

**TRANSPORT COLORADO
FDP AMENDMENT
MANILA ROAD AND COLFAX AVENUE
MASTER UTILITY REPORT
CITY OF AURORA, COLORADO**

APRIL 2020

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**MASTER UTILITY REPORT
FOR
TRANSPORT COLORADO**

City of Aurora Approval Block

Aurora Water

Date

City Engineer

Date

Fire Department

Date

FACSIMILE

This electronic plan is a facsimile of the signed and sealed PDF set.

Colorado Professional Engineer
Jason Mann, CO P.E. No. 42735

Date

ENGINEER'S STATEMENT:

This utility study "Master Utility Report for TransPort Colorado" was prepared under my direct supervision in accordance with the provisions of the City of Aurora Standards and Specifications Regarding Water, Sanitary Sewer and Storm Drainage Infrastructure. I understand that the City of Aurora does not and will not assume liability for facilities designed by others.

Jason Mann, CO P.E. No. 42735
CVL Consultants of Colorado, Inc.

Date

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1 INTRODUCTION

1.1 Project Description

TransPort Colorado is a proposed logistics and commerce park consisting of approximately 5,400 acres of industrial and commercial development adjacent to the Colorado Air and Space Port (Space Port), formerly known as Front Range Airport in Aurora, Colorado. The project offers significant growth opportunity for the area due to its proximity to I-70, Highway 36, Denver International Airport (DIA), and the Union Pacific Rail line that borders the southern portion of the site.

The TransPort Colorado Project proposes light to heavy industrial, and mixed commercial uses. Improvements will include the construction of new roads, water, sanitary, and stormwater infrastructure, as well as parks and open space.

1.2 Project Location

The project is located at the eastern edge of Aurora in Adams County, Colorado, approximately 20 miles east of downtown Denver, and approximately 6 miles southeast of DIA. The site is immediately adjacent to Space Port, I-70, and the Union Pacific Rail line. It consists of property in Sections 8, 16, 17, 20, 21, 22, 24, 25, 27, 28, 29, 32, and 33, Township 3 South, Range 64 West of the Sixth Principal Meridian. The project includes unannexed property in Sections 17, 20, and 29. This study will be revised accordingly when that property is annexed into the City of Aurora. Refer to Figure 1 below for a location map of the project and surrounding areas.

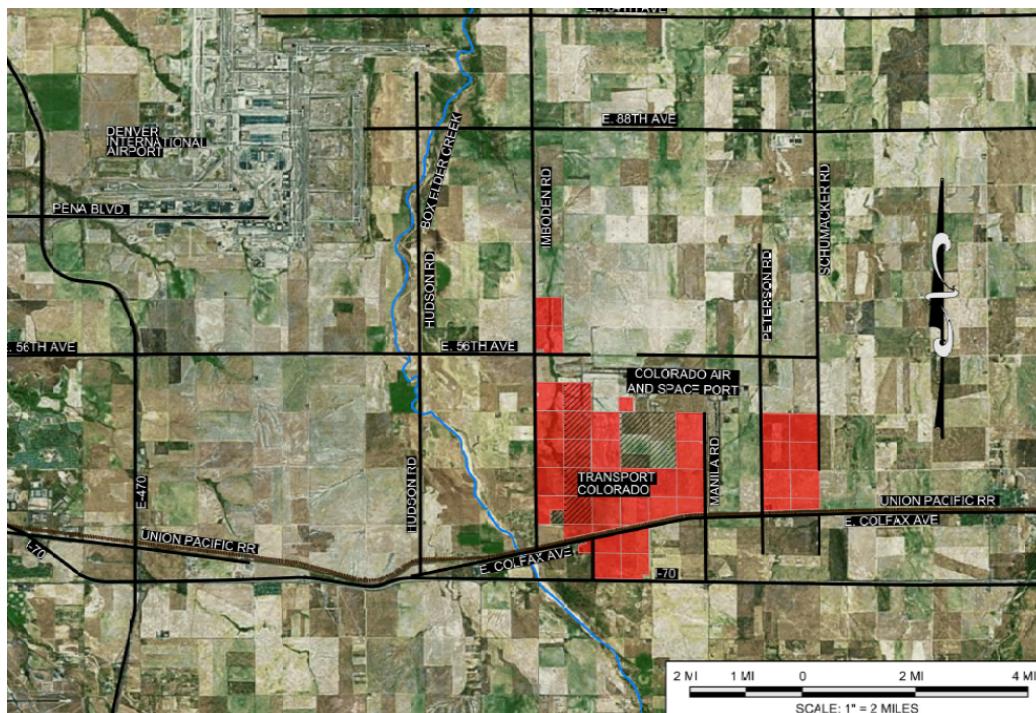


Figure 1 – Location Map

1.3 Scope

This report serves as a companion document to the amended Framework Development Plan (FDP) and Public Improvement Plan (PIP) for TransPort Colorado. The purpose of this Master Utility Report (MUR) is to establish the water and wastewater infrastructure needed to support the project at full build-out while accounting for surrounding areas as shown in the respective City of Aurora (COA) Capital Improvement Plans (CIPs). Initial and interim phases are discussed briefly. Refer to the Master Utility Study for each sub-area for a more detailed discussion on interim conditions.

Two studies were previously performed for the site. The first is titled the ***Water and Wastewater Master Plan for Front Range Airport and Surrounding Area*** by the Farnsworth Group, dated December 20, 2001 (Ref. 1). The second is titled the ***Transport and Front Range Airport Area Master Utilities Plan*** by the Matrix Design Group, Inc., dated May 1, 2007 (Ref. 2). The latter was a companion document to the FDP that was approved in 2005 and revised in 2006. Sections of this report will reference the report compiled by Matrix in 2007. Excerpts will be shown in italics.

Similar to the Matrix report, this report will follow several guiding principles for the implementation of the design. Those guiding principles are as follows:

- *Develop just-in-time construction strategies that defer capital expenditures to the extent possible to enable the development to become established and create revenue streams to support broader regional capital improvement programs,*
- *Minimize stranded costs related to phasing infrastructure. To the extent practicable, trunk infrastructure will be sized to serve either build-out conditions or to provide a reasonable life cycle to justify future replacement,*
- *Utilize a wide variety of funding sources including developer contributions, water and sewer enterprise funds, Title 32 Metropolitan District tax revenues, and State/Federal grants to clear the significant cost hurdles for water and wastewater systems at this location, and*
- *Provide for design of infrastructure that becomes fully integrated into the City of Aurora capital and operations programs.*

2 SANITARY SEWER MASTER PLAN

2.1 Objective

The objective of this report is to define the sanitary requirements for the site and establish a conceptual design and system layout at full build-out. Because there are many unknowns regarding timing and actual users, detailed design will be performed at the Site Plan level when the site parameters are better defined. Each Site Plan will include amendments to this MUR identifying actual utility needs and any sanitary sewer treatment systems needed to meet sub-area requirements.

2.2 Existing Conditions

With the exception of Space Port, the predominant land use in the area is agriculture with few residents. There is currently no public sanitary infrastructure in the area of the

site. Existing residents are served by individual septic systems. There is an existing wastewater treatment plant servicing Space Port. For the purposes of this report, it is assumed that Space Port will connect to the infrastructure installed with the development of TransPort, which may include a future wastewater treatment plant at 64th Avenue and Bear Gulch.

2.3 Criteria

Because this report is focusing on the full build-out scenario, COA criteria is used for the design of the overall system. These design criteria were adopted from the ***Standards and Specifications Regarding Water, Sanitary Sewer and Storm Drainage Infrastructure*** (Ref. 3).

The following list of criteria was used to develop the wastewater loading and system design for the proposed site:

- Commercial Average Day loading = 1,500 gpd/acre*
- Commercial Equivalent Population per acre = 22*
- Industrial Average Day loading = 1,200 gpd/acre*
- Industrial Equivalent Population per acre = 18*
- Peaking Factor (PF) = $5 \div p^{0.167}$, where p = population in thousands and PF is no greater than 4.0 and no less than 1.7.
- The flow velocity shall not exceed ten (10) fps flowing full or ½ full using Manning's Formula and n=0.011 for PVC or n=0.013 for RCP. Minimum slope shall be 0.4% for pipes 8" in diameter or larger with a minimum velocity of two (2) fps at least once per day.
- Depth of flow in pipes should not exceed 75% of capacity for pipes 12 inches or smaller and 80% for pipes larger than 12 inches.
- Minimum drop through a manhole from inlet to outlet or same diameter pipe shall be:
 - 0.2 ft. on straight through run.
 - 0.3 ft. on deflected bends greater than 45 degrees.
- Minimum of diameter pipe for service lines is 4 inches.
- Infiltration = 10% of the average flow (not peaked)

*Note: Actual loadings and populations will be analyzed as individual users come on-line.

2.4 Proposed System

In general, wastewater will be conveyed north and west by service laterals, trunk lines, lift stations, and force mains. The City is collaborating with the Metro Wastewater Reclamation District on a feasibility study to develop a regional approach for development in the Box Elder Basin. If a regional public treatment solution is not in place or planned by the time it is needed for the development, a Wastewater Treatment Plant (WWTP) will be built to serve the project and surrounding areas. If required, the WWTP will be constructed east of Imboden Road at E. 64th Ave and Bear Gulch. This facility will be constructed by the developer and owned/operated by the metro district established for the development.

The proposed service area of the WWTP is shown in the Wastewater System Layout Plan – Exhibit SS1 in Appendix B, which generally matches the service area shown in the report prepared by Matrix. The layout of the proposed trunk lines generally matches that of the COA Wastewater CIP (Ref. 4).

2.5 Phasing

As noted above, this report focuses on the full build-out scenario. However, due to the scale and long-term nature of the project, the sanitary infrastructure will need to be phased as discussed below.

2.5.1 Initial Improvements

Sub-Area 1 is anticipated to be developed first, although portions of Sub-Area 2 may be developed concurrently. Initial users will be served by On-Site Wastewater Treatment Systems (OWTS). Systems generating 2,000 gpd or less will be regulated by Tri-County Health. Systems generating more than 2,000 gpd will be regulated by the Colorado Department of Health and Environment. Connections to trunk mains will be made available by the developer. Individual users will be required to switch over to the public infrastructure at their lot lines when the regional system becomes active.

2.5.2 Interim Improvements

It is possible that a package plant or sub-regional wastewater treatment facility will be needed before a regional treatment solution is available. If so, the timing of these improvements will depend on how quickly the sub-areas are developed and what the actual loading of those sub-areas is. It is also possible that portions of these sub-areas could be developed simultaneously. This report does not include an evaluation of that timing, nor does it include an evaluation of the timing for a regional wastewater treatment facility. Rather, it is recommended that a detailed study begin when approximately 70% of the OWTS flows for Sub-Area 1 are reached. This study will include a discussion on the need for a regional wastewater treatment plant. This recommendation is consistent with that made in the previously approved Matrix Report.

2.5.3 Build-out Improvements

As noted above, a regional wastewater treatment solution has yet to be determined. For the purposes of this report, it is assumed that a WWTP will be constructed at E. 64th Ave and Bear Gulch. The connecting infrastructure will include trunk mains, service laterals and force mains.

Due to variations in topography, it is anticipated that four lift stations will be needed throughout the site. Those locations are shown on Exhibit SS1 referenced above. Currently, it is expected that two lift stations will collect flows from Sub-Area 6, one at 48th Avenue and Schumaker Road, and the second at 48th Avenue and Peterson Road. From there, force mains will route flows south to Peterson Road and Colfax Ave where they will gravity flow west and connect to the system in Sub-Area 1. Another lift station will be needed in East 48th Avenue west of Manila Road to convey flows west to the trunk line running along Bear Gulch. One additional lift station is anticipated in Sub-Area 5 to convey flows from the eastern portion of the site to Quail Run Road. These lift

station locations will be further evaluated as development progresses to limit the length of lift required to convey flows.

2.6 **System Analysis**

The sewer network was sized using the COA criteria listed above to support the project and the properties included in the regional service area shown on Exhibit SS1 in Appendix B. This service area was analyzed for the fully built-out scenario and incorporates historical data from the previously approved reports for the off-site areas. The historical land uses have been updated to reflect those shown in the “**Aurora Places**” comprehensive plan (Ref. 5). The loading calculated in the previous reports have been updated to reflect the city’s current criteria.

Although likely conservative, on-site planning areas that are anticipated to contain mostly warehouse-related businesses are designated as industrial uses. As individual users come on-line, the design will be re-evaluated to ensure sanitary mains are not unnecessarily over-sized. The on-site and off-site loading is described in more detail below.

2.6.1 **On-site Loading**

On-site flows are calculated based on the anticipated land uses for the site listed in the Land Use Table included in the FDP Amendment. The proposed site consists mainly of industrial and warehouse uses, as well as mixed commercial. Table 1 below shows a summary of the on-site, average day flows generated by each sub-area. Peaking and routing calculations for each planning area within the individual sub-areas are shown in the appendix.

TABLE 1 – ON-SITE SANITARY FLOWS

| SUB-AREA | USE | GROSS AREA* (AC) | AVERAGE DAY LOADING (GPD) |
|---------------|------------|---------------------|------------------------------|
| SA-1 | INDUSTRIAL | 1,097 | 1,316,640 |
| SA-2 | INDUSTRIAL | 1,151 | 1,380,840 |
| SA-3 | INDUSTRIAL | 991 | 1,188,840 |
| SA-4 | INDUSTRIAL | 235 | 282,240 |
| SA-5 | COMMERCIAL | 544 | 816,300 |
| SA-6 | INDUSTRIAL | 1,090 | 1,308,120 |
| TOTALS | | 5,108 | 6,292,980 |

*Note: For sanitary loading calculations, open space is excluded from the gross area.

2.6.2 **Off-site Loading**

The system at full build-out has been sized to serve areas outside the project boundaries and city limits should those properties be annexed. The sanitary loading for Space Port calculated in the Matrix report was broken down by module. These modules were not defined or delineated. Therefore, this report maintains the acreages listed in the Matrix report for Space Port and the off-site parcels contained within the service boundary. The off-site loading calculations were then updated to reflect the land uses shown in

“Aurora Places” and incorporate current COA criteria. Table 2 below summarizes the flows generated by the off-site parcels considered in this report. Refer to the appendix for a more detailed breakdown of these flows.

TABLE 2 – OFF-SITE SANITARY FLOWS

| OFFSITE PLANNING AREA | USE | GROSS AREA* (AC) | AVERAGE DAY LOADING (GPD) |
|-----------------------|------------|------------------|---------------------------|
| FUTURE PLANNING AREAS | INDUSTRIAL | 636 | 763,440 |
| SPACE PORT | INDUSTRIAL | 662 | 794,280 |
| OFFSITE | INDUSTRIAL | 12,113 | 14,535,600 |
| TOTALS | | 13,411 | 16,093,320 |

2.7 Outstanding Issues

Aurora Water and the Metro Wastewater Reclamation District are collaborating on a feasibility study to determine a regional wastewater treatment solution for the Box Elder Basin. Until an approach is determined, it is assumed that a regional wastewater treatment plant will be constructed at E. 64th Ave. and Bear Gulch. Coordination between the various stakeholders will be required to determine the timing and design of the regional wastewater treatment plant. The necessity and timing of any interim improvements, such as package plants or sub-regional wastewater treatment plants will also need to be addressed. The details and triggers for these improvements will be further evaluated with the development of the Sub-Area Master Utility Studies.

3 WATER SUPPLY MASTER PLAN

3.1 Objective

The objective of this report is to define the water requirements for the site and establish a conceptual design and system layout. Because there are many unknowns regarding timing and actual users, detailed design will be performed at the Site Plan level when the site parameters are better defined. Each Site Plan will include amendments to this Master Utility Report identifying actual water demands and infrastructure needed to meet planning area and/or lot requirements.

3.2 Existing Conditions

Similar to the sanitary system, there is currently no city water infrastructure in the vicinity of the site. Existing residents are served by groundwater wells. Space Port has two on-site storage and distribution systems. One is owned and operated by COA, the other is owned and operated by Space Port. This report assumes that Space Port will connect to the city system when it becomes available.

3.3 Criteria

The following list of criteria was used to design the water network for the proposed site:

3.3.1 Demands

- Commercial Average Day demand = 1,500 gpd/acre*
- Industrial Average Day demand = 1,200 gpd/acre*

- Parks and Greenbelts demand = 1,800 gpd/acre*
- Max Day Factor = 2.8 x average day demand
- Peak Hour Factor = 4.5 x average day demand

*Note: actual demands will be analyzed as individual users come on-line.

3.3.2 Maximum Velocity

- Max Hour Velocity for 6-inch line = 2.5 fps
- Max Hour Velocity for 8-12-inch line = 3 fps
- Max Hour Velocity for 16-24-inch = 4.5 fps
- Max Hour Velocity for >24-inch = 7.8 fps

3.3.3 Maximum Head Loss

- Max Hour Head Loss for 6-inch line = 5 ft/1000ft
- Max Hour Head Loss for 8-12-inch line = 5 ft/1000ft
- Max Hour Head Loss for 16-24-inch = 5 ft/1000ft
- Max Hour Head Loss for >24-inch = 4 ft/1000ft

3.3.4 Fire Flow

- Commercial Fire Flow = 2,500 gpm for 2 hours
- Industrial Fire Flow = 3,500gpm for 3 hours
- 20 psi minimum at any point in the system

3.3.5 Pressures

Allowable pressures are not defined within the COA criteria; however, the city has indicated that pressures ranging from 45psi – 120psi have been permitted for industrial sites.

3.4 Proposed System

At full build-out, water infrastructure will include mains, service lines and connections to the city water system. The layout of the water mains will generally follow the COA Water Capital Improvement Plan. The proposed network will be sized to provide service to the project and Space Port in accordance with the criteria listed above. However, as users purchase their individual parcels, actual demands will be analyzed, and these calculations will be revised if appropriate. Sufficient looping will be incorporated to minimize the effects of main breaks. Refer to Exhibit WL1 – Water System Layout Plan in Appendix C for a map of the proposed system.

3.5 Phasing

3.5.1 Initial Improvements

It is anticipated that development will begin in Sub-Area 1 with the initial 100-300 acres being served by a well, tank and pump system. Early estimates indicate that a 1.0-1.5MG tank will be sufficient to supply the initial development including fire flow needs. This is based on an industrial fire flow demand of 3,500 gpm for 3 hours (3,500gpm x 3hr x 60min/hr = 630,000gal) in addition to the Average Day Demand for 300 acres of industrial development (1,200gpd/acre x 300acres = 360,000gpd). Water demands will be refined as actual users come online.

An Interim Water Service Agreement with COA will be required for the use of groundwater wells. Based on an assumed output of 40 acre-feet/year, approximately 2-5 wells will be needed to supply the proposed tank. Output may vary, so the estimated number of wells needed will be adjusted as better information becomes available.

3.5.2 Interim Improvements

Once development surpasses the capacity of the tank system described above, a connection to a city water source will be needed. This connection is anticipated to be made after the first 100-300 acres of Sub-Area 1 are developed. At that time, it is planned for the site to connect a 16" line to the existing 24" line at the southeast corner of the Porteos site east of E. 56th Ave and Powhaton Rd. The wells will be disconnected when the connection to city infrastructure is made and the 16" line will fill the tank. The pump(s) will continue to provide for the average day, maximum day, maximum hour and fire flow demands. The tank and pump system will be maintained and operated by the Metro District until a second city connection is made, however, Aurora Water reserves the right to assume ownership of the interim system at the discretion of the Aurora Water Department.

The pipe network will ultimately be looped to provide adequate coverage and minimize impacts due to main breaks. However, there will be a period of time when the site will only be supplied by one city connection. A second city connection will be made once the infrastructure becomes available or when demands require a second line be brought to the site, whichever comes first. At this time, it is anticipated that the second connection will be made to a future line in E. 48th Ave. after Sub-Area 1 is fully developed, as Sub-Area 2 comes online. This will be reevaluated as development progresses. Refer to the MURs for Sub-Areas 1 and 2 for a more detailed discussion of the secondary connection.

Additional phasing of the infrastructure will be addressed in the MUR for each subsequent sub-area. Generally, Sub-Areas 3 and 4 will connect to the system established for Sub-Areas 1 and 2. Sub-Area 5 is planned for commercial use and will likely require a connection to the 30" line planned along the I-70 corridor. Sub-Area 6 is planned for industrial use and will ultimately connect to the surrounding network shown in the **COA Water CIP** (Ref. 6). If the infrastructure is not in place at that time, the sub-area could be served by a well and tank system, similar to Sub-Area 1, until a connection to the public system can be made. Given that Sub-Area 6 is expected to be the last area developed, it is likely that public infrastructure will be available at that time.

3.5.3 Build-out Improvements

As noted above, the calculations in this study are based on the built-out scenario, which is shown on Exhibit WL1. Due to the long-term nature of the project, it is anticipated that the infrastructure shown on the CIP will be constructed and available by the time the site is fully developed. This will include connections along E. 48th Ave, I-70, Colfax Ave, Peterson Road, and Schumaker Road.

Additionally, it is anticipated that the tank and pumps will no longer be necessary at full build-out. Therefore, these appurtenances are not included in the model. Refer to the Sub-Area 1 MUR for a more detailed discussion on the tank and pump system.

3.6 System Analysis

The city has indicated that the majority of the site will be within pressure Zone 4E with an HGL of 5,744'. Northern portions of the site fall within Zone 3E which has an HGL of 5,665'. The connection west of E. 48th Ave. is anticipated to be in Zone 3 with an HGL of 5,720'. The pressure zones will be reevaluated as the project is developed. Pressure reducing valves (PRVs) will be used to separate the different zones. Refer to Exhibit WL1 for the locations of these PRVs.

The system has been designed to meet the maximum day + fire flow demand with a residual pressure of no less than 20 psi at any point in the water distribution system. Demands were calculated using the criteria listed above for the land uses proposed in the FDP documents. Although likely conservative, planning areas that are anticipated to contain mostly warehouse-related businesses were designated as industrial uses. These land uses are summarized in the calculation tables in the appendix. The demands are summarized by sub-area in Table 3 below. The pipe sizes across the site range from 12" to 36". Refer to Exhibit WL1 for pipe sizing and routing. Smaller mains will be looped within the individual planning areas as they are developed. These designs will be shown on the Site Plans for those areas at that time.

TABLE 3 – WATER DEMANDS

| SUB-AREA | GROSS AREA* (AC) | AVG. DAY (GPM) | MAX. DAY (GPM) | MAX. HR. (GPM) | MAX DAY + FIRE FLOW (GPM) |
|---------------|------------------|----------------|----------------|----------------|---------------------------|
| SA-1 | 1,131 | 956 | 2,677 | 4,115 | 34,060 |
| SA-2 | 1,208 | 1,030 | 2,884 | 4,315 | 34,185 |
| SA-3 | 1,007 | 846 | 2,369 | 3,715 | 44,311 |
| SA-4 | 245 | 209 | 586 | 868 | 7,540 |
| SA-5 | 544 | 567 | 1,587 | 2,550 | 6,587 |
| SA-6 | 1,090 | 908 | 2,544 | 4,088 | 9,544 |
| SPACE PORT | 662 | 552 | 1,544 | 2,482 | 26,044 |
| FUTURE | 636 | 530 | 1,484 | 2,386 | 15,484 |
| TOTALS | 6,522 | 5,598 | 15,675 | 24,518 | N/A |

*Note: The gross acreage does not include area within the existing or proposed floodplain.

3.7 Results

The system was analyzed using WaterGEMS by Bentley. The results of the analysis are presented in Appendix A. This analysis represents the proposed water distribution system, including node locations, pipe locations and pipe sizes that serve the project site. See Table 4 below for a summary of the WaterGEMS analysis.

TABLE 4 – WATERGEMS RESULTS

| SCENARIO | | MINIMUM PRESSURE | | MAXIMUM PRESSURE | | MAXIMUM VELOCITY (FPS) | PIPE ID |
|----------|---------------------|------------------|------------|------------------|------|---------------------------|------------|
| | | (PSIG) | NODE | (PSIG) | NODE | | |
| 1 | AVERAGE DAY | 60 | J-39 | 128 | J-1 | 5.11 | P-49 |
| 2 | MAX DAY | 60 | J-39 | 128 | J-1 | 6.05 | P-49 |
| 3 | MAX HOUR | 60 | J-39 | 128 | J-1 | 7.01 | P-49 |
| 4 | MAX DAY + FIRE FLOW | 60 | J-28, J-39 | 124 | J-5 | 10.90 | P-6 |

3.8 Outstanding Issues

Due to the size, complexity, and unknown timeline of the project, many details will need to be determined and/or reevaluated as development progresses. The triggers for and timing of major infrastructure improvements for all phases of construction will require the coordination of multiple agencies and stakeholders. Items requiring further discussion and coordination include: the use of groundwater and well permitting; the trigger for and timing of the initial connection to city water; and the trigger for and location of the secondary connection to the city water system. Refer to the MURs for Sub-Areas 1 and 2 for a more detailed discussion on these triggers.

4 CONCLUSION

This Master Utility Report for the TransPort Colorado development was prepared in accordance with the **Aurora Water Standards and Specifications Regarding Water, Sanitary Sewer and Storm Drainage Infrastructure**, and per discussions with Aurora Water and Tri-County Health. The purpose of this report was to size the water and sanitary sewer infrastructure to serve the TransPort Colorado development at full build-out while providing a high-level discussion on initial and interim conditions. Refer to the MURs for the individual sub-areas for more information regarding the interim designs in those areas.

