

MEMORANDUM

TO: Steve Wall

FROM: Peter Tuck, P.E.



RE: Evaluation of potential impacts to the City's sewer and water system from the proposed comprehensive plan amendment/zone change.

DATE: May 17, 2023

Introduction

This memorandum reports and evaluates the potential impacts to the City's sewer and water system from the proposed comprehensive plan amendment/rezone change of five properties (tax lot 125185000, 125193000, 127367000, 127372000, and 986055381) located at/near 4345 NW 16th Avenue in Camas Washington. The proposal would rezone the five properties from Community Commercial (CC) and Business Park (BP) to Multifamily-18 (MF-18).

The purpose of this memorandum is to respond to a request from City of Camas Staff to examine and address what the water demand/sewer discharge is under the General Sewer Plan (GSP) and Water System Plan (WSP), how this compares to the rezoned use and what if any changes would be required in the plans to address the rezone.

The plan amendment/rezone includes five properties that encompass 30.99 acres. Each parcel is currently zoned and developed as follows:

- Tax Lot 125185000: BP, Undeveloped (11.15 acres)
- Tax Lot 125193000: BP, Undeveloped (8.56 acres)
- Tax Lot 986055381: BP, Undeveloped (4.70 acres)
- Tax Lot 127367000: CC, Nursery/Single-Family Residence (4.19 acres)
- Tax Lot 127372000: CC, Undeveloped/Outdoor Storage (2.39 acres)

A. Sewer

This analysis is based on information within the 2022 Draft GSP by Carrollo Engineers as provided by city staff.

The five properties that are part of the rezone application are all located in sewer basin 13. (Fig 4.2 Existing Wastewater Collection System) This is a Septic Tank Effluent Pump (STEP) basin. All discharge from the basin is to the STEP main that conveys all effluent north along NW Parker Rd to NW Lake Rd, through downtown to the Wastewater Treatment Plant. (Fig 6.24 Overview of Potential STEP Main Model).

The analysis is broken into two parts.

1. Determination of wastewater flow and the difference between the existing plan's flow and the impact from the zone change to the wastewater flow; and
2. Review of capacity of existing conveyance system.

A.1.1 Wastewater Flow to the Wastewater Treatment Facility

Based on Fig 3.3 Land Use in GSP, the two CC parcels are considered commercial whereas the three BP parcels are considered Industrial. In the GSP, wastewater flow factors are used to create a relationship between land use and wastewater generation. The wastewater flow factors were established to project the estimated Average Dry Weather Flow (ADWF) through future development of the City's wastewater collection system and project future flows within the Study Area boundary.

Section 3.4.3 in the GSP states; Wastewater flow coefficients for residential areas typically range between 500 to 3,000 gallons per acre per day (gpad), and commercial or industrial areas might range from 1,000 to 4,000 gpad, with typical values averaging approximately 1,500 gpad. The actual Wastewater Flow Factor used in the report for Commercial, Industrial and Multi-Family High are as follows:

- Commercial – 1,270 gpad
- Industrial – 1,000 gpad
- Multi-Family High – 1,520 gpad

Currently the STEP portion of the City's sewer system that is not upstream of gravity sewer has not been modelled. Due to this, the GSP does not include any assumptions or details related to modelling of STEP systems and thus does not identify what flows are coming from the STEP areas. The gravity system has been modelled for the GSP with flow projections included for ADWF and Peak Wet Weather Flow (PWWF). The ratio between the ADWF and PWWF is termed the peaking factor within the GSP with the following values:

- 2018 – 6.8
- 2035 – 8.2
- Full Buildout – 5.7

Since this is a factor to address increased flow from wet weather rather than peaked use, it is really more of an inflow and infiltration (I&I) factor. Based on the size of the factor, I&I is a large element within the system and has the biggest impact of overall flows, rather than actual land use.

