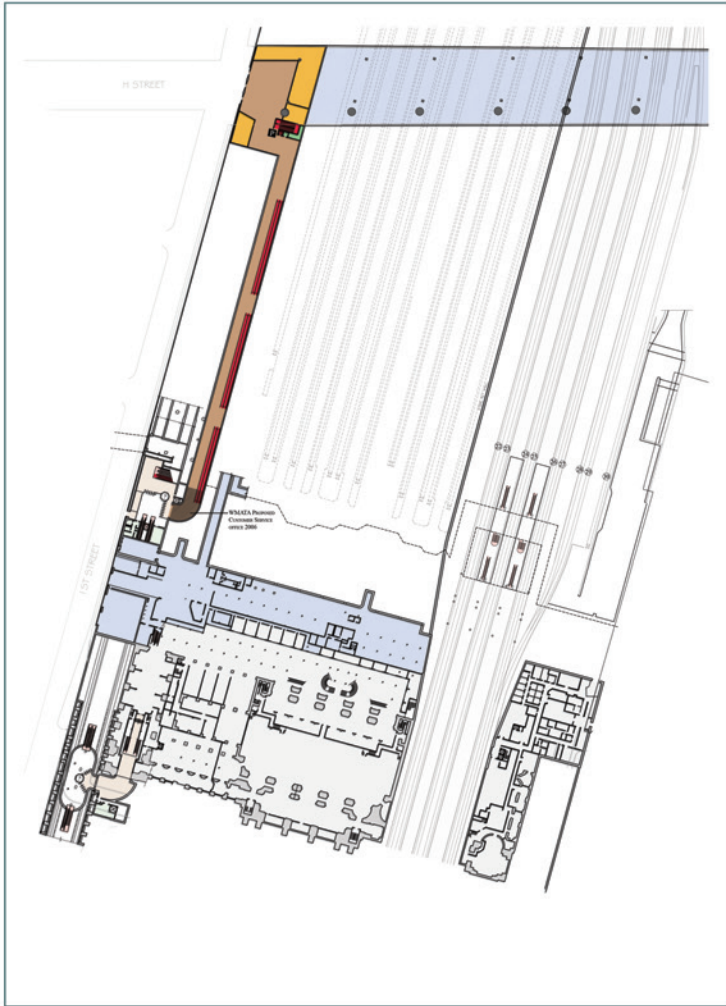
Parsons held a preliminary design charrette on October 6, 2008; it was attended by representatives from Akridge, Shalom Baranes Architects, Baker Donelson, JLL, USRC, Amtrak, MARC, MTA, DDOT-MTA, Parsons, and Del Studio.

On November 18, 2008, Parsons and Del Studio hosted a follow-up design charrette to the October 6 meeting. Preliminary concepts for Amtrak station space and circulation, taxi road-level expansion, pedestrian walkway extension and connections to H Street tunnel, and train operations and track layout were presented. Attendees included representatives from Akridge, MARC, VRE, Amtrak, Greyhound, SBA, WMATA, USRC, Baker Donelson, and MTA. Because of the amount of new information presented in the conceptual plans, it was recommended that the consultant team meet with representatives in smaller group sessions, after attendees had opportunity to review the proposed concepts. Accordingly, the consult-ant team met with USRC, AAC, and JLL on December 2, 2008; with Amtrak, MARC, and VRE on December 3, 2008; with Akridge and SBA on December 5, 2008; with Greyhound on December 5, 2008; and with WMATA on December 8, 2008.

