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AT A GLANCE: A PROJECT OVERVIEW

**the Project:** Girdwood Wastewater Treatment Facility Upgrade

**the Reason:** The existing facility was built in 1978. Girdwood’s population of residents and visitors has grown since then and so has the demand on the system. The plant now needs to be replaced to serve Girdwood’s present needs and projected future growth. The plant is experiencing increasing difficulties with the day-to-day operation and maintenance activities needed to meet discharge requirements. These difficulties are aggravated by the unexpected amounts of water (infiltration and inflow) that enters the collection system and stresses the treatment plant processes.

**the Timeline:** Since 2006, a team of engineers has been helping AWWU evaluate Girdwood’s wastewater facility and treatment process. They recommend using new technology to produce cleaner water. Now, the utility is working with regulatory agencies, the Girdwood Board of Supervisors (GBOS) and the community to provide specifics on project design, funding and permitting. Construction could begin in 2012.

**the Way:** The facility will be constructed in phases, within the same eight-acres it sits on now, to provide effective wastewater treatment for the next 10-20 years of Girdwood’s anticipated growth. The new facility will be designed so it can later be efficiently expanded to meet further community wastewater needs.

**the Cost:** The upgrade is estimated to cost $40-$60 million with annual operation costs of $1 million. The project is funded by AWWU rate-payers and loans and grants – not through taxes. There may be an option to access funding via the Federal Economic Recovery Plan.

**the Team:** Engineers at AWWU and MWH Engineering have designed a facility to make cleaner water in a way that is responsive to changes in Girdwood. Agnew::Beck Consulting is helping AWWU educate people about the facility and the process that will lead to funding and construction.

**YOU:** Learn more at the proposed Girdwood Land Use Committee Meeting on April 13, 2009. Attend the April 20, 2009, GBOS meeting when the project will be presented for a resolution of support. Receive updates and learn more: Contact Tom Winkler at AWWU or Chris Beck at Agnew::Beck. Find more contact information on page 4.
The purpose of the Girdwood Wastewater Treatment Facility Upgrade is to provide a reliable wastewater treatment system for Girdwood. The facility is reaching its permitted capacity and improvements are needed to meet Girdwood’s present and future wastewater treatment needs.

Anchorage Water and Wastewater Utility (AWWU) provides public water and wastewater service to more than 80 percent of the Municipality of Anchorage. In Girdwood, AWWU has owned and operated the Girdwood Wastewater Treatment Facility since its construction in 1978. The treatment facility is located about 1.5 miles from the intersection of Alyeska Highway and Seward Highway, on an approximately 8-acre tract owned by the Municipality of Anchorage Heritage Land Bank (HLB); with management authority held by AWWU.

The existing treatment facility was constructed in 1978 with major improvements completed in 1990, 1995, and 1998. The facility receives and treats the domestic and commercial wastewater from residents and businesses of the community of Girdwood and visitors to the Alyeska Resort. Since the plant was constructed, the service population has grown substantially, new visitor accommodations have been built, and Girdwood has evolved into a popular year-round destination. The Girdwood Wastewater Treatment Facility is now more than 30 years old and nearing the end of its useful service life. Many of the components of existing facility are aging and in poor condition. The facility needs to be replaced because it is reaching its capacity and the treatment process needs to be upgraded.

Anchorage Water and Wastewater Utility provides infrastructure that responds to anticipated growth, as specified in approved municipal plans. It is operated and owned by the Municipality of Anchorage and governed by the AWWU Authority Board of Directors, the Anchorage Assembly and regulated by the Regulatory Commission of Alaska.

Public water service that AWWU provides includes the treatment, transmission and distribution of potable water, from two treatment facilities to the residents and the commercial establishments in the municipality. The treatment facilities are supplied with water from Eklutna Lake, Ship Creek and 16 wells. Public wastewater service includes the collection and treatment of wastewater at three treatment facilities located in Girdwood, Eagle River and Anchorage. The utility also treats wastewater from Elmendorf Air Force Base, Ft. Richardson and septage collected from on-site systems in Anchorage and the Matanuska-Susitna Borough.

