OREGON DEPARTMENT OF FISH AND WILDLIFE

Fish Passage Plan for a Road-Stream Crossing

- *If you unlock and re-lock this Form, information already entered may be lost in certain versions of MS Word.*
- *If your project includes multiple crossings, please complete this form for each crossing.*

APPLICANT INFORMATION

APPLICANT: Jason Waters **TITLE:** Civil Engineer
ORGANIZATION: City of Sherwood
ADDRESS: 22560 SW Pine Street
CITY: Sherwood **STATE:** OR **ZIP:** 97140
PHONE: 503.925.2304
FAX:
E-MAIL ADDRESS: WatersJ@SherwoodOregon.gov

SIGNATURE: Jason M. Waters **DATE:** 8/11/2020

AUTHORIZED AGENT (*if any*): Sage Jensen **TITLE:** Senior Biologist
ORGANIZATION: Jacobs Engineering Group
ADDRESS: 2020 SW 4th Avenue
CITY: Portland **STATE:** OR **ZIP:** 97201
PHONE: 503.724.3531
FAX:
E-MAIL ADDRESS: Sage.Jensen@jacobs.com

SIGNATURE: Sage Jensen **DATE:** July 31, 2020

OWNER (*if different than Applicant*): **TITLE:**
ORGANIZATION:
ADDRESS:
CITY: **STATE:** **ZIP:**
PHONE:
FAX:
E-MAIL ADDRESS:

SIGNATURE: _____ **DATE:** _____

LOCATION

- **COUNTY** ..... Washington
- **ROAD** ..... Upstream of Oregon 99 (OR99W aka SW Pacific Highway)
- **RIVER/STREAM** ..... "Tributary 7"
- **TRIBUTARY OF** ..... Cedar Creek
- **BASIN** ..... Tualatin River
- **COORDINATES** [a] ..... Longitude: 122° 50' 46.11" W Latitude: 45° 21' 40.14" N
- **LEGAL DESCRIPTION** ..... ¼ / ¼:
  Section: 29 Tax Map #: 2S130DD
  Township: 2S Tax Lot #: 01400
  Range: 1W

[a] *geographic projection using NAD_83 and formatted as decimal degrees to at least 4 places*

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[a] *geographic projection using NAD_83 and formatted as decimal degrees to at least 4 places*

STREAM CROSSING INFORMATION

Please indicate measurement units where applicable and see footnotes for supporting descriptions of the information requested.

NEW CROSSING ☒
REPLACEMENT OF EXISTING CROSSING ☐
MODIFICATION OF EXISTING CROSSING ☐

EXISTING CROSSING	• **TYPE/SHAPE** [b]	
	• **MATERIAL** [c]	
	• **LENGTH**	
	• **INSIDE DIAMETER** (*if round*)	
	OR	
	INSIDE RISE (Height) **AND**	***Not Applicable (New Crossing)***
	INSIDE SPAN (Width)	
	• **CULVERT SLOPE**	
	• **DOES IT CONTROL AN UPSTREAM POND, WETLAND, BACKWATER AREA, OR WATER RIGHT?** [d]	Yes ☐ No ☐
STREAM	• **AVERAGE UPSTREAM ACW** [e,f]	5.7 ft
	• **AVERAGE DOWNSTREAM ACW** [e,f]	6.1 ft
	• **UPSTREAM SLOPE** [g]	0.12
	• **DOWNSTREAM SLOPE** [g]	0.07
	• **DESCRIBE STREAMBED MATERIAL** ...	Angular rock, stable (moss-covered)
	• **SIZE OF D_{100} ROCK** [h]	16 inches
PROPOSED CROSSING	• **TYPE/SHAPE** [b]	Bottomless arch culvert
	• **MATERIAL** [c]	Corrugated metal
	• **LENGTH**	39 ft
	• **INSIDE DIAMETER** (*if round*)	
	OR	
	INSIDE RISE (Height) **AND**	4 ft
	INSIDE SPAN (Width)	12 ft
	• **CULVERT SLOPE**	11%
	• **BED HEIGHT – INLET** [i,j]	N/A (existing material)
	• **BED HEIGHT – OUTLET** [i,k]	N/A (existing material)
	• **BED SLOPE** [i]	11%
	• **BED MATERIAL** [i] (*describe and/or fill in %s*) .	N/A (existing material) **Please see Attachment A.**
	% FINES (*dirt, silt, sand*)	
	% SMALL ROCK (*½-6" diameter*)	
	% LARGE ROCK (*6"-D_{100}*) [h]	
	% OVER-SIZED ROCK (D_{150}-D_{200}) [h] ...	
	• **BED PLACEMENT METHOD** [i]	Removal, stockpile, replacement
	• **BED RETENTION MEASURES** [i]	N/A (existing material)
	• **GRADE CONTROL MEASURES** [l]	N/A (existing material)
	• **ADDITIONAL STRUCTURES** [m]	N/A (existing material)
CONSTRUCTION	• **DATE WORK WILL BEGIN**	Approximately December 1, 2020
	• **DATE WORK WILL BE COMPLETED** ..	Approximately November 30, 2021
	• **DETAILS** [n]	Construction means and methods will be the responsibility of the construction contractor in compliance with regulatory permits. All work below the ordinary high water mark, including the

		culvert installation, will occur within the regulated ODFW in-water work window for the Tualatin River tributaries, July 15 to September 30 (ODFW, 2008). In-water work construction sequencing is proposed to include the following steps: in-water work area isolation, fish salvage by a qualified fisheries biologist, flow bypass allowing for downstream volitional fish passage, dewatering of the work area, ongoing sediment and erosion control, removal and stockpile of existing channel surface and subsurface substrate, excavation, concrete footings pour/placement, replacement of subsurface and surface substrate, arch culvert placement, site restoration measures, and channel rewatering. Anticipated equipment includes an excavator, haul truck, concrete truck, and hand and power tools. The work area isolation plan showing the isolation structures, bypass pipe, and in-water works area is shown in Attachments C and E.
MAINTENANCE	• **WILL THE CROSSING BE INSPECTED FOR DEBRIS AND BED RETENTION (WITHIN, BELOW, AND ABOVE THE CROSSING) AT LEAST ANNUALLY AND AFTER STORM EVENTS?** ..... Yes ☒	No ☐ **Please see Attachment D.**
	• **IF NEEDED, WILL REMEDIAL MEASURES BE TAKEN AS SOON AS POSSIBLE?** ..... Yes ☒	No ☐

[b] *e.g., bridge, open-bottomed arch, pipe arch/squashed, round, rectangular*

[c] *e.g., reinforced concrete, concrete, wood, plastic, corrugated metal, metal*

[d] *if "Yes", explain how these will be addressed in a separate attachment*

[e] *"ACW" is the active channel width, which is the stream width between the ordinary high water lines, or at the channel bankfull elevation if the ordinary high water lines are indeterminate; ordinary high water lines are not the same as the wetted width and are typically determined by changes on the bank in vegetation, changes in sediment size and/or color, water lines on the bank, trees, or leaves, or the point where debris (e.g., needles, leaves, twigs, cones) accumulation begins*

[f] *3 measurements 20 feet apart should be averaged; begin measurements approximately 10 ACWs from the inlet (upstream) or outlet (downstream) of the crossing if this distance is outside of the influence of existing artificial obstructions and prior to adjoining tributaries as you move away from the crossing (if not, take measures at locations which fulfill these requirements); indicate measurement locations on the* **Profile Design Drawing**

[g] *take measurements away from the crossing and at the point where ACW measurement begins*

[h] *D_{100} is the average diameter of the 10 largest, naturally-occurring rocks in the stream reach; $D_{150} = D_{100} \times 1.5$; $D_{200} = D_{100} \times 2$*

[i] *"bed" refers to the stream bed within or under the crossing structure*

[j] *depth of fill material or countersinking/embedding (excluding protruding over-sized rock) at the crossing's inlet*

[k] *depth of fill material or countersinking/embedding (excluding protruding over-sized rock) at the crossing's outlet*

[l] *these are measures outside of the crossing structure intended to prevent up- or downstream channel degradation, especially important to consider in locations where an existing smaller culvert is being replaced and there is the potential for upstream channel degradation (i.e., a "headcut") and associated off-site property or passage problems*

[m] *e.g., bed retention measures, weirs, baffles, trash racks, aprons, retaining walls, overflow pipes, channel restoration/scour remediation measures*

[n] *unless already described in an accompanying Department of State Lands Removal-Fill Application, include a description of a) temporary downstream passage, upstream passage, screening, and bypass measures, b) worksite isolation measures, c) fish salvage (note: an ODFW Fish Take Permit may be necessary), d) sediment and erosion control measures, and e) site restoration measures. For more details on Oregon Fill Removal Law see the Oregon Division of State Lands Removal-Fill Guide at* http://oregonstatelands.us/DSL/PERMITS/rfg.shtml .

