

COVER PAGE

Final Scientific/Technical Report for DOE/EERE

Award Number: DE-FC36-06GO86093.007

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Submitted by

Tom Ammons

OCT. 30 2015

Final Scientific/Technical Report for DOE/EERE

1.

Award Number: DE-FC36-06GO86093.007
Recipient: Brigham City Corporation
20 N Main
Brigham City, UT 84302
Project Title: Brigham City Hydro Generation Project

Project Director: Dave Burnett dburnett@brighamcity.utah.gov
Business Officer: Tom Ammons tammons@brighamcity.utah.gov
Working Partners: Derek Anderson P.E. Sunrise Engineering
danderson@dunrise-eng.com
John Sevey P.E. Sunrise Engineering
jsevey@dunrise-eng.com
Scott Archibald P.E. Sunrise Engineering
sarchibald@sunrise-eng.com
Brett Bauer Canyon Industries Inc.
brett.bauer@canyonhydro.com
Fred Hoff Caribou Construction
fred@caribouinc.com

2.

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3.

Brigham City owns and operates its own municipal power system which currently includes several hydroelectric facilities. This project was to update the efficiency and capacity of current

hydro production due to increased water flow demands that could pass through existing generation facilities.

During 2006-2012, this project completed efficiency evaluation as it related to its main objective by completing a feasibility study, undergoing necessary City Council approvals and required federal environmental reviews.

As a result of Phase 1 of the project, a feasibility study was conducted to determine feasibility of hydro and solar portions of the original proposal. The results indicated that the existing Hydro plant which was constructed in the 1960's was running at approximately 77% efficiency or less. Brigham City proposes that the efficiency calculations be refined to determine the economic feasibility of improving or replacing the existing equipment with new high efficiency equipment design specifically for the site.

Brigham City completed the Feasibility Assessment of this project, and determined that the Upper Hydro that supplies the main culinary water to the city was feasible to continue with. Brigham City Council provided their approval of feasibility assessment's results.

4.

The Upper Hydroelectric Power Plant (UHPP) is located 0.5 miles east of Brigham City at the intersection of Highway 90 and Highway 91. The existing hydro-turbine and generator are located approximately 100 yards north of Box Elder Creek. The site is surrounded by gravel pits and open space. The UHPP was constructed in the 1960's and currently operates at maximum capacity and full turbine speeds. Recently, Brigham City entered into a contract to provide the new Proctor and Gamble plant with an additional four million gallons of water per day. A portion of this new potable water supply will pass through the UHPP.

The Upper Hydro Project included removal of the existing powerhouse equipment and controls and demolition of a section of concrete encased penstock, replacement of penstock just upstream of the turbine inlet, turbine bypass, turbine shut-off and bypass valves, turbine and generator package, control equipment, assembly, start-up, commissioning, Supervisory Control And Data Acquisition (SCADA), and the replacement of a section of conductors to the step-up transformer. Brigham City is looking to increase the existing 575 KW turbine and generator with a 825 kW turbine that would be most efficient with the new increased flow of culinary water through our system determined by the new engineer design for that site.

5.

It was determined that there is a need for increased power generation. Brigham City Corporation has subsequently entered into a contract to provide the new Proctor and Gamble plant with up to 4.0 MGD of new water supply. A portion of this new supply may need to come from the Mantua Valley water supply and pass through the Upper Hydro Plant facility. Currently, this facility operates at maximum capacity and high turbine speeds. Brigham City recommends that an additional evaluation is completed to look at the potential need for increased water flow and the potential of increasing power generation from this increased flow. If additional power

generation is not provided, the increased flows will need to be “by passed” through the bypass structure and all increased power generation will be lost.

Following the results of the feasibility assessment Brigham City pursued required environmental reviews with the DOE and the U.S. Fish and Wildlife Services (USFWS) concurring with the National Environmental Policy Act of 1969 (NEPA) It was determined that Brigham City’s Upper Hydroelectric Power Plant upgrade would have no effect to federally listed or candidate species. However Brigham City has contributed a onetime lump sum towards Bonneville cutthroat trout conservation in the Northern Bonneville Geographic Management Unit with the intention to offset any impacts from the Upper Hydro Project needed to move forward with design and construction and is sufficient for NEPA compliance.

