TECHNICAL MEMORANDUM

MWH

Preserving Bend's Water Environment

TM 3.8 – Pump Station Master Plan

To: Heidi Lansdowne, P.E.
City of Bend, Oregon
Engineering Division

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INTRODUCTION

The City of Bend, Oregon (City) has contracted with MWH Americas, Inc. (MWH) to develop a Collection System Master Plan for the current and future wastewater service areas within the Urban Growth Boundary (UGB) and the planned Urban Area Reserve (UAR). This Technical Memorandum (TM) summarizes the evaluation of the **82** pump stations that are currently being maintained by the City. There are other stations and individual home sumps that are privately maintained. This TM provides an evaluation the City owned and maintained stations only.

The discussion of the stations has been organized around the nine study areas that have been defined for analysis of the service areas in the 2006 Collection System Master Plan. These nine study areas provide for a more focused presentation of the final planning information. ***Figure 1*** shows the nine study areas. A pump station summary that provides a summary of the service area and current pump station capacity for each pump station is provided in ***Attachment A***.

The City has defined three stations as Regional Pump Stations and the other stations as Area Pump Stations. Area Pump Stations provide service to a single drainage area. In some instances, one station will pump to another pump station drainage basin. Regional Pump Stations provide service to a larger area that encompasses multiple drainage areas.

The estimated costs to complete various upgrades to the pump stations are provided in this TM in 2006 dollars (ENR-CCI of 8449). Further information on the basis of the cost estimates is provided in TM 3.6 – Cost Criteria. The statistics on the percentage sewered for each pump station basin is based on the development as of May 2005.

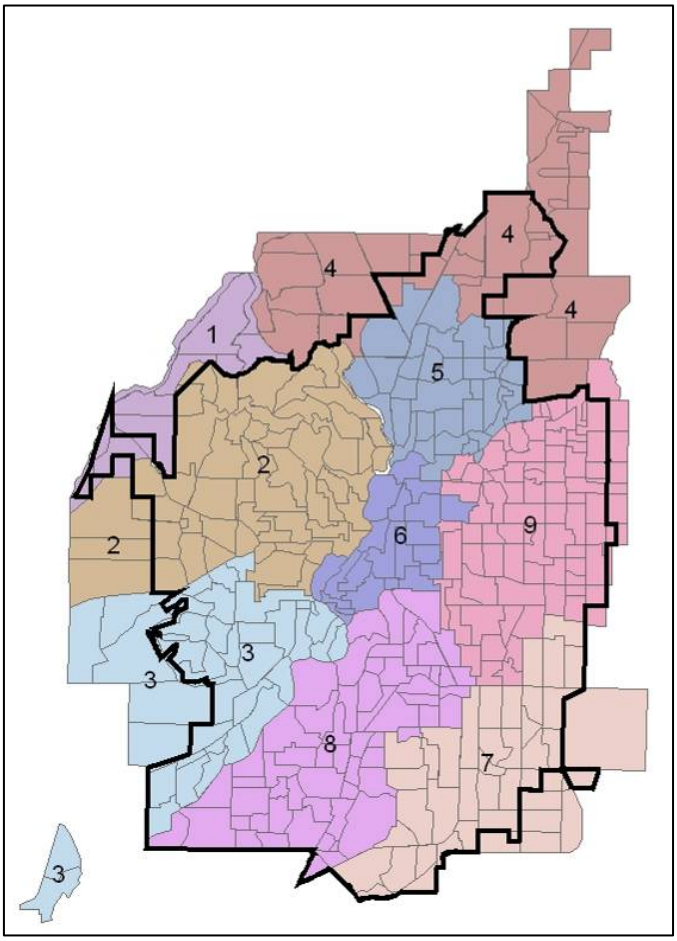


Figure 1 – Planning Study Areas

REGIONAL PUMP STATIONS

There are three regional pump stations within the City. These stations are the Westside Regional Pump Station, Sawyer Park Regional Pump Station and the Murphy Road Regional Pump Station.

Westside Regional Pump Station

The Westside Regional Pump Station receives flows from most of the service area located on the west side of the Deschutes River. The service area for the Westside Regional Pump Station is shown in ***Figure 2***. This station currently pumps flow across

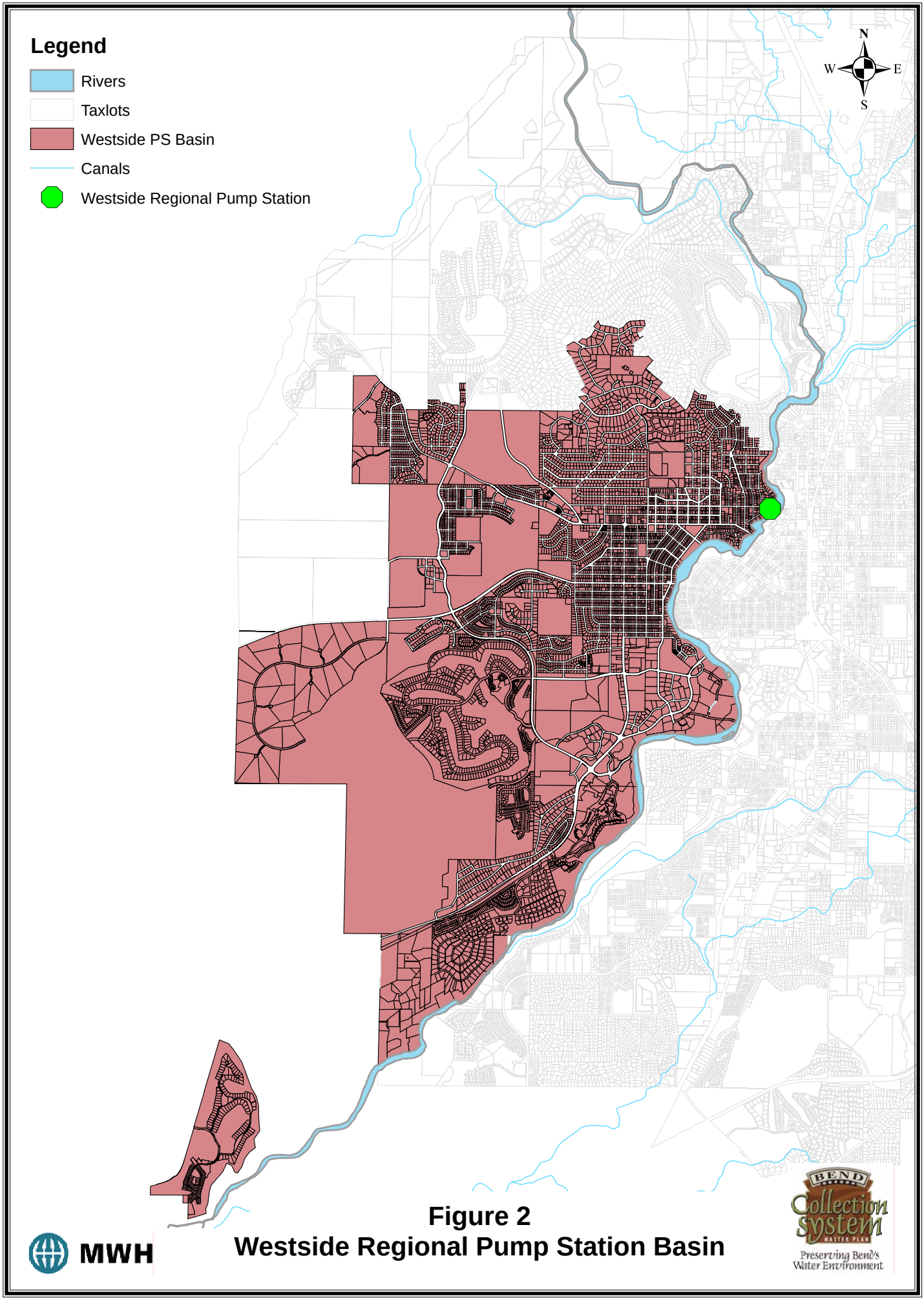


Figure 2
Westside Regional Pump Station Basin

the river. The wastewater then flows by gravity to the treatment plant.

The existing station has four pumps. Two variable speed pumps with a range from 750-gpm to 2,400-gpm each and two 600-gpm constant speed pumps. These pumps discharge through a 2,060 LF 16-inch force main. The station has a backup generator to provide service during power outages.

The service area for this station is 10,261 acres. This station service area is currently 25% sewered serving 5,884 of the 23,221 potential build-out dwelling units. The current (2005) estimated base flow for this station is 800-gpm with a peak flow of 3,940-gpm. The build-out estimated base flow for this station is 3,140-gpm with a peak flow of 10,900-gpm. The InfoSWMM modeled flow for the station under build-out conditions for peak dry weather flow and peak wet weather flow is shown in ***Figures 3 and 4***, respectively. The station does not have the hydraulic capacity to meet the long-term requirements of the service area.

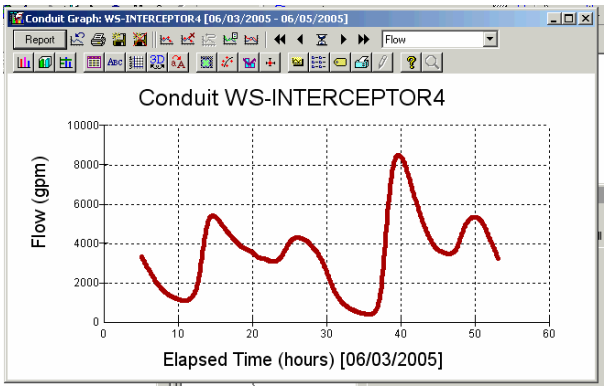


Figure 3: Dry weather flow – 8,350 - gpm

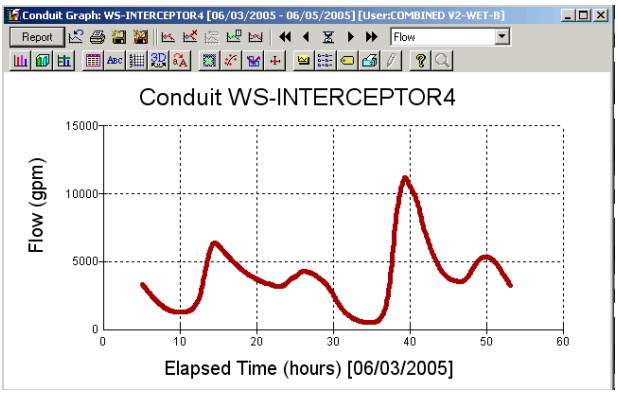


Figure 4: Peak wet weather flow – 10,900 - gpm

To provide the required capacity for the future, a new station will need to be constructed to provide a peak hour flow of 10,900-gpm. A new station has been assumed in this evaluation instead of upgrading the existing station due to the large increase in pumping capacity that will be required. The cost of the new pump station is estimated at $3.77M. This includes the cost of the new pump station with three 4,000-gpm pumps and two (2) 2000-gpm pumps. Two of the 4,000-gpm pumps and both of the 2000-gpm pumps will have VFD's to provide a pumping range from 500-gpm to the required peak flow of 10,800-gpm. Also included in the cost estimate is an odor control system, standby power and $400,000 for land purchase.

In addition to the new station, a new force main and interceptor will need to be constructed to discharge the flows pumped from this station to the new North Interceptor. Two alternative routes have been developed. Alternative 1 crosses the river on the NW Portland Avenue bridge and follows NE Onley Avenue to NE 4th Street where it turns north. The alignment follows NE 4th Street to NE Boyd Acres xx which becomes NE Vogt. The alignment then follows NE Vogt to the North Interceptor. This alignment will require a new 2,765-foot, 18-inch force main that will discharge to a 21,150-foot, 27-inch gravity trunk that discharges to the new North interceptor.

Alternative 2 crosses the river on the NW Portland Avenue bridge and turns north on NW Wall Street. The route follows NW Wall to NW Revere Avenue where it turns east to Division Street. The route then follows Division Street to Business 97, then follows Hwy. 97 to the North Interceptor. This alignment will require a new 1,600-foot, 18-inch force main that will discharge to a 19,950-foot, 27-inch gravity trunk that discharges to the new North interceptor. The Westside Interceptor alignments are shown in ***Figure 5***. The estimated cost of the new Westside Interceptor is $9.78M.

Sawyer Park Regional Pump Station

The Sawyer Park Regional Pump Station receives flows from a small service area located on the west side of the Deschutes River on the northern portion of the City and a small area on the east side of the river. The station is located on the east side of the river. The service area for the Sawyer Park Regional Pump Station is shown in ***Figure 6***.

The existing station has three pumps. Each pump has a rated flow of 560-gpm. The design system curve shows a total station firm capacity of 700-gpm with two pumps in operation. Pump tests have shown that the combined flow of two pumps is 1,000-gpm resulting in a firm capacity of 1,000-gpm instead of the design firm capacity of 700-gpm. These pumps discharge through a 1,566 LF 8-inch force main where the flows are split between a discharge to a gravity system and a 6-inch force main that connects to the Wyndamere Pump Station force main discharging to another location in the gravity system. Both gravity systems where these stations discharge are at capacity and have no capacity for additional flows.

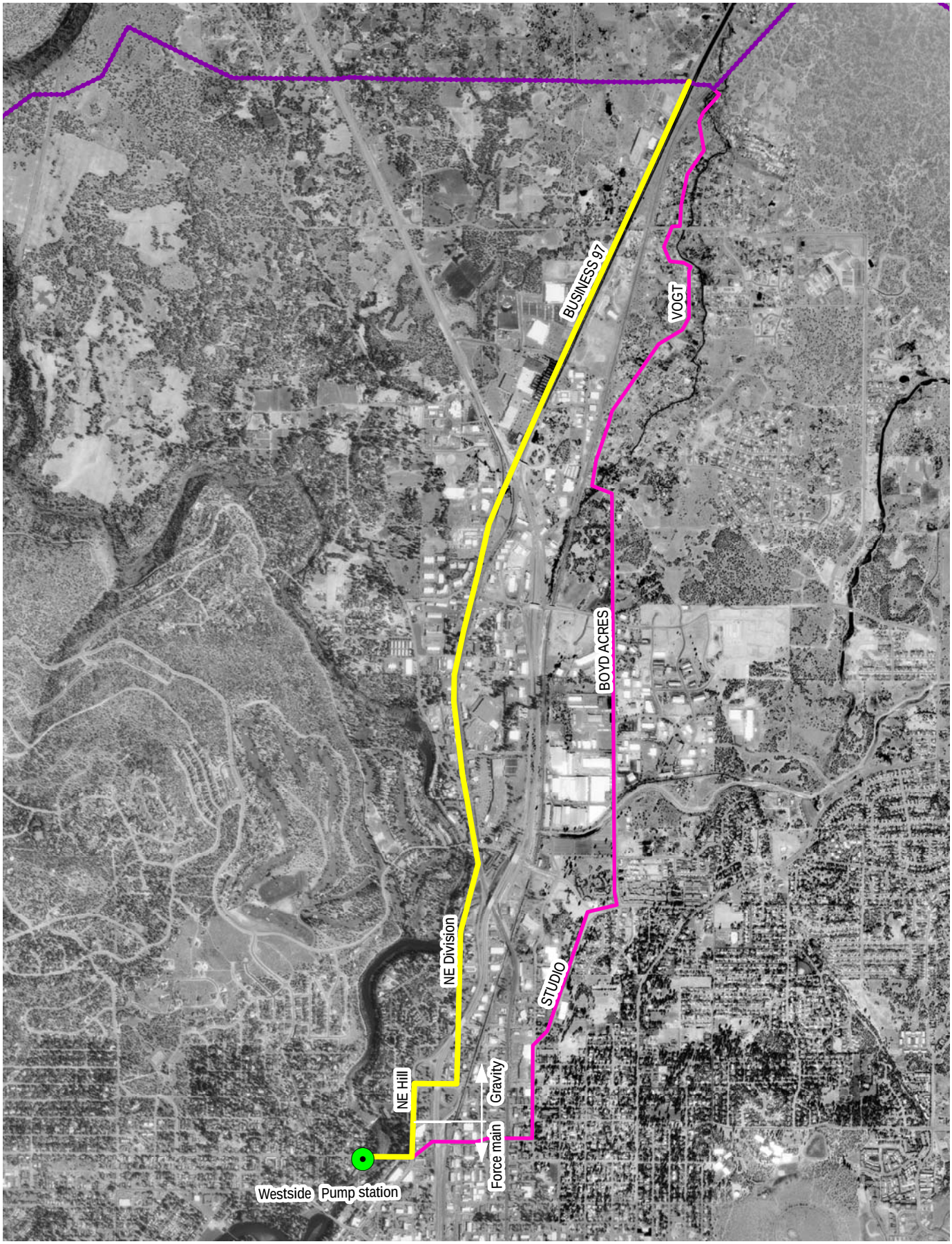
The service area for the Sawyer Park station is 765 acres. This station service area is currently at 18% sewered serving 512 of the 2896 potential build-out dwelling units. The current (2005) estimated base flow for this station is 71-gpm with a peak hour flow of 320-gpm. The build-out estimated base flow for this station is 365-gpm with a peak flow of 1,165-gpm. The station has a firm capacity of 1,000-gpm that may meet the long-term requirements of the service area. Additional evaluation of the RDII for this system needs to be done prior to determining if this station capacity will be adequate under build-out peak flow conditions.

A new force main can be constructed to discharge to the new Westside Interceptor sending the flows to the North Interceptor. This will eliminate most of the capacity problems in the gravity system downstream of the current discharge point. This new force main can also continue to handle the flows from the Wyndamere Pump Station. The City's preferred alignment for the Westside Interceptor is shown in ***Figure 5***.

Murphy Road Regional Pump Station

The Murphy Road Regional Pump Station receives flow from the old Juniper Ridge Utility sewer system located on the south side of the City. The service area for the Murphy Road Regional Pump Station is shown in ***Figure 7***.

The existing station has two (2) pumps. Each pump has a rated flow of 300-gpm. The City staff has tested this station and has rated the actual flow to be 250-gpm. The station pumps through a 4,297 LF 6-inch force main. The flow is pumped west along Murphy Road to its discharge at



Westside Alternative 1

North Interceptor

Westside Interceptor Preferred Alternative

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FIGURE 5
WESTSIDE INTERCEPTOR ALIGNMENTS

N
W E
S

Bend Collection System Master Plan
Preserving Bend's Water Environment

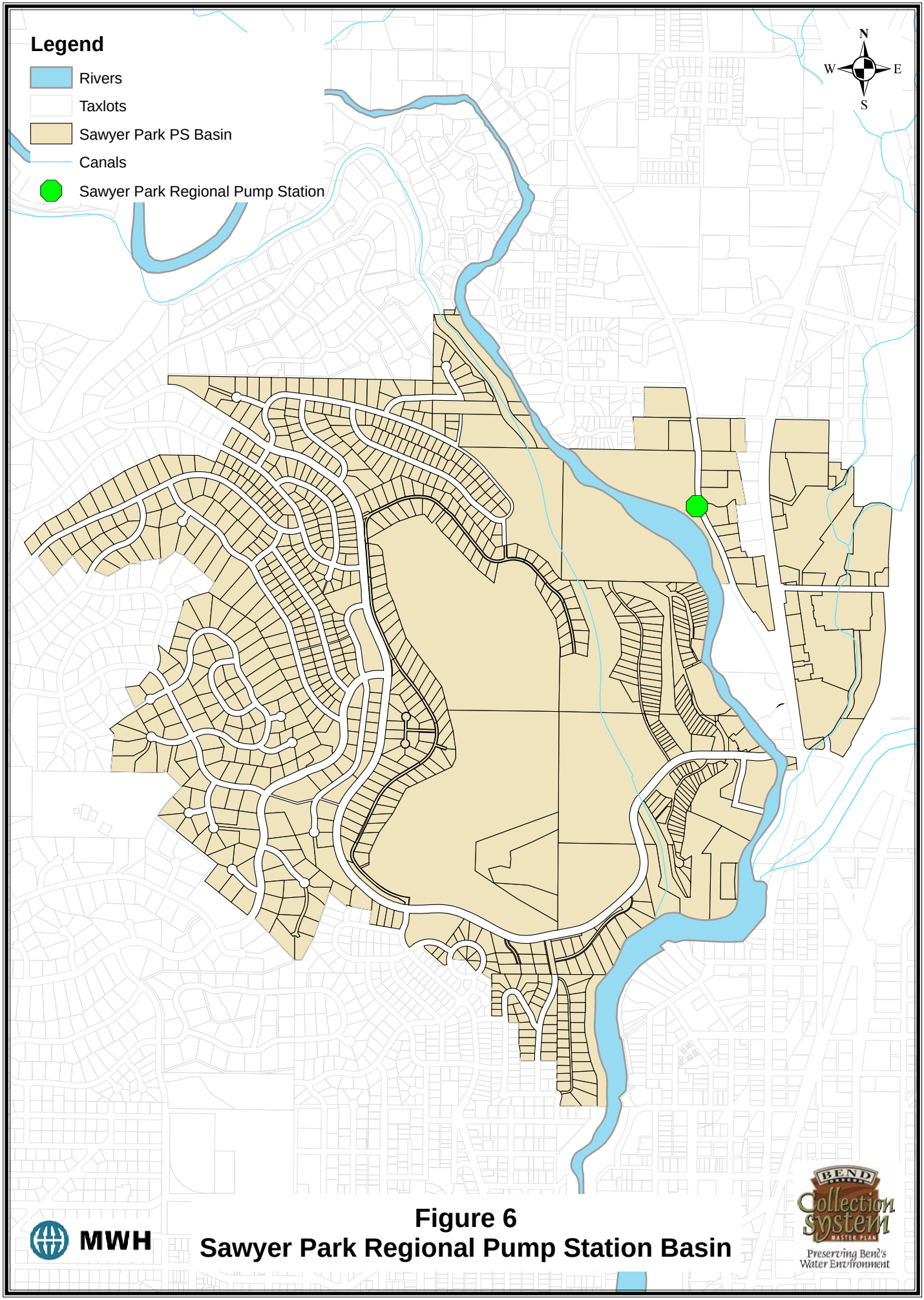


Figure 6
Sawyer Park Regional Pump Station Basin

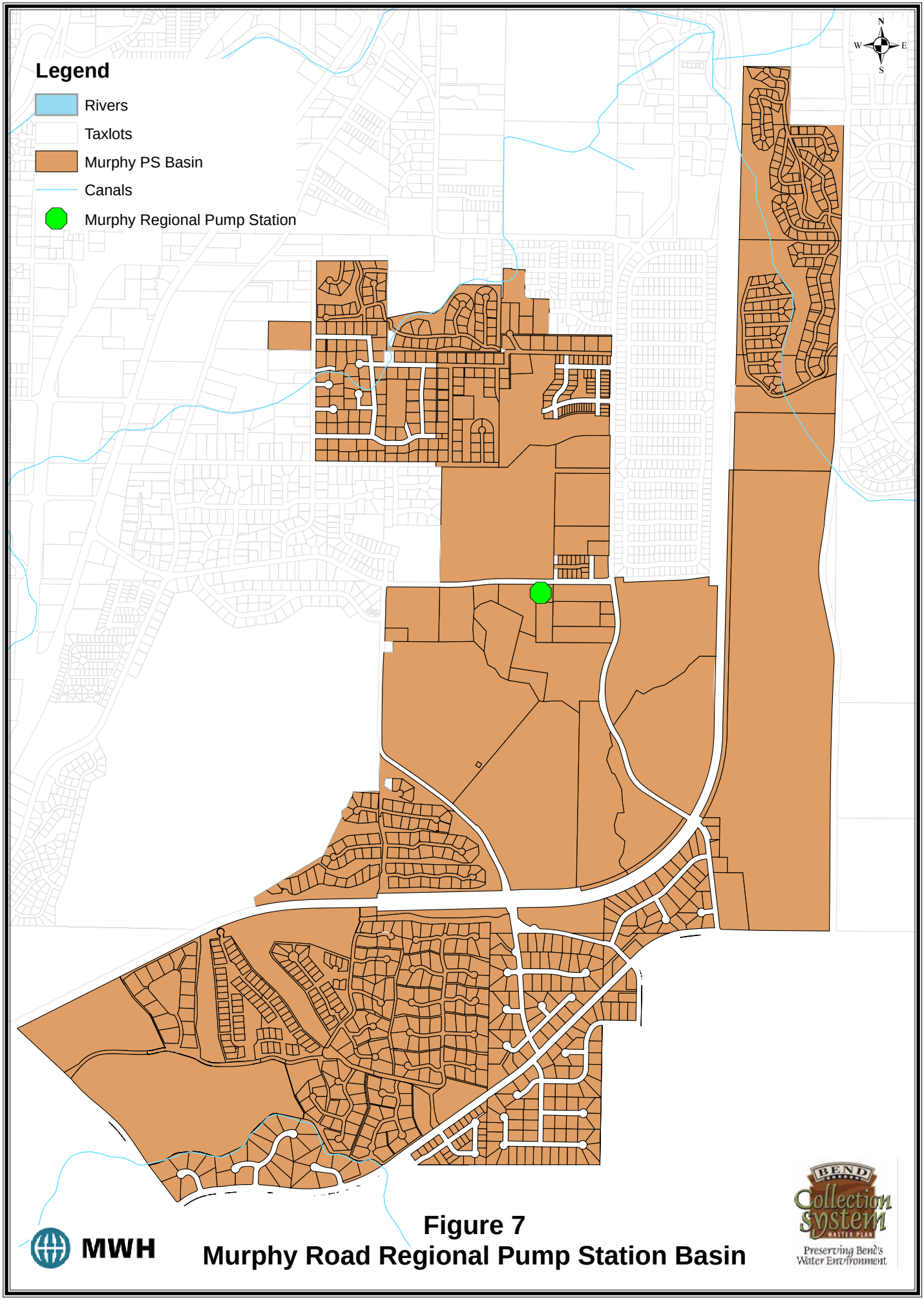
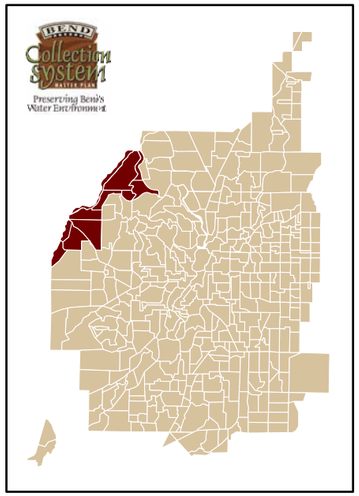


Figure 7
Murphy Road Regional Pump Station Basin



PS Capacity Upgrade Required
North Interceptor
Trunk Sewers
Existing Sewers
UAR
UGB
Shevlin Commons
Deschutes River

N
W E
S

0 1,000 2,000 Feet

NW Putnam Road
NW Skyline Ranch Road
NW Shevlin Park Road

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Figure 8
Study Area 1
Current Pump Station Service Areas

Highway 97. The service area for this station is 3,064 acres. This station service area is currently at 33% sewered serving 1,547 of the 4,675 potential build-out dwelling units. The current (2005) estimated base flow for this station is 215-gpm with a peak flow of 1,122-gpm. The build-out estimated base flow for this station is 560-gpm with a peak flow of 1,898-gpm. The station is currently under capacity. This station does ***NOT*** have capacity to meet the build-out conditions for this service area. Expansion of this station is not feasible because the gravity system to which it currently pumps does not have the capacity to handle the flows from this station. This station will be removed from service with the construction of the SE Interceptor.

AREA PUMP STATIONS

There are a total of 83 area pump stations located throughout the service area. The service area has been divided into nine (9) Study Areas as shown in ***Figure 1***. The evaluation of the capacity of each pump station is summarized in the following sections by Study Area.