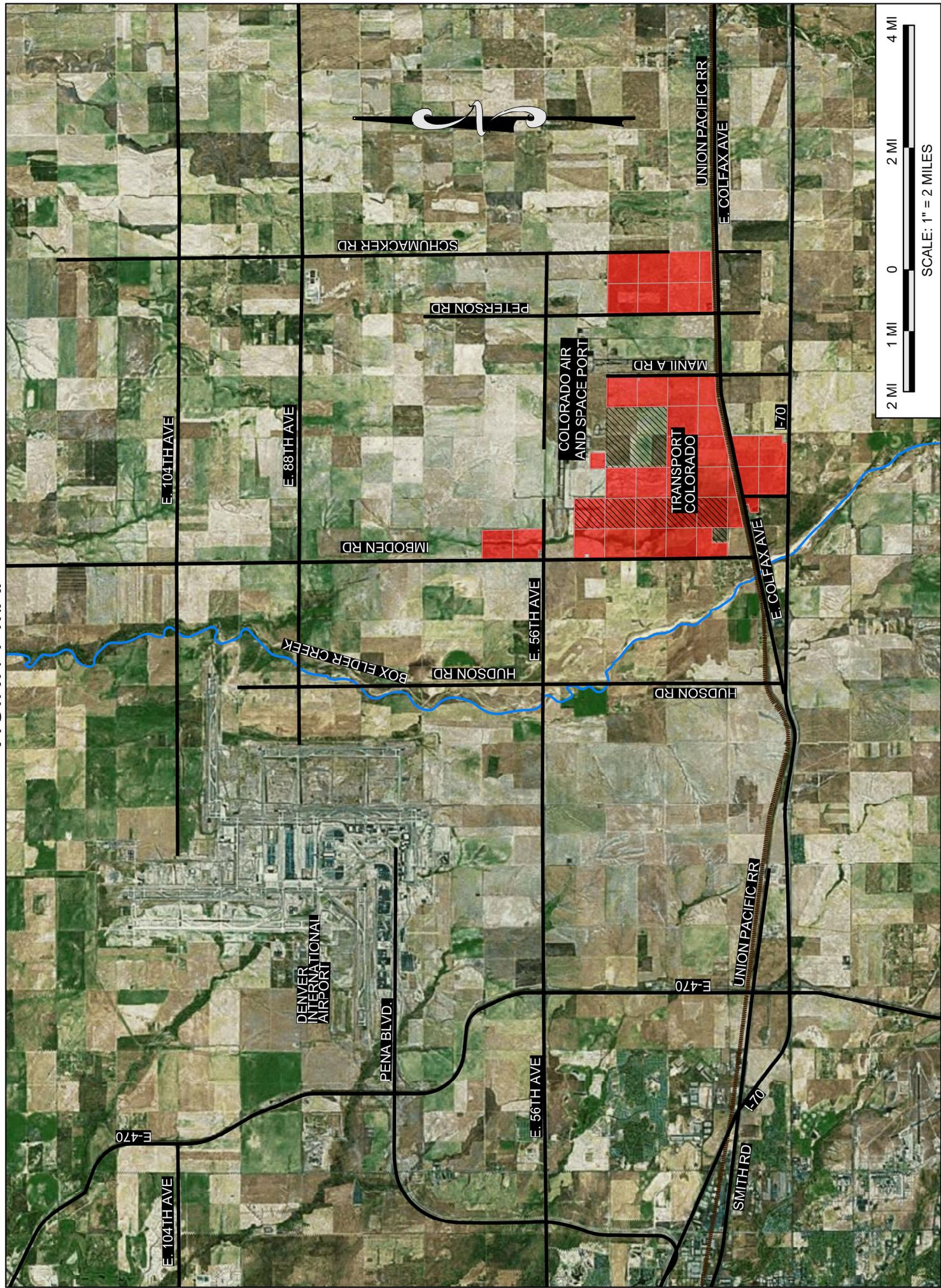
5 REFERENCES

1. Farnsworth Group. "Water and Wastewater Master Plan for Front Range Airport and Surrounding Area." December 20, 2001.
2. Matrix Design Group, Inc. "Transport/Front Range Airport Area Master Utilities Plan." 2007. (COA #207075)
3. City of Aurora. "Standards and Specifications Regarding Water, Sanitary Sewer and Storm Drainage Infrastructure."
4. City of Aurora. "City of Aurora Wastewater Capital Improvement Plan." January 2018.
5. City of Aurora. "Aurora Places." December 27, 2018.
6. City of Aurora. "City of Aurora Water Capital Improvement Plan." May 2018

APPENDIX A

VICINITY MAP

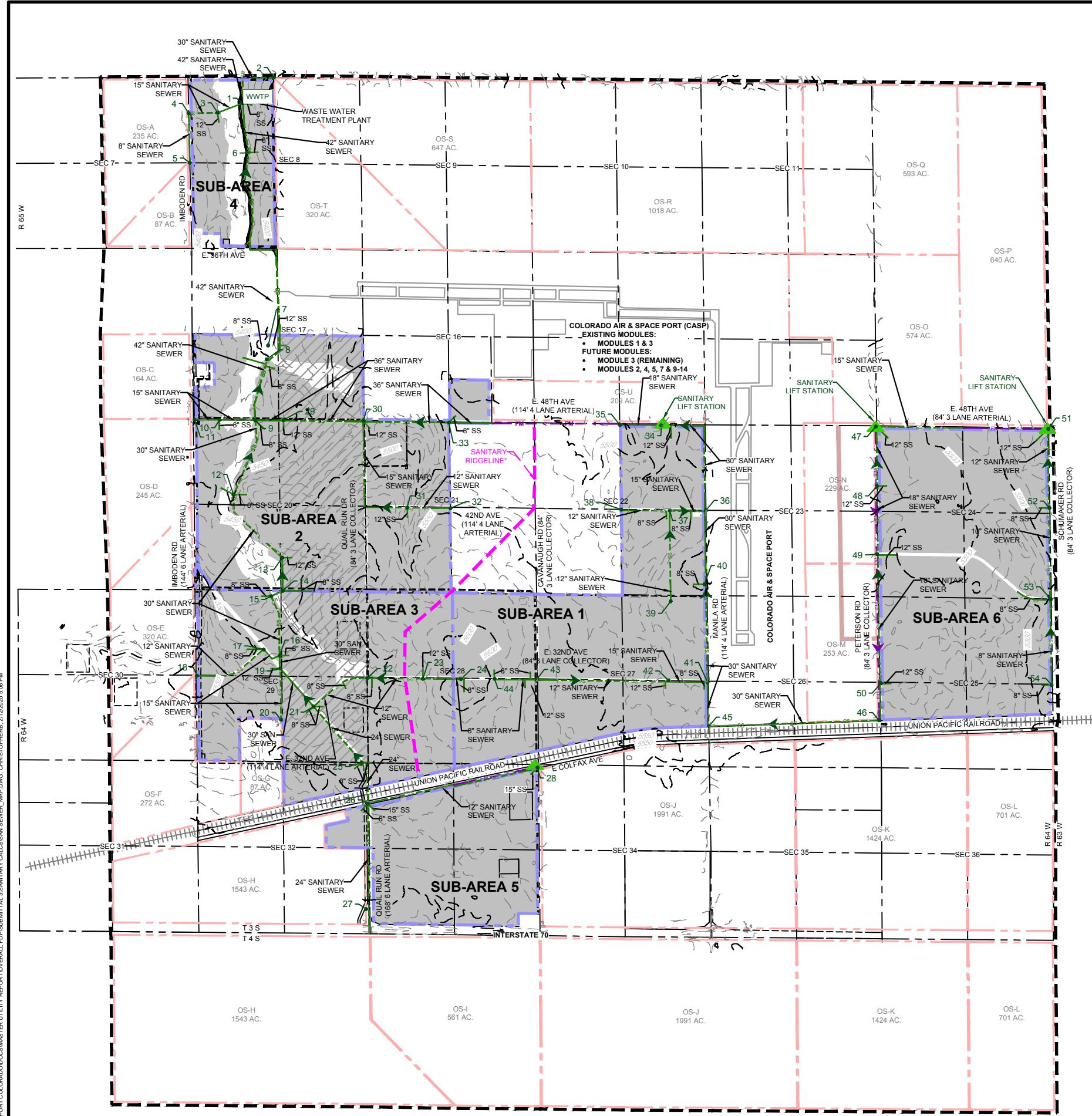
VICINITY MAP



APPENDIX B

Sanitary Sewer System

- 1. Sanitary Systems Layout Plan**
- 2. Sanitary Routing Layout Schematic**
- 3. Sanitary Sewer Calculations**
 - a. OWTS Loading Calculations**
 - b. System Loading Calculations**
 - c. Routing and Sizing Calculations**
 - d. FlowMaster Results**



| SANITARY SEWER DESIGN POINT | CONTRIBUTING PARCEL/PLANNING AREA | NET ACRES OF CONTRIBUTING AREA |
|-----------------------------|-----------------------------------|--------------------------------|
| 1 | F1 | 158.0 |
| 2 | F2 | 159.1 |
| 3 | F3 | 158.6 |
| 4 | F4 | 160.5 |
| 5 | MODUAL 1 & 3 | 68.5 |
| 6 | MODUAL 2 | 48.0 |
| 7 | MODUAL 3 (REMAINING) | 14.4 |
| 8 | MODUAL 4 | 48.0 |
| 9 | MODUAL 5 | 73.0 |
| 10 | MODUAL 7 | 106.0 |
| 11 | MODUAL 9-14 | 304.0 |
| 12 | OS-A | 235.0 |
| 13 | OS-B | 87.0 |
| 14 | OS-C | 164.0 |
| 15 | OS-D | 245.0 |
| 16 | OS-E | 320.0 |
| 17 | OS-F | 272.0 |
| 18 | OS-G | 87.0 |
| 19 | OS-H | 1,543.0 |
| 20 | OS-I | 561.0 |
| 21 | OS-J | 1,991.0 |
| 22 | OS-K | 1,424.0 |
| 23 | OS-L | 701.0 |
| 24 | OS-M | 253.0 |
| 25 | OS-N | 229.0 |
| 26 | OS-O | 574.0 |
| 27 | OS-P | 640.0 |
| 28 | OS-Q | 593.0 |
| 29 | OS-R | 1,018.0 |
| 30 | OS-S | 647.0 |
| 31 | OS-T | 320.0 |
| 32 | OS-U | 209.0 |
| 33 | PA-10 | 156.8 |
| 34 | PA-11.1 | 35.2 |
| 35 | PA-11.2 | 82.0 |
| 36 | PA-12 | 60.8 |
| 37 | PA-13.1 | 96.1 |
| 38 | PA-13.2 | 64.1 |
| 39 | PA-14 | 251.1 |
| 40 | PA-15A.1 | 37.6 |
| 41 | PA-15A.2 | 113.0 |
| 42 | PA-15B | 2.8 |
| 43 | PA-16 | 174.5 |

NOTES:

- REFER TO THE MASTER UTILITY REPORT BY CVL INCLUDED IN FDP AMENDMENT FOR INFORMATION REGARDING OFF-SITE BASINS. ALSO, REFER TO SS2, SUB-AREA 1 ROUTING SCHEMATIC FOR ADDITIONAL ROUTING INFORMATION.
- SANITARY RIDGELINE: SANITARY LINES EAST OF THE RIDGELINE RUN TO A TRUNKLINE WITHIN MANILA. ALL OTHER LINES RUN WEST TO THE TRUNKLINE PARALLELING BEAR GULCH. ALL LINES ULTIMATELY RUN NORTH TO THE WWTP.

| SANITARY SEWER DESIGN POINT | CONTRIBUTING PARCEL/PLANNING AREA | NET ACRES OF CONTRIBUTING AREA |
|-----------------------------|-----------------------------------|--------------------------------|
| 28 | PA-17 | 23.2 |
| 29 | PA-18.1 | 182.7 |
| 30 | PA-18.2 | 146.2 |
| 31 | PA-18.3 | 130.5 |
| 32 | PA-18.4 | 62.6 |
| 33 | PA-19.1 | 244.3 |
| 34 | PA-19.2 | 142.0 |
| 35 | PA-19.3 | 96.6 |
| 36 | PA-19.4 | 85.2 |
| 37 | PA-1A | 117.6 |
| 38 | PA-18.1 | 58.8 |
| 39 | PA-18.2 | 58.8 |
| 40 | PA-20 | 88.2 |
| 41 | PA-21 | 55.8 |
| 42 | PA-22 | 57.3 |
| 43 | PA-23A | 19.7 |
| 44 | PA-23B | 82.5 |
| 45 | PA-24 | 154.0 |
| 46 | PA-25 | 136.0 |
| 47 | PA-26 | 82.6 |
| 48 | PA-27A | 42.1 |
| 49 | PA-27B | 18.6 |
| 50 | PA-28.1 | 94.8 |
| 51 | PA-28.2 | 94.8 |
| 52 | PA-29 | 64.3 |
| 53 | PA-2A | 81.2 |
| 54 | PA-30 | 31.6 |
| 55 | PA-31.1 | 256.3 |
| 56 | PA-31.2 | 256.3 |
| 57 | PA-4 | 37.4 |
| 58 | PA-5.1 | 69.6 |
| 59 | PA-5.2 | 69.6 |
| 60 | PA-6.1 | 51.6 |
| 61 | PA-6.2 | 51.6 |
| 62 | PA-7.1 | 160.9 |
| 63 | PA-7.2 | 160.9 |
| 64 | PA-8 | 158.2 |
| 65 | PA-9 | 159.1 |

| | | |
|--------------|------------|---------------|
| SHEET NUMBER | DRAWN BY: | SCALE: |
| | CUB | AS SHOWN |
| | CHEKED BY: | FILE NO.: |
| | JMM | 8130292103 |
| | DATE: | FEBRUARY 2020 |

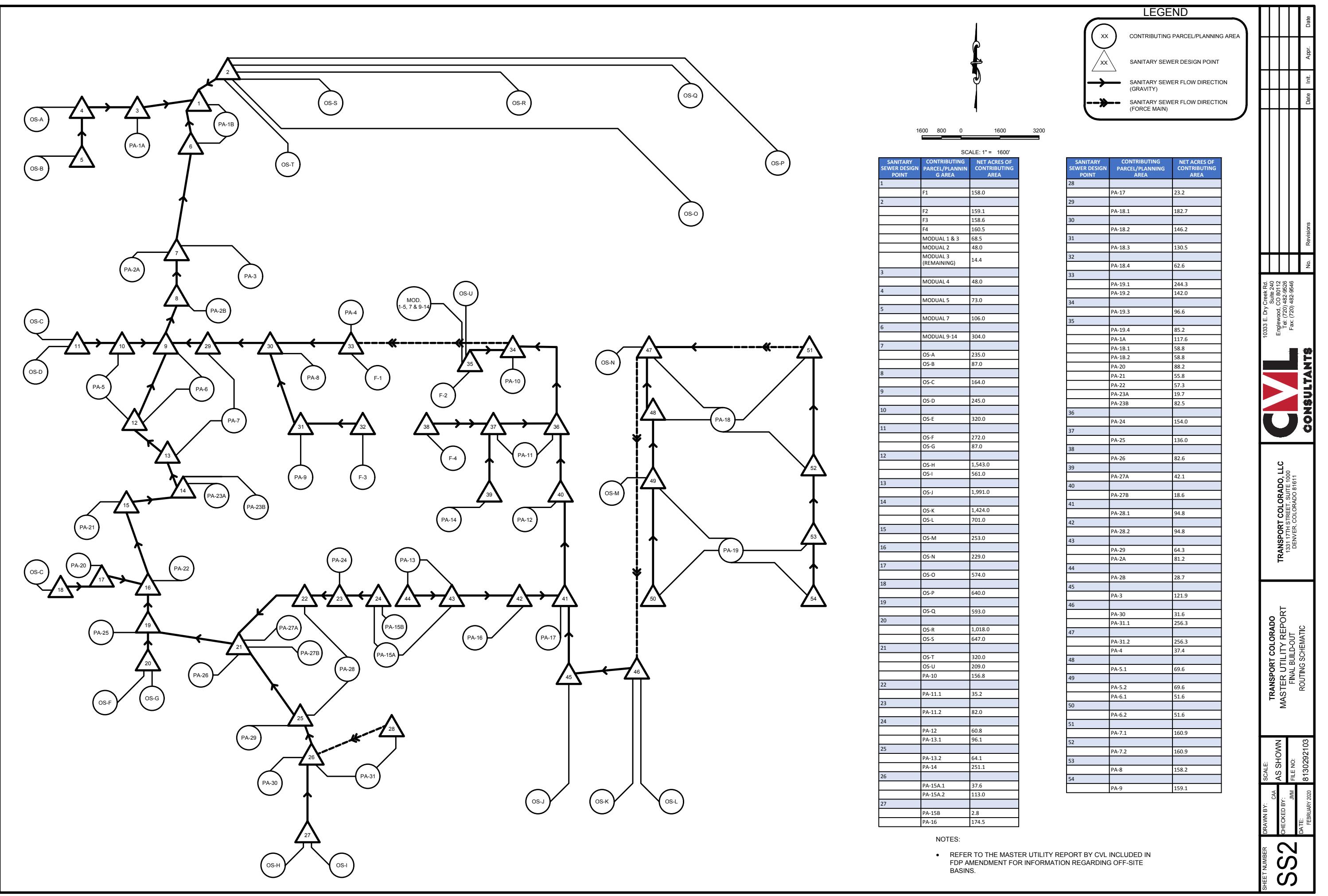
SS1

TRANSPORT COLORADO
MASTER UTILITY REPORT
FINAL BUILD-OUT
WASTEWATER SYSTEM LAYOUT PLAN

10333 E. Dry Creek Rd.
Suite 240
Englewood, CO 80112
Tel: (720) 482-9526
Fax: (720) 482-9546

No. Revisions

CVL CONSULTANTS



TRANSPORT COLORADO - FINAL BUILD-OUT
ON-SITE WASTEWATER TREATMENT SYSTEM CALCULATIONS
COLORADO DEPARTMENT OF PUBLIC HEALTH CRITERIA

| USE | EMPLOYEE PER 100,000 SF | AVG. FLOW (GPD/PERSON) | Avg.Flow (GPD/SF) | FAR |
|-------------------|-------------------------|------------------------|-------------------|------|
| COMMERCIAL | 97 | -- | 0.10 | 0.30 |
| LIGHT INDUSTRIAL | 40 | 15 | | 0.18 |
| MEDIUM INDUSTRIAL | 66 | 20 | | 0.18 |
| HEAVY INDUSTRIAL | 66 | 20 | | 0.15 |

| EMPLOYMENT ESTIMATES | | |
|--------------------------------------|--------------------|--------------------------|
| USE | Avg. Building (SF) | EMPLOYEES PER 100,000 SF |
| HEAVY INDUSTRIAL | 1500 | 66 |
| MEDIUM INDUSTRIAL (WAREHOUSE) | 1500 | 66 |
| RAIL | 2000 | 50 |
| MIXED USE (LODGING, OFFICE & RETAIL) | 1029 | 97 |
| DATA CENTER | 2500 | 40 |

| SUB-AREA | PLANNING AREA | USE | GROSS AREA (AC) | GROSS AREA (SF) | FAR | BUILDING (SF) | BUILDING (AC) | Avg. Day (GPD/PERSON) | Avg. Day (GPD/SF) | POPULATION | Avg. Day (GPD) |
|----------|---------------|-------------------|-----------------|-----------------|------|---------------|---------------|-----------------------|-------------------|------------|----------------|
| SA-1 | PA-10 | Heavy Industrial | 156.8 | 6,830,208 | 0.15 | 1,024,531 | 23.52 | 20.00 | -- | 676 | 13,524 |
| SA-1 | PA-11 | Heavy Industrial | 118.2 | 5,148,792 | 0.15 | 772,319 | 17.73 | 20.00 | -- | 510 | 10,195 |
| SA-1 | PA-12 | Heavy Industrial | 60.9 | 2,652,804 | 0.15 | 397,921 | 9.14 | 20.00 | -- | 263 | 5,253 |
| SA-1 | PA-13 | Heavy Industrial | 160.2 | 6,978,312 | 0.15 | 1,046,747 | 24.03 | 20.00 | -- | 691 | 13,817 |
| SA-1 | PA-14 | Heavy Industrial | 253.5 | 11,042,460 | 0.30 | 3,312,738 | 76.05 | 20.00 | -- | 2,186 | 43,728 |
| SA-1 | PA-15A | Heavy Industrial | 150.9 | 6,573,204 | 0.15 | 985,981 | 22.64 | 20.00 | -- | 651 | 13,015 |
| SA-1 | PA-15B | Heavy Industrial | 2.5 | 108,900 | 0.15 | 16,335 | 0.38 | 20.00 | -- | 11 | 216 |
| SA-1 | PA-16 | Heavy Industrial | 176.2 | 7,675,272 | 0.15 | 1,151,291 | 26.43 | 20.00 | -- | 760 | 15,197 |
| SA-1 | PA-17 | Heavy Industrial | 23.2 | 1,010,592 | 0.15 | 151,589 | 3.48 | 20.00 | -- | 100 | 2,001 |
| SA-2 | PA-2A | Medium Industrial | 81.2 | 3,537,072 | 0.18 | 636,673 | 14.62 | 20.00 | -- | 420 | 8,404 |
| SA-2 | PA-2B | Medium Industrial | 28.7 | 1,250,172 | 0.18 | 225,031 | 5.17 | 20.00 | -- | 149 | 2,970 |
| SA-2 | PA-3 | Medium Industrial | 121.9 | 5,309,964 | 0.18 | 955,794 | 21.94 | 20.00 | -- | 631 | 12,616 |
| SA-2 | PA-4 | Commercial | 36.7 | 1,598,652 | 0.30 | 479,596 | 11.01 | -- | 0.10 | 465 | 47,960 |
| SA-2 | PA-5 | Medium Industrial | 139.2 | 6,063,552 | 0.18 | 1,091,439 | 25.06 | 20.00 | -- | 720 | 14,407 |
| SA-2 | PA-6 | Medium Industrial | 103.3 | 4,499,748 | 0.18 | 809,955 | 18.59 | 20.00 | -- | 535 | 10,691 |
| SA-2 | PA-7 | Medium Industrial | 321.1 | 13,987,116 | 0.18 | 2,517,681 | 57.80 | 20.00 | -- | 1,662 | 33,233 |
| SA-2 | PA-8 | Heavy Industrial | 158.5 | 6,904,260 | 0.15 | 1,035,639 | 23.78 | 20.00 | -- | 684 | 13,670 |
| SA-2 | PA-9 | Heavy Industrial | 159.4 | 6,943,464 | 0.15 | 1,041,520 | 23.91 | 20.00 | -- | 687 | 13,748 |
| SA-3 | PA-20 | Medium Industrial | 88.2 | 3,841,992 | 0.18 | 691,559 | 15.88 | 20.00 | -- | 456 | 9,129 |
| SA-3 | PA-21 | Medium Industrial | 55.8 | 2,430,648 | 0.18 | 437,517 | 10.04 | 20.00 | -- | 289 | 5,775 |
| SA-3 | PA-22 | Medium Industrial | 57.3 | 2,495,988 | 0.18 | 449,278 | 10.31 | 20.00 | -- | 297 | 5,930 |
| SA-3 | PA-23A | Medium Industrial | 19.7 | 858,132 | 0.18 | 154,464 | 3.55 | 20.00 | -- | 102 | 2,039 |
| SA-3 | PA-23B | Medium Industrial | 75.8 | 3,301,848 | 0.18 | 594,333 | 13.64 | 20.00 | -- | 392 | 7,845 |

TRANSPORT COLORADO - FINAL BUILD-OUT
ON-SITE WASTEWATER TREATMENT SYSTEM CALCULATIONS
COLORADO DEPARTMENT OF PUBLIC HEALTH CRITERIA

| USE | EMPLOYEE PER 100,000 SF | AVG. FLOW (GPD/PERSON) | AVG.FLOW (GPD/SF) | FAR |
|-------------------|-------------------------|------------------------|-------------------|------|
| COMMERCIAL | 97 | -- | 0.10 | 0.30 |
| LIGHT INDUSTRIAL | 40 | 15 | | 0.18 |
| MEDIUM INDUSTRIAL | 66 | 20 | | 0.18 |
| HEAVY INDUSTRIAL | 66 | 20 | | 0.15 |

| EMPLOYMENT ESTIMATES | | |
|--------------------------------------|--------------------|--------------------------|
| USE | AVG. BUILDING (SF) | EMPLOYEES PER 100,000 SF |
| HEAVY INDUSTRIAL | 1500 | 66 |
| MEDIUM INDUSTRIAL (WAREHOUSE) | 1500 | 66 |
| RAIL | 2000 | 50 |
| MIXED USE (LODGING, OFFICE & RETAIL) | 1029 | 97 |
| DATA CENTER | 2500 | 40 |

| SUB-AREA | PLANNING AREA | USE | GROSS AREA (AC) | GROSS AREA (SF) | FAR | BUILDING (SF) | BUILDING (AC) | AVG. DAY (GPD/PERSON) | AVG. DAY (GPD/SF) | POPULATION | AVG. DAY (GPD) |
|----------|---------------|-------------------|-----------------|-----------------|------|---------------|---------------|-----------------------|-------------------|------------|----------------|
| SA-3 | PA-24 | Heavy Industrial | 160.6 | 6,995,736 | 0.15 | 1,049,360 | 24.09 | 20.00 | -- | 693 | 13,852 |
| SA-3 | PA-25 | Medium Industrial | 136.0 | 5,924,160 | 0.18 | 1,066,349 | 24.48 | 20.00 | -- | 704 | 14,076 |
| SA-3 | PA-26 | Medium Industrial | 82.6 | 3,598,056 | 0.18 | 647,650 | 14.87 | 20.00 | -- | 427 | 8,549 |
| SA-3 | PA-27A | Medium Industrial | 42.3 | 1,842,588 | 0.18 | 331,666 | 7.61 | 20.00 | -- | 219 | 4,378 |
| SA-3 | PA-27B | Medium Industrial | 18.6 | 810,216 | 0.18 | 145,839 | 3.35 | 20.00 | -- | 96 | 1,925 |
| SA-3 | PA-28 | Heavy Industrial | 189.3 | 8,245,908 | 0.15 | 1,236,886 | 28.40 | 20.00 | -- | 816 | 16,327 |
| SA-3 | PA-29 | Medium Industrial | 64.3 | 2,800,908 | 0.18 | 504,163 | 11.57 | 20.00 | -- | 333 | 6,655 |
| SA-4 | PA-1A | Medium Industrial | 117.6 | 5,122,656 | 0.18 | 922,078 | 21.17 | 20.00 | -- | 609 | 12,171 |
| SA-4 | PA-1B | Medium Industrial | 113.9 | 4,961,484 | 0.18 | 893,067 | 20.50 | 20.00 | -- | 589 | 11,788 |
| SA-5 | PA-30 | Commercial | 31.6 | 1,376,496 | 0.30 | 412,949 | 9.48 | -- | 0.10 | 401 | 41,295 |
| SA-5 | PA-31 | Commercial | 512.8 | 22,337,568 | 0.30 | 6,701,270 | 153.84 | -- | 0.10 | 6,500 | 670,127 |
| SA-6 | PA-18 | Heavy Industrial | 522.0 | 22,738,320 | 0.15 | 3,410,748 | 78.30 | 20.00 | -- | 2,251 | 45,022 |
| SA-6 | PA-19 | Heavy Industrial | 568.1 | 24,746,436 | 0.15 | 3,711,965 | 85.22 | 20.00 | -- | 2,450 | 48,998 |
| | Total | | 5,108.9 | 222,543,684 | | 41,013,918 | 941.55 | | | 29,423 | 1,200,527 |

TRANSPORT COLORADO - FINAL BUILD-OUT
SANITARY LOADING CALCULATIONS
CITY OF AURORA CRITERIA

| LAND USE | AVG DAY (GPD/AC) | EQUIVALENT POPULATION PER ACRE |
|------------|------------------|--------------------------------|
| COMMERCIAL | 1,500 | 22 |
| INDUSTRIAL | 1,200 | 18 |

| DESIGN POINTS* | SUB-AREA | PLANNING AREA | LAND USE | GROSS AREA (AC) | AVG. DAY (GPD/AC) | POPULATION (THOUSANDS) | AVG. DAY (GPD) |
|----------------|-----------------|---------------|-------------------|-----------------|-------------------|------------------------|----------------|
| 1 | SA-4 | PA-1B.1 | Medium Industrial | 58.8 | 1,200 | 1.06 | 70,560 |
| 2 | OFF-SITE FUTURE | OS-O | Industrial | 574.0 | 1,200 | 10.33 | 688,800 |
| 2 | OFF-SITE FUTURE | OS-P | Industrial | 640.0 | 1,200 | 11.52 | 768,000 |
| 2 | OFF-SITE FUTURE | OS-Q | Industrial | 593.0 | 1,200 | 10.67 | 711,600 |
| 2 | OFF-SITE FUTURE | OS-R | Industrial | 1,018.0 | 1,200 | 18.32 | 1,221,600 |
| 2 | OFF-SITE FUTURE | OS-S | Industrial | 647.0 | 1,200 | 11.65 | 776,400 |
| 2 | OFF-SITE FUTURE | OS-T | Industrial | 320.0 | 1,200 | 5.76 | 384,000 |
| 3 | SA-4 | PA-1A | Medium Industrial | 117.6 | 1,200 | 2.12 | 141,120 |
| 4 | OFF-SITE FUTURE | OS-A | Industrial | 235.0 | 1,200 | 4.23 | 282,000 |
| 5 | OFF-SITE FUTURE | OS-B | Industrial | 87.0 | 1,200 | 1.57 | 104,400 |
| 6 | SA-4 | PA-1B.2 | Medium Industrial | 58.8 | 1,200 | 1.06 | 70,560 |
| 7 | SA-2 | PA-2A | Medium Industrial | 81.2 | 1,200 | 1.46 | 97,440 |
| 7 | SA-2 | PA-3 | Medium Industrial | 121.9 | 1,200 | 2.19 | 146,280 |
| 8 | SA-2 | PA-2B | Medium Industrial | 28.7 | 1,200 | 0.52 | 34,440 |
| 9 | SA-2 | PA-6.1 | Medium Industrial | 51.6 | 1,200 | 0.93 | 61,920 |
| 10 | SA-2 | PA-5.1 | Medium Industrial | 69.6 | 1,200 | 1.25 | 83,520 |
| 11 | OFF-SITE FUTURE | OS-C | Industrial | 164.0 | 1,200 | 2.95 | 196,800 |
| 11 | OFF-SITE FUTURE | OS-D | Industrial | 245.0 | 1,200 | 4.41 | 294,000 |
| 12 | SA-2 | PA-5.2 | Medium Industrial | 69.6 | 1,200 | 1.25 | 83,520 |
| 12 | SA-2 | PA-6.2 | Medium Industrial | 51.6 | 1,200 | 0.93 | 61,920 |
| 13 | SA-2 | PA-7.1 | Medium Industrial | 160.9 | 1,200 | 2.90 | 193,080 |
| 14 | SA-3 | PA-23A | Medium Industrial | 19.7 | 1,200 | 0.35 | 23,640 |
| 14 | SA-3 | PA-23B | Medium Industrial | 82.5 | 1,200 | 1.49 | 99,000 |
| 15 | SA-3 | PA-21 | Medium Industrial | 55.8 | 1,200 | 1.00 | 66,960 |
| 16 | SA-3 | PA-22 | Medium Industrial | 57.3 | 1,200 | 1.03 | 68,760 |

