WELBY JACOB WATER USERS COMPANY

Instruction Packet

Guide to obtain an Encroachment Agreement with the
Welby Jacob Water Users Company (WJWUC)

Revised 09/2023

Welby Jacob Water Users Company (WJWUC) has two canals, both starting near Camp Williams Military Base. The Welby Canal flows north and ends at approximately 8200 South Welby Park Drive in the City of West Jordan, Utah. The Jacob Canal flows south and ends in the City of Saratoga Springs, Utah. In most instances, WJWUC owns the canal corridor in fee for the Welby Canal. In some limited locations, the Welby Canal has a deeded easement or a prescriptive easement for the canal corridor. The Jacob Canal is mostly prescriptive easement.

This packet is intended to assist Applicants in working with WJWUC. All entities or persons proposing projects within the WJWUC corridor, or affecting WJWUC facilities, must obtain permission from WJWUC prior to performing work.

This permission is usually granted with an encroachment agreement. In an encroachment agreement, WJWUC grants permission for the Applicant to encroach on its real property interests. An encroachment agreement is a license, a conditioned right to encroach upon WJWUC lands, a collection of contractual rights and responsibilities. It is **not** an easement or other real property interest. An encroachment agreement, or other agreement, must be signed **before** the site preparation or construction begins. **Note: WJWUC does not accept stormwater or other discharge into their facilities.**

Hansen, Allen & Luce, Inc. (HAL) is the engineer for WJWUC. WJWUC and HAL is not responsible for design or construction of encroaching project facilities. WJWUC and HAL review project designs and applications in a brief fashion, for the purposes of protecting the operation and maintenance of the WJWUC facilities only. WJWUC's duties regarding an encroachment run only to its shareholders. HAL's duties run only to WJWUC. Once an encroachment agreement is executed, limited field review may be provided by HAL to observe that construction appears to be in accordance with the accepted design drawings and the encroachment agreement. The person or entity constructing an encroaching project, and their project engineers and contractors, maintain all responsibility for design and construction. No review or approval waives or modifies any encroachment agreement terms or gives WJWUC or HAL any responsibility for design or construction, to workers on site, or the public. It is the responsibility of the Applicant to provide WJWUC and HAL with accurate information so a reasonable determination can be made if the project will meet WJWUC standards and will not adversely affect WJWUC facilities.

This review process can be expedited by ensuring the first submittal to HAL meets WJWUC standards, following careful review of the checklist that is provided in this packet. The following is a guideline of the typical steps for the application, review, and encroachment agreement process, though projects may vary:

- HAL receives the **application**, **application fees**, and **drawings**. The review process will **not** begin until all of these items have been received. The application must be submitted with sufficient time to review the drawings, write/execute the agreement, and construct the facilities before April. HAL reserves the right to decline applications or delay construction if they (or WJWUC) believe the construction may interfere with the delivery of water.

- HAL will **review** the drawings. A meeting will be held as needed with HAL, WJWUC, and the Applicant to discuss the project. A redline comment letter will be sent to the Applicant with a checklist of items that must be addressed. The reviews will repeat as explained above until all items from the checklist have been addressed and plans are to WJWUC standards. This typically takes two reviews, but complex projects may take have a more extensive review process.
- An **encroachment agreement** will be prepared between the Applicant and WJWUC once all of the above mentioned items have been completed. An encroachment agreement is a legal document that details the responsibilities of the Applicant and WJWUC. A digital version of the unsigned agreement will be sent to the Applicant. This document is prepared by WJWUC's attorney. HAL has no control over the time frame of this step. However, it is typically three to four weeks after receiving drawings that meet WJWUC standards. **Please note:**
    - It is the responsibility of the Applicant to procure all signatures and distribute the signed agreements to the WJWUC president, HAL, and the Applicant.
    - The applicant shall print two copies of the agreement; both the Applicant and the WJWUC president must sign both copies to properly execute the agreement.
    - The applicant shall have one executed copy delivered by mail or other means to WJWUC and HAL, each; the final executed copy is for the applicant's records.
- Once the agreement has been executed by all parties, permission has been granted to the Applicant to begin the construction phase of the project, in accordance with the agreement.
- The Applicant is required to notify WJWUC and HAL at least 24 hours before beginning construction on WJWUC facilities.
- HAL and WJWUC may perform limited field review to observe that construction appears to be in accordance with the design drawings and the encroachment agreement. It is the responsibility of the Applicant to perform adequate construction review to ensure the facilities are constructed to WJWUC standards, and in accordance to their design drawings attached to the encroachment agreement.
- After construction is complete, the Applicant is required to schedule a **final walkthrough** that will be attended by HAL and WJWUC (at its option) to identify any final items that need to be completed before construction is accepted. A **punch list** will be prepared and sent to the Applicant listing items required.

