

Please do not resubmit until comments from Adams County and UDFCD have been received and addressed.

**TRANSPORT COLORADO  
FDP DRAINAGE LETTER  
SUB-AREA 1**

Approval of overall MDP is required before approval of PD can occur.

Prepared for:  
WEP Transport Holding, LLC  
16909 Via De Santa Fe  
Rancho, Santa Fe, CA, 92067  
Phone (858) 756-1010

Prepared by:  
CVL Consultants of Colorado, Inc.  
10333 E. Dry Creek Road, Suite 240  
Englewood, CO 80112  
Phone (720) 249-3545  
Contact: Mark Scheurer, P.E.,C.F.M.

CVL PROJECT NO.8130292103

April 2019



<b>Approved For One Year From This Date</b>	
_____	
_____	_____
<b>City Engineer</b>	<b>Date</b>
_____	_____
<b>Water Department</b>	<b>Date</b>

April 22, 2019

## Drainage Conformance Letter

### Subject: Sub-Area 1\_ Framework Development Plan

This drainage conformance letter identifies that Sub-Area 1 complies with the proposed Master Drainage Report (MDR) for Transport Colorado [Ref: 1]. The content of this letter is an overview of future stormwater infrastructure presented with the MDR [Ref: 1]. No changes are proposed for Sub-Area 1 at this time.

### INTRODUCTION:

Sub-Area 1 is located in the south east of Transport Colorado site within Sections 15, 22, 27 & 28 of Township 3 South, Range 64 West of the Sixth Principal Meridian, City of Aurora, Adams County, Colorado. Please see the Vicinity Map provided below.

Appears Sub-Area 1 is entirely within COA - please firm and state jurisdictions which site is within.

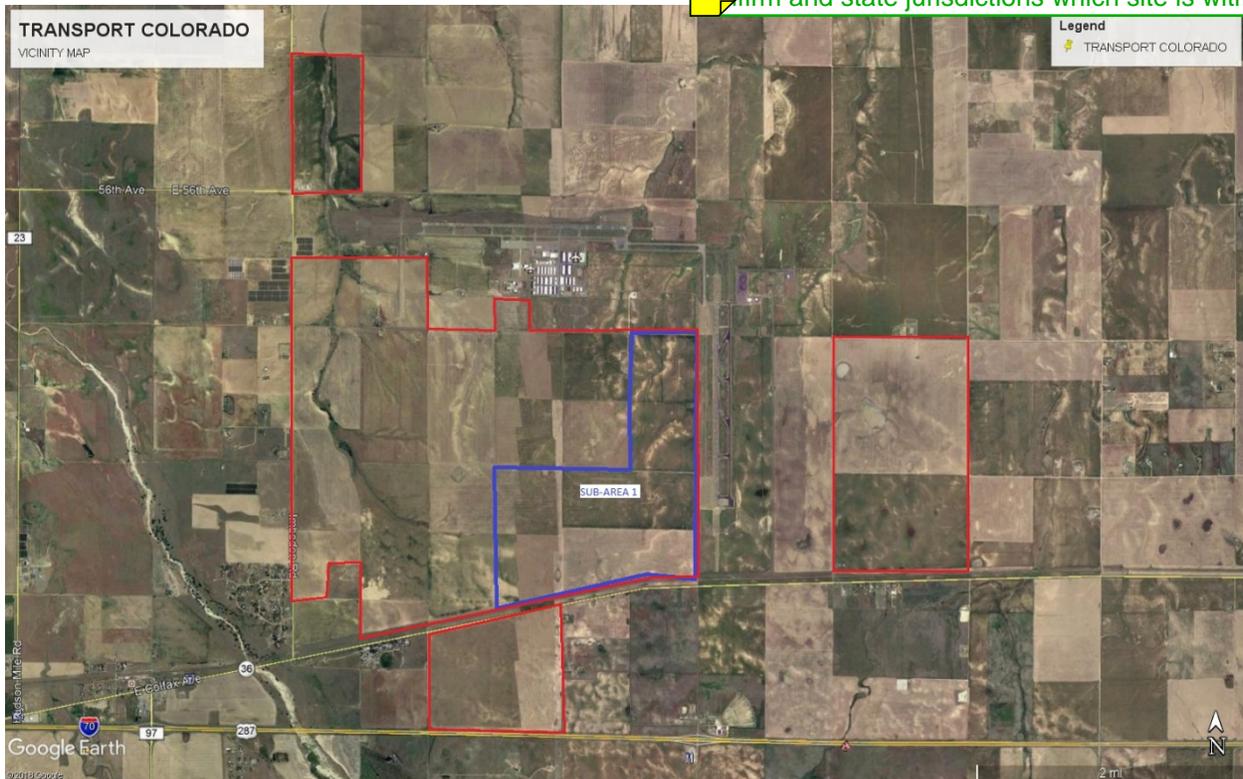


FIG 1: VICINITY MAP

### PROPOSED DEVELOPMENT:

The Sub-Area 1 site is approximately 1,154 acres and will primarily consist of heavy and medium industrial development. Impervious cover values were selected from UDFCD recommended values Table 6-3 *USDCM Volume I*. Sub-Area 1 is comprised of the Crooked Run and Newcomb Gulch watersheds. A small portion of the Henry David Draw and Bear Gulch also drain through the Sub-Area 1 watershed.

Section on variances is needed. Appears you will be requesting variances from COA crit. for at least channel design. Please specifically list criteria that you are requesting variances for and explain why.

**HYDROLOGY:**

Hydrological soil classification for Sub-Area 1 is consistent with the USGS soil map provided with Transport Colorado MDR [Ref: 1].

The 100 Year – 1 Hour Point Rainfall is used for hydraulic analysis. See NOAA Atlas rainfall distribution provided with MDR [Ref:1].

**HYDRAULICS:**

The “City of Aurora Drainage Criteria” [Ref: 2] and “Urban Storm Drainage Criteria Manual” [Ref: 3] are the design guidelines for the design and analyses for Transport Colorado.

**Major Basins**

Sub-area 1 is comprised of four major watersheds, Crooked Run, Henry David Draw, Newcomb Gulch & Bear Gulch. Crooked Run, Henry David Draw and Newcomb Gulch drain south to northeast while Bear Gulch drains south to Northwest. Detailed descriptions of each watershed are provided with MDR [Ref: 1].

**Minor Basins**

The development of Sub-Area is divided into 13 minor basins. Basins HD-P10, NG-P6, NG-P7, CR-P9-P15 are located within Sub-area 1 boundary while basin NG-P4, BG-P32 & BG-P34 are partially located within the sub-area boundary and drains offsite. Detailed descriptions of each basin are provided with MDR [Ref: 1].

**Detention Facility**

Eight detention facilities are located on site. HD-I1 is an interim full spectrum pond and will be removed upon completion of downstream infrastructure. NG-D1 & NG-D2 are online detention ponds that provide 100-year detention on-site and EURV offsite. NG-F1, CR-F2, CR-F3, CR-F4 & CR-F5 are offline full spectrum ponds. Detailed descriptions of each pond are provided with MDR [Ref: 1].

TABLE 1: POND SUMMARY FOR SUB-AREA 1

Pond	Type	Direct Tributary Area (AC)	Total Tributary Area (AC)	WQCV Volume (AC-FT)	EURV Volume (AC-FT)	UD-Detention (AC-FT)	SWMM (AC-FT)	Design Volume (AC-FT)	Allowable Release (CFS)
HD-I1	Full Spectrum	64.38	64.38	2.16	5.75	9.18	9.20	9.20	83.75
NG-F1	Full Spectrum	201.81	201.81	6.75	18.01	28.75	29.85	29.85	179.61
NG-D1	Detention	149.92	351.01	11.79	18.01	21.79	13.46	21.79	278.26
NG-D2	Detention	198.12	549.13	26.57	18.01	26.57	45.63	45.63	260*
CR-F2	Full Spectrum	126.96	126.96	4.35	13.09	19.66	18.44	19.66	149.41
CR-F3	Full Spectrum	181.19	181.19	6.60	18.21	27.43	27.31	27.43	161.96
CR-F4	Full Spectrum	139.85	139.85	4.68	14.10	21.13	20.36	21.13	127.73
CR-F5	Full Spectrum	167.15	167.15	5.59	16.50	25.01	25.31	25.31	131.20

\*Limited to capacity of downstream culvert on FRA

Detention facilities - Address 48 hr required drain time - all ponds shown appear to be within 1000 of airport.

Add brief discussion of floodplain issues. Appears FEMA mapping for Bear Gulch terminates just d/s of this proposed site and that there are no other currently mapped flood hazards areas within site. Please confirm and discuss in report.



## Conveyance Facility

There are 4 major channels (cross-sections) and 7 culvert crossings identified for Sub-Area 1. Description of all conveyance facilities are provided with MDR [Ref: 1].

TABLE 2: CHANNEL SUMMARY FOR SUB-AREA 1

Channel	CHANNEL FLOWS $Q_{100}$	APPROX REACH SLOPE	BANKFULL CHANNEL		FLOOD TERRACE		100-YEAR FLOODPLAIN		
			$W_{BKF}$	$D_{BKF}$	$W_{FLTR}$	$D_{FLTR}$	$W_{FP}$	$D_{FP}$	TOP WIDTH WITH 1.5' FREEBOARD
ID	CFS	%				FT	FT	FT	FT
DP-CR-5*	2109.00	0.62	11.20	1.00	34.00	1.11	162.00	3.12	198.96
CR-C9*	1890.00	0.94	6.00	0.53	14.40	0.63	238.00	2.05	266.40
CR-C7*	1589.00	0.84	10.60	0.95	31.90	0.59	176.00	2.28	206.24
NG-C2*	944.00	0.83					107.00	2.32	137.56

TABLE 3: CULVERT SUMMARY FOR SUB-AREA 1

Watershed	Design Point	$Q_{100}$ (cfs)	Size
Bear Gulch	BG-D1_DS	362	1-6'x8' RCBC
Bear Gulch	BG-D2_DS	462	2-6'x6' RCBC
New Gulch	NG-D1_DS	260	1-4'x6' RCBC
New Gulch	NG-D2_DS	260	1-6'x6' RCBC
New Gulch	NG-D2_DS	260	1-6'x6' RCBC
Crooked Run	CR4	1896	5-6'x9' RCBC
Crooked Run	CR5	2109	5-6'x10' RCBC

## CONCLUSION:

This drainage letter outlines the Phasing Plan for Sub-Area 1 located within the Transport Colorado Development. Conceptual Design presented with the MDR [Ref: 1] is consistent with drainage improvements presented in this letter.

If you have any additional questions, please do not hesitate to contact me directly at 720.249.3545.

Sincerely,  
**CVL Consultants of Colorado, Inc.**

Mark Scheurer, PE, CFM  
*Director of Water Resources*

**REFERENCES:**

1. Transport Colorado Master Drainage Report, CVL Consultants of Colorado., April 2019. (Under Review).
2. Storm Drainage Design and Technical Criteria Manual; City of Aurora; Revised October 2010
3. Urban Storm Drainage Criteria Manual. Volumes 1-3, Urban Drainage and Flood Control District, Volumes 1 & 2 - Originally Published September 1969, Volume 1 revised March 2017, Volume 2 revised September 2017, Volume 3 revised 2010 with individual sections updated November 2015.

Calcs must be included with this letter for Pond HD-I1. Calcs should include WQ/EURV/Det and allowable release rate. This pond was not included in MDP submittal so calss for it are needed here.



