

WATER SYSTEM CONSERVATION PLAN

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SUBMITTED TO THE

North Kootenai Water District

JULY 2007

PREPARED BY:



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1. INTRODUCTION

1.1. BACKGROUND

North Kootenai Water District currently owns and operates 14 individual public water systems. The District owns and operates a total of 23 groundwater wells on the Aquifer. Each of these existing water systems relies on the Spokane Valley – Rathdrum Prairie Aquifer as the source of supply. This Aquifer supplies drinking water to over 500,000 people. The District recognizes that this is a valuable but not unlimited resource. As the District grows, they have become aware of the need to promote responsible use of the Aquifer in order to preserve it for future generations.

A Final Order adopting a Ground Water Management Plan for the Rathdrum Prairie Aquifer, dated September 15, 2005, was developed by the Rathdrum Prairie Ground Water Advisory Committee. The Ground Water Management Plan includes 6 goals. Goal 5 requires municipal water right holders, applying for new or modifying existing water rights, to prepare, follow, and continuously update a Conservation Plan. (See Appendix A.)

1.2. PURPOSE

North Kootenai Water District (District) authorized Welch Comer & Associates, Inc. to complete this Conservation Plan in order to meet the requirements of the “Final Order Developing Ground Water Management Plan,” dated September 15, 2005 in order to allow them to file for new and modify existing water rights, as may be required.

1.3. SCOPE

In accordance with “Goal 5” of the Final Order, the scope of this Plan includes the following elements:

1. Measurable Conservation Planning Goals
2. Summary of Existing System Characteristics and Water Use Conditions, including:
 - a. Water System Profile
 - b. Description of Planned Facilities
3. Current and Future Conservation Opportunities
 - a. Identification of Water Conservation Measures
 - b. Analysis of Benefits and Costs
4. Selection of Water Conservation Measures
5. Implementation Mechanisms, Timetable, and Assessment Strategy

1.4. OBJECTIVES

North Kootenai Water District is among the first municipal water right holder to submit a DRAFT Conservation Plan in the State of Idaho. The State of Idaho (Idaho Department of Water Resources) has prepared a DRAFT Conservation Planning Document Guidance Manual. However, this document has not yet been finalized and discussions with IDWR officials have indicated that this DRAFT Guidance may be significantly modified.

North Kootenai Water District initially set out to develop the District's conservation plan in general conformance with IDWR's DRAFT Guidance Manual. However, it became clear upon the initial water usage data collection and reduction, that precise information regarding water use cannot be obtained from the District's meter records due to recording equipment and procedures. Welch Comer prepared an April 25, 2007 memorandum for the District's Attorney identifying the potential difficulty in utilizing and relying upon the data provided. This document is included in Appendix B.

After further consultation with the District and their Attorney, it was determined that the initial version of this conservation plan should be developed to meet the following objectives:

1. Meet the requirements listed in Goal 5 of the Final Order.
2. Develop and Implement a Process for Accurately Monitoring and Tracking Water Production and Consumption throughout the District
3. Develop a Strategy for Reducing Water Consumption and Production
4. Develop Specific (Measurable) Goals for Reducing Water Consumption and Production once Baseline Demands and Production are Established

2. DISTRICT PROFILE

2.1. SOURCE WATER

North Kootenai Water District currently owns and operates 14 individual public water systems. The District owns and operates a total of 23 groundwater wells on the Aquifer. Each of these existing water systems relies on the Spokane Valley – Rathdrum Prairie Aquifer as the source of supply.

A map of the District’s water systems and well locations are provided in Exhibit 2.1.

2.2. WATER RIGHTS

The majority of the District’s water rights are municipal and are transferable between all sources. Water rights acquired by the District when they acquired water systems after 2005 have not been transferred into NKWD’s name. However, the ownership of the water rights have been secured by the District. A summary of the existing water rights and the status of each are provided in Exhibit 2.2.

