WASTEWATER COLLECTION SYSTEM FACILITY PLAN

FOR THE

HAYDEN LAKE RECREATIONAL WATER AND SEWER DISTRICT

SUBMITTED TO THE HAYDEN LAKE RECREATIONAL WATER AND SEWER DISTRICT

FEBRUARY 2012

REVISED OCTOBER 2012

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PROJECT NO. 41055

SUBMITTED TO THE:

HAYDEN LAKE RECREATIONAL WATER AND SEWER DISTRICT

PROFESSIONAL ENGINEER REGISTERED 3751 STATE OF IDAHO LARRY E. COMER

10/31/12

FEBRUARY 2012

REVISED OCTOBER 2012

PREPARED BY:

WELCH-COMER
ENGINEERS | SURVEYORS

350 E. Kathleen Avenue
Coeur d'Alene, ID 83815
208-664-9382 ♦ 208-664-5946 Fax
E-Mail: wc@welchcomer.com

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1. EXECUTIVE SUMMARY

1.1. PURPOSE

The purpose of this Facility Plan is to analyze the Hayden Lake Recreational Water and Sewer District's wastewater collection system, identify system deficiencies, and provide improvement recommendations. Primarily, this document will address the existing lift station and collection line deficiencies throughout the system.

1.2. BACKGROUND

The wastewater system is part of a regional facility, Hayden Area Regional Sewer Board, which treats wastewater from the District, City of Hayden, and Kootenai County at a regional treatment facility. The District's collection system presently serves an estimated 1,922 equivalent residential (ER) units. In addition, 723 vacant lots and parcels have purchased capacity for future connection to the District's sewer system. Due to the nature of the terrain around Hayden Lake, the sewer collection system operates with seventeen lift stations that pump to one main lift station (H-1D) before pumping to the HARSB treatment facility.

The existing system was evaluated for current wastewater flows. A combination of pump run times and drawdown tests were utilized to determine the flows in the system. An average of 250 gpd/ER was used for the projections of future wastewater flows.

The number of future connections at build-out of the system is estimated based on the number of lots, proposed developments, and expected service area growth. A total of 2,311 ERs are estimated at build-out (vacant lots served) and 3,134 ERs are estimated with service area expansion and new developments.

1.3. CONCLUSIONS

Most of the HLRWSD sewer collection system was constructed in 1986 and 1987, so the system is now 25 years old. The District owns and operates 17 duplex sewage lift stations, 13 of which are 25 years old or more. The system has operated well and protected water quality since it was constructed in 1986 and 1987. However, some of the mechanical components of the system have worn out or depreciated due to wear and tear and natural corrosion.

a. Interior coatings on most of the 13 lift stations, which are at least 25 years old, are beginning to fail in areas and expose the lift station steel structure to corrosion.
b. Electrical control panels of 13 of the lift stations, which are over 25 years old, are operational; however, they do not meet current standards for operating safety.
c. The HLRWSD has the opportunity to install gravity sewer relief lines in Strahorn Road and Miles Avenue over the next few years, in coordination with roadway reconstruction proposed by the City of Hayden Lake.

1.4. ALTERNATIVES

Multiple alternatives are evaluated for upgrading and repairing the collection system. Lift station controls/electrical components were analyzed for standardization and upgrades. The structural and mechanical condition of the lift stations was also analyzed.

a. The electrical component repairs were placed into three categories based on flow and risk at the lift station: Tier I (high flow/high risk) includes "smart panels" with telemetry, Tier II (moderate flow/moderate risk) includes "smart panels" without telemetry but option to upgrade to telemetry at a future time, and Tier III (low flow/low risk) includes a traditional hard wired control panel with autodialer communication.
b. The structural/mechanical improvements to the lift stations include three alternatives: A) rehabilitation (in-place), B) replacement, and C) slip-line. Each alternative includes new internal components (pumps, rails, etc.), structural repairs/replacement, and site improvements.
c. Lastly, gravity sewer relief lines (Strahorn and Miles/Bruce) were analyzed to significantly reduce wastewater flows into the Country Club lift station near the shore of Hayden Lake.

1.5. RECOMMENDATIONS

The recommendations of this report include the following items, including rehabilitation recommendations and financing arrangement options:

a. Thirteen of the District's 17 duplex lift stations should be rehabilitated, in order to assure reliable operation for the next 25 years.
b. The recommended lift station rehabilitation consists of rehabilitation in place for 11 of the 17 lift stations.
c. Full replacement is recommended for two of the lift stations.
d. Control panel and/or telemetry improvements are recommended for 16 of the lift stations.
e. Gravity sewer relief lines should be constructed in Strahorn Road and Miles Avenue, in coordination with the roadway improvements proposed by the City of Hayden Lake.
f. The total estimated cost for the sewer collection system Capital Improvements Plan (CIP) is approximately $4.2 million.
g. The total estimated cost for the HLRWSD share of the upgrades to the HARSB treatment facility is $6.2 million.
h. In order to finance the recommended improvements, the HLRWSD Board should propose a Local Improvements District (LID) to property owners within the sewer service area, during the summer of 2012.
i. The District should seek Idaho DEQ low interest loan funding for its share ($6.2 million) of the HARSB treatment facility.
j. The District should also seek USDA-Rural Development low interest loan funding for the recommended sewer collection system Capital Improvements ($4.2 million)

k. The preliminary estimate for the total LID assessment for a single parcel or ER, based upon the assumptions above, is approximately $4000 per lot or ER.

2. INTRODUCTION

The Hayden Lake Recreational Water and Sewer District (HLRWSD or District), Sewer Collection System consists of multiple collection areas and lift stations in the City of Hayden Lake and unincorporated portions of Kootenai County, Idaho. The HLRWSD lift stations pump raw and septic tank effluent wastewater through a series of gravity and force mains to the H-1D lift station. From there, the wastewater is pumped through a series of force mains to the Hayden Area Regional Sewer Treatment Facility, four miles to the northwest of the District. An interagency "joint powers" agreement for sewage treatment services was established in 1986 between the HLRWSD, City of Hayden and Kootenai County. The agreement is included in Appendix B for reference.

The majority of the collection system was constructed in 1987. However, some of the pre-existing effluent sewer systems constructed before 1987 have been "taken over" by HLRWSD. Currently the sewer collection system is operated and maintained by the HLRWSD. The District contracts with HARSB (Hayden Area Regional Sewer Board) to perform certain O&M (operation and maintenance) duties.

2.1. PURPOSE AND NEED

The HLRWSD Board of Directors has authorized Welch Comer and Associates, Inc. to prepare this wastewater system report for the HLRWSD wastewater system located in Kootenai County, Idaho. The purpose of this report is to identify existing and future sub-standard components of the system and to develop a facility plan to implement the capital improvements necessary to provide an adequate sewer collection system to its users for the next 20 years, or more.

2.2. DESCRIPTION OF PLAN OF STUDY

This Facility Plan will evaluate alternatives and make recommendations for repairing or replacing the 17 duplex lift stations and improving other components of the sewer system. It will be prepared in general conformance with the Idaho Department of Environment Quality (DEQ) Wastewater Facility Plan Outline. The following items will be addressed in this report.

- Condition of Existing Facilities and Deficiencies
- Existing Wastewater Flow Analysis
- Effects of Infiltration and Inflow
- Forecast of 20-year Wastewater Flows
- Alternatives for the Correction of Identified Deficiencies
- Cost Estimates
- Proposed Projects and Recommendations

2.3. OWNER RESPONSIBILITY

The District has the capability to obtain financial resources through bond elections or formation of Local Improvement Districts (LIDs), incurrence of debt through loans from state and federal agencies, and reception of grants through federal or state agencies. They also can fund improvements through the sewer depreciation and

operation and maintenance reserve funds collected from the District users. The District also has the technical qualifications and facilities to carry out the project since they have hired Welch Comer & Associates, Inc. as the District engineer and can hire or train their operators to suit the needs of the facility.

The District has completed several minor and major improvements since the District was formed in 1976. The major improvements have consisted of lift station and collection line construction in 1986 and 1987. The minor improvements have consisted of upgrades and inclusion of systems throughout the District. The major improvements have been funded primarily through LIDs and the minor improvements are typically funded through the funds provided by the District users and capitalization fees.

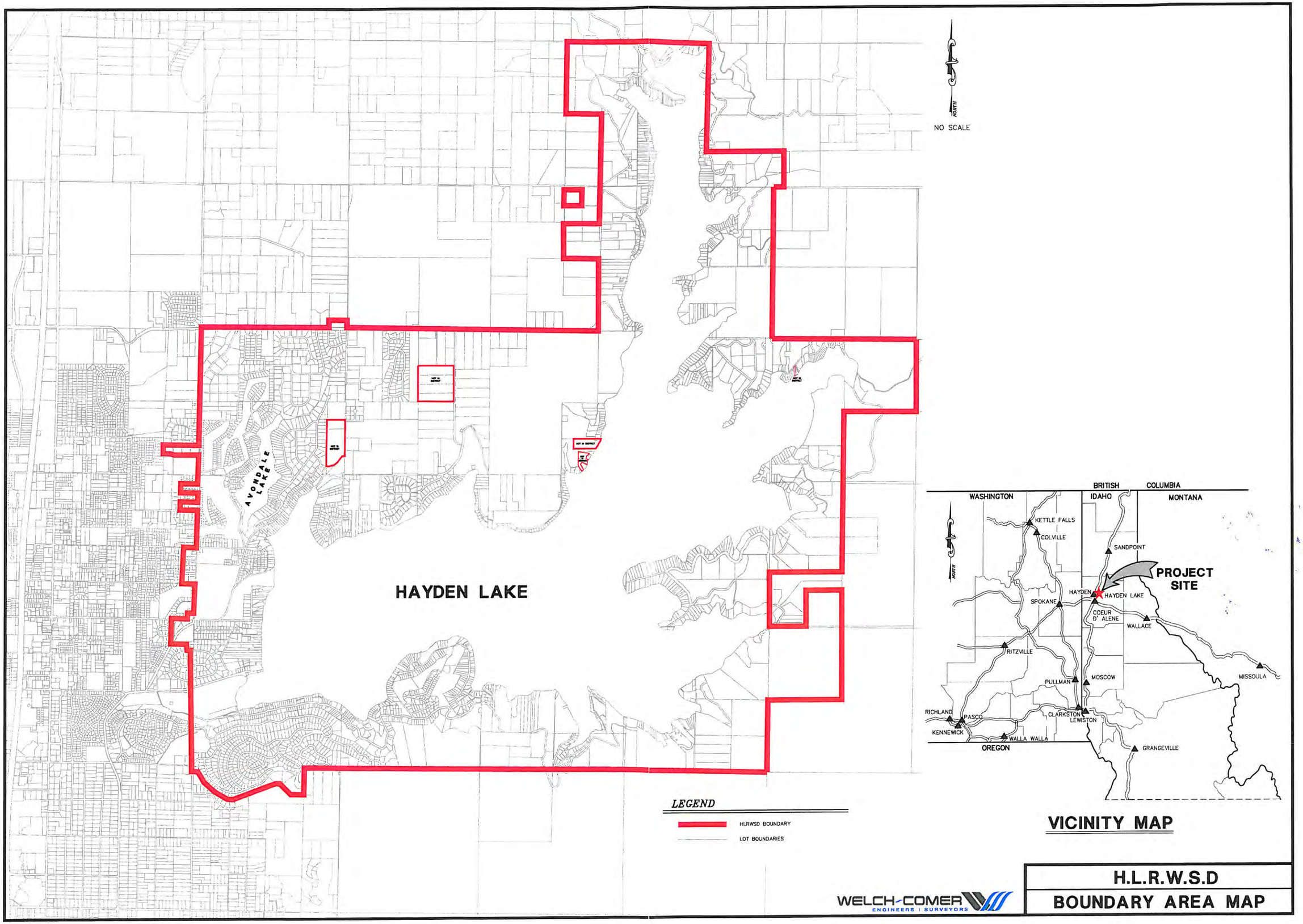
If property acquisition is required by the improvements discussed in this project, the District will follow the process required by Idaho Code, through obtaining an appraisal, entering into negotiations with the land owner, and finally purchasing the property. If property owned by the District requires disposal, the District will follow the appropriate protocols established by Idaho Code.

3. EXISTING CONDITIONS

3.1. BOUNDARIES OF THE PLANNING AREA

The Hayden Lake Recreational Water and Sewer District boundary extends around the full perimeter of Hayden Lake, Idaho, as shown in Figure 3-1. However, the existing sewer system includes only the western third of the area around Hayden Lake. The service areas were originally established with the formation of two local improvement districts (LIDs) in 1987 for the construction of the sewer system. There have been six total LIDs created by the District, four for sewer and two for water. The Service Area Map in Appendix A shows the current HLRWSD service area by lift station drainage basin. The collection system consists of gravity sewer, effluent sewer, and force mains and lift stations. These facilities are shown in the System Overview Map provided in Figure 3-2.

Hayden Lake, Idaho



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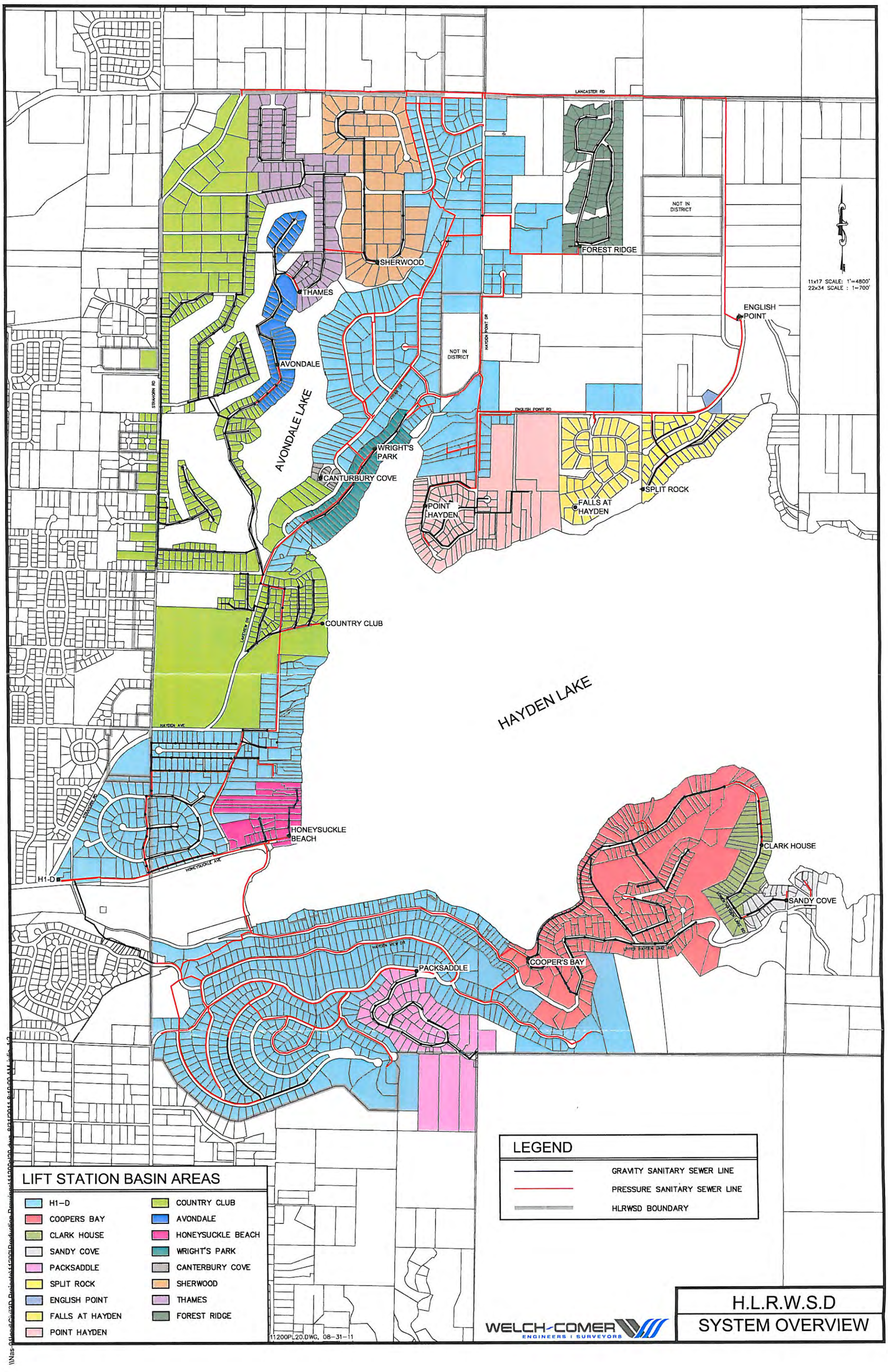
LANCASTER RD
NOT IN DISTRICT
FOREST RIDGE
SHERWOOD
THAMES
11x17 SCALE: 1"=4800'
22x34 SCALE : 1=700'
ENGLISH POINT
HAYDEN POINT DR
NOT IN DISTRICT
AVONDALE
AVONDALE LAKE
OLD MAYPES
ENGLISH POINT RD
WRIGHT'S PARK
CANTURBURY COVE
SPLIT ROCK
POINT HAYDEN
FALLS AT HAYDEN
COUNTRY CLUB
LAKEVIEW DR
HAYDEN LAKE
HAYDEN AVE
HONEYSUCKLE BEACH
HONEYSUCKLE AVE
H1-D
CLARK HOUSE
SANDY COVE
COOPER'S BAY
PACKSADDLE
LIFT STATION BASIN AREAS
H1-D
COOPERS BAY
CLARK HOUSE
SANDY COVE
PACKSADDLE
SPLIT ROCK
ENGLISH POINT
FALLS AT HAYDEN
POINT HAYDEN
COUNTRY CLUB
AVONDALE
HONEYSUCKLE BEACH
WRIGHT'S PARK
CANTERBURY COVE
SHERWOOD
THAMES
FOREST RIDGE
LEGEND
GRAVITY SANITARY SEWER LINE
PRESSURE SANITARY SEWER LINE
HLRWSD BOUNDARY
11200PL20.DWG, 08-31-11
WELCH-COMER
ENGINEERS | SURVEYORS
H.L.R.W.S.D
SYSTEM OVERVIEW

3.2. EXISTING ENVIRONMENTAL CONDITIONS

The following sections address the known environmental issues that will need to be addressed in the planning and design stages of recommended improvements.

3.2.1. PHYSIOGRAPHY, TOPOGRAPHY, GEOLOGY, AND SOILS

The HLRWSD includes the City of Hayden Lake which is located east of Hayden, Idaho. To the east is Kootenai County lands (Idaho Panhandle National Forest) and to the south is the city of Dalton Gardens. Refer to Appendix A for more information. In addition, the City of Hayden Lake Area of Impact is included in Appendix A. The District boundary surrounds the full perimeter of Hayden Lake, as well as the entirety of Avondale Lake. Specifically, the District is located in portions of Sections 3, 4, 6, 7, 8, 9, 10, 11, 13, 14, 15, 16, 17, 19, 20, 21, 22, 23, 34 Township 51 North, Range 3 West, Boise Meridian.

The HLRWSD's topography was acquired through the Environmental Systems Research Institute, Inc. (ESRI). They provide "USA Topographical Maps" in a variety of scales across the United States. As can be seen in Appendix C, the terrain is generally very steep and hilly in the eastern portions of the District while the western portions are generally flatter with the exception of the area around Avondale Lake.

The aerial map was also acquired through ESRI. The aerial information was provided for Kootenai County. The accuracy depends on the openness of terrain but is generally assumed to be within approximately 1 foot of actual elevation. The HLRWSD Aerial Map, located in Appendix C, shows the surrounding roadways, existing buildings, and the two lakes, Hayden and Avondale.

The Geologic Map of Coeur d'Alene, Idaho Quadrangle (Lewis et. al, 2002) was consulted to determine the geologic information for the area surrounding the District. This map can be found in Appendix C. In addition, Appendix C provides an enlarged version of the above map for the area surrounding the District as well as two Surficial Geologic maps that together capture more specific geologic information for the District. The types of rock present are:

- Holocene Deposits – Alluvial Deposits (Holocene), Lacustrine Sediments and Alluvium (Holocene), Fluvial Gravel (Pleistocene and Holocene)
- Catastrophic Flood Deposits and Reworked Outwash – Gravel of Hayden Lake (Pleistocene)
- Older Sediments – Sediment (Miocene)
- Columbia River Basalt Group, Wanapum Formation – Priest Rapids Member (Miocene)
- Columbia River Basalt Group, Grande Ronde Formation – Grande Ronde N_2 magnetostratigraphic unit (Miocene)
- Intrusive Rocks – Biotite Granodiorite (Cretaceous)
- Belt Supergroup – Burke Formation (Middle Proterozoic)

Detailed description of these deposits, sediments, basalt and bedrock can be found in Appendix C on the geological map. There are two high-angle faults in the southern portion of the District. In addition, there are a few instances of "strike and dip of compositional layering interpreted as bedding" in the southern portion of the District. However, the associated description of the map does not identify major faults in this area.

The National Resources Conservation Service (NRCS) database was consulted to determine the soil information for the Hayden Lake Recreational Water and Sewer District. There is a portion surrounding Hayden Lake that does not have soil information through the NRCS since it is part of the Idaho Panhandle National Forest. From the information available, the District is comprised of many different soils. A soils map of the area and description of the soils comprising this area can be found in Appendix C.

3.2.2. Surface and Ground Water Hydrology

The primary surface water bodies within the District are Avondale Lake and Hayden Lake. Both of the lakes are fed by small tributaries and discharge to the Spokane Valley-Rathdrum Prairie Aquifer. Avondale Lake is of good quality. Hayden Lake currently has a TMDL (Total Maximum Daily Load, established by the EPA) for total phosphorus. The phosphorus originates from Hayden Creek, Mokins Creek, and other tributaries, atmospheric fallout, residential storm water, and shoreline septic systems (not within the District service area). For more information on the Hayden Lake TMDL, see Appendix C.

The Spokane Valley-Rathdrum Prairie Aquifer underlies the western portion of the District, and the District is within the source area for the Aquifer, as can be seen in the map of the Aquifer in Appendix C. The Aquifer is classified as a "Sole Source Aquifer" by the US Environmental Protection Agency. A sole source aquifer classification indicates that the aquifer supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer. This aquifer is the sole source of drinking water for the majority of residents within the District and makes the protection of the source very important.

Both Hayden Lake and Avondale Lake recharge the Spokane Valley-Rathdrum Prairie Aquifer. Hayden Lake's discharge is the major contributor to the recharge flows in the aquifer. Area lakes contribute about 20 percent of the inflow into the Aquifer. Hayden Lake's inflow constitutes the largest inflow from area lakes (62 cubic feet per second), contributing approximately 22 percent of the overall inflow from area lakes, which is considerable relative to Hayden Lake's size.

3.2.3. Fauna, Flora, and Natural Communities

The Idaho Fish and Wildlife Office was consulted to determine the threatened and endangered plant and animal species in Kootenai County. A list from the Office can be found in Appendix C. According to this agency's database, there are no endangered species within the county. Threatened species include the following: Canada Lynx, Bull Trout, Spalding's Catchfly, and Water Howellia. Candidate species include the following: Yellow-billed Cuckoo and Wolverine. In addition, critical habitat

has been identified in the Columbia River Basin for the protection of Bull Trout.

3.2.4. HOUSING, INDUSTRIAL, AND COMMERCIAL DEVELOPMENT

The areas within the District are zoned primarily as residential areas. The residential areas within the District are comprised of single-family residential parcels. In addition, there are a few areas that are considered part of an "overlay district" zone within the Hayden Lake city limits that consists of country club facilities, professional offices, and restaurants. Table 3-1 provides a summary of the commercial properties within the District:

Table 3-1: Commercial Uses in HLRWSD

Name	No. of Properties
Country Club	2
Restaurant	2
Marina	1
Assisted Living	3
Beach Facility	1
Professional Offices	2
Bed and Breakfast	1

3.2.5. CULTURAL RESOURCES (HISTORICAL AND ARCHAEOLOGICAL)

A search of the Idaho sites listed on National Register of Historic Places, provided in Appendix C, shows the historic sites located in the Hayden Lake area and Kootenai County. There are two historic properties within the District SMA and two others within the District boundary. John A. Finch Caretaker's House is located near the Hayden Lake Country Club and the Clark House is located on Hayden Lake Road; both are within the current SMA. The Jacob and Cristina Thunborg House and the East Hayden Lake School II are on the other side of Hayden Lake near Chicken Point; both are within the District boundary. Appendix C contains a map with the location of these four properties. The closest Tribal Land is the Coeur d'Alene Indian Reservation. However, the District is not located within this property.

3.2.6. UTILITY USE

The utilities used by the District include power, phone for auto-dialers, and natural gas. The power supply to the system is single- and three-phase and is supplied by Avista Utilities. The dialer alarm system installed in the lift stations is supplied by a land-line phone through Frontier Communications, and the natural gas for the generators is supplied by Avista Utilities.

3.2.7. FLOODPLAINS AND WETLANDS

The Federal Emergency Management Agency (FEMA) Map Service Center was consulted to determine the floodplain information for the HLRWSD. There are portions

of the District that are within the floodplain area, including the two lakes, Hayden and Avondale. A map of the floodplain area can be found in Appendix C.

The US Fish and Wildlife Service wetlands mapper was consulted to determine wetland information for the District and the area surrounding the District. Hayden Lake and Avondale Lake, located within the District are classified as wetlands in addition to several other areas surrounding the lakes. A map of the area can be found in Appendix C.

3.2.8. WILD AND SCENIC RIVERS

The nearest river to Hayden Lake is the Spokane River, which is not designated as "Wild and Scenic." The National Wild and Scenic Rivers database was consulted to determine the above information. A nationwide map of the area can be found in Appendix C.

3.2.9. EXISTING DRINKING WATER SYSTEM IN PROPOSED PROJECT AREA

A large portion of the residential and commercial areas served by the HLRWSD are supplied domestic water from a water distribution system owned and operated by the North Kootenai Water District. The NKWD serves more than 4,000 connections within their system. There are three service areas that NKWD operates that serve areas within the HLRWSD: Rimrock, Hillside, and Honeysuckle Hills. Each of these areas is served by wells drawing from the Spokane Valley-Rathdrum Prairie Aquifer. The other portion of the sewer District inside the City Limits is served by the City of Hayden Lake's water distribution system.

3.2.10. PUBLIC HEALTH CONCERNS

The recommended improvements to the HLRWSD collection system and lift stations will provide a much better protection against sewer spills and leaks which could potentially pose a serious public health and environmental hazard, should a failure occur.

3.2.11. IMPORTANT FARMLANDS PROTECTION

Prime agricultural classification is provided as part of the USDA Soil Survey conducted for the soil information in Section 4.2.1. According to the Soil Survey, "farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland. It identifies the location and extent of the soils that are best suited to food, feed, fiber, forage, and oilseed crops." There are soils listed as prime farmland if irrigated. The areas that show this classification are primarily on golf courses, which are irrigated. A map of the USDA Soil Survey information for the District is provided in Appendix C.

3.2.12. PROXIMITY TO SOLE SOURCE AQUIFER

As mentioned in Section 4.2.2, the District is within the aquifer area and the source area for the Spokane Valley-Rathdrum Prairie Aquifer. This aquifer is classified as a "Sole Source Aquifer" by the US Environmental Protection Agency. The District

area is served by domestic water supplies which draw water from wells located over this Aquifer.

3.2.13. LAND USE AND DEVELOPMENT

The HLRWSD encompasses land use classifications from several entities. The City of Hayden Lake, City of Hayden, and Kootenai County together comprise the land use classifications for the District. The land area within the District is mainly comprised of urban/residential and rural residential. See Appendix C for land use maps from the three agencies.

3.2.14. PRECIPITATION, TEMPERATURE, AND PREVAILING WINDS

The following climate information for the Hayden Lake area was obtained from The Weather Channel:

- Average Annual Temperature High – 58° F
- Average Annual Temperature Low – 39° F
- Average Annual Precipitation – 25.8 inches
- Average Annual Snow Fall – 32.5 inches[1]

The prevailing wind in the area is North, Northeast, according to the Western Regional Climate Center.

3.2.15. AIR QUALITY AND NOISE

The State of Idaho has been delegated authority to regulate air quality through the EPA and the Clean Air Act. The State Implementation Plan provides the rules and regulation to maintain acceptable air quality standards within the state and site specific plans delineating areas that do not meet air quality standards. Areas that do not meet specific air quality standards are known as Nonattainment Areas. A map showing Nonattainment Areas and Areas of Concern for the State of Idaho is provided in Appendix C. The project is not located in any of the nonattainment areas or areas of concern.

Noise from the collection system only occurs when alarms activate for the lift stations. A high-pitched alarm sounds when certain conditions occur within the lift station. Residents have been bothered by this in the past, but it is the secondary notification for the District since the autodialers call the operator and/or District directly should alarms be activated.

3.2.16. ENERGY PRODUCTION AND CONSUMPTION

Replacing the aged components with new, energy efficient components has the potential of decreasing the current energy consumption by improving efficiency. Depending on the alternative selected, new components may be implemented or the old, aged components may be replaced to improve energy efficiency.

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[1] Average annual snow fall for Hayden Lake Recreational Water and Sewer District (Coeur d'Alene Station) was obtained from NOAA

3.2.17. SOCIOECONOMIC PROFILE

Although no social-economic data is available specifically for this project planning area, the US Census Bureau reports that 13.8 percent of the population in Kootenai County is below the poverty level, and the median household income in 2009 was reported as $47,196.

Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. The District will seek the input of all persons within the impact area. All members of the community will be treated the same and have equal access to the District's public services and decision-making process.

3.3. EXISTING COLLECTION AND TREATMENT FACILITIES

3.3.1. TREATMENT FACILITY DESCRIPTION, CONDITION, AND OPERATION AND MAINTENANCE CONSIDERATION

The HLRWSD collection system discharges into the Hayden Area Regional Sewer Board (HARSB) treatment facility through the H-1D lift station. All of the District's wastewater is treated at this facility. Wastewater from the City of Hayden and the Kootenai County Airport is also treated at this facility; therefore, this facility is considered a "regional" facility.

At the time of this report, the treatment facility has a capacity of 2.0 million gallons per day (mgd) and treats residential, commercial, and industrial sources to a standard that allows discharge to the Spokane River (south of the facility) or to land application for "reuse". The treatment consists of primary treatment (influent screening, grit removal, odor control, and influent flow measurement), secondary treatment (oxidation ditches, secondary clarification, RAS, and WAS pumping), disinfection and discharge (effluent flow measurement, chlorination, dechlorination, and discharge to Spokane River or reuse), and biosolids stabilization and dewatering (aerated sludge holding tank, sludge dewatering disposal).

The treatment facility has a detailed operation and maintenance manual (JUB Engineers, 2009) including manuals for the individual components of the system. The manual outlines daily, weekly, monthly, and long-term maintenance activities. Refer to the manual for more detail on these activities. In addition, the manual outlines the laboratory monitoring, sampling, and record keeping that is required for the treatment facility. These activities are used to ensure the facility is in permit compliance and maintain operational control. Lastly, the emergency operations were outlined, specifically electrical power failure, natural disasters, and man-made disasters.

HARSB Treatment Facility

3.3.2. SEWER SYSTEM DESCRIPTION, CONDITION, AND OPERATION AND MAINTENANCE CONSIDERATIONS

The HLRWSD sewer system is mainly comprised of PVC gravity and pressure collection lines. Table 3-2 provides a summary of the pipelines in the HLRWSD system.

Table 3-2: Pipeline Information for HLRWSD

Size	PVC Gravity (ft)	PVC Pressure (ft)	HDPE (ft)
2		5,978	
2.5		2,950	
3		22,736	
4	12,434	25,164	
6		29,434	2,895
8	86,807		
10	5,190		
12	1,476	1,464	
Total	105,907 ft	116,836 ft	2,895 ft
	(20 miles)	(22 miles)	(0.5 miles)

The system also includes 17 duplex pump lift stations located throughout the existing service area. Figure 3-3 is a schematic that shows the way in which each lift station's flow contributes to the other lift stations within the system. The lift station H-1D collects the flow from each lift station and transmits it to the treatment facility. Therefore, all lift stations' sewage eventually flows into H-1D lift station. As can be seen, there are a few lift stations that have several lift stations' sewage contributing to them in series.

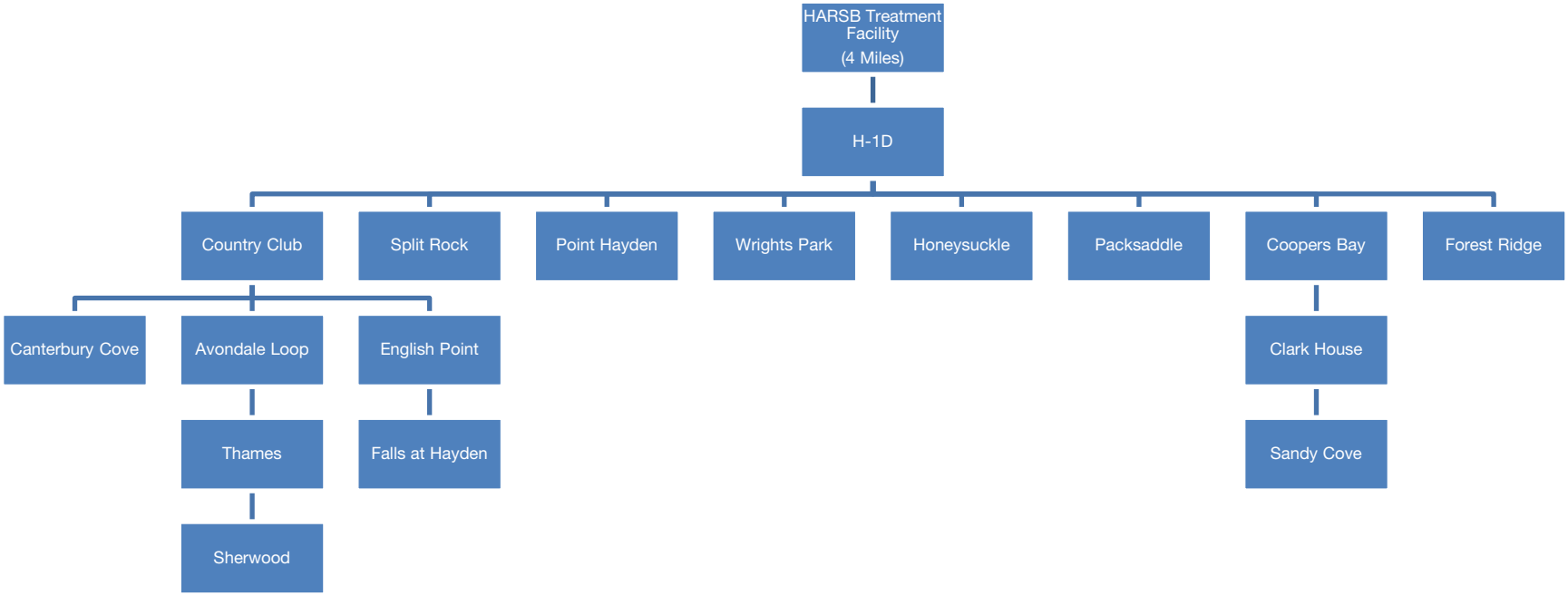


Figure 3-3: Lift Station Schematic

Table 3-3 is a list of the current lift stations with approximate flow information. The percentage of District flow accounts for the parcels that discharge to the listed lift station. The Approximate Flow with Upstream Lift Stations accounts for the parcels discharging to the listed lift station and the upstream lift stations that flow to the listed lift station.

Table 3-3: Lift Station Summary

Lift Station	Contributing ERs[2]	Commercial ERs	Approximate Percentage of District Flow	Approximate Percentage of District Flow with Upstream Lift Stations
Avondale	56		2.9	-
Canterbury Cove	15		0.8	-
Clark House	32		1.7	-
Coopers Bay	177	8.6	9.7	12.6
Country Club	354	19.9	19.6	31.9
English Point	2		0.1	-
Falls at Hayden	3		0.2	-
Forest Ridge	6		0.3	0.3
H1D	810	1	42.4	42.4
Honeysuckle Beach	29	0	1.5	1.5
Packsaddle	53		2.8	2.8
Point Hayden	74		3.9	3.9
Sandy Cove	23		1.2	-
Sherwood	58		3.0	-
Split Rock	39		2.0	2.0
Thames	98	2.5	5.3	-
Wrights Park	50		2.6	2.6
Total	1879	31	100	100
TOTAL	***1910***			

3.3.2.1. SEWER COLLECTION CONDITION

The operator of the system conducted an extensive analysis of his observations of the needs within the system in terms of service upgrades, ARI valve replacement, sags, observed infiltration and inflow, root issues, and miscellaneous other issues. The results of TV Video inspection of the sewer system were included in this analysis. The complete analysis can be found in Appendix D, and Table 3-4 which gives a summary of the analysis.

[2] The term "equivalent residence" or ER will be used throughout this document as the common denominator for projecting future sewer flows or comparing flows on an equal basis. An ER is equivalent to the amount of wastewater produced by the average single-family detached housing unit within a sewer system.

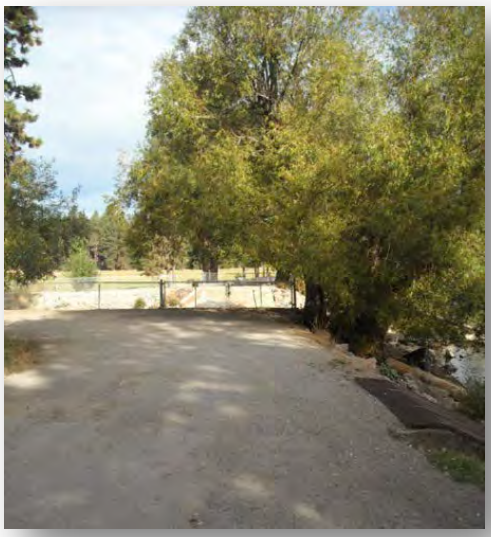
Table 3-4: Operator Analysis of TV Inspection Results

	Number of Observations
Service Upgrades	157
Air Release Valve Replacement	6
Line Sags	18
Infiltration and Inflow	22
Root Issues	4
Miscellaneous	9

The air release valve replacement involves eliminating, replacing, or searching for and replacing. Out of the 18 line sag observations, 13 are severe (nearly 75%). The miscellaneous issues include cracks, joint separation, mystery pipes, hydrogen sulfide (H_2S) issues, and grease accumulation.

3.3.2.1.1. HAYDEN LAKE DAM FORCE MAIN

In 1984, a sewage force main was installed as part of the Cooper's Bay Development that runs along the centerline of the Hayden Lake Dam on the west side of Hayden Lake. This 8-inch Class 160 sewage line connects the flows from Packsaddle, Cooper's Bay, Clark House, and Sandy Cove to the H-1D station to be delivered to the treatment facility. If the dam along the west end of Hayden Lake were to fail during flood stage, the sewage line would be at risk for failure as well. If a major sewage spill occurred, severe public health issues would result. The dam is classified by the Idaho Department of Water Resources as a Significant Hazard structure. This indicates that the consequences to downstream property would be significant in the event of failure and sudden release of water.



Hayden Lake Dam, facing North

Due to the high lake levels in spring of 2011, the U.S. Army Corps of Engineers (USACE) performed emergency construction of a downstream rock buttress to fortify the dam. It was successful in helping to reduce the threat of breach caused by the high water levels and the accompanying wave erosion of the existing dam (J. Falk, personal communication, August 29, 2011).

In the spring of 2011, the District installed a pump-around bypass facility which provides the ability to divert the flow from this sewage line around the dam. The bypass details and overview can be found in Appendix A. As the result of the extensive structural improvements made by USACE to the Hayden Lake dam in 2011, it is not deemed necessary to re-route the existing pressure sewer line which is presently in the earthen dam structure.

3.3.2.2. LIFT STATION CONDITION

An inspection of each of the lift stations was completed as part of this facilities plan. The following sections describe the lift station along with the structural, mechanical, and electrical condition of each of the lift stations. In addition, a discussion of the site and access issues is provided for each lift station. Refer to Appendix D for further information on the operator's notes on the condition of the lift stations, in addition to photos for each lift station.

3.3.2.2.1. AVONDALE LOOP LIFT STATION

The Avondale lift station was constructed in 1987; it is a 9 foot diameter steel lift station. Currently, there are two 7.5 HP Barnes pumps that were installed in 2010 in the lift station; there is one spare pump for this lift station. The station has two sewer lines entering the station, which may require complicated pump-around to rehabilitate or replace the station. The lift station was updated in 2010 with the addition of a generator and "smart panel" (Multi-Smart pump station manager hardware); it was upgraded in 2003 with new lids.

Avondale Loop Lift Station

The overall condition of the lift station is good. The structural condition of the steel is sufficient, but it does require new coatings to replace the coal tar epoxy coating which was installed over the steel. The piping, rails, and chains are in poor condition and should be replaced. The electrical and telemetry components were upgraded to include a "smart panel", which utilizes a probe instead of floats (eliminating the need to replace floats). The telemetry system is not yet complete since there is no radio installed to communicate with the District or HARSB. However, the auto-dialer is still in operation. The station has a standby generator that was recently installed.

The room for maintenance at the lift station is poor, since there is only parking for one vehicle parking. The lids should be replaced to increase the safety for the operators by installing a grid to prevent an accidental fall into the station. Lastly, any improvements to this lift station may require easements since the station is located in a residential area.

3.3.2.2.2. CANTERBURY COVE LIFT STATION

The Canterbury Cove lift station was constructed in 1984 by a private developer; it is a 6 foot diameter concrete lift station located only 40 feet from Avondale Lake. Currently, there are two 7.5 HP Barnes pumps that were installed in 2011 and 2007 in the lift station; there is not a spare pump for this lift station. The station has two sewer lines entering the station, which may require complicated pump-around to rehabilitate

Canterbury Cove Lift Station

or replace the station. This lift station was upgraded in 2006 with new lids and in 2004 with new rails.

The overall condition of the lift station is very poor. The structural condition is good. The piping, rails, and chains are in fairly good condition; the piping is in poor condition. The floats are also in good condition. The electrical panel is an older model that includes relays, and the operator has recommended that the door be relocated for the electrical panel. The communication method is through dialers, as with all the lift stations. There is a generator located at a distance from the lift station.

The access to this lift station is very poor. The lift station is located at the bottom of a steep hillside, close to Avondale Lake. The generator is located at a cul-de-sac at the top of the hillside. The lift station is also located adjacent to lake front properties, and the operators utilize an easement roadway through these properties' lake front to access the lift station for repairs and maintenance. Thus, the access to this lift station during the winter or wet weather can be very hazardous for the operators. Again, the lids should be replaced to increase safety for the operators by installing a grid to prevent an accidental fall into the station. The District's operators have recommended that this lift station be relocated to the roadway above in order to improve access and maintenance.

3.3.2.2.3. CLARK HOUSE LIFT STATION

The Clark House lift station was constructed in 1987; it is a 9 foot diameter steel lift station. Currently, there are two 7.5 HP Hydromatic pumps that were installed in 2008 in the lift station; there is one spare pump for this lift station. The station has one sewer line, from a manhole, entering the station. The lift station was upgraded in 1996 with new lids and in 2007 with new rails.

Clark House Lift Station

The overall condition of the lift station is fair. The structural condition of the steel is good and the tar epoxy coating on the interior of the lift station is in good condition. The rails and chains are stainless steel and are in good condition; the piping is ductile iron and in good condition; the floats are also in good condition. It was noticed that significant corrosion was occurring in the lift station interior. The electrical panel is an older model that includes relays, and the operator has recommended that the panel be relocated as it is currently located below grade and below the lid of the lift station. The communication method is through dialers, as with all the lift stations; additionally, the beacon light is not working currently. There is not a standby

generator for this lift station, although there is a pig-tail connection for use by the HARSB portable generator.

The access to this lift station is poor. There is often not enough parking room for the maintenance of the lift station, and the panel is located down a stair case from the lift station lids which can be hazardous in the winter. There is also little room for expansion or installation of a generator near the lift station. Again, the lids should be replaced to increase safety for the operators by installing a grid to prevent an accidental fall into the station.

3.3.2.2.4. COOPERS BAY LIFT STATION

The Coopers Bay lift station was constructed in 1985 by a private developer; it is a 6.5 foot diameter steel lift station located 140 feet from Hayden Lake. Currently, there are two 7.5 HP Barnes pumps that were installed in 2009 in the lift station; there is one spare pump for this lift station. The station has one sewer line, from a manhole, entering the station. The lift station was rehabilitated in 2009 with a new liner and rails; it was upgraded in 2003 with a new lid.

Coopers Bay Lift Station

The overall condition of the lift station is good since it has been recently rehabilitated. The structural condition of the concrete is good and the "spray rock" coating on the interior and the tar epoxy coating on the exterior is in good condition. The rails and chains are stainless steel and are in good condition; the piping is new ductile iron and in good condition. The floats are also new and in good condition. The electrical panel is an older model that includes relays, and the operator has recommended that the panel be relocated so that it is not directly above the lids for the lift station, which is hazardous for the operators. The communication method is through dialers, as with all the lift stations. There is a standby generator for this lift station.

The access to this lift station is good. The lids should be modified to increase safety for the operators by installing a grid to prevent an accidental fall into the station.

3.3.2.2.5. COUNTRY CLUB LIFT STATION

The Country Club lift station was constructed in 1987; it is a 16 foot by 15 foot (240 square feet) rectangular lift station located 110 feet from the shoreline of Hayden Lake. Currently, there are two 10 HP Hydromatic pumps that were installed in 2006 in the lift station; there are two spare pumps for this lift station. The station has one sewer line entering the station. The lift station was upgraded in 2006 with new lids. This lift station is crucial to the operation of rest of the system and must be in good condition to prevent a catastrophic spill into Hayden Lake.

The overall condition of the lift station is fair. The structural condition of the concrete is fairly good with minor hairline cracking. The rails are old galvanized steel and the chains are stainless steel. The piping is ductile iron that is in poor shape; additionally, the check valves are old and would cause failure at the station if these valves were to fail. The floats are in good condition as well. The electrical panel is an older model that includes relays, and the panel is in a good location, away from the lids of the station. The communication method is through dialers, as with all the lift stations. There is a standby generator for this lift station.

Country Club Lift Station

The access to this lift station is fairly good. The road to the lift station is steep and is difficult in the winter. The lids should be modified to increase safety for the operators by installing a grid to prevent an accidental fall into the station.

3.3.2.2.6. English Point Lift Station

English Point Lift Station

The English Point lift station was constructed in 2010; it is an 8 foot diameter concrete lift station with a 6 foot diameter valve vault. Currently, there are two 23 HP Flygt pumps that were installed in 2010 in the lift station; there is one spare pump for this lift station which is also shared with Falls at Hayden. The station has one sewer line entering the station. The overall condition of this lift station is excellent since it is newly constructed. The spray rock coating is in excellent condition along with the rails, chains, and piping. The electrical panel is a PLC (programmable logic controls) with communication via dialers. There is a standby generator for this lift station. The access to the lift station is good. The lids should be modified to increase safety for the operators by installing a grid to prevent an accidental fall into the station.

3.3.2.2.7. The Falls at Hayden Lift Station

The Falls at Hayden lift station was constructed in 2010; it is an 8 foot diameter concrete lift station with a 6 foot diameter valve vault. Currently, there are two 23 HP Flygt pumps that were installed in 2010 in the lift station; there is one spare pump for this lift station (shared with English Point). The station

Falls at Hayden Lift Station

has two sewer lines entering the station. The overall condition of this lift station is excellent since it is newly constructed. The spray rock coating is in excellent condition along with the rails, chains, and piping. The electrical panel is a “smart panel” with communication via dialers. There is a standby generator for this lift station. The access to the lift station is good. The lids should be modified to increase safety for the operators by installing a grid to prevent an accidental fall into the station.

3.3.2.2.8. FOREST RIDGE LIFT STATION

Forest Ridge Lift Station

The Forest Ridge lift station was constructed in 2008; it is an 8 foot diameter concrete lift station with a 6 foot diameter valve fault. Currently, there are two 3 HP Hydromatic pumps that were installed in 2008; currently, there is not a spare pump for this lift station. The station has one sewer line entering the station. The overall condition of this lift station is good since it is recently constructed. The electrical panel is a PLC with communication via dialers. There is a standby generator for this lift station. The access to the lift station is good. The lids should be modified to increase safety for the operators by installing a grid to prevent an accidental fall into the station.

3.3.2.2.9. H-1D LIFT STATION

The H-1D lift station was constructed in 1999; it is a 71 foot by 30 foot (2130 square feet) concrete rectangular lift station with an overflow basin/wet well configuration. Currently, there are two 60 HP Gorman-Rupp suction lift pumps that were installed in 1999 in the lift station; there is not a spare pump or motor for this lift station. The station has one sewer line entering the station. The lift station has not been upgraded recently. This lift station receives the flow from all the other lift stations within the District and pumps it four miles to the HARSB treatment facilities.

H-1D Lift Station

The overall condition of the lift station is good. The structural condition of the concrete is good. The piping is ductile iron epoxy coated and the pressure switch is used instead of floats. Gate valves which isolate the pumps are currently being replaced. The electrical panel is a PLC and it is in a good location. The communication method is through dialers. There is a standby generator for this lift station. The access to the lift station is very good.

3.3.2.2.10. HONEYSUCKLE BEACH LIFT STATION

Honeysuckle Beach Lift Station

The Honeysuckle Beach lift station was constructed in 1987; it is a 9 foot diameter steel lift station and is located 240 feet from Hayden Lake. Currently, there are two 3 HP Barnes pumps that were installed in 2000 and 2007; there are two spare pumps for this lift station. The station has two sewer lines entering the station, one from a restroom facility and another from the rest of the service area. The lift station was upgraded in 2000 with new lids.

The overall condition of this lift station is poor. The structural condition of the steel is fair; there is evidence of rust on the epoxy coating. The rails and chains are old stainless steel and are rusting; the piping is ductile iron, and the floats are in fair condition. The station has a great deal of ragging due to the public restroom facility, which can cause maintenance issues with the pumps. The electrical panel is an older model that includes relays, and the panel needs to be relocated since it is directly over the lids for the station, which is hazardous for the operators. The communication method is through dialers, as with all the lift stations. There is not a standby generator for this lift station, but it is a low-flow station and does not require a generator immediately. The station has a pig-tail connector for use by the HARSB portable generator.

The access to this lift station is fairly good, since it is located in the parking lot for the beach. However, the area around the lift station is gravel, and the operator has suggested paving around the lift station. The lids should be replaced to increase safety for the operators by installing a grid to prevent an accidental fall into the station.

3.3.2.2.11. PACKSADDLE LIFT STATION

The Packsaddle lift station was constructed in 1981 by a private developer; it is a septic tank/pump station configuration, with a 2 foot diameter concrete lift station. Currently, there are two 0.5 HP Hydromatic pumps that were installed in 2002; there is one spare pump for this lift station. The station has one line entering the station from the septic tank facility. The lift station was upgraded in 1999 with new lids, rails, and electrical panel.

Packsaddle Lift Station

The overall condition of this lift station is very poor. The structural condition of the concrete is fair. The discharge piping is PVC and the rails and chains are essentially replaced with PVC pipe/rope due to the septic tank configuration. The station is operating in a siphon fashion and the solids build-up from

the septic tank is a major maintenance issue. The electrical panel is an older model that includes relays, and the panel needs to be relocated since it is directly over the lids for the station, which is hazardous for the operators. The communication method is through dialers, as with all the lift stations. There is not a standby generator for this lift station.

The access to the lift station is good since it is located on a large parcel. The lids should be replaced to increase safety for the operators by installing a grid to prevent an accidental fall into the station.

3.3.2.2.12. POINT HAYDEN LIFT STATION

Point Hayden Lift Station

The Point Hayden lift station was constructed in 1982 by a private developer; it is a 5 foot diameter steel lift station with a fiberglass slip-liner that was installed in the 1990s. Currently, there are two 5 HP Barnes pumps that were installed in 2010; there is not a spare pump for this lift station. The station has two septic effluent sewer lines entering the station. The lift station was slip-lined in the 1990s, and it was also upgraded in 1996 and 2007 with new lids and rails, respectively.

The overall condition of the lift station is poor. The structural condition of the steel was improved with the fiberglass slip-liner. The chains are stainless steel, and there are no rails since it is pitless. The discharge piping is PVC and is in poor condition; specifically, the ball check valves are in poor condition. Since the fiberglass was installed, the storage capacity of the lift station has been reduced. The electrical panel is an older model with relays, and the panel needs to be relocated since it is directly over the lids for the station, which is hazardous for the operators. The communication method is through dialers, as with all the lift stations. There is a standby generator for this lift station.

The access to the lift station is poor since there is no parking at the lift station, and it is located on a narrow street. The lids should be replaced to increase the safety for the operators by installing a grid to prevent an accidental fall into the station.

3.3.2.2.13. SANDY COVE LIFT STATION

The Sandy Cove lift station was constructed in 1987; it is a 9 foot diameter steel lift station. Currently, there are two 5 HP Hydromatic pumps that were installed in 2006 and 2010; there is no spare pump for this lift station. The station has two sewer lines entering the station. The lift station was upgraded in 2003 with new lids.

Sandy Cove Lift Station

The overall condition of the lift station is very poor. The structural condition of the steel is good, and it is coated with coal tar epoxy on the interior. The chains are stainless steel and in good condition; the rails are galvanized steel and in good condition. The piping is ductile iron, galvanized steel, and PVC. In 2011, the welded steel flange inside the lift station rusted out and was temporarily repaired. However, this is only temporary and requires a permanent repair. The floats are in good condition as well. The electrical panel is an older model with relays, and the panel needs to be relocated since it is directly over the lids for the station, which is hazardous for the operators. One of the pumps indicator lights is out as well. The communication method is through dialers, as with all the lift stations. There is no standby generator for this lift station.

The access to this lift station is very poor and hazardous, particularly in the winter. There is no off-street parking for maintenance and the existing access road is steep, which makes this hazardous for operators and maintenance vehicles. This is also the most difficult station to pull pumps from for maintenance and repair. The lids should be replaced to increase the safety for the operators by installing a grid to prevent an accidental fall into the station.

3.3.2.2.14. SHERWOOD COURT LIFT STATION

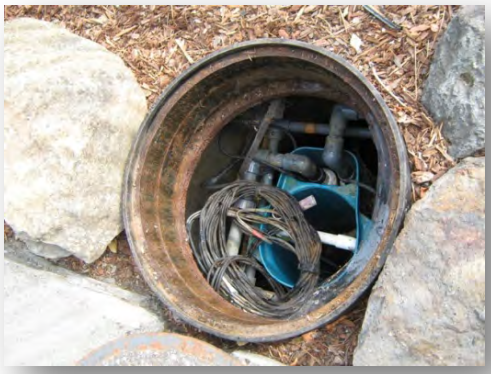
Sherwood Court Lift Station

The Sherwood Court lift station was constructed in 1987; it is a 9 foot diameter steel lift station. Currently, there are two 2 HP Hydromatic pumps that were installed in 2003 and 2005; there are two spare pumps for this lift station. The station has one sewer line, from a manhole, entering the station. The lift station was upgraded with new lids in 1996 and new rails in 2009.

The overall condition of the lift station is fair. The structural condition of the steel is good, and it is coated with coal tar epoxy on the interior. The chains and rails are stainless steel and in fair condition. The piping is ductile iron, and the floats are in good condition. It was observed that portions of the interior are rusting within the lift station. The electrical panel is an older model with relays, and the panel needs to be relocated since it is directly over the lids for the station, which is hazardous for the operators. The communication method is through dialers, as with all the lift stations. There is no standby generator for this lift station, and there is not much room for generator without acquiring easements. The station has a pig-tail connector for use by the HARSB portable generator.

The access to this lift station is fair since it is located on a low-volume, low-speed Street. The lids should be replaced to increase the safety for the operators by installing a grid to prevent an accidental fall into the station.

3.3.2.2.15. SPLIT ROCK LIFT STATION



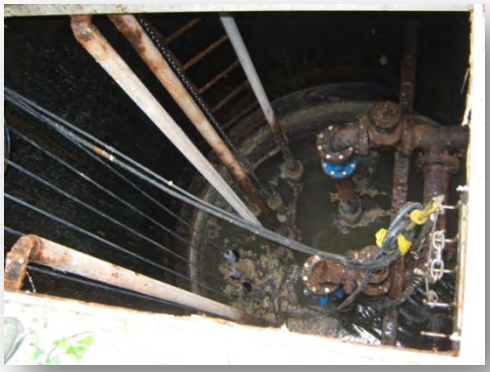
Split Rock Lift Station

The Split Rock lift station was constructed in 1990 by a private developer; it is a septic tank effluent/pump station configuration with a 2 foot diameter concrete lift station. Currently, there are two 1.5 HP Grundfos stainless steel well pumps that were installed in 2006; there is one spare pump for this lift station. The station employs ORENCO effluent screens to filter the effluent before being pumped by the well pumps.

The overall condition of the lift station is fair. The structural condition of the concrete is good. The discharge piping is PVC, and the floats are in good condition. The ORENCO effluent filtration system in the lift station requires routine maintenance, but at the time of this report, filter maintenance had not been performed recently. Also, to replace the current septic tank effluent configuration, a high head pump would be required due to site elevations. The electrical panel is an older model with relays, and the panel needs to be relocated since it is directly over the lids for the station, which is hazardous for the operators. The communication method is through dialers, as with all the lift stations. There is no standby generator for this lift station, and there is not much room for generator without acquiring easements. The station has a pig-tail connector for use by the HARSB portable generator.

The access to this lift station is poor since it is located on a steep driveway, and there is not much room to turn around maintenance vehicles. Lakes Highway District has allowed a private property owner to place improvements in the right-of-way which severely constrains the lift station access. The lids should be replaced to increase the safety for the operators by installing a grid to prevent an accidental fall into the station.

3.3.2.2.16. THAMES COURT LIFT STATION



Thames Court Lift Station

The Thames Court lift station was constructed in 1987; it is a 9 foot diameter steel lift station. Currently, there are two 3 HP Hydromatic pumps that were installed in 2007; there is 1 spare pump for this lift station. The station has one sewer line, from a manhole, entering the station. The lift station was upgraded in 1997 with new lids.

The overall condition of the lift station is very poor. The structural condition of the steel is poor; the coal tar epoxy liner is peeling, and the steel is badly rusting. The chains are stainless steel, and the rails are galvanized steel. The discharge piping is ductile iron, but the coating appears to be gone from the piping. The floats are new and thus in good condition. The electrical

panel is an older model with relays, and the panel needs to be relocated since it is directly over the lids for the station, which is hazardous for the operators. The communication method is through dialers, as with all the lift stations. There is a standby generator for this lift station.

The access to this lift station is poor since there is only parking for one car, and the lift station is located on the curve of a roadway impacting the safety for the operators and maintenance vehicles. The lids should be replaced to increase the safety for the operators by installing a grid to prevent an accidental fall into the station.

3.3.2.2.17. WRIGHTS PARK LIFT STATION

The Wrights Park lift station was constructed in 1987; it is a 9 foot diameter steel lift station. Currently, there are two 7.5 HP Hydromatic pumps; there is one spare pump for this lift station. The station has one sewer line, from a manhole, entering the station. The lift station was upgraded in 1996 with new lids and in 2009 with new rails.

Wrights Park Lift Station

The overall condition of the lift station is fair. The structural condition of the steel is poor, with lots of rust and grease at the water level; the steel is coated with coal tar epoxy. The chains and rails are stainless steel, and the rail holder is old. The piping is ductile iron, and the coating is flaking off and rusting. The floats are in fair condition. The electrical panel is an older model with relays. The panel needs to be relocated since it is directly over the lids for the station, which is hazardous for the operators, and the location of the panel is situated so that it is difficult for operators to maintain the station. The communication method is through dialers, as with all the lift stations. There is no standby generator for this lift station, and there is not much room for generator without acquiring easements. The station has a pig-tail connector for use by the HARSB portable generator.

The access to this lift station is good. The lids should be modified to increase the safety for the operators by installing a grid to prevent an accidental fall into the station.

3.3.2.2.18. CALL OUT ANALYSIS

In addition, the “call out” records maintained by the operators for each lift station were analyzed to determine which lift stations were generating the most maintenance calls, and of those calls, what the defects were. This analysis is also included for each lift station for the years 2007 to 2011. Table 3-5 and Table 3-6 show the analysis of call outs for each lift station.

Table 3-5: Call Out Analysis for Lift Stations

					Pump Issues					
Priority	Lift Station	Total Call Outs	Alarms - High Water	Call Out	Pull and De-Rag	Pump Repair	Pump Fail	Repair	Replace-ment	Other
1	Sandy Cove	44	5	16	2		8	5	2	6
2	Thames Court	28	2	11	9		5			1
3	Avondale	26	1	9	13		2			1
4	Point Hayden	23	3	17	1			1	1	
5	Clark House	9	2	5				2		
6	Sherwood Court	9	1	8						
7	Coopers Bay	8	2	6						
8	Honeysuckle	8	3	2	1				2	
9	H1D	7	3	4						
10	Canterbury Cove	6	1	5						
11	Country Club	5	1	4						
12	Wrights Park	5	1	4						
13	Split Rock	4	1	1					1	1
14	English Point	2				1	1			
15	Forest Ridge	2	2							
16	Falls at Hayden	1					1			
17	Packsaddle	0								

Notes: Priority based on number of callouts

Table 3-6: Call Out Analysis for Lift Stations (Percentages)

					Pump Issues					
Priority	Lift Stations	Total Call Outs	Alarms - High Water	Call Out	Pull and De-Rag	Pump Repair	Pump Fail	Repair	Replace-ment	Other
1	Sandy Cove	100%	11%	36%	5%	0%	18%	11%	5%	14%
2	Thames Court	100%	7%	39%	32%	0%	18%	0%	0%	4%
3	Avondale	100%	4%	35%	50%	0%	8%	0%	0%	4%
4	Point Hayden	100%	13%	74%	4%	0%	0%	4%	4%	0%
5	Clark House	100%	22%	56%	0%	0%	0%	22%	0%	0%
6	Sherwood Court	100%	11%	89%	0%	0%	0%	0%	0%	0%
7	Coopers Bay	100%	25%	75%	0%	0%	0%	0%	0%	0%
8	Honeysuckle	100%	38%	25%	13%	0%	0%	0%	25%	0%
9	H1D	100%	43%	57%	0%	0%	0%	0%	0%	0%
10	Canterbury Cove	100%	17%	83%	0%	0%	0%	0%	0%	0%
11	Country Club	100%	20%	80%	0%	0%	0%	0%	0%	0%
12	Wrights Park	100%	20%	80%	0%	0%	0%	0%	0%	0%
13	Split Rock	100%	25%	25%	0%	0%	0%	0%	25%	25%
14	English Point	100%	0%	0%	0%	50%	50%	0%	0%	0%
15	Forest Ridge	100%	100%	0%	0%	0%	0%	0%	0%	0%
16	Falls at Hayden	100%	0%	0%	0%	0%	100%	0%	0%	0%
17	Packsaddle	100%	-	-	-	-	-	-	-	-

Notes: Priority based on number of callouts

Appendix D also includes graphical representations of this information. From this analysis, several maintenance issues can be identified. Avondale, Point Hayden, Sandy Cove, and Thames Court have the highest number of call outs. Out of those call outs, the primary issues for each are:

- Avondale: Pull and De-Rag for pumps,
- Point Hayden: general Call Outs,
- Sandy Cove: variety of issues, (general Call Outs, Pump issues, Repair and Replacement, Other) and
- Thames Court: general Call Outs, Pull and De-Rag for pumps

Analyzing these call outs aids in the identification of lift stations that may take priority over others for capital improvements.

3.3.2.3. OPERATION AND MAINTENANCE

In terms of Operation and Maintenance, the District is in need of an updated O&M policy. The last O&M manual for the entire District was produced in June of 1988. This manual lists the responsibilities of the operator (routine operation, routine preventative maintenance, emergency service, records, and public relations), the procedures for operation and maintenance for the pipelines, lift stations, odor problems, and safety. In addition to this overall O&M manual, each lift station has its own individual manual. Currently, the District and HARSB operators utilize their own methods of operating and maintaining the system since the June 1988 manual is outdated. Therefore, the District needs an updated comprehensive O&M policy that can be used to maintain the system which incorporates the O&M considerations for the system as a whole, as well as the 17 lift stations.

3.3.3. EXISTING WASTEWATER FLOWS

Currently, the HLRWSD sewer system does not have any flow meters, except at the H-1D lift station. Weekly pump hour readings are recorded for each lift station. A consistent flow rate is difficult to correlate with the hour readings in order to provide a reliable flow measurement, because of the variability of the hour readings and inherent inaccuracies in using a “draw down” to calibrate pump flows. However, this was the best information available, so drawdown tests were conducted to determine the volume pumped during the hour readings. Multiplying the pump hour readings by the pump production determined by draw down information resulted in estimated total flow information. Obvious anomalies, such as long hours due to clogged pump or stuck check valve, have been removed from the data set for each lift station. Table 3-7 shows the estimated flows (peak and average) for each lift station. H-1D was evaluated separately since it has a flow meter and is the final lift station contributing to the HARSB treatment facility.

Table 3-7: Existing Wastewater Flows (January 2008-April 2011)[1]

Lift Station	Pump Flow (Duplex)[2] (gpm)	Pump Hours/Day Ratio[3]	Peak Flow (gpd)[4]	Date of Peak Flow	Average Flow (gpd)[5]	Average Flow Dry Season (gpd)[6]
Avondale	128.89	4.17	66,285	January-11	32,223	27,285
Canterbury Cove	127.78	0.24	5,111	March-09	1,831	1,812
Clark House	138.80	0.48	13,325	January-11	4,656	3,983
Coopers Bay	29.30	7.83	28,635	May-08	13,870	16,262
Country Club	299.22	6.00	230,827	January-11	112,513	99,534
English Point	510.50	0.04	2,188	January-11	1,262	N/A
Falls at Hayden	231.09	0.23	28,193	April-11	3,172	N/A
Forest Ridge	101.84	0.26	5,270	March-10	1,589	0
Honeysuckle Beach	128.89	0.32	7,733	July-08	2,323	3,252
Packsaddle	0	0.18	0	March-09	0	0
Point Hayden	116.28	3.16	63,788	March-10	22,210	19,293
Sandy Cove	69.40	0.97	19,491	July-08	4,371	4,083
Sherwood	138.80	1.65	18,441	January-11	13,796	12,657
Split Rock	13.19	2.57	4,618	March-09	2,056	1,770
Thames	158.63	2.90	78,522	March-10	27,959	24,408
Wrights Park	178.46	1.12	78,012	October-09	11,633	14,422

Notes:

1. Drawdown test results were used to derive lift station flows. The Pump Hours/Day ratio was multiplied by drawdown results to produce flows (gpd).
2. Pump flow for each lift station (in Duplex) was collected during a drawdown test. The values presented here used diameter and drawdown time to calculate flow rate for each pump. Lift stations operating in duplex indicate that pumps should alternate operation. The two pump flows (gpm) were averaged to calculate a total lift station pump flow.
3. Pump Hours/Day is the hours the pumps operate divided by the total days between readings.
4. Peak Flow = largest peak (daily)
5. Average Flow over the duration of record, shorter for some new lift stations (English Point, Falls at Hayden, Forest Ridge).
6. Average Flow Dry Season was estimated based on the lift station flows for May through September for weeks with no precipitation.

The estimated flow numbers above were compared to a previous study completed by Welch Comer & Associates, Inc. in 2004. The data derived in that study was based on similar data acquisition methods. The pump hours/day ratios were utilized to determine what percent change would be expected for each lift station. Table 3-8 shows the comparison between average and peak flows.

Table 3-8: Flow Comparison – 2004 and 2011

	2004	2011		2004	2011		2004	2011	
Lift Station	Pump Hours/Day Ratio	Pump Hours/Day Ratio	Percent Change in Pump Hours/Day Ratio	Peak Flow (gpd)	Peak Flow (gpd)	Percent Change in Peak Flow	Average Flow (gpd)	Average Flow (gpd)	Percent Change in Average Flow
Avondale	3.92	4.17	**6.2%**	64,260	66,285	**3%**	44,366	32,223	**-27%**
Canterbury Cove		0.24			5,111			1,831	
Clark House	0.78	0.48	**-38.0%**	18,857	13,325	**-29%**	10,301	4,656	**-55%**
Coopers Bay	10.56	7.83	**-25.8%**	159,600	28,635	**-82%**	60,165	13,870	**-77%**
Country Club	5.71	6.00	**5.1%**	249,429	230,827	**-7%**	166,220	112,513	**-32%**
English Point		0.04			2,188			1,262	
Falls at Hayden		0.23			28,193			3,172	
Forest Ridge		0.26			5,270			1,589	
Honeysuckle Beach	0.49	0.32	**-34.9%**	9,600	7,733	**-19%**	3,514	2,323	**-34%**
Packsaddle		0.18			0			0	
Point Hayden	2.86	3.16	**10.5%**	7,714	63,788	**727%**	5,141	22,210	**332%**
Sandy Cove	0.82	0.97	**18.6%**	10,140	19,491	**92%**	3,204	4,371	**36%**
Sherwood	1.49	1.65	**10.9%**	20,571	18,441	**-10%**	7,852	13,796	**76%**
Split Rock	4.23	2.57	**-39.2%**	20,160	4,618	**-77%**	8,116	2,056	**-75%**
Thames	2.54	2.90	**14.1%**	34,560	78,522	**127%**	23,070	27,959	**21%**
Wrights Park	0.62	1.12	**81.1%**	13,200	78,012	**491%**	8,163	11,633	**43%**

There were several stations with large differences between what changes in flow would be expected, versus what the data shows. Again, the pump hours can have errors, which could be driving these differences. In addition, the drawdown tests are inaccurate in many cases due to the flows available at the lift stations. However, since this information is the best available, it will be utilized for this report.

As indicated previously, H-1D was analyzed separately from the other 16 submersible duplex lift stations. The H-1D lift station better approximates the flow for the entire District since it is the final lift station through which all flow is processed before the HARSB treatment facility. The following statistics were generated from daily flow meter readings for the H-1D lift station. There are some anomalies due to potential recording errors; the flow meter was re-set on numerous occasions by the HARSB operators (the meter operates in a totalizing fashion much like a car odometer and should not be reset). The meter resetting can generate errors. As with the smaller lift stations, flow anomalies were evaluated and removed if found to be unreliable. However, it is uncertain the large peaks are real data points or a result of erroneous readings.

- Peak Flow = 1.595 MGD (million gallons per day)
- Date of Peak Flow = August 2010
- Average Flow = 0.313 MGD
- Average Flow Dry Season = 0.313 MGD

The estimates of Infiltration and Inflow (I&I) will be analyzed in a Section 3.3.6.

3.3.4. *WASTELOAD ALLOCATION AND NPDES PERMIT LIMITS*

The Hayden Area Regional Sewer treatment facility has a NPDES permit (ID-0026590), which gives authorization to the HARSB to discharge secondary treated wastewater to the Spokane River. HARSB also has a land application/reuse permit from the Idaho Department of Environmental Quality (LA-000109-03) for land disposal of treated secondary effluent.

The permit authorizes (with discharge points, effluent limitations, monitoring requirements and other conditions) discharge to the Spokane River and land application of biosolids to a specific area (Kootenai County, north of Interstate 90 and west of Interstate 95). The discharge permit is included in Appendix B for further information. There have not been any violations of the clean water act and the Idaho Water Quality Standards and Wastewater Treatment Requirements (IDAPA 58.01.02).

3.3.5. *SEWER USE AND USER CHARGE ORDINANCE*

The District currently has an ordinance (No. 89-2) which provides for the ownership, operation, and maintenance of the regional treatment facility and the local collector system servicing the district and for the "allocation of operation and maintenance expenses to users and for capitalization fees…and for hook-up requirements." This ordinance is provided in Appendix B. The ordinance sets up the fee structure in that operation and maintenance expense are paid by regular user fees, the capitalization and connection fees are paid by new properties for depreciation and long-term maintenance of the system.

3.3.6. *INFILTRATION AND INFLOW (I&I) CONDITIONS*

Infiltration is defined by Metcalf and Eddy's 4th Edition *Wastewater Engineering Treatment and Reuse* as "the amount of flow that can enter a collection system from groundwater or infiltration"; it can enter through defective pipes, pipe joints, connections, or manhole walls. Thus infiltration is usually directly proportional to groundwater levels and soil types. In general, infiltration can be identified as increased flows during high groundwater months.

Inflow is defined in Metcalf and Eddy's 4th Edition *Wastewater Engineering Treatment and Reuse* as flow that can cause "an almost immediate increase in flow rates in sanitary systems"; it can enter through storm drain connections (catch basins), roof leaders, foundation and basement drains, or through manhole covers. This inflow is usually directly proportional to precipitation and/or snowmelt.

The District is subject to both of these conditions, as are most sewer systems. Newer systems have fewer amounts of I&I than older systems. The District's sewer system is located within high groundwater areas and borders two lakes. The District carefully monitors new and existing connections to prevent and eliminate illegal roof drains and other stormwater connections onto the sewer system, in order to minimize inflow.

3.3.6.1. *PREVIOUS I&I STUDIES*

In March of 2004, the District authorized Welch Comer & Associates, Inc. to complete an analysis of infiltration and inflow for the existing collection system. As part

of the analysis, they:

- Reviewed lift station flow data to identify areas of potential infiltration and inflow
- Reviewed District sewer videotapes in areas of concern and analyzed for further study or remediation
- Visually evaluated flows in gravity manholes in areas of concern
- Evaluated District flows with respect to treatment plan flows
- Recommended areas for more detailed evaluations as part of a subsequent study

The analysis indicated that several of the HLRWSD lift stations appeared to be influenced by infiltration and inflow. These lift stations are located in the older part of the service area and include: Thames/Avondale, Clark House, and Coopers Bay. In the report, several suggestions were made:

- Segments of gravity sewer line upstream from these lift stations are likely places for further investigation, which may include video inspection, smoke testing, and flow observation between manholes.
- Hillside service area may have infiltration and inflow issues, due to the prevalence of high groundwater and soil conditions in this area.
- The District may consider placing a flow meter on the Loch Haven sewer line, which was installed in fall 2003 to separate the Hillside service area. The flow meter could be temporary or permanent.

The final conclusions of the analysis were:

> "Based on the recommended standards and guidelines for sanitary sewer systems, the peak flows (including infiltration and inflow) originating from HLRWSD do not appear to be excessive. Therefore, further inspection for infiltration and inflow may not be cost effective for the District at this time. If the District decides not to pursue further inspection of infiltration and inflow on the system, it is recommended that at a minimum the District continue to monitor flows, perhaps on an annual basis, to ensure that they remain within or below the guidelines for a system of this size."

No further infiltration and inflow studies have been conducted since the March 2004 report. However, the District did continue to perform internal TV video inspection of certain sewer lines.

3.3.6.2. OBSERVED I&I IN THE HLRWSD SYSTEM

There are several guidelines for determining what acceptable levels of infiltration and inflow may exist in a sewer system. The following guidelines were utilized to analyze the current Districts I&I levels:

- Wastewater Committee of the Great Lakes – Upper Mississippi River's 2004

Recommended Standards for Wastewater Facilities

- Metcalf and Eddy 3rd Edition *Wastewater Engineering Treatment and Reuse*
- Environmental Protection Agency's 1985 *Infiltration/Inflow Analysis and Project Certification*

The system's flow data, as obtained from the H-1D lift station, was examined with respect to the limits discussed in the previous three guidelines. This analysis can be found in Appendix E. The results of the infiltration/inflow analysis for the HLRWSD sewer collection system were as follows:

- Wastewater Committee of the Great Lakes – Upper Mississippi River's 2004 *Recommended Standards for Wastewater Facilities*
    - Average Daily Flow – UNDER the limit
    - Peak Hourly Flow – OVER the limit
- Metcalf and Eddy 3rd Edition *Wastewater Engineering Treatment and Reuse*
    - Average Daily Flow – UNDER the limit
    - Peak Hourly Flow – OVER the limit
- Environmental Protection Agency's 1985 *Infiltration/Inflow Analysis and Project Certification*
    - Dry Weather Average Flow – UNDER the limit ←
    - Wet Weather Peak Flow – UNDER the limit ←

It is important to note, however, that the EPA guidance is utilized by the Idaho Department of Environmental Quality for determination of excessive I&I within a system. According to this guideline, the District does not have excessive I&I. Lastly, as was mentioned in Section 3.3.3, the flows for the system are not extremely accurate, and the high peak may not be an accurate peak flow for the District. If the next highest peak (approximately 1 MGD) were utilized, the District would be at or under these guidelines and would not have an excessive I&I problem within the system. It would be prudent to improve the manner in which the flow data was recorded before implementing an exhaustive I&I improvement scheme.

The flows for the system were examined utilizing the lift station records and precipitation information from the National Climate Data Center for Coeur d'Alene, Idaho. The flows were reviewed for both inflow and infiltration, similar to the 2004 study:

- Inflow – review lift stations' responsiveness to "significant" amounts of precipitation during low ground water periods (winter months versus summer months).
- Infiltration – review lift stations' "dry season" flow average versus "wet season" flow average. Higher flow averages during the "wet season" may be an indicator for infiltration. Flows may also be influenced by seasonal use. Summertime usage will likely be higher in areas of high recreational use.
- Location of Infiltration and Inflow – review the variation in flow at each lift

station fed by upstream lift stations to evaluate if infiltration is localized or passed on from upstream lift stations.

3.3.6.2.1. INFILTRATION

As was indicated in Section 3.3.3, weekly pump hour readings were used for each lift station to estimate the average and peak flows for each lift station. Refer to Table 3-7 in Section 3.3.3 for information on "dry season" and "wet season" flows. The flows at Coopers Bay, Honeysuckle Beach, and Wrights Park have higher "dry season" flows than "wet season"; this may be due to the increase in summer time users since the area is influenced by summer time recreation. Several of the other lift stations have higher "wet season" flows when compared to "dry season" flows. These lift stations may be subject to infiltration. The lift stations that appear to be influenced by infiltration are listed below (listed from highest to lowest *change* in flow):

Table 3-9: Potential Infiltration Influenced Lift Stations

	Lift Station	Average Flow minus (–) Average Flow "Dry Season" (gallons per day)
1.	Country Club	12,979
2.	Avondale	4,938
3.	Thames	3,551
4.	Point Hayden	2,971
5.	Sherwood	1,139
6.	Clark House	673
7.	Sandy Cove	288
8.	Split Rock	286
9.	Canterbury Cove	19

3.3.6.2.2. INFLOW

The estimated daily flows for each lift station were plotted against total precipitation for the corresponding time period. These graphs were utilized to analyze the patterns in flow during precipitation events. Refer to Appendix E for these figures.

These graphs indicate that some lift stations follow the pattern of precipitation very closely. A straight linear trend line was fitted to both the flow data and the precipitation data. The two trend lines for the flow and precipitation were compared visually, to determine if the lift station flow patterns match or follow those of the precipitation patterns. If the lines match or are similar, this may indicate inflow issues. Specifically, if the flow trend line had the same slope (parallel) as the precipitation trend line, the lift station was described as having "greatest linear similarity". If the flow trend line had a similar slope (nearly parallel) as the precipitation trend line, the lift station was described as having "less linear similarity". Finally, if the flow trend line and the precipitation trend line were divergent, or different (non-parallel), the lift station was described as having "no linear similarity". The following table (Table 3-10) summarizes

the greatest linear similarities between flow rates and precipitation:

Table 3-10: Comparison of Data Trend (Precipitation vs. Lift Station Flow)

Greatest Linear Similarity (parallel trend lines)	Less Linear Similarity (nearly parallel trend lines)	No Linear Similarity (non-parallel trend lines)
Forest Ridge	Canterbury Cove	Avondale
Point Hayden	English Point	Clark House
Sandy Cove		Coopers Bay
Sherwood Court		Country Club
Wrights Park		Falls at Hayden
		Honeysuckle Beach
		Split Rock
		Thames

The figures in Appendix E display the trends identified in Table 3-10. The trend lines for Forest Ridge, Point Hayden, Sandy Cove, Sherwood Court, and Wrights Park are nearly parallel to the trend lines for the precipitation. This indicates that the overall lift station flow was closely following the precipitation. This may be a good indicator that the flow at these lift stations are directly influenced by precipitation (inflow).

The trend lines for Canterbury Cove and English Point followed the precipitation trend line, but not as closely as the previously mentioned lift stations. The remaining lift stations did not follow the precipitation trends at all.

3.3.6.2.3. EFFECTS OF UPSTREAM LIFT STATIONS

Many of the District's lift stations are located in series, as indicated by Figure 4-2. This may subject the downstream lift stations to the upstream lift station's I&I. The following lift stations could be subject to the effects from upstream lift stations:

- Country Club
- Avondale, Thames
- English Point
- Coopers Bay, Clark House

Several of these have questionable peak flows mentioned previously (peaks in lift station flows following peaks in precipitation). This could be due to the upstream lift stations. However, most of these lift stations are not subject to the linear similarity.

These lift stations could be subject to infiltration issues from upstream lift stations. The lift stations with the highest amount of infiltration potential (refer to Table 4-9) are Country Club, Avondale, and Thames.

3.3.6.2.4. CONCLUSIONS

There are several lift stations listed in the potential for inflow concerns based on linear similarity with precipitation data, but these do not show infiltration issues or are

subject to upstream lift stations. Thus, the analysis does not show any specific lift stations are subject to both infiltration and inflow. As mentioned above, the District has identified locations of I&I and will continue to monitor the system for further I&I issues. The HLRWSD continues to be committed to look for sources of infiltration and inflow, and to make repairs wherever it is determined economically feasible.

3.3.7. USER CHARGES AND OPERATION AND MAINTENANCE BUDGET

The City of Hayden and HLRWSD entered into an Interagency Agreement for Sewer Treatment Services, establishing the Hayden Area Regional Sewer Board (HARSB) on October 9th, 1986 (Kootenai County Airport was added in 1991). This agreement served to establish the responsibilities of the City and HLRWSD (and later the Airport) with respect to the HARSB regional treatment facility. Each of the three entities pay a pro-rata share for the costs associated with the facility. The proportion paid by each entity is calculated by ER capacity. At the time of this facility plan, City of Hayden contributes 72 percent, HLRWSD contributes 27 percent, and Kootenai County contributes 1 percent.

3.3.7.1. HLRWSD INCOME SOURCES

There are several categories of income for the District, and each has its own purpose and applicability:

1. Ad Valorum Taxes –

   This is the property tax levied by the District around the entire District Boundary (full perimeter of Hayden Lake) based upon assessed valuation. The District has traditionally used this income for general administration / operating costs of general benefit to all of the constituents within the District.

2. Monthly Sewer Operation and Maintenance Fee –

   These are monthly fees paid only by active sewer users and are made up of the following elements:

   a. HARSB treatment costs which are passed through to the District based upon the number of active sewer users (ER's).
   b. District operation fixed costs: Administration, Payroll, Benefits, and Overhead.
   c. District collection system variable costs: Repairs, Power, Chemicals and Consumables
   d. Collection system depreciation and reverse funding

3. Capitalization Fees –

   The District presently charges $10,500 to each new sewer user or lot within the sewer service area, which has not previously invested in the District's sewer capacity via an LID or prior Cap Fees. The purpose of the Cap Fee is to replace sewer system capacity which is required by the new user or parcel.

4. Capital Borrowing Using Bonds –

   Revenue Bond- Sewer Districts in Idaho often use revenue bonds to finance sewer improvements. These require a 50% + majority election (qualified voters only). The bond debt is re-paid by only active sewer users as part of their monthly sewer fees. (Note: vacant lots do not participate in repayment of a revenue bond).

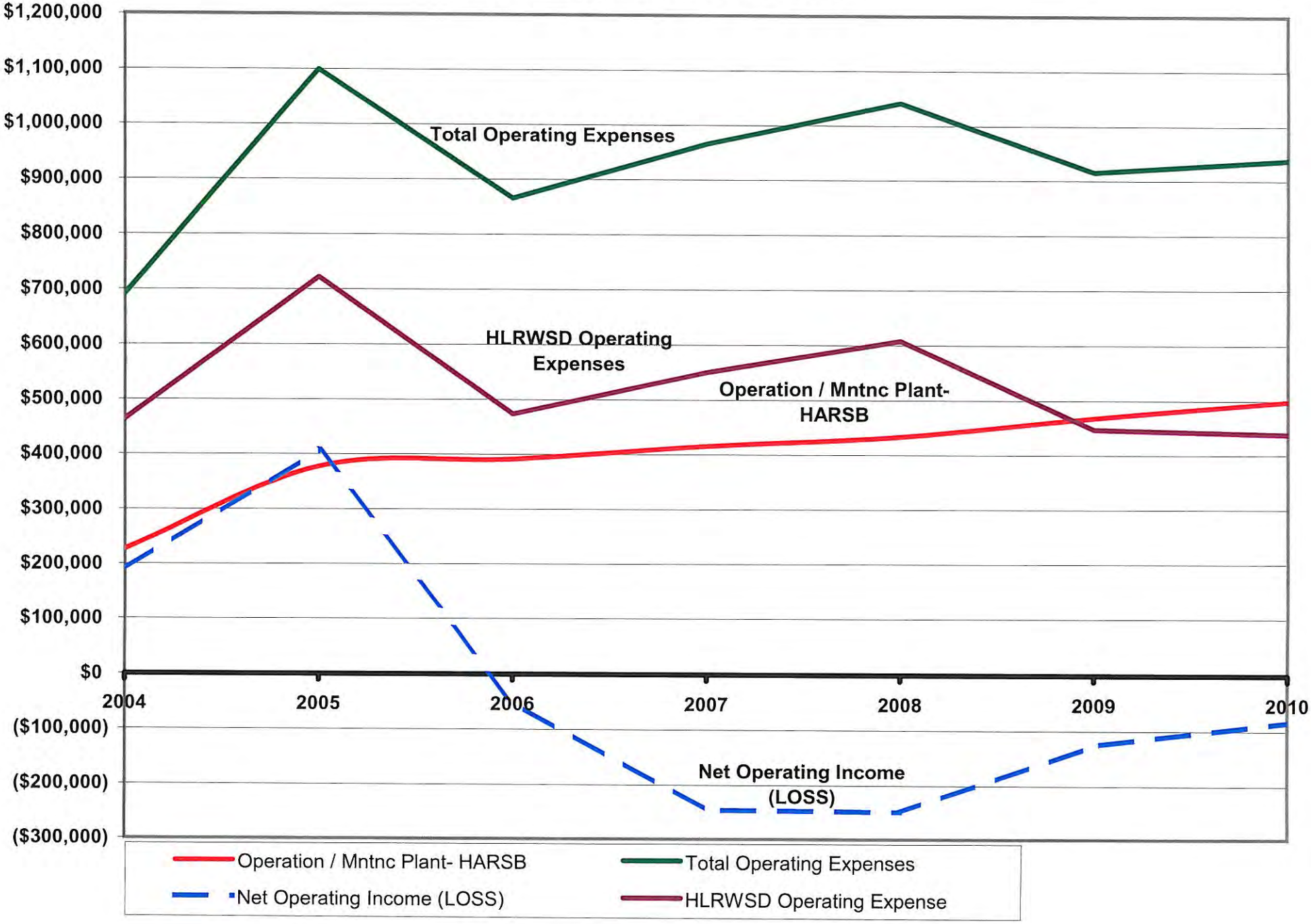
   Local Improvement District (LID) - A LID is an assessment against the real property which is benefitted by the utility improvement. Both occupied and vacant parcels which front the sewer system can be assessed on a LID. A LID is formed by a public hearing process where all property owners have the opportunity to protest (or support) the formation of the LID. After the LID hearing, the District Board may approve an ordinance creating the LID, unless over 60% (or 2/3) of the owners protest the LID formation (Idaho Code Title 50, Ch. 17).

3.3.7.2. HLRWSD Sewer Rates

As of September 2011 the monthly Operation and Maintenance fee for HLRWSD is $44.00 per ER (equivalent residence). This reflects an increase of $6.50 per month per ER, which the District Board adopted in June 2011 in order to address its declining depreciation reserve account. Over the years, these fees have been increased, as needed, to meet the needs of the District. The user rate started at $25.00 per month and was increased in January of 2003 to $30.00 per month. The rate was increased to $31.50 in February of 2009 and again to $37.50 in April of 2010. In general, these increases were proposed to supply revenue for: (1) increased costs from the HARSB treatment facility, (2) increased costs of labor and utilities, and (3) increase the reserve/replacement fund which is used for depreciation.

The rate of $44.00 per month was computed in order for the District to break-even with annual expenses, plus fund depreciation reserves at 30% of the theoretical requirement computed by the District's auditor at $200,000/year ($60,000/yr now goes to the depreciation reserve). Figure 3-4 presents the HLRWSD Operating Expense History for the years 2004 through 2010.

HLRWSD
Operating Expenses History



3.3.7.3. HLRWSD Operating Budget

The HLRWSD adopted the following operating budget for its fiscal year November 1, 2011 through October 31, 2012.

Table 3-11: Operating Budget for HLRWSD (2011-2012)

General Fund	FY 11-12 Budget
Resources	
Beginning Balance	$147,000
Property Tax	$51,500
Fees	-
Interest	$300
Total Resources	*$198,800*
Expenditures	
Legal	$20,000
Administration/Engineering	$7,000
Accounting	$6,700
Insurance	$7,100
Audit	$7,400
Study	$105,600
Dir. Fees	$26,000
Labor	$9,000
Other	$10,000
Watershed Protection	-
Total Expenditures	*$198,800*
O&M Fund	**FY 11-12 Budget**
Resources	
Beginning Balance	$541,000
Fees	$830,000
Interest	$1,000
Capitalization Fees	$13,000
Other	-
Total Resources	*$1,385,000*
Expenditures	
Auto	$7,000
Legal	$28,000
Administration/Engineering	$26,000
Office Costs	$13,000
Supplies/Repairs	$170,000
Shared Costs H.L.	$40,000
Labor	$145,000

Utilities	$45,000
Plant Operation	$550,000
Other	$5,000
Reserve Capital	$356,000
Total Expenditures	*$1,385,000*
Water Fund	**FY 11-12 Budget**
Resources	
Beginning Balance	$(17,000)
Fees	-
Interest	$200
Sale of System	$4,668
Assessment Principle and Interest	$32,000
Total Resources	*$19,868*
Expenditures	
Accounting	-
Debt/Bond Costs	$19,868
Supplies/Repairs	-
Utilities	-
Other/Legal/Engineering	-
Reserve	-
Billing/Office Help	-
Interest	-
Total Expenditures	*$19,868*
Debt/Grn/LID Funds	**FY 11-12 Budget**
Resources	
Beginning Balance	$211,000
Assessment Principle and Interest	$400,000
Interest	-
Bond Sale	$500,000
Total Resources	*$1,111,000*
Expenditures	
Debt/Bond Costs	$300,000
LID Exp/Int	$811,000
Other	-
Total Expenditures	*$1,111,000*
Expenditure Grand Total	$2,714,668

3.3.8. LIST AND STATUS OF DEFECTS OR DEFICIENCIES

As mentioned previously, there are numerous defects and deficiencies with the 17 lift stations within the District service area. In addition, the system requires maintenance in terms of service upgrades, air release valve replacement, line sags, observed I&I, tree root issues, and miscellaneous issues such as cracks, joint separation, hydrogen sulfide (H_2S), and grease buildup. Lastly, the District is in need of an updated O&M policy. These defects and deficiencies will be discussed in greater detail in subsequent sections.

- Lift station deficiencies (discussed in detail in Section 3.3.2.2)
- Service upgrades, air release valve replacement, line sags, observed I&I, tree root issues, and miscellaneous problems
- Update O&M policy

4. FUTURE CONDITIONS

4.1. FUTURE GROWTH (20-YEAR POPULATION PROJECTION)

4.1.1. GROWTH BY LIFT STATION

The U.S. Census Bureau estimates the population growth rate for Kootenai County from 2000 to 2010 to be 27.4% or 2.74% annually. Many of the lift station service area basins in the District have already essentially reached their "build-out" growth. However, there are a few service areas that still have potential for growth. Therefore, a growth rate of 2% will be utilized in the growth projections in these areas. In addition, an analysis of occupied lots, vacant lots, and future sewer service area have been tabulated and projected for future growth. The future service area includes lots within the District boundaries that have been platted already. In addition, the future service area includes areas in the northeastern portion of the District that are not yet platted, but have been estimated based on 1 lot per acre. Table 4-1 shows the analysis of current and potential growth in terms of ERs in each lift station service area.

Table 4-1: Future Growth Estimations (ERs) at Build-out

Basin	Occupied	Build-out of Vacancies	Service Area Growth (Outside of SMA)
Avondale	56	6	0
Canterbury Cove	15	0	0
Clark House	32	0	0
Coopers Bay	177	80	22
Country Club	354	30	62
English Point	2	0	602
Falls at Hayden	3	43	0
Forest Ridge	6	71	6
H-1D	810	151	107
Honeysuckle Beach	29	1	1
Packsaddle	53	5	4
Point Hayden	74	19	2
Sandy Cove	23	10	1
Sherwood	58	0	1
Split Rock	39	7	3
Thames	98	9	2
Wrights Park	50	0	10
Commercial	31		
Total	**1910**	**432**	**823**

Notes:

1. "Commercial" is the total ERs of commercial properties (43) minus how many parcels they are located on (12)
2. "Vacant refers to vacant lots with an ER
3. "Service Area Growth" refers to ERs outside the District or vacant lots with no ER, lots with no capitalization fees paid, and lots outside the SMA calculated by 1 lot/acre

4. English Point's growth includes the lots outside the SMA calculated by 1 lot/acre and Fox Hollow Development (60 lots)
5. Coopers Bay growth includes Hemlock Hills Development (11 lots)

The 2% growth rate was utilized to estimate the *time* that the growth may be achieved in the District (Table 4-2). Additionally, estimations of when developments will be built and included in the system are included for English Point, Falls at Hayden, and Forest Ridge lift stations.

Table 4-2: Projected Year of Build-out

Basin	Build-out of Vacancies	Service Area Growth (Outside of SMA)
Avondale	2016	2016
Canterbury Cove	2011	2011
Clark House	2011	2011
Coopers Bay	2030	2034
Country Club	2015	2023
English Point	2011	2051
Falls at Hayden	2021	2031
Forest Ridge	2021	2031
H-1D	2020	2025
Honeysuckle Beach	2013	2014
Packsaddle	2016	2019
Point Hayden	2023	2024
Sandy Cove	2029	2030
Sherwood	2011	2012
Split Rock	2019	2023
Thames	2016	2017
Wrights Park	2011	2020
Commercial	2011	2011

Notes:

1. English Point – estimated to reach growth in 40 years
2. Falls at Hayden – estimated to reach build out in 10 years and growth in 20 years
3. Forest Ridge – estimated to reach build out in 10 years and growth in 20 years

4.1.2. HARSB CAPACITY

The current pre-paid ER capacity at the HARSB treatment facility is 2,645. The District currently services 1918 active sewer users. Also, 702 vacant lots have purchased sewer capacity through a prior LID or by paying a capitalization fee. The District has 24.5 ER's at the HARSB facility which are pre-paid but not sold to a specific parcel yet. This means that the District can have up to 2,645 ERs in capacity going to the facility. However, only 2,342 ERs were accounted for from the mapping that was completed for this document. This indicates a 279 ER differential between the sold ER's versus the mapped ER's. It would be difficult to add these missing ERs into the analysis above since there is no record of which lift station basin they are included

in. Therefore, the values indicated in Table 4-1 will be used for allocating future flows for each lift station since they approximate the ratio of flow in each lift station compared to the total flow in the system.

Additionally, HARSB has established a pool reserve (described below in Section 4.1.2.1) of 391 ERs available on a "first come – first served basis", available to all HARSB entities. The total growth anticipated for the District (including the growth outside the SMA) would exceed the capacity of the District and the pool reserve (total growth 3,134 ERs compared to total capacity of 3,036 ERs (2,645 + 391)). Thus, the District may need to negotiate additional capacity, if needed, to serve the growth in excess of the existing capacity and pool reserve, which would most likely occur outside the service area (growth outside the SMA).

4.1.2.1. HARSB CAPACITY POOL

The HARSB has established capitalization fees which are charged to all new sewer users. The purpose of the capitalization fees is to provide a self-perpetuating method of funding replacement of treatment capacity. HARSB Resolution 1996-1 also provides that capitalization fees will be sufficient to maintain an excess capacity in the treatment facility, so that least 391 ERs would be available to each of the HARSB entities to purchase on a "first come – first served" basis.

4.1.3. GROWTH THROUGHOUT THE DISTRICT (OVERALL GROWTH)

The District has seen a decrease in the District hook-ups over the last few years, despite two large peaks in ERs sold (see Figure 4-1 and Figure 4-2 below). The hook-ups are generally indication of market conditions (how many residents are building out their lots) and the ERs sold can be subject to outside conditions. For example, in 2005 and 2008, a large number of lots were bought due to a development and an LID, respectively.

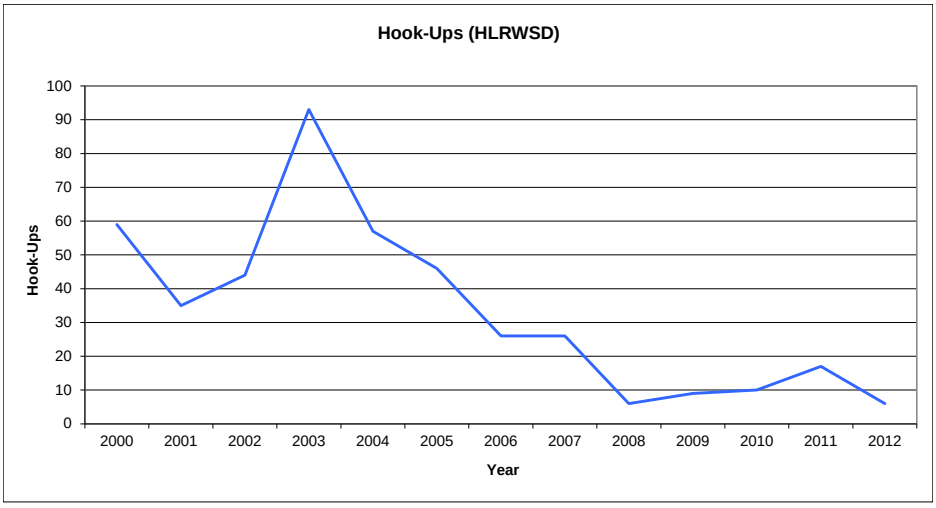


Figure 4-1: HLRWSD Hook-Ups

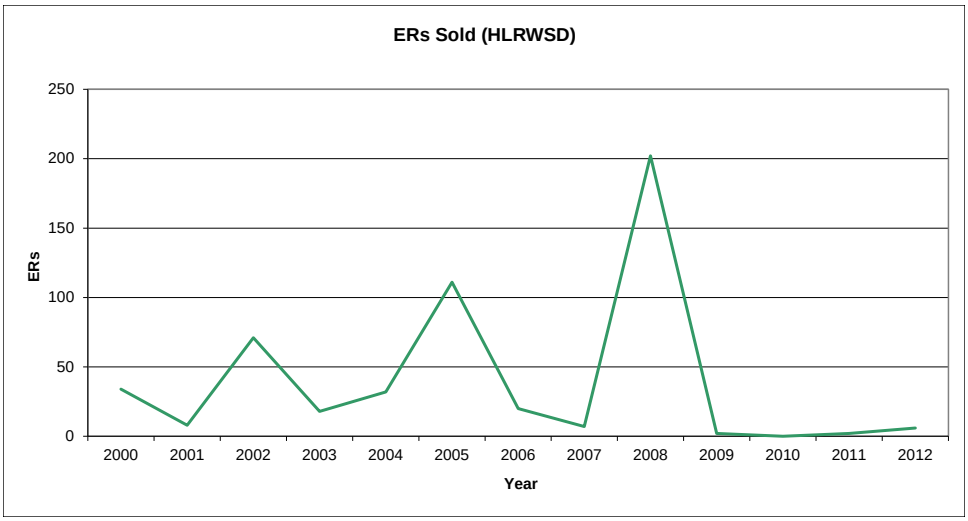


Figure 4-2: HLRWSD ERs Sold

Taking into account the recent trends, the District anticipates that over the next 20 years, growth within the sewer service area will be able to be accommodated within the existing ER allocation (2,645.5). If market conditions should change this assumption, then any additional capacity demand within the District should be able to be provided within the scope of the HARSB pool reserve (described above) of 391 ERs. Beyond 20 years, the District may need to negotiate additional capacity to serve growth in excess of the existing capacity and pool reserve, which would most likely occur outside the service area (growth outside the SMA).

4.2. Forecast of Flows and Wasteload (20-Year Period)

As was shown in the previous section, the computed flow estimates for the District's 16 duplex lift stations is highly variable due to hour readings and drawdown information that could be contributing to erroneous flow estimates. In addition, flow meter readings at H-1D could be contributing as well. Therefore, the forecast of future flows will utilize an average daily flow of 250 gallons per day per ER. The peak day can be achieved by applying a 1.5 peaking factor. The peak flow or peak instantaneous flow is estimated by multiplying the peak day flow by a peaking factor of 2.5. Table 4-3 shows the resulting flows for the projected growth.

Table 4-3: Projected Wastewater Flows for HLRWSD

	No. Users (EDUs)			Flow (gal/day)								
			SMA	Current			Buildout			SMA Growth		
Basin	Current	Buildout	Growth	Average	Peak Day	Inst. Peak	Average	Peak Day	Inst. Peak	Average	Peak Day	Inst. Peak
Avondale	56	62	62	14,000	21,000	52,500	15,500	23,250	58,125	15,500	23,250	58,125
Canterbury Cove	15	15	15	3,750	5,625	14,063	3,750	5,625	14,063	3,750	5,625	14,063
Clark House	32	32	32	8,000	12,000	30,000	8,000	12,000	30,000	8,000	12,000	30,000
Coopers Bay	177	257	279	44,250	66,375	165,938	64,250	96,375	240,938	69,750	104,625	261,563
Country Club	354	384	446	88,500	132,750	331,875	96,000	144,000	360,000	111,500	167,250	418,125
English Point	2	2	604	500	750	1,875	500	750	1,875	151,029	226,543	566,358
Falls at Hayden	3	46	46	750	1,125	2,813	11,500	17,250	43,125	11,500	17,250	43,125
Forest Ridge	6	77	83	1,500	2,250	5,625	19,250	28,875	72,188	20,750	31,125	77,813
H1D	810	961	1068	202,500	303,750	759,375	240,250	360,375	900,938	267,000	400,500	1,001,250
Honeysuckle Beach	29	30	31	7,250	10,875	27,188	7,500	11,250	28,125	7,750	11,625	29,063
Packsaddle	53	58	62	13,250	19,875	49,688	14,500	21,750	54,375	15,500	23,250	58,125
Point Hayden	74	93	95	18,500	27,750	69,375	23,250	34,875	87,188	23,750	35,625	89,063
Sandy Cove	23	33	34	5,750	8,625	21,563	8,250	12,375	30,938	8,500	12,750	31,875
Sherwood	58	58	59	14,500	21,750	54,375	14,500	21,750	54,375	14,750	22,125	55,313
Split Rock	39	46	49	9,750	14,625	36,563	11,500	17,250	43,125	12,250	18,375	45,938
Thames	98	107	109	24,500	36,750	91,875	26,750	40,125	100,313	27,250	40,875	102,188
Wrights Park	50	50	60	12,500	18,750	46,875	12,500	18,750	46,875	15,000	22,500	56,250
Commercial	31			7,750	11,625	29,063	7,750	11,625	29,063	7,750	11,625	29,063
Total	1910	2311	3134	477,500	716,250	1,790,625	585,500	878,250	2,195,625	791,279	1,186,918	2,967,296

Notes:

1. Average Daily Flow utilizing 250 gallons/day/ER
2. Peak Daily Flow utilizing 1.5*Average Daily Flow
3. Peak Instantaneous Flow utilizing 2.5*Peak Daily Flow

The District carefully monitors new and existing connections to prevent and eliminate illegal roof drains and other stormwater connections onto the sewer system, in order to minimize excess flow coming into the system. The District also conducts inspections during hook-ups to make sure connections are water tight. Thus, the District is currently implementing flow reduction efforts to minimize excess flow from entering the system.

4.3. Land Use Plans for the Area Served by the Existing and Future Sewer Facilities

The District's land use is determined by several entities, as was discussed in Section 4. The land use plans from these entities were taken into consideration. It is anticipated that the existing land use will remain intact and that the future land use plans call for additional residential areas.

4.4. Future Conditions Without the Proposed Projects(s)

Since the HLRWSD sewer collection system is over 25 years old, it requires capital re-investment due to depreciation, wear-and-tear, and obsolescence of equipment such as electrical controls and configuration. The HLRWSD has done an excellent job of managing its sewer collection system around Hayden Lake thus far. However, without re-investing in the sewer collection system infrastructure through an intentional Capital Improvement Program, serious risks to water quality and public health could result.

5. DEVELOPMENT AND INITIAL SCREENING OF ALTERNATIVES

5.1. DESCRIPTION OF PROBLEMS AND DEFICIENCIES TO BE CORRECTED BY THE PROJECT

The problems and deficiencies to be corrected by this project will be discussed in Section 3.3.8, with reference to specific issues at each lift station and general sewer collection system improvements that will be corrected by this project.

5.2. DEVELOPMENT OF ALTERNATIVES

The pertinent elements of the Idaho Wastewater Rules (IDAPA 58.01.16) are summarized below. Idaho DEQ has the responsibility to review and approve plans for new or modified public wastewater facilities in Idaho.

Table 5-1: Summary of Idaho Wastewater Rule Design Requirements

Lift Station Component	Rule Requirement	IDAPA 58.01.16 Reference
Multiple Pumps/ Pump Capacity	Lift stations are required to have multiple pumps. The capacity of the pumps shall be sufficient to handle peak hourly flow with any unit out of service.	440.02.c(i)
Valves	For submersible lift stations, check valves and shutoff valves are required to be located in a separate valve chamber.	440.04.d, 440.02.c(ii)
Site Access	Lift stations are required to be accessible by maintenance vehicles during all weather conditions	440.01.b
Stand-By Power	Emergency pumping capability is required for all new or modified lift stations.	440.07.b
Pump Capacity	At design pumping rates, a cleansing velocity of at least 2 fps is required in the force mains.	440.10.a
Flood Plain Locations	Lift stations located within the 100 year flood plain required a description of how electrical and pumping equipment will be protected during 100 year flood	440.01.a

These rules are applicable since "material modification" (as defined in IDAPA 58.01.16.010.35) is may be occurring. Material modifications are defined as:

> *…those that are intended to increase system capacity or to alter the methods or processes employed. Any project that increases the pumping capacity of a system, increases the potential population served by the system or the number of service connections within the system, adds new or alters existing wastewater system components, or affects the wastewater flow of the system is considered to be increasing system capacity or altering the methods or processes employed. Maintenance and repair performed on the system and the replacement of valves, pumps, or other similar items with new items of the same size and type are not considered a material modification.*

5.2.1. LIFT STATION ELECTRICAL ALTERNATIVES

5.2.1.1. EXISTING CONDITIONS

Table 5-3 on page 47 demonstrates that out of the 17 lift stations owned and operated by HLRWSD, 12 of these stations employ electrical control panels using relays and dialer alarm systems and are 25 years old or older.

As the adjacent photo demonstrates, the control panels built in 1986 are simple and still functional; however, these panels do not meet present electrical codes for operator safety.

The other 5 panels which employ newer technologies include 3 programmable logic controls (PLC) and 2 "smart panels" (Multi-Smart pump station manager hardware).

Existing Clark House Lift Station Control Panel Built in 1986

The following table (Table 5-2) explains the common vocabulary used for lift station controls:

Table 5-2: Common Vocabulary for Lift Station Controls

Abbreviation	Explanation
SCADA	Supervisory Control and Data Acquisition
PLC	Programmable Logic Controller
RTU	Remote Telemetry Unit
MTU	Master Telemetry Unit
HMI	Human Machine Interface
GUI	Graphical User Interface
OIT	Operator Interface Terminal
I/O	Inputs/Outputs
VHF	Very High Frequency (30MHz to 300MHz)
UHF	Ultra High Frequency (300MHz to 3GHz)

Table 5-3: HLRWSD Summary of Lift Station Controls

Lift Station Name	Type of Control (e.g. PLC w/ dialer, "smart panel", etc)	Enunciator/Alarm (e.g. dialer)	Standby Generator (Yes/No)	Missing Components?
Avondale	"smart panel"	dialer	yes	radio
Canterbury Cove	1986 with relays	dialer	yes	requires panel upgrade
Clark House	1986 with relays	dialer	no	requires panel upgrade, generator
Coopers Bay	1986 with relays	dialer	yes	requires panel upgrade
Country Club	1986 with relays	dialer	yes	requires panel upgrade
English Point	PLC	dialer	yes	radio
The Falls at Hayden	"smart panel"	dialer	yes	radio
Forest Ridge	PLC	dialer	yes	radio
H-1D	PLC	dialer	yes	radio
Honeysuckle Beach	1986 with relays	dialer	no	requires panel upgrade, generator
Packsaddle	1986 with relays	dialer	no	requires panel upgrade, generator
Point Hayden	1986 with relays	dialer	yes	requires panel upgrade
Sandy Cove	1986 with relays	dialer	no	requires panel upgrade, generator
Sherwood Court	1986 with relays	dialer	no	requires panel upgrade, generator
Split Rock	1986 with relays	dialer	no	requires panel upgrade, generator
Thames Court	1986 with relays	dialer	yes	requires panel upgrade
Wrights Park	1986 with relays	dialer	no	requires panel upgrade, generator

5.2.1.2. LIFT STATION CONTROL PANEL STANDARDIZATION

The Hayden Area Regional Sewer Board (HARSB) is responsible for the operations of the HLRWSD lift stations, as well as the lift stations owned by the other two public entities which are partners in HARSB: The City of Hayden and Kootenai County. It is the goal of HARSB and its three partner entities to adopt one common model for future lift station controls, in order to standardize, integrate, and automate all lift stations under the HARSB operational "umbrella".

On September 28, 2011 representatives of HARSB, HLRWSD and the City of Hayden met to hold a planning "summit" to evaluate a common approach for future lift station control improvements for HARSB and its partner agencies. The following options were discussed in detail, as presented by Terry Stulc, P.E., an electrical engineer with Trindera Engineering.

5.2.1.3. COMMUNICATION ALTERNATIVE 1: AUTODIALER BASED SYSTEM

This alternative would consist of an autodialer based system which includes: hardwired controls, or dedicated level controller (like Siemens/Milltronics Hydroranger) for pump control, coupled with Autodialer for remote alarming.

- Pros:
    1. Simple to implement and maintain
    2. Cost effective solution overall
- Cons:
    1. Requires phone service (landline, cellular or Cable TV, etc.) at each site.
    2. Limited control and monitoring options
    3. No real option for telemetry / SCADA
    4. Requires site visit to confirm alarms / status

5.2.1.4. COMMUNICATION ALTERNATIVE 2: PLC/RTU BASED SYSTEM

This alternative would consist of a PLC/RTU based system which includes: programmable controller, presumably with Operator Interface for visual information and coupled with floats, or level transmitters for level monitoring. This system forces reliance on a system integrator (programmer/technician).

- Pros:
    1. Programmable- meaning customizable and relatively easily changeable
    2. Visual status and alarm information
    3. Telemetry / SCADA add-on is an option
- Cons:
    1. For remote alarming, still need an autodialer, with phone service (landline, cellular or Cable TV, etc.)
    2. Still requires site visit to confirm alarms / status
    3. Programs (in PLC and OIT) still need to be maintained

5.2.1.5. COMMUNICATION ALTERNATIVE 2A: PLC/RTU BASED SYSTEM WITH TELEMETRY

This alternative would consist of a PLC/RTU based system, as described above, but with telemetry, which includes: programmable controller, presumably with Operator

Interface for visual information and coupled with floats, or level transmitters for level monitoring, but with telemetry radio/modem for communications for master site. This system would require periodic upgrades and updates.

- Pros:
    1. Same as Option 2
    2. Remote indication of status and alarms
    3. Remote control is option
    4. Data logging and historical archiving
    5. Reporting
- Cons:
    1. Same as Option 2
    2. More expensive
    3. Complicated system
    4. Probably required continuous 3rd party support (beyond basic options staff)

5.2.1.6. COMMUNICATION ALTERNATIVE 3: "MULTITRODE" BASED SYSTEM

This alternative would consist of a "MultiTrode" based system which includes: configurable controller with Operator Interface for visual information and coupled with level probes and/or level transmitter for level monitoring.

- Pros:
    1. Configurable with multiple options- meaning relatively customizable but not easily changeable (options) after purchased and installed.
    2. Arguable more expensive than PLC/OIT system (Option 2 above)
    3. Visual status and alarm information
    4. Telemetry / SCADA add-on is an option
    5. Has features beyond typical PLC/OIT implementation for motoring motor status/information, continuous testing.
    6. Multiple options for level monitoring beyond typical floats
- Cons:
    1. For remote alarming, still need an autodialer, with phone service (landline, cellular or Cable TV, etc.) at each site.
    2. Still requires site visit to confirm alarms/status
    3. Configuration (program) still need to be maintained
    4. Forces reliance on one vendor

5.2.1.7. COMMUNICATION ALTERNATIVE 3A: "MULTITRODE" BASED SYSTEM WITH TELEMETRY

This alternative would consist of a "MultiTrode" based system with telemetry, which includes: configurable controller with Operator Interface for visual information and coupled with level probes and/or level transmitter for level monitoring, but with telemetry radio/modem for communications to master site. However, no other local systems have similar configurations as Alternative 3A, which may prove difficult should HLRWSD want advice or suggestions from another system.

- Pros:
    1. Same as Option 3
    2. Remote indication for status and alarms
    3. Remote control is option
    4. Data logging and historical archiving
    5. Reporting
- Cons:
    1. Complicated system
    2. Probably required continuous 3rd party and/or vendor support (beyond basic options staff)

5.2.1.8. PHASED IMPLEMENTATION

As with most public works improvements, there are costs, benefits and risks to consider with evaluating capital improvement options. For example, the "MultiTrode/MultiSmart" control panel option is the most expensive alternative; however, for high risk or high flow lift stations, this system provides the remote monitoring and reset capabilities, data gathering and energy conservation. Also, it is suggested that operating costs can be reduced by allowing operators to monitor many of the stations functions and alarms remotely potentially saving labor costs.

As the result of the HARSB / HLRWSD / Hayden lift station control "summit", the following recommendations have been proposed:

A Tiered Approach to Lift Station Control

Tier 1- High Flow / High Risk Stations

Implement Option 3A-

The "MultiTrode/MultiSmart" pump station management system, with radio telemetry to a base system as the HARSB treatment facility.

Tier 2- Moderate Flow / Moderate Risk Stations

Implement Option 3-

Use the "MultiTrode/MultiSmart" panels and probes, with limited optional features and defer radio telemetry until a future time.

Tier 3- Lower Flow / Lower Risk Stations

Implement Option 1-

For small lift stations with a low potential for growth or increased risk, a traditional hard wired control panel coupled with an autodialer for remote alarming. This approach assumes the small stations will be controlled by telemetry.

5.2.1.9. ENVIRONMENTAL IMPACTS FOR COMMUNICATION ALTERNATIVES

The environmental impacts associated with the communication improvements would be similar for each alternative. All the alternatives will require the existing panels

to be replaced with at least Tier 3 control panel components. The higher risk lift station communications will be replaced with Tier 1 or 2 control panel components. The difference in alternatives is within the electrical panel itself and should not have any differing environmental impacts. The primary impacts to the environment are anticipated to be higher utility use (due to changed power usage), improvement to public health (due to the reduction in risk to the operators by replacing aged components), increased energy consumption (due to changed power usage), reduction in noise (due to the installation of telemetry on high risk stations, eliminating the audio/visual alarm system that emits considerable noise), and improvement to the socioeconomic profile (due to the capacity added which will serve future growth).

5.2.2. LIFT STATION STRUCTURAL/MECHANICAL ALTERNATIVES

Refer to Section 4 for the condition of each lift station. Table 5-4 provides a summary of the HLRWSD lift station structural materials and conditions. Table 5-5 provides a rating system based on the condition of each lift station. The rating identifies the lift stations with more severe repair needs.

