



UNION STATION MASTER PLAN

AMTRAK
WASHINGTON, DC

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OVERVIEW



View of the historic station, train shed and air rights development from the southwest. Image courtesy of Akridge/SBA.

THE CHALLENGE

Designed by Daniel Burnham and opened in 1907, Washington Union Station instantly became one of the pre-eminent passenger rail facilities in the world, and a national landmark. Today, with renewed growth in rail travel, it has emerged as one of the nation's busiest transportation hubs and a model for multimodal transportation centers across the country. The station is the second busiest in the Amtrak system, hosting 100,000 passenger trips per day. Eight Amtrak long-distance and regional train lines serve the station, in addition to Amtrak's Acela Express and Northeast Corridor routes, MARC and Virginia Railway Express (VRE) services, the Metrorail's Red Line, local, region, tour, and intercity bus lines, and two bicycle facilities. Streetcar service is soon to arrive, with a new line currently being constructed that will connect the station with surrounding neighborhoods. Located in a vibrant business district, and a retail and tourist destination in its own right, Union Station is an engine for sustainable economic growth, and its ability to expand and thrive is essential to continued regional vitality.

While Union Station has served the region well for over 100 years, it is now operating beyond its capacity, especially during rush hours and peak travel periods. Queues of departing Amtrak passengers form a half-hour before boarding begins and routinely extend into the public concourse, blocking flows. Additionally, the tracks and platforms do not comply with modern design standards, including the requirements of the Americans with Disabilities Act (ADA) and the emergency egress standards of life safety codes. The mixing of train servicing activities with passengers – both concentrated at the same end of the platforms – creates circulation bottlenecks that will worsen as passenger volumes increase. Many of the station's support facilities are obsolete and inadequate for modern railroad operations.

Realizing the station's potential for growth must be accomplished within the existing station footprint, preserve the iconic existing Union Station, limit negative impacts on surrounding neighborhoods, and respect the historic legacy of Daniel Burnham's original station design and Washington's city plan.

THE SOLUTION

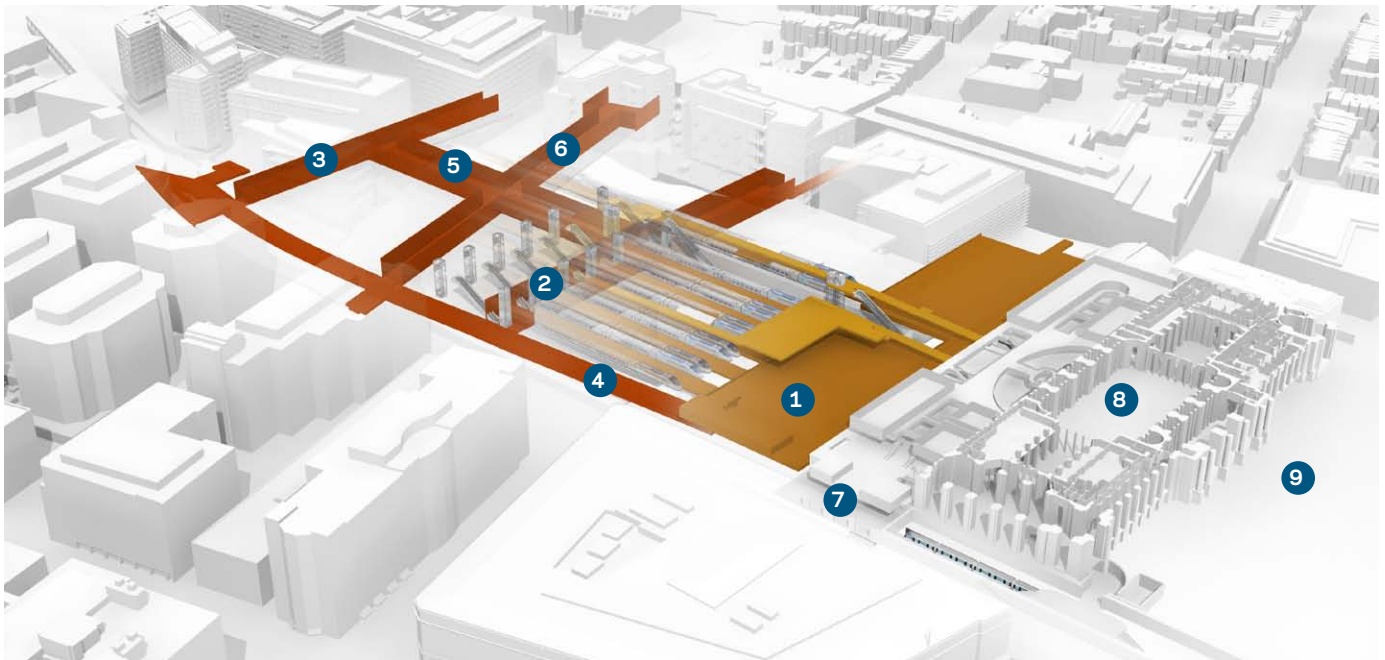
Amtrak and other stakeholders, including Union Station Redevelopment Corporation (USRC), United States Department of Transportation (USDOT), Maryland Transit Administration (MTA), Virginia Department of Rail and Public Transportation (VDRPT) and the Washington Metropolitan Area Transit Authority (WMATA), among others, have engaged in a collaborative planning process, creating a world-class master plan that addresses existing deficiencies and provides for future growth. The Washington Union Station Master Plan (Master Plan) creates a framework for capital investment that will provide numerous local, regional, and national benefits. The plan is practical, with phased construction that can be accomplished incrementally.

The plan will improve the primary functions of the station, focusing on the core needs and customer experience of a multimodal transportation center, by increasing:

Capacity to triple the passengers in the station and double the train service, moving towards more sustainable transportation.

Quality to improve the passenger and visitor experience as commuters and travelers move swiftly and efficiently across all modes of transportation.

Vitality in the surrounding area by providing transportation and economic growth to support Washington as a nexus of cultural, political, and business opportunity in the region and nation.



Diagrammatic view of the master plan from the southwest.

- 1 Concourse A
- 2 Concourse B
- 3 Concourse C
- 4 West Concourse
- 5 Central Concourse
- 6 Market Passage
- 7 Metro
- 8 Main Hall
- 9 Columbus Plaza

The Master Plan creates a vision that celebrates the renaissance of rail transportation in the United States, expanding the truly wonderful station that serves millions each year - rail passengers, transit riders, area workers and residents, tourists and the general public.

PLAN ELEMENTS

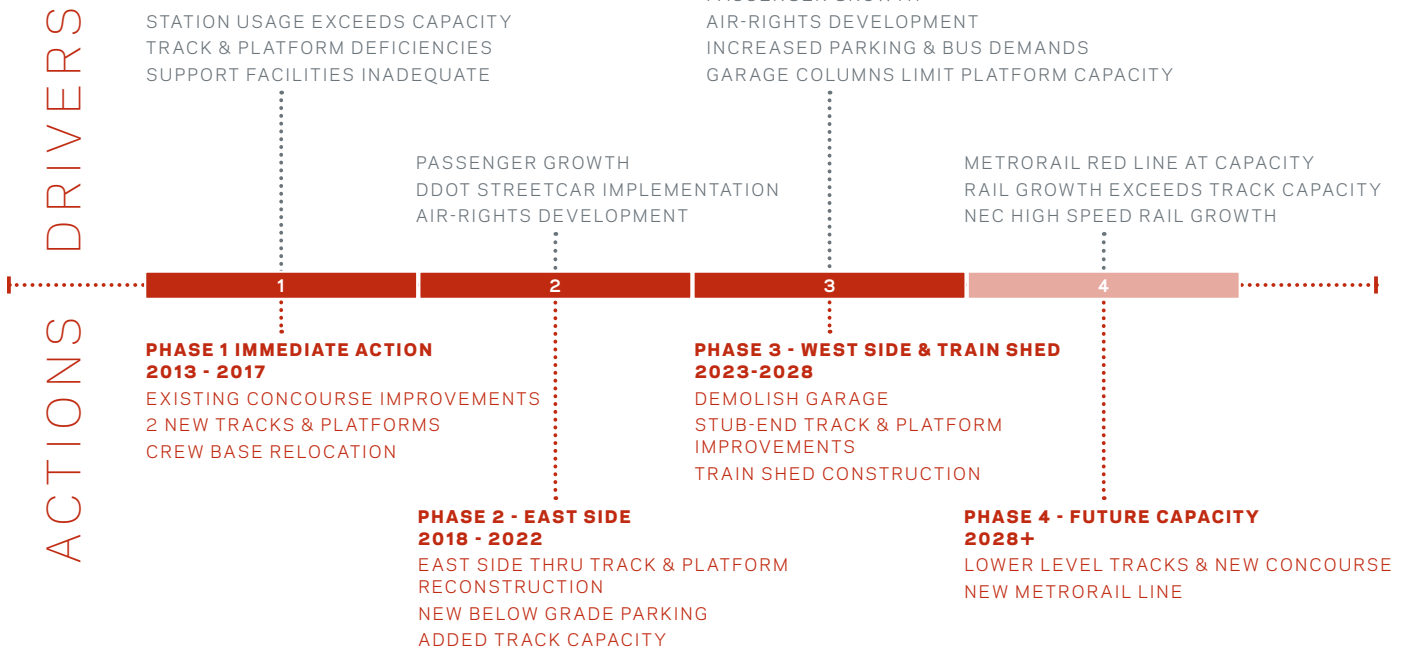
The power of the Master Plan lies in its ability to create a high-functioning and well-integrated multimodal transportation hub, as well as a wonderful new urban neighborhood - all within a relatively confined space. The Master Plan matches the quality and vision of the original, iconic Union Station design, while creating a world-class transportation hub and preserving Union Station as an architectural treasure. The further appeal of the plan is its ability to create critical station space on multiple levels below the tracks and platforms. The Union Station Master Plan combines significant new passenger features with new connections to the city and a practical approach to phased construction.

