



TOWN BOARD WORK SESSION
November 26, 2012 – 6:15 P.M.
301 Walnut Street, Windsor, CO 80550

The Town of Windsor will make reasonable accommodations for access to Town services, programs, and activities and will make special communication arrangements for persons with disabilities. Please call (970) 674-2400 by noon on the Thursday prior to the meeting to make arrangements.

GOAL of this Work Session is to have the Town Board receive information on topics of Town business from the Town Manager, Town Attorney and Town staff in order to exchange ideas and opinions regarding these topics.

Members of the public in attendance who have a question related to an agenda item are requested to allow the Town Board to discuss the topic and then be recognized by the Mayor prior to asking their question.

AGENDA

6:15 – 6:50 p.m. 1. Meet with Boy Scouts – First Floor Conference Room

Reconvene Work Session immediately following Regular Town Board Meeting – Town Board Chambers

2. Davis Seepage Pipe Drain and Law Basin West Tributary Channel Reports – K. Arnold, I. McCargar, D. Wagner
3. Future Meetings Agenda
4. Adjourn



MEMORANDUM

Date: November 20, 2012
To: Mayor and Town Board
From: Kelly Arnold, Ian McCargar, Dennis Wagner
Re: Preliminary design of Davis Seepage Pipe Rehabilitation and Law Basin West Tributary Channel

Background / Discussion:

The Davis Seepage Pipe was constructed following an agreement in 1919 that committed several property owners to share in the costs of construction. Those property owners decided that a pipe would convey groundwater more effectively than the open ditch that existed at the time. High groundwater levels cause crop damage and the open ditch was an ongoing maintenance problem. Open ditches have a tendency to collect silt and weeds which reduce the ability to convey water.

Now almost 100 years later houses occupy the land instead of crops and the conveyance of water is a problem once again. Several homeowners within the Peakview Subdivision report frequent and persistent sump pump operation, and a high level of concern for potential damage to property. Discussions involved stakeholders starting in the spring of 2011, followed by extensive information gathering and additional meetings. The conclusion at that point was that further consulting resources were needed to provide potential solutions.

In August 2012, the Town Board approved a contract with Anderson Consulting Engineers (ACE) in Fort Collins to develop a preliminary design and cost estimate for rehabilitating the Davis Seepage Pipe system and a channel to convey storm water in what is referred to in the town's Master Drainage Plan as the west tributary of the Law Drainage Basin. The Executive Summaries of both of those works are attached.

Two sources of water, groundwater and storm water, are involved. The original Davis Seepage Pipe was intended mainly to convey groundwater with some minor surface and storm water flows. However, with the development of the Greenspire and Peakview Estates Subdivisions, increased surface water runoff enters the Davis Seepage Pipe. Groundwater collection pipes are perforated to allow the water to steadily enter the pipe and flow downhill; they do not work well for conveying storm water. Storm water typically comes quickly, over-powering pipe capacity. The pressure forces water out of the pipe into the surrounding soil which eventually leads to system failure.

Aside from the functional disadvantages to comingling surface water and storm water in the same pipe, there are potential water rights and water quality issues that add complication to current demands being placed on the Davis Pipe.

ACE recommends that the groundwater and the storm water be separated into separate and distinct facilities, thereby returning the Davis Pipe to its intended function of primarily carrying ground water. Attached Figure 1 illustrates the existing and proposed alignments of the Davis Seepage Pipe and Drainage Channel. Figure 2 is an illustration of the typical relationship of the 30" seepage pipe and the storm water channel and 24" low flow storm water pipe.

Recommendation: Review ACE Preliminary Design reports. Give staff direction on whether to further pursue Davis Pipe rehabilitation or Law Basin West Tributary Channel, or both.

Attachments:

Davis Seepage Pipe Rehabilitation Preliminary Design – Executive Summary
Law Basin West Tributary Channel Preliminary Design – Executive Summary
Figure 1 – Alignments of the Davis Drain and Law Basin West Tributary
Figure 2 – Typical Davis Drain and West Tributary Channel Configuration

MEMORANDUM



ANDERSON CONSULTING ENGINEERS, INC.
Civil • Water Resources • Environmental

DATE: November 20, 2012 **ACE PROJECT NO.:** COTOW21.01
TO: Dennis Wagner, P.E. - Town of Windsor
Doug Roth, P.E., CFM - Town of Windsor
FROM: Chris Pauley, P.E., CFM - Anderson Consulting Engineers, Inc.
Scott Parker, P.E. - Anderson Consulting Engineers, Inc.
SUBJECT: Rehabilitation of Davis Seepage Drain: Preliminary Design - **EXECUTIVE SUMMARY**