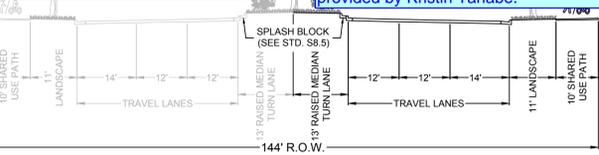
**ROADWAY/ DRAINAGE CHANNEL SECTIONS:**

Half of the median will not be constructed. Either construct the entire median or just construct to the curb

The street sections have been revised to show only the curb being constructed.

The use of "interim condition/life safety access" roadways cannot be supplemented without Public Works approval. If allowed, the section shown below must be labeled as a fire lane easement, dedicated and constructed to the Public Works specifications for a fire lane easement. An additional note will be required within a phasing plan to state when the required public roadway will be installed and the dedicated fire lane removed.

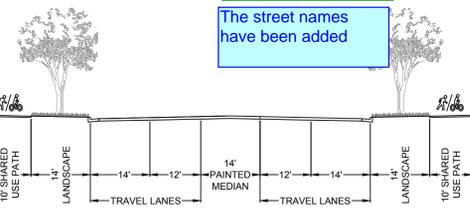
The road section has been modified to reflect the section for public use provided by Kristin Tanabe.



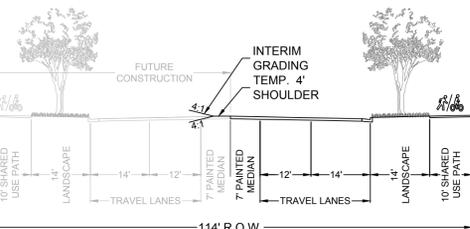
SIX LANE MAJOR ARTERIAL - HALF STREET IMPROVEMENT (S1.4)

Add street names to the relevant sections

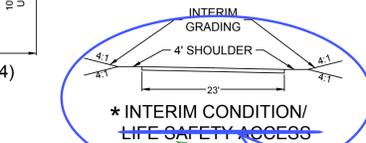
The street names have been added



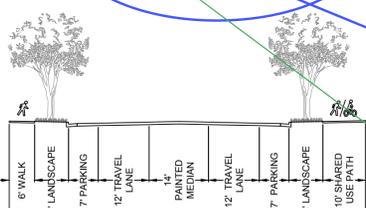
FOUR LANE MINOR ARTERIAL WITH SEPARATED SHARED USE PATH (S1.5)



FOUR LANE MINOR ARTERIAL WITH SEPARATED SHARED USE PATH - HALF STREET IMPROVEMENT (S1.5)

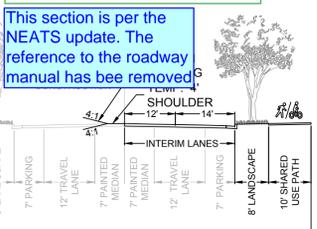


\* INTERIM CONDITION/ LIFE SAFETY ACCESS



THREE LANE COLLECTOR (S1.3)

There is no 84' three lane collector in S1.3. Please make sure you are using the most recent updates to the Roadway Manual



THREE LANE COLLECTOR HALF STREET IMPROVEMENT (S1.3)

**NOTES:**

- TRANSPORT COLORADO RESERVES THE RIGHT TO PROVIDE SUB-PUBLIC IMPROVEMENT PLAN ADDENDUMS TO THE CITY OF AURORA AS SITE DEVELOPS TO PROVIDE FOR LIFE SAFETY WITHIN INFRASTRUCTURE. OVERALL FDP AND SUB-AREAS WERE SUBMITTED ON THE SAME DAY. FUTURE SUBMITTALS WILL BE STAGGERED.
- SANITARY SEWER MAINS SHOWN HERON MAY BE ASSOCIATED GRADING.
- THE SUB-AREA SHOWN WILL BE SERVICED BY THE CITY SYSTEM OR REGIONAL WASTEWATER TREATMENT PLANT IS AT THIS TIME, LIFE STATION, FORCE MAINS, AND DOWNSTREAM SANITARY TO THE AVAILABLE SYSTEM.
- THE 2018 CITY OF AURORA WASTEWATER CAPACITY ON-LINE WHEN INDIVIDUAL SEWAGE DISPOSAL SYSTEMS (ISDS) LOADING HAS MET THE MAXIMUM THRESHOLD, A REGIONAL WASTEWATER TREATMENT PLANT WILL BE CONSTRUCTED TO SERVE THE AREA.
- IT IS ANTICIPATED THAT WATER DEMANDS FOR THE INITIAL 100-300 ACRES OF DEVELOPMENT WILL BE MET WITH A TANK AND WELL SYSTEM FOLLOWED BY A CONNECTION TO THE CITY WATER SUPPLY IN E. 56TH AVENUE NEAR JACKSON GAP WAY. DEPENDING ON DEMAND AND PERMITTING REQUIREMENTS, THIS CONNECTION MAY TAKE PLACE PRIOR TO INITIAL ESTIMATES.
- WATER SERVICE IN SUB-AREA 1 WILL BE SINGLE SERVICE FOR AN INITIAL PORTION OF SUB-AREA 1 WHEN A SECOND SOURCE IS PROVIDED IN A SUBSEQUENT PORTION OF SUB-AREA 1. A WATER MAIN LOOP WILL BE PROVIDED TO TIE THE TWO SOURCES. THEREAFTER, WATER MAINS WILL BE CONSTRUCTED ONLY AS NECESSARY TO PROVIDE LOOPING OF RESPECTIVE PARCELS.

This note needs to be discussed.

Comment addressed with Mike Dean. The interim roadway section has been updated and easements will not be required where right-of-way will be dedicated. Please label Fire Lane Easement.

If this is to be emergency access only, it will need to be gated. If it will be open for the public to use, 2 lanes (min 24') with curb and gutter will need to be constructed

The section has been modified to reflect the section for public use provided by Kristin Tanabe

Additional conversations have been had regarding water main sizing. Please ensure those discussions and comments are reflected in this utility study and any other utility studies for the Transport Colorado Development.

Conversations regarding main sizing and other water system details are reflected in this study and will be carried forward to subsequent utility studies.

Include intersections that were identified in the Traffic Study for future signalization. Include a note that references the City's Traffic Signal Escrow Ordinance

Signalized intersections are now indicated on the PIP Exhibits. A note referencing the escrow ordinance has been added. Monies will be escrowed for traffic signal construction as individual sub-areas are being developed.

Waterline to the west of Sub-Area 1 is to be constructed to and capped at Imboden Rd. (connection to a main is not proposed during this phase). waterline to be installed under interim road.

We are working with Aurora Water and Life Safety to determine an acceptable tank location. The location shown represents the highest point on the site based on proposed elevations

Storage tank should be on a looped portion of the water mains to ensure fire service.

Fire/Life Safety concurs.

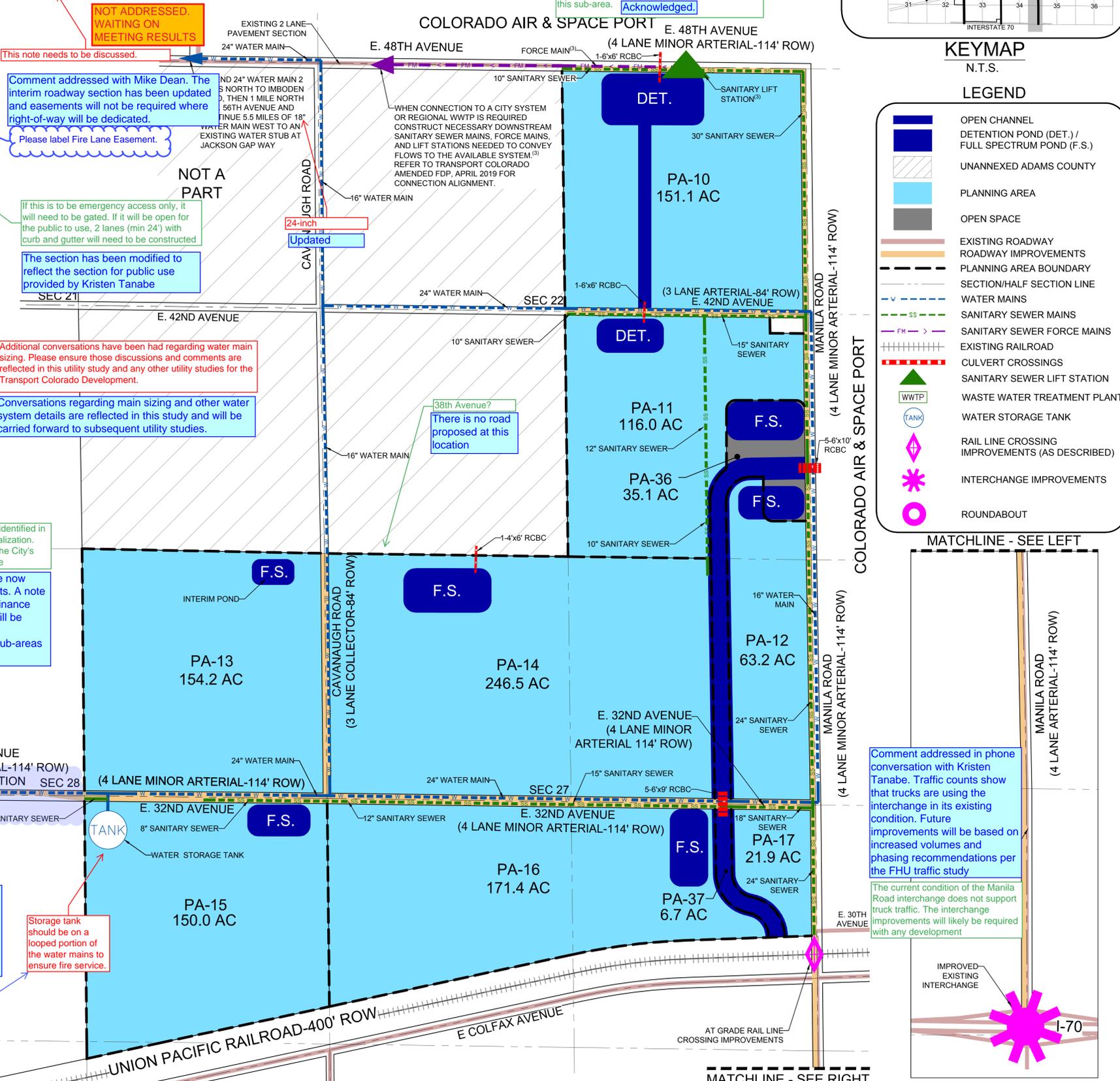
NOT ADDRESSED. WAITING ON MEETING RESULTS

NOT A PART

NOT A PART

NOT A PART

NOT A PART



Please put the exhibits at the back of the document

We submitted the exhibits as a separate file and are not sure how they got placed before the text.

Replace "as necessary" with "as required by the City of Aurora" Updated

The FDP will not be approved by public works until the Master Drainage Study has been approved. There may be additional analysis required with the drainage report submitted with this sub-area. Acknowledged.

Please remove AutoCad SHX text items in the comment section. Please flatten to reduce select-ability of the items.

PDF to be flattened for re-submittal.

**KEYMAP**

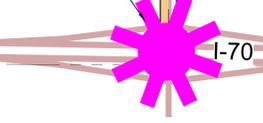
N.T.S.

