COLORADO
Department of Transportation

CENTRAL 70 PROJECT

Public Disclosure Administrative and Technical Proposal:
5280 CONNECTORS

5280 Connectors
Linking Communities

VOLUME 2 | Electronic Copy | Binder 7 of 8

TRANSPARENCY | RELIABILITY | ACCOUNTABILITY | INCLUSIVITY

7

Volume 2 Technical Submissions
Table of Contents

2.1 Technical Proposal

Volume 2 Technical Submissions
Table of Contents, Continued

2.2 Alternative Technical Concepts (ATCs)

SECTION 2.1.13

APPENDIX F: DRAFT TRANSPORTATION MANAGEMENT PLAN

Overview

This Appendix F includes the 5280 Connectors draft Transportation Management Plan, which complies with the requirements set out in Section 2.2 of Schedule 10 (Design and Construction Requirements) and all other applicable provisions to the Project Agreement.

It describes our approach to designing, providing and maintaining safe and effective traffic control on all roadways affected by the Construction Work for the movement of people, goods and services through and around the Project, while minimizing impacts to local residents, businesses and commuters. It includes Temporary Control Plan Strategies, Transportation Operations Strategies, and Public Information Strategies for all Work associated with the Project during the Construction Period, and documents how traffic should be managed during construction of the Project.

Highlights

Our Transportation Management Plan:

- Provides an improved level of service on I-70 over two years prior to substantial completion
- Enhances cross-street and pedestrian access
- Extends existing ramp and viaduct connectivity
- Eliminates some allowable ramp closures
- Utilizes the diverging diamond interchange concept to improve MOT by maintaining I-70 capacity during its construction (Per approved ATC 2.3)

5280 Connectors commit to working collaboratively with HTPE, CDOT, and BE, as well as the project stakeholders, to implement our work in an efficient and safe manner while minimizing impacts to project stakeholders, the local community and the travelling public

Appendix F

Draft Transportation Management Plan

Central 70 Project

Volume 2
Technical Proposal

June 1, 2017

Contents

Figures

1.0 Purpose

5280 Connectors are responsible for designing, providing and maintaining safe and effective traffic control on all roadways that are affected by the Construction Work for the movement of people, goods and services through and around the Project, while minimizing impacts to local residents, businesses and commuters. Our team is committed to working collaboratively with HTPE, CDOT, and BE, as well as the project stakeholders, to implement our work in an efficient and safe manner while minimizing impacts.

This draft Transportation Management Plan (TMP) defines the strategic plan for traffic management on the Project. It addresses major aspects of the Construction Work for individual construction areas, phases and stages. We will engage all affected agencies in the development of this TMP and its associated plans. This TMP shall be used as a planning and policy guide to develop and execute the Maintenance of Traffic (MOT) program for the Project.

2.0 Reference Documents

The following reference documents form the basis of this plan's structure:

- Central 70 contract documents
  - Project Agreement, Schedule 10, Section 2
  - Instructions to Proposers

3.0 Abbreviations and Definitions

Capitalized terms shall have the meaning as set forth in the Project Agreement or Instructions to Proposers unless otherwise provided herein.

4.0 Transportation Management Plan

This Transportation Management Plan (TMP), which includes Temporary Control Plan (TCP) Strategies, Transportation Operations (TOP) Strategies, and Public Information (PI) Strategies for all Work associated with the Project during the Construction Period, documents how traffic should be managed during construction of the Project. 5280 Connectors will monitor and update the TMP throughout the Construction Period, as necessary, to verify plan effectiveness. This TMP shall document traffic management during construction and follow the requirements shown in CDOT's Work Zone Safety and Mobility Rule Procedures Document.

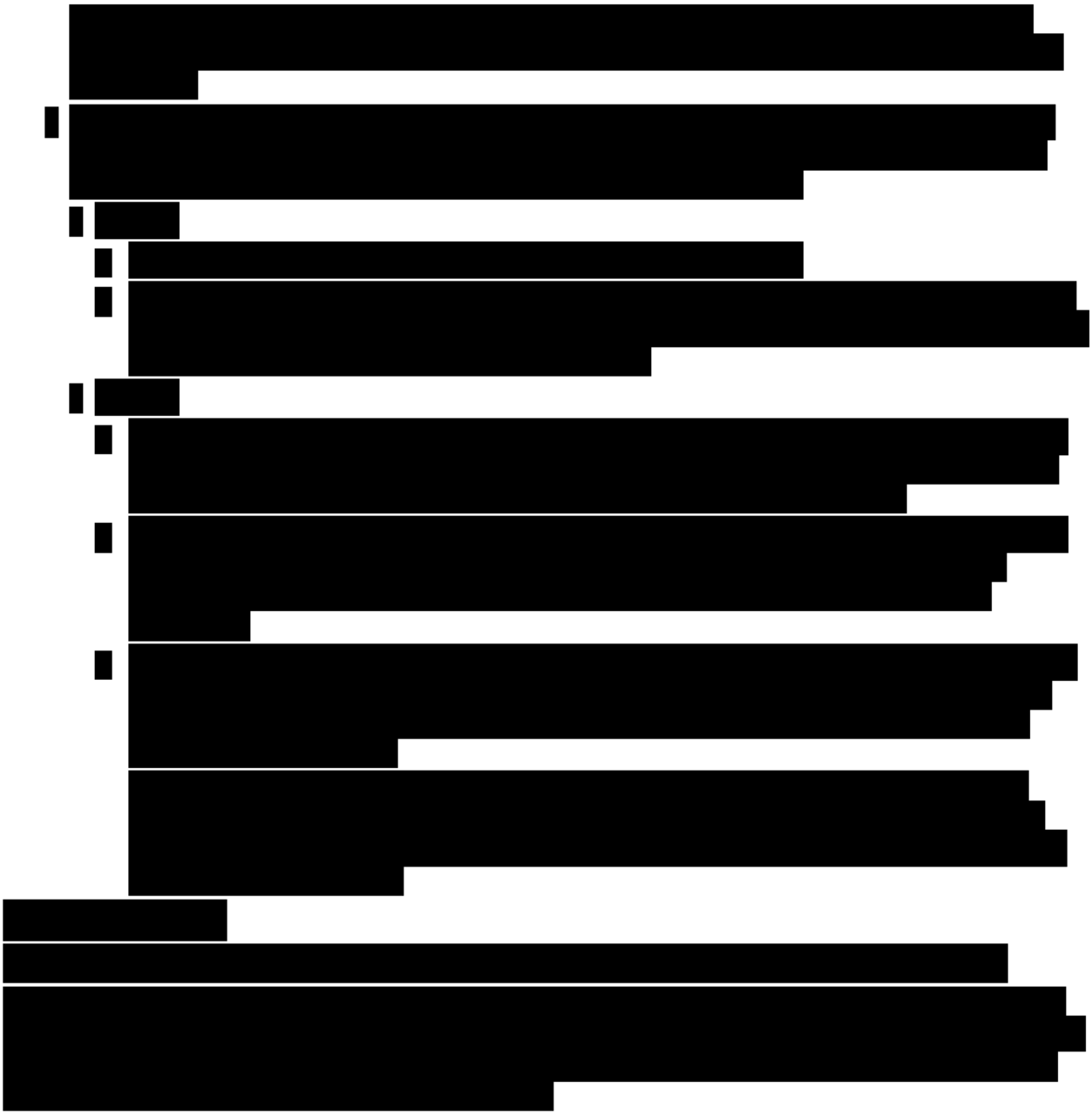
4.1. Monitoring and Updating the TMP

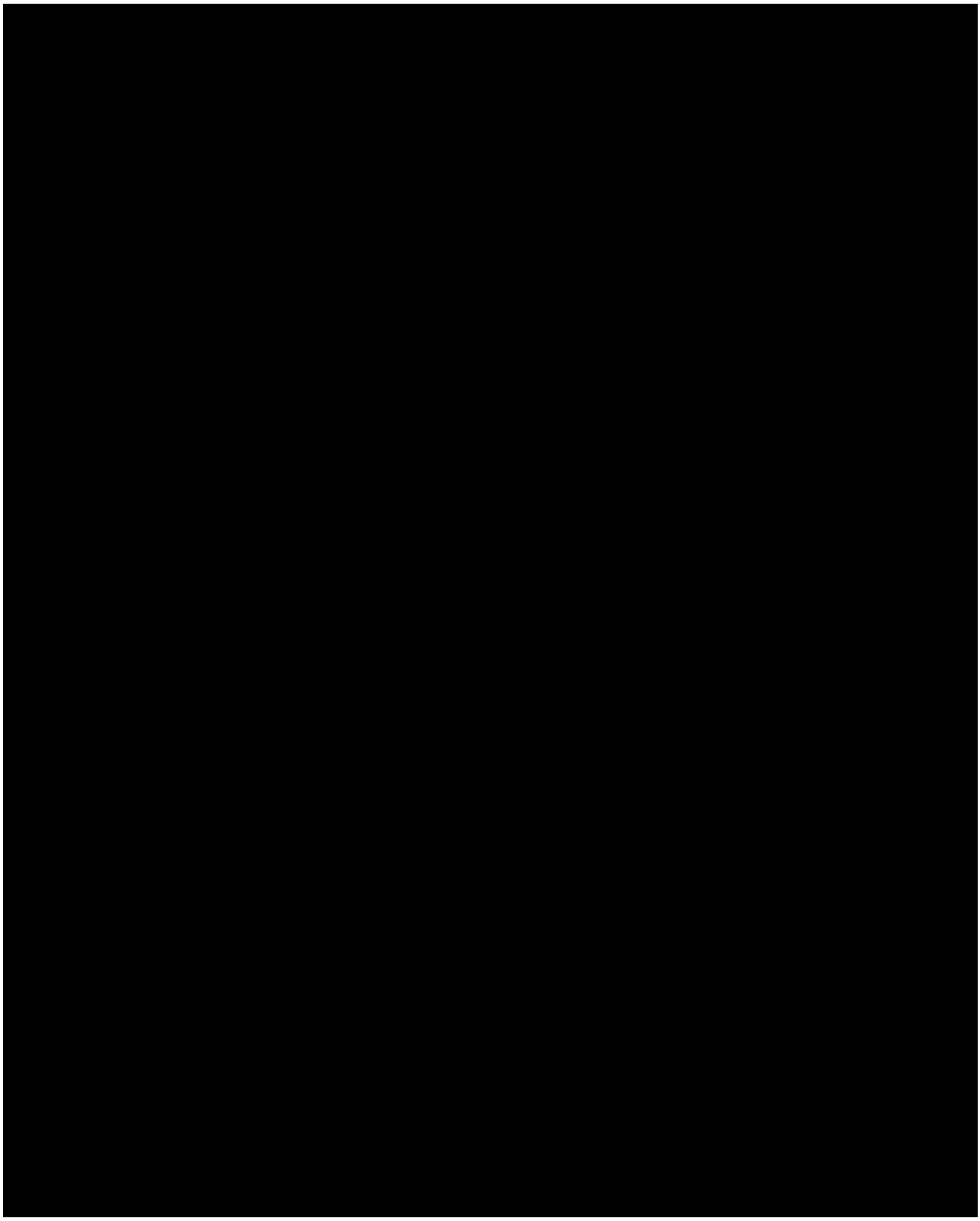
The TMP shall be monitored and updated throughout the Construction Period. We will work with the appropriate Enterprises staff to review monitoring results, analyze TMP performance and identify necessary solutions to maintain an effective TMP.

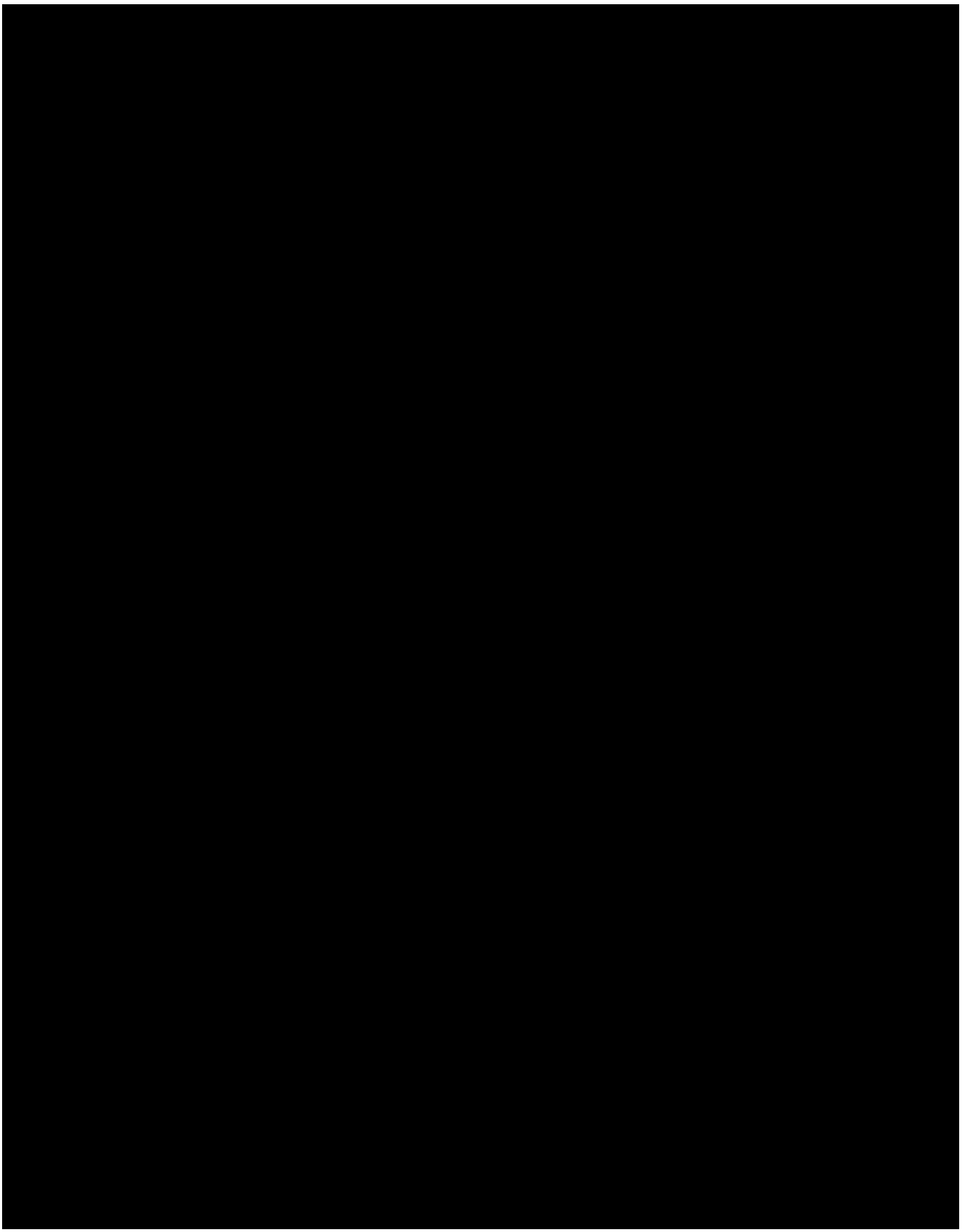
5.0 Overview of the Project

[redacted]

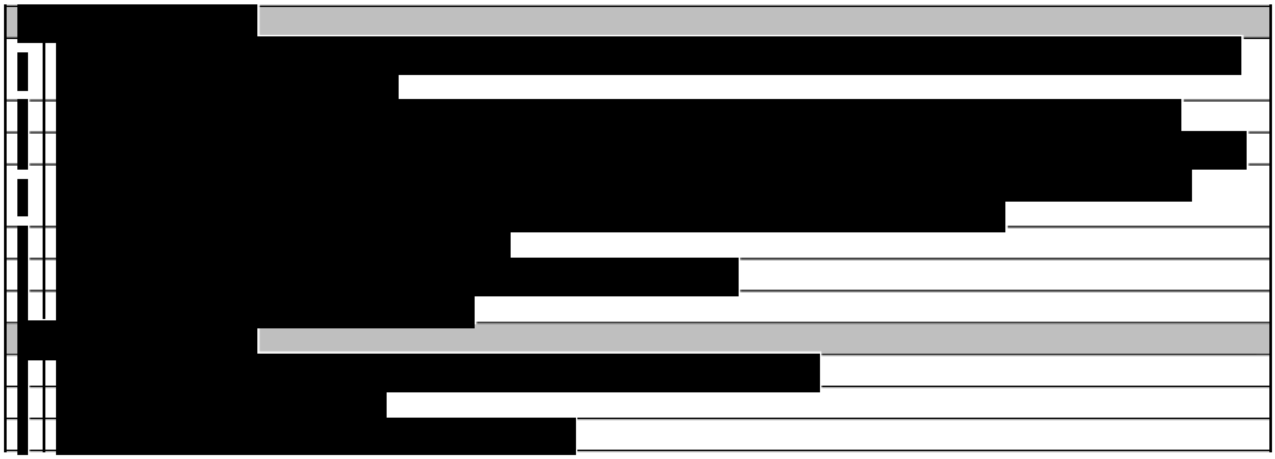
[redacted]



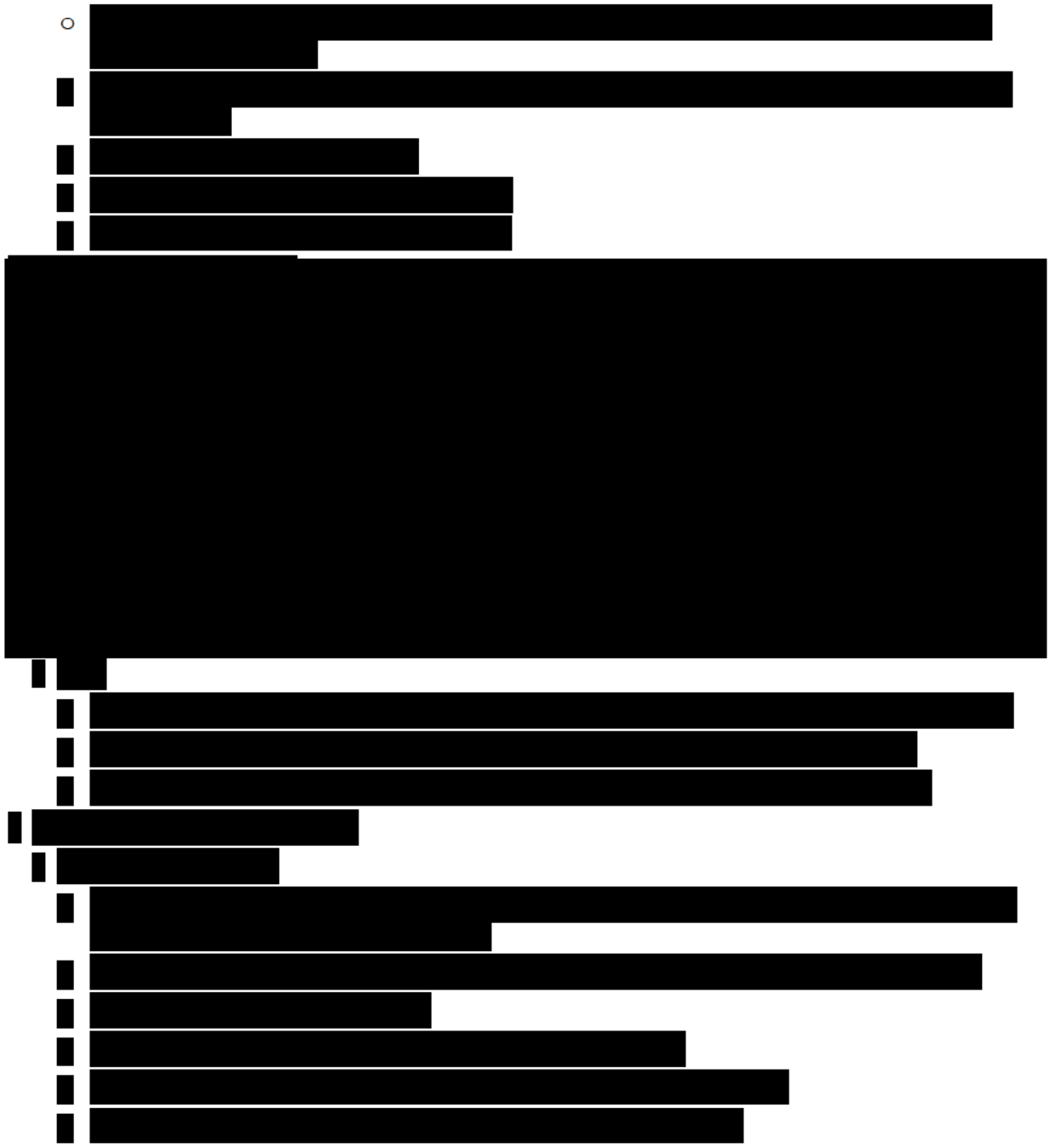


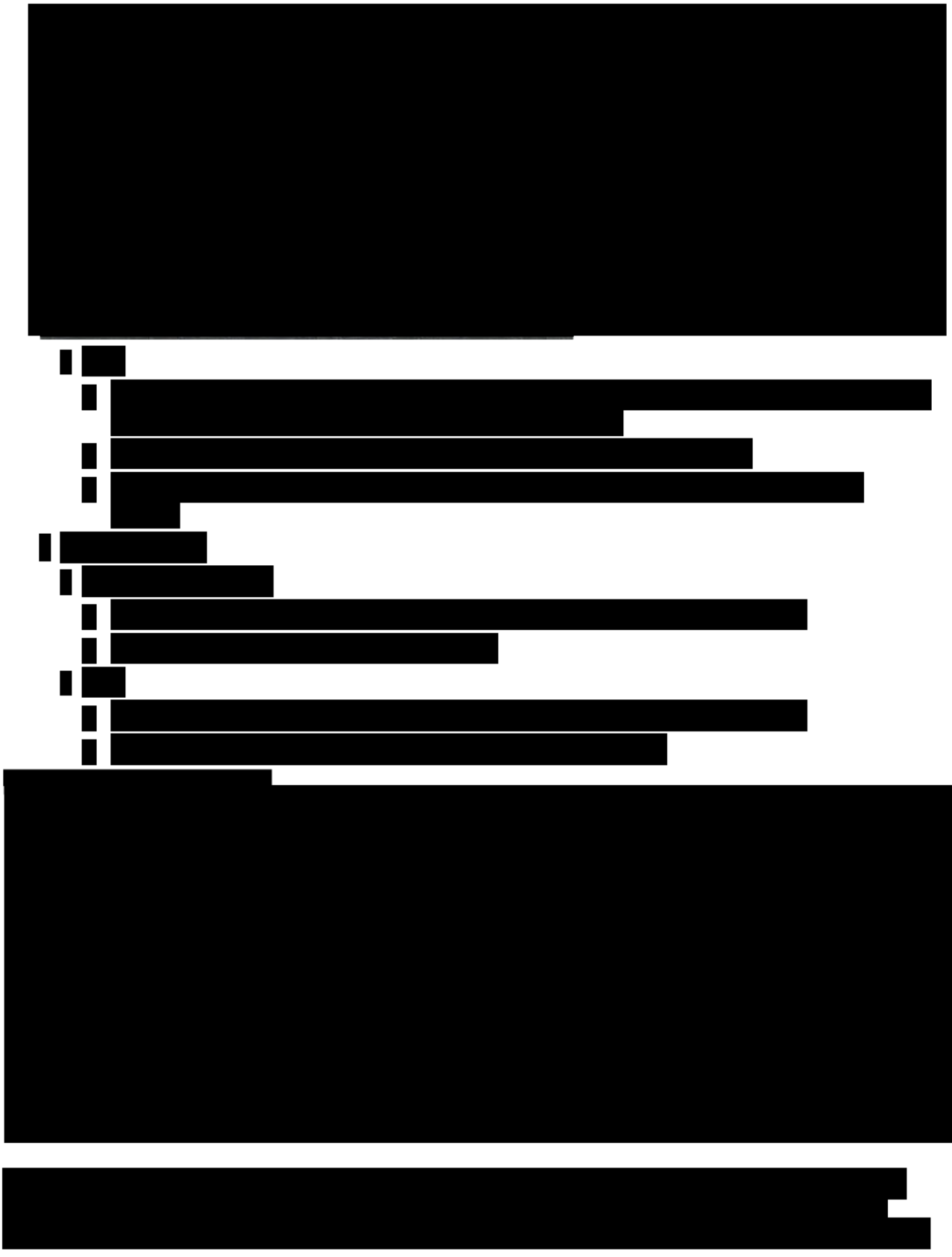


[redacted]

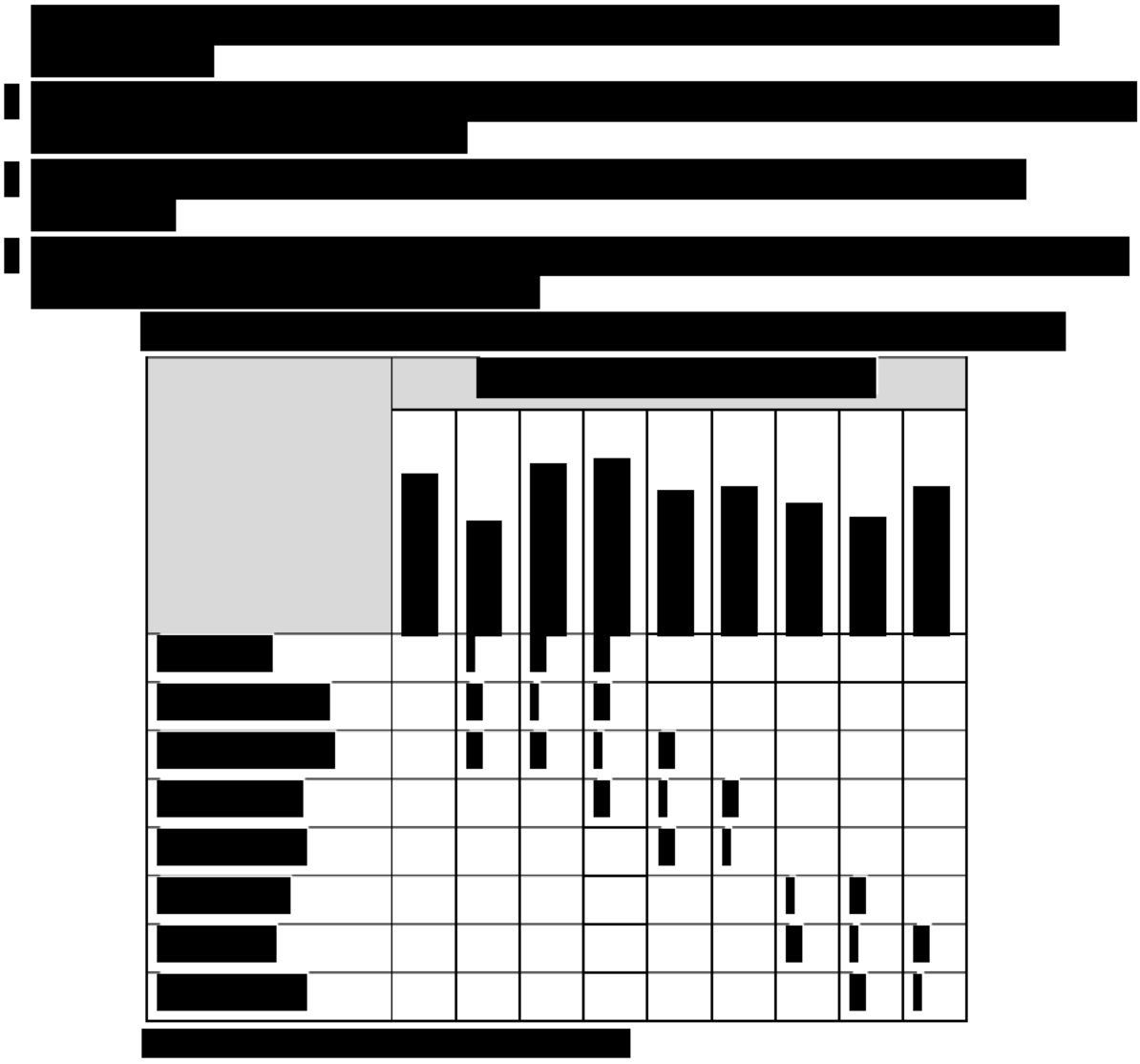


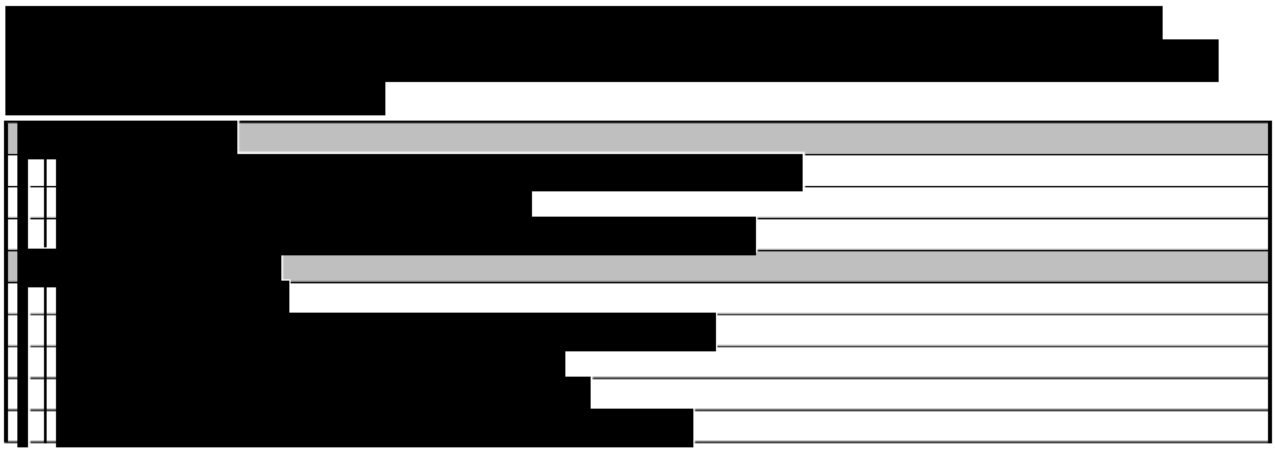
[redacted]

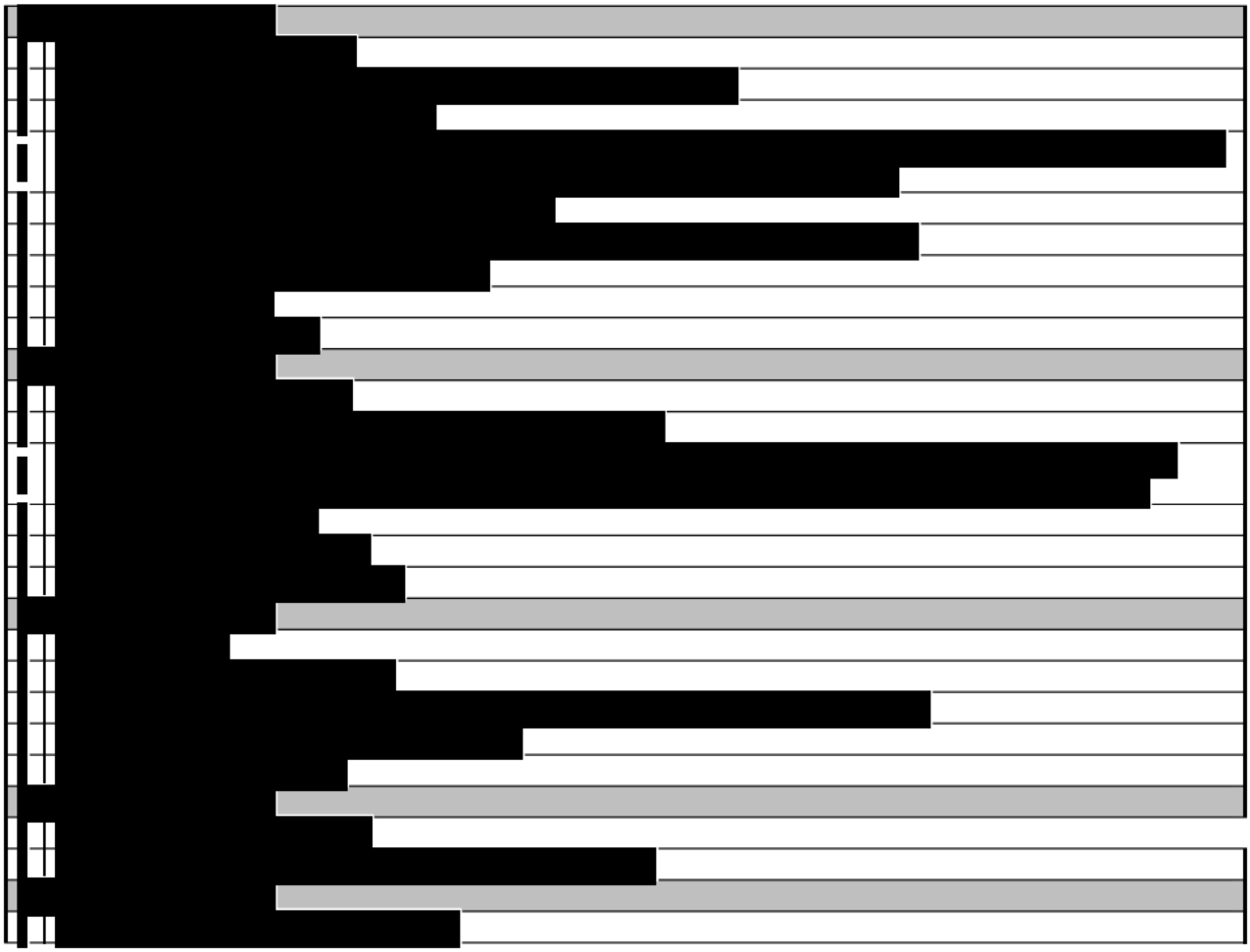




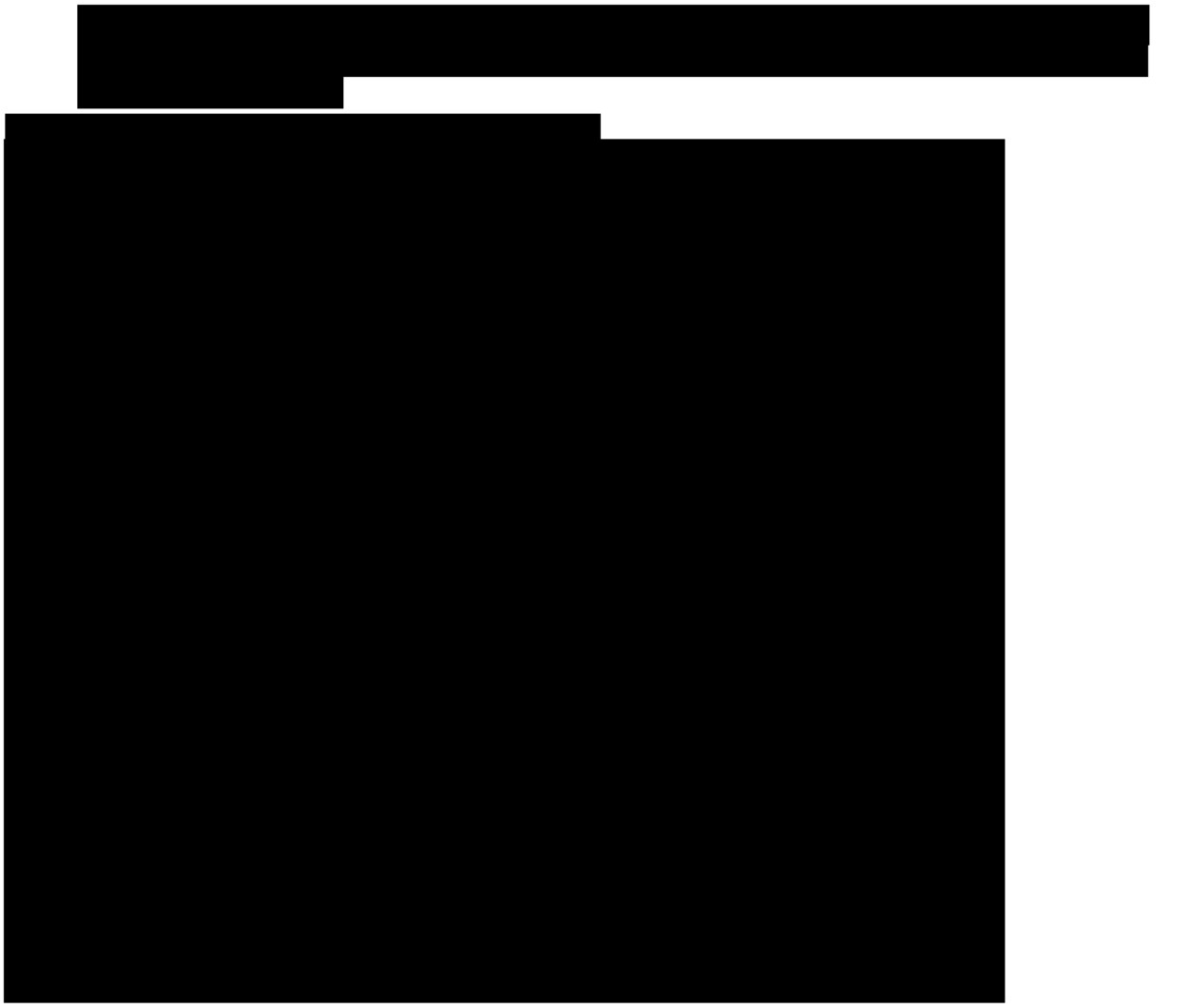
[redacted]







5.4.1.1



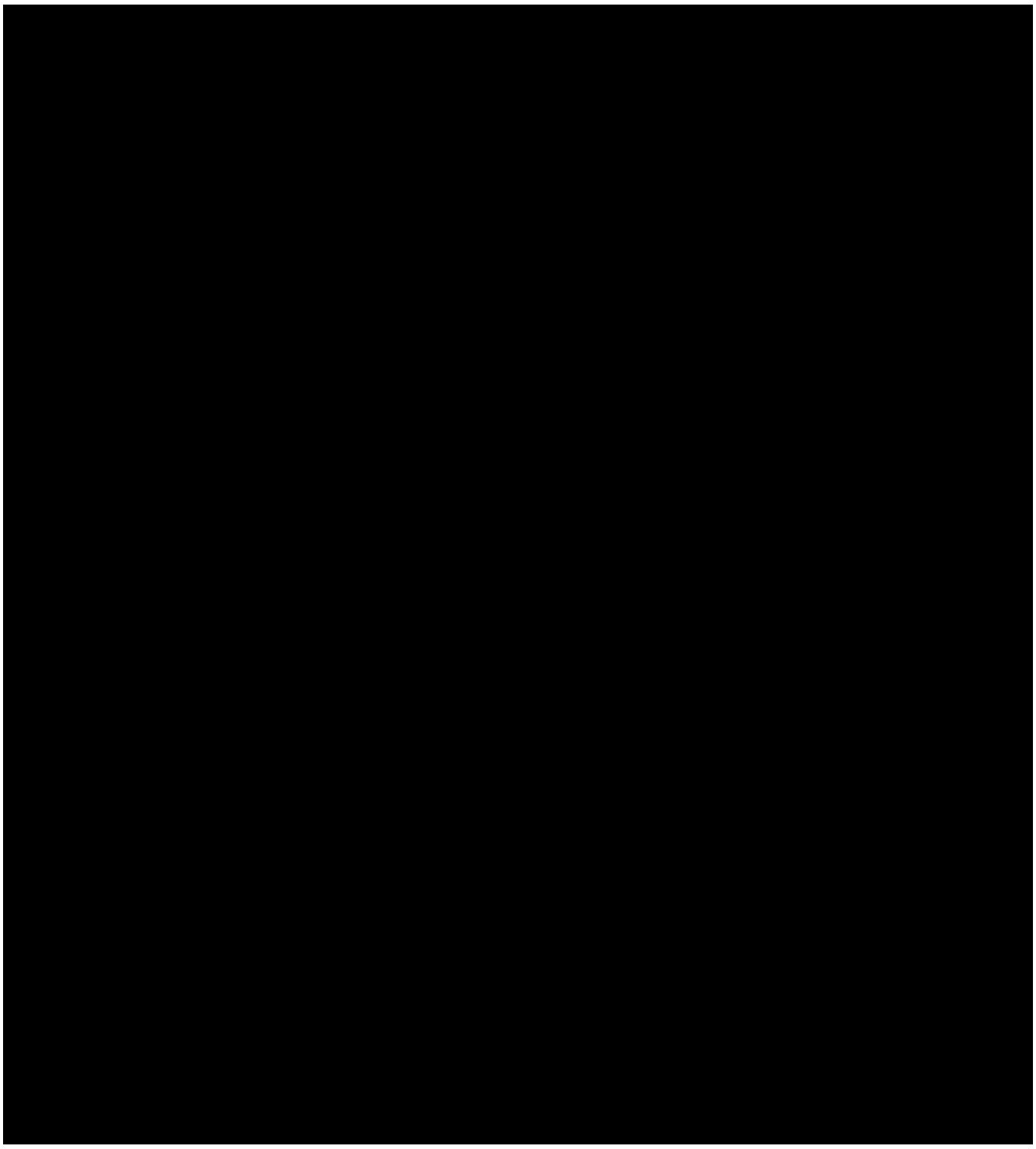
- [redacted]
- [redacted]

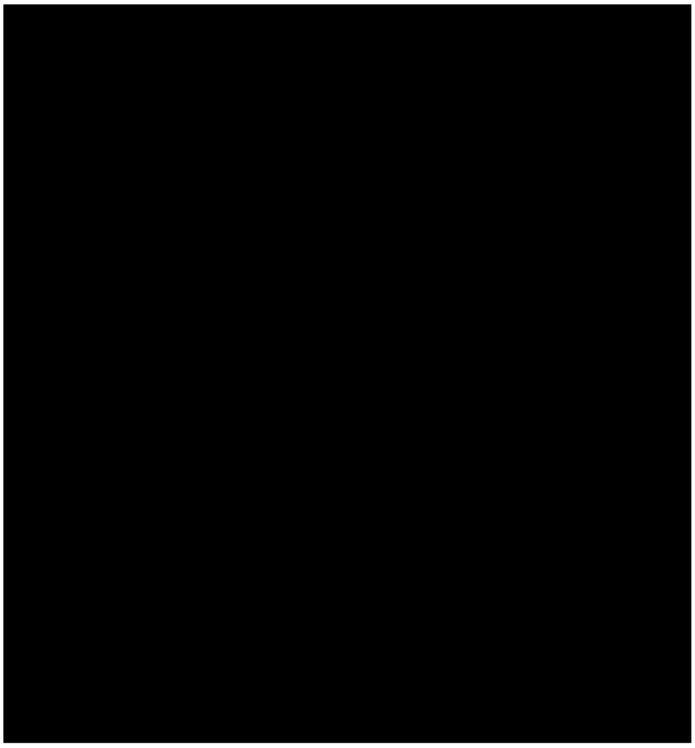
[redacted]

5.4.2. [redacted]

[redacted]

[redacted]





6.0 Existing and Future Conditions

6.1. Traffic

The Project widens five miles the existing I-70 mainline accommodating one future express lane in each direction through the Ultimate Section with minor restriping and reconstructs four miles of the I-70 Interim Section for additional roadway widening between structures built to full section. This accommodates future conditions that improve the Level of Service (LOS) for mainline motorists and creates an updated facility with extended useful life.

At the Colorado Boulevard Interchange, the existing partial clover design is replaced by our Diverging Diamond Interchange (DDI). The DDI provides a LOS B (An improvement over the LOS C baseline design) and its geometry has a self-metering benefit. East leg entrance and exit ramps provide over 700 feet of weaving distance from soft gore to soft gore for typical three-lane traffic operations and merging movements. West leg entrance and exit ramps provide over 500 feet of weaving distance. Braided ramps maintain and improve east and westbound frontage road service through movement connectivity.

At the Quebec Street I-70 WB off-ramp, our future condition increases from one lane to two leading to a signalized intersection with a left turn, shared left turn-through, and right turn lane. Under I-70, Quebec Street increases from 6 to 8 lanes. The proposed single span bridge eliminates the two-span center pier RPF design, creating flexibility for future MOT improvements, improving driver lines of sight and eliminating potential vehicular impacts.

The design of the I-270 Interchange accommodates the I-70 Ultimate Section Express Lane as well as Express Lane Direct connection ramps to the east of the two roadways .

6.2. Safety

Most of the existing project was constructed in the early 1960's and has undergone periodic repair work in order to maintain safety. The existing two-mile long viaduct between Colorado and Brighton boulevards was included on the state's 30 worst bridges list in 2009. The new Project configuration replaces the viaduct with a lowered section and constructs a Cover structure, along with a new 4-acre park and public space over the interstate between Clayton and Columbine streets. The mainline I-70 travelling underneath the Cover is equipped with modern, state of the art mechanical, electrical, plumbing, ITS, and communication systems that ensure traveler safety.

At the Colorado Boulevard Interchange, our DDI configuration separates the connection with 46th Avenue North and South with I-70 from Colorado Boulevard and reduces conflict points by 46% providing a safer roadway for vehicles, pedestrians and bicyclists.

Under future conditions, pedestrian crossings only occur at one-way traffic movements, improving pedestrian safety. The future intersection geometry reduces the severity of potential broadside accidents.

6.3. Lighting

The existing lighting technology utilized throughout the project has been maintained and periodically upgraded over the last 40 years. The completed Project will update the corridor lighting to modern standards improving public safety and reducing environmental impacts through the implementation of inherent technological improvements.

Future traffic signal equipment and features comply with CCD, Xcel Energy, and ADA requirements. Traffic signals and metering ramps (for designated I-70 on-ramps) are interconnected by ITS fiber-optic infrastructure and incorporate railroad signal pre-emption at crossings. Lighting design incorporates energy efficient, long-lasting fixtures that reduce operations and maintenance costs. High-wattage fixtures reduce the number of light poles. Lighting on the Cover and within the Swansea Elementary School

outdoor area will utilize dark-sky compliant fixtures, and the sports field lighting will benefit from locations and fixture aiming that comply with spill and glare requirements.

6.4. Business/Community Access

Existing conditions impact business/community access due to lower levels of service and inadequate traffic flow on the mainline, bridges and interchanges. Future conditions will improve business and community access by providing an improved level of service on the mainline, bridges and interchanges combined with upgraded ITS technology and improved design geometry.

At the Colorado Boulevard Interchange, local road access via 40th Avenue and 48th Avenue is maintained while our design provides improved business access along 46th Avenue with a connection directly on to I-70 EB, avoiding a connection through Colorado Boulevard.

7.0 Roadway, Ramp and Lane Closures

For Extended Roadway Closures, 5280 Connectors will meet the criteria set forth in Schedule 10 Table 2-2 of the Project Agreement (below):

	Duration (MO)	Roadway Closures Not Permitted								
		UPRR Crossing	York Street	Josephine Street	Columbine Street	Clayton Street	Fillmore Street	Dahlia Street	Holly Street	Monaco Street
York Street	5		-	X	X					
Josephine Street	4		X	-	X					
Columbine Street	0		X	X	-	X				
Clayton Street	2.5				X	-	X			
Fillmore Street	4					X	-			
Dahlia Street	0							-	X	
Holly Street	0							X	-	X
Monaco Street	0								X	-

We will also provide the following enhancements:

Location	Ramp	Closure Allowable	Closure Used
Brighton Boulevard Interchange	WB exit ramp	Full Closure allowed for up to the lesser of the period of construction and six months upon initiation of construction that affects ramp	**No Closure Used**
York Street	EB exit ramp	Full Closure allowed upon initiation of viaduct removal that affects ramp	**Remains in service three additional years**

Location	Ramp	Closure Allowable	Closure Used
	WB entrance ramp	Full Closure allowed upon initiation of construction that affects ramp for UPRR phasing	**Remains in service one additional year**
Steele/Vasquez Boulevard Interchange	WB exit ramp	Full Closure allowed for up to six months upon initiation of construction that affects ramp	**No Closure Used**
	EB exit ramp	Full Closure allowed for up to the lesser of the period of construction and six months upon initiation of viaduct removal that affects ramp	**No Closure Used**
Colorado Boulevard Interchange	EB entrance (loop ramp from northbound Colorado Boulevard)	Full Closure allowed upon initiation of construction that affects ramp	**EB entrance ramp from Colorado Boulevard remains active**
I-70 Slip Ramps to Stapleton Road	EB exit @ Dahlia Street	Full Closure allowed upon initiation of construction that affects ramp	**DDI provides accelerated reconnection by 6 months**
	WB entrance @ Dahlia Street	Full Closure allowed upon initiation of construction that affects ramp	**DDI provides accelerated reconnection by 6 months**
Quebec Street Interchange	EB exit ramp	Full Closure allowed for up to the lesser of the period of construction and six months upon initiation of construction that affects ramp	**4 months**
	WB entrance ramp	Full Closure allowed for up to the lesser of the period of construction and six months upon initiation of construction that affects ramp	**4 months**

8.0 Description of Proposed Detour Routes

Detour routes are summarized in Figure 17.

9.0 Typical Section Requirements

Typical section requirements are provided in Appendix A of the Proposal.

9.1. Lane Widths

Minimum lane widths of 11 feet to be provided on all roadways within the construction zone.

9.2. Shoulder Widths

Where temporary or permanent barrier is being utilized within a construction zone, a 2-foot minimum shoulder width will be provided from edge of traveled lane to face of barrier. Where temporary or permanent barrier is not being utilized, clear zone lateral offsets as provided by the *AASHTO Roadside Design Guide* shall be enforced.

9.3. Number of Lanes

Roadways within the construction limits shall provide the same number of lanes as the existing condition unless lane reductions, along with planned detours and coordination with local agencies, provide an equivalent existing level of service.

9.4. Barrier/Wall Locations

Temporary and permanent barrier will be provided when clear zone lateral offsets cannot be met as provided by the AASHTO Roadside Design Guide. Pinned temporary barrier will be utilized when specified offset distance behind barrier cannot be obtained. Temporary and permanent impact attenuators will be utilized when blunt ends of temporary and permanent barrier are exposed to the traveled way. Temporary shoring will be utilized when temporary side slopes could infringe on the operation of the traveled way.

9.5. Proposed Work Zone Locations

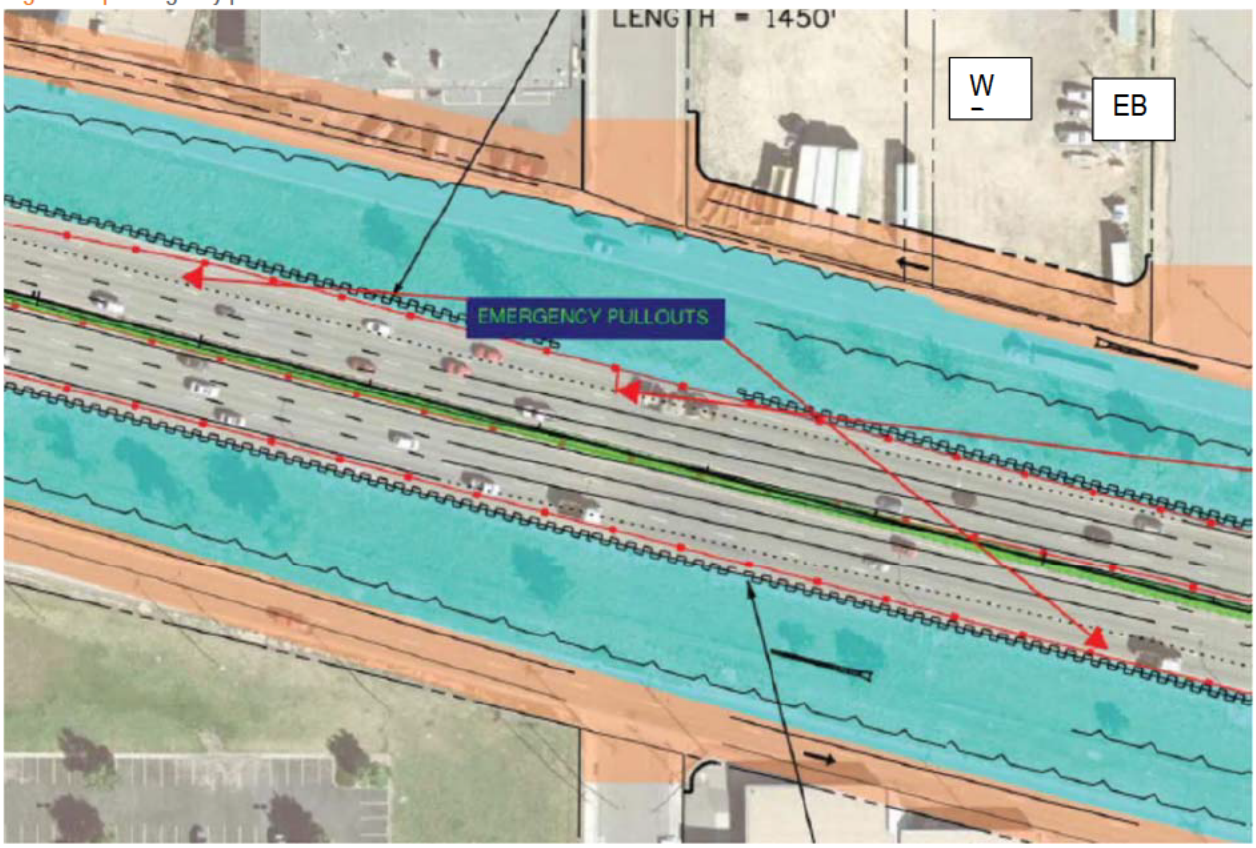
All Work Zone locations are depicted on the proposal MOT plan roll plots.

10.0 Emergency Requirements

10.1. Pullout Locations

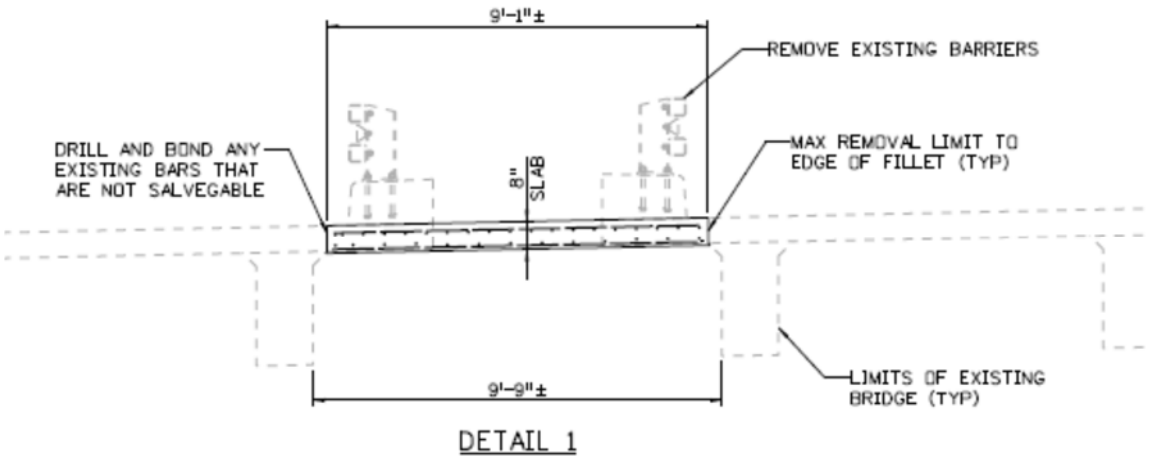
For facilities under construction, 5280 Connectors will provide emergency pullouts on the I-70 Mainline for disabled vehicles, staging of incident management, and law enforcement vehicles, when shoulder widths are less than 8 feet at any point along a 0.5-mile stretch. Emergency pullouts (see Figure 18) shall be provided at the outside shoulder, between each interchange or at 0.5-mile spacing, whichever is less. For determining 0.5-mile spacing, the emergency pullouts will be measured from the center of the first pullout to the center of the next pullout. Interchange distance will be measured from ramp gore to ramp gore in the same direction of travel. The minimum pullout length will be 150 feet, not including transitions. Pullouts will be placed on the outside shoulder only; and transitions will be made at 15:1 or greater. The minimum pullout width will be 14 feet measured beyond the travel lane. The pullouts will be signed for emergency parking only, will have a paved surface, will include advance signing in compliance with the FHWA *Manual on Uniform Traffic Control Devices* (MUTCD), and will not be subject to ponding or other weather-related conditions that could render them unsafe or ineffective. Snow removal in emergency pullouts will be performed as required. With I-70 in this area being elevated from the surrounding existing ground and limited ROW available, it was identified early on that additional roadway and bridge would need to be provided in a temporary condition.

Figure 18 | Emergency pullouts



With both of these requirements and situations limiting opportunities to move traffic onto existing conditions, temporary structures, pavement and pavement marking with removal of existing barrier was the ultimate solution. From STA 2104+00 to 2156+00, there is approximately an 8-foot gap between the existing WB and EB directions that is separated by steel guardrail on both sides for the roadway condition and concrete guardrail at both Holly and Dahlia Streets for the bridge condition. The guardrail would be removed through this entire section and the EB and WB direction would be connected together to gain more space for outside construction. Temporary asphalt would be used to connect the roadway sections, and a temporary bridge demolition and overhang connection would be added at Holly and Dahlia Streets as shown in Figure 19.

Figure 19 | Gap Closure on Existing Bridge to Accommodate Traffic



10.2. Emergency Access

One of the most important aspects of access during construction is awareness and understanding emergency requirements to accommodate local emergency responders. 5280 Connectors will coordinate with local emergency responders to verify that they understand MOT changes, pullouts and access through the construction Work Zone. If necessary, we will accommodate emergency vehicles through construction zones during construction.

Throughout each phase of construction and included in each work area breakdown, there are emergency pullouts included at half-mile increments. These emergency pullouts will be provided in areas in either direction where the shoulder is restricted to less than 8 feet. Emergency pullouts allow traffic and emergency vehicles to use the shoulder where all other lanes are restricted as much as possible. These are necessary so that accidents, stalled cars and other car troubles can be moved from the lanes of traffic and additional traffic congestion can be kept to a minimum.

The Project will identify safety and health hazards and environmental aspects that could create the potential for emergency response. Projects will implement procedures to respond to emergency situations, taking into account the needs of relevant interested parties. The procedures will be communicated to all site personnel as part of the employee New Hire Orientation and discussed in our field safety meetings as access changes through construction. The Project shall be responsible for coordinating the emergency response procedures. Initially, we shall develop a list of activities and associated environmental aspects and/or hazards that could pose a threat to employee safety, health and/or the environment. This information will be incorporated into the Emergency Action Plan(s). Locations with activities that may pose a threat to the environment shall verify that an emergency action plan is in place and that the necessary resources are available to respond to emergencies. This includes identifying and establishing service agreements with local environmental response contractor(s) capable of responding to environmental emergencies during the initial procurement phases of the contract, following contract Notice to Proceed but prior to construction field activities. The plan shall make necessary resources and equipment available to manage smaller incidents. Emergency phone numbers shall be posted that includes the emergency hot line for the applicable state as well as any additional local numbers.

The Emergency Action Plan will include the emergency escape routes, emergency signals, assembly points, and designated lines of authority. The plan shall be periodically tested where and when practicable. Following any emergency response, a debriefing will be conducted to determine if additional training is required or if Emergency Action Plans need to be revised. Emergency Action Plan Training, the critique of all emergency drills, as well as incident reports, shall be recorded and maintained in accordance with the Control of Records procedures in the SHEMS. The site superintendent or general superintendent performs the applicable pre-emergency planning tasks before starting field activities and coordinates emergency response with on-site parties and local emergency service providers as appropriate. These pre-emergency planning activities include the following:

1) Review any host facility emergency and contingency plans where applicable, or determine how host facility emergency and contingency plans affect, or are implemented at, the Project site location.

2) Determine which on-site communication equipment is necessary and available (e.g., two-way radio, air horn, nearest telephone, cell phones, etc.).

3) Verify sufficient resources are available so that the “Buddy System” can be used for all assigned work.

4) Confirm and post emergency telephone numbers, evacuation routes, assembly areas, and route to hospital, and communicate the information to onsite personnel. Emergency contact information shall be posted in a commonly accessed area in clear view of the on-site workers.

5) Review changed site conditions, on-site operations, and accessibility/availability of host facility/outside agency responders in relation to emergency response conditions.

6) Inventory and check site emergency provisions (first aid kits/eye wash, equipment, supplies, and potable water).

7) Review the emergency response plan before site activities begin, including driving route to hospital.

8) Brief new workers on the components of emergency response procedures.

9) Communicate emergency procedures for personnel injury, exposures, fires, explosions, and releases.

10) Where appropriate, inform emergency room and ambulance and emergency response teams of anticipated types of site emergencies.

11) Evacuation routes and assembly areas will be specified at the commencement of field work. Evacuation route(s) and assembly area(s) will be designated by the site superintendent before work begins and posted at the designated evacuation rally point or construction support facility.

12) Personnel shall be advised of the assembly and accounting process during emergency condition, must be capable of understanding evacuation signals, and know where final evacuation assembly areas are located. The site superintendent will account for personnel assembly area(s).

10.3. Courtesy Patrol

For the duration of the O&M period during construction and the Operating Period, 5280 Connectors will provide Courtesy Patrol Services for the Project as described in this Section 10 and in Appendix B of Schedule 11. The purpose of the service is to reduce congestion and potential safety risks on the Project by:

- Continuously patrolling within the Project during peak and non-peak traffic hours and weekends;
- Providing towing and motorist assistance services;
- Providing towing services for the Tolled Express Lane(s) and General Purpose Lane(s);

- Providing on-call severe weather emergency or planned Special Event towing services; and
- Quickly locating, assisting, and/or removing any disabled vehicles thereon as soon as possible.

Categories of service:

a. We will provide five general categories of service, as follows:

i. To locate a disabled vehicle on the shoulder of the highway segment and, at the motorist's election, move the vehicle to an appropriate drop site, and there to provide the limited assistance available to 5280 Connectors (flat tire, out of gas, etc.) if such assistance will make the vehicle operational;

ii. To locate a disabled vehicle in traffic on the highway segment and, at the motorist's election, move the vehicle either to the shoulder of the highway segment or to an appropriate drop site, and there to provide the limited assistance available to 5280 Connectors if such assistance will make the vehicle operational;

iii. To assist motorists, and Local Agencies or Emergency Services as requested, concerning an accident or other emergency on the highway segment. Such assistance includes, without limitation, towing or pushing vehicles as directed, protecting the scene of an accident, cleaning up debris caused by an accident, and calling and assisting local law enforcement in the event of an accident;

iv. To pick up light debris on roadway; and

v. To communicate data collection to the Department.

11.0 Temporary Closure Scenarios

Location	Work Activity	Duration
Quebec Street	Girders, bridge demo, traffic signals, deck pours	6 Nightly Closures
Colorado Boulevard	Completion of the directional crossovers	5 Nightly Closures 3 Weekend Closures
Brighton Boulevard	Girders, bridge demo, traffic signals, deck pours	6 Nightly Closures
I-70 Closure for I-270 Flyover	Bridge demo, girders and deck pours	1 Weekend Closure
Steele Street	Utility work	6 Nightly Closures

12.0 Access

5280 Connectors will maintain access to properties along the corridor by minimizing the number and duration of closures and coordinating key issues with stakeholders during planning and staging of the work.

Temporary traffic signals will be installed as described in Schedule 10, Section 11 Signing, Pavement Marking, Signalization, and Lighting

12.1. Pedestrian/Bike

Our TMP will include an approach to pedestrian and bicycle movements and school traffic circulation. This approach and solution will be coordinated with City and County of Denver (CCD) and the Denver Public Schools Department of Transportation, and Approved by the Department

Trail and pedestrian impacts:

a. We will comply with all requirements of Schedule 17 Environmental Requirements;

b. Existing trail systems, temporary trails, sidewalks, and pedestrian routes will be maintained at all times. We will meet all requirements of the Americans with Disabilities (ADA) Act for all Construction Work that impacts existing trails and pedestrian facilities or that will be used for temporary detour routes;

c. Temporary trail detours will meet requirements for trail detours as outlined in the CCD Construction Detour Standards for Bikeways and Multi-Use Trails; and

d. The following restrictions will apply to existing trail systems in the vicinity of the Project:

i. No trail closures will be allowed; and

ii. Temporary trail detours will be allowed provided that (A) PIP requirements shall be identified and appropriate public notifications provided; and (B) our team shall comply with the CCD Construction Detour Standards for Bikeways and Multi-Use Trails.

e. 5280 Connectors will comply with the CDOT Construction Detour Standards for Multi-Use Trails.

12.2. Business

For the utility work that requires trenching, we will use trench platting and road patching to cover all holes so access is not cut off to businesses and residents.

5280 Connectors will maintain a minimum of one driveway per business at all times. If a business has delivery driveways or access, we will also maintain a minimum of one delivery access. For businesses with multiple driveways, when driveway closure is necessary to progress Construction Work, no driveway will be closed for more than 30 consecutive Calendar Days or more than 45 Calendar Days in aggregate. The grades for temporary driveways will not be greater than the existing driveway grade. We will meet with the property owner to coordinate access restrictions during that particular construction phase.

In all cases, at least one access point will be maintained for each property. This may include an alternate access location or constructing driveways in halves. We will use access guide signing when construction activity prohibits left turns into or out of businesses and whenever obvious access points are closed or obscured. Businesses will receive advance notification, allowing them time to inform their customers of impending changes to access.

Each property directly affected by construction activities will receive an access inventory, which will review business access points that construction might affect and will record pertinent information, such as the following:

- Driveway location and condition
- Volume and time of day usage
- Parking and traffic circulation
- Americans with Disabilities Act (ADA) access needs
- Location of delivery and loading docks
- Emergency exits

For businesses with three or more impacted access points, we will rebuild one to two driveways at a time, depending upon the volume of traffic entering and exiting the business. For businesses with two impacted access points, one access point will remain completely open during construction. Finally, for businesses and private residences with only one access point, we will build driveways half at a time or under off-service hours closures, with concurrence of the owner.

We understand that while their access may be open, their visibility from the street may be obscured. We will meet with the business owners and, if requested, will provide signage to post in plain view, advertising that their business is "open during construction."

12.3. Local/Adjacent Property Owner Access

Our team has studied the Project corridor extensively and developed a preliminary schematic construction staging plan to maximize access to adjacent properties during construction. We will work closely with local/adjacent property owners to advise them prior to construction activities and temporary property access modifications. These plans will be communicated to our roadway crews to verify the TMP is clearly understood and executed in the field. In all cases, at least one access point will be maintained for each property.

Protection of property along the alignment is one of our highest priorities. During our community meetings, prior to construction, we will coordinate with residents and businesses in order to gain access to perform pre-construction surveys. They will consist of photo and video documentation of each property that will help each property owner establish a baseline for which damage could be compared. If we damage it, we will fix it.

12.4. Project

A freeway project of this length and complexity will require multiple construction entrances along the alignment. The locations of these construction entrances will be determined based on location and accessibility. Wherever possible, access to work areas will be located on side streets, and not off the mainline freeway. Access located in communities and business areas will be secured with temporary fences and gates to protect the public from entering the Work Zone.

Where access to a work area is only available from the mainline roadway, acceleration and deceleration lanes will be maintained in order to provide safe egress. Where this is not possible, work will be performed within lane closures on the mainline, in order to provide access to the work.

12.5. Bus/Transit

5280 Connectors will work with the Regional Transportation District (RTD) to maintain all existing routes and bus stops that are within or nearby the I-70 corridor. Maintaining routes includes new construction, MOT implementation and temporary detour routes. If a route or bus stop is impacted, we will provide a detour route per the requirements and as approved by the RTD.

13.0 Temporary Traffic Control Plan Strategies

13.1. Approach to Development of TCPs and MHT

Throughout the construction period, we will focus on developing Traffic Control Plans and Methods of Handling Traffic that minimize disruption to the traveling public along the mainline and cross streets. To successfully minimize the disruption, thorough planning, extensive communication and detailed execution must all come together. To successfully and safely construct the Central 70 corridor within the Project limits, the CJV Team will implement a multiphase approach to developing and implementing the Maintenance of Traffic strategy developed for the Project. This MOT strategy is based on producing Traffic Control Plans (TCPs) and Methods of Handling Traffic (MHTs).

Generally, as 5280 Connectors develop work plans, the CJV will work with the Engineer of Record to

develop TCPs and/or MHTs that will allow the work to be performed safely, efficiently and in accordance with MUTCD and CDOT standards. During the development of the plans, the impacts to the traveling public will also be considered. The considerations will include driver safety, driver confusion, detour signing, sidewalk and RTD bus route impacts, and alternate routes available. After evaluating all the available options, the CJV and EOR will share their preferred option with the Developer. Following the Developer's approval, the plan will be discussed with Enterprises' staff in an over-the-shoulder meeting. Most of these over-the-shoulder meetings will translate to a joint strategy heading into the MOT Task Force and traffic control meetings. This allows neighboring communities to participate in the discussions with the Project team. Once the plan is revised to address the Enterprises' informal comments, it will be submitted to the Enterprises for formal Approval/Acceptance.

The communication process will continue following the Enterprises' Approval/Acceptance. A Lane Closure Report will reflect the approved TCP/MHT. The LCR will be provided to Enterprises staff (including Engineering and Communications staff) and will become the basis for the Traveler Report that CDOT distributes to the public.

We will submit Temporary Drainage Plans concurrently with each Temporary Traffic Control Plan (TCP), when required, to the Department for Acceptance as described in Schedule 10, Section 2 Maintenance of Traffic, and with changes to design; and we will provide the location of all Approved abandoned drains. We will establish a labeling system specific to each temporary storm drain system and provide a table to summarize all pertinent information. The table will include temporary connection locations, the drain line, and sheet number where applicable profiles can be found.

The following sections elaborate on the development of both TCPs and MHTs, as well as a description of the contents of the respective documents.

13.1.1. Traffic Control Plans (TCPs)

The project TCPs will document the overall project phasing that will be implemented to successfully construct the project, maximize regional mobility, and provide a safe construction zone for field staff and the traveling public. TCPs will focus on providing detailed descriptions of traffic locations and configurations, Work Zone limits, and the interaction between the two.

TCPs will be produced under the direct supervision of the 5280 Connectors Design Manager and be signed and sealed by a Colorado Professional Engineer.

13.1.1.1 Design Development Process

5280 Connectors have developed an extensive construction phasing plan during the proposal phase that will form the backbone of the individual Traffic Control Plans (TCPs) required for each modification of the traveled way. To initiate development of the specific plans, our team will work closely with the MOT Task Force and use the weekly meetings as a format to discuss the direction the staging design is proceeding, elaborate on problem areas that detail design is uncovering, and receive real-time input from the Task Force members. The MOT design team members assigned to the MOT Task Force will have primary responsibility for developing the necessary TCPs in accordance with the phasing plans and applicable design criteria and in the proper sequence to meet the project schedule. The intended result of these meetings will be to keep the Enterprises dialed into the phasing design so that when TCPs are submitted for Acceptance, the Enterprises is already intimately familiar with the TCPs' content and supports the product.

13.1.1.2 Design Criteria

All TCPs will comply with Schedule 5, Section 16 of the Project Agreement (PA) and will be a refinement of the phasing and closures identified by the 5280 Connectors team Proposal. Specifically, lane geometrics and typical sections will be developed in accordance with Schedule 5, Section 16.2.5 of the contract. In addition to the contract, TCPs will follow the guidelines established in the Basis of Design

Manual – MOT developed by our team for the Project.

13.1.1.3 Plan Content

The anticipated content of TCPs is described below. This list is a guideline, and the specific contents of each TCP will be controlled by project specific needs.

- MOT General Notes and Legends
- Detour Route Plans (for closures critical to phasing), showing:
  - Location of Closure
  - Proposed Detour Route
  - All applicable signage and Traffic Control
- Typical Section Sheets, showing:
  - Centerlines
  - Lane/Shoulder dimensions
  - Work Zone Areas
  - Location of existing, temporary, or new pavement
  - Barriers or walls
  - Temporary pavement sections
- Construction Phasing Sheets, showing:
  - Horizontal alignment
  - Existing topography
  - Number of lanes
  - Temporary pavement construction, drainage features, wall locations, lane geometry and shoulders, striping and concrete barrier locations with attenuators
  - Work Zone Areas
  - Construction vehicle entrances and exits
  - Emergency pullout locations
  - Taper dimensions
  - Guide and construction sign locations (including pre-project warning signing)
  - Access and signing (RTD bus stops, schools, businesses and residents)
  - Impacted bus stops/routes and school drop-offs
  - Pedestrian/bicycle accommodations
  - Other relevant devices and activities
- Temporary Traffic Signals and Lighting
  - Temporary signal layouts
  - Modification to existing signals
  - Temporary lighting locations

13.1.2. Methods of Handling Traffic (MHTs)

MHTs will be generated on an ongoing basis throughout the duration of the Project and build upon the TCPs. They will be site, situation, and time specific and focus on the traffic control devices necessary to successfully and safely implement/supplement a construction phase. In addition, standard MHTs will be produced that establish typical traffic control setups (also referred to as Typical Applications) that will be utilized throughout the life of the Project.

MHTs will be produced under the direct supervision of and reviewed by our MOT Design Manager and Accepted by the Enterprise prior to being implemented in the field.

13.1.2.1 Design Development Process

CJV construction personnel will be responsible for identifying the need for an MHT and informing the 5280 Connectors MOT Design Team to begin the MHT design development process a minimum of 10 days prior to MHT implementation for typical application MHTs, and 15 days prior to implementation for major/non-standard MHTs such as detours.

To allow for necessary review times, the CJV will initiate a weekly internal traffic control meeting, where a five-week look-ahead traffic control schedule will be developed. This tool will be used to develop necessary plans in a timely matter and meet submittal criteria. It also will be used by the Project Communications Manager to distribute information to necessary stakeholders.

The MOT Design Team will produce the MHT in accordance with all applicable standards. Once complete, the MOT Design Team will forward the MHT to the CJV construction personnel for an informal constructability review. As applicable, our team will forward the MHT to third parties/stakeholders to collect their input and ultimately receive their concurrence. In select instances as determined by the MOT Design Manager, the MOT Field Manager may produce minor MHTs. MHTs developed under the direction of the MOT Manager will be reviewed and approved by the MOT Design Lead prior to forwarding to the Enterprises for Acceptance.

In occasions where MHTs involve complex detour routes, RTD impacts, and other stakeholder impacts, an over-the-shoulder review will be conducted with the Enterprises staff to collect stakeholder input prior to formal submittal for Acceptance.

Upon completion of all informal reviews, the MOT Design Team will perform a Detail Check of the MHT and have the MHT audited for conformance with the DQMP.

Completed MHTs will be signed by the MOT Design Manager or a member of the MOT Design Team and forwarded to the Developer for formal submittal to HPTE for Acceptance a minimum of 48 hours before implementation per the contract. HPTE will review the MHT for compliance with standards and the contract.

13.1.2.2 Design Criteria

All MHTs will comply with Schedule 5, Section 16 of the Project Agreement and in accordance with CDOT Standards.

13.1.2.3 Plan Content

The content of MHTs will be consistent with the content established in the CDOT Standard Specification Section.

13.2. Approach to Implementation and Monitoring of TCPs and MHTs

13.2.1. Process for Developer MOT Inspections (Daytime and Nighttime)

Our team will take several steps to make certain that the project TCPs and MHTs are installed and maintained correctly. We commit to including a three-phase QC process and the following steps:

QC Phase 1 (Preparatory)-Beginning around the time of submittal to the Enterprises

- Meeting with MOT Manager, MOT Staff, and Traffic Control Supervisor to review the plans, discuss the anticipated schedule, identify resources needed (signs, striping, equipment, and staff), study weather forecast, analyze job hazards, and determine importance of the MHT and/or TCP. This process will begin at the CJV's internal weekly traffic control schedule meeting.

QC Phase 2 (Pre-Placement)-Following the Enterprises' approval and 1-2 days prior to implementing the TCP and/or TCP

- Meeting with MOT Manager, MOT Staff, and Traffic Control Supervisor to review the approved plans, confirm the anticipated schedule, confirm resources needed (signs, striping, equipment, and staff), study weather forecast, analyze job hazards, and determine importance of the MHT and/or TCP.

QC Phase 3 (Verification)-During and immediately following the installation of the MHT and/or TCP

- Developer's IQC will work with the MOT Manager, MOT Staff, and Traffic Control Supervisor to confirm the installation was performed in accordance with the approved plans. Any deviations will be documented so that the TCS can direct the cure immediately or request that the CJV's MOT staff cures the issue using their self-performance capabilities within two hours.
- Video record all MOT implementations and traffic shifts to provide a record of the devices installed and their locations.

Ongoing Inspection Process

- The MOT Manager or Traffic Control Supervisor will inspect all traffic control devices and implementations at the beginning and end of each shift. During the inspection the MOT Manager or Traffic Control Supervisor will schedule any device maintenance that is needed and verify that all traffic control implementations remain according to the TCPs.
- The MOT Manager or the Traffic Control Supervisor will perform a weekly nighttime inspection of all traffic control devices and implementations to verify visibility per CDOT Standard Specifications. Any repairs will be made within two hours or as weather allows.

13.2.2. Process for Opening New MOT Phases or Stages to Traffic (Safe-to-Open Procedure)

Traffic control devices installed for a new MOT phase or stage to traffic will be inspected by both our MOT Design Manager or MOT Field Manager and the Traffic Control Supervisor to verify conformance with the TCPs and the MUTCD. The Enterprises is expected to also participate in the inspection. If an unexpected safety concern is discovered during the safe-to-open inspection, we will seek a resolution plan with the Enterprises and execute that resolution or will delay the shift to the new MOT phase or stage to traffic until the resolution can be mutually agreed upon.

Video record will be performed daily on all MOT implementations and traffic shifts to provide a record of the devices installed and their locations.

13.2.3. Process for Opening New MOT Phases or Stages to Traffic on Local Agency Roadways

Traffic control devices installed for a new MOT phase or stage to traffic will be inspected by both the 5280 Connectors MOT Design Manager or MOT Field Manager and the Traffic Control Supervisor to verify conformance with the TCPs and the MUTCD. The Enterprises is expected to also participate in the inspection. If an unexpected safety concern is discovered during the safe-to-open inspection, 5280 Connectors will seek a resolution plan with the Enterprises and execute that resolution or will delay the shift to the new MOT phase or stage to traffic until the resolution can be mutually agreed upon.

Video record will be performed daily on all MOT implementations and traffic shifts to provide a record of the devices installed and their locations.

13.2.4. Process for Winter Maintenance of MOT Devices and Temporary Striping

The MOT Manager or Traffic Control Supervisor will inspect all traffic control devices and implementations at the beginning and end of each shift. During the inspection, the MOT Manager or Traffic Control Supervisor will schedule any device maintenance that is needed and verify that all traffic control implementations remain according to the TCPs.

After every snow event, where snow removal operations are necessary, the MOT Manager or Traffic Control Supervisor will inspect the temporary striping on the roadway and determine if touch-up or restriping is needed.

The MOT Manager or the Traffic Control Supervisor will perform a daily nighttime inspection of all traffic control devices and implementations to verify visibility per CDOT Standard Specifications. Any repairs will be made within two hours or as weather allows.

13.2.5. Process for Monitoring the Safety and Effectiveness of TCPs and MHTs

TCPs and MHTs are meant to be guidelines for installation. Often the traveling public operates differently than expected, with new traffic set-ups. Studying traffic and making constant observations on ways to improve will be one of our top priorities in implementing a TMP for such a large project.

Ongoing project traffic flow observations will be performed by the MOT Field Manager. Notable traffic flow problems will presented to the MOT Task Force. The MOT Field Manager, Traffic Control Supervisor, and Safety Manager will monitor the TCP's impact to the safety of the traveling public and the construction workforce. Observations will be presented to the MOT Task Force.

13.2.6. Process for Refining Unsafe or Ineffective TCPs and MHTs

Our MOT Manager, Traffic Control Supervisor, and Safety Manager will monitor the TCP's impact to the safety of the traveling public and the construction workforce. Observations will be presented to the MOT Task Force.

The MOT Design Lead will collect input regarding the safety and effectiveness of the TCPs and determine if any refinement of the TCPs is warranted. If refinement is necessary, the plans will be updated and released to the field as soon as possible.

In addition to the processes documented above (i-vi), our team will perform the Traffic Control Management duties listed in Section 630.11 of the CDOT Standard Specifications. Included below are the specific duties listed in Section 630.11, followed by the responsible party of the 5280 Connectors team in parenthesis:

- Ensure all TCPs and MHTs are in place as per plan (MOT Manager).
- Preparing, revising and implementing each required Method of Handling Traffic in accordance with the Traffic Control Plan. (MOT Manager will prepare/revise/implement MHTs).
- Directly supervising project flaggers and all traffic control operations and maintenance (Traffic Control Supervisor).
- Coordination of traffic field staff, devices, equipment and suppliers (MOT Manager).
- Coordinating project activities with appropriate police and fire control agencies. (MOT Manager).
- Preparing a traffic control diary on every Calendar Day traffic control devices are in use. This diary shall be submitted to the EOR and become a part of the Department's project records. The diary shall include the following information at a minimum: (Traffic Control Supervisor).
  - Date

  - For Traffic Control Inspection, the time of the inspection
  - Project number
  - Traffic Control Supervisor's name
  - Description of traffic control operations (lane closures, shoulder closures, pilot car operations, detours, etc.) including location, setup and takedown time, and approved Method of Handling Traffic (MHT) number
  - Types and quantities of traffic control devices used in accordance with the approved MHT
  - List of flaggers and uniformed traffic control (UTC) used, including start time, stop time, and number of flagging hours and UTC hours used
  - Traffic control issues (traffic accidents; damaged, missing or malfunctioning devices, etc.) and Corrective Action taken
- Inspecting traffic control devices on every Calendar Day that traffic control devices are in use, masked, or turned away from traffic. The TCS or another representative who is certified as a work site traffic supervisor will perform these inspections (Traffic Control Supervisor).
- Verifying that traffic control devices are functioning as required (Traffic Control Supervisor).
- Overseeing all requirements covered by the Contract that contribute to the convenience, safety and orderly movement of traffic. Have an up-to-date copy of the MUTCD and applicable standards and specifications available at all times on the project (MOT Manager).
- Attending all project scheduling meetings (MOT Manager).
- Supervising the cleaning and maintenance of all traffic control devices (Traffic Control Supervisor).
- Videotape traffic control devices and set-ups daily (Traffic Control Supervisor).