The appropriate application can be obtained at www.hansenallenluce.com.

Enclosed in this packet are a copy of the application for a general crossing and the installation of a turnout. Also included is a checklist to assist the Applicant's engineer in designing the plans to WJWUC standards. This checklist is updated periodically, so downloading the most recent version of the packet for each new application is recommended. Any questions regarding the application process can be directed to Tyler Ashby at HAL. The office phone number is 801-566-5599.

WELBY JACOB WATER USERS COMPANY

Application for Encroachment Agreement
Instructions and Application for Encroachment Agreement
to Construct Within or Cross Canal Right-of-Way

**** Generally, the Applicant must be the governmental entity or utility that will eventually own, operate and maintain the encroaching project facilities. One common exception is a weir for delivery of Welby Jacob Water Users Company (WJWUC) water to its shareholders. ****

1. Applicant for Encroachment Agreement (Applicant): _____
   _____
   Mailing Address: _____
   Contact Person: _____
   Telephone Number: _____ Email: _____

2. Contact Person/Company Name: _____
   Mailing Address: _____
   Telephone Number: _____
   Email: _____

3. Engineering Company: _____
   Mailing Address: _____
   Telephone Number: _____
   Contact Person: _____
   Email: _____

4. Brief Description of Proposed Construction (include location): _____
   _____
   _____

5. Proposed Start and Completion Dates for Construction: _____

6. Attach two (2) printed 11x17 and one (1) digital PDF copies of plans/design drawings for the proposed construction. Plans shall be drawn to WJWUC standards. A Standards Checklist has been prepared to assist engineers in designing to WJWUC standards.

7. Application fees are listed below. For initial submittal, the fee below will begin the review process.

Application Type	Application Fee	Potential Refund Amount
Bridge or Box Culvert	$10,500	$2,500
Canal Parkway	$9,200	$1,500
Excavation of Canal	$9,200	$1,500
Large Bore (over 24 inches in diameter)	$8,200	$600
New Weir & Turnout	$8,200	None
Small Boring or Directional Drilling	$5,000	$600
Overhead Crossing	$5,000	$2,500
Use of Existing Conduit	$1,800	$600
Enclosure of Canal*	See Note Below	See Note Below

*Note: For applications of enclosures of the canal, a Final Engineer's Estimate of Probable Cost shall be submitted with the application. The **application fee** for enclosures of canal shall be 10% of the total cost of the Final Engineer's Estimate of Probable Cost for the enclosure of the canal, rounded to the nearest hundred dollars. The **potential refund amount** shall be 3% of the total cost of the Final Engineer's Estimate of Probable Cost for the enclosure of the canal, rounded to the nearest hundred dollars.

Application fees will be used by WJWUC for purposes of administration, coordination, engineer review, preparation of agreements, review during construction, legal guidance, and any other expenses it incurs related to this application. If fees incurred by WJWUC are greater than the application fee, the Applicant will be responsible to reimburse WJWUC for the remainder of the expenses. Any refund amount shown is refundable upon satisfactory and timely completion of the project, as determined by WJWUC. **Applicant must submit written request for refund at the end of the project.**

Please make all checks payable to: **Welby Jacob Water Users Company**.

8. Send application, plans, and application fee to:

   Hansen, Allen & Luce, Inc.
   Attn: Tyler Ashby
   859 W. South Jordan Pkwy.,
   Ste. 200
   South Jordan, UT 84095
   Telephone: (801) 566-5599

NOTE:

1. Starting construction without prior written approval from WJWUC may result in WJWUC assessing an additional fee of $5,000.
2. If application costs exceed the fees paid, the Applicant will be responsible to reimburse WJWUC within 30 days following receipt of an invoice.
3. The review process will not begin until the application fee is paid.
4. This application is valid for 6 months from the date it is submitted. The encroachment agreement must be signed within this 6-month period. Once the encroachment agreement is signed, the Applicant has 12 months to complete work of irrigation company facilities. A new application and fee must be submitted if these time frames are not met.
5. Other permits (i.e. city, county, etc.) are the responsibility of the Applicant.

