



EXECUTIVE SUMMARY

In December 2002, the City of Stayton, Oregon contracted with Keller Associates, Inc. to complete water system master planning. Separate detailed reports were completed for the water distribution system and the water treatment plant. Additionally, a water conservation plan was developed. This executive summary summarizes the findings of these reports.

A Technical Review Committee (TRC) comprising of city staff and hired consultants were critical to the development and success of this master plan.

1 BACKGROUND

1.1 Study Area and Land Use

The study area includes all land located within the existing Stayton Urban Growth Boundary (UGB). Keller Associates worked closely with the TRC and city planner in projecting future water system demands for undeveloped land.

1.2 The City of Stayton Population Projections

Year 2000 census data and 2000-2004 building permit records were used to determine existing populations. Future populations were determined assuming a constant growth rate of approximately 3.35%. Build-out considerations were also evaluated. Table 1 below outlines the projected population for the Stayton water service area.

1.3 The City of Stayton Water Demands

Water production data from the Water Treatment Plant (WTP) and metered consumption data were used to quantify water system demands. As much as 30% of the water leaving the water treatment plant is lost via leaking pipes or is otherwise unaccounted for. The following table summarizes anticipated water system demands.



Table ES.1
Water Demand Projections

| | 2003 (MGD) | 2015 (MGD) | 2025 (MGD) | Build-out (MGD) |
|------------------------------|---------------|---------------|---------------|--------------------|
| Stayton Population | 7,300 | 10,800 | 15,000 | 19,200 |
| Average Day | 2.71 | 3.45 | 4.33 | 5.20 |
| Peak Day | 6.50 | 8.25 | 10.35 | 12.45 |
| Dry Weather (May-Oct) | 3.75 | 4.70 | 5.83 | 6.96 |
| Wet Weather (Nov-Apr) | 1.65 | 2.21 | 2.88 | 3.55 |

1.4 Water Rights

The projected 2025 peak day demand of 10.35 MGD. When the Stayton urban growth boundary is at build-out, peak day demands are projected to be about 12.45 MGD, which is still less than the existing 17.62 MGD summer water right.

2. WATER DISTRIBUTION SYSTEM EVALUATION & RECOMMENDATIONS

2.1 Overview

The existing water distribution system is illustrated in Figure 1 (located at the end of this executive summary). The distribution system consists of approximately 44 miles of pipelines, three water reservoirs, and three booster stations. An additional storage clearwell and booster station are also located at the water treatment plant.

Haestad Method's computer model Water CAD v6.5 was used to evaluate the flows, fire protection, tank circulation, and system pressures. As part of the model development, flow tests and field verification was completed to ensure model accuracy.

For detailed evaluations and recommendations, refer to the *Water Distribution Facilities Planning Study*.

2.2 The Existing Deficiencies

Existing deficiencies are illustrated in Figure 2, and are summarized below:



- Approximately 24% of the City's distribution system is comprised of either steel or galvanized iron pipe. These pipelines are believed to be responsible for the majority of system water loss.
- An additional 21% of the pipelines are constructed with asbestos cement pipe. As the system continues to age, many of these pipelines will need to be replaced.
- Approximately 26% of the City's distribution system is comprised of pipelines that are 4-inches in diameter and smaller. These pipelines, many of which are steel and galvanized pipe, are primarily responsible for areas of inadequate fire protection.
- The existing booster stations and reservoirs located at the Schedule "M" site and the Regis site provide limited benefit to the City's water distribution system and are in need of major upgrades for continued use.
- Immediate upgrades at Pine Street are recommended to correct existing pump and control deficiencies.

2.3 The Recommended Improvements

Recommended capital improvements are summarized according to priority. Priority improvements (i.e. those needed within the next 5+ years) and are illustrated in Figure 3.

The Water Distribution System Master Plan is illustrated in Figure 4 and shows future priority improvements, future pipeline sizes, and future pipeline alignments. Pipeline alignments are coordinated with the adopted transportation master plan. Two future pressure zones, or service areas, are also illustrated. New booster stations will be needed to extend service to these areas.

Keller Associates recommends that the Schedule "M" booster station eventually be abandoned and that the Schedule "M" tank be relocated to the water treatment plant site where it can provide needed clearwell storage.

Keller Associates also recommends that the Regis tank eventually be abandoned, as its useful life expires. The existing Regis booster station should be upgraded to provide back-up supply to the upper pressure service area.

In addition to the capital improvements illustrated in Figures 3 and 4, Keller Associates recommends operations changes and implementation of programs, including:



- Updating city code and standards. One example of a standard update would be requiring all new development to install radio read metering.
- Implement recommendations outlined in the *Water Conservation Plan*.
- Committing approximately 6.3 people to the water system (this is approximately 1 person more than what is currently funded out of the water system budget).
- Implementing replacement programs for pipelines, meters, hydrants, and other equipment.
- Implementing maintenance programs including flushing of hydrants, testing of water meters, and exercising of water valves.

