Infrastructure Master Plan
May 2016
## Contents

Section 1: Executive Summary ........................................................................................................ 1
  Section 1.1: Amendments and Minor Deviations ........................................................................ 2
  Exhibit 1.0A: Broadway Station Development Gross Area ....................................................... 4
Section 2 – Development Concept ................................................................................................ 5
  2.0 Location................................................................................................................................ 5
  Exhibit 2.0A: Project Location ...................................................................................................... 5
  2.1 Proposed Districts, Uses and Development Intensities .......................................................... 5
  Exhibit 2.1A: Broadway Station Subareas .................................................................................. 5
  Exhibit 2.1B: Land Uses by District ............................................................................................ 6
  2.2 Consistency with Agency Plans ............................................................................................. 7
Section 3 – Transportation System ................................................................................................. 8
  3.0 Introduction ........................................................................................................................... 8
  3.1 Existing Transportation System ........................................................................................... 8
  3.2 Design Criteria ....................................................................................................................... 9
  3.3 Proposed Transportation System .......................................................................................... 9
  Exhibit 3.3A: Surrounding Infrastructure Improvements ............................................................ 9
  Exhibit 3.3B: Roadway Improvement .......................................................................................... 11
  Exhibit 3.3C: Typical Sections - East Side Streets ....................................................................... 12
  Exhibit 3.3D: Typical Sections - West Side Streets ..................................................................... 14
  3.4 Pedestrian and Bicycle Connections .................................................................................... 17
  Exhibit 3.4A: Pedestrian Connections ......................................................................................... 19
  Exhibit 3.4B: Bicycle Circulation Routes .................................................................................... 20
  Exhibit 3.4C: Transit Lines .......................................................................................................... 21
  3.5 Conclusions .......................................................................................................................... 22
Section 4: Water Supply and Distribution System .......................................................................... 23
  4.0 Introduction ........................................................................................................................... 23
  4.1 Existing Water Distribution Facilities .................................................................................... 23
  4.2 Design Criteria ....................................................................................................................... 23
  4.3 Proposed Distribution System Layout ................................................................................... 23
  4.4 Conclusions ............................................................................................................................ 24
  Exhibit 4.3A: Water Improvements ............................................................................................ 25
Section 5: Wastewater Collection System ...................................................................................... 26
  5.0 Introduction ........................................................................................................................... 26
  5.1 Existing Wastewater Collection System ............................................................................. 26
  5.2 Design Criteria ....................................................................................................................... 26
  5.3 Proposed Collection System Layout ..................................................................................... 26
  5.4 Graywater Reuse ................................................................................................................... 27
  5.5 Conclusions ............................................................................................................................ 27
  Exhibit 5.3A: Sanitary Sewer Improvement ............................................................................... 28
Section 6: Drainage .......................................................................................................................... 29
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.0</td>
<td>Introduction</td>
<td>29</td>
</tr>
<tr>
<td>6.1</td>
<td>Background</td>
<td>29</td>
</tr>
<tr>
<td>6.2</td>
<td>Design Criteria</td>
<td>29</td>
</tr>
<tr>
<td>6.3</td>
<td>Major Drainage Basins</td>
<td>30</td>
</tr>
<tr>
<td>6.4</td>
<td>Drainage Sub Basins</td>
<td>30</td>
</tr>
<tr>
<td>6.5</td>
<td>Hydrology</td>
<td>31</td>
</tr>
<tr>
<td>6.6</td>
<td>Water Quality Best Management Practices</td>
<td>32</td>
</tr>
<tr>
<td>6.7</td>
<td>Floodplain</td>
<td>33</td>
</tr>
<tr>
<td>Exhibit 6.4A</td>
<td>Drainage Improvement</td>
<td>34</td>
</tr>
<tr>
<td>Exhibit 6.7A</td>
<td>Flood Insurance Rate Map</td>
<td>35</td>
</tr>
<tr>
<td>Section 7: Parks and Open Space</td>
<td></td>
<td>36</td>
</tr>
<tr>
<td>7.0</td>
<td>Parks and Open Space Concept</td>
<td>36</td>
</tr>
<tr>
<td>7.1</td>
<td>Minimum Open Space Requirement</td>
<td>36</td>
</tr>
<tr>
<td>7.2</td>
<td>Bonus Open Space</td>
<td>39</td>
</tr>
<tr>
<td>Exhibit 7.1A</td>
<td>Net Development Area</td>
<td>40</td>
</tr>
<tr>
<td>Exhibit 7.1B</td>
<td>Open Space Calculations</td>
<td>41</td>
</tr>
<tr>
<td>Section 8: Project Phasing</td>
<td></td>
<td>42</td>
</tr>
<tr>
<td>8.0</td>
<td>Introduction</td>
<td>42</td>
</tr>
<tr>
<td>8.1</td>
<td>Infrastructure Phasing</td>
<td>42</td>
</tr>
<tr>
<td>Exhibit 8.1A</td>
<td>I-25 &amp; Broadway Station District Phasing</td>
<td>43</td>
</tr>
<tr>
<td>Exhibit 8.1B</td>
<td>Market Place Mixed-Use District Phasing</td>
<td>44</td>
</tr>
<tr>
<td>Exhibit 8.1C</td>
<td>Santa Fe Residential District Phasing</td>
<td>45</td>
</tr>
<tr>
<td>Exhibit 8.1D</td>
<td>Office &amp; Parkland District Phasing</td>
<td>46</td>
</tr>
<tr>
<td>8.2</td>
<td>Conclusions</td>
<td>47</td>
</tr>
<tr>
<td>Section 9: Appendix</td>
<td></td>
<td>48</td>
</tr>
<tr>
<td>9.1</td>
<td>Alta Survey (Separate Document)</td>
<td>48</td>
</tr>
<tr>
<td>9.2</td>
<td>Infrastructure Master Plan Drainage Report (Separate Document)</td>
<td>48</td>
</tr>
<tr>
<td>9.3</td>
<td>Infrastructure Master Plan Sanitary Sewer Report (Separate Document)</td>
<td>48</td>
</tr>
<tr>
<td>9.4</td>
<td>Infrastructure Master Plan Water Distribution System Memo (Separate Document)</td>
<td>48</td>
</tr>
<tr>
<td>9.5</td>
<td>Infrastructure Master Plan Transportation Impact Study (Separate Document)</td>
<td>48</td>
</tr>
</tbody>
</table>
Section 1: Executive Summary

Broadway Station will be a high quality, mixed use transit-oriented development; strategically located and planned as a vibrant hub of Denver’s city life. The development will integrate a former industrial site back into the city network and revitalize 50 acres of key urban real estate. The gross project area is illustrated in Exhibit 1.0A: Broadway Station Gross Area. It is anchored by I-25 & Broadway station and includes approximately 11 acres owned by the Regional Transportation District (RTD). Development of the site will be done in a thoughtful way to leverage the station connection and integrate the site with the urban fabric of the surrounding neighborhoods. Important links to public amenities such as Vanderbilt Park and the South Platte River trail will be established to provide a seamless pedestrian and bike connection across the Consolidated Mainline (CML) rail and the South Platte River. The redevelopment will emerge as an urban jewel that propels the site from its historic past into a metropolitan celebration of Denver’s future.

Guiding principles for the project are as follows:

- Create an appealing mixed-use urban environment
- Enhance connections and activate streets
- Create a multi-modal transit hub at the heart of the development
- Develop a variety of public realm spaces for all to enjoy
- Transform the site from brown to green
- Reconnect with the past

Infrastructure is the backbone of the Broadway Station redevelopment; it supports site development and anticipated uses. Overall development of the Broadway Station property will be governed by four regulatory instruments:

- I-25 and Broadway Station Area Plan – This document provides the overall vision and goals for the entire station area, of which the Broadway Station redevelopment project is a portion.
- Denver Zoning Code (DZC) – In conjunction with development of the Broadway Station project, the property owners are seeking rezoning of the property to permit development which aligns with the vision and goals set forth within the I-25 and Broadway Station Area Plan. The DZC regulates land uses, overall building massing, setbacks and building heights.
- Urban Design Standards and Guidelines (UDSG) – The Urban Design Standards and Guidelines will regulate the overall look and feel of the development and how individual buildings, streetscape, open spaces and plazas are to be designed. The UDSG also refine and shape design elements more loosely defined in the DZC.
- Infrastructure Master Plan (IMP) – The IMP provides the master plan infrastructure concept for streets, sewer lines, water lines, storm water systems, and bike and pedestrian circulation and
connections. The IMP ensures the infrastructure requirements and upgrades are identified so the proposed development is adequately served.

These four documents combined govern the development of the site and will be utilized to evaluate individual site development.

The Infrastructure Master Plan (IMP) is the guiding document of needed infrastructure to serve development on the site. This document contains master plan concepts and layout of all streets, sewer, storm water, water, pedestrian and bike facilities and open spaces needed to service and support the development. The document is organized by discipline (transportation, water supply, wastewater, drainage) and includes a section on required open space and a phasing plan detailing required improvements to support individual sub-areas of the proposed development. The infrastructure master plan concepts contained in the IMP are based upon various engineering studies required by the City to support the concept. Copies of these studies are included as Appendices to this document.

