

**UTAH LAKE DISTRIBUTING COMPANY**

**SARATOGA BRANCH**

a.k.a. South Lateral

Instruction Packet

Guide to obtain an Encroachment Agreement with the  
Utah Lake Distributing Company (ULDC) through  
U.S. Bureau of Reclamation (Reclamation)

Note: This application packet is facilitated by ULDC. Reclamation has their own application and requirements that are outlined and facilitated by their office. ULDC and Reclamation reviews must be performed simultaneously. Any descriptions of Reclamation's practices or procedures are not guaranteed to be accurate or binding.

## **Saratoga Branch**

The Utah Lake Distributing Company's (ULDC) Saratoga Branch begins below and near Camp Williams Military Base and flows south, eventually terminating at Tickville Gulch in the City of Saratoga Springs, Utah. This canal is known by the U.S. Bureau of Reclamation (Reclamation) as the ULDC South Lateral. The canal was designed and constructed by Reclamation as a part of the Provo River Project in the 1950s. The U.S. holds an easement under the authority of the Act of August 30, 1890 (26 Stat. 371), commonly known as the Canal Act. The Canal Act essentially says that every patent to land west of the 100th meridian has an easement reserved to the U.S. and its contractors for ditches and canals that may be constructed in the future. All of the lands under the South Lateral were patented after the date of the Canal Act. Operation and maintenance of the South Lateral has been turned over to ULDC, but ULDC must comply with applicable statutes and regulations. Reclamation is responsible, in consultation with ULDC, to authorize encroachments to the canal in a manner consistent with applicable Federal statute, regulation, and Reclamation policy. The principle requirement is that encroachments not adversely impact the use, operation, or maintenance of the South Lateral.

## **ULDC & Reclamation's Relationship & the Application Process**

All projects within Reclamation easements and/or affecting ULDC facilities are required to obtain permission from ULDC and Reclamation prior to performing work.

This permission is usually granted with an encroachment agreement. In the encroachment agreement, Reclamation grants permission for the Applicant to encroach on its right-of-way. An encroachment agreement is **not** an easement, but is a contract that sets out the terms and conditions under which the Applicant may encroach on the U.S. right-of-way. The encroachment agreement is signed by the Applicant, Reclamation, and ULDC before construction begins.

Franson Civil Engineers (FCE) is the engineer for ULDC. Neither ULDC nor FCE are responsible for design or construction of encroaching project facilities. ULDC and FCE review project designs and applications in a brief fashion, for the purposes of protecting the operation and maintenance of the ULDC canal only. ULDC duties regarding an encroachment run only to its shareholders. FCE duties run only to ULDC. Once an encroachment agreement is executed, limited field review may be provided by FCE to observe that construction appears to be in accordance with the 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 ULDC or FCE any responsibility for design or construction, to workers on site, or the public. It is the responsibility of the Applicant to provide ULDC and FCE with accurate information so a reasonable determination can be made if the project will meet ULDC standards and will not adversely affect ULDC facilities.

Applicants may contact Kieth Marvin of Reclamation at 801-379-1193 or [kmarvin@usbr.gov](mailto:kmarvin@usbr.gov) to discuss the Reclamation application process and requirements.

## Easements

As described above, the U.S. holds an easement for the ULDC South Lateral. This right-of-way is 30 feet on the uphill side of the canal, and 20 feet on the downhill side of the canal, measured from the centerline. The uphill side of the canal is the west or north side of the canal, depending on the location.

If the location of the canal, maintenance road, etc. is outside the U.S. easement, then the ULDC's prescriptive easement will extend beyond the U.S. easement.