No work was done in the river or river bank. During construction, the penstock was disconnected and water was diverted through an existing system around the powerhouse and back into the water system. The penstock, which is currently a 30-inch steel pipe, would be removed and replaced with a new section of 30-inch pipe.

Brigham City worked with the DOE and was awarded a new modification and the permission to proceed with Phase III of our Hydro Project in Dec. 2013; with the exception to the modification of the award for the construction phase.

Brigham City developed and issued a Request for Proposal for Engineer and Design vendor. Sunrise Engineering was selected for the Design and throughout the Construction Phase of the Upper Hydroelectric Power Plant. Brigham City conducted a Kickoff Meeting with Sunrise June 28, 2013 and received a Scope of Work

Brigham City along with engineering firm sent out a RFP for Turbine, Generator and Equipment for Upper Hydro. We select Turbine/Generator Equipment from Canyon Industries located in Deming, WA.

DOE awarded Brigham City a new modification and the permission to proceed with Phase III Construction of our Hydro Project.

Brigham City Crews removed existing turbine/generator and old equipment along with feeder wires coming into the building basically giving Caribou Construction an empty shell to begin demolition.

Brigham City contracted with Caribou Construction from Jerome, Idaho for the Upper Power Plant construction. A kickoff meeting was June 24, 2014 and demolition was immediately started on building. Because of a delivery delay of Turbine, Generator and Equipment from Canyon Brigham City had to request another extension for the final date of completion. DOE awarded modification (.007) to Brigham City with a new completion date of August 1, 2015.

The Turbine has had a few adjustments to help with efficiency; but the Generator had a slight vibration when generator got hot so Canyon Industries had U S Motor’s that manufactured the generator come to check out the issue. The other Equipment seems to be running normal.

Brigham City, Sunrise Engineering and Canyon Industries met to determine what the vibration in the generator was and how to solve the issue

Us Motor's found some welds that failed: they have been repaired. U S Motor's delivered the repaired generator Feb. 17, 2015. Canyon Industries arranged for a crane to installed generator in Power Plant. U S Motor's balanced and wired generator. Plant Operators put the generator back on line. Canyon Industries returned and gave their approval to keep Hydro online.

After Hydro was put back into operations it kept going off line because of overheating issues. Canyon Industries returned and replaced sensors and adjusted them to the proper settings for normal operations. Brigham City added additional steel screens to windows to increase air flow in Power Plant Building.

After construction phase of the Upper Hydro Plant some landscaping has been restored around the building additional gravel brought in and leveled out and the road that was cut through for conduits to run wires. A retaining wall was installed to protect penstock.

The Upper Hydro Plant is complete and in full operations. The final reimbursement was submitted.

6.

- a. The project was briefly mentioned in the Brigham City Mayor's State of the City Address at a City Counsel. Attached at the end of document.
- b. None; we are planning to put the results of this project on the Brigham City Web Page to go along with an open house to showcase the New Hydro. We have pictures attached at the end of document.
- c. In compliance with NEPA we made a onetime contribution of \$21,000.00 to Trout Unlimited towards Bonneville cutthroat trout to offset this project. Commitment letter attached at the end of document.
- d. None
- e. None
- f. None

7.