BACKGROUND

The Davis Seepage Drain (See Figure 1) is a nearly 100-year old 5,300-foot long, 21-inch diameter, clay tile pipe that has historically dewatered an area east of Windsor Lake (aka Kern Reservoir) and has provided the source of a water right for one or more land owners in the area. A 1919 Agreement, between a water right holder and the properties dewatered by the drain, indicated that the water right holder would be responsible for maintaining the mainline drain tile while the property owners were responsible for the upkeep of the laterals tying into the mainline. During the last decade the lands historically dewatered by the Davis Seepage Drain have started to transition from farming to residential development uses. New private underdrain systems constructed in conjunction with the developments were tied into the Davis Seepage Drain mainline pipe. Portions of the mainline pipe were removed to facilitate the tie-ins of the new laterals via a new surface connection.

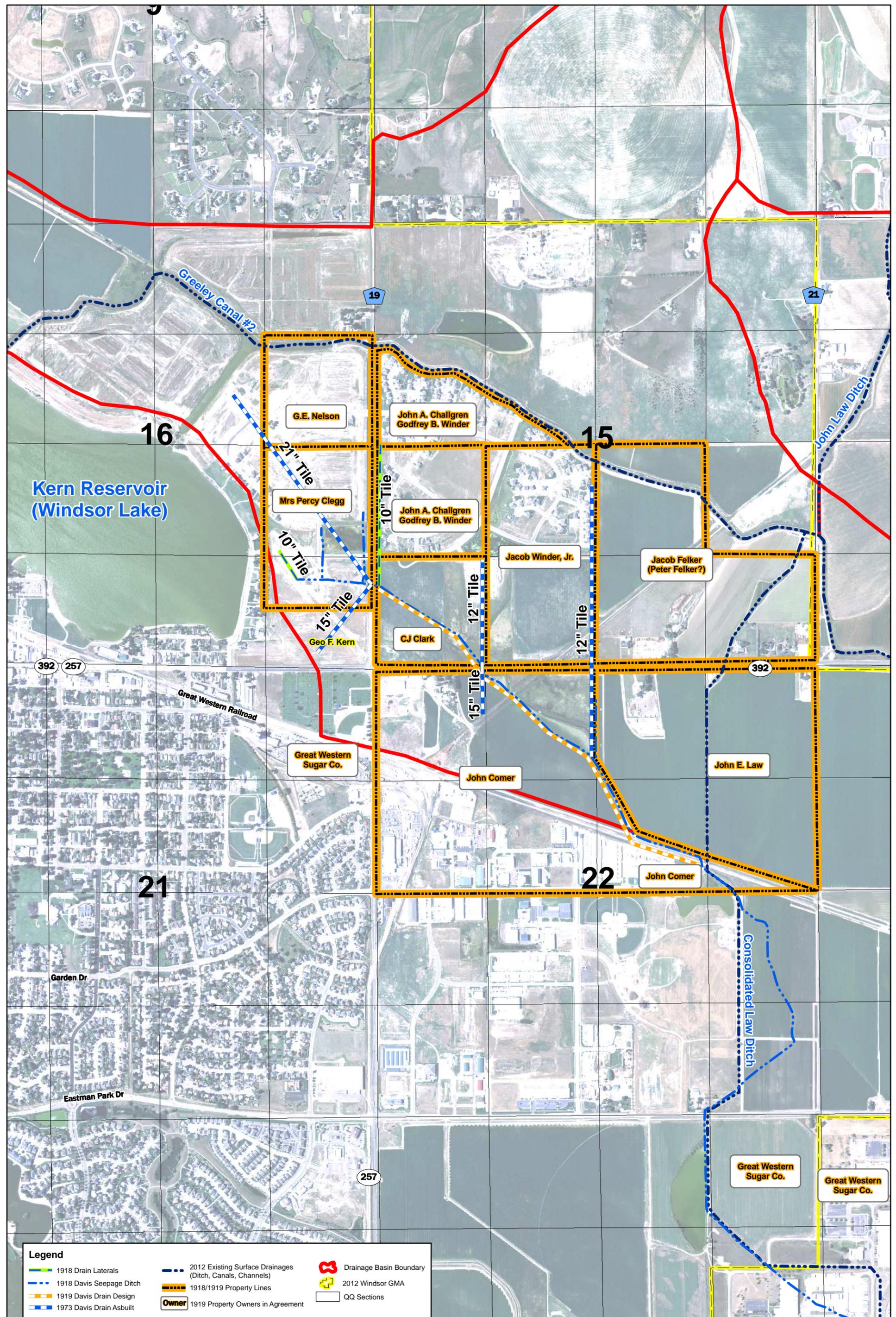
A number of problems have arisen in recent years which are believed to be at least in part related to the age, use, and condition of the Davis Seepage System's mainline pipe. These problems include:

- Sinkholes developing at the ground surface along the drain tile alignment between SH 392 and the Colorado & Southern Railroad;
- The creation of the Duck Pond exposes groundwater to surface evaporation and creates drainage problems along the north side of SH 392; and
- In the Peak View (aka the Winter Farm) development; high ground water levels are affecting a number of houses and the subdivision's detention pond.