Table 3.2 Comprehensive Plan Land Use Summary, identifies the acreage of each of the six, sewer generating land uses in the GSP. From this table the projected ADWF and PWWF can be determined for the full buildout scenario for both the current GSP areas and when considering the re-zoned areas based on the wastewater flow factors and peaking factors. In addition to the wastewater flow factors

and peaking factors, the total acreage for each designation was reduced by a factor of 27.7% to consider area lost to right of way and stormwater facilities. There are no factors within the GSP to address areas lost to environmental issues such as wetlands and steep slopes.

Comprehensive Plan Designation	Total Acreage	Total Acreage reduce for ROW/Storm	Wastewater Flow Factor (gpad)	Total Wastewater Flow (gpad)
Single Family - High	425	307	450	138,150
Single Family - Medium	3,617	2,615	670	1,752,050
Single Family - Low	871	630	800	504,000
Multi Family - High	246	178	1,520	270,560
Multi Family - Low	279	202	1,250	252,500
Commercial	992	717	1,270	910,590
Industrial	2,427	1,755	1,000	1,755,000
Total Wastewater Flow after reduction for ROW/Storm				5,582,850 mgd

Table S1 - Wastewater Generation under existing zoning. (ADWF)

Comprehensive Plan Designation	Total Acreage	Total Acreage reduce for ROW/Storm	Wastewater Flow Factor (gpad)	Total Wastewater Flow (gpad)
Single Family - High	425	307	450	138,150
Single Family - Medium	3,617	2,615	670	1,752,050
Single Family - Low	871	630	800	504,000
Multi Family - High	277	200	1,520	304,000
Multi Family - Low	279	202	1,250	252,500
Commercial	985	712	1,270	904,240
Industrial	2,403	1,737	1,000	1,737,000
Total Wastewater Flow after reduction for ROW/Storm				5,591,940 mgd

Table S2 - Wastewater Generation with Zone Change Included (ADWF)

Comparing the ultimate wastewater flow under the existing zoning with the ultimate wastewater with the zone change included shows a 0.16% change in flow which is negligible when considering the assumptions and estimates made throughout the GSP.

A.1.2 Sewer System Capacity

In section 9.5 *STEP Projects*, there is an overview of the City’s STEP system. Based on this overview, the STEP system is currently unmodelled. The section details the efforts the city is going through to enable a model to be set up including the addition of flow meters to enable the model to be calibrated.

Currently no modelling exists for the main STEP main that starts at Brady Road, extends north to NW Lake Road then east and south to the Wastewater Treatment Plant. See *Fig 6.24 Overview of Potential STEP Main Model*.

In discussions with City staff, a manhole was installed on the 21" STEP main at NW 38th Avenue. Inspection of the pipe at that time found the pipe in excellent condition with no sediment or other detritus in the pipe. The pipe velocity was at or less than 1 fps which is considerably slower than the self-cleaning velocity which is 2fps. Based on the velocity in the pipe, hardly any of the maximum capacity is currently being used. In addition, any new development will have a positive effect on the pipe's operation since it should help in increasing the flow velocity.

The 21" pipe extends south to the intersection of NW Parker Road and NW Columbia Rim Boulevard. From here there is a 10" line that extends south up NW Brady Road to NW 16th Avenue. A gravity lateral exists for tax lot 127367000 and 127372000 (Commercial zoning). The 10" STEP main adjacent to tax lot 125185000 is in a pressure state and would need to be pumped from any onsite septic tank system. Currently the area the 10" line serves 11 subdivisions including all Grand Ridge Phases, all Deer Creek Phases, Brecken Ridge and Dawson's Ridge. No capacity study has been completed for this line, so the level of the hydraulic grade line (HGL) is unknown. There could be some issues routing effluent to this line from the lower, currently industrial lots however, this would be the case whether the rezone occurs or not. There is a second sewer connection adjacent to the NW corner of the west industrial parcel (tax lot 125193000). This is located on the old Sharp Parcels and runs north to STEP main in NW Pacific Rim Drive. This has more capacity than the NW Brady Road line.