ADDITIONAL INFORMATION – *NOT APPLICABLE*

*Provide this information **only if** the bed within the proposed crossing is not as wide as the active channel width or will not be embedded.*

	High Design Flow [o]	Low Design Flow [p]
Flow [q] (cfs)		
Water Depth in Crossing (in.)		
Water Velocity in Crossing (fps)		
Water Drop [r] at Inlet (in.)		
Water Drop [r] at Outlet (in.)		
Pool Depth Below Outlet (in.)		
Water Drop [r] at Weirs/Baffles (in.)		
Pool Depth Below Weirs/Baffles (in.)		
Depth of Nappe [s] at Weirs/Baffles (in.)		

[o] *High Design Flow is the mean daily average stream discharge that is exceeded 5 percent of the time during the period when ODFW determines that native migratory fish require fish passage*
[p] *Low Design Flow is the mean daily average stream discharge that is exceeded 95 percent of the time, excluding days with no flow, during the period when ODFW determines that native migratory fish require fish passage*
[q] *attach a description of the methodology, calculations, and assumptions used to determine the high and low design flows*
[r] *drop should be measured from the upstream water surface elevation to the downstream water surface elevation*
[s] *the nappe is the water flowing over weirs/baffles*

DESIGN DRAWINGS

Please attach the following design drawings with the specified information on them.

☒ -- **PLAN**, including: **Please see Exhibits 1 and 3 and Attachments A and C.**
- active channel (i.e., ordinary high water or bankfull lines)
- existing crossing and additional structures
- proposed crossing and additional structures
- dimensions

☒ -- **PROFILE**, including: **Please see Exhibits 1 and 3 and Attachments A, B, and C.**
- existing grade (measured at the deepest part of the stream channel from 10 ACWs downstream of the outlet [i.e., downstream end of crossing] to 10 ACWs upstream of the inlet [i.e., upstream end of crossing], at 5-foot intervals), including road
- existing crossing and additional structures
- proposed grade (measured at the deepest part of the stream channel from 10 ACWs downstream of the outlet to 10 ACWs upstream of the inlet, at 5-foot intervals), including road
- proposed crossing, bed, and additional structures
- dimensions
- location of **STREAM CHANNEL CROSS-SECTIONS** (see below), *ACW* measurements, and *Slope* measurements
- water surface elevations at high and low design flows for the proposed crossing, **if** the proposed crossing will not be as wide as the active channel width or will not be embedded

☒ -- **CROSS-SECTION OF PROPOSED CROSSING**, including bed details **Please see Exhibit 3 and Attachment A.**

☒ -- **STREAM CHANNEL CROSS-SECTIONS** *(2 cross-sections total, with one located downstream where the ACW measurements begin and one located upstream where the ACW measurements begin; measurements should be taken at 1-foot intervals perpendicular to the flow of the stream and should encompass the entire active channel plus 0.5 ACW on each side of the stream [for a total cross-section measurement of 2 x ACW]; measurements may be taken with survey equipment or by measuring the distance from a level line to the bottom of the streambed or ground)* **Please see Attachment B.**

☐ -- **DETAILS OF ADDITIONAL STRUCTURES** *(e.g., grade control measures, bed retention measures, weirs/baffles, trash racks, aprons, retaining walls, overflow pipes, channel restoration/scour remediation measures)* **Not applicable.**

Please submit this application along with project design plans to the appropriate ODFW District Fish Biologist for the crossing's location. The complete application can also be sent electronically to the ODFW Fish Passage Coordinator at greg.d.apke@state.or.us and send one signed original paper copy of the application to the ODFW Fish Passage Coordinator at 4034 Fairview Industrial Dr. SE, Salem, OR 97302.

ODFW FISH PASSAGE APPROVAL #PA-00-0000
(insert name of project)

• *ODFW will use the following criteria to determine the level of review required.*

For ODFW Use Only

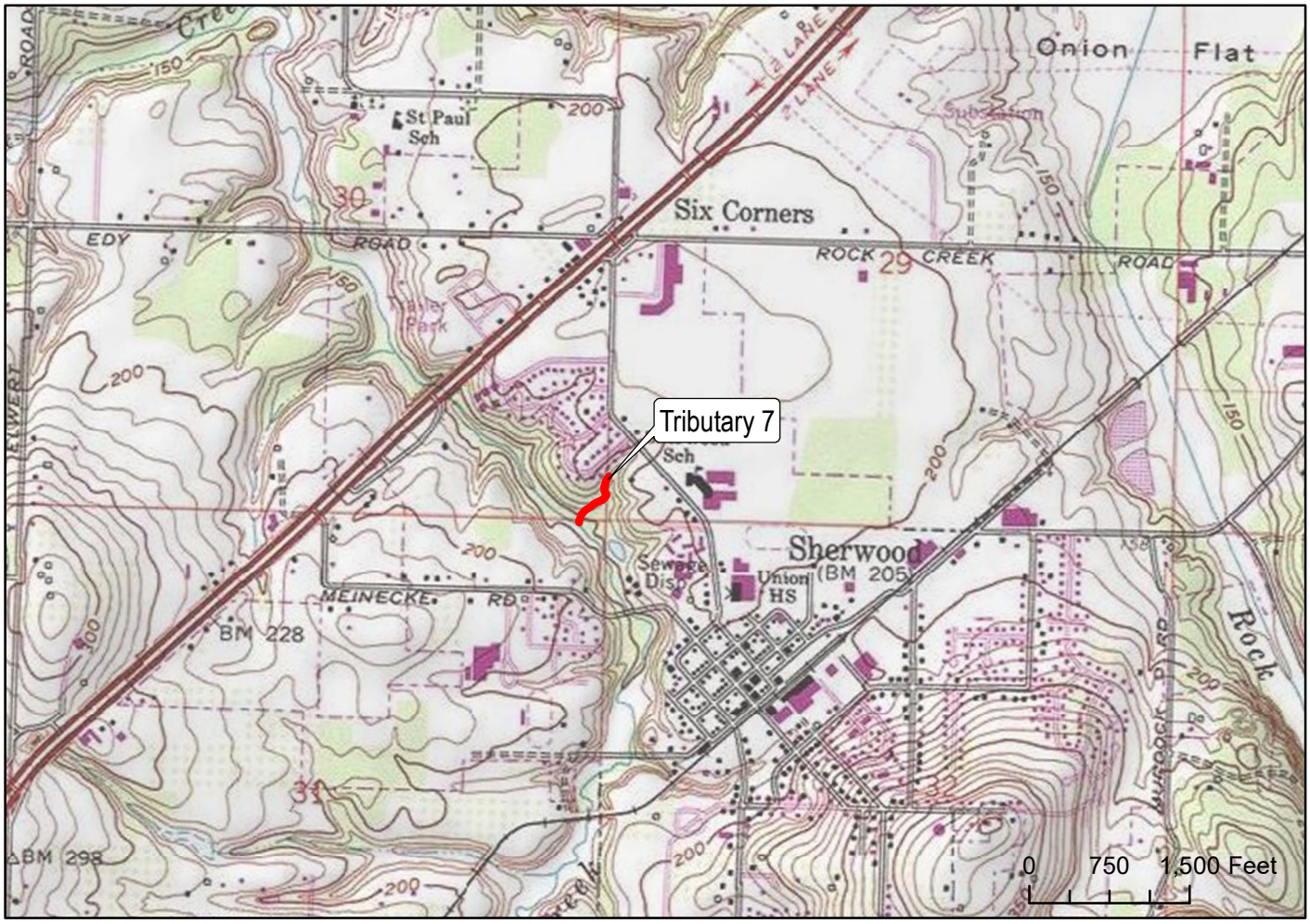
	YES	NO	N/A
1. Is the bed within the crossing as wide as the active channel:	☐	☐	☐
2. Is the bed within the culvert at the same slope, and at grades continuous with, the surrounding stream:	☐	☐	☐
3a. If the crossing is open-bottomed, is there 3 feet of vertical clearance between the active channel width elevation and the inside top of the crossing:	☐	☐	☐
OR			
3b. If the crossing is closed-bottomed, will bed depth within the culvert be 20-50% of the crossing height:	☐	☐	☐
4. Is the bed material that will be used sufficient to assure water depth will be similar to that in the surrounding stream (i.e., will not go sub-surface prematurely):	☐	☐	☐
5. Are the bed material or retention measures that will be used sufficient to assure that the bed will be maintained through time:	☐	☐	☐
6. If the crossing is longer than 40 feet, will partially-buried, over-sized rock be placed within the crossing's bed:	☐	☐	☐
7. Will the bed within the crossing be placed during construction:	☐	☐	☐
8. If trash racks are present, are they above the active channel width elevation and do vertical bars have at least 9 inches of clear space between them:	☐	☐	☐
9. If there is an upstream pond, wetland, or backwater area, has its desired state after construction been determined, and have these considerations been addressed in the design:	☐	☐	☐
10. Are upstream grade control measures satisfactory:	☐	☐	☐
11. Are the construction timing and measures adequate based on the location:	☐	☐	☐
12. Are there plans to maintain the crossing:	☐	☐	☐