3. WATER TREATMENT PLANT EVALUATION & RECOMMENDATIONS

3.1 Overview

The City of Stayton operates a Surface Water Treatment Plant (WTP) to supply potable water to its residents. Treated water from the plant is Stayton's primary source of potable water, with an emergency inter-tie with Salem acting as the secondary supply. The plant is located along the Santiam River south of the City of Stayton and utilizes the slow sand filtration treatment process.

The existing treatment plant is illustrated in Figure 5. Treatment processes include filtration, chlorination, and the addition of soda ash. A 0.5 Million Gallon (MG) clearwell provides necessary chlorine contact time. A finished water booster station draws treated water from the clearwell and delivers it to the water distribution system.

With the completion of the proposed Salem water transmission line through Stayton's WTP site, the City will lose one of two existing shallow groundwater wells that currently supply water during high turbidity events.

For detailed evaluations and recommendations relative to the WTP, refer to the *Water Treatment Plant Analysis* report.

3.2 Existing Deficiencies

Existing deficiencies at the WTP include the following:



- Leaky Filter #3 that poses a potential health risk.
- Lack of a reliable future water supply during periods when the river has high turbidity.
- Outdated controls and automation.
- No standby power.
- Outdated electrical components.
- Existing gas chlorination system poses a health and safety risk.

3.3 Recommended Improvements

Improvements are organized by priority and are outlined in the capital improvement plan. As demands increase, additional future improvements are recommended. Figure 6 illustrates recommended improvements at the WTP. Some of the major future improvements include:

- Construction of additional clearwell storage
- Filter expansion – new filter bed
- Addition of 4th pump at finished water pump station
- Security upgrades
- Miscellaneous plant upgrades and expansions

Other potential future improvements include the construction of a deep well and a new river intake and pipeline. Because of water rights and groundwater aquifer restrictions north of the Santiam River, the construction of a new deep well south of the river would likely entail significant costs associated with groundwater rights, transmission piping, and a river crossing. These improvements are illustrated in Figure 7.

4 CAPITAL IMPROVEMENT PLAN

4.1 Summary of Costs

Table 2 illustrates the capital improvements recommended for the distribution system and water treatment plant. More detailed descriptions and timing information are provided in the Capital Improvement sections of the water distribution and water treatment plant reports. This capital improvement plan should be reviewed and updated every 3 to 5 years.



Table ES.2
Summary of Probable Costs

| Item | Project Costs | | | | |
|--|--------------------|--------------------|--------------------|--------------------|--------|
| | Priority 1 2005 | Priority 2 2010 | Priority 3 2015 | Priority 4 2025 | Future |
| <u>Priority 1 --Distribution System</u> | | | | | |
| Pipeline Replacements and Upsizing* | \$2,222,000 | | | | |
| Add Valves To Shaff Road** | 11,000 | | | | |
| Complete Leak Detection Study** | 25,000 | | | | |
| Meter Unmetered Facilities** | 68,000 | | | | |
| Repaint Interior & Exterior of Regis Tank** | 135,000 | | | | |
| Pine St. Booster Station** | 97,000 | | | | |
| City Hall** | 409,200 | | | | |
| Total Priority 1 – Distribution System | \$2,967,200 | | | | |
| <u>Priority 1 --Water Treatment Plant</u> | | | | | |
| Raw Water Intake Maintenance** | \$24,400 | | | | |
| Shallow Well Field** | 716,000 | | | | |
| Raw Water Wier Box Modifications** | 5,800 | | | | |
| Filter Turbiditymeters** | 56,000 | | | | |
| Replace Filter # 3 Liner** | 542,000 | | | | |
| Soda Ash Feed Modifications | 39,500 | | | | |
| On-site hypochlorite generation | 220,000 | | | | |
| Clearwell Maintenance – interior/exterior** | 94,000 | | | | |
| Finished Water Pumping Maintenance** | 6,700 | | | | |
| Plant Maintenance Shop / Entrance | 359,000 | | | | |
| Plant Automation / Instrumentation** | 300,800 | | | | |
| Eletrical Upgrade** | 116,000 | | | | |
| Emergency Power System** | 169,000 | | | | |
| Total Priority 1 – Water Treatment Plant | \$2,649,200 | | | | |
| TOTAL PRIORITY 1 Improvements | \$5,616,400 | | | | |
| <u>Priority 2 – Distribution System</u> | | | | | |
| Pipeline / Distribution Improvements– Pipelines* | | \$1,695,000 | | | |
| Replacement of Poor Water Services | | 418,000 | | | |
| Secure Land for Tank Site | | 150,000 | | | |
| Regis Booster Station | | 182,000 | | | |
| Install Radio-read Meter System | | 50,000 | | | |
| Salem Inter-tie | | 58,000 | | | |
| City Shop | | 410,000 | | | |
| Total Priority 2 – Distribution System | | \$2,963,000 | | | |