Table 5-4: Structural/Mechanical Condition of Lift Stations

Lift Station	Age	Structural Condition	Mechanical Condition	Environmental Risk	Access/Safety	Space for Expansion	Pump Size/Age	3-phase OR 1-phase
Avondale	1987	good	poor	fair	good	low	7.5 HP / 2010	1-phase
Canterbury Cove	1984	good	poor	high	poor	low	7.5 HP / 2007	1-phase
Clark House	1987	fair	fair	fair	poor	low	7.5 HP / 2008	1-phase
Coopers Bay	1985	good	good	fair	good	moderate	7.5 HP / 2009	3-phase
Country Club	1987	fair	poor	high	fair	low	10 HP / 2006	3-phase
English Point	2010	good	good	low	good	high	23 HP / 2010	3-phase
The Falls at Hayden	2010	good	good	fair	good	high	23 HP / 2010	3-phase
Forest Ridge	2008	good	good	low	good	high	3 HP / 2008	1-phase
H-1D	1999	good	good	low	good	high	60 HP	3-phase
Honeysuckle Beach	1987	fair	poor	fair	good	moderate	3 HP / 2000	1-phase
Packsaddle	1981	fair	poor	high	good	high	0.5 HP / 2002	1-phase
Point Hayden	1982	fair	poor	fair	poor	low	5 HP / 2010	1-phase
Sandy Cove	1987	poor	poor	high	poor	moderate	5 HP / 2006	1-phase
Sherwood Court	1987	good	moderate	fair	good	moderate	2 HP / 2003	1-phase
Split Rock	1990	good	moderate	fair	fair	low	1.5 HP / 2006	1-phase
Thames Court	1987	poor	poor	fair	poor	low	3 HP / 2007	1-phase
Wrights Park	1987	poor	poor	fair	good	low	7.5 HP /	1-phase

Table 5-5: Structural/Mechanical Condition of Lift Stations, Rating

Lift Station	Age	Structural Condition	Mechanical Condition	Environmental Risk	Access/Safety	Space for Expansion	Total Score (Weighted)
Avondale	1987	1	3	2	1	3	1.9
Canterbury Cove	1984	1	3	3	3	3	2.5
Clark House	1987	2	2	2	3	3	2.3
Coopers Bay	1985	1	1	2	1	2	1.3
Country Club	1987	2	3	3	2	3	2.6
English Point	2010	1	1	1	1	1	1.0
The Falls at Hayden	2010	1	1	2	1	1	1.2
Forest Ridge	2008	1	1	1	1	1	1.0
H-1D	1999	1	1	1	1	1	1.0
Honeysuckle Beach	1987	2	3	2	1	2	2.1
Packsaddle	1981	2	3	3	1	1	2.2
Point Hayden	1982	2	3	2	3	3	2.6
Sandy Cove	1987	3	3	3	3	2	2.9
Sherwood Court	1987	1	2	2	1	2	1.6
Split Rock	1990	1	2	2	2	3	1.9
Thames Court	1987	3	3	2	3	3	2.8
Wrights Park	1987	3	3	2	1	3	2.4

Notes: good = 1, fair = 2, low = 3 for Structural Condition, Mechanical Condition, Access/Safety, Space for Expansion
low = 1, fair = 2, high = 3 for Environmental Risk
Structural Condition = 25%, Mechanical Condition = 25%, Environmental Risk = 20%, Access/Safety = 20%, Space for Expansion = 10%

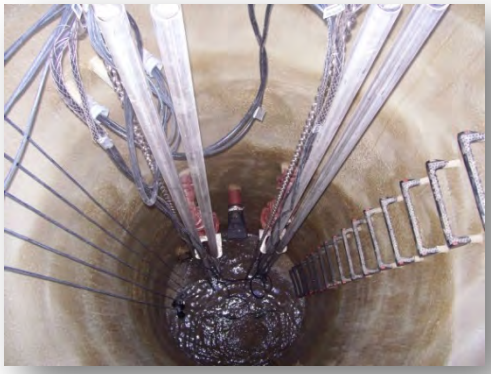
Based on the ratings in Table 5-5, the following is a list of the lift stations with a score of 2 and higher, listed from greatest score – worst condition (2.9) to lowest score – best condition (2.1):

Priority Rating	Lift Station	Condition Rating
1	Sandy Cove	2.9
2	Thames Court	2.8
3	Country Club	2.6
4	Point Hayden	2.6
5	Canterbury Cove	2.5
6	Wrights Park	2.4
7	Clark House	2.3
8	Packsaddle	2.2
9	Honeysuckle Beach	2.1

The following alternatives have been identified as potential solutions to the defects noted above.

5.2.2.1. STRUCTURAL/MECHANICAL ALTERNATIVE A: REHAB-IN-PLACE (REHABILITATION)

This option would restore the existing steel lift station in-basin place (Refer to Figure 5-1: Option A Lift Station Rehabilitation). Restoration of the lift stations would include the following elements:



Kingston-Cataldo lift station recently rehabilitated with "spray rock" liner, 2011

a. **Re-coat Interior:** Recoat the interior of the steel lift stations by sand blasting and applying an industrial elastomeric coating, such as "spray rock". This would require temporary by-pass pumping facilities to maintain live sewage service around each lift station for at least five days.
b. **New Aluminum Lids:** The tops of each steel lift station would be removed before sand-blasting and coating the interior to facilitate access. A pre-fabricated aluminum top and access hatch would then be bolted on top of each station after re-coating the interior, including an air tight seal.
c. **Replace Interior Piping and Rails:** All interior piping would be replaced with stainless steel piping, guide rails, and pump lift chains.
d. **Replace Pumps and Pitless Fittings:** All duplex lift stations would be supplied with standardized pumps of the same manufacturer, with

several standardized horsepower sizes to fit the operating criteria. The pitless adaptors attached to the lift station bottom will also be standardized and will facilitate operator's removal of pumps without entering the lift station. FLYGT N-Type pumps with semi-open impellers are recommended for reduced clogging problems due to fibrous materials such as "wipes and swifters".

e. **New Exterior Valve Vault:** All lift stations will be supplied with new isolation gate valves and check valves on the discharge force main, and will be located in a separate watertight valve vault, as required by current DEQ design requirements. This will require maintenance accessibility and operator safety.
f. **Maintain Existing Ground Stability:** Some excavation will be necessary on the exterior of the existing steel lift stations in order to replace exterior piping and valves. However, one primary benefit of this rehabilitation option is the fact that the sub-soils and existing concrete anti-flotation pad will remain undisturbed.
g. **Site Improvements:** Each lift station site will be re-graded to improve drainage, vehicle access, and all weather accessibility, which may require additional property easements.

The environmental impacts associated with rehab-in-place would generally include similar impacts as the replacement; but the impacts would be reduced due to the smaller disturbed area. The impacts would generally include change in topography (due to excavation and site restoration), short-term change to surface and ground water (protected by stormwater controls to prevent pollution of surface and ground water), short-term disturbance to wildlife (noise and excavation), small potential for cultural resource impact (disturbance within existing footprint, in most cases), improvement to public health (rehabilitating aging lift stations will reduce the likelihood of sewer leaks and lift station failures), positive impact to sole source aquifer (reducing likelihood of leaks and station failures), and improved socioeconomic profile (allowing for growth within the system).

5.2.2.2. STRUCTURAL/MECHANICAL ALTERNATIVE B: REPLACEMENT

This option would excavate, remove and dispose of the existing steel lift station and replace it with a pre-packaged fiberglass lift station. This existing concrete anti-floatation pad would remain in place and undisturbed. (Refer to Figure 5-2: Option B Lift Station Replacement). Replacement of the steel lift station would include the following elements:

a. **Excavate and Remove Steel Structure:** In order to remove the existing steel lift stations, and yet leave the existing concrete anti-floatation pads in place, excavation would be required to the bottom of each station which varies in depth from 12 ft to 16 ft. The soils at each lift station vary, however some sites may consist of saturated and unstable clay materials. The steel basin structure would be salvaged for recycling.

b. **Bypass Pumping:** as with all other options, temporary bypass pumping will be required to provide live sewage service around each lift station for at least 4 days.

c. **Pre-Fabricated Fiberglass Packaged Lift Station:** In order to minimize the cost and risk of an extended pump by-pass period, the Replacement option would include a pre-fabricated fiberglass (packaged) lift station. This fiberglass lift station would be delivered to the site on a semi-trailer, and would be pre-fabricated and tested prior to shipping, including piping, pumps, rails, and aluminum access hatch. The new fiberglass lift station structure would be bolted to the existing concrete anti-buoyancy slabs, with a supplemental concrete "donut" poured to provide stability and resistance to buoyancy of the structure.

Granite Reeder Sewer Department pre-packaged lift station, 2011

Similar to the other options, all interior piping and guide rails would be stainless steel. Pumps and pitless adaptors would be standardized. The exterior value vault would also be similar to the other options, using a watertight concrete manhole and all new isolation gate valves and check valves.

d. **Site Restoration:** This option would result in the most site disturbance during construction. In some locations, the instability of the saturated clay soils will either require a very large excavation with gradual sloping, or temporary sheet piling to support the excavation walls. The final grading will include improvements to drainage, access, and an all-weather gravel surface around the stations.

The environmental impacts associated with replacement would generally include change in topography (due to excavation and site restoration), short-term change to surface and ground water (protected by stormwater controls to prevent pollution of surface and ground water), short-term disturbance to wildlife (noise and excavation), small potential cultural resource impact (disturbance within existing footprint, in most cases), improvement to public health (replacing aging lift stations will reduce the likelihood of sewer leaks and lift station failures), positive impact to sole source aquifer (reducing likelihood of leaks and station failures), and improved socioeconomic profile (allowing for growth within the system).

5.2.2.3. STRUCTURAL/MECHANICAL ALTERNATIVE C: SLIP-LINE

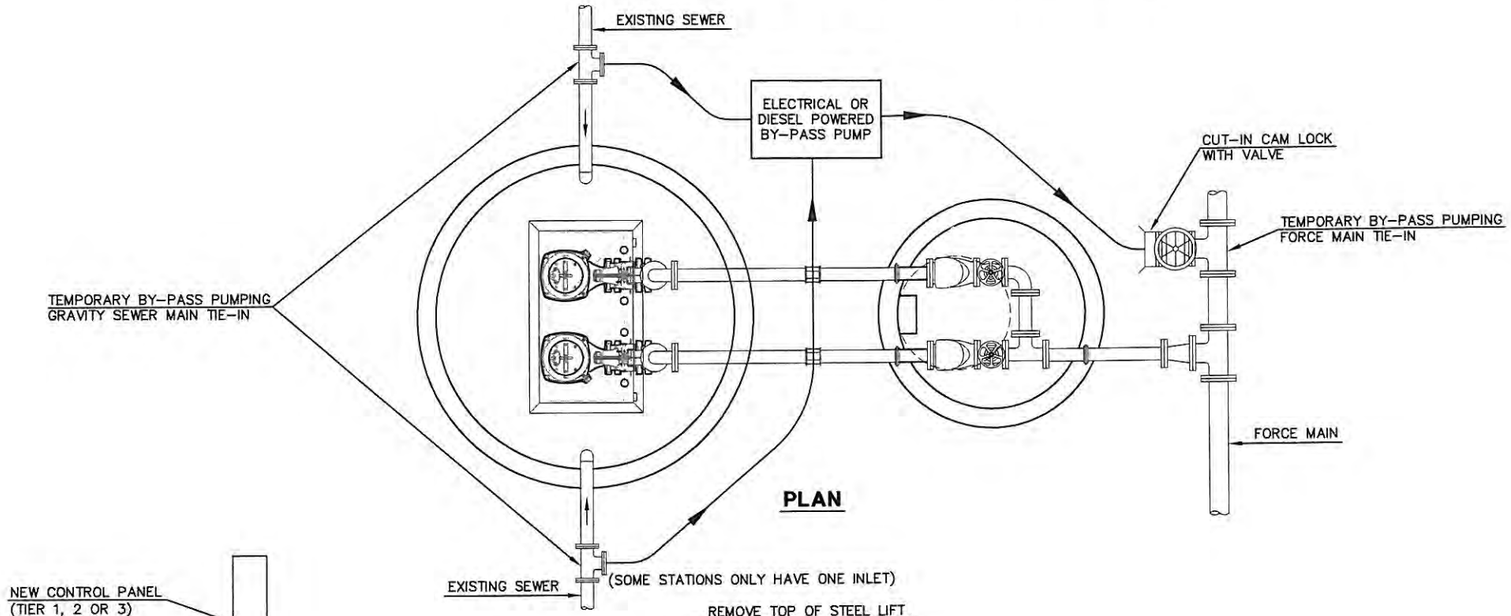
This option is a hybrid approach which combines elements of Options A and B. The existing steel structure and concrete bases of the lift station would be retained as a shell, and then slip-lined with a fiberglass basin which is pre-fabricated as a packaged lift station. (Refer to Figure 5-3: Option C Lift Station Slip-Line)

a. **Existing Steel Basing:** The existing steel basins would remain in place, but all the interior piping and penetrations would be removed. The top of the basin would be cut off, and the existing coatings would remain as-is.
b. **Fiberglass Slip Line Basin:** The inside diameter of the existing steel lift station varies among the lift stations. The new fiberglass basin would have a smaller outside diameter so it would slip inside the existing steel shell. The annular space between the steel and fiberglass basin would be filled with fiber reinforced concrete grout. The steel and fiberglass basin would have tabs in the annular space so that the concrete grout provides a structural bond between the steel and fiberglass basins.
c. **Exterior Piping and Excavation:** The exterior of the old steel lift station shell must be excavated to the invert elevations of the gravity and pressure sewer pipes, in order to re-connect the piping to the new fiberglass basin. This will require cutting through the steel basins in order to access the pipe hubs on the fiberglass basins.
d. **Fate of the Steel Basins:** Since the coatings of the existing steel basins will not be repaired, it is expected that the steel will continue to corrode in-place and eventually lose any structural stability. This would not affect the stability or water-tightness of the inner fiberglass basin which would be designed to independently resist buoyant forces. Also, the concrete grout would be fiber reinforced and would add structural strength to the basin “sandwich”.
e. **New Exterior Value Vault:** All lift stations will be supplied with new isolation gate valves and check valves on the discharge force main, and will be located in a separate watertight valve vault.
f. **Maintain Existing Ground Stability:** Similar to Option 1, some excavation will be necessary on the exterior of the existing steel lift stations in order to replace exterior piping and valves. However, another benefit of this slip line option is the fact that the soils and existing concrete anti-flotation pad will remain undisturbed.
g. **Site Improvements:** Each lift station site will be re-graded to improve drainage, vehicle access, and all weather accessibility. This can generally be accomplished with the addition of culverts and gravel.

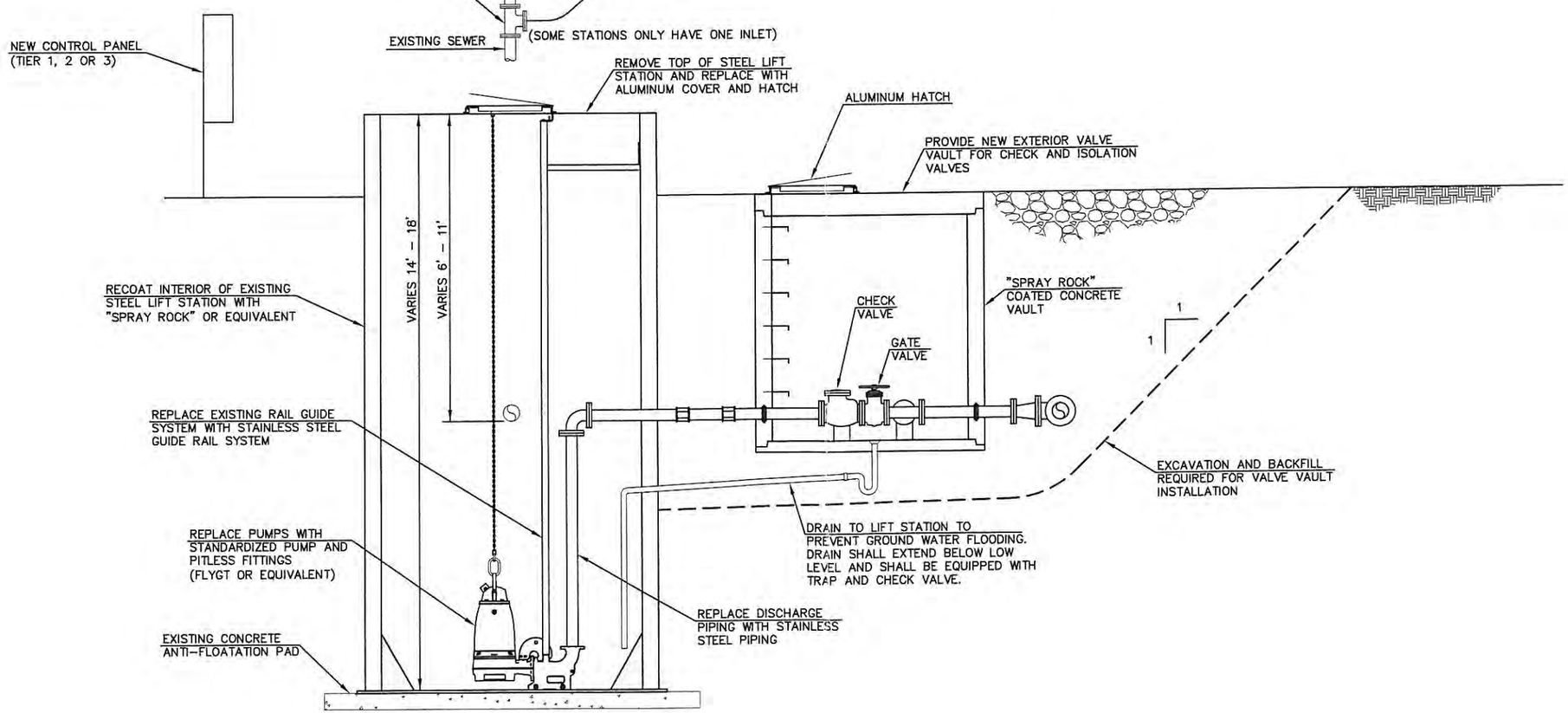
The environmental impacts associated with rehab-in-place would generally include similar impacts as the replacement; but the impacts would be reduced due to the smaller disturbed area. The impacts would generally include change in topography (due to excavation and site restoration), short-term change to surface and ground water (protected by stormwater controls to prevent pollution of surface

and ground water), short-term disturbance to wildlife (noise and excavation), small potential cultural resource impact (disturbance within existing footprint, in most cases), improvement to public health (rehabilitating aging lift stations will reduce the likelihood of sewer leaks and lift station failures), positive impact to sole source aquifer (reducing likelihood of leaks and station failures), and improved socioeconomic profile (allowing for growth within the system).

OPTION A
LIFT STATION REHABILITATION



PLAN



PROFILE

11x17 SCALE: 1"=4'
22x34 SCALE: 1"=2'

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ENGINEERS | SURVEYORS
www.welchcomer.com
350 E. Kathleen Ave.
Coeur d'Alene, ID 83815
208-664-9382
(toll free) 877-815-5672
(fax) 208-664-5946

NO.	DATE	REVISION DESCRIPTION	BY

H.L.R.W.S.D.

LIFT STATION FACILITIES PLAN

LIFT STATION DETAIL OPTION A REHABILITATION

PROJECT NO.:	41055
DESIGNED BY:	D.D.O.
DRAWN BY:	J.A.L.
CHECKED BY:	
DWG NAME:	43002DT02.DWG
DATE:	11-15-11
SHEET NO:	

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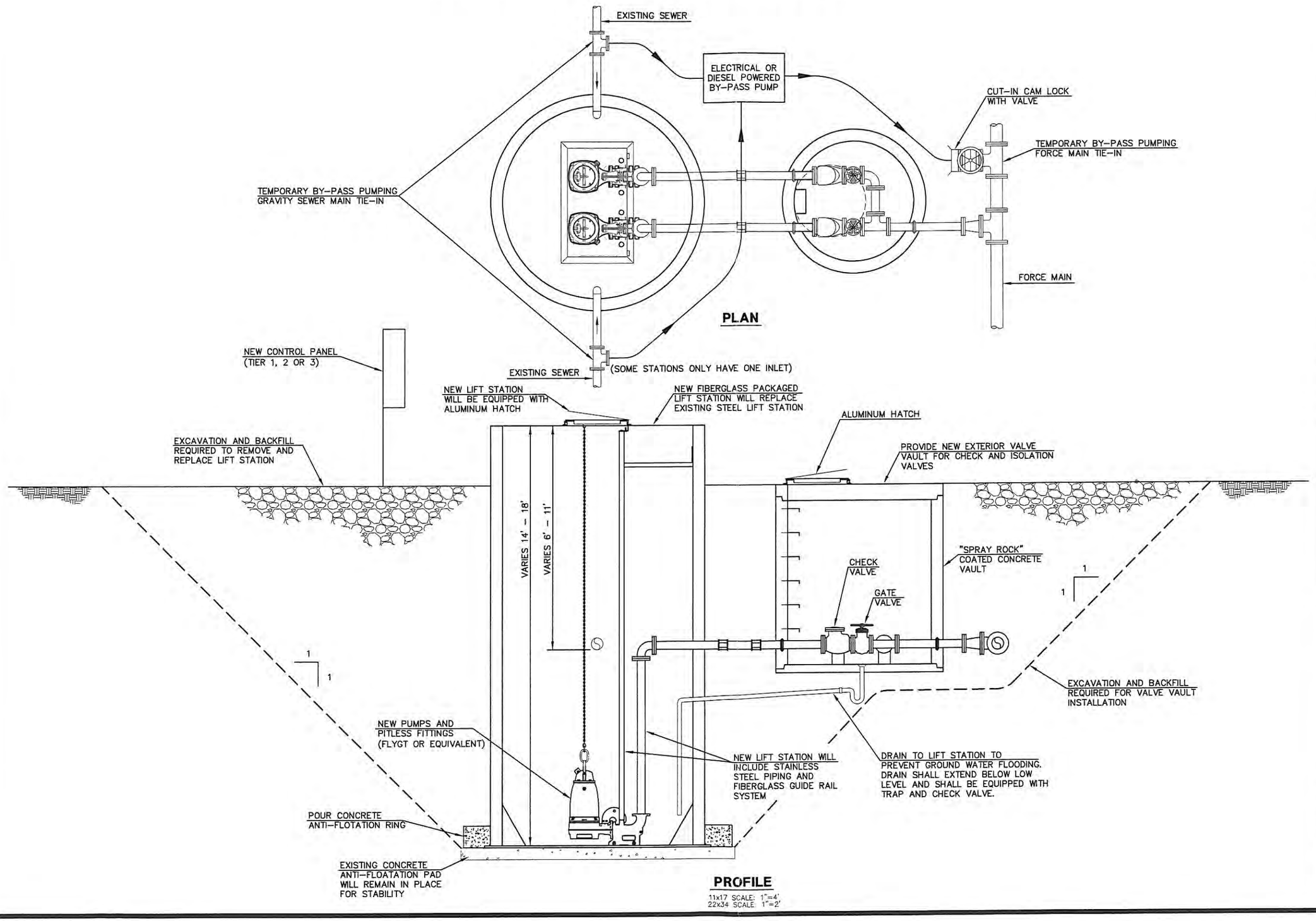
OPTION B
LIFT STATION REPLACEMENT



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H.L.R.W.S.D.

LIFT STATION FACILITIES PLAN

LIFT STATION DETAIL OPTION B REPLACEMENT

PROJECT NO.:	41055
DESIGNED BY:	D.D.O.
DRAWN BY:	J.A.L.
CHECKED BY:	
DWG NAME:	43002DT02.DWG
DATE:	11-15-11
SHEET NO:	

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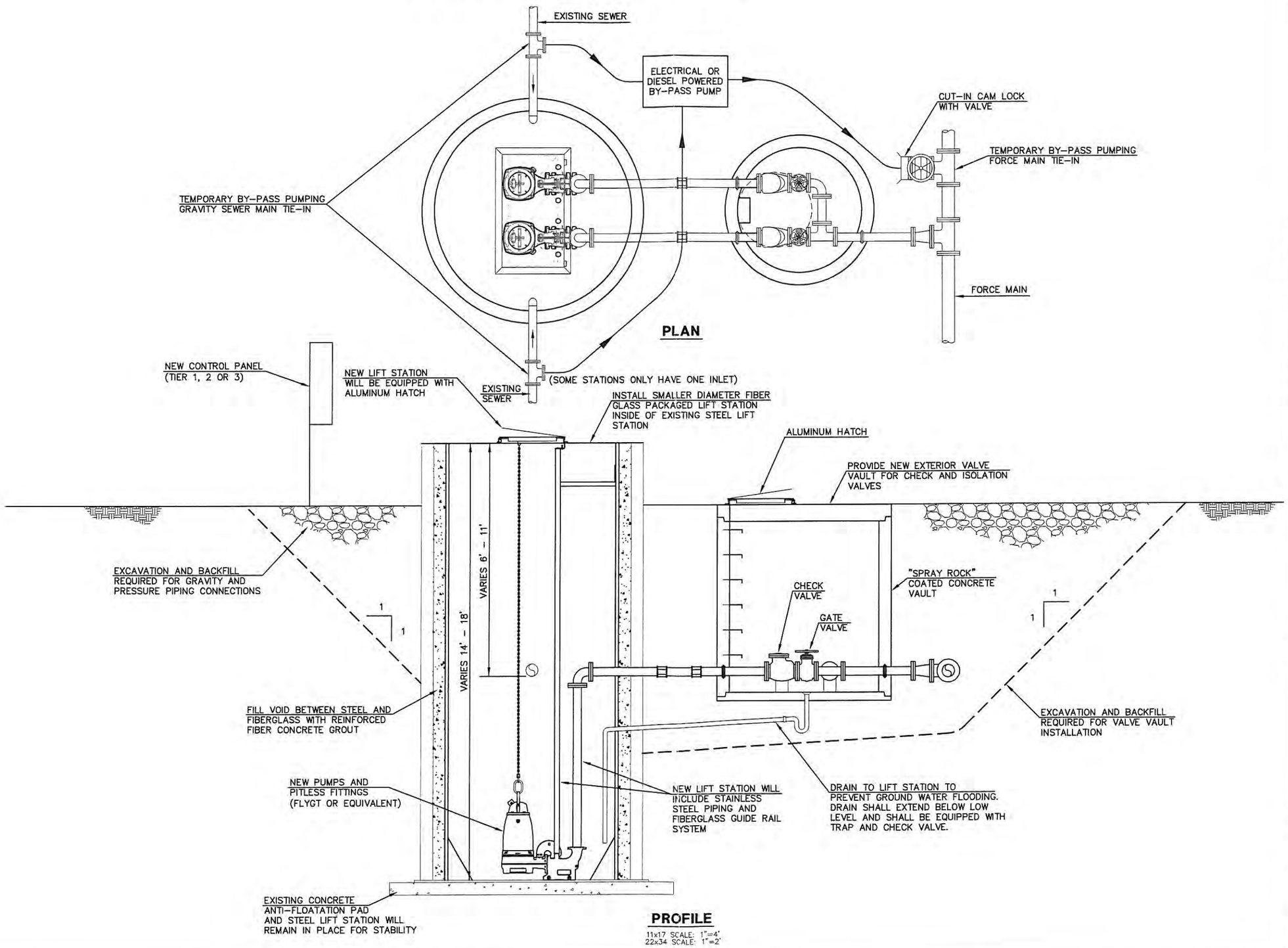
OPTION C
LIFT STATION SLIP-LINE



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208-664-9382
(toll free) 877-815-5672
(fax) 208-664-5946

NO.	DATE	REVISION DESCRIPTION	BY

H.L.R.W.S.D.

LIFT STATION FACILITIES PLAN

LIFT STATION DETAIL
OPTION C
SLIP-LINE

PROJECT NO.:	41055
DESIGNED BY:	D.D.O.
DRAWN BY:	J.A.L.
CHECKED BY:	
DWG NAME:	43002DT02.DWG
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5.2.2.4. RECOMMENDED SUBMERSIBLE PUMP REPLACEMENT

As lift station pumps require replacement, or when lift stations receive a major upgrade, the HLRWSD Board has adopted a policy to replace all raw sewage pumps with FLYGT N-Series semi-open impeller pumps. This style of pump has a proven design to be more reliable in pumping fibrous materials, like "wipes and swifters", without plugging.

In recent years, the marketing and use of "disposable" fibrous cleaning products have added a new problem in pumping wastewater. This fact can be seen in the increased frequency of call-outs by HARSB personnel to HLRWSD lift stations due to plugged (rags) in pump impellers. In addition, pumps which continue to perform at high-efficiency without plugging, not only save money from labor savings and emergency response, but also cuts energy costs.

5.2.3. LIFT STATION DISCUSSION

Each lift station requires different repairs based on its condition, risk, and safety. The following is a discussion of the needs for each lift station.

5.2.3.1. AVONDALE LOOP

The overall condition of the lift station is good, but the mechanical components require upgrading. The electrical component for the station consists of a "smart panel", but does require upgrading for telemetry. Thus, this station would require either rehabilitation or slip-line improvements, but not a replacement. The station is at a high risk/high flow capacity and would therefore require a Tier I communication upgrade.

5.2.3.2. CANTERBURY COVE

The overall condition of this lift station is very poor. The structural condition is good, but the mechanical components are in fair condition. This lift station's location is a safety and environmental risk. Thus, this station would require a replacement and relocation. This would entail providing three grinder pumps for the residences that would be below gradient of the new location for the lift station. This lift station is a low risk/low flow (once relocated) and would therefore only require a Tier III communication upgrade.

5.2.3.3. CLARK HOUSE

The overall condition of this lift station is fair; however, access to this lift station is a safety risk since the lid of the station is below gradient and the electrical panel is under the lid (to the side of the station). Therefore, this station would require either rehabilitation or slip-line, but not a replacement. The repair would include raising the

station to grade, for ease of access. The station is a moderate flow/moderate risk capacity and would therefore require a Tier II communication upgrade. The station does not currently have a standby generator, which should be included in the improvements, but may require additional property easements to install it across the South Hayden Lake Road.

5.2.3.4. COOPERS BAY

This lift station has been upgraded recently and does not require significant repairs. However, the station could be upgraded to new pumps (FLYGT), which would require new mechanical components. Thus, this station could be rehabilitated or slip-lined but does not require replacement. This station is a high flow/high risk capacity and would require a Tier I communication upgrade.

5.2.3.5. COUNTRY CLUB

The overall condition of this lift station is fair. The structural condition of the concrete is good, but the mechanical components are in poor condition. Thus, this station could be rehabilitated or slip-lined but does not require replacement. The station may require an additional pump if the sewer alignment improvements (see Section 6.2.5) are not included in the system improvements. This station is high flow/high risk and would therefore require a Tier I communication upgrade.

5.2.3.6. ENGLISH POINT

This station is in excellent condition and was constructed recently. The electrical components are sufficient, but require telemetry upgrades. Thus, the only improvement to this station would be the addition of telemetry (Tier I communication upgrade, just telemetry) and safety grates.

5.2.3.7. THE FALLS AT HAYDEN

This station is in excellent condition and was constructed recently. The electrical components are sufficient, but require telemetry upgrades. Thus, the only improvement to this station would be the addition of telemetry (Tier I communication upgrade, just telemetry) and safety grates.

5.2.3.8. FOREST RIDGE

This station is in good condition and was constructed recently. The electrical components are sufficient, but require telemetry upgrades. Thus, the only improvement to this station would be the addition of telemetry (Tier I communication upgrade, just telemetry) and safety grates.

5.2.3.9. H-1D

This station is in good condition and does not require upgrades at this time. HARSB will be installing radio telemetry in 2012, so communication upgrades are also not needed.

5.2.3.10. Honeysuckle Beach

The lift station is in poor condition, overall. Both the structural and mechanical components of the lift station are in poor condition. Therefore, any of the three alternatives for structural/mechanical improvements could be considered. The station has a great deal of ragging due to a restroom located near the station. A macerator (Muffin Monster) or a manual screen system should be installed on the restroom inlet line, but the District may wish to request that this unit be supplied by City of Hayden, who owns the public restroom facility. The station is a moderate flow/moderate risk station, due to the lack of storage capacity, and will need a Tier II communication upgrade. The station does not currently have a standby generator, which should be included in the improvements.

5.2.3.11. Packsaddle

The lift station is in very poor condition, receiving raw sewage and functioning as a siphon. Therefore, replacement, installing a raw sewage grinder station, should be considered. This lift station is a low flow/low risk capacity and would only require a Tier I communication upgrade. The station does not currently have a standby generator, which should be included in the improvements.

5.2.3.12. Point Hayden

The overall condition of this lift station is poor. The station was recently slip-lined with a fiberglass liner, but this reduced the capacity of the lift station. Thus, this lift station does not require any of the three structural/mechanical improvements, but could be upgraded by adding an overflow basin for additional capacity. This station is a high flow/high risk capacity and would therefore require a Tier I communication upgrade.

5.2.3.13. Sandy Cove

The overall condition of this lift station is very poor. The structural condition of the steel is in good condition, but the mechanical components require repair. Thus, this lift station would require either rehabilitation or slip-line, but may not require replacement. This station is a high flow/high risk due to a pending subdivision and would therefore require a Tier I communication upgrade. The station does not currently have a standby generator, which should be included in the improvements.

5.2.3.14. Sherwood Court

The overall condition of this lift station is fair. The structural condition of the steel is in good condition, but the mechanical components are in fair condition. Thus, this lift station would require either rehabilitation or slip-line but not replacement. This station is moderate flow/moderate risk and would therefore require a Tier II communication upgrade. The station does not currently have a standby generator, which should be included in the improvements, but may require additional property easements to install.

5.2.3.15. SPLIT ROCK

This lift station receives raw sewage from a septic tank and is located in a high hydraulic head situation. The mechanical components of the station are in fair condition, but the routine maintenance required for the filtration system is not conducted regularly and can leave the station in poor condition. Thus, this station should be considered for replacement to eliminate the well pump and screen configuration. The high hydraulic head will be a design issue and may require larger pumps or a new location. The station is a high flow/high risk capacity and would therefore require a Tier I communication upgrade. The station does not currently have a standby generator, which should be included in the improvements.

5.2.3.16. THAMES COURT

The overall condition of this station is very poor. The structural condition of the steel is poor and the mechanical components are in poor condition. Thus, any of the three alternatives could be considered for this lift station. The station is a high flow/high risk capacity and would require a Tier I communication upgrade.

5.2.3.17. WRIGHTS PARK

The overall condition of this station is fair. The structural condition of the steel is poor and the mechanical components are in poor condition. Thus, any of the three alternatives could be considered for this lift station. The station is a high flow/high risk capacity and would require a Tier II communication upgrade. The station does not currently have a standby generator, which should be included in the improvements.

5.2.4. COLLECTION SYSTEM IMPROVEMENTS

There were several deficiencies identified within the collection system, such as pressure service upgrades, air release valve (ARV) replacements, line sags, infiltration and inflow issues, and root issues. The pressure service upgrades and the ARV replacements will be included in the improvements for this facility plan. It is projected that the line sags, I&I, root issues, and miscellaneous other issues will be monitored and repaired with operation and maintenance funds.

Since the flow data used for this report was not optimal, an improved system for reading or monitoring flows for the District's lift stations should be implemented. The individual lift stations required draw down tests in order to utilize the pump hour information. The H-1D lift station has a flow meter, but it took several iterations before realistic values were obtained. It is unknown whether flow values that are included in this report could be erroneous. Therefore, an improved system should be implemented in order to produce more reliable and useable flow data for the District.

Lastly, as was mentioned in Section 3, an updated O&M manual should be written for the District. This will help the operators maintain the system more consistently and will provide a valuable reference for the system.

5.2.5. SEWER ALIGNMENT ALTERNATIVES

5.2.5.1. STRAHORN ROAD GRAVITY SEWER RELIEF LINE

The proposed construction of a new gravity sewer main line (10-inch) along Strahorn Road between Bruce Road and Honeysuckle Avenue was examined in a study of feasibility in July of 2008 by Welch Comer & Associates, Inc. This sewer "relief line" would ease the loading to the rest of the system and would allow for approximately 97 ERs (billed), 59 ERs (vacant), and 618 ERs (SMA growth) to be redirected by gravity flow directly to H-1D instead of going through the Country Club lift station which is adjacent to Hayden Lake. Refer to Figure 5-4: Strahorn Relief Areas for a map of the service areas that could be redirected from the Country Club lift station.

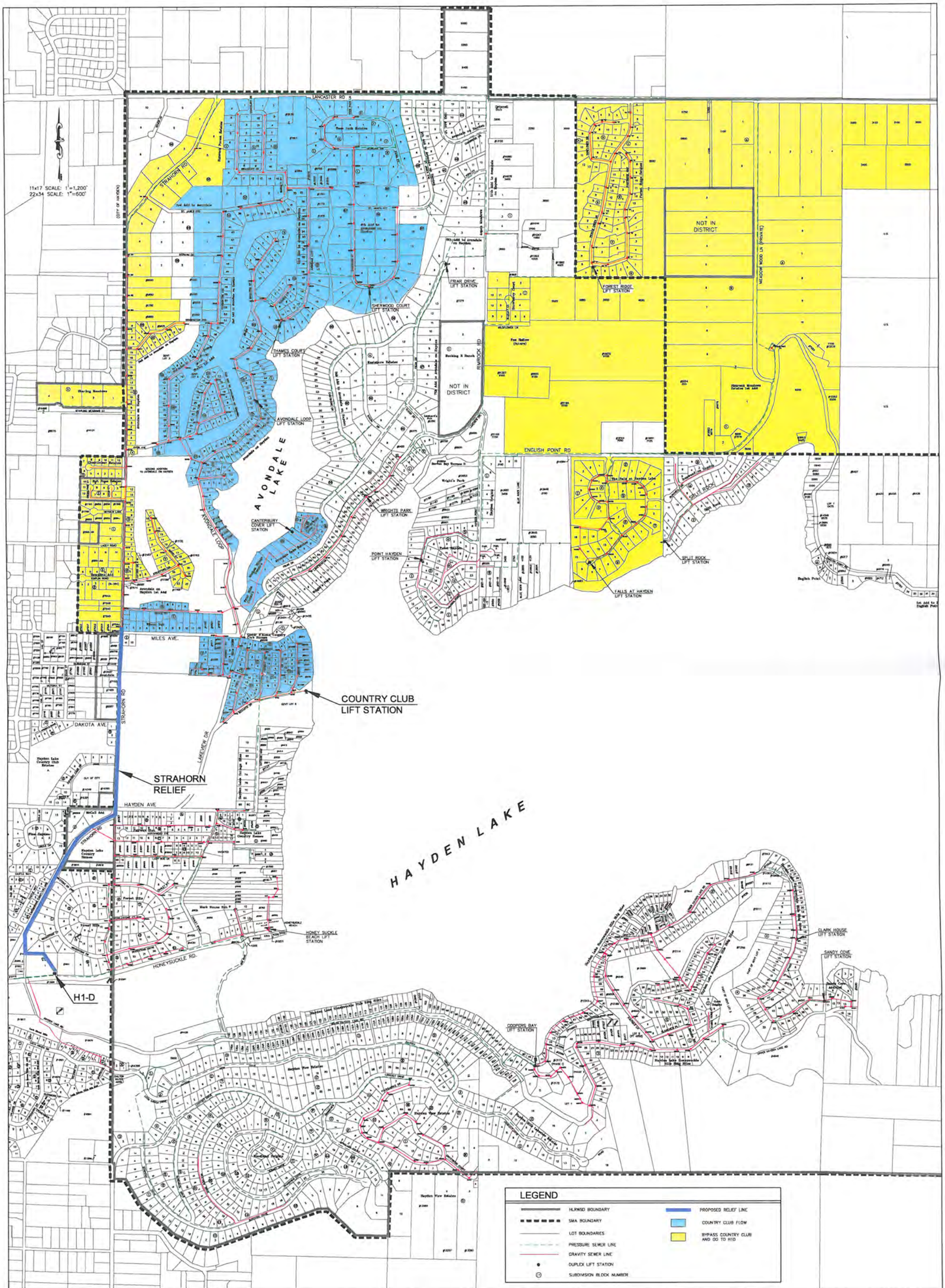
The sewer relief line analyzed in the feasibility study completed in July of 2008 connects to an existing manhole at the intersection of Bruce Rd. and Strahorn Rd. (at the North end of the project) and continues down Strahorn Rd. heading south to an existing manhole on Fieldstone Dr. This proposed gravity line would have a total length of 4,600 feet and would be located in Strahorn Rd. for almost 3,300 feet and underneath either gravel or paved roadways for nearly 1,300 feet. The existing ground for the proposed route has a vertical drop of 14.0 feet from rim to rim. This route was later found to require an additional segment along Honeysuckle Ave. in order to connect the relief line directly to H-1D, adding approximately 1,050 feet to the route as well as additional cost.

As an alternate to this route described above, the relief line could be routed down Strahorn Rd. and then tie-in to H-1D from the north side. This proposed gravity line would have a total length of 6,450 feet and would be located in Strahorn Rd. (pavement) for approximately 3,100 feet and underneath either grassy or gravel surface areas for the remaining 3,350 feet. This alternate route is less expensive and is the recommended route for the relief line.

The City of Hayden Lake has plans to repave Strahorn Rd. The District could cooperate with the City of Hayden Lake to install the relief line during this time with potential for cost sharing for the pavement removal and replacement. This cooperative venture between these two entities would result in significant cost savings for the public. Additionally, other utilities (particularly water facilities) could be located in the construction corridor of this alignment. Appropriate separation will be maintained for these utilities (the roadway is wide enough to allow for separation), especially water/sewer separation for water utilities. Water utilities in the area include North Kootenai Water District, Avondale Irrigation, and City of Hayden. Figure 5-5: Strahorn Road Gravity Sewer Relief Line shows the proposed sewer relief line, first route through Forest Hills, and Figure 5-6: Strahorn Road Gravity Sewer Relief Line (Alternate) shows the proposed sewer relief line, second route down Strahorn Road.

The environmental impacts associated with the Strahorn Relief Line would generally include excavation and site restoration for approximately 20 feet width for the length of the relief line, short-term change to surface and ground water (protected by stormwater controls to prevent pollution of surface and ground water), short-term disturbance to wildlife (noise and excavation), small potential cultural resource impact

(disturbance within previously disturbed areas), improvement to public health (reducing loading on Country Club lift station), positive impact to sole source aquifer (reducing likelihood of leaks and station failures), and improved socioeconomic profile (allowing for growth within the system).



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ENGINEERS · SURVEYORS
350 E. Kathleen Avenue
Phone (208) 664-9382 Fax (208) 664-5946

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PROJECT NO.:	11200
DESIGNED BY:	S.C.
DRAWN BY:	SDS-JAL
CHECKED BY:	

STRAHORN RELIEF AREAS

HAYDEN LAKE RECREATIONAL WATER & SEWER DISTRICT
HAYDEN LAKE, KOOTENAI COUNTY, IDAHO

DWG NAME:	11200PL30.DWG
DATE:	08-28-12
SHEET NO:	

11x17 SCALE: 1"=200'
22x34 SCALE : 1=100

TIE INTO EXISTING GRAVITY SEWER MANHOLE

FIELDSTONE DR

WOODSTONE DR.

E. PEBBLESTONE CT

HONEYSUCKLE AVE.

EXISTING SEWER FORCE MAIN

Forest Hills

WOODSTONE DR

Hayden Lake Country Homes

PROPOSED STRAHORN RELIEF LINE

EXISTING GRAVITY SEWER

LADY BUG LN

Fairway Glen

NORTHWOOD AVE

STRAHORN RD.

HAYDEN AVE.

MATCHLINE THIS SHEET

MATCHLINE THIS SHEET

DAKOTA AVE.

Avondale

BURNHAM ST.

MILES AVE.

STRAHORN RD.

PROPOSED STRAHORN RELIEF LINE

TIE INTO EXISTING GRAVITY SEWER MANHOLE

TEMPLINE RD.

BRUCE ST.

EXISTING GRAVITY SEWER

Wilson Sub.

STRATFORD DR.

OXFORD DR.

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H.L.R.W.S.D

STRAHORN ROAD RELIEF LINE
PROPOSED SANITARY SEWER
(BRUCE ST. TO HONEYSUCKLE AVE)

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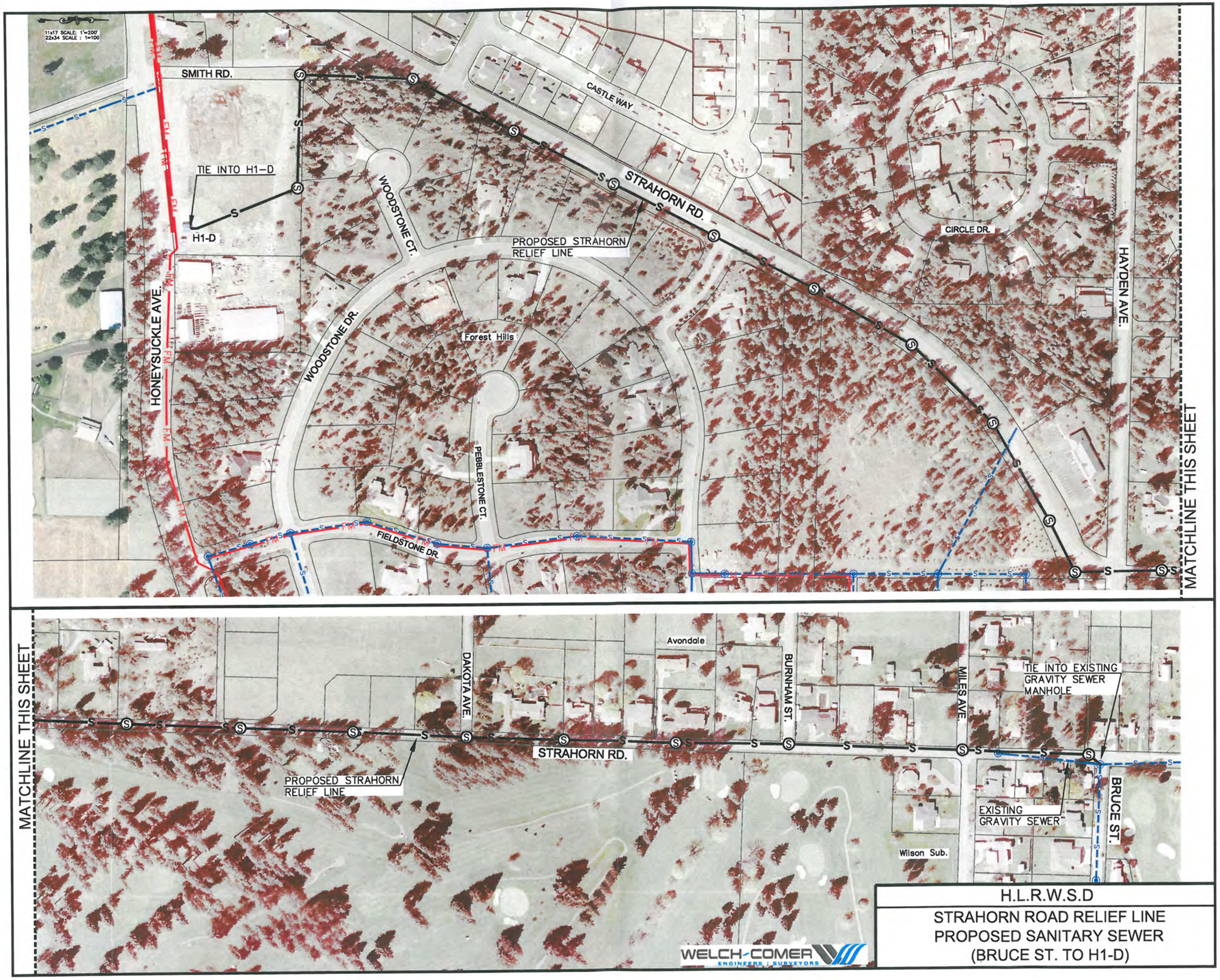

H.L.R.W.S.D

STRAHORN ROAD RELIEF LINE
PROPOSED SANITARY SEWER
(BRUCE ST. TO H1-D)

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5.2.5.2. MILES AVENUE/BRUCE ROAD RELIEF LINE

Another gravity sewer relief line that would alleviate an additional amount of the loading on the current Country Club lift station would be a sewer line running along either Miles Avenue or Bruce Road connecting to the Strahorn Road Gravity Sewer Relief Line. Thus, the Miles Avenue or Bruce Road relief lines should be constructed in conjunction with the Strahorn Road Gravity Sewer Relief Line, or as a separate project. As mentioned before, other utilities (particularly water facilities) could be located in the construction corridor of this alignment. Appropriate separation will be maintained for these utilities (the roadways are wide enough to allow for separation), especially water/sewer separation for water utilities. Water utilities in the area include North Kootenai Water District, Avondale Irrigation, and City of Hayden.

The environmental impacts associated with the either Miles or Bruce Relief Lines would generally include excavation and site restoration for approximately 20 feet width for the length of the relief line, short-term change to surface and ground water (protected by stormwater controls to prevent pollution of surface and ground water), short-term disturbance to wildlife (noise and excavation), small potential cultural resource impact (disturbance within previously disturbed areas), improvement to public health (reducing loading on Country Club lift station), positive impact to sole source aquifer (reducing likelihood of leaks and station failures), and improved socioeconomic profile (allowing for growth within the system).

5.2.5.2.1. MILES AVENUE RELIEF LINE

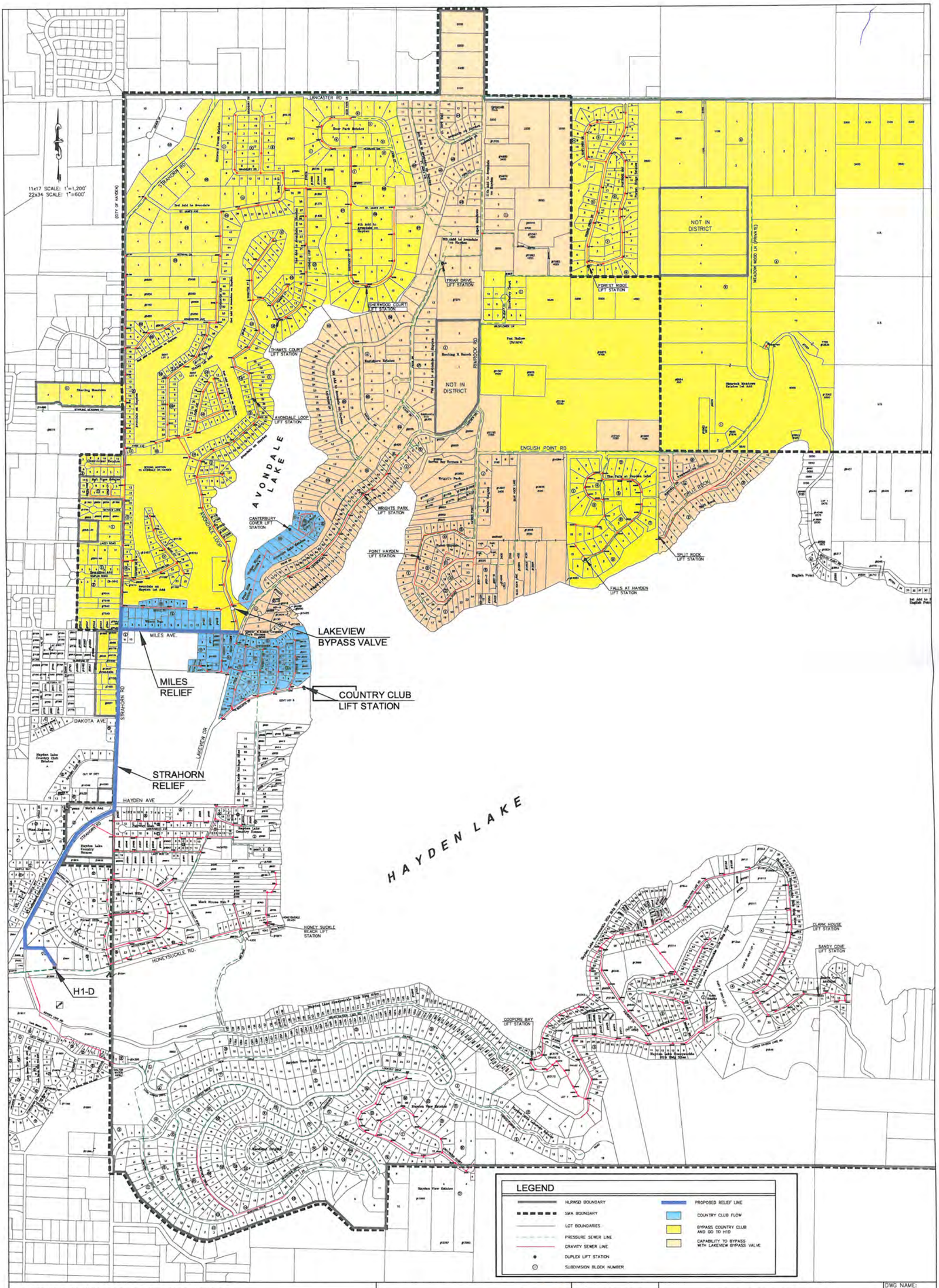
This relief line would tie-in to a manhole that would be part of the proposed Strahorn Relief Line (see Section 6.2.5.1) and be constructed in Miles Avenue, between Strahorn and Lakeview Drive. This would allow for 408 ERs (billed), 83 ERs (vacant), and 665 ERs (SMA growth) to be redirected to H-1D instead of flowing through the Country Club lift station. The line would capture the flow from the existing Avondale and Lakeview Drive sewer lines, leaving these flows in-service while construction is taking place. Valves would be added to the connection at Lakeview Drive, providing for additional routing options for the force main from Lakeview Drive in case of breaks or repairs. Refer to Figure 5-7: Miles and Strahorn Relief Areas for a map of the areas that will be redirected from the Country Club lift station.

Additionally, it is anticipated that Miles Avenue would be under re-construction by the City of Hayden Lake in 2013 or 2014, so installing gravity sewer in Miles Avenue would not require replacing the roadway asphalt, which would be a cost savings. The two possible challenges to this relief line would be the additional existing lines that would be crossed (30” concrete lined, 12” steel water line, gas, and TV cable) and gaining easement/permission from Avondale Country Club. Figure 5-8: Miles Avenue Relief Line shows the proposed sewer line.

5.2.5.2.2. BRUCE ROAD RELIEF LINE (ALTERNATE ROUTE)

This relief line would tie-in to an existing manhole on Strahorn Road and run east toward Avondale Loop, running parallel to an existing sewer line. The line would capture the flow from the existing Avondale sewer lines, leaving this flow in-service

while construction is taking place. This relief line will not capture the Lakeview Drive sewer line. Therefore the same areas would be bypassed as is noted in Figure 5-7, but the Lakeview Bypass would not be installed as part of this relief line. Additionally, Bruce Road will not be under construction in the near future, so laying sewer would require replacing the roadway asphalt. Figure 5-8: Bruce Road Relief Line shows the proposed sewer line. Therefore, this option is not recommended.



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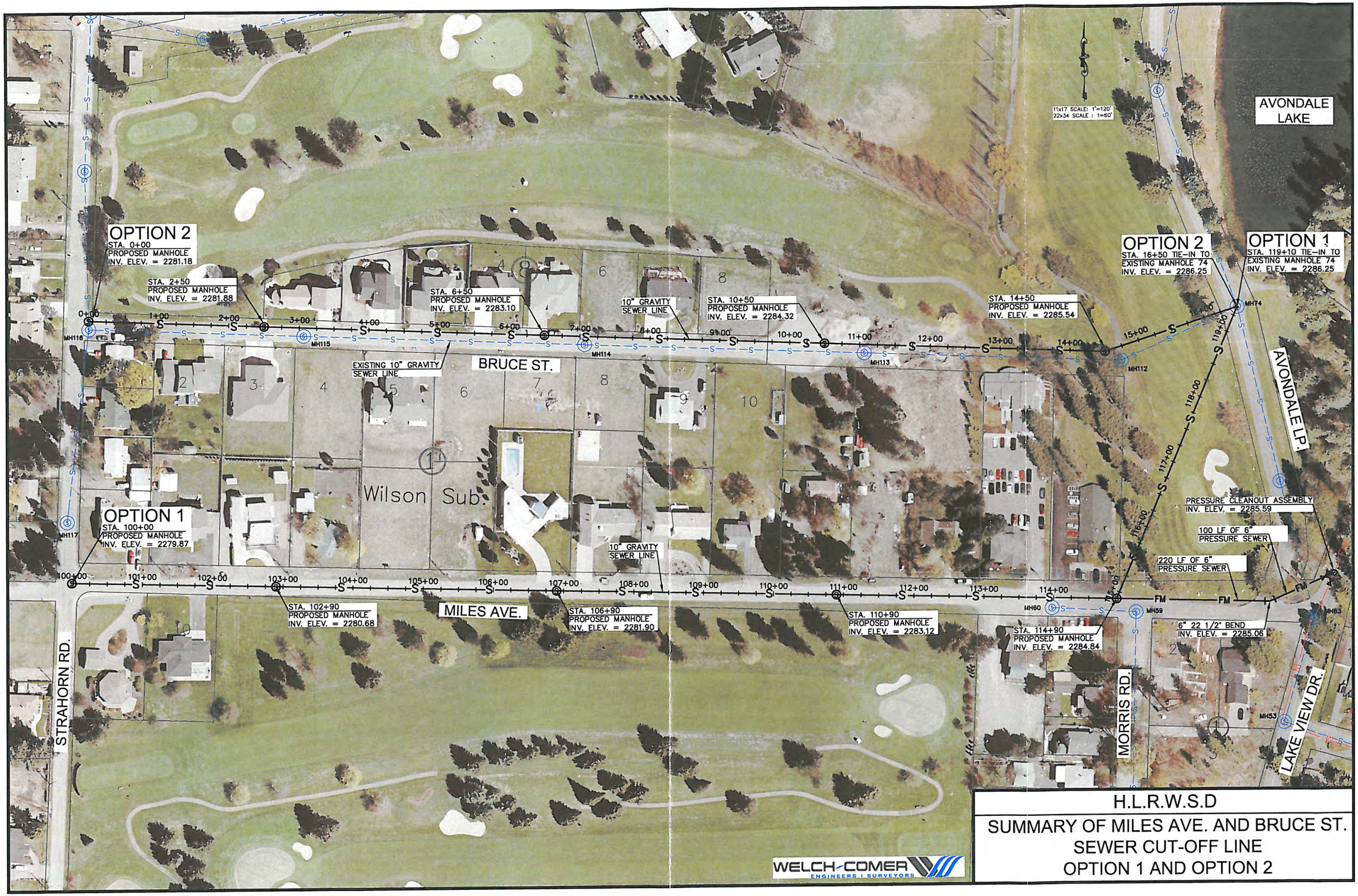
PROJECT NO.:	11200
DESIGNED BY:	S.C.
DRAWN BY:	SDS-JAL
CHECKED BY:	

STRAHORN AND MILES RELIEF AREAS

HAYDEN LAKE RECREATIONAL WATER & SEWER DISTRICT

DWG NAME:	11200PL32.DWG
DATE:	08-28-12
SHEET NO:	



H.L.R.W.S.D

SUMMARY OF MILES AVE. AND BRUCE ST.
SEWER CUT-OFF LINE
OPTION 1 AND OPTION 2

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5.3. "NO ACTION" ALTERNATIVE

Several lift stations are located adjacent to either Hayden Lake or Avondale Lake. If the stations were to fail in some manner (structurally, mechanically, or electrically), there would be very serious effects to the water quality of these Lakes and to public health in the area. Therefore, it is imperative that the District improve the components of each lift station that have been identified above. In addition, as was discussed, the safety of the operators is of concern since most of the electrical panels are not up to current electrical codes.

Lastly, the general collection system requires improvements in terms of maintenance, safety and prevention of significant failures. The sewer collection system alignments and condition should be improved to protect water quality as well as the public health and welfare of the District's residents.

5.4. OPTIMUM OPERATION OF EXISTING FACILITIES

The operation of the facilities could be improved by examining the efficiency of the individual components of the system. However, there are lift stations with structural issues that cannot be addressed with simply improving the operation of the existing facilities. Capital improvements have been recommended for 16 of the District's 17 lift stations.

5.5. REGIONALIZATION

Although the HLRWSD owns and operates its own, independent wastewater collection system, the District has been a partner in a three way regional wastewater facility since October 9, 1986. The Hayden Area Regional Sewer Board (HARSB) is an Inter-Governmental regional entity established by a "Joint Powers Agreement" among HLRWSD, the City of Hayden and Kootenai County.

The purpose of the HARSB "Regional" entity, created under the authority of Idaho Code 67-2328, is to enhance the cost-effectiveness, reliability and quality of service by cooperating on a shared wastewater interagency and treatment system. The HARSB regional entity is governed by a Board, consisting of representatives appointed from each of the three partner agencies.

The following table provides a summary of the existing and reserved capacity allocated to the HARSB regional treatment facility.

Table 5-6: Hayden Area Regional Sewer Board Equivalent Residence (ER) Capacity Breakdown as of 09/01/2011

	Purchased ER TOTAL	Billable ER's	Pre-Paid ER's For Sale	ER's Sold Not Billed
Hayden	6139.5	5902.62	0	236.88
HLRWSD	2645.1	1922	24.5	698.6
Kootenai County	117	79.7	26.01	11.29
HARSB	1139.43	0	1139.43	0
Misc.	20.1	0	0	20.1
TOTAL	10061.13	7940.32	1189.94	966.87

5.6. UN-SEWERED AREAS IN AND AROUND THE COMMUNITY

The un-sewered areas in and around the District have been included in the future growth analysis. These areas are anticipated to become part of the District's service area in the future and ensuring capacity and facilities for these areas has been considered in the alternatives.

5.7. CONVENTIONAL AND ALTERNATIVE COLLECTION/CONVEYANCE SYSTEM

The collection system for the District is fairly conventional in terms of the system set-up. The collection system consists of both pressure and gravity lines. Since the District is almost entirely built-out, the collection system will not be altered significantly. In addition, to reduce the pumping requirements, a gravity sewer pipe design should be used wherever possible.

5.8. SMALL ALTERNATIVE WASTEWATER SYSTEMS

Utilizing small alternative wastewater systems does occur in the District in that some residents are still on individual septic tanks with on-site drainfields. However, utilizing these within the District sewer service area is a risk to public health due to the location and sensitivity of the Aquifer and to the Lakes. When development within the District does occur in the future, consideration of small alternative systems will be evaluated.

5.9. WASTEWATER MANAGEMENT

HARSB operators and staff are under contract with HLRWSD to operate the District's lift stations since the District is part of the regional facility. They monitor flows from each portion of the system (the District, City of Hayden, and Kootenai Airport) using flow meters at the major lift stations in addition to pump hour readings at the minor stations. In addition, they have implemented "smart panels" on several lift stations and utilize the data to increase efficiency of those lift stations. In addition, they monitor the treatment and flow through the treatment facility to be in compliance with their NPDES permit for discharge to the Spokane River and land application.

The alternatives for the electrical panels were discussed with HARSB operators and staff to determine what would ensure that wastewater management would be

efficient and accurate. They have concurred with the alternatives and are supportive of the standardization of the panels.

As discussed previously, HARSB manages land application/reuse and sludge handling. Please refer to the HARSB facility plan for details on these issues. This facility plan only addresses the District's collection system.

5.10. System Classification and Operator Licensure

The alternatives consist of upgrading current facilities and will not change the system classification or the operator licensure requirements.

5.11. Public Input and Participation

As part of the improvement alternative selection process, public input was sought and received from the community. This is documented in Section 6.4.

6. FINAL SCREENING OF PRINCIPAL ALTERNATIVES AND PLAN ADOPTION

6.1. EVALUATION OF COSTS

6.1.1. CAPITAL COSTS AND FINANCING PLAN

For the purposed of comparison, the relative capital costs associated with each of the alternatives for the structural/mechanical and electrical options were based on average costs for the different lift stations. Specific cost estimates for each lift station will be developed once the alternative has been selected. In addition, the collection system upgrade costs were included in the capital costs. These include pressure service upgrades and ARV replacements. Lastly, the two gravity sewer relief lines (Strahorn and Miles) were included as well. The budget for Miles was used for cost estimation, since the Bruce route is not recommended. The total costs associated with each option are shown in Table 6-1 and are included in detailed cost estimates in Appendix F.

Table 6-1: Relative Capital Costs for Each Alternative

		Alt. A: Rehabilitation	Alt. B: Replacement	Alt. C: Slip-Line
Description	Quantity	Total Cost	Total Cost	Total Cost
Lift Station Upgrades				
Structural/Mechanical	13	$ 1,806,740	$ 3,162,640	$ 2,113,540
Control Tier I	10	$ 618,750	$ 618,750	$ 618,750
Control Tier II	4	$ 233,620	$ 233,620	$ 233,620
Control Tier III	2	$ 90,760	$ 90,760	$ 90,760
Generator	7	$ 538,300	$ 538,300	$ 538,300
Collection System Upgrades				
Pressure Service Upgrades	157	$ 541,650	$ 541,650	$ 541,650
ARV Replacements	6	$ 28,500	$ 28,500	$ 28,500
Relief Lines				
Strahorn Relief Line	1	$ 487,270	$ 487,270	$ 487,270
Miles/Bruce Relief Line	1	$ 170,250	$ 170,250	$ 170,250
TOTAL COST	1	**$ 4,305,540**	**$ 5,661,440**	**$ 4,612,340**

Notes:

1. English Point, Falls at Hayden, Forest Ridge, and H-1D assumed not to require structural/mechanical upgrades, only electrical/control improvements.
2. For Miles/Bruce cost, budget for Miles (more expensive) due to similar costs and unknown easements/restoration costs

As can be seen in the table above, the rehabilitation option (Alternative A) for the structural/mechanical alternative is the least expensive, followed by the slip-line option, and the total replacement of the lift station is the most expensive. Each alternative includes bypass pumping, excavation, new mechanical components, and site

improvements/restoration. Refer to detailed cost estimates in Appendix F for more information.

6.1.2. *Operation and Maintenance Costs*

The recommended improvements should reduce call-out costs and frequency. However, any savings in O&M should be applied toward future reserve and replacement. Thus, the operation and maintenance costs are expected to remain the same as those discussed for the previous years (see Section 4).

6.1.3. *Cost Escalation Factors for Energy Use*

The alternatives presented are structural and mechanical in nature with little variability in electrical or energy usage. Thus, cost escalation for energy use is not does not affect the selection of alternatives in this case.

6.1.4. *Present Worth Analysis*

A "present worth" analysis consists of comparing various alternatives on an "apples to apples" basis. This was done by computing 20 years of O&M expenses to a present worth value, assuming 3 percent interest. Then the present value of O&M is added to the estimated capital project cost, in order to determine the "present worth" value with which to compare alternatives.

The present worth analysis was conducted utilizing the current operation and maintenance costs in addition to the capital costs presented in Section 6.1.1 above. The following table (Table 6-2) presents the results of this analysis.

Table 6-2: Present Worth Analysis

Alternatives	Annual O&M	Capital Cost	Total Present Worth[1]
Alternative A: Rehabilitation	$ 333,500	$ 4,305,540	$ 8,944,750
Alternative B: Replacement	$ 333,500	$ 5,661,440	$ 10,300,650
Alternative C: Slip-Line	$ 333,500	$ 4,612,340	$ 9,251,550

[1] An annual interest rate of 3% was assumed for a 20 year period.

Since the operation and maintenance costs are expected to remain similar to what the District spends now, the present worth analysis does not appear to yield new insights into the costs of the project. Alternative A: Rehabilitation remains the least cost alternative for the lift stations.

6.1.5. *Comparison of Costs of Alternatives*

The present worth analysis conducted above shows that since the operation and maintenance costs are expected to remain similar to what the District spends now, Alternative A remains the least expensive option for the lift stations.

The gravity sewer relief lines (Miles/Bruce and Strahorn) were included in the total capital costs; however, these relief lines warrant a separate discussion of costs and benefits. As discussed previously, the relief lines are anticipated to improve

reliability of the system, significantly reduce the flows to the Country Club lift station, and reduce environmental risks at the Country Club lift station. If only the Strahorn relief line is installed, these benefits can be realized; if the Strahorn relief line is installed along with the Miles/Bruce relief line, the benefits could increase significantly (see Section 5). Thus, the cost of installing both relief lines should be considered due to the significant increase in benefits.

6.2. Reliability and Implementability

The options proposed structural/mechanical and communication improvements for the 17 lift stations; rehabilitation, replacement, and slip-lining, are expected to be dependable options that will provide service for at least another 20 years. One concern with the rehabilitation option is the unknown longevity of the existing steel. During the inspection, the interior steel walls of the lift stations appeared to be sound with only minor surface corrosion. However, the fact that this steel has already been in the ground for over 25 years makes the remaining life expectancy difficult to quantify. When compared to a new fiberglass lift station, as proposed in the replacement and slip-lining options, the option to rehabilitate the existing steel lift stations does not provide the same reliability. The option not to make any improvements (do nothing) would leave the lift stations in their current unstable and vulnerable condition providing poor reliability over the long term.

Each of the options has similar capability to be implemented, which will be dependent upon the public and Board's direction in approving an LID or revenue bond. The success will also depend on the ability to secure loan funds from agencies such as Idaho Department of Environmental Quality or USDA-Rural Development. The success of securing low interest funding avenues will allow the project to be more affordable by the sewer rate payers. Refer to Section 8 for more information on funding options for the District.

6.3. Alternative Comparison (Environmental)

A discussion of environmental impacts was included in the previous section. A comparison of the alternatives has been included in Appendix G. This comparison highlights the major impacts anticipated for each alternative. The electrical control options are not anticipated to impact the environment significantly. Additionally, the various electrical options are not expected to impact the environment differently than each other. Thus, an analysis of the impacts associated with the controls is not required. A more detailed evaluation of impacts and inclusion of comments from federal and state agencies will be included in the Environmental Impact Document.

Impacts to water supply systems (in the long-term) are not anticipated since the improvements are aimed at improving the structural and operational efficiency and condition of the sewer system lift stations and collection system. The improvements are anticipated to improve reliability and thereby reduce the potential for untreated and uncontrolled discharges to reach either the Aquifer or the surface water bodies in the area.

6.4. FINAL PUBLIC INPUT

As part of the improvement alternative selection process, public input was sought and received from the community. This section identifies the steps taken to solicit public input.

The DRAFT Facility Plan for the Wastewater Collection System was presented to the District at a public meeting held on September 5, 2012. During this meeting a presentation was given identifying and discussing the recommended improvement alternatives. Cost information for the improvements presented in Section 6 was also summarized in the presentation. Additionally, information regarding the HARSB Wastewater Treatment Facility improvements (discussed in a separate document) and costs were presented. A newsletter was direct mailed to all sewer rate payers in late August used to notify the District of the September 5th meeting and answer questions regarding the wastewater projects (both collection and treatment facility). The public was also notified of the meeting through a legal notice in the local paper. The public's questions during the public meeting mainly consisted of the reasoning for the project, costs, and the treatment facility upgrade regulatory requirements and operation and maintenance costs. These questions were addressed by the Board, the Engineer, or the HARSB manager. Copies of the newsletter, presentation, meeting minutes, and meeting sign-in sheets are included in Appendix H.

The public was then provided a 14-day comment period to review the DRAFT document and submit written comments to the Board regarding the improvement alternatives (discussed in the August newsletter and the legal notice). One written comment was received, which is documented and included in Appendix H. This comment was largely related to an older issue (with the operation of the system); the District responded to the comment, and their written response is included in Appendix H.

At the regularly scheduled Board meeting on September 26th, the Board reviewed the public comments received (verbally during the public meeting and the written comment) and selected the recommended improvement options for the collection system (discussed in further detail in Section 7). The recommended improvement options consist of specific improvements to each lift station, relief lines, and other system improvements (refer to Section 7 for more information). The meeting minutes and sign-in sheet are included in Appendix H.

The Board elected to conduct two more public meetings after the September 5th meeting in order to inform the District residents about the projects and the potential funding methods. These public meetings were held on October 10th and October 12th (identical information was presented at both meetings). The public was informed of these meetings in an October newsletter and through a newspaper advertisement in the local paper. As with the first meeting, the meetings presented information on the recommended improvements, costs, and funding methods for both the collection system and the treatment facility. The public's questions during these meetings mainly consisted of the project costs, treatment facility regulatory requirements, and methods of funding the projects. Copies of the newsletter, presentation, and meeting minutes are included in Appendix H.

6.5. COST EFFECTIVENESS

The components necessary for this analysis have been included in previous sections (Sections 4, 5, and 6). The component descriptions provided in 40 CFR 35.2030 (b.)(3.) were utilized within these sections to comply with this regulation.

7. RECOMMENDED PLAN DESCRIPTION (CAPITAL IMPROVEMENT PLAN)

7.1. JUSTIFICATION AND DESCRIPTION OF RECOMMENDED PLAN

Each lift station was evaluated in terms of condition, risk, and safety to determine which capital improvement option was recommended for each lift station. From this evaluation, each lift station has a separate improvement priority and need. These repairs may be funded through capital financing such as an LID, or may be funded through future Operation and Maintenance reserve from the sewer user rates.

The capital improvement plan also recommends construction of the gravity sewer relief lines at Strahorn and Miles/Bruce. These were discussed separately from the lift station and collection system improvements, but will be included in the recommended funding for the capital improvement plan.

In addition to the lift station and relief line improvements, collection system improvements will be conducted, as was mentioned in Section 6. These improvements include:

- Pressure service upgrades
- ARV replacement
- Line sags
- I&I issues
- Root issues
- Miscellaneous issues

These improvements are proposed to be funded through future Operation and Maintenance reserves from the sewer user rates.

The following table (Figure 7-1) shows the recommended alternatives for each lift station and the other improvements included in this capital improvement plan.

Figure 7-1: Capital Improvement Plan Recommended Improvements

Priority	Capital Improvement Projects	Notes	Phase
1	Thames Court Lift Station	Rehabilitation (Coating In-Place)	A
		Electrical Tier I	A
2	Strahorn Relief Line ***	Strahorn	A
3	Miles/Bruce Relief Line ***	Budget for Miles	A
4	Point Hayden Lift Station	Replacement	A
		Electrical Tier I	A
5	Sandy Cove Lift Station	Replacement	A
		Electrical Tier I	A
		Generator	B
6	Canterbury Cove Lift Station *	Replacement (+3 grinders for houses)	A
		Electrical Tier III	A
7	Clark House Lift Station	Rehabilitation (Coating In-Place)	A
		Electrical Tier II	A
		Generator	A
7	Avondale Loop Lift Station	Rehabilitation (Coating In-Place)	B
		Electrical Tier I (Complete)	
8	Wrights Park Lift Station	Rehabilitation (Coating In-Place)	B
		Electrical Tier II	B
		Generator	B
9	Sherwood Court Lift Station	Rehabilitation (Coating In-Place)	B
		Electrical Tier II	B
		Generator	B
10	Split Rock Lift Station	Replacement	B
		Electrical Tier I	B
		Generator	B

Priority	Capital Improvement Projects	Notes	Phase
11	Honeysuckle Beach Lift Station **	Rehabilitation (Coating In-Place)	B
		Muffin monster (City of Hayden supplied)	B
		Electrical Tier II	B
		Generator	B
12	Coopers Bay Lift Station	Rehabilitation	B
		Electrical Tier I	B
12	Country Club Lift Station	Electrical Tier I	B
12	English Point Lift Station	Electrical Tier I (Telemetry)	O&M
		Safety grate	O&M
12	Falls at Hayden Lift Station	Electrical Tier I (Telemetry)	O&M
		Safety grate	O&M
12	Forest Ridge Lift Station	Electrical Tier I (Telemetry)	O&M
		Safety grate	O&M
12	H-1D Lift Station	Repairs/Improvements	O&M
		HARSB installing radio (2012)	
12	Packsaddle Lift Station	Replacement (raw sewage grinder station)	B
		Electrical Tier III	B
		Generator	B
12	Back-up Pumps	For 4-5 pump types	B
13	Pressure Service Upgrades	For 157 Services	O&M
13	ARV Replacement	For 6 Replacements	O&M
13	Line Sags	For 18 Line Sags (13 Severe)	O&M
13	I&I Identification	For 22 Locations	O&M
13	Root Issues	For 4 Locations	O&M
13	Miscellaneous Issues	For 9 Miscellaneous Issues	O&M

* Requires additional considerations

** Assumes cooperation with City of Hayden

*** Assumes cooperation with City of Hayden Lake

The recommended alternative reflects the preferred option with respect to both cost and environmental impact. The recommended repair and replacement options for the lift stations and collection system improvements were chosen to address the deficiencies at each lift station while balancing cost to the user and environmental impacts. Thus, the recommended alternative is a combination of replacement, repair, and new installation (of relief lines) for the lift stations and collection system.

7.2. Preliminary Design of Recommended Plan

The preliminary design and description of the recommended options for each lift station is presented in Section 5, in Figures 5-1, 5-2, and 5-3. Each lift station may require slightly different components based on site and inlet/outlet conditions; however, the figures in Section 5 present a general concept of the repairs to the lift stations.

7.3. Cost Estimates for the Recommended Plan Including Monthly Charges

The District has decided to apply for federal or state loan (see Section 9 for further discussion on funding) with terms of 3.7% interest rate (or lower) for a term of 20 years and possibility of loan principal forgiveness. Based on these low interest loan terms, the following table provides the estimated cost of the project and the expected cost per user for 2,645 benefited ERs and parcels estimated at current conditions. Several funding options were considered with combinations of capital funding versus operation and maintenance funding. Ultimately, the Board decided to recommend full capital funding of the improvements, but implemented in phases. Phase A will include the immediate needs of the District, Phase B will include the remaining lift station improvements that are necessary, and the improvements in the operation and maintenance (O&M) category will be funded with future O&M reserves. Detailed cost estimates for each lift station are included in Appendix F. Table 7-1 shows a summary of these improvement costs and Table 7-2 shows the estimated cost for the District property owners.

Table 7-1: Cost Estimates for Recommended Improvements

	All Improvements	Phase A	Phase B	Operation and Maintenance
Total	$ 4,800,000	$ 2,265,700	$ 1,823,700	$ 689,000
Total LID	$ 4,089,400			
Total O&M	$ 689,000			

Table 7-2: Estimated Cost of Collection Improvements for District Property Owners

	LID	O&M
Recommended Project Cost	$ 4,089,400	$ 689,000
ADD Project Admin/Legal	$ 100,000	
Project TOTAL	$ 4,200,000	$ 689,000
Total Project Cost per User[1]	$ 1,588	
Annual Cost per User[3]	$ 114	
Monthly Cost per User[2]		$ 3.00

Notes:

1. Cost assumes 2645 ERs and parcels (LID)
2. Assumes 1922 ERs, current actual users
3. Financing terms of 3.7% over 20 years
4. O&M amount over 10 years
5. Costs not included: Loan Reserve

The current monthly sewer use fee in the District is $44.00 per month per ER. With completion of the collection system improvements it is estimated that the current and future users would pay an effective fee of $54.00 per month if the LID cost of the collection system improvements was added as an equivalent monthly payment. At this time, the District Board does not anticipate raising the O&M fee in order to increase the reserve amount.

Figure 7-2 on the following pages includes a cost breakdown for the recommended improvements including financing options which are discussed in this section and in Section 8.

HLRWSD Sewer Collection System
Capital Improvement Phasing

Priority	Capital Improvement Projects	Notes	Total Cost	LID Phase A	LID Phase B	O&M Replacement Fund
1	Thames Court Lift Station	Rehabilitation (Coating In-Place)	$ 151,210	$ 151,210		
		Electrical Tier I	$ 61,875	$ 61,875		
			$ 213,085			
2	Strahorn Relief Line ***	Strahorn	$ 464,880	$ 464,880		
3	Miles/Bruce Relief Line ***	Budget for Miles	$ 170,250	$ 170,250		
4	Point Hayden Lift Station	Replacement	$ 198,810	$ 198,810		
		Electrical Tier I	$ 61,875	$ 61,875		
			$ 260,685			
5	Sandy Cove Lift Station	Replacement	$ 333,960	$ 333,960		
		Electrical Tier I	$ 61,875	$ 61,875		
		Generator	$ 76,900		$ 76,900	
			$ 472,735			
6	Canterbury Cove Lift Station *	Replacement (+3 grinders for houses)	$ 252,410	$ 252,410		
		Electrical Tier III	$ 58,405	$ 58,405		
			$ 310,815			
7	Clark House Lift Station	Rehabilitation (Coating In-Place)	$ 314,810	$ 314,810		
		Electrical Tier II	$ 58,405	$ 58,405		
		Generator	$ 76,900	$ 76,900		
			$ 450,115			
7	Avondale Loop Lift Station	Rehabilitation (Coating In-Place)	$ 150,460		$ 150,460	
		Electrical Tier I (Complete)	$ -			
			$ 150,460			
8	Wrights Park Lift Station	Rehabilitation (Coating In-Place)	$ 150,460		$ 150,460	
		Electrical Tier II	$ 58,405		$ 58,405	
		Generator	$ 76,900		$ 76,900	
			$ 285,765			
9	Sherwood Court Lift Station	Rehabilitation (Coating In-Place)	$ 140,060		$ 140,060	
		Electrical Tier II	$ 58,405		$ 58,405	
		Generator	$ 76,900		$ 76,900	
			$ 275,365			
10	Split Rock Lift Station	Replacement	$ 241,560		$ 241,560	
		Electrical Tier I	$ 61,875		$ 61,875	
		Generator	$ 76,900		$ 76,900	
			$ 380,335			
11	Honeysuckle Beach Lift Station **	Rehabilitation (Coating In-Place)	$ 141,580		$ 141,580	
		Muffin monster (City of Hayden supplied)	$ -			
		Electrical Tier II	$ 58,405		$ 58,405	
		Generator	$ 76,900		$ 76,900	
			$ 276,885			
12	Coopers Bay Lift Station	Rehabilitation	$ 52,860		$ 52,860	
		Electrical Tier I	$ 61,875		$ 61,875	
			$ 114,735			
12	Country Club Lift Station	Electrical Tier I	$ 61,875		$ 61,875	
			$ 61,875			
12	English Point Lift Station	Electrical Tier I (Telemetry)	$ 22,125			$ 22,125
		Safety grate	$ 600			$ 600
			$ 22,725			

HLRWSD Sewer Collection System
Capital Improvement Phasing

Priority	Capital Improvement Projects	Notes	Total Cost	LID Phase A	LID Phase B	O&M Replacement Fund
12	Falls at Hayden Lift Station	Electrical Tier I (Telemetry)	$ 22,125			$ 22,125
		Safety grate	$ 600			$ 600
			$ 22,725			
12	Forest Ridge Lift Station	Electrical Tier I (Telemetry)	$ 22,125			$ 22,125
		Safety grate	$ 600			$ 600
			$ 22,725			
12	H-1D Lift Station	Repairs/Improvements	$ 50,700			$ 50,700
		HARSB installing radio (2012)	$ -			
			$ 50,700			
12	Packsaddle Lift Station	Replacement (raw sewage grinder station)	$ 29,060		$ 29,060	
		Electrical Tier III	$ 45,380		$ 45,380	
		Generator	$ 76,900		$ 76,900	
			$ 151,340			
12	Back-up Pumps	For 4-5 pump types	$ 50,000		$ 50,000	
13	Pressure Service Upgrades	For 157 Services	$ 541,650			$ 541,650
13	ARV Replacement	For 6 Replacements	$ 28,500			$ 28,500
13	Line Sags	For 18 Line Sags (13 Severe); reserve fund	$ -			
13	I&I Identification	For 22 Locations; reserve fund	$ -			
13	Root Issues	For 4 Locations; reserve fund	$ -			
13	Miscellaneous Issues	For 9 Miscellaneous Issues; reserve fund	$ -			
	TOTAL		$ 4,778,400	$ 2,265,700	$ 1,823,700	$ 689,000
	TOTAL LID		$ 4,089,400			
	Administration/Legal		$ 100,000.00			
	TOTAL O&M		$ 689,000			

* requires additional considerations
** assumes cooperation with City of Hayden
*** assumes cooperation with City of Hayden Lake

COLLECTION SYSTEM FUNDING

	Funding	Notes	LID	O&M
1	Total LID		$ 4,200,000	
	LID Assessment ($ / ER)	Assumes 2645 ERs	$ 1,588	
	LID Monthly Cost ($ / Year / ER)	Ammortized at 3.7% over 20 years (USDA)	$ 113.80	
	LID Monthly Cost ($ / Month / ER)	Ammortized at 3.7% over 20 years (USDA)	$ 9.50	
2	Monthly O&M Requirement	Assumes 1922 ERs		
	Depreciation ($ / Month / ER)	Paid over 10 years		$ 3.00

* Collected through O&M funds

HLRWSD SHARE OF HARSB IMPROVEMENTS

Funding	Notes	LID
Total LID		$ 6,200,000
LID Assessment ($ / ER)	Assumes 2645 ERs	$ 2,344
LID Monthly Cost ($ / Year / ER)	Ammortized at 2% over 20 years (DEQ)	$ 143.40
LID Monthly Cost ($ / Month / ER)	Ammortized at 2% over 20 years (DEQ)	$ 11.90

TOTAL LID ASSESSMENT (per ER) $ 3,932

7.4. Financial Capability

As a "water and sewer district" authorized by Idaho State Statues, the District has the capability to obtain financial resources through formation of Local Improvement Districts (LIDs), incurrence of debt through loans from state and federal agencies, and reception of grants through federal or state agencies. They also can fund improvements through the depreciation and operation and maintenance funds collected from the District users. They also have the technical qualifications and facilities to carry out the project since they have hired Welch Comer & Associates, Inc. as the District engineer and can hire or train their operator to suit the needs of the facility.

7.5. Land Acquisition

If property is required by the improvements discussed in this project, the District will follow the process required by Idaho Code, through obtaining an appraisal, entering into negotiations with the land owner, and finally purchasing the property.

7.6. Environmental Impacts of the Recommended Plan

An Environmental Informational Document (EID) is included in a separate document.

8. IMPLEMENTATION ARRANGEMENTS

8.1. INTER-MUNICIPAL SERVICE AGREEMENTS

Although the HLRWSD owns and operates its own, independent wastewater collection system, the District has been a partner in a three way regional wastewater facility since October 9, 1986. The Hayden Area Regional Sewer Board (HARSB) in an Inter-Governmental entity established by a "Joint Powers Agreement" among HLRWSD, the City of Hayden and Kootenai County. This agreement is included in Appendix B.

8.2. FINANCING ARRANGEMENTS

8.2.1. FEDERAL FUNDING SOURCES

8.2.1.1. USDA-RURAL DEVELOPMENT GRANTS AND LOANS

USDA-Rural Development provides both grants and loans for water and wastewater project for rural communities with less than 10,000 populations.

Loans- The primary role of USDA-RD is to provide long term, low interest loans for water and wastewater projects. Their loans must be secured by a municipal bond approved by voters or property owners per state law.

Grants- The USDA-RD can also supplement its loans with a grant which is intended to reduce the monthly rate of the public utility, including loan payments, operation, maintenance, and reserve, within a range which USDA has determine "affordable". This "affordability" criterion is related to the median household income of the community. However, the HLRWSD has been informed by USDA-RD that the District would not qualify for grant funding.

8.2.2. STATE AND LOCAL FUNDING SOURCES

8.2.2.1. (STATE) IDAHO DEQ STATE REVOLVING LOAN FUNDS

The Idaho Department of Environmental Quality offers below market revolving loan funds, on a statewide competitive basis to help finance public wastewater system improvements. The loan debt must be authorized and issued by the public agency, by passing a Revenue Bond election or a Local Improvement District (LID).

For Fiscal Year 2013, DEQ loans have interest rates from 0 to 1.75%, over an amortization term of 20 to 30 years. Letter of Interests (LOI) for DEQ SRF loan funds for FY 2013 are due to DEQ by January 6, 2012. DEQ establishes a statewide priority list ranking of potential loan projects each year. Some of the most important criteria in the ranking process include:

- Complete Facilities Plan
- Public Health/Water Quality Needs
- Compliance with State/Federal Regulations
- Bond Financing in Place
- Readiness to Proceed

8.2.2.2. LOCAL MATCHING FUNDS

IDEQ requires that the municipality provide a guarantee for its loans through approval of some form of municipal bond. There are two primary bonding methods used in Idaho to finance municipal sewer improvements: Revenue Bond or Local Improvements District.

8.2.2.2.1. REVENUE BOND

A revenue bond is formed by an election of resident voters within the District. A simple majority (50% +) is required to pass the bond. The bond is repaid by user fees (revenue) generated by the sewer utility. Vacant lots cannot be charged for the bond costs under a revenue bond.

8.2.2.2.2. LOCAL IMPROVEMENTS DISTRICT

A Local Improvement District (LID) is formed by public hearing process, rather than an election (Figure 8-1). A LID bond is repaid by assessments against real property, which is benefited by the public improvement. Any owner of property, which is proposed to be assessed under the LID, regardless of residency, has the right to support or object to formation of the LID. If 60% of owners of property within the LID object to the LID formation, then the LID cannot proceed without resubmitting the LID after 6 months' time, or without appeal by the District Board.

All property owners have two options regarding re-payment of the LID assessments. Each property owner can either pay the amount of the LID assessment in full after completion of the project and prior to finalization of the assessment roll, or the owner can choose to amortize the amount at a set interest rate for a fixed number of years (typically 10-20 years). A LID assessment, which is amortized, becomes a lien on the property as security for repayment of the assessment, until such time as the assessment has been paid in full.

Figure 8-1: LID Process Outline

LID PROCESS PER IDAHO CODE

(Title 50, Ch. 17)

1. LID Initiated By Resolution
2. Resolution of Intent to Create the LID
3. Notice of Hearing Published and Mailed to Property Owners
4. Public Hearing to Consider Protests and Supporters
5. Ordinance Creating LID Adopted
6. Engineering Authorized to Prepare Plans and Bidding Documents
7. Construction Phase
8. Prepare Final Costs and Assessment Roll
9. Notice of Final LID Hearing
10. Hearing on Objections to Assessment Roll
11. Confirmation of Assessment Roll
12. Notice of Final Assessment to Property
13. 30-Day Pre-payment Period

Assessments Not Pre-Paid Will be Amortized at LID Bond Term and Rate and are Paid in Annual Installments of Principal and Interest

8.2.3. *PENDING HARSB TERTIARY TREATMENT UPGRADES*

Regardless of the outcome of the pending challenges to the Spokane River TMDL, it is clear that HARSB must finance and construct significant tertiary treatment (phosphorus removal) improvements within the next few years in order to comply with the pending NPDES Discharge Permit which EPA is scheduled to issue to HARSB in spring of 2012.

The District presently has 1,918 active sewer users and 727 vacant parcels with "pre-paid" sewer capacity within the sewer service area. A total of 2,645 ER's have already purchased capacity in the existing "secondary treatment" facility.

In order to finance the Sewer District's pending share of the HARSB upgrades, including vacant lots keeping current with their rights to capacity, it is recommend the District consider forming a LID. This would need to occur perhaps in 2012 or 2013, depending on the HARSB treatment facilities schedule and availability of DEQ loans. The District's share of the HARSB treatment facility upgrades is estimated at $6.2 million.

8.2.4. *OTHER POSSIBLE CAPITAL IMPROVEMENTS FUNDED BY A LID*

As the District's Sewer Collection system ages (constructed in 1986-1987), components of the system depreciate at various rates, and must be scheduled for upgrades or replacement. Sewer Districts in Idaho finance these types of depreciation/capital improvements using a depreciation/reserve fund generated by O&M fees, bond financing (revenue or LID Bond) or a combination of both.

With the pending formation of a LID on the horizon for the HARSB upgrades, it allows the District to consider also financing some of the major capital improvement/depreciation projects within the District's sewer collection system. This could take advantage of a) economies of scale for LID administration and legal costs, b) economies in scale in bidding one large capital improvement project, and c) relieves some of the financial burden on monthly sewer rates to accommodate significant depreciation reserves.

An example of how the District's capital improvement/depreciation projects might be financed using both a LID and a depreciation reserve from monthly rates is as follows:

POTENTIAL FINANCING APPROACH FOR HLRWSD SEWER COLLECTION CAPITAL IMPROVEMENTS

LID Bond Financing	Depreciation Reserves (Monthly Fees)
- Lift Station Controls, Telemetry, Basins	- Air Release Valves
- Generators	- Pressure Services
- Gravity Sewer Relief Line Improvements (Strahorn, Miles)	- Manholes
	- Pressure Sewers

8.2.5. DEQ LOAN FINANCING FOR HLRWSD SHARE OF HARSB IMPROVEMENTS

DEQ loan funding can be compared to the District's recent experience with LID #6 financing on the open municipal bond market, along with the associated high LID financing legal and overhead costs. An estimate of the LID assessment for the District's share of the HARSB Treatment Facility Upgrades is:

$6.2 million ÷ 2,645 ERs = $2,344 per ER

A sample calculation comparing LID financing using a DEQ loan verses an open market municipal bond financing is as follows:

Assume LID Principal Assessment = $2344 / ER

Financing Source	DEQ Loan	Open Market Municipal Bond
Assumed Interest	2%	6%
Rate Term	20 Years	15 Years
	(.06116)	(.10296)
Resulting Annual LID Payment	$143 / Year / ER	$241 / Year / ER
% Reduction By Using DEQ Loan	40% Less	

A pre-requisite to qualify for a DEQ loan is for the District to have a current preliminary engineering facilities plan which evaluates sewer system needs, options, costs, and implementation / funding. Also, these DEQ regulations, amended in May 2009, now require all owners of municipal sewer systems to prepare a current facilities plan prior to DEQ approval of plans for any material modifications or expansions.

8.2.6. USDA-RURAL DEVELOPMENT (OR BOND BANK) FUNDING FOR COLLECTION SYSTEM IMPROVEMENTS

The HLRWAS Board intends to apply for funding from USDA-Rural Development for loan funding for the recommended sewer collection capital improvement plan (CIP) improvements. Another financing option being considered by the District is to seek bond financing through the State of Idaho "Bond Bank". It is anticipated that the market interest rate over a 20 year amortization period will be similar to USDA-RD loan financing. The amount of the LID which would be allocated for sewer collection improvements has not yet been determined by the Board. The sewer collection improvements have been listed in priority order, and reported in two phases: Phase A and Phase B:

	Total Estimated Project Cost
Phase A =	$ 2,265,700
Phase B =	$ 1,823,700
Sum of A and B =	$ 4,089,400

An estimate of the LID assessment for the two phases of the collection system improvements is:

$4.2 million ÷ 2,645 ERs = $1,588 per ER

A sample calculation comparing LID financing using a USDA loan verses an open market municipal bond financing is as follows:

Assume LID Principal Assessment = $1588 / ER

Financing Source	USDA Loan / Bond Bank	Open Market Municipal Bond
Assumed Interest	3.7%	6%
Rate Term	20 Years	15 Years
	(.07165)	(.10296)
Resulting Annual LID Payment	$114 / Year / ER	$161 / Year / ER
% Reduction By Using USDA Loan/Bond Bank	29% Less	

As with the DEQ loan, the District will need to have a current preliminary engineering facilities plan which evaluates sewer system needs, options, costs, and implementation / funding to qualify for the USDA loan.

8.2.7. PROJECT FINANCING CONCEPT

Given the description of the funding sources and the potential options for the District, the following project financing concept (see Figure 8-2) has been developed which involves coordination with the financing options for HARSB. As a note, the HARSB Treatment Plant Facilities Plan and this Collection System Facilities Plan are anticipated to be complete (draft form) by February 2012.

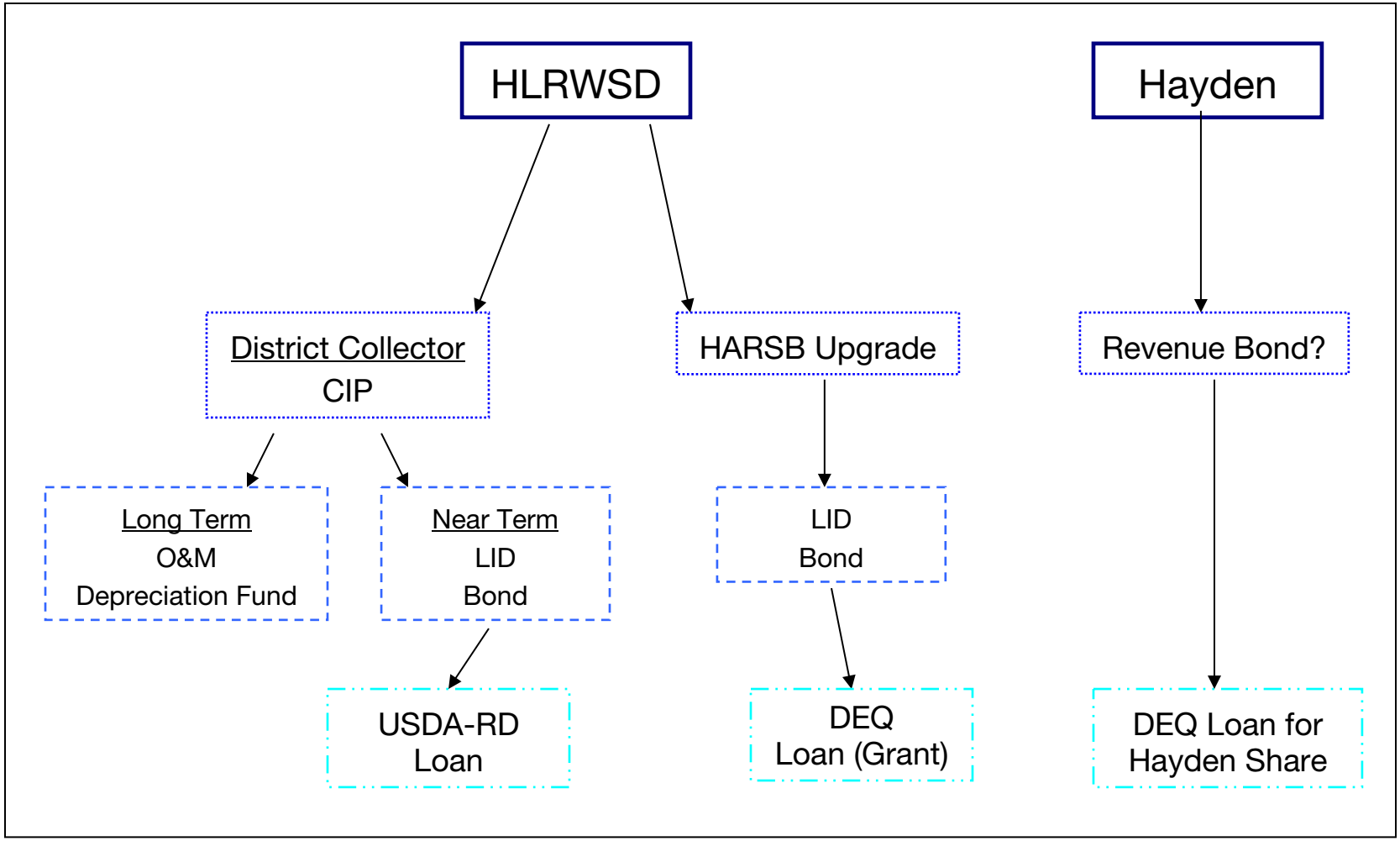

Figure 8-2: Coordination of Financing Options with HARSB

Given the financing option coordination, the total cost of both collection system improvements and HARSB treatment upgrades are summarized in Table 8-1 below.

Table 8-1: Estimated Cost of Improvements for District Property Owners

	Collection System	HARSB
Recommended Project Cost	$ 4,089,400	
ADD Project Admin/Legal	$ 100,000	
Project TOTAL	$ 4,200,000	$ 6,200,000[1]
Project Cost per User	$ 1,588	$2,345
Annual Cost per User	$ 114[2]	$ 144[3]

1. Cost assumes 2645 ERs at build-out (LID)
2. Financing terms of 3.7% over 20 years collection system (USDA-RD);
3. Financing terms of 2% over 20 years for HARSB (DEQ)
4. Costs not included: Loan Reserve
5. O&M amount not shown, refer to Table 7-2

The current monthly District fees include a $44.00 sewer user fee. With completion of the collection system improvements and HARSB treatment upgrades, it is estimated that the current and future users will pay an effective fee of $66 per month.

8.3. Operation and Maintenance Requirements

The processes within the system will not change as a result of the improvements listed here, thus the operation and maintenance of the system will not significantly change. With the addition of upgraded electrical panels and improved condition for the existing system, the operation and maintenance efforts should be slightly reduced.

8.4. Project Schedule

The proposed project schedule (Table 8-2) includes planning, funding, and construction schedule estimates.

Table 8-2: Proposed Project Schedule

Task	HLRWSD Collection System Timeframe	HARSB Treatment Facilities Timeframe
Complete Draft Facilities Plan	February 2012	July 2012
DEQ Funding Workshop	December 14, 2011	N/A
Submit DEQ Letter of Interest (LOI)	January 2012	January 2012
Draft NPDES Permit	N/A	October 2012
Public Participation	Fall 2012	Fall 2012
Funding Implementation (LID)	November 2012	November 2012
Secure DEQ Loan (Grant) / Funding	June 2013	June 2013
Begin Design	July 2013	July 2013
Begin Construction	May 2014	May 2014

8.5. CERTIFICATION OF OPERATOR(S)

The processes within the system will not change as a result of the improvements listed here, thus the certification of the operators will not need to change.

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APPENDIX A
DISTRICT MAPS

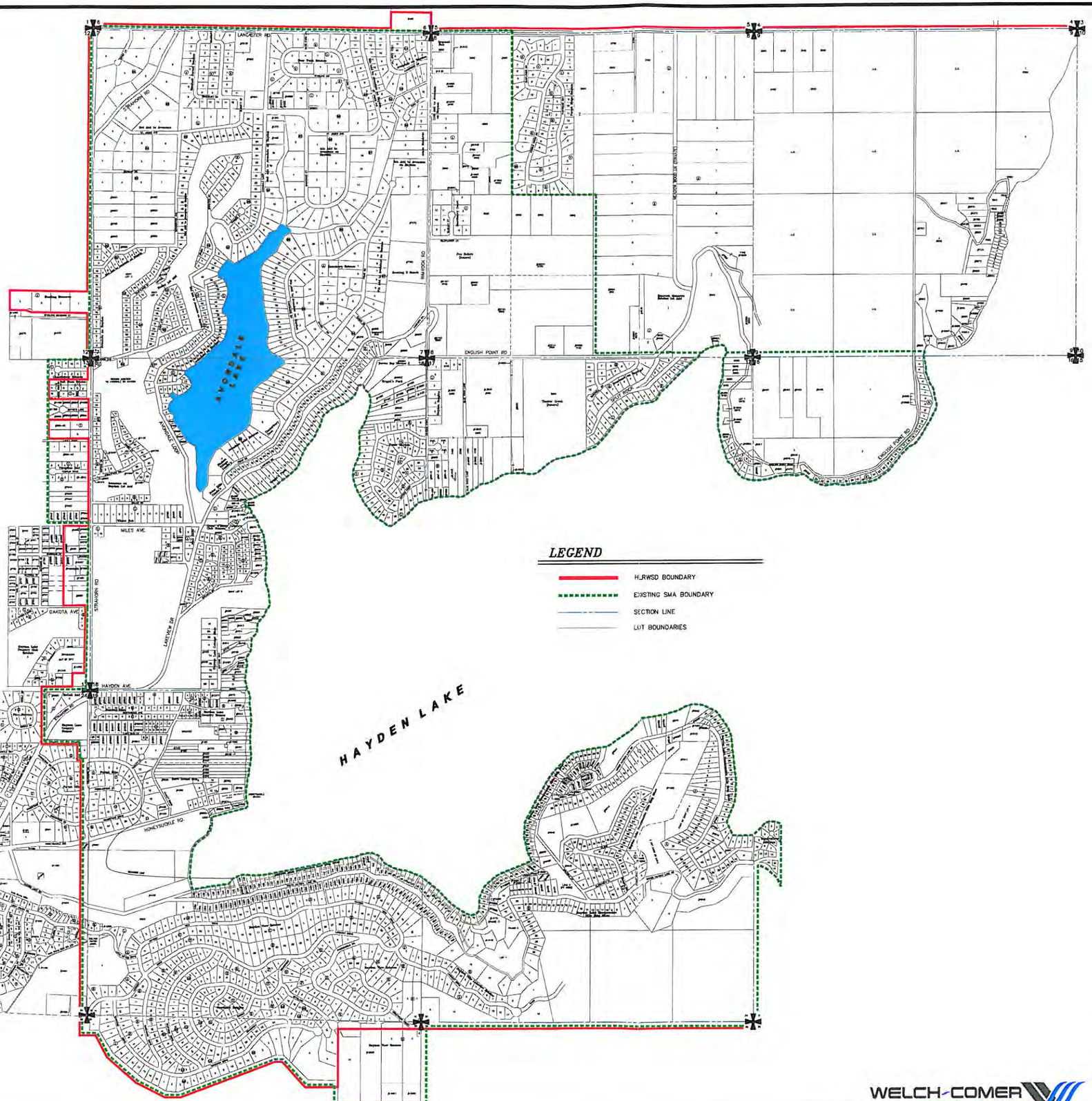
Service Area Map

Lift Station Basin Overview

Area of City Impact (For Area)

Hayden Lake Dam Overview

WELCH-COMER
ENGINEERS | SURVEYORS



NORTH

GRAPHIC SCALE

800 0 400 800 1600

(IN FEET)

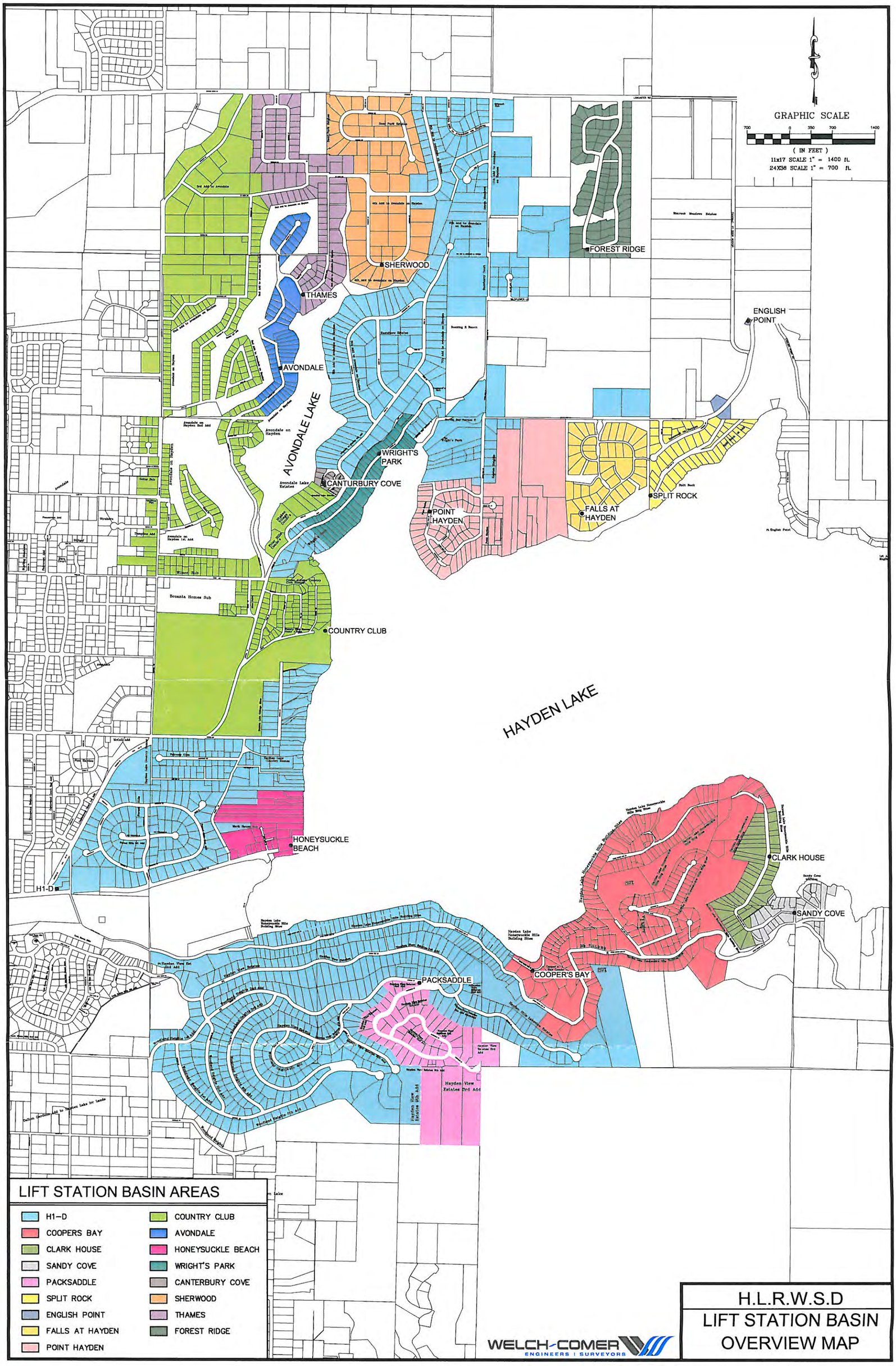
11x17 SCALE 1" = 1600 ft.

24X36 SCALE 1" = 800 ft.

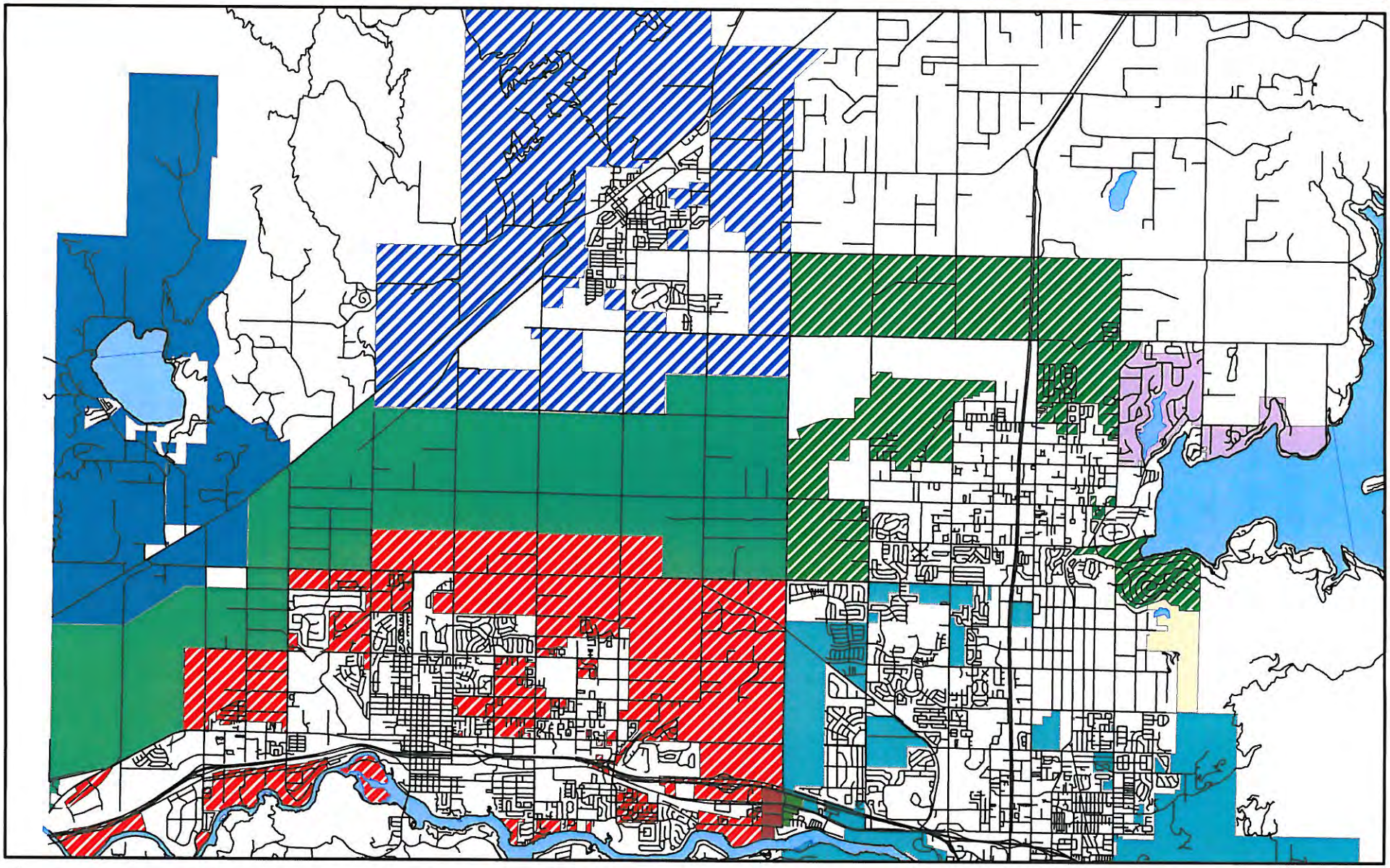
WELCH-COMER
ENGINEERS | SURVEYORS

H.L.R.W.S.D
SERVICE AREA

\\Nas-01\cad\Civil3D Projects\11200\Production Drawings\11200BOUNDARIES.dwg, 12/30/2011 3:24:20 PM, julie, 1:2.12572


GRAPHIC SCALE
700 0 350 700 1400
(IN FEET)
11x17 SCALE 1" = 1400 ft.
24X36 SCALE 1" = 700 ft.
FOREST RIDGE
SHERWOOD
THAMES
ENGLISH POINT
AVONDALE
AVONDALE LAKE
WRIGHT'S PARK
CANTURBURY COVE
POINT HAYDEN
FALLS AT HAYDEN
SPLIT ROCK
COUNTRY CLUB
HAYDEN LAKE
HONEYSUCKLE BEACH
H1-D
CLARK HOUSE
SANDY COVE
COOPER'S BAY
PACKSADDLE
LIFT STATION BASIN AREAS
H1-D
COOPERS BAY
CLARK HOUSE
SANDY COVE
PACKSADDLE
SPLIT ROCK
ENGLISH POINT
FALLS AT HAYDEN
POINT HAYDEN
COUNTRY CLUB
AVONDALE
HONEYSUCKLE BEACH
WRIGHT'S PARK
CANTERBURY COVE
SHERWOOD
THAMES
FOREST RIDGE
WELCH-COMER
ENGINEERS | SURVEYORS
H.L.R.W.S.D
LIFT STATION BASIN
OVERVIEW MAP

Area of City Impact

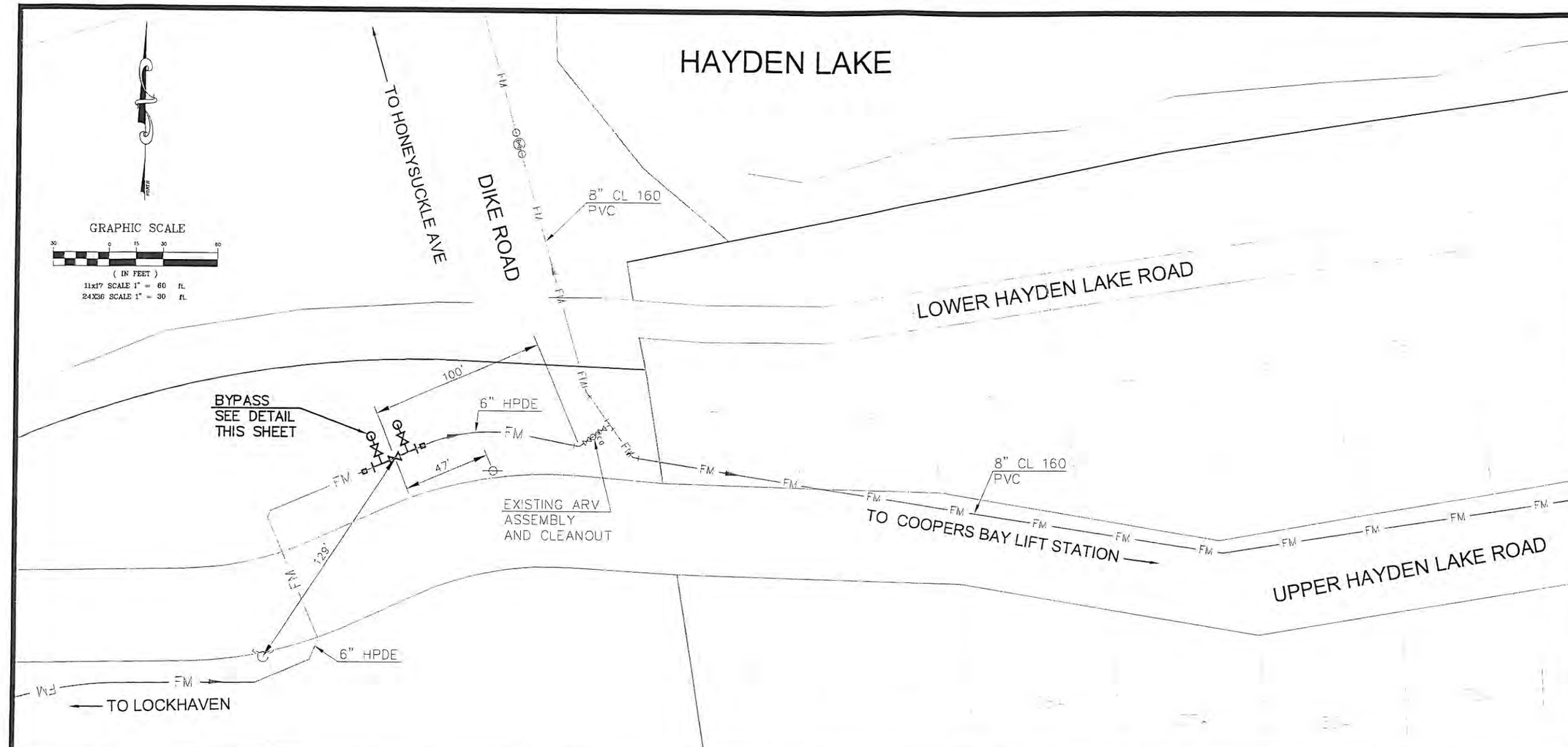


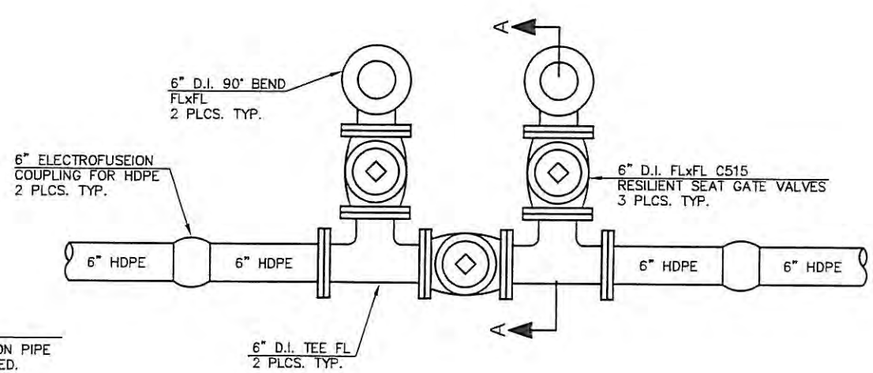
N

0 1.25 2.5 5 Miles

Areas of City Impact, 2006

- ATHOL
- CDA
- DALTON_GARDENS
- HARRISON
- HAUSER
- HAYDEN
- HAYDEN_LAKE
- HUETTER
- POST_FALLS
- POST_FALLS / HUETTER
- RATHDRUM
- SHARED TIER
- SPIRIT_LAKE
- WATERSHED
- WORLEY



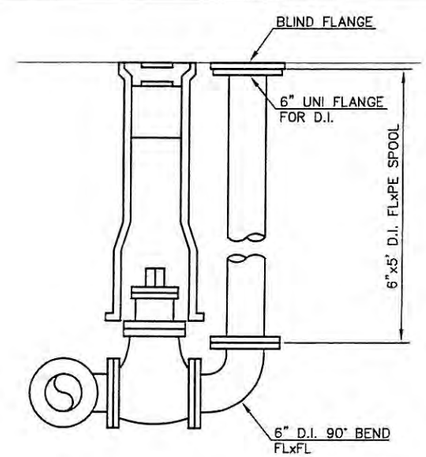


NOTE

ALL DUCTILE IRON PIPE IS EPOXY-COATED.