13.2.7. Business and Private Access

5280 Connectors will maintain public and private access to the local street system. The TCPs and MHTs shall incorporate stakeholder information from the PI, available surveys, and other pertinent studies relating to business and private access to the local street system and the highway facilities. At a minimum, we will communicate and document the following information relevant to business and private access:

13.2.8. Access Points Impacted by Each Phase and Stage

Information will be provided as the plans are advanced.

13.2.9. Notifications of Affected Businesses and Land Owners

Prior to and during construction activities, which will affect businesses and land owners, the Communications Manager and Community Relations Superintendent will set up meetings with each business to discuss the project and how the construction will affect their property. On a monthly basis, our team will conduct meetings with the local business and property owners to inform them of construction activities approaching over the next two months. This will allow for coordination with each property owner to facilitate their needs in maintaining access during construction. In addition to the monthly meetings, our team will produce periodic newsletters to be distributed throughout the area, linking the local stakeholders to our website that will also be kept up to date with traffic and construction information.

13.2.10. Schedule of Closures and Estimated Durations

The quantity of short-term closures, either nightly or weekend closures, is defined below:

Item #	Description	Qty(Ea)
Traffic Control (Daily/Nightly)		
1	Freeway Single Lane Closure (1 mile)	389
2	Freeway Double Lane Closure (1 mile)	594
3	Freeway Triple Lane Closure (1 mile)	18
4	Freeway Full Closure (Between Brighton Boulevard and I-270)	10
5	Freeway Full Closure (Outside Limits)	19
5	Cross Street Minor Closure	202
6	Cross Street Major Closure	80
7	Freeway to Freeway Ramp Closure	12
8	On-ramp Closure	157
9	Off-ramp Closure	175
10	Stapleton Road/46th Avenue Closure (1/2 Mile)	207
11	Cross Street Single Lane (1,000')	322
12	Cross Street Single Lane (1,000') - Flagging Situation	451
13	Operated Shadow Attenuator Truck for 10-hr shift	266

13.2.11. Project-Specific Access or Delivery Requirements for Local Businesses

Businesses

Stapleton Rd. serves as primary access for businesses between Rock Island Railroad and Colorado Boulevard, and will require the most outreach during construction.

Highlights

- 5280 Connectors will provide access across work zones and traffic while new utilities, pavement and demolition work is performed.
- Each MOT phase will provide a temporary pavement connection, temporary striping and business access signage.
- Construct temporary entrances and striping for those that are impacted

13.2.12. Proposed Mitigation Efforts

Mitigation efforts and enhancements to the RFP requirements are outlined in Section 6 of this TMP in the Roadway, Ramp and Lane Closures.

13.3. Colorado Transportation Management Center Coordination

13.3.1. Approach to Use of Intelligent Transportation System (ITS)/Variable Message Sign (VMS) Boards and Traffic Signals/Ramp Meter Stations

5280 Connectors will provide real-time information, which is critical to the traveling public and local agencies, in order to minimize construction disruption along the corridor. By deploying staff in the CTMC and sharing information with the CTMC management, DTMC management, Department Project Staff, and Region 1 Traffic, our team will be able to inform the traveling public with the best information available.

Typically, major traffic control plans (TCPs) will originate and be developed within the MOT Task Force. From there, Lane Closure Requests, MHTs and the five-week traffic control look-ahead schedule will be developed by the internal CJV meeting. We will submit the five-week traffic-control look-ahead schedule and the Lane Closure Reports to the Department Project Staff on Thursdays of each week. When the Lane Closure Request is approved by the Department Project Staff, we will hold the external traffic control meeting and share the information. The Lane Closure Request will be shared with Region 1 Traffic and other necessary stakeholders as well as added to the CDOT Traveler Report on Friday. While being added to the Traveler Report, we will contact our staff and management within the CTMC to develop the messages that need to be posted to VMS throughout the corridor and adjacent roads. In addition, portable variable message sign boards may be placed at key locations to relay the information to travelers who may not see messages on the fixed VMS. Closures that may affect ramp traffic will also be topics of discussion during the weekly MOT Task Force. These closures may require modification to the traffic signals and ramp meters, and we will work with the Department Project staff and Region 1 Traffic to adjust the cycles and schedules to optimize throughput during the construction impacts.

13.3.2. Routine Requests for Use of the CTMC VMS Boards

Routine requests for use of the CTMC VMS boards shall be submitted to the Department by 10:30 a.m. on Thursday of the week prior to when the VMS boards will be needed (Monday through Sunday of the following week). Requests for routine use of the VMS will be reviewed by noon Friday of the same week of the submittal. We will coordinate directly with the CTMC at 303-512-5830 following review by the Department.

As discussed above, weekly coordination will occur within the Project team and stakeholders. In addition to the routine process, we will have the ability to adjust to unplanned incidents that need messages immediately pushed out to corridor VMS and portable VMS. This messaging will adhere to messaging standards already in place at the CTMC. Our operators at the CTMC will have the authority to post these messages and will notify DTMC, CTMC Management, and Project staff after the messages have been posted.

13.3.3. After-Hours (Non-Construction Work Times) Operations

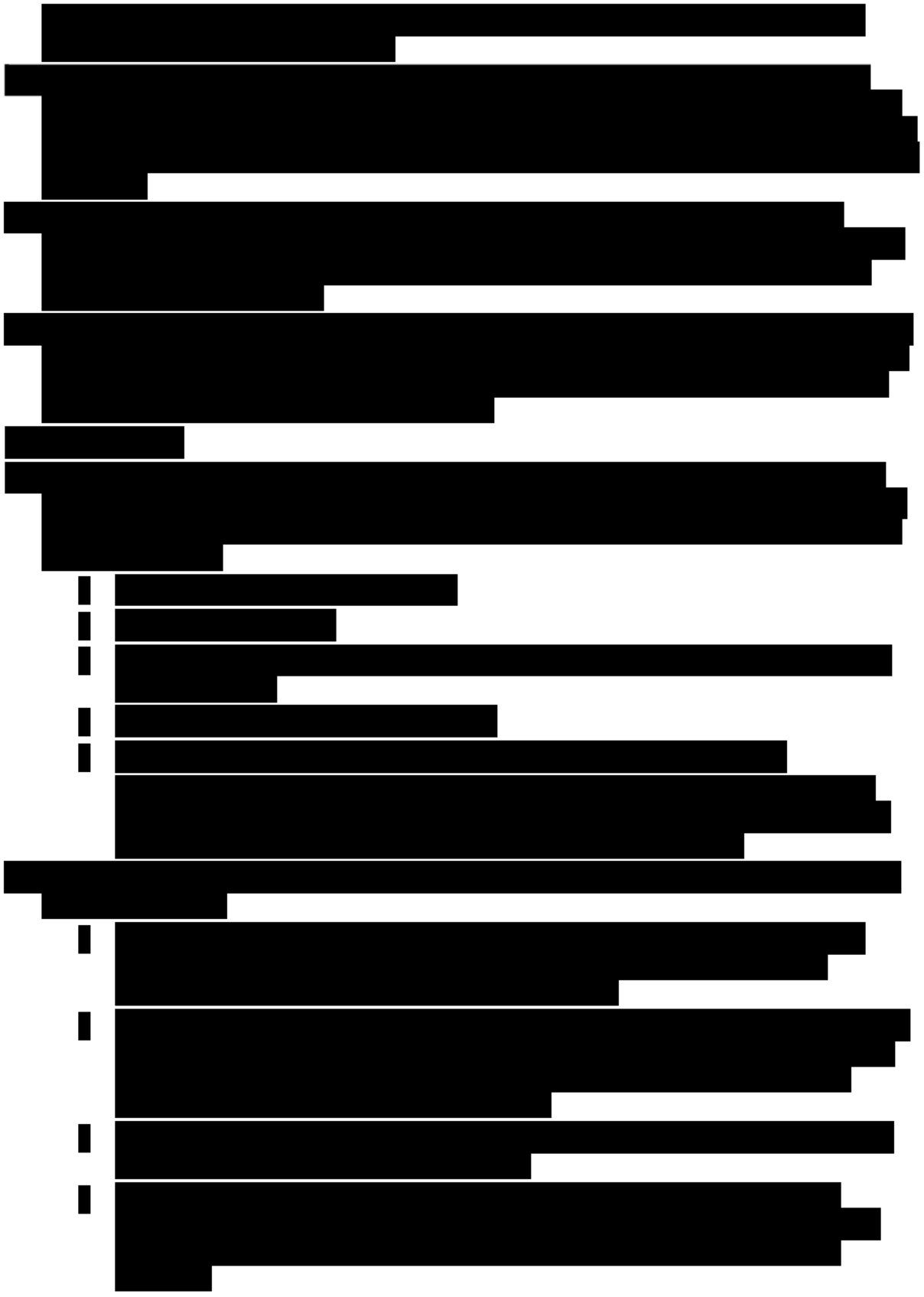
For after-hours (non-construction-work times) operations only, we will coordinate directly with the CTMC. The CTMC is available to the Developer to modify VMS messages 24 hours a day, seven days a week.

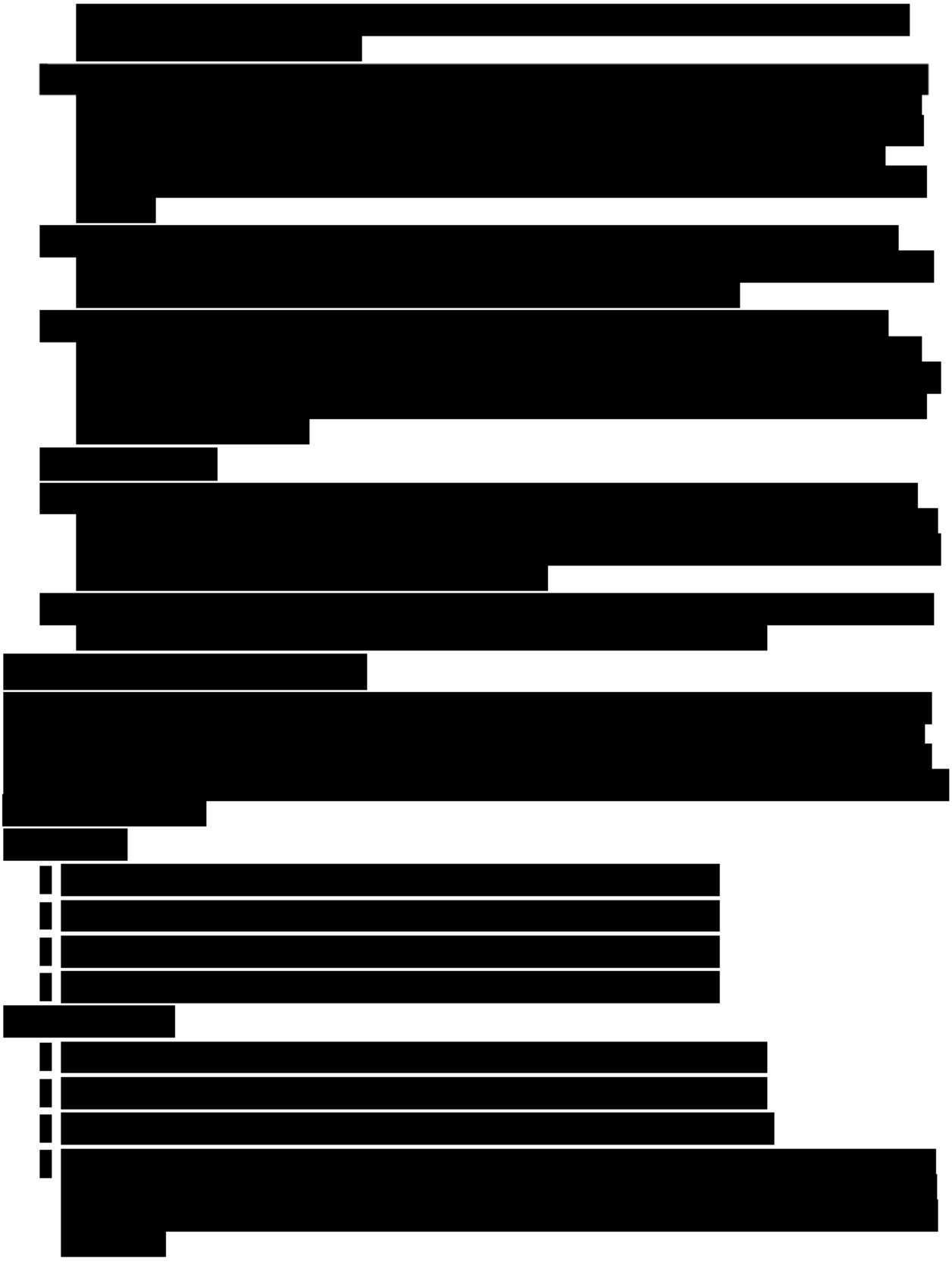
In the event VMS messages need to be changed when our staff is not present in the CTMC, we will contact the CTMC management or designee to post approved messages. Similarly, if an incident occurs during these times, a call tree will be available for the CTMC operators to contact 5280 Connectors and discuss the incident and messaging.

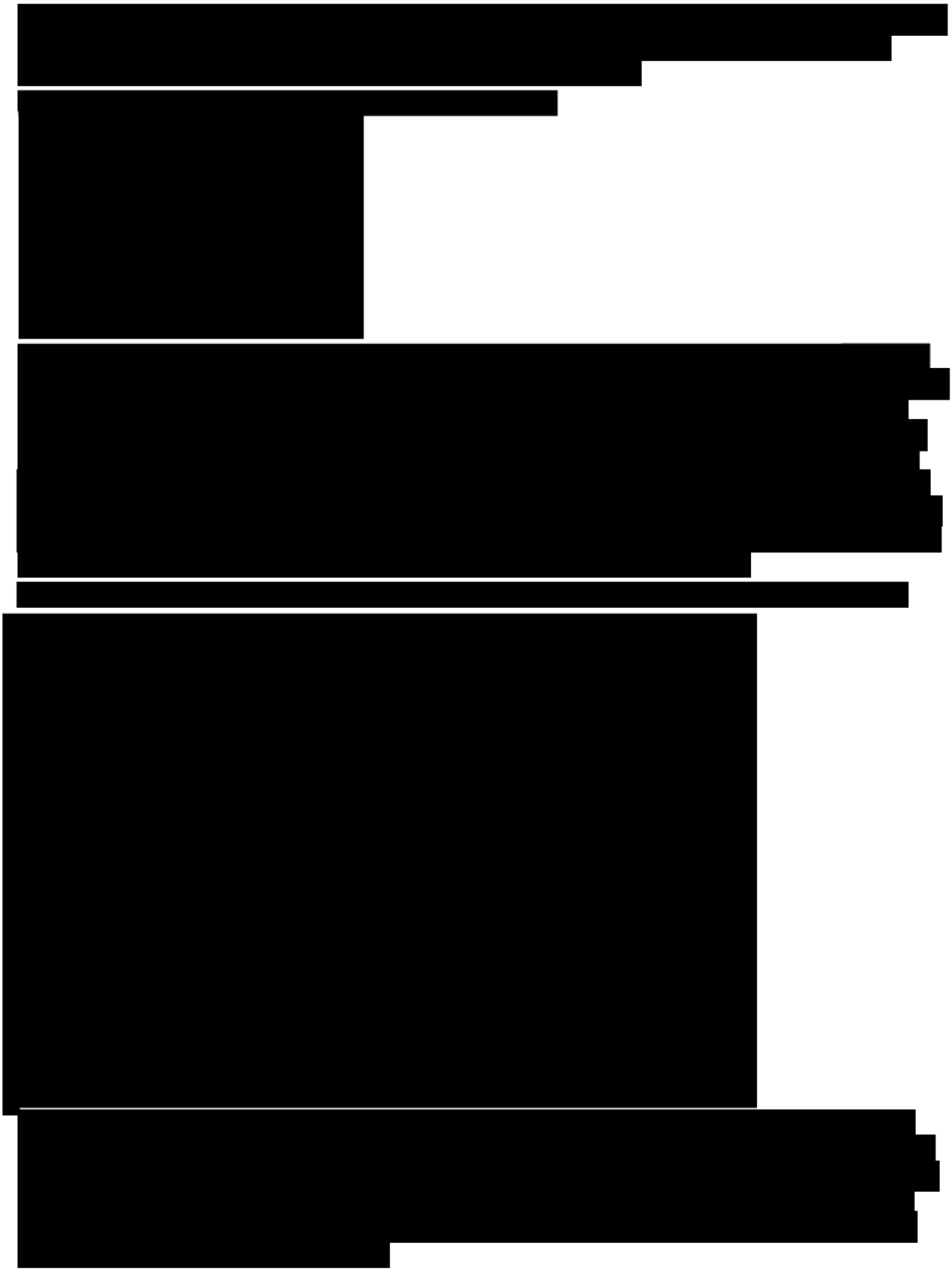
13.3.4. Communication Related to Emergencies

We will coordinate with the Colorado Department of Transportation (CDOT), City of Denver (CCD), and the CTMC in relation to Emergencies, in accordance with the Accepted Incident Management Plan (IMP).

14.0 [redacted]

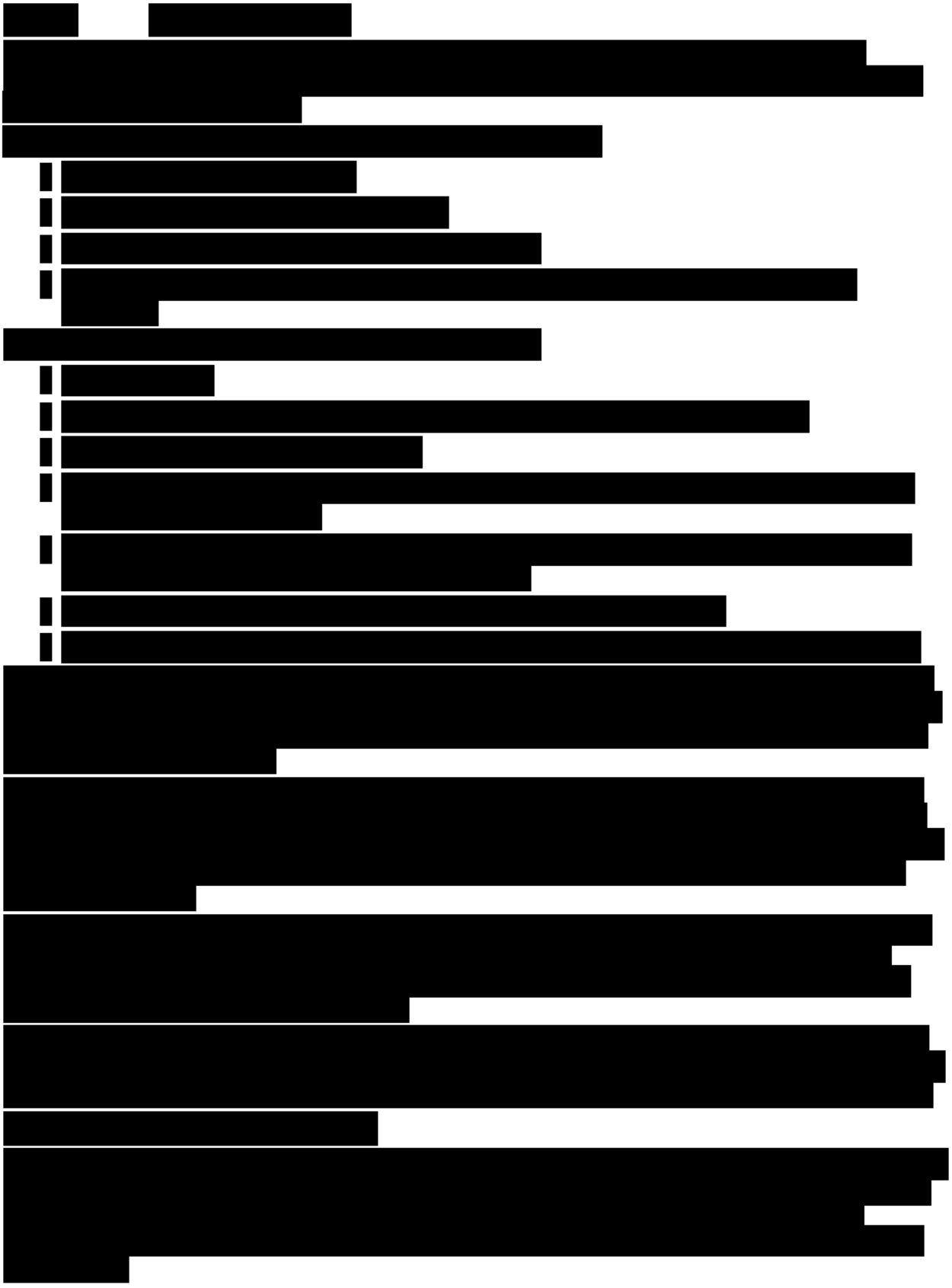






14.7. [redacted]

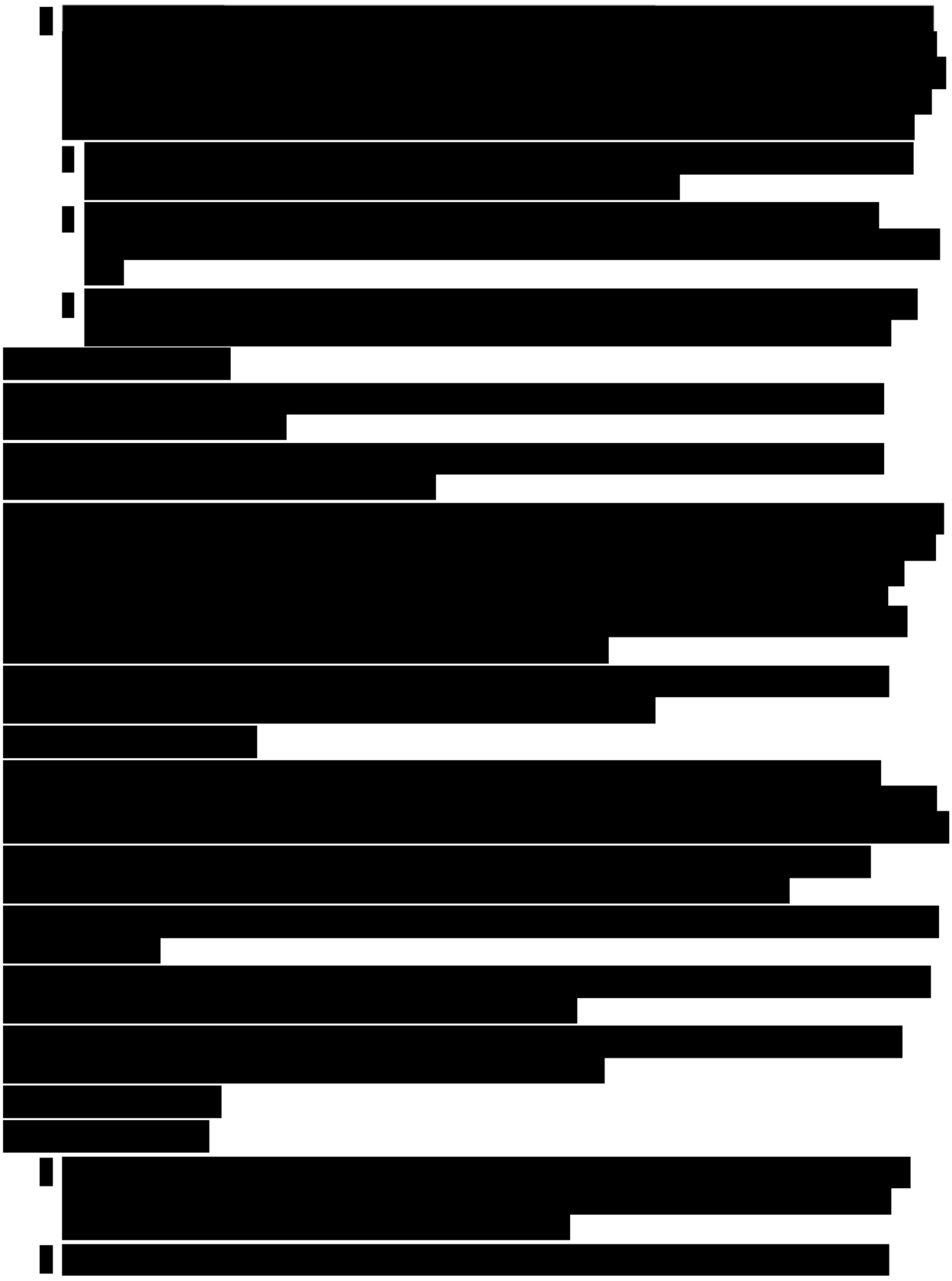
[redacted]

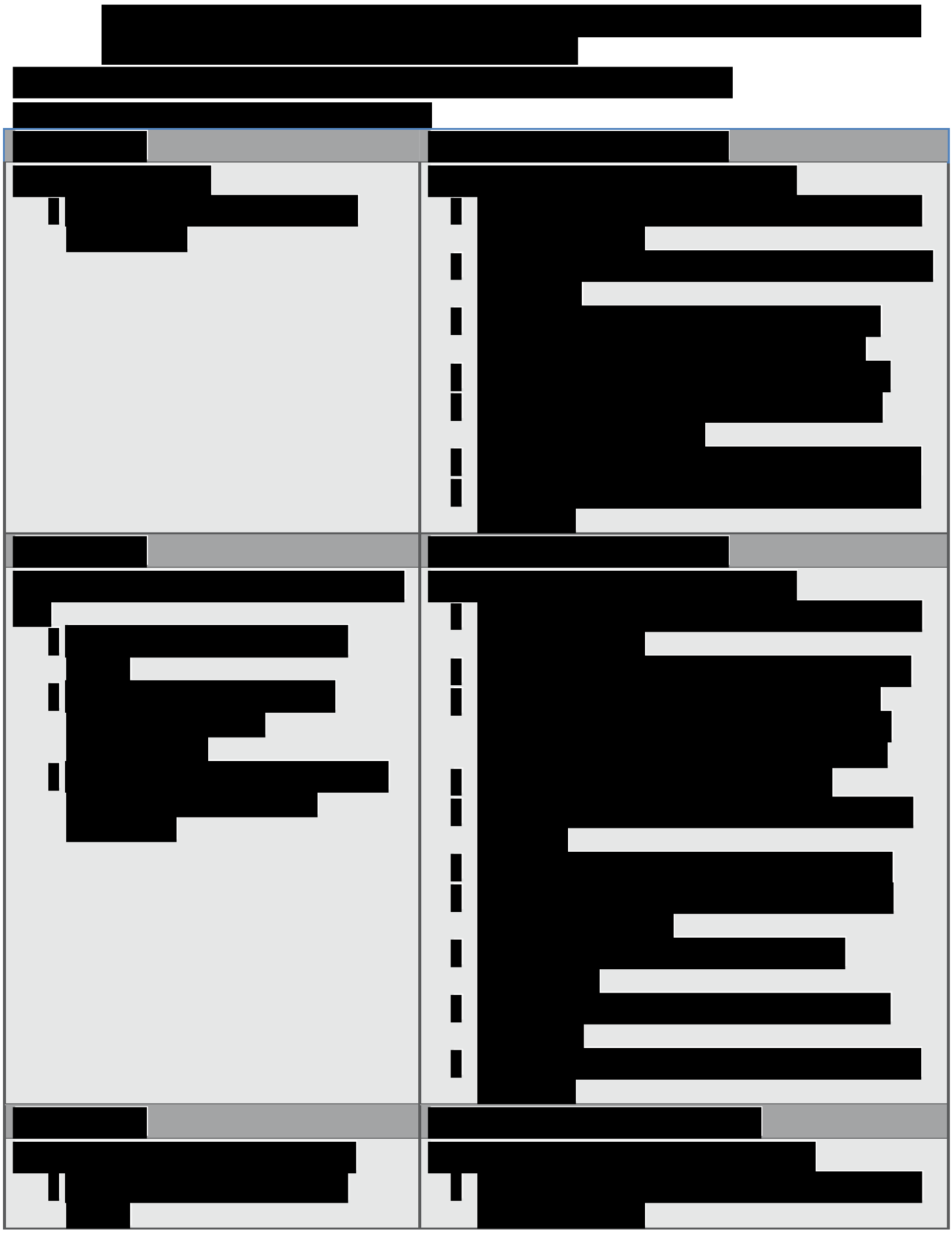


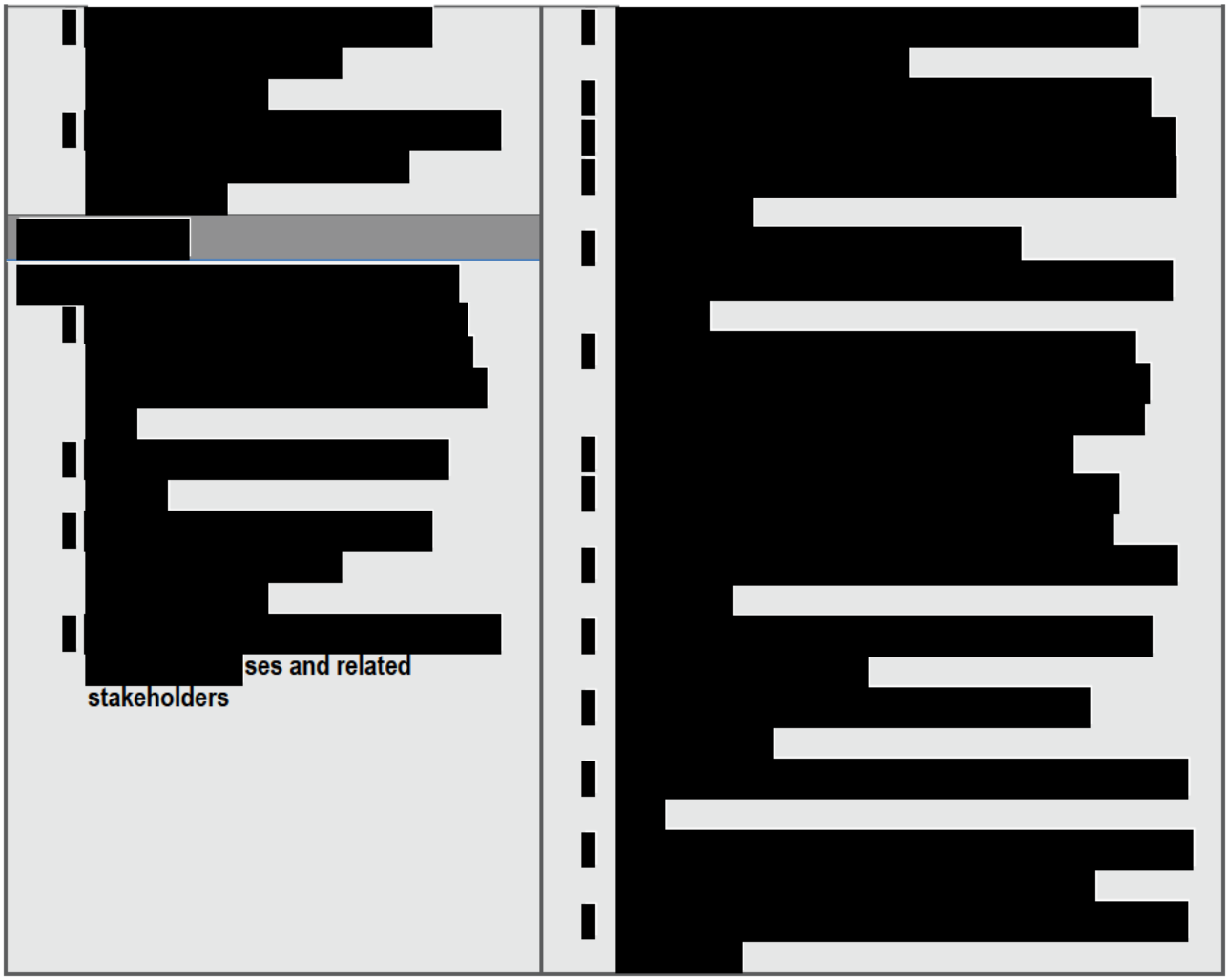
[redacted]

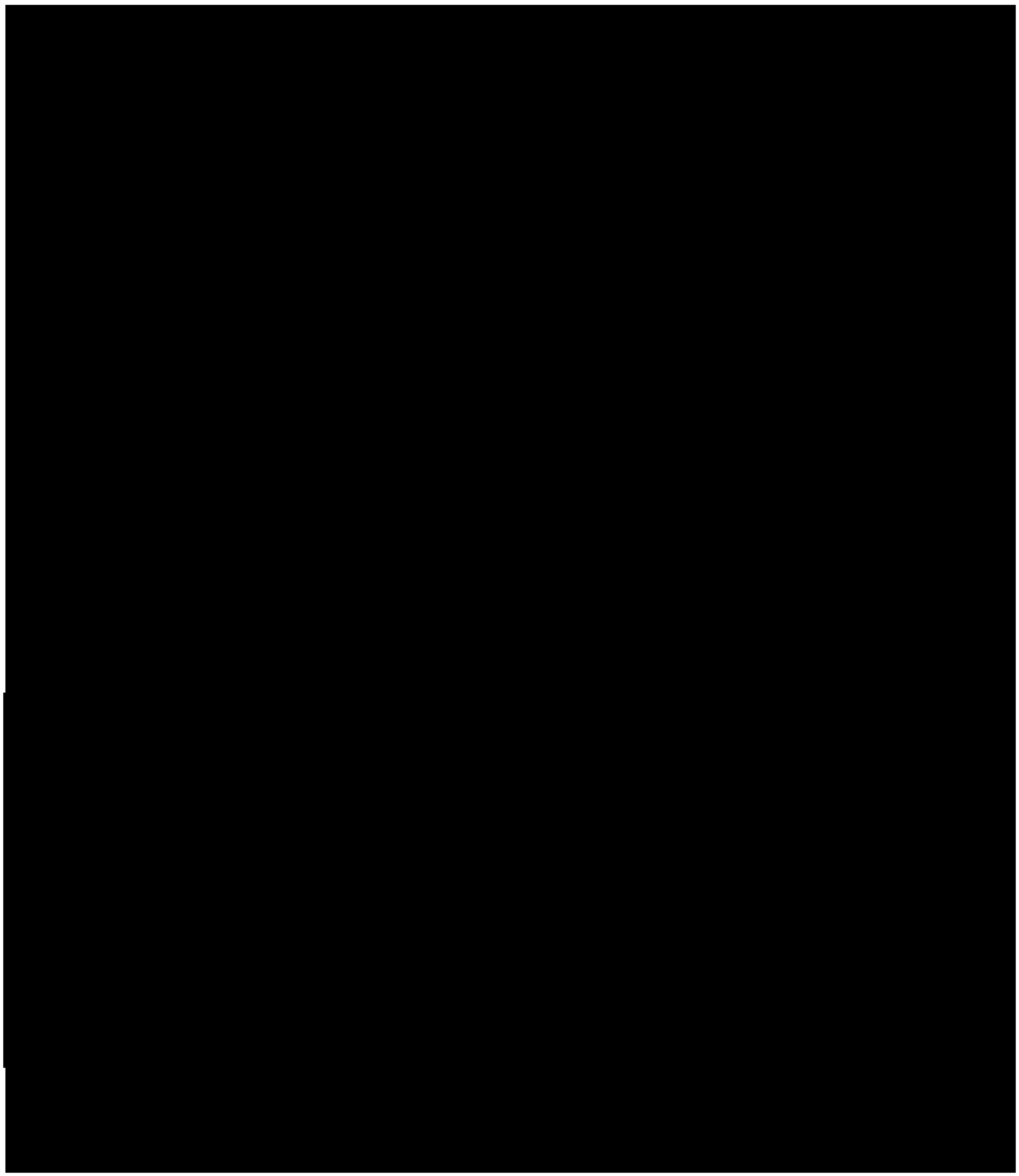
[redacted]

[redacted]






ses and related
stakeholders



14.7.10. Geographic and Other Special Constraints

There are no geographic constraints. Special constraints include the National Western Stock Show, as stated in Appendix H Draft Operations Management Plan, Appendix 2: Incident Response Plan.

14.7.11. Available Resources

Available resources to respond to incidents include the incident response team, risk manager and Courtesy Patrol. Details regarding these resources were previously discussed in Section 14.7.7.

14.7.12. Operational Procedures

Our operational procedures are defined in Appendix H Draft Operations Management Plan, Appendix 2: Incident Response Plan.

14.7.13. Detour Routes in a Catastrophic Incident

Detour routes are to be used in the event of a catastrophic incident along I-70 Mainline or ramps that would require a closure that is not permitted by any of Sections 2.11.6, 2.11.9, or 2.11.10. The Developer shall coordinate with any impacted Local Agencies if detour routes use Local Agency Roadways. Developer shall verify that the detour routes work for each traffic phase and stage throughout construction.

14.8. Coordinate and Work Cooperatively with the Corridor-Focused Transportation Management Organization (TMO) and the Department

Our team will coordinate and work cooperatively with the corridor-focused Transportation Management Organization (TMO) and the Department. Additionally, our team will:

- Provide four VMS boards used exclusively for TDM outreach
- Implement a grant program, in cooperation with the Department, during the first three years of the Operating Period. The grant program shall be funded by the 5280 Connectors and have a total amount of no less than $100,000. The program shall support community-based projects that reduce Vehicle Miles Traveled and encourage multi-modal options within the Project area. Such projects may include support for bus stops, sidewalks, bike lanes, and crossing guards at key pedestrian crossing locations. The Developer shall administer an annual competitive grant application program, open to all nonprofit groups, registered neighborhood organizations, and schools located within the Project area, to award the grant funds. Individual grants may be awarded in reasonable amounts to be determined by the Developer.
- Cooperate with the Department with regards to any dynamic ride-sharing programs established in the metro area.

14.9. Public Information Strategies

14.9.1. Approach to Coordinate TMP Activities with Obligations under Schedule 14 Strategic Communications

Throughout the Construction Period, 5280 Connectors will focus on developing Traffic Control Plans and Methods of Handling Traffic that minimize disruption to the traveling public along mainline, cross streets and adjacent construction projects. To successfully minimize the disruption, thorough planning, extensive communication and detailed execution must all come together. In order to properly communicate our strategy with the National western Center Redevelopment or other neighboring projects, we must first gain concurrence from our team and Project stakeholders and then coordinate our plan appropriately with neighboring projects. We intend to use a four-step approach in communicating our MOT strategy to the necessary parties:

1. MOT task force (high-level strategy), engages stakeholders as necessary
    a. Traffic control plans are developed
    b. Big-picture communication strategy to stakeholders
2. Internal Lead Contractor weekly traffic control meetings
    a. Discuss traffic control needs and MHTs that need to be developed and implemented
    b. Five week look ahead for traffic control
    c. Develop Lane Closure Reports

3. Weekly construction meeting with the Developer, the Communications Group, HPTE and the CJV
   a. Deliver construction schedule and traffic control schedule
4. Monthly Traffic Control Coordination Meetings with Neighboring Projects (CCD, CDOT, Neighboring Project Contractors, other stakeholders as necessary)
   a. Communication of forthcoming short-term traffic detours and closures
   b. Communication of other nearby construction projects and events

14.9.2. Checklist of items to be provided to the Department

Our checklist of items to be provided to the Department is provided in Figure 25.

Figure 25 | Checklist of Items to be Provided from 5280 Connectors to Department

Deliverable	Information, Acceptance, or Approval	Schedule
Developer's Communications Team Details	Information	Prior to the issuance of NTP 1. Updates submitted quarterly during the Construction Period, annually during the Operating Period and otherwise as required
Public Involvement Services Contact Sheet	Information	Prior to the issuance of NTP 1. Updates submitted annually and otherwise as required
Stakeholder Distribution List	Acceptance	Prior to the issuance of NTP 2. Updates submitted annually
Construction Period Communications Plan (CPCP)	Approval/Acceptance	Prior to the issuance of NTP 1 for Approval Updates submitted annually for Acceptance
Maintenance and Operations Communications Plan (MOCP)	Approval/Acceptance	Prior to Substantial Completion for Approval Updates submitted annually for Acceptance
CPCP Quarterly Report	Acceptance	10 Working Days after 90 Calendar Days after issuance of NTP 2; quarterly thereafter
MOCP Quarterly Report	Acceptance	10 Working Days after 90 Calendar Days after Substantial Completion; quarterly thereafter
Crisis Communications Plan (CCP)	Approval/Acceptance	Prior to the issuance of NTP 1 for Approval Updates submitted annually for Acceptance
Emergency response communications tree	Acceptance	Prior to the issuance of NTP 1
Traffic alerts/media releases	Acceptance	Weekly by Thursday at 10:30 a.m.
Lane Closure Reports	Information	Weekly by Thursday at 10:30 a.m.

Deliverable	Information, Acceptance, or Approval	Schedule
Newsletters	Acceptance	Five Working Days prior to scheduled quarterly distribution date during the Construction Period
Project identification sign layout	Acceptance	To permit installment by 14 Calendar Days following the issuance of NTP 2
Fliers, posters or other public material	Acceptance	As needed, five Working Days prior to the scheduled distribution date or, in cases of rapid response, 48 hours prior to distribution
Photos	Acceptance	Two a month or as requested Aerial photographs annually during the Construction Period
Video	Acceptance	One annually or at key project milestones
Social media posts	Acceptance	As needed, one Working Day in advance of inclusion on social media
Webpage content	Acceptance	Weekly or as often as reasonably required, two Working Days in advance of inclusion on the website
Weekly Meetings	Information	Weekly

14.9.3. Developer and Department Coordination of Checklist

Our Project Communications Manager and the Department's Communications Manager shall meet once per week to discuss public information and management Activities on the Project. The checklist shall provide the inclusion of supporting information relevant to coping messages and public awareness and shall be included in the Construction Period Communications Plan (CPCP), as described in Schedule 14 Strategic Communications.

14.9.4. MOT Task Force

5280 Connectors will establish a MOT Task Force to verify proper coordination with affected agencies. The MOT Task Force will include, at a minimum, the following people:

- Project Communications Manager
- Traffic Control Supervisor
- MOT Superintendent
- the Department
- RTD
- Denver Police Department-Traffic Unit
- Local Agencies (CCD, Commerce City, Adams County, and City of Aurora)
- Other stakeholders as necessary

5280 Connectors will submit the proposed list of the MOT Task Force members to the Department for Acceptance within 30 Calendar Days after issuance of NTP 1. Within 14 Calendar Days after Acceptance

of the proposed list of MOT Task Force members, we will hold a TMP kick-off meeting. The meeting will be used to develop agreement upon the level of detail required for the TMP.

The MOT Task Force will meet weekly, and will be an integrated component of the CPCP, as described in Schedule 14 Strategic Communications. 5280 Connectors are responsible for the preparation and distribution of agendas, meeting materials, and meeting minutes, and will submit the minutes to the Department for Acceptance in accordance with Section 9 of Schedule 8 Project Agreement.

14.9.5. MOT Task Force Weekly Meetings

The MOT Task Force will focus on TCPs generated for the corridor and will include the individuals listed above in Section 12.6.4. The task force group will meet each week to discuss agenda items such as:

- MOT Design Plan Review
- Stakeholder Comments
- Events
- Communication Plan
- Bus/Pedestrian/Bike Routes
- Local Business Access
- MOT Implementation Schedule
- Action Items and Responsibility

SECTION 2.1.14

APPENDIX G: DRAFT COVER DESIGN BASELINE REPORT

Overview

This Appendix G includes 5280 Connectors Draft Cover Design Baseline Report, which shall comply with the requirements set out in Schedule 10, Section12.11 (Cover Design Baseline Report) to the Central 70 Project (Project) Agreement.

It describes our system description that includes the schedule elements, incorporating information on concept proposals, design criteria, performance, durability, maintenance requirements and spares.

Highlights

- ITS communication system will allow operation of the Cover from the CTCMC
- CCMS is designed to provide monitoring and management for all electrical and mechanical systems
- Jet fan system provides both smoke control (in the event of a fire) and pollution control during heavy traffic periods
- Stainless-steel LED lane lighting system mitigates "black-hole" effect to provide safe transitions for drivers as they travel through the cover
- Equipment control center at Josephine and 42nd North will house our monitoring system to control monitors installed at various locations and work in conjunction with jet fans to remove toxic gases
- CCT cameras provide pan, tilt and zoom capabilities and are designed for direct integration into the CCMS for primary operational monitoring

5280 Connectors commits to designing, constructing, operating and maintaining a Cover facility that provides safe and efficient access by the travelling public.

We will collaborate with the Enterprises to promote our Cover design advantages to garner public support and will actively see public input into the naming of the Cover and in generating public support of the final design concept.

Appendix G

Cover Design Baseline Report

Central 70 Project

Volume 2
Technical Proposal

June 1, 2017

Cover Design Baseline Report Reviewer Reference Guide

The following table serves as a guide reference and summarizes the RFP requirements for the Cover Baseline Report with reference to the corresponding report sections.

RFP	FINAL RFP STATEMENT	APPENDIX G LOCATION	DRAWING REFERENCE
a.	System block diagrams for the overall CCMS, each cover subsystem, and any other systems or software that are related to the Cover operations	Exhibit 1	M001, M002, M003, M004, M005, M006, E002, E012, E018, E019, E020, E021, E022, E023, E025, E026, E028, E029
b.	Detailed logic and development plan for CCMS interfaces with other systems or software	To be provided as part of the Final Cover Baseline Report	
c.	Proposed ventilation system type and supplier	Section 3.1	M001, M002, M003
c. - i	Proposed ventilation design process	Section 2.3	
c. - ii	Approach to derivation of design adverse cover portal pressure condition due to the influence of meteorological conditions induced by a headwind at one Portal	Section 3.2	
d.	Proposed FFFS type and supplier	Section 5.2	M004, M005, M006
e.	FDAS type, model, and supplier	Section 7.7	E022
f.	CCTV camera system type, model, and supplier	Section 8.7	E021
g.	Operator interface system	Section 8.4	
h.	Monitoring and control system	Section 8.4	E020
i.	Proposed system operation, including temporary operation during construction	Section 12	M005, E016, E022, E028, E029
j.	Hydraulic and pneumatic calculations;	To be provided as part of the Final Cover Baseline Report	
k.	Computational Fluid Dynamics (CFD) analysis process, model, cases, and assumptions	Section 2.3	
l.	Cover Ventilation System (CVS)	Section 3.0	
m.	Proposed approach to demonstrating FFFS performance	Section 2.3	
n.	Analysis of the safety functions for all fire and life safety systems as prescribed in IEC61508-1	To be provided as part of the Final Cover Baseline Report	
o.	Proposed approach to passive fire protection as prescribed in NFPA 502, Section 7.3	To be provided as part of the Final Cover Baseline Report	
P	Lighting and signing	Section 10.2	E015, E026, M008
q.	Emergency way-finding signing	Section 10.4	E026
r.	ITS and communications system	Section 8	E018, E019, E020, E021, E022, E023, E025, E026, E028, E029
s.	Drainage	Section 11	

Contents

Figures

Exhibit

1.0 Introduction

1.1. Project Background

The I-70 East between I-25 and Tower Road is one of the most heavily traveled and congested highway corridors in the Denver region and the state. The Central 70 Project is a Design, Build, Finance, Operate, and Maintain Project Agreement which proposes to widen and reconstruct most of that corridor. As part of the reconstruction, the project proposes to remove the existing viaduct and widen and replace the highway with a below-grade section. Between approximate streets of Columbine and Clayton, a 1000-foot long bridge, the “Cover”, is proposed to maintain local street access and serve as an at-grade greenspace / landscaped connection between the communities north and south of the highway.

1.2. Purpose

This Draft Cover Design Baseline Report provides the system descriptions and basis of design for the auxiliary components of the Cover including Fire Life Safety, Lighting, Drainage, and Intelligent Transportation Systems and Communications.

These components will:

- Provide a level of safety for road occupants and users that is consistent with road transport infrastructure best practice in the United States.
- Achieve levels of safety and access for operations and maintenance staff during routine activities; and emergency service personnel during an incident.
- Limit the impact of any incidents within the roadway on the assets, and operation and maintenance of the roadway.
- Avoid any adverse environmental impacts and limit any unavoidable environmental impact to levels acceptable to the relevant authorities.

Unless otherwise specified herein, the system design, in addition to the terms of the Project Agreement, is governed by the standards, codes, policies, and regulations of the agencies listed below.

- American National Standards Institute (ANSI)
- American Society of Mechanical Engineers (ASME)
- American Society for Testing and Materials (ASTM)
- International Conference of Building Officials and Code Administration (IBCO)
- National Fire Protection Association (NFPA)
- National Electrical Code (NEC)
- Occupational Safety and Health Administration (OSHA)
- Underwriters' Laboratory Inc. (UL)
- Uniform Building Code (UBC)
- Uniform Fire Code (UFC)

2.0 Fire Life Safety

2.1. General

5280 Connectors has, with the support of team member Mott MacDonald, identified the following Fire and Life Safety (FLS) objectives for the Cover as follows:

- Provide a level of safety for road occupants and users that is consistent with road transport infrastructure best practice in the United States.

- Achieve levels of safety and access for operations and maintenance staff during routine activities; and emergency service personnel during an incident.
- Limit the impact of any incidents within the roadway on the assets, and operation and maintenance of the roadway.
- Avoid any adverse environmental impacts and limit any unavoidable environmental impact to levels acceptable to the relevant authorities.

The major C-70 Cover FLS provisions include:

- Longitudinal ventilation for smoke management and control of vehicle emissions;
- Fire detection system (linear heat detection);
- Fixed firefighting system (deluge type);
- Standpipe/hydrant system;
- Complete video coverage with Automated Incident Detection (AID);
- Communication systems;
- Emergency egress lighting;
- Emergency generators;
- Egress signage with directional indication;
- Local Control Facilities (a protected room at each end of the Cover for Incident Commander staging and standpipe system control valves);
- Cover Service Building (a building near the Cover to house power distribution equipment, fire pumps and the back-up control center)
- Emergency exit doors between roadways; and
- Full time tunnel operators and courtesy patrols.

2.2. Cover Design Fire Properties

Per the Project Agreement, the determination of tunnel system requirements is based on a design fire size of 30 MW with an ultra-fast growth rate. Fire growth, spread and duration are limited using a water based fixed fire suppression system. A 30 MW fire would be the equivalent of a heavy goods truck on fire where an adequately designed sprinkler system controls the maximum burn rate. The design fire size is specified in the Project Agreement as follows:

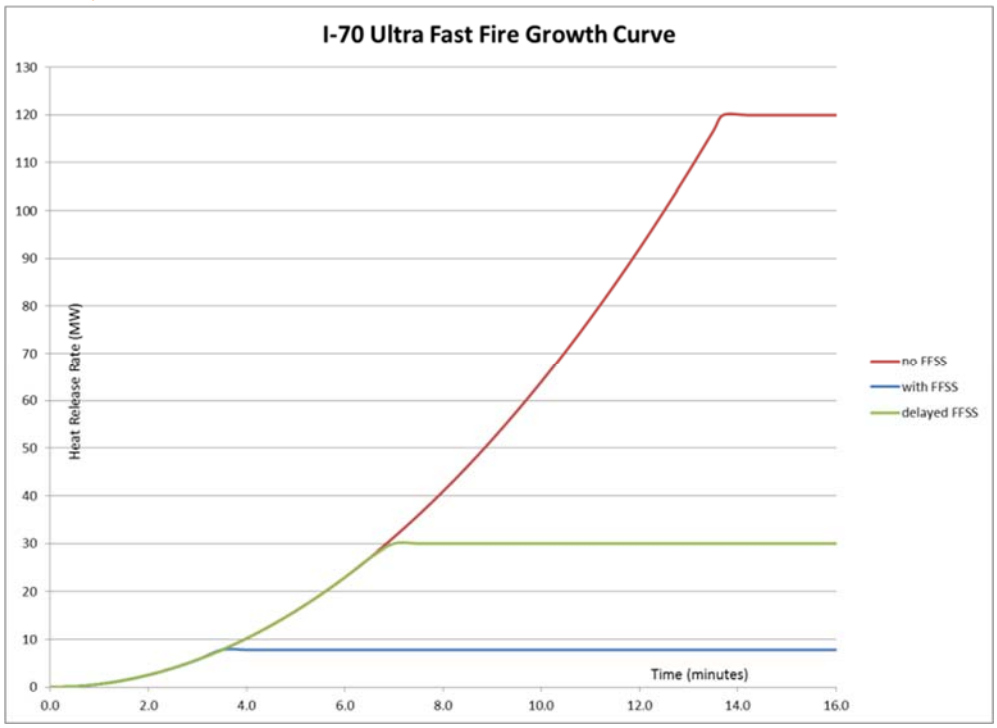
> *12.13.4.b.iv: The design fire size for the Cover MEP System shall be 30 MW convective peak heat release rate. The CVS is required to be capable of generating at least the critical velocity for smoke control for the design fire at the worst-case location in the Cover during an adverse Portal pressure condition*.

The description and substantiation of the 30 MW design fire size rate is within Concept Design Report titled “Ventilation and Fire Life Safety Report”, Version 4.0 (Amended by Technical Note, dated 20-Jan-2017) by Atkins North America.

When a fire begins, it does not emit its maximum Fire Heat Release Rate. It starts small and then grows at some rate until it reaches its ultimate or peak rate. It then burns at the peak rate for some time and then begins to decay. The rate of growth, length at peak and rate of decay depend largely on properties of the fuel, packing configuration, ventilation, available fire suppression systems and tunnel geometry. Based on 5280 Constructors team member Mott MacDonald’s analysis, the heat detection alarms will be initiated at approximately 90 seconds of fire growth when the heat release rate is approximately 4 MW.

How fast a fire grows is an important factor in design of suppression, detection, and ventilation systems as well as evacuation strategies (Figure 1).

Figure 1 | Fire Growth Curve



When a fire is developing, suppression activities are more effective than when the fire has reached its maximum size. In addition, some lag time usually occurs between fire detection and the activation of ventilation and/or suppression systems. Therefore, a realistic assessment of this lag time coupled with the fire growth rate is important when determining ventilation and suppression system effectiveness. Furthermore, an exiting strategy will be provided that allows motorists to escape the fire environment while it is still tenable, i.e. survivable.

The ventilation system for the Cover is a longitudinal ventilation system employing jet fans.

Ventilation of the tunnel for the control of heat and smoke during firefighting varies greatly due to such factors as fire size, tunnel grade, tunnel cross-section and direction of airflow. The velocity of air for smoke control is predicted using the methodology developed from studies conducted by the U.S. Bureau of Mines to determine the “Critical Velocity" at which longitudinal airflow overcomes the buoyant effect of the hot gases. The critical velocity was determined by manual calculation to be approximately 310 ft/minute for the Eastbound Cover and 325 ft/minute for the Westbound Cover to mitigate fire hazards from 30 MW fire size.

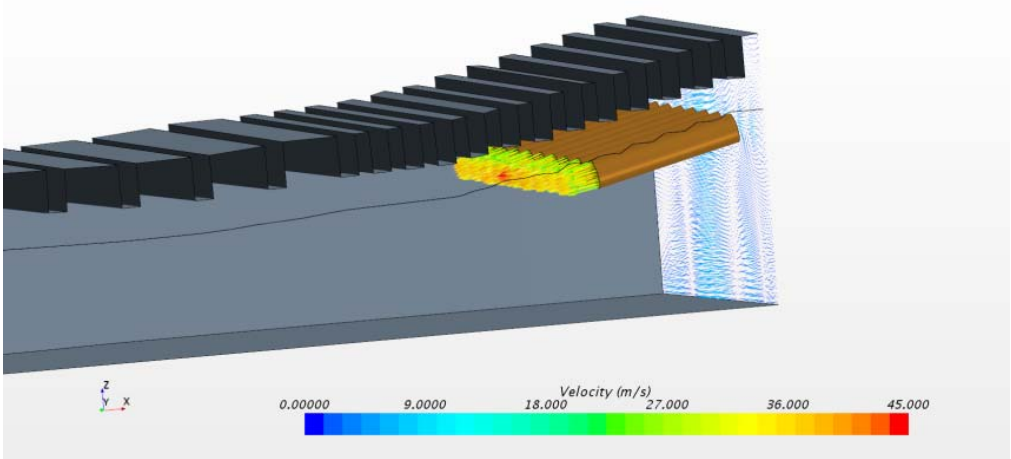
Manual fan performance calculations have been completed using a 14-mph adverse wind velocity, the buoyancy of the heated air, throttling effect of the fire, and the friction loss caused by the surfaces of the tunnel. These calculations yield the thrust needed by the jet fans to develop the required critical velocity approaching the fire.

2.3. Computational Fluid Dynamics (CFD) analysis process, model, cases, and assumptions;

CFD analysis is required per the Project Agreement. STAR-CCM+ (v10.04)[4] is the 3-D CFD software used for the smoke and ventilation design simulations. It is an integrated package for solving problems involving multi-physics (flow, heat transfer, combustion, etc.) and complex geometries. The software is also equipped with effective visualization tools allowing us to post-process the results and generate animations, iso-surfaces for temperature and airflow velocity, and vector field in the tunnels.

A case study to assess the jet fan system was undertaken with steady state CFD simulation performed for a fire incident involving a Heavy Goods Vehicle (HGV). The simulation is used to predict the amount of time a tenable environment exists for tunnel occupants to evacuate and for fire fighters to access the fire. A tenable environment is defined by NFPA 502 Standard for Road Tunnels, Bridges and Limited Access Highways, as a region where motorists and other tunnel occupants can safely evacuate to a point of safety within a prescribed period of time. This is estimated when the smoke layer drops below a height of 8.2 ft above the road surface. The simulation also confirmed the jet fan performance and placement is capable of providing indefinite tenable conditions for the design scenario modeled (Figure 2).

Figure 2 | Example of CFD Output with Airflow Distribution at Westbound Entrance Portal



To assess the results of the simulations a design event timeline is assumed for this design phase (Figure 3). The timeline will be re-examined once the Denver Fire Department can be consulted for their concurrence during the post award design phase. This timeline accounts for the time needed to recognize there is a dangerous fire in the tunnel and occupants start moving towards the exits (response time) and the time required to move to the entrance portal. In addition, firefighter response and activity is estimated.

The proposed deluge application rate for the cover is in line with existing highway tunnels and tunnels currently under design with emergency ventilation systems. Examples include the following:

- Interstate 5 (I5) Seattle, in 12 lanes
- Port of Miami Tunnel
- Presidio Parkway Tunnels – San Francisco
- Virginia Midtown Tunnel – Norfolk
- SR99 Alaska Way Viaduct Replacement

The topic of the effect of water application for design fire heat release rates is currently very active in the road tunnel fire life safety community. 5280 Connectors team member, Mott MacDonald is represented within PIARC (World Road Congress) and the NFPA 502 technical committees and therefore has access to globally accepted best practices in this area to provide a reasonable justification for the modified design fire heat release rate due to the presence of a deluge system.

Figure 3 | Event Timeline

Time Lapse (min:sec)	Event	Heat Release Rate (MW)
0:00	Fire Ignition	0
1:30	Fire Detection and Evacuation Begins	1.5
2:30	Confirmation of Fire: Activation of Fire Suppression System	4
3:30	Fire Suppression functioning at design capacity applied to roadway	8
6:30	Fire Department arrive (5 minutes after detection)	27
6:51	FFSS to limit heat release to 30 MW	30
13:42	Full Design Heat Release Rate (In absence of FFFS)	120

2.4. Key Owners Requirements from Project Agreement

12.13.12. *Computational Fluid Dynamics Model*

As part of the Fire System Performance Report, effective performance in operation of the combined FFFS and the CVS shall be demonstrated through analysis with a CFD model and comparison to data from full scale fire test tests and other data relevant to the proposed design. Should reasonable testing, data and performance be provided for the Developer's proposed design, new full scale fire tests are not a requirement. The CFD modeling shall be coordinated closely with and fully demonstrate the performance of the Developer's proposed design to the complete satisfaction of the AHJ.

12.13.13. Ventilation System Design

Information on ventilation system performance requirements, design criteria and the demonstration of how the design meets the requirements for Emergency operation… shall be placed in the Fire System Performance Report.

2.5. Emergency Response Plan

The C-70 Cover Emergency Response Plan will integrate the best practices into a consistent, comprehensive approach to incident management that is applicable to all jurisdictional levels and across all the incident responder disciplines. To insure the key issues have been addressed, the plan will be produced following procedures, and in a format similar to, that outlined by Colorado Department of Transportation's (CDOT) *Guidelines for Developing Traffic Incident Management Plans for Work Zones;* and the NFPA 502 and NFPA 1561 Standard on Emergency Services Incident Management System.

The C-70 Cover will have a dedicated staff and resources to operate the facility. 5280 Connectors will be responsible for traffic management and the safe operation of the Cover, including response to all incidents during the Operational Period. Incident management procedures will be developed as part of the Emergency Response Plan. These procedures will consider:

- Vehicle breakdowns;
- Vehicle collisions;
- Spillages and lost loads;
- Over height vehicles;

- Prohibited vehicles including Dangerous Goods Vehicles;
- Vehicles out of fuel;
- Pedestrians in the tunnel;
- Injury to persons and other reports received;
- Fire or smoke:
    - within the tunnel;
    - adjacent to the tunnel;
    - within support buildings;
- Multiple casualty incidents;
- Vandalism and criminal acts including bomb threats and terrorism;
- Natural hazards, including earthquakes and floods;
- Hazardous material incidents either accidently or intentionally; and
- Degraded modes of operation, such as;
    - Plant failures;
    - Electrical supply failure resulting in loss of lighting, ventilation, or other life safety systems;
    - Damage to the tunnel or any part of the tunnel;
    - Extreme weather conditions;
- Emergencies in the CTMS and maintenance depot;
- Vehicle queuing and emissions/air quality exceeding the acceptable level inside of the tunnel;
- Surrounding road/motorway closures adversely affecting traffic flow within the tunnels;
- Incorrect direction of travel; and
- Over-sized vehicles.

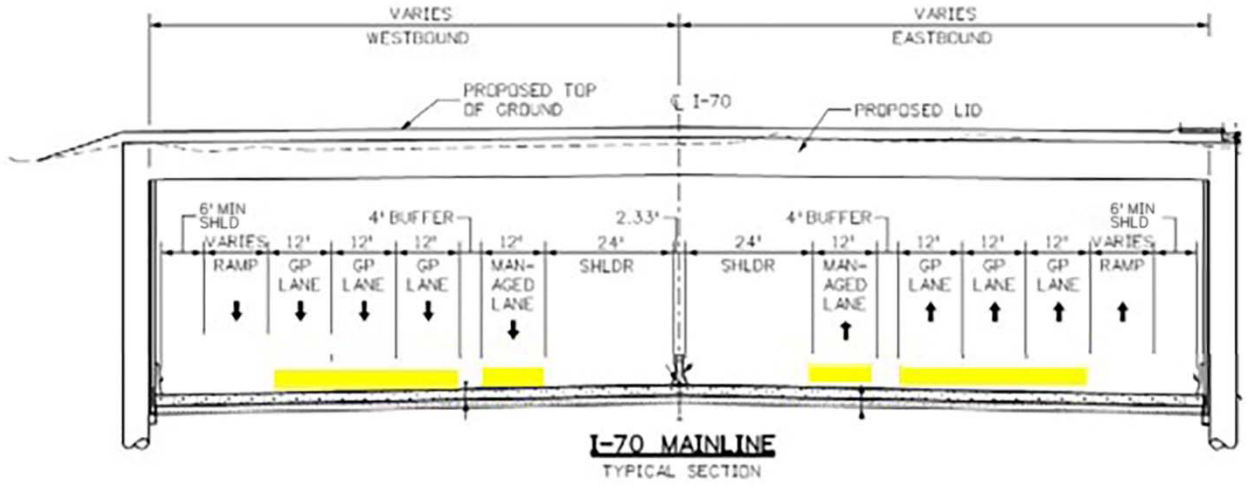
2.6. Primary Means of Access/Egress

The primary means of access for the tunnels will be through the portals. The Cover is relatively short in length but includes 3 emergency exits between the Cover roadways. A door is located 50’ into the tunnel from both the entrance and exit portals and one is locate at the tunnel mid-point.

Egress locations and emergency wayfinding signage are shown on Sketch M008.

The C-70 Cover consists of two adjacent roadway tunnels, each 1,000 ft long. The tunnels are approximately 18’ high from the roadway to the tunnel soffit, and vary from 90’ to 120’ wide at roadway to accommodate five 12’ wide lanes of unidirectional traffic. A full height, fire rated wall approximately 3’ thick, separates the tunnels. The I-70 Mainline pavement area under the Cover will have an inside shoulder; a Tolled Express Lane with inside shoulder; three General Purpose Lanes; and an outside shoulder. As shown in Figure 4 there is ample space for traffic to maneuver around an incident vehicle and clear the tunnel during an emergency.

Figure 4 | Typical Cross Sections



Active monitoring, control systems and operating procedures will be in place throughout the whole I-70 Project network to ensure that congested traffic is contained outside the tunnel. This monitoring and control will ensure the traffic performance is maintained to a level where the average speed in the tunnel is greater than 10 mph. Adhering to this strategy means that downstream occupants can continue to drive out the tunnel unaffected, and enables early activation of the tunnel ventilation for smoke control to maintain tenable conditions for upstream occupants. In the unlikely event of a tunnel evacuation, occupants are to self-egress via emergency exit doors to the non-incident tunnel or out the portals.

Egress signage will comply with NFPA 170 Standard for Fire Safety and Emergency Symbols.

Monitoring of the Cover by trained 5280 Connectors operations staff will be provided within a proprietary supervising station at CDOT's Colorado Transportation Management Center (CTMC). These tunnel operators will have the capability of quickly identifying an incident in the tunnel and rapid initiation of the emergency response measures such as immediate road closure, expedite traffic removal from the tunnel, notification of the Denver Fire Department, and assisting in evacuation of the tunnel. Additionally, Courtesy Patrol Service is to be provided for the Project. The purpose of the service is to reduce congestion and potential safety risks on the Project by continuously patrolling within the Project during peak and non-peak traffic hours and weekends.

Communication with the tunnel occupants will be achieved with the following items acting as part of the evacuation management:

- Public Address – This mass notification system provides live or pre-recorded messages through high fidelity speakers to people within the cover and can direct them to zoned areas and doors for tunnel evacuation. This system is interlocked with the fire alarm system and CCMS (Cover Control and Monitoring System) to silence alarms while message play.
- Radio Rebroadcast System - in addition to rebroadcasting radio systems within the tunnel, the system allows interruption into the car radio systems and playing either live or pre-recorded evacuation messages.
- Traffic provisions – Through the CCMS and Intelligent Transportation System (ITS) equipment, allows closure of one or both portals, warns the non-incident bore of evacuating occupants, and interfaces with the Access Ramp Metering Systems.
- Lighting – Emergency Egress Lighting is activated by the Fire Detection System and is controlled through the CCMS to help people locate exit points in the event of an emergency.

In summary, the base strategy for tunnel egress during a fire incident is for vehicles downstream of the fire to continue driving out of the tunnel. Protection is afforded to motorists at the fire by activation of the deluge system to prevent propagation of the fire; and the Cover Ventilation System directing the smoke downstream. This process will keep the motorists upstream of the fire in the tunnel in a stream of fresh air and permit a controlled evacuation, if deemed necessary, by the tunnel operators or incident commanders.

2.7. Local Control Facility

Rooms with facilities and equipment for use by the Fire Department's Incident Commander are located at each entrance portal, on I-70 roadway grade. The following facilities and systems are provided in the Local Control Facility:

- Fire main manual wheel valve to allow the dry standpipe hydrant main to be filled from the water supply (automated control to be provided as a backup);
- Control panel with override facilities and status indicators for the FFFS;
- CCMS control panel with direct override controls and status indicators for the ventilation control system;
- Fire Alarm Control Panel (FACP);
- Fire Department connections to connect sufficient hoses to supplement FFFS should supply fail (At Local Control Facilities);
- Local control workstations for interface to the CCMS and video monitoring of the Cover;
- Radio and Communications Equipment; and
- Electrical Distribution Equipment and disconnects.

2.8. Cover Service Building

The Cover Service Building will house electrical and electronic equipment, fire pumps, a back-up control room. See Chapter 9 for a detail description and Sketch E010 for a proposed floor plan.

2.9. Design Standards and Codes

The following documents will be used for the design of Fire Life Safety work:

Fire/Life Safety criteria for road tunnels are based on NFPA 502 Standard for Road Tunnels, Bridges and Other Limited Access Highways, 2017 Edition.

Fire/Life Safety standards and codes including the latest editions of:

- NFPA 10: Standard for Portable Fire Extinguishers
- NFPA 13: Standard for the Installation of Sprinkler Systems
- NFPA 14: Standard for the Installation of Standpipe and Hose Systems
- NFPA 20 Standard for the Installation of Stationary Pumps for Fire Protection
- NFPA 24: Standard for the Installation of Private Fire Service Mains and Their Appurtenances
- NFPA 70: National Electrical Code
- NFPA 72: National Fire Alarm Code
- NFPA 101: Life Safety Code
- NFPA 110: Standard for Emergency and Standby Power Systems
- NFPA 170: Standard for Fire Safety and Emergency Symbols
- NFPA 502: Standard for Road Tunnels, Bridges and Other Limited Access Highways
- NFPA 1963: Standard for Fire Hose Connections

3.0 Cover Ventilation System (CVS)

3.1. General

The Cover Ventilation System operation can be grouped into three distinct modes:

3.1.1. Normal Operations

Normal Operation includes all free-flowing and congested traffic scenarios. The goal of the system in this mode is to maintain in-tunnel air quality and if required, restrict portal emissions. The CVS operation will be varied throughout the day based upon time of day, traffic volumes, traffic speed, in-tunnel air quality and portal air velocity. In-tunnel pollution sensors will monitor the air quality and visibility. If the in-tunnel pollutant levels reach a set-point, an automatic response from the CVS will be initiated to maintain in-tunnel conditions to within the design criteria. Air velocity sensors will monitor the portal inflow condition and will trigger changes to the ventilation operating mode depending upon whether the portal inflow is too low or too high. Congested traffic is slow-moving (and stop-and-go) traffic typically considered at 12 mph or less. The minimum air requirements are based on the following maximum pollutant levels:

- Carbon Monoxide, CO: 120 ppm
- Nitrogen Dioxide, NO2: 1 ppm
- Nitric Oxide, NO: 15 ppm
- Particulate Matter, PM: 0.007 m-1 extinction coefficient

3.1.2. Emergency Operations

Emergency operations are invoked in the event of a fire incident within the tunnel or near the portal. The operation of the Cover Ventilation System will depend upon the smoke management strategy which differs depending upon the traffic condition. In the cases where smoke management is instigated, jet fans will be used to maintain a minimum velocity (critical velocity) across the fire to limit back-layering of smoke. This will provide a tenable egress path for tunnel occupants and tenable access for the fire service upstream of the fire. Jet fans in the non-incident tunnel will not be operated as this could cause smoke to be drawn into the non-incident roadway by smoke recirculation at the portals. Operation of the jet fans will be via an automatic response to a fire system alarm or a manual request from the 5280 Connectors Operator staff. Full manual control will also be available for the emergency services personnel at either one of the Local Control Facilities or the Cover Service Building.

3.1.3. Maintenance Operations

During maintenance operations, the CVS will operate to achieve fresh air and temperature requirements. The CVS will be operated manually. Ventilation of the tunnel for tunnel workers is based on US Occupational Safety and Health Administration (OSHA) requirements.

3.2. Cover Ventilation Equipment

Jet fan locations and details are shown on Sketches M001, M002, and M003.

Jet fan sizing is based on the most stringent of the two conditions: (1) the rate required for acceptable levels of air pollution in the tunnel during congested traffic operations, and (2) the rate required for control of smoke and hot gases.

The ventilation equipment will be heat resistant so it can operate under sustained fire exposure temperatures. Fans used during fire emergency will remain operational for a minimum of 1 hour in an air stream temperature of 482ºF.

A single row of jet fans will be located near the entrance portal. The intake end of the fan is a couple feet from the portal face. No installed, redundant jet fans are included in this proposal. No loss of fans, due to high temperature destruction, is assumed in the design because of the limited possibility of a fan loss due to direct exposure to the fire. In addition, the overhead deluge system will be able to considerably cool

down the fire and hence the potential loss of a fan during a fire becomes less of an issue. If a fire does occur below a row of fans and there is loss of equipment, the entrance portal will still be less than 10 ft away and therefore no occupants behind the fire. In keeping with the Project Agreement requirements, jet fan spares are expected to be two complete jet fans and will be stored under environmentally controlled conditions.

An adverse wind of 14 mph has been used for sizing the jet fans. An adverse wind blows against the exit portal opposing the longitudinal flow through the tunnel generated by the jet fans. The basis for 14 mph wind is the wind rose for Denver International Airport. The adverse wind velocity source is the Concept Design "Ventilation and Fire Life Safety Report".

Preliminary jet fan selection has been based upon a nominal factory thrust rating of 300 pound-force (lbf) per jet fan. This preliminary jet fan selection has been based on balancing minimising total equipment, installed system performance (including in-tunnel acoustics) and operating costs. Jet fans will be unidirectional to meet operational requirements.

The concept design including all space-proofing exercises has been based upon the following jet fan characteristics:

- Nominal factory thrust: 300 lbf
- Fan diameter: 45" interior diameter
- External unit diameter: 52"
- Unit length (including silencers): 20'
- Installed inclination angle: 15 Degrees (maximum)
- Sound Attenuation: 2D silencer on the inlet and outlet

One jet fan row will be installed at each entrance portal to achieve reasonable aerodynamic efficiency. Based upon the proposed installation, an installation factor of 0.80 has been estimated.

- Eastbound Cover: 10 fans
- Westbound Cover: 9 fans

The operational noise level at 5' above the roadway will be no greater than 90 dB(A) for the preliminary fan selection. This noise level is within the Minimum Requirements and does not detrimentally impact the PA system during emergency operations. The final acoustic performance of the system will be dependent upon the final fan selection and tunnel finish.

Based upon preliminary equipment selection it is estimated that, each jet fan will require at least a 60 HP motor. Jet fans will operate at 480 Volts.

A Ventilation Control System (VCS) for the CVS will be integrated into the Command Control and Monitoring System (CCMS) to:

- Permit interface between the operator and CVS equipment components;
- Provide automatic ventilation control in normal operations, ensuring the Cover is maintained within required environmental conditions that can be adjusted when required;
- Operate in real time to provide live monitoring, control, and fault reporting of the CVS equipment;
- Provide real time indication of status and alarm conditions at various operator locations;
- Interface with and provide data transfer between related systems;
- Provide a secure interface between the CVS equipment and the automatic incident/fire detection systems in the event of fire in the Cover; and
- Minimize effects and constraints on tunnel operations through automatic reconfiguration modes in the event of plant failure or routine maintenance activities.

3.3. Interim Phase Ventilation

The Interim Phase is the period during construction when traffic is traveling through the tunnel in both directions. The Westbound bore will be completed first and all traffic will be routed through. During the Interim Phase, an opening will be provided in the roof to aid in naturally ventilating the tunnel for both normal and emergency operation. The opening will be approximately 60 feet long with Cover deck left-off girders to provide opening area.

3.4. Key Owners Requirements from Project Agreement

Select relevant excerpts from the Project Agreement have been identified below.

12.13.7. Jet Fans

- *The jet fans shall be of the horizontal shaft unidirectional type complete with silencers with bell mouth on both ends of the jet fan.*
- *The jet fans may be inclined, fitted with adjustable air flow directors or fixed deflectors for setting the optimum jet effect.*
- *The complete jet fan assembly, including but not limited to the fan, fan motor and cables shall be capable of operating in the ambient temperature (100 deg F) during normal operation.*
- *Anti-vibration mountings shall be provided.*
- *Jet fans shall be equipped with vibration monitors.*
- *The design shall be such that under Emergency operations any vibration alarms shall be inhibited and shall not result in the switching off of a jet fan.*
- *Jet fans shall be equipped with motor temperature monitors.*
- *The design shall be such that under Emergency operations any motor temperature or vibration alarms shall be inhibited and shall not result in the switching off of a jet fan.*
- *The complete fan assembly, including but not limited to the fan, fan motor and cables, shall be designed and installed such that it not suffer mechanical, electrical or structural failure when operating at full capacity in smoke laden air with an ambient temperature of 482°F for a minimum period of one hour.*
- *The whole fan assembly shall be waterproof and capable of withstanding water spray from maintenance washing vehicles and the FFFS.*
- *Fan motors shall be suitable for use in the corrosive atmosphere; suitable for use with soft starters; and be totally enclosed fan ventilated cage rotor type.*
- *Fan motor shall be capable of being run in an inclined position, not greater than 15° from the horizontal with no detrimental effects.*

3.5. Jet Fan Suppliers

Two jet fan suppliers have been providing product information, Howden American Fan Company, and Clarage Fan Company. Both are long standing providers of road tunnel jet fans.

4.0 Tunnel Environment Monitors

Sensors are required to monitor the air quality and average tunnel air velocity throughout the system. Measurements from these sensors will be used to inform the control of the Cover Ventilation System. The Pollution Monitoring System will interface with the Ventilation Control System via the CCMS so that ventilation rates in the Cover can be set automatically, per dilution requirements.

4.1. Air quality

Per the Project Agreement, Air Quality (AQ) sensors are required to monitor the in-tunnel concentrations of carbon monoxide (CO), nitrogen oxide (NO) and nitrogen dioxide (NO2). The visibility level, measured as the extinction coefficient of light through the air, will also be measured to determine the level of Particulate Matter (PM) in the tunnel. Where possible a single monitoring unit that measures all of these properties will be used.

Three AQ monitors will be installed within each tunnel roadway, at locations near where the worst levels are anticipated for the occupants. Multiple units are required to ensure availability. For the measurement of pollutants, at least two sampling points shall be provided at each side of the roadway (eight in total). The location of sampling points will be selected to avoid dilution by air circulating from the portals.

If the 5-minute averaged AQ values exceed the control setpoints for any AQ sensor and any measurement (CO, NOX Vis), a calculated number of jet fans will turn on in the incident tunnel. No further control action will occur from this time for the Stabilisation Period (A period of time after a control action where no other control action is to occur unless required by the control logic). Upon expiration of the Stabilisation Period, the AQ is re-evaluated and if still above the control setpoint, an additional jet fans shall turn on. If below the control setpoint jet fans are to be turned off.

4.2. Velocity

Velocity sensors will be used to monitor portal inflow conditions and will be used inform the TV system operation during fire incidents where providing a minimum air velocity is required. Six air speed and direction monitors will be installed: two in each roadway of the Cover to provide information to the operator on the flow speed and direction of air inside the Cover and two outside the Cover near to each Portal at a location suitable to provide information on external ambient wind conditions to the operator.

4.3. Key Owners Requirements from Project Agreement

Select relevant excerpts from the Project Agreement have been identified below.

12.13.10. Monitoring Equipment and System

- *A logical method for control shall be developed for normal, maintenance and congested operations and safeguard the fans from frequent switching.*
- *Pollutant and visibility monitors shall be located adjacent to the traffic lanes in the Cover, at locations where the worst level is anticipated.*
- *All monitoring equipment shall be calibrated to represent the average air quality within the Cover; stored for analysis.*
- *Data to be recorded shall include pollution levels, Cover air speed, fan operations and alarm states.*
- *For the measurement of pollutants, at least two sampling points shall be provided at each side of each roadway of the Cover (eight in total). The location of sampling points shall avoid dilution by air circulating from the Portals.*
- *Monitoring equipment shall not be installed near to jet fan inlets and outlets so as to affect the performance of the CVS.*
- *Six air speed and direction monitors shall be installed: two in each roadway of the Cover to provide information to the operator on the flow speed and direction of air inside the Cover and two outside the Cover near to each Portal at a location suitable to provide information on external ambient wind conditions to the operator.*

4.4. Environment Monitor Suppliers

Potential suppliers are Drager, Sick or MSA.

5.0 Fixed Fire Fighting System (FFFS)

5.1. General

The provision of an appropriately designed water based FFFS for the Cover will mitigate the potential for fires to grow and spread to involve multiple vehicles. The FFFS is designed to achieve the following objectives in the event of a vehicle fire in the Cover:

- To control the fire and limit peak heat release rate and smoke production;
- To reduce temperatures near the fire to aid self-rescue operations;
- To reduce temperatures near the fire to reduce likelihood of fire spread; and
- To maintain conditions that are reasonable for Fire Department intervention.

The FFFS is being designed to limit the maximum heat release rate to be handled by the CVS to 30 MW convective heat release rate. The design case considered is a heavy goods truck with an ultrafast fire growth rate per NFPA 92 up to a maximum of 120 MW (a fire that grows in the absence of a FFFS).

5.2. System Description

A plan view of the FFFS is shown on Sketch M004 in the Appendix. Sketch M005 describes the arrangement of the FFFS during the Interim Phase. The Interim Phase is the period during construction when traffic is traveling through the tunnel in both directions.

The FFFS for the Cover will be a deluge sprinkler type system. Deluge systems discharge water through an array of open spray nozzles simultaneously over a given coverage zone. The zones are 100 feet in length and cover wall-to-wall. Water is supplied from the public utility in a wet pipe main to one or more automatic deluge valves. Valve actuation allows water to discharge into the previously dry distribution piping network and through the open spray nozzles along the tunnel ceiling.

Because the outboard Cover walls taper each zone has a unique area. The largest area of 2 adjacent zones is approximately 23,500 sf.

Design density for a standard deluge rate is 0.2 gpm/sf.

