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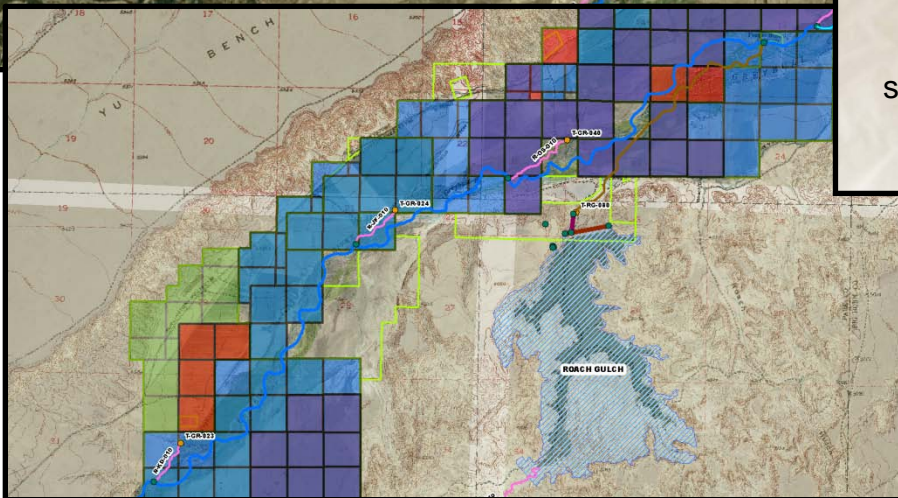
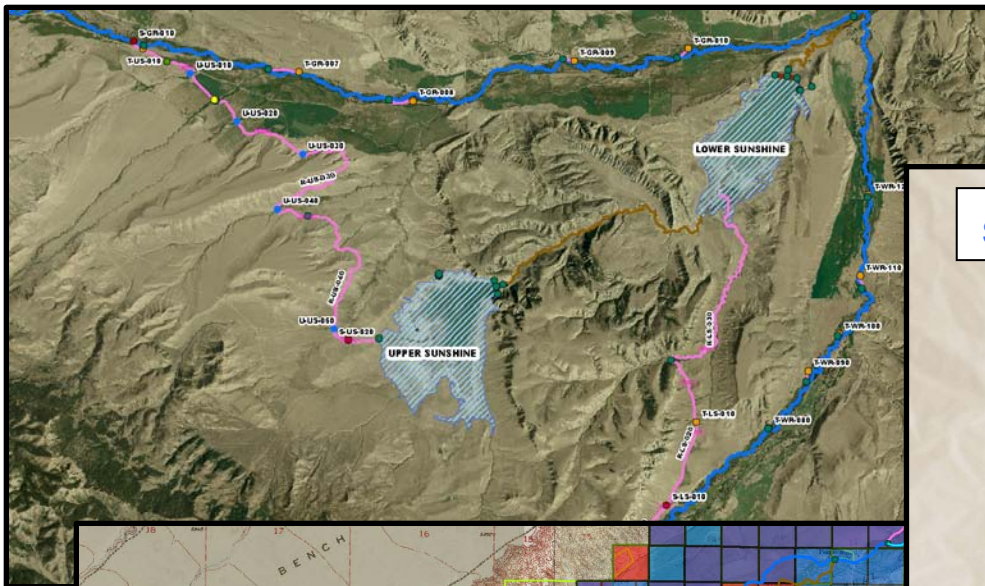
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Executive Summary for GREYBULL VALLEY REHABILITATION AND GIS, LEVEL II STUDY

To: WYOMING WATER DEVELOPMENT
COMMISSION



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December 2010

Executive Summary

GREYBULL VALLEY REHABILITATION AND GIS, LEVEL II

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1.1

1 Introduction

The Sponsor - Greybull Valley Irrigation District (GVID) was organized as an irrigation district in 1920 and provides water to irrigate approximately 80,000 acres. The District operates three off-channel storage reservoirs to store water from the Greybull River – Upper Sunshine, Lower Sunshine and Roach Gulch Reservoir (See Figure 1.1). Three supply canals and their associated diversions from the Greybull and Wood Rivers are also maintained by the District. Water released from these reservoirs is delivered to the various ditches via the Greybull River. The receiving diversions themselves are privately maintained by individuals or canal companies.

Purpose

This study had the following goals.

After completion of the project, the District will have a functional GIS and a clear picture of the District's ongoing projects and future commitments.

- GIS Development - Creation of a GIS based on the various components.
- Mapping – This portion of the project entailed all of the work required to map the following components of the GVID:
 - Canals diverting water from the Wood and Greybull Rivers to Upper Sunshine, Lower Sunshine and Roach Gulch Reservoirs.
 - Reservoir Facilities
 - Diversion points of the receiving ditches
 - Water Shares for each reservoir.
- Structural Inventory – Inventory the facilities owned and maintained by the GVID.
- Flow Monitoring Plan – Create a flow monitoring plan to collect data on the inflows and outflows from selected reaches within the Greybull River used for delivery of reservoir water.
- Conceptual Designs, Cost Estimates and Financial Review – Produce conceptual designs to replace/rehabilitate the various structures in poor condition and implement the flow monitoring plan.
- Review Districts Project Schedule – Based on cost estimates, review and compare the District's current and future project schedule to its income to determine feasibility of the proposed improvement.

2 GIS Development

The first step in any GIS project is to identify the design constraints and create the database framework for the project. This framework will form the foundation for the data collection and field mapping. Two components of the District were identified by the Wyoming Water Development Commission (WWDC) and the Sponsor for inclusion in the GIS. These are:

- Storage and Supply System
- Water Share (Water Rights) Mapping

Each component has unique data associated with it that are incorporated into the database. Data from other sources – referred to as Base Mapping was included. This information consisted of:

- Aerial Photography
- 7.5 Minute USGS Quadrangle Maps

- County Parcel Data

GIS Framework

With the base mapping requirements identified, the basic framework of the remainder of the GIS needed to be created. This framework is dependent upon the types of features that make up each component and the amount of data the District needs on each feature to effectively meet its needs. For this project, the water share mapping is the most important. The District has three main canals and reservoirs under their responsibility, but is not responsible for the infrastructure required to deliver water to each field. Therefore, they have a limited amount of infrastructure requiring mapping.

All of the mapping data generated by SCE is stored in the “GVID_GIS” database, which consists of two separate components:

- Storage and Delivery System GIS
- Water Share “Water Rights” GIS

This project was configured as a single database with the following basic structure.