In accord with municipal land use decisions, AWWU supports the public health, safety and economic interests of the community by providing quality water and wastewater services in a responsible, efficient and sustainable manner.
Project Area

Legend
- Proposed buildings
- AWWU parcel
- HLB land
- HLB 178-acre parcel
- Parcels
- Zoning
The purpose of this document is to provide people with a short overview of the planned upgrade. Anchorage Water and Wastewater Utility is working with the Girdwood community, land use committee and Girdwood Board of Supervisors (GBOS) to provide more specifics on project design, costs, funding, environmental permit process, etc. A general project schedule is below. The timeline may be accelerated as a condition of use of federal stimulus money.

Attend the proposed April 13, 2009 Girdwood Land Use Committee Meeting and the April 20, 2009 GBOS meeting when the project will be presented for a resolution of support.

Contact: Chris Beck, Agnew::Beck Consulting (assisting AWWU with public participation) e chris@agnewbeck.com : : t 907.222.5424

Contact: Tom Winkler, AWWU Project Manager e tom.winkler@awwu.biz : : t 907.564.2785

Watch for information on the Agnew::Beck website and AWWU website. Visit www.agnewbeck.com click on “Current Projects,” then “Girdwood AWWU Wastewater Treatment.”

Next Steps – AWWU will work with Girdwood Board of Supervisors (GBOS) and the community to provide more specifics on project design, costs, funding, environmental permit process, etc.

- Propose creating a GBOS/community advisory committee
- Prepare, circulate Background Information Report + Website
- Proposed community informational meeting April 13th Land Use Committee meeting.
- Request for GBOS review of project and resolution of support April 20th.

Tentative dates for project completion – (subject to revision, affected by Federal funding requirements)
**TODAY: EXISTING FACILITY + TREATMENT PROCESS**

**Existing facility**

The Girdwood Wastewater Treatment Facility is located in Girdwood about 1.5 miles from the intersection of Alyeska Highway and Seward Highway, off of Ruane Road. (See the Project Area map on page 3.) The existing facility was constructed in 1978 and designed to serve Girdwood’s growing population.

Girdwood has continued to grown steadily during the life of the facility. Girdwood is now home to about 2,300 full-time residents. If year-round population growth continues at about 3.5 percent annually (the average rate between 1990 and 2000), by the year 2035, the year-round population is expected to reach nearly 6,000 people. (See the Year-round Population Projections table on page 11.) To this needs to be added growth by day, overnight and seasonal visitors. These numbers have grown significantly since the design of the facility. Day and overnight visitor use is likely to continue to grow, particularly as the ski mountain and other recreation facilities are improved. Please read more pertaining to population growth in the Project Issues + Answer section answering: “Is Girdwood expected to grow?”

**Existing treatment process**

To treat wastewater, the existing facility uses an “activated sludge” treatment process that includes screening to remove debris; aeration, sedimentation, and filtration of the wastewater; and disinfecting the treated effluent by chemical chlorination. The treated effluent is then dechlorinated before it leaves the facility. The treated outgoing water (effluent) is discharged through a perforated pipe submerged along the bank of Glacier Creek. This discharge is regulated under a National Pollutant Discharge Elimination System (NPDES) permit.

Wastewater sludge, the material that is removed by the biological wastewater treatment process, is thickened, stored, and trucked to AWWU’s Asplund Wastewater Treatment Facility in Anchorage for disposal by incineration.

The facility typically meets the permitted 30-day limit for flow (0.6 million gallons of wastewater per day). However, this limit has been exceeded several times. In 2006, the Girdwood Wastewater Treatment Facility Plan was updated. The plan projected that average flows will exceed 0.7 million gallons per day before 2014. Large amounts of extraneous water flow into the facility during periods of heavy rainfall and snowmelt which causes groundwater levels to rise.
Wastewater Treatment Processes

**TODAY (activated sludge treatment process)**

- incoming (influent) wastewater
- solids / grit removal & screening
- aeration
- sedimentation
- tertiary filters
- chlorine disinfection & dechlorination

**TOMORROW (membrane bioreactor technology treatment process)**

- incoming (influent) wastewater
- solids / grit removal & screening
- aerobic reactor
- membrane bioreactor technology
- ultraviolet disinfection