Evaluation Criteria

The capacity of each pump station was evaluated to determine if the existing station has adequate capacity for future growth conditions. For stations that were modeled, the dynamic peak flow determined by the InfoSWMM model was used as the peak flow. For stations that were not modeled, first the current and future service area for each station was determined. Next, the number of dwelling units and base flow for each service area was determined based on the land area and zoning based on the criteria outlined in TM 3.1 – Planning Criteria. Finally, the peak flow was calculated by applying peaking factors and an RDII flow of 150 gallons/acre/day. The following terms and peaking factors were used in the evaluation of each pump station:

- Modeled – Yes in this column means that pump station is included in the INFOSWMM hydraulic model. No means it has not been included in the model
- Firm Capacity – The firm capacity is the capacity of the station with one pump out of service to act as a redundant pump. This is a regulatory requirement.
- Base Flow – The base flow is the winter season flow based on area zoning.
- RDII Flow – RDII flow is the flow based on inflow into the system during heavy rainfall.
- Peak Flow – The peak hour flow for non-modeled pumps was estimated as the base flow multiplied by a diurnal peaking factor of 1.8 and the seasonal peaking factor of 1.25 to which the RDII flow was added

The application of this criteria determined if the pump station will meet the build-out flow of its respective service area or not. For stations where their installed capacity will not serve the build-out flows, the time at which the stations will reach capacity was not part of this evaluation. This must be determined by the respective growth rate in each pump station's service area. The respective service area estimated growth rates was not available for this evaluation.

Study Area 1

Study Area 1 is located on the northwest corner of the Bend planning area. The Study Area 1 pump stations and their respective drainage basins are shown in ***Figure 8***. The only pump

station in this study area is the Shevlin Commons Pump Station. The design and operating conditions for this pump station are summarized in ***Tables 1 and 2***.

Table 1
Study Area 1 Pump Stations

No.	Name	In Model	Dwelling Units		Peak Influent Flow (gpm)		Force Main	
			2005	Build-out	2005	Build-out	Size (in)	Length (ft)
1	Shevlin Commons	Y	3	52	30	202	4	3,000

Table 2
Study Area 1 Pump Stations
Current Operating Information

Station Name	Number of Pumps	Station Capacity (gpm)		Force Main Velocity (fps)	
		Firm	Installed	Firm	Installed
Shevlin Commons	2	118	236	3.0	6.0

Shevlin Commons Pump Station

The Shevlin Commons Pump Station serves an area of 140 acres. This station service area is currently at 1% sewered serving three (3) of the potential build-out 458 dwelling units. The estimated build-out base flow for this service area is 52-gpm and the estimated peak hour flow is 202-gpm. The current firm capacity of 118-gpm is ***NOT*** adequate for build-out conditions. The cost to increase the capacity of the pumps for this station is estimated at $80,000.

The force main for this pump station is a 5,740 LF 4-inch line. The design velocity in this force main under firm pumping conditions is 3.0-fps. The design Total Dynamic Head (TDH) for this station is currently 126-feet. As the pump station service area reaches build-out conditions, the velocity will be 4.9-fps with a TDH of 208-feet. This TDH can be reduced to 60-feet with a 6-inch diameter force main. The cost for construction of a new 6-inch force main is approximately $809,000. A cost savings may be realized by installing VFD's on the new pumps in lieu of constructing a new force main. This analysis can be performed when the system is upgraded.

The Shevlin Commons Pump Station can be removed from service when the western portion of the North Interceptor between the Deschutes River and Shevlin Park is constructed. To remove the pump station from service, a 380-foot gravity sewer will need to be constructed between the pump station and the North Interceptor Trunk Sewer. The estimated project cost to construct the gravity sewer to remove the station from service is approximately $72,500. The estimated cost to remove the pump station is $25,000. A present value analysis of this project was done to determine the cost-effectiveness of this project. In this analysis it was assumed that the project would occur in the year 2015. Growth in the area would grow at a constant growth rate until build-out of the area occurs in 2043. Based on these assumptions, the 20 year and 50 year

present values for continuing operation of the station (starting in 2006) are $1,119,000 and $1,542,000, respectively. This includes the cost of a required pump station capacity upgrade in the year 2015. Based on the same assumptions, the 20 year and 50 year present values for removing the pump station in 2015 are $197,300 and $202,400, respectively. ***This analysis shows that replacement of the pump station is cost effective when the North Interceptor is completed.***

Study Area 2

Study Area 2 is located on the west side of the Bend planning area. There are nine (9) pump stations in this study area. The Study Area 2 pump stations and their respective drainage basins are shown in ***Figure 9***. The design and operating conditions for these pump stations are summarized in ***Table 3 and Table 4***.

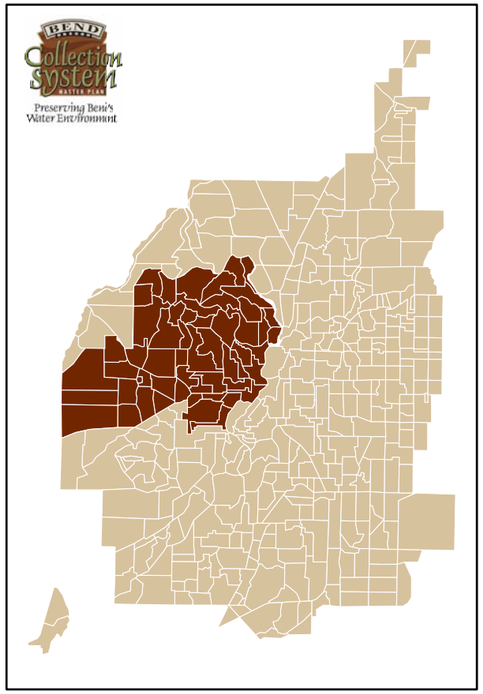
Table 3
Study Area 2 Pump Stations

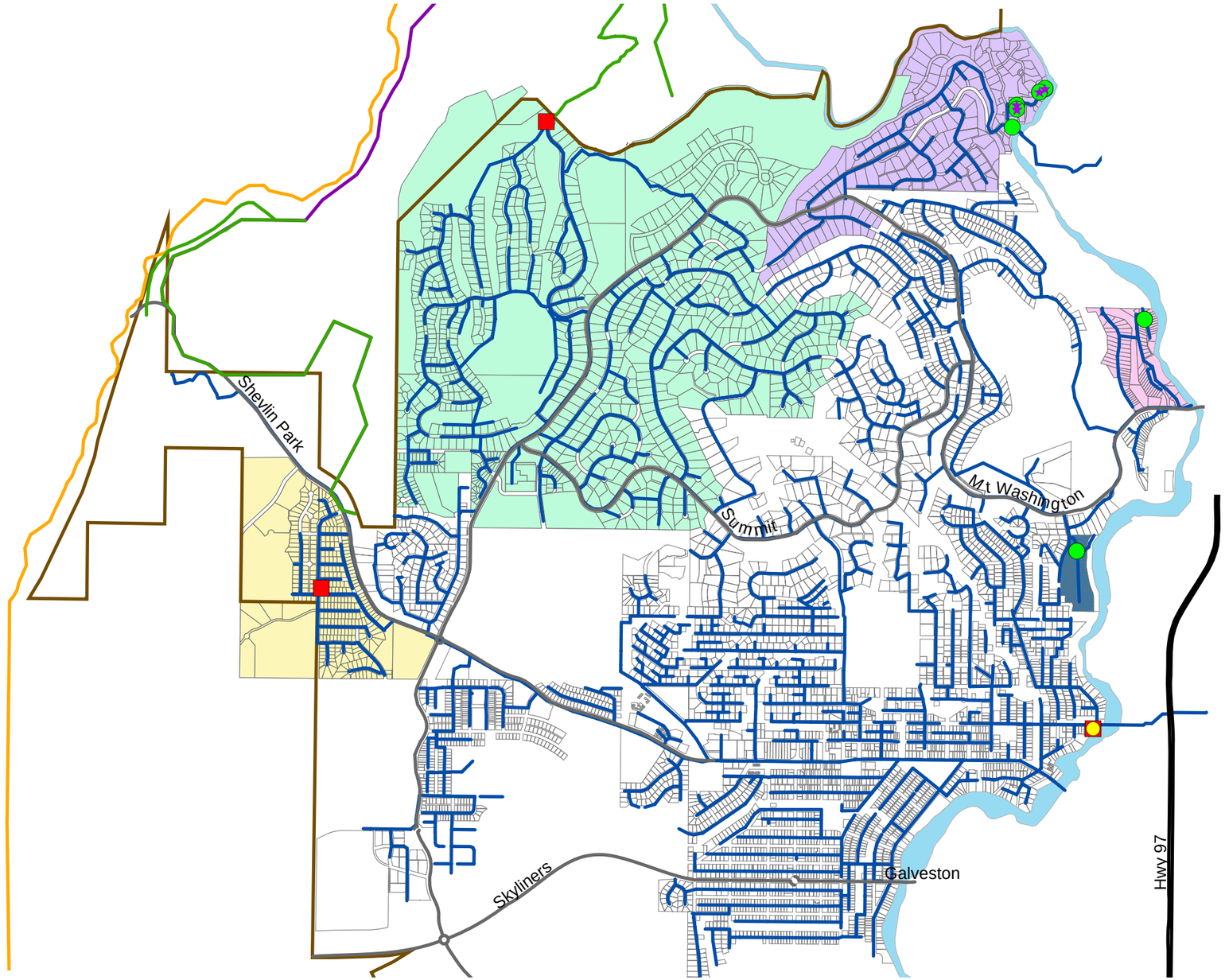
Name	In Model	Dwelling Units		Peak Influent Flow (gpm)		Force Main	
		2005	Build-out	2005	Build-out	Size (in)	Length (ft)
Awbrey Glen	Y	764	4,668	500	1,750	8	8,726
Rimrock #1	N	Note 1	Note 1	Note 1	Note 1	3	487
Rimrock #2	N	Note 1	Note 1	Note 1	Note 1	3	487
Rimrock #3	N	Note 1	Note 1	Note 1	Note 1	3	487
Rimrock #4	N	Note 1	Note 1	Note 1	Note 1	3	487
Rivers Edge	N	72	174	20	53	4	583
Shevlin Meadows	Y	104	1,018	129	464	4	1,389
Tumalo Heights	N	28	78	9	22	4	320
Wyndemere	Y	139	657	77	214	4	3,931

Note 1: The Rimrock Pump Stations serve from 4 to 6 residences each and will not have additional residences added.

Table 4
Study Area 2 Pump Stations
Current Operating Information

Station Name	Number of Pumps	Station Capacity (gpm)		Force Main Velocity (fps)	
		Firm	Installed	Firm	Installed
Awbrey Glen	2 pairs	450	900	2.9	5.8
Rimrock #1	2	40	80	1.8	3.6
Rimrock #2	2	40	80	1.8	3.6
Rimrock #3	1	40	40	1.8	1.8
Rimrock #4	2	40	80	1.8	3.6
Rivers Edge	2	125	250	3.2	6.4
Shevlin Meadows	2	145	290	3.7	7.4
Tumalo Heights	2	195	390	5.0	10.0
Wyndemere	2	240	480	6.1	12.3





- Rimrock #1-4
- Westside Regional Pump Station
- PS Capacity Adequate
- PS Capacity Upgrade Required
- North Interceptor
- Trunk Sewers
- Existing Lines
- UAR
- UGB
- Deschutes River
- Awbrey Glen
- Rivers Edge
- Shevlin Meadows
- Tumalo Heights
- Wyndemere

N
W E
S

0 1,000 2,000 Feet

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Figure 9
Study Area 2
Current Pump Station Basins

Awbrey Glen Pump Station

The Awbrey Glen Pump Station serves an area of 1,013 acres. This station service area is currently at 16% sewered serving 764 of the 4,668 potential build-out dwelling units. The estimated build-out base flow for this service area is 500-gpm and the estimated peak hour flow is 1,747-gpm. The current firm capacity of 450-gpm for this pump station is not adequate for build-out conditions. A photo of the station is shown in ***Figure 10***.

The force main for this pump station is an 8,726 LF 8-inch line. The design velocity in this force main under firm pumping conditions is 2.9-fps. The design TDH for this station is currently 420-feet.

Figure 10: Awbrey Glen Pump Station

Figure 11: Awbrey Glen PS Discharge Manhole

The current gravity system this station discharges to does not have adequate capacity to handle the current flows and the design flows from this station. A photo of the manhole into which the force main discharges into is shown in ***Figure 11***. The City has placed a restriction in the existing discharge line to create an artificial head to lower the flow from the station. This has restricted the existing operating capacity of this station to 275-gpm. This restriction in the downstream gravity system that the station discharges to will have to be removed before this station can be operated at its current capacity of 450-gpm and before it can be expanded to its build-out capacity.

The long force main and low velocities led the designer to include an aeration system on the force main to minimize odor production in the line so that there would not be an odor potential at the station discharge. The aeration system consists of a compressor and diffuser located in a pit approximately halfway up the length of the force main. Photos of the air station and air station compressor are shown in ***Figures 12 and 13***, respectively.

As the pump station service area grows, the existing pumps and force main will ***NOT*** be adequate enough to handle the peak flow. Two options are available for handling the future flows for this station. The first option is to install new pumps and construct a new 12-inch force main. The cost to increase the capacity of the pumps for this station is estimated at $560,000 and

to construct the new force main is $1.9M. This option also requires upgrading the existing gravity

Figure 12: Awbrey Glen PS Air Station

Figure 13: Awbrey Glen PS Air Station Compressor

system at the station discharge. The estimated cost to upgrade the gravity system immediately downstream of the pump station is approximately $452,000. This does not include the cost to upgrade the main trunk sewers on the west side of the river, if this station is operated through build-out.

The second option, which is the recommended option in the Master Plan, is to remove the pump station from service by connecting to the North Interceptor. This connection will be done by connecting to Trunk 4 of the North Interceptor as described in TM 3.9 – North and SE Interceptor Evaluation. The Awbrey Glen Pump Station can be removed from service when the western portion of the North Interceptor between the Deschutes River and Shevlin Park is constructed. To remove the pump station from service, an 8,350-foot, 12-inch gravity sewer will need to be constructed between the pump station and the North Interceptor Trunk Sewer. The estimated project cost to construct the gravity sewer to remove the station from service is $1,433,000. The estimated cost to remove the pump station is $50,000. A present value analysis of this project was done to determine the cost-effectiveness of this project. In this analysis it was assumed that the project would occur in the year 2015. Growth in the area would grow at a constant growth rate until build-out of the area occurs in 2032. Based on these assumptions, the 20-year and 50-year present values for continuing operation of the station (starting in 2006) are $2,678,000 and $3,988,000, respectively. This includes the cost of a pump station capacity upgrade in the year 2015 at an estimated cost of $2,719,000 to expand the station, build a new force main and upgrade the gravity sewer that the station discharges to.

The 20 year and 50 year present values for removing the pump station from service in 2015 by constructing the gravity trunk to divert flows to the North Interceptor are $1,842,000 and $1,955,000 respectively. This analysis shows that replacement of the pump station is cost effective when possible. This analysis shows that the removing the station from service is the most cost effective solution on both a capital and present worth cost basis. This does require the construction of the North Interceptor on the west side of the Deschutes River.

Rimrock #1, #2, #3 and #4 Pump Stations

The Rimrock Pump Stations each serve from 4 to 6 homes in a private development. Each station is a Hydromatic submersible station with two (2) 40-gpm pumps. These stations pump to the Wyndamere Pump Station basin through a common 3-inch force main.

Rivers Edge Pump Station

The Rivers Edge Pump Station serves an area of thirty-seven (37) acres. This station service area is currently at 41% sewered serving 72 of the 174 potential build-out dwelling units. The current (2005) estimated base flow for this station is 10-gpm with a peak hour flow of 30-gpm. The build-out estimated base flow for this station is 20-gpm with a peak flow of 53-gpm. The station capacity of 125-gpm is adequate to meet the long-term requirements of the service area.

The force main for this pump station is a 583 LF 4-inch line. The design velocity in this force main under firm pumping conditions is 3.2-fps. The design TDH for this station is currently 55-feet.

Shevlin Meadows Pump Station

The Shevlin Meadows Pump Station serves an area of 162 acres. This station service area is currently at 10% sewered serving 104 of the potential build-out 1,018 dwelling units. The estimated build-out base flow for this service area is 129-gpm and the estimated peak hour flow is 464-gpm. The current firm capacity of 145-gpm for this pump station is ***NOT*** adequate for build-out conditions. A photo of the station is shown in ***Figure 14***.

Figure 14: Shevlin Meadows PS

Figure 15: Shevlin Meadows PS Proximity to Home

The force main for this pump station is a 1,389-foot long 4-inch line. The design velocity in this force main under firm pumping conditions is 3.7-fps. The design TDH for this station is currently 86-feet. As the pump station service area reaches build-out conditions the velocity will be 8.3-fps with an estimated TDH of 140-feet under peak flow conditions. The estimated cost for a capacity upgrade to meet the build-out conditions is $66,000. The City should evaluate the cost-effectiveness of installing VFDs on these pumps with the capacity upgrade as an energy

saving measure. The topography in the area of the station does not provide an economic means to remove this station from service.

This pump station is within a few feet of a residence. This close proximity is shown in the photo in ***Figure 15***. As the flows to this station increase, it is very likely that an on-site odor control system will be required for this station. A budget of $25,000 should be provided for an activated carbon scrubber to provide odor control for this pump station.

Tumalo Heights Pump Station

The Tumalo Heights Pump Station serves an area of ten (10) acres. This station service area is currently at 36% sewered serving 28 of the 78 potential build-out dwelling units. The estimated build-out base flow for this service area is 9-gpm and the estimated peak hour flow is 22-gpm. The current firm capacity of 195-gpm is adequate for build-out conditions.

The force main for this pump station is a 320 LF 4-inch line. The design velocity in this force main under firm pumping conditions is 5-fps.

Wyndemere Pump Station

The Wyndemere Pump Station serves an area of 194 acres. This station service area is currently at 21% sewered serving 139 of the 657 potential build-out dwelling units. The estimated build-out base flow for this service area is 77-gpm and the estimated peak hour flow is 233-gpm. The current firm capacity for this pump station is adequate for build-out conditions, but the condition of this station is not adequate for long-term operation. A photo of the station is shown in ***Figure 16***.

Figure 16: Wyndamere Pump Station

The force main for this pump station is a 3,931 LF 4-inch line. The design velocity in this force main under firm pumping conditions is 6.1-fps.

The force main for this station is manifolded with the Sawyer Park Pump Station. The gravity system at the discharge from these two stations does not have the capacity to handle the current or future flows from these stations. The new Westside Interceptor will cross the existing force main alignment providing the opportunity to change the discharge of this station into the new Westside Interceptor. This will eliminate most of the capacity problems in the gravity system downstream of the current discharge points. The proposed Westside Interceptor alignments are shown on ***Figure 5***.

The City is currently in the process of designing a new station to replace the Wyndamere Pump Station. Therefore, no specific cost analysis is provided in this study.

Study Area 3

Study Area 3 is located on the southwest side of the Bend planning area. The Study Area 3 pump stations and their respective drainage basins are shown in ***Figure 17***. There are six (6) pump stations in this study area.The design and current operating conditions for these pump stations are summarized in ***Tables 5 and 6.***

Table 5
Study Area 3 Pump Stations

Name	In Model	Dwelling Units		Peak Influent Flow (gpm)		Force Main	
		2005	Build-out	2005	Build-out	Size (in)	Length (ft)
Bachelor Village	N	13	140	17	50	4	862
Main Fire Station	N	Note 1	Note 1	Note 1	Note 1	2	525
Shevlin	Y	3	458	29	182	6	351
Sunrise Village #1	Y	395	1,611	222	660	6	258
Touchmark	N	-	93	-	33	6	497
Widgi Creek	Y	-	1,023	-	420	6	13,660

Note 1: The Main Fire Station Pump Station provides service to the fire station only.

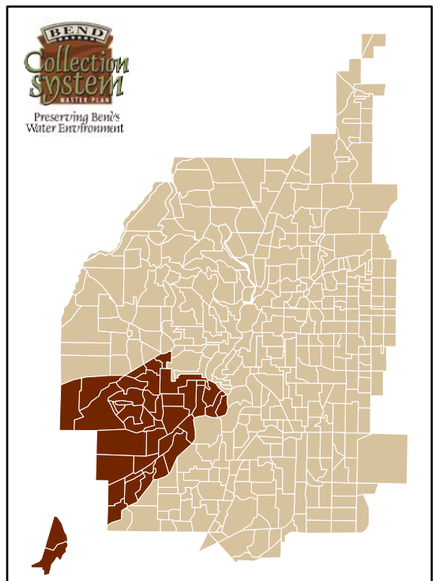
Table 6
Study Area 3 Pump Stations
Current Operating Information

Station Name	Number of Pumps	Station Capacity (gpm)		Force Main Velocity (fps)	
		Firm	Installed	Firm	Installed
Bachelor Village	2	125	250	3.2	6.4
Main Fire Station	2	80	160	8.2	16.3
Shevlin	2	280	560	3.2	6.4
Sunrise Village #1	2	250	500	2.8	5.7
Touchmark	-	425	850	4.8	-
Widgi Creek	2	450	900	5.1	10.2

Bachelor Village Pump Station

The Bachelor Village Pump Station serves an area of fifty-seven (57) acres. This station service area is currently at 9% sewered serving thirteen (13) of the 140 potential build-out dwelling units. The current (2005) estimated base flow for this station is 2-gpm with a peak hour flow of 16-gpm. The build-out estimated base flow for this station is 17-gpm with a peak flow of 50-gpm. The force main for this pump station is a 862 LF 4-inch line. The design velocity in this force main under firm pumping conditions is 3.2-fps. The existing station capacity of 125-gpm will meet the long-term requirements of the service area.

Main Fire Station Pump Station



- Main Fire Station
- PS Capacity Adequate
- PS Capacity Upgrade Required
- Existing Sewers
- UAR
- UGB
- Deschutes River
- Bachelor Village
- Shevlin
- Sunrise Village # 1
- Touchmark
- Widgi Creek

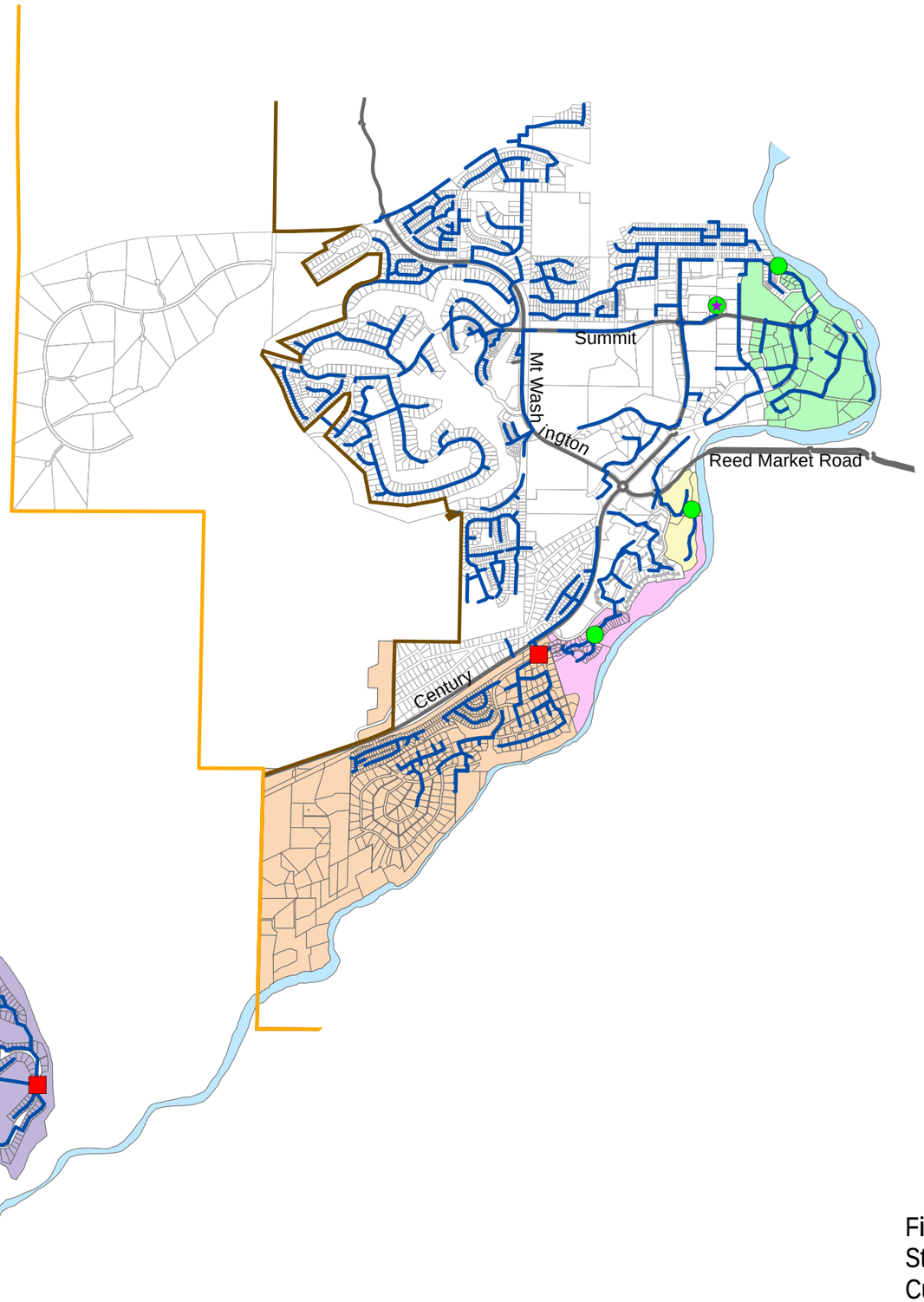


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Figure 17
Study Area 3
Current Pump Station Basins

The Main Fire Station Pump Station is a small station that serves the Main Fire Station. This station has two (2) 80-gpm pumps with one of the pumps a redundant unit. The force main for this pump station is a 524 LF 2-inch line. The design velocity in this force main under firm pumping conditions is 8.2-fps. The service requirements for this station will not change in the future so this station will meet the long-term requirements of the service area.

Shevlin Pump Station

The Shevlin Pump Station serves an area of 137 acres. This station service area is mixed riverfront zoning classification. The build-out estimated base flow for this station is 69-gpm with a peak flow of 182-gpm. The force main for this pump station is a 351LF 6-inch line. The design velocity in this force main under firm pumping conditions is 3.2-fps. The existing station capacity of 280-gpm will meet the long-term requirements of the service area.

Sunrise Village #1 Pump Station

The Sunrise Village #1 Pump Station serves an area of 693 acres. This station service area is currently at 25% sewered serving 395 of the 1,611 potential build-out dwelling units. The current (2005) estimated base flow for this station is 55-gpm with a peak hour flow of 268-gpm. The build-out estimated base flow for this station is 222-gpm with a peak flow of 660-gpm. The force main for this pump station is a 258 LF 6-inch line. The design velocity in this force main under firm pumping conditions is 2.8-fps. The current station capacity of 250-gpm is ***NOT*** adequate for build-out conditions.

The station will need to be upgraded to meet the peak flow of 660-gpm when the service area reaches build-out. This will require the installation of new pumps and associated equipment at an estimated cost of $80,000. The upgraded pumps will pump at a velocity of 7.5-fps under peak flow conditions. This will result in a TDH of 40-feet. This velocity will be acceptable due to the low TDH.

Touchmark Pump Station

The Touchmark Pump Station serves an area of 27 acres. This station service area is currently lightly sewered with the potential of serving 174 dwelling units at build-out. The build-out estimated base flow for this station is 63-gpm with a peak flow of 167-gpm. The force main for this pump station is a 497 LF 6-inch line. The design velocity in this force main under firm pumping conditions is 4.8-fps. The design TDH for this station is currently 90-feet. The existing station capacity of 425-gpm will meet the long-term requirements of the service area.