TRANSPORT COLORADO - FINAL BUILD-OUT
SANITARY LOADING CALCULATIONS
CITY OF AURORA CRITERIA

| LAND USE | AVG DAY (GPD/AC) | EQUIVALENT POPULATION PER ACRE |
|------------|------------------|--------------------------------|
| COMMERCIAL | 1,500 | 22 |
| INDUSTRIAL | 1,200 | 18 |

| DESIGN POINTS* | SUB-AREA | PLANNING AREA | LAND USE | GROSS AREA (AC) | AVG. DAY (GPD/AC) | POPULATION (THOUSANDS) | AVG. DAY (GPD) |
|----------------|-----------------|---------------|-------------------|-----------------|-------------------|------------------------|----------------|
| 17 | SA-3 | PA-20 | Medium Industrial | 88.2 | 1,200 | 1.59 | 105,840 |
| 18 | OFF-SITE FUTURE | OS-E | Industrial | 320.0 | 1,200 | 5.76 | 384,000 |
| 19 | SA-3 | PA-25 | Medium Industrial | 136.0 | 1,200 | 2.45 | 163,200 |
| 20 | OFF-SITE FUTURE | OS-F | Industrial | 272.0 | 1,200 | 4.90 | 326,400 |
| 20 | OFF-SITE FUTURE | OS-G | Industrial | 87.0 | 1,200 | 1.57 | 104,400 |
| 21 | SA-3 | PA-26 | Medium Industrial | 82.6 | 1,200 | 1.49 | 99,120 |
| 21 | SA-3 | PA-27A | Medium Industrial | 42.1 | 1,200 | 0.76 | 50,520 |
| 21 | SA-3 | PA-27B | Medium Industrial | 18.6 | 1,200 | 0.33 | 22,320 |
| 22 | SA-3 | PA-28.1 | Heavy Industrial | 94.8 | 1,200 | 1.71 | 113,760 |
| 23 | SA-3 | PA-24 | Heavy Industrial | 154.0 | 1,200 | 2.77 | 184,800 |
| 24 | SA-1 | PA-15A.1 | Heavy Industrial | 37.6 | 1,200 | 0.68 | 45,120 |
| 24 | SA-1 | PA-15B | Heavy Industrial | 2.8 | 1,200 | 0.05 | 3,360 |
| 25 | SA-3 | PA-28.2 | Heavy Industrial | 94.8 | 1,200 | 1.71 | 113,760 |
| 25 | SA-3 | PA-29 | Medium Industrial | 64.3 | 1,200 | 1.16 | 77,160 |
| 26 | SA-5 | PA-30 | Commercial | 31.6 | 1,500 | 0.70 | 47,400 |
| 26 | SA-5 | PA-31.1 | Commercial | 256.3 | 1,500 | 5.64 | 384,450 |
| 27 | OFF-SITE FUTURE | OS-H | Industrial | 1,543.0 | 1,200 | 27.77 | 1,851,600 |
| 27 | OFF-SITE FUTURE | OS-I | Industrial | 561.0 | 1,200 | 10.10 | 673,200 |
| 28 | SA-5 | PA-31.2 | Commercial | 256.3 | 1,500 | 5.64 | 384,450 |
| 29 | SA-2 | PA-7.2 | Medium Industrial | 160.9 | 1,200 | 2.90 | 193,080 |
| 30 | SA-2 | PA-8 | Heavy Industrial | 158.2 | 1,200 | 2.85 | 189,840 |
| 31 | SA-2 | PA-9 | Heavy Industrial | 159.1 | 1,200 | 2.86 | 190,920 |
| 32 | FUTURE | F3 | Heavy Industrial | 158.6 | 1,200 | 2.85 | 190,320 |
| 33 | FUTURE | F1 | Heavy Industrial | 158.0 | 1,200 | 2.84 | 189,600 |
| 33 | SA-2 | PA-4 | Light Industrial | 37.4 | 1,200 | 0.67 | 44,880 |

TRANSPORT COLORADO - FINAL BUILD-OUT
SANITARY LOADING CALCULATIONS
CITY OF AURORA CRITERIA

| LAND USE | AVG DAY (GPD/AC) | EQUIVALENT POPULATION PER ACRE |
|------------|------------------|--------------------------------|
| COMMERCIAL | 1,500 | 22 |
| INDUSTRIAL | 1,200 | 18 |

| DESIGN POINTS* | SUB-AREA | PLANNING AREA | LAND USE | GROSS AREA (AC) | AVG. DAY (GPD/AC) | POPULATION (THOUSANDS) | AVG. DAY (GPD) |
|----------------|---------------------|-------------------|--------------------|-----------------|-------------------|------------------------|----------------|
| 34 | SA-1 | PA-10 | Heavy Industrial | 156.8 | 1,200 | 2.82 | 188,160 |
| 35 | FUTURE | F2 | Heavy Industrial | 159.1 | 1,200 | 2.86 | 190,920 |
| 35 | CO AIR & SPACE PORT | MODUAL 1 & 3 | Airport Industrial | 68.5 | 1,200 | 1.23 | 82,200 |
| 35 | CO AIR & SPACE PORT | MODUAL 2 | Airport Industrial | 48.0 | 1,200 | 0.86 | 57,600 |
| 35 | CO AIR & SPACE PORT | ODUAL 3 (REMAININ | Airport Industrial | 14.4 | 1,200 | 0.26 | 17,280 |
| 35 | CO AIR & SPACE PORT | MODUAL 4 | Airport Industrial | 48.0 | 1,200 | 0.86 | 57,600 |
| 35 | CO AIR & SPACE PORT | MODUAL 5 | Airport Industrial | 73.0 | 1,200 | 1.31 | 87,600 |
| 35 | CO AIR & SPACE PORT | MODUAL 7 | Cargo | 106.0 | 1,200 | 1.91 | 127,200 |
| 35 | CO AIR & SPACE PORT | MODUAL 9-14 | Cargo | 304.0 | 1,200 | 5.47 | 364,800 |
| 35 | OFF-SITE FUTURE | OS-U | Industrial | 209.0 | 1,200 | 3.76 | 250,800 |
| 36 | SA-1 | PA-11.1 | Heavy Industrial | 35.2 | 1,200 | 0.63 | 42,240 |
| 37 | SA-1 | PA-11.2 | Heavy Industrial | 82.0 | 1,200 | 1.48 | 98,400 |
| 38 | FUTURE | F4 | Heavy Industrial | 160.5 | 1,200 | 2.89 | 192,600 |
| 39 | SA-1 | PA-14 | Heavy Industrial | 251.1 | 1,200 | 4.52 | 301,320 |
| 40 | SA-1 | PA-12 | Heavy Industrial | 60.8 | 1,200 | 1.09 | 72,960 |
| 41 | SA-1 | PA-17 | Heavy Industrial | 23.2 | 1,200 | 0.42 | 27,840 |
| 42 | SA-1 | PA-16 | Heavy Industrial | 174.5 | 1,200 | 3.14 | 209,400 |
| 43 | SA-1 | PA-13.1 | Heavy Industrial | 96.1 | 1,200 | 1.73 | 115,320 |
| 43 | SA-1 | PA-15A.2 | Heavy Industrial | 113.0 | 1,200 | 2.03 | 135,600 |
| 44 | SA-1 | PA-13.2 | Heavy Industrial | 64.1 | 1,200 | 1.15 | 76,920 |
| 45 | OFF-SITE FUTURE | OS-J | Industrial | 1,991.0 | 1,200 | 35.84 | 2,389,200 |
| 46 | OFF-SITE FUTURE | OS-K | Industrial | 1,424.0 | 1,200 | 25.63 | 1,708,800 |
| 46 | OFF-SITE FUTURE | OS-L | Industrial | 701.0 | 1,200 | 12.62 | 841,200 |
| 47 | OFF-SITE FUTURE | OS-N | Industrial | 229.0 | 1,200 | 4.12 | 274,800 |
| 47 | SA-6 | PA-18.1 | Heavy Industrial | 182.7 | 1,200 | 3.29 | 219,240 |

TRANSPORT COLORADO - FINAL BUILD-OUT
SANITARY LOADING CALCULATIONS
CITY OF AURORA CRITERIA

| LAND USE | AVG DAY (GPD/AC) | EQUIVALENT POPULATION PER ACRE |
|------------|------------------|--------------------------------|
| COMMERCIAL | 1,500 | 22 |
| INDUSTRIAL | 1,200 | 18 |

| DESIGN POINTS* | SUB-AREA | PLANNING AREA | LAND USE | GROSS AREA (AC) | AVG. DAY (GPD/AC) | POPULATION (THOUSANDS) | AVG. DAY (GPD) |
|----------------|-----------------|---------------|------------------|-----------------|-------------------|------------------------|----------------|
| 48 | SA-6 | PA-18.2 | Heavy Industrial | 146.2 | 1,200 | 2.63 | 175,440 |
| 49 | OFF-SITE FUTURE | OS-M | Industrial | 253.0 | 1,200 | 4.55 | 303,600 |
| 49 | SA-6 | PA-19.1 | Heavy Industrial | 244.3 | 1,200 | 4.40 | 293,160 |
| 50 | SA-6 | PA-19.2 | Heavy Industrial | 142.0 | 1,200 | 2.56 | 170,400 |
| 51 | SA-6 | PA-18.3 | Heavy Industrial | 130.5 | 1,200 | 2.35 | 156,600 |
| 52 | SA-6 | PA-18.4 | Heavy Industrial | 62.6 | 1,200 | 1.13 | 75,120 |
| 53 | SA-6 | PA-19.3 | Heavy Industrial | 96.6 | 1,200 | 1.74 | 115,920 |
| 54 | SA-6 | PA-19.4 | Heavy Industrial | 85.2 | 1,200 | 1.53 | 102,240 |
| | | TOTAL | | 18,519.2 | | 335.51 | 22,386,300 |

TRANSPORT COLORADO - FULL BUILD-OUT
SANITARY LOADING, ROUTING AND PIPE SIZING SIZING CALCULATIONS
CITY OF AURORA CRITERIA

| ROUTING DESIGN POINTS | INCLUDED UPSTREAM ROUTING DP's | DESIGN POINT LOADING (GPD) | CUMULATIVE LOADING (GPD) | DESIGN POINT POP. (THOUSANDS) | CUMULATIVE POP. (THOUSANDS) | CUMULATIVE INFILTRATION 10% (GPD) | PEAKING FACTOR* | CUMULATIVE PEAK LOADING (GPD) | CUMULATIVE PEAK LOADING (CFS) | PIPE DIAMETER (IN.) | MIN. SLOPE (%) | MIN. SLOPE VELOCITY (%) | MAX. SLOPE (%)* | PERCENT FULL (%) |
|-----------------------|--------------------------------|----------------------------|--------------------------|-------------------------------|-----------------------------|-----------------------------------|-----------------|-------------------------------|-------------------------------|---------------------|----------------|-------------------------|-----------------|------------------|
| 54 | -- | 102,240 | 102,240 | 1.53 | 1.53 | 10,224 | 4.00 | 419,184 | 0.65 | 8 | 0.4 | 2.81 | 12.74 | 62.8 |
| 53 | 54 | 115,920 | 218,160 | 1.74 | 3.27 | 21,816 | 4.00 | 894,456 | 1.38 | 10 | 0.4 | 3.37 | 7.36 | 70.4 |
| 52 | 53-54 | 75,120 | 293,280 | 1.13 | 4.40 | 29,328 | 3.90 | 1,174,303 | 1.82 | 12 | 0.4 | 3.65 | 6.18 | 60.7 |
| 51 *** | 52-54 | 156,600 | 449,880 | 2.35 | 6.75 | 44,988 | 3.63 | 1,680,196 | 2.60 | 15 | 0.4 | 4.01 | 4.93 | 52.3 |
| 50 | -- | 170,400 | 170,400 | 2.56 | 2.56 | 17,040 | 4.00 | 698,640 | 1.08 | 10 | 0.4 | 3.21 | 8.95 | 59.3 |
| 49 | 50 | 596,760 | 767,160 | 8.95 | 11.51 | 76,716 | 3.32 | 2,627,398 | 4.07 | 18 | 0.4 | 4.48 | 3.61 | 51.1 |
| 48 | 49-50 | 175,440 | 942,600 | 2.63 | 14.14 | 94,260 | 3.21 | 3,122,375 | 4.83 | 18 | 0.4 | 4.67 | 3.16 | 56.7 |
| 47 *** | 48-54 | 494,040 | 1,886,520 | 7.41 | 28.30 | 188,652 | 2.86 | 5,586,033 | 8.64 | 24 | 0.4 | 5.41 | 2.14 | 50.6 |
| 46 | 47-54 | 2,550,000 | 4,436,520 | 38.25 | 66.55 | 443,652 | 2.48 | 11,447,554 | 17.71 | 30 | 0.4 | 6.47 | 1.29 | 54.5 |
| 45 | 46-54 | 2,389,200 | 6,825,720 | 35.84 | 102.39 | 682,572 | 2.31 | 16,437,102 | 25.43 | 30 | 0.4 | 6.98 | 1.00 | 69.5 |
| 44 | -- | 76,920 | 76,920 | 1.15 | 1.15 | 7,692 | 4.00 | 315,372 | 0.49 | 8 | 0.4 | 2.64 | 16.00 | 52.5 |
| 43 | 44 | 250,920 | 327,840 | 3.76 | 4.91 | 32,784 | 3.83 | 1,289,454 | 2.00 | 12 | 0.4 | 3.72 | 5.72 | 64.9 |
| 42 | 43-44 | 209,400 | 537,240 | 3.14 | 8.05 | 53,724 | 3.53 | 1,949,864 | 3.02 | 15 | 0.4 | 4.16 | 4.35 | 57.6 |
| 41 | 42-54 | 27,840 | 7,390,800 | 0.42 | 110.86 | 739,080 | 2.28 | 17,572,953 | 27.19 | 30 | 0.4 | 7.05 | 0.96 | 73.3 |
| 40 | 41-54 | 72,960 | 7,463,760 | 1.09 | 111.95 | 746,376 | 2.27 | 17,718,674 | 27.41 | 30 | 0.4 | 7.06 | 0.95 | 73.8 |
| 39 | -- | 301,320 | 301,320 | 4.52 | 4.52 | 30,132 | 3.89 | 1,201,221 | 1.86 | 12 | 0.4 | 3.67 | 6.06 | 61.8 |
| 38 | -- | 192,600 | 192,600 | 2.89 | 2.89 | 19,260 | 4.00 | 789,660 | 1.22 | 10 | 0.4 | 3.29 | 8.13 | 64.3 |
| 37 | 38-39 | 98,400 | 592,320 | 1.48 | 8.89 | 59,232 | 3.47 | 2,115,406 | 3.27 | 15 | 0.4 | 4.23 | 4.09 | 60.6 |
| 36 | 37-54 | 42,240 | 8,098,320 | 0.63 | 121.47 | 809,832 | 2.24 | 18,975,803 | 29.36 | 30 | 0.4 | 7.11 | 0.91 | 78.5 |
| 35 | -- | 1,236,000 | 1,236,000 | 18.52 | 18.52 | 123,600 | 3.07 | 3,919,305 | 6.06 | 18 | 0.4 | 4.90 | 2.66 | 65.9 |
| 34 *** | 35-54 | 188,160 | 9,522,480 | 2.82 | 142.81 | 952,248 | 2.18 | 21,743,248 | 33.64 | 36 | 0.4 | 7.57 | 0.83 | 60.2 |
| 33 *** | 34-54 | 234,480 | 9,756,960 | 3.51 | 146.32 | 975,696 | 2.17 | 22,192,444 | 34.34 | 36 | 0.4 | 7.61 | 0.82 | 61.0 |
| 32 | -- | 190,320 | 190,320 | 2.85 | 2.85 | 19,032 | 4.00 | 780,312 | 1.21 | 10 | 0.4 | 3.28 | 8.18 | 64.0 |
| 31 | 32 | 190,920 | 381,240 | 2.86 | 5.71 | 38,124 | 3.74 | 1,463,109 | 2.26 | 15 | 0.4 | 3.88 | 5.51 | 48.2 |
| 30 | 31-54 | 189,840 | 10,328,040 | 2.85 | 154.88 | 1,032,804 | 2.15 | 23,279,150 | 36.02 | 36 | 0.4 | 7.68 | 0.79 | 63.0 |
| 29 | 30-54 | 193,080 | 10,521,120 | 2.90 | 157.78 | 1,052,112 | 2.15 | 23,644,248 | 36.58 | 36 | 0.4 | 7.71 | 0.78 | 63.7 |
| 28 *** | -- | 384,450 | 384,450 | 5.64 | 5.64 | 38,445 | 3.75 | 1,478,391 | 2.29 | 12 | 0.4 | 3.81 | 5.15 | 71.5 |
| 27 *** | -- | 2,524,800 | 2,524,800 | 37.87 | 37.87 | 252,480 | 2.73 | 7,133,006 | 11.04 | 24 | 0.4 | 5.73 | 1.77 | 58.9 |
| 26 *** | 27-28 | 431,850 | 3,341,100 | 6.34 | 49.85 | 334,110 | 2.60 | 9,030,708 | 13.97 | 24 | 0.4 | 6.01 | 1.49 | 69.3 |
| 25 | 26-28 | 190,920 | 3,532,020 | 2.87 | 52.72 | 353,202 | 2.58 | 9,461,207 | 14.64 | 24 | 0.4 | 6.06 | 1.44 | 71.9 |
| 24 | -- | 48,480 | 48,480 | 0.73 | 0.73 | 4,848 | 4.00 | 198,768 | 0.31 | 8 | 0.4 | 2.31 | 24.99 | 38.9 |
| 23 | 24 | 184,800 | 233,280 | 2.77 | 3.50 | 23,328 | 4.00 | 956,448 | 1.48 | 12 | 0.4 | 3.50 | 7.19 | 53.9 |
| 22 | 23-24 | 113,760 | 347,040 | 1.71 | 5.21 | 34,704 | 3.80 | 1,351,861 | 2.09 | 12 | 0.4 | 3.76 | 5.48 | 67.4 |
| 21 | 22-28 | 171,960 | 4,051,020 | 2.58 | 60.51 | 405,102 | 2.52 | 10,613,774 | 16.42 | 30 | 0.4 | 6.35 | 1.36 | 52.1 |
| 20 | -- | 430,800 | 430,800 | 6.47 | 6.47 | 43,080 | 3.66 | 1,620,055 | 2.51 | 15 | 0.4 | 3.97 | 5.08 | 51.2 |
| 19 | 20-28 | 163,200 | 4,645,020 | 2.45 | 69.43 | 464,502 | 2.46 | 11,904,323 | 18.42 | 30 | 0.4 | 6.53 | 1.25 | 55.9 |
| 18 | -- | 384,000 | 384,000 | 5.76 | 5.76 | 38,400 | 3.73 | 1,471,613 | 2.28 | 12 | 0.4 | 3.81 | 5.16 | 72.1 |
| 17 | 18 | 105,840 | 489,840 | 1.59 | 7.35 | 48,984 | 3.58 | 1,804,296 | 2.79 | 15 | 0.4 | 4.08 | 4.67 | 54.5 |
| 16 | 17-28 | 68,760 | 5,203,620 | 1.03 | 77.81 | 520,362 | 2.42 | 13,094,339 | 20.26 | 30 | 0.4 | 6.67 | 1.17 | 59.4 |
| 15 | 16-28 | 66,960 | 5,270,580 | 1.00 | 78.81 | 527,058 | 2.41 | 13,235,705 | 20.48 | 30 | 0.4 | 6.69 | 1.16 | 59.8 |
| 14 | 15-28 | 122,640 | 5,393,220 | 1.84 | 80.65 | 539,322 | 2.40 | 13,493,660 | 20.88 | 30 | 0.4 | 6.72 | 1.14 | 60.5 |
| 13 | 14-28 | 193,080 | 5,586,300 | 2.90 | 83.55 | 558,630 | 2.39 | 13,897,812 | 21.50 | 30 | 0.4 | 6.76 | 1.12 | 61.7 |
| 12 | 13-28 | 145,440 | 5,731,740 | 2.18 | 85.73 | 573,174 | 2.38 | 14,200,897 | 21.97 | 30 | 0.4 | 6.79 | 1.10 | 62.6 |

TRANSPORT COLORADO - FULL BUILD-OUT
 SANITARY LOADING, ROUTING AND PIPE SIZING SIZING CALCULATIONS
 CITY OF AURORA CRITERIA

| ROUTING DESIGN POINTS | INCLUDED UPSTREAM ROUTING DP's | DESIGN POINT LOADING (GPD) | CUMULATIVE LOADING (GPD) | DESIGN POINT POP. (THOUSANDS) | CUMULATIVE POP. (THOUSANDS) | CUMULATIVE INFILTRATION 10% (GPD) | PEAKING FACTOR* | CUMULATIVE PEAK LOADING (GPD) | CUMULATIVE PEAK LOADING (CFS) | PIPE DIAMETER (IN.) | MIN. SLOPE (%) | MIN. SLOPE VELOCITY (%) | MAX. SLOPE (%)* | PERCENT FULL (%) |
|-----------------------|--------------------------------|----------------------------|--------------------------|-------------------------------|-----------------------------|-----------------------------------|-----------------|-------------------------------|-------------------------------|---------------------|----------------|-------------------------|-----------------|------------------|
| 11 | -- | 490,800 | 490,800 | 7.36 | 7.36 | 49,080 | 3.58 | 1,807,433 | 2.80 | 15 | 0.4 | 4.08 | 4.64 | 54.7 |
| 10 | 11 | 83,520 | 574,320 | 1.25 | 8.61 | 57,432 | 3.49 | 2,061,804 | 3.19 | 15 | 0.4 | 4.20 | 4.19 | 59.4 |
| 9 | 10-54 | 61,920 | 16,889,100 | 0.93 | 253.05 | 1,688,910 | 1.98 | 35,204,051 | 54.47 | 42 | 0.4 | 8.52 | 0.60 | 63.1 |
| 8 | 9-54 | 34,440 | 16,923,540 | 0.52 | 253.57 | 1,692,354 | 1.98 | 35,264,328 | 54.56 | 42 | 0.4 | 8.52 | 0.60 | 63.2 |
| 7 | 8-54 | 243,720 | 17,167,260 | 3.65 | 257.22 | 1,716,726 | 1.98 | 35,690,993 | 55.22 | 42 | 0.4 | 8.54 | 0.60 | 63.7 |
| 6 | 7-54 | 70,560 | 17,237,820 | 1.06 | 258.28 | 1,723,782 | 1.98 | 35,814,267 | 55.41 | 42 | 0.4 | 8.55 | 0.59 | 63.8 |
| 5 | -- | 104,400 | 104,400 | 1.57 | 1.57 | 10,440 | 4.00 | 428,040 | 0.66 | 8 | 0.4 | 2.82 | 12.55 | 63.5 |
| 4 | 5 | 282,000 | 386,400 | 4.23 | 5.80 | 38,640 | 3.73 | 1,479,145 | 2.29 | 15 | 0.4 | 3.88 | 5.46 | 48.5 |
| 3 | 4-5 | 141,120 | 527,520 | 2.12 | 7.92 | 52,752 | 3.54 | 1,919,655 | 2.97 | 15 | 0.4 | 4.14 | 4.43 | 56.7 |
| 2 | -- | 4,550,400 | 4,550,400 | 68.25 | 68.25 | 455,040 | 2.47 | 11,693,956 | 18.09 | 30 | 0.4 | 6.50 | 1.27 | 55.3 |
| 1 | 2-54 | 70,560 | 22,386,300 | 1.06 | 335.51 | 2,238,630 | 1.89 | 44,618,489 | 69.04 | 42 | 0.4 | 8.87 | 0.53 | 75.4 |

* PEAKING FACTOR BASED ON CUMULATIVE POPULATION VALUES

** MAXIMUM SLOPE IS BASED ON A MAXIMUM VELOCITY OF 10 FT.SEC.

*** FORCE MAIN MAY BE REQUIRED FOR A PORTION OR ENTIRE STRETCH. TBD AT TIME OF DESIGN.

Worksheet for DESIGN POINT 1

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|--------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 42.00 in |
| Discharge | 69.04 ft ³ /s |

Results

| | | |
|-------------------|-------------|--------------------|
| Normal Depth | 31.69 | in |
| Flow Area | 7.79 | ft ² |
| Wetted Perimeter | 7.37 | ft |
| Hydraulic Radius | 12.69 | in |
| Top Width | 3.01 | ft |
| Critical Depth | 2.60 | ft |
| Percent Full | 75.4 | % |
| Critical Slope | 0.00413 | ft/ft |
| Velocity | 8.87 | ft/s |
| Velocity Head | 1.22 | ft |
| Specific Energy | 3.86 | ft |
| Froude Number | 0.97 | |
| Maximum Discharge | 80.89 | ft ³ /s |
| Discharge Full | 75.20 | ft ³ /s |
| Slope Full | 0.00337 | ft/ft |
| Flow Type | SubCritical | |

GVF Input Data

Downstream Depth 0.00 in
Length 0.00 ft
Number Of Steps 0

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 75.45 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 31.69 | in |
| Critical Depth | 2.60 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00413 | ft/ft |

Worksheet for DESIGN POINT 2

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|--------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 30.00 in |
| Discharge | 18.09 ft ³ /s |

Results

| | | |
|-------------------|---------------|--------------------|
| Normal Depth | 16.58 | in |
| Flow Area | 2.78 | ft ² |
| Wetted Perimeter | 4.19 | ft |
| Hydraulic Radius | 7.97 | in |
| Top Width | 2.49 | ft |
| Critical Depth | 1.44 | ft |
| Percent Full | 55.3 | % |
| Critical Slope | 0.00350 | ft/ft |
| Velocity | 6.50 | ft/s |
| Velocity Head | 0.66 | ft |
| Specific Energy | 2.04 | ft |
| Froude Number | 1.08 | |
| Maximum Discharge | 32.98 | ft ³ /s |
| Discharge Full | 30.66 | ft ³ /s |
| Slope Full | 0.00139 | ft/ft |
| Flow Type | SuperCritical | |

GVF Input Data

Downstream Depth 0.00 in
Length 0.00 ft
Number Of Steps 0

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 55.25 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 16.58 | in |
| Critical Depth | 1.44 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00350 | ft/ft |

Worksheet for DESIGN POINT 3

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|-------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 15.00 in |
| Discharge | 2.97 ft ³ /s |

Results

| | | |
|-------------------|-------------|--------------------|
| Normal Depth | 8.51 | in |
| Flow Area | 0.72 | ft ² |
| Wetted Perimeter | 2.13 | ft |
| Hydraulic Radius | 4.04 | in |
| Top Width | 1.24 | ft |
| Critical Depth | 0.69 | ft |
| Percent Full | 56.7 | % |
| Critical Slope | 0.00430 | ft/ft |
| Velocity | 4.14 | ft/s |
| Velocity Head | 0.27 | ft |
| Specific Energy | 0.97 | ft |
| Froude Number | 0.96 | |
| Maximum Discharge | 5.19 | ft ³ /s |
| Discharge Full | 4.83 | ft ³ /s |
| Slope Full | 0.00151 | ft/ft |
| Flow Type | SubCritical | |