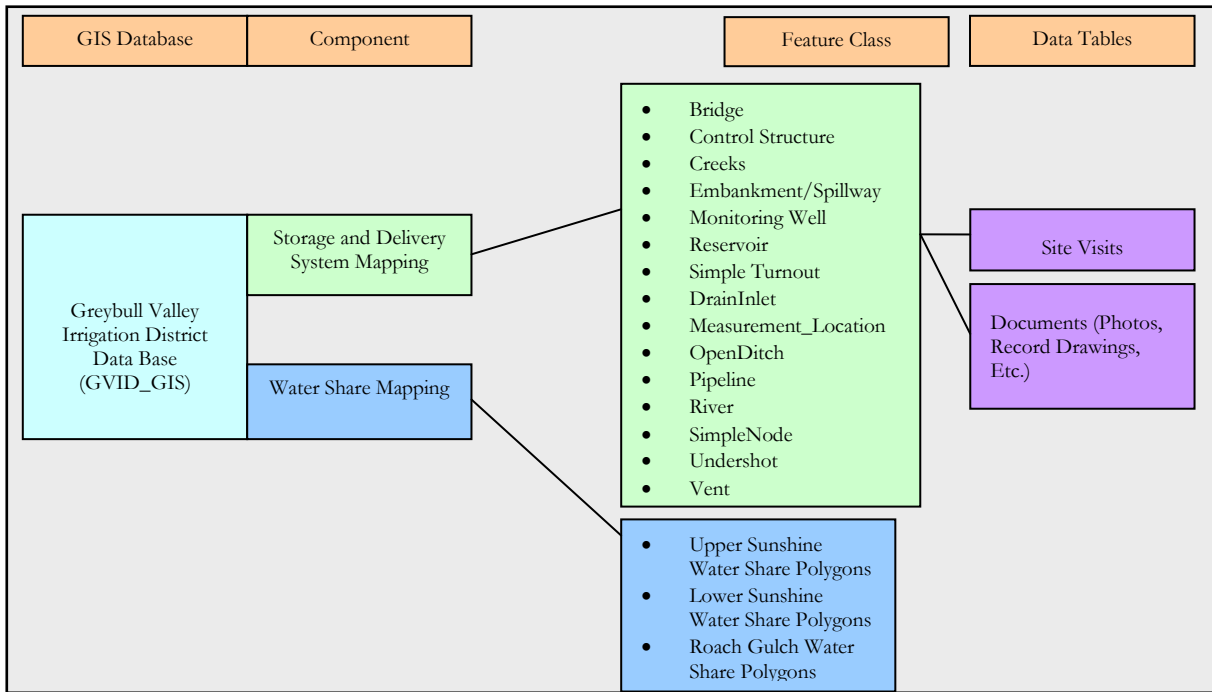


Figure 2.1 GIS Framework

3 Mapping

The mapping was completed either through “field mapping” or “digitization”. Field mapping involved visiting each feature and using a GPS to locate and store information about it. Digitizing involved using areal photo information and other base mapping to locate features.

Field Mapping

The field mapping was used where, in our opinion, an actual field location was required. These features include the various structures and point features in the canal and reservoir system.

Digitized Mapping

Concurrent with the field mapping, digitizing of certain features was completed. Some of the storage and delivery system features were digitized. The linear features such as pipelines, open

ditches and closed drain pipelines were digitized based on the aerial photos. This process involved using a combination of existing maps and aerial photos to locate the linear features such as the canals, reservoir boundaries, etc. Since the point features on either end were field located, any discrepancies were corrected there.

The second component of the GIS digitized was the Water Share Mapping. The purpose of this mapping was to provide a GIS containing the information on the water shares for each reservoir. This is essentially the filing system used by the District to track and organize the amount of storage in each reservoir attached to each piece of property within the District.

4 Creation of GIS Search Tool

To aid the District in the use of the GIS, a GIS search tool was created. The User's Manual and Installation Manual are included in the report.

5 GIS Training

SCE provided training to the District on an as-needed basis. Our personnel met with the District on several occasions to illustrate basic tasks and how best the GIS could benefit them. Since the on-site meetings, we have provided support and answers to questions over the phone, and will continue to aid the District if required.

6 Map Books

Two hard copies of the map book were provided. They consist of three-ring binders with plastic slip sleeves containing maps 11X17 in size. Substitute maps in the books can be reprinted from Adobe pdf files contained with the project files. These map book pages can also be accessed using ArcGIS.

7 Structure Inventory and Evaluation

The structures owned by the Greybull Valley Irrigation District display a wide range of physical conditions. Concurrent with the GIS mapping, the structures were inventoried and evaluated. The information collected was used to make recommendations for rehabilitation, replacement, or upgrades. Two structures, in addition to those currently being rehabilitated by previous projects, were identified.

1. Upper Sunshine Canal Outlet Structure.
2. Lower Sunshine Canal Diversion Structure (Add screening)

8 Flow Monitoring

GVID is interested in improving their understanding of flows within their system. To this end a flow monitoring task was added to the project. SCE has proposed a long-term monitoring system to track inflows and outflows from Meeteetse to Otto. Data from these flow recording stations could be used in the future to more accurately quantify conveyance losses from reservoir release.

9 Conceptual Designs and Cost Estimates

The GVID has several projects in progress. Previous studies have dealt with the Upper Sunshine Diversion and hydropower generation at several sites. The projects are either in Level III, or about to enter their Level III, phases. Designs were prepared for the two structures listed above. Estimates were also prepared for the flow monitoring stations and the costs to retrofit automation to the Upper and Lower Sunshine Reservoir Canal Outlets. The cost estimates for these projects are summarized below.

In addition to the cost estimates for construction, the savings due to lower O&M Costs was estimated for the automation and the current Upper Sunshine Diversion Project (currently in design as a Level III).

Final Report: Greybull Valley Rehabilitation and GIS, Level II

Table 9.1 Upper Sunshine Canal Outlet Structure Cost Estimate

Upper Sunshine Canal Outlet Structure - Level III Construction Costs	
Preparation of Final Designs and Specifications	\$ 22,000.00
Permitting and Mitigation	\$ -
Legal Fees	\$ -
Right of Way Acquisition Cost	\$ -

Project Components				
Item	Unit	Estimated Quantity	Estimated Unit Price	Estimated Total Price
Concrete	CY	250	\$700.00	\$175,000.00
18-in. Rip Rap	CY	355	\$50.00	\$17,750.00
Excavation	CY	800	\$50.00	\$40,000.00
Crushed Base	CY	40	\$20.00	\$800.00
Construction Cost Subtotal				\$233,550.00
Engineering Costs (10%)				\$23,355.00
Subtotal #2				\$256,905.00
Contingency (15%)				\$38,535.75
Construction Cost Total				\$295,440.75
Project Cost Total				\$317,440.75

Table 9.2 Lower Sunshine Canal Gate Cost Estimate

Lower Sunshine Canal Gate - Level III Construction Costs	
Preparation of Final Designs and Specifications	\$ 2,000.00
Permitting and Mitigation	\$ -
Legal Fees	\$ -
Right of Way Acquisition Cost	\$ -

Project Components				
Item	Unit	Estimated Quantity	Estimated Unit Price	Estimated Total Price
Concrete	CY	1	\$1,000.00	\$1,000.00
Steel Grating Panels	EA	3	\$2,400.00	\$7,200.00
Channel Steel	LB	100	\$1.10	\$110.00
Construction Cost Subtotal				\$8,310.00
Engineering Costs (10%)				\$831.00
Subtotal #2				\$9,141.00
Contingency (15%)				\$1,371.15
Construction Cost Total				\$10,512.15
Project Cost Total				\$12,512.15