It is apparent that a number of these problems have been exacerbated by utilizing the tile line as the outfall for both the surface (stormwater) and subsurface (groundwater) systems. In particular, the formation of sinkholes is indicative of full and surging flows in a drainage tile line designed to flow only partially full. Another contributing factor to the problems may be the age and condition of the tile line. A well constructed, undisturbed, properly functioning, and maintained clay tile drain line may have at most a useful service life approaching 100 years. The Davis Seepage System's mainline pipe is approximately 92 years old. Ignoring the potentially damaging use of the tile line for stormwater conveyance over the last decade, the tile line is most likely at or near the end of its useful life.

In consideration of the history and problems presented above, on July 25, 2012 the Town of Windsor asked Anderson Consulting Engineers, Inc. (ACE) to develop a scope of work for engineering efforts that would lead to recommendations for and the rehabilitation of the Davis Seepage System's mainline pipe.

The Phase 1 Preliminary Design developed approximately a 30% level design for the Davis Drain Rehabilitation using available information. No additional surveying and geotechnical investigations were performed during the preliminary design. The goal of Phase 1 was to identify permitting issues and develop a preliminary cost estimate to be utilized for planning purposes by the Town.



Legend		
1918 Drain Laterals	2012 Existing Surface Drainages (Ditch, Canals, Channels)	Drainage Basin Boundary
1918 Davis Seepage Ditch	1918/1919 Property Lines	2012 Windsor GMA
1919 Davis Drain Design	1919 Property Owners in Agreement	QQ Sections
1973 Davis Drain Asbuilt		

0 250 500 1,000
Feet
1 inch equals 1,000 feet
2011 NAIP Aerial Photo

Project Number:
COTOW21.01
Date:
10/26/2012

Created by:
BNA
Reviewed by:
CJP

DAVIS SEEPAGE SYSTEM MAP (AS OF ≈ 1973)

ANDERSON CONSULTING ENGINEERS, INC.
Civil • Water Resources • Environmental

MEMORANDUM



PERMITTING -Water Rights, Wetlands, and Discharge

Initial discussions with the State Engineers Office indicated that water rights permitting would not be required for the rehabilitation of the Davis Seepage Drain System however coordination with the local Water Commissioner was advised. It is anticipated that the Davis Seepage Drain Rehabilitation project will have minimal impacts to wetlands. Potential wetlands impacts will be evaluated with a qualified wetlands consultant prior to the start of the final design. The Colorado Department of Public Health and Environment, CDPHE, regulates groundwater discharges as potential pollution point sources. With limited exceptions, permits are required for work that will result in the release of groundwater to the surface. According to the CDPHE document: *Rationale, Discharges Associated with Subterranean Dewatering or Well Development, General Permit in Colorado, First Issue, CDPS Permit Number COG-603000*, Page 1, the exercise of a water right is an exception to the discharge permitting requirement. Surface discharges from the Davis Tile Drain are, according to the 1919 Contract and Grant describing the tile drain, the waters associated with an irrigation water right formerly owned by the Great Western Sugar Company and now owned by their successors. Therefore, a CDPHE permit is not anticipated.