Widgi Creek Pump Station

The Widgi Creek Pump Station serves an area of 230 acres. This station is outside of the current UGB, so no information is available to determine the existing service conditions. This station service area has the potential build-out of 1,023 dwelling units. This station also serves the Inn at the 7th Mountain. According to City records, the winter average daily flow for the resort is

5,800 gpd which is fairly insignificant for this station. The build-out estimated base flow for this station is 129-gpm with a peak flow of 420-gpm. The force main for this pump station is a 13,660 LF 6-inch line.

The design flow for this pump station is 450-gpm. The design velocity in this force main under firm pumping conditions is 5.1-fps. The design TDH for this station is currently 110-feet. A photo of the station is shown in ***Figure 18***.

Figure 18: Wigi Creek Pump Station

A flow test conducted by City staff showed the actual capacity of this station to be 297-gpm. Based on the flow test, this station does ***NOT*** have the capacity to meet the long-term requirements of the service area.

An investigation of the cause for the actual operating capacity being less than the design capacity needs to be performed. Based on the results of this test, if a peak flow capacity of greater than 420-gpm is not possible with the existing pumps, the existing pumps in the station need to be changed to meet the required 420-gpm build-out flow requirement. No cost estimate for upgrading these pumps was developed due to the uncertainty of the existing operating conditions.

Study Area 4

Study Area 4 is located on the north side of the Bend planning area. The Study Area 4 pump stations and their respective drainage basins are shown in ***Figure 19***. There are 7 pump stations in this study area. The design and current operating conditions for these pump stations are summarized in ***Tables 7 and 8***.

Table 7
Study Area 4 Pump Stations

Name	In Model	Dwelling Units		Peak Influent Flow (gpm)		Force Main	
		2005	Build-out	2005	Build-out	Size (in)	Length (ft)
Boyd Acres	N	46	92	17	31	4	1,195
Highlands	N	13	278	77	196	4	4,908
Holiday Inn	N	-	127	35	90	4	3,117
North Pointe	Y	147	467	58	157	6	4,018
North Wind	Y	22	106	13	34	6	199
Phoenix	Y	75	180	17	44	6	65
Summer Meadows	N	23	104	12	31	4	892

Boyd Acres Pump Station

The Boyd Acres Pump Station serves an area of 18 acres. This station service area is currently at 50% sewered serving 46 of the potential build-out 92 dwelling units. The current (2005) estimated base flow for this station is 6-gpm with a peak hour flow of 17-gpm. The build-out estimated base flow for this station is 12-gpm with a peak flow of 31-gpm. This station has been expanded to include the Summer Meadow Pump Station flows which will add and an additional estimated peak flow of 31-gpm. The force main for this pump station is a 1,195 LF 4-inch line. The design velocity in this force main under firm pumping conditions is 1.7-fps. The existing station capacity of 113-gpm will meet the long-term requirements of the service area. The station is shown in the photo in ***Figure 20***.

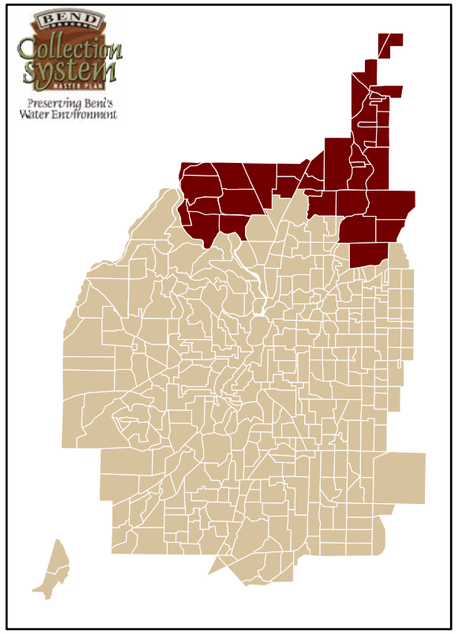
Table 8
Study Area 4 Pump Stations
Current Operating Information

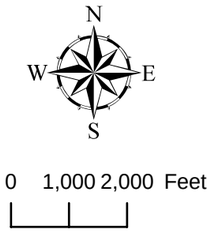
Station Name	Number of Pumps	Station Capacity (gpm)		Force Main Velocity (fps)	
		Firm	Installed	Firm	Installed
Boyd Acres	2	113	226	1.7	2.9
Highlands	2	250	500	6.4	12.8
Holiday Inn	-	-	-	-	-
Northpointe	2	265	530	3.0	6.0
North Wind	2	270	540	3.1	6.1
Phoenix	2	228	456	2.6	5.2
Summer Meadows	2	125	250	3.2	6.4

The Boyd Acres Pump Station can be removed from service with the construction of a 460-foot 8-inch trunk sewer. This new trunk will connect to a new sewer serving the area to the west of the existing service area. This new sewer will flow by gravity for discharge into the new North Interceptor. The estimated project cost to construct the gravity sewer to remove the station from service is $72,000. The estimated cost to remove the pump station is $25,000. A present value analysis of this project was done to determine the cost-effectiveness of this project. In this analysis it was assumed that the project would occur in the year 2015. Growth in the area would grow at a constant growth rate until build-out of the area occurs in 2020. Based on these assumptions, the 20 year and 50 year present values for continuing operation of the station (starting in 2006) are $204,000 and $497,000, respectively. Based on the same assumptions, the 20 year and 50 year present values for removing the pump station in 2015 are $181,000 and $187,000, respectively. This analysis shows that replacement of the pump station is cost effective when possible.

Figure 20: Boyd Acres Pump Station

Highlands Pump Station





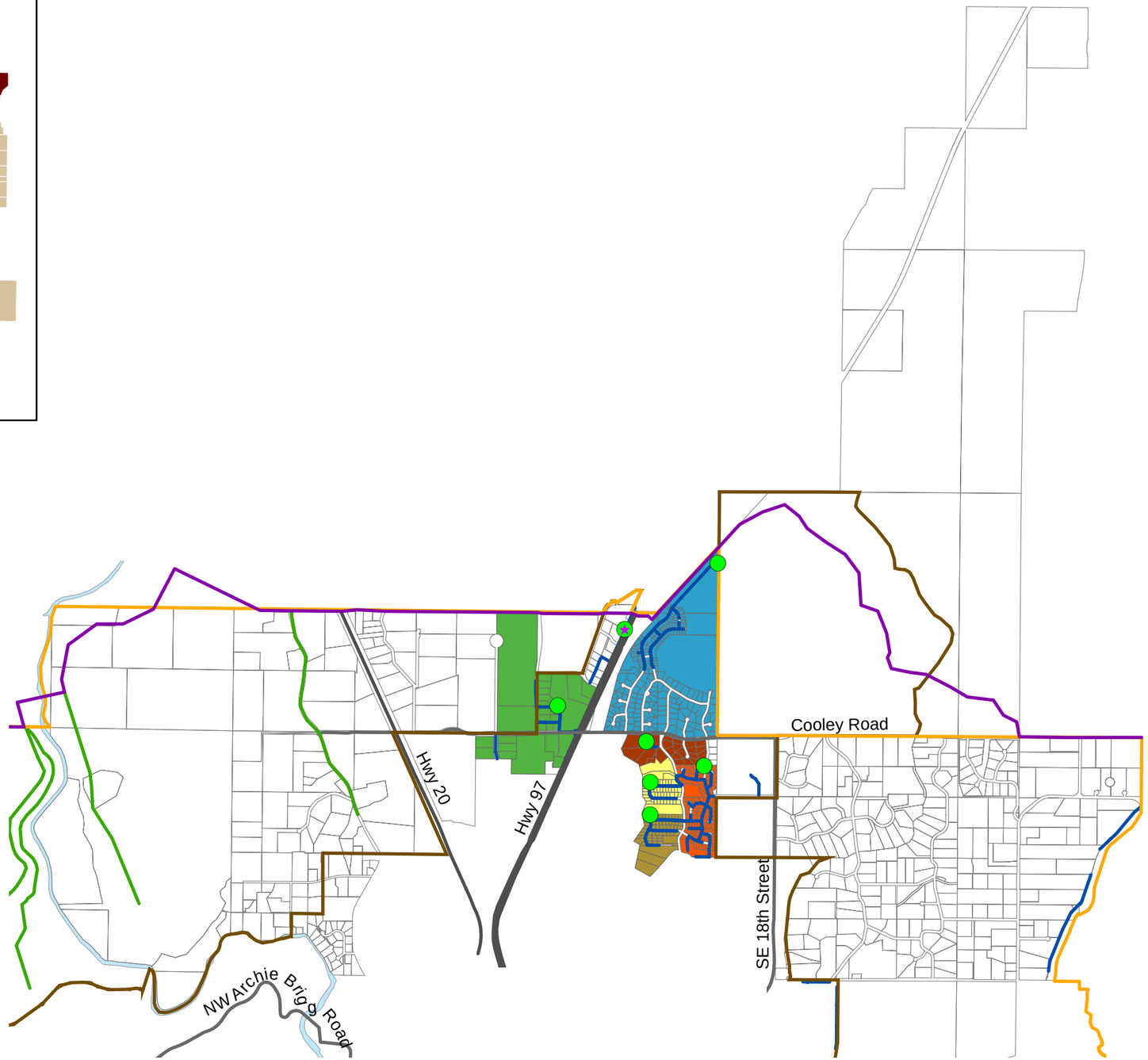


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Figure 19
Study Area 4
Current Pump Station Service Areas

The Highlands Pump Station serves an area of 110 acres. This station service area is currently 5% sewered serving 13 of the 278 potential build-out dwelling units. The current (2005) estimated base flow for this station is 2-gpm with a peak hour flow of 27-gpm. The build-out estimated base flow for this station is 77-gpm with a peak flow of 196-gpm. The force main for this pump station is a 4,908 LF 4-inch line. The design velocity in this force main under firm pumping conditions is 6.4-fps. The existing station capacity of 250-gpm will meet the long-term requirements of the service area.

The Highlands Pump Station can be removed from service with the construction of a 2,512-foot 8-inch trunk sewer. This new trunk will discharge into the new North Interceptor. The estimated project cost to construct the gravity sewer to remove the station from service is $393,000. The estimated cost to remove the pump station is $25,000. A present value analysis of this project was done to determine the cost-effectiveness of this project. In this analysis it was assumed that the project would occur in the year 2015. Growth in the area would grow at a constant growth rate until build-out of the area occurs in 2033. Based on these assumptions, the 20 year and 50 year present values for continuing operation of the station (starting in 2006) are $275,000 and $759,000, respectively. Based on the same assumptions, the 20 year and 50 year present values for removing the pump station in 2015 are $527,500 and $561,500, respectively. This analysis shows that replacement of the pump station is cost effective in the long run, but not in a 20-year planning period.

The removal of this station should be done with the development of the parcel to the north of the Highlands Pump Station basin. This cost analysis cannot be evaluated as a single project for this basin. Construction of this sewer will also provide one segment of the gravity sewer required to remove the Deschutes County Jail and North Fire Station Pump Stations as well a number of unsewered parcels located north of the intersection of Highway 20 and Highway 97.

Holiday Inn Pump Station

The Holiday Inn Pump Station is only serving the Holiday Inn Hotel at this time. The force main for this pump station is a 3,117 LF 4-inch line. This station shares a force main with the Highlands Pump Station. It is assumed that the existing station capacity will meet the long-term requirements of the service area.

The Holiday Inn Pump Station can be removed from service with the construction of a 382-foot 8-inch trunk sewer. This new trunk will discharge into the new North Interceptor. The estimated project cost to construct the gravity sewer to remove the station from service is $60,000. The estimated cost to remove the pump station is $10,000. A present value analysis of this project was done to determine the cost-effectiveness of this project. In this analysis it was assumed that the project would occur in the year 2015. A 5-gpm base flow was estimated for the life of the station. No bioxide was fed for odor control. Based on these assumptions, the 20 year and 50 year present values for continuing operation of the station (starting in 2006) are $214,000 and $517,000, respectively. Based on the same assumptions, the 20 year and 50 year present values for removing the pump station in 2015 are $159,500 and $164,500, respectively. This analysis shows that replacement of the pump station is cost effective when possible.

Northpointe Pump Station

The Northpointe Pump Station serves an area of 128 acres. This station service area is currently at 32% sewered serving 147 of the 467 potential build-out dwelling units. The current (2005) estimated base flow for this station is 20-gpm with a peak hour flow of 72-gpm. The build-out estimated base flow for this station is 58-gpm with a peak flow of 157-gpm. The force main for this pump station is a 4,018 LF 6-inch line. The design velocity in this force main under firm pumping conditions is 3.0-fps. The design TDH for this station is currently 152-feet. The existing station capacity of 265-gpm will meet the long-term requirements of the service area.
The Northpointe Pump Station can be removed from service with the construction of a 350 LF 8-inch trunk sewer. This new trunk will discharge into the new North Interceptor. The estimated project cost to construct the gravity sewer to remove the station from service is $55,000. The estimated cost to remove the pump station is $25,000. A present value analysis of this project was done to determine the cost-effectiveness of this project. In this analysis it was assumed that the project would occur in the year 2015. Growth in the area would grow at a constant growth rate until build-out of the area occurs in 2028. Based on these assumptions, the 20 year and 50 year present values for continuing operation of the station (starting in 2006) are $264,000 and $678,000, respectively. This includes the cost of a pump station capacity upgrade in the year 2015. Based on the same assumptions, the 20 year and 50 year present values for removing the pump station in 2015 are $187,000 and $191,000, respectively. This analysis shows that replacement of the pump station is cost effective when possible.

North Wind Pump Station

The North Wind Pump Station serves an area of twenty-one (21) acres. This station service area is currently at 21% sewered serving 22 of the 106 potential build-out dwelling units. The current (2005) estimated base flow for this station is 3-gpm with a peak hour flow of 11-gpm. The build-out estimated base flow for this station is 13-gpm with a peak flow of 34-gpm. The force main for this pump station is a 199 LF 6-inch line. The design velocity in this force main under firm pumping conditions is 3.1-fps. The design TDH for this station is currently 54-feet. The existing station capacity of 270-gpm will meet the long-term requirements of the service area.

The North Wind Pump Station can be removed from service to allow the system to flow by gravity to the North Pointe Pump Station Basin with the sewering of the area north of the North Wind basin. This inter-tie can be done by constructing between 300 and 400-feet of gravity sewer at an estimated cost of $63,000. The estimated cost to remove the pump station is $25,000. A present value analysis of this project was done to determine the cost-effectiveness of this project. In this analysis it was assumed that the project would occur in the year 2015. Growth in the area would grow at a constant growth rate until build-out of the area occurs in 2036. Based on these assumptions, the 20 year and 50 year present values for continuing operation of the station (starting in 2006) are $195,000 and $481,000, respectively. This includes the cost of a pump station capacity upgrade in the year 2015. Based on the same assumptions, the 20 year and 50 year present values for removing the pump station in

when the area north of the North Wind basin is sewered.

Phoenix Pump Station

Figure 21: Phoenix Pump Station

The Phoenix Pump Station serves an area of twenty-five (25) acres. This station service area is currently at 42% sewered serving 75 of the 180 potential build-out dwelling units. The current (2005) estimated base flow for this station is 10-gpm with a peak hour flow of 28-gpm. The build-out estimated base flow for this station is 17-gpm with a peak flow of 44-gpm. This station also receives flow from the Boyd Acres and Summer Meadow Pump Stations. The force main for this pump station is a 65 LF 6-inch line. The design velocity in this force main under firm pumping conditions is 2.6-fps. The design TDH for this station is currently 70-feet. The existing station capacity of 228-gpm will meet the long-term requirements of the service area as well as the flows received from Boyd Acres and Summer Meadow stations. A photo of the station is shown in ***Figure 21***.

The Phoenix station can be removed from service to allow the system to flow by gravity to the North Pointe Pump Station Basin with the sewering of the area north of the Phoenix basin. This inter-tie can be done at an estimated cost of $16,000. The estimated project cost is $41,000 which includes the cost to remove the pump station from service. The 20-year and 50-year present value costs for continued operation of the station are $209,000 and $506,000, respectively. Removal of this station from service will be a cost-effective project. This project cannot be done until sanitary service is provided to the unsewered area north of the Phoenix basin.

Summer Meadows Pump Station

The Summer Meadows Pump Station serves an area of nineteen (19) acres. This station service area is currently 22% sewered serving 23 of the 104 potential build-out dwelling units. The current (2005) estimated base flow for this station is 3-gpm with a peak hour flow of 11-gpm. The build-out estimated base flow for this station is 12-gpm with a peak flow of 31-gpm. The force main for this pump station is a 892 LF 4-inch line. The design velocity in this force main under firm pumping conditions is 3.2-fps. The existing station capacity of 125-gpm will meet the long-term requirements of the service area.

The Summer Meadows Pump Station can be removed from service with the construction of a 450-foot 8-inch trunk sewer. This new trunk will discharge into a new gravity system to the west of the station for gravity flow and discharge into the new North Interceptor. The estimated project cost to construct the gravity sewer to remove the station from service is $70,000. The estimated cost to remove the pump station is $25,000. A present value analysis of this project was done to determine the cost-effectiveness of this project. In this analysis it was assumed that the project would occur in the year 2015. Growth in the area would grow at a constant growth rate until build-out of the area occurs in 2034. Based on these assumptions, the 20 year and 50 year present values for continuing operation of the station (starting in 2006) are $201,000 and $494,000, respectively. Based on the same assumptions, the 20 year and 50 year present values for removing the pump station in 2015 are $176,000 and $183,000, respectively. This analysis shows that replacement of the pump station is cost effective. This station should be removed from service when the new gravity system to the west of the station is constructed.

Study Area 5

Study Area 5 is located in the west-central Bend planning area providing service on the west side of the Deschutes River. The Study Area 5 pump stations and their respective drainage basins are shown in ***Figure 22***. There are twelve (12) pump stations in this study area. The design and current operating conditions for these pump stations are summarized in ***Tables 9 and 10***.

Table 9
Study Area 5 Pump Stations

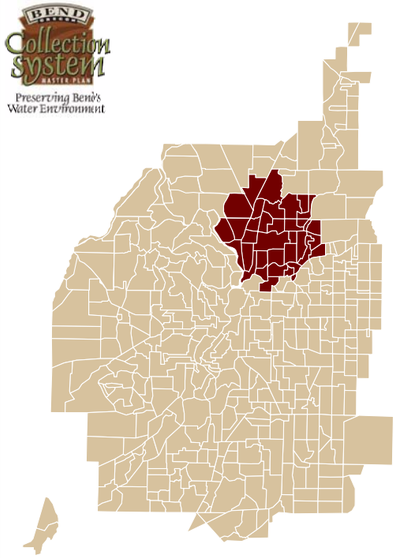
Name	In Model	Dwelling Units		Peak Influent Flow (gpm)		Force Main	
		2005	Build-out	2005	Build-out	Size (in)	Length (ft)
Canal View	Y	38	217	38	59	6	444
Deschutes Business	N	-	-	25	65	3	-
Deschutes Co. Jail	N	82	292	50	130	4	-
Empire	N	-	-	37	96	4	1,798
Empire Village	Y	64	182	21	65	4	82
Enchantment	N	129	405	61	137	4	670
Glenshire	N	215	520	73	152	4	665
Majestic	Y	303	489	112	170	6	2,286
North Fire Station	N	Note 1	Note 1	Note 1	Note 1	4	-
Quail Crossing	Y	25	149	15	46	6	306
Riverhouse	N	-	-	-	-	6	-
Service	N	54	194	30	86	4	-

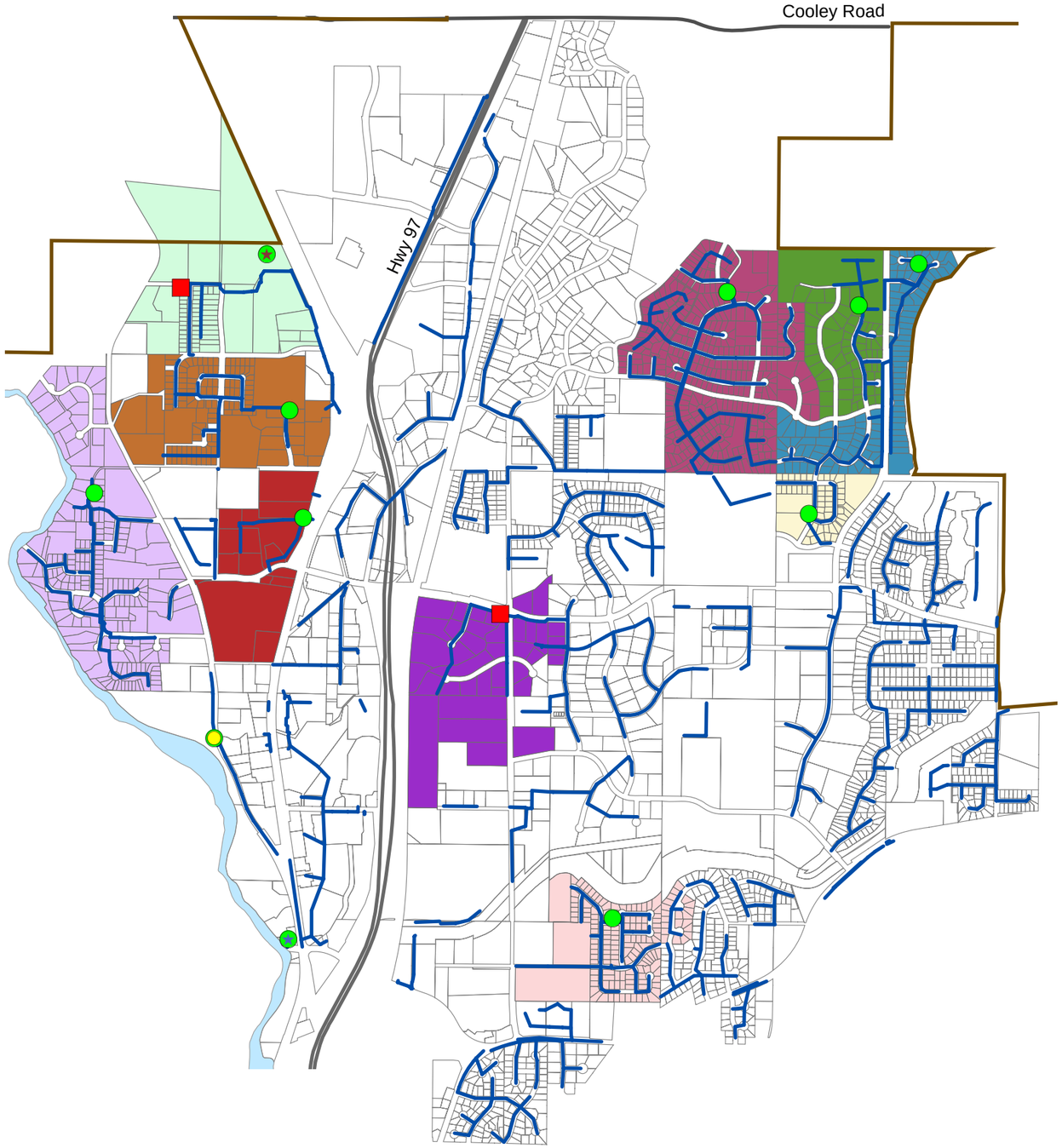
Note1: The North Fire Station Pump Station provides service to the fire station only.

Table 10
Study Area 5 Pump Stations
Current Operating Information

Station Name	Number of Pumps	Station Capacity (gpm)		Force Main Velocity (fps)	
		Firm	Installed	Firm	Installed
Canal View	2	120	240	1.4	2.7
Deschutes Business	2	100	200	4.5	9.0
Deschutes County Jail	2	115	230	2.9	5.9
Empire	2	50	100	1.3	2.6
Empire Village	2	125	250	3.2	6.4
Enchantment	2	150	300	3.8	7.7
Glenshire	2	172	244	4.4	8.8
Majestic	2	265	530	3.0	6.0
North Fire Station	2	80	160	2.0	4.1
Quail Crossing	2	208	300	-	-
Riverhouse	2	400	800	4.5	9.1
Service	2	120	240	3.1	6.1

Bend Collection System Master Plan
Preserving Bend's Water Environment





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- North Fire Station
- Riverhouse
- Sawyer Park Regional Pump Station
- PS Capacity Adequate
- PS Capacity Upgrade Required
- Existing Sewers
- UGB
- Deschutes River
- Canal View
- Deschutes Business
- Deschutes County Jail
- Empire
- Empire Village
- Enchantment
- Glenshire
- Majestic
- Quail Crossing
- Service

MWH

Figure 22
Study Area 5
Current Pump Station Service Areas

Canal View Pump Station

The Canal View Pump Station serves an area of thirty-three (33) acres. This station service area is currently 48% sewered serving 103 of the 217 potential build-out dwelling units. The current (2005) estimated base flow for this station is 14-gpm with a peak hour flow of 38-gpm. The build-out estimated base flow for this station is 23-gpm with a peak flow of 59-gpm. The force main for this pump station is a 444 LF 6-inch line. The design velocity in this force main under firm pumping conditions is 1.4-fps. The design TDH for this station is currently 22-feet. The existing station capacity of 120-gpm will meet the long-term requirements of the service area. A photo of this pump station is shown in ***Figure 23***.

Figure 23: Canal View Pump Station

Deschutes Business Pump Station

The Deschutes Business Pump Station serves an area of forty-three (43) acres. This station service area is a commercial area. The build-out estimated flow for this station is a peak flow of 65-gpm. The force main for this pump station is a 3-inch line. The design velocity in this force main under firm pumping conditions is 4.5-fps. The design TDH for this station is currently 40-feet. The existing station capacity of 100-gpm will meet the long-term requirements of the service area.

Deschutes County Jail Pump Station

The Deschutes County Jail Pump Station serves an area of 78 acres. This station service area is currently 28% sewered serving 82 of the 292 potential build-out dwelling units. The current (2005) estimated base flow for this station is 11-gpm with a peak hour flow of 41-gpm. The build-out estimated base flow for this station is 50-gpm with a peak flow of 129-gpm. A photo of this station is shown in ***Figure 24***.

Figure 24: Deschutes County Jail Pump Station

The force main for this pump station is a 50 to 100 LF 4-inch line. The design velocity in this force main under firm pumping conditions is 2.9-fps. The existing station capacity of 115-gpm is less than the estimated peak flow of 129-gpm. This may require replacement of the pumps with larger pumps, depending on the RDII of the service area. The City should monitor the operation of this station during peak RDII flow events to determine if there is a future need to upgrade the station. Installing new pumps with a capacity of 130-gpm is estimated to cost $25,300.

The Deschutes County Jail Pump Station can be removed from service with the construction of a number of 8-inch gravity sewer segments that eventually discharge to the North Interceptor. This line will also allow for removal of the North Fire Station Pump Station. This gravity sewer will also provide gravity sewers to currently unsewered areas north of the intersection of Highway 20 and Highway 97 as well as provide for the removal of the and will provide service to the currently unsewered areas to the southwest of the pump station prior to the sewer's discharge into the new North Interceptor. An analysis of the cost effectiveness of this network of sewers cannot be done for a single station. The driver for this project will be the desire to sewer a number of currently unsewered parcels adjacent to the proposed route of the gravity sewer.

Empire Pump Station

The Empire Pump Station serves an area of sixty-four (64) acres. The service area for this station is mostly commercial. The build-out estimated flow for this station is a peak flow of 96-gpm. The force main for this pump station is a 1,798 LF 4-inch line. The design velocity in this force main under firm pumping conditions is 1.3-fps. The existing station capacity of 50-gpm will ***NOT*** meet the long-term requirements of the service area.

The pumps will need to be replaced with new 100-gpm pumps to provide for the long-term needs of the service area. The existing force main is adequate as the new design velocity at 100-gpm will be 2.6-fps at a TDH of 31-feet. The estimated cost for installing new pumps in this station is $25,300.

Empire Village Pump Station

The Empire Village Pump Station serves an area of fourteen (14) acres. This station service area is currently 35% sewered serving 64 of the 182 potential build-out dwelling units. The current (2005) estimated base flow for this station is 8-gpm with a peak hour flow of 21-gpm. The build-out estimated base flow for this station is 21-gpm with a peak flow of 65-gpm. The force main for this pump station is a 82 LF 4-inch line. The design velocity in this force main under firm pumping conditions is 3.2-fps. The design TDH for this station is currently 15-feet. The existing station capacity of 125-gpm will meet the long-term requirements of the service area.