GVF Input Data

| | | |
|------------------|------|----|
| Downstream Depth | 0.00 | in |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 56.71 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 8.51 | in |
| Critical Depth | 0.69 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00430 | ft/ft |

Worksheet for DESIGN POINT 4

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|-------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 15.00 in |
| Discharge | 2.29 ft ³ /s |

Results

| | | |
|-------------------|-------------|--------------------|
| Normal Depth | 7.27 | in |
| Flow Area | 0.59 | ft ² |
| Wetted Perimeter | 1.93 | ft |
| Hydraulic Radius | 3.68 | in |
| Top Width | 1.25 | ft |
| Critical Depth | 0.60 | ft |
| Percent Full | 48.5 | % |
| Critical Slope | 0.00403 | ft/ft |
| Velocity | 3.88 | ft/s |
| Velocity Head | 0.23 | ft |
| Specific Energy | 0.84 | ft |
| Froude Number | 1.00 | |
| Maximum Discharge | 5.19 | ft ³ /s |
| Discharge Full | 4.83 | ft ³ /s |
| Slope Full | 0.00090 | ft/ft |
| Flow Type | SubCritical | |

GVF Input Data

| | | |
|------------------|------|----|
| Downstream Depth | 0.00 | in |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 48.46 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 7.27 | in |
| Critical Depth | 0.60 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00403 | ft/ft |

Worksheet for DESIGN POINT 5

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|-------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 8.00 in |
| Discharge | 0.66 ft ³ /s |

Results

| | | |
|-------------------|-------------|--------------------|
| Normal Depth | 5.08 | in |
| Flow Area | 0.23 | ft ² |
| Wetted Perimeter | 1.23 | ft |
| Hydraulic Radius | 2.28 | in |
| Top Width | 0.64 | ft |
| Critical Depth | 0.38 | ft |
| Percent Full | 63.5 | % |
| Critical Slope | 0.00542 | ft/ft |
| Velocity | 2.82 | ft/s |
| Velocity Head | 0.12 | ft |
| Specific Energy | 0.55 | ft |
| Froude Number | 0.83 | |
| Maximum Discharge | 0.97 | ft ³ /s |
| Discharge Full | 0.90 | ft ³ /s |
| Slope Full | 0.00214 | ft/ft |
| Flow Type | SubCritical | |

GVF Input Data

Downstream Depth 0.00 in
Length 0.00 ft
Number Of Steps 0

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 63.49 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 5.08 | in |
| Critical Depth | 0.38 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00542 | ft/ft |

Worksheet for DESIGN POINT 6

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|--------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 42.00 in |
| Discharge | 55.42 ft ³ /s |

Results

| | | |
|-------------------|---------------|--------------------|
| Normal Depth | 26.81 | in |
| Flow Area | 6.48 | ft ² |
| Wetted Perimeter | 6.48 | ft |
| Hydraulic Radius | 12.01 | in |
| Top Width | 3.36 | ft |
| Critical Depth | 2.33 | ft |
| Percent Full | 63.8 | % |
| Critical Slope | 0.00355 | ft/ft |
| Velocity | 8.55 | ft/s |
| Velocity Head | 1.14 | ft |
| Specific Energy | 3.37 | ft |
| Froude Number | 1.09 | |
| Maximum Discharge | 80.89 | ft ³ /s |
| Discharge Full | 75.20 | ft ³ /s |
| Slope Full | 0.00217 | ft/ft |
| Flow Type | SuperCritical | |

GVF Input Data

Downstream Depth 0.00 in
Length 0.00 ft
Number Of Steps 0

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 63.84 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 26.81 | in |
| Critical Depth | 2.33 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00355 | ft/ft |

Worksheet for DESIGN POINT 7

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|--------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 42.00 in |
| Discharge | 55.24 ft ³ /s |

Results

| | | |
|-------------------|---------------|--------------------|
| Normal Depth | 26.75 | in |
| Flow Area | 6.47 | ft ² |
| Wetted Perimeter | 6.47 | ft |
| Hydraulic Radius | 12.00 | in |
| Top Width | 3.37 | ft |
| Critical Depth | 2.33 | ft |
| Percent Full | 63.7 | % |
| Critical Slope | 0.00354 | ft/ft |
| Velocity | 8.54 | ft/s |
| Velocity Head | 1.13 | ft |
| Specific Energy | 3.36 | ft |
| Froude Number | 1.09 | |
| Maximum Discharge | 80.89 | ft ³ /s |
| Discharge Full | 75.20 | ft ³ /s |
| Slope Full | 0.00216 | ft/ft |
| Flow Type | SuperCritical | |

GVF Input Data

Downstream Depth 0.00 in
Length 0.00 ft
Number Of Steps 0

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 63.70 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 26.75 | in |
| Critical Depth | 2.33 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00354 | ft/ft |

Worksheet for DESIGN POINT 8

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|--------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 42.00 in |
| Discharge | 54.58 ft ³ /s |

Results

| | | |
|-------------------|---------------|--------------------|
| Normal Depth | 26.53 | in |
| Flow Area | 6.41 | ft ² |
| Wetted Perimeter | 6.43 | ft |
| Hydraulic Radius | 11.95 | in |
| Top Width | 3.38 | ft |
| Critical Depth | 2.31 | ft |
| Percent Full | 63.2 | % |
| Critical Slope | 0.00352 | ft/ft |
| Velocity | 8.52 | ft/s |
| Velocity Head | 1.13 | ft |
| Specific Energy | 3.34 | ft |
| Froude Number | 1.09 | |
| Maximum Discharge | 80.89 | ft ³ /s |
| Discharge Full | 75.20 | ft ³ /s |
| Slope Full | 0.00211 | ft/ft |
| Flow Type | SuperCritical | |

GVF Input Data

Downstream Depth 0.00 in
Length 0.00 ft
Number Of Steps 0

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 63.17 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 26.53 | in |
| Critical Depth | 2.31 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00352 | ft/ft |

Worksheet for DESIGN POINT 9

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|--------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 42.00 in |
| Discharge | 54.49 ft ³ /s |

Results

| | | |
|-------------------|---------------|--------------------|
| Normal Depth | 26.50 | in |
| Flow Area | 6.40 | ft ² |
| Wetted Perimeter | 6.43 | ft |
| Hydraulic Radius | 11.95 | in |
| Top Width | 3.38 | ft |
| Critical Depth | 2.31 | ft |
| Percent Full | 63.1 | % |
| Critical Slope | 0.00351 | ft/ft |
| Velocity | 8.52 | ft/s |
| Velocity Head | 1.13 | ft |
| Specific Energy | 3.34 | ft |
| Froude Number | 1.09 | |
| Maximum Discharge | 80.89 | ft ³ /s |
| Discharge Full | 75.20 | ft ³ /s |
| Slope Full | 0.00210 | ft/ft |
| Flow Type | SuperCritical | |

GVF Input Data

Downstream Depth 0.00 in
Length 0.00 ft
Number Of Steps 0

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 63.10 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 26.50 | in |
| Critical Depth | 2.31 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00351 | ft/ft |

Worksheet for DESIGN POINT 10

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|-------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 15.00 in |
| Discharge | 3.19 ft ³ /s |

Results

| | | |
|-------------------|-------------|--------------------|
| Normal Depth | 8.90 | in |
| Flow Area | 0.76 | ft ² |
| Wetted Perimeter | 2.20 | ft |
| Hydraulic Radius | 4.14 | in |
| Top Width | 1.23 | ft |
| Critical Depth | 0.72 | ft |
| Percent Full | 59.4 | % |
| Critical Slope | 0.00440 | ft/ft |
| Velocity | 4.20 | ft/s |
| Velocity Head | 0.27 | ft |
| Specific Energy | 1.02 | ft |
| Froude Number | 0.94 | |
| Maximum Discharge | 5.19 | ft ³ /s |
| Discharge Full | 4.83 | ft ³ /s |
| Slope Full | 0.00175 | ft/ft |
| Flow Type | SubCritical | |

GVF Input Data

Downstream Depth 0.00 in
Length 0.00 ft
Number Of Steps 0

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 59.36 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 8.90 | in |
| Critical Depth | 0.72 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00440 | ft/ft |

Worksheet for DESIGN POINT 11

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|-------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 15.00 in |
| Discharge | 2.80 ft ³ /s |

Results

| | | |
|-------------------|-------------|--------------------|
| Normal Depth | 8.20 | in |
| Flow Area | 0.69 | ft ² |
| Wetted Perimeter | 2.08 | ft |
| Hydraulic Radius | 3.96 | in |
| Top Width | 1.24 | ft |
| Critical Depth | 0.67 | ft |
| Percent Full | 54.7 | % |
| Critical Slope | 0.00423 | ft/ft |
| Velocity | 4.08 | ft/s |
| Velocity Head | 0.26 | ft |
| Specific Energy | 0.94 | ft |
| Froude Number | 0.97 | |
| Maximum Discharge | 5.19 | ft ³ /s |
| Discharge Full | 4.83 | ft ³ /s |
| Slope Full | 0.00135 | ft/ft |
| Flow Type | SubCritical | |

GVF Input Data

| | | |
|------------------|------|----|
| Downstream Depth | 0.00 | in |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 54.66 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 8.20 | in |
| Critical Depth | 0.67 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00423 | ft/ft |

Worksheet for DESIGN POINT 12

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|--------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 30.00 in |
| Discharge | 21.97 ft ³ /s |

Results

| | | |
|-------------------|---------------|--------------------|
| Normal Depth | 18.79 | in |
| Flow Area | 3.24 | ft ² |
| Wetted Perimeter | 4.57 | ft |
| Hydraulic Radius | 8.50 | in |
| Top Width | 2.42 | ft |
| Critical Depth | 1.59 | ft |
| Percent Full | 62.6 | % |
| Critical Slope | 0.00379 | ft/ft |
| Velocity | 6.79 | ft/s |
| Velocity Head | 0.72 | ft |
| Specific Energy | 2.28 | ft |
| Froude Number | 1.04 | |
| Maximum Discharge | 32.98 | ft ³ /s |
| Discharge Full | 30.66 | ft ³ /s |
| Slope Full | 0.00205 | ft/ft |
| Flow Type | SuperCritical | |

GVF Input Data

| | | |
|------------------|------|----|
| Downstream Depth | 0.00 | in |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 62.63 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 18.79 | in |
| Critical Depth | 1.59 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00379 | ft/ft |

Worksheet for DESIGN POINT 13

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|--------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 30.00 in |
| Discharge | 21.50 ft ³ /s |

Results

| | | |
|-------------------|---------------|--------------------|
| Normal Depth | 18.52 | in |
| Flow Area | 3.18 | ft ² |
| Wetted Perimeter | 4.52 | ft |
| Hydraulic Radius | 8.45 | in |
| Top Width | 2.43 | ft |
| Critical Depth | 1.58 | ft |
| Percent Full | 61.7 | % |
| Critical Slope | 0.00376 | ft/ft |
| Velocity | 6.76 | ft/s |
| Velocity Head | 0.71 | ft |
| Specific Energy | 2.25 | ft |
| Froude Number | 1.04 | |
| Maximum Discharge | 32.98 | ft ³ /s |
| Discharge Full | 30.66 | ft ³ /s |
| Slope Full | 0.00197 | ft/ft |
| Flow Type | SuperCritical | |

GVF Input Data

Downstream Depth 0.00 in
Length 0.00 ft
Number Of Steps 0

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 61.74 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 18.52 | in |
| Critical Depth | 1.58 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00376 | ft/ft |

Worksheet for DESIGN POINT 14

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|--------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 30.00 in |
| Discharge | 20.87 ft ³ /s |

Results

| | | |
|-------------------|---------------|--------------------|
| Normal Depth | 18.16 | in |
| Flow Area | 3.11 | ft ² |
| Wetted Perimeter | 4.46 | ft |
| Hydraulic Radius | 8.37 | in |
| Top Width | 2.44 | ft |
| Critical Depth | 1.55 | ft |
| Percent Full | 60.5 | % |
| Critical Slope | 0.00370 | ft/ft |
| Velocity | 6.72 | ft/s |
| Velocity Head | 0.70 | ft |
| Specific Energy | 2.21 | ft |
| Froude Number | 1.05 | |
| Maximum Discharge | 32.98 | ft ³ /s |
| Discharge Full | 30.66 | ft ³ /s |
| Slope Full | 0.00185 | ft/ft |
| Flow Type | SuperCritical | |

GVF Input Data

Downstream Depth 0.00 in
Length 0.00 ft
Number Of Steps 0

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 60.52 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 18.16 | in |
| Critical Depth | 1.55 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00370 | ft/ft |

Worksheet for DESIGN POINT 15

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|--------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 30.00 in |
| Discharge | 20.50 ft ³ /s |

Results

| | | |
|-------------------|---------------|--------------------|
| Normal Depth | 17.95 | in |
| Flow Area | 3.06 | ft ² |
| Wetted Perimeter | 4.42 | ft |
| Hydraulic Radius | 8.32 | in |
| Top Width | 2.45 | ft |
| Critical Depth | 1.54 | ft |
| Percent Full | 59.8 | % |
| Critical Slope | 0.00367 | ft/ft |
| Velocity | 6.69 | ft/s |
| Velocity Head | 0.70 | ft |
| Specific Energy | 2.19 | ft |
| Froude Number | 1.05 | |
| Maximum Discharge | 32.98 | ft ³ /s |
| Discharge Full | 30.66 | ft ³ /s |
| Slope Full | 0.00179 | ft/ft |
| Flow Type | SuperCritical | |

GVF Input Data

Downstream Depth 0.00 in
Length 0.00 ft
Number Of Steps 0

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 59.82 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 17.95 | in |
| Critical Depth | 1.54 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00367 | ft/ft |

Worksheet for DESIGN POINT 16

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|--------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 30.00 in |
| Discharge | 20.28 ft ³ /s |

Results

| | | |
|-------------------|---------------|--------------------|
| Normal Depth | 17.82 | in |
| Flow Area | 3.04 | ft ² |
| Wetted Perimeter | 4.40 | ft |
| Hydraulic Radius | 8.29 | in |
| Top Width | 2.46 | ft |
| Critical Depth | 1.53 | ft |
| Percent Full | 59.4 | % |
| Critical Slope | 0.00366 | ft/ft |
| Velocity | 6.67 | ft/s |
| Velocity Head | 0.69 | ft |
| Specific Energy | 2.18 | ft |
| Froude Number | 1.06 | |
| Maximum Discharge | 32.98 | ft ³ /s |
| Discharge Full | 30.66 | ft ³ /s |
| Slope Full | 0.00175 | ft/ft |
| Flow Type | SuperCritical | |

GVF Input Data

Downstream Depth 0.00 in
Length 0.00 ft
Number Of Steps 0

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 59.40 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 17.82 | in |
| Critical Depth | 1.53 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00366 | ft/ft |

Worksheet for DESIGN POINT 17

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|-------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 15.00 in |
| Discharge | 2.79 ft ³ /s |

Results

| | | |
|-------------------|-------------|--------------------|
| Normal Depth | 8.18 | in |
| Flow Area | 0.68 | ft ² |
| Wetted Perimeter | 2.08 | ft |
| Hydraulic Radius | 3.95 | in |
| Top Width | 1.24 | ft |
| Critical Depth | 0.67 | ft |
| Percent Full | 54.5 | % |
| Critical Slope | 0.00422 | ft/ft |
| Velocity | 4.08 | ft/s |
| Velocity Head | 0.26 | ft |
| Specific Energy | 0.94 | ft |
| Froude Number | 0.97 | |
| Maximum Discharge | 5.19 | ft ³ /s |
| Discharge Full | 4.83 | ft ³ /s |
| Slope Full | 0.00134 | ft/ft |
| Flow Type | SubCritical | |

GVF Input Data

Downstream Depth 0.00 in
Length 0.00 ft
Number Of Steps 0

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 54.54 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 8.18 | in |
| Critical Depth | 0.67 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00422 | ft/ft |

Worksheet for DESIGN POINT 18

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|-------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 12.00 in |
| Discharge | 2.28 ft ³ /s |

Results

| | | |
|-------------------|-------------|--------------------|
| Normal Depth | 8.55 | in |
| Flow Area | 0.60 | ft ² |
| Wetted Perimeter | 2.01 | ft |
| Hydraulic Radius | 3.57 | in |
| Top Width | 0.91 | ft |
| Critical Depth | 0.65 | ft |
| Percent Full | 71.2 | % |
| Critical Slope | 0.00522 | ft/ft |
| Velocity | 3.81 | ft/s |
| Velocity Head | 0.23 | ft |
| Specific Energy | 0.94 | ft |
| Froude Number | 0.83 | |
| Maximum Discharge | 2.86 | ft ³ /s |
| Discharge Full | 2.66 | ft ³ /s |
| Slope Full | 0.00293 | ft/ft |
| Flow Type | SubCritical | |

GVF Input Data

Downstream Depth 0.00 in
Length 0.00 ft
Number Of Steps 0

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 71.21 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 8.55 | in |
| Critical Depth | 0.65 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00522 | ft/ft |

Worksheet for DESIGN POINT 19

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|--------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 30.00 in |
| Discharge | 18.44 ft ³ /s |

Results

| | | |
|-------------------|---------------|--------------------|
| Normal Depth | 16.77 | in |
| Flow Area | 2.82 | ft ² |
| Wetted Perimeter | 4.22 | ft |
| Hydraulic Radius | 8.02 | in |
| Top Width | 2.48 | ft |
| Critical Depth | 1.46 | ft |
| Percent Full | 55.9 | % |
| Critical Slope | 0.00352 | ft/ft |
| Velocity | 6.53 | ft/s |
| Velocity Head | 0.66 | ft |
| Specific Energy | 2.06 | ft |
| Froude Number | 1.08 | |
| Maximum Discharge | 32.98 | ft ³ /s |
| Discharge Full | 30.66 | ft ³ /s |
| Slope Full | 0.00145 | ft/ft |
| Flow Type | SuperCritical | |

GVF Input Data

Downstream Depth 0.00 in
Length 0.00 ft
Number Of Steps 0

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 55.91 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 16.77 | in |
| Critical Depth | 1.46 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00352 | ft/ft |

Worksheet for DESIGN POINT 20

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|-------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 15.00 in |
| Discharge | 2.51 ft ³ /s |

Results

| | | |
|-------------------|-------------|--------------------|
| Normal Depth | 7.67 | in |
| Flow Area | 0.63 | ft ² |
| Wetted Perimeter | 1.99 | ft |
| Hydraulic Radius | 3.80 | in |
| Top Width | 1.25 | ft |
| Critical Depth | 0.63 | ft |
| Percent Full | 51.2 | % |
| Critical Slope | 0.00411 | ft/ft |
| Velocity | 3.97 | ft/s |
| Velocity Head | 0.25 | ft |
| Specific Energy | 0.88 | ft |
| Froude Number | 0.99 | |
| Maximum Discharge | 5.19 | ft ³ /s |
| Discharge Full | 4.83 | ft ³ /s |
| Slope Full | 0.00108 | ft/ft |
| Flow Type | SubCritical | |

GVF Input Data

| | | |
|------------------|------|----|
| Downstream Depth | 0.00 | in |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 51.16 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 7.67 | in |
| Critical Depth | 0.63 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00411 | ft/ft |

Worksheet for DESIGN POINT 21

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|--------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 30.00 in |
| Discharge | 16.44 ft ³ /s |

Results

| | | |
|-------------------|---------------|--------------------|
| Normal Depth | 15.64 | in |
| Flow Area | 2.59 | ft ² |
| Wetted Perimeter | 4.03 | ft |
| Hydraulic Radius | 7.70 | in |
| Top Width | 2.50 | ft |
| Critical Depth | 1.37 | ft |
| Percent Full | 52.1 | % |
| Critical Slope | 0.00339 | ft/ft |
| Velocity | 6.35 | ft/s |
| Velocity Head | 0.63 | ft |
| Specific Energy | 1.93 | ft |
| Froude Number | 1.10 | |
| Maximum Discharge | 32.98 | ft ³ /s |
| Discharge Full | 30.66 | ft ³ /s |
| Slope Full | 0.00115 | ft/ft |
| Flow Type | SuperCritical | |

GVF Input Data

| | | |
|------------------|------|----|
| Downstream Depth | 0.00 | in |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 52.12 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 15.64 | in |
| Critical Depth | 1.37 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00339 | ft/ft |

Worksheet for DESIGN POINT 22

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|-------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 12.00 in |
| Discharge | 2.12 ft ³ /s |

Results

| | | |
|-------------------|-------------|--------------------|
| Normal Depth | 8.09 | in |
| Flow Area | 0.56 | ft ² |
| Wetted Perimeter | 1.93 | ft |
| Hydraulic Radius | 3.51 | in |
| Top Width | 0.94 | ft |
| Critical Depth | 0.62 | ft |
| Percent Full | 67.4 | % |
| Critical Slope | 0.00503 | ft/ft |
| Velocity | 3.76 | ft/s |
| Velocity Head | 0.22 | ft |
| Specific Energy | 0.89 | ft |
| Froude Number | 0.86 | |
| Maximum Discharge | 2.86 | ft ³ /s |
| Discharge Full | 2.66 | ft ³ /s |
| Slope Full | 0.00254 | ft/ft |
| Flow Type | SubCritical | |

GVF Input Data

Downstream Depth 0.00 in
Length 0.00 ft
Number Of Steps 0

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 67.40 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 8.09 | in |
| Critical Depth | 0.62 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00503 | ft/ft |

Worksheet for DESIGN POINT 23

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|-------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 12.00 in |
| Discharge | 1.51 ft ³ /s |

Results

| | | |
|-------------------|-------------|--------------------|
| Normal Depth | 6.47 | in |
| Flow Area | 0.43 | ft ² |
| Wetted Perimeter | 1.65 | ft |
| Hydraulic Radius | 3.14 | in |
| Top Width | 1.00 | ft |
| Critical Depth | 0.52 | ft |
| Percent Full | 53.9 | % |
| Critical Slope | 0.00449 | ft/ft |
| Velocity | 3.50 | ft/s |
| Velocity Head | 0.19 | ft |
| Specific Energy | 0.73 | ft |
| Froude Number | 0.94 | |
| Maximum Discharge | 2.86 | ft ³ /s |
| Discharge Full | 2.66 | ft ³ /s |
| Slope Full | 0.00129 | ft/ft |
| Flow Type | SubCritical | |

GVF Input Data

Downstream Depth 0.00 in
Length 0.00 ft
Number Of Steps 0

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 53.91 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 6.47 | in |
| Critical Depth | 0.52 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00449 | ft/ft |

Worksheet for DESIGN POINT 24

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|-------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 8.00 in |
| Discharge | 0.29 ft ³ /s |

Results

| | | |
|-------------------|-------------|--------------------|
| Normal Depth | 3.11 | in |
| Flow Area | 0.13 | ft ² |
| Wetted Perimeter | 0.90 | ft |
| Hydraulic Radius | 1.68 | in |
| Top Width | 0.65 | ft |
| Critical Depth | 0.25 | ft |
| Percent Full | 38.9 | % |
| Critical Slope | 0.00467 | ft/ft |
| Velocity | 2.31 | ft/s |
| Velocity Head | 0.08 | ft |
| Specific Energy | 0.34 | ft |
| Froude Number | 0.92 | |
| Maximum Discharge | 0.97 | ft ³ /s |
| Discharge Full | 0.90 | ft ³ /s |
| Slope Full | 0.00041 | ft/ft |
| Flow Type | SubCritical | |

GVF Input Data

Downstream Depth 0.00 in
Length 0.00 ft
Number Of Steps 0

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 38.93 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 3.11 | in |
| Critical Depth | 0.25 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00467 | ft/ft |

Worksheet for DESIGN POINT 25

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|--------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 24.00 in |
| Discharge | 14.64 ft ³ /s |

Results

| | | |
|-------------------|-------------|--------------------|
| Normal Depth | 17.25 | in |
| Flow Area | 2.42 | ft ² |
| Wetted Perimeter | 4.05 | ft |
| Hydraulic Radius | 7.17 | in |
| Top Width | 1.80 | ft |
| Critical Depth | 1.38 | ft |
| Percent Full | 71.9 | % |
| Critical Slope | 0.00445 | ft/ft |
| Velocity | 6.06 | ft/s |
| Velocity Head | 0.57 | ft |
| Specific Energy | 2.01 | ft |
| Froude Number | 0.92 | |
| Maximum Discharge | 18.19 | ft ³ /s |
| Discharge Full | 16.91 | ft ³ /s |
| Slope Full | 0.00300 | ft/ft |
| Flow Type | SubCritical | |

GVF Input Data

Downstream Depth 0.00 in
Length 0.00 ft
Number Of Steps 0

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 71.86 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 17.25 | in |
| Critical Depth | 1.38 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00445 | ft/ft |

Worksheet for DESIGN POINT 26

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|--------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 24.00 in |
| Discharge | 13.97 ft ³ /s |

Results

| | | |
|-------------------|-------------|--------------------|
| Normal Depth | 16.63 | in |
| Flow Area | 2.32 | ft ² |
| Wetted Perimeter | 3.93 | ft |
| Hydraulic Radius | 7.09 | in |
| Top Width | 1.85 | ft |
| Critical Depth | 1.35 | ft |
| Percent Full | 69.3 | % |
| Critical Slope | 0.00433 | ft/ft |
| Velocity | 6.01 | ft/s |
| Velocity Head | 0.56 | ft |
| Specific Energy | 1.95 | ft |
| Froude Number | 0.94 | |
| Maximum Discharge | 18.19 | ft ³ /s |
| Discharge Full | 16.91 | ft ³ /s |
| Slope Full | 0.00273 | ft/ft |
| Flow Type | SubCritical | |

GVF Input Data

Downstream Depth 0.00 in
Length 0.00 ft
Number Of Steps 0

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 69.30 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 16.63 | in |
| Critical Depth | 1.35 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00433 | ft/ft |

Worksheet for DESIGN POINT 27

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|--------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 24.00 in |
| Discharge | 11.04 ft ³ /s |

Results

| | | |
|-------------------|---------------|--------------------|
| Normal Depth | 14.14 | in |
| Flow Area | 1.93 | ft ² |
| Wetted Perimeter | 3.50 | ft |
| Hydraulic Radius | 6.60 | in |
| Top Width | 1.97 | ft |
| Critical Depth | 1.19 | ft |
| Percent Full | 58.9 | % |
| Critical Slope | 0.00386 | ft/ft |
| Velocity | 5.73 | ft/s |
| Velocity Head | 0.51 | ft |
| Specific Energy | 1.69 | ft |
| Froude Number | 1.02 | |
| Maximum Discharge | 18.19 | ft ³ /s |
| Discharge Full | 16.91 | ft ³ /s |
| Slope Full | 0.00171 | ft/ft |
| Flow Type | SuperCritical | |

GVF Input Data

| | | |
|------------------|------|----|
| Downstream Depth | 0.00 | in |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 58.91 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 14.14 | in |
| Critical Depth | 1.19 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00386 | ft/ft |

Worksheet for DESIGN POINT 28

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|-------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 12.00 in |
| Discharge | 2.29 ft ³ /s |

Results

| | | |
|-------------------|-------------|--------------------|
| Normal Depth | 8.58 | in |
| Flow Area | 0.60 | ft ² |
| Wetted Perimeter | 2.01 | ft |
| Hydraulic Radius | 3.58 | in |
| Top Width | 0.90 | ft |
| Critical Depth | 0.65 | ft |
| Percent Full | 71.5 | % |
| Critical Slope | 0.00523 | ft/ft |
| Velocity | 3.81 | ft/s |
| Velocity Head | 0.23 | ft |
| Specific Energy | 0.94 | ft |
| Froude Number | 0.82 | |
| Maximum Discharge | 2.86 | ft ³ /s |
| Discharge Full | 2.66 | ft ³ /s |
| Slope Full | 0.00296 | ft/ft |
| Flow Type | SubCritical | |

