2. General methodology/assumptions for population projections: (Estimated # of DWELLING UNITS * PERSONS PER HOUSEHOLD (PPH) * OCCUPANCY RATE=POPULATION ESTIMATE).
3. Small Area Estimate Program (SAEP)-2007 and 2008 estimates prepared by Washington State Office of Financial Management 9/26/08. Population estimates are derived from the current housing stock using decennial census-based occupancy rates and household size that have been adjusted based on other estimation information. For more information about SAEP, see http://ofm.wa.gov/pop/small area. Disclaimer: by using these data the user agrees that the Washington State Office of Financial Management shall not be liable for any activity involving these data with regard to lost profits or savings or any other consequential damages; or the fitness for the use of the data for a particular purpose; or the installation of the data, its use, or the results obtained. All SAEP estimates are subject to change due to data updates and revisions.

Notes:
**Data: All data obtained from Pierce Co. GIS/CountyView database August-September 2008, unless otherwise indicated.
See Also: "Exception Areas".xls on the CD for detailed data on parcels outside plats with potential to subdivide.

Both the 2007 estimates are similar, however the estimates prepared using PSRC data are all slightly lower than the OFM estimates due to differences in methodology. OFM's SAEP estimates that the entire study area has a population of 7,349, while the PSRC based estimate is slightly less at 7,011, with Sub-Areas 1-3 comprising approximately 98% of that total with 6,878 residents. Cascadia currently has an estimated 133 residents.

Projected Estimates
The annual projected dwelling unit and population estimates through 2028 for Sub-Areas 1-3, and Cascadia are shown in Table 2.

Dwelling Units. The total number of projected dwelling units was estimated by first multiplying the total number of existing units in 2008 by the build-out potential (estimate of additional dwelling units * various annual percentages=Build-Out Potential). The Cascadia Employment-Based Community Plan is expected to have the greatest increase in dwelling units over the next twenty years, increasing from 120 units in 2008 to 8,486 in 2028. Sub-Area 1 is expected to have the least amount of growth, with an increase of 100 dwelling units during that same period, with Sub-Area 2 increasing by a similar margin at 152 new dwelling units. Sub-Area 3 is expected to see a substantial increase of 3,346 dwelling units by 2028, due primarily to the development of Plateau 465. It is important to note that all projected estimates are independent of the Cascadia Employment-Based Community Plan, as discussed above in the background on Cascadia.

The estimated number of dwelling units for each sub-area was calculated using the following formula:

Estimated # of Dwelling Units=
2008 OFM SAEP of EXISTING DWELLING UNITS + NUMBER OF DWELLING UNITS FROM PENDING PLATS + dwelling unit build-out potential from EXCEPTION AREAS.

"EXCEPTION AREAS" are defined as vacant or underdeveloped parcels outside of formal plats that are greater than one acre in size. Calculations were made under the assumption that parcels meeting the criterion might sub-divide up to four dwelling units

per acre in the future. The total number of dwelling units in the exception areas was calculated using the following formula:

Dwelling Units per Net Acre in Pending Plats=
(((GROSS ACREAGE * 4du/acre) - existing du on-site (if applicable)) - sensitive area acreage).

Population. During the twenty-year projection period, the Cascadia Employment-Based Community Master Plan is expected to have the most growth, increasing from 315 residents in 2008 to 23,069 in 2028 for a total increase of 22,754 people. By comparison, Sub-Areas 1, 2, and 3 are expected to have a total growth of 307 people, 444 people, and 9,731 people, respectively. The 2028 population projection for the entire study area is estimated at 40,985, a growth factor of approximately 500%.

The annual population projections were calculated using the 2008 Office of Financial Management (OFM) Small Area Estimate Program (SAEP) figures for each sub-area as the base starting point. The subsequent 2009-2028 annual figures were then calculated using the following formula:

Annual Population Estimate=
Estimated annual number of DWELLING UNITS in each sub-area * 2007 PSRC estimated PERSONS PER HOUSEHOLD figure (PPH) * 2007 PSRC estimated OCCUPANCY RATE.

As noted in Table 2, the persons per household and occupancy rate are based on

Table 2. Projected Population Estimates for Bonney Lake "CUGA" Annexation Area

POPULATION PROJECTIONS

	2008*	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Sub-Area 1	2,104	2,107	2,110	2,116	2,125	2,135	2,150	2,165	2,181	2,196	2,211	2,227	2,242	2,261	2,282	2,303	2,325	2,346	2,368	2,389	2,411
Sub-Area 2	2,741	2,791	2,838	2,942	2,949	2,958	2,967	2,979	2,992	3,004	3,016	3,044	3,071	3,099	3,127	3,154	3,176	3,185	3,185	3,185	3,185
Sub-Area 3	2,589	2,656	2,697	2,737	2,805	2,872	2,939	3,007	3,074	3,141	3,209	3,276	3,774	4,272	5,203	6,134	7,902	9,657	11,411	12,299	12,320
Cascadia	315	379	898	1,471	2,329	3,421	4,851	6,486	8,060	10,072	12,084	14,096	16,515	17,441	18,624	19,807	20,989	21,968	22,335	22,702	23,069
TOTAL	7,749	7,933	8,543	9,266	10,208	11,386	12,907	14,637	16,307	18,413	20,520	22,643	25,602	27,073	29,236	31,398	34,392	37,156	39,299	40,575	40,985

DWELLING UNIT PROJECTIONS

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Sub-Area 1	685	686	687	689	692	695	700	705	710	715	720	725	730	736	743	750	757	764	771	778	785
Sub-Area 2	938	956	973	1,011	1,013	1,016	1,019	1,023	1,027	1,031	1,035	1,044	1,053	1,062	1,071	1,080	1,087	1,090	1,090	1,090	1,090
Sub-Area 3	890	913	927	941	964	987	1,010	1,034	1,057	1,080	1,103	1,126	1,297	1,469	1,789	2,109	2,717	3,320	3,923	4,229	4,236
Cascadia	120	139	330	541	857	1,258	1,785	2,386	2,965	3,705	4,445	5,185	6,075	6,416	6,851	7,286	7,721	8,081	8,216	8,351	8,486
TOTAL	2,633	2,694	2,917	3,182	3,526	3,956	4,514	5,148	5,759	6,531	7,303	8,080	9,155	9,683	10,454	11,225	12,282	13,255	14,000	14,448	14,597

Calculations: See worksheet calculations for each subarea in Appendix A under Section 1:Calculations, including "Exception Areas" that includes pending formal plats, with the potential to subdivide, etc.

estimated average household size (2007) and differ by census tract. For further detail on these estimates see “Census Tract Estimates of Housing Units, Households, and Population: 2007” prepared by Puget Sound Regional Council. Sub-Area 2 is divided between three census tracts so the respective occupancy rate and persons per household figures were used in the calculations.

ASSESSED VALUE

Table 3 shows the assessed value by sub-area, as well as land area (in square feet and acres), parcel acreage, and total number of parcels. While Cascadia is the largest of the sub areas, its predominantly undeveloped state puts its assessed value well under that of the other three sub-areas. Sub-Area 1 has an assessed value of $146,737,700 or an average of $11.5/square foot. Sub-Area 2 has an assessed value of $172,800,300 which averages out to approximately $8/square foot, while Sub-Area 3 has an assessed value of $256,090,600 and an average of $5.5/square foot. The assessed value of the entire study area is $659,203,700 or an average of $2.17/square foot. It is assumed that the assessed value of Cascadia will significantly increase as each stage of the Employment-Based Master Plan is complete.