HYDROLOGY

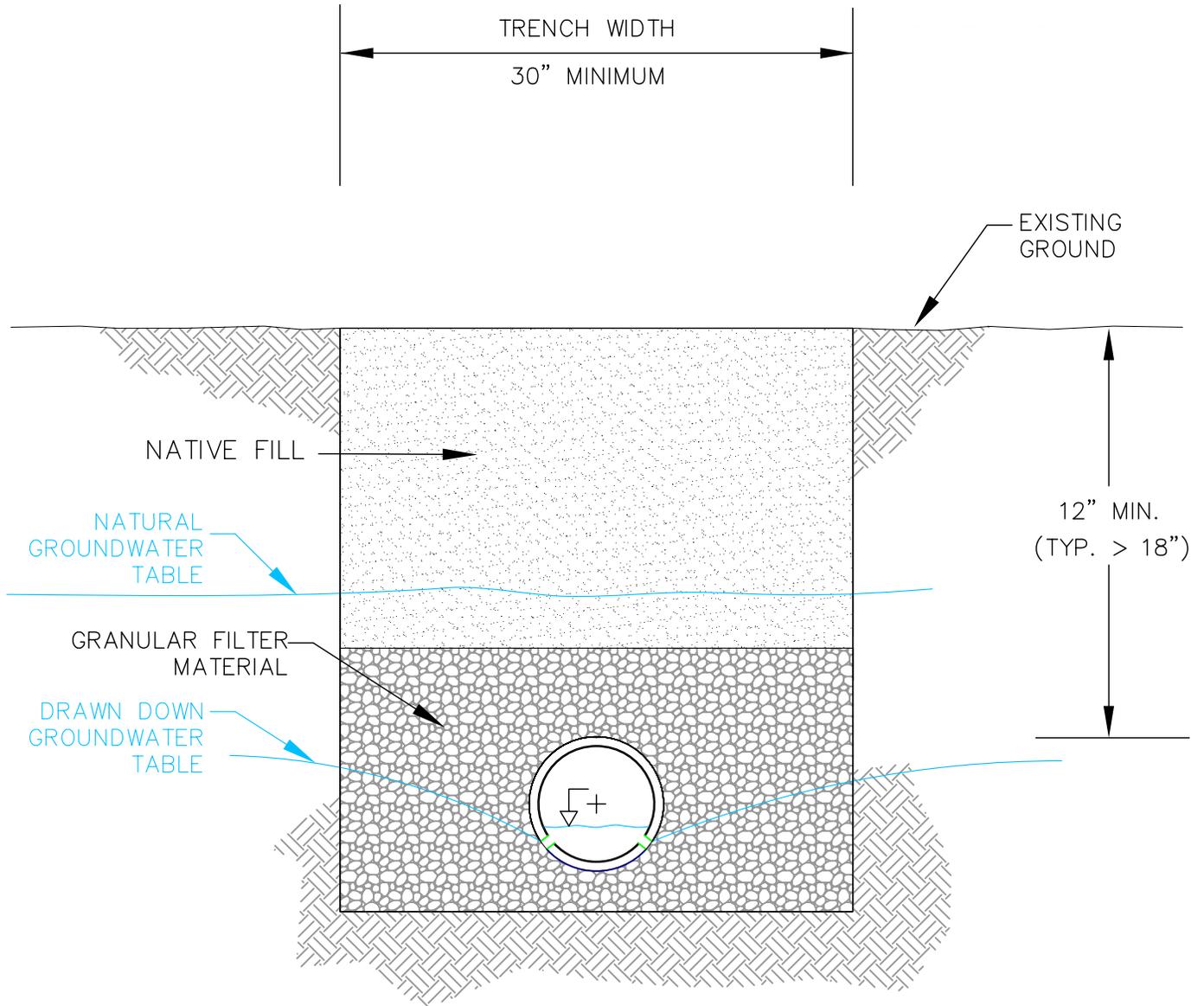
A modern subsurface drain design criterion requires that the perforated underdrain pipe not be pressurized as shown in Figure 2. This means that at the design discharge (6 cfs based on the historic water right and recent discharge field measurements) the pipe should flow only partially full, usually half-full, to maintain atmospheric pressure in the pipe. It is assumed that no surface water inflows will be allowed in the rehabilitated drain system so damaging surge/pressurizing flows will be eliminated.

PRELIMINARY DESIGN

The preliminary alignment generally follows the historic alignment. The proposed pipe will be 30-inch diameter plastic irrigation pipe. The proposed pipe is slightly larger than the historic 21-inch pipe in order to accommodate the deeper burial and subsequently flatter invert slope. The new pipe will end at its historic outfall in the Consolidated Law Ditch immediately south of the GWRR. The pipe will go under both the GWRR and SH 392 prior to tying into the existing underdrain pipes north of SH 392. The open 'Duck Pond' on the north side of SH 392 will be removed (i.e. filled in) once new drain system is tied into the old system.

COST ESTIMATE

The cost estimate assumes that the rehabilitation of the Davis Seepage Drain will be designed and constructed as a separate and independent project. It is estimated that the rehabilitation of the Davis Seepage Drain will cost approximately \$930,700.