None; the project did not involve any computer modeling,

**REGULAR SESSION OF THE
BRIGHAM CITY COUNCIL
February 5, 2015**

PRESENT:	Tyler Vincent DJ Bott Ruth Jensen Tom Peterson Mark Thompson	Mayor Councilmember Councilmember Councilmember Councilmember
ALSO PRESENT:	Joseph Bach Rick Bosworth Mark Bradley Dave Burnett Mary Kate Christensen Nancy Green Jared Johnson Paul Larsen Kristy Law Bruce Leonard Mike Nelsen Derek Oyler Tyler Pugsley Jason Roberts	Fire Chief Human Resource Manager City Planner Public Power Director City Recorder Senior Center Director Community Development Director Economic Development Director Community Activities & Services Manager City Administrator Police Chief EMS Director Public Works Director Finance Director
EXCUSED:	Alden Farr	Councilmember

Mayor Vincent called the meeting to order. The Reverence Period was given by Pastor Laura Stellmon from the Community Presbyterian Church. The Pledge of Allegiance was recited.

Approval of Minutes: A motion to approve the minutes of the January 15, 2015 Council meeting and January 22, 2015 Special Meeting was made by Councilmember Bott, seconded by Councilmember Jensen. Councilmember Peterson noted a correction in the January 22nd meeting, "3-way exposure" should read "freeway exposure." The minutes were unanimously approved as corrected.

AGENDA

**MAYOR'S STATE OF THE CITY
PUBLIC COMMENT
COUNCILMEMBER COMMENTS
CONSENT**

Request to Schedule Work Session for March 5, 2015 at 6:00 PM to Discuss Green Waste Facility and Recycling
Appointment of Citizen Corps Council Coordinator

PUBLIC HEARING

Environmental Study for 1100 West 1100 South Intersection

SCHEDULED DELEGATION

Presentation by the Brigham-Tremonton Board of Realtors
Request for Facade Grant for 112 N. Main Subject to Funds Being Approved in the 2015-16 Budget
Golf Course Annual Report

PLANNING COMMISSION

Request for Approval of Ordinance Amending Title 29.13, Protection of Residential Property to Modify Fencing and Wall Requirements Between Districts/Uses

MAYOR'S STATE OF THE CITY

The following is a verbatim transcript of the Mayor's State of the City address.

"It is my great opportunity to stand tonight and address the state of our City. I'd like to thank Sharon Brailsford and Bruce Leonard and Paul Larsen and our staff for the help they have given me to prepare this talk. I could not have done it without them.

"As I pondered in December about the last year I had many emotions run through my mind. What I mean by this is we had some big hurdles to get over - smart meters, the hotel, the USU building, etc. We had some great accomplishments that made it all worthwhile. The hotel was completed, started implementing smart meters, received funding from the State of Utah to get the Utah State building started, the Academy Building and restaurant are in process, and the Main Street corridor is growing and looking prosperous from north to south.

"I'm grateful for the opportunity to serve as the Mayor of Brigham City. Thank you for the trust you placed in myself and our City Council. I love Brigham City; it is my home and when people ask me where I'm from I'm extremely proud to say Brigham City.

"The Mayor and City Council are working together in the best interest of the community. I've placed high priority on uniting our elected officials and improving employee morale. We've made a lot of progress. We want the City to grow and prosper for future generations to come.

"There are those who think of the City as a nameless face of bureaucracy. In reality, the City is all of us - the residents, the Mayor, the City Council, the volunteers and the employees that make it all function. The City is a very complex organization and few of us realize all the things it takes to make life better for us. The departments have spent many years building a more effective operation in which they have worked together to meet the City's needs.

"City Services - As you can see the City has a lot of infrastructure and facilities that are important in fulfilling this mission. These assets have come about through many years of wise investment on the part of the City, right back to its beginning. Can you imagine what your life would be like if these assets disappeared? Brigham City would not be a very nice place to live.

"One of the City's goals is responsive government. We had a recent incident that showed how responsive government works. A few weeks ago we had a major waterline break on Main Street. This leak caused a sink hole that was six feet deep and 50 feet across. During the break we lost between 4,700 and 5,200 gallons of water per minute. The break spilled approximately 900,000 gallons of water. We usually take for granted when we turn the water tap on we get water. In Brigham City that is true because of the investment we've made in infrastructure in many years. It is also due to great employees who keep these systems functioning. It is because of them most of us rarely know there is a problem. This is true of all the departments in our City. When we had this water break we had an employee who had bronchitis and had been to the doctor and got a prescription and gone home to rest and try to get feeling better. When this waterline broke he assisted all night even though he was sick. That is one of the things that is very impressive to me is the dedication our employees have for us as citizens and that our infrastructure continues to work and go forward. Our

employees make our City work. They are our greatest asset. Without them none of the other assets would matter.