Table 3. CUGA Annexation Study Area and Assessed Value Summary***

	LAND AREA (Square Ft)	LAND AREA (Acres)	PARCEL ACREAGE *	TOTAL PARCELS		ASSESSED VALUE**
Sub-Area 1	12,748,015.25	292.65	221.29	662	$	146,737,700
Sub-Area 2	21,647,971.22	496.97	371.07	915	$	172,800,300
Sub-Area 3	46,657,461.28	1,071.11	992.5	940	$	256,090,600
Sub-Total Areas 1+3	*81,053,447.75*	*1,860.73*	*1,585*	*2,517*	*$*	*575,628,600.00*
Cascadia	222,301,668.75	5,103.34	5,059	296	$	83,575,100
Sub-Areas 1-3+ Cascadia	**303,355,116.50**	**6,964.08**	**6,644**	**2,813**	**$**	**659,203,700**

FOOTNOTES FOR TABLE 3:

* Excludes right-of-way.

** For individual parcel data see Excel file on CD.

*** Data obtained from the Pierce County Assessor's Office and CountyView GIS data base in September 2008.

PIERCE COUNTY COMPREHENSIVE PLAN POLICIES

The following policies contained within the Pierce County Comprehensive Plan support the idea of providing efficient delivery of services and promoting urban growth where services are readily available.

- *Pierce Co. Code Title 19A – Comprehensive Plan*
  - Chapter 19A.10 – Growth Management Planning.
    - 19A.10.010(A) **Urban Growth**. Encourage development in urban areas where adequate public facilities and services exist or can be provided in an efficient manner.
    - 19A.10.010(B) **Reduce Sprawl**. Reduce the inappropriate conversion of undeveloped land into sprawling, low-density development.
  - *Chapter 19A.20 – Pierce County Goals.*
    - 19A.20.050(C) Contain urban sprawl by designating an urban/rural boundary and focusing infrastructure development in proposed employment centers and near cities and towns where a full range of urban services are available.
    - 19A.20.090(G) Pierce County shall rely primarily upon cities and towns and special purpose districts as providers of local facilities and services appropriate to serve those local needs, except where the County is the local service provider.
  - *Chapter 19A.30 Urban Growth Areas.*

- 19A.30.010(C) **LU-UGA Objective 2**. Provide efficient government facilities and services.
  1. Contain and direct growth within the designated Comprehensive Urban Growth Area or satellite city and town UGAs where adequate public facilities exist or can be efficiently provided.
     a. Assure that urban level facilities and services are provided prior to or concurrent with development. These services include, but are not limited to, potable water supply, adequate sewage disposal, surface water management, roads, and transit.
     b. Assure that urban level facilities and services are only provided within the designated Urban Growth Areas.
     c. Seek to reduce the per unit cost of public facilities and services by encouraging urban density development within the designated Urban Growth Areas, while encouraging rural densities in the rural areas.
- *19A.30.010(F) **LU-UGA Objective 5**. Coordinate planning within Urban Growth Areas.*
  1. Designated Urban Growth Areas or Urban Service Areas of municipalities, outside of municipal corporate limits, shall be subject to joint municipal-County planning.
     a. Joint planning shall also occur in those other areas where the respective
     jurisdictions agree such joint planning would be beneficial.
     b. The parties involved in the joint planning process may include one or more municipalities and the County.
     c. When joint planning is required, the joint planning effort shall determine and resolve issues including, but not limited to, the following:
        1. How zoning, subdivision and other land use approvals in designated Urban Growth Areas or Urban Service Areas of municipalities will be coordinated;
        2. How appropriate service level standards for determining adequacy and availability of public facilities and services will be coordinated;
        3. How the rate, timing, and sequencing of boundary changes will be coordinated;
        4. How the provision of capital improvements to an area will be coordinated; and
        5. To what extent a jurisdiction(s) may exercise extra jurisdictional responsibility.
     d. Joint planning may be based upon factors including, but not limited to, the following:
        1. Contemplated changes in municipal and special purpose district boundaries;
        2. The likelihood that development, capital improvements, or regulations will have significant impacts across a jurisdictional boundary;
        3. The consideration of how public facilities and services are and

should be provided and by which jurisdiction(s); or
4. The consideration of how economic development may best be encouraged and supported.

2. Adopt the urban development standards for new developments in urban growth areas, as provided in the County-Wide Planning Policies.

County-Wide Planning Policies: Urban Growth Areas

Section III. COUNTY-WIDE PLANNING POLICIES FOR URBAN GROWTH AREAS

COUNTY-WIDE PLANNING POLICY ON URBAN GROWTH AREAS, PROMOTION OF CONTIGUOUS AND ORDERLY DEVELOPMENT AND PROVISION OF URBAN SERVICES TO SUCH DEVELOPMENT (pg.48)

"The Growth Management Act amendments expressly require that county-wide planning policies address..., the promotion of contiguous and orderly development, the provision of urban services to such development [RCW 36.70A.210(3)(b), and the coordination of county and municipal planning within urban growth areas [RCW 36.70A.210(3)(f)]." (pgs. 48-49)

"As to the timing and sequencing of urban growth and development...urban growth shall occur first in areas already characterized by urban growth that have existing public facility and service capacities to service such development…. Urban government services shall be provided primarily by cities, and should not be provided in rural areas." (pg. 48)

"The County recognizes that unincorporated lands within urban growth areas are often potential annexation areas for cities. These are also areas where incorporation of new cities can occur. The County will work with existing municipalities and emerging communities to make such transitions efficiently." (pg. 49)

"3.6.5 Urban government services shall be provided primarily by cities and urban government services shall not be provided in rural areas." (pg. 61)

Community Plans

Community Plans dictate land use designations, appropriate densities, and design standards within unincorporated portions of Pierce County. The proposed CUGA annexation area is not governed by a Community Plan, however it is located adjacent to the Alderton-McMillin Community Plan boundaries.

ANNEXATION OPTIONS

The methods by which cities may annex territory are strictly governed by state law, and they vary somewhat by city classification. Cities and towns located in counties that plan under the Growth Management Act may only annex property that is located within their designated urban growth areas. Table 4 summarizes the annexation methods available to Code Cities, such as Bonney Lake.