The IMP and supporting engineering studies will be utilized to evaluate site specific development as it occurs within the property and will serve as the basis for future site plan and engineering design.

The IMP is a living document and provides flexibility to the future development. While the plan has been created to support the current vision of the site, there are many factors that will affect the planned development including market conditions, site constraints, economic factors, and unforeseen conditions. This document may be amended through a process similar to the General Development Plan process.

Section 1.1: Amendments and Minor Deviations

The City may approve amendments to the Approved IMP. Any of the following changes to the Approved IMP, if included in the Approved IMP, shall be considered an amendment, as determined by the City:

- Significantly altering the location or amount of land area intended for publicly accessible open space or other public purposes required by the Approved IMP or by other City ordinances, rules or regulations;
- Substantially moving or altering the vehicle access and circulation to or within the development;
- Substantially moving or altering stormwater drainage or water quality to or within the development;
- Changing or negating a condition of approval; or
- Modifying any other element of the Approved IMP that would substantially change its character or impacts on surrounding property, as determined by the Manager of Community Planning and Development

Minor Deviations to the Approved Imp: The DRC may approve minor deviations from the Approved IMP. Minor deviations are allowed provided such deviation does not constitute an Amendment to the Approved IMP as noted above.
Procedure for Amendments and Minor Deviations

An amendment or minor deviation to an approved IMP may be reviewed concurrently with other applications. An amendment or minor deviation to an Approved IMP shall be reviewed according to the following procedures:

a. A concept meeting will be scheduled to discuss the proposed change. At the concept meeting, a determination on whether a proposed change to an Approved IMP constitutes a minor deviation or amendment, the submittal requirements, and necessary referral agencies will be established based upon the scope of change and other pertinent information.
b. Amendments will require a public meeting before a formal application is submitted.
c. After the concept meeting, and public meeting, as applicable, a formal application will be submitted for review by the agreed upon referral agencies.
d. Minor deviations will be approved as redlined edits to the Approved IMP.

Filing of the Approved IMP, Approved IMP Amendments and Approved IMP Minor Deviations

The approved IMP and any amendments, supplements or minor deviation shall be put on file in the City Clerk’s Office and assigned a City Clerk File Number.
Section 2 – Development Concept

2.0 Location
The site as illustrated in Exhibit 2.0A: Project Location is located approximately 3 miles south of downtown Denver and is immediately adjacent to I-25 & Broadway station. It is bounded by Interstate 25 on the north, West Mississippi Avenue on the south, South Broadway on the east, and Vanderbilt Park on the west. The Santa Fe Couplet and the South Platte River run north-south through the west portion of the site and the Consolidated Main Line (CML) Corridor runs north-south through the middle of the site.

The Gates Rubber Factory opened on the site in 1918 and was a vital source of employment in the city as well as an important hub of industry and innovation. The site underwent an extensive environmental remediation after the plant closed in 1991. Conscientious demolition of the old factory buildings and exportation of contaminated soils prepared the site for redevelopment.

2.1 Proposed Districts, Uses and Development Intensities
The proposed plan includes a variety of uses to create a diverse and vibrant transit-oriented development with a focus on creating a unique, active and memorable development. Land uses are also important drivers of infrastructure and roadway design.

The proposed development is divided into four sub-districts depicted in Exhibit 2.1A: Broadway Station Subareas. Each district has a unique urban design objective, with specific land uses and development intensities as described in Exhibit 2.1B: Land Uses by District. (For more on urban design objectives, see the Urban Design Guidelines and Standards Document).
Exhibit 2.1B: Land Uses by District

<table>
<thead>
<tr>
<th>District</th>
<th>Residential (Units)</th>
<th>Commercial/ Retail (SF)</th>
<th>Office (SF)</th>
<th>Civic (SF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Place Mixed-Use District</td>
<td>1,518</td>
<td>170,100</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Santa Fe Residential District</td>
<td>1,138</td>
<td>7,500</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Office &amp; Parkland District</td>
<td>0</td>
<td>16,700</td>
<td>958,700</td>
<td>0</td>
</tr>
<tr>
<td>I-25 &amp; Broadway Station District*</td>
<td>162</td>
<td>63,200</td>
<td>277,200</td>
<td>15,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2,818</strong></td>
<td><strong>257,500</strong></td>
<td><strong>1,235,900</strong></td>
<td><strong>15,000</strong></td>
</tr>
</tbody>
</table>

*Uses within the I-25 & Broadway Station District are shown only as a basis for infrastructure planning. Specific uses will be determined by RTD and/or future property owners.

Mixed use is proposed for all districts; however the particular uses and development intensities in each district are carefully considered to balance site opportunities and infrastructure needs. The mix of residential and commercial/retail uses in the Market Place Mixed-Use District is designed to create a vibrant city life focused on street level interactions. Activated ground floor uses will focus on a mix of retail uses while upper levels of the vertical development will consist of multi-family living units. In the Santa Fe Residential district, a lower density of commercial/retail uses will complement the primarily residential feel of the district. Of the proposed residential uses in the Santa Fe Residential District, 125 units will be located on the west side of the Santa-Fe Couplet. In both the east and west portions of the Santa Fe Residential District, park access and mountain views will be leveraged to create a “home on the park” feel. The mix of uses in the Office and Parkland District will consist of primarily office with some commercial/retail uses. This district’s proximity to I-25 allows the desired visibility and transit access for these uses in the district. The increased size and density of building in this district will also shield residential uses in the other districts from highway noise and glare.

The I-25 & Broadway Station District is a central component to realizing the vision presented in the Station Area Plan. The 11 acres of this district that is owned by RTD is referred to in this document as the “RTD Ownership Area”. It includes the light rail station, the bus terminal and a portion of the park-and-ride surface parking associated with the transit station. The remaining approximately 1.8 acres of the district is privately owned. The RTD Ownership Area is self-contained and will require its own infrastructure at time of redevelopment. For infrastructure planning purposes, the mix of residential, retail, office, and civic (e.g.; museum) uses in this district have been selected to best align with and achieve the Station Area Plan vision to activate transit. However, actual programmatic uses for this sub-area will be determined by RTD and/or future property owners at the time of development. Specific infrastructure and connectivity issues will be resolved at that time. Redevelopment plans must reflect the desired minimum vision expressed above as well as those expressed in the Station Area Plan.

Vehicular access within the site is restricted to circulation on either the west or east side of the CML corridor. The internal transportation network will tie into existing arterial streets; leveraging east/west
travel under the CML on Mississippi Avenue and north/south travel on S Broadway and the Santa Fe Couplet.

All district uses will be supported by a transportation system, water supply and distribution system, wastewater collection system and drainage; as described in subsequent chapters and project phasing.

A network of open space will serve the collective development and will be accessible to the entire district and surrounding neighborhoods, as such it is not district specific. Similarly, pedestrian and bicycle connections are not district specific as they will link not only between districts but will also provide access to regional trails and commuter routes stretching far beyond the site. Pedestrian and bicycle circulation will overcome the on-site barrier through the installation of pedestrian bridges across the CML corridor.

In the I-25 & Broadway Station District the existing light rail station, bus facility and commuter parking lots serve both the surrounding neighborhood and the broader commuting public. The importance of this station is anticipated to grow as this site grows to become a mid-town for the City and center for surrounding neighborhoods.

A continuous and direct north/south connection parallel to South Broadway will be important to this district. South Bannock Street will extend Bannock from the Denver Design Center site through the station area to a realigned Kentucky Avenue, continuing on to connect with Internal Street. This Bannock Street connection must also provide multi-modal access with a bike route and generous space for pedestrians. Additionally, the existing bus facility is envisioned to be relocated beneath I-25 to free up surrounding land for redevelopment options.

2.2 Consistency with Agency Plans
The Broadway Station Development project has worked closely with the on-going Station Area Plan adopted by the City and County of Denver. The IMP and development concept are also consistent with BluePrint Denver as an Area of Change. The Broadway Station Development project will continue to work with the City to align its plan with those adopted and in-progress plans.
Section 3 – Transportation System

3.0 Introduction
The transportation system is designed to not only support the needs of residents and businesses within the development, but also to improve connectivity to and through the site from the surrounding neighborhoods and regional facilities for all modes of transportation.

Goals for the transportation system were directly influenced by the I-25 & Broadway Station Area Plan and include the following:

- Provide better pedestrian and bike connectivity under I-25 and over the Consolidated Main Line and South Platte River and Mississippi Avenue, which are major regional barriers
- Provide an internal transportation network for all modes of traffic and to provide better first and last mile access to the rail station
- Design a transportation system that can accommodate anticipated development and is integrated into the existing transportation network.
- Identify surrounding infrastructure upgrades to accommodate the development and provide better connectivity to and through the site.
- Design roadways so they provide adequate site and fire access.

This Section provides information on existing conditions, design criteria, transportation improvements adjacent to the project, Internal Street design, and pedestrian and bike circulation.

3.1 Existing Transportation System
The project is accessed from the existing roadway network surrounding the site. South Broadway is a major six lane arterial located east of the site, Mississippi Avenue is a four lane arterial located to the south, and west of the site the Santa Fe couplet is an existing eight lane State Highway which is bisected by the South Platte River. Within the site is the I-25 & Broadway Station transit station which serves as a lightrail station, park and ride and bus route hub for RTD.