The heart of the plan is the creation of a new train shed that will welcome passengers to Washington, bring natural light to station spaces, and symbolically organize the connections of all transit modes. The new train shed will become the nexus for vertical connectivity to the commercial development above and horizontal connectivity between

the train station and its neighborhood. The planted vegetated roof of the train shed will retain rainwater, and temper the interior environment.

New passenger concourses will be seamlessly integrated with the existing historic station building, enabling passengers and visitors to spread throughout the station complex in light-filled spaces with significant retail and passenger amenities. Two north-south public concourses will form the backbone of the circulation system - the Central Concourse on the north-south axis of the historic station, and the West Concourse connecting to Metro and the business district on the west side. These public concourses will connect new passenger spaces with the existing station, including a series of new street entrances along 1st and 2nd Streets.

The existing Concourse A, which currently serves both intercity and commuter rail passengers, will be one of the first areas of improvement. This important passenger space will be substantially widened and opened vertically, fitted with a new glazed roof to increase natural light and spaciousness. This concourse will have a direct line of sight to the tracks and platforms, and will be the primary Amtrak waiting and boarding concourse. Amtrak's passengers will have a seamless experience extending from an improved taxi operation,



(above) New train shed as seen from H Street.
(lower) The Concourse A looking northwest showing the waiting areas, skylights and mezzanine bridges.

through enlarged waiting areas and onto wide and open platforms.

Complementing the renovated existing Concourse A, two new commuter concourses will efficiently connect rail passengers to the city. These new passenger concourses will be located one level below the tracks and platforms, with Concourse B, at approximately the center of the platforms, and Concourse C at the north ends of the platforms. While commuters will be able to use all three concourses, Concourses B and C will see primary commuter use. An east-west pedestrian connection directly beneath H Street, called the Market Passage, will interconnect with the other public concourses, offer more opportunities for retail uses, and help to re-weave the urban fabric of the city below the tracks and platforms.

Union Station currently has 20 usable rail platform tracks, served by a combination of high-level and low-level platforms. All of these platforms are less than 20 feet wide and are only accessible to passengers at their southern ends. Many are interrupted by columns supporting the parking garage or the H Street Bridge. Capacity growth and safety standards cannot be achieved without realigning and re-spacing the station tracks; the Master Plan creates platforms that are wider, longer and straighter – and capable of handling more passengers per train and more trains per hour than the existing platforms. The new platforms will meet ADA

accessibility requirements and the rigorous emergency egress standards required in transit facilities.

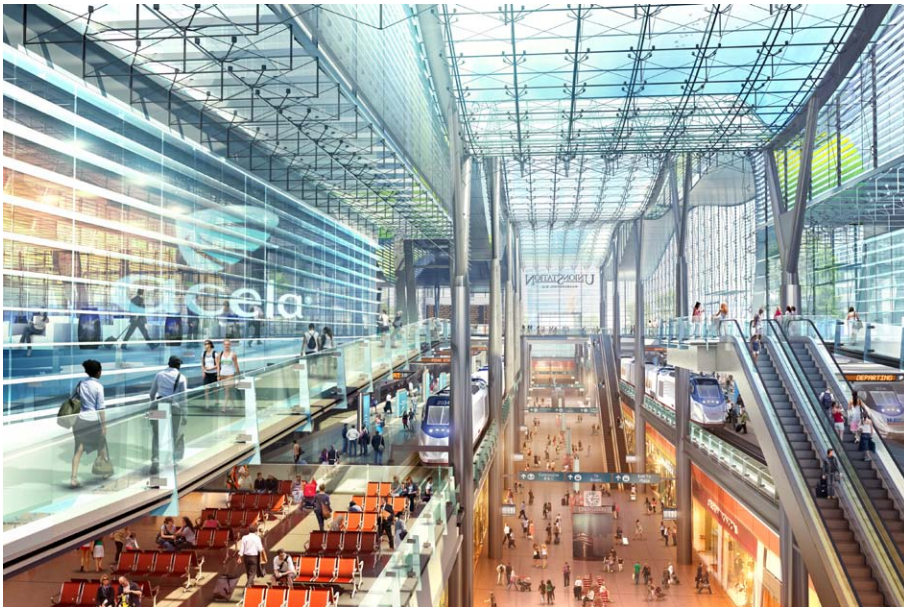
The new Union Station complex will be a multi-level facility, with new development above the tracks creating a new street network and neighborhood, and complementing the transportation functions below. Public spaces at the H Street level air rights development will focus on the new train shed with multiple, sky-lit atria that will bring both light and passengers to the station below. The air rights development will provide a number of new entrances to Union Station, crowned by a new northern entrance into the train shed, connecting the streetcar line, public plazas and passenger concourses with retail, hotels, offices and residences. Complementing the open space system, a new linear park will connect NoMa’s¹ planned park improvements at L Street with landscaping and the northern continuation of the Metropolitan Bike Trail.

IMPLEMENTING THE PLAN

The Master Plan envisions a phased construction effort over a 15-20 year period, designed to efficiently implement the plan and minimize disruption to the station users and the surrounding neighborhoods. It incorporates a construction approach that is conducted in three phases of implementation:

Phase 1 includes early action projects to facilitate subsequent construction phases

¹ “NoMa” refers to a DC neighborhood north of Union Station. The District of Columbia City Council approved creation of the NoMa Business Improvement District in 2007. Development has ushered in a number of prominent commercial businesses, government organizations, and retail establishments.



Central Concourse as viewed from the south showing waiting areas, reconstructed tracks and platforms, the first class lounge & retail opportunities.

and relieve existing passenger and train congestion and significant improvements to Concourse A.

Phase 2 includes reconstruction of the east side of the rail yard - providing all new tracks and platforms (with two tracks added to capacity), new passenger concourses, and replacement parking below.

Phase 3 includes the renovation of the west side of the rail yard, including the terminal stub end tracks and construction of the train shed that will be the centerpiece of the passenger experience and the urban development above.

Phase 4 provides for further expanded tracks and platforms on a lower level and the creation of a new Amtrak lower-level concourse, and provides the basis for extension of expanded high-speed rail service south to Virginia and the Southeastern United States.

The phased construction allows major investments in new capacity to occur as needed, with the scope and timing of future investments based on travel demand and the availability of resources. Phased construction leverages the available untapped real estate that exists beneath the tracks and platforms, which is important as station facilities can not be expanded upwards or laterally. The construction will be implemented in a top-down approach, permitting the tracks and platforms to

be built first, and allowing the air rights development platform and below-grade levels to be constructed simultaneously, or afterwards. Creating the foundations and support structure for the reconfigured train station will require a higher initial investment, but this up-front construction creates the opportunity for the construction of three million square feet of air rights development above coupled with six million square feet of station development below.

COST AND BENEFITS

The preliminary estimated cost for the station reconstruction and terminal capacity expansion is between \$6.5 and \$7.5 billion (2012 dollars). This provides for the construction of Phases 1, 2, and 3, and includes contingencies and allowances for design and other ancillary costs associated with implementation. When combined with an estimated \$1.5 billion (2012 dollars) for the air rights development, this spending is estimated to have an impact on the Washington area economy of between \$13.5 to \$15 billion in gross regional product over the same 15-20 year construction period. Additionally, expenditures by arriving Amtrak passengers at Union Station, currently at approximately \$900 million, are projected to grow to approximately \$2.75 billion, an increase of \$1.85 billion, or 200%.

By making this investment in Washington Union Station, the city and region receive enormous benefits. There will be room to comfortably triple the number of passengers

and double the number of trains within the existing station footprint. Commuters will be able to move expeditiously through the station to their connections. And the plan will create significant public spaces that can be enjoyed for decades to come, knitting the city of Washington together in a way that has not been possible for 100 years. Union Station itself will strengthen its role as a destination, a magnet for commercial and cultural events, and the region's most significant transportation hub. Finally, the investment also makes possible the extension of high-speed rail service into the Southeastern United States.

CONCLUSION

The Master Plan is a visionary, yet practical way to meet the region's transportation needs for the next century. The Master Plan creates capacity, provides the highest quality passenger experience, and stimulates economic vitality for the National Capital Region. The plan provides and facilitates the local, regional and national travel capabilities to support Washington as the political, cultural, and business capital of the country. It is a practical way to rebuild Union Station because it uses a phased approach and is designed with the budget realities of today's world in mind. We have a once-in-a-generation opportunity to secure the long-range transportation and economic future of the Washington region and the Northeast mega-region by equipping Union Station for its second century of outstanding service to the traveling public.

THE MASTER PLAN CHALLENGE



St. Pancras Station, London

GOALS OF THE STUDY

- Increase Capacity
- Improve Passenger Experience
- Enhance Vitality

The Master Plan connects a modernized rail infrastructure with the city – infrastructure necessary to move millions of passengers a year through Union Station to jobs, homes, schools, cultural facilities and tourist destinations. With its unparalleled location, Union Station has the potential to surpass its peers around the world as a high capacity, efficiently functioning rail terminal, with extraordinary economic, social, and cultural benefits. However, realizing the station’s potential for growth must be accomplished within the existing station footprint, preserve the iconic existing Union Station, limit negative impacts on surrounding neighborhoods, and respect the historic legacy of Daniel Burnham’s original station design and Washington’s city plan.