Based on the largest area for two adjacent deluge zones 4,700 gpm is need to supply the deluge system. Note, this excludes water to be provided to the standpipe/hydrant system which is an additional 750 gpm.

Water flow includes the ability to cover a vehicle at the incident zone boundaries. This can include multiple zone operation or overlapping zones.

5.3. Water Supply

An analysis of local water supplies by the project civil engineers has determined adequate flows can be made available for the FFFS. No storage tank is needed for the FFFS. However, fire pumps will be needed to provide the operating pressures.

5.4. Fire Pumps

Fire pumps are necessary to provide the minimum pressures at the most hydraulically remote deluge nozzle for the FFFS. Three pumps are required, two operating and one standby. The pumps and related equipment will be designed to conform to NFPA 20 Standard for the Installation of Stationary Pumps for Fire Protection.

5.5. System Control

Control of the deluge valves is typically automatic or semi-automatic responding to inputs from a fire detection system. When fire, heat, or smoke is detected in a deluge zone, the valve is either automatically opened by a signal from the detection system via the Fire Alarm Control Panel (FACP) or by an operator responding to a trouble alert on the SCADA monitor. Zone actuation is limited to two zones at any given time.

The deluge water system may be started manually or start automatically if it receives an alarm from the linear heat detector. If a high temperature causes an alarm, the system will activate an audible alarm and a visual indication on the SCADA monitor screen. If the notification of a fire occurs via the linear heat detector the operator the following sequence begins for the deluge system:

- 0 Seconds - Alarm from LHD
- 1-15 Seconds – Acknowledge alarm or system discharges after 15 second
- 16-120 Seconds – Investigate, activate or abort system
- 120 – Automatic activation if no abort command given and the alarm is not cleared

Alarms are acknowledged and manual activation of the FFFS is through the CCMS SCADA interface. A CCMS workstation will be located at either local cover portal building and the main interface will be remotely at the CTMS.

If the operator does not acknowledge first alarm the system will discharge and water will spray the programmed zones for the alarm location. If the alarm is acknowledged and no action (abort) is taken after 120 seconds, then the system will discharge and water will spray the zones programmed for the alarm location. The operator has the option of activating the deluge system in adjacent zones. Manual activation and stop can be initiated at any time.

5.6. FFFS System Vaults.

Five vaults will be provided to house and protect the FFFS deluge valves. The vault interior dimensions need to large enough to accommodate:

- Four deluge valves,
- Shut-off valves
- Water main supply header,
- Lights,
- Heater (room air temperature to be no less than 40 deg F),
- Dehumidifier,
- Electrical panel,
- Electronics panel to interface with the fire alarm control panel,
- Vault drain or sump (6000 gpm flow through the waterline),
- Access stair or ladder,
- Lugs to hoist the deluge valves into place; and
- Vault ventilation.

The vault located on the far west end needs to have additional space for the standpipe system's electric actuated valve (automated control valve).

5.7. Key Owners Requirements from Project Agreement.

Select relevant key excerpts from the Agreement have been identified below.

12.14 Fixed Firefighting System

- *The entire Cover shall be protected by the FFFS, which shall be zoned.*
- *Water supply provided in accordance with NFPA and Fire Department requirements (Once FD is available for consultation during next design phase).*
- *Section valves to create suppression zones of the minimum section length of 80 foot to 100 foot in length.*

The figures in this report assume 2 x100' zones.

- *Two zones are activated during a fire.*
- *Dry secondary distribution pipework at high (soffit) level of the structure to feed the suppression nozzles above the traffic lanes.*
- *Suppression nozzles connected to the secondary distribution network.*
- *The Developer shall design, install and commission a water supply system to provide water supply for the FFFS.*
- *The water demand for the FFFS shall be sized based upon a minimum demand of 30 minutes of simultaneous operation for two zones in the event of a fire.*
- *The water supply shall be adequate to provide water at the minimum working pressure required by the FFFS. Under dynamic full fire flow conditions, all locations within the system shall be demonstrated to have adequate pressure for the FFFS.*
- *Operation of the FFFS shall not reduce the operating pressure or flow rate of the Cover standpipe system and vice versa.*
- *Arranging the source of the FFFS water supply, which shall be (i) direct mains supply from the local/municipal water company, (ii) capable of supplying the system minimum demand at the most disadvantageous location for the pipeline system for the required period and (iii) at a water quality that complies with the manufacturer's requirements.*
- *The FFFS shall be equipped with pump station to be located in a designated pump room.*
- *Pump units shall consist of one or more pumps and driven by electrical motors. The electrical power supply shall be dual redundant with automatic switch over.*
- *Pump sets shall be arranged with at least one pump available as a standby in the event of a duty pump failing.*
- *The pump station shall be capable of delivering 110% of the full design flow rate demanded by the FFFS at the required system pressure to supply the protected area - the two spray zones within the Cover - at the minimum pressure specific to the nozzle.*
- *The water and fire mains shall be adequately insulated and trace heated where subject to freezing. The mains passing through the Cover shall be insulated and trace heated.*
- *Trace heating shall be monitored on the Developer's Command Control and Monitoring System (CCMS).*
- *Fire suppression distribution mains shall be insulated and trace heated up to the section control valve as directed by the system provider.*

5.8. FFFS Suppliers

Preliminary suppliers include (to be determined after award):

- Fire Pump: Patterson Pump Company
- Sprinkler Heads: Reliable Automatic Sprinkler company
- Grooved Fittings: Victaulic Company
- Flow, Tamper & Pressure Switches: Potter Electric Signal Company

5.9. Hydraulic and pneumatic calculations;

Provided with the Final Basis of Design Report

6.0 Standpipes, Hydrants and Portable Fire Extinguishers

6.1. General

The tunnels will be provided with a Class 1 dry standpipe system conforming to NFPA 14, Standard for the Installation of Standpipe and Hose Systems.

A plan view of the standpipes, hydrants and fire extinguisher locations is shown on Sketch M006. Sketch M007 describes the arrangement of the standpipes, hydrants, and fire extinguishers during the Interim Phase.

Standpipe connection stations are located along each wall and spaced at intervals of less than 230 ft along the outside and inside walls of the Cover. Standpipe connection stations are part of a complete cabinet called an “Emergency Point”.

Emergency Points are fabricated of grade 316 stainless steel stainless steel and contain portable fire extinguishers, the emergency telephone, hose connections, and manual call points. The cabinets will be in recesses in the side walls of the Cover to finish flush with the wall surface. The cabinet’s face is flush mounted to the wall as shown in Figure 5.

Signage will comply with NFPA 170 Standard for Fire Safety and Emergency Symbols.

Figure 5 | Emergency Points

6.2. Standpipe

The standpipe system consists of a water supply system, piping, back flow preventers, isolation valves, air vents, drains, fire pumps, and standpipe connection stations located throughout the tunnel. The standpipe system will be an automatic dry system that is filled on demand with water at a sufficient pressure to provide the required flow and pressure at each hose connection. Longitudinal mains run the length of the tunnels beneath the roadway, along the inside westbound and eastbound walls to feed the standpipe connection stations at the specified intervals. Laterals extend beneath the roadways to a standpipe connection station mounted on the outside wall opposite each inside wall standpipe connection station. The system will be designed to deliver 750 gpm for a maximum anticipated duration of two hours, at a pressure at the hose valves of 100 psi with simultaneous operation of the fixed fire suppression system. The required 100 psi residual pressure will be attained with the help of fire pumps or department pumper trucks connected to the fire department connections at the portals. The standpipe system has at least one direct connection to the permanent city water supply. Backflow preventer protection will be provided.

6.3. Fire Department Connections

Free standing Fire Department Connections (FDCs) will be located outside each entrance and exit portal. FDC are located at the I-70 roadway level. A two-way Siamese coupling will be provided at each FDC to allow the Fire Department to provide back-up water supplies. City hydrants will be provided near the FDC.

6.4. Fire Pumps

Fire pumps are necessary to provide the minimum pressures at the most hydraulically remote hose connection. Two pumps are required, one operating and one standby. The pumps and related equipment will be designed to conform to NFPA 20 Standard for the Installation of Stationary Pumps for Fire Protection.

Water pressure with the fire water supply system is monitored through the CCMS. Low pressure will trigger alarms displayed within the CCMS.

6.5. Fire Extinguishers

Portable fire extinguishers will be provided with a rating of 2-A: 20-B: C and located in each of the emergency point cabinets. The maximum weight of the extinguishers is 20 pounds. The installation will be in accordance with NFPA 10.

6.6. Key Owners Requirements from Project Agreement

Select relevant excerpts from the Project Agreement have been identified below.

12.20 Standpipes, Hydrants and Portable Fire Extinguishers

- *The standpipe system shall be a Class 1 dry pipe system supplied from the municipal water company mains supply.*
- *Mains supply is capable of supplying the system demand for a minimum period of one hour.*
- *Deliver water to all hose connections on the system within 10 minutes or less.*
- *Provide suitable water pumping equipment complete with jockey pump to maintain system pressures.*
- *The required flow rate shall be 750 gpm at the hydraulically most demanding outlet.*
- *Allowance shall be made for two hydrants operating simultaneously.*
- *The minimum residual pressure at the hydraulically most remote 2.5 inch outlet shall be 100 psi.*
- *Pressure restricting valves shall be provided where the hydraulic head exceeds 100 psi.*
- *Hose connection spacing shall be such that that no location within the protected area is more than 150 feet from the hose connection.*
- *Hose connection spacing shall not exceed 275 feet.*
- *The entire standpipe system including valves shall be protected against freezing and shall be complete with all necessary status monitoring and alarms linked to the CCMS system.*
- *Suitable back flow prevention devices shall be installed to prevent contamination of the water Company supply and distribution system.*
- *The standpipe system shall be provided with drain points to enable the entire system to be drained down.*
- *A two way Siamese coupling shall be provided at both ends of each roadway to allow the Fire Department to provide back-up water supplies. the location of these connections.*
- *Provide all fire hydrants and associated piping.*
- *Each standpipe connection station shall have two, 2.5 inch, hose connections with an external thread in accordance with NFPA 1963 or as otherwise required by the Fire Department.*
- *Standpipe connection station cabinets shall be located in recesses in the side walls of the Cover to finish flush with the wall surface.*
- *The Developer shall provide an appropriate signage system in accordance with NFPA.*

12.14.7. Pumps

- *Pump units shall consist of one or more pumps and driven by electrical motors.*
- *The electrical power supply shall be dual redundant with automatic switch over.*
- *Pump sets shall be arranged with at least one pump available as a standby in the event of a duty pump failing.*
- *The following equipment/fittings shall be provided as minimum within the pump station:*
  - *Isolating valves;*
  - *Safety valves for each pump set at 115% of the operating pump pressure;*
  - *Diverter valves;*
  - *Manifolds;*
  - *Provide a by-pass for blockages;*
  - *Flow meters;*
  - *Pressure gauges;*
  - *Controls; and*
  - *Surge prevention devices.*
- *Pump rooms shall be kept at a temperature above 39°F at all times in order to prevent freezing.*

6.7. Standpipes, Hydrants and Portable Fire Extinguishers Suppliers

Equipment supplier's information to be provided after award.

6.8. Hydraulic and pneumatic calculations;

Provided with the Final Basis of Design Report

7.0 Fire Detection and Alarm System

7.1. General

The C-70 Cover Fire Life Safety System includes an automatic Fire Detection and Alarm System (FDAS) in the tunnels and support buildings.

The fire alarm system provides the following control and monitoring functions:

- Monitoring of the Linear Heat Detection (LHD) system in the tunnel roadways.
- Monitoring of the deluge system main isolating valves and system status.
- Monitoring of the smoke detectors in the support buildings.
- Monitoring of the pull stations in the support building and within the cover.
- Monitoring of the emergency point access panel tamper switches within the cover.
- Initiate the automatic activation of the deluge valves upon unacknowledged alarm.
- Initiate manual activation of deluge valves via CCMS commands.

The fire alarm system will be monitored by the full-time operators at the CTMS control center. Redundant back-up controls and CCMS SCADA workstations will be provided at each of the Cover's Local Control Facilities.

The tunnel fire alarm system forms part of the overall tunnel fire detection strategy, comprising automatic video incident detection (AID), CCTV surveillance, emergency telephones, manual call points, door monitoring alarms on emergency point cabinets and emergency exit doors.

The tunnel fire alarm system includes linear heat detection (LHD) in the tunnel roadways, and smoke detectors in the support buildings.

Within the tunnel roadway the AID / CCTV surveillance system is the primary means of detecting a fire incident. The linear heat detection system provides an automatic back up to AID/CCTV.

An LHD alarm will automatically initiate the activation of the fire suppression system through the fire alarm system, in the event when the manual response action has not been initiated by the tunnel control operator within a predetermined time period.

The fire alarm system equipment for the tunnel and support buildings will be of the same manufacturer and networked to form an integrated system.

7.2. System Architecture

The tunnel fire alarm system and control architecture is described in SKETCH E-022 Fire System Network Overview.

The alarm system configuration and control components will be based on one type of proprietary manufactured equipment. The system equipment supplier will provide details of the system architecture and wiring scheme based on the manufacturer's recommendations of the selected equipment.

The system network wiring configuration will be arranged such that it will provide sufficient redundant paths to ensure that the system main functionality will not be significantly affected by a localized defect developed anywhere within the network.

The fire alarm signal transmission between the control panels will either utilize the communications fiber backbone cable network and interfaced via appropriate copper/ fiber interface equipment, switches, patching cables and termination, or by means of dedicated fire alarm cabling.

7.3. System Components

Fire Alarm Control Panels (FACP)

The fire alarm panels will incorporate microprocessor based intelligence with menu driven software to facilitate flexible field configuration and system operation. The panels will be capable of mapping individual detector inputs to multiple zones, subgroups or collective control outputs, as well as identifying and monitoring status of individually polled detectors on software graphics.

The FACP will located at each Local Control Facility and the Cover Service Building. The FACP will be linked via a fiber optic self-healing ring and will interface with the CCMS SCADA system via hard-wired connections.

Fire Alarm Indicator Panels

Fire Alarm Indicator Panels (FAIP) are located in the Local Control Facilities. They identify basic fire system operations including:

- Location (zone) of the fire; and
- Linear heat detector information;

The panel will incorporate LED indicators to show the status of the various systems.

Linear Heat Detection System

Addressable linear heat detector sensor lines are installed above the tunnel roadways along the whole length of the Eastbound Cover and Westbound Cover. Heat detector cable spacing and installation will conform to the manufacturer's requirements and application guidelines.

The LHD alarm zones will be configured to match the deluge zones.

When the Fire Alarm System is in 'Auto Mode', the system will limit the maximum number of operating deluge zones to two zones.

The linear heat detection system will be of a listed/approved type – either micro-chip (e.g. 'Listec') or fiber-optic (e.g. 'Protectowire', 'Sensa', 'Minerva') type.

Smoke Detector

Multi-criteria smoke detectors with combined thermal and smoke sensing elements will be installed in the support buildings.

Alarm Peripheral Equipment

Alarm peripheral equipment and components include interface modules between the FACP's and deluge/standpipe control and monitoring devices. These components will be of the same manufacture as the FACP's, or of a listed/approved type.

Manual Pull Stations

Manual pull stations in the tunnels will be installed in the Emergency Point locations. Manual fire alarm pull stations will be installed at the exit doors of the support buildings. The manual pull stations will be addressable. They will be weatherproof double-action type, red LEXAN with molded, raised letter operating instructions of contrasting color. Each pull station will have a tamperproof, clear lexan shield. The pull station will mechanically latch upon operation and remain so until manually reset by opening with a common key.

Tamper Switches, Pressure Switches and Flow Switches

The fire alarm system will monitor tamper switches, pressure switches and flow switches installed on the fire suppression system valves and piping including the fixed fire suppression system and the standpipe system and the access doors on the emergency exits.

7.4. System Operation

The fire alarm system utilizes appropriate equipment to interface with the PCMS to achieve a high level interface between the various systems and provide a fully integrated tunnel fire safety system, with the necessary emergency response in the event of a fire incident.

The full-time trained operators at the CTMS will initiate the emergency ventilation system modes, traffic management plans, lighting and deluge responses through the CCMS interface.

The unique feature of the tunnel fire alarm system, which differs from a normal building fire alarm system, is that the FACP does not directly control the emergency response. In most situations the FACP receives a fire detection signal, notifying the PLC the signal source and which fire zone(s) the signal (or combination of signals) corresponds to. The interface control system (PCMS) is programmed to respond accordingly (i.e. turn on ventilation, deluge system, traffic plans, etc.)

The modes of operation in the event of a fire in the tunnel roadway are described as follows:

Manual Detection

The operator has manually (visually) detected a fire incident via AID/CCTV. With a manually detected incident, it is reasonable to assume that the operator will be informed of the event, via AID/CCTV, before an automatic detection device (e.g. LHD) has activated. The operator will then communicate the incident response to the FACP and PCMS via the CCMS interface. The response will then progress according to the location information provided by the operator (i.e. a pre-programmed fire response mode will be initiated).

Automatic Detection

The FACP will receive a signal from one of the addressable fire detection devices monitored by the FACP (e.g. the LHD). A notification of the incident will then be sent to the PCMS. An automatic fire response mode will be initiated with respect to the location of the incident detected, if no prior manual response has already been initiated by the operator within a pre-determined time period.

Control Override

Provision will be made in the fire alarm system controls to allow the tunnel operator to remotely activate or deactivate any deluge zone at any time (up to a maximum of 2 zones), so to enable the operator to release the appropriate deluge zone(s), corresponding to the actual location of the fire.

Local Manual Controls

Provision will be made for manual release of any deluge zones from any FACP in the fire alarm network, or by activating the local manual release device at the individual deluge valve.

7.5. Design Standards and Codes

All devices, equipment and components relating to the tunnel fire detection and alarm system will be listed by Underwriters Laboratories, Inc. UL and/or approved by Factory Mutual Research Corporation (FM), for detection system signaling purposes.

The fire alarm system will be installed in compliance with:

- NFPA 70: National Electric Code
- NFPA 72: National Fire Alarm Code
- NFPA 101: Life Safety Code
- NFPA 110: Standard for Emergency and Standby Power Systems
- NFPA 170: Standard for Fire Safety and Emergency Symbols
- NFPA 502: Standard for Road Tunnels, Bridges and Other Limited Access Highways

The system will be designed in compliance with the Project Agreement and CDOT Standards.

All devices will be suitable for the location of its intended use, such as normal, wet or tamper proof locations.

7.6. Key Owners Requirements from Project Agreement

Select relevant excerpts from the Project Agreement have been identified below.

12.14.5 Fire Detection and Alarm System

- *The Developer shall install an automatic Fire Detection and Alarm System (FDAS) in accordance with the provisions in NFPA 72, including fire alarm control panels.*
- *The fire detection system shall be capable of locating a vehicle fire to within a longitudinal distance of 25% of the length of a single FFFS zone.*
- *The fire detection system shall be integrated with the FFFS and the CVS to ensure effective and timely response to fire to meet the performance requirements for the FFFS and other safety systems.*

7.7. Fire Detection and Alarm System Suppliers

The ‘Fibersystem 8000’ Linear Heat Detection system, from manufacturer Protectowire, will be used as the Cover Fire Detection and Alarm System. The system will consist of Fiber Optic Sensor Cable, routed above the roadway into ten (10) zones on either side of the cover (refer to drawings E022). Two (2) Linear Heat Detection Cabinets (LHDC), one (1) located in each of the local control facilities at each entrance portal, will be connected to the adjacent Fire Alarm Control Panels using relay inputs and outputs. The system is specifically designed for high risk commercial and industrial hazards that demand high reliability and customized system features.

8.0 Cover ITS and Communication System

8.1. General

This section outlines the design approach that will be used for the SCADA (Supervisory Control and Data Acquisition)/ITS (Intelligent Transportation Systems) and communications systems as part of the cover MEP systems defined in Section 12 of the Project Agreement. These systems will be designed based on recognized and generally accepted practices, applicable standards (e.g. NFPA 502), Project Agreement technical requirements, and Mott MacDonald's proven design expertise.

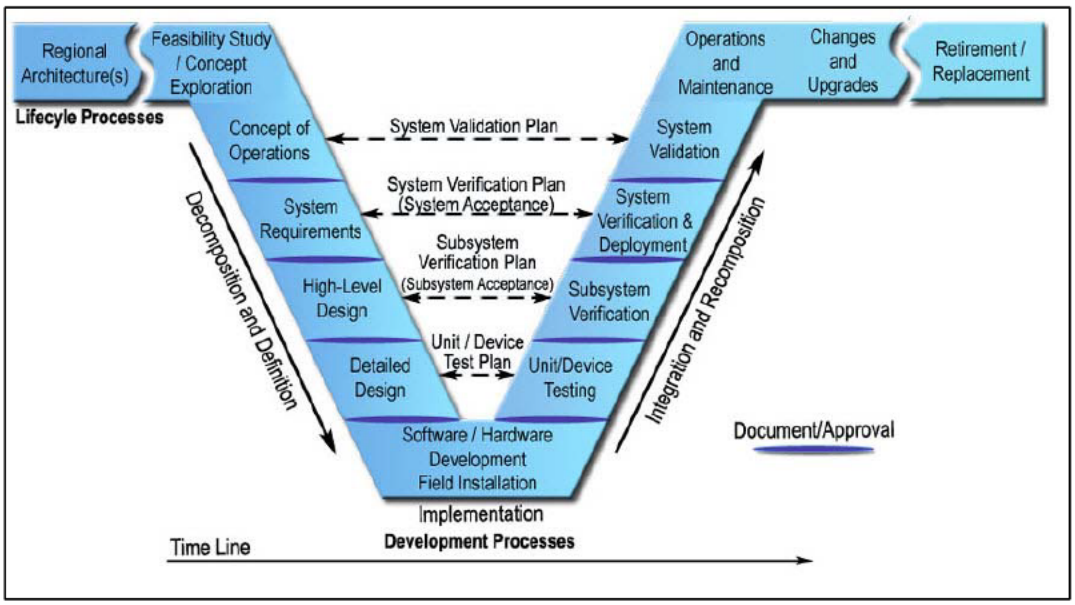
8.2. Design Approach

The overall approach for the systems design for the C-70 cover is to consider the systems to be part of an ITS (Intelligent Transportation Systems) project. The US Department of transportation (DOT) defines that an ITS project is one that in whole or part, funds the acquisition of technologies or systems of technologies that provides or significantly contributes to the provision of one or more ITS user services as defined in the National ITS architecture. 5280 Connectors recognizes we are providing systems and technologies that meet this definition and are considering several of the Cover's systems part of an ITS project in the Denver Regional ITS Architecture (Region 6 and portions of Regions 1 and 4). A second part of the approach is to meet the intent and standards defined in NFPA with the overall purpose of designing systems that provide overall operational control, situational awareness of the Cover, and help protect the travelers, operational personnel, and the actual infrastructure of the Cover.

The existing framework (Regional Architecture) combined with coordination with other ITS elements in the 5280 Connectors team, will be used to guide the ITS design and this approach will help achieve consistent integration of the new ITS systems for the Cover into the existing ITS framework.

In order to follow a structured process for development of the Cover systems, the design approach for the SCADA and ITS systems will be to utilize the "V-Model" for Systems Engineering (Figure 6). This is the recommended systems engineering approach model as outlined in Rule 940 (23 CFR Part 940) by the Federal Highway Administration's DOT. This approach will be used for not only the ITS systems, but for defining and developing all of the Cover systems.

Figure 6 | ITS System Engineering V Model



The complete ITS system engineering approach is outlined in the V Model. As shown in the system engineering steps progress from the system's generic concept to detailed system specification, testing, and validation. The following sections describe the SCADA related systems, and where appropriate, how each system will be developed using the Systems Engineering process.

8.2.1. Defining and Integrating the Cover Systems

Following the path in the V-Model, 5280 Connectors' SCADA/ITS design will progress from first conducting surveys of existing systems at the CTMS (Colorado Transportation Management System) along with interviews conducted with key stakeholders. Following the surveys, a detailed ConOps (Concept of Operations) document will be developed. The ConOps will be the initial design step in the Systems engineering approach. Its main objective is to describe the existing system operations and functionalities and then describe the planned operations and functionalities that will be needed to integrate the new Cover systems into the CTMS systems. The ConOps document describes how the system operates and functions on a daily basis. This serves to document how the stakeholders operate the existing systems, and their vision and requirements for the new Cover systems. The ConOps also describes how the new systems will be implemented, but at a very high level. This document will become part of the basis of design for the detailed system design.

During the detailed design phase, the ConOps report will be produced in accordance with the IEEE 1362 standard. This report will serve as part of the definition phase of the systems engineering V-Model. The purpose of the ConOps will be to formally and systematically define the role of each system within the Cover, how they interact with each other and how the CCMS (Command Control and Monitoring System) will function. It will be used later during the integration and construction phase to validate the final system.

Figure 7 presents the general outline (as based on the IEEE 1362 standard) for the proposed Concept of Operations document. This document will be used to support the initial ConOps phase of the V-Model Systems Engineering Design Philosophy.

Figure 7 | Outline for Concept of Operations

Title page
Revision chart
Preface
Table of contents
List of figures
List of tables
1. Scope
- 1.1 Identification - Chesapeake Bay Bridge-Tunnel TOC (Tunnel Operation Centers)
- 1.2 Document Overview
- 1.3 System Overview

2. Referenced documents
3. Current system or situation
- 3.1 Background, objectives, and scope
- 3.2 Operational policies and constraints
- 3.3 Description of the current system or situation
- 3.4 Modes of operation for the current system or situation
- 3.5 User classes and other involved personnel
- 3.6 Support environment

4. Justification for and nature of changes
- 4.1 Justification of changes
- 4.2 Description of desired changes
- 4.3 Priorities among changes
- 4.4 Changes considered but not included

5. Concepts for the proposed system
- 5.1 Background, objectives, and scope
- 5.2 Operational policies and constraints
- 5.3 Description of the proposed system
- 5.4 Modes of operation
- 5.5 User classes and other involved personnel
- 5.6 Support environment

6. Operational scenarios

7. Summary of impacts
- 7.1 Operational impacts
- 7.2 Organizational impacts
- 7.3 Impacts during development

8. Analysis of the proposed system
- 8.1 Summary of improvements
- 8.2 Disadvantages and limitations
- 8.3 Alternatives and trade-offs considered

9. Notes
Appendices
Glossary

8.3. Systems Definitions

The systems within the Cover will be controlled and monitored by a Command Control and Monitoring System (CCMS). This CCMS will have a local node located within the Service Building Backup Control Room. The primary node will be remotely located at the CMTS. The following sections describe the CCMS and the subsystems within the Cover that are monitored and controlled.

8.4. Command Control and Monitoring System (CCMS)

The Cover systems will consist of varied systems for communications, control, ITS, and Fire and Life Safety. These systems will all be integrated into the Command Control and Monitoring system (CCMS) which will act as an overall Supervisory Control and Data Acquisition system for the Cover. The basis of design for the CCMS is to use a transportation specific software system to interface and integrate all the systems into a single software package. The arrangement will be to have local control nodes and a primary remote node at the CTMS for remote control and monitoring. The CCMS will include the following general systems and features:

- Backbone Communications and Device Level Ring Networks
- Redundant PLC's for control
- Emergency Call Box System
- Mass Notification/Public Address System
- ITS Systems
  - Portal LUS (Lane Usage Signs) and DMS (Dynamic Message Signs)
  - DSRC (Dedicated Short Range Communications) system
- CCTV Video Monitoring Systems
- Ventilation Systems
- Fire Detection and Notification Systems
  - Linear Heat Detection System
- Fire Fighting (Deluge) Systems
- Roadway Lighting Systems
- Emergency Way-Finding Systems
- Radio Systems
  - Operational and Maintenance Radio System
  - Emergency Services Radio System
  - AM/FM Radio Re-broadcast and notification System
  - Commercial Cellular Systems

8.4.1. Backbone Interface and Device Level Ring Networks

As shown in Drawing E018 – High Speed Backbone Overview Concept, the Cover systems will interface with the ITS backbone from the Service Building. A lateral drop of 12 fiber optic strands will connect the Cover systems into the CDOT ITS backbone for remote monitoring and control of the Cover. The ITS backbone is understood to have redundant ring and star configurations for resiliency. Within the cover, the Cover systems will utilize four separate device level ring networks derived from the core distribution switches:

- Ring1 – ITS
- Ring2 – SCADA
- Ring3 – Video
- Ring4 – Fire

This drawing depicts the four ring networks and how Communication Node Cabinets (CNC's) will be used to provide an interface into the ring networks for the field devices. Once interfaced into the communication networks, the new Cover systems will be available throughout the system including at the CTMS. This distribute control concept will minimize conduit runs and home runs of wires by utilizing Ethernet and PoE technology to consolidate field I/O and communications into the fiber rings. Note that a single CNC will interface with all four rings and is represented on all the systems drawings.

Ring1 – ITS will contain the following systems:

- LUS (Lane Usage Sign) Signals
- VMS (Variable Message Sign) Signals
- Emergency Call Box System
- Mass Notification System

Ring2 – SCADA will contain the following system(s):

- Ventilation System
- Air Monitoring Sensors/Instrumentation
- Electrical Power Control and Monitoring
    - ATS Status
    - Generator Status
    - UPS Status
    - Switchgear Status
    - MCC Status
- Lighting Control System
- Intrusion Detection/Access Control Systems
- Over Height Vehicle Detection
- Portal Anemometers
- Radio Systems

Ring3 – Video will contain the following systems:

- Video/CCTV Camera networks
- CCTV NVR's/Video Management System

Ring4 – Fire will contain the following system(s):

- Linear Heat Detection System
- Fire Detection and Alarm System
- Fixed Fire Fighting/Deluge System
- Heat Trace System

8.4.2. SCADA and PLC Systems

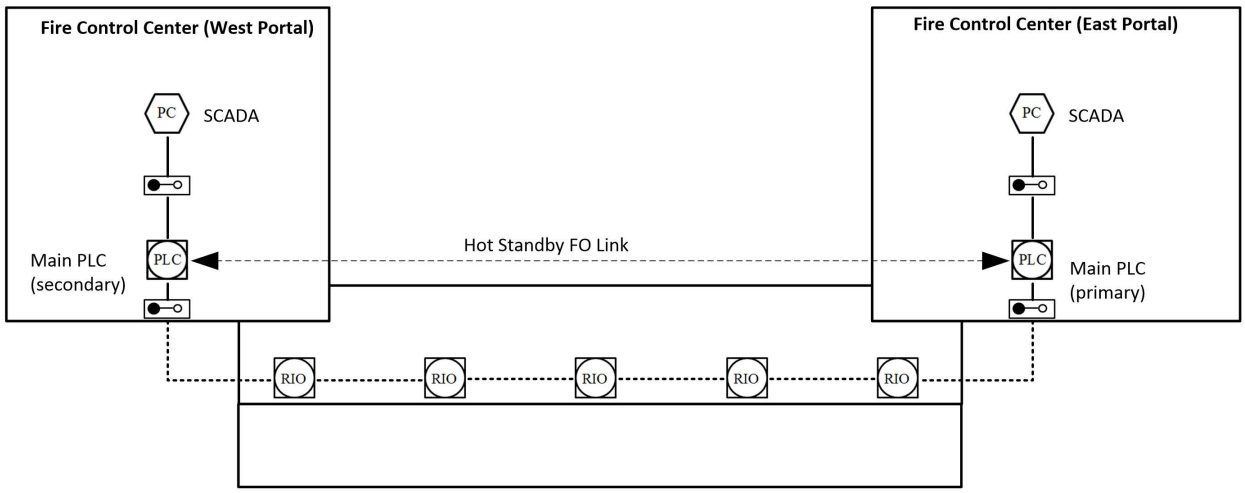
The Command Control and Monitoring System (CCMS) will act as an overall SCADA system for the cover. It will consist of redundant PLC's and HMI computer nodes at the Service Building Backup Control Room with overall supervisory control and monitoring at the CTMS.

Programmable Logic Controllers (PLC's) will provide centralized control and interface to the field I/O.

The new "Hot Standby" PLC system will be provided (Figure 8). The new PLC system will interface with the existing SCADA system via communication drivers on the SCADA servers. The PLC main processors will have fail-over capabilities and will automatically synchronize their PLC programs so that in the event of a failure of one of the PLC's, the secondary PLC will assume control. These synchronized PLC's will be located in separate rooms of the Service Building. They will communicate and synchronize continuously via a fiber-optic connection

The new PLC will communicate to Remote Input/Output (RIO) modules in the Cover's CNC's via Ethernet connections and the self-healing fiber rings.

Figure 8 | Hot Standby PLC Concept



The new PLC hardware and RIO modules will be able to communicate I/O status and controls, as necessary, to the CCMS and will be used to control the Cover's Ventilation System, ITS components, and other instruments and sub-systems for the CCMS. The basis of design for the PLC hardware is the Allen-Bradley Control Logix platform with Flex-I/O RIO modules installed in the CNC's within the Cover. The new PLC hardware will be supplied, installed, configured, and programmed by a Control System Integrator based on functional narratives provided by the designer and developed in coordination with CDOT's stakeholders.

The design and integration approach will be to ensure minimal impact during each construction phase with the intent of maintaining continuous operation at all times. This will be accomplished by utilizing an approved and coordinated migration plan when transition from single bore operation to dual bore operation.

In order to minimize down time and programming on-site, the CCMS will be tested first off-site using a formalized Factory Acceptance Testing protocol. To mimic the existing systems, images of the existing system will be made and existing PLC programs will be uploaded during the survey and detailed design phases. This process will serve two purposes:

- Disaster Recovery – During installation and commissioning, a known and recoverable backup will be available for recovery.
- Simulation Testing – During software application development, to optimize development time and proper communications interface, images can be converted into virtual machines to mimic the CCMS system. Application changes and communications can be tested and validated prior to installation in the live system.

8.4.3. Cover Ventilation Systems

The jet fan controls and status will be routed through PLC I/O interfaces as shown in E020 – SCADA System Network Overview Concept Drawing. The fan will be controlled via start stop signals and key status information from each fan will be monitored, including, as a minimum, following signals:

- Vibration Status
- Forward/Reverse Status
- Run Status
- H-O-A Status
- Alarm Status
- Winding and Bearing Temperature

Alarming and historical trending for the ventilation systems will be developed and incorporated into the CCMS as part of a complete package.

Air quality will be monitored for control of the ventilation system to include:

- NO2
- CO
- PM
- NO
- Portal Air Flow
- Portal Anemometers

The CCMS will use these process variables to control non-emergency operation of the ventilation system. During emergency operation, the CCMS will automatically control the vent fans based on the zone location of the fire detected and automatically sequence and run the fans to vent smoke and proved safe egress routes for travelers.

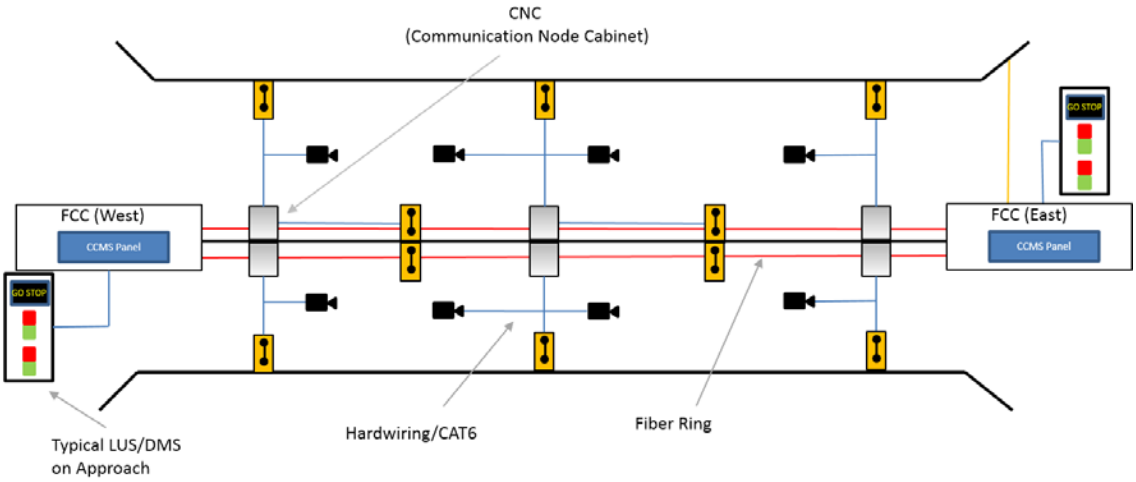
Local fan controls will be provided in the Fire Control Centers at each portal. Local controls will include Remote/Local selector switches and Start/Stop pushbuttons and will override the CCMS when Local control is selected.

8.5. Communication Systems

Integrated within the Cover and its systems are the communications systems. Communication node cabinets (CNC's) are located in the Cover near their I/O points and connected via a high-speed communication link. This method is used instead of having a single centralized panel where wiring must be "home-runned" to each individual field device. Cable and conduit runs are reduced to short distances from the distributed I/O panels to local devices

The primary advantage of this method is to save installation and material costs for the installer and to allow trouble-shooting of the field device at the field input/output cabinet. By localizing the control to a local communication node cabinet, maintenance is also simplified. Control components can be serviced during normal operating hours via the egress corridor and the impact of availability is limited to devices associated with the particular cabinet. Figure 9 illustrates the concept of distributed I/O panels that will be used in the Cover.

Figure 9 | Distributed I/O Concept



A detailed concept of the CNC's, communications, and SCADA systems is shown in Drawings E018 and E024.

Communication Systems consist of the following sub-systems:

8.5.1. Emergency Call Box System/Emergency Roadside Telephones

As part of the Fire and Life Safety Systems, the roadside emergency call box systems provide emergency call boxes on both sides of each bore's roadway and the approaches for travelers to make emergency calls. The basis of design for the call boxes is to use Talk-a-Phone VoIP model phones to connect travelers at the roadside to operators at the CTMS. A head-end VoIP system will be included for basic call forwarding features and call recording. The head-end system will be in the CCCs.

Concept drawing E019 – ITS System Network Overview Concept depicts the locations of the roadside telephones and equipment.

8.5.2. Mass Notification/Public Address System

The basis of design for the Mass Notification/Public Address system is to use the Axys Duran Audio system for mass notifications. The system includes a head-end server and microphones for live messaging or playback of emergency pre-recorded messages. Amplifiers are spaced throughout the Cover to drive speakers in coordination with distance from each other to account for the sound wave front to assure intelligible messages within the Cover.

8.5.3. Radio Systems

Drawing E023 – Radio System Network Concept depicts the concept for the wireless radio systems within the Cover. The radio systems concept includes:

1. Operational and Maintenance Radio System (O&M) – This wireless radio system will provide CDOT operational and maintenance personnel the ability to communicate within the cover. One FM leaky coax cable will be mounted in each bore providing the ability to extend radio communications for O&M personnel into the Cover. The FM radio antenna will be extended from the FCC, or another inconspicuous location, to communicate with the existing CDOT radio network.

2. Radio Re-Broadcast System – This system re-broadcasts AM and FM radio broadcasts into the tunnel utilizing the AM and FM leaky coax cables. A head-end system installed in the FCC utilizes and outside antenna to gather and rebroadcast radio signals within the Cover. The head-end system also allows radio break-in with pre-recorded or live messages.
3. Cellular Telephone Systems - The project agreement requires for provision of commercial cellular systems. Based on previous tunnel project experience, cellular services providers require that any equipment and specialized antennae are installed by specialized technical personnel. This includes fiber, antennae, equipment. Assuming such, the concept for the design provides rack space (see radio room in the E010– Fire Control Center East Portal Space Proofing Plan) and UPS power in the FCC for future installation of commercial cellular service. Assuming there would be at least one GSM and one CDMA provider, two racks have been allocated for the commercial service providers.
4. Emergency Radio Systems – The project agreement requires provisions for extending emergency services radio service (assuming Fire, Police, and possibly others) into the Cover. The concept for the proposed design is that head-end equipment for designated emergency services organizations would be located in the radio room in the FCC. Two racks for two emergency services organizations, UPS power and access to the Cover's FM antennae will be provided. Given that no specific emergency service has been designated to coordinate with, no additional equipment or design is provided in the conceptual design.

8.6. ITS Lane Use Signs and Dynamic Message Signs

5280 Connectors' ITS Systems for the Cover are shown on concept drawing E019 – ITS System Network Overview Concept. The ITS systems for the Cover include LUS and DMS signs mounted on sign posts or gantries on the approaches to the Cover. The LUS and DMS signs throughout the I-70 corridor follow standard details for interfacing with the ITS backbone. However, the ITS devices designated on the concept drawing on the approach to the Cover are instead interfaced into the CNC at the East portal and the CR-1 Rack in the Service Building. This is to ensure that the control of the ITS signs for the cover are localized. The concept is that this will ensure more resilient control in the event of tunnel/Cover closure. As per NFPA 502, section 7.6 a means to provide traffic control for tunnel closures is required and the ITS signage will serve that purpose. Also in NFPA 502, section 12.4.1, it is required that tunnel closure and traffic control should be connected to the tunnel's emergency power systems. Given these requirements, it is interpreted that these tunnel traffic control devices should be connected to the tunnel in its entirety.

Designs and communications will be coordinated the ITS lead team member, IBS.

8.7. CCTV Video Monitoring Systems

5280 Connectors' CCTV systems will utilize I/P based cameras. The I/P connection will support control of the PTZ (Pan Tilt Zoom) camera, transmission of the video feeds and camera diagnostics. Cameras are IP66 rated.

The design will include the following type of cameras:

1. Automatic License Plate Recognition (ALPR) – Detection of license plates entering and leaving the Cover.
2. Microwave Vehicle Radar Detection (MVRD) – In combination with ground detector loops, will assess vehicle speeds entering and leaving the Cover.
3. Thermal Camera – Located above center lanes within the Cover and at key location at the approach and departure zones of the Cover will provide video feeds and advanced analytics in low light conditions.

The Thermal cameras are located longitudinally along the roof of each bore to provide 100% coverage of

the interior. The MVRD's and ALPR's are mounted at the portals of the Cover only. Conceptual locations for the cameras are shown on drawing E021 and E029. Additional cameras are necessary for the Interim Phase. The rationale for this approach is described in ATC submission No. 82. Additionally, simulated design views of the cameras are provided in drawing E027. This approach is used to optimize the camera placement and to ensure that 100% coverage of the Cover is attained.

NVR's are located at the Service Building for local video recording. Live video streams are provided to the CTMS as well through the backbone interface for recording and archiving of the video. Workstations and monitors will be provided for local viewing of live and recorded video feeds at the Service Building Control Room. Incident detection analytics will utilize either onboard camera analytics or the analytics within the CCMS software.

Figure 10 | Bosch MIC612 series PTZ Thermal Camera

The basis of design for the thermal cameras is the Bosch MIXCX series 612 cameras (Figure 10). Other equivalent cameras are listed in the ATC submission No. 82.

Camera spacing and layout will be finalized in the detailed design phase and will be dependent on the final architecture of the tunnel to ensure 100% viewing of the tunnel. CCTV cameras will also be installed throughout the FCC's as required.

The cameras will communicate via multi-casting over the fiber network. As shown in Drawing E021 - Video System Network Overview Concept Drawing, a CNC cabinet will house an Ethernet switch where each camera's video feed and control will interface into the tunnel fiber ring network. In the ventilation/service buildings, the new CCTV fiber ring will interface through patch panels and then through a switch into the existing backbone network.

8.8. System Testing and Validation

Following the V-Model, testing and validation will be performed at the device level, sub-system level, and system level following installation and commissioning. This testing is intended to test the software systems and integration of the systems together in a comprehensive and systematic manner in accordance with industry standard practices. The ISA 62381 standard will serve as the model for the testing outline and sequence.

Essentially, the testing protocol documents will be progressed from the Factory Acceptance Testing (FAT) through to the final Site Acceptance Testing (SAT) using the same document and revising them as necessary for each testing qualification phase. This method will ensure consistent testing and efficiency. The complete testing sequence is outlined as follows:

1. Factory Acceptance Testing (FAT) – This testing will use simulation and virtualization as needed to simulate the system as much as possible offsite prior to installation. An FAT test protocol will be used to document the testing and track corrective actions. The owner may witness FAT's for the systems as desired and will be asked to approve the test protocols prior to execution. Upon successful completion of the FAT, the system may be shipped and installed on-site. FAT protocols will be developed and executed for the following:
    a. CCMS (including sections for each sub-system)
2. Installation and Commissioning (Local Equipment Test) – Following installation of the systems, sections for each sub-system will be executed to ensure that each sub-system or system is functioning correctly.

3. Site Acceptance Testing (SAT) – Following successful commissioning and testing of each sub-system or partial system, the system as a whole will be tested in a Site Acceptance Test (SAT). The SAT will test the following systems concurrently to ensure that no systems have been impacted:
    a. CCMS
    b. Testing will be concluded with a prove-in period to help uncover any errors or omissions in the systems integration.

Site Integration Testing (SIT) – Following successful completion of the SAT for each system, a site integration test will be conducted test the integration of the CCMS and all other Cover systems with the ITS network and validation of its integration into the CTMS.

9.0 Electrical System

9.1. Overview

The C-70 Cover will be connected with two Utility-provided MV power supplies, one main utility supply and one standby utility supply for redundancy, and an emergency standby generator in accordance with Article 700 of NFPA 70. The Utility power supplies shall be at 13.2 kV and fed into the Cover Service Building, located to the north-west of the Cover. To mitigate the risk of single-point failures, the MV Utility supplies shall be provided from different buses of the same Utility substation as a minimum requirement. It is preferred for the Utility power supplies to take alternative paths to the site for improved security of supply. Each Utility feed and the emergency generator shall be rated to supply the entire electrical load of the Cover.

The C-70 Cover shall have a single Cover Service Building. This building shall be located on the corner of 46th Street and Josephine Street; the layout of the Cover Service Building is shown on drawing E-010. Cover equipment loads shall be distributed between the two (2) 480VAC electrical switchboards located within the two (2) Service Building Electrical Equipment Rooms. The switchboards shall be separated by a 2-hour fire wall in order to maintain service to the cover in the event of a fire incident within one of the equipment rooms.

The Cover Service Building will include space provisions for the following:

- Two (2) Electrical Equipment Rooms – Including Switchgear, Transformer, Switchboard, MCC, Station Batteries, Electrical Distribution Panels and equipment;
- Two (2) Uninterruptable Power Supply (UPS) Rooms;
- One (1) Backup Control Room – Control Station, CCMC, VCS, FACP, LHDC, DATA Center, Radio equipment enclosures;
- One (1) Briefing Room;
- One (1) Mechanical Room;
- Two (2) FM200 (Building Fire Suppression) Closets;
- One (1) Restroom with Eye-Wash Station; and,
- One (1) External LV Generator.

The MV switchboard will be 15 kV class 1200 A rated with individual 600 A withdrawable vacuum circuit breakers. The switchgear SCCR withstand is assumed to be 65 KAIC (this rating will be confirmed with the local Utility during detailed design). Each circuit breaker will be provided with electronic protective relays complete with control interlocks to the electrical room SCADA system. Interlocks shall be provided such that the switchboards can only be energised from one source of supply at any one time. and an ATS to ensure that power is automatically transferred to another source on loss of MV power supply. One (1) 13.2 kV/480 V dry type transformer rated at 3000 kVA shall be provided in each electrical room. Two (2) 13.2 kV/480 V dry type transformer rated at 750 kVA shall be provided in the Mechanical Room to supply the Main and Standby Fire Pump Controllers.

9.2. Normal Feeding Arrangement

The switchboards will be arranged in a Main-Tie-Tie-Main configuration. The normal power feeding arrangement is to have the distribution network supplied from the Main Utility supply at LV Switchboard #1. The Tie-Breakers will be normally closed so that LV Switchboard #2 will be normally fed from the Main Utility Supply. The Main Breaker at LV Switchboard #2 will be normally open with the second Utility supply used for standby service only.

In the event of loss of the Main Utility Supply, the Main breaker on LV Switchboard #1 will automatically open and the interlocked main breakers on LV Switchboard #2 will close. The four (4) UPS units will maintain essential cover equipment during the changeover so the risk of power loss to any equipment is minimized.

9.3. Emergency Power

On loss of power from both Utility supplies the 480VAC diesel generator shall be used to supply the Cover. This generator shall automatically start up and supply power within 10 seconds. The generator is rated at 2000 kVA and is sized to support all the Cover loads. The fuel tank for the generator shall be sized to support the load for eight (8) hours. The fuel tank will be double wall construction and will be located underneath the generator, with a 2-hour fire rating and a fuel polishing filtration system.

The generator shall be located above ground adjacent to Cover Service Building in a noise attenuating enclosure.

Two UPS systems will be provided in each electrical room – one for lighting and one for all other safety critical systems. Each UPS is based on the Eaton 93PM series and is designed using the N+1 redundancy principle with 20 % spare capacity. The battery cabinets have been sized and space proofed to provide a minimum 90-minute autonomy at full load capacity.

The following systems shall be connected to the lighting UPS:

- Emergency Roadway Lighting;

The following systems shall be connected to the other UPS:

- CCMS and ITS;
- Emergency Communications;
- Fire Alarm and detection;
- CCTV;
- Way-Finding Lighting
- Exit Signs

9.4. Cables and Raceways

All cabling installed in the C-70 Cover shall, as a minimum, be low smoke, zero halogen cables. Cables utilised for the connections to emergency/safety critical systems that are exposed in the tunnel environment shall be fire survivable for a period of no less than 1 hour. Fire survivability shall be maintained for by utilizing metal-clad cable in compliance with UL-FHIT 120.

Separate containment shall be provided for 13.2 kV cables, 480/277/120 V cables, Fire Alarm System, and control/communications cabling.

Power cables may be run on tray or in trunking and conduit depending on whether they are armoured. All control and communications shall be run in conduit. See drawings E013 – E014 for further details of conceptual layout.

One large ductbank shall be installed down the center of the C-70 Cover as shown on drawing E-013. This ductbank will have conduits accessible from either side as appropriate. The ductbank shall have at least 4” of concrete cover to ensure it is two hour fire rated and each duct shall be two hour fire rated from each other.

9.5. Grounding

All electrical work shall be grounded per the requirements of applicable codes and standards. As a minimum, an underground ground grid shall be provided with the grounding conductor connected to the structural rebar by Cadweld at each portal, as shown on drawing E-012. On site testing shall be required to determine if further measures are required to keep the ground system resistance below 5 ohms. Each electrical room and UPS room shall include a grounding bus connected into the main grounding system. The ground grid at each portal shall be bonded together with a 4/0 conductor.

An assessment shall be undertaken during detailed design if lightning protection need to be provided for the FCC buildings. If so, this will be bonded to the ground grids.

10.0 Lighting

10.1. General

5280 Connectors' C-70 Cover Roadway Lighting System has been designed in accordance with IES RP-22-11, *American National Standard Practice for Tunnel Lighting,* and will consist of Day/Night luminaires and Boost-Lighting luminaires. During daylight hours, the system is designed to mitigate the 'black-hole effect', and provide a safe transition between the bright exterior environment and the darker interior of the cover. During nighttime hours, the system will provide a seamless transition from the highway, into the covered section and back to the highway.

The design is based on the *Luxtran LTSI* LED luminaire from manufacturer Kenall. This low-profile, stainless steel fixture is specifically designed for road tunnel environments; it is rated as IP66 and certified for 100psi hose-testing. The roadway lighting system will be capable of being dimmed and controlled to suit the exterior lighting levels, thus automatically providing a safe environment for drivers while also maximizing system efficiency.

The C-70 Cover has four lighting zones in each direction, namely;

- Threshold Zone 1;
- Threshold Zone 2;
- Transition Zone 1;
- Transition Zone 2;

As the Cover is not long enough to require an interior lighting zone, no additional exit lighting is deemed necessary.

The concept design for 5280 Connectors' lighting is shown on drawing E-015, and consists of rows of stainless steel LED luminaires mounted over the center of each traffic lane. The luminaires shall be mounted to stainless steel channel, which in turn is mounted to the bottom flanges of the ceiling girders. Phenolic Fiberglass Conduits and stainless steel junction boxes shall be mounted to the same support channel and will be used to connect the lighting circuits in the tunnel back to the lighting distribution panels located in the Service Building.

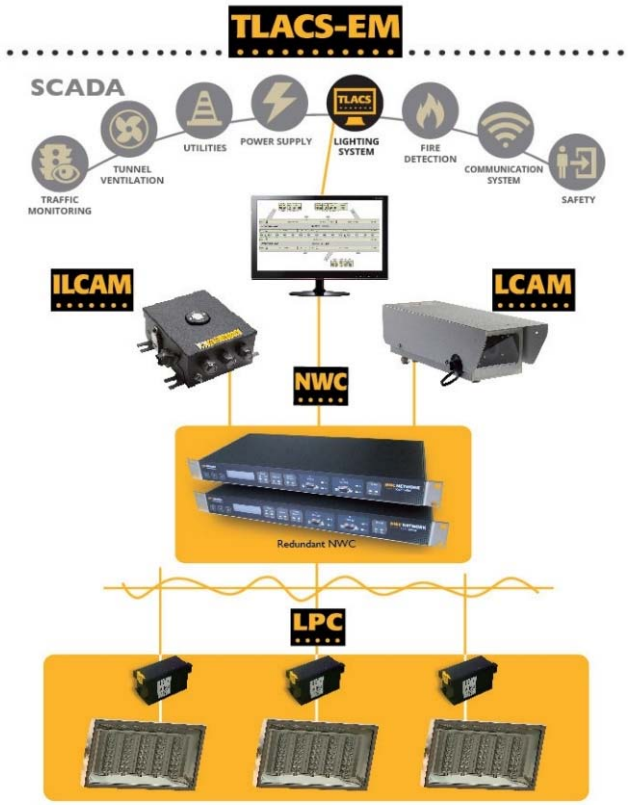
10.2. Emergency Lighting

In order to provide emergency lighting within the tunnel below the cover, some of the Day/Night roadway luminaires will be supplied with UPS backup, and connected via 2-hour fire rated circuits. In the event of loss of utility power the emergency luminaires will provide the minimum lighting levels required for pedestrian egress. The emergency luminaries will be spaced at approximately 80' intervals. In the event of loss of both utility and backup generator power, the UPS will maintain emergency lighting levels within the cover for a period of 90 minutes. The emergency circuits will be circuited using a 2-hour fire rated metal-clad cable assembly in compliance with UL-FHIT 120.

10.3. Lighting Control System

The lighting control system has been designed based on the *TLACS (Tunnel Lighting Addressable Control System),* from manufacturer NYX HEMERA (Figure 11) The TLACS uses power line technology to trigger bidirectional communication over the electrical power wiring.

Figure 11 | NYX HEMERA TLACS-EM Lighting Control System



The system shall switch ON, DIM or turn OFF every individual luminaire to allow for the visual adaptation of drivers and get the most accurate light levels inside the tunnel. At least 12 stages of dimming/switching shall be provided to allow adjustment to the lighting.

10.3.1. System Components

The lighting control system shall consist of the following components;

- Network Controller (NWC);
- Tunnel Luminance Photometer (LCAM);
- Tunnel Illuminance Photometer (ILCAM);
- Local Product Controller 480 (LPC);
- Tunnel Lighting Control Cabinet (LCC);
- TLACS user interface.

The NWC will have four major roles: configure the network, maintain the network, gather information from the local controllers on its network, and communicate the lighting level to the local controllers according to their zones. The NWC shall be installed in the LCCs located within the Cover Service Building, while the LPCs shall be installed in Stainless Steel, NEMA 4X junction box adjacent to each roadway luminaire. The

LCAM shall be pole mounted in the approach to both the eastbound and westbound portals, at one Safe Sight Stopping Distance (SSSD) of 570'. The ILCAMs shall be installed inside the Cover, within each of the different tunnel zones.

Each NWC shall be paired with a hot swappable second unit, both embedded with redundancy software enabling one to continue functioning if the other fails. A user interface located either in the cabinet or at the command center shall be connected to the NWC to configure, control, and monitor tunnel operations. The NWC shall have outputs to communicate with the CTMS.

The TLACS user interface shall be located both within the CTMC for normal operation, and within the Backup Control Room in the Cover Service Building for redundant system operation. The user interface shall be connected to the NWC to configure, control, and monitor all roadway lighting operations within the Cover.

10.3.2. System Operation

The TLACS shall allow for automatic stage controlling (ON/DIM/OFF) of all day/night roadway lighting within the cover, and all boost lights at the portals. This will be accomplished by obtaining the cd/m^2 output sensing signals from the LCAM to the NWC and controlling the light in stages depending on the information from the photometers to achieve the desired lighting, as per the design photometry. The system shall provide a virtual luminance photometer based on an astronomical clock to take over in case of LCAM's failure.

Each NWC shall control up to 1,022 LPCs using power line control. In response to inputs from the portal luminance cameras, the TLACS modulates a low-energy, high-frequency control signal on to the 60HZ alternating electrical signal. The LPCs located adjacent to each luminaire demodulate the signal and facilitate bidirectional communication between each individual luminaire and the NWC. The NWC shall gather data from the LPCs and save it to a database.

LPCs shall be installed in the junction box next to every luminaire. LPCs shall turn luminaires ON/OFF and DIM as well as permanently monitor electrical parameters to diagnose the various troubles that could unfold from external components, such LED drivers etc. LPCs shall also receive commands from the NWCs and, in turn, send back status data.

NWCs shall control the LPCs' status according to their locations and from signals from the LCAM to reduce the "black whole effect" at the tunnel portal and from the ILCAM to adjust the lumens inside the tunnel to account for the depreciation of the luminaires over their lifetime.

The control system configuration, management, monitoring and reporting shall be performed through a dedicated interface provided with TLACS.

10.3.3. System Functionality

The TLAC shall perform the following functions;

- Control (ON/DIM/OFF) LED roadway luminaires;
- Communicate over power line between LPCs and NWCs;
- Provide a real-time detailed analysis of the electrical parameters of the luminaires:
    - Voltage;
    - Power factor;
    - Current;
    - Power consumption;
    - Lamp status.
- Support luminaire alternation to average lamp usage;
- Monitor and report lamps burn hours to the NWC;

- Upgrade the firmware through the communication network;
- Have a configurable failsafe switching mode (on/off);
- Continuous polling type such that the system continuously monitors each luminaire;
- Control and monitor up to 1022 LPCs per NWC;
- Support scalable number of NWC on the same network;
- Have a communication failure detection;
- Alert the cover operator of any main failure in any group of luminaires;
- Adapt the lumens per Light Loss Factors (LLF) and real depreciation factor;
- Detects of communication failure;
- 100 – 480 VAC;
- Control type:
    - 0-10 VDC up to four(4) channels/120 luminaires OR
    - DALI up to 4 channels/256 luminaires.

10.4. Way-Finding Lighting

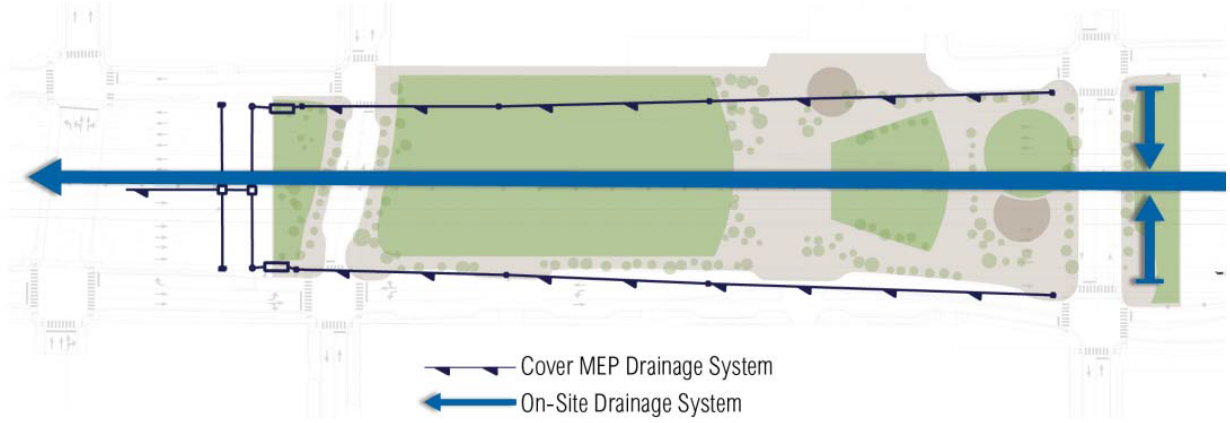
Illuminated way-finding directional signs shall be mounted at 82’ (25m) intervals on both side walls in both tubes of the Cover. The signs will be dual-faced, mounted approximately 3’ above roadway level and will indicate the distance in feet to the nearest portal or cross-passage in either direction. The way-finding signs shall be connected to the Fire Alarm system, such that in the event of a fire within the Cover, only the signs that point away from the fire will be illuminated. During normal operation both sides of the signs will be illuminated. The way-finding signs will be custom design and will be manufactured from 316L stainless steel.

11.0 Drainage

11.1. Cover Drainage System

The C-70 Cover Drainage design provides a separate drainage system to accommodate the Cover MEP drainage system requirements (Figure 12). Both east and westbound lanes of I-70, within in the limits of the Cover, include vane grates in the outside shoulders to capture potential hazardous substances that may arise from a fuel tanker spill. This system provides efficient capture and conveyance of spills with features at each vane grate and manhole to capture grit, restrict flame propagation and monitor the operation of the system. Capture and treatment of a potential 500 gallon fuel spill within the limits of the Cover is achieved with the use of oil-water separators, located under the outside shoulders of both east and westbound I-70. This system eliminates the need for valves, manual control or CCMS overrides to capture potential spills. Additional vane grates are located immediately downstream of the spill capture system to collect discharges from the fire suppression systems. Discharge from the Cover MEP drainage system connects to the I-70 on-site drainage system providing an efficient and complete drainage system for the lowered section of I-70. In compliance with Specification 12.21.3, the installation will be fitted with pollution and hydrocarbons sensors with alarms via the CCMS System.

Figure 12 | Cover Drainage System



12.0 Temporary Operation During Construction

Project phasing will include the construction and commissioning and westbound Cover section, followed by the eastbound cover section. During the interim phase, a temporary roof opening will be maintained in the westbound cover lid in order to eliminate the requirement for forced ventilation for the bi-direction traffic configuration. Refer to Drawing M005 for the details of the temporary roof opening.

Temporary operations will include the following provisions:

12.1. Interim Roadway Lighting

During the interim construction period, two (2) of the westbound traffic lanes will be used to accommodate eastbound traffic. Temporary threshold and transition zone lighting will be provided for the two (2) eastbound lanes at the West Portal Entrance. The permanent roadway lighting shall be supported across the temporary roof opening during the interim phase. For details refer to Drawing E016.

12.2. Interim Fire Detection and Alarm System

The permanent FDAS will be installed in the westbound cover and supported across the temporary roof opening during the interim phase. Refer to Drawings E022 for details.

12.3. Interim ITS System

The arrangement of the ITS systems to be in operation during the interim phase are detailed in Drawing E028. The interim system will include temporary traffic signals to allow the CCMS to stop traffic from entering the two (2) eastbound lanes in the westbound cover section, and the temporary support of equipment conduits across the temporary roof opening.

Exhibit 1.
Conceptual Design Sketches

COVER	EMERGENCY VENTILATION JET FAN LOCATIONS	M001
COVER	JET FAN PERFORMANCE DETAILS	M002
COVER	JET FAN DETAILS	M003
COVER	FIXED FIREFIGHTING SYSTEM	M004
COVER	FIXED FIREFIGHTING SYSTEM INTERIM PHASE	M005
COVER	STANDPIPES, HYDRANTS, AND PORTABLE EXTINGUISHERS	M006
COVER	STANDPIPES, HYDRANTS, AND PORTABLE EXTINGUISHERS INTERIM PHASE	M007
COVER	EMERGENCY WAYFINDING SIGNAGE	M008
COVER	ELECTRICAL AND ICA SYMBOLS AND ABBREVIATIONS	E001
COVER	ELECTRICAL OVERALL POWER DISTRIBUTION BLOCK DIAGRAM	E002
COVER	ELECTRICAL 13.2kV SWITCHGEAR ONE-LINE DIAGRAM	E003
COVER	ELECTRICAL 13.2kV SWITCHGEAR ELEVATIONS	E004
COVER	ELECTRICAL 480V SUBSTATION	E005
COVER	GENERATOR CONCEPT DESIGN	E007
COVER	ELECTRICAL & ICA UPS CONCEPT DESIGN	E008
COVER	ELECTRICAL NOTES	E009
COVER	SERVICE BUILDING SPACE PROOFING PLAN	E010
COVER	GROUNDING SECTION AND PLAN CONCEPT	E012
COVER	TYPICAL CROSS SECTION ELECTRICAL/ICA	E013
COVER	COVER POWER DISTRIBUTION CONCEPT DESIGN	E014
COVER	LIGHTING POWER DISTRIBUTION CONCEPT DESIGN	E015
COVER	CONDUIT AND CABLE SCHEDULE	E015B
COVER	"INTERIM" LIGHITNG POWER DISTRBUTION CONCEPT DESIGN	E016
COVER	LIGHTING PORTAL LAYOUT CONCEPT DESIGN	E017
COVER	HIGHSPEED BACKBONE OVERVIEW CONCEPT	E018
COVER	ITS SYSTEM NETWORK OVERVIEW CONCEPT	E019
COVER	SCADA SYSTEM NETWORK OVERVIEW CONCEPT	E020
COVER	VIDEO SYSTEM NETWORK OVERVIEW CONCEPT	E021
COVER	FIRE SYSTEM NETWORK OVERVIEW CONCEPT	E022
COVER	RADIO SYSTEM NETWORK OVERVIEW CONCEPT	E023
COVER	FIRE ALARM RISER DIGRAM CONCEPT	E025
COVER	LIGHTING CONTROL SYSTEM CONCEPT	E026
COVER	"INTERIM" ITS SYSTEM NETWORK OVERVIEW CONCEPT	E028
COVER	"INTERIM" VIDEO SYSTEM NETWORK OVERVIEW CONCEPT	E029
COVER	I-70 COVERED LID DRAINAGE SPILL CONTAINMENT SYSTEM	DC-01

Print Date: 5/24/2017
File Name: 19631 Appendix G_Index of Sheets_01.dgn
Scale: 1:1

5280 Connectors Linking I-70 Communities

Sheet Revisions

Date:	Comments	Init.

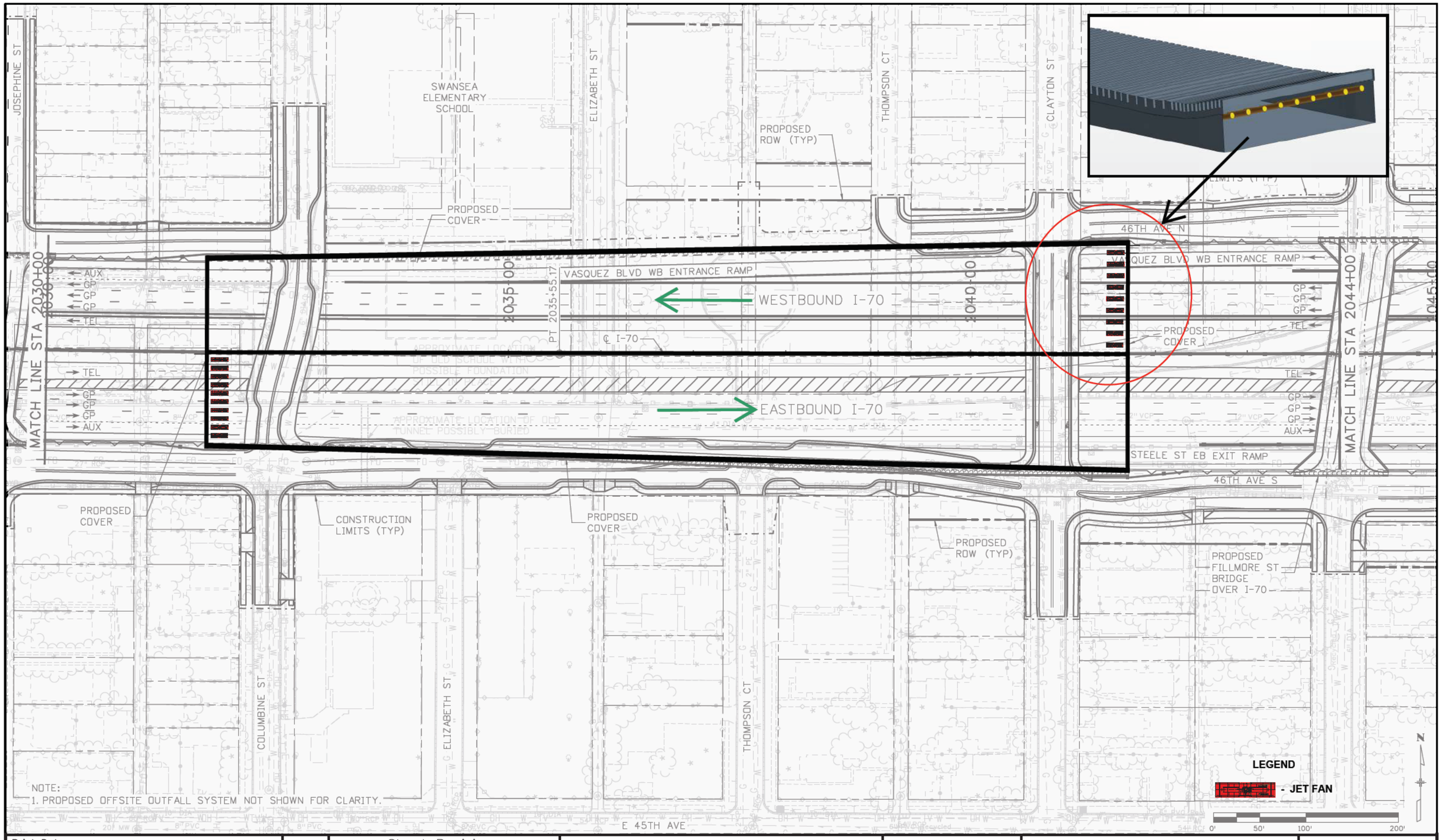
Colorado Department of Transportation
2000 South Holly Street
Denver, CO 80222
Phone: 303-757-9295 FAX: 303-757-9963
Region 1
JKE

As Constructed
No Revisions:
Revised:
Void:

I-70
INDEX OF SHEETS
APPENDIX G

Designer: J. CORONADO
Detailer: M. SCHWAB
Sheet Subset: GENERAL
Structure Numbers:
Subset Sheets: of

Project No./Code
FBR 0704 234
19631
Sheet Number GNG-01



Print Date:	Sheet Revisions	Colorado Department of Transportation	
File Name:	Date: / Comments / Init.	2000 South Holly Street Denver, CO 80222 Phone: 303-757-9295 FAX: 303-757-9963 Region 1	No Revisions: Revised: Void:

5280 Connectors Linking I-70 Communities

0000

EMERGENCY VENTILATION JET FAN LOCATIONS

Designer:	Structure Numbers	
Detailer:		
Sheet Subset:	Subset Sheets:	of

Project No./Code: FBR 0704-234

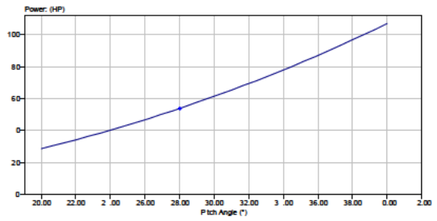
19631

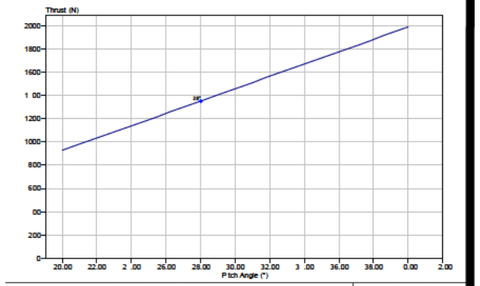
Sheet Number M001

Combination Data Sheet
Jetfoil - JMG Unidirectional 2D Silencers

Quotation Number	:	Project Code	: AF-18606-1
Project Name	:	Customer	:
Item Reference:	:	Date:	: Monday, July 25, 2016

Fan Code	112JMG/40/4/9/28/-/2.0D N
Fan Diameter / Size	1120 Size / mm
Fan Speed	1775 rpm
Blade Angle	28°
Percentage Duty	101 %
Requested Duty	1334 N
Actual Duty	1352 N
Velocity	7533 fpm
Duty Shaft Power	54.1 HP
Motor Frame	200M
Motor Rating	55.5 HP [IE1]
Full Load Current	65.6 A
Starting Current	367.36 A
Motor Mounting	Pad
Electrical Supply	440-480 Volts 60 Hz 3 Phase
Start Type	DOL
Motor Winding	Standard
Enclosure	Standard All
Air Density	0.059 lb/ft³ / 100 °F / 5380 ft / 50% RH
Smoke Venting	250°C / 2 Hours



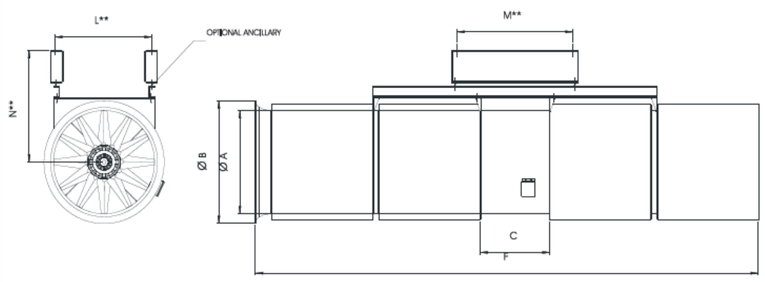


	Sound Spectrum (Hz)								Overall	
	63	125	250	500	1k	2k	4k	8k	Lw*	LwA
Forward*	91	90	95	90	90	89	86	80	99	95

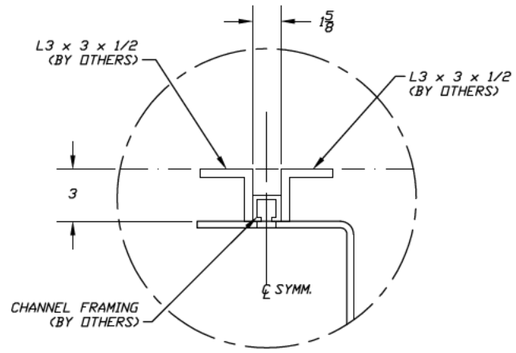
* Lw dB re 10 $^{-12}$ W
Sound data at requested duty.

UNI-DIRECTIONAL JET FAN WITH 2D SILENCERS

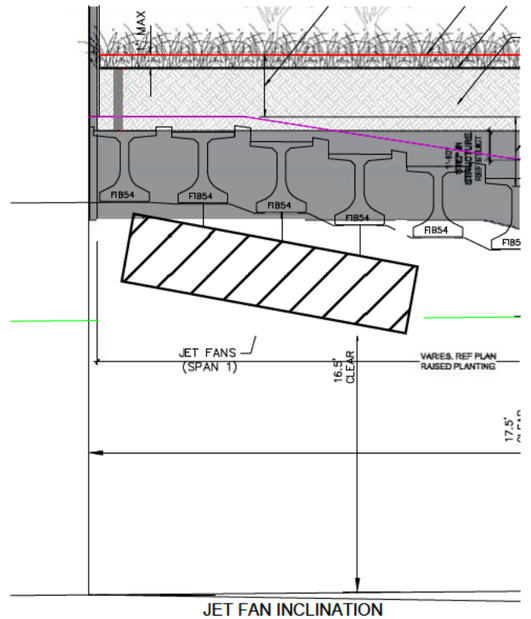
A	1120
B	1338
C	900
F	5772
Motor Frame	D200
Unit Weight (kg)	1019



Notes Dimensions shown in mm / Weight in kg
Reference Catalogue drawing
This drawing shows dimensions that should be used as a guide only and are subject to change. Certified drawings are available on request.



JET FAN ANCHORAGE EXAMPLE



JET FAN INCLINATION
INSTALLED AT APPROXIMATELY 10 DEGREE ANGLE

Print Date:		Sheet Revisions	
File Name:		Date:	Comments / Init.
5280 Connectors Linking I-70 Communities			

Colorado Department of Transportation
2000 South Holly Street
Denver, CO 80222
Phone: 303-757-9295 FAX: 303-757-9963
Region 1

No Revisions:	JET FAN PERFORMANCE AND DETAILS		Project No./Code
Revised:	Designer:	Structure Numbers	FBR 0704-234
Void:	Detailer:		19631
	Sheet Subset:	Subset Sheets: of	Sheet Number M002

NOTES.

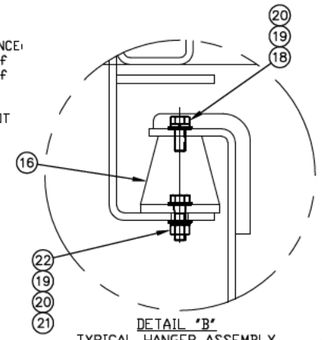
1. ALL WELDING IS IN ACCORDANCE WITH AWS D1.1.
2. MOTOR TERMINAL BOX AND AUXILIARY TERMINAL BOX ARE BOTH NEMA 4x ENCLOSURES.
3. ALL BOLTS,NUTS,WASHERS AND LOCK WASHERS OF AISI TYPE 316 STAINLESS STEEL.
4. ALL NAMEPLATES OF STAINLESS STEEL.
5. ALL NON STAINLESS STEEL OR ALUMINUM SURFACES WILL BE:
   A. HOT DIP GALVANIZED GS-165.
   B. PAINT AMERLOCK SEALER / AMERLOCK 2 /AMERSHELD VOC.
6. FANS ARE SUITABLE FOR 1 HOUR OF OPERATION AT 482 DEGREES F.

PERFORMANCE:

1. 11T18-9-2-B FAN PERFORMANCE:
   THRUST FORWARD = 298 LBf
   THRUST REVERSE = 298 LBf
   BHP = 48 HP / 36kW
   RPM = 1790
   BLADE ANGLE = 57° AT ROOT
   DENSITY = 0.075 LB/FT3

LOADING SUMMARY

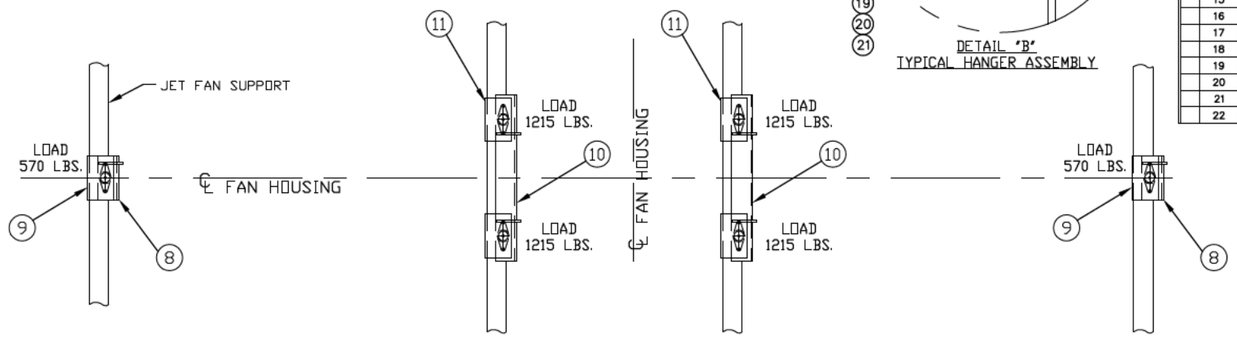
DEAD LOAD - BELOW
LIVE LOAD - 50 LB.
THRUST LOAD - 298 LB.