South Bannock Way and South Cherokee Street are all smaller local roadways that connect north (west side of the CML only) and south of the site (either side of the CML). In addition to the existing roadways, there are also existing unimproved rights-of-way within the site that will be petitioned to be vacated to accommodate the new internal roadway network. All surrounding roadways have deficient pedestrian and bicycle facilities, with the exception of the regional trail along the South Platte River and Broadway where it is adjacent to newer surrounding development. South Broadway from Kentucky Avenue to Arizona Ave and Mississippi Avenue from South Logan Street to the eastern side of the CML are scheduled to be improved by the City, beginning Spring 2016.

The existing intersections of South Broadway and West Arizona Avenue and South Santa Fe Drive and West Florida Avenue will be evaluated in the Filing level traffic impact studies. Additional monitoring at these intersections will be required at that time to confirm the assumptions made within the IMP traffic
impact study and to determine any additional demands upon these intersections caused by the Broadway Station Project.

3.2 Design Criteria
The transportation system has been designed to accommodate anticipated vehicular trip generation as detailed in the Transportation Impact Study (see Appendix). The proposed roadways were designed in accordance with the applicable design standards of the Colorado Department of Transportation, RTD and the City and County of Denver (CCD). Ownership and maintenance of the roadways will be determined primarily by environmental remediation factors, in compliance with the standards outlined in the City / Metropolitan District Intragovernmental Agreement (IGA). Streets that are located within City right-of-way will be designed and constructed to City standards or as amended by approved variance. Streets that are located within Metropolitan District tracts must meet the intent of this plan and comply with the UDSG.

3.3 Proposed Transportation System
The transportation system is designed to achieve the goals outlined above and within the I-25 & Broadway Station Area Plan. The project consists of select improvements to existing surrounding infrastructure and a new internal transportation network. Improvements to surrounding infrastructure include:

1. Acceleration/deceleration lanes along North bound Santa Fe from Mississippi to the new W. Kentucky intersection.
2. A left turn lane on S. Platte Drive north of Mississippi to the new W. Kentucky intersection.
3. A multi-modal bridge across the South Platte River at W. Kentucky Ave connecting the development on the east side of the river to the expanded Vanderbilt Park on the west side of the river.
4. A new connection from the multi-modal bridge to the South Platte River trail.
5. Two new pedestrian/bike bridges across the Central Main Line; one at approximately the I-25 & Broadway Station and one at approximately W. Tennessee Avenue.
6. Pedestrian improvements along Mississippi Avenue from the west end of the existing retaining wall on the north side of Mississippi, with connections to the north-south promenade system, Cherokee and Santa Fe intersections.
7. Broadway and Mississippi Avenue improvements are anticipated with the City's South Broadway Reconstruction, Arizona Avenue to Kentucky Avenue project. Anticipated Mississippi Avenue improvements will include pedestrian improvements east of the CML bridge.
8. Kentucky Avenue relocation as needed to accommodate regional traffic volumes on Broadway and circulation patterns coordinating with RTD Ownership Area redevelopment.
Exhibit 3.3B: Roadway Improvement illustrates the proposed improvements to the internal transportation network. Streets illustrated as “Proposed Publically Accessible Street (CCD Standard Section)” shall be constructed to Public Works CCD Standards. A variance has been approved (Variance 2015PM000429) for those portions of South Bannock Way and South Cherokee Street adjacent to the CML corridor, illustrated as “Proposed Publicly Accessible Street (CCD Standard Variance Approved)” as they are not designed to Public Works CCD Standards. Due to hazards associated with the rail corridor, a 32-foot flowline to flowline street width with parking on one side of the street is proposed for these streets. A minimum 25 foot clear zone for fire access shall be maintained on all streets. “Internal Street”, Hoye Street, and West Tennessee Avenue lying east of the CML are labeled in the exhibit as “Proposed Publically Accessible Street (non CCD Standard Section)”. These three streets will be Metropolitan District streets with the design of each being subject to the Urban Design Standards and Guidelines and adhering to minimum clearance widths for fire access. The Private Drive in the Office and Parkland District will provide multiple services including fire access, a service corridor, and a Denver Water easement.

The new on-site transportation network will consist primarily of two-lane local roadways with and without parking with additional turn lanes at key intersections as warranted by the Transportation Impact Study (See Appendix). The IMP focuses on the roadway infrastructure from curb-line to curb-line, while the Urban Design Standards and Guidelines focus on the design of the streetscape from the curb to the face of buildings and open spaces.

Due to the differing urban character of the development, there are three distinct character areas as it relates to street layout. The Market Place Mixed Use district is characterized by a gridded network with a smaller block size to promote pedestrian activity. This also includes the proposed Internal Street which is intended to be a curbless shared street for pedestrians, bicycles and vehicles.

Both the Office & Park District and Santa Fe Residential District are characterized by a larger block size in a semi-gridded street network that connects to Santa Fe to the west, Bannock Street to the south and Cherokee Drive to the north. This area features a system of multi-use trails designed to provide east/west connectivity from Broadway to the South Platte River and neighborhoods to the west.

The I-25 & Broadway Station District, when more fully designed, will focus on connectivity between I-25 & Broadway Station and South Broadway as well as neighborhoods to the north. It will also be an anchor for pedestrian and bike connectivity across the Central Main Line to the west. The Station Area Plan will further guide transportation access and movement through that District.
The following street sections are proposed for the project and are keyed to the cross-sections referenced on Exhibit 3.3B: Roadway Improvement. Additional standards and dimensions related to bicycle requirements, sidewalk, planting and streetscape widths and treatment are contained within the UDSG. Streets that are proposed Metropolitan District streets are denoted below with “District Tract” and can be changed to City right-of-way if modified to conform to City and County of Denver standards.

Exhibit 3.3C: Typical Sections - East Side Streets

- **Internal Street**

  ![Section A-A Diagram]

  ![Section B-B Diagram]

- **South Bannock Street on the RTD parcel** – To be determined with development of the RTD Ownership Area
• **South Bannock Way** – Parking and sidewalk to be provided on building side of street only. No parking or walk provided on side closest to rail.

![Diagram of South Bannock Way](image)

Section C-C

• **West Kentucky Avenue** – To be constructed with the redevelopment of the RTD Ownership Area or the Interstate 25 wedge ramp project.

• **West Tennessee Avenue (between S. Broadway and Internal Street)** – East and westbound on-street bike lanes to be provided. No parking or access allowed within this section of West Tennessee Avenue.

![Diagram of West Tennessee Avenue (between S. Broadway and Internal Street)](image)

Section D1-D1

• **West Tennessee Avenue (between Internal Street and S. Bannock Way)**

![Diagram of West Tennessee Avenue (between Internal Street and S. Bannock Way)](image)

Section E-E
• West Hoye Place

Exhibit 3.3D: Typical Sections - West Side Streets

- South Cherokee Street at Santa Fe Residential – Parking and sidewalk to be provided on building side of street only. No parking or walk provided on side closest to rail.

• West Tennessee Avenue

Section H-H
- **West Kentucky Avenue**

  ![Section J-J Diagram]

  **Section J-J**

- **South Cherokee Street at Office Park**

  ![Section O-O Diagram]

  **Section O-O**

- **West Kentucky Avenue at River Bridge**

  ![Section K-K Diagram]

  **Section K-K**
• South Platte River Drive

Section L-L

• South Santa Fe Drive

Section M-M
3.4 Pedestrian and Bicycle Connections

The pedestrian and bicycle systems are designed to bring people to the site as well as tie into regional connections to the north, south, east and west. Bicycle and pedestrian routes are instrumental in connecting the site to surrounding neighborhoods and enhance circulation within the site itself to foster a cohesive sense of neighborhood.

On-site north-south primary routes stretch from beneath the I-25 corridor through the site to Mississippi Ave and increase the number and convenience of local origin to destination connections on each side of the CML Corridor. Circulation at perimeter streets will further improve the pedestrian and bicycle connectivity around the site; especially improvements adjacent to the site running north-south along Santa Fe Drive and on Broadway.

East-west pedestrian and bicycle connections across the rail road tracks will be essential to site circulation and will also connect the surrounding east and west neighborhoods. The proposed northern pedestrian bridge provides regional connectivity from the neighborhoods west of Vanderbilt Park to I-25 & Broadway Station and from neighborhoods east of the site to the South Platte River Trail. In addition to complementing regional connections, the proposed southern bridge will bring vital energy to Internal Street by linking it to the proposed residences within the Santa Fe Residential District immediately adjacent to this area on the west side of the CML. The width of both bridges will allow ample room for heavy usage and design elements defined in the UDSG will ensure the bridges are highly functional. Public Utilities Commission, RTD, Union Pacific Railroad and the BNSF Railroad will be engaged for permitting and design and construction approval of the pedestrian bridges.

For commuters who prefer an at-/grade crossing, the pedestrian and bicycle connection will be improved along the northern side of Mississippi Avenue from Broadway to S. Santa Fe Drive. The City and County of Denver is improving that section east of the CML and BSP will improve that section west of the CML to Santa Fe along the north side of Mississippi. Improvements here can enhance the environmental experience but are limited to existing widths due to the prohibitive expense of widening the CML bridge.