CAPACITY GROWTH

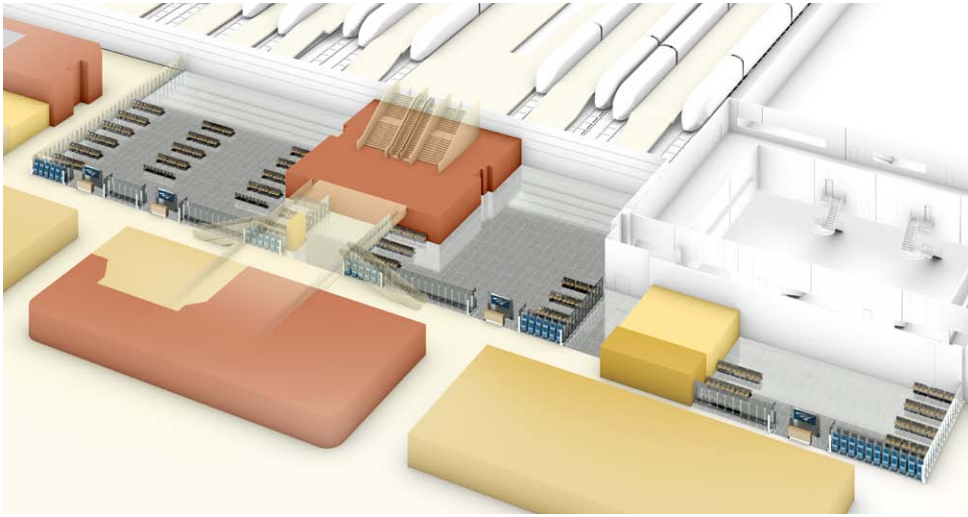
All three railroads – Amtrak, MARC and VRE – achieved record levels of ridership in 2011, and the train station is now close to the limits of its practical capacity, struggling to accommodate 8,000 rail passengers during weekday peak hours. Demand for other transit modes at Union Station will continue to grow, and plans for the introduction of high-performance high-speed rail, intercity bus, and streetcar service will add tens of thousands of additional daily occupants. Over the long term additional station capacity will be needed to accommodate this growth, and deferring action is not an option. The millions of people each year that will move through the station will require seamless transfers between intercity and commuter trains, Metrorail, Metrobus,

Streetcar, taxi, parking, pedestrian systems, and bicycles.

PASSENGER EXPERIENCE

The existing station tracks and platforms must be reconstructed to meet code requirements, improve passenger service and operational efficiency, and enable future growth in the number of passengers per train and passengers per hour. Station platforms do not meet the current requirements of the Americans with Disabilities Act (ADA) – level boarding of trains is not possible with low platforms or high platforms that are too short; excessively steep ramps and parking garage columns result in unacceptable platform edge clearances. Overcrowding and congestion are daily occurrences at Union Station, with concourse, gate areas and Metro entrances routinely congested and long, uncontrolled boarding queues of Amtrak passengers extending into the public concourse.

To provide the highest quality passenger experience, the Master Plan must incorporate lessons learned from comparable domestic and international stations, including: St. Pancras and King’s Cross in London, Puerta de Atocha in Madrid, Gare du Nord in Paris, Antwerpen-Centraal, and the Berlin Hauptbahnhof. These facilities are inspirational in the ways they provide for passenger capacity, interconnect rail with other transportation modes, integrate with their surroundings, and become places of civic and national pride, and destinations in their own right. All of these stations achieve



Diagrammatic view of the reconstructed Concourse A in Phase 1.

extraordinarily high passenger capacities within facility footprints similar to Union Station.

ECONOMIC VITALITY

Union Station's surrounding environment is rapidly changing. Multiple plans for the station vicinity will affect the station's growth, including the emergence of the vibrant NoMa district surrounding the station and the three million square feet of mixed use development planned for the station's air rights. The retail at Union Station is already being redeveloped and offers significant potential to further shape the character and appeal of the station vicinity.

On a broader scale, the challenge of the Master Plan is to enable Union Station to

fulfill its role to transform the Washington metro area and the mega-region that stretches from North Carolina and Virginia through New England, and beyond. As regional roadways become more congested and fuel prices continue to rise, increasing numbers of people will live in locations easily accessible to rail service. Making travel easier and journey times shorter, Union Station will ultimately shape the spatial development of the region, influencing decisions of people and companies about where they locate.



View of station looking southeast showing midday storage of equipment on active platforms

A GROWING UNION STATION



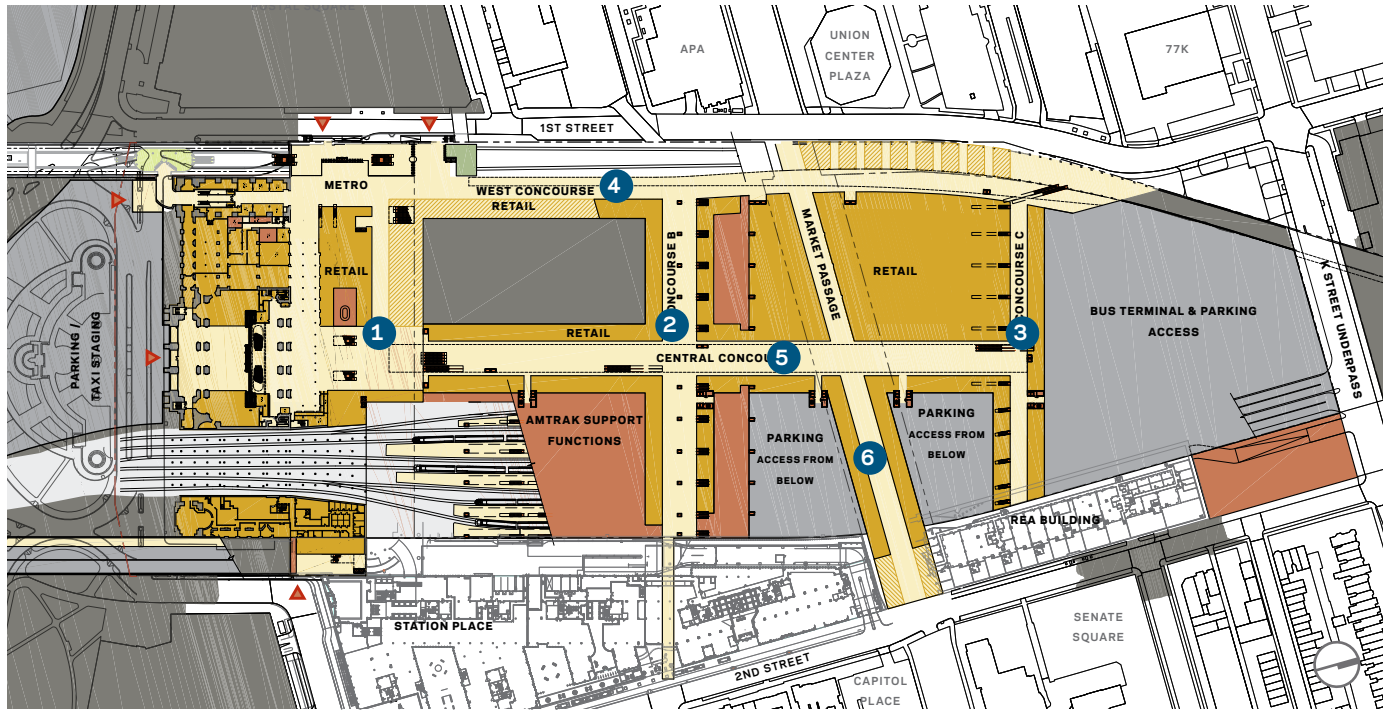
The train shed looking southwest showing the vegetated green roof.

The power of the Master Plan lies in its ability to create a high-functioning and well-integrated multimodal transportation hub, as well as a wonderful new urban neighborhood – all within a relatively confined space. The Master Plan matches the quality and vision of the original, iconic Union Station design, while creating a world-class transportation hub and preserving Union Station as an architectural treasure. The further appeal of the plan is its ability to create critical station space on multiple levels below the tracks and platforms. At Union Station, the opportunity

exists to create both a high-capacity train station and a compact, efficient and well-connected hub for multiple transportation modes.

NEW TRAIN SHED

For many international visitors, Union Station is one of their first impressions of the Nation's Capital. Therefore, the Master Plan has foreseen a new design of a world-class transportation hub worthy of a great nation. The heart of the plan is the creation of a new train shed that will welcome passengers to



Plan of 1st Street Level showing new concourses below the tracks and platforms.

- 1 Concourse A (level above)
- 2 Concourse B
- 3 Concourse C
- 4 West Concourse
- 5 Central Concourse
- 6 Market Passage

Washington, bring natural light to station spaces, and symbolically organize the connections of all transit modes. The new train shed will become the nexus for vertical connectivity to the commercial development above and horizontal connectivity between the train station and its neighborhood. The planted vegetated roof of the train shed will retain rainwater, and temper the interior environment.

The new train shed features a modern green ribbon roof design. It matches the quality and vision of the original, iconic Union Station design, while creating a world class transportation hub.

