Bend Central District MMA - Memorandum

To: Wendy Robinson, City of Bend

From: Matt Hastie, Andrew Parish & Serah Breakstone, Angelo Planning Group

Copy: Rod Cathcart and Devin Hearing, Oregon Department of Transportation

Date: November 21, 2013

Re: Tech Memo #2 Future Baseline Conditions – FINAL DRAFT

Overview

The City of Bend has been awarded a Transportation and Growth Management (TGM) grant in order to develop a plan for the Bend Central District Multi-Modal Mixed Use Area (MMA). An MMA designation may be applied by local governments to downtowns, town centers, main streets, or other areas where the local government determines that there is:

- Potential for high-quality connectivity to and within the area by modes of transportation other than the automobile;
- A denser level of development of a variety of commercial and residential uses than in surrounding areas;
- A desire to encourage these characteristics through development standards; and
- An understanding that increased automobile congestion within and around the MMA is accepted as a potential trade-off.

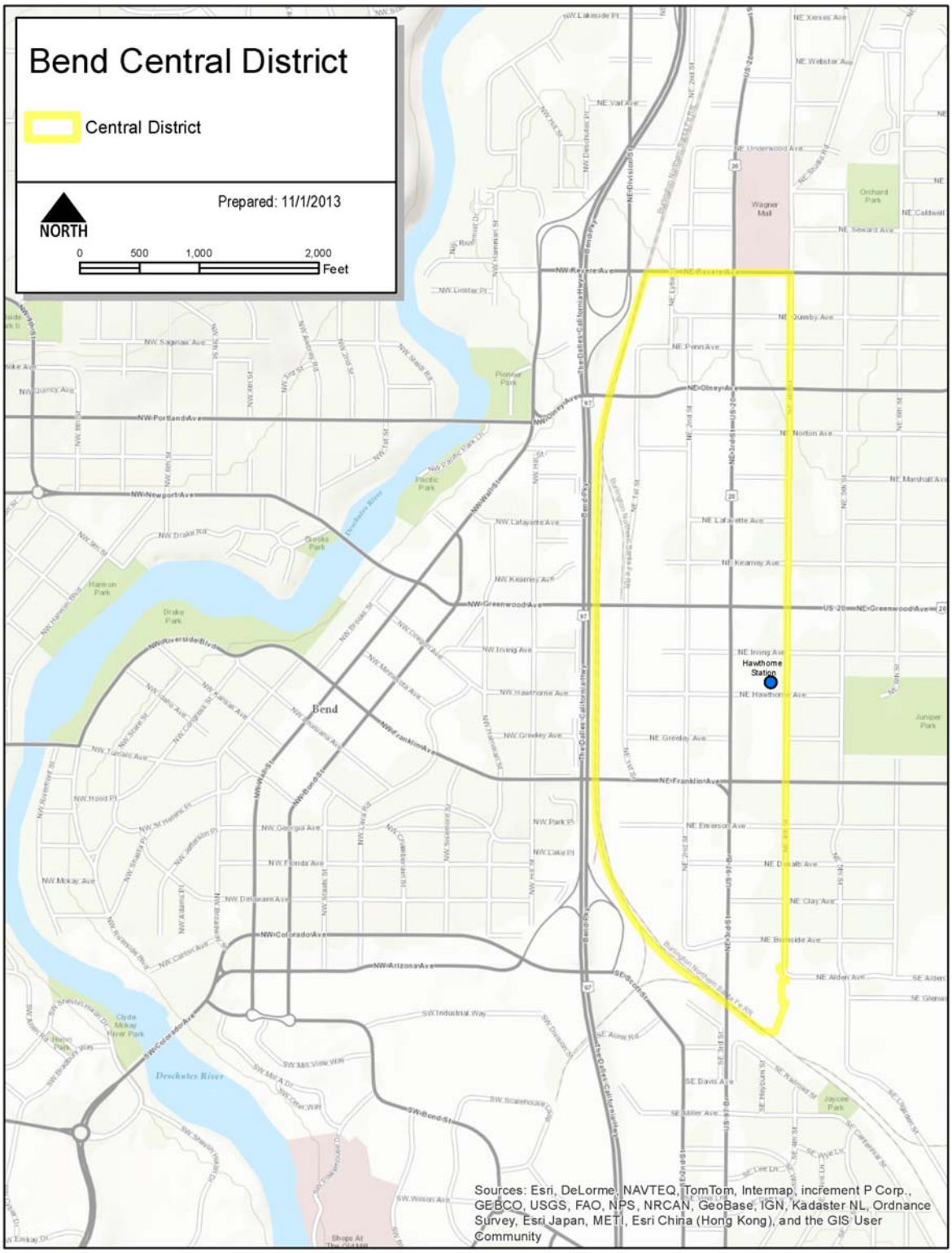
This work will build upon work previously completed for the Bend Central Area Plan (CAP) and focus specifically on an area along the 3rd Street corridor east of the Parkway. The (MMA) plan will look at ways to improve connections for people traveling in the area by foot, bike, bus, car, or freight truck. The plan will look at ways to develop the area in the future to include a combination of housing, businesses, shops and other uses to create a distinct and vibrant district. In addition to defining the MMA, the project will develop amendments to the Bend General Plan (comprehensive plan), Transportation System Plan (TSP), and Development Code to allow future land use changes and redevelopment in the MMA.