In addition to north-south and east-west circulation routes on site, a bridge connection across the South Platte River at Kentucky Avenue will provide access between the site and the South Platte River Regional Trail. The regional trail links the site with the greater metro Denver area and neighboring municipalities. This regional connection together with local circulation patterns and site wide trails and routes allow the site to function as a link between multiple city neighborhoods. These site wide pedestrian and bicycle links are illustrated in Exhibits 3.4A Pedestrian Connections and 3.4B Bikeway Routes.
Urban Design details, pedestrian routes and bikeway classifications are provided in the UDSG.

**Pedestrian and Bicycle Underpass Connections**

Given the visual barriers of the RTD flyover and CDOT I-25 highway overpass it will be important to transform these unwelcoming spaces for pedestrians and cyclists. A variety of urban design techniques including lighting, hardscape, art installation and activation can be implemented beneath these structures. These concepts are discussed in greater detail in 7.0 Open Space and the Urban Design Standards and Guidelines.

Similarly, the treatment of the grade separated multi-use trail where Mississippi passes underneath the CML tracks is important to the pedestrian and bicycle experience in that confined space. Improvements to the Mississippi pedestrian and bicycle underpass will match the improvements completed by the city east of the CML and could include surface and railing replacement as well as lighting upgrades and art installation.

**Transit Lines**

I-25 and Broadway Station is an active regional light rail and bus hub. Heavily used light rail and bus routes are shown surrounding the site in Exhibit 3.4C: *Transit Lines*. Currently there are no additional routes that are planned for the site. Proposed redevelopment of the station will require that on site parking be accommodated according to the station requirements determined by RTD. Parking solutions will be explored as planning of the site progresses from preliminary design to final design. As the site is developed and the I-25 / Broadway Interchange is reconstructed, the access to the station will change over time from Ohio to Exposition Avenue for both the commuter and bus traffic. The Kentucky Avenue intersection will also be realigned and changing access will be improved. As these infrastructure improvements are constructed the access will need to be phased along with realignment of the access points to the station to allow the station to function efficiently and effectively throughout the phasing and lifecycle of the development.
Future roadway alignments and associated rights-of-way within the I-25 & Broadway Station District will be determined in coordination with redevelopment of the RTD Ownership area and the pedestrian connections will follow the same.
Future roadway alignments and associated rights-of-way within the I-25 & Broadway Station District will be determined in coordination with redevelopment of the RTD Ownership area and the bike routes will follow the same.

Note: Bikeroute classification types are located and defined in the Urban Design Standards and Guidelines.
Future roadway alignments and associated rights-of-way within the I-25 & Broadway Station District will be determined in coordination with redevelopment of the RTD Ownership area and the transit lines will follow the same.

3.4C TRANSIT LINES

Light Rail Station

Bus Access (approximate location - actual route to be determined by RTD)

Light Rail

Bus Route

Project Boundary
3.5 Conclusions

Preliminary and Final Design
Preliminary and final design of the transportation system shall be in accordance with the City and County of Denver standards (with approved variances), Colorado Department of Transportation standards, RTD Bus and Lightrail standards, the requirements of the UP and BNSF railroads and related criteria as well as the regional travel demands and forecast models. Roadways intended to be owned and maintained by the Metropolitan District may provide for slight on-street parking and design deviations. The system will need to be designed in phases to accommodate the vertical development, and temporary facilities may need to be constructed to accommodate future phasing.

Summary
Redevelopment of the former Gates Factory site provides a unique opportunity to remove barriers that hinder local and regional connectivity to and through the site. Internal circulation within the site will be critical to providing access and service to the development.
Section 4: Water Supply and Distribution System

4.0 Introduction
This section describes the proposed water system improvements required to serve the Broadway Station development with potable water service and irrigation supply; as well as fire flow protection to both the new structures and proposed fire hydrants. Several new 12-inch water distribution mains are proposed to be constructed beneath the proposed streets. Where new water lines are proposed outside of public right-of-way, easements will be provided in accordance with Denver Water standards. The new water lines will connect to the existing Denver Water system at several locations along the perimeter of the project to provide the necessary system required to provide adequate main line pressures and redundancies for a reliable, continuous supply of water to the project.

4.1 Existing Water Distribution Facilities
The existing water system bordering the project includes:

- South - 12-inch and 30-inch (Conduit No. 61) in Mississippi Avenue
- North – 6-inch north of the I-25 overpass
- East - 12-inch and 30-inch (Conduit No. 61) in South Broadway
- West – 12-inch in South Santa Fe Drive
- Vanderbilt Park – 8-inch in South Huron Street and South Platte River Drive.

Internal to the site most of the existing water system has been abandoned. There is an extension of the 12-inch line in Santa Fe that is located in the Cherokee Street and Ohio Avenue rights of way.

4.2 Design Criteria
All design of the new water distribution system is required to be in accordance with the latest edition of the Denver Water Board Engineering Standards.

4.3 Proposed Distribution System Layout
The design team met with Denver Water to determine if there were any planned water system upgrades within the project limits or adjacent to the project. At this time, Denver Water has no upgrades planned within the project area or surrounding areas, and therefore, none have been included in this plan. However there is a plan to relocate Conduit No. 61 in Mississippi Avenue, from north of the bridge walls to within the roadway. The entire site lies within the same hydraulic zone, and no pressure regulating valves are anticipated in the proposed system. All new distribution lines will be located to match the proposed roadway alignments and site layout in order to provide the necessary pressure and flows to the proposed buildings. All existing water lines within the project limits, which are undersized or in
conflict with the proposed improvements, will be removed or abandoned per Denver Water Standards. Based on the anticipated demands at the time of this IMP, the proposed water distribution network is envisioned to include the following:

- Main Extensions
  - Tennessee Avenue: Broadway to South Bannock Way – 12-inch
  - Hoye Place: Broadway to South Bannock Way – 12-inch
  - Acoma Street: Mississippi Avenue to Kentucky Avenue – 12-inch
  - Bannock Street: Mississippi Avenue to Interstate 25 – 12-inch
  - Tennessee Avenue: Santa Fe Drive to South Cherokee Street – 12-inch
  - Kentucky Avenue / Cherokee Street: Santa Fe Drive to Interstate 25 – 12-inch
    - Relocated line in existing Cherokee Street right-of-way.
  - Mississippi Avenue: Santa Fe Drive to South Cherokee Street – 12-inch
  - CML / LRT Crossing: South Bannock Way to Bannock Street – 12-inch

The proposed distribution network described above is illustrated in Exhibit 4.3A: Water Improvements

**Fire Protection**
The City and County of Denver will continue to provide fire protection service for Broadway Station. All fire protection for the site will need to meet the requirements of the International Fire Code as amended. Exhibit 4.3A shows preliminary location of all fire hydrants. Specific locations of fire hydrants will be located as part of the detailed engineering design for the project and future site development plans for vertical construction. Locations of fire hydrants will be approved by the Denver Fire Department and fire hydrants will be consistent with the most current Denver Water Standards. Additional hydrants may be needed depending on building construction type to meet code requirements. Automatic sprinkler systems will be installed in most if not all of the buildings on the site as required by the Denver Building and Fire Code.

**4.4 Conclusions**

**Final Design**
Final design of the water distribution system must be in accordance with Denver Water Board Engineering Standards and related criteria as well as all applicable International Fire Code that has been adopted by the City and County of Denver. All proposed mains will be required to be located in City and County of Denver right-of-way or easements dedicated to Denver Water per applicable standards.

**Summary**
With the proposed redevelopment of the Broadway Station site there will need to be a complete internal distribution system constructed for each area of the project. It is anticipated at this time that there will not be any upgrades required to the existing system adjacent to the project. As the project moves to final design additional coordination will be required with Denver Water.

It is anticipated that the project will be phased and construction of the water lines will need to follow the phasing of the project. The water system will need to be constructed to provide the service required by the projected demands of each building and the proposed uses. The water system will also need to meet the required fire flow demands required for fire protection of all proposed structures.
1. All existing utilities are shown for information only.
2. All proposed water mains are 12" unless otherwise noted.
3. Future roadway alignments and associated pipe-wa
   dy under the BLD & Broadway Station district will be determined in consultation with the City of Denver and the water lines will follow the same.

CONNECT TO EX. 8" AT S. HURON ST.
CONNECT TO EX. 8" IN S. PLATTE RIVER DR.

* SEE NOTE 3

DATE: MAY 2016

INFRASTRUCTURE MASTER PLAN
EXHIBIT 4.3A: WATER IMPROVEMENT

SCALE: 1" = 200 FEET
Section 5: Wastewater Collection System

5.0 Introduction
This section describes the improvements for the wastewater collection system required to service the proposed Broadway Station development based on the projected uses. Proposed sanitary sewer lines will be located to collect wastewater effluent from the proposed buildings within the site and will outfall to the existing Denver Wastewater system located on the east side of Santa Fe Drive and within the South Cherokee Street right-of-way which flows north along the east side of Vanderbilt Park East.