| | | | | | |
|--|--------------------|--------------------|-------------------|--------------------|--------------------|
| <u>Priority 2 –Water Treatment Plant</u> | | | | | |
| Individual Raw Water Flow Meters | | \$72,000 | | | |
| Security Upgrades | | 368,000 | | | |
| Additional FW pump with VFD (200 hp)** | | 170,000 | | | |
| Additional Clearwell Capacity | | 510,000 | | | |
| Total Priority 2 – Water Treatment Plant | | \$1,120,000 | | | |
| TOTAL PRIORITY 2 Improvements | | \$4,083,000 | | | |
| <u>Priority 3 – Distribution System</u> | | | | | |
| Abandon Schedule "M" | | | \$29,000 | | |
| Pine Street Add'l Capacity w/ VFDs | | | 74,000 | | |
| Total Priority 3 – Distribution System | | | \$103,000 | | |
| <u>Priority 3-Water Treatment Plant</u> | | | | | |
| Shallow Well Field Expansion | | | \$79,000 | | |
| Raw Water Weir Box Expansion | | | 29,700 | | |
| Soda Ash System Expansion | | | 29,000 | | |
| New Filter | | | 750,000 | | |
| Total Priority 3 – Water Treatment Plant | | | \$887,700 | | |
| TOTAL PRIORITY 3 Improvements | | | \$990,700 | | |
| <u>Priority 4 -- Distribution System</u> | | | | | |
| Fern Ridge Road Pipeline | | | | \$198,000 | |
| 16-inch Transmission Loop from Pine St. | | | | 779,000 | |
| Abandon Regis Tank (2025) | | | | 42,000 | |
| Construct New 5.0 MG Storage Reservoir | | | | 2,862,000 | |
| 3 rd Avenue Future -- upsize cost | | | | 37,000 | |
| Total Priority 4 -- Distribution System | | | | \$3,918,000 | |
| <u>Future-- Distiribution (Coordinate w/ Growth and Street Repairs)</u> | | | | | |
| Upsize Costs for Future Pipeline | | | | | \$990,000 |
| Shaff Road Pipeline | | | | | 90,000 |
| Wilco Road Pipeline | | | | | 132,000 |
| East Pine Street Small Booster | | | | | 130,000 |
| Mill Creek Booster Station | | | | | 427,000 |
| Total Future -- Distribution System | | | | | \$1,769,000 |
| <u>Future -- Water Treatment Plant</u> | | | | | |
| Construct Deep Well -- Backup Supply | | | | | \$1,333,000 |
| Replace 100-hp pump with 200-hp pump | | | | | 115,000 |
| New Independent Intake Facility and Pipeline | | | | | 2,250,000 |
| Future -- Water Treatment Plant | | | | | \$3,698,000 |
| TOTAL FUTURE Improvements | | | | | \$5,467,000 |
| TOTAL (rounded) | \$5,616,400 | \$4,083,000 | \$ 990,700 | \$3,918,000 | \$5,467,000 |



*Projects to be phased over many years

**Project to be financed during the first three years

4.2 Budget and Rate Impacts

An evaluation of budget and rate impacts of the proposed water distribution and treatment capital improvement plans was completed by Economic and Financial Analysis. As part of this evaluation, priority capital improvements were phased over the course of the next 10 years to minimize initial rate impacts. A detailed evaluation can be found in Appendix F of the water distribution facilities planning study. Recommended rate increases are presented in the table below:

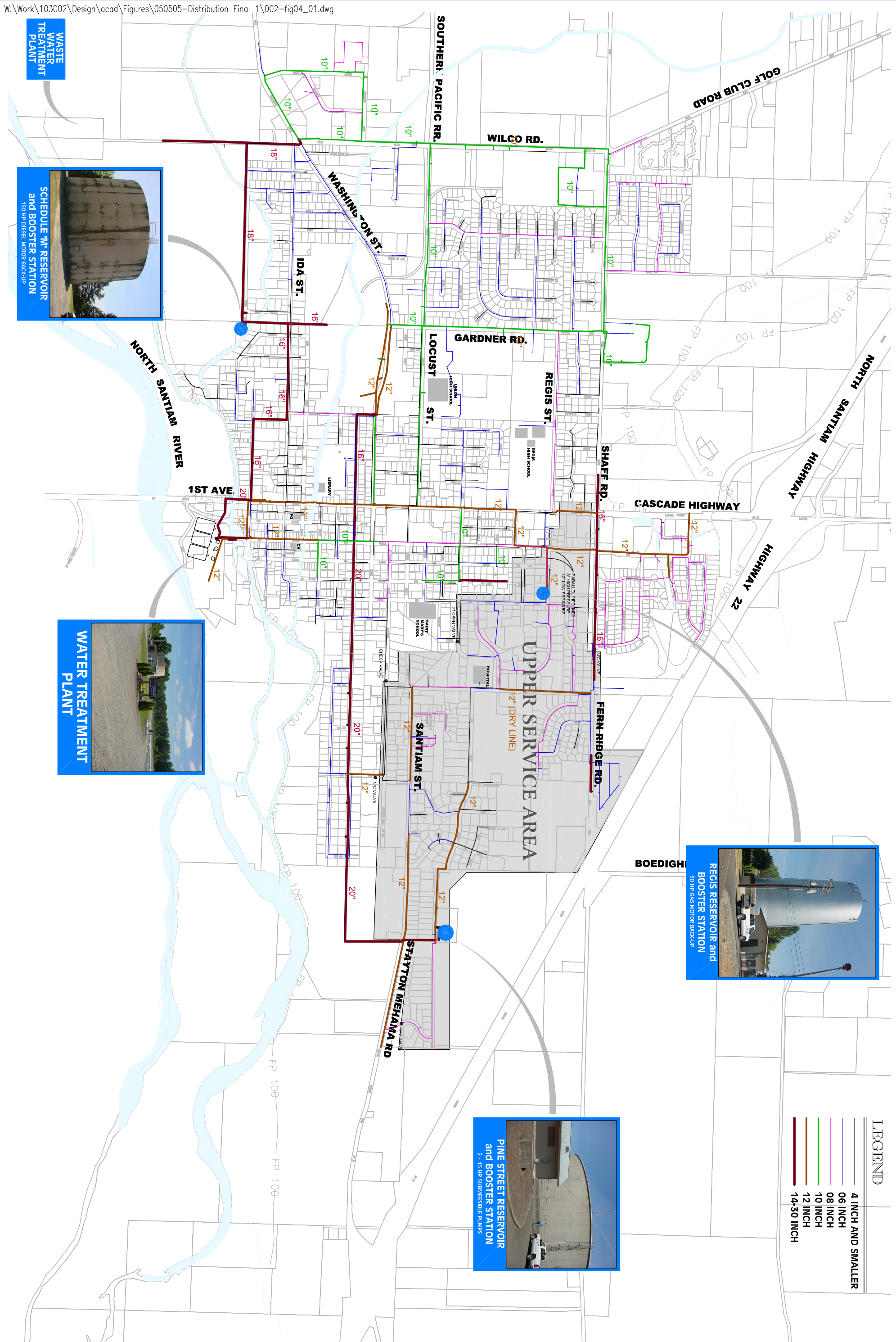
Table ES.3
Phase Water Rate Increase

| Year | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|-----------------------|------|------|------|------|------|------|------|------|
| % Increase (per year) | 15% | 12% | 10% | 5% | 5% | 7.5% | 5% | 5% |

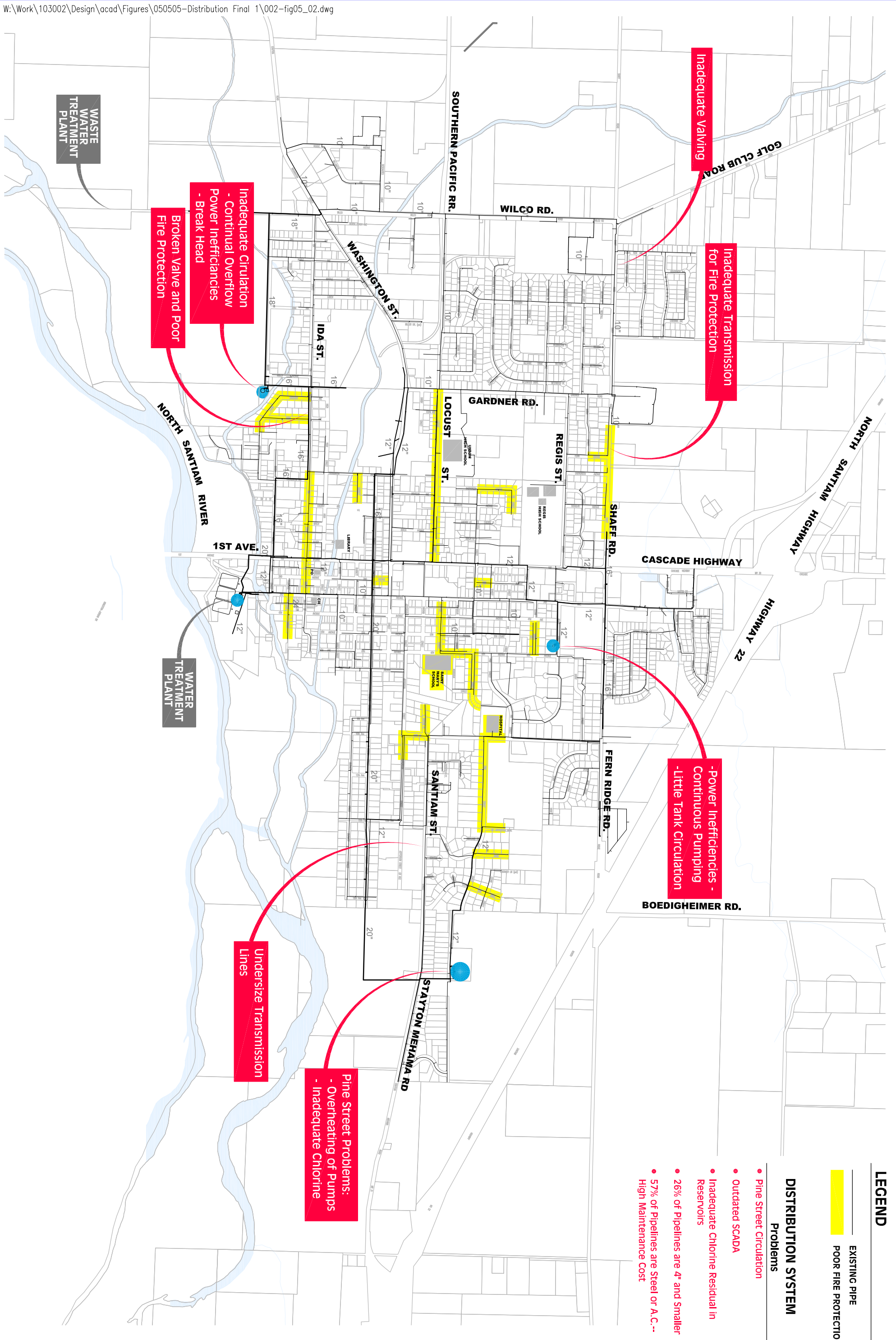
In addition to these general rate increases, Economic and Financial Analysis recommends that the City consider simplifying the water rate structure sometime in 2006 and 2007. Special consideration may be required to mitigate or phase impacts to certain groups of customers (i.e. industrial) that may be adversely impacted by rate structure changes.