GVF Input Data

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 71.46 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 8.58 | in |
| Critical Depth | 0.65 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00523 | ft/ft |

Worksheet for DESIGN POINT 29

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|--------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 36.00 in |
| Discharge | 36.61 ft ³ /s |

Results

| | | |
|-------------------|---------------|--------------------|
| Normal Depth | 22.93 | in |
| Flow Area | 4.75 | ft ² |
| Wetted Perimeter | 5.54 | ft |
| Hydraulic Radius | 10.28 | in |
| Top Width | 2.89 | ft |
| Critical Depth | 1.97 | ft |
| Percent Full | 63.7 | % |
| Critical Slope | 0.00367 | ft/ft |
| Velocity | 7.71 | ft/s |
| Velocity Head | 0.92 | ft |
| Specific Energy | 2.83 | ft |
| Froude Number | 1.06 | |
| Maximum Discharge | 53.62 | ft ³ /s |
| Discharge Full | 49.85 | ft ³ /s |
| Slope Full | 0.00216 | ft/ft |
| Flow Type | SuperCritical | |

GVF Input Data

Downstream Depth 0.00 in
Length 0.00 ft
Number Of Steps 0

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 63.68 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 22.93 | in |
| Critical Depth | 1.97 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00367 | ft/ft |

Worksheet for DESIGN POINT 30

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|--------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 36.00 in |
| Discharge | 36.04 ft ³ /s |

Results

| | | |
|-------------------|---------------|--------------------|
| Normal Depth | 22.68 | in |
| Flow Area | 4.69 | ft ² |
| Wetted Perimeter | 5.50 | ft |
| Hydraulic Radius | 10.23 | in |
| Top Width | 2.90 | ft |
| Critical Depth | 1.95 | ft |
| Percent Full | 63.0 | % |
| Critical Slope | 0.00364 | ft/ft |
| Velocity | 7.68 | ft/s |
| Velocity Head | 0.92 | ft |
| Specific Energy | 2.81 | ft |
| Froude Number | 1.06 | |
| Maximum Discharge | 53.62 | ft ³ /s |
| Discharge Full | 49.85 | ft ³ /s |
| Slope Full | 0.00209 | ft/ft |
| Flow Type | SuperCritical | |

GVF Input Data

Downstream Depth 0.00 in
Length 0.00 ft
Number Of Steps 0

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 63.00 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 22.68 | in |
| Critical Depth | 1.95 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00364 | ft/ft |

Worksheet for DESIGN POINT 31

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|-------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 15.00 in |
| Discharge | 2.27 ft ³ /s |

Results

| | | |
|-------------------|-------------|--------------------|
| Normal Depth | 7.23 | in |
| Flow Area | 0.59 | ft ² |
| Wetted Perimeter | 1.92 | ft |
| Hydraulic Radius | 3.66 | in |
| Top Width | 1.25 | ft |
| Critical Depth | 0.60 | ft |
| Percent Full | 48.2 | % |
| Critical Slope | 0.00402 | ft/ft |
| Velocity | 3.88 | ft/s |
| Velocity Head | 0.23 | ft |
| Specific Energy | 0.84 | ft |
| Froude Number | 1.00 | |
| Maximum Discharge | 5.19 | ft ³ /s |
| Discharge Full | 4.83 | ft ³ /s |
| Slope Full | 0.00088 | ft/ft |
| Flow Type | SubCritical | |

GVF Input Data

| | | |
|------------------|------|----|
| Downstream Depth | 0.00 | in |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 48.22 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 7.23 | in |
| Critical Depth | 0.60 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00402 | ft/ft |

Worksheet for DESIGN POINT 32

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|-------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 10.00 in |
| Discharge | 1.21 ft ³ /s |

Results

| | | |
|-------------------|-------------|--------------------|
| Normal Depth | 6.40 | in |
| Flow Area | 0.37 | ft ² |
| Wetted Perimeter | 1.54 | ft |
| Hydraulic Radius | 2.86 | in |
| Top Width | 0.80 | ft |
| Critical Depth | 0.49 | ft |
| Percent Full | 64.0 | % |
| Critical Slope | 0.00512 | ft/ft |
| Velocity | 3.28 | ft/s |
| Velocity Head | 0.17 | ft |
| Specific Energy | 0.70 | ft |
| Froude Number | 0.85 | |
| Maximum Discharge | 1.76 | ft ³ /s |
| Discharge Full | 1.64 | ft ³ /s |
| Slope Full | 0.00218 | ft/ft |
| Flow Type | SubCritical | |

GVF Input Data

| | | |
|------------------|------|----|
| Downstream Depth | 0.00 | in |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 63.97 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 6.40 | in |
| Critical Depth | 0.49 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00512 | ft/ft |

Worksheet for DESIGN POINT 33

Project Description

Friction Method Manning Formula
Solve For Normal Depth

Input Data

| | |
|-----------------------|-------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 36.00 in |
| Discharge | 34.36 ft³/s |

Results

| | |
|-------------------|---------------|
| Normal Depth | 21.97 in |
| Flow Area | 4.52 ft² |
| Wetted Perimeter | 5.38 ft |
| Hydraulic Radius | 10.08 in |
| Top Width | 2.93 ft |
| Critical Depth | 1.90 ft |
| Percent Full | 61.0 % |
| Critical Slope | 0.00356 ft/ft |
| Velocity | 7.61 ft/s |
| Velocity Head | 0.90 ft |
| Specific Energy | 2.73 ft |
| Froude Number | 1.08 |
| Maximum Discharge | 53.62 ft³/s |
| Discharge Full | 49.85 ft³/s |
| Slope Full | 0.00190 ft/ft |
| Flow Type | SuperCritical |

GVF Input Data

| | |
|------------------|---------|
| Downstream Depth | 0.00 in |
| Length | 0.00 ft |
| Number Of Steps | 0 |

GVF Output Data

| | |
|-----------------------------|---------------|
| Upstream Depth | 0.00 in |
| Profile Description | |
| Profile Headloss | 0.00 ft |
| Average End Depth Over Rise | 0.00 % |
| Normal Depth Over Rise | 61.02 % |
| Downstream Velocity | Infinity ft/s |
| Upstream Velocity | Infinity ft/s |
| Normal Depth | 21.97 in |
| Critical Depth | 1.90 ft |
| Channel Slope | 0.40000 % |
| Critical Slope | 0.00356 ft/ft |

Worksheet for DESIGN POINT 34

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|--------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 36.00 in |
| Discharge | 33.67 ft ³ /s |

Results

| | | |
|-------------------|---------------|--------------------|
| Normal Depth | 21.68 | in |
| Flow Area | 4.45 | ft ² |
| Wetted Perimeter | 5.33 | ft |
| Hydraulic Radius | 10.01 | in |
| Top Width | 2.94 | ft |
| Critical Depth | 1.88 | ft |
| Percent Full | 60.2 | % |
| Critical Slope | 0.00352 | ft/ft |
| Velocity | 7.57 | ft/s |
| Velocity Head | 0.89 | ft |
| Specific Energy | 2.70 | ft |
| Froude Number | 1.08 | |
| Maximum Discharge | 53.62 | ft ³ /s |
| Discharge Full | 49.85 | ft ³ /s |
| Slope Full | 0.00182 | ft/ft |
| Flow Type | SuperCritical | |

GVF Input Data

| | | |
|------------------|------|----|
| Downstream Depth | 0.00 | in |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 60.21 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 21.68 | in |
| Critical Depth | 1.88 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00352 | ft/ft |

Worksheet for DESIGN POINT 35

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|-------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 18.00 in |
| Discharge | 6.06 ft ³ /s |

Results

| | | |
|-------------------|-------------|--------------------|
| Normal Depth | 11.87 | in |
| Flow Area | 1.24 | ft ² |
| Wetted Perimeter | 2.84 | ft |
| Hydraulic Radius | 5.22 | in |
| Top Width | 1.42 | ft |
| Critical Depth | 0.95 | ft |
| Percent Full | 65.9 | % |
| Critical Slope | 0.00448 | ft/ft |
| Velocity | 4.90 | ft/s |
| Velocity Head | 0.37 | ft |
| Specific Energy | 1.36 | ft |
| Froude Number | 0.93 | |
| Maximum Discharge | 8.45 | ft ³ /s |
| Discharge Full | 7.85 | ft ³ /s |
| Slope Full | 0.00238 | ft/ft |
| Flow Type | SubCritical | |

GVF Input Data

Downstream Depth 0.00 in
Length 0.00 ft
Number Of Steps 0

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 65.94 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 11.87 | in |
| Critical Depth | 0.95 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00448 | ft/ft |

Worksheet for DESIGN POINT 36

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|--------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 30.00 in |
| Discharge | 29.39 ft ³ /s |

Results

| | | |
|-------------------|-------------|--------------------|
| Normal Depth | 23.54 | in |
| Flow Area | 4.13 | ft ² |
| Wetted Perimeter | 5.44 | ft |
| Hydraulic Radius | 9.11 | in |
| Top Width | 2.05 | ft |
| Critical Depth | 1.85 | ft |
| Percent Full | 78.5 | % |
| Critical Slope | 0.00457 | ft/ft |
| Velocity | 7.11 | ft/s |
| Velocity Head | 0.79 | ft |
| Specific Energy | 2.75 | ft |
| Froude Number | 0.88 | |
| Maximum Discharge | 32.98 | ft ³ /s |
| Discharge Full | 30.66 | ft ³ /s |
| Slope Full | 0.00368 | ft/ft |
| Flow Type | SubCritical | |

GVF Input Data

| | | |
|------------------|------|----|
| Downstream Depth | 0.00 | in |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 78.48 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 23.54 | in |
| Critical Depth | 1.85 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00457 | ft/ft |

Worksheet for DESIGN POINT 37

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|-------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 15.00 in |
| Discharge | 3.29 ft ³ /s |

Results

| | | |
|-------------------|-------------|--------------------|
| Normal Depth | 9.08 | in |
| Flow Area | 0.78 | ft ² |
| Wetted Perimeter | 2.23 | ft |
| Hydraulic Radius | 4.18 | in |
| Top Width | 1.22 | ft |
| Critical Depth | 0.73 | ft |
| Percent Full | 60.6 | % |
| Critical Slope | 0.00445 | ft/ft |
| Velocity | 4.23 | ft/s |
| Velocity Head | 0.28 | ft |
| Specific Energy | 1.04 | ft |
| Froude Number | 0.94 | |
| Maximum Discharge | 5.19 | ft ³ /s |
| Discharge Full | 4.83 | ft ³ /s |
| Slope Full | 0.00186 | ft/ft |
| Flow Type | SubCritical | |

GVF Input Data

Downstream Depth 0.00 in
Length 0.00 ft
Number Of Steps 0

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 60.56 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 9.08 | in |
| Critical Depth | 0.73 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00445 | ft/ft |

Worksheet for DESIGN POINT 38

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|-------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 10.00 in |
| Discharge | 1.22 ft ³ /s |

Results

| | | |
|-------------------|-------------|--------------------|
| Normal Depth | 6.43 | in |
| Flow Area | 0.37 | ft ² |
| Wetted Perimeter | 1.55 | ft |
| Hydraulic Radius | 2.87 | in |
| Top Width | 0.80 | ft |
| Critical Depth | 0.49 | ft |
| Percent Full | 64.3 | % |
| Critical Slope | 0.00514 | ft/ft |
| Velocity | 3.29 | ft/s |
| Velocity Head | 0.17 | ft |
| Specific Energy | 0.70 | ft |
| Froude Number | 0.85 | |
| Maximum Discharge | 1.76 | ft ³ /s |
| Discharge Full | 1.64 | ft ³ /s |
| Slope Full | 0.00222 | ft/ft |
| Flow Type | SubCritical | |

GVF Input Data

Downstream Depth 0.00 in
Length 0.00 ft
Number Of Steps 0

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 64.33 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 6.43 | in |
| Critical Depth | 0.49 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00514 | ft/ft |

Worksheet for DESIGN POINT 39

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|-------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 12.00 in |
| Discharge | 1.87 ft ³ /s |

Results

| | | |
|-------------------|-------------|--------------------|
| Normal Depth | 7.41 | in |
| Flow Area | 0.51 | ft ² |
| Wetted Perimeter | 1.81 | ft |
| Hydraulic Radius | 3.38 | in |
| Top Width | 0.97 | ft |
| Critical Depth | 0.58 | ft |
| Percent Full | 61.8 | % |
| Critical Slope | 0.00478 | ft/ft |
| Velocity | 3.67 | ft/s |
| Velocity Head | 0.21 | ft |
| Specific Energy | 0.83 | ft |
| Froude Number | 0.89 | |
| Maximum Discharge | 2.86 | ft ³ /s |
| Discharge Full | 2.66 | ft ³ /s |
| Slope Full | 0.00197 | ft/ft |
| Flow Type | SubCritical | |

GVF Input Data

Downstream Depth 0.00 in
Length 0.00 ft
Number Of Steps 0

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 61.79 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 7.41 | in |
| Critical Depth | 0.58 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00478 | ft/ft |

Worksheet for DESIGN POINT 40

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|--------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 30.00 in |
| Discharge | 27.43 ft ³ /s |

Results

| | | |
|-------------------|-------------|--------------------|
| Normal Depth | 22.14 | in |
| Flow Area | 3.88 | ft ² |
| Wetted Perimeter | 5.17 | ft |
| Hydraulic Radius | 9.02 | in |
| Top Width | 2.20 | ft |
| Critical Depth | 1.79 | ft |
| Percent Full | 73.8 | % |
| Critical Slope | 0.00433 | ft/ft |
| Velocity | 7.06 | ft/s |
| Velocity Head | 0.78 | ft |
| Specific Energy | 2.62 | ft |
| Froude Number | 0.94 | |
| Maximum Discharge | 32.98 | ft ³ /s |
| Discharge Full | 30.66 | ft ³ /s |
| Slope Full | 0.00320 | ft/ft |
| Flow Type | SubCritical | |

GVF Input Data

Downstream Depth 0.00 in
Length 0.00 ft
Number Of Steps 0

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 73.81 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 22.14 | in |
| Critical Depth | 1.79 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00433 | ft/ft |

Worksheet for DESIGN POINT 41

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|--------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 30.00 in |
| Discharge | 27.20 ft ³ /s |

Results

| | | |
|-------------------|-------------|--------------------|
| Normal Depth | 21.99 | in |
| Flow Area | 3.86 | ft ² |
| Wetted Perimeter | 5.14 | ft |
| Hydraulic Radius | 9.00 | in |
| Top Width | 2.21 | ft |
| Critical Depth | 1.78 | ft |
| Percent Full | 73.3 | % |
| Critical Slope | 0.00431 | ft/ft |
| Velocity | 7.05 | ft/s |
| Velocity Head | 0.77 | ft |
| Specific Energy | 2.61 | ft |
| Froude Number | 0.94 | |
| Maximum Discharge | 32.98 | ft ³ /s |
| Discharge Full | 30.66 | ft ³ /s |
| Slope Full | 0.00315 | ft/ft |
| Flow Type | SubCritical | |

GVF Input Data

| | | |
|------------------|------|----|
| Downstream Depth | 0.00 | in |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 73.29 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 21.99 | in |
| Critical Depth | 1.78 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00431 | ft/ft |

Worksheet for DESIGN POINT 42

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|-------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 15.00 in |
| Discharge | 3.04 ft ³ /s |

Results

| | | |
|-------------------|-------------|--------------------|
| Normal Depth | 8.63 | in |
| Flow Area | 0.73 | ft ² |
| Wetted Perimeter | 2.15 | ft |
| Hydraulic Radius | 4.08 | in |
| Top Width | 1.24 | ft |
| Critical Depth | 0.70 | ft |
| Percent Full | 57.6 | % |
| Critical Slope | 0.00433 | ft/ft |
| Velocity | 4.16 | ft/s |
| Velocity Head | 0.27 | ft |
| Specific Energy | 0.99 | ft |
| Froude Number | 0.95 | |
| Maximum Discharge | 5.19 | ft ³ /s |
| Discharge Full | 4.83 | ft ³ /s |
| Slope Full | 0.00159 | ft/ft |
| Flow Type | SubCritical | |

GVF Input Data

Downstream Depth 0.00 in
Length 0.00 ft
Number Of Steps 0

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 57.55 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 8.63 | in |
| Critical Depth | 0.70 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00433 | ft/ft |

Worksheet for DESIGN POINT 43

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|-------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 12.00 in |
| Discharge | 2.01 ft ³ /s |

Results

| | | |
|-------------------|-------------|--------------------|
| Normal Depth | 7.79 | in |
| Flow Area | 0.54 | ft ² |
| Wetted Perimeter | 1.87 | ft |
| Hydraulic Radius | 3.46 | in |
| Top Width | 0.95 | ft |
| Critical Depth | 0.61 | ft |
| Percent Full | 64.9 | % |
| Critical Slope | 0.00492 | ft/ft |
| Velocity | 3.72 | ft/s |
| Velocity Head | 0.22 | ft |
| Specific Energy | 0.86 | ft |
| Froude Number | 0.87 | |
| Maximum Discharge | 2.86 | ft ³ /s |
| Discharge Full | 2.66 | ft ³ /s |
| Slope Full | 0.00228 | ft/ft |
| Flow Type | SubCritical | |

GVF Input Data

Downstream Depth 0.00 in
Length 0.00 ft
Number Of Steps 0

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 64.92 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 7.79 | in |
| Critical Depth | 0.61 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00492 | ft/ft |

Worksheet for DESIGN POINT 44

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|-------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 8.00 in |
| Discharge | 0.49 ft ³ /s |

Results

| | | |
|-------------------|-------------|--------------------|
| Normal Depth | 4.20 | in |
| Flow Area | 0.19 | ft ² |
| Wetted Perimeter | 1.08 | ft |
| Hydraulic Radius | 2.06 | in |
| Top Width | 0.67 | ft |
| Critical Depth | 0.33 | ft |
| Percent Full | 52.5 | % |
| Critical Slope | 0.00500 | ft/ft |
| Velocity | 2.64 | ft/s |
| Velocity Head | 0.11 | ft |
| Specific Energy | 0.46 | ft |
| Froude Number | 0.88 | |
| Maximum Discharge | 0.97 | ft ³ /s |
| Discharge Full | 0.90 | ft ³ /s |
| Slope Full | 0.00118 | ft/ft |
| Flow Type | SubCritical | |

GVF Input Data

Downstream Depth 0.00 in
Length 0.00 ft
Number Of Steps 0

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 52.49 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 4.20 | in |
| Critical Depth | 0.33 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00500 | ft/ft |

Worksheet for DESIGN POINT 45

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|--------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 30.00 in |
| Discharge | 25.43 ft ³ /s |

Results

| | | |
|-------------------|-------------|--------------------|
| Normal Depth | 20.85 | in |
| Flow Area | 3.64 | ft ² |
| Wetted Perimeter | 4.93 | ft |
| Hydraulic Radius | 8.87 | in |
| Top Width | 2.30 | ft |
| Critical Depth | 1.72 | ft |
| Percent Full | 69.5 | % |
| Critical Slope | 0.00412 | ft/ft |
| Velocity | 6.98 | ft/s |
| Velocity Head | 0.76 | ft |
| Specific Energy | 2.50 | ft |
| Froude Number | 0.98 | |
| Maximum Discharge | 32.98 | ft ³ /s |
| Discharge Full | 30.66 | ft ³ /s |
| Slope Full | 0.00275 | ft/ft |
| Flow Type | SubCritical | |

GVF Input Data

Downstream Depth 0.00 in
Length 0.00 ft
Number Of Steps 0

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 69.51 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 20.85 | in |
| Critical Depth | 1.72 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00412 | ft/ft |

Worksheet for DESIGN POINT 46

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|--------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 30.00 in |
| Discharge | 17.71 ft ³ /s |

Results

| | | |
|-------------------|---------------|--------------------|
| Normal Depth | 16.36 | in |
| Flow Area | 2.74 | ft ² |
| Wetted Perimeter | 4.15 | ft |
| Hydraulic Radius | 7.91 | in |
| Top Width | 2.49 | ft |
| Critical Depth | 1.42 | ft |
| Percent Full | 54.5 | % |
| Critical Slope | 0.00347 | ft/ft |
| Velocity | 6.47 | ft/s |
| Velocity Head | 0.65 | ft |
| Specific Energy | 2.01 | ft |
| Froude Number | 1.09 | |
| Maximum Discharge | 32.98 | ft ³ /s |
| Discharge Full | 30.66 | ft ³ /s |
| Slope Full | 0.00133 | ft/ft |
| Flow Type | SuperCritical | |

GVF Input Data

Downstream Depth 0.00 in
Length 0.00 ft
Number Of Steps 0

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 54.53 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 16.36 | in |
| Critical Depth | 1.42 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00347 | ft/ft |

Worksheet for DESIGN POINT 47

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|-------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 24.00 in |
| Discharge | 8.64 ft ³ /s |

Results

| | | |
|-------------------|---------------|--------------------|
| Normal Depth | 12.15 | in |
| Flow Area | 1.60 | ft ² |
| Wetted Perimeter | 3.17 | ft |
| Hydraulic Radius | 6.05 | in |
| Top Width | 2.00 | ft |
| Critical Depth | 1.05 | ft |
| Percent Full | 50.6 | % |
| Critical Slope | 0.00357 | ft/ft |
| Velocity | 5.41 | ft/s |
| Velocity Head | 0.46 | ft |
| Specific Energy | 1.47 | ft |
| Froude Number | 1.07 | |
| Maximum Discharge | 18.19 | ft ³ /s |
| Discharge Full | 16.91 | ft ³ /s |
| Slope Full | 0.00104 | ft/ft |
| Flow Type | SuperCritical | |

GVF Input Data

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 50.64 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 12.15 | in |
| Critical Depth | 1.05 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00357 | ft/ft |

Worksheet for DESIGN POINT 48

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|-------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 18.00 in |
| Discharge | 4.83 ft ³ /s |

Results

| | | |
|-------------------|-------------|--------------------|
| Normal Depth | 10.21 | in |
| Flow Area | 1.03 | ft ² |
| Wetted Perimeter | 2.56 | ft |
| Hydraulic Radius | 4.85 | in |
| Top Width | 1.49 | ft |
| Critical Depth | 0.85 | ft |
| Percent Full | 56.7 | % |
| Critical Slope | 0.00408 | ft/ft |
| Velocity | 4.67 | ft/s |
| Velocity Head | 0.34 | ft |
| Specific Energy | 1.19 | ft |
| Froude Number | 0.99 | |
| Maximum Discharge | 8.45 | ft ³ /s |
| Discharge Full | 7.85 | ft ³ /s |
| Slope Full | 0.00151 | ft/ft |
| Flow Type | SubCritical | |

GVF Input Data

Downstream Depth 0.00 in
Length 0.00 ft
Number Of Steps 0

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 56.71 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 10.21 | in |
| Critical Depth | 0.85 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00408 | ft/ft |

Worksheet for DESIGN POINT 49

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|-------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 18.00 in |
| Discharge | 4.07 ft ³ /s |

Results

| | | |
|-------------------|---------------|--------------------|
| Normal Depth | 9.19 | in |
| Flow Area | 0.91 | ft ² |
| Wetted Perimeter | 2.39 | ft |
| Hydraulic Radius | 4.56 | in |
| Top Width | 1.50 | ft |
| Critical Depth | 0.77 | ft |
| Percent Full | 51.1 | % |
| Critical Slope | 0.00389 | ft/ft |
| Velocity | 4.48 | ft/s |
| Velocity Head | 0.31 | ft |
| Specific Energy | 1.08 | ft |
| Froude Number | 1.02 | |
| Maximum Discharge | 8.45 | ft ³ /s |
| Discharge Full | 7.85 | ft ³ /s |
| Slope Full | 0.00107 | ft/ft |
| Flow Type | SuperCritical | |

GVF Input Data

Downstream Depth 0.00 in
Length 0.00 ft
Number Of Steps 0

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 51.08 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 9.19 | in |
| Critical Depth | 0.77 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00389 | ft/ft |

Worksheet for DESIGN POINT 50

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|-------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 10.00 in |
| Discharge | 1.08 ft ³ /s |

Results

| | | |
|-------------------|-------------|--------------------|
| Normal Depth | 5.93 | in |
| Flow Area | 0.34 | ft ² |
| Wetted Perimeter | 1.46 | ft |
| Hydraulic Radius | 2.76 | in |
| Top Width | 0.82 | ft |
| Critical Depth | 0.46 | ft |
| Percent Full | 59.3 | % |
| Critical Slope | 0.00493 | ft/ft |
| Velocity | 3.21 | ft/s |
| Velocity Head | 0.16 | ft |
| Specific Energy | 0.65 | ft |
| Froude Number | 0.88 | |
| Maximum Discharge | 1.76 | ft ³ /s |
| Discharge Full | 1.64 | ft ³ /s |
| Slope Full | 0.00174 | ft/ft |
| Flow Type | SubCritical | |

GVF Input Data

Downstream Depth 0.00 in
Length 0.00 ft
Number Of Steps 0

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 59.29 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 5.93 | in |
| Critical Depth | 0.46 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00493 | ft/ft |

Worksheet for DESIGN POINT 51

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|-------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 15.00 in |
| Discharge | 2.60 ft ³ /s |

Results

| | | |
|-------------------|-------------|--------------------|
| Normal Depth | 7.84 | in |
| Flow Area | 0.65 | ft ² |
| Wetted Perimeter | 2.02 | ft |
| Hydraulic Radius | 3.85 | in |
| Top Width | 1.25 | ft |
| Critical Depth | 0.65 | ft |
| Percent Full | 52.3 | % |
| Critical Slope | 0.00415 | ft/ft |
| Velocity | 4.01 | ft/s |
| Velocity Head | 0.25 | ft |
| Specific Energy | 0.90 | ft |
| Froude Number | 0.98 | |
| Maximum Discharge | 5.19 | ft ³ /s |
| Discharge Full | 4.83 | ft ³ /s |
| Slope Full | 0.00116 | ft/ft |
| Flow Type | SubCritical | |

GVF Input Data

| | | |
|------------------|------|----|
| Downstream Depth | 0.00 | in |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 52.25 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 7.84 | in |
| Critical Depth | 0.65 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00415 | ft/ft |

Worksheet for DESIGN POINT 52

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|-------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 12.00 in |
| Discharge | 1.82 ft ³ /s |

Results

| | | |
|-------------------|-------------|--------------------|
| Normal Depth | 7.28 | in |
| Flow Area | 0.50 | ft ² |
| Wetted Perimeter | 1.79 | ft |
| Hydraulic Radius | 3.35 | in |
| Top Width | 0.98 | ft |
| Critical Depth | 0.57 | ft |
| Percent Full | 60.7 | % |
| Critical Slope | 0.00474 | ft/ft |
| Velocity | 3.65 | ft/s |
| Velocity Head | 0.21 | ft |
| Specific Energy | 0.81 | ft |
| Froude Number | 0.90 | |
| Maximum Discharge | 2.86 | ft ³ /s |
| Discharge Full | 2.66 | ft ³ /s |
| Slope Full | 0.00187 | ft/ft |
| Flow Type | SubCritical | |

GVF Input Data

| | | |
|------------------|------|----|
| Downstream Depth | 0.00 | in |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 60.68 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 7.28 | in |
| Critical Depth | 0.57 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00474 | ft/ft |

Worksheet for DESIGN POINT 53

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|-------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 10.00 in |
| Discharge | 1.38 ft ³ /s |

Results

| | | |
|-------------------|-------------|--------------------|
| Normal Depth | 7.04 | in |
| Flow Area | 0.41 | ft ² |
| Wetted Perimeter | 1.66 | ft |
| Hydraulic Radius | 2.97 | in |
| Top Width | 0.76 | ft |
| Critical Depth | 0.53 | ft |
| Percent Full | 70.4 | % |
| Critical Slope | 0.00542 | ft/ft |
| Velocity | 3.37 | ft/s |
| Velocity Head | 0.18 | ft |
| Specific Energy | 0.76 | ft |
| Froude Number | 0.81 | |
| Maximum Discharge | 1.76 | ft ³ /s |
| Discharge Full | 1.64 | ft ³ /s |
| Slope Full | 0.00284 | ft/ft |
| Flow Type | SubCritical | |