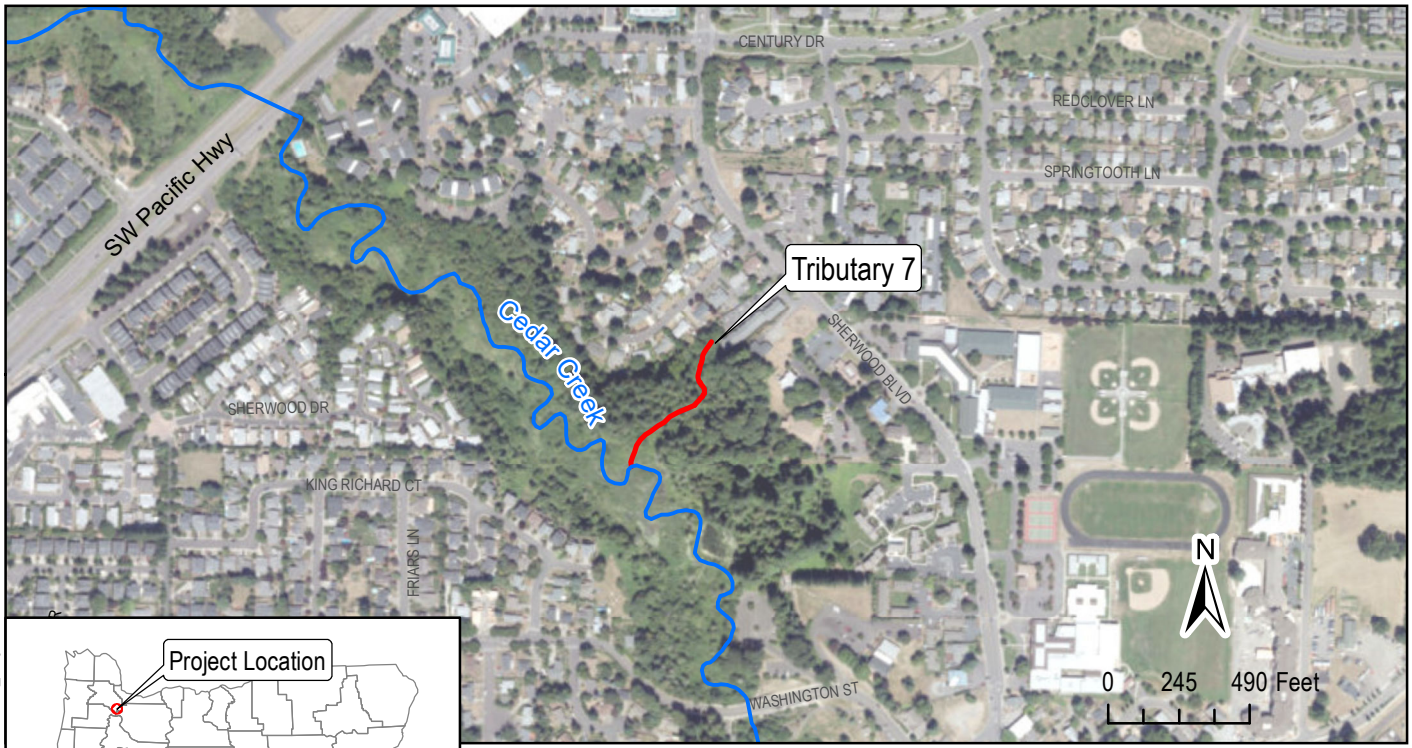
- If all answers are "Yes" or "Not Applicable", this plan is eligible for approval by an ODFW biologist.
- If any answer is "No" or there are other concerns, consult with the Fish Passage Coordinator.

APPLICATION IDENTIFIER: (insert name of project & applicant) **ODFW # PA-00-0000**
DATE RECEIVED: (insert date)

APPROVED ☐ **SIGNATURE:** _____ **DATE:** _____
DENIED ☐ **TITLE:**

CONDITIONS:





Cedar Creek/Tonquin Trail Project

Exhibit 1. Tributary 7 Project Location

Legend

- Stream
- Tributary 7 Centerline

Notes:
* Metro 2019 Aerial Imagery

Jacobs

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Exhibit 2. *Tributary 7 photo (facing upstream) taken from immediately downstream of the proposed multi-use trail crossing location. Conifers in the background are near the top of bank where the houses/buildings are lo cated.*

