



for the
Cities of Hayden, Post Falls, and Rathdrum
with Kootenai County

Rathdrum Prairie Wastewater Master Plan

Infrastructure Cost Allocations for
Capital Improvement Planning

Final Draft

November 2008

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Introduction

This technical memorandum tabulates the planning level capital costs associated with collecting, treating, and reclaiming the wastewater generated in the Shared Tier Study Area. The Shared Tier is that area bounded by Hayden's, Post Falls', and Rathdrum's Areas of City Impact (ACI) on the Rathdrum Prairie. Each City's Exclusive Tier is synonymous with their existing ACI. As discussed in earlier memos, the existing collection systems and wastewater treatment plants (WWTPs) will play an integral role in long-term service for the Shared Tier. Consequently, the economic evaluation must address the incremental build-out necessary to collect, treat, and reclaim both Exclusive and Shared Tier flows.

The analysis is divided by the three distinct system categories—collections, treatment, and reuse. It includes costs associated with upsizing existing collection system components necessary to convey wastewater through Hayden and through Post Falls in order to reach the respective treatment plant. Treatment plant expansions include both Exclusive and Shared Tier flows. Satellite treatment costs are also presented to compare with construction of treatment capacity at the existing central facilities. Finally, reuse costs for transmission, storage, irrigation, and land are documented for both Shared and Exclusive Tier build-out.

Section 1 – Collections Costs for Shared Tier

1.1 General Analysis Procedure

The Shared Tier Study Area sewer model was developed as part of Technical Memoranda No. 1 and No. 2 to produce collection system planning recommendations. The recommended collection system infrastructure consists of the larger diameter gravity flow piping (trunks and interceptors), lift stations and force main piping reflective of the computer model. This section of the Rathdrum Prairie Wastewater Master Plan utilizes the compiled infrastructure recommendations to project infrastructure costs. **Figure 1.1** provides a generalized layout of the gravity collection system with pump stations, force mains, and totalized flow rates. The reader can find details of the analysis in Technical Memoranda No. 1 and No. 2.

The cost allocations provide master planning level infrastructure necessary for the build-out of the Shared Tier Study Area. It should be noted that these costs do not include every pipe required for future build-out but rather the larger trunks and interceptors common to many users. The following elements from the sewer model are totalized and are included in cost allocations:

- **Interceptor Piping** - The required linear footage for future pipes 12-inch and larger to 33-inch are organized by required size. Cost allocations are based on PVC materials of construction. Depth is accounted for with a separate price for Excavation, Bedding, and Backfill.
- **Excavation, Bedding, and Backfill** - The required depth is accounted for with increasing cost with increasing depth requirements applied to the Excavation, Bedding, and Backfill.

- **Lift stations** - Lift Stations are sized based on the peak flow required at peak build-out.
- **Emergency Storage** - Lift station emergency storage costs are based on 30 minutes of storage at the required peak flow.
- **Force Mains** - The required linear footage for future pressure pipes for each lift station is organized by required size. The pipe diameter has been calculated from hydraulic calculations to produce adequate velocities at peak build-out.
- **Manholes** - The total number of manholes required has been organized by required size and depth. Costs are specific to size and depth and cover a range of standard 48-inch-diameter manholes at standard depth to 60-inch-diameter manholes at depths approaching average depths of 17 feet.
- **Surface Repair** - Surface repair has been accounted for as best known at this time. Alignments routed adjacent to roadway corridors are considered to be constructed under the roadway section. Values for typical roadway costs are consistent with local Highway District asphalt surface construction consisting of 12 inches of granular ballast, 4 inches of base, and 2 inches of asphalt. Alignments routed along the quarter section and not adjacent to an existing roadway corridor do not include roadway costs but do include miscellaneous surface repair similar to the existing surface.