It should be mentioned that STEP systems with pumps can use storage in the tanks to reduce maximum daily peaks. This can be used as a mitigating method if any that can be used to offset some downstream capacity issues is determined.

A.2 Conclusion

Based on the information contained in the latest GSP, *the rezoning of the five parcels to Multi-Family High will cause a slight increase in sewer flow, however the effect to the overall system is negligible* when considering the assumptions and estimates made throughout the GSP especially the impact of I&I on the system.

It should be noted that, even though the Wastewater Flow Factor used for Industrial and Commercial is 1,000 gpad and 1,270 gpad respectively, it is accepted that an approved land use within the commercial or industrial zoning on any of the properties could have a flow as high as 4,000 gpad. Since the Multi-Family High has a rate of 1,520 gpad, it is considerably less than the maximum flow accepted for an industrial or commercial zone. Based on this, *the effect of the zone change on the sewer capacity in the GSP should be non-effectual.*

The main *STEP mains that route all flow to the WWTP are only using a very small portion of their capacity. Therefore, the rezone will not have any impact on the STEP transmission lines.*

Based on the above analysis, there should be no impact on the city's sewer system from the rezone.

B. Water.

This analysis is based on information within the 2019 WSP by Carrollo Engineers.

B.1.1 Water Flow

The five properties that are part of the rezone application are all located in the 852-pressure zone that includes Prune Hill. (Fig 9.1 Service Areas).

Section 5.4.2 Demographic Growth Rates in the WSP states; To estimate households and employees from land use data, the following employee and household density assumptions were used based on the 2015 Clark County Buildable Lands Report:

- *SFR: 6 households per acre*
- *MFR: 18 households per acre*
- *Commercial/City: 20 employees per acre*
- *Industrial: 9 employees per acre*

The water use per Equivalent Residential Unit (ERU) is defined as 260 gpd in section 5.6.1. There is no definition of the flow per employee for either commercial or industrial however, industry norms assign 10gpd to 15gpd for commercial and 15gpd to 30gpd for industrial. Applying these flows to MFR, commercial and Industrial land uses results in 18 ERU/acre for MFR and approximately 1 ERU/acre for both Industrial and Commercial. However, it should be noted that the flows associated with both commercial and industrial are both restricted to flows from employee-based uses and do not consider wet commercial or industrial users that can be approved in both zoning districts. If only the employee-based flows are addressed the additional flow generated by the MFR 18 rezone is as follows:

As previously detailed, the proposed rezone encompasses approximately 31 acres. Of this, 27.7% of the area is lost to right of way and stormwater facilities. Thus, the resultant area impacted by the rezone will be 22.4 acres. Since both the commercial and industrial areas are projected to generate approximately 1 ERU/acre and MFR 18 ERU/acre, the resultant increase in ERU's will be:

- 24.4 acres (Commercial or Industrial) x 1 ERU/acre = 24.4 ERU's
- 24.4 acres MFR x 18 ERU/acre = 439.2 ERU's

Therefore, the rezone will generate approximately 414.8 ERU's more than current zoning if only the employee-based flows are considered.

To address wet industrial users a 0.5 mgd block of flow has been included in the WSP. In *Section 5.6.2 Large Users Demand Forecast* the report states, ... *the city has requested Large Users projections include a 0.5mgd "block" for future industrial clients. This 0.5 mgd was added to the Large Users demand projections in 2021... .*

Since this block of flow is part of the flow associated with the existing zoning, it is reasonable to assume that a portion of this can be applied to the rezone area thus greatly reducing or eliminating any change in flows seen by the water system.

It should be noted that there is a large discrepancy between the planning value within the WSP and the GSP with 4 to 6 times higher flows related to sewer in the GSP over the WSP for industrial and Commercial zones and 3 x higher flows related to water in the WSP over the GSP for the MFR zoning.