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Sludge thickener & storage

Sludge is moved to Anchorage’s Asplund Wastewater Treatment Facility

Treated, outgoing (effluent) water enters Glacier Creek

Sludge thickener & storage

Sludge is moved to Anchorage’s Asplund Wastewater Treatment Facility

Treated, outgoing (effluent) water enters Glacier Creek
Recommendations

Anchorage Water and Wastewater Utility engaged a team of engineers to evaluate the facility’s wastewater treatment process for the upgrade project. The team evaluated existing conditions and forecasted future needs. This process established criteria by which to judge options for the upgrade and then offered these recommendations for treating wastewater:

- **Use New Technology:** The membrane bioreactor (MBR) technology includes pre-treating wastewater using screens and grit removal systems. Aeration basins and submerged membrane basins separate solids and treat water with biological microbes. It also disinfects outgoing treated effluent with ultraviolet (UV) lamps to meet anticipated discharge limitations. The current sludge handling approach (including thickening, storage, and transportation to Anchorage’s Asplund wastewater treatment facility for disposal) would continue.

- **Replace the Existing Facility:** The rehabilitation and reuse of the existing treatment facility is not cost-effective. The existing treatment facility will be retired as part of the upgrade project.

- **Phase Construction:** The treatment facility will be constructed in phases to accommodate the gradual increase in wastewater flows projected through the year 2033. Initial construction will provide the capacity to treat wastewater for about half of the projected population growth in the service area. Facilities will be designed and constructed for expansion to accommodate the remaining projected growth. This latter phase would require a significant extension of the wastewater collection system.

New treatment technology

The membrane bioreactor (MBR) technology is a way of treating wastewater that employs microbes to eat organic material in wastewater, and then passes the water through a semi-permeable membrane which separates solids and micro-organisms from clean water. This technology offers these advantages:

- It cleans and treats outgoing effluent better than existing tertiary filters.
- The technology is amenable to phased construction and can be easily expanded.
- It requires a smaller site footprint.
- The technology is well-positioned to accommodate future regulations on wastewater discharge.
- The treatment process is more reliable.
- It offers greater potential for automation.

The conceptual diagram shows the planned membrane bioreactor treatment technology process compared to the existing process.
New facilities

The new facilities will be constructed just south of the existing plant and will impact five acres within the eight-acre tract of HLB land under AWWU management authority. (See adjacent Facility Layout map.) Additional acreage within the eight-acre tract will be used for storage and staging during construction. The layout, configuration, and size of the buildings can be further refined as the design advances, as the facility layout shows. The new facilities will remain in the general location indicated. The new facilities will include three buildings and site improvements:

**Residuals Building** will house the equipment and processes to pump and pre-treat the influent wastewater, to clean and empty the screens and grit removal apparatus, and to thicken, store, and load sludge.

**Treatment Building** will house equipment and processes to provide biological wastewater treatment that removes organic material, ammonia, and solids from the influent wastewater. This involves aeration basins, submerged membranes, air blowers and diffusers (to supply oxygen to the microbes that perform the biological treatment) and ultraviolet disinfection. A generator will supply stand-by electricity to maintain operation during power outages.

**Non-Process Building** is dedicated for space not directly involved in the wastewater treatment. Elements include:

- Control room and operations lab
- Locker rooms, break room and overnight room
- Offices and conference room
- Warm vehicle storage.

The following **site improvements** are planned:

- Earthwork to raise the entrance of the new buildings above the 100-year flood elevation
- Grading and paving for site drainage, vehicular traffic, and snow removal
- Yard piping to convey wastewater from the existing collection system to the Residuals Building; convey wastewater, sludge, and utilities between the Residuals Building and Treatment Building; and convey treated effluent to the existing subsurface percolation pipe along the bank of Glacier Creek
- Utility connections for potable water, natural gas, and electrical services for the new buildings and associated equipment.
New improvements

The proposed wastewater treatment facility improvements will:

- Produce cleaner water using the membrane bioreactor treatment technology instead of tertiary filters
- Use ultraviolet (UV) disinfection instead of chemical chlorination
- Use technology to better meet future discharge regulations
- Increase reliability and ease in operating the treatment process
- Use the existing percolation system to discharge treated water
- Allow efficient phased expansion to respond to community growth (as existing subdivisions are further developed and new areas are constructed).
Where is it? Who owns and manages the land?