Table 4: Annexation Options for Code Cities (Chapter 35A.14 RCW)

AUTHORITY	*METHOD*	*GENERAL SUMMARY*	*APPLICABLE FOR CUGA ANNEXATION?*	*TIME REQUIRED TO PROCESS**
RCW 35A.14.015-.110	Election Method	A City may initiate an election-method annexation by passing a resolution calling for the annexation to be placed on an upcoming ballot. Simple majority of registered voters (in annexation area) must vote for annexation and votes cast must be at least 40% of those cast in preceding general election. Petitions will be certified by Auditor and election subject to referendum.	Yes but city assumes cost of election (cheaper to share cost with other agencies during a general election). The cost of election may still be equal to or less than staff time/costs to gather signatures using either petition method.	8 Months + (depending on desired election date)
RCW 35A.14.120-.150	Direct Petition Method ("Old" Petition Method-still constitutional)	Property owners of 10% of the area's ***assessed value*** shall file petition with the City Council requesting approval to circulate official petitions. Final petitions must be signed representing 60% of the area's ***assessed value.*** See below for 60% figures for each sub-area.	Yes. This method is the most common by all cities in Washington and is marginally easier than the Alternative Direction Petition.	8 Months+
RCW 35A.14.420-.450	Alternative Direct Petition Method ("New" Petition Method)	Property owners of 10% of the area's ***acreage*** shall file a petition with the City Council requesting approval to circulate official petitions. Final petitions must be signed representing owners of the majority of the area's ***acreage*** AND majority of the area's ***registered voters*** (those who physically reside/and are registered within annexation area only).	Yes. This method would be more effective in areas with large un/underdeveloped parcels with owners that support annexation. Typically, it's much easier to satisfy the requirement for majority of the acreage but is more difficult to obtain support by the majority of registered voters.	8 Months +
RCW 35A.14.300	Municipal Purposes	Allows a city to annex city-owned property that will be used for municipal purposes (i.e. utilities) even if it lies outside city limits. The property can be non-contiguous to city limits but must still exist within a designated urban growth area.	No.	6-8 Months
RCW 35A.14.295-.299	Unincorporated Island	Annexation area must be less than 100 acres and have at least 80% of the boundaries contiguous to the code city.	No. Smaller individual developments may qualify for annexation under this method (i.e. Wilderness Ridge), but not the entire CUGA.	6-8 Months

*

The time required to process any annexation varies depending on whether a legal description has already been prepared and approved by Pierce Co., and on whether petitions have already been signed by residents. Those two variables can extend the processing time by several months. The estimated "time to process" assumes the legal description can be prepared quickly and there is general support for the annexation by residents.

**In order to complete the annexation, state law requires signatures that account for 60% of the assessed value for successful annexation using the direct petition method (RCW 35A.14.120).

If the Direct Petition method (also known as "Old Petition Method") is used, then final signatures must account for 60% of the area's assessed value. Table 5 shows the amount needed by sub-area.

Table 5: 60% Assessed Value Necessary for Annexation under the 'Old' Petition Method.

SUB-AREA	60% ASSESSED VALUE- NEEDED FOR ANNEXATION*
Sub-Area 1	$ 88,042,620
Sub-Area 2	$ 103,680,180
Sub-Area 3	$ 153,654,360
Sub-Total Areas 1+3	$ *345,377,160*
Cascadia	$ 50,145,060
Sub-Areas 1-3+ Cascadia	**$ 395,522,220**

* 2008 Assessed Value as of 9/10/08.

Parcel Data Inventory

For a list of formal plats and formal plats by sub-area, see " Formal Plats" in Appendix A. See 'Parcel Inventory' Excel file on CD for the parcel data inventory of the study area.

INTRODUCTION

Data gathered for the infrastructure and inventory analysis reflects the capacity and condition of existing infrastructure within the potential CUGA and Cascadia annexation areas. Based on the city's request, information was collected for the following types of infrastructure:

- Roads and Transportation
- Storm water systems
- Parks
- Sewer and Septic
- Water Systems
- Police
- Fire
- Other Utilities

Roads and transportation, storm water systems, and parks were identified as the city's top three priorities relative to the potential annexation study, and therefore the bulk of data collection and analysis focuses on these three areas. The specific information gathered, methodology used, and subsequent analysis for each category above are discussed in the sections that follow.

ROAD INFRASTRUCTURE

Existing Roads

There are three Pierce County arterials that serve as primary routes to the study area: 214th Avenue East, South Prairie Road, and Rhodes Lake Road. A brief description of each of these routes is outlined below:

- 214th Avenue East (Major arterial):
  - 2-lane road providing north-south access providing main travel route to the Plateau 465 development and Cascadia.
  - Connects to South Prairie Road East in City of Bonney Lake.
  - Shoulder width varies creating difficulty for pedestrians and cyclists.
  - Based on the City's Transportation Plan prepared in 2006, there has been a 12% increase in the amount of traffic on the road between 2002 and 2005.

- South Prairie Road (Minor arterial):
  - 2-lane road running southeast from SR 410/198th Avenue East intersection to South Prairie where it connects to SR 162.
  - Sidewalks are provided east of the city limits to 214th Avenue East.
  - In other locations, shoulder width varies creating difficulty for pedestrians and cyclists
  - Based on the City's Transportation Plan prepared in 2006, there has been a 16% increase in the amount of traffic on the road between 2002 and 2005.

- Rhodes Lake Road (Minor arterial):
  - 2-lane road which meanders along the downstream portion of the Fennel Creek corridor.
  - There is a small portion of this road within the annexation area before it becomes

198th Avenue East, one of the key north-south routes providing access into the proposed annexation area.

- The road has a posted speed of 25 miles per hour, narrow lanes and no shoulders. Current conditions for bicycles and pedestrians are poor.
- Based on the City's Transportation Plan prepared in 2006, there has been a 16% decrease in the amount of traffic on the road between 2002 and 2005.

Within Sub-areas 1-3, there are approximately 47[1] miles of road. Based on field observation and Pierce County GIS data, approximately 76% of roads within the study area are publicly owned and 21% are privately owned, and ownership data was unavailable for the remaining 3%. The County is responsible for 18 center-line miles of road[2] (including 112th Street East and 120th Street East) and approximately 19.5 miles of non-center-line roads. Pierce County Department of Road Operations estimates that the average annual maintenance cost per mile for a two-lane road is approximately $7,000. Using $7,000/year as a baseline average for road maintenance, it is estimated that the annual cost for maintaining all County roads within the three sub-areas is about $194,250 each year. The anticipated capital costs associated with the County's Transportation Improvement Plan (TIP) are discussed in the subsections that follow.

Pierce County Transportation Improvement Program (TIP)[3]

Pierce County's 2009-2014 Transportation Improvement Program shows a total of seven current or planned projects within the study area. Funding for all seven projects are either fully or partially funded through the County Road Fund (CRF). CRF monies are established through property taxes, where in 2008 the County will collect

Table 6. Transportation Improvement Projects within the Study Area

Project Title	Map ID	Description	Length (miles)	Prior Expenditure (in $1,000's)	Monies Allocated 2009-2014 (in $1,000's)	Estimated Total Cost (in $1,000's)	Fully Funded
144 St. E to 120 St. E	316	County portion of partnering project with the Cascadia Development. Widen and recontruct to provide additional lanes.	1.52	209	196 (CRF 2009)	1,500	Yes
120 St. E to Rhodes Lake Dr. E	317	County portion of partnering project with the Cascadia Development. Widen and recontruct to provide additional lanes.	0.26	333	57 (CRF 2009) 100 (0ther 2009)	500	Yes
Rhodes Lake E to 104 St. E	318	County portion of partnering project with the Cascadia Development. Construct new roadway on new alignment.	0.81	2,153	629 (CRF 1009) 604 (Other 2009) 112 (CRF 2010) 86 (Other 2010)	3,600	Yes
198 Ave E/199 Ave Ct.E to 300ft. w/o 203 Ave E	396	Construct new roadway	0.26	200	196 (CRF 2009)	1,200	No
Intersection (safety)	483	Install traffic signal and proivde turn lane(s).	0.25	N/A	1 (CRF 2012-2014)	1,500	No
Falling Water Blvd E. to 198 Ave E	537	Reconstruct roadway-Full scope to be determined. Potential developer partnering project.	0.61	N/A	1 (CRF 2009)	TBD	No
SR-162 to Falling Water Blvd. E.	538	Potential public/private partnership to construct a new arterial roadway	3.31	N/A	50 (CRF 2009)	TBD	No

1 Estimate from County GIS data.

2 Estimate from Pierce County Road Operations Department, November 2008.

3 Data and information taken from Pierce County Public Works and Utilities, "2009-2014 Draft Transportation Improvement Program."

a maximum of $1.40 per $1,000 of assessed valuation on property in the unincorporated areas of the County for roads. CRF monies are used for the overall administration, engineering, construction, maintenance, and operation of the public road and bridge system in the unincorporated areas. More than half of the County Road Fund collected by property taxes is expended on maintenance and operation of the currently existing County roads and bridges.