GVF Input Data

Downstream Depth 0.00 in
Length 0.00 ft
Number Of Steps 0

GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 70.35 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 7.04 | in |
| Critical Depth | 0.53 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00542 | ft/ft |

Worksheet for DESIGN POINT 54

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | |
|-----------------------|-------------------------|
| Roughness Coefficient | 0.011 |
| Channel Slope | 0.40000 % |
| Diameter | 8.00 in |
| Discharge | 0.65 ft ³ /s |

Results

| | | |
|-------------------|-------------|--------------------|
| Normal Depth | 5.03 | in |
| Flow Area | 0.23 | ft ² |
| Wetted Perimeter | 1.22 | ft |
| Hydraulic Radius | 2.27 | in |
| Top Width | 0.64 | ft |
| Critical Depth | 0.38 | ft |
| Percent Full | 62.8 | % |
| Critical Slope | 0.00539 | ft/ft |
| Velocity | 2.81 | ft/s |
| Velocity Head | 0.12 | ft |
| Specific Energy | 0.54 | ft |
| Froude Number | 0.83 | |
| Maximum Discharge | 0.97 | ft ³ /s |
| Discharge Full | 0.90 | ft ³ /s |
| Slope Full | 0.00207 | ft/ft |
| Flow Type | SubCritical | |

GVF Input Data

Downstream Depth 0.00 in
Length 0.00 ft
Number Of Steps 0

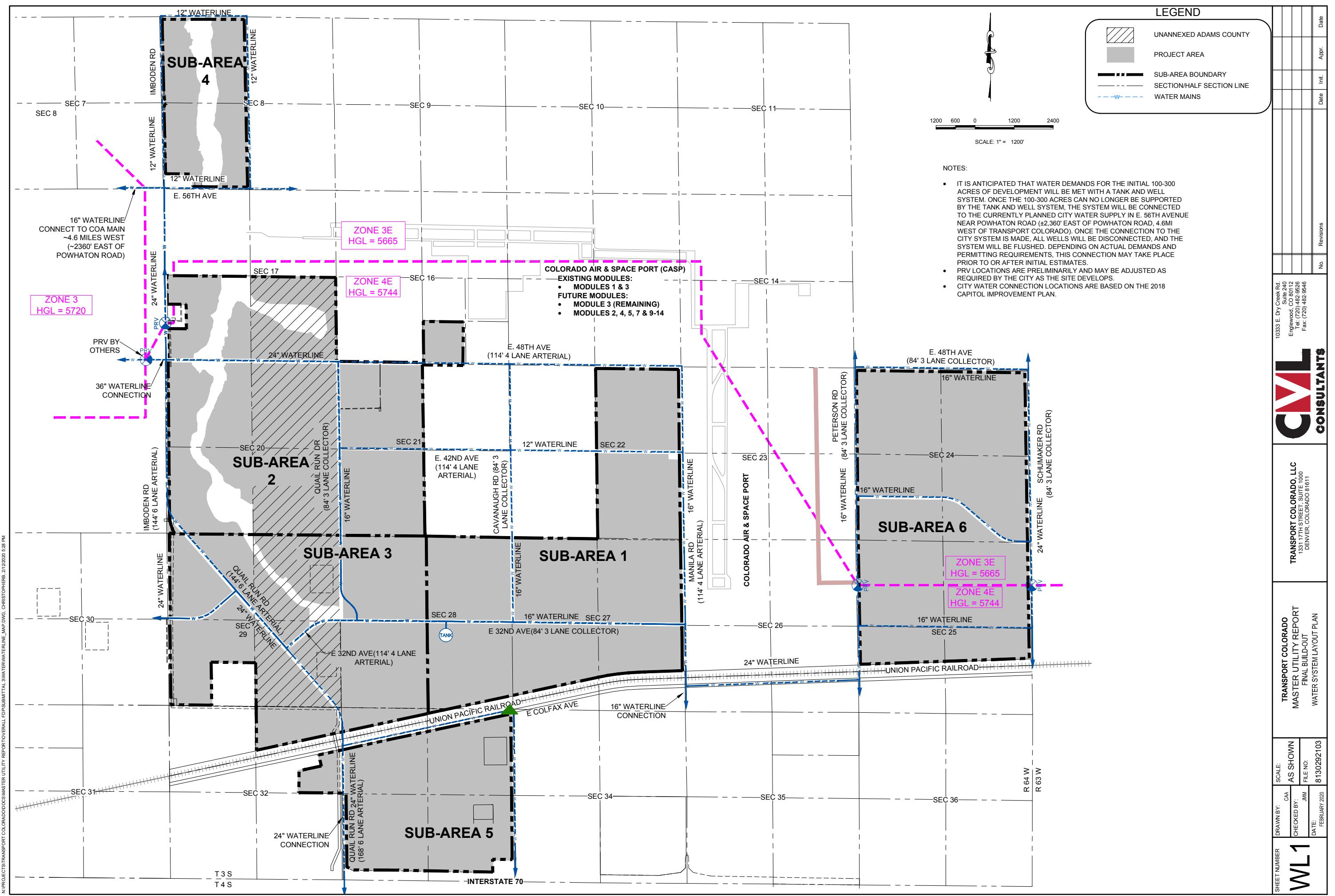
GVF Output Data

| | | |
|-----------------------------|----------|-------|
| Upstream Depth | 0.00 | in |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Average End Depth Over Rise | 0.00 | % |
| Normal Depth Over Rise | 62.83 | % |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 5.03 | in |
| Critical Depth | 0.38 | ft |
| Channel Slope | 0.40000 | % |
| Critical Slope | 0.00539 | ft/ft |

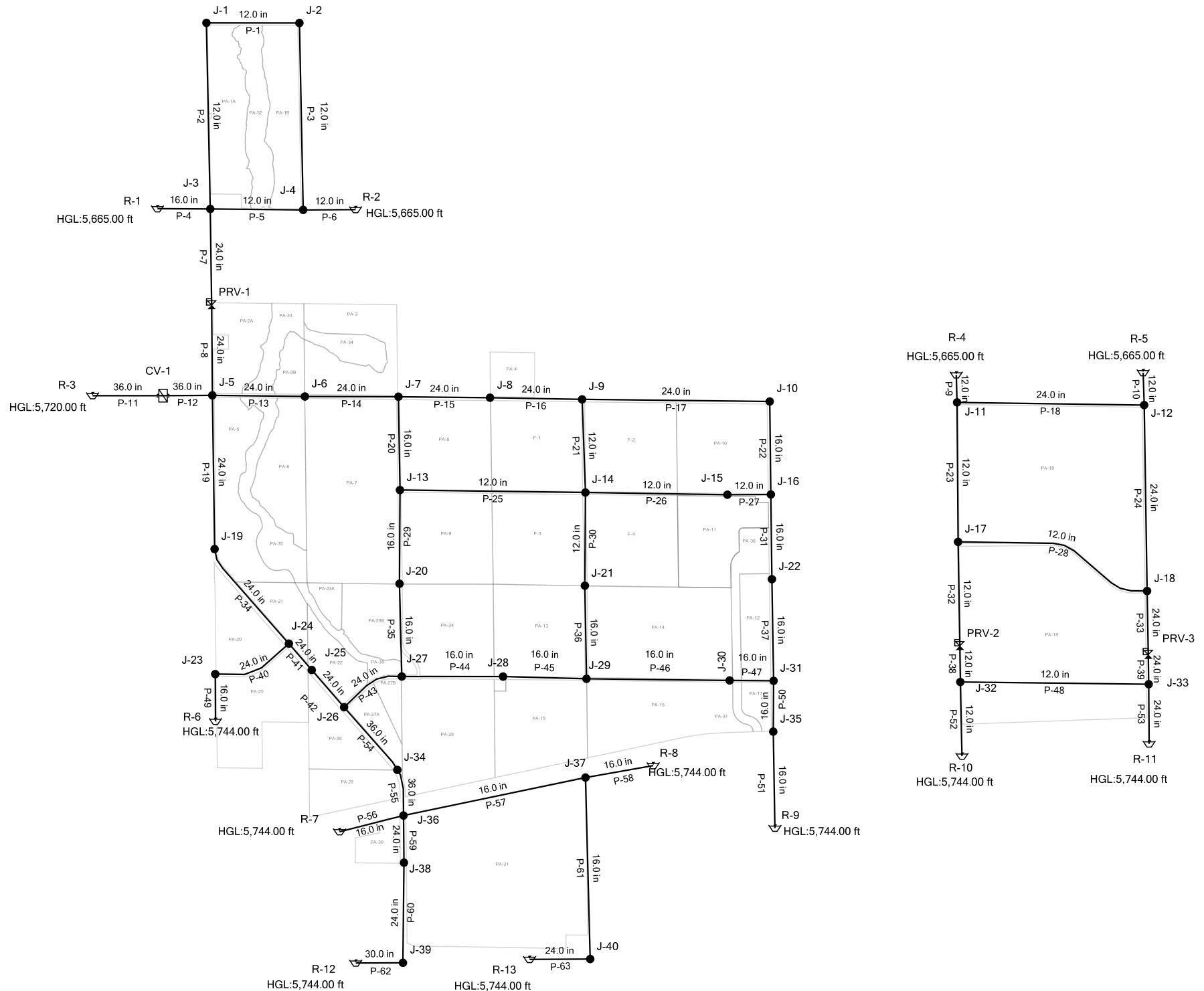
APPENDIX C

Water System

- 1. Water System Layout Plan**
- 2. Water Calculations**
 - a. Network Schematic – Final Build-out**
 - b. Demand Calculations**
 - c. Water Demand Distribution**
 - d. Average Day Results**
 - e. Max Day Results**
 - f. Max Hour Results**
 - g. Fire Flow Results**



TRANSPORT COLORADO - FINAL BUILDOUT



TRANSPORT COLORADO - FINAL BUILD-OUT
WATER DEMAND CALCULATIONS
CITY OF AURORA CRITERIA

| USE | AVG. DAY (GPD/AC) | MAX. DAY (GPD/AC) | MAX. HR. (GPD/AC) | FIRE FLOW (GPM) | FIRE FLOW DURATION (HR) |
|--------------------|-------------------|-------------------|-------------------|-----------------|-------------------------|
| COMMERCIAL | 1,500 | 4,200 | 6,750 | 2,500 | 2 |
| PARKS & GREENBELTS | 1,800 | 5,040 | 8,100 | - | 0 |
| HEAVY INDUSTRIAL | 1,200 | 3,360 | 5,400 | 3,500 | 3 |

| SUB-AREA | PLANNING AREA | USE | GROSS ACREAGE | AVG. DAY (GPM/AC) | MAX. DAY (GPM/AC) | MAX. HOUR (GPM/AC) | AVG. DAY (GPM) | MAX. DAY (GPM) | MAX. HR. (GPM) | MAX DAY + FIRE FLOW (GPM) |
|----------|---------------|--------------------|---------------|-------------------|-------------------|--------------------|----------------|----------------|----------------|---------------------------|
| SA-1 | 10 | Heavy Industrial | 156.8 | 0.83 | 2.33 | 3.75 | 131 | 366 | 588 | 3,866 |
| SA-1 | 11 | Heavy Industrial | 117.2 | 0.83 | 2.33 | 3.75 | 98 | 273 | 440 | 3,773 |
| SA-1 | 12 | Heavy Industrial | 60.8 | 0.83 | 2.33 | 3.75 | 51 | 142 | 228 | 3,642 |
| SA-1 | 13 | Heavy Industrial | 160.2 | 0.83 | 2.33 | 3.75 | 134 | 374 | 601 | 3,874 |
| SA-1 | 14 | Heavy Industrial | 251.1 | 0.83 | 2.33 | 3.75 | 209 | 586 | 942 | 4,086 |
| SA-1 | 15A | Heavy Industrial | 150.6 | 0.83 | 2.33 | 3.75 | 126 | 351 | 565 | 3,851 |
| SA-1 | 15B | Heavy Industrial | 2.8 | 0.83 | 2.33 | 3.75 | 2 | 7 | 11 | 3,507 |
| SA-1 | 16 | Heavy Industrial | 174.5 | 0.83 | 2.33 | 3.75 | 145 | 407 | 654 | 3,907 |
| SA-1 | 17 | Heavy Industrial | 23.2 | 0.83 | 2.33 | 3.75 | 19 | 54 | 87 | 3,554 |
| SA-1 | 36 | PARKS & GREENBELTS | 29.8 | 1.25 | 3.50 | 5.63 | 37 | 104 | 168 | 0 |
| SA-1 | 37 | PARKS & GREENBELTS | 3.7 | 1.25 | 3.50 | 5.63 | 5 | 13 | 21 | 0 |
| SA-2 | 3 | Medium Industrial | 121.9 | 0.83 | 2.33 | 3.75 | 102 | 284 | 457 | 3,784 |
| SA-2 | 4 | Light Industrial | 37.4 | 0.83 | 2.33 | 3.75 | 31 | 87 | 140 | 3,587 |
| SA-2 | 5 | Medium Industrial | 139.2 | 0.83 | 2.33 | 3.75 | 116 | 325 | 522 | 3,825 |
| SA-2 | 6 | Medium Industrial | 103.2 | 0.83 | 2.33 | 3.75 | 86 | 241 | 387 | 3,741 |
| SA-2 | 7 | Medium Industrial | 321.7 | 0.83 | 2.33 | 3.75 | 268 | 751 | 1,206 | 4,251 |
| SA-2 | 8 | Heavy Industrial | 158.2 | 0.83 | 2.33 | 3.75 | 132 | 369 | 593 | 3,869 |
| SA-2 | 9 | Heavy Industrial | 159.1 | 0.83 | 2.33 | 3.75 | 133 | 371 | 597 | 3,871 |
| SA-2 | 2A | Medium Industrial | 81.2 | 0.83 | 2.33 | 3.75 | 68 | 189 | 305 | 3,689 |
| SA-2 | 2B | Medium Industrial | 28.7 | 0.83 | 2.33 | 3.75 | 24 | 67 | 108 | 3,567 |
| SA-2 | 33 | PARKS & GREENBELTS | 14.7 | 1.25 | 3.50 | 5.63 | 18 | 51 | 83 | 0 |
| SA-2 | 34 | PARKS & GREENBELTS | 16.5 | 1.25 | 3.50 | 5.63 | 21 | 58 | 93 | 0 |
| SA-2 | 35 | PARKS & GREENBELTS | 25.7 | 1.25 | 3.50 | 5.63 | 32 | 90 | 145 | 0 |
| SA-3 | 20 | Medium Industrial | 88.2 | 0.83 | 2.33 | 3.75 | 74 | 206 | 331 | 3,706 |
| SA-3 | 21 | Medium Industrial | 55.8 | 0.83 | 2.33 | 3.75 | 47 | 130 | 209 | 3,630 |
| SA-3 | 22 | Medium Industrial | 57.3 | 0.83 | 2.33 | 3.75 | 48 | 134 | 215 | 3,634 |
| SA-3 | 24 | Heavy Industrial | 154.0 | 0.83 | 2.33 | 3.75 | 128 | 359 | 578 | 3,859 |
| SA-3 | 25 | Medium Industrial | 136.0 | 0.83 | 2.33 | 3.75 | 113 | 317 | 510 | 3,817 |
| SA-3 | 26 | Medium Industrial | 82.6 | 0.83 | 2.33 | 3.75 | 69 | 193 | 310 | 3,693 |
| SA-3 | 28 | Heavy Industrial | 189.5 | 0.83 | 2.33 | 3.75 | 158 | 442 | 711 | 3,942 |
| SA-3 | 29 | Medium Industrial | 64.3 | 0.83 | 2.33 | 3.75 | 54 | 150 | 241 | 3,650 |
| SA-3 | 23A | Medium Industrial | 19.7 | 0.83 | 2.33 | 3.75 | 16 | 46 | 74 | 3,546 |
| SA-3 | 23B | Medium Industrial | 82.5 | 0.83 | 2.33 | 3.75 | 69 | 193 | 309 | 3,693 |
| SA-3 | 27A | Medium Industrial | 42.1 | 0.83 | 2.33 | 3.75 | 35 | 98 | 158 | 3,598 |
| SA-3 | 27B | Medium Industrial | 18.6 | 0.83 | 2.33 | 3.75 | 16 | 43 | 70 | 3,543 |
| SA-3 | 38 | PARKS & GREENBELTS | 16.4 | 1.25 | 3.50 | 5.63 | 21 | 57 | 92 | 0 |
| SA-4 | 1A | Medium Industrial | 117.6 | 0.83 | 2.33 | 3.75 | 98 | 274 | 441 | 3,774 |
| SA-4 | 1B | Medium Industrial | 113.9 | 0.83 | 2.33 | 3.75 | 95 | 266 | 427 | 3,766 |
| SA-4 | 32 | PARKS & GREENBELTS | 13.0 | 1.25 | 3.50 | 5.63 | 16 | 46 | 73 | 0 |
| SA-5 | 30 | Commercial | 31.6 | 1.04 | 2.92 | 4.69 | 33 | 92 | 148 | 2,592 |
| SA-5 | 31 | Commercial | 512.5 | 1.04 | 2.92 | 4.69 | 534 | 1,495 | 2,402 | 3,995 |

TRANSPORT COLORADO - FINAL BUILD-OUT
WATER DEMAND CALCULATIONS
CITY OF AURORA CRITERIA

| USE | AVG. DAY (GPD/AC) | MAX. DAY (GPD/AC) | MAX. HR. (GPD/AC) | FIRE FLOW (GPM) | FIRE FLOW DURATION (HR) |
|--------------------|-------------------|-------------------|-------------------|-----------------|-------------------------|
| COMMERCIAL | 1,500 | 4,200 | 6,750 | 2,500 | 2 |
| PARKS & GREENBELTS | 1,800 | 5,040 | 8,100 | - | 0 |
| HEAVY INDUSTRIAL | 1,200 | 3,360 | 5,400 | 3,500 | 3 |

| SUB-AREA | PLANNING AREA | USE | GROSS ACREAGE | AVG. DAY (GPM/AC) | MAX. DAY (GPM/AC) | MAX. HOUR (GPM/AC) | AVG. DAY (GPM) | MAX. DAY (GPM) | MAX. HR. (GPM) | MAX DAY + FIRE FLOW (GPM) |
|---------------------------|-------------------------|------------------|---------------|-------------------|-------------------|--------------------|----------------|----------------|----------------|---------------------------|
| SA-6 | 18 | Heavy Industrial | 522.0 | 0.83 | 2.33 | 3.75 | 435 | 1,218 | 1,958 | 4,718 |
| SA-6 | 19 | Heavy Industrial | 568.1 | 0.83 | 2.33 | 3.75 | 473 | 1,326 | 2,130 | 4,826 |
| FUTURE | F1 | Heavy Industrial | 158.0 | 0.83 | 2.33 | 3.75 | 132 | 369 | 593 | 3,869 |
| FUTURE | F2 | Heavy Industrial | 159.1 | 0.83 | 2.33 | 3.75 | 133 | 371 | 597 | 3,871 |
| FUTURE | F3 | Heavy Industrial | 158.6 | 0.83 | 2.33 | 3.75 | 132 | 370 | 595 | 3,870 |
| FUTURE | F4 | Heavy Industrial | 160.5 | 0.83 | 2.33 | 3.75 | 134 | 375 | 602 | 3,875 |
| COLORADO AIR & SPACE PORT | MODULES 1 & 3 (CURRENT) | Heavy Industrial | 68.5 | 0.83 | 2.33 | 3.75 | 57 | 160 | 257 | 3,660 |
| COLORADO AIR & SPACE PORT | MODULE 3 (REMAINING) | Heavy Industrial | 14.4 | 0.83 | 2.33 | 3.75 | 12 | 34 | 54 | 3,534 |
| COLORADO AIR & SPACE PORT | MODULE 2 | Heavy Industrial | 48.0 | 0.83 | 2.33 | 3.75 | 40 | 112 | 180 | 3,612 |
| COLORADO AIR & SPACE PORT | MODULE 5 | Heavy Industrial | 73.0 | 0.83 | 2.33 | 3.75 | 61 | 170 | 274 | 3,670 |
| COLORADO AIR & SPACE PORT | MODULE 4 | Heavy Industrial | 48.0 | 0.83 | 2.33 | 3.75 | 40 | 112 | 180 | 3,612 |
| COLORADO AIR & SPACE PORT | MODULE 7 | Heavy Industrial | 106.0 | 0.83 | 2.33 | 3.75 | 88 | 247 | 398 | 3,747 |
| COLORADO AIR & SPACE PORT | MODULE 9-14 | Heavy Industrial | 304.0 | 0.83 | 2.33 | 3.75 | 253 | 709 | 1,140 | 4,209 |
| | Total | | 6,522.0 | | | | 5,598 | 15,675 | 25,192 | |

TRANSPORT COLORADO - FINAL BUILD-OUT
AVERAGE DAY WATER DEMAND DISTRIBUTION
CITY OF AURORA CRITERIA

| JUNCTION | PLANNING AREA | DISTRIBUTION (%) | DEMAND (GPM) |
|----------|---------------------------|------------------|--------------|
| J-1 | | | |
| | 1A | 50% | 49.00 |
| | 32 | 50% | 8.13 |
| J-2 | | | |
| | 1B | 50% | 47.46 |
| J-3 | | | |
| | 1A | 50% | 49.00 |
| J-4 | | | |
| | 1B | 50% | 47.46 |
| | 32 | 50% | 8.13 |
| J-5 | | | |
| | 2A | 100% | 67.67 |
| | 5 | 50% | 58.00 |
| J-6 | | | |
| | 2B | 100% | 23.92 |
| | 6 | 100% | 86.00 |
| | 33 | 100% | 18.38 |
| | 35 | 50% | 16.06 |
| J-7 | | | |
| | 3 | 100% | 101.58 |
| | 7 | 50% | 134.04 |
| | 8 | 100% | 131.83 |
| | 34 | 100% | 20.63 |
| J-8 | | | |
| | COLORADO AIR & SPACE PORT | 100% | 551.58 |
| | 4 | 100% | 31.17 |
| J-9 | | | |
| | F1 | 100% | 131.67 |
| | F2 | 100% | 132.58 |
| J-10 | | | |
| | -- | -- | |
| J-11 | | | |
| | 18 | 25% | 108.75 |
| J-12 | | | |
| | 18 | 25% | 108.75 |
| J-13 | | | |
| | 9 | 100% | 132.58 |
| J-14 | | | |
| | F3 | 100% | 132.17 |
| | F4 | 100% | 133.75 |
| J-15 | | | |
| | 11 | 100% | 97.67 |
| J-16 | | | |
| | 10 | 100% | 130.67 |
| J-17 | | | |
| | 18 | 25% | 108.75 |
| | 19 | 25% | 118.35 |
| J-18 | | | |
| | 18 | 25% | 108.75 |
| | 19 | 25% | 118.35 |
| J-19 | | | |
| | 5 | 50% | 58.00 |
| | 35 | 50% | 16.06 |
| J-20 | | | |
| | 7 | 50% | 134.04 |
| | 23A | 100% | 16.42 |
| | 23B | 100% | 68.75 |

| JUNCTION | PLANNING AREA | DISTRIBUTION (%) | DEMAND (GPM) |
|----------|---------------|------------------|--------------|
| J-21 | | | |
| | 13 | 100% | 133.50 |
| J-22 | | | |
| | 12 | 50% | 25.33 |
| J-23 | | | |
| | 20 | 100% | 73.50 |
| | 25 | 100% | 113.33 |
| J-24 | | | |
| | 21 | 100% | 46.50 |
| J-25 | | | |
| | 22 | 100% | 47.75 |
| J-26 | | | |
| | 26 | 100% | 68.83 |
| | 27A | 100% | 35.08 |
| J-27 | | | |
| | 24 | 100% | 128.33 |
| | 27B | 100% | 15.50 |
| | 28 | 50% | 78.96 |
| | 38 | 100% | 20.50 |
| J-28 | | | |
| | 15A | 100% | 125.50 |
| | 15B | 100% | 2.33 |
| | 28 | 50% | 78.96 |
| J-29 | | | |
| | 14 | 50% | 104.63 |
| | 16 | 50% | 72.71 |
| J-30 | | | |
| | 14 | 50% | 104.63 |
| | 16 | 50% | 72.71 |
| | 37 | 100% | 4.63 |
| | 36 | 100% | 37.25 |
| J-31 | | | |
| | 12 | 50% | 25.33 |
| | 17 | 100% | 19.33 |
| J-32 | | | |
| | 19 | 25% | 118.35 |
| J-33 | | | |
| | 19 | 25% | 118.35 |
| J-34 | | | |
| | 29 | 100% | 53.58 |
| J-35 | | | |
| | -- | -- | |
| J-36 | | | |
| | 30 | 100% | 32.92 |
| J-37 | | | |
| | 31 | 25% | 133.46 |
| J-38 | | | |
| | 31 | 25% | 133.46 |
| J-39 | | | |
| | 31 | 25% | 133.46 |
| J-40 | | | |
| | 31 | 25% | 133.46 |

TRANSPORT COLORADO - FINAL BUILDOUT

Active Scenario: AVERAGE DAY

FlexTable: Check Valve Table

| ID | Label | Elevation (ft) | Pressure (Threshold) (psi) | Is Initially Closed? | Is Open? | Is Closed? |
|-----|-------|----------------|----------------------------|----------------------|----------|------------|
| 366 | CV-1 | 5,433.00 | 0 | False | True | False |

TRANSPORT COLORADO - FINAL BUILDOUT

Active Scenario: AVERAGE DAY

FlexTable: Junction Table

| Label | Elevation (ft) | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|-------|-------------------|-----------------|-------------------------|-------------------|
| J-1 | 5,368.11 | 57 | 5,664.96 | 128 |
| J-2 | 5,388.08 | 47 | 5,664.96 | 120 |
| J-3 | 5,403.42 | 49 | 5,665.00 | 113 |
| J-4 | 5,398.60 | 56 | 5,665.00 | 115 |
| J-5 | 5,432.81 | 126 | 5,721.52 | 125 |
| J-6 | 5,433.39 | 144 | 5,722.57 | 125 |
| J-7 | 5,464.12 | 388 | 5,723.74 | 112 |
| J-8 | 5,495.61 | 583 | 5,724.04 | 99 |
| J-9 | 5,500.59 | 264 | 5,724.62 | 97 |
| J-10 | 5,478.95 | 0 | 5,725.30 | 107 |
| J-11 | 5,478.14 | 109 | 5,665.00 | 81 |
| J-12 | 5,457.21 | 109 | 5,665.00 | 90 |
| J-13 | 5,542.35 | 133 | 5,727.66 | 80 |
| J-14 | 5,517.16 | 266 | 5,727.66 | 91 |
| J-15 | 5,498.85 | 98 | 5,727.69 | 99 |
| J-16 | 5,507.03 | 131 | 5,727.75 | 95 |
| J-17 | 5,486.11 | 227 | 5,664.96 | 77 |
| J-18 | 5,490.38 | 227 | 5,665.03 | 76 |
| J-19 | 5,486.25 | 74 | 5,730.21 | 106 |
| J-20 | 5,555.70 | 219 | 5,732.05 | 76 |
| J-21 | 5,560.27 | 134 | 5,732.70 | 75 |
| J-22 | 5,503.34 | 25 | 5,730.85 | 98 |
| J-23 | 5,537.18 | 187 | 5,738.45 | 87 |
| J-24 | 5,501.36 | 47 | 5,737.23 | 102 |
| J-25 | 5,508.80 | 48 | 5,737.85 | 99 |
| J-26 | 5,524.16 | 104 | 5,738.76 | 93 |
| J-27 | 5,534.26 | 243 | 5,737.36 | 88 |
| J-28 | 5,578.49 | 207 | 5,735.41 | 68 |
| J-29 | 5,567.14 | 177 | 5,734.27 | 72 |
| J-30 | 5,526.11 | 219 | 5,734.49 | 90 |
| J-31 | 5,516.51 | 45 | 5,734.66 | 94 |
| J-32 | 5,518.91 | 118 | 5,743.86 | 97 |
| J-33 | 5,491.18 | 118 | 5,743.94 | 109 |
| J-34 | 5,538.50 | 54 | 5,739.58 | 87 |
| J-35 | 5,536.09 | 0 | 5,737.88 | 87 |
| J-36 | 5,555.42 | 33 | 5,740.06 | 80 |
| J-37 | 5,569.38 | 133 | 5,743.35 | 75 |
| J-38 | 5,578.90 | 133 | 5,741.14 | 70 |
| J-39 | 5,604.34 | 133 | 5,743.59 | 60 |
| J-40 | 5,581.81 | 133 | 5,743.96 | 70 |