Enchantment Pump Station

The Enchantment Pump Station serves an area of 96 acres. This station service area is currently 32% sewered serving 129 of the 405 potential build-out dwelling units. The current (2005) estimated base flow for this station is 18-gpm with a peak hour flow of 61-gpm. The build-out estimated base flow for this station is 52-gpm with a peak flow of 137-gpm. The force main for this pump station is a 670 LF 4-inch line. The design velocity in this force main under firm pumping conditions is 3.8-fps. The existing station capacity of 150-gpm will meet the long-term requirements of the service area.

Glenshire Pump Station

The Glenshire Pump Station serves an area of thirty-eight (38) acres. This station service area is currently 41% sewered serving 215 of the 520 potential build-out dwelling units. The current

(2005) estimated base flow for this station is 29-gpm with a peak hour flow of 73-gpm. The build-out estimated base flow for this station is 64-gpm with a peak flow of 152-gpm. The force main for this pump station is a 665 LF 4-inch line. The design velocity in this force main under firm pumping conditions is 4.4-fps. The existing station capacity of 172-gpm will meet the long-term requirements of the service area.

Majestic Pump Station

Figure 25: Majestic Pump Station

The Majestic Pump Station serves an area of eighty-four (84) acres. This station service area is currently 62% sewered serving 303 of the 489 potential build-out dwelling units. The current (2005) estimated base flow for this station is 42-gpm with a peak hour flow of 112-gpm. The build-out estimated base flow for this station is 55-gpm with a peak flow of 170-gpm. The force main for this pump station is a 2,286 LF 6-inch line. The design velocity in this force main under firm pumping conditions is 3.0-fps. The design TDH for this station is currently 39-feet. The existing station capacity of 265-gpm will meet the long-term requirements of the service area. A photo of the Majestic Pump Station is shown in ***Figure 25***.

The Majestic Pump Station can be removed from service with the construction of a 1,800-foot 8-inch trunk sewer. This new trunk will connect the station influent sewer to the Summer Meadows Pump Station basin located to the north. The Summer Meadows Pump Station will be removed from service with a gravity sewer that will flow by gravity to the new North Interceptor. The estimated project cost to construct the gravity sewer to connect the influent sewer to the Summer Meadows gravity system is $281,000. The estimated cost to remove the pump station is $25,000. A present value analysis of this project was done to determine the cost-effectiveness of this project. In this analysis it was assumed that the project would occur in the year 2015. Growth in the area would grow at a constant growth rate until build-out of the area occurs in 2045. Based on these assumptions, the 20 year and 50 year present values for continuing operation of the station (starting in 2006) are $265,000 and $651,000, respectively. This includes the cost of a pump station capacity upgrade in the year 2015. Based on the same assumptions, the 20 year and 50 year present values for removing the pump station in 2015 are $421,000 and $445,000, respectively. This analysis shows that replacement of the pump station is cost effective in the long run, following the removal of the Summer Meadows Pump Station from service.

North Fire Station Pump Station

The North Fire Station Pump Station is a small station that serves the Main Fire Station. This station has two (2) 80-gpm pumps with one of the pumps being a redundant unit. The force main for this pump station is a 4-inch line. The design velocity in this force main under firm pumping conditions is 2.0-fps. The service requirements for this station will not change in the future so this station will meet the long-term requirements of the service area.

The North Fire Station Pump Station can be removed from service with the construction of a number of 8-inch gravity sewer segments that eventually discharge to the North Interceptor. This line will also allow for removal of the Deschutes County Jail Pump Station. This gravity sewer will also provide gravity sewers to currently unsewered areas north of the intersection of Highway 20 and Highway 97 as well as provide for the removal of the and will provide service to the currently unsewered areas to the southwest of the pump station prior to the sewer's discharge into the new North Interceptor. An analysis of the cost effectiveness of this network of sewers cannot be done for a single station. The driver for this project will be the desire to sewer a number of currently unsewered parcels adjacent to the proposed route of the gravity sewer.

Quail Crossing Pump Station

The Quail Crossing Pump Station serves an area of thirty-eight (38) acres. This station service area is currently 17% sewered serving 25 of the potential build-out 149 dwelling units. The current (2005) estimated base flow for this station is 3-gpm with a peak hour flow of 15-gpm. The build-out estimated base flow for this station is 17-gpm with a peak flow of 46-gpm. The force main for this pump station is a 306 LF 6-inch line. The design velocity in this force main under firm pumping conditions is 3.0-fps. The design TDH for this station is currently 47-feet. The existing station capacity of 208-gpm will meet the long-term requirements of the service area.

Riverhouse Pump Station

The Riverhouse Pump Station currently serves the Riverhouse Hotel and Restaurant, only. All of the flows that previously went to this station were redirected to the Sawyer Park Regional Pump Station, when it was placed into operation. This 400-gpm pump station is adequate to meet the requirements of the current service. A photo of the station is shown in ***Figure 26***.

Figure 26: Riverhouse Pump Station

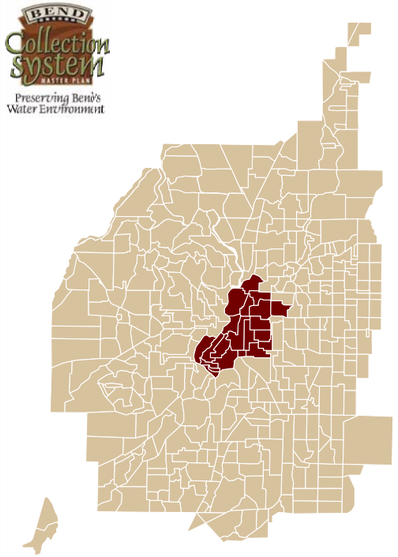
Service Pump Station

The Service Pump Station serves an area of fifty-seven (57) acres. This station service area is currently 28% sewered serving 54 of the 194 potential build-out dwelling units. The current (2005) estimated base flow for this station is 8-gpm with a peak hour flow of 30-gpm. The build-out estimated base flow for this station is 33-gpm with a peak flow of 86-gpm. The force main for this pump station is a 4-inch line. The design velocity in this force main under firm pumping conditions is 3.1-fps. The existing station capacity of 120-gpm will meet the long-term requirements of the service area.

Study Area 6

Study Area 6 serves the downtown core of the Bend planning area. The Study Area 6 pump stations and their respective drainage basins are shown in ***Figure 27***. There are five (5) pump

Bend Collection System Master Plan
Preserving Bend's Water Environment



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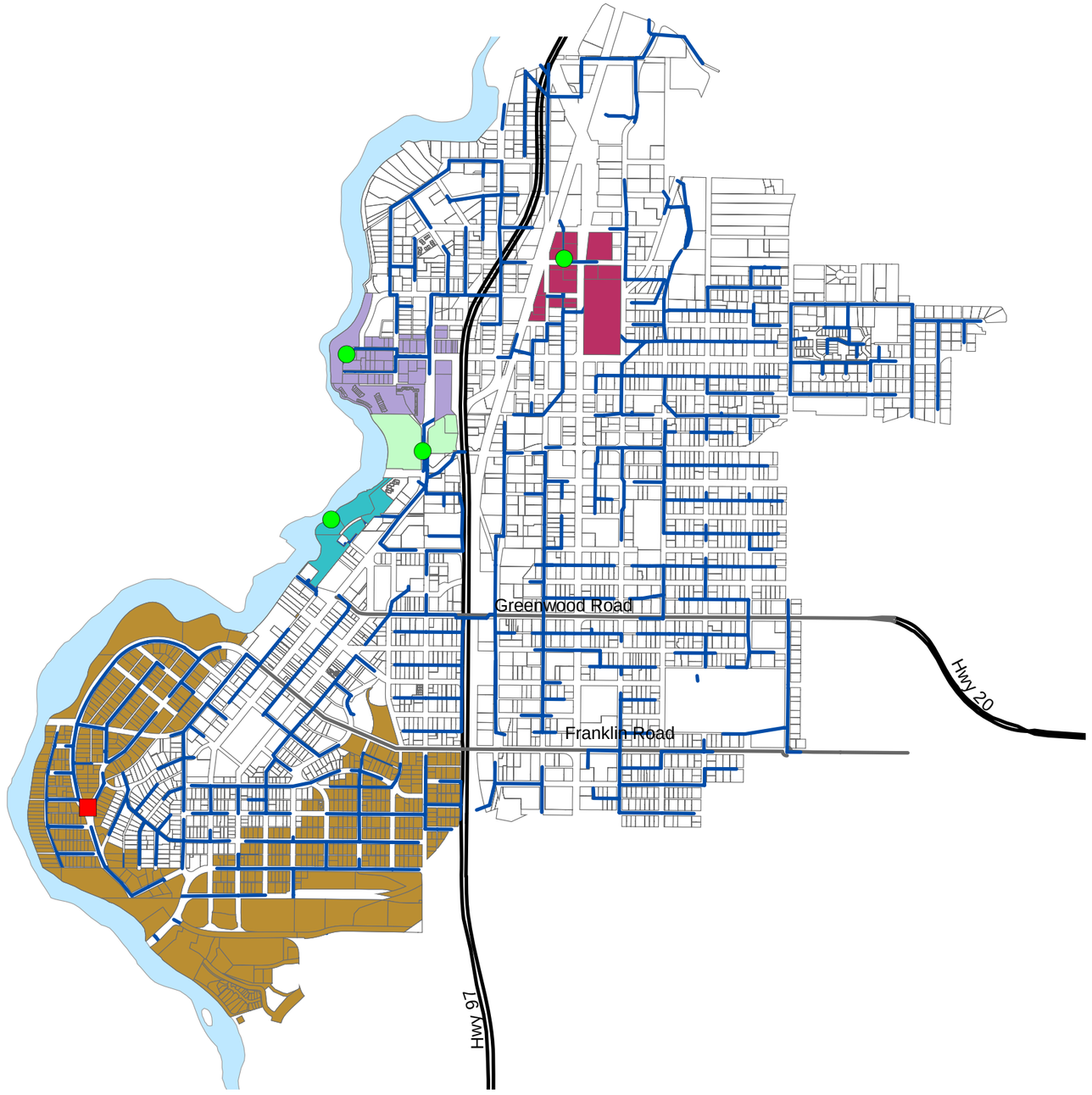


- PS Capacity Adequate
- PS Capacity Upgrade Required
- Existing Sewers
- Drake
- Linster
- Pacific
- Pioneer
- Underwood
- Deschutes River

MWH

Figure 27
Study Area 6
Current Pump Station Service Areas

stations in this study area. The design and current operating conditions for these pump stations are summarized in ***Tables 11 and 12***.

Table 11
Study Area 6 Pump Stations

Name	In Model	Dwelling Units		Peak Influent Flow (gpm)		Force Main	
		2005	Build-out	2005	Build-out	Size (in)	Length (ft)
Drake	Y	654	1,228	233	446	6	557
Linster	N	199	292	61	88	4	1,854
Pacific	N	Note 1	Note 1	Note 1	11	2	398
Pioneer	N	Note 1	Note 1	Note 1	8	6	-
Underwood	N	Note 1	Note 1	Note 1	35	4	564

Note 1: Commercial Area

Table 12
Study Area 6 Pump Stations
Current Operating Information

Station Name	Number of Pumps	Station Capacity (gpm)		Force Main Velocity (fps)	
		Firm	Installed	Firm	Installed
Drake	2	650	1,300	7.4	14.8
Linster	2	100	200	2.6	5.1
Pacific	2	50	100	5.1	10.2
Pioneer	2	60	120	0.7	1.4
Underwood	2	150	300	3.8	7.7

Drake Pump Station

The Drake Pump Station serves an area of 155 acres. This station service area is currently 53% sewered serving 654 of the 1,228 potential build-out dwelling units. The current (2005) estimated base flow for this station is 89-gpm with a peak hour flow of 233-gpm. The build-out estimated base flow for this station is 177-gpm with a peak flow of 446-gpm. The force main for this pump station is a 557 LF 6-inch line. The design velocity in this force main under firm pumping conditions is 7.4-fps. The design TDH for this station is currently 64-feet. The existing station capacity of 650-gpm will meet the long-term requirements of the service area. A photo of the location of the station is shown in ***Figure 28***. A photo of the inside of the station is shown in ***Figure 29***.

This physical condition of this station is questionable for long-term operation. The City needs to evaluate and incorporate into their CIP the replacement of the current station. The estimated cost to construct a new station is $363,000 not including land and easements for the new station.

Figure 28: Drake Pump Station Location

Figure 29: Inside Drake Pump Station Dry Well

Linster Pump Station

The Linster Pump Station serves an area of twenty-three (23) acres. This station service area is currently 68% sewered serving 199 of the 292 potential build-out dwelling units. The current (2005) estimated base flow for this station is 25-gpm with a peak hour flow of 61-gpm. The build-out estimated base flow for this station is 37-gpm with a peak flow of 88-gpm. The force main for this pump station is a 1,854 LF 4-inch line. The design velocity in this force main under firm pumping conditions is 2.6-fps. The existing station capacity of 100-gpm will meet the long-term requirements of the service area.

Pacific Pump Station

The Pacific Pump Station serves an area of eight (8) acres. This station serves a commercial area. The build-out estimated flow for this station is a peak flow of 11-gpm. The force main for this pump station is a 480 LF 2-inch line. The design velocity in this force main under firm pumping conditions is 5.1-fps. The design TDH for this station is currently 34-feet. The existing station capacity of 50-gpm should meet the long-term requirements of the service area.

Pioneer Pump Station

The Pioneer Pump Station serves an area of approximatey eight (8) acres. This station serves the restroom facilities a Pioneer Park. In addition, this station also serves Bond Street, including a large motel and a large vacant commercial lot to be built. The station has experienced high water alarms due to high flows in the past. The existing station capacity of 60-gpm should meet the long-term requirements of the service area. This station may provide service to a large commercial development in the future. As this development is permitted, long-term flows for this station will need to be determined. At that time, a decision will need to be made as to the long-term capacity of this station.

Underwood Pump Station

The Underwood Pump Station serves an area of sixteen (16) acres. This station serves a commercial area. The build-out estimated flow for this station is a peak flow of 35-gpm. The

force main for this pump station is a 564 LF4-inch line. The design velocity in this force main under firm pumping conditions is 3.8-fps. The design TDH for this station is currently 18-feet. The existing station capacity of 150-gpm will meet the long-term requirements of the service area.

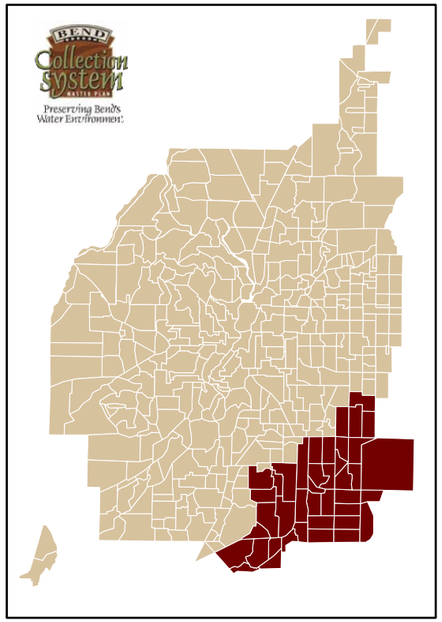
Study Area 7

Study Area 7 is located in the southeast corner of the Bend planning area. The Study Area 7 pump stations and their respective drainage basins are shown in ***Figure 30***. There are currently 23 pump stations in this study area. The design and current operating conditions for these pump stations are summarized in ***Tables 13 and 14***.

Table 13
Study Area 7 Pump Stations

Name	In Model	Dwelling Units		Peak Influent Flow (gpm)		Force Main	
		2005	Build-out	2005	Build-out	Size (in)	Length (ft)
Blue Ridge	N	68	110	28	39	3	-
Camden	Y	63	214	35	80	4	38
Crown Villa RV #1	N	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1
Crown Villa RV #2	N	Note 1	Note 1	Note 1	Note 1	Note 1	Note 1
Darnell Estates	Y	8	283	17	98	4	528
Desert Skies	Y	200	531	92	175	4	649
Foxborough	Y	384	636	138	192	6	2,837
Nottingham #1	N	98	208	45	65	4	Note 1
Nottingham #2	N	170	437	81	200[Note 2]	4	Note 1
Quail Ridge #1	N	Note 1	Note 1	Note 1	Note 1	-	Note 1
Quail Ridge #2	N	Note 1	Note 1	Note 1	Note 1	-	Note 1
Ridgewater #1	Y	43	108	19	26	4	5,489
Ridgewater #2	Y	75	202	37	62	4	3,709
South Fire Station	N	-	-	-	-	2	Note 1
Stonehaven	N	40	133	29	60	4	Note 1
Sun Meadows	N	196	651	90	196	6	Note 1
The Pines #1	N	Note 1	Note 1	Note 1	Note 1	4	Note 1
The Pines #2	N	Note 1	Note 1	Note 1	Note 1	4	Note 1
The Pines #3	N	Note 1	Note 1	Note 1	Note 1	4	Note 1
The Pines #4	N	Note 1	Note 1	Note 1	Note 1	4	Note 1
The Pines #5	N	Note 1	Note 1	Note 1	Note 1	4	Note 1
The Pines #6	N	Note 1	Note 1	Note 1	Note 1	4	Note 1
The Pines #7	N	Note 1	Note 1	Note 1	Note 1	4	Note 1

Note 1: This system was part of the original Juniper Ridge Utilities System. No service area analysis was performed due to the lack of required data.
Note 2: Nottingham #2 receives flow from Nottingham #1.



- South Fire Station
- Crown Villa RV #1 & 2
- Quail Ridge #1 & 2
- The Pines #1-7
- Murphy Regional Pump Station
- PS Capacity Adequate
- PS Capacity Upgrade Required
- Southeast Interceptor
- Existing Sewers
- UAR
- UGB
- Blue Ridge
- Camden
- Darnell Estates
- Desert Skies
- Foxborough
- Nottingham # 1
- Nottingham # 2
- Ridge Water # 1
- Ridge Water # 2
- Stonehaven
- Sun Meadows

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Reed Market Road

Business 97

Murphy Road

Ferguson Road

MWH

Figure 30
Study Area 7
Current Pump Station Service Areas

Blue Ridge Pump Station

The Blue Ridge Pump Station serves an area of 38 acres. This station service area is currently 62% sewered serving 68 of the 110 potential build-out dwelling units. The current (2005) estimated base flow for this station is 9-gpm with a peak hour flow of 28-gpm. The build-out estimated base flow for this station is 14-gpm with a peak flow of 39-gpm. The force main for this pump station is a 3-inch line. The design velocity in this force main under firm pumping conditions is 3.2-fps. The existing station capacity of 70-gpm will meet the long-term requirements of the service area.

The Blue Ridge Pump Station can be removed from service with the installation of sewers on the unsewered parcels east of the station. This area will flow by gravity to the new SE Interceptor.

Table 14
Study Area 7 Pump Stations
Current Operating Information

Station Name	Number of Pumps	Station Capacity (gpm)		Force Main Velocity (fps)	
		Firm	Installed	Firm	Installed
Blue Ridge	2	70	140	3.2	6.4
Camden	2	125	250	3.2	6.4
Crown Villa RV #1	2	80	160	Note 1	Note 1
Crown Villa RV #2	2	80	160	Note 1	Note 1
Darnell Estates	2	170	340	4.3	6.7
Desert Skies	2	95	190	2.4	4.9
Foxborough	2	260	520	3.0	5.9
Nottingham #1	2	76	152	Note 1	Note 1
Nottingham #2	2	55	110	Note 1	Note 1
Quail Ridge #1	2	100	200	Note 1	Note 1
Quail Ridge #2	2	100	200	Note 1	Note 1
Ridgewater #1	2	125	250	3.0	6.0
Ridgewater #2	2	118	236	3.2	6.4
South Fire Station	2	65	130	6.6	13.3
Stonehaven	2	250	500	6.4	12.8
Sun Meadows	2	380	670	4.3	8.6
The Pines #1	2	60	120	Note 1	Note 1
The Pines #2	2	60	120	Note 1	Note 1
The Pines #3	2	60	120	Note 1	Note 1
The Pines #4	2	60	120	Note 1	Note 1
The Pines #5	2	60	120	Note 1	Note 1
The Pines #6	2	60	120	Note 1	Note 1
The Pines #7	2	60	120	Note 1	Note 1

Note 1: This system was part of the original Juniper Ridge Utilities System. No service area analysis was performed due to the lack of required data.

This inter-tie can be done at an estimated cost of $16,000. The estimated project cost is $41,000 which includes the cost to remove the pump station from service.

Camden Pump Station

The Camden Pump Station serves an area of seventy-two (72) acres. This station service area is currently 29% sewered serving 63 of the 214 potential build-out dwelling units. The current (2005) estimated base flow for this station is 9-gpm with a peak hour flow of 35-gpm. The build-out estimated base flow for this station is 29-gpm with a peak flow of 80-gpm. The force main for this pump station is a 38 LF 4-inch line. The design velocity in this force main under firm pumping conditions is 3.2-fps. The design TDH for this station is currently 48-feet. The existing station capacity of 125-gpm will meet the long-term requirements of the service area.

The Camden Pump Station currently pumps into a common force main with four other pump stations. Three of these pump stations will be removed from the force main when the SE Interceptor is constructed. This will ensure that the interference from other pump stations will be reduced, allowing this station to pump its design flow without any problems.

Crown Villa RV #1 and #2 Pump Stations

The Crown Villa RV #1 and #2 Pump Stations were part of the original Juniper Utility System. The service areas for each of these stations are at build-out. These stations pump to a common pressure header the discharges into the Murphy Road Pump station. No detailed analysis was done on this system for the 2006 Collection System Master Plan. The City staff has stated that the existing station capacities of 80-gpm will meet the long-term requirements of the respective service areas.

Darnell Estates Pump Station

The Darnell Estates Pump Station serves an area of sixty-nine (69) acres. This station service area is currently 3% sewered serving 8 of the 283 potential build-out dwelling units. The current (2005) estimated base flow for this station is 1-gpm with a peak hour flow of 17-gpm. The build-out estimated base flow for this station is 37-gpm with a peak flow of 98-gpm. The force main for this pump station is a 528 LF 4-inch line. The design velocity in this force main under firm pumping conditions is 4.3-fps. The design TDH for this station is currently 25-feet. The existing station capacity of 170-gpm will meet the long-term requirements of the service area.

The Darnell Estates Pump Station can be removed from service with the construction of a 300-foot 8-inch sewer that discharges to the SE Interceptor on 27th Street. The estimated project cost to construct the gravity sewer to remove the station from service is $49,000. The estimated cost to remove the pump station is $25,000. A present value analysis of this project was done to determine the cost-effectiveness of this project. In this analysis it was assumed that the project would occur in the year 2015. Growth in the area would grow at a constant growth rate until build-out of the area occurs in 2035. Based on these assumptions, the 20 year and 50 year present values for continuing operation of the station (starting in 2006) are $194,000 and $517,000, respectively. Based on the same assumptions, the 20 year and 50 year present values

for removing the pump station in 2015 are $153,000 and $159,000, respectively. This analysis shows that replacement of the pump station is cost effective when the SE Interceptor is constructed.

Desert Skies Pump Station

The Desert Skies Pump Station serves an area of 142 acres. This station service area is currently 38% sewered serving 200 of the 531 potential build-out dwelling units. The current (2005) estimated base flow for this station is 28-gpm with a peak hour flow of 92-gpm. The build-out estimated base flow for this station is 65-gpm with a peak flow of 176-gpm. The force main for this pump station is a 649 LF 4-inch line. The design velocity in this force main under firm pumping conditions is 2.4-fps. The design TDH for this station is currently 32-feet. The existing station capacity of 95-gpm will ***NOT*** meet the long-term requirements of the service area. The cost to replace the pumps with new pumps to provide a capacity of 180-gpm is estimated at $30,500.

The Desert Skies Pump Station can be removed from service with the construction of a 550 LF 8-inch trunk sewer that discharges to the SE Interceptor on 27th Street. The estimated project cost to construct the gravity sewer to remove the station from service is $86,000. The estimated cost to remove the pump station is $25,000. A present value analysis of this project was done to determine the cost-effectiveness of this project. In this analysis it was assumed that the project would occur in the year 2015. Growth in the area would grow at a constant growth rate until build-out of the area occurs in 2024. Based on these assumptions, the 20 year and 50 year present values for continuing operation of the station (starting in 2006) are $255,000 and $642,000, respectively. This includes the cost of a pump station capacity upgrade in the year 2010. Based on the same assumptions, the 20 year and 50 year present values for removing the pump station in 2015 are $191,000 and $199,000, respectively. This analysis shows that replacement of the pump station is cost effective when the SE Interceptor is constructed.

Foxborough Pump Station

The Foxborough Pump Station serves an area of eighty-eight (88) acres. This station service area is currently 60% sewered serving 384 of the 636 potential build-out dwelling units. The current (2005) estimated base flow for this station is 53-gpm with a peak hour flow of 138-gpm. The build-out estimated base flow for this station is 77-gpm with a peak flow of 192-gpm. The force main for this pump station is a 2,837 LF 6-inch line. The design velocity in this force main under firm pumping conditions is 3.0-fps. The design TDH for this station is currently 66-feet. The existing station capacity of 260-gpm will meet the long-term requirements of the service area.

Nottingham #1 Pump Station

The Nottingham #1 Pump Station serves an area of sixty-three (63) acres. This station service area is currently 47% sewered serving 98 of the 208 potential build-out dwelling units. The current (2005) estimated base flow for this station is 14-gpm with a peak hour flow of 45-gpm. The build-out estimated base flow for this station is 23-gpm with a peak flow of 65-gpm. The

force main for this pump station is a 4-inch line. This station pumps through the common force main network of the original Juniper Ridge development ultimately discharging to the Murphy Road Regional Pump Station. No detailed analysis was done on this system for the 2006 Collection System Master Plan. The existing station capacity of 76-gpm will meet the long-term requirements of the service area.

Nottingham #2 Pump Station

The Nottingham #2 Pump Station serves an area of 131 acres. This station service area is currently 39% sewered serving 170 of the 437 potential build-out dwelling units. The current (2005) estimated base flow for this station is 24-gpm with a peak hour flow of 81-gpm. The build-out estimated base flow for this station is 49-gpm with a peak flow of 202-gpm. This station receives flow from the Nottingham #1 Pump Station. The force main for this pump station is a 4-inch line. This station pumps through the common force main network of the original Juniper Ridge development ultimately discharging to the Murphy Road Regional Pump Station. No detailed analysis was done on this system for the 2006 Collection System Master Plan. The existing station capacity of 55-gpm will ***NOT*** meet the long-term requirements of the service area.

The pumps will need to be replaced with new 200-gpm pumps to provide for the long-term needs of the service area. The existing force main is adequate as the new design velocity at 100-gpm will be 2.6-fps at a TDH of 31-feet. The estimated cost for installing new pumps in this station is $30,500.

Quail Ridge #1 and #2 Pump Stations

The Quail Ridge #1 and #2 Pump Stations serve areas within the original Juniper Ridge Utility. The flows from these stations are discharged through an existing pressure network to the Murphy Road Regional Pump Station. No detailed analysis was done on this system for the 2006 Collection System Master Plan. The existing station capacities of 100-gpm each will meet the long-term requirements of the service area, based on input from City staff.

Ridgewater #1 Pump Station

The Ridgewater #1 Pump Station serves an area of twenty-six (26) acres. This station service area is currently 40% sewered serving 43 of the 108 potential build-out dwelling units. The current (2005) estimated base flow for this station is 6-gpm with a peak hour flow of 19-gpm. The build-out estimated base flow for this station is 9-gpm with a peak flow of 26-gpm. The force main for this pump station is a 1,432 LF 4-inch line that is shared with four other pump stations. The design TDH for this station is 82-feet. The design velocity in this force main will vary depending on the number of stations that are pumping into the common line. The existing station capacity of 118-gpm will meet the long-term requirements of the service area.