The above elements are itemized for the entire Shared Tier Study Area, separated by entity, and organized into their respective flow basins. J-U-B ENGINEERS, Inc teamed with Welch Comer and Associates, Inc. to prepare costs for the recommended infrastructure. The appropriate costs were applied to each element, totaled for each entity, and totaled for each flow basin. Costs are derived with the following methodology:

- Costs are based on supplier quotations, past projects of comparable magnitude and scope in the Inland Northwest (including Washington and Idaho), discussions with local contractors, and comparisons to standard construction cost estimating guides, professional judgment, and local experience.
- Costs opinions were developed based on January 2008 on an Engineering News Record (ENR) Construction Cost Index (CCI) of 8090 and a Building Cost Index (BCI) of 4557. Annual inflation is generally not considered for this analysis because all projects are based on 2008 capital cost opinions for comparison rather than an annual cost analysis.
- Total capital costs include a planning level contingency factor of 20 percent of the construction cost opinion subtotal to account for uncertainties in bid climate, project scope and material supply.
- Total capital costs also include engineering, surveying and construction administration cost of 20 percent of the construction cost opinion subtotal.

1.2 Shared Tier Collection Cost Summary

The cost allocations have been compiled and separated for each collection system flow basin. Detailed cost opinion breakouts of each flow basin may be viewed in full detail in Welch Comer and Associates' technical memorandum located in **Appendix A**. The results appear in **Table 1.1**, which summarizes cost allocations for each flow basin in the Shared Tier Study

Area. The flow basins are grouped by the individual cities of Hayden, Post Falls, and Rathdrum, as required to serve their portion of the Shared Tier. In total, the recommended Shared Tier improvements represent over \$46 million worth of capital investments in 2008 costs. Based on earlier discussions of build-out rates, these expenditures would occur over a number of decades. However, collection systems are typically constructed to serve projected build-out conditions even though they may not see those flows for many years. This can make early costs disproportionate to the number of connected users. Staging and implementation are discussed in more detail in Technical Memorandum No. 5.

Table 1.1 – Collection System Capital Improvements – Shared Tier Study Area

Capital Improvement by Basin	Cost Opinion Subtotal	Cost Opinion Total
Hayden		\$5,345,000
North Basin Improvements	\$987,000	
Central Basin Improvements	\$2,597,000	
South Basin Improvements	\$1,073,000	
Central West Basin Improvements	\$688,000	
Post Falls		\$34,905,000
Central Basin Improvements	\$10,000	
SH-41 Basin Improvements ¹	\$947,000	
Major Basin Improvements	\$14,159,000	
Meyer Basin Improvements ¹	\$1,922,000	
Southwest Basin Improvements	\$6,383,000	
Stateline Basin Improvements	\$8,219,000	
West Basin Improvements	\$3,265,000	
Rathdrum		\$5,854,000
Central Basin Improvements	\$1,865,000	
Major Basin Improvements	\$3,989,000	
Rathdrum Prairie Shared Tier Study Area		\$46,104,000

¹ Exclusive to Post Falls' future service area only.

Section 2 – Collection System Upsizing Costs for Exclusive Tiers

General

The cities of Hayden, Post Falls, and Rathdrum have each developed Capital Improvement Plans (CIPs) for build-out of their Exclusive Tier. This section outlines the status of their individual CIPs and upsizing necessary to route additional flow from the Rathdrum Prairie Study Area through previously planned Exclusive Tier infrastructure.

2.1 City of Hayden Capital Improvement Plan Impacts

The City of Hayden’s CIP was most recently updated with the December 2006 Sewer Model and Master Plan Update (Welch Comer and Associates, Inc.). The City’s Master Plan includes sewer planning and CIP information for the Exclusive Tier.

Flow routed from the Hayden Shared Tier Study Area through previously planned Exclusive Tier infrastructure was detailed in Section 5 of Technical Memoranda No. 1 and No. 2. The additional flow would require the City to modify its recently completed ACI analysis. Welch Comer and Associates performed that analysis as part of this study. Their resulting technical memorandum appears in **Appendix A**. Costs associated with those upsizing requirements are also included in **Appendix A**.

Hayden’s H10 Lift Station is planned as the City’s main west side future lift station. It is the only impacted infrastructure in the CIP. **Table 2.1** summarizes the cost to increase the sizes of the impacted gravity sewers as well as the H10 Lift Station and its force main.