NEW PUBLIC AND PASSENGER CONCOURSES

The Master Plan addresses the challenges of passenger crowding and confusion by both enlarging the existing Amtrak and commuter rail concourse and also providing new public and passenger concourses that are convenient to use and easy to access. Pedestrian circulation in the station will be organized around two major north-south concourses located one level below the existing tracks and platforms at the 1st Street level. Both of these public concourses will have natural light since the tracks above

will be re-positioned to provide openings down to the concourse level.

The Central Concourse, on the axis of the historic station, will tie all parts of the multimodal hub together: the historic building and the new rail infrastructure, the H Street neighborhood, passenger concourse, and transit connections. The Central Concourse will consist of a 50-foot wide and 100-foot high pedestrian passage linking all three arrival and departure concourses, and be lined with retail and public amenities. The connection of the Central Concourse to the existing station will become the new central hub of the station and will have dramatic views into the train shed. This intersection will also represent a symbolic joining of the historic Burnham building to the south and the future of rail to the north. The Central Concourse will be entirely covered with an iconic skylight that is one of a series of undulating forms that are an integral part of the train shed.

A new West Concourse will supplement the north-south circulation capacity of the Central Concourse, running the length of the station complex and linking the Metrorail Red Line station with the NoMa district to the north. The West Concourse will be



Passenger information signage

primarily used by transferring commuter rail passengers, but will also serve as an amenity to the entire Union Station area with many connections to 1st Street and lined with retail.

The existing rail concourse, shown as Concourse A in this plan will be expanded, doubling its present capacity, and revitalized with new architectural finishes and a skylit roof that will allow sunlight to fill and enliven the space. The taxi roadway above the existing concourse will be relocated, further opening up the volume of space within the concourse. Concourse A will be the primary area used for departing Amtrak passengers, and will also be used by all arriving passengers - both intercity and commuters.

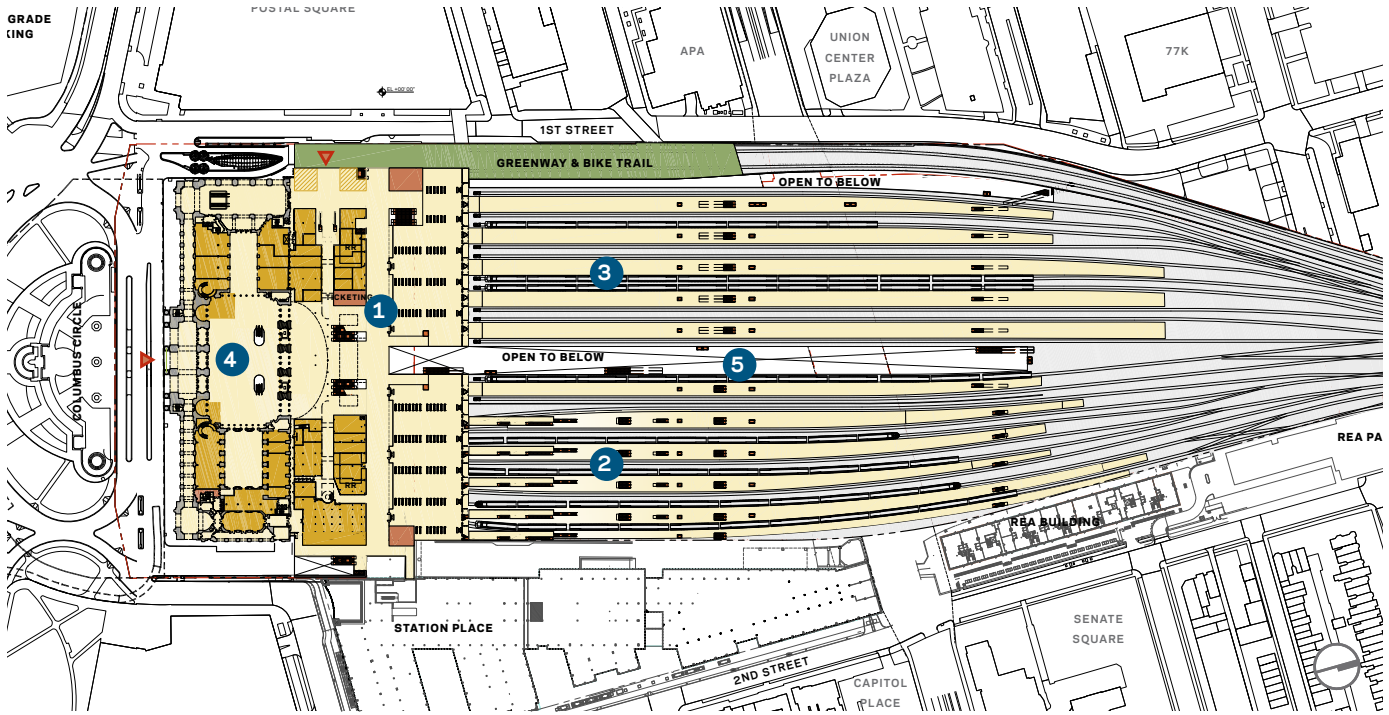
Two large waiting areas within Concourse A will provide seating for departing passengers and queuing space at the gates leading to the train platforms. Amtrak is improving the passenger experience with e-ticketing and

concierge-style customer service, and will provide these amenities at the entrances from the public concourse into the waiting and gate areas, with reception desks staffed by Amtrak personnel, providing train information, handling ticketing transactions, directing passengers to other services within the station, and checking the validity of tickets for passengers entering the waiting area. Concourse A will become the heart of intercity rail passenger service at Union Station.

Two additional east-west concourses will be constructed one level below the existing tracks and platforms. Concourse B will be located at the mid-point of the platforms and will become a commuter concourse for MARC and VRE passenger services, including ticketing, train information and seated waiting areas. The northernmost Concourse C will have access to all platforms at their northern ends, and will provide a convenient pedestrian route to and from



Central Concourse as viewed from the south showing waiting areas, reconstructed tracks and platforms, the first class lounge & retail opportunities.



Main Level plan of the station showing reconstructed tracks and platforms and the historic train station.

- 1 Concourse A
- 2 East Side Run-Thru Tracks
- 3 West Side Stub End Tracks
- 4 Main Hall
- 5 Central Concourse (below)

the neighborhoods lying to the north of the station. Passengers using these concourses will have convenient, direct access to transfer to Metro without a change in levels after exiting the platforms.

Concourses A, B, and C will primarily serve departing and arriving passengers, providing access to every platform in the station and maximizing the operational flexibility of both intercity and commuter rail. Arriving passengers will be able to exit the platform to any of the three concourses, which will minimize the time required to clear the platforms of passengers following train arrivals. The multiple concourses also will help evenly distribute passengers throughout the station.

TRACKS AND PLATFORMS

The Master Plan will replace or modernize virtually all of the elements of railroad infrastructure within the terminal limits - tracks, structures, electric power systems, signaling and train control systems and rolling stock storage and maintenance facilities. Switches within the station area will be upgraded to better geometric standards, and configuration of tracks and switches in the terminal will be adjusted to facilitate better train movement into and out of the station. The Master Plan will

accommodate commuter railroad and Amtrak requirements for storage and maintenance of longer trainsets and a larger fleet, and the eventual new fleet of high-performance, high-speed rolling stock.

The Master Plan provides for new tracks and platforms at the station that will meet current and future project rail planning standards and all safety and accessibility requirements. The new platforms will be substantially wider, longer and straighter and capable of handling double the passengers per train and more trains per hour than the existing platforms. These widened platforms are particularly important for the large passenger loads of commuter trains. A key component in the Master Plan is the proposed removal and replacement of the existing parking deck that was constructed in the 1970's and later expanded by the USRC. Presently a revenue source for USRC, the parking deck provides bus access and parking for 2,200 cars at the station. Unfortunately, the constricted column grid of the deck at the platform level prevents the current tracks and platforms from being reconstructed with the configuration and dimensions necessary to accommodate future passenger capacity. The Master Plan team studied numerous alternatives to the removal of the parking deck, and concluded that replacement of the

parking capacity to a below-grade facility is critical to meeting rail infrastructure needs, and will also allow the highest and best possible use of the parking garage site for redevelopment and creation of a public amenity.

Service access to the platforms will be provided via a series of new elevators located near the mid-points of the platforms to minimize interference with rail passengers. The service elevators will link to a below-grade network of service corridors.

The east side run-through tracks (which travel under the station through the 1st Street tunnel to points south) will be reconstructed to provide eight platform tracks and five platforms, including three tracks with low level boarding platform edges, to accommodate bi-level commuter trainsets, as well as Amtrak's Superliner

equipment, that are only able to unload and load passengers from a low level boarding platform. All tracks will be equipped with an overhead catenary system to accommodate electric locomotives.