The Ridgewater #1 Pump Station can be removed from service with the construction of a 250-foot 8-inch trunk sewer that discharges to the SE Interceptor at 15th Street. The estimated project cost to construct the gravity sewer to remove the station from service is $39,000. The estimated

cost to remove the pump station is $25,000. A present value analysis of this project was done to determine the cost-effectiveness of this project. In this analysis it was assumed that the project would occur in the year 2015. Growth in the area would grow at a constant growth rate until build-out of the area occurs in 2014. Based on these assumptions, the 20 year and 50 year present values for continuing operation of the station (starting in 2006) are $206,000 and $500,000, respectively. Based on the same assumptions, the 20 year and 50 year present values for removing the pump station in 2015 are $149,000 and $152,000, respectively. This analysis shows that replacement of the pump station is cost effective when possible.

Ridgewater #2 Pump Station

The Ridgewater #2 Pump Station serves an area of sixty-nine (69) acres. This station service area is currently 37% sewered serving 75 of the 202 potential build-out dwelling units. The current (2005) estimated base flow for this station is 10-gpm with a peak hour flow of 37-gpm. The build-out estimated base flow for this station is 21-gpm with a peak flow of 62-gpm. The force main for this pump station is an 88 LF 4-inch line that discharges to a force main that is shared with four other pump stations. The design TDH for this station is 73-feet. The design velocity in this force main will vary depending on the number of stations that are pumping into the common line. The existing station capacity of 127-gpm will meet the long-term requirements of the service area.

South Fire Station Pump Station

The South Fire Station Pump Station is a small station that serves the South Fire Station. This station has two 65-gpm pumps with one of the pumps being a redundant unit. The force main for this pump station is a 2-inch line. The design velocity in this force main under firm pumping conditions is 6.6-fps. The service requirements for this station will not change in the future so this station will meet the long-term requirements of the service area.

Stonehaven Pump Station

The Stonehaven Pump Station serves an area of seventy-four (74) acres. This station service area is currently 30% sewered serving 40 of the 133 potential build-out dwelling units. The current (2005) estimated base flow for this station is 6-gpm with a peak hour flow of 29-gpm. The build-out estimated base flow for this station is 20-gpm with a peak flow of 60-gpm. This station serves an area that was within the original Juniper Ridge Utility service area. The force main from this station is shared with the Murphy Road Regional Pump Station force main. No detailed analysis was done on this system for the 2006 Collection System Master Plan. The existing station capacity of 250-gpm will meet the long-term requirements of the service area.

Sun Meadows Pump Station

The Sun Meadows Pump Station serves an area of 142 acres. This station service area is currently 30% sewered serving 196 of the 651 potential build-out dwelling units. The current (2005) estimated base flow for this station is 27-gpm with a peak hour flow of 90-gpm. The build-out estimated base flow for this station is 74-gpm with a peak flow of 196-gpm. The force

main for this pump station is a 6-inch line. The design velocity in this force main under firm pumping conditions is 4.3-fps. The existing station capacity of 380-gpm will meet the long-term requirements of the service area The City has installed an interrupter that shuts the pumps off when the Murphy Road Pump Station is pumping. This results in occasional high level alarms in this station. This situation will be relieved when the new SE Interceptor is constructed, removing the Murphy Road Pump Station from service.

The Sun Meadows Pump Station can be removed from service with the construction of a 1,500-foot 8-inch trunk sewer that discharges to the newly sewered area located on the east side of the Foxborough Pump Station service area. The estimated project cost to construct the gravity sewer to remove the station from service is $204,000. The estimated cost to remove the pump station is $25,000. A present value analysis of this project was done to determine the cost-effectiveness of this project. In this analysis it was assumed that the project would occur in the year 2015. Growth in the area would grow at a constant growth rate until build-out of the area occurs in 2027. Based on these assumptions, the 20 year and 50 year present values for continuing operation of the station (starting in 2006) are $235,000 and $620,000, respectively. Based on the same assumptions, the 20 year and 50 year present values for removing the pump station in 2015 are $323,000 and $341,000, respectively. This analysis shows that replacement of the pump station is cost effective in the long-term, once the area to the east of the Foxorough service area is sewered.

The Pines #1, #2, #3, #4, #5, #6 and #7 Pump Stations

The Pines #1, #2, #3, #4, #5, #6 and #7 Pump Stations serve areas within the original Juniper Ridge Utility. The flows from these stations are discharged through an existing pressure network to the Murphy Road Regional Pump Station. No detailed analysis was done on this system for the 2006 Collection System Master Plan. The existing station capacities of 60-gpm each will meet the long-term requirements of the service area, based on input from City staff.

Study Area 8

Study Area 8 is located on the south side of the Bend planning area, east of the Deschutes River. The Study Area 8 pump stations and their respective drainage basins are shown in ***Figure 31***. There are twelve (12) pump stations in this study area. The design and current operating conditions for these pump stations are summarized in ***Tables 15 and 16***.

Table 15
Study Area 8 Pump Stations

Name	In Model	Dwelling Units		Peak Influent Flow (gpm)		Force Main	
		2005	Build-out	2005	Build-out	Size (in)	Length (ft)
Aspen Ridge	N	-	90	-	32	Note 1	Note 2
Deschutes River X-ing	N	27	78	12	19	3	1,380
Old Mill	Y	364	1,206	184	600	6	1,552
Pheasant Run	N	40	209	20	68	4	1,022
Pine Ridge	N	1	86	3	23	4	715

Poplar Park	N	3	48	2	13	4	1,966
River Canyon #1	N	5	296	15	92	4	Note 2
River Canyon #2	N	57	324	31	94	6	Note 2
River Rim	N	107	673	66	199	4	3,323
South Village	Y	110	1,410	178	330	6	260
Tri-Peaks	N	86	454	45	150	3	1,195
Woodriver Village	N	145	412	62	123	6	2,616

Note 1: Data not available.
Note 2: Force main is shared with Aspen Ridge and River Canyon #2 Pump Stations

Aspen Ridge Pump Station

The Aspen Ridge Pump Station serves an area of twenty-four (24) acres. This station service area was not sewered in May 2005, but has recently been sewered. The potential number of dwelling units at build-out is ninety (90). The build-out estimated base flow for this station is 12-gpm with a peak flow of 32-gpm. The force main for this pump station is manifolded with the River Canyon Pump

Table 16
Study Area 8 Pump Stations
Current Operating Information

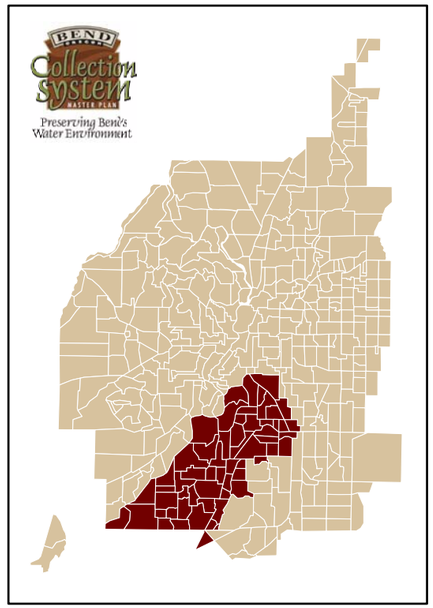
Station Name	Number of Pumps	Station Capacity (gpm)		Force Main Velocity (fps)	
		Firm	Installed	Firm	Installed
Aspen Ridge	2	Note 1	Note 1	Note 1	Note 1
Deschutes River X-ing	2	148	296	6.7	13.4
Old Mill	2	300	600	3.4	6.8
Pheasant Run	2	125	250	3.2	6.4
Pine Ridge	2	180	360	4.1	8.2
Poplar Park	2	180	360	4.6	9.2
River Canyon #1	2	320	440	8.2	16.3
River Canyon #2	2	400	800	4.5	9.1
River Rim	2	150	300	3.8	7.7
South Village	2	265	530	3.0	6.0
Tri-Peaks	2	120	240	5.4	10.9
Woodriver Village	2	240	480	2.7	5.4

Note 1: Data not available.

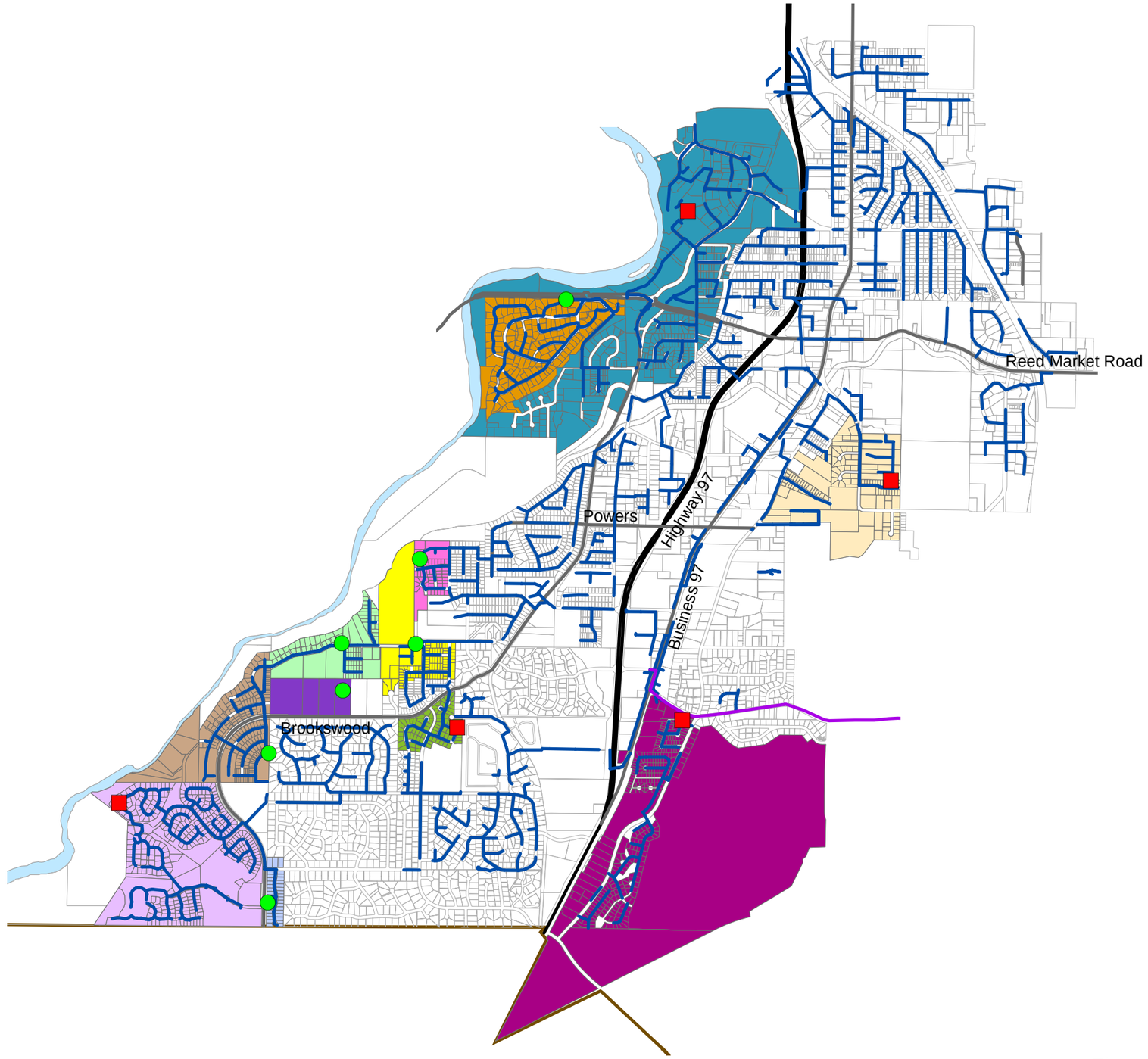
Station Nos. 1 and 2. This is a new station that was placed into operation in 2005. It is assumed that this station will be able to meet the estimated peak flow of 32-gpm at build-out of the service area.

Deschutes River Crossing Pump Station

The Deschutes River Crossing Pump Station serves an area of fourteen (14) acres. This station service area is currently 35% sewered serving 27 of the 78 potential build-out dwelling units.



PS Capacity Adequate
PS Capacity Upgrade Required
Southeast Interceptor
Existing Sewers
UGB
Deschutes River
Aspen Ridge
Deschutes River x-ing
Old Mill
Pheasant Run
Pine Ridge
Poplar Park
River Canyon #1
River Canyon #2
River Rim
South Village
Tri-Peaks
Woodriver Village



N
W E
S

0 1,000 2,000 Feet

MWH

Figure 31
Study Area 8
Current Pump Station Service Areas

The current (2005) estimated base flow for this station is 4-gpm with a peak hour flow of 12-gpm. The build-out estimated base flow for this station is 7-gpm with a peak flow of 19-gpm. The force main for this pump station is a 1,380 LF 3-inch line. The design velocity in this force main under firm pumping conditions is 6.7-fps. The existing station capacity of 148-gpm will meet the long-term requirements of the service area.

The velocity in the force main exceeds the planning criteria of 6.0-fps. This higher velocity cause excessive TDH resulting in a higher power usage for the pump station. It is recommended that the existing pumps be replaced with 100-gpm pumps at a future date when the existing pumps have reached their service life. The 100-gpm pumping rate will result in a velocity of 4.5-fps in the force main.

Old Mill Pump Station

The Old Mill Pump Station serves an area of 344 acres. This area includes the Woodriver Village pump station (84 acres). In the future, the Woodriver Village pump station will be redirected to the gravity system resulting in a reduction of the estimated build-out peak flow of 123 gpm. This station service area is currently 30% sewered serving 364 of the 1,206 potential build-out dwelling units. The current (2005) estimated base flow for this station is 50-gpm with a peak hour flow of 184-gpm. The build-out estimated base flow for this station is 236-gpm with a peak flow of 600-gpm (includes 477 gpm with Woodriver Village). The force main for this pump station is a 1,552 LF 6-inch line. The design velocity in this force main under firm pumping conditions is 3.4-fps. The design TDH for this station is currently 93-feet. The existing station capacity of 300-gpm will ***NOT*** meet the long-term requirements of the service area. A photo of this station is shown in ***Figure 32 (This build-out flow data includes the Woodriver Village pump station)***.

Figure 32: Old Mill Pump Station

At some point in the future, the capacity of the pump station will need to be increased to provide adequate capacity. This can be done by installing new pumps with a peak flow capacity of 600-gpm. The existing force main will be adequate for the future flows with a peak velocity of 6.8-fps resulting in a TDH of 95-feet. It may be appropriate to install VFDs on the pumps to conserve power. The estimated cost to install pumps with a capacity of 600-gpm is $60,000.

Pheasant Run Pump Station

The Pheasant Run Pump Station serves an area of forty-four (44) acres. This station service area is currently 19% sewered serving 40 of the 209 potential build-out dwelling units. The current (2005) estimated base flow for this station is 5-gpm with a peak hour flow of 20-gpm. The build-out estimated base flow for this station is 26-gpm with a peak flow of 68-gpm. The force main for this pump station is a 1,022 LF 4-inch line. The design velocity in this force main

under firm pumping conditions is 3.2-fps. The existing station capacity of 125-gpm will meet the long-term requirements of the service area.

Pine Ridge Pump Station

The Pine Ridge Pump Station serves an area of sixteen (16) acres. This station service area is currently 1% sewered serving 1 of the 86 potential build-out dwelling units. The current (2005) estimated base flow for this station is 1-gpm with a peak hour flow of 3-gpm. The build-out estimated base flow for this station is 9-gpm with a peak flow of 23-gpm. The force main for this pump station is a 715-foot long 4-inch line. The design velocity in this force main under firm pumping conditions is 4.1-fps. The existing station capacity of 160-gpm will meet the long-term requirements of the service area.

Poplar Park Pump Station

The Poplar Park Pump Station serves an area of 7.4 acres. This station service area is currently 6% sewered serving 3 of the 48 potential build-out dwelling units. The current (2005) estimated base flow for this station is less than 1-gpm with a peak hour flow of 2-gpm. The build-out estimated base flow for this station is 5-gpm with a peak flow of 13-gpm. The force main for this pump station is a 1,966 LF 4-inch line. The design velocity in this force main under firm pumping conditions is 4.6-fps. The existing station capacity of 180-gpm will meet the long-term requirements of the service area.

River Canyon #1 Pump Station

The River Canyon #1 Pump Station serves an area of sixty-two (62) acres. This station service area is currently 2% sewered serving 5 of the 296 potential build-out dwelling units. The current (2005) estimated base flow for this station is 1-gpm with a peak hour flow of 15-gpm. The build-out estimated base flow for this station is 35-gpm with a peak flow of 92-gpm. The force main for this pump station is a 4-inch line that changes to a 6-inch line at the River Canyon #2 Pump Station. No data was accessible to determine the LF. This station shares the force main with the Aspen Ridge Pump Station and the River Canyon #2 Pump Station. The design velocity in this force main under firm pumping conditions is dependent on whether the Aspen Ridge or River Canyon #2 Pump Stations are pumping or not. The existing station capacity of 320-gpm will meet the long-term requirements of the service area.

River Canyon #2 Pump Station

The River Canyon #2 Pump Station serves an area of sixty-three (63) acres. This station service area is currently 18% sewered serving 57 of the 324 potential build-out dwelling units. The current (2005) estimated base flow for this station is 8-gpm with a peak hour flow of 31-gpm. The build-out estimated base flow for this station is 36-gpm with a peak flow of 94-gpm. The force main for this pump station is a 6-inch line. This station shares the force main with the Aspen Ridge Pump Station and the River Canyon #1 Pump Station. The design velocity in this force main under firm pumping conditions is dependent on whether the Aspen Ridge or River

Canyon #2 Pump Stations are pumping or not. The existing station capacity of 400-gpm will meet the long-term requirements of the service area.

River Rim Pump Station

The River Rim Pump Station serves an area of 156 acres. This station service area is currently 16% sewered serving 107 of the 673 potential build-out dwelling units. The current (2005) estimated base flow for this station is 15-gpm with a peak hour flow of 66-gpm. The build-out estimated base flow for this station is 74-gpm with a peak flow of 200-gpm. The force main for this pump station is a 3,323 LF 4-inch line. The design velocity in this force main under firm pumping conditions is 3.8-fps. The existing station capacity of 150-gpm will ***NOT*** meet the long-term requirements of the service area.

At some point in the future, the capacity of the pump station will need to be increased to provide adequate capacity. This can be done by installing two new pumps, each with a peak flow capacity of 200-gpm. The existing force main will be adequate for the future flows with a peak velocity of 5.1-fps. At this velocity, the TDH for the pumps will be 140-feet. The estimated cost to install new pumps is $40,000. Increasing the size of the force main to a 6-inch line will drop the TDH from 140-feet to 44-feet. This will provide a reduction in power costs for this station. The cost of a new 6-inch force main is $677,000. A present worth analysis was performed to evaluate the cost-effectiveness of constructing a new force main. This analysis showed that the most cost-effective alternative is to continue the use of the 4-inch force main. The City should evaluate the installation of VFDs when the pumps are upgraded to minimize power use.

South Village Pump Station

The South Village Pump Station serves an area of 693 acres. This station service area is currently 8% sewered serving 110 of the 1,410 potential build-out dwelling units. The current (2005) estimated base flow for this station is 15-gpm with a peak hour flow of 178-gpm. The build-out estimated base flow for this station is 82-gpm with a peak flow of 330-gpm. The force main for this pump station is a 260 LF 6-inch line. The design velocity in this force main under firm pumping conditions is 3.0-fps. The design TDH for this station is currently 42-feet. The existing station capacity of 265-gpm will ***NOT*** meet the long-term requirements of the service area.

At some point in the future, the capacity of the pump station will need to be increased to provide adequate capacity. This can be done by installing two new pumps, each with a peak flow capacity of 330-gpm. The existing force main will be adequate for the future flows with a peak velocity of 3.7-fps. At this velocity, the TDH for the pumps will be 6.5-feet. The estimated cost to install new pumps is $25,300.

The South Village Pump Station can be removed from service with the construction of a 400 LF 8-inch trunk sewer that discharges to the new SE Interceptor extension on Murphy Road. The estimated project cost to construct the gravity sewer to remove the station from service is $63,000. The estimated cost to remove the pump station is $25,000. A present value analysis of this project was done to determine the cost-effectiveness of this project. In this analysis it was

assumed that the project would occur in the year 2015. Growth in the area would grow at a constant growth rate until build-out of the area occurs in 2032 requiring the capacity of the station to be upgraded in 2025. Based on these assumptions, the 20 year and 50 year present values for continuing operation of the station (starting in 2006) are $230,000 and $626,000, respectively. Based on the same assumptions, the 20 year and 50 year present values for removing the pump station in 2015 are $173,000 and $178,000, respectively. This analysis shows that replacement of the pump station is cost effective, once the SE Interceptor is extended to serve the areas east of the Murphy Road Pump Station.

Tri-Peaks Pump Station

The Tri-Peaks Pump Station serves an area of 87 acres. This station service area is currently 19% sewered serving 86 of the 454 potential build-out dwelling units. The current (2005) estimated base flow for this station is 12-gpm with a peak hour flow of 45-gpm. The build-out estimated base flow for this station is 59-gpm with a peak flow of 150-gpm. The force main for this pump station is an 1,195 foot long 3-inch line. The design velocity in this force main under firm pumping conditions is 3.2-fps. The existing station capacity of 120-gpm will ***NOT*** meet the long-term requirements of the service area.

At some point in the future, the capacity of the pump station will need to be increased to provide adequate capacity. This can be done by installing two new pumps, each with a peak flow capacity of 150-gpm. The existing force main will be adequate for the future flows with a peak velocity of 6.8-fps. At this velocity, the TDH for the pumps will be 100-feet. The estimated cost to install new pumps is $25,300. Increasing the size of the force main to a 4-inch line will drop the TDH from 100-feet to 38-feet. This will provide a reduction in power costs for this station. The estimated cost of a new 4-inch force main is $166,000. A present worth analysis was performed to evaluate the cost-effectiveness of constructing a new force main. This analysis showed that constructing a new force main to conserve pumping cost is not cost-effective.

Woodriver Village Pump Station

The Woodriver Village Pump Station serves an area of 84 acres. This station service area is currently 35% sewered serving 145 of the 412 potential build-out dwelling units. The current (2005) estimated base flow for this station is 20-gpm with a peak hour flow of 62-gpm. The build-out estimated base flow for this station is 47-gpm with a peak flow of 123-gpm. The force main for this pump station is a 2,616 LF 6-inch line. The design velocity in this force main under firm pumping conditions is 2.7-fps. The existing station capacity of 240-gpm will meet the long-term requirements of the service area.

Study Area 9

Study Area 9 is located on the east-central side of the Bend planning area. The Study Area 9 pump stations and their respective drainage basins are shown in ***Figure 33***. There are 4 pump stations in this study area. The design and current operating conditions for these pump stations are summarized in ***Tables 17 and 18***.

Table 17
Study Area 9 Pump Stations

Name	In Model	Dwelling Units		Peak Influent Flow (gpm)		Force Main	
		2005	Build-out	2005	Build-out	Size (in)	Length (ft)
Hollow Pines #1	N	132	315	52	92	4	2350
Hollow Pines #2	N	30	144	14	43	4	700
Renwick	N	38	55	13	15	3	358
Summit Park	N	18	157	14	50	4	262

Table 18
Study Area 9 Pump Stations
Current Operating Information

Station Name	Number of Pumps	Station Capacity (gpm)		Force Main Velocity (fps)	
		Firm	Installed	Firm	Installed
Hollow Pines #1	2	140	280	3.6	7.1
Hollow Pines #2	2	95	190	2.4	4.9
Renwick	2	40	80	1.8	3.6
Summit Park	2	125	250	3.2	6.4

Hollow Pines #1 Pump Station

The Hollow Pines #1 Pump Station serves an area of 54 acres. This station service area is currently 42% sewered serving 132 of the 315 potential build-out dwelling units. The current (2005) estimated base flow for this station is 18-gpm with a peak hour flow of 52-gpm. The build-out estimated base flow for this station is 36-gpm with a peak flow of 92-gpm. The force main for this pump station is a 2,350 LF 4-inch line. The design velocity in this force main under firm pumping conditions is 3.6-fps. The existing station capacity of 140-gpm will meet the long-term requirements of the service area.

Hollow Pines #2 Pump Station

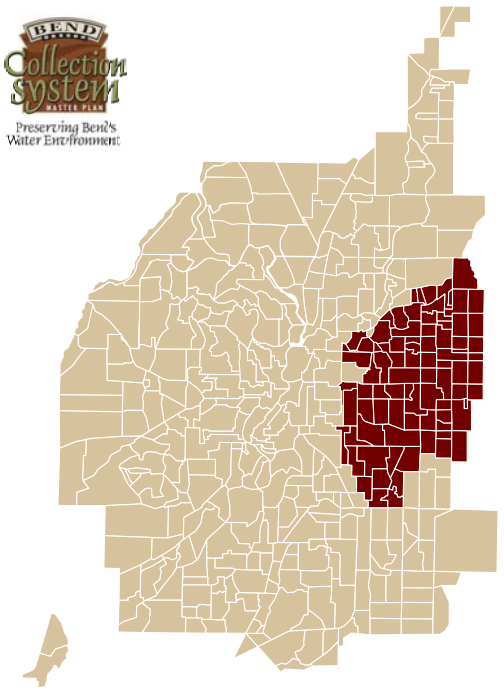
The Hollow Pines #2 Pump Station serves an area of 23 acres. This station service area is currently 26% sewered serving 30 of the 144 potential build-out dwelling units. The current (2005) estimated base flow for this station is 4-gpm with a peak hour flow of 14-gpm. The build-out estimated base flow for this station is 17-gpm with a peak flow of 43-gpm. The force main for this pump station is a 700 LF long 4-inch line. The design velocity in this force main under firm pumping conditions is 2.4-fps. The existing station capacity of 95-gpm will meet the long-term requirements of the service area.

Renwick Pump Station

The Renwick Pump Station serves an area of 8 acres. This station service area is currently 69% sewered serving 38 of the 55 potential build-out dwelling units. The current (2005) estimated

BEND Collection System MASTER PLAN

Preserving Bend's Water Environment



N

W E

S

Neff Road

27th Street

Hwy 20

Reed Market Road

PS Capacity Adequate

Southeast Interceptor

Existing Sanitary Sewers

UAR

UGB

Hollow Pines # 1

Hollow Pines # 2

Renwick

Summit Park

0 1,000 2,000 Feet

MWH

Figure 33
Study Area 9
Current Pump Station Service Basins

base flow for this station is 5-gpm with a peak hour flow of 13-gpm. The build-out estimated base flow for this station is 6-gpm with a peak flow of 15-gpm. The force main for this pump station is a 358 LF 3-inch line. The design velocity in this force main under firm pumping conditions is 1.8-fps. The existing station capacity of 40-gpm will meet the long-term requirements of the service area.

Summit Park Pump Station

The Summit Park Pump Station serves an area of 36 acres. This station service area is currently 12% sewered serving 18 of the 157 potential build-out dwelling units. The current (2005) estimated base flow for this station is 3-gpm with a peak hour flow of 14-gpm. The build-out estimated base flow for this station is 19-gpm with a peak flow of 50-gpm. The force main for this pump station is a 262-foot long 4-inch line. The design velocity in this force main under firm pumping conditions is 3.2-fps. The existing station capacity of 125-gpm will meet the long-term requirements of the service area.