This memorandum describes future projected land use, transportation and public infrastructure conditions for the Bend Central District according to current plan designations. The information in this memo is derived from existing sources, including the Bend Central Area Plan and appendices; for the most part, new data was not collected. Future year 2035 transportation volumes and operations analyses were summarized from available plans for major intersections.

Project Area

The Bend Central District (BCD) is adjacent to Bend's existing downtown core. It covers roughly 206 acres and is bounded by the Bend Parkway (OR 97) to the west, NE Revere Avenue to the north, NE Fourth Street to the east, and the rail line to the south. This area is similar to the "3rd Street Corridor" described in the Bend Central Area Plan (CAP), but it does not include areas to the north of NE Revere Avenue or south across the railroad tracks. See Figure 1 for a map of the BCD.

Figure 1: Bend Central District Map



Future Land Use & Development

Population & Employment Projections

Bend's long-term population and employment projections, as described in the Central Area Plan (CAP), are shown in Table 1 below. For additional detail, see Attachment A: CAP Future Conditions.

Table 1: Bend Population & Employment Projections

	2005	2010	2015	2020	2025	2030
Population	69,004	81,242	91,158	100,646	109,389	119,009
5-year avg. annual growth rate		3.3%	2.3%	2.0%	1.7%	1.7%
Employment	40,372	46,602	55,948	62,757	69,566	76,375
5-year avg. annual growth rate		2.9%	3.7%	2.3%	2.1%	1.9%

Source: Leland Consulting Group, 2007.

The 2010 Census reported a population of 76,639 for the City of Bend, roughly 5% below the CAP forecast.

The BCD has very few residents and contains only 5 acres of land zoned for residential uses. The CAP states that the 3rd Street Corridor (which encompasses the BCD as well as industrial lands to the north) has just 122 residents. The CAP estimated future year 2030 housing units and square footages for other employment uses inside the 3rd Street Corridor based on information that was available at that time (2007). The CAP included baseline estimates that assumed development consistent with the existing (as of 2008) Bend General Plan designations, as well as updated projections, consistent with land use recommendations in the CAP. Those estimations (based on the CAP recommendations) for the 3rd Street Corridor were as follows (again, note that the 3rd Street Corridor covers a larger area than the BCD):

- 1,369 housing units
- 1.2 million square feet of office space
- Approximately 200,000 square feet of retail
- A reduction of 375,000 square feet of industrial

This represents a significant amount of growth in office space in the 3rd Street Corridor and a more modest growth in retail space. It also represents a significant increase in housing and new residents in the area.

The plan for growth in the BCD specifically (as described in the CAP and the MMA Goals & Objectives) calls for at least 500 new housing units at an average development density of at least 12 dwelling units per acre.