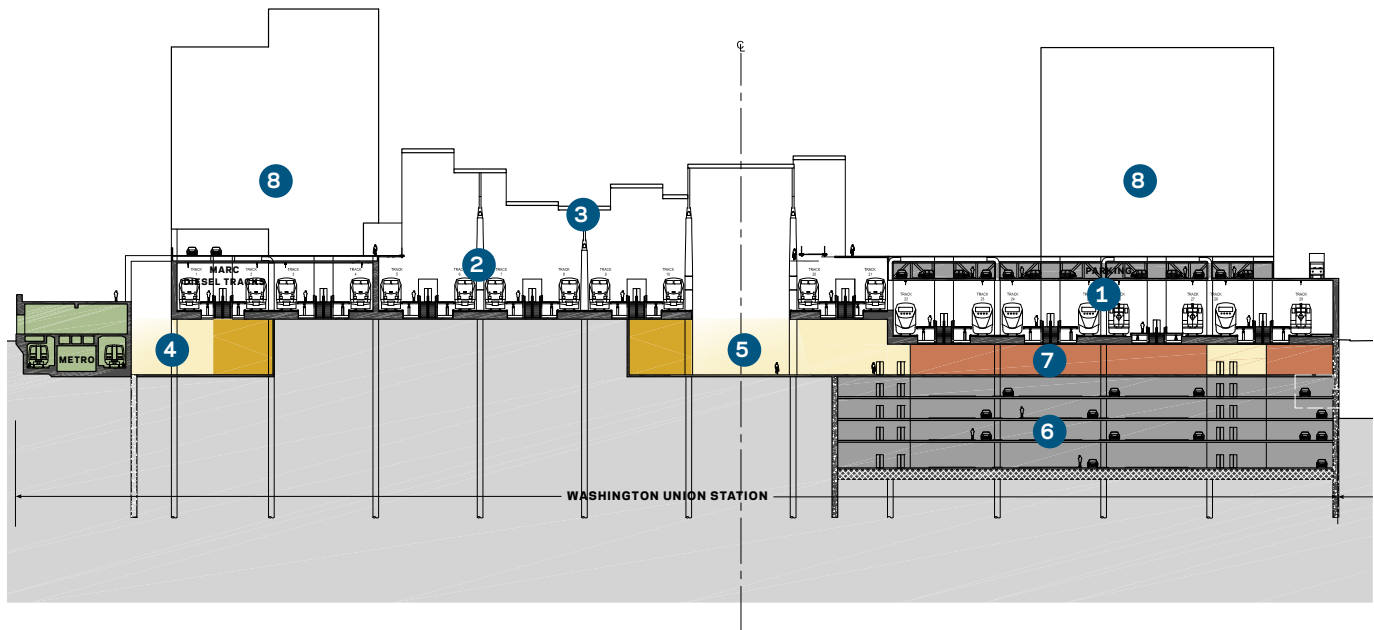
The west side stub-end tracks will be reconstructed with six high level boarding platforms and twelve stub-end tracks. These tracks will be spaced to open the north-south axis of the Central Concourse to natural light and the activity of the train shed.

TERMINAL CAPACITY EXPANSION

The track and platform reconstruction and passenger concourse improvements will increase Union Station's rail passenger handling capacity. However, additional investments in terminal capacity rail facilities will be needed to enable MARC, VRE and Amtrak rail service to keep growing to meet future demand. These investments include



Interior view of the train shed looking north showing the reconstructed track and platforms at the main level



Diagrammatic cross section looking north showing the reconstructed tracks and platforms, train shed, air rights development and replacement parking.

- 1 East Side Run-Thru Tracks
- 2 West Side Stub End Tracks
- 3 Train Shed
- 4 West Concourse
- 5 Central Concourse
- 6 Parking
- 7 Service
- 8 Air Rights Development

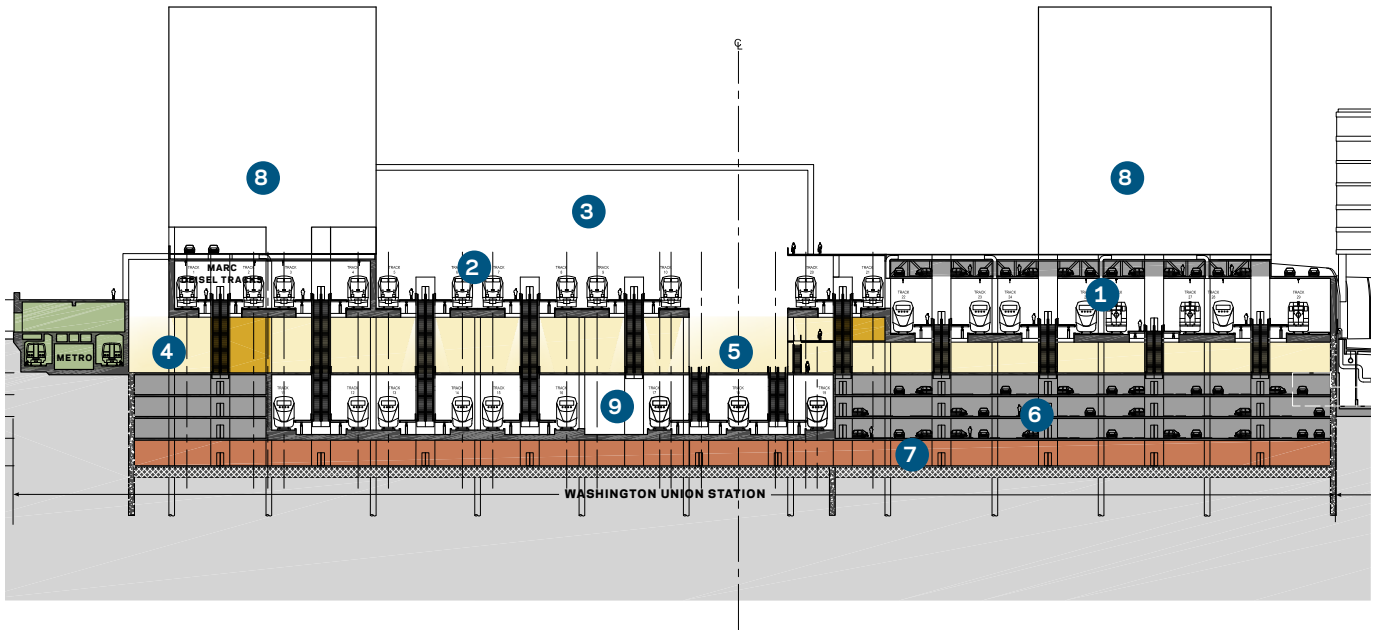
the expansion of mid-day storage capacity for commuter trains and expansion of Amtrak fleet storage and maintenance facilities. The plan will enhance the capacity available for mid-day storage of commuter trains within the existing limits of the terminal. However, at some point in the future, the capacity of the existing facilities will be reached and the development of a new commuter storage yard on a new parcel of land will be required. The Master Plan identifies potential sites for these functions, and improvements to the terminal's approach tracks and junctions that will also be required to increase the volume of trains that can operate to and from Washington (and between Union Station and the servicing facilities at Ivy City).

STATION SUPPORT FACILITIES

The Master Plan includes a detailed program of support uses at the station today and projected space needs for the future. Projected space needs vary based upon function, but overall space needs to support train growth are generally expected to double during the 15-20 year life of the plan.

A number of near-term opportunities for support space are identified in the plan and will be studied moving forward, including acquisition or lease of space adjacent to the station. Ultimately, full development of all phases of the plan will provide for the ability to locate all crew base, baggage

handling, commissary, and rail support functions in space below the station tracks, thereby providing secure facilities that do not conflict with the public and passenger spaces above. Station servicing and loading dock facilities will be provided on the lowest level of the station complex, connected via service passageways to the existing station and to the service elevators leading to the platforms.



Diagrammatic future Phase 4 cross section looking north showing lower level tracks and platforms.

- 1 East Side Run-Thru Tracks
- 2 West Side Stub End Tracks
- 3 Train Shed
- 4 West Concourse
- 5 Central Concourse
- 6 Parking
- 7 Service
- 8 Air Rights Development
- 9 Lower Level Tracks

FUTURE POSSIBILITIES

While the Master Plan improvements will allow Amtrak and the commuter railroads to maximize the existing rail infrastructure at the terminal, demand for rail service will someday rise to the level where the practical capacity of these facilities is reached. This could happen as early as 2030, depending on the pace of growth and investment in overall rail system capacity. To provide for this future capacity the Master Plan allows for the development of a new lower level of tracks and platforms in a zone beneath the west side stub tracks that can be excavated to create six additional station tracks (or up to nine if needed for additional capacity).

The lower-level development would provide space for a new concourse for Amtrak, in-between the upper and lower platform levels, with dedicated facilities for Amtrak passengers including a reception area, ticketing, baggage claim, waiting areas, and first class lounges. This new Amtrak concourse would be beneath the central skylights of both the Central Concourse and the train shed, allowing abundant natural light. The areas available for Amtrak passengers would be ample enough to support a potential four-fold increase in the volume of peak hour intercity traffic.

The lower track level would be connected to the Northeast Corridor main line by means of

a bored tunnel from Union Station northeast to the vicinity of the Anacostia River. An additional tunnel would connect the station with new train storage and maintenance facilities in the Ivy City area. Additionally, the plan provides that future tracks from the lower level of Union Station could be extended to the south, enabling extension of high-performance high-speed rail service to Virginia, North Carolina, and the southeastern United States.

Collectively, all of the improvements envisioned in the Master Plan would generate a quantum increase in the capacity of the terminal, setting it up to serve local, regional, and national transportation needs through the 21st Century.



Escalators down to the Central Concourse in the train shed. The vegetated roof and Air Rights development can also be seen.

A MULTI MODAL FACILITY

Already a major regional transportation hub, Union Station's importance will grow as the level of rail and transit ridership increases in the future. As many as 100,000 rail and transit passenger trips are made daily through Union Station, making it one of the nation's busiest rail stations. The station is a true multi-modal facility with access to intercity and commuter rail, Metrorail, intercity, commuter and local buses, taxis, cars, pedestrians, bicycles and, in the near future, a streetcar line.