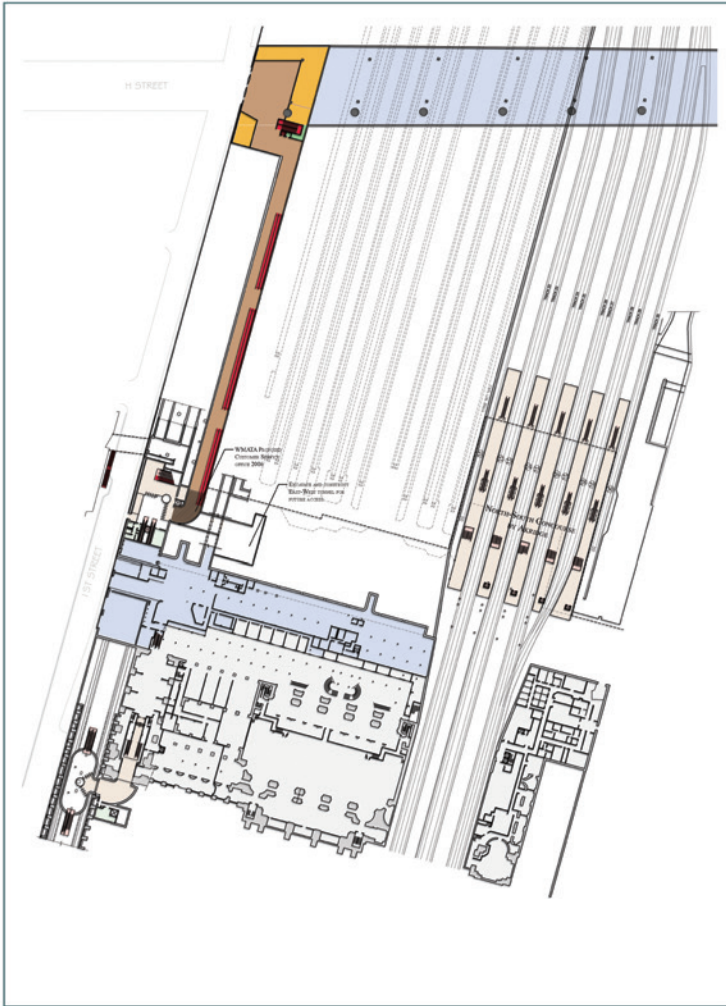
Figure 7-1 Union Station Improvement by Phase: Lower Level