Future Land Use and Urban Form

General Vision. The Central Area Plan describes the future vision for the Bend Central Districts as:

> *"… a new mixed-use area in the Bend Central District that will fill in missing spaces and provide greater density feeding onto a "new" 3rd Street. Because the 3rd*
> *Street re-invention will carry less automobile traffic, it can transition into a boulevard with greater levels of pedestrians socializing in community plazas, dining in local restaurants, shopping in a variety of mid-sized businesses, and working in a variety of professional offices. 3rd Street will become a passageway through medium to high density, compact, mixed-use residential areas with cafes and shops; it will be a street full of public spaces linking with the employment/industrial district to the north, the employment/office districts in Bend Central, the Historic Downtown Core via Greenwood and Franklin Avenues, and the Mill District to the south…"*

Changes to the Bend General Plan and Development Code (including new zoning designations) will likely be needed in order to implement this vision. Those amendments may include a new mixed-use zone for the BCD that allows the appropriate mix of uses and building design needed to achieve the established vision. The CAP Land Use Regulatory Recommendations memo (see Attachment B) provides a preliminary assessment of the types of plan and code amendments that may be needed. Specific recommendations regarding plan and code amendments for implementing the MMA will be provided as part of this project.

Redevelopment. The CAP (see Attachment C: CAP Redevelopment Framework Refinement) identifies a number of large-scale redevelopment opportunity sites within the BCD, most of which are located along 3rd Street. Those sites were identified based on market data and pressures available at that time. Market conditions have changed in the district since the CAP was completed in 2007 and may not support the same intensity or types of developments or redevelopments that were identified at that time. In addition, the City is facing challenges in providing the level of infrastructure (water and sewer facilities) that would be needed to support this level of development. As a result, redevelopment assumptions and projections may be refined as part of the Central District planning process.

Urban Form. In terms of urban character, the BCD is envisioned to become a hub of employment, retail and residential uses that includes:

- Reinvention of 3rd Street as a pedestrian-friendly corridor

- Mixed-use, close-in neighborhood
- Higher densities and taller signature structures
- Activity centers with unique green spaces and public places
- Effective connections to the Historic Downtown Core via all modes of transportation
- Vibrant street-level uses along East-West corridors connecting 3rd Street to the Historic Core

The CAP identified a detailed list of "performance guidelines" for future development in the BCD to ensure consistency with this vision. Those guidelines generally include the following elements (full guidelines are provided in Attachment B):

- Making the BCD a "new town in town" that will draw people and activity into the district during all seasons and all times of day.
- Connections (visual, vehicle, pedestrian) within the district and to adjacent districts.
- Defined civic spaces and landscaping throughout the district that create gathering spots and pathways.
- Buildings that relate to their context in terms of scale, mass and design. Buildings should also be active on the ground floor and help to define the streets.

The CAP also identifies the BCD as a "tall building" district (see Attachment B: Land Use Regulatory Recommendations memo) and includes specific recommendations for height (100 to 150 feet, generally) and floor area limitations intended to provide opportunities for development of taller, more slender buildings. Per the tall building standards, buildings should be placed with their long dimension in an east/west orientation in order to create and maintain view corridors. Buildings should also be set back from property lines on the east and west to allow positioning of taller buildings to minimize view blockage on or from neighboring properties.

While the overall concept for the BCD has not changed since adoption of the Central Area Plan, the densities and building heights originally envisioned for this district may no longer be suitable given changes in market conditions and current infrastructure needs and challenges. In general, four to five-story buildings may be a more suitable target in much of the planning area, including along 3rd Street, in comparison to the taller buildings described in the Central Area Plan.

Transportation System Needs

Motor Vehicle System

The CAP analyzed 2030 transportation system conditions for a larger area, which included downtown, adjacent neighborhoods to the north and south, and the Third Street Corridor area, as shown in **Error! Reference source not found.**. This subarea around Third Street corresponds roughly to the Bend Central District. Analysis for this subarea, which was based on the current Bend MPO regional travel demand model, is summarized below.