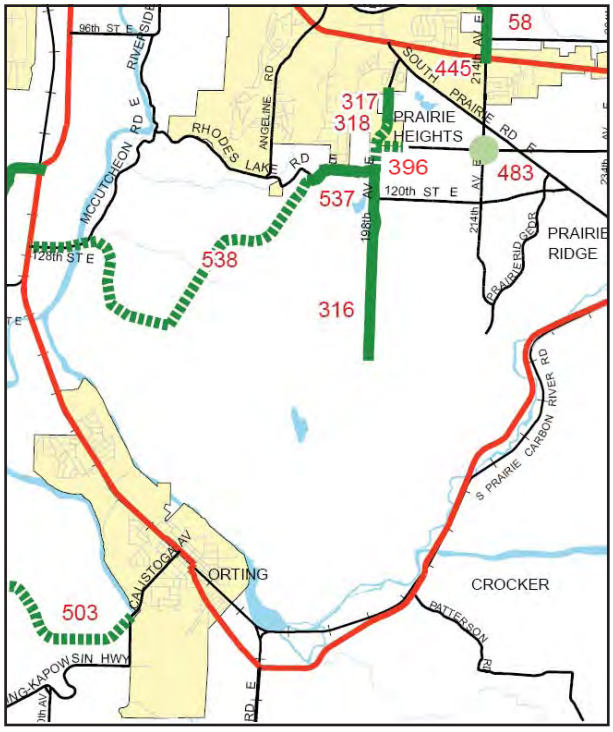


Figure 12: Pierce County Transportation Improvement Projects 2009-2014.

Table 6 provides the details for the seven transportation projects within the study area, and Figure 12 provides a spatial reference for each project via the Map ID. Three of the seven projects (Map IDs 316, 317, 318) are fully funded and are part of a road widening effort for 198th Avenue East, a north-south corridor that runs along the western edge of Sub-Areas 1-3. The increased road width is intended to accommodate the growth anticipated from the Cascadia Employment-Based Master Planned Development. Two of the projects yet to be fully-funded (Map IDs 437 and 438) included the reconstruction and extension of an existing road that will provide an east-west corridor through the northern portion of Cascadia. The other two projects (Map IDs 396 and 483) include the construction of a new road and the installation of a traffic signal and turning lane in Sub-Area 1.

The estimated capital cost for all seven projects is $8.3 million for approximately 7.02 miles of transportation infrastructure improvements. The average cost per project is approximately $1.2 million. On the whole, the capital costs of planned projects within the potential annexation area account for about 4% of the total cost for all of the Pierce County TIP projects from 2009-2014. The TIP plan estimates the total capital costs for all projects will be $207,997,000, including projects in the following categories: bridges, capacity, environmental, new alignment/corridor projects, non-motorized, jurisdiction partnering, preservation, concurrency failed, concurrency projected failed, and safety (ferry projects are not included in this total).

Using the County's estimate of $7,000 for annual maintenance of a center-line roadway, the average annual maintenance cost for the existing roads in Sub-areas 1-3 which are slated for improvement or expansion under the TIP plan (Map IDs 316, 317, 318) is approximately $18,130. Anticipated maintenance costs for these projects once the improvements are complete is unclear, because the TIP plan (Table 6) does not specify how many more lanes will be added for road widening projects. Therefore maintenance

costs estimates for road expansion within the study area is based on the assumption that these roads are widened from two lanes to four lanes. Under this assumption, the average annual maintenance cost for these three projects would double to $36,260. With respect to project Map ID 396, approximately 0.26 miles of 198th Avenue East is slated to be reconstructed to a two-lane roadway[4], for an average of $1,800 per year in maintenance.

The new road construction project planned for the Cascadia area (Map IDs 537 and 538) is estimated to be a five-lane roadway[5] that will serve the employment-based master-planned community. This new road is estimated to cost approximately $68,600 in annual maintenance for 3.91 miles of new ROW. The average annual maintenance cost for all the TIP projects listed in Table 6, with the exception of the intersection/safety improvement (Map ID 483), is approximately $106,660 (assuming IDs 316, 317, 318 are expanded to four-lane roadways).

Both the anticipated capital costs and maintenance cost estimates do not include any additional county roads that may develop as a result of the Cascadia Master Plan. With a projection of 16,000 new residents and 10,000 new jobs resulting from the Employment-Based Master Plan, an increase in traffic congestion is anticipated. As such, it is likely that the addition of new roads and/or public transit in Cascadia will be necessary to adequately serve new residents and comply with any relevant state or federal policies related to commute trip reduction and green house gas reduction. Such an addition would significantly add to the overall capital and maintenance costs for transportation infrastructure in the study area.

Road Inventory

As agreed upon in the project Scope of Work, primary data was collected via a 'windshield survey' in order to assess the condition and characteristics of roads within the study area. The field survey included all accessible public roads. Since Cascadia and Plateau 465 are largely undeveloped and inaccessible, the survey was primarily limited to Sub-Areas 1, 2, and the northern portion of Sub-Area 3. Information gathered included (no valuation data was gathered):

- Condition of roads
- Lane miles
- Presence of sidewalks, curbs, and gutters
- Location of signalized intersections/signed intersections
- Shoulder widths and safety drop-off areas
- Presence of street lights

Transportation Improvement Board (TIB) standards were used as a general guide for determining the condition of roadways. Table 7 summarizes the road survey results, where all results are rough estimates based on the "windshield survey." The complete road inventory survey can be found in Appendix B. Data was not collected for approximately 6% of the roads within the study area, as these were private

4 Two-lane road anticipated by Pierce County Road Operations Department, November 2008.

5 Five-lane road anticipated by Pierce County Road Operations Department, November 2008.

developments and therefore inaccessible.
The road inventory summary table shows that only about 1.5% of the roads surveyed have sidewalk, and 51% roads surveyed do not have sidewalks or curbs. Based on field observation, sidewalks were primarily found on major roads such as South Prairie Road. Roughly 42% of the roads surveyed have rolled curb, while approximately 1% have vertical curb. Vertical curb was only found on a few high-traffic roads and was

Table 7: Road Inventory Summary.