## Application & Review Process Guidelines

The following is a guideline of the typical process for the ULDC portion of the application, review, and encroachment agreement process:

- FCE receives the ULDC **application, application fees, and drawings**. The review process will **not** begin until these items have been received. The application must be submitted with sufficient time to review the drawings, write and execute the agreement, and construct the facilities before April 1. FCE reserves the right to decline applications or delay construction if they (or ULDC) believe the construction may interfere with delivery of water.
- FCE will **review** the drawings. A meeting will be held as needed with FCE, ULDC, 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 the satisfaction of FCE and ULDC. This typically takes two reviews. **\*\*The next step will not progress until Reclamation is also satisfied with the drawings.\*\***
- Reclamation will prepare an **Encroachment Agreement** between Reclamation, the Applicant, and ULDC. Copies of the agreement will be sent to the Applicant for signature.
  - After the Applicant has signed the agreement, they will need to secure the signature of the ULDC president. The agreement will then need to be returned to Reclamation by the Applicant for Reclamation signature.
- Once the agreement has been executed by all parties and the Applicant has their copy, 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 ULDC and FCE at least 24 hours before beginning construction on ULDC facilities.
- FCE and ULDC 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 ULDC 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 FCE and ULDC (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.fransonicivil.com/uldc](http://www.fransonicivil.com/uldc).

Enclosed in this packet is 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 ULDC 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 Todd Adams at FCE. The office phone number is 801-756-0309.

**UTAH LAKE DISTRIBUTING COMPANY  
SARATOGA BRANCH**

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**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 Utah Lake Distributing Company (ULDC) 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 ULDC standards. A Standards Checklist has been prepared to assist engineers in designing to ULDC standards.

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

<b>Application Type</b>	<b>Application Fee</b>	<b>Possible Refund Amount</b>
Bridge or Box Culvert	\$8,400	\$2,000
Excavation of Canal	\$7,300	\$1,000
Large Bore (over 24 inches in diameter)	\$6,500	\$500
New Weir & Turnout	\$6,500	Unused Application Fees
Small Boring or Directional Drilling	\$4,000	\$500
Overhead Crossing	\$4,000	\$2,000
Use of Existing Conduit	\$1,500	\$500

Application fees will be used by ULDC 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 ULDC are greater than the application fee, the Applicant will be responsible to reimburse ULDC for the remainder of the expenses. Any refund amount shown is refundable upon satisfactory and timely completion of the project, as determined by ULDC. **Applicant must submit written request for refund at the end of the project.**

Please make all checks payable to: **Utah Lake Distributing Company.**

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

Franson Civil Engineers  
Attn: Todd Adams  
1276 South 820 East, Suite 100  
American Fork, UT 84003  
Telephone: (801) 756-0309

For the Reclamation application packet, complete and submit the following items to FCE:

- Completed Standard Form 299 (SF299), which can be found at [www.fransoncivil.com/uldc](http://www.fransoncivil.com/uldc)
- Initial application fee of \$100.00 (payable to U.S. Bureau of Reclamation)
- Two 11x17 printed drawing sets

**NOTE:**

1. Starting construction without prior written approval from ULDC may result in ULDC assessing an additional fee of \$5,000.
2. If application costs exceed the fees paid, the Applicant will be responsible to reimburse ULDC 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 Franson Civil Engineers nor ULDC 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

**UTAH LAKE DISTRIBUTING COMPANY**

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**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 ULDC Corridor.

**NEW TURNOUT/WEIR**

1. 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 no refund will be given if the work is not completed to the satisfaction of ULDC. Also, irrigation share(s) listed above are subject to additional assessments if the work is not completed to the satisfaction of ULDC.**

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Title)

\_\_\_\_\_  
(Title)

\_\_\_\_\_  
(Date)

\_\_\_\_\_  
(Date)