2030 Traffic Volume Development

2030 PM peak hour traffic volumes for the CAP were developed using methods outlined in ODOT's Analysis Procedures Manual and NCHRP Report 255[1]. This included using output from the Bend Metropolitan Planning Organization (BMPO) travel demand model for 2003 and 2030 and post-processing with existing turn movement count data. The 2030 BMPO model reflected the baseline Metropolitan Transportation Plan (MTP) land use scenario and network. Post-processed 2030 volumes were carried into intersection operations analysis to evaluate how the existing transportation network in the Central Area would perform under future baseline traffic volumes. See Appendix F of the CAP for more detail.[2]

Intersection Volumes and Operations

The following targets and standards apply for intersections in the Central District study area:

Table 1: Mobility Targets for ODOT Facilities in the Study Area

Roadway	OHP designation	Signalized Intersection Maximum V/C Ratio	Unsignalized Intersection Maximum V/C/ Ratio
US Hwy 97	Statewide Expressway within MPO	0.85	0.95
US Hwy 20	State Highway within MPO	0.90	0.95

Source: Oregon Highway Plan, Policy 1F, Table 6

For city streets, standards are laid out in the City's Development Code, Chapter 4.7 which identifies traffic operational thresholds. The following standards define acceptable intersection operations, and are applied to the entire peak hour:

Two-Way Stop Control

- Delay for individual lane groups less than or equal to 50 seconds, and
- Volume to capacity ratio for individual lane groups less than or equal to 1.0, and
- 95th percentile queuing less than or equal to storage length available.

All-Way Stop Control

- Delay for the intersection as a whole is less than or equal to 80 seconds

Roundabout

- Volume-to-capacity ratio for individual approaches less than or equal to 1.0.

Signalized Intersection

- Volume to capacity ratio for the intersection as a whole less than or equal to 1.0, and
- 95th percentile queuing less than or equal to storage length available

[1] *Highway Traffic Data for Urbanized Area Project planning and Design – National Cooperative Highway Research Program Report 255*, Transportation Research Board, Washington, D.C., 1982.
[2] *Bend Central Area Plan,* City of Bend, 2007

- Further details of relevant standards from City Code are presented below in Table 2**Error! Reference source not found.**.

Figure 1: 2030 Baseline PM Peak Traffic Volumes (Bend Central Area Plan)


Revere Ave
Olney Ave
Hawthorne Ave
Hill St
Bend Olney Ave
3rd St
4th St
Colorado Ave
395
40
670
15
200
850
460
400
60
75
2725
125
3445
0
55
155
1125
455
160
350
760
355
370
935
160
195
1335
100
130
220
2695
290
3445
55
5
0
35
130
10
5
10
5
50
30
30
15
80
5
155
1375
130
70
415
180
145
15
15
15
470
25
80
735
50
385
700
130
25
25
45
420
130
270
30
850
240

Table 2: City of Bend Signalized Intersection Operating Standards

Intersection Status/Jurisdiction	Operating Standard
Built to TSP/Master Plan	v/c less than 1.0 for hour preceding and following Peak Hour
Not built to TSP/Master Plan; within Central Business/historic district	v/c less than 1.0 for hour preceding and following Peak Hour
Not built to TSP/Master Plan; outside Central Business/historic district	v/c less than 1.0 for Peak Hour

Source: Bend Development Code, Chapter 4.7, Transportation Analysis, Table 4.7.400a.

The CAP analysis used Synchro software to perform capacity analysis consistent with 2000 Highway Capacity Manual methodology. Results of this analysis for intersections in the Central District study area are shown in the following tables.

Table 3: Baseline Signalized Intersection Operations, 2030 30th Highest Hour

Intersection	Overall V/C ratio	Average Control Delay (sec/veh)	Exceeds City Standards?	Exceeds State Standards?
Revere Avenue/Parkway SB Ramps	0.83	20.6		No
Revere Avenue/Parkway NB Ramps	**0.92**	27.8		Yes
Revere Avenue/3rd Street	**1.22**	> 80.0		Yes
Olney Avenue/3rd Street	**1.15**	> 80.0		Yes
Greenwood Avenue/3rd Street	**1.42**	> 80.0		Yes
Franklin Avenue/3rd Street	**1.11**	81.1		Yes
Colorado Avenue/Parkway SB Ramps	0.74	26.0		No