Table 2.1 – Hayden Exclusive Tier CIP Cost Increase

Capital Improvement Description	Cost Opinion
Previously Planned 10-inch & 12-inch to 18-inch	\$76,000
Previously Planned 15-inch to 18-inch	\$36,000
H10 Lift Station Capacity Increase of 4.14 cfs	\$549,000
H10 Force Main Capacity Increase of 4.14 cfs	\$115,000
Contingency, Engineering & Administration	\$341,000
Total	\$1,117,000

The resulting \$1.12 million upsizing cost must be added to the previously detailed \$5.35 million to obtain the total collection system cost for Hayden to serve their portion of the Shared Tier. Since the Shared Tier would add an estimated 560,000 gallons per day (gpd) of flows to the HARSB treatment plant, the incremental collection system cost is \$11.54/gpd. For each 200 gpd equivalent residence (ER), this equates to \$2,308 in capitalization costs. It compares favorably to the City’s existing \$2,280 capacity fee per “flow factor” charged to the typical residence at the time of a requested building permit.

2.2 City of Post Falls Capital Improvement Plan Impacts

The City of Post Falls' CIP for their Exclusive Tier was most recently updated with the March 2006 Technical Memorandum, "Wastewater Lift Station Capacity Evaluation and Capital Improvement Plan Update Through 2012" (J-U-B ENGINEERS, Inc.). It should be noted that since the initial development of the City's 2000 sewer model, the City has taken a proactive role by regularly updating their model. As a result, their current CIP does not completely match the most current version of their model. The City is in the process of adjusting their CIP to agree with their most current model analysis.

It should also be noted that two areas in the City's Exclusive Tier were not included in the City's most current model (as noted and described in full detail in Section 5.2 of Technical Memoranda No. 1 and No. 2). Those two areas are included in the Rathdrum Prairie Collection System Model as well as in the cost allocations for the Rathdrum Prairie Shared Tier Study Area.

Understanding the City's sewer model and CIP for the Exclusive Tier is imperative for routing additional flow from the Shared Tier through the previously planned Exclusive Tier. The additional flow will require adjustment to the City's CIP since it must be routed through the previously planned Meyer Trunk Line, 12th Avenue Lift Station, Force Main, and WWTP. Table 2.2 provides a summary of the cost increases affecting the City's existing wastewater collection system and CIP. Post Falls' CIP cost increases may be referenced in full detail in Appendix B of this report.

Table 2.2 – City of Post Falls Exclusive Tier Upsizing Costs

Capital Improvement Plan Element	Cost Opinion
Upsize Existing 12-inch to 21-inch	\$363,000
Previously Planned 15-inch to 21-inch	\$513,000
Previously Planned 12-inch to 21-inch	\$132,000
Previously Planned 12-inch to 18-inch	\$49,000
Previously Planned 10-inch to 18-inch	\$75,000
12 th Avenue Lift Station and 16-inch Dual Force Main	\$1,617,000
Total	\$2,749,000

Since the \$2.75 million detailed above benefits only Post Falls' Exclusive Tier, it cannot be combined with the \$34.91 million Shared Tier collection system cost opinion. Post Falls must serve this portion of the Shared Tier on their own and remove the \$2.87 million for the Meyer and Highway 41 sub-basins from the \$34.91 million.

Of the projected 17.8 mgd of build-out flow at the wastewater treatment plant, 13.16 mgd will be generated in Post Falls' and Rathdrum's combined Exclusive Tiers. The combined Shared Tier will generate the balance of 4.64 mgd on an annual average basis. The upsizing exclusive to Post Falls could serve up to 0.64 mgd of that flow (2.0 cfs peak flow) in the Meyer and Highway 41 sub-basins. This equates to \$4.26/gpd just for the upsizing requirements and \$8.78/gpd total plus participation in shared collection costs. Since both

entities will share the future central portion of the recommended collection system, it would cost \$8.01/gpd to serve the 4.0 mgd in the Shared Tier. Both Post Falls and Rathdrum would need to include this \$1,322 per 165 gpd “service unit” (SU) in their future CIPs plus the cost of upsizing or added infrastructure in their Exclusive Tiers. As described for the Meyer and Highway 41 sub-basins, this becomes at least \$1,449/SU.