NOT TO SCALE



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TYPICAL UNDERDRAIN INSTALLATION

Project No.	COTOW21.01
Date:	11/15/2012
Design:	CJP
Drawn:	TAW
Revisions:	
ACADFILE: UNDERDRAIN INSTALL DETAIL	

FIGURE 2

MEMORANDUM



ANDERSON CONSULTING ENGINEERS, INC.
Civil • Water Resources • Environmental

DATE: November 20, 2012 **ACE PROJECT NO.:** COTOW21.02
TO: Dennis Wagner, P.E. - Town of Windsor
Doug Roth, P.E., CFM - Town of Windsor
FROM: Chris Pauley, P.E., CFM - Anderson Consulting Engineers, Inc. (ACE)
Scott Parker, P.E. - Anderson Consulting Engineers, Inc.
SUBJECT: Law Basin West Tributary Channel: Preliminary Design - **EXECUTIVE SUMMARY**

BACKGROUND

The 7.3 square mile West Tributary of the Law Basin is the largest major tributary to the approximately 29 square miles Law Basin as shown in Figure 1. Stormwater runoff from minor rainfall events have generally been captured by lakes, reservoirs, road/railroad embankments, and the Greeley Number 2 Canal (GRNO2) within the basin. The Town of Windsor's Master Drainage Plan (MDP) [ACE, October 3, 2003; Revised January 6, 2004] indicated that significant flooding could occur along the Law Basin West Tributary and the Law Basin drainages if these inadvertent detention facilities were overtopped by runoff emanating from a major rainfall event. The MDP identified two projects which could be implemented to improve flooding conditions in the Law Basin West Tributary. The first project required diverting and detaining stormwater flows from the upper approximately 6 square miles of the basin into Kern Reservoir (aka Windsor Lake) and slowly releasing them after the rain event passes. The major components of the detention project have been completed. The upper basin is generally defined as that area above of the GRNO2 and west of Weld County Road 19 (WCR 19). The second project identified in the MDP was to develop conveyance facilities (channels, pipes, and associated crossing structures) for the area below the GRNO2. The MDP identified the need for a channel from the north side of SH 392 to a confluence with the Consolidated Law Ditch at the Great Western Railroad.

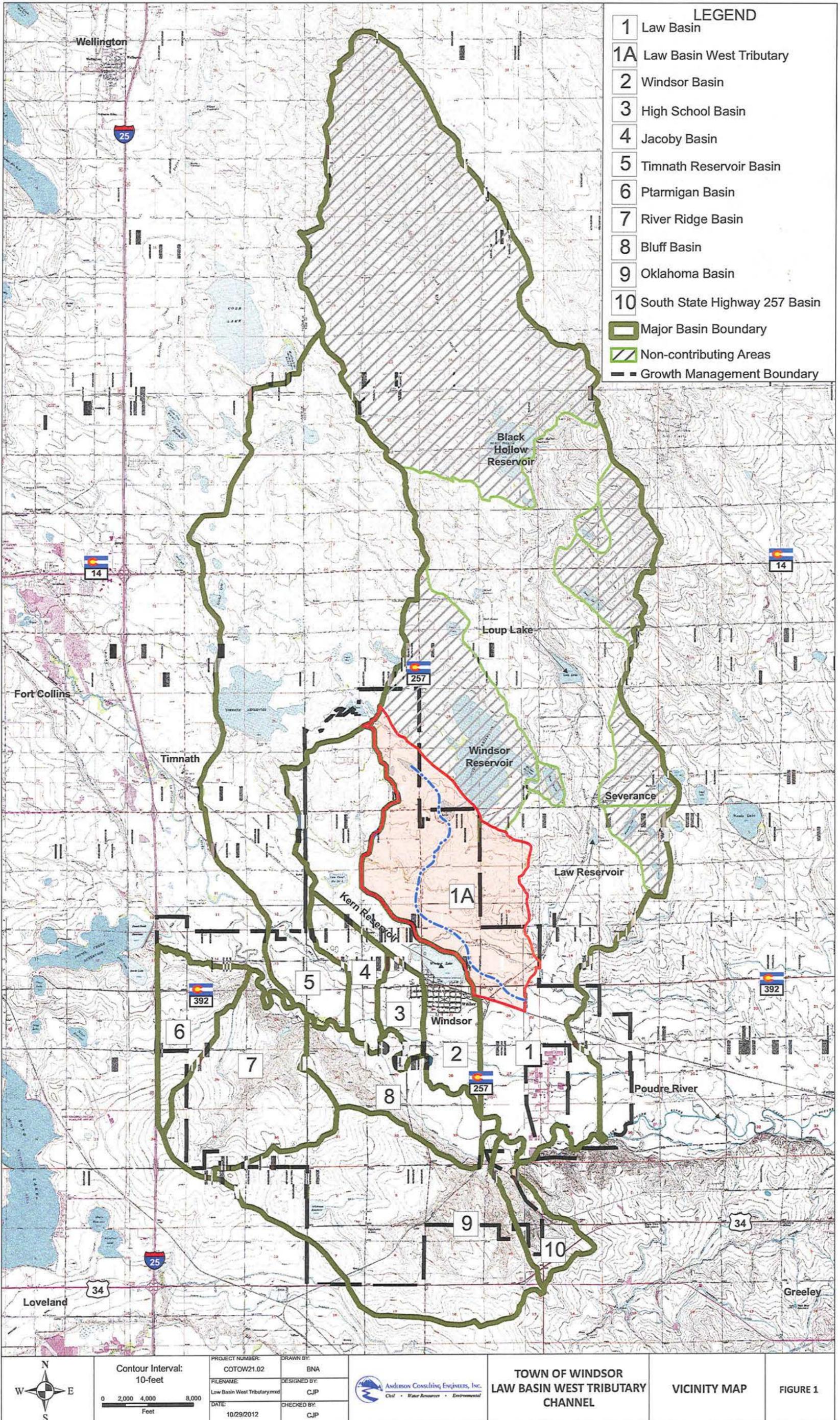
The Davis Seepage Drain is a clay tile underdrain pipeline installed in the 1920s as a replacement of the historic Davis Seepage Ditch. The drain removes groundwater from the historically wet area in the lower portion of the West Tributary Basin. Currently, surface water runoff is being conveyed in the Davis Seepage Drain as this is the lowest outfall for surface water. Conveyance of stormwater in an under drain system can negatively impact the operation of the underdrain and ultimately lead to the failure of the drain system.