All wastewater flows will be treated by Metro Wastewater Reclamation District (MWRD). The flows will be conveyed to the MWRD collector along the alignment of Interstate 25 at the northwest side of the site.

5.1 Existing Wastewater Collection System
There are two major trunk lines that serve the site and surrounding neighborhoods. MWRD owns and maintains the collector that parallels Interstate 25 and runs along the north side of the project site. The pipe is a 27-inch PVC and a 36-inch RCP that conveys the flows to the north. In addition to the MWRD collector there is also a 30-inch collector owned and maintained by the City and County of Denver. The CCD collector is located in the existing Cherokee Street right-of-way. The Denver system carries flows north and connects to the MWRD 30-inch pipe. The collector carries flows to the north to a larger interceptor system and eventually to the MWRD treatment plant.

Internal to the site most of the existing sanitary sewer lines have been abandoned. Services for the existing buildings were removed and abandoned when the buildings were demolished.

5.2 Design Criteria
Design calculations for the wastewater demands and peak flow calculations are detailed in the Infrastructure Master Plan Sanitary Sewer Report Appendix. The preliminary pipe sizes and design are also detailed in the report. All design will need to comply with the latest Denver Wastewater Management Divisions standards.

5.3 Proposed Collection System Layout
The proposed system is illustrated in Exhibit 5.3A Sanitary Sewer Improvement. It has been laid out for two basins; one basin for the I-25 & Broadway Station District, and another for the remainder of the site. The RTD site continues to flow to the north to the existing MWRD 27-inch collector system. The RTD parcel and its storm system will be put in place when those parcels are redeveloped.

The remainder of the east side of the site is collected by an internal collection system that connects to an existing sanitary sewer that crosses the LRT/CML along the extended alignment of Tennessee Avenue. Prior to reuse of the existing system, a condition assessment will be done to determine that the line is acceptable for reuse. Once the line has been inspected it will be lined per CCD standards and accepted by the City. The development parcel south of Tennessee Avenue is collected by the same system and ties into an existing CCD 34-inch brick collection system at the intersection of Santa Fe and Tennessee Avenue. The blocks that are serviced by this system are:
• Blocks 2-6 Mixed Use (Residential / Retail)

The remainder of the site, west of the rail, includes the development north of Tennessee Avenue on the west parcel. Flows are collected by a proposed sanitary sewer collection system within the new rights-of-ways. The proposed system also ties into the same existing CCD 34-inch brick system just north of Kentucky Avenue.

• Blocks 7-8 Mixed Use (Residential)
• Blocks 9 – 10 (Office / Parking / Retail)

The flow will be conveyed north through the site in the CCD collector to the MWRD collector on the north end of the site.

Block 11 will be conveyed to an existing sanitary sewer within Tennessee Avenue that flows to the west.

5.4 Graywater Reuse
The State Plumbing Board has adopted the 2015 International Plumbing and Residential Codes, including sections related to graywater reuse, as has the City of Denver. Vertical developers may elect to utilize internal graywater systems per the adopted rules and regulations of Colorado Department of Public Health and Environment. In the event CCD is successful in developing and constructing a reliable recycled purple pipe system adjacent to the project, future planning efforts may include connection to this system as an alternative implementation of water use.

5.5 Conclusions
Final Design
Final design of the wastewater collection system must be in accordance with the City and County of Denver Wastewater Management Division Engineering Standards and related criteria. All proposed lines will be required to be located in City and County of Denver right-of-way or easements dedicated to the City in accordance with CCD standards. Connections to the MWRD system will be in accordance and approved by the District.

Summary
With the redevelopment of the Broadway Station site there will need to be a complete internal sanitary sewer collection system constructed. It is anticipated at this time that there will not be any upgrades required to the existing system adjacent to the project. As the project moves to final design additional coordination will be required with the City and County of Denver.

It is anticipated that the project will be phased and construction of the wastewater system will need to follow the phasing of the project. The wastewater system will need to be constructed to provide service to the buildings. As a result of phased construction, it is anticipated that interim connections to the existing system may be necessary to provide interim service prior to completion of the entire collection system.
Section 6: Drainage

6.0 Introduction
Drainage from the site generally flows from the east toward the west to the South Platte River. The major barrier to drainage is the CML that prevents flow from the east district of the site to the west. Therefore, the 100-year event will need to be conveyed across the rail from the east district to the west district.

6.1 Background
Studies
The City has studied the area at a Master Plan level through the City and County of Denver Storm Drainage Master Plan (September 2014). The Project is located within three of the CCD Storm Drainage Master Plan (September 2014) basins; West Washington Park (5000-01), University and Mexico South (5000-03), and Valverde (0064-02). The northeast area of the project area ultimately flows to the northwest and outfalls to the South Platte River, the west side of the project area flows west and north and outfalls to the South Platte River. The area west of South Platte Drive flows into Vanderbilt Lake, which outfalls directly into the South Platte River. In the master plan there are no system wide improvements described within the project limits. A separate site specific Infrastructure Master Plan Drainage Report has been prepared that details the proposed stormwater master plan and detention concepts associated with the proposed development.

Site Drainage Criteria
Urban redevelopment projects require a comprehensive evaluation of the onsite and offsite drainage and integration with the other site infrastructure. Key principles for the site drainage of the project are:

- Provide a major storm conveyance system from the east district to the west and a conveyance to the South Platte River.
- Based on the program and space limitations of the site, 100-year detention volume will be difficult to provide. With the proximity of the site to the South Platte River, the project will rely upon passing the 100-yr storm event in order to “beat the peak” of flood waters within the river. A variance to the CCD Storm Drainage Design & Technical Criteria Section 13 with a request to waive 100-year detention is on file.
- Excess Urban Runoff Volume (EURV) will be provided in-lieu of the 100-year detention volume storage for the project. This will provide water quality treatment and release smaller storm events near historic levels. The EURV is in lieu of the 10-year storm and water quality.
- Develop an integrated water quality treatment methodology for the site. Include end of pipe treatment as well as decentralized site specific Low Impact Development (LID) strategies.

6.2 Design Criteria
Drainage improvements to the site will be required to follow the City and County of Denver and Urban Drainage and Flood Control District standards. Improvements within the South Platte River and at the proposed Kentucky Avenue Bridge will require coordination with the US Army Corps of Engineers and Federal Emergency Management Agency (FEMA). Prior to construction of these improvements, a
Conditional Letter of Map Revision (CLOMR) will be required at the location where there will be crossings of the river or improvements to the river itself. Upon completion of these improvements, a final Letter of Map Revision (LOMR) will also be required.

6.3 Major Drainage Basins

Major Drainage and Floodplains

A portion of the Project west of the South Platte River is located within a FEMA regulated floodplain (Zone AO) based on the Flood Insurance Rate Map (FIRM) Number 0800460203H, last revised November 20, 2013. See the end of this section for a copy of the FIRM. Development within the floodplain must meet the requirements of the City & County of Denver Floodplain Ordinance (DRMC 56-200 through 56-206), which includes flood protection requirements for new buildings.

6.4 Drainage Sub Basins

Historic Drainage Patterns

As previously discussed, the project is located in a portion of Basin 5000-01, 5000-03 and 0064-02 in the City and County of Denver Drainage Master Plan. The existing basin east of the rail line and north of Kentucky Avenue is collected by multiple inlets and conveyed to the north to the existing RTD detention pond before passing through multiple outfalls that carry flows to the South Platte River. South of Kentucky Avenue on the east side of the rail line, flows are conveyed to the south to Mississippi Avenue then west to the river. West of the rail line and east of Santa Fe Drive, overland flows progress toward the highway and are collected in a series of culverts that discharge the flows to the river. West of the river, the effective floodplain is a result of Sanderson Gulch not having adequate capacity. Block 11 lies within this Zone AO flood hazard area. Flood protection, in accordance with the City & County of Denver Floodplain Ordinance, will be required on this block to ensure the proposed building is protected from Sanderson Gulch overflows.

Onsite and Offsite Basins

The plan for the Project splits the developed area into five main onsite basins that are detained and treated by five ponds, illustrated in Exhibit 6.4A: Drainage Improvement.

The RTD pond currently detains and treats the flows from the I-25 & Broadway Station, north of Kentucky Avenue, as well as CDOT flows from I-25. Required stormwater storage will be provided to serve the I-25 & Broadway Station District in coordination with the redevelopment of the RTD Ownership Area. The I-25 & Broadway Station District will continue to drain to the north. Depending upon potential developments to the north, the area will either continue to drain to the existing detention pond north of I-25, or a new pond or underground detention vault will be required at the time the existing pond is removed.

Flows from the Market Place Mixed Use District, will be collected through a system of inlets and storm sewer pipe. The flows will be conveyed west through an existing 8-ft x 8-ft box culvert under the rail. The existing box will be inspected and a condition assessment will be provided. The box will then be sealed as part of the drainage improvements. The proposed storm sewer improvements within the box will be prepared in accordance with City and County of Denver Wastewater standards and will be
submitted to the City, Union Pacific Railroad, Burlington Northern Santa Fe Railroad, RTD and the Public Utilities Commission for review, approval and necessary agreements. The District will be responsible for maintenance of the box and related improvements. From the box, drainage will be conveyed via pipe to Pond C, which provides the excess urban runoff volume (EURV).