2.3 City of Rathdrum Capital Improvement Plan Impacts

The City of Rathdrum’s CIP was most recently updated with the June 2006 Provisional Sanitary Sewer Evaluation (Welch Comer and Associates, Inc.). No flow from the Shared Tier Study Area will be routed through previously planned Exclusive Tier infrastructure; therefore, there are no upsizing modifications to Rathdrum’s Exclusive Tier infrastructure and CIP. However, Rathdrum must extend the planned collection system north and east to serve their portion of the Shared Tier. Table 1.1 outlined the \$5.85 million needed to construct those extensions to serve an estimated 928,000 gpd of Shared Tier flow (20 percent of the 4.64 mgd total expected). Therefore, Rathdrum must account for an additional \$6.30/gpd, or \$1,040 per 165 gpd SU. Combined with the \$8.01/gpd Rathdrum will share with Post Falls in the central part of the collection system, the total becomes \$14.31/gpd, or \$2,361/SU.

Section 3 – Treatment Costs

General

In comparison with collection systems, wastewater treatment, reclamation and reuse methodologies may vary significantly as technology improves and regulatory issues impact planning endeavors. The proposed HARSB and Post Falls treatment scenarios discussed in Technical Memorandum No. 3 provide one of the most viable strategies to successfully treat and discharge reclaimed wastewater using current technology under anticipated treatment regulations. The recommended improvements take current and future operating conditions into account, but are not the only viable options under today's parameters. This section provides 2008 cost opinions intended to be utilized by the entities to further evaluate and refine their long-term treatment strategy.

3.1 Hayden Treatment Costs

The requirements for build-out flow planning for the HARSB wastewater treatment plant were established in Technical Memorandum No. 3. The resulting flows are summarized again in Table 3.1. Hayden's build-out of the Shared Tier Study Area ultimately routes flow to the HARSB WWTP for treatment and discharge. HARSB's build-out capacity must accommodate flow from the City of Hayden, Hayden Lake Recreational Water and Sewer District (HLRWSD), and the Coeur d'Alene (Kootenai County) Airport. Figure 3.1 shows how the required capacity might be accommodated on the existing HARSB treatment site. Since a portion of the recommended layout is nearing completion, it is shown for clarity but not considered as part of the future capital planning discussions.

Table 3.1 – HARSB WWTP Flow Planning Summary

Flow Scenario No. 3	Flow (mgd)
Existing Area of City Impact Build-Out (Exclusive Tier)	3.48
Rathdrum Prairie Build-Out (Exclusive plus Shared Tier)	0.56
Total Build-Out Capacity	4.04

The cost opinions for each stage of flow planning are included in Table 3.2. Detailed costs are included in Appendix B of this technical memorandum. The treatment plant expansion stages do not necessarily agree precisely with the Exclusive or Shared Tier build-outs. However, they are presented in logical groups to accommodate those flows and anticipated regulatory requirements for capital planning purposes. In reality, the individual projects will be programmed and built in more manageable increments. As an example, the next major capacity impediment for HARSB is its outfall piping system. They have already initiated the design of that project to determine specific right-of-way and easement requirements. Planning, design, and construction will likely take 3 to 5 years or more. HARSB is also updating its Wastewater Facility Plan to look at more specific improvement projects and their priorities.

Table 3.2 – HARSB WWTP Improvement Cost Summary

Improvement Description	Rated Capacity	Cost Opinion
Stage 1 - Secondary Capacity and Outfall Expansion	2.4 mgd	\$8,356,000
Stage 1 – BNR and Filtration	2.4 mgd	\$17,747,000
Stage 2 – Secondary and Filtration Expansion	3.22 mgd	\$8,014,000
Stage 3 – BNR, Secondary and Filtration Expansion to Scenario 3 Build-Out	4.04 mgd	\$7,808,000
Stage 4 – Optional Secondary Expansion to Class "A"	4.8 mgd	\$6,101,000
	Total	\$41,925,000 (w/out optional Stage 4)

The \$41.9 million in identified capital projects will expand the WWTP from the current 2.0 mgd rating to 4.04 mgd. This represents a cost of \$20.54/gpd, or \$4,108/ER. All of the listed improvements provide a capacity increase except for the first 2.0 mgd of biological nutrient removal (BNR) and filtration for enhanced phosphorus removal. The more detailed information in **Appendix B** shows that all BNR and filtration efforts through Stage 2 (3.22 mgd) would cost approximately \$6.15/gpd for every user of the system (\$12.3 million). That unit cost remains consistent through Stage 3 at \$1,230/ER for BNR/phosphorus removal. Subtracting the common BNR/filtration cost from the \$41.9 million total cost would produce an incremental cost of \$29.625 million (\$14.52/gpd). Of course, expanded reuse requirements will add to these capital planning costs, as detailed in later sections.