“During 2014 I called a ‘time out’ to better organize the City Corps Council. This process is complete and the new coordinator is in place. He is with us tonight, Kenny Kawa. We appreciate Kenny being willing to come and serve in this very important position. The coordinator will serve as the hub for the Citizen Corps Council; the spokes are the Volunteers in Police Service (VIPS) and the Community Emergency Response Team (CERT).

“Main Street - One of our priorities for economic development is Main Street. If you watched the Super Bowl last week you saw our beautiful Main Street was highlighted in an advertisement. It is an icon throughout the state. One of my favorite things is when I come through town and go under that beautiful arch. Without a healthy and vibrant Main Street our community would decay. As we work on development of the 1100 South corridor, we need to make sure that we don’t abandon the heart of our City. We will have the opportunity during 2015 to work with one of the premier experts in downtown revitalization.

“Downtown Revitalization - The Academy building is on track for completion in early summer of this year. We are receiving an increasing number of inquiries about availability of the building for wedding receptions, professional conferences and meetings, and other events.

“Last year at this time we were breaking ground on the new Hampton Inn Hotel. During 2014, we saw the building completed and on January 23, we had the ribbon cutting for this new facility. The Hampton Inn will introduce a new element to the business market for downtown, drawing thousands of patrons on an annual basis. The property and room taxes from the Hampton Inn, along with ongoing infusions of private donations, will allow the City to complete the Academy building project, which has long been a goal of the City and County. We have received a report that Brigham City’s room tax for January of this year was 58% higher than January of 2014.

“With the LDS Temple, the Hampton Inn, and the Academy Building, downtown will become a much more vibrant and active place with many new opportunities for business growth and development.

“On Tuesday night I came back to the office and as I came by the hotel I noticed there was a great number of cars, so I went in and asked the lady at the front desk how many people were staying with them on Tuesday night and she commented that they had 28 rooms filled Tuesday. Then she got a big smile on her face and I said what’s that smile about? She said last night we had 48 rooms filled. We’re seeing that this hotel is being filled on a nightly basis. So we are excited about that and the important part that will play in our revitalization for our downtown.

“Research has shown that 70% of first time retail sales are based on curb appeal of the business. The appearance of our Main Street and the businesses located there is important to our success in revitalization. The Main Street façade grant was instituted in 1992. Since that time, the City has issued 26 grants and invested nearly \$210,000 into façade improvements on Main Street. These grants have leveraged approximately \$466,000 of investments by the businesses that received the grants. This program has been very successful in helping building owners improve the appearance of their buildings. The façade grant program has become so popular that there is more demand for grant funding than there is funding available.

"Tourism" - Tourism accounted for \$7.4 billion in in-state spending in 2012. Tourism can become a powerful economic engine for downtown Brigham City. We will be participating with the Utah Office of Tourism and Box Elder County in the State's "Rourism" initiative which is intended to increase tourism in rural counties. Bird watching ranks high in the amount of visitor spending for recreational activities. The Bear River Migratory Bird Refuge is right on our doorstep. As one of the top ten bird watching destinations in the United States, the Refuge has the potential to become an even larger and more important tourism destination than it is, and our community can benefit economically from this. Roger Brooks, an internationally recognized expert in downtown revitalization and tourism, will be working with the State on the Rourism project, and will be working directly with Brigham City to identify strategies to increase tourism business in our area, including downtown revitalization.

"Improving Economy" - Brigham City has great businesses. Businesses large and small are reporting significant improvements in their businesses and the economy during 2014, and a continued upward trend in 2015. The lines on the graph represent unemployment rates between 1996 and today. Box Elder County's unemployment rate peaked at 9.6% in November of 2010. Unemployment has declined since 2010 to 3.6% in December 2014. It's great to see that our economy is coming back and that we are doing better.