The Santa Fe Residential District flows will be collected by a system of inlets and pipes. Storm water will be routed to and treated in both Ponds B and C through EURV release structures prior to release to the South Platte River.

The Office and Parkland District will be collected via a system of inlets and pipes and conveyed to Pond A. Pond A will provide treatment of the storm water through an EURV release structure prior to outfalling to the South Platte River. The pond concept located within Vanderbilt Park East has not been approved by CCD at this time. As a result the final location of this pond may move to another location(s) during the final design review process.

Development in Block 11, west of South Platte Drive, will flow to the EURV Pond D and discharge into the South Platte River.

The new proposed outfalls to the South Platte River will need to be reviewed and approved by Urban Drainage and Flood Control District. As the design is coordinated with UDFCD additional permits from USACE will be required. New outfalls must consider impacts to the regulatory floodplain, and will require a floodplain use permit from the City.

6.5 Hydrology

Design Rainfall
The hydrologic criteria to be used during the final drainage design of this project will be in compliance with UDFCD and CCD, which includes the one-hour precipitation values, as shown in Table 2.

<table>
<thead>
<tr>
<th>Storm Event (years)</th>
<th>2</th>
<th>5</th>
<th>10</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rainfall Depth (inches)</td>
<td>0.95</td>
<td>1.34</td>
<td>1.55</td>
<td>2.57</td>
</tr>
</tbody>
</table>

Source: CCD Storm Criteria Table 5.1

Hydrologic Soil Group
The hydrologic soil group assumed for the initial Master Plan and the analysis within this report was type C soil. A soils and geotechnical report will need to be completed with subsequent phases for the Project for a more detailed analysis of the soil types throughout the Project.

Detention Discharge and Storage Calculation Method
Due to the proximity of the Project to the South Platte River, the overall approach to detention is to provide the Excess Urban Runoff Volume (EURV) for the developed area. While this method does not provide 100-year detention, it provides a more accurate historic discharge rate for regularly occurring storm events. Because the runoff from larger events will reach the South Platte River ahead of the peak flows for the South Platte River basin; it is more advantageous to provide historic release rates for the smaller events, and allow the larger events to enter the river without 100-year detention. As design
progresses, consideration will need to be given to the depth of the groundwater as it relates to the depth of the pond. Ponds within the groundwater may need to be lined as required by Volume 3 of the UDFCD standards to eliminate possible infiltration into the pond from contaminated groundwater.

**Design Storm Recurrence Intervals**

The storm sewer system will be designed to accommodate multiple storm events. Because of the need for the runoff to be safely conveyed across the railroad tracks to the South Platte River, the main outfall systems will be sized to convey the 100-year event, for the remainder of the site the minimum design requirement is for the 5-year event.

**6.6 Water Quality Best Management Practices**

**Design Procedures for Water Quality**

Water quality for the Project will be provided for all new improvements through end of pipe treatment with ponds designed to provide EURV storage and water quality treatment, in accordance with the Urban Drainage and Flood Control Manual design criteria. Due to previously discussed proximity of the site to the South Platte River, the project will rely upon passing the 100-yr storm event in order to “beat the peak” of flood waters within the river and the ponds will be sized accordingly to hold the Excess Urban Runoff Volume. A variance to the CCD Storm Drainage Design & Technical Criteria Section 13 to waive 100-year detention in these ponds, while still providing the required EURV treatment is on file.

**Permanent BMPs**

Where possible within the site, decentralized water quality treatment methods should be provided per best management practices. As design advances the CCD Ultra-Urban Green Infrastructure Guidelines should be reviewed and the practices described in the guidelines should be implemented when possible. Due to the co-mingling of treated and untreated water within the storm sewer system, the end of pipe EURV ponds are recommended as described above. During the final design, it may be determined that the end of pipe EURV sizes may be reduced based on the different treatments provided upstream. A separate treated water outfall should also be considered where possible to prevent co-mingling with untreated water and allowing for a larger portion of the off-site basin to be treated within the EURV ponds.
6.7 Floodplain

**Proposed Improvements**

As previously discussed the portion of the development west of the South Platte River that is within the floodplain must meet the requirements of the City & County of Denver Floodplain Ordinance (DRMC 56-200 through 56-206), which includes flood protection requirements for new buildings.

In addition to the proposed development, a multi-modal bridge will be constructed to connect south bound South Platte River Drive to the site and to connect pedestrians and bicycles to the South Platte River trail. Regional trail improvements corresponding with the bridge construction will impact the floodplain and will need to be analyzed. A Conditional Letter of Map Revision (CLOMR) will need to be prepared and approved as part of the design and a post project Letter of Map Revisions (LOMR) prepared to revise the floodplain mapping accordingly. The proposed West Kentucky Avenue Bridge will need to meet the minimum freeboard criteria of the City and County of Denver over the 100-year water surface elevation.
Section 7: Parks and Open Space

7.0 Parks and Open Space Concept
The framework of open space at Broadway Station brings connectivity to a site that is currently severed by heavily trafficked arterial roads, the CML corridor, and the South Platte River. The open space framework will be a system of interconnected public spaces that include plazas, parks and promenades. These spaces will link surrounding neighborhoods from all directions and enhance the experience of pedestrians and bicyclists. They will create new destinations and community gathering spaces within the site, support wildlife habitat and migration, and contribute to a distinctive site identity.

The open space in the Market Place Mixed-Use District and the I-25 & Broadway Station District will feel urban and plaza-like, while the open space to the west of the CML will have a park-like character reflective of the river corridor along which it is oriented. The bridges between these two areas will combine the two aesthetics with unique urban park crossings over the rail corridor. All open spaces will be publicly accessible and will serve the residents and workers within the mixed use community as well as neighboring communities. Design of the Vanderbilt Park Parcel and Vanderbilt Park East will be done in coordination with Denver Parks and Recreation and will follow design requirements of Denver Parks and Recreation for any dedicated parks. Detailed regulatory guidance and minimum design requirements for other Parks and Open Space, including the Santa Fe Promenade and North Market Plaza, will be determined in the Urban Design Standards and Guidelines.

7.1 Minimum Open Space Requirement
A minimum of 10% of the net development area shall be open space. The net development area is illustrated in the Exhibit 7.1A: Net Development Area and is determined by subtracting street area from the gross area according to the following parameters:

1. Private streets and private access fire drives are not subtracted from the gross area.
2. Streets owned by the Metro District with public access easements are subtracted from the gross area.
3. Dedicated ROW or ROW easements are subtracted from the gross area.

The 10% open space is achieved as a site wide calculation and is not district specific. In order to qualify as open space contributing to the 10% open space requirement, areas must meet the following criteria:

- Be provided in one or more areas
- Must remain publicly accessible and usable
- Shall result in one or more of the following public benefits:
  - Enhanced Connections to transit facility, plazas, or streets;
  - Enhanced pedestrian environments; and/or
  - Enhances or creates public spaces.

Areas contributing to the open space requirement are illustrated in the Exhibit 7.1B: Open Space Calculations. In some cases only partial credit is given if open space constraints such as detention
facilities are proposed within the open space. The areas comprising partial or fully credited open space are listed below, with an explanation or partial credit calculations where applicable.

**Santa Fe Promenade**
Santa Fe Promenade will be a multi-use trail with a landscape strip adjacent to the berming that provides a buffer for future residential uses from the high intensity arterial nature of the Santa Fe Couplet. The trail provides a connection from the W Kentucky Avenue and S Santa Fe Drive intersection to the Mississippi Avenue underpass. Area credited towards open space will consist of a minimum width of 12', including the multi-use path. To meet the open space requirement it will be publicly accessible and will enhance connections to both the existing and proposed street network and enhance the pedestrian environments. Beyond the multi-use path, the berms and detention areas will incorporate native plant palettes that contribute to wildlife habitat and enrich the pedestrian experience. However, the berming, detention area and land between detention and the Santa Fe roadway is not credited as open space. The amount of land credited as open space can be increased by increasing the width of non-detention landscape adjacent to the multi-use path. Specific design guidance for the Santa Fe Promenade is expanded upon in the Urban Design Standards and Guidelines.

**Vanderbilt Park Parcel**
The Vanderbilt Park addition provides a missing piece of open space between the existing active use park improvements to the west, the Regional Platte River Trail improvements including Johnson Habitat Park to the North, the future Vanderbilt Park East, and the new mixed-use development to the east. The southeast of the parcel will align with the planned Kentucky Bridge over the South Platte River to provide a public connection into Vanderbilt Park. It will be publicly accessible and meet the criteria of enhancing and creating public space as well as providing enhanced connections to the South Platte River trail.