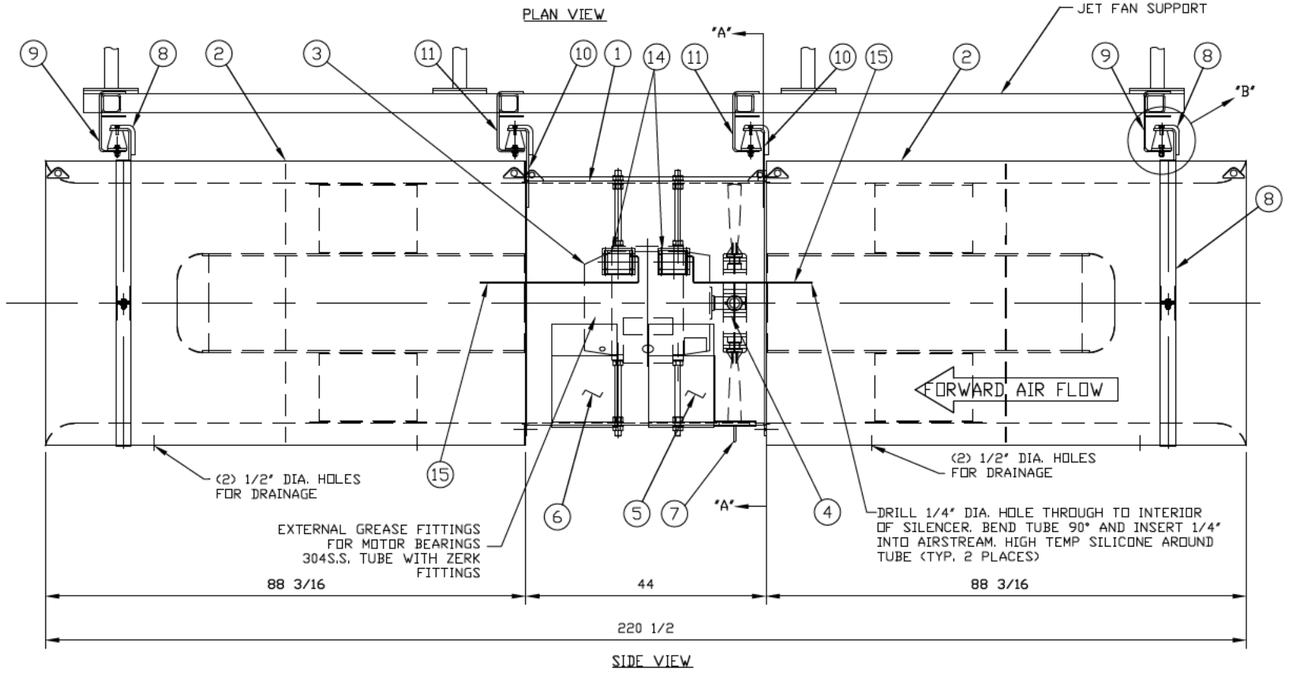
DETAIL 'B'
TYPICAL HANGER ASSEMBLY

ITEM	QTY.	PART NO.	DESCRIPTION	MATL.	THK.	AMT.	WT
1	1		FAN HOUSING	A36	1/4"		
2	2	B703015A01	ATTENUATOR	GALV.SHEET	18GA.		
3	1		MOTOR BALDOR 50HP,1770RPM,60Hz,460V				
4	1	B703015R01	IMPELLER	ALUM.			
5	1		MOTOR TERMINAL BOX NEMA 4X: 12" x 12" x 6"				
6	1		AUXILIARY TERMINAL BOX NEMA 4X: 12" x 12" x 6"				
7	1		ACCESS DOOR WITH SILICONE GASKET: 12" x 8"	A36			
8	2		SILENCER BELLY BANDS	A36			
9	2		SILENCER MOUNTING BEAMS	A36			
10	2		FAN HOUSING HANGERS	A36	3/8"		
11	2		FAN HOUSING MOUNTING BEAM	A36	3/8"		
12	2		PRESSURE SWITCH:				
13	2		VIBRATION SWITCH				
14	2		PRESSURE SWITCH BOXES: 6" x 6" x 4 1/4"				
15	2		1/4" O.D. TUBING	S.S.			
16	6		VIBRATION ELIMINATOR: NEOPRENE ISOLATORS D55-7A				
17	8		THREADED ROD 1"-8 UNC/LOCK WASHERS 1"/NUTS 1"-8 UNC	316			
18	6		HEX HEAD BOLT: 1/2"-13 UNC x 1 1/4" LG.	316			
19	30		FLAT WASHERS: 1/2" DIA.	316			
20	18		LOCK WASHERS: 1/2" DIA.	316			
21	12		HEX NUTS: 1/2"-13 UNC	316			
22	12		HEX HEAD BOLT: 1/2"-13 UNC x 1 3/4" LG.	316			

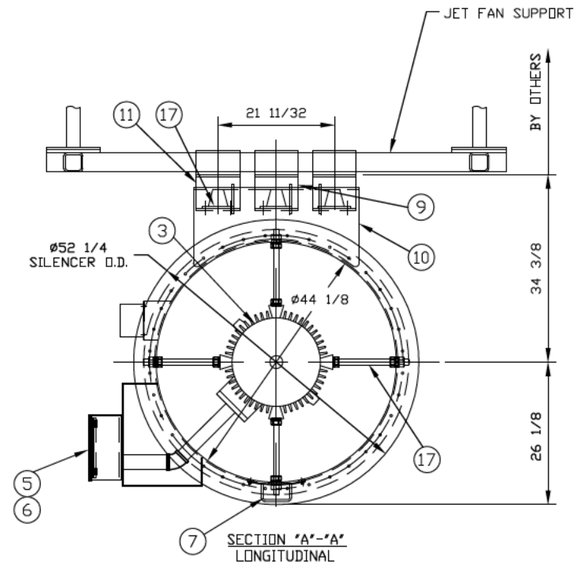
APPROXIMATE TOTAL WEIGHT = 6000.0 LBS.



PLAN VIEW



SIDE VIEW



SECTION 'A'-'A'
LONGITUDINAL

Print Date:		Sheet Revisions			Colorado Department of Transportation
File Name:		Date:	Comments	Init.	2000 South Holly Street Denver, CO 80222 Phone: 303-757-9295 FAX: 303-757-9963
					Region 1
5280 Connectors Linking I-70 Communities					

	JET FAN DETAILS		Project No./Code
No Revisions:			FBR 0704-234
Revised:	Designer:	Structure Numbers	19631
Void:	Detailer:		Sheet Number M003
	Sheet Subset:	Subset Sheets: of	

SYSTEM DEMAND:
2 x 100' ZONE FLOW: 4,700 GPM

NFPA 20 DESIGN FLOW FOR PUMP SIZING: 5,200 GPM
DESIGN SYSTEM PRESSURE: 70 PSI
CITY WATER PRESSURE ASSUMED TO BE 20 PSI

PUMPS SIZED FOR 5,200 GPM and 50 PSI. PROVIDE TWO DUTY AND ONE STAND-BY PUMPS AT 3,000 GPM EACH. (Ref: AURORA MODEL 8-491-14A)

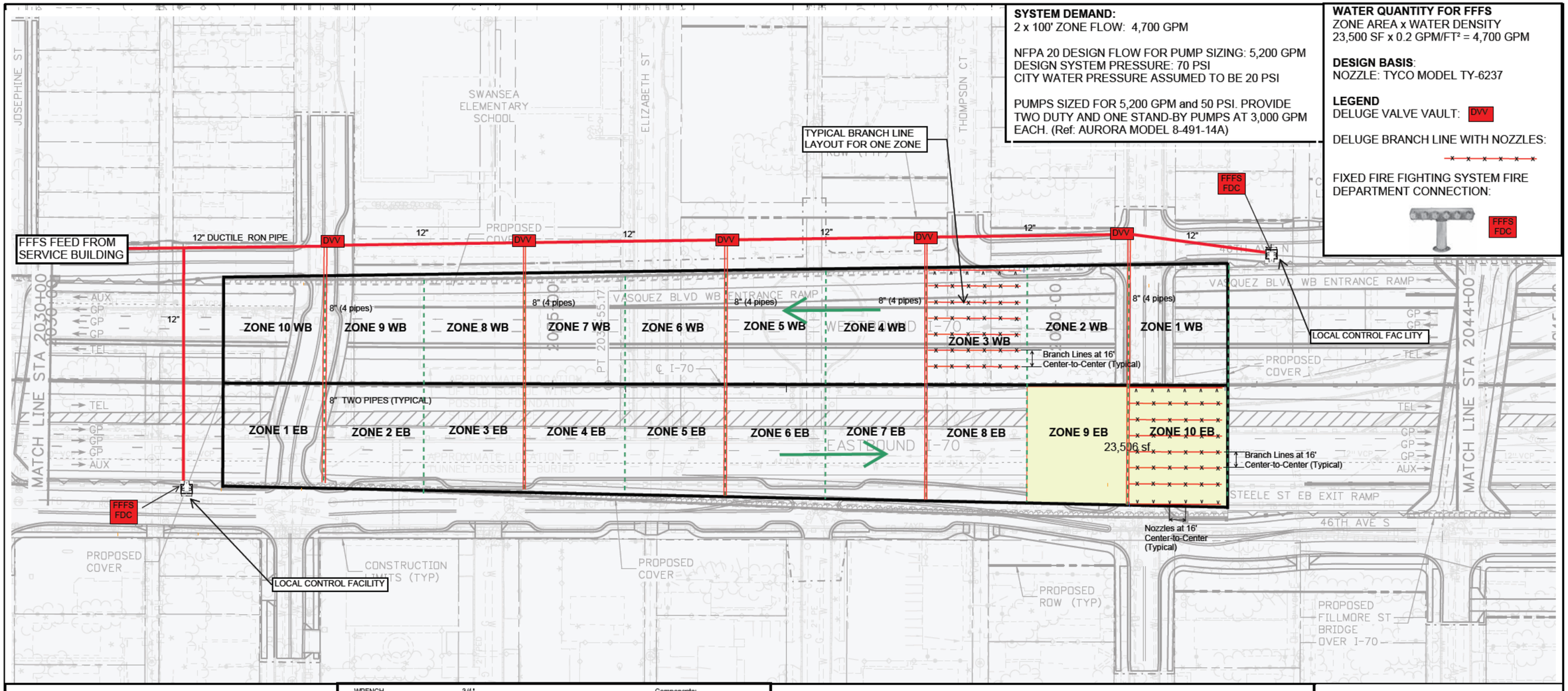
WATER QUANTITY FOR FFFS
ZONE AREA x WATER DENSITY
23,500 SF x 0.2 GPM/FT² = 4,700 GPM

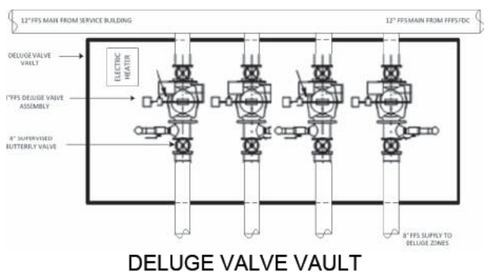
DESIGN BASIS:
NOZZLE: TYCO MODEL TY-6237

LEGEND
DELUGE VALVE VAULT: DVV

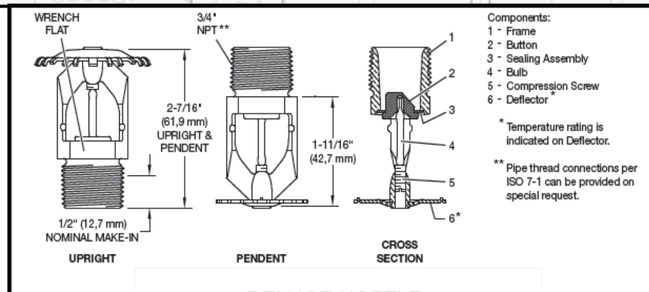
DELUGE BRANCH LINE WITH NOZZLES:

FIXED FIRE FIGHTING SYSTEM FIRE DEPARTMENT CONNECTION: FFFS FDC

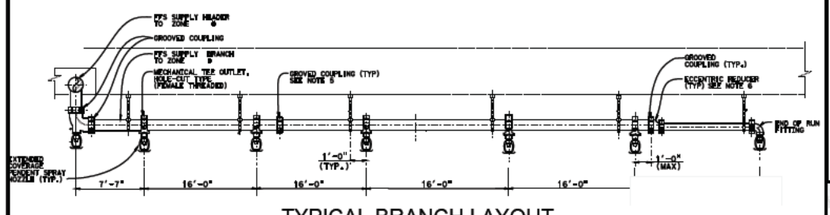




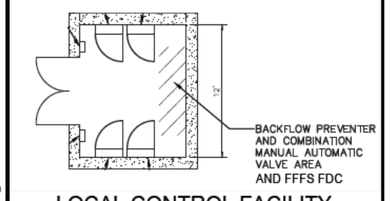
DELUGE VALVE VAULT



DELUGE NOZZLE



TYPICAL BRANCH LAYOUT



LOCAL CONTROL FACILITY

0' 50' 100' 200'

Print Date:	Sheet Revisions			Colorado Department of Transportation	
File Name:	Date:	Comments	Init.	2000 South Holly Street Denver, CO 80222 Phone: 303-757-9295 FAX: 303-757-9963	No Revisions:
5280 Connectors Linking I-70 Communities				Region 1	Revised:
					Void:

FIXED FIREFIGHTING SYSTEM			Project No./Code
Designer:	Structure Numbers		FBR 0704-234
Detailer:			19631
Sheet Subset:	Subset Sheets: of		Sheet Number M004

SYSTEM DEMAND:
2 x 100' ZONE FLOW: 4,700 GPM

NFPA 20 DESIGN FLOW FOR PUMP SIZING: 5,200 GPM
DESIGN SYSTEM PRESSURE: 70 PSI
CITY WATER PRESSURE ASSUMED TO BE 20 PSI

PUMPS SIZED FOR 5,200 GPM and 50 PSI. PROVIDE TWO DUTY AND ONE STAND-BY PUMPS AT 3,000 GPM EACH. (Ref: AURORA MODEL 8-491-14A)

LEGEND

DELUGE VALVE VAULT: DVV

DELUGE BRANCH LINE WITH NOZZLES:

FIXED FIRE FIGHTING SYSTEM FIRE DEPARTMENT CONNECTION:

FFFS FDC

TYPICAL LAYOUT FOR ONE ZONE

FFFS FEED FROM SERVICE BUILDING

12" DUCTILE IRON PIPE

DVV

12"

8" (4 pipes)

ZONE 10 WB | ZONE 9 WB | ZONE 8 WB | ZONE 7 WB | ZONE 6 WB | ZONE 5 WB | ZONE 4 WB | ZONE 3 WB | ZONE 2 WB | ZONE 1 WB

TEMPORARY ROOF OPENING

Branch Lines at 16' Center-to-Center (Typical)

CAP THE TWO 8" EB ZONE PIPES HERE (TYPICAL)

LOCAL CONTROL FACILITY

CONSTRUCTION LIMITS (TYP)

PROPOSED COVER

PROPOSED ROW (TYP)

SWANSEA ELEMENTARY SCHOOL

JOSEPHINE ST

ELIZABETH ST

THOMPSON CT

VASQUEZ BLVD WB EXIT RAMP

EASTBOUND I-70

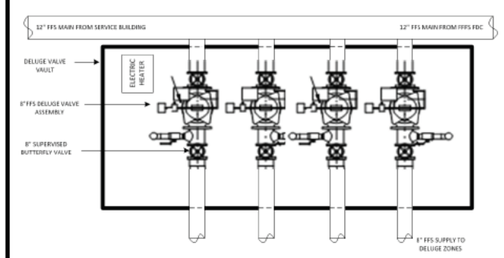
STEELE ST EB EXIT RAMP

46TH AVE S

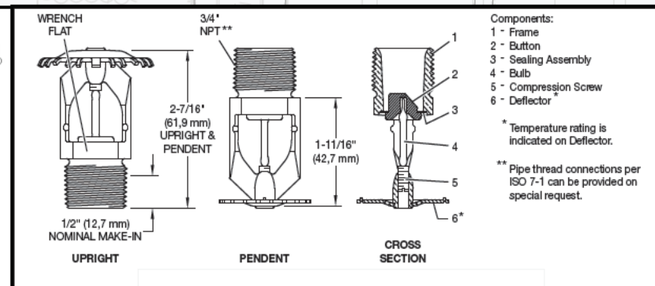
PROPOSED FILLMORE ST BRIDGE OVER I-70

MATCH LINE STA 2030+00

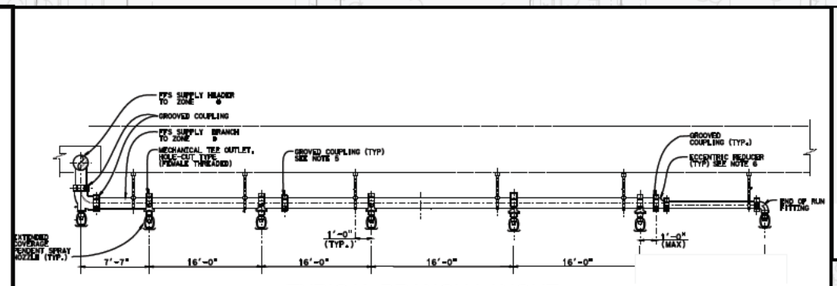
MATCH LINE STA 2044+00



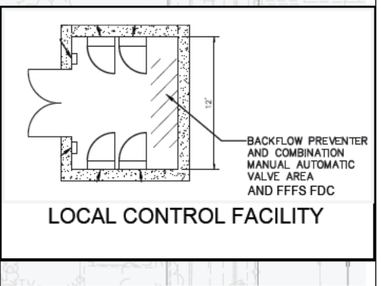
DELUGE VALVE VAULT



DELUGE NOZZLE



TYPICAL BRANCH LAYOUT



LOCAL CONTROL FACILITY

0' 50' 100' 200'

Print Date:	Sheet Revisions		
File Name:	Date:	Comments	Init.
5280 Connectors Linking I-70 Communities			

Colorado Department of Transportation
2000 South Holly Street
Denver, CO 80222
Phone: 303-757-9295 FAX: 303-757-9963
Region 1

No Revisions:	
Revised:	
Void:	

FIXED FIREFIGHTING SYSTEM INTERIM PHASE

Designer:		Structure Numbers	
Detailer:			
Sheet Subset:		Subset Sheets:	of

Project No./Code
FBR 0704-234
19631
Sheet Number M005

SYSTEM DEMAND
FLOW: 750 GPM
SYSTEM PRESSURE: 140 PSI
CITY WATER RESIDUAL PRESSURE ASSUMED TO BE: 20 PSI

PUMPS SIZED FOR 750 GPM and 120 PSI. PROVIDE ONE DUTY AND ONE STAND-BY PUMP AT 750 GPM EACH. (REF: XYLEM MODEL 8100 6x4x10 F-M)

LEGEND
FIRE DEPARTMENT CONNECTION: FDC
FIRE HYDRANT: FH
HOSE CONNECTION STATION: HC
VALVE:

STANDPIPE FEED FROM SERVICE BUILDING

8" DUCTILE IRON PIPE

CONNECT TO CITY WATER

PROVIDE AN AUTOMATED CONTROL VALVE WITHIN THIS DELUGE VALVE VAULT

DVV

LOCAL CONTROL FACILITY

DOWN TO ROADWAY LEVEL

DUCTILE IRON PIPES BURIED UNDER ROADWAY (TYPICAL)

CONNECT TO CITY WATER

CONNECT TO CITY WATER

DOWN TO ROADWAY LEVEL

LOCAL CONTROL FACILITY

CONNECT TO CITY WATER

SWANSEA ELEMENTARY SCHOOL

JOSEPHINE ST

ELIZABETH ST

THOMPSON CT

PROPOSED ROW (TYP)

PROPOSED COVER

CONSTRUCTION LIMITS (TYP)

VASQUEZ BLVD WB ENTRANCE RAMP

WESTBOUND I-70

EASTBOUND I-70

46TH AVE

STEELE ST EB EXIT RAMP

46TH AVE S

PROPOSED FILLMORE ST BRIDGE OVER I-70

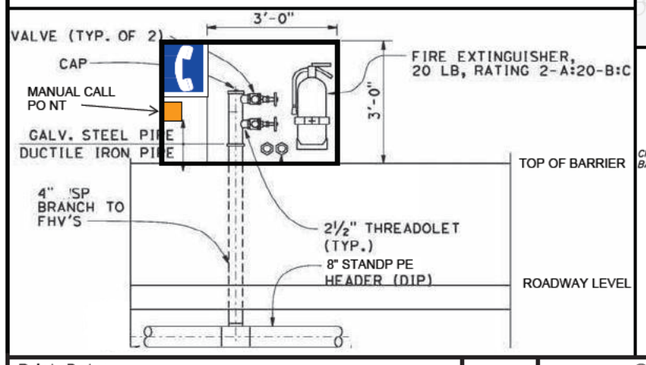
MATCH LINE STA 2030+00

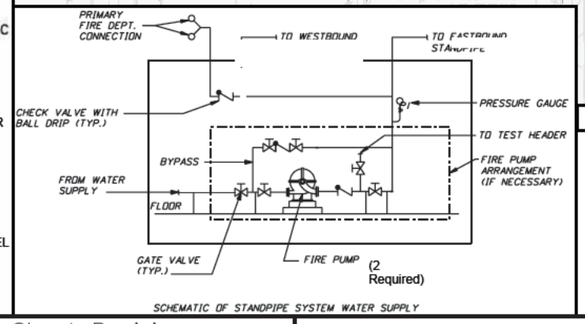
MATCH LINE STA 2040+00

2035+00

PT 2035+53.17

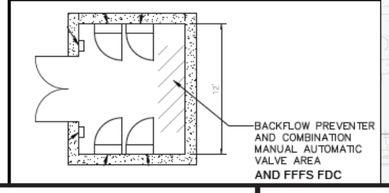
STANDPIPE CONNECTION STATION / EMERGENCY POINT





SCHEMATIC OF STANDPIPE SYSTEM WATER SUPPLY

LOCAL CONTROL FACILITY



Print Date:
File Name:

5280 Connectors Linking I-70 Communities

Sheet Revisions		
Date:	Comments	Init.

Colorado Department of Transportation
2000 South Holly Street
Denver, CO 80222
Phone: 303-757-9295 FAX: 303-757-9963
Region 1

No Revisions:
Revised:
Void:

STANDPIPES, HYDRANTS AND PORTABLE EXTINGUISHERS

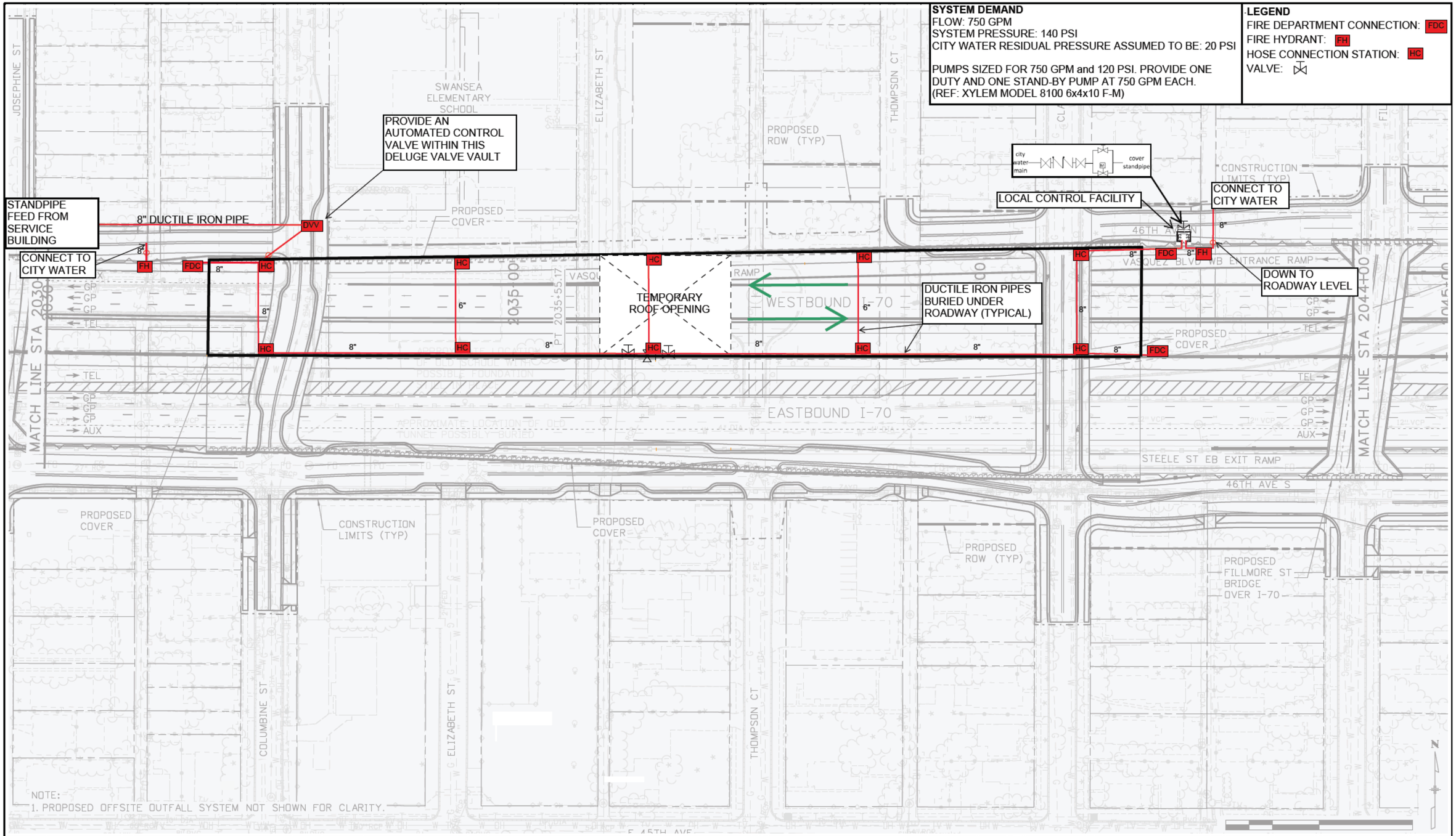
Designer:
Detailer:
Sheet Subset:
Structure Numbers:
Subset Sheets: of

Project No./Code
FBR 0704-234
19631
Sheet Number M006

SYSTEM DEMAND
FLOW: 750 GPM
SYSTEM PRESSURE: 140 PSI
CITY WATER RESIDUAL PRESSURE ASSUMED TO BE: 20 PSI

PUMPS SIZED FOR 750 GPM and 120 PSI. PROVIDE ONE DUTY AND ONE STAND-BY PUMP AT 750 GPM EACH.
(REF: XYLEM MODEL 8100 6x4x10 F-M)

LEGEND
FIRE DEPARTMENT CONNECTION: FDC
FIRE HYDRANT: FH
HOSE CONNECTION STATION: HC
VALVE:



NOTE:
1. PROPOSED OFFSITE OUTFALL SYSTEM NOT SHOWN FOR CLARITY.

Print Date:	Sheet Revisions	Colorado Department of Transportation	
File Name:	Date: / Comments / Init.	2000 South Holly Street Denver, CO 80222 Phone: 303-757-9295 FAX: 303-757-9963	No Revisions:
5280 Connectors Linking I-70 Communities		Region 1	Revised:
			Void:

STANDPIPES, HYDRANTS AND PORTABLE EXTINGUISHERS INTERIM PHASE

Designer:		Structure Numbers	
Detailer:			
Sheet Subset:		Subset Sheets:	of

Project No./Code
FBR 0704-234
19631
Sheet Number M007

ILLUM NATED FIRE EXIT F RE EXIT DISTANCE FROM HERE LEFT

REFER TO SKETCH E026 FOR SIGN D MENSIONS

XX FT - DISTANCE VAR ES COLORS: SAFETY GREEN AND WHITE

ILLUMINATED FIRE EXIT F RE EXIT DISTANCE FROM HERE RIGHT

REFER TO SKETCH E026 FOR SIGN D MENSIONS

XX FT - DISTANCE VARIES COLORS: SAFETY GREEN AND WHITE

ILLUMINATED TRIANGULAR STRAIGHT FROM HERE WITH ROTATING FLASH NG BEACON

10" SYMBOL HEIGHT
3" TEXT HEIGHT
COLORS: SAFETY GREEN AND WHITE

SLIDE TO OPEN LEFT

10" SYMBOL HEIGHT
3" TEXT HEIGHT
COLORS: SAFETY GREEN AND WHITE

SLIDE TO OPEN RIGHT

10" SYMBOL HEIGHT
3" TEXT HEIGHT
COLORS: SAFETY GREEN AND WHITE

FIRE EXIT

10" SYMBOL HEIGHT
3" TEXT HEIGHT
COLORS: SAFETY GREEN AND WHITE

F RE HYDRANT

2" TEXT HEIGHT
COLORS: SAFETY RED AND WHITE

FIRE HOSE REEL

NOT USED

EMERGENCY PHONE

COLORS: BLUE AND WHITE

DOOR LABEL

2" TEXT HEIGHT
COLORS: WHITE AND BLACK

DELUGE ZONE XX ODD NUMBERED LABEL

4" TEXT HEIGHT
COLORS: WHITE AND BLACK

DELUGE ZONE YY EVEN NUMBERED LABEL

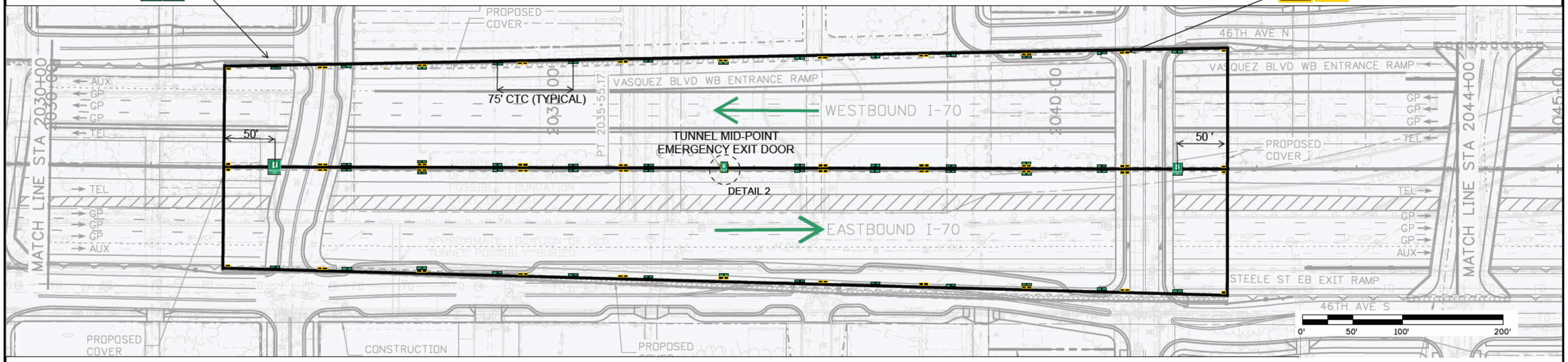
4" TEXT HEIGHT
COLORS: WHITE AND BLACK

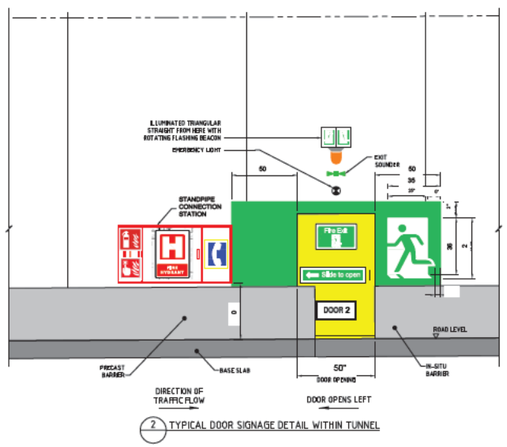
HAZARD WARNING

4" TEXT HEIGHT
COLORS: SAFETY YELLOW AND BLACK

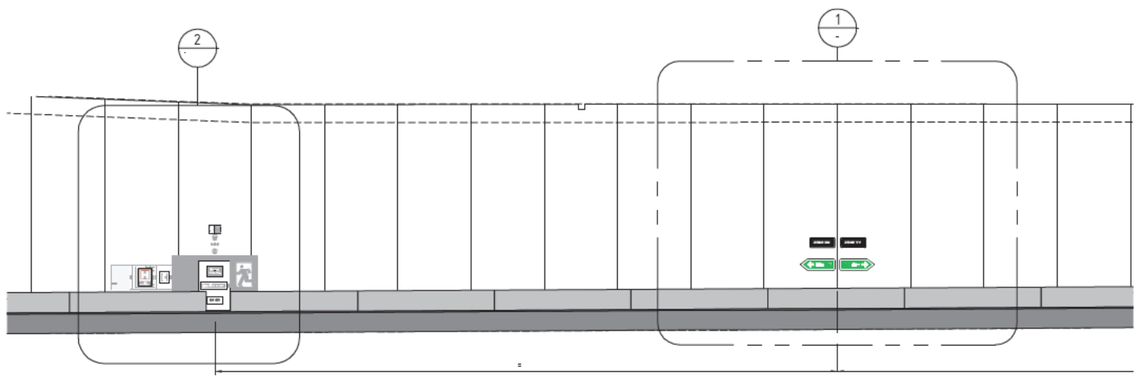
SCHEMATIC SYMBOL:

SCHEMATIC SYMBOL:

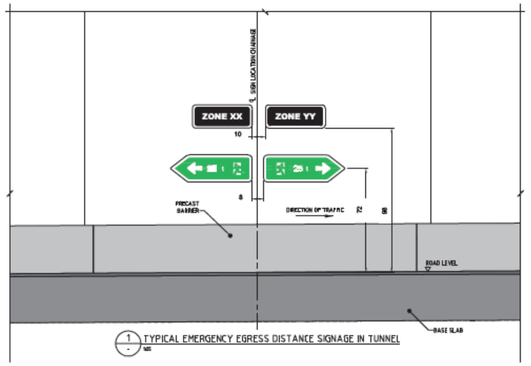




2 TYPICAL DOOR SIGNAGE DETAIL WITHIN TUNNEL



EMERGENCY EGRESS SIGNAGE
ELEVATION OF EGRESS PASSAGE WALL



1 TYPICAL EMERGENCY EGRESS DISTANCE SIGNAGE IN TUNNEL

Print Date:	Sheet Revisions	Colorado Department of Transportation	EMERGENCY WAYFINDING SIGNAGE
File Name:	Date: / Comments / Init.	2000 South Holly Street Denver, CO 80222 Phone: 303-757-9295 FAX: 303-757-9963 Region 1	Designer: / Detailer: / Sheet Subset: / Structure Numbers / Subset Sheets: of
5280 Connectors Linking I-70 Communities		No Revisions: / Revised: / Void:	Project No./Code: FBR 0704-234 / 19631 / Sheet Number M008

NETWORK SYMBOLS:

- EXISTING HIGH SPEED BACKBONE FIBER OPTIC CABLE
- FIBER OPTIC CABLE
- CAT-6 CABLE
- EXISTING NETWORK CONNECTION
- NETWORK CONNECTION
- XX-SM — XX = FIBER STRAND COUNT, SM = SINGLEMODE FIBEROPTIC CABLE
- EXISTING HIGH SPEED BACKBONE (HSB) ETHERNET SWITCH (X) V=VIDEO, P=POWER, S=SCADA
- FOPP — EXISTING HIGH SPEED BACKBONE FIBER OPTIC PATCH PANEL (FOPP)
- P — LOCAL FIBER OPTIC INDUSTRIAL POE ETHERNET SWITCH LOCATED IN THE TUNNEL CNC BOX
- LOCAL FIBER OPTIC ETHERNET SWITCH
- FOPP — NEW HIGH SPEED BACKBONE FIBER OPTIC PATCH PANEL (FOPP)
- FIREWALL

ITS SYMBOLS:

- XT — ANEMOMETER
- OVD — OVERHEIGHT VEHICLE DETECTOR
- DMS — DYNAMIC MESSAGE SIGN (DMS), ETHERNET BASED, LED
- LUS — LANE USE SIGN (LUS), ETHERNET BASED, LED
- ARM — ACCESS RAMP METER
- OOO — TRAFFIC CONTROL LIGHT

SCADA SYMBOLS:

- RIO — REMOTE INPUT OUTPUT ADAPTER MODULE
- PLC — PROGRAMMABLE LOGIC CONTROLLER (PLC), CONTROL PANEL
- SRV — COMPUTER SERVER
- PC — PERSONAL COMPUTER
- WS — WORKSTATION
- MON — MONITOR FOR PERSONAL COMPUTER
- HMI — HUMAN MACHINE INTERFACE
- VS — VIBRATION SENSOR
- AE — ANALYTICAL ANALYZER

SCADA SYMBOLS (CONT.):

- PT — PRESSURE TRANSMITTER
- FT — AIR QUALITY FLOW TRANSMITTER
- S — GENERIC SENSOR(S)
- HC — HYDROCARBON VAPOR DETECTION SYSTEM
- JET FAN
- LCP — LIGHTING CONTROL PANEL
- HTCP — HEAT TRACE CONTROL PANEL
- PSG — POWER SYSTEM GATEWAY
- —C— — CONTROL CABLE

CCTV SYMBOLS:

- A — AUTOMATIC LICENSE PLATE RECOGNITION (ALPR) CAMERA
- P/T — PAN-TILT-ZOOM CAMERA. FULL 360 DEGREE OVERVIEW WITH ONE-CLICK PTZ, ETHERNET-BASED, NEMA-4X, IP-66, PAN, 220 DEGREE TILT, ZOOM OPERATION, 32X OPTICAL ZOOM AND 12X DIGITAL ZOOM MINIMUM, MINIMUM ILLUMINATION NO LESS THAN 0.3 LUX, 30FPS, 16:9 ASPECT RATIO, 1920X1080 PIXELS. CAMERA SHALL HAVE WASH WIPE FUNCTIONALITY. ("P' - PAN TILT ZOOM , 'T' - THERMAL IMAGING PAN TILT ZOOM)
  - TYPICAL FOR GROUP OF THREE. CENTER CAMERA IS THERMAL WITH REMAINING TWO CAMERAS BEING NON THERMAL CAMERAS.
- M — MICROWAVE VEHICLE RADAR DETECTOR (MVRD) CAMERA
- NVR — NVR (NETWORK VIDEO RECORDER) COMPATIBLE WITH QOGNIFY AND/OR CURRENT STANDARD USED BY THE DEPARTMENT CDOT. VIDEO STREAMING = MULTICASTING, H.264. RECORDING RETENTION= 30 DAYS, MINIMUM BANDWIDTH OF 1.2 mbs PER CAMERA. (XX DENOTES NVR NUMBER)
- CCTV WS — QOGNIFY VIDEO WORKSTATION

ACCESS CONTROL SYMBOLS:

- DPS — IP DOOR POSITION SWITCH
- DAC — IP DOOR ACCESS CONTROLLER GATEWAY
- DCR — IP DOOR CARD READER
- GCR — GATE CONTROLLER
- EGRESS CORRIDOR EXIT DOOR
- EGRESS CORRIDOR SLIDING DOOR

RADIO COMMUNICATIONS SYMBOLS:

- —FM— — RADIATING COAXIAL CABLE (RADIO RE-BROADCAST AND MAINTENANCE)
- — H — — HELIAX CABLE (RADIO RE-BROADCAST AND MAINTENANCE)

RADIO COMMUNICATIONS SYMBOLS (CONT.):

- BDA — BI-DIRECTIONAL AMPLIFIER
- ANTENNA (OUTDOORS)
- ANTENNA (INDOORS)
- DSRC — DEDICATED SHORT RANGE COMMUNICATION RADIO
- CBC — CROSS BAND COUPLER
- SSC — SIGNAL SPLITTER COMBINER
- RFSW — RADIO FREQUENCY MEDIA CONVERTER SWITCH
- CABLE SPLICE
- RADIO HEADEND EQUIPMENT
- T — RADIATING CABLE TERMINATION
- —AM— — AM RADIO REBROADCAST CABLE (RADIO RE-BROADCAST)
- PA BREAK-IN — AM/FM RADIO REBROADCAST BREAK-IN

TELECOMMUNICATIONS SYMBOLS:

- CALL BOX VOIP TELEPHONE WITH NEMA 4X ENCLOSURE
- DPM — DIGITAL PHONE MODULE
- DPMC — DIGITAL PHONE MODULE CHASSIS - RACK MOUNTED
- PABX — EXISTING PRIVATE AUTOMATIC BRANCH EXCHANGE
- PABX — NEW PRIVATE AUTOMATIC BRANCH EXCHANGE
- VOIP TELEPHONE

MASS NOTIFICATION SYMBOLS:

- MASS NOTIFICATION LOUD SPEAKERS
- MNC — MASS NOTIFICATION HEAD END CONTROLLER
- MASS NOTIFICATION MICROPHONE
- AMP — MASS NOTIFICATION AMPLIFIER

ELECTRICAL SYMBOLS:

- UPS — UNINTERRUPTIBLE POWER SUPPLY
- ATS — AUTOMATIC TRANSFER SWITCH
- G — ENGINE GENERATOR
- H — HEAT DETECTOR
- G — PORTABLE GENERATOR CONNECTION

ELECTRICAL SYMBOLS (CONT.):

- X — ELECTRIC MOTOR 'X' DESIGNATES HORSEPOWER
- MCC — MOTOR CONTROL CENTER
- SWGR — SWITCHGEAR
- T — TRANSFORMER
- E — ELECTRICALLY OPERATED INTERLOCK
- X-X-X — 13.2 KV FEEDER
- 52 — MV DRAW OUT POWER CIRCUIT BREAKER
- FUSED DISCONNECT
- FIXED CIRCUIT BREAKER
- 480V DRAW OUT CIRCUIT BREAKER
- MV DRAW OUT BREAKER FRAME
- M — UTILITY METERING (PT & CT)
- YYY / XXX — PANELBOARD 'X' DESIGNATES RATING 'Y' DESIGNATES SERVICE TYPE
- UNDERGROUND CONDUIT
- GROUNDING
- AA/FA TRANSFORMER

FIRE ALARM SYMBOLS:

- CNC — COMMUNICATION NODE CABINET
- FC — FAN CONTROL
- FPM — FIRE PUMP MONITORING
- F — FIRE ALARM MANUAL PULL STATION SINGLE ACTION
- FDCP — FIRE DELUGE CONTROL PANEL
- DVV — DELUGE VALVE VAULT
- ZB — ZONE BOX
- FACP — FIRE ALARM CONTROL PANEL

FIRE ALARM SYMBOLS CONT.:

- S — FIRE ALARM SMOKE DETECTOR
- H — HEAT DETECTOR
- F — FIRE ALARM SPEAKER/STROBE LIGHT COMBINATION WALL MOUNTED
- R — FIRE ALARM RELAY
- FP — FIRE PUMP CONTROL PANEL
- FS — FIRE ALARM FLOW SWITCH
- TS — FIRE ALARM TAMPER SWITCH
- DV — DELUGE VALVE

LIGHTING CONTROL SYSTEM SYMBOLS:

- NWC — NETWORK CONTROLLER
- WF — EMERGENCY WAY-FINDING LED SIGN
- JB — JUNCTION BOX
- LDP — LGHTING DISTRIBUTION PANEL
- L — LED LUMINAIRE
- LPC — LOCAL PRODUCT CONTROLLER
- P — PHOTOMETER FOR MEASURING LUMINANCE AT PORTALS. SHALL INCLUDE A THERMOSTATICALLY CONTROLLED HEATER AND A WASH WIPE SYSTEM.
- I — ILLUMINANCE METER FOR MEASURING ILLUMINANCE IN THE TUNNEL. VENDOR SUPPLIED IP 65 ENCLOSURE.

ABBREVIATIONS:

A	AMPERE
C	CONDUIT
CNC	COMMUNICATION NODE CABINET
ES-I-XX	ITS ETHERNET SWITCH
ES-S-XX	SCADA SYSTEM ETHERNET SWITCH
ES-V-XX	VIDEO SYSTEM ETHERNET SWITCH
ES-F-XX	FIRE SYSTEM ETHERNET SWITCH
GEN	GENERATOR
HD	HIGH DEFINITION
IP	INTERNET PROTOCOL
LCC	LIGHTING CONTROL CABINET
LCF	LOCAL CONTROL FACILITY
LCS	LIGHTING CONTROL SYSTEM
LED	LIGHT EMITTING DIODE
MCC	MOTOR CONTROL CENTER
NVR	NETWORK VIDEO RECORDER
PF	PHENOLIC FIBERGLASS
POE	POWER OVER ETHERNET
PTZ	PAN-TILT-ZOOM
XFMR	TRANSFORMER

Print Date: 4/24/2017 2:11 PM
File Name: E001.DWG
Staff Bridge Branch - Unit 0226 Unit Leader DDG

Sheet Revisions

Date:	Comments	Init.
04/24/17	FINAL FOR ESTIMATING	

Colorado Department of Transportation
2000 South Holly Street
Denver, CO 80222
Phone: 303-757-9295 FAX: 303-757-9963
Region 1 JKE

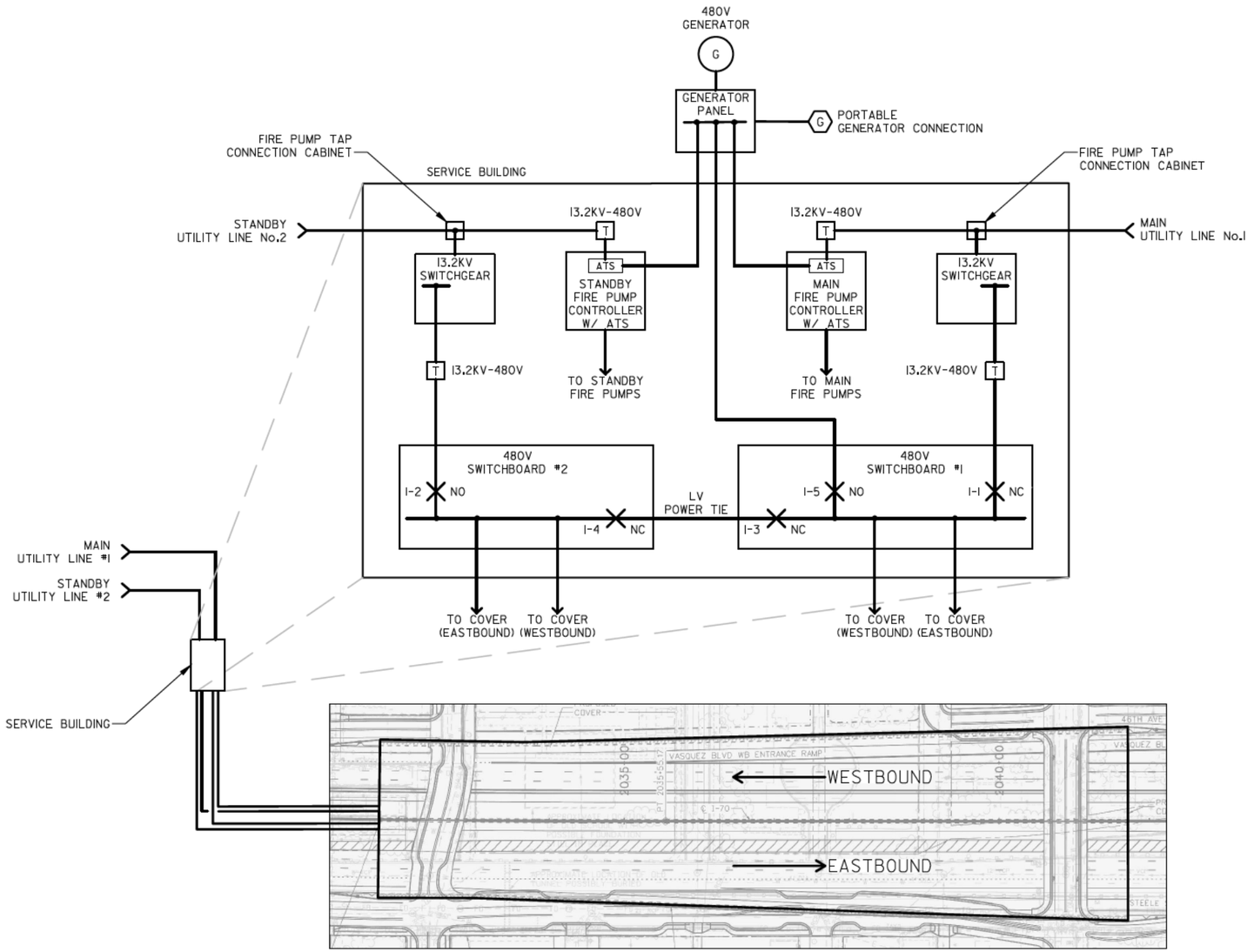
As Constructed
No Revisions:
Revised:
Void:

ELECTRICAL AND ICA SYMBOLS AND ABBREVIATIONS

Designer: RRU
Detailer: TK
Sheet Subset:
Structure Numbers
Subset Sheets: of

Project No./Code
FBR 0704-234
19631
Sheet Number E001

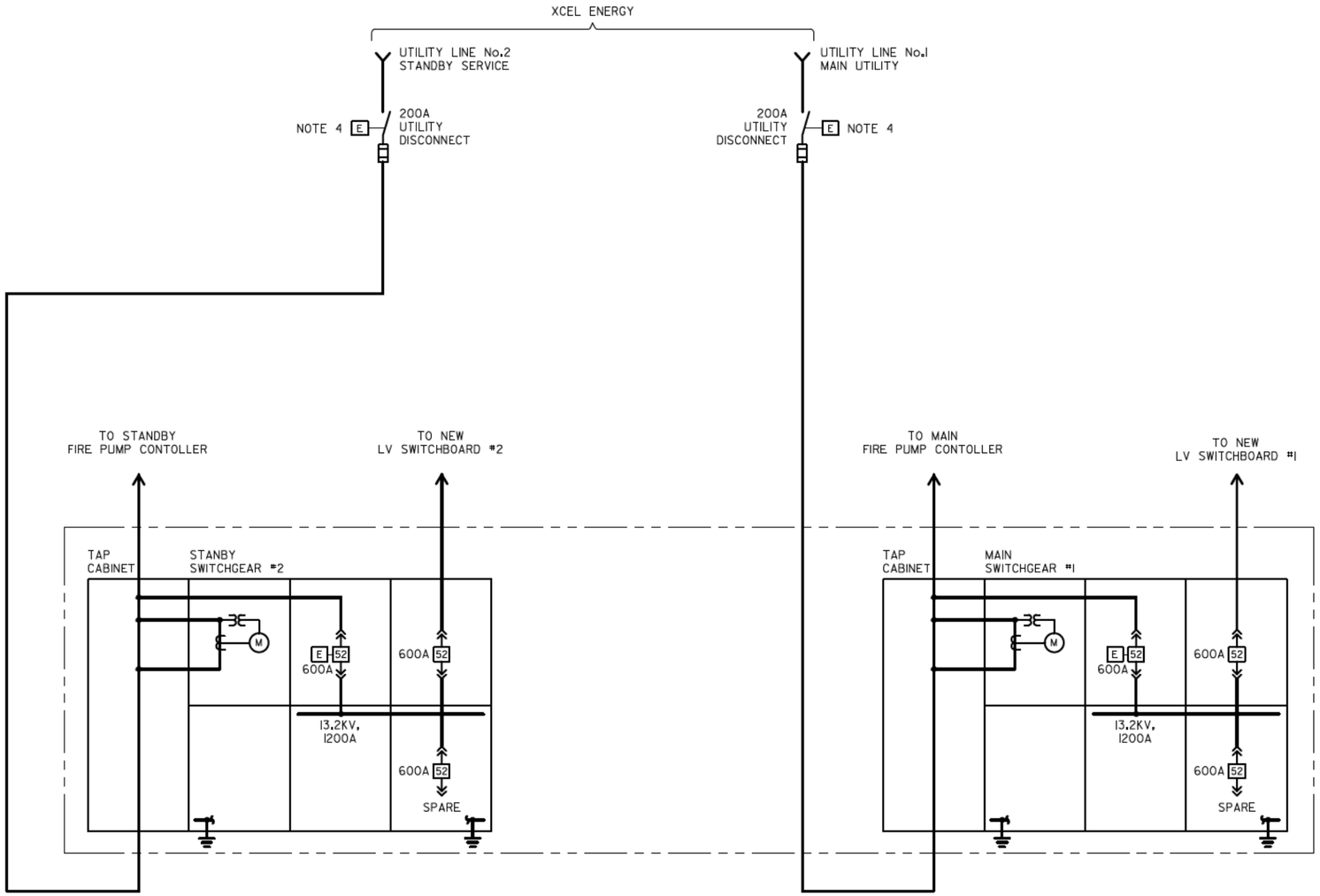
INTERLOCK PROCEDURE TABLE (CONCEPT)				
INTERLOCK	UTILITY 1 (MAIN)	UTILITY 2 (STANDBY)	GENERATOR (EMERGENCY)	UTILITY 1&2 (ALT)
I-1	CLOSED	OPEN	OPEN	CLOSED
I-2	OPEN	CLOSED	OPEN	CLOSED
I-3	CLOSED	CLOSED	CLOSED	OPEN
I-4	CLOSED	CLOSED	CLOSED	OPEN
I-5	OPEN	OPEN	CLOSED	OPEN



OVERALL POWER DISTRIBUTION BLOCK DIAGRAM

SCALE: NTS

Print Date: 4/24/2017 2:11 PM	0008	Sheet Revisions			Colorado Department of Transportation	As Constructed	ELECTRICAL OVERALL POWER DISTRIBUTION BLOCK DIAGRAM	Project No./Code
File Name: E002.DWG		Date:	Comments	Init.	2000 South Holly Street Denver, CO 80222 Phone: 303-757-9295 FAX: 303-757-9963	No Revisions:	Designer: CML	FBR 0704-234
		04/24/17	FINAL FOR ESTIMATING			Revised:	Detailer: MK	Structure Numbers: 19631
Staff Bridge Branch - Unit 0226 Unit Leader DDG					Region 1 JKE	Void:	Sheet Subset:	Subset Sheets: of
								Sheet Number E002



13.2KV SWITCHGEAR

SCALE: NTS

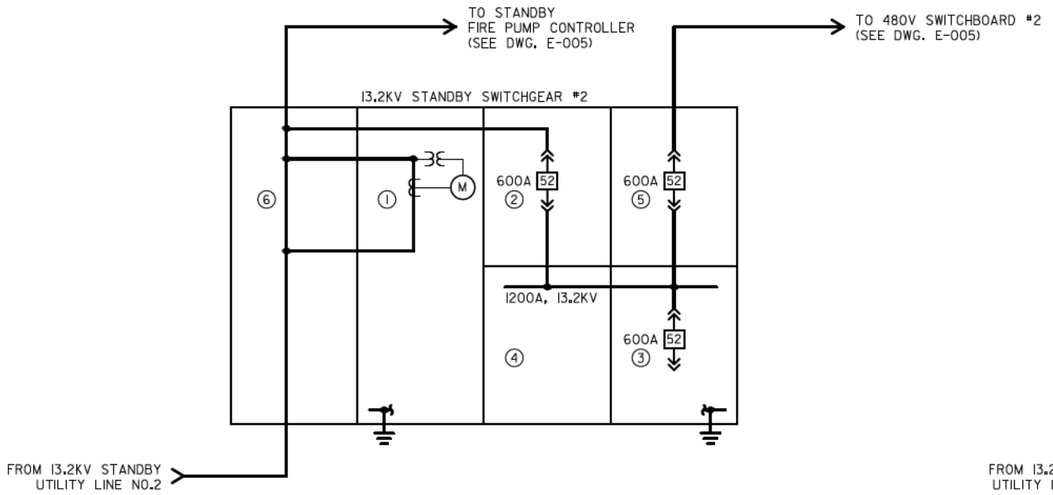
NOTES:

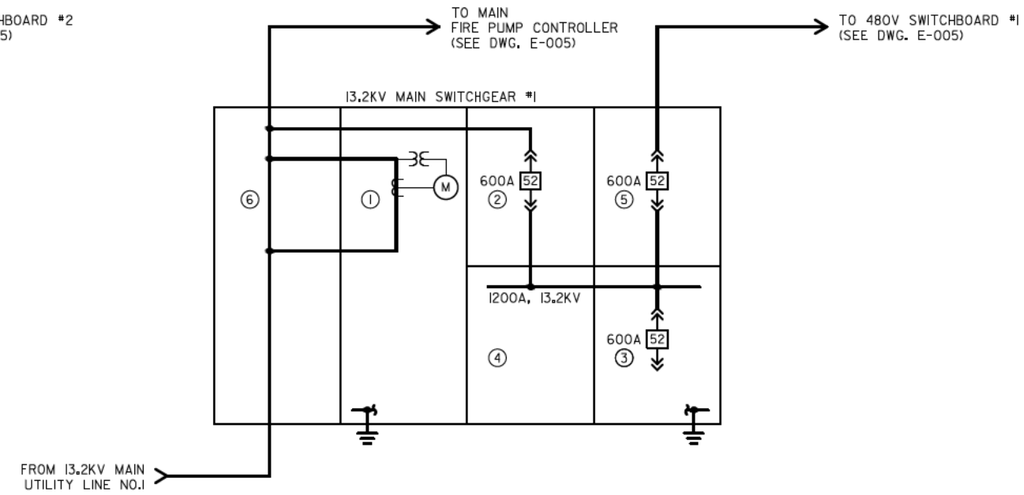
1. ALL 13.2KV CIRCUIT BREAKERS WILL BE PROVIDED WITH MULTI FUNCTION ELECTRONIC PROTECTIVE RELAYS. THESE RELAYS WILL BE CONNECTED TO SCADA.
2. GENERATOR WILL SUPPORT THE FULL LOAD OF THE COVER CONNECTED TO THE LV SWITCHBOARDS.
3. THE BASIS OF DESIGN MANUFACTURER FOR THE 13.2KV SWITCHGEARS ARE EATON.
4. INTERLOCKS TO BE FULLY DEVELOPED DURING DETAILED DESIGN.

Print Date: 4/24/2017 2:11 PM File Name: E003.DWG Staff Bridge Branch - Unit 0226 Unit Leader DDG	0000	Sheet Revisions Date: 04/24/17 — Comments: FINAL FOR ESTIMATING — Init.:	Colorado Department of Transportation 2000 South Holly Street Denver, CO 80222 Phone: 303-757-9295 FAX: 303-757-9963 Region 1 JKE	As Constructed No Revisions: Revised: Void:	ELECTRICAL 13.2KV SWITCHGEAR ONE-LINE DIAGRAM Designer: CML Detailer: FJM Sheet Subset: Structure Numbers Subset Sheets: of	Project No./Code FBR 0704-234 19631 Sheet Number E003

NOTES:

1. ALL MV CIRCUIT BREAKERS SHALL BE 600AMP.





13.2KV SWITCHGEAR - ELEVATION PLAN

SCALE: NTS

13.2KV SWITCHGEAR #2:

1. UTILITY METERING COMPARTMENT (CT's AND PT's BY UTILITY)
2. (1) INCOMING CIRCUIT BREAKER FROM 13.2KV STANDBY UTILITY
3. (1) SPARE CIRCUIT BREAKER
4. (1) SPACE FOR FUTURE 600A BREAKER
5. (1) CIRCUIT BREAKER FOR STEP DOWN TRANSFORMER (13.2KV-480/277V)
6. FIRE PUMP CONTROLLER TAP CABINET (VERTICAL SECTION AHEAD OF MAIN DISCONNECT)

13.2KV SWITCHGEAR #1:

1. UTILITY METERING COMPARTMENT (CT's AND PT's BY UTILITY)
2. (1) INCOMING CIRCUIT BREAKER FROM 13.2KV MAIN UTILITY
3. (1) SPARE CIRCUIT BREAKER
4. (1) SPACE FOR FUTURE 600A BREAKER
5. (1) CIRCUIT BREAKER FOR STEP DOWN TRANSFORMER (13.2KV-480/277V)
6. FIRE PUMP CONTROLLER TAP CABINET (VERTICAL SECTION AHEAD OF MAIN DISCONNECT)

Print Date: 4/24/2017 2:11 PM
File Name: E004.DWG
Staff Bridge Branch - Unit 0226 Unit Leader DDG

0000

Sheet Revisions

Date:	Comments	Init.
04/24/17	FINAL FOR ESTIMATING	

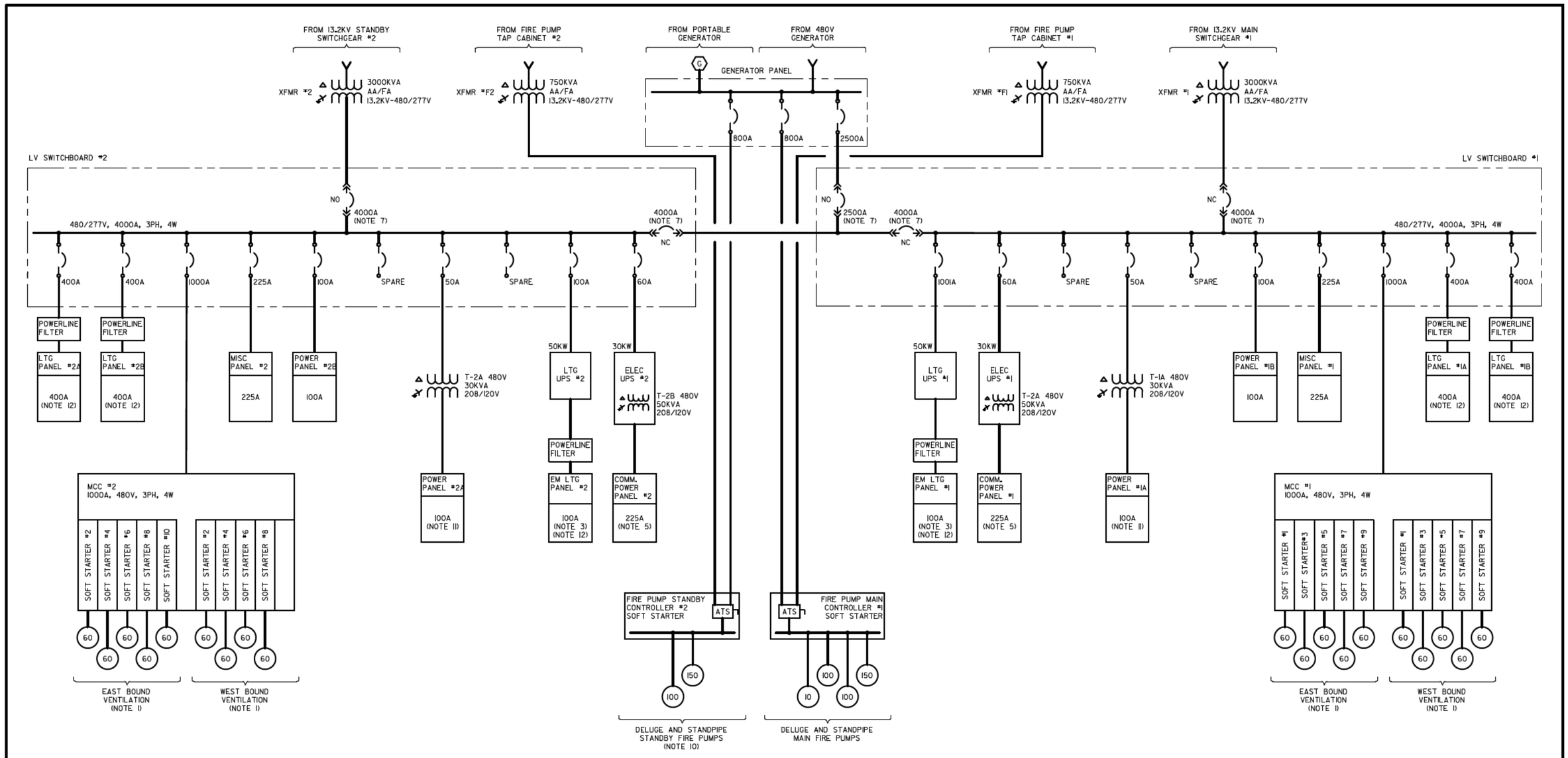
Colorado Department of Transportation
2000 South Holly Street
Denver, CO 80222
Phone: 303-757-9295 FAX: 303-757-9963
Region 1 JKE

As Constructed
No Revisions:
Revised:
Void:

ELECTRICAL
13.2KV SWITCHGEAR
ELEVATIONS

Designer: CML
Detailer: FJM
Sheet Subset:
Structure Numbers:
Subset Sheets: of

Project No./Code
FBR 0704-234
19631
Sheet Number E004



NOTES:

1. ALL TUNNEL VENTILATION MOTORS SHALL BE PROTECTED BY A MAGNETIC AND THERMAL CIRCUIT BREAKER AND EQUIPPED WITH A SOFT STARTER AND LOCAL DISCONNECT SWITCH. TUNNEL VENTILATION FANS ARE UNIDIRECTIONAL.
2. ALL PANELBOARDS SHALL BE PROVIDED WITH SPARE CIRCUIT BREAKERS.
3. THE FOLLOWING LIGHTING LOADS SHALL BE POWERED WITH LIGHTING UPS'S AT 480V:
   A. TUNNEL ROADWAY EMERGENCY LIGHTING
4. MCC SHALL BE PROVIDED WITH AUXILIARY INPUTS AND OUTPUTS TO ALLOW ALL MCC STARTERS TO BE MONITORED AND CONTROLLED BY SCADA.
5. THE FOLLOWING LOADS SHALL BE POWERED BY ELECTRONIC UPS:
   A. ITS SYSTEMS EQUIPMENT
   B. CAMERAS AND VIDEO SURVEILLANCE SYSTEMS
   C. COMMUNICATION SYSTEMS AND EQUIPMENT INCLUDING EMERGENCY CALL BOX SYSTEM, TUNNEL MASS NOTIFICATION SYSTEM, EMERGENCY RESPONDERS TWO WAY RADIO SYSTEM, AND O&M TWO WAY RADIO SYSTEM
   D. EMERGENCY WAYFINDING SIGN LIGHTING
   E. ALL FIRE ALARM, DETECTION, AND CONTROL SYSTEMS.
   F. ALL SCADA EQUIPMENT, SERVERS, PROGRAMMABLE LOGIC CONTROLLERS (PLC'S), COMMUNICATION NODE CABINETS (CNC'S) AND REMOTE INPUT/OUTPUT UNITS (RIO'S)
   G. ALL INTRUSION DETECTION EQUIPMENT
   H. ALL CONTROL ROOM WORKSTATION COMPUTERS, MONITORS, PRINTERS, RACKS, SERVERS AND OTHER ELECTRICAL OPERATION LOADS
   I. AN ADDITIONAL 20% SPARE CAPACITY ON THE HIGHEST CALCULATED UPS DEMAND LOAD ON EACH UPS
   J. SERVICE BUILDING INTERIOR (BY OTHERS)
   K. EXIT SIGNS
   L. ESSENTIAL POWER AND CONTROL IN DELUGE VALVE VAULTS
6. PROVIDE 13.2KV TO 480V SUBSTATIONS IN THE SERVICE BUILDING FOR THE NEW COVER. SUBSTATIONS TO BE IN SEPARATE 2-HOUR FIRE RATED ELECTRICAL ROOMS.
7. MAIN 480V CIRCUIT BREAKERS SHALL BE DRAWOUT TYPE. PROVIDE (1) SPARE DRAW-OUT POWER CIRCUIT BREAKER FOR EACH 480V POWER DISTRIBUTION BOARD.
8. THE BASIS OF DESIGN FOR ALL 480V ELECTRICAL EQUIPMENT IS EATON.
9. THE BASIS OF DESIGN MANUFACTURER FOR THE LOW VOLTAGE DISTRIBUTION EQUIPMENT IS EATON.
10. ONE DELUGE FIRE PUMP AND ONE STANDPIPE FIRE PUMP DEDICATED FOR STANDBY OPERATION.
11. 208/120V POWER PANEL TO SUPPLY NON-ESSENTIAL POWER TO SERVICE BUILDING, DELUGE VALVE VAULTS AND LOCAL CONTROL FACILITIES.
12. LIGHTING AND EMERGENCY DISTRIBUTION PANELS TO CONNECT WITH LIGHTING CONTROL CABINET EQUIPPED WITH NETWORK CONTROLLERS FOR LIGHTING CONTROL SYSTEM.

Print Date: 4/24/2017 2:11 PM
File Name: E005.DWG
Staff Bridge Branch - Unit 0226 Unit Leader DDG

0008

Sheet Revisions

Date:	Comments	Init.
04/24/17	FINAL FOR ESTIMATING	

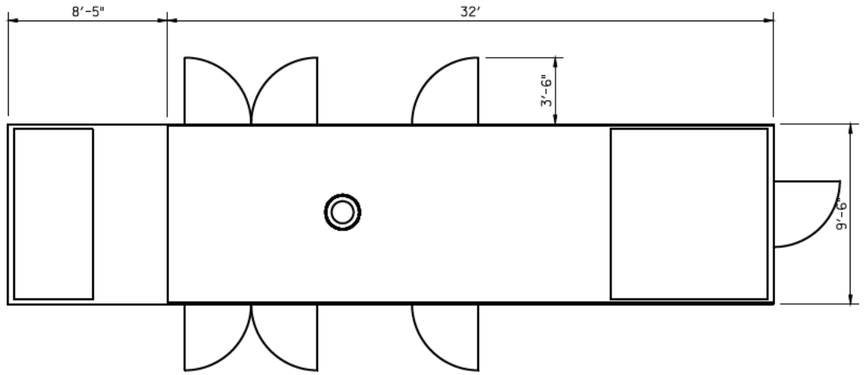
Colorado Department of Transportation
2000 South Holly Street
Denver, CO 80222
Phone: 303-757-9295 FAX: 303-757-9963
Region 1
JKE

As Constructed
No Revisions:
Revised:
Void:

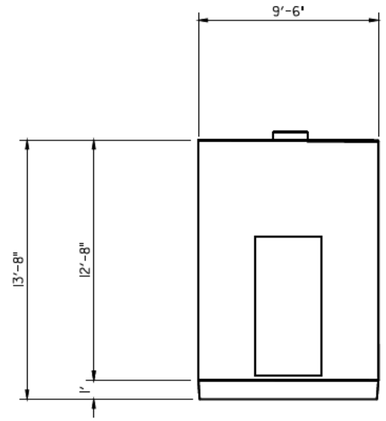
ELECTRICAL
480V SUBSTATIONS

Designer: CML
Detailer: FJM
Sheet Subset:
Structure Numbers
Subset Sheets: of

Project No./Code
FBR 0704-234
19631
Sheet Number E005



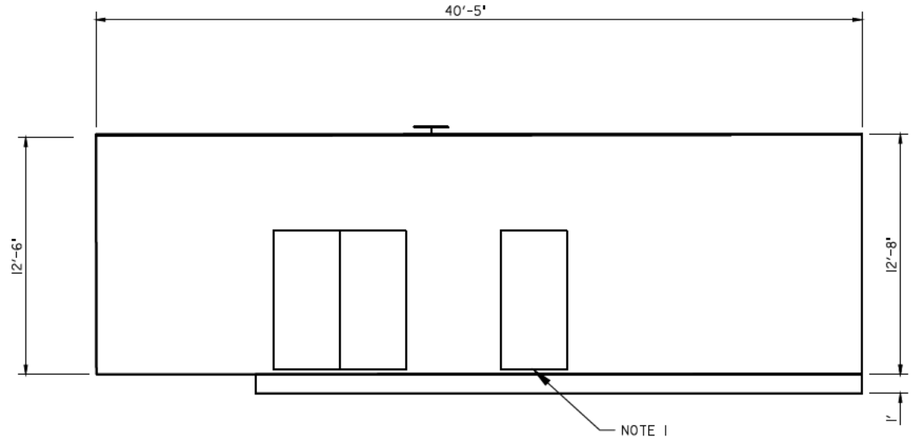
PLAN VIEW - TOP
SCALE: 1/8" = 1'-0"



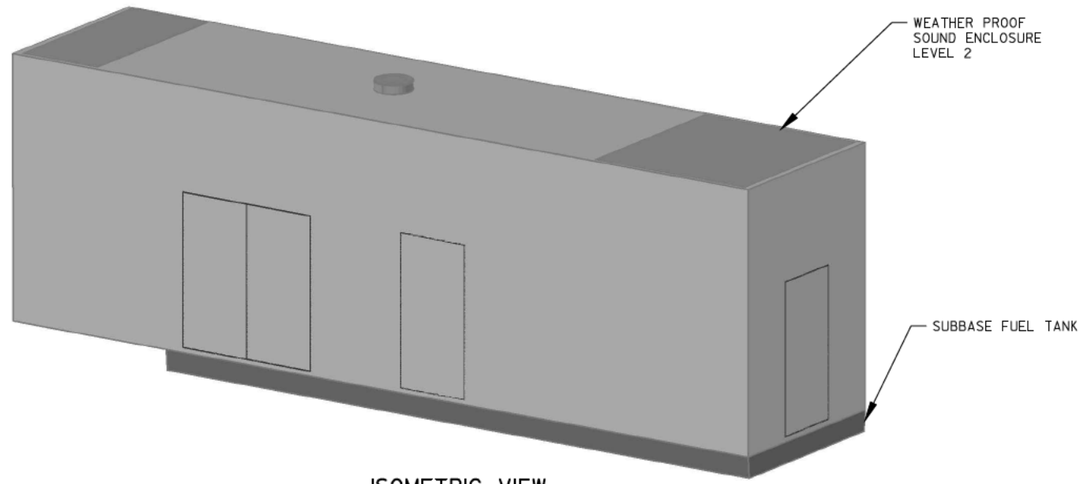
ELEVATION VIEW - FRONT
SCALE: 1/8" = 1'-0"

NOTES:

1. ANY ACCESS TO THE INSIDE OF THE GENERATOR ENCLOSURE BY MEANS OF A FUTURE STRUCTURE FROM GROUND LEVEL TO BOTTOM OF ENCLOSURE FLOOR TO BE BUILT BY OTHERS.
2. GENERATOR BASIS OF DESIGN IS FROM KOHLER POWER SYSTEMS. STANDARD MODEL OF A 1750-2000KW KOHLER-MITSUBISHI DIESEL GENERATOR PROVIDED FROM KOHLER AS SHOWN.



PLAN VIEW - SIDE
SCALE: 1/8" = 1'-0"



ISOMETRIC VIEW
SCALE: NTS

LV GENERATOR SPECIFICATIONS WITH INTERNAL SILENCER AND SUBBASE FUEL TANK							
ITEM	WEIGHT (LBS)	DIMENSIONS (LXWXH)	TANK(GAL)	MANUFACTURER	MODEL	ENCLOSURE	NOTES
2000KVA W/ 40 DEGREE CELSIUS RADIATOR	47175 + 9598 FUEL	485"X114"X169"	1350	KOHLER	8EOZMD	SOUND ENCLOSURE LVL 2	1. INTERNAL SILENCER 2. 8 HOUR FUEL SUPPLY

Print Date: 4/24/2017 2:11 PM
File Name: E007.DWG
Staff Bridge Branch - Unit 0226 Unit Leader DDG

0008

Sheet Revisions

Date:	Comments	Init.
04/24/17	FINAL FOR ESTIMATING	

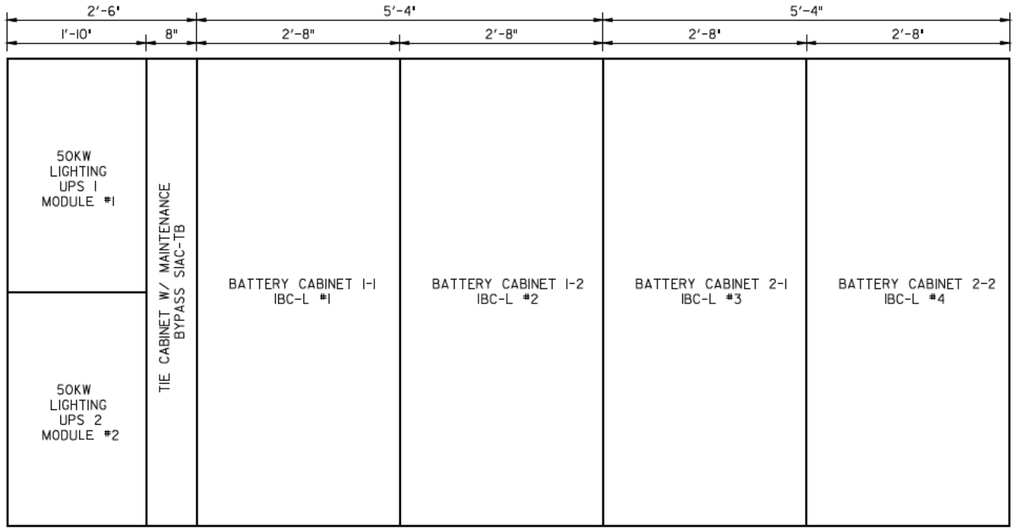
Colorado Department of Transportation
2000 South Holly Street
Denver, CO 80222
Phone: 303-757-9295 FAX: 303-757-9963
Region 1 JKE

As Constructed
No Revisions:
Revised:
Void:

GENERATOR CONCEPT DESIGN

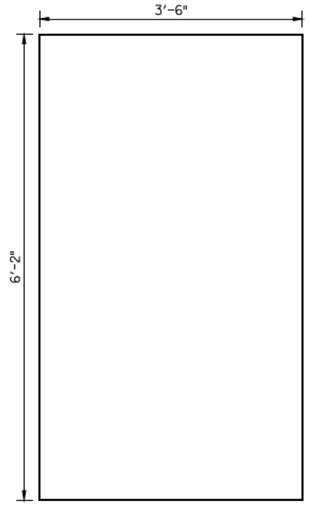
Designer: CML
Detailer: MK
Sheet Subset:
Structure Numbers
Subset Sheets: of

Project No./Code
FBR 0704-234
19631
Sheet Number E007



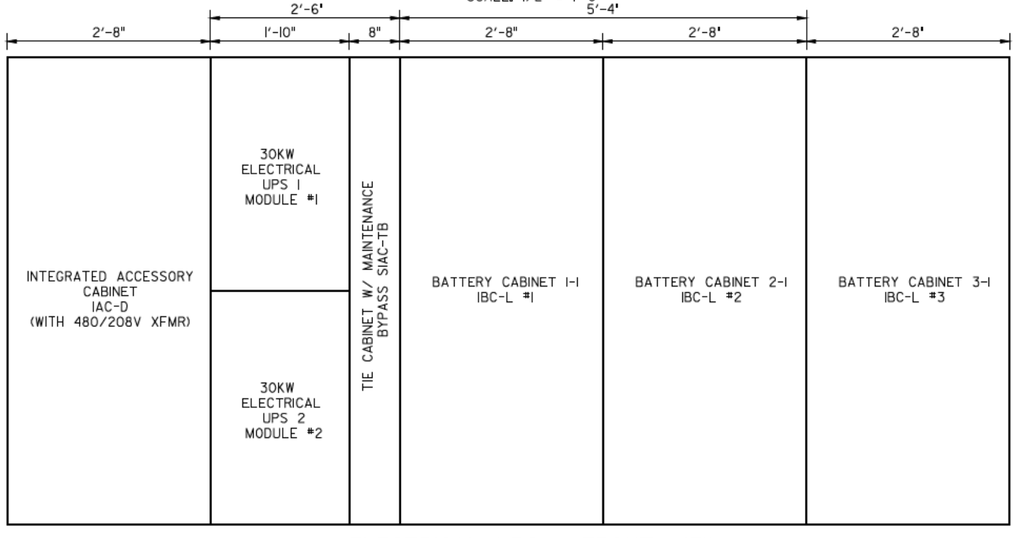
LIGHTING UPS - FRONT VIEW

SCALE: 1/2" = 1'-0"



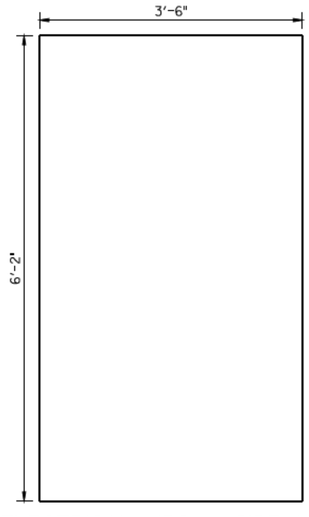
LIGHTING UPS - SIDE VIEW

SCALE: 1/2" = 1'-0"



ELECTRICAL UPS - FRONT VIEW

SCALE: 1/2" = 1'-0"



ELECTRICAL UPS - SIDE VIEW

SCALE: 1/2" = 1'-0"

NOTES:

1. UPS CONCEPT DESIGN FOR ELECTRICAL AND LIGHTING UPS USED THE EATON 93PM SERIES BASED UPON THREE-PHASE, ON-LINE, DOUBLE-CONVERSION MODULES.
2. LIGHTING UPS DIMENSIONS BASED UPON FULL EMERGENCY LIGHTING LOAD (IN KW). ELECTRICAL UPS DIMENSIONS BASED UPON ALL CCMS AND ITS EQUIPMENT LOAD (IN KW). ELECTRICAL UPS INCLUDES STEP DOWN TRANSFORMER FROM 480/208V. ALL UPS DESIGNS FOLLOWS N+1 MODULAR REDUNDANCY (DOUBLE KW CAPACITY).
3. UPS BATTERY CABINETS SIZED TO SUPPLY 90 MINUTES OF FULL LOAD EMERGENCY BACKUP POWER WITH 20% SPARE CAPACITY.
4. EACH PARALLEL UNIT OPERATES WITH ITS OWN BATTERY STRING ALLOWING MAINTENANCE OR UNEXPECTED FAILURE TO OCCUR WITH THE LOAD FULLY SUPPORTED BY THE REMAINING MODULE.
5. CONNECTIVITY OPTIONS FOR UP-TO-DATE SYSTEM STATUS AND INTEGRATION INTO THE COMMAND CONTROL AND MONITORING SYSTEM (CCMS) IS READILY AVAILABLE.
6. VENTILATION AND GAS DETECTION REQUIRED FOR UPS ROOMS.

EATON 93PM SERIES SPECIFICATIONS

ITEM	WEIGHT (LBS)	DIMENSIONS (HXWXD)	DESCRIPTION
50KW MODULE (480V)	~887	74"X22"X42"	MODULE - 50KW LIGHTING UPS (EATON 93PM-50-2 (N+1))
30KW MODULE (208V)	~887	74"X22"X42"	MODULE - 30KW ELECTRICAL UPS (EATON 93PM-50-2 (N+1))
BATTERY CABINET	UP TP 9000 LBS	74"X32.2"X42"	INTEGRATED BATTERY CABINET (IBC-L) W/ E54 BATTERIES
TIE CABINET	UP TO 540 LBS	74"X8"X42"	SLIM INTEGRATED ACCESSORY CABINET (SIAC-TB) TWO-BREAKER TIE W/ MAINTENANCE BYPASS
50KW ACCESSORY CABINET	~1149	74"X31.3"X42"	INTEGRATED ACCESSORY CABINET - DISTRIBUTION (IAC-D) W/ XFMR- CONFIGURATION TBD

Print Date: 4/24/2017 2:11 PM
File Name: E008.DWG
Staff Bridge Branch - Unit 0226 Unit Leader DDG

0008

Sheet Revisions

Date:	Comments	Init.
04/24/17	FINAL FOR ESTIMATING	

Colorado Department of Transportation
2000 South Holly Street
Denver, CO 80222
Phone: 303-757-9295 FAX: 303-757-9963
Region 1 JKE

As Constructed
No Revisions:
Revised:
Void:

ELECTRICAL & ICA UPS CONCEPT DESIGN

Designer: CML
Detailer: MK
Sheet Subset:
Structure Numbers
Subset Sheets: of

Project No./Code
FBR 0704-234
19631
Sheet Number E008

HANGERS AND SUPPORTS

1. ALL HANGERS, SUPPORTS, HARDWARE AND ANCHORS INSTALLED WITHIN THE COVER, EXPOSED TO THE OUTDOORS, OR IN NON-CONDITIONED SPACES OPEN TO OUTDOORS SHALL BE TYPE 316 STAINLESS STEEL.
2. ALL ANCHORS INSTALLED WITHIN THE COVER ABOVE THE COVER ROADWAY CLEARANCE ENVELOP TO SUPPORT ELECTRICAL, SCADA OR ITS EQUIPMENT AND CONDUIT SHALL BE STAINLESS STEEL EPOXY ANCHORS.
3. PROVIDE DIELECTRIC ISOLATION BETWEEN DISSIMILAR METALS.