"The Mayor and the City Council are very much aware that the City operates from public funds. The City is in good financial condition. Our fund balance is a major indicator of financial health, and it is as high as the State allows it to be. That is a very positive sign. We are using our resources to improve the assets of the City in order to maintain our financial health. We also continue to look for ways to make better use of our resources.

"There is good news coming out of UTOPIA. UTOPIA's condition continues to improve. Revenues are increasing and operating losses are decreasing. The RUS settlement will be used to increase the amount of revenue coming into UTOPIA.

"Leakage analysis has identified approximately \$48 million per year in retail sales that go to other markets. These sales go to businesses in other markets such as Ogden, Logan, and Salt Lake. We are seeing increasing commercial development, which will begin to capture some of this retail leakage, but there is much room for improvement.

"Utah State University Brigham City Regional Campus" - Higher education is critical to Brigham City's future economic development. We were successful in 2014 in securing the funding to move forward with the USU Brigham City Regional Campus. The first building in the campus is under construction, and classes should begin there in January of 2016.

"Airport" - One of the responsibilities the City has with the airport is snow removal. The City received an airport snow removal equipment grant to obtain a ten wheeler truck with a 17.5 foot plow to aid us in our airport snow removal operations. Prior to acquisition of this equipment, it took our crews approximately eight hours to clear the airport of snow. With this new equipment, that time has been cut in half, providing significant cost savings and operational improvements. A building is now under construction that will house this equipment and help protect our investment.

"Transportation" - The 1100 South interchange on I-15 was completed in 2014. This project has dramatically improved the function of this interchange. Brigham City and the southern part of Box Elder County are part of the Wasatch Front Regional Council. We have participated with

Wasatch Front Regional Council to include important transportation projects in the Small Area Plan that will guide their investment for the next several years. The 1100 West interchange has been funded by Wasatch Regional Council and we have applied for additional funding from this source.

“Water - Brigham City leaders made decisions many decades ago, followed by ongoing investments and improvements, that are helping us deal with drought conditions today. In the past our elected officials have been very proactive with water development and we hope that trend continues. Last year, the Canyon View well was under construction. It is now complete, and is in service. When in use, it is projected to produce up to 3,000 gallons per minute, or four million gallons per day, of high quality water. This well alone could serve a population of 30,000 if only used for household use.

“Waste Management - The green waste recycling program has been highly successful and very popular. We have seen increases in utilization of this service. Due to the demand and cost of the service, we are implementing some management changes that will help ensure that this service continues to improve. The City is working with Western Metals to analyze materials from the old City landfill at the Forest Street/I-15 interchange. If feasible, Western Metals will mine the metals in the landfill, and the site will be rehabilitated into a very attractive commercial site with freeway visibility.

“100 East Storm Drain and Resurfacing - The City completed the 100 East storm drain and resurfacing project in 2014. This project had been in the City’s plans for a number of years, but we decided to coordinate the project with the construction of the Hampton Inn hotel. By doing this, we saved money and headaches. We utilized the existing asphalt on the 100 East resurfacing project, reduced the crown on the street, and maintained the historic character of the street with the high back curb that is typical of this street.

Housing - Housing continues to be built in Brigham City. This includes housing in Kotter Canyon, in the Eagle Crest project, and other infill lots throughout the City. We anticipate this trend to continue, with new projects anticipated to come online in 2015. As you can see, our City is in great financial shape. Our quality of life continues to be improved. As I said before, Brigham City is all of us.

“Electricity - We are currently dependent on Rocky Mountain Power for much of our wholesale power purchases. We were unable to reach an agreement with Rocky Mountain Power on an acceptable rate increase for wholesale power. It is our intent to move forward with a transition from Rocky Mountain Power to UAMPS as our wholesale provider. I am proposing that we explore a natural gas generation plant to operate during peak usage periods. These actions will bring us more stable rates for the long run.