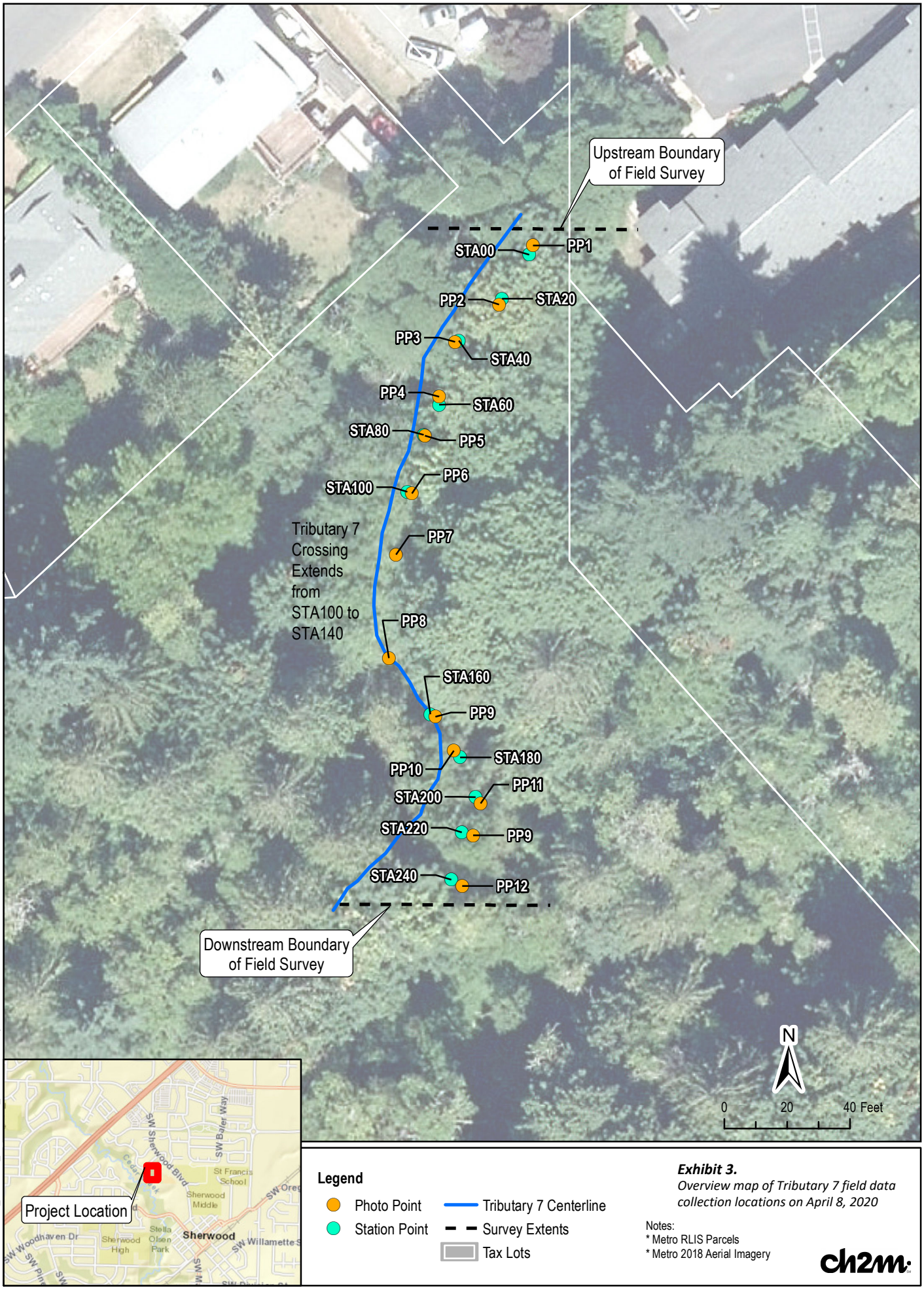

Exhibit 3.
Overview map of Tributary 7 field data collection locations on April 8, 2020

Notes:
* Metro RLIS Parcels
* Metro 2018 Aerial Imagery

ch2m.

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The channel survey extended approximately 240 ft overall, with 100 ft upstream of the crossing, 40 ft through the crossing, and 100 ft downstream of the crossing. The longitudinal profile has a slope of 0.07 for the overall reach (240 ft), with a defined inflection through the crossing, resulting in a slope of 0.12 immediately upstream of the crossing and 0.07 immediately downstream of the crossing (Exhibit 4).

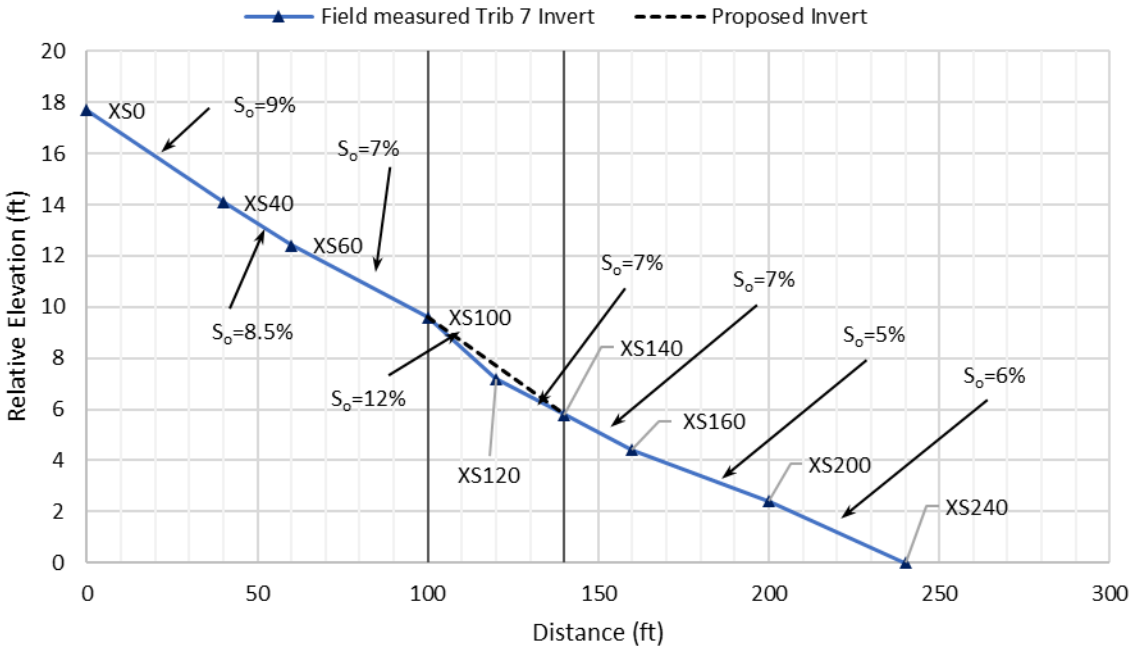


Exhibit 4. *Tributary 7 longitudinal profile measured April 8, 2020; crossing location is marked by vertical lines*

A total of 13 ACW measurements were collected, approximately every 20 ft along the channel. Upstream of the crossing, ACWs ranged from 3.3 to 6.9 ft, and downstream of the crossing ACWs ranged from 4.6 to 7.3 ft (Exhibit 5). Through the crossing, the three ACW measurements were 9.0 ft, 4.5 ft, and 7.6 ft, from upstream to downstream.

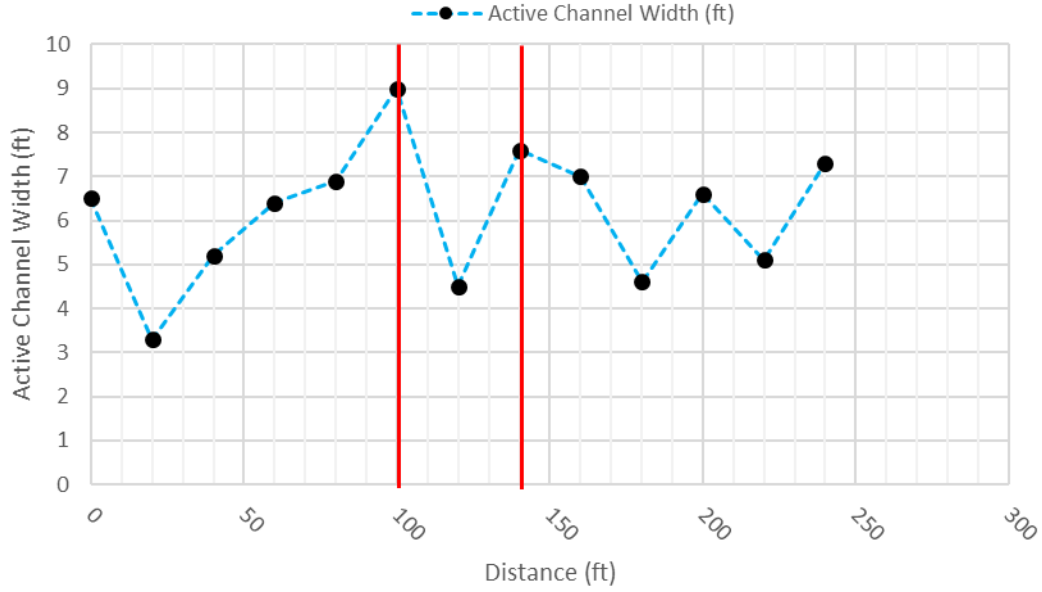
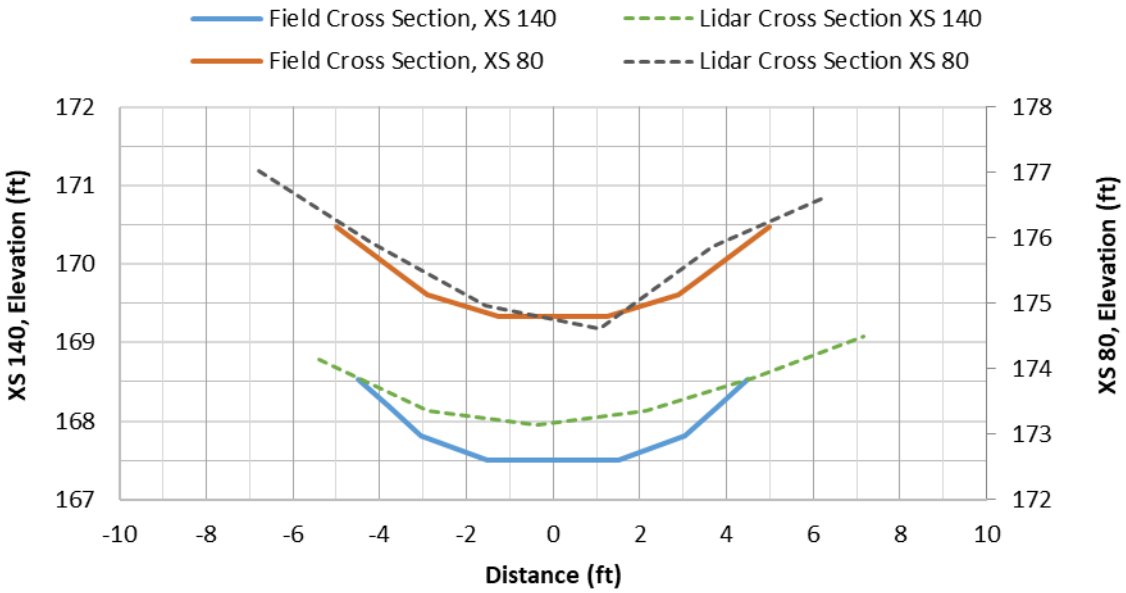