Neither Hansen, Allen & Luce, Inc. nor WJWUC will have any responsibility for design or construction of the facilities related to this application.

I have read, understand, and agree to the terms of this application.

_____	_____	_____
Signature of Applicant	Printed	Date

WELBY JACOB WATER USERS COMPANY

APPLICATION FOR TURNOUT/WEIR

This document must be completed in conjunction with the Application for Encroachment Agreement when modifying or constructing a turnout and/or weir within the WJWUC Corridor.

NEW TURNOUT/WEIR

Number of Shares Being Moved to Proposed Turnout/Weir: _____

Owner(s) of Shares: _____

_____

Certificate Number(s): _____

MODIFYING EXISTING TURNOUT/WEIR

Number of Shares Remaining in Existing Turnout/Weir: _____

Owner(s) with Remaining Shares in Existing Turnout/Weir: _____

_____

Certificate Number(s): _____

SIGNATURE REQUIRED

The Applicant(s) acknowledge that the irrigation share(s) listed above are subject to additional assessments if the work is not completed to the satisfaction of the WJWUC.

_____	_____
(Signature)	(Signature)
_____	_____
(Title)	(Title)
_____	_____
(Date)	(Date)

WELBY JACOB WATER USERS COMPANY STANDARDS CHECKLIST

This checklist is intended to assist engineers in designing projects to Welby Jacob Water Users Company (WJWUC) standards. All projects seeking acceptance by WJWUC must be designed to these standards. When used correctly, this checklist will expedite the review and encroachment agreement process. Not all items on this checklist will be applicable to every project.

Neither WJWUC nor Hansen, Allen & Luce, Inc. (HAL) will have responsibility for design, construction, or maintenance of the Applicant's facilities. It is the responsibility of the Applicant and its engineer to design the project to WJWUC standards. No approval or acquiescence by WJWUC or HAL will operate as a waiver or modification of WJWUC standards.

In most instances, the Applicant will install, operate, maintain, inspect, repair, and replace the facilities that are constructed through the application process with no interruption of WJWUC delivery of water or operation, maintenance, repair or replacement of WJWUC facilities.

Note: This checklist is updated when standards are amended. Checking for the latest version of this checklist at www.hansenallenluce.com will ensure the most up-to-date information. Standard drawings and specifications are also available on the website. WJWUC reserves the right to make exceptions to the standards or impose other requirements, depending on the Applicant's project.

GENERAL INFORMATION AND REQUIREMENTS

- ☐ Submit an "Application for Encroachment Agreement" and all application fees.
- ☐ WJWUC maintains its irrigation facilities by burning weeds prior to each irrigation season and as needed. This should be considered while designing your project. WJWUC only accepts concrete structures or pipes to be installed in its easement so they will not be damaged due to maintenance.
    - WJWUC requests that the types of fencing installed adjacent to its property be fire-resistant. During maintenance of the canals it is possible that open flames will border the canal easement.
- ☐ Pipes, conduits, or other similar facilities are not allowed to be installed over the canal channel. Irrigation boxes, trees, or other facilities are not allowed to be installed in WJWUC corridors. Turnouts, overhead power lines, etc. can be exceptions.
- ☐ All drawings must be stamped, signed, and dated by a licensed professional engineer. This can be completed after the project meets WJWUC standards and is ready for the encroachment agreement.
- ☐ Before submitting drawings to HAL for review, please verify that all notes, references, and labels are correct and accurate.
- ☐ Neither WJWUC nor HAL can verify the locations of underground facilities. Blue Stakes should always be called before digging (1-800-662-4111).

ALL SUBMITTALS SHALL:

- ☐ Show the plan and profile view of the proposed facilities.
- ☐ Show all existing facilities in and around the project (i.e. canal O&M road, turnouts, pipes, box culverts, pipe outlets, etc.).
- ☐ Provide the location map, and if applicable, the plat map.
- ☐ Show the WJWUC canal corridor on the drawings, which is generally 16.5 feet on the uphill side and 33 feet on the downhill side, measured from the center of the canal (Standard Easement).
    - Applicant is responsible for checking surrounding property and labeling WJWUC corridor as owned by WJWUC or as an easement. If the land is owned, the actual ownership boundaries should be shown.

