

November 1, 2023

SUBJECT: PRIVATE SEWER SIZING MEMORANDUM FOR DANA POINT HARBOR MARINA GANGWAYS

**Prepared under the Approval of: Daniela Malott, P.E.
TAIT & Associates, Inc.**



As part of The Dana Point Harbor Revitalization Marina Improvements project, a private sewer line system will be constructed to service the sewage discharge generated by boaters. The discharge lines from dock sewer pump outs will be connected to the existing South Coast Water District sewer main. The proposed sewer system is depicted in the Dana Point Harbor Marina Wet Utility Construction Documents submitted under permit PKG22-0060. This memorandum is in response to comment 2.07 and it provides a summary of the calculations and results of the sewer line sizing. The following calculations were performed in accordance with the South Coast Water District Design (SCWD) Requirements (2014).

See **Attachment A** for the Marina Private Sewer Exhibit for locations of Sewer Laterals 1, 2, and 3 and the proposed sewer lines discussed in this memo.

SEWER SIZING METHODOLOGY AND FINDINGS

Several private sewer lines are proposed to connect to the marina gangways and are to be used for discharging effluent from the boats docked at the harbor. The pump design and analysis were conducted by KECO Inc and is provided under a separate cover for the sewage pump design. The analysis showed that only one pump will be active at any one time with a discharge rate of 35 gallons per minute (gpm). The smallest line proposed was analyzed utilizing the flow design criteria provided by KECO and following the SCWD standards to ensure the smallest line has capacity for the proposed effluent. The proposed 4-inch gravity sewer line connection was evaluated with a peak flow rate of 35 gallons per minute (0.08 CFS) and slope of 1.06% (minimum slope for Sewer Lateral 3) using the Launch Express software tool, which runs a manning's equation calculation to calculate the depth of flow. A maximum flow depth of 0.15-feet was found. This indicates that the calculated D/d for the project is below the 0.5 required by SCWD standards for pipes less than 12-inches. See calculation below for design check to ensure the depth of flow is less than half the pipe diameter.

$$\frac{\text{Depth of Flow (FT)}}{\text{diameter of pipe (FT)}} < 0.5 \text{ (Standard from South Coast Water District)}$$

$$\text{Design Check} = \frac{0.15'}{0.33'} = 0.45 < 0.5$$

The flow velocity is 2.11 FPS, which complies with the minimum of 2 FPS. As a result, it can be concluded that if the smaller size pipe of 4-inches at the minimum slope of 1.06% complies with the requirement, all other proposed sewer lines that are same or larger size at slopes higher than 1.06% also provide sufficient capacity for the sewage effluent. It can be concluded then that the proposed private sewer systems are designed adequately.

See **Attachment B** for calculations.

SEWER SIZING AT WEST COVE

Sewer Lateral 1

Existing Sewer Lateral 1 is a 4-inch sewer line that currently receives flows from the Dolphin Dave's building. The building flows were obtained from the Dudek Master Plan Review, dated March 2021. In the proposed condition, it will also receive flows from a 4-inch sewer line connected to docks W1 and W2. The anticipated flows are:

Existing building flow (Dolphin Dave's) = 0.005cfs

Proposed W1 max flow = 35gpm = 0.08cfs

Proposed W2 max flow = 35gpm = 0.08cfs

Combined existing and proposed flows = 0.165cfs

Minimum proposed slope after lines from W1 and W2 join = 4.00%

$$\text{Design Check} = \frac{0.16'}{0.33'} = 0.48 < 0.5$$

Flow velocity = 4.11 FPS

The depth of flow is less than half the pipe diameter and the flow velocity is 4.11 FPS which complies with the minimum of 2 FPS.

See **Attachment C** for calculations.

Sewer Lateral 2

Existing Sewer Lateral 2 does not receive flows from the building but rather carries flows from the existing gangways. Therefore, this sewer lateral sized at 4-inches is sufficient and can carry the proposed discharge flows.