**LEGEND**

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- CULVERT CROSSINGS
- SANITARY SEWER LIFT STATION
- WASTE WATER TREATMENT PLANT
- WATER STORAGE TANK
- RAIL LINE CROSSING IMPROVEMENTS (AS DESCRIBED)
- INTERCHANGE IMPROVEMENTS
- ROUNDBOUT

MATCHLINE - SEE LEFT

IMPROVED EXISTING INTERCHANGE



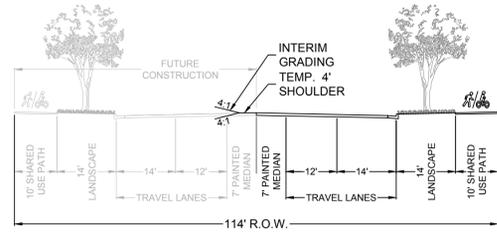
MATCHLINE - SEE RIGHT

10333 E. Dry Creek Rd. Suite 240 Englewood, CO 80112 Tel: (720) 482-9529 Fax: (720) 482-9546	Revisions	Date	Date	Date
	No.	Appr.	Init.	Date
	TRANSPORT COLORADO, LLC c/o WESTERN TRANSPORT, LLC 1331 17TH STREET, SUITE 1000 DENVER, COLORADO 81611			
TRANSPORT COLORADO SUB-AREA 1 - FDP PUBLIC IMPROVEMENT PLAN ULTIMATE BUILDOUT	SCALE: AS SHOWN	FILE NO: 8130292103	SHEET NUMBER <b>1</b>	
DRAWN BY: CAA CHECKED BY: JMM DATE: APRIL 2019	APRIL 2019			





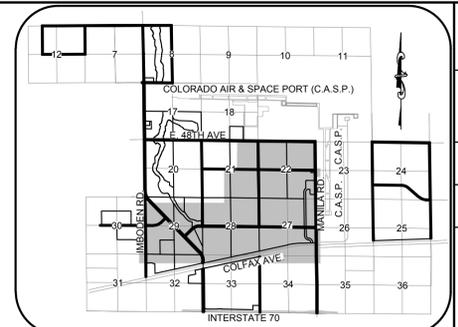
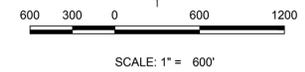
**ROADWAY SECTIONS:**



**FOUR LANE MINOR ARTERIAL WITH SEPARATED SHARED USE PATH - HALF STREET IMPROVEMENT (S1.5)**

**NOTES:**

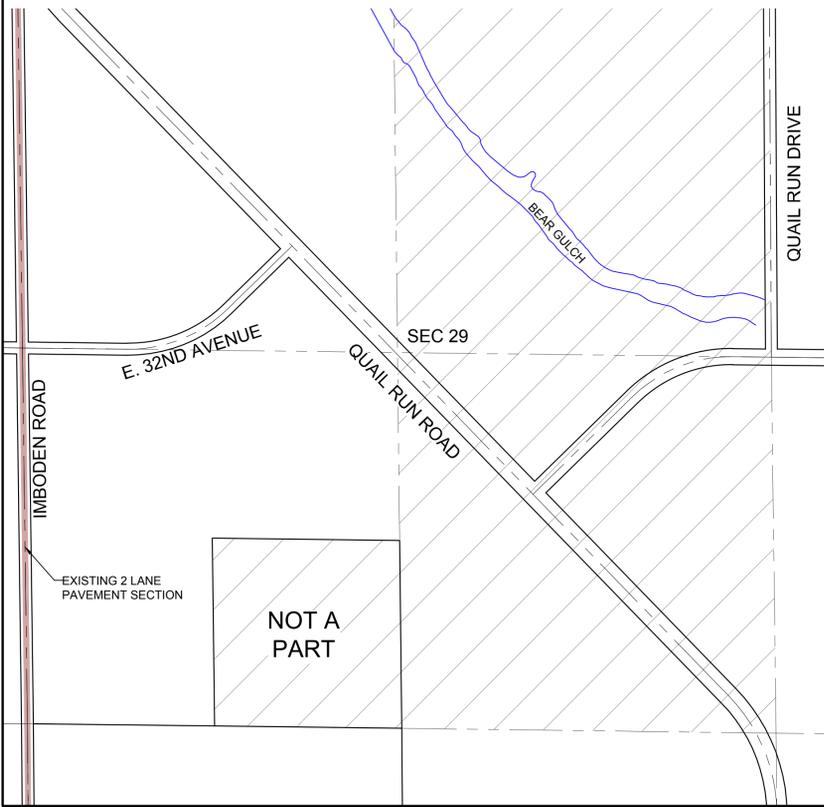
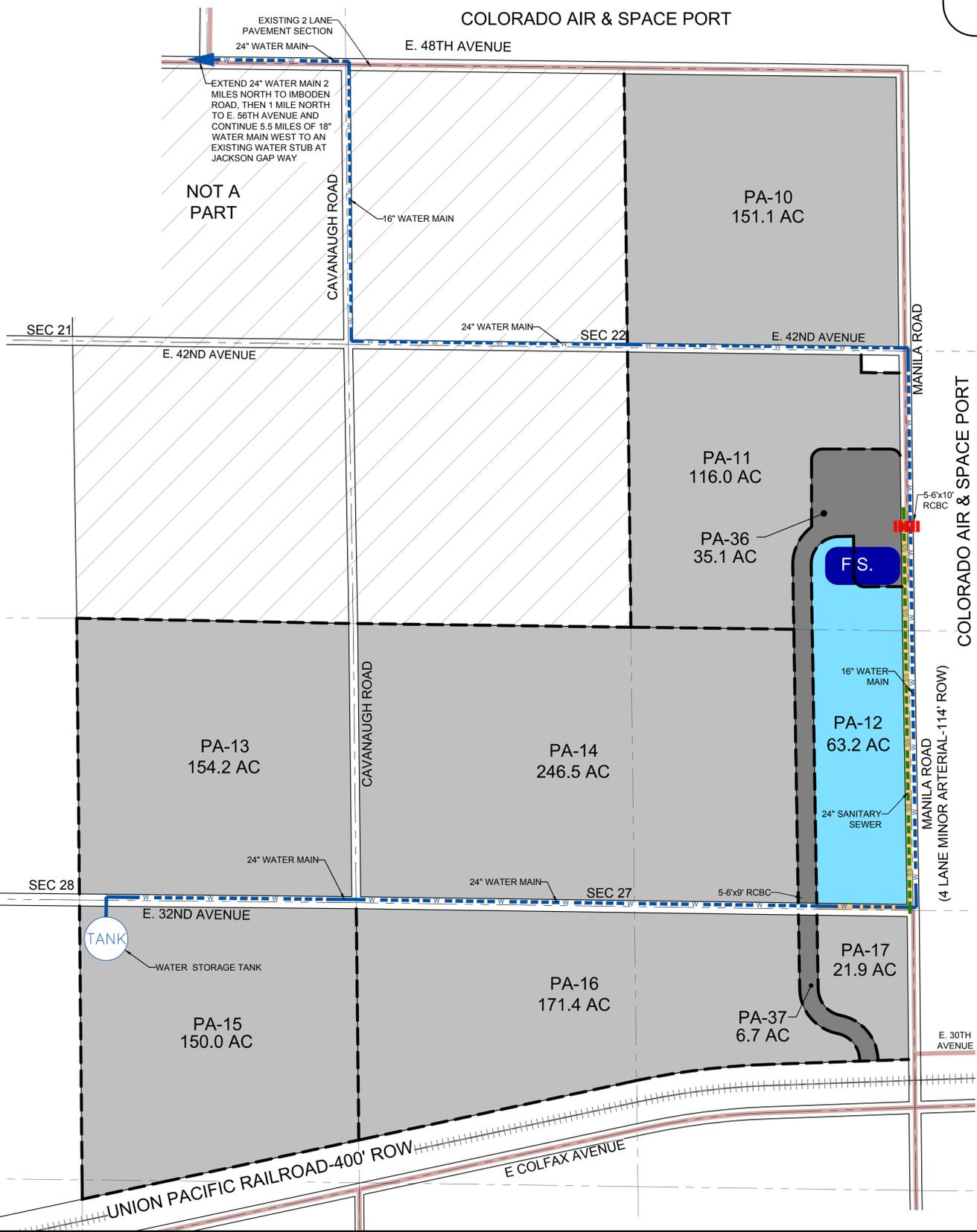
1. PA-12 MAY BE SERVED BY EITHER THE ONSITE TANK AND WELL SYSTEM OR VIA AN 18" WATER MAIN CONNECTION IN E 56TH AVENUE AT JACKSON GAP WAY. A SINGLE SERVICE WILL BE ACCEPTABLE FOR THIS PLANNING AREA.
2. AS DEVELOPMENT OF MULTIPLE PLANNING AREAS WITHIN SUB-AREA 2 OCCURS IN SEQUENCE, DEMANDS WILL BE ASSESSED TO DETERMINE WHEN ADDITIONAL ONSITE WELLS MUST BE DRILLED AND WHEN THE ONSITE WATER MAINS MUST BE LOOPED BACK TO THE ONSITE WATER STORAGE TANK.
3. SUB-AREA 1 MIGHT ALSO TAKE SERVICE FROM A FUTURE CITY OF AURORA NON-POTABLE LINE TO BE AVAILABLE AT A STUB LOCATED IN THE GENERAL VICINITY OF E. 56TH AVENUE WEST OF IMBODEN ROAD.
4. SANITARY SEWER MAINS SHOWN HEREON MAY BE REROUTED BASED ON THE BOUNDARY AND CONFIGURATIONS OF PURCHASED PARCELS AND ASSOCIATED GRADING.
5. THE PLANNING AREA SHOWN WILL BE SERVICED BY ISDS UNTIL A CONNECTION TO A CITY SYSTEM OR REGIONAL WASTEWATER TREATMENT PLANT IS TRIGGERED PER PARAMETERS OUTLINED IN THE MASTER UTILITY REPORT. AT THIS TIME, LIFT STATION, FORCE MAINS, AND DOWNSTREAM SANITARY SEWER MAINS WILL BE CONSTRUCTED AS NECESSARY TO CONVEY FLOWS TO THE AVAILABLE SYSTEM.
6. THE 2018 CITY OF AURORA WASTEWATER CAPITAL IMPROVEMENT PLAN SHOWS A FORCE MAIN CONVEYING FLOWS TO THE WEST. IF THIS SYSTEM IS NOT ON-LINE WHEN INDIVIDUAL SEWAGE DISPOSAL SYSTEMS (ISDS) LOADING HAS MET THE MAXIMUM THRESHOLD, A REGIONAL WASTEWATER TREATMENT PLANT WILL BE CONSTRUCTED TO SERVE THE AREA.