CRACKING	PATCHING	RAVELLING/AGING	SIDEWALK AND CURB	DRAINAGE
None/Good Condition: 38.5% Allligator/Low: 5.8% Longitudinal/Low: 54% Longitudinal/Low-Med: 0.9% Transverse/Low: 28% No Data: 5.8%	No Patching: 61% Low Patching: 30% Medium Patching: 2.4% No data: 5.8%	None: 28% Low: 59.5% Low/Med: 4% Medium: 2% No Data: 5.8%	No Curb/No Sidewalk: 51.2% Rolled Curb/No Sidewalk: 42% Sidewalk: 1.5% Vertical Curb and Sidewalk: 0.9% No Data: 5.8%	Swales/Grassy Swales/Ditches: 36.4% Gutter: 39% Unclear/None Observed: 18.5% No Data: 5.8%

Notes: 1. Road data collected through the windshield survey are estimates based on field observation.
2. Data on road cracking includes roads with multiple types of cracking issues, and therefore the data does not add up to 100%.

accompanied by sidewalk or portions of sidewalk.
Approximately 36% of roads in the study area are served by swales, grass swales, or gravel ditches for drainage, while about 39% are served by gutters. For approximately 18.5% of the roads surveyed, the primary drainage system was either unknown or indiscernible, and therefore recorded as “No Drainage/None”. This uncertainty can be partially attributed to the fact that gutters or drainage swales are often designed to serve more than one road, but this is not necessarily obvious to an observer.

With respect to the assessment of pavement conditions, roads were classified as being in either poor, fair or good condition (Figure 13). All accessible roads within the study area were evaluated to be in either good or fair condition. The majority of the roads located in Sub-Area 1 appear to be in slightly less good condition as roads located in the other portions of the study area. Pavement condition was based on the type and degree of pavement cracking on the road, as well as the frequency and severity of patching, raveling and aging. Table 7 shows that approximately 88% of roads surveyed had a low amount of cracking, which includes alligator, longitudinal, and transverse cracking. About 38.5% had no cracking, and less than 1% had low/medium cracking. The majority of roads within the study area were not patched (61%), while 30% had a low amount of patching. Signs of minimal road ravelling and aging were evident on approximately 60% of roads, with low/medium ravelling and aging on 4%, medium ravelling and aging on 2%, and no evidence of aging on 28%. Figures 14A shows field examples of roads in good condition, and Figure 14B provides examples of roads in fair condition.

Street lights
There are one hundred and seventy street lights in Sub-Areas 1-3, all of which are shown in Figure 15. Street light GIS data was obtained from Puget Sound Energy.

Roads

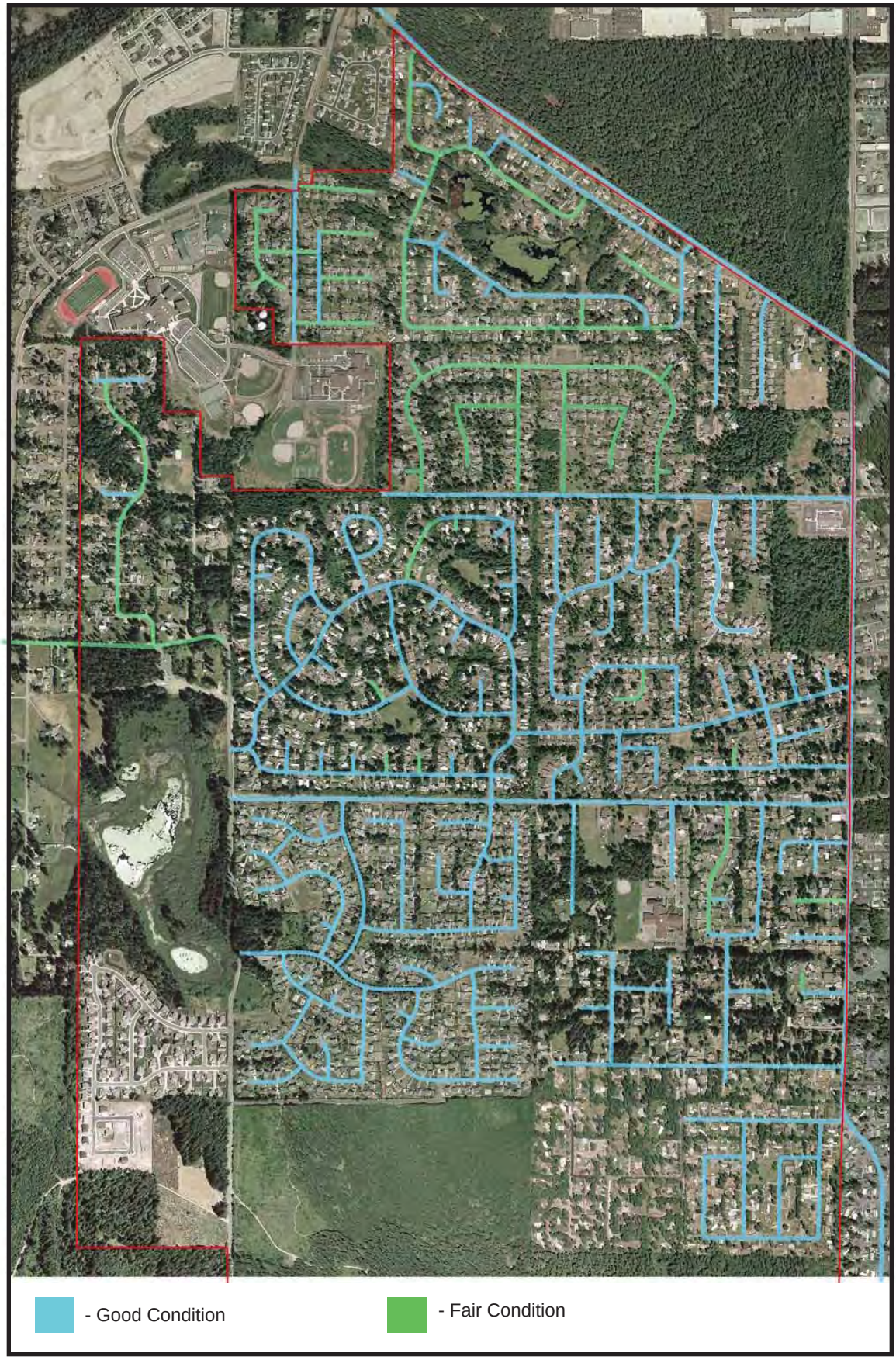


Figure 13: Road Condition Inventory Map

Sub Area 1: Ponderosa Estates

Sub Area 1: Pondersosa Estates

Sub Area 2: Rhododendron Park

Sub Area 2: Forest Trails

Sub Area 3: Timber Ridge

Sub Area 3: Autumn Crest

Common characteristics of roads in good condition include good condition of the pavement, rolled curbs or well defined grass curbs, minimal if any evidence of damage or aging.