TRANSPORT COLORADO - FINAL BUILDOUT

Active Scenario: AVERAGE DAY

FlexTable: Pipe Table

| Label | Is Active? | Length (Scaled) (ft) | Length (User Defined) (ft) | Start Node | Stop Node | Material | Hazen-Williams C | Diameter (in) | Flow (gpm) | Velocity (ft/s) | Headloss Gradient (ft/ft) |
|-------|------------|----------------------|----------------------------|------------|-----------|----------|------------------|---------------|------------|-----------------|---------------------------|
| P-1 | True | 2,642 | 0 | J-2 | J-1 | PVC | 150.0 | 12.0 | 5 | 0.01 | 0.000 |
| P-2 | True | 5,291 | 0 | J-1 | J-3 | PVC | 150.0 | 12.0 | -52 | 0.15 | 0.000 |
| P-3 | True | 5,315 | 0 | J-4 | J-2 | PVC | 150.0 | 12.0 | 52 | 0.15 | 0.000 |
| P-4 | True | 1,500 | 1 | R-1 | J-3 | PVC | 150.0 | 16.0 | -553 | 0.88 | 0.000 |
| P-5 | True | 2,641 | 0 | J-3 | J-4 | PVC | 150.0 | 12.0 | 4 | 0.01 | 0.000 |
| P-6 | True | 1,488 | 1 | R-2 | J-4 | PVC | 150.0 | 12.0 | 104 | 0.29 | 0.000 |
| P-7 | True | 2,731 | 0 | J-3 | PRV-1 | PVC | 150.0 | 24.0 | -659 | 0.47 | 0.000 |
| P-8 | True | 2,568 | 0 | PRV-1 | J-5 | PVC | 150.0 | 24.0 | -659 | 0.47 | 0.000 |
| P-9 | True | 783 | 0 | R-4 | J-11 | PVC | 150.0 | 12.0 | 45 | 0.13 | 0.000 |
| P-10 | True | 923 | 0 | R-5 | J-12 | PVC | 150.0 | 12.0 | -24 | 0.07 | 0.000 |
| P-11 | True | 2,004 | 0 | R-3 | CV-1 | PVC | 150.0 | 36.0 | -8,118 | 2.56 | 0.000 |
| P-12 | True | 1,400 | 0 | CV-1 | J-5 | PVC | 150.0 | 36.0 | -8,118 | 2.56 | 0.000 |
| P-13 | True | 2,630 | 0 | J-5 | J-6 | PVC | 150.0 | 24.0 | -2,637 | 1.87 | 0.000 |
| P-14 | True | 2,657 | 0 | J-6 | J-7 | PVC | 150.0 | 24.0 | -2,781 | 1.97 | 0.000 |
| P-15 | True | 2,603 | 0 | J-7 | J-8 | PVC | 150.0 | 24.0 | -1,334 | 0.95 | 0.000 |
| P-16 | True | 2,617 | 0 | J-8 | J-9 | PVC | 150.0 | 24.0 | -1,917 | 1.36 | 0.000 |
| P-17 | True | 5,331 | 0 | J-10 | J-9 | PVC | 150.0 | 24.0 | 1,428 | 1.01 | 0.000 |
| P-18 | True | 5,318 | 0 | J-12 | J-11 | PVC | 150.0 | 24.0 | 118 | 0.08 | 0.000 |
| P-19 | True | 4,370 | 0 | J-5 | J-19 | PVC | 150.0 | 24.0 | -6,266 | 4.44 | 0.002 |
| P-20 | True | 2,654 | 0 | J-7 | J-13 | PVC | 150.0 | 16.0 | -1,835 | 2.93 | 0.001 |
| P-21 | True | 2,650 | 0 | J-9 | J-14 | PVC | 150.0 | 12.0 | -752 | 2.13 | 0.001 |
| P-22 | True | 2,644 | 0 | J-10 | J-16 | PVC | 150.0 | 16.0 | -1,428 | 2.28 | 0.001 |
| P-23 | True | 3,965 | 0 | J-11 | J-17 | PVC | 150.0 | 12.0 | 54 | 0.15 | 0.000 |
| P-24 | True | 5,286 | 0 | J-12 | J-18 | PVC | 150.0 | 24.0 | -251 | 0.18 | 0.000 |
| P-25 | True | 5,271 | 0 | J-13 | J-14 | PVC | 150.0 | 12.0 | -17 | 0.05 | 0.000 |
| P-26 | True | 4,035 | 0 | J-14 | J-15 | PVC | 150.0 | 12.0 | -47 | 0.13 | 0.000 |
| P-27 | True | 1,234 | 0 | J-16 | J-15 | PVC | 150.0 | 12.0 | 145 | 0.41 | 0.000 |
| P-28 | True | 5,805 | 0 | J-18 | J-17 | PVC | 150.0 | 12.0 | 64 | 0.18 | 0.000 |
| P-29 | True | 2,664 | 0 | J-13 | J-20 | PVC | 150.0 | 16.0 | -1,951 | 3.11 | 0.002 |
| P-30 | True | 2,648 | 0 | J-21 | J-14 | PVC | 150.0 | 12.0 | 989 | 2.81 | 0.002 |
| P-31 | True | 2,409 | 0 | J-22 | J-16 | PVC | 150.0 | 16.0 | 1,704 | 2.72 | 0.001 |
| P-32 | True | 2,954 | 0 | PRV-2 | J-17 | PVC | 150.0 | 12.0 | 109 | 0.31 | 0.000 |
| P-33 | True | 1,809 | 0 | J-18 | PRV-3 | PVC | 150.0 | 24.0 | -542 | 0.38 | 0.000 |
| P-34 | True | 3,454 | 0 | J-19 | J-24 | PVC | 150.0 | 24.0 | -6,340 | 4.50 | 0.002 |
| P-35 | True | 2,638 | 0 | J-20 | J-27 | PVC | 150.0 | 16.0 | -2,170 | 3.46 | 0.002 |
| P-36 | True | 2,649 | 0 | J-29 | J-21 | PVC | 150.0 | 16.0 | 1,122 | 1.79 | 0.001 |
| P-37 | True | 2,889 | 0 | J-31 | J-22 | PVC | 150.0 | 16.0 | 1,729 | 2.76 | 0.001 |
| P-38 | True | 1,029 | 0 | J-32 | PRV-2 | PVC | 150.0 | 12.0 | 109 | 0.31 | 0.000 |
| P-39 | True | 841 | 0 | PRV-3 | J-33 | PVC | 150.0 | 24.0 | -542 | 0.38 | 0.000 |
| P-40 | True | 2,389 | 0 | J-23 | J-24 | PVC | 150.0 | 24.0 | 3,015 | 2.14 | 0.001 |
| P-41 | True | 991 | 0 | J-24 | J-25 | PVC | 150.0 | 24.0 | -3,372 | 2.39 | 0.001 |
| P-42 | True | 1,403 | 0 | J-25 | J-26 | PVC | 150.0 | 24.0 | -3,419 | 2.42 | 0.001 |
| P-43 | True | 1,951 | 0 | J-26 | J-27 | PVC | 150.0 | 24.0 | 3,619 | 2.57 | 0.001 |
| P-44 | True | 2,877 | 0 | J-28 | J-27 | PVC | 150.0 | 16.0 | -1,206 | 1.92 | 0.001 |

TRANSPORT COLORADO - FINAL BUILDOUT

Active Scenario: AVERAGE DAY

FlexTable: Pipe Table

| Label | Is Active? | Length (Scaled) (ft) | Length (User Defined) (ft) | Start Node | Stop Node | Material | Hazen-Williams C | Diameter (in) | Flow (gpm) | Velocity (ft/s) | Headloss Gradient (ft/ft) |
|-------|------------|----------------------|----------------------------|------------|-----------|----------|------------------|---------------|------------|-----------------|---------------------------|
| P-45 | True | 2,373 | 0 | J-28 | J-29 | PVC | 150.0 | 16.0 | 999 | 1.59 | 0.000 |
| P-46 | True | 4,066 | 0 | J-29 | J-30 | PVC | 150.0 | 16.0 | -301 | 0.48 | 0.000 |
| P-47 | True | 1,251 | 0 | J-30 | J-31 | PVC | 150.0 | 16.0 | -520 | 0.83 | 0.000 |
| P-48 | True | 5,353 | 0 | J-33 | J-32 | PVC | 150.0 | 12.0 | 69 | 0.19 | 0.000 |
| P-49 | True | 1,343 | 0 | R-6 | J-23 | PVC | 150.0 | 16.0 | 3,202 | 5.11 | 0.004 |
| P-50 | True | 1,445 | 0 | J-35 | J-31 | PVC | 150.0 | 16.0 | 2,294 | 3.66 | 0.002 |
| P-51 | True | 2,745 | 0 | R-9 | J-35 | PVC | 150.0 | 16.0 | 2,294 | 3.66 | 0.002 |
| P-52 | True | 2,108 | 0 | R-10 | J-32 | PVC | 150.0 | 12.0 | 159 | 0.45 | 0.000 |
| P-53 | True | 1,698 | 0 | R-11 | J-33 | PVC | 150.0 | 24.0 | 728 | 0.52 | 0.000 |
| P-54 | True | 2,341 | 0 | J-34 | J-26 | PVC | 150.0 | 36.0 | 7,142 | 2.25 | 0.000 |
| P-55 | True | 1,330 | 0 | J-36 | J-34 | PVC | 150.0 | 36.0 | 7,195 | 2.27 | 0.000 |
| P-56 | True | 1,875 | 0 | R-7 | J-36 | PVC | 150.0 | 16.0 | 2,223 | 3.55 | 0.002 |
| P-57 | True | 5,282 | 0 | J-36 | J-37 | PVC | 150.0 | 16.0 | -1,154 | 1.84 | 0.001 |
| P-58 | True | 1,954 | 0 | R-8 | J-37 | PVC | 150.0 | 16.0 | 820 | 1.31 | 0.000 |
| P-59 | True | 1,341 | 0 | J-38 | J-36 | PVC | 150.0 | 24.0 | 3,852 | 2.73 | 0.001 |
| P-60 | True | 2,846 | 0 | J-39 | J-38 | PVC | 150.0 | 24.0 | 3,985 | 2.83 | 0.001 |
| P-61 | True | 5,161 | 0 | J-37 | J-40 | PVC | 150.0 | 16.0 | -467 | 0.75 | 0.000 |
| P-62 | True | 1,340 | 0 | R-12 | J-39 | PVC | 150.0 | 30.0 | 4,118 | 1.87 | 0.000 |
| P-63 | True | 1,724 | 0 | R-13 | J-40 | PVC | 150.0 | 24.0 | 600 | 0.43 | 0.000 |

TRANSPORT COLORADO - FINAL BUILDOUT

Active Scenario: AVERAGE DAY

FlexTable: PRV Table

| Label | Elevation (ft) | Diameter (Valve) (in) | Hydraulic Grade Setting (Initial) (ft) | Pressure Setting (Initial) (psi) | Flow (gpm) | Hydraulic Grade (From) (ft) | Hydraulic Grade (To) (ft) | Headloss (ft) | Status (Initial) | Status (Calculated) |
|-------|----------------|-----------------------|----------------------------------------|----------------------------------|------------|-----------------------------|---------------------------|---------------|------------------|---------------------|
| PRV-1 | 5,431.15 | 24.0 | 5,665.00 | 102 | 659 | 5,721.44 | 5,665.08 | 56.35 | Active | Active |
| PRV-2 | 5,512.95 | 12.0 | 5,665.00 | 67 | 109 | 5,743.83 | 5,665.05 | 78.78 | Active | Active |
| PRV-3 | 5,478.15 | 24.0 | 5,665.00 | 75 | 542 | 5,743.92 | 5,665.07 | 78.85 | Active | Active |

TRANSPORT COLORADO - FINAL BUILDOUT

Active Scenario: AVERAGE DAY

FlexTable: Reservoir Table

| Label | Elevation (ft) | Flow (Out net) (gpm) | Hydraulic Grade (ft) |
|-------|-------------------|-------------------------|-------------------------|
| R-1 | 5,665.00 | -553 | 5,665.00 |
| R-2 | 5,665.00 | 104 | 5,665.00 |
| R-3 | 5,720.00 | -8,118 | 5,720.00 |
| R-4 | 5,665.00 | 45 | 5,665.00 |
| R-5 | 5,665.00 | -24 | 5,665.00 |
| R-6 | 5,744.00 | 3,202 | 5,744.00 |
| R-7 | 5,744.00 | 2,223 | 5,744.00 |
| R-8 | 5,744.00 | 820 | 5,744.00 |
| R-9 | 5,744.00 | 2,294 | 5,744.00 |
| R-10 | 5,744.00 | 159 | 5,744.00 |
| R-11 | 5,744.00 | 728 | 5,744.00 |
| R-12 | 5,744.00 | 4,118 | 5,744.00 |
| R-13 | 5,744.00 | 600 | 5,744.00 |

TRANSPORT COLORADO - FINAL BUILDOUT

Active Scenario: MAX. DAY

FlexTable: Check Valve Table

| ID | Label | Elevation (ft) | Pressure (Threshold) (psi) | Is Initially Closed? | Is Open? | Is Closed? |
|-----|-------|-------------------|----------------------------------|-------------------------|----------|------------|
| 366 | CV-1 | 5,433.00 | 0 | False | True | False |

TRANSPORT COLORADO - FINAL BUILDOUT

Active Scenario: MAX. DAY

FlexTable: Junction Table

| Label | Elevation (ft) | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|-------|-------------------|-----------------|-------------------------|-------------------|
| J-1 | 5,368.11 | 160 | 5,664.71 | 128 |
| J-2 | 5,388.08 | 133 | 5,664.71 | 120 |
| J-3 | 5,403.42 | 137 | 5,665.00 | 113 |
| J-4 | 5,398.60 | 156 | 5,665.00 | 115 |
| J-5 | 5,432.81 | 352 | 5,720.38 | 124 |
| J-6 | 5,433.39 | 404 | 5,720.18 | 124 |
| J-7 | 5,464.12 | 1,087 | 5,720.09 | 111 |
| J-8 | 5,495.61 | 1,632 | 5,719.95 | 97 |
| J-9 | 5,500.59 | 740 | 5,720.04 | 95 |
| J-10 | 5,478.95 | 0 | 5,720.40 | 104 |
| J-11 | 5,478.14 | 305 | 5,664.86 | 81 |
| J-12 | 5,457.21 | 305 | 5,664.89 | 90 |
| J-13 | 5,542.35 | 372 | 5,722.16 | 78 |
| J-14 | 5,517.16 | 745 | 5,721.32 | 88 |
| J-15 | 5,498.85 | 273 | 5,721.36 | 96 |
| J-16 | 5,507.03 | 366 | 5,721.67 | 93 |
| J-17 | 5,486.11 | 636 | 5,664.51 | 77 |
| J-18 | 5,490.38 | 636 | 5,664.92 | 76 |
| J-19 | 5,486.25 | 207 | 5,728.31 | 105 |
| J-20 | 5,555.70 | 614 | 5,726.49 | 74 |
| J-21 | 5,560.27 | 374 | 5,725.52 | 71 |
| J-22 | 5,503.34 | 71 | 5,724.74 | 96 |
| J-23 | 5,537.18 | 523 | 5,736.40 | 86 |
| J-24 | 5,501.36 | 130 | 5,734.98 | 101 |
| J-25 | 5,508.80 | 134 | 5,735.49 | 98 |
| J-26 | 5,524.16 | 291 | 5,736.27 | 92 |
| J-27 | 5,534.26 | 681 | 5,733.64 | 86 |
| J-28 | 5,578.49 | 579 | 5,729.29 | 65 |
| J-29 | 5,567.14 | 497 | 5,727.49 | 69 |
| J-30 | 5,526.11 | 614 | 5,728.00 | 87 |
| J-31 | 5,516.51 | 125 | 5,728.72 | 92 |
| J-32 | 5,518.91 | 331 | 5,743.20 | 97 |
| J-33 | 5,491.18 | 331 | 5,743.72 | 109 |
| J-34 | 5,538.50 | 150 | 5,737.42 | 86 |
| J-35 | 5,536.09 | 0 | 5,733.99 | 86 |
| J-36 | 5,555.42 | 92 | 5,738.09 | 79 |
| J-37 | 5,569.38 | 374 | 5,742.81 | 75 |
| J-38 | 5,578.90 | 374 | 5,739.61 | 70 |
| J-39 | 5,604.34 | 374 | 5,743.33 | 60 |
| J-40 | 5,581.81 | 374 | 5,743.88 | 70 |

TRANSPORT COLORADO - FINAL BUILDOUT

Active Scenario: MAX. DAY

FlexTable: Pipe Table

| Label | Is Active? | Length (Scaled) (ft) | Length (User Defined) (ft) | Start Node | Stop Node | Material | Hazen-Williams C | Diameter (in) | Flow (gpm) | Velocity (ft/s) | Headloss Gradient (ft/ft) |
|-------|------------|----------------------|----------------------------|------------|-----------|----------|------------------|---------------|------------|-----------------|---------------------------|
| P-1 | True | 2,642 | 0 | J-2 | J-1 | PVC | 150.0 | 12.0 | 13 | 0.04 | 0.000 |
| P-2 | True | 5,291 | 0 | J-1 | J-3 | PVC | 150.0 | 12.0 | -147 | 0.42 | 0.000 |
| P-3 | True | 5,315 | 0 | J-4 | J-2 | PVC | 150.0 | 12.0 | 146 | 0.41 | 0.000 |
| P-4 | True | 1,500 | 1 | R-1 | J-3 | PVC | 150.0 | 16.0 | -370 | 0.59 | 0.000 |
| P-5 | True | 2,641 | 0 | J-3 | J-4 | PVC | 150.0 | 12.0 | 5 | 0.01 | 0.000 |
| P-6 | True | 1,488 | 1 | R-2 | J-4 | PVC | 150.0 | 12.0 | 297 | 0.84 | 0.000 |
| P-7 | True | 2,731 | 0 | J-3 | PRV-1 | PVC | 150.0 | 24.0 | -659 | 0.47 | 0.000 |
| P-8 | True | 2,568 | 0 | PRV-1 | J-5 | PVC | 150.0 | 24.0 | -659 | 0.47 | 0.000 |
| P-9 | True | 783 | 0 | R-4 | J-11 | PVC | 150.0 | 12.0 | 272 | 0.77 | 0.000 |
| P-10 | True | 923 | 0 | R-5 | J-12 | PVC | 150.0 | 12.0 | 226 | 0.64 | 0.000 |
| P-11 | True | 2,004 | 0 | R-3 | CV-1 | PVC | 150.0 | 36.0 | -3,860 | 1.22 | 0.000 |
| P-12 | True | 1,400 | 0 | CV-1 | J-5 | PVC | 150.0 | 36.0 | -3,860 | 1.22 | 0.000 |
| P-13 | True | 2,630 | 0 | J-5 | J-6 | PVC | 150.0 | 24.0 | 1,090 | 0.77 | 0.000 |
| P-14 | True | 2,657 | 0 | J-6 | J-7 | PVC | 150.0 | 24.0 | 686 | 0.49 | 0.000 |
| P-15 | True | 2,603 | 0 | J-7 | J-8 | PVC | 150.0 | 24.0 | 902 | 0.64 | 0.000 |
| P-16 | True | 2,617 | 0 | J-8 | J-9 | PVC | 150.0 | 24.0 | -730 | 0.52 | 0.000 |
| P-17 | True | 5,331 | 0 | J-10 | J-9 | PVC | 150.0 | 24.0 | 1,000 | 0.71 | 0.000 |
| P-18 | True | 5,318 | 0 | J-12 | J-11 | PVC | 150.0 | 24.0 | 222 | 0.16 | 0.000 |
| P-19 | True | 4,370 | 0 | J-5 | J-19 | PVC | 150.0 | 24.0 | -5,961 | 4.23 | 0.002 |
| P-20 | True | 2,654 | 0 | J-7 | J-13 | PVC | 150.0 | 16.0 | -1,302 | 2.08 | 0.001 |
| P-21 | True | 2,650 | 0 | J-9 | J-14 | PVC | 150.0 | 12.0 | -470 | 1.33 | 0.000 |
| P-22 | True | 2,644 | 0 | J-10 | J-16 | PVC | 150.0 | 16.0 | -1,000 | 1.60 | 0.000 |
| P-23 | True | 3,965 | 0 | J-11 | J-17 | PVC | 150.0 | 12.0 | 189 | 0.54 | 0.000 |
| P-24 | True | 5,286 | 0 | J-12 | J-18 | PVC | 150.0 | 24.0 | -300 | 0.21 | 0.000 |
| P-25 | True | 5,271 | 0 | J-13 | J-14 | PVC | 150.0 | 12.0 | 260 | 0.74 | 0.000 |
| P-26 | True | 4,035 | 0 | J-14 | J-15 | PVC | 150.0 | 12.0 | -58 | 0.16 | 0.000 |
| P-27 | True | 1,234 | 0 | J-16 | J-15 | PVC | 150.0 | 12.0 | 331 | 0.94 | 0.000 |
| P-28 | True | 5,805 | 0 | J-18 | J-17 | PVC | 150.0 | 12.0 | 167 | 0.47 | 0.000 |
| P-29 | True | 2,664 | 0 | J-13 | J-20 | PVC | 150.0 | 16.0 | -1,935 | 3.09 | 0.002 |
| P-30 | True | 2,648 | 0 | J-21 | J-14 | PVC | 150.0 | 12.0 | 896 | 2.54 | 0.002 |
| P-31 | True | 2,409 | 0 | J-22 | J-16 | PVC | 150.0 | 16.0 | 1,698 | 2.71 | 0.001 |
| P-32 | True | 2,954 | 0 | PRV-2 | J-17 | PVC | 150.0 | 12.0 | 280 | 0.79 | 0.000 |
| P-33 | True | 1,809 | 0 | J-18 | PRV-3 | PVC | 150.0 | 24.0 | -1,103 | 0.78 | 0.000 |
| P-34 | True | 3,454 | 0 | J-19 | J-24 | PVC | 150.0 | 24.0 | -6,168 | 4.37 | 0.002 |
| P-35 | True | 2,638 | 0 | J-20 | J-27 | PVC | 150.0 | 16.0 | -2,548 | 4.07 | 0.003 |
| P-36 | True | 2,649 | 0 | J-29 | J-21 | PVC | 150.0 | 16.0 | 1,270 | 2.03 | 0.001 |
| P-37 | True | 2,889 | 0 | J-31 | J-22 | PVC | 150.0 | 16.0 | 1,769 | 2.82 | 0.001 |
| P-38 | True | 1,029 | 0 | J-32 | PRV-2 | PVC | 150.0 | 12.0 | 280 | 0.79 | 0.000 |
| P-39 | True | 841 | 0 | PRV-3 | J-33 | PVC | 150.0 | 24.0 | -1,103 | 0.78 | 0.000 |
| P-40 | True | 2,389 | 0 | J-23 | J-24 | PVC | 150.0 | 24.0 | 3,271 | 2.32 | 0.001 |
| P-41 | True | 991 | 0 | J-24 | J-25 | PVC | 150.0 | 24.0 | -3,028 | 2.15 | 0.001 |
| P-42 | True | 1,403 | 0 | J-25 | J-26 | PVC | 150.0 | 24.0 | -3,162 | 2.24 | 0.001 |
| P-43 | True | 1,951 | 0 | J-26 | J-27 | PVC | 150.0 | 24.0 | 5,089 | 3.61 | 0.001 |
| P-44 | True | 2,877 | 0 | J-28 | J-27 | PVC | 150.0 | 16.0 | -1,860 | 2.97 | 0.002 |

TRANSPORT COLORADO - FINAL BUILDOUT

Active Scenario: MAX. DAY

FlexTable: Pipe Table

| Label | Is Active? | Length (Scaled) (ft) | Length (User Defined) (ft) | Start Node | Stop Node | Material | Hazen-Williams C | Diameter (in) | Flow (gpm) | Velocity (ft/s) | Headloss Gradient (ft/ft) |
|-------|------------|----------------------|----------------------------|------------|-----------|----------|------------------|---------------|------------|-----------------|---------------------------|
| P-45 | True | 2,373 | 0 | J-28 | J-29 | PVC | 150.0 | 16.0 | 1,281 | 2.04 | 0.001 |
| P-46 | True | 4,066 | 0 | J-29 | J-30 | PVC | 150.0 | 16.0 | -486 | 0.78 | 0.000 |
| P-47 | True | 1,251 | 0 | J-30 | J-31 | PVC | 150.0 | 16.0 | -1,100 | 1.75 | 0.001 |
| P-48 | True | 5,353 | 0 | J-33 | J-32 | PVC | 150.0 | 12.0 | 198 | 0.56 | 0.000 |
| P-49 | True | 1,343 | 0 | R-6 | J-23 | PVC | 150.0 | 16.0 | 3,794 | 6.05 | 0.006 |
| P-50 | True | 1,445 | 0 | J-35 | J-31 | PVC | 150.0 | 16.0 | 2,993 | 4.78 | 0.004 |
| P-51 | True | 2,745 | 0 | R-9 | J-35 | PVC | 150.0 | 16.0 | 2,993 | 4.78 | 0.004 |
| P-52 | True | 2,108 | 0 | R-10 | J-32 | PVC | 150.0 | 12.0 | 413 | 1.17 | 0.000 |
| P-53 | True | 1,698 | 0 | R-11 | J-33 | PVC | 150.0 | 24.0 | 1,632 | 1.16 | 0.000 |
| P-54 | True | 2,341 | 0 | J-34 | J-26 | PVC | 150.0 | 36.0 | 8,542 | 2.69 | 0.000 |
| P-55 | True | 1,330 | 0 | J-36 | J-34 | PVC | 150.0 | 36.0 | 8,692 | 2.74 | 0.001 |
| P-56 | True | 1,875 | 0 | R-7 | J-36 | PVC | 150.0 | 16.0 | 2,765 | 4.41 | 0.003 |
| P-57 | True | 5,282 | 0 | J-36 | J-37 | PVC | 150.0 | 16.0 | -1,400 | 2.23 | 0.001 |
| P-58 | True | 1,954 | 0 | R-8 | J-37 | PVC | 150.0 | 16.0 | 1,137 | 1.81 | 0.001 |
| P-59 | True | 1,341 | 0 | J-38 | J-36 | PVC | 150.0 | 24.0 | 4,619 | 3.28 | 0.001 |
| P-60 | True | 2,846 | 0 | J-39 | J-38 | PVC | 150.0 | 24.0 | 4,992 | 3.54 | 0.001 |
| P-61 | True | 5,161 | 0 | J-37 | J-40 | PVC | 150.0 | 16.0 | -637 | 1.02 | 0.000 |
| P-62 | True | 1,340 | 0 | R-12 | J-39 | PVC | 150.0 | 30.0 | 5,366 | 2.44 | 0.001 |
| P-63 | True | 1,724 | 0 | R-13 | J-40 | PVC | 150.0 | 24.0 | 1,010 | 0.72 | 0.000 |