- ☐ Provide proposed dates for start and completion of construction. The start date should reflect adequate time to complete the application process and secure an encroachment agreement.

ADD THE FOLLOWING TO PLANS UNDER HEADING "WJWUC CANAL NOTES"

- ☐ Notification must be given at least 24 hours prior to the beginning of construction work and re-notification of re-commencement of work following any cessation of work for more than 4 (four) days. Call Tyler Ashby and the canal water master. Failure to do so may result in a $5,000 fine.
- ☐ Contact information for HAL and WJWUC:
    - Tyler Ashby, P.E., Hansen, Allen & Luce, 801-566-5599
    - Darryl Lehmitz, President, Welby Jacob Water Users Company, 801-718-3327
    - Bob Thomas, Water Master, **Welby Canal**, 801-205-5578

      OR
    - Clyde Rasmussen, Water Master, **Jacob Canal**, 801-830-5928
- ☐ Any changes in design drawings after the encroachment agreement has been executed must be reviewed and accepted by Hansen, Allen & Luce and Welby Jacob Water Users Company.
- ☐ Work cannot interfere with delivery of water. Construction within canal corridors that impacts the canal or operation & maintenance road (O&M road) must be completed between October 15 and April 1.
- ☐ All construction within the canal corridor must be completed to Welby Jacob Water Users Company standards.
- ☐ If disturbed, the canal O&M road shall be reinstalled following construction. O&M road must be available for use by canal personnel no later than April 1.
    - The O&M road shall be graded at a 2% slope away from the canal.
    - After placing and compacting native material, place a minimum of two inches of compacted roadbase on road surface. Compaction shall be 92% modified Proctor density.
- ☐ Stormwater runoff may enter the canal during storm events or at other unexpected times. It is the responsibility of the Contractor to protect the work site. Any damage to the canal corridor caused by construction activities will be the responsibility of the Contractor.

BORING

For the purpose of this application packet, boring refers to the installation of a casing under the canal without excavating the canal itself. Also see the "Directional Drilling/Boring" section to see if your project qualifies for that section.

- ☐ All facilities (utilities, pipes, etc.) installed under the canal (even under box culverts) must be encased in a steel, fusible HDPE, or fusible PVC casing. Minimum steel casing thickness can be found on the standard drawings. Minimum HDPE casing thickness shall be DR 32.5. Verification that the minimum thickness is sufficient is the responsibility of the Applicant.
- ☐ In locations where steel casing pipe is used, soil tests for resistivity shall be completed by the Applicant and at the Applicant's expense. Test results shall be submitted to HAL. Soils with a soil resistivity (ohm cm) of 2,500 or less shall have cathodic protection with a 25-year life or have cellular concrete placed in the annular space between the carrier pipe and casing pipe.
- ☐ Casings must have a minimum of two feet between the top of the casing and the bottom of the box culvert or concrete-lined canal, and four feet between the top of the casing and the earthen canal bottom. In areas with sand or cobbles, this distance may need to be increased. The actual safe depth is to be determined by the Applicant's engineer.
- ☐ The casing shall extend outside the canal corridor.
- ☐ Bore pits must be located outside the canal corridor.
- ☐ Bore pit compaction shall be 92% modified Proctor density.
- ☐ Trench plugs are to be placed at each end of the casing.
- ☐ Trench plugs are to extend the width of trench, 12 inches above and below casing pipes, and with a thickness of 24 inches.
- ☐ Trench plugs shall be 10% bentonite and 90% clay mixture. At least 40% of the backfill material must pass a No. 200 U.S. standard sieve prior to adding bentonite powder. The backfill material shall then be amended by adding and thoroughly mixing commercial bentonite powder with the backfill material at a ratio of one part bentonite to nine parts backfill material. Impermeable flowable fill is an acceptable alternative.
- ☐ The carrier pipe shall have adequate casing spacers.
- ☐ Waterline pipes inside the casings shall have restrained joints.
- ☐ Adequate thrust blocks are required on all bends for DIP, PVC or PIP waterlines.
- ☐ See the "Canal Boring Details" standard drawing for additional requirements.

Add the following notes to plans under heading "WJWUC Canal Notes"

- ☐ Contractor to notify Tyler Ashby of Hansen, Allen & Luce when trench plugs are installed. Verification of trench plug completion must be performed by Hansen, Allen & Luce before backfilling. Tyler can be reached at 801-566-5599.