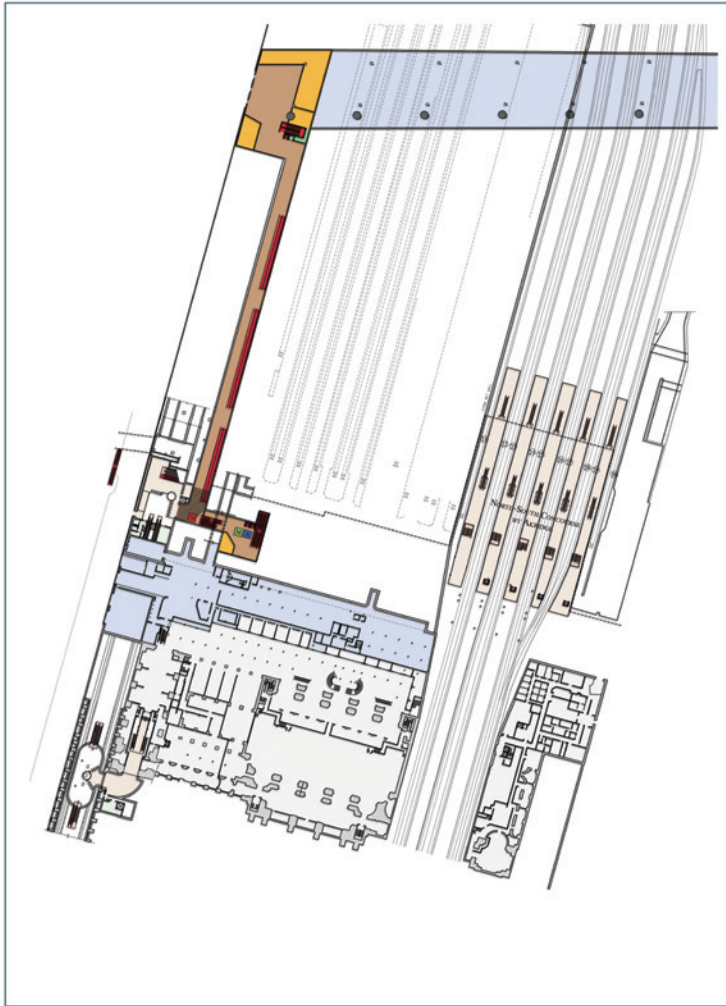
Lower Level
Existing



Lower Level
0-2 Years



Lower Level
2-10 Years



Lower Level
10-20 Years

- Conduct WMATA Station Access Study
- Improve Union Station Interior Signage

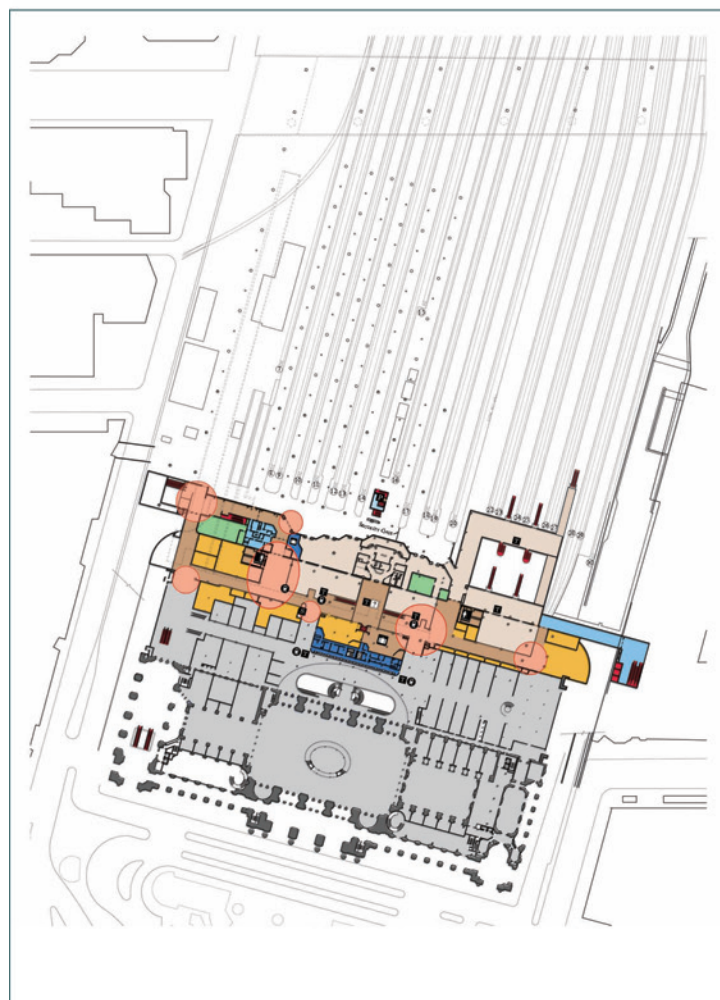
- Train Concourse Connector Tunnel
- North Pedestrian Walkway
- First Street Lobby
- Extend Rail Concourse to the north (North Concourse)

SYMBOL LEGEND	
	SECURITY
	BAGGAGE
	INFORMATION
	RESTROOMS
	TICKET KIOSK/MACHINE
	GARAGE
	TRAIN SCHEDULE DISPLAY
COLOR CODED SIGNAGE	
	METRO SIGNAGE
	AMTRAK SIGNAGE
	MARC SIGNAGE
	VRE SIGNAGE
	OVERGROUND

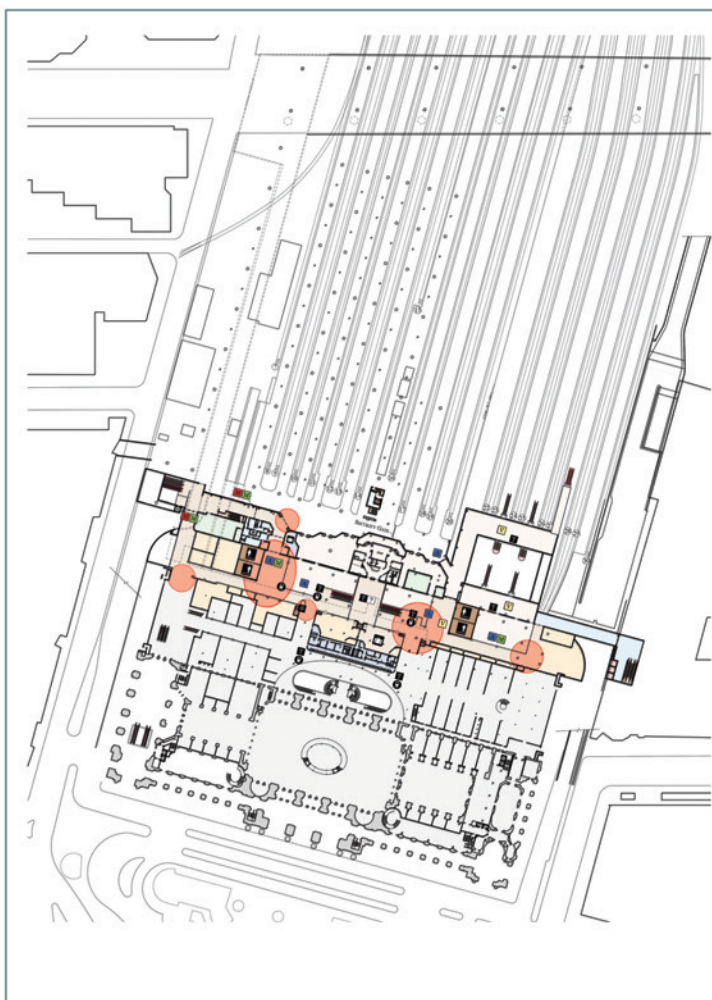
AREA LEGEND	
	PUBLIC AREA CIRCULATION
	RETAIL/FOOD SERVICE
	WAITING/HOLDING AREA
	UNDISTURBED AREA
	VERTICAL CIRCULATION
	EXISTING VERTICAL CIRCULATION
	GENERAL PRIVATE ACCESS AREA
	MECH/ELECT. EQUIPMENT ROOM
	SERVICE AREA
	EXISTING PEDESTRIAN TRAFFIC CONFLICTS