4.3 System Development Charges

Keller Associates evaluated each improvement to determine which improvements were growth related and which ones were not. Where correcting existing deficiencies also benefits future growth, a portion of the improvement costs have been assessed growth. A detailed evaluation of SDCs was completed by Economic and Financial Analysis and can be found in Appendix F of the Water Distribution Facilities Planning Study.



| LEGEND | |
|--------|--------------------|
| | 4 INCH AND SMALLER |
| | 06 INCH |
| | 08 INCH |
| | 10 INCH |
| | 12 INCH |
| | 14-30 INCH |



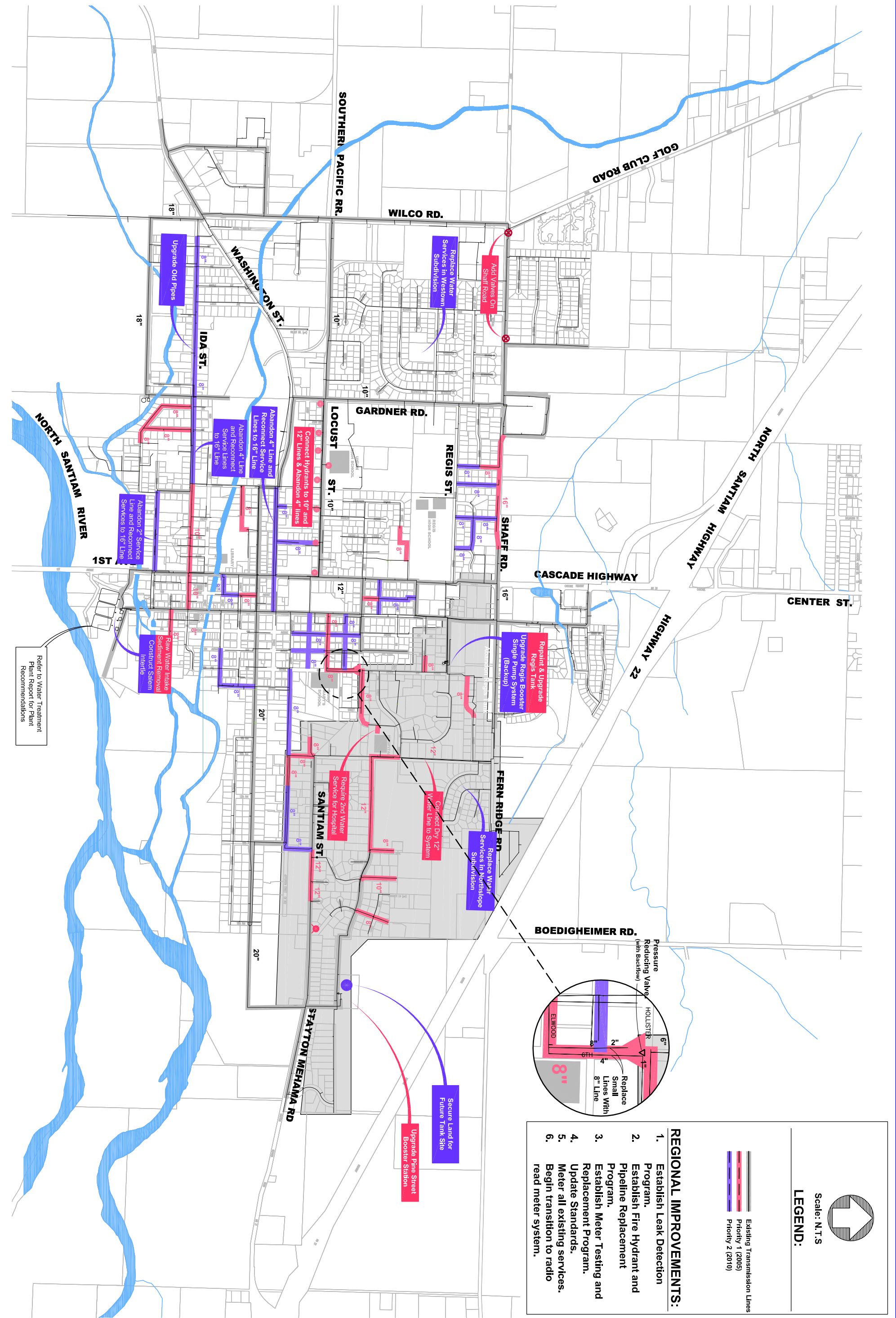