As shown in Exhibit 2.2, the District currently has a total instantaneous Municipal diversion right of 13.31 cfs. This capacity is transferable between the wells listed. The District has an additional 4.58 cfs in ground water rights that are currently not in the District’s name and cannot be transferred across the District’s wells. Additionally, the District owns 0.94 cfs in surface water rights from Hayden Lake which may or may not be transferable to the District’s wells. Upon approval of this Plan in accordance with Goal 5 of the Groundwater Management Plan as previously indicated, the District intends to change the type of use for all the District water rights to municipal

2.3. WATER SERVICE CHARACTERISTICS

The District currently supplies water to approximately 3537 active connections. The District is the third largest water purveyor in Kootenai County (behind City of Coeur d’Alene and City of Post Falls). The characteristics of each service area within the District are very diverse. Some of the water systems serve within defined City Limits (Coeur d’Alene, Hayden, Hayden Lake, Post Falls) some of the water systems serve rural areas (Chilco and Ohio Match). Some water systems provide service to large parcels of property with large homes (Rimrock), and some of the water systems provide service for very small lots and homes (East Seasons Acres). Some water systems are relatively new, while some are more than 50 years old. Thus, the water consumption and production varies significantly through the District. A general overview of each of the District’s water systems is provided in Exhibit 2.3.

As previously indicated, there is no attempt to define the baseline consumption and demand for the water system at this time due to apparent inaccuracies in the historic metering data. One primary goal of this plan is to establish and implement a method for improved metering.

2.4. WASTEWATER TREATMENT AND REUSE

A summary of sewer service providers for each water system was listed in Exhibit 2.2. As shown, the majority of the water systems have individual septic/drainfield systems. The larger water systems (Hillside and Rimrock) are part of a sewer district (Hayden Area Regional Sewer Board-HARSB or Hayden Lake Recreational Water and Sewer District-HLRWSD). Wastewater from HLRWSD is ultimately treated by HARSB and land applied or sent to the Spokane River. The following is a brief summary of the treatment level supplied by the sewer district

2.4.1. REUSE

None of the existing water systems use reclaimed water. At this point in time, reuse is not considered a viable option for reduction in water demand for the majority of the systems for the following reasons:

1. As shown in Section 2.4, many of the existing systems utilize individual septic systems. Thus, in order to implement reuse, these systems would have to develop a community wastewater and treatment system, which would be too expensive.
2. Many of the existing systems are part of a larger Sewer District. In order to implement reuse, the treatment facilities would have to first supply sufficient treatment to allow for the treated wastewater to be applied without buffers. Additionally, reclaimed water transmission/distribution mains would have to be constructed from the treatment facility to each system. This option would be too expensive.

A figure of each NKWD water system with respect to existing wastewater treatment facilities and approximate boundaries is shown in Exhibit 2.4.

2.5. 3 YEAR CAPITAL IMPROVEMENT PROGRAM

The District maintains a 3 year Capital Improvement Program on a monthly basis. This program is provided in Exhibit 2.5. Conservation related items are defined as “Priority 6”. The following is a summary list of conservation related improvements for each fiscal year:

1. **Fiscal Year 2006/2007: (Total Conservation Improvements: \$70,000)**
 - a. Conservation Plan (Phase 1)
 - b. Point Hayden Mains
2. **Fiscal Year 2007/2008: (Total Conservation Improvements: \$218,600)**
 - a. Hydrant Locks
 - b. Telemetry Improvements (See Section 4.2.1.1)
 - c. Radio Read Meters
 - d. Conservation Plan (Phase 2)
 - e. Conservation Public Education
3. **Fiscal Year 2008/2009: (Total Conservation Improvements: \$180,300)**
 - a. Hydrant Locks
 - b. Telemetry Improvements
 - c. Radio Read Meters

- d. Conservation Public Education
- e. Annual Review

The 3 year Capital Improvement Program does not include emergency waterline repairs.

3. CONSERVATION PLANNING GOALS

3.1. FISCAL YEAR 2007/2008

The following Conservation Planning Goals (“Goals”) were developed by the District using the Groundwater Management Plant Goals, and IDWR’s Draft Water Conservation Guidance Manual. In establishing the Goals, the District consider the economic impact on its customers, the estimated reduction in water consumption, and the time frame within which the Goal could be accomplished.

3.1.1. GOAL #1: METER UPGRADE AND IMPROVEMENT PROGRAM

The District’s first conservation goal to be implemented by October 2007 is to establish a metering program to accurately track consumption and production. This is necessary to establish the baseline demand and production required for the system. This goal must be implemented by October 2007 in order to allow the District a full year to gather data as required for Goal #4 and Goal #5.