The Summit Park Pump Station can be removed from service with the construction of a 500-foot 8-inch trunk sewer that discharges to the SE Interceptor on 27th Street. The estimated project cost to construct the gravity sewer to remove the station from service is $78,500. The estimated cost to remove the pump station is $15,000. A present value analysis of this project was done to determine the cost-effectiveness of this project. In this analysis it was assumed that the project would occur in the year 2015. Growth in the area would grow at a constant growth rate until build-out of the area occurs in 2032. Based on these assumptions, the 20 year and 50 year present values for continuing operation of the station (starting in 2006) are $193,000 and $485,000, respectively. Based on the same assumptions, the 20 year and 50 year present values for removing the pump station in 2015 are $177,000 and $194,000, respectively. This analysis shows that replacement of the pump station is cost effective when the SE Interceptor is constructed.

PUMP STATION CAPITAL PROJECTS

Capital improvements are projects that upgrade the capacity of the station due to growth in the service area and projects that provide for the removal of the stations from service. The 2006 Collection System Master Plan will specify capital projects only.

Pump stations must be maintained on a regular basis to ensure that they operate properly. The typical mechanical life of a pump in the highly corrosive environment of a submersible wet well is 15 to 20 years. Pumps will need to be rebuilt or replaced when their efficiency drops to a point where they can no longer provide dependable service. The rebuilding or replacement due to wear is part of the normal maintenance that is performed on the pump stations and not a capital improvement. Pump station structures can have a life of from 50 to 100-years, however their condition must be monitored to ensure a reliable operating condition.

Required Pump Station Capacity Improvements

Some of the pump stations do not meet the projected capacity requirements for their service areas. This can be due to a variety of factors including:

- Expansion of the original station service area
- Increase in the density of dwelling units
- Changes in zoning

Whatever the reason, capacity improvements will be required on a number of pump stations in the system. The exact timing for capacity improvement cannot be estimated at this time because the specific growth rates of areas are not known. This process of reaching capacity can be charted however. As flows to the station increase and pump starts begin to exceed 4-per hour or capacity cannot maintain the upper wet well levels during diurnal peaks, plans for capacity improvements should be underway. For this reason, the City staff should monitor development activity within each pump station basin including tracking of the run times of each station to determine when specific stations are reaching their design capacity.

The stations requiring a capacity increase prior to the build-out of their service area are listed in ***Table 19***. These stations are shown on ***Figure 34***.

Removing Pump Stations from Service

Nine-teen of the existing pump stations can be removed from service by constructing a gravity trunk to an existing gravity system or to one of the new gravity interceptors that will be

Table 19
Pump Stations Requiring Improvements

Study Area	Station Name	Station Capacity (gpm)		Required Improvements	Project Cost
		Existing	Build-out		($x1000)
1	Shevlin Commons	118	200	Increase pumping capacity and construct new force main	$889
2	Awbrey Glen	450	1747	Increase pumping capacity, construct new force main and improve downstream gravity sewers	$3,039
2	Shevlin Meadows	145	464	Increase pumping capacity	$91
2	Westside Regional[1]	3600	10,800	Build new pump station	$3,770
3	Sunrise Village #1	250	660	Increase pumping capacity	$80
3	Wigi Creek[2]	297	420	Evaluate system to determine cause of capacity limitation	$15
5	Deschutes Co. Jail	115	130	Evaluate RDII and increase pumping capacity, if required.	$25
5	Empire	50	100	Increase pumping capacity	$25

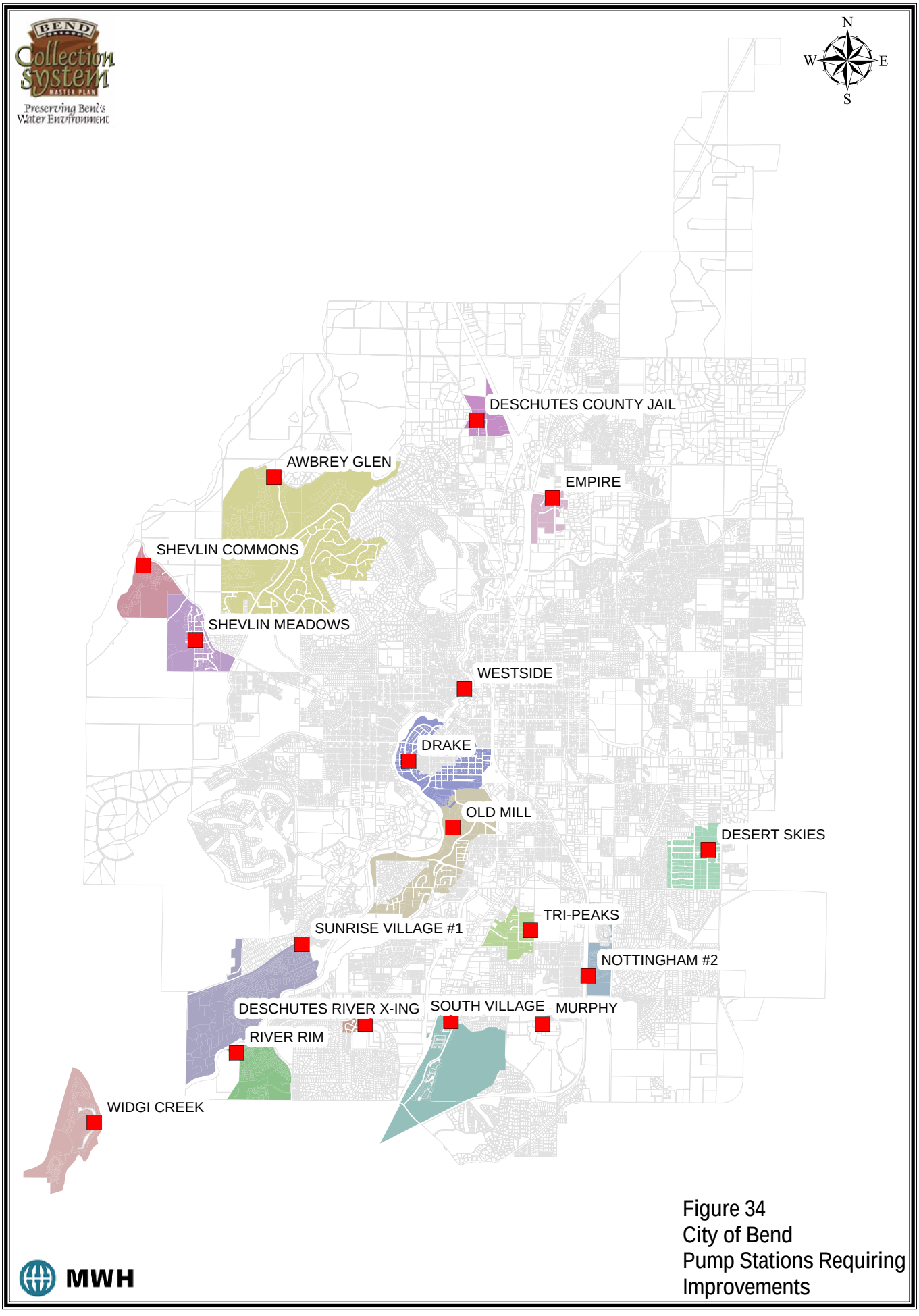


Figure 34
City of Bend
Pump Stations Requiring Improvements

MWH

6	Drake	650	500	Replace pump station with new 500-gpm station	$363
7	Desert Skies	95	175	Increase pumping capacity	$31
7	Nottingham #2	55	200	Increase pumping capacity	$31
7	Murphy Road Regional	300	1900	Remove with construction of SE Interceptor	-
8	Deschutes River X-ing	148	100	Reduce pumping capacity to 100-gpm when pumps are replaced	-
8	Old Mill	300	600	Increase pumping capacity and evaluate installation of VFDs	$60
8	River Rim	150	200	Increase pumping capacity	$40
8	South Village	265	330	Increase pumping capacity	$25
8	Tri-Peaks	120	150	Increase pumping capacity	$25

Notes
1. Westside Regional cost are for pump station only. Cost for force main are included in Westside Interceptor Costs
2. Wigi Creek actual measured capacity is 297-gpm. Design capacity is 450-gpm.

constructed as part of the master plan. A summary of the stations that can be removed from service are listed in ***Table 20***. A present worth evaluation for each station to be removed from service was done to determine the cost-effectiveness of the project. A 20-year and 50-year present worth analysis was done to show the long-term savings of a gravity system when compared to a mechanical system. This analysis is summarized in ***Table 21***. This includes the estimated cost for removal of each of these stations. These stations are shown on ***Figure 35***.

Table 20
Pump Stations to be Removed from Service

Study Area	Station Name	Project Description	Project Cost ($x1000)
1	Shevlin Commons	Construct 380-foot trunk sewer to North Interceptor	$97.5
2	Awbrey Glen	Construct North Interceptor Trunk 4	$1,483
4	Boyd Acres	Construct 460-foot trunk sewer	$97
4	Highlands	Construct 2512-foot trunk sewer	$418
4	Holiday Inn	Construct 382-foot trunk sewer	$70
4	Northpointe	Construct 350-foot trunk sewer	$80
4	North Wind	Construct 400-foot trunk sewer when area north of pump station is sewered	$88

4	Phoenix	Connect to new gravity system to the north when it is constructed	$41
4	Summer Meadows	Construct 450-foot trunk sewer	$95
5	Deschutes Co. Jail	Connect to gravity sewer system when it is constructed to the northeast of the station	$25
5	Majestic	Construct 1800-foot gravity sewer to Summer Meadows PS basin when Summer Meadows PS is removed from service	$306
5	North Fire Station	Connect to gravity sewer system when it is constructed to the northeast of the station	$25
7	Blue Ridge	Connect to new gravity system to the east when it is constructed	$41
7	Darnell Estates	Construct 300-foot trunk sewer to SE Interceptor on 27th Ave.	$74
7	Desert Skies	Construct 550-foot trunk sewer to SE Interceptor on 27th Ave.	$111
7	Murphy Road	Remove station when SE Interceptor is constructed on Murphy Road	-
7	Ridgewater #1	Construct 250-foot trunk sewer to SE Interceptor on 15th Ave.	$64
7	Sun Meadows	Construct 1500-foot trunk sewer to connect to new gravity system east of the basin when it is constructed	$229
8	South Village	Construct 400-foot sewer to connect to the SE Interceptor on Murphy Road	$88
9	Summit Park	Construct 500-foot sewer to connect to the SE Interceptor on 27th Street	$93.5

Table 21
Present Value Analysis of
Pump Stations to be Removed from Service

Study Area	Station Name	Project Cost ($x1000)	Continued Operation Present Value		Remove From Service Present Value		Average[1] Annual Savings ($/year)
			20-year	50-year	20-year	50-year	
1	Shevlin Commons	$97.5	$1,119,000	$1,542,000	$197,300	$202,400	$46,085
2	Awbrey Glen	$1,483	$2,678,000	$3,988,000	$1,842,000	$1,955,000	$41,800
4	Boyd Acres	$97	$204,000	$497,000	$181,000	$187,000	$1,150
4	Highlands	$418	$275,000	$759,000	$527,000	$561,000	($12,600)
4	Holiday Inn	$70	$214,000	$517,000	$159,500	$164,000	$2,725
4	Northpointe	$80	$264,000	$678,000	$187,000	$191,000	$3,850
4	North Wind	$88	$195,000	$481,000	$167,000	$172,000	$1,400
4	Phoenix	$41	$209,000	$506,000	Note 2	Note 2	Note 2
4	Summer Meadows	$95	$201,000	$494,000	$176,000	$183,000	$1,250
5	Deschutes Co. Jail	25	Note 3	Note 3	Note 3	Note 3	Note 3
5	Majestic	$306	$265,000	$651,000	$421,000	$445,000	($7,800)
5	North Fire Station	25	Note 3	Note 3	Note 3	Note 3	Note 3
7	Blue Ridge	$41	$211,000	$513,000	$132,000	$125,000	$3,950

Notes
1. Annual Savings based on 20-year present value.
2. Removal of station will be cost effective, but cannot be done until sanitary service is provided to the unsewered area north of the Phoenix basin.
3. Present value analysis was not done due to inability to break out specific costs for gravity sewer providing service to multiple projects.

Table 21 (cont)
Present Value Analysis of
Pump Stations to be Removed from Service

Study Area	Station Name	Project Cost ($x1000)	Present Value		Present Value		Average[1] Annual Savings ($/year)
			20-year	20-year	20-year	50-year	
7	Darnell Estates	$74	$194,000	$517,000	$153,000	$159,000	$2,050
7	Desert Skies	$111	$255,000	$642,000	$191,000	$199,000	$3,200
7	Murphy Road	Note 4	Note 4	Note 4	Note 4	Note 4	Note 4
7	Ridgewater #1	$64	$206,000	$500,000	$149,000	$152,000	$2,850
7	Sun Meadows	$229	$235,000	$620,000	$323,000	$341,000	($4,400)
8	South Village	$88	$230,000	$626,000	$173,000	$178,000	$2,850
9	Summit Park	$93.5	$193,000	$485,000	$177,000	$194,000	$800

Notes
4. Murphy Road Pump Station to be removed from service with construction of SE interceptor.

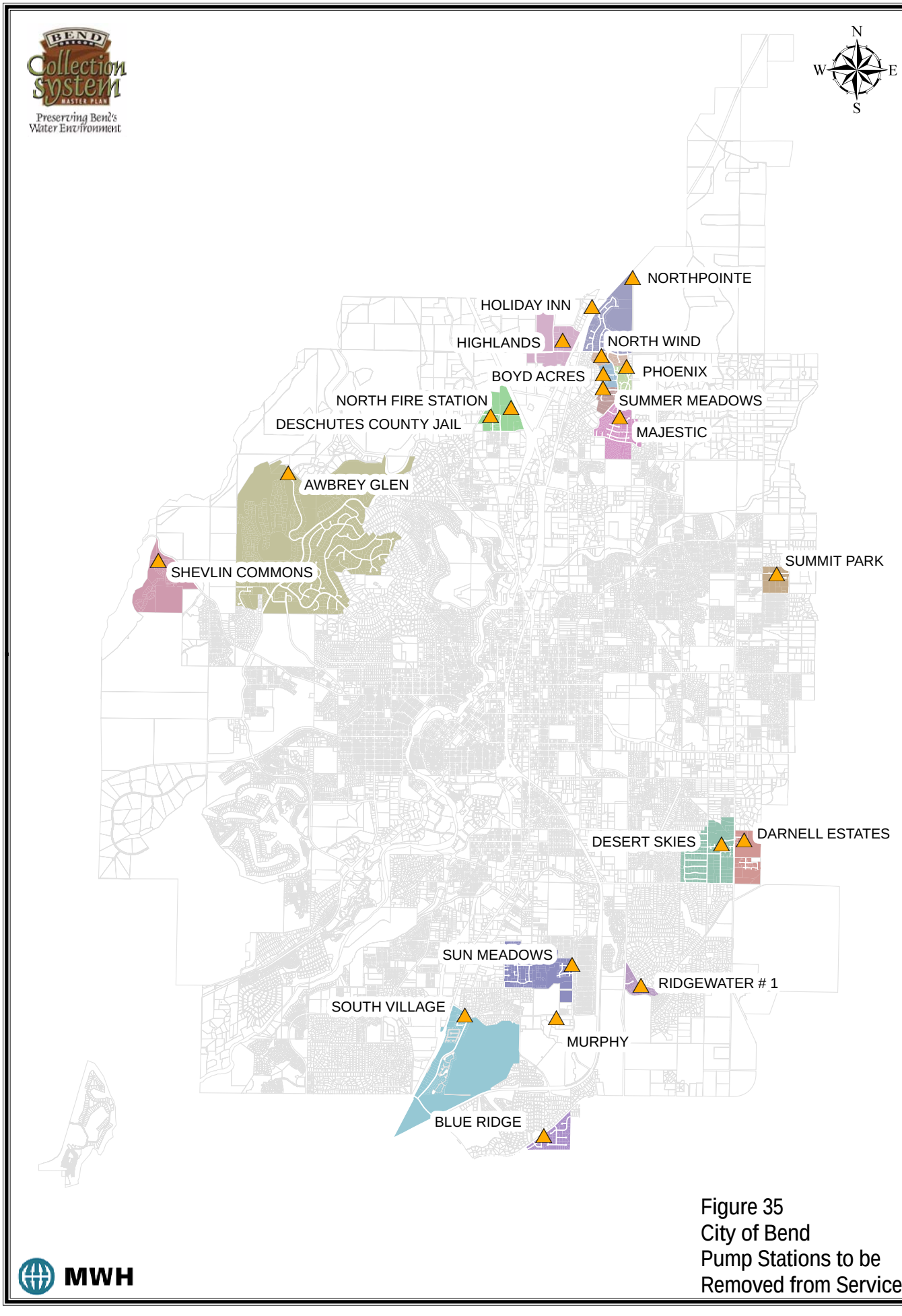


Figure 35
City of Bend
Pump Stations to be
Removed from Service

MWH

ATTACHMENT A
PUMP STATION SUMMARIES

Pump Station No. 13084 **Station Name:** ASPEN RIDGE

Basin Summary

Area 23.9 acres Study Area 8 % Sewered 0.0

Dwelling Units

2005 0 2010 _____ 2020 _____ 2030 _____ Build-out 90

Flow Projections

2005 Base Flow 0 gpm 2005 Peak Hour Flow 5 gpm

Build-out Base Flow 12 gpm Build-out Peak Hour Flow 32 gpm

Note: Shares FM with River Canyon #1 and #2

Pump Station Summary

Pump Station No. 13084 Pump Station Name ASPEN RIDGE

Location _____

Type of Installation -- Manufacturer Meyers

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power Portable

Motor Size 25 Hp Motor Speed -- rpm Rated Flow 50 gpm

Force Main Diam. -- Inches Force Main Length -- feet

Pump Station No. 13082 **Station Name:** AWBREY GLEN

Basin Summary

Area 1013.0 acres Study Area 2 % Sewered 16.4

Dwelling Units

2005 764 2010 _____ 2020 _____ 2030 _____ Build-out 4668

Flow Projections

2005 Base Flow 104 gpm 2005 Peak Hour Flow 445 gpm

Build-out Base Flow 501 gpm Build-out Peak Hour Flow 1747 gpm

Pump Station Summary

Pump Station No. 13082 Pump Station Name AWBREY GLEN

Location _____

Type of Installation -- Manufacturer --

Wet Well Size 24.72 feet No. of Pumps 2 Auxiliary Power --

Motor Size 75 Hp Motor Speed 1760 rpm Rated Flow 450 @ 420ft gpm

Force Main Diam. 8 Inches Force Main Length 8726 feet

Pumps work in series – pairs of 2 @ 75 Hp each.
2 Series pump @ 210 ft each
Changed by putting a 3-inch line to add more head
Use 275 gpm w/existing bottleneck. Adding additional flow will flood downstream gravity.

Pump Station No. 13002 **Station Name:** BACHELOR VILLAGE

Basin Summary

Area 57.2 acres Study Area 3 % Sewered 9.3

Dwelling Units

2005 13 2010 _____ 2020 _____ 2030 _____ Build-out 140

Flow Projections

2005 Base Flow 2 gpm 2005 Peak Hour Flow 16 gpm

Build-out Base Flow 17 gpm Build-out Peak Hour Flow 50 gpm

Pump Station Summary

Pump Station No. 13002 Pump Station Name BACHELOR VILLAGE

Location _____

Type of Installation -- Manufacturer --

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power PORTABLE

Motor Size 7.5 Hp Motor Speed -- rpm Rated Flow 125 gpm

Force Main Diam. 4 Inches Force Main Length 862 feet

Pump Station No. 13048 **Station Name:** BLUE RIDGE

Basin Summary

Area 38.28 acres Study Area 7 % Sewered 61.8

Dwelling Units

2005 68 2010 ____ 2020 ____ 2030 ____ Build-out 110

Flow Projections

2005 Base Flow 9 gpm 2005 Peak Hour Flow 28 gpm

Build-out Base Flow 14 gpm Build-out Peak Hour Flow 39 gpm

Note: Discharges to Murphy through Mt. High pressure system

Pump Station Summary

Pump Station No. 13048 Pump Station Name BLUE RIDGE

Location BLUE RIDGE RD

Type of Installation SUBMERSIBLE Manufacturer MYERS

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power None

Motor Size 5 Hp Motor Speed -- rpm Rated Flow 70 gpm

Force Main Diam. 3 Inches Force Main Length N/A feet

Pump Station No. 13022 **Station Name:** BOYD ACRES

Basin Summary

Area 17.86 acres Study Area 4 % Sewered 50.0

Dwelling Units

2005 46 2010 ____ 2020 ____ 2030 ____ Build-out 92

Flow Projections

2005 Base Flow 6 gpm 2005 Peak Hour Flow 17 gpm

Build-out Base Flow 12 gpm Build-out Peak Hour Flow 31 gpm

Pump Station Summary

Pump Station No. 13022 Pump Station Name BOYD ACRES

Location ____

Type of Installation -- Manufacturer MYERS

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power --

Motor Size 7.5 Hp Motor Speed -- rpm Rated Flow 113 gpm

Force Main Diam. 4 Inches Force Main Length 1195 feet

Notes: Original station was expanded to a capacity of 113 to provide capacity to accept flows from the Summer Meadows pump station.

Pump Station No. 13043 **Station Name:** CAMDEN

Basin Summary

Area 71.52 acres Study Area 7 % Sewered 29.4

Dwelling Units

2005 63 2010 ____ 2020 ____ 2030 ____ Build-out 214

Flow Projections

2005 Base Flow 9 gpm 2005 Peak Hour Flow 35 gpm

Build-out Base Flow 29 gpm Build-out Peak Hour Flow 80 gpm

Pump Station Summary

Pump Station No. 13043 Pump Station Name CAMDEN

Location ____

Type of Installation -- Manufacturer MYERS

Wet Well Size 6 feet No. of Pumps 2 Auxiliary Power --

Motor Size 7.5 Hp Motor Speed 1750 rpm Rated Flow 125 gpm

Force Main Diam. 4 Inches Force Main Length 38 feet @48 TDH

Pump Station No. 13025 **Station Name:** CANAL VIEW

Basin Summary

Area 32.55 acres Study Area 5 % Sewered 47.5

Dwelling Units

2005 103 2010 _____ 2020 _____ 2030 _____ Build-out 217

Flow Projections

2005 Base Flow 14 gpm 2005 Peak Hour Flow 38 gpm

Build-out Base Flow 23 gpm Build-out Peak Hour Flow 59 gpm

Pump Station Summary

Pump Station No. 13025 Pump Station Name CANAL VIEW

Location _____

Type of Installation -- Manufacturer MYERS

Wet Well Size 8 feet No. of Pumps 2 Auxiliary Power --

Motor Size -- Hp Motor Speed -- rpm Rated Flow 120 gpm

Force Main Diam. 6 Inches Force Main Length 444 feet

Pump Station No. 13057 **Station Name:** CROWN VILLA RV # 1

Basin Summary

Area _____ acres Study Area 7 % Sewered _____

Dwelling Units

2005 _____ 2010 _____ 2020 _____ 2030 _____ Build-out _____

Flow Projections

2005 Base Flow Note gpm 2005 Peak Hour Flow Note gpm

Build-out Base Flow Note gpm Build-out Peak Hour Flow Note gpm

Note: Negligible flow (serves private lots).

Note: Discharges to Murphy pressure system (Juniper Utility)

Pump Station Summary

Pump Station No. 13057 Pump Station Name CROWN VILLA RU # 1

Location _____

Type of Installation SUBMERSIBLE Manufacturer --

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power NO

Motor Size 2 Hp Motor Speed -- rpm Rated Flow 80 gpm

Force Main Diam. -- Inches Force Main Length -- feet

Pump Station No. 13056 **Station Name:** CROWN VILLA RV # 2

Basin Summary

Area _____ acres Study Area 7 % Sewered _____

Dwelling Units

2005 _____ 2010 _____ 2020 _____ 2030 _____ Build-out _____

Flow Projections

2005 Base Flow Note gpm 2005 Peak Hour Flow Note gpm

Build-out Base Flow Note gpm Build-out Peak Hour Flow Note gpm

Note: Negligible flow (serves private lots).

Note: Discharges to Murphy pressure system (Juniper Utility)

Pump Station Summary

Pump Station No. 13057 Pump Station Name CROWN VILLA RU # 2

Location _____

Type of Installation SUBMERSIBLE Manufacturer --

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power NO

Motor Size 2 Hp Motor Speed -- rpm Rated Flow 80 gpm

Force Main Diam. -- Inches Force Main Length -- feet

Pump Station No. 13041 **Station Name:** DARNELL ESTATES

Basin Summary

Area 68.55 acres Study Area 7 % Sewered 2.8

Dwelling Units

2005 8 2010 _____ 2020 _____ 2030 _____ Build-out 283

Flow Projections

2005 Base Flow 1 gpm 2005 Peak Hour Flow 17 gpm

Build-out Base Flow 37 gpm Build-out Peak Hour Flow 98 gpm

Pump Station Summary

Pump Station No. 13041 Pump Station Name DARNELL ESTATES

Location _____

Type of Installation -- Manufacturer HYDROMATIC

Wet Well Size 16.92 feet No. of Pumps 2 Auxiliary Power --

Motor Size 2 Hp Motor Speed 1750 rpm Rated Flow 170 gpm

Force Main Diam. 4 Inches Force Main Length 528 feet @25.1 TDH

Pump Station No. 13014 **Station Name:** DESCHUTES BUSINESS

Basin Summary

Area 43.1 acres Study Area 5 % Sewered 0.0

Dwelling Units

2005 Note 2010 2020 2030 Build-out Note

Flow Projections

2005 Base Flow 0 gpm 2005 Peak Hour Flow 9 gpm

Build-out Base Flow 25 gpm Build-out Peak Hour Flow 65 gpm

Note: Commercial Zone

Pump Station Summary

Pump Station No. 13014 Pump Station Name DESCHUTES BUSINESS

Location

Type of Installation -- Manufacturer HYDRONIX

Wet Well Size -- feet No. of Pumps -- Auxiliary Power --

Motor Size -- Hp Motor Speed -- rpm Rated Flow 100 gpm

Force Main Diam. 3 Inches Force Main Length -- feet

Pump Station No. 13011 **Station Name:** DESCHUTES COUNTY JAIL

Basin Summary

Area 77.5 acres Study Area 5 % Sewered 28.1

Dwelling Units

2005 82 2010 _____ 2020 _____ 2030 _____ Build-out 292

Flow Projections

2005 Base Flow 11 gpm 2005 Peak Hour Flow 41 gpm

Build-out Base Flow 50 gpm Build-out Peak Hour Flow 129 gpm

Pump Station Summary

Pump Station No. 13011 Pump Station Name DESCHUTES COUNTY JAIL

Location HARDY RD

Type of Installation _____ Manufacturer HYDROMATIC

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power --

Motor Size 7.5 Hp Motor Speed -- rpm Rated Flow 115 gpm

Force Main Diam. 4 Inches Force Main Length -- feet

Pump Station No. 13068 **Station Name:** DESCHUTES RIVER X-ING

Basin Summary

Area 13.8 acres Study Area 8 % Sewered 34.6

Dwelling Units

2005 27 2010 _____ 2020 _____ 2030 _____ Build-out 78

Flow Projections

2005 Base Flow 4 gpm 2005 Peak Hour Flow 12 gpm

Build-out Base Flow 7 gpm Build-out Peak Hour Flow 19 gpm

Pump Station Summary

Pump Station No. 13068 Pump Station Name DESCHUTES RIVER X-ING

Location MAHOGANY DR

Type of Installation SUBMERSIBLE Manufacturer FLYGT

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power --

Motor Size 5 Hp Motor Speed -- rpm Rated Flow 148 gpm

Force Main Diam. 3 Inches Force Main Length 1380 feet

Pump Station No. 13042 **Station Name:** DESERT SKIES

Basin Summary

Area 141.6 acres Study Area 7 % Sewered 37.7

Dwelling Units

2005 200 2010 _____ 2020 _____ 2030 _____ Build-out 531

Flow Projections

2005 Base Flow 28 gpm 2005 Peak Hour Flow 92 gpm

Build-out Base Flow 65 gpm Build-out Peak Hour Flow 176 gpm

Pump Station Summary

Pump Station No. 13042 Pump Station Name DESERT SKIES

Location _____

Type of Installation -- Manufacturer HYDROMATIC

Wet Well Size 16.92 feet No. of Pumps 2 Auxiliary Power --

Motor Size -- Hp Motor Speed -- rpm Rated Flow 95 gpm

Force Main Diam. 4 Inches Force Main Length 649 feet

Pump Station No. 13005 **Station Name:** DRAKE

Basin Summary

Area 155.0 acres Study Area 6 % Sewered 53.3

Dwelling Units

2005 654 2010 ____ 2020 ____ 2030 ____ Build-out 1228

Flow Projections

2005 Base Flow 89 gpm 2005 Peak Hour Flow 233 gpm

Build-out Base Flow 177 gpm Build-out Peak Hour Flow 446 gpm

Pump Station Summary

Pump Station No. 13005 Pump Station Name DRAKE

Location ____

Type of Installation -- Manufacturer CORNELL

Wet Well Size 8.15 feet No. of Pumps 2 Auxiliary Power --

Motor Size -- Hp Motor Speed -- rpm Rated Flow 650 gpm

Force Main Diam. 6 Inches Force Main Length 557 feet

NOTE: Information based on design drawing. Staff stated that single pump capacity is actually 380-gpm.