Note: Detailed plans of station improvements appear in **Appendix B**.

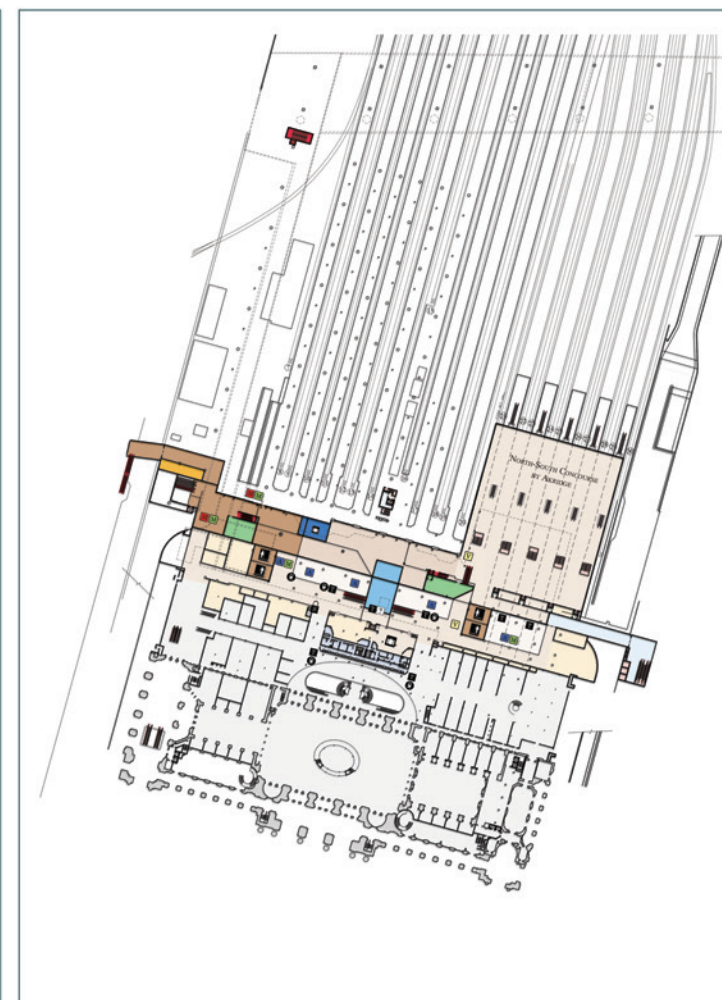
Figure 7-2 Union Station Improvement by Phase: Concourse Level