In consideration of the history of groundwater issues in the West Tributary Basin and the need to provide existing and future development with a surface water only outfall, on July 25, 2012 the Town of Windsor asked Anderson Consulting Engineers, Inc. (ACE) to develop a scope of work for engineering efforts that would lead to recommendations for and the implementation of the West Tributary MDP conveyance channel.

The Phase I - Preliminary Design developed approximately a 30% level design for the Law Basin West Tributary Channel using available information. Additional surveying and geotechnical investigations were not performed during the preliminary design. The goal of Phase I was to identify permitting issues and develop a preliminary cost estimate to be utilized for planning purposes by the Town.

HYDROLOGY

The selected discharge, per the MDP, is the Future with Over Detention Condition 100-year discharge of 223 cfs (approximately a 2-year Existing Condition flood event).



MEMORANDUM



PERMITTING -Water Rights, Wetlands, and Discharge

It is not anticipated that any water rights will be impacted by the construction of this project. Water rights impacts will be evaluated during the rehabilitation of the Davis Seepage Drain. It is anticipated that the Law Basin West Tributary project will have minimal impacts to existing wetlands. Potential wetlands impacts will be evaluated with a qualified wetlands consultant prior to the start of the final design. Wetlands mitigation maybe required if it is determined that the removal of: a) the 'Duck Pond' on the north side of SH 392 and/or b) remnants of the Davis Seepage Ditch system south of SH 392 may impact jurisdictional wetlands. It is anticipated that crossing agreements will be required from the Great Western Railroad and CDOT. The proposed channel alignment may cross 2 to 4 private property owners, thereby requiring purchase or easements on the properties.

PRELIMINARY DESIGN

The preliminary alignment generally follows the historic alignment of the Davis Seepage Ditch as shown in Figure 2. An approximately 60-foot wide corridor, including a 12-foot wide access road, will be required. The alignment stays north of the Great Western Railroad in order to avoid crossing the Greeley waterline and the railroad prior to its confluence with the Consolidated Law Ditch.

The preliminary channel profile will be capable of gravity draining the Greenspire Development detention facility however; it will only be able to partially drain the Peak View Development detention facility due to elevation constraints. For privately developed drainage facilities to work optimally and efficiently, additional modifications to the local systems may be required. The channel will be constructed at a 0.0014 foot/foot slope with a 10-foot wide channel and 4H:1V side slopes. It will convey the design discharge in approximately 3.3 feet of flow depth.