Union Station originally had a simple arrangement of public spaces that was well understood by passengers, but the station has become complex and unclear with changes over time. Today there are unmarked station entrances, intersecting and conflicting paths of travels, and safety concerns related to small carts and electrified service vehicles. Recognizing the problems that currently exist, the USRC is in the process of implementing a comprehensive and coordinated system of signage and graphics to assist pedestrians. The Master Plan builds upon this system and employs spatial planning principles that focus on axial concourses that utilize natural light where possible.

The Master Plan improves passenger flows and relieves congestion within the station by spreading people over a much larger area of the station complex. The plan increases the size of concourses, waiting areas and vertical circulation elements and more evenly distributes railroad passenger loads among multiple concourses, with several possible

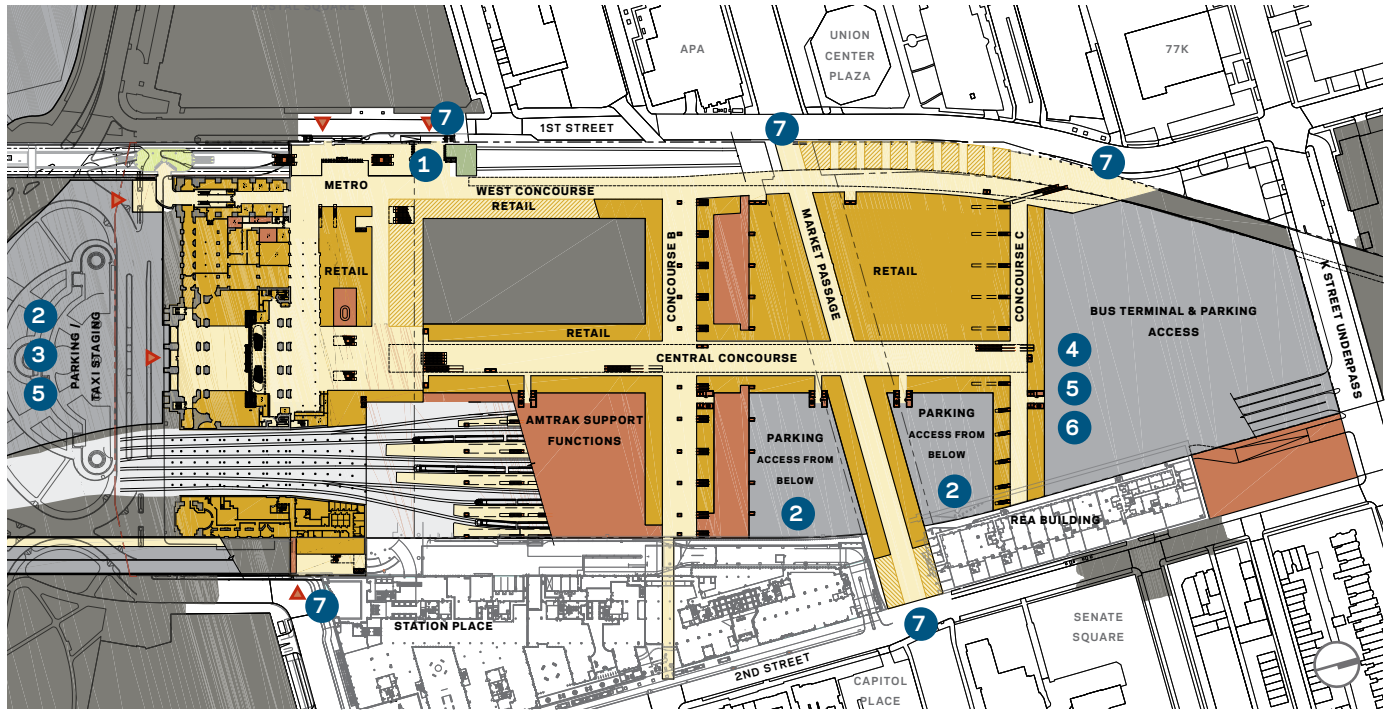
routes for commuters to travel between trains and the Metro.

METRO RAIL

Currently WMATA's busiest station, 68,000 metrorail passengers utilize Union Station each weekday. Today, the greatest points of congestion within the station surround the Metrorail's access points. The Master Plan incorporates Metrorail's near-term station improvements at the north mezzanine and provides a new pedestrian network at the Metrorail mezzanine level that offers convenient connections to all of the passenger concourses and to 1st Street and NoMa via the West Concourse. The Master Plan also recognizes that at some point in the future the Metrorail Red Line will reach its capacity at Union Station, and anticipates new Metrorail capacity serving Union Station. WMATA, operator of the Metrorail, has initiated long-range planning for a possible new line serving Union Station, but a preferred alignment has not yet been identified, and thus the Master Plan allows for future pedestrian connections to a new Metrorail station in any of several possible configurations.

STREETCAR

The District of Columbia Department of Transportation (DDOT) has planned a network of streetcar tracks that will connect Union Station along H Street and Benning Road to the east, and along K Street to Georgetown to the west. The Master Plan addresses both long-term and interim goals for the streetcar program. To address the long-term goal, the Master Plan assumes



1st Street Plan showing connection to various modes of transport.

- 1 Metrorail
- 2 Parking
- 3 Taxi
- 4 Intercity Bus
- 5 Tourist Bus
- 6 Metrobus
- 7 Pedestrian Entrance

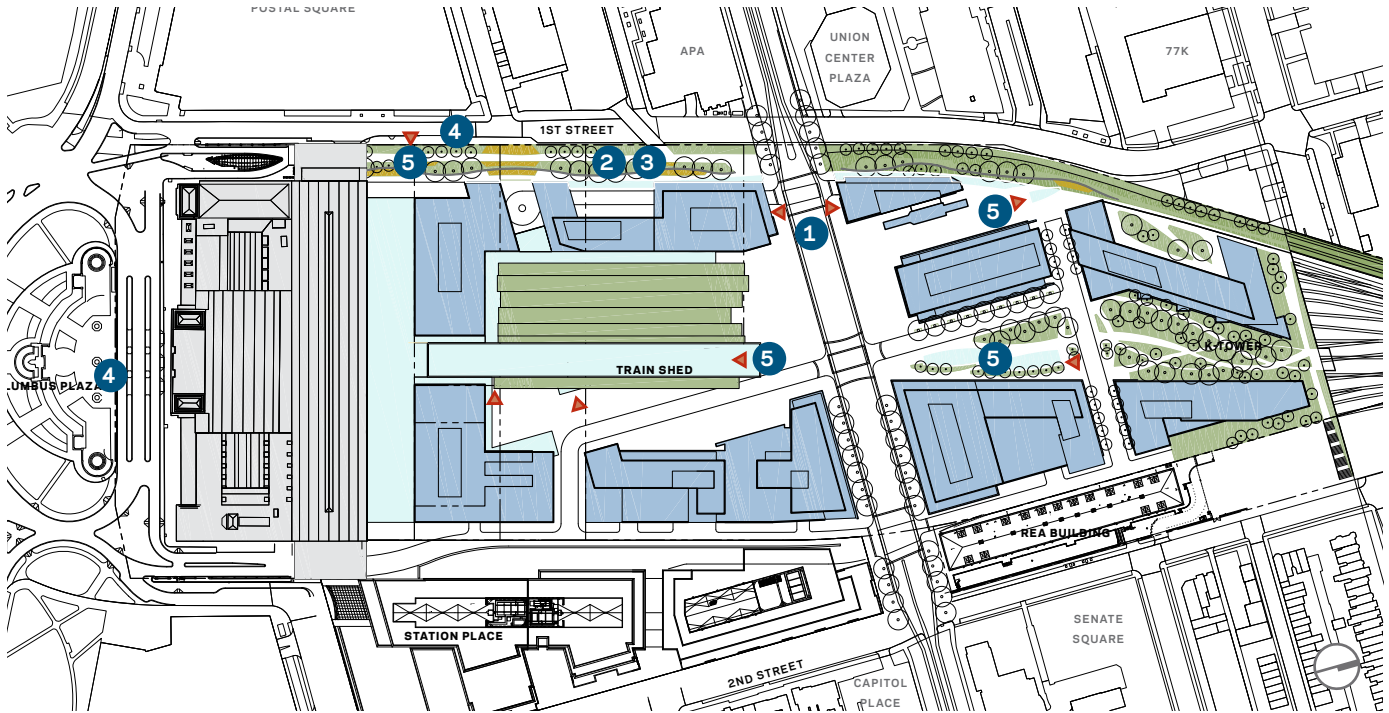
a streetcar station at Union Station positioned on the crest of the H Street Bridge with access to the station from H Street via the train shed station entrance. In inclement weather, streetcar passengers could descend directly down the H Street underpass concourse. An interim plan for the streetcar has been developed that provides easy access to Union Station and also permits construction of the Master Plan. The Master Plan provides efficient and seamless connections between the streetcar and all other modes of transportation at Union Station.

BUSES

Intercity, Circulator, Metrobus, commuter and tour buses serve Union Station. Buses can be accessed from the Bus Deck on the lowest level of the parking garage and in the front of the Station in Columbus Plaza. Tour bus activity peaks in the spring and summer seasons with 23 buses per hour and 1,300 passengers in the afternoon. With the recent addition of Megabus and BoltBus services, there are expected to be a peak of forty-three buses per hour and 3,200 to 4,400 passengers, adding further congestion to the over-capacity station concourses. Local Metrobus and express bus routes operate on Massachusetts Avenue, North Capitol Street and H Street with multiple stops serving

Union Station – providing relatively poor intermodal connections and connections between bus routes. Additionally, several tourist bus services operate at the curb in front of the main station entrance on Columbus Plaza, adding to congestion and disrupting the visual imagery of Union Station from Capitol Hill.