3.2 Post Falls with Rathdrum Treatment Costs

The requirements for build-out flow planning for the Post Falls wastewater treatment plant were also established with Technical Memorandum No. 3. The resulting flows are summarized again in **Table 3.3**. The recommended flow planning scenario assumes the build-out of both Post Falls’ and Rathdrum’s Shared Tier Study Area. The additional flow will ultimately be routed to the Post Falls WWTP for treatment and discharge. The build-out would require significant capacity expansion for the WWTP. **Figure 3.2** shows how the existing Post Falls WWTP site might accommodate the required build-out in a phased manner. The cost implications for each stage of flow planning are summarized in **Table 3.4**. Detailed costs appear in **Appendix B** of this technical memorandum.

Table 3.3 – Post Falls WWTP Flow Planning Summary

Flow Scenario No. 3	Post Falls WWTP Flow (mgd)
Existing Area of City Impact Build-Out (Exclusive Tiers)	13.16
Rathdrum Prairie Build-Out (Exclusive plus Shared Tiers)	4.64
Total Build-Out Capacity	17.8

Table 3.4 – Post Falls w/Rathdrum WWTP Improvement Cost Summary

Improvement Description	Rated Capacity	Cost Opinion
BNR and Secondary Expansion with Filtration	4.1 mgd	\$23,310,000
BNR, Secondary and Filtration	5.1 mgd	\$7,721,000
Primary w/Anaerobic Digestion and Filtration	7.0 mgd	\$19,863,000
Primary, BNR, Secondary and Filtration	9.7 mgd	\$29,820,000
Primary, BNR, Secondary and Filtration	12.4 mgd	\$30,396,000
BNR, Secondary and Filtration	15.1 mgd	\$21,455,000
BNR, Secondary and Filtration	17.8 mgd	\$19,918,000
Total		\$152,483,000

As with the HARSB WWTP expansion, the phases do not necessarily correspond precisely with Exclusive and Shared Tier build-outs. Rather, the phases occur logically for the unit processes needed at the time. The improvement projects will be constructed in manageable units of cost and capacity to stay ahead of system demands.

While the \$152.5 million total cost presented in **Table 3.4** is extraordinarily large, it will occur over a number of decades. Since the estimated cost expands the WWTP from its current 3.1 mgd to 17.8 mgd, the unit cost is \$10.37/gpd, or \$1,711/SU. That cost includes adding filtration and full BNR for the existing 3.1 mgd. Since the existing ratepayers have financed the current reuse property purchases, it seems reasonable to consider that to be an equivalent contribution toward future phosphorus treatment for planning level purposes. The existing 932 acres represents approximately \$28 million at \$30,000/acre, which equates to \$9.02/gpd. Reuse costs will be detailed further in the following section.

3.3 Satellite Treatment Costs

The satellite treatment plant concept detailed in Technical Memorandum No. 3 could be applied in numerous locations throughout the study area. The size increment and treatment technology are also adaptable to the entities' specific needs. For the purposes of comparison in this study, the membrane bioreactor technology appears to be the most logical for remote operation and high quality reuse water production. It also seems most logical to locate it on existing Post Falls or Rathdrum reuse property where Rathdrum's force main already exists. **Table 3.5** details the costs that would be involved in constructing a 0.5 mgd satellite plant.