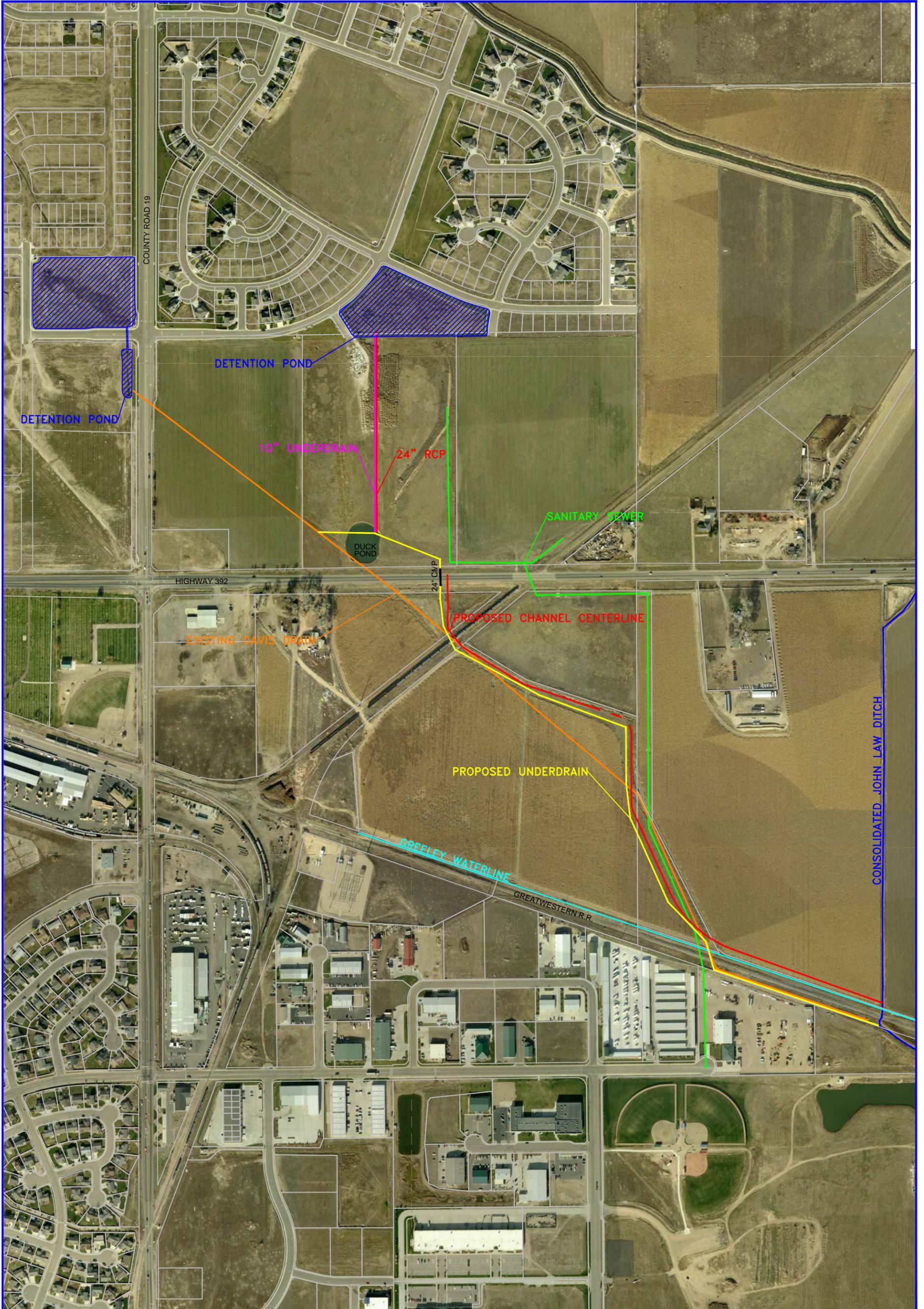
Groundwater seepage and trickle/frequent/low flows in an open channel can support vegetation growth which in turn becomes a maintenance issue for the channel's owner. In order to minimize potential vegetation growth in the West Tributary Channel; a low flow pipe is proposed under the channel. It is anticipated that the combination of the rehabilitated Davis Seepage Drain and the low flow pipe will minimize the vegetation growth and subsequent maintenance issues in the West Tributary Channel. The low flow pipe will be a 24-inch SDR 35 Pipe generally constructed parallel to the rehabilitated Davis Seepage Drain. Manhole/vault drop inlets will be provided at select locations in the channel bottom to remove daily trickle flows (sprinkler overspray, car washing, etc.) and occasional low flows (from very minor rainfall events) from the channel. The manhole vaults will include dropped bottoms to facilitate sediment trapping and pipe cleaning. Additionally, the low flow pipe's upstream daylight invert (north of SH 392) will be low enough to fully drain the Peak View Detention facility.

COST ESTIMATE

The cost estimate assumes that the rehabilitation of the West Tributary Channel will be designed and constructed as a separate and independent project. It is estimated that the design and construction of the West Tributary Channel will cost approximately \$1,188,000.