**KEYMAP**  
N.T.S.

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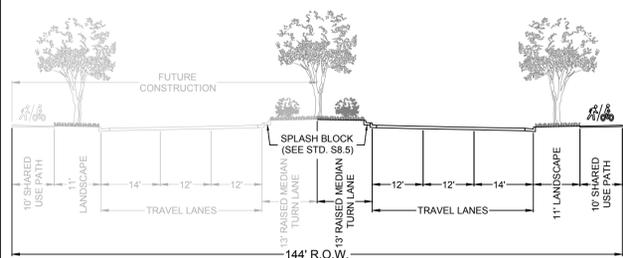


SHEET NUMBER	DRAWN BY: CAA	CHECKED BY: JMM	DATE: APRIL 2019	SCALE: AS SHOWN	FILE NO: 8130292103	Revisions	No.	Date	Init.	Appr.	Date
				TRANSPORT COLORADO SUB-AREA 1 - FDP PUBLIC IMPROVEMENT PLAN PA-12							
TRANSPORT COLORADO, LLC		c/o WESTERN TRANSPORT, LLC		10333 E. Dry Creek Rd., Suite 240, Englewood, CO 80112		Tel: (720) 482-9529		Fax: (720) 482-9546			
<b>CWL CONSULTANTS</b>											

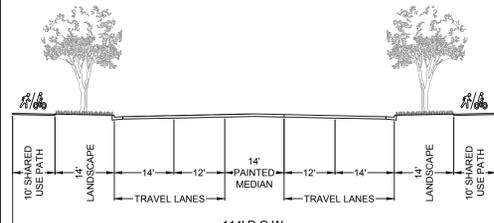
N:\PROJECTS\TRANSPORT COLORADO\ENGINEERING\SH12\SET\SD\PHASE 1 SUBAREA 1\FDP\PIP.DWG, CDDYA, 4/24/2019 7:42 PM



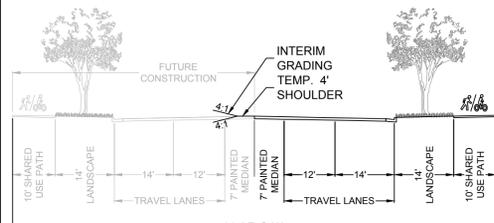
**ROADWAY/ DRAINAGE CHANNEL SECTIONS:**



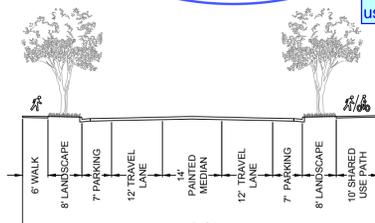
SIX LANE MAJOR ARTERIAL - HALF STREET IMPROVEMENT (S1.4)



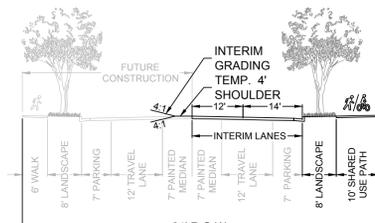
FOUR LANE MINOR ARTERIAL WITH SEPARATED SHARED USE PATH (S1.5)



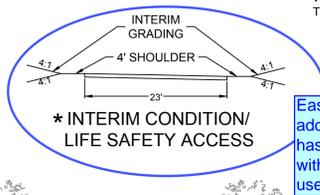
FOUR LANE MINOR ARTERIAL WITH SEPARATED SHARED USE PATH - HALF STREET IMPROVEMENT (S1.5)



THREE LANE COLLECTOR (S1.3)



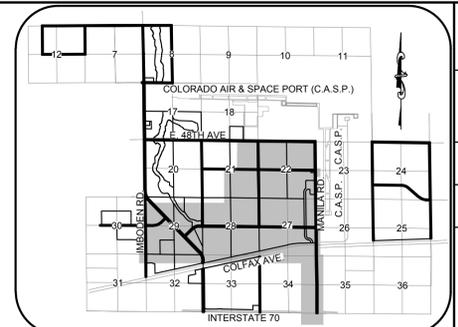
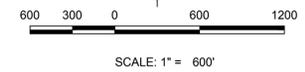
THREE LANE COLLECTOR HALF STREET IMPROVEMENT (S1.3)



\* INTERIM CONDITION/ LIFE SAFETY ACCESS  
Easement labels have been added to the interim section and has been updated to a 24' width with curb/gutter to allow public use.

**NOTES:**

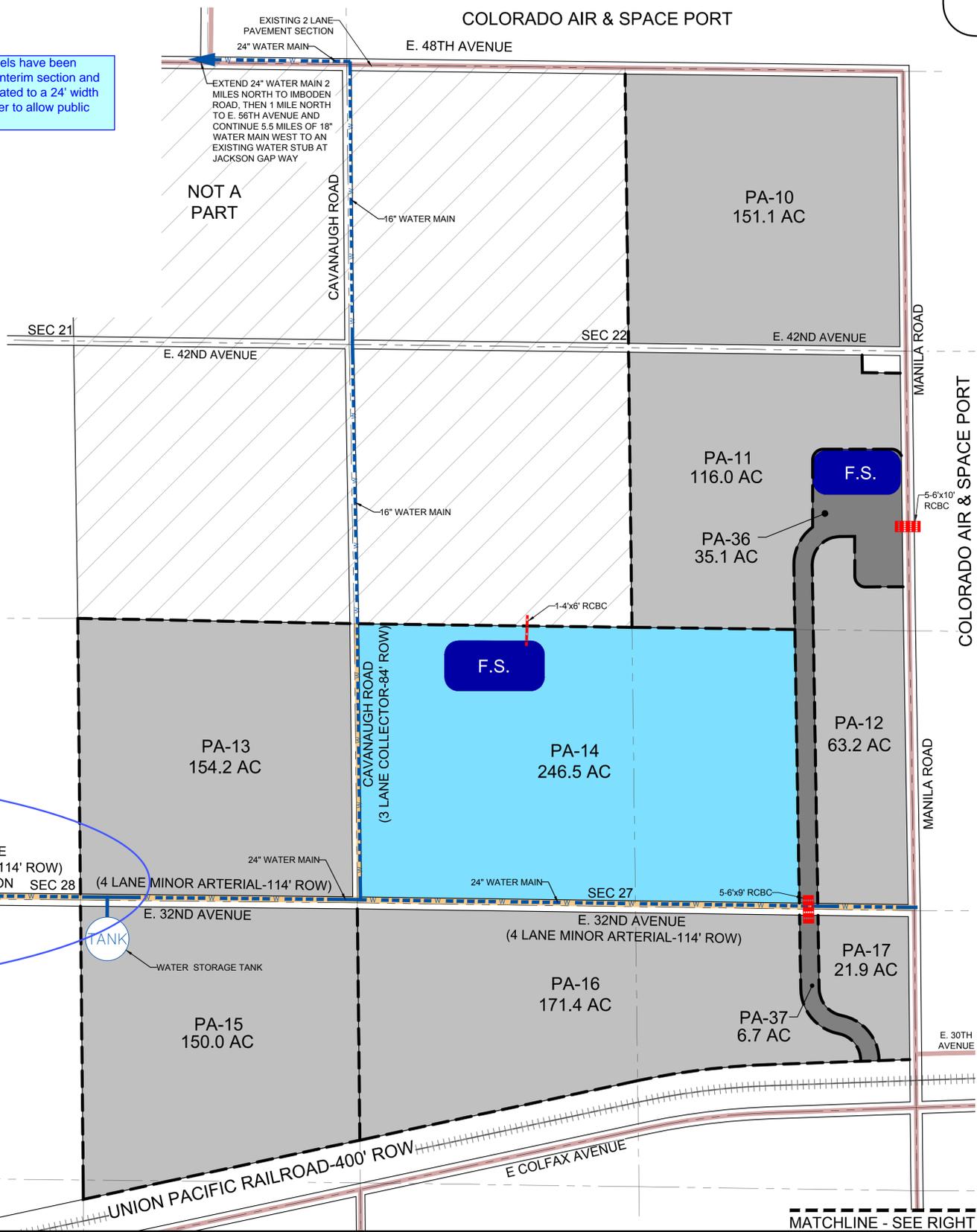
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N.T.S.

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- ROUNDABOUT



MATCHLINE - SEE LEFT

MATCHLINE - SEE RIGHT

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				PROJECT: TRANSPORT COLORADO SUB-AREA 1 - FDP PUBLIC IMPROVEMENT PLAN PA-14	CLIENT: TRANSPORT COLORADO, LLC c/o WESTERN TRANSPORT, LLC 1331 17TH STREET, SUITE 1000 DENVER, COLORADO 81611				
<b>6</b>									











CVL Job No. 8.13.292103  
AURORA, COLORADO

**TRANSPORT COLORADO**  
**PUBLIC IMPROVEMENT PLAN**  
**SUB-AREA 1**

Additional comments will be supplied once Traffic Comments on TIS had been incorporated. Traffic Volumes, roadway laneage, intersection laneage, potential signalized intersections, overall geometry, and may other items may be modified. Conformance with LOS NEATS (based on ADT) may be discussed (additional lanes may be needed in multiple loctions) and COA TIS Guidelines will be required.

Acknowledged.

Prepared by:  
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Report Date:  
April 2019

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## Appendix

**E1 - Public Improvement Plan**

## Introduction

### General Description

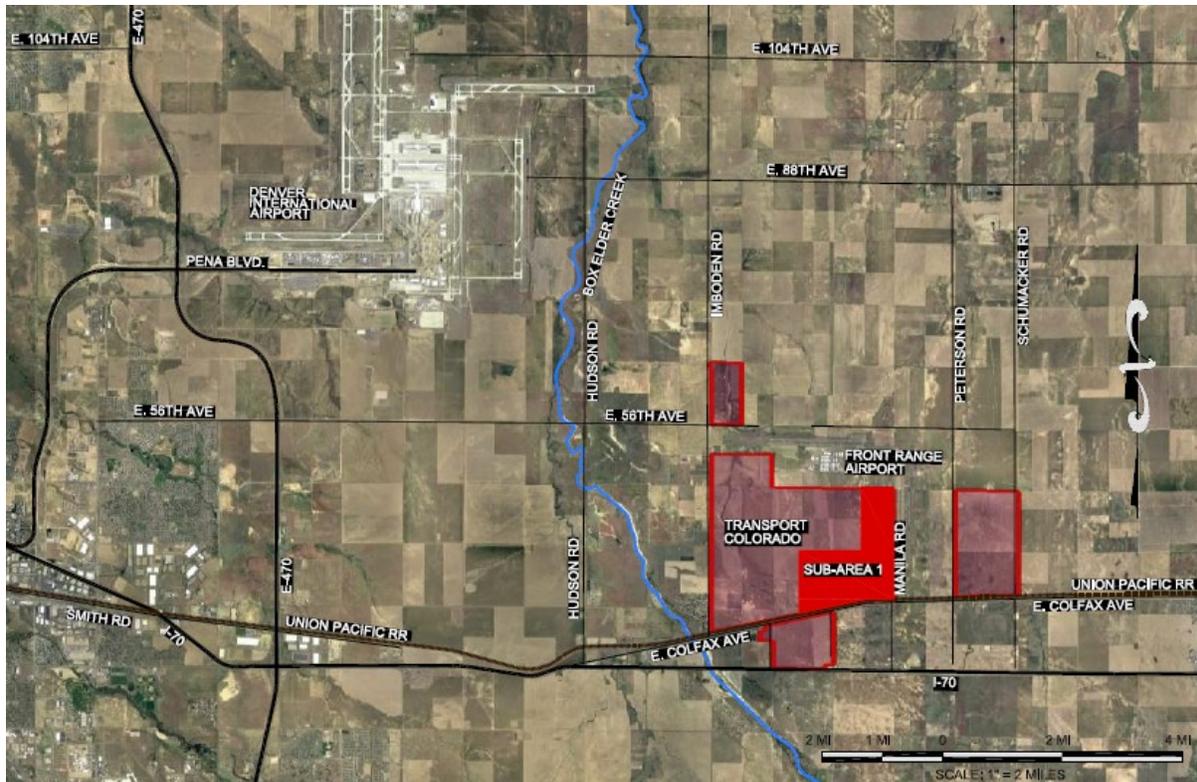
Transport Colorado contains approximately 5,400 acres of planned industrial and mixed-use commercial development in eastern Aurora, CO. The site is divided into six separate sub-areas which will be treated as individual projects. Sub-Area 1 is located in the eastern portion of the site and contains approximately 1,154 acres of planned industrial development. The majority of the land surrounding the proposed site, with the exception of the Colorado Air and Space Port (Space Port), formerly known as Front Range Airport, is undeveloped farm/ranching land. Land uses within the subject sub-area are heavy industrial, except for Planning Area 10, which is designated as medium industrial. The improvements necessary for the build-out of Sub-Area 1 will include the construction of arterial, collector and local roads; water, sanitary, and stormwater infrastructure; and parks/open space.