Sewer Lateral 3

Existing Sewer Lateral 3 is a 6-inch drop inlet that connects to an existing manhole and currently receives flows from an existing 6-inch sewer line from the existing boater building. The building flows were obtained from the Dudek Master Plan Review, dated March 2021. In the proposed condition, it will also receive flows from docks W4 and W5. When the 4-inch sewer lines from W4 and W5 connect, the line size is increased to a proposed 6-inch sewer line.

The anticipated flows are:

Existing building flow (boater building) = 0.007cfs

Proposed W4 max flow = 35gpm = 0.08cfs

Proposed W5 max flow = 35gpm = 0.08cfs

Combined existing and proposed flows = 0.167cfs

Minimum proposed slope after lines from W4 and W5 join = 1.06%

$$\text{Proposed 6 - Inch Design Check} = \frac{0.19'}{0.5'} = 0.38 < 0.5$$

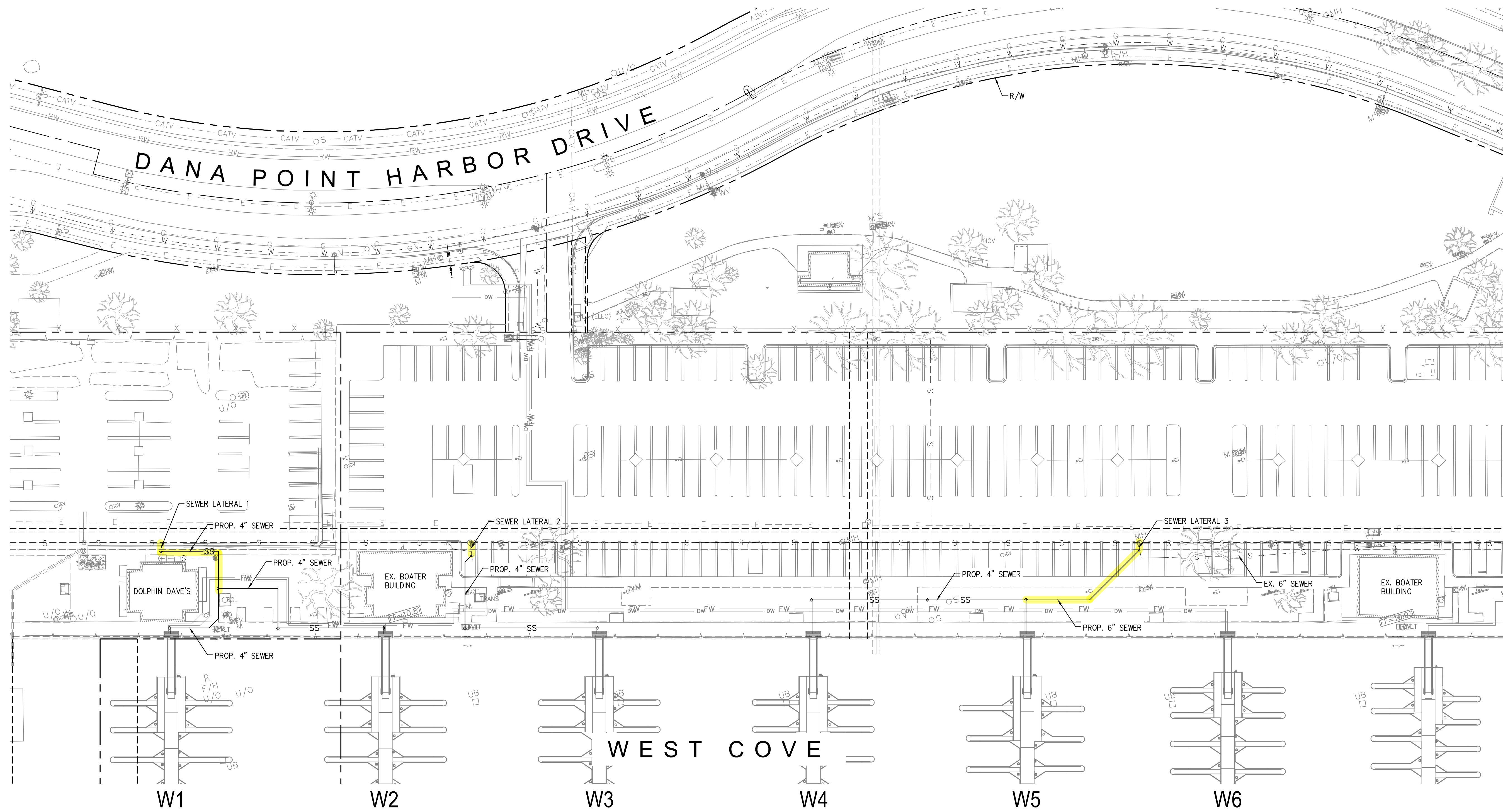
Proposed 6-Inch flow velocity = 2.43 FPS