HANDHOLES & JUNCTION BOXES

1. ALL HANDHOLES AND PULL/JUNCTION BOXES INSTALLED IN PAVED AREAS THAT CAN BE SUBJECT TO VEHICLE TRAFFIC SHALL HAVE H-20 RATED BOLT-DOWN COVERS. BOLTS SHALL BE TYPE 316 STAINLESS STEEL.
2. ALL HANDHOLES AND PULL/JUNCTION BOXES INSTALLED WITHIN ROADWAYS AND THE COVER ROADWAY SHALL HAVE THE CENTER LINE OF COVER IN LINE WITH THE CENTER OF TRAFFIC LANES TO MINIMIZE VEHICLE TIRES FROM RIDING OVER COVERS.
3. ALL HANDHOLES AND PULL JUNCTION BOXES INSTALLED WITHIN THE COVER ROADWAY SHALL HAVE COVERS PROVIDED WITH GASKETS TO PREVENT FUEL AND OIL SPILLS FROM ENTERING THE HANDHOLE, OR PULL/JUNCTION BOX. COVER GASKET MATERIAL SHALL BE NITRILE-BUNA RUBBER (BUTADIENE ACRYLONITRILE) (NBR) OR SIMILAR MATERIAL.
4. ALL PULL/JUNCTION BOXES OR CONCRETE CAVITIES INSTALLED WITHIN THE COVER, EXPOSED OUTDOORS OR IN NON-CONDITIONED SPACES OPEN TO THE OUTDOORS SHALL BE 316 STAINLESS STEEL NEMA 4X.
5. ALL ELECTRICAL PULL/JUNCTION BOXES INSTALLED WITHIN THE SERVICE BUILDING INTERIOR IN CONDITIONED SPACES SHALL BE HOT DIPPED GALVANIZED STEEL.
6. ALL HANDHOLE COVERS SHALL HAVE CAST-IN LETTERING IDENTIFYING HANDHOLE SERVICE FUNCTION.
7. ALL STAINLESS STEEL JUNCTION/PULL BOX COVERS SHALL HAVE MACHINE PRINTED TYPE 316 STAINLESS STEEL NAME PLATES ATTACHED TO THE COVER TO IDENTIFY THE JUNCTION BOX SERVICE FUNCTION. ALL OTHER JUNCTION BOX COVERS SHALL HAVE MACHINE PRINTED SYNTHETIC NAME PLATES ATTACHED TO THE COVER TO IDENTIFY THE JUNCTION BOX SERVICE FUNCTION.

EQUIPMENT CABINETS AND ENCLOSURES

1. ITS AND SCADA CABINETS AND ENCLOSURES IN ALL LOCATIONS EXCEPT IN THE SERVER AND CONTROL ROOMS SHALL BE TYPE 316 STAINLESS STEEL NEMA 4X ENCLOSURES WITH A FULL LENGTH HINGE AND THREE POINT LATCH RECESSED HANDLE KEY LOCK SYSTEM.
2. ALL ELECTRICAL DISTRIBUTION PANELBOARDS, CABINETS AND ENCLOSURES INSTALLED WITHIN THE COVER EXPOSED TO THE OUTDOORS OR IN NON-CONDITIONED SPACES OPEN TO THE OUTDOORS SHALL BE TYPES 316 STAINLESS STEEL NEMA 4X ENCLOSURES WITHA FULL LENGTH HINGE AND THREE POINT LATCHING DOOR LOCK SYSTEM WITH KEY LOCK AND RECESSED DOOR HANDLE.
3. ALL ELECTRICAL PANELBOARDS, CABINETS AND ENCLOSURES INSTALLED WITHIN THE SERVICE BUILDING INTERIOR IN CONDITIONED SPACES SHALL BE NEMA 1 OR NEMA 12 IN UNFINISHED BUT CONDITIONED SPACES.
4. ALL ELECTRICAL, SCADA AND ITS PANELBOARDS, CABINETS, AND ENCLOSURES THAT REQUIRE OPERABLE DOORS AND ARE INSTALLED WITHIN THE COVER AND ALL OUTDOOR LOCATIONS SHALL BE PROVIDED WITH MAGNETIC DOOR SWITCHES TO MONITOR THE DOOR OPEN/CLOSE STATUS THROUGH THE SCADA SYSTEM. ACTIVATION OF THE DOOR SWITCHES TO MONITOR THE DOOR OPEN/CLOSE STATUS THROUGH THE SCADA SYSTEM. ACTIVATION OF THE DOOR MAGNETIC SWITCH "DOOR OPEN ALARM' SHALL AUTOMATICALLY ADJUST THE CLOSEST CAMERA TO VIEW THE SPECIFIC DEVICE INSTALLED FOR THE DOOR OPEN ALARM SIGNAL AND DISPLAY THE CAMERA VIDEO IMAGE ON CTMS VIDEO MONITORS.
5. ALL ELECTRICAL, SCADA, AND ITS PANELS, CABINETS, AND ENCLOSURES SHALL HAVE MACHINE-PRINTED SYNTHETIC NAME PLATES ADHERED TO THE FRONT OF THE UNIT DOOR WITH EPOXY RESIN TO IDENTIFY THE UNIT'S UNIQUE IDENTIFICATION NAME.
6. ALL ELECTRICAL, SCADA AND ITS PANELS, CABINETS LOCATED WITHIN THE ROADWAY TUNNEL SHALL BE ENCLOSED WITHIN A TWO (2) HOUR FIRE RATED ENCLOSURE THAT PROVIDES DIRECT ACCESS TO THE ENTIRE PANELBOARDS OR CABINET IT ENCLOSES THROUGH OPERABLE TWO (2) HOUR FIRE RATED DOORS.

GROUNDING AND BONDING

1. PROVIDE A SEPARATE INSULATED GROUND CONDUCTOR WITH ALL 600V AND BELOW FEEDERS.
2. IN ALL HANDHOLES, AND JUNCTION/PULL BOXES BOND ALL METAL COMPONENTS WITH A MINIMUM #6 AWG BARE COPPER BONDING CONDUCTOR. THIS INCLUDES BUT IS NOT LIMITED TO COVERS, FRAMES, PULLING EYES, CONDUITS, CABLE SHIELDS, GROUND RODS AND GROUND CONDUCTORS.
3. BOND ALL METAL RACEWAYS TO ALL METAL JUNCTION/PULL BOXES.
4. PROVIDE BONDING JUMPER FOR ALL CABLE TRAYS AND METAL CONDUITS ACROSS THE CABLE TRAY GAP OR EXTERIOR OF THE CONDUIT EXPANSION FITTING THAT HAVE BEEN INSTALLED TO ACCOMMODATE THERMAL OR STRUCTURE EXPANSION/MOVEMENT.
5. PROVIDE A GROUND BUS IN THE SERVICE BUILDING ELECTRIC DISTRIBUTION, EMERGENCY GENERATOR, UPS, SCADA/ITS SERVER, AND COMMUNICATION EQUIPMENT ROOMS CONNECTED TO THE BUILDING GROUND.
6. CADWELD THE 4/0 DOWN CONDUCTOR FROM THE FIRE CONTROL ROOMS TO THE REBAR OF THE SUPPORT COLUMN AT INTERVALS NO GREATER THAN 3 FEET.
7. GROUNDING SYSTEM SHALL BE TESTED AND ADDITIONAL TO BE ADDED AS REQUIRED TO ENSURE RESISTANCE IS 5 OHM OR LESS.

CABLES

1. ALL 600 VOLT AND LESS FEEDERS, BRANCH CIRCUIT, AND CONTROL WIRING SHALL USE TINNED COPPER CONDUCTORS.
   a. MINIMUM CONDUCTOR SIZE #12 AWG FOR POWER WIRING
   b. MINIMUM CONDUCTOR SIZE #14 AWG FOR CONTROL AND SIGNAL WIRING
   c. ALL 600 VOLT AND LESS FEEDERS AND BRANCH CIRCUIT WIRING CONDUCTORS SHALL HAVE 600 VOLT INSULATION TYPES RHW-2/RHW-2 WITH 2HR FIRE RATING AS APPROPRIATE SHALL BE LISTED FOR WET LOCATIONS, SHALL BE OF THE LOW SMOKE ZERO HALOGEN TYPE, AND SHALL COMPLY WITH THE REQUIREMENTS OF NFPA 502.
2. ALL 15KV CABLES SHALL BE OF THE SINGLE CONDUCTOR TYPE WITH TINNED COPPER CONDUCTOR, ETHYLENE PROPYLENE RUBBER (EPR) INSULATION, 133 PERCENT INSULATION LEVEL, ONE HUNDRED (100) PERCENT FOIL COPPER SHIELD, MV-105 CLASSIFICATION WITH LOW-FRICTION, FLAME RETARDANT, AND A MOISTURE AND SUNLIGHT RESISTANT OUTER JACKET. CABLE SHALL BE LISTED FOR WET, AERIAL, AND UNDERGROUND IN DUCTS AND CABLE TRAY (CT) USE. MINIMUM CONDUCTOR SIZE SHALL NOT BE LESS THAN #4/0 AWG.
3. ALL CONDUCTORS AND CABLES SHALL BE LABELED AT ALL TERMINATION POINTS, SPLICES, TAPS, AND AT BOXES WHERE THE CONDUCTORS OR CABLES PASS THROUGH UNINTERRUPTED. ALL CONDUCTOR AND CABLE LABELS INSTALLED IN HANDHOLES, AND BELOW GROUND LOCATIONS SHALL BE MACHINE ENGRAVED OR PRINTED WATERPROOF AND CORROSION RESISTANT TAGS. ALL CONDUCTOR AND CABLE LABELS IN OTHER LOCATIONS SHALL BE MACHINE PRINTED WRAP AROUND, MARINE, WATERPROOF, ULTRAVIOLET (UV) RESISTANT, AND FABRICATED FROM LOW-SMOKE ZERO HALOGEN SYNTHETIC MATERIAL.
4. THE INSTALLATION OF ALL CONDUCTORS AND CABLES SHALL COMPLY WITH NFPA 70 AND IEEE STANDARD 576-2000, IEEE RECOMMENDED PRACTICE FOR INSTALLATION, TERMINATION AND TESTING OF INSULATED POWER CABLE AS USED IN INDUSTRIAL AND COMMERCIAL APPLICATIONS.
5. ALL MACHINE AND/OR EQUIPMENT ASSISTED CONDUCTOR OR CABLE PULLS SHALL UTILIZE AN IN-LINE CALIBRATED DYNAMOMETER THAT IS SET AT THE MAXIMUM PULL TENSION SPECIFIED BY THE CONDUCTOR OR CABLE MANUFACTURER THAT HAS BEEN SUBMITTED AND ACCEPTED BY THE DISTRICT. IF DURING ANY CONDUCTOR OR CABLE PULL THE CONDUCTOR OR CABLE MAXIMUM PULL TENSION IS EXCEEDED THE PULLING OPERATION SHALL STOP, THE CONDUCTOR OR CABLE SHALL BE REMOVED, THE REMOVED CONDUCTOR OR CABLE SHALL BE DISPOSED, AND THE CONDUCTOR OR CABLE SHALL BE REPLACED WITH A NEW CONDUCTOR OR CABLE. THE TENSION GAUGE CALIBRATION SHALL BE CERTIFIED BY A QUALIFIED TESTING LABORATORY WITHIN ONE (1) YEAR OF USE AT ALL TIMES. PULLING TENSION AND SIDE WALL PRESSURE SHALL NOT EXCEED THE MANUFACTURER'S ALLOWABLE VALUES. IF THE PULLING TENSION OR SIDEWALL PRESSURE IS EXCEEDED DURING A PULL, THE CABLE SHALL BE CONSIDERED DAMAGED AND SHALL BE REPLACED BY THE DESIGN-BUILDER. RECORD ALL CABLE PULL TENSIONS AND SUBMIT A REPORT.
6. WHEN INSTALLING AND ROUTING CABLES AND CONDUCTORS THROUGH HANDHOLES THE CABLE SHALL NOT BE INSTALLED UTILIZING THE SHORTEST ROUTE, BUT SHALL BE ROUTED ALONG THOSE WALLS PROVIDING THE LONGEST ROUTE AND THE MAXIMUM SPARE CABLE LENGTHS. CABLES SHALL BE FORMED CLOSELY PARALLEL TO THE WALLS, SHALL NOT INTERFERE WITH DUCT ENTRANCES, AND SHALL BE SUPPORTED ON BRACKETS AND CABLE INSULATORS, SPACED AT A MAXIMUM OF FOUR (4) FEET. IN EXISTING HANDHOLES WHERE NEW DUCTS ARE TO BE TERMINATED OR WHERE NEW CABLES ARE TO BE INSTALLED, THE EXISTING INSTALLATION OF CABLES, CABLE SUPPORTS, AND GROUNDING SHALL BE MODIFIED AS REQUIRED FOR A NEAT AND WORKMANLIKE INSTALLATION WITH CABLES PROPERLY ARRANGED AND SUPPORTED.
7. PROVIDE AT LEAST TWO (2) COMPLETE LOOPS OF SLACK CABLE IN EVERY HANDHOLE FOR ALL 13.2KV FEEDERS AND CABLES.
8. EACH PHASE CONDUCTOR OF ALL 13.2KV FEEDERS SHALL BE INDIVIDUALLY WRAPPED (BY PHASE) WITH ARC-PROOFING TAPE IN EVERY HANDHOLE, AND JUNCTION BOX. EXTEND THE ARC-PROOFING TAPE ON EACH PHASE CONDUCTOR OR CABLE A MINIMUM OF FOUR (4) INCHES INTO ALL CONDUITS AND DUCTS AT ALL HANDHOLES, AND JUNCTION BOXES. TO PREVENT UNRAVELING, THE ARC-PROOFING TAPE SHALL BE RANDOM WRAPPED THE ENTIRE LENGTH OF THE ARC-PROOFING WITH PRESSURE SENSITIVE GLASS CLOTH TAPE.
9. EACH PHASE CONDUCTOR OF ALL 480V AND 208V FEEDERS OR CABLES SERVING FANS, TRANSFORMERS AND/OR PANELBOARDS ANYWHERE WITHIN THE COVER SHALL BE INDIVIDUALLY WRAPPED (BY PHASE) WITH ARC-PROOFING TAPE IN EVERY HANDHOLE, AND JUNCTION BOX WITHIN THE COVER. EXTEND THE ARC-PROOFING TAPE ON EACH PHASE CONDUCTOR A MINIMUM OF FOUR (4) INCHES INTO ALL CONDUITS AND DUCTS AT ALL HANDHOLES AND JUNCTION BOXES. TO PREVENT UNRAVELING, THE ARC-PROOFING TAPE SHALL BE RANDOM WRAPPED THE ENTIRE LENGTH OF THE ARC-PROOFING WITH PRESSURE SENSITIVE GLASS CLOTH TAPE.

RACEWAYS

1. ALL RACEWAYS INSTALLED THAT ARE EXPOSED IN THE COVER AND/OR CONCEALED BEHIND FINISH PANELS AND/OR FIREPROOFING PANELS SHALL BE PHENOLIC FIBERGLASS CONDUIT.
2. ALL RACEWAYS INSTALLED THAT ARE CONCEALED WITH AT LEAST FOUR-INCHES OF CONCRETE COVER IN THE TUNNEL, TUNNEL EGRESS CORRIDOR, STAIRS AND HORIZONTAL/VERTICAL VENTILATION SHAFTS/SPACES SHALL BE SCHEDULE 40 RIGID POLYVINYL CHLORIDE CONDUIT (PVC) OR REINFORCED THERMOSETTING RESIN CONDUIT (RTRC).
   a. WHERE RACEWAYS HAVE LESS THAN FOUR (4) INCHES OF CONCRETE COVER USE PHENOLIC FIBERGLASS CONDUITS.
   b. WHERE CONCRETE ENCASED PVC EXITS CONCRETE AND CONNECTS TO EXPOSED CONDUIT THE LAST SIX (6) INCHES OF THE RACEWAY SHALL BE CONVERTED TO TYPE 316 STAINLESS STEEL RIGID METAL CONDUIT BEFORE EXITING THE CONCRETE.

3 ALL RACEWAYS INSTALLED THAT ARE EXPOSED OUTDOORS OR IN NON-CONDITIONED SPACES EXPOSED AND OPEN TO THE OUTDOORS SHALL BE TYPE 316 STAINLESS STEEL RIGID METAL CONDUIT.

4. ALL RACEWAYS INSTALLED INDOORS IN CONDITIONED SPACES EXPOSED OR CONCEALED WITHIN WALLS OR ABOVE SUSPENDED CEILINGS SHALL BE GALVANIZED STEEL RIGID METAL CONDUIT.
5. ALL STAINLESS STEEL ELECTRIC METALLIC TUBING FITTINGS AND CONNECTORS SHALL BE WATERPROOF TYPE 316 STAINLESS STEEL COMPRESSION.
6. USE ONLY TYPE 316 STAINLESS STEEL SUPPORTS AND MOUNTING HARDWARE WITH STAINLESS STEEL ELECTRIC METALLIC TUBING AND STAINLESS STEEL RIGID METAL CONDUIT.
7. FOR INDOOR LOCATIONS IN CONDITIONED SPACES USE GALVANIZED STEEL SUPPORTS AND MOUNTING HARDWARE WITH GALVANIZED STEEL RIGID METAL CONDUIT.
8. IN THE COVER AND ALL RACEWAY CONNECTIONS TO MOTORS, DAMPER ACTUATORS, ADJUSTABLE LIGHT FIXTURES, LANE USE SIGNS, TRAFFIC SIGNALS, CAMERAS AND ANY OTHER EQUIPMENT OR COMPONENT THAT REQUIRES ADJUSTMENT OR CAN VIBRATE SHALL BE MADE USING WEATHERPROOF, FIRE RATED TYPE MC CABLE COMPLYING WITH UL SYSTEM NO. 120, FHIT.120, ELECTRICAL CIRCUIT INTEGRITY SYSTEM. THIS INCLUDES ALL EMERGENCY CIRCUITS FOR LIGHTING, FANS AND FIRE ALARM SYSTEM.
9. FOR INDOOR LOCATIONS IN CONDITIONED SPACES USE LIQUID-TIGHT FLEXIBLE (GALVANIZED STEEL) METAL CONDUIT (LFMC) FOR CONNECTION TO MOTORS, DAMPER ACTUATORS, ADJUSTABLE LIGHT FIXTURES, LANE USE SIGNS, TRAFFIC SIGNALS, CAMERAS AND ANY OTHER EQUIPMENT OR COMPONENT THAT REQUIRES ADJUSTMENT OR CAN VIBRATE LOCATED.
10. USE TYPE 316 STAINLESS STEEL CABLE TRAY/TROUGH AND TYPE 316 STAINLESS STEEL SUPPORT BRACKETS AND TYPE 316 STAINLESS STEEL MOUNTING HARDWARE WHERE CABLE TRAY IS USED.
11. USE SCHEDULE 40 PVC CONDUITS ENCASED IN A MINIMUM OF THREE (3) INCHES OF CONCRETE (DUCT BANK) ON ALL SIDES FOR ALL UNDERGROUND RACEWAYS. ALL MULTIPLE UNDERGROUND CONCRETE ENCASED CONDUITS SHALL HAVE A MINIMUM OF 3/4 -INCH SEPARATION BETWEEN EACH CONDUIT IN ALL DIRECTIONS. THE INSTALLATION OF DIRECT BURIED UNDERGROUND CABLE IS NOT ACCEPTABLE, EXCEPT FOR UNDERGROUND GROUND TRIADS.
12. ALL UNDERGROUND DUCT BANKS FOR 15KV CABLES SHALL BE CONSTRUCTED WITH A MINIMUM OF FIVE (5) INCH SCHEDULE 40 PVC CONDUITS.
13. ALL 15KV DUCT BANKS SHALL BE CONSTRUCTED WITH A MINIMUM OF ONE (1) SPARE FIVE (5) INCH PVC CONDUIT.
14. ALL SPARE CONDUITS AND/OR DUCTS SHALL BE HAVE ALL ENDS CAPPED WITH A REMOVABLE CAP AND HAVE A MINIMUM OF 3/8-INCH WIDE FLAT DACRON TRUE TAPE INSTALLED END TO END.
15. PROVIDE COLORED WARNING TAPE TWELVE (12) INCHES ABOVE THE TOP OF ALL UNDERGROUND DUCT BANKS.
16. ALL UNDERGROUND DUCT BANKS INSTALLED FOR FIBER OPTIC CABLES SHALL BE PROVIDED WITH A TRACER CABLE SYSTEM ABOVE THE DUCT BANK FOR THE ENTIRE LENGTH OF THE DUCT BANK.
17. PROVIDE FLEXIBLE AND/OR EXPANSION TYPE FITTINGS WITH BONDING JUMPERS IN ALL RACEWAY SYSTEMS CROSSING EXPANSION JOINTS, CROSSING BETWEEN DIFFERENT TYPES OF STRUCTURES AND/OR CROSSING BETWEEN A RIGID STRUCTURE AND A STRUCTURE THAT MAY HAVE MOVEMENT.
18. THE MINIMUM DIAMETER CONDUIT FOR ALL CONDUIT TYPES IS 3/4-INCH.
19. ALL EXPOSED RACEWAYS SHALL BE INSTALLED PARALLEL OR PERPENDICULAR TO AND FOLLOW THE CONTOUR OF THE SURFACES WHERE THE RACEWAY IS INSTALLED.
20. ALL POWER AND COMMUNICATION CONDUCTORS AND CABLES INSTALLED WITH ANY CABLE TRAY SHALL BE INDIVIDUALLY SECURED TO THE CABLE TRAY USING MARINE, ULTRAVIOLET AND WEATHER RESISTANT SYNTHETIC CABLE TIES, AT FIVE (5) FOOT INTERVALS.
21. PROVIDE DIELECTRIC ISOLATION BETWEEN ALL DISSIMILAR METALS.
22. THE FIRE AND LIFE SAFETY ELECTRICAL SYSTEMS SHALL BE DESIGNED AND INSTALLED TO RESIST LATERAL FORCES INDUCED BY EARTHQUAKES.
23. ALL PHENOLIC FIBERGLASS FITTINGS, ADAPTERS AND ELBOWS SHALL BE NON-METALLIC FIBERGLASS CONSTRUCTED OF THE SAME FILAMENT WOUND MATERAL AS THE CONDUIT. THEY SHALL HAVE A SOCKET DEPTH AND AN INSIDE TAPERED BELL DESIGN CONSISTENT WITH THE CONDUIT. ADHESIVE SHALL BE SUPPLIED BY THE MANUFACTURER OF THE CONDUIT.
24. PHENOLIC FIBERGLASS EXPANSION FITTINGS SHALL BE PROVIDED ON ALL PHENOLIC FIBERGLASS CONDUITS PER NEC.

HEAT TRACE

1. PROVIDE HEAT TRACE FOR PIPING SUBJECT TO FREEZING IN COVER.
2. PROVIDE HEAT TRACE CONTROL PANEL IN EACH MAIN ELECTRIC ROOM.
3. PROVIDE GFEP CIRCUIT BREAKERS FOR HEAT TRACE CIRCUITS.

Print Date: 4/24/2017 2:11 PM
File Name: E009.DWG
Staff Bridge Branch - Unit 0226 Unit Leader DDG

0009

Sheet Revisions

Date:	Comments	Init.
04/24/17	FINAL FOR ESTIMATING	

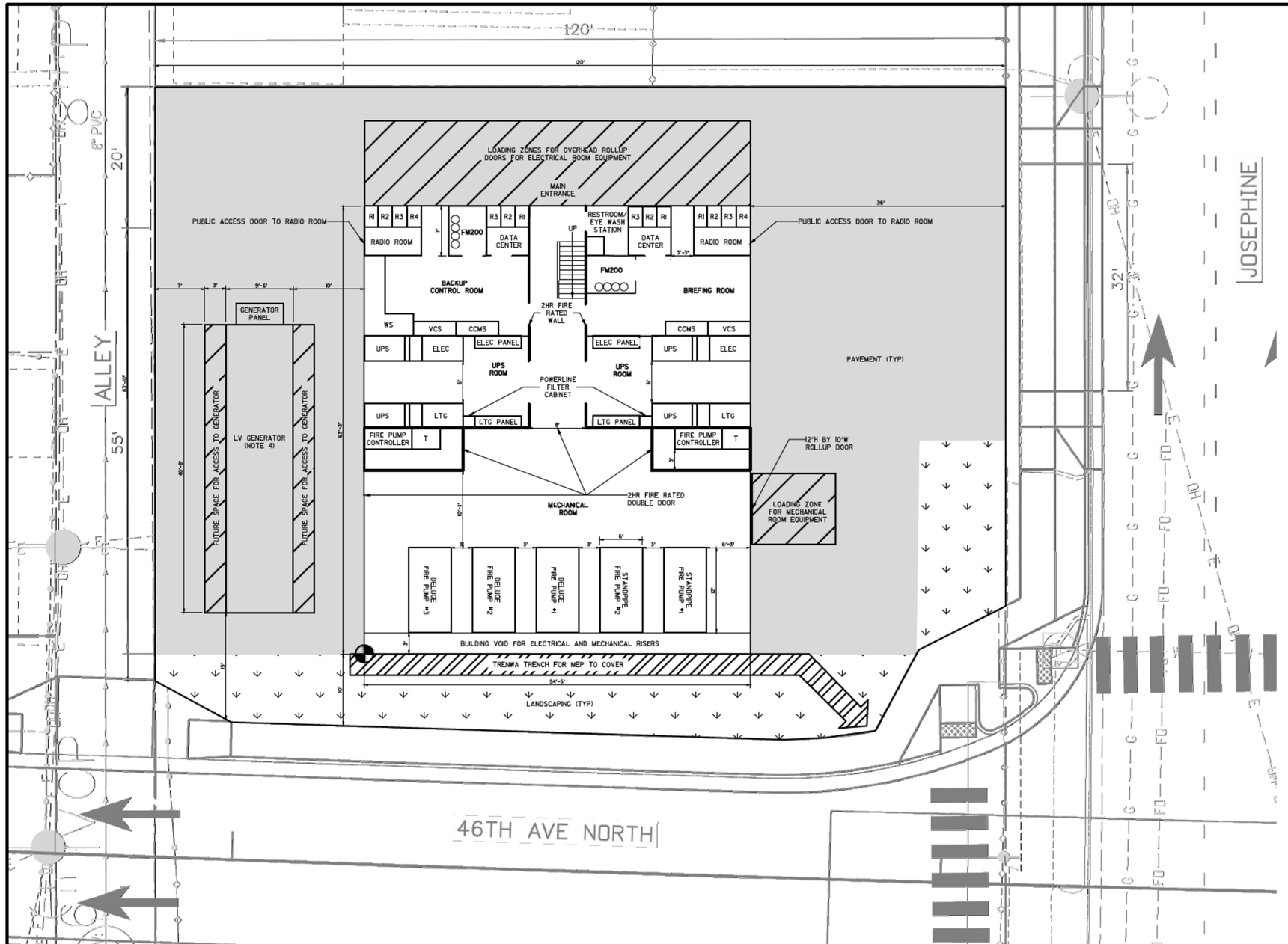
Colorado Department of Transportation
2000 South Holly Street
Denver, CO 80222
Phone: 303-757-9295 FAX: 303-757-9963
Region 1 JKE

As Constructed
No Revisions:
Revised:
Void:

ELECTRICAL NOTES

Designer: CML
Detailer: MK
Sheet Subset:
Structure Numbers:
Subset Sheets: of

Project No./Code
FBR 0704-234
19631
Sheet Number E009



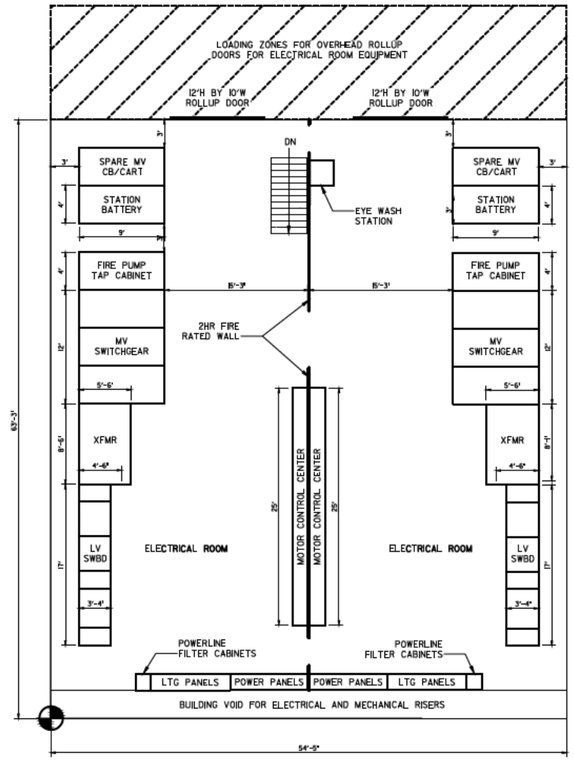
GROUND LEVEL
SCALE: 1/16" = 1'-0"

NOTES:

1. SERVICE BUILDING LAYOUT IS BASED ON A CONCEPTUAL DESIGN APPROACH TO ESTIMATE THE SPACE REQUIREMENTS NEEDED IN TOTAL SQUARE FOOTAGE (SF). THE SQUARE FOOTAGE OF THE BUILDING IS APPROXIMATELY 3520 SF PLUS 384 SF FOR THE GENERATOR SET.
2. ELECTRICAL SERVICES IN THIS LAYOUT ARE NOT ILLUSTRATED, THE ELECTRICAL CONTRACTOR IS TO INCLUDE FOR TYPICAL ELECTRICAL SYSTEMS WITHIN AN INDUSTRIAL SERVICE BUILDING LIKE THIS.
3. HEIGHT OF BUILDING SHOULD BE 16' HIGH ABOVE FINISHED FLOOR AT THE MINIMUM IN THE ELECTRICAL ROOMS AND 12' HIGH FOR ROOMS AT GROUND LEVEL.
4. LV GENERATOR SIZED TO INCLUDE SOUND ENCLOSURE WITH INTERNAL SILENCER AND SUBBASE FUEL TANK.

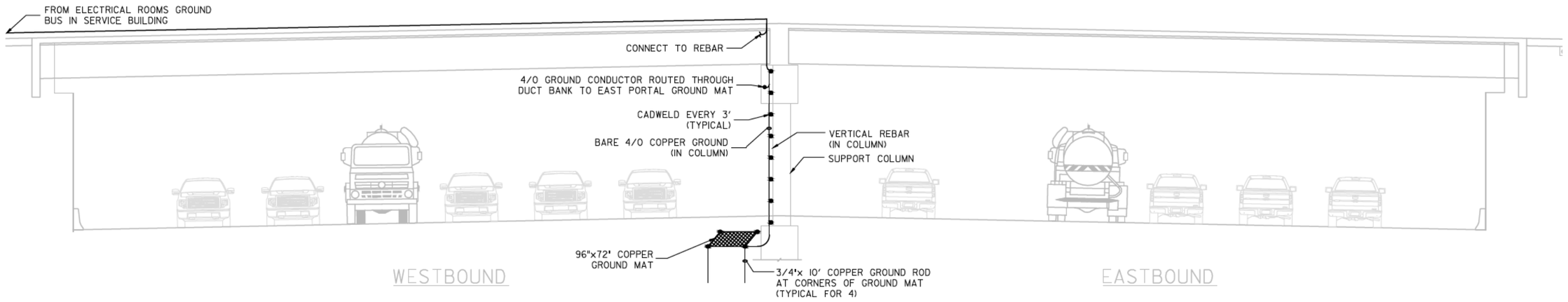
HOLD NOTES:

1. AN ARCHITECT MUST DEVELOP THIS SPACE PROOFING LAYOUT INTO A BUILDING THAT WILL BE ACCEPTABLE TO CDOT.



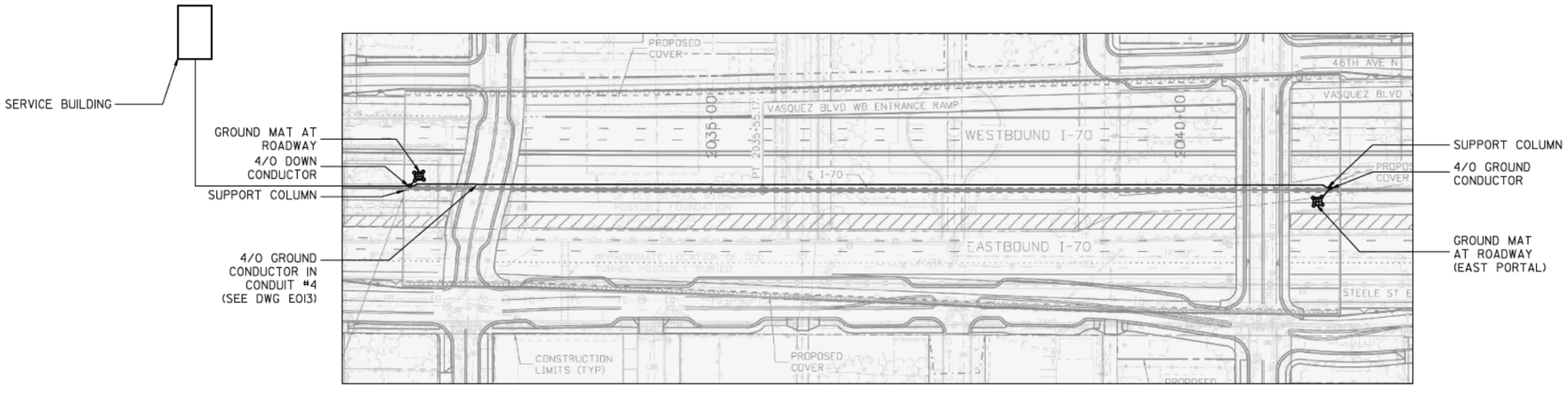
SECOND LEVEL
SCALE: 1/16" = 1'-0"

Print Date: 4/24/2017 2:11 PM		Sheet Revisions			Colorado Department of Transportation	As Constructed	SERVICE BUILDING SPACE PROOFING PLAN	Project No./Code
File Name: E010.DWG		Date:	Comments	Init.	2000 South Holly Street Denver, CO 80222 Phone: 303-757-9295 FAX: 303-757-9963	No Revisions:		FBR 0704-234
Staff Bridge Branch - Unit 0226 Unit Leader DDG	0000	04/24/17	FINAL FOR ESTIMATING		Region 1 JKE	Revised:	Designer: CML / Detailer: MK / Sheet Subset:	19631
						Void:	Structure Numbers / Subset Sheets: of	Sheet Number E010



GROUNDING CONCEPT SECTION (TYPICAL FOR EAST AND WEST PORTALS)

SCALE: NTS



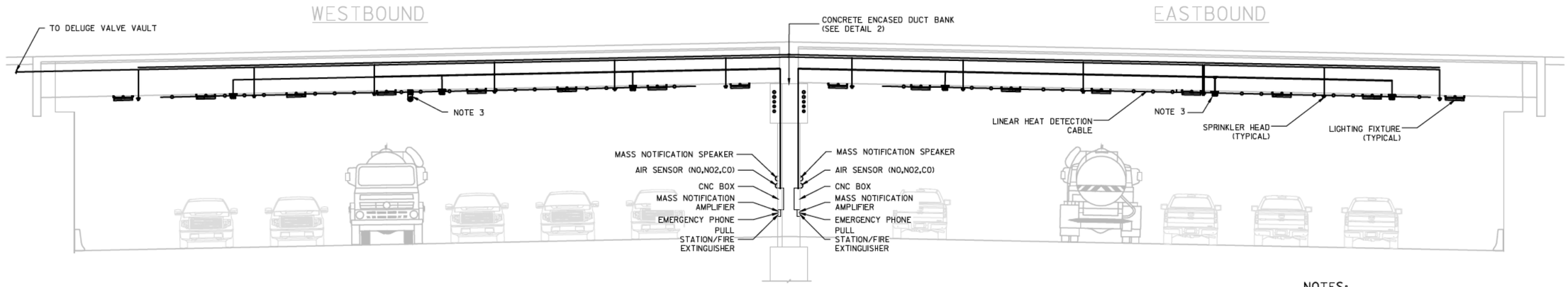
GROUNDING CONCEPT PLAN

SCALE: NTS

NOTES:

1. INSTALL SUFFICIENT GROUNDING IN ADDITION TO CODE REQUIRED GROUNDING SO THAT RESISTANCE TO GROUND AS TESTED BY STANDARD METHODS DOES NOT EXCEED 5 OHMS. WHEN MORE THAN ONE ROD IS REQUIRED, INSTALL RODS AT LEAST 10' APART.
2. WHEN MAKING THERMO WELDS, WIRE BRUSH OR FILE THE POINT OF CONTACT TO A BARE METAL SURFACE. USE THERMO WELDING CARTRIDGES AND MOLDS IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS. AFTER WELDS HAVE BEEN MADE AND COOLED, BRUSH SLAG FROM THE WELD AREA AND THOROUGHLY CLEAN THE JOINT.
3. THE 4/0 GROUND CONDUCTOR SHALL BE CADWELD TO THE VERTICAL SUPPORT REBAR AT INTERVALS NO GREATER THAN 3 FEET. ANY EXPOSED GROUNDING CONDUCTOR SHALL BE ENCLOSED IN A PVC SLEEVE. GROUND CONDUCTOR SHALL BE ROUTED THROUGH CONDUIT DUCT BANK FROM PORTAL TO PORTAL (REFER TO DWG. E013).
4. PROVIDE 1/4"x2" GROUND BUS AROUND PERIMETER OF EACH ELECTRICAL ROOM. CONNECT ALL MV AND LV EQUIPMENT TO THIS BUS.
5. PROVIDE 1/4"x2'x8'0" GROUND BUS IN EACH UPS ROOM. RUN 1#4/0 CU GROUND WIRE TO ELECTRIC ROOM BUS. CONNECT ALL COMMUNICATIONS AND INSTRUMENT GROUNDS TO THIS BUS.

Print Date: 4/24/2017 2:12 PM	0008	Sheet Revisions			Colorado Department of Transportation	As Constructed	GROUNDING SECTION AND PLAN CONCEPT	Project No./Code
File Name: E012.DWG		Date:	Comments	Init.	2000 South Holly Street Denver, CO 80222 Phone: 303-757-9295 FAX: 303-757-9963	No Revisions:		FBR 0704-234
		04/24/17	FINAL FOR ESTIMATING			Revised:	Designer: RRU / Structure Numbers:	19631
Staff Bridge Branch - Unit 0226 Unit Leader DDG					Region 1 JKE	Void:	Detailer: TK / Sheet Subset: / Subset Sheets: of	Sheet Number E012



COVER CROSS SECTION - LOOKING EAST STA. 2031+74

SCALE: NTS

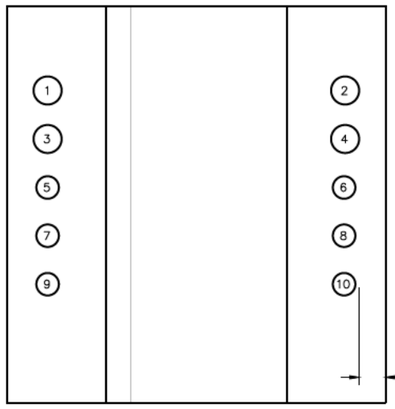
LEGEND:

(X) WHERE 'X' DESIGNATES:

'X'	SIZE	DESCRIPTION
1	5"C	JETFAN WESTBOUND ICA (CONTROL)
2	5"C	JETFAN WESTBOUND ICA (SIGNAL)
3	5"C	JETFANS WESTBOUND PWR (1,3,5,7,9)
4	5"C	JETFANS WESTBOUND PWR (2,4,6,8)
5	4"C	FIRE DETECTION/FFFS - LOOP #1
6	4"C	FIRE DETECTION/FFFS - LOOP #2
7	4"C	SCADA/ITS - LOOP #1
8	4"C	SCADA/ITS - LOOP #2
9	4"C	CNC CABINET PWR - WEST BOUND
10	4"C	CNC CABINET PWR - EAST BOUND

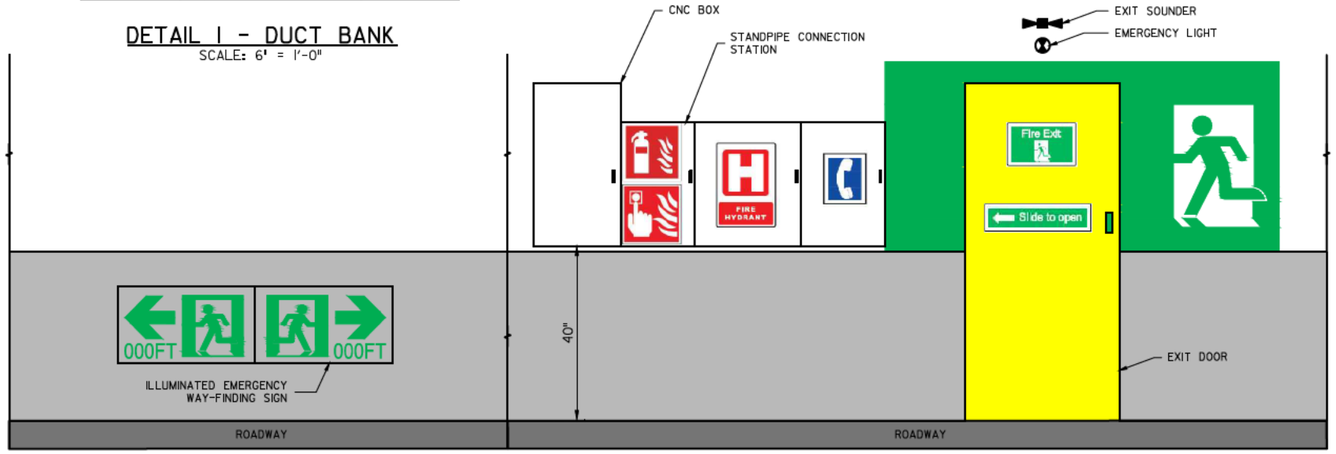
NOTES:

1. PROVIDE MAXCELL 4" 3-CELL INNERDUCT IN CONDUIT #5 & #6.
2. MINIMUM OF 4" CONCRETE COVER BETWEEN OUTER PVC CONDUIT WALL AND EXTERIOR DUCT BANK SURFACE.
3. GROUP OF 3 PTZ CAMERAS WITH CENTER CAMERA BEING EQUIPPED WITH THERMAL RECOGNITION.
4. 4/0 GROUND CONDUCTOR INSTALLED IN CONDUIT #4 IDENTIFIED IN DETAIL 1 (SEE DWG. E012).



DETAIL 1 - DUCT BANK

SCALE: 6" = 1'-0"

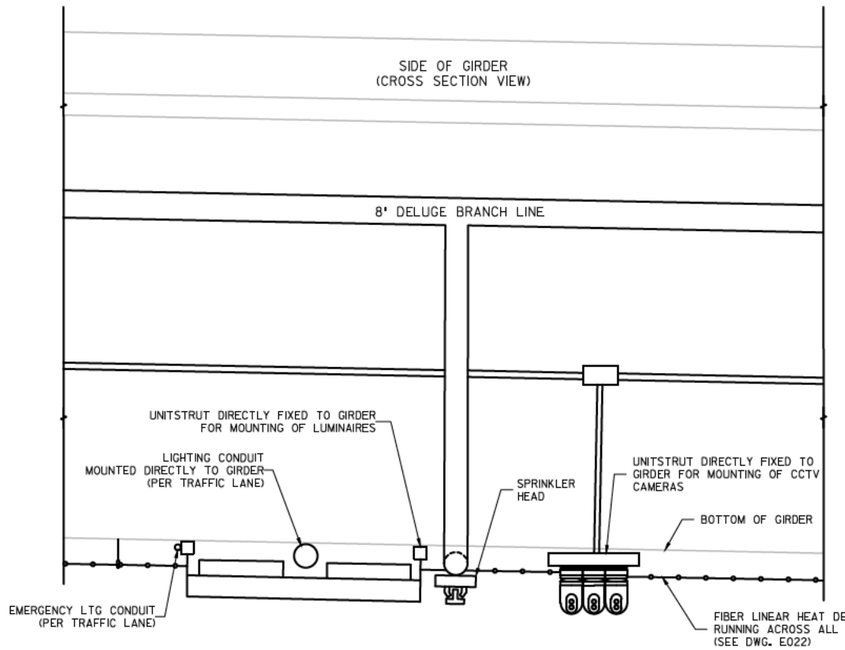


DETAIL 2 - TYPICAL WAYFINDING SIGNAGE

SCALE: 6" = 1'-0"

DETAIL 3 - TYPICAL DOOR SECTION WITHIN COVER

SCALE: NTS

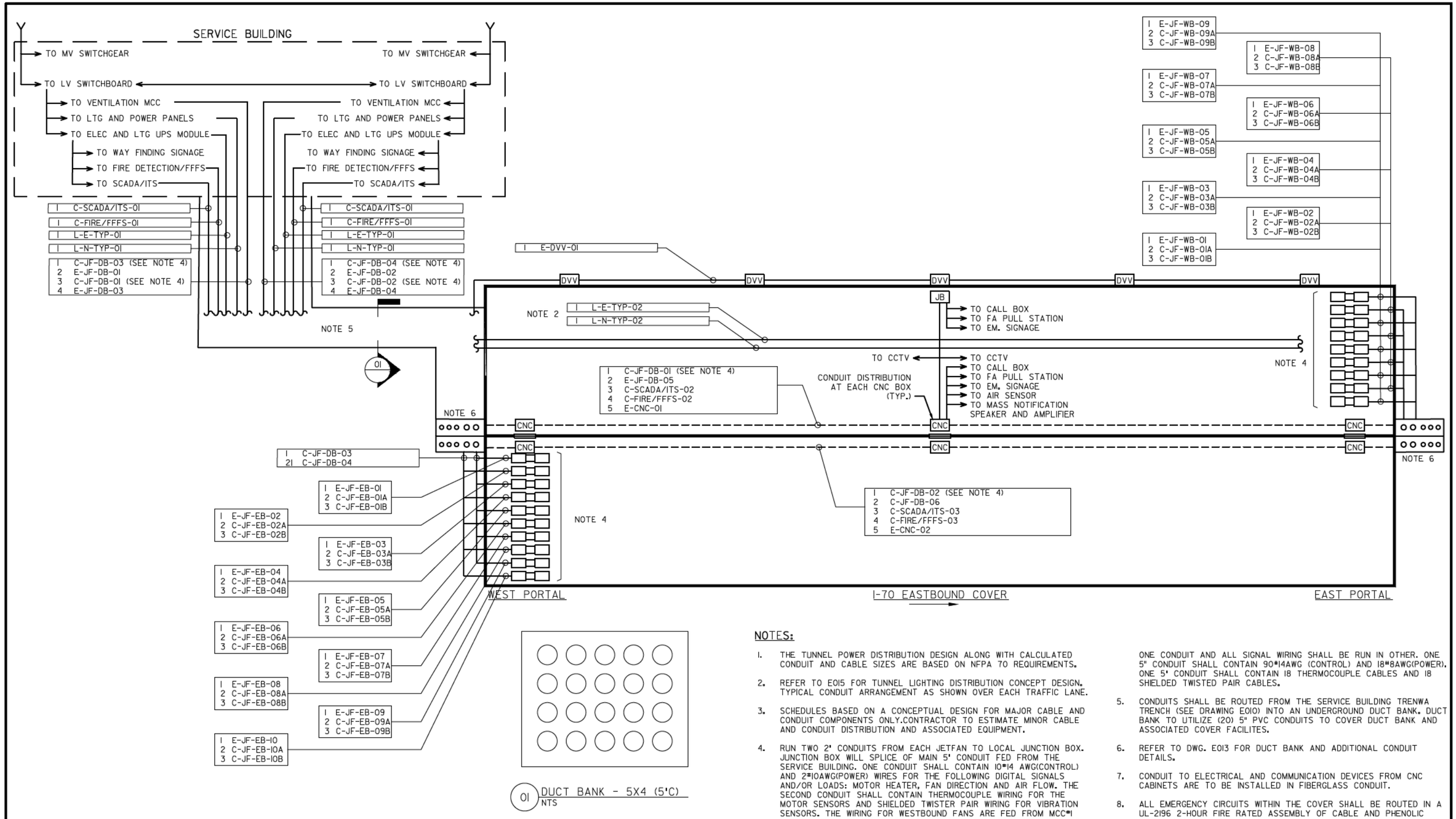


DETAIL 4 - MEP COVER EQUIPMENT

SCALE: NTS

Print Date: 4/24/2017 2:12 PM		Sheet Revisions			Colorado Department of Transportation
File Name: E013.DWG		Date:	Comments	Init.	2000 South Holly Street Denver, CO 80222 Phone: 303-757-9295 FAX: 303-757-9963
		04/24/17	FINAL FOR ESTIMATING		Region 1 JKE
Staff Bridge Branch - Unit 0226 Unit Leader DDG	0008				

As Constructed	TYPICAL CROSS SECTION ELECTRICAL/ICA			Project No./Code
No Revisions:	Designer: RRU	Structure Numbers		FBR 0704-234
Revised:	Detailer: TK			19631
Void:	Sheet Subset:	Subset Sheets: of		Sheet Number E013



NOTES:

1. THE TUNNEL POWER DISTRIBUTION DESIGN ALONG WITH CALCULATED CONDUIT AND CABLE SIZES ARE BASED ON NFPA 70 REQUIREMENTS.
2. REFER TO E015 FOR TUNNEL LIGHTING DISTRIBUTION CONCEPT DESIGN. TYPICAL CONDUIT ARRANGEMENT AS SHOWN OVER EACH TRAFFIC LANE.
3. SCHEDULES BASED ON A CONCEPTUAL DESIGN FOR MAJOR CABLE AND CONDUIT COMPONENTS ONLY.CONTRACTOR TO ESTIMATE MINOR CABLE AND CONDUIT DISTRIBUTION AND ASSOCIATED EQUIPMENT.
4. RUN TWO 2' CONDUITS FROM EACH JETFAN TO LOCAL JUNCTION BOX. JUNCTION BOX WILL SPLICE OF MAIN 5' CONDUIT FED FROM THE SERVICE BUILDING. ONE CONDUIT SHALL CONTAIN 10#14 AWG(CONTROL) AND 2#10AWG(POWER) WIRES FOR THE FOLLOWING DIGITAL SIGNALS AND/OR LOADS: MOTOR HEATER, FAN DIRECTION AND AIR FLOW. THE SECOND CONDUIT SHALL CONTAIN THERMOCOUPLE WIRING FOR THE MOTOR SENSORS AND SHIELDED TWISTER PAIR WIRING FOR VIBRATION SENSORS. THE WIRING FOR WESTBOUND FANS ARE FED FROM MCC#1 AND MCC#2. THEY SHALL BE ROUTED IN TWO 5' CONDUITS IN COVER DUCT BANK AS INDICATED. ALL CONTROL WIRING SHALL BE RUN IN ONE CONDUIT AND ALL SIGNAL WIRING SHALL BE RUN IN OTHER. ONE 5" CONDUIT SHALL CONTAIN 90#14AWG (CONTROL) AND 18#8AWG(POWER). ONE 5' CONDUIT SHALL CONTAIN 18 THERMOCOUPLE CABLES AND 18 SHIELDED TWISTED PAIR CABLES.
5. CONDUITS SHALL BE ROUTED FROM THE SERVICE BUILDING TRENWA TRENCH (SEE DRAWING E010) INTO AN UNDERGROUND DUCT BANK. DUCT BANK TO UTILIZE (20) 5" PVC CONDUITS TO COVER DUCT BANK AND ASSOCIATED COVER FACILITES.
6. REFER TO DWG. E013 FOR DUCT BANK AND ADDITIONAL CONDUIT DETAILS.
7. CONDUIT TO ELECTRICAL AND COMMUNICATION DEVICES FROM CNC CABINETS ARE TO BE INSTALLED IN FIBERGLASS CONDUIT.
8. ALL EMERGENCY CIRCUITS WITHIN THE COVER SHALL BE ROUTED IN A UL-2196 2-HOUR FIRE RATED ASSEMBLY OF CABLE AND PHENOLIC FIBERGLASS CONDUIT.

Print Date: 4/24/2017 2:12 PM
File Name: E014..DWG
Staff Bridge Branch - Unit 0226 Unit Leader DDG

0000

Sheet Revisions

Date:	Comments	Init.
04/24/17	FINAL FOR ESTIMATING	

Colorado Department of Transportation
2000 South Holly Street
Denver, CO 80222
Phone: 303-757-9295 FAX: 303-757-9963
Region 1 JKE

As Constructed
No Revisions:
Revised:
Void:

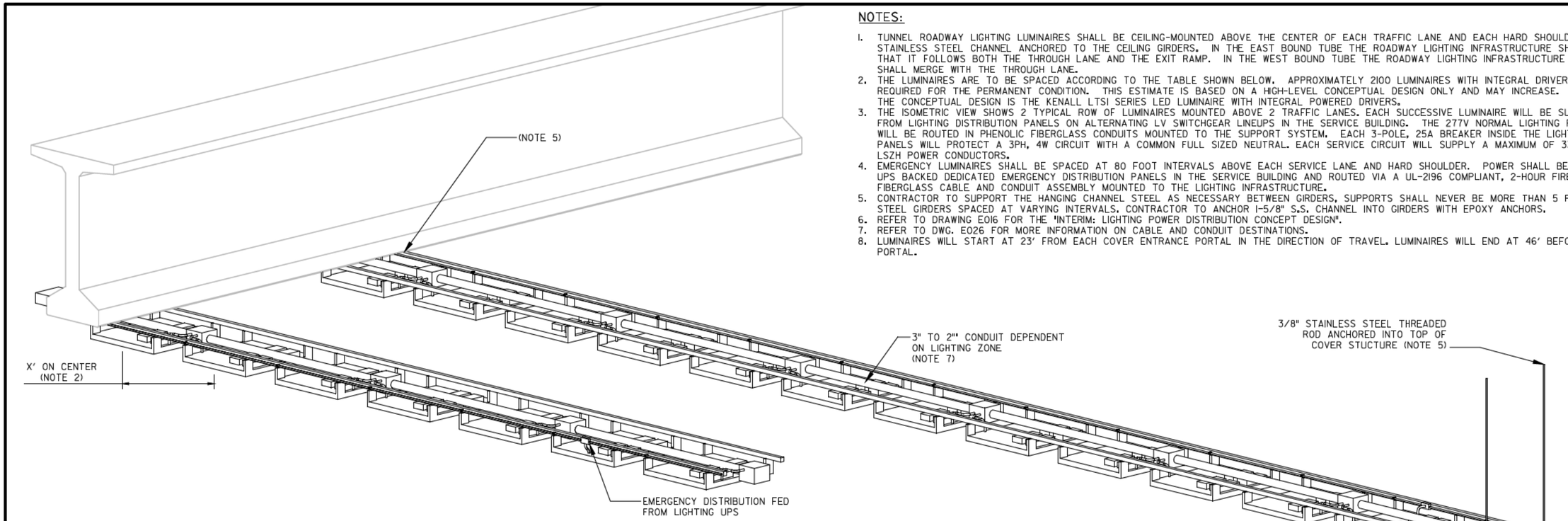
COVER
POWER DISTRIBUTION
CONCEPT DESIGN

Designer: CML
Detailer: MK
Sheet Subset:
Structure Numbers
Subset Sheets: of

Project No./Code
FBR 0704-234
19631
Sheet Number E014

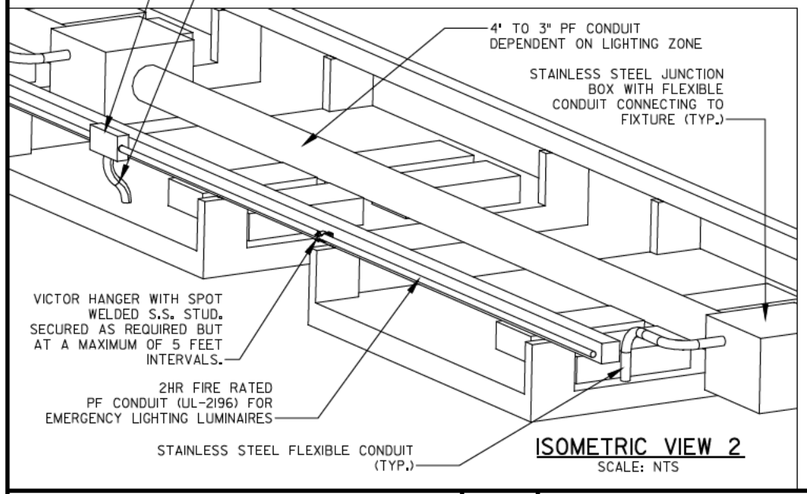
NOTES:

1. TUNNEL ROADWAY LIGHTING LUMINAIRES SHALL BE CEILING-MOUNTED ABOVE THE CENTER OF EACH TRAFFIC LANE AND EACH HARD SHOULDER USING STAINLESS STEEL CHANNEL ANCHORED TO THE CEILING GIRDERS. IN THE EAST BOUND TUBE THE ROADWAY LIGHTING INFRASTRUCTURE SHALL SPLIT SUCH THAT IT FOLLOWS BOTH THE THROUGH LANE AND THE EXIT RAMP. IN THE WEST BOUND TUBE THE ROADWAY LIGHTING INFRASTRUCTURE FOR THE ON-RAMP SHALL MERGE WITH THE THROUGH LANE.
2. THE LUMINAIRES ARE TO BE SPACED ACCORDING TO THE TABLE SHOWN BELOW. APPROXIMATELY 2100 LUMINAIRES WITH INTEGRAL DRIVERS WILL BE REQUIRED FOR THE PERMANENT CONDITION. THIS ESTIMATE IS BASED ON A HIGH-LEVEL CONCEPTUAL DESIGN ONLY AND MAY INCREASE. THE BASIS OF THE CONCEPTUAL DESIGN IS THE KENALL LTSI SERIES LED LUMINAIRE WITH INTEGRAL POWERED DRIVERS.
3. THE ISOMETRIC VIEW SHOWS 2 TYPICAL ROW OF LUMINAIRES MOUNTED ABOVE 2 TRAFFIC LANES. EACH SUCCESSIVE LUMINAIRE WILL BE SUPPLIED WITH 277V FROM LIGHTING DISTRIBUTION PANELS ON ALTERNATING LV SWITCHGEAR LINEUPS IN THE SERVICE BUILDING. THE 277V NORMAL LIGHTING POWER CONDUCTORS WILL BE ROUTED IN PHENOLIC FIBERGLASS CONDUITS MOUNTED TO THE SUPPORT SYSTEM. EACH 3-POLE, 25A BREAKER INSIDE THE LIGHTING DISTRIBUTION PANELS WILL PROTECT A 3PH, 4W CIRCUIT WITH A COMMON FULL SIZED NEUTRAL. EACH SERVICE CIRCUIT WILL SUPPLY A MAXIMUM OF 33 LUMINAIRES WITH LSZH POWER CONDUCTORS.
4. EMERGENCY LUMINAIRES SHALL BE SPACED AT 80 FOOT INTERVALS ABOVE EACH SERVICE LANE AND HARD SHOULDER. POWER SHALL BE SUPPLIED FROM UPS BACKED DEDICATED EMERGENCY DISTRIBUTION PANELS IN THE SERVICE BUILDING AND ROUTED VIA A UL-2196 COMPLIANT, 2-HOUR FIRE RATED PHENOLIC FIBERGLASS CABLE AND CONDUIT ASSEMBLY MOUNTED TO THE LIGHTING INFRASTRUCTURE.
5. CONTRACTOR TO SUPPORT THE HANGING CHANNEL STEEL AS NECESSARY BETWEEN GIRDERS, SUPPORTS SHALL NEVER BE MORE THAN 5 FOOT INTERVALS. STEEL GIRDERS SPACED AT VARYING INTERVALS, CONTRACTOR TO ANCHOR 1-5/8" S.S. CHANNEL INTO GIRDERS WITH EPOXY ANCHORS.
6. REFER TO DRAWING E016 FOR THE 'INTERIM: LIGHTING POWER DISTRIBUTION CONCEPT DESIGN".
7. REFER TO DWG. E026 FOR MORE INFORMATION ON CABLE AND CONDUIT DESTINATIONS.
8. LUMINAIRES WILL START AT 23' FROM EACH COVER ENTRANCE PORTAL IN THE DIRECTION OF TRAVEL. LUMINAIRES WILL END AT 46' BEFORE THE EXIT PORTAL.



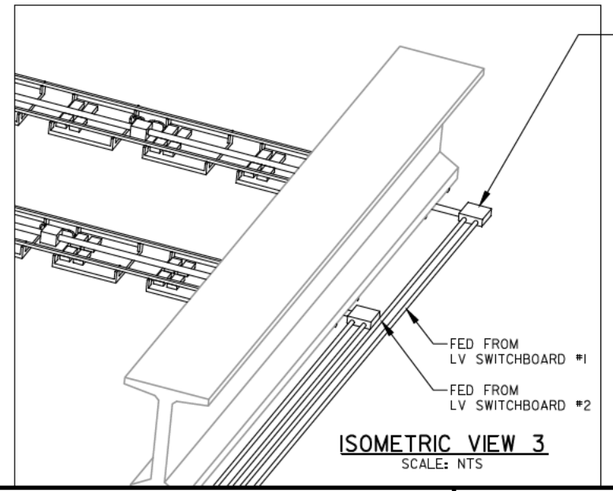
COVER LIGHTING POWER DISTRIBUTION CONCEPT DESIGN

SCALE: NTS



ISOMETRIC VIEW 2

SCALE: NTS



ISOMETRIC VIEW 3

SCALE: NTS

LIGHTING SCHEDULE

LABEL	LUMINAIRE LUMENS	LLF	DESCRIPTION
LTS-B2-C-SM-5N-8-384L-50K7-DC	56509	0.7	LUXTRAN SUPPLEMENTAL

CALCULATION SUMMARY

LABEL	UNITS	AVG	LENGTH (FT)	SPACING BETWEEN FIXTURE CENTERS	DIM %
THRESHOLD 1	CD/SQ.M	317	356	4	100
THRESHOLD 2	CD/SQ.M	236	176	4	80
TRANSITION 1	CD/SQ.M	117	264	10	100
TRANSITION 2	CD/SQ.M	57	204	20	100
EMERGENCY	CD/SQ.M	14	1000	80	100
SHOULDERS	CD/SQ.M	–	1000	20	100

Print Date: 4/24/2017 2:12 PM
File Name: E015.DWG
Staff Bridge Branch - Unit 0226 Unit Leader DDG

0000

Sheet Revisions

Date:	Comments	Init.
04/24/17	FINAL FOR ESTIMATING	

Colorado Department of Transportation
2000 South Holly Street
Denver, CO 80222
Phone: 303-757-9295 FAX: 303-757-9963
Region 1 JKE

As Constructed
No Revisions:
Revised:
Void:

LIGHTING POWER DISTRIBUTION CONCEPT DESIGN

Designer: CML
Detailer: MK
Sheet Subset:
Structure Numbers
Subset Sheets: of

Project No./Code
FBR 0704-234
19631
Sheet Number E015

JETFAN SCHEDULE

CONDUIT					CABLE	
DESIGNATION	TYPE	SIZE	FED FROM	LOCATION	TYPE	QUANTITY
E-JF-DB-01	PVC	5"	MCC #2	DUCT BANK	RHW2-2H	(12) #2/0 AWG, #3 GND
E-JF-DB-02	PVC	5"	MCC #1	DUCT BANK	RHW2-2H	(15) #2/0 AWG, #3 GND
E-JF-DB-03	PVC	5"	MCC #2	DUCT BANK	RHW2-2H	(15) #1 AWG, #4 GND
E-JF-DB-04	PVC	5"	MCC #1	DUCT BANK	RHW2-2H	(15) #1 AWG, #4 GND
E-JF-DB-05	PVC	5"	MCC #2	DUCT BANK	RHW2-2H	(12) #2/0 AWG, #3 GND
E-JF-DB-06	PVC	5"	MCC #1	DUCT BANK	RHW2-2H	(15) #2/0 AWG, #3 GND
E-JF-EB-01	FG	4"	MCC #1	W PORTAL	RHW2-2H	(3) #1 AWG, #4 GND
E-JF-EB-02	FG	4"	MCC #2	W PORTAL	RHW2-2H	(3) #1 AWG, #4 GND
E-JF-EB-03	FG	4"	MCC #1	W PORTAL	RHW2-2H	(3) #1 AWG, #4 GND
E-JF-EB-04	FG	4"	MCC #2	W PORTAL	RHW2-2H	(3) #1 AWG, #4 GND
E-JF-EB-05	FG	4"	MCC #1	W PORTAL	RHW2-2H	(3) #1 AWG, #4 GND
E-JF-EB-06	FG	4"	MCC #2	W PORTAL	RHW2-2H	(3) #1 AWG, #4 GND
E-JF-EB-07	FG	4"	MCC #1	W PORTAL	RHW2-2H	(3) #1 AWG, #4 GND
E-JF-EB-08	FG	4"	MCC #2	W PORTAL	RHW2-2H	(3) #1 AWG, #4 GND
E-JF-EB-09	FG	4"	MCC #1	W PORTAL	RHW2-2H	(3) #1 AWG, #4 GND
E-JF-EB-10	FG	4"	MCC #2	W PORTAL	RHW2-2H	(3) #1 AWG, #4 GND
E-JF-WB-01	FG	4"	MCC #1	E PORTAL	RHW2-2H	(3) #2/0 AWG, #3 GND
E-JF-WB-02	FG	4"	MCC #2	E PORTAL	RHW2-2H	(3) #2/0 AWG, #3 GND
E-JF-WB-03	FG	4"	MCC #1	E PORTAL	RHW2-2H	(3) #2/0 AWG, #3 GND
E-JF-WB-04	FG	4"	MCC #2	E PORTAL	RHW2-2H	(3) #2/0 AWG, #3 GND
E-JF-WB-05	FG	4"	MCC #1	E PORTAL	RHW2-2H	(3) #2/0 AWG, #3 GND
E-JF-WB-06	FG	4"	MCC #2	E PORTAL	RHW2-2H	(3) #2/0 AWG, #3 GND
E-JF-WB-07	FG	4"	MCC #1	E PORTAL	RHW2-2H	(3) #2/0 AWG, #3 GND
E-JF-WB-08	FG	4"	MCC #2	E PORTAL	RHW2-2H	(3) #2/0 AWG, #3 GND
E-JF-WB-09	FG	4"	MCC #1	E PORTAL	RHW2-2H	(3) #2/0 AWG, #3 GND
C-JF-DB-01	PVC	5"	MCC #2	DUCT BANK	RHW2-2H	(90) #14 AWG, (18) #8 AWG
C-JF-DB-02	PVC	5"	MCC #1	DUCT BANK	RHW2-2H	(18) THERMO, (18) ST-PR
C-JF-DB-03	PVC	5"	MCC #2	DUCT BANK	RHW2-2H	(100) #14 AWG, (20) #10 AWG
C-JF-DB-04	PVC	5"	MCC #1	DUCT BANK	RHW2-2H	(20) THERMO, (20) ST-PR
C-JF-EB-01A	FG	2"	MCC #1	W PORTAL	RHW2-2H	(10) #14 AWG, (2) #10
C-JF-EB-01B	FG	2"	MCC #1	W PORTAL	RHW2-2H	(2) THERMO, (2) ST-PR
C-JF-EB-02A	FG	2"	MCC #2	W PORTAL	RHW2-2H	(10) #14 AWG, (2) #10
C-JF-EB-02B	FG	2"	MCC #2	W PORTAL	RHW2-2H	(2) THERMO, (2) ST-PR

JETFAN SCHEDULE - CONT'D

CONDUIT					CABLE	
DESIGNATION	TYPE	SIZE	FED FROM	LOCATION	TYPE	QUANTITY
C-JF-EB-03A	FG	2"	MCC #1	W PORTAL	RHW2-2H	(10) #14 AWG, (2) #10
C-JF-EB-03B	FG	2"	MCC #1	W PORTAL	RHW2-2H	(2) THERMO, (2) ST-PR
C-JF-EB-04A	FG	2"	MCC #2	W PORTAL	RHW2-2H	(10) #14 AWG, (2) #10
C-JF-EB-04B	FG	2"	MCC #2	W PORTAL	RHW2-2H	(2) THERMO, (2) ST-PR
C-JF-EB-05A	FG	2"	MCC #1	W PORTAL	RHW2-2H	(10) #14 AWG, (2) #10
C-JF-EB-05B	FG	2"	MCC #1	W PORTAL	RHW2-2H	(2) THERMO, (2) ST-PR
C-JF-EB-06A	FG	2"	MCC #2	W PORTAL	RHW2-2H	(10) #14 AWG, (2) #10
C-JF-EB-06B	FG	2"	MCC #2	W PORTAL	RHW2-2H	(2) THERMO, (2) ST-PR
C-JF-EB-07A	FG	2"	MCC #1	W PORTAL	RHW2-2H	(10) #14 AWG, (2) #10
C-JF-EB-07B	FG	2"	MCC #1	W PORTAL	RHW2-2H	(2) THERMO, (2) ST-PR
C-JF-EB-08A	FG	2"	MCC #2	W PORTAL	RHW2-2H	(10) #14 AWG, (2) #10
C-JF-EB-08B	FG	2"	MCC #2	W PORTAL	RHW2-2H	(2) THERMO, (2) ST-PR
C-JF-EB-09A	FG	2"	MCC #1	W PORTAL	RHW2-2H	(10) #14 AWG, (2) #10
C-JF-EB-09B	FG	2"	MCC #1	W PORTAL	RHW2-2H	(2) THERMO, (2) ST-PR
C-JF-EB-10A	FG	2"	MCC #2	W PORTAL	RHW2-2H	(10) #14 AWG, (2) #10
C-JF-EB-10B	FG	2"	MCC #2	W PORTAL	RHW2-2H	(2) THERMO, (2) ST-PR
C-JF-WB-01A	FG	2"	MCC #1	E PORTAL	RHW2-2H	(10) #14 AWG, (2) #8
C-JF-WB-01B	FG	2"	MCC #1	E PORTAL	RHW2-2H	(2) THERMO, (2) ST-PR
C-JF-WB-02A	FG	2"	MCC #2	E PORTAL	RHW2-2H	(10) #14 AWG, (2) #8
C-JF-WB-02B	FG	2"	MCC #2	E PORTAL	RHW2-2H	(2) THERMO, (2) ST-PR
C-JF-WB-03A	FG	2"	MCC #1	E PORTAL	RHW2-2H	(10) #14 AWG, (2) #8
C-JF-WB-03B	FG	2"	MCC #1	E PORTAL	RHW2-2H	(2) THERMO, (2) ST-PR
C-JF-WB-04A	FG	2"	MCC #2	E PORTAL	RHW2-2H	(10) #14 AWG, (2) #8
C-JF-WB-04B	FG	2"	MCC #2	E PORTAL	RHW2-2H	(2) THERMO, (2) ST-PR
C-JF-WB-05A	FG	2"	MCC #1	E PORTAL	RHW2-2H	(10) #14 AWG, (2) #8
C-JF-WB-05B	FG	2"	MCC #1	E PORTAL	RHW2-2H	(2) THERMO, (2) ST-PR
C-JF-WB-06A	FG	2"	MCC #2	E PORTAL	RHW2-2H	(10) #14 AWG, (2) #8
C-JF-WB-06B	FG	2"	MCC #2	E PORTAL	RHW2-2H	(2) THERMO, (2) ST-PR
C-JF-WB-07A	FG	2"	MCC #1	E PORTAL	RHW2-2H	(10) #14 AWG, (2) #8
C-JF-WB-07B	FG	2"	MCC #1	E PORTAL	RHW2-2H	(2) THERMO, (2) ST-PR
C-JF-WB-08A	FG	2"	MCC #2	E PORTAL	RHW2-2H	(10) #14 AWG, (2) #8
C-JF-WB-08B	FG	2"	MCC #2	E PORTAL	RHW2-2H	(2) THERMO, (2) ST-PR
C-JF-WB-09A	FG	2"	MCC #1	E PORTAL	RHW2-2H	(10) #14 AWG, (2) #8
C-JF-WB-09B	FG	2"	MCC #1	E PORTAL	RHW2-2H	(2) THERMO, (2) ST-PR

FIRE PUMP SCHEDULE

CONDUIT					CABLE	
DESIGNATION	TYPE	SIZE	USAGE	LOCATION	TYPE	QUANTITY
STANDPIPE PUMP-01	FG	3"	DUTY	S. BUILDING	RHW2-2H	(3) #2/0 AWG, #6 GND
STANDPIPE PUMP-02	FG	3"	STANDBY	S. BUILDING	RHW2-2H	(3) #2/0 AWG, #6 GND
JOCKEY PUMP-01	FG	1"	DUTY	S. BUILDING	RHW2-2H	(3) #12 AWG, #12 GND
DELUGE PUMP-01	FG	3"	DUTY	S. BUILDING	RHW2-2H	(3) #4/0 AWG, #4 GND
DELUGE PUMP-02	FG	3"	DUTY	S. BUILDING	RHW2-2H	(3) #4/0 AWG, #4 GND
DELUGEPUMP -03	FG	3"	STANDBY	S. BUILDING	RHW2-2H	(3) #4/0 AWG, #4 GND

TYPICAL TRAFFIC LANE LIGHTING SCHEDULE

CONDUIT					CABLE	
DESIGNATION	TYPE	SIZE	FED FROM	LOCATION	TYPE	QUANTITY
L-N-TYP-01	PVC	5"	MCC #1 & #2	DUCT BANK	RHW2-2H	(72) #6 AWG, #6 GND
L-N-TYP-02	FG	4"	MCC #1 & #2	COVER	RHW2-2H	(24) #6 AWG, #6 GND
L-E-TYP-01	PVC	5"	UPS #1 OR #2	DUCT BANK	RHW2-2H	(64) #8 AWG, #8 GND
L-E-TYP-02	FG	2"	UPS #1 OR #2	COVER	RHW2-2H	(8) #8 AWG, #8 GND

ICA SCHEDULE

CONDUIT					CABLE	
DESIGNATION	TYPE	SIZE	FED FROM	LOCATION	TYPE	QUANTITY
C-SCADA/ITS-01	PVC	5"	BCR	DUCT BANK	FIBER	XX-SM
C-FIRE/FFFS-01	PVC	5"	BCR	DUCT BANK	FIBER	XX-SM
C-SCADA/ITS-02	PVC	4"	BCR	DUCT BANK	FIBER	XX-SM
C-SCADA/ITS-03	PVC	4"	BCR	DUCT BANK	FIBER	XX-SM
C-FIRE/FFFS-02	PVC	4"	BCR	DUCT BANK	FIBER	XX-SM
C-FIRE/FFFS-03	PVC	4"	BCR	DUCT BANK	FIBER	XX-SM
E-CNC-01	PVC	4"	UPS	DUCT BANK	RHW2-2H	TBD
E-CNC-02	PVC	4"	UPS	DUCT BANK	RHW2-2H	TBD
E-DVV-01	PVC	4"	UPS	UNDERGROUND	RHW2-2H	TBD

NOTES:

1. LIGHTING SCHEDULE BASED UPON TYPICAL CONDUIT AND CABLE INSTALLED OVER EACH TRAFFIC LANE.
2. REFER TO DRAWING E014 FOR CONDUIT LAYOUT DETAILS.

Print Date: 4/24/2017 2:12 PM
File Name: E015B.DWG
Staff Bridge Branch - Unit 0226 Unit Leader DDG

6000

Sheet Revisions

Date:	Comments	Init.
04/24/17	FINAL FOR ESTIMATING	

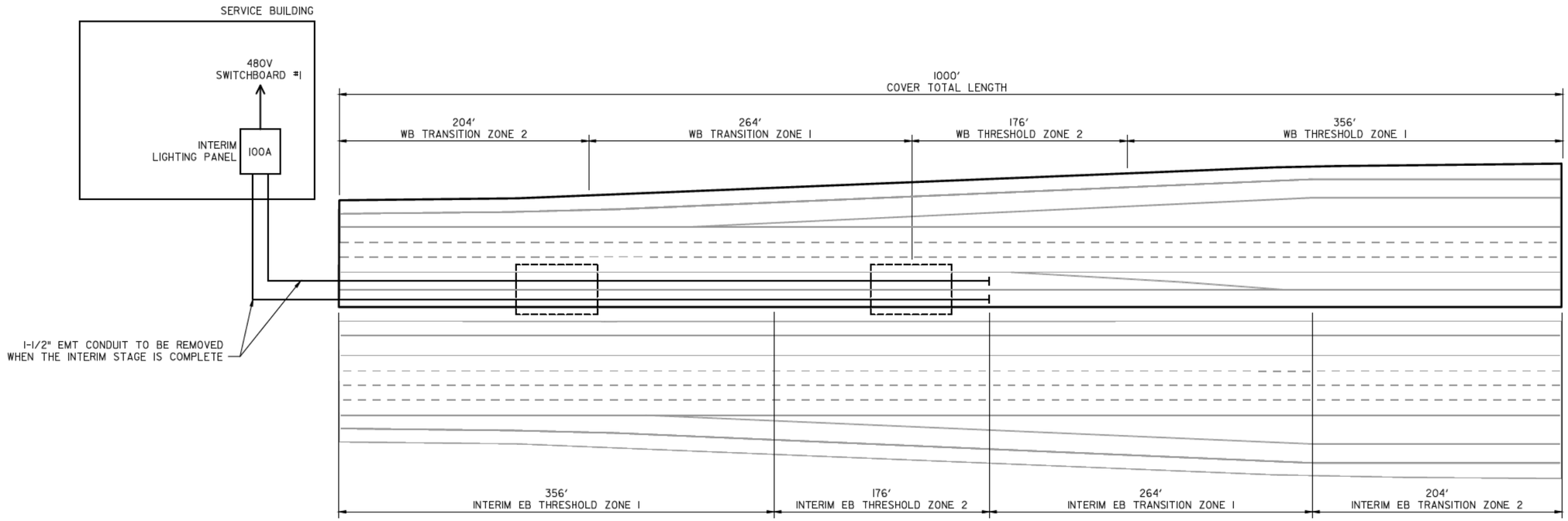
Colorado Department of Transportation
2000 South Holly Street
Denver, CO 80222
Phone: 303-757-9295 FAX: 303-757-9963
Region 1
JKE

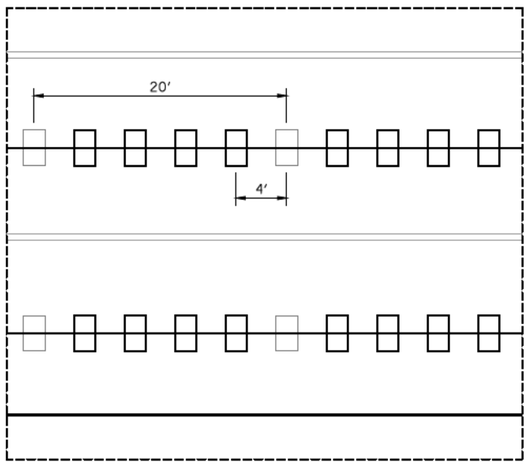
As Constructed
No Revisions:
Revised:
Void:

CONDUIT AND CABLE SCHEDULE

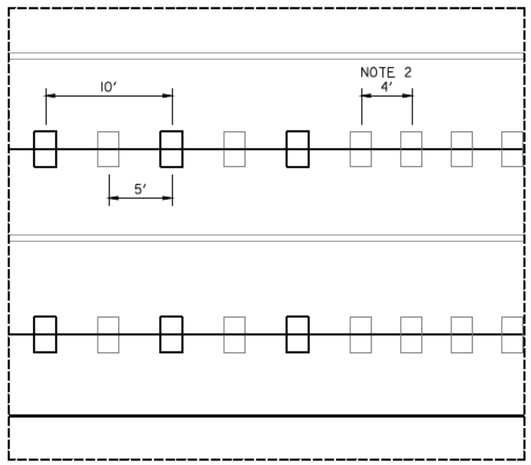
Designer: CML
Detailer: MK
Sheet Subset:
Structure Numbers
Subset Sheets: of

Project No./Code
FBR 0704-234
19631
Sheet Number E015B





INTERIM EB
THRESHOLD ZONE 1



INTERIM EB
THRESHOLD ZONE 2

LEGEND:

PERMANENT LIGHTING FIXTURE

'INTERIM' LIGHTING FIXTURE

NOTES:

1. INTERIM LIGHTING FIXTURES HAVE NO LIGHTING CONTROL WHICH WILL RESULT IN FULL 24/7 OPERATION WITH NO DIMMING FUNCTIONALITY. CONTRACTOR TO USE LUMINAIRES TO MATCH 5000K LED COLOR TEMPERATURE. FIXTURE IS NOT REQUIRED TO BE STAINLESS STEEL FOR THE INTERIM STAGE.
2. INTERIM EB THRESHOLD ZONE 2 TO BE SPACED AS SHOWN UNTIL PERMANENT LIGHTING FIXTURES BEGIN TO BE SPACED ON CENTER AT 4 FEET FROM THE OPPOSITE TRAVEL DIRECTION.