### Scope of Work

The purpose of this Public Improvement Plan (PIP) for Sub-Area 1 is to provide development details for the planning areas (PAs) within Sub-Area 1. This report will serve as a companion document to the Framework Development Plan (FDP) for Sub-Area 1. The improvements discussed herein are specifically in regard to the infrastructure requirements for Sub-Area 1 and have been analyzed in coordination with the PIP Amendment for the overall development (Ref. 1). Historic land uses have not changed from those shown in the FDP prepared by N.E.S. Inc. in 2005 (Ref. 3).

### Project Location

The Transport Colorado development is approximately 6 miles southwest of Denver International Airport (DIA) and 20 miles east of downtown Denver within Township 3 South, Range 64 West of the 6<sup>th</sup> Principal Meridian. Sub-Area 1 includes the east half of Section 22, Sections 27, 28, and the portion of Section 33 north of the Union Pacific Railroad (UPRR), Township 3 South, Range 64 West of the 6<sup>th</sup> Principal Meridian. Refer to Figure 1 below for a vicinity map of the project and surrounding areas.



**Figure 1 - Vicinity Map**

Cores showing adequacy of pavement are required for existing roads such as Imboden to ensure the existing sections meet traffic demands and loading. If they do not meet standards, reconstruction will be required.

## Public Improvements

### Sub-Area 1 Build-Out (Exhibit 1 of 9)

#### General

The infrastructure necessary for the build-out of Sub-Area 1 includes roadways, water mains, sanitary and storm sewers. The alignments and locations of these improvements will be finalized as development progresses. They will be finalized in future Infrastructure Site Plan (ISP), Contextual Site Plan (CSP) and construction drawing (CD) submittals. All utilities and roads will be designed in accordance with the City of Aurora (COA) standards and specifications. Exhibit 1 shows a color-coded view of the proposed improvements for Sub-Area 1. The exhibit shows how Sub-Area 1 and its respective utilities are planned independently of the other sub-areas.

Acknowledged. Verbiage has been added to the PIP document. Based on conversations with Kristen Tanabe, it is understood that this is not required at this point in the design.

#### Roadway System

Per the Master Traffic Study (Ref. 5), the following roadway improvements will be required for the build-out of Sub-Area 1. All roadways will be constructed per COA standards and specifications. Half-section roads will be constructed along the periphery. The remaining half-sections will be constructed when the adjacent property or sub-area is developed. Interior roads will be constructed to their full widths as planning areas are developed. The improvements required for Sub-Area 1 are described in more detail below.

Fire hydrants will be required along all roadways on alternating sides of the proposed street systems regardless of water main sizing.

The interim section is only 23'. If this is to be emergency access only, it will need to be gated. If it will be open for the public to use, 2 lanes (min 24') with curb and gutter will need to be constructed

- Construct the south sub-area boundary from E. 48th Avenue along the northern boundary of Sub-Area 1 in Section 22 to Manila Road.
- Construct the full width of a 3-lane collector for E. 32nd Avenue from the western boundary of Sub-Area 1 in Section 22 to Manila Road.
- Construct the full section of a 4-lane minor arterial for E. 32nd Avenue within the sub-area boundary and connect to Manila Road. For life safety purposes, the north two-lanes of E. 32nd Avenue will need to be constructed through Sub-Area 3 from Quail Run Road to the western boundary of Sub-Area 1.
- Construct the north two-lanes of a 6-lane major arterial for Quail Run Road, between the east and west intersections of E. 32nd Avenue and Quail Run Road, for life safety access.
- Construct the north two-lanes of a 3-lane collector for E. 32nd Avenue, from Imboden Road to Quail Run Road, for life safety access
- Construct the full width of a 3-lane collector for Cavanaugh Road from E. 32nd Avenue to the Sub-Area 1 boundary.
- Construct the west half of a 4-lane minor arterial for Manila Road from E. 48th Avenue to I-70.

The section has been modified to reflect the section for public use provided by Kristin Tanabe.

For life safety purposes, the north two-lanes of E. 32nd Avenue will need to be constructed through Sub-Area 3 from Quail Run Road to the western boundary of Sub-Area 1.

The full buildout of Sub-Area 1 will also require improvements at UPRR, E. Colfax, I-70, and various intersections. These improvements include:

- A signalized intersection at E. 32nd Avenue and Manila Road.
- Widening and other improvements to the existing at-grade rail crossing at E. 32nd Avenue.
- A signalized intersection at Manila Road and E. Colfax Avenue.
- Temporary roundabouts on the north and south sides of the I-70 crossing at E. 32nd Avenue.
- Reconstruction and widening of the I-70 bridge including signalized turn lanes for entry and exit movements.

Specific triggers need to be identified for these improvements

Due to the size and unknown rate of development, triggers will be added in terms of developed acres rather than years.

The improvements listed above are based on assumed land uses. As actual users purchase and develop their property, these improvements may be reevaluated and revised in the future.

### Water Distribution System

It is anticipated that the initial 100-300 acres of development will be served by a well and tank system located at the high point of the site in Planning Area 15. The water distribution system will include drilling onsite wells and constructing a storage tank for servicing domestic and fire suppression. Early estimates indicate that a 1.0-1.5 MG tank would be adequate for this demand. This would require approximately 4-10 wells drilled in the Upper and Lower Arapahoe aquifers. Refer to the Master Utility Report (Ref. 1) for included as part of this FDP submittal for a more detailed discussion on the initial water system.

As Sub-Area 1 develops beyond 100-300 acres, a connection to a city source will be needed to supply additional users. Discussions with city staff indicate that a connection in E. 56th Avenue to the existing system near the Porteos site would be allowable as long as adequate backflow prevention is provided. Depending on demand and permitting requirements, this connection may be made sooner. Preliminary calculations estimate that an 18" water line would adequately supply the average daily demands of Sub-areas 1, 2, and 3 in conjunction with the well and tank

Water main size has been updated.

Update water main size based on previous comments.



system for fire flows. The development of the remaining sub-areas would be dependent on additional connections to planned city infrastructure in E. 48<sup>th</sup> Avenue and I-70. Timing and sizing of proposed connections will include assessment of water quality. Further discussions with the city will be needed to determine lines sizes, timing, and potential cost sharing opportunities.

The water lines required for the build-out of Sub-Area 1 are shown on Exhibit 1 in the appendix. The layout shown is preliminary and may be revised as development progresses. The Sub-Area 1 system will be designed to integrate with the network that will be installed for the buildout of the overall development. Water lines will be designed and constructed per COA standards and specifications. Adequate looping within the sub-area and planning areas will be provided to minimize disruption in service due to water main breaks. The water line loop for Sub-Area 1 will be established with the following improvements:

- A 24" line from the proposed water tank will run north to E. 32<sup>nd</sup> Avenue,
- A 24" line running east in E. 32<sup>nd</sup> Avenue to Manila Road,
- A 16" line running north in Manila Road to E. 42<sup>nd</sup> Avenue,
- A 24" line running west in E. 42<sup>nd</sup> Avenue to Cavanaugh Road, and
- A 16" line running south in Cavanaugh Road to E. 32<sup>nd</sup> Avenue.

Additionally, water lines will be installed where roads are being constructed for emergency access to avoid the replacement of asphalt or concrete in the future. This will be the case when E. 32<sup>nd</sup> Avenue is constructed through Sub-Area 3 to provide two points of access, for life safety purposes, to planning areas within Sub-Area 1. This line will be stubbed into Imboden Road for a future connection to the city water system.

### **Sanitary Distribution System**

Sub-Area 1 will be served by Individual Sewage Disposal Systems (ISDS). It is understood that systems generating 2,000 gpd or less will be permitted by the Tri-County Health Department, and systems generating more than 2,000 gpd will be regulated by the Colorado Department of Public Health and Environment (CDPHE).

The ~~2018~~ COA 2018 Wastewater Capital Improvement Plan shows a force main connecting to the site at Bear Gulch and 64<sup>th</sup> Avenue and conveying flows to the west. If the city infrastructure downstream of Bear Gulch and 64<sup>th</sup> Avenue is not in place at the buildout of Sub-Area 1, a new Wastewater Treatment Plant (WWTP) will be constructed at that location. When required, the WWTP will be designed and constructed in modules as needed. This scenario will need to be assessed periodically and if required, detailed design will begin when ISDS loading reaches 70% of the predicted Sub-Area 1 flows to ensure the WWTP is in service as subsequent sub-areas are developed.

To ensure the infrastructure is in place when the time comes for individual users to connect to the regional or city sewer system, sanitary mains will be installed as the south or west sides of adjacent roads are constructed. The sewer mains have been sized according to COA design criteria and account for flows from the off-site parcels that fall within the service area boundary shown in the Master Utility Report for this FDP submittal.

Per COA criteria, sanitary sewer lines are to be constructed to the south and west of roadway centerlines. The build-out of Sub-Area 1 will include the following sanitary improvements:

- An 8” line running west in E. 32<sup>nd</sup> Avenue from the northwest corner of PA-15 to the western boundary of Sub-Area 1,
- A combination of 8”, 12”, 15”, and 18” lines running east in E. 32<sup>nd</sup> Avenue to Manila Road,
- A 24” line in Manila Road from the UPRR right-of-way to E. 42<sup>nd</sup> Avenue,
- A 30” line in Manila Road from E. 42<sup>nd</sup> Avenue to E. 48<sup>th</sup> Avenue,
- A 30” line in E. 48<sup>th</sup> Avenue from Manila Road to the western sub-area boundary,
- A 10” line running north through PA-11 to E. 42<sup>nd</sup> Avenue, and
- A combination of 10” and 15” line in E. 42<sup>nd</sup> Avenue running east from the western sub-area boundary to Manila Road.

This channel is described in multiple planning areas as conveying offsite flows, but not identified as "proposed" until PA-15

The narrative has been updated to more clearly describe routing of off-site flows.

### Storm Drainage System

On-site runoff will be routed through street flow, piped systems, and open channels, detention ponds, or detention basins. These ponds will release to proposed outfall swales and be discharged into their respective drainage basins. There are eight stormwater ponds in Sub-Area 1 that have been designed to collect and discharge run-off at historic rates. These ponds are designed to provide detention for the 100-yr storm with Excess Urban Runoff Volume (EURV) being provided by individual users when they develop their property, at a later date. The rest will be full-spectrum detention and will include the EURV. These improvements are discussed in more detail in the companion Master Drainage Report for Transport Colorado (Ref. 2).

Off-site flows from the south will be conveyed through the site via open channel through 5-6’x9’ reinforced concrete box culverts (RCBC) under E. 32<sup>nd</sup> Avenue to 5-6’x10’ RCBCs crossing under Manila Road where it will discharge off-site. Any upstream detention required will be provided by the developer of that property.

### Parks and Open Space

Sub-Area 1 will contain common open space and landscape buffers. Open space will include channels and detention ponds. Refer to Exhibit 1 for locations of the channels and detention ponds.

## Planning Area Improvements

### Overview

Sub-Area 1 of the Transport Colorado site has been divided into 10 planning areas, 2 of which have been set aside for open space and storm drainage improvements.

Generally, any planning area can be constructed at any time if the following improvements are provided.

- Two points of access for life safety,

Please add "looped".

- A water system capable of supplying adequate fire flow and domestic service,
- An approved sanitary sewer system, including ISDS or connection to the COA sewer system, and
- Stormwater storage and conveyance to downstream facilities.

## Planning Area 10 (Exhibit 2 of 9)

### General

Planning Area 10 contains approximately 151.1 acres of planned medium industrial development. The infrastructure necessary for the build-out of this area includes the construction of arterial and collector roadways, water mains, sanitary sewer mains, storm sewers, drainage channels and detention ponds. The proposed infrastructure shown on Sheet 2 is preliminary and subject to change as the planning area is developed.