The depth of flow is less than half the pipe diameter and the flow velocity is 2.43 FPS which complies with the minimum of 2 FPS.

At Existing Sewer Lateral 3, the 6-inch drop inlet receives flows from the existing boater building and proposed docks W4 and W5. The flows from the existing boater building and docks W4 and W5 are already combined in the above calculation, therefore the 6-inch drop inlet is sized adequately for a flow of 0.167cfs.

See **Attachment D** for calculations.

Dec 15, 2023 - 11:54am by eddie.k. K:\Drawings\ME\ME03810 - Dana Point Harbor Private Sewer Memorandum\ME03810_WC_PH1_UT_PRIV Exhibit.dwg



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701 North Parkcenter Drive
Santa Ana, CA 92705
p: 714.540.9200
www.tait.com

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MARINA PRIVATE SEWER EXHIBIT

Channel Report

ATTACHMENT B

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc.

Tuesday, Oct 31 2023

4IN SEWER LINE

Circular

Diameter (ft) = 0.33

Invert Elev (ft) = 1.00

Slope (%) = 1.06

N-Value = 0.013

Calculations

Compute by: Known Q

Known Q (cfs) = 0.08

Highlighted

Depth (ft) = 0.15

Q (cfs) = 0.080

Area (sqft) = 0.04

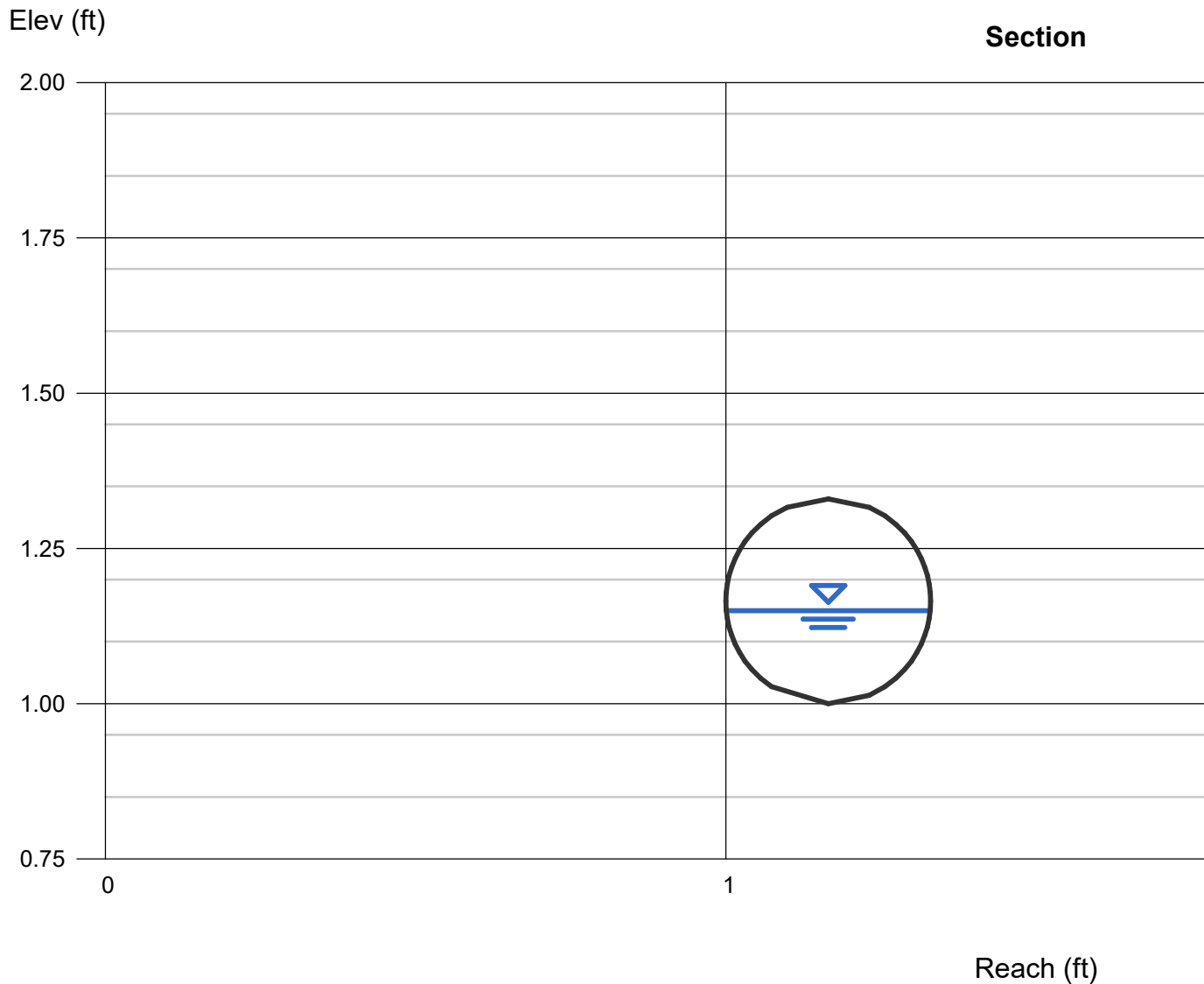
Velocity (ft/s) = 2.11

Wetted Perim (ft) = 0.49

Crit Depth, Yc (ft) = 0.16

Top Width (ft) = 0.33

EGL (ft) = 0.22



Channel Report

ATTACHMENT C

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc.