Table 9.3 Summary Flow Monitoring Cost Estimates

Summary of Flow Monitoring Cost Estimates

Description	Type of Measurement	Design Costs				Construction Costs					Project Component Cost Total
		Preparation of Final Designs and Specifications	Permitting and Mitigation	Legal Fees	Right of Way Acquisition Cost	Construction Cost Subtotal	Engineering Costs 10%	Construction Cost Subtotal 2	Contingency 15%	Construction Cost Total	
Base Station	Base Station/Computer/SCADA	\$ 800.00	\$ -		\$ -	\$ 69,000.00	\$ 6,900.00	\$ 75,900.00	\$ 11,385.00	\$ 87,285.00	\$ 88,085.00
Repeater	Repeater Station	\$ 800.00	\$ 1,000.00		\$ -	\$ 12,150.00	\$ 1,215.00	\$ 13,365.00	\$ 2,004.75	\$ 15,369.75	\$ 17,169.75
Repeater	Repeater Station	\$ 800.00	\$ 1,000.00		\$ -	\$ 12,150.00	\$ 1,215.00	\$ 13,365.00	\$ 2,004.75	\$ 15,369.75	\$ 17,169.75
USGS Station 06276500	Natural	\$ -	\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Reach 1	TL Ditch	\$ 800.00	\$ -	\$ 1,000.00	\$ 2,155.79	\$ 8,850.00	\$ 885.00	\$ 9,735.00	\$ 1,460.25	\$ 11,195.25	\$ 15,151.04
	Spring Creek	\$ -	\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	Dotterer Ditch	\$ 800.00	\$ -	\$ 1,000.00	\$ 2,370.86	\$ 8,850.00	\$ 885.00	\$ 9,735.00	\$ 1,460.25	\$ 11,195.25	\$ 15,366.11
	Meeteetse Creek	\$ 800.00	\$ -	\$ 1,000.00	\$ 1,390.00	\$ 14,850.00	\$ 1,485.00	\$ 16,335.00	\$ 2,450.25	\$ 18,785.25	\$ 21,975.25
	Wyoming Ditch	\$ 800.00	\$ -	\$ 1,000.00	\$ 2,508.18	\$ 8,850.00	\$ 885.00	\$ 9,735.00	\$ 1,460.25	\$ 11,195.25	\$ 15,503.43
	Winkle Benbrooke Ditch	\$ 800.00	\$ -	\$ 1,000.00	\$ 1,390.00	\$ 8,850.00	\$ 885.00	\$ 9,735.00	\$ 1,460.25	\$ 11,195.25	\$ 14,385.25
	Dyer Ditch	\$ 800.00	\$ -	\$ 1,000.00	\$ 1,390.00	\$ 8,850.00	\$ 885.00	\$ 9,735.00	\$ 1,460.25	\$ 11,195.25	\$ 14,385.25
	Long Hollow	\$ -	\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	Cottonwood Creek	\$ -	\$ -		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	Cheeseman Ditch	\$ 800.00	\$ -	\$ 1,000.00	\$ 4,182.53	\$ 8,850.00	\$ 885.00	\$ 9,735.00	\$ 1,460.25	\$ 11,195.25	\$ 17,177.78
	Dodge Ditch	\$ 800.00	\$ -	\$ 1,000.00	\$ 1,390.00	\$ 8,850.00	\$ 885.00	\$ 9,735.00	\$ 1,460.25	\$ 11,195.25	\$ 14,385.25
	Arnold Ditch	\$ 800.00	\$ -	\$ 1,000.00	\$ 2,077.67	\$ 8,850.00	\$ 885.00	\$ 9,735.00	\$ 1,460.25	\$ 11,195.25	\$ 15,072.92
	Boone Ditch	\$ 800.00	\$ -	\$ 1,000.00	\$ 2,343.47	\$ 8,850.00	\$ 885.00	\$ 9,735.00	\$ 1,460.25	\$ 11,195.25	\$ 15,338.72
	Roach Gulch Supply	\$ 800.00	\$ -		\$ -	\$ 8,850.00	\$ 885.00	\$ 9,735.00	\$ 1,460.25	\$ 11,195.25	\$ 11,995.25
Roach Gulch Diversion	\$ 800.00	\$ -		\$ -	\$ 8,850.00	\$ 885.00	\$ 9,735.00	\$ 1,460.25	\$ 11,195.25	\$ 11,995.25	
Reach 2	Keystone Ditch	\$ 800.00	\$ -	\$ 1,000.00	\$ 1,945.09	\$ 8,850.00	\$ 885.00	\$ 9,735.00	\$ 1,460.25	\$ 11,195.25	\$ 14,940.34
	Jimmerfield Ditch	\$ 800.00	\$ -	\$ 1,000.00	\$ 1,390.00	\$ 8,850.00	\$ 885.00	\$ 9,735.00	\$ 1,460.25	\$ 11,195.25	\$ 14,385.25
	Old Smith Ditch	\$ 800.00	\$ -	\$ 1,000.00	\$ 2,078.50	\$ 8,850.00	\$ 885.00	\$ 9,735.00	\$ 1,460.25	\$ 11,195.25	\$ 15,073.75
	Avent Ditch	\$ 800.00	\$ -	\$ 1,000.00	\$ 2,094.53	\$ 8,850.00	\$ 885.00	\$ 9,735.00	\$ 1,460.25	\$ 11,195.25	\$ 15,089.78
	Bench Canal	\$ 800.00	\$ -	\$ 1,000.00	\$ 1,390.00	\$ 8,850.00	\$ 885.00	\$ 9,735.00	\$ 1,460.25	\$ 11,195.25	\$ 14,385.25
	Farmers Canal	\$ 800.00	\$ -	\$ 1,000.00	\$ 1,390.00	\$ 8,850.00	\$ 885.00	\$ 9,735.00	\$ 1,460.25	\$ 11,195.25	\$ 14,385.25
	German Ditch	\$ 800.00	\$ -	\$ 1,000.00	\$ 1,390.00	\$ 8,850.00	\$ 885.00	\$ 9,735.00	\$ 1,460.25	\$ 11,195.25	\$ 14,385.25
	St. Joe Ditch	\$ 800.00	\$ -	\$ 1,000.00	\$ 1,390.00	\$ 8,850.00	\$ 885.00	\$ 9,735.00	\$ 1,460.25	\$ 11,195.25	\$ 14,385.25
	Erickson Ditch	\$ 800.00	\$ -	\$ 1,000.00	\$ 1,390.00	\$ 8,850.00	\$ 885.00	\$ 9,735.00	\$ 1,460.25	\$ 11,195.25	\$ 14,385.25
	Greybull River at Road 8	\$ 800.00	\$ -	\$ 1,000.00	\$ -	\$ 14,850.00	\$ 1,485.00	\$ 16,335.00	\$ 2,450.25	\$ 18,785.25	\$ 20,585.25
Reach 3	Brown Ditch	\$ 800.00	\$ -	\$ 1,000.00	\$ 2,622.85	\$ 8,850.00	\$ 885.00	\$ 9,735.00	\$ 1,460.25	\$ 11,195.25	\$ 15,618.10
	Fairview Canal	\$ 800.00	\$ -	\$ 1,000.00	\$ 4,054.97	\$ 8,850.00	\$ 885.00	\$ 9,735.00	\$ 1,460.25	\$ 11,195.25	\$ 17,050.22
	Wood and Burnett Ditch	\$ 800.00	\$ -	\$ 1,000.00	\$ 2,344.75	\$ 8,850.00	\$ 885.00	\$ 9,735.00	\$ 1,460.25	\$ 11,195.25	\$ 15,340.00
	Sandstone Ditch	\$ 800.00	\$ -	\$ 1,000.00	\$ 1,390.00	\$ 8,850.00	\$ 885.00	\$ 9,735.00	\$ 1,460.25	\$ 11,195.25	\$ 14,385.25
	Greybull River at Road 16	\$ 800.00	\$ -	\$ 1,000.00	\$ 1,390.00	\$ 14,850.00	\$ 1,485.00	\$ 16,335.00	\$ 2,450.25	\$ 18,785.25	\$ 21,975.25
Subtotal		\$ 24,000.00	\$ 2,000.00	\$ 25,000.00	\$ 47,459.20	\$ 350,250.00	\$ 35,025.00	\$ 385,275.00	\$ 57,791.25	\$ 443,066.25	\$ 541,525.45