### Roadway System

All roadways will be constructed per COA standards and specifications. Half-section roads will be constructed along the perimeter of the planning area. Full-section roads will be constructed when the adjacent roads are constructed to full widths. The roadway improvements are detailed below.

Fire hydrants will be required along all roadways on alternating sides of the proposed street systems regardless of water main sizing.

- Construct the west half of a 3-lane collector for E. 42<sup>nd</sup> Avenue from E. 42<sup>nd</sup> Avenue to E. 48<sup>th</sup> Avenue.
- Construct the south half of a 3-lane collector for E. 42<sup>nd</sup> Avenue from the western sub-area boundary to Manila Road.
- Construct the north half of a 3-lane collector for E. 42<sup>nd</sup> Avenue south of PA-10 from the western sub-area boundary to Manila Road.

Acknowledged. Hydrants will be shown on Site Plan level design drawings.

Adjust water mains required for each planning area based on comments on the plan sheets.

### Water Distribution System

If Planning Area 10 is to be developed first, it will be served by the water main and tank system described above with a possible connection to the city system near the 36" line in E. 56<sup>th</sup> Avenue. The water lines required for the build-out of the planning area are shown on Exhibit 2 in the appendix. The layout shown is preliminary and may be revised as development progresses. Water lines will be designed and constructed per COA standards and specifications. Adequate looping within the planning area will be provided to minimize disruption in service due to water main breaks. The water lines to be installed with the development of PA-10 are described below.

Water main sizes have been updated.

- A 24" line from the proposed water tank will run north to E. 32<sup>nd</sup> Avenue,
- A 24" line running east in E. 32<sup>nd</sup> Avenue to Cavanaugh Road,
- A 16" line running north in Cavanaugh Road to E. 42<sup>nd</sup> Avenue, and
- A 24" line running east in E. 42<sup>nd</sup> Avenue to Manila Road.

Also shown is a possible connection to the city system in E. 56<sup>th</sup> Avenue via an 18” line starting at Cavanaugh Road and E. 42<sup>nd</sup> Avenue. Adequate backflow prevention would be provided for city system connection.

### Sanitary Sewer System

Planning Area 10 will be served by Individual Sewage Disposal Systems (ISDS). To ensure the infrastructure is in place when the time comes for individual users to connect to the regional or city sewer system, sanitary mains will be installed as adjacent roads are constructed. The sewer mains have been sized according to COA design criteria and account for flows from the off-site parcels that fall within the service area boundary shown in the Master Utility Report for this FDP submittal.

Per COA criteria, sanitary sewer lines are to be constructed to the south and west of roadway centerlines. The build-out of Planning Area 10 will include the following sanitary improvements:

- A 30” line in Manila Road from E. 42<sup>nd</sup> Avenue to E. 48<sup>th</sup> Avenue,
- A 30” line in E. 48<sup>th</sup> Avenue from the western sub-area boundary to Manila Road.

### Storm Drainage System

On-site runoff will be routed through street flow, piped systems, and open detention pond at the northwest corner of the site. This pond is designed to the 100-yr storm with EURV being provided by individual users at a later date. This pond will release to a 6’x6’ RCBC that crosses under E. 48<sup>th</sup> Avenue.

Off-site flows from the south will be conveyed through the site via open channel through 1-6’x6’ reinforced concrete box culvert (RCBC) crossing under E. 42<sup>nd</sup> Avenue. Any upstream detention required will be provided when that planning area is developed. These improvements are discussed in more detail in the companion Master Drainage Report for Transport Colorado (Ref. 2).

Existing channel?

The narrative has been updated to more clearly describe routing of off-site flows.

### Planning Area 11 (Exhibit 3 of 9)

#### General

Planning Area 11 contains approximately 116.0 acres of planned heavy industrial development. The infrastructure necessary for the build-out of this area includes the construction of arterial and collector roadways, water mains, sanitary sewer main, detention ponds. The proposed infrastructure shown change as the planning area is developed.

Acknowledged. Hydrants will be shown on Site Plan level design drawings.

#### Roadway System

All roadways will be constructed per COA standards. Roadways will be constructed along the periphery of the planned area. Roadways will be constructed when the adjacent property is developed to full widths. The roadway improvements required for Planning Area 11 are described in more detail below.

Fire hydrants will be required along all roadways on alternating sides of the proposed street systems regardless of water main sizing.

- Construct the west half of a 4-lane minor arterial for Manila Road from the storm crossing in PA-36 to E. 42<sup>nd</sup> Avenue.
- Construct the south half of a 3-lane collector for E. 42<sup>nd</sup> Avenue north of PA-11 from the western planning area boundary to Manila Road.

## Water Distribution System

If Planning Area 11 is to be developed first, it will be served by the well and tank system described above. The water lines required for the build-out of Planning Area 11 are shown on Exhibit 3 in the appendix. The layout shown is preliminary and may be revised as development progresses. Water lines will be designed and constructed per COA standards and specifications. Adequate looping within the planning area will be provided to minimize disruption in service due to water main breaks. The water lines to be installed with the development of PA-11 are described below.

- A 24" line from the proposed water tank will run north to E. 32<sup>nd</sup> Avenue,
- A 24" line running east in E. 32<sup>nd</sup> Avenue to Cavanaugh Road,
- A 16" line running north in Cavanaugh Road to E. 42<sup>nd</sup> Avenue, and
- A 24" line running east in E. 42<sup>nd</sup> Avenue to the western boundary of the planning area.

Also shown is a possible connection to the city system in E. 56<sup>th</sup> Avenue via an 18" line starting at Cavanaugh Road and E. 42<sup>nd</sup> Avenue. Adequate backflow prevention would be provided for city system connection.

## Sanitary Sewer System

Planning Area 11 will be served by Individual Sewage Disposal Systems (ISDS). To ensure the infrastructure is in place when the time comes for individual users to connect to the regional or city sewer system, sanitary mains will be installed as adjacent roads are constructed. The sewer mains have been sized according to COA design criteria and account for flows from the off-site parcels that fall within the service area boundary shown in the Master Utility Report for this FDP submittal.

Per COA criteria, sanitary sewer lines are to be constructed to the south and west of roadway centerlines. The build-out of Planning Area 11 will include the following sanitary improvements:

- A 24" line in Manila Road from the southern boundary of PA-36 to E. 42<sup>nd</sup> Avenue,
- A combination of 10" & 15" lines running east in E. 42<sup>nd</sup> Avenue from the western planning area boundary to Manila Road,
- A 10" line running north through PA-11 from the northeast corner of PA-14 to E. 42<sup>nd</sup> Avenue.

## Storm Drainage System

On-site runoff will be routed through street flow, piped systems, and open channels to a detention pond at the northwest corner of the site. This pond is designed to provide detention for the 100-yr storm with EURV being provided by individual users at a later date. This pond will

This narrative does not discuss the full spectrum pond shown on site

The narrative has been updated to discuss the full spectrum pond shown in PA-10

release to a 6'x6' RCBC that crosses under E. 42<sup>nd</sup> Avenue. These improvements are discussed in more detail in the companion Master Drainage Report for Transport Colorado (Ref. 2).

Off-site flows from the south will be conveyed through the site via open channel through 5-6'x10' RCBCs crossing under Manila Road where it will discharge off-site. Any upstream detention required will be provided when that planning area is developed.

## **Planning Area 12 (Exhibit 4 of 9)**

### **General**

Planning Area 12 contains approximately 63.2 acres of planned heavy industrial development. The infrastructure necessary for the build-out of this area includes the construction of arterial and collector roadways, water mains, sanitary sewer mains, storm sewers, drainage channels and detention ponds. The proposed infrastructure shown on Sheet 4 is preliminary and subject to change as the planning area is developed.

### **Roadway System**

All roadways will be constructed per COA standards and specifications. Half-section roads will be constructed along the perimeter of the site. Full-width roads will be constructed when the adjacent roads are constructed. Fire hydrants will be required along all roadways on alternating sides of the proposed street systems regardless of water main sizing. The roadway improvements are shown in detail below.

- Construct the west half of a 4-lane minor arterial for Manila Road from E. 32<sup>nd</sup> Avenue to the culvert crossing in PA-36.
- Construct the north half of a 4-lane minor arterial for E. 32<sup>nd</sup> Avenue south of PA-12 from the western boundary of Planning Area 12 to Manila Road.

### **Water Distribution System**

If Planning Area 12 is to be developed first, it will be served by the well and tank system described above. The water lines required for the build-out of Planning Area 12 are shown on Exhibit 4 in the appendix. The layout shown is preliminary and may be revised as development progresses. Water lines will be designed and constructed per COA standards and specifications. Adequate looping within the planning area will be provided to minimize disruption in service due to water main breaks. The water lines to be installed with the development of PA-12 are described below.

- A 24" line from the proposed water tank will run north to E. 32<sup>nd</sup> Avenue,
- A 24" line running east in E. 32<sup>nd</sup> Avenue to Manila Road,
- A 16" line running north in Manila Road to E. 42<sup>nd</sup> Avenue, and
- A 24" line running west in E. 42<sup>nd</sup> Avenue to Cavanaugh Road.

Also shown is a possible connection to the city system in E. 56<sup>th</sup> Avenue via an 18" line starting at Cavanaugh Road and E. 42<sup>nd</sup> Avenue. Adequate backflow prevention would be provided for city system connection.

## Sanitary Sewer System

Planning Area 12 will be served by Individual Sewage Disposal Systems (ISDS). To ensure the infrastructure is in place when the time comes for individual users to connect to the regional or city sewer system, sanitary mains will be installed as adjacent roads are constructed. The sewer mains have been sized according to COA design criteria and account for flows from the off-site parcels that fall within the service area boundary shown in the Master Utility Report (Ref. 1) for this FDP submittal.

Per COA criteria, sanitary sewer lines are to be constructed to the south and west of roadway centerlines. The build-out of Planning Area 12 will include the following sanitary improvements:

- A 24" line in Manila Road from E. 32<sup>nd</sup> Avenue to the culvert crossing in PA-36.

## Storm Drainage System

On-site runoff will be routed through street flow, piped systems, and open channels to a detention pond at the north end of the site. This pond is designed to provide full spectrum detention for the 100-yr storm including EURV. This pond will release to the channel that crosses Manila Road via a 5-6'x10' RCBCs. These improvements are discussed in more detail in the companion Master Drainage Report for Transport Colorado (Ref. 3).

Off-site flows from the south will be conveyed through the same open channel and 5-6'x10' RCBCs crossing under Manila Road. Any upstream detention required will be provided when that planning area is developed.

## Planning Area 13 (Exhibit 5 of 9)

### General

Planning Area 13 contains approximately 154.2 acres of planned heavy industrial development. The infrastructure necessary for the build-out of this area includes the construction of arterial and collector roadways, water mains, sanitary sewer mains, storm sewers, drainage channels and detention ponds. The proposed infrastructure shown on Sheet 5 is preliminary and subject to change as the planning area is developed.

### Roadway System

All roadways will be constructed per COA standards and specifications. Half-section roads will be constructed along the periphery of the planning area. The remaining half sections will be constructed when the adjacent property is developed. The roadway improvements are shown in detail below.

Fire hydrants will be required along all roadways on alternating sides of the proposed street systems regardless of water main sizing.

- Construct the west half of a 3-lane collector for Cavanaugh Road from E. 32<sup>nd</sup> Avenue to the northern boundary of PA-13.
- Construct the north half of a 4-lane minor arterial for E. 32<sup>nd</sup> Avenue from the western boundary of PA-13 to Manila Road.