TRANSPORT COLORADO - FINAL BUILDOUT

Active Scenario: MAX. DAY

FlexTable: PRV Table

| Label | Elevation (ft) | Diameter (Valve) (in) | Hydraulic Grade Setting (Initial) (ft) | Pressure Setting (Initial) (psi) | Flow (gpm) | Hydraulic Grade (From) (ft) | Hydraulic Grade (To) (ft) | Headloss (ft) | Status (Initial) | Status (Calculated) |
|-------|----------------|-----------------------|----------------------------------------|----------------------------------|------------|-----------------------------|---------------------------|---------------|------------------|---------------------|
| PRV-1 | 5,431.15 | 24.0 | 5,665.00 | 102 | 659 | 5,720.30 | 5,665.08 | 55.22 | Active | Active |
| PRV-2 | 5,512.95 | 12.0 | 5,665.00 | 67 | 280 | 5,743.01 | 5,665.05 | 77.96 | Active | Active |
| PRV-3 | 5,478.15 | 24.0 | 5,665.00 | 75 | 1,103 | 5,743.65 | 5,665.07 | 78.59 | Active | Active |

TRANSPORT COLORADO - FINAL BUILDOUT

Active Scenario: MAX. DAY

FlexTable: Reservoir Table

| Label | Elevation (ft) | Flow (Out net) (gpm) | Hydraulic Grade (ft) |
|-------|-------------------|-------------------------|-------------------------|
| R-1 | 5,665.00 | -370 | 5,665.00 |
| R-2 | 5,665.00 | 297 | 5,665.00 |
| R-3 | 5,720.00 | -3,860 | 5,720.00 |
| R-4 | 5,665.00 | 272 | 5,665.00 |
| R-5 | 5,665.00 | 226 | 5,665.00 |
| R-6 | 5,744.00 | 3,794 | 5,744.00 |
| R-7 | 5,744.00 | 2,765 | 5,744.00 |
| R-8 | 5,744.00 | 1,137 | 5,744.00 |
| R-9 | 5,744.00 | 2,993 | 5,744.00 |
| R-10 | 5,744.00 | 413 | 5,744.00 |
| R-11 | 5,744.00 | 1,632 | 5,744.00 |
| R-12 | 5,744.00 | 5,366 | 5,744.00 |
| R-13 | 5,744.00 | 1,010 | 5,744.00 |

TRANSPORT COLORADO - FINAL BUILDOUT

Active Scenario: MAX. HR

FlexTable: Check Valve Table

| ID | Label | Elevation (ft) | Pressure (Threshold) (psi) | Is Initially Closed? | Is Open? | Is Closed? |
|-----|-------|----------------|----------------------------|----------------------|----------|------------|
| 366 | CV-1 | 5,433.00 | 0 | False | False | True |

TRANSPORT COLORADO - FINAL BUILDOUT

Active Scenario: MAX. HR

FlexTable: Junction Table

| Label | Elevation (ft) | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|-------|-------------------|-----------------|-------------------------|-------------------|
| J-1 | 5,368.11 | 257 | 5,664.29 | 128 |
| J-2 | 5,388.08 | 214 | 5,664.29 | 120 |
| J-3 | 5,403.42 | 221 | 5,665.00 | 113 |
| J-4 | 5,398.60 | 250 | 5,665.00 | 115 |
| J-5 | 5,432.81 | 566 | 5,718.81 | 124 |
| J-6 | 5,433.39 | 650 | 5,716.04 | 122 |
| J-7 | 5,464.12 | 1,746 | 5,713.96 | 108 |
| J-8 | 5,495.61 | 2,622 | 5,712.65 | 94 |
| J-9 | 5,500.59 | 1,189 | 5,712.62 | 92 |
| J-10 | 5,478.95 | 0 | 5,712.80 | 101 |
| J-11 | 5,478.14 | 489 | 5,664.63 | 81 |
| J-12 | 5,457.21 | 489 | 5,664.67 | 90 |
| J-13 | 5,542.35 | 598 | 5,715.09 | 75 |
| J-14 | 5,517.16 | 1,197 | 5,712.75 | 85 |
| J-15 | 5,498.85 | 440 | 5,712.79 | 93 |
| J-16 | 5,507.03 | 588 | 5,713.43 | 89 |
| J-17 | 5,486.11 | 1,022 | 5,663.76 | 77 |
| J-18 | 5,490.38 | 1,022 | 5,664.74 | 75 |
| J-19 | 5,486.25 | 333 | 5,726.02 | 104 |
| J-20 | 5,555.70 | 986 | 5,719.65 | 71 |
| J-21 | 5,560.27 | 601 | 5,716.41 | 68 |
| J-22 | 5,503.34 | 114 | 5,716.75 | 92 |
| J-23 | 5,537.18 | 841 | 5,734.02 | 85 |
| J-24 | 5,501.36 | 209 | 5,732.36 | 100 |
| J-25 | 5,508.80 | 215 | 5,732.76 | 97 |
| J-26 | 5,524.16 | 468 | 5,733.41 | 91 |
| J-27 | 5,534.26 | 1,095 | 5,729.16 | 84 |
| J-28 | 5,578.49 | 931 | 5,721.54 | 62 |
| J-29 | 5,567.14 | 798 | 5,718.87 | 66 |
| J-30 | 5,526.11 | 986 | 5,719.73 | 84 |
| J-31 | 5,516.51 | 201 | 5,721.21 | 89 |
| J-32 | 5,518.91 | 533 | 5,742.10 | 97 |
| J-33 | 5,491.18 | 533 | 5,743.36 | 109 |
| J-34 | 5,538.50 | 241 | 5,734.93 | 85 |
| J-35 | 5,536.09 | 0 | 5,729.07 | 83 |
| J-36 | 5,555.42 | 148 | 5,735.83 | 78 |
| J-37 | 5,569.38 | 601 | 5,742.16 | 75 |
| J-38 | 5,578.90 | 601 | 5,737.83 | 69 |
| J-39 | 5,604.34 | 601 | 5,743.02 | 60 |
| J-40 | 5,581.81 | 601 | 5,743.79 | 70 |

TRANSPORT COLORADO - FINAL BUILDOUT

Active Scenario: MAX. HR

FlexTable: Pipe Table

| Label | Is Active? | Length (Scaled) (ft) | Length (User Defined) (ft) | Start Node | Stop Node | Material | Hazen-Williams C | Diameter (in) | Flow (gpm) | Velocity (ft/s) | Headloss Gradient (ft/ft) |
|-------|------------|----------------------|----------------------------|------------|-----------|----------|------------------|---------------|------------|-----------------|---------------------------|
| P-1 | True | 2,642 | 0 | J-2 | J-1 | PVC | 150.0 | 12.0 | 21 | 0.06 | 0.000 |
| P-2 | True | 5,291 | 0 | J-1 | J-3 | PVC | 150.0 | 12.0 | -236 | 0.67 | 0.000 |
| P-3 | True | 5,315 | 0 | J-4 | J-2 | PVC | 150.0 | 12.0 | 235 | 0.67 | 0.000 |
| P-4 | True | 1,500 | 1 | R-1 | J-3 | PVC | 150.0 | 16.0 | -196 | 0.31 | 0.000 |
| P-5 | True | 2,641 | 0 | J-3 | J-4 | PVC | 150.0 | 12.0 | 7 | 0.02 | 0.000 |
| P-6 | True | 1,488 | 1 | R-2 | J-4 | PVC | 150.0 | 12.0 | 478 | 1.36 | 0.000 |
| P-7 | True | 2,731 | 0 | J-3 | PRV-1 | PVC | 150.0 | 24.0 | -659 | 0.47 | 0.000 |
| P-8 | True | 2,568 | 0 | PRV-1 | J-5 | PVC | 150.0 | 24.0 | -659 | 0.47 | 0.000 |
| P-9 | True | 783 | 0 | R-4 | J-11 | PVC | 150.0 | 12.0 | 468 | 1.33 | 0.000 |
| P-10 | True | 923 | 0 | R-5 | J-12 | PVC | 150.0 | 12.0 | 399 | 1.13 | 0.000 |
| P-11 | True | 2,004 | 0 | R-3 | CV-1 | PVC | 150.0 | 36.0 | 0 | 0.00 | 0.000 |
| P-12 | True | 1,400 | 0 | CV-1 | J-5 | PVC | 150.0 | 36.0 | 0 | 0.00 | 0.000 |
| P-13 | True | 2,630 | 0 | J-5 | J-6 | PVC | 150.0 | 24.0 | 4,441 | 3.15 | 0.001 |
| P-14 | True | 2,657 | 0 | J-6 | J-7 | PVC | 150.0 | 24.0 | 3,792 | 2.69 | 0.001 |
| P-15 | True | 2,603 | 0 | J-7 | J-8 | PVC | 150.0 | 24.0 | 2,985 | 2.12 | 0.001 |
| P-16 | True | 2,617 | 0 | J-8 | J-9 | PVC | 150.0 | 24.0 | 363 | 0.26 | 0.000 |
| P-17 | True | 5,331 | 0 | J-10 | J-9 | PVC | 150.0 | 24.0 | 688 | 0.49 | 0.000 |
| P-18 | True | 5,318 | 0 | J-12 | J-11 | PVC | 150.0 | 24.0 | 329 | 0.23 | 0.000 |
| P-19 | True | 4,370 | 0 | J-5 | J-19 | PVC | 150.0 | 24.0 | -5,666 | 4.02 | 0.002 |
| P-20 | True | 2,654 | 0 | J-7 | J-13 | PVC | 150.0 | 16.0 | -940 | 1.50 | 0.000 |
| P-21 | True | 2,650 | 0 | J-9 | J-14 | PVC | 150.0 | 12.0 | -138 | 0.39 | 0.000 |
| P-22 | True | 2,644 | 0 | J-10 | J-16 | PVC | 150.0 | 16.0 | -688 | 1.10 | 0.000 |
| P-23 | True | 3,965 | 0 | J-11 | J-17 | PVC | 150.0 | 12.0 | 307 | 0.87 | 0.000 |
| P-24 | True | 5,286 | 0 | J-12 | J-18 | PVC | 150.0 | 24.0 | -420 | 0.30 | 0.000 |
| P-25 | True | 5,271 | 0 | J-13 | J-14 | PVC | 150.0 | 12.0 | 450 | 1.28 | 0.000 |
| P-26 | True | 4,035 | 0 | J-14 | J-15 | PVC | 150.0 | 12.0 | -53 | 0.15 | 0.000 |
| P-27 | True | 1,234 | 0 | J-16 | J-15 | PVC | 150.0 | 12.0 | 492 | 1.40 | 0.001 |
| P-28 | True | 5,805 | 0 | J-18 | J-17 | PVC | 150.0 | 12.0 | 268 | 0.76 | 0.000 |
| P-29 | True | 2,664 | 0 | J-13 | J-20 | PVC | 150.0 | 16.0 | -1,988 | 3.17 | 0.002 |
| P-30 | True | 2,648 | 0 | J-21 | J-14 | PVC | 150.0 | 12.0 | 831 | 2.36 | 0.001 |
| P-31 | True | 2,409 | 0 | J-22 | J-16 | PVC | 150.0 | 16.0 | 1,769 | 2.82 | 0.001 |
| P-32 | True | 2,954 | 0 | PRV-2 | J-17 | PVC | 150.0 | 12.0 | 447 | 1.27 | 0.000 |
| P-33 | True | 1,809 | 0 | J-18 | PRV-3 | PVC | 150.0 | 24.0 | -1,709 | 1.21 | 0.000 |
| P-34 | True | 3,454 | 0 | J-19 | J-24 | PVC | 150.0 | 24.0 | -5,999 | 4.25 | 0.002 |
| P-35 | True | 2,638 | 0 | J-20 | J-27 | PVC | 150.0 | 16.0 | -2,975 | 4.75 | 0.004 |
| P-36 | True | 2,649 | 0 | J-29 | J-21 | PVC | 150.0 | 16.0 | 1,432 | 2.28 | 0.001 |
| P-37 | True | 2,889 | 0 | J-31 | J-22 | PVC | 150.0 | 16.0 | 1,883 | 3.00 | 0.002 |
| P-38 | True | 1,029 | 0 | J-32 | PRV-2 | PVC | 150.0 | 12.0 | 447 | 1.27 | 0.000 |
| P-39 | True | 841 | 0 | PRV-3 | J-33 | PVC | 150.0 | 24.0 | -1,709 | 1.21 | 0.000 |
| P-40 | True | 2,389 | 0 | J-23 | J-24 | PVC | 150.0 | 24.0 | 3,555 | 2.52 | 0.001 |
| P-41 | True | 991 | 0 | J-24 | J-25 | PVC | 150.0 | 24.0 | -2,654 | 1.88 | 0.000 |
| P-42 | True | 1,403 | 0 | J-25 | J-26 | PVC | 150.0 | 24.0 | -2,868 | 2.03 | 0.000 |
| P-43 | True | 1,951 | 0 | J-26 | J-27 | PVC | 150.0 | 24.0 | 6,586 | 4.67 | 0.002 |
| P-44 | True | 2,877 | 0 | J-28 | J-27 | PVC | 150.0 | 16.0 | -2,517 | 4.02 | 0.003 |

TRANSPORT COLORADO - FINAL BUILDOUT

Active Scenario: MAX. HR

FlexTable: Pipe Table

| Label | Is Active? | Length (Scaled) (ft) | Length (User Defined) (ft) | Start Node | Stop Node | Material | Hazen-Williams C | Diameter (in) | Flow (gpm) | Velocity (ft/s) | Headloss Gradient (ft/ft) |
|-------|------------|----------------------|----------------------------|------------|-----------|----------|------------------|---------------|------------|-----------------|---------------------------|
| P-45 | True | 2,373 | 0 | J-28 | J-29 | PVC | 150.0 | 16.0 | 1,587 | 2.53 | 0.001 |
| P-46 | True | 4,066 | 0 | J-29 | J-30 | PVC | 150.0 | 16.0 | -643 | 1.03 | 0.000 |
| P-47 | True | 1,251 | 0 | J-30 | J-31 | PVC | 150.0 | 16.0 | -1,630 | 2.60 | 0.001 |
| P-48 | True | 5,353 | 0 | J-33 | J-32 | PVC | 150.0 | 12.0 | 319 | 0.91 | 0.000 |
| P-49 | True | 1,343 | 0 | R-6 | J-23 | PVC | 150.0 | 16.0 | 4,396 | 7.01 | 0.007 |
| P-50 | True | 1,445 | 0 | J-35 | J-31 | PVC | 150.0 | 16.0 | 3,714 | 5.93 | 0.005 |
| P-51 | True | 2,745 | 0 | R-9 | J-35 | PVC | 150.0 | 16.0 | 3,714 | 5.93 | 0.005 |
| P-52 | True | 2,108 | 0 | R-10 | J-32 | PVC | 150.0 | 12.0 | 660 | 1.87 | 0.001 |
| P-53 | True | 1,698 | 0 | R-11 | J-33 | PVC | 150.0 | 24.0 | 2,561 | 1.82 | 0.000 |
| P-54 | True | 2,341 | 0 | J-34 | J-26 | PVC | 150.0 | 36.0 | 9,923 | 3.13 | 0.001 |
| P-55 | True | 1,330 | 0 | J-36 | J-34 | PVC | 150.0 | 36.0 | 10,164 | 3.20 | 0.001 |
| P-56 | True | 1,875 | 0 | R-7 | J-36 | PVC | 150.0 | 16.0 | 3,295 | 5.26 | 0.004 |
| P-57 | True | 5,282 | 0 | J-36 | J-37 | PVC | 150.0 | 16.0 | -1,641 | 2.62 | 0.001 |
| P-58 | True | 1,954 | 0 | R-8 | J-37 | PVC | 150.0 | 16.0 | 1,443 | 2.30 | 0.001 |
| P-59 | True | 1,341 | 0 | J-38 | J-36 | PVC | 150.0 | 24.0 | 5,375 | 3.81 | 0.001 |
| P-60 | True | 2,846 | 0 | J-39 | J-38 | PVC | 150.0 | 24.0 | 5,976 | 4.24 | 0.002 |
| P-61 | True | 5,161 | 0 | J-37 | J-40 | PVC | 150.0 | 16.0 | -799 | 1.27 | 0.000 |
| P-62 | True | 1,340 | 0 | R-12 | J-39 | PVC | 150.0 | 30.0 | 6,577 | 2.98 | 0.001 |
| P-63 | True | 1,724 | 0 | R-13 | J-40 | PVC | 150.0 | 24.0 | 1,399 | 0.99 | 0.000 |

TRANSPORT COLORADO - FINAL BUILDOUT

Active Scenario: MAX. HR

FlexTable: PRV Table

| Label | Elevation (ft) | Diameter (Valve) (in) | Hydraulic Grade Setting (Initial) (ft) | Pressure Setting (Initial) (psi) | Flow (gpm) | Hydraulic Grade (From) (ft) | Hydraulic Grade (To) (ft) | Headloss (ft) | Status (Initial) | Status (Calculated) |
|-------|----------------|-----------------------|----------------------------------------|----------------------------------|------------|-----------------------------|---------------------------|---------------|------------------|---------------------|
| PRV-1 | 5,431.15 | 24.0 | 5,665.00 | 102 | 659 | 5,718.73 | 5,665.08 | 53.64 | Active | Active |
| PRV-2 | 5,512.95 | 12.0 | 5,665.00 | 67 | 447 | 5,741.65 | 5,665.05 | 76.59 | Active | Active |
| PRV-3 | 5,478.15 | 24.0 | 5,665.00 | 75 | 1,709 | 5,743.21 | 5,665.07 | 78.14 | Active | Active |

TRANSPORT COLORADO - FINAL BUILDOUT

Active Scenario: MAX. HR

FlexTable: Reservoir Table

| Label | Elevation (ft) | Flow (Out net) (gpm) | Hydraulic Grade (ft) |
|-------|-------------------|-------------------------|-------------------------|
| R-1 | 5,665.00 | -196 | 5,665.00 |
| R-2 | 5,665.00 | 478 | 5,665.00 |
| R-3 | 5,720.00 | 0 | 5,720.00 |
| R-4 | 5,665.00 | 468 | 5,665.00 |
| R-5 | 5,665.00 | 399 | 5,665.00 |
| R-6 | 5,744.00 | 4,396 | 5,744.00 |
| R-7 | 5,744.00 | 3,295 | 5,744.00 |
| R-8 | 5,744.00 | 1,443 | 5,744.00 |
| R-9 | 5,744.00 | 3,714 | 5,744.00 |
| R-10 | 5,744.00 | 660 | 5,744.00 |
| R-11 | 5,744.00 | 2,561 | 5,744.00 |
| R-12 | 5,744.00 | 6,577 | 5,744.00 |
| R-13 | 5,744.00 | 1,399 | 5,744.00 |

TRANSPORT COLORADO - FINAL BUILDOUT

Active Scenario: MAX. DAY + FIRE FLOW

Fire Flow Node FlexTable: Fire Flow Report

| Label | Fire Flow Iterations | Satisfies Fire Flow Constraints? | Fire Flow (Needed) (gpm) | Fire Flow (Available) (gpm) | Flow (Total Needed) (gpm) | Flow (Total Available) (gpm) | Fire Flow (Upper Limit) (gpm) | Fire Flow (Total Upper Limit) (gpm) | Pressure (Calculated System Lower Limit) (psi) | Pressure (Calculated Residual) (psi) | Junction w/ Minimum Pressure (System) | Is Fire Flow Run Balanced? | Velocity of Maximum Pipe (ft/s) | Pipe w/ Maximum Velocity |
|-------|----------------------|----------------------------------|--------------------------|-----------------------------|---------------------------|------------------------------|-------------------------------|-------------------------------------|------------------------------------------------|--------------------------------------|---------------------------------------|----------------------------|---------------------------------|--------------------------|
| J-4 | 2 | True | 3,500 | 3,600 | 3,656 | 3,756 | 3,600 | 3,756 | 60 | 115 | J-39 | True | 10.90 | P-6 |
| J-23 | 2 | True | 3,500 | 3,600 | 4,023 | 4,123 | 3,600 | 4,123 | 60 | 84 | J-39 | True | 7.95 | P-49 |
| J-32 | 2 | True | 3,500 | 3,600 | 3,831 | 3,931 | 3,600 | 3,931 | 60 | 87 | J-39 | True | 7.50 | P-52 |
| J-35 | 2 | True | 3,500 | 3,600 | 3,500 | 3,600 | 3,600 | 3,600 | 60 | 80 | J-39 | True | 7.48 | P-51 |
| J-24 | 2 | True | 3,500 | 3,600 | 3,630 | 3,730 | 3,600 | 3,730 | 60 | 99 | J-39 | True | 7.41 | P-49 |
| J-25 | 2 | True | 3,500 | 3,600 | 3,634 | 3,734 | 3,600 | 3,734 | 60 | 96 | J-39 | True | 7.24 | P-49 |
| J-15 | 2 | True | 3,500 | 3,600 | 3,773 | 3,873 | 3,600 | 3,873 | 60 | 87 | J-39 | True | 7.16 | P-27 |
| J-26 | 2 | True | 3,500 | 3,600 | 3,791 | 3,891 | 3,600 | 3,891 | 60 | 90 | J-39 | True | 6.95 | P-49 |
| J-34 | 2 | True | 3,500 | 3,600 | 3,650 | 3,750 | 3,600 | 3,750 | 60 | 85 | J-39 | True | 6.82 | P-49 |
| J-27 | 2 | True | 3,500 | 3,600 | 4,181 | 4,281 | 3,600 | 4,281 | 60 | 84 | J-39 | True | 6.81 | P-49 |
| J-19 | 2 | True | 3,500 | 3,600 | 3,707 | 3,807 | 3,600 | 3,807 | 60 | 103 | J-39 | True | 6.74 | P-49 |
| J-36 | 2 | True | 2,500 | 2,600 | 2,592 | 2,692 | 2,600 | 2,692 | 60 | 78 | J-39 | True | 6.55 | P-49 |
| J-28 | 2 | True | 3,500 | 3,600 | 4,079 | 4,179 | 3,600 | 4,179 | 60 | 60 | J-39 | True | 6.50 | P-49 |
| J-38 | 2 | True | 2,500 | 2,600 | 2,874 | 2,974 | 2,600 | 2,974 | 60 | 69 | J-39 | True | 6.43 | P-49 |
| J-31 | 2 | True | 3,500 | 3,600 | 3,625 | 3,725 | 3,600 | 3,725 | 60 | 87 | J-39 | True | 6.42 | P-51 |
| J-20 | 2 | True | 3,500 | 3,600 | 4,114 | 4,214 | 3,600 | 4,214 | 60 | 70 | J-39 | True | 6.41 | P-49 |
| J-29 | 2 | True | 3,500 | 3,600 | 3,997 | 4,097 | 3,600 | 4,097 | 60 | 64 | J-39 | True | 6.40 | P-49 |
| J-2 | 2 | True | 3,500 | 3,600 | 3,633 | 3,733 | 3,600 | 3,733 | 60 | 102 | J-39 | True | 6.39 | P-6 |
| J-21 | 2 | True | 3,500 | 3,600 | 3,874 | 3,974 | 3,600 | 3,974 | 60 | 64 | J-39 | True | 6.36 | P-49 |
| J-30 | 2 | True | 3,500 | 3,600 | 4,114 | 4,214 | 3,600 | 4,214 | 60 | 81 | J-39 | True | 6.35 | P-49 |
| J-14 | 2 | True | 3,500 | 3,600 | 4,245 | 4,345 | 3,600 | 4,345 | 60 | 83 | J-39 | True | 6.28 | P-49 |
| J-13 | 2 | True | 3,500 | 3,600 | 3,872 | 3,972 | 3,600 | 3,972 | 60 | 75 | J-39 | True | 6.28 | P-49 |
| J-22 | 2 | True | 3,500 | 3,600 | 3,571 | 3,671 | 3,600 | 3,671 | 60 | 91 | J-39 | True | 6.27 | P-49 |
| J-37 | 2 | True | 3,500 | 3,600 | 3,874 | 3,974 | 3,600 | 3,974 | 60 | 73 | J-39 | True | 6.26 | P-49 |
| J-16 | 2 | True | 3,500 | 3,600 | 3,866 | 3,966 | 3,600 | 3,966 | 60 | 89 | J-39 | True | 6.25 | P-49 |
| J-10 | 2 | True | 3,500 | 3,600 | 3,500 | 3,600 | 3,600 | 3,600 | 60 | 101 | J-39 | True | 6.23 | P-49 |
| J-9 | 2 | True | 3,500 | 3,600 | 4,240 | 4,340 | 3,600 | 4,340 | 60 | 92 | J-39 | True | 6.22 | P-49 |
| J-7 | 2 | True | 3,500 | 3,600 | 4,587 | 4,687 | 3,600 | 4,687 | 60 | 109 | J-39 | True | 6.20 | P-49 |
| J-8 | 2 | True | 2,500 | 2,600 | 4,132 | 4,232 | 2,600 | 4,232 | 60 | 95 | J-39 | True | 6.17 | P-49 |
| J-6 | 2 | True | 3,500 | 3,600 | 3,904 | 4,004 | 3,600 | 4,004 | 60 | 123 | J-39 | True | 6.16 | P-49 |
| J-39 | 2 | True | 3,500 | 3,600 | 3,874 | 3,974 | 3,600 | 3,974 | 65 | 60 | J-28 | True | 6.14 | P-49 |

WaterGEMS CONNECT Edition Update 1

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TRANSPORT COLORADO - FINAL BUILDOUT

Active Scenario: MAX. DAY + FIRE FLOW

Fire Flow Node FlexTable: Fire Flow Report

| Label | Fire Flow Iterations | Satisfies Fire Flow Constraints? | Fire Flow (Needed) (gpm) | Fire Flow (Available) (gpm) | Flow (Total Needed) (gpm) | Flow (Total Available) (gpm) | Fire Flow (Upper Limit) (gpm) | Fire Flow (Total Upper Limit) (gpm) | Pressure (Calculated System Lower Limit) (psi) | Pressure (Calculated Residual) (psi) | Junction w/ Minimum Pressure (System) | Is Fire Flow Run Balanced? | Velocity of Maximum Pipe (ft/s) | Pipe w/ Maximum Velocity |
|-------|----------------------|----------------------------------|--------------------------|-----------------------------|---------------------------|------------------------------|-------------------------------|-------------------------------------|------------------------------------------------|--------------------------------------|---------------------------------------|----------------------------|---------------------------------|--------------------------|
| J-5 | 2 | True | 3,500 | 3,600 | 3,852 | 3,952 | 3,600 | 3,952 | 60 | 124 | J-39 | True | 6.10 | P-49 |
| J-40 | 2 | True | 3,500 | 3,600 | 3,874 | 3,974 | 3,600 | 3,974 | 60 | 69 | J-39 | True | 6.07 | P-49 |
| J-1 | 2 | True | 3,500 | 3,600 | 3,660 | 3,760 | 3,600 | 3,760 | 60 | 110 | J-39 | True | 6.06 | P-2 |
| J-3 | 2 | True | 3,500 | 3,600 | 3,637 | 3,737 | 3,600 | 3,737 | 60 | 113 | J-39 | True | 6.05 | P-49 |
| J-11 | 2 | True | 3,500 | 3,600 | 3,805 | 3,904 | 3,600 | 3,904 | 60 | 80 | J-39 | True | 6.05 | P-49 |
| J-12 | 2 | True | 3,500 | 3,600 | 3,805 | 3,904 | 3,600 | 3,904 | 60 | 89 | J-39 | True | 6.05 | P-49 |
| J-17 | 2 | True | 3,500 | 3,600 | 4,136 | 4,236 | 3,600 | 4,236 | 60 | 71 | J-39 | True | 6.05 | P-49 |
| J-18 | 2 | True | 3,500 | 3,600 | 4,136 | 4,236 | 3,600 | 4,236 | 60 | 75 | J-39 | True | 6.05 | P-49 |
| J-33 | 2 | True | 3,500 | 3,600 | 3,831 | 3,931 | 3,600 | 3,931 | 60 | 108 | J-39 | True | 6.05 | P-49 |