The Girdwood Wastewater Treatment Facility is located east of the Alyeska Highway, at the end of Ruane Road. The facility is located on an approximately eight-acre tract owned by the Municipality of Anchorage Heritage Land Bank (HLB). Management authority for the use of this site has been transferred by HLB to AWWU. The eight-acre treatment site is part of a larger, 178-acre tract owned by the Heritage Land Bank. (See the Project Area map on page 3.)

How is the area zoned? What uses are planned in the area?

The AWWU-managed treatment plant tract is zoned PLI – Public Lands & Institutions. This category is intended for a range of public facilities, including water and wastewater treatment. The surrounding HLB property – the remainder of the 178-acre tract – is designated for industrial use and open space. The industrial area is located immediately south of the treatment plant. East and west of the industrial areas are the corridors of California Creek and Glacier Creek, zoned for open space.

The general intent of the Area Plan, for this part of Girdwood, is to make it available for industrial purposes, including storage of equipment and material, construction and fabrication activities, or similar uses that require some space but are not appropriate in other parts of the community. Consistent with this objective, the Heritage Land Bank intends to subdivide the industrial parcel, and lease or sell this land for these purposes.

A majority of the eight-acre parcel will be needed to construct and operate the new wastewater treatment facility. This AWWU area houses several other temporary uses which will need to be accommodated by the other parcels within the future HLB industrial subdivision.

Is Girdwood expected to grow? How will the updated wastewater facility meet that anticipated growth?

The existing treatment facility typically meets the permitted 30-day average flow limit of 0.6 million gallons per day (mgd); however, this limit has been exceeded at least eight times since 1998. The 2006 updated Girdwood Wastewater Treatment Facility Plan projected that average flows will exceed 0.7 mgd flows before 2014. Additionally, large flows can occur due to infiltration and inflow, from water that enters the valley’s wastewater collection system due to heavy rainfall, snowmelt conditions, and high groundwater levels.

The effective treatment capacity of the current facility is suited to serve about 2,500–2,700 people. About 2,300 live in Girdwood now. That number is predicted to grow as high as 6,000 by the year 2035.

The proposed plant’s membrane bioreactor treatment technology readily accommodates phased expansion and the upgraded facility will be able to handle the population projected at buildout. The initial capacity of the plant’s membrane treatment system will be designed to match
the amount of people that can reasonably be expected to be served by the existing wastewater collection system without major sewer improvements. This will provide effective treatment for the next 10-20 years of growth. The plant can then efficiently expand to meet later growth.

The figures found in the Year-round Population Projection table are found in the 2005 updated Girdwood Wastewater Treatment Facility Plan. This simplified projection of population growth is based on an annual growth rate of 3.5 percent. The underlying assumption is that the land use patterns and demographic changes in Girdwood will continue, on average, at about the same pace experienced over the last 20 years. Many factors will determine the actual growth rate, however, and estimating future demand for wastewater treatment in Girdwood requires consideration of other variables. These variables could push the growth rate higher or lower than the projections. For housing development there are two variables to consider:

- **Development in new areas**: this includes a handful of projects that have been approved or are still in the planning stages. The Projected Area Development table and accompanying map show numbers of new housing units or other residential development.

- **Ongoing infill and intensified use of existing developed areas**: this includes the filling-in of the few remaining vacant residential parcels within existing subdivisions, replacement of smaller older structures with new larger structures and new and more-intense uses in places like the New Girdwood Townsite, and incremental growth in skiing and other recreation uses.

Girdwood is a community driven by recreational opportunities. In addition to permanent residents, a substantial number of part-time residents, overnight visitors and day visitors use the wastewater system. Since the facility’s construction in 1978, more and more people visit and live in Girdwood seasonally. Also since 1978, Alyeska Resort has been constructed along with a number of condominiums and other seasonal housing and other overnight accommodations.

A major component of the projects listed in the Project Area Development table are likely to be seasonal homes. The number of day visitors to Girdwood (particularly in the summer) has also grown significantly since 1978. This growth could continue as the ski area is improved and state tourism increases.