Table 3.5 – Satellite Treatment Plant Cost Summary

Process Area Description	2008 Capital Cost Opinion
Site Work and Yard Piping	\$650,000
Headworks	\$1,659,000
BNR (Anaerobic/Anoxic)	\$1,143,000
MBR w/Activated Sludge	\$4,863,000
UV Disinfection	\$308,000
Total	\$8,623,000

The above capital costs show that MBR treatment for reclamation and reuse can be very cost competitive with conventional processes at \$17.25/gpd. Specific project costs may vary above or below this estimate, depending on the elements required. The above plant would provide complete BNR with total nitrogen and phosphorus concentrations at the limits of current technology. It does not, however, include land, storage, or reuse conveyance costs. This is consistent with the other options presented. It also does not provide solids handling because that effort is assumed to continue at the central treatment plant. Perhaps most importantly, each entity must determine their respective comfort level with the price and availability of the replacement membranes in 8 to 10 years as well as the logistics of staffing and maintaining a remote treatment plant. Those policy implications will be discussed further in Technical Memorandum No. 5, but they ultimately rest with the cities of Hayden, Post Falls, and Rathdrum, .

Section 4 – Reuse Transmission, Storage, and Land

4.1 Land Acquisition Costs

The cities of Hayden, Post Falls, and Rathdrum have incorporated wastewater reclamation and reuse in their previous planning efforts. Post Falls and Rathdrum have purchased land in the Shared Tier Study Area with the intent of using it for irrigation of reuse wastewater for crop production and/or parks. Hayden and HARSB are currently land applying to their 476 acres during periods of low Spokane River flows (<2,000 cfs) to meet their NPDES Discharge Permit requirements. The quantity of land currently owned by the entities, however, is not sufficient for build-out of their Exclusive Tiers. Prior to this Master Plan, the quantity of land each entity would be required to secure for complete build-out was not fully defined. This analysis provides the next step by determining those needs. The cities' proactive approach to secure land for reuse must continue to be emphasized to provide long-term capacity for the Exclusive and Shared Tiers.

Table 4.1 summarizes cost implications for additional land acquisition for future reuse. The land currently owned by each entity for reuse is located in the center of the Shared and Exclusive Tier Study Areas. Additional land should be acquired adjacent to the existing sites wherever possible to reduce setbacks, transmission, storage, and monitoring costs. This will allow for the consolidation of reuse operations. See Section 4 of Technical Memorandum No. 3 for a detailed discussion of wastewater reuse recommendations.

Table 4.1 – Additional Land Acquisition Cost Summary

Flow Scenario	HARSB w/Hayden Additional Land Acquisition (acres)	HARSB w/Hayden Cost for Land Acquisition (\$) ¹	Post Falls w/Rathdrum Additional Land Acquisition (acres)	Post Falls and Rathdrum Cost for Land Acquisition (\$) ¹
Anticipated Discharge Permit	NONE	NONE	NONE	NONE
Exclusive Tier (ACI) Build-Out	440	\$13,200,000	1,875	\$56,250,000
Flow Scenario 3 Addition for Shared Tier Build-Out	160	\$4,800,000	1,355	\$40,650,000
Total	600	\$18,000,000	3,230	\$96,900,000

¹ Land costs are based on estimated 2008 land cost values of \$30,000 per acre, including legal, bonding, and other acquisition costs.

4.2 Wastewater Reuse Transmission, Storage, and Irrigation Costs

Reuse water flow, storage, and application requirements are governed by Idaho's reuse regulations summarized in Technical Memorandum No. 3 (IDAPA 58.01.17). Reuse water pumping and transmission requirements are based on the complete Rathdrum Prairie build-out flow requirements. Infrastructure required to meet the governing regulations include pumping and piping sized to meet the complete build-out flow requirements and storage for at least seven days of average flows. Additional storage could be required for operational flexibility or if regulatory constraints change. Figure 4.1 illustrates how the

infrastructure could be constructed in order to aggregate reuse facilities to the maximum extent possible. The following sections provide reuse transmission and irrigation costs for HARSB with Hayden and Post Falls with Rathdrum.

4.3 HARSB Reuse Transmission, Storage, and Irrigation Costs

Costs for reuse wastewater transmission, storage, irrigation, and monitoring to transport reuse wastewater from where it is treated to where it will be stored and eventually irrigated are summarized in Table 4.2. Detailed costs are included in Appendix B of this technical memorandum.

Table 4.2 – HARSB w/Hayden Reuse Transmission, Storage, and Irrigation Cost Summary

Item Description	Cost Opinion
Pumping and Transmission	\$6,555,000
Storage	\$2,730,000
Irrigation and Monitoring	\$1,845,000
Total	\$11,130,000
Unit Cost	\$5.46/gpd Capacity¹
Exclusive Tier (ACI) Share	\$8,075,000
Shared Tier Share	\$3,055,000

¹ Utilizing 4.04 mgd capacity needed. 2.0 mgd served by existing with treatment upgrades to allow summer discharge of 0.33 mgd. 0.56 mgd served in Shared Tier.