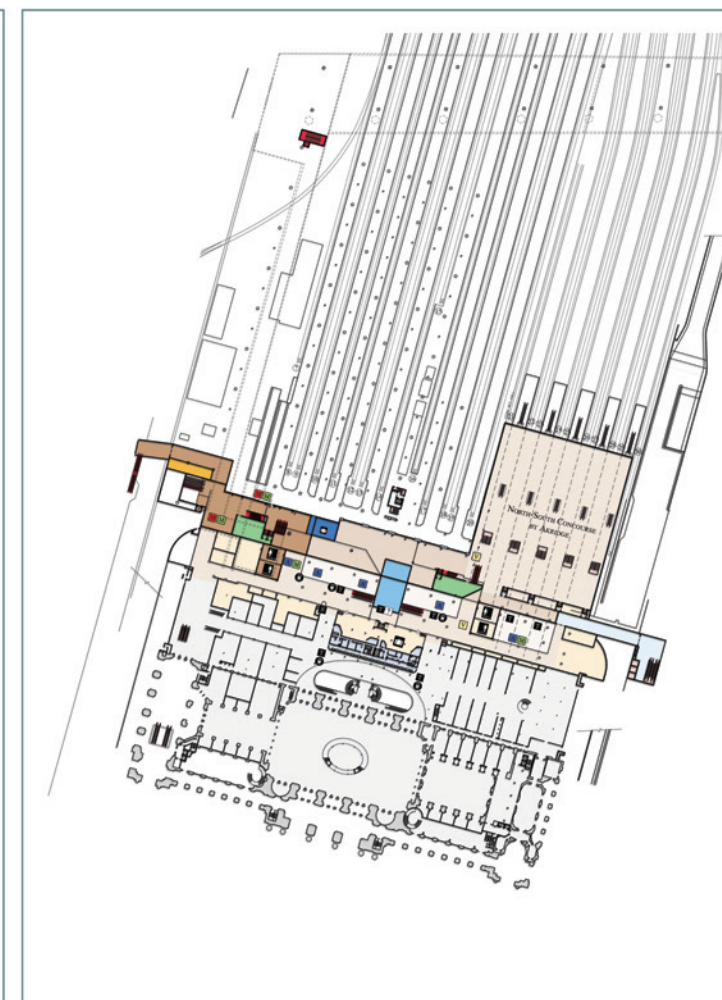
Concourse Level
Existing



Concourse Level
0-2 Years



Concourse Level
2-10 Years



Concourse Level
10-20 Years

- | | | |
|---|--|---|
| <ul style="list-style-type: none"> Construct Bikestation Columbus Plaza [Safety and character improvements] Improve Union Station Interior Signage | <ul style="list-style-type: none"> Extend Rail Concourse to the north (North Concourse) Expand East-West Concourse to North Improved North Entrance (Escalators connecting Mezzanine) Catenary for Platforms 8 through 10 Add High-level platforms for tracks 25 and 26 Emergency Egress at H Street Rail Operations Facilities Improvements at H Street Metropolitan Branch Trail | <ul style="list-style-type: none"> Northeast Corridor Electrification Through Union Stationh to Newport News |
|---|--|---|

SYMBOL LEGEND

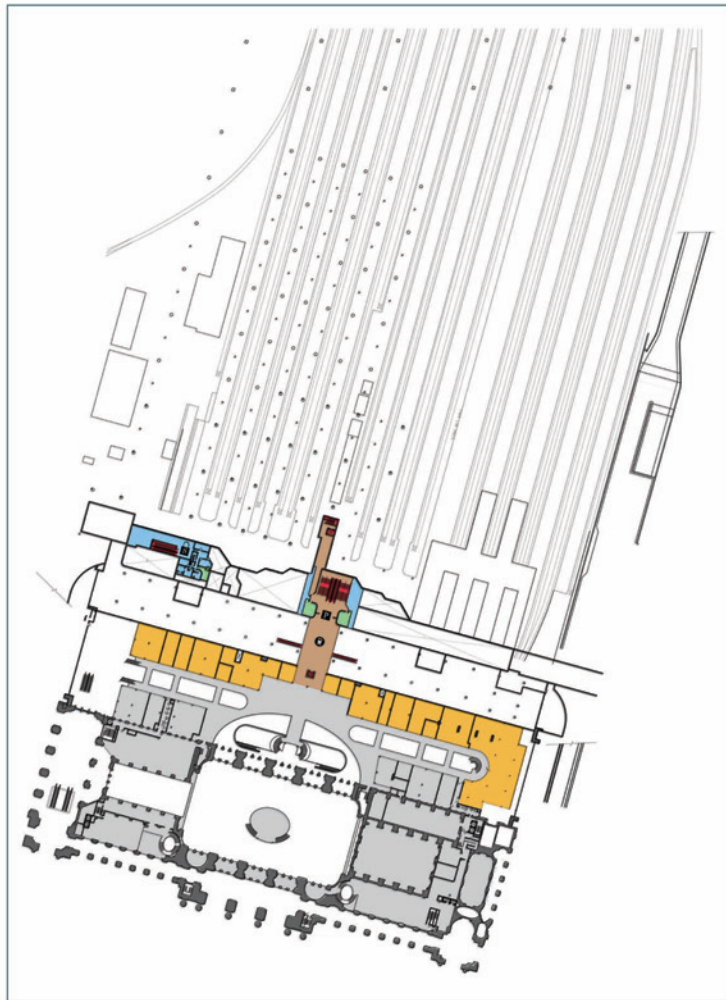
	SECURITY		COLOR CODED SIGNAGE
	BAGGAGE		METRO SIGNAGE
	INFORMATION		AMTRAK SIGNAGE
	RESTROOM		MARC SIGNAGE
	TICKET KIOSK/MACHINE		VRE SIGNAGE
	GARAGE		CRESTWOOD
	TRAIN SCHEDULE DISPLAY		