Pump Station No. 13015 **Station Name:** EMPIRE

Basin Summary

Area 63.5 acres Study Area 5 % Sewered 0.0

Dwelling Units

2005 0 2010 2020 2030 Build-out 0

Flow Projections

2005 Base Flow 0 gpm 2005 Peak Hour Flow 13 gpm

Build-out Base Flow 37 gpm Build-out Peak Hour Flow 96 gpm

Pump Station Summary

Pump Station No. 13015 Pump Station Name EMPIRE

Location

Type of Installation -- Manufacturer MYERS

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power --

Motor Size -- Hp Motor Speed -- rpm Rated Flow 50 gpm

Force Main Diam. 4 Inches Force Main Length 1798 feet

Pump Station No. 13005 **Station Name:** EMPIRE VILLAGE

Basin Summary

Area 14.13 acres Study Area 5 % Sewered 35.2

Dwelling Units

2005 64 2010 2020 2030 Build-out 182

Flow Projections

2005 Base Flow 8 gpm 2005 Peak Hour Flow 21 gpm

Build-out Base Flow 21 gpm Build-out Peak Hour Flow 65 gpm

Pump Station Summary

Pump Station No. 13016 Pump Station Name EMPIRE VILLAGE

Location

Type of Installation -- Manufacturer HYDROMATIC

Wet Well Size 13.54 feet No. of Pumps 2 Auxiliary Power --

Motor Size -- Hp Motor Speed -- rpm Rated Flow 125 gpm

Force Main Diam. 4 Inches Force Main Length 82 feet

Pump Station No. 13010 **Station Name:** ENCHANTMENT

Basin Summary

Area 96.43 acres Study Area 5 % Sewered 31.9

Dwelling Units

2005 129 2010 _____ 2020 _____ 2030 _____ Build-out 405

Flow Projections

2005 Base Flow 18 gpm 2005 Peak Hour Flow 61 gpm

Build-out Base Flow 52 gpm Build-out Peak Hour Flow 137 gpm

Pump Station Summary

Pump Station No. 13010 Pump Station Name ENCHANTMENT

Location _____

Type of Installation _____ Manufacturer HYDROMATIC

Wet Well Size _____ feet No. of Pumps 2 Auxiliary Power _____

Motor Size 30 Hp Motor Speed _____ rpm Rated Flow 150 gpm

Force Main Diam. 4 Inches Force Main Length 670 feet

Pump Station No. 13061 **Station Name:** FOXBOROUGH

Basin Summary

Area 88.1 acres Study Area 7 % Sewered 60.4

Dwelling Units

2005 384 2010 _____ 2020 _____ 2030 _____ Build-out 636

Flow Projections

2005 Base Flow 53 gpm 2005 Peak Hour Flow 138 gpm

Build-out Base Flow 77 gpm Build-out Peak Hour Flow 192 gpm

Pump Station Summary

Pump Station No. 13061 Pump Station Name FOXBOROUGH

Location _____

Type of Installation -- Manufacturer HYDROMATIC

Wet Well Size 13.54 feet No. of Pumps 2 Auxiliary Power --

Motor Size -- Hp Motor Speed -- rpm Rated Flow 260 gpm

Force Main Diam. 6 Inches Force Main Length 2837 feet

Pump Station No. 13017 **Station Name:** GLENSHIRE

Basin Summary

Area 38.2 acres Study Area 5 % Sewered 41.3

Dwelling Units

2005 215 2010 _____ 2020 _____ 2030 _____ Build-out 520

Flow Projections

2005 Base Flow 29 gpm 2005 Peak Hour Flow 73 gpm

Build-out Base Flow 64 gpm Build-out Peak Hour Flow 152 gpm

Pump Station Summary

Pump Station No. 13017 Pump Station Name GLENSHIRE

Location GLENSHIRE DR

Type of Installation -- Manufacturer FLYGT

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power --

Motor Size 5 Hp Motor Speed 1750 rpm Rated Flow 172 gpm

Force Main Diam. 4 Inches Force Main Length 665 feet

Pump Station No. 13019 **Station Name:** HIGHLANDS

Basin Summary

Area 109.5 acres Study Area 4 % Sewered 4.7

Dwelling Units

2005 13 2010 _____ 2020 _____ 2030 _____ Build-out 278

Flow Projections

2005 Base Flow 2 gpm 2005 Peak Hour Flow 27 gpm

Build-out Base Flow 77 gpm Build-out Peak Hour Flow 196 gpm

Pump Station Summary

Pump Station No. 13019 Pump Station Name HIGHLANDS

Location _____

Type of Installation -- Manufacturer HYDROMATIC

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power --

Motor Size 25 Hp Motor Speed -- rpm Rated Flow 250 gpm

Force Main Diam. 4 Inches Force Main Length 4908 feet

Pump Station No. 13018 **Station Name:** HOLIDAY INN

Basin Summary

Area Note acres Study Area 4 % Sewered

Dwelling Units

2005 Note 2010 2020 2030 Build-out Note

Flow Projections

2005 Base Flow Note gpm 2005 Peak Hour Flow Note gpm

Build-out Base Flow Note gpm Build-out Peak Hour Flow Note gpm

Note: Serves a Holiday Inn

Note: Flows to Highlands PS

Pump Station Summary

Pump Station No. 13018 Pump Station Name HOLIDAY INN

Location

Type of Installation Submersible Manufacturer ABS

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power Portable

Motor Size 33 Hp Motor Speed -- rpm Rated Flow 150 gpm

Force Main Diam. 4 Inches Force Main Length 3117 feet

Pump Station No. 13038 **Station Name:** HOLLOW PINES # 1

Basin Summary

Area 53.9 acres Study Area 9 % Sewered 41.9

Dwelling Units

2005 132 2010 _____ 2020 _____ 2030 _____ Build-out 315

Flow Projections

2005 Base Flow 18 gpm 2005 Peak Hour Flow 52 gpm

Build-out Base Flow 36 gpm Build-out Peak Hour Flow 92 gpm

Pump Station Summary

Pump Station No. 13038 Pump Station Name HOLLOW PINES # 1

Location _____

Type of Installation SUBMERSIBLE Manufacturer --

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power --

Motor Size -- Hp Motor Speed -- rpm Rated Flow 140 gpm

Force Main Diam. 4 Inches Force Main Length 2350 feet

Pump Station No. 13037 **Station Name:** HOLLOW PINES # 2

Basin Summary

Area 22.69 acres Study Area 9 % Sewered 26.3

Dwelling Units

2005 30 2010 _____ 2020 _____ 2030 _____ Build-out 144

Flow Projections

2005 Base Flow 4 gpm 2005 Peak Hour Flow 14 gpm

Build-out Base Flow 17 gpm Build-out Peak Hour Flow 43 gpm

Pump Station Summary

Pump Station No. 13037 Pump Station Name HOLLOW PINES # 2

Location _____

Type of Installation SUBMERSIBLE Manufacturer HYDROMATIC

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power --

Motor Size 5 Hp Motor Speed -- rpm Rated Flow 95 gpm

Force Main Diam. 4 Inches Force Main Length 700 feet

Pump Station No. 13034 **Station Name:** LINSTER

Basin Summary

Area 22.5 acres Study Area 6 % Sewered 68.2

Dwelling Units

2005 199 2010 _____ 2020 _____ 2030 _____ Build-out 292

Flow Projections

2005 Base Flow 25 gpm 2005 Peak Hour Flow 61 gpm

Build-out Base Flow 37 gpm Build-out Peak Hour Flow 88 gpm

Pump Station Summary

Pump Station No. 13034 Pump Station Name LINSTER

Location _____

Type of Installation DRYWELL Manufacturer CORNELL

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power PORTABLE

Motor Size 7.5 Hp Motor Speed -- rpm Rated Flow 100 gpm

Force Main Diam. 4 Inches Force Main Length 1854 feet

Pump Station No. 13007 **Station Name:** MAIN FIRE STATION

Basin Summary

Area Note acres Study Area 3 % Sewered

Dwelling Units

2005 Note 2010 2020 2030 Build-out Note

Flow Projections

2005 Base Flow Note gpm 2005 Peak Hour Flow Note gpm

Build-out Base Flow Note gpm Build-out Peak Hour Flow Note gpm

Note: Serves Main Fire Station

Pump Station Summary

Pump Station No. 13007 Pump Station Name MAIN FIRE STATION

Location

Type of Installation SUBMERSIBLE Manufacturer --

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power ON-SITE

Motor Size 2 Hp Motor Speed -- rpm Rated Flow 80 gpm

Force Main Diam. 2 Inches Force Main Length 525 feet

Pump Station No. 13027 **Station Name:** MAJESTIC

Basin Summary

Area 84.2 acres Study Area 5 % Sewered 62.0

Dwelling Units

2005 303 2010 _____ 2020 _____ 2030 _____ Build-out 489

Flow Projections

2005 Base Flow 42 gpm 2005 Peak Hour Flow 112 gpm

Build-out Base Flow 55 gpm Build-out Peak Hour Flow 170 gpm

Pump Station Summary

Pump Station No. 13027 Pump Station Name MAJESTIC

Location _____

Type of Installation -- Manufacturer HYDROMATIC

Wet Well Size 14.18 feet No. of Pumps 2 Auxiliary Power --

Motor Size -- Hp Motor Speed -- rpm Rated Flow 265 gpm

Force Main Diam. 6 Inches Force Main Length 2286 feet

Pump Station No. 13060 **Station Name:** MURPHY

Basin Summary

Area 3063.5 acres Study Area 7 % Sewered 33.1

Dwelling Units

2005 1547 2010 _____ 2020 _____ 2030 _____ Build-out 4675

Flow Projections

2005 Base Flow 215 gpm 2005 Peak Hour Flow 1122 gpm

Build-out Base Flow 560 gpm Build-out Peak Hour Flow 1898 gpm

Note: Regional Pumping Facility

Pump Station Summary

Pump Station No. 13060 Pump Station Name MURPHY

Location _____

Type of Installation -- Manufacturer --

Wet Well Size 18 feet No. of Pumps 2 Auxiliary Power --

Motor Size 20 Hp Motor Speed -- rpm Rated Flow 300* gpm

Force Main Diam. 6 Inches Force Main Length 4297 feet

Note (*): Actual Flow assumed @ 250 gpm by Bend Staff.

Pump Station No. 13012 **Station Name:** NORTH FIRE STATION

Basin Summary

Area _____ acres Study Area 5 % Sewered 100

Dwelling Units

2005 Note 2010 _____ 2020 _____ 2030 _____ Build-out Note

Flow Projections

2005 Base Flow Note gpm 2005 Peak Hour Flow Note gpm

Build-out Base Flow Note gpm Build-out Peak Hour Flow Note gpm

Note: Receives flow only from fire station

Note: Pumps to Deschutes County Jail force main

Pump Station Summary

Pump Station No. 13012 Pump Station Name NORTH FIRE STATION

Location _____

Type of Installation SUBMERSIBLE Manufacturer --

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power ON SITE

Motor Size 2 Hp Motor Speed -- rpm Rated Flow 80 gpm

Force Main Diam. 4 Inches Force Main Length 0 feet

Pump Station No. 13020 **Station Name:** NORTHPOINTE

Basin Summary

Area 128.23 acres Study Area 4 % Sewered 31.5

Dwelling Units

2005 147 2010 _____ 2020 _____ 2030 _____ Build-out 467

Flow Projections

2005 Base Flow 20 gpm 2005 Peak Hour Flow 72 gpm

Build-out Base Flow 58 gpm Build-out Peak Hour Flow 157 gpm

Pump Station Summary

Pump Station No. 13020 Pump Station Name NORTHPOINTE

Location _____

Type of Installation -- Manufacturer HYDROMATIC

Wet Well Size 18 feet No. of Pumps 2 Auxiliary Power --

Motor Size -- Hp Motor Speed -- rpm Rated Flow 265 gpm

Force Main Diam. 6 Inches Force Main Length 4018 feet

Pump Station No. 13021 **Station Name:** NORTH WIND

Basin Summary

Area 21.03 acres Study Area 4 % Sewered 20.8

Dwelling Units

2005 22 2010 _____ 2020 _____ 2030 _____ Build-out 106

Flow Projections

2005 Base Flow 3 gpm 2005 Peak Hour Flow 11 gpm

Build-out Base Flow 13 gpm Build-out Peak Hour Flow 34 gpm

Pump Station Summary

Pump Station No. 13021 Pump Station Name NORTH WIND

Location _____

Type of Installation -- Manufacturer MYERS

Wet Well Size 22.56 feet No. of Pumps 2 Auxiliary Power --

Motor Size -- Hp Motor Speed -- rpm Rated Flow 270 gpm

Force Main Diam. 6 Inches Force Main Length 199 feet

Pump Station No. 13047 **Station Name:** NOTTINGHAM # 1

Basin Summary

Area 62.65 acres Study Area 7 % Sewered 47.1

Dwelling Units

2005 98 2010 _____ 2020 _____ 2030 _____ Build-out 208

Flow Projections

2005 Base Flow 14 gpm 2005 Peak Hour Flow 45 gpm

Build-out Base Flow 23 gpm Build-out Peak Hour Flow 65 gpm

Note: Common FM for Juniper Ridge (private development)

Note: Pumps to Nottingham #2. Then to Murphy Road PS

Pump Station Summary

Pump Station No. 13047 Pump Station Name NOTTINGHAM # 1

Location _____

Type of Installation -- Manufacturer --

Wet Well Size -- feet No. of Pumps -- Auxiliary Power --

Motor Size -- Hp Motor Speed -- rpm Rated Flow 76 gpm

Force Main Diam. 4 Inches Force Main Length -- feet

Pump Station No. 13046 **Station Name:** NOTTINGHAM # 2

Basin Summary

Area 131.22 acres Study Area 7 % Sewered 38.9

Dwelling Units

2005 170 2010 ____ 2020 ____ 2030 ____ Build-out 437

Flow Projections

2005 Base Flow 24 gpm 2005 Peak Hour Flow 81 gpm

Build-out Base Flow 49 gpm Build-out Peak Hour Flow 202* gpm

Note*: Nottingham #2 receives flow from Nottingham #1

Note: Pumps through join Juniper Ridge system to Murphy Road PS

Pump Station Summary

Pump Station No. 13046 Pump Station Name NOTTINGHAM # 2

Location ____

Type of Installation -- Manufacturer --

Wet Well Size -- feet No. of Pumps -- Auxiliary Power --

Motor Size -- Hp Motor Speed -- rpm Rated Flow 55 gpm

Force Main Diam. 4 Inches Force Main Length -- feet

Pump Station No. 13075 **Station Name:** OLD MILL

Basin Summary

Area 344.4 acres Study Area 8 % Sewered 30.2

Dwelling Units

2005 364 2010 _____ 2020 _____ 2030 _____ Build-out 1206

Flow Projections

2005 Base Flow 50 gpm 2005 Peak Hour Flow 184 gpm

Build-out Base Flow 236 gpm Build-out Peak Hour Flow 601 gpm

Note: Receives flow from Woodriver Village (already included)

Pump Station Summary

Pump Station No. 13075 Pump Station Name OLD MILL

Location _____

Type of Installation -- Manufacturer HYDROMATIC

Wet Well Size 12 feet No. of Pumps 2 Auxiliary Power --

Motor Size -- Hp Motor Speed -- rpm Rated Flow 300 gpm

Force Main Diam. 6 Inches Force Main Length 1552 feet

Pump Station No. 13032 **Station Name:** PACIFIC

Basin Summary

Area 7.9 acres Study Area 6 % Sewered 0.0

Dwelling Units

2005 0 2010 2020 2030 Build-out 0

Flow Projections

2005 Base Flow 0 gpm 2005 Peak Hour Flow 2 gpm

Build-out Base Flow 4 gpm Build-out Peak Hour Flow 11 gpm

Pump Station Summary

Pump Station No. 13032 Pump Station Name PACIFIC

Location

Type of Installation SUBMERSIBLE- Manufacturer FLYGT

Wet Well Size -- feet No. of Pumps -- Auxiliary Power --

Motor Size -- Hp Motor Speed -- rpm Rated Flow 50 gpm

Force Main Diam. 2 Inches Force Main Length 480 feet

Pump Station No. 13069 **Station Name:** PHEASANT RUN

Basin Summary

Area 43.7 acres Study Area 8 % Sewered 19.1

Dwelling Units

2005 40 2010 ____ 2020 ____ 2030 ____ Build-out 209

Flow Projections

2005 Base Flow 5 gpm 2005 Peak Hour Flow 20 gpm

Build-out Base Flow 26 gpm Build-out Peak Hour Flow 68 gpm

Pump Station Summary

Pump Station No. 13069 Pump Station Name PHEASANT RUN

Location HOLLYGRAPE, WEST OF BROOKWOOD

Type of Installation SUBMERSIBLE Manufacturer HYDROMATIC

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power PORTABLE

Motor Size 5 Hp Motor Speed -- rpm Rated Flow 125 gpm

Force Main Diam. 4 Inches Force Main Length 1022 feet

Pump Station No. 13024 **Station Name:** PHOENIX

Basin Summary

Area 25.2 acres Study Area 4 % Sewered 41.7

Dwelling Units

2005 75 2010 _____ 2020 _____ 2030 _____ Build-out 180

Flow Projections

2005 Base Flow 10 gpm 2005 Peak Hour Flow 28 gpm

Build-out Base Flow 17 gpm Build-out Peak Hour Flow 44 gpm

Pump Station Summary

Pump Station No. 13024 Pump Station Name PHOENIX

Location _____

Type of Installation -- Manufacturer MYERS

Wet Well Size 10.1 feet No. of Pumps 2 Auxiliary Power --

Motor Size -- Hp Motor Speed -- rpm Rated Flow 228 gpm

Force Main Diam. 6 Inches Force Main Length 65 feet

Pump Station No. 13074 **Station Name:** PINE RIDGE

Basin Summary

Area 15.5 acres Study Area 8 % Sewered 1.2

Dwelling Units

2005 1 2010 2020 2030 Build-out 86

Flow Projections

2005 Base Flow 1 gpm 2005 Peak Hour Flow 3 gpm

Build-out Base Flow 9 gpm Build-out Peak Hour Flow 23 gpm

Pump Station Summary

Pump Station No. 13074 Pump Station Name PINE RIDGE

Location

Type of Installation SUBMERSIBLE Manufacturer HYDROMATIC

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power PORTABLE

Motor Size 5 Hp Motor Speed -- rpm Rated Flow 160 gpm

Force Main Diam. 4 Inches Force Main Length 715 feet

Pump Station No. 13033 **Station Name:** PIONEER

Basin Summary

Area 8.18 acres Study Area 6 % Sewered 0.0

Dwelling Units

2005 0 2010 2020 2030 Build-out 0

Flow Projections

2005 Base Flow Note gpm 2005 Peak Hour Flow Note gpm

Build-out Base Flow Note gpm Build-out Peak Hour Flow Note gpm

Note: Serves a park

Note: Discharge to Riverside Hotel private 4" force main to manhole 46392A

Pump Station Summary

Pump Station No. 13033 Pump Station Name PIONEER

Location

Type of Installation SUBMERSIBLE Manufacturer GOULD

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power --

Motor Size 1 Hp Motor Speed -- rpm Rated Flow 60 gpm

Force Main Diam. 4 Inches Force Main Length -- feet

Pump Station No. 13073 **Station Name:** POPLAR PARK

Basin Summary

Area 7.4 acres Study Area 8 % Sewered 6.3

Dwelling Units

2005 3 2010 _____ 2020 _____ 2030 _____ Build-out 48

Flow Projections

2005 Base Flow 0 gpm 2005 Peak Hour Flow 2 gpm

Build-out Base Flow 5 gpm Build-out Peak Hour Flow 13 gpm

Pump Station Summary

Pump Station No. 13073 Pump Station Name POPLAR PARK

Location _____

Type of Installation SUBMERSIBLE Manufacturer HYDROMATIC

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power PORTABLE

Motor Size 5 Hp Motor Speed -- rpm Rated Flow 180 gpm

Force Main Diam. 4 Inches Force Main Length 1966 feet

Pump Station No. 13026 **Station Name:** QUAIL CROSSING

Basin Summary

Area 38.16 acres Study Area 5 % Sewered 16.8

Dwelling Units

2005 25 2010 _____ 2020 _____ 2030 _____ Build-out 149

Flow Projections

2005 Base Flow 3 gpm 2005 Peak Hour Flow 15 gpm

Build-out Base Flow 17 gpm Build-out Peak Hour Flow 46 gpm

Pump Station Summary

Pump Station No. 13026 Pump Station Name QUAIL CROSSING

Location _____

Type of Installation Submersible Manufacturer Hydromatic

Wet Well Size 13.54 feet No. of Pumps 2 Auxiliary Power --

Motor Size 7.5 Hp Motor Speed 1750 rpm Rated Flow 208 gpm

Force Main Diam. 6 Inches Force Main Length 306 feet 47 ft TDH

Note: Rate flow of 208 gpm provided by City Maintenance Staff

Pump Station No. 13058 **Station Name:** QUAIL RIDGE # 1

Basin Summary

Area _____ acres Study Area 7 % Sewered _____

Dwelling Units

2005 _____ 2010 _____ 2020 _____ 2030 _____ Build-out _____

Flow Projections

2005 Base Flow Note gpm 2005 Peak Hour Flow Note gpm

Build-out Base Flow Note gpm Build-out Peak Hour Flow Note gpm

Note: Discharges to Murphy pressure system (Juniper Utility)

Pump Station Summary

Pump Station No. 13058 Pump Station Name QUAIL RIDGE # 1

Location _____

Type of Installation SUBMERSIBLE Manufacturer _____

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power NO

Motor Size 2 Hp Motor Speed -- rpm Rated Flow 100 gpm

Force Main Diam. -- Inches Force Main Length -- feet

Pump Station No. 13059 **Station Name:** QUAIL RIDGE # 2

Basin Summary

Area _____ acres Study Area 7 % Sewered _____

Dwelling Units

2005 _____ 2010 _____ 2020 _____ 2030 _____ Build-out _____

Flow Projections

2005 Base Flow Note gpm 2005 Peak Hour Flow Note gpm

Build-out Base Flow Note gpm Build-out Peak Hour Flow Note gpm

Note: Discharges to Murphy pressure system (Juniper Utility)