Where life safety access is required outside of Sub-Area 1, construct a two-lane section on the north side of E. 32<sup>nd</sup> Avenue and Quail Run Road to Imboden Road. Refer to the roadway sections shown on Exhibit 5, for section details.

See life safety comments reflected in Exhibit 5.

## Water Distribution System

If Planning Area 13 is to be developed first, it will be served by the well and tank described above. The water lines required for the build-out of Planning Area 13 are shown on Exhibit 5 in the appendix. The layout shown is preliminary and may be revised as development progresses. Water lines will be designed and constructed per COA standards and specifications. Adequate looping within the planning area will be provided to minimize disruption in service due to water main breaks. The water lines to be installed with the development of PA-13 are described below.

- A 24" line from the proposed water tank will run north to E. 32<sup>nd</sup> Avenue,
- A 24" line running east in E. 32<sup>nd</sup> Avenue to Manila Road, and
- A 16" line running north in Cavanaugh Road to the north boundary of Planning Area 13.

Additionally, a 24" water line will be installed in E. 32<sup>nd</sup> Avenue and Quail Run Road as they extend west through Sub-Area 3. This line will be stubbed into Imboden Road for a future connection to the city water system. A possible connection to the city system in E. 56<sup>th</sup> Avenue via 16" line is shown starting in Cavanaugh Road at the northern boundary of the PA-13. Adequate backflow prevention would be provided for city system connection.

## Sanitary Sewer System

Planning Area 13 will be served by Individual Sewage Disposal Systems (ISDS). No sanitary mains will need to be constructed in the roadways for the development of PA-14 as the sanitary will be installed with the roadway improvements for PA-15. However, internal sewer mains will be constructed as the planning area is built out.

## Storm Drainage System

On-site runoff will be routed through street flow, piped systems, and open channels to an interim detention pond at the northeast corner of the site and a pond in PA-14. Both ponds are designed to provide full spectrum detention for the 100-yr storm and EURV. Additionally, the following stormwater culvert improvements will be installed:

- 5-6'x9' RCBCs at the southeast corner of Planning Area 14 with the construction of E. 32<sup>nd</sup> Avenue.
- 2-6'x6' RCBCs at E. 32<sup>nd</sup> Avenue and Bear Gulch.
- 1-4'x6' RCBC for the outlet of the pond in PA-14.

These improvements are discussed in more detail in the companion Master Drainage Report for Transport Colorado (Ref. 3).

## **Planning Area 14 (Exhibit 6 of 9)**

### **General**

Planning Area 14 contains approximately 246.5 acres of planned heavy industrial development. The infrastructure necessary for the build-out of this area includes the construction of arterial and collector roadways, water mains, sanitary sewer mains, storm sewers, drainage channels and detention ponds. The proposed infrastructure shown on Sheet 6 is preliminary and subject to change as the planning area is developed.

### **Roadway System**

All roadways will be constructed per COA standards and specifications. Half-section roads will be constructed along the periphery of the planning area. The remaining half-sections will be constructed when the adjacent property is full widths. The roadway improvements are detailed below.

Fire hydrants will be required along all roadways on alternating sides of the proposed street systems regardless of water main sizing.

- Construct the east half of a 3-lane minor arterial for E. 32<sup>nd</sup> Avenue from the northern boundary of PA-14.
- Construct the north half of a 4-lane minor arterial for E. 32<sup>nd</sup> Avenue from the western boundary of Sub-Area 1 to Manila Road.

Where life safety access is required outside of Sub-Area 1, construct a two-lane section on the north side of E. 32<sup>nd</sup> Avenue and Quail Run Road to Imboden Road. Refer to the roadway sections shown on Exhibit 6, for section details.

Add: To be determined at time of CSP submittal.

### **Water Distribution System**

If Planning Area 14 is to be developed first, it will be served by the water system described above. The water lines required for the build-out of Planning Area 14 are shown on Exhibit 6 in the appendix. The layout shown is preliminary and may be revised as development progresses. Water lines will be designed and constructed per COA standards and specifications. Adequate looping within the planning area will be provided to minimize disruption in service due to water main breaks. The water lines to be installed with the development of PA-14 are described below.

- A 24" line from the proposed water tank will run north to E. 32<sup>nd</sup> Avenue,
- A 24" line running east in E. 32<sup>nd</sup> Avenue to Manila Road, and
- A 16" line running north in Cavanaugh Road to the north boundary of Planning Area 14.

Additionally, a 24" water line will be installed in E. 32<sup>nd</sup> Avenue and Quail Run Road as they extend west through Sub-Area 3. This line will be stubbed into Imboden Road for a future connection to the city water system. A possible connection to the city system in E. 56<sup>th</sup> Avenue via a 16" line is shown in Cavanaugh Road at the northern boundary of the planning area. Adequate backflow prevention would be provided for city system connection.

## Sanitary Sewer System

Planning Area 14 will be served by Individual Sewage Disposal Systems (ISDS). No sanitary mains will need to be constructed in the roadways for the development of PA-14. However, internal sewer mains will be constructed as the planning area is built out.

## Storm Drainage System

On-site runoff will be routed through street flow, piped systems, and open channels to two full spectrum detention ponds. One pond is at the northern edge of PA-14 and the other is in PA-11 on the north side of the channel. Both ponds are designed to provide detention for the 100-yr storm and EURV. Additionally, the following stormwater culvert improvements will be installed:

- 5-6'x9' RCBCs at the southeast corner of Planning Area 14 with the construction of E. 32<sup>nd</sup> Avenue.
- 5-6'x10' RCBC in PA-36 crossing under Manila Road.
- 2-6'x6' RCBCs at E. 32<sup>nd</sup> Avenue and Bear Gulch.
- 1-4'x6' RCBC for the outlet of the pond in PA-14.

These improvements are discussed in more detail in the companion Master Drainage Report for Transport Colorado (Ref. 3).

Additionally, 5-6'x9' RCBCs will be installed at the southeast corner of Planning Area 14 and 1-6'x11' RCBC will be installed at the upstream end of Bear Gulch with the construction of E. 32<sup>nd</sup> Avenue. These improvements are discussed in more detail in the companion Master Drainage Report for Transport Colorado (Ref. 3).

## Planning Area 15 (Exhibit 7 of 9)

### General

Planning Area 15 contains approximately 150.0 acres of planned heavy industrial development. The infrastructure necessary for the build-out of this area includes the construction of arterial and collector roadways, water mains, sanitary sewer mains, storm sewers, drainage channels and detention ponds. The proposed infrastructure shown on Sheet 7 is preliminary and subject to change as the planning area is developed.

### Roadway System

All roadways will be constructed per COA standards and specifications. Half-section roads will be constructed along the perimeter of the planning area and full-width roads will be constructed when the adjacent full widths. The roadway improvements are detailed below.

Fire hydrants will be required along all roadways on alternating sides of the proposed street systems regardless of water main sizing.

- Construct the south half of a 4-lane minor arterial for E. 32<sup>nd</sup> Avenue from the western boundary of Sub-Area 1 to Manila Road.

Where life safety access is required outside of Sub-Area 1, construct a two-lane section on the north side of E. 32<sup>nd</sup> Avenue and Quail Run Road to Imboden Road. Refer to the roadway sections shown on Exhibit 7, for details.

## **Water Distribution System**

If Planning Area 15 is to be developed first, it will be served by the well and tank system described above. The water lines required for the build-out of Planning Area 15 are shown on Exhibit 7 in the appendix. The layout shown is preliminary and may be revised as development progresses. Water lines will be designed and constructed per COA standards and specifications. Adequate looping within the planning area will be provided to minimize disruption in service due to water main breaks. The water lines to be installed with the development of PA-15 are described below.

- A 24” line from the proposed water tank will run north to E. 32<sup>nd</sup> Avenue,
- A 24” line running east in E. 32<sup>nd</sup> Avenue to Cavanaugh Road, and

Additionally, a 24” water line will be installed in E. 32<sup>nd</sup> Avenue and Quail Run Road as they extend west through Sub-Area 3. This line will be stubbed into Imboden Road for a future connection to the city water system. A possible connection to the city system in E. 56<sup>th</sup> Avenue via a 16” line is shown in Cavanaugh Road at the northern boundary of the planning area. Adequate backflow prevention would be provided for city system connection.

## **Sanitary Sewer System**

Planning Area 15 will be served by Individual Sewage Disposal Systems (ISDS). To ensure the infrastructure is in place when the time comes for individual users to connect to the regional or city sewer system, sanitary mains will be installed as adjacent roads are constructed. The sewer mains have been sized according to COA design criteria and account for flows from the off-site parcels that fall within the service area boundary shown in the Master Utility Report for this FDP submittal.

Per COA criteria, sanitary sewer lines are to be constructed to the south and west of roadway centerlines. The build-out of Planning Area 15 will include the following sanitary improvements:

- An 8” line in E. 32<sup>nd</sup> Avenue at the northwestern corner of PA-15 to the western boundary of PA-15.
- A combination of 8”, 12”, 15”, and 18” lines running east in E. 32<sup>nd</sup> Avenue to Manila Road.

## **Storm Drainage System**

On-site runoff will be routed through street flow, piped systems, and open channels to one full spectrum detention pond at the northeast corner of the planning area. This pond is designed to provide detention for the 100-yr storm including EURV and drain to the east where flows will enter the channel in PA-36.

Additionally, 5-6'x9' RCBCs will be installed at the northeast corner of PA-16 with the construction of E. 32<sup>nd</sup> Avenue. The channel in PA-36 will need to be installed north from E. 32<sup>nd</sup> Avenue with the 5-6'x10' RCBCs crossing Manila Road. Also, 1-6'x11' RCBC will be installed at the upstream end of Bear Gulch with the construction of E. 32<sup>nd</sup> Avenue through Sub-Area 3. These improvements are discussed in more detail in the companion Master Drainage Report for Transport Colorado (Ref. 3).

## **Planning Area 16 (Exhibit 8 of 9)**

### **General**

Planning Area 16 contains approximately 171.4 acres of planned heavy industrial development. The infrastructure necessary for the build-out of this area includes the construction of arterial and collector roadways, water mains, sanitary sewer mains, storm sewers, drainage channels and detention ponds. The proposed infrastructure shown on Sheet 8 is preliminary and subject to change as the planning area is developed.

### **Roadway System**

All roadways will be constructed per COA standards and specifications. Half-section roads will be constructed along the periphery of the planning area. The remaining half-sections will be constructed when the adjacent full widths. The roadway in detail below.

Fire hydrants will be required along all roadways on alternating sides of the proposed street systems regardless of water main sizing.

- Construct the south half of a 4-lane minor arterial for E. 32<sup>nd</sup> Avenue from the western boundary of Sub-Area 1 to Manila Road.

Where life safety access is required outside of Sub-Area 1, construct a two-lane section on the north side of E. 32<sup>nd</sup> Avenue and Quail Run Road to Imboden Road. Refer to the roadway sections shown on Exhibit 8, for details.

### **Water Distribution System**

If Planning Area 16 is to be developed first, it will be served by the well and tank system described above. The water lines required for the build-out of Planning Area 16 are shown on Exhibit 8 in the appendix. The layout shown is preliminary and may be revised as development progresses. Water lines will be designed and constructed per COA standards and specifications. Adequate looping within the planning area will be provided to minimize disruption in service due to water main breaks. The water lines to be installed with the development of PA-16 are described below.

- A 24" line from the proposed water tank will run north to E. 32<sup>nd</sup> Avenue.
- A 24" line running east in E. 32<sup>nd</sup> Avenue to Cavanaugh Road.