## UTAH LAKE DISTRIBUTING COMPANY STANDARDS CHECKLIST

# SARATOGA BRANCH

The Utah Lake Distributing Company's (ULDC) Saratoga Branch begins below and near Camp Williams Military Base and flows south, eventually terminating at Tickville Gulch in the City of Saratoga Springs, Utah. This canal is known by the United States Bureau of Reclamation (Reclamation) as the ULDC South Lateral. The canal was designed and constructed by Reclamation as a part of the Provo River Project in the early 1950s. The U.S. holds an easement under the authority of the Act of August 30, 1890 (26 Stat. 371), commonly known as the Canal Act. The Canal Act essentially says that every patent to land west of the 100th meridian has an easement reserved to the U.S. and its contractors for ditches and canals that may be constructed in the future. All of the lands under the South Lateral were patented after the date of the Canal Act. Operation and maintenance of the South Lateral has been turned over to ULDC, but ULDC must comply with applicable statutes and regulations. Reclamation is responsible, in consultation with ULDC, to authorize encroachments to the canal in a manner consistent with applicable federal statute, regulation and Reclamation policy. The principle requirement is that encroachments not adversely impact the use, operation or maintenance of the South Lateral.

This checklist is intended to assist engineers in designing projects to ULDC standards. All projects seeking acceptance by ULDC 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 ULDC nor Franson Civil Engineers (FCE) 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 ULDC standards. No approval or acquiescence by ULDC or FCE will operate as a waiver or modification of ULDC 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 ULDC delivery of water or operation, maintenance, repair or replacement of ULDC facilities.

Note: This checklist is updated when standards are amended. Checking for the latest version of this checklist at [www.fransonicivil.com/uldc](http://www.fransonicivil.com/uldc) will ensure the most up-to-date information. Standard drawings are also available on the website. ULDC 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.
- ULDC maintains their irrigation facilities by burning weeds prior to each irrigation season and as needed. This should be considered while designing your project. ULDC only accepts concrete structures or pipes to be installed in their easement so they will not be damaged due to maintenance.
  - ULDC requests that the types of fencing installed adjacent to their 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 ULDC 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 ULDC standards and is ready for the encroachment agreement.
- Before submitting drawings to FCE for review, please verify that all notes, references, and labels are correct and accurate.
- Neither ULDC nor FCE can verify the locations of underground facilities. Blue Stakes should always be called before digging (1-800-662-4111).

### **ALL SUBMITALS 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 U.S. easement on the drawing, which is generally 30 feet on the uphill side, and 20 feet on the downhill side, measured from the center of the canal.
- 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 “ULDC 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 Todd Adams and the canal water master. Failure to do so may result in a \$5,000 fine.
- Contact information for FCE and ULDC:
  - Todd Adams, Franson Civil Engineers, 801-756-0309
  - Vince Hogge, P.E., Franson Civil Engineers, 801-756-0309
  - Jeff McMullin, President, Utah Lake Distributing Company, 801-641-3233
  - Eric Chamberlain, Water Master, ULDC Saratoga Canal, 801-360-4117
- Any changes in design drawings after the encroachment agreement has been executed must be reviewed and accepted by Franson Civil Engineers and Utah Lake Distributing 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 Utah Lake Distributing Company standards.
- If disturbed, canal O&M road must be returned to pre-construction state or better, following construction. O&M road must be available for use by ULDC personnel no later than April 1.
- Stormwater runoff enters 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 FCE. 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.
- A concrete-liner on the floor and banks, extending ten feet on either side of casing is required. See standard drawing "Concrete Liner Details" for more information.
- Silt collects at the bottom of the canal. The installation of the concrete liner shall match the bottom of the canal and not the current silt layer.
- 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 restraining 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 “ULDC Canal Notes”

- Contractor to notify Todd Adams of Franson Civil Engineers when trench plugs are installed. Verification of trench plug completion must be performed by Franson Civil Engineers before backfilling. Todd can be reached at 801-756-0309.
- Rebar for the canal liner shall be a minimum of #4 bar at 12 inches on center.
- A two foot deep concrete cutoff wall is required on both ends of the concrete liner.

## **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 a 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 solid wall, 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 done and submitted to FCE. 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.
- A concrete-liner on the floor and banks, extending ten feet on either side of casing is required. See standard drawing "Concrete Liner Details" for more information.
- Silt collects at the bottom of the canal. The installation of the concrete liner shall match the bottom of the canal and not the current silt layer.