Print Date: 4/24/2017 2:12 PM
File Name: E016.DWG
Staff Bridge Branch - Unit 0226 Unit Leader DDG

0000

Sheet Revisions

Date:	Comments	Init.
04/24/17	FINAL FOR ESTIMATING	

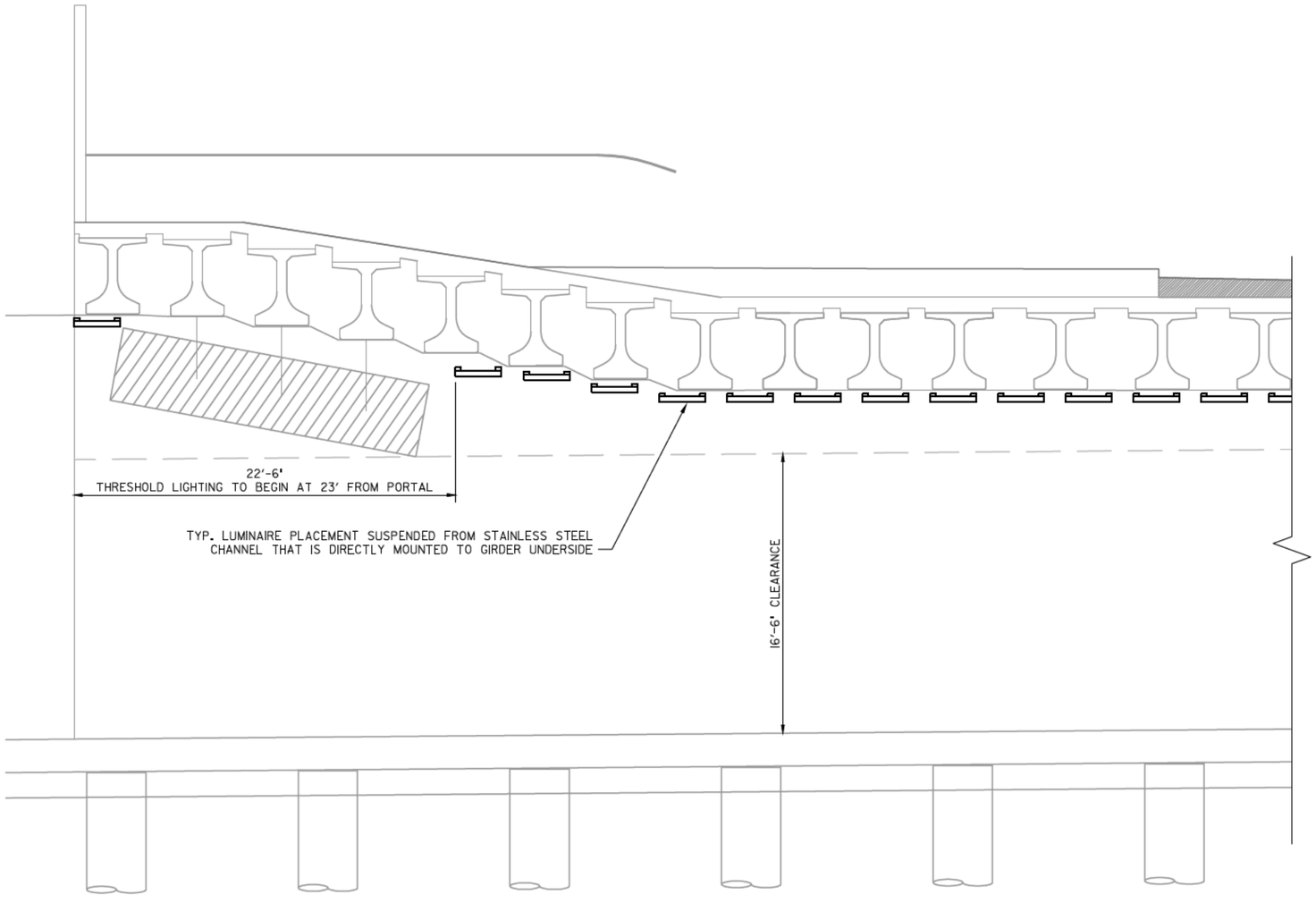
Colorado Department of Transportation
2000 South Holly Street
Denver, CO 80222
Phone: 303-757-9295 FAX: 303-757-9963
Region 1 JKE

As Constructed
No Revisions:
Revised:
Void:

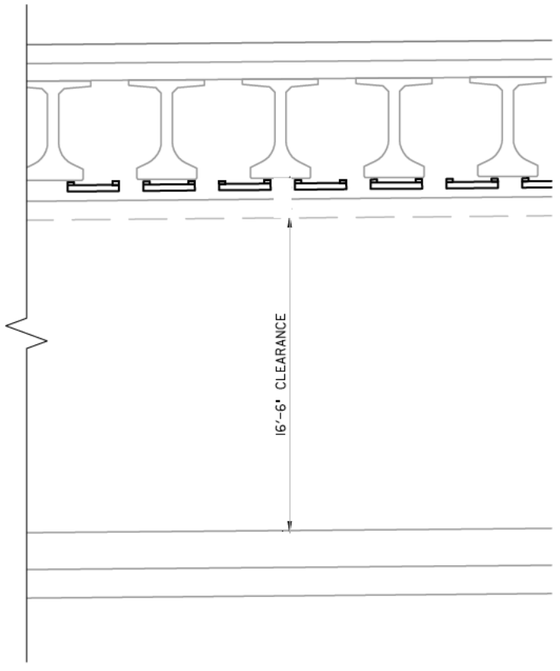
"INTERIM"
LIGHTING POWER DISTRIBUTION
CONCEPT DESIGN

Designer: CML
Detailer: MK
Sheet Subset:
Structure Numbers
Subset Sheets: of

Project No./Code
FBR 0704-234
19631
Sheet Number E016



LIGHTING - PORTAL CROSS SECTION (TYP.)
SCALE: 1-1/2" = 1'-0"



LIGHTING - LOWEST CLEARANCE FROM GIRDER
SCALE: 1-1/2" = 1'-0"

NOTES:

1. LIGHTING POWER DISTRIBUTION NOT INCLUDED IN CROSS SECTION VIEWS. PORTAL ARRANGEMENT SHOWN IS TYPICAL FOR COVER ENTRANCE PORTALS WITH JET FANS INSTALLED AT A 10 DEGREE ANGLE.

Print Date: 4/24/2017 2:12 PM
File Name: E017.DWG
Staff Bridge Branch - Unit 0226 Unit Leader DDG

0000

Sheet Revisions

Date:	Comments	Init.
04/24/17	FINAL FOR ESTIMATING	

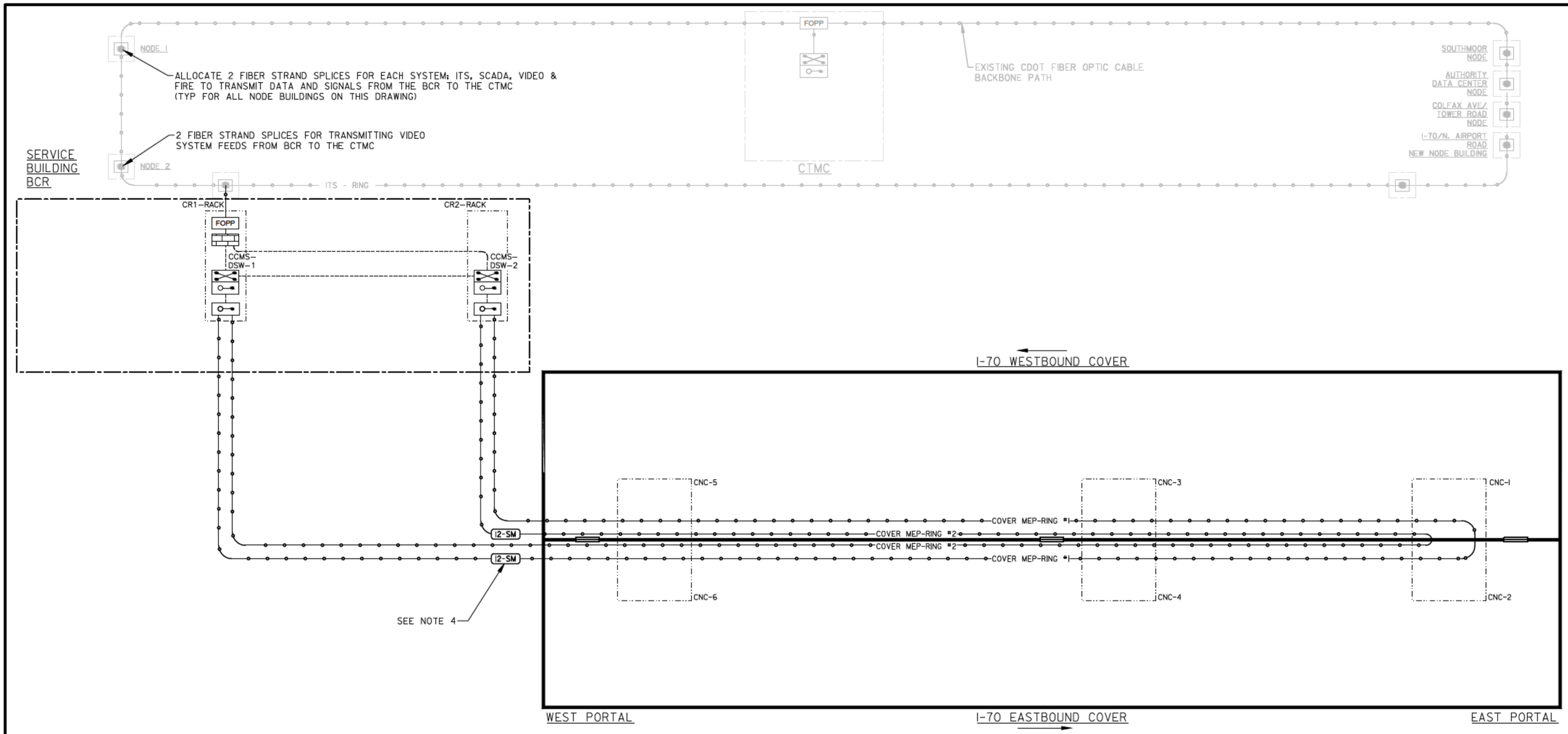
Colorado Department of Transportation
2000 South Holly Street
Denver, CO 80222
Phone: 303-757-9295 FAX: 303-757-9963
Region 1 JKE

As Constructed
No Revisions:
Revised:
Void:

LIGHTING
PORTAL LAYOUT
CONCEPT DESIGN

Designer: CML
Detailer: MK
Sheet Subset:
Structure Numbers:
Subset Sheets: of

Project No./Code
FBR 0704-234
19631
Sheet Number E017



NOTES:

1. COVER MEP RING #1 AND #2 CONSISTS OF 2 SEPARATE FAULT TOLERANT RING SWITCHES FOR EACH SYSTEM: ITS, SCADA, VIDEO AND FIRE. REFER TO NETWORK DRAWINGS E19, E20, E21 AND E22 FOR EACH SYSTEM.
2. CDOT WILL PROVIDE ONE SEATING AREA WITH A DESK AND COMPUTER FOR HOUSING AT THE CTMC.
3. ALL COVER MEP SYSTEM FUNCTIONALITY FOR MONITORING AND CONTROL SHALL BE ABLE TO BE PERFORMED REMOTELY FROM THE CTMC.
4. A FACTORY ACCEPTANCE TEST (FAT), SITE ACCEPTANCE TEST (SAT) AND SITE INTEGRATION TEST (SIT) SHALL BE REQUIRED FOR THE SCADA, VIDEO, FIRE AND ITS SYSTEMS.

SYSTEM:	STRANDS
ITS SYSTEM	2
SCADA SYSTEM	2
VIDEO SYSTEM	2
FIRE SYSTEM	2
SPARE	4
TOTAL (PER RING / PER TUBE)	12

Print Date: 4/24/2017 2:12 PM
File Name: E018.DWG
Staff Bridge Branch - Unit 0226 Unit Leader DDG

0008

Sheet Revisions

Date:	Comments	Init.
04/24/17	FINAL FOR ESTIMATING	

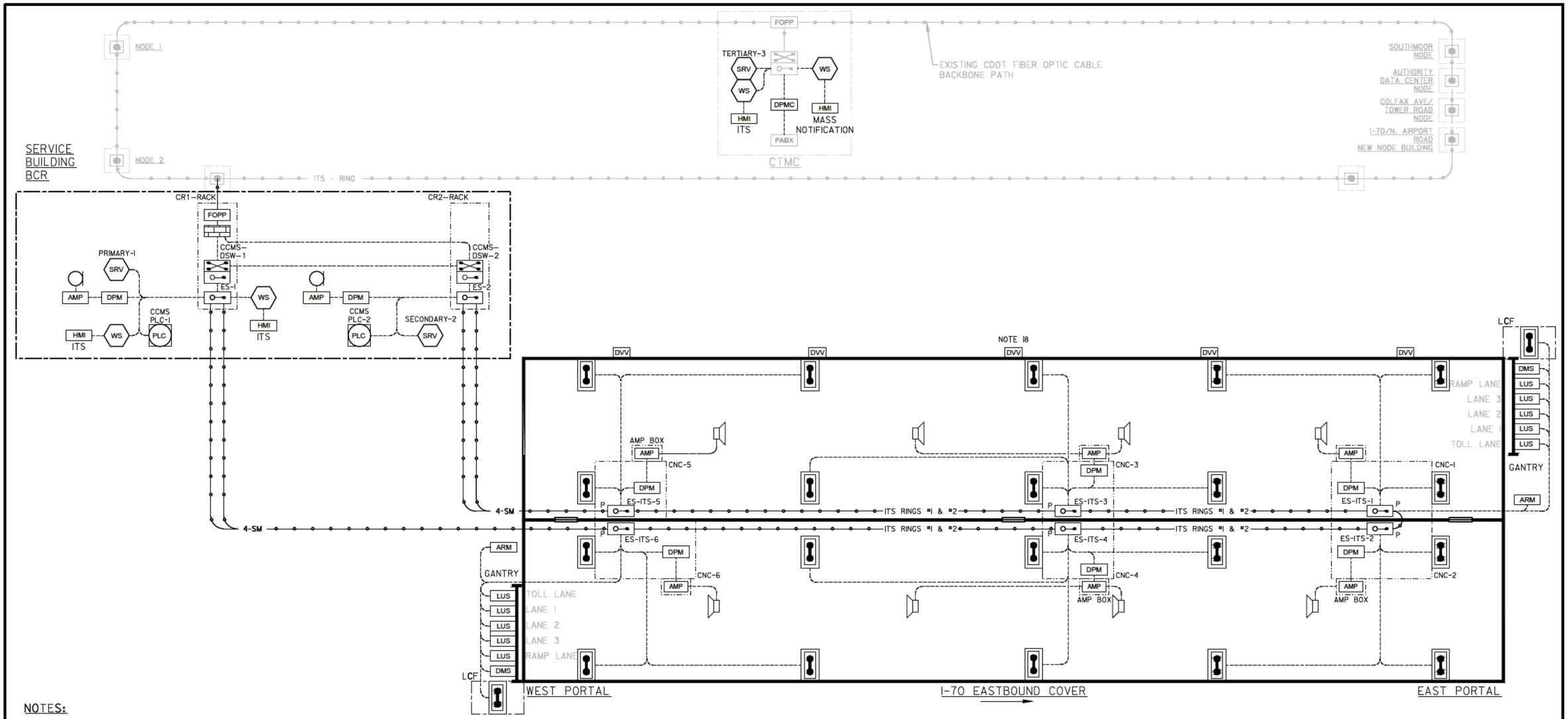
Colorado Department of Transportation
2000 South Holly Street
Denver, CO 80222
Phone: 303-757-9295 FAX: 303-757-9963
Region 1 JKE

As Constructed
No Revisions:
Revised:
Void:

HIGHSPEED BACKBONE OVERVIEW CONCEPT

Designer: RRU
Detailer: TK
Sheet Subset:
Structure Numbers:
Subset Sheets: of

Project No./Code
FBR 0704-234
19631
Sheet Number E018



NOTES:

1. MOTORIST AID CALL BOXES SHALL INCLUDE A HANDSET AND HAND SET RECEIVER CRADLE BEHIND A WEATHERPROOF LATCHED HINGED DOOR.THE ENTIRE CALL BOX AND DOOR ASSEMBLY SHALL BE A NEMA 4X ENCLOSURE CONSTRUCTED OF TYPE 316 STAINLESS STEEL.
2. EMERGENCY ROADSIDE TELEPHONES SHALL BE PROVIDED IN THE COVER AND ON ITS IMMEDIATE APPROACHES IN BOTH DIRECTIONS. THE TELEPHONES SHALL BE CONNECTED DIRECTLY TO A TELEPHONE AT THE BACKUP CONTROL ROOM OPERATOR'S DESK. AN ADDITIONAL TELEPHONE SHALL BE PROVIDED AT THE CTMC AND IT SHALL BE POSSIBLE FOR THE CTMC OPERATOR TO PICK UP INCOMING TELEPHONE CALLS FROM THE COVER IN THE EVENT THAT THE DEVELOPER'S CONTROL ROOM OPERATOR IS UNABLE TO ANSWER THE CALL. THE SYSTEM SHALL BE DESIGNED SUCH THAT IN THE EVENT THAT AN EMERGENCY CALL IS NOT ANSWERED WITHIN 10 SECONDS, ALL CONTROL ROOM TELEPHONES SHALL RING AND THE FIRST OPERATOR TO PICK UP THE CALL WILL BE CONNECTED TO THE COVER EMERGENCY TELEPHONE. THIS TIME PERIOD SHALL BE ADJUSTABLE BY A SUITABLY ACCREDITED SYSTEM OPERATOR.
3. DEVICES SHOWN IN LID SECTION ARE TYPICAL SCHEMATIC REPRESENTATIONS OF SPACING AND CONNECTIONS. ACTUAL QUANTITIES NOT SHOWN.
4. PROVIDE DOOR SWITCH WITH EACH CALL BOX TO INTEGRATE STATUS OF DOOR IN SCADA.
5. DEVICES SHOWN IN LID SECTION ARE TYPICAL SCHEMATIC REPRESENTATIONS OF SPACING AND CONNECTIONS. ACTUAL QUANTITIES NOT SHOWN.
6. ALL LOUDSPEAKERS SHALL BE WATERPROOF AND CORROSIVE RESISTANT TO A SALTWATER ENVIRONMENT.
7. CCTV CAMERAS SHALL BE INTEGRATED INTO THE CTMC. THE DEPARTMENT SHALL BE RESPONSIBLE FOR MODIFYING THE VIDEO CONTROL SOFTWARE TO INCORPORATE THE NEW DEVICES.
8. INTEGRATOR SHALL COORDINATE WITH STRUCTURAL FOR THE LOCATION OF CAMERAS AND MOUNTING EQUIPMENT.
9. EACH DEVICE SHALL BE CONNECTED TO CDOT'S COMMUNICATION SYSTEM USING FIBER OPTIC LATERALS. CDOT'S FIBER OPTIC BACKBONE AND COMMUNICATIONS TO A CDOT'S NODE BUILDING. THE DEVELOPER SHALL WORK WITH THE DEPARTMENT'S ITS STAFF TO ENSURE ACCEPTABLE COMMUNICATIONS TO CTMC.
10. ITS DEVICES INCLUDING: VARIABLE MESSAGE SIGNS, CLOSED CIRCUIT TELEVISION CAMERAS, TRAVEL TIME INDICATORS, DTD ATR'S, DOPPLER RADAR.
11. THE MANUFACTURER SHALL PROVIDE 8 HOURS OF CLASS ROOM TRAINING FOR CDOT AT THE CTMC IN GOLDEN, CO.
12. THE ETHERNET SWITCHES SHALL INTERFACE WITH EXISTING CIENA 5150 ETHERNET AGGREGATION SWITCHES LOCATED IN AN EXISTING REGENERATION NODE BUILDING, THE CTMC AND THE NEW CIENA 5150 ETHERNET SWITCHES 'CCMS-DSW-IX' IN THE BACKUP CONTROL ROOM.
13. THE CCMS SYSTEM SHALL HAVE THE CAPABILITY OF CHANGING DMS MESSAGES FROM THE BACKUP CONTROL ROOM AND THE CTMC.
14. THE LUS SHALL BE INTEGRATED INTO THE CDOT ATM SYSTEM.
15. THE BASIS OF DESIGN FOR THE MASS NOTIFICATION SYSTEM IS THE AXYS DURAN SYSTEM.
16. THE RAMP METERING SYSTEM, DMS, LUS, COMMUNICATIONS SYSTEM, SHALL BE INTEGRATED INTO THE CCMS.
17. THE PROJECT ITS SYSTEM SHALL BE INTEGRATED WITH THE COVER ITS SYSTEM.
18. EACH DELUGE VALVE VAULT WILL INCLUDE AN EMERGENCY CALL BOX.

Print Date: 4/24/2017 2:12 PM
File Name: E019.DWG
Staff Bridge Branch - Unit 0226 Unit Leader DDG

0008

Sheet Revisions

Date:	Comments	Init.
04/24/17	FINAL FOR ESTIMATING	

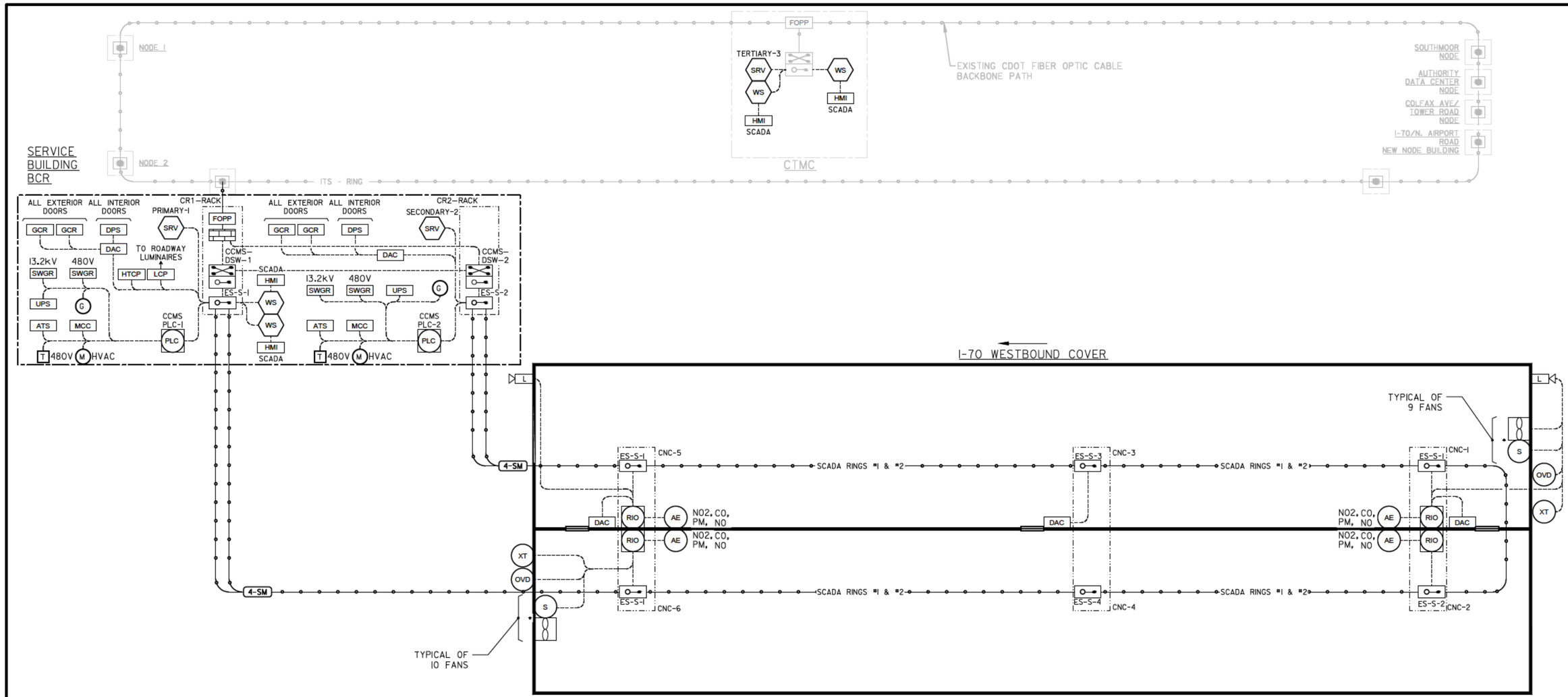
Colorado Department of Transportation
Region 1
2000 South Holly Street
Denver, CO 80222
Phone: 303-757-9295 FAX: 303-757-9963
JKE

As Constructed
No Revisions:
Revised:
Void:

ITS SYSTEM NETWORK OVERVIEW CONCEPT

Designer: RRU
Detailer: TK
Sheet Subset:
Structure Numbers
Subset Sheets: of

Project No./Code
FBR 0704-234
19631
Sheet Number E019

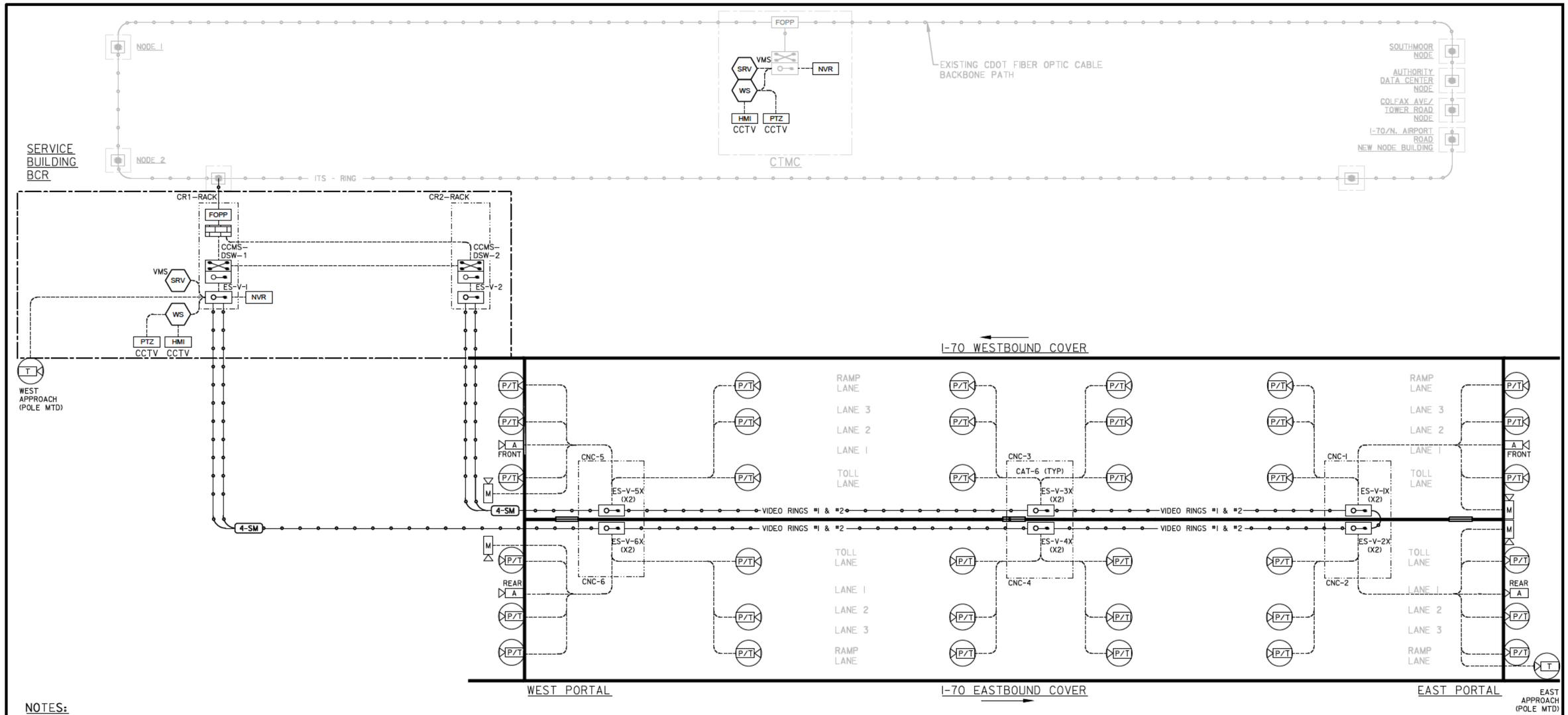


NOTES:

1. • = TYPICAL COVER VENTILATION FAN MOTOR INSTRUMENTATION CONSISTING OF: WINDING TEMPERATURE SENSORS, AND BEARING VIBRATION SENSORS. ANTI-VIBRATION MOUNTINGS SHALL BE PROVIDED TO REDUCE THE TRANSMISSION OF VIBRATIONS, AT FREQUENCIES ASSOCIATED WITH THE FAN RUNNING SPEEDS AND THEIR FIRST THREE MULTIPLES (HARMONICS), TO LEVELS THAT ARE ACCEPTABLE FOR TRANSMISSION OF NOISE AND VIBRATION THROUGH THE STRUCTURE.
2. SCADA SYSTEM SHALL MONITOR THE FOLLOWING:
   - CARBON MONOXIDE, CO 120 PPM
   - NITROGEN DIOXIDE, NO2 1 PPM
   - NITRIC OXIDE, NO 15 PPM
   - PARTICULATE MATTER, PM 0.007 M-1 EXTINCTION COEFFICIENT
   - AMBIENT TEMPERATURE OF 100^F;
   - AIR FLOW DIRECTION
3. TWO SAMPLING POINTS SHALL BE PROVIDED AT EACH SIDE OF EACH BORE OF THE COVER (EIGHT SAMPLING POINTS SHALL AVOID DILUTION BY AIR CIRCULATING FROM THE PORTALS.
4. SIX AIR SPEED AND DIRECTION MONITORS SHALL BE INSTALLED: TWO IN EACH BORE OF THE COVER TO PROVIDE INFORMATION TO THE OPERATOR ON THE FLOW SPEED AND DIRECTION OF AIR INSIDE THE COVER AND TWO OUTSIDE THE COVER NEAR TO EACH PORTAL AT A LOCATION SUITABLE TO PROVIDE INFORMATION ON EXTERNAL AMBIENT WIND CONDITIONS TO THE OPERATOR.
5. THE SCADA SYSTEM SHALL BE INTEGRATED WITH THE FOLLOWING SYSTEMS:
   - COMMAND, CONTROL AND MONITORING SYSTEM (CCMS)
   - FIXED FIRE FIGHTING SYSTEM (FFFS)
   - FIRE DETECTION AND ALARM SYSTEM (FDAS)
   - POLLUTION MONITORING SYSTEM (PMS)
6. INTEGRATOR SHALL COORDINATE WITH STRUCTURAL FOR THE LOCATION OF INSTRUMENTS AND SENSORS.
7. AUTOMATED AND AIR RELEASE VALVES SHALL BE INTEGRATED INTO THE CCMS SYSTEM.
8. PROVIDE LICENSES FOR SCADA AND PLC SOFTWARE SUPPLIED AS PART OF SOFTWARE TRACKING AND RELEASE PROCEDURES.
9. VCS FOR THE CVS SHALL BE INTEGRATED INTO THE CCMS SYSTEM.
10. WATER TANK INSTRUMENTATION, VALVE STATUS AND PUMP STATUS SHALL BE INTEGRATED INTO THE CCMS SYSTEM.
11. THE EMERGENCY WAYFINDING LIGHTS SHALL BE INTEGRATED (BY OTHERS) INTO THE CCMS SYSTEM AND SHALL BE INTERLOCKED WITH THE FIRE SYSTEM.
12. CCMS SYSTEM SHALL PROVIDE FAULT MONOTORING AND MANAGEMENT OF ALL ELECTRICAL AND MECHANICAL SYSTEMS IN THE COVER MEP.
13. THE CVS, ELECTRICAL DISTRIBUTION SYSTEM, LIGHTING SYSTEM, WAYFINDING, FFFS, RADIO REBROADCAST, VA/FA, FIRE MAIN, RADIO REBROADCAST, VA./PA, AID, FIRE DETECTION, CROSS BORE DOORS, HVAC, ENVIRONMENTAL AND OTHER SENSORS, TRAFFIC MANAGEMENT SYSTEM SHALL BE INTEGRATED INTO THE CCMS SYSTEM.
14. THE CCMS SYSTEM SHALL MONITOR THE VA/PA SYSTEM; ALARM FAULT TO THE OPERATOR; COVER OPERATOR SPEECH BROADCAST.
15. THE CCMS SYSTEM SHALL MONITOR THE VEHICLE DETECTION SYSTEM STATUS; ALARM FAULT TO THE OPERATOR; MONITOR INCIDENTS AND ALERT OPERATOR.
16. THE CCMS SYSTEM SHALL MONITOR THE FIRE DETECTION SYSTEM STATUS; ALARM FAULT TO THE OPERATOR; MONITOR INCIDENTS OF FIRE AND ALERT OPERATOR; FIRE ALARM CALL POINTS; FIRE DETECTION SYSTEM WITH DIRECT CONNECTION TO FIRE DEPARTMENT AND BACKUP CONTROL ROOM.
17. THE CCMS SYSTEM SHALL MONITOR STATUS OF HVAC, LIGHTING, INTRUDER ALARM, BUILDING FIRE ALARM; RAISE ALARM OF ANY FAULT.
18. AN ACCESS CONTROL SYSTEM SHALL BE SUPPLIED TO SECURE ACCESS FOR PLANT ROOMS AND THE CCMS, THE BASIS OF DESIGN FOR THE ACCESS CONTROL SYSTEM WILL BE SAME MODEL NUMBER AS IS USED ON THE CDOT ITS SYSTEM.

Print Date: 4/24/2017 2:12 PM	Sheet Revisions			Colorado Department of Transportation	As Constructed
File Name: E020.DWG	Date:	Comments	Init.	2000 South Holly Street Denver, CO 80222 Phone: 303-757-9295 FAX: 303-757-9963	No Revisions:
	04/24/17	FINAL FOR ESTIMATING		Region 1 JKE	Revised:
Staff Bridge Branch - Unit 0226 Unit Leader DDG					Void:

SCADA SYSTEM NETWORK OVERVIEW CONCEPT			Project No./Code
Designer: RRU	Structure Numbers		FBR 0704-234
Detailer: TK			19631
Sheet Subset:	Subset Sheets: of		Sheet Number E020

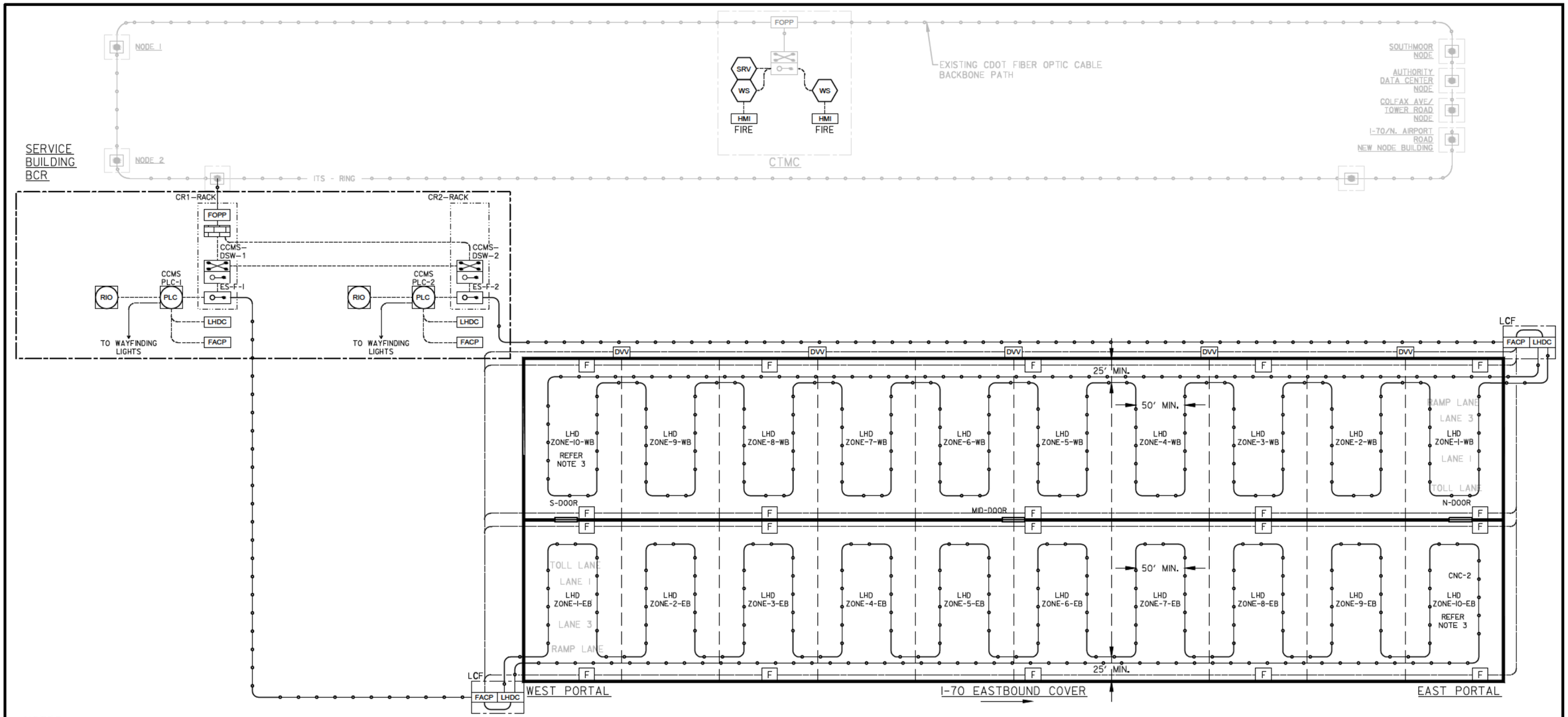


NOTES:

1. CCTV VIDEO FEEDS SHALL BE TRANSMITTED TO THE CTMC FOR BACKUP RECORDING. THE CCTV CAMERA IMAGES SHALL BE TRANSMITTED TO BOTH THE BACKUP CONTROL ROOM AND THE CTMC.
2. INTEGRATOR SHALL COORDINATE WITH STRUCTURAL FOR THE LOCATION OF CAMERAS AND MOUNTING EQUIPMENT.
3. DEVELOPER SHALL INTEGRATE THE CAMERAS INTO BOTH THE CCMS AND CTMC CAMERA VIEWING AND CONTROL SOFTWARE; CTMC CURRENTLY USES NICEVISION (QOGNIFY) CAMERA CONTROL AND VIEWING SOFTWARE. DEVELOPER SHALL PROVIDE A NICE (QOGNIFY) SOFTWARE SERVER AT THE CCMS FOR REAL-TIME CAMERA VIEWING AND CONTROL.
4. PAN, TILT AND ZOOM CONTROLS OF THE CCTV CAMERAS SHALL BE PROVIDED FOR BOTH THE BACKUP CONTROL ROOM AND CTMC.
5. CAMERAS SHALL BE MOUNTED OVER THE RUNNING LANES IN GROUPS OF THREE, THE MIDDLE CAMERA OF EACH GROUP SHALL BE A THERMAL CAMERA.
6. THE BASIS OF DESIGN FOR THE CCTV CAMERAS SHALL BE BOSCH MIC SERIES AND SHALL MEET THE FOLLOWING TECHNICAL REQUIREMENTS:
   - PTZ DOME
   - WIPE WASH FACILITIES
   - CEILING MOUNT
   - THERMOGRAPHY, ANALYTICS AND ALARMS
   - ETHERNET BASED
   - IP-66 RATED
   - H.264 COMPRESSION WITH 16:9 ASPECT RATIO
   - COMPATIBLE WITH NICE VISION (QOGNIFY)
   - ONVIF COMPLITANT
7. CAMERAS SIGNALS SHALL BE TRANSMITTED TO THE BACKUP CONTROL ROOM (BCR) AND THE COLORADO DEPARTMENT OF TRANSPORTATION (CDOT) FOR ONE SHALL BE OVER THE RAMP LANE, ONE OVER THE CENTER OF GENERAL PURPOSE LANES AND ONE OVER THE TOLLED EXPRESS LANE.
8. CCTV CAMERAS SHALL BE CAPABLE OF OBSERVING AND RECORDING TRAFFIC AND PEDESTRIAN. BACKUP RECORDING. CAMERA SHALL COVER 100% OF THE COVER WHILE IN THE HOME POSITION WITH MINIMAL BLIND SPOTS.
9. CCTV CAMERAS SHALL BE CAPABLE OF DETECTION, ANALYTICS FOR TRAFFIC FLOW SUCH AS: STOPPED VEHICLE, SPEED CONGESTION, WRONG DIRECTION, NO PACKAGE LEFT BEHIND.
10. THE BASIS OF DESIGN FOR VIDEO SYSTEM IS BOSCH MIC SERIES.

Print Date: 4/24/2017 2:12 PM	Sheet Revisions	Colorado Department of Transportation	As Constructed
File Name: E021-ALT1.DWG	Date: / Comments / Init.	2000 South Holly Street, Denver, CO 80222	No Revisions:
Staff Bridge Branch - Unit 0226 Unit Leader DDG	04/24/17 FINAL FOR ESTIMATING	Phone: 303-757-9295 FAX: 303-757-9963	Revised:
0008		Region 1 JKE	Void:

VIDEO SYSTEM NETWORK OVERVIEW CONCEPT		Project No./Code	
Designer: RRU	Structure Numbers	FBR 0704-234	
Detailer: TK		19631	
Sheet Subset:	Subset Sheets: of	Sheet Number E021	



NOTES:

1. FIRE DETECTION AND ALARM SYSTEM: THE DEVELOPER SHALL INSTALL AN AUTOMATIC FIRE DETECTION AND ALARM SYSTEM (FDAS) IN ACCORDANCE WITH THE PROVISIONS IN NFPA 72, INCLUDING FIRE ALARM CONTROL PANELS. THE FIRE DETECTION SYSTEM SHALL BE CAPABLE OF LOCATING A VEHICLE FIRE TO WITHIN A LONGITUDINAL DISTANCE OF 25% OF THE LENGTH OF A SINGLE FFFS ZONE. THE FIRE DETECTION SYSTEM SHALL BE INTEGRATED WITH THE FFFS AND THE CVS TO ENSURE EFFECTIVE AND TIMELY RESPONSE TO FIRE TO MEET THE PERFORMANCE REQUIREMENTS FOR THE FFFS AND OTHER SAFETY SYSTEMS. EMERGENCY FACILITIES INCLUDING EMERGENCY PANELS.
2. CCMS CONTROL AND MONITORING FACILITIES: THE CCMS SHALL MONITOR THE CURRENT STATUS OF THE FIRE MAIN SYSTEM INCLUDING PUMPS, PUMP CONTROLLERS, TRACE HEATING, LEVEL SENSORS, DVV LOW TEMPERATURE ALARM AND INPUT PRESSURES. THE CCMS SHALL MONITOR THE PRESSURE ON THE FIRE MAIN WITHIN THE COVER. THE CCMS SHALL RAISE AN ALARM TO THE OPERATORS IF THE PRESSURE IS OUTSIDE PREDEFINED LIMITS.HEATING, LEVEL SENSORS AND INPUT PRESSURES. THE CCMS SHALL MONITOR THE PRESSURE ON THE FIRE MAIN WITHIN THE COVER. THE CCMS SHALL RAISE AN ALARM TO THE OPERATORS IF THE PRESSURE IS OUTSIDE PREDEFINED LIMITS.
3. LINEAR HEAT DETECTION CABLE USED IN DESIGN IS PFS-654-MF FIBER OPTIC CABLE.
4. THE BASIS OF DESIGN FOR ALL LINEAR HEAT DETECTION IS PROTECTOWIRE FIBERSYSTEM 8000.
5. LINEAR HEAT DETECTION CABLE IS TO BE SUSPENDED PER UL SPACING REQUIREMENTS IN THE INTERIM CONDITION WHERE A HOLE IS TO BE REQUIRED IN THE WESTBOUND TUBE.

FIRE SYSTEM INCLUDES:	REQUIREMENT
LINEAR HEAT DETECTION	12.15.11.
FIRE DETECTION AND ALARM SYSTEM	12.14.14.
FIXED FIRE FIGHTING SYSTEM	12.14.
HEAT TRACE	12.16.4.

Print Date: 4/24/2017 2:12 PM
File Name: E022.DWG
Staff Bridge Branch - Unit 0226 Unit Leader DDG

0008

Sheet Revisions

Date:	Comments	Init.
04/24/17	FINAL FOR ESTIMATING	

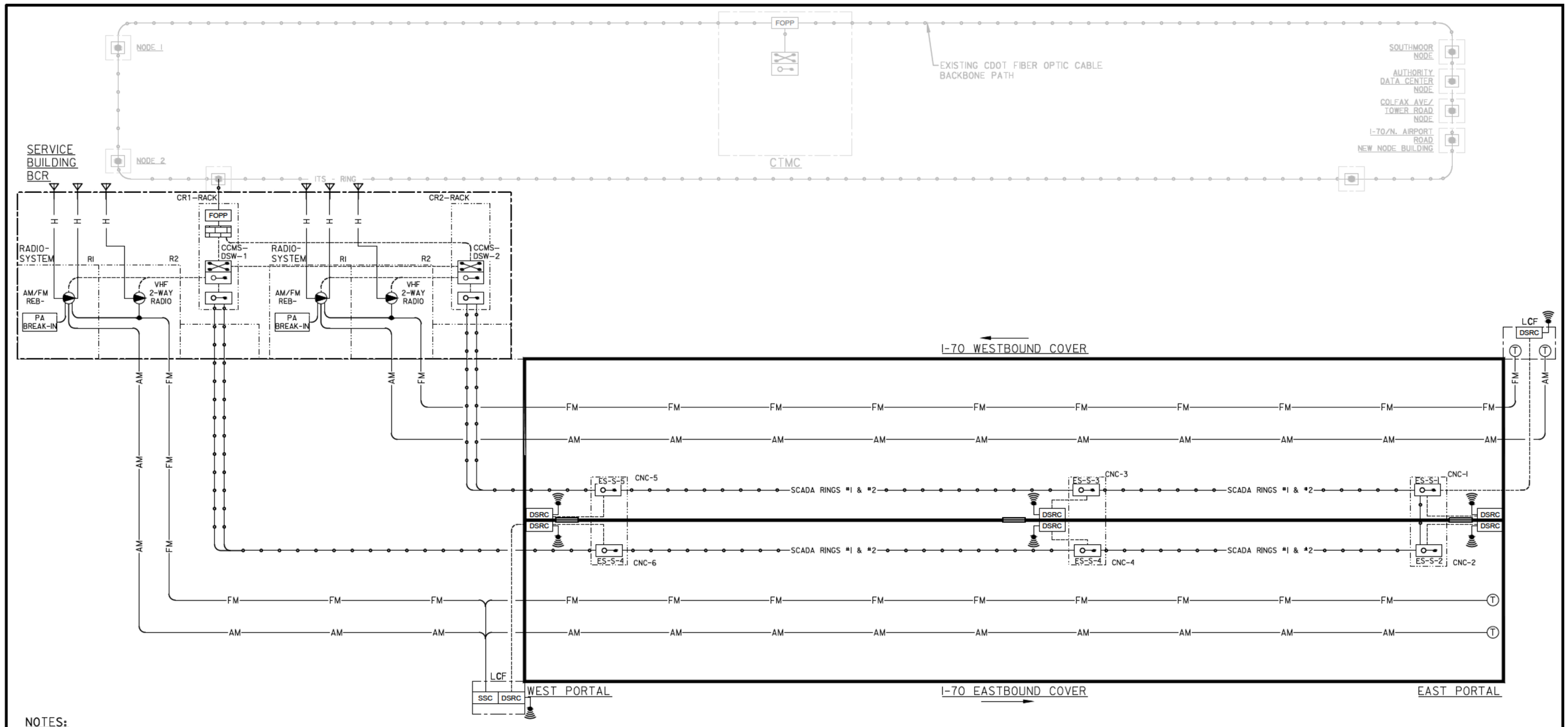
Colorado Department of Transportation
2000 South Holly Street
Denver, CO 80222
Phone: 303-757-9295 FAX: 303-757-9963
Region 1 JKE

As Constructed
No Revisions:
Revised:
Void:

FIRE SYSTEM NETWORK OVERVIEW CONCEPT

Designer: RRU
Detailer: TK
Sheet Subset:
Structure Numbers:
Subset Sheets: of

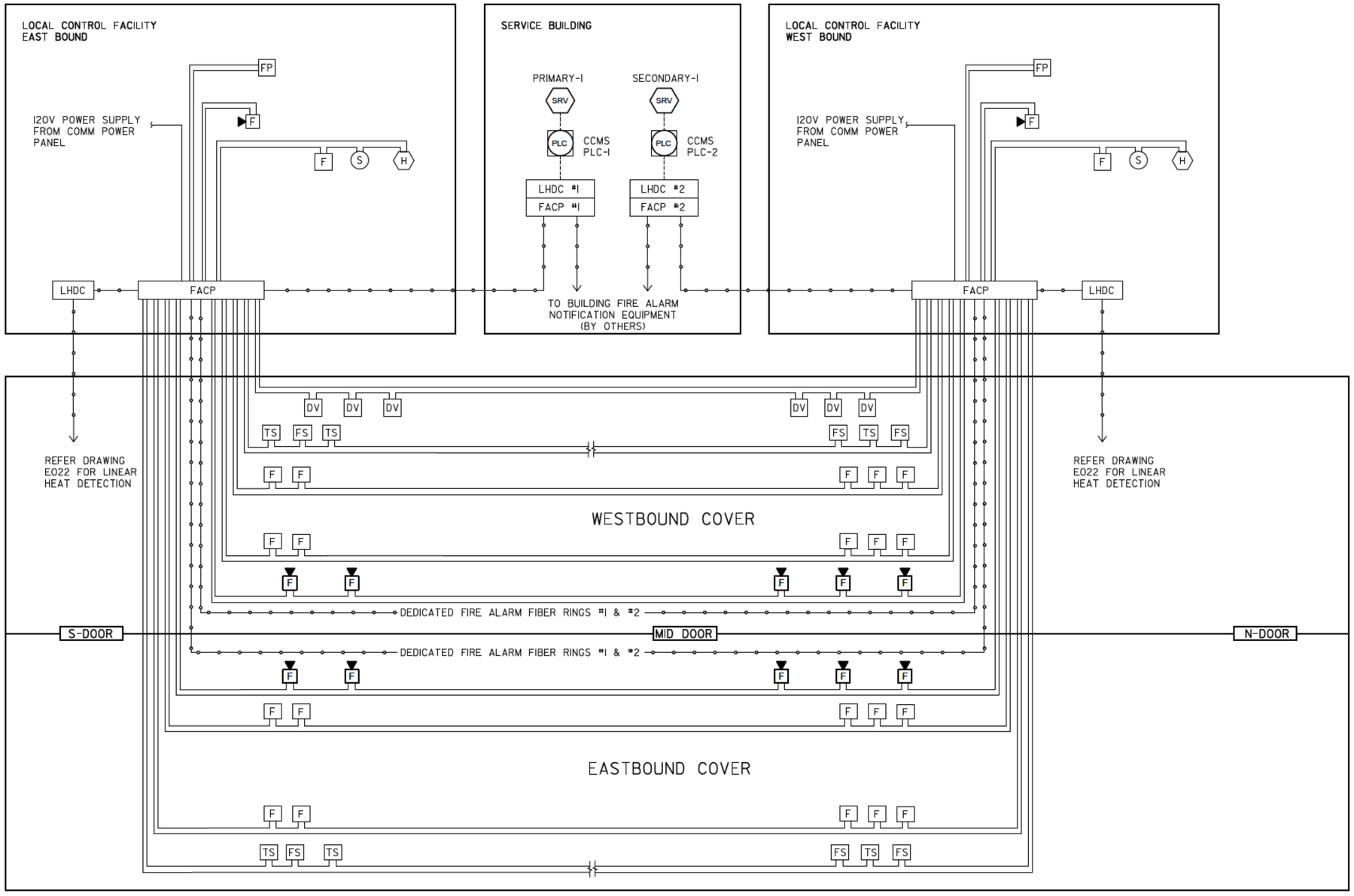
Project No./Code
FBR 0704-234
19631
Sheet Number E022



NOTES:

1. INCLUDED RADIO SYSTEMS
   a) 2-WAY O&M RADIO WILL USE FM ANTENNA
   b) RADIO REBROADCAST SYSTEM WILL USE FM AND AM ANTENNAS
2. 2-WAY RADIO SYSTEM FOR EMERGENCY SERVICES PERSONNEL TO BE PROVIDED BY OTHERS. FIRE CONTROL ROOMS WILL INCLUDE PROVISIONS FOR SECURE SPACE AND UPS POWER. THIS SYSTEM WILL USE FM ANTENNA.
3. COMMERCIAL CELLULAR SYSTEMS TO BE POWERED BY OTHERS. DESIGN INCLUDES PROVISIONS FOR SECURE SPACE AND UPS POWER FOR TWO SYSTEMS. (ASSUMING (I)GMS AND (I) CDMA.
5. PROVIDE TRANSMITTER ANTENNA, AND ALL FRONT END TRANSMITTING EQUIPMENT, AND HARDWARE TO ALLOW 2-WAY RADIO SYSTEM TO PROVIDE ONE HUNDRED PERCENT COVERAGE IN THE LID AND APPROACHES.
6. PROVIDE TRANSMITTER ANTENNA, AND FRONT END TRANSMISSION EQUIPMENT, AND HARDWARE TO ALLOW DOMESTIC RADIO RE-BROADCAST WITH BREAK-IN SYSTEM FOR EMERGENCY PUBIC SAFETY MESSAGE.
7. PROVIDE SPACE PROOFING AND POWER FOR INSTALLING EMERGENCY SERVICES AND CELLULAR SERVICE RADIO SYSTEM.
8. INTEGRATOR SHALL COORDINATE WITH STRUCTURAL FOR THE LOCATION OF RADIO ANTENNAS, CABLES AND MOUNTING EQUIPMENT.
9. THE CCMS SYSTEM SHALL MONITOR THE RADIO REBROADCAST SYSTEM STATUS; ALARM FAULT TO THE OPERATOR; COVER OPERATOR SPEECH BROADCAST.

Print Date: 4/24/2017 2:13 PM		Sheet Revisions			Colorado Department of Transportation	As Constructed	RADIO SYSTEM NETWORK OVERVIEW CONCEPT	Project No./Code
File Name: E023.DWG		Date:	Comments	Init.	2000 South Holly Street Denver, CO 80222 Phone: 303-757-9295 FAX: 303-757-9963	No Revisions:	Designer: RRU	FBR 0704-234
		04/24/17	FINAL FOR ESTIMATING			Revised:	Detailer: TK / Structure Numbers	19631
Staff Bridge Branch - Unit 0226 Unit Leader DDG	0000				Region 1 JKE	Void:	Sheet Subset: / Subset Sheets: of	Sheet Number E023



NOTES:

1. QUANTITY AND LOCATION OF DEVICES TO BE DETERMINED BASED ON NFPA 72 AND NFPA 502 STANDARDS.
2. REFER TO DWG E022 FOR LINEAR HEAT DETECTION ZONES.
3. DELUGE VALVE LOCATED IN VAULTS (DVV) OUTSIDE WESTBOUND COVER BELOW ROADWAY.
4. REFER TO DRAWING E022, FIRE SYSTEM NETWORK OVERVIEW CONCEPT FOR FACP COMMUNICATION DETAILS.
5. ALL FA CABLES SIZES ASSUMED TO BE 4#10AWG 2-HOUR FIRE RATED IN SS CONDUIT PER UL FHIT/2196 REQUIREMENTS AND NFPA-502:12.1.2
6. FIRE ALARM DEVICES WIRED IN LOOP AND SHALL BE MONITORED FOR TROUBLE.

Print Date: 4/24/2017 2:13 PM
File Name: E025.DWG
Staff Bridge Branch - Unit 0226 Unit Leader DDG

0008

Sheet Revisions

Date:	Comments	Init.
04/24/17	FINAL FOR ESTIMATING	

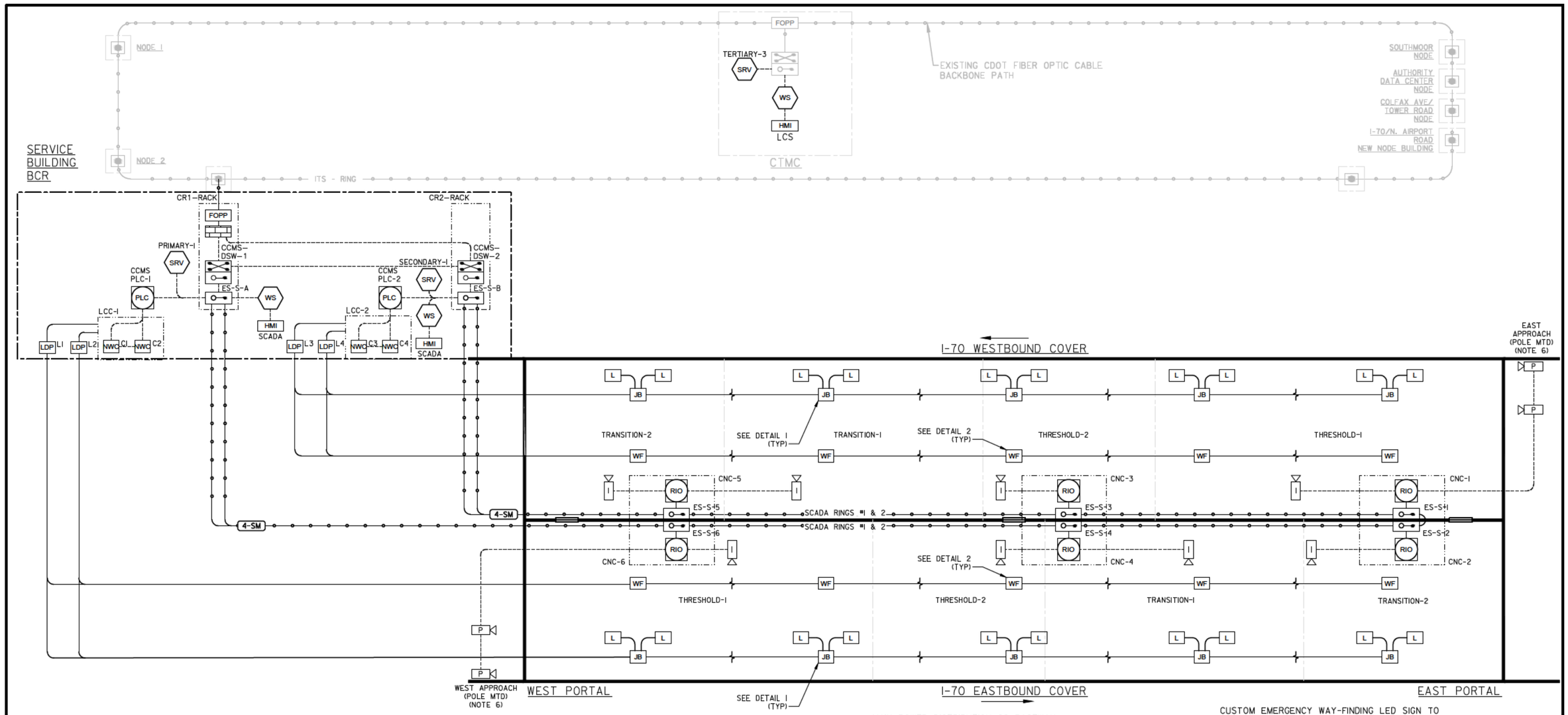
Colorado Department of Transportation
2000 South Holly Street
Denver, CO 80222
Phone: 303-757-9295 FAX: 303-757-9963
Region 1 JKE

As Constructed
No Revisions:
Revised:
Void:

FIRE ALARM RISER DIAGRAM CONCEPT

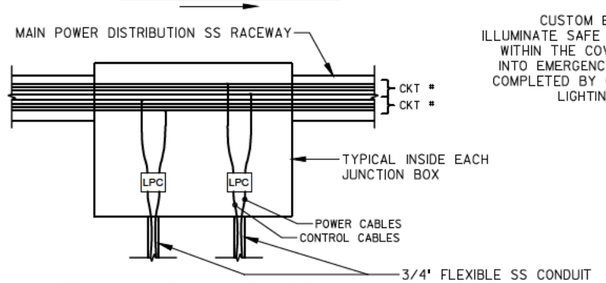
Designer: RRU
Detailer: TK
Sheet Subset:
Structure Numbers
Subset Sheets: of

Project No./Code
FBR 0704-234
19631
Sheet Number E025



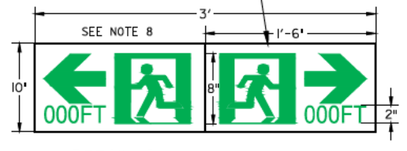
NOTES:

1. THE LIGHTING CONTROL SYSTEM IS BASED AROUND A LOCAL PRODUCT CONTROLLER THAT IS HARDWIRED INTO A JUNCTION BOX. INTERFACE FROM THE NETWORK CONTROLLER INTO THE CCMS PLC ALLEN BRADLEY SHALL BE VIA A PROTOCOL CONVERTER.
2. REFER TO DRAWING E015 FOR LIGHTING POWER DISTRIBUTION CONCEPT, LIGHTING SCHEDULE AND CALCULATION SUMMARY.
3. THE LIGHTING CONTROL SYSTEM SHALL BE INTEGRATED WITH THE CCMS SYSTEM AND PROVIDE INFORMATION IN COORDINATED MANNER ON THE STATUS OF THE LIGHTING SYSTEM.
4. THE LIGHTING CONTROLS SYSTEM SHALL ALSO INCLUDE ILLUMINANCE SENSORS MONITORING THE ACTUAL LUMINANCE PROVIDED BY THE LIGHTING SYSTEM ON THE PAVEMENT IN EACH OF THE LIGHTING ZONES. ALARMS SHALL BE GENERATED WHEN DESIGNED MAINTAINED ILLUMINANCE LEVELS ARE NOT MET.
5. THERE SHALL BE 4 LIGHTING ZONES IN EACH TUNNEL:
   - THRESHOLD-1
   - THRESHOLD-2
   - TRANSITION-1
   - TRANSITION-2
6. CONTRACTOR TO PROVIDE CABLE AND CONDUIT TO POLE-MOUNTED EAST AND WEST APPROACH LUMINANCE CAMERAS LOCATED AT A SAFE STOPPING SIGHT DISTANCE OF 570 FT FROM THE COVER PORTALS. THE LUMINANCE CAMERAS MAY BE CO-LOCATED ON THE SHOULDER SIDE FOR MAINTENANCE ACCESS. INCLUDE PROVISION FOR A POLE-MOUNTED RESERVOIR FOR AUTOMATIC CAMERA LENS CLEANING.
7. THE LIGHTING CONTROL SYSTEM IS BASED ON THE TUNNEL LIGHTING ADDRESSABLE CONTROL SYSTEM VIA POWERLINE CARRIER BY NYX HEMERA. THE POWER CONDUCTORS TO EACH LUMINAIRE WILL TERMINATE AT TERMINAL BLOCKS INSIDE EACH JUNCTION BOX. CONNECTION FROM LPC TO EACH LUMINAIRES WILL BE USED FOR FULL DIMMING CONTROLS.
8. QUANTITIES FOR JUNCTION BOXES, LUMINAIRES AND WAY-FINDING SIGNS ARE FOR DIAGRAMMATIC PURPOSES ONLY. WAY-FINDING SIGNS TO BE SPACED AT 80' INTERVALS. EACH SIGN WILL HAVE INTERNAL LEDS ILLUMINATING EACH HALF EQUIPPED WITH INDEPENDENT CIRCUITRY.



DETAIL 1 -JUNCTION BOX (TYP.)

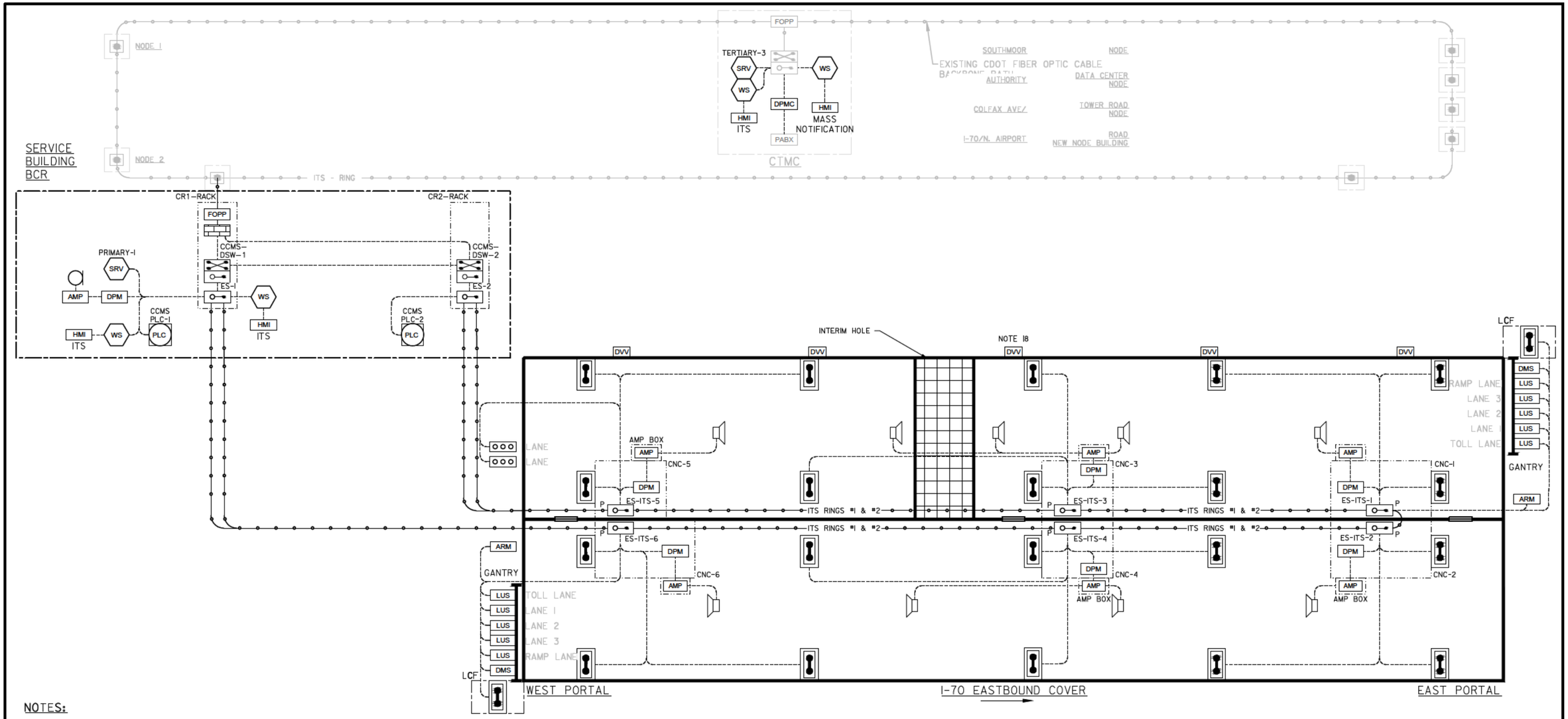
CUSTOM EMERGENCY WAY-FINDING LED SIGN TO ILLUMINATE SAFE ROUTE BASED ON INCIDENT LOCATION WITHIN THE COVER. INTEGRATION AND PROGRAMMING INTO EMERGENCY EVACUATION CONTROL PLAN TO BE COMPLETED BY OTHERS. INTERGATION INTO PROPOSED LIGHTING CONTROL SYSTEM SHALL BE USED.



DETAIL 2 - EMERGENCY WAY-FINDING SIGNAGE

Print Date: 4/24/2017 2:13 PM	0008	Sheet Revisions			Colorado Department of Transportation
File Name: E026.DWG		Date:	Comments	Init.	2000 South Holly Street, Denver, CO 80222
		04/24/17	FINAL FOR ESTIMATING		Phone: 303-757-9295 FAX: 303-757-9963
Staff Bridge Branch - Unit 0226 Unit Leader DDG					Region 1 JKE

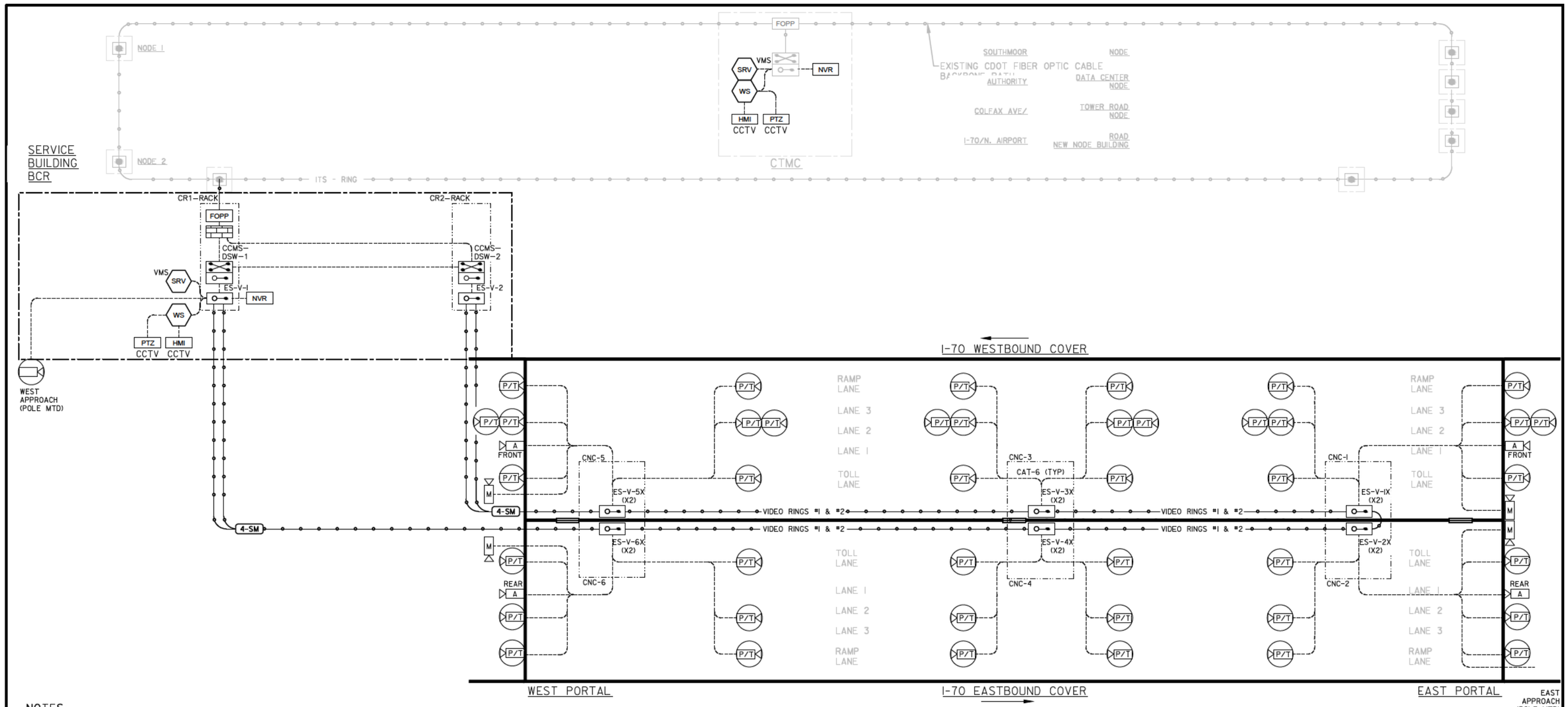
As Constructed	LIGHTING CONTROL SYSTEM CONCEPT		Project No./Code
No Revisions:	Designer: RRU	Structure Numbers	FBR 0704-234
Revised:	Detailer: TK		19631
Void:	Sheet Subset:	Subset Sheets: of	Sheet Number E026



NOTES:

1. MOTORIST AID CALL BOXES SHALL INCLUDE A HANDSET AND HAND SET RECEIVER CRADLE BEHIND A WEATHERPROOF LATCHED HINGED DOOR.THE ENTIRE CALL BOX AND DOOR ASSEMBLY SHALL BE A NEMA 4X ENCLOSURE CONSTRUCTED OF TYPE 316 STAINLESS STEEL.
2. EMERGENCY ROADSIDE TELEPHONES SHALL BE PROVIDED IN THE COVER AND ON ITS IMMEDIATE APPROACHES IN BOTH DIRECTIONS. THE TELEPHONES SHALL BE CONNECTED DIRECTLY TO A TELEPHONE AT THE BACKUP CONTROL ROOM OPERATOR'S DESK. AN ADDITIONAL TELEPHONE SHALL BE PROVIDED AT THE CTMC AND IT SHALL BE POSSIBLE FOR THE CTMC OPERATOR TO PICK UP INCOMING TELEPHONE CALLS FROM THE COVER IN THE EVENT THAT THE DEVELOPER'S CONTROL ROOM OPERATOR IS UNABLE TO ANSWER THE CALL. THE SYSTEM SHALL BE DESIGNED SUCH THAT IN THE EVENT THAT AN EMERGENCY CALL IS NOT ANSWERED WITHIN 10 SECONDS, ALL CONTROL ROOM TELEPHONES SHALL RING AND THE FIRST OPERATOR TO PICK UP THE CALL WILL BE CONNECTED TO THE COVER EMERGENCY TELEPHONE. THIS TIME PERIOD SHALL BE ADJUSTABLE BY A SUITABLY ACCREDITED SYSTEM OPERATOR.
3. DEVICES SHOWN IN LID SECTION ARE TYPICAL SCHEMATIC REPRESENTATIONS OF SPACING AND CONNECTIONS. ACTUAL QUANTITIES NOT SHOWN.
4. PROVIDE DOOR SWITCH WITH EACH CALL BOX TO INTEGRATE STATUS OF DOOR IN SCADA.
5. DEVICES SHOWN IN LID SECTION ARE TYPICAL SCHEMATIC REPRESENTATIONS OF SPACING AND CONNECTIONS. ACTUAL QUANTITIES NOT SHOWN.
6. ALL LOUDSPEAKERS SHALL BE WATERPROOF AND CORROSIVE RESISTANT TO A SALTWATER ENVIRONMENT.
7. CCTV CAMERAS SHALL BE INTEGRATED INTO THE CTMC. THE DEPARTMENT SHALL BE RESPONSIBLE FOR MODIFYING THE VIDEO CONTROL SOFTWARE TO INCORPORATE THE NEW DEVICES.
8. INTEGRATOR SHALL COORDINATE WITH STRUCTURAL FOR THE LOCATION OF CAMERAS AND MOUNTING EQUIPMENT.
9. EACH DEVICE SHALL BE CONNECTED TO CDOT'S COMMUNICATION SYSTEM USING FIBER OPTIC LATERALS, CDOT'S FIBER OPTIC BACKBONE AND COMMUNICATIONS TO A CDOT'S NODE BUILDING. THE DEVELOPER SHALL WORK WITH THE DEPARTMENT'S ITS STAFF TO ENSURE ACCEPTABLE COMMUNICATIONS TO CTMC.
10. ITS DEVICES INCLUDING: VARIABLE MESSAGE SIGNS, CLOSED CIRCUIT TELEVISION CAMERAS, TRAVEL TIME INDICATORS, DTD ATR'S, DOPPLER RADAR.
11. THE MANUFACTURER SHALL PROVIDE 8 HOURS OF CLASS ROOM TRAINING FOR CDOT AT THE CTMC IN GOLDEN, CO.
12. THE ETHERNET SWITCHES SHALL INTERFACE WITH EXISTING CIENA 5150 ETHERNET AGGREGATION SWITCHES LOCATED IN AN EXISTING REGENERATION NODE BUILDING, THE CTMC AND THE NEW CIENA 5150 ETHERNET SWITCHES 'CCMS-DSW-1X' IN THE BACKUP CONTROL ROOM.
13. THE CCMS SYSTEM SHALL HAVE THE CAPABILITY OF CHANGING DMS MESSAGES FROM THE BACKUP CONTROL ROOM AND THE CTMC.
14. THE LUS SHALL BE INTEGRATED INTO THE CDOT ATM SYSTEM.
15. THE BASIS OF DESIGN FOR THE MASS NOTIFICATION SYSTEM IS THE AXYS DURAN SYSTEM.
16. THE RAMP METERING SYSTEM, DMS, LUS, COMMUNICATIONS SYSTEM, SHALL BE INTEGRATED INTO THE CCMS.
17. THE PROJECT ITS SYSTEM SHALL BE INTEGRATED WITH THE COVER ITS SYSTEM.
18. EACH DELUGE VALVE VAULT WILL INCLUDE AN EMERGENCY CALL BOX.
19. ITS CONTROLS SHALL COVER THE ENTIRE 1000 FOOT SECTION OF THE TUNNEL ROADWAY.

Print Date: 4/24/2017 2:13 PM		Sheet Revisions			Colorado Department of Transportation	As Constructed	"INTERIM" ITS SYSTEM NETWORK OVERVIEW CONCEPT	Project No./Code
File Name: E028.DWG		Date:	Comments	Init.	2000 South Holly Street Denver, CO 80222 Phone: 303-757-9295 FAX: 303-757-9963	No Revisions:		FBR 0704-234
		04/24/17	FINAL FOR ESTIMATING			Revised:	Designer: RRU / Structure Numbers	19631
Staff Bridge Branch - Unit 0226 Unit Leader DDG	0000				Region 1 JKE	Void:	Detailer: TK	Sheet Number E028
							Sheet Subset:	Subset Sheets: of



NOTES:

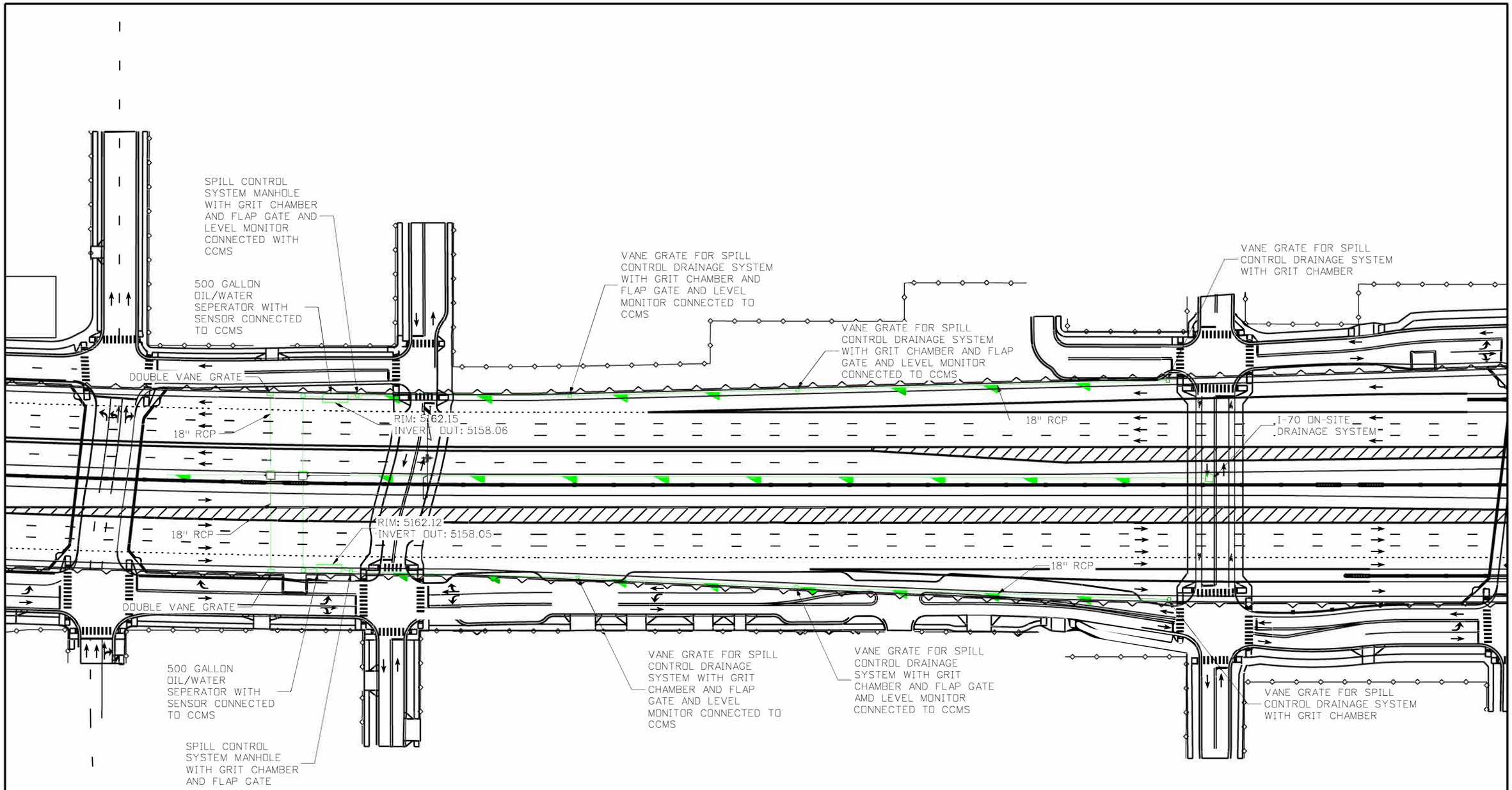
1. CCTV VIDEO FEEDS SHALL BE TRANSMITTED TO THE CTMC FOR BACKUP RECORDING. THE CCTV CAMERA IMAGES SHALL BE TRANSMITTED TO BOTH THE BACKUP CONTROL ROOM AND THE CTMC.
2. INTEGRATOR SHALL COORDINATE WITH STRUCTURAL FOR THE LOCATION OF CAMERAS AND MOUNTING EQUIPMENT.
3. DEVELOPER SHALL INTEGRATE THE CAMERAS INTO BOTH THE CCMS AND CTMC CAMERA VIEWING AND CONTROL SOFTWARE; CTMC CURRENTLY USES NICEVISION (QOGNIFY) CAMERA CONTROL AND VIEWING SOFTWARE. DEVELOPER SHALL PROVIDE A NICE (QOGNIFY) SOFTWARE SERVER AT THE CCMS FOR REAL-TIME CAMERA VIEWING AND CONTROL.
4. PAN, TILT AND ZOOM CONTROLS OF THE CCTV CAMERAS SHALL BE PROVIDED FOR BOTH THE BACKUP CONTROL ROOM AND CTMC.
5. CAMERAS SHALL BE MOUNTED OVER THE RUNNING LANES IN GROUPS OF THREE, THE MIDDLE CAMERA OF EACH GROUP SHALL BE A THERMAL CAMERA. ONE SHALL BE OVER THE RAMP LANE, ONE OVER THE CENTER OF GENERAL PURPOSE LANES AND ONE OVER THE TOLLED EXPRESS LANE.
6. THE BASIS OF DESIGN FOR THE CCTV CAMERAS SHALL BE BOSCH MIC SERIES AND SHALL MEET THE FOLLOWING TECHNICAL REQUIREMENTS:
   - PTZ DOME
   - WIPE WASH FACILITIES
   - CEILING MOUNT
   - THERMOGRAPHY, ANALYTICS AND ALARMS
   - ETHERNET BASED
   - IP-66 RATED
   - H.264 COMPRESSION WITH 16:9 ASPECT RATIO
   - COMPATIBLE WITH NICE VISION (QOGNIFY)
   - ONVIF COMPLITANT
7. CAMERAS SIGNALS SHALL BE TRANSMITTED TO THE BACKUP CONTROL ROOM (BCR) AND THE COLORADO DEPARTMENT OF TRANSPORTATION (CDOT) FOR BACKUP RECORDING. CAMERA SHALL COVER 100% OF THE COVER WHILE IN THE HOME POSITION WITH MINIMAL BLIND SPOTS.
8. CCTV CAMERAS SHALL BE CAPABLE OF OBSERVING AND RECORDING TRAFFIC AND PEDESTRIAN.
9. CCTV CAMERAS SHALL BE CAPABLE OF DETECTION, ANALYTICS FOR TRAFFIC FLOW SUCH AS: STOPPED VEHICLE, SPEED CONGESTION, WRONG DIRECTION, NO PACKAGE LEFT BEHIND.
10. THE BASIS OF DESIGN FOR VIDEO SYSTEM IS BOSCH MIC SERIES.