Exhibit 5. *Tributary 7 active channel widths measured April 8, 2020; crossing location is marked by vertical lines*

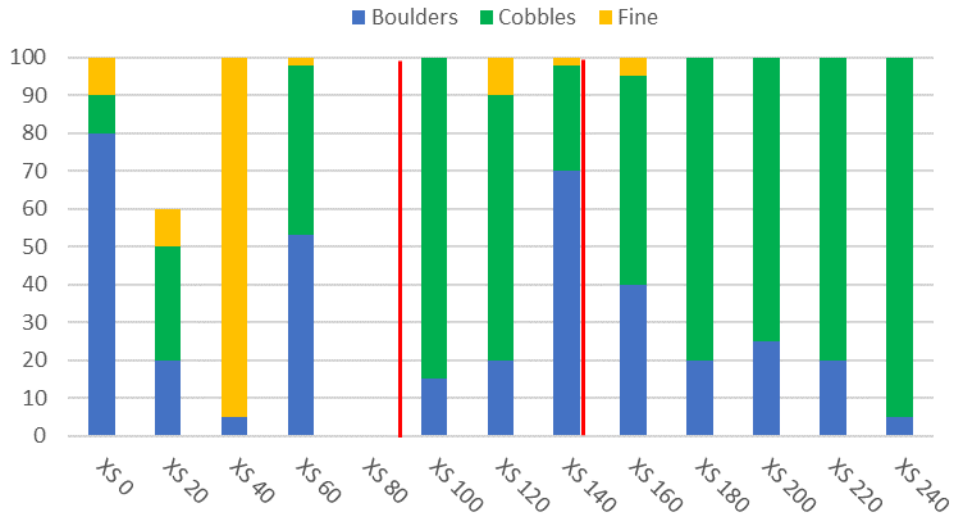
The channel shape is generally trapezoidal and uniform. Two cross sections, measured during the field investigation at XS 80 above the proposed culvert and XS 140 directly below the proposed culvert, are shown in Exhibit 6.



Note: Lidar source data, dogami lidar portal. Data collected in 2014. (https://gis.dogami.oregon.gov/maps/lidarviewer/)

Exhibit 6. *Tributary 7 cross sections at STA 80 (above proposed culvert) and STA 140 (outlet of proposed cul vert) measured April 8, 2020*

At 12 of the 13 cross section locations, surface substrate was also visually estimated by percent of three categories: boulders, cobbles, and fines (Exhibit 7). Through the crossing, boulders and cobbles dominant (Exhibit 7).



Note: No bed material data collected at XS 80

Exhibit 7*. Tributary 7 bed substrate visually estimated April 8, 2020; crossing location is marked by vertical lines*

Subsurface conditions in the vicinity of the crossing are characterized by two test bores collected on November 15, 2015, TB 18026-14 and TB 18026-15 (Exhibit 6). Located on the right (west) bank of Tributary 7, the bore at TB 18026-14 extended 12 ft deep and consists of sandy silt (ML), clayey silt (CL-ML), and fine sand (SM) (RhinoOne Geotechnical, 2016). Located on the left (east) bank of Tributary 7, the bore at TB 18026-15 extended 35 ft deep and consists of sandy silt (ML), clayey silt (CL-ML), and Silty fine sand (SM) (Rhino One, 2016). Both bores include liquefiable soils, which require a more conservative design approach to channel source and structural stability.

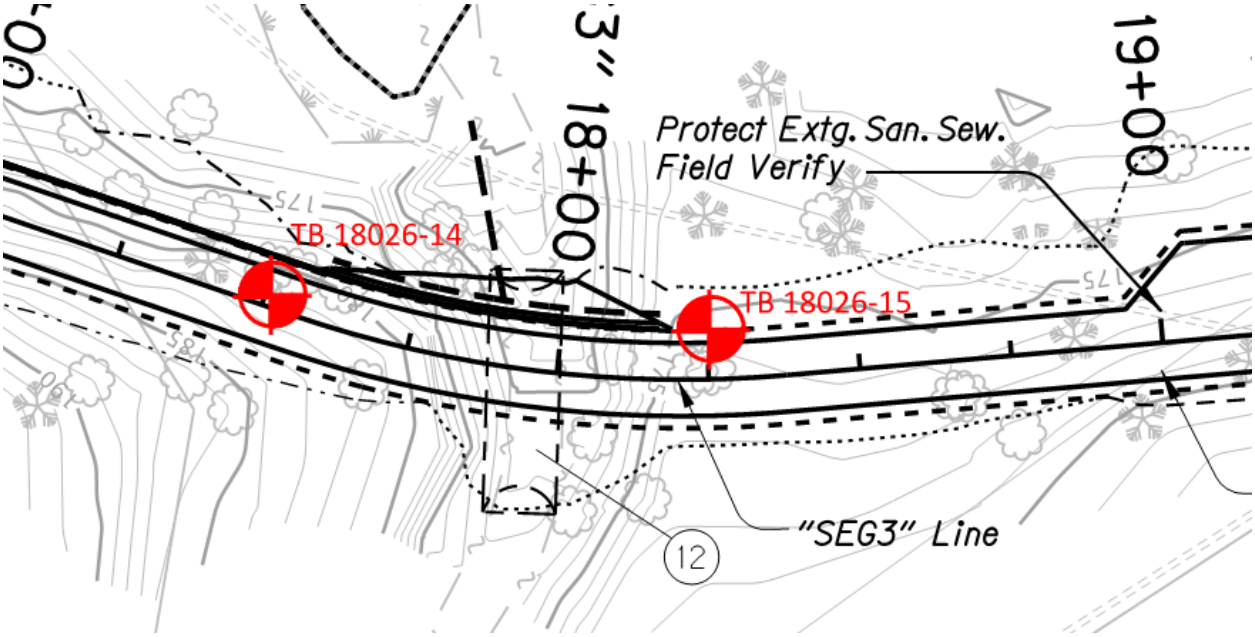


Exhibit 6. *Tributary 7 subsurface test bore locations collected November 15, 2015*

The existing channel bed material will be retained for reuse (removed during construction, stockpiled, and replaced). This material is currently stable (i.e., no field observations of bed or bank erosion) and generally consistent in size and shape with the bed material upstream and downstream of the crossing (Exhibit 7 and Attachment B). Replacement of the bed material with smaller imported "spawning gravel" substrate would significantly increase the potential for erosion of bed material causing an upstream headcut through this relatively short, steep tributary. Any potential small gain in 40 ft of channel length for spawning would be greatly offset by the potential increased risk of a headcut and subsequent unraveling of up to 200 ft of channel, impacts to upstream drainage infrastructure at the transition to the residential area, displacement of the trail crossing arch culvert, and downstream sediment deposition in Tributary 7 and Cedar Creek.