3.1.2. GOAL #2: CONSERVATION POLICY

The District plans to implement a Conservation Ordinance, which will allow the District to establish the following District-wide policies for new and existing customers in the Fiscal Year 2007/2008:

1. Irrigation: The District will establish mandatory hours of “non-irrigation” between 10 am and 6 pm in order to reduce peak hour source requirements as well as to eliminate irrigation during the hottest, driest hours of the day when evaporation is highest.
2. Construction Water: The District will require contractors to pay for construction water. Contractors will be assigned a hydrant and water will be metered and billed on a monthly basis. Contractors will then be charged the appropriate rate based on water consumed.

3.1.3. GOAL #3: CONSERVATION FUNDING

The District will establish a Conservation Fund. This fund will be used to fund conservation measures and related improvements. The Conservation Fund will be funded by transferring 8% of the total money collected (on a monthly basis) from the top tier of the District’s current water rate structure.

This tier generated an estimated \$365,000 in 2006, at 8 % the District estimates they will put aside \$20,000 to \$30,000 per year for implementation of conservation measures.

3.2. FISCAL YEAR 2008/2009

3.2.1. GOAL #4: REDUCE CONSUMPTION PER CONNECTION

Upon establishing an accurate baseline production and consumption in 2008, the District will develop an appropriate goal for reduction in consumption per connection.

3.2.2. GOAL #5: REDUCE SYSTEM LOSS

In addition to Goal #4, the District will also establish a goal for reduction of system loss or unaccounted for water.

3.2.3. GOAL #6: ANNUAL REVIEW

An annual review will be conducted, beginning in 2009 in order to determine the impact of conservation measures implemented each year. New goals will be established each year based upon the prior years' results. Additionally, conservation measures will be modified or added as necessary to reach the District's goals.

4. CURRENT AND FUTURE CONSERVATION OPPORTUNITIES

Water conservation not only helps to preserve and protect one of the most valuable natural resources in this area, upon which thousands depend upon, it will also ultimately result in reduced operating costs and increased operating efficiencies for the District and will preserve system capacity. The following section includes a list of current and future conservation measures that will help the District to realize the goals listed in Section 3.

4.1. CURRENT MEASURES

4.1.1. WATER RATES

The current water rates were implemented on May 15, 2006 and consist of a base rate and a progressive block rate structure. With four tiers and the highest tier charging 90% more than the lowest tier, the current rate structure is very aggressive in promoting water conservation. A diagram of the rate structure is shown in Exhibit 4.1. The 2006 rate structure replaced a rate structure that had been in effect since 2001 and was also a progressive block structure. However, the previous rate structure had only three tiers and wasn't as aggressive as the current structure.

A graphic of the District's water rate schedule in comparison with other local groundwater systems is provided in Exhibit 4.2. Based on the public water systems shown, NKWD is the most aggressive, conservation based rate structure in the area. It should be noted that NKWD is the third largest water provider in Kootenai County, behind the City of Coeur d'Alene and Post Falls. As shown in Exhibit 4.2, Coeur d'Alene and Post Falls currently maintain a comparatively low water rate structure. (City of Coeur d'Alene is currently re-evaluating their water rates.)

The District evaluates their rate schedule every 2 years. The District intends to maintain the progressive rate schedule in order to promote conservation. Additionally, as previously mentioned, the District will utilize a % of revenue from the top tier to fund their conservation fund.

4.1.2. METERING PROGRAM

All known water service connections within the District are metered. The District currently reads meters on most water systems starting in April through October. (This is due to snow cover in the winter months which makes access to meters difficult.) During winter months, services are charged based on an estimated average monthly demand. These estimates are reconciled for the actual consumption during the first month of meter reading during the year.

4.1.3. PUBLIC EDUCATION

In 2005, the District developed a brochure including water conservation tips. This brochure is mailed annually to all customers. A copy of the brochure is included in Appendix C. In addition, the District operates and maintains a website with additional information on conservation as well as links to conservation resources.