PLAN VIEW

NO SCALE



SECTION A-A

NO SCALE

RECORD DRAWING 2/1/12

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(fax) 208-664-5946

NO.	DATE	REVISION DESCRIPTION	BY

HLRWSD

HAYDEN LAKE DAM
BYPASS ASSEMBLY

BYPASS VALVES AND RISERS
PLAN AND DETAILS

PROJECT NO.:	11200
DESIGNED BY:	L.E.C.
DRAWN BY:	J.A.L.
CHECKED BY:	
DWG NAME:	11200PL11.DWG
DATE:	02-01-12
SHEET NO:	

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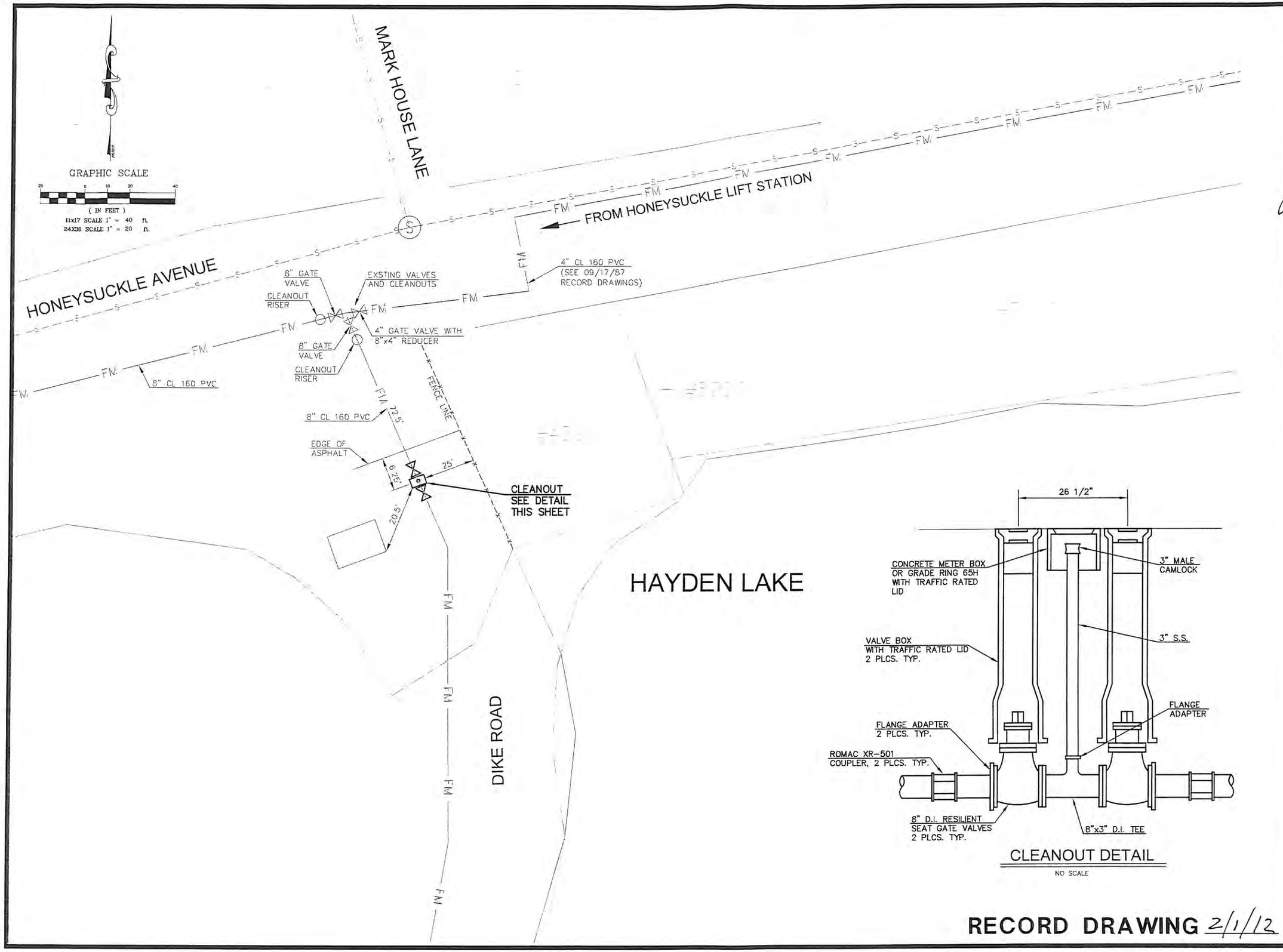

RECORD DRAWING 2/1/12

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PROFESSIONAL ENGINEER
REGISTERED
3754
2/1/12
STATE OF IDAHO
LARRY E COMER

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ENGINEERS | SURVEYORS
www.welchcomer.com
350 E. Kathleen Ave.
Coeur d'Alene, ID 83815
208-664-9382
(toll free) 877-815-5672
(fax) 208-664-5946

NO	DATE	REVISION DESCRIPTION	BY

HLRWSD

HAYDEN LAKE DAM
BYPASS ASSEMBLY

CLEANOUT ON THE
NORTH END OF DAM
PLAN AND DETAILS

PROJECT NO.:	11200
DESIGNED BY:	L.E.C.
DRAWN BY:	J.A.L.
CHECKED BY:	
DWG NAME:	11200PL11.DWG
DATE:	02-01-12
SHEET NO:	

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APPENDIX B
DISTRICT AGREEMENTS AND PERMITS

Joint Powers Agreement for Hayden Area Regional Sewer Board

EPA Disrcharge and Land Application Permit (ID-0022659-0)

Ordinance No. 89-2

WELCH-COMER
ENGINEERS | SURVEYORS

ORIGINAL COPY

JOINT POWERS AGREEMENT

OF THE

HAYDEN AREA REGIONAL SEWER BOARD

FOR THE

HAYDEN AREA REGIONAL SEWER FACILITIES

THIS AGREEMENT is entered into this 9th day of October, 1986, between THE CITY OF HAYDEN (the "City") and THE HAYDEN LAKE RECREATIONAL WATER AND SEWER DISTRICT (the "Sewer District"), being governmental Entities in Kootenai County, Idaho, who are referred to herein individually as "Entity" and collectively as "Entities." The Entities desire to join together, under the authority of Idaho Code § 67-2328, to provide for the acquisition, ownership, development, operation, and maintenance of the proposed Hayden Area Regional Sewer Facility (the "Facility"), which Facility shall consist of the following:

A. Phase I: Interim Drain Field and Regional Collector;

B. Phase II: Mechanical Treatment Plant;

C. Phase IIIA: Spokane River Outfall; and

D. Phase IIIB: Mechanical Treatment Plant Expansion.

As used in this Agreement, the term "Facility" shall refer to and include all real and personal property and equipment and related rights necessary to the collection and treatment of sewage from areas within the jurisdiction of each Entity, as more fully described herein.

The parties contemplate: (i) the construction and operation, as part of the Facility, of an Interim Drainfield on land owned by Kootenai County, pursuant to the terms of an existing agreement with Kootenai County; (ii) the construction and operation of a Mechanical Treatment Plant on land to be owned by the Board; (iii) the providing of sewer service to specific Entity Service Areas within the jurisdiction of each Entity as defined herein (and the possible expansion of the Entity Service Areas); and (iv) the providing of sewer service to individuals or entities occupying land outside the Entity Service Areas but within the Kootenai County Airport Service Area as defined herein.

Attached hereto and incorporated herein as Exhibits are the following descriptions which pertain to the Facility and the operations of the Board:

Exhibit	Description
"A-1"	Schematic Map showing the Hayden Area Regional Sewer System, including the Regional Collector, the Interim Drainfield and the Treatment Plant Site (the "Facility") as presently contemplated
"A-2"	Map showing the Airport Service Area
"B"	Description of Facility Components
"C"	Legal Description of Interim Drainfield and Treatment Plant Site

Immediately following execution of this Agreement, each Entity shall execute such documents as may be necessary to convey all right, title, and interest in the Facility components to the Board.

NOW, THEREFORE, the Entities agree as follows:

1. NAME AND COMPOSITION. The entity created by this Joint Powers Agreement shall be known as the "Hayden Area Regional Sewer Board," to be referred to herein as "the Board". The members of the Board shall be the two (2) Entities described above, each of which shall appoint two (2) individual representatives, each of whom shall be fully authorized and empowered to attend all meetings and vote on all Board matters on behalf of the respective Entities. Each Entity shall designate one representative as "primary" and the other as "secondary," with the function of the secondary representative being only to act in the absence or unavailability of the primary representatives. Each Entity shall provide and maintain at the office of the Board, a duly authorized resolution of that Entity setting forth the authority of the individual representatives to bind such Entity with respect to all decisions required of or deemed appropriate by the Board. Except for the Major Decisions described in Paragraph 5 below, which must be approved by direct action of both Entities, the representatives shall have full authority to vote on behalf of the Entities with respect to Board business, and it shall be the responsibility of each Entity to provide guidelines to its representatives as to how that Entity's interests should be voted.

2. OFFICE. The principal office of the Board shall be at the Hayden City Hall, or at such other place as may be designated by the Entities. This Agreement and all records of the Board shall be maintained at the office and shall be available to all Entities and all members of the general public for inspection and/or copying (at the requesting party's expense) at reasonable business hours and on reasonable notice.

3. TERM. The term of this Agreement and of the Board shall be for so long as the Facility, or any part thereof, is required to provide sewer collection and treatment service for Users in the area to be served by the Facility.

4. PURPOSE AND POWERS.

4.1 Purpose. The purpose of the Board shall be as follows:

(a) To acquire, own, develop, operate, and maintain the Facility so as to provide the most cost-effective sewer service possible to the Users of the Facility. Users are classified as follows:

(1) Entity Users are those Users entitled to sewer service by virtue of their location within the Entity Service Areas. The Entity Service Areas are currently coextensive with the jurisdictional boundaries of the City and the Sewer District, and may be expanded in the discretion of either Entity, subject only to the provisions of Paragraph 9.2 below.

(2) Airport Users are third parties located outside the Entity Service Areas, but within the Airport Service Area, who are entitled to sewer service by virtue of a written contractual arrangement between Kootenai County and the Board, to be executed concurrently with this Agreement.

(b) To coordinate the performance of the Entities' responsibilities toward their respective constituents with respect to the provision of sewer services.

4.2 Powers. Subject to the provisions of this Agreement, and such limitations as may be imposed by law, the Board shall have the following powers:

(a) To acquire, own, develop, operate, and maintain the Facility, and to conduct and operate the business of the Board, and to execute documents and instruments relating to such business;

(b) To negotiate agreements with the Panhandle Health District, Division of Environment, and other local, state, or federal agencies, for funding, design, etc., of the initial and subsequent Phases of the Facility;

(c) To negotiate agreements for the acquisition of land, improvements, equipment, easements,

permits, or other interests in real or personal property which may become components of or otherwise be needed for the construction, operation, and/or maintenance of the Facility (including the Treatment Plant Site);

(d) To negotiate arrangements with Kootenai County for the providing of sewer service to the Airport Service Area and for the use of the Interim Drainfield;

(e) To establish and collect appropriate assessments, fees, and service charges to be levied against Users of the Facility in order to cover any necessary capital improvements and any repair, operation, and maintenance costs, including reserves therefore;

(f) To procure and maintain insurance covering the various risks to which the Board (including the Entities and the individual representatives) or its operations may be subjected;

(g) To open bank accounts in the name of the Board, designate the authorized signatures therefor, and make deposits and withdrawals from Board accounts on the signatures of one or more designated individuals;

(h) To pay expenses incurred in performing the business and purposes of the Board;

(i) To employ, discharge, and pay the compensation of the Managing Agent, accountants, contractors, engineers, laborers, Facility operators, consultants, lawyers, and others whose services are required or necessary;

(j) To perform rate analysis and establish User fees, and to provide minimum standards for sewer use, spill control, and industrial pretreatment;

(k) To monitor actual flows to the Facility and actual numbers of Equivalent Residences (ERs) connected to the Facility from all Users, and to require control of significant commercial and industrial discharges;

(l) To provide secretarial and administrative services for Board meetings, including, but not limited to, agendas, secretarial services for the meetings, and minutes;

5.1 Sale, transfer, or encumbrance of all or any part of the Facility;

5.2 Adoption or revision of an operational budget for the Board, or the incursion or payment of any obligation or contract, except as specifically contemplated in a unanimously approved budget;

5.3 Expansion or reduction of the capacity of the Facility except as specifically contemplated in Paragraph 9 below;

5.4 Modification or amendment of this Agreement;

5.5 Negotiation, amendment, or modification of agreements for the acquisition or disposition of rights in land and/or improvements, including, without limitation, the agreements for use of the Interim Drainfield and for acquisition of the Treatment Plant Site;

5.6 Negotiation, amendment, or modification of agreements with Kootenai County pertaining to the Airport Service Area;

5.7 Establishment, modification, or revision of rates to be charged Users in the Service Areas for sewer hookups, collection, or treatment services;

5.8 Appointment, dismissal, establishment, or verification of the authority of Managing Agent;

5.9 The resolution of a voting deadlock between representatives; and

5.10 The doing or causing to be done of any act which would have a material adverse effect on the Board of the Facility or which would impose a financial obligation on the Board or either Entity over and above those imposed under a duly approved budget of the Board.

The books and records of the Board shall be kept on a cash basis in accordance with generally accepted accounting principles applied on a consistent basis from year to year. The fiscal year of the Board shall be from December 1 until November 30 of the following year.

6. MEETINGS.

6.1 Regular Meetings. Regular meetings of the Board shall be conducted at least monthly at such time and place as may be fixed by the Board. Notice of the time and place of each regular meeting shall be given to each primary representative, personally, or by mail

(m) To establish billing procedures and provide for the collection of funds from all Users for repair, maintenance, and operation of the Facility, including such sinking fund reserves as may be considered necessary;

(n) To establish bookkeeping and auditing procedures for the receipt and expenditures of all funds collected by the Board;

(o) To furnish an annual status report to each Entity on the Facility, including an audit of all financial aspects and the status of actual flows and hookups from each Entity;

(p) To prosecute or defend, as the case may be, any suit, arbitration, or administrative proceedings asserted against or brought on behalf of the Board;

(q) To review and approve contracts for acquisition, design, construction management, and construction of Facility components, even though only one (1) Entity may be providing the funding or acting as the "lead" Entity with respect to the construction of any such component;

(r) To apply for and cause compliance with the requirements of any grant or loan which would be utilized to establish or increase capacity for the Facility or reduce expenses of operation of the Facility;

(s) To do all other things allowed or required by law and necessary, incidental, or convenient to the exercise of the foregoing powers and to the accomplishment of the foregoing purposes.

5. MANAGEMENT AND ACCOUNTING. The affairs of the Board shall be managed by both Entities, through their respective representatives, with all decisions to be made by a unanimous vote of the Entities at a regular or special meeting; provided, however, that the Entities may unanimously appoint a Managing Agent, who may or may not be a representative of an Entity, to manage the day to day administrative affairs of the Board, subject to such scope and limitation as may be unanimously agreed upon by the Entities.

Regardless of the appointment of a Managing Agent, or of the general authority of the Entity representatives as set forth herein, the following major decisions ("Major Decisions") shall require the written approval of both Entities (acting directly and not through their representatives):

or telephone, at least three (3) days prior to the day of the meeting, and shall be posted on the door of the Board office.

6.2 Special Meetings. A special meeting of the Board may be called by either Entity. Except in the case of an emergency, notice shall be provided and posted in the manner prescribed for notice of regular meetings, and shall include a description of the nature of any special business to be conducted by the Board.

6.3 Waiver of Notice. Before or at any meeting of the Board, either Entity may waive notice of such meeting, and such waiver shall be deemed equivalent to the giving of such notice of to that Entity.

6.4 Quorum. The presence in person of a representative of all Entities shall be required at all meetings. However, in the absence of one Entity at a duly noticed meeting, the attending Entity present may adjourn the meeting to another time, but may not transact any other business. Any such adjournment for lack of attendance shall be to a date not less than five (5) days, nor more than twenty (20) days from the original meeting date. Notice for this reconvened meeting shall be provided by the Entity in attendance, in the same manner as for regular meetings. At any such reconvened meeting, which is not attended by both Entities, the attending Entity shall be empowered to take any action on behalf of the Board which would be authorized by this Agreement, except for the Major Decisions described in Paragraph 5 above, which shall require unanimous consent in all cases.

6.5 Chairman. The Chairman of the Board will be alternated annually between the representatives of the two Entities of the Board at the first regular meeting in January. The first Chairman will be selected by the flip of a coin at the first regular meeting after the effective date of this Agreement, and shall serve until the next January meeting.

6.6 Open Meetings. Regular and special meetings of the Board shall be open to all members of the public; provided, however, that only the representatives of the Entities (or the Entities themselves) may participate in the actual decision-making.

7. SEWER SERVICE CHARGES. With respect to each ER, the Board shall be responsible for assessing and collecting from each Entity (or directly from the Entity Users, as determined by the Board) and from the Airport Users:

7.1 A discharge/hookup fee or its equivalent (sometimes referred to as a "capitalization fee") in a minimum amount as established by the Board (which shall be uniform for all Entity Users, and which shall be subject to a mandatory annual adjustment at the beginning of each fiscal year according to the Engineering News Record Index increase over the most recent year for which the Index is published). Even though the capital expense of constructing the Facility shall be paid by the initial Users, the purpose of the charge described in this subparagraph is to create a reserve fund for the construction of further improvements to expand capacity and to spread the burden of capital expenses over new Users as well as the original Users;

7.2 Periodic assessments, as established by the Board, in amounts sufficient to provide for repair, maintenance, and operation of the Facility and reserves therefor ("O&M fees") with each Entity's and User's share of costs to be computed in accordance with the general policy guidance of Article 8 below. The intent of the parties is to have O&M fees be uniform for all Entity Users, to the extent that the fees pertain to operation and management of the Facility as defined herein; however, the Board may, in its discretion, adjust fees to individual Entity Users if the Board undertakes management and operation of collection systems owned by the Entities but which are not part of the Facility;

While each Entity must collect, as a minimum, O&M fees and discharge/hookup fees established by the Board, this section in no way precludes each Entity from establishing its own O&M fees and discharge/hookup fees for the area within its jurisdiction. Minimum O&M fees and discharge/-hookup fees must be collected by each Entity and deposited in a dedicated fund maintained by the Board on a monthly or quarterly basis.

Each Entity agrees to provide, by Ordinance, that discharge/hookup fees or their equivalent will be collected for each building or structure requiring new or additional sewer service within its Service Area boundaries and to standardize its definition of an ER and the allocation of ERs to a particular property. Each Entity agrees to provide periodic reports as required by the Board giving the numbers of structures, ERs assigned, the amount of fees collected, and other relevant information requested by the Board.

8. PRORATION; INDEMNIFICATION. It is the intent of this Agreement to allocate costs equitably between the Entities on an approximate percentage of use basis. Each Entity will pay a percentage of the repair, operation, and maintenance of the Facility (including Sewer Collector Lines, Lift

Stations, and all other Facility components, as well as the Treatment Plant) based upon its number of ERs on line compared to the total of all ERs on line for the Entity Users. Arrangements with Airport Users shall similarly be made on an approximate percentage of use basis; provided, however, that the Board may, in its discretion, exclude certain components of the Facility from consideration in establishing fees to be paid by Airport Users.

Further, in the event of a federal, state or local court action, concerning the Facility, the two Entities will assume responsibility for such litigation in a direct proportion to the percentage of use of the system. This formula shall be based upon the total ERs on line and in use by that Entity to the total number of ERs on line and in use by both Entities at the time of the event on which the court action is based. Each Entity shall agree to indemnify the other Entity in the same percentage for any damages or costs suffered by the other Entity due to such court action. Any unanticipated cost of such a court action may then be charged to the Entity Users and Airport Users as a cost of operation of the Facility, to be incorporated into and amortized on a reasonable schedule, payable along with the periodic O&M charges.

9. EXPANSION OF SERVICE AND/OR CAPACITY. The parties agree that service provided by the Facility may be expanded in one or more of the following manners, and subject to the following terms and conditions:

9.1 Addition of Users Within A Service Area. The Entity Service Areas and the Airport Service Area, as defined herein, are recognized under Sewage Management Plan Agreements with the Panhandle Health District, where required. Either Entity shall have the right to expand its number of Users within its Service Area without the consent of the Board; provided, however, that any such expansion shall be subject to availability of capacity of the Facility of a "first come, first served" basis. However, the additional capacity may only be reserved by payment of the appropriate capitalization (discharge/hookup) fee set by the Board as provided herein.

9.2 Expansion of Service Areas. Either of the Entity Service Areas may be expanded, in the sole discretion of the appropriate Entity, by the lawful expansion of the City or the Sewer District, and pursuant to modification of the applicable Sewage Management Plan Agreement, where required.

9.3 Expansion of Treatment Plant Capacity. The parties acknowledge that the Facility is presently

designed to accommodate more Users than will require sewer service on completion of the Regional Treatment Plant. By collecting discharge/hookup fees as Users are added to the system, the Board will accumulate a reserve fund which can later be used to finance construction of the Spokane River Outfall, and then for additional capacity at the Treatment Plant. After construction of the Spokane River Outfall, either Entity which desires to add Users to the system, which would require expansion of the Facility for additional capacity, shall have the right to utilize any existing reserve fund for that purpose; provided that the expanding Entity shall pay any additional funds necessary to construct the complete next phase of the development of the Facility (including lift stations as well as Treatment Plant expansion and with the size and scope of the "complete next phase" being determined by the Board). The amount advanced by the expanding Entity shall then be divided by the then current ER capital assessment fee to determine the portion of the excess capacity which then belongs exclusively to the expanding Entity. All remaining capacity shall then be considered available at par to either Entity and to the Airport Users as provided herein or in the User Agreement with Kootenai County. Notwithstanding the right of either Entity to require unilaterally the expansion of the capacity, the Board shall unanimously approve and supervise the design and construction of the expansion.

10. TRANSFERS. No Entity may directly or indirectly sell, transfer, assign, pledge, or encumber all or any part of its rights or obligations in the Board or in the Facility.

11. TERMINATION AND DEFAULT. This agreement will terminate only upon agreement of both Entities or upon the entering of a court order requiring termination of the Board.

12. CONTEMPLATION OF PARTIES. Certain basic facts and/or assumptions have been contemplated by the Entities in connection with the negotiation and execution of this Agreement, and are set forth as follows to assist in the interpretation of intent, should questions later arise:

12.1 The design capacity of the Phase I Regional Pump Stations is 4,000 ERs.

12.2 The design capacity of the Phase II Treatment Plant is to be 0.75 mgd or 3333 ERs, with completion estimated in October 1987;

12.3 The design capacity of the Phase IIIB Treatment Plant is to be based on growth requirements and demand by the participating Entities. Projected total Facility capacity following construction of Phase III is 5200 ERs, or 1.2 mgd;

12.4 Treatment in Phase I will consist of septic tank effluent applied under pressure to Drainfield Module No. 1. Each User under Phase I must utilize an approved septic tank;

12.5 Treatment anticipated under Phase II will be treatment of raw sewage in a mechanical oxidation ditch treatment plant with discharge of effluent to the Interim Drainfield, Modules 1 and 2;

12.6 Subsurface land application of treated effluent may be incorporated into the Phase I and II treatment processes to provide more drainfield capacity on a temporary basis, and/or reduce nutrient loading to the Spokane River;

12.7 Each Entity has purchased through cash contribution to Phase I, the following numbers of paid-up hookups in the Phase II Treatment Plant:

Entity	ERs Paid
City	183
Sewer District	116

12.8 The Sewer District may issue a credit to LID property owners who have already paid discharge/hookup fees, since no further discharge/hookup fees will be charged until after the LID process is completed;

12.9 The Sewer District, under its LIDs 2 and 3, will design and construct the Phase II Treatment Plant as the "Lead Entity." It is estimated that the two thousand one hundred forty-one (2,141) parcels of land within LIDs 2 and 3 will be entitled to Facility capacity (including Treatment Plant and Regional Collector) as a result of the LID process, although the exact number will not be known until the LID process is complete;

12.10 In addition to the cash already contributed, as reflected in the credits allocated in Paragraph 12.7 above, the City agrees to contribute at least eight percent (8%) toward construction of Phase II Treatment Plant and/or Phase IIIB Spokane River Outfall for which it will receive credit for ERs in ratio to the discharge/-hookup fee in effect at the time of construction. These total amounts due will be turned over to the Sewer District in monthly progress payments based upon approved Pay Estimates;

12.11 Capacity in the Phase I Interim Drainfield will be allocated on a first come, first served basis, with a Three Hundred Dollar ($300.00) per ER charge, in addition to LID or discharge/hookup fees, assessed for

new subdivision lots or buildings which will contribute sewage directly to the Phase I Interim Drainfield. Money assessed under this provision will be placed in a separate account and will be used for construction of Drainfield Module No. 2 or for the Spokane River Outfall. The Interim Drainfield fee may, however, be waived in specific cases on an equitable basis, such as for existing tenants within the Airport Service Area who have already paid discharge/hookup fees to Kootenai County.

12.12 At no time will an Entity be entitled to more connections to Regional Facilities than the total number of paid-up discharge/hookup fees in terms of ERs. Additional reserve capacity will be available to either Entity on a first come, first served basis. Capacity may not be allocated or purchased above and beyond the approved design capacity of the Facility, except by Major Decision, and only if the required additional capacity is under design.

12.13 The Entities shall acquire the Treatment Plant Site, by each advancing fifty percent (50%) of the costs of acquisition, following which the Treatment Plant Site shall be purchased by the Board as an expense of the Facility.

13. MISCELLANEOUS AND PROCEDURAL.

13.1 Attorney's Fees. If legal action is required or deemed necessary to enforce or interpret any provisions of this Agreement, the prevailing party shall be entitled to recover its costs of suit, including a reasonable attorney's fee incurred in connection therewith.

13.2 Municipal Authority. Each Entity, and each individual signing on behalf of an Entity, hereby agrees that the execution of this Agreement is fully authorized by appropriate municipal action of the Entity and will be supported by an appropriate resolution to be filed at the office of the Board.

13.3 Integrated Agreement; Modification. This Agreement contains all agreements of the parties and may not be amended or modified except in writing, signed by all parties.

13.4 Termination of Interest of Kootenai County. The Entities acknowledge that this Agreement is a substantial revision of a prior Joint Powers Agreement among the Entities described herein and Kootenai County, and that Kootenai County has elected not to be represented on the Board under this Agreement, but to

obtain sewer service for Airport Users within the Airport Service Area pursuant to a separate agreement between the Board and Kootenai County. Accordingly, the effectiveness of this Agreement is hereby made contingent upon the consent of Kootenai County as set forth below. By execution of the attached Consent, the County shall agree that it is no longer a party to the Board and that further modifications of this Agreement may be adopted by the City and the Sewer District without any consent of the County.

13.5 Arbitration. Any controversy arising from this Agreement or its breach, with respect to interpretation of the provisions hereof or the intent of the parties, shall be resolved by three (3) arbitrators appointed as follows:

(a) Within ten (10) days after notice by either party to the other requesting arbitration and stating the basis of the party's claim, one (1) arbitrator shall be appointed by each party. Notice of the appointment shall be given by each party to the other when made;

(b) Two (2) arbitrators shall immediately choose a third arbitrator to act with them. If they fail to select a third arbitrator within ten (10) days of their appointment, on application by either party, the third arbitrator shall be promptly appointed by the then presiding judge of the District Court for Kootenai County, Idaho, acting as an individual.

The arbitration shall be conducted according to the then prevailing Rules of the American Arbitration Association, and any judgment upon the award rendered in the arbitration may be entered in any court having jurisdiction.

IN WITNESS WHEREOF, the parties to the Agreement have executed the same by reason of the authorization separately obtained by both parties as required by the laws governing their powers.

CITY OF HAYDEN

By Chester R. Davis

CHESTER R. DAVIS, Mayor Pro-tem

HAYDEN LAKE RECREATIONAL WATER
AND SEWER DISTRICT

By _____
HENRY HINCK, Chairman

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CONSENT OF KOOTENAI COUNTY

Kootenai County hereby consents to the execution of the above Agreement, and to the immediate termination of the prior Joint Powers Agreement among the Entities described herein and Kootenai County. The rights and obligations of Kootenai County with respect to the Facility shall be as described by separate agreements between the Board and Kootenai County, executed simultaneously with this Agreement, and the effectiveness of this Consent is specifically made contingent upon the execution of the Contract User Sewer Agreement between Kootenai County and the Board. Immediately upon execution of this Agreement and such separate agreements, Kootenai County shall execute such documents as may be necessary to convey all of its right, title and interest in all Facility components as described herein, to the Board.

Further, by execution of this Consent, the County hereby agrees that it is no longer a party to the Board and that further modifications of this Agreement may be adopted by the City and the Sewer District without any consent of the County.

BOARD OF COMMISSIONERS OF
KOOTENAI COUNTY

By_____
GLENN R. JACKSON,
Chairman

By Frank N. Henderson
FRANK N. HENDERSON
Commissioner

By Evalyn R. Adams
EVALYN R. ADAMS,
Commissioner

ATTEST:

Leah Phelps
LEAH PHELPS
Clerk
By Jennifer Lee
Deputy Clerk

STATE OF IDAHO)
:ss.
County of Kootenai)

On this 10th day of October, 1986, before me, Marian L. Jobes, a Notary Public in and for the State of Idaho, duly commissioned and sworn, personally appeared CHESTER R. DAVIS, to me known to be the Mayor Pro-tem of THE CITY OF HAYDEN, the Entity that executed the foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said Entity, for the uses and purposes therein mentioned, and on oath stated that he was authorized to execute the said instrument on behalf of said Entity.

WITNESS my hand and official seal hereto affixed the day and year first above written.

Marian L. Jobes
Notary Public for Idaho
Residing at Hayden Idaho
Commission Exp. 10/30/86

STATE OF IDAHO)
:ss.
County of Kootenai)

On this 2d day of October, 1986, before me, Edward F. Wroe, a Notary Public in and for the State of Idaho, duly commissioned and sworn, personally appeared HENRY HINCK, to me known to be the Chairman of the HAYDEN LAKE RECREATIONAL WATER AND SEWER DISTRICT, the Entity that executed the foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said Entity, for the uses and purposes therein mentioned, and on oath stated that he was authorized to execute the said instrument on behalf of said Entity.

WITNESS my hand and official seal hereto affixed the day and year first above written.

Edward F. Wroe
Notary Public for Idaho
Residing at Hayden Lake
Commission Exp. 12/26/88

STATE OF IDAHO)
:ss.
County of Kootenai)

On this 9th day of October, 1986, before me, Terri R. Anderson, a Notary Public in and for the State of Idaho, duly commissioned and sworn, personally appeared ~~GLENN R. JACKSON~~, FRANK N. HENDERSON, and EVALYN R. ADAMS, to me known to be ~~the Chairman and~~ Commissioners, of the BOARD OF COMMISSIONERS OF KOOTENAI COUNTY, ~~respectively~~, the Entity that executed the foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said Entity, for the uses and purposes therein mentioned, and on oath stated that they were authorized to execute the said instrument.

WITNESS my hand and official seal hereto affixed the day and year first above written.

Terri R. Anderson
Notary Public for Idaho
Residing at Coeur d'Alene
Commission Exp. 4-9-91

EFW12A/D,1 - D9/25/86

HAYDEN AREA REGIONAL FACILITIES SCHEMATIC MAP

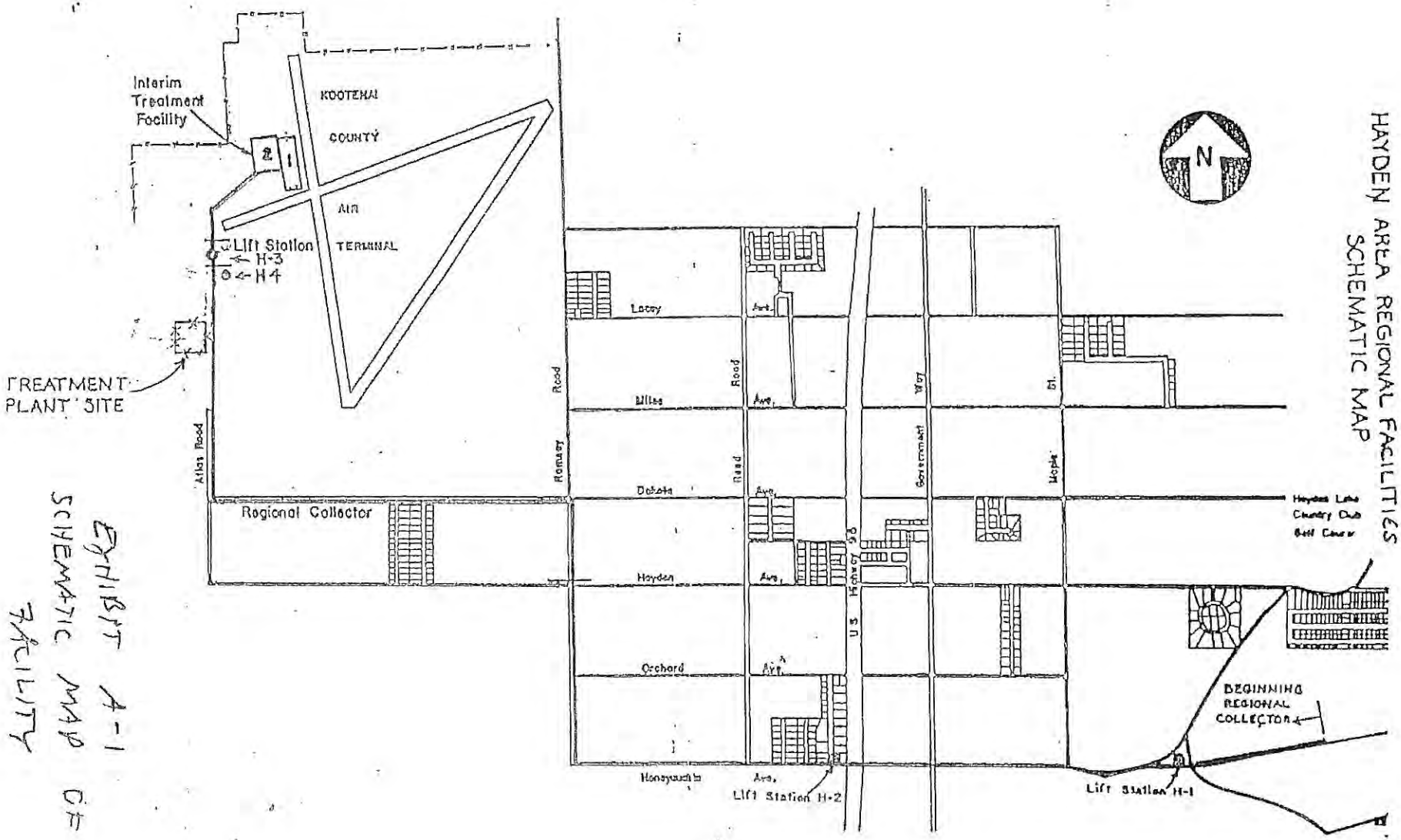

EXHIBIT A-1
SCHEMATIC MAP OF
FACILITY

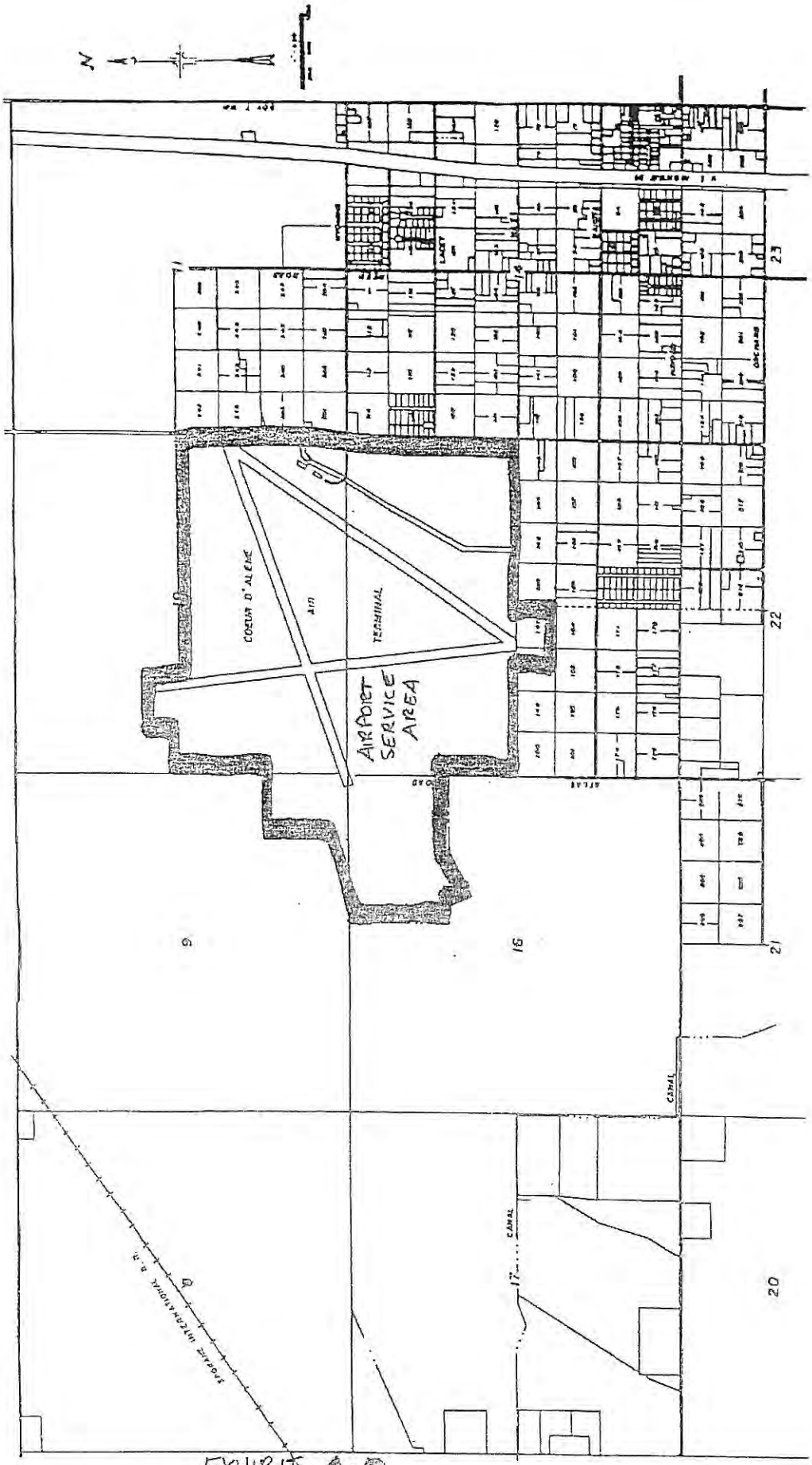

EXHIBIT A-2
AIRPORT SERVICE AREA

EXHIBIT "B" TO
JOINT POWERS AGREEMENT

[DESCRIPTION OF FACILITY COMPONENTS]

PHASE I:

The Hayden Area Regional Sewer Collector Facilities, as shown on engineering construction drawings entitled "Construction Plan, Hayden Area Regional Sewer Collector and Interim Treatment Facility", prepared by LePard & Frame, Inc., and V. David Welch Associates, Inc., dated August 29, 1985, exclusive of Schedule "I-B" and Schedule "I-BB" of those plans, all of which plans are on file at the office of the Kootenai County Commissioner. Phase I Facilities consist of thee major pumping stations and controls, pipeline, valves, one subsurface drainfield module, and related appurtenances (subject, however, to the rights of Kootenai County as fee owner of the Interim Drainfield property).

PHASE II:

Mechanical Treatment Plant, initially sized to provide sewage treatment service for 3,333 Equivalent Residences including, without limitation, screening and grit removal, oxidation ditch, clarification, disinfection, sludge handling facilities, buildings, land disposal facilities, and other related appurtenances.

PHASE III:

A. Spokane River Outfall, including, without limitation, lift stations, force mains, diffuser, and related appurtenances to convey and discharge the Treatment Plant effluent to the Spokane River;

B. Mechanical Treatment Plant Expansion, including without limitation, addition of various treatment and sludge handling components to increase capacity of Treatment Plant. Expansion is not limited to one increment or project and will be accomplished by the addition of various components over an extended time frame.

ANCILLARY RIGHTS:

Included within the description of the Facility components shall be all easements, rights of way, permits, grant applications, and other rights appurtenant to and/or necessary for the construction and operation of the Facility for its intended purpose, for which specific assignments or conveyances shall be prepared and delivered upon request.

EFW12A/D,18 - D9/25/86

EXHIBIT "C" TO
JOINT POWERS AGREEMENT

LEGAL DESCRIPTIONS OF INTERIM DRAINFIELD
AND TREATMENT PLANT SITE

INTERIM DRAINFIELD

A portion of the Southwest Quarter of Section 10, Township 51 North, Range 41 West, B.M., Kootenai County, Idaho, more particularly described as follows:

Commencing at the Southwest corner of said Section 10; thence North 0°43'15" West, 74.57 feet along the West boundary of said Southwest Quarter to a point on the extension of the Northerly boundary of Runway 23, the POINT OF BEGINNING; thence continuing North 0°43'15" West, 2587.96 feet along the West boundary of said Southwest Quarter to the Northwest corner of said Southwest Quarter (West Quarter Corner of said Section 10); thence South 89°52'29" East, 878.01 feet along the North boundary of said Southwest Quarter to a point on an extension of the Westerly boundary of airport Runway 14; thence South 15°07'00" East, 2036.28 feet along the Westerly boundary of Runway 14 extended and the Westerly boundary of Runway 14; thence 147.11 feet along the arc of a 100.00 foot radius curve right, said curve having a chord bearing South 27°01'38" West, 134.20 feet; thence South 69°10'16" West, 1407.48 feet along the northerly boundary of Runway 23 and the Northerly boundary of Runway 23 extended to the POINT OF BEGINNING.

Containing approximately 62.4 acres

TREATMENT PLANT SITE

The East 500 feet of the North 435 feet of the Northeast Quarter of the Southeast Quarter of the Northeast Quarter of Section 16, Township 51 North, Range 4 West, B.M., Kootenai County, Idaho;

Less any recorded right-of-way.

EFW12A/D,19 - D9/25/86

Permit No.: ID-002659-0

United States Environmental Protection Agency
Region 10
1200 Sixth Avenue
Seattle, Washington 98101

AUTHORIZATION TO DISCHARGE AND LAND APPLY/LANDFILL SEWAGE SLUDGE (BIOSOLIDS) UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Clean Water Act, 33 U.S.C. §1251 et seq., as amended by the Water Quality Act of 1987, P.L. 100-4, the "CWA",

Hayden Area Regional Sewer Board
10789 North Atlas Road
Rathdrum, Idaho 83858

is authorized to discharge from a wastewater treatment facility located near the City of Hayden, Idaho, at approximately latitude 47• 41' 54" and longitude: 116• 50' 03" to receiving waters named the Spokane River (River Mile 108.7), in accordance with discharge point(s), effluent limitations, monitoring requirements and other conditions set forth herein, and is authorized to land apply/landfill treated biosolids, in accordance with application sites, specific limitations, monitoring requirements, management practices, and other conditions set forth herein. Authorization to land apply biosolids is limited to the area of Kootenai County north of Interstate 90 and west of Interstate 95.

This permit shall become effective November 2, 1999

This permit and the authorization to discharge and land apply/landfill treated biosolids shall expire at midnight, November 2, 2004

Signed this 30th day of Sepember, 1999

/s/ Randy Smith
Director, Office of Water Region 10
U.S. Environmental Protection Agency

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I. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

A. Outfall 001 Effluent Limitations and Monitoring Requirements.

1. During the effective period of this permit, the permittee is authorized to discharge from outfall 001 from October 1 to May 31 and from June 1 to September 30 when the Spokane River flow is greater than 2,000 cfs. The discharge is subject to the restrictions set forth herein. This permit does not authorize the discharge of any waste streams, including spills and other unintentional or non-routine discharges of pollutants, that are not part of the normal operation of the facility as disclosed in the permit application, or any pollutants that are not ordinarily present in such waste streams.

Table 1: Limitations and Monitoring Requirements for Outfall 001

Parameter	Effluent Limitations			Monitoring Requirements	
	Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit	Sample Frequency	Sample Type
Five-day Biochemical Oxygen Demand (BOD_5)[1] mg/L lbs/day Percent Removal	 30 375 85[2]	 45 563 ---	 --- --- ---	2/week	24 hr composite
Total Suspended Solids (TSS)[1] mg/L lbs/day Percent Removal	 30 375 85[2]	 45 563 ---	 --- --- ---	2/week	24 hr composite
Fecal Coliform[3], #/100ml May 1-Sept 30[4] Oct 1-Apr 30[5]	 50 ---	 200 200	 500 800	3/week	grab
E. coli, #/100ml	---	---	---	3/week[6]	grab
Total Residual Chlorine[7/8], mg/L	0.5	---	---	1/day	grab
pH	---	---	See I.A.2	5/week	grab
Temperature, • C	---	---	---	2/week	grab
Total Ammonia (as N)[8] mg/L lbs/day	 78.7 985	 --- ---	 250 3128	2/week	24 hr composite
Cadmium[8/9], • g/L	---	---	---	1/month	24 hr composite

Lead[8/9] • g/L lbs/day	2.66 0.033	--- ---	3.76 0.047	1/month	24 hr composite
Zinc[8/9] • g/L lbs/day	88.2 1.10	--- ---	112.0 1.40	1/month	24 hr composite
Flow, mgd	---	---	---	Continuous	Recording
Spokane River Flow, cfs	---	---	---	Daily	See Note 10
Whole Effluent Toxicity, TU_c	---	---	---	Semi-annually for five years	See Part I.C

Notes:

1 The sample location shall be influent and effluent for these parameters. The permittee shall collect influent and effluent samples over the same 24 hour period.
2 This value represents a minimum percent removal.
3 Monthly and weekly averages shall be measured as a geometric mean.
4 No more than 10% of the effluent samples in any 30-day period may exceed 200/100 ml.
5 No more than 10% of the effluent samples in any 30-day period may exceed 400/100 ml.
6 Monitoring shall begin four years from the effective date of the permit.
7 Monitoring and average monthly limit are only required when the facility is discharging to the Spokane River.
8 Reporting is required within 24 hours of a maximum daily limit violation. See Part III.H.
9 The permittee shall conduct analysis for total recoverable metals.
10 Avista Corp. record from Post Falls Dam.

2. The pH range shall be between 6.0 - 9.0 standard units at all times. The permittee shall report the number and duration of excursions during the month with the discharge monitoring report (DMR) for each month.

3. There shall be no discharge of floating, suspended or submerged matter such that it causes a nuisance or objectionable condition or impairs designated beneficial uses.

B. Method Detection Limits. For all monitoring, the permittee shall use methods that can achieve a method detection limit (MDL) equal to 0.1 times the effluent limitation or the most sensitive EPA approved method, whichever is greater. If the analytical result for any sample is below the MDL, the permittee shall report "less than {numeric MDL} on the DMR. For purposes of averaging results, the permittee shall use 0 for all values below the MDL.

C. Whole Effluent Toxicity Testing.

The permittee shall conduct semi-annual chronic toxicity tests on 24 hour composite effluent samples from outfall 001 for five years after the effective date of the permit.

Testing and reporting shall be conducted in accordance with subsections 1 through 3 below.

1. Test Species and Methods

   a. The permittee shall conduct short-term tests with the water flea, *Ceriodaphnia dubia* (survival and reproduction test), fathead minnow, and *Pimephales promelas* (larval survival and growth test) for the first year of testing. After this screening, monitoring shall be conducted using the most sensitive species. The most sensitive species shall be defined as the one with the lowest no observed effect concentration (NOEC).

   b. Testing shall be conducted on 24-hour composite samples of effluent. In addition, a split of each sample collected shall be analyzed for the chemical and physical parameters required in Part 1.A above. When the timing of sample collection coincides with that of the sampling required in Part I.A, analysis of the split sample will fulfill the requirements of Part I.A. as well.

   c. The presence of toxicity shall be estimated as specified in *Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, Third Edition, EPA/600/4-91/002, July 1994.

   d. Results shall be calculated in chronic toxicity units (TU_c), where TU_c = 100/NOEC. If in the calculation of a NOEC, two tested concentrations cause statistically significant effects but an intermediate concentration does not cause statistically significant effects, the permittee must either repeat the test or use the lowest concentration to calculate the NOEC.

2. Quality Assurance

   a. The toxicity testing on each organism shall include a series of five test dilutions and a control. The series shall include one dilution equal to the instream waste concentration (IWC), two dilutions above the IWC, and two dilutions below the IWC. The IWC is 0.57 percent for winter (October 1 through June 30) and 1.8 percent effluent for summer (July 1 through September 30).

   b. All quality assurance criteria and statistical analyses used for chronic tests and reference toxicant tests shall be in accordance with *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and*

Receiving Waters to Freshwater Organisms, Third Edition, EPA/600-4-91-002, July 1994, and individual test protocols.

c. In addition to those quality assurance measures specified in the methodology, the following quality assurance procedures shall be followed:

i) To the extent practicable, control and dilution water should be receiving water. If the dilution water used is different from the culture water, a second control, using culture water shall also be used. For purposes of this paragraph, "receiving water" means water collected from the Spokane River upstream from the permittee's discharge. In no case shall water that has not met test acceptability criteria be used as dilution water.

ii) If organisms are not cultured in-house, concurrent testing with reference toxicants shall also be conducted. Where organisms are cultured in-house, quarterly reference toxicant testing is sufficient. Reference toxicant tests shall be conducted using the same test conditions as the effluent toxicity tests (same test duration, etc).

iii) If either of the reference toxicant test or the effluent test do not meet all test acceptability criteria as specified in the manual, the permittee must re-sample and re-test as soon as possible.

3. Reporting

a. The permittee shall submit the full report for each toxicity test with the June and December DMRs.

b. Test results for chronic tests shall include all relevant information in Section 10, Report Preparation, of *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, Third Edition, EPA/600-4-91-002, July 1994.

c. Toxicity test results shall be reported in TU_c.

d. The full report shall consist of:
i) the chronic toxicity test results
ii) the dates of sample collection and initiation of each toxicity test
iii) the flow rate at the time of sample collection

iv) the results of the monitoring in Part I.A.1 of the permit.

4. Preparation of Initial Investigation TRE Workplan

a. The permittee shall develop and submit to EPA an initial investigation Toxicity Reduction Evaluation (TRE) workplan within 90 days of the effective date of this permit. This plan shall describe the steps the permittee intends to follow if toxicity is detected, and should include, at a minimum:

i) A description of the investigation and evaluation techniques that would be used to identify potential causes/sources of toxicity, effluent variability, and treatment system efficiency.
ii) A description of the facility's methods of maximizing in-house treatment efficiency, good housekeeping practices, and a list of all chemicals used at the facility.
iii) If a toxicity identification evaluation (TIE) is necessary, who will conduct it (i.e. in-house expertise or contractors).

5. Accelerated Testing

a. If chronic toxicity is detected above the 24 TU_c, the permittee shall conduct six more biweekly tests over a twelve-week period. Accelerated testing must be initiated within two weeks of receipt of the test results which indicate an exceedence.

b. If the Permittee is able to adequately demonstrate through an evaluation of facility operations that the cause of the exceedence(s) is known and corrective actions have been immediately implemented, or in cases where additional test quality assurance/quality control is necessary, only one additional test is necessary. If toxicity is detected in this test, the paragraph 6 shall apply.

c. If chronic toxicity is detected above the 24 TU_c during accelerated testing, the permittee must initiate a toxicity reduction evaluation as outlined in paragraph 6, below, within fifteen days of the exceedence.

d. If none of the six tests indicates toxicity, the permittee may return to the normal testing frequency.

6. Toxicity Reduction Evaluation and Toxicity Identification Evaluation

a. If chronic toxicity exceeds the 24 TU_c in any of the six biweekly tests, the permittee shall initiate a TRE in accordance with *Toxicity*

Reduction Evaluation Protocol for Municipal Wastewater Treatment Plants (EPA/600/2-88/062).

b. The permittee will develop a more detailed TRE workplan as expeditiously as possible. At a minimum, the workplan will include:

i) further actions to investigate and identify the cause of toxicity;
ii) actions the permittee will take to mitigate the impact of the discharge and to prevent the recurrence of toxicity; and
iii) a schedule for these actions.

c. The permittee may initiate a TIE as part of the overall TRE process described in the EPA acute and chronic TIE manuals EPA/600/6-91/005F (Phase I), EPA/600/R-92/080 (Phase II), and EPA-600/R-92/081 (Phase III).

d. If a TIE is triggered prior to completion of the accelerated testing, the accelerated testing schedule may be terminated, or used as necessary in performing the TIE.

II. SLUDGE (BIOSOLIDS) MANAGEMENT REQUIREMENTS

A. The permittee shall comply with all existing federal and state laws and regulations that apply to its biosolids use or disposal practice. Including the requirements of 40 CFR 503 Subparts A, B and D and the biosolids management plan identified in the Definitions section of this permit (refer to Appendix A).

B. The permittee shall handle and dispose of biosolids so the public health and the environment are protected from any reasonably anticipated adverse effects due to any toxic pollutants that may be present.

C. The permittee shall ensure pollutants from the biosolids do not reach surface waters of the United States.

D. When the permittee's biosolids are applied to the land, the permittee is considered the person who applies biosolids for the purposes of determining compliance with the permit and compliance with the 40 CFR 503. The biosolids may be land applied between April 1 and October 15 of each year if it can be demonstrated that the nitrogen will be utilized by a crop or stubble (consistent with the appropriate agronomic rate) within this growing season. The permittee must retain records of actual agronomic loadings and the types of crops grown. Biosolids may be land applied during non-growing seasons if it can be demonstrated to the satisfaction of IDEQ, that the nitrogen is sufficiently immobilized through biosolids remediation

techniques and the application method complies with the State Groundwater Quality Rule and federal 503 regulations.

E. The permittee shall collect and analyze samples of biosolids that are applied to the land as follows:

1. The samples shall be representative of the variability in biosolids quality considering location, season, processing, and handling;

2. At a minimum, the biosolids shall be sampled in accordance with 40 CFR 503.16, but often enough to represent biosolids quality;

3. Sampling protocol shall follow procedures outlined in Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA Publication SW-846, 2nd Edition (1982) with Updates I (April 1984) and II (April 1985) and 3rd Edition (November 1986) with Revision I (December 1987); and

4. Analytical protocols shall be in accordance with 40 CFR 503.8.

F. Class B biosolids applied to the land shall meet the following biosolids treatment requirements in Table 2:

Table 2: Biosolids Treatment Requirements for Land Application

Disposal Method	Product	Requirements
Land Application	Class B biosolids only	Pollutants: Monthly average concentrations, 40 CFR 503.13(a)(2)(ii)[1] Ceiling concentrations, 40 CFR 503.13(a)(1) Pathogens: Aerobic Digestion 40 CFR 503.32(b)(2)[2] Vector Control: Volatile solids reduction 40 CFR 503.33(b)(1)[2] Soil Reclamation: The Permittee must obtain EPA approval before land application for soil reclamation (above agronomic rates).

Notes:

1 The EPA may separately approve by letter, the method controlling the accumulation of metals per 40 CFR 503.13(a)(2)(i).

2 EPA may separately approve by letter: Pathogen Treatment available in 40 CFR 503.32(a) for Class A and 40 CFR 503.32(b)(3) Appendix B (A.1,2,4 or 5) for Class B and Vector Control available in 40 CFR 503.33(b)(3-6). If the permittee intends to use one of these additional alternatives, the EPA and IDEQ must be notified at least 30 days prior to its use. Notification shall include a demonstration of the facility's ability to measure compliance with the alternative option. The permittee may begin using the new alternative 30 days after submittal of a complete process description unless notified otherwise by EPA.

G. Biosolids may be distributed to the specific land application areas identified northwest of the Spokane International Railway Company in Appendix B. Additional land application sites may be developed within Kootenai County north of Interstate 90 and west of Highway 95 provided the following conditions are met:

a. An individual site plan shall be submitted to EPA 90 days prior to land applying biosolids to the new site. The site plan shall provide information on the site conditions and on the intended disposal practices at the site. The site plan shall be prepared in accordance with the this permit and the Biosolids Management Plan (See section VI for definitions).

b. The permittee shall evaluate each new site for potential endangered species habitat(s), and report the findings in the individual site plan. The review shall consider the species currently listed by the US Government for the geographical area approved in this permit. The permittee shall notify EPA immediately if any potential habitat is found. Biosolids shall not be applied to land with potential endangered species habitat without written approval from EPA.

c. Prior to land applying biosolids at a new site, the permittee shall notify interested parties by notice and letter. The notice shall include a site map, directions on how to obtain the site management plan from the permittee or its representative, and directions on how to comment on the site or plan. Comment to EPA on the site or plan shall be addressed to:

U.S. Environmental Protection Agency
ATTN: Sludge Management Coordinator
1200 Sixth Avenue, OW-130
Seattle, WA 98101

The interested parties shall include: 1) surrounding community within 300 feet; 2) the local United States Department of Agriculture Natural Resource Conservation Service (NRCS); 3) the State Agricultural Extension Service; 4) the local Soil Conservation District; and 5) the Idaho Division of Environmental Quality.

H. Distribution of Class B biosolids to areas outside of the Kootenai County authorized site is not authorized by this permit (except for crop trials under J below). To expand the authorized land application sites, the permittee shall submit a revised permit application to EPA (40 CFR 122.41(l)(1)(iii)).

I. As a contingency measure, biosolids from the Hayden Wastewater Treatment Plant (WWTP) may be transferred to the Kootenai County Municipal Solid Waste Landfill

(MSWLF), a compost facility, or other treatment plant. In addition the biosolids may also be stored. Other MSWLFs may be approved by letter, including landfills in adjacent counties upon evidence of compliance with 40 CFR 503.4. The biosolids sent to a MSWLF shall be non-hazardous, and not contain "free liquids" as defined by EPA test method 9095 in Test Methods for *Evaluating Solid Wastes Physical/Chemical Methods* (EPA Publication # SW-846).

J. The permittee may distribute Class B biosolids in crop trials of two acres or less. Crop trials may occur outside the land application sites listed in Appendix B. Notification of planned crop trials shall be sent to (1) the EPA, Idaho Operations Office (2) the applicable regional office of the IDEQ if so required by the state, and (3) to the office of the NRCS of the United States Department of Agriculture closest to the crop trial site. Crop trial need not comply with section F above. Crop trials shall comply with all other requirements of the federal standards at 40 CFR 503 and the other requirements of this permit.

K. The permittee shall submit a report to EPA on February 19th of each year that includes the following information:

1. a report of any times that the biosolids were stockpiled (no use or disposal), disposed in a MSWLF unit, or disposed of in a manner other than that in the permittee's sludge application;

2. the location(s) biosolids were used or disposed (if applicable);

3. if the permittee land applied biosolids, provide the following information required at 40 CFR 503.18(a)(4):

   - the dry weight concentration (including units) of each pollutant listed in 40 CFR 503.13 in the biosolids;
   - a description of how one of the vector attraction requirements in 40 CFR 503.33(b)(1) through (b)(8) were met;
   - a description of how the Class B pathogen requirements in 40 CFR 503.32(b) were met;
   - the following certification statement by the person who prepares the bulk biosolids:

     "I certify, under penalty of law, that the Class B pathogen requirements in 503.32(b) and the vector attraction reduction requirement in [insert one of the vector attraction reduction requirements in 503.33(b)(1) through (b)(8) if one of those requirements was met] have been met. This determination has been made under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather

and evaluate the information used to determine that the pathogen requirements [and vector attraction reduction requirements if applicable] have been met. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment.";

4. A statement that appliers certifications under 40 CFR 503.17 were completed for all sites;

5. Types of crops grown on the sites where sludge was applied; and

6. Number of excursions during the monitoring period.

L. The permittee shall maintain all information required under paragraph II.K for a period of 5 years. This period may be extended by request of the Director or IDEQ.

III. MONITORING, RECORDING, AND REPORTING REQUIREMENTS

A. Quality Assurance Plan.

1. The permittee shall develop a Quality Assurance Plan (QAP) for all monitoring requirements identified in the permit. The plan shall be completed and implemented within 120 days of the effective date of the permit.

2. At a minimum, the plan shall include the following:

   - Protocols for sampling techniques (field blanks, replicates, duplicates, control samples, etc.),
   - Sample preservation methods,
   - Sample shipment procedures,
   - Instrument calibration procedures and preventive maintenance (frequency, standard, spare parts),
   - Qualification and training of personnel, and
   - Analytical test methods that achieve the method detection limits in Section II.D including quality control checks, quantification/detection levels).

3. Throughout all sample collection and analysis activities, the permittee shall use the EPA approved quality assurance, quality control, and chain-of-custody procedures described in: *Requirements for Quality Assurance Project Plans*, EPA QA/R-5 and Guidance on *Quality Assurance Project Plans*, EPA QA/G-5.

4. The permittee shall amend the QAP whenever there is a modification in sample collection, sample analysis, or other procedure addressed by the QAP.

5. Copies of the QAP shall be kept on site and made available to EPA and/or Idaho Division of Environmental Quality (IDEQ) upon request.

B. **Representative Sampling**. The permittee shall collect all effluent samples from the effluent stream after the last treatment unit and prior to discharge into the receiving waters. Samples and measurements shall be representative of the volume and nature of the monitored discharge. In order to ensure that the effluent limits set forth in this permit are not violated at times other than when routine samples are taken, the permittee shall collect additional samples whenever any discharge occurs that may reasonably be expected to cause or contribute to a violation that is unlikely to be detected by a routine sample. The permittee shall analyze the additional samples for those parameters limited in Part I.A. of this permit that are likely to be affected by the discharge.

The permittee shall collect such additional samples as soon as the spill, discharge, or bypassed effluent reaches the outfall. The samples shall be analyzed in accordance with paragraph III.C ("Monitoring Procedures"). The permittee shall report all additional monitoring in accordance with paragraph III.E ("Additional Monitoring by Permittee").

C. **Monitoring Procedures**. Monitoring must be conducted according to test procedures approved under 40 CFR 136, unless other test procedures have been specified in this permit.

D. **Reporting of Monitoring Results**. Monitoring results shall be summarized each month on the DMR form (EPA No. 3320-1). The reports shall be submitted monthly and are to be postmarked by the 10th day of the following month. Legible copies of these, and all other reports, shall be signed and certified in accordance with the requirements of Part V.J. Signatory Requirements, and submitted to the Director, Office of Water and the State agency at the following addresses:

original to: United States Environmental Protection Agency Region 10
1200 Sixth Avenue, OW-133
Seattle, Washington 98101

copy to: Idaho Division of Environmental Quality
2110 Ironwood Pkwy
Coeur d'Alene, Idaho 83814

E. Additional Monitoring by the Permittee. If the permittee monitors any pollutant more frequently than required by this permit, using test procedures approved under 40 CFR 136 or as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR. Such increased frequency shall also be indicated and an explanation of why such additional monitoring was performed.

Upon request by the Director, the permittee shall submit results of any other sampling, regardless of the test method used.

F. Records Contents. Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements;
2. The individual(s) who performed the sampling or measurements;
3. The date(s) analyses were performed;
4. The individual(s) who performed the analyses;
5. The analytical techniques or methods used; and
6. The results of such analyses.

G. Retention of Records. Except as specified in paragraph II.L., the permittee shall retain records of all monitoring information, including but not limited to all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, and records of all data used to complete the application for this permit, for a period of at least three years from the date of the sample, measurement, report or application. This period may be extended by request of the Director or IDEQ at any time. A copy of the NPDES permit must be maintained on-site for the duration of activity at the permitted location.

H. Twenty-four Hour Notice of Noncompliance Reporting.

1. The following occurrences of noncompliance shall be reported by telephone within 24 hours from the time the permittee becomes aware of the circumstances:

   a. Any unanticipated bypass which exceeds any effluent limitation in the permit (See Part IV.G, Bypass of Treatment Facilities);

   b. Any upset which exceeds any effluent limitation in the permit (See Part IV.H, Upset Conditions); or

c. Violation of a maximum daily discharge limitation for any of the pollutants in Table 1 of Section I.A of the permit requiring 24-hour reporting.

2. The following occurrences of noncompliance with biosolids requirements shall be reported by telephone by the first workday (8:00am - 4:30pm PST) following the day the permittee became aware of the circumstances:

   a. violation of any limits of 40 CFR 503.13, Table 1 (maximum individual sample) or Table 3 (monthly average);

   b. violation of the pathogen limits;

   c. violation of the vector attraction reduction limits; or

   d. violation of the management practices for biosolids that have been land applied.

3. A written submission shall also be provided within five days of the time that the permittee becomes aware of the circumstances. The written submission shall contain:

   a. A description of the noncompliance and its cause;

   b. The period of noncompliance, including exact dates and times;

   c. The estimated time noncompliance is expected to continue if it has not been corrected; and

   d. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

4. The Director may waive the written report on a case-by-case basis if the oral report has been received within 24 hours by the NPDES Compliance Unit in Seattle, Washington, by phone, (206) 553-1846.

5. Reports shall be submitted to the addresses in Part III.D Reporting of Monitoring Results.

I. Other Noncompliance Reporting. Instances of noncompliance not required to be reported within 24 hours shall be reported at the time that monitoring reports for Part III.D Reporting of Monitoring Results are submitted. The reports shall contain the information listed in Part III.F.

J. Notice of New Introduction of Pollutants. The permittee shall provide adequate notice to the Director, Office of Water of:

1. Any new introduction of pollutants into the treatment works from an indirect discharger which would be subject to Sections 301 or 306 of the CWA if it were directly discharging those pollutants; and

2. Any substantial change in the volume or character of pollutants being introduced into the treatment works by a source introducing pollutants into the treatment works at the time of issuance of the permit.

3. For the purposes of this section, adequate notice shall include information on:

   a. The quality and quantity of effluent to be introduced into such treatment works; and

   b. Any anticipated impact of the change on the quantity or quality of effluent to be discharged from such publicly owned treatment works.

IV. COMPLIANCE RESPONSIBILITIES

A. Duty to Comply. The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the CWA and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application. The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

B. Penalties for Violations of Permit Conditions. Except as provided in permit conditions in Part IV.G Bypass of Treatment Facilities and Part IV.H Upset Conditions, nothing in this permit shall be construed to relieve the permittee of the civil or criminal penalties for noncompliance.

1. Civil and Administrative Penalties. Any person who violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the CWA shall be subject to a civil or administrative penalty, not to exceed the maximum amounts authorized by Sections 309(d) and 309(g) of the CWA and the Federal Civil Penalties Inflation Adjustment Act (28 U.S.C. § 2461 note) as amended by the Debt Collection Improvement Act (31 U.S.C. § 3701 note).

2. Criminal Penalties:

a. Negligent Violations. Any person who negligently violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the CWA shall, upon conviction, be punished by a fine and/or imprisonment as specified in Section 309(c)(1) of the CWA.

b. Knowing Violations. Any person who knowingly violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the CWA shall, upon conviction, be punished by a fine and/or imprisonment as specified in Section 309(c)(2) of the CWA.

c. Knowing Endangerment. Any person who knowingly violates a permit condition implementing Sections 301, 302, 303, 306, 307, 308, 318, or 405 of the CWA, and who knows at that time that he thereby places another person in imminent danger of death or serious bodily injury, shall, upon conviction, be subject to a fine and/or imprisonment as specified in Section 309(c)(3) of the CWA.

d. False Statements. Any person who knowingly makes any false material statement, representation, or certification in any application, record, report, plan, or other document filed or required to be maintained under this CWA or who knowingly falsifies, tampers with, or renders inaccurate any monitoring device or method required to be maintained under this CWA, shall, upon conviction, be punished by a fine and/or imprisonment as specified in Section 309(c)(4) of the CWA.

C. Need to Halt or Reduce Activity not a Defense. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

D. Duty to Mitigate. The permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

E. Operation and Maintenance.

1. The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed, or used, by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This

provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

2. Within 180 days of the effective date of the permit, the permittee shall review its operation and maintenance plan and ensure that it includes appropriate best management practices (BMPs). The O&M plan shall include measures which prevent or minimize the potential for the release of pollutants to the Spokane River. The Plan shall be retained on site and made available to EPA and IDEQ upon request.

3. The permittee shall develop a description of pollution prevention measures and controls appropriate for the facility, and implement such controls. The appropriateness and priorities of controls in the Plan shall reflect identified potential sources of pollutants at the facility. The description of BMPs shall address, to the extent practicable, the following minimum components:

   a. Spill prevention and control

   b. Optimization of chlorine and other chemical use

   c. Research, development and implementation of a public information and education program to control the introduction of household hazardous materials to the sewer system

   d. Water conservation

4. The design criterion for the permitted facility is an annual average flow of 1.5 mgd. Each month, the permittee shall compute an annual average value for flow entering the facility based on the previous twelve months data. If the average annual value exceeds 85% of the design criterion value, the permittee shall develop a facility plan and schedule within one year from the date of the first exceedence. The plan must include the permittees' strategy for continuing to maintain compliance with effluent limits and will be made available to the Director or authorized representative upon request.

F. **Removed Substances**. Collected screenings, grit, solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters shall be disposed of in a manner such as to prevent any pollutant from such materials from entering navigable waters.

G. Bypass of Treatment Facilities.

1. Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of paragraphs 2 and 3 of this section.

2. Notice.

   a. Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least 10 days before the date of the bypass.

   b. Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required under Part III.L Twenty-four Hour Notice of Noncompliance Reporting.

3. Prohibition of bypass.

   a. Bypass is prohibited and the Director may take enforcement action against a permittee for a bypass, unless:

      (1) The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

      (2) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

      (3) The permittee submitted notices as required under paragraph 2 of this section.

   b. The Director may approve an anticipated bypass, after considering its adverse effects, if the Director determine that it will meet the three conditions listed above in paragraph 3.a. of this section.

H. Upset Conditions.

1. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of paragraph 2 of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

2. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

   a. An upset occurred and that the permittee can identify the cause(s) of the upset;

   b. The permitted facility was at the time being properly operated;

   c. The permittee submitted notice of the upset as required under Part III.L Twenty-four Hour Notice of Noncompliance Reporting; and

   d. The permittee complied with any remedial measures required under Part IV.D Duty to Mitigate.

3. Burden of proof. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

I. Toxic Pollutants. The permittee shall comply with effluent standards or prohibitions established under Section 307(a) of the CWA for toxic pollutants within the time provided in the regulations that establish those standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

J. Control of Undesirable Pollutants. Under no circumstances shall the permittee allow introduction of the following wastes into the waste treatment system:

1. Pollutants which create a fire or explosion hazard in the treatment works;

2. Pollutants which will cause corrosive structural damage to the treatment works, but in no case, wastes with a pH lower than 5.0, unless the works is designed to accommodate such wastes;

3. Solid or viscous pollutants in amounts which will cause obstructions to the flow in the treatment works, or interference with the proper operation of the treatment works;

4. Any pollutant, including oxygen demanding pollutants (BOD, etc.) released in a discharge of such volume or concentration as to cause interference in the treatment works;

5. Heat in amounts which inhibit biological activity in the treatment works resulting in interference;

6. Petroleum oil, nonbiodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through;

7. Pollutants which result in the presences of toxic gases, vapors, or fumes within the treatment works in quantity that may cause acute worker health and safety problems; and

8. Any trucked or hauled pollutants, except at discharge points designated by the treatment works.

K. **Requirements for Industrial Users**. The permittee shall require any industrial user of these treatment works to comply with any applicable requirements of Sections 204(b), 307, and 308 of the CWA, including any requirements established under 40 CFR Part 403.

L. **Planned Changes**. The permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

1. the alteration or addition could significantly change the nature or increase the quantity of pollutants discharged (This notification applies to pollutants which are not subject to effluent limitations in the permit or notification requirements under 122.42(a)(1)); or

2. the alteration or addition results in a significant change in the permittee's sludge use or disposal practices, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to the land application plan approved in this permit.

M. **Anticipated Noncompliance**. The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

V. GENERAL PROVISIONS

A. Permit Actions. This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

B. Duty to Reapply. If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. The application must be submitted at least 180 days before the expiration date of this permit unless the Administrator grants permission to submit the application at a later date.

C. Duty to Provide Information. The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

D. Other Information. When the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or any report to the Director, it shall promptly submit such facts or information.

E. Signatory Requirements. All applications, reports or information submitted to the Director shall be signed and certified.

1. All permit applications shall be signed by either a principal executive officer or ranking elected official.

2. All reports required by the permit and other information requested by the Director shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

   a. The authorization is made in writing by a person described above and submitted to the Director, and

   b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility, such as the position of plant manager, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters. (A duly authorized

representative may thus be either a named individual or any individual occupying a named position.)

3. Changes to authorization. If an authorization under paragraph V.J.2. is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of paragraph V.J.2. must be submitted to the Director prior to or together with any reports, information, or applications to be signed by an authorized representative.

4. Certification. Any person signing a document under this section shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

F. **Availability of Reports**. Except for data determined to be confidential under 40 CFR Part 2, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Director. As required by the CWA, permit applications, permits and effluent data shall not be considered confidential.

G. **Inspection and Entry**. The permittee shall allow the Director or an authorized representative (including an authorized contractor acting as a representative of the Administrator), upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

4. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the CWA, any substances or parameters at any location.

H. **Oil and Hazardous Substance Liability**. Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the CWA.

I. **Property Rights**. The issuance of this permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state or local laws for regulations.

J. **Severability**. The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

K. **Transfers**. This permit may be automatically transferred to a new permittee if:

1. The current permittee notifies the Director at least 30 days in advance of the proposed transfer date;

2. The notice includes a written agreement between the existing and new permittees containing a specific date for transfer of permit responsibility, coverage, and liability between them; and

3. The Director does not notify the existing permittee and the proposed new permittee of his or her intent to modify, or revoke and reissue the permit. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in paragraph 2 above.

L. **State Laws**. Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation under authority preserved by Section 510 of the CWA.

M. **Reopener Clause**. This permit is subject to modification, revocation and reissuance, or termination at the request of any interested person (including the permittee) or upon EPA initiative. However, permits may only be modified, revoked or reissued, or terminated for the reasons specified in 40 CFR 122.62 or 122.64, and 40 CFR 124.5. This includes new information which was not available at the time of permit issuance and would have justified the application of different permit conditions at the

time of issuance, including but not limited to future monitoring results. All requests for permit modification must be addressed to EPA in writing and shall contain facts or reasons supporting the request.

VI. DEFINITIONS

1. "Administrator" means the Administrator of the EPA, or an authorized representative.

2. "Agronomic rate" is the whole sludge (biosolids) application rate (dry weight basis) designed: 1) To provide the amount of nitrogen needed by the food crop, feed crop, fiber crop, cover crop, or vegetation grown on the land; and 2) To minimize the amount of nitrogen in the sewage sludge that passes below the root zone in the crop or vegetation grown on the land to the ground water. Agronomic rate shall consider other sources of nitrogen, reasonable estimate of crop yields, and other practices appropriate to the site and crop.

3. "Average monthly discharge limitation" means the highest allowable average of "daily discharges" over a calendar month. For pollutants other than fecal coliform bacteria, the average monthly discharge shall be calculated as the sum of all "daily discharges" measured during a calendar month divided by the number of "daily discharges" measured during that month. For fecal coliform bacteria, the average monthly discharge shall be calculated as a geometric mean.

4. "Average weekly discharge limitation" means the highest allowable average of "daily discharges" over a calendar week. For pollutant other than fecal coliform bacteria, the average weekly discharge shall be calculated as the sum of all "daily discharges" measured during a calendar week divided by the number of "daily discharges" measured during that week. For fecal coliform bacteria, the average weekly discharge shall be calculated as a geometric mean.

5. "Biosolids" means any sewage sludge or material derived from sewage sludge.

6. A "Biosolids Management Plan", for the purposes of this permit, means the amended sludge permit application submitted by the Hayden Area Regional Sewer Board, received by EPA in January 1998 including a June 10, 1999 letter.

7. "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility.

8. "Chronic toxic unit" ("TU_c") is a measure of chronic toxicity. The number of chronic toxic units in the effluent is calculated as 100/NOEC, where the NOEC is measured in percent effluent.

9. "Crop trial" means applying biosolids as a soil amendment on an area of land two (2) acres or less for the purpose of developing appropriate agriculture practices.

10. "Daily discharge" means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the "daily discharge" is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the "daily discharge" is calculated as the average measurement of the pollutant over the day.

11. "Director" means the Director of the Office of Water, EPA, or an authorized representative.

12. "DMR" means discharge monitoring report.

13. "EPA" means the United States Environmental Protection Agency.

14. Farm Customer/Site Plans: The specific plans referenced and covered by this permit are for the HARSB land application site at 14398 N. Huetler Road, Rathdrum, ID.

15. A "Farm Grade" Biosolids (Soil Products Made From Sewage Sludge) is a Class B biosolid sludge product that is used as a fertilizer or soil improvement product. These products usually have a fair nitrogen fertilizer value but with some amounts of pathogen (disease) organisms still present. This type of sludge must be used according to regulated plans and short term site restrictions. The biosolids must also meet the federal limits for control of potentially toxic pollutants (mainly metals), and for preventing spread of pathogens by "vectors" (e.g., flies).

16. "Grab" sample is a single sample or measurement taken at a specific time or over as short a period of time as is feasible.

17. "Land application" is the spraying or spreading of biosolids onto the land surface; the injection of biosolids below the land surface; or the incorporation of biosolids into the land so that the biosolids can either condition the soil or fertilize crops or vegetation grown in the soil. Land application includes distribution and marketing (i.e., the selling or giving away of the biosolids).

18. "Maximum daily discharge limitation" means the highest allowable "daily discharge."

19. "Method Detection Limit (MDL)" means the minimum concentration of an analyte that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero as determined by a specific laboratory method.

20. "Minimum Level (ML)" means the concentration at which the entire analytical system gives recognizable signals and an acceptable calibration point.

21. "No observed effect concentration (NOEC)" is the highest tested concentration of an effluent at which adverse effects are observed on the test organisms at the specific time of observation.

22. "Pathogen" means an organism that is capable of producing an infection or disease in a susceptible host.

23. "Regional Administrator" means the EPA Region 10 Regional Administrator, or an authorized representative.

24. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

25. A "24-hour composite" sample shall mean a flow proportioned mixture of not less than 8 discrete aliquots. Each aliquot shall be a grab sample of not less than 100 ml and shall be collected and stored in accordance with procedures prescribed in the most recent edition of Standard Methods for the Examination of Water and Wastewater.

26. "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

27. "Vector attraction" means the characteristic of biosolids that attracts rodents, flies, mosquitos or other organisms capable of transporting infectious agents.

28. "Waste stream" means any non-de minimis stream of pollutants within the permittee's facility that enters any permitted outfall or navigable waters. This includes spills and other unintentional, non-routine or unanticipated discharges.

APPENDIX A - 40 CFR 503 LANGUAGE

1. Subpart A - General Provisions.

503.1 Purpose and applicability
503.2 Compliance period
503.3 Permits and direct enforceability
503.4 Relationship to other regulations
503.5 Additional or more stringent requirements
503.6 Exclusions
503.7 Requirement for a person who prepares sewage sludge
503.8 Sampling and analysis
503.9 General Definitions

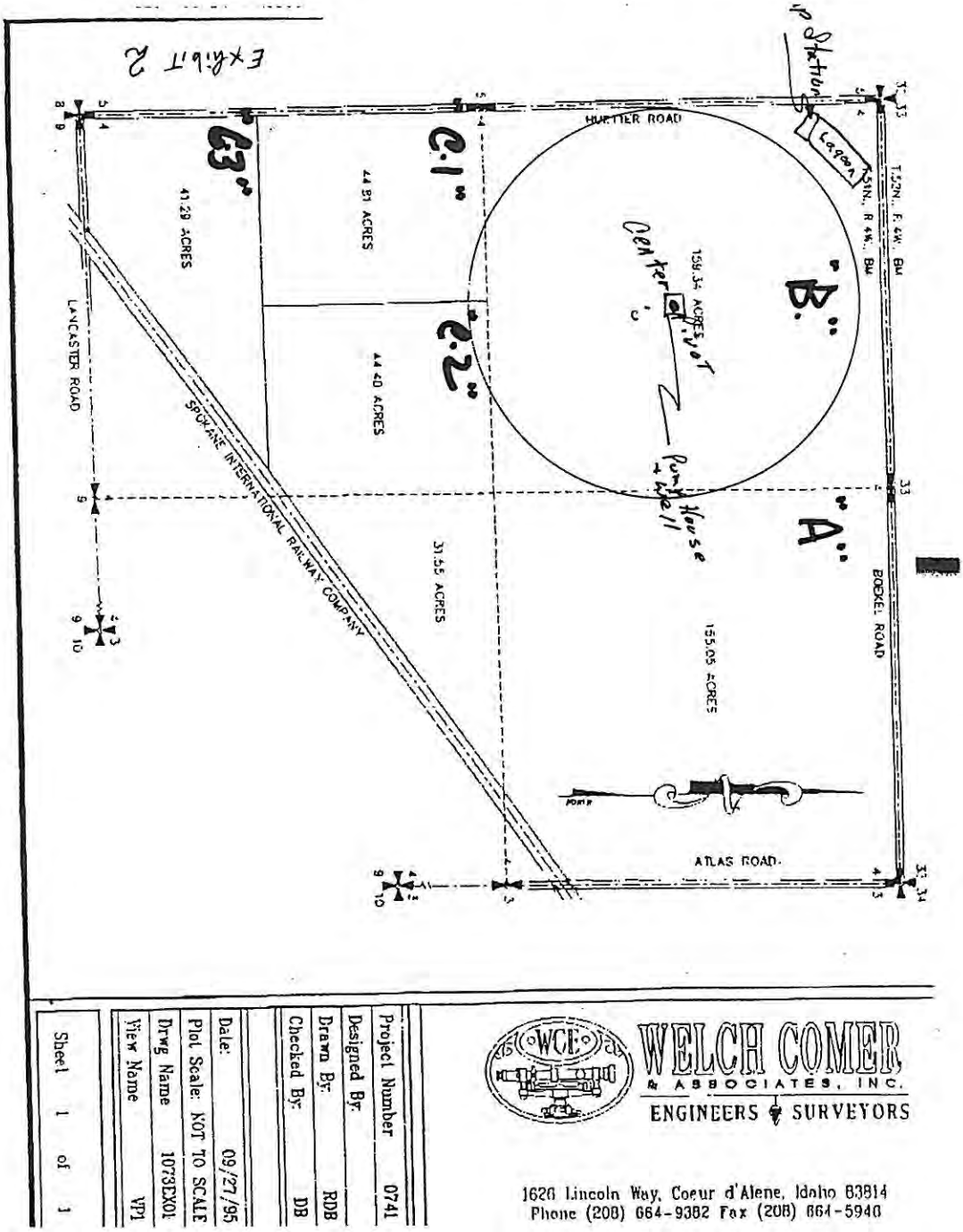
2. Subpart B - Land Application

503.10 Applicability
503.11 Special definitions
503.12 General requirements (specifically paragraphs a, b, d, e, f, g, h, i, and j)
503.13 Pollutant limits (specifically paragraph b(1, 2, 3, and 4))
503.14 Management practices (specifically paragraphs a, b, c, d, and e)
503.15 Operational standards- pathogens and vector attraction reduction (specifically paragraph a)
503.16 Frequency of monitoring (specifically paragraph a)
503.17 Recordkeeping (specifically paragraph a(1, 2, 3, 4, 5, and 6))
503.18 Reporting

3. Subpart D - Pathogens and Vector Attraction Reduction

503.30 Scope
503.31 Special definitions
503.32 Pathogens (specifically paragraph b)
503.33 Vector attraction reduction (specifically paragraph b)

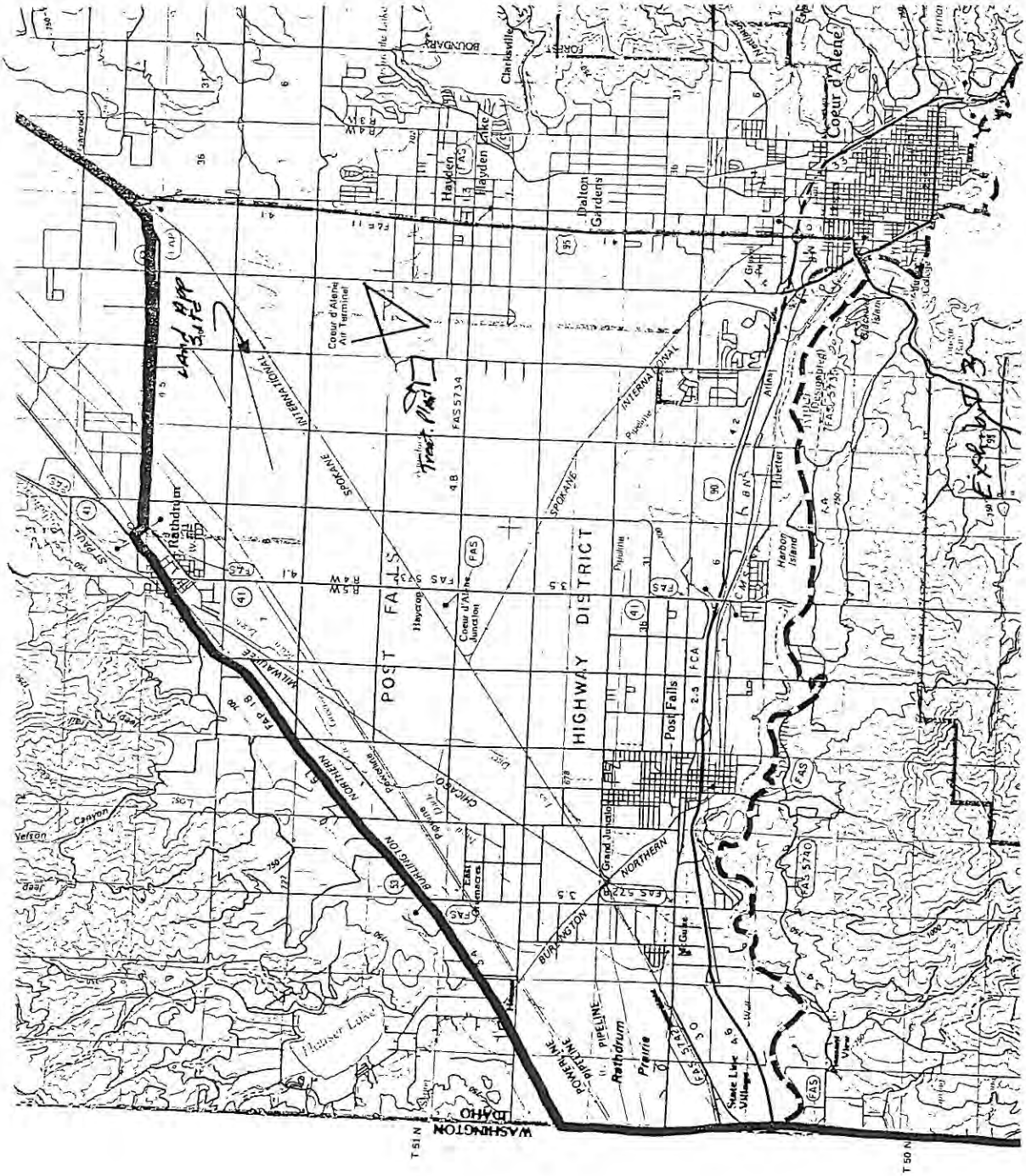
APPENDIX B - CURRENT LAND APPLICATION SITES



WELCH COMER & ASSOCIATES, INC.
ENGINEERS & SURVEYORS

1626 Lincoln Way, Coeur d'Alene, Idaho 83814
Phone (208) 664-9382 Fax (208) 664-5940

Project Number	0741
Designed By:	
Drawn By:	RDB
Checked By:	DB
Date:	09/27/95
Plot Scale:	NOT TO SCALE
Drwg Name	1073EX01
View Name	VP1
Sheet	1 of 1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Dalton Gardens
Hayden
Hayden Lake
Clarkesville
Coeur d'Alene Air Terminal
Rathdrum
Post Falls
HIGHWAY DISTRICT
Harbor Island
Huetter
Hauser Lake
Rathdrum Prairie
WASHINGTON
IDAHO
T 51 N
T 50 N
R 4 W
R 5 W
R 4 W
INTERNATIONAL
SPOKANE
CHICAGO
NORTHERN
BURLINGTON
POWERLINE PIPELINE
FAS 5734
FAS 5740
FAS 5722
FAS 5735
FAS 5732
FAS 5733
FAS 5731
FAS 18
FCA
Land Use Site
Exhibit 3

12/29/89

ORDINANCE NO. 89-2

AN ORDINANCE PROVIDING FOR THE OWNERSHIP, OPERATION, MAINTENANCE, AND EXPANSION OF THE HAYDEN AREA REGIONAL TREATMENT FACILITY AND LOCAL COLLECTOR SYSTEM SERVICING LOCAL IMPROVEMENT DISTRICTS NOS. 2 AND 3 OF THE HAYDEN LAKE RECREATIONAL WATER AND SEWER DISTRICT; PROVIDING FOR ALLOCATION OF OPERATION AND MAINTENANCE EXPENSES TO USERS AND FOR CAPITALIZATION FEES; PROVIDING FOR HOOK-UP REQUIREMENTS; PROVIDING FOR OTHER MATTERS PROPERLY RELATING THERETO.

HAYDEN LAKE RECREATIONAL WATER AND SEWER DISTRICT
KOOTENAI COUNTY, IDAHO

BE IT ORDAINED by the Board of Directors of Hayden Lake Recreational Water and Sewer District of Kootenai County, Idaho, as follows:

WHEREAS, the Hayden Lake Recreational Water and Sewer District of Kootenai County, Idaho (the "District"), is a recreational water and sewer district organized and existing under and pursuant to the laws of the State of Idaho; and

WHEREAS, the Board of Directors for the District ("Board") has previously created Local Improvement Districts Nos. 2 and 3, pursuant to Ordinance Nos. 85-7 and 85-6, respectively, adopted on May 15, 1985, for the purpose of acquiring, constructing, and installing improvements and betterments to the Hayden Area Regional Sewer Facility and Local Collector System, as defined herein; and

WHEREAS, the Board, by Joint Powers Agreement dated October 9, 1986, joined with the City of Hayden in forming the Hayden Area Regional Sewer Board, providing for the construction, operation, and maintenance of the Hayden Area Regional Sewer Facility; and

WHEREAS, the construction of the Regional Sewer Facility and the Local Collector System has been completed, the LID bonds have been sold, and the entire system is presently in operation; and

WHEREAS, the District desires to provide a comprehensive regulatory scheme relating to waste water services to be provided to Users within Local Improvement Districts Nos. 2 and 3 (the "Sewer Service Area") or otherwise utilizing the services of the Regional Sewer Facility and Local Collector System;

NOW, THEREFORE, BE IT FURTHER ORDAINED by the Board of Directors of Hayden Lake Recreational Water and Sewer District as follows:

PURPOSE AND APPLICABILITY

Section 1: The District hereby determines and declares that a fair regulatory scheme should be implemented to deal with waste water services to be provided by the District and the Hayden Area Regional Sewer Board to those Users and Parcels in the District who shall be benefitted by the operation and expansion of the Regional Facility and the Local Collector System, as defined herein. This Ordinance shall apply only to: (i) Users and Parcels now or hereafter included within the boundaries of the Sewer Service Area as defined herein; and (ii) Users and Parcels located within the District but outside the boundaries of the Sewer Service Area, but which may hereafter be provided with waste water services through connection to the Local Collector System and the Regional Facility. To the extent they may conflict with this Ordinance, the existing Ordinance No. 83-2, adopted by the District on September 12, 1983, and existing Ordinance No. 87-1, adopted by the District on July 9, 1987, are hereby superseded.

This Ordinance shall not apply to property located outside the boundaries of the Sewer Service Area, unless and until such property is provided with waste water services through connection to the Local Collector System and/or the Regional Facility. Such property shall continue to be regulated by Ordinance No. 83-2.

DEFINITIONS

Section 2: Unless the context specifically indicates otherwise, the meaning of the terms used in this Ordinance shall be as follows:

Board or Board of Directors: The Board of Directors of the District, as it may be constituted from time to time.

Boarding House: Any building or portion thereof which includes separate bedrooms for rent and common kitchen and/or bathroom facilities.

BOD_5:- Biochemical oxygen demand shall mean the quantity of oxygen utilized in the biochemical oxidation of organic matter under standard laboratory procedure in five (5) days at 20°C, expressed in milligrams per liter (mg/l).

Building Drain: That part of the lowest horizontal piping of a drainage system which receives the discharge from soil, waste, and other drainage pipes originating inside the walls of a building and conveys the discharge to the building sewer, beginning five (5) feet outside the inner face of the building wall.

Building Sewer: The extension of piping, pumps, and equipment carrying discharge from the building drain to the service

connection of the Local Collector System, at the edge of the public right-of-way or easement.

Capitalization Fee: The fee calculated and collected according to this Ordinance, with respect to Parcels created or otherwise brought under this Ordinance after closure of the LIDs (and which are therefore not included within the LID confirmation ordinances and not subject to an LID Assessment), representing a fair share of the cost of construction of the Regional Facility and Local Collector System, as allocated to an individual Parcel of land.

Closure of LID(s): With respect to LID Nos. 2 or 3, the date following completion of construction of the Regional Facility and the Local Collector System, on which the District mailed the notices of proposed assessment liens for such LID(s), as required by the applicable LID statute, which notices were used as a basis for confirmation of the final allocation of LID Assessments to Parcels.

District: The Hayden Lake Recreational Water and Sewer District.

Engineer: The Engineer(s) or engineering firm(s) (or the duly authorized employee or representative thereof) contracted or otherwise designated by the District from time to time to advise the Board with respect to waste water services provided through the Regional Facility and/or the Local Collector System.

Equivalent Residence or "ER": The basic unit of measurement utilized by the District to establish relative waste water disposal requirements of various property uses, with one (1) Equivalent Residence or "ER" being defined as one (1) typical single-family residence. The number of ER's attributable to a particular use shall be determined according to Section 3 of this Ordinance.

Guest House: A secondary improvement (including a mobile home, trailer, garage apartment, and the like) which is designed or intended to accommodate overnight human occupancy, and which is located on a residential Parcel which is also improved with a primary Single Family Residence or a multi-family dwelling.

Industrial Wastes: The liquid wastes from industrial manufacturing processes, trades, or businesses, as distinct from residential sanitary sewage.

Joint Powers Agreement: The Agreement dated October 9, 1986, between the District and the City of Hayden, establishing the Regional Board, as such Agreement may be amended from time to time.

LID or LIDs: Local Improvement District No. 2 (established by the District's Ordinance No. 85-7) and Local Improvement District No. 3 (established by the District's Ordinance No. 85-6), or either or both of them, as the context may require.

LID Assessment: The final Assessment levied against each Parcel in existence as of the date of Closure of the appropriate LID, in such amount as determined by the final LID confirmation ordinance, representing a fair share of the cost of construction of the Regional Facility and the Local Collector System. For LID No. 2, the Assessment was Four Thousand Three Hundred Eighty-seven Dollars ($4,387.00); for LID No. 3, the Assessment was One Thousand Two Hundred Thirty-two Dollars ($1,232.00).

Local Collector System: The system of pipes, pumps, reservoirs, and other sewage collection and conveyance equipment owned by the District (now or in the future), whether by initial construction or by acquisition, operated for the purpose of collecting sewage from individual Parcels and transporting such sewage to the Regional Facility. The Local Collector System shall include all such equipment between the individual service connections (at the edge of the public right-of-way or easement) and the Regional Facility as defined herein.

Motel and Hotel: A building or group of buildings on the same premises, either detached or connected, containing sleeping or dwelling units, and designed for or occupied with an ordinary rental period not exceeding two (2) weeks.

Multi-Unit Dwelling: A building containing a combination of units with individual sleeping, bath, and kitchen facilities, each unit being designated and intended for individual or single-family occupancy. This definition includes apartments, townhouses, duplexes, triplexes, and the like.

Operation and Maintenance (O&M) Charge: The share of operation and maintenance expense for the Regional Facility and the Local Collector System which is attributable to and charged to a particular Parcel in accordance with Section 7 of this Ordinance.

Parcel or Legal Parcel: Any legal lot now existing or hereafter created through a division or subdivision process, and any other parcel of real property recognized by the appropriate governmental Planning and Zoning Department as a separate legal parcel, having dimensions which would legally allow such Parcel to be improved with a residence or other structure for human use and/or occupancy, or which otherwise could reasonably be deemed benefitted by the availability of sewer service provided by the District. Additionally, the term "Parcel" shall include a unit in a condominium project for which a condominium plan shall have been recorded, and any unit having final approval as part of a planned unit development, but only where no further platting or

other governmental approvals are required as a prerequisite to the issuance of a building permit.

However, for purposes of this Ordinance, the term "Parcel" shall only include property which is now or hereafter physically located within the boundaries of the Sewer Service Area (or which is outside the Sewer Service Area but which is provided with waste water services by connection to the Local Collector System and the Regional Facility) and which has frontage on the Local Collector System or the Regional Facility, or legal access thereto by fee or easement. The term "pre-existing" Parcel shall refer to a Parcel in existence as of Closure of the appropriate LID, and "new" Parcel shall refer to a Parcel created or otherwise brought under this Ordinance after Closure of the appropriate LID.

Person: Any individual, firm, company, association, partnership, society, corporation, group, or other legal entity.

Regional Board: The inter-municipal agency comprising the District and the City of Hayden, established pursuant to Idaho Code § 67-2328, by the Joint Powers Agreement.

Regional Facility: The Hayden Area Regional Sewer Facility, consisting of the following elements (as more fully described in the Joint Powers Agreement):

Phase I:	Interim Drainfield and Regional (Honeysuckle) Interceptor;
Phase II:	Mechanical Treatment Plant;
Phase IIIA:	Spokane River Outfall; and
Phase IIIB:	Mechanical Treatment Plant Expansion

The term "Regional Facility" shall refer to and include all real and personal property and equipment and related rights necessary to the collection and treatment of sewage from areas within the jurisdiction of the District and the City of Hayden, as described in the Joint Powers Agreement.

Service Connection: The point at which a building sewer connects to the public sewer (the Local Collector System) at the edge of the public right-of-way or easement.

Sewage: A combination of the water-carried wastes from residences, business buildings, institutions, and industrial establishments, together with such ground, surface, and storm waters as may be present.

Sewer Service Area: Initially, the entire area within the boundaries of LID Nos. 2 and 3, but also including any area to which the Local Collector System may be extended from time to time and to which sewage collection and disposal services are therefore made available, or which may be designated as part of the Sewer Service Area by resolution or ordinance of the District.

Single-Family Residence: A building or condominium unit designed and used exclusively for residential purposes by one family. This definition shall also include mobile homes, trailers, garage apartments, and the like, used for residential purposes.

Suspended Solids (SS): Solids that either float on the surface of, or are in suspension in, water, sewage or other liquids, and which are removable by laboratory filtering.

User: Any person owning, controlling, occupying, or otherwise using an improved Parcel which is connected to or is required to be connected to the Local Collector System and/or the Regional Facility.

Any other term not herein defined shall be defined according to the District's Ordinance 83-2 or as presented in the "Glossary--WATER AND SEWAGE CONTROL ENGINEERING," A.P.H.A., A.S.C.E., and W.P.C.F., latest Edition.

DETERMINATION OF EQUIVALENT RESIDENCE FACTORS FOR SPECIFIC USES

3.1 Assignment of Equivalent Residence Factors: The Board has previously assigned to all pre-existing Parcels, and shall assign to all new Parcels an Equivalent Residence, or "ER", factor for purposes of determining that Parcel's LID Assessment (for pre-existing Parcels), Capitalization Fee (for new Parcels), and O&M Charge (for improved Parcels) with one (1) ER corresponding to a single-family residence. The number of ERs attributable to a particular use shall be determined as follows:

(a) An unimproved Parcel shall be one (1) ER; provided that unimproved Parcels shall not be required to pay any O&M charge;

(b) A single-family residence shall be one (1) ER;

(c) A multi-unit dwelling shall be one (1) ER per residential unit;

(d) A guest house, as defined herein, shall be treated as follows:

(i) If the guest house has no toilet/bath or kitchen facilities, or if the guest house has toilet/bath facilities but no kitchen facilities, or vice versa, it shall not be assigned any ERs;

(ii) If the guest house has both toilet/bath and kitchen facilities, it shall be deemed a separate single-family residence and shall be assigned one (1) ER.

The determination of the number of ERs attributable to a guest house shall be made by reference to the Assessor's records for that Parcel or, at the Board's option, by specific on-site inspection by the Board or its authorized representative. The ER factor assigned to a guest house shall be in addition to the ER factor assigned to the remaining primary improvements on the subject Parcel.

(e) Parcels improved for special uses (other than single-family residences, multi-unit dwellings, guest houses, and industrial uses as described in subparagraph (f) below) shall be assigned ERs according to the potential relative waste produced, on an annualized basis, as compared to a single-family residence; provided that no such Parcel shall be assigned less than one (1) ER. The ER factor for such Parcels shall be calculated depending upon its classification under the following schedule (representing generally accepted national averages). Notwithstanding the foregoing schedule, the Board shall have the right, where required by considerations of fairness and consistency, to assess ERs based on actual water use on an annualized basis, with two hundred fifty (250) gallons per day being deemed equivalent to one (1) ER:

NON-RESIDENTIAL USERS
EQUIVALENT RESIDENCE (ER) SCHEDULE

Churches	ER = 1
Taverns	ER = No. of Seats x .07
Restaurant	ER = No. of Seats x .17
Businesses and Offices	ER = No. of Employees x .07
Service Stations	ER = No. sets of 3 hoses x 1.7
Hospitals	ER = No. of Beds x 0.7 and No. of Employees x .17
Bowling Alleys	ER = No. of Lanes x 0.7
Medical & Dental Offices	ER = No. of Hours/Week x No. of Employees x .01

Auto Dealership	ER = 2
Boarding Houses	ER = No. of Occupants x .25
Laundromats	ER = No. of Washing Machines x .56
Theaters	ER = No. of Seats x .007
Nursing Homes	ER = No. of Beds x 0.7
Motel and Hotel w/Kitchen	ER = No. of Units x 0.5
Motel and Hotel w/o Kitchen	ER = No. of Units x 0.25
High Schools	
w/o Kitchen	ER = No. of Students x .13
w/Kitchen	ER = No. of Students x .25
w/Showers	ER = No. of Students x .17
w/Kitchen and Showers	ER = No. of Students x .29
Elementary Schools	
w/o Kitchen	ER = No. of Students x .065
w/Kitchen	ER = No. of Students x .125
w/Showers	ER = No. of Students x .085
w/Kitchen and Showers	ER = No. of Students x .145

(f) Parcels having improvements discharging industrial wastes or producing a flow, biochemical oxygen demand or suspended solids loading in excess of five percent (5%) of the average dry weather sewage flow measured at the main interceptors shall have its ER allocation designated by the Board. No quantity discounts shall be allowed, and the District may assess reasonable surcharges on waste flows with biochemical oxygen demand or suspended solids concentrations above 250 milligrams per liter.

3.2 Special Circumstances: Any use not covered by the above classifications shall have its ER factor determined by the Board on an individual basis, in such a manner as to approximate potential waste water service requirements. Further, the Board shall have the authority, but not the obligation, to adjust ER factors according to particular special circumstances; provided, however, that ER factors will not be reduced based upon claims of seasonal use of a particular Parcel, upon physical size of a Parcel or any building thereon, or solely upon the number of toilet facilities within or persons using a particular residential building.

3.3 Adjustments: The Board reserves the right to adjust a particular ER factor from time to time (both with respect to collection of additional Capitalization Fees and with respect to assessment of greater or lesser O&M charges) in the case of a substantial change in use of a particular Parcel. Specifically with

respect to guest houses, the District may observe a policy by which the owner of a guest house will have the right to resell the guest house ER (under such reasonable terms as may be proposed by the Board), if the Board determines that the guest house is not independently habitable.

CONSTRUCTION, OWNERSHIP, OPERATION, AND MAINTENANCE RESPONSIBILITIES

Section 4: The Regional Facility has been constructed, and is now owned, operated, and maintained by the Regional Board, subject to the District's responsibility to pay its share of construction, operation, and maintenance costs, as provided herein, in the Joint Powers Agreement, and in such ordinances as may be promulgated by the Regional Board.

The Local Collector System has been constructed (or, in the case of existing systems, acquired), and is now owned, operated, and maintained by the District, subject to the responsibility of the owners of all Parcels to pay the costs of construction, and the responsibility of all Users to pay the costs of operation and maintenance, all as provided herein and in such other ordinances as may be promulgated by the District.

Service lines, service taps, septic tanks (prohibited except on services connected to a District-designated septic tank effluent collection system), individual pump stations, and all other elements of the building drain and building sewer, up to the service connection, shall be installed, owned, and maintained by individual Users. All expenses associated with the installation, ownership and maintenance of such services shall be borne by the User. Additionally, the cost of repairing defective or broken parts of the Local Collector System, which are discovered by a User during installation or repair of a private service line, shall be borne by the User, unless the Board or the engineer or other authorized agent, is notified prior to such repair being made and given an opportunity to participate in decisions and work relating to such repair.

To the extent that hookup of a private Parcel may require installation of a stub from the main line of the Local Collector System to the edge of the public right-of-way or easement, the construction of such stub shall be the responsibility of the User, including the cost of any necessary road repair, landscaping, or the like.

COSTS OF CONSTRUCTION AND/OR ACQUISITION; LID ASSESSMENTS AND CAPITALIZATION FEES

5.1 Creation of Obligation: The District hereby determines and declares that all Parcels, by definition

under this Ordinance, are deemed benefitted by the existence and availability of the Regional Facility and Local Collector System, which Facility and System have been constructed and paid for by owners of Parcels in existence as of the Closure of the LIDs (pre-existing Parcels). There is hereby imposed upon all Parcels (both pre-existing and new), the obligation to pay to the District a fair share of the cost of the Regional Facility and Local Collector System, to be paid in such amounts and at such times as required in this Section 5.

5.2 Pre-Existing Parcels: The cost to the District for its share of construction of the Regional Facility, and the entire cost of constructing and/or acquiring the various elements of the Local Collector System has been borne initially by all pre-existing Parcels by LID Assessment. At Closure of the LIDs, each pre-existing Parcel was assigned an ER factor depending upon existing improvements, uses, and platting status, with each unimproved Parcel being assigned one (1) ER. Improved Parcels were assigned ER factors according to Section 3 of this Ordinance. Payment of the share of the total costs attributable to each pre-existing Parcel has been made or provided for in accordance with the appropriate LID confirmation ordinances and as permitted by Idaho law.

5.3 New Parcels: While the District's share of all construction and acquisition costs has been paid or provided for by Assessment against Parcels in existence as of the Closure of the LIDs (pre-existing Parcels), the District recognizes and declares that new Parcels created or otherwise brought under this Ordinance after Closure of the LIDs will similarly be benefitted by the availability of the Regional Facility and Local Collector System, and that expanded uses of pre-existing Parcels will realize increased benefits from the availability of such Facility and System. Accordingly, a Capitalization Fee is hereby established and shall be charged against such new Parcels and expanded uses as follows:

(a) Allocation of Original Assessment: Recognizing that new Parcels may be created from pre-existing Parcels through a division, subdivision, or special planning process (e.g., by approval of a planned unit development), one (1) of the new Parcels shall be deemed a successor to the pre-existing Parcel (and therefore subject to the original LID Assessment rather than the Capitalization Fee imposed by this Subparagraph), and the remaining new Parcel(s) shall be subject to the Capitalization Fee. The LID Assessment for

the pre-existing Parcel, as determined at the confirmation of the appropriate LID, shall be accelerated and paid at the same time the Capitalization Fee(s) for the new Parcel(s) come due; provided, however, that if, in the opinion of counsel for the District, the LID Assessment (and the lien securing payment thereof) may be allocated to one (1) of the new Parcels (as a successor to the original Parcel), then the LID Assessment may continue to be amortized under its original schedule.

(b) Calculation of Capitalization Fee: The Capitalization Fee for a single ER, as defined in this Ordinance, shall be the sum of the following amounts:

(i) Four Thousand Three Hundred Eighty-seven Dollars ($4,387.00), being the final LID Assessment for a single ER as determined at the Closure of LID No. 2; plus

(ii) Four Hundred Thirty-eight and 70/100 Dollars ($438.70), being a ten percent (10%) surcharge on payments made between the Closure of the LIDs and December 31, 1989; plus

(iii) An additional surcharge, calculated as of the date the Capitalization Fee is actually paid, as follows: commencing January 1, 1990, and as of each January 1 thereafter, the Board may impose a surcharge not to exceed Four Hundred Thirty-eight and 70/100 Dollars ($438.70) per adjustment. Once imposed as of any January 1, the surcharge shall remain constant until the following January 1, so that surcharge amounts will not be prorated based on the date of actual payment; less

(iv) Any credit to which the Parcel may be entitled under this Ordinance, as amended from time to time, or as may be negotiated by the Board under separate agreement.

(c) Time of Payment; Reservation of Capacity: The Capitalization Fee determined according to this Subparagraph shall become due at the time of creation of the new Parcel to which it pertains, whether by: (i) recordation of an approved subdivision plat; (ii) final approval of a planned unit development creating multiple

Parcels, where no further platting or governmental approval is required as a prerequisite to the issuance of a building permit; (iii) recordation of a record of survey depicting a division of a Parcel not requiring compliance with subdivision regulations; (iv) division of ownership by conveyance of fee or equitable title to a portion of a Parcel that has previously been assessed; (v) agreement by the District to allow property outside the Sewer Service Area to connect to the Local Collector System; or (vi) other process resulting in the creation of a new legal Parcel or Parcels recognized by the appropriate governmental Planning and Zoning Department or similar agency or department. The amount paid at that time shall be based upon a single ER for each unimproved new Parcel, or upon the appropriate total number of ERs for each new Parcel which may be improved at the time of its creation. Any adjustment required for multiple ERs shall be paid in connection with the application for, and issuance of, a building permit for the appropriate Parcel(s). At the time the building permit is issued for multiple ERs, the full Capitalization Fee shall be calculated and paid, and credit applied for any amount actually paid when the new Parcel was created. Payment at the time of creation of a new Parcel or at the time of issuance of the building permit shall entitle the land owner to reserve capacity for the number of ERs actually paid for in the Regional Facility and Local Collector System. From the Capitalization Fee, the District shall pay the appropriate amount then required by the Regional Board for the reservation of treatment capacity to that Parcel, recognizing that treatment capacity at the Regional Facility shall be available only on a "first come -- first served" basis, and only upon payment in full for the required capacity.

5.4 Change in Use: The Board shall have the right to assess additional Capitalization Fees on any Parcel (whether pre-existing or new), in the case of a substantial change in use of the Parcel, as provided in Section 3.3 of this Ordinance. In such case, Capitalization Fees shall be calculated in the manner described for new Parcels, but with credit given for the LID Assessment(s) and for Capitalization Fees previously charged and paid based on prior use.

5.5 New Construction Extending System: Owners of land within the District (but not necessarily within the Sewer Service Area), which does not have frontage

or legal access to the Local Collector System or the Regional Facility, may nevertheless be permitted or required to hook into the system, subject to the following terms and conditions:

(a) The right to hook into the system shall be granted only by written agreement with the Board, which shall have the discretion to accept or deny applications based upon the existing and anticipated availability of capacity at the Regional Facility and in the Local Collector System;

(b) All costs of extending the Local Collector System or the Regional Facility to the subject property shall be borne by the applicant, with no right to reimbursement or credit for costs except as provided herein;

(c) All construction shall be according to detailed plans and specifications submitted to and approved by the Board or the District Engineer, with the terms of construction specifically contemplating periodic inspection and final certification by the Engineer at the applicant's expense;

~~(d) The applicant shall, prior to commencement of construction, pay the full Capitalization Fee calculated according to this Ordinance, based upon the total number of Parcels and ERs to be serviced by the extension of the System; provided that the applicant shall be entitled to a credit to compensate the applicant for the cost of construction of the extension of the System, such credit to be the lesser of: (a) the actual contract price for construction of the collector portion of the extension (excluding the cost of installing service laterals for individual residential units or other improvements, for which no credit shall be allowed); or (b) $1,000 per ER to be serviced. No credit shall be allowed with respect to any Capitalization Fee which is not paid prior to commencement of construction as provided herein (whether such unpaid Capitalization Fee pertains to new Parcels created after commencement of construction, or to improvement or expanded use of existing Parcels, or otherwise);~~

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(e) Following completion and certification of construction, that portion of the extension of the System which lies within the public right-of-way or easement shall be conveyed to the District

or legal access to the Local Collector System or the Regional Facility, may nevertheless be permitted or required to hook into the system, subject to the following terms and conditions:

(a) The right to hook into the system shall be granted only by written agreement with the Board, which shall have the discretion to accept or deny applications based upon the existing and anticipated availability of capacity at the Regional Facility and in the Local Collector System;

(b) All costs of extending the Local Collector System or the Regional Facility to the subject property shall be borne by the applicant, with no right to reimbursement or credit for costs except as provided herein;

(c) All construction shall be according to detailed plans and specifications submitted to and approved by the Board or the District Engineer, with the terms of construction specifically contemplating periodic inspection and final certification by the Engineer at the applicant's expense;

(d) The applicant shall, prior to commencement of construction, pay the full Capitalization Fee calculated according to this Ordinance, based upon the total number of Parcels and ERs to be serviced by the extension of the System; provided that the applicant shall be entitled to a credit to compensate the applicant for the cost of construction of the extension of the System, such credit to be the lesser of: (a) the actual contract price for construction of the collector portion of the extension (excluding the cost of installing service laterals for individual residential units or other improvements, for which no credit shall be allowed); or (b) $1,400 per ER to be serviced. The Board shall have the right to increase such maximum credit per ER by Resolution duly adopted from time to time. No credit shall be allowed with respect to any Capitalization Fee which is not paid prior to commencement of construction as provided herein (whether such unpaid Capitalization Fee pertains to new Parcels created after commencement of construction, or to improvement or expanded use of existing Parcels, or otherwise).

(e) Following completion and certification of construction, that portion of the extension of the System which lies within the public right-of-way or easement shall be conveyed to the District

and shall thereafter be considered part of the Local Collector System for all purposes.

5.6 Special Circumstances: Upon a showing of special circumstances respecting a particular Parcel or Parcels, the Board shall have the power to negotiate a special arrangement for calculation and payment of Capitalization Fees; provided that the special arrangement shall result in a Capitalization Fee calculation and payment structure which is substantially equivalent to the calculation and payment structure required of other similar Parcels.