DIRECTIONAL DRILLING/BORING

For the purpose of this application packet, directional drilling refers to the installation of a smaller casing for a utility (usually under six inches in diameter) installed by directional drilling.

- ☐ Label the conduit material and thickness. Verification that the conduit specifications are sufficient is the responsibility of the Applicant.
- ☐ Conduit must have a minimum of two feet between the top of the conduit and the bottom of the box culvert or concrete-lined canal, and four feet between the top of the conduit and the earthen canal bottom. In areas with sand or cobbles, this distance may need to be increased. The actual safe depth is to be determined by the Applicant's engineer.
- ☐ The conduit shall extend outside the canal corridor.
- ☐ Bore pits must be located outside the canal corridor.
- ☐ Fill bore pits with a mixture of native material and 10% bentonite powder to create a seal that will prevent water from following the new conduit.
- ☐ Bore pit compaction shall be 92% modified Proctor density.
- ☐ See the "Directional Drilling Details" standard drawing for additional requirements.

OCCUPYING EXISTING BLANK CONDUIT/CASING

This section is used when an existing blank conduit is in place under the canal and the Applicant wishes to occupy the conduit. It is common for conduits to be installed at the same time as a box culvert; however, the placement of these conduits does **not** give permission for the utility to be installed in the conduit. An application, drawings, and fee need to be submitted and an encroachment agreement signed before the conduit is occupied. Drawings from the original conduit placement can be used if the Applicant can provide them.

- ☐ Show the plan and profile view of the existing blank conduit.
- ☐ Specify the existing conduit material and thickness.
- ☐ Show or note the details of the utility to be installed in the blank conduit.
- ☐ Show where and how the conduit will be accessed to install the utility.
- ☐ Show the canal corridor.

OPEN CUT OF CANAL CHANNEL

- ☐ All facilities (utilities, pipes, etc.) installed under the canal must be encased in a steel, fusible HDPE, or fusible PVC casing. Minimum steel casing thickness can be found on the standard drawings. Minimum HDPE casing thickness shall be DR 32.5. Verification that the minimum thickness is sufficient is the responsibility of the Applicant.
- ☐ In locations where steel casing pipe is used, soil tests for resistivity shall be performed and submitted to HAL. Soils with a soil resistivity (ohm cm) of 2,500 or less shall have cathodic protection with a 25-year life or have cellular concrete placed in the annular space between the carrier pipe and casing pipe.
- ☐ Casings must have a minimum of two feet between the top of the casing and the bottom of the box culvert or concrete-lined canal, and four feet between the top of the casing and the earthen canal bottom. In areas with sand or cobbles, this distance may need to be increased. The actual safe depth is to be determined by the Applicant's engineer.
- ☐ The casing shall extend outside the canal corridor.
- ☐ Trench plugs are to be placed at each end of the casing.
- ☐ Trench plugs are to extend the width of trench, 12 inches above and below casing pipes, and with a thickness of 24 inches.
- ☐ Trench plugs shall be a 10% bentonite and 90% clay mixture. At least 40% of the backfill material must pass a No. 200 U.S. standard sieve prior to adding bentonite powder. The backfill material shall then be amended by adding and thoroughly mixing commercial bentonite powder with the backfill material at a ratio of one part bentonite to nine parts backfill material. Impermeable flowable fill is an acceptable alternative.
- ☐ The carrier pipe must have adequate casing spacers.
- ☐ Waterline pipes inside the casings shall have restraining joints.
- ☐ Adequate thrust blocks are required on all bends for DIP, PVC or PIP waterlines.
- ☐ Bedding material must be shown, as appropriate for the design.
- ☐ See the "Open-Cut Trench Cross-Section" standard drawing for additional requirements.

<u>Add the following notes to plans under heading "WJWUC Canal Notes" if canal is earthen</u>

- ☐ The canal floor and embankment material removed for excavation shall be replaced with a 12-inch minimum thickness of 10^{-6} cm/sec permeability clay material, in 6-inch maximum lifts.
- ☐ All replaced materials shall be compacted to 92% modified Proctor density.
- ☐ Canal embankment shall be shaped to match the existing canal prism.