The ultimate amount and location of future growth is determined by market forces, and by the land use policies of the Girdwood Area Plan and related Municipal plans. The responsibility of AWWU is to provide sufficient wastewater treatment capacity to respond to this growth.

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### Year-round Population Projections

<table>
<thead>
<tr>
<th>Year</th>
<th>Permanent Residents</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000*</td>
<td>1,794</td>
</tr>
<tr>
<td>2004</td>
<td>2,060</td>
</tr>
<tr>
<td>2005</td>
<td>2,130</td>
</tr>
<tr>
<td>2006</td>
<td>2,200</td>
</tr>
<tr>
<td>2007</td>
<td>2,280</td>
</tr>
<tr>
<td>2008</td>
<td>2,360</td>
</tr>
<tr>
<td>2009</td>
<td>2,440</td>
</tr>
<tr>
<td>2014</td>
<td>2,900</td>
</tr>
<tr>
<td>2019</td>
<td>3,450</td>
</tr>
<tr>
<td>2024</td>
<td>4,090</td>
</tr>
<tr>
<td>2029</td>
<td>4,857</td>
</tr>
<tr>
<td>2035</td>
<td>5,970</td>
</tr>
</tbody>
</table>

*Source: 2000 figures – U.S. Census; projections, beginning in 2004, are from the 2005 Anchorage Water Master Plan; figures for projected growth after 2024 calculated by Agnew::Beck using the same growth rate.*
Federal and state funding is needed so that the necessary improvements will be economically feasible for AWWU and its rate payers. To finance this project, AWWU is receiving a loan from the Alaska Clean Water Fund, which is funded by the U.S. Environmental Protection Agency (EPA) through the Alaska Environmental Department of Conservation (ADEC) as well as possible grants from the EPA under the Special Appropriations Act. Additional funding may also be available from the recently approved Federal Economic Recovery Plan.

The EPA action will require an environmental review under the National Environmental Policy Act (NEPA). In this case, to replace the existing Girdwood wastewater treatment facility with a similar one at the same location – an environmental assessment meets the NEPA requirements. Based on initial review of the proposed project and affected resources, AWWU anticipates that the following issue(s) will be evaluated in the environmental assessment:

**What kind of environmental review is required for the project? What permits and approvals?**

---

### Projected Area Development

<table>
<thead>
<tr>
<th>Area</th>
<th>Acres</th>
<th>Single Family and Duplex Units (dua = dwelling units per acre)</th>
<th>Attached Units (dua = dwelling units per acre)</th>
<th>Total Housing Units/Lots</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Glacier/Winner Creek Area Land Use Plan</strong>¹</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Development Acres</td>
<td>197</td>
<td>205 (1.25 dua)</td>
<td>133 (4.3 dua)</td>
<td><strong>338</strong></td>
</tr>
<tr>
<td>Open Space/Golf Course</td>
<td>330</td>
<td>–</td>
<td>–</td>
<td>0</td>
</tr>
<tr>
<td><strong>Alyeska Area Master Plan</strong>²</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Development Acres</td>
<td>120</td>
<td>609 (1.3-4.1 dua)</td>
<td>768 (15-16 dua)</td>
<td><strong>1,377</strong></td>
</tr>
<tr>
<td>Open Space</td>
<td>266</td>
<td>–</td>
<td>–</td>
<td>0</td>
</tr>
<tr>
<td><strong>Girdwood South Townsite Plan</strong>³</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Development Acres</td>
<td>5</td>
<td></td>
<td>30-80 (6-14 dua)</td>
<td><strong>30-80</strong></td>
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<tr>
<td>Open Space</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Crow Creek Neighborhood Plan</strong>⁴</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Development Areas</td>
<td>281</td>
<td>350 (1.2 dua)</td>
<td>115 min-360 max (3.2-4.6 dua)</td>
<td><strong>465-710</strong></td>
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<tr>
<td>Open space</td>
<td>718</td>
<td>–</td>
<td>–</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>2,210-2,505</strong></td>
</tr>
</tbody>
</table>