Table 9.4 Upper, Lower Outlet Control Cost Estimates

Upper, Lower Outlet Control - Level III				
Preparation of Final Designs and Specifications				\$ 20,000.00
Permitting and Mitigation				\$ -
Legal Fees				\$ -
Right of Way Acquisition Cost				\$ -

Project Components				
Item	Unit	Estimated Quantity	Estimated Unit Price	Estimated Total Price
Upper Sunshine Reservoir				
Pressure Transducer	EA	1	\$1,100.00	\$1,100.00
SRTU	EA	1	\$15,000.00	\$15,000.00
Mounting Pole	EA	1	\$350.00	\$350.00
Radio/Antenna	EA	1	\$2,500.00	\$2,500.00
Trench Excavation, Backfill and Conduit - Antenna	ft	300	\$20.00	\$6,000.00
Installation	EA	1	\$5,000.00	\$5,000.00
Lower Sunshine Reservoir				
Valve Actuator - Lower	EA	1	\$8,500.00	\$8,500.00
Valve Actuator - Lower	EA	1	\$9,500.00	\$9,500.00
Pressure Transducer	EA	2	\$1,100.00	\$2,200.00
SRTU	EA	1	\$15,000.00	\$15,000.00
Mounting Pole	EA	1	\$350.00	\$350.00
Radio/Antenna	EA	1	\$2,500.00	\$2,500.00
Trench Excavation, Backfill and Conduit - Antenna	ft	300	\$20.00	\$6,000.00
Installation	EA	1	\$2,500.00	\$2,500.00
Construction Cost Subtotal				\$76,500.00
Engineering Costs (10%)				\$7,650.00
Subtotal #2				\$84,150.00
Contingency (15%)				\$12,622.50
Construction Cost Total				\$96,772.50
Project Cost Total				\$116,772.50

Table 9.5 Cost Savings of Automation

Cost Savings of Automation

Savings Assumptions	Cost per Unit	Unit	Cost per day	Operation - May through October (183 days)
3 hrs/day	\$ 18.00	Hour	\$ 54.00	\$ 9,882.00
100 miles/day	\$ 0.55	Mile	\$ 55.00	\$ 10,065.00
Totals			\$ 109.00	\$ 19,947.00

Table 9.6 Cost Savings of Upper Sunshine Diversion Rehabilitation

Cost Savings of Upper Sunshine Diversion Rehabilitation

Savings Assumptions	Cost per Unit	Unit	Cost per day	Runoff Duration - Average 21 Days/year
16 hrs/day	\$ 18.00	Hour	\$ 288.00	\$ 6,048.00
8 hrs/day	\$ 27.00	Hour	\$ 216.00	\$ 4,536.00
6 hrs/day - Loader Time	\$ 120.00	Hour	\$ 720.00	\$ 15,120.00
1,890 CY Assumed 2,520 CY Stockpiled/year and 50% is given away and hauled by others, leaving 1,260 CY to be removed by the District.	\$ 1.50	CY	N/A	\$ 2,835.00
Totals			\$ 1,224.00	\$ 28,539.00

Financing

Several options exist for financing. Two of these methods were evaluated to bracket the available options. These options are briefly summarized below:

- WWDC Loan
- Private Financing – Tax Exempt Status
- Private Financing – Non-tax Exempt
- Clean Renewable Energy Bonds

Two of these methods were investigated in the report. The first was the WWDC loan. A summary of this method is shown in Table 9.7 Cash Flow Summary - All Projects – WWDC Financing below. The second method for which payment calculations were completed was the Private Financing – Non-tax Exempt shown in Table 9.8 Cash Flow Summary – All Projects Private Financing. These two methods were chosen because they represented a reasonable financing assumption (WWDC method) and the most costly financing option (Private Financing Non-tax Exempt). The remaining options were either similar to or less expensive than these two methods. The primary difference between the two is the interest rate. GVID apportions all expenses individually to the three reservoirs. Separate tabulations for each reservoir's share of the projects is contained in the reports.

A rate of 4% was used for the WWDC method. A variable rate starting at 6.5% was used for the Private Financing method. From an overall GVID perspective, the projects become profitable in 2032. Prior to that time, the hydropower revenue is funding a larger and larger portion of the debt service, not only from the hydropower generation projects themselves, but also the other improvement projects, such as the Upper Sunshine Diversion and Flow Monitoring projects. It just takes until 2032 to begin generating revenue in excess of the debt service and O&M expenses.