“Our electrical staff was also able to re-purpose a Department of Energy grant to purchase the new generator, which is much more efficient than the previous generator. We began implementation of AML or ‘smart meter’ conversion. The Mayor and City Councilmembers were among the first to have these meters installed. This project is going very well.

Parks and Recreation - Quality of life is important to our residents, and the availability of parks and recreation programs for children and adults is part of that. Pickleball has taken Brigham City by storm. We now have five public locations in Brigham City with pickleball courts. This includes the complex at Pioneer Park, with eight courts. We are currently being

considered as a location for a tournament that would make Brigham City an even more attractive destination for pickleball fans.

"Our sports complex continues to take shape. In 2014 there were approximately 300 competitive games played on the four fields that have been completed. A restroom and bowery complex was completed. These structures will make the sports complex more attractive to users.

"Brigham City is Me - As you can see, our City is in great financial shape. Our quality of life continues to be improved. As I said before, Brigham City is all of us. Our City Administrator has worked closely with our directors to identify this year's City-wide goal, which is 'Brigham City is Me - it's my city, it's my responsibility, it's my legacy.'

"As I said before, I am very grateful to serve as the Mayor of Brigham City and I'm grateful for the trust you place in me. I want to let you know that every decision we make, myself, City Council and staff, we spend a lot of time thinking through things, reviewing issues and going over things trying to make the best decision we can.

"I'm grateful for a wonderful staff to work with. Our Staff spend endless hours at their jobs and a lot are doing things at night that we don't even see them doing, but they are there and working hard and they have a lot of love for their City. They are very passionate about their job and where they work and making sure that the services they provide are there for all of us. They do a great job and we appreciate our employees. All their hard work and the things they do make the City Council and Mayor shine. It is because of them. We appreciate all they do and all their efforts."

October 18, 2012

National Environmental Policy Act

U.S. Department of Energy

Golden Field Office

NEPA,

This letter is to affirm the commitment of Brigham City to contribute a onetime, lump sum contribution of \$21,000.00 towards Bonneville cutthroat trout (*Oncorhynchus clarkii utah*) conservation in the Northern Bonneville Geographic Management Unit (GMU). Because Bonneville cutthroat trout is a native species of conservation concern in both the project area and the surrounding watershed, Brigham City would like to be a partner in the species' recovery. Brigham City's intention is to offset impacts from the Upper Hydro Project located near Box Elder Creek at the mouth of Box Elder Canyon.

To accomplish a specific conservation action, Brigham City will transfer funds to Trout Unlimited to be applied to a conservation action in the Northern Bonneville GMU. Brigham City requests that the funds be used for the Weber River fish passage structure located near the mouth of Ogden Canyon, but understands that funds may be used for other projects (any projects receiving funds from their contribution must first approved by Brigham City). The Weber River fish passage structure is located near the mouth of Ogden Canyon at a major irrigation intake facility. Trout Unlimited has already installed a fish screen on the diversion and are in the process of rebuilding the fish passage structure. The Brigham City contribution will help finalize the fish passage work.

This contribution is expected to alleviate existing and future impacts to Bonneville cutthroat trout from the Upper Hydro Project and be considered in NEPA analysis. In relation to NEPA determinations, a Department of Energy award and Brigham City's environmental commitment, preliminary calculation of efficiency impacts of the existing Upper Hydro Plant on the culinary water system has been completed. The preliminary evaluation has indicated that the existing plant (constructed approximately 1954) is not running at an efficiency or output level which allows optimum use of the available water resource. Brigham City is proposing replacement of the existing equipment with new, high efficiency equipment designed specifically for the site. The proposed project will include removal of the existing turbine and control equipment and be replaced with a larger, updated unit, complete with SCADA capabilities.

Sincerely,

A handwritten signature in blue ink, appearing to read "Dave Burnett", with a stylized flourish at the end.

Dave Burnett

Director Brigham City Public Power