¹. Glacier/Winner Creek Area Land Use Plan – October 2006 – Draft
². Alyeska Area Master Plan – October 2007. Figures include existing hotel (300) and 24 employee housing units
³. Girdwood South Townsite Master Plan – July 2008
⁴. Crow Creek Neighborhood Plan – May 2006
The EPA and the ADEC will consider the environmental assessment. If they determine that the facility upgrade will not significantly impact the environment, they will issue a Finding of No Significant Impact (FONSI). This includes mitigation measures required to ensure that expected environmental impacts will not be significant.
Public participation: Community members are invited to learn more about the project at the regularly scheduled April 2009 meetings of the Girdwood Land Use Committee and the Girdwood Board of Supervisors. The EPA and the ADEC will also provide a formal chance to comment during a 30-day comment period on the preliminary FONSI and the supporting environmental analysis. This is expected to occur in late spring or early summer. The EPA and ADEC will determine how to address substantive comments it may receive. If no substantive comments are received, the FONSI and the environmental assessment will be finalized.

Environmental permitting: Because the Girdwood wastewater treatment facility is an existing active facility, operational permits are in place and will be modified as needed to incorporate improvements. The National Pollutant Discharge Elimination System (NPDES) permit is currently in the renewal process under ADEC primacy. Permits for construction of proposed improvements will be applied for as the details of design and layout are completed. Final ADEC approval cannot occur until the full, detailed project design drawings are complete.

Land Use Permitting: The treatment area is located in an area zoned G-IP, Institutions and Parks. In this zone, under the terms of Municipal Code 21.09.040, an upgrade of the treatment plant will require review and approval. “Conditional uses” are carefully evaluated so as not to adversely impact adjacent land uses. As part of the conditional-use process, a public hearing allows neighboring property owners and government agencies to comment on the proposed conditional use. The Planning and Zoning Commission weighs the public and government agency comment on the conditional use to determine the

The upgrade is estimated to cost $40-$60 million. The estimated operational costs for the new facility are approximately $1 million per year. The project is not funded by taxes. The rate-payers in the Anchorage Wastewater Utility will pay for this project equally, just as they do for other capital projects in the Anchorage Bowl, Eagle River, Northern Communities and Girdwood.
Where does wastewater go? Flush a toilet, wash the dishes at your home or hotel, and the wastewater flows through a series of pipes on each parcel to a publicly owned and maintained collection system, and ultimately to the wastewater treatment plant where it is treated. Treated, effluent water then enters Glacier Creek through a submerged percolation pipe. The Wastewater System map shows the layout of this collection system.
What is infiltration and inflow?

An excessive amount of infiltration and inflow (I/I) water is entering the Girdwood sewer collection system. This disrupts the operation of the wastewater treatment plant.

**Infiltration** is extraneous water entering the sewer system from the ground through defective pipes and joints, leaking connections or manhole walls. **Inflow** is extraneous water entering through roof leaders, area drains, foundation drains, manhole covers, storm sewers and surface runoff.

On average, the amount of I/I flow into the Girdwood plant equals the amount of sanitary waste coming through the system. During high rainfall or snowmelt events, the daily I/I flow can increase to 10 times the amount of sanitary flow. The peak daily flow of typical wastewater systems are about 2-3 times the average sanitary flow.

Recently, AWWU improved portions of the wastewater collection system to reduce the amount of I/I. Such improvements are costly. Collecting and treating I/I may be cheaper than the expensive additional improvements to reduce it. So, the upgraded facility will be designed to receive and treat I/I that delivered by the wastewater collection system. State and federal regulations do restrict the amount of I/I, so AWWU will continue to evaluate sources of I/I and with plans to eliminate or reduce it.

**The Issue of I/I**

I/I is a wastewater treatment term that stands for “infiltration” and “inflow.” Currently, an excessive amount of infiltration and inflow (I/I) is entering the Girdwood sewer collection system. I/I causes the hydraulic capacity of the wastewater treatment plant to be exceeded during a wet weather event. This excess is a result of the massive amounts of water (in the form of rain and snow) that occur in Girdwood annually. I/I disrupts the operation of the current facility. The proposed replacement facility will be more costly to build and operate because of the need include capacity to handle the actual amount of Girdwood’s I/I.