Attachment B. Bottomless Arch Culvert Hydraulic Analysis

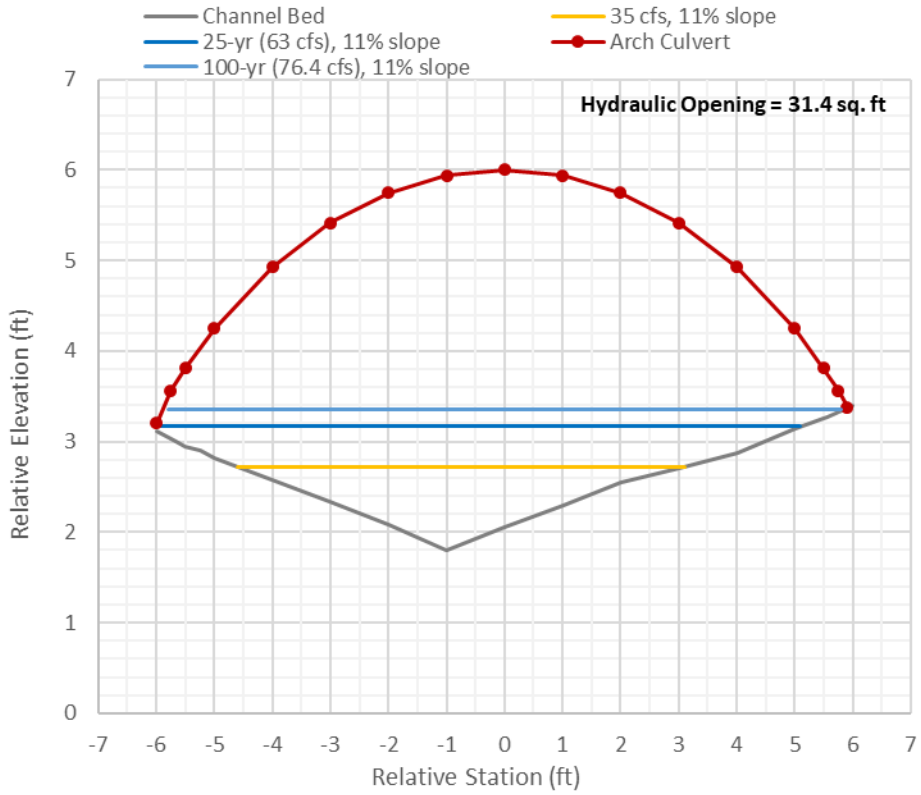


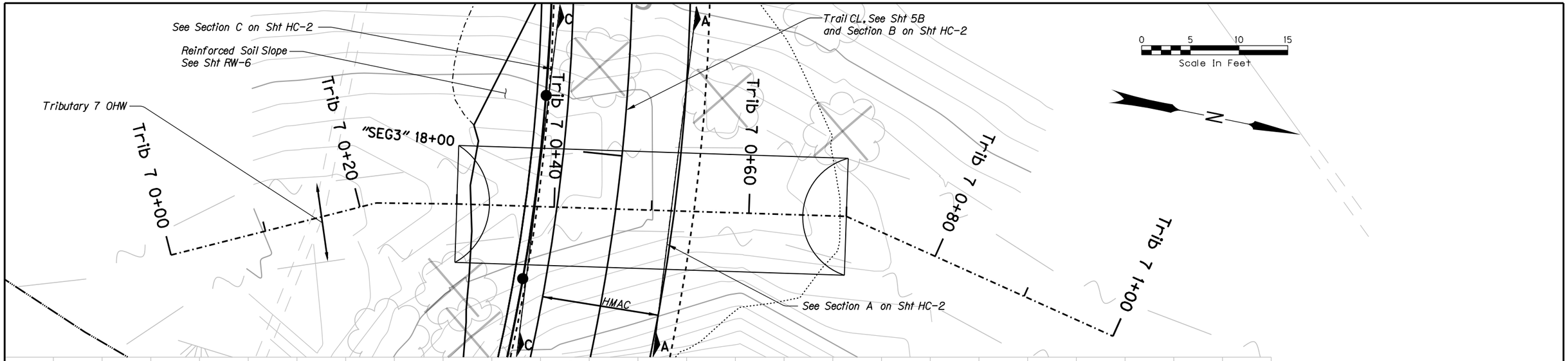
***Exhibit 7**. Proposed bottomless arch culvert (12-ft wide channel width) and channel cross section at Sta 140*

Hydraulics for the proposed bottomless arch culvert were simulated using the Federal Highway Administration's (FHWA) Culvert Hydraulic Analysis Program, HY-8 version 7.60. At the 25-year flow of 63 cfs, depths and velocities through the bottomless arch culvert are consistent with hydraulics in the adjacent channel. All flow is contained within the active channel, and no narrowing of the floodplain occurs. Hydraulic model results are summarized in Exhibit 8 and detailed in Attachment C.

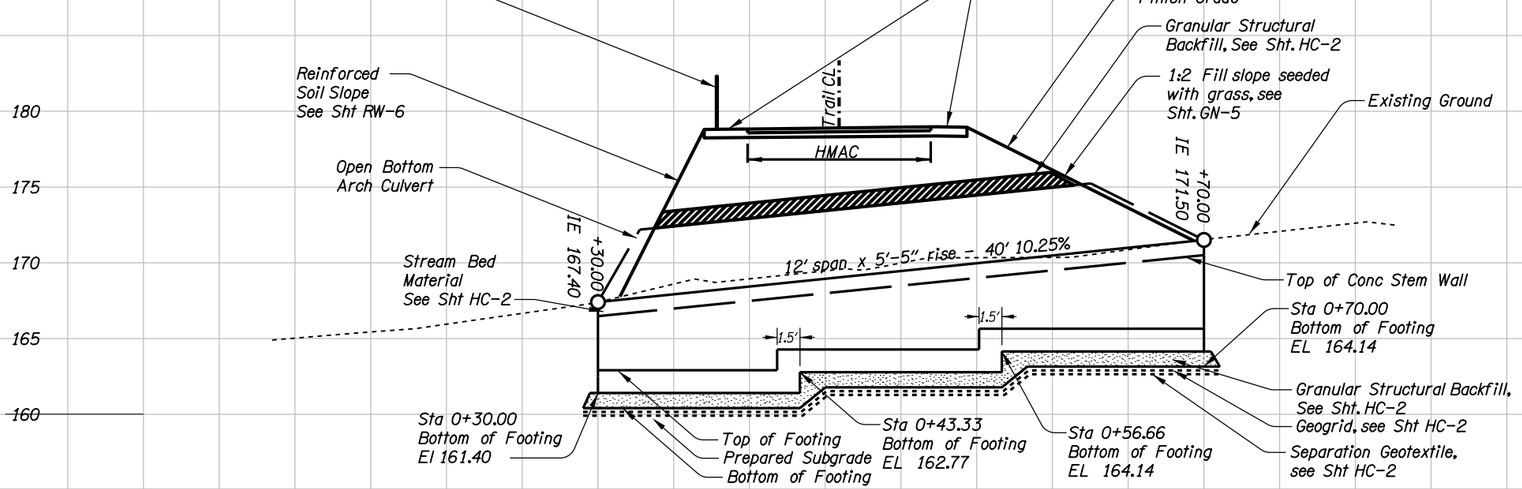
	At Inlet		At Outlet		
Total Discharge	**Headwater Elevation**	**Vertical Clearance**	**Outlet Depth**	**Tailwater Vertical Clearance**	**Velocity**
cfs	*ft*	*ft*	*ft*	*ft*	*cfs*
34 (Q2)	1.6	3.7	1.6	4.9	8.6
63 (Q25)	2.0	3.3	2.0	4.6	10.0
76 (Q100)	2.2	3.1	2.1	4.5	10.5