4.1.4. HYDRANT LOCKS

The District has an estimated 330 fire hydrants, many located in rural areas. The District has installed a hydrant lock on approximately 200 of these hydrants to prevent unauthorized water use and protect the system from contamination. The locks are approximately \$75 per hydrant

4.2. FUTURE MEASURES/IMPROVEMENTS TO EXISTING MEASURES

4.2.1. METER UPGRADE AND IMPROVEMENT PROGRAM

Although the District has meters installed on all existing service connections and water sources they have not been required in the past to track water system losses to a measurable degree of accuracy. In development of this Conservation Plan it became apparent that the meter data available could not be used to determine baseline demand, production, or loss for the following reasons (also refer to the April 25, 2007 Memo in Appendix B):

1. Meter read dates for production meters did not match the read dates for consumption meters.
2. The exact amount of time between meter reads for the consumption data could not be determined.
3. Some of the source meters were out of calibration or failing.

Thus, the following meter upgrade and improvement program will be implemented in Fiscal Year 2007/2008 in order to meet Goal #2 defined in Section 3.

4.2.1.1. METER UPGRADES AND IMPROVEMENTS

Individual Meters

The District is currently in the process of installing radio read meters District-wide. This will allow the District to read meters throughout the year. The District has installed 250 meters. The radio reads are located on the following systems:

1. Ohio Match
2. Mountain View Terrace (1/2 of water system)
3. Rimrock (Lancaster Road)
4. Twin Lakes (Condo Buildings)

The District has budgeted \$100,000 per year for the installation of 500 meters per year this program. However, they have been unable to complete installations during the last two years due to funding limitations and priority projects in the last two years. The District intends to continue the program in Fiscal Year 2007/2008. The program will likely take another 5 years to complete based on the proposed budget amount. (Radio reads are required on all new connections.)

Source Meters

All of the District's sources are metered. However, some of the meters are very old and the accuracy is questionable. The District replaces the meters as required and as funds allow. In the long term, the District intends to rebuild and upgrade their source meters to allow for remote read capabilities through their telemetry system. Currently the only meters tied into the telemetry system are:

1. Lancaster #3 on the Rimrock Water System
2. Tree Farm #2 on the Twin Lakes Water System

The District has telemetry capabilities on the following water systems and thus intends to upgrade the source meters for these systems next. The estimated cost for upgrades and addition to telemetry for each source meter is \$3000 to \$5000 per site. These upgrades are included in the 3 Year Capital Improvement Program for Fiscal Year 2006/2007 and 2007/2008.

1. Twin Lakes (Echo Beach Well and Tree Farm #1)
2. Atlas Acres (Selkirk Meadows Well and Atlas Acres Well)
3. Chilco (Chilco #1 and #2)
4. Hillside (Hayden and Finucane Wells)

Improvements to the GTE/Hayden Pines water system will take place in Fiscal Year 2007/2008 which will include telemetry for the GTE/Hayden Pines Water System. Thus at that time the GTE well #1 and #2 and Hayden Pines source meters will be added to the District's telemetry system.

The District has budgeted \$15,000 per system to complete the telemetry work at the following water systems for Fiscal Year 2007/2008 and 2010/2011:

1. Ohio Match
2. Mountain View
3. Meadowland Acres
4. Valley Green
5. Hayden Orchard
6. Ranch Valley
7. East Season's Acres

Upon completion of telemetry at the remaining systems, the District will upgrade the source meters to allow for remote read capabilities.

4.2.1.2. METER READING

In order to establish the baseline demand and production on the system, the following meter reading program should be implemented starting immediately:

1. Source Meters

- a. All source meters shall read to a minimum of 100 gallons. (Magnetic meters shall read to a minimum of 0 gallons).
 - b. Source meter accuracy shall be tested every 5 years. Meters performing beyond an accuracy of 5% shall be replaced or repaired.
 - c. Propeller meters shall be used for constant speed pumps. Magnetic meters shall be used for variable speed pumps. (New source meters shall be McCrometer.)
 - d. Source meters shall be read on a **weekly** basis. During individual meter readings, source meters for the corresponding water system shall be read on a **daily** basis. The following information shall be gathered at each reading:
 - i. Weather condition
 - ii. Pump run hours
 - iii. Instantaneous flow
 - iv. Pressure
 - v. Meter reading to the nearest 100 gallons.
 - vi. Date and exact time of reading
 - e. Inordinate (very high or very low) meter readings shall be reported immediately to the District Manager.
 - f. Broken meters shall be replaced within 30 days of the last correct reading.
2. Individual Meters
- a. All individual meters shall read to a minimum of 100 gallons. All new meters shall be Master Meter equipped with Radio Read.
 - b. Individual meters shall be read on a **monthly** basis. Each individual meter shall be read on the **same** day of each month. The date corresponding to **each** reading shall be recorded with the meter reading.
 - c. Inordinate (very high or very low) meter readings shall be reported immediately to the District Manager. The District Manager will review and determine if it is necessary to contact the Property Owner for further investigation.
 - d. Broken meters shall be replaced within 30 days of the most current reading.
 - e. Service line leaks on the District's side of the meter shall be repaired within 30 days of the most current reading.
3. Record Keeping: The District shall maintain an electronic record of the following information:
- a. Maintenance/Depreciation Information
 - i. Source
 - 1. Meter #
 - 2. Meter Model
 - 3. Meter Install Date
 - 4. Meter Service Date
 - ii. Individual