LEGEND

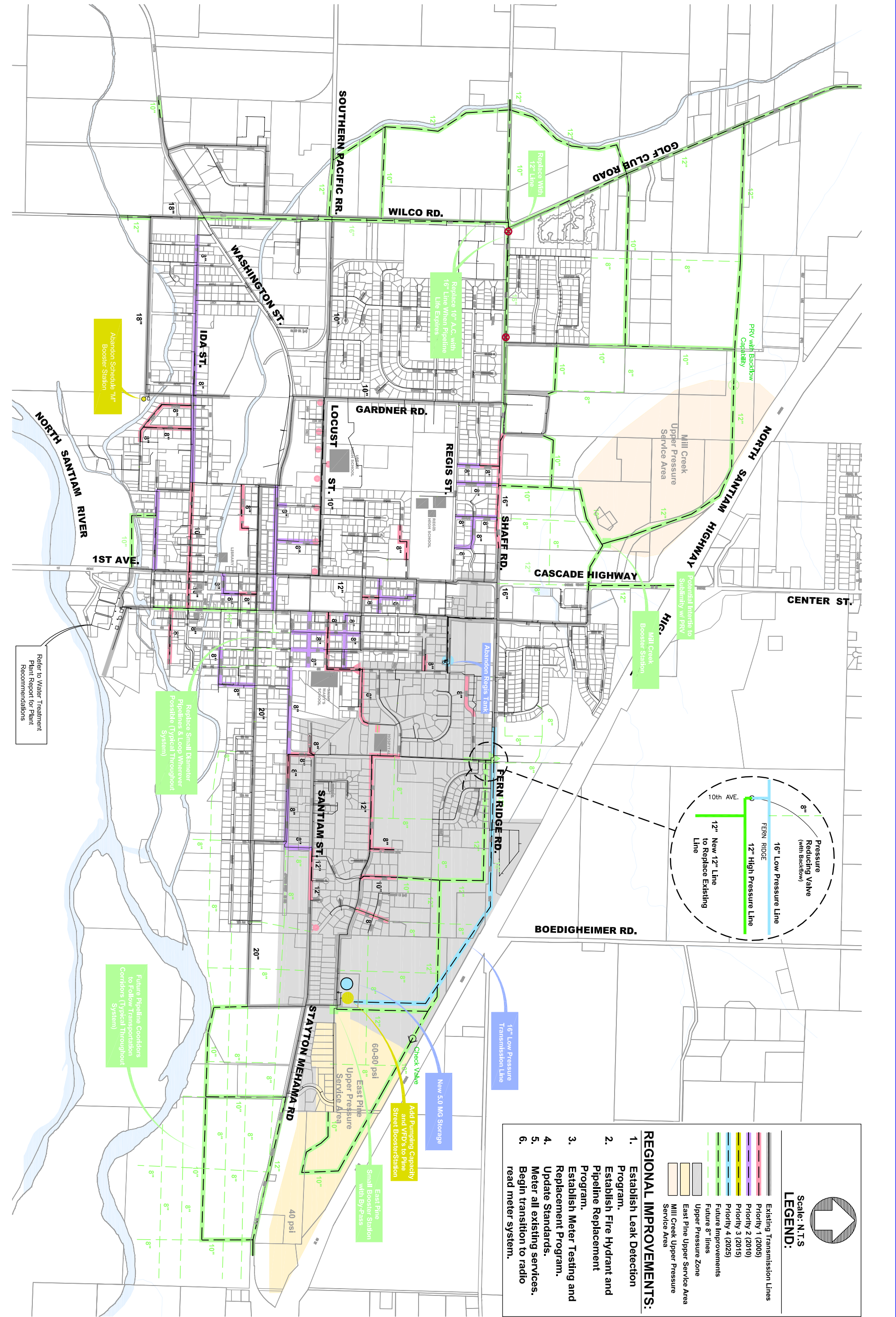
- EXISTING PIPE
- POOR FIRE PROTECTION

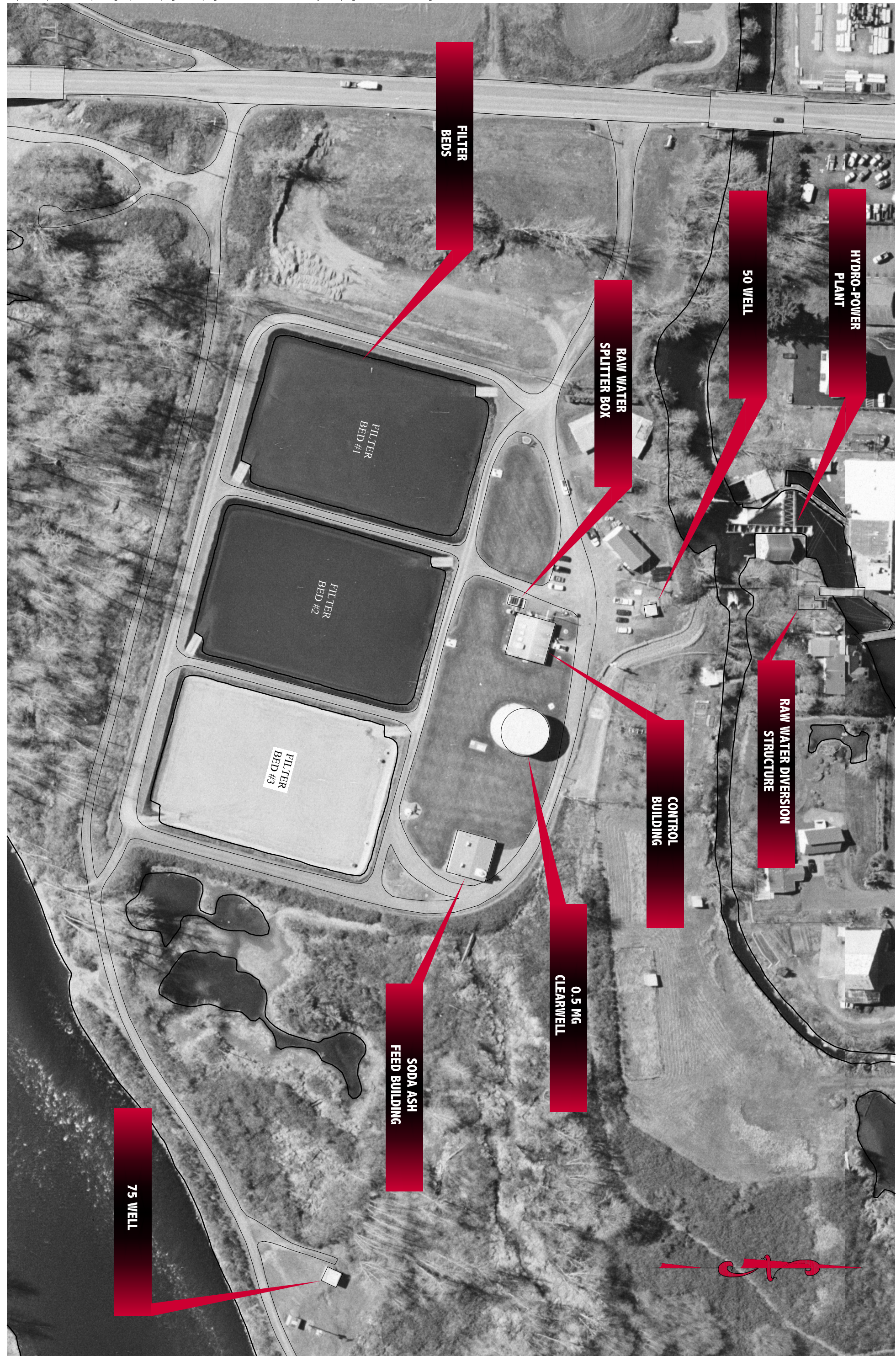
DISTRIBUTION SYSTEM

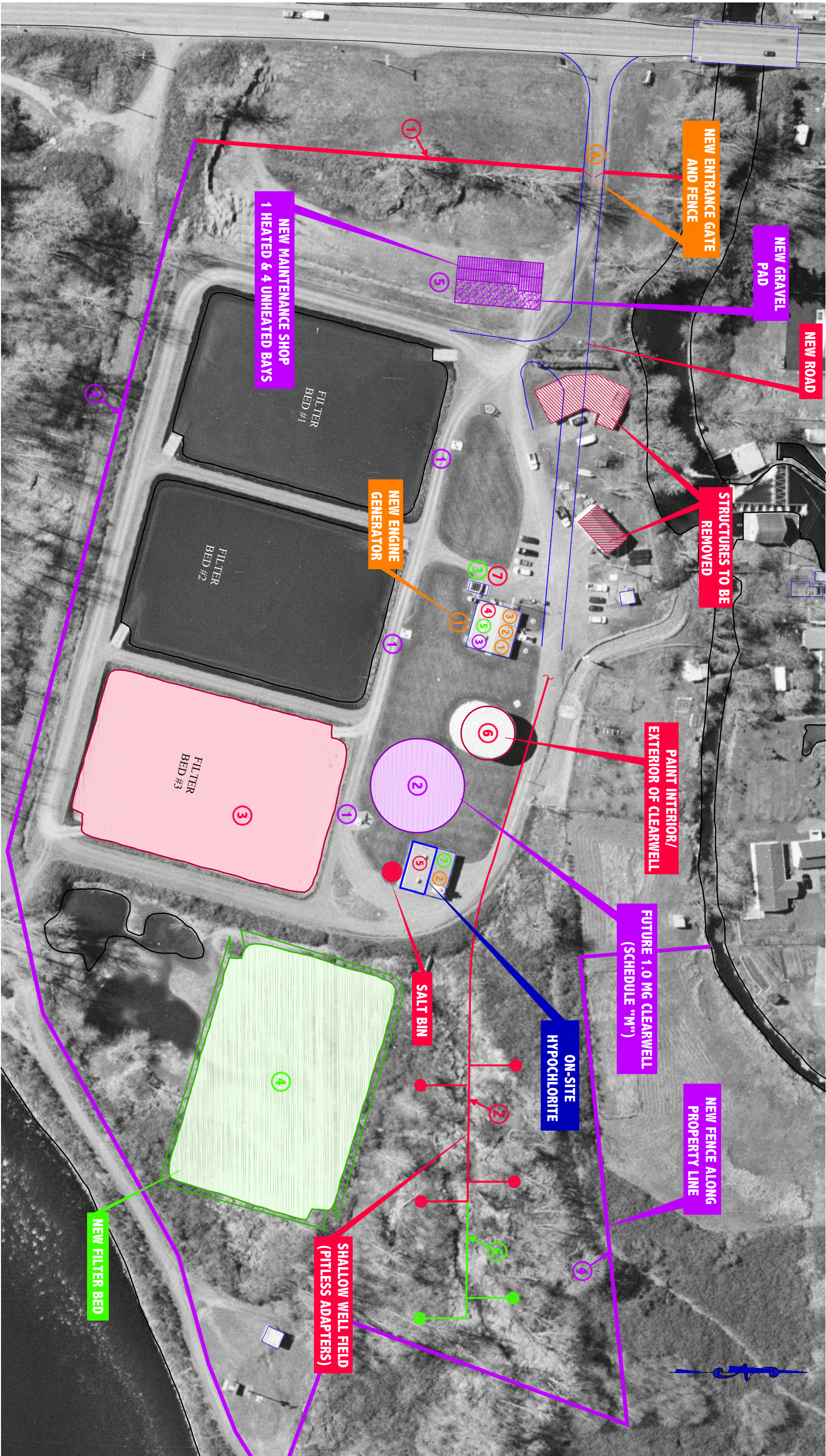
Problems

- Pine Street Circulation
- Outdated SCADA
- Inadequate Chlorine Residual in Reservoirs
- 26% of Pipelines are 4" and smaller
- 57% of Pipelines are Steel or A.C.-- High Maintenance Cost









PRIORITY 1A (2005)

- 1** Setback Entrance Fencing
- 2** Shallow Well Field
- 3** Replace Filter Liner
- 4** Add Filter Turbidimeters
- 5** Add Hypochlorite Generation System
- 6** Refinish 0.5 Mg Clearwell
- 7** Add Finish Water Flow Meter
- 8** Intake Improvements

PRIORITY 1B (2005)

- 1** Upgrade Plant Electrical/ SCADA System
- 2** Chemical Feed Improvements
- 3** Rehab Pump Control Valves
- 4** Upgrade Plant Entrance

PRIORITY 2 (2010)

- 1** Meter Each Filter
- 2** Add Clearwell Capacity
- 3** Add Finished Water Pump with VFD
- 4** Improve Plant Security
- 5** Add Maintenance Shop

PRIORITY 3 / FUTURE (2015+)

- 1** New Intake Facility (See Figure 6-2)
- 2** Construct / Obtain Deep Well (See Figure 6-2)
- 3** Weir Box Expansion
- 4** Add New Filter
- 5** FW Pump Improvements
- 6** Shallow Well Field Expansion
- 7** Soda Ash Expansion