***Exhibit 8.** Proposed bottomless arch culvert hydraulic analysis (HY-8) results*

Attachment C. Design Drawings



PLAN
1"=5'



PROFILE
1"=5'

REGISTERED PROFESSIONAL ENGINEER
72869PE
OREGON
JULY 23, 2009
MATTHEW RYAN LITTLE
EXPIRES: 12/31/2020

REVIEW COPY ONLY

OREGON DEPARTMENT OF TRANSPORTATION

Jacobs
2020 SW 4TH AVE. - 3RD FLOOR
PORTLAND, OR 97201-4953
TEL. 503.235.5000

CEDAR CREEK/TONQUIN TRAIL:
OR99W - SW PINE ST (SHERWOOD)
PACIFIC HIGHWAY WEST
WASHINGTON COUNTY

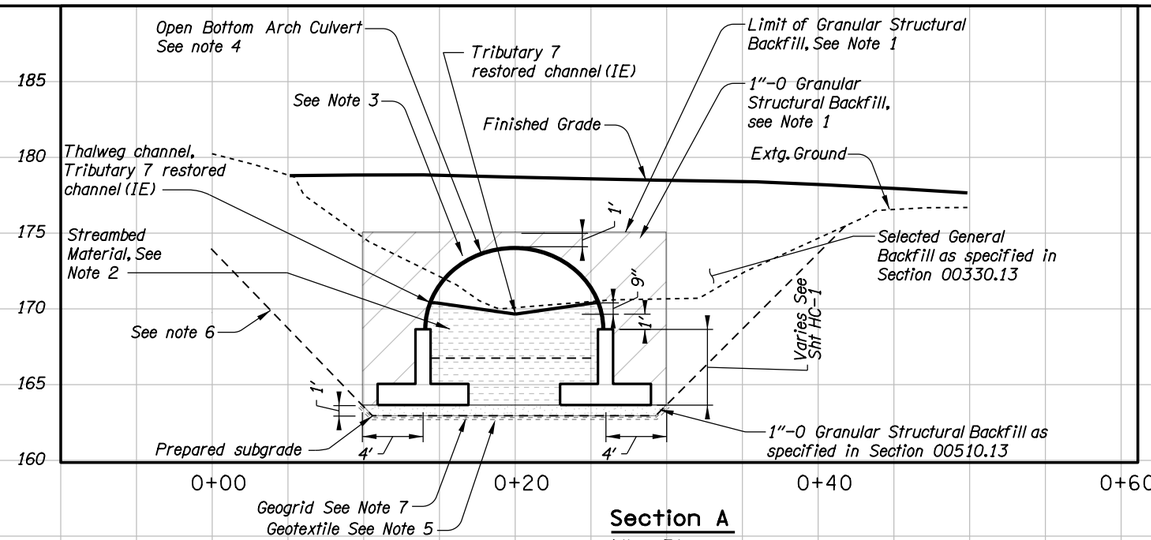
Reviewed By - R. Attanasio
Designed By - M. Little
Drafted By - J. Walker

FISH PASSAGE CULVERT PLAN AND PROFILE

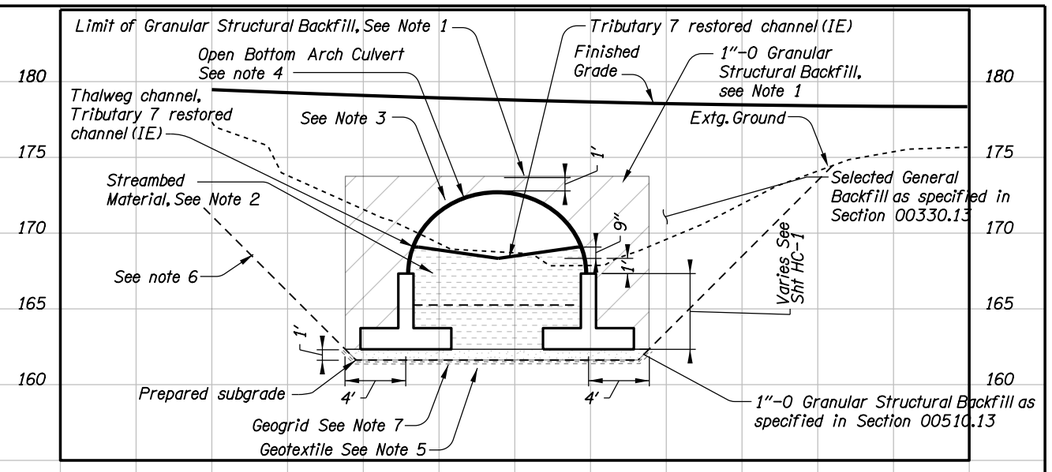
SHEET NO. HC-1

ROADWAY

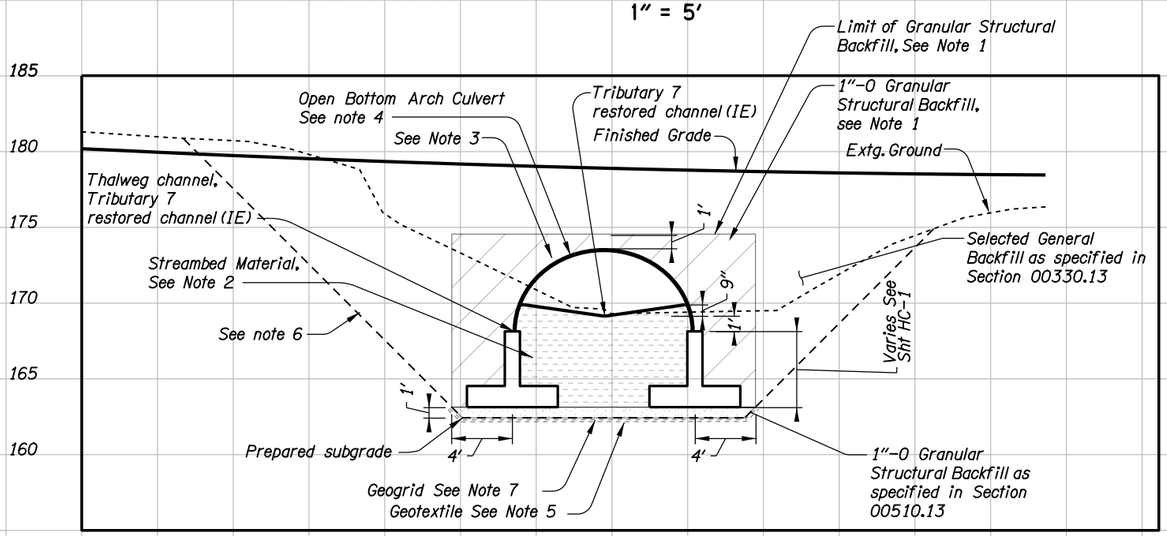
662691ST-PP01.dgn



Section A
1" = 5'



Section C
1" = 5'



Section B
1" = 5'

Notes:

1. Provide Granular Structure Backfill as specified in Section 00510.13, except that backfill shall be installed in 8" loose lifts placed symmetrically on each side of the culvert and compacted to minimum 90% density per AASHTO T-180. Compaction of the backfill shall be with hand operated equipment or with lightweight (D-4 or lighter) equipment.
2. Stockpile native material from streambed excavation on site and isolate from other excavated materials. Backfill and restore streambed with native streambed material.
3. After culvert is installed and backfilled, protect from excessive loading by other construction equipment.
4. Open bottom arch culvert shall be a Structural Plate Arch as specified in Section 00450. Structural Plate shall be manufactured of 6"x2" Corrugated plate. Contrtactor shall verify metal gauge with manufacturer, and submit calculations for approval by Engineer demonstrating the structural arch plate has been designed to resist the loading from 10-ft cover and HS-20 Live Load.
5. Provide Woven Subgrade Geotextile as specified in Section 02320.
6. Schematic Excavation Slope. Contractor to design and excavate to provide safe stable slope complying with OSHA standards and local, state, and federal standards.
7. Provide Subgrade Reinforcement Geogrid as specified in Section 02320.
8. Refer to Sht HC-1 for loactions of Sections in Plan.