5.7 Advance Reservations: Prior to Closure of the LIDs, several owners reserved excess sewer capacity for specific Parcels, with the cost thereof being paid by Assessment through the LID process. Additionally, the owner of any Parcel may, in the future, purchase excess sewer capacity, attributable to such Parcel, by payment of the appropriate Capitalization Fee. Excess capacity, however acquired, may not be transferred for the benefit of other property, but may be either: (i) allocated to separate Parcels created by subdivision of the original Parcel to which it pertains, according to guidelines and procedures adopted by the Board; or (ii) returned to the District for reallocation to other property, according to a waiting list or other procedure establishing priority of requests for capacity. At such time as the excess capacity is reallocated, and upon receipt of payment therefor, the District shall pay the proceeds on resale to the selling party.

5.8 Use of Capitalization Fees: The portion of the Capitalization Fees which is not required to be remitted to the Regional Board shall be retained by the District in a reserve to retire bond indebtedness, to cover operation and maintenance expenses of the District, to reduce O&M charges otherwise assessed to all Users, or to defray any other expenses of operating the District or administering the LIDs, to the extent allowed by law.

USE OF SEWER SYSTEM

Section 6: The use of the Regional Facility and Local Collector System shall be in accordance with ordinances, rules, and regulations promulgated by the Regional Board and/or the District. In the absence of such ordinances, rules, and regulations, which specifically relate to the Local Collector System and the Regional Facility, the provisions of Section IV(B) of the District's Ordinance No. 83-2, as amended or modified by any successor ordinance, shall be applicable.

OPERATION AND MAINTENANCE CHARGES

Section 7: Charges for operation, maintenance, repair, replacement, insurance, and administration of the Regional Facility and Local Collector System, and a reasonable reserve therefor (O&M charges), shall be estimated by the Board in cooperation with the Regional Board, and a budget shall be adopted on a yearly basis, at the same time and in the same manner as adoption of the General District Budget. The total O&M charges shall be allocated between the Regional Facility and the Local Collector System, with that portion attributable to the Regional Facility being charged to all Users of the Regional Facility (both within and without the District), according to the Joint Powers Agreement, and with that portion attributable to the Local Collector System being charged to all Parcels within the District which are connected to, or which are required to be connected to the Local Collector System and/or the Regional Facility. The charges attributable to the Local Collector System may then be allocated among different sections of the System to fairly reflect the relative operation and maintenance demands of such sections. Within each such section, the charges shall be borne equally by all Parcels (adjusted for multiple ERs) that are connected to, or required to be connected to the Local Collector System and/or the Regional Facility; provided, however, that the Board shall have the right to allow a credit to those Parcels being serviced by a septic effluent system, to compensate the Owners for the expense of periodic pumping of private septic tanks. O&M charges shall be billed on a quarterly or more frequent basis, as determined by the Board, and payments shall be due within thirty (30) days of billing. If payments are not timely made, the Board shall assess penalties in the maximum amount allowed by law, or if no such maximum amount is specified by law, then at the rate of Five Dollars ($5.00) per ER for each month, or portion thereof, between the payment due date and the date full payment (including all accrued penalties) is made.

The Board hereby reserves the right to delegate administration and collection procedures for O&M charges to the Regional Board or to such other third party as may be deemed appropriate in the discretion of the Board.

The first billings for O&M charges attributable to a particular Parcel shall be delivered immediately following the date of actual connection, or the date connection is required, whichever is earlier.

The obligation to pay O&M charges shall be enforced by the District according to the provisions of Idaho Code § 42-3212, as amended or modified from time to time, or as may otherwise be allowed by law.

CONNECTION REQUIREMENTS

8.1 Mandatory Connection: All improved Parcels shall, to the extent allowed by law, be required to connect to the Local Collector System or the Regional Facility on the earlier of:

(a) The date connection is required by Panhandle Health District under its regulatory authority; or

(b) Sixty (60) days from written notification from the Board.

The obligation to connect shall be enforced by the Board according to Idaho Code § 42-3212, as amended or modified from time to time, or by such other method as may be allowed by law.

8.2 Connection Permit: A permit for connection must be obtained from the District, prior to construction of the physical connection. The permit will be issued by the District or its Engineer or other authorized representative upon completion of an Application for Connection and payment of any fees required by Subparagraph 8.3 below; provided that any late connection fee required under subparagraph 8.3(c) below, which may accrue after issuance of the permit, shall be paid as a condition to final approval following inspection. Construction of the sewer connection shall be made according to specifications recommended and maintained by the Engineer, and shall be performed by the User of a specific Parcel, by a journeyman plumber licensed by the Idaho State Plumbing Board, or by a licensed public works contractor, and shall be made at the User's expense.

8.3 Connection Fees: Connection fees shall be paid to the District in connection with the issuance of a connection permit. Such fees shall be calculated as follows:

(a) A Fifty Dollar ($50.00) inspection fee, to compensate the District for the cost of inspecting the hook-up (with additional fees not to exceed $50.00 for each subsequent inspection required to assure compliance with the hook-up requirements); plus

(b) Any unpaid Capitalization Fee based upon the ER factor allocated to the proposed use of the connection, including any applicable surcharge, credit being given for LID assessments imposed

and/or Capitalization Fees previously paid for such Parcel; provided, that nothing in this subparagraph shall be construed as accelerating any LID Assessment which is being paid according to an approved amortization schedule; plus

(c) In the case of a connection which is not completed within the time required under this Ordinance for a particular Parcel, or in the case of a permit for which application is not made before the required hookup date, a late connection charge equal to One Hundred Dollars ($100.00).

8.4 Inspection: The physical connection must be inspected by the state plumbing inspector or the Engineer or by such other representative as may be designated by the District, prior to backfill of the excavation. At least forty-eight (48) hours notice of the time requested for the connection must be provided to the appropriate inspecting individual. Deviation from the District's design standards must be corrected at the permittee's expense. Connection made without inspection and approval shall be re-excavated at the permittee's expense to allow proper inspection.

ENFORCEABILITY CLAUSE

Section 9: The District shall enforce and seek remedies for breaches of the terms of this Ordinance, as provided by the laws of the State of Idaho.

REPEALER CLAUSE

Section 10: All ordinances or resolutions of this District or parts thereof, insofar as they are in conflict with this Ordinance, are hereby repealed and rescinded; provided, however, that Ordinance No. 83-2 shall remain in full force and effect with respect to all parts of the District which are outside the boundaries of LID Nos. 2 and 3 and which are not connected to or required to be connected to the Local Collector System or the Regional Facility; and provided further, that Ordinance No. 87-1 shall continue to govern the hookup requirements with respect to Parcels required to hook up before the effective date of this Ordinance.

SEVERABILITY CLAUSE

Section 11: If any section, subsection, sentence or provision hereof or the application thereof to any particular circumstance shall ever be held invalid or unenforceable, such holding shall not affect the remainder hereof, which shall continue in full force and effect and applicable to all circumstances to which it may validly apply.

EFFECTIVE DATE

Section 12: This Ordinance shall be in full force and effect upon its publication according to law in the Coeur d'Alene Press, a newspaper of general distribution in the District, and hereby designated as the official newspaper for the publication of this Ordinance.

PASSED AND ADOPTED the 29th day of December, 1989.

ATTEST:

District Secretary

GERRY HOUSE
Board Chairman

EFW28/B

12/29/89

CERTIFICATE OF ADOPTION OF ORDINANCE

I, the undersigned, as Secretary of the Hayden Lake Recreational Water and Sewer District of Kootenai County, Idaho, hereby certify that the foregoing Ordinance is a full, true, and correct copy of an Ordinance duly adopted at a meeting of the Board of Directors of said District, duly and regularly held at the regular meeting place thereof on December 29, 1989, of which meeting all members of said Board had due notice, and at which a majority thereof were present; and that at said meeting said Ordinance was adopted by the following vote:

AYES, and in favor thereof, Directors:

Gerry House
Robert Gillespie
Ralph Kizer
Tom de Pew

NOES, Directors:

NONE

ABSENT, Directors:

John Crowe

ABSTAINED, Directors:

None

I further certify that I have carefully compared the same with the original Ordinance on file and of record in my office;

that said Ordinance is a full, true, and correct copy of the original Ordinance adopted at said meeting; and that said Ordinance has not been amended, modified, or rescinded since the date of its adoption, and is now in full force and effect.

IN WITNESS WHEREOF, I have set my hand and affixed the official seal of said District on December 29, 1989.

HAYDEN LAKE RECREATIONAL WATER AND SEWER DISTRICT, Kootenai County, Idaho

By: Ralph D. Kaiser
District Secretary

(Seal)

EFW28/B

APPENDIX C
ENVIRONMENTAL INFORMATION

Topographic Map

Aerial Map

Geologic Information

Soils Information

Sub-Basin Assessment and Total Maximum Daily Loads (TMDLs) of Lakes and Streams Located on or Draining to the Rathdrum Prairie (17010305)

Aquifer Map

Endangered Species Information

Historic Properties Information

FEMA Floodplain Maps

Wetland Map

Wild and Scenic River Information

Farmland Classification Information

Land Use Information

Air Quality Map

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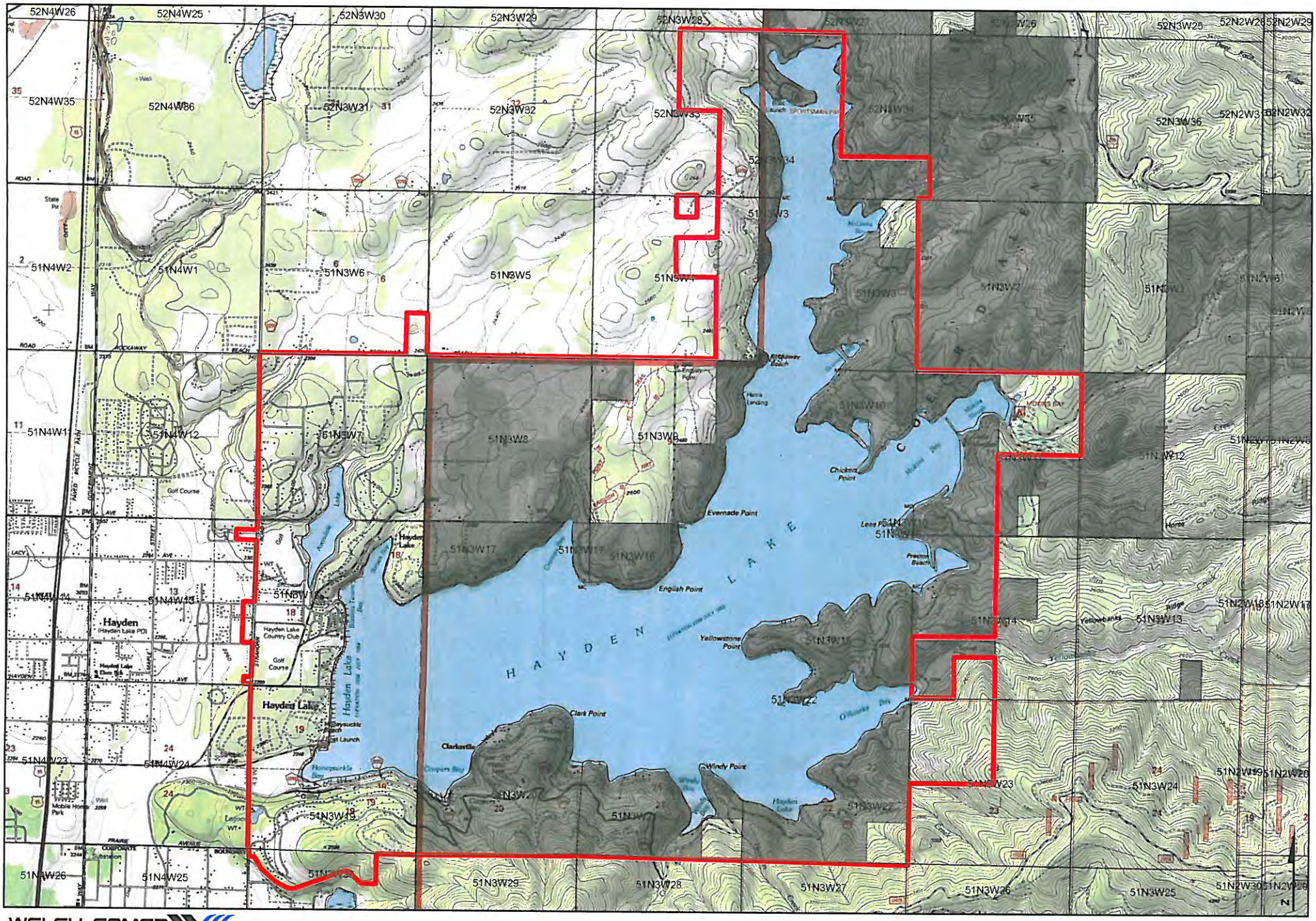

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Topographic Map

0 4,000 8,000 16,000 Feet

Sources:
Kootenai County GIS Department
INSIDE Idaho, University of Idaho, 2009
Idaho State Tax Commission

PROJECT NO.....41055
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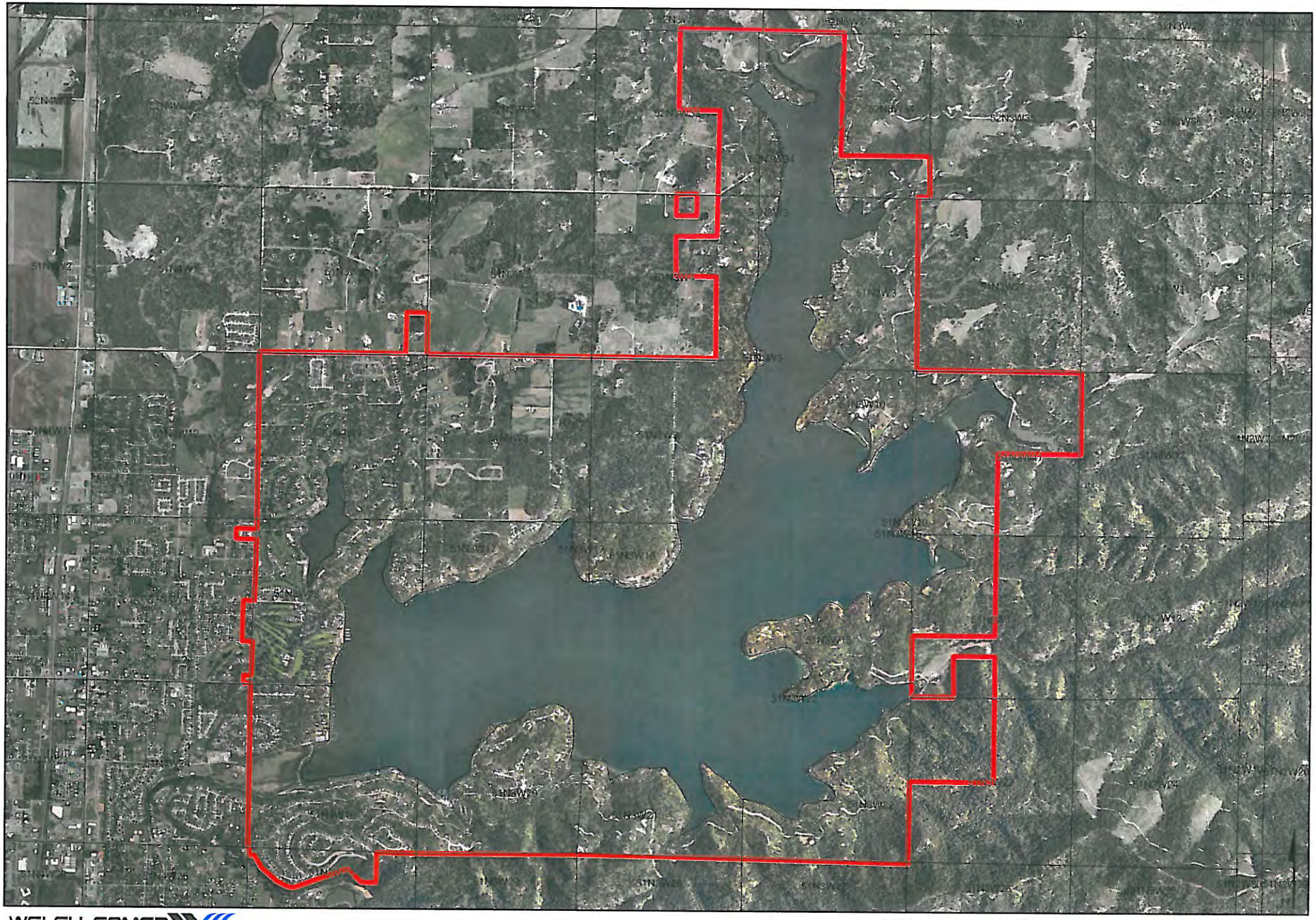

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Aerial Map

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Idaho State Tax Commission

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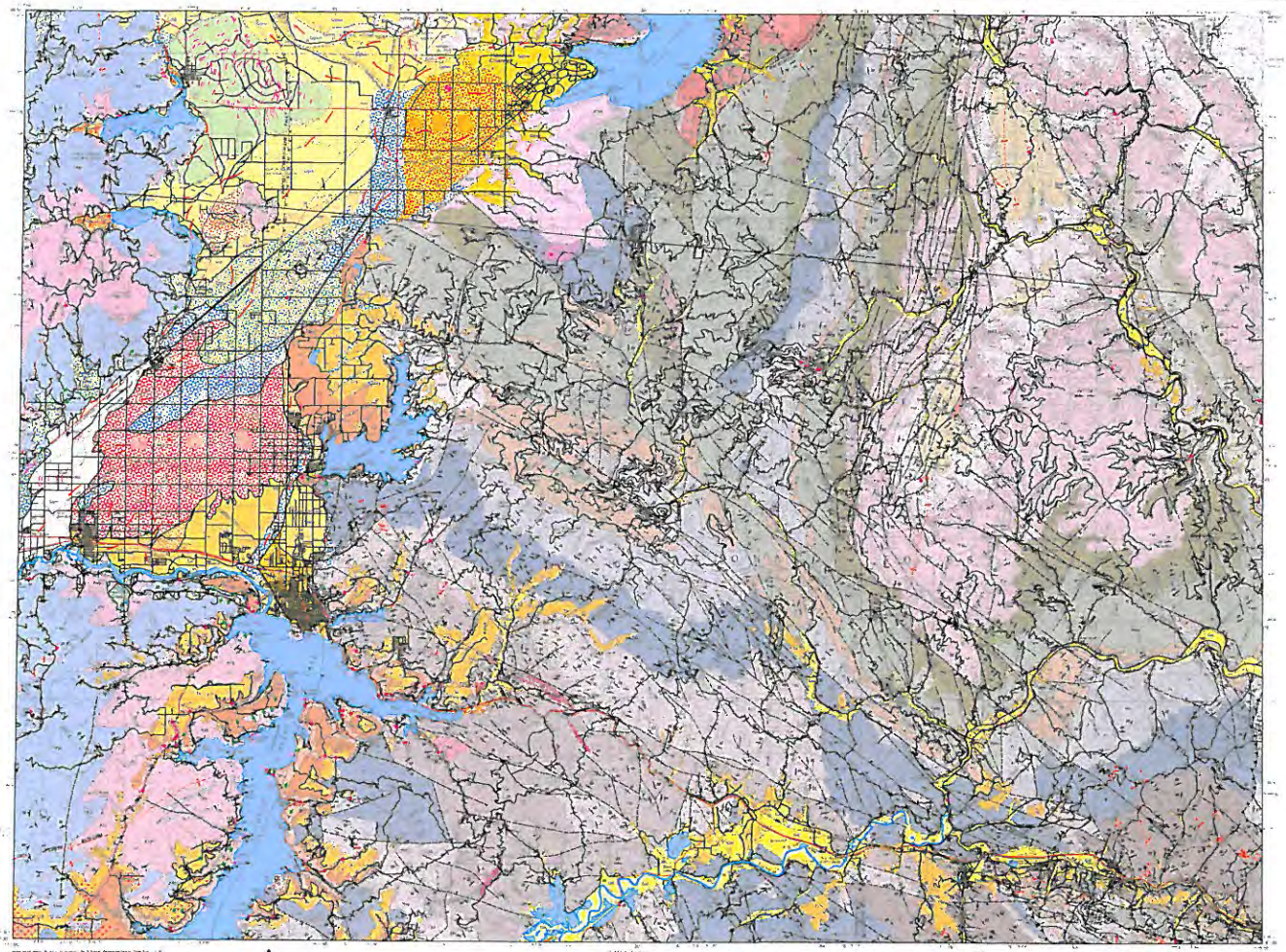
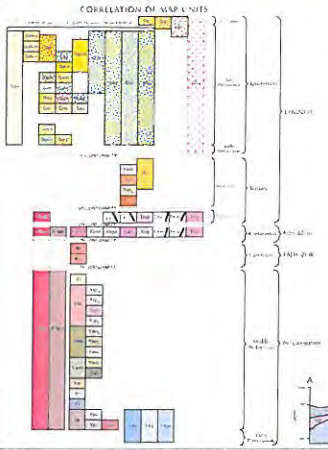
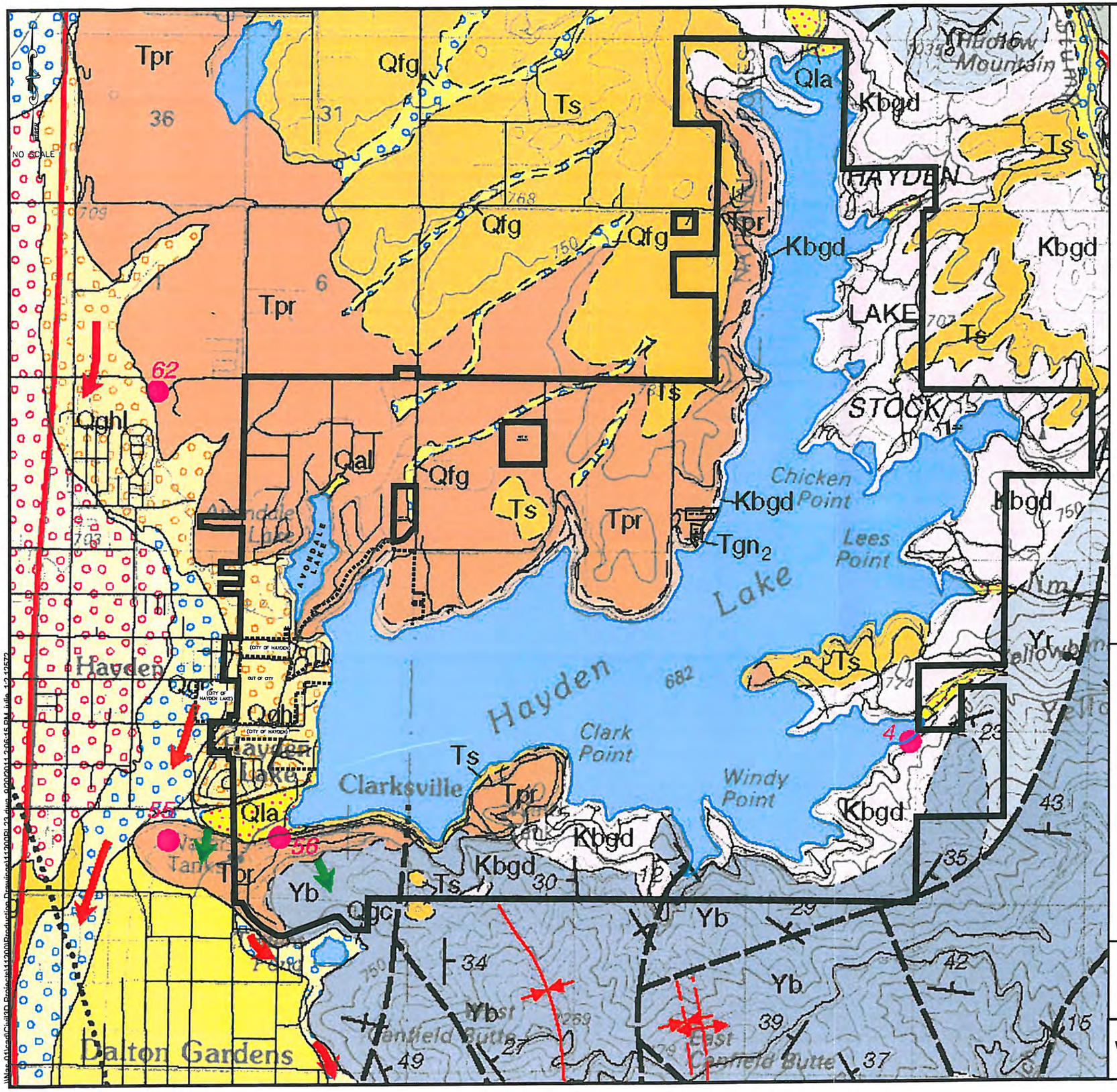


Geologic Map of the Coeur d'Alene 30 x 60 Minute Quadrangle, Idaho

Compiled and mapped by
Reed S. Lewis, Russell F. Burmester, Roy M. Breckenridge, Mark D. McFaddan, and John D. Kauffman

2002





MAP UNITS

Unit descriptions in accompanying booklet

HOLOCENE DEPOSITS

- Qal — Alluvial deposits (Holocene)
- Qla — Lacustrine sediments and alluvium (Holocene)
- Qls — Landslide deposits (Holocene)
- Qfg — Fluvial gravel (Pleistocene and Holocene)
- Qp — Palouse Formation (Pleistocene and Holocene)(pattern only)

DEPOSITS OF GLACIAL ORIGIN

- Qghcy — Gravel of Hoodoo channel, younger (late Pleistocene)
- Qghcm — Gravel of Hoodoo channel, middle (late Pleistocene)
- Qghco — Gravel of Hoodoo channel, older (late Pleistocene)
- Qgtow — Bouldery till and outwash deposits (late Pleistocene)

CATASTROPHIC FLOOD DEPOSITS AND REWORKED OUTWASH

- Qgu — Gravel, undivided (Pleistocene) (cross section only)
- Qgf — Gravel of Farragut State Park (Pleistocene)
- Qgc — Channel gravel, undivided (Pleistocene)
- Qdg — Distal gravel deposits (Pleistocene)
- Qds — Distal sand and silt deposits (Pleistocene)
- Qgb — Gravel of Beck Road (Pleistocene)
- Qgcd — Gravel of Coeur d' Alene (Pleistocene)
- Qgdg — Gravel of Dalton Gardens fan (Pleistocene)
- Qgga — Gravel of Garwood (Pleistocene)
- Qgm — Gravel of McGuire (Pleistocene)
- Qgmb — Gravel of McGuire, bar facies (Pleistocene)
- Qgg — Gravel of Green Ferry (Pleistocene)
- Qggf — Gravel of Green Ferry, fan facies (Pleistocene)
- Qggb — Gravel of Green Ferry, bar facies (Pleistocene)
- Qgs — Gravel of Scarcello Road (Pleistocene)
- Qghl — Gravel of Hayden Lake (Pleistocene)
- Qgtl — Gravel of Twin Lake (Pleistocene)
- Qgsly — Gravel of Spirit Lake, younger (Pleistocene)
- Qgslo — Gravel of Spirit Lake, older (Pleistocene)
- Qgrp — Gravel of Ross Point (Pleistocene)

OLDER SEDIMENTS

- Ts — Sediment (Miocene)

COLUMBIA RIVER BASALT GROUP

Saddle Mountains Formation(?)

- Tmfb — Basalt of Mica Flats (Miocene)

Wanapum Formation

- Tpr — Priest Rapids Member (Miocene)

Grande Ronde Formation

- Tgn_2 — Grande Ronde N_2 magnetostratigraphic unit (Miocene)
- Tgr_2 — Grande Ronde R_2 magnetostratigraphic unit (Miocene)

INTRUSIVE ROCKS

- Tr — Rhyolite dikes (Eocene)
- Td — Dacite dikes (Eocene)
- Tbgf — Fine-grained biotite granite (Eocene)
- TKds — Diabase and diorite dikes (Tertiary or Cretaceous)
- TKla — Lamprophyre dikes (Tertiary or Cretaceous)
- TKg — Granitic rocks, undivided (Tertiary or Cretaceous)
- TYqd — Quartz diorite dikes and sills (Tertiary, Cretaceous, or Proterozoic)
- Kphgd — Porphyritic hornblende-biotite granodiorite (Cretaceous)
- Kbgd — Biotite granodiorite (Cretaceous)
- Khgd — Hornblende-biotite granodiorite (Cretaceous)
- Kqs — Biotite-hornblende quartz diorite (Cretaceous)
- Kog — Orthogneiss (Cretaceous)
- KYam — Amphibolite (Cretaceous or Proterozoic)

PALEOZOIC ROCKS

- Ꞓl — Lakeview Limestone (Cambrian)
- Ꞓrg — Rennie Shale and Gold Creek Quartzite (Cambrian)

BELT SUPERGROUP

- Yl — Libby Formation (Middle Proterozoic)
- Ysp — Striped Peak Formation, undivided (Middle Proterozoic)
- Ysp_4 — Striped Peak Formation, member four (Middle Proterozoic)
- Ysp_3 — Striped Peak Formation, member three (Middle Proterozoic)
- Ysp_2 — Striped Peak Formation, member two (Middle Proterozoic)
- Ysp_1 — Striped Peak Formation, member one (Middle Proterozoic)
- Ywu — Wallace Formation, upper member, undivided (Middle Proterozoic)
- Ywu_3 — Wallace Formation, upper member three (Middle Proterozoic)
- Ywu_2 — Wallace Formation, upper member two (Middle Proterozoic)
- Ywu_1 — Wallace Formation, upper member one (Middle Proterozoic)
- Ywml — Wallace Formation, middle and lower members, undivided (Middle Proterozoic)
- Ywm — Wallace Formation, middle member (Middle Proterozoic)
- Ywl — Wallace Formation, lower member (Middle Proterozoic)
- Ysr — St. Regis Formation (Middle Proterozoic)
- Yr — Revett Formation (Middle Proterozoic)
- Yb — Burke Formation (Middle Proterozoic)
- Yp — Prichard Formation, undivided (Middle Proterozoic)
- Ypu — Prichard Formation, upper part (Middle Proterozoic)
- Ypl — Prichard Formation, lower part (Middle Proterozoic)
- Yqp — Quartzite of the Prichard Formation (Middle Proterozoic)

BELT SUPERGROUP OR PRE-BELT METAMORPHIC ROCKS

- YXs — Schist of the Priest River metamorphic complex (Proterozoic)
- YXq — Quartzite of the Priest River metamorphic complex (Proterozoic)
- YXgn — Gneiss of the Priest River metamorphic complex (Proterozoic)

MAP SYMBOLS

- Contact: dashed where approximately located
- High-angle fault: dashed where approximately located; dotted where concealed
- Normal fault: dashed where approximately located, dotted where concealed; ball and bar on downthrown side
- Detachment fault: dashed where approximately located; dotted where concealed; hachures on downthrown side
- Strike-slip fault: dashed where approximately located; dotted where concealed
- Thrust fault: approximately located; dotted where concealed; teeth on upper plate; includes steep reverse faults
- Fold axis: dotted where concealed; arrow indicates plunge direction
- Syncline
- Anticline
- Overturned syncline
- Overturned anticline
- 27 Strike and dip of compositional layering interpreted as bedding
- Strike of vertical bedding
- Horizontal bedding
- 27 Strike and dip of bedding; ball indicates bedding known to be upright
- 20 Overturned bedding
- 17 Strike and dip of foliation
- Strike of vertical foliation
- 40 Bearing and plunge of lineation, type unknown
- 5 Bearing and plunge of mineral lineation
- 10 Bearing and plunge of crenulation lineation
- 25 Bearing and plunge of small fold axis
- 15 Bearing and plunge of asymmetrical small fold showing counterclockwise rotation viewed down plunge
- 9 Bearing and plunge of asymmetrical small fold showing clockwise rotation viewed down plunge
- 40 Strike and dip of fracture cleavage
- Strike of vertical fracture cleavage
- Vein
- Sample location
- Giant current ripple field
- Abandoned channels of Glacial Lake Missoula floods drainageways
- Channels scoured in bedrock by Glacial Lake Missoula floods
- Mylonite (cross section only)

LEGEND

- HLRWSD BOUNDARY
- CITY OF HAYDEN LAKE CITY LIMITS

Prepared in cooperation with the U.S. Geological Survey.
This geologic map was funded in part by the USGS National Cooperative Geologic Mapping Program.
Digital cartography and GIS data capture by Jane S. Freed, Loudon R. Stanford, Vance T. MacAubbin, and Alan K. Schlicht.
Map edited by Roger C. Stewart.
Note on printing: The map is reproduced at a high resolution of 600 dots per inch. The inks are resistant to run but not to the fading caused by long-term exposure to light.
Map version 8-23-2006.

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H.L.R.W.S.D
GEOLOGICAL MAP

Geologic Map of the Coeur d'Alene 30 X 60 Minute Quadrangle, Idaho

Compiled and Mapped by Reed S. Lewis, Russell F. Burmester, Roy M. Breckenridge, Mark D. McFaddan, and John D. Kauffman

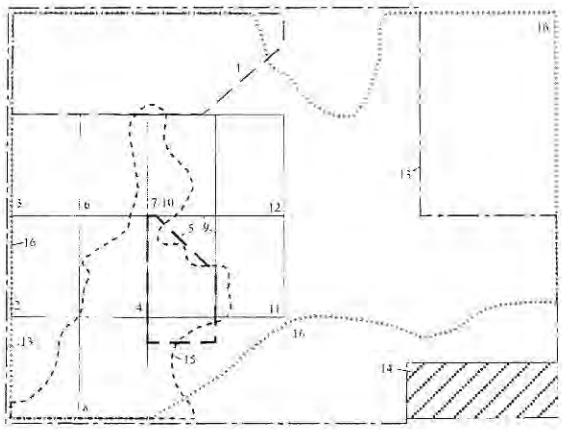
2002

INTRODUCTION

This compilation of the geology of the 1:100,000-scale Coeur d'Alene 30' x 60' quadrangle relied extensively on previous mapping. The principal sources were the seven unpublished 1:62,500-scale field maps used to prepare the 1:250,000-scale map of Griggs (1973). We supplemented Griggs' data with extensive field work in 1999, primarily in the northeast corner of the quadrangle. Basalt stratigraphy is based on the regional framework developed by Wright and others (1973) and Swanson and others (1979a, 1979b). Quaternary mapping in the Rathdrum Prairie area is based on our past unpublished and new work. The areal extent of the sources are shown on Figures 1 and 2. The geology of the Coeur d'Alene 1:100,000 quadrangle will also be published as a digital version in the Digital Data Series (see the Idaho Geological Survey's Web site: www.idahogeology.org).

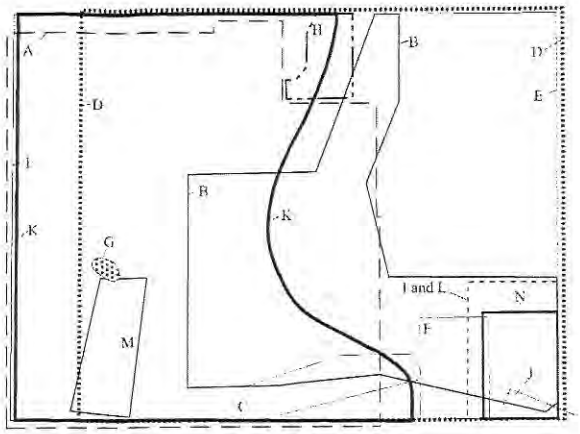
The oldest and most abundant rocks in the Coeur d'Alene quadrangle are Precambrian (Figures 3 and 4). These include low-grade metasedimentary rocks of the Belt Supergroup and high-grade (amphibolite facies) metamorphic rocks whose protolith is either the Belt Supergroup or the basement rocks that predate the Belt metasedimentary rocks. The high-grade rocks are exposed in a metamorphic core complex in the western part of the map area (Priest River complex in Figure 4). Previously unmapped, deformed granitic rock (orthogneiss) of probable Cretaceous age is included in the core complex. Plutonic rocks of Cretaceous age are also present as intrusions within the low-grade Belt Supergroup. Relatively undeformed Eocene igneous rocks are exposed as plutons in the northwestern part of the map area and as a few rhyolite and dacite dikes in the central part. Flows of Miocene Columbia River basalt cover much of the western part of the quadrangle, although in places these flows are covered with Miocene sediments. Abundant Quaternary gravels in and near the Rathdrum Prairie were deposited by catastrophic floods derived from Glacial Lake Missoula.

This geologic map was funded in part by the USGS National Cooperative Geologic Mapping Program



1. R.M. Breckenridge, unpublished geologic mapping, 1995-1999
2. R.M. Breckenridge and K.L. Othberg, 1998a
3. R.M. Breckenridge and K.L. Othberg, 1998b
4. R.M. Breckenridge and K.L. Othberg, 1999a
5. R.M. Breckenridge and K.L. Othberg, 2000a
6. R.M. Breckenridge and K.L. Othberg , 1999b
7. R.M. Breckenridge and K.L. Othberg, 2000b
8. R.M. Breckenridge and K.L. Othberg, 2000c
9. J.L. Browne, 2000a
10. J.L. Browne, 2000b
11. J.L. Browne, 2002b
12. J.L. Browne, 2002a
13. A.B. Griggs, unpublished geologic maps of the Athol, Coeur d'Alene, Kellogg, Kingston, Lakeview, Lane, and Spirit Lake quadrangles, Idaho. U.S. Geological Survey Field Records Library, Denver, Colorado, scale 1:62,5000
14. S.W. Hobbs and others, 1965
15. J.D. Kauffman, R.M. Breckenridge, and K.L. Othberg, unpublished basalt mapping, 1998-1999
16. R.S. Lewis, R. F. Burmester, and M.D. McFaddan, unpublished geologic mapping, 1999

Figure 1. *Previous mapping used as primary sources of data.*



A. Anderson, 1940
B. Boleneus and others, 2001
C. Bookstrom and others, 1999
D. Griggs, 1968
E. Griggs, 1973
F. Hayden, 1992
G. Hosterman and others, 1960
H. Kun, 1970
I. Ransome and Calkins, 1908
J. Shenon and McConnel, 1939
K. Swanson and others, 1979a
L. Umpleby and Jones, 1923
M. Wavra and Reid,1990-1992
N. Willoughby, 1986

Figure 2. *Previous mapping used as secondary sources of data*

DESCRIPTION OF ROCK UNITS

Intrusive rocks are classified according to IUGS nomenclature using normalized values of modal quartz (Q), alkali feldspar (A), and plagioclase (P) on a ternary diagram (Streckeisen, 1976). Mineral modifiers are listed in order of increasing abundance for both igneous and metamorphic rocks. Grain size classification of unconsolidated and consolidated sediment is based on the Wentworth scale.

HOLOCENE DEPOSITS

Qal—Alluvial deposits (Holocene)—Stream deposits in modern drainages. Most deposits are composed of stratified, poorly sorted, and laterally discontinuous beds of sandy gravel with sand and silt lenses. Thickness of 3 m or less.

Qla—Lacustrine sediments and alluvium (Holocene)—Moderately to well-sorted, silt and sand deposits in bays of Coeur d'Alene Lake and Hayden Lake. The deposits are mainly located within the lakes' high-water zones and are interbedded with and grade upstream into alluvium of tributary streams. Soils are deep and poorly drained and include muck of the Pywell series and silt loam of the Cald, Cougar Bay, Pywell, and Ramsdell series (Weisel, 1981). Thickness as much as 5 m.

Qls—Landslide deposits (Holocene)—Nonsorted and poorly sorted, stratified angular basalt clasts mixed with silt and clay. Mass-movement slope deposits are mainly associated with steep basalt rimrock and the interbedded fine-grained sediments and weathering surfaces. Locally may include columns of basalt carried either by mass movement processes or by Glacial Lake Missoula floods. Gradations from talus to smaller landslide deposits are present and difficult to distinguish. Thickness as much as 12 m.

Qfg—Fluvial gravel (Pleistocene and Holocene)—Moderately to poorly sorted sandy gravel and sandy silt in abandoned drainageways of the latest Glacial Lake Missoula floods. The Coeur d'Alene and Hayden Lake basins were inundated by the largest releases from Glacial Lake Missoula. Unit is mostly reworked Miocene sediment and colluvium that were previously carried and deposited by lower energy Missoula floods in slack-water areas. Includes various thicknesses of Holocene alluvium and wetland bog deposits. Thickness as much as 3 m.

Qp—Palouse Formation (Pleistocene and Holocene)—Loess composed of massive silt and clayey silt of the Palouse hills in the eastern Columbia Plateau. Consists of many layers that represent periods of rapid loess deposition followed by long surface exposure and soil development. Depositional and soil units within the Palouse Formation form complex surface and subsurface patterns that are discontinuous and difficult to map. Thick, welded, clayey B horizons of paleosols are locally exposed through erosion, especially on steep amphitheater-shaped slopes with northerly aspects, and form low knobs below the high ridge crests of the Palouse hills. Where the loess is thin, it is mostly composed of late Pleistocene and Holocene deposits. The Palouse Formation has previously been restricted to only Pleistocene loess deposits, but some workers have included Holocene loess in it. The Palouse Formation overlies a Miocene-Pliocene surface primarily developed on the basalt of the Priest Rapids Member (Wanapum Basalt) and Tertiary alluvial deposits. Soils include the Santa and the Taney series (Weisel, 1981). Shown only by an overlay pattern without well-defined boundaries. Thickness less than 3 m. Thin to absent on surfaces scoured by Glacial Lake Missoula floods.

DEPOSITS OF GLACIAL ORIGIN

Qghcy—Gravel of Hoodoo channel, younger (late Pleistocene)—Poorly sorted, coarse boulder outwash gravel that forms the lowest terrace of Hoodoo channel and records the meltwater flow through Granite Lake to the Pend Oreille

River. Graded to the outlet of Pend Oreille Lake at Bayview at an elevation of 670 m (2,200 feet). Contains kettles from melted blocks of ice. Probably records overflow of the lake during the last phase of alpine glaciation in the region. Moraines of alpine valley glaciers in the Selkirk and Cabinet Mountains are still intact and postdate the retreat of Cordilleran ice from the southern end of the Purcell Trench. Postdates the last Cordilleran ice dam at Clark Fork about 12,000 years ago. Thickness as much as 18 m.

Qghcm—Gravel of Hoodoo channel, middle (late Pleistocene)—Poorly sorted very coarse boulder gravel with a granule and sand matrix; the gravel forms the middle terrace of Hoodoo channel and records the lowest elevation of flow through the Spirit Lake part of the Hoodoo channel. Graded to an elevation of 700 m (2,300 feet). Probably resulted from overflow of the Pend Oreille Lake basin during Cordilleran deglaciation of the Purcell Trench, or from a late ice-marginal and noncatastrophic drainage of Glacial Lake Missoula. Thickness as much as 30 m.

Qghco—Gravel of Hoodoo channel, older (late Pleistocene)—Poorly sorted, very coarse boulder gravel that forms the highest terrace of Hoodoo channel; graded to approximately 730 m (2,400 feet). Probably represents the last emptying cycle of a much diminished and shallow Glacial Lake Missoula. Thickness as much as 30 m.

Qgtow—Bouldery till and outwash deposits (late Pleistocene)—Nonsorted, bouldery clay till and boulder outwash deposits that form a modified end moraine at the south end of Lake Pend Oreille. Clay till recorded in well logs and exposed by excavations in Farragut State Park. Probably equivalent in age to the gravel of Farragut State Park and the distal facies of the oldest gravel of Hoodoo channel (*Qghco*). Thickness as much as 25 m.

CATASTROPHIC FLOOD DEPOSITS AND REWORKED OUTWASH

Qgu—Gravel, undivided (Pleistocene)—Shown only in cross section. Bouldery flood gravels of Rathdrum Prairie undivided for the purpose of the cross section. Fills a deep paleovalley between Round Mountain and Twin Lakes (Adema, 1999). Thickness as much as 180 m.

Qgf—Gravel of Farragut State Park (Pleistocene)—Poorly sorted, sandy boulder gravel at the Glacial Lake Missoula flood breakout from the south end of Lake Pend Oreille. Probably represents the last drainage from Glacial Lake Missoula and outwash from late Wisconsin glacial retreat. Includes reworked outwash facies from the bouldery till moraine (*Qgtow*) at the southern end of Lake Pend Oreille. Thickness from 10 to 30 m.

Qgc—Channel gravel, undivided (Pleistocene)—Latest Wisconsin catastrophic flood and outwash gravel and sand deposited in channelways cut into high energy fans and bars of Glacial Lake Missoula flood origin. Deposited during declining stages of last catastrophic flood event. The last overland flood event was post-"S" ash (13,000 years ago) and pre-Glacier Peak ash (11,200 years ago), perhaps 12,800 years ago (Stradling and Kiver, 1986). Moderately sorted and stratified in the lower flow regimes. The channels are commonly developed at the margin of the Rathdrum Prairie because the larger boulders armor the center of the flood path. Locally includes angular basalt columns derived from the basalt rimrock. Soil is gravelly loam of the Kootenai series (Weisel, 1981). Thickness from 3 to 12 m.

Qdg—Distal gravel deposits (Pleistocene)—Moderately sorted, sandy flood gravels. These deposits form eddy bars at the mouths of the tributary valleys to the Rathdrum Prairie. Lower energy eddy flows deposit finer facies behind the main bar form. May be mantled by post-Glacial Lake Missoula flood lacustrine silt and alluvial deposits. Thickness as much as 60 m.

Qds—Distal sand and silt deposits (Pleistocene)—Moderately sorted sand and silt with some gravel deposited in a lower energy, Glacial Lake Missoula flood regime; represents slack-water sediments in waning floodwaters or finer facies of pendant bar deposits. Includes planar medium-bedded sand of low flow regime. Overlain by postflood lacustrine silt and peat deposits in local basins. Thickness from 3 to 10 m.

Qgb—Gravel of Beck Road (Pleistocene)—Poorly sorted flood gravel graded to the lowest valley-filling episode of flooding continuous with the Spokane Valley, about 640 m (2,100 feet) at the Idaho-Washington state line. The gravel is associated with the most developed incision representing a large abandoned river channel meandering westward into Washington (Gerstel and Palmer, 1994). Two separate sets of thick-bedded foresets are exposed in deep gravel pits. Soil is very stony and includes the gravelly silt loam of the Garrison series (Weisel, 1981). Thickness in excess of 25 m.

Qgcd—Gravel of Coeur d'Alene (Pleistocene)—Mixed deposits of poorly to moderately sorted, stratified cobbly sand and sandy gravel carried by outburst floods and currents of reverse outflow from inundation of the Coeur d'Alene basin. Composes the deposits damming Coeur d'Alene Lake and forming giant current ripples on the lake bottom shown

in seismic profiles (Breckenridge and Othberg, 1999a). Soil is gravelly silt loam of the McGuire series (Weisel, 1981). Thickness from 6 to 25 m.

Qgdg—Gravel of Dalton Gardens fan (Pleistocene)—Poorly sorted sandy gravel deposited in a large fan formed downstream from Hayden Lake outlet. Lobate in form at the downstream margin. Soil is fine gravelly silt loam of the Avonville series (Weisel, 1981). Thickness from 3 to 15 m.

Qgga—Gravel of Garwood (Pleistocene)—Poorly to moderately sorted sandy gravel deposited in a large fan formed downstream from the flood outlet of Lake Pend Oreille. Probably represents waning stages of the last recognizable flood event or a very small late flood. Includes local fans composed of gravel contributed from side drainages and rimrock basalt. Soils are gravelly silt loam of the Kootenai series and silt loam of the Bonner series (Weisel, 1981). Thickness from 3 to 15 m.

Qgm—Gravel of McGuire (Pleistocene)—Poorly sorted sandy flood gravel graded to an intermediate level of 650 m (2,140 feet) near Post Falls. Though extensive, the gravel unit appears to be characterized by incision and scour unconformities of a waning flood; the surface is marked by channel erosion and lag deposits. Soil is gravelly silt loam of the Garrison series (Weisel, 1981). Thickness from 20 to 30 m.

Qgmb—Gravel of McGuire, bar facies (Pleistocene)—Coarse, poorly sorted, imbricate flood gravel with parallel bedding. Forms a large longitudinal bar extending several miles west to the Idaho-Washington state line. Graded to the gravel of McGuire. Soil is very stony silt loam of the Garrison series. Thickness from 6 to 12 m.

Qgg—Gravel of Green Ferry (Pleistocene)—Coarse flood gravel. Consists of an extensive sheet of flood deposits in the quadrangle. Has poor sorting and variation in bedding; graded to about 670 m (2,200 feet) at Post Falls. Probably represents the last episode of major flood events about 12,800 years ago. Soil is gravelly silt loam of the McGuire-Marble association (Weisel, 1981). Thickness in excess of 30 m.

Qggf—Gravel of Green Ferry, fan facies (Pleistocene)—Poorly sorted, sandy flood gravel with channel cut and fill structures. The deposits form a large coalescing fan complex characterized by scour and fill features and concentrations of lag boulders, dissected by waning phases of flooding and smaller, later flood events. The depositional morphology of the fan tends to form lobes. Soils are fine gravelly silt loam of the Avonville series and gravelly silt loam of the Garrison series (Weisel, 1981). Thickness from 3 to 25 m.

Qggb—Gravel of Green Ferry, bar facies (Pleistocene)—Bouldery flood gravel. Coarse, poorly sorted imbricate flood gravel with large-scale foreset bedding. Forms a large channel bar with well-developed current ripples at the surface. Soil is gravelly silt loam of the Avonville series (Weisel, 1981). Thickness as much as 12 m.

Qgs—Gravel of Scarcello Road (Pleistocene)—Mixed deposits of poorly to moderately sorted, stratified cobbly sand and sandy gravel carried by outburst floods. Forms a well-developed terrace at about 720 m (2,360 feet) in elevation. Soil is gravelly silt loam of the Kootenai series (Weisel, 1981). Thickness from 6 to 25 m.

Qghl—Gravel of Hayden Lake (Pleistocene)—Coarse, poorly sorted gravel forms a terrace at about 700 m (2,300 feet) along the eastern margin of Rathdrum Prairie. Characteristically contains columns of basalt eroded from the nearby rimrock and large rip-up clasts of clay from the Latah Formation. Soils are fine gravelly silt loam of the Avonville series and gravelly silty loam of the Kootenai series (Weisel, 1981). Thickness from 12 to 15 m.

Qgtl—Gravel of Twin Lake (Pleistocene)—Poorly sorted, bouldery flood gravel deposited as a major pendant bar in the lee of Round Mountain, a scoured bedrock knob. Soils are gravelly silt loam of the Kootenai series and the Kootenai-Rathdrum association (Weisel, 1981). Thickness as much as 25 m.

Qgsly—Gravel of Spirit Lake, younger (Pleistocene)—Poorly sorted, bouldery flood gravel deposited as a large fan directly from the earlier and larger flood breakouts from Lake Pend Oreille. Forms the second (youngest and lower) of two high fan surfaces isolated by later flood erosion. Soil is cobbly silt loam of the Kootenai series (Weisel, 1981). Thickness as much as 30 m.

Qgslo—Gravel of Spirit Lake, older (Pleistocene)—Poorly sorted, bouldery flood gravel deposited as a large fan directly from the earlier and larger flood breakouts from Lake Pend Oreille. Forms the first (oldest and highest) of two high fan surfaces isolated by later flood erosion. Locally contains some very large boulders greater than 5 m that were probably carried in icebergs. Surface marked by giant current ripples up to 150 m (500 feet) between crests and 12 m (40 feet) in height. Pattern of current ripples shows divergent flow directions both north toward the Pend Oreille River drainage and south down Rathdrum Prairie as the floodwaters were deflected by the Mount Spokane uplands. Soils are gravelly

silt loam and silt loam of the Kootenai-Rathdrum association mantled by loess and Mazama volcanic ash (Weisel, 1981). Thickness in excess of 30 m.

Qgrp—Gravel of Ross Point (Pleistocene)—Poorly to moderately sorted, coarse, stratified sandy gravel forms the highest preserved remnant flood terrace south of Spirit Lake at about 713 m (2,340 feet) in elevation. Represents the earliest of the flood deposits recognized in the area; may be equivalent to the gravel of Spirit Lake. Has the most soil development of all the Rathdrum Prairie gravel units: the gravelly and sandy silt loam of the Avonville series and the McGuire-Marble association (Weisel, 1981). Thickness in excess of 50 m.

OLDER SEDIMENTS

Ts—Sediment (Miocene)—Mostly deeply weathered yellow to orange silt and clay, but also quartzite pebbles and cobbles, and sand. Clasts derived primarily from the Belt Supergroup. Typical thickness is 5-15 m. Cobble and pebble gravels consist of mature, rounded quartzite and other rock types derived from the Precambrian Belt Supergroup and the Mesozoic-Tertiary intrusions. In the western part of the area, the unit forms a flat to gently sloping upland surface 730-790 m (2,400-2,600 feet) in elevation that is underlain by basalt of the Priest Rapids Member (Wanapum Basalt). The unit grades laterally into thick colluvium or residuum of pre-Tertiary rocks. These deposits are probably graded to high base levels formed when the Miocene plateau basalt flows blocked and diverted stream drainages (McDaniel and others, 1998). These basalt-related sediments are considered part of the Latah Formation. The age of the deposits in the eastern part of the area is unknown, and these deposits are not included in the Latah Formation. Unit includes clay-rich interbeds of sediment between flows of Columbia River Basalt Group exposed 2 km west of Coeur d'Alene. Most interbeds are too poorly exposed or too thin to show at map scale, so they are included in the basalt map units.

COLUMBIA RIVER BASALT GROUP

Saddle Mountains Formation(?)

Tmfb—Basalt of Mica Flats (Miocene)—Medium gray to dark gray, fine-grained basalt. Microphyric with abundant plagioclase laths and needles, typically < 1 mm in length; a few scattered plagioclase phenocrysts as laths as much as 4 mm in length, or as clear to waxy clots and clusters as much as 4 mm across. Diktytaxitic cavities common but irregularly distributed. Freshly broken surfaces commonly have a rough, irregular texture. Known only from outcrops along U.S. Highway 95 and in a small rock quarry west of the highway, just south of Mica, and in the Idaho Highway Department's quarry east of Mica. Stratigraphically above Priest Rapids Member (Rosalia chemical type) where exposed along the highway. Probably underlain there by an interbed containing quartzite pebbles and cobbles. Unit consists of one known flow having reverse magnetic polarity. The mean paleomagnetic direction for the basalt of Mica Flats is distinct from the mean direction for Priest Rapids' Rosalia flows from nearby locations. Chemically the unit is also distinct from Priest Rapids, as well as from other known Wanapum and Saddle Mountains Basalt chemical types. Because of its position above Priest Rapids (Rosalia chemical type), it is tentatively correlated with Saddle Mountains Basalt. Additionally, it does not appear to be time-correlative with younger Priest Rapids (Lolo chemical type), the uppermost Wanapum unit found farther to the south, because the paleomagnetic direction differs significantly from that of the Lolo unit. At least 12 m is exposed in the quarry east of Mica, although the base of the unit has not been uncovered.

Wanapum Formation

Tpr—Priest Rapids Member (Miocene)—Medium gray to dark gray basalt. Typically has a grainy, felty texture caused by abundant small plagioclase and olivine phenocrysts and by microvesicles and diktytaxitic cavities. The denser parts of the flows are dark gray to black and fine grained; they lack the grainy texture, although small plagioclase phenocrysts are apparent. Outcrops weather gray-brown to reddish brown. In thick flows, large, poorly defined basal columnar zones 3-6 m thick change upward to slabby, platy zones that are typically medium bluish gray on fresh surfaces. Above the platy zones, flows commonly have a thick blocky to hackly entablature, 15 m or more thick, and in places well-developed thin, vertical to radiating columns. The top of the entablature grades upward into an increasingly vesicular, rubbly in places, flow top. Thin flows are more vesicular throughout and generally have only weakly developed basal columns and a vesicular flow top. Pillow-palagonite complexes are locally common at the base of flows or flow units (series of chemically similar thin flows that grade laterally into a single flow). The Priest Rapids Member consists of one or more flows of Rosalia chemical type and has reverse magnetic polarity. Thicknesses of individual flow units range from 8 to 25 m for thin units and as much as 180 m for thick units.

Grande Ronde Formation

Tgn_2—Grande Ronde N_2 magnetostratigraphic unit

(Miocene)—Dark gray to black, fine-grained aphyric to very sparsely plagioclase-phyric basalt. Locally, at least one flow near the top of this unit has a Priest Rapids-like grainy, felty texture. Large columns of the basal colonnade are generally visible only in quarry cuts. Natural exposures are typically of the thick entablature, consisting of either thin, well-developed and commonly radiating columns, or poorly developed columns with a blocky, hackly character. These entablature exposures are commonly cliff-forming masses that can be traced laterally for several miles. Individual flows are generally over 30 m thick and may be more than 60 m thick. Locally, hyaloclastic material is associated with the top of individual flows, especially near contacts with basement rocks.

Grande Ronde N_2 has normal magnetic polarity and is the lowermost basalt unit exposed on most of the Coeur d'Alene quadrangle; generally, its base either is not exposed or lies directly on prebasalt basement rocks. However, on the east side of Coeur d'Alene Lake near the south edge of the Coeur d'Alene quadrangle, the top of a *Tgr*$_2$ flow is exposed along the shoreline beneath the base of *Tgn*$_2$; this *Tgr*$_2$ flow is also present beneath the *Tgn*$_2$ along the west shoreline of the lake at University Point and Black Rock, but is too thin to show at map scale. *Tgn*$_2$ is overlain by either *Ted* or *Tpr* flows.

Tgr$_2$—Grande Ronde R$_2$ magnetostratigraphic unit (Miocene)—Dark gray to black, fine-grained aphyric to very sparsely plagioclase-phyric basalt similar to *Tgn*$_2$. One flow, with reverse magnetic polarity, is the lowermost basalt unit exposed along the Coeur d'Alene Lake shoreline. Only the vesicular top and upper part of the blocky entablature of this flow are exposed.

INTRUSIVE ROCKS

Tr—Rhyolite dikes (Eocene)—Light gray rhyolite dikes, most or all of which are porphyritic. Phenocrysts are quartz, andesine, and biotite. Present only in the area southeast of Beauty Bay, where Anderson (1940) mapped these dikes as rhyolite porphyry.

Td—Dacite dikes (Eocene)—Gray, porphyritic dacite dikes. Phenocrysts of plagioclase, biotite, quartz, and hornblende are set in a fine-grained groundmass. Present only at the mouth of Wolf Lodge Creek.

Tbgf—Fine-grained biotite granite (Eocene)—Gray, fine-grained, biotite granite. Locally forms lit-par-lit injection into *YXgn*. Potassium feldspar is interstitial. Termed the Rathdrum Mountain Granite by Rhodes and Hyndman (1984). Unpublished U-Pb zircon data of M.E. Bickford indicate an approximate 52 Ma age for this rock (Rhodes and others, 1989).

TKdd—Diabase and diorite dikes (Tertiary or Cretaceous)—Fine- to medium-grained, pyroxene-bearing mafic dikes mapped by Hobbs and others (1965) in and near the Coeur d'Alene mining district. Most are probably quartz diorite or diorite in the IUGS classification scheme (Streckeisen, 1976).

TKla—Lamprophyre dikes (Tertiary or Cretaceous)—Lamprophyre dikes with biotite or hornblende phenocrysts or microphenocrysts in a fine-grained groundmass. These dikes were mapped in and near the Coeur d'Alene mining district by Hobbs and others (1965).

TKg—Granitic rocks, undivided (Tertiary or Cretaceous)—Predominantly medium-grained granite and granodiorite, but may include diorite. Largest intrusion is the Beauty Creek stock, a porphyritic biotite granite described by Anderson (1940) as porphyritic quartz monzonite. Composed of 25 percent quartz, 30 percent zoned andesine, 30 percent orthoclase, 15 percent biotite, and trace amounts of zircon, apatite, and magnetite (Anderson, 1940).

TYqd—Quartz diorite dikes and sills (Tertiary, Cretaceous, or Proterozoic)—Dark green, fine-grained, hornblende quartz diorite. Previously considered Precambrian in age (Griggs, 1973), but many dikes cross-cut stratigraphy and are thus unlike the Precambrian sills in the Prichard Formation north and east of the map area. All or part of unit may be Cretaceous or Eocene in age.

Kphgd—Porphyritic hornblende-biotite granodiorite (Cretaceous)—Light gray, limonite-stained, highly porphyritic, hornblende-biotite granodiorite. Matrix is fine grained. Average composition is 30 percent quartz, 30 percent plagioclase, 20 percent orthoclase, 8 percent biotite, 7 percent hornblende, and 5 percent calcite, epidote, zoisite, apatite, and zircon (Kun, 1970). Plagioclase has prominent zoning and is typically altered. Unit continues to the north along east side of Pend Oreille Lake where a sample of presumably similar rock yielded a K-Ar date (biotite) of 87.7 Ma (recalculated from Miller and Engels, 1975).

Kbgd—Biotite granodiorite (Cretaceous)—Light gray, medium-grained, equigranular, biotite granodiorite of the Hayden Lake stock. Readily weathers to grus. Composed of 25 percent quartz, 40 percent zoned andesine, 15 percent interstitial microcline, 15 percent biotite, and extraordinarily large amounts of epidote in addition to chlorite, sphene, zircon, allanite, zoisite, sericite, and apatite (Anderson,

1940). K-Ar date on biotite is 83.8 Ma (recalculated from Miller and Engels, 1975).

Khgd—Hornblende-biotite granodiorite (Cretaceous)—Gray, medium-grained, hornblende-biotite granodiorite. Mafic mineral content varies, and unit probably is composed of multiple plutons or plutonic phases. Three typical samples contain 22-23 percent quartz, 41-43 percent plagioclase, 10-19 percent microcline, 11-13 percent biotite, and 6-15 percent hornblende (Gillson, 1927). A mafic marginal phase at Cape Horn east of Bayview contains 25 percent biotite and 5 percent hornblende (Gillson, 1927). Biotite is typically in thick euhedral books. Mafic phase mapped to the north as granodiorite of Salee Creek (Miller and others, 1999). Includes hornblende-bearing phases of the Kelso Lake pluton. Termed the Bayview batholith by Gillson, (1927) and Anderson (1940). A K-Ar date on biotite of 74.6 Ma (recalculated from Miller and Engels, 1975) is from the less mafic central part of the exposed pluton or plutons.

Kqd—Biotite-hornblende quartz diorite (Cretaceous)—Dark gray, equigranular, medium-grained quartz diorite. Rock contains about 13 percent quartz, 55 percent plagioclase, 15 percent biotite, 30 percent altered hornblende, and no potassium feldspar. Trace amounts of sphene, apatite, magnetite, and zircon; trace pyroxene in cores of hornblende. Appears to be a marginal phase to the *Khgd* unit. Extent is uncertain.

Kog—Orthogneiss (Cretaceous)—Gray, moderately to strongly foliated, moderately lineated biotite- and hornblende-biotite tonalite, granodiorite, granite, and quartz diorite. Muscovite bearing at the eastern edge of Round Mountain and magnetite-rich phase in roadcuts along U.S. Highway 95 near the mouth of Cougar Creek. Rocks mapped as *Kog* are heterogeneous and range in composition from granite to quartz diorite. Contains amphibolite bodies up to 100 m wide with contacts approximately parallel to foliation. Foliation is overprinted locally by s-c fabric (see Simpson and Schmid, 1983) with top-to-the-east sense of shear. Radiometric dates do not exist, but orthogneiss is considered to be Cretaceous based on similarities with deformed, approximately 94-Ma phases of the Cretaceous Idaho batholith near Lowell (Toth and Stacey, 1992) and to the Cretaceous Newman Lake orthogneiss exposed immediately west of the map area (Armstrong and others, 1987).

KYam—Amphibolite (Cretaceous or Proterozoic)—Black to dark gray, fine- to medium-grained, foliated to lineated hornblende-plagioclase meta-igneous rock. Present in schist considered by some workers as metamorphosed Prichard Formation (Griggs, 1973) and thus may be metamorphosed Proterozoic basaltic sills. However, those associated with *Kog* unit and those with relict pyroxene are probably Cretaceous.

PALEOZOIC ROCKS

Ꞓl—Lakeview Limestone (Cambrian)—Light to dark gray, thin- to thick-bedded, blocky limestone (Griggs, 1973). Includes blocky gray dolomite unit in upper part; contains some silty to sandy intervals and is metamorphosed to marble or hornfels adjacent to granitic intrusive rocks. Unit was mined for lime at Bayview (Savage, 1969). Thickness at least 2,000 feet (610 m), with the top eroded (Griggs, 1973).

Ꞓrg—Rennie Shale and Gold Creek Quartzite (Cambrian)—Rennie Shale is a fissile olive-colored fossiliferous shale, about 30 m (100 feet) thick, that is poorly exposed (Griggs, 1973). Underlying the shale is white to pale pink, vitreous coarse-grained quartzite. Contains some pebble conglomerate at its base. Thickness according to Griggs (1973) is about 500 feet (152 m).

BELT SUPERGROUP

Yl—Libby Formation (Middle Proterozoic)—Dark gray argillite and light gray to green siltite, green and red siltite, pink, fine-grained quartzite, and minor chert. Nonresistant and poorly exposed. Lower part is predominantly dark gray argillite and lighter-colored siltite. Coarsens upward into siltite and quartzite that contain dark green chert as thin beds and rounded clasts. Upper part eroded, but at least 200 m remain.

Ysp—Striped Peak Formation, undivided (Middle Proterozoic)—Quartzite and interbedded siltite and argillite. Probably consists largely (or entirely?) of Ysp_1. Shown only where lack of mapping prevented subdivision.

Ysp_4—Striped Peak Formation, member four (Middle Proterozoic)—Light gray to red, fine- to medium-grained arkosic quartzite and interbedded siltite and argillite. Characterized by 30- to 40-cm-thick tabular beds of flat-laminated, pink quartzite with red argillite caps and wavy laminated green siltite-green argillite in zones 10-30 cm thick. Less common are centimeter-scale-thick "apple green" argillite-siltite beds, and 1- to 2-m-thick beds of pink quartzite that locally contain large-scale, tangential cross-stratification. Thickest quartzite beds and quartzite with medium-grained sand lag deposits are present low in the unit. Mudchips are common throughout, as are conspicuous detrital muscovite flakes. Quartzite contains less potassium feldspar and more plagioclase (as much as 20 percent) than is present to the south (Lewis and others, 2000) and southeast (Lewis, 1998).

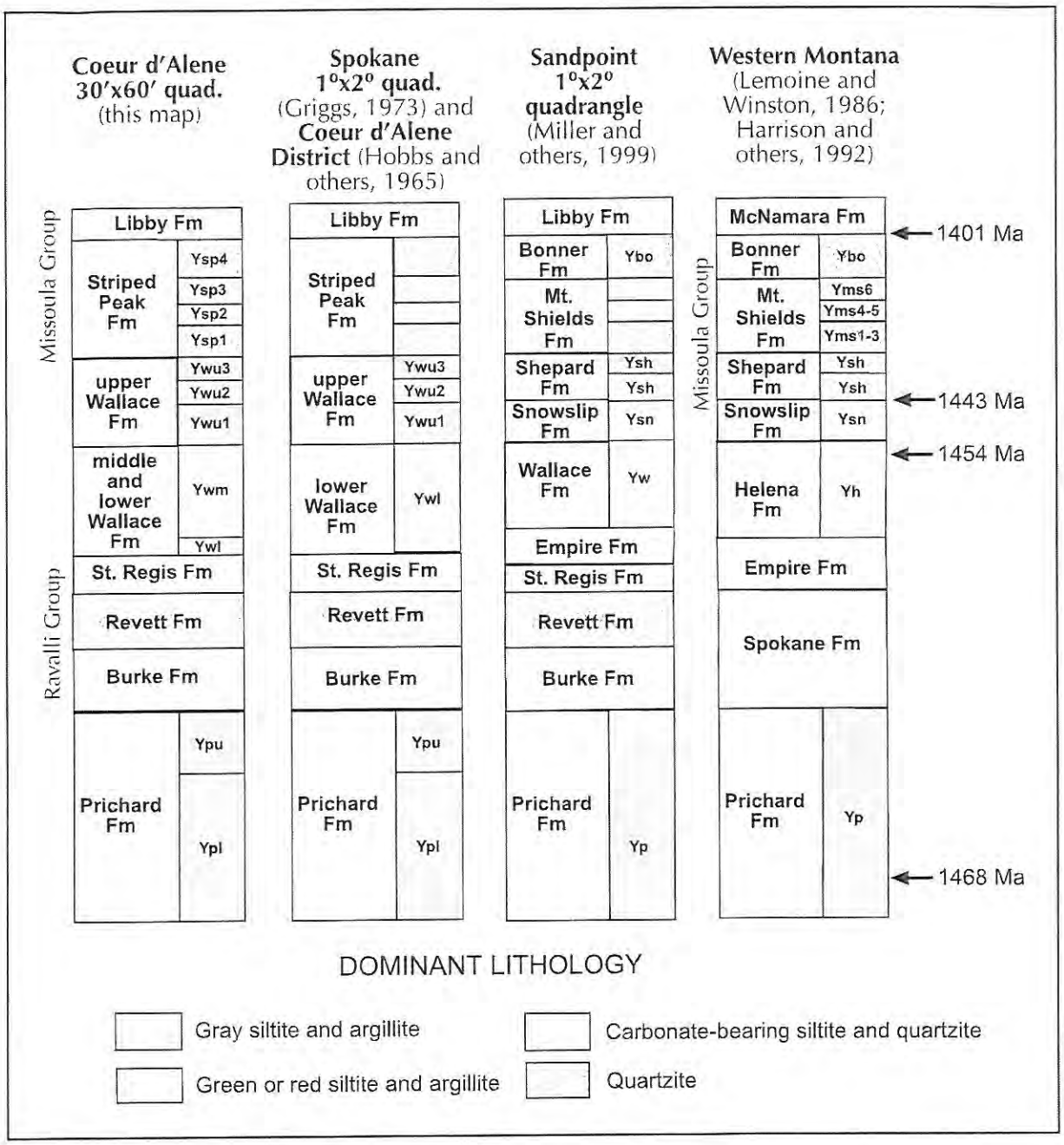


Figure 3. *Summary of Belt Supergroup nomenclature in the Coeur d'Alene quadrangle and surrounding area. Ages are U-Pb zircon dates of sills (Prichard Formation: Evans and others 2000) and volcanic rocks (Helena and younger formations; Anderson and Davis 1995).*

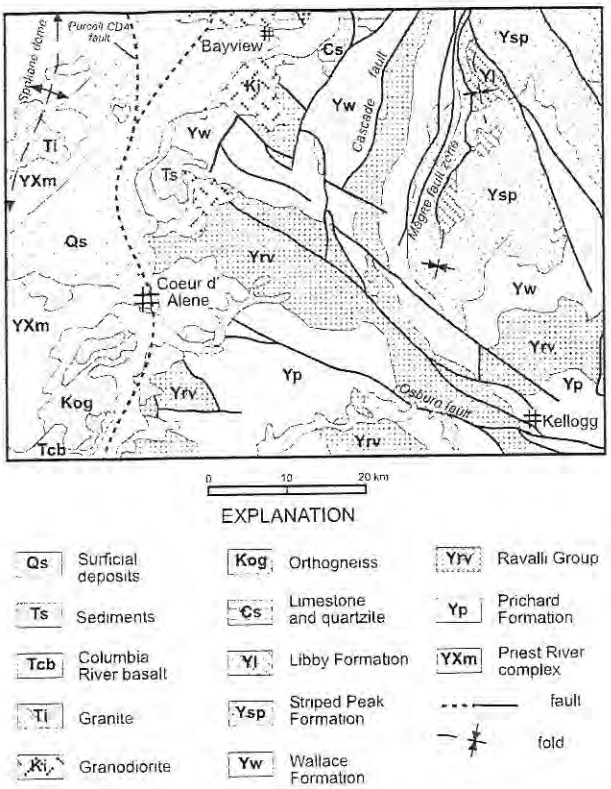


Figure 4. *Simplified geologic map of the Coeur d'Alene 30'x 60' quadrangle.*

Red chert clasts were noted at one quartzite locality on the ridge east of Calamity Creek in the northeast corner of the map area. Below this quartzite at this locality is a 20-cm-thick ash(?) bed with no internal structure and a conchoidal fracture pattern. Base of Ysp_4 is drawn at the lowest appearance of 20- to 30-cm-thick tabular light green quartzite. Upper contact is the lowest appearance of dark gray argillite and gray siltite of *Yl*. Equivalent to uppermost Striped Peak Formation (quartzite member of Harrison and Jobin, 1963) near Clark Fork and to the Bonner Quartzite (Nelson and Dobell, 1961) present in the Missoula area (Figure 3). Thickness approximately 280 m in the northeastern part of the area.

Ysp_3—Striped Peak Formation, member three (Middle Proterozoic)—Rusty weathering, wavy laminated, dark gray siltite and dark gray to black argillite, and lesser amounts of gray to greenish gray quartzite in thin beds as much as 10-cm thick. Totally black argillite is rare. Thin, dark gray argillite chips occur sparsely within some 10-cm-thick, dark gray argillite layers. Unit is equivalent to member six of the Mount Shields Formation (Figure 3) described to the northeast in the Kalispell quadrangle (Harrison and others, 1992) and to the laminated argillite and siltite member of the Striped Peak Formation in the Clark Fork area (Harrison and Jobin, 1963). Thickness approximately 120 m in the northeastern part of the area.

Ysp_2—Striped Peak Formation, member two (Middle Proterozoic)—Tan-weathering, white stromatolitic dolomite and tan-weathering, green dolomitic siltite. The dolomitic siltite is low in the unit and grades upward from carbonate-free siltite and argillite of Ysp_1. Unit weathers recessively, forming benches. Distinctive "boxwork" weathering pattern formed by resistant, millimeter-scale-thick vertical and horizontal siliceous stringers. Algal mats typically flat, rarely as scattered, low algal domes. Rare 5- to 10-cm-thick layers of ooids. This carbonate interval is mapped as the dolomite member of the Striped Peak Formation to the north near Clark Fork (Harrison and Jobin, 1963) and as members four (green dolomitic siltite) and five (boxwork dolomite) of the Mount Shields Formation (Figure 3) to the northeast in the Kalispell quadrangle (Harrison and others, 1992). Thickness approximately 100 m in the northeastern part of the area.

Ysp_1—Striped Peak Formation, member one (Middle Proterozoic)—Pale purplish red, fine-grained, flat-laminated quartzite and green and red argillite and siltite. Equivalent to the argillite, siltite, and quartzite member of the Striped Peak Formation near Clark Fork (Harrison and Jobin, 1963) and to the lower three members of the Mount Shields Formation to the northeast (Harrison and others, 1992). Lowest part (Mt. Shields member 1 equivalent; Figure 3) is characterized by fine- to very fine-grained, pink, flat-laminated quartzite in beds 20-30 cm thick, capped by red argillite layers as much as 3 cm thick. Mudcracks, mudchips, and ripple marks common. Uncommon 20-cm-thick beds of pale green quartzite are present near the base.

Middle part (Mt. Shields member 2 equivalent) is characterized by flat-laminated 0.5- to 1.0-m-thick beds of fine- to medium-grained quartzite that form 15- to 30-m-thick cliffs with blocky talus. Diffuse brown wisps of carbonate in the quartzite average a few centimeters in thickness and 10-15 cm in length. Uppermost part of this quartzite is medium grained and distinctly coarser than all other quartzite in the area except the thin sand lags in the Ysp_4 unit. Thin red argillite drapes at the tops of the quartzite beds are commonly rippled. Mudcracks and mudchips are less common than in the underlying interval. Flat-laminated to low domal stromatolites occur both near the base and at the top of this quartzite interval. The stromatolites are interbedded with centimeter-scale-thick calcitic white quartzite and locally with layers as much as 20 cm thick of cross-stratified ooids. Salt casts increase in abundance

upward in this subunit.

Upper part of unit (Mt. Shields member 3 equivalent) is characterized by thin quartzite beds, green and red siltite and argillite, and abundant salt casts. The quartzite is most abundant in the lower part of this subunit. The upper part of the subunit contains distinctive dark green siltite beds. Quartzite in Ysp_1 contains more potassium feldspar (12-25 percent) and less plagioclase (1-15 percent) than is present to the south (Lewis and others, 2000) and southeast (Lewis, 1998). Overall thickness of Ysp_1 uncertain but about 350 m in the northeastern part of the area.

Ywu—Wallace Formation, upper member, undivided (Middle Proterozoic)—Predominantly green and dark gray siltite and argillite, but locally contains unmapped carbonate intervals equivalent to upper member two. Shown where lack of mapping or poor exposure prevents subdivision.

Ywu_3—Wallace Formation, upper member three (Middle Proterozoic)—Rusty weathering, dark gray, laminated and thinly laminated siltite and argillite. Lower part is unevenly laminated light green to white siltite with thin gray to black argillite caps. Rare, very fine-grained white quartzite containing scattered black mudchips is also present in beds as much as 20 cm thick. Above this are 5- to 10-cm-thick beds of slightly dolomitic, dark green siltite interstratified with uneven laminations and thin (< 3 cm thick) graded beds (couplets) of dark green siltite and pale green argillite identical to rock types in Ywu_2. The uppermost part of the unit is unevenly laminated dark green siltite and pale green argillite similar to lower rock types but lacking any trace of carbonate. Includes rare 10-m-thick beds of light green quartzite and green decimeter-scale-thick siltite beds. Contact with the overlying Mt. Shields Formation (Ysp_1) is the lowest occurrence of centimeter-scale-thick, very fine-grained pink quartzite with red argillite caps. Lower contact is very gradational and best placed above the highest dolomitic siltite of Ywu_2. Equivalent to the nondolomitic upper part of the Shepard Formation (Figure 3) in western Montana (Lemoine and Winston, 1986). Relationship to Clark Fork section (Harrison and Jobin, 1963) uncertain, as are the relationships of other Wallace units to the Clark Fork section. Thickness about 80 m in the northeastern part of the area.

Ywu_2—Wallace Formation, upper member two (Middle Proterozoic)—Tan- and brown-weathering, dolomitic green siltite and argillite with minor interstratified, 10- to 20-cm-thick beds of dolomitic, very fine-grained quartzite. Argillite and siltite are thinly laminated, microlaminated, and in couplets. Lower contact placed at the lowest appearance of carbonate. Uneven laminations of dark green siltite and pale green argillite at the base of unit pass upward into intervals of thicker uneven couplets of dark green siltite and pale green argillite. Weathered outcrops are distinctive brown (siltite) and tan (argillite) as dolomite content increases up section. Scattered dolomitic quartzite layers as much as 20 cm thick also are present. Bedding locally discontinuous in middle and upper parts, with thin gray limestone pods and silty and sandy ripple trains within the thicker argillites. Centimeter-wide straight cracks that penetrate bedding to 10-cm depths are associated with layers of flat rip-up pebble conglomerates as much as 5 cm thick near the middle. Upper part is uneven siltite-argillite couples (graded beds over 3 cm thick) and uneven laminations of slightly dolomitic siltite and argillite. Upper contact problematic but placed at the highest, thick dolomitic laminated unit. Equivalent to the middle and lower parts of the Shepard Formation (Figure 3) in western Montana (Lemoine and Winston, 1986). Thickness about 300 m in the northeastern part of the area.

Ywu_1—Wallace Formation, upper member one (Middle Proterozoic)—Rusty weathering green siltite and dark green and gray argillite, and subordinate pale green fine-grained quartzite. Quartzite beds as much as 5 cm thick are locally common, although not abundant. Couplets of planar-laminated dark gray argillite and green siltite are near the base of the unit. At stratigraphically higher levels, decimeter-scale-thick green siltite beds are more common. Large, straight-sided cracks, visible on bedding-plane surfaces, commonly disrupt laminations to a depth of several centimeters. These are rarely associated with mudchips and are interpreted as water-escape structures; only near the upper contact are true desiccation cracks and mudchips common. Unit is at the stratigraphic level of the Snowslip Formation (Figure 3) mapped to the northeast in Montana (Harrison and others, 1992), but the lack of red zones and the paucity of mudcracks distinguish it from the Snowslip. Thickness about 300 m in the northeastern part of the area.

Ywml—Wallace Formation, middle and lower members, undivided (Middle Proterozoic)—Calcareous and noncalcareous, very fine-grained quartzite or siltite, black argillite, and green dolomitic siltite and argillite. Shown where the lack of mapping or poor exposure prevents subdivision. Equivalent to the lower Wallace unit of Griggs (1973) and Hobbs and others (1965) as shown in Figure 3. Relationship to Clark Fork section (Harrison and Jobin, 1963) uncertain, as are relationships of other Wallace units to the Clark Fork section. Thickness highly uncertain but about 1,200 m.

Ywm—Wallace Formation, middle member (Middle Proterozoic)—Gray, calcareous, very fine-grained quartzite or siltite and black argillite and lesser amounts of

noncalcareous white quartzite. A green dolomitic siltite and argillite interval may also be present, but it was only observed east of the map area. Alternatively, the green interval might represent the upper part of the lower member. Vertical calcite ribbons, horizontal pods, and molar tooth structures are common in some siltites over 20 cm thick. White quartzite also occurs as hummocky cross-stratified planar beds 15-30 cm thick. Quartzite contains 5-13 percent potassium feldspar and approximately 15-20 percent plagioclase. Characterized by graded beds (couplets and couples) that have the pinch and swell sediment type of Winston (1986) in which scours and loads of quartzite cut or deform the tops of subjacent black argillite. Argillite caps commonly contain ptygmatically folded siltite- or quartzite-filled cracks that taper downward. On bedding plane surfaces, the cracks are generally discontinuous and sinuous, occurring as isolated "birdsfoot" cracks, short parallel cracks, or radial cracks around loads. Relatively thin interval of green, dolomitic siltite and argillite that closely resembles the lower member may be present in the lower third of the unit. Equivalent to the middle member of Wallace as mapped by Harrison and others (1986). Mapped as part of the lower Wallace by Griggs (1973). Thickness highly uncertain but about 1,000 m.

Ywl—Wallace Formation, lower member (Middle Proterozoic)—Massive green siltite and thinly laminated green siltite-argillite couplets with varied amounts of carbonate (dolomite) and recessive-weathering calcite pods. Subdivided only in a few localities. Best exposed east of the area at the mouth of Shoshone Creek, where an orange-weathering dolomitic siltite appears to be at the top of the unit. Equivalent to the lower member of Wallace as mapped by Harrison and others (1986). Thickness highly uncertain but about 200 m.

Ysr—St. Regis Formation (Middle Proterozoic)—Pale purple to gray siltite, argillite, and quartzite. Also, light green siltite and darker green argillite or dark green siltite and light green argillite couplets. Typically mudcracked, 1-cm-thick siltite-argillite couplets but with thin (2-5 cm) and rarer thick (10-20 cm), tabular, fine-grained quartzite beds with green argillite caps similar to those of the Revett Formation. Abundant mudchips. Thickness about 250 m.

Yr—Revett Formation (Middle Proterozoic)—Quartzite with siltite and argillite. Characteristically 20-cm- to rare 1-m-thick beds of fine-grained to rare medium-grained quartzite. Some vitreous; most feldspathic with orange-brown spots. Feldspar is mostly potassium feldspar in the central and eastern part of the area (12-20 percent; 3 percent plagioclase), but two samples from the southwestern part contain subequal amounts of plagioclase and potassium feldspar. Rippled tops and ripple cross lamination more common than trough cross lamination; much is flat laminated. Thickness about 600 m.

Yb—Burke Formation (Middle Proterozoic)—Siltite and quartzite. Pale green siltite in 10- to 20-cm-thick beds, typically with macroscopic magnetite octahedra and darker green argillite partings. Includes some flat-laminated, fine-grained, gray to white quartzite in scattered beds and zones. Includes hornfelsed siltite and quartzite in the South Chilco Mountain area south of Lake Pend Oreille (Griggs, 1973) that may alternatively be a downdropped block of the Striped Peak Formation. Thickness uncertain but about 1,000 m.

Yp—Prichard Formation, undivided (Middle Proterozoic)—Gray, rusty-weathering siltite and minor quartzite. Minor discontinuous carbonate layers. Rare mudcracks. Shown where the lack of mapping or poor exposure prevents subdivision. See Hobbs and others (1965), Griggs (1973), or Cressman (1989) for more detail.

Ypu—Prichard Formation, upper part (Middle Proterozoic)—Map unit of Griggs (1973) described as dark to medium gray, very thinly bedded argillite commonly interlaminated with light gray siltite and also containing some thicker siltite beds. Grades upward into an interbedded and interzoned argillite, siltite, and quartzite sequence. Upper contact placed at highest dark gray argillite by Browne (2000a), similar to mapping by Griggs (1973), but ASARCO geologists placed contact lower than these two workers (at first light-colored quartzitic interval; Larry Appelgate, written commun., 1998). Total thickness is 2,500-3,500 feet (760-1070 m) according to Griggs (1973).

Ypl—Prichard Formation, lower part (Middle Proterozoic)—Map unit of Griggs (1973) described as predominantly medium to light gray, thin- and evenly bedded siltite, and laminated in part; some argillite laminae and beds. Some beds or zones of gray to white quartzite have been subdivided locally (*Yqp* unit). Thickness according to Griggs (1973) 7,500+ feet (2,290+ m); base not exposed.

Yqp—Quartzite of the Prichard Formation (Middle Proterozoic)—Nearly white to light gray impure to pure quartzite mapped by Hobbs and others (1965) in the southeast part of the area. Individual quartzite zones probably as much as 50 m thick are discontinuous laterally.

BELT SUPERGROUP OR PRE-BELT METAMORPHIC ROCKS

High-grade (amphibolite facies) metasedimentary rocks in

the western part of the area are part of the Priest River metamorphic complex. Meta-igneous rocks to the north and northwest within this complex have U-Pb ages that range from 1,576 to 2,651 Ma, indicating a pre-Belt age (Clark, 1973; Evans and Fischer, 1986; Armstrong and others, 1987; Doughty and others, 1998). However, some may be basement upon which the sedimentary rocks were deposited rather than intrusive into the sedimentary package (Doughty and others, 1998). Thus, all or part of the complex may be younger than the intrusions and correlate with the lower part of the Belt Supergroup.

YXs—Schist of the Priest River metamorphic complex (Proterozoic)—Fine-grained garnetiferous muscovite schist. Mapped as Prichard Formation by Griggs (1973).

YXq—Quartzite of the Priest River metamorphic complex (Proterozoic)—Strongly lineated and foliated light gray to white quartzite. Contains 5 percent or less muscovite and 15 percent feldspar. Coarsely recrystallized, and resembles vein quartz. Areas of *YXq* within *Kog* are either remnants of unmelted country rock or extremely large quartz veins.

YXgn—Gneiss of the Priest River metamorphic complex (Proterozoic)—Purplish brown sillimanite-biotite gneiss. Locally schistose and includes minor amounts of quartzite and amphibolite. Layering probably inherited from sedimentary protolith. Predominant mineral assemblage is quartz, plagioclase, potassium feldspar, biotite, and sillimanite. Includes rocks mapped as the Hauser Lake gneiss of Weisenborn and Weis (1976), gneiss of Cable Peak (Weis, 1968) and metamorphic rocks, undivided (Weis, 1968). See Rhodes (1986) and Doughty and others (1998) for a more detailed description of the Hauser Lake gneiss.

BELT SUPERGROUP NOMENCLATURE

Nomenclature for Belt Supergroup units is complicated by the many formation names in northern Idaho that differ from those developed in western Montana (Figure 3). We have adopted "Idaho terminology" similar to that of Hobbs and others (1965) and Griggs (1973), with the exception of that for the lower Wallace Formation. Here, we follow the usage of Harrison and others (1986) and subdivide the lower Wallace of Hobbs and others (1965) and Griggs (1973) into informal middle and lower members. A regional stratigraphic nomenclature is currently being pursued by Don Winston and the authors. A likely outcome involves assigning formation rank to the present members of the upper Wallace Formation and carrying the easily recognized Shepard Formation west into Idaho.

GEOLOGIC HISTORY

Most of the Coeur d'Alene quadrangle is underlain by a thick sequence of fine-grained siliciclastic and carbonate-bearing clastic rocks of the Belt Supergroup (Figures 3 and 4). These rocks were deposited between about 1,470 and 1,400 Ma during the Middle Proterozoic (Anderson and Davis, 1995; Evans and others, 2000). Continental reconstructions suggest that the Belt basin was intracratonic (e.g., Moores, 1991; Dalziel, 1991; Doughty and others, 1998; Burrett and Berry, 2000); a rifting event may have triggered initial subsidence. The lower part of the Belt (Prichard Formation) was deposited in relatively deep water under anoxic conditions. Intrusion of tholeiitic magmas formed extensive sills north and east of the area (Bishop, 1973). Units above the Prichard were deposited in relatively shallow water (near or above wave base) and under more oxidizing conditions. Algal mats and sedimentary structures such as mudcracks and salt casts are well preserved in the younger Belt rocks (Winston, 1986). Protoliths for high-grade (amphibolite facies) metasedimentary rocks in the western part of the quadrangle (units *YXgn*, *YXq*, and *YXs*) may have been deposited at the same time as the Belt Supergroup. Alternatively, some or all of these units may be the basement of the Belt (see discussions by Armstrong and others, 1987; Doughty and others, 1998; and Rhodes and Hyndman, 1988).

Deformation and magmatism during the East Kootenai orogeny at about 1,300-1,350 Ma affected rocks to the north in Canada (McMechan and Price, 1982) and may have affected rocks in the study area as well. Rifting of the former continent in the Late Proterozoic led to the accumulation of sedimentary and volcanic rocks of the Windermere Group in northeastern Washington (Miller, 1994). Rocks of this age are not found in the Coeur d'Alene quadrangle, although they may have once existed. Later rifting that formed the continental margin to the west lead to the deposition of Cambrian sedimentary rocks on a regional angular unconformity (Campbell, 1959), indicating that the Belt rocks were folded or faulted during one or both of the events above. No record exists of additional sedimentation or deformation in the Paleozoic or early Mesozoic.

The region was subjected to compressional deformation during the Cretaceous Sevier Orogeny, when the Belt Supergroup was strongly folded and faulted (Fillipone and Yin, 1994; Rhodes and Hyndman, 1988). Contractional faults and a strong cleavage formed in the southeastern part of the area (Clark, 1970). At the present level of exposure, all of these faults are relatively steep (reverse). We believe these structures are related to regional thrusting in the

Cretaceous and refer to them as thrust faults regardless of present dip. An example is the Alhambra fault south of Kellogg. During this time, rocks in the western part of the area were deformed at deeper levels and acquired a foliation (S_2 of Rehrig and others, 1987) as well as a lineation defined by sillimanite.

Magmatism in the Cretaceous affected the western half of the quadrangle (Figure 4). The Hayden Lake stock and similar rocks to the north were intruded into the Belt Supergroup. These plutonic rocks lack significant fabric and presumably were emplaced at relatively shallow crustal levels or after much of the deformation in the area. Biotite K-Ar dates of 75 Ma and 83 Ma provide minimum emplacement ages. Even less certain are the ages of some of the other intrusive rock units (*TKdd*, *TKla*, *TKg*, *TYqd*). The greatest uncertainty is for quartz diorite dikes (*TYqd*) that were previously assigned to the Proterozoic and thought to represent sills in the Prichard Formation (Griggs, 1973). Some may indeed be Proterozoic, but because many tend to be discordant to bedding and are concentrated in areas of faulting, a Cretaceous or Eocene age seems more likely.

Orthogneiss southwest of Coeur d'Alene (*Kog*) formed from plutons that resided at deeper crustal levels than the Hayden Lake stock and related rocks. The Cretaceous age is suggested because chemically and mineralogically the orthogneiss more closely resembles the Na- and Ca-rich Idaho batholith than the K-rich Proterozoic orthogneiss in the region. Widespread K-Ar cooling ages of 46-52 Ma (Miller and Engels, 1975; Harms and Price, 1992; Doughty and Price, 1999) indicate that this orthogneiss and the surrounding amphibolite facies metasedimentary rocks of the Priest River metamorphic complex were brought to near-surface levels during the Eocene. The timing details and the role that the Purcell-Coeur d'Alene detachment fault played in this unroofing event are still being debated.

Most of the mylonites in the footwall of the Purcell-Coeur d'Alene fault may have formed during late Cretaceous compressional strain before the intrusion of the fine-grained biotite granite of Rathdrum Mountain (*Tbgf*) at about 52 Ma (Rhodes and Hyndman, 1984, 1988; Rhodes and others, 1989; Doughty and Price, 1999). Of the three foliations in the area, only the latest may have formed or been superimposed upon earlier fabrics during down-to-the-east faulting along the Purcell-Coeur d'Alene fault in the Eocene (Rehrig and others, 1987). The mylonitic fabric in the footwall of the fault has kinematic indicators that show top-to-the-east motion. This mylonitic fabric was later folded into the Spokane dome (Rhodes and Hyndman, 1984) contemporaneously with uplift.

Doughty and Price (1999) have suggested that there is a relatively steep normal fault within the Purcell Trench to the north that cuts the Spokane dome mylonite zone. One is likely to be present in the Coeur d'Alene area as well. We speculate that a relatively steep normal fault extends from north of Athol south through Coeur d'Alene Lake. It appears to intersect (and cut) the Purcell-Coeur d'Alene fault southeast of Round Mountain but is entirely covered by surficial deposits. Alternatively, the Purcell-Coeur d'Alene fault may extend the entire length of the map area and not be offset by a younger fault. The trace of the northern extension of the Purcell-Coeur d'Alene fault from Athol north to Sandpoint is uncertain, partly because of cover by glacial deposits and partly because the exposed bedrock is largely granitic rocks that have little or no fabric. We show the Purcell-Coeur d'Alene fault (mylonite zone) continuing due north from Round Mountain more or less where McCarthy and others (1993) suggested it might be located. Alternatively, it may continue as a steeper structure north of Athol.

Extension in the central and eastern part of the quadrangle was probably localized along north-northeast-striking faults such as the Cascade fault. Both the steep bedding and some faults in the Magee fault zone probably originated during contractional deformation, but the present configuration appears strongly dependent on down-to-the-west normal faulting. West-northwest faults such as the Osburn fault are thought to have had right-lateral strike-slip motion at this time and served to transfer the extension from the area of the Priest River metamorphic complex eastward into Montana (Sheriff and others, 1984; Rehrig and others, 1987). Movement on the Purcell-Coeur d'Alene fault had ended by Miocene time (about 16 Ma) when drainages in the area were invaded by Columbia River basalt. No offset of basalt is apparent across the fault. The Columbia River basalt disrupted drainages in the area and established a new base level. Drainage systems that previously had transported sediment out of the area now deposited their sediment at the margins of the basalt flows, or upstream from them. These sediments (*Ts*) are widespread in the region south of the map area.

During the Pleistocene, a lobe of the Cordilleran ice sheet moved south down the Purcell Trench from Canada into northern Idaho. Glacial Lake Missoula was formed when this lobe blocked the Clark Fork drainage near its mouth into Lake Pend Oreille. At its maximum, the lake was over 610 m (2,000 feet) deep against the ice dam. Repeated failures and re-formations of the Clark Fork ice dams resulted in catastrophic outbursts of as much as 2,000 cubic km (500 cubic miles) of water flowing across northern Idaho and into the Channeled Scabland of Washington (Waitt,

1985). The main path of the floods was from the southern end of Lake Pend Oreille across Rathdrum Prairie and through the Spokane Valley. The enormous energy of the flood water transported coarse boulder gravel downstream. This gravel forms the Rathdrum-Spokane aquifer, which is the sole source of ground water for the area's urban and rural population. The largest of the floods would have removed evidence of earlier flood events, so only the physical record for the late Wisconsin floods and ice advances remains. Similar floods, however, likely recurred in earlier Pleistocene glaciations. Remnants of the oldest recognized gravel form high expansion flood bars at Spirit Lake (*Qgslo*, *Qgsly*) and at Ross Point (*Qgrp*). Pendant bars formed behind bedrock obstructions at Round Mountain (*Qgtl*), and eddy bars dammed the side valleys (*Qdg*). Lakes bordering the Purcell Trench (Spirit, Twin, Hayden, Coeur d'Alene, Fernan, Hauser, and Newman) formed behind bars of flood gravel deposited at the mouths of valleys (Breckenridge, 1989). Younger gravel units mapped in the Rathdrum Prairie formed gravel sheets and fans and resulted from younger and smaller floods after the late Wisconsin maximum, about 18,000 years ago. The Mount St. Helens set S tephra of approximately 13,000 years ago is associated with late flood deposits, and the last flood is immediately postdated by the Glacier Peak ashes B and G (about 11,200 years ago; Kiver and others, 1991). Small alpine glaciers postdate the Cordilleran ice retreat in the high elevations of the Selkirk and Cabinet Mountains north of the map area. Eolian deposits of silt, the loess of the Palouse Formation (*Qp*), accumulated on the Columbia Plateau throughout the Quaternary to the present and were mainly a result of ice age erosion and winds (Busacca, 1991).

GEOCHEMISTRY

Over ninety samples from the Coeur d'Alene quadrangle were analyzed by X-ray fluorescence (XRF) methods for major and trace element concentrations at Washington State University as part of this study and other related STATEMAP projects. Results for igneous intrusive rocks are presented in Table 1; those for metasedimentary rocks are in Table 2, and those for basalts are in Table 3. Sample locations are shown on the map, and their latitude and longitude are listed in the tables. Also reported here are two samples outside the map area: one, a garnet-muscovite schist from an exposure just south of the quadrangle along the west side of Coeur d'Alene Lake (99RL244); and the other, an augen gneiss of Laclede (99RL262), a Proterozoic igneous rock within the Priest River complex, but from north of the area.

The two analyzed samples from the fine-grained biotite granite unit (*Thgf*) have significantly different chemical compositions (Table 1). Sample 99RL202 from a pluton on the northwest side of Spirit Lake has a lower SiO_2 content (68 versus 74 percent) and a lower K_2O content (3.7 versus 5.2 percent) than sample 99RL256 collected from a larger pluton extending west from Rathdrum Mountain. The pluton at Rathdrum Mountain has K_2O well in excess of Na_2O and Rb in excess of Sr, characteristics common to epizonal Eocene granite plutons in central Idaho (Lewis and Kiilsgaard, 1991). Although the pluton at Rathdrum Mountain lacks miarolitic cavities that characterize the epizonal granite, it may be similar in age and origin but was emplaced at deeper levels than those in central Idaho. A sample collected from the Beauty Creek stock (unit *TKg*, sample 99RL281) is similar in composition to the pluton of *Thgf* on the northwest side of Spirit Lake. Both have K_2O/Na_2O ratios of 1.1 to 1.3, and SiO_2 contents in the 68-69 percent range.

Samples of biotite granodiorite from the Hayden Lake stock and the hornblende-biotite granodiorite north of Hayden Lake (units *Khgd* and *Khgd*) have similar major element concentrations (compare 99RL208, 99RL257, and 99RL258). Most trace element concentrations are also similar. However, the sample from the Hayden Lake stock contains considerably more Sr than samples from the hornblende-bearing unit (708 ppm versus 297 and 348 ppm). Biotite K-Ar ages on the two rock units of 83.8 and 74.6 Ma (recalculated from Miller and Engels, 1975) suggest two episodes of magmatism. All three samples have K_2O in excess of Na_2O. In this regard, they are unlike the bulk of the Idaho batholith, which is relatively sodic. The higher K_2O contents and the presence of euhedral biotite books are similar to some of the satellite plutons southeast of the southern lobe of the Idaho batholith (Lewis and others, 1987; Lewis, 1989, 1990) as well as the potassic series of the Boulder batholith of Montana (Tilling, 1973).

Craig Wavra and Rolland Reid analyzed thirteen samples of "deep igneous rocks" (our orthogneiss unit, *Kog*) from southwest of Coeur d'Alene that they described as granite gneiss, granodiorite gneiss, and tonalite gneiss (Rolland Reid, written commun., 1998). These rocks have a moderate SiO_2 range from 69 to 76 percent and a wider K_2O range from 2.8 to 5.9 percent. One anomalous analysis with 83 percent SiO_2 and only 1.2 percent K_2O we attribute to contamination by quartzite. Two samples of diorite gneiss from the same area have SiO_2 contents of 55-57 percent. K_2O exceeds Na_2O in ten of the samples, and Rb exceeds Sr in three samples. The four orthogneiss samples we analyzed (Table 1) have compositions that are within the range found by Wavra and Reid.

Chemical compositions of argillite-siltite from different formations of the Belt Supergroup (Table 2) largely overlap,

a result consistent with those of previous workers (e.g., Harrison and Grimes, 1970; Harrison and Hamilton, 1971). Concentrations of Sr are higher in the siltite-argillite and siltite samples of the Prichard Formation (111 and 76 ppm) relative to other noncarbonate-bearing siltite or argillite samples in the Belt (58 ppm or less). This distinction was originally noted by Jack Harrison (written commun., 1991). Copper concentrations are 44 ppm or less in all samples, with the exception of 99RL251, an argillite-siltite from the lower part of the Libby Formation that contains 148 ppm Cu. Zinc concentrations exceed 100 ppm in only two samples (99RL279 and 98RL052), both from the Prichard Formation. Concentrations of K_2O are highest (greater than 4 percent) in the argillite-siltite samples from the Prichard, St. Regis, lower Wallace, and Striped Peak Formations. K_2O content of siltite-argillite in the middle and upper members of the Wallace and in the Libby Formation ranges more widely (2.6 to 5.4 percent K_2O). Carbonate-bearing samples have low total oxides because CO_2 was not analyzed. These carbonate-bearing rocks also have low K_2O concentrations (0.8-3.8 percent) relative to the noncarbonate rocks and, as expected, high CaO concentrations. Quartzite samples have lower K_2O concentrations (1.4 to 3.8 percent) as a result of the high quartz sand content in these rocks. Sample 98RL176 is from the "lower green marker" in the Sunshine Mine and has an unusually high silica content (80.35%).

Seven samples of metasedimentary gneiss and schist from the Priest River metamorphic complex (units *YXgn* and *YXs*) have an expected moderate range in chemical composition. The most schistose sample (99RL244) also has the lowest SiO_2 content (62 percent) and the highest Al_2O_3 content (23 percent). This sample is from just south of the map area. Metasedimentary rocks from the Priest River metamorphic complex are compositionally similar in many respects to the Belt Supergroup. However, they typically have higher Sr concentrations (all but one sample exceed 143 ppm). This may be a metamorphic effect, as Sr is known to increase with increasing metamorphic grade in this region (Harrison and Hamilton, 1971). Alternatively, all or some of the metasedimentary rocks of the Priest River complex may predate the Belt Supergroup, as discussed in the previous section. All of the analyses of Columbia River basalt (Table 3) match well with previously published results (Griggs, 1978; Swanson and others, 1979b; Wright and others, 1973, 1979, 1980). Significant differences exist in both major and trace element contents of the different units, but variations within the units are small. One important result was from an analysis of samples collected on Mica Flat southwest of Coeur d'Alene. These samples are from a previously unknown flow with a chemical composition unlike that of the underlying Priest Rapids member.

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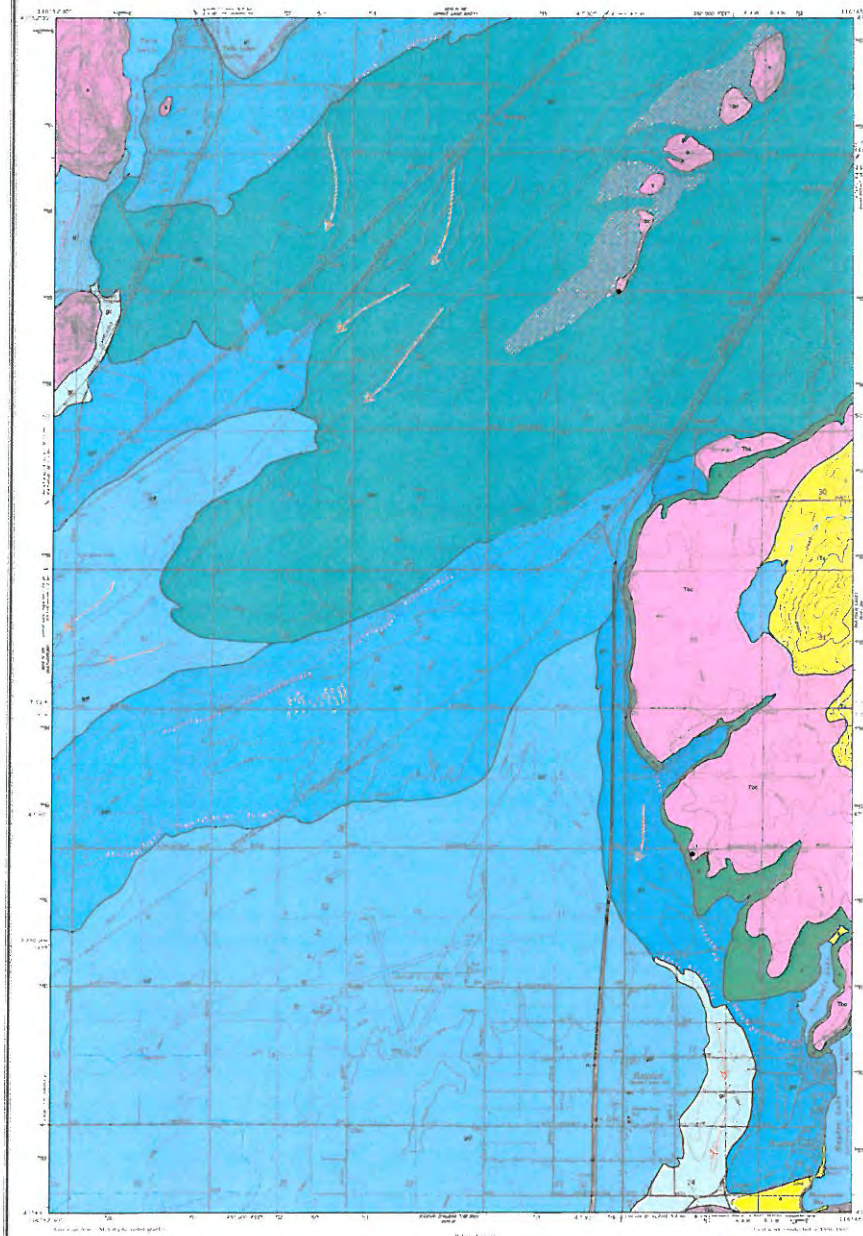
Appendix not printed

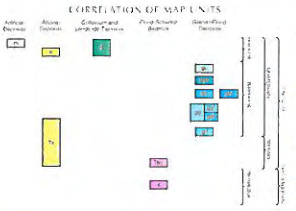
Surficial Geologic Map of the Hayden Quadrangle, Kootenai County, Idaho

Roy M. Breckenridge and Kurt L. Othberg

1999



Correlation of Map Units



Introduction

Description of Map Units

Artificial Deposits

Waste ground thermo-alt. [illegible]

Alluvial Deposits

Alluvial and lacustrine sediments. [illegible]

Delta alluvium. [illegible]

Colluvial and Landslide Deposits

Talus and landslide deposits of Columbia River Basalt Group. [illegible]

Glacial, Flood, and Periglacial Deposits

Glacial of Rathdrum Prairie

Channel gravel, undivided. [illegible]

Gravel of Garwood. [illegible]

Gravel in Scarville Road. [illegible]

Gravel of Hayden Lake. [illegible]

Gravel of Green Acres. [illegible]

Gravel of Greenacres-Spokane. [illegible]

Gravel of Greenacres-Sunshine. [illegible]

Gravel of Greenacres-Sunset. [illegible]

Gravel of Sunset Lake. [illegible]

Flood-scoured bedrock

Basalt scoured by Missoula Floods. [illegible]

Precambrian metamorphic rocks of the Belt Supergroup and gneiss and granite scoured by Missoula Floods. [illegible]

Symbols

References

[illegible]

Basalt Analyses

Sample	Location: Latitude	Location: Longitude	Chemical Type	Magnetic Polarity
1	[illegible]	[illegible]	FR	R
2	[illegible]	[illegible]	GF	N

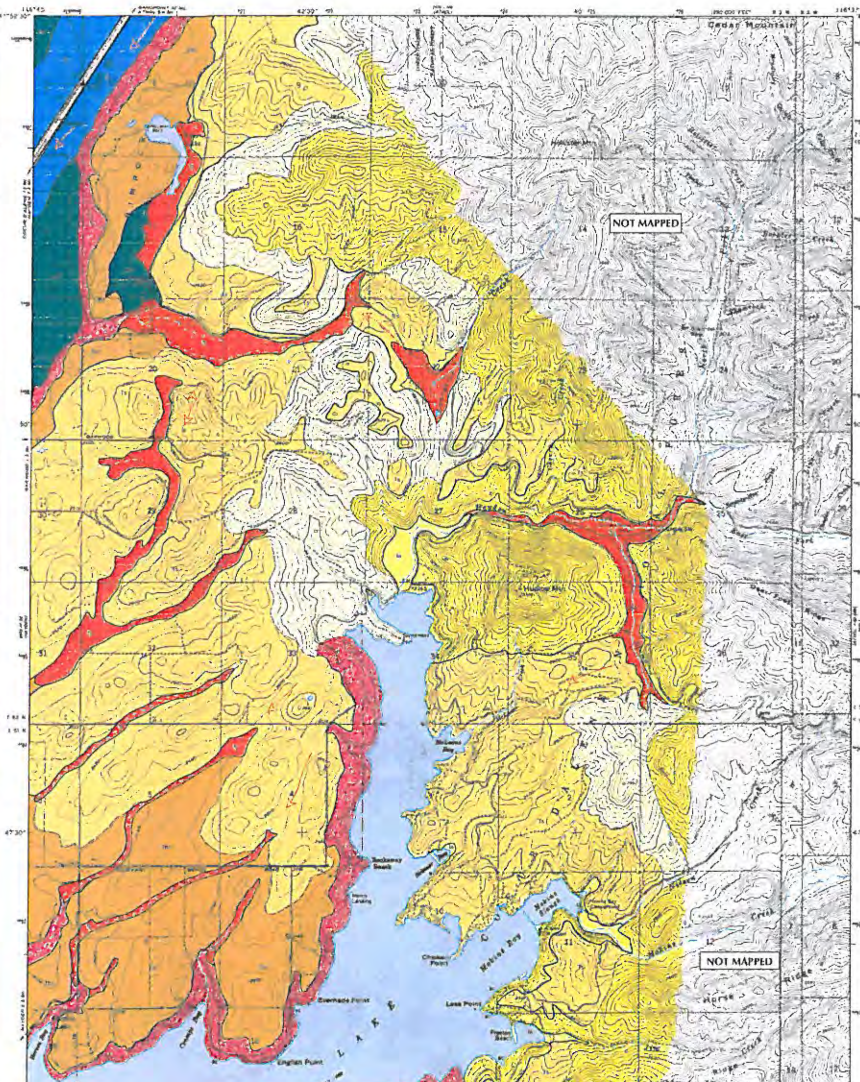
[illegible]

Digital Orthophoto of Hayden Quadrangle, 1992

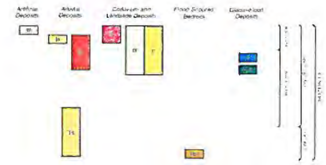
Surficial Geologic Map of the Hayden Lake Quadrangle, Kootenai County, Idaho

Roy M. Breckenridge and Kurt L. Othberg

2000



CORRELATION OF MAP UNITS



INTRODUCTION

DESCRIPTION OF MAP UNITS

Made ground (Historical)

Lacustrine sediments and alluvium (Holocene)

Flood gravels (Pleistocene and Holocene)

Relict alluvium (Tertiary)

Talus and landslide deposits of Columbia River Basalt Group (Holocene and late Pleistocene)

Colluvium and residuum (Quaternary and Tertiary)

Colluvium and common small rock outcrops (Quaternary and Tertiary)

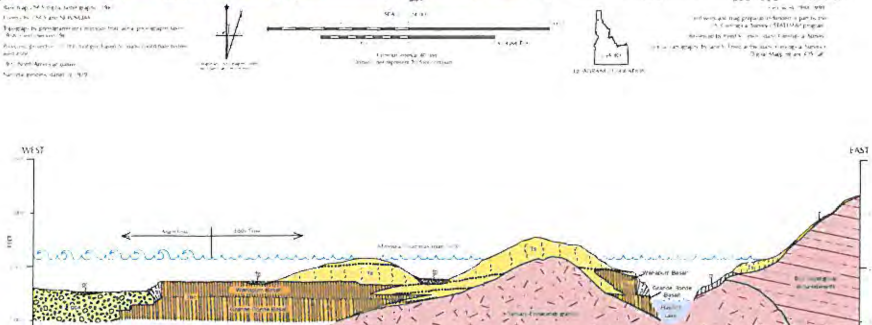
Channel gravels, undivided (Pleistocene)

Gravel of Garwood (Pleistocene)

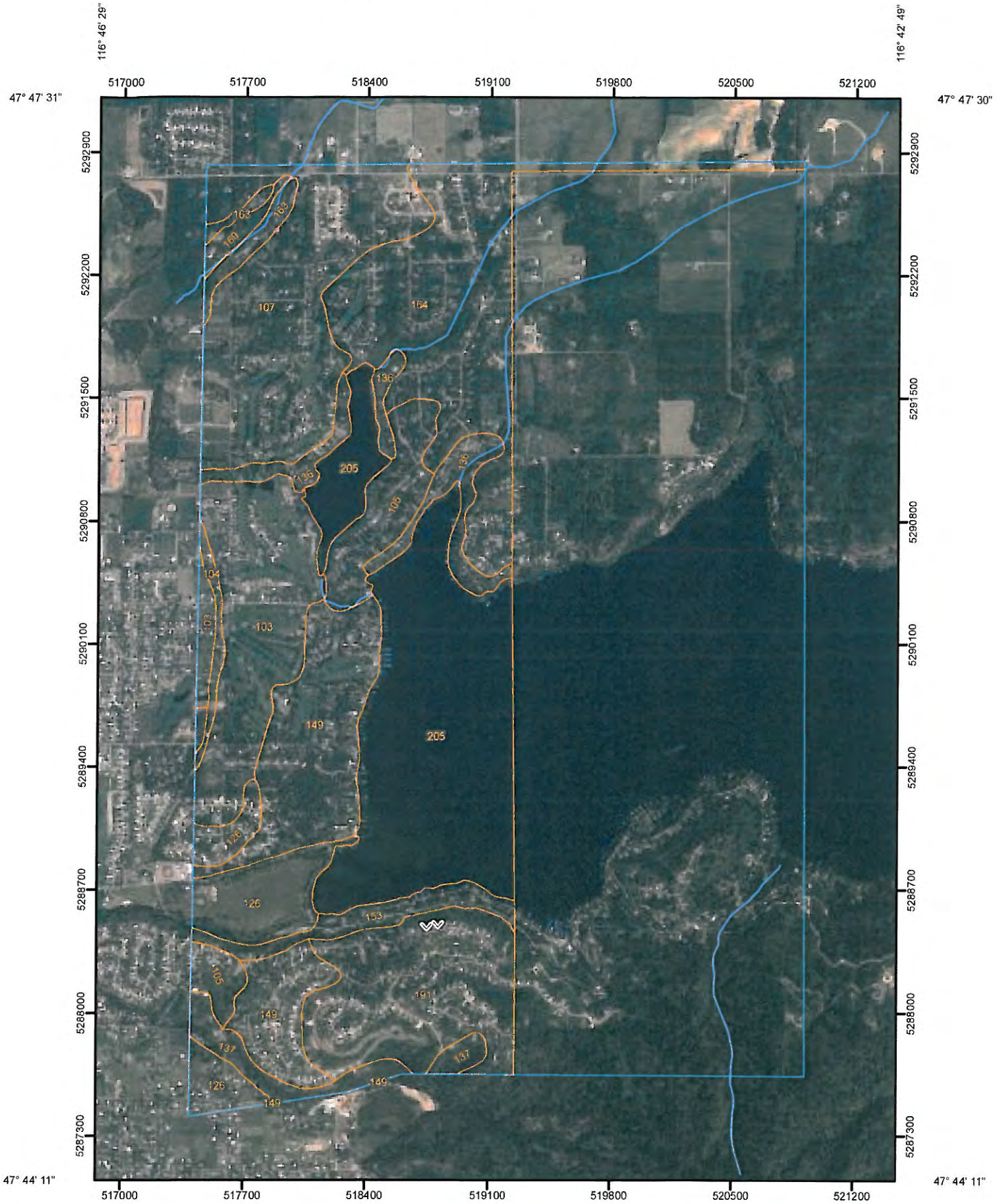
Basalt scoured by Missoula Floods (Miocene)

SYMBOLS

REFERENCES



Digital Orthophoto of Hayden Lake Quadrangle (1992)



Map Scale: 1:29,400 if printed on A size (8.5" x 11") sheet.