Figure 2. Project Location Map



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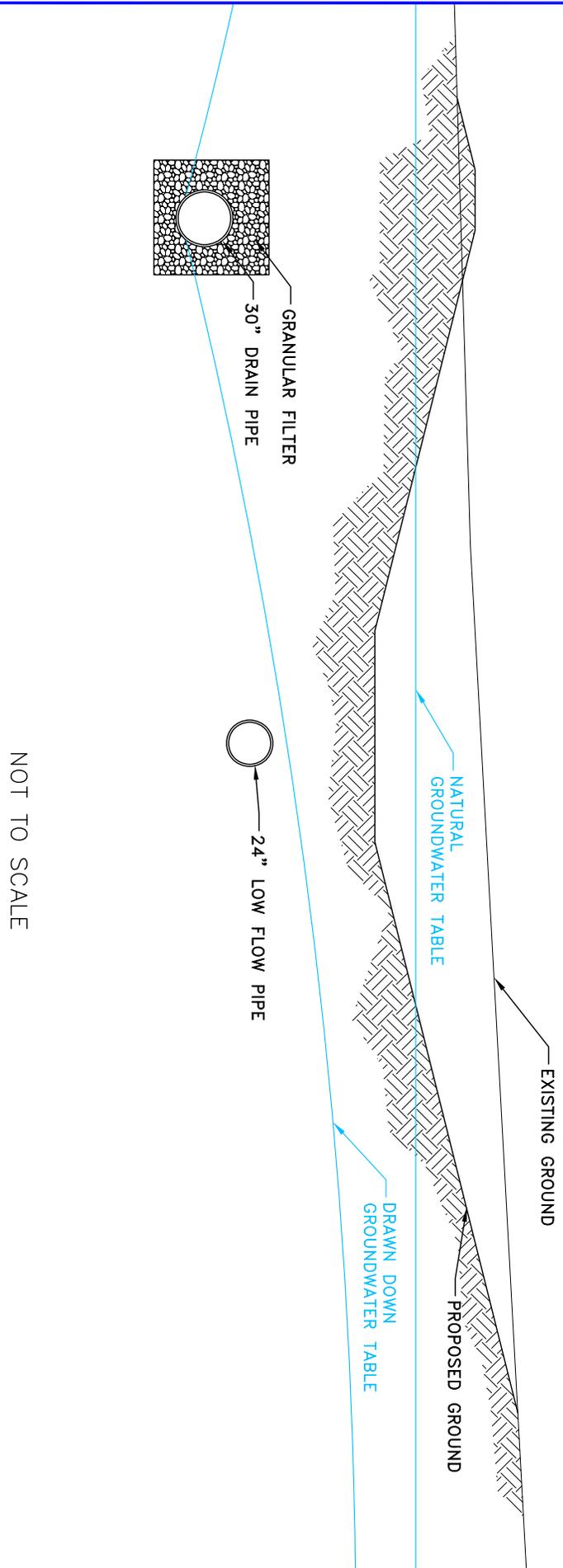


PROPOSED
 ALIGNMENTS OF THE DAVIS DRAIN &
 LAW BASIN WEST TRIBUTARY

NO SCALE

Project No.	COTOW21
Date:	11/19/12
Design:	CJP/SRP/MMC
Drawn:	MMC
Revisions:	
ACADFILE:	ALIGNMENTS.dwg

FIGURE
 1



NOT TO SCALE



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**PROPOSED
 TYPICAL DAVIS DRAIN AND
 W. TRIBUTARY CHANNEL CONFIGURATION**

Project No.	COTOW21.01
Date:	11/15/2012
Design:	CJP
Drawn:	TAW
Revisions:	
ACRIFLE: UNDERDRAIN INSTAL DETAIL	

FIGURE 2



FUTURE TOWN BOARD MEETINGS

Work Sessions & Regular Meetings will be held in the Board Chambers unless otherwise noted.

December 3, 2012 6:00 p.m.	Town Board Work Session Outside agency funding application wrap up Municipal Judge interviews
December 10, 2012 5:30 p.m.	Board/Manager/Attorney Monthly Meeting
December 10, 2012 7:00 p.m.	Town Board Meeting
December 17, 2012 6:00 p.m.	Town Board Work Session Residential street speed limit discussion – D. Thompson Park Regulations Special Event Liquor Licensing
December 24, 2012	Town Board Meeting – Cancelled
December 31, 2012	New Year's Eve – Town Hall closed
January 7, 2013 6:00 p.m.	Town Board Work Session
January 14, 2013 5:30 p.m.	Board/Manager/Attorney Monthly Meeting
January 14, 2013 7:00 p.m.	Town Board Meeting Kern Board Meeting
January 21, 2013 6:00 p.m.	Town Board Work Session
January 28, 2013 6:00 p.m.	Town Board Work Session
January 28, 2013 7:00 p.m.	Town Board Meeting

Additional Events

November 30, 2012 11:30 a.m. – 12:30 p.m.	I25-SH392 Ribbon Cutting ceremony Attending: Jeremy Rose, Don Thompson, Robert Bishop-Cotner, Myles Baker, Kristie Melendez, John Vazquez, Ivan Adams
December 14, 2012 6:00 p.m. – 9:00 p.m. Community Recreation Center	Town of Windsor – End of the Year Banquet

Future Work Session Topics

Golf carts follow up