Table 9.7 Cash Flow Summary - All Projects – WWDC Financing

WWDC FUNDING OPTION SUMMARY OF ALL PROJECTS - CASH FLOW														
Note	Year	Year No.	Principal	Interest	Total Payment	Hydropower O&M Costs	General O&M Costs	Total Cost	Hydropower Revenue	Estimated O&M Savings - Upper Sunshine Diversion and Automation	General O&M Assessment Revenue	Project Related Assessment Revenue	Net Cashflow	Savings Balance
	2010	1	\$ 7,797,598.04	\$ 311,903.92	\$ 390,015.40	\$ -	\$ 353,974.25	\$ 743,989.65	\$ -		\$ 353,973.75	\$ 300,060.00	\$ (89,955.90)	\$ 392,044.10
1	2011	2	\$ 7,806,478.42	\$ 312,259.14	\$ 396,416.41	\$ -	\$ 361,053.74	\$ 757,470.14	\$ -	\$ 48,486.00	\$ 361,053.23	\$ 445,167.00	\$ 97,236.08	\$ 489,280.19
2	2012	3	\$ 17,550,698.43	\$ 702,027.94	\$ 1,119,605.61	\$ 42,448.00	\$ 368,274.81	\$ 1,530,328.42	\$ 744,968.20	\$ 49,455.72	\$ 368,274.29	\$ 520,416.00	\$ 152,785.79	\$ 642,065.97
	2013	4	\$ 17,133,120.76	\$ 685,324.83	\$ 1,119,605.61	\$ 43,296.96	\$ 375,640.31	\$ 1,538,542.88	\$ 767,317.25	\$ 50,444.83	\$ 375,639.78	\$ 520,416.00	\$ 175,274.98	\$ 817,340.95
3	2014	5	\$ 26,005,743.87	\$ 1,040,229.75	\$ 1,657,824.79	\$ 88,325.90	\$ 383,153.11	\$ 2,129,303.80	\$ 1,314,069.48	\$ 51,453.73	\$ 383,152.57	\$ 771,246.00	\$ 390,617.99	\$ 1,207,958.94
	2015	6	\$ 25,388,148.84	\$ 1,015,525.95	\$ 1,657,824.79	\$ 90,092.42	\$ 390,816.17	\$ 2,138,733.38	\$ 1,353,491.57	\$ 52,482.81	\$ 390,815.62	\$ 771,246.00	\$ 429,302.62	\$ 1,637,261.56
4	2016	7	\$ 35,700,367.82	\$ 1,428,014.71	\$ 2,359,044.98	\$ 137,841.27	\$ 398,632.50	\$ 2,895,518.74	\$ 1,982,101.48	\$ 53,532.46	\$ 398,631.94	\$ 771,246.00	\$ 309,993.14	\$ 1,947,254.70
5	2017	8	\$ 34,979,395.17	\$ 1,399,175.81	\$ 2,374,501.38	\$ 140,598.09	\$ 406,605.15	\$ 2,921,704.62	\$ 2,041,564.53	\$ 54,603.11	\$ 344,737.87	\$ 771,246.00	\$ 290,446.89	\$ 2,237,701.59
6	2018	9	\$ 34,172,720.38	\$ 1,366,908.82	\$ 2,386,911.00	\$ 143,410.05	\$ 414,737.25	\$ 2,945,058.31	\$ 2,102,811.47	\$ 55,695.17	\$ 114,259.64	\$ 771,246.00	\$ 98,953.97	\$ 2,336,655.56
	2019	10	\$ 33,152,718.19	\$ 1,326,108.73	\$ 2,386,911.00	\$ 146,278.25	\$ 423,032.00	\$ 2,956,221.25	\$ 2,165,895.81	\$ 56,809.08	\$ 116,544.83	\$ 771,246.00	\$ 154,274.46	\$ 2,490,930.02
	2020	11	\$ 32,091,915.91	\$ 1,283,676.64	\$ 2,386,911.00	\$ 149,203.82	\$ 431,492.64	\$ 2,967,607.46	\$ 2,230,872.68	\$ 57,945.26	\$ 118,875.73	\$ 771,246.00	\$ 211,332.21	\$ 2,702,262.23
	2021	12	\$ 30,988,681.55	\$ 1,239,547.26	\$ 2,386,911.00	\$ 152,187.90	\$ 440,122.49	\$ 2,979,221.39	\$ 2,297,798.86	\$ 59,104.16	\$ 120,024.00	\$ 771,246.00	\$ 268,951.64	\$ 2,971,213.87
	2022	13	\$ 29,841,317.81	\$ 1,193,652.71	\$ 2,386,911.00	\$ 155,231.65	\$ 448,924.94	\$ 2,991,067.59	\$ 2,366,732.83	\$ 60,286.25	\$ 120,024.00	\$ 721,080.00	\$ 277,055.48	\$ 3,248,269.36
	2023	14	\$ 28,648,059.52	\$ 1,145,922.38	\$ 2,386,911.00	\$ 158,336.29	\$ 457,903.44	\$ 3,003,150.73	\$ 2,437,734.81	\$ 61,491.97	\$ 120,024.00	\$ 721,080.00	\$ 337,180.06	\$ 3,585,449.42
	2024	15	\$ 27,407,070.90	\$ 1,096,282.84	\$ 2,386,911.00	\$ 161,503.01	\$ 467,061.51	\$ 3,015,475.52	\$ 2,510,866.86	\$ 62,721.81	\$ 120,024.00	\$ 640,908.00	\$ 319,045.15	\$ 3,904,494.57
	2025	16	\$ 26,116,442.73	\$ 1,044,657.71	\$ 2,386,911.00	\$ 164,733.07	\$ 476,402.74	\$ 3,028,046.81	\$ 2,586,192.87	\$ 63,976.25	\$ 120,024.00	\$ 520,884.00	\$ 263,030.30	\$ 4,167,524.87
	2026	17	\$ 24,774,189.44	\$ 990,967.58	\$ 2,386,911.00	\$ 168,027.73	\$ 485,930.79	\$ 3,040,869.53	\$ 2,663,778.65	\$ 65,255.77	\$ 120,024.00	\$ 440,712.00	\$ 248,900.90	\$ 4,416,425.77
	2027	18	\$ 23,378,246.01	\$ 935,129.84	\$ 2,386,911.00	\$ 171,388.29	\$ 495,649.41	\$ 3,053,948.70	\$ 2,743,692.01	\$ 66,560.89	\$ 120,024.00	\$ 440,712.00	\$ 317,040.20	\$ 4,733,465.97
	2028	19	\$ 21,926,464.85	\$ 877,058.59	\$ 2,386,911.00	\$ 174,816.05	\$ 505,562.39	\$ 3,067,289.45	\$ 2,826,002.77	\$ 67,892.11	\$ 120,024.00	\$ 440,712.00	\$ 387,341.43	\$ 5,120,807.40
	2029	20	\$ 20,416,612.44	\$ 816,664.50	\$ 2,386,911.00	\$ 178,312.38	\$ 515,673.64	\$ 3,080,897.02	\$ 2,910,782.85	\$ 69,249.95	\$ 120,024.00	\$ 360,540.00	\$ 379,699.78	\$ 5,500,507.18
	2030	21	\$ 18,846,365.94	\$ 753,854.64	\$ 2,386,911.00	\$ 181,878.62	\$ 525,987.12	\$ 3,094,776.74	\$ 2,998,106.34	\$ 70,634.95	\$ 120,024.00	\$ 330,534.00	\$ 424,522.55	\$ 5,925,029.73
	2031	22	\$ 17,213,309.57	\$ 688,532.38	\$ 2,380,509.99	\$ 185,516.19	\$ 536,506.86	\$ 3,102,533.04	\$ 3,088,049.53	\$ 72,047.65	\$ 120,024.00	\$ 250,362.00	\$ 427,950.13	\$ 6,352,979.86
	2032	23	\$ 15,521,331.96	\$ 620,853.28	\$ 1,657,320.79	\$ 189,226.52	\$ 547,236.99	\$ 2,393,784.30	\$ 3,180,691.02	\$ 73,488.60	\$ 120,024.00	\$ 220,356.00	\$ 1,200,775.32	\$ 7,553,755.17
	2033	24	\$ 14,484,864.46	\$ 579,394.58	\$ 1,657,320.79	\$ 193,011.05	\$ 558,181.73	\$ 2,408,513.57	\$ 3,276,111.75	\$ 74,958.37	\$ 120,024.00	\$ 140,184.00	\$ 1,202,764.55	\$ 8,756,519.72
	2034	25	\$ 13,406,938.25	\$ 536,277.53	\$ 1,657,320.79	\$ 196,871.27	\$ 569,345.37	\$ 2,423,537.43	\$ 3,374,395.10	\$ 76,457.54	\$ 120,024.00	\$ 90,018.00	\$ 1,237,357.21	\$ 9,993,876.93
	2035	26	\$ 12,285,894.99	\$ 491,435.80	\$ 1,657,320.79	\$ 200,808.70	\$ 580,732.28	\$ 2,438,861.76	\$ 3,475,626.95	\$ 77,986.69	\$ 120,024.00	\$ 90,018.00	\$ 1,324,793.88	\$ 11,318,670.82
	2036	27	\$ 11,120,010.01	\$ 444,800.40	\$ 1,657,320.79	\$ 204,824.87	\$ 592,346.92	\$ 2,454,492.58	\$ 3,579,895.76	\$ 79,546.42	\$ 120,024.00	\$ 90,018.00	\$ 1,414,991.61	\$ 12,733,662.42
	2037	28	\$ 9,907,489.62	\$ 396,299.58	\$ 1,641,864.38	\$ 208,921.37	\$ 604,193.86	\$ 2,454,979.61	\$ 3,687,292.63	\$ 81,137.35	\$ -	\$ 90,018.00	\$ 1,403,468.38	\$ 14,137,130.80
	2038	29	\$ 8,661,924.83	\$ 346,476.99	\$ 1,629,454.76	\$ 213,099.79	\$ 616,277.74	\$ 2,458,832.29	\$ 3,797,911.41	\$ 82,760.10	\$ -	\$ 90,018.00	\$ 1,511,857.22	\$ 15,648,988.02
	2039	30	\$ 7,378,947.06	\$ 295,157.88	\$ 1,629,454.76	\$ 217,361.79	\$ 628,603.29	\$ 2,475,419.84	\$ 3,911,848.75	\$ 84,415.30	\$ -	\$ 90,018.00	\$ 1,610,862.21	\$ 17,259,850.23
	2040	31	\$ 6,044,650.19	\$ 241,786.01	\$ 1,629,454.76	\$ 221,709.03	\$ 641,175.36	\$ 2,492,339.14	\$ 4,029,204.22	\$ 86,103.61	\$ -	\$ 30,006.00	\$ 1,652,974.68	\$ 18,912,824.91
	2041	32	\$ 4,656,981.44	\$ 186,279.26	\$ 928,234.57	\$ 226,143.21	\$ 653,998.87	\$ 1,808,376.64	\$ 4,150,080.34	\$ 87,825.68	\$ -	\$ 30,006.00	\$ 2,459,535.38	\$ 21,372,360.29
	2042	33	\$ 3,915,026.12	\$ 156,601.04	\$ 928,234.57	\$ 230,666.07	\$ 667,078.84	\$ 1,825,979.49	\$ 4,274,582.75	\$ 89,582.19	\$ -	\$ -	\$ 2,538,185.46	\$ 23,910,545.75
	2043	34	\$ 3,143,392.59	\$ 125,735.70	\$ 928,234.57	\$ 235,279.39	\$ 680,420.42	\$ 1,843,934.38	\$ 4,402,820.24	\$ 91,373.84	\$ -	\$ -	\$ 2,650,259.69	\$ 26,560,805.43
	2044	35	\$ 2,340,893.73	\$ 93,635.75	\$ 390,015.40	\$ 239,984.98	\$ 694,028.83	\$ 1,324,029.21	\$ 4,534,904.84	\$ 93,201.31	\$ -	\$ -	\$ 3,304,076.95	\$ 29,864,882.38
	2045	36	\$ 2,044,514.08	\$ 81,780.56	\$ 390,015.40	\$ 244,784.68	\$ 707,909.40	\$ 1,342,709.48	\$ 4,670,951.99	\$ 95,065.34	\$ -	\$ -	\$ 3,423,307.85	\$ 33,288,190.23
	2046	37	\$ 1,736,279.24	\$ 69,451.17	\$ 390,015.40	\$ 249,680.37	\$ 722,067.59	\$ 1,361,763.36	\$ 4,811,080.55	\$ 96,966.64	\$ -	\$ -	\$ 3,546,283.83	\$ 36,834,474.06
	2047	38	\$ 1,415,715.02	\$ 56,628.60	\$ 390,015.40	\$ 254,673.98	\$ 736,508.94	\$ 1,381,198.32	\$ 4,955,412.96	\$ 98,905.98	\$ -	\$ -	\$ 3,673,120.62	\$ 40,507,594.68
	2048	39	\$ 1,082,328.22	\$ 43,293.13	\$ 390,015.40	\$ 259,767.46	\$ 751,239.12	\$ 1,401,021.98	\$ 5,104,075.35	\$ 100,884.10	\$ -	\$ -	\$ 3,803,937.47	\$ 44,311,532.15
	2049	40	\$ 735,605.95	\$ 29,424.24	\$ 390,015.40	\$ 264,962.81	\$ 766,263.91	\$ 1,421,242.11	\$ 5,257,197.61	\$ 102,901.78	\$ -	\$ -	\$ 3,938,857.28	\$ 48,250,389.43
	2050	41	\$ 375,014.79	\$ 15,000.59	\$ 390,015.40	\$ 270,262.07	\$ 781,589.18	\$ 1,441,866.65	\$ 5,414,913.54	\$ 104,959.81	\$ -	\$ -	\$ 4,078,006.71	\$ 52,328,396.14
	2051	41	\$ -	\$ -	\$ -	\$ 275,667.31	\$ 797,220.97	\$ 1,072,888.27	\$ 5,577,360.95	\$ 107,059.01	\$ -	\$ -	\$ 4,611,531.69	\$ 56,939,927.83