Figure 14A: Road Inventory-Roads in Good Condition

Sub Area 1: Near Peach Tree Place

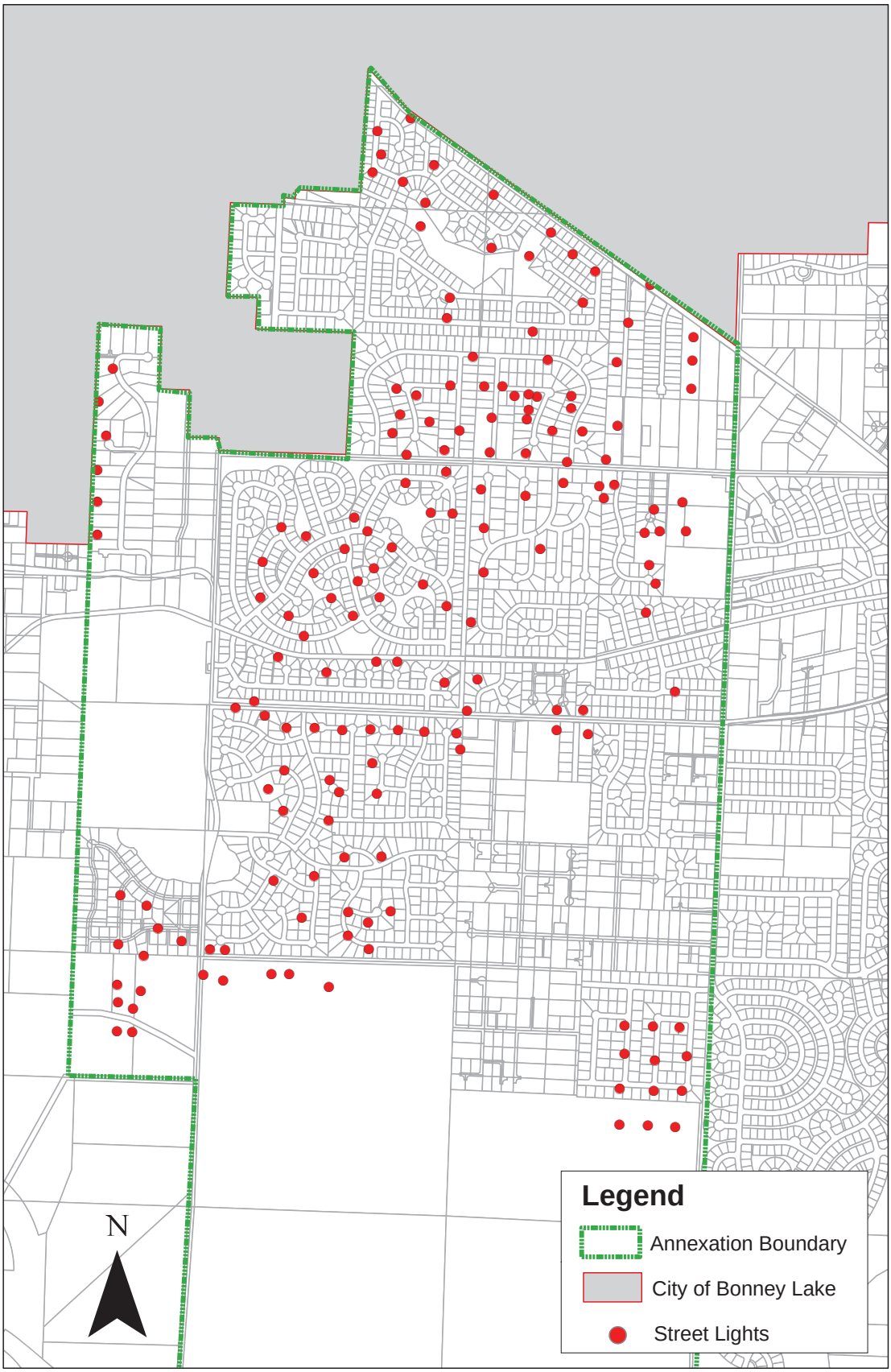
Sub Area 2: Rhododendron Park

Sub Area 1: NW corner

Common characteristics of roads in 'Fair Condition' include small pot holes, road ravelling (often from loose gravel), alligator cracks down the center of roads, and small patched areas.

Typical Examples of Road Aging, Damage, and Repairs

Figure 14B: Road Inventory-Roads in Fair Condition



*GIS data from Puget Sound Energy

Figure 15: Existing Street Lights in the Potential Annexation Area

STORM WATER SYSTEMS

An inventory and assessment of the storm water systems included gathering data for the following:

- County owned storm water ponds
- Storm pipe sizing
- Existing flooding problems

Storm Water Drainage Systems and Ponds

According to Pierce County GIS data, there are approximately 14 storm water ponds located within the potential annexation area (see Figures 16A and 16B). Five storm water ponds are located in Sub-Area 1, there are two known and two questionable ponds in Sub-Area 2, and five ponds in Sub-Area 3. The two questionable ponds (Map IDs 439 and 440) are noted as such in Figure 16B because they are shown in Count

Table 7: Storm water Pond Summary Table

POND #	ADDRESS	Sub Division	Public or Private	Storage Volume (cu. Ft)	Estimated Size (sq. ft.)	In FEMA Flood Zone	Discharge to Salmon Bearing Stream	REF. PARCEL
18	20210 111TH STCT E	CEDAR RIDGE	Public	20,167	10,032	N	N	7000090920
41	11621 208TH AVCT E	FOREST TRAILS DIV 2	Public	31,008	Triangular	N	N	7000050430
80	21032 SOUTH PRAIRIE RD E	PEACH TREE PLACE	Public	5,243	Irregular	N	N	7000740290
85	20508 123RD STCT E	PRAIRIE HILLS PDD	Public	20,111	Irregular	N	N	7000020920
94	21003 119TH ST E	RHODES WOOD DIV 2	Public	62,500	Circular	N	N	7176020082
118	19925 122ND ST E	TIMBER RIDGE ESTATES DIV 2	Public	N/A	75600	N	N	519103023
119	12418 199TH AVCT E	TIMBER RIDGE ESTATES DIV 3	Public	40,044	18200	N	N	7000422060
128	20601 108TH STCT E	WEMBLEY PARK SOUTH	Public	79,725	34,749	N	N	7000070810
167	12321 124TH STCT E	TIMBER RIDGE EAST	PVT/Public	98,524	Irregular	N	N	7000731030
249*	20601 125TH ST CT E	127TH ST E ET AL	Public	N/A	N/A	N	N	519108084
310*	10401 202 AVE E	PONDEROSA ESTATES PH 4 PND 1	Public	N/A	N/A	N/A	N/A	6936401287
311*	20511 107TH ST E	PONDEROSA ESTATES PH 4 PND 2	Public	N/A	N/A	N/A	N/A	6936401288
439*	11213 208TH AVE CT E	WILDERNESS ESTATES EASEMENT 2	PVT	N/A	N/A	N/A	N/A	9551000011
440*	11319 208th Ave CT E	WILDERNESS ESTATES EASEMENT 2	PVT	N/A	N/A	N/A	N/A	9551000240

Data: All pond data from Pierce County Records.
*N/A denotes that information was not available for that pond.

View Web GIS data, but field observation and aerial photographs seem to indicate that there may not be storm water ponds in those locations. Figure 16A shows drainage areas and storm water pond locations for the study area. The shaded areas in Figure 16A denote different drainage systems for the area. Figure 16B shows the storm water ponds in Sub-Areas 1-3 in greater detail (Pierce County data currently shows no storm water ponds in Cascadia). Table 8 shows that all but 3 of the 14 ponds in the study area are publicly owned. Detailed information was only available for some of the ponds within the study area. Figure 17 shows examples of typical existing storm water ponds within the annexation area. Pictures were provided from Pierce County.