- ☐ Compaction test results must be submitted to Hansen, Allen & Luce, Inc. (HAL). All failed material shall be removed and compacted to specifications. Testing must be performed by a licensed soils lab.
- ☐ Open-cut trenches shall be cut at a minimum of 2 horizontal to 1 vertical so that backfill can be properly compacted.
- ☐ Contractor to notify Tyler Ashby of Hansen, Allen & Luce when trench plugs are installed. Verification of trench plug completion must be performed by Hansen, Allen & Luce before backfilling. Tyler can be reached at 801-566-5599.

<u>Add the following notes to plans under heading "WJWUC Canal Notes" if canal is concrete-lined</u>

- ☐ The existing concrete section must be sawcut to give a clean edge for the replacement section.
- ☐ The trench through the canal may be cut as little as ¼ horizontal to 1 vertical to minimize the amount of concrete liner that needs to be removed. It is the responsibility of the Contractor to verify that compaction will not be affected.
- ☐ Embankment material shall be compacted to a minimum of 92% modified Proctor density. Native material may be used.
- ☐ Compaction test results must be submitted to HAL. All failed material shall be removed and compacted to specifications. Testing must be performed by a licensed soils lab.
- ☐ Canal embankment shall be shaped to match the existing canal prism.
- ☐ Rebar shall be a minimum of #4 bar at 12 inches on center.
- ☐ Contractor to notify Tyler Ashby of HAL when trench plugs are installed. Verification of trench plug completion must be performed by HAL before backfilling. Tyler can be reached at 801-566-5599.

BOX AND PIPE CULVERTS

- ☐ If extending an existing box culvert, WJWUC recommends that the Applicant perform a reasonable inspection of the existing culvert to make a determination of whether it should be replaced instead of extended.
- ☐ Applicant is responsible to verify that culvert design will not negatively impact the hydraulics of the canal, including other existing structures in the area.

- ☐ A plan view is required of the culvert showing the centerline of the canal, the top of banks, and the WJWUC corridor boundaries.
  - Show the elevation and location of the top of the banks, bottom of the banks, and the canal prism, as well as new structures including box culvert and wing walls.
  - Silt collects at the bottom of the canal. The invert of the culvert is to match the bottom of the canal, not the top of the current silt layer.
- ☐ Trench detail is required showing bedding, backfill material, and compaction requirements.
- ☐ The dimensions and type of culvert must be labeled.
- ☐ Label the culvert with loading information and rebar details. Loading shall be determined by the Applicant.
- ☐ The culvert wing walls should flare at a 30 to 45-degree angle then a 90-degree angle into the canal banks, a minimum of two feet perpendicular to the canal banks. Placement of the wing walls cannot interfere with the O&M road. The top of the wing walls shall be a minimum of 12 inches above the high-water mark in the canal.
- ☐ Wing walls shall be tied into the canal banks in a manner that provides a smooth transition from the canal into the culvert, and back out of the culvert on the outlet side.
- ☐ If using a pre-cast wing wall/end section, the wing walls, apron, and cutoff wall shall be one piece.
- ☐ If cast-in-place concrete is placed next to pre-cast concrete, Waterstop RX, Swellstop, or an approved equivalent, shall be placed to prevent seepage between the surfaces.
- ☐ PVC water stop, or equivalent, is required in all joints of cast-in-place concrete.
- ☐ If extending an existing box culvert, Waterstop RX, Swellstop, or an approved equivalent, shall be placed between the old culvert and the new culvert to prevent seepage. Mastic is not acceptable.
- ☐ A concrete apron shall be constructed between the wing walls.
- ☐ Concrete cut-off walls are required on the inlet and outlet, a minimum of two feet below the bottom of the concrete slab (apron). These cutoffs are required to extend into the banks to the ends of the wing walls.
- ☐ The structure must be able to handle the maximum flow capacity of the canal. The Applicant is responsible for verifying maximum flows and designing appropriately. The culvert cannot cause water to backup further upstream. Neither WJWUC nor HAL have flow data available for the canal. The typical minimum culvert size is 6 feet tall. However, site conditions may determine that this dimension be altered.