The Master Plan addresses the need for buses in two ways. First, a new off-street bus terminal that can both meet today's demand and allow for future growth is planned for the below-grade zone at the north end of the station complex. Locating the Bus Terminal at the northern end of the station complex helps to better distribute pedestrians within the complex and provides a northern “anchor” for the Central Concourse. Bus passengers will have direct access to concourses lined with shops, cafés and restaurants that have vitality and sunlight from skylights, as well as direct pedestrian connections to all other transportation modes. Secondly, those local and commuter bus services that remain at the street level will be better organized, consolidated and routed to a more limited number of bus stops around the perimeter of the station site, with improved pedestrian connections to and from the station complex. The specific solution for local bus service and



Preliminary H Street Plan showing multimodal connections and air rights development.

- 1 Streetcar
- 2 Greenway
- 3 Bicycle
- 4 Taxi
- 5 Pedestrian Entrance

vehicular traffic in general in the vicinity of the station will be determined as a result of a detailed traffic study to be undertaken in the next phase of master planning.

TAXIS

Currently, business and leisure travelers must navigate their way from the trains to the single taxi stand located at the front of the station. Passengers with baggage must travel over 2,000 feet if they are seated in the northern most train car and traverse a maze of passageways and halls to the taxi stand. At peak conditions, the queue for today’s taxi service can extend around the station through the bus deck onto the H Street Bridge. Similarly, queues for arriving passengers can extend from the taxi pick up stand to the eastern end of the arcade at the front of the station.

In the short term, operational changes can be made with limited operating costs to alleviate this condition. Over the long term, providing multiple taxi stands and pick up points would reduce wait times and queue lengths. The Master Plan considers multiple taxi stand locations near the new station entrances. It is also possible within the Master Plan to bring the taxi staging and primary drop-

off and pick-up functions within the lower levels of the station complex, enabling rail passengers to access taxis directly adjacent to the passenger concourses and removing the queues of taxicabs from the surface roadways surrounding the station. Removing taxis from Columbus Plaza would also reduce the visual and environmental impacts of the taxi operation in that area, and allow an alternative vision for Columbus Circle would be a pedestrian friendly public plaza free of vehicles.

PARKING

The existing Union Station parking garage provides approximately 2,200 parking spaces for visitors to Union Station, and general neighborhood parking, and currently, only a small percentage of Amtrak and commuter rail passengers drive and park at the station. With the improved multi-modal connections provided by the Master Plan, the percentage of passengers getting to or from the station by private auto is expected to drop even further - making Union Station one of the top rail stations in the U.S. in terms of the share of passengers using transit. Even so, the total future requirement for parking at Union Station will increase to 5,000 cars, including Amtrak and retail requirements,



The Greenway as seen from 1st street looking north with the air rights development office & hotel buildings. Image courtesy of Akridge/SBA.

rental cars, taxi queueing, and parking for the new commercial and residential space in the air rights development.

The Master Plan provides for this parking in several locations: below the new east side tracks and platforms, above the tracks in a single level of parking below the air rights development, and ideally, south of the station below lots controlled by other stakeholders. The plan calls for 2,500 parking spaces below the east side tracks in a garage that would have immediate access to the Central Concourse. In the southern location the plan identifies a potential for 1,500 parking spaces in a multi-story parking garage below Columbus Plaza and in lots controlled by the Architect of the Capitol. If the southern parking locations prove infeasible, the below station option could be expanded to allow for required parking growth.

BICYCLES

Washington DC and surrounding jurisdictions have been in the forefront nationally in promoting a sustainable and healthy form of transportation - the bicycle. At Union Station there are two bicycle facilities: a

bikestation located at the southwest corner of the historic building with storage for 150 bicycles; and a bikeshare station located at the southeast corner of station. The Master Plan promotes the use of bicycles by extending the existing Metropolitan Branch bike trail approximately one mile from its current terminus at the NOMA-Gallaudet U (New York Ave) Metrorail station to the Union Station bikestation. The new bike path will be part of a proposed Greenway along the west edge of the Union Station complex. Bikesharing facilities also might be added along the Greenway corridor, providing full-service opportunities for bicyclists.

A NEW URBAN PLACE



(above) View of Delaware Avenue looking south from H Street with the new north entrance to Union Station and residential buildings.



(lower) The reconstructed K Tower as a destination bar/restaurant in the air rights development. Images courtesy of Akridge/SBA.

The Master Plan sees Union Station as much more than just the region's premier transportation gateway and passenger rail station; but also as an invigorated urban center and a destination unto itself for tourists, visitors, workers and residents. This requires that the development above the tracks and platforms be completely integrated with the transportation functions below, and also with the surrounding neighborhoods. The air rights development plan focuses on a sequence of public spaces: the new train shed, public plazas and streets surrounding the train shed, an open space network north of H Street, and the proposed bicycle and pedestrian greenway on the west of the site. At street level, a new network of entrances will connect to the station concourses and serve an important civic function as extensions of the public realm.

THE AIR RIGHTS DEVELOPMENT

In 2006, the Federal government sold the air-space above Union Station's tracks and platforms as a redevelopment opportunity to Akridge, a local, Washington based commercial real estate firm. The sale provided for fourteen acres of potential developable area, separated into two parcels north and south of the H Street bridge. After several years of work by the District of Columbia Office of Planning, neighborhood stakeholders, and Akridge and its design team, the DC Zoning Commission rezoned the air rights property in 2011. The new zone established general parameters including acceptable building heights, uses, and design criteria, and established a multiple-stage public review process for future applications within the air rights space. The Master Plan envisions the

development envelope at the H Street level to include approximately three million square feet of mixed-use space, in addition to the train shed.

A NETWORK OF PUBLIC SPACES

The Master Plan incorporates a vision for the air rights development that will complement and enhance the public infrastructure proposed in the plan, and has been developed as a collaboration between USRC, Amtrak, Akridge and other stakeholders. The geometry of the buildings at H Street is driven by extension of a planning grid from surrounding streets, the overarching requirement for daylight, and access to the public and rail passenger concourses below. The focal point of H Street is a grand plaza and a new northern entrance to Union Station which has dramatic views of the concourses, trains and platforms below. To the north of H Street, this plaza will provide a vibrant public space with retail and restaurants, and connect to quiet neighborhood parks.

An overarching theme of the Master Plan is connectivity, and this applies not just to connections between transit systems, but also the connectivity between the transportation systems and the surrounding city. Pierre L'Enfant's 1791 plan for the City of Washington depicted Delaware Avenue as an axial boulevard beginning at the Capitol and heading northeast. As part of the 1901 McMillian Plan for Washington, Daniel Burnham sited Union Station and the new railroad embankment directly on this axis, which consolidated the railroads at a single terminal and removed the train tracks from the National Mall. Unfortunately, this decision cut off the boulevard at the front of



Aerial View of air rights development, historic station and train shed as seen from the east with a view looking down H Street. Image courtesy of Akridge/SBA.



The Greenway as seen from 1st street looking north with the air rights development office & hotel buildings. Image courtesy of Akridge/SBA.

the station and separated the neighborhoods on both sides of the railroad from each other. The Master Plan places the Central Concourse along the main axis of the historic station, evoking the original idea of Delaware Avenue, and connecting Columbus Plaza and the historic Capitol Hill neighborhood to the south and east with NoMa and the air rights development above. The West Concourse will enhance the west edge of the station, linking the Union Station Metro with 1st Street and NoMa. These two public north-south concourses will also connect vertically to the H Street level at multiple locations.