Source: Bend Central Area Plan, 2007
Intersections not meeting targets shown in **bold**

Table 4: Baseline Unsignalized Intersection Operations, 2030 30th Highest Hour

		WORST MOVEMENT			OVERALL	
Intersection	Control Type	Movement	V/C ratio	Average Delay (sec/veh)	V/C Ratio	Average Delay (sec/veh)
4th Street/Revere Avenue	AWSC	EBTR	> 1.0	> 80.0	> 1.0	**> 80.0**
4th Street/Olney Avenue	AWSC	WBTR	> 1.0	> 80.0	0.92	**> 80.0**
4th Street/Greenwood Avenue	TWSC	SBR	0.56	30.0	0.61	3.0
3rd Street/Hawthorne Avenue	TWSC	EB	**0.71**	**> 80.0**	0.63	2.7
4th Street/Hawthorne Avenue	TWSC	EB	0.18	11.7	0.28	4.1
4th Street/Franklin Avenue	TWSC	NB	**0.87**	**> 80.0**	0.47	10.5
Colorado Avenue/Parkway NB Ramps	TWSC	SBL	**> 1.0**	**> 80.0**	> 1.0	> 80.0

Source: Bend Central Area Plan, 2007
Intersections not meeting targets shown in **bold**

Five signalized intersections and five unsignalized intersections are forecast to exceed performance targets in 2030 with current General Plan land use in place and no transportation improvements. All

intersections along 3rd Street that were analyzed for the CAP exceed standards, and most study intersections along 4th Street do as well.

Both northbound ramp terminal intersections for the Bend Parkway (at Revere and Colorado Avenues) exceeded standards, while the southbound terminals did not. Because operations at these northbound ramp terminals may indicate queuing issues from the northbound off-ramp back onto the mainline of the Bend Parkway, further discussion is warranted.

- **Revere Avenue/Bend Parkway NB Ramps.** The northbound off-ramp has a shared through/left and a right-turn only at its approach to the intersection. The right-turn only lane experiences the most operational issues under 2030 conditions, with about 58 seconds of average delay and a lane v/c of 0.97. This suggests that vehicles using the off-ramp may occasionally wait through multiple cycles, particularly as the right turn lane is striped to only about 50 feet. This increases the risk of queues accumulating and extending to the mainline.
- **Colorado Avenue/Bend Parkway NB Ramps.** This intersection is assumed to remain unsignalized under 2030 baseline conditions. The current configuration includes a northbound off-ramp that loops and tees into Colorado Avenue from the north, where it has a left-turn only and a right-turn only lane and is stop-controlled. The east-west Colorado Avenue approaches are uncontrolled. The southbound left movement from the off-ramp is forecast to experience very large average delays (likely in excess of three minutes) due to the lack of gaps in cross traffic and a forecast queue of vehicles waiting to make an eastbound left turn from Colorado Avenue onto the northbound on-ramp. Although only 30 vehicles are forecast to make this southbound left from the off-ramp, the significant average delay and left-turn lane storage length of about 250 feet may lead to lane-blocking and queue spillback to the mainline.

Bicycle and Pedestrian Facilities

Bicycle and pedestrian facilities in the Central District area consist of dedicated bicycle lanes, bikeways (shared roadways), multi-use paths, and sidewalks. These systems are more fully described in the Existing Conditions memo for this project. Key bicycle and pedestrian facility issues for the Central District include:

- Lack of bicycle connections between the 3rd Street corridor and downtown Bend due to the barrier formed by the Bend Parkway and the BNSF tracks. Existing connections via Greenwood Avenue or Franklin Avenue are narrow, dark, and unappealing, and feature facilities that must be shared by people walking and biking. As the mix of uses in the Central District evolves, there will likely be more demand for non-motorized access to and from downtown. Also, as the OSU-Cascades campus is developed in western Bend, demand for multi-modal connections to the west from the BCD will significantly increase.
- The pedestrian environment along 3rd Street features curb-tight sidewalks, frequent driveways, and inconsistent pavement conditions. With denser and more diverse land uses in the Central District, the existing conditions on 3rd Street and other auto-oriented facilities may expose more people to uncomfortable and/or unsafe walking conditions.