Wednesday, Nov 1 2023

<Name>

Circular

Diameter (ft) = 0.33

Invert Elev (ft) = 1.00

Slope (%) = 4.00

N-Value = 0.013

Calculations

Compute by: Known Q

Known Q (cfs) = 0.17

Highlighted

Depth (ft) = 0.16

Q (cfs) = 0.170

Area (sqft) = 0.04

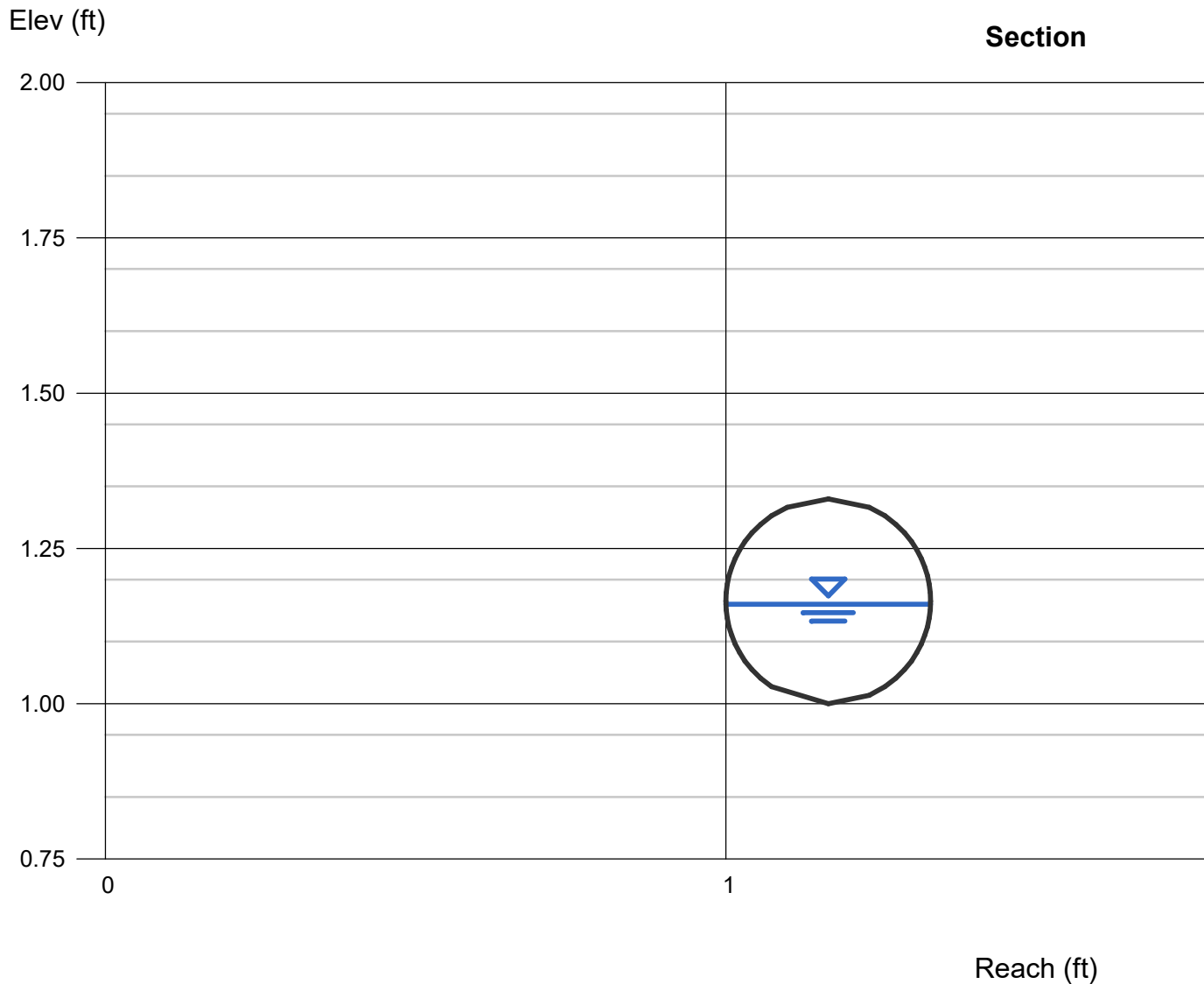
Velocity (ft/s) = 4.11

Wetted Perim (ft) = 0.51

Crit Depth, Yc (ft) = 0.24

Top Width (ft) = 0.33

EGL (ft) = 0.42



Channel Report

ATTACHMENT D

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc.

Wednesday, Nov 1 2023

<Name>

Circular

Diameter (ft) = 0.50

Invert Elev (ft) = 1.00

Slope (%) = 1.06

N-Value = 0.013

Calculations

Compute by: Known Q

Known Q (cfs) = 0.17

Highlighted

Depth (ft) = 0.19

Q (cfs) = 0.167

Area (sqft) = 0.07

Velocity (ft/s) = 2.43

Wetted Perim (ft) = 0.66

Crit Depth, Y_c (ft) = 0.21

Top Width (ft) = 0.49

EGL (ft) = 0.28