4.4 Post Falls with Rathdrum Reuse Transmission and Irrigation Costs

Costs for reuse wastewater transmission, storage, irrigation, and monitoring to transport reuse wastewater from where it is reclaimed at the City of Post Falls treatment plant to where it will be stored and eventually reused are summarized in Table 4.3. Detailed costs are included in Appendix B of this technical memorandum.

Table 4.3 – Post Falls w/Rathdrum Reuse, Transmission, Storage and Irrigation Cost Summary

Item Description	Cost Opinion
Pumping and Transmission	\$21,385,000
Storage	\$10,500,000
Irrigation and Monitoring	\$12,666,000
Total	\$44,551,000

Unit Cost	\$3.11/gpd Capacity¹
Exclusive Tier (ACI) Share	\$30,115,000
Shared Tier Share	\$14,436,000

¹ Utilizing 17.8 mgd capacity needed. 3.48 mgd served by river discharge year-round upgraded for exceptional phosphorus removal. 4.64 mgd will be served in Shared Tier.

Section 5 – Collection System, Treatment and Reuse Cost Summary

Capital cost opinions for each entity are summarized in Table 5.1. The costs provide estimations for potential future CIP comparison purposes. They include collection, treatment, reuse transmission, irrigation, monitoring, and land acquisition for each entity. Necessary upsizing to the existing Exclusive Tier collection systems, wastewater treatment, reuse, and the previously planned infrastructure improvements are included. Anticipated upgrades necessary to meet new regulations or rectify deficiencies in the existing systems for existing users are not included, as they should be attributed to user fees.

While it appears that Post Falls and Rathdrum benefit dramatically from economy of scale, each system has additional collection system costs specific to their portion of the Shared Tier. HARSB and Hayden would undoubtedly benefit from the economy of scale created by the additional capacity expansion to 4.8 mgd. Even without that expansion, treatment and reuse costs total to \$28.68/gpd, or \$5,736/ER. This is only 11 percent higher than HARSB’s current \$5,158 capacity fee.

Table 5.1 – Rathdrum Prairie Master Plan Capital Cost Summary

Description	Hayden (Total)	Hayden (\$/gpd)	Post Falls w/Rathdrum (Total) ¹	Post Falls w/Rathdrum (\$/gpd)
Collection System	\$6,462,000	\$11.54	\$32,036,000	\$8.73 ¹
Treatment/Reclamation	\$29,625,000 ²	\$14.52	\$152,484,000	\$10.37
Reuse Transmission, Storage and Irrigation	\$11,130,000	\$5.46	\$44,551,000	\$3.11
Land Acquisition for Reuse	\$18,000,000	\$8.70	\$96,900,000	\$8.70
Total	\$65,217,000	\$40.22	\$325,971,000	\$30.19

¹ Post Falls’ Shared Tier Collection System and upsizing that is not common with Rathdrum will cost \$5,618,000 (\$8.78/gpd). Rathdrum’s Shared Tier Collection System not common with Post Falls will cost an additional \$5,854,000 (\$6.30/gpd).

² HARSB projected \$41,925,000 of treatment improvements is reduced by the \$12,300,000 required for the first 2.0 mgd to add BNR and filtration (6.15 gpd).

Figures

(Figures Bound Separately)

Figure 1.1 - Shared Tier Collection System and Flows

Figure 3.1 - HARSB WWTP Phasing Schematic

Figure 3.2 - Post Falls WWTP Phasing Schematic

Figure 4.1 - Potential Expanded Reuse Locations, Transmission, and Storage

Appendices

(Appendices Bound Separately)

Appendix A - Technical Memorandum No. 1 - Hayden Exclusive Tier Upsizing and Technical Memorandum No. 2 - Shared Tier and Hayden Exclusive Tier Collection System Costs (Welch Comer and Associates, Inc.)

Appendix B - Detailed Engineer's Opinion of Cost for Wastewater Collection, Treatment, and Reuse