1. Meter #
 2. Meter Model
 3. Meter Install Date
- b. Meter Reading
- i. Source
 1. Weather condition
 2. Pump run hours
 3. Instantaneous flow
 4. Pressure
 5. Meter reading to the nearest 100 gallon.
 6. Date and exact time of reading
 - ii. Individual
 1. Meter reading to the nearest 100 gallon
 2. Date and exact time of reading

4.2.2. IDENTIFICATION OF UNACCOUNTED FOR WATER

It is important to note that “lost” water does not necessarily equal water system leakage. Lost water is defined as the difference between the water produced for a system and the water consumed for that system. There are many potential sources for “lost” or unaccounted for water including:

1. Meter error
2. Accounting or reading errors
3. Unmetered connections
4. Un-permitted connections
5. Construction water
6. Waterline Leakage

In order to meet Goal #5, the most cost-effective measures the District takes will be to define and eliminate or minimize items #1 through #4 listed above. The following is a summary of how these items will be addressed by the District:

1. Meter and Accounting Errors:
 - a. Items #1d and #2d (identification of very high or low meter readings) from Section 4.2 will assist in minimizing number 1 and number 2 listed above.
2. Unmetered Connections:
 - a. There are currently no, known unmetered connections within the District.
 - b. The District will attempt to identify all unknown, unmetered (illegal) connections. Once identified, these connections will be eliminated from the system or will be metered and charged as appropriate.
3. Construction Water:

- a. The District has started a lock program on hydrants within the District. See Section 4.1.2. The Conservation Policy to be implemented in Fiscal Year 2007/2008 will require contractors using water from locked hydrants to meter and pay for water used. See Goal #2 in Section 3.

4. Waterline Leakage: See Section 4.2.3.

4.2.3. LEAK DETECTION PROGRAM

The District currently monitors meter reading for inordinate readings. Very high or low readings are further inspected and any necessary repairs on the District side of the meter are repaired. If leakage is suspected on the customer side of the meter, the customer is notified.

The District currently repairs an estimated 8 to 10 service line (District side of meter) or main line leaks per year. The estimated cost of these repairs is \$3000 to \$4000 per each repair. In order to further minimize “lost” water, and as an aid to quantify waterline leakage as well as to locate leaks, a leak detection program could be implemented.

The District does have leak detection equipment, but currently does not have staff time available to dedicate to leak detection. Upon completion of the radio read program, the District plans to re-assign meter reading staff to this task.

4.2.4. WATERLINE REPLACEMENT PROGRAM

The District fully funds water system depreciation. Therefore, they maintain a depreciation fund which allows them to replace depreciated water system components. The District has several thousand feet of aging water main that will eventually need to be replaced. The District prioritizes replacement of depreciated or depreciating components and includes these projects in their 3 and 10 year Capital Improvement Programs. Refer to the 3-year Capital Improvement Program in Exhibit 2.4 for a listing of projects to be completed within the next 3 years.

4.2.5. PRESSURE MANAGEMENT

The District may eventually consider reducing excessive pressures (>80 psi) in areas in order to reduce the average water consumption as well as to reduce stress on piping. The proposed plan would include incorporation of main line pressure reducing valves (PRV) for portions of service areas with pressures exceeding 80 psi. This program would apply only to a handful of the District’s large water systems (Rimrock, Hillside, and Twin Lakes) as most of the District’s systems normally operate below 80 psi.