Print Date: 4/24/2017 2:13 PM	Sheet Revisions	Colorado Department of Transportation	As Constructed
File Name: E029-ALT1.DWG	Date: / Comments / Init.	2000 South Holly Street, Denver, CO 80222	No Revisions:
Staff Bridge Branch - Unit 0226 Unit Leader DDG	04/24/17 FINAL FOR ESTIMATING	Phone: 303-757-9295 FAX: 303-757-9963	Revised:
0008		Region 1 JKE	Void:

"INTERIM" VIDEO SYSTEM NETWORK OVERVIEW CONCEPT

Designer:	RRU	Structure Numbers	
Detailer:	TK		
Sheet Subset:		Subset Sheets:	of

Project No./Code	
FBR 0704-234	
19631	
Sheet Number	E029



Print Date: 5/24/2017
File Name: 13599HYDR_LID_CONTAINMENT_SYS.dgn
Scale: 1:100

5280 Connectors Linking I-70 Communities

Sheet Revisions		
Date:	Comments	Init.

Colorado Department of Transportation
CDOT
2000 South Holly Street
Denver, CO 80222
Phone: 303 757 9295 FAX: 303 757 9963
Region 1
JKE

As Constructed
No Revisions:
Revised:
Void:

I-70 COVERED LID DRAINAGE SPILL CONTAINMENT SYSTEM

Designer: J. CORONADO
Detailer: M. SCHWAB
Sheet Subset:
Structure Numbers
Subset Sheets: of

Project No./Code
FBR 0704 234
19631
Sheet Number DC-01

SECTION 2.1.15

APPENDIX H: DRAFT OPERATIONS MANAGEMENT PLAN

APPENDIX H: DRAFT OPERATIONS MANAGEMENT PLAN

As stated in Form B (Confidential Contents Index), this section has been redacted in accordance with Section 1.5 of the RFP and C.R.S. § 24-72-204.

SECTION 2.1.16

APPENDIX I: DRAFT MAINTENANCE MANAGEMENT PLAN

APPENDIX I: DRAFT MAINTENANCE MANAGEMENT PLAN

As stated in Form B (Confidential Contents Index), this section has been redacted in accordance with Section 1.5 of the RFP and C.R.S. § 24-72-204.

SECTION 2.1.17

APPENDIX J: DRAFT STRATEGIC COMMUNICATIONS PLAN

Overview

This Appendix J includes 5280 Connectors draft Strategic Communications Plan that addresses the requirements set forth in Schedule 14 (Strategic Communications), Sections 4, 5, 6, 7 and 8 of the Project Agreement.

It describes our approach to well-coordinated, two-way communications for each phase of the project, as detailed for each of the following:

- Construction Period Communications Plan (CPCP)
- Maintenance and Operations Communications Plan (MOCP)
- Crisis Communications Plan (CCP).

Highlights

Our Strategic Communications Plan:

- Supports the Colorado Department of Transportation (CDOT) goal of communicating a sense of caring and inclusion to all identified stakeholders
- Is designed to retain the public's trust in CDOT
- Promotes transparency and collaboration
- Incorporates expectations of the Envision program
- Is flexible and tailored with adaptable outreach:
  - Is multilingual
  - Uses technology and personalized communication platforms
- Maintains two-way communications
- Includes mechanisms to vet key public issues and concerns, and incorporate concerns into the Maintenance of Traffic (MOT) and other plans.

5280 Connectors commit to a proactive, customized public relations solution to minimize disruptions and enhance two-way communication.

Appendix J

Draft Strategic Communications Plan

Central 70 Project

Volume 2
Technical Proposal

June 1, 2017

Contents

Figures

1.0 Purpose

The goal of our Strategic Communications Plan is to ensure well-coordinated stakeholder awareness through the full Project life cycle, to disseminate accurate Project Information, and to provide support to CDOT in proactively managing issues and responding to requests for information.

The following set of guiding principles will be the foundation of all communications for the Project:

Figure 1 | Guiding Principles for Strategic Communications Plan

Guiding Principles for Strategic Communications Plan
Two-way. Dissemination will be complemented by ensuring receipt and understanding of information, as well as providing the opportunity for feedback and questions.
Customer-focused. We will make sure communication messages are customized to the varied audiences so they are accessible and easily understood.
Relevant. We will make sure that communication is to-the-point and directly relevant to those who receive it.
Responsive. We will make sure that responses to concerns raised are provided in a timely manner.
Proactive. We will make sure that a variety of communication methods are used to keep people informed.

Specifically, 5280 Connectors will prepare and maintain an overall Strategic Communications Plan consisting of the Construction Period Communications Plan (CPCP), Maintenance and Operations Communications Plan (MOCP), and Crisis Communications Plan (CCP) to ensure well-coordinated two-way communications during each phase of the Project. Each plan will include planned communications strategies; primary stakeholder communications lists; and identification of any Public Information (PI) issues and proposed outreach.

2.0 Reference Documents

The following reference documents form the basis of this plan's structure:

- Central 70 contract documents
  - Project Agreement, Schedule 14, Secion 4
  - Instructions to Proposers

3.0 Abbreviations and Definitions

BIM	Building information modeling
CCP	Crisis Communications Plan
CNMMP	Construction Noise Mitigation and Monitoring Plan
CPCP	Construction Period Communications Plan
DBE	Disadvanged business enterprise
ESR	Environmental Status Report
FEIS	Final Environmental Impact Statement
MOCP	Maintenance and Operations Communications Plan
NWC	National Western Center
PCCP	Portland Cement Concrete Pavement
PCM	Project Communications Manager

PI Public Information

TMP Transportation Management Plan

4.0 Approval Process and Procedure

Each plan will be submitted to the Colorado Department of Transportation (CDOT or Department) for approval according to the timelines provided in Figure 2 below:

Figure 2 | Strategic Communications Plan Approval Process

Deliverable	Information, Acceptance or Approval	Schedule
Developer's Communications Team Details	Information	Prior to the issuance of NTP 1. Updates submitted quarterly during the Construction Period, annually during the Operating Period and otherwise as required
Public Involvement Services Contact Sheet	Information	Prior to the issuance of NTP 1. Updates submitted annually and otherwise as required
Stakeholder Distribution List	Acceptance	Prior to the issuance of NTP 2. Updates submitted annually
Construction Period Communications Plan (CPCP)	Approval/Acceptance	Prior to the issuance of NTP 1 for approval Updates submitted annually for acceptance
Maintenance and Operations Communications Plan (MOCP)	Approval/Acceptance	Prior to Substantial Completion for approval Updates submitted annually for acceptance
CPCP Quarterly Report	Acceptance	10 working days after 90 calendar days after issuance of NTP 2; quarterly thereafter
MOCP Quarterly Report	Acceptance	10 working days after 90 calendar days after Substantial Completion; quarterly thereafter
Crisis Communications Plan (CCP)	Approval/Acceptance	Prior to the issuance of NTP 1 for approval Updates submitted annually for acceptance
Emergency Response Communications Tree	Acceptance	Prior to the issuance of NTP 1
Traffic Alerts/Media Releases	Acceptance	Weekly by Thursday at 10:30 a.m.
Lane Closure Reports	Information	Weekly by Thursday at 10:30 a.m.
Newsletters	Acceptance	Five working days prior to scheduled monthly distribution date during the Construction Period
Project Identification Sign Layout	Acceptance	To permit installment by 14 calendar days following the issuance of NTP 2
Flyers, Posters or other Public Material	Acceptance	As needed, five working days prior to the scheduled distribution date or, in cases of rapid response, 48 hours prior to distribution
Photos	Acceptance	Two per week or as requested Aerial photographs annually during the Construction Period Post-event photography within 72 hours or as agreed upon
Video	Acceptance	One annually or at key project milestones
Social Media Posts	Acceptance	As needed, one working day in advance of inclusion on social media or as agreed upon prior to an event
Web Page Content	Acceptance	Weekly or as often as reasonably required, two working days in advance of inclusion on the website

5280 Connectors will monitor and improve the effectiveness of each plan and resubmit for acceptance annually upon the anniversary of the initial approval by the Department or whenever the following conditions exist:

- A plan or procedure no longer adequately addresses the matters it was originally intended to address
- A plan or procedure does not conform to the requirements of this Agreement
- An audit by 5280 Connectors or the Department identifies a deficiency requiring an update
- Organizational structure changes require revision to a plan.

We will clearly identify in a cover sheet what changes were made in each update to expedite the Department's review. Also, a red line and a final copy shall be provided.

5.0 General Responsibilities

5280 Connectors will collaborate with the Department to develop key messages related to Construction Work and Operations and Maintenance (O&M) Work activities. The Department will have final approval before the messages are disseminated. In general, the responsibilities between us and the Department are shown in Figure 3 below:

Figure 3 | Responsiblities of the Department and 5280 Connectors

Department Responsibilities	5280 Connectors Responsibilities
The Department is responsible for communicating overall vision on the Project including why the Project is needed, what Work will be done, how the Project will benefit customers, how the Project fits into the community, and how the Project fits into broader transportation plans. The Department will communicate the overall purpose of, implementation of, and education on how to use the Tolled Express Lanes.	Our team is responsible for communicating overall coping information during the Construction Period and the Operating Period including details about the Transportation Management Plan (TMP), and other activities that affect residents and businesses.

5.1. Government Relations

Throughout the Contract Term, all communication requests received by us from Governmental Authorities will be immediately referred to the Department (not including those requests related to Project management or coordination for Local Agency Permits). Our team will assist in giving timely information to the Department regarding construction activities and will participate in meetings as requested.

5.2. Media Requests

We will make project managers, supervisors, and other area experts available to the Department for assistance in media requests. We will assist in media site visits and adhere to media deadlines when possible.

We will also provide media training to project managers, supervisors and other area experts prior to fulfilling media requests to ensure that key messages are delivered accurately and consistently.

6.0 Construction Period Communications Plan (CPCP)

Successfully delivering a project of the size, complexity and importance of Central 70, requires significant interface and robust transparent communication with a wide range of stakeholders.This involves direct engagement with many regulatory agencies, utilities and other project stakeholders prior to the Construction Period and beyond. An overview of those stakeholders is shown in Figure 4 below:

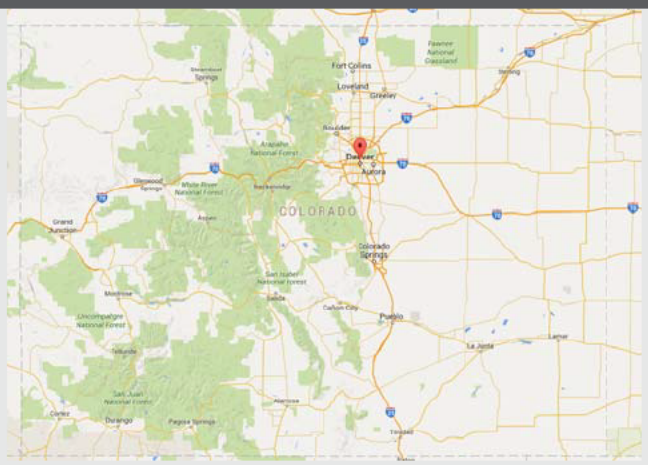
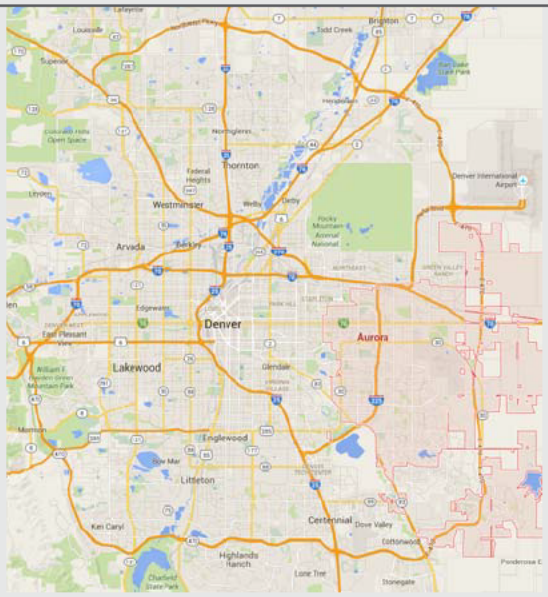
Figure 4 | Project Stakeholders

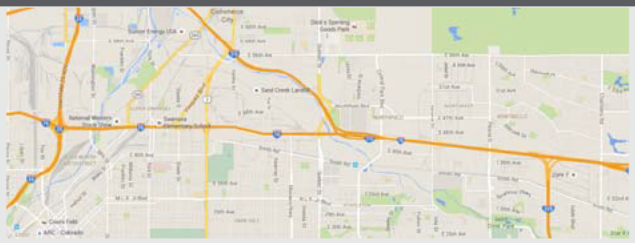
Stakeholder Groups	
Area Residents	
Businesses	
City and County of Denver (CCD)	
Denver public schools, Swansea Elementary School	
Commuters and the traveling public	
Union Pacific Railroad (UPRR), Burlington Northern Santa Fe (BNSF) and Denver Rock Island Railroads	
Registered Neighborhood organizations and associations	
Denver International Airport	
Regional Transportation District (RTD)	
Delivery services	
Taxis, shuttles and rental car companies	
Disadvantaged business enterprises (DBEs) and emerging small businesses	
Tourist destinations and organizations	
Emergency response agencies such as the Colorado State Highway Patrol, and local police, sheriff and fire departments, ambulance service providers and hospitals	
Commercial vehicle operators, Ports of Entry, Denver Permit Office, and Colorado Motor Carriers Association	
National Western Center Denver Coliseum	
Utility Agency Owners	**Regulatory Agencies**
Denver Water	Federal Highway Administration (FHWA)
Denver Wastewater	Colorado Department of Health and Environment (CDPHE)
Metro Wastewater	Environmental Protection Agency (EPA)
Aurora	Federal Emergency Management Administration (FEMA)
Xcel (gas and electric)	Urban Drainage
Century Link	
Zayo	
AT&T	
Denver Fiber	
Comcast	
Level 3	
Sprint-MCI	
Nustar	
Phillips 66	

The Project Communications Manager (PCM) will be responsible for continuance of the Public Information program currently underway and will be the principal point of contact during the design and construction phases of the Project. 5280 Connectors will provide strategic communication elements as described in Schedule 14 of the Project Agreement.

Our Communications Plan is summarized into three tiers, as shown below in Figure 5. This summary has a focus on traffic, but will be used for general updates on the project, as well.

Figure 5 | Three Tier Communication Strategy

	Graphic (map showing area affected)	Strategy	Specific Strategy Examples	People You Can Reach
1. Statewide		Develop a regional approach to communicating traffic delays and allow drivers to select alternate routes well in advance of the project	• Place flyers at welcome centers on I-70, I-25 and I-76 • Utilize existing DMS where necessary to report traffic times and facilitate wayfinding in advance of the project • Partner with CDOT to use already existing social media interfaces to reach wide stakeholders	Locals Tourists Truckers Business travelers Commuters Delivery Services Taxis, busses shuttles Emergency response
2. Regional		Host open meetings prior to major traffic shifts and invite affected businesses to attend	• Host meetings for the busing companies, specifically focusing on routes from Denver International Airport to downtown Denver • Use Construction Tools to provide detours and updates on construction and inform of the temporary entrance for customers attending the National Western Stock Show • Participate in construction traffic control coordination meetings with adjacent CCD and CDOT projects	

	Graphic (map showing area affected)	Strategy	Specific Strategy Examples	People You Can Reach
3. Local		Communicate traffic shifts and potential delays	• Provide door-to-door flyers in the communities • Partner with CDOT to use already existing social media interfaces to reach local stakeholders • Partner with CDOT to utilize already existing website to interface with local stakeholders • Present exhibits of the revised configuration including alternate routes, potential congestion points, accesses to businesses	

6.1. General Requirements

Our team will maintain a CPCP that develops two-way communication of Project Information with the public. We will use the CPCP throughout the duration of the Construction Period to manage and implement the PI process. The CPCP will be submitted to the Department for approval prior to the issuance of NTP 1.

For a Communications Plan to be successful, it is essential that qualified people, possessing in-depth knowledge of the Project, are the first points of contact and control, to the greatest extent possible, the messaging surrounding the Project. This is a requirement for the public relations personnel for both 5280 Connectors and the Department.

Each of the individuals identified below will participate on behalf of our team in actively supporting the implementation of the Strategic Communications Plan. Individual time contribution will vary through the various stages of the Term and will be dynamic in response to public communications requirements. Project Communications Manager, Marta Sipeki has been extensively media-trained and will be available to address and respond to issues and concerns during the Construction Period and Operations Period as required.

Figure 6 and Figure 7 outline our Communications Team:

Figure 6 | Strategic Communications Construction Organization Chart

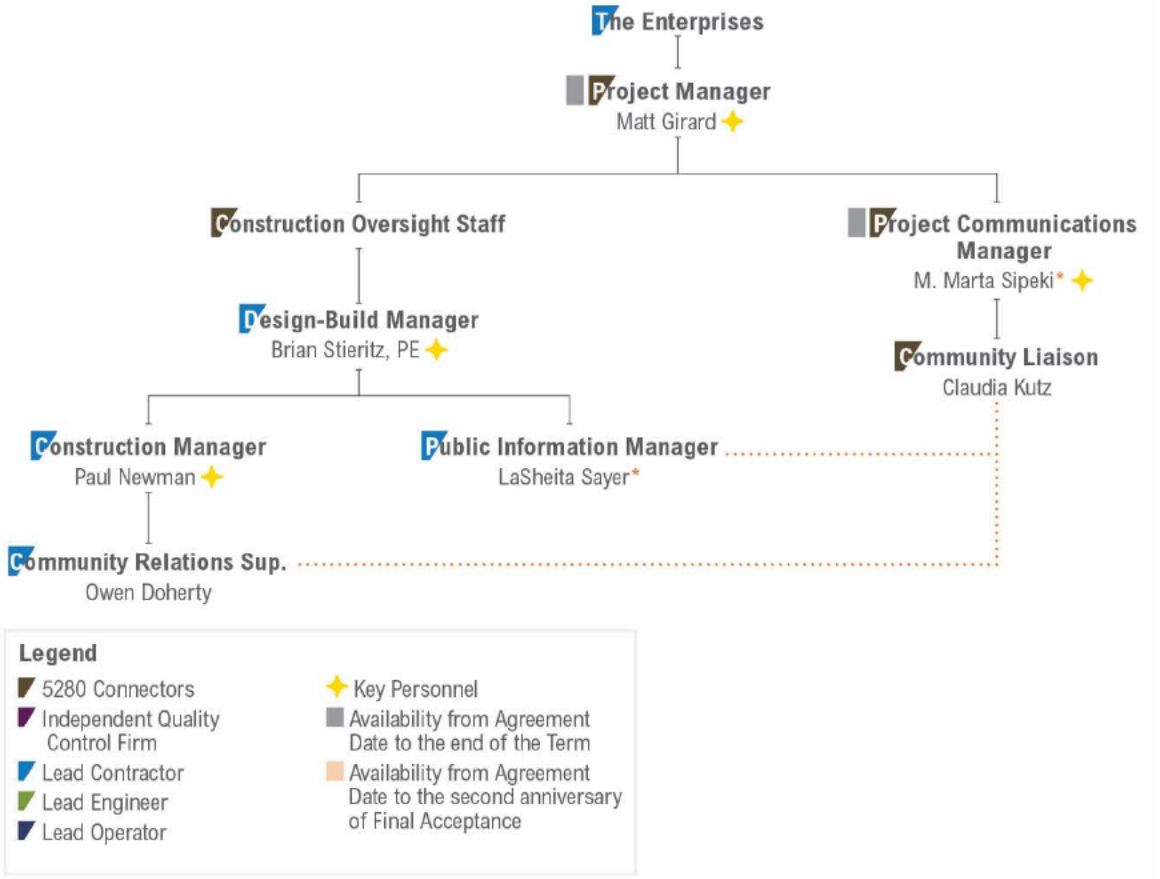


Figure 7 | Strategic Communications Team Members

Name	Project Role	Qualifications
Marta Sipeki	Project Communications Manager	A senior communications professional with more than 25 years of award-winning experience in public relations, media relations, marketing, community relations and special event management. This includes nearly 10 years on transportation projects, including Public Information, public outreach, transit research and project management.
Claudia Kutz	Community Liaison	A senior communications professional with over 15 years of experience and degrees in Business Administration and Public Administration. Consultative, bilingual communicator (English/Spanish) with diplomatic relationship and facilitation skills. Analytical, detail-focused, and organized, with strong community engagement, process and program management, and problem-solving skills.
Owen Doherty	Community Relations Superintendent	Experienced superintendent with 10 years' field experience and previous experience engaging with stakeholders and community members to promote the project planning efforts. Knowledge of MOT and traffic operations.
LaSheita Sayer	Public Information Manager	A senior communications professional with 18 years' marketing communications and project management experience to direct and lead a diverse team of creative talents in Public Outreach, involvement and Relations for publicly funded construction projects. LaSheita has specialized training in strategic planning, project management, crisis communication, public speaking and internet marketing.

6.2. Community, Government and Business Stakeholders

We will use a variety of strategic PI approaches, as listed in Figure 8, and tools to ensure that stakeholders have accurate information about the Project schedule, progress and construction impacts, as well as address issues as they arise.

Figure 8 | Stakeholders Communication Platform

	Phone/ Email	E-Blasts	Public Meet-ings	Tele-phone Town Halls	Social Media & Website	News Media	Signage/ Lane Closure Reports	Tours/ Events	News-letters	Collateral	Hot-line	Alert Apps
Area Residents		•	•	•	•	•	•		•	•	•	•
Area Businesses		•	•	•	•	•	•		•	•	•	
Neighborhood Associations		•	•	•	•	•	•	•	•	•	•	
Community Organizations		•	•	•	•	•	•	•	•	•	•	
Schools	•	•		•	•	•	•	•	•	•	•	
Property Owners & Property Mgmt Companies		•	•	•	•	•	•	•	•	•	•	
Transportation Organizations		•		•	•	•			•			
Denver Int'l Airport		•		•	•	•	•		•		•	
National Western Center		•	•	•	•	•	•		•	•	•	
RTD		•	•	•	•		•		•		•	
Traveling Public				•	•	•	•				•	•
Local Governments	•		•	•	•	•	•	•	•		•	•
Regional Governments	•		•	•	•	•	•	•	•		•	•
State Government	•		•	•	•	•	•	•	•		•	•
Federal Government	•		•	•	•	•		•	•		•	•
Delivery/Courier Services	•	•		•	•	•	•		•		•	•
Taxis, Shuttles, Rental Car Companies		•	•	•	•	•	•		•		•	•
Commercial Vehicle Operators		•		•		•	•		•	•	•	•
Ports of Entry	•	•				•	•		•	•		
Colorado Motor Carriers Assn		•		•		•	•		•	•	•	•

	Phone/ Email	E-Blasts	Public Meet-ings	Tele-phone Town Halls	Social Media & Website	News Media	Signage/ Lane Closure Reports	Tours/ Events	News-letters	Collateral	Hot-line	Alert Apps
Emergency Response Agencies	•	•				•	•		•	•	•	•
Tourist Destinations		•		•	•	•			•	•		
CDOT	•	•		•	•	•	•		•	•	•	•
DBE/SBE		•		•	•	•			•	•		
Utilities		•		•		•	•		•	•	•	•
Railroads		•		•		•	•		•	•	•	•

Certain PI strategies will be tailored for the individual stakeholders listed above. Figure 9 below specifies which approaches and tools will be used to disseminate information. We will use the Department's database established during the Final Environmental Impact Statement (FEIS) to continue to build upon our outreach program.

Figure 9 | Stakeholders Public Information Strategies

	Project Stakeholder Groups	Tailored PI Strategies	Approaches/Tools	Specific Organizations
i	Area Residents	• C-70 After-Hours Monthly Progress Meetings mirroring a chamber after-hours format (we hold this business meeting every 3rd Tuesday evening in our office) • Evening HOA meetings. Conduct surveys on the communications residents would like, how often, and become regular contributors to HOA newsletters • Monthly newsletter C-70 and You, C-70 Near You, etc. will push regular project content to newsletter editors. • Access the HOA lists from City and County of Denver website	• Coping messages shall provide stakeholders with information needed to make short- and long-term decisions on dealing with the Construction Work and O&M Work during construction with minimal disruption. • Coping strategies will also allow stakeholders to determine their preferred method of plugging into the project via multiple information tools available. Tools may include, but are not limited to Project website, social media platforms, e-blasts, newsletters (print and electronic), letters, flyers, posters, mobile apps, PowerPoint presentations, telephone, hotline, telephone town halls, public meetings, door hangers, etc. • Information available in Spanish and other languages as needed.	Globeville, Elyria, Swansea, Montebello, Denver City, Brighton Blvd. Corridor, Stapleton, River North (RiNo), National Western Center complex
ii	Local and Regional Business Owners, Employees and Customers	• Coordinate with local chambers for membership and communication along the corridor. • Include business contacts along the	• Provide short- and long-term construction plans, and access signage. • Identify ambassadors	Adams County Economic Development, Aurora Chamber of

	Project Stakeholder Groups	Tailored PI Strategies	Approaches/Tools	Specific Organizations
		corridor for our C-70 After-Hours Monthly Progress Meetings • Upon award, one-on-one meetings with strip malls, larger warehouses, shopping centers and all major employers along the corridor. Outreach to HR departments for employee brown bag lunch-and-learn meetings.	• Invite, empower and work with businesses to create a network for information sharing. Schedule periodic update presentations to various chambers. • Design corridor specific maps on website that can be downloaded and which highlight closed ramps and detours. • Encourage business owners to educate their vendors/suppliers about construction and detours. • Encourage employers to offer employees flex hours to decrease travel time ▪ Encourage carpooling and ridesharing to reduce congestion	Commerce, Aurora Economic Development Council, Colorado Women's Chamber of Commerce, Denver Metro Chamber of Commerce, I-70 Corridor Regional Economic Development Corp., Denver Hispanic Chamber of Commerce, Colorado Black Chamber of Commerce
iii	Local Community Organizations	• Hold meeting with organization leadership • Attend organization events	• Discuss issues with leadership • Project Information handouts • Provide regular project updates	Globeville, Swansea and Elyria Citizens Advisory Groups
iv	Local Schools	• Develop key messaging for safety, schools and construction, cone zones, what to do, who to call. • Develop science, technology, engineering and mathematics (STEM) school lesson plans on the Cover, congestion, environment, traffic management, construction planning curriculum, etc. for students to enroll in a 9-month elective course. • Collaborate with local trade schools and Junior Achievement programs for training and career opportunities.	• Dedicate PI personnel to work with schools to deliver presentations and collateral information to reach students, faculty, staff, parents and neighbors. • Teach children about construction zones and inform their parents to drive safely and slowly through work zones.	Swansea Elementary, Garden Place Elementary, Cole Middle School, Bruce Randolph Middle School and several other potential schools near the corridor. Consider custom outreach to blind and hearing impaired children and adults if applicable.
v	Property Owners and Management Companies	• Establish regular network and presentations for apartment managers and residential HOA's	• Develop custom newsletters to communicate with these groups	
vii	Transportation Management/Advocacy Organizations	• Partner for newsletters, possible funding, reciprocate content and cross-promote.	• Provide support communications materials already produced and custom messages, as needed	I-70 Coalition Sand Creek Greenway Stapleton Area Transportation Management Authority (TMA) EGo Carshare, etc.
viii	Denver International Airport (DIA)	• Work with DIA PR department for news releases and daily impacts.	• Set up Kiosk/Collateral on-site near information booth and update bimonthly. • Advertise smart phone app in the airport. • Set up Traveler Report	

	Project Stakeholder Groups	Tailored PI Strategies	Approaches/Tools	Specific Organizations
			Centers in rental car agencies and private parking lots. • Dedicate Message sign, accessible from computer, to change messaging (VMS) located on the airport exit road advising of specific daily and nightly detours, impacts and alternate routes, with anticipated travel times.	
ix	National Western Center (NWC)	• Work with NWC management and assigned PI firm for North Denver Cornerstone Collaborative (NDCC) to collaborate on effective messaging opportunities at key public events and with key stakeholders	• Booths at all Stock Show events in January. • Insert in Stock Show program with map, details, and timelines for construction and project website. • Regular coordination PI meetings with City and County of Denver. • Weekly Task Force meetings to compare and plan work.	
x	Regional Transportation District (RTD)	• Work with RTD management and PI team to collaborate on effective messaging	• Inclusion in internal and external RTD communications. • Provide regular facts presentations and snacks to employees. • Present to RTD board at regularly scheduled meetings. • Deliver regular content weekly for all RTD internal and external publications. • Support regular communications with RTD dispatch of weekly Lane Closure Report and traveler report.	
xi	Traveling Public	• Travelers are a major audience; therefore, the goal is to mitigate the negative effects of road construction and keep travelers informed of detours or delays along the Central I-70 corridor and network levels (I-25), parallel corridors of I-270 and I-76 and alternative neighborhood routes. A traveler may be reached pre-trip or en route.	• Traveler reports, radio, billboards, VMS signs, smartphone application, brochures at truckstop information stations, rest areas, newsletter e-blasts, collect traffic delay data for media purposes, public opinion surveys will help to identify when to adjust the campaign to address changing conditions or degrees of effectiveness	Transportation reporters at TV and radio stations, transportation bloggers, emergency responders, planned special sporting events and hazmat transportation routes
xii	Local, Regional and State Government Officials	• Work with area mayors, city councils, state and federal representatives to keep them informed of the project's	• Write and produce regular feature articles for city and county newsletters.	Denver Mayor and City Council Commerce City Mayor and City Council,

	Project Stakeholder Groups	Tailored PI Strategies	Approaches/Tools	Specific Organizations
		progress.	• Send letters to congressional and state representatives. • Host one-on-one meetings. • Host legislative briefings and tours on the corridor when appropriate. • Make presentations to government bodies as needed.	Local, state, federal representatives Federal Highway Administration (FHA) Environmental Protection Agency (EPA) US DOT and CDOT
xiii	Delivery and Courier Services	• Develop an extensive list, offer regular update meetings, invite to business after-hours meetings, add to distribution lists.	• Coordinate with CDOT to post on CDOT website additional outreach and updates weekly, or as needed.	List TBD.
xiv	Taxis, Shuttles and Rental Car Companies	• Add to database for weekly distribution.	• After NTP 1, schedule meetings for preferred communication methods with all local taxi, shuttle and rental car companies. • Develop and distribute information.	*Not an extensive list, but including:* • Taxis: Metro, Yellow, Union, Freedom, Uber, Lyft, etc. • Shuttles: Colorado Mountain Express, Denver's Airport Transportation, eTuk Ride, Peak I Express, etc. • Rentals: Avis, Budget, Enterprise, Hertz, etc.
xv	Commercial Vehicle Operators, Ports of Entry, Denver Permit Office and Colorado Motor Carriers Association	• Work with CDOT TOC to post regular updates on CDOT website and permitting office, and changes to traffic configurations as needed.	• Distribute direct mail flyers to trucking companies, use trucking industry newsletters and CB radio network. • Send frequent notices alerting leadership to inform drivers, establish a highway advisory radio drivers can tune to, employ dynamic message signs and reports on dedicated radio and TV stations.	Colorado Motor Carriers Association, Ports of Entry, Denver Permit Office
xvi	Emergency Response Agencies such as the Colorado State Highway Patrol, Local Police, Sheriff and Fire Departments, Ambulance Service Providers and Hospitals	• Attend Emergency Responder Coordination meetings and update groups as frequently as possible.	• Prepare reports and supply information. • Offer PowerPoint presentations to meetings.	Colorado State Highway Patrol, Local Police, Sheriff and Fire Departments, Ambulance Service Providers and Hospitals
xvii	Tourist Destinations and Organizations	• Work with local and state groups to push information to travelers entering the State via Denver International Airport (DEN) or Highway.	• Deliver and post frequent information about project progress, delays or detours to visitor centers, airport	Local chambers of commerce, ski associations, State Tourism Board, Visit

	Project Stakeholder Groups	Tailored PI Strategies	Approaches/Tools	Specific Organizations
			kiosks, airline offices, and car rental businesses.	Denver, etc.
xviii	Colorado Department of Transportation (CDOT) Employees and other Internal Team Members, including CDOT Headquarters, the Office of Communications and the Government Relations Office	• Frequent collaboration between 5280 Connectors' project managers, supervisors and PI team with CDOT's leadership and PI team to ensure effective communication of project progress and issues along the corridor, so CDOT has up-to-date information to respond to constituent inquiries.	• Staff and one-on-one meetings and presentations to encourage CDOT employees to stay updated with progress on the CDOT website, and to partner on outreach strategies and unique perspectives.	CDOT employees and other internal team members, including CDOT Headquarters, the Office of Communications and the Government Relations Office
xix	Disadvantaged Business Enterprises and Emerging Small Businesses	• Coordinate PI activities with DBE/ESB outreach functions to provide an integrated platform of communication and Project Messaging	• Outreach communication modes (Advertisements, internet, agency websites) • Booths, industry event setups and collateral.	• See Small and DBE Participation Plan
xx	Utility Owners	• Work with major utility stakeholders to minimize relevant issues which may arise as a result of the construction project.	• Communicate frequently prior to, during and after construction to ensure no interruption in service as a result of the construction	XCEL, Denver Water, City of Aurora, Cable Companies, Comcast, Sprint, Verizon, AT&T, etc.
xxi	Railroads (RR)	• Work with major RR leadership and PR departments to collaborate on communication to mitigate any interruption of service of RR lines near or parallel to the I-70 corridor.	• Host personalized meetings and tabletop discussions to review geography of project and potential areas of cross over.	BNSF and UPPR establish contact for communication.
xxii	Special Event Coordination	• Create master schedule for major sporting events that generate significant traffic and require access from I-70.	• Encourage professional sports organizations to alert their patrons of potential construction delays on I-70 and to plan accordingly. • Update these organizations on construction progress and delays with direct mail, e-blasts, one-on-one meetings, newsletters, etc.	Denver Broncos, Colorado Rockies, Denver Nuggets, Denver Avalanche, CU Football and Basketball, Colorado Rapids, Dick's Sporting Stadium, etc.

6.3. Key Communication Topics

5280 Connectors recognizes the importance of collaborating with the Department to ensure a seamless and comprehensive communications approach. Upon being selected Preferred Proponent, we will consult with the Department to establish, in addition to the Communications Working Group, a Communications Plan based on the Guiding Principles outlined above. We have various key communication topics at our disposal.

6.4. Coping Strategies

Our coping strategies are detailed in Figure 9 above. We will develop and implement community and business relations strategies that communicate coping messages to stakeholders. All coping messages will focus on providing stakeholders with the information they need to make short- and long-term decisions about how they can deal with the Construction Work and O&M Work during construction with as little disruption as possible.

6.5. Environmental Information

Included in our plan is our approach for coordinating any environmental mitigation requirements as provided in Schedule 17 (Environmental Requirements), as it pertains to stakeholders referenced in the CPCP. This ensures that stakeholders are aware of and participate in those areas where appropriate. For the measures representing the principal disciplines subject to the compliance or mitigation requirements that potentially affect the Project, please see Figure 6 of the Environmental Compliance Work Plan (see Appendix M).

The Environmental Compliance Manager Matt Zoss will provide monthly, no later than 10 working days after the reporting period, the Environmental Status Report (ESR). This report will be in accordance with Schedule 17 Environmental Requirements and available via the Project website. The Environmental Compliance Manager, the Environmental Engineer and the Department, will review the results of all PM-10 monitors, as specified in Schedule 17 Environmental Requirements, and together will select data to be uploaded to the Project website as specified in Schedule 17 Environmental Requirements.

The Environmental Engineer will collect and submit PM-10 and meteorological data to the Department in an electronic format. This data submittal is for the purpose of posting on the Project website and is separate from the reporting requirements under Schedule 17, Section 10.1.4. Data for each 24-hour period will be submitted to the Department prior to the end of the following working day. The data will be submitted in a format that allows the Department to review the data and post selected data in a manner specified by the Department.

The PM-10 data shall be submitted in the following formats:

- Actual data for each individual reading
- The 8-hour running average
- The average for each 24-hour period
- Meteorological data will include temperature, humidity, wind speed, and wind direction for each reading
- The results of the PM-10 monitor calibration will be included in the data submittal.

6.6. Noise

5280 Connectors will detail its plan for noise mitigation and monitoring in our Construction Noise Mitigation and Monitoring Plan (CNMMP), which will incorporate mitigation measures outlined in the FEIS and Record of Decision (ROD). Our plan for communicating the scheduling of high noise events, as well as temporary and permanent noise wall construction with individual property owners and impacted communities, includes the following:

- Pile driving
- Demolition – bridge and roadway
- Soil nail installation
- Mass earthwork
- Dowel mag drilling
- Pressure blasting
- Paving – Portland cement concrete pavement (PCCP) and asphalt.

A temporary noise and curtain wall will be placed on the south side of Swansea Elementary to eliminate noise from below surface construction activities and will restrict visibility to construction activities at the school location. As required, blockouts will be provided for students to view construction activities safely.

Permanent noise walls will be installed along the north side of the I-70 from the Union Pacific Railroad (UPRR) to Brighton Blvd.

During our monthly business meetings, we will also add an agenda item regarding construction of upcoming temporary and permanent noise wall construction.

For high decibel noise activities, our team will send out flyers two weeks prior to beginning construction to the impacted community members. Information in the flyers will include the schedule, an explanation of the work, and our PI hotline.

During extremely high decibel activities such as pile driving, vibration monitoring devices will be used if the decibel rating is anticipated over 100 dBa.

6.7. Access to Local Schools

We will develop a plan for coordinating with Denver Public Schools, and all schools within close proximity of the Project, including Swansea Elementary School, Garden Place Elementary and Bruce Randolph Middle School. A few of our strategies for interacting with each school are shown in Figure 10 below:

Figure 10 | Strategies for Local Schools

School	Plan (information pulled from coping strategy plan)
Swansea Elementary School	• Develop key messaging for safety, schools, construction, and cone zones; include what to do and who to call. Dedicate PI personnel to work with schools to deliver presentations and collateral. • Develop school lesson plan, including The Lid, Congestion, Environmental, Traffic Management, Construction Planning curriculum for young students to enroll in a 9-month elective course. • Meet prior to beginning nearby work to share/comment on our detour plan. Provide a follow-up meeting for all parents and teachers addressing their comments and presenting our approved plan. • Conduct quarterly follow up meetings with the principal and teachers. We will address our schedule, any changes to the current detour, and allow for any questions and concerns to be addressed.
Garden Place Elementary	• Develop key messaging for safety, schools, construction, and cone zones; include what to do and who to call. Dedicate PI personnel to work with schools to deliver presentations and collateral.
Bruce Randolph Middle School	• Develop key messaging for safety, schools, construction, and cone zones; include what to do and who to call. Dedicate PI personnel to work with schools to deliver presentations and collateral.
Other Denver Public Schools	• Send out flyers to other neighboring schools that may be impacted by detours or traffic control to notify them of upcoming traffic control changes, detour routes and any impacts to bus/pedestrian routes.

Maintaining access around Swansea Elementary is a critical function of the Central 70 Project. 5280 Connectors has developed a clear understanding of commitments and requirements regarding the school. The critical functions that will require communications include but are not limited to:

- School bus routes and drop off locations for students
- Existing pedestrian walkway and walkways during and following completion of construction
- RTD Bus Routes and Bus Stops for school employees
- Requirements for construction adjacent to the school and on Columbine/Clayton during the summer months
- Access for vehicles and pedestrians across the new I-70 alignment and the UPRR.

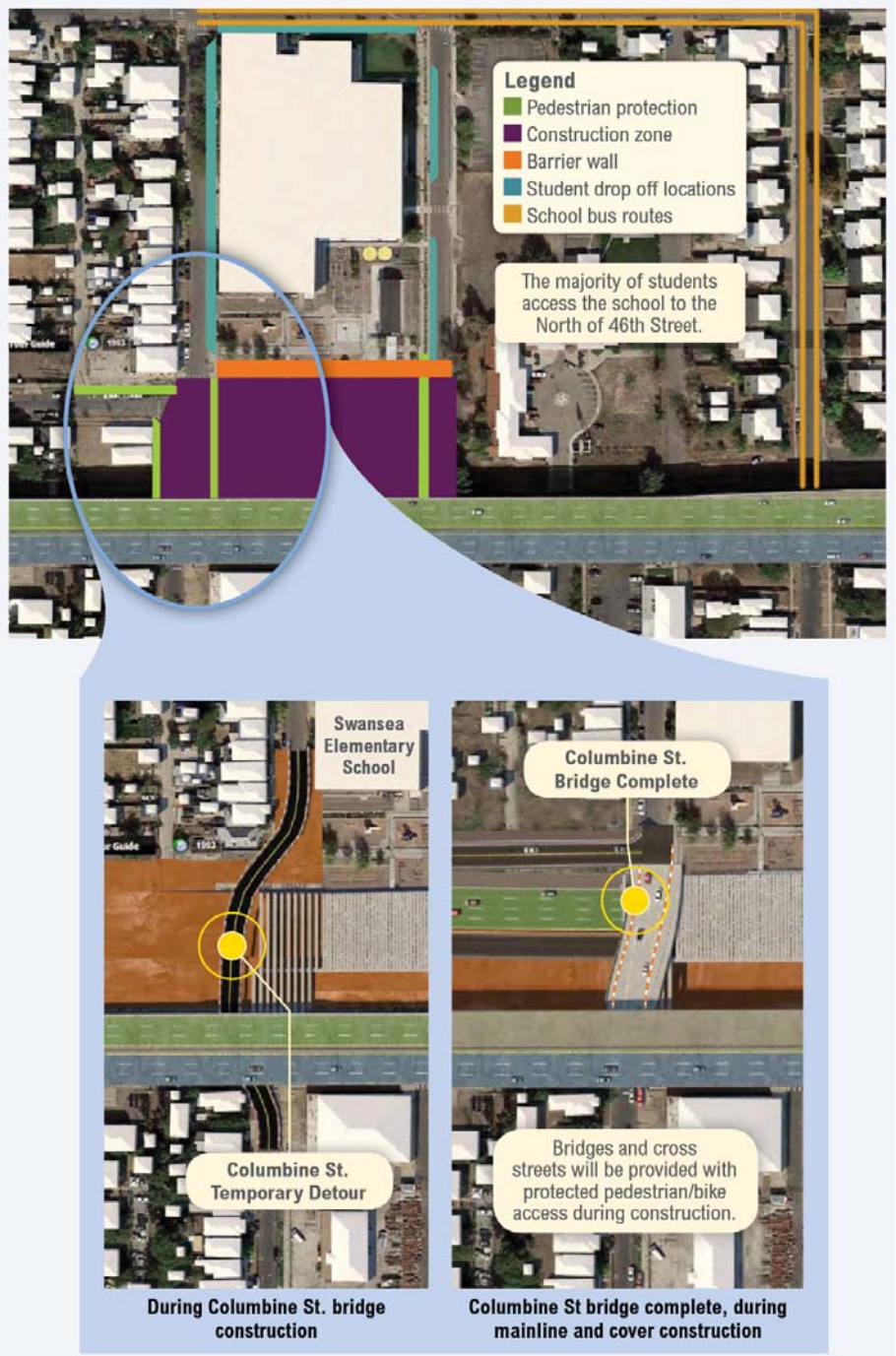
To adhere to and, in many cases, provide enhanced solutions to the requirements set forth, we will use the following communications tools:

- Provide quarterly updated detour route maps, pedestrian and bicycle access maps to the elementary school advising of all routes, street closures and changes
- Provide quarterly updated detour route maps, bus routes, stops and drop off locations to RTD and school buses advising of all routes, street closures and changes

- Install temporary sidewalk signing and striping as well as variable message boards to notify of upcoming traffic changes
- Deliver presentations each semester at the school to discuss forthcoming construction activities in the vicinity.

An example of the map to be distributed to Swansea Elementary School to be communicated to parents and school buses is shown in Figure 11.

Figure 11 | Swansea School Map for Parents



6.8. Access to Transit and Pedestrian and Bicycle Routes

5280 Connectors Traffic Management Plan (see Appendix F) addresses a detailed approach to transit, pedestrian and bicycle movements. The strategy revolves around maintaining access to trails, sidewalks, bus stops and not impacting existing RTD routes. When presented with a situation where it is not possible to maintain access or a route in its current condition due to construction access, we intend to replace an equivalent route or device in kind. This approach and solution shall be coordinated with CCD and the Denver Public Schools Department of Transportation and approved by the Enterprises.

6.8.1. Communication Strategies for Maintaining Access to Bicycle and Pedestrian Routes

- Provide updated trail detour, pedestrian and bicycle access maps to the local community advising of all routes, street closures and changes to trails and sidewalks as needed.
- Our team meets all requirements of the Americans with Disabilities (ADA) Act for all Construction Work that impacts existing trails, pedestrian facilities.
- New routes and detours will be communicated via flyers to the local community and posted on the Project website.
- Community outreach meetings to be conducted in advance of major alterations to existing routes including the local community and parks and recreation group as needed. Maps of new routes to be made available at the Denver Parks & Recreation office.

6.9. Communication Strategies for Maintaining Access to RTD Transit Routes

We recognize that coordination with the RTD bus and commuter rail operations is essential in meeting the travel requirements of the community while construction of Central 70 is taking place. Although we do not anticipate impacts to newly designated commuter rail corridor or access to stations, we do foresee a significant effort in communicating with the RTD on their bus routes and stop locations within the Central 70 corridor. Understanding the RTD operations, communicating impacts to bus routes and stops, and discussing equivalent detour routes and new stop locations are going to be critical functions of maintaining an effective transit system. Keeping our MOT scheme consistent with RTD standards and community travel expectations is how this project will deliver beyond expectations.

Communication Tools to Exceed Expectations:

- The initial MOT scheme revealing anticipated impacts to the RTD routes and stops will be provided at the Pre-Construction and Partnering Kick-Off sessions.
- Throughout the Design Phase, we will engage RTD at design intervals of 60%, 90% and Release for Construction of the MOT design using the Design Review Process as an opportunity to provide feedback. Presence of the RTD at the Design Task Force Meetings will be as required.
- Throughout the Construction Phase of the project, we will coordinate quarterly meetings with the RTD to deliver the schedule of activities, traffic control changes and any potential affects to RTD facilities or routes. This meeting includes the Community Liaison and the MOT Manager at a minimum.

Our plan for communicating to the public and other associated stakeholders significant impacts and routing changes pertaining to mass transit, bicycles, pedestrian and handicap mobility is shown below in Figure 12.

Figure 12 | Plan for Communicating Impacts and Route Changes

Stakeholder	Plan
Mass Transit	Our team will help RTD augment its information notices about construction delays or route changes with frequent email updates and electronic newsletters so RTD can notify its riders and the public who rely on mass transit. Information also will be disseminated via the news media.
Bicycles	Coordinate information with the City and County of Denver's Public Works Department and "Denver Moves" bicycle program; direct stakeholders to the Project website to download maps showing detours for bicycle paths; coordinate with the 12 bicycle organizations in Denver including BikeDenver, Bicycle Colorado, Denver B-Cycle; handout out informational flyers at bicycling events throughout the year; and engage in robust social media postings and announcements to news media.
Pedestrians	Our team will incorporate safety messages into all PI efforts including news releases, fact sheets for local officials, press events, etc. As construction advances, messages will highlight those pedestrian facilities impacted. The information also will be disseminated during community meetings highlighted by maps and fact sheets. Also this plan will inform impacted businesses so they can inform their customers and employees.
Handicap Mobility	With a focus on disabled individuals (hearing, visually and/or mobility impaired), our team will work with the City's Office of Disability Rights and nonprofit programs to ensure that key safety messages are widely disseminated.

6.10. National Western Center Coordination

The National Western Center (NWC) redevelopment project convert the existing 130-acre Denver Coliseum site into a 250-acre campus to elevate Denver as a dynamic hub for entertainment, experiential education, research, commercial activity and innovation in the agricultural industry. The NWC campus redevelopment program will transform the existing National Western Stock Show Complex and Denver Coliseum sites into a destination and regional asset, and our approach to coordination with the NWC redevelopment project reflects our understanding of this project's importance to the region.

6.10.1. Frequency of Joint Meetings

The Public Information Manager will hold quarterly joint meetings where we will present details about the Project, the schedule for the next six months, and specific details around the detours necessary at the Western Center. The location of such meetings will be coordinated closer to the scheduled meeting.

6.10.2. Shared Communication Tools

In addition to the joint meetings described above, we will provide NWC with the following forms of communication of the Project as shown in Figure 13 below.

Figure 13 | Plan for Communicating with National Western Center

Phone/ Email	E-Blasts	Public Meetings	Telephone Town Halls	Social Media & Website	News Media	Signage/ Lane Closure Reports	Tours/ Events	Newsletters	Collateral	Hotline	Alert Apps
	•	•	•	•	•	•		•	•	•	

6.11. Additional Redevelopment Projects

Additionally, we recognize that NWC is part of a larger effort by the City and County of Denver to align six large-scale projects that are converging on the communities of Globeville, Elyria, Swansea, and River North. This effort is being led by the Denver Mayor's North Denver Cornerstone Collaborative (NDCC).

Beyond the NWC redevelopment project, four additional projects are inter-connected and geographically related to Central 70; these are listed in Figure 14.

Figure 14 | Plan for Coordinating with Additional Redevelopment Projects

Additional Redevelopment Projects	Our Understanding of the Project
Globeville and Elyria-Swansea Neighborhood Plans	Globeville and Elyria-Swansea Neighborhood Plans will guide future decision-making on land use, urban design and infrastructure, and identify key partnerships. Aspects of the NWC Master Plan will meet the goals of these neighborhoods, while honoring their common history.
Brighton Boulevard Corridor Redevelopment	Brighton Boulevard Corridor Redevelopment is a multi-modal redevelopment project from 29th Ave. to 44th Ave. that will make Brighton Blvd. a northern gateway to downtown Denver. Construction is scheduled through 2017. Brighton Blvd. also passes under I-70 and through the NWC. This improved right-of-way is scheduled for completion, along with RTD's new North Metro Commuter Rail Line and station at 49th and Brighton, in 2018.
River North/ South Platte River Restoration	River North/ South Platte River Restoration was historically considered an industrial zone. The River North Arts District (RiNo) is now Colorado's largest arts district which houses office and residential space, restaurants, bars, and small businesses. This area is expected to continue to evolve over the next 20 years. Also being revitalized in the area is nearly three miles of the South Platte River. Denver, along with the US Army Corp of Engineers, the Metro Denver Urban Drainage and Flood Control District, Denver Parks & Recreation, and the Greenway Foundation are working to restore the river's ecology and access. Portions of this effort are within and adjacent to the NWC campus.
RTD Station Development	RTD Station Development in Globeville, Elyria, and Swansea will soon be home to four RTD stations and the commuter rail maintenance facility. The opening of the East, Gold and North Rail Lines will connect these communities with other parts of the region and provide access to and from Denver Union Station, Denver International Airport (DIA), and the NWC, as well as the region's transit system. The first station will be located on the NWC campus at 49th and Brighton Blvd.

6.12. How Lane Closures and Access Impacts will be Coordinated between Neighboring Projects

Throughout the Construction Period, 5280 Connectors will focus on developing Traffic Control Plans and Methods of Handling Traffic that minimize disruption to the traveling public along mainline, cross streets and adjacent construction projects. To successfully minimize the disruption, thorough planning, extensive communication, and detailed execution must all come together. In order to properly communicate our strategy with the National Western Center Redevelopment or other neighboring projects we must first gain concurrence from our team and project stakeholders then coordinate our plan appropriately with neighboring projects. We intend to use a four-step approach in communicating our MOT strategy to the necessary parties:

1. MOT task force (high level strategy), engages stakeholders as necessary
    a. Traffic control plans are developed
    b. Big picture communication strategy to stakeholders
2. Internal Lead Contractor weekly traffic control meetings:
    a. Discuss traffic control needs and maintenance of traffic (MOT) plans that need to be developed, implemented and communicated
    b. Five-week look-ahead for traffic control
    c. Develop Lane Closure Reports
3. Weekly construction meeting with the Developer, the Communications Group, High Performance Transportation Enterprise (HPTE) and the CJV
    a. Deliver construction schedule and traffic control schedule
4. Monthly Traffic Control Coordination Meetings with Neighboring Projects (CCD, CDOT, Neighboring Project Contractors, and other stakeholders as necessary)

a. Communication of forthcoming short-term traffic detours and closures
b. Communication of other nearby construction projects and events.

6.13. Cover Coordination and Outreach

We will coordination with the City of Denver to involve local residents in selecting a name for the Cover as well as any final design considerations that would benefit from resident input.

6.13.1. Naming the Cover

Working jointly with Enterprises, and subject to Enterprises approval, we will develop and implement a "Name the Cover" competition that promotes the benefits of the Cover and solicits community involvement to create a Cover name that embraces the spirit of local residents. Our Name the Cover competition planning will include:

- Developing a schedule for advertising, outreach, selection and announcement of the Cover name
- Strategic advertisements to gain support and active involvement in the competition
- Direct participation in community events to promote the competition and generate active interest
- Development of a competition format and guidelines
- Active communication to general political support and involvement with the completion
- Review and selection of the Cover name
- Plan and execute a public "unveiling" of the cover name within the community

6.13.2. Final Design Considerations

Public considerations for Cover design will be an important aspect during task force meeting. We will include participation from the Enterprises in expanding our Cover design concept to work towards a design that serves the community while meeting Department requirements.

Our team will work with the Enterprises to facilitate public consideration of the final Cover design, including providing visual illustrations and other information to help communicate our design and intent to the public. We will participate in Enterprises public events to promote and communicate our design features and logic with the goal of helping to inform and gain public support for the Cover.

6.14. Public Information Outreach Tools

Public Information is an important part of the Project's overall Communications Plan. 5280 Connectors will work with the Communications Working Group to develop a schedule of public consultation events and will submit individual consultation event plans prior to each event. Each event plan will include the type of event, date, time, location and staffing details as well as notification procedures (e.g. advertising, email distribution, web updates, mail drops, etc.). Each plan will also include a detailed outline of the information to be provided at the event as well as the format for presenting the information and receiving feedback (e.g. storyboards, discussion guides and feedback forms, FAQ sheets, discussion papers, renderings, etc.).

Our PI tool box has the flexibility to meet different stakeholder needs. Throughout the Project, our team will coordinate with the Department to ensure that the tools employed during the Project are effective. All PI materials will be provided in English and Spanish, unless approved otherwise by the Department.

Public consultation events provide an inclusive and interactive way for the public to:

- Gather facts about the project and clear up misconceptions that may have caused concern
- Understand any real impact the project will have on them and the measures the team is taking to reduce such impacts

- Interact with our team and the Department in person
- Ask questions about the project and engage in discussions with the people best able to answer their questions.

Feedback received during the various events will help inform our communications efforts across all stages of the Project in anticipating and addressing community concerns and in developing relationships with community groups, businesses, local citizens and local governments. Tailoring our overall communications strategies to better meet the needs of our key stakeholders will aid in generating public support and will help develop and maintain strong relationships throughout the life of the Project.

6.14.1. Phone and Email

Throughout the Term, we will maintain a project office equipped with a local call line telephone, voicemail (English and Spanish compatible), computer and email address.

- Voice Recording. A telephone recording will provide an updated message each week, or each day if necessary, concerning relevant completion dates and forthcoming activities on the Project
- Voicemail. Voicemail messages will be checked and responded to throughout each working day that construction operations and lane closures are being carried out. During highly impactful construction activity or extended night work, as identified by the Department and in conjunction with 5280 Connectors, we will provide 24-hour staffing of the PI telephone line.
- Dialog License. We will pay for a Dialog license and will use Dialog, a web-based contact, and issue tracking database provided by the Department. Within Dialog, the team will track the following data for all inquiries made by citizens and businesses:
  - The date and time of the initial call
  - Contact information (name, phone number, street address and email address)
  - Location and description of complaint and/or request
  - Response we will provide includes:
    - Date of response
    - Manner of response
    - If request was relayed to the Department for response
    - Any additional follow-up actions
  - The Dialog system will provide an automated report to CDOT each week. We will follow up on inquiries and complaints with a return phone call or email from 5280 Connectors or CDOT (when necessary or requested by 5280 Connectors or CDOT).

6.14.2. Public Meetings

We will host and facilitate many public meetings, with the first meeting within one month after the issuance of NTP 2 to introduce our team to the local community, and to seek input on defining community values and establishing a collaborative process to enhance those values. There will also be public meetings at every major traffic shift in the Project phasing for a total of five public meetings. Additional public meetings will be held at key times during the Term, as identified by the Department and in consultation with us.

The public meeting will be led by the PCM, together with the Department's PI team. Additional personnel may include the following:

- Design-Build Manager (or assigned representative)
- Community Liaison [or assigned representative that can provide language assistance for Limited English Proficiency (LEPs)]

- Construction technical personnel familiar with details specific to the focus of the meeting
- Project Manager (or assigned representative).

The agenda for each meeting will be developed and managed by the PCM, with assistance from the Community Liaison and other key construction and operations team members. The agendas for all public meetings will be submitted by the PCM to the Department for acceptance three weeks prior to the meeting date, with approval from the Department within 48 hours. These meetings will be publicized two weeks prior to the meeting through the following multiple means:

- Local media
- Paid advertisements in newspapers
- Email
- Inserts in local newsletters
- Door-to-door flyers
- Mailers
- Facebook and Twitter announcements.

We will utilize a stakeholder list, which will be provided by the Department prior to the issuance of NTP 1. This stakeholder list will include local elected officials, city/county staff, and surrounding local agencies. This list will be managed by the PCM.

These meetings will be held within the corridor boundaries; however, where relevant, our team shall host meetings in the neighborhood location(s) closest to the upcoming Construction Work or O&M Work. These locations may include: Swansea Elementary School, RTD Facilities and the Project Office.

All public meetings will inform attendees of Project plans and schedules and provide information on how to receive updates on the Project (via email address list and/or the Department's GovDelivery messaging system). We will provide Project displays that explain information on Construction Work, O&M Work, phasing, traffic impacts, etc. Project displays and other presentation materials used at the public meetings will be of professional quality and designed to clearly convey accurate Project Information to a non-technical audience. The community liaison will translate all displays in Spanish, so all displays are provided in English and Spanish.

5280 Connectors, in coordination with the Department, will respond to all feasible requests to attend regular community and stakeholder meetings or community events, such as those organized by nonprofit groups, and neighborhood and business associations. Our team will provide appropriate technical staff, as required.

6.14.3. Business Meetings

In addition to the public meetings required to be held pursuant to Schedule 14, Section 5.2.b, we will organize and lead at least two public meetings specifically focused on local and regional business impacts within two months after the issuance of NTP 2. The meetings will focus on:

- Upcoming work that may affect access, timing/schedule
- Allow for questions
- Address detours.

These meetings will be led by our PCM, with technical support from our construction personnel. We will also host additional meetings focused on local and regional business impacts at designated project phases as identified by the Department. These key project phases include the major traffic shifts along the corridor.

These meetings will have advertisements sent to our local and regional businesses' stakeholder list one week prior to the meeting through a variety of means specified in our Stakeholder Communications Platform.

6.14.4. Social Media

Our team will use the Department's social media platforms, including Facebook and Twitter, to share real-time information (construction progress photos, meeting notices, etc.) with the public. We will submit all social media posts to the Department for acceptance one working day in advance of inclusion on social media. A Twitter post example is shown in Figure 15.

Figure 15 | Twitter Example

6.14.5. Stakeholder Distribution List

We will develop a master distribution list of contacts to be used for general PI, publications, and informational flyers/newsletters. A sample list is shown in Figure 16. We will use the Department's database established through the FEIS as the basis for development of this list/database as well as the Department's GovDelivery messaging system.

Our team will submit this list/database to the Department for acceptance prior to issuance of NTP 2. We will also update it annually throughout the Term. The information we are tracking for the distribution list includes primary contact name, email, telephone number, website, physical address and supplemental notes.

Figure 16 | Sample Stakeholder Distribution List

Stakeholder Distribution List (Sample)		
American Council of Engineering Companies (ACEC) of Colorado	Elyria and Swansea Neighborhood Association	Mi Casa Innovation Lab
American Planning Association	Emily Griffith School	National Western Center
Associated General Contractors of Colorado	Elyria-Swansea Globeville Business Association (ESGBA)	Northeast Denver Change
Citizens for a Greater Denver	Globeville Civic Association #1	Northeast Transportation Connections
Colorado Black Chamber of Commerce / Black Construction Group	Globeville Elyria-Swansea LiveWell	Northfield Stapleton Shopping Center
Colorado Minority Transportation Officials - Colorado Chapter (COMTO)	Groundwork Denver	Park Hill Golf Club
Clínica Tepeyac	Habitat for Humanity	The Forney Museum of Transportation
Colorado Black Round Table	Hispanic Contractors of Colorado	The GrowHaus
Colorado Construction Institute	Holy Rosary Church	The Stapleton Foundation
Colorado Contractors Association	Holy Transfiguration of Christ Cathedral	Unite North Metro Denver
Cross Community Coalition	Mary Lou Egan/ Freelance Blog Writer	Vickers Boys & Girls Club
Denver Center for International Studies at Ford Elementary	Metro Denver Economic Development Corporation	Women's Transportation Seminar (WTS) - Colorado Chapter
Denver Metro Chamber of Commerce		

6.14.6. Tours and Communication Events

5280 Connectors will be available to participate in all media, business and government official tours of the construction areas, at the request of the Department. We will participate in the coordination and delivery of communication events (e.g. groundbreaking or grand openings). The Department will lead tours and events. For key communication events we will have our PCM available, as well as other management personnel. Key events the Department will lead include:

- Original project ground breaking ceremony
- Ground breaking of the Cover
- Grand opening for the Swansea Elementary School playground.

We will hold regularly-occurring, one-hour guided tours. This is a monthly sidewalk tour of the lowered section, once extensive construction has begun. These sidewalk tours are led by a technical superintendent or manager and allows the public to ask questions. We will use social media and our email lists, to inform the public regarding these events. Additionally, our Community Liaison will be present to provide language assistance, if necessary.

6.14.7. Lane Closure Reports

Throughout the Term, we will submit a Lane Closure Report each Thursday by 10:30 a.m., as required by Schedule 10, Section 2 Maintenance of Traffic (MOT) for the following week (Saturday through Friday) for information. The MOT Manager or their designee is responsible for filling out the Lane Closure Report. We will provide this report to the list of contacts provided by the Department. We will use the Lane Closure Report from Schedule 10, Section 2, Appendix A. Should any changes be made to the Lane Closure Plan, an updated Lane Closure Report will be submitted on the day that the change occurs.

6.14.8. Traffic Alerts

Throughout the Term, our PCM will submit a weekly traveler alert each Thursday for distribution on media services such as GovDelivery and CDOT's COTRIP. The alerts will be provided by the MOT Manager to the PCM in the weekly schedule meeting and reviewed and discussed during the weekly Strategic Communications meetings. The alert shall include the following details:

- I-70 Mainline
- Ramp closures and detour routes
- CDOT roadways
- Local agency roadways
- Any activity that may impact the traveling public
- Impacts/detours – sidewalks, bike paths and RTD transit routes.

6.14.9. Web Page Updates

5280 Connectors will work with the Department to develop internet web page content specifically for this Project. During the Term, we will provide weekly updates with the latest Project Information. We will also submit all proposed web page content updates to the Department for acceptance two working days in advance of inclusion on the website. The Department's website will provide consistent and updated information for the CCD, stakeholders and general public throughout the Term. As a result, our team is committed to providing the Department with key information for the website, including:

- A monthly Project newsletter (see details below)
- Notification of public consultations, consultation materials and summary reports

- Graphics and renderings showcasing the design of each station, including high-resolution construction progress photos
- Additional information on construction, including:
  - Timelines (with forecasted closures, if any, and alternate route directions)
  - Traffic advisories
  - Detailed construction progress section (including photos)
- Background information and economic benefits of the Project
- Information on our team, including project contact details
- Detailed map of the Project
- Updated contact information
- Email sign-up tool to enable quick receipt of relevant communication released through the website
- Media section with links to or postings of related media reports.

6.14.10. Project Newsletters

During the Construction Period, we will produce and distribute a monthly newsletter with information on the Project's progress and will make it available to the community and future users of I-70. Each edition will be submitted to the Department for approval prior to publication. The newsletter will also be available electronically for regular community updates for area residents in the Globeville, Elyria, Swansea, Montebello, Denver City, Brighton Blvd. Corridor, Stapleton and River North areas.

Information for the newsletter will be managed by the Communications Team and it will meet the following requirements:

- Summary on the Project's purpose and schedule
- Any upcoming job fairs or opportunities
- Project Information hotline
- Email address
- Website address: www.i-70east.com
- Project segment/work area map
- Construction safety message
- Highlight feature of local hires and on-the-job training (OJT) apprentices
- Any other updates requrested from the Department.

The community liaison will translate and produce the newsletter in Spanish and provide both the Spanish and English newsletter versions for acceptance by the Department prior to distribution.

After receiving acceptance by the Department, we will distribute the newsletter electronically to the 5280 Connectors project website (www.5280connectors.com) and the Department's project website. Additionally, the newsletter will be provided via email once per month to the master distribution list of contacts as described in the Stakeholder Distribution List, and distributed door-to-door to the impacted Project area – approximately 2,500 households—once per quarter.

The first newsletter will be distributed within 30 calendar days following the issuance of NTP 2.

6.14.11. Language Assistance for Limited English Proficient Persons (LEP)

Our team, specifically the Community Liaison, will provide access to LEP persons by translating during

individual conversations, communication materials such as meeting notices and newsletters, and provide interpretation services at public meetings. All requests and measures taken to communicate with LEP persons will be documented by our team in the CPCP and MOCP quarterly reports.

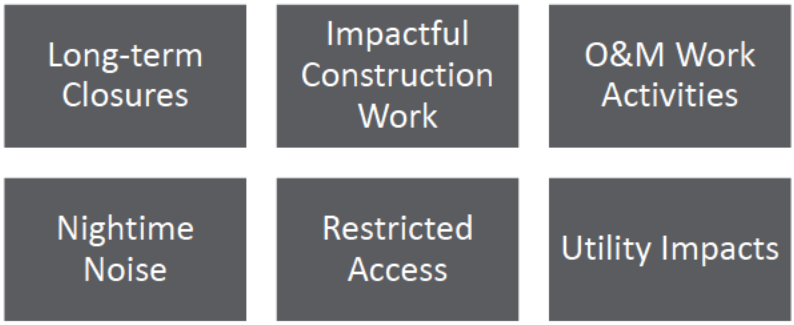
6.14.12. Public Communication Collateral

We will develop a variety of outreach collateral to share information, including coping strategies, to the public as necessary for major project milestones. As described above, this collateral will include our monthly Project newsletters, emails, and social media updates. All collateral will be submitted to the Department for acceptance prior to distribution.

Depending on the targeted audience, the Community Liaison will work with the Department to determine which collateral will be used. All collateral will use Department provided branding throughout the Project, adhere to CDOT *The Colorado Brand Guidelines*, and be created with the intention of broad distribution with Spanish translation.

The Major Project milestones shown in Figure 17 will include the following:

Figure 17 | Major Project Milestones



6.14.13. Photos/Videos

We will take and submit to the Department photos/videos of the work on a monthly basis. Our Project Engineer will gather two digital photographs each week that may include traffic control, paving, slope repair, erosion control, bridge deck, rail work, and other key areas of work identified by the Department. The photos/videos submitted to the Department will be able to be used in reports to interested agencies and for Stakeholder Communication Platform.

Our team will manage the following additional videos and photographs:

- **Progress photographs**. Aerial professional photographs produced quarterly and submitted yearly to the Department
- **Time-lapse photographs**. Construction web cam set on the Cover and demolition of the viaduct to create videos of the Construction Work. The camera will be capable of time-lapse photography.
- **BIM videos**. Specifically of the UPRR construction
- **Digital photos**. Two digital photos will be submitted to the Department weekly.

Additionally, the PCM will coordinate and develop the following videos and photo shoots to be used for public distribution to share progress of the Project annually or at key project milestones:

- Videos of project milestones such as grand openings
- Videos highlighting the local hire training facility
- Photo shoots, minimum of three sessions, focusing on 5280 Connectors building the Project.

We will develop videos as necessary to communicate coping strategies as directed by the Department.

6.14.14. Project Identification Signing

We will provide one large project identification sign for each direction of travel along the I-70 Mainline at the Project limits. The sign layout and position will be submitted for acceptance by the Department prior to installation. Project identification signs will be installed by the Lead Contractor within 14 calendar days following the issuance of NTP 2. Project identification signs shall be MUTCD compliant and include the project logo, project start and estimating completion dates and Developer name and PI hotline number.

6.15. Response and Deliverables Protocol

Our team will comply with Figure 18 in responding to communications from stakeholders and the public.

Figure 18 | Response Protocol

Type of Communication	Timing of Response
Hotline calls	Check messages throughout each day Respond to initial call within 24 hours (including weekends if work is occurring)
Email	Same day or within 48 business hours for high volume situations
Calls from Department staff	Within 24 hours
Webpage inquiries	Same day or within 48 business hours for high volume situations
Public meeting inquires	Within one week of the meeting

6.16. CPCP Quarterly Reporting

The PCM will prepare a quarterly communications report during the construction period and will submit the initial report to the Department for acceptance no later than 10 working days after the 90th calendar day following the issuance of NTP 2. Each quarterly report shall be provided in English and, if requested by a member of the public, translated to Spanish by our Community Liaison.

In addition to the information required in the CPCP quarterly reports, we will also create a summary dashboard page for each of these reports. On the dashboard we will show relevant statistical data for the last quarter, as well as cumulative data. Figure 19 shows our plan for the CPCP quarterly reporting.

Figure 19 | Plan for CPCP Quarterly Reporting

Report Activity	Person Responsible
A summary of primary Construction Work and O&M Work during construction activities performed during the preceding quarter (refer to Progress Reports as required in Schedule 8 Project Administration)	Scheduler
Detailed summary of strategic communication efforts as part of the Progress Report activities performed during the preceding quarter	Project Communications Manager (PCM)
Detailed summary of the Environmental Compliance Work Plan (ECWP) as part of the Progress Report activities, environmental mitigation summary, and a list of the date and time of any PM-10 alert thresholds reached or exceeded, in each case, during the preceding quarter	Environmental Compliance Manager
A summary of progress in implementing the Small and Disadvantaged Business Participation Plan's Construction Contract Plan from the preceding quarter	DBE/SBE Manager
A summary of progress in implementing the Workforce Development Plan from the preceding quarter	Local Hiring Manager
Detailed summary of number of accidents cleared during the preceding quarter	MOT Manager
Detailed summary of measures taken to communicate with LEP persons and requests for language assistance during the preceding quarter	Community Liaison

7.0 Maintenance and Operations Communications Plan (MOCP)

5280 Connectors will prepare and maintain a MOCP in coordination with the Department to develop two-way communication of Project Information with the public. The main goal of the MOCP will be to ensure relevant information about the project is communicated to interested stakeholders during the concession period (including information about accessibility, maintenance, construction, tolls, operations, etc.), enabling them to make informed travel decisions.

This MOCP will be used throughout the duration of the operating period to manage and implement the PI process. The MOCP will be submitted to the Department for approval prior to Substantial Completion.

7.1. Planned Projects

This outreach consists of providing regular and continuous PI services throughout the duration of the operating period and must adhere to the specifications outlined in the HPTE Strategic Communications and Transparency Plan. Our team will ensure that stakeholders are kept apprised of maintenance and roadway closures in an active and timely manner during the concession period. Providing detailed information to stakeholders in advance allows them the opportunity to plan ways for coping with disruption to their planned daily activities.

Key coping information to include:

- Detours
- Planned works and lane closures
- Duration of Construction Work (start and end times)
- Access impacts
- Alternative methods of transportation
- Travel Demand Management (TDM) strategies.

We will coordinate with the Department to determine which level of Public Information Management (PIM) activities are warranted prior to commencement of planned O&M Work (including Renewal Work) projects. A detailed Communications Plan may be developed for each anticipated disruption to address specific requirements.

Two tiers of planned projects require Developer PIM activities.

Tier II PIM projects

- Tier II PIM projects of medium to high impact which typically involve:
  - Moderate/High visibility from media/public
  - Moderate/High stakeholder involvement, and/or
  - Moderate/High impact to traveling public/stakeholders
- Examples: Grand Ave. Bridge, I-25 in CO Springs, I-76 (Brush to Ft. Morgan), US 36 Lyons to Estes Park, US 160/US 550 CFI Durango
- Tier II PIM requirements apply under the following conditions
  - The planned project is being conducted on a high-volume road with possibly a significant number of direct-access points/driveways
  - The planned project is in or adjacent to a community's business center with high commuter/pedestrian/cycling traffic; changing work zones; variety of stakeholders (e.g., businesses, transit providers, commuters, tourists, etc.), and/or
  - The Department identifies a need for more consistent Public Information activities.

Tier II PIM requirements

- Our PCM will ensure the following activities are performed in relation to Tier II PIM projects:
  - Host a public meeting prior to commencement of, as well as (if warranted) during, the project
  - Gather and manage a planned Project specific Stakeholder Distribution List
  - Establish a Project Information number for posting on static construction signs
  - Complete a Lane Closure Report each week
  - Deliver project flyers to residences/businesses with direct access to highway and email to specific users
  - Meet with affected property owners as necessary
  - Provide content for a project web page, if warranted
  - Answer and log calls/emails to the Project Information line/email address, and track inquiries using Dialog
  - Assist with media relations, including providing information for or writing press releases.

Tier III PIM projects

- Tier III PIM projects are of medium impact which typically involve:
  - Moderate visibility from media/public
  - Moderate stakeholder involvement and/or
  - Moderate impact to traveling public/stakeholders
- Examples: I-25 Lane Balancing, US 287 Resurfacing, US 50 Delta to Montrose resurfacing
- Tier III PIM requirements apply under the following conditions:
  - The planned project is being conducted on a mid-volume road with possibly a significant number direct-access points/driveways
  - The planned project is in a location with relatively high commuter/tourist traffic, and changing work zones, and/or
  - The Department identifies a need for consistent Public Information.

Tier III PIM requirements

- Our PCM will ensure the following activities are performed in relation to Tier III PIM projects:
  - Establish a project number for construction signs
  - Complete a Lane Closure Report each week
  - Deliver project flyers to residences/businesses with direct access to highway, and email to specific users
  - Meet with affected property owners as necessary
  - Provide content for a project web page, if warranted
  - Answer and log calls/emails to the Project Information line/email address, and track inquiries using Dialog
  - Assist with media relations, including providing information for or writing press releases.

7.2. Safety-Related Complaints

We will report safety-related complaints to the Department within one calendar day of receipt unless the circumstance/complaint constitutes an immediate safety hazard, in which case, we will notify the Department as soon as practicable, but no later than one hour after receipt.

Our team will respond to valid complaints or requests to the extent that the complaints or requests cover issues within the scope of our responsibilities under Schedule 11 Operations and Maintenance Requirements. We will convey any requests for services that are beyond the scope of our obligations under this Agreement to the Department. All complaints and responses will be recorded in the Dialog system.

7.3. Operations and Maintenance Education

We will assist the Department in outreach and education messages to help clarify unfamiliar, complex or often misunderstood concepts related to the Project's long-term O&M, allowing the public to make informed decisions. Topics include HOV 3, TDM, and accessing Tolled Express Lanes. Communicating about these concepts and any changes to the operations of the facilities will be critical to ensuring stakeholders are able to manage change smoothly. Outreach must adhere to the specifications outlined in the HPTE Strategic Communications and Transparency Plan.

7.4. Maintenance and Operations Communications Plan Quarterly Reporting

We will prepare and submit quarterly O&M communications reports during the Operating Period. The initial report will be provided to the Department for acceptance no later than 10 working days after the 90th calendar day following Substantial Completion. Each quarterly report will be provided in English with Spanish translation, if requested by a member of the public, and will include the following:

- Details of primary O&M Work activities performed during the preceding quarter (refer to Progress Reports as required in Schedule 8 Project Administration)
- Detailed summary of MOCP activities performed during the preceding quarter
- Detailed summary of the ECWP as part of the Progress Report activities during the preceding quarter
- A summary of progress in implementing the Small and Disadvantaged Business Participation Plan's O&M Contract Plan from the preceding quarter
- Detailed summary of number of accidents cleared during the preceding quarter
- A summary of all calls and emails as recorded in the Dialog system
- Detailed summary of measures taken to communicate with LEP persons and requests for language assistance during the preceding quarter.

7.5. Emergency or Unanticipated Maintenance

The MOCP will establish a communications procedure for emergency or unanticipated maintenance work. They will specify which communications tools will be utilized to communicate the impacts of repairs.

For emergency maintenance, we will immediately provide the following information to the Department and the Colorado Transportation Management Center (CTMC):

- Description of the activity and why it is necessary
- Start of the activity
- End of the activity including any updates to the above

- Impacts to traffic and property (businesses and residences)
- Communications tools to share information [Variable Message Sign (VMS) boards, GovDelivery alert, Twitter, photos, media release, email distribution, etc.]
- Contact number.

Once work is completed, we will also contact the Department's Communications Manager and the CTMC.

8.0 Crisis Communications Plan (CCP)

The Crisis Communications Plan outlines our approach to emergencies and incidents at any time during the Construction Period and Operating Period. We will coordinate this approach with our overall Incident Management Plan.

Our general policy on crisis management is to ensure the safety and well-being of employees, infrastructure users and the general public, and to be responsive, responsible, compassionate and committed to corrective action.

In the event of a crisis, the Department will be the lead agency to handle communication with the media, public, the Department staff, etc. 5280 Connectors will be available to help coordinate with the Department and provide information necessary to respond to the crisis. We will provide specific details on internal coordination and communication that will occur with our team, the Department, and other stakeholders.

8.1. Approval Process and Procedure

We will submit our CCP to the Department for approval prior to the issuance of NTP 1.

8.2. Types of Potential Emergencies

For the purpose of the Strategic Communications Plan, an “Emergency” means any non-ordinary course event affecting the Project, whether directly or indirectly, that:

- Is an immediate or imminent threat, or, if not promptly addressed, a potential threat to the safety of the public
- Causes disruption or, if not promptly addressed, has the potential to cause disruption, to the free flow of traffic on or about the Project
- Is an immediate or imminent threat to the long-term integrity of any part of the infrastructure of the Project, to the Environment or to property adjacent to the Project
- Is recognized by the Enterprises or CDOT as an emergency pursuant to Fiscal Rule 2-2 of the State of Colorado Fiscal Rules, which defines *Emergency* as "an unexpected event creating an immediate threat to public health, welfare, or safety, the functioning of government, or the preservation or protection of property, which requires an immediate response"
- Is recognized or declared as a state of emergency by the Governor of the State, FEMA, the U.S. Department of Homeland Security or any other Governmental Authority with legal authority to recognize or declare an emergency.

The table in Figure 20 below categorizes the incident level depending on the nature of the emergency.