Notes:

- | | |
|---|--|
| 1. Base Station Repeater Installation Complete | 4. Upper Sunshine Hydropower Complete |
| 2. Lower Sunshine Hydropower, Upper Sunshine Diversion Structure Complete and Upper and Lower Sunshine Automation Completed | 5. Flow Monitoring Installation Complete |
| 3. Roach Gulch Hydropower Complete | 6. Upper Sunshine Canal Outfall Complete |

Table 9.8 Cash Flow Summary – All Projects Private Financing

PRIVATE FINANCING OPTION - SUMMARY OF ALL PROJECTS - CASH FLOW														
Note	Year	Year No.	Principal	Interest	Total Payment	Hydropower O&M Costs	General O&M Costs	Total Cost	Hydropower Revenue	Estimated O&M Savings - Upper Sunshine Diversion and Automation	General O&M Assessment Revenue	Project Related Assessment Revenue	Net Cashflow	Savings Balance
	2010	1	\$ 7,797,598.04	\$ 311,903.92	\$ 390,015.40	\$ -	\$ 353,974.25	\$ 743,989.65	\$ -	\$ -	\$ 353,973.75	\$ 480,096.00	\$ 90,080.10	\$ 572,080.10
1	2011	2	\$ 7,806,478.42	\$ 312,259.14	\$ 396,416.41	\$ -	\$ 361,053.74	\$ 757,470.14	\$ -	\$ 48,486.00	\$ 361,053.23	\$ 772,074.00	\$ 424,143.08	\$ 996,223.19
2	2012	3	\$ 17,550,698.43	\$ 911,220.37	\$ 1,307,679.27	\$ 42,448.00	\$ 368,274.81	\$ 1,718,402.08	\$ 744,968.20	\$ 49,455.72	\$ 368,274.29	\$ 847,323.00	\$ 291,619.13	\$ 1,287,842.31
	2013	4	\$ 17,154,239.53	\$ 888,864.93	\$ 1,307,679.27	\$ 43,296.96	\$ 375,640.31	\$ 1,726,616.54	\$ 767,317.25	\$ 50,444.83	\$ 375,639.78	\$ 847,323.00	\$ 314,108.32	\$ 1,601,950.63
3	2014	5	\$ 26,042,329.09	\$ 1,470,141.73	\$ 2,128,518.59	\$ 88,325.90	\$ 383,153.11	\$ 2,599,997.60	\$ 1,314,069.48	\$ 51,453.73	\$ 383,152.57	\$ 1,211,283.00	\$ 359,961.19	\$ 1,961,911.82
	2015	6	\$ 25,383,952.22	\$ 1,431,040.24	\$ 2,128,518.59	\$ 90,092.42	\$ 390,816.17	\$ 2,609,427.18	\$ 1,353,491.57	\$ 52,482.81	\$ 390,815.62	\$ 1,208,070.00	\$ 395,432.82	\$ 2,357,344.64
4	2016	7	\$ 35,640,991.69	\$ 2,101,588.53	\$ 3,168,395.63	\$ 137,841.27	\$ 398,632.50	\$ 3,704,869.39	\$ 1,982,101.48	\$ 53,532.46	\$ 398,631.94	\$ 1,458,900.00	\$ 188,296.49	\$ 2,545,641.13
5	2017	8	\$ 34,784,242.22	\$ 2,305,951.95	\$ 3,183,852.04	\$ 140,598.09	\$ 406,605.15	\$ 3,731,055.27	\$ 2,041,564.53	\$ 54,603.11	\$ 406,604.58	\$ 1,458,900.00	\$ 230,616.94	\$ 2,776,258.07
6	2018	9	\$ 34,074,992.91	\$ 2,252,918.15	\$ 3,196,261.65	\$ 143,410.05	\$ 414,737.25	\$ 3,754,408.96	\$ 2,102,811.47	\$ 55,695.17	\$ 305,288.16	\$ 1,458,900.00	\$ 168,285.84	\$ 2,944,543.91
	2019	10	\$ 33,131,649.41	\$ 2,188,670.80	\$ 3,196,261.65	\$ 146,278.25	\$ 423,032.00	\$ 3,765,571.90	\$ 2,165,895.81	\$ 56,809.08	\$ 311,393.92	\$ 1,458,900.00	\$ 227,426.90	\$ 3,171,970.81
	2020	11	\$ 32,124,058.56	\$ 2,119,865.04	\$ 3,196,261.65	\$ 149,203.82	\$ 431,492.64	\$ 3,776,958.11	\$ 2,230,872.68	\$ 57,945.26	\$ 269,375.11	\$ 1,458,900.00	\$ 240,134.95	\$ 3,412,105.75
	2021	12	\$ 31,047,661.94	\$ 2,046,169.38	\$ 3,196,261.65	\$ 152,187.90	\$ 440,122.49	\$ 3,788,572.04	\$ 2,297,798.86	\$ 59,104.16	\$ 271,752.63	\$ 1,338,876.00	\$ 178,959.62	\$ 3,591,065.37
	2022	13	\$ 29,897,569.67	\$ 2,187,606.52	\$ 3,196,261.65	\$ 155,231.65	\$ 448,924.94	\$ 3,800,418.25	\$ 2,366,732.83	\$ 60,286.25	\$ 148,761.54	\$ 1,338,876.00	\$ 114,238.37	\$ 3,705,303.74
	2023	14	\$ 28,888,914.54	\$ 2,111,652.64	\$ 3,196,261.65	\$ 158,336.29	\$ 457,903.44	\$ 3,812,501.38	\$ 2,437,734.81	\$ 61,491.97	\$ 126,151.87	\$ 1,202,112.00	\$ 14,989.28	\$ 3,720,293.02
	2024	15	\$ 27,804,305.52	\$ 2,029,633.95	\$ 3,196,261.65	\$ 161,503.01	\$ 467,061.51	\$ 3,824,826.17	\$ 2,510,866.86	\$ 62,721.81	\$ 128,674.91	\$ 1,172,106.00	\$ 49,543.41	\$ 3,769,836.43
	2025	16	\$ 26,637,677.82	\$ 1,941,050.60	\$ 3,196,261.65	\$ 164,733.07	\$ 476,402.74	\$ 3,837,397.46	\$ 2,586,192.87	\$ 63,976.25	\$ 131,248.41	\$ 1,142,100.00	\$ 86,120.06	\$ 3,855,956.48
	2026	17	\$ 25,382,466.77	\$ 1,845,360.86	\$ 3,196,261.65	\$ 168,027.73	\$ 485,930.79	\$ 3,850,220.18	\$ 2,663,778.65	\$ 65,255.77	\$ 133,873.38	\$ 1,061,928.00	\$ 74,615.62	\$ 3,930,572.10
	2027	18	\$ 24,031,565.98	\$ 1,915,469.85	\$ 3,196,261.65	\$ 171,388.29	\$ 495,649.41	\$ 3,863,299.35	\$ 2,743,692.01	\$ 66,560.89	\$ 136,550.84	\$ 1,061,928.00	\$ 145,432.39	\$ 4,076,004.50
	2028	19	\$ 22,750,774.17	\$ 1,808,340.37	\$ 3,196,261.65	\$ 174,816.05	\$ 505,562.39	\$ 3,876,640.10	\$ 2,826,002.77	\$ 67,892.11	\$ 139,281.86	\$ 981,756.00	\$ 138,292.63	\$ 4,214,297.13