N

Meters: 0 250 500 1,000 1,500

Feet: 0 1,000 2,000 4,000 6,000

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Units

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features

- Gully
- Short Steep Slope
- Other

Political Features

- Cities

Water Features

- Oceans
- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:29,400 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 11N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Idaho Panhandle National Forest, Idaho
Survey Area Data: Not available

Soil Survey Area: Kootenai County Area, Idaho
Survey Area Data: Version 6, Jan 31, 2008

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Date(s) aerial images were photographed: 6/23/2004

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Idaho Panhandle National Forest, Idaho (ID670)		
No soil data available for this soil survey area.		
Totals for Area of Interest	**4,515.0**	**100.0%**

Kootenai County Area, Idaho (ID606)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
103	Avonville fine gravelly silt loam, 0 to 7 percent slopes	237.8	5.3%
104	Avonville fine gravelly silt loam, 7 to 20 percent slopes	15.6	0.3%
105	Blinn stony loam, 5 to 35 percent slopes	104.2	2.3%
107	Bonner silt loam, 0 to 8 percent slopes	331.3	7.3%
126	Kootenai gravelly silt loam, 0 to 7 percent slopes	134.8	3.0%
136	Lacy-Bobbitt association, 5 to 35 percent slopes	85.0	1.9%
137	Lacy-Bobbitt association, 35 to 65 percent slopes	52.6	1.2%
149	McGuire-Marble association, 0 to 7 percent slopes	260.2	5.8%
153	Mokins silt loam, 35 to 65 percent slopes	51.0	1.1%
160	Ramsdell silt loam	14.7	0.3%
163	Rock outcrop	27.5	0.6%
164	Rubson-Mokins complex, 0 to 20 percent slopes	349.8	7.7%
191	Tekoa gravelly silt loam, 35 to 65 percent slopes	230.5	5.1%
205	Water	480.6	10.6%
Subtotals for Soil Survey Area		**2,375.6**	**52.6%**
Totals for Area of Interest		**4,515.0**	**100.0%**

Kootenai County Area, Idaho

103—Avonville fine gravelly silt loam, 0 to 7 percent slopes

Map Unit Setting

Elevation: 2,200 to 2,400 feet
Mean annual precipitation: 22 to 26 inches
Mean annual air temperature: 43 to 45 degrees F
Frost-free period: 140 to 150 days

Map Unit Composition

Avonville and similar soils: 70 percent

Description of Avonville

Setting

Landform: Outwash terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Volcanic ash and loess over outwash

Properties and qualities

Slope: 0 to 7 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability (nonirrigated): 3s

Typical profile

0 to 16 inches: Fine gravelly silt loam
16 to 25 inches: Very gravelly silt loam
25 to 37 inches: Extremely gravelly sandy loam
37 to 60 inches: Extremely gravelly sand

Data Source Information

Soil Survey Area: Idaho Panhandle National Forest, Idaho
Survey Area Data: Version 0, Jan 1, 0001

Soil Survey Area: Kootenai County Area, Idaho
Survey Area Data: Version 6, Jan 31, 2008

Kootenai County Area, Idaho

104—Avonville fine gravelly silt loam, 7 to 20 percent slopes

Map Unit Setting

Elevation: 2,200 to 2,400 feet
Mean annual precipitation: 22 to 26 inches
Mean annual air temperature: 43 to 45 degrees F
Frost-free period: 140 to 150 days

Map Unit Composition

Avonville and similar soils: 75 percent

Description of Avonville

Setting

Landform: Outwash terraces
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Volcanic ash and loess over outwash

Properties and qualities

Slope: 7 to 20 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.9 inches)

Interpretive groups

Land capability (nonirrigated): 4e

Typical profile

0 to 16 inches: Fine gravelly silt loam
16 to 25 inches: Very gravelly silt loam
25 to 37 inches: Extremely gravelly sandy loam
37 to 60 inches: Extremely gravelly sand

Data Source Information

Soil Survey Area: Idaho Panhandle National Forest, Idaho
Survey Area Data: Version 0, Jan 1, 0001

Soil Survey Area: Kootenai County Area, Idaho
Survey Area Data: Version 6, Jan 31, 2008

Kootenai County Area, Idaho

105—Blinn stony loam, 5 to 35 percent slopes

Map Unit Setting

Elevation: 2,100 to 3,200 feet
Mean annual precipitation: 25 to 28 inches
Mean annual air temperature: 43 to 45 degrees F
Frost-free period: 90 to 110 days

Map Unit Composition

Blinn and similar soils: 85 percent

Description of Blinn

Setting

Landform: Escarpments
Landform position (two-dimensional): Backslope, footslope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Volcanic ash and loess over bedrock derived from basalt

Properties and qualities

Slope: 5 to 35 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.4 inches)

Interpretive groups

Land capability (nonirrigated): 6e

Typical profile

0 to 1 inches: Slightly decomposed plant material
1 to 2 inches: Moderately decomposed plant material
2 to 11 inches: Stony loam
11 to 23 inches: Stony loam
23 to 32 inches: Very stony loam
32 to 42 inches: Unweathered bedrock

Data Source Information

Soil Survey Area: Idaho Panhandle National Forest, Idaho
Survey Area Data: Version 0, Jan 1, 0001

Soil Survey Area: Kootenai County Area, Idaho
Survey Area Data: Version 6, Jan 31, 2008

Kootenai County Area, Idaho

107—Bonner silt loam, 0 to 8 percent slopes

Map Unit Setting

Elevation: 2,000 to 3,000 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 43 to 46 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Bonner and similar soils: 85 percent

Description of Bonner

Setting

Landform: Outwash terraces
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Volcanic ash and loess over outwash derived from granite and/or schist and/or gneiss

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 24 to 36 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability (nonirrigated): 4e

Typical profile

0 to 1 inches: Slightly decomposed plant material
1 to 2 inches: Moderately decomposed plant material
2 to 10 inches: Silt loam
10 to 20 inches: Gravelly silt loam
20 to 28 inches: Gravelly sandy loam
28 to 62 inches: Very gravelly loamy sand

Data Source Information

Soil Survey Area: Idaho Panhandle National Forest, Idaho
Survey Area Data: Version 0, Jan 1, 0001

Soil Survey Area: Kootenai County Area, Idaho
Survey Area Data: Version 6, Jan 31, 2008

Kootenai County Area, Idaho

126—Kootenai gravelly silt loam, 0 to 7 percent slopes

Map Unit Setting

Elevation: 2,100 to 2,700 feet
Mean annual precipitation: 25 to 30 inches
Mean annual air temperature: 43 to 46 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Kootenai and similar soils: 75 percent

Description of Kootenai

Setting

Landform: Outwash terraces, moraines
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Volcanic ash and loess over outwash derived from granite and/or gneiss and/or schist

Properties and qualities

Slope: 0 to 7 percent
Depth to restrictive feature: 20 to 36 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability (nonirrigated): 4s

Typical profile

0 to 1 inches: Slightly decomposed plant material
1 to 2 inches: Moderately decomposed plant material
2 to 8 inches: Gravelly silt loam
8 to 24 inches: Gravelly silt loam
24 to 28 inches: Very gravelly loam
28 to 62 inches: Extremely gravelly coarse sand

Data Source Information

Soil Survey Area: Idaho Panhandle National Forest, Idaho
Survey Area Data: Version 0, Jan 1, 0001

Soil Survey Area: Kootenai County Area, Idaho
Survey Area Data: Version 6, Jan 31, 2008

Kootenai County Area, Idaho

136—Lacy-Bobbitt association, 5 to 35 percent slopes

Map Unit Setting

Elevation: 1,500 to 3,200 feet
Mean annual precipitation: 22 to 28 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 100 to 140 days

Map Unit Composition

Lacy and similar soils: 55 percent
Bobbitt and similar soils: 35 percent

Description of Lacy

Setting

Landform: Canyons, escarpments
Landform position (two-dimensional): Summit, shoulder
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess and/or colluvium over bedrock derived from basalt

Properties and qualities

Slope: 5 to 35 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.1 inches)

Interpretive groups

Land capability (nonirrigated): 6e

Typical profile

0 to 1 inches: Slightly decomposed plant material
1 to 8 inches: Stony loam
8 to 15 inches: Stony clay loam
15 to 20 inches: Very stony clay loam
20 to 30 inches: Unweathered bedrock

Description of Bobbitt

Setting

Landform: Mountain slopes, escarpments
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Volcanic ash and/or loess over colluvium over bedrock derived from basalt

Properties and qualities

Slope: 5 to 35 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.7 inches)

Interpretive groups

Land capability (nonirrigated): 6e

Typical profile

0 to 1 inches: Moderately decomposed plant material
1 to 11 inches: Stony loam
11 to 36 inches: Very stony clay loam
36 to 46 inches: Unweathered bedrock

Data Source Information

Soil Survey Area: Idaho Panhandle National Forest, Idaho
Survey Area Data: Version 0, Jan 1, 0001

Soil Survey Area: Kootenai County Area, Idaho
Survey Area Data: Version 6, Jan 31, 2008

Kootenai County Area, Idaho

137—Lacy-Bobbitt association, 35 to 65 percent slopes

Map Unit Setting

Elevation: 1,500 to 3,200 feet
Mean annual precipitation: 22 to 28 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 100 to 140 days

Map Unit Composition

Lacy and similar soils: 55 percent
Bobbitt and similar soils: 35 percent

Description of Lacy

Setting

Landform: Canyons, escarpments
Landform position (two-dimensional): Backslope, shoulder
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess and/or colluvium over bedrock derived from basalt

Properties and qualities

Slope: 35 to 65 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.1 inches)

Interpretive groups

Land capability (nonirrigated): 7e

Typical profile

0 to 1 inches: Slightly decomposed plant material
1 to 8 inches: Stony loam
8 to 15 inches: Stony loam
15 to 20 inches: Very stony clay loam
20 to 30 inches: Unweathered bedrock

Description of Bobbitt

Setting

Landform: Mountain slopes, escarpments
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Volcanic ash and/or loess over colluvium over bedrock derived from basalt

Properties and qualities

Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.7 inches)

Interpretive groups

Land capability (nonirrigated): 7e

Typical profile

0 to 1 inches: Moderately decomposed plant material
1 to 11 inches: Stony loam
11 to 36 inches: Very stony clay loam
36 to 46 inches: Unweathered bedrock

Data Source Information

Soil Survey Area: Idaho Panhandle National Forest, Idaho
Survey Area Data: Version 0, Jan 1, 0001

Soil Survey Area: Kootenai County Area, Idaho
Survey Area Data: Version 6, Jan 31, 2008

Kootenai County Area, Idaho

149—McGuire-Marble association, 0 to 7 percent slopes

Map Unit Setting

Elevation: 1,500 to 2,500 feet
Mean annual precipitation: 15 to 26 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 110 to 150 days

Map Unit Composition

Mcguire and similar soils: 60 percent
Marble and similar soils: 30 percent

Description of Mcguire

Setting

Landform: Outwash terraces
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Volcanic ash and loess over outwash

Properties and qualities

Slope: 0 to 7 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.5 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability (nonirrigated): 4e

Typical profile

0 to 1 inches: Slightly decomposed plant material
1 to 9 inches: Gravelly sandy loam
9 to 23 inches: Very gravelly sandy loam
23 to 27 inches: Extremely gravelly coarse sandy loam
27 to 61 inches: Extremely gravelly coarse sand

Description of Marble

Setting

Landform: Outwash terraces
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Reworked sandy outwash

Properties and qualities

Slope: 0 to 7 percent

Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.7 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability (nonirrigated): 4e

Typical profile

0 to 2 inches: Slightly decomposed plant material
2 to 3 inches: Moderately decomposed plant material
3 to 9 inches: Sandy loam
9 to 63 inches: Loamy sand

Data Source Information

Soil Survey Area: Idaho Panhandle National Forest, Idaho
Survey Area Data: Version 0, Jan 1, 0001

Soil Survey Area: Kootenai County Area, Idaho
Survey Area Data: Version 6, Jan 31, 2008

Kootenai County Area, Idaho

153—Mokins silt loam, 35 to 65 percent slopes

Map Unit Setting

Elevation: 2,200 to 2,800 feet
Mean annual precipitation: 25 to 30 inches
Mean annual air temperature: 43 to 45 degrees F
Frost-free period: 80 to 100 days

Map Unit Composition

Mokins and similar soils: 90 percent

Description of Mokins

Setting

Landform: Lake terraces, escarpments
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Volcanic ash and loess over lacustrine deposits

Properties and qualities

Slope: 35 to 65 percent
Depth to restrictive feature: 14 to 36 inches to abrupt textural change
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 12 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.6 inches)

Interpretive groups

Land capability (nonirrigated): 7e

Typical profile

0 to 2 inches: Slightly decomposed plant material
2 to 8 inches: Silt loam
8 to 16 inches: Gravelly silt loam
16 to 22 inches: Silt loam
22 to 62 inches: Silty clay

Data Source Information

Soil Survey Area: Idaho Panhandle National Forest, Idaho
Survey Area Data: Version 0, Jan 1, 0001

Soil Survey Area: Kootenai County Area, Idaho
Survey Area Data: Version 6, Jan 31, 2008

Kootenai County Area, Idaho

160—Ramsdell silt loam

Map Unit Setting

Elevation: 2,100 to 2,800 feet
Mean annual precipitation: 20 to 35 inches
Mean annual air temperature: 43 to 46 degrees F
Frost-free period: 80 to 130 days

Map Unit Composition

Ramsdell and similar soils: 90 percent
Minor components: 10 percent

Description of Ramsdell

Setting

Landform: Flood plains, stream terraces
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Mixed alluvium

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 2.00 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Available water capacity: High (about 9.7 inches)

Interpretive groups

Land capability (nonirrigated): 5w

Typical profile

0 to 8 inches: Silt loam
8 to 15 inches: Silt loam
15 to 60 inches: Silt loam

Minor Components

Cougarbay

Percent of map unit: 5 percent
Landform: Flood plains

Pywell

Percent of map unit: 5 percent

Landform: Flood plains

Data Source Information

Soil Survey Area: Idaho Panhandle National Forest, Idaho
Survey Area Data: Version 0, Jan 1, 0001

Soil Survey Area: Kootenai County Area, Idaho
Survey Area Data: Version 6, Jan 31, 2008

Kootenai County Area, Idaho

163—Rock outcrop

Map Unit Composition

Rock outcrop: 100 percent

Description of Rock Outcrop

Properties and qualities

Depth to restrictive feature: 0 inches to lithic bedrock

Interpretive groups

Land capability (nonirrigated): 8

Typical profile

0 to 60 inches: Unweathered bedrock

Data Source Information

Soil Survey Area: Idaho Panhandle National Forest, Idaho
Survey Area Data: Version 0, Jan 1, 0001

Soil Survey Area: Kootenai County Area, Idaho
Survey Area Data: Version 6, Jan 31, 2008

Kootenai County Area, Idaho

164—Rubson-Mokins complex, 0 to 20 percent slopes

Map Unit Setting

Elevation: 2,100 to 2,800 feet
Mean annual precipitation: 25 to 30 inches
Mean annual air temperature: 43 to 45 degrees F
Frost-free period: 80 to 135 days

Map Unit Composition

Rubson and similar soils: 55 percent
Mokins and similar soils: 35 percent

Description of Rubson

Setting

Landform: Terraces
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Volcanic ash and/or loess over glaciolacustrine deposits

Properties and qualities

Slope: 0 to 20 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: High (about 11.1 inches)

Interpretive groups

Land capability (nonirrigated): 3e

Typical profile

0 to 6 inches: Silt loam
6 to 16 inches: Silt loam
16 to 60 inches: Silt loam

Description of Mokins

Setting

Landform: Lake terraces
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Volcanic ash and loess over lacustrine deposits

Properties and qualities

Slope: 0 to 20 percent
Depth to restrictive feature: 14 to 36 inches to abrupt textural change
Drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 12 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.6 inches)

Interpretive groups

Land capability (nonirrigated): 4e

Typical profile

0 to 2 inches: Slightly decomposed plant material
2 to 8 inches: Silt loam
8 to 16 inches: Gravelly silt loam
16 to 22 inches: Silt loam
22 to 62 inches: Silty clay

Data Source Information

Soil Survey Area: Idaho Panhandle National Forest, Idaho
Survey Area Data: Version 0, Jan 1, 0001

Soil Survey Area: Kootenai County Area, Idaho
Survey Area Data: Version 6, Jan 31, 2008

Kootenai County Area, Idaho

191—Tekoa gravelly silt loam, 35 to 65 percent slopes

Map Unit Setting

Elevation: 2,000 to 4,000 feet
Mean annual precipitation: 20 to 30 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 140 days

Map Unit Composition

Tekoa and similar soils: 90 percent

Description of Tekoa

Setting

Landform: Mountains
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Volcanic ash and loess over residuum weathered from quartzite

Properties and qualities

Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.0 inches)

Interpretive groups

Land capability (nonirrigated): 7e

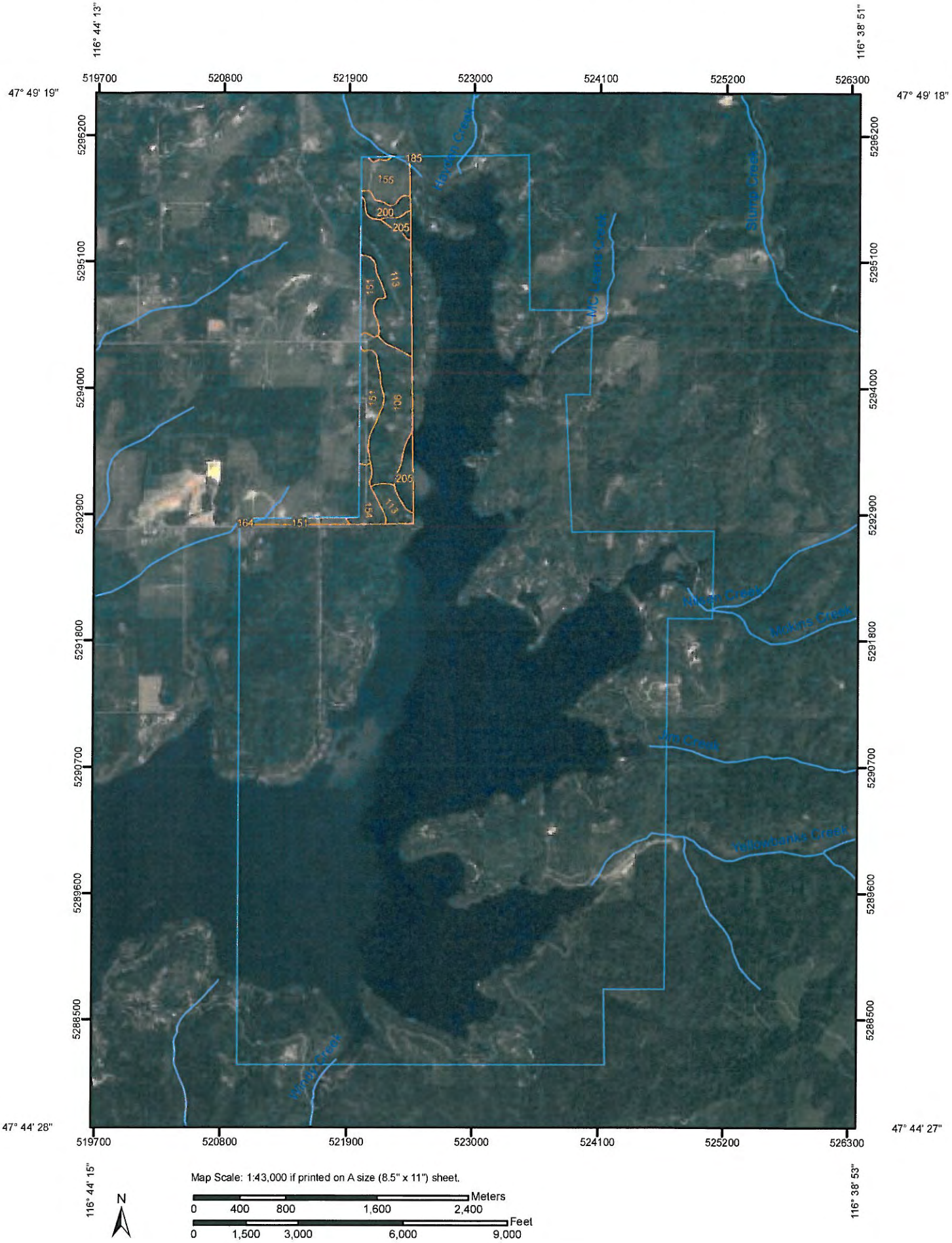
Typical profile

0 to 1 inches: Slightly decomposed plant material
1 to 2 inches: Moderately decomposed plant material
2 to 9 inches: Gravelly silt loam
9 to 16 inches: Very gravelly silt loam
16 to 32 inches: Very gravelly silt loam
32 to 42 inches: Weathered bedrock

Data Source Information

Soil Survey Area: Idaho Panhandle National Forest, Idaho
Survey Area Data: Version 0, Jan 1, 0001

Soil Survey Area: Kootenai County Area, Idaho
Survey Area Data: Version 6, Jan 31, 2008


116° 44' 13"
116° 38' 51"
47° 49' 19"
47° 49' 18"
47° 44' 28"
47° 44' 27"
116° 44' 15"
116° 38' 53"
519700
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521900
523000
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525200
526300
5296200
5295100
5294000
5292900
5291800
5290700
5289600
5288500
185
155
200
205
113
151
106
164
Hanson Creek
Stump Creek
MC Hang Creek
Moking Creek
Yellowbanks Creek
Windy Creek
N
Map Scale: 1:43,000 if printed on A size (8.5" x 11") sheet.
Meters
0
400
800
1,600
2,400
Feet
0
1,500
3,000
6,000
9,000

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Units

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features

- Gully
- Short Steep Slope
- Other

Political Features

- Cities

Water Features

- Oceans
- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads

MAP INFORMATION

Map Scale: 1:43,000 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 11N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Idaho Panhandle National Forest, Idaho
Survey Area Data: Not available

Soil Survey Area: Kootenai County Area, Idaho
Survey Area Data: Version 6, Jan 31, 2008

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Date(s) aerial images were photographed: 6/23/2004

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Idaho Panhandle National Forest, Idaho (ID670)			
No soil data available for this soil survey area.			
Totals for Area of Interest		**5,723.0**	**100.0%**

Kootenai County Area, Idaho (ID606)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
106	Blinn stony loam, 35 to 65 percent slopes	90.3	1.6%
113	Chatcolet cobbly loam, 25 to 65 percent slopes	107.7	1.9%
151	Mokins silt loam, 5 to 20 percent slopes	74.3	1.3%
154	Mokins-Chatcolet complex, 5 to 20 percent slopes	20.9	0.4%
155	Moscow loam, 5 to 35 percent slopes	37.0	0.6%
164	Rubson-Mokins complex, 0 to 20 percent slopes	1.3	0.0%
185	Spokane-Moscow association, 35 to 65 percent slopes	0.0	0.0%
200	Vassar-Rock outcrop complex, 20 to 55 percent slopes	15.7	0.3%
205	Water	25.7	0.4%
Subtotals for Soil Survey Area		**372.9**	**6.5%**
Totals for Area of Interest		**5,723.0**	**100.0%**

Kootenai County Area, Idaho

106—Blinn stony loam, 35 to 65 percent slopes

Map Unit Setting

Elevation: 2,100 to 3,200 feet
Mean annual precipitation: 25 to 28 inches
Mean annual air temperature: 43 to 45 degrees F
Frost-free period: 90 to 110 days

Map Unit Composition

Blinn and similar soils: 90 percent

Description of Blinn

Setting

Landform: Escarpments
Landform position (two-dimensional): Backslope, footslope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Volcanic ash and loess over bedrock derived from basalt

Properties and qualities

Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.4 inches)

Interpretive groups

Land capability (nonirrigated): 7e

Typical profile

0 to 1 inches: Slightly decomposed plant material
1 to 2 inches: Moderately decomposed plant material
2 to 11 inches: Stony loam
11 to 23 inches: Stony loam
23 to 32 inches: Very stony loam
32 to 42 inches: Unweathered bedrock

Data Source Information

Soil Survey Area: Idaho Panhandle National Forest, Idaho
Survey Area Data: Version 0, Jan 1, 0001

Soil Survey Area: Kootenai County Area, Idaho
Survey Area Data: Version 6, Jan 31, 2008

Kootenai County Area, Idaho

113—Chatcolet cobbly loam, 25 to 65 percent slopes

Map Unit Setting

Elevation: 2,200 to 2,800 feet
Mean annual precipitation: 25 to 30 inches
Mean annual air temperature: 37 to 43 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Chatcolet and similar soils: 85 percent

Description of Chatcolet

Setting

Landform: Lake terraces
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Volcanic ash and/or loess over glaciolacustrine deposits and/or lacustrine deposits

Properties and qualities

Slope: 25 to 65 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: High (about 10.7 inches)

Typical profile

0 to 8 inches: Cobbly loam
8 to 17 inches: Cobbly loam
17 to 60 inches: Silty clay loam

Data Source Information

Soil Survey Area: Idaho Panhandle National Forest, Idaho
Survey Area Data: Version 0, Jan 1, 0001

Soil Survey Area: Kootenai County Area, Idaho
Survey Area Data: Version 6, Jan 31, 2008

Kootenai County Area, Idaho

151—Mokins silt loam, 5 to 20 percent slopes

Map Unit Setting

Elevation: 2,200 to 2,800 feet
Mean annual precipitation: 25 to 30 inches
Mean annual air temperature: 43 to 45 degrees F
Frost-free period: 80 to 100 days

Map Unit Composition

Mokins and similar soils: 80 percent

Description of Mokins

Setting

Landform: Lake terraces
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Volcanic ash and loess over lacustrine deposits

Properties and qualities

Slope: 5 to 20 percent
Depth to restrictive feature: 14 to 36 inches to abrupt textural change
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 12 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.6 inches)

Interpretive groups

Land capability (nonirrigated): 4e

Typical profile

0 to 2 inches: Slightly decomposed plant material
2 to 8 inches: Silt loam
8 to 16 inches: Gravelly silt loam
16 to 22 inches: Silt loam
22 to 62 inches: Silty clay

Data Source Information

Soil Survey Area: Idaho Panhandle National Forest, Idaho
Survey Area Data: Version 0, Jan 1, 0001

Soil Survey Area: Kootenai County Area, Idaho
Survey Area Data: Version 6, Jan 31, 2008

Kootenai County Area, Idaho

154—Mokins-Chatcolet complex, 5 to 20 percent slopes

Map Unit Setting

Elevation: 2,200 to 2,800 feet
Mean annual precipitation: 25 to 30 inches
Mean annual air temperature: 37 to 45 degrees F
Frost-free period: 70 to 100 days

Map Unit Composition

Mokins and similar soils: 55 percent
Chatcolet and similar soils: 35 percent

Description of Mokins

Setting

Landform: Lake terraces
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Volcanic ash and loess over lacustrine deposits

Properties and qualities

Slope: 5 to 20 percent
Depth to restrictive feature: 14 to 36 inches to abrupt textural change
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 12 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.6 inches)

Interpretive groups

Land capability (nonirrigated): 4e

Typical profile

0 to 2 inches: Slightly decomposed plant material
2 to 8 inches: Silt loam
8 to 16 inches: Gravelly silt loam
16 to 22 inches: Silt loam
22 to 62 inches: Silty clay

Description of Chatcolet

Setting

Landform: Lake terraces
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Volcanic ash and/or loess over glaciolacustrine deposits and/or lacustrine deposits

Properties and qualities

Slope: 5 to 20 percent

Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: High (about 10.7 inches)

Interpretive groups

Land capability (nonirrigated): 4e

Typical profile

0 to 8 inches: Cobbly loam
8 to 17 inches: Cobbly loam
17 to 60 inches: Silty clay loam

Data Source Information

Soil Survey Area: Idaho Panhandle National Forest, Idaho
Survey Area Data: Version 0, Jan 1, 0001

Soil Survey Area: Kootenai County Area, Idaho
Survey Area Data: Version 6, Jan 31, 2008

Kootenai County Area, Idaho

155—Moscow loam, 5 to 35 percent slopes

Map Unit Setting

Elevation: 2,200 to 5,000 feet
Mean annual precipitation: 18 to 30 inches
Mean annual air temperature: 43 to 45 degrees F
Frost-free period: 80 to 120 days

Map Unit Composition

Moscow and similar soils: 80 percent

Description of Moscow

Setting

Landform: Mountains
Landform position (two-dimensional): Backslope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Volcanic ash and loess over residuum weathered from schist and/or gneiss and/or granite

Properties and qualities

Slope: 5 to 35 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 6.0 inches)

Interpretive groups

Land capability (nonirrigated): 4e

Typical profile

0 to 2 inches: Slightly decomposed plant material
2 to 3 inches: Moderately decomposed plant material
3 to 4 inches: Loam
4 to 26 inches: Loam
26 to 29 inches: Gravelly sandy loam
29 to 39 inches: Weathered bedrock

Data Source Information

Soil Survey Area: Idaho Panhandle National Forest, Idaho
Survey Area Data: Version 0, Jan 1, 0001

Soil Survey Area: Kootenai County Area, Idaho
Survey Area Data: Version 6, Jan 31, 2008

Kootenai County Area, Idaho

164—Rubson-Mokins complex, 0 to 20 percent slopes

Map Unit Setting

Elevation: 2,100 to 2,800 feet
Mean annual precipitation: 25 to 30 inches
Mean annual air temperature: 43 to 45 degrees F
Frost-free period: 80 to 135 days

Map Unit Composition

Rubson and similar soils: 55 percent
Mokins and similar soils: 35 percent

Description of Rubson

Setting

Landform: Terraces
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Volcanic ash and/or loess over glaciolacustrine deposits

Properties and qualities

Slope: 0 to 20 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: High (about 11.1 inches)

Interpretive groups

Land capability (nonirrigated): 3e

Typical profile

0 to 6 inches: Silt loam
6 to 16 inches: Silt loam
16 to 60 inches: Silt loam

Description of Mokins

Setting

Landform: Lake terraces
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Volcanic ash and loess over lacustrine deposits

Properties and qualities

Slope: 0 to 20 percent
Depth to restrictive feature: 14 to 36 inches to abrupt textural change
Drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 12 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.6 inches)

Interpretive groups

Land capability (nonirrigated): 4e

Typical profile

0 to 2 inches: Slightly decomposed plant material
2 to 8 inches: Silt loam
8 to 16 inches: Gravelly silt loam
16 to 22 inches: Silt loam
22 to 62 inches: Silty clay

Data Source Information

Soil Survey Area: Idaho Panhandle National Forest, Idaho
Survey Area Data: Version 0, Jan 1, 0001

Soil Survey Area: Kootenai County Area, Idaho
Survey Area Data: Version 6, Jan 31, 2008

Kootenai County Area, Idaho

185—Spokane-Moscow association, 35 to 65 percent slopes

Map Unit Setting

Elevation: 1,800 to 5,000 feet
Mean annual precipitation: 15 to 30 inches
Mean annual air temperature: 43 to 48 degrees F
Frost-free period: 80 to 140 days

Map Unit Composition

Spokane and similar soils: 45 percent
Moscow and similar soils: 35 percent

Description of Spokane

Setting

Landform: Mountains
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess over residuum weathered from granite and/or gneiss and/or schist

Properties and qualities

Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.5 inches)

Interpretive groups

Land capability (nonirrigated): 7e

Typical profile

0 to 1 inches: Slightly decomposed plant material
1 to 9 inches: Loam
9 to 28 inches: Gravelly loam
28 to 38 inches: Weathered bedrock

Description of Moscow

Setting

Landform: Mountains
Landform position (two-dimensional): Backslope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Volcanic ash and loess over residuum weathered from schist and/or gneiss and/or granite

Properties and qualities

Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 6.0 inches)

Interpretive groups

Land capability (nonirrigated): 7e

Typical profile

0 to 2 inches: Slightly decomposed plant material
2 to 3 inches: Moderately decomposed plant material
3 to 4 inches: Loam
4 to 26 inches: Loam
26 to 29 inches: Gravelly sandy loam
29 to 39 inches: Weathered bedrock

Data Source Information

Soil Survey Area: Idaho Panhandle National Forest, Idaho
Survey Area Data: Version 0, Jan 1, 0001

Soil Survey Area: Kootenai County Area, Idaho
Survey Area Data: Version 6, Jan 31, 2008

Kootenai County Area, Idaho

200—Vassar-Rock outcrop complex, 20 to 55 percent slopes

Map Unit Setting

Elevation: 2,500 to 5,000 feet
Mean annual precipitation: 30 to 45 inches
Mean annual air temperature: 37 to 45 degrees F
Frost-free period: 50 to 90 days

Map Unit Composition

Vassar and similar soils: 55 percent
Rock outcrop: 35 percent

Description of Vassar

Setting

Landform: Mountains
Landform position (two-dimensional): Backslope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Volcanic ash over residuum weathered from granite and/or gneiss and/or schist

Properties and qualities

Slope: 20 to 55 percent
Depth to restrictive feature: 40 to 60 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 7.7 inches)

Interpretive groups

Land capability (nonirrigated): 7e

Typical profile

0 to 1 inches: Slightly decomposed plant material
1 to 2 inches: Moderately decomposed plant material
2 to 22 inches: Silt loam
22 to 62 inches: Coarse sandy loam

Description of Rock Outcrop

Properties and qualities

Slope: 20 to 55 percent
Depth to restrictive feature: 0 inches to lithic bedrock

Interpretive groups

Land capability (nonirrigated): 8

Typical profile

0 to 60 inches: Unweathered bedrock

Data Source Information

Soil Survey Area: Idaho Panhandle National Forest, Idaho
Survey Area Data: Version 0, Jan 1, 0001

Soil Survey Area: Kootenai County Area, Idaho
Survey Area Data: Version 6, Jan 31, 2008

SUB-BASIN ASSESSMENT AND TOTAL MAXIMUM DAILY LOADS OF LAKES AND STREAMS LOCATED ON OR DRAINING TO THE RATHDRUM PRAIRIE (17010305)

November 22, 2000

Idaho Department of Environmental Quality
Coeur d'Alene Regional Office
2110 Ironwood Parkway
Coeur d'Alene ID 83814

1. Executive Summary

The streams and lakes flowing or draining to the Rathdrum-Spokane Aquifer are assessed. The section 303(d) listed streams are Fish and Rathdrum Creeks. The listed lakes are Hauser, Hayden, Spirit and Twin Lakes. The sub-basin assessment reviews the existing data for the streams and lakes. The Spokane River's water temperature is assessed. Sediment model results are provided for Fish and Rathdrum Creek. The assessment finds that the temperature limitation of the Spokane River is caused by natural conditions. It recommends the river be redesignated as a seasonal cold water biota supported by a temperature standard reflecting temperatures attained during hot, dry summers. The assessment recommends nutrient total maximum daily loads (TMDLs) be developed for Hauser, Hayden and Twin Lakes. Dissolved oxygen limitation of Hauser Lake is dependent on total phosphorous reductions. The most recent monitoring data (1993-1999) indicates that Spirit Lake is meeting and is often below its total phosphorous goal of 12 ug/L. Dissolved oxygen data indicates the lake meets the standards. Biotic data and sediment modeling of Fish and Rathdrum Creeks indicate these water bodies are not water quality limited by sediment. Both water bodies are well below or near the threshold of 50% above background sedimentation rates. Bacteria analyses indicate the standards are met for Fish and Rathdrum Creeks as well as Upper Twin Lake. Although nutrient data demonstrates Fish and Rathdrum Creeks are not limited by nutrients, the nutrient TMDL developed for Twin Lakes will, by necessity, address Fish and Rathdrum Creeks.

No TMDLs are required for the Fish Creek, Rathdrum Creek and Spirit Lake. Bacteria and sediment TMDLs are not required for Twin Lakes. Sediment TMDLs are not required for Hayden, Spirit or Twin Lakes. The Department of Environmental Quality will be de-listing these segments for these pollutants as part of its 2002 303(d) listing process.

If the Spokane River is redesignated as recommended, its three segments will meet the more appropriate standards. The TMDLs for temperature of the Spokane River are deferred until the redesignation process has proceeded to its end point. The nutrient TMDL should address the dissolved oxygen limitation of Hauser Lake. The dissolved oxygen TMDL for Hauser Lake is deferred until nutrient limitation has an opportunity to reduce the lake productivity and oxygen demand. The recommendations of the sub-basin assessment for TMDL development, segment - pollutant de-listing and TMDL deferment are summarized in Table 1.

Total phosphorous total maximum daily loads (TMDLs) have been developed for Hauser, Hayden and Twin Lakes based on the goals of their respective lake management plans and nutrient loading analyses. The TMDLs allocate yearly total phosphorous loads to the sources of phosphorous to the lakes and apportions total phosphorous load reductions required of the manageable sources.

Lake management plans addressing nutrients reductions have been developed for Hauser, Hayden, and Twin Lakes. These plans will serve as the starting points for TMDL implementation plans for the three lakes.

Table 1: Results of sub-basin assessment based on application of the available data.

Water body Name and HUC Number	Assessed Support Status	Reasons segment to be de-listed for pollutant	Reason TMDL deferred
Spokane River 17010305 3552	CWB temperature standard exceeded	N.A.	TMDL deferred until temperature and/or beneficial use standards reviewed/revised
Spokane River 17010305 3553	CWB temperature standard exceeded	N.A.	TMDL deferred until temperature and/or beneficial use standards reviewed/revised
Spokane River 17010305 4554	CWB temperature standard exceeded	N.A.	TMDL deferred until temperature and/or beneficial use standards reviewed/revised
FishCreek 17010305 3561	Sediment modeling and nutrient data indicate cold water biota supported.	Sediment modeled at below 50% above background. Nutrients concentrations of Fish Creek well below stream guidelines. Twin Lakes nutrient TMDL will address Fish Creek	N.A.
Twin Lakes 17010305 7561	CWB impaired by nutrients; nutrient TMDL required.	CWB not impaired by sediment. Sediment not impacting salmonid sight feeding beneficial use directly; listing in error	N.A
Rathdrum Creek 17010305 3560	Sediment modeling and nutrient data indicate cold water biota supported. Bacteria standard not exceeded indicating secondary contact recreation supported.	Sediment below 100% above background and near lowest threshold of 50% above background. Nutrient concentrations below stream guidelines. Nutrient TMDL for Twin Lakes will address Rathdrum Creek. Bacteria standard not exceeded.	N.A.
Hauser Lake17010305 3562	CWB impaired by nutrients; nutrient TMDL required. CWB impaired by dissolved oxygen deficit created by organic matter resulting from lake productivity	N.A.	Dissolved oxygen TMDL deferred until nutrient reduction approach is assessed to determine if dissolved oxygen recovers.
Hayden Lake 17010305 7555	CWB threatened by nutrients, nutrient TMDL required.	CWB not impaired by sediment. Sediment not impacting salmonid sight feeding beneficial use directly; listing in error	N.A.
Spirit Lake 17010305 3438	CWB supported by measured dissolved oxygen, and nutrients. CWB not impaired by sediment.	Sediment not impacting salmonid sight feeding beneficial use directly; listing in error. Dissolved oxygen meeting water quality standards. Total phosphorous at or below the lake plan goals.	N.A.

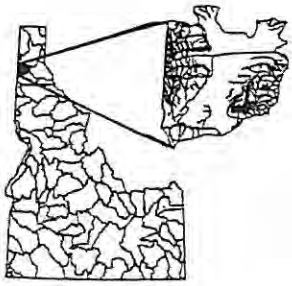
Note: N.A. - Not Applicable

2. SUB-BASIN ASSESSMENT OF LAKES AND STREAMS LOCATED ON OR DRAINING TO THE RATHDRUM PRAIRIE (17010305)

2.0 Rathdrum-Spokane Sub-basin Water Quality at a Glance

Water Quality at a Glance:

Hydrologic Unit Code..... 17010305
Water Quality Limited Segments..... Hauser Lake; Hayden Lake; Spirit Lake; Fish Creek-Twin Lakes-Rathdrum Creek
Beneficial Uses affected..... Cold Water Biota, salmonid Spawning, Primary Contact Recreation
Pollutants of Concern..... Nutrients, sediment, D.O. and bacteria
Known Land Uses..... Forestry, agriculture, urban



2.0.1 Prologue:

The impact of the trace (heavy) metals cadmium, lead and zinc on the Spokane River has been addressed in assessments of the Spokane River and the Coeur d'Alene Lake Plan (Gugliomone, 1992; IDEQ, 1996a). A total maximum daily load document has been developed for these pollutants (IDEQ, 1998a; EPA, 2000). This subbasin assessment addresses the nonmetallic pollutants of concern for the entire subbasin. For background on the Spokane River, the reader is referred to the documents cited.

2.1. Characterization of the Watershed

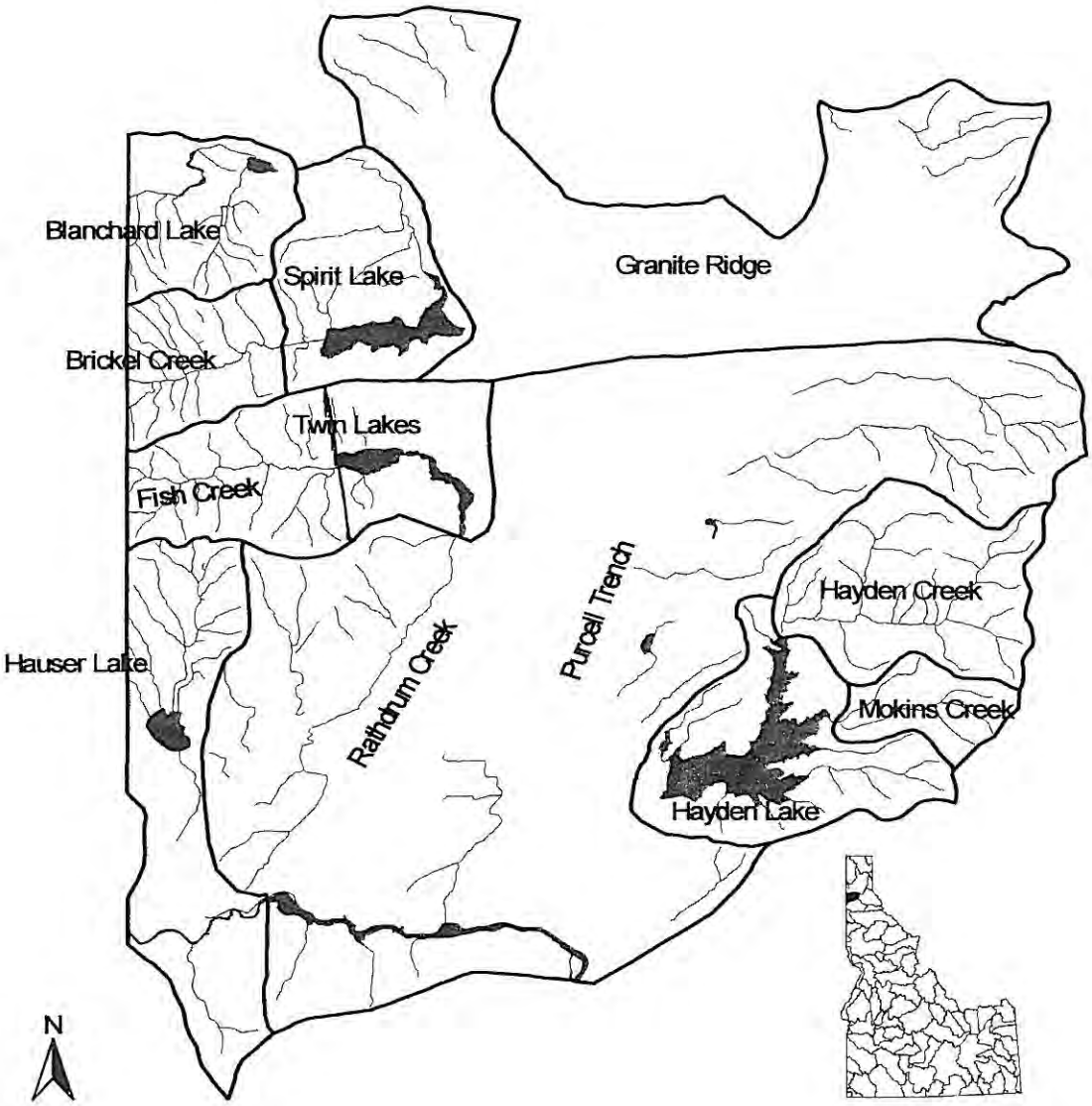
The Rathdrum Prairie is a 209 square mile area located west of the Coeur d'Alene Mountains, north of Coeur d'Alene Lake and south of Lake Pend Oreille (Figure 1). In addition to the two large lakes, five smaller lakes (Blanchard, Hauser, Hayden, Spirit and Twin) are located at the fringes of the prairie. Streams flow from the mountains adjacent to the prairie, either into the lake basins or onto the prairie, where these streams dewater rapidly to the underlying Rathdrum-Spokane Aquifer. The lakes at the margin of the prairie discharge in part, (Blanchard, Coeur d'Alene, Pend Oreille and Twin), or nearly wholly, to the aquifer (Hauser, Spirit and Hayden). The Spokane River traces the southern boundary of the watershed on its route from Coeur d'Alene Lake to the Washington border. The majority of the population of northern Idaho lives in the subbasin on or adjacent to the prairie.

2.1.1. Physical and Biological Characteristics

2.1.1.1 Climate

The Rathdrum Prairie sub-basin is located in the Northern Rocky Mountain physiographic region

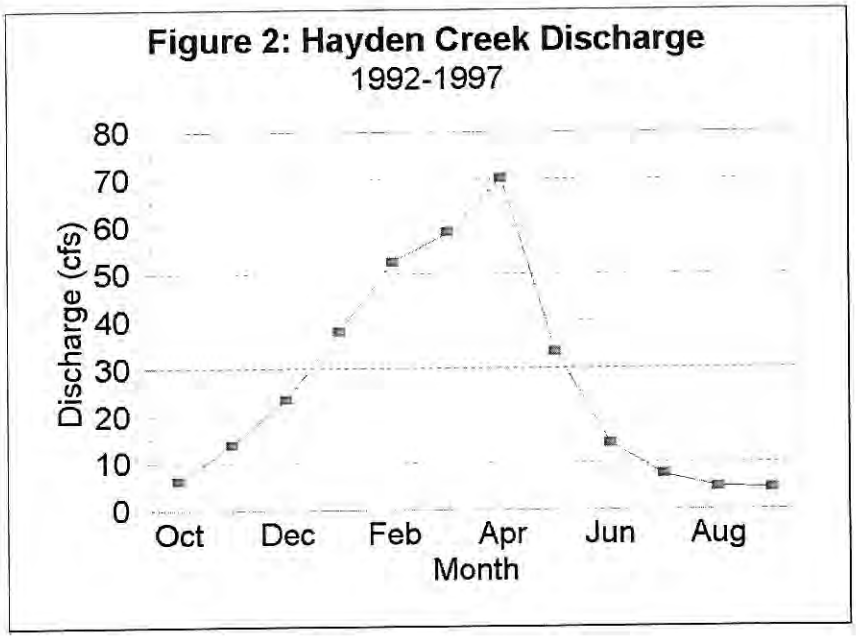
Figure 1: Rathdrum Aquifer Watershed (HUC 17010305)



to the west of the Bitterroot Mountains. The local climate is influenced by both pacific maritime air masses from the west as well as continental air masses from Canada to the north. The annual weather cycle generally consists of cool to warm summers with cold and wet winters. The relative warmth of summers or winters depends on the dominance of pacific or continental air masses. Precipitation amounts are most generous in the winter months. Precipitation takes the form of rain on the prairie and in the adjacent mountains below 3,000 feet of elevation, while it is in the form of snow in the mountains above 4,500 feet. The transitional zone between 3,000 and 4,500 feet holds a transient snow pack, which is subject to rapid melt when warm wet pacific air masses predominate. The result of these snow melt events is high discharge rain on snow events.

2.1.1.2. Hydrology

The average discharge hydrograph of Hayden Creek near its mouth is provided in Figure 2 (USGS, 1992-1997). The hydrograph is representative of streams of the sub-basin. The discharge of the streams of the sub-basin is dominated by the spring snowmelt. The streams draining the Coeur d'Alene and Selkirk Mountains have watersheds predominantly in the elevation range (3,000 - 4,500 feet) subject to winter "rain on snow" discharge events. The relative low elevation of the watersheds causes earlier maximum discharge (early-April), than from the majority of the watersheds of the Coeur d'Alene Mountains to the east or the Selkirk Mountains to the north. The lakes discharge to the aquifer with no back flow from the aquifer to the lakes. Lake levels are controlled by tributary stream discharge from their watersheds and the rate of discharge to the aquifer. The levels of Coeur d'Alene, Pend Oreille and Twin Lakes are controlled by discharge structures.



2.1.1.3 Land Forms, Geology and Soils

The Rathdrum Prairie is a large sand, gravel and cobble deposit resulting from the out wash of the Pleistocene Missoulian floods. The deposit is believed to have partially or wholly impounded Coeur d'Alene Lake as well as Hayden, Hauser, Twin and Spirit Lakes (Anderson, 1927). The prairie deposit is ringed by mountainous lands to the east (Coeur d'Alene Mountains), north, west and south (Selkirk Range). A gap in the Selkirk Range at the southwest edge of the prairie is the outlet for both the Spokane River as well as the Rathdrum-Spokane Aquifer.

The watersheds of the sub-basin draining the western flank of the Coeur d'Alene Mountains are generally underlain by rocks of the Belt Supergroup meta-sedimentary terrain. Isolated granitic intrusions and Miocene basalt flow formations are found in these watersheds as well. The Belt terrene weathers to predominantly silt size particles with rounded cobbles as the primary transitional material found in the higher gradient streams. The Selkirk Range forms the watersheds of streams flowing from the north and west to the lakes or the prairie. The range is a granitic formation. However, some remnant Belt geologies exist in some watersheds. These granitic substrates weather to sandy substrates. The predominant bedload of these streams is sand. Soils of the Coeur d'Alene Mountain watersheds are silty and stony podzols developed under predominantly cool conditions and mixed coniferous forest. Soils of the Selkirk Mountain watersheds are sandy podzols developed under predominantly cool conditions and mixed coniferous forest.

Tributaries to the lakes flowing from the mountains are high gradient streams (Rosgen B) channels. Streams flowing onto the prairie are similar. As these streams enter the prairie formation, an abrupt transition to lower gradient channels occurs in their final half miles. Streams quickly dewater into the sands and gravels. The lakes discharge to the prairie formation to feed the Rathdrum-Spokane Aquifer. Blanchard, Hauser Hayden and Spirit Lakes have either no or modest outlets which rapidly dewater. The exception is Twin Lakes, which forms Rathdrum Creek. This Creek flows at the edge of the prairie for approximately seven miles before it dewaters into the prairie gravels.

2.1.1.4. Vegetation

The predominant vegetation of the Coeur d'Alene and Selkirk Mountains, adjacent to the prairie, is mixed coniferous forest at higher elevations. Dominant conifers of the mixed forest are pines, true fir, Douglas fir, tamarack and red cedar. Cottonwood, aspen and alder are the predominant broadleaf species. Lower elevation slopes supported a dryer ponderosa pine forest, which was kept sparse by a more frequent fire occurrence. Fire suppression in the past ninety years has caused the conversion of most of these stands to Douglas fir forest. Riparian areas would be dominated by cottonwood, alder and red cedar. The prairie was grassland with a stony surface prior to European settlement. This vegetation formation was likely maintained by frequent burning practiced by the indigenous peoples. The grasslands and wooded areas would have expanded and contracted dependent on the fire cycle.

2.1.1.5. Aquatic Fauna

The native salmonids of the sub-basin's streams are cutthroat trout, whitefish and bull trout. Sculpin, shiners and bullhead catfish are also natives. The tailed frog, giant salamander and turtles completed the vertebrate species. The fish fauna of the lakes and some streams have been greatly altered by the introduction of several trouts, salmon and warm water species. A detailed discussion of the current fishery of Coeur d'Alene Lake is available in the Coeur d'Alene Lake Management Plan (IDEQ, 1996a). Similar introductions were made to the smaller lakes of the sub-basin with the collateral impact to their tributary streams. Although the lakes and some streams have highly altered aquatic fauna due to introductions, some headwater streams retain native species with the addition of rainbow and brook trout and the loss of bull trout. Although fish composition appears stable in the headwaters, fish abundance is generally believed to be reduced from historic levels observed during settlement of the area.

2.1.2 Cultural Impacts:

The watersheds of the Coeur d'Alene and Selkirk Mountains which drain to the lakes or directly to the prairie formation are managed primarily for timber production and dispersed recreation. Timber management has been moderately intense with large clear-cut areas and dense road development. Land management in this area is primarily by the U.S. Forest Service in the Coeur d'Alene Mountains. Large tracts of private industrial and private forestland exist in the Selkirk Mountains. The Inland Empire Paper Company has large timber land holdings in the watersheds of Hauser, Twin and Spirit Lakes as well as the watersheds draining south to the prairie formation. Near the population center of Coeur d'Alene, Hayden Lake and Dalton, timber management has been less intense to protect scenic values. Some forested watersheds were logged using railroad systems (Hayden and Fish Creeks).

Agriculture on the Rathdrum Prairie is primarily bluegrass seed and small grain production. No streams are present on the prairie to be affected by these practices. Agricultural burning (Falter and Hallock, 1987) has been suggested as a source of atmospheric nutrient deposition to the lakes, but the level of contribution has not been quantified. Grazing occurs on some tributaries to the lakes. Lancaster Creek, a tributary to Hayden Creek, and Fish Creek, as well as the shoreline of Upper Twin Lake, remain areas of intense cattle grazing. Grazing continues in the Brickel Creek watershed, which is the primary tributary to Spirit Lake. Cattle have been excluded from the stream by fencing.

The Rathdrum Prairie sub-basin has the largest population concentration in northern Idaho. The main population center in the sub-basin is the City of Coeur d'Alene on the northern shore of the lake. The Hayden, Hayden Lake and Dalton communities are arrayed along the eastern edge of the prairie. Many residences are located in the watersheds of tributaries to the lakes or streams flowing onto the prairie. The city of Post Falls is located along the Spokane River six miles west of Coeur d'Alene. Rathdrum is located on the western edge of the prairie. Twin Lakes Village is located at the foot of Twin Lakes, while the City of Spirit Lake is located to the north near Spirit Lake. The town of Athol is situated on the northeast edge of the prairie. Rural residences and businesses are found across the prairie and in the adjacent mountains. Lakeside residences and cabins fill the

shores of all the lakes. The cities of Coeur d'Alene, Post Falls, Hayden, Hayden Lake, Dalton and Rathdrum have centralized sewage collection and treatment. Many rural residences and lakeside homes or cabins use on-site wastewater treatment systems of varying efficiency. Lot size restrictions have been imposed on the Rathdrum Prairie to protect the Rathdrum-Spokane Aquifer from contamination. For additional information on the land use and demographics of the Coeur d'Alene Basin refer to the Coeur d'Alene Lake Management Plan (IDEQ, 1996a).

2.2. Regulatory Requirements:

2.2.1. Segments of Concern:

The stream segments listed in 1998 under Section 303(d) Clean Water Act for nonmetallic pollutants in sub-basin 17010305 are provided in Table 1. Two additional water bodies had been listed on the 1996 list. These were Mokins Creek (17010305 3557), which was listed for nutrients, sediment and habitat alteration and Brickel Creek (17010305 3437, which was listed for sediment. Mokins and Brickel Creeks were removed from the list when analysis of more recent water quality data provided scores sufficiently high for delisting (IDEQ 1996b).

Table 1: List of 1998 Section 303(d) Clean Water Act listed water bodies.

Water body Name	HUC Number	Boundaries	Pollutant(s)
Spokane River	17010305 3552	CdA Lake to Huetter	Temperature
Spokane River	17010305 3553	Huetter to Post Falls Bridge	Temperature
Spokane River	17010305 4554	Post Falls Bridge to WA Border	Temperature
Fish Creek	17010305 3561	WA Border to Twin lakes	Nutrients and sediment
Twin Lakes	17010305 7561		Bacteria, nutrients and sediment
Rathdrum Creek	17010305 3560	Twin Lks Outlet to E. Green acres Diversion	Nutrients and sediment
Hauser Lake	17010305 3562		Dissolved oxygen and nutrients
Hayden Lake	17010305 7555		Nutrients and sediment
Spirit Lake	17010305 3438		Nutrients, dissolved oxygen and sediment

2.2.2 Beneficial uses:

Of the listed water bodies, the Spokane River, Hauser, Hayden, Spirit and Twin Lakes have beneficial uses specifically designated in the Idaho Water Quality Standards (IDAPA 58.01.02.)(IDEQ, 2000). Beneficial uses of the other water bodies listed (Fish and Rathdrum Creeks) would be by interpretation of the standards, cold water biota and secondary contact recreation (IDAPA 58.01.02101.01.a).

The Spokane River (P-3, P-4) has designated uses in the Idaho water quality standards (IDAPA 58.01.02110.12.) of domestic water supply, agricultural water supply, cold water biota, primary and secondary contact recreation and salmonid spawning. Twin Lakes (P-13) have designated uses of domestic water supply, agricultural water supply, cold water biota, primary and secondary contact recreation (IDAPA 58.01.02110.12.). Hayden Lake (P-5) has designated uses of domestic water supply, agricultural water supply, cold water biota, salmonid spawning and primary and secondary contact recreation (IDAPA 58.01.02110.12.). It is designated as a special resource water as well. Hauser Lake (P-16) has designated uses of domestic water supply, agricultural water supply, cold water biota, primary and secondary contact recreation (IDAPA 58.01.02110.12.). Hauser and Twin Lakes have salmonid spawning protected for future use. Spirit Lake (P-9) has designated beneficial uses of domestic water supply, agricultural water supply, cold water biota, salmonid spawning, primary and secondary contact recreation and special resource water (IDAPA 58.01.02110.05.)

The Idaho Water Quality Standards and Wastewater Treatment Requirements are currently undergoing major revision under the Idaho Administrative Procedures Act requirements. Among the revisions are changes to the designated uses of several water bodies including those listed in Table 1. Agricultural water use would be dropped from all these water bodies. Secondary contact recreation is dropped as redundant, when primary contact recreation is designated. Primary contact recreation requires more stringent support criteria than secondary contact recreation. The protection of salmonid spawning for future use is dropped for Hauser and Twin Lakes. These changes have been adopted by the Idaho Board of Health & Welfare and approved by the Legislature. These changes are currently under review by the EPA.

2.2.3. Water Quality Criteria:

Water quality criteria supportive of the beneficial uses are stated in the Idaho Water Quality Standards and Wastewater Treatment Requirements (IDHW 1996b). The standards supporting the beneficial uses are outlined in Table 2. In addition to these standards cold water biota and salmonid spawning are supported by two narrative standards. The narrative sediment standard states:

Sediment shall not exceed quantities specified in section 250 or, in the absence of specific sediment criteria, quantities, which impair designated beneficial uses. Determinations of impairment shall be based on water quality monitoring and surveillance and the information utilized as described in Subsection 350.02.b. (IDAPA 58.01.02.200.08).

The excess nutrients standard states:

Surface waters of the state shall be free from excess nutrients that can cause visible slime growths or other aquatic growths impairing designated beneficial uses. (IDAPA 58.01.02.200.06).

Table 2: Water quality criteria supportive of beneficial uses.

Designated Use	Primary Contact Recreation	Secondary Contact Recreation	Cold Water Biota	Salmonid Spawning
Coliforms and pH	406 EC/100mL	576 EC/100mL	pH between 6.5 and 9.5	pH between 6.5 and 9.5
Coliforms and dissolved gas	126 EC/100mL geometric mean over 30days	126 FC/100mL geometric mean over 30 days	dissolved gas not exceeding 110%	dissolved gas not exceeding 110%
chlorine			total chlorine residual less than 19 ug/L/hr or an average 11 ug/L/4 day period	total chlorine residual less than 19 ug/L/hr or an average 11 ug/L/4 day period
toxics substances			less than toxic substances set forth in 40 CFR 131.36(b)(1) Columns B1, B2, D2	less than toxic substances set forth in 40 CFR 131.36(b)(1) Columns B1, B2, D2
dissolved oxygen			exceeding 6 mg/L D.O	exceeding 5 mg/L intergraval D. O.; exceeding 6 mg/L surface
temperature			less than 22°C (72°F) instantaneous; 19°C (66°F) daily average	less than 13°C (55°F) instantaneous; 9°C (48°F) daily average
ammonia			low ammonia (formula/tables for exact concentration	low ammonia (formula/tables for exact concentration
turbidity			less than 50 NTU instantaneous greater than background; 25 NTU over 10 days greater than background	

2.3. Water Quality Concerns and Status:

2.3.1 Pollutant Sources

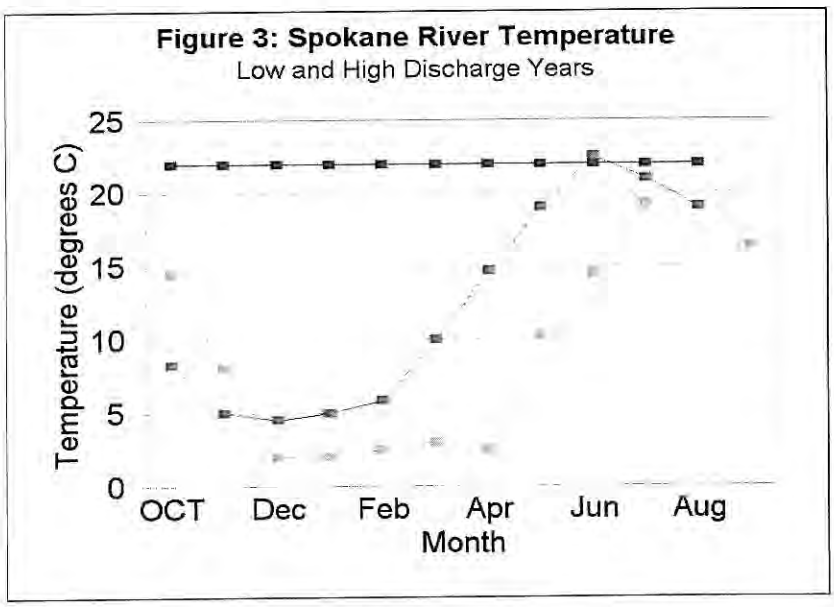
The water bodies listed in the sub-basin have reported pollutant exceedences for one or more of the following pollutants: bacteria, nutrients, sediment, dissolved oxygen and temperature. Bacterial contamination would be predominantly from livestock grazing. Some bacterial contamination may be from insufficient treatment of human wastes at lakeshore cabins. Excess nutrients normally are the result of human residential development or livestock grazing activities in the waters under assessment. Nutrients may also naturally build up in a lake over time causing a naturally eutrophic lake. Shallow lakes, which have limited water flow through the lake on an annual basis, are more likely to be eutrophic. Any water body, which has its source in a nutrient enriched lake, will itself be rich in nutrients. Sediment is a water constituent naturally yielded by watersheds to water bodies.

Excess sedimentation most often has its origin in roads developed for logging or access to a watershed. Roads may yield sediment directly from their surfaces or bed through mass wasting or their locations may cause the adjacent stream to begin bank and channel cutting. Dissolved oxygen may be deficient in lakes and some streams as the result of the presence of biological oxygen demanding materials. Often eutrophic lakes have sufficient algal and weed growth to engender dissolved oxygen problems. Dissolved oxygen deficits normally appear initially in the hypolimnetic waters of lakes, which thermally stratify. Streams often have insufficient dissolved oxygen as a result of temperature exceedences. Oxygen solubility declines with increased water temperature. Temperature exceedences in these waters are often due either to insufficient water flow, alteration of the stream structure to a broad shallow morphology or lack of riparian vegetation to supply shading. Streams which have their source in shallow warm lakes often are warm as well.

2.3.2. Available Water Quality Data:

2.3.2.1. Spokane River

Water temperature data has been collected on the Spokane River by the US Geological Survey at its Post Falls gauging station, Idaho Department of Environmental Quality, Spokane River Dischargers Group and others. Gugliomone (1992) summarized much of this data. During the late summer months of drought years, the Spokane River exceeds the temperature criteria (Figure 3) for cold water biota and salmonid spawning.



Note: Red: Low discharge year; Green: High discharge year; Blue: Temperature standard

Estimated backgrounds based on the assumption of totally forested watersheds would be 567.8 and 115 tons per year. Fish Creek sediment modeling provides a value 21.7% above the natural background, while Rathdrum Creek sediment modeling provides a value 54% above natural background. Model results for neither creek exceed the 100% above natural background and threshold indicative of water quality impairment, while Fish Creek is below the 50% above natural background lower limit and Rathdrum Creek is only 4% above this lower limit (Washington Forest Practices Board, 1995).

2.3.2.2.5 Fish Population Data:

Sedimentation can interfere with natural trout recruitment and cause the filling of pools. The impact should be reflected in the trout populations. Trout population density has been assessed in some tributaries of the lakes by DEQ beneficial use reconnaissance teams (IDEQ, 1998b). Brook and cutthroat trout are the salmonids found in Fish Creek. Trout population densities (salmonid/m^2/ hour effort) were 0.072 and 0.230 in the two reaches of Fish Creek assessed. Sculpin populations (sculpin/m^2/ hour effort) were 0.028 and 0.061. Three age classes of brook trout, the most abundant fish, were found. Fish populations were not assessed in Rathdrum Creek. Reference streams, in the Priest Lake Basin (Two Mouth and Trapper Creeks), range from 0.1 - 0.3 salmonid/m^2/hour effort and 0.1 - 0.5 sculpin/m^2/hour effort (IDEQ, 1999). It is necessary to default to these reference streams, because no appropriate references have been assessed in the sub-basin. Fish density can be affected by other factors such as harvest and disease. In this case, however, fish densities and age class distribution data support the conclusion that Fish Creek is not water quality limited by sediment.

Twin Lakes was a west slope cutthroat trout fishery prior to European settlement of the area. Trout remains an important part of the fishery with some tributary production of trout. Tributary trout production is insufficient to support the lake population under fishing pressure. The trout population is augmented by stocking. Upper Twin Lake becomes too warm to support trout during August and September of most summers. Warm water species have been introduced to the lakes. Bass, pike, crappie, sunfish and bullhead catfish make up the important warm water biota (Horner, 1999).

2.3.2.3. Hayden Lake:

2.3.2.3.1 Limnology and Nutrient Loading

The limnology of the Hayden Lake was investigated in depth by Soltero and Associates (1986) and Bellatty (IDEQ, 1990). Hayden Lake was assessed as oligotrophic bordering on mesotrophy. The assessment was based on nutrient concentration, primary productivity and chlorophyll a concentrations. Algal bioassay of an earlier eutrophication survey indicated that phosphorous was the limiting nutrient to vegetation growth. During spring and fall, while nitrogen limits growth during the summer (USEPA, 1977b). Later more detailed investigations, by Soltero and his associates (1986), Bellatty (1990) and the Panhandle Health District (PHD 1994) indicate that phosphorous is the nutrient limiting algal growth in Hayden Lake. Volunteer monitoring completed between 1990 and 1999 indicates that phosphorous, chlorophyll a and clarity have remained rather

stable at the mid lake station. The ten-year average total phosphorous concentration for the lake in its photic zone is 7.75 ug/L. The ten-year average chlorophyll a concentration in the Secchi zone is 1.4 ug/L, while the ten-year average Secchi depth is 8.4 meters (Appendix C). These values are consistent with an oligotrophic lake, limited by phosphorous concentration (Ryding and Rast, 1989). Chlorophyll a and total phosphorous are considerably higher in near shore areas (Honeysuckle Beach) and in the shallow northern arm of the lake, while Secchi depths are more shallow. (Mosier, 1999).

Soltero and associates (1986) and later data (PHD, 1994) estimated the annual phosphorous loading at 3610 kg P/yr. The source of phosphorous loadings was estimated as 33% (1,200 kg P/yr) from the Hayden Creek watershed, 7% (240 kg P/yr) from Mokins Creek, 7% (250 kg P/yr) from the other tributaries, 17% (630 kg P/yr) from atmospheric fallout, 32% (1,170 kg P/yr) from residential storm water and 3% (120 kg P/yr) from shoreline septic systems. Water leaves Hayden Lake by evaporation, discharge to the Rathdrum Prairie Aquifer or through a very limited seasonal outlet. Effectively, phosphorous entering the lake remains in the lake system primarily in the bottom sediments.

Sediment contribution to Hayden Lake is primarily from Hayden Creek. Sediment contribution from the other tributaries is minimal. Examination of Secchi measurements of the lake early in the season (May and early June) indicates a pattern of higher clarity (5-7 meters) during and shortly after the high runoff period (Appendix C). This result indicates that fine sediment delivery is not exceeding the salmonid sight-feeding standard. Fisheries population information provided by Fish and Game do not indicate that sediment impairs in lake spawning. The original listing that sediment was exceeding a water quality standard was in error. Other than the impact of sediment bound phosphorous on the phosphorous concentration of the lake, an impact of sediment to a beneficial use of the lake could not be demonstrated.

2.3.2.3.2 Fisheries

Hayden Lake was a west slope cutthroat trout fishery prior to settlement of the area. Trout remains an important part of the fishery with significant tributary production of trout. Most trout production occurs in Hayden Creek where fishing is prohibited. Tributary trout production is insufficient to support the lake population under fishing pressure. The trout population is augmented by stocking. Warm water species have been introduced to the lake. Bass, pike, crappie, sunfish and bullhead catfish make up the important warm water biota. This fishery is limited to the bays and northern arm of this cold and deep lake. The small mouth bass, largemouth bass and crappie are managed as high quality fisheries (Horner, 1999).

3.0 Total Maximum Daily Loads for the Water Quality Limited Water Bodies Located on or Draining to the Rathdrum Prairie (17010305)

3.1. Hayden Lake Total Maximum Daily Load

3.1.1. Introduction

The limnology and water quality of Hayden Lake has been investigated in depth (Soltero et. al., 1986; Bellatty, 1990). The lake has the nutrient status and biological productivity consistent with oligotrophy bordering on mesotrophy. The lake is phosphorous limited. Phosphorous entering the lake remains in the lake or its bottom sediments, because the lake discharges nearly completely to the Rathdrum-Spokane Aquifer.

The phosphorous loading budget of the lake is provided in Table 1.

Table 1: Total Phosphorous budget of Hayden Lake (Saltero et. al., 1986; PHD, 1994)

Phosphorous Source	**Phosphorous Load (kg/year)**	**Percentage**
Hayden Creek	1,200	33%
Mokins Creek	240	7%
Other Tributaries	250	7%
Atmospheric Fallout	630	17%
Residential Storm Water	1,170	32%
Shoreline Septic Systems	120	3%
Total	3,610	99%

The Hayden Lake Watershed Management Plan (PHD, 1994) has a goal for Hayden Lake of:

- Total Phosphorous at Secchi depth of 7 ug/L (10-year average)
- Average secchi depth of 10 meters
- Minimum dissolved oxygen of 6 mg/L or 90% of saturation whichever is greater.

Average total phosphorous is designated as the primary indicator of lake productivity and water quality (PHD, 1994).

The total phosphorous ten-year average in the Secchi zone is 7.75 ug/L (Mossier, 1993; CVMP, 1992-1999, Appendix C). The ten-year total phosphorous average is 10.7% above the Hayden Lake Management Plan goal.

3.1.2. TMDL Authority

Section 303(d)(1) of the Clean Water Act requires states to prepare a list of waters not meeting state water quality standards in spite of technology based pollution control efforts and the application of best management practices for nonpoint sources. This list must include a priority ranking "... taking into account severity of the pollution and the uses to be made of such waters." The prescribed remedy for these water quality limited waters is for states to determine the total maximum daily load (TMDL) for pollutants □... at a level necessary to implement applicable water quality standards with seasonal variations and a margin of safety ...□ A margin of safety is included to account for any lack of knowledge about how limiting pollutant loads will attain water quality.

Section 303(d)(2) requires both the list and any total maximum daily loads developed by the state be submitted to the Environmental Protection Agency (EPA). The EPA is given thirty days to either approve or disapprove the state's submission. If the EPA disapproves, the agency has another thirty days to develop a list or TMDL for the state. Both the list and all TMDLs, either approved or developed by EPA, are incorporated into the state's continuing planning process as required by section 303(e).

3.1.3. Loading Capacity

Based on the management plan goal of 7 ug/L in the Secchi zone and the ten-year average phosphorous of 7.75 ug/L, a 10.7% (7.75/7.0 x 100) reduction in total phosphorous is required by the plan. Since the measured load to the lake is 3,610 kilograms total phosphorous per year, the loading capacity required to meet the management plan is 3,223 kilograms total phosphorous per year ((3,610- (3,610 X 0.107). This value is the total phosphorous loading capacity of Hayden Lake. An estimated total phosphorous load reduction of 386.3 kilograms phosphorous per year is required to meet the lake plan goal.

3.1.4. Margins of Safety

The chemical measurements used to develop the ten-year total phosphorous average and nutrient loads have a precision margin of error of 5%. Discharge measurements contain a margin of error of 5%. Based on these two errors an additive margin of safety of 10% is applied. This additional total phosphorous load is deducted from the loading capacity to develop an allocable phosphorous load of 2,901 kilograms per year (3,223 - (3,223 X 0.1). An additional margin of safety is the deposition of phosphorous mineral in the lake bottom. The level of this mechanism has not been estimated and is ignored in the loading capacity calculations.

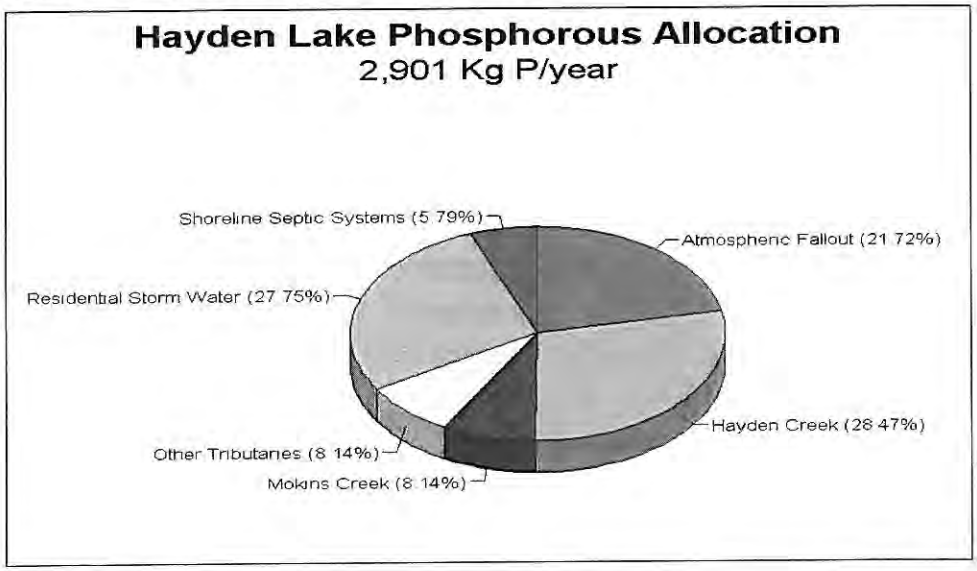
3.1.5. Total Phosphorous Load Allocation

All sources of phosphorous to Hayden Lake are nonpoint sources. Phosphorous load cannot be allocated evenly to the sources to the lake. Atmospheric fallout cannot realistically be controlled. The load allocation is constructed by removing the full load of atmospheric fallout from the allocable phosphorous load. Atmospheric fallout is 17% of the phosphorous load to the lake. Three and four-tenths percent (17%/5) is deducted from the load percentage of the five controllable sources to develop the load allocation (Table 2) (Figure 1).

Table 1: Total phosphorous allocation for Hayden Lake.

Phosphorous Source	Adjusted Percentage after Fallout Removed	Allocated Phosphorous Load (kilograms/year)	Total phosphorous load reduction required.
Atmospheric Fallout	-	630	0
Hayden Creek	36.4%	826	257
Mokins Creek	10.4%	236	74
Other Tributaries	10.4%	236	74
Residential Storm Water	35.4%	805	251
Shoreline Septic Systems	7.4%	168	53
Total	100%	2,901	709

Figure 1: Total phosphorous allocation for Hayden Lake.



3.1.6. Total Phosphorous Load Reduction Allocation

Phosphorous load reduction actions are discussed in depth in the Hayden Lake Management Plan (PHD, 1994). The sources and the responsible agencies or governments are designated in the plan's action items. The load reduction required, including the margin of safety (10%; 322 kilograms phosphorous per year) is 709 kilograms per year. The load reductions required of each source are provided in Table 2, column 4. The reductions are provided graphically in Figure 2.

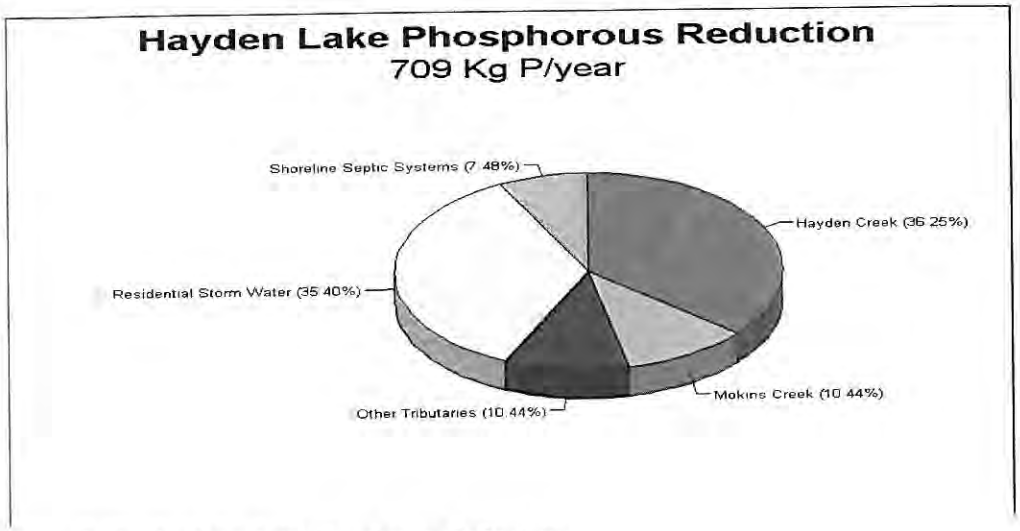


Figure 2: Hayden Lake Total Phosphorous Reductions

3.1.7. Seasonal critical conditions

The issue of critical conditions has importance in a stream which experiences radical changes in discharge (water volume) throughout the year. A lake, by its very nature as a watershed sink integrates and buffers seasonal flows. Plant growth conditions are critical during the summer months, but the growth nutrients are conserved by the lake. For this reason, lake nutrient TMDLs seek yearly reductions in the nutrient load without regard to seasonality.

3.1.8. Reasonable assurance

No point sources of nutrients are present in the watershed. The only assurance that the TMDL will be implemented is the ongoing implementation of remedial actions by Kootenai County, lakeshore owner's association and the State.

3.1.9. Monitoring Provisions

Hayden Lake has been monitored by a Citizens Volunteer Monitoring Program (CVMP) for the past ten years. The program has reliably provided phosphorous, clarity and chlorophyll a data collected during four and some years five summer months. This program will be relied upon to provide the water column data necessary to assess the effectiveness of the phosphorous load reductions required by the TMDL.

3.1.10. Feedback Provisions

Data from which the problem assessment and TMDL for Hayden Lake were developed are fairly accurate measurements. The loading analysis was completed more than a decade ago. As more up to date measurements are developed, these will be added to a revised TMDL as required.

When total phosphorous concentration declines below 7 ug/L, and remains at this level, further phosphorous load reduction will not be required of the sources. Best management practices for forest and road practices will be prescribed by a revised TMDL with erosion abatement structure maintenance provisions. Regular monitoring of the lake will be continued for an appropriate period to document maintenance of the full support.

3.1.11. References:

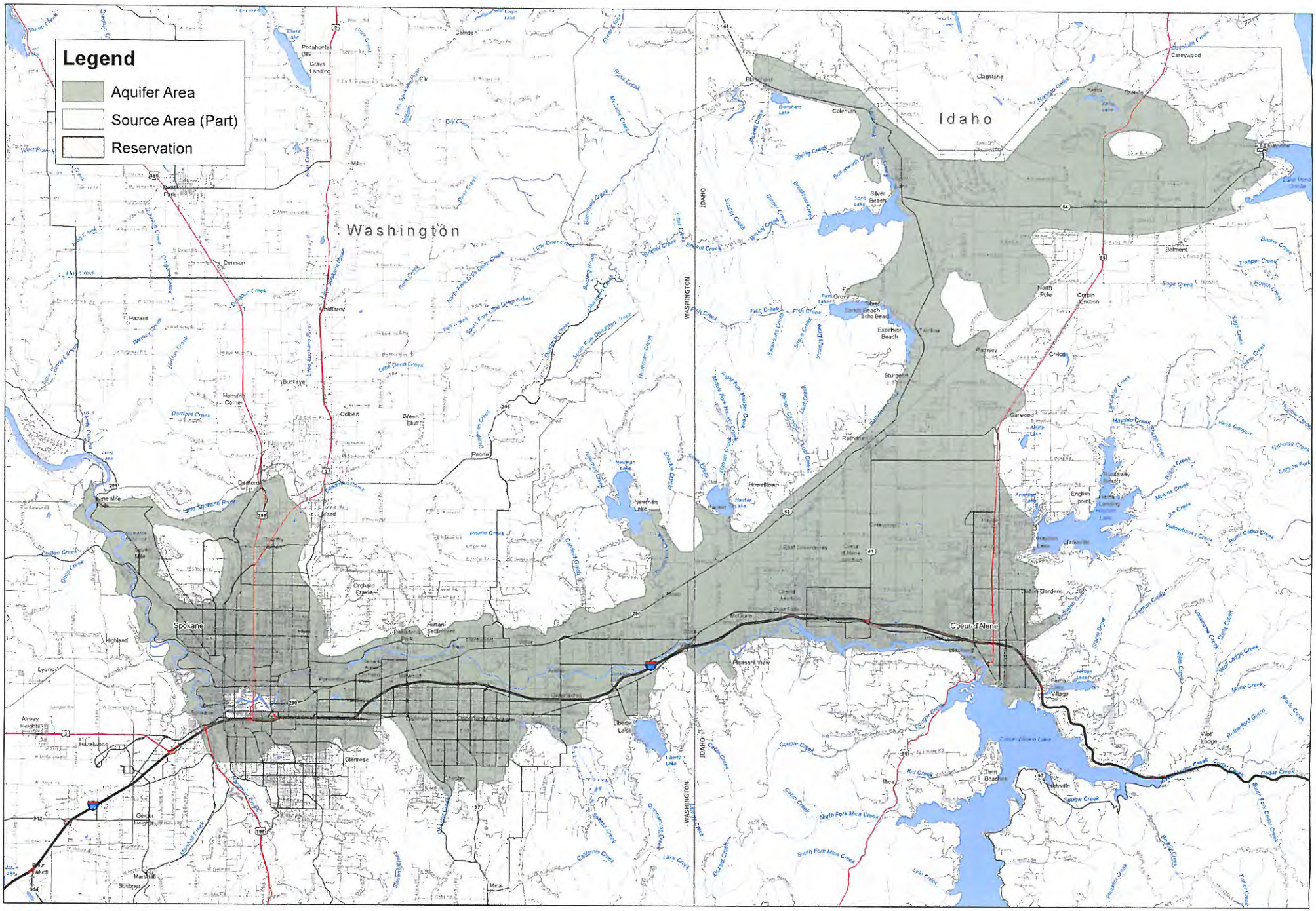
Bellatty, J., 1990. Hayden Lake, Kootenai County, Idaho 1987. Idaho Department of Health and Welfare, Division of Environmental Quality, Coeur d'Alene Regional Office, 2110 Ironwood Parkway, Coeur d'Alene ID 83814. 26p.

CVMP, 1992-1999. Unpublished data collected by the Citizens Volunteer Monitoring Project. Robert Black, Hayden Lake.

Mossier, J. 1993. Idaho lake water quality assessment report. Idaho Department of Health & Welfare-Division of Environmental Quality, Northern Idaho Regional Office, 2110 Ironwood Parkway, Coeur d'Alene ID 83814. Water Quality Status Report No. 105. 232p

PHD, 1994. Hayden Lake Management Plan. Panhandle Health District, 2195 Ironwood Court, Coeur d'Alene ID 83814. 88p.

Soltero, R.A., K.R. Merrill, M.R. Cather and L.M. Appel, 1986. Water quality assessment of Hayden Lake, Idaho. Department of Biology, Eastern Washington University, Cheney, WA 99004. 92p.



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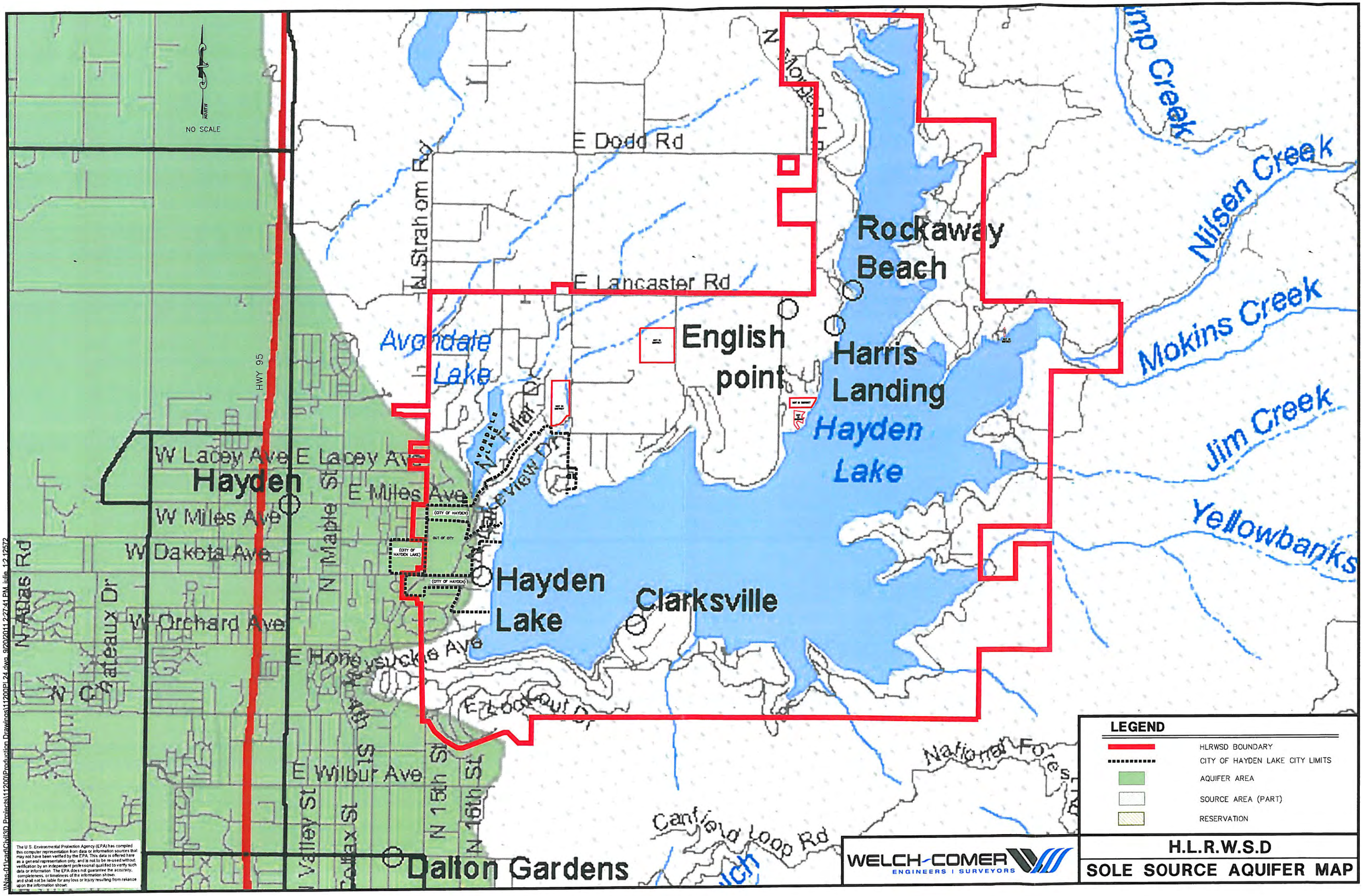
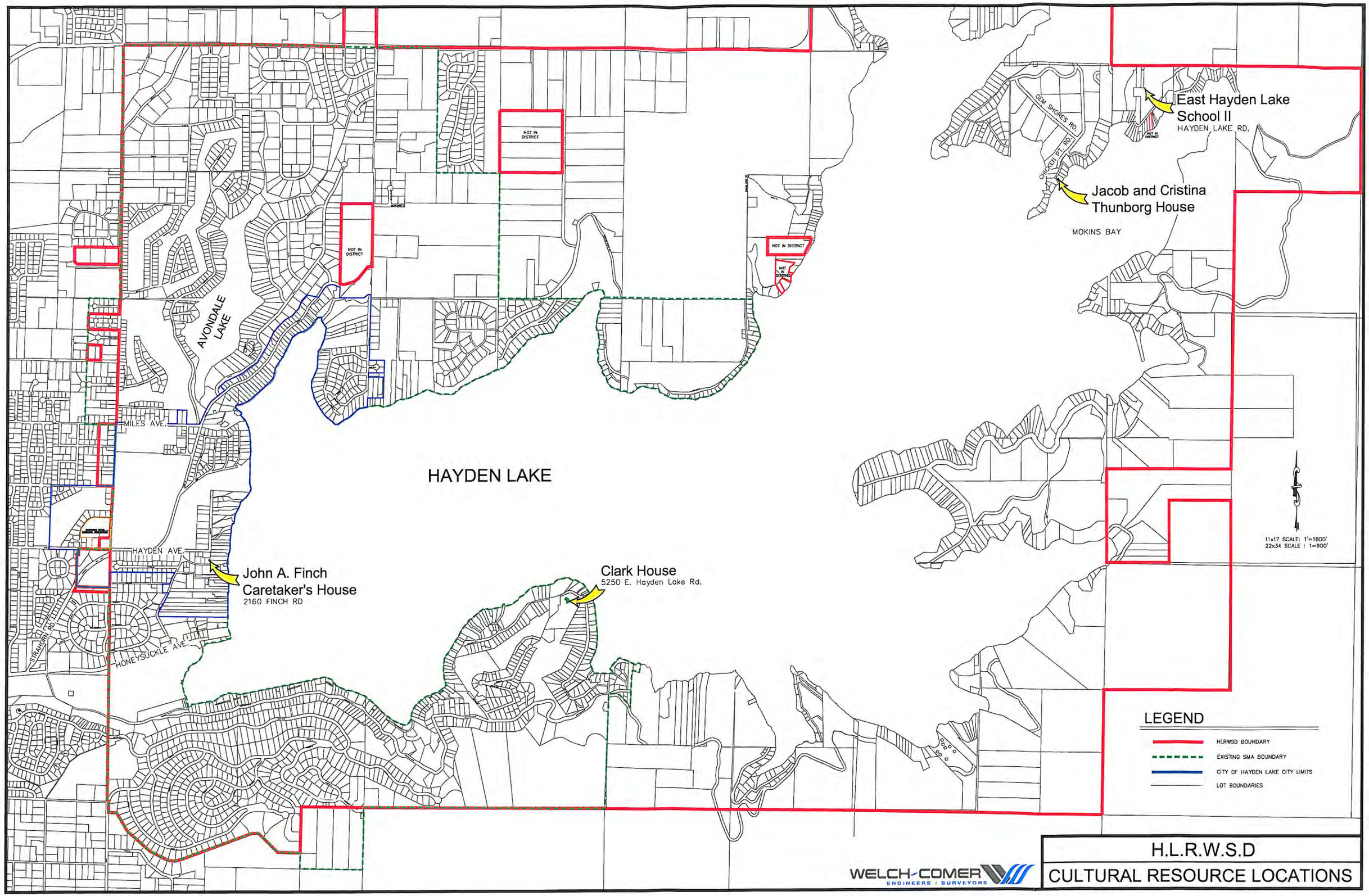
Spokane-Rathdrum Sole Source Aquifer

Aquifer Area and Part of Source Area

Map Created 11/04/2008 EPA Region 10


NO SCALE
E Dodd Rd
N Strahorn Rd
E Lancaster Rd
Rockaway Beach
English point
Harris Landing
Avondale Lake
Hayden Lake
Hayden
W Lacey Ave
E Lacey Ave
W Miles Ave
E Miles Ave
W Dakota Ave
N Maple St
W Orchard Ave
N Atlas Rd
W Cataleaux Dr
E Honeysuckle Ave
E Lookout Dr
E Wilbur Ave
N Valley St
N Pollax St
N 15th St
N 16th St
HWY 95
Clarksville
Dalton Gardens
Canfield Loop Rd
National Forest
Nilsen Creek
Mokins Creek
Jim Creek
Yellowbanks
(CITY OF HAYDEN)
OUT OF CITY
(CITY OF HAYDEN LAKE)
LEGEND
HLRWSD BOUNDARY
CITY OF HAYDEN LAKE CITY LIMITS
AQUIFER AREA
SOURCE AREA (PART)
RESERVATION
WELCH-COMER
ENGINEERS | SURVEYORS
H.L.R.W.S.D
SOLE SOURCE AQUIFER MAP
The U.S. Environmental Protection Agency (EPA) has compiled this computer representation from data or information sources that may not have been verified by the EPA. This data is offered here as a general representation only, and is not to be re-used without verification by an independent professional qualified to verify such data or information. The EPA does not guarantee the accuracy, completeness, or timeliness of the information shown and shall not be liable for any loss or injury resulting from reliance upon the information shown.
\\tlas-01\cadCivil\3D Projects\112001\Production Drawings\112001PL24.dwg, 9/20/2011 2:27:41 PM, julie, 1:2.12572

Group	Name	Population	Status	Lead Office	Recovery Plan Name	Recovery Plan Stage
Birds	Yellow-billed Cuckoo (Coccyzus	Western U.S. DPS	Candidate	Sacramento Fish And Wildlife		
Fishes	Bull Trout (Salvelinus	U.S.A., conterminous, lower 48	Threatened	Idaho Fish And Wildlife Office	Draft Recovery Plan for the	Draft
Fishes	Bull Trout (Salvelinus	U.S.A., conterminous, lower 48	Threatened	Idaho Fish And Wildlife Office	Draft Recovery Plan for Three of	Draft
Fishes	Bull Trout (Salvelinus	U.S.A., conterminous, lower 48	Threatened	Idaho Fish And Wildlife Office	Draft Recovery Plan for the	Draft
Flowering Plants	Spalding's Catchfly (Silene		Threatened	Idaho Fish And Wildlife Office	Spalding's Catchfly Final	Final
Mammals	Gray wolf (Canis lupus)	Northern Rocky Mountain DPS	Recovery	Office Of The Regional Director		
Mammals	Canada Lynx (Lynx canadensis)	(Contiguous U.S. DPS)	Threatened	Montana Ecological Services	Recovery Outline for the	Outline
Mammals	North American wolverine (Gulo		Candidate	Montana Ecological Services		



\\Nas-01\cadt\Civil3D Projects\111200\Production Drawings\111200SEWER-AREAS.dwg, 8/23/2011 7:41:46 AM, julie, 1:2

Idaho > Kootenai County > Landmark #150970

Clark House

On Hayden Lake, Clarksville, Idaho

Enlarge map

Map

- Google Maps
- Google Street View (if available)
- Yahoo! Maps
- Bing Maps
- MSR Maps
- OpenStreetMap

Coordinates:
+47.75608, -116.72619
47°45'22" N, 116°43'34" W
USGS topographic map:
Hayden Lake, ID

National Register information

Note: The following information comes from the NRHP database and has not been verified.

Status
Posted to the National Register of Historic Places on December 12, 1978
Reference number
78001070
Architectural styles
Late 19th and 20th Century Revival: Colonial Revival; Other architectural type; American Colonial
Area of significance
Architecture
Level of significance

State

Evaluation criteria

C - Design/Construction

Property type

Building

Historic function

Single dwelling

Current function

Single dwelling

Period of significance

1900-1924

Significant year

1912

Materials

Walls: Concrete

Roof: Slate

Tags

- 20th Century *(28,992)*
- Built 1912 *(841)*
- Built during 1910s *(7,795)*
- Clarksville, Idaho *(1)*
- Colonial Revival *(5,048)*
- House *(26,063)*
- Idaho *(1,087)*
- K.K. Cutter *(1)*
- Kootenai County, Idaho *(44)*
- Late 19th and 20th Century Revival *(16,228)*
- Private owner *(54,394)*
- Slate *(5,715)*

Search selected >>

Sources

- National Register database - Reference number 78001070

Comments

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This page's URL is http://landmarkhunter.com/150970-clark-house/

Idaho > Kootenai County > Landmark #133753

East Hayden Lake School II

Hayden Lake Rd., Camp Mivoden, Idaho

Enlarge map

Map

- Google Maps
- Google Street View (if available)
- Yahoo! Maps
- Bing Maps
- MSR Maps
- OpenStreetMap

Coordinates:
+47.78618, -116.67664
47°47'10" N, 116°40'36" W
USGS topographic map:
Hayden Lake, ID

National Register information

Note: The following information comes from the NRHP database and has not been verified.

Status
Posted to the National Register of Historic Places on September 12, 1985
Reference number
85002095
Areas of significance
Exploration/Settlement; Architecture
Level of significance
Local
Evaluation criteria
A - Event; C - Design/Construction

Property type
Building
Historic function
School
Period of significance
1900-1924
Significant year
ca. 1918
Materials
Walls: Weatherboard
Roof: Shingle

Tags

- 20th Century *(28,992)*
- Built during 1910s *(7,795)*
- Camp Mivoden, Idaho *(1)*
- Idaho *(1,087)*
- Kootenai County Rural Schools TR *(13)*
- Kootenai County, Idaho *(44)*
- Private owner *(54,394)*
- School *(4,597)*

Search selected >>

Sources

- National Register database - Reference number 85002095

Comments

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Idaho > Kootenai County > Landmark #160073

Jacob and Cristina Thunborg House

Also known as: Shoemaker,George and Jane,House
Chicken Point, Hayden Lake, Idaho

Enlarge map

Map

- Google Maps
- Google Street View (if available)
- Yahoo! Maps
- Bing Maps
- MSR Maps
- OpenStreetMap

Coordinates:
+47.78080, -116.68401
47°46'51" N, 116°41'02" W
USGS topographic map:
Hayden Lake, ID

National Register information

Note: The following information comes from the NRHP database and has not been verified.

Status
Posted to the National Register of Historic Places on September 12, 1985
Reference number
85002156
NR name
Thunborg, Jacob and Cristina, House
Architectural style
Other architectural type; Log pen
Areas of significance

Exploration/Settlement; Architecture
Level of significance
Local
Evaluation criteria
C - Design/Construction; B - Person
Property type
Building
Historic functions
Single dwelling; Secondary structure
Current function
Single dwelling
Periods of significance
1900-1924; 1875-1899
Significant year
ca. 1893
Materials
Foundation: Stone
Walls: Log; Shingle
Roof: Shingle
Other: Shingle
Number of properties
Contributing buildings: 2

Tags

- 19th Century *(35,429)*
- Built during 1890s *(7,012)*
- Hayden Lake, Idaho *(2)*
- House *(26,063)*
- Idaho *(1,087)*
- Jacob Thunborg *(1)*
- Kootenai County, Idaho *(44)*
- Log *(2,296)*
- Private owner *(54,394)*
- Stone *(26,143)*

Search selected >>

Sources

- National Register database - Reference number 85002156

Comments

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This page's URL is http://landmarkhunter.com/160073-jacob-and-cristina-thunborg-house/

Idaho > Kootenai County > Landmark #162233

John A. Finch Caretaker's House

Also known as: 012084
2160 Finch Rd., Hayden Lake, Idaho

Enlarge map

Map

- Google Maps
- Google Street View (if available)
- Yahoo! Maps
- Bing Maps
- MSR Maps
- OpenStreetMap

Coordinates:
+47.75810, -116.75790
47°45'29" N, 116°45'28" W
USGS topographic map:
Hayden, ID

National Register information

Note: The following information comes from the NRHP database and has not been verified.

Status
Posted to the National Register of Historic Places on September 14, 1987
Reference number
87001562
NR name
Finch, John A., Caretaker's House
Architectural style
Other architectural type; Swiss Chalet
Areas of significance

Economics; Entertainment/Recreation; Exploration/Settlement; Architecture

Level of significance

Local

Evaluation criteria

A - Event; C - Design/Construction; B - Person

Property type

Building

Historic functions

Outdoor recreation; Single dwelling; Secondary structure

Periods of significance

1900-1924; 1925-1949

Significant years

1903; 1904

Materials

Foundation: Concrete
Walls: Weatherboard
Roof: Asphalt
Other: Wood

Tags

- 20th Century *(28,992)*
- Built 1903 *(720)*
- Built during 1900s *(8,538)*
- Hayden Lake, Idaho *(2)*
- House *(26,063)*
- Idaho *(1,087)*
- John Alvard Finch *(1)*
- Kirtland Kelsey Cutter *(14)*
- Kootenai County, Idaho *(44)*
- Private owner *(54,394)*

Search selected >>

Sources

- National Register database - Reference number 87001562

Comments

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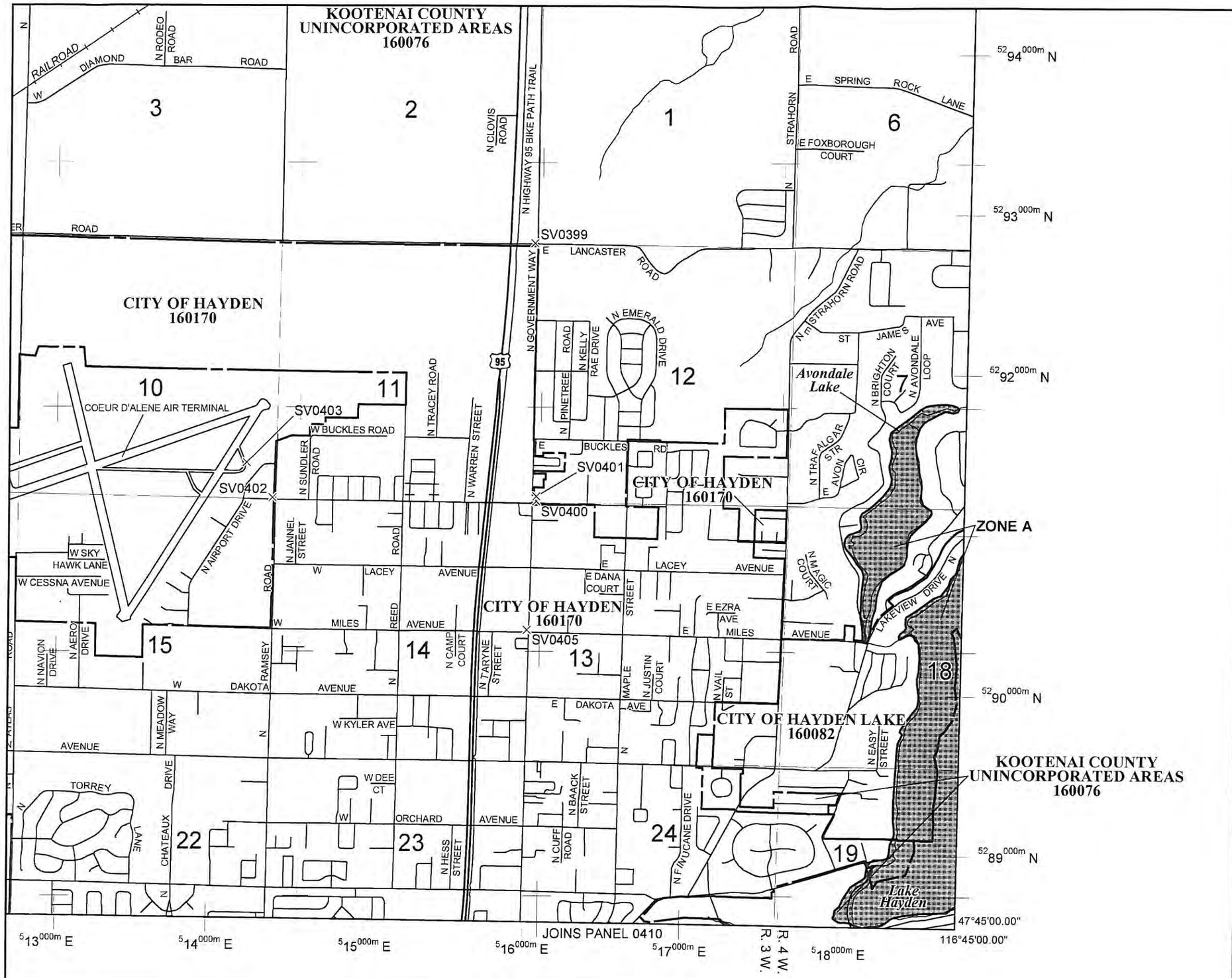
This page's URL is http://landmarkhunter.com/162233-john-finch-caretakers-house/



MAP SCALE 1" = 2000'

1000 0 2000 4000 FEET

METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0250E

FIRM

FLOOD INSURANCE RATE MAP

KOOTENAI COUNTY, IDAHO

AND INCORPORATED AREAS

PANEL 250 OF 975

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
KOOTENAI COUNTY	160076	0250	E
HAYDEN LAKE, CITY OF	160082	0250	E
HAYDEN, CITY OF	160170	0250	E
RATHDRUM, CITY OF	160187	0250	E

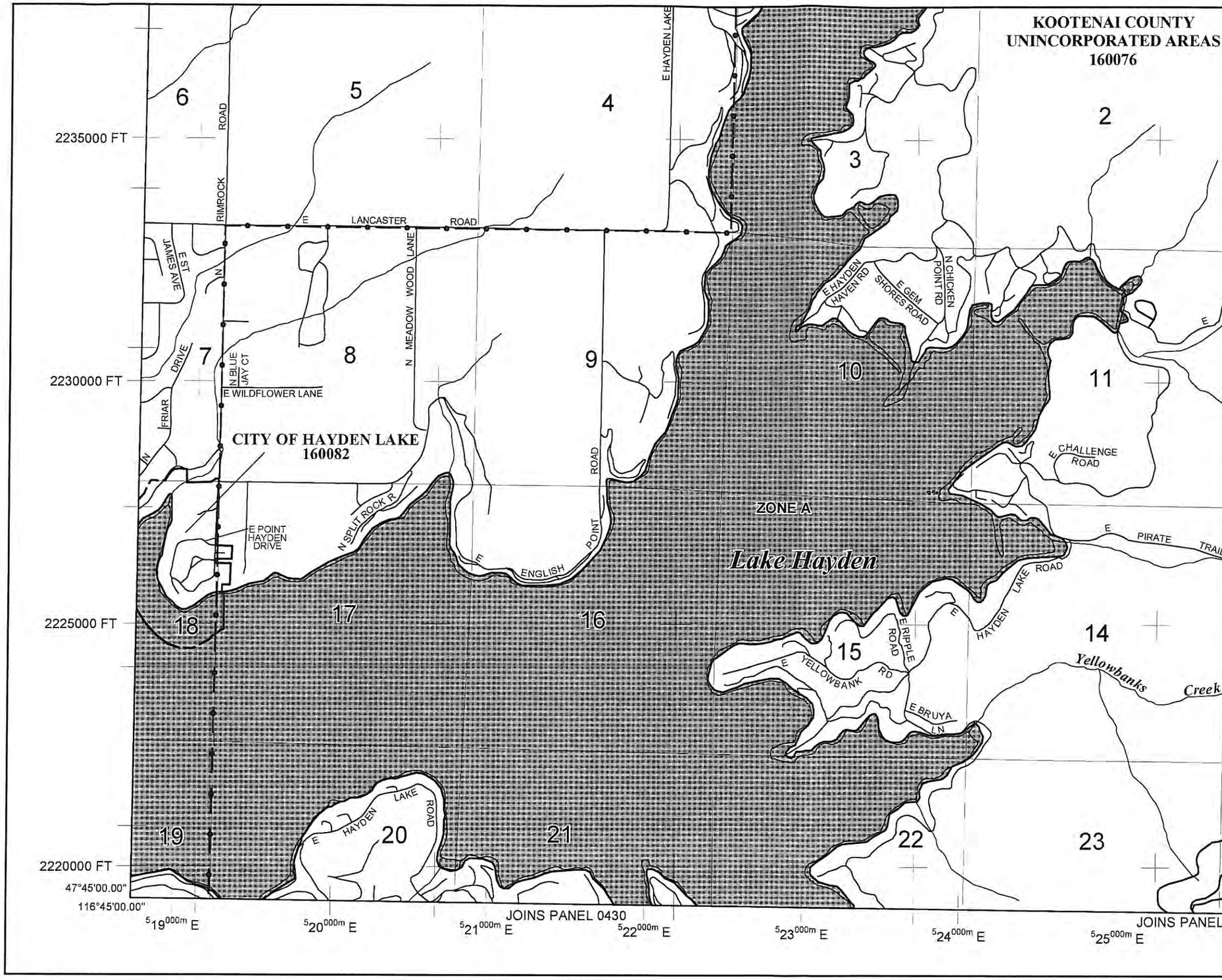
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
16055C0250E

EFFECTIVE DATE
MAY 3, 2010

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



MAP SCALE 1" = 2000'

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NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0275E

FIRM

FLOOD INSURANCE RATE MAP

KOOTENAI COUNTY, IDAHO

AND INCORPORATED AREAS

PANEL 275 OF 975

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
KOOTENAI COUNTY	160076	0275	E
HAYDEN LAKE, CITY OF	160082	0275	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
16055C0275E

EFFECTIVE DATE
MAY 3, 2010

Federal Emergency Management Agency

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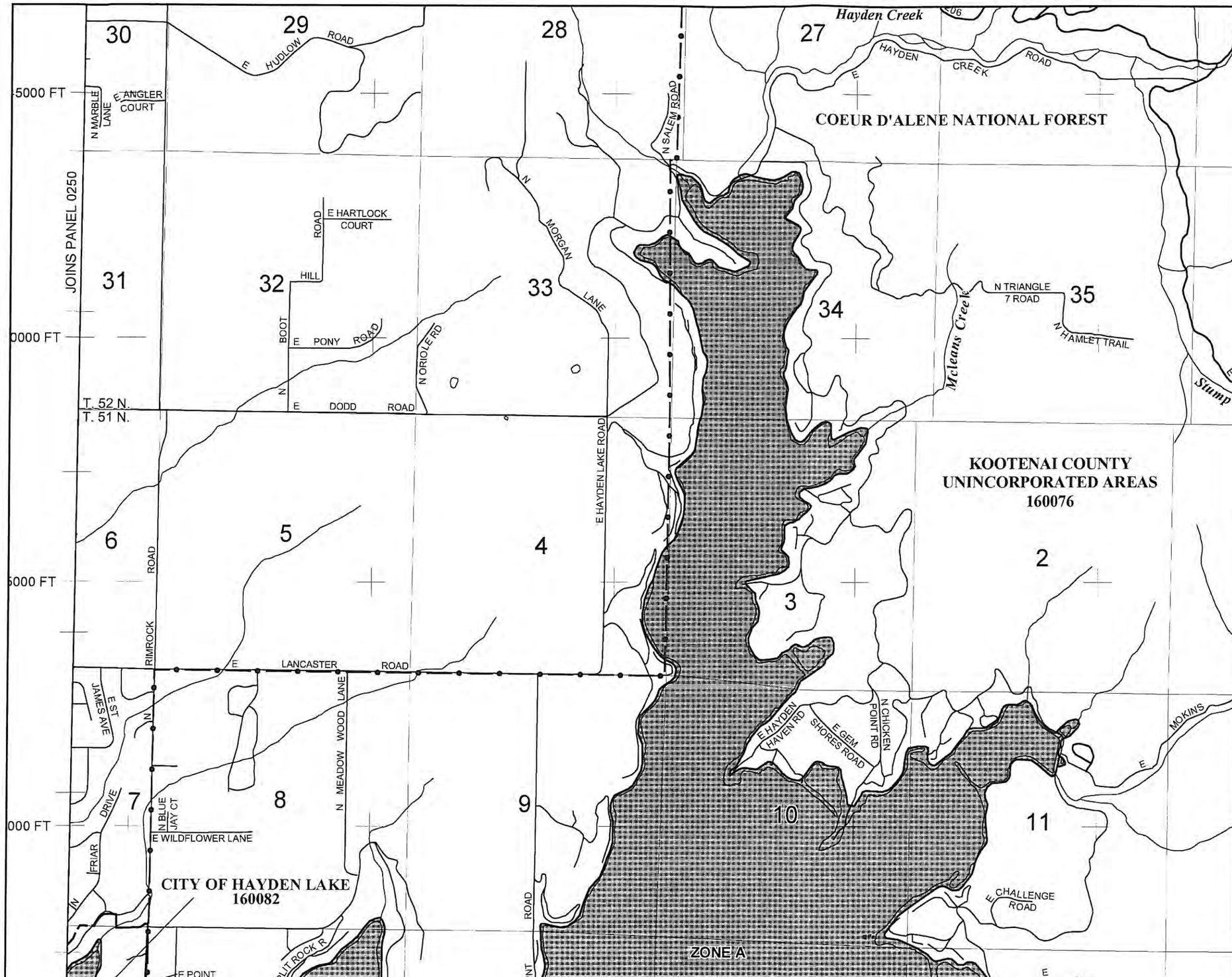

MAP SCALE 1" = 2000'

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NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0275E

FIRM

FLOOD INSURANCE RATE MAP

KOOTENAI COUNTY, IDAHO

AND INCORPORATED AREAS

PANEL 275 OF 975

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
KOOTENAI COUNTY	160076	0275	E
HAYDEN LAKE, CITY OF	160082	0275	E

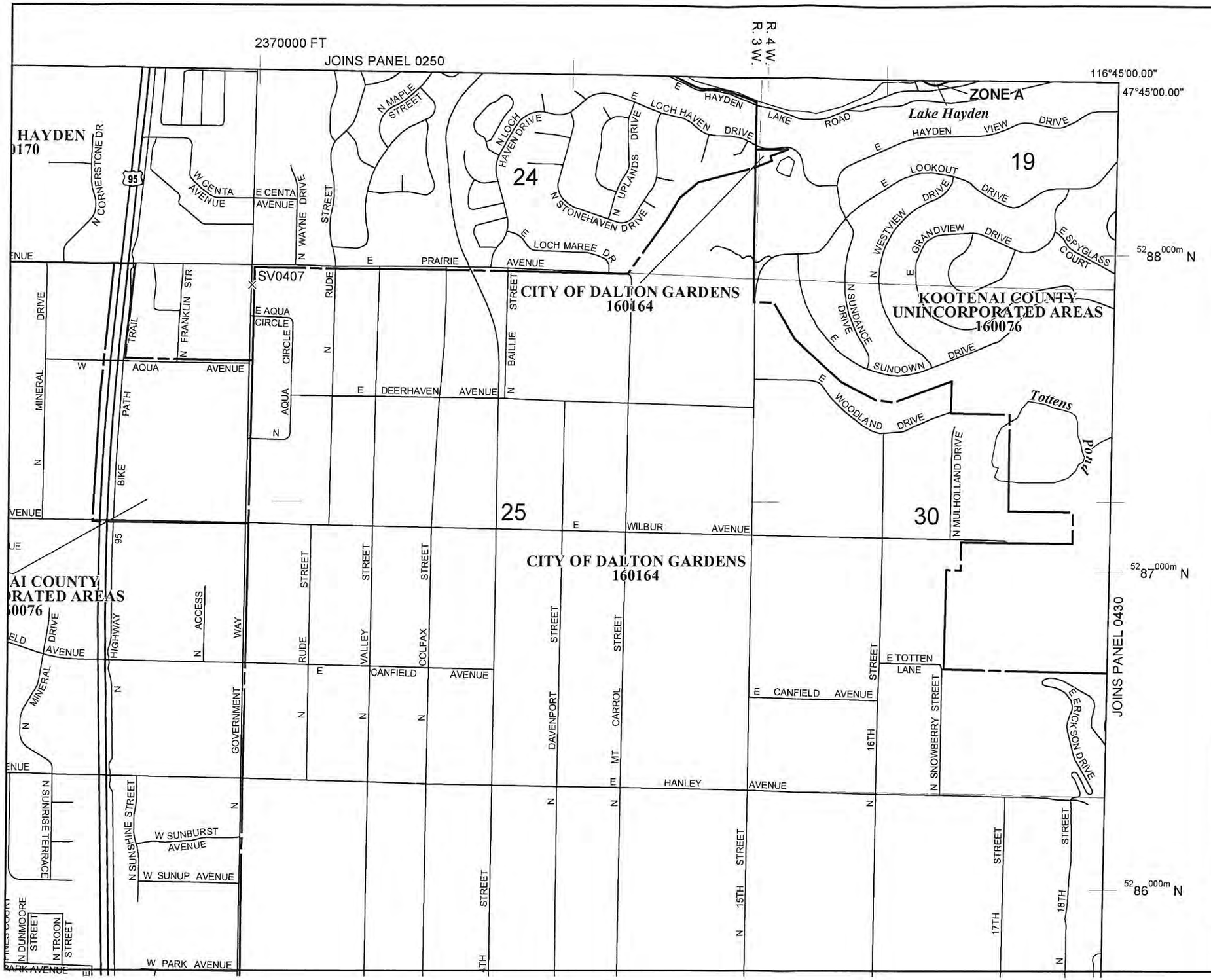
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
16055C0275E

EFFECTIVE DATE
MAY 3, 2010

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



MAP SCALE 1" = 1000'

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NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0410E

FIRM

FLOOD INSURANCE RATE MAP

KOOTENAI COUNTY, IDAHO

AND INCORPORATED AREAS

PANEL 410 OF 975

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
KOOTENAI COUNTY	160076	0410	E
COEUR D'ALENE, CITY OF	160078	0410	E
DALTON GARDENS, CITY OF	160164	0410	E
HAYDEN, CITY OF	160170	0410	E

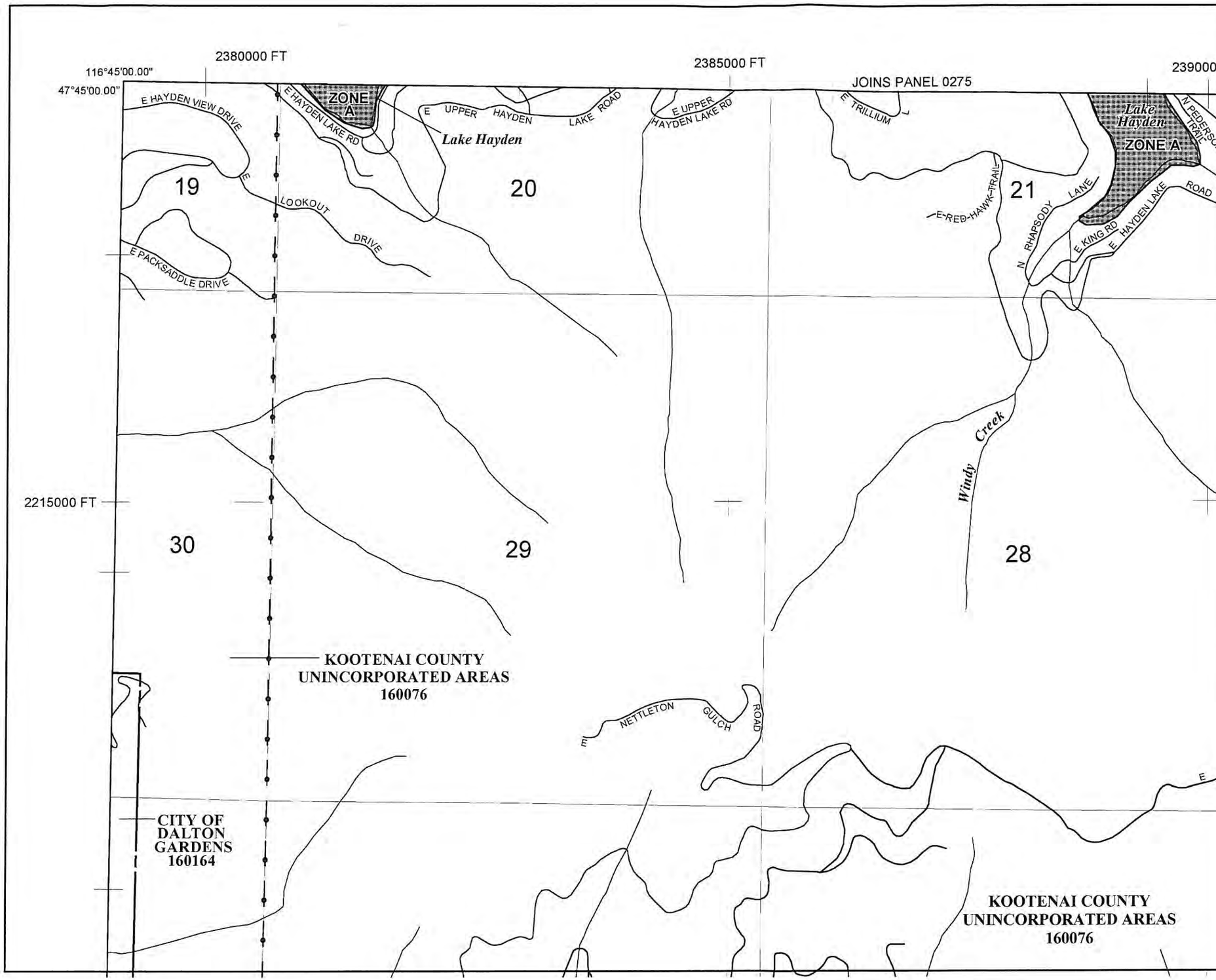
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
16055C0410E

EFFECTIVE DATE
MAY 3, 2010

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

METE

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0430E

FIRM

FLOOD INSURANCE RATE MAP

KOOTENAI COUNTY, IDAHO

AND INCORPORATED AREAS

PANEL 430 OF 975

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
KOOTENAI COUNTY	160076	0430	E
COEUR DALENE, CITY OF	160076	0430	E
DALTON GARDENS, CITY OF	160164	0430	E

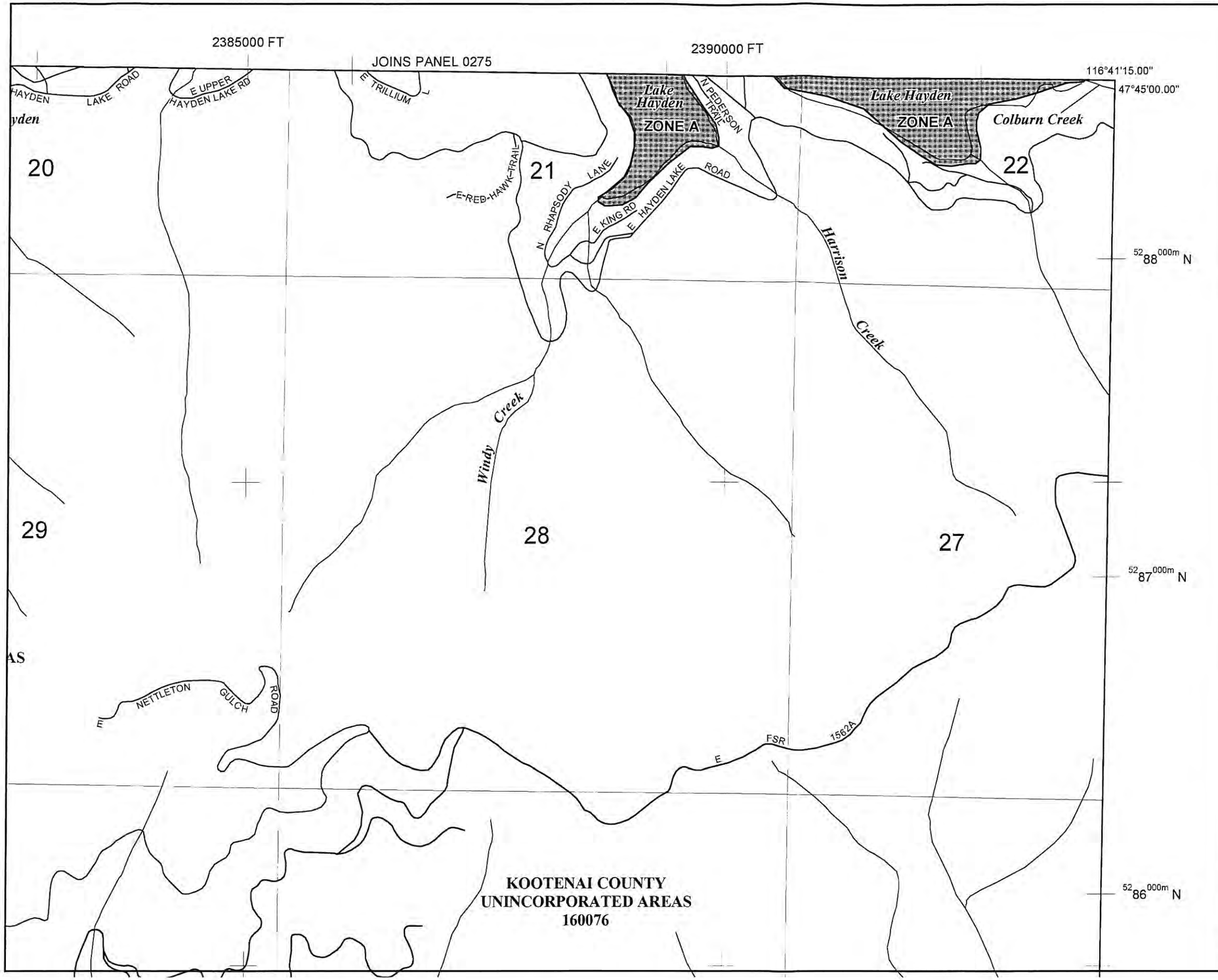
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
16055C0430E

EFFECTIVE DATE
MAY 3, 2010

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

METE

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0430E

FIRM

FLOOD INSURANCE RATE MAP

KOOTENAI COUNTY, IDAHO

AND INCORPORATED AREAS

PANEL 430 OF 975

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
KOOTENAI COUNTY	160076	0430	E
COEUR D'ALENE, CITY OF	160078	0430	E
DALTON GARDENS, CITY OF	160164	0430	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

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EFFECTIVE DATE
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LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	Floodplain boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

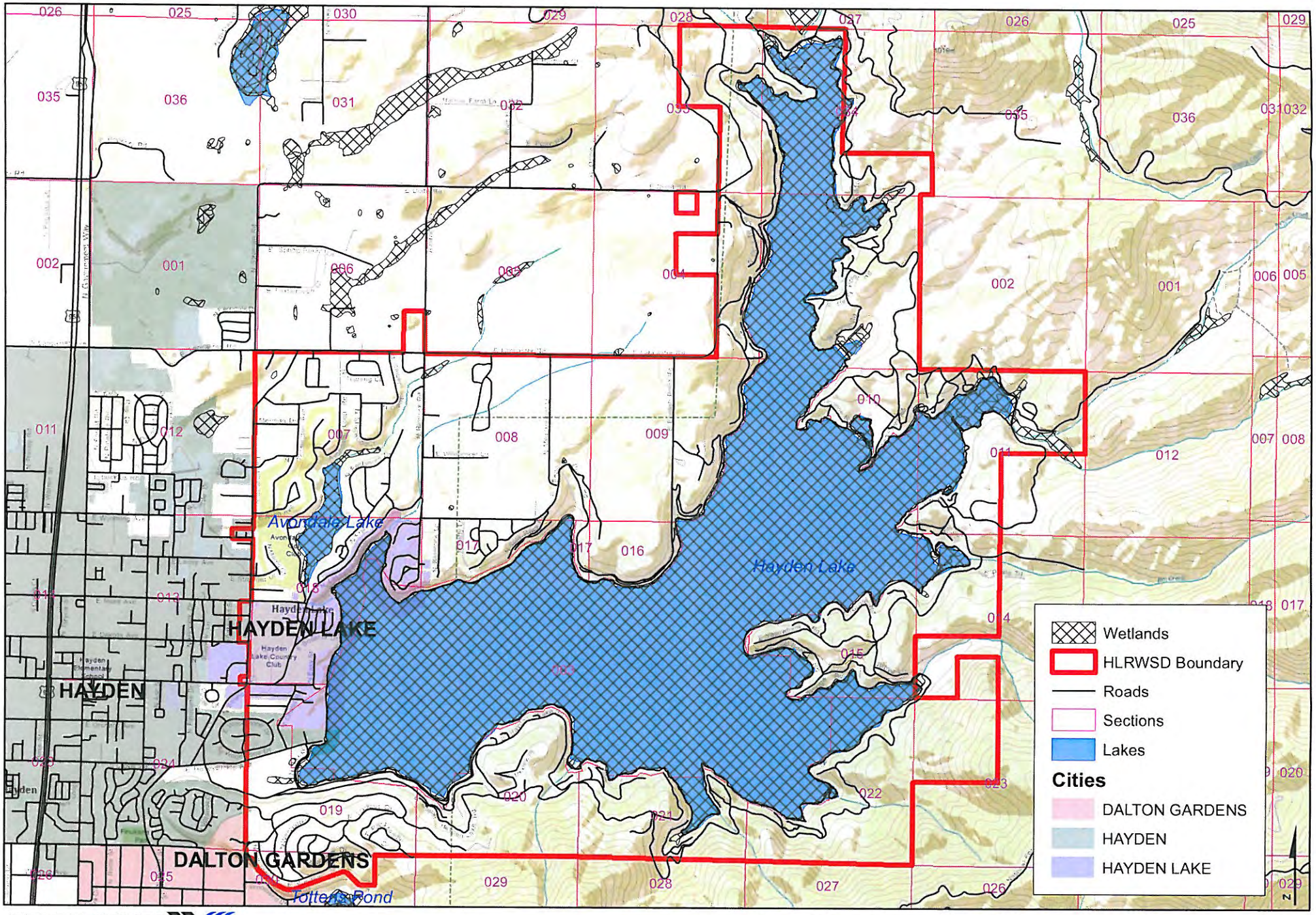
* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

A — A	Cross section line
23 - - - - - - - 23	Transect line
97°07'30", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
$^{42}75^{000m}$N	1000-meter Universal Transverse Mercator grid ticks, zone 11
6000000 FT	5000-foot grid ticks: Idaho State Plane coordinate system, west zone (FIPSZONE 1103), Transverse Mercator
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
May 3, 2010
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

\\Nas-01\cad\Civil3D Projects\41055\Production Drawings\41055DS01.dwg, 10/13/2011 11:19:14 AM, julie, 1:1



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877-815-5762
(fax) 208-664-5946

HLRWSD

Wetlands Areas

0 2,000 4,000 8,000 12,000 16,000 Feet

Sources:
INSIDE Idaho - University of Idaho
Kootenai County GIS Department
Idaho State Tax Commission
US Fish and Wildlife Service

PROJECT NO 41055
DRAWN BY ..... TT
FILENAME ..... HLRWSD_WW_FacilitiesPlan_01.mxd
DATE 06/22/2011

Designated Wild & Scenic Rivers

Idaho Go

Rivers that pass through several states may have segments in each state designated. For example, the Klamath River has designations in California and Oregon. Many rivers also have numerous tributaries designated (e.g., Washington's Skagit River). Multiple listings of some rivers indicate more than one segment of the river is designated (e.g., the Missouri River in Nebraska).