Transit

As part of the Bend MPO's Public Transit Plan[3], several corridors within the Central District are identified as having potential as part of future transit routes. The following corridors were subject to a screening evaluation to help identify the most transit-supportive segments within the MPO area:

- Revere Avenue
- Neff Road
- Greenwood Avenue
- Hawthorne Avenue
- Franklin Avenue
- 3rd Street
- 8th Street

Screening criteria included current and future population and employment density, development potential, facility constraints (including future traffic congestion), and concentrations of transit-reliant demographic groups. The screening process designated three "Definite Corridors" within the Central District: 3rd Street, Greenwood Avenue, and Franklin Avenue (west of 3rd Street). These are the most densely developed corridors and/or have the greatest development potential and connect key destinations that generate transit demand.

Rail

As described in Bend's Metropolitan Transportation Plan (MTP)[4], the BNSF rail line through the study area is expected to continue to haul freight over the plan's 20-year horizon. This rail line will likely continue to be a barrier for multimodal connectivity between the district and downtown Bend. Widening the existing railroad/Bend Parkway undercrossings at Greenwood Avenue or Franklin Avenue to improve connectivity would be a significant undertaking. Bend's MTP includes a future railroad undercrossing at Hawthorne Avenue, which is aimed at helping to improve east-west capacity between downtown and the Central District, and could also significantly improve bicycle and pedestrian connectivity.

Other Infrastructure

Water System Projected Demand and Needs

The Bend Central District is located within the City of Bend Water Pressure Zone 5, which provides customers with gravity fed water from the Awbrey reservoir and the Pilot Butte reservoirs at elevations ranging from 3,540 to 3,680 feet. Pressure Zone 5 extends well beyond the BCD and serves a population of 20,890 (Bend Water System Master Plan, 2007 update).

The Bend Water System Master Plan provides water demand forecasts for Pressure Zone 5. Zone 5 is expected to accommodate 29,480 people at build-out, after adding approximately 9,007 residents. The average daily water demand (ADD) is expected to increase by 29.6 million gallons per day (mgd) and maximum daily water demand (MDD) is expected to increase by 6.8 mgd.

[3] Accessed at http://www.bendoregon.gov/index.aspx?page=759 on October 8, 2013
[4] Accessed at http://www.bend.or.us/index.aspx?page=124 on October 8, 2013

The Central Area Plan states that the projections for residential and commercial growth in the Central Area are consistent with current Water System Master Plan assumptions. It also identifies the following water infrastructure needs:

- Various, scattered in-fill upgrades are planned in the area, especially in the areas just east and west of the Division Street corridor. The in-fills comprise distribution size (8-inch, 10-inch and 12-inch) additions to the existing system. Please refer to the Water Master Plan, Section 6.
- Pressure in the area is good (about 80 psi) and no pressure enhancing improvements are planned. However, mid-story building construction will need to provide its own internal pumping systems.
- Flow is good and will be sufficient to meet fire flow requirements. However, new building construction will need to provide its own fire suppression systems.
- Eventually, three new Pilot Butte reservoirs are needed to accommodate build-out water demand within Pressure Zones 5, 6 and 7. The exact timing for these will be a function of demand, city priorities, and funding.

In 2013 the City adopted a new Water Public Facility Plan that has been acknowledged by the state. The 2013 Plan assumed a more intense pattern of development within the Bend Central District.

Sewer System Projected Demand and Needs

The Central Area is located primarily within the City of Bend's Sewer Area 6. According to the Bend Wastewater Collection System Master Plan (2007), the city currently provides sewer service to approximately 4,413 residents within Area 6 (the total population of Area 6 is estimated at 5,455 people.) Based on the Sewer Master Plan, it is anticipated that the base wastewater flows generated in this area will increase from a current 0.436 mgd to 0.950 mgd by build-out.