AREA LEGEND

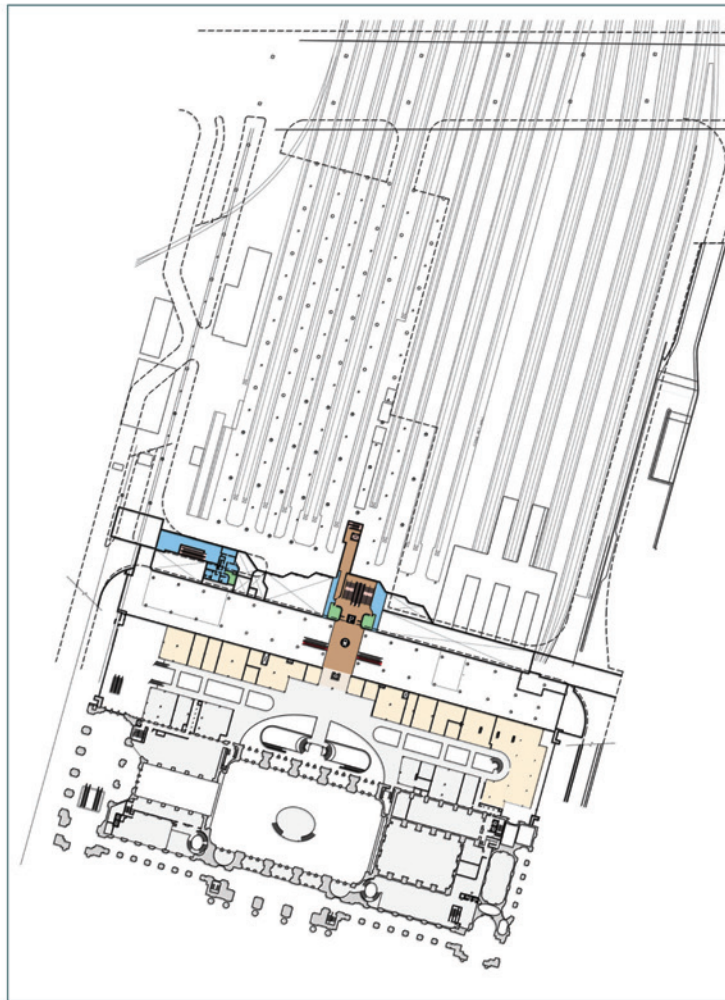
	PUBLIC AREA CIRCULATION		GENERAL PRIVATE ACCESS AREA
	RETAIL/FOOD SERVICE		MECH/ELECT. EQUIPMENT ROOM
	WAITING/ HOLDING AREA		SERVICE AREA
	UNDISTURBED AREA		EXISTING PEDESTRIAN TRAFFIC CONFLICTS
	VERTICAL CIRCULATION		
	EXISTING VERTICAL CIRCULATION		

Note: Detailed plans of station improvements appear in **Appendix B**.