Cossatot River, Arkansas

Alabama

- Black Warrior River (Sipsey Fork)

Top of the Page

Alaska

- Alagnak River — National Park Service Site
- Alatna River
- Andreafsky River
- Aniakchak River
- Beaver Creek — Bureau of Land Management Site
- Birch Creek — Bureau of Land Management Site
- Charley River — National Park Service Site
- Chilikadrotna River
- Delta River — Bureau of Land Management Site
- Fortymile River — Bureau of Land Management Site
- Gulkana River— Bureau of Land Management Site
- Ivishak River
- John River
- Kobuk River
- Koyukuk River (North Fork)
- Mulchatna River
- Noatak River
- Nowitna River
- Salmon River
- Selawik River
- Sheeniek River
- Tinayguk River
- Tlikakila River
- Unalakleet River — Bureau of Land Management Site
- Wind River

Top of the Page

Arizona

- Fossil Creek
- Verde River — U.S. Forest Service Site

Top of the Page

Arkansas

- Big Piney Creek
- Buffalo River
- Cossatot River
- Hurricane Creek
- Little Missouri River
- Mulberry River
- North Sylamore Creek
- Richland Creek

Top of the Page

California

- Amargosa River
- American River (Lower)
- American River (North Fork) — Bureau of Land Management Site
- Bautista Creek
- Big Sur River
- Black Butte River
- Cottonwood Creek
- Eel River
- Feather River
- Fuller Mill Creek
- Kern River
- Kings River
- Klamath River — U.S. Forest Service Site
- Merced River — Bureau of Land Management Site
- Owens River Headwaters
- Palm Canyon Creek
- Piru Creek
- San Jacinto River (North Fork)
- Sespe Creek
- Sisquoc River
- Smith River
- Trinity River
- Tuolumne River — Bureau of Land Management Site

Top of the Page

Colorado

- Cache la Poudre River

Top of the Page

Connecticut

- Eightmile River
- Farmington River (West Branch) — Farmington River Committee Site

Top of the Page

Delaware

- White Clay Creek (See also Pennsylvania)

Top of the Page

Florida

- Loxahatchee River
- Wekiva River

Top of the Page

Georgia

- Chattooga River (See also North Carolina, South Carolina — U.S. Forest Service Site, Chattooga Net

Top of the Page

Idaho

- Battle Creek
- Big Jacks Creek
- Bruneau River
- Bruneau River (West Fork)
- Clearwater River (Middle Fork)
- Cottonwood Creek
- Deep Creek
- Dickshooter Creek
- Duncan Creek
- Jarbidge River
- Little Jacks Creek

- Owyhee River
- Owyhee River (North Fork)
- Owyhee River (South Fork)
- Red Canyon
- Rapid River
- Saint Joe River
- Salmon River
- Salmon River (Middle Fork)
- Sheep Creek
- Snake River (See also Oregon)
- Wickahoney Creek

Top of the Page

Illinois

- Vermilion River — State of Illinois Site

Top of the Page

Kentucky

- Red River

Top of the Page

Louisiana

- Saline Bayou

Top of the Page

Maine

- Allagash River — State of Maine Site

Top of the Page

Massachusetts

- Westfield River — Westfield River Wild & Scenic Advisory Committee Site
- Sudbury, Assabet and Concord Rivers
- Taunton River

Top of the Page

Michigan

- Au Sable River
- Bear Creek
- Black River
- Carp River
- Indian River
- Manistee River
- Ontonagon River
- Paint River
- Pere Marquette River
- Pine River
- Presque Isle River
- Sturgeon River (Hiawatha National Forest)
- Sturgeon River (Ottawa National Forest)
- Tahquamenon River (East Branch)
- Whitefish River
- Yellow Dog River

Top of the Page

Minnesota

- St. Croix River (Lower) (See also Wisconsin) — National Park Service Site
- St. Croix River (Upper) (See also Wisconsin) — National Park Service Site
- St. Croix River (Lower) (See also Wisconsin)

THE NATIONAL WILD AND SCENIC RIVERS SYSTEM

www.rivers.gov

The National Wild and Scenic Rivers System was created by Congress in 1968 (Public Law 90-542; 16 U.S.C. § 1271 et seq.) to preserve certain rivers with outstanding natural, cultural, and recreational values. The System consists of the designation of protected and federally-managed rivers. The Act recognizes that not all rivers can be preserved in their entirety, but that those rivers meeting the criteria for their designation and development of a management plan for their preservation, and development if encouraged, can and should be protected and enhanced for the benefit and enjoyment of the American people. Protection of the river is provided through voluntary stewardship by landowners and state, users and through partnerships with federal agencies, state, local, or tribal governments. In most cases not all land within the boundaries of a wild and scenic river is owned by the Federal government. The Federal government is allowed to acquire from willing sellers, interests in these rivers and developed to be more of one unique public property rights.

The Act essentially serves as Congress's first and other consideration of appropriate manner of many with permanent protection for some of the country's more outstanding free-flowing rivers. To accomplish this, it mandates federal protection for rivers, such as the improvement of some of other overuse activities that will impair the river's free flowing condition, water quality, or outstanding resource values. However, designation does not affect existing water rights or the authority of the states and the federal government over waters as determined by controlling principles of law.

With the passage of the Omnibus Public Land Management Act of 2009, the National System protected more than 52,000 miles of 208 rivers in 38 states, and the Commonwealth of Puerto Rico. This is a 1,000 miles increase in the protected miles of rivers since 2008. Nearly 12,000 miles of 1,000 miles items behind the country have doubled or had 200,000 miles. (Approx. 0.7% of American rivers)

For general questions concerning the wild and scenic rivers program, refer to the lead agency. Wild and Scenic Rivers Coordinating Council website at www.rivers.gov to contact one of the following:

USDA Forest Service
U.S. Department of Agriculture
Wilderness and Wild and Scenic Rivers
1400 Independence Ave. SW
Washington, DC 20250

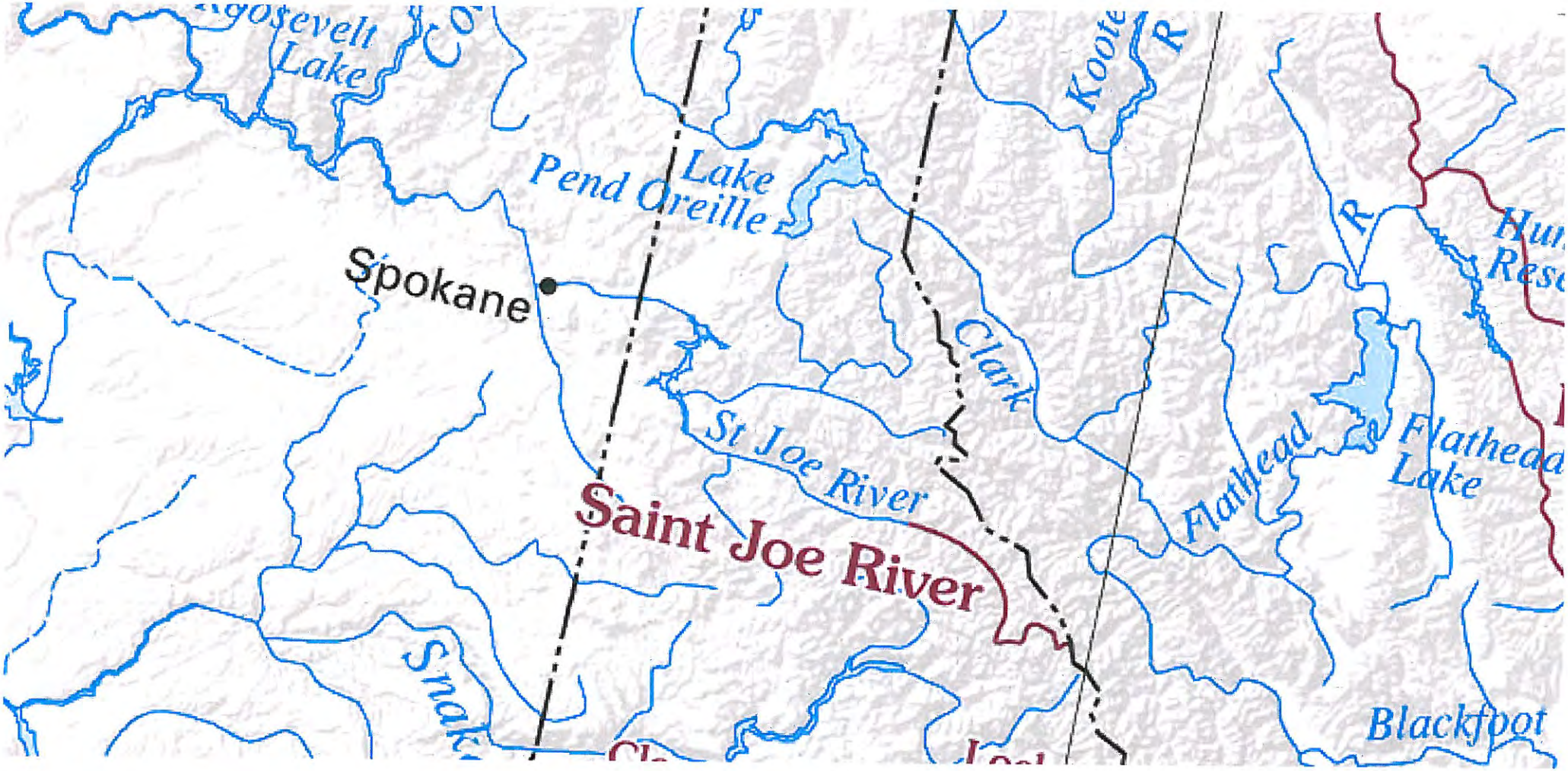
Bureau of Land Management
U.S. Department of the Interior
National Landscape Conservation System
1849 C Street NW
Washington, DC 20240

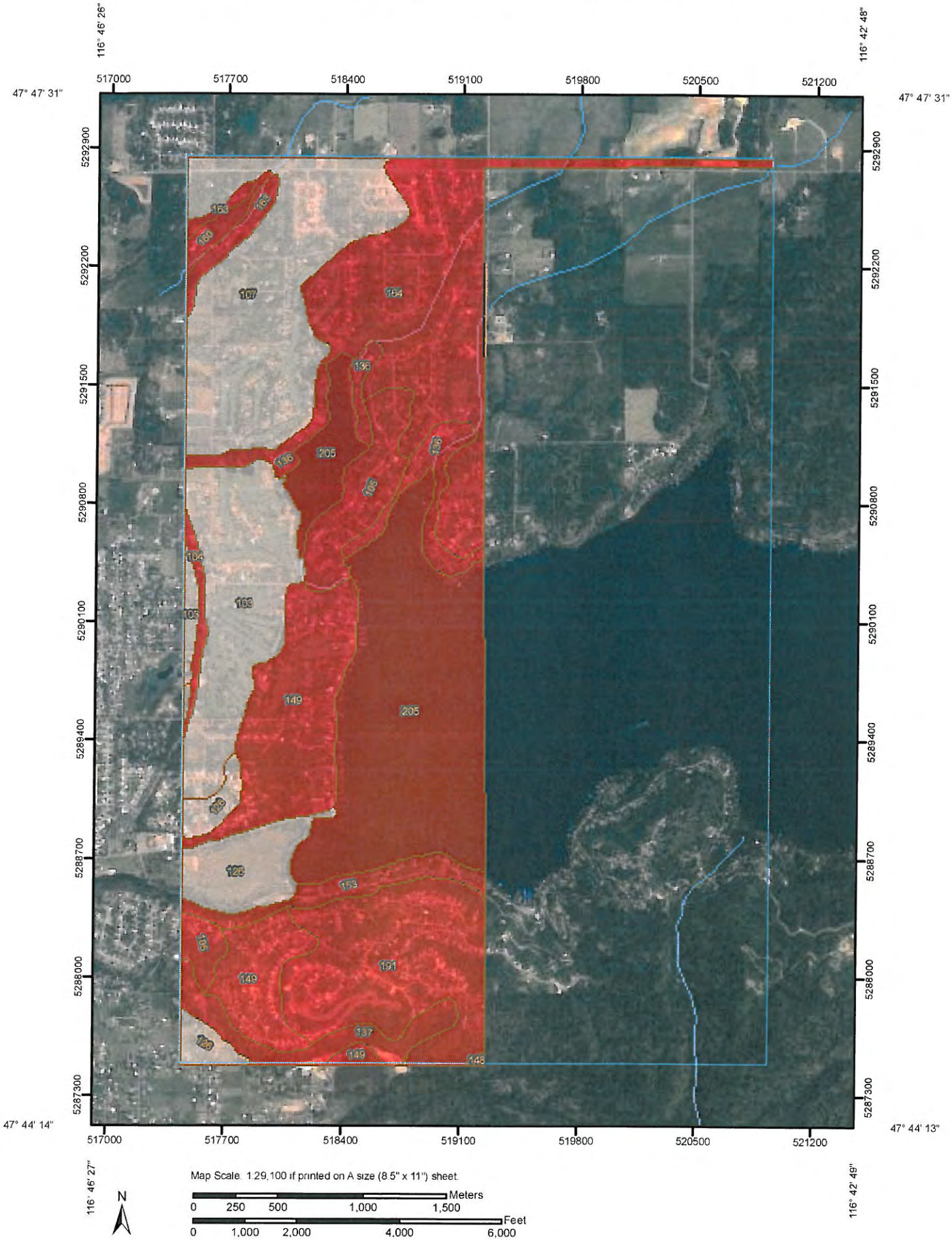
U.S. Fish and Wildlife Service
U.S. Department of the Interior
National Wildlife Refuge System
Division of Refuge Resources
4401 North Fairfax Drive, MS 670
Arlington, VA 22203

National Park Service
U.S. Department of the Interior
Conservation and Outdoor Recreation
1849 C Street, NW
Room 2646
Washington, DC 20240

Produced by the USDA Forest Service, USDI Bureau of Land Management, Fish and Wildlife Service, and National Park Service in cooperation with the National Atlas of the United States®.

Alaska Wild and Scenic Rivers System map is available through www.rivers.gov. There are no Wild and Scenic Rivers in Hawaii.


Lake
Pend Oreille
Lake
Spokane
Clark
St Joe River
Saint Joe River
Flathead
Lake
Flathead
Blackfoot


116° 46' 26"
116° 42' 48"
47° 47' 31"
47° 47' 31"
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5288700
5288000
5287300
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116° 46' 27"
116° 42' 49"
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Map Scale: 1:29,100 if printed on A size (8.5" x 11") sheet.
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Meters
0 250 500 1,000 1,500
Feet
0 1,000 2,000 4,000 6,000

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Units

Soil Ratings

- Not prime farmland
- All areas are prime farmland
- Prime farmland if drained
- Prime farmland if protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated
- Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated and drained
- Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if subsoiled, completely removing the root inhibiting soil layer
- Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
- Prime farmland if irrigated and reclaimed of excess salts and sodium
- Farmland of statewide importance
- Farmland of local importance
- Farmland of unique importance
- Not rated or not available

Political Features

- Cities

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads

MAP INFORMATION

Map Scale: 1:29,100 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 11N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Idaho Panhandle National Forest, Idaho
Survey Area Data: Not available

Soil Survey Area: Kootenai County Area, Idaho
Survey Area Data: Version 6, Jan 31, 2008

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Date(s) aerial images were photographed: 6/23/2004

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Farmland Classification

Farmland Classification— Summary by Map Unit — Idaho Panhandle National Forest, Idaho (ID670)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
No soil data available for this soil survey area.				
Subtotals for Soil Survey Area			**—**	**—**
Totals for Area of Interest			**4,626.9**	**100.0%**

Farmland Classification— Summary by Map Unit — Kootenai County Area, Idaho (ID606)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
103	Avonville fine gravelly silt loam, 0 to 7 percent slopes	Prime farmland if irrigated	232.3	5.0%
104	Avonville fine gravelly silt loam, 7 to 20 percent slopes	Not prime farmland	14.7	0.3%
105	Blinn stony loam, 5 to 35 percent slopes	Not prime farmland	101.3	2.2%
107	Bonner silt loam, 0 to 8 percent slopes	Prime farmland if irrigated	340.6	7.4%
126	Kootenai gravelly silt loam, 0 to 7 percent slopes	Prime farmland if irrigated	119.4	2.6%
136	Lacy-Bobbitt association, 5 to 35 percent slopes	Not prime farmland	85.0	1.8%
137	Lacy-Bobbitt association, 35 to 65 percent slopes	Not prime farmland	61.2	1.3%
148	McCrosket-Tekoa association, 35 to 65 percent slopes	Not prime farmland	1.4	0.0%
149	McGuire-Marble association, 0 to 7 percent slopes	Not prime farmland	266.7	5.8%
153	Mokins silt loam, 35 to 65 percent slopes	Not prime farmland	50.3	1.1%
160	Ramsdell silt loam	Not prime farmland	15.5	0.3%
163	Rock outcrop	Not prime farmland	28.7	0.6%
164	Rubson-Mokins complex, 0 to 20 percent slopes	Not prime farmland	355.5	7.7%
191	Tekoa gravelly silt loam, 35 to 65 percent slopes	Not prime farmland	245.9	5.3%
205	Water	Not prime farmland	480.6	10.4%
Subtotals for Soil Survey Area			**2,399.2**	**51.9%**
Totals for Area of Interest			**4,626.9**	**100.0%**

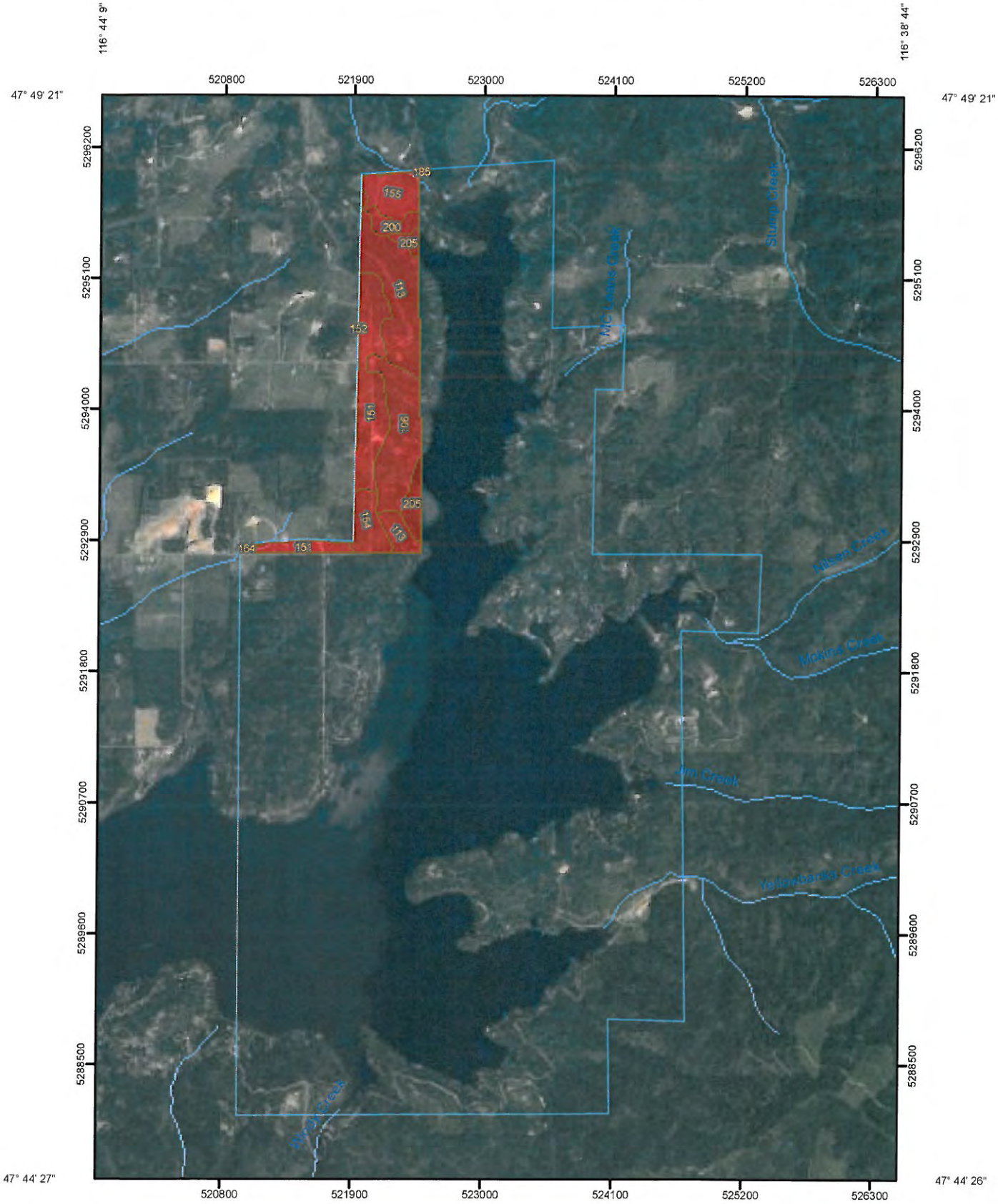
Description

Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland. It identifies the location and extent of the soils that are best suited to food, feed, fiber, forage, and oilseed crops. NRCS policy and procedures on prime and unique farmlands are published in the "Federal Register," Vol. 43, No. 21, January 31, 1978.

Rating Options

Aggregation Method: No Aggregation Necessary

Tie-break Rule: Lower



Map Scale: 1:43,400 if printed on A size (8.5" x 11") sheet.

N

Meters: 0 400 800 1,600 2,400

Feet: 0 1,500 3,000 6,000 9,000

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Units

Soil Ratings

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- Prime farmland if irrigated and reclaimed of excess salts and sodium
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- Farmland of local importance
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Political Features

- Cities

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads

MAP INFORMATION

Map Scale: 1:43,400 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 11N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Idaho Panhandle National Forest, Idaho
Survey Area Data: Not available

Soil Survey Area: Kootenai County Area, Idaho
Survey Area Data: Version 6, Jan 31, 2008

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Date(s) aerial images were photographed: 6/23/2004

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Farmland Classification

Farmland Classification— Summary by Map Unit — Idaho Panhandle National Forest, Idaho (ID670)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
No soil data available for this soil survey area.				
Subtotals for Soil Survey Area			**—**	**—**
Totals for Area of Interest			**5,901.1**	**100.0%**

Farmland Classification— Summary by Map Unit — Kootenai County Area, Idaho (ID606)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
106	Blinn stony loam, 35 to 65 percent slopes	Not prime farmland	90.4	1.5%
113	Chatcolet cobbly loam, 25 to 65 percent slopes	Not prime farmland	116.5	2.0%
151	Mokins silt loam, 5 to 20 percent slopes	Not prime farmland	114.1	1.9%
152	Mokins silt loam, 20 to 35 percent slopes	Not prime farmland	0.0	0.0%
154	Mokins-Chatcolet complex, 5 to 20 percent slopes	Not prime farmland	31.6	0.5%
155	Moscow loam, 5 to 35 percent slopes	Not prime farmland	38.4	0.7%
164	Rubson-Mokins complex, 0 to 20 percent slopes	Not prime farmland	1.8	0.0%
185	Spokane-Moscow association, 35 to 65 percent slopes	Not prime farmland	0.0	0.0%
200	Vassar-Rock outcrop complex, 20 to 55 percent slopes	Not prime farmland	16.1	0.3%
205	Water	Not prime farmland	25.7	0.4%
Subtotals for Soil Survey Area			**434.6**	**7.4%**
Totals for Area of Interest			**5,901.1**	**100.0%**

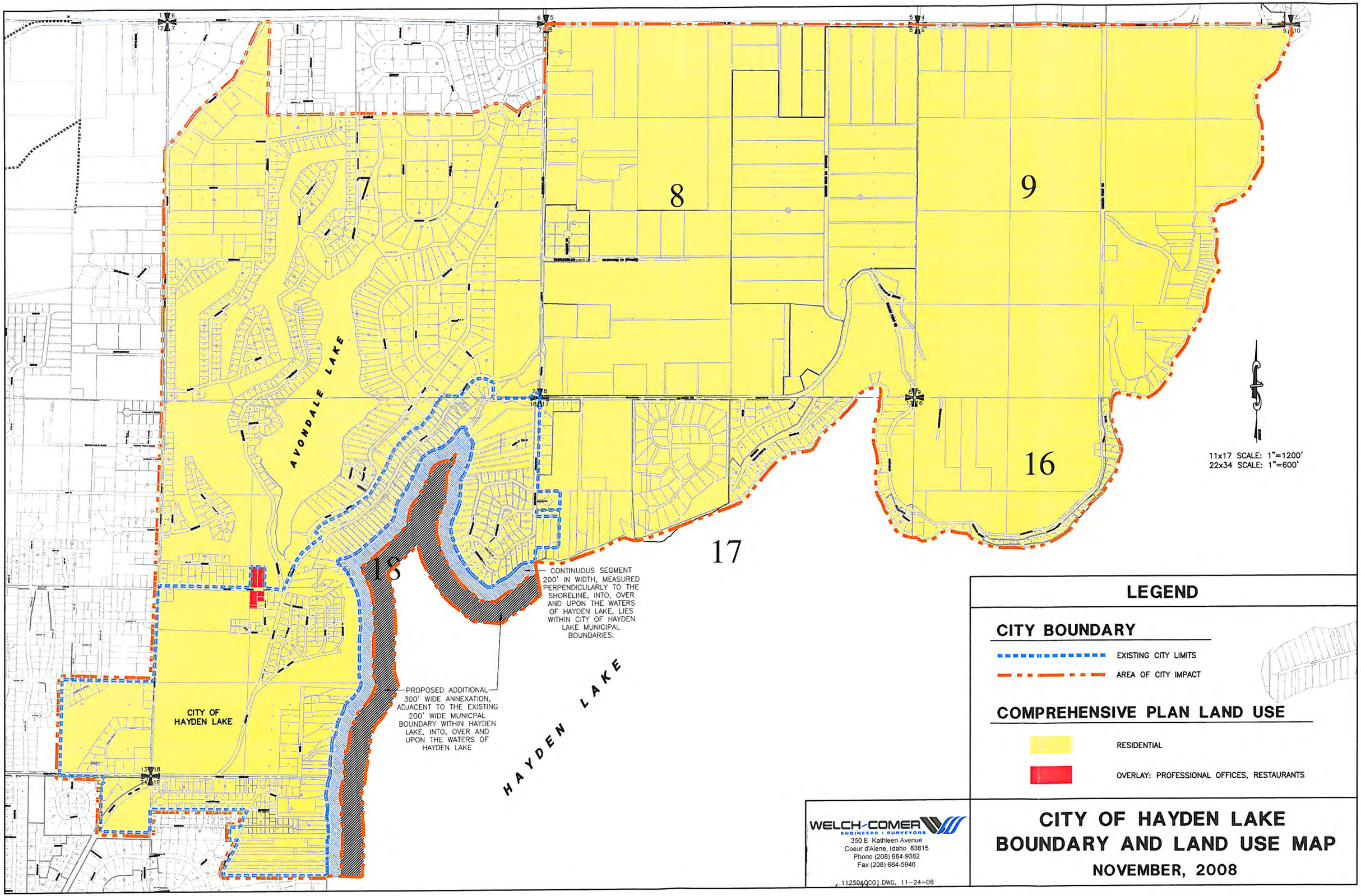
Description

Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland. It identifies the location and extent of the soils that are best suited to food, feed, fiber, forage, and oilseed crops. NRCS policy and procedures on prime and unique farmlands are published in the "Federal Register," Vol. 43, No. 21, January 31, 1978.

Rating Options

Aggregation Method: No Aggregation Necessary

Tie-break Rule: Lower



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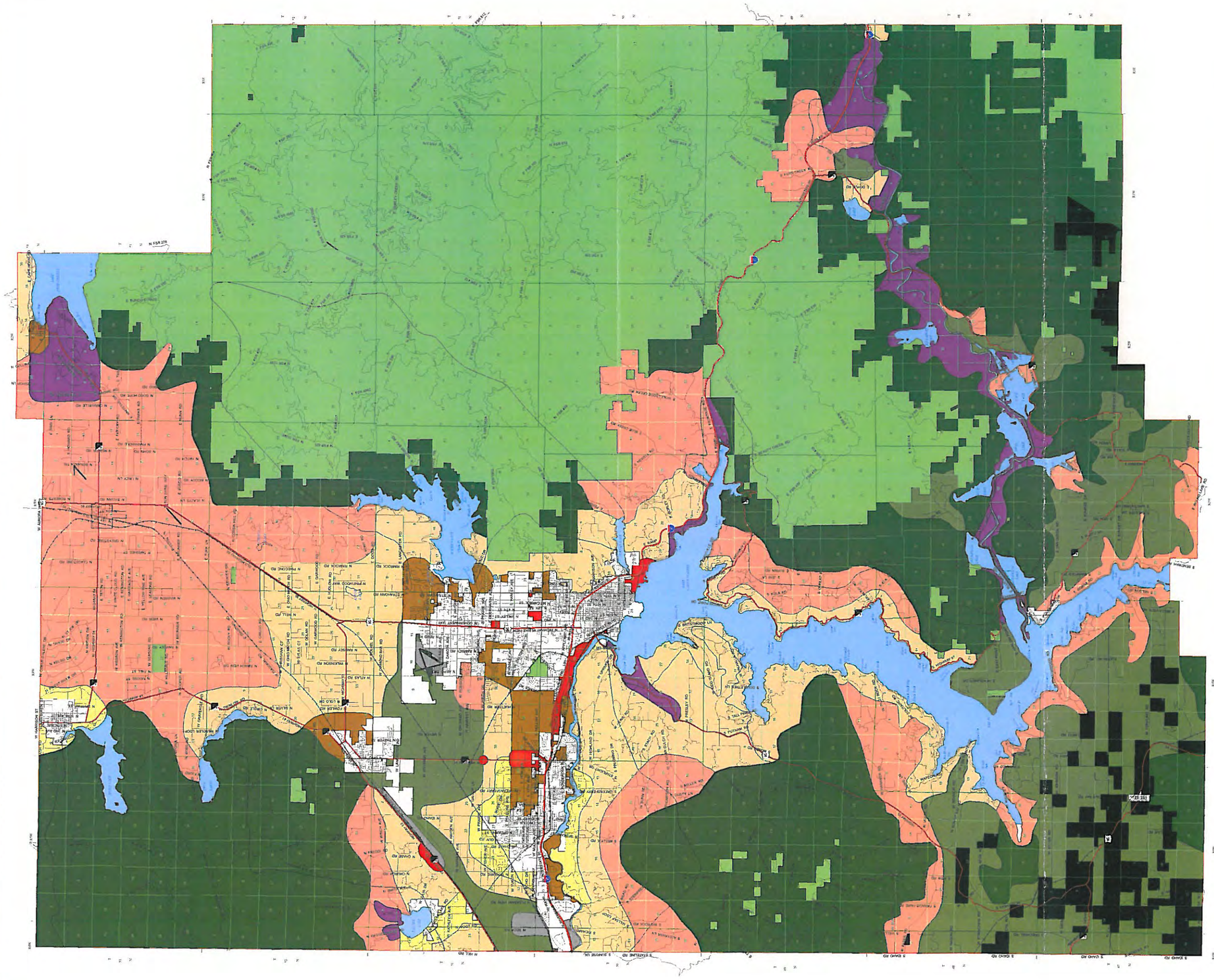
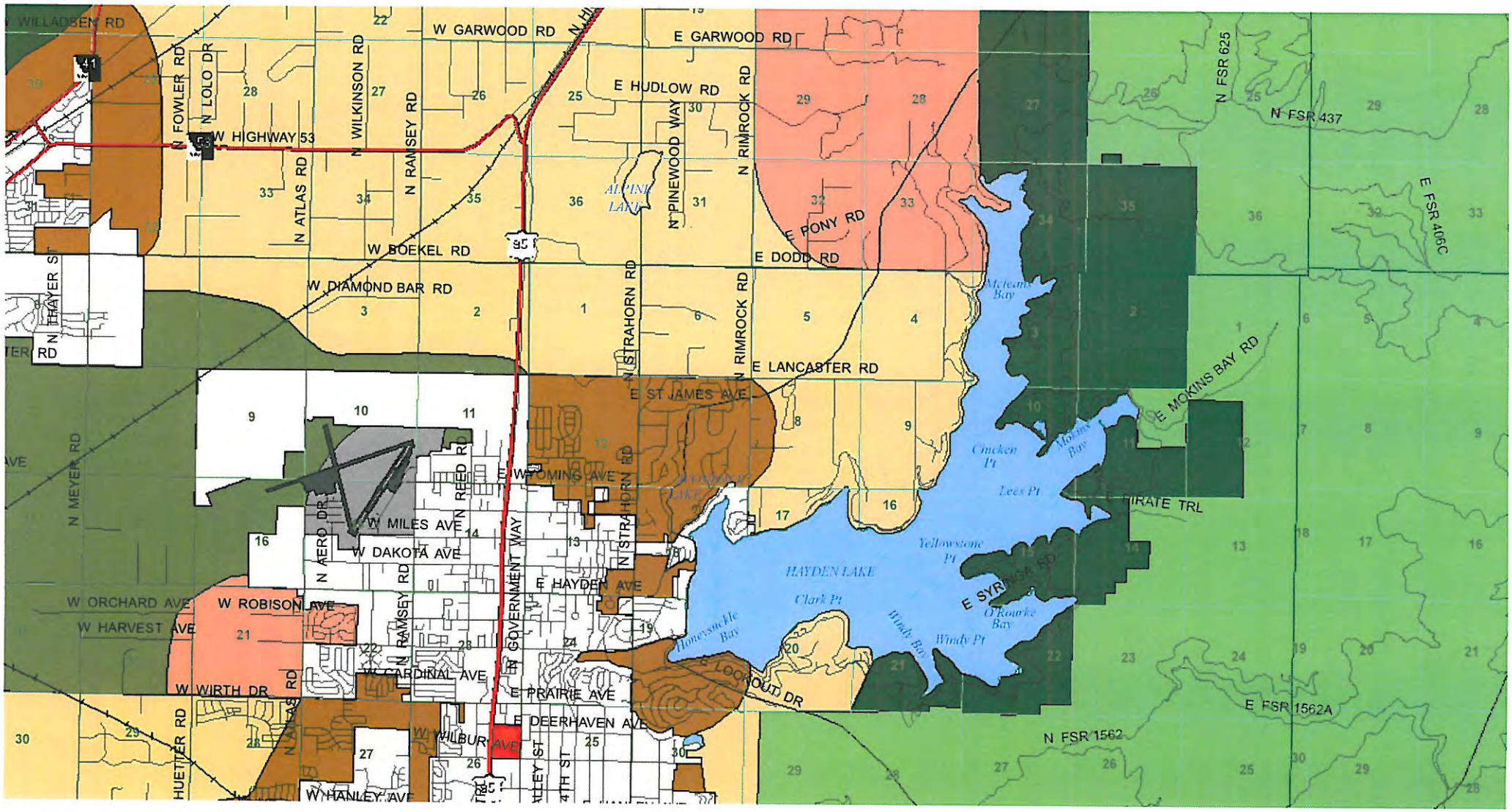
Kootenai County Comprehensive Plan
Land Use



Kootenai County Planning & Zoning Office

Prepared by:
Jim Brannon
Planning Director
Kootenai County
Planning & Zoning
451 Government Way
Coeur d'Alene, Idaho 83816
(208) 446-1600


W WILLADSEN RD
W GARWOOD RD
E GARWOOD RD
E HUDLOW RD
N FOWLER RD
N LOLO DR
W HIGHWAY 53
N WILKINSON RD
N ATLAS RD
N RAMSEY RD
N PINEWOOD WAY
N RIMROCK RD
N FSR 625
N FSR 437
E FSR 406C
ALPINE LAKE
E PONY RD
W BOEKEL RD
E DODD RD
W DIAMOND BAR RD
N THAYER ST
N STRAHORN RD
E LANCASTER RD
E ST JAMES AVE
E MOKINS BAY RD
N MEYER RD
E WYOMING AVE
N REED RD
W MILES AVE
W DAKOTA AVE
N AERO DR
N GOVERNMENT WAY
E HAYDEN AVE
W ORCHARD AVE
W ROBISON AVE
W HARVEST AVE
W CARDINAL AVE
W WIRTH DR
E PRAIRIE AVE
E DEERHAVEN AVE
W WILBUR AVE
W HANLEY AVE
HUETTER RD
N ATLAS RD
E PIRATE TRL
E SYRINGA RD
E LOOKOUT DR
E FSR 1562A
N FSR 1562
HAYDEN LAKE
Mcleans Bay
Chicken Pt
Mokins Bay
Lees Pt
Yellowstone Pt
Clark Pt
Honeysuckle Bay
Windy Bay
Windy Pt
O'Rourke Bay

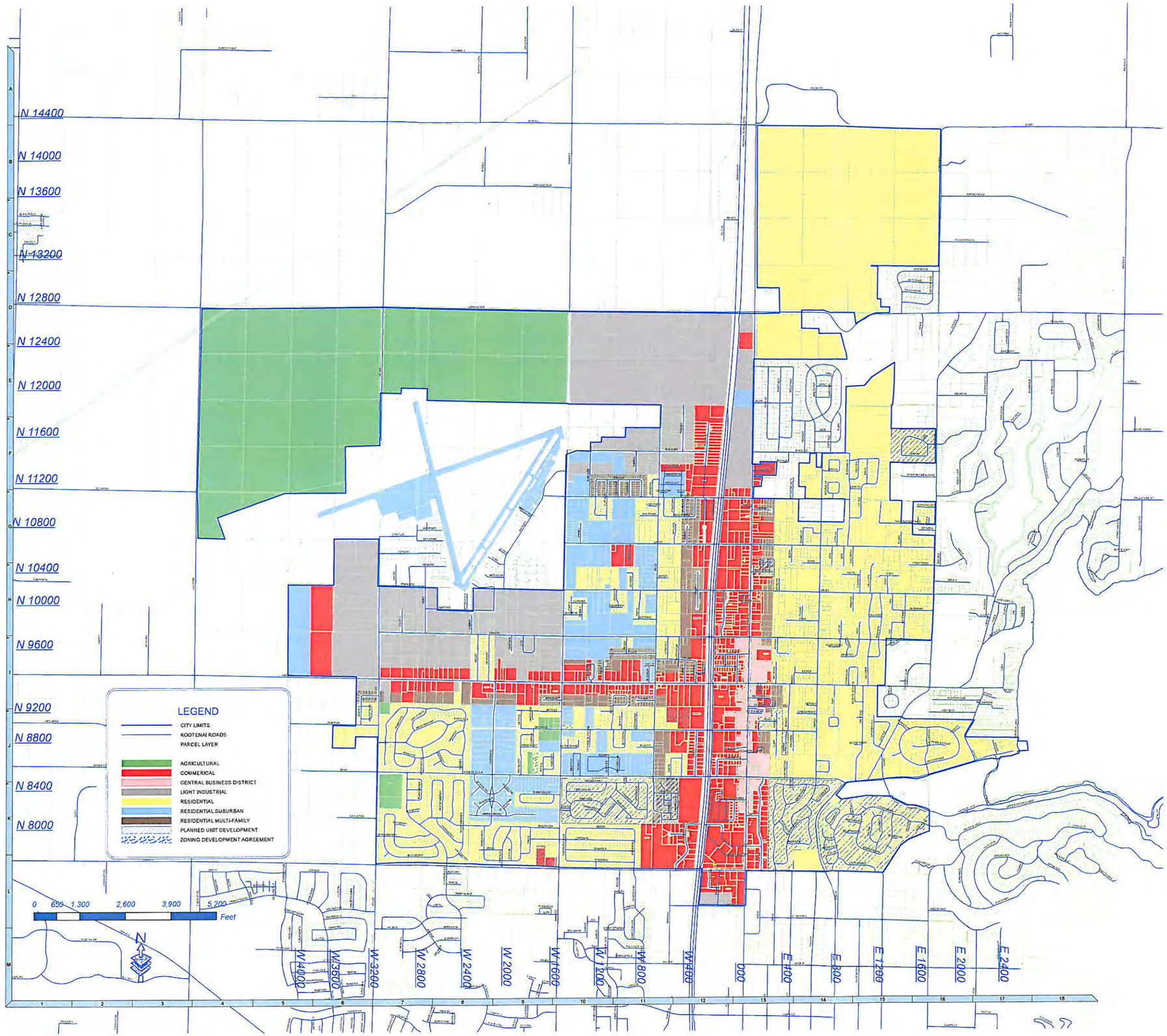
2010 ZONING CLASSES

Street Name	Location
Aero Dr	H 7
Ainsworth Dr	K 8
Alaska Loop	F 11
Arena Loop	F 14
Ash St	I 14
Ash St	G 14
Ashland Ln	J 7-8
Atlas Rd	D/K 6
Atwater St	H 10
Atwood Dr	K 13
Audubon Dr	J/K 14
Avalanche Ln	J 11
Baack St	I 13
Baldwin Ct*	J 13
Bartlett St	F 11
Bateman St	H 15
Bayberry Ct	K 7
Benoit St	G 10
Berkley Ln	J 7
Birtown Loop*	I 10
Blackberry Loop	J 7
Blake Ct*	G 15
Bligh Ct	G 13
Blossom Dr	J 10-11
Blueberry Cir	K 7-8
Bordeaux Ave	J 8-9
Bounty Loop	J 10-11
Boyles Ave	I 9
Boysenberry Loop	J 8
Braemar St	F 12
Broadmoore Dr	I/J 7-8
Brookside Dr	K 8-9
Bruce Ln	I 11
Brule Loop*	E/F 15
Buckles Rd	F 10-12
Burnham Ave	H 15
Buttercup Ln	I 11
Calloway Ln	H 14
Camp Ct	G/H 12
Capstone Ct	K 11
Cardinal Ave	K 10-11
Carisa Ct	F 11
Castle Way	I/J 15
Cattle Dr	F/G 14-15
Cedar Ct	H 13
Centa Ave	K 12
Chalet Ct	I 16
Chalet Rd	I 16
Chanticleer Ct*	F 15
Chateaux Dr	I/K 8
Chateaux Dr	K 7-8
Chelsea Ct*	H 9
Chesapeake Ct	I 13
Cheyenne Ave	F 11
Clearview Ct	H 10
Cloverleaf Dr	J/K 13-14
Commerce Dr	J 12
Coolin Dr	K 9
Coopers Hawk Dr	K 10
Cornerstone Dr	K 11-12
Cornice Lane	J 11
Corsair St	F 11
Country Ridge Ct*	J 13
Country Squire Ln	I 14
Courcelles Pkwy	J/K 7
Cozy Acres Ln	H 14
Crabapple Ct	I 11
Cranberry Ave	J 7
Crimson Dr	G 14
Crusader St	F 10
Cub Ct*	E 15
Cuff Rd*	J 13
Cutlass St	F 10
Dakota Ave	H 7-15
Dana Ct	G 13-14
Danielle Rd	G 13
Davis Cir	J 11
Dee Ct	I 11
Dempsey Dr	H 14
Dike Rd*	J 16
Dogwood Ln*	J/K 10
Drawbridge Ct	I 15
Drover Dr	F 14
Eileen Ct	I 10
Emig Rd	G 15
Enfiate Dr	I/J 9
Erica Ct*	F 15
Exra Ave	G 15
Fairview Dr*	J/K 10-11
Falkirk St	F 12
Ferrians*	I 13
Fieldstone Dr*	I/J 15
Flaucase Dr	I/J 14
Fitzne Dr	J 9
Fourth St	J/K 14
Franklin St*	L 12
Frigg Ave	J 11

*Private Street

Street Name	Location
Gairlock St	G 12
Gettys Ln	I 9
Giscours Ct	J 9
Gleason Ave	I 11
Glenmore Ct	K 15
Goerig Way*	H 8
Gooseberry Ct	K 7
Government Way	D 13
Great Hall Dr	I 7
Green Tree Ct*	F 15
Halleberry Ct	K 8
Handler Dr	J 9
Hans	F 12
Hartford Ct	I 10
Hayden Ave	I 5-15
Hayden Pines Way*	J 12
Heather Way*	J 10
Helen Ave	H 11-12
Heron Ave	K 10-11
Hess St	J 12
Highway 95	B/K 12
Hilgras Ave	H 12
Hillview Dr	G/I 15
Honeysuckle Ave	J 7-15
House Ln*	I 17
Hubble St	H 10
Huntington Ct	J 13
Icefall Dr	J 11
Indywood Dr	J 11
Iowa Ave	H 13-14
Jadyna Ct	F 13
James Crowe Dr	K 8-9
Janis St	H 12
Jannel St	G 10
Jennifer Ln	F 11
Jensen Dr	H 13
Jewel Ave	K 8-9
Jonathan St	F 11
Joshua Ct	G 14
Juno St	I 13
Justice Way	I 6
Justin Ct	H 14
Kayla Ct	I 13
Kender Ln*	H 12
Kentucky Ave	F 11
Kirkpatrick St	I 12
Krest St	G 12
Kyler Ave	H 11-10
Lacey Ave	G 10-15
Lamson Ln	H 14
Laredo Rd	F 14
Leisure Dr*	J/K 10
Liberty Ct	J 13
Linwood Dr*	J/K 10
Little Bear*	I 13
Loch Haven Dr	J/K 14-15
Loch Lomond Ct*	J 14
Loch Maree Dr	K 14-15
Loch Wood Ct	K 14
Logarch*	G 14
Lookout Dr*	H 11
Loralee Ln	I 13
Lyle Loop	H 9
MacArthur	J 10
Macie Loop	I 10
Magistrate Loop	I 6
Maple Pl	J 14
Maple St	F/J 14
Marabou Dr	K 11
Marigold Ct	I 9
Maryanna	G 15
May	G 13
Meadow Way	H/I 8
Meadowlark Way	L 12
Medoc Ct	K 8
Melrose Ave	I 13
Melrose* Ave	I 13
Mid-town Ln	I 13
Miles Ave	G 6-16
Minnesota Ave	F 11
Monaahee Ct	J 11
Montrose Ct	K 15
Morgan Ln	I 14
Morse Rd	I 13-14
Mulberry Ct	J 7
Mustang Ave	H 11
Navion Dr	H 7
Neufeld Rd	J 10
New Castle Ln	J 7
Nita Ave	J 13
Nomad Ct*	I 10
Northwood Ct	K 14
Oak St	G 14
Oakwood Dr*	J 10-11
Oklahoma Ave	F 11
Olympus Ave	H 10
Orange Blossom Dr	J 10
Orchard Ave	I 8-14

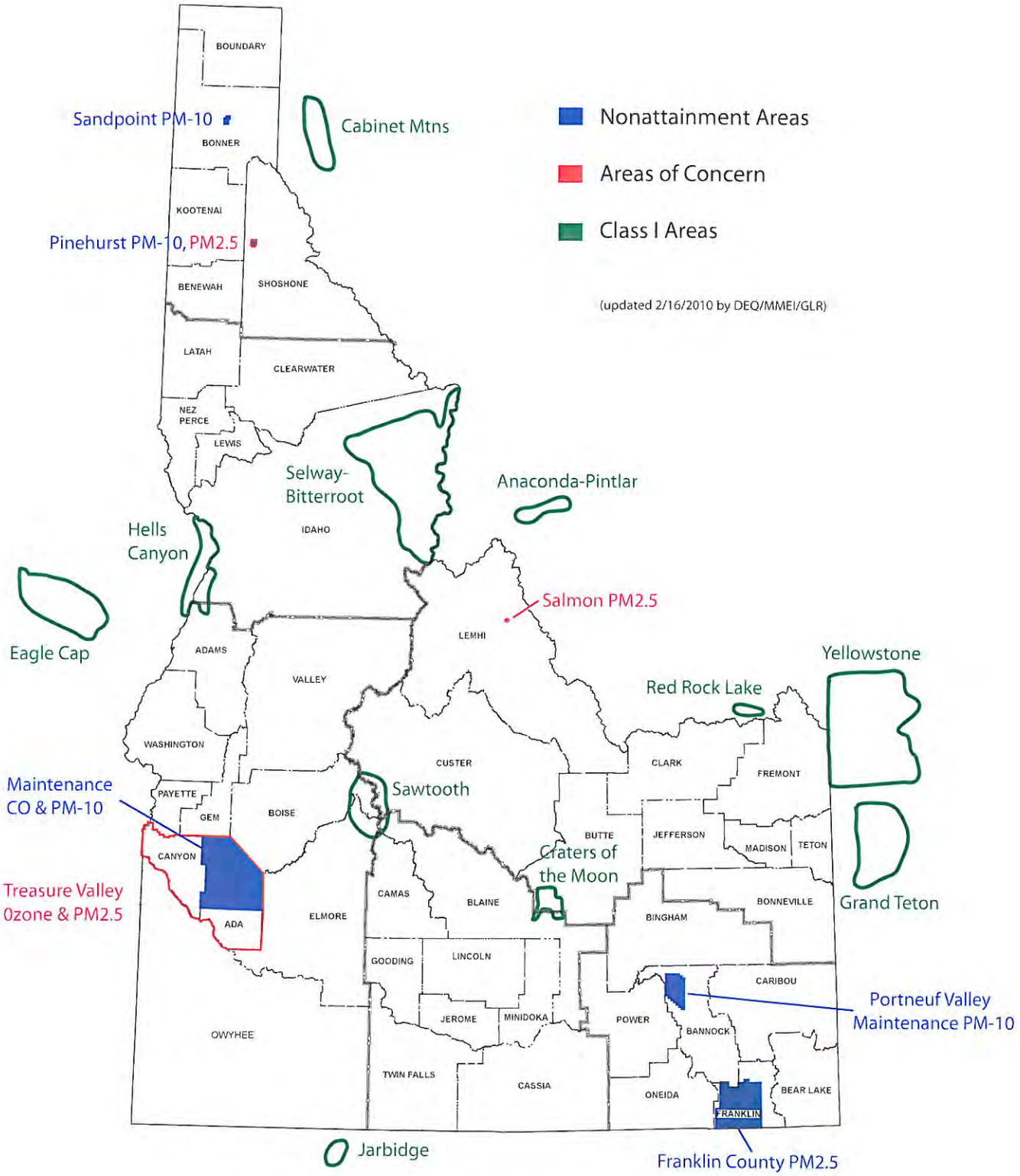
Street Name	Location
Parkside Dr	J/K 13
Parkstone Dr*	I 15
Patriot Ct	K 13
Peachtree Dr	F/G 11-
Pearl Ave	G 14
Pebblestone Ct*	J 15-16
Pines Way*	J 12
Pinto Ln	H 11
Placer Ct	J 11
Porthill Ct	J 7
Prairie Ave	K 7-15
Prescott Dr	J 9
Progress Dr*	J 10
Ptarmigan Ave	I 14
Ramsey Rd	D/K 9
Ramsgate Ln	I J 7
Raspberry Ln	K 7-8
Reed Rd	E/K 13
Retirewood Ct*	K 11
Retreat Ln*	I 14
Riata Rd	F 14
Ridgemont Ave	J 9
Ridgewood Dr*	K 14
Rocking R Rd	F/G 14
Rosewood Ct*	J 10
Roundup Cir	F 14
Rude St	J/K 13
Rudolph Ct	J 8
Ruskie Rd	J 10
Ryan Dr	I 13
Sally St	K 9
Salmonberry Loop	J/K 8
Sandpiper Way	K 10
Sarah Loop*	I 13
Sargent's Dr*	J 12
Schmidt St	I 12
Seaside St	G 11
Secretariat Ln	I 14
Selkirk Ct	K 15
Smith	J 15
Snowflake Ln	J 11
Shaw St	I 11
Sheffield Dr	I 8
Sheridan Ave	F 11
Shiloh*	K 14
Skylark Ln	G 11
Southwood Ct	K 14
Spoor	G 13
St Emillion Dr	J 8-9
St Estephe Ct	J 9
Starling Ave	K 10-1
Starr Loop	K 12
Stinson Loop	F 10-1
Stonehaven Ct	K 15
Stonehaven Dr	K 14-1
Strahorn Rd	E/J 15
Stratford Dr	G 15
Strawberry Ln	K 7
Summerfield Loop	K 13
Sundier Rd	F 10
Sunny Ln*	J 12
Sunview Ln	H 15
Sutherland Ct	J 10
Tamarindo Ln	I 10
Tanager Ave	K 10-11
Tanglewood Ct*	J 10
Tartan Dr	J/K 15
Tayne St	H 12
Tessa Way	H 11
Texas Ave	F 11
Torrey Ln	I/J 7-8
Tracey Rd	E 11
Tresdale Ct	J 10
Tumbleweed Cir	J 9
Ulysses Ave	H 10
Uplands Dr	K 15
Vail St	H 15
Valley Way	H/I 8
Vantage Dr	K 9
Vicki St	H 12
Victoria Ave	H 15
Village Dr*	K 14
Walker Rd*	H 14
Walrose Loop	F 13
Warren St	E/F 12
Warwick Ct	J 8
Wayne Dr	J/K 13
Whispering Pines	KG 15
Woodlawn Dr*	J 10-11
Woodstone Ct*	J 15
Woodstone Dr*	I/J 15-16
Woodvine Dr	J 13
Wyoming Ave	F 10-14
Zack Ct*	H 14
Zenith St	H 10



Official Map of the City of Hayden
8930 N Government Way
Hayden, ID 83835

T51N R3&4 W, BM
Kootenai County
November 1, 2010

Idaho Air Quality Planning Areas



APPENDIX D
INSPECTION RESULTS

TV Inspection Notes (from Operator)

Lift Station Inspection Notes

Call Out Graphs

WELCH-COMER
ENGINEERS | SURVEYORS

Lot Upgrades		
Address/Near	**Number of Lots**	**Can't Find**
4498 E Deepwater Ct	1	
4492 E Deepwater Ct	1	
4468 E Deepwater Ct	1	
4404 E Deepwater Ct	1	
4400 E Deepwater Ct	1	
Deepwater Ct	6	
4354 E Deepwater Ct	1	
4318 E Deepwater Ct	1	
4300 E Deepwater Ct	1	
4274 E Deepwater Ct	1	
11395 N Split Rock Rd	1	
4381 E English Point Rd	1	
10970 N Point Hayden Dr	1	
2963 E Underbrush Trl	1	
2977 E Underbrush Trl	1	
3005 E Underbrush Trl	1	
11089 N Point Hayden Dr	1	
11230 N Lakeview Dr	1	
10868 N Lakeview Dr	1	
10900 N Lakeview Dr	1	
10858 N Lakeview Dr	1	
Lakeview Dr	4	
11328 N Friar Dr	1	
11381 N Tudor Dr	1	
11501 N Friar Dr		1
11352 N Saxon Dr	1	
11393 N Saxon Dr	1	
11465 N Saxon Dr	1	
11392 N Saxon Dr	1	
11466 N Saxon Dr	1	
11516 N Saxon Dr	1	
11612 N Saxon Dr	1	
11677 N Saxon Dr	1	
11674 N Saxon Dr	1	
11641 N Friar Dr	1	
2834 E Somerset Ct	1	
2831 E Somerset Ct	1	
11851 N Friar Dr	1	
11843 N Eastshore Dr	1	
11901 N Eastshore Dr	1	
11953 N Eastshore Dr	1	
12020 N Friar Dr	1	
11994 N Friar Dr	1	
11948 N Friar Dr	1	
11880 N Friar Dr	1	
11820 N Friar Dr	1	
10626 N Bluerock Ln		1
10634 N Bluerock Ln		1

10750 N Point Hayden Dr		1
10652 E Point Hayden Dr		1
10658 N Point Hayden Dr		1
N Point Hayden Dr		1
3792 E Upper Hayden Lake Rd		1
2959 E Ponderosa Ln	1	
2961 E Ponderosa Ln	1	
2965 E Ponderosa Ln	1	
2969 E Ponderosa Ln	1	
Friar Dr	2	
11245 N Eastshore Dr	1	
11361 N Eastshore Dr	1	
Eastshore Dr	1	
11493 N Eastshore Dr	1	
11557 N Eastshore Dr		1
11646 N Eastshore Dr	1	
11582 N Eastshore Dr	1	
11496 N Eastshore Dr	1	
11458 N Eastshore Dr	1	
11410 N Eastshore Dr	1	
11296 N Eastshore Dr	1	
9244 N Chalet Rd	1	
N Chalet Rd		2
9132 N Chalet Rd		1
9035 N Chalet Rd		1
Upper Hayden Lake Rd	8	
3920 Upper Hayden Lake Rd	1	
11597 N Eastshore Dr	1	
Eastshore Dr	1	
11685 N Eastshore Dr	1	
11582 N Eastshore Dr	1	
11646 N Eastshore Dr	1	
11710 N Eastshore Dr	1	
11809 N Eastshore Dr	1	
11843 N Eastshore Dr	1	
11901 N Eastshore Dr	1	
11953 N Eastshore Dr	1	
11674 N Saxon Dr	1	
11612 N Saxon Dr	1	
11516 N Saxon Dr	1	
2834 E Somerset Ct	1	
2831 E Somerset Ct	1	
11851 N Friar Dr	1	
11820 N Friar Dr	1	
11880 N Friar Dr	1	
11948 N Friar Dr	1	
11994 N Friar Dr	1	
12020 N Friar Dr	1	
12125 N Friar Dr	1	
12173 N Friar Dr	1	
12245 N Friar Dr	1	
12190 N Friar Dr	1	

12326 N Friar Dr	1	
12372 N Friar Dr	1	
11985 N Rimrock Rd	1	
3082 E St James Ave	1	
12321 N Sherwood Ct	1	
St James Ave	2	
3162 E St James Ave	1	
3210 E St James Ave	1	
3207 E St James Ave	1	
3242 E St James Ave	1	
3265 E St James Ave	1	
3264 E St James Ave	1	
3300 E St James Ave	1	
3417 E St James Ave	1	
3456 E St James Ave	1	
3496 E St James Ave	1	
3534 E St James Ave	1	
3562 E St James Ave	1	
3022 E Cambridge Dr	1	
3052 E Cambridge Dr	1	
3092 E Cambridge Dr	1	
3134 E Cambridge Dr	1	
3164 E Cambridge Dr	1	
3182 E Cambridge Dr	1	
3206 E Cambridge Dr	1	
Cambridge Dr	1	
12777 N Rimrock Rd	1	
12739 N Rimrock Rd	1	
12736 N Rimrock Rd		1
12522 N Rimrock Rd		1
12440 N Rimrock Rd		1
12368 N Rimrock Rd		1
12324 N Rimrock Rd		1
12234 N Rimrock Rd		1
3375 E Aspen Ln		1
E Aspen Ln		1
3372 E Aspen Ln		1
3368 E Aspen Ln		1
3370 E Aspen Ln		1

ARI Valve Replacement	
Address/Near	**Notes**
Between 4174 E English Point Rd and 11168 N Patty Dr	eliminate (excavate, cap, fill)
2701 E Point Hayden Dr	eliminate (excavate, cap, fill)
Between 3442 E Lookout Dr and 3410 E Lookout Dr	replace
128613 Unknown, near Doe Run	replaced
St. James/Avondale Area	Search for, replace
Near MH 294	Search for, replace

Sags			
Upper Manhole	**Lower Manhole**	**Severe?**	**Notes**
219	212 (269)	N	
228	220	N	
281	280	Y	
284	283	Y	
268	267	Y	
245	244	Y	
152	149	N	LAT problem
159	158	Y	
137	136	Y	
148	146	Y	97.4 feet
322	321	Y	
167	166	Y	
162	161	Y	
139	138	Y	
91	90	Y	
93	92	Y	
108	107	N	
109	108	N	

Infiltration and Inflow		
Upper Manhole	**Lower Manhole**	**Notes**
288	287	
289	288	
265	264	
268	267	
83	81	concrete pipe
158	157	
159	158	
138	137	service
136	135	do service
318	317	all over
310	310	MH
315	315	MH
173	173	
109	109	MH
109	108	
108	107	
106	105	
102	101	
162	161	
139	138	weeping steady stream
169	168	possible I&I
179	179	

Roots		
Upper Manhole	**Lower Manhole**	**Notes**
273	272	
248	247	
247	246	
244	243	Roots in LAT

Miscellaneous			
Address/Near	**Upper Manhole**	**Lower Manhole**	**Notes**
11491 N Avondale Loop			service T cracked
	84	83	small crack
	146	145	joint separated, small
	290	289	unknown
	246	222	mystery pipe
	106	105	H_2S
	102	101	bad grease
12752 N Pebble Creek Dr			point repair made
	103	103	H_2S corrosion

HLRWSD Lift Station Facilities Report

Lift Station Inspection Notes

Lift Station: Avondale

Lift Station Pumps	Status	Model	Hp	Flow	Age	Comments
				cfs		
Pump #1	ON	4se7524hl	7.5		2010	Barnes, 7 Impeller size
Pump #2	ON	4se7524hl	7.5		2010	Barnes, 7 Impeller size
Both pumps						

Lift Station Coatings	
Interior:	coal tar epoxy over steel
Exterior:	same
Interior Components	
Rails/Chains:	Galvanized rail, SS chain
Discharge Piping:	coal tar epoxy
Floats:	multi-smar prob.
Electrical:	
	new
Access/Site Issues	
	poor location, one car parking
Additional Comments:	
	lift station needs coating, pump #1 has blow by

HLRWSD Lift Station Facilities Report

Lift Station Inspection Notes

Lift Station: Canterbury Cove

Lift Station Pumps	Status	Model	Hp	Flow	Age	Comments
				cfs		
Pump #1	ON	7se7524l	7.5		2011	Barnes, 7.5 Impeller size
Pump #2	ON	7se7524l	7.5		2007	
Both pumps						

Lift Station Coatings	
Interior:	concrete
Exterior:	same
Interior Components	
Rails/Chains:	SS rails, SS chains
Discharge Piping:	Ductile iron, very rusty
Floats:	6 floats good
Electrical:	
	door needs relocated
Access/Site Issues	
	dangerous, needs to be relocated
	access to this site with equipment is life threatening in the winter and in any wet weather
Additional Comments:	
	I feel this station should be moved to the culdesac for safety reasons and proper maintenance

HLRWSD Lift Station Facilities Report

Lift Station Inspection Notes

Lift Station: Clark House

Lift Station Pumps	Status	Model	Hp	Flow	Age	Comments
				cfs		
Pump #1	ON	s4m750m2-4	7.5		2008	Hydro, 7.56 Impeller size
Pump #2	ON	s4m750m2-5	7.5		2008	
Both pumps						

Lift Station Coatings		
Interior:	tar epoxy steel	
Exterior:	same	rust on steel bolts

Interior Components	
Rails/Chains:	SS chain, SS rails
Discharge Piping:	Ductile Iron
Floats:	ok
	**lots of flaking rust
Electrical:	
	Panel needs to be relocated
Access/Site Issues	
	Parking poor
Additional Comments:	
	Beacon light not working
	Lid, one latch broken

HLRWSD Lift Station Facilities Report

Lift Station Inspection Notes

Lift Station: Coopers Bay

Lift Station Pumps	Status	Model	Hp	Flow	Age	Comments
				cfs		
Pump #1	ON	sgv75321	7.5		2009	Barnes, 6.46 Impeller size
Pump #2	ON	sgv75322	7.5		2009	
Both pumps						

Lift Station Coatings	
Interior:	spray rock
Exterior:	tar epoxy

Interior Components	
Rails/Chains:	SS bars, SS chain
Discharge Piping:	New ductile iron
Floats:	new

Electrical:	
	Panel needs moved

Access/Site Issues	
	Good

Additional Comments:		
	Lift station in good shape	Removed 5 trees
	Panel light out	

HLRWSD Lift Station Facilities Report

Lift Station Inspection Notes

Lift Station: Country Club

Lift Station Pumps	Status	Model	Hp	Flow	Age	Comments
				cfs		
Pump #1	ON	s4m1000m4-1	10		2006	Hydro, 8.38 Impeller size
Pump #2	ON	s4m1000m4-1	10			
Both pumps						

Lift Station Coatings	
Interior:	concrete
Exterior:	same

Interior Components	
Rails/Chains:	SS chain, old galv. Rails
Discharge Piping:	ductile, very poor shape, old check valves
Floats:	floats - yes

Electrical:	
	location good
	panel old

Access/Site Issues	
	Ok
	Bad in winter

Additional Comments:	
	If check valves fail at this station and pumps were to stop working, we would have a major problem

HLRWSD Lift Station Facilities Report

Lift Station Inspection Notes

Lift Station: English Point

Lift Station Pumps	Status	Model	Hp	Flow	Age	Comments
				cfs		
Pump #1	ON	np 3153 sh			2010	flyght
Pump #2	ON	np 3153 sh			2010	
Both pumps						

Lift Station Coatings	
Interior:	spray rock good
Exterior:	tar good

Interior Components	
Rails/Chains:	SS good
Discharge Piping:	good
Floats:	good

Electrical:	
	good

Access/Site Issues	
	None

Additional Comments:	
	new lift station

HLRWSD Lift Station Facilities Report

Lift Station Inspection Notes

Lift Station: The Falls at Hayden

Lift Station Pumps	Status	Model	Hp	Flow	Age	Comments
				cfs		
Pump #1	ON	np 3153 sh			2010	flyght
Pump #2	ON	np 3153 sh			2010	
Both pumps						

Lift Station Coatings	
Interior:	spray rock
Exterior:	tar

Interior Components	
Rails/Chains:	SS chains, SS rails
Discharge Piping:	
Floats:	sensor prob
	back up sensor prob

Electrical:	
	Good

Access/Site Issues	
	Good

Additional Comments:

HLRWSD Lift Station Facilities Report

Lift Station Inspection Notes

Lift Station: Forest Ridge

Lift Station Pumps	Status	Model	Hp	Flow	Age	Comments
				cfs		
Pump #1	ON				2008	
Pump #2	ON				2008	

Lift Station Coatings	
Interior:	concrete
Exterior:	concrete coal tar epoxy

Interior Components	
Rails/Chains:	SS chain, SS rail
Discharge Piping:	Ductile Iron
Floats:	Floats and transducer

Electrical:	
	Ok

Access/Site Issues	
	Ok

Additional Comments:	
	Looks bad

HLRWSD Lift Station Facilities Report

Lift Station Inspection Notes

Lift Station: H1-D

Lift Station Pumps	Status	Model	Hp	Flow	Age	Comments
				cfs		
Pump #1	ON				1999	
Pump #2	ON				1999	

Lift Station Coatings	
Interior:	concrete
Exterior:	concrete

Interior Components	
Rails/Chains:	N/A
Discharge Piping:	Ductile iron epoxy
Floats:	pressure switch
Electrical:	
	good
Access/Site Issues	
	good
Additional Comments:	
	Buy back up pump

HLRWSD Lift Station Facilities Report

Lift Station Inspection Notes

Lift Station: Honeysuckle Beach

Lift Station Pumps	Status	Model	Hp	Flow	Age	Comments
				cfs		
Pump #1	ON	4xse3024a	3		2000	Barnes, 6.25 Impeller size
Pump #2	ON	4xse3024a	3		2007	
Both pumps						

Lift Station Coatings	
Interior:	steel epoxy, lots of rust
Exterior:	steel?
Interior Components	
Rails/Chains:	SS, old chain, old rails
Discharge Piping:	ductile iron
Floats:	yes
Electrical:	
	panel needs to be relocated
	old
Access/Site Issues	
	good
Additional Comments:	
	We have a great deal of ragging with the pumps due to the public restrooms
	Lots of trash High amps for pump #2

HLRWSD Lift Station Facilities Report

Lift Station Inspection Notes

Lift Station: Packsaddle

Lift Station Pumps	Status	Model	Hp	Flow	Age	Comments
				cfs		
Pump #1	ON	sk50	0.5		2002	Hydro
Pump #2	ON	sk51	0.5		2002	

Lift Station Coatings

Interior:	concrete
Exterior:	concrete

Interior Components

Rails/Chains:	N/A, PVC pipe/rope
Discharge Piping:	PVC
Floats:	yes

Electrical:

old, needs new control center

Access/Site Issues

good

Additional Comments:

I would like to see septic tank bypassed and grinder pumps put in

HLRWSD Lift Station Facilities Report

Lift Station Inspection Notes

Lift Station: Point Hayden

Lift Station Pumps	Status	Model	Hp	Flow	Age	Comments
				cfs		
Pump #1	ON	sgv5022l	5			Barnes, 6.25 Impeller size
Pump #2	ON	sgv5022l	5		2010	
Both pumps						

Lift Station Coatings	
Interior:	fiberglass slip liner, Good
Exterior:	same/steel casing
Interior Components	
Rails/Chains:	SS chain, No rails/pitless
Discharge Piping:	poor, PVC (ball checks in bad shape)
Floats:	ok
Electrical:	
	poor, needs upgrade
Access/Site Issues	
	no parking, small street
Additional Comments:	
	lift station too small, no flow stored

HLRWSD Lift Station Facilities Report

Lift Station Inspection Notes

Lift Station: Sandy Cove

Lift Station Pumps	Status	Model	Hp	Flow	Age	Comments
				cfs		
Pump #1	ON	HRGF500M2-4	5		2006	Hydro, 10.13 Impeller size
Pump #2	ON	HRGF500M2-5	5		2010	
Both pumps						

Lift Station Coatings	
Interior:	steel coal tar epoxy
Exterior:	steel
Interior Components	
Rails/Chains:	SS chain, galvanized rails
Discharge Piping:	Ductile iron pipe, galvanized pipe, PVC pipe
Floats:	good
Electrical:	
	poor, needs to be relocated
Access/Site Issues	
	poor/dangerous
Additional Comments:	
	no generator set — pump 2 indicator light out
	bad approach

HLRWSD Lift Station Facilities Report

Lift Station Inspection Notes

Lift Station: Sherwood Court

Lift Station Pumps	Status	Model	Hp	Flow	Age	Comments
				cfs		
Pump #1	ON	s4nx200cc	2		2003	Hydro, 5.88 Impeller size
Pump #2	ON	s4nx200cc	2		2005	
Both Pumps						

Lift Station Coatings	
Interior:	Coal tar, epoxy over steel
Exterior:	same

Interior Components	
Rails/Chains:	SS chain, SS rails
Discharge Piping:	ductile iron, lots of rust
Floats:	good

Electrical:	
	old, poor, needs relocated

Access/Site Issues	
	ok, slow street

Additional Comments:	
	no generator

HLRWSD Lift Station Facilities Report

Lift Station Inspection Notes

Lift Station: Split Rock

Lift Station Pumps	Status	Model	Hp	Flow	Age	Comments
				cfs		
Pump #1	ON	25515-9	1.5		2006	Grundfos
Pump #2	ON	25515-9	1.5			
Both pumps						

Lift Station Coatings	
Interior:	concrete
Exterior:	concrete

Interior Components	
Rails/Chains:	N/A
Discharge Piping:	PVC
Floats:	Ok

Electrical:	
	poor (in wetwell)

Access/Site Issues	
	Bad, cannot turn around

Additional Comments:		
	Hard to do accurate drawdown, station needs cleaned;	
	looks like lids have not been off in several months	Needs attention

HLRWSD Lift Station Facilities Report

Lift Station Inspection Notes

Lift Station: Thames Court

Lift Station Pumps	Status	Model	Hp	Flow	Age	Comments
				cfs		
Pump #1	ON	s4nx300	2		2007	Hydro, 6.27 Impeller size
Pump #2	ON	s4nx301	2		2007	
Both pumps						

Lift Station Coatings	
Interior:	coat tar over steel, peeling, bad rust, liner gone
Exterior:	?
Interior Components	
Rails/Chains:	SS chain, galvanized rails
Discharge Piping:	Ductile iron, coating gone
Floats:	new
Electrical:	
	panel needs relocated
Access/Site Issues	
	not safe location, on curve, parking for one car
Additional Comments:	
	generator needs paint

HLRWSD Lift Station Facilities Report

Lift Station Inspection Notes

Lift Station: Wright's Park

Lift Station Pumps	Status	Model	Hp	Flow	Age	Comments
				cfs		
Pump #1	ON	s4m750m2-4	7.5			Hydro, 5.56 Impeller size
Pump #2	ON	s4m750m2-4	7.5			
Both pumps						

Lift Station Coatings	
Interior:	coal tar epoxy over steel, lots of rust
Exterior:	

Interior Components	
Rails/Chains:	SS chain, SS rail (old rail holder)
Discharge Piping:	Ductile iron coating has flaked off and rusting
Floats:	ok

Electrical:	
	poor, no room to work, needs upgrade

Access/Site Issues	
	ok

Additional Comments:	
	just rebuilt scrubber vault, it is dry now; spray rock; new Bromel motor; new sump pump.

HLRWSD Lift Station Facilities Report

Lift Station Inspection Notes

Date: 9/13/11

Lift Station: Avondale

Lift Station Pumps	Time 1	Time 2	Height 1	Height 2	Diameter	High Float	Low Float	Storage
	sec	sec	ft	ft	ft	ft	ft	ft
Pump #1	120		11.9	12.3	9	probe 10 ft		
Pump #2	120		12.3	12.9	9			
Both pumps	60		12.8	13.2	9			

Lift Station Pumps	Status	Model	Hp	Flow	Age	Comments
				gpm		
Pump #1	ON	4se7524hl	7.5	99.1	2010	Barnes, 7 Impeller size
Pump #2	ON	4se7524hl	7.5	158.6	2010	Barnes, 7 Impeller size
Both pumps				158.6		

HLRWSD Lift Station Facilities Report

Lift Station Inspection Notes

Date:_____

Lift Station: Canterbury Cove

Lift Station Pumps	Time 1	Time 2	Height 1	Height 2	Diameter	High Float	Low Float	Storage
	sec	sec	ft	ft	ft	ft	ft	ft
Pump #1	60		8.7	9.3	6	10.58	7.42	3.17
Pump #2	60		9.3	9.9	6			
Both pumps	60		9.9	10.6	6			

Lift Station Pumps	Status	Model	Hp	Flow	Age	Comments
				gpm		
Pump #1	ON	7se7524l	7.5	141.0	2011	Barnes, 7.5 Impeller size
Pump #2	ON	7se7524l	7.5	114.6	2007	
Both pumps				158.6		

HLRWSD Lift Station Facilities Report

Lift Station Inspection Notes

Date: 8/23/11

Lift Station: Clark House

Lift Station Pumps	Time 1	Time 2	Height 1	Height 2	Diameter	High Float	Low Float	Storage
	sec	sec	ft	ft	ft	ft	ft	ft
Pump #1	0	60	7.3	7.6	9	8.25	11	2.75
Pump #2	0	60	7.6	7.9	9			
Both pumps	0	60	7.9	8.5	9			

Lift Station Pumps	Status	Model	Hp	Flow	Age	Comments
				gpm		
Pump #1	ON	s4m750m2-4	7.5	119.0	2008	Hydro, 7.56 Impeller size
Pump #2	ON	s4m750m2-5	7.5	158.6	2008	
Both pumps				277.6		

HLRWSD Lift Station Facilities Report

Lift Station Inspection Notes

Date: 8/23/11

Lift Station: Coopers Bay

Lift Station Pumps	Time 1	Time 2	Height 1	Height 2	Diameter	High Float	Low Float	Storage
	sec	sec	ft	ft	ft	ft	ft	ft
Pump #1	0	75	9.5	9.8	6.5			0
Pump #2	0	180	9.5	9.8	6.5			
Both pumps	0	55	9.5	9.8	6.5			

Lift Station Pumps	Status	Model	Hp	Flow	Age	Comments
				gpm		
Pump #1	ON	sgv75321	7.5	41.4	2009	Barnes, 6.46 Impeller size
Pump #2	ON	sgv75322	7.5	17.2	2009	
Both pumps				79.0		

HLRWSD Lift Station Facilities Report

Lift Station Inspection Notes

Date: 9/8/11

Lift Station: Country Club

Lift Station Pumps	Time 1	Time 2	Height 1	Height 2	Area	High Float	Low Float	Storage
	sec	sec	ft	ft	ft^2	ft	ft	ft
Pump #1		60	13.1	13.3	240			0
Pump #2		60	13.3	13.4	240			
Both pumps		60	13.4	13.6	240			

Lift Station Pumps	Status	Model	Hp	Flow	Age	Comments
				gpm		
Pump #1	ON	s4m1000m4-1	10	299.2	2006	Hydro, 8.38 Impeller size
Pump #2	ON	s4m1000m4-1	10	299.2		
Both pumps				299.2		

HLRWSD Lift Station Facilities Report

Lift Station Inspection Notes

Date: 7/7/11

Lift Station: English Point

Lift Station Pumps	Time 1	Time 2	Height 1	Height 2	Diameter	High Float	Low Float	Storage
	sec	sec	ft	ft	ft	ft	ft	ft
Pump #1					8	9.8	13.6	3.8
Pump #2					8			
Both pumps								

Lift Station Pumps	Status	Model	Hp	Flow	Age	Comments
				gpm		
Pump #1	ON	np 3153 sh		452.0	2010	flyght
Pump #2	ON	np 3153 sh		569.0	2010	
Both pumps				773.0		

HLRWSD Lift Station Facilities Report

Lift Station Inspection Notes

Date:11/17/11

Lift Station: The Falls at Hayden

Lift Station Pumps	Time 1	Time 2	Height 1	Height 2	Diameter	High Float	Low Float	Storage
	sec	sec	ft	ft	ft	ft	ft	ft
Pump #1	0	120	12.71	13.79	8			0
Pump #2	0	120	13.79	15.17	8			
Both pumps	0	150	15.17	17.83	8			

Lift Station Pumps	Status	Model	Hp	Flow	Age	Comments
				gpm		
Pump #1	ON	np 3153 sh		203.67	2010	flyght
Pump #2	ON	np 3153 sh		258.51	2010	
Both pumps				401.08		

HLRWSD Lift Station Facilities Report

Lift Station Inspection Notes

Date: 11/17/11

Lift Station: Forest Ridge

Lift Station Pumps	Time 1	Time 2	Height 1	Height 2	Diameter	High Float	Low Float	Storage
	sec	sec	ft	ft	ft	ft	ft	ft
Pump #1	0	120	18	18.54	8	16.5		16.5
Pump #2	Blowby needed to fix pump				8			

Lift Station Pumps	Status	Model	Hp	Flow	Age	Comments
				gpm		
Pump #1	ON			101.84	2008	
Pump #2	ON				2008	

HLRWSD Lift Station Facilities Report

Lift Station Inspection Notes

Date: 9/8/11

Lift Station: H1-D

Lift Station Pumps	Time 1	Time 2	Height 1	Height 2	Area	High Float	Low Float	Storage
	sec	sec	ft	ft	ft	ft	ft	ft
Pump #1		60	3.15	3.12		7	2	5
Pump #2		60	3.13	2.95				

Lift Station Pumps	Status	Model	Hp	Flow	Age	Comments
				gpm		
Pump #1	ON			0.0	1999	
Pump #2	ON			0.0	1999	

HLRWSD Lift Station Facilities Report

Lift Station Inspection Notes

Date: 9/8/11

Lift Station: Honeysuckle Beach

Lift Station Pumps	Time 1	Time 2	Height 1	Height 2	Diameter	High Float	Low Float	Storage
	sec	sec	ft	ft	ft	ft	ft	ft
Pump #1		180	10.5	11.2	9	10.00	11.79	1.79
Pump #2		90	10.5	10.9	9			
Both pumps								

Lift Station Pumps	Status	Model	Hp	Flow	Age	Comments
				gpm		
Pump #1	ON	4xse3024a	3	112.4	2000	Barnes, 6.25 Impeller size
Pump #2	ON	4xse3024a	3	145.4	2007	
Both pumps						

HLRWSD Lift Station Facilities Report

Lift Station Inspection Notes

Date: 9/8/11

Lift Station: Packsaddle

Lift Station Pumps	Time 1	Time 2	Height 1	Height 2	Diameter	High Float	Low Float	Storage
	sec	sec	ft	ft	ft	ft	ft	ft
Pump #1	NO FLOW							0
Pump #2	NO FLOW							

Lift Station Pumps	Status	Model	Hp	Flow	Age	Comments
				gpm		
Pump #1	ON	sk50	0.5	#VALUE!	2002	Hydro
Pump #2	ON	sk51	0.5	#VALUE!	2002	

HLRWSD Lift Station Facilities Report

Lift Station Inspection Notes

Date: 7/7/11

Lift Station: Point Hayden

Lift Station Pumps	Time 1	Time 2	Height 1	Height 2	Diameter	High Float	Low Float	Storage
	sec	sec	ft	ft	ft	ft	ft	ft
Pump #1	0	120	5.9	7.2	5	5	7.7	2.7
Pump #2	0	120	6.3	8.2	5			
Both pumps	0	60	6.9	7.9	5			

Lift Station Pumps	Status	Model	Hp	Flow	Age	Comments
				gpm		
Pump #1	ON	sgv5022l	5	91.8		Barnes, 6.25 Impeller size
Pump #2	ON	sgv5022l	5	140.8	2010	
Both pumps				146.9		

HLRWSD Lift Station Facilities Report

Lift Station Inspection Notes

Date: 8/23/11

Lift Station: Sandy Cove

Lift Station Pumps	Time 1	Time 2	Height 1	Height 2	Diameter	High Float	Low Float	Storage
	sec	sec	ft	ft	ft	ft	ft	ft
Pump #1	0	60	10.6	10.8	9	8.75		8.75
Pump #2	0	60	10.8	10.9	9			
Both pumps	0	420	10.9	12.3	9			

Lift Station Pumps	Status	Model	Hp	Flow	Age	Comments
				gpm		
Pump #1	ON	HRGF500M2-4	5	79.3	2006	Hydro, 10.13 Impeller size
Pump #2	ON	HRGF500M2-5	5	59.5	2010	
Both pumps				93.5		

HLRWSD Lift Station Facilities Report

Lift Station Inspection Notes

Date: 9/13/11

Lift Station: Sherwood Court

Lift Station Pumps	Time 1	Time 2	Height 1	Height 2	Diameter	High Float	Low Float	Storage
	sec	sec	ft	ft	ft	ft	ft	ft
Pump #1	60		9.8	10.2	9	9.1	12.4	3.3
Pump #2	60		10.2	10.4	9			
Both Pumps	240		10.4	11.3	9			

Lift Station Pumps	Status	Model	Hp	Flow	Age	Comments
				gpm		
Pump #1	ON	s4nx200cc	2	158.6	2003	Hydro, 5.88 Impeller size
Pump #2	ON	s4nx200cc	2	119.0	2005	
Both Pumps				109.1		

HLRWSD Lift Station Facilities Report

Lift Station Inspection Notes

Date: 7/7/11

Lift Station: Split Rock

Lift Station Pumps	Time 1	Time 2	Height 1	Height 2	Diameter	High Float	Low Float	Storage
	sec	sec	ft	ft	ft	ft	ft	ft
Pump #1	0	120	3.2	4.0	2			0
Pump #2	0	70.8	3.2	4.0	2			
Both pumps	0	88.8	4.0	4.5	2			

Lift Station Pumps	Status	Model	Hp	Flow	Age	Comments
				gpm		
Pump #1	ON	25515-9	1.5	9.8	2006	Grundfos
Pump #2	ON	25515-9	1.5	16.6		
Both pumps				7.9		

HLRWSD Lift Station Facilities Report

Lift Station Inspection Notes

Date: 9/13/11

Lift Station: Thames Court

Lift Station Pumps	Time 1	Time 2	Height 1	Height 2	Diameter	High Float	Low Float	Storage
	sec	sec	ft	ft	ft	ft	ft	ft
Pump #1	60		10.0	10.4	9	9	12.4	3.4
Pump #2	60		10.4	10.7	9			
Both pumps	180		10.7	11.8	9			

Lift Station Pumps	Status	Model	Hp	Flow	Age	Comments
				gpm		
Pump #1	ON	s4nx300	2	198.3	2007	Hydro, 6.27 Impeller size
Pump #2	ON	s4nx301	2	119.0	2007	
Both pumps				171.8		

HLRWSD Lift Station Facilities Report

Lift Station Inspection Notes

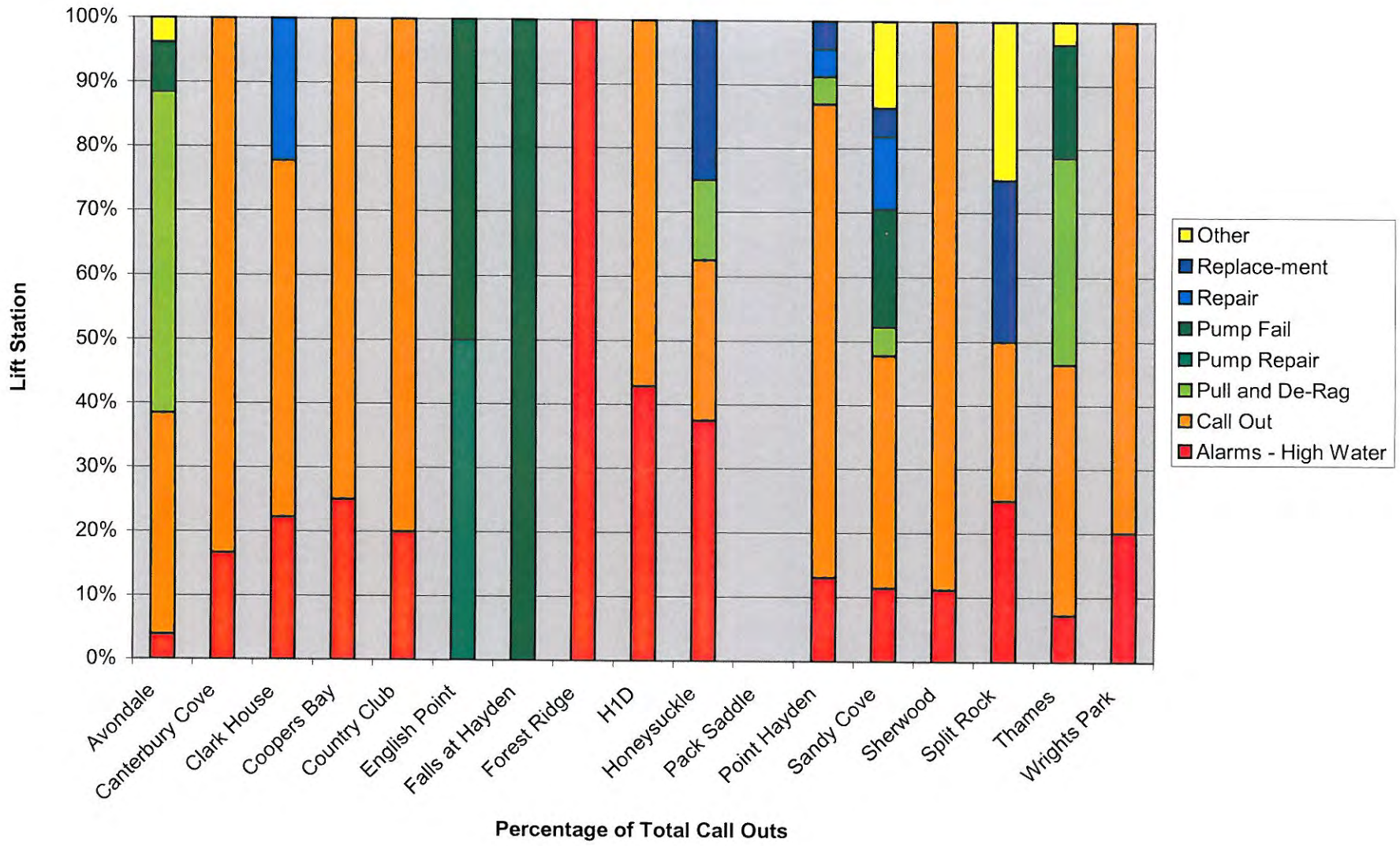
Date: 7/13/11

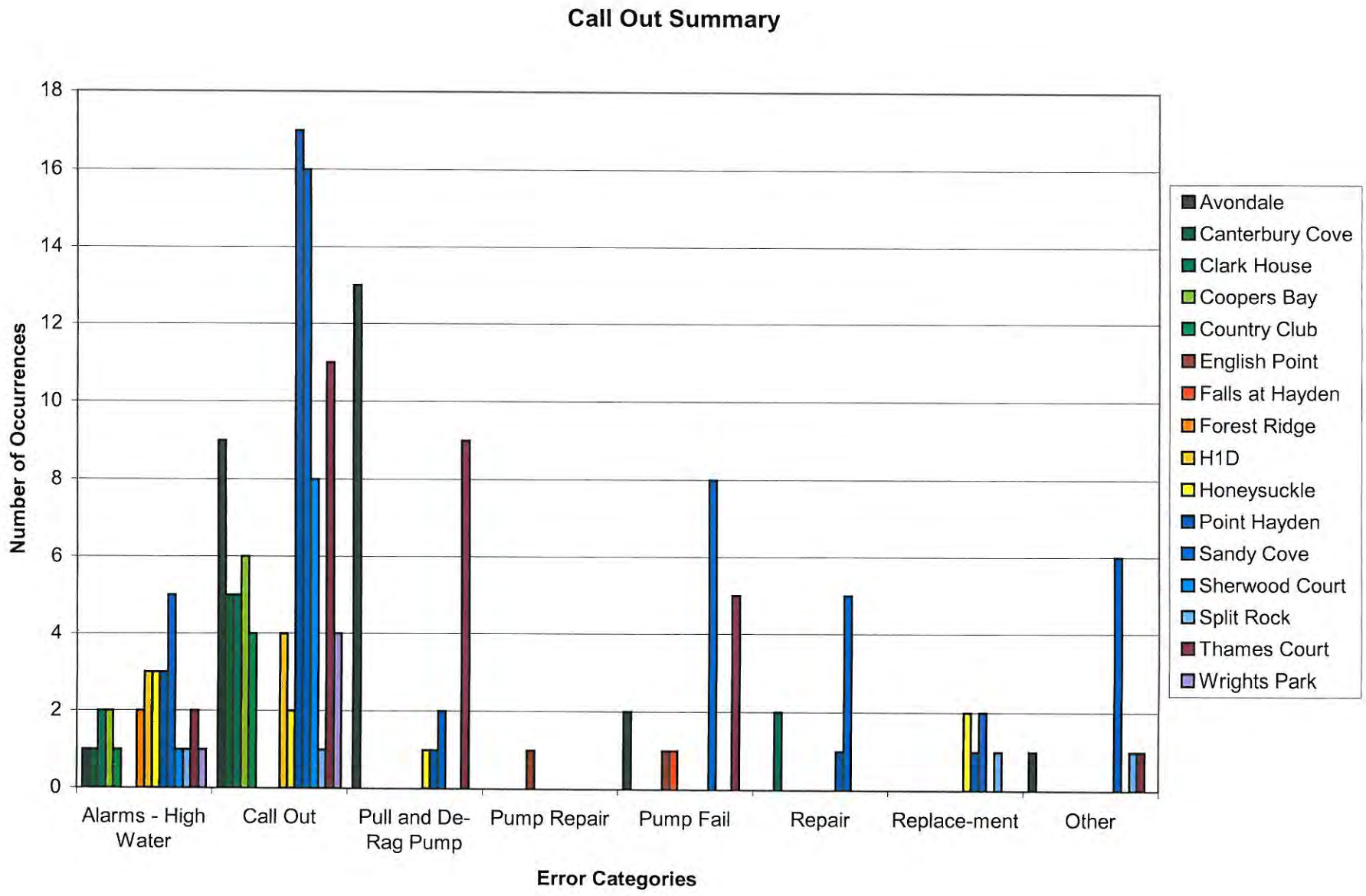
Lift Station: Wright's Park

Lift Station Pumps	Time 1	Time 2	Height 1	Height 2	Diameter	High Float	Low Float	Storage
	sec	sec	ft	ft	ft	ft	ft	ft
Pump #1	0	60	10.3	10.7	9	9.2	11.3	2.2
Pump #2	0	60	10.7	11.1	9			
Both Pumps	0	N/A						

Lift Station Pumps	Status	Model	Hp	Flow	Age	Comments
				gpm		
Pump #1	ON	s4m750m2-4	7.5	158.6		Hydro, 5.56 Impeller size
Pump #2	ON	s4m750m2-4	7.5	198.3		
Both pumps				N/A		

Call Out Summary




Call Out Summary
Number of Occurrences
0
2
4
6
8
10
12
14
16
18
Alarms - High Water
Call Out
Pull and De-Rag Pump
Pump Repair
Pump Fail
Repair
Replace-ment
Other
Error Categories
Avondale
Canterbury Cove
Clark House
Coopers Bay
Country Club
English Point
Falls at Hayden
Forest Ridge
H1D
Honeysuckle
Point Hayden
Sandy Cove
Sherwood Court
Split Rock
Thames Court
Wrights Park

APPENDIX E
INFILTRATION AND INFLOW ANALYSIS

Infiltration and Inflow Standards Comparison Calculations

Lift Station Flow and Precipitation Comparison Graphs

WELCH-COMER
ENGINEERS | SURVEYORS

EDUs = 1918
cap/EDU = 2.5

No. Gravity Services = 1918
Assume 25ft services, 3in size

10-State Standards (2004)

Average Daily Flow (Domestic with Normal Infiltration)

Ave. Daily Flow = 100 gpcd
Ave. Daily Flow = 0.4795 MGD

Peak Hourly Flow

Factor - $\frac{PeakHourly\_Q}{DesignAverage\_Q} = \frac{18+\sqrt{P}}{4+\sqrt{P}}$ (P is population in 1000)

3.261804

Peak Hourly Flow = 326 gpcd
Peak Hourly Flow = 1.56 MGD

H-1D Average Daily Flow

Ave Daily Flow = 0.313 MGD UNDER

H-1D Peak Hourly Flow

Peak hour not known

USE 2 x Peak Day

Peak Hourly Flow = 3.19 MGD OVER

Metcalf and Eddy

Peak Inflow and Infiltration Rate = 1500 gallons/day/(in-mile)
(in-mile = pipe diameter x pipe length)
**gravity only*
***rate is max. allowed and still not be excessive infiltration and inflow*

In-Mile Calculation

HLRWSD: 105,907 ft of gravity pipe
154 in-mile

% Gravity: 60.2%

Services: 16.39 in-mile

TOTAL: 170.39 in-mile

Average Daily Flow

Ave. Daily Flow = 0.256 MGD

Peak with I&I

Peak Daily Flow = 0.444 MGD

H-1D Average Daily Flow

Ave Daily Flow = 0.188 MGD UNDER

H-1D Peak Flow

Peak Daily Flow = 1.595 MGD OVER

EPA I&I Guidance

Infiltration DWF = 120 gpcd (domestic WW flow, infiltration, nominal industrial and commercial flows)
**compare to highest average daily flow recorded over 7-14 period during a period of seasonal high groundwater*

Inflow WWF = 275 gpcd
**compare to highest daily flow recorded during a storm event*

Infiltration (DWF)

DWF =	0.575	MGD

Inflow (WWF)

WWF =	1.319	MGD

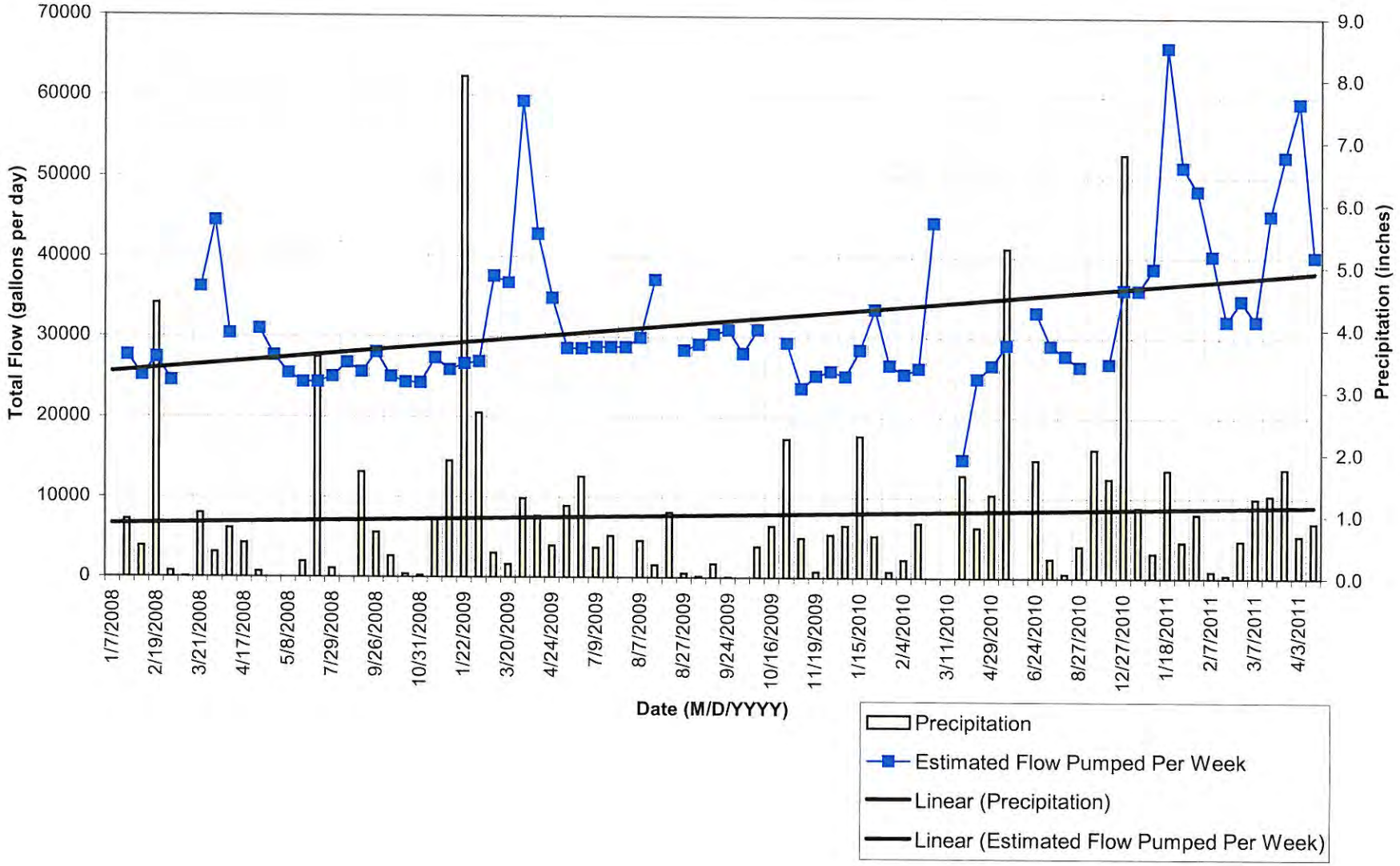
H-1D DWF Average

DWF =	0.400	MGD	UNDER

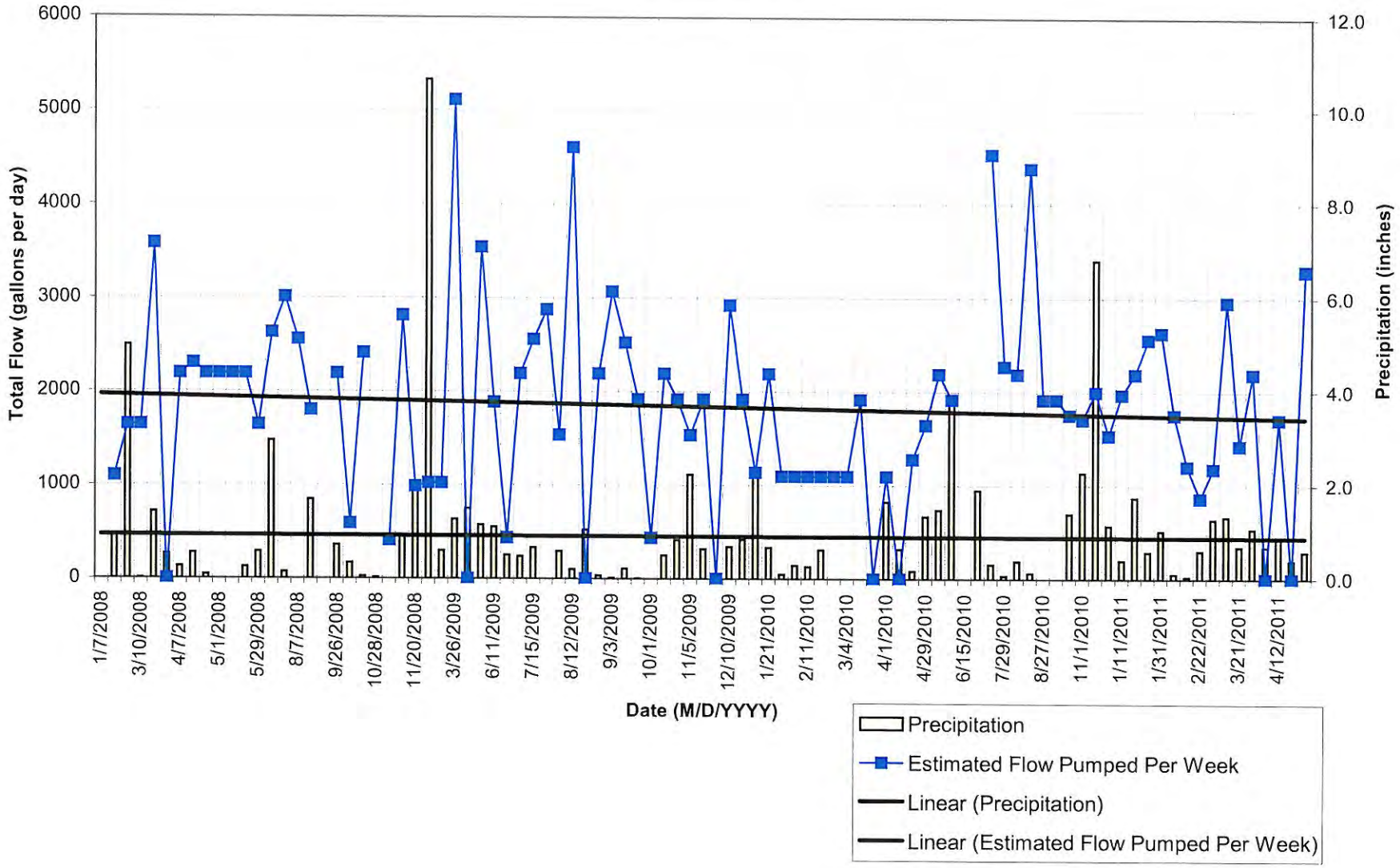
H-1D WWF Peak

WWF	0.870	MGD	UNDER

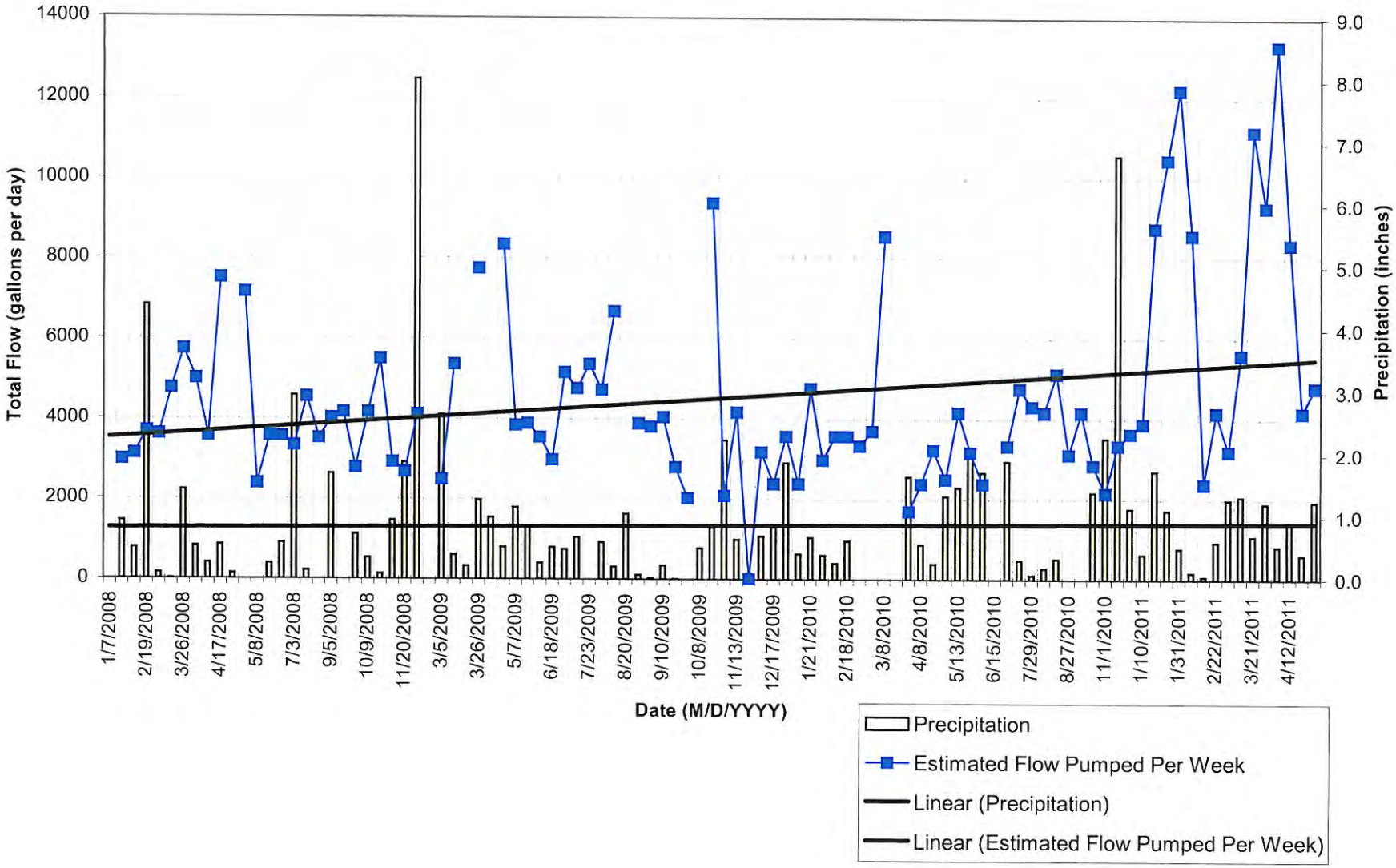
Comparison of Pump Flow and Rainfall 2008-2011