0 5 10 15
Scale In Feet

REGISTERED PROFESSIONAL ENGINEER
72869PE
OREGON
JULY 23, 2009
MATTHEW RYAN LITTLE
EXPIRES: 12/31/2020

REVIEW COPY ONLY

OREGON DEPARTMENT OF TRANSPORTATION

Jacobs
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PORTLAND, OR 97201-4953
TEL. 503.235.5000

CEDAR CREEK/TONQUIN TRAIL:
OR99W - SW PINE ST (SHERWOOD)
PACIFIC HIGHWAY WEST
WASHINGTON COUNTY

Reviewed By - R. Attanasio
Designed By - M. Little
Drafted By - J. Walker

FISH PASSAGE CULVERT SECTIONS

SHEET NO. HC-2

ROADWAY

662691ST-pr03.dgn

Attachment D. Construction Schedule, Construction Methods, and Project Maintenance

Construction Schedule

Construction is estimated to start around December 1, 2020, and last approximately 12 months. All work below the ordinary high water mark, including the culvert installation, will occur within the regulated ODFW in-water work window for the Tualatin River tributaries, July 15 to September 30 (ODFW, 2008).

Construction Methods

Construction means and methods will be the responsibility of the construction contractor in compliance with regulatory permits. In-water work construction sequencing is proposed to include the following steps: in-water work area isolation, fish salvage by a qualified fisheries biologist, flow bypass allowing for downstream volitional fish passage, dewatering of the work area, ongoing sediment and erosion control, removal and stockpile of existing channel surface and subsurface substrate, excavation, concrete footings pour/placement, replacement of subsurface and surface substrate, arch culvert placement, site restoration measures, and channel rewatering. Anticipated equipment includes an excavator, haul truck, concrete truck, and hand and power tools.

Project Maintenance

Because the watershed upstream of the Tributary 7 crossing is residential, little input of sediment and native large wood material is anticipated. Also, with no changes proposed to the existing channel width and profile and the large span (lateral and vertical) of the bottomless arch culvert, no changes to the existing conveyance are expected. Required maintenance (e.g., removal of Christmas trees dumped into the creek) would be the responsibility of the City of Sherwood.

Attachment E. Temporary Bypass Plan
Final construction means and methods to be determined by construction contractor.

SCHEMATIC DOWNSTREAM COFFERDAM
COFFERDAM SHALL BE SIZED BY CONTRACTOR TO ISOLATE WORK AREA FOR CULVERT

Access to Culvert along Trail Alignment

PROPOSED OPEN BOTTOM ARCH CULVERT

0 5 10 15
Scale In Feet

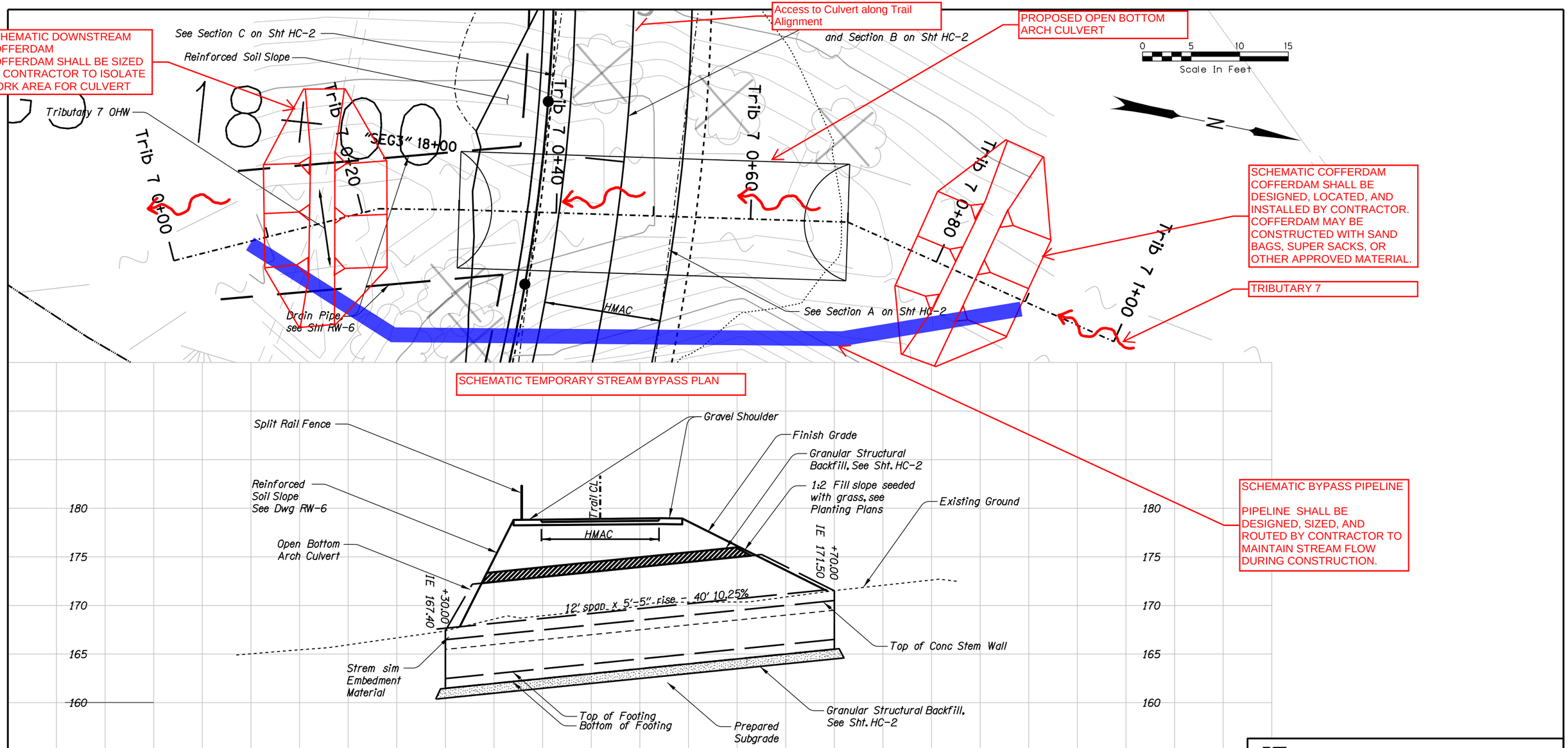
N

SCHEMATIC COFFERDAM
COFFERDAM SHALL BE DESIGNED, LOCATED, AND INSTALLED BY CONTRACTOR. COFFERDAM MAY BE CONSTRUCTED WITH SAND BAGS, SUPER SACKS, OR OTHER APPROVED MATERIAL.

TRIBUTARY 7

SCHEMATIC BYPASS PIPELINE

PIPELINE SHALL BE DESIGNED, SIZED, AND ROUTED BY CONTRACTOR TO MAINTAIN STREAM FLOW DURING CONSTRUCTION.



SCHEMATIC TEMPORARY STREAM BYPASS PLAN

PROFILE

ROADWAY

662691ST-PP01.dgn

OREGON DEPARTMENT OF TRANSPORTATION

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JULY 23, 2009
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EXPIRES: 12/31/2020

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CEDAR CREEK/TONQUIN TRAIL:
OR99W - SW PINE ST (SHERWOOD)
PACIFIC HIGHWAY WEST
WASHINGTON COUNTY

Reviewed By - M. Bittancourt
Designed By - M. Little
Drafted By - M. Wainscott

CULVERT PROFILES

SHEET NO. HC-1