**Vanderbilt Park East**
Vanderbilt Park East is a publicly owned and designated park that is currently vacant and unimproved but will be transformed into an iconic open space. It will serve the broader neighborhood’s recreational uses and will include large areas of lawn to accommodate informal games and activities. The park promenade edge provides an enhanced pedestrian experience along South Cherokee Street and provides space for seating, community events and street side festivals. Paths through the park will connect points north, south and west to I-25 & Broadway Station via the north pedestrian bridge. Water quality practices including a detention pond with a landscape buffer will create an attractive edge along Santa Fe Blvd and provide additional foraging and resting ground for birds migrating through the South Platte River corridor. The pond concept located within Vanderbilt Park East has not been approved by CCD at this time. As a result the final location of this pond may move to another location(s) during the final design review process. The southwest corner of the park will serve as the connecting point for bicycles and pedestrians to cross the Santa Fe Couplet on the proposed Kentucky Avenue Bridge. Vanderbilt Park East will be publicly accessible and will meet open space criteria for enhanced connections to a transit facility, for enhanced connections to a street, and for enhanced pedestrian environment and the creation of public spaces.
Vanderbilt Park East is a partially credited open space area. The proposed design and construction of improvements within the vacant and undeveloped Vanderbilt Park East shall receive a partial open space credit equal to 50% of the net park area. The net park area shall be considered the gross area of the park minus that portion of the park occupied by the water surface area of the proposed drainage pond, Pond A, as shown in Exhibit 6.4A Drainage Improvement to be constructed within Vanderbilt Park East. Pond A is subject to a separate agreement between the City and BSP which must be approved by City Council.

The parcel lying immediately southeast of Vanderbilt Park East and northwest of the proposed West Kentucky Avenue is envisioned as an integral part of Vanderbilt Park East in both function and appearance. It will complete park trail connections and include a paved plaza oriented around the north pedestrian bridge stairway. The paved plaza will celebrate the north pedestrian bridge as the gateway to the grade separated connection over the CML corridor with direct access to I-25 & Broadway Station.

The parcel lying immediately southeast of Vanderbilt Park East and northwest of the proposed West Kentucky Avenue shall receive a partial open space credit based upon 100% of the gross parcel land area less any portions of the parcel occupied by the structural components of the bridge, elevator and bridge stairway within this parcel. Any portion of the stairway near the base of the stairs which serves as plaza, seating or provides other public use shall be included as 100% open space credit. If a detention pond is located in this parcel, that portion of the park occupied by the water surface area of the drainage pond proposed shall also be deducted from the gross area.

**North Market Plaza**

Gathering, seating and landscaping areas will be incorporated into North Market Plaza to create a common neighborhood space that is anchored by the public sidewalk on Internal Street. The plaza will extend underneath the RTD flyover, providing a pedestrian scaled hardscape passageway to facilitate pedestrian movement to and from I-25 & Broadway Station. Area in this plaza is fully credited towards the open space requirement and may include decorative hardscape, landscape, furnishing, art and lighting elements. However credited space must include a main plaza area that is a minimum of 55’ long and 40’ wide and it must be connected to an area that is a minimum of 10’ wide running adjacent to the sidewalk on Internal Street. The areas of the public sidewalk on Internal Street and S Bannock Way do not count toward the open space area. The area credited towards open space can be increased by increasing the width of open space adjacent to the sidewalk. The plaza will be publicly accessible and meet the criteria for creating public space and for enhancing pedestrian environments. Specific design guidance for North Market Plaza is expanded upon in the Urban Design Standards and Guidelines.

**RTD Ownership Area & Streetscape**

At the time of redevelopment of the RTD Ownership Area, the proposed development will be required to provide 10% of the net developable area as a publicly accessible open space meeting the city criteria for open space credit. However, the 1.84 acres that is owned by BSP within the I-25 & Broadway Station District is included in the gross area calculation for open space provided herein and may be excluded from the gross area calculation for open space associated with the RTD Ownership Area.
7.2 Bonus Open Space

Certain areas of the site will be publicly accessible improved outdoor areas, but are not included in the calculation of open space credited to meet the 10% open space requirement. These spaces include:

**Internal Street Enhanced Streetscape**
Internal Street will be a private curbless shared street where the impact of vehicular traffic is minimized to enhance the bicycle and pedestrian experience. In this retail oriented district, the articulation of architectural facades will accommodate outdoor cafes, live-work and gallery spaces and informal seating areas for residents and visitors to congregate.

**Pedestrian Bridges**
In addition to providing passage across the CML, pedestrian bridges over the rail corridor will be gathering and view point areas. They will include amenity zones that provide seating and rest points oriented towards the Denver skyline and Front Range views. The bridge areas will be publicly accessible by stairs and elevators and will incorporate richly textured plantings.

**W Kentucky Bridge & Platte River Trail Connection**
This publicly accessible bridge across the South Platte River will provide a park-like passageway that connects to the regional South Platte River Trail by an at grade ramp down to the existing trail at the river’s edge.

**Rail Corridor Landscape Buffer**
A stretch of heavily planted landscape will buffer the south west corner of the site from train activity in the CML corridor. This buffer will provide an enhanced streetscape to S. Cherokee St as it approaches the S. Bannock St Bridge over Mississippi Ave.

**South Pedestrian Bridge Plaza**
A plaza at the east end of the south pedestrian bridge will enhance the pedestrian experience leading up to the bridge from Internal Street. It will provide clear continuous pedestrian access to the bridge from Internal Street and clearly connect the bridge to the Santa Fe Promenade and W Tennessee Ave.
BROADWAY STATION
DATE: MAY 2016
INFRASTRUCTURE MASTER PLAN
EXHIBIT 7.1 A: NET DEVELOPMENT AREA

NET DEVELOPMENT AREA
(AFTER ROW VACATIONS AND LAND TRANSFERS)

LEGEND

- TOTAL PROJECT AREA: 58.901 AC
- VANDERBILT PARK EAST: 3.891 AC
- RTD OWNERSHIP AREA*: 11.265 AC
- PROPOSED PUBLICLY ACCESSIBLE STREET: 10.487 AC
- NET DEVELOPMENT AREA: 33.258 AC

*(EXCLUSIVE OF RTD OWNERSHIP AREA)

NOTES:
1. When developed, the RTD Ownership area will be required to provide 10% of the net developable area as open space. However, the 1.84 acre parcel owned by BSP within the I-25 & Broadway Station District is included in the gross area calculation for open space provided hereon and may be excluded from the gross area calculation for open space associated with the RTD sub-area.
2. Pond A is conditionally approved subject to separate agreement and City Council approval.

### Open Space Calculations

<table>
<thead>
<tr>
<th>Space</th>
<th>Title</th>
<th>Gross Area (AC)</th>
<th>Credited Area (AC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Santa Fe Promenade (South)</td>
<td>1.03</td>
<td>0.16</td>
</tr>
<tr>
<td></td>
<td>Credit Area = Gross - 0.87 Ac Detention Area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Santa Fe Promenade (North)</td>
<td>0.79</td>
<td>0.16</td>
</tr>
<tr>
<td></td>
<td>Credit Area = Gross - 0.63 Ac Detention Area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>North Pedestrian Bridge Plaza/Park</td>
<td>1.34</td>
<td>1.20</td>
</tr>
<tr>
<td></td>
<td>Credit Area = Parcel Gross Area - Bridge &amp; Stairway Area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Vanderbilt Park East</td>
<td>3.89</td>
<td>1.53</td>
</tr>
<tr>
<td></td>
<td>Credit Area = (Vanderbilt Park East Area - 0.83 Ac Detention Area) x 50%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Vanderbilt Park Connection</td>
<td>0.50</td>
<td>0.50</td>
</tr>
<tr>
<td>6</td>
<td>North Market Place Plaza</td>
<td>0.37</td>
<td>0.17</td>
</tr>
<tr>
<td>7</td>
<td>Platte River Trail Connections</td>
<td>0.43</td>
<td>0</td>
</tr>
<tr>
<td>8</td>
<td>South Ped Bridge Plazas</td>
<td>0.32</td>
<td>0</td>
</tr>
<tr>
<td>9</td>
<td>Rail Corridor Buffer</td>
<td>0.31</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
<td>South Pedestrian Bridge/Park</td>
<td>0.28</td>
<td>0</td>
</tr>
<tr>
<td>11</td>
<td>North Pedestrian Bridge/Park</td>
<td>0.6</td>
<td>0</td>
</tr>
<tr>
<td>12</td>
<td>Internal Street Enhanced Streetscape</td>
<td>0.84</td>
<td>0</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td></td>
<td><strong>30.7</strong></td>
<td><strong>3.72</strong></td>
</tr>
</tbody>
</table>

**IMP Net Area**

- Open Space Required (10% of IMP Net Area) = 33.258 Acres
- Bonus Project Open Space = 6.98 Acres
- Total Open Space Credit Provided = 3.72 Acres

---

**For Information Only**
Section 8: Project Phasing

8.0 Introduction
A project of this scale and mix of use needs to be flexible to respond to varying market conditions and the development needs of the project. The site has been broken up into four sub-area districts, Market Place Mixed-Use District, Santa Fe Residential District, Office and Parkland District, and I-25 & Broadway Station District. Development within each sub-area district can be separated into sub phases with the requirement that all waterlines will need to be looped to provide service, and interim connections may be needed for sanitary sewer. Interim drainage improvements may also need to be constructed in any phased approach. Two points of fire access shall be required for every subphase. These requirements will be evaluated when site development plans are submitted to the City and determined according to the demands of the phasing.