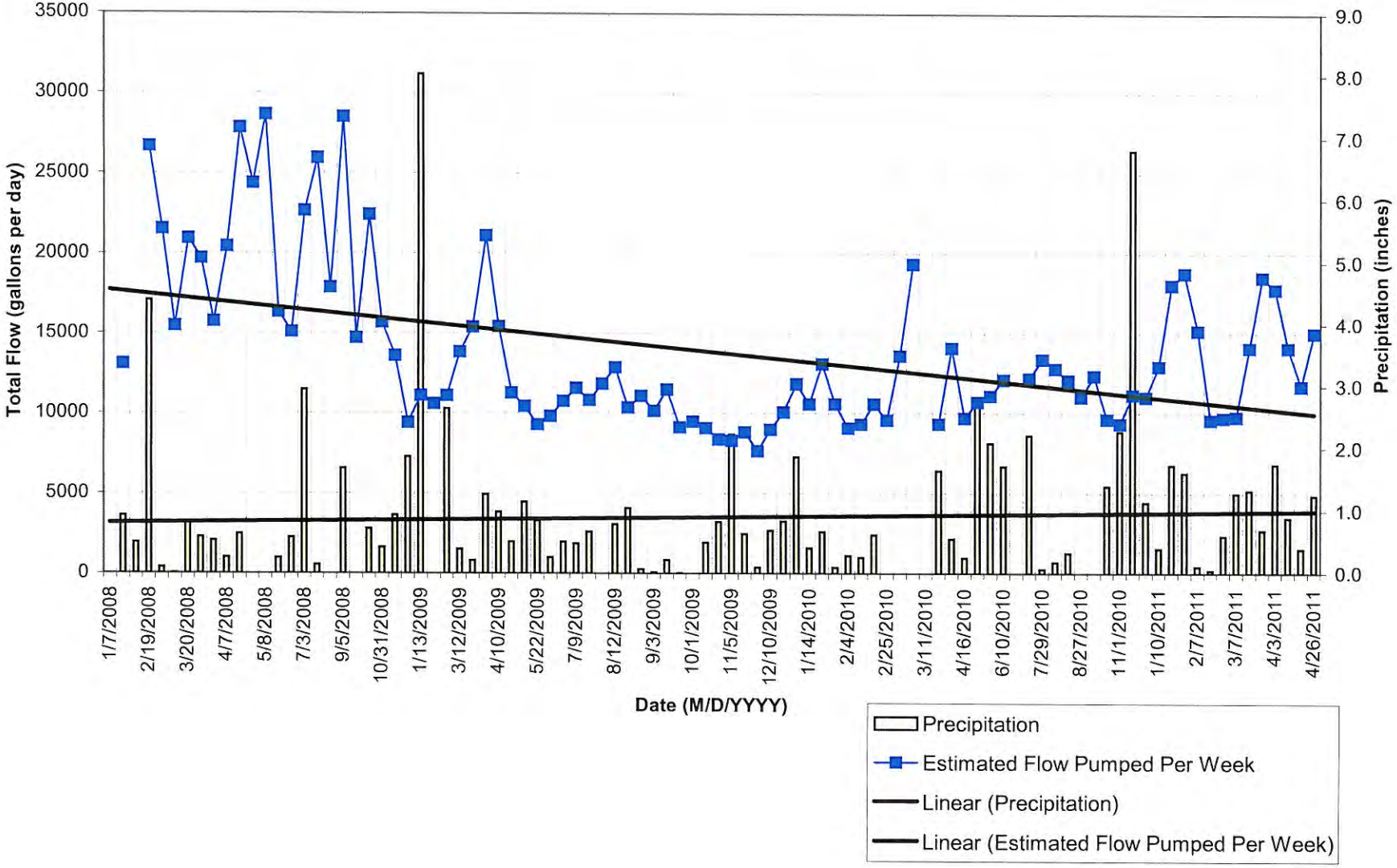
Comparison of Pump Flow and Rainfall 2008-2011



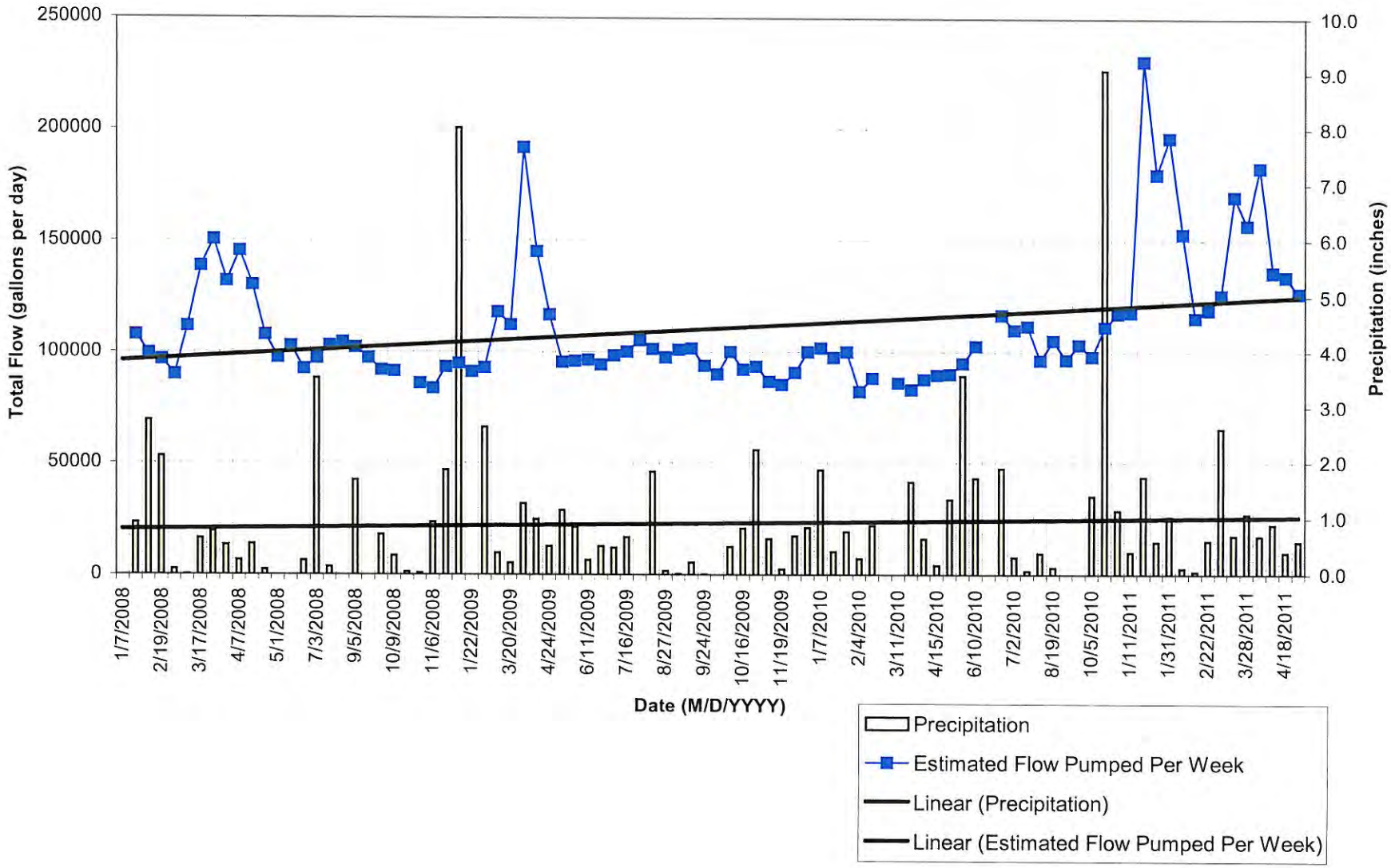
Comparison of Pump Flow and Rainfall 2008-2011



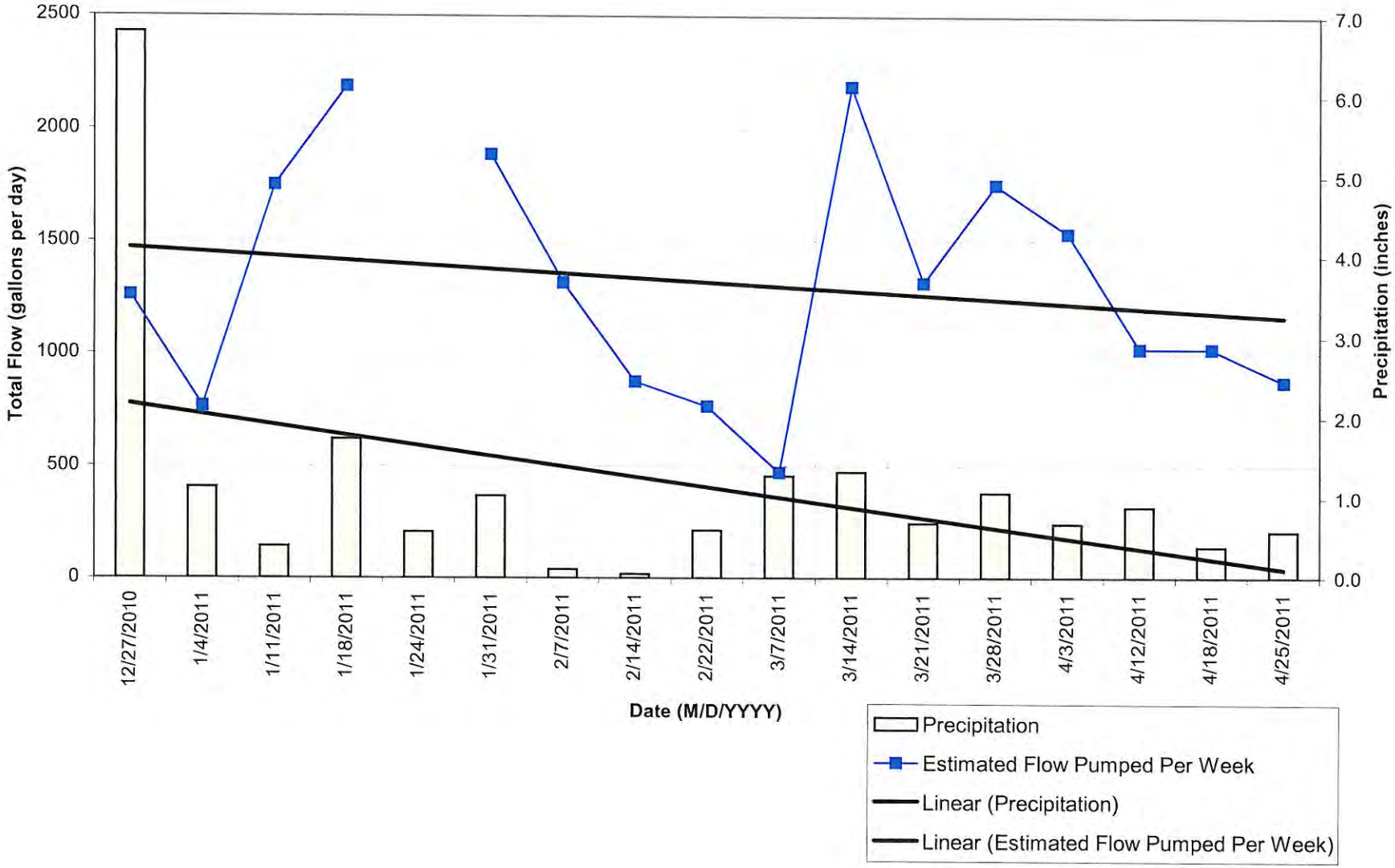
Comparison of Pump Flow and Rainfall 2008-2011



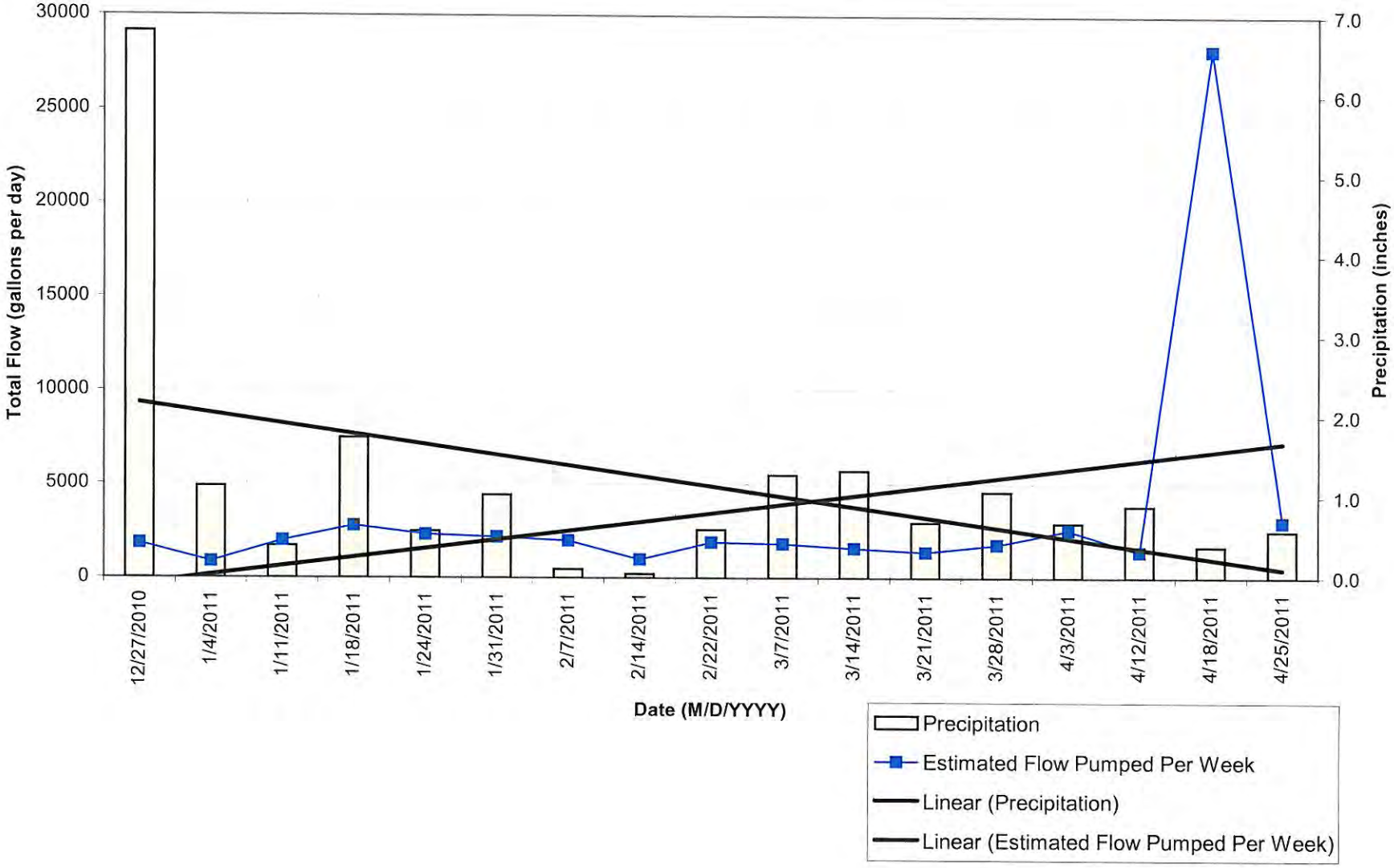
Comparison of Pump Flow and Rainfall 2008-2011



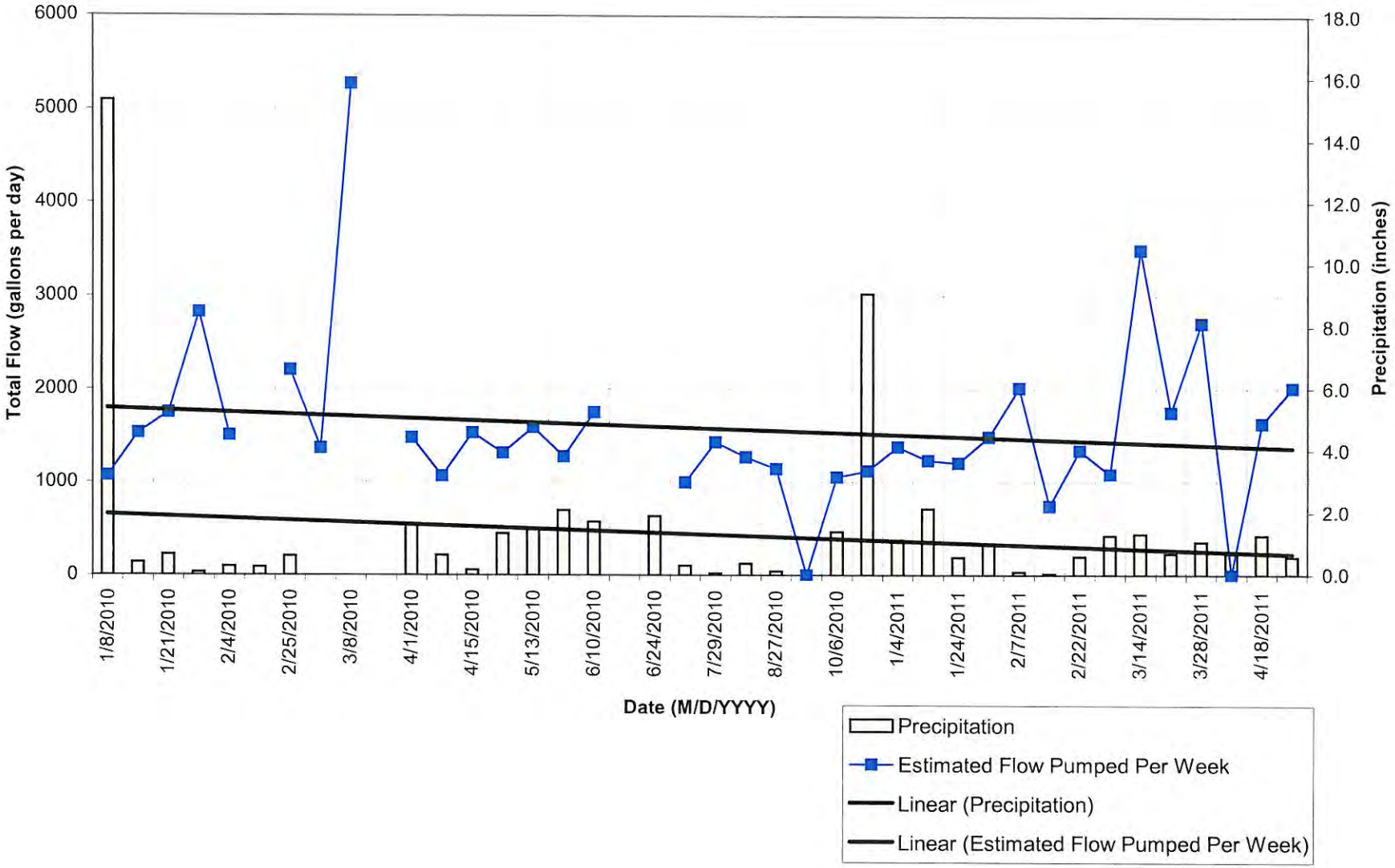
Comparison of Pump Flow and Rainfall 2010-2011



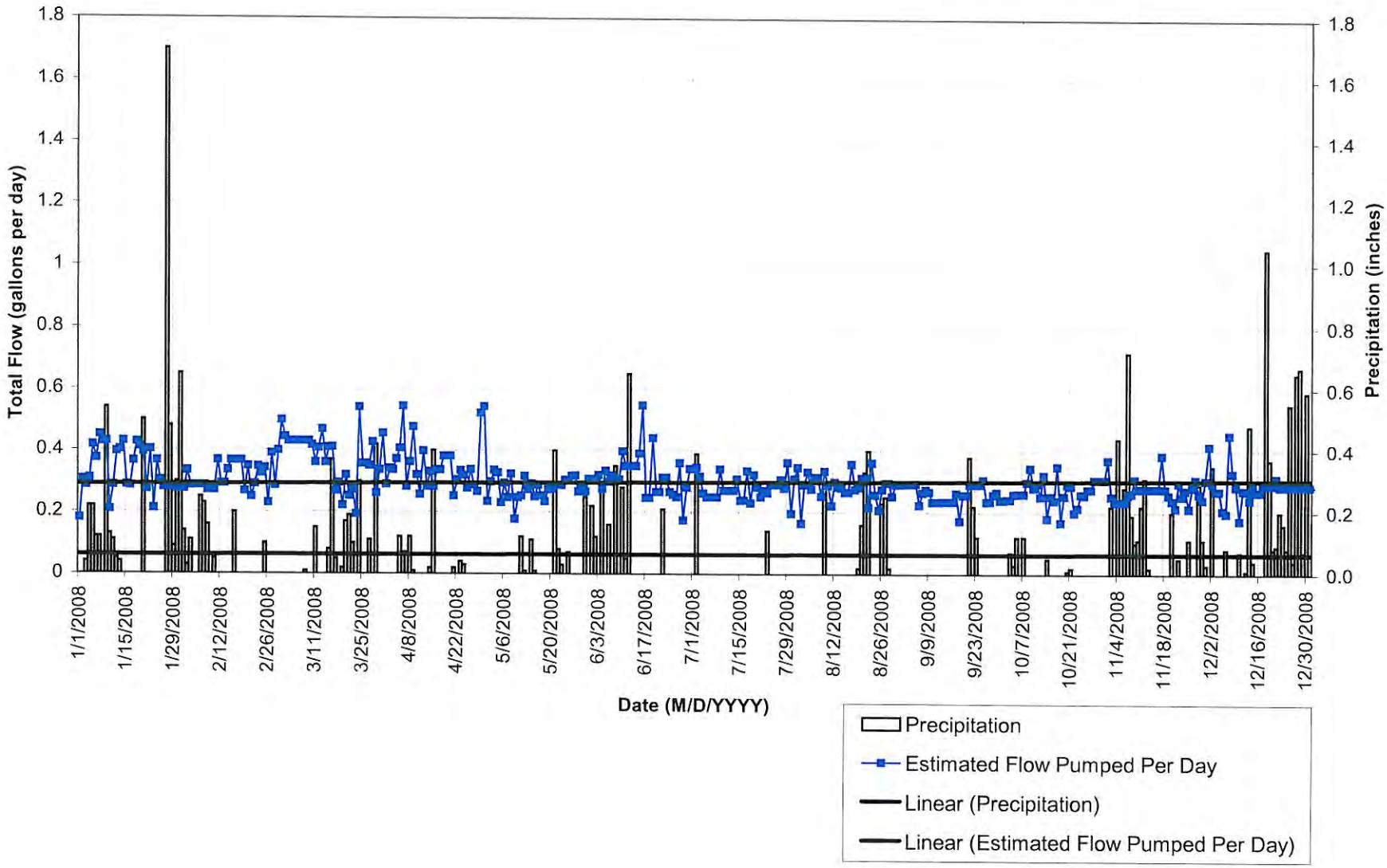
Comparison of Pump Flow and Rainfall 2010-2011



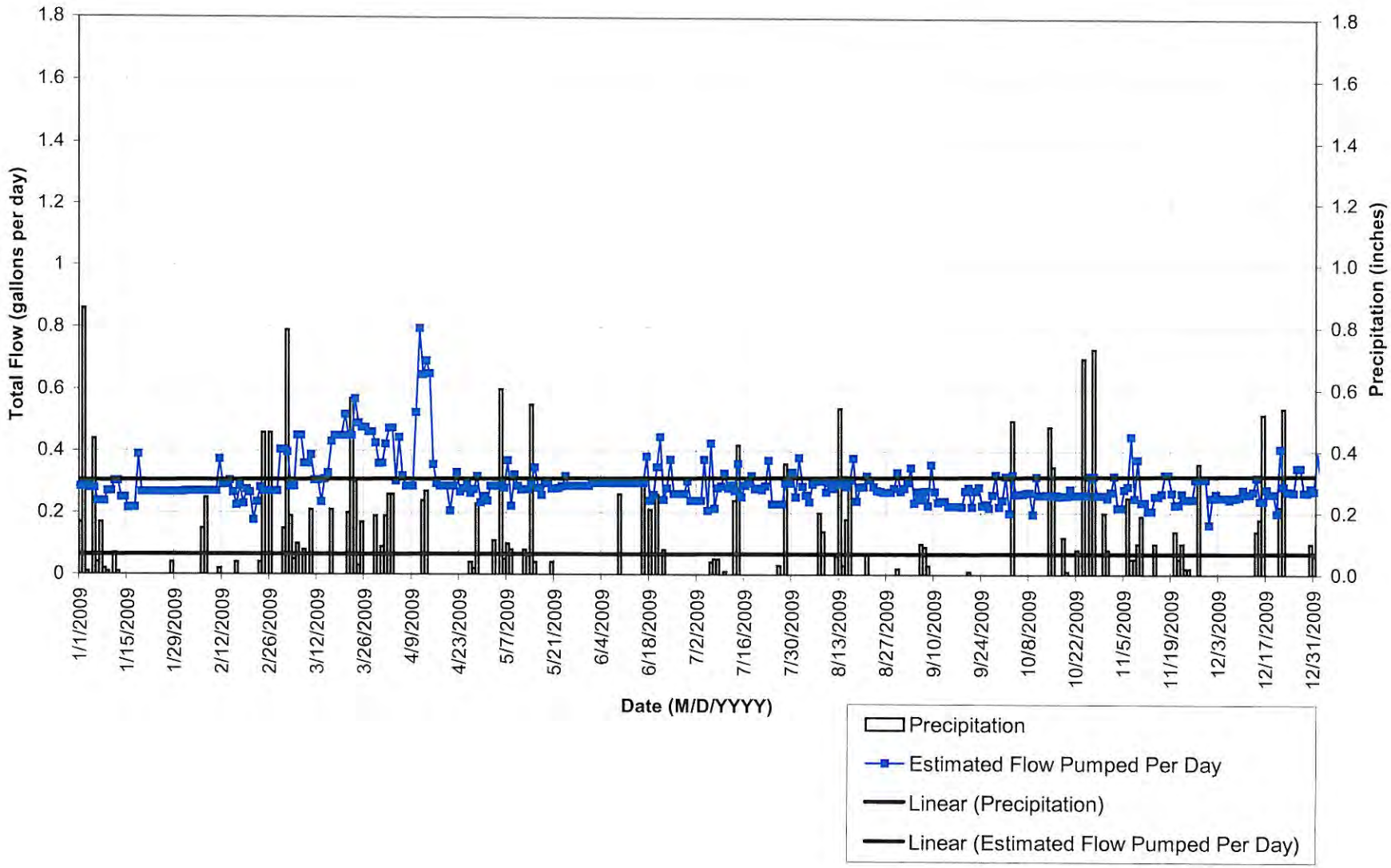
Comparison of Pump Flow and Rainfall 2010-2011



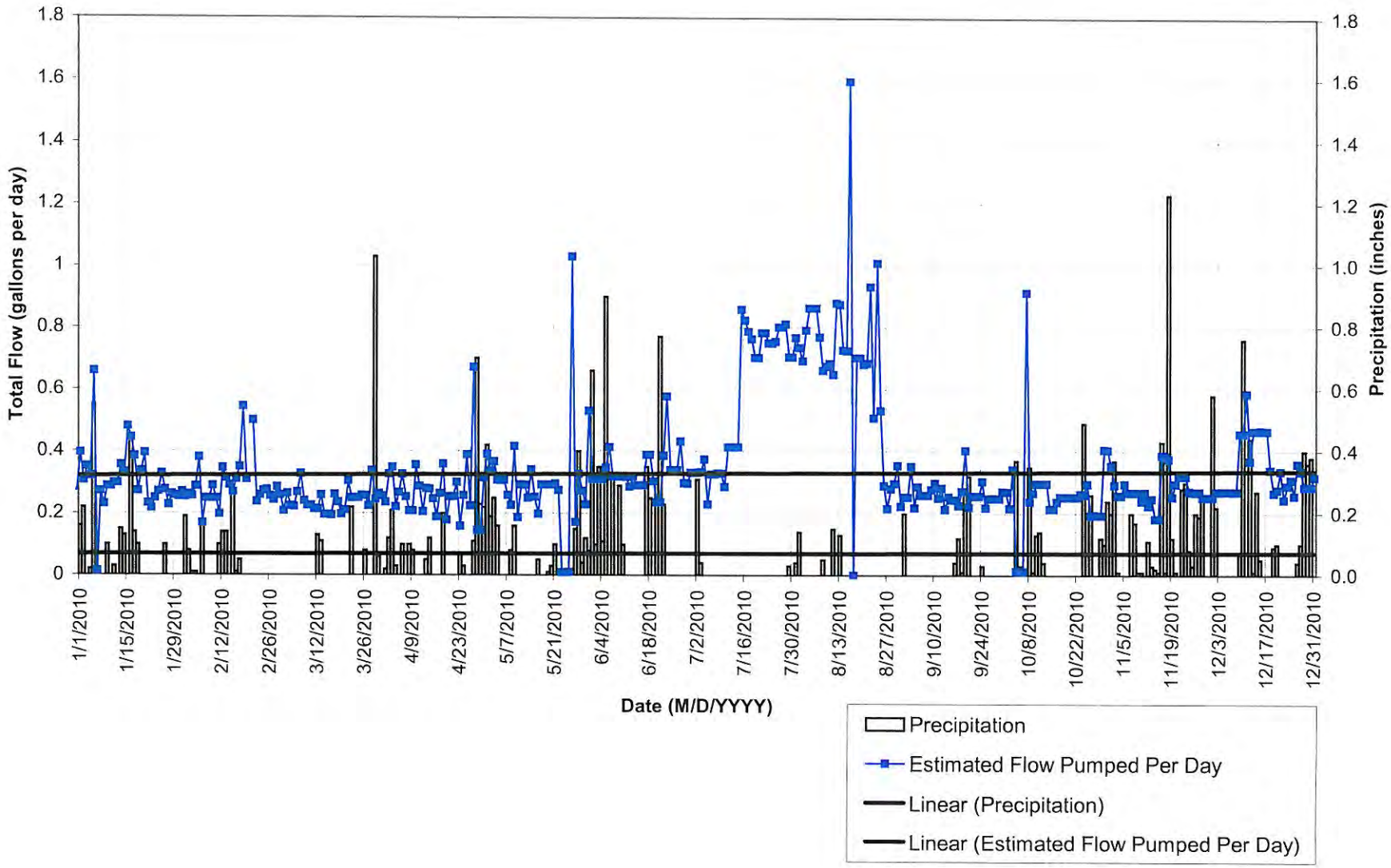
Comparison of Pump Flow and Rainfall 2008



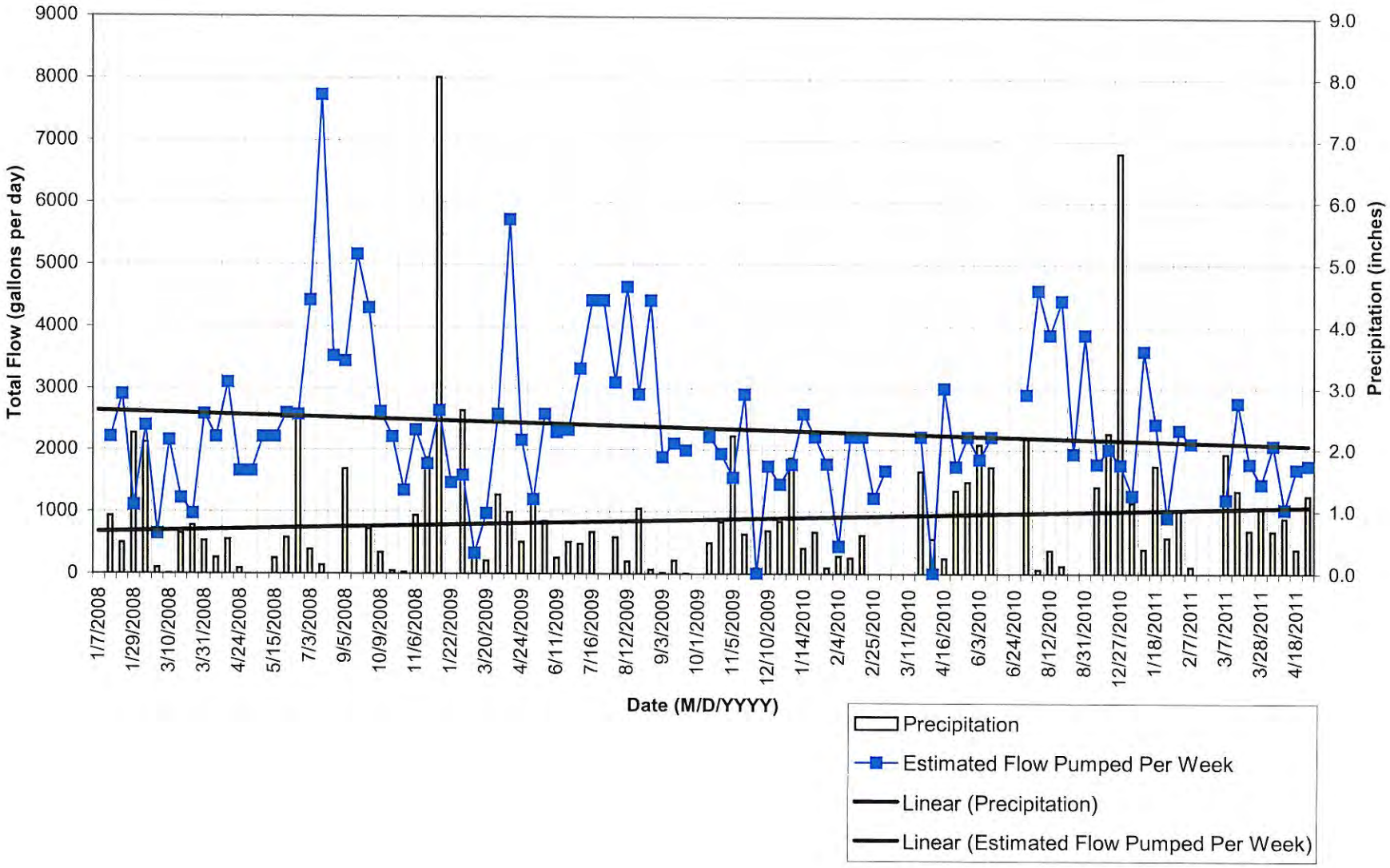
Comparison of Pump Flow and Rainfall 2009



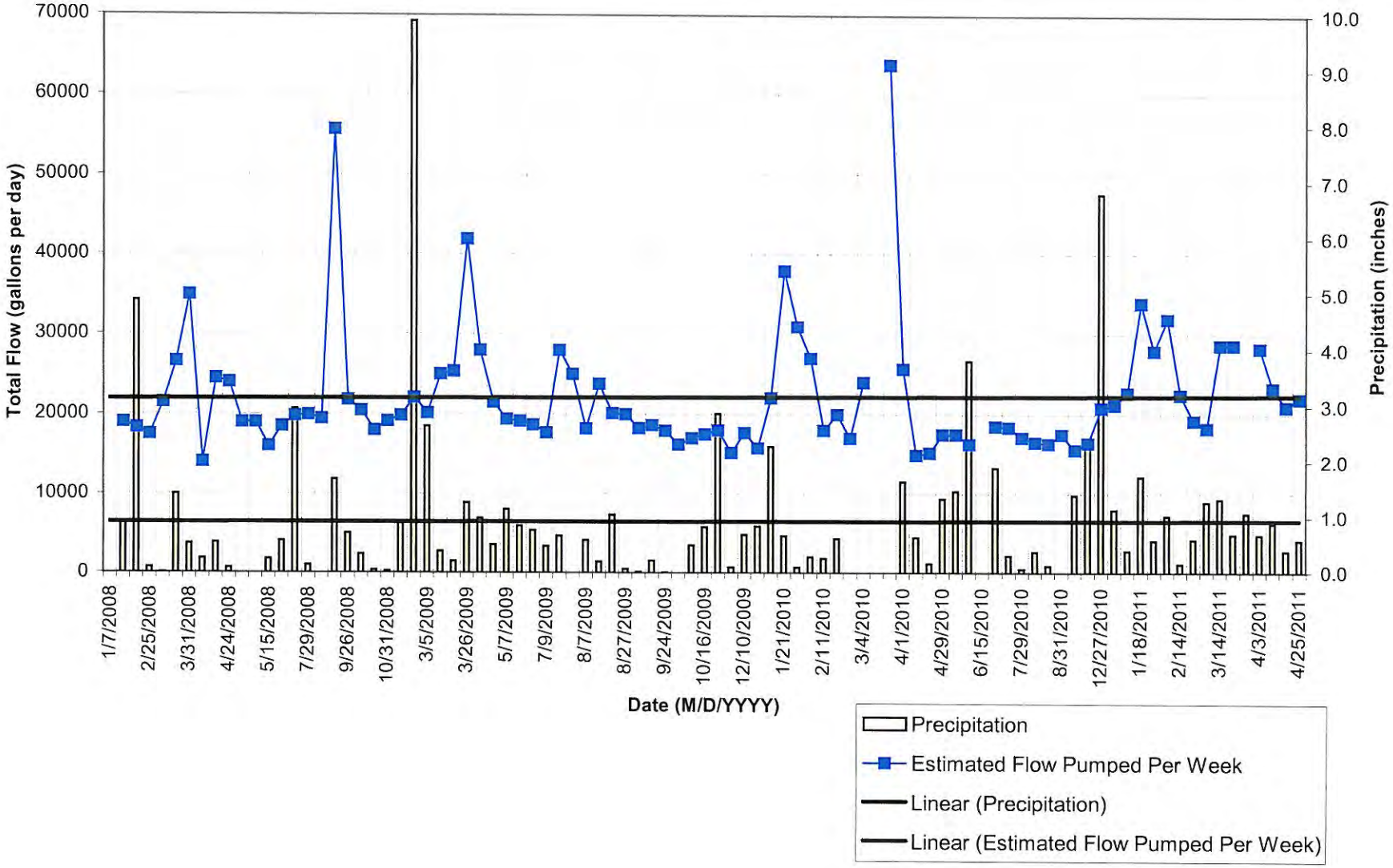
Comparison of Pump Flow and Rainfall 2010



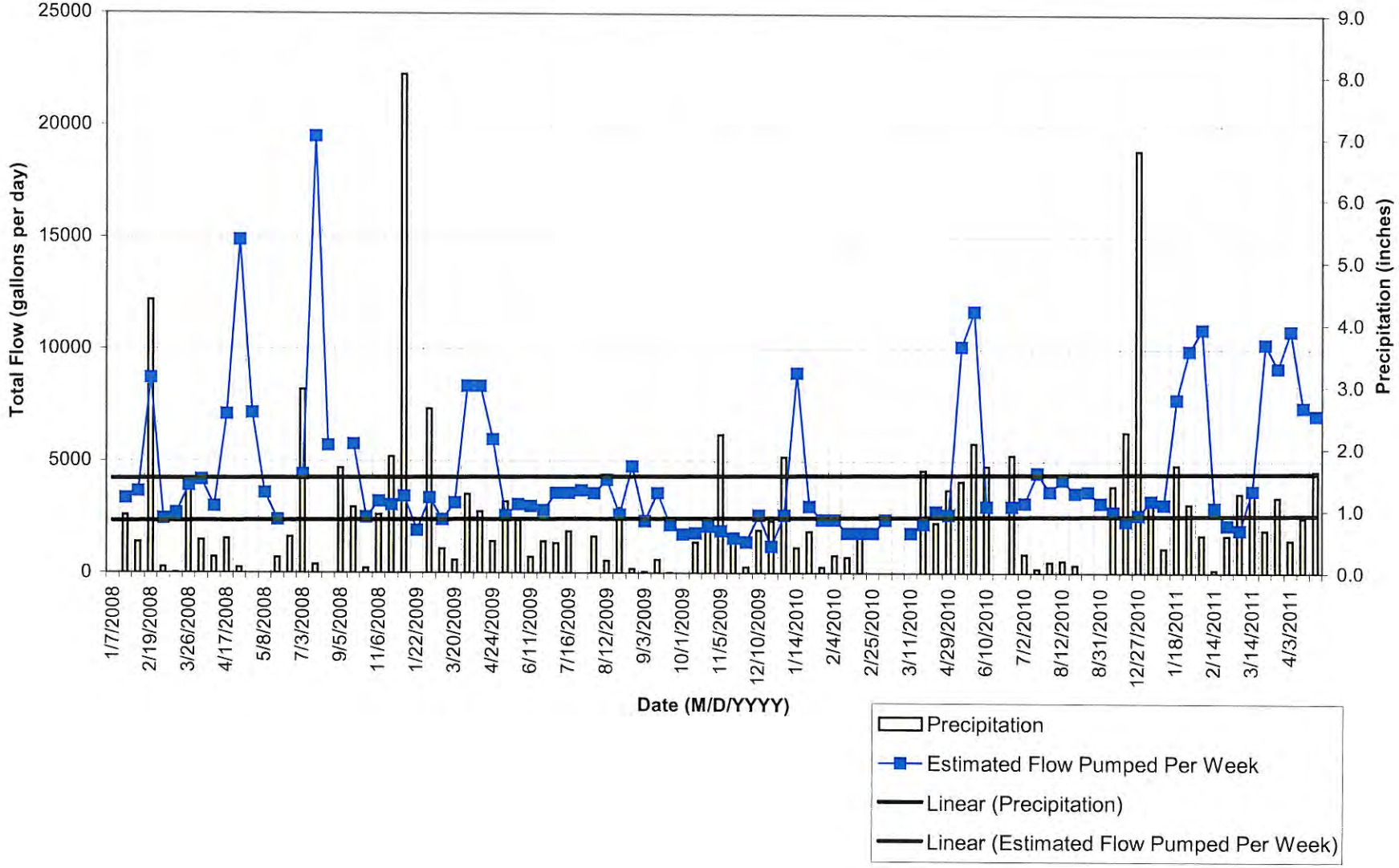
Comparison of Pump Flow and Rainfall 2008-2011



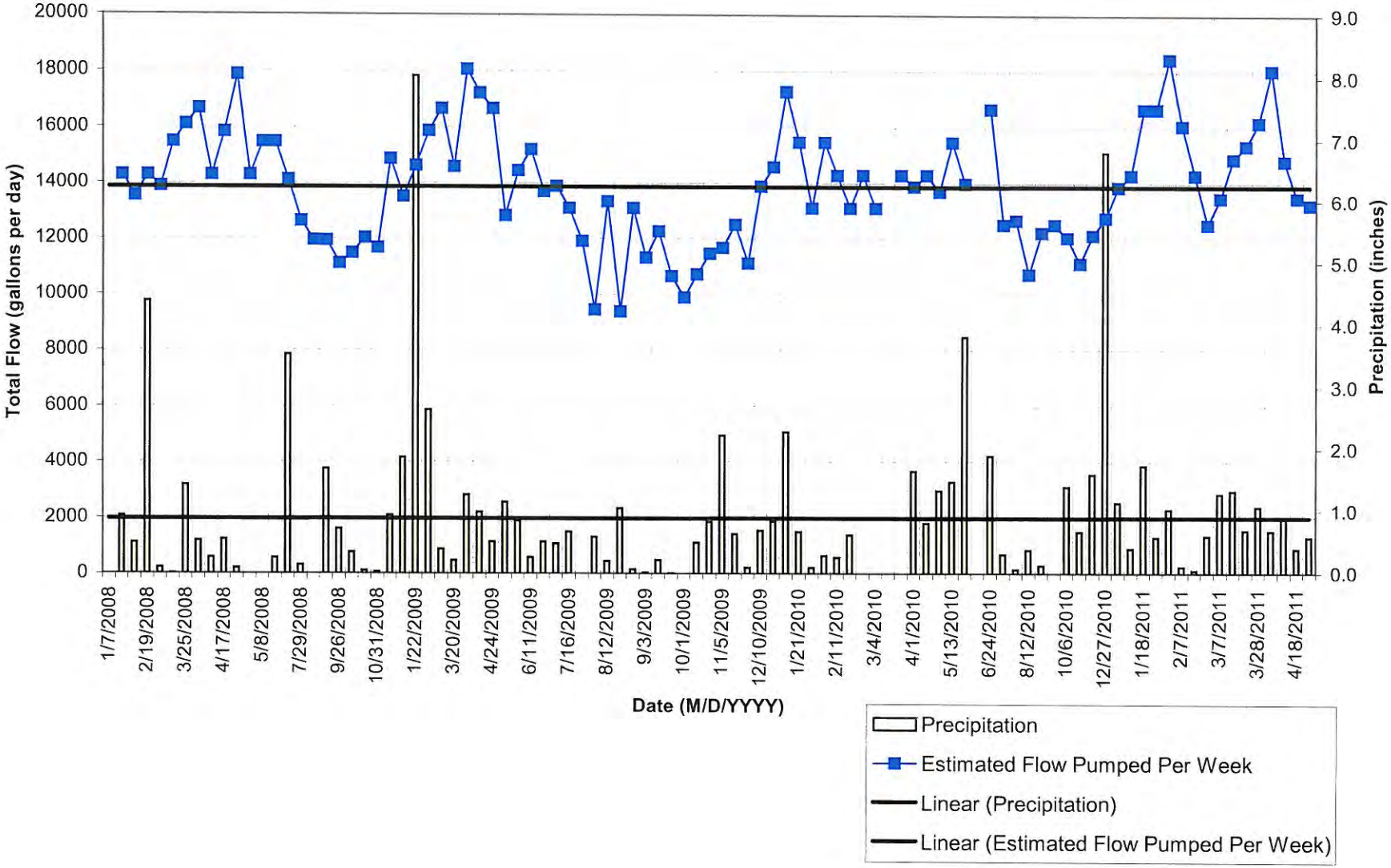
Comparison of Pump Flow and Rainfall 2008-2011



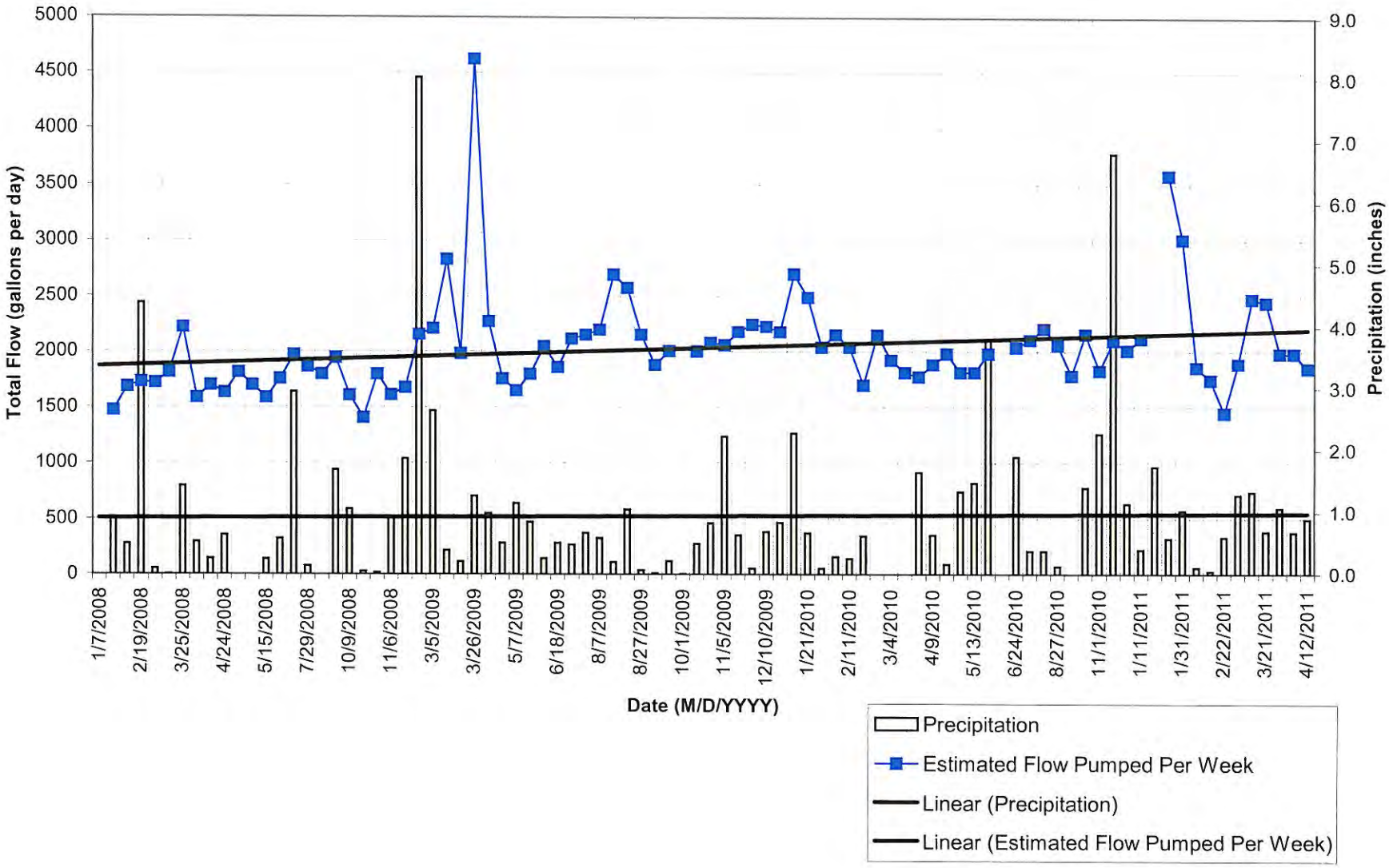
Comparison of Pump Flow and Rainfall 2008-2011



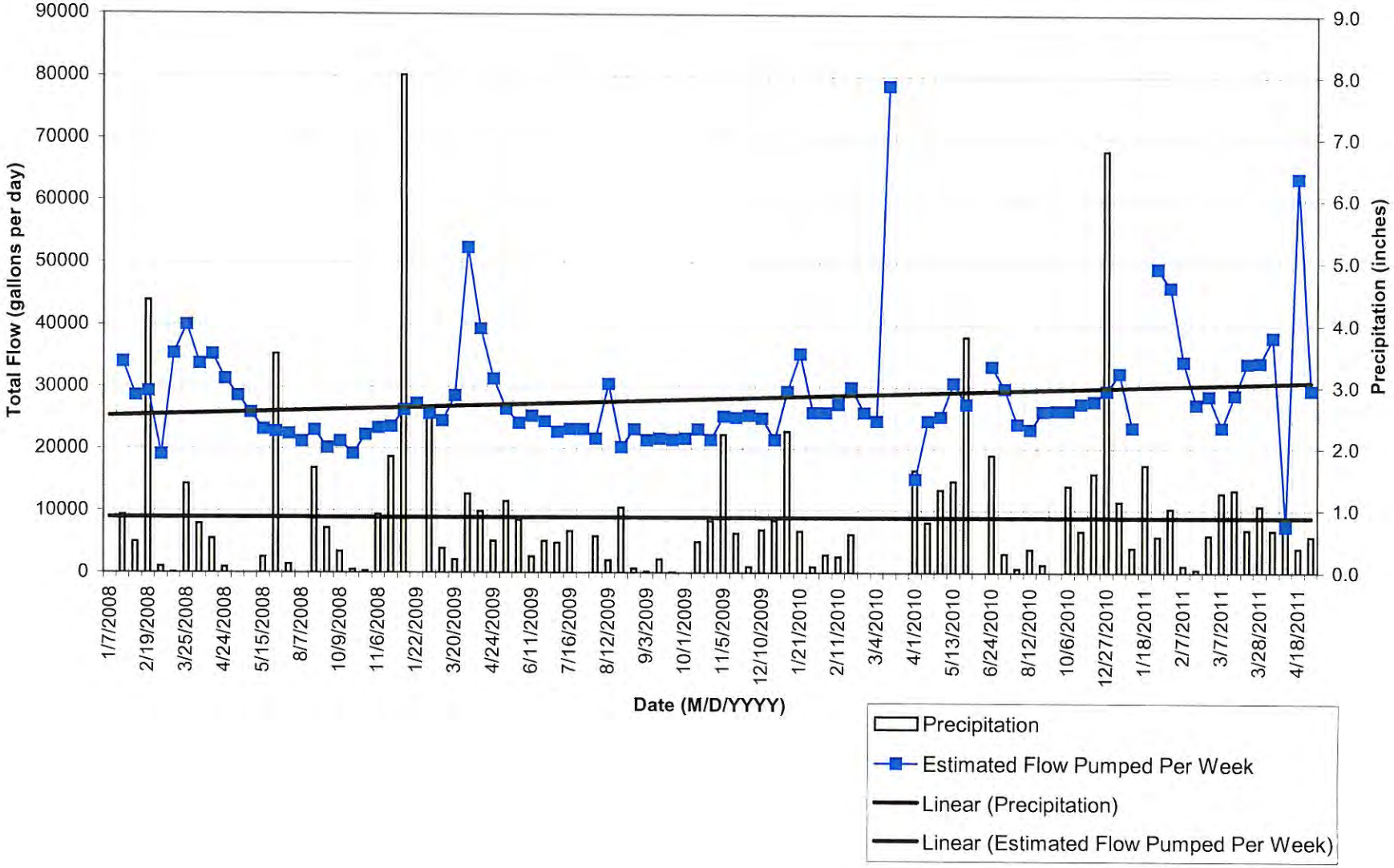
Comparison of Pump Flow and Rainfall 2008-2011



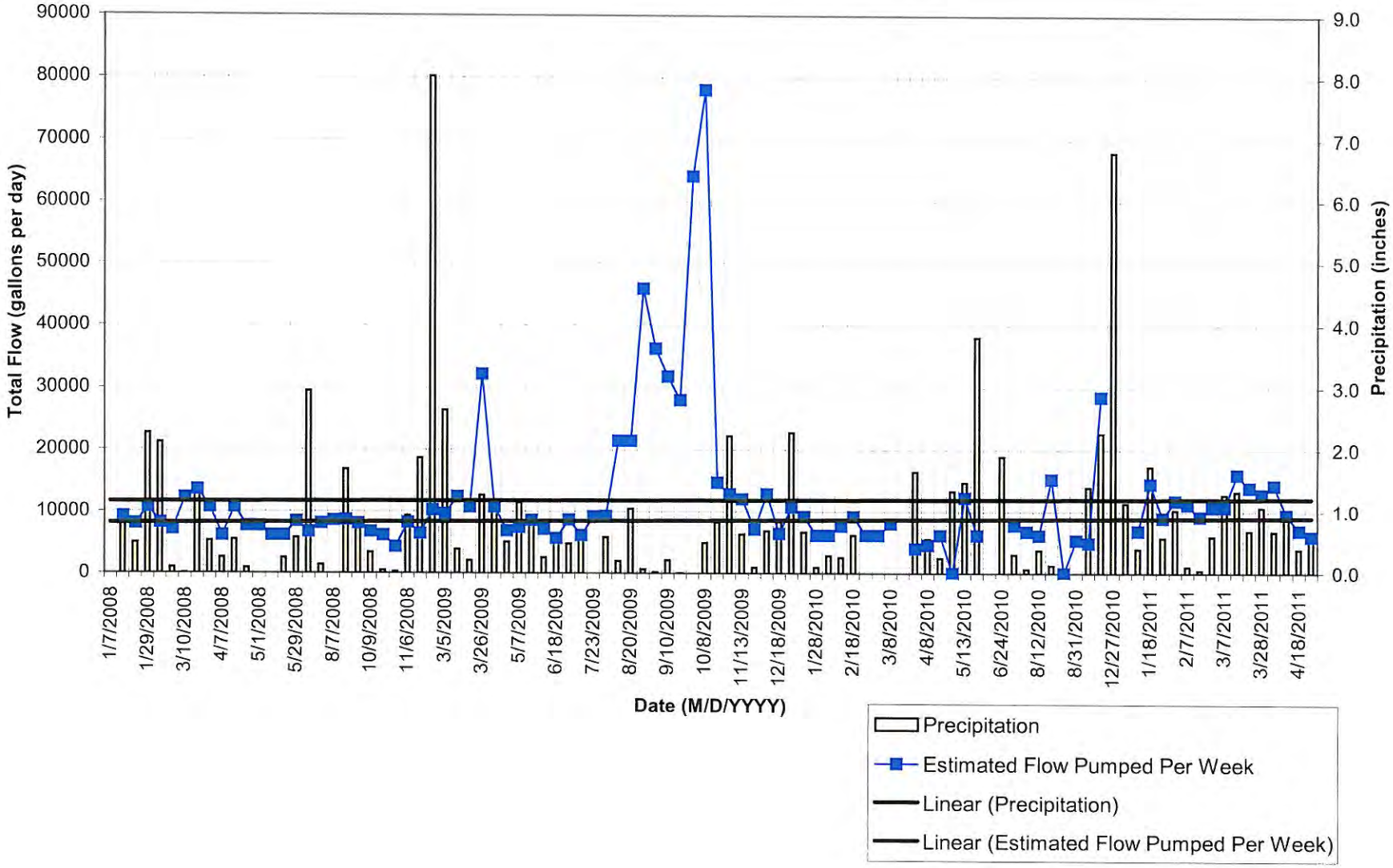
Comparison of Pump Flow and Rainfall 2008-2011



Comparison of Pump Flow and Rainfall 2008-2011



Comparison of Pump Flow and Rainfall 2008-2011



APPENDIX F
ENGINEER'S OPINION OF PRELIMINARY PROJECT COSTS

Alternative Project Costs

Summary of Alternative Project Costs

Lift Station Specific Structural / Mechanical Project Costs

WELCH-COMER
ENGINEERS | SURVEYORS

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Option A: Lift Station Rehabilitation (Coating In-Place)

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Prepared By:	Ashley M. Williams, EIT	Date:	November 17, 2011
Project Manager:	Larry E. Comer, PE	Date:	

Segment	Description	Unit	Quantity	Unit Price	Total
	Mobilization	LS	1	$ 5,000.00	$ 5,000.00
	Traffic Control	DAY	4	$ 800.00	$ 3,200.00
	Bypass Infrastructure	LS	1	$ 3,500.00	$ 3,500.00
	Bypass Pumping	DAY	4	$ 1,500.00	$ 6,000.00
	"Spray Rock" Preparation and Coating	LS	1	$ 12,000.00	$ 12,000.00
	Lift Station Mechanical Piping/Rails	LS	1	$ 15,000.00	$ 15,000.00
	Valve Vault	LS	1	$ 20,000.00	$ 20,000.00
	New Pumps	EA	2	$ 8,000.00	$ 16,000.00
	New Top/Hatch	LS	1	$ 5,000.00	$ 5,000.00
	Safety Grid	LS	1	$ 600.00	$ 600.00
	Site Improvements	LS	1	$ 5,000.00	$ 5,000.00
	Surface Restoration	LS	1	$ 5,000.00	$ 5,000.00
	Odor Control	LS	1	$ 2,500.00	$ 2,500.00
				Subtotal =	$98,800.00
				10% Contingency =	$9,880.00
				Total Estimated Construction =	$108,680.00
ENGINEERING					
	Design Phase Services				$10,900.00
	Bidding Phase Services				$3,500.00
	Construction Phase Services				$10,900.00
	Start-Up/O&M Manuals				$2,500.00
	Post Construction Phase				$2,500.00
ESTIMATED TOTAL PROJECT COST					**$138,980.00**

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Option B: Lift Station Replacement

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Prepared By:	Ashley M. Williams, EIT	Date:	November 17, 2011
Project Manager:	Larry E. Comer, PE	Date:	

Segment	Description	Unit	Quantity	Unit Price	Total
	Mobilization	LS	1	$ 5,000.00	$ 5,000.00
	Traffic Control	DAY	4	$ 800.00	$ 3,200.00
	Bypass Infrastructure	LS	1	$ 3,500.00	$ 3,500.00
	Bypass Pumping	DAY	4	$ 1,500.00	$ 6,000.00
	New Fiberglass Basin	LS	1	$ 86,000.00	$ 86,000.00
	Lift Station Mechanical Piping/Rails	LS	1	$ 15,000.00	$ 15,000.00
	Valve Vault	LS	1	$ 20,000.00	$ 20,000.00
	New Pumps	EA	2	$ 8,000.00	$ 16,000.00
	Safety Grid	LS	1	$ 600.00	$ 600.00
	Site Improvements	LS	1	$ 5,000.00	$ 5,000.00
	Surface Restoration	LS	1	$ 5,000.00	$ 5,000.00
	Odor Control	LS	1	$ 2,500.00	$ 2,500.00
	Demolish/Dispose Existing Lift Steel Basin	LS	1	$ 10,000.00	$ 10,000.00
				Subtotal =	$177,800.00
				10% Contingency =	$17,780.00
				Total Estimated Construction =	$195,580.00
ENGINEERING					
	Design Phase Services				$19,600.00
	Bidding Phase Services				$3,500.00
	Construction Phase Services				$19,600.00
	Start-Up/O&M Manuals				$2,500.00
	Post Construction Phase				$2,500.00
ESTIMATED TOTAL PROJECT COST					**$243,280.00**

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Option C: Lift Station Slip-Line

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Prepared By:	Ashley M. Williams, EIT	Date:	November 17, 2011
Project Manager:	Larry E. Comer, PE	Date:	

Segment	Description	Unit	Quantity	Unit Price	Total
	Mobilization	LS	1	$ 5,000.00	$ 5,000.00
	Traffic Control	DAY	4	$ 800.00	$ 3,200.00
	Bypass Infrastructure	LS	1	$ 3,500.00	$ 3,500.00
	Bypass Pumping	DAY	4	$ 1,500.00	$ 6,000.00
	Fiberglass Slip-Lining	LS	1	$ 30,000.00	$ 30,000.00
	Lift Station Mechanical Piping/Rails	LS	1	$ 15,000.00	$ 15,000.00
	Valve Vault	LS	1	$ 20,000.00	$ 20,000.00
	New Pumps	EA	2	$ 8,000.00	$ 16,000.00
	New Top/Hatch	LS	1	$ 5,000.00	$ 5,000.00
	Safety Grid	LS	1	$ 600.00	$ 600.00
	Site Improvements	LS	1	$ 5,000.00	$ 5,000.00
	Surface Restoration	LS	1	$ 5,000.00	$ 5,000.00
	Odor Control	LS	1	$ 2,500.00	$ 2,500.00
				Subtotal =	$116,800.00
				10% Contingency =	$11,680.00
				Total Estimated Construction =	$128,480.00
ENGINEERING					
	Design Phase Services				$12,800.00
	Bidding Phase Services				$3,500.00
	Construction Phase Services				$12,800.00
	Start-Up/O&M Manuals				$2,500.00
	Post Construction Phase				$2,500.00
ESTIMATED TOTAL PROJECT COST					**$162,580.00**

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Lift Station Electrical Tier I (MultiTrode/MultiSmart w/ Telemetry)

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Prepared By:	Ashley M. Williams, EIT	Date:	November 17, 2011
Project Manager:	Larry E. Comer, PE	Date:	

Segment	Description	Unit	Quantity	Unit Price	Total
	Panel Replacement	LS	1	$ 30,000.00	$ 30,000.00
	MultiTrode/MultiSmart	LS	1	$ 9,000.00	$ 9,000.00
	Configuration	LS	1	$ 750.00	$ 750.00
	Radio Telemetry	LS	1	$ 4,500.00	$ 4,500.00

Subtotal =	$44,250.00
10% Contingency =	$4,425.00
Total Estimated Construction =	$48,675.00

ENGINEERING		
	Electrical Subconsultant	$7,300.00
	Bidding Phase Services	$3,500.00
	Construction Phase Services	$2,400.00
ESTIMATED TOTAL PROJECT COST		**$61,875.00**

HLRWSD

Lift Station Electrical Tier II (MultiTrode/MultiSmart w/o Telemetry

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Prepared By:	Ashley M. Williams, EIT	Date:	November 17, 2011
Project Manager:	Larry E. Comer, PE	Date:	

Segment	Description	Unit	Quantity	Unit Price	Total
	Panel Replacement	LS	1	$ 30,000.00	$ 30,000.00
	MultiTrode/MultiSmart	LS	1	$ 9,000.00	$ 9,000.00
	Configuration	LS	1	$ 750.00	$ 750.00
	Autodialer	LS	1	$ 1,800.00	$ 1,800.00
				Subtotal =	$41,550.00
				10% Contingency =	$4,155.00
				Total Estimated Construction =	$45,705.00
ENGINEERING					
	Electrical Subconsultant				$6,900.00
	Bidding Phase Services				$3,500.00
	Construction Phase Services				$2,300.00
ESTIMATED TOTAL PROJECT COST					**$58,405.00**

HLRWSD

Lift Station Electrical Tier III (Traditional Hard Wired, Autodialer)

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Prepared By:	Ashley M. Williams, EIT	Date:	November 17, 2011
Project Manager:	Larry E. Comer, PE	Date:	

Segment	Description	Unit	Quantity	Unit Price	Total
	Panel Replacement	LS	1	$ 30,000.00	$ 30,000.00
	Autodialer	LS	1	$ 1,800.00	$ 1,800.00
				Subtotal =	$31,800.00
				10% Contingency =	$3,180.00
				Total Estimated Construction =	$34,980.00
ENGINEERING					
	Electrical Subconsultant				$5,200.00
	Bidding Phase Services				$3,500.00
	Construction Phase Services				$1,700.00
ESTIMATED TOTAL PROJECT COST					**$45,380.00**

HLRWSD

Lift Station Back-Up Generator

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Prepared By:	Ashley M. Williams, EIT	Date:	November 17, 2011
Project Manager:	Larry E. Comer, PE	Date:	

Segment	Description	Unit	Quantity	Unit Price	Total
	Generator and Installation	LS	1	$ 50,000.00	$ 50,000.00
	Site Work	LS	1	$ 8,000.00	$ 8,000.00
				Subtotal =	$58,000.00
				10% Contingency =	$5,800.00
				Total Estimated Construction =	$63,800.00
ENGINEERING					
	Design Phase Services				$6,400.00
	Bidding Phase Services				$3,500.00
	Construction Phase Services				$3,200.00
ESTIMATED TOTAL PROJECT COST					**$76,900.00**

HLRWSD

Pressure Service Upgrade

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Prepared By:	Ashley M. Williams, EIT	Date:	November 17, 2011
Project Manager:	Larry E. Comer, PE	Date:	

Segment	Description	Unit	Quantity	Unit Price	Total
	Pressure Service Upgrade	LS	1	$ 2,500.00	$ 2,500.00
			Subtotal =		$2,500.00
			10% Contingency =		$250.00
			Total Estimated Construction =		$2,750.00
ENGINEERING					
	Design Phase Services				$300.00
	Bidding Phase Services				$300.00
	Construction Phase Services				$100.00
ESTIMATED TOTAL PROJECT COST					**$3,450.00**

HLRWSD

Air Release Valve (ARV) Replacement

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Prepared By:	Ashley M. Williams, EIT	Date:	November 17, 2011
Project Manager:	Larry E. Comer, PE	Date:	

Segment	Description	Unit	Quantity	Unit Price	Total
	ARV Replacement	LS	1	$ 3,500.00	$ 3,500.00
			Subtotal =		$3,500.00
			10% Contingency =		$350.00
			Total Estimated Construction =		$3,850.00
ENGINEERING					
	Design Phase Services				$400.00
	Bidding Phase Services				$300.00
	Construction Phase Services				$200.00
ESTIMATED TOTAL PROJECT COST					**$4,750.00**

HLRWSD
Strahorn Gravity Relief Line
ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Prepared By:	Ashley M. Williams, EIT	Date:	August 23, 2012		
Project Manager:	Larry E. Comer, PE	Date:			
Segment	Description	Unit	Quantity	Unit Price	Total
	Mobilization	LS	1	$ 15,000.00	$ 15,000.00
	Traffic Control	LS	1	$ 6,000.00	$ 6,000.00
	SWPPP Set-Up and Close Out	LS	1	$ 1,000.00	$ 1,000.00
	SWPPP Implementation	WK	8	$ 150.00	$ 1,200.00
	Site Control and Maintenance	WK	8	$ 150.00	$ 1,200.00
	Dust Control	HR	40	$ 50.00	$ 2,000.00
STRAHORN	Type A8 Coarse Aggregate (bedding)	LF	3080	$ 5.00	$ 15,400.00
Bruce to Hayden	Trench Excavation and Backfill, 0'-6'	LF	500	$ 7.50	$ 3,750.00
	Trench Excavation and Backfill, 0'-9'	LF	500	$ 12.00	$ 6,000.00
	Trench Excavation and Backfill, 0'-12'	LF	2080	$ 13.00	$ 27,040.00
	AC Pavement Restoration (Strahorn - by City of Hayden Lk)				$ -
	Directional Bore (under Hayden Ave)	LF	50	$ 650.00	$ 32,500.00
	Concrete Manhole 48" Diameter	EA	11	$ 2,200.00	$ 24,200.00
	10" Gravity PVC Sewer Pipe	LF	3080	$ 13.00	$ 40,040.00
	Tie-In to Existing Manhole	EA	1	$ 1,000.00	$ 1,000.00
STRAHORN	Type A3 Coarse Aggregate (3/4" Minus)	CY	80	$ 30.00	$ 2,400.00
Hayden to	Type A8 Coarse Aggregate (bedding)	LF	3350	$ 5.00	$ 16,750.00
H-1D	Trench Excavation and Backfill, 0'-6'	LF	3350	$ 7.50	$ 25,125.00
	Hydroseeding/Landscape Restoration	SY	3110	$ 10.00	$ 31,100.00
	Concrete Manhole 48" Diameter	EA	9	$ 5,000.00	$ 45,000.00
	10" Gravity PVC Sewer Pipe	LF	3350	$ 13.00	$ 43,550.00
	Tie-In to H1-D	EA	1	$ 2,500.00	$ 2,500.00
	Water/Sewer Crossing	EA	1	$ 3,000.00	$ 3,000.00
				Subtotal =	$345,800.00
				10% Contingency =	$34,580.00
				Total Estimated Construction =	$380,380.00
ENGINEERING					
	Design Phase Services				$38,000.00
	Bidding Phase Services				$3,500.00
	Construction Phase Services				$38,000.00
	Start-Up/O&M Manuals				$2,500.00
	Post Construction Phase				$2,500.00
ESTIMATED TOTAL PROJECT COST					**$464,880.00**

HLRWSD

Miles Avenue Relief Line

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Prepared By:	Ashley M. Williams, EIT	Date:	November 17, 2011
Project Manager:	Larry E. Comer, PE	Date:	

Segment	Description	Unit	Quantity	Unit Price	Total
	Mobilization	LS	1	$ 7,500.00	$ 7,500.00
	Traffic Control	LS	1	$ 3,500.00	$ 3,500.00
	SWPPP Set-Up and Close Out	LS	1	$ 1,000.00	$ 1,000.00
	SWPPP Implementation	WK	4	$ 150.00	$ 600.00
	Site Control and Maintenance	WK	4	$ 150.00	$ 600.00
	Dust Control	HR	20	$ 50.00	$ 1,000.00
	Type A8 Coarse Aggregate (bedding)	LF	2230	$ 5.00	$ 11,150.00
	Trench Excavation and Backfill, 0'-6'	LF	1140	$ 7.50	$ 8,550.00
	Trench Excavation and Backfill, 0'-9'	LF	1090	$ 12.00	$ 13,080.00
	Landscape Restoration (Avondale Country Club)	LS	1	$ 8,000.00	$ 8,000.00
	CDF Backfill	CY	5	$ 115.00	$ 575.00
	Concrete Manhole 48" Diameter	EA	5	$ 2,200.00	$ 11,000.00
	10" C900 PVC Sewer Pipe	LF	330	$ 13.00	$ 4,290.00
	10" Gravity PVC Sewer Pipe	LF	1900	$ 13.00	$ 24,700.00
	Tie-In to Existing Manhole	EA	2	$ 1,000.00	$ 2,000.00
	6" Tee Cleanout, tie-in to existing pressure line	EA	1	$ 15,000.00	$ 15,000.00
	Diversion Vault	LS	1	$ 10,000.00	$ 10,000.00
				Subtotal =	$122,500.00
				10% Contingency =	$12,250.00
				Total Estimated Construction =	$134,750.00
ENGINEERING					
	Design Phase Services				$13,500.00
	Bidding Phase Services				$3,500.00
	Construction Phase Services				$13,500.00
	Start-Up/O&M Manuals				$2,500.00
	Post Construction Phase				$2,500.00
ESTIMATED TOTAL PROJECT COST					**$170,250.00**

HLRWSD
Bruce Relief Line
ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Prepared By:	Ashley M. Williams, EIT	Date:	November 17, 2011
Project Manager:	Larry E. Comer, PE	Date:	

Segment	Description	Unit	Quantity	Unit Price	Total
	Mobilization	LS	1	$ 7,500.00	$ 7,500.00
	Traffic Control	LS	1	$ 3,500.00	$ 3,500.00
	SWPPP Set-Up and Close Out	LS	1	$ 1,000.00	$ 1,000.00
	SWPPP Implementation	WK	4	$ 150.00	$ 600.00
	Site Control and Maintenance	WK	4	$ 150.00	$ 600.00
	Dust Control	HR	20	$ 50.00	$ 1,000.00
	Type A3 Coarse Aggregate (3/4" Minus)	CY	238	$ 30.00	$ 7,140.00
	Type A8 Coarse Aggregate (bedding)	LF	1650	$ 5.00	$ 8,250.00
	Trench Excavation and Backfill, 0'-6'	LF	750	$ 7.50	$ 5,625.00
	Trench Excavation and Backfill, 0'-9'	LF	740	$ 12.00	$ 8,880.00
	Trench Excavation and Backfill, 0'-12'	LF	160	$ 13.00	$ 2,080.00
	AC Pavement Removal	SY	1427	$ 1.50	$ 2,140.50
	AC Pavement Restoration	SY	1427	$ 15.00	$ 21,405.00
	Hydroseeding	SY	800	$ 2.50	$ 2,000.00
	Concrete Manhole 48" Diameter	EA	5	$ 2,200.00	$ 11,000.00
	10" Gravity PVC Sewer Pipe	LF	1650	$ 13.00	$ 21,450.00
	Tie-In to Existing Manhole	EA	2	$ 1,000.00	$ 2,000.00
	Diversion Vault	LS	1	$ 10,000.00	$ 10,000.00
				Subtotal =	$116,200.00
				10% Contingency =	$11,620.00
				Total Estimated Construction =	$127,820.00
ENGINEERING					
	Design Phase Services				$12,800.00
	Bidding Phase Services				$3,500.00
	Construction Phase Services				$12,800.00
	Start-Up/O&M Manuals				$2,500.00
	Post Construction Phase				$2,500.00
ESTIMATED TOTAL PROJECT COST					**$161,920.00**

HLRWSD

Lift Station Rehabilitation (with Electrical) Alternative Cost

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Prepared By:	Ashley M. Williams, EIT	Date:	January 3, 2012
Project Manager:	Larry E. Comer, PE	Date:	

Segment	Description	Unit	Quantity	Unit Price	Total
Lift Station Upgrades					
	Rehabilitation (13 lift stations)	EA	13	$138,980.00	$ 1,806,740.00
	Control Tier I	EA	10	$ 61,875.00	$ 618,750.00
	Control Tier II	EA	4	$ 58,405.00	$ 233,620.00
	Control Tier III	EA	2	$ 45,380.00	$ 90,760.00
	Generator (7 lift stations)	EA	7	$ 76,900.00	$ 538,300.00
Collection System Upgrades					
	Pressure Service Upgrades	EA	157	$ 3,450.00	$ 541,650.00
	ARV Replacements	EA	6	$ 4,750.00	$ 28,500.00
Relief Lines					
	Strahorn Relief Line	LS	1	$487,270.00	$ 487,270.00
	Miles/Bruce Relief Line (Budget for Miles)	LS	1	$170,250.00	$ 170,250.00
				Subtotal =	$4,515,800.00
				10% Contingency =	$451,580.00
				Total Estimated Construction =	$4,967,380.00
ENGINEERING (included)					
	Design Phase Services				$0.00
	Bidding Phase Services				$0.00
	Construction Phase Services				$0.00
	Start-Up/O&M Manuals				$0.00
	Post Construction Phase				$0.00
ESTIMATED TOTAL PROJECT COST					**$4,967,380.00**

HLRWSD

Lift Station Replacement (with Electrical) Alternative Cost

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Prepared By:	Ashley M. Williams, EIT	Date:	January 3, 2012
Project Manager:	Larry E. Comer, PE	Date:	

Segment	Description	Unit	Quantity	Unit Price	Total
Lift Station Upgrades					
	Replacement (13 lift stations)	EA	13	$243,280.00	$ 3,162,640.00
	Control Tier I	EA	10	$ 61,875.00	$ 618,750.00
	Control Tier II	EA	4	$ 58,405.00	$ 233,620.00
	Control Tier III	EA	2	$ 45,380.00	$ 90,760.00
	Generator (7 lift stations)	EA	7	$ 76,900.00	$ 538,300.00
Collection System Upgrades					
	Pressure Service Upgrades	EA	157	$ 3,450.00	$ 541,650.00
	ARV Replacements	EA	6	$ 4,750.00	$ 28,500.00
Relief Lines					
	Strahorn Relief Line	LS	1	$487,270.00	$ 487,270.00
	Miles/Bruce Relief Line (Budget for Miles)	LS	1	$170,250.00	$ 170,250.00
				Subtotal =	$5,871,700.00
				10% Contingency =	$587,170.00
				Total Estimated Construction =	$6,458,870.00
ENGINEERING (included)					
	Design Phase Services				$0.00
	Bidding Phase Services				$0.00
	Construction Phase Services				$0.00
	Start-Up/O&M Manuals				$0.00
	Post Construction Phase				$0.00
ESTIMATED TOTAL PROJECT COST					**$6,458,870.00**

HLRWSD

Lift Station Slip-Line (with Electrical) Alternative Cost

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Prepared By:	Ashley M. Williams, EIT	Date:	January 3, 2012		
Project Manager:	Larry E. Comer, PE	Date:			
Segment	Description	Unit	Quantity	Unit Price	Total
Lift Station Upgrades					
	Slipline (13 lift stations)	EA	13	$162,580.00	$ 2,113,540.00
	Control Tier I	EA	10	$ 61,875.00	$ 618,750.00
	Control Tier II	EA	4	$ 58,405.00	$ 233,620.00
	Control Tier III	EA	2	$ 45,380.00	$ 90,760.00
	Generator (7 lift stations)	EA	7	$ 76,900.00	$ 538,300.00
Collection System Upgrades					
	Pressure Service Upgrades	EA	157	$ 3,450.00	$ 541,650.00
	ARV Replacements	EA	6	$ 4,750.00	$ 28,500.00
Relief Lines					
	Strahorn Relief Line	LS	1	$487,270.00	$ 487,270.00
	Miles/Bruce Relief Line (Budget for Miles)	LS	1	$170,250.00	$ 170,250.00
				Subtotal =	$4,822,600.00
				10% Contingency =	$482,260.00
				Total Estimated Construction =	$5,304,860.00
ENGINEERING (included)					
	Design Phase Services				$0.00
	Bidding Phase Services				$0.00
	Construction Phase Services				$0.00
	Start-Up/O&M Manuals				$0.00
	Post Construction Phase				$0.00
ESTIMATED TOTAL PROJECT COST					**$5,304,860.00**

HLRWSD

Option A: Lift Station Rehabilitation (Coating In-Place) for AVONDALE LOOP

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Prepared By:	Ashley M. Williams, EIT	Date:	November 17, 2011
Project Manager:	Larry E. Comer, PE	Date:	

Segment	Description	Unit	Quantity	Unit Price	Total
	Mobilization	LS	1	$ 5,000.00	$ 5,000.00
	Traffic Control	DAY	5	$ 2,000.00	$ 10,000.00
	Bypass Infrastructure	LS	1	$ 3,500.00	$ 3,500.00
	Bypass Pumping	DAY	4	$ 1,500.00	$ 6,000.00
	"Spray Rock" Preparation and Coating	LS	1	$ 12,000.00	$ 12,000.00
	Lift Station Mechanical Piping/Rails	LS	1	$ 15,000.00	$ 15,000.00
	Valve Vault	LS	1	$ 20,000.00	$ 20,000.00
	New Pumps	EA	2	$ 9,000.00	$ 18,000.00
	New Top/Hatch	LS	1	$ 5,000.00	$ 5,000.00
	Safety Grid	LS	1	$ 600.00	$ 600.00
	Site Improvements	LS	1	$ 5,000.00	$ 5,000.00
	Surface Restoration	LS	1	$ 5,000.00	$ 5,000.00
	Odor Control	LS	1	$ 2,500.00	$ 2,500.00
				Subtotal =	$107,600.00
				10% Contingency =	$10,760.00
				Total Estimated Construction =	$118,360.00
ENGINEERING					
	Design Phase Services				$11,800.00
	Bidding Phase Services				$3,500.00
	Construction Phase Services				$11,800.00
	Start-Up/O&M Manuals				$2,500.00
	Post Construction Phase				$2,500.00
ESTIMATED TOTAL PROJECT COST					**$150,460.00**

HLRWSD

Option B: Lift Station Replacement for CANTERBURY COVE

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Prepared By:	Ashley M. Williams, EIT	Date:	November 17, 2011
Project Manager:	Larry E. Comer, PE	Date:	

Segment	Description	Unit	Quantity	Unit Price	Total
	Mobilization	LS	1	$ 5,000.00	$ 5,000.00
	New Fiberglass Basin	LS	1	$ 50,000.00	$ 50,000.00
	Lift Station Mechanical Piping/Rails	LS	1	$ 15,000.00	$ 15,000.00
	Valve Vault	LS	1	$ 20,000.00	$ 20,000.00
	New Pumps	EA	2	$ 9,000.00	$ 18,000.00
	Safety Grid	LS	1	$ 600.00	$ 600.00
	Site Improvements	LS	1	$ 5,000.00	$ 5,000.00
	Surface Restoration	LS	1	$ 5,000.00	$ 5,000.00
	Odor Control	LS	1	$ 2,500.00	$ 2,500.00
	Demolish/Dispose Existing Lift Steel Basin	LS	1	$ 10,000.00	$ 10,000.00
	Simplex Grinder Pump Stations	EA	3	$ 7,500.00	$ 22,500.00
	Type A3 Aggregate (3/4" minus)	CY	90	$ 30.00	$ 2,700.00
	Type A8 Aggregate (bedding)	LF	260	$ 5.00	$ 1,300.00
	Trench Excavation and Backfill (0-6')	LF	260	$ 7.50	$ 1,950.00
	AC Pavement Removal	SY	640	$ 1.50	$ 960.00
	AC Pavement Restoration	SY	640	$ 13.00	$ 8,320.00
	Concrete Manhole (48" Diameter)	EA	2	$ 2,200.00	$ 4,400.00
	8" Gravity Sewer Pipe	LF	260	$ 10.00	$ 2,600.00
	2" HDPE Slipline Force Main	LF	450	$ 20.00	$ 9,000.00

Subtotal =	$184,830.00
10% Contingency =	$18,483.00
Total Estimated Construction =	$203,310.00

ENGINEERING	
Design Phase Services	$20,300.00
Bidding Phase Services	$3,500.00
Construction Phase Services	$20,300.00
Start-Up/O&M Manuals	$2,500.00
Post Construction Phase	$2,500.00
ESTIMATED TOTAL PROJECT COST	**$252,410.00**

HLRWSD

Option B: Lift Station Replacement for CLARK HOUSE

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Prepared By:	Ashley M. Williams, EIT	Date:	November 17, 2011
Project Manager:	Larry E. Comer, PE	Date:	

Segment	Description	Unit	Quantity	Unit Price	Total
	Mobilization	LS	1	$ 10,000.00	$ 10,000.00
	Traffic Control	DAY	10	$ 2,000.00	$ 20,000.00
	New Fiberglass Basin	LS	1	$ 86,000.00	$ 86,000.00
	Lift Station Mechanical Piping/Rails	LS	1	$ 15,000.00	$ 15,000.00
	Valve Vault	LS	1	$ 20,000.00	$ 20,000.00
	New Pumps	EA	2	$ 9,000.00	$ 18,000.00
	Safety Grid	LS	1	$ 600.00	$ 600.00
	Site Improvements	LS	1	$ 5,000.00	$ 5,000.00
	Surface Restoration	LS	1	$ 5,000.00	$ 5,000.00
	Odor Control	LS	1	$ 2,500.00	$ 2,500.00
	Demolish/Dispose Existing Lift Steel Basin	LS	1	$ 10,000.00	$ 10,000.00
	Excavation and Haul	LS	1	$ 10,000.00	$ 10,000.00
	Retaining Wall	LS	1	$ 30,000.00	$ 30,000.00
				Subtotal =	$232,100.00
				10% Contingency =	$23,210.00
				Total Estimated Construction =	$255,310.00
ENGINEERING					
	Design Phase Services				$25,500.00
	Bidding Phase Services				$3,500.00
	Construction Phase Services				$25,500.00
	Start-Up/O&M Manuals				$2,500.00
	Post Construction Phase				$2,500.00
ESTIMATED TOTAL PROJECT COST					**$314,810.00**

HLRWSD

Option A: Lift Station Rehabilitation (Coating In-Place) for COOPERS BAY

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Prepared By:	Ashley M. Williams, EIT	Date:	November 17, 2011
Project Manager:	Larry E. Comer, PE	Date:	

Segment	Description	Unit	Quantity	Unit Price	Total
	Lift Station Mechanical Piping/Rails	LS	1	$ 15,000.00	$ 15,000.00
	New Pumps	EA	2	$ 9,000.00	$ 18,000.00
	Safety Grid	LS	1	$ 600.00	$ 600.00
				Subtotal =	$33,600.00
				10% Contingency =	$3,360.00
				Total Estimated Construction =	$36,960.00
ENGINEERING					
	Design Phase Services				$3,700.00
	Bidding Phase Services				$3,500.00
	Construction Phase Services				$3,700.00
	Start-Up/O&M Manuals				$2,500.00
	Post Construction Phase				$2,500.00
ESTIMATED TOTAL PROJECT COST					**$52,860.00**

HLRWSD

Option A: Lift Station Rehabilitation for COUNTRY CLUB

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Prepared By:	Ashley M. Williams, EIT	Date:	November 17, 2011
Project Manager:	Larry E. Comer, PE	Date:	

Segment	Description	Unit	Quantity	Unit Price	Total
	Mobilization	LS	1	$ 5,000.00	$ 5,000.00
	Bypass Infrastructure	LS	1	$ 3,500.00	$ 3,500.00
	Bypass Pumping	DAY	4	$ 2,500.00	$ 10,000.00
	Lift Station Mechanical Piping/Rails	LS	1	$ 25,000.00	$ 25,000.00
	Valve Vault	LS	1	$ 20,000.00	$ 20,000.00
	New Pumps	EA	3	$ 10,000.00	$ 30,000.00
	Safety Grid	LS	1	$ 600.00	$ 600.00

Assumes: **No Miles/Strahorn Relief Line**

Subtotal =	$94,100.00
10% Contingency =	$9,410.00
Total Estimated Construction =	$103,510.00

ENGINEERING	
Design Phase Services	$10,400.00
Bidding Phase Services	$3,500.00
Construction Phase Services	$10,400.00
Start-Up/O&M Manuals	$2,500.00
Post Construction Phase	$2,500.00
ESTIMATED TOTAL PROJECT COST	**$132,810.00**

HLRWSD
Improvements for H1D
ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Prepared By:	Ashley M. Williams, EIT	Date:	November 17, 2011
Project Manager:	Larry E. Comer, PE	Date:	

Segment	Description	Unit	Quantity	Unit Price	Total
	3-Way Valve Replacement	LS	1	$ 12,000.00	$ 12,000.00
	Pump Motor Replacement	EA	2	$ 10,000.00	$ 20,000.00
				Subtotal =	$32,000.00
				10% Contingency =	$3,200.00
				Total Estimated Construction =	$35,200.00
ENGINEERING					
	Design Phase Services				$3,500.00
	Bidding Phase Services				$3,500.00
	Construction Phase Services				$3,500.00
	Start-Up/O&M Manuals				$2,500.00
	Post Construction Phase				$2,500.00
ESTIMATED TOTAL PROJECT COST					**$50,700.00**

HLRWSD

Option A: Lift Station Rehabilitation (Coating In-Place) for HONEYSUCKLE BEACH

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Prepared By:	Ashley M. Williams, EIT	Date:	November 17, 2011
Project Manager:	Larry E. Comer, PE	Date:	

Segment	Description	Unit	Quantity	Unit Price	Total
	Mobilization	LS	1	$ 5,000.00	$ 5,000.00
	Traffic Control	DAY	4	$ 800.00	$ 3,200.00
	Bypass Infrastructure	LS	1	$ 3,500.00	$ 3,500.00
	Bypass Pumping	DAY	4	$ 1,500.00	$ 6,000.00
	"Spray Rock" Preparation and Coating	LS	1	$ 12,000.00	$ 12,000.00
	Lift Station Mechanical Piping/Rails	LS	1	$ 15,000.00	$ 15,000.00
	Valve Vault	LS	1	$ 20,000.00	$ 20,000.00
	New Pumps	EA	2	$ 9,000.00	$ 18,000.00
	New Top/Hatch	LS	1	$ 5,000.00	$ 5,000.00
	Safety Grid	LS	1	$ 600.00	$ 600.00
	Site Improvements	LS	1	$ 5,000.00	$ 5,000.00
	Surface Restoration	LS	1	$ 5,000.00	$ 5,000.00
	Odor Control	LS	1	$ 2,500.00	$ 2,500.00
				Subtotal =	$100,800.00
				10% Contingency =	$10,080.00
				Total Estimated Construction =	$110,880.00
ENGINEERING					
	Design Phase Services				$11,100.00
	Bidding Phase Services				$3,500.00
	Construction Phase Services				$11,100.00
	Start-Up/O&M Manuals				$2,500.00
	Post Construction Phase				$2,500.00
ESTIMATED TOTAL PROJECT COST					**$141,580.00**

HLRWSD

Option B: Lift Station Replacement for PACKSADDLE

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Prepared By:	Ashley M. Williams, EIT	Date:	November 17, 2011
Project Manager:	Larry E. Comer, PE	Date:	

Segment	Description	Unit	Quantity	Unit Price	Total
	Mobilization	LS	1	$ 5,000.00	$ 5,000.00
	Access Upgrades	LS	1	$ 10,000.00	$ 10,000.00
	Safety Grid	LS	1	$ 600.00	$ 600.00
				Subtotal =	$15,600.00
				10% Contingency =	$1,560.00
				Total Estimated Construction =	$17,160.00
ENGINEERING					
	Design Phase Services				$1,700.00
	Bidding Phase Services				$3,500.00
	Construction Phase Services				$1,700.00
	Start-Up/O&M Manuals				$2,500.00
	Post Construction Phase				$2,500.00
ESTIMATED TOTAL PROJECT COST					**$29,060.00**

HLRWSD

Option B: Lift Station Replacement for POINT HAYDEN

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Prepared By:	Ashley M. Williams, EIT	Date:	November 17, 2011
Project Manager:	Larry E. Comer, PE	Date:	

Segment	Description	Unit	Quantity	Unit Price	Total
	Mobilization	LS	1	$ 5,000.00	$ 5,000.00
	Traffic Control	DAY	5	$ 2,000.00	$ 10,000.00
	Bypass Infrastructure	LS	1	$ 3,500.00	$ 3,500.00
	Bypass Pumping	DAY	5	$ 1,500.00	$ 7,500.00
	New Fiberglass Basin	LS	1	$ 50,000.00	$ 50,000.00
	Lift Station Mechanical Piping/Rails	LS	1	$ 15,000.00	$ 15,000.00
	Valve Vault	LS	1	$ 20,000.00	$ 20,000.00
	New Pumps	EA	2	$ 5,000.00	$ 10,000.00
	Safety Grid	LS	1	$ 600.00	$ 600.00
	Site Improvements	LS	1	$ 5,000.00	$ 5,000.00
	Surface Restoration	LS	1	$ 5,000.00	$ 5,000.00
	Odor Control	LS	1	$ 2,500.00	$ 2,500.00
	Demolish/Dispose Existing Lift Steel Basin	LS	1	$ 10,000.00	$ 10,000.00
				Subtotal =	$144,100.00
				10% Contingency =	$14,410.00
				Total Estimated Construction =	$158,510.00

ENGINEERING		
	Design Phase Services	$15,900.00
	Bidding Phase Services	$3,500.00
	Construction Phase Services	$15,900.00
	Start-Up/O&M Manuals	$2,500.00
	Post Construction Phase	$2,500.00
ESTIMATED TOTAL PROJECT COST		**$198,810.00**

HLRWSD

Option B: Lift Station Replacement for SANDY COVE

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Prepared By: Ashley M. Williams, EIT Date: November 17, 2011
Project Manager: Larry E. Comer, PE Date:

Segment	Description	Unit	Quantity	Unit Price	Total
	Mobilization	LS	1	$ 5,000.00	$ 5,000.00
	Traffic Control	DAY	5	$ 2,000.00	$ 10,000.00
	Bypass Infrastructure	LS	1	$ 3,500.00	$ 3,500.00
	Bypass Pumping	DAY	4	$ 1,500.00	$ 6,000.00
	New Fiberglass Basin	LS	1	$ 86,000.00	$ 86,000.00
	Lift Station Mechanical Piping/Rails	LS	1	$ 15,000.00	$ 15,000.00
	Valve Vault	LS	1	$ 20,000.00	$ 20,000.00
	New Pumps	EA	2	$ 9,000.00	$ 18,000.00
	Safety Grid	LS	1	$ 600.00	$ 600.00
	Site Improvements	LS	1	$ 5,000.00	$ 5,000.00
	Surface Restoration	LS	1	$ 5,000.00	$ 5,000.00
	Odor Control	LS	1	$ 2,500.00	$ 2,500.00
	Demolish/Dispose Existing Lift Steel Basin	LS	1	$ 10,000.00	$ 10,000.00
	Excavation and Haul	LS	1	$ 10,000.00	$ 10,000.00
	Retaining Wall	LS	1	$ 50,000.00	$ 50,000.00
				Subtotal =	$246,600.00
				10% Contingency =	$24,660.00
				Total Estimated Construction =	$271,260.00
ENGINEERING					
	Design Phase Services				$27,100.00
	Bidding Phase Services				$3,500.00
	Construction Phase Services				$27,100.00
	Start-Up/O&M Manuals				$2,500.00
	Post Construction Phase				$2,500.00
ESTIMATED TOTAL PROJECT COST					**$333,960.00**

HLRWSD

Option A: Lift Station Rehabilitation (Coating In-Place) for SHERWOOD COURT

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Prepared By:	Ashley M. Williams, EIT	Date:	November 17, 2011
Project Manager:	Larry E. Comer, PE	Date:	

Segment	Description	Unit	Quantity	Unit Price	Total
	Mobilization	LS	1	$ 5,000.00	$ 5,000.00
	Traffic Control	DAY	4	$ 500.00	$ 2,000.00
	Bypass Infrastructure	LS	1	$ 3,500.00	$ 3,500.00
	Bypass Pumping	DAY	4	$ 1,500.00	$ 6,000.00
	"Spray Rock" Preparation and Coating	LS	1	$ 12,000.00	$ 12,000.00
	Lift Station Mechanical Piping/Rails	LS	1	$ 15,000.00	$ 15,000.00
	Valve Vault	LS	1	$ 20,000.00	$ 20,000.00
	New Pumps	EA	2	$ 9,000.00	$ 18,000.00
	New Top/Hatch	LS	1	$ 5,000.00	$ 5,000.00
	Safety Grid	LS	1	$ 600.00	$ 600.00
	Site Improvements	LS	1	$ 5,000.00	$ 5,000.00
	Surface Restoration	LS	1	$ 5,000.00	$ 5,000.00
	Odor Control	LS	1	$ 2,500.00	$ 2,500.00
				Subtotal =	$99,600.00
				10% Contingency =	$9,960.00
				Total Estimated Construction =	$109,560.00
ENGINEERING					
	Design Phase Services				$11,000.00
	Bidding Phase Services				$3,500.00
	Construction Phase Services				$11,000.00
	Start-Up/O&M Manuals				$2,500.00
	Post Construction Phase				$2,500.00
ESTIMATED TOTAL PROJECT COST					**$140,060.00**

HLRWSD

Option B: Lift Station Replacement for SPLIT ROCK

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Prepared By:	Ashley M. Williams, EIT	Date:	November 17, 2011
Project Manager:	Larry E. Comer, PE	Date:	

Segment	Description	Unit	Quantity	Unit Price	Total
	Mobilization	LS	1	$ 5,000.00	$ 5,000.00
	Bypass Infrastructure	LS	1	$ 3,500.00	$ 3,500.00
	Bypass Pumping	DAY	4	$ 1,500.00	$ 6,000.00
	New Fiberglass Basin	LS	1	$ 86,000.00	$ 86,000.00
	Lift Station Mechanical Piping/Rails	LS	1	$ 15,000.00	$ 15,000.00
	Valve Vault	LS	1	$ 20,000.00	$ 20,000.00
	New Pumps	EA	2	$ 9,000.00	$ 18,000.00
	Safety Grid	LS	1	$ 600.00	$ 600.00
	Site Improvements	LS	1	$ 5,000.00	$ 5,000.00
	Surface Restoration	LS	1	$ 5,000.00	$ 5,000.00
	Odor Control	LS	1	$ 2,500.00	$ 2,500.00
	Demolish/Dispose Existing Lift Steel Basin	LS	1	$ 10,000.00	$ 10,000.00
				Subtotal =	$176,600.00
				10% Contingency =	$17,660.00
				Total Estimated Construction =	$194,260.00
ENGINEERING					
	Design Phase Services				$19,400.00
	Bidding Phase Services				$3,500.00
	Construction Phase Services				$19,400.00
	Start-Up/O&M Manuals				$2,500.00
	Post Construction Phase				$2,500.00
ESTIMATED TOTAL PROJECT COST					**$241,560.00**

HLRWSD

Option A: Lift Station Rehabilitation (Coating In-Place) for THAMES COURT

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Prepared By:	Ashley M. Williams, EIT	Date:	November 17, 2011
Project Manager:	Larry E. Comer, PE	Date:	

Segment	Description	Unit	Quantity	Unit Price	Total
	Mobilization	LS	1	$ 5,000.00	$ 5,000.00
	Traffic Control	DAY	5	$ 2,000.00	$ 10,000.00
	Bypass Infrastructure	LS	1	$ 3,500.00	$ 3,500.00
	Bypass Pumping	DAY	4	$ 1,500.00	$ 6,000.00
	"Spray Rock" Preparation and Coating	LS	1	$ 12,000.00	$ 12,000.00
	Lift Station Mechanical Piping/Rails	LS	1	$ 15,000.00	$ 15,000.00
	Valve Vault	LS	1	$ 20,000.00	$ 20,000.00
	New Pumps	EA	2	$ 9,000.00	$ 18,000.00
	New Top/Hatch	LS	1	$ 5,000.00	$ 5,000.00
	Safety Grid	LS	1	$ 600.00	$ 600.00
	Site Improvements	LS	1	$ 5,000.00	$ 5,000.00
	Surface Restoration	LS	1	$ 5,000.00	$ 5,000.00
	Odor Control	LS	1	$ 3,000.00	$ 3,000.00
				Subtotal =	$108,100.00
				10% Contingency =	$10,810.00
				Total Estimated Construction =	$118,910.00
ENGINEERING					
	Design Phase Services				$11,900.00
	Bidding Phase Services				$3,500.00
	Construction Phase Services				$11,900.00
	Start-Up/O&M Manuals				$2,500.00
	Post Construction Phase				$2,500.00
ESTIMATED TOTAL PROJECT COST					**$151,210.00**

HLRWSD

Option A: Lift Station Rehabilitation (Coating In-Place) for WRIGHTS PARK

ENGINEER's OPINION OF PRELIMINARY PROJECT COSTS

Prepared By:	Ashley M. Williams, EIT	Date:	November 17, 2011
Project Manager:	Larry E. Comer, PE	Date:	

Segment	Description	Unit	Quantity	Unit Price	Total
	Mobilization	LS	1	$ 5,000.00	$ 5,000.00
	Traffic Control	DAY	5	$ 2,000.00	$ 10,000.00
	Bypass Infrastructure	LS	1	$ 3,500.00	$ 3,500.00
	Bypass Pumping	DAY	4	$ 1,500.00	$ 6,000.00
	"Spray Rock" Preparation and Coating	LS	1	$ 12,000.00	$ 12,000.00
	Lift Station Mechanical Piping/Rails	LS	1	$ 15,000.00	$ 15,000.00
	Valve Vault	LS	1	$ 20,000.00	$ 20,000.00
	New Pumps	EA	2	$ 9,000.00	$ 18,000.00
	New Top/Hatch	LS	1	$ 5,000.00	$ 5,000.00
	Safety Grid	LS	1	$ 600.00	$ 600.00
	Site Improvements	LS	1	$ 5,000.00	$ 5,000.00
	Surface Restoration	LS	1	$ 5,000.00	$ 5,000.00
	Odor Control	LS	1	$ 2,500.00	$ 2,500.00
				Subtotal =	$107,600.00
				10% Contingency =	$10,760.00
				Total Estimated Construction =	$118,360.00
ENGINEERING					
	Design Phase Services				$11,800.00
	Bidding Phase Services				$3,500.00
	Construction Phase Services				$11,800.00
	Start-Up/O&M Manuals				$2,500.00
	Post Construction Phase				$2,500.00
ESTIMATED TOTAL PROJECT COST					**$150,460.00**

APPENDIX G

ENVIRONMENTAL IMPACT COMPARISON

WELCH-COMER
ENGINEERS | SURVEYORS

Environmental Criteria	No Action Alternative	Structural/Mechanical Option A Rehabilitation	Structural/Mechanical Option B Replacement	Structural/Mechanical Option C Slip-Line
Climate and Physical Aspects (Topography, Geology, and Soils)	No Impact	Excavation for Lift Station Rehabilitation, Long-Term Impacts Minimal	Excavation for Lift Station Replacement (largest of 3 opt.), Long-Term Impacts Minimal	Excavation for Lift Station Slip-Line, Long-Term Impacts Minimal
Population, Economic, and Social Profile	Small Potential for Growth	Potential for Growth	Potential for Growth	Potential for Growth
Land Use	No Impact	No Impact	No Impact	No Impact
Floodplain Development	No Impact	No Impact	No Impact	No Impact
Wetlands and Water Quality	Impact to Existing Water Quality due to Potential Station Failure	Protection from Further Damage to Existing Water Quality	Protection from Further Damage to Existing Water Quality	Protection from Further Damage to Existing Water Quality
Wild and Scenic Rivers	No Impact	No Impact	No Impact	No Impact
Cultural Resources	No Impact	No Adverse Impact	No Adverse Impact	No Adverse Impact
Flora and Fauna	No Impact	Site Disturbance, Short-Term Impact	Site Disturbance, Short-Term Impact	Site Disturbance, Short-Term Impact
Recreation and Open Space	No Impact	No Impact	No Impact	No Impact
Agricultural Lands	No Impact	No Adverse Impact	No Adverse Impact	No Adverse Impact
Air Quality	No Impact	Construction Emissions, Short-Term Impact	Construction Emissions, Short-Term Impact	Construction Emissions, Short-Term Impact
Energy	No Impact	No Impact	No Impact	No Impact
Public Health	Potential Detriment to Public Water Supply and General Public Health	Protection from Future Potential Impacts to Public Health	Protection from Future Potential Impacts to Public Health	Protection from Future Potential Impacts to Public Health
Option Cost	$0	$4.306 million	$5.662 million	$4.613 million

Environmental Criteria	No Action Alternative	Strahorn Relief Line	Miles Relief Line	Bruce Relief Line
Climate and Physical Aspects (Topography, Geology, and Soils)	No Impact	Excavation for Relief Line, Long-Term Impacts Minimal	Excavation for Relief Line, Long-Term Impacts Minimal	Excavation for Relief Line, Long-Term Impacts Minimal
Population, Economic, and Social Profile	Small Potential for Growth	Potential for Growth	Potential for Growth	Potential for Growth
Land Use	No Impact	No Impact	No Impact	No Impact
Floodplain Development	No Impact	No Impact	No Impact	No Impact
Wetlands and Water Quality	Impact to Existing Water Quality due to Potential Station Failure at Ctry Club	Protection from Further Damage to Existing Water Quality	Protection from Further Damage to Existing Water Quality	Protection from Further Damage to Existing Water Quality
Wild and Scenic Rivers	No Impact	No Impact	No Impact	No Impact
Cultural Resources	No Impact	No Adverse Impact	No Adverse Impact	No Adverse Impact
Flora and Fauna	No Impact	Site Disturbance, Short-Term Impact	Site Disturbance, Short-Term Impact	Site Disturbance, Short-Term Impact
Recreation and Open Space	No Impact	No Impact	No Impact	No Impact
Agricultural Lands	No Impact	No Adverse Impact	No Adverse Impact	No Adverse Impact
Air Quality	No Impact	Construction Emissions, Short-Term Impact	Construction Emissions, Short-Term Impact	Construction Emissions, Short-Term Impact
Energy	No Impact	No Impact	No Impact	No Impact
Public Health	Potential Detriment to Public Water Supply and General Public Health (failure at Ctry Club)	Protection from Future Potential Impacts to Public Health	Protection from Future Potential Impacts to Public Health	Protection from Future Potential Impacts to Public Health
Option Cost	$0	$487,270	$170,250	$161,920

HAYDEN LAKE RECREATIONAL WATER AND SEWER DISTRICT

NEWSLETTER

August 22, 2012

SEWER COLLECTION SYSTEM FACILITIES PLAN BACKGROUND

The Hayden Lake Sewer System was constructed in 1987 and is now 25 years old. Although the facilities have been operating well and have been maintained, certain components such as the major lift stations require upgrading due to normal depreciation and use.

HLRWSD has recently completed a "Facilities Plan" engineering study which is required by the Idaho Department of Environmental Quality (IDEQ) before designing any public sewer system improvements. The purpose of a wastewater facility plan is to analyze the sewer system, identify system deficiencies, and provide improvement recommendations.

PUBLIC MEETING

The Board invites property owners in its sewer service area to attend a public meeting to discuss proposed improvements to the Districts' sewer collection system and the Hayden Area Regional Sewer Board (HARSB) treatment plant.

WEDNESDAY, SEPT. 5, 2012

6:00 PM at HLRWSD OFFICE

9393 Strahorn Rd, Hayden Lake

The findings and recommendations of the facilities plan will be presented at the public meeting on September 5th.

RECOMMENDED SEWER SYSTEM IMPROVEMENTS

The facilities plan presents options for improvements to the District's sewer collection system, including:

- Re-lining the interior of the steel lift stations with a new industrial-strength coating due to corrosion.
- Replacement of lift station pumps and interior piping to meet current demands of flow and materials.
- Upgrading of electrical controls to meet current electrical standards and improved emergency communication.
- Adding stand-by generators for certain lift stations to improve reliability.
- Constructing gravity relief sewer lines along Miles Avenue and Strahorn Road to reduce power usage, improve reliability, and reduce risks on lift stations along Hayden Lake.
- Options for financing the proposed improvements.

PUBLIC COMMENT

The Board would like to hear from you!

A copy of the facility plan will be available for public review at the District's office during normal business hours. After considering and addressing comments the Board will determine which improvement option to implement and document the selection at their regularly scheduled Board Meeting on September 26, 2012 at 5:00 p.m. A detailed environmental evaluation will then be performed based on the selected option.

In addition to comments received from property owners at the September 5th public meeting, the Board will also consider all written comments received between Sept. 5 and Sept. 19, 2012. Please mail your comments to the following address:

HLRWSD
9393 Strahorn Road
Hayden Lake, ID 83835

Funding Options

In order to meet a time sensitive application date, the District submitted a Letter of Interest to IDEQ in January for construction loan money for sewer system improvements. The District has been listed by IDEQ as eligible to receive loan funds at 2.0% interest over a 20 year term. **The District will discuss this funding option as well as others, at the public meeting.**

PENDING EPA REQUIREMENTS FOR UPGRADING TREATMENT STANDARDS

The HLRWSD is one of three partners of the Hayden Area Regional Sewer Board (HARSB) who own and operate the regional wastewater treatment facility near the County Airport. The other partners are the City of Hayden and Kootenai County. The U.S. Environmental Protection Agency (EPA) is requiring that the HARSB wastewater treatment facility meet much more stringent water quality standards for phosphorous and other constituents, in order to continue to discharge treated wastewater into the Spokane River.

The District and HARSB engaged special legal counsel to challenge unfair limits that were set by Washington State and adopted by the EPA which we felt put an unequal share of treatment requirements on Idaho discharges. Parallel to the legal challenge we have worked to negotiate a fairer allocation of treatment and discharge responsibilities. However the litigation and negotiations have made it very clear that sewer treatment standards are going up and so are costs.

The HARSB Board has prepared a wastewater facilities plan which evaluates the methods and costs of meeting these new EPA discharge requirements, which are some of the most stringent in the U.S. These improvements must be phased-in over the next 10 years, and will cost the rate-payers in our District millions of dollars.

The EPA discharge permit provides that if the HARSB should fail to comply with the new standards, the HARSB partners, including our District, could be liable for fines up to $50,000 per day. Although the Sewer District and HARSB have engaged special legal counsel to challenge these requirements, it appears that the HLRWSD must develop a plan to finance its share of these EPA mandated treatment facility upgrades.

More information on the technical background, options, and costs of the EPA mandated wastewater treatment improvements will be presented at our public meeting on September 5th at 6:00 p.m.

FAIR HOUSING ISSUES IN IDAHO

You are invited to a FREE Fair Housing Training

Sponsored by: Intermountain Fair Housing Council

When: Tuesday, September 25, 2012 7:00 p.m. to 9:00 p.m.

Where: Hayden Lake Recreational Water and Sewer District building
9393 North Strahorn Road, Hayden, Idaho 83835

Speaker: Ken Nagy, Attorney at Law

This Training Will Cover:

- Basic Protections of the Fair Housing Act
- "Best Practice" Fair Housing Principles
- In-Depth Coverage of Disability-Related Issues and Reasonable Accommodations
- New and Emerging Fair Housing Issues

For more information or to register for this workshop, please contact:

Ken Nagy
(208) 301-0126
E-mail: knagy@lewiston.com

Facilities provided by: Hayden Lake Recreational Water and Sewer District

Please note: space is limited therefore please register early

Hayden Lake Recreational
Water and Sewer District

9393 N. Strahorn Road
Hayden Lake, ID 83835

Tel: 208.772.4379
E-mail:
hlrwsdclerk@frontier.com
www.cityofhaydenlake.us

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HAYDEN LAKE RECREATIONAL WATER & SEWER DISTRICT
SEWER SYSTEM PUBLIC MEETING

The Hayden Lake Recreational Water and Sewer District will hold a public meeting on September 5, 2012 at the District office at 9393 N Strahorn Road in Hayden at 6:00 p.m. The purpose of the public meeting is to present recommendations for improvements from the Hayden Lake Recreational Water and Sewer District Wastewater Collection System Facility Plan. The meeting will: present the sewer system deficiencies, proposed improvement options, discuss the environmental impacts associated with each option, funding options, and potential financial impact to the District's customers, as well as to solicit verbal and written comments regarding the plan. Written comments will be accepted by the Board from September 5, 2012 to September 19, 2012. A copy of the facility plan will be available for public review at the District's office during normal business hours. After considering and addressing comments the Board will determine which improvement option to implement and document the selection at their regularly scheduled Board Meeting on September 26, 2012 at 5:00 p.m. A detailed environmental evaluation will then be performed based on the selected option.

AFFIDAVIT OF PUBLICATION

STATE OF IDAHO, }
County of Kootenai, } ss.

Amber Tice being first duly sworn upon oath deposes and says:

1. I am now and at all times hereinafter mentioned was a citizen of the United States, resident of the State of Idaho, over the age of twenty-one years and not a party of the above entitled action.

2. I am now and at all times hereinafter mentioned was the printer (principal clerk) of the "Coeur d'Alene Press," a newspaper printed and published daily except Sunday in Coeur d'Alene, Kootenai County, Idaho, and having a general circulation in said county.

3. The Legal Notice

of which the annexed is a printed copy, was published in the regular Friday issue of said newspaper for 1 consecutive day commencing on the 24 day of August 2012, and ending on the 24 day of August 2012, and such publication was made as often during said period as said daily newspaper was regularly issued.

4. That said newspaper has been continuously and uninterruptedly published in said Kootenai County, during a period of more than seventy-eight consecutive weeks immediately prior to the first publication of said notice. Amber Tice

On this 24 day of August in the year of 2012, before me, a Notary Public, personally appeared Amber Tice, known or identified to me to be the person whose name subscribed to the within instrument, and being by me first duly sworn, declared that the statements therein are true, and acknowledged to me that he executed the same.

Katrina George
Notary Public for the State of Idaho, residing at Coeur d'Alene, Idaho.

KATRINA GEORGE NOTARY PUBLIC STATE OF IDAHO

MY COMMISSION EXPIRES 8/29/17

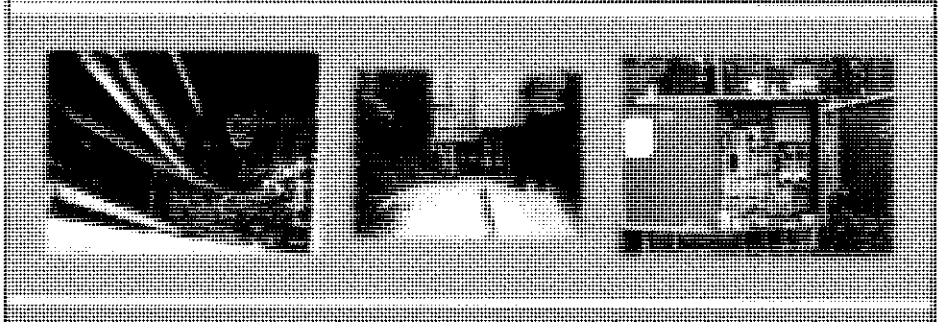
HAYDEN LAKE RECREATIONAL WATER & SEWER DISTRICT SEWER SYSTEM PUBLIC MEETING

The Hayden Lake Recreational Water and Sewer District will hold a public meeting on September 5, 2012 at the District office at 9393 N Strahorn Road in Hayden at 6:00 p.m. The purpose of the public meeting is to present recommendations for improvements from the Hayden Lake Recreational Water and Sewer District Wastewater Collection System Facility Plan. The meeting will: present the sewer system deficiencies, proposed improvement options, discuss the environmental impacts associated with each option, funding options, and potential financial impact to the District's customers, as well as to solicit verbal and written comments regarding the plan. Written comments will be accepted by the Board from September 5, 2012 to September 19, 2012. A copy of the facility plan will be available for public review at the District's office during normal business hours. After considering and addressing comments the Board will determine which improvement option to implement and document the selection at their regularly scheduled Board Meeting on September 26, 2012 at 5:00 p.m. A detailed environmental evaluation will then be performed based on the selected option.