B.1.2 Deficiencies in the Water System

- Supply - The WSP provides an in-depth analysis of the current City's water sources and its deficiencies. The deficiencies include the lack of generators on some wells that remove them from some of the source calculations. The plan identifies improvements needed within the system to address Maximum Daily Demands (MDD) and Average Daily Demands (ADD). All these improvements are needed whether the rezone occurs or not and should not be exacerbated by its approval.
- Pressure Zone 852 – Since the rezone is in the 852 pressure zone, any deficiencies related to this zone could be impacted by the rezone.
 - Booster Pump Stations - Section 9.3.4 in the WSP states the following related to deficits in BPS needs for the 852 pressure zone:

Figure 9.4 shows that the 852 and 455 service areas each have a deficit of approximately 1,000 gallons per minute (gpm) by 2035. As shown in Figure 9.5, 1,000 gpm of additional firm pump capacity is needed for the 852 pressure zone, but a total of 2,000 gpm of additional firm pump capacity is required for the 455 pressure zone because in addition to the 1,000 gpm of unmet demand in the 455 Service Area, the 1,000 gpm deficit for the 852 Service Area must be pumped up from the 343 Zone to the 455 Zone before being pumped into the 852 Zone. Due to its condition, the City intends to replace the existing Forest Home BPS with a new pump station. This new pump station should have a firm capacity of approximately 2,000 gpm. The additional 1,000 gpm flow of the new Forest Home BPS will wheel the 1,000 gpm of additional flow needed for the 852 Zone through the 455 Zone. Approximately 1,000 gpm of additional firm booster pumping capacity will need to be built at Angelo BPS or a new BPS to the 455 Zone. Additionally, as shown in Figure 9.5, the City intends to construct the 500-gpm Well 17 in the 544 Zone by 2021. The biggest issue with flow to the 852 zone is limits to the booster stations supplying the 455 zone that provides service to the 852 zone. To address deficiencies in the 455 zone, the Forest Home BPS needs to be increased from 1,000 gpm to 2,000 gpm and a correctly sized generator added.

The improvements as identified by this section are included in the recommended improvements within the WSP. If the rezone is completed and development occurs on any of the properties, the need for some of these improvements could be accelerated over what is in the WSP.

- Storage – based on section 9.4.3, the 852 pressure zone has storage surpluses throughout the planning period. Therefore, there are no storage related deficiencies related to this zone.
- Distribution – There were no distribution related deficiencies identified for the 852 pressure zone.

B.2 Conclusion

Based on the above analysis, the rezone will have a significant impact on water demand within the system if only the employee-based flows are considered. If some of the flow from the reserved “block” for industrial clients who would otherwise have wet processes is assigned to the rezone area, the impact on the system can be lowered to a neutral state.

The applicant acknowledges that there could be some potential impacts to the water from the rezone even if just an acceleration for the need of some improvements as identified in the WSP. We are confident and acknowledge that there are likely appropriate and feasible conditions of approval that may be attached as mitigation (under SEPA review) that could be tied to the properties that offset any impacts as part of future development applications. These could include System Development Charges (SDC's) or the requirement for certain system improvements to occur with the development of any of the parcels.

Attachments:

- Fig 4.2 Existing Wastewater Collection System (GSP)
- Fig 6.24 Overview of Potential STEP Main Model (GSP)
- Fig 9.1 Services Area (WSP)