Pump Station Summary

Pump Station No. 13059 Pump Station Name QUAIL RIDGE # 2

Location _____

Type of Installation SUBMERSIBLE Manufacturer --

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power NO

Motor Size 2 Hp Motor Speed -- rpm Rated Flow 100 gpm

Force Main Diam. -- Inches Force Main Length -- feet

Pump Station No. 13036 **Station Name:** RENWICK

Basin Summary

Area 7.95 acres Study Area 9 % Sewered 69.1

Dwelling Units

2005 38 2010 _____ 2020 _____ 2030 _____ Build-out 55

Flow Projections

2005 Base Flow 5 gpm 2005 Peak Hour Flow 13 gpm

Build-out Base Flow 6 gpm Build-out Peak Hour Flow 15 gpm

Pump Station Summary

Pump Station No. 13036 Pump Station Name RENWICK

Location _____

Type of Installation DRYWELL Manufacturer --

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power --

Motor Size -- Hp Motor Speed -- rpm Rated Flow 40 gpm

Force Main Diam. 3 Inches Force Main Length 358 feet

Pump Station No. 13045 **Station Name:** RIDGE WATER #1

Basin Summary

Area 25.75 acres Study Area 7 % Sewered 39.8

Dwelling Units

2005 43 2010 _____ 2020 _____ 2030 _____ Build-out 108

Flow Projections

2005 Base Flow 6 gpm 2005 Peak Hour Flow 19 gpm

Build-out Base Flow 9 gpm Build-out Peak Hour Flow 26 gpm

Pump Station Summary

Pump Station No. 13045 Pump Station Name RIDGE WATER #1

Location _____

Type of Installation -- Manufacturer Hydromatic

Wet Well Size 9 feet No. of Pumps 2 Auxiliary Power --

Motor Size 10 Hp Motor Speed 3450 rpm Rated Flow 118 gpm

Force Main Diam. 4 Inches Force Main Length 1432 feet 82 ft TDH

Pump Station No. 13044 **Station Name:** RIDGE WATER #2

Basin Summary

Area 68.96 acres Study Area 7 % Sewered 37.1

Dwelling Units

2005 75 2010 2020 2030 Build-out 202

Flow Projections

2005 Base Flow 10 gpm 2005 Peak Hour Flow 37 gpm

Build-out Base Flow 21 gpm Build-out Peak Hour Flow 62 gpm

Pump Station Summary

Pump Station No. 13044 Pump Station Name RIDGE WATER #2

Location

Type of Installation -- Manufacturer Hydromatic

Wet Well Size 9 feet No. of Pumps 2 Auxiliary Power --

Motor Size 7.5 Hp Motor Speed -- rpm Rated Flow 127 gpm

Force Main Diam. 4 Inches Force Main Length 88 feet 47 ft TDH

Pump Station No. 13078 **Station Name:** RIMROCK # 1

Basin Summary

Area _____ acres Study Area 2 % Sewered _____

Dwelling Units

2005 _____ 2010 _____ 2020 _____ 2030 _____ Build-out _____

Flow Projections

2005 Base Flow Note gpm 2005 Peak Hour Flow Note gpm

Build-out Base Flow Note gpm Build-out Peak Hour Flow _____ gpm

Note: Serves private development with 4-6 homes on each (Rimrock) station

Note: Pumps through Wyndemere PS

Pump Station Summary

Pump Station No. 13078 Pump Station Name RIMROCK # 1

Location SILVER BUCKLE

Type of Installation SUBMERSIBLE Manufacturer HYDROMATIC

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power NONE

Motor Size 0.6 Hp Motor Speed -- rpm Rated Flow 40 gpm

Force Main Diam. 3 Inches Force Main Length -- feet

Pump Station No. 13079 **Station Name:** RIMROCK # 2

Basin Summary

Area _____ acres Study Area 2 % Sewered _____

Dwelling Units

2005 _____ 2010 _____ 2020 _____ 2030 _____ Build-out _____

Flow Projections

2005 Base Flow Note gpm 2005 Peak Hour Flow Note gpm

Build-out Base Flow Note gpm Build-out Peak Hour Flow Note gpm

Note: Serves private development with 4-6 homes on each (Rimrock) station

Note: Pumps through Wyndemere PS

Pump Station Summary

Pump Station No. 13079 Pump Station Name RIMROCK # 2

Location SILVER BUCKLE

Type of Installation SUBMERSIBLE Manufacturer HYDROMATIC

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power NONE

Motor Size .6 Hp Motor Speed -- rpm Rated Flow 40 gpm

Force Main Diam. 3 Inches Force Main Length -- feet

Pump Station No. 13080 **Station Name:** RIMROCK # 3

Basin Summary

Area _____ acres Study Area 2 % Sewered _____

Dwelling Units

2005 _____ 2010 _____ 2020 _____ 2030 _____ Build-out _____

Flow Projections

2005 Base Flow Note gpm 2005 Peak Hour Flow Note gpm

Build-out Base Flow Note gpm Build-out Peak Hour Flow Note gpm

Note: Serves private development with 4-6 homes on each (Rimrock) station

Note: Pumps through Wyndemere PS

Pump Station Summary

Pump Station No. 13080 Pump Station Name RIMROCK # 3

Location SILVER BUCKLE

Type of Installation SUBMERSIBLE Manufacturer HYDROMATIC

Wet Well Size -- feet No. of Pumps 1 Auxiliary Power NO

Motor Size .6 Hp Motor Speed -- rpm Rated Flow 40 gpm

Force Main Diam. 3 Inches Force Main Length -- feet

Pump Station No. 13084 **Station Name:** RIMROCK # 4

Basin Summary

Area _____ acres Study Area 2 % Sewered _____

Dwelling Units

2005 _____ 2010 _____ 2020 _____ 2030 _____ Build-out _____

Flow Projections

2005 Base Flow Note gpm 2005 Peak Hour Flow Note gpm

Build-out Base Flow Note gpm Build-out Peak Hour Flow Note gpm

Note: Serves private development with 4-6 homes on each (Rimrock) station

Note: Pumps through Wyndemere PS

Pump Station Summary

Pump Station No. 13084 Pump Station Name RIMROCK # 4

Location SILVER BUCKLE

Type of Installation SUBMERSIBLE Manufacturer HYDROMATIC

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power NO

Motor Size .6 Hp Motor Speed -- rpm Rated Flow 40 gpm

Force Main Diam. 3 Inches Force Main Length 487 feet

Pump Station No. 13070 **Station Name:** RIVER CANYON # 1

Basin Summary

Area 62.0 acres Study Area 8 % Sewered 1.7

Dwelling Units

2005 5 2010 ____ 2020 ____ 2030 ____ Build-out 296

Flow Projections

2005 Base Flow 1 gpm 2005 Peak Hour Flow 15 gpm

Build-out Base Flow 35 gpm Build-out Peak Hour Flow 92 gpm

Note: Shares FM with Aspen Ridge PS and pumps to River Canyon #2

Pump Station Summary

Pump Station No. 13070 Pump Station Name RIVER CANYON # 1

Location HOLLYGRAPE, EAST OF BROOKWOOD

Type of Installation SUBMERSIBLE Manufacturer FLYGT

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power --

Motor Size 10 Hp Motor Speed -- rpm Rated Flow 320 gpm

Force Main Diam. 4/6 Inches Force Main Length -- feet

Pump Station No. 13071 **Station Name:** RIVER CANYON # 2

Basin Summary

Area 63 acres Study Area 8 % Sewered 17.6

Dwelling Units

2005 57 2010 ____ 2020 ____ 2030 ____ Build-out 324

Flow Projections

2005 Base Flow 8 gpm 2005 Peak Hour Flow 31 gpm

Build-out Base Flow 36 gpm Build-out Peak Hour Flow 94 gpm

Note: River Canyon #2 receives flow from River Canyon #1

Note: Shares FM with Aspen Ridge PS and River Canyon #1

Pump Station Summary

Pump Station No. 13071 Pump Station Name RIVER CANYON # 2

Location HOLLYGRAPE, WEST OF BROOKWOOD

Type of Installation SUBMERSIBLE Manufacturer HYDROMATIC

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power --

Motor Size 10 Hp Motor Speed -- rpm Rated Flow 400 gpm

Force Main Diam. 6 Inches Force Main Length -- feet

Pump Station No. 13072 **Station Name:** RIVER RIM

Basin Summary

Area 155.7 acres Study Area 8 % Sewered 15.9

Dwelling Units

2005 107 2010 _____ 2020 _____ 2030 _____ Build-out 673

Flow Projections

2005 Base Flow 15 gpm 2005 Peak Hour Flow 66 gpm

Build-out Base Flow 74 gpm Build-out Peak Hour Flow 199 gpm

Pump Station Summary

Pump Station No. 13072 Pump Station Name RIVER RIM

Location _____

Type of Installation SUBMERSIBLE Manufacturer HYDROMATIC

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power --

Motor Size 10 Hp Motor Speed -- rpm Rated Flow 150 gpm

Force Main Diam. 4 Inches Force Main Length 3323 feet

Pump Station No. 13029 **Station Name:** RIVERS EDGE

Basin Summary

Area 36.72 acres Study Area 2 % Sewered 41.4

Dwelling Units

2005 72 2010 _____ 2020 _____ 2030 _____ Build-out 174

Flow Projections

2005 Base Flow 10 gpm 2005 Peak Hour Flow 30 gpm

Build-out Base Flow 20 gpm Build-out Peak Hour Flow 53 gpm

Pump Station Summary

Pump Station No. 13029 Pump Station Name RIVERS EDGE

Location _____

Type of Installation SUBMERSIBLE Manufacturer MYERS

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power --

Motor Size -- Hp Motor Speed -- rpm Rated Flow 125 gpm

Force Main Diam. 4 Inches Force Main Length 583 feet

Pump Station No. 13028 **Station Name:** RIVERHOUSE

Basin Summary

Area -- acres Study Area 5 % Sewered --

Dwelling Units

2005 _____ 2010 _____ 2020 _____ 2030 _____ Build-out _____

Flow Projections

2005 Base Flow Note gpm 2005 Peak Hour Flow Note gpm

Build-out Base Flow Note gpm Build-out Peak Hour Flow Note gpm

Note: Serves Riverhouse Hotel only with some commercial

Pump Station Summary

Pump Station No. 13028 Pump Station Name RIVERHOUSE

Location _____

Type of Installation SUBMERSIBLE Manufacturer _____

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power PORTABLE

Motor Size 20 Hp Motor Speed -- rpm Rated Flow 400 gpm

Force Main Diam. 6 Inches Force Main Length -- feet

Pump Station No. 13076 **Station Name:** SAWYER PARK

Basin Summary

Area 765.2 acres Study Area 5 % Sewered 17.7

Dwelling Units

2005 512 2010 _____ 2020 _____ 2030 _____ Build-out 2896

Flow Projections

2005 Base Flow 71 gpm 2005 Peak Hour Flow 319 gpm

Build-out Base Flow 367 gpm Build-out Peak Hour Flow 1164 gpm

Pump Station Summary

Pump Station No. 13076 Pump Station Name SAWYER PARK

Location _____

Type of Installation -- Manufacturer FLYGT

Wet Well Size 20 feet No. of Pumps 3 Auxiliary Power --

Motor Size -- Hp Motor Speed -- rpm Rated Flow 560 gpm

Force Main Diam. 4 Inches Force Main Length 1566 feet

Pump Station No. 13013 **Station Name:** SERVICE

Basin Summary

Area 57.2 acres Study Area 5 % Sewered 27.8

Dwelling Units

2005 54 2010 2020 2030 Build-out 194

Flow Projections

2005 Base Flow 8 gpm 2005 Peak Hour Flow 30 gpm

Build-out Base Flow 33 gpm Build-out Peak Hour Flow 86 gpm

Note: Pumps into same FM as Riverhouse PS

Pump Station Summary

Pump Station No. 13013 Pump Station Name SERVICE

Location SERVICE RD

Type of Installation -- Manufacturer --

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power --

Motor Size 2 Hp Motor Speed 1750 rpm Rated Flow 120 gpm

Force Main Diam. 4 Inches Force Main Length feet

Pump Station No. 13006 **Station Name:** SHEVLIN

Basin Summary

Area 120.9 acres Study Area 3 % Sewered 0.0

Dwelling Units

2005 0 2010 _____ 2020 _____ 2030 _____ Build-out 0

Flow Projections

2005 Base Flow 0 gpm 2005 Peak Hour Flow 25 gpm

Build-out Base Flow 63 gpm Build-out Peak Hour Flow 167 gpm

Pump Station Summary

Pump Station No. 13006 Pump Station Name SHEVLIN

Location _____

Type of Installation _____ Manufacturer _____

Wet Well Size 6 feet No. of Pumps 2 Auxiliary Power _____

Motor Size _____ Hp Motor Speed _____ rpm Rated Flow 280 gpm

Force Main Diam. 6 Inches Force Main Length 351 feet

Pump Station No. 13009 **Station Name:** SHEVLIN COMMONS

Basin Summary

Area 140.3 acres Study Area 1 % Sewered 0.7

Dwelling Units

2005 3 2010 _____ 2020 _____ 2030 _____ Build-out 458

Flow Projections

2005 Base Flow 0.4 gpm 2005 Peak Hour Flow 30 gpm

Build-out Base Flow 52 gpm Build-out Peak Hour Flow 202 gpm

Pump Station Summary

Pump Station No. 13009 Pump Station Name SHEVLIN COMMONS

Location _____

Type of Installation SUBMERSIBLE Manufacturer HYDROMATIC

Wet Well Size 11.28 feet No. of Pumps 2 Auxiliary Power --

Motor Size -- Hp Motor Speed -- rpm Rated Flow 118 gpm

Force Main Diam. 4 Inches Force Main Length 5740 feet

Pump Station No. 13008 **Station Name:** SHEVLIN MEADOWS

Basin Summary

Area 161.6 acres Study Area 2 % Sewered 10.2

Dwelling Units

2005 104 2010 _____ 2020 _____ 2030 _____ Build-out 1018

Flow Projections

2005 Base Flow 14 gpm 2005 Peak Hour Flow 65 gpm

Build-out Base Flow 129 gpm Build-out Peak Hour Flow 464 gpm

Pump Station Summary

Pump Station No. 13008 Pump Station Name SHEVLIN MEADOWS

Location _____

Type of Installation SUBMERSIBLE Manufacturer HYDROMATIC

Wet Well Size 17 feet No. of Pumps 2 Auxiliary Power --

Motor Size -- Hp Motor Speed -- rpm Rated Flow 145 gpm

Force Main Diam. 4 Inches Force Main Length 1389 feet

Pump Station No. 13063 **Station Name:** SOUTH FIRE STATION

Basin Summary

Area _____ acres Study Area 7 % Sewered _____

Dwelling Units

2005 _____ 2010 _____ 2020 _____ 2030 _____ Build-out _____

Flow Projections

2005 Base Flow Note gpm 2005 Peak Hour Flow Note gpm

Build-out Base Flow Note gpm Build-out Peak Hour Flow Note gpm

Note: Serves fire station only

Note: Discharges to Murphy pressure system (Juniper Utility)

Pump Station Summary

Pump Station No. 13063 Pump Station Name SOUTH FIRE STATION

Location _____

Type of Installation -- Manufacturer GOULD

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power ON-SITE

Motor Size 1.5 Hp Motor Speed -- rpm Rated Flow 65 gpm

Force Main Diam. 2 Inches Force Main Length -- feet

Pump Station No. 13065 **Station Name:** SOUTH VILLAGE

Basin Summary

Area 693.2 acres Study Area 8 % Sewered 7.8

Dwelling Units

2005 110 2010 _____ 2020 _____ 2030 _____ Build-out 1410

Flow Projections

2005 Base Flow 15 gpm 2005 Peak Hour Flow 178 gpm

Build-out Base Flow 82 gpm Build-out Peak Hour Flow 329 gpm

Note: Discharges to Murphy force main

Pump Station Summary

Pump Station No. 13065 Pump Station Name SOUTH VILLAGE

Location _____

Type of Installation SUBMERSIBLE Manufacturer MYERS

Wet Well Size 22.56 feet No. of Pumps 2 Auxiliary Power --

Motor Size -- Hp Motor Speed -- rpm Rated Flow 265 gpm

Force Main Diam. 6 Inches Force Main Length 260 feet

Pump Station No. 13064 **Station Name:** STONEHAVEN

Basin Summary

Area 73.88 acres Study Area 7 % Sewered 30.1

Dwelling Units

2005 40 2010 ____ 2020 ____ 2030 ____ Build-out 133

Flow Projections

2005 Base Flow 6 gpm 2005 Peak Hour Flow 29 gpm

Build-out Base Flow 20 gpm Build-out Peak Hour Flow 60 gpm

Note: Discharge to Murphy Road PS force main

Pump Station Summary

Pump Station No. 13064 Pump Station Name STONEHAVEN

Location ____

Type of Installation SUBMERSIBLE Manufacturer HYDROMATIC

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power --

Motor Size 10 Hp Motor Speed -- rpm Rated Flow 250 gpm

Force Main Diam. 4 Inches Force Main Length -- feet

Pump Station No. 13023 **Station Name:** SUMMER MEADOWS

Basin Summary

Area 18.91 acres Study Area 4 % Sewered 22.1

Dwelling Units

2005 23 2010 2020 2030 Build-out 104

Flow Projections

2005 Base Flow 3 gpm 2005 Peak Hour Flow 11 gpm

Build-out Base Flow 12 gpm Build-out Peak Hour Flow 31 gpm

Pump Station Summary

Pump Station No. 13023 Pump Station Name SUMMER MEADOWS

Location

Type of Installation SUBMERSIBLE Manufacturer HYDROMATIC

Wet Well Size -- feet No. of Pumps -- Auxiliary Power --

Motor Size 3 Hp Motor Speed 1750 rpm Rated Flow 125 gpm

Force Main Diam. 4 Inches Force Main Length 892 feet

Note: Pumps to the Boyd Acres pump station.

Pump Station No. 13040 **Station Name:** SUMMIT PARK

Basin Summary

Area 36.1 acres Study Area 9 % Sewered 11.5

Dwelling Units

2005 18 2010 ____ 2020 ____ 2030 ____ Build-out 157

Flow Projections

2005 Base Flow 3 gpm 2005 Peak Hour Flow 14 gpm

Build-out Base Flow 19 gpm Build-out Peak Hour Flow 50 gpm

Pump Station Summary

Pump Station No. 13040 Pump Station Name SUMMIT PARK

Location WELLS ACRE RD AT PROMISE LANE

Type of Installation SUBMERSIBLE Manufacturer FLYGT

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power PORTABLE

Motor Size 5 Hp Motor Speed -- rpm Rated Flow 125 gpm

Force Main Diam. 4 Inches Force Main Length 262 feet

Pump Station No. 13062 **Station Name:** SUN MEADOWS

Basin Summary

Area 141.95 acres Study Area 7 % Sewered 30.1

Dwelling Units

2005 196 2010 _____ 2020 _____ 2030 _____ Build-out 651

Flow Projections

2005 Base Flow 27 gpm 2005 Peak Hour Flow 90 gpm

Build-out Base Flow 74 gpm Build-out Peak Hour Flow 196 gpm

Note: Discharges directly to the Murphy Road force main

Pump Station Summary

Pump Station No. 13062 Pump Station Name SUN MEADOWS

Location _____

Type of Installation SUBMERSIBLE Manufacturer --

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power PORTABLE

Motor Size 50 Hp Motor Speed -- rpm Rated Flow 380 gpm

Force Main Diam. 6 Inches Force Main Length -- feet

Pump Station No. 13001 **Station Name:** SUNRISE VILLAGE # 1

Basin Summary

Area 693.3 acres Study Area 3 % Sewered 24.5

Dwelling Units

2005 395 2010 _____ 2020 _____ 2030 _____ Build-out 1611

Flow Projections

2005 Base Flow 55 gpm 2005 Peak Hour Flow 268 gpm

Build-out Base Flow 222 gpm Build-out Peak Hour Flow 661 gpm

Pump Station Summary

Pump Station No. 13001 Pump Station Name SUNRISE VILLAGE # 1

Location _____

Type of Installation -- Manufacturer --

Wet Well Size 13.54 feet No. of Pumps 2 Auxiliary Power --

Motor Size -- Hp Motor Speed -- rpm Rated Flow 250 gpm

Force Main Diam. 6 Inches Force Main Length 258 feet

Pump Station No. 13052 **Station Name:** THE PINES # 1

Basin Summary

Area _____ acres Study Area 7 % Sewered _____

Dwelling Units

2005 _____ 2010 _____ 2020 _____ 2030 _____ Build-out _____

Flow Projections

2005 Base Flow Note gpm 2005 Peak Hour Flow Note gpm

Build-out Base Flow Note gpm Build-out Peak Hour Flow Note gpm

Note: Discharges to Murphy pressure system (Juniper Utility)

Pump Station Summary

Pump Station No. 13052 Pump Station Name THE PINES # 1

Location _____

Type of Installation SUBMERSIBLE Manufacturer --

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power NO

Motor Size 2 Hp Motor Speed -- rpm Rated Flow 60 gpm

Force Main Diam. 4 Inches Force Main Length -- feet

Pump Station No. 13053 **Station Name:** THE PINES # 2

Basin Summary

Area _____ acres Study Area 7 % Sewered _____

Dwelling Units

2005 _____ 2010 _____ 2020 _____ 2030 _____ Build-out _____

Flow Projections

2005 Base Flow _____ gpm 2005 Peak Hour Flow _____ gpm

Build-out Base Flow _____ gpm Build-out Peak Hour Flow _____ gpm

Note: Discharges to Murphy pressure system (Juniper Utility)

Pump Station Summary

Pump Station No. 13053 Pump Station Name THE PINES # 2

Location _____

Type of Installation SUBMERSIBLE Manufacturer --

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power --

Motor Size 2 Hp Motor Speed -- rpm Rated Flow 60 gpm

Force Main Diam. 4 Inches Force Main Length _____ feet

Pump Station No. 13055 **Station Name:** THE PINES # 3

Basin Summary

Area _____ acres Study Area 7 % Sewered _____

Dwelling Units

2005 _____ 2010 _____ 2020 _____ 2030 _____ Build-out _____

Flow Projections

2005 Base Flow Note gpm 2005 Peak Hour Flow Note gpm

Build-out Base Flow Note gpm Build-out Peak Hour Flow Note gpm

Note: Discharges to Murphy pressure system (Juniper Utility)

Pump Station Summary

Pump Station No. 13055 Pump Station Name THE PINES # 3

Location _____

Type of Installation SUBMERSIBLE Manufacturer --

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power NO

Motor Size 2 Hp Motor Speed -- rpm Rated Flow 60 gpm

Force Main Diam. 4 Inches Force Main Length -- feet

Pump Station No. 13054 **Station Name:** THE PINES # 4

Basin Summary

Area _____ acres Study Area 7 % Sewered _____

Dwelling Units

2005 _____ 2010 _____ 2020 _____ 2030 _____ Build-out _____

Flow Projections

2005 Base Flow Note gpm 2005 Peak Hour Flow Note gpm

Build-out Base Flow Note gpm Build-out Peak Hour Flow Note gpm

Note: Discharges to Murphy pressure system (Juniper Utility)

Pump Station Summary

Pump Station No. 13054 Pump Station Name THE PINES # 4

Location _____

Type of Installation SUBMERSIIBLE Manufacturer --

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power NO

Motor Size 2 Hp Motor Speed -- rpm Rated Flow 60 gpm

Force Main Diam. 4 Inches Force Main Length -- feet

Pump Station No. 13050 **Station Name:** THE PINES # 5

Basin Summary

Area _____ acres Study Area 7 % Sewered _____

Dwelling Units

2005 _____ 2010 _____ 2020 _____ 2030 _____ Build-out _____

Flow Projections

2005 Base Flow Note gpm 2005 Peak Hour Flow Note gpm

Build-out Base Flow Note gpm Build-out Peak Hour Flow Note gpm

Note: Discharges to Murphy pressure system (Juniper Utility)

Pump Station Summary

Pump Station No. 13050 Pump Station Name THE PINES # 5

Location _____

Type of Installation SUBMERSIBLE Manufacturer --

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power --

Motor Size 2 Hp Motor Speed -- rpm Rated Flow 60 gpm

Force Main Diam. 4 Inches Force Main Length -- feet

Pump Station No. 13051 **Station Name:** THE PINES # 6

Basin Summary

Area _____ acres Study Area 7 % Sewered _____

Dwelling Units

2005 _____ 2010 _____ 2020 _____ 2030 _____ Build-out _____

Flow Projections

2005 Base Flow Note gpm 2005 Peak Hour Flow Note gpm

Build-out Base Flow Note gpm Build-out Peak Hour Flow Note gpm

Note: Discharges to Murphy pressure system (Juniper Utility)

Pump Station Summary

Pump Station No. 13051 Pump Station Name THE PINES # 6

Location _____

Type of Installation -- Manufacturer --

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power NO

Motor Size 2 Hp Motor Speed -- rpm Rated Flow 60 gpm

Force Main Diam. 4 Inches Force Main Length -- feet

Pump Station No. 13049 **Station Name:** THE PINES # 7

Basin Summary

Area _____ acres Study Area 7 % Sewered _____

Dwelling Units

2005 _____ 2010 _____ 2020 _____ 2030 _____ Build-out _____

Flow Projections

2005 Base Flow Note gpm 2005 Peak Hour Flow Note gpm

Build-out Base Flow Note gpm Build-out Peak Hour Flow Note gpm

Note: Discharges to Murphy pressure system (Juniper Utility)

Pump Station Summary

Pump Station No. 13049 Pump Station Name THE PINES # 7

Location _____

Type of Installation -- Manufacturer --

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power NO

Motor Size 2 Hp Motor Speed -- rpm Rated Flow 60 gpm

Force Main Diam. 4 Inches Force Main Length -- feet

Pump Station No. 13003 **Station Name:** TOUCHMARK

Basin Summary

Area 27.2 acres Study Area 3 % Sewered 0.0

Dwelling Units

2005 0 2010 2020 2030 Build-out 93

Flow Projections

2005 Base Flow 0 gpm 2005 Peak Hour Flow 25 gpm

Build-out Base Flow 63 gpm Build-out Peak Hour Flow 167 gpm

Pump Station Summary

Pump Station No. 13003 Pump Station Name TOUCHMARK

Location

Type of Installation SUBMERSIBLE Manufacturer --

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power --

Motor Size 20 Hp Motor Speed -- rpm Rated Flow 425 gpm

Force Main Diam. 6 Inches Force Main Length 497 feet

Pump Station No. 13067 **Station Name:** TRI-PEAKS

Basin Summary

Area 86.9 acres Study Area 8 % Sewered 18.9

Dwelling Units

2005 86 2010 2020 2030 Build-out 454

Flow Projections

2005 Base Flow 12 gpm 2005 Peak Hour Flow 45 gpm

Build-out Base Flow 59 gpm Build-out Peak Hour Flow 151 gpm

Pump Station Summary

Pump Station No. 13067 Pump Station Name TRI-PEAKS

Location EDRO PALCE

Type of Installation -- Manufacturer HYDROMATIC

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power PORTABLE

Motor Size 5 Hp Motor Speed -- rpm Rated Flow 120 gpm

Force Main Diam. 3 Inches Force Main Length 1195 feet

Pump Station No. 13030 **Station Name:** TUMALO HEIGHTS

Basin Summary

Area 9.66 acres Study Area 2 % Sewered 38.3

Dwelling Units

2005 23 2010 _____ 2020 _____ 2030 _____ Build-out 60

Flow Projections

2005 Base Flow 3 gpm 2005 Peak Hour Flow 9 gpm

Build-out Base Flow 7 gpm Build-out Peak Hour Flow 18 gpm

Pump Station Summary

Pump Station No. 13030 Pump Station Name TUMALO HEIGHTS

Location _____

Type of Installation SUBMERSIBLE Manufacturer --

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power PORTABLE

Motor Size -- Hp Motor Speed -- rpm Rated Flow 195 gpm

Force Main Diam. 4 Inches Force Main Length 320 feet

Pump Station No. 13035 **Station Name:** UNDERWOOD

Basin Summary

Area 16.3 acres Study Area 6 % Sewered 0.0

Dwelling Units

2005 0 2010 2020 2030 Build-out 0

Flow Projections

2005 Base Flow 0 gpm 2005 Peak Hour Flow 3 gpm

Build-out Base Flow 14 gpm Build-out Peak Hour Flow 35 gpm

Note: 19B-SW pumps south to gravity main

Pump Station Summary

Pump Station No. 13035 Pump Station Name UNDERWOOD

Location

Type of Installation DRYWELL Manufacturer CORNELL

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power --

Motor Size 3 Hp Motor Speed -- rpm Rated Flow 150 gpm

Force Main Diam. 4 Inches Force Main Length 564 feet

Pump Station No. 13081 **Station Name:** WEST SIDE

Basin Summary

Area 10261 acres Study Area 2 % Sewered 25.3

Dwelling Units

2005 5884 2010 _____ 2020 _____ 2030 _____ Build-out 23221

Flow Projections

2005 Base Flow 803 gpm 2005 Peak Hour Flow 3944 gpm

Build-out Base Flow 3138 gpm Build-out Peak Hour Flow 9805 gpm

Note: Receives flows from pumps west of river.

Pump Station Summary

Pump Station No. 13081 Pump Station Name WEST SIDE

Location _____

Type of Installation -- Manufacturer CORNELL

Wet Well Size 19.86 feet No. of Pumps 4 Auxiliary Power --

Motor Size -- Hp Motor Speed -- rpm Rated Flow -- gpm

Force Main Diam. 16 Inches Force Main Length 2060 feet

2 Pumps: 750-2400 each
2 Pumps: 600 max

Pump Station No. 13000 **Station Name:** WIDGI CREEK

Basin Summary

Area 229.6 acres Study Area 3 % Sewered 0.0

Dwelling Units

2005 0 2010 2020 2030 Build-out 1023

Flow Projections

2005 Base Flow 0 gpm 2005 Peak Hour Flow 48 gpm

Build-out Base Flow 129 gpm Build-out Peak Hour Flow 338 gpm

Pump Station Summary

Pump Station No. 13000 Pump Station Name WIDGI CREEK

Location

Type of Installation Wet Pit Submersible Manufacturer HYDROMATIC

Wet Well Size 9 feet No. of Pumps 2 Auxiliary Power NO

Motor Size 40 Hp Motor Speed 1750 rpm Rated Flow 450* gpm

Force Main Diam. 6 Inches Force Main Length 13660 feet

*: 297 gpm from flow test @ 110ft TDH

Pump Station No. 13004 **Station Name:** WOODRIVER VILLAGE

Basin Summary

Area 83.6 acres Study Area 8 % Sewered 35.2

Dwelling Units

2005 145 2010 _____ 2020 _____ 2030 _____ Build-out 412

Flow Projections

2005 Base Flow 20 gpm 2005 Peak Hour Flow 62 gpm

Build-out Base Flow 47 gpm Build-out Peak Hour Flow 123 gpm

Note: Will pump to gravity system and not Old Mill PS

Pump Station Summary

Pump Station No. 13004 Pump Station Name WOODRIVER VILLAGE

Location _____

Type of Installation -- Manufacturer --

Wet Well Size -- feet No. of Pumps 2 Auxiliary Power PORTABLE

Motor Size 16 Hp Motor Speed -- rpm Rated Flow 240 gpm

Force Main Diam. 6 Inches Force Main Length 2616 feet

Pump Station No. 13077 **Station Name:** WYNDEMERE

Basin Summary

Area 191.7 acres Study Area 2 % Sewered 20.8

Dwelling Units

2005 138 2010 _____ 2020 _____ 2030 _____ Build-out 663

Flow Projections

2005 Base Flow 19 gpm 2005 Peak Hour Flow 84 gpm

Build-out Base Flow 78 gpm Build-out Peak Hour Flow 216 gpm

Pump Station Summary

Pump Station No. 13077 Pump Station Name WYNDEMERE

Location _____

Type of Installation -- Manufacturer --

Wet Well Size 6.77 feet No. of Pumps 2 Auxiliary Power --

Motor Size 16 Hp Motor Speed -- rpm Rated Flow 240 gpm

Force Main Diam. 4 Inches Force Main Length 3931 feet