Lynn Hagman
District Administrator
Legal 6083
August 24, 2012

Hayden Lake Recreational Water and Sewer District

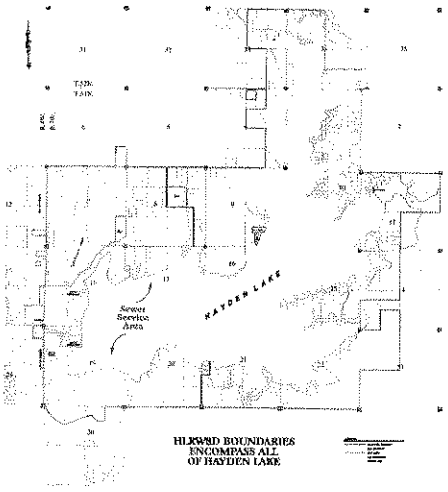
Sewer Collection System – Wastewater Facility Plan Public Meeting

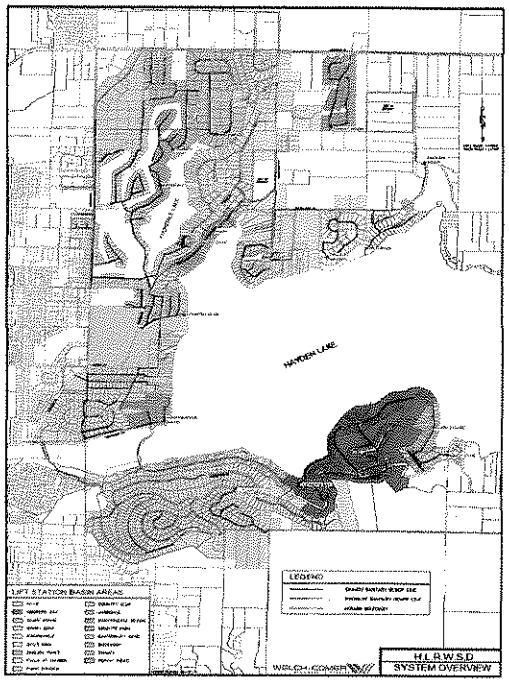


September 5, 2012

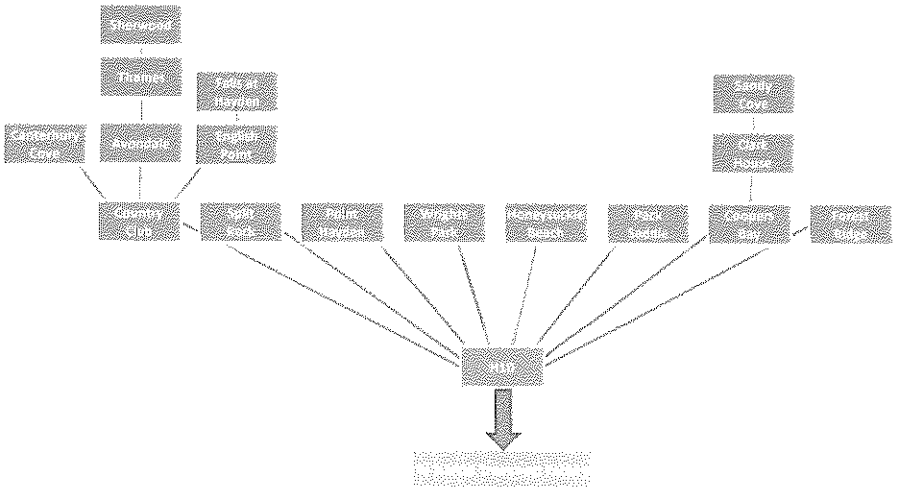
HLRWSD Background

- District formed in 1976 by Public Election
- Majority of system constructed in 1986-1987, financed through 15-year LID (has been paid off for 10 years)
- Hayden Area Regional Sewer Board (HARSB) formed in 1986
  - Regional Interagency Partnership
    - City of Hayden
    - Hayden Lake Recreational Water & Sewer District
    - Kootenai County (Airport)
  - Regional Treatment Facility Built in 1987





HLRWSD- Lift Station Basin Logic

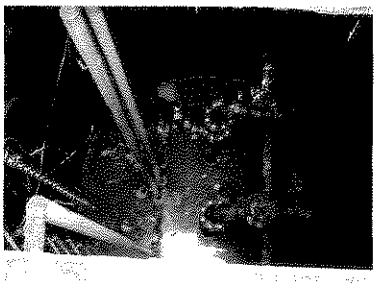


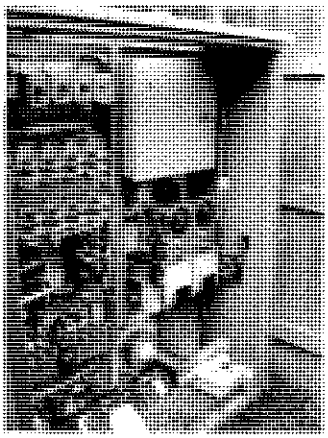
Future Growth Estimates

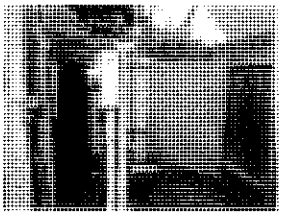
- Current billed ERs: 1,922
- ER allocation at HARSB Treatment Facility: 2,645.5
- Vacant ERs: 702

- District anticipates over the next 20 years, growth in service area accommodated by the ER allocation at HARSB

Existing Conditions







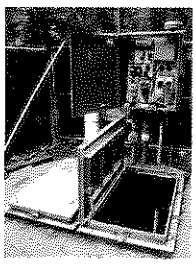
Structural/Mechanical Condition of Lift Stations, Rating

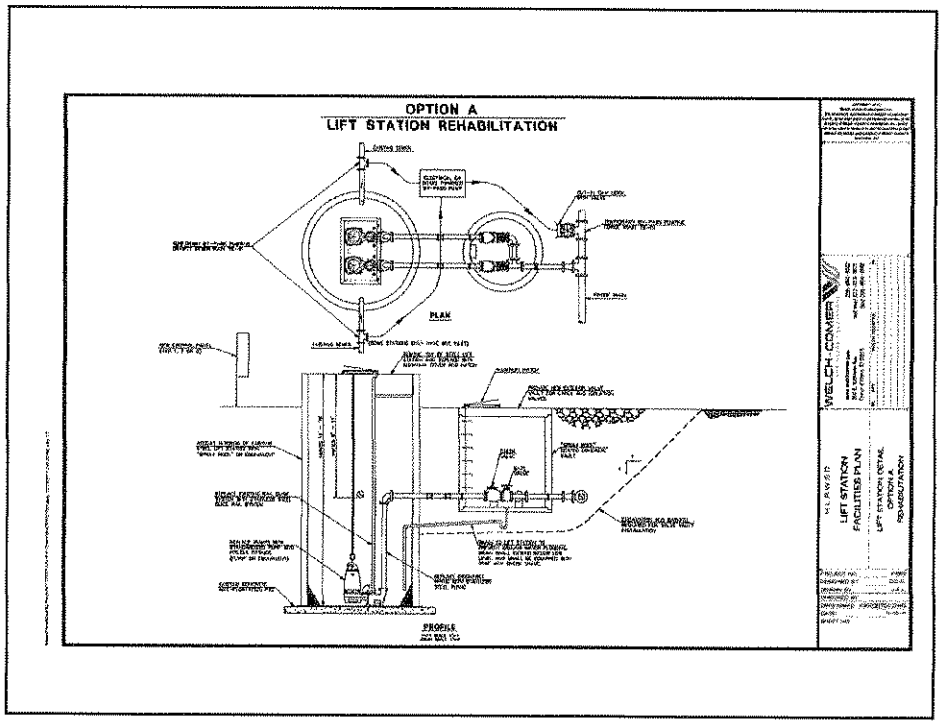
Lift Station	Age	Structural Condition	Mechanical Condition	Environmental Risk	Access/ Safety	Space for Expansion	Total Score (Weighted)
Avondale	1987	1	3	2	1	3	1.9
Canterbury Cove	1984	1	3	3	3	3	2.5
Clark House	1987	2	2	2	3	3	2.3
Coopers Bay	1985	1	1	2	1	2	1.3
Country Club	1987	2	3	3	2	3	2.6
English Point	2010	1	1	1	1	1	1.0
The Falls at Hayden	2010	1	1	2	1	1	1.2
Forest Ridge	2008	1	1	1	1	1	1.0
H-1D	1999	1	1	1	1	1	1.0
Honeysuckle Beach	1987	2	3	2	1	2	2.1
Packsaddle	1981	2	3	3	1	1	2.2
Point Hayden	1982	2	3	2	3	3	2.6
Sandy Cove	1987	3	3	3	3	2	2.9
Sherwood Court	1987	1	2	2	1	2	1.6
Split Rock	1990	1	2	2	2	3	1.9
Thames Court	1987	3	3	2	3	3	2.8
Wrights Park	1987	3	3	2	1	3	2.4

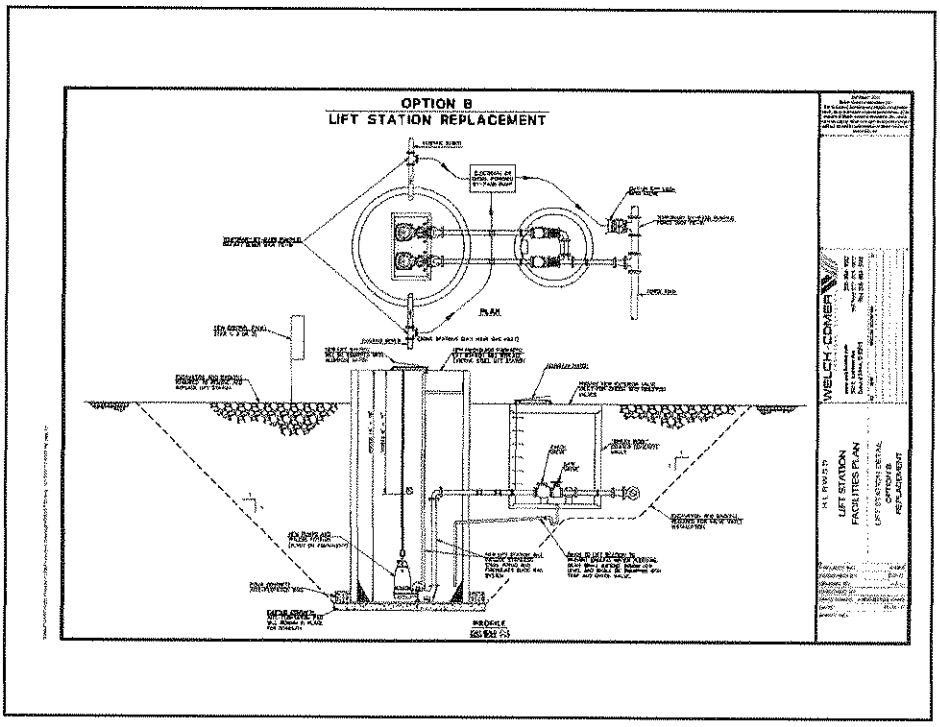
Notes: good = 1, fair = 2, low = 3 for Structural Condition, Mechanical Condition, Access/Safety, Space for Expansion ; low = 1, fair = 2, high = 3 for Environmental Risk
Structural Condition = 25%, Mechanical Condition = 25%, Environmental Risk = 20%, Access/Safety = 20%, Space for Expansion = 10%

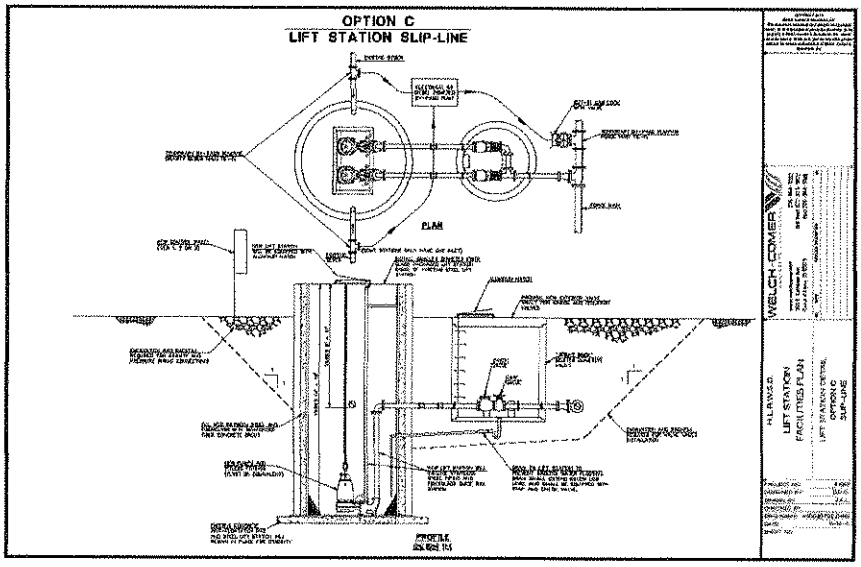
Lift Station Rating Results

1. Sandy Cove 2.9
2. Thames Court 2.8
3. Country Club 2.6
4. Point Hayden 2.6
5. Canterbury Cove 2.5
6. Wrights Park 2.4
7. Clark House 2.3
8. Packsaddle 2.2
9. Honeysuckle Beach 2.1




OPTION A
LIFT STATION REHABILITATION
PLAN
PROFILE
WELCH-COMER
LIFT STATION
FACILITIES PLAN
LIFT STATION DETAIL
OPTION A
REHABILITATION


OPTION B
LIFT STATION REPLACEMENT
PLAN
PROFILE
WELCH-COMER
LIFT STATION
FACILITIES PLAN
LIFT STATION DETAIL
OPTION B
REPLACEMENT



Environmental Analysis

Environmental Criteria	No Action Alternative	Structural/Mechanical Option A Rehabilitation	Structural/Mechanical Option B Replacement	Structural/Mechanical Option C Slip-Line
Climate and Physical Aspects (Topography, Geology, and Soils)	No Impact	Excavation for Lift Station Rehabilitation, Long-Term Impacts Minimal	Excavation for Lift Station Replacement (largest of 3 opt.). Long-Term Impacts Minimal	Excavation for Lift Station Slip-Line, Long-Term Impacts Minimal
Population, Economic, and Social Profile	Small Potential for Growth	Potential for Growth	Potential for Growth	Potential for Growth
Land Use	No Impact	No Impact	No Impact	No Impact
Floodplain Development	No Impact	No Impact	No Impact	No Impact
Wetlands and Water Quality	Impact to Existing Water Quality due to Potential Station Failure	Protection from Further Damage to Existing Water Quality	Protection from Further Damage to Existing Water Quality	Protection from Further Damage to Existing Water Quality
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Cultural Resources	No Impact	No Adverse Impact	No Adverse Impact	No Adverse Impact
Flora and Fauna	No Impact	Site Disturbance, Short-Term Impact	Site Disturbance, Short-Term Impact	Site Disturbance, Short-Term Impact
Recreation and Open Space	No Impact	No Impact	No Impact	No Impact
Agricultural Lands	No Impact	No Adverse Impact	No Adverse Impact	No Adverse Impact
Air Quality	No Impact	Construction Emissions, Short-Term Impact	Construction Emissions, Short-Term Impact	Construction Emissions, Short-Term Impact
Energy	No Impact	No Impact	No Impact	No Impact
Public Health	Potential Detriment to Public Water Supply and General Public Health	Protection from Future Potential Impacts to Public Health	Protection from Future Potential Impacts to Public Health	Protection from Future Potential Impacts to Public Health

HLRWSD Summary of Lift Station Controls

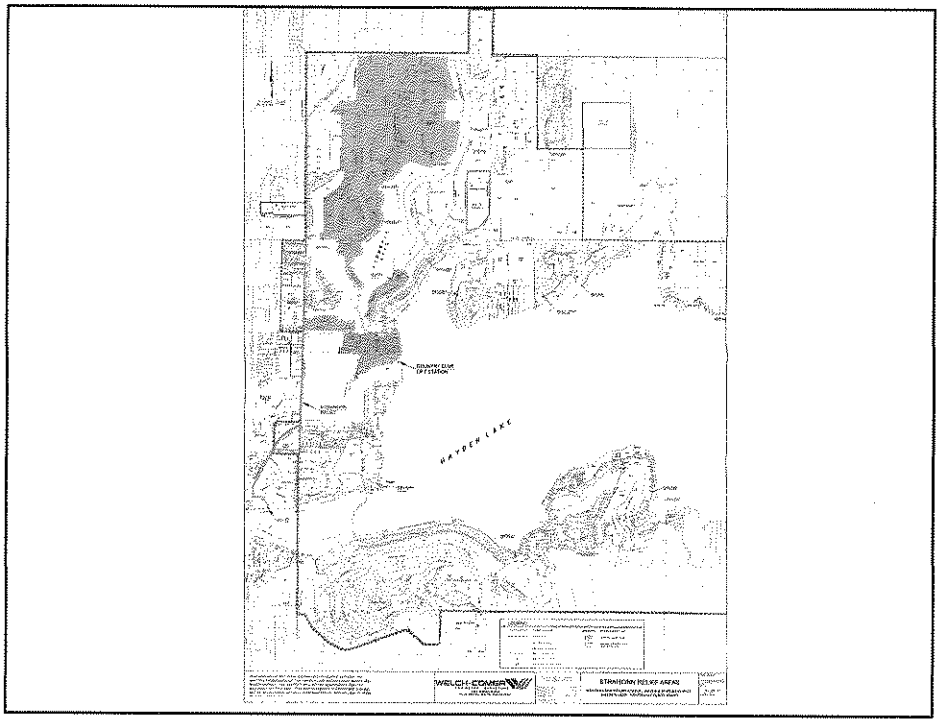
Lift Station Name	Type of Control (e.g. PLC w/ dialer, "smart panel", etc)	Alarm (e.g. dialer)	Standby Generator (Yes/No)	Missing Components?
Avondale	"smart panel"	dialer	yes	radio
Canterbury Cove	1986 with relays	dialer	yes	requires panel upgrade
Clark House	1986 with relays	dialer	no	requires panel upgrade, generator
Coopers Bay	1986 with relays	dialer	yes	requires panel upgrade
Country Club	1986 with relays	dialer	yes	requires panel upgrade
English Point	PLC	dialer	yes	radio
The Falls at Hayden	"smart panel"	dialer	yes	radio
Forest Ridge	PLC	dialer	yes	radio
H-1D	PLC	dialer	yes	radio
Honeysuckle Beach	1986 with relays	dialer	no	requires panel upgrade, generator
Packsaddle	1986 with relays	dialer	no	requires panel upgrade, generator
Point Hayden	1986 with relays	dialer	yes	requires panel upgrade
Sandy Cove	1986 with relays	dialer	no	requires panel upgrade, generator
Sherwood Court	1986 with relays	dialer	no	requires panel upgrade, generator
Split Rock	1986 with relays	dialer	no	requires panel upgrade, generator
Thames Court	1986 with relays	dialer	yes	requires panel upgrade
Wrights Park	1986 with relays	dialer	no	requires panel upgrade, generator

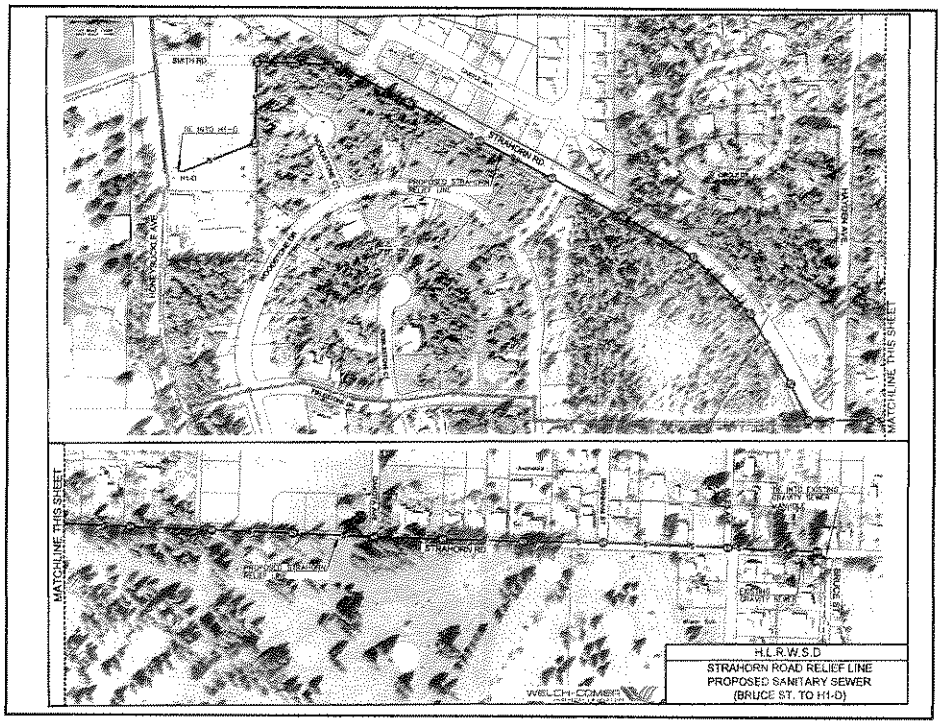
A Tiered Approach to Lift Station Control

- **Tier 1- High Flow / High Risk Stations**
  The "MultiTrode/MultiSmart" pump station management system, with radio telemetry to a base system at the HARSB treatment facility.

- **Tier 2- Moderate Flow / Moderate Risk Stations**
  Use the "MultiTrode/MultiSmart" panels and probes, with limited optional features and defer radio telemetry until a future time.

- **Tier 3- Lower Flow / Lower Risk Stations**
  For small lift stations with a low potential for growth or increased risk, a traditional hard wired control panel coupled with an autodialer for remote alarming. This approach assumes the small stations will not be controlled by telemetry.


HAYDEN LAKE
WELCH-COMEN
STRAHORN RELIEF AREAS

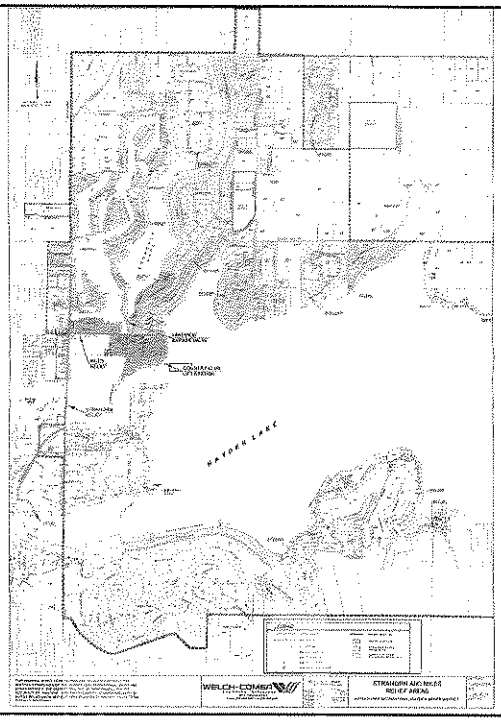

MATCHLINE THIS SHEET
STRAHORN RD
BRUCE ST
MATCHLINE THIS SHEET
H.L.R.W.S.D
STRAHORN ROAD RELIEF LINE
PROPOSED SANITARY SEWER
(BRUCE ST. TO H1-D)
WELCH-COMEN

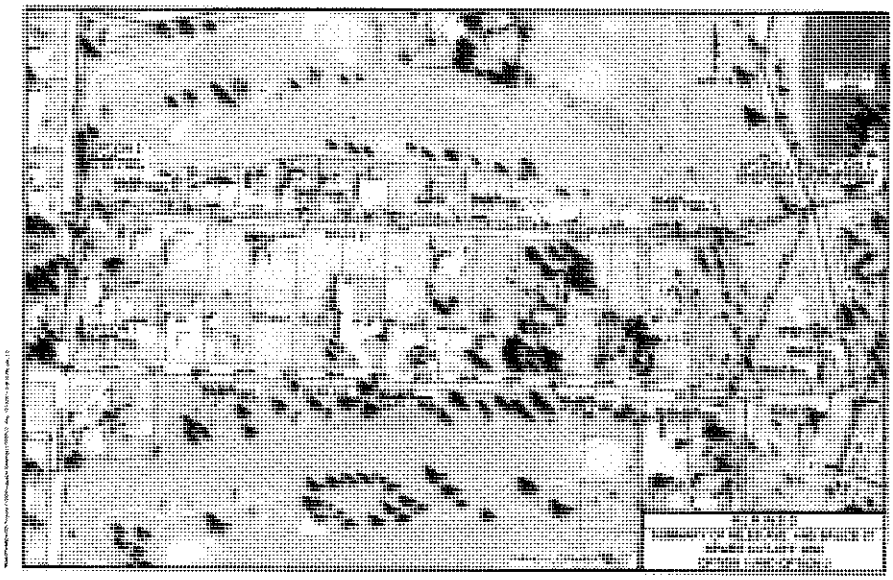
Cost/Benefit Information for Strahorn Gravity Relief Line

Strahorn Relief Line

- **Benefits:**
  1. Percent of Flow (gpd) eliminated from Country Club Lift Station
     - 17% billed flow
     - 67% vacant lot flow
     - 93% SMA growth flow
  2. Window of Opportunity (Strahorn Restoration will be complete by City of Hayden Lake, so would eliminate asphalt restoration and perhaps gravel base from cost)
  3. Higher Reliability in the new gravity sewer line

- **Challenges:**
  1. Landscaping restoration along portions Strahorn Road
  2. City of Hayden Lake would need to agree with the cost sharing





Cost/Benefit Information for Strahorn/Miles Gravity Relief Line

Strahorn and Miles Relief Lines

- **Benefits:**
  1. Percent of Flow (gpd) eliminated from Country Club Lift Station
     - 70% billed flow
     - 94% vacant lot flow
     - 99% SMA growth flow
  2. Added Value of bypass for Lakeview force main
  3. Window of Opportunity (Miles Avenue Restoration will be completed (2013 to 2015?), so would eliminate asphalt restoration from cost)
  4. Eliminates need to upgrade pumps at Country Club Lift Station

- **Challenges:**
  1. Avondale Country Club easement would need to be obtained to install sewer line across fairway
  2. City of Hayden Lake would need to agree with the cost sharing

Environmental Analysis

Environmental Concern	No Action Alternative	Uniform Relief Line	Tiffin Relief Line	Davis Relief Line
Climate and Physical Aspects (Topography, Geology, and Soils)	No Impact	Excavation for Relief Line, Long-Term Impacts Minimal	Excavation for Relief Line, Long-Term Impacts Minimal	Excavation for Relief Line, Long-Term Impacts Minimal
Population, Economic, and Social Profile	Small Potential for Growth	Potential for Growth	Potential for Growth	Potential for Growth
Land Use	No Impact	No Impact	No Impact	No Impact
Floodplain Development	No Impact	No Impact	No Impact	No Impact
Wetlands and Water Quality	Impact to Existing Water Quality due to Potential Station Failure at Country Club	Protection from Further Damage to Existing Water Quality	Protection from Further Damage to Existing Water Quality	Protection from Further Damage to Existing Water Quality
Wild and Scenic Rivers	No Impact	No Impact	No Impact	No Impact
Cultural Resources	No Impact	No Adverse Impact	No Adverse Impact	No Adverse Impact
Flora and Fauna	No Impact	Site Disturbance, Short-Term Impact	Site Disturbance, Short-Term Impact	Site Disturbance, Short-Term Impact
Recreation and Open Space	No Impact	No Impact	No Impact	No Impact
Agricultural Lands	No Impact	No Adverse Impact	No Adverse Impact	No Adverse Impact
Air Quality	No Impact	Construction Emissions, Short-Term Impact	Construction Emissions, Short-Term Impact	Construction Emissions, Short-Term Impact
Energy	No Impact	No Impact	No Impact	No Impact
Public Health	Potential Detriment to Public Water Supply and General Public Health (Failure at Country Club)	Protection from Future Potential Impacts to Public Health	Protection from Future Potential Impacts to Public Health	Protection from Future Potential Impacts to Public Health

Depreciation Analysis

- District has accumulated $10.17 million in unfunded depreciation (including collection system and 27% share in HARSB treatment facility)
- Projected deficit between accumulated depreciation and depreciation revenue is $14.92 million by 2022
- If improvements are made (recommended in facility plan), deficit in unfunded depreciation could be lowered to $7.10 million by 2022

HLRWSD Sewer Collection System Capital Improvements Options

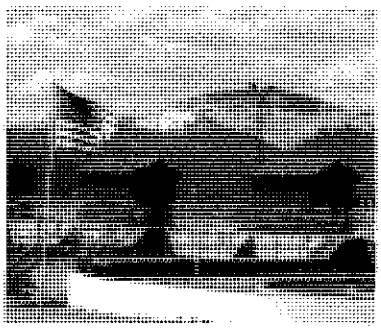
- District staff reviewed options for each lift station and formed a recommended alternative for each station
- Assembled these recommendations and divided the improvements into three parts:
  - Phase A (near-term need),
  - Phase B (mid-term need), and
  - O&M (long-term need)

HLRWSD Sewer Collection System Capital Improvement Costs

Phase	Cost
Phase A	$2,265,700
Phase B	$1,823,700
O&M Replacement Fund	$689,000
Total Proposed LID	$4,189,400 (round to $4,200,000)
Total Proposed O&M	$689,000 ($3.00 / month over 10 years)

HARSB Treatment Plant

- Existing Plant
- TMDL
- EPA Permit
- Proposed Improvements / Phasing
- Range of Costs
- Facility Plan meeting (more detail) TBD

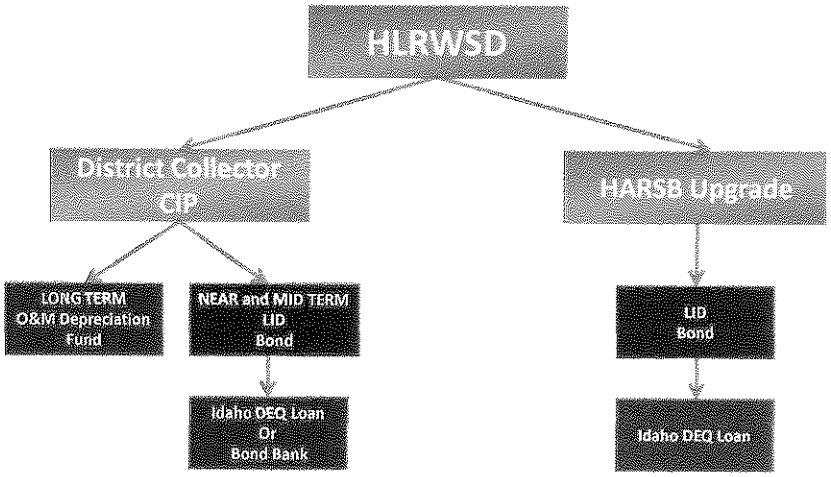


HARSB-Capital Project Funding (2013 through 2023)

Project Element	Common Costs (Quality, Depreciation)	Capacity Driven Costs (Growth)
NPDES Regulatory Quality Improvements	$16.19 Million	
Replacement (Unfunded Depreciation)	$4.65 Million	
Increased Capacity		$6.66 Million
TOTAL	$20.84 Million	$6.66 Million

Hayden	HLRWSD	County	HARSB
61.46%	26.29%	1.17%	10.88%
↓	↓	↓	↓
$12.8 Million	$5.5 Million	$244,000	$2.3 Million

Financing Options



Proposed LID #7 Overview

	Estimated Cost	Funding Options
HARSB Treatment Plant Improvements	**$6,200,000**	Proposed DEQ Loan
HLRWSD Collection System Capital Improvements Plan	$4,089,400	
LID Legal, Admin, Interim Interest	$100,000	
	$4,189,400	Proposed DEQ Loan
Proposed Total LID Amount	$10,389,400	
Round Up:	**$10,400,000**	Total Proposed DEQ Loan
Estimated Number of Assessments	2,645 ER's	
Estimated LID Assessment per ER	**$4,000 per ER**	
Estimated Annual Installment – Amortized at 3% for 20 years (assumes DEQ Loan)	**$265/year/ER**	

Next Steps / Schedule

Public Comment Period	*Sept. 5 – Sept. 19, 2012*
District Board Selects Preferred Alternative	*Sept. 26, 2012*
District Board Considers Initiating LID	*Sept. 26, 2012*
HARSB Public Meeting	*Sept., 2012 (?)*
Notice of LID Hearing	*Late Oct., 2012*
Tentative LID Hearing Date	*Nov. 14, 2012*
District Board Decision on LID	*Nov. 28, 2012*
Final Application to DEQ for Loan	*Jan., 2013*
Secure DEQ Low Interest Loan	*July, 2013*

Thank you!

QUESTIONS and COMMENTS

HAYDEN LAKE RECREATIONAL WATER AND SEWER DISTRICT
MINUTES OF LID7 PUBLIC INFORMATIONAL MEETING
SEPTEMBER 5, 2012

Chairman Sewell opened the public meeting at 6:00 p.m. Board members present were Dave Weinstein, Todd Walker and Carole Stringer. Board member Tom DePew was absent. Others present at the meeting were Larry Comer and Ashley Williams from Welch Comer & Associates, Mike Schmidt, Attorney for the District, Ken Windram, Administrator for HARSB Ken Thompson, Accountant for the District, Danielle Quade from Hawley Troxell LLP and Dustin Jacobson, District Superintendent. Administrator Lynn Hagman recorded the minutes of the meeting.

Chairman Sewell introduced the Board, Larry Comer, Attorney Schmidt and staff. Chairman Sewell explained that Mr. Comer will be giving the presentation.

Mr. Comer explained the comment period and regarding this meeting and stated that the District will take comments up to September 26, 2012. Mr. Comer discussed the history of the Sewer District and explained that the sewer treatment plant is also 25 years old. Ashley Williams addressed the Board and public with an overview of the District boundaries and lift stations. Future growth estimates were discussed; the District currently bills 1,922 ER's and has 702 vacant ER's. The District anticipates over the next 20 years, growth in the service area accommodated by the ER allocation at HARSB.

Ms. Williams explained the conditions of the existing lift stations and presented charts for structural/mechanical conditions with ratings. Rehabilitation of the lift stations were discussed with options A, B, and C. An environmental analysis was done for each option. Ms. Williams showed a tiered approach to the lift stations controls. Tier 1 is high flow/high risk, tier 2 is moderate and tier 3 is low.

Larry Comer explained the relief line on Strahorn Rd. and the cost benefit. Miles Ave. relief line was also discussed and Mr. Comer stated that this would be used for emergency use only. The benefits and challenges for both lines were reviewed by Mr. Comer. An environmental analysis and a depreciation analysis for both lines was presented to the Board and reviewed by Mr. Comer.

The collection system capital improvement options were discussed. Mr. Comer informed the Board that the District staff reviewed options for each lift station and formed a recommended alternative for each station. The improvements were divided into three parts, phase A (near-term need), and phase B (mid-term need) and O & M (long-term need). Mr. Comer reviewed a summary of costs for the collection system capital improvements.

Ken Windram, Administrator for HARSB, discussed the TMDL and the EPA permit process and new standards. Some of the proposed improvements and the phasing of them were discussed as well as a range of costs for each entity. The treatment plant will be upgraded to tertiary treatment level. The Sewer District portion will be $5.5 million. Mr. Comer informed the Board and the public that the upgrade from secondary to tertiary treatment is regulated by federal law.

Mr. Comer discussed the financing options for the Sewer District. For the District collector capital improvements there could be long-term with O & M depreciations funding or near and mid-term with LID bond with a DEQ loan or using the bond bank. The HARSB upgrades would be LID bond with the DEQ loan. Mr. Comer explained that the DEQ funding is at a very low

interest rate of 2%. Mr. Comer gave a proposed LID7 overview and explained that the Board will take public comments until September 26, 2012.

Alan Peterson questioned the cost per year for the LID7. Mr. Comer replied that it would be approximately $225.00. Mr. Peterson asked what the impact to Lake Spokane would be if these new regulations weren't there. Mr. Comer explained the draft permit and the mandated regulations.

Dana Smith questioned the treatment cost to change from chemicals to bacteria and who supplies the bugs. Mr. Windram explained that the bugs are just there and the bio is a fraction of what the chemicals are in cost. This is a natural process. Ms. Smith then questioned how deep the gravity relief line would be on Strahorn Rd. and where will it be placed. Mr. Comer explained that the work will be done in conjunction with the City of Hayden Lake doing a project at the same time and the line will be placed down the middle of the road. This will be a cost savings to the District. Ms. Smith asked if the line would come through people's property to connect. Mr. Comer replied that there will be no connections to this line.

Terry Ferris questioned the gravity relief line and why we needed it. Mr. Comer explained that the line is an interceptor and will be 10 to 12". Mr. Ferris questioned the cost to put it in. Mr. Comer replied that it will cost approximately $30.00 to $40.00 a foot and we will save on asphalt costs by working with the City of Hayden Lake. Mr. Ferris questioned if the capital improvements had to be done now. Mr. Comer stated that it did not, however the maintenance will keep the lift stations reliable.

Linda Schultz questioned if the vacant lots are paying towards the common costs. Mr. Comer explained that the District has 700 vacant lots that would not have to pay for growth. If a new sub-division were to come into the District they would pay the growth cost portion. Ms. Schultz asked if there will be an increase in the O & M fees and what would it be for and will there be future increases in the O & M. Mr. Comer explained that $3.00 of the last increase went towards depreciation.

Attorney Schmidt discussed the fight with the state of Washington Dept. of Ecology regarding the Spokane River and Lake Spokane and the new regulations. Ms. Schultz asked if there will be savings if chemicals are not used and how much per month and will it offset the total. Mr. Comer stated that the operating costs of the new facility will be higher and these costs will be discussed in further detail at future meetings.

John Schultz asked if Hayden Canyon would be involved. Mr. Comer explained the Hayden Canyon is not in our District. Mr. Schultz asked if the next thing going to be phosphorus in household products. Danielle Quade explained that the interest rate is 4% with 3% interest and 1% in reserve.

Danielle Quade explained the debt reserve that is required. Mr. Schultz asked how the depreciation would be unfunded. Mr. Comer explained how the depreciation works. Mr. Schultz asked if the $689,000 could come from the depreciation fund. Mr. Comer explained that these are real costs.

Merlin Deurkson questioned the bio process and will it work in cold weather. Mr. Windram stated that it would work in cold weather, the bugs slow down in the winter but they don't die.

Dana Smith asked if there is a provision to not upgrade the plant. Mr. Comer explained the permit process and the plant upgrades could be mandated. If they are not done DEQ could impose a large daily fine. Ms. Smith asked if the capital improvements could be done now and the plant upgrades later. Mr. Comer replied that the DEQ funding comes with a very low interest rate now.

Danielle Quade stated that the money is drawn on as needed and the District can only use the money they need for the project. Board member Stringer explained that the District is not at the point of an LID yet.

Mr. Ferris asked if the District could change the destination of the flow from the Spokane River. Mr. Windram discussed the Woodland Water project briefly and why this would not work for the District.

ADJOURN

The meeting was adjourned at 8:00 p.m.

Dave Weinstein, SECRETARY

Lynn Hagman, ADMINISTRATOR

HAYDEN LAKE RECREATIONAL WATER & SEWER DISTRICT

FACILITY PLAN MEETING ROSTER

Date: September 5, 2012 **Time:** 6:00 p.m. **Location:** HLRWSD Office

NAME	ADDRESS	PHONE	EMAIL
TERRY FERRIS	5278 Upper Hayden Lk Rd	762-3437	
DIANNE CHRISTENSEN	" "	" "	
H. Allen Peterson	10849 N. Lakeview Dr	208 772-6968	
Gladys Cody	11466 N. Friar Dr HL	772-3620	
Danielle Quade	3326 Ferran Terr. CDA	208 867 4411	
~~John Moran~~	2931 Rd Hayden	~~208~~ 635-5229	
Dale Bandy	12326 N. FRIAR	635-5064	
Dolly Bohnenkamp	12326 N. Friar	635-5064	
McMorris, J.D.	P.O. Box 754, Hayden	772-3735	
Ken Thompson	Box 2788 Hayden	769 4275	
Ken Windram	10789 N Atlas Rd Hayden	772 0672	
Ashley Williams	Welch Comer	—	
LARRY COMER	WELCH COMER		
DESTIN JACOBSON	HLRWSD	772 4379	

NAME	ADDRESS	PHONE	EMAIL
BOB & BARB CHILCUTT	10932 PT. HAYDEN DR. HAYDEN LAKE 83835	208-691-6898	CHILINPARADISE@ROADRUNNER.COM
JOHN + LINDA SHULTZ	11441 N AVONDALE LOOP RD HAYDEN LAKE 83835	208-772-3118	JJS15/0@GMAIL.COM
Roderick & Merlyn Dickson	10780 Blackrock Ln 83835	208 772-8381	mcdmd5@aol.com

Hayden Lake Recreational
Water and Sewer District
9393 N Strahorn Rd.
Hayden Lake, ID 83835

September 5, 2012

Dear Board Members;

Enclosed are three pages of my last cost for maintaining my septic system.

Sorry I could not attend your meeting as I was out of town. As a retired individual and living on a fixed income I am concerned about any increases. I know that things need to be replaced and repaired; I just hope that you do it prudently and with practicality in mind.

I know that you are probably aware that our bimonthly fee is only part of our total cost for our sewer system. I have lived at this residence since 1984. The enclosed bill reveals a total cost of $1287.30. This is the 4th pump that I have replaced. I am not sure if individuals on the up side of the hill have to have a separate septic tank or not, but I do know, it is getting rather expensive for an individual couple to only use the septic line for grey water. And, I may add, only for six months since we winter in Arizona.

It seems that there should be some kind of a user fee. A family of 4 or 5 living here year round without a septic tank is probably getting a pretty good deal.

I bring this to your attention and hope my comments are considered in your analysis.

Sincerely,

Joe and Laurie Venkus
2235 N Loch Haven Dr
Hayden, ID 83835
208-772-9005
autimee@msn.com

P.S. It would also help if we could start paying our bills on line.

TOTAL
$ 1287.30

DRAINS PLUS... ROOTER SERVICE

" NO RESULTS - NO CHARGE "

P.O. BOX 2812
HAYDEN, ID 83835
(208) 683-4217 • (208) 772-0475

Joe	5-11-11
CUSTOMER	
3235 Lake Haven	DATE
Dalton TR	P.O.# 13914
JOB ADDRESS	

DRAIN SERVICED				SIZE (GALLONS)	EQUIPMENT USED	
MAIN SEWER		SINK		1000	M/L ROOTER MACHINE	
STACK		TUB		TANK CONDITION	R.R. JR.	
STOOL		URINAL		Good	CAMERA	
FLOOR DRAIN		SHOWER			HAND AUGER	
TRAP		GREASE TRAP		LENGTH OF HOSE	JETTER	
WASHER		SEPTIC	x	50'		

CAUSE OF STOPPAGE

ROOTS	GARBAGE	MUD	LINT	GREASE	GENERAL	LOADED	FEM. HYGIENE PRODUCTS

OTHER

SEE REVERSE SIDE FOR GUARANTEE INFORMATION

IF NO GUARANTEE, EXPLAIN: Pump Tested - Referred to PM used

DESCRIPTION OF WORK:

Pump - $160.00
Enzymes - $84.00
518
Visa# 4147 3400 1444 [redacted]
Exp - 08/13

ASK ABOUT PREVENTATIVE MAINTENANCE PROGRAM

SERVICE

PRODUCT SOLD

SUB TOTAL

TAX

TOTAL AMOUNT $ 344.00

DRAIN OPEN AND RUNNING PROPERLY: YES ☑ NO ☐

CASH	CHECK	CREDIT CARD (VISA / MC)	CHARGED AMOUNT DUE
$	$	$ 344.00	$

SERVICE PERSON [signature]

APPROVED & ACCEPTED X [signature]

INVOICES NOT PAID WHEN DUE ARE SUBJECT TO A LATE CHARGE OF 1.5% PER MONTH, 18% PER ANNUM OR THE HIGHEST RATE PERMITTED BY LAW. MINIMUM FINANCE CHARGE OF $5.00 PER MONTH.

THANK YOU FOR CALLING DRAINS PLUS

R.C. Worst co.
EXPECT THE BEST FROM R.C.WORST
625 Best Ave, Coeur d'Alene ID 83814
Phone: 208.664.2133 Fax: 208.667.8775
www.rcworst.com

SERVICE INVOICE

Invoice No.:	216387
Invoice Date:	05/13/2011
Due Date:	05/13/2011
Custom No.:	C109140
Job No.:	7580

Bill To:
Joe Venkus
2235 Loch Haven Drive
~~Hayen~~, ID 83835
Hayden

Job Location:
Venkus Residence
2235 Loch Haven Dr.
Hayden ID 83835

Joe Venkus - 1T796-Replace the Pump, Floats & Plumbing

Item No.	Description	UOM	Qty	Price	Amount
L710.LR	Labor Job Order - Regular - Eric Halladay	HR	5.00	$87.50	$437.50
EU.JO-FUELSC	EQUIPMENT USED -- ON JOB ORDERS	MI	9.00	$0.80	$7.20
**					

Ref T/S 07884 Eric Halladay Thursday 5-12-11

Labor to check the sewer system. We replaced the pump, floats and plumbing. We reset, cycled the system and everything was okay.

System Info:
Pump: SHEF 40 A1
Pipe: 1 1/4" SCH 80
Tank: 10' deep

***

HTC526080107	SHEF40A1 .4HP 115V 20C - HYDROMATIC	EA	1.00	$371.70	$371.70
PDTJN418212C	PANDUIT WIRE JOINT INS 18-12GA	EA	7.00	$0.35	$2.45
PRP1/4	POLY ROPE 1/4"	FT	10.00	$0.09	$0.90
PVC829012	PVC 80 COUPLING SS 1-1/4"	EA	1.00	$5.06	$5.06
PVC836012	PVC 80 MALE ADAPTER 1-1/4"	EA	1.00	$6.22	$6.22
PVC839212	PVC 80 BUSHING TT 1-1/2X1-1/4	EA	1.00	$5.81	$5.81
PVCP8012PE	PVC PIPE SCH80 PLAIN END 1.25"	FT	1.00	$1.20	$1.20
RCWVIAL075	VIAL PVC 3/4" X 4" W/PLUG	EA	2.00	$0.90	$1.80
RCWVIAL100	VIAL PVC 1" X 4" W/PLUG	EA	1.00	$1.08	$1.08
SJEPC30NO	SJ ELTRO 30PC NO SENSOR FLOAT	EA	1.00	$44.33	$44.33
SPRS172012	SPEARS SWG CHK UNION S 1-1/4"	EA	1.00	$18.33	$18.33
STH4B	SCOTCHCAST INSULATING RESIN	EA	1.00	$34.30	$34.30
TAPA33	TAPE ELECTRICAL A33 3/4"X66'	EA	1.00	$3.00	$3.00
MSCC	MISC SERVICE CONSUMABLES	EA	1.00	$2.50	$2.50

Subtotal:	$943.38
Sales Tax:	$29.77

Item No.	Description	UOM	Qty	Price	Amount

R.C. WORST & CO INC.
625 BEST AVE
COEUR D ALENE, ID 83814

TERMINAL ID: 005175252
MERCHANT #: 433165830889

VISA
#xxxxxxxxxxxxx1726
SALE
BATCH: 000413 INVOICE: 013950
DATE: MAY 16, 11 TIME: 08:41
SQ: 003 AV: YY AUTH NO: 93086C

TOTAL $973.15

CUSTOMER COPY

Thank you for choosing R.C. Worst & Company Inc.
for your Water and Wastewater needs

A finance charge of 1.5% per month, with a minimum of $0.50 will be applied against unpaid balances 30 days after invoice due date.

Total: $973.15

HAYDEN LAKE RECREATIONAL WATER AND SEWER DISTRICT
9393 N. STRAHORN RD.
HAYDEN LAKE, IDAHO 83835
208-772-4379 FAX 208-772-4456

September 24, 2012

Joe and Laurie Venkus
2235 N. Loch Haven Dr.
Hayden Lake, ID 83835

Re: Wastewater Facilities Plan

Dear Mr. and Mrs. Venkus:

Thank you for your written comments dated September 5, 2012 concerning the District's Wastewater Facilities Plan.

First, as you state, our District Board of Directors are very focused on keeping our operations as efficient as possible, while also protecting water quality and the capital assets of our District. We are committed to being prudent and practical. Each of our Board Members are also sewer users, and most of us are also retired.

With respect to the fact that you and your neighbors in the Woodland Heights and Hayden View Estates area must use septic tanks and in most cases also effluent pumps, here is some background information.

1. The "pressure effluent" sewer system in Woodland Heights and Hayden View Estates was either already constructed or was master planned by the land developer, prior to the District constructing the regional sewer system in 1986-87. The District "assumed" ownership and operation of the existing sewer collection system from the developer at that time.

2. Since lot owners of Woodland Heights and Hayden View Estates already had "equity" in their own sewer collection system when the District assumed ownership, in 1987 property owners were given a significant credit for the value of the existing sewer system.

3. The District formed a separate LID in 1987 for Woodland Heights and Hayden View Estates, known as LID #3. Assessments in this area in 1987 were about $1280 per lot. Whereas, the rest of the District's western sewer service area which had new sewer lines constructed in LID #2, required an assessment of approximately $4380.

So you can see, owners of property in your area originally received a reduction in the 1987 LID assessments of about $3100 per lot in recognition that you already had equity in an effluent sewer system.

Due to the age and corrosive nature of the septic effluent sewer system in Woodland Heights/Hayden View Estates, the District does spend a considerable amount of repair and reserve funds in your area. Due to the wide variety of geography, history and age of the

many neighborhoods in our sewer service area, the District Board is not able to customize sewer service fees for each neighborhood.

We believe that all of us as neighbors benefit equally by protecting the lake, aquifer and public health or our community; as a result, we have now standardized the sewer service fees for all of our constituents.

We certainly appreciate your comments. Please join us at one of our upcoming public information meetings on either October 10th at 6:00 p.m. or October 12th at 2:00 p.m. when we will be discussing the proposed sewer improvements and costs in more detail. You should be receiving a separate newsletter about these meetings by mail very soon.

Sincerely
Hayden Lake Recreational Water and Sewer District

Kenneth Sewell
Board Chairman

cc: Board Members
Welch Comer
Mike Schmidt

HAYDEN LAKE RECREATIONAL WATER AND SEWER DISTRICT
MINUTES OF REGULAR MEETING
SEPTEMBER 26, 2012

CALL TO ORDER

Chairman Sewell called the meeting to order at 5:00 p.m. Board members present were Dave Weinstein, Tom DePew, Todd Walker and Carole Stringer. Ken Thompson, Larry Comer, Attorney Mike Schmidt, Superintendent Dustin Jacobson, Ashley Williams and Danielle Quade were present as representatives of the Board. Administrator Lynn Hagman recorded the minutes of the meeting.

AGENDA - MINUTES

Board member Stringer made a motion to amend the agenda to add the Idaho Fair Housing Council to the agenda due to information just received and to then approve the amended agenda. Board member DePew seconded the motion. The motion carried.

Board member DePew moved to approve the minutes for September 12, 2012, seconded by Board member Stringer. The motion carried.

FINANCIAL

Ken Thompson gave a report on the financial status of the District and reviewed the invoices for payment. **Board member DePew moved to approve the financial report and pay the bills. Board member Weinstein seconded the motion. The motion carried.**

ATTORNEY

Attorney Schmidt informed the Board that the IFHC training session that was scheduled for September 25th has been postponed due to no responses to the notice. Mr. Nagy has suggested rescheduling the training. Attorney Schmidt informed the Board that this would be up to them, the obligation has been met already to hold the training at the District offices.

LID7 RESOLUTION

Danielle Quade informed the Board that the boundaries are not ready to approve the resolution at this meeting. The resolution should be ready to approve at the October 10th meeting.

Ashley William from Welch Comer & Associates discussed the Board making a decision on the collector system. Board member Weinstein questioned if the District could move forward separately between the collector system and the plant upgrades. Ms. Williams explained that the decision is mainly for the engineers report and it does not have to be the final decision. Attorney Schmidt explained that they are choosing with options to bring to the public for comment.

Board member Stringer concurred with Board member Weinstein that the collector system and the plant upgrades were merged together and should be kept separate so the public understands the difference. Ms. Quade stated that the Board did not have to make a final decision now. The process can move forward using the engineer's estimates for the reports.

HAYDEN LAKE RECREATIONAL WATER AND SEWER DISTRICT
MINUTES OF LID7 PUBLIC INFORMATIONAL MEETING
SEPTEMBER 5, 2012

Chairman Sewell opened the public meeting at 6:00 p.m. Board members present were Dave Weinstein, Todd Walker and Carole Stringer. Board member Tom DePew was absent. Others present at the meeting were Larry Comer and Ashley Williams from Welch Comer & Associates, Mike Schmidt, Attorney for the District, Ken Windram, Administrator for HARSB Ken Thompson, Accountant for the District, Danielle Quade from Hawley Troxell LLP and Dustin Jacobson, District Superintendent. Administrator Lynn Hagman recorded the minutes of the meeting.

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Ms. Williams explained the conditions of the existing lift stations and presented charts for structural/mechanical conditions with ratings. Rehabilitation of the lift stations were discussed with options A, B, and C. An environmental analysis was done for each option. Ms. Williams showed a tiered approach to the lift stations controls. Tier 1 is high flow/high risk, tier 2 is moderate and tier 3 is low.

Larry Comer explained the relief line on Strahom Rd. and the cost benefit. Miles Ave. relief line was also discussed and Mr. Comer stated that this would be used for emergency use only. The benefits and challenges for both lines were reviewed by Mr. Comer. An environmental analysis and a depreciation analysis for both lines was presented to the Board and reviewed by Mr. Comer.

The collection system capital improvement options were discussed. Mr. Comer informed the Board that the District staff reviewed options for each lift station and formed a recommended alternative for each station. The improvements were divided into three parts, phase A (near-term need), and phase B (mid-term need) and O & M (long-term need). Mr. Comer reviewed a summary of costs for the collection system capital improvements.

Ken Windram, Administrator for HARSB, discussed the TMDL and the EPA permit process and new standards. Some of the proposed improvements and the phasing of them were discussed as well as a range of costs for each entity. The treatment plant will be upgraded to tertiary treatment level. The Sewer District portion will be $5.5 million. Mr. Comer informed the Board and the public that the upgrade from secondary to tertiary treatment is regulated by federal law.

Mr. Comer discussed the financing options for the Sewer District. For the District collector capital improvements there could be long-term with O & M depreciations funding or near and mid-term with LID bond with a DEQ loan or using the bond bank. The HARSB upgrades would be LID bond with the DEQ loan. Mr. Comer explained that the DEQ funding is at a very low

interest rate of 2%. Mr. Comer gave a proposed LID7 overview and explained that the Board will take public comments until September 26, 2012.

Alan Peterson questioned the cost per year for the LID7. Mr. Comer replied that it would be approximately $225.00. Mr. Peterson asked what the impact to Lake Spokane would be if these new regulations weren't there. Mr. Comer explained the draft permit and the mandated regulations.

Dana Smith questioned the treatment cost to change from chemicals to bacteria and who supplies the bugs. Mr. Windram explained that the bugs are just there and the bio is a fraction of what the chemicals are in cost. This is a natural process. Ms. Smith then questioned how deep the gravity relief line would be on Strahorn Rd. and where will it be placed. Mr. Comer explained that the work will be done in conjunction with the City of Hayden Lake doing a project at the same time and the line will be placed down the middle of the road. This will be a cost savings to the District. Ms. Smith asked if the line would come through people's property to connect. Mr. Comer replied that there will be no connections to this line.

Terry Ferris questioned the gravity relief line and why we needed it. Mr. Comer explained that the line is an interceptor and will be 10 to 12". Mr. Ferris questioned the cost to put it in. Mr. Comer replied that it will cost approximately $30.00 to $40.00 a foot and we will save on asphalt costs by working with the City of Hayden Lake. Mr. Ferris questioned if the capital improvements had to be done now. Mr. Comer stated that it did not, however the maintenance will keep the lift stations reliable.

Linda Schultz questioned if the vacant lots are paying towards the common costs. Mr. Comer explained that the District has 700 vacant lots that would not have to pay for growth. If a new sub-division were to come into the District they would pay the growth cost portion. Ms. Schultz asked if there will be an increase in the O & M fees and what would it be for and will there be future increases in the O & M. Mr. Comer explained that $3.00 of the last increase went towards depreciation.

Attorney Schmidt discussed the fight with the state of Washington Dept. of Ecology regarding the Spokane River and Lake Spokane and the new regulations. Ms. Schultz asked if there will be savings if chemicals are not used and how much per month and will it offset the total. Mr. Comer stated that the operating costs of the new facility will be higher and these costs will be discussed in further detail at future meetings.

John Schultz asked if Hayden Canyon would be involved. Mr. Comer explained the Hayden Canyon is not in our District. Mr. Schultz asked if the next thing going to be phosphorus in household products. Danielle Quade explained that the interest rate is 4% with 3% interest and 1% in reserve.

Danielle Quade explained the debt reserve that is required. Mr. Schultz asked how the depreciation would be unfunded. Mr. Comer explained how the depreciation works. Mr. Schultz asked if the $689,000 could come from the depreciation fund. Mr. Comer explained that these are real costs.

Merlin Deurkson questioned the bio process and will it work in cold weather. Mr. Windram stated that it would work in cold weather, the bugs slow down in the winter but they don't die.

Dana Smith asked if there is a provision to not upgrade the plant. Mr. Comer explained the permit process and the plant upgrades could be mandated. If they are not done DEQ could impose a large daily fine. Ms. Smith asked if the capital improvements could be done now and the plant upgrades later. Mr. Comer replied that the DEQ funding comes with a very low interest rate now.

Danielle Quade stated that the money is drawn on as needed and the District can only use the money they need for the project. Board member Stringer explained that the District is not at the point of an LID yet.

Mr. Ferris asked if the District could change the destination of the flow from the Spokane River. Mr. Windram discussed the Woodland Water project briefly and why this would not work for the District.

ADJOURN

The meeting was adjourned at 8:00 p.m.

Dave Weinstein, SECRETARY

Lynn Hagman, ADMINISTRATOR

NAME	ADDRESS	PHONE	EMAIL
McManigle, James & Jan	46035 E. Hayden Lk. Rd	208-772-3735	

for HLRWSD Board meeting September 26, 2012 at 5:00pm., HLRWSD office

Hayden Lake Recreational Water and Sewer District

Newsletter

September, 2012

Sewer Collection System Facilities Plan Background

The Hayden Lake Sewer System was constructed in 1987 and is now 25 years old. Although the facilities have been operating well and have been maintained, certain components such as the major lift stations require upgrading due to normal depreciation and use.

The District has recently completed a "Facilities Plan" engineering study. The purpose of a wastewater facility plan is to analyze the sewer system, identify system deficiencies, and provide improvement recommendations.

Sewer System Collection Improvements

The District Board is considering financing improvements to the sewer collection system, which includes:

- Re-lining or replacing lift stations (including replacement of pumps and interior piping)
- Upgrading of electrical controls to meet current electrical standards and improved emergency communication.
- Adding stand-by generators for certain lift stations to improve reliability.
- Constructing gravity relief sewer lines along Miles Avenue and Strahorn Road to reduce power usage, improve reliability, and reduce risks on lift stations along Hayden Lake.

PUBLIC INFORMATION MEETING NOTICE

• • •

The Board invites property owners in its sewer service area to attend one of two public meetings (identical information will be presented at both). The purpose of the meeting is to discuss proposed sewer improvements and funding options (including financial impacts on sewer service bills) for the Districts' sewer collection system and the Hayden Area Regional Sewer Board (HARSB) treatment plant.

WEDNESDAY, OCT. 10, 2012 at 6:00 PM and FRIDAY, OCT. 12, 2012 at 2:00 PM

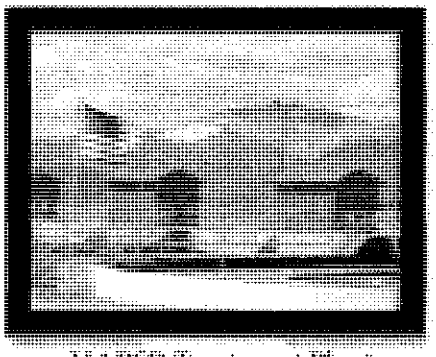
at the
HLRWSD OFFICE
9393 Strahorn Rd
Hayden Lake, ID

Pending EPA Requirements for Upgrading Treatment Standards

The District is one of three partners (City of Hayden and Kootenai County are the others) of the Hayden Area Regional Sewer Board (HARSB) who operates the regional wastewater treatment facility near the County Airport.

The U.S. Environmental Protection Agency (EPA) is requiring that the HARSB wastewater treatment facility meet much more stringent water quality standards for phosphorous and other constituents, in order to continue to discharge treated wastewater into the Spokane River under its federal discharge permit.

The HARSB has prepared a wastewater facilities plan which evaluates the methods and costs of meeting these new EPA discharge requirements, which are some of the most stringent in the U.S. These improvements must be phased-in over the next 10 years, and will cost the rate-payers in our District millions of dollars.



HARSB Treatment Plant

Funding Sewer System Improvements

Both collection system and treatment system improvements consist of multi-million dollar improvement projects. In order to fund these improvements, the District is considering forming a Local Improvement District (LID) and utilizing Idaho Department of Environmental Quality (IDEQ) loan monies for the projects. The District has been listed by IDEQ as eligible to receive low-interest loan funds (2.0 % over 20 years), which appears to be the best funding option available.

Public Information Meeting

The Board would like to invite you to attend one of two public meetings (identical information will be presented at both) which will discuss the proposed improvements and funding options for the District's sewer collection system and the HARSB treatment plant. The IDEQ loan option and the financial impact to your sewer service bill will be discussed as well. These meetings will be held on October 10th at 6:00 pm and October 12th at 2:00 pm at the HLRWSD office. Please attend whichever meeting is most convenient for you.

HLRWSD
9393 Strahorn Rd
Hayden Lake, ID
Tel: 208.772.4379
E-mail:
hlrwsdclerk@frontier.com
www.cityofhaydenlake.us

Board of Directors
Ken Sewell, Chairman
Tom DePew, Vice-Chairman
Dave Weinstein, Secretary
Todd Walker, Director
Carole Stringer, Director

Hayden Lake Recreational Water & Sewer District
9393 Strahorn Road
Hayden Lake, ID 83835

PRSRT STD
U.S. POSTAGE PAID
HAYDEN, ID
PERMIT NO. 101

PUBLIC INFORAMATION MEETING OCTOBER 10TH AT 6:00PM AND OCTOBER 12TH AT 2:00PM AT HLRWSD OFFICE

M MORRISEY
12 SABRINA RD
WELLESLEY, MA 02482

Information on the financial impact to your sewer cost included inside this newsletter

PUBLIC MEETING

The Hayden Lake Recreational Water & Sewer District values your opinion. That's why we want you to attend a public meeting to discuss the recent sewer system facility plan and EPA's required improvements to the wastewater treatment plant and collection system.

The purpose of this meeting is to solicit public comments and answer questions regarding the project scope, costs, and impacts on sewer rates.

WHEN: Wednesday, October 10, 2012
at 6:00 pm

AND

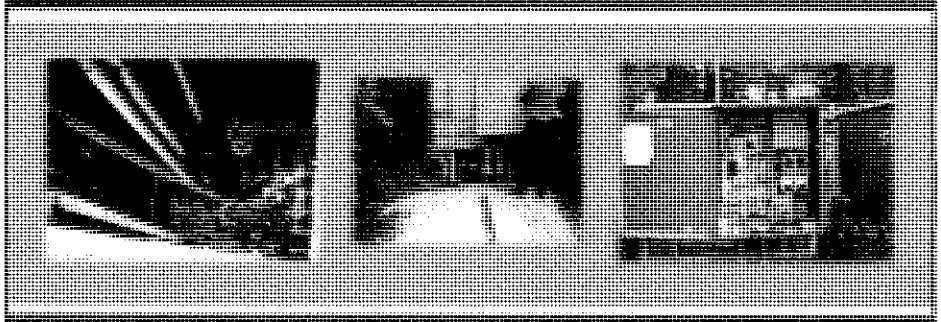
Friday, October 12, 2012
at 2:00 pm

WHERE: HLRWSD Office at
9393 Strahorn Road,
Hayden Lake, ID

Information will be available upon request in Braille, audio tape or by interpreter in accordance with the Americans with Disabilities Act. Please call the District at 208-772-4379 for details

Hayden Lake Recreational Water and Sewer District

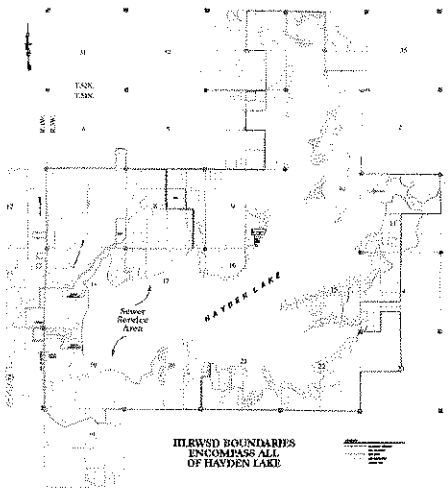
Sewer System Public Meeting



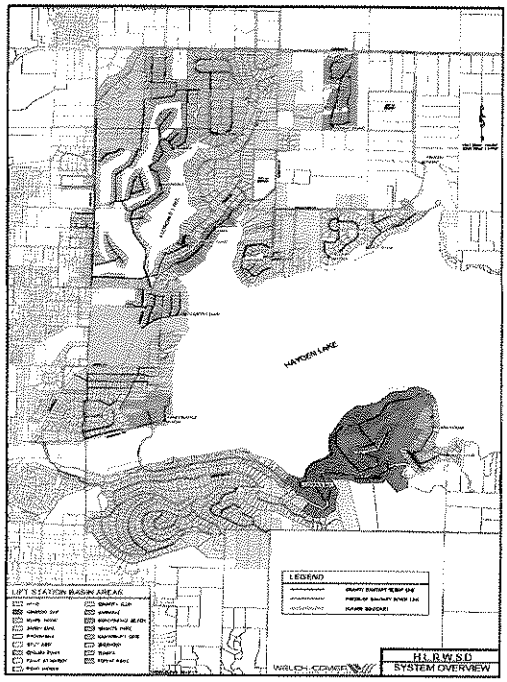
October 10 and 12, 2012

HLRWSD Background

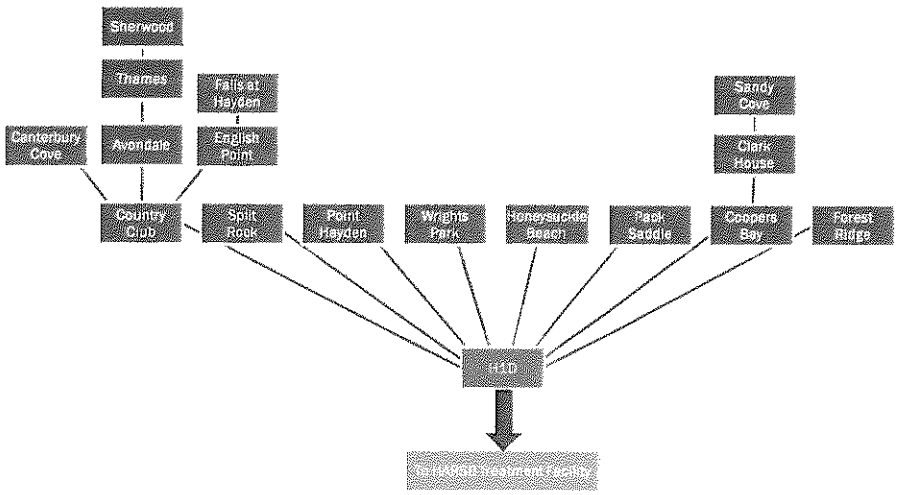
- District formed in 1976 by Public Election
- Majority of system constructed in 1986-1987, financed through 15-year LID (has been paid off for 10 years)
- Hayden Area Regional Sewer Board (HARSB) formed in 1986
  - Regional Interagency Partnership
    - City of Hayden
    - Hayden Lake Recreational Water & Sewer District
    - Kootenai County (Airport)
  - Regional Treatment Facility Built in 1987



Collection System



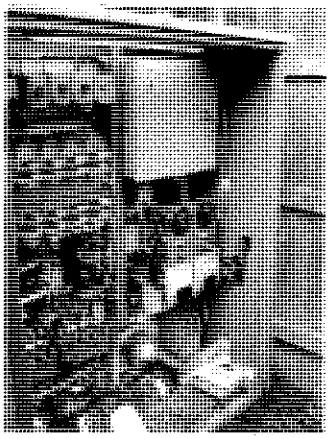
HLRWSD- Lift Station Basin Logic

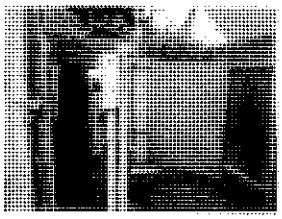


Future Growth Estimates

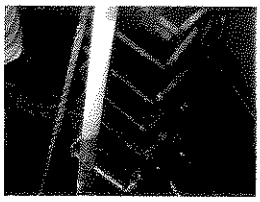
- Current billed ERs: 1,922
- ER allocation at HARSB Treatment Facility: 2,645.5
- Vacant Parcel ERs: 702
- District anticipates over the next 20 years, growth in service area accommodated by the ER allocation at HARSB

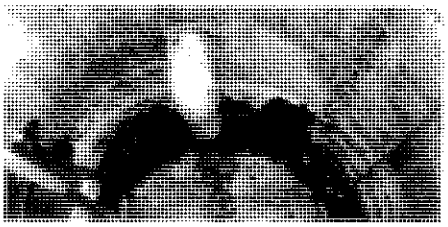
Existing Conditions

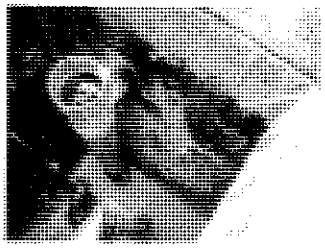




Existing Conditions







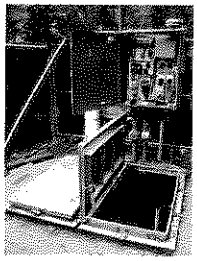
Structural/Mechanical Condition of Lift Stations, Rating

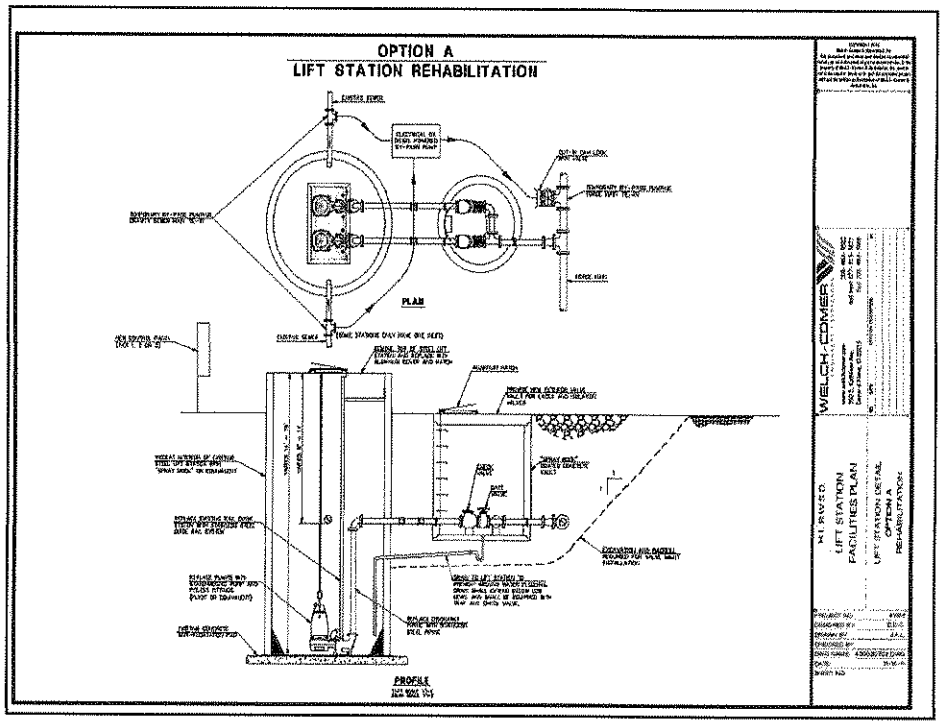
Lift Station	Age	Structural Condition	Mechanical Condition	Environmental Risk	Access/ Safety	Space for Expansion	Total Score (Weighted)
Avondale	1987	1	3	2	1	3	1.9
Canterbury Cove	1984	1	3	3	3	3	2.5
Clark House	1987	2	2	2	3	3	2.3
Coopers Bay	1985	1	1	2	1	2	1.3
Country Club	1987	2	3	3	2	3	2.6
English Point	2010	1	1	1	1	1	1.0
The Falls at Hayden	2010	1	1	2	1	1	1.2
Forest Ridge	2008	1	1	1	1	1	1.0
H-10	1999	1	1	1	1	1	1.0
Honeysuckle Beach	1987	2	3	2	1	2	2.1
Packsaddle	1981	2	3	3	1	1	2.2
Point Hayden	1982	2	3	2	3	3	2.6
Sandy Cove	1987	3	3	3	3	2	2.9
Sherwood Court	1987	1	2	2	1	2	1.6
Split Rock	1990	1	2	2	2	3	1.9
Thames Court	1987	3	3	2	3	3	2.8
Wrights Park	1987	3	3	2	1	3	2.4

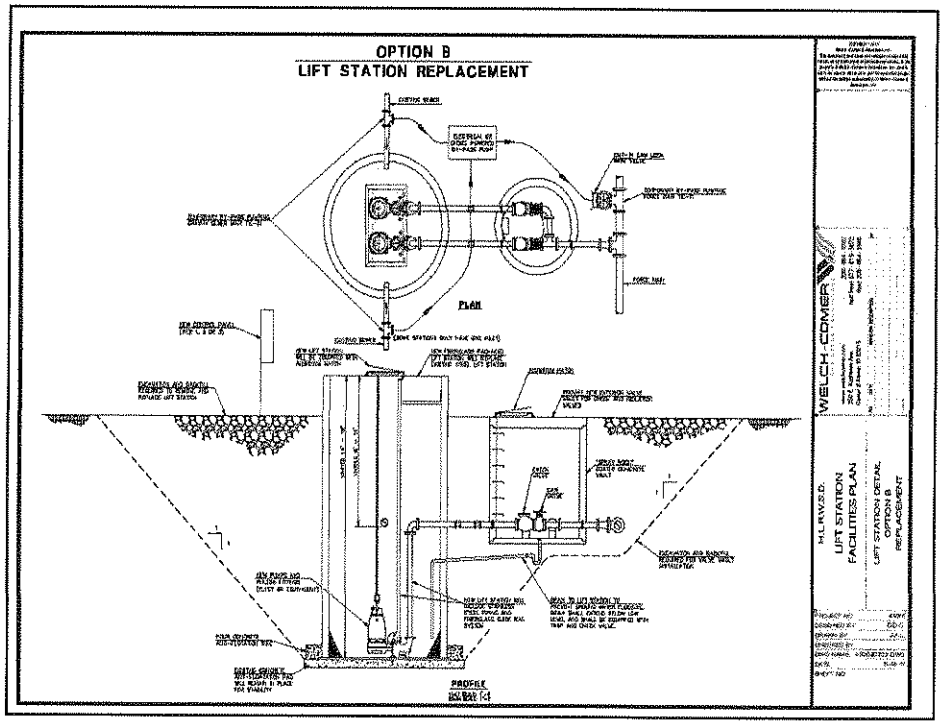
Notes: good = 1, fair = 2, low = 3 for Structural Condition, Mechanical Condition, Access/Safety, Space for Expansion . low = 1, fair = 2, high = 3 for Environmental Risk Structural Condition = 25%, Mechanical Condition = 25%, Environmental Risk = 20%, Access/Safety = 20%, Space for Expansion = 10%

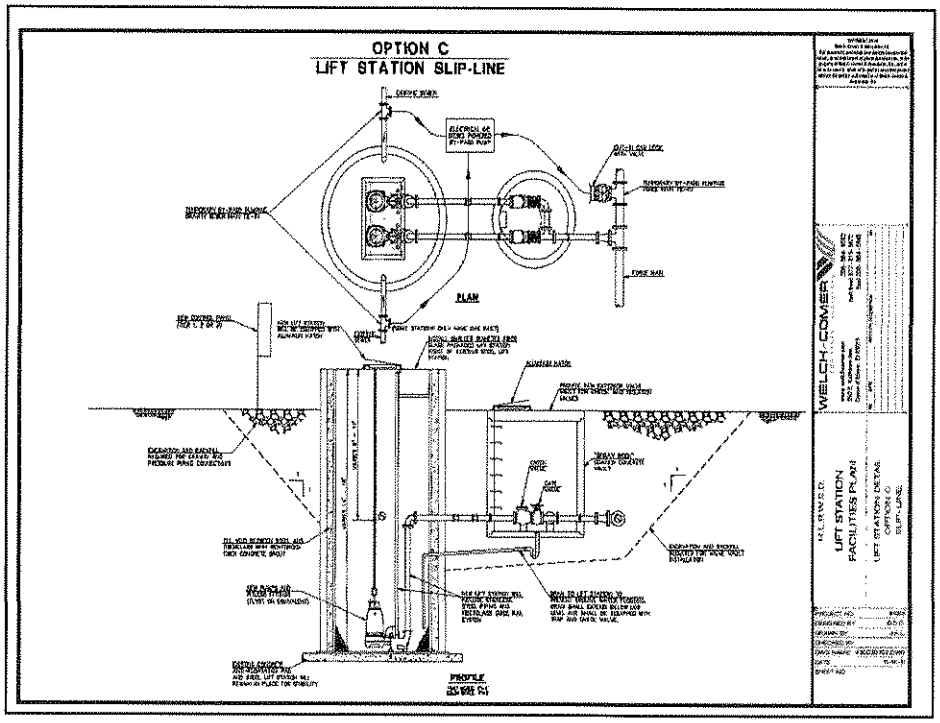
Lift Station Rating Results

1. Sandy Cove 2.9
2. Thames Court 2.8
3. Country Club 2.6
4. Point Hayden 2.6
5. Canterbury Cove 2.5
6. Wrights Park 2.4
7. Clark House 2.3
8. Packsaddle 2.2
9. Honeysuckle Beach 2.1




OPTION A
LIFT STATION REHABILITATION
PLAN
PROFILE
WELCH-COMER
H.L.RVSD.
LIFT STATION
FACILITIES PLAN
LIFT STATION DETAIL
OPTION A
REHABILITATION


OPTION B
LIFT STATION REPLACEMENT
PLAN
PROFILE
WELCH-COMER
H.L.RVSD.
LIFT STATION
FACILITIES PLAN
LIFT STATION DETAIL
OPTION B
REPLACEMENT



Environmental Analysis

Environmental Aspects Items	No Action Alternative	Structural/Mechanical Option A Rehabilitation	Structural/Mechanical Option B Replacement	Structural/Mechanical Option C Slip-Line
Climate and Physical Aspects (Topography, Geology, and Soils)	No Impact	Excavation for Lift Station Rehabilitation, Long-Term Impacts Minimal	Excavation for Lift Station Replacement (largest of 3 opt.), Long-Term Impacts Minimal	Excavation for Lift Station Slip-Line, Long-Term Impacts Minimal
Population, Economic, and Social Profile	Small Potential for Growth	Potential for Growth	Potential for Growth	Potential for Growth
Land Use	No Impact	No Impact	No Impact	No Impact
Floodplain Development	No Impact	No Impact	No Impact	No Impact
Wetlands and Water Quality	Impact to Existing Water Quality due to Potential Station Failure	Protection from Further Damage to Existing Water Quality	Protection from Further Damage to Existing Water Quality	Protection from Further Damage to Existing Water Quality
Wild and Scenic Rivers	No Impact	No Impact	No Impact	No Impact
Cultural Resources	No Impact	No Adverse Impact	No Adverse Impact	No Adverse Impact
Flora and Fauna	No Impact	Site Disturbance, Short-Term Impact	Site Disturbance, Short-Term Impact	Site Disturbance, Short-Term Impact
Recreation and Open Space	No Impact	No Impact	No Impact	No Impact
Agricultural Lands	No Impact	No Adverse Impact	No Adverse Impact	No Adverse Impact
Air Quality	No Impact	Construction Emissions, Short-Term Impact	Construction Emissions, Short-Term Impact	Construction Emissions, Short-Term Impact
Energy	No Impact	No Impact	No Impact	No Impact
Public Health	Potential Detriment to Public Water Supply and General Public Health	Protection from Future Potential Impacts to Public Health	Protection from Future Potential Impacts to Public Health	Protection from Future Potential Impacts to Public Health

HLRWSD Summary of Lift Station Controls

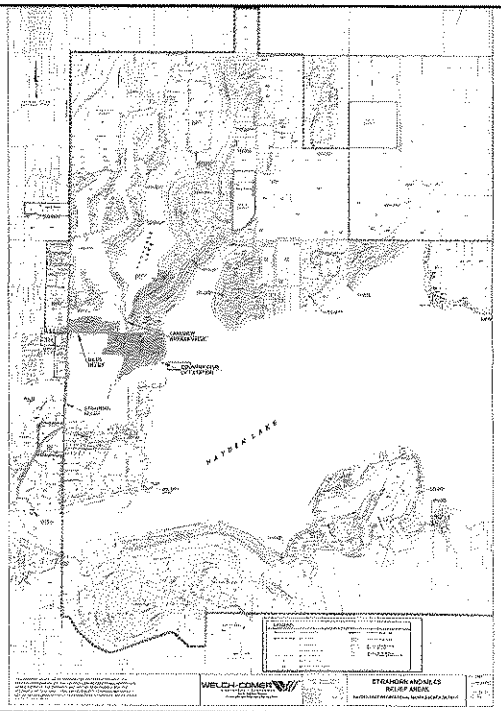
Lift Station Name	Type of Control (e.g. PLC w/ dialer, "smart panel", etc)	Alarm (e.g. dialer)	Standby Generator (Yes/No)	Missing Components?
Avondale	"smart panel"	dialer	yes	radio
Canterbury Cove	1986 with relays	dialer	yes	requires panel upgrade
Clark House	1986 with relays	dialer	no	requires panel upgrade, generator
Coopers Bay	1986 with relays	dialer	yes	requires panel upgrade
Country Club	1986 with relays	dialer	yes	requires panel upgrade
English Point	PLC	dialer	yes	radio
The Falls at Hayden	"smart panel"	dialer	yes	radio
Forest Ridge	PLC	dialer	yes	radio
H-1D	PLC	dialer	yes	radio
Honeysuckle Beach	1986 with relays	dialer	no	requires panel upgrade, generator
Packsaddle	1986 with relays	dialer	no	requires panel upgrade, generator
Point Hayden	1986 with relays	dialer	yes	requires panel upgrade
Sandy Cove	1986 with relays	dialer	no	requires panel upgrade, generator
Sherwood Court	1986 with relays	dialer	no	requires panel upgrade, generator
Split Rock	1986 with relays	dialer	no	requires panel upgrade, generator
Thames Court	1986 with relays	dialer	yes	requires panel upgrade
Wrights Park	1986 with relays	dialer	no	requires panel upgrade, generator

A Tiered Approach to Lift Station Control

- Tier 1- High Flow / High Risk Stations
  The "MultiTrode/MultiSmart" pump station management system, with radio telemetry to a base system at the HARSB treatment facility.

- Tier 2- Moderate Flow / Moderate Risk Stations
  Use the "MultiTrode/MultiSmart" panels and probes, with limited optional features and defer radio telemetry until a future time.

- Tier 3- Lower Flow / Lower Risk Stations
  For small lift stations with a low potential for growth or increased risk, a traditional hard wired control panel coupled with an autodialer for remote alarming. This approach assumes the small stations will not be controlled by telemetry.



Cost/Benefit Information for Strahorn/Miles Gravity Relief Line

Strahorn and Miles Relief Lines

- **Benefits:**
  1. Percent of Flow (gpd) eliminated from Country Club Lift Station
     - 70% billed flow
     - 94% vacant lot flow
     - 99% SMA growth flow
  2. Added Value of bypass for Lakeview force main
  3. Window of Opportunity (Proposed Miles Avenue and Strahorn Road Restoration will be completed (2013 to 2015?), so would eliminate asphalt restoration from cost)
  4. Eliminates need to upgrade pumps at Country Club Lift Station

- **Challenges:**
  1. Avondale Country Club easement would need to be obtained to install sewer line across fairway
  2. City of Hayden Lake would need to agree with the cost sharing

Environmental Analysis

Environmental Concern	No Action Alternative	Minimal Relief Line	Mid-Relief Line	Full Relief Line
Climate and Physical Aspects (Topography, Geology, and Soils)	No Impact	Excavation for Relief Line Long-Term Impacts Minimal	Excavation for Relief Line, Long-Term Impacts Minimal	Excavation for Relief Line, Long-Term Impacts Minimal
Population, Economic, and Social Profile	Small Potential for Growth	Potential for Growth	Potential for Growth	Potential for Growth
Land Use	No Impact	No Impact	No Impact	No Impact
Floodplain Development	No Impact	No Impact	No Impact	No Impact
Wetlands and Water Quality	Impact to Existing Water Quality due to Potential Station Failure at Country Club	Protection from Further Damage to Existing Water Quality	Protection from Further Damage to Existing Water Quality	Protection from Further Damage to Existing Water Quality
Wild and Scenic Rivers	No Impact	No Impact	No Impact	No Impact
Cultural Resources	No Impact	No Adverse Impact	No Adverse Impact	No Adverse Impact
Flora and Fauna	No Impact	Site Disturbance, Short-Term Impact	Site Disturbance, Short-Term Impact	Site Disturbance, Short-Term Impact
Recreation and Open Space	No Impact	No Impact	No Impact	No Impact
Agricultural Lands	No Impact	No Adverse Impact	No Adverse Impact	No Adverse Impact
Air Quality	No Impact	Construction Emissions, Short-Term Impact	Construction Emissions, Short-Term Impact	Construction Emissions, Short-Term Impact
Energy	No Impact	No Impact	No Impact	No Impact
Public Health	Potential Detriment to Public Water Supply and General Public Health (failure at Country Club)	Protection from Future Potential Impacts to Public Health	Protection from Future Potential Impacts to Public Health	Protection from Future Potential Impacts to Public Health

HLRWSD Sewer Collection System Capital Improvements Options

- District staff reviewed options for each lift station and formed a recommended alternative for each station
- Assembled these recommendations and divided the improvements into three parts:
  - Phase A (near-term need),
  - Phase B (mid-term need), and
  - O&M (long-term need)

HLRWSD Sewer Collection System Capital Improvement Costs

Phase	Cost
Phase A	$2,265,700
Phase B	$1,823,700
O&M Replacement Fund	$689,000
Total Proposed Capital Funding	$4,189,400
	(round to $4,200,000)
Total Proposed O&M Funding	$689,000
	($3.00 / month over 10 years)

Treatment Facility

New Treatment Plant Effluent Limits

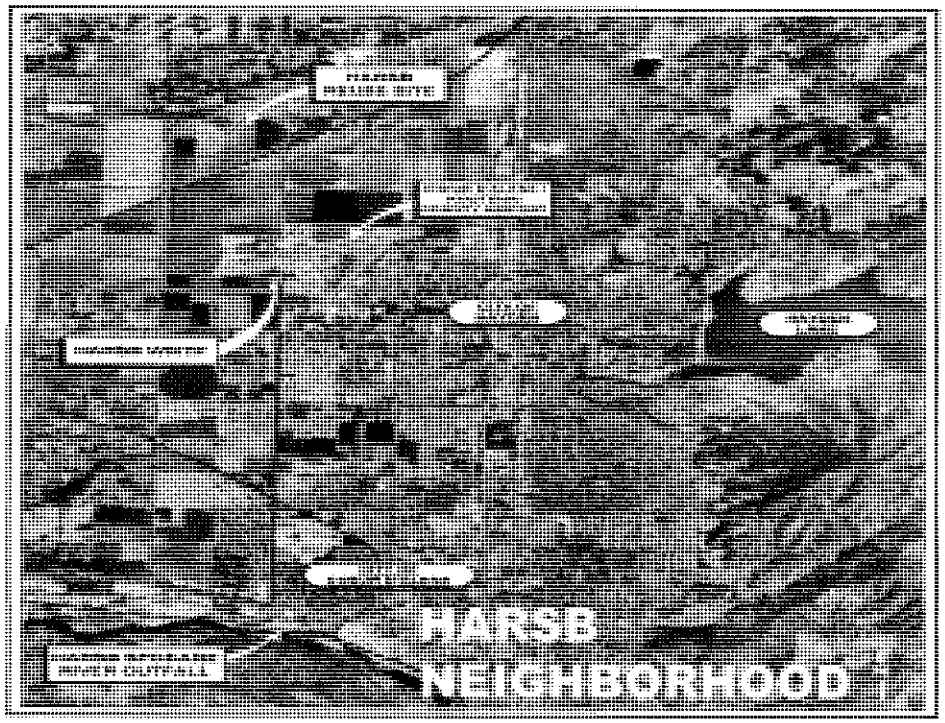
- WA Department of Ecology (DOE) set a Dissolved Oxygen (D.O) standard for Lake Spokane based on Washington Dissolved Oxygen TMDL
- The Lake Spokane D.O. standard isn't being met.
  - Biological Oxygen Demand (BOD)& Phosphorus.
- WA DOE used a model to set BOD &Phosphorus Waste Load Allocations for each discharger.
- The BOD & Phosphorus Waste Load Allocation are incorporated in the New NPDES Permit. (EPA)

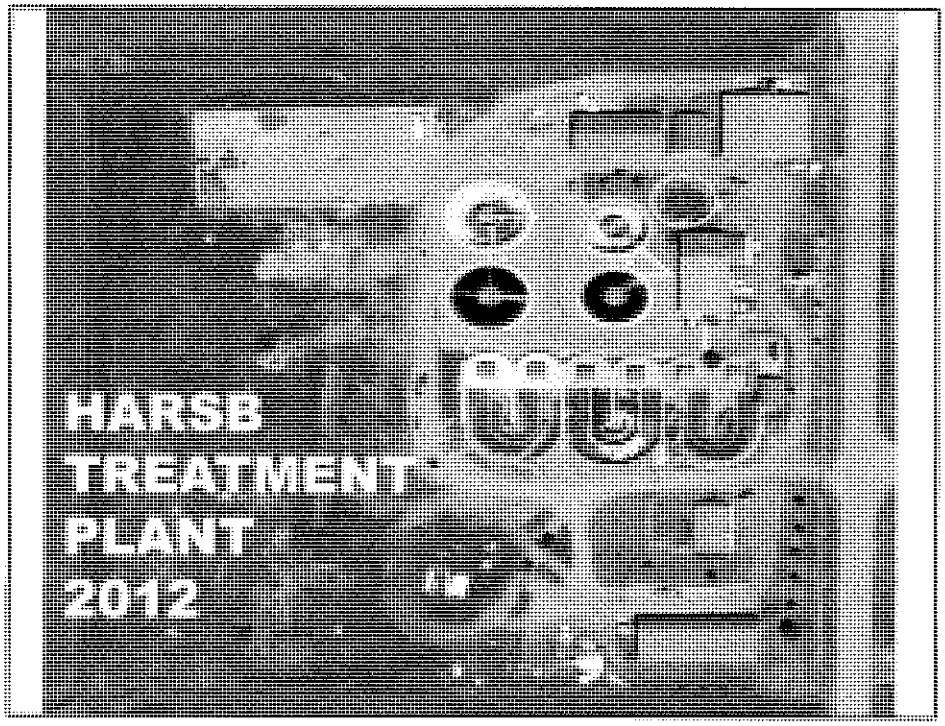
Treatment Plant Upgrades / TMDL Impact

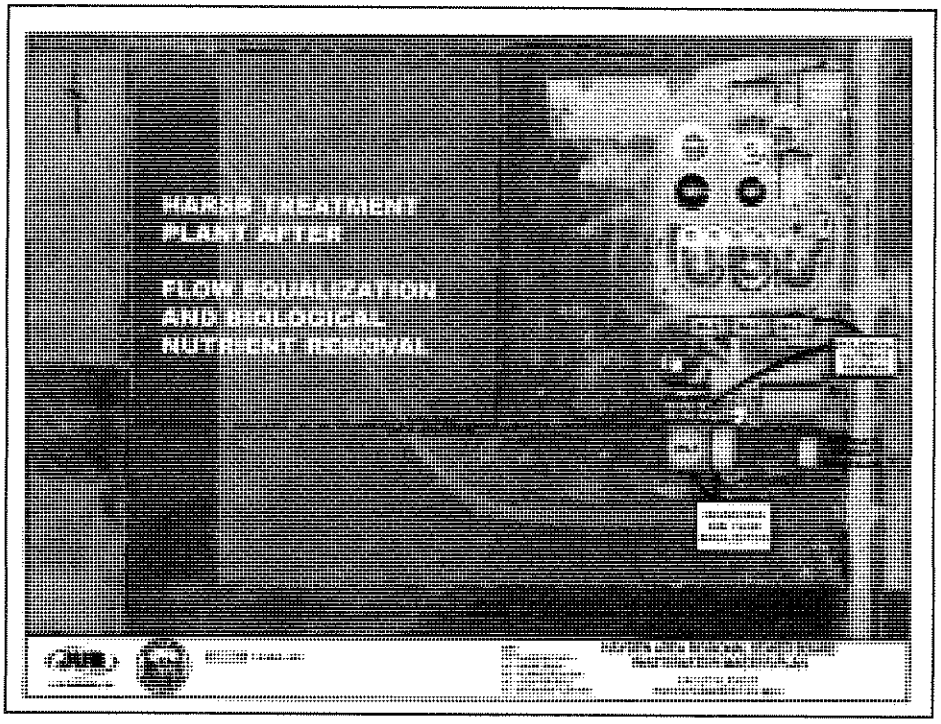
- The treatment upgrade phases for Phosphorus < 0.05 mg/l, Total Nitrogen <4.0 mg/l, TSS <1.0 mg/l, CBOD < 4.0 mg/l
- Today's plant effluent permit conditions are 30 mg/l TSS and 30 mg/l CBOD.
- Must meet limit within 10 years.

How Much Phosphorus to Remove?

- Today the treatment plant influent is about 6,000 to 8,000 parts per billion.
- Today's treatment plant effluent 4,000 to 5,000 parts per billion.
- Within 10 years the plant effluent must be less than 50 parts per billion. (about 99.9% Phosphorus removal)


HARSB
NEIGHBORHOOD


HARSB
TREATMENT
PLANT
2012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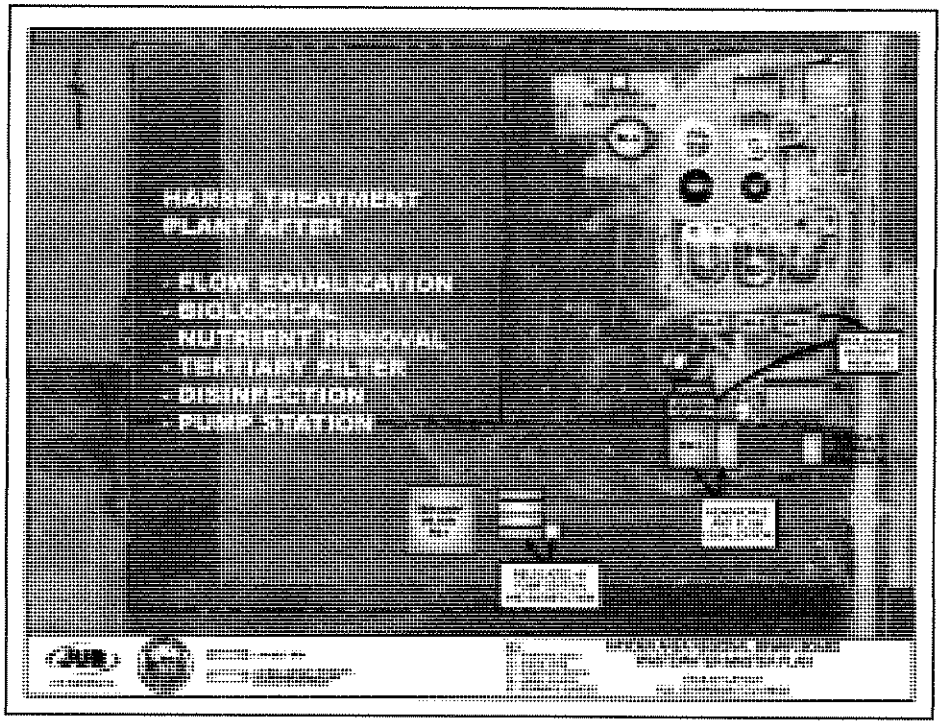
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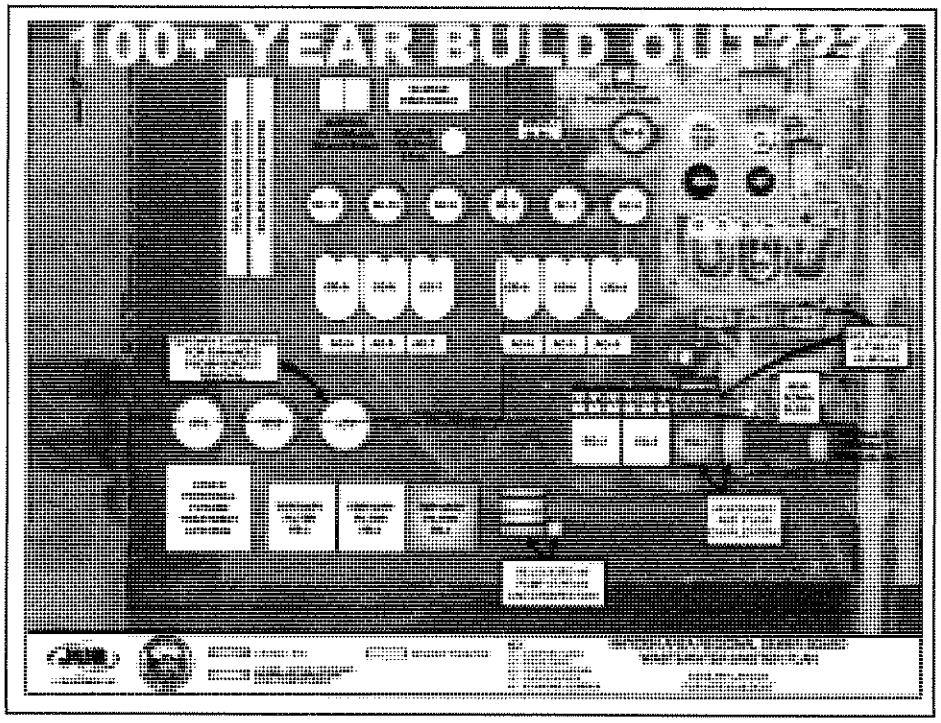


HARSB-Capital Project Funding

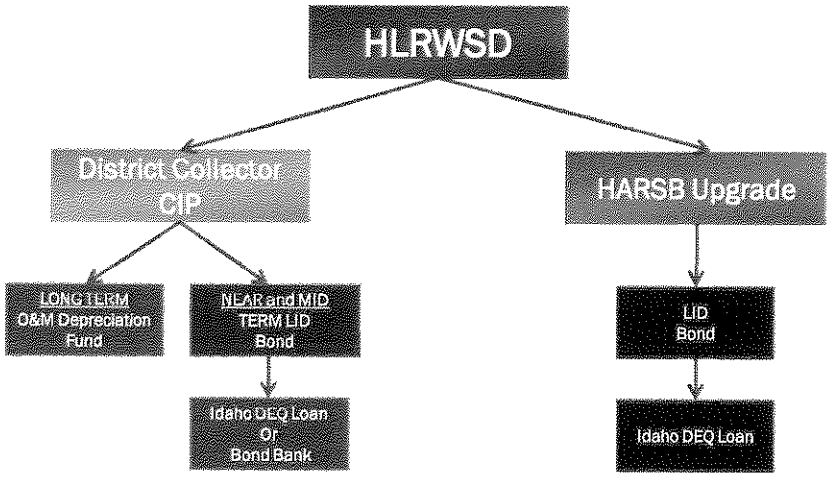
(2013 through 2023)

Project Element	Common Costs (Quality, Depreciation)	Capacity Driven Costs (Growth)
NPDES Regulatory Quality Improvements	$16.35 Million	
Replacement (Unfunded Depreciation)	$5.16 Million	
Increased Capacity		$6.66 Million
TOTAL	$21.51 Million	$6.66 Million

Hayden	HLRWSD	County	HARSB
61.57%	26.29%	1.17%	10.97%
↓	↓	↓	↓
$13.24 Million	$5.65 Million	$251,000	$2.36 Million

Financing Options

Financing Options



Proposed Capital Funding Overview

	Estimated Cost	Funding Options
HARSB Treatment Plant Improvements (2013-2023)	$6,200,000	Proposed DEQ Loan
HLRWSD Collection System Capital Improvements Plan	$4,089,400	
Legal, Admin, Interim Interest	$100,000	
	$4,189,400	Proposed DEQ Loan
Proposed Total Capital Funding Amount	$10,389,400	
Round Up:	**$10,400,000**	Total Proposed DEQ Loan
Estimated Number of Assessments	2,645 ER's	
Estimated Assessment per ER	**$4,000 per ER**	
Estimated Annual Installment – Amortized at 3% for 20 years (assumes DEQ Loan)	**$265/year/ER**	

Looking Ahead to Future HARSB Upgrade Requirements

- HLRWSD share of future upgrades (year 2023-2032):
  - **$1.5 million**

- Funding options for this future capital expense:
  A. Begin a dedicated reserve fund (sinking fund) to be accumulated over 10 years through a rate increase

     $1.5 million ÷ (10 years x 12 months x 1922 ERs) = **$6.50/month/ER**

  B. Defer this expense to a future Board for a future LID(?) in 10 years

Monthly Cost Projections

	Current Monthly O&M Fees	Future Changes to Monthly Fees
HLRWSD	$19.00 / month / ER	(CCI Adjustments Likely)
To HARSB	$25.00 / month / ER	$1.67 / month / ER / year
Dedicated Sinking Fund?		$6.50 / month / ER ?
TOTAL Current O&M	$44.00 / month / ER	
Proposed/Potential LID		$4,000 / ER
		$265 / year / ER
		$22 / month / ER

Next Steps / Schedule

HLRWSD First Public Meeting	*Sept. 5, 2012*
HLRWSD Second Round of Public Meetings	*Oct. 10 and 12, 2012*
HARSB Public Comment Period	*Oct. 17 to Nov. 1, 2012*
HARSB Public Meeting	*Nov. 1, 2012 (3:00pm)* *(Hayden City Hall)*
IF LID IS INITIATED:	
Notice of LID Hearing	*Late Oct., 2012*
Tentative LID Hearing Date	*Nov. 14, 2012*
District Board Decision on LID	*Nov. 28, 2012*
Final Application to DEQ for Loan	*Jan., 2013*
Secure DEQ Low Interest Loan	*July, 2013*

Thank you!

QUESTIONS and COMMENTS

HAYDEN LAKE RECREATIONAL WATER AND SEWER DISTRICT
MINUTES OF REGULAR MEETING
OCTOBER 10, 2012

CALL TO ORDER

Chairman Sewell called the regular meeting to order at 9:00 a.m. Board members present were Todd Walker, Carole Stringer and Tom DePew. Board member Weinstein was absent. Larry Comer was present as a representative of the Board. Administrator Lynn Hagman recorded the minutes of the meeting.

AGENDA / MINUTES

Board member Stringer moved to approve the agenda for this meeting, seconded by Board member Walker. The motion carried.

Following review of the minutes of September 5th and September 26, 2012 Board member Stringer moved to approve. Board member Walker seconded the motion to approve the minutes. The motion carried.

ENGINEER

Larry Comer discussed the costs that will be discussed at the public meeting. Ken Windram will be present at the meeting and will give an overview of the plant history and technology at the meeting. Mr. Comer informed the Board that the presentation is ready but there are still some O & M questions. Mr. Comer reminded the Board of the financial plan and cap fee update that was developed by FCS. The projected O & M costs were discussed up to 2022.

Board member Stringer felt that the Board would take advantage of any new technology during the phases. Mr. Comer will talk about benefits of phasing and the cash flow analysis at the meeting. Mr. Comer discussed the District's share of regulatory and replacement costs. The first phase will be the first ten years of the LID and the second phase will be the second ten years. The O & M reserve fund would pay for any improvements to the collector system in the second 10 years and the LID would pay for the first 10 years of our share of the plant facility and the upgrades to the collector system. Mr. Comer would like to have feedback from the citizens on what the second 10 years of funding should be.

Mr. Comer estimated the new calculation for a cap fee from HARSB will be $8,400. Mr. Comer informed the Board that the EID letter is being sent out. The HARSB facility plan public meeting is November 1, 2012 at 3:00 p.m. at the Hayden City Hall and the citizens attending the District public meeting will be invited to come.

The public hearing venue was discussed. Administrator Hagman informed the Board that the Hayden Meadows Elementary school had November 14th at 6:00 p.m. marked for the Sewer District to use the facility.

Administrator Hagman discussed the ER buy back list that we have. There are two people who have requested the District to buy back an ER from then and one person who has not submitted a formal request yet. The requests are for consolidated lots that do not need the ER anymore.

Board member Walker moved to buy back the 3 ER's on the list. Board member Stringer seconded the motion. The motion carried.

Larry Comer presented a map and gave an update on the District boundaries. There are several parcels along Strahorn Rd. that are still questionable and the District staff if looking into this.

ADJOURN

With no further business before the Board a motion was made by Board member Stringer and seconded by Board member Walker to adjourn at 10:20 a.m.

Dave Weinstein, SECRETARY

Lynn M. Hagman, ADMINISTRATOR

HAYDEN LAKE REREATIONAL WATER AND SEWER DISTRICT
MINUTES OF PUBLIC INFORMATIONAL MEETING
OCTOBER 10, 2012

At 6:00 p.m. Chairman Sewell opened the public meeting. Board members present were Tom DePew, Todd Walker and Carole Stringer. Larry Comer and Ashley Williams from Welch Comer & Associates, Attorney Mike Schmidt, Ken Windram from HARSB, Stephanie Schulman and Attorney Danielle Quade were also present as representatives of the Board. Administrator Lynn Hagman recorded the minutes of the meeting.

Chairman Sewell introduced the panel who would speak and then turned the meeting over to Larry Comer. Mr. Comer discussed the Hayden Lake Recreational Water and Sewer District background and then turned the presentation over to Ashley Williams to talk about the collection system.

Ms. Williams Informed the audience that a facility plan has been done for the collection system and for the plant. Ms. Williams explained that the District has 17 lift stations with pressure and gravity lines. Future growth estimates were discussed and the ER allocation at HARSB treatment facility was explained as well as how many ER's the District is billing and how many ER's we have on vacant lots. Slides were shown of the existing conditions of some of the lift stations and Ms. Williams then explained the ratings that were done on the structural/mechanical condition of the lift stations as well as the lift station rating results.

There are three options for the lift stations, option A is rehabilitation, option B is replacement and option C is slip line. Ms. Williams explained what each of the options would entail. An Environmental Analysis was done on each of these options as well as an option of doing nothing.

Ms. Williams discussed the summary of lift stations controls and how it works and what is missing for each lift station. Ms. Williams explained the tiered approach to the lift station controls. Tier 1 would be high flow/high risk stations, tier 2 would be moderate flow/moderate risk stations and tier 3 would be lower flow/lower risk stations. Ms. Williams then discussed the cost/benefit information for the Strahorn R. and Miles Ave. gravity relief lines. Some of the benefits would be percent of flow would be eliminated from the Country Club lift station which would also eliminate the need to upgrade the Country Club lift station. Added value of bypass for Lakeview Dr. force main and the window of opportunity to share costs with City of Hayden Lake.

The challenges would be obtaining an easement from the Avondale Country Club and the City of Hayden Lake agreeing to share costs. Ms. Williams explained the environmental analysis done on the relief lines. The sewer collection system capital improvement options were explained. There are three phases, phase A would be near term need, phase B would be midterm need and O & M would be long term need. Ms. Williams discussed the costs for each phase with phase A being $2,265,700, phase B being $1,823,700 and O & M being $689,000. This would round down to $4,200,000 for phase A and B and the O & M amount of $689,000 would come from O & M funding.

process for funding. Mr. Erickson questioned what will happen if we don't get the DEQ funding. Mr. Comer explained that the next step would be to go out to sell bonds. Mr. Erickson questioned how an ER is determined. Mr. Comer stated that each house equals one ER.

Board member Walker explained that the Board has been waiting for numbers and that the District put their name in for this loan a year ago and we are now close to the top position on the list for the funds. Mr. Erickson questioned why some of the homes with a large number of bathrooms were not charged more. Board member DePew explained that the charge is not based on bathrooms. Board member Stringer stated that the Board will always be looking for creative solutions.

Mr. Steve Caiden asked the Board if there were no other options. Attorney Mike Schmidt explained the litigation is on-going and he explained the history of the lawsuit. Ken Windram stated that the TMDL structure that was issued got a stay in court which gave us more flexibility with the phosphorus. Mr. Caiden questioned if the LID was a majority vote or was it decided by the Board. Attorney Danielle Quade explained that the Board can take action. Mr. Caiden voiced his concern with the extra monthly costs being very hard on people with fixed incomes.

Mr. Art Brown felt that the presentation did not do justice to the fact of what people will be paying. Mr. Brown asked the Board to get the cost down as low as possible. The presentation did not show the monthly costs. Mr. Brown asked that the Board look at future costs and make sure they are in the numbers. Mr. Brown would also like to see a breakout of costs for maintenance of the upgrades and the upgrades to meet environmental standards.

Mr. Comer informed the audience that HARSB will hold a public meeting on November 1st on the facility plan and comments will be taken there as well.

ADJOURN

The public meeting was adjourned at 7:30 p.m.

Kenneth Sewell, CHAIRMAN

Lynn M. Hagman, ADMINISTRATOR

HAYDEN LAKE RECREATIONAL WATER AND SEWER DISTRICT
MINUTES OF PUBLIC INFORMATIONAL MEETING
OCTOBER 12, 2012

Chairman Sewell opened the meeting at 2:00 p.m. Board members present were Todd Walker, Carole Stringer and Tom DePew. Board member Dave Weinstein was absent. Larry Comer and Ashley Williams from Welch Comer & Associates, Attorney Mike Schmidt, Attorney Danielle Quade, Ken Thompson, Ken Windram from HARSB, Laurie Robb and Chris Seward were all present as representatives of the Board. Administrator Lynn Hagman recorded the minutes of the meeting.

Chairman Sewell introduced the panel who would speak and then turned the meeting over to Larry Comer. Mr. Comer discussed the Hayden Lake Recreational Water and Sewer District background and then turned the presentation over to Ashley Williams to talk about the collection system.

Ms. Williams Informed the audience that a facility plan has been done for the collection system and for the plant. Ms. Williams explained that the District has 17 lift stations with pressure and gravity lines. Future growth estimates were discussed and the ER allocation at HARSB treatment facility was explained as well as how many ER's the District is billing and how many ER's we have on vacant lots. Slides were shown of the existing conditions of some of the lift stations and Ms. Williams then explained the ratings that were done on the structural/mechanical condition of the lift stations as well as the lift station rating results.

There are three options for the lift stations, option A is rehabilitation, option B is replacement and option C is slip line. Ms. Williams explained what each of the options would entail. An Environmental Analysis was done on each of these options as well as an option of doing nothing.

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The challenges would be obtaining an easement from the Avondale Country Club and the City of Hayden Lake agreeing to share costs. Ms. Williams explained the environmental analysis done on the relief lines. The sewer collection system capital improvement options were explained. There are three phases, phase A would be near term need, phase B would be midterm need and O & M would be long term need. Ms. Williams discussed the costs for each phase with phase A being $2,265,700, phase B being $1,823,700 and O & M being $689,000. This would round to $4,200,000 for phase A and B and the O & M amount of $689,000 would come from O & M funding.

Mr. Ken Windram from the Hayden Area Regional Sewer discussed the treatment facility and what the State of Washington Department of Ecology has set for the standard for Lake Spokane for dissolved oxygen and how this affects the new NPDES permit from EPA. Mr. Windram explained the new treatment plant upgrades and that it will be done in phases. The new limits on phosphorus, total nitrogen, TSS and CBOD will need to be met within 10 years. The phosphorus removal will be 99.9%. Mr. Windram explained the re-use farm and what time of year it is used. The first phase will be flow equalization and biological nutrient removal and then a tertiary filter, disinfection and pump station.

Larry Comer addressed the audience and explained the HARSB capital project funding. Mr. Comer explained that there are three categories of costs, the NPDES regulatory quality improvement with a cost of $16.35 million, replacement (unfunded depreciation) with a cost of $5.16 million and Increased capacity with a cost of $6.66 million. Mr. Comer explained that the increased capacity would be growth driven and only the new comers would pay for this. The NPDES permit and the replacement would come to $21.51 million and would be split between the City of Hayden, the Sewer District, the County and HARSB. The Sewer District share would be $5.65 million

Mr. Comer went on to discuss the funding options for the District collector system and the HARSB upgrades. The District collector system would be $4.2 million and the HARSB upgrades would be $6.2 million for a total of $10.4 million. Mr. Comer explained the long term for the collector system would come from O & M depreciation fund, the near and mid - term would be an LID bond with a DEQ loan or Bond Bank. The HARSB upgrade would be LID bond with DEQ loan.

Mr. Comer discussed the DEQ funds and the low interest of 2%. If the District were to receive the DEQ loan for the $10.4 million the estimated assessments would be $4,000 per ER which would equate to $265.00 per year. Mr. Comer explained possible future upgrade requirements for the years 2023 – 2032. The upgrades could be up to $1.5 million which would be funded by a dedicated reserve fund to be accumulated over 10 years through a rate increase. The monthly operations and maintenance cost projections were discussed. The Sewer District currently pays $44.00 per month with $19.00 a month going to the District for operations and maintenance and $25.00 going to HARSB. In the future a suggested $6.50 per month would need to go to the reserve fund. This would mean an increase.

Mr. Comer went over the proposed schedule if an LID is initiated. A notice of LID hearing would go out in late October with a hearing date of November 14, 2012. The District Board would make their decision on forming and LID on November 28th. Final application to DEQ for the loan would be January, 2013 and to secure the DEQ low interest loan would be July, 2013. This being the end of the presentation, Mr. Comer turned the meeting over to Chairman Sewell and the Board for questions and comments.

Ken Haagenson questioned Mr. Comer on how thick the slip line would be. Mr. Comer replied that the slip line is not one of the recommendations. Rock coating would be recommended because it is much cheaper and can do many of the lift stations at the same time.

Caron Miller asked if there will be more people who will hook to the sewer that are past the Clark House. Mr. Comer explained the District service area and it ends at Sandy Cove and this has not changed. Mr. Comer explained that it is a density issue and there is no plan to extend the sewer.

Ken Haagenson questioned the costs. Mr. Comer reviewed the LID costs and pointed out the assessment per ER and the dollar amount of the annual payment as well as what it would be on a monthly basis. Mr. Haagenson asked if the new standards were from the EPA. Mr. Comer explained that there are two parts to the LID, the plant upgrades and the collection system. Mr. Haagenson asked when the new regulations took effect. Mr. Windram explained the US Supreme Court ruling. Attorney Schmidt discussed the on-going law suit regarding the new regulations. Mr. Haagenson asked if the lift stations could be done on an as needed basis. Mr. Comer explained the low interest loan from DEQ and it would be less cost to do more than one at a time. Attorney Schmidt discussed the 2% interest rate on the DEQ loan and the flexibility with fees that we would not have to pay. The money is a draw down, we only use what we need, when we need it and we only pay interest on what we use.

Ken Windram discussed the relief on phosphorus that we got on a seasonal average. Elaine Haagenson questioned borrowing the money all at once. Attorney Danielle Quade explained that the funds are only spent as it is used and the rest stays with DEQ until we need it.

Mary Ann McCleary asked about payments on the LID. Larry Comer explained that the assessment can be paid off at any time. Board member Walker explained that the District has been looking at this for the last year and put our name on the list for the low interest DEQ loan. Board member Walker assured the citizens that the Board has researched this issue very carefully and has been put on the list for the DEQ loan to save money. Board member Stringer stated that if things change over the next ten years, the DEQ money could change also.

Mrs. Haagenson felt that the costs should be indicated in the next newsletter that is sent out. Mr. Comer replied that it will be for the public hearing notice.

Caron Miller asked if other land comes into the District, what they will pay. Mr. Comer explained the current vacant lots that have an ER are being included in the LID and vacant land that comes in after would pay the current capitalization fee plus the LID costs and interest.

With no further questions for the Board, the public meeting was adjourned at 3:35 p.m.

Kenneth Sewell, CHAIRMAN

Lynn M. Hagman, ADMIISTRATOR