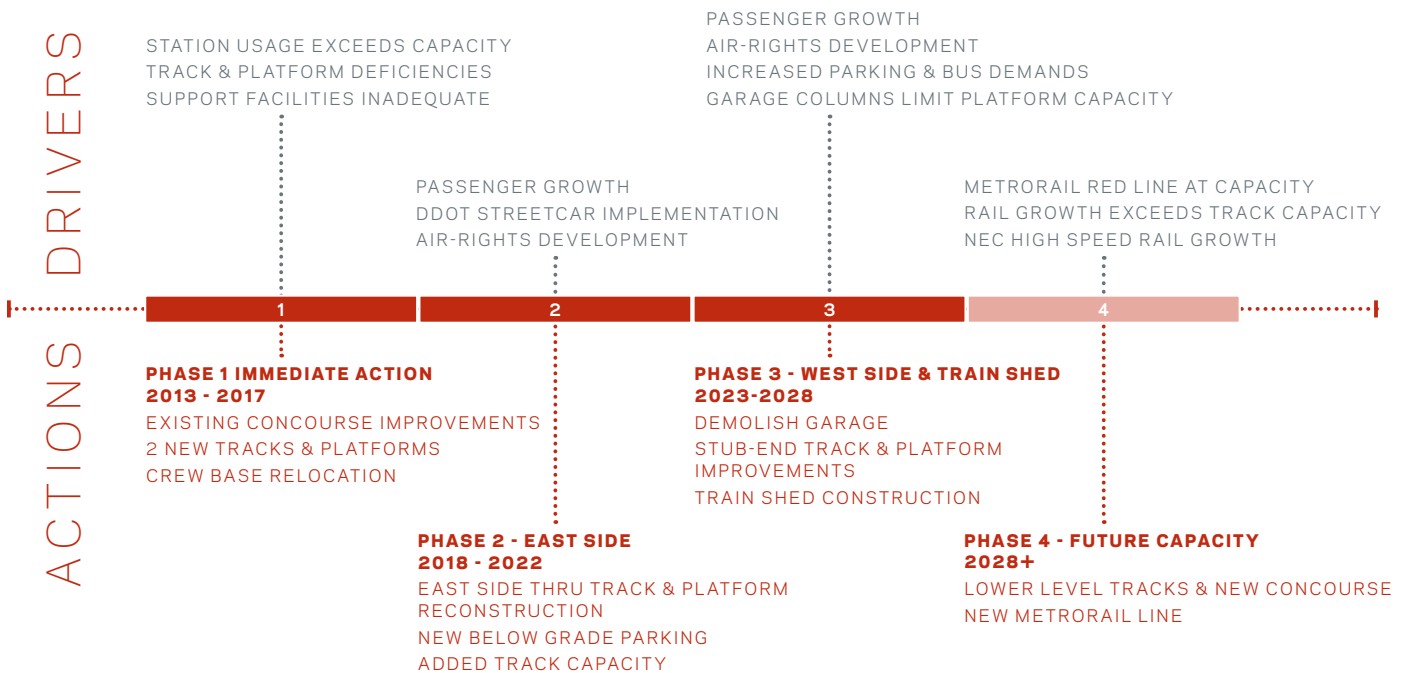
The H Street level is envisioned as a network of urban streets and blocks, with vehicular access from the crest of the H Street Bridge into the northern and southern portions of the air rights development. The visual alignment of 1st Street NE extends into the site, with an axial view corridor from the north that provides vistas of the new grand train shed. A mix of commercial buildings, offices, residences and hotels form a perimeter around the edge of the site arranged around well-landscaped public plazas of varying sizes and configurations. The lowest level of each building will have rich and vibrant retail activities that will further invigorate the public plazas. K Tower, an original Burnham brick structure currently housing the terminal's train control center, will be relocated onto the deck and repurposed as a bar/restaurant when the train control functions are moved to another location.

THE GREENWAY

The Master Plan also proposes the construction of a greenway above the Metro

right-of-way, connecting NoMa to the north with Union Station, Metro, and Capitol Hill, providing a dramatic civic amenity and linear park. The proposed greenway will run along the west edge of the air rights development and will be used by station passengers, workers, residents, cyclists, and visitors to the Union Station district. The greenway is planned as a beautifully landscaped outdoor space providing a raised extension of the Metropolitan Branch Trail bike path and pedestrian walkway, and connecting with the NoMa- Gallaudet U Metrorail Station and NoMa's planned park at L Street.

IMPLEMENTING THE PLAN



PHASING

The strategy for implementation of the plan includes a phased approach to construction, with costs and benefits carefully balanced throughout the implementation period. The Master Plan envisions a phased construction effort over a 15-20 year period, designed to minimize disruption to the station users and the surrounding neighborhoods, and create tremendous flexibility by incorporating a top-down construction approach. The four phases of implementation include:

Phase 1, includes early action projects to facilitate subsequent construction phases and relieve existing passenger and train congestion. Significant improvements to Concourse A will be undertaken, and the construction of two new tracks and one new platform on the west side of the rail yard completed. This will provide the capacity needed for rail operations to continue during the remaining construction phases, as the tracks and platforms can then be taken out of service while they are reconstructed. Phase 1 also includes modernization and

relocation of crew and rail support facilities that will increase crew efficiency and promote employee welfare.

Phase 2 includes reconstruction of the east side of the rail yard - providing all new tracks that run through the 1st Street tunnel to Virginia and points south of DC. The eastern portions of the Concourses A, B, and C will be constructed and put into service, as well as a portion of the Central Concourse. New below-grade parking that will provide immediate access to the station concourses will be constructed, replacing and expanding the existing parking in the USRC structure, and allowing its removal in Phase 2. The Phase 2 construction will also allow for construction of the east half of the air rights development.

Phase 3 introduces the new train shed to Union Station, with the renovation of the west side of the rail yard, including the terminal (stub end) tracks. To accomplish this, the parking structure is removed and the train shed is constructed, along with



View of the historic station, train shed and air rights development from the southwest. Image courtesy of Akridge/SBA.

completion of the Central Concourse, the west halves of Concourses B and C, and the West Concourse.

Phase 4 provides the opportunity for future construction to expand station capacity significantly, with the provision of new lower level tracks, platforms, and an Amtrak passenger concourse below the west side stub end tracks. While the full realization of Phase 4 is not included in the cost estimate included in this report, the Phase 3 construction and cost does include construction of the foundation and structural system, and the spacing of the tracks and platforms that will accommodate the future Phase 4 of station development.

CONSTRUCTION METHOD

Construction will be implemented in a top-down approach, permitting tracks and platforms to be built first and allowing the air rights platform and below-grade levels to be constructed simultaneously, or afterwards. Creating the foundations and support structure for the reconfigured train station will require a higher initial investment, but this up-front construction creates the opportunity for the construction of future tracks and platforms, concourses, and station support facilities. The top-down construction method proposed in the Master Plan allows major investments in new capacity to occur as needed, with the scope and timing of future investments based on travel demand and the availability of resources. Top-down construction leverages the available untapped real estate that exists beneath the tracks and platforms, which is important as station facilities can not be expanded upwards or laterally.

COST AND BENEFITS

The projected construction spending for redevelopment of Washington Union Terminal and Burnham Place is estimated between \$8 and \$9.5 billion (2012 dollars), with the estimated cost for the station reconstruction and terminal capacity expansion between \$6.5 and \$7.5 billion (2012 dollars). This provides for the construction of Phases 1, 2, and 3, and includes contingencies and

allowances for design and other ancillary costs associated with implementation. In addition to the railroad infrastructure and train station improvements, the cost will also cover: civil and structural work to create a below-grade structural envelope within which multi-modal, multi-purpose facilities will be located; construction of the deck supporting the planned air rights development (though not the buildings on the deck); and civic improvements, comprising the proposed greenway, bicycle trail, new station entrances, improvements to the historic station building, a new below-grade bus terminal and taxi staging area, and a new district utility plant.

This spending is estimated to have an impact on the Washington area economy of between \$13.5 to \$15 billion in gross regional product over the same 15-20 year construction period. By the end of this period, preliminary estimates indicate nearly 7,000 full-time employees will work at the Washington Union Terminal and Burnham Place Development. The average annual temporary construction employment over the fifteen-year period is preliminarily estimated to exceed 3,000 full-time employees. Additionally, by increasing the number of rail passengers arriving at Union Station, the community should expect to see a dramatic increase in revenue from lodging, food and beverage, entertainment, retail purchases, and local transportation.

By making this investment into Washington Union Station, the city and region receive enormous benefits. There will be room for comfortably triple the number of passengers and double the number of trains within the same Union Station footprint. Commuters will be able to move expeditiously through the station to their connections. It creates beautiful public spaces that can be enjoyed for decades to come, and knits the city of Washington together in a way that has not been possible for 100 years. Finally, Union Station itself will become a destination for the city, a magnet for commercial and cultural events, in addition to the transportation benefits that it brings.

CONCLUSION



The train shed looking southwest showing the vegetated green roof.

This Master Plan is the right plan at the right time for Washington Union Station. The Master Plan builds facilities for the next century for railroad and transit passengers that are modern, safe, secure and code-compliant. It creates capacity to accommodate future service changes and ridership growth, provides the highest quality passenger experience and adds vitality to the neighborhood surrounding the station.

The Master Plan will allow Washington Union Station to expand its capacity to accommodate up to triple the number of passengers and double the number of trains using Union Station over a 15 to 20 year period, within the existing footprint of Union Station. An integral part of Amtrak's Northeast Corridor investment plan, the Master Plan will enable trainsets to be lengthened, train service frequencies to be increased, and new train services not currently offered on the Northeast Corridor to be introduced. It unlocks six million square feet of station development below and three million square feet of air rights development above.

The Master Plan will enhance the quality of the passenger experience by creating a world-class transportation hub that anchors the U.S. East Coast passenger rail network for the next century. Providing superior performance for the fundamental train station and multi-modal transportation terminal functions, the Master Plan will make travel faster and more convenient for passengers. The improved station facilities will celebrate intercity travel, and they will let commuters find the shortest and most convenient pathways to and from their trains.

The Master Plan will promote the health and prosperity of the entire metropolitan region, including Washington, Maryland, and Virginia. As the most significant hub in the regional transportation system, Union Station plays a vital role in connecting jobs to people, and is essential to broad-based regional economic growth. By creating station and commercial development that is well-integrated with the surrounding neighborhoods and well-connected to the multi-modal regional transportation system, Union Station will become even more of a regional destination.

Implementing the Master Plan requires a major investment and requires decisions to be made soon to create the institutional framework necessary to pursue necessary funding and deliver a series of complex capital projects in an efficient and timely manner. The project will require funding beyond the traditional sources from which capital investments are made by the railroads and Washington area transportation agencies. However, the benefits of the plan are far-reaching, the need is great, and a collective effort to implement the Master Plan will be more productive and cost-effective than if each player were to attempt to meet its needs individually at separate locations.

The challenges facing the future of Washington Union Station can be seen as opportunities. We have a once-in-a-generation opportunity to secure the long-range transportation and economic future of the Washington region and Northeast mega-region by equipping Washington Union Station for its second century of successful service to the traveling public.

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