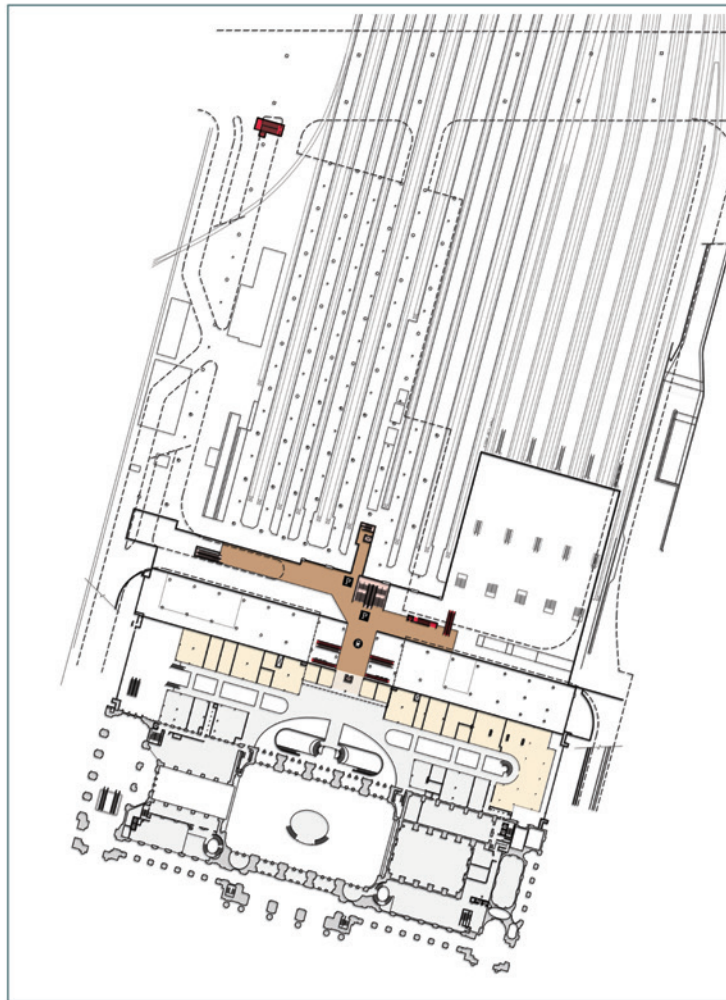
Figure 7-3 Union Station Improvement by Phase: Mezzanine Level



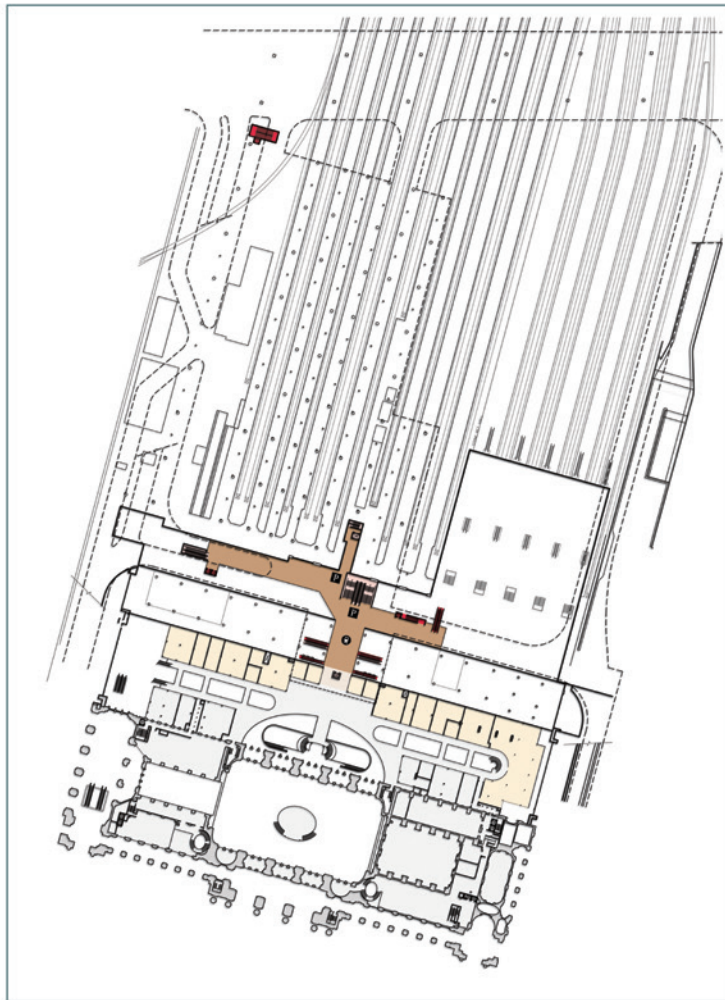
Mezzanine Level
Existing



Mezzanine Level
0-2 Years



Mezzanine Level
2-10 Years



Mezzanine Level
10-20 Years

- Improve Union Station Interior Signage

- Improved North Entrance (escalators connecting to Parking Garage)