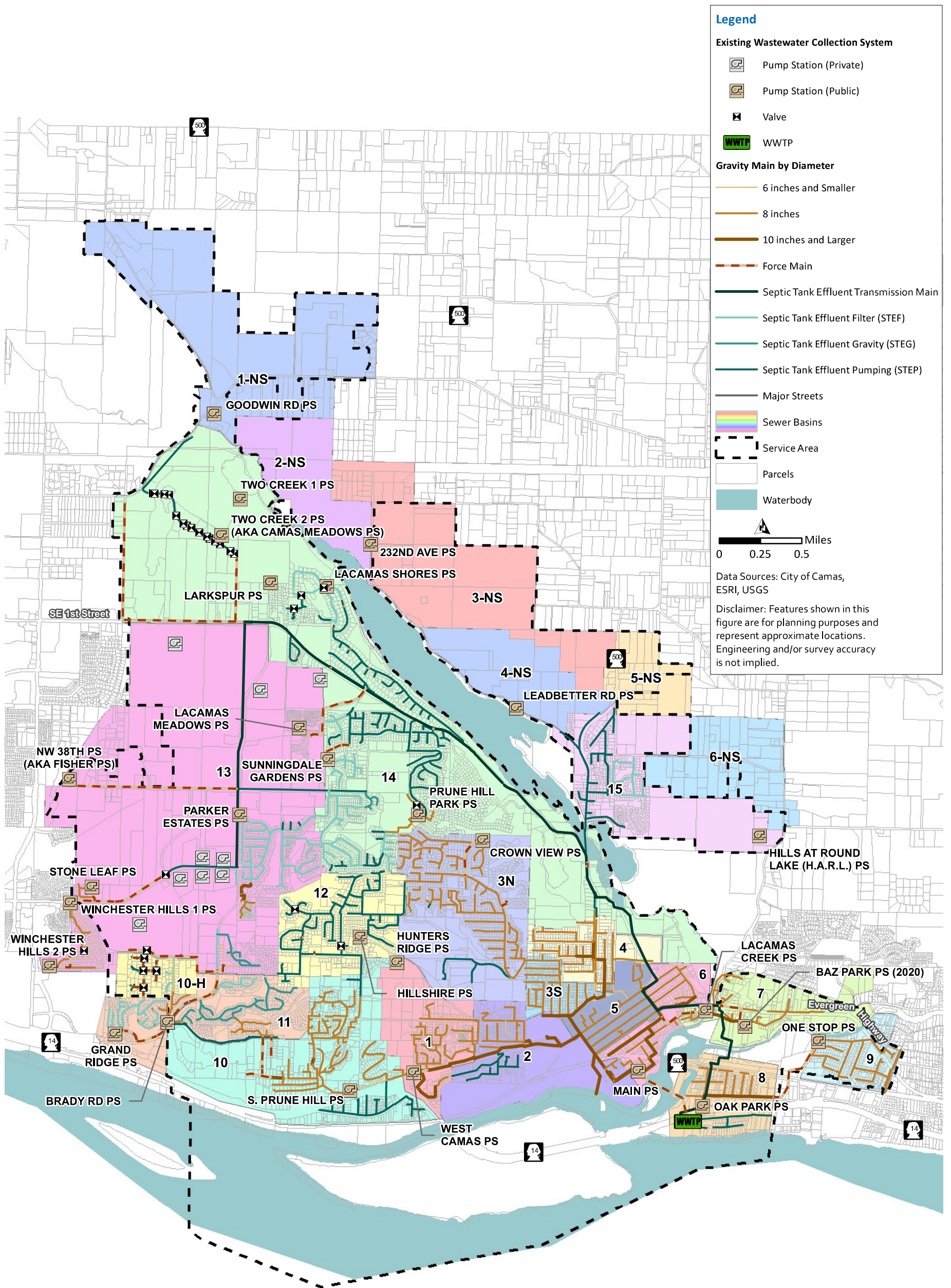


Figure 4.2 Existing Wastewater Collection System

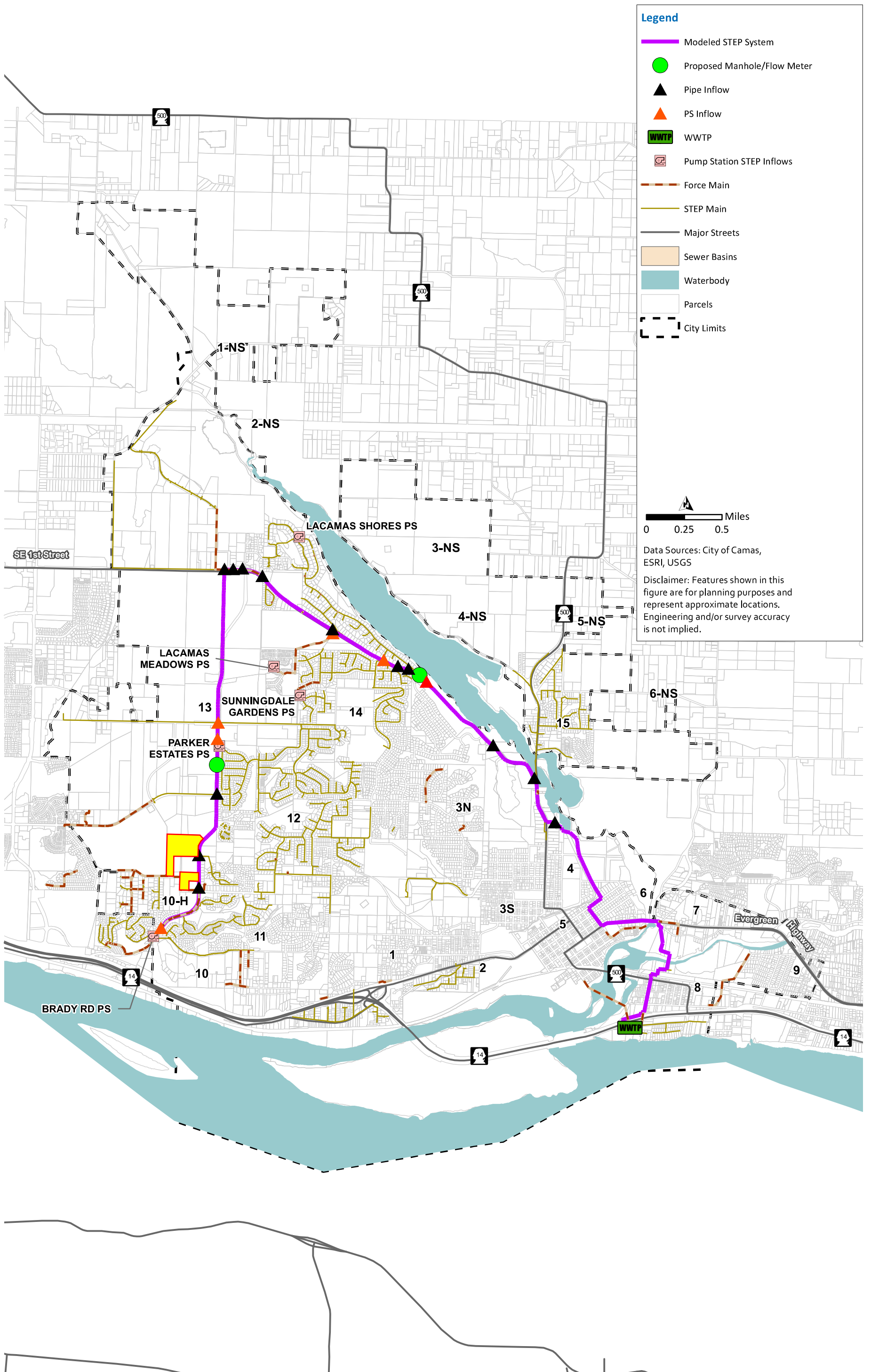
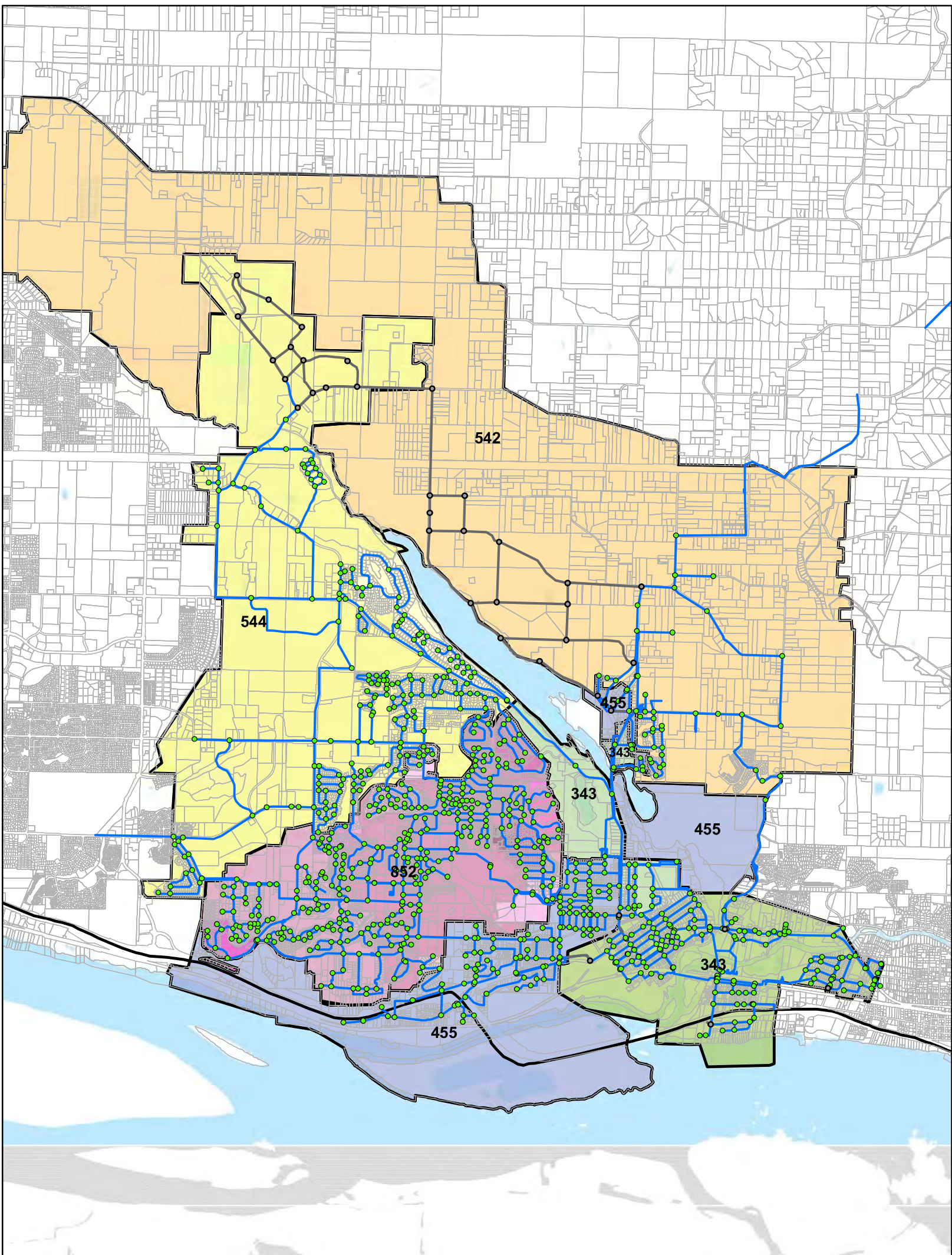
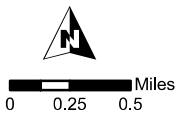


Figure 6.24 Overview of Potential STEP Main Model



- Legend**
- Highway 14
 - ▭ Parcels
 - ▭ Waterbody
 - Existing Water Main
 - Future Pipelines
 - Existing Junction
 - Future Junctions
- ▭ Service Area
- Pressure Zones
- ▭ 343
 - ▭ 455
 - ▭ 542
 - ▭ 544
 - ▭ 852



SERVICE AREAS
FIGURE 9.1
 CITY OF CAMAS
 WATER SYSTEM PLAN UPDATE