Drainage Pipes

The size of storm water drainage pipe width (in inches) is shown in Figure 18. The majority of drainage pipes in Sub-Areas 1-3 are 12’ wide. Larger pipes ranging from 15’-36’ in width are most common in the northwest corner of Sub-Area 1 and western half of Sub-Area 3. Small segments of other sized drainage pipes are also scattered about, but are less common then the aforementioned pipe sizes. Pierce County CountyView GIS

Pond 128

Pond 18

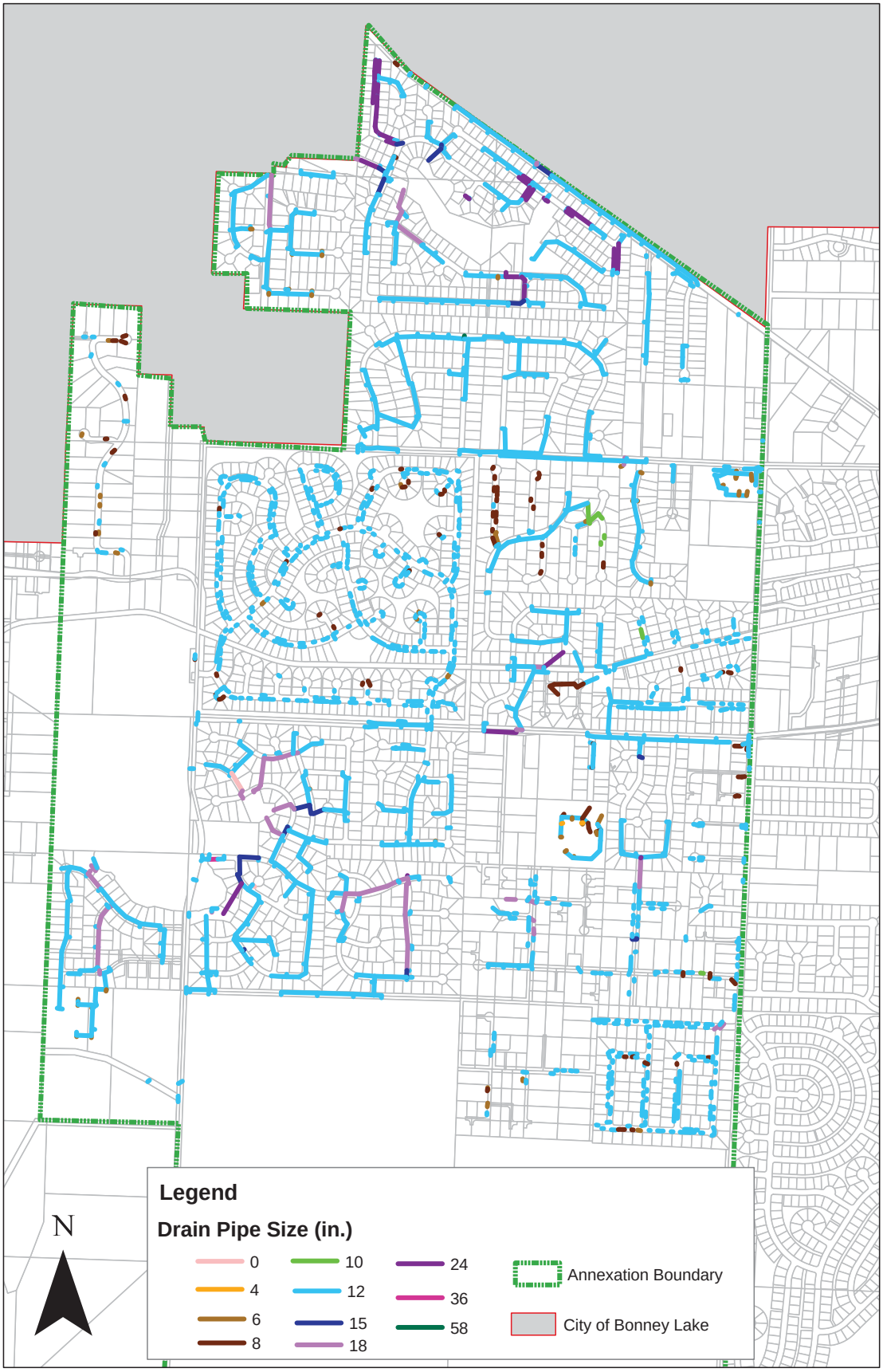
Pond 311

Pond 41

Pond 249

Pond 118

Figure 17: Examples of Existing Storm water Ponds (*Storm water Pond Photos from Pierce County)