	2029	20	\$ 21,362,852.89	\$ 1,691,615.42	\$ 3,196,261.65	\$ 178,312.38	\$ 515,673.64	\$ 3,890,247.67	\$ 2,910,782.85	\$ 69,249.95	\$ 142,067.50	\$ 951,750.00	\$ 183,602.63	\$ 4,397,899.76
	2030	21	\$ 19,858,206.65	\$ 1,564,406.70	\$ 3,196,261.65	\$ 181,878.62	\$ 525,987.12	\$ 3,904,127.39	\$ 2,998,106.34	\$ 70,634.95	\$ 144,908.85	\$ 871,578.00	\$ 181,100.74	\$ 4,579,000.50
	2031	22	\$ 18,226,351.70	\$ 1,425,742.47	\$ 3,189,860.64	\$ 185,516.19	\$ 536,506.86	\$ 3,911,883.69	\$ 3,088,049.53	\$ 72,047.65	\$ 147,807.02	\$ 871,578.00	\$ 267,598.51	\$ 4,846,599.00
	2032	23	\$ 16,462,233.53	\$ 1,386,874.98	\$ 2,278,597.78	\$ 189,226.52	\$ 547,236.99	\$ 3,015,061.29	\$ 3,180,691.02	\$ 73,488.60	\$ 150,763.16	\$ 811,566.00	\$ 1,201,447.49	\$ 6,048,046.49
	2033	24	\$ 15,570,510.73	\$ 1,306,739.99	\$ 2,278,597.78	\$ 193,011.05	\$ 558,181.73	\$ 3,029,790.56	\$ 3,276,111.75	\$ 74,958.37	\$ 153,778.43	\$ 761,400.00	\$ 1,236,457.98	\$ 7,284,504.47
	2034	25	\$ 14,598,652.94	\$ 1,218,730.67	\$ 2,278,597.78	\$ 196,871.27	\$ 569,345.37	\$ 3,044,814.42	\$ 3,374,395.10	\$ 76,457.54	\$ 156,854.00	\$ 681,228.00	\$ 1,244,120.22	\$ 8,528,624.69
	2035	26	\$ 13,538,785.83	\$ 1,122,041.80	\$ 2,278,597.78	\$ 200,808.70	\$ 580,732.28	\$ 3,060,138.75	\$ 3,475,626.95	\$ 77,986.69	\$ 159,991.08	\$ 601,056.00	\$ 1,254,521.97	\$ 9,783,146.66
	2036	27	\$ 12,382,229.86	\$ 1,015,784.49	\$ 2,278,597.78	\$ 204,824.87	\$ 592,346.92	\$ 3,075,769.57	\$ 3,579,895.76	\$ 79,546.42	\$ 163,190.90	\$ 520,884.00	\$ 1,267,747.51	\$ 11,050,894.17
	2037	28	\$ 11,119,416.57	\$ 968,854.44	\$ 2,263,141.37	\$ 208,921.37	\$ 604,193.86	\$ 3,076,256.60	\$ 3,687,292.63	\$ 81,137.35	\$ 166,454.72	\$ 440,712.00	\$ 1,299,340.10	\$ 12,350,234.27
	2038	29	\$ 9,825,129.64	\$ 837,798.18	\$ 2,250,731.75	\$ 213,099.79	\$ 616,277.74	\$ 3,080,109.28	\$ 3,797,911.41	\$ 82,760.10	\$ 169,783.81	\$ 440,712.00	\$ 1,411,058.04	\$ 13,761,292.31
	2039	30	\$ 8,412,196.07	\$ 692,878.30	\$ 2,250,731.75	\$ 217,361.79	\$ 628,603.29	\$ 3,096,696.83	\$ 3,911,848.75	\$ 84,415.30	\$ 173,179.49	\$ 380,700.00	\$ 1,453,446.71	\$ 15,214,739.01
	2040	31	\$ 6,854,342.62	\$ 531,995.34	\$ 2,250,731.75	\$ 221,709.03	\$ 641,175.36	\$ 3,113,616.14	\$ 4,029,204.22	\$ 86,103.61	\$ 176,643.08	\$ 300,528.00	\$ 1,478,862.76	\$ 16,693,601.78
	2041	32	\$ 5,135,606.21	\$ 353,341.65	\$ 1,210,854.71	\$ 226,143.21	\$ 653,998.87	\$ 2,090,996.78	\$ 4,150,080.34	\$ 87,825.68	\$ 180,175.94	\$ 120,024.00	\$ 2,447,109.18	\$ 19,140,710.95
	2042	33	\$ 4,278,093.14	\$ 288,270.67	\$ 1,210,854.71	\$ 230,666.07	\$ 667,078.84	\$ 2,108,599.62	\$ 4,274,582.75	\$ 89,582.19	\$ 183,779.46	\$ 90,018.00	\$ 2,529,362.78	\$ 21,670,073.73
	2043	34	\$ 3,355,509.10	\$ 196,239.33	\$ 1,210,854.71	\$ 235,279.39	\$ 680,420.42	\$ 2,126,554.52	\$ 4,402,820.24	\$ 91,373.84	\$ 187,455.05	\$ 90,018.00	\$ 2,645,112.59	\$ 24,315,186.32
	2044	35	\$ 2,340,893.73	\$ 93,635.75	\$ 390,015.40	\$ 239,984.98	\$ 694,028.83	\$ 1,324,029.21	\$ 4,534,904.84	\$ 93,201.31	\$ -	\$ -	\$ 3,304,076.95	\$ 27,619,263.27
	2045	36	\$ 2,044,514.08	\$ 81,780.56	\$ 390,015.40	\$ 244,784.68	\$ 707,909.40	\$ 1,342,709.48	\$ 4,670,951.99	\$ 95,065.34	\$ -	\$ -	\$ 3,423,307.85	\$ 31,042,571.12
	2046	37	\$ 1,736,279.24	\$ 69,451.17	\$ 390,015.40	\$ 249,680.37	\$ 722,067.59	\$ 1,361,763.36	\$ 4,811,080.55	\$ 96,966.64	\$ -	\$ -	\$ 3,546,283.83	\$ 34,588,854.95
	2047	38	\$ 1,415,715.02	\$ 56,628.60	\$ 390,015.40	\$ 254,673.98	\$ 736,508.94	\$ 1,381,198.32	\$ 4,955,412.96	\$ 98,905.98	\$ -	\$ -	\$ 3,673,120.62	\$ 38,261,975.57
	2048	39	\$ 1,082,328.22	\$ 43,293.13	\$ 390,015.40	\$ 259,767.46	\$ 751,239.12	\$ 1,401,021.98	\$ 5,104,075.35	\$ 100,884.10	\$ -	\$ -	\$ 3,803,937.47	\$ 42,065,913.04
	2049	40	\$ 735,605.95	\$ 29,424.24	\$ 390,015.40	\$ 264,962.81	\$ 766,263.91	\$ 1,421,242.11	\$ 5,257,197.61	\$ 102,901.78	\$ -	\$ -	\$ 3,938,857.28	\$ 46,004,770.32
	2050	41	\$ 375,014.79	\$ 15,000.59	\$ 390,015.40	\$ 270,262.07	\$ 781,589.18	\$ 1,441,866.65	\$ 5,414,913.54	\$ 104,959.81	\$ -	\$ -	\$ 4,078,006.71	\$ 50,082,777.03
	2051	41	\$ -	\$ -	\$ -	\$ 275,667.31	\$ 797,220.97	\$ 1,072,888.27	\$ 5,577,360.95	\$ 107,059.01	\$ -	\$ -	\$ 4,611,531.69	\$ 54,694,308.72