According to the market forecasts conducted as part of the Central Area Plan, the Bend Central Area is expected to add approximately 2,314 dwellings that house an additional 4,143 people by 2030. This amount of growth is likely to generate additional wastewater flow. Future wastewater flow within the Central Area is expected to increase by approximately 0.258 mgd by 2030.

The CAP identifies the following wastewater infrastructure needs:

- Small, localized capacity enhancing improvements throughout the study area consisting of small diameter, short re-routes of the current system (please refer to the wastewater Collection Master Plan).
- Many of the sewers in the existing core system are already at capacity. In order for the higher density suggested for the Central Area Plan to be served by sewer, the existing main interceptor sewer that runs through the study area will need to be relieved of significant flows to generate additional capacity. This will be a major issue that will limit the ability to implement increased density in the study area.

- The construction of at least one, and eventually both, of two proposed new interceptor sewers will need to be constructed to relieve flows in the study area in order to generate additional new capacity.
- Construction of the proposed Westside Interceptor will divert some flows on the west side of Bend that currently flow through the existing mainline in the study area. Currently, sewer flows from the southeastern part of Bend are passing through the existing downtown trunkline. To date, there is no set alignment for the Westside Interceptor, but it most likely will be installed near the northern boundary of the BCD. Since the alignment is undetermined, it is unknown for sure whether the pipeline would cross into this district or narrowly avoid it.
- Replacement of the Drake Pump Station.
- Replacement of the pump station near 4th and Addison (the existing station has already been removed).
- Replacing 2,700 feet of gravity sewer (including a bore under Highway 97) and installing a new pump station near the Linster Pump Station.

The city is in the process of updating the sewer Collection System Master Plan (CSMP), which will identify recommended projects for the city-wide sewer collection system. The resulting improvement projects may differ significantly from those recommended in the CAP. The CSMP update is expected to be completed in the spring of 2014.

Storm Drainage

The Bend Public Works Department has recently identified specific problem areas in the BCD and has developed a Sewer and Stormwater Capital Improvement Plan (2011) that identifies stormwater projects in the BCD. Existing stormwater flooding issues occur within or near the BCD in the following areas:

- Franklin and Greenwood Avenue underpasses
- Olney Avenue and 4th Street
- Miller Avenue and 2nd Street
- Lafayette Avenue between 2nd and 3rd Streets
- Thurston Avenue and 2nd Street
- NE 1st Street near Mission Linen
- Penn Avenue and 2nd Street near the fitness center
- The alley between Revere and Seward Avenues
- Hawthorne Avenue and 2nd Street

In the summer of 2013, construction began on the 3rd Street underpass. The existing stormwater mitigation facilities were replaced with new, more efficient systems. The project includes several swales/infiltration ponds in the NE corner of 3rd Street and catch basins along the underpass that

convey runoff to a wet well that is located in the underpass. The majority of this work is located outside of the BCD, but it helps in capturing and mitigating the runoff from the central district.

At some time in the future (funding and timing dependent) similar work will be performed on two other underpasses on the western boundary of the area. These are the Franklin underpass (under the parkway) and the Greenwood underpass (under the parkway). These underpasses have a tendency to flood/pond during high rain events.

Future redevelopment is unlikely to increase the total impervious area over existing conditions, as most properties are already paved and landscaping is limited to residential and park areas. Future developments in the BCD will likely need to retrofit existing drywells, abandon drill holes, and/or install a piped conveyance system to avoid untreated subsurface discharge. Use of additional drainage swales or similar facilities also may be an option for larger or combined development sites.

The proximity to the Deschutes River provides both an opportunity and a constraint for storm drainage. As a regulated river, discharge of higher peak flows (i.e. from rerouting drywell or drill hole drainage through a piped system) should be permitted as the stormwater contribution from the downtown area would be so minor compared to total river flows. However, surface discharge to the river will need to have pre-treatment to meet DEQ water quality standards. This will make it very important to identify open spaces in the BCD that are located in low-lying areas that would be available for stormwater treatment prior to discharging to the river. In addition, the distance from the river, topographic conditions in the area and the ability to use other techniques to manage stormwater, make conveyance to the Deschutes a relatively unlikely strategy.