- See the “Open-Cut Trench Cross-Section” standard drawing for additional requirements.

Add the following notes to plans under heading “ULDC Canal Notes” if canal is earthen

- The canal floor and embankment material removed for excavation (excluding under concrete liner) 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 Franson Civil Engineers. All failed material shall be removed and compacted to specifications. Testing must be performed by a licensed soils lab.
- The trench through the canal may be cut as little as  $\frac{1}{4}$  horizontal to vertical.
- Contractor to notify Todd Adams of Franson Civil Engineers when trench plugs are installed. Verification of trench plug completion must be performed by Franson Civil Engineers before backfilling. Todd can be reached at 801-756-0309.

Add the following notes to plans under heading “ULDC Canal Notes” if canal is concrete-lined

- 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  $\frac{1}{4}$  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 Franson Civil Engineers. 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 Todd Adams of Franson Civil Engineers when trench plugs are installed. Verification of trench plug completion must be performed by Franson Civil Engineers before backfilling. Todd can be reached at 801-756-0309.

## **BOX AND PIPE CULVERTS**

- If extending an existing box culvert, ULDC 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 ULDC 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 precast 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 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 ULDC nor FCE 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.
- No riprap is allowed in the canal.
- 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 headwalls 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 note otherwise, and upon agreement by ULDC and FCE.
- Access to the 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.

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

- All concrete used in 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 Franson Civil Engineers. All failed material shall be removed and compacted to specifications. Testing must be performed by a licensed soils lab.
- Open-cut trenches for the cutoff walls 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 ULDC/Reclamation.
- Signs must be placed at each entrance to the canal O&M road that state:
  - o 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 ULDC 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 ULDC 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 ULDC 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.
- A check structure is required to be designed and constructed at the same time as the turnout, even if a check structure may not be necessary at the time.

- If the turnout/weir is being built by another entity other than the shareholders that will use the turnout/weir, it is the responsibility of the Applicant to coordinate a meeting with the shareholders, canal water master, and FCE 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 structure 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.
- 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.

#### Turnout Gate & Headwall

- 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 should 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 should 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.
  - 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 “ULDC 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 FCE. 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 headwall. 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 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 of the U.S. easement, 30 feet on the uphill side and 20 feet on the downhill side, measured from the center of the canal. In some instances, prescriptive rights of ULDC will extend past the 50 feet.

## **PIPING LATERAL DITCHES**

- All pipes on all the drawings must be specifically labeled for pipe type, class, and size. For maintenance purposes, ULDC only accepts RCP to be installed in their corridor.
- All pipe sizes must be verified by the Applicant's engineer to carry sufficient flow.
- A plan and profile view of each pipe is required. Show the flow line profile and provide calculations.
- Trench detail is required, showing bedding detail. ULDC standards require bedding to be six inches below the pipe, up to the springline minimum of ¾-inch crushed rock, unless otherwise specified by the manufacturer and accepted by Franson Civil Engineers. Compact all backfill materials to 92% of the modified Proctor density.
- At minimum, irrigation cleanout boxes are required every 500 feet, on either side of roads/driveways, and at all alignment changes.
- Prior to any easements being recorded that affect ULDC, the legal description must be submitted to and reviewed by Franson Civil Engineers. Also, the entire document will be reviewed by ULDC's attorney.
- Easements are required to be recorded with the County Recorder for all ULDC facilities.
  - Proof that the easement was recorded must be submitted to FCE.
- ULDC Saratoga Branch lateral corridors are typically 25 feet, centered over the lateral. Easements should be in the name of the Utah Lake Distributing Company.
- Title insurance may be required.
- Add a note to the drawings, stating: "No foliage, structures, or other unauthorized improvements are allowed in Utah Lake Distributing Company corridors."