- ☐ Detail should show riprap, appropriately designed to protect the banks and structure:
  - Riprap sized for velocities.
  - Appropriate length and location for riprap. Riprap not generally required on inlet.
  - Riprap shall be placed up to the high-water mark in the canal.
  - Top of riprap to be level with top of concrete apron.
- ☐ State on the plans the backfill material and methods for filling and compacting around the box and wing walls. Backfill around the box culvert shall meet manufacturer's specifications for compaction and materials, or a minimum of 92% modified Proctor density.
- ☐ Place a minimum of 24 inches of clay material behind wing walls, compacted to a minimum of 92% modified Proctor density.
- ☐ All other backfill material around head walls and in open canal channel to be compacted to a minimum of 92% modified Proctor density.
- ☐ A 6-foot chain-link fence or 4-foot parapet wall is required on all box culverts that carry pedestrian traffic. Exceptions may occur where local ordinances require otherwise, and upon approval by WJWUC and HAL.
- ☐ Access to canal O&M road shall be installed with curb cuts at drive approaches and thickened concrete at sidewalks.
- ☐ Casings under the culvert must be shown on the plan and profile view (See "Open Cut of Canal Channel" for information on standards for casing installation).
- ☐ Identify existing conduits and utilities under the canal.
- ☐ Identify each new conduit being placed under the canal.
  - If the conduit owner/occupier is known, label as such.
  - If the conduit is to remain empty, label as such.
- ☐ See the "Box Culvert Details" standard drawing for additional requirements.

<u>Add the following notes to plans under heading "WJWUC Canal Notes"</u>

- ☐ All concrete used in the construction shall have a minimum compressive strength of 4,000 psi. The concrete mix shall include between 5% and 7% air entrainment.
- ☐ Canal floor and embankment material removed for excavation (between apron and undisturbed canal) shall be replaced with a 12-inch minimum thickness of 10^{-6} cm/sec permeability clay material in 6-inch maximum lifts.

- ☐ Compaction around the box culverts to meet manufacturer requirements or a minimum of 92% modified Proctor density.
- ☐ All materials placed in the canal corridor shall be compacted to 92% modified Proctor density.
- ☐ Canal embankment shall be shaped to match the existing canal prism.
- ☐ Compaction test results must be submitted to HAL. All failed material shall be removed and compacted to specifications. Testing must be performed by a licensed soils lab.
- ☐ Open-cut trenches shall be cut at a minimum of 2 horizontal to 1 vertical so that backfill can be properly compacted.
- ☐ Conduits shown on these drawings do not give permission for the conduit to be occupied by an entity other than the original Applicant. Each entity crossing the canal must apply for, and receive, an encroachment agreement from the Welby Jacob Water Users Company.
- ☐ Signs must be placed at each entrance to the canal O&M road that state:
    - No Trespassing. Warning: Canal Maintenance Road, Authorized Personnel Only. No Swimming or Tubing.

TURNOUT/WEIR

The turnout/weir structure being proposed shall at all times be subject to rights reserved by WJWUC to reasonably use, operate, maintain, inspect, repair, replace and improve the canal. The turnout/weir structure to be built by the Applicant pursuant to the encroachment agreement shall be the sole responsibility of the Applicant for purposes of ongoing maintenance and repair, but the canal shall continue to be used exclusively by WJWUC for its ongoing delivery of water to its shareholders. Any future repairs, excavation, removal or other work on the turnout/weir structure shall be subject to advanced review and approval by WJWUC engineers.

- ☐ Submit an “Application for Encroachment Agreement” and “Application for Turnout/Weir.”
- ☐ See “Weir Turnout Gate,” “Check Structure and Turnout,” and “3-foot Cipoletti Weir” standard drawings for additional requirements.
- ☐ If the turnout/weir is being built by another entity other than the shareholder(s) that will use the turnout/weir, it is the responsibility of the Applicant to coordinate a meeting with

the shareholder(s), canal water master, and HAL to verify the required flows and any special conditions of the turnout/weir.

- ☐ Provide the cross-section showing the elevation and location of the turnout gate, weir, and any permanent structures in relation to the canal. Show the toe of the canal embankment, and the elevation of the existing canal invert.
    - Silt collects at the bottom of the canal. The placement of the turnout shall match the bottom of the canal, not the top of the current silt layer.
- ☐ If vacating an old weir, it is the responsibility of the Applicant to remove the existing structure(s) and return the canal to proper functioning condition.
- ☐ Show compaction as appropriate for the design of weir boxes placed outside the canal corridor.
- ☐ All concrete used in the construction shall have a minimum compressive strength of 4,000 psi. The concrete mix shall include between 5% and 7% air entrainment.
- ☐ Compaction of all replaced embankment material shall be impermeable material, meeting a modified Proctor density of 92%.
- ☐ Compaction test results must be submitted to HAL. All failed material shall be removed and compacted to specifications. Testing must be performed by a licensed soils lab.
- ☐ If cast-in-place concrete is placed next to pre-cast concrete, Waterstop RX, Swellstop, or an approved equivalent shall be placed to prevent seepage between the surfaces.
- ☐ PVC water stop, or equivalent, is required in all joints of cast-in-place concrete.