Data: Pierce County, CountyView GIS

Figure 18: Storm water Drainage System Pipe Size

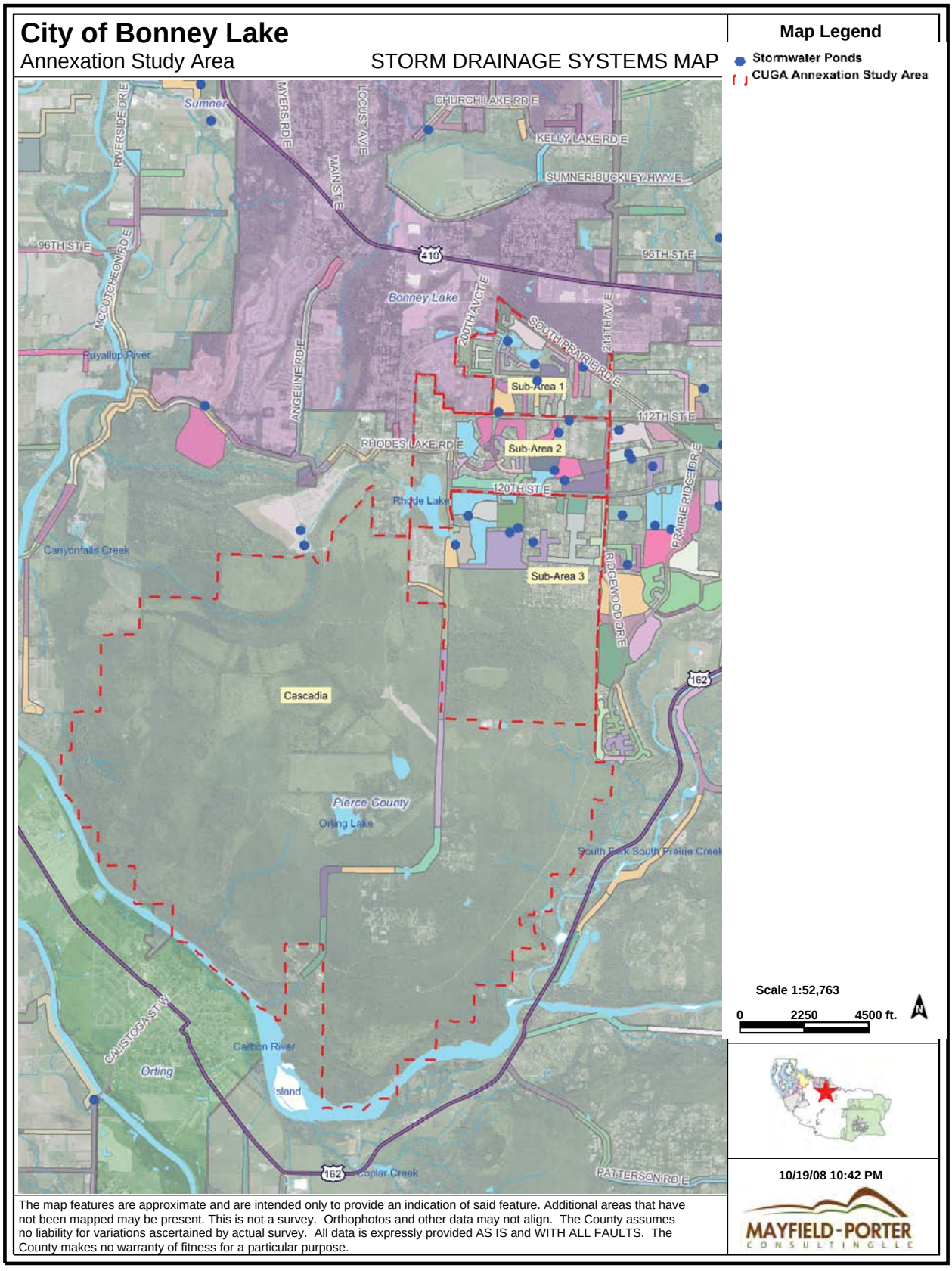
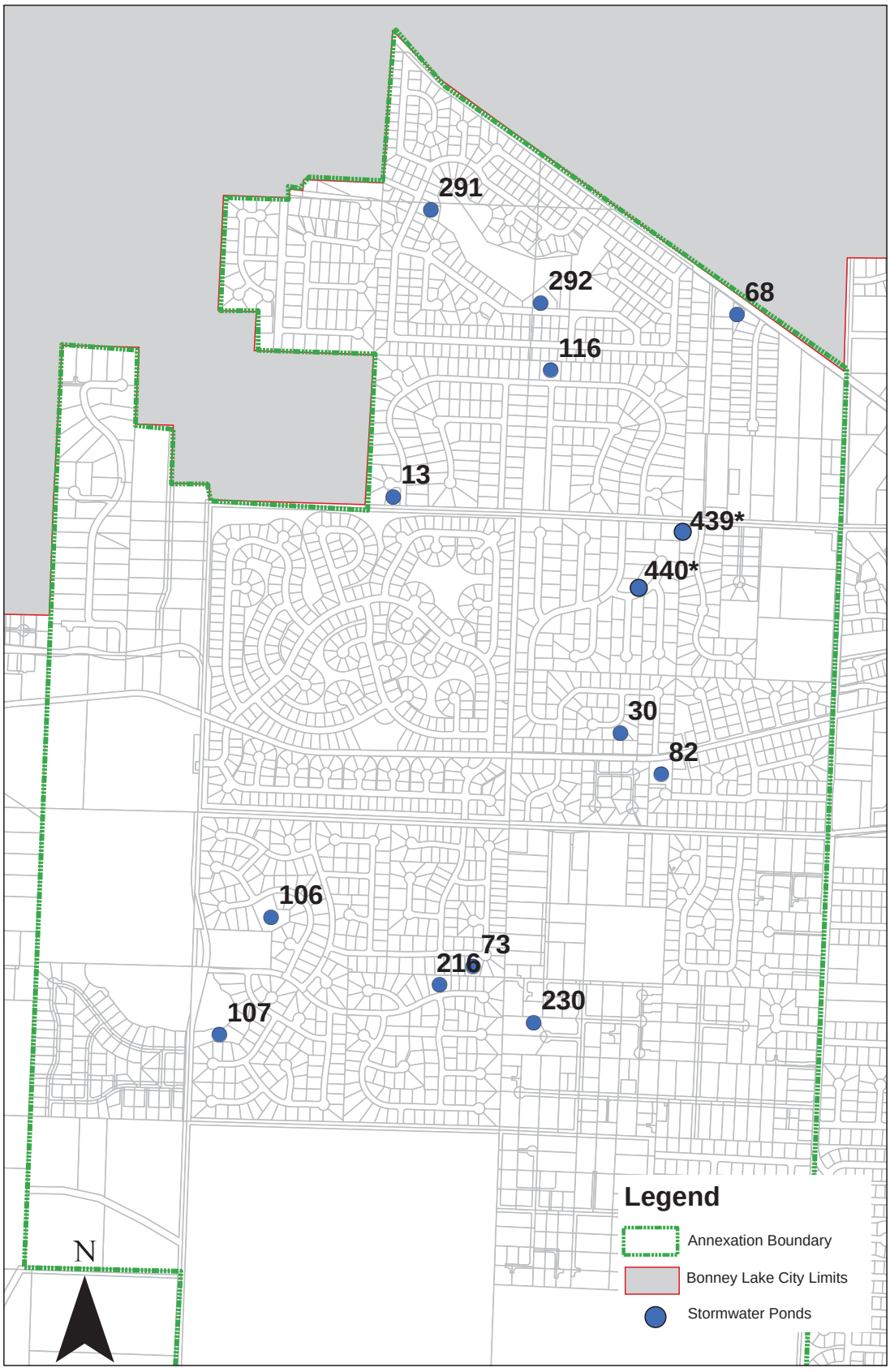


Figure 16A: Drainage Systems and Storm water Ponds



*Asterisk denotes ponds on CountyView GIS that are questionable after field observation.
Data: Pierce County, CountyView GIS

Figure 16B: Storm Water Ponds In Study Area

did not display any pipe size drainage data for Cascadia.

Storm Water and Flooding Capital Facilities Program[1]

The County's proposed Surface Water Management program for 2009-2014 includes 67 capital projects which are estimated to cost $44,355,000 during that time period. These capacity projects represent improvements and repair to existing storm water outfall pipes, ponds, culverts, fish ladders, storm water pump stations, pipelines, and raised roads. The Capital Facilities Plan includes three storm water improvement projects within the study area (Figure 19 shows the location of planned improvements):

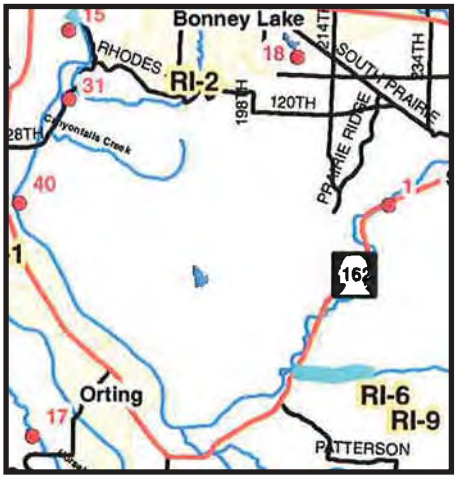


Figure 19: Pierce County Capital Facilities Plan-Stormwater Improvements.

- Silver Springs (Map ID 1): A green initiated restoration project at the South Prairie Creek Basin (Tumbolt).
- McCutcheon Road Replacement (Map ID 31): Elevating McCutcheon road and bridge while installing additional culverts.
- Wetland Banking south of Canyon Falls Creek (Map ID 40): Construct wetlands in advance of needs. The is one of numerous sites that will be slated for wetland mitigation banking.

Collectively, these three projects are estimated to cost $3,380,000 which represents about 7.6% of the total cost for all Pierce County surface water capital facilities projects planned during that time period. The Silver Springs project is funded through a storm water management grant, while the McCutcheon Road replacement and wetland mitigation banking are both financed through the County's surface water management funds.

Sewer and Septic Systems

The information gathered for sewer and septic systems includes the following:

- Identify existing community systems and systems that have failed.
- Identify how the City Sewer System will be provided.

A brief analysis of the data gathered in each of these areas is discussed below.

Existing Septic Systems

Figure 20 shows existing community septic systems, and it is clear that septic is the primary wastewater treatment method for Sub-Areas 1-3, with 1,091 septic systems for 2,517 parcels. From Figure 21, data obtained from the Pierce County Health Department demonstrates that as of September (2008), 39 septic systems have been identified as needing repair.

1 All Data is from "2009-2014 S.W.M. Capital Improvement Projects", Pierce County. Obtained from Hans Hunger, November 21, 2008, and from the "2006-2012 Draft Capital Facilities Plan", Pierce County Website".