8.1 Infrastructure Phasing
Infrastructure will need to be constructed to support any vertical development, however the type of infrastructure varies within each district and the intensity of the required infrastructure is dependent upon the mix of uses and location of subphasing within the district. The unique infrastructure needs of development phasing in each districts is summarized in:

- Exhibit 8.1A: Broadway Plaza District Phasing
- Exhibit 8.1B: Market Place Mixed-Use District Phasing
- Exhibit 8.1C: Santa Fe Residential District Phasing
- Exhibit 8.1D: Office & Parkland District Phasing

The exhibits illustrate phasing elements graphically and notate triggers of infrastructure development as phasing progresses. ‘Infrastructure’ in these phasing diagrams is inclusive of open space and bike/pedestrian connectivity needs. Infrastructure outside of each phase’s boundary will be determined at the filing level.
DEVELOPMENT PHASING NOTES:

OPEN SPACE:
- Plazas within the district will be constructed with any adjacent vertical development.

DRAINAGE:
- The outfall from the district will flow the existing outfall near I-25. Detention and water quality will need to be provided.

SANITARY SEWER:
- The outfall from the district will connect to the existing metro wastewater collector. Approval from MWAQ will be required for connection.

WATER:
- (2) connections to the existing water system and a looped system will need to be constructed with the phase.
- Fire hydrant locations will need be approved by the Denver Fire Department as part of the site plan approval.

ROADWAY:
- Future roadway and associated rights-of-way within the I-25 & Broadway Station district will be determined in coordination with the redevelopment of the RTD ownership area and the utilities will follow the same.
- (2) connections to the existing roadway system will be required to provide fire access to the site.

- A supplemental traffic impact study will be required for each site development plan.
- West Kentucky Avenue will be required to be reconfigured in coordination with RTD and the associated redevelopment of the I-25 & Broadway Station Park-N-Ride.

GENERAL:
- Sub phases of the development will need to be evaluated on a site plan basis.

LEGEND:
- PROPOSED OPEN SPACE DEVELOPMENT
- PROPOSED C-MX 12 ZONED DEVELOPMENT
- PROPOSED ROADWAY
- EXISTING POND
- IMP BOUNDARY

BROADWAY STATION
INFRASTRUCTURE MASTER PLAN
EXHIBIT E-T-396 & BROADWAY STATION DISTRICT phasing
DATE: MAY 2016

CONNECT TO EXIST SANITARY SEWER
CONNECT TO EXIST WATER
EXISTING POND

I-25 & BROADWAY STATION

EXHIBIT E-T-396 & BROADWAY STATION DISTRICT phasing
DATE: MAY 2016
DEVELOPMENT PHASING NOTES:

OPEN SPACE:
- Plazas within the district will be constructed with any adjacent vertical development.

DRAINAGE:
- The outfall from the market place mixed use district to the proposed water quality facility in the South Promenade. The pond will include area from block 7 in future phases.

SANITARY SEWER:
- The outfall from the the market place mixed use district will connect to the south to the existing system along the north side of Mississippi Ave.

WATER:
- (3) Connections to the existing water system and a looped system will need to be constructed with the phase.
- Fire hydrant locations will need be approved by the Denver Fire Department as part of the site plan approval.

ROADWAY:
- (2) Connections to the existing roadway system will be required to provide fire access to the site.
- A supplemental traffic impact study will be required for each site development plan.
- West Kentucky Ave intersections with Broadway and "INTERNAL STREET" will be mitigated when traffic warrants are met by the development of the market place mixed use district.
- A pedestrian connection between "INTERNAL STREET" and Mississippi Avenue will be provided. Designs details to be determined with a future site development plan.

GENERAL:
- Sub phases of the development will need to be evaluated on a site plan basis.

LEGEND:
- PROPOSED OPEN SPACE DEVELOPMENT
- PROPOSED G-MIS 12 ZONED DEVELOPMENT
- PROPOSED ROADWAY
- PROPOSED WQ POND
- PROPOSED PEDESTRIAN/BIKE IMPROVEMENTS
- IMP BOUNDARY
- PROPOSED STORM
- PROPOSED SANITARY
- PROPOSED WATER
- EXISTING STORM
- EXISTING SANITARY
- EXISTING WATER
- CONNECT TO EXISTING WATER
- PEDESTRIAN CONNECTION TO MISSISSIPPI WILL BE PROVIDED. DESIGN DETAILS TO BE PROVIDED WITH FUTURE SITE DEVELOPMENT PLANS
**Development Phasing Notes:**

- **Open Space:** Santa Fe Promenade will be constructed with adjacent vertical development.
- **Mississippi Bike / Pedestrian Improvements:** Include extending the bike/ped system from the end of the existing retaining wall on the north side of Mississippi with a connection to both the north-south promenade trail and Santa Fe Interchange. A parallel, grade-separated system will also connect to South Cherokee Street.
- **A Temporary Trail Connection to Mississippi Ave. will be constructed if Block 8 is constructed prior to Block 7.**

**Drainage:**
- The outfall from the district will flow into the water quality / detention pond and outfall to the South Platte River.

**Sanitary Sewer:**
- The outfall from the district will connect to the existing Denver sanitary sewer collector system.

**Water:**
- (3) Connections to the existing water system and a looped system will need to be constructed with the phase.
- Fire hydrant locations will need to be approved by the Denver Fire Department as part of the site plan approval.
- Connection beneath the owl to water system on east will be constructed with the phase.

**Roadway:**
- (2) Connections to system will be required to provide fire access to the site.
- A supplemental traffic impact study will be required for each site development plan.
- Removal of the South Bannock on-ramp to US 85 will be removed with the phase.
- One (1) lane along northbound Santa Fe drive will need to be constructed.

**General:**
- Sub phases of the development will need to be evaluated on a site plan basis.
- South pedestrian bridge will be constructed with the phase.

---

**Legend:**
- Proposed Open Space Development
- Proposed C-MX 16 Zoned Development
- Proposed pedestrian bridge
- Proposed roadway
- Remove existing street
- Proposed pond
- Proposed pedestrian/bike improvements
- Imp boundary
Development Phasing Notes:

Open Space:
- The 0.5 acre open space parcel adjacent to Vanderbilt Park will be legally defined with the earlier of the Kentucky Avenue Bridge Transportation Engineering Plans or the site development plan for Block 11. The construction of improvements on the 0.5 acre parcel will be completed together with the Kentucky Avenue vehicular bridge construction.
- Vanderbilt Park East will be constructed upon completion of the first phase of vertical development in the Office Parkland District.
- A temporary trail connection to Mississippi Ave will be constructed with this phase if connection is not yet completed.

Drainage:
- The outfall from the district will flow into the water quality facility on Vanderbilt Park East. A separate facility will be constructed with the Vanderbilt Park West Addition. Two new outfalls will be constructed to the South Platte River.

Sanitary Sewer:
- The outfall from the district will connect to the existing Denver sanitary sewer collector system.

Water:
- Connections to the existing water system and a looped system will need to be constructed with this phase.
- Waterline will need to extend from S. Huron Street through W. Tennessee Avenue with vertical development of Block 11.
- Fire hydrant locations will need to be approved by the Denver Fire Department as part of the site plan approval.

Roadway:
- Connections to the existing roadway system will be required to provide fire access to the site.
- Kentucky Bridge will be constructed when traffic demands from vertical development require the access point.
- Additional left turn lane on southbound S. Platte River drive will be constructed with Kentucky Bridge.
- A supplemental traffic impact study will be required for each site development plan.

General:
- Sub phases of the development will need to be evaluated on a site plan basis.
- North Pedestrian Bridge will be constructed with this phase.

Legend:
- Proposed Open Space Development
- Proposed C-Max 16 Zoned Development
- Proposed Pedestrian Bridge
- Proposed Roadway
- Proposed WQ Pond
- Proposed Storm Sewer
- Proposed Sanitary Sewer
- Proposed Water
- Existing Storm
- Existing Sanitary
- Existing Water
- Proposed Pedestrian/Bike Improvements
- Imp Boundary

Connect to Existing Water

Date: May 2016
8.2 Conclusions

Summary
Phasing for the Broadway Station development needs to be flexible with the ability to respond to the needs of the project as well as varying market conditions. Infrastructure development phasing will need to follow the guidelines in the IMP, but should be evaluated to properly support the vertical development. Interim improvements may be required to complete systems and connections to utilities and providing access to the site.
Section 9: Appendix

9.1. Alta Survey (Separate Document)
9.2. Infrastructure Master Plan Drainage Report (Separate Document)
9.3. Infrastructure Master Plan Sanitary Sewer Report (Separate Document)
9.4. Infrastructure Master Plan Water Distribution System Memo (Separate Document)
9.5. Infrastructure Master Plan Transportation Impact Study (Separate Document)
Broadway Station Infrastructure Master Plan

The Broadway Station Infrastructure Master Plan is hereby approved by the City and County of Denver after review by staff from Public Works, Parks and Recreation, and Community Planning and Development.

Approved by ___________________________ 6/3/16
Development Services Project Coordinator

Approved by ___________________________ 6/3/16
For the Manager of Community Planning and Development

Clerk and Recorder Filing Information:

This project was filed in the City and County of Denver Clerk and Recorders Office on 6/3/16 under City Clerk File Number 2016-0236.
BROADWAY STATION

Infrastructure Master Plan

May 2016