Additionally, a 24" water line will be installed in E. 32<sup>nd</sup> Avenue and Quail Run Road as they extend west through Sub-Area 3. This line will be stubbed into Imboden Road for a future connection to the city water system. A possible connection to the city system in E. 56<sup>th</sup> Avenue

via a 16" line is shown in Cavanaugh Road at the northern boundary of the PA-16. Adequate backflow prevention would be provided for city system connection.

### **Sanitary Sewer System**

Planning Area 16 will be served by Individual Sewage Disposal Systems (ISDS). To ensure the infrastructure is in place when the time comes for individual users to connect to the regional or city sewer system, sanitary mains will be installed as adjacent roads are constructed. The sewer mains have been sized according to COA design criteria and account for flows from the off-site parcels that fall within the service area boundary shown in the Master Utility Report for this FDP submittal.

Per COA criteria, sanitary sewer lines are to be constructed to the south and west of roadway centerlines. The build-out of Planning Area 16 will include the following sanitary improvements:

- An 8" line in E. 32<sup>nd</sup> Avenue at the northwestern corner of PA-15 to the western boundary of Sub-Area 1.
- A combination of 8", 12", 15", and 18" lines running east in E. 32<sup>nd</sup> Avenue to Manila Road.

### **Storm Drainage System**

On-site runoff will be routed through street flow, piped systems, and open channels to one full spectrum detention pond at the northeast corner of the planning area. This pond is designed to provide detention for the 100-yr storm and EURV.

On-site runoff will be routed through street flow, piped systems, and open channels to one full spectrum detention pond at the northeast corner of the planning area. This pond is designed to provide detention for the 100-yr storm including EURV and drain to the east where flows will enter the channel in PA-36.

Additionally, the following channel and culvert improvements will need to be installed:

- Five 6'x9' RCBCs will be installed at the southeast corner of PA-16 with the construction of E. 32<sup>nd</sup> Avenue.
- The channel in PA-36 will need to be installed north from E. 32<sup>nd</sup> Avenue with the 5-6'x10' RCBCs crossing Manila Road.
- One 6'x11' RCBC will be installed at the upstream end of Bear Gulch with the construction of E. 32<sup>nd</sup> Avenue through Sub-Area 3.

These improvements are discussed in more detail in the companion Master Drainage Report for Transport Colorado (Ref. 3).

## **Planning Area 17 (Exhibit 9 of 9)**

### **General**

Planning Area 17 contains approximately 21.9 acres of planned heavy industrial development. The infrastructure necessary for the build-out of this area includes the construction of arterial

roadways, water mains, sanitary sewer mains, storm sewers, drainage channels and detention ponds. The proposed infrastructure shown on Sheet 9 is preliminary and subject to change as the planning area is developed.

## Roadway System

All roadways will be constructed per COA standards and specifications. Half-section roads will be constructed along the periphery of the planning area. The remaining half-sections will be constructed when the adjacent full widths. The roadway imp

Fire hydrants will be required along all roadways on alternating sides of the proposed street systems regardless of water main sizing.

- Construct the west half of a 4-lane minor arterial for Manila Road from the northern boundary of PA-17 to the UPRR right-of-way.
- Construct the north half of a 4-lane minor arterial for E. 32<sup>nd</sup> Avenue north of PA-17 from the channel to Manila Road.

## Water Distribution System

If Planning Area 17 is to be developed first, it will be served by the well and tank system described above. The water lines required for the build-out of Planning Area 17 are shown on Exhibit 9 in the appendix. The layout shown is preliminary and may be revised as development progresses. Water lines will be designed and constructed per COA standards and specifications. Adequate looping within the planning area will be provided to minimize disruption in service due to water main breaks. The water lines to be installed with the development of PA-17 are described below.

- A 24" line from the proposed water tank will run north to E. 32<sup>nd</sup> Avenue.
- A 24" line running east in E. 32<sup>nd</sup> Avenue to the northwest corner of PA-17.

Additionally, a possible connection to the city system in E. 56<sup>th</sup> Avenue via a 16" line is shown in Cavanaugh Road.

## Sanitary Sewer System

Planning Area 17 will be served by Individual Sewage Disposal Systems (ISDS). To ensure the infrastructure is in place when the time comes for individual users to connect to the regional or city sewer system, sanitary mains will be installed as adjacent roads are constructed. The sewer mains have been sized according to COA design criteria and account for flows from the off-site parcels that fall within the service area boundary shown in the Master Utility Report for this FDP submittal.

Per COA criteria, sanitary sewer lines are to be constructed to the south and west of roadway centerlines. The build-out of Planning Area 17 will include the following sanitary improvements:

- A 24" line in Manila Road from the UPRR right-of-way to E. 32<sup>nd</sup> Avenue,
- An 18" line in E. 32<sup>nd</sup> Avenue from the western boundary of PA-17 to Manila Road,

The narrative has been updated to include the channel south of 32nd Ave. with the development of PA-16.

The channel south of 32nd Avenue is never highlighted as being improved nor is it discussed at any point in this narrative

No channel improvements are indicated on the exhibit

### Storm Drainage System

On-site runoff will be routed through street flow, piped systems, and open channel detention pond at the north end of PA-12. This pond is designed to provide full storm detention for the 100-yr storm and EURV. This pond will release to the channel at Manila Road via a 5-6'x10' RCBCs. These improvements are discussed in more companion Master Drainage Report for Transport Colorado (Ref. 3).

Off-site flows from the south will be conveyed through the same open channel and RCBCs crossing under Manila Road. Any upstream detention required will be provided in that planning area is developed.

The improvements described in this sentence are general in nature and will be detailed in subsequent design phases. The narrative has been updated to more clearly describe the channel improvements in question.

### Life Safety

The developer will construct on-site, and off-site infrastructure needed to establish two points of emergency access to the overall site and each internal phase of construction. The developer will construct, looped water supply and fire hydrants as required by the adopted fire code and city ordinances. The developer has discussed some initial development with single water service to promote water quality in the system.

It is anticipated that this development will initially be serviced by Bennet Fire Station #92. As the site develops, a temporary fire station may be required before a permanent location is established on-site. The temporary station might be provided in a portion of a proposed onsite building.

A Whelen Warning System may be required for this site. Site selection can be determined by several different methods. Selection to insure overlapping or edge to edge coverage.

### Conclusion

This Public Improvement Plan Report was prepared as a companion document to the FDP for Sub-Area 1. It outlines the infrastructure improvements required for development of Sub-Area 1. As detailed above, the development of Sub-Area 1 is anticipated to be broken up into 10 planning areas, 2 of which are areas for drainage and open space. These improvements are preliminary and may change as planning areas area developed. Any changes will be captured in future revisions.

The city of Aurora will not be responsible for the costs associated to the construction of the Temporary Fire Station. A separate meeting with the applicant, ODA staff, Fire Department and Fire/Life Safety is needed to solidify requirements in this area. Please contact Mike Dean at 303-739-7447 to schedule an appointment.

## References

1. **Transport Colorado Master Utility Study**, CVL Consultants of Colorado, Inc., April 2019
2. **Transport Colorado Sub-Area 1 Master Utility Study**, CVL Consultants of Colorado, Inc., April 2019
3. **Transport Colorado Master Drainage Report**, CVL Consultants of Colorado, Inc., April 2019
4. **Transport Colorado Framework Development Plan**, CVL Consultants of Colorado, Inc. April 2019
5. **Transport Colorado Traffic Impact Analysis**, Felsburg Holt & Ullevig, April 2019
6. **Framework Development Plan Application**, N.E.S. Inc., September 26, 2006
7. **Transport/Front Range Airport Area Master Utilities Plan**, Matrix Design Group, Inc. 2007
8. **Transport Colorado**

**APPENDIX A**  
**E1 - Public Improvement Plan**





## MAINTENANCE ELIGIBILITY PROGRAM (MEP)

### MEP Referral Review Comments

Date: October 16, 2019

To: George Slovensky  
Via email

RE: MHFD Referral Review Comments

Project Name:	Transport Colorado – Sub-Area 1
Drainageway:	Crooked Run and Tributaries, Newcomb Gulch
MEP Phase:	Referral
MEP ID:	107127
SUBMITTAL ID:	10003780

This letter is in response to the request for our comments concerning the referenced project. We have reviewed this proposal only as it relates to maintenance eligibility of major drainage features, in this case:

- Crooked Run and Tributaries, Newcomb Gulch

The report provided indicates that the infrastructure and designs for Sub-Area 1 are consistent with those provided in the Master Drainage Report. Since no update of the MDR was provided with this submittal, the District assumes that the previous version of the MDR, provided in July, is the current version. As such, many of our previous comments do not appear to have been acknowledged or addressed. We have the following comments to offer:

1. Because there is no existing published master plan to date, if the design team’s schedule will need regional hydrology for design related to the eastern watersheds (i.e. Crooked Run), the work provided by the design consultant will need to be consistent with UDFCD master planning standards. COA and MHFD have secured a consultant to provide existing land use regional hydrology for Crooked Run and other tributaries through the active development area ahead of the formal start of the Crooked Run study. This study has begun and is on an expedited schedule to be completed by the end of this year, if possible.
2. The channel alignment of Crooked Run and Newcomb Gulch appear to be completely realigned and probably considerably narrowed. We’d like to better understand the drivers for these significant alterations in the nature of the stream corridors and explore opportunities to be more compatible to the existing valleys and maintain historic flow paths.
3. Numerous regional detention basins are proposed throughout the site and watersheds, both onsite and offsite of the Transport Colorado development area. Keep in mind that unless regional detention is proposed in a published master plan, the site cannot assume lower developed flows

**Commented [EW1]:** Understood. The design of TransPort will be consistent with the results of the MDP provided that the MDP is completed on schedule

**Commented [EW2]:** Newcomb Gulch, Henry David Draw and Crooked Run are all intended to be engineered natural channels. The alignments shown on the documents are schematic in nature. The final designs will conform to the design recommendations of 5 Smooth Stones Restoration as well as MHFD Criteria.

Project Name: Transport Colorado Sub-Area 1  
MEP ID: 107127/10003780  
Date: 11/20/19

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- without some sort of agreement with the adjacent property owner(s) that detention will be constructed at the proposed locations.
4. Detention provided by non-regional (less than 130 acres tributary) facilities cannot be included in design hydrology. For Sub-Area 1, this would apply to pond HD-11.
  5. There are seven roadway crossings proposed with the plan for Sub-Area 1. The District would like to discuss with the design team the design approach to the roadway crossings to better maintain channel flow patterns through the crossing to minimize sediment accumulation and maintenance needs.
  6. The Newcomb Gulch and Crooked Run channels should be assessed for long-term stability as a part of the development of the Sub-Area 1 design. These drainageways will likely need some sort of stabilization measures to prepare them for changes in the runoff patterns (volume, frequency, duration, etc.) as a result of increased imperviousness. In areas where the existing floodplain is intended to be preserved, the channel should be assessed to ensure that an adequate stream management corridor is established within the 100-year floodplain.

**Commented [EW3]:** Understood. Any offsite ponds will be coordinated with the relevant property owners as appropriate.

**Commented [EW4]:** Understood. Pond HD-11 maintenance will be the responsibility of the metro district or of the owner.

**Commented [EW5]:** The TransPort design team would be open to collaborating on the final design of these major crossing structures.

**Commented [EW6]:** The final design of the Crooked Run open channels will follow the design philosophy of engineered natural channels. Grade control and lateral stabilization measures will also be included in the final designs of these channels.

We appreciate the opportunity to review this proposal. Please feel free to contact me with any questions or concerns.

Sincerely,



**Teresa Patterson**  
Project Manager, Watershed Services  
Mile High Flood District