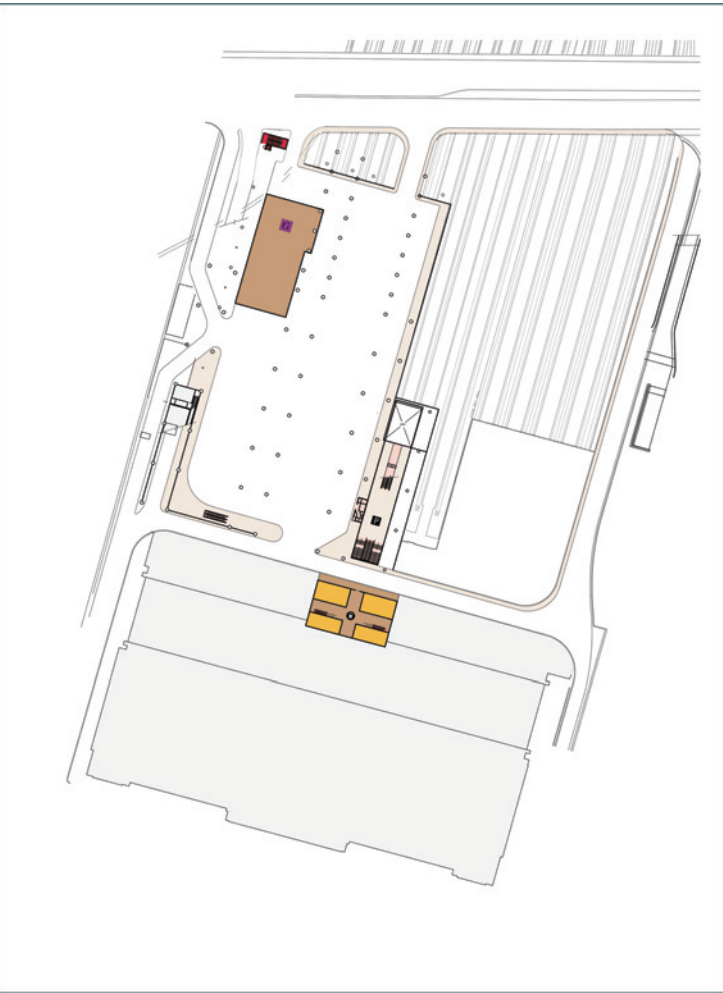
- Expand the Union Station Mezzanine Level

SYMBOL LEGEND	
	SECURITY
	BAGGAGE
	INFORMATION
	RESTROOMS
	TICKET KIOSK/ MACHINE
	GARAGE
	TRAIN SCHEDULE DISPLAY
	COLOR CODED SIGNAGE
	METRO SIGNAGE
	AMTRAK SIGNAGE
	MARC SIGNAGE
	VRE SIGNAGE
	OVERGROUND

AREA LEGEND	
	PUBLIC AREA CIRCULATION
	RETAIL/FOOD SERVICE
	WAITING/ HOLDING AREA
	UNDISTURBED AREA
	VERTICAL CIRCULATION
	EXISTING VERTICAL CIRCULATION
	GENERAL PRIVATE ACCESS AREA
	MECH/ELECT. EQUIPMENT ROOM
	SERVICE AREA
	EXISTING PEDESTRIAN TRAFFIC CONFLICTS

Note: Detailed plans of station improvements appear in **Appendix B**.

Figure 7-4 Union Station Improvement by Phase: Parking Garage Level



Parking Deck Level
0-2 Years

- Improve Union Station Interior Signage

Parking Deck Level
2-10 Years

- Improved North Entrance (expanded retail space)
- Metropolitan Branch Trail (path at level of existing garage)
- First Street Lobby (vertical circulation connecting H Street with First Street)
- Incorporate Streetcar into H Street
- Improve Intercity Bus Connections

SYMBOL LEGEND	
	SECURITY
	BAGGAGE
	INFORMATION
	RESTROOMS
	TICKET KIOSK/MACHINE
	GARAGE
	TRAIN SCHEDULE DISPLAY
COLOR CODED SIGNAGE	
	METRO SIGNAGE
	AMTRAK SIGNAGE
	MARC SIGNAGE
	VRE SIGNAGE
	GREYHOUND

AREA LEGEND	
	PUBLIC AREA CIRCULATION
	RETAIL/FOOD SERVICE
	WAITING/HOLDING AREA
	UNDISTURBED AREA
	VERTICAL CIRCULATION
	EXISTING VERTICAL CIRCULATION
	GENERAL PRIVATE ACCESS AREA
	MECH/ELECT. EQUIPMENT ROOM
	SERVICE AREA
	EXISTING PEDESTRIAN TRAFFIC CONFLICTS

Note: Detailed plans of station improvements appear in **Appendix B**.