This program is not proposed for implementation in the first five years of the conservation program. Additional analysis of each water system will be necessary to determine the feasibility and cost effectiveness of a program of this nature. The cost of a main line PRV station is likely to be as much \$30,000. The District will not have budget to implement this program within the first five years of the conservation plan.

4.2.6. PUBLIC EDUCATION

In addition to the annual conservation brochure and website resource, the District intends to implement the following public education measures as conservation funds allow each year:

1. Publicize District policy to eliminate irrigation between 10 am and 5 pm.
2. Include prior year's consumption on each water bill for each water service.
3. Develop a water conservation review team to work with high use customers in order to assist them with reducing consumption.
4. Work with local sprinkler companies to develop low volume irrigation plans for District customers.
5. Facilitate an annual conference with local water purveyors to discuss conservation measures implemented and the effectiveness of each.
6. Sponsor public workshops to promote conservation.

The District will select at least one of the above measures each year for implementation. Depending upon the effectiveness of the measure as determined in the annual evaluation (Section 4.2.7), the District may choose to continue that measure and/or choose a new measure to implement in the following year.

4.2.7. ANNUAL EVALUATION

An annual "report card" will be prepared each year (at the end of the fiscal year) evaluating the goals that were set for that year and the effectiveness of the conservation measure implemented that year. The annual evaluation will include revisions or additions to the District's goals and conservation measures to be implemented in the following year. The first annual report card will be completed in October 2009.

The annual evaluation will be presented to the public in a publicly noticed hearing in order to get public input on the effectiveness of District policies and conservation measures used in the previous year.

5. SELECTION OF CONSERVATION MEASURES

The estimated annual available funding for the conservation program is \$20,000 to \$30,000. Based on this and the analysis of conservation measures presented in Section 4, the District has selected the following as the most effective and economical conservation measures required to meet the goals listed in Section 3:

1. Fiscal Year 2006/2007:
 - a. Conservation Plan
2. Fiscal Year 2007/2008
 - a. Meter Upgrade and Improvement Program
 - b. Conservation Fund
 - c. Conservation Policy
 - d. Public Education (Select 1 from the list provided in Section 4.2.6.)
3. Fiscal Year 2008/2009
 - a. Continuation of 2007/2008 Measures
 - b. Annual Evaluation
4. Fiscal Year 2009/2010
 - a. Continuation of 2008/2009 Measures
 - b. Leak Detection Program
 - c. Annual Evaluation

In subsequent years, the District may choose to utilize the savings realized from the success of the Conservation Plan to fund additional conservation measures.

6. IMPLEMENTATION OF SELECTED MEASURES

The following table shows the schedule of implementation for the selected measures, relative to the goals they are intended to achieve (see Section 3) as well as the estimated cost of implementation and source of funding for each measure.

Conservation Measure	Implementation Date	Schedule	Estimated Annual Cost	Source of Funding
Conservation Plan	August 2007	Update Every 5 Years	\$32,000 ¹	Capitalization Fee Fund
Goal #1: Meter Upgrade and Improvement Program				
Individual Meters (Radio Read)	October 2007	Annual for 5 years	\$105,000 per year	Capitalization Fee-Depreciation Fund/Conservation Fund
Source Meters (Remote Read)	October 2007	Annual for 5 years	\$15,000 to \$60,000 per year	Capitalization Fee-Depreciation Fund/Conservation Fund
Goal #2: Conservation Fund				
Conservation Fund	October 2007	Continuous	\$0	N/A
Goal #3: Conservation Policy				
Hydrant Lock Program	October 2007	Annual for 2 years	\$3,000	Conservation Fund
Goal #4 and #5: Reduce Water System Consumption and Loss				
Leak Detection/Repair	October 2007	Continuous	\$30,000	Depreciation Fund/Conservation Fund
Annual Evaluation	October 2008	Annual/Continuous	\$5,000	Conservation Fund
Estimated Annual Total			\$235,000	

1. Total cost for first and second year plan development. (Year 1: Current Plan, Year 2: Update to Plan with Baseline Demand and Loss.)

The above table shows that the estimated annual expenditure for the District for conservation related improvements is \$235,000. The District's conservation fund will provide only \$20,000 to \$30,000 each year. The remaining portion of the improvements will be funded using the capitalization fee and depreciation funds. (Also refer to Section 2.5 and Exhibit 2.5 for further detail.)