Notes:

- | | |
|---|--|
| 1. Base Station Repeater Installation Complete | 4. Upper Sunshine Hydropower Complete |
| 2. Lower Sunshine Hydropower, Upper Sunshine Diversion Structure Complete and Upper and Lower Sunshine Automation Completed | 5. Flow Monitoring Installation Complete |
| 3. Roach Gulch Hydropower Complete | 6. Upper Sunshine Canal Outfall Complete |

10 Summary

The GVID Rehabilitation and GIS, Level II Study resulted in a combination of products and conclusions for consideration by the District and the WWDC.

- A Geographic Information System (GIS) consisting of two distinct parts was created for use by the District. These parts were: Storage and Delivery System mapping and Water Share mapping.
- The GIS includes a variety of base mapping, such as USGS Quadrangles, aerial photography from various years obtained by SCE, or other maps provided by the District and geo-referenced by SCE.
- An interface tool was provided to facilitate use of the GIS.
- Map Books were provided for use by the District.
- A flow monitoring plan suitable for determining conveyance losses was proposed. Several irrigation seasons of data will be necessary to calculate the conveyance loss.
- Conceptual designs and cost estimates were prepared for each project reviewed as part of this study.
- The replacement/rehabilitation of structures was prioritized based on their relative condition.
- The District's budgets and project list were reviewed and summarized.

The District's ongoing hydropower and rehabilitation projects are feasible. It is anticipated that within a few years the projects will become self sufficient and energy revenues will become large enough to service the debt on all of the proposed projects, fund O&M budgets and provide excess income to the District for future projects.

Sage
CIVIL ENGINEERING