<u>Turnout Gate & Headwall</u>

- ☐ Provide specifications for the turnout gate. A water-tight Waterman gate, or equivalent, is required.
- ☐ Canal banks shall be tied into the wing walls in a manner that provides a smooth transition around the headwall.
- ☐ The headwall shall be placed in a manner so that the structure does not extend into the canal or the O&M road.
- ☐ The inlet structure shall be placed on undisturbed soils.
- ☐ The bottom of the pipe opening shall be a minimum of two inches off the bottom of the canal floor.
- ☐ Rebar details are required on the submitted drawings. The rebar design must be appropriate for the proposed site and conditions.

Pipe from Turnout to Weir

- ☐ Open-cut trenches shall be cut at a minimum of 2 horizontal to 1 vertical so that the backfill can be properly compacted. See "Open-Cut Trench Cross-Section" standard drawing for additional requirements.
- ☐ Bedding material must be shown, as appropriate for the design.
- ☐ Pipe shall be reinforced concrete pipe through the canal corridor. Specify the pipe size and class.

Weir (Measurement Structure)

- ☐ Provide specifications for the weir type.
    - o The 3-foot Cipoletti Weir is shown as an example on the standard drawings. This exact weir type and/or size may not be optimal for your design.
- ☐ Show the details of the grate.
- ☐ Weir or transition boxes are not allowed in the canal corridor. The weir shall be placed outside the canal corridor, but in a convenient location for the canal water master to have access to verify and monitor the amount of water being taken by the shareholder(s).
- ☐ Box not to be placed in driveways, roads, or other traffic areas.
- ☐ All pipes into boxes shall be grouted and water tight.

Add the following notes to plans under heading "WJWUC Canal Notes"

- ☐ All concrete used in the construction shall have a minimum compressive strength of 4,000 psi. The concrete mix shall include between 5% and 7% air entrainment.
- ☐ Compaction of all replaced embankment material shall be impermeable material, meeting a modified Proctor density of 92%.
- ☐ Compaction test results must be submitted to HAL. All failed material shall be removed and compacted to specifications. Testing must be performed by a licensed soils lab.
- ☐ A trench plug is required behind the head wall. Trench plug to be placed in location shown for width of trench, 12 inches above and below the pipe, and a thickness of 24 inches.
- ☐ Trench plugs shall be a 10% bentonite and 90% clay mixture. At least 40% of the backfill material must pass a No. 200 U.S. standard sieve prior to adding bentonite powder. The backfill material shall then be amended by adding and thoroughly mixing commercial

bentonite powder with the backfill material at a ratio of one-part bentonite to nine parts backfill material. Impermeable flowable fill is an acceptable alternative.

OVERHEAD CROSSING

- ☐ Provide a cross section showing the elevation of the overhead crossing and the elevation of the canal invert and banks.
- ☐ Show the location of power poles and any permanent structures in relation to the canal and toe of the canal embankment.
- ☐ Structures shall be located outside the WJWUC corridor, which is generally 16.5 feet on the uphill side and 33 feet on the downhill side, measured from the center of the canal. In some instances, WJWUC owns the land in fee and the width may vary.

EASEMENTS (Normally only required when relocating irrigation facilities)

- ☐ Prior to any easements being recorded that affect WJWUC; the legal description must be submitted to and reviewed by HAL. Also, the entire document will be reviewed by WJWUC's attorney.
- ☐ Easements are required to be recorded with the Utah County Recorder for all WJWUC facilities.
  - Proof that the easement was recorded must be submitted to HAL.
- ☐ WJWUC corridors are typically 16.5 feet on the uphill side and 33 feet on the downhill side, measured from the center of the canal. Easements should be in the name of the Welby Jacob Water Users Company. In some instances, WJWUC owns the land in fee and the width may vary.
- ☐ Title insurance may be required.
- ☐ Add a note to the drawings, stating: "No foliage, structures, or other unauthorized improvements are allowed in Welby Jacob Water Users Company corridors."