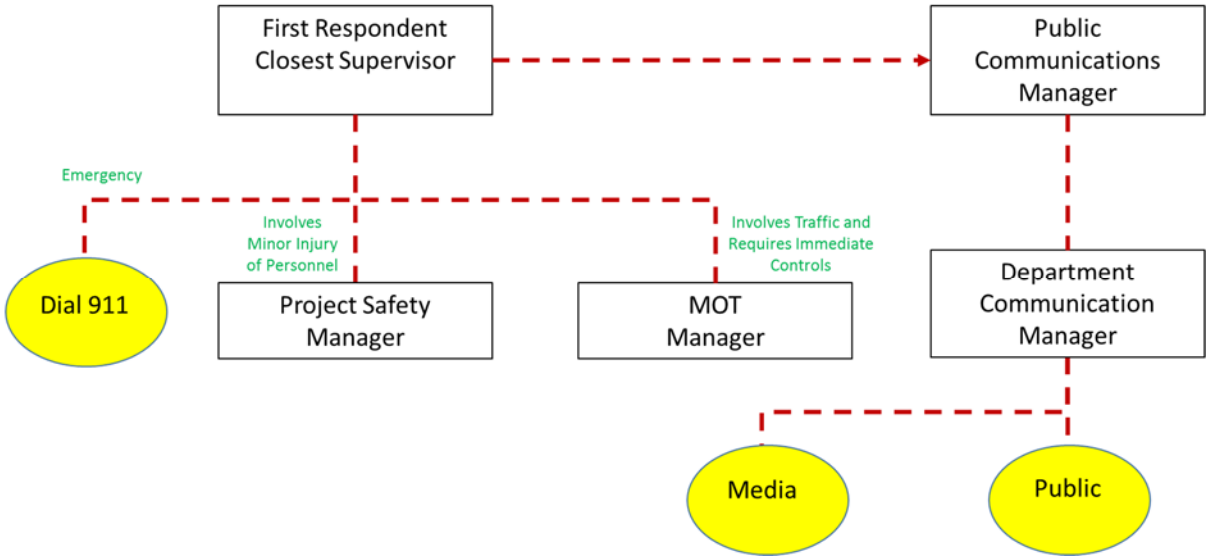
Figure 20 | Incident Levels and Communications Response

Incident Level	Communications Response
Level 1 Incident	**Level 1 Communications Response**
A serious incident that: • Generates some general, low-level media interest	The communications response will involve: • Every effort to provide an initial response within one hour of the incident • Drafting media releases and other communications (if appropriate) • Securing approval for media releases and other communications such as talking points/Q&As • Distributing media releases and other responses • Contacting other agencies and coordinating the communications approach • Monitoring media and internal stakeholders' interest • Making sure regularly updated FAQs are supplied to the website
Level 2 Incident	**Level 2 Communications Response**
A serious incident (but no loss of life) or issue that: • Is likely to generate strong media interest • Requires fast, honest, accurate, credible and consistent communications • Threatens the reputation/public image of the Enterprises and related stakeholders	The communications response will involve: • Every effort to provide an initial response within one hour of the incident • Drafting media releases and other communications • Securing approval for media releases and other communications (5280 Connectors to coordinate Government/Departmental approval as required) • Scheduling media interviews/conferences • Attending media conferences to monitor media and responses • Setting up a crisis communications control room • Answering and documenting media enquiries and requests for interviews • Coordinating the interview schedule for the spokesperson • Phoning key media to advise of upcoming media conferences • Making sure regularly updated FAQs are supplied to the website
Level 3 Incident	**Level 3 & 4 Communications Response**
A serious incident (with loss of life) that: • Is likely to generate strong media interest • Requires fast, honest, accurate, credible and consistent communications • Threatens the reputation/public image of the Enterprises and related stakeholders	In this instance, communications will involve: • Every effort to provide an initial response within one hour of the incident • Contacting other agencies and coordinating the communications approach • Setting up a crisis communications control room • Drafting media releases and other communications • Contacting key media to advise of upcoming media conferences • Checking and approving all outgoing communications created by other communications advisers • Securing approval for media releases and other communications (5280 Connectors to coordinate Government/Departmental approval as required) • Scheduling media interviews/conferences • Securing the involvement of other agencies at scheduled media conferences (if appropriate) • Attending media conferences to monitor media and responses • Answering and documenting media enquiries and requests for interviews • Coordinating the interview schedule for the spokesperson • Providing information about public safety to internal staff • Providing communications updates, including media releases and alerts, to internal stakeholders • Making sure regularly updated FAQs are supplied to the website
Level 4 Incident	
A serious incident (with loss of life) that: • Will involve the active and ongoing involvement of emergency services agencies at Province and/or National level • Is likely to generate strong media interest • Requires fast, honest, accurate, credible and consistent communications • Threatens the reputation/public image of the Enterprises and related stakeholders	

8.3. Designated Staff

8.3.1. Public Information Team

Figure 21 | Emergency Telephone Tree



When a project-related crisis has been identified, the closest supervisor will be responsible for alerting the crisis team. The Crisis Management Team will initiate the Emergency Telephone Tree shown in Figure 21 above. These individuals will serve as the core of the Crisis Communication Team, although other company personnel may be included. The PCM is the primary member to call, unless immediate action is required such as traffic control measures or emergency action which would then follow the Emergency Telephone Tree. Members of the Crisis Management Team will always be "on duty," including weekends and holidays. The Safety Manager is an Occupational Safety and Health Administration (OSHA) certified supervisor with the qualifications to perform CPR and First Aid as well as training in emergency response. The MOT Manager is a certified traffic control supervisor with the ability to make on-the-scene adjustments to traffic control in the case of an emergency. Both individuals have the training and the authority to make decisions in the case of an emergency. A copy of the Crisis Management Plan and Crisis Management Communications Plan will be posted at the jobsite and in each construction facility. Crisis Team members' home and mobile numbers are listed below:

Information to be provided after award

The list above will be available to be distributed to Emergency service providers.

8.3.2. Spokesperson

As described in Schedule 14 (Project Agreement), the Department will be the lead agency to handle communications with the media, public, Department staff and other emergency responders should a crisis arise. The PCM will take the lead from the Safety Manager in the field.

Following debriefing, the information will be conveyed to the Department and the Department PI Team in an accurate and timely manner. Should the PCM be unavailable, the Design-Build Manager or the O&M Manager will be on call to coordinate the effort and relay information to the Department.

In the event of an Emergency, consistent and clear messaging is critical. The Public Information Team will be on-site and will be able to provide the most up-to-the-minute information. From the initial collection of data, a Crisis Data Sheet will quickly be produced for use by the Department PI Team. This Crisis Data Sheet will provide the designated Department PI with the necessary information about the crisis and the

actions currently under way to manage the situation. Additional Crisis Data Sheets will be updated throughout the event as more information is made available.

8.4. Addressing Potential Emergencies

Depending on the Emergency at hand, we have developed procedures for dealing with such Emergencies.

8.4.1. Safety of our Employees and the Public

8.4.1.1. Fire Incidents

In the event of a fire situation in or near the work zone (vehicle, structure, equipment, material, etc.), one of our team members will call 9-1-1. If the fire is in the beginning stages, and the employees are equipped with the proper fire suppression equipment, extinguishment may be attempted if the employees are trained in such activity and are not in danger. In the event of a major fire, or involvement of hazardous materials, our team shall evacuate the area (either by the direction of the officer-in-charge or at their own discretion), and take measures to protect the public, along with ensuring that emergency equipment will have clear access to the area. Fire hydrants in the area will be identified if adjacent to the work area, and access to the hydrant will be maintained. After you have addressed the items in the FIRST HOUR RESPONSE CHECKLIST, proceed with the following protocols if there are any injuries:

- Ask EMS responders which medical facility they will be going to, but know EMS can be rerouted.
- If possible, send a company employee with the injured to call the Crisis Management Team once a destination has been determined and to meet the family once they arrive at the facility.
- Once you are certain of the medical facility, dispatch a cab/car to the spouse/families house/place of business.
- The Project Superintendent will determine the correct person to call the spouse/family. This person should call the spouse/family and explain there has been an accident and that the employee has been injured, but should not discuss the severity of the injuries. If asked about the severity of the injuries, the response should be: “We can’t be certain of the extent of the injuries until we hear from a doctor.”
- Advise the spouse/family that a cab/car is arriving momentarily to take them to the medical facility. Discourage anyone from driving themselves, but note that you cannot prevent anyone from doing so if they insist.
- If possible, send a company representative to the injured employee’s home to lend assistance.
- Assign an employee to be the liaison between the family and the company. The company must make certain that the family’s needs are being met.

8.4.1.2. Employee Fatality on the Project

In the event of an employee fatality, address the items in the FIRST HOUR RESPONSE CHECKLIST, then proceed with the following:

- A member of the company’s management team makes a “best effort” to inform the spouse/family in person of the accident.
- NOTE: Management may decide to treat the notification in the same manner as an injury situation (as described above) in order to get the spouse/family to the medical facility as quickly as possible. Once the spouse/family arrives at the medical facility, the attending physician can deliver the news. A member of the company’s management and/or crisis team should be in attendance to provide support.
- Company representative should remain at the employee’s home until other family members arrive or for as long as he or she can.

- Determine whether the employee's family is in need of money to cover small expenses. If so, it may be appropriate to provide assistance in this area.
- Maintain contact with a relative or close family friend of the spouse or family to ensure that funeral arrangements and related items are being handled.
- NOTE: If the fatality involves a non-employee, the authorities should be consulted about notification procedures. Alert the Crisis Management Team and the insurance department as soon as possible.
- NOTE: The media may attempt to contact a family member. You cannot prevent them from talking to the media. It is their right to speak to the media if they wish.

8.4.1.3. Bomb Threat

If you receive a bomb threat, dial 9-1-1 immediately. A uniformed officer will be mobilized and will assess whether or not additional help should be summoned. The officer will not be familiar with your site so you will be asked to perform a visual search, starting with public access areas. During the call and after, use your best judgment on how you would implement the following information:

- Keep the caller on the line for as long as possible. If possible, ask key questions to determine as much information as possible.
- Take detailed notes of the caller and any background noise.
- Notify the supervisor on-site or the Project Manager who will determine whether or not to evacuate the premises.
- Do not allow anyone except authorized personnel to enter the jobsite.

8.4.2. Free Flow of Traffic

Specific emergencies may impact the free flow of traffic and they may increase the possibility of further incidents occurring as a result of the initial emergency.

8.4.2.1. Crash

Call 9-1-1 first. Contact CTMC / Governing Road Agency with any additional information including incident level. Contact the Traffic Control Supervisor and Emergency Phone. Contact the PCM for notification to the Department PI Team.

The MOT Manager will be contacted to provide all additional traffic control required by the incident where the incident duration exceeds the two hour anticipated response and resolution period. Our team will communicate with support authorities in gaining access to the accident by means of construction zones if necessary.

8.4.3. Infrastructure

In the case of an immediate or imminent threat to the long-term integrity of any part of the infrastructure of the Project, to the environment or to property adjacent to the Project, address all applicable items in the FIRST HOUR RESPONSE CHECKLIST, then:

- Convene the Crisis Communications Team where the PCM or the Project Manager will communicate the facts and relevant data and the team will jointly determine the following:
  - Confirm the type and level of communications response required
  - Confirm how the incident will be managed and who will be responsible for preparing communications materials
  - Determine who will act as spokesperson for external communications
  - Determine who will be the key contact to manage the flow of information between all parties and the frequency of information updates to the Crisis Communications Team.

8.4.4. Fiscal Rule 2-2

In the case of an incident recognized by the Enterprises or CDOT as an emergency pursuant to Fiscal Rule 2-2 of the State of Colorado Fiscal Rules, address all applicable items in the FIRST HOUR RESPONSE CHECKLIST, then:

- Convene the Crisis Communications Team where the PCM will communicate the facts and relevant data and the team will jointly determine the following:
  - Confirm the type and level of communications response required
  - Confirm how the incident will be managed and who will be responsible for preparing communications materials
  - Determine who will act as spokesperson for external communications
  - Determine who will be the key contact to manage the flow of information between all parties and the frequency of information updates to the Crisis Communications Team.

8.4.5. State of Emergency

Every year, natural disasters such as tornadoes, hurricanes, floods, and earthquakes strike, causing unimaginable suffering and loss. Unlike other types of crises, natural disasters are not preventable. There are, however, ways to plan for and mitigate the effects of natural disasters that will help protect against serious injury or loss of life and property.

The following are some common-sense steps, recommended by the Federal Emergency Management Administration (FEMA), to plan for a natural disaster. For more information, visit FEMA's website at www.fema.gov.

STEP ONE: ASSESSING YOUR RISK FOR NATURAL DISASTERS

Determine whether your company or its projects are located in an area that is at high risk of a natural disaster. The community's local emergency management or the local American Red Cross will be able to provide this information to you, if you are unsure.

STEP TWO: DEVELOPING DISASTER RESPONSE PROCEDURES

Contact the local emergency management office or local American Red Cross chapter for a copy of the community evacuation plan. This plan should include information on the safest routes to shelters and away from the area. Note that if you are located in a flash flood area, your company should have several alternative routes.

Invite local, public and private emergency response agencies to your company or site to see where the turn-off switches are for specific items such as water and electricity.

Designate an employee (or more than one if needed) to monitor weather conditions. If necessary, this employee should also make arrangements to:

- Check emergency supplies:
  - Fuel company vehicles
  - Secure buildings by closing and boarding up windows
  - Remove outside antennas
- Develop an emergency communication plan. Ensure that all employees know:
  - What the emergency evacuation signal sounds like (this could be a bullhorn, a siren, even a paging system)
  - Where exit routes are located

- Where to go in the event of a natural disaster and what to do after a natural disaster has occurred (i.e., appoint someone to do a headcount of all employees).

8.4.5.1. Tornados

If your location is prone to tornadoes, FEMA recommends the following steps:

- Ensure that employees understand the difference between a "tornado watch" and a "tornado warning." A watch is when conditions could lead to a tornado, whereas a warning is issued if a tornado has been sighted or indicated by weather radar.
- Designate an area, room or rooms in the office building where all employees can go in the event of a tornado threat.

Tornado danger signs:

- An approaching cloud of debris can mark the location of a tornado even if a funnel is not visible.
- Before a tornado hits, the wind may die down and the air may become very still.
- Tornados generally occur near the trailing edge of a thunderstorm. It is not uncommon to see clear, sunlit skies behind a tornado.

During a tornado:

- Many construction sites use mobile homes as project field offices. These are particularly vulnerable during a tornado since they overturn easily even if precautions have been taken to tie down the unit.
- If possible, go to the basement or to an inside hallway at the lowest level of the building. Avoid places with wide-span roofs such as auditoriums, cafeterias, large hallways, or shopping malls.
- Take shelter under a piece of sturdy furniture such as a workbench or heavy table or desk and hold onto it.
- Use arms to protect the head and neck.

If you are outdoors:

- If shelter is not available or there is not time to get indoors, lie in a ditch or low-lying area or crouch near a strong building. However, be aware that there is a potential for flooding in ditches.

If you are in a car:

- Never try to out-drive a tornado in a car or truck. Tornadoes can change direction quickly and can lift up a car or truck and toss it into the air.
- Get out of the car immediately and take shelter in a nearby building or lie in a ditch or low-lying area away from the vehicle.

8.4.5.2. Floods

If your location is in an area that is prone to flooding, FEMA recommends that your company learn to recognize flood-warning signs and your community's alert signals. Request information on preparing for floods and flash floods.

During a Flood:

- If Indoors:
  - Turn on a battery-operated radio or television to get the latest emergency information
  - If told to leave, do so immediately.
- If Outdoors:
  - Climb to high ground and stay there.

- Avoid walking through any floodwaters. If it is moving swiftly, even water several inches deep can sweep you off your feet.

- If in a Vehicle:
  - If you come to a flooded area, turn around and go another way.
  - Do not attempt to move a vehicle that has stalled. Instead, abandon the vehicle immediately and climb to higher ground, many deaths have resulted from attempts to move stalled vehicles.

8.4.5.3. Earthquakes

Unlike tornadoes, hurricanes and floods, earthquakes strike suddenly, violently, and without warning. Therefore, FEMA recommends that individuals located in an area that is prone to earthquakes understand what to do should one strike.

- Proactive precautions to do before an Earthquake:
  - Fasten shelves securely to walls and brace overhead light fixtures
  - Place large or heavy objects on lower shelves
  - Hang heavy items such as pictures and mirrors away from where people sit or lay
  - Identify safe places in each room: under sturdy furniture such as a heavy desk or table; against an inside wall; away from where glass could shatter around windows, mirrors, pictures, or where heavy bookcases or other heavy furniture could fall over
  - Locate safe places outdoors such as in the open, away from buildings, trees, telephone and electrical lines, overpasses or elevated expressways.
- Proactive precautions during an Earthquake:
  - Stay inside. The most dangerous thing to do during the shaking of an earthquake is to try to leave the building because objects can fall on you.
  - If Outdoors:
    - Move into the open, away from buildings, street lights, and utility wires
    - Once in the open, stay there until the shaking stops
  - If in a moving vehicle:
    - Stop quickly and stay in the vehicle. Move to a clear area away from buildings, trees, overpasses or utility wires
    - Once the shaking has stopped, proceed with caution. Avoid bridges or ramps that might have been damaged by the earthquake.
- After an Earthquake:
  - Be prepared for aftershocks. Although smaller than the main shock, aftershocks cause additional damage and may bring weakened structures down. Aftershocks can occur in the first hour, days, weeks, or even months after the earthquake.
  - Have the following disaster supplies on hand:
    - Flashlights and extra batteries
    - Portable, battery-operated radio and extra batteries
    - First-aid kit and manual
    - Emergency food and water and a non-electric can opener.

8.5. Messaging

The Public Information Team will assist the Department PI Team in the dissemination of information to the following stakeholders:

- Emergency Response Agencies
- General public
- Nearby and impacted schools and universities
- Media
- Community members
- Commuters
- Businesses
- Local and regional government officials.

The PCM will assist in the notification and outreach effort of stakeholders by utilizing the communication tools listed in the Public Information Plan/ Communication Matrix Forms. In addition, as outlined in the "Department News Media Communications Guidelines" all media requests received by the Public Information Team will be directed to the Department.

The PCM will assist the Department with all media relation efforts including news releases, traffic advisories, coordination of appropriate personnel for interviews (live and taped), media tours and escorts onto the jobsite, and any other additional requests to facilitate pressing media deadlines.

8.5.1. Gathering Information

8.5.1.1. Messaging/What to Say

In the event of a crisis, consistent and clear messaging is critical. The Public Information Team will be on-site and in constant contact with the Crisis Management Team, acquiring the most up-to-the-minute information. From the initial collection of data, a Crisis Data Sheet will quickly be produced for use by the Department Public Information team. This sheet will provide the designated Department Public Information Manager with the necessary information about the crisis and the actions currently under way to manage the situation. Additional Crisis Data Sheets will be updated throughout the event as more information is made available.

Only designated and trained personnel are authorized to conduct media interviews. DO NOT conduct any media interviews until you have been authorized to do so by the Project Manager or PCM, the Department, or an authorized Crisis Team member. Once authorized, you may use one of the following sample approved statements shown in Figure 22 until an official Department spokesperson arrives.

In general, key messages should be guided by the following principles:

- Open, honest and accurate
- Always communicate that our first concern is for the safety of the workers on site and the local community
- The secondary message should always be that the incident is being handled competently and is taken seriously and that all steps necessary will be taken to avoid the incident happening again.

The list of key messages should also include the following information:

- Date/Time of the incident and a general description of what happened
- Cause of specific disruptions (whether construction related or not)
- Actions being taken to alleviate the problem

- Impact to the public and notification procedures
- Instructions for coping with/avoiding the impact (e.g. detours).

Figure 22 | Sample Approved Statements/Buy-Time Statements

Sample Approved Statements/Buy-Time Statements

1. "At approximately (time) we experienced an accident at (location). We have not determined the cause and are devoting all necessary resources to the investigation. Safety precautions have been taken to secure the site. We will provide an update as soon as we have more information."

2. "The cause of the accident is not known at this time. A thorough investigation is currently underway and we will be able to provide more information when the investigation is completed."

3. "The CJV and the Department have had and will continue to have a strong safety program that is enforced by a full time safety officer. The safety of our employees and those who work on the site is our highest priority."

4. "My name is _____ and I am (title) with _____. The incident has just happened and I am not prepared to answer your questions at this time; however, I will do my best to gather whatever facts I can and share them with you at _____(time). As you can imagine, we are all very busy and I need to return to the site for more information. Please stay in this safety area so we can do our job and access this situation. Thank you for your cooperation and I will be back by_____ (time).

8.5.1.2. Fact Preserving Procedures

Often company personnel are not trained in investigative procedures so we must periodically rely on outside insurance investigators to conduct necessary inquiries following an incident to assess liability. By the time an investigator is briefed on a case it is possible there can be substantial time lapse, so it is imperative that company employees take steps in preserving evidence.

Fact preserving procedures overview for company personnel:

__If not already done, dial 9-1-1

__Note names and contact numbers of key emergency personnel

__Introduce yourself to authorities on-site, explaining your need to investigate facts

__Direct movement of equipment or personnel not involved in the incident/accident out of the area

__Without obstructing emergency personnel, try to preserve the scene with photos, diagrams, video camera, and tape recorder

__If possible isolate witnesses taking note of names, affiliation, etc., and how they may be contacted if they are unable to remain at the scene

__Determine all contributing factors and gather any physical evidence and preserve it appropriately (i.e. bundle, seal)

__Instruct personnel not to give out authorizations or information to anyone either in person or by telephone except authorities at the scene

__You may advise authorities of the representative that will be contacting them from either the insurance company or the corporate office.

Prepare a written report on the incident including the following:

- ✓ Location of incident
- ✓ Time of incident
- ✓ Who and what were involved
- ✓ What was sequence of events
- ✓ What is the extent of damage/injury
- ✓ What type of accident occurred

No one is to either accept or deny fault.

8.5.1.3. Procedures for Administration/Insurance Department

The first few hours are critical for potential future insurance claims as a result of a crisis. An insurance carrier representative may be sent to the scene of the crisis. The Safety Manager will be responsible for contacting the Insurance Department.

Checklist for Safety Personnel

__Gather number/names of injured and/or fatalities and obtain phone number(s) of the spouse/family. Contact the Project Manager to determine who should notify the spouse/family.

__Debrief workers who witnessed the accident

__If necessary, initiate a post-accident drug/alcohol test

__Contact OSHA within eight hours for a fatality and/or three or more workers requiring hospitalization. At mine operations, notify Mine Safety and Health Administration (MSHA) immediately for a fatality or a life-threatening injury.

__Initiate a third-party investigation team to work together with authorities

__Designate someone to stay with the injured worker(s) at the hospital until family members arrive

__Document the incident in writing and with photos.

8.5.1.4. First Hour Response Checklist

The Crisis Communication Plan includes the First Hour Response Checklist to ensure all policies and procedures are being conducted in a timely manner. This checklist will be used by the PCM, Safety Manager, Design-Build Manager, O&M Manager and other personnel as a guide for collecting accurate data to convey to the Department and others listed in the plan in the event of a crisis.

FIRST HOUR RESPONSE CHECKLIST

Supervisor on-site:

__Contact emergency services, dial 9-1-1

__Alert a Crisis Team member, starting with the Safety Manager, PCM, Design-Build Manager, and the O&M Manager

__Determine if the site should be shut down

__Make certain that all employees are safe and accounted for

__Do not move anything that could be classified as evidence

__Post workers to restrict entry to the site until deemed safe and all evidence is secured

__Determine what happened, when and where it happened, and who was involved

__Gather name(s) of injured and/or fatalities

__Identify temporary spokesperson with the assistance of a Crisis Team member

__Tell jobsite personnel how to handle requests for information and the name of the person who has been designated as the temporary spokesperson

__Notify the Project Enterprises (in coordination with the Project Manager)

If there is an employee injury/fatality:

__Determine who will notify spouse/family

__Follow policies for notification

__If a non-employee is hurt or killed, allow the authorities to make the notification

__Inform any surrounding construction Project managers that may be affected by the incident

__Instruct employees at the site to contact their families to let them know they are ok

8.5.1.5. Emergency Response Telephone and Email Tree

When the Public Information Team communicates the crisis situation to other "tree members" the message needs to remain clear and consistent. If the PCM is unavailable, the Safety Manager will activate the telephone and email tree.

- If a member is unavailable, leave a message at each contact number and proceed to notify their contacts per above procedures. Information to include:
  - Injuries/Fatalities on scene?
  - Has someone called 9-1-1? Have Emergency Responders been notified? Who is at the scene?
  - Nature / Location / Facts (who, what, when, where and why)
  - Has the Project site been secured, or has controlled access been established?
  - Identify if a supervisor is on scene. If not, who has been called to act as the spokesperson for the Project team until the Department arrives?

5280 Connectors will submit an updated Emergency Response Communications Tree (current version shown in Figure 21) to the Department, for acceptance, prior to the issuance of NTP 1.

8.6. Deliverables and Public Notifications ***

5280 Connectors will submit the following to the Department for information, acceptance, or approval in accordance with the timeframes specified below in Figure 23:

Figure 23 | List and Schedule of Deliverables for Information, Accpetance or Approval

Deliverable	Information, Acceptance or Approval	Schedule
Developer's Communications Team Details	Information	• *Prior to the issuance of NTP 1.* • *Updates submitted quarterly during the Construction Period, annually during the Operating Period and otherwise as required*
Public Involvement Services Contact Sheet	Information	• *Prior to the issuance of NTP 1.* • *Updates submitted annually and otherwise as required*
Stakeholder Distribution List	Acceptance	• *Prior to the issuance of NTP 2.* • *Updates submitted annually*
Construction Period Communications Plan (CPCP)	Approval/Acceptance	• *Prior to the issuance of NTP 1 for Approval* • *Updates submitted annually for Acceptance*
Maintenance and Operations Communications Plan (MOCP)	Approval/Acceptance	• *Prior to Substantial Completion for Approval* • *Updates submitted annually for Acceptance*
CPCP Quarterly Report	Acceptance	• *10 Working Days after 90 Calendar Days after issuance of NTP 2.* • *Updates submitted quarterly thereafter*
MOCP Quarterly Report	Acceptance	• *10 Working Days after 90 Calendar Days after Substantial Completion* • *Updates submitted quarterly thereafter*
Crisis Communications Plan (CCP)	Approval/Acceptance	• *Prior to the issuance of NTP 1 for Approval* • *Updates submitted annually for Acceptance*
Emergency Response Communications tree	Acceptance	• *Prior to the issuance of NTP 1*
Traffic alerts/media releases	Acceptance	• *Weekly by Thursday at 10:30 a.m.*
Lane Closure Reports	Information	• *Weekly by Thursday at 10:30 a.m.*
Newsletters	Acceptance	• *Five Working Days prior to scheduled quarterly distribution date during the Construction Period*
Project identification sign layout	Acceptance	• *To permit installment by 14 Calendar Days following the issuance of NTP 2*
Fliers, posters or other public material	Acceptance	• *As needed, five Working Days prior to the scheduled distribution date or, in cases of rapid response, 48 hours prior to distribution*
Photos	Acceptance	• *Two per month or as requested* • *Aerial photographs annually during the Construction Period*
Video	Acceptance	• *One annually or at key project milestones*
Social media posts	Acceptance	• *As needed, one Working Day in advance of inclusion on social media*
Web page content	*Acceptance*	• *Weekly or as often as reasonably required, two Working Days in advance of inclusion on the website*

8.7. Public Notification

5280 Connectors will comply with the information in Figure 24 in providing the following information to the public:

Figure 24 | List and Schedule of Public Notification Deliverables

Deliverable	Publishing Schedule
Full road closures, detours, and major traffic impacts lasting seven Calendar Days or longer	14 Calendar Days prior to the beginning of activity in any area of the Project
Major project activities (such as major lane shifts, bridge demolitions, etc.) lasting seven Calendar Days or less	7 Calendar Days prior to the beginning of the activity
Other remaining types of Construction activities in any area of the Project including: ▪ Night Work ▪ Heavy Noise Work ▪ Utilities ▪ Change of business/residential access	7 Calendar Days prior to the beginning of activity in any area of the Project or as determined jointly by the Developer and Department
Other construction updates that directly impact the public such as cancellation of planned closures, additional lane closures, closure removals, major traffic shifts, etc.	As soon as known with at least 24 hours notice

SECTION 2.1.18

APPENDIX K: DRAFT SMALL AND DISADVANTAGED BUSINESS PARTICIPATION PLAN

Overview

This Appendix K includes 5280 Connectors' draft Small and Disadvantaged Business Participation Plan (SDBPP). The SDBPP addresses the requirements set forth in Part I of Appendix A to Schedule 15 (Federal and State requirements) of the Project Agreement. It describes roles and responsibilities of staff administrating the plan, as well as our strategic approach to meeting the project's participation goals and assisting businesses as they integrate with our team.

Highlights

Our SDBPP:

- Assigns authority to team members implementing the plan.
- Assigns value to Design Services and Construction Work that is the basis for ongoing monitoring of our progress in meeting participation goals.
- Includes a transparent process for communicating opportunities to the business community.
- Outlines an approach for tracking DBE and ESB participation in the project.
- Describes how we will support businesses in training and development.

5280 Connectors is committed to helping local businesses grow as part of our responsibility to enhance the overall quality of our industry. Through partnerships, workshops and extensive communications, we will succeed in meeting or exceeding our SBE/ DBE goals on this project.

Appendix K

Small and Disadvantaged Business Participation Plan

Central 70 Project

Volume 2
Technical Proposal

June 1, 2017

Contents

Figures

1.0 Purpose

This Small and Disadvantaged Business Participation Plan (SDBPP) provides a detailed process and approach for verifying that 5280 Connectors meets or exceeds all stated goals and objectives as defined by the Project Agreement, Schedule 15, Appendix A, as they apply to the Construction and Operations and Maintenance (O&M) Phases of the Project. This plan shall be executed in a collaborative manner that engages all relevant Project parties in establishing, managing, executing and monitoring those activities required to identify, assist and secure participation from qualified firms. 5280 Connectors shall monitor and review plan activities and utilize an accurate, detailed reporting process to make certain that plan participation information is accurate and that all firms meet the requirements of a Commercially Useful Function (CUF).

Our team commits to meeting or exceeding the stated goals and working together with all Project parties to execute a well-developed and managed program that facilitates successful achievement of the goals.

2.0 Reference Documents

The following reference documents form the basis of this plan's structure:

- Central 70 contract documents
  - Project Agreement, Schedule 15, Appendix A
  - Instructions to Proposers
- 49 CFR § 26.55,

3.0 Abbreviations and Definitions

All capitalized terms have the meaning as providing in the Project Agreement unless otherwise specified herein.

CRPM Civil Rights Program Manager

DBE Disadvantaged business enterprise

EEO Equal employment opportunity

ESB Emerging small business

RFP Request for Proposal

SBE Small Business Enterprise

SDBPP Small and Disadvantaged Business Participation Plan

4.0 Part I. Small and Disadvantaged Business Participation Plan (SDBPP)

4.1. Small Business Program Team Members

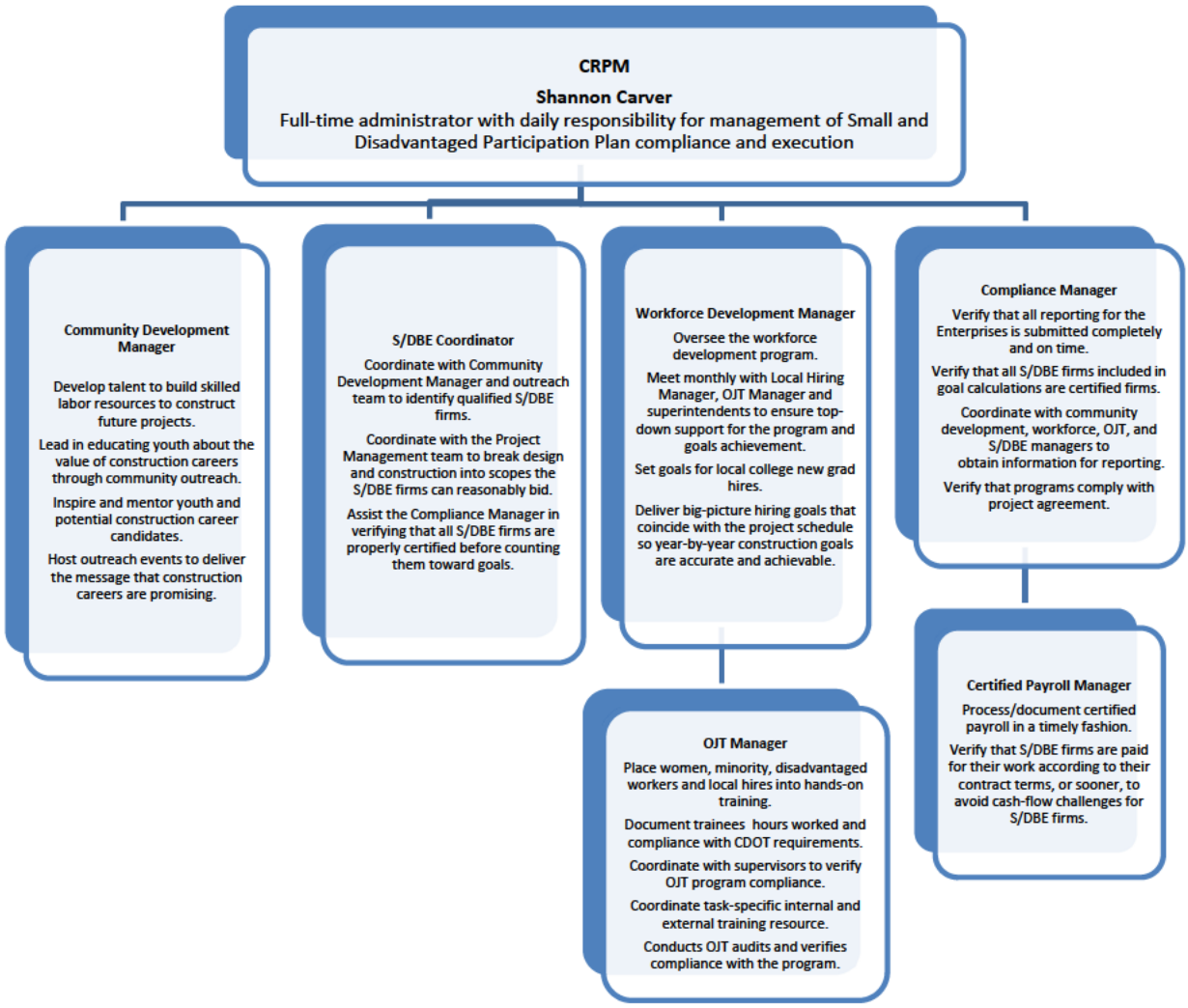
5280 Connectors designates Civil Rights Program Manager (CRPM) Shannon Carver to administer this plan. Figure 1 illustrates the organizational structure of our Small Business Program Team. Shannon has extensive experience managing Small and Minority Business compliance programs on transportation-related construction projects and will bring this experience to our team in leading our SDBPP efforts. Our CRPM is responsible for developing, implementing, monitoring, and managing the day-to-day operations of this plan. The CRPM will report directly to the Design-Build Manager and will also be a critical connection between our team's senior management, Subcontractors and stakeholders.

With the support of our leadership team, Shannon commits to the following key functions, so that opportunities will be available to small firms on this Project:

- Implementing the SDBPP, keeping it up to date with current Project circumstances, and verifying that all 5280 Connectors employees and Subcontractors comply with the plan and Small Business Program requirements.
- Advising the Design-Build Manager on small business matters and achievements.
- Preparing and submitting monthly and quarterly reports to CDOT on plan implementation, including good-faith efforts, activities and small business participation.
- Monitoring and analyzing our progress toward meeting goal commitments and making adjustments, as necessary, to maximize small business participation.
- Verifying compliance with CDOT's Small Business Program requirements and related Federal, State and local requirements.
- Coordinating Small Business Program meetings and deliverables with CDOT, local agencies and the business community.
- Establishing and maintaining relationships with interested businesses, including small businesses, as well as local agencies and business organizations and associations.
- Providing supportive services to small businesses in obtaining management, technical and business development expertise, bonding, insurance, lines of credit, and other assistance.
- Including small businesses in our solicitation process for design, construction and other support services.
- Performing extensive small business outreach through participation at workshops, minority business enterprise seminars, trade fairs and other small business-focused events.
- Making bid notices and requests for proposals readily accessible and promptly disseminating them to the small business community.

The CRPM will coordinate with CDOT's Small Business Program staff, including the facilitation of quarterly and other planned meetings to report on progress of the plan implementation.

Figure 1 | Small Business Program Team Members



4.2. Strategic Approach for Meeting Goals during the Construction Period

5280 Connectors have already begun work to meet the 11.6% Designer Services and 12.5% Other Construction Work disadvantaged business enterprise (DBE) goals, as well as the 3% Design Services and 3% Other Construction Work emerging small business (ESB) goals. Our process began during the proposal phase with a complete canvassing of firms and holding outreach events for the Colorado business community to identify all certified DBE and ESBs, and those with the potential to be certified, that can support the scopes of services needed for the Project. We maintain the list of identified DBE and ESB firms in our Subcontractor database, which we use to communicate our activities and project information firms that are interested in the Project.

Based on the scopes of Work provided by the identified and interested DBE and ESB firms, we will identify specific contract opportunities of appropriate sizes and scopes that those DBE and ESB firms can

reasonably perform. We will include DBE and ESB firms in bid opportunities for work packages that match their North American Industry Classification System (NAICS) codes, usual scopes of service, and capacities. In some cases, we will offer bid packages only to small business firms, and in others to a combination of DBE, ESB and other businesses.

We will define work packages that position the Project to meet its stated DBE and ESB goals. Our work packaging process is consistent with the best practices of the Federal DBE program regarding DBE/ESB participation on design-build projects.

When appropriate, we will provide support services to assist DBE and ESB firms in overcoming specific barriers to their participation. Section 4.3 of this appendix, "Approach to Small Business Development and Assistance," outlines those support services.

Major Subcontractors and Vendors on our team must follow the same approach to attain DBE and ESB participation. In compliance with the Project Agreement, subcontract documents will specifically include a requirement for each major subcontractor to achieve agreed-upon minimum DBE and ESB participation levels. We will develop these levels so the Project meets or exceeds all of its participation goals. Major Subcontractors must submit monthly reports of dollar amounts awarded and paid to DBE and ESB firms to verify that SDBPP implementation proceeds according to schedule and that the teams meet DBE and ESB participation goals. We will address any Subcontractor's issues in complying in good faith with the agreed-upon DBE and ESB participation levels.

4.2.1. Process to Identify and Solicit SB Firms

5280 Connectors' goal is to solicit, through all reasonable means, the interest of DBEs and ESBs in Colorado, with specific focus on certified firms located in the Denver area.

We recognize that a key challenge to DBE and ESB participation on major public works projects is awareness of bid opportunities with enough lead time for these firms to act. To help DBEs and ESBs overcome this challenge, our team has taken the initiative to canvass Colorado and major surrounding cities to identify certified firms that provide construction, design/engineering, and other support services. We will include these businesses in an ongoing communications campaign to prepare them to do business with our team for upcoming bid opportunities.

To help in those preparations, we collected certified DBE and ESB firms from the following databases:

- Colorado Unified Certified Program Database
- AGC member Subcontractors in Colorado, Arizona and Utah
- Attendees from our small business outreach events (see Figure 2)

Figure 2 identifies Subcontractor outreach activities that our team participated in during the proposal phase. We have added interested firms to our subcontracting and communications database, which we will maintain throughout the life of the Project. We supplement the database quarterly with any newly certified DBE and ESB firms.

Figure 2 | 5280 Connectors DBE/ESB Events

Outreach Event	Date	Location
5280 Connectors	March 17, 2017	Phoenix, AZ
5280 Connectors	March 15, 2017	Denver, CO
5280 Connectors	August 31, 2016	Phoenix, AZ
5280 Connectors	July 26, 2016	Salt Lake City, UT
5280 Connectors	June 14, 2016	Denver, CO
CDOT	October 22, 2014	Denver, CO

Registered Vendors in our database provide additional information on the types of services they provide. We invite Vendors whose scopes align with Project needs to participate in the prequalification process, taking them one step closer to doing business with our team. Prequalified firms are well-positioned to bid on work packages and will be invited to submit quotes.

In addition to prequalified construction Subcontractors, we will solicit DBE and ESB Subcontractors for additional Project support and administrative functions that do not require prequalification. These include printing, catering, delivery service, audio/visual support, and other Project support services.

We have established a team website (www.5280Connectors.com). The intent of the site is to further advertise contracting and procurement opportunities to small business firms and to share information on the team's involvement in local community events. These activities will, in turn, increase the positive public perception of the Central 70 Project within the community.

The website will provide an interactive resource where Contractors can report their interest in the Project and provide information on their qualifications, and it includes the following:

- Contact information for our CRPM
- Invitations to public meetings, with special emphasis on those relevant to the small business community
- Vendor registration and bidder/proposer prequalification criteria and requirements
- Technical assistance resources, such as small business loan and bonding assistance programs
- Links to other related websites of interest

We will continually promote the website in mailings, emails and newsletters distributed to small businesses, local businesses and small business organizations and advocacy groups, religious and community organizations, and the news media.

4.2.2. Approach to Value Calculation

4.2.2.1. Construction Work Small Business Goal Calculation

The goals will be calculated as follows:

A. The Construction Work to be performed during the Construction Period are separated (i) into design-related activities ("Design Services") (as further defined below) and (ii) all other Work to be performed during the Construction Period under the terms of the Construction Contract (excluding, for certainty, O&M Work During Construction) ("Other Construction Work").

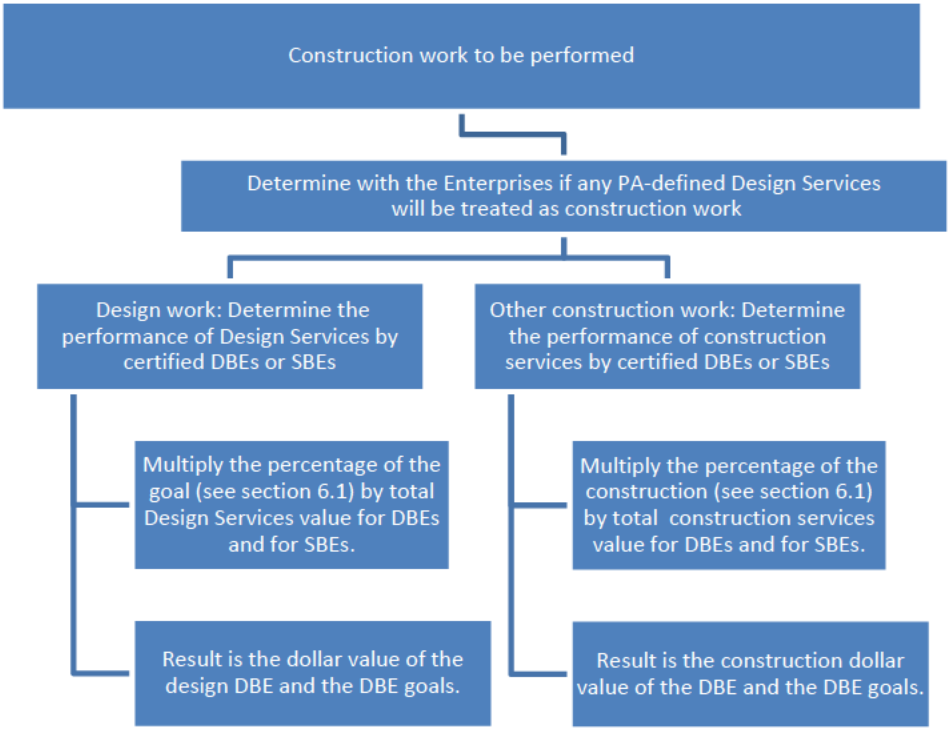
B. "Design Services" are comprised of all program management, construction management, feasibility study, preliminary engineering, design, engineering, surveying, mapping, and architectural related services that comprise part of the Construction Work; provided, however, that, (i) the following (or equivalent) Design Services performed by our team or Subcontractors such as construction surveying, erosion control consulting, health and safety plans, and public involvement may, at our reasonable discretion, be considered Other Construction Work and (ii) we may request that any other Design Services that are under the direct control of the Lead Construction Contractor team be included in the Other Construction Work subject to the Department's consent. We will establish whether design-related activities under the direct control of the Lead Construction Contractor will be considered in Design Services or Other Construction Work and make any other requests for modifications to these categories in our SDBPP. The Department may request additional data to verify the value of the Design Services.

C. The dollar value of the DBE Design Goal and ESB Design Goal will each be determined by multiplying the percentage of the goal set out in Section 6.1 of Schedule 15 by the total value of the Design Services. Subject to Section 3 of this Part II of Appendix A, only the performance of Design Services by DBEs and ESBs, respectively, will count toward achieving the respective goals, provided that (for certainty) the

participation in the performance of Design Services by a firm that is certified as both a DBE and an ESB will count towards the achievement of both goals.

D. The dollar value of the DBE Construction Goal and ESB Construction Goal will each be determined by multiplying the percentage of the goal set out in Section 6.1 of Schedule 15 by the total value of the Other Construction Work. Subject to Section 3 of Part II of Appendix A, only the performance of Other Construction Work by DBEs and ESBs, respectively, will count toward achieving the respective goals, provided that (for certainty) the participation in the performance of Other Construction Work by a firm that is certified as both a DBE and an ESB shall count towards the achievement of both goals.

Figure 3 | Construction Work Small Business Goal Calculation



4.2.3. Counting Eligible Participation

Unless otherwise specified in Appendix A, eligible DBE participation will be counted in accordance with 49 CFR 26.55. ESB participation will be counted in the same manner as DBE participation with the exception that ESBs do not have work codes and therefore are not limited to performance in certain work areas.

4.2.3.1. Accepted Small Business Commitment

In order for the work performed by a DBE or ESB to count toward achieving a Construction Work Small Business Goal, we must have an Accepted Small Business Commitment for the Work to be performed. All proposed Small Business Commitments to DBE and ESB firms must be submitted to the Department for Acceptance prior to the DBE or ESB commencing work in order for the participation to be counted toward the relevant Construction Work Small Business Goal. Once Accepted, Small Business Commitments are enforceable obligations from the Developer under this Agreement. Each DBE and ESB firm must be certified for the work to be performed upon submission of the Small Business Commitment.

4.2.3.1.1. Firms Not Listed in Its Annual Small Business Commitments

For firms not listed in our annual small business commitments, we must submit a "Commitment Confirmation Form," in a form to be agreed between the parties (both acting reasonably), no later than the

tenth Working Day of each month during the Term. The Commitment Confirmation Form must be submitted no earlier than 90 Calendar Days prior to the firm commencing work.

4.2.3.1.2. Trucking

For trucking participation by DBE and/or ESB firms, we may submit an overall trucking commitment for an annual period with a list of DBE or ESB firms that will perform work under such commitment. Each DBE and ESB firm listed may provide no more than $100,000 of participation under this commitment. We will submit a Commitment Confirmation Form for each listed firm and the annual overall commitment for each goal will be submitted for Approval concurrently with its list of annual small business commitments. For any individual trucking firm with a commitment more than $100,000, we will submit a separate Small Business Commitment for that firm.

4.2.3.2. Applicable Work Areas

The Work performed by a DBE or ESB must be reasonably construed to be included in the work area identified by our team in the Accepted Small Business Commitment. DBE firms must be certified in the applicable work code (NAICS code plus descriptor) for the work to be performed. A DBE cannot receive credit for work in an area for which it is not certified.

4.2.3.3. Noncertified Trucking Firms

The Department's DBE Program does not permit the counting of participation by noncertified trucking firms.

4.2.3.4. Reasonable Fees

In accordance with 49 CFR 26.55(2), we can only count a reasonable fee for contract-specific services toward achieving the relevant Construction Work Small Business Goal. Non-contract-specific expenses will not be counted. In the case of temporary employment placement agencies, only the placement fee and fees for a temporary employee that will be specifically and exclusively used for work on the Project will count toward achieving the relevant Construction Work Small Business Goal; the temporary employee's hourly fee will not count.

4.2.3.5. Certification

Work by a DBE or ESB firm that was not certified for the work to be performed upon execution of its Subcontract may not count toward achieving the relevant Construction Work Small Business Goal. If a DBE or ESB is decertified in the work to be performed after Acceptance of a Small Business Commitment and the execution of a Subcontract, we may still count the DBE or ESB participation toward achieving the relevant Construction Work Small Business Goal.

4.2.3.6. Trucking Firm Listing Not a Guarantee

Being listed as a trucking firm does not guarantee the relevant firm work. We can achieve our annual trucking commitment by using any combination of the listed firms (so long as any one firm does not exceed $100,000).

4.2.3.7. Joint Ventures

If we seek to count participation by a DBE or ESB firm engaged in a joint venture, we must seek Acceptance from the Department of the joint venture's eligible participation by submitting the joint venture agreement explaining the work and management arrangement between the joint venture.

4.2.4. Commercially Useful Function ("CUF") Reviews

All DBEs and ESBs must perform a commercially useful function as defined by 49 CFR § 26.55.

We will monitor all DBE and ESB firms to ensure those firms are performing a CUF. The Department shall determine whether a DBE or ESB firm has performed a CUF on the Project. If the Department determines

that a firm is not performing a CUF pursuant to 49 CFR § 26.55, no work performed by such firm will count toward achieving the relevant Construction Work Small Business Goal.

The use of joint checks to DBEs and ESBs must be Approved by the Department before used to make a payment. We must request Approval for the use of a joint check in a written letter signed by the DBE/ESB and the Developer, stating the reason for the joint checks and the approximate number of checks that will be needed.

4.2.5. Schedule for Achieving the Construction Work Goals

Our preliminary schedule for achieving the Construction Work goals is provided in Figure 4. During preconstruction, it is the responsibility of the CRPM to work directly with our procurement, scheduling, design and construction planning staff to develop a detailed schedule for achieving the goals. This schedule will become a roadmap for our team to follow as we identify and procure eligible firms in order to meet these goals.

Figure 4 | Preliminary Schedule for Achieving Construction Work Goals

	Goal	Year 1	Year 2	Year 3	Year 4	Year 5
DBE						
Design	11.6%	8.70%	2.32%	0.23%	0.23%	0.12%
Construction	12.5%	0.63%	3.13%	3.13%	3.13%	2.50%
ESB						
Design	3%	2.25%	0.60%	0.06%	0.06%	0.03%
Construction	3%	0.15%	0.75%	0.75%	0.75%	0.60%

4.2.6. DBE/ESB Areas of Work

5280 Connectors will seek DBE or ESB firm participation in numerous aspects of the Project, including bridges; tunneling and shafts; drainage and utilities; roadway and maintenance of traffic; walls; railroads; demolition; lighting, signs, signals, and ITS; and systemwide functions. We anticipate that the following percentages of all Construction Work will apply to these various key applicable work areas:

- Civil, roadway and environmental: 39%
- Structures: 26%
- Electrical and ITS: 10%
- Third party relocations: 7%
- MOT and erosion control: 12%
- Design: 6%

We will proactively approach meeting the goals with ready, willing and able DBE and ESB firms to perform the applicable work. If already selected, DBE or ESB team members will be identified in respect of their relevant work areas. We will consult the directories at www.coloradodbe.org and www.coloradoesb.org to meet the goals.

4.2.7. Integrating Small Business Participation into the Approach to Subcontracting

We will implement a strategic approach to integrating achievement of small business participation into the overall approach to subcontracting.

4.2.7.1. Communicating Opportunities

Initially, our communication will occur at outreach events, offering interested DBE and ESB firms the

opportunity to gather information about the Project and interact with our team. We will invite firms identified in the directories at www.coloradodbe.org and www.coloradoesb.org to participate in outreach events. As the Project progresses, opportunities will also be posted to the Project's SharePoint site and to the 5280 Connectors and Project websites. Communication will also occur via other sources, including SB resource assistance centers, Chambers, Minority and Industry Contractor Associations, Procurement and Technical Assistance Centers, newspapers and various social media outlets.

4.2.7.2. Clear, Transparent Process

From our initial outreach events through Project completion, 5280 Connectors will create a clear, transparent process in awarding subcontracts to all firms, including DBE and ESB firms. Hosting open, public outreach events to publicize the Project and subcontracting opportunities will help verify that all firms receive equal and complete access to information about upcoming opportunities and likewise make any comments or responses to questions public knowledge. For those who are unable to attend these meetings in person, we will post minutes to the 5280 Connectors website.

All subcontracting opportunities will be posted to the Project and 5280 Connectors websites, meaning all interested firms will have access to the same Project information and will be given sufficient notice to apply for opportunities. Finally, we will monitor and track opportunities to fairly and accurately account for all participation.

4.2.7.3. Establishing Opportunities

Although our team members Skanska and Zachry are self-perform Contractors, we place high value on the participation of DBE and ESB firms. These firms are often innovators that bring unique insight and perspective. Helping to grow the community to expand the pool of high quality local DBE and SBE Subcontractors benefits the industry and community as a whole. With this commitment in mind, we will actively work to establish attainable opportunities for subcontracting.

One key method to encourage and support opportunities for DBE and ESB firms is to unbundle services allowing for smaller firms to better compete on projects. For example, 5280 Connectors have identified the specific types of work shown in Figure 55 as likely candidates for DBE and ESB participation.

Figure 5 | Work Types for DBE and ESB Participation

Category	Work Types
Office products and services	Catering General office supplies Printing and plotting supplies Reproduction of plans Office furniture Coffee and kitchen supplies Computer purchases Building Cat5 wiring for network requirements Training supplies Safety supplies Team branding items like shirts and jackets Office janitorial Dumpsters Deck construction at our offices
Construction products and services	Lumber and plywood Oil, nails and form ties Curing compound Epoxy Saws, drills and just about any other type of power tool Hand tools and expendables Sheet pile, H-Pile and many other steel shapes for temporary and permanent use

Category	Work Types
	Equipment mobile fueling services Power washing services Welding services
Roadway work	Guardrail and attenuators Fencing Erosion control devices Traffic control devices Roadway sweeping Pavement markings Signing Lighting Signalization Architectural pavers Concrete flatwork like sidewalk, ramps, ADA, traffic separators Concrete slipform of barrier wall, curbs, gutters Storm drainage Water and sewer work Trucking Painting and coatings for structural steel and concrete Clearing and grubbing
Bridge and wall work	Rebar installation Girder erection Bridge demolition MSE walls CIP walls Waterproofing membrane work Bridge rail Grooving and grinding Decorative elements like ornamental railings Piling and drilled shaft foundations Vibration and noise analysis
Work specific to the 4-acre cover/urban park	Jet fan installation Fire & life-safety items such as deluge system, valves, fire extinguishers Tunnel lighting Tunnel railings Architectural surface items such as pathway lighting, pavers, landscaping, irrigation, court construction Painting and coatings Tunnel communication systems such as PA, exit signing and lighting
Design opportunities	Potholing and site investigation Design engineering support – all disciplines Architectural design Environmental engineering Traffic management engineering Design quality management support Office support Administrative services and materials
Operations and Maintenance opportunities	Maintenance services support Quality control management support Maintenance of traffic support Office support Administrative services and materials

4.2.8. Monitor and Track Participation

We will track and disclose all participation electronically to allow access to current, accurate information. Tracking information will go beyond the monitoring of the number of DBE and ESB firms offered contracts in support of the Project goals. We will provide complete tracking of DBE and ESB participation, attendance at outreach events, and correspondence between interested Subcontractors and our team. We will track and report on actual DBE and ESB work performed under the Commercial Useful Function requirements, including actual payments made to the firm as each tier to verify that participation numbers are correct and fully auditable.

5280 Connectors will disclose to CDOT the cumulative value of the Design Services and Other Construction Work, and the value of all individual Subcontracts (not just DBE or ESB Subcontracts), and we will assist CDOT in verifying this information by supplying contracts and payment documents for review upon request.

1. Monthly reports: We will submit monthly summary reports of these values in accordance with Schedule 8 (Project Administration) no later than the tenth Working Day of each month during the Construction Period. The report will include the following:
    a. Subcontractor Participation and Payment: We will outline the total value of (1) Design Services, (2) all Other Construction Work, (3) Routine O&M Work and (4) all other O&M Work during Construction to date, and provide a detailed breakdown of all Subcontractors that have participated on the Project to date, separated by these four categories of Work. The reports will include the (i) firm name; (ii) whether the firm is an ESB or DBE and the Small Business Commitment amount to the firm and whether the firm is a Small Subcontractor; (iii) Subcontract amount, area of work performed, total paid to date to the firm, most recent invoice date and amount, and most recent payment date and amount; (iv) identification of all parties to the relevant Subcontract and to the higher and lower tier Subcontracts associated with the Subcontract; and (v) any other relevant information to facilitate the Enterprises' assessment of compliance with Section 17.5 of the Project Agreement in relation to the Subcontract.
    b. Outreach and Upcoming Opportunities: We will describe work areas on the Project for which we are seeking Subcontractors and include upcoming outreach and training events.
    c. Compliance Issues Report: We will report the details of any issues that the Department should be aware of regarding DBE and ESB participation on the Project, including payment disputes, non-performance by DBEs and ESBs, significant scope of work changes, potential CUF concerns or other performance issues.
2. Semiannual Assessment: In addition to the monthly reports, we will also submit to CDOT a semiannual assessment of progress toward achieving the Construction Work Small Business Goals, including a summary of solicitation and good faith efforts to date and anticipated DBE and ESB participation for the next six months.
3. Uniform Report of DBE Awards or Commitments and Payments Form: By May 15 and November 15 of each year, we will submit to a completed Uniform Report of DBE Awards or Commitments and Payments Form completed in accordance with Appendix B of 49 CFR Part 26.
4. Annual Performance Progress Report and Reviews: We will also submit an annual report, no later than 30 Calendar Days before the end of each Contract Year, and prior to the annual progress review conducted in respect of such Contract Year, as outlined in Project Agreement, Schedule 15, Section 1.2.4. This report will include the following information:
    – Bidders List: We will list all firms that submitted a quote to participate on the Project and include a description of the work for which the bid was submitted, whether the firms are DBE or ESB, and whether they were selected for the work.

- Participation Assessment: We will submit a summary and assessment of DBE and ESB participation of the past Contract Year and total to date progress made toward achieving the Construction Work Small Business Goals.
- Strategies for continuing implementation of the SDBPP: We will include proposed areas of work for DBEs and ESBs and outreach efforts for the next Contract Year.
- Request for Amendment: If necessary, we may request to amend the SDBPP in the unlikely event that we have not met the annual target for the current Contract Year or other commitments detailed in the SDBPP. The request will include a revised schedule of annual targets for each Construction Work Small Business Goal. A revised schedule of annual targets will include a description of our approach to making up the participation not achieved during the current Contract Year.

5. Department Annual Assessment: Within 30 Calendar Days after each Annual Performance Progress Review conducted per Section 1.2.4 of Schedule 15, CDOT shall provide a written determination on the our progress toward achieving the Construction Work Small Business Goals. We will review CDOT's assessment of our progress, which will be based on our demonstrated good faith efforts, compliance with its SDBPP and meeting the schedules and milestones described in the plan, and we will make adjustments as necessary based on CDOT feedback.
6. Final Report: We will submit our final report on DBE and ESB participation during the Construction Period no later than 30 Calendar Days prior to the Substantial Completion Date. It will summarize total DBE and ESB participation toward achieving each of the Construction Work Small Business Goals, and it will include the Small Business Commitment amount, the actual dollar amount paid to each DBE or ESB firm, the eligible participation amount, area of work performed, and the total value of the Design Services and Other Construction Work. If we fail to achieve any Construction Work Small Business Goal as of the Substantial Completion Date (as determined by CDOT, per Schedule 15, Appendix A, Section 8, Part III), we will submit an updated report no later than 30 Calendar Days prior to the Final Acceptance Date.
7. Department Report: CDOT has committed to evaluating the report data we submit to comply with Schedule 17, Appendix A, Part III, Section 7. CDOT's evaluation will determine whether we (i) achieved each of the Construction Work Small Business Goals as of the Substantial Completion Date (or, as applicable, as of the Final Acceptance Date) and (ii) in relation to any such goal that has not been met, demonstrated that we made good efforts to achieve such goal. CDOT has also committed to setting out these determinations in a report, which we will review and use to inform any Construction Work Small Business Goals planning for future collaboration with the Enterprises.

4.3. Approach to Small Business Development and Assistance

4.3.1. Prompt Subcontractor Payment

Cash flow is crucial to the success of any business enterprise, and we are considerate of the challenges DBE and ESB firms face while participating in major public works projects. Ensuring prompt payment to all Subcontractors, including DBE and ESB firms, allows Subcontractors to focus their best efforts on creating the highest quality project, without utilizing their resources chasing down errant payments. For this reason, we will actively minimize the time between Subcontractor invoices and payments, including the use of joint check payments where applicable and Approved by the Department.

We will work diligently with our Subcontractors to verify they are properly trained on how and when to submit invoices for prompt payment, as well as provide training on other administrative requirements of the Project Agreement for which Subcontractors have responsibility to comply.

Subcontractor invoicing, payments and retention will be tracked and monitored by our team. An accounts payable reporting system (JD Edwards) will confirm invoices received, payments made, and the status of outstanding invoices including retention. Our team will assist Subcontractors in the process of resolving outstanding paperwork requirements to facilitate efficient resolution of monthly invoicing requirements. Typical paperwork requirements include certified payroll records, partial and final lien waivers and insurance certificate renewals.

4.3.2. Bonding and Insurance Assistance

5280 Connectors will transparently list our requirements for insurance, bonding and the like as set forth by CDOT. We will collaborate with businesses that cannot meet those requirements on a case-by-case basis that best supports both the success of the Project and the inclusion of otherwise qualified firms.

4.3.3. Small Business Outreach, Training, and Development

Our teams early outreach efforts are provided in Figure 2. A primary outreach objective is educating DBE and ESB firms about the processes by which they can participate on the Project. To meet this objective, our DBE and ESB outreach and training program will focus on:

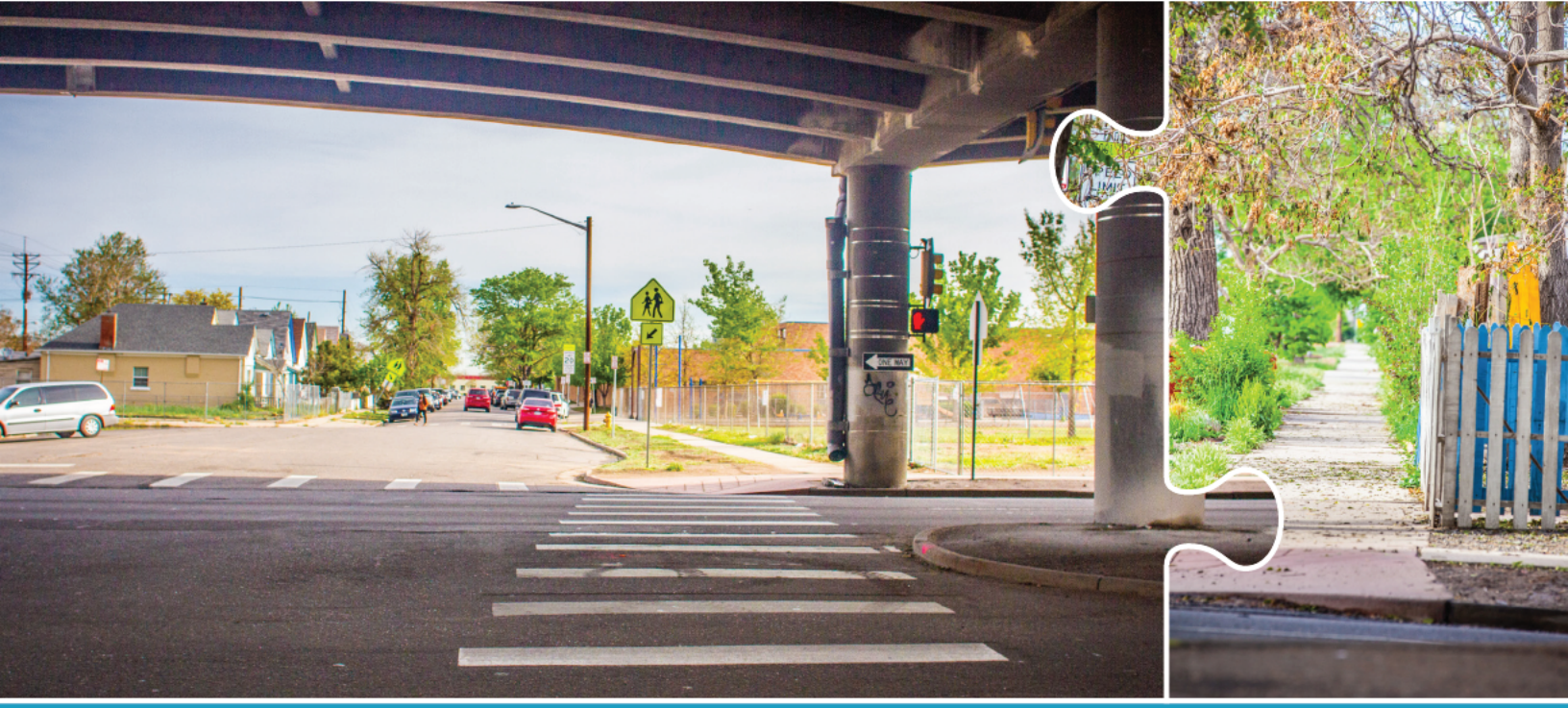
- Strategic business development (accounting, problem solving, business analysis, project management, and time management)
- Strategic relationship development (leadership and motivation, networking, communication, and professionalism)
- Specific training that focuses on informing the DBE and ESB Subcontractor community of upcoming bidding opportunities and providing business resources, as well networking opportunities with other Contractors and the Project team
- Access to Project technical information needed to accurately estimate and develop competitive bids

Outreach, training and development activities that our team will perform include:

- We will conduct a mandatory outreach event directed at DBE and ESB firms after the Agreement Date and prior to the issuance of NTP2. Key 5280 Connectors staff will attend and share project information and specific details regarding subcontracting opportunities and the process through which candidate firms can access project scope information and bid work.
- We will collaborate with and utilize CDOT's established Connect2DOT Program (www.connect2dot.org).
- We will collaborate directly with CDOT to develop and facilitation one or more Connect2DOT Transportation Leading Edge Courses for firms participating or seeking to participate in the Construction Work. We will provide key technical and leadership staff to participate directly in this

training and work with CDOT to tailor the curriculum to specifically address training needs that will directly address DBE and ESB firm needs.

- Our team will regularly bring Project updates to and participate in CDOT's quarterly Small Business Collaborative Forums.
- On a monthly basis, we will provide CDOT with a list of upcoming subcontracting opportunities and events for distribution via the Connect2DOT newsletter.
- We will make our key project staff available to participate in project-specific training and informational sessions with interested firms geared towards sharing project bidding requirements and procedures as well as hands-on training in industry skills areas. Our team member firms have hosted multiple day educational training sessions for small businesses in a classroom environment. With CDOT's approval, we will collaborate with them to develop and implement one or more of these classes in the local community.
- Project scope and technical information will be posted in an electronic format for interested firm to access via the internet. Interested firms will be invited to visit our staff in person to ask questions and obtain technical clarifications regarding the scope of work.
- We will meet with CDOT to discuss training/mentor protégé opportunities that our team can provide to further support our outreach and development activities.
- We will host introductions between small Contractors and project managers during scheduled sessions. The purpose and intent is to build relationships between the DBE and ESB firms and key 5280 Connectors project management staff.



SECTION 2.1.19

APPENDIX L: DRAFT WORKFORCE DEVELOPMENT PLAN

Overview

This Appendix L includes 5280 Connectors draft Workforce Development Plan that addresses the requirements set forth in Part I of Appendix B to Schedule 15 (Federal and State Requirements) to the Project Agreement.

It describes roles and responsibilities for those responsible for our Workforce Development Plan, our strategic approach to meeting the Project's participation goals, our on-the-job training plan, and our local hiring plan.

Highlights

Our Workforce Development Plan:

- Includes a commitment statement.
- Assigns authority to team members implementing the plan.
- Describes skilled craft areas where trainees and apprentices will be used and how we will train them on the Project.
- Outlines how we will recruit for our on-the-job training plan.
- Outlines an approach to tracking our progress on meeting the goals for the Project.

5280 Connectors understands that growing a well-trained workforce in the construction trades not only enhances the Project and community perception but also fosters a truly sustainable Project that enhances the quality of life for the community after the Project is completed and for years to come.

Appendix L

Workforce Development Plan

Central 70 Project

Volume 2
Technical Proposal

June 1, 2017

Contents

Figures

1.0 Purpose

The purpose of this Plan is to outline an achievable and measureable process to provide the necessary workforce recruitment, training and development of local staff necessary to meet or exceed the on-the-job training and local hiring goals set forth in Schedule 15 of the Project Agreement.

2.0 Reference Documents

The structure of this Workforce Development Plan is based on the following reference documents:

- Central 70 Contract Documents, per Final Request For Proposal issued April 25, 2017 and addenda
  - Project Agreement, Schedule 15, Appendix B, Part 1
  - Instructions to Proposers

3.0 Terms and Definitions

Except as otherwise specified herein, or as the context may otherwise require, the following terms have the respective meanings set out below for all purposes of this plan. All terms provided in Central 70 Project Agreement Annex A: Definitions and Abbreviations also apply.

Approval	has the meaning given to it in Project Agreement Section 2.2.3.b and "Approve" and "Approved" shall be similarly construed.
Calendar Day	means a calendar day as determined by reference to the time and date in Denver, Colorado, and "day" means any such calendar day.
City of Denver	means the City and County of Denver, Colorado.
Civil Rights Requirements	has the meaning given to it in Section 1.1.1 of Schedule 15 (*Federal and State Requirements*).
Construction Period	means the period that begins on the earlier to occur of the date of issuance of NTP1 and the Financial Close Date and ends on (and including) the Substantial Completion Date.
Construction Period OJT Goal	has the meaning given to it in Section 6.3.1.a of Schedule 15 (*Federal and State Requirements*).
Contract Year	means a period of 12 months commencing on (and including) July 1 of each Calendar Year, provided that: the first Contract Year shall be the period commencing on (and including) the Agreement Date and ending on the immediately following June 30; and the final Contract Year shall be the period commencing on (and including) July 1 immediately preceding the last Calendar Day of the Term and ending on that last Calendar Day of the Term, where each of June 30 and July 1 shall be determined by reference to the time and date in Denver, Colorado.
CRPM	Civil Rights Program Manager; has the meaning given to it in Section 1.1.1 of Schedule 15 (*Federal and State Requirements*).
Department	means: CDOT acting pursuant to a delegation of authority by the Enterprises pursuant to Project Agreement Section 18.1.2; or the Enterprises, but only if and to the extent that: the context may require; or the Enterprises otherwise notify Developer.

Developer	5280 Connectors
Developer Employee Redundancy Payments	means the amount of all payments of wages earned, accrued unused vacation time, and any other payments required by Law or required by Developer's employment agreement with Developer's employees, which in each case have been or will be reasonably incurred by Developer as a direct result of termination of this Agreement.
Document Control System	means the system established and maintained by Developer pursuant to Section 13.1.1 of Schedule 8 (*Project Administration*).
FHWA	has the meaning given to it in the Recitals.
FHWA 1273	has the meaning given to it in Section 2.5.1 of Schedule 15 (*Federal and State Requirements*).
Good Industry Practice	means that degree of skill, care, prudence, foresight and practice which would reasonably and ordinarily be expected from time to time of a skilled and experienced professional designer, engineer, constructor, maintainer or operator, as applicable, engaged in the same type of activity in North America as that of Developer, or any other Person to which such term relates, seeking to comply with all Law and the same type of obligations and responsibilities in North America as the obligations and responsibilities of Developer under this Agreement and/or the obligations and responsibilities of such Person under the same or similar circumstances.
Local Agency	means any local Governmental Authority other than the State or an agency thereof.
Local Hiring Goal	has the meaning given to it in Section 6.3.1.b of Schedule 15 (*Federal and State Requirements*).
OJT	on-the-job training
Renewal Work DBE Goal	has the meaning given to it in Section 6.2.2.f of Schedule 15 (*Federal and State Requirements*).
Renewal Work OJT Goal	has the meaning given to it in Section 6.3.2 of Schedule 15 (*Federal and State Requirements*).
SDBPP	has the meaning given to it in Section 5.1 of Schedule 15 (*Federal and State Requirements*).
Small Business and Workforce Goals	has the meaning given to it in Section 6.1 of Schedule 15 (*Federal and State Requirements*).
Subcontractor	means any party, other than Developer, to a Subcontract.
Supplier	means a Subcontractor that primarily provides goods and/or materials, but not services, under the terms of its Subcontract.
WDP	has the meaning given to it in Section 5.1 of Schedule 15 (*Federal and State Requirements*).
Workforce Development Goals	has the meaning given to it in Section 6.3 of Schedule 15 (*Federal and State Requirements*).

4.0 Part I. Workforce Development Plan

4.1 Statement of Commitment

5280 Connectors, a consortium consisting of Plenary, Skanska, Zachry, and HDR, is responsible for the design, construction, operations and maintenance of the Central 70 Project for the Enterprises. Our team includes skilled professionals in the design, construction, and operations and maintenance of major transportation systems across the United States and more prominently in the Denver region.

The Central 70 Project presents an opportunity to provide employment and career options for a very diverse local community. Instituting a skilled workforce will be a significant factor in delivering this challenging Project. It is evident that the industry is affected by a downturn in the number of individuals entering the construction workforce. At the same time, there is a higher demand for those same construction professionals to meet the needs of the growing market. In order to meet the labor demand of this large Project, it will be necessary to develop a hiring and training plan that focuses on acquiring the right individuals from the local community, training them to specialize in their given trade, and providing apprenticeships that turn into professional careers through implementation of the on-the-job training program.

The Project team is proud to have the opportunity to give back to the local community and is committed to meeting or exceeding the Construction Period OJT Goal and Local Hiring Goal as set forth in the Instructions to Proposers and Schedule 15 of the Project Agreement.

Matt Girard

Project Manager
5280 Connectors

4.2 Workforce Development Team

The 5280 Connectors Workforce Development Team is provided in Figure 1 and includes a description of the Civil Rights Program Manager (CRPM) and other team members responsible for implementing the WDP.

Figure 1 | Workforce Development Team

Team Member	Workforce Development Experience	Role and Responsibility
Civil Rights Program Manager (CRPM): Shannon Carver	Has at least three years' professional experience working on design-build or other related alternative delivery construction projects and knowledge of small business and workforce applicable regulations and best practices to verify compliance with all the Civil Rights Requirements filled prior to issuance of NTP1, and remain filled through the duration of the Construction Period. The appointment of the CRPM, and any replacement thereof, shall be subject to the Department's acceptance. • Colorado SR7 Emergency Repair • ADOT I-10 – Perryville Design-Build • Skanska RMD EEO and Civil Rights Officer • Colorado Steelworkers Union Representative • Member of the Colorado Contractors Association (CCA)	HR person who performs civil rights audits, writes reports, and monitors and oversees Federal Highway Administration (FHWA) 1273 program Full-time; responsible for the day-to-day operational components of, and serves as the primary contact to the Department for, all matters and requirements concerning: • Davis-Bacon and related Acts • equal employment opportunity • Title VI of the Civil Rights Act • Americans with Disabilities Act • compliance with federal law requirements • small business participation and workforce development • community development programs • Equal Employment Opportunity (EEO) presentation • internal EEO compliance audits
On-the-Job Training (OJT) Manager: Abel Luna	• Experience with Department of Transportation (DOT) projects in South Carolina, North Carolina and Texas • Chair member for the OJT Program for the State of Texas	• Successfully place women, minority, disadvantaged workers and local hires into a hands-on training experience to prepare them for construction industry careers • Document new trainees, hours worked and compliance with the Colorado Department of Transportation (CDOT) requirements • Coordination with trainee supervisors to verify compliance with the OJT program • Coordination of internal training with task-specific trainers and external training with outside agencies • Monitor progress of the program to verify goals are being achieved • Conduct OJT audits and verify compliance with the program
Local Hiring Manager (Craft and College): Dalena Erickson	• Colorado Steelworkers Union Trust Administrator and Managed Insurance Benefits • Reached out to local workforces to post job ads	Hiring manager targeting local workforces: • Workforce Center Outreach • Application and employment verification • Local hiring outreach and verification • Coordination with superintendents and Project management on hiring needs • Coordination with the OJT manager on achieving hiring goals to supplement OJT program • Colorado college recruiting

Team Member	Workforce Development Experience	Role and Responsibility
Design-Build Manager Brian Stieritz	• Has served in project leadership roles throughout the United States for over 30 years including over 10 years in Colorado • Has proven experience supporting project teams in meeting its hiring and small business goal • Skilled at engaging with third party and community stakeholders to create a "Project First" environment	• Oversight of workforce development program • Monthly update meetings with Local Hiring Manager, OJT Manager and superintendents to verify top-down support for the program and make certain that goals are being achieved • Sets goals for local college new grad hires • Delivers big-picture hiring goals that coincide with the Project schedule so year-by-year goals during the Construction Period are accurate and achievable
Orientation Trainer Alex Rivera	• Bilingual • Extensive hand-on safety and orientation training experience • Extensive project experience working to create a well-trained and knowledgeable work force • Familiar with project administrative and documentary requirements necessary to ensure that record-keeping documentation and progress tracking is accurate and reliable	• Documents all employee new hires and pre-employment screening • Verifies employees are fit for duty • Introduces person to the Project, their supervisor and their role on the Project • Reviews ethics and code of conduct with the employee • Briefs individual requirements of our safety program and personal protective equipment to be used and required on the job site • Provides hands-on safety demonstration • Documents and verifies all prior certifications and training • Briefs employees on site-specific hazards associated with the work they will be performing • Provides environmental training
Task Specific Field Trainers Multiple superintendent and field staff assigned to providing effective construction skills training	Trainers will be selected based on technical knowledge of work disciplines and ability to communicate and work with trainees in an effective manner.	• Special equipment and tools training • CPR and first aid training • Hands-on training of pre-planning and safe execution of field construction activities

4.3 Recruiting the Workforce

4.3.1 Approach

Our team will utilized proven processes from past experience staffing large and complex projects. Our staffing process focuses on quality, consistency and safety, and the attraction and retention of qualified skilled craft and construction professionals.

Our team member firms are currently completing large and complex industrial, highway and bridge projects across the western United States, including Texas, New Mexico, Arizona, Nevada and California, that required peak workforces of 1,675 employees. Establishing these large workforces was accomplished by setting up dedicated local employment centers that focused on recruiting and new employee safety/hiring orientations to ensure the Projects were staffed with qualified workers. On this Project, we will implement the same strategy to set up a local employment center on-site which will house the Project's Civil Rights Program Manager, OJT Manager and Local Hiring Manager.

We are committed to meeting the challenges posed by the Project's size, schedule and scope. Attracting and retaining skilled craft personnel will drive overall Project success and we will utilize a variety of recruiting methods to identify qualified applicants. These methods include:

- **Utilize well-established agencies that assist with development of tradesmen regularly with CDOT**. Our team will leverage extensive experience working with the Colorado Contractors Association (CCA) and the Association of General Contractors (AGC). These agencies offer training

to employees and apprenticeship programs. The intent of our Workforce Development Plan is to supplement the Agencies' existing programs with our own efforts and staff with establish clear expectations and goals for the team. Interaction and participation with both of these agencies is instrumental to the success of the Project.

- Using established CDOT workforce centers. (https://www.codot.gov/business/civilrights/contractor-compliance/assets/contractor-recruitment-resources)
  - Several of the workforce development centers focus on employing disabled veterans, minorities and women, which will support our effort to achieve the goals. We will hold monthly coordination meetings with the workforce development centers to verify that a steady stream of employment candidates is available.
- Using active community-based organizations serving the area. Work with these communities to discuss scope and schedule of the Project and assess résumés of any clients.
- Set up a dedicated Local Employment Center. Actively pursue local talent for the on-the-job training (OJT) program by using our local employment center near the Project site that is accessible to local ZIP codes (80010, 80011, 80019, 80022, 80205, 80207, 80211, 80216, 80238, and 80239). Use this employment center as an office to focus on hiring, training, human resources, orientation, screening and staffing for the local hiring, civil rights and OJT team.
- Using the Project website for job seekers. Our website will state that we are hiring workers and provide interested candidates with job locations, contact information (phone number and email addresses), and instructions for submitting resumes and expressions of interest.

4.3.2 Planned Outreach Events Involving the Local Community

Research suggests that there has been a steady decline in the number of high school students graduating and pursuing a career in the construction industry. Without developing new talent, the construction industry will suffer from a lack of labor resources needed for these major projects to move forward. Over the past few years, 5280 Connectors has taken a lead in educating our youth about the value of construction careers. We have performed community outreach, sponsorships of high school construction fairs in several regions of Colorado, and developed of our own OJT programs for Departments of Transportation in Arizona, New Mexico and Texas while following the Colorado Contractors Associations Program for CDOT projects.

The 5280 Connectors team assists high school students at the CCA Career Days with a masonry workshop.

The OJT program provides inspiration for youth with a prescriptive career path and a mentor in an industry that hasn't offered these opportunities in the past. Many graduating high school students do not understand that these opportunities are out there, and these outreach events, such as the AGC Colorado Construction Career Day (which our team sponsors regularly), deliver a message to these young individuals that construction careers can be promising.

For this Project, we will participate in the following:

- Work with programs to hire employees who have received basic construction skills training. These types of training programs give new hires a better perspective of the variety of trades in the industry, tool use, safety and measurement, with enhanced oversight to provide them a step up starting in the industry:
  - Associated General Contractors (AGC) of Colorado Training Program
  - Colorado Contractors Association (CCA)
  - Colorado Construction Institution (CCI)
  - Build Colorado (post job openings)
  - Colorado Construction Now (CCN)
- On a yearly basis, attend the CCA Construction career day, an industry-sponsored event for high school students offering a glimpse of the careers in the industry
- AGC scholarship program
- Visit local high schools, provide Project information and explain construction opportunities
- Visit local technical schools and participate in their workshops and recruiting fairs. Share Project information and potential opportunities.

In addition to reaching out to local high school students and recruiting for local hiring and OJT goals, we will continue to focus on local hiring of professional employees for positions in engineering, construction management, business management, accounting/finance and human resources. We will continue our active approach to sponsor career fairs, participate in Associated Schools of Construction (ASC) construction competitions, and provide information sessions about our company and the industry including the following:

- Colorado State University, Fort Collins
- Colorado State, Pueblo
- Colorado School of Mines
- Mesa State University
- Associated Schools of Construction Reno Event

4.3.3 Advertising Jobs with CDOT-Approved Workforce Development Organizations

Project employment positions will first be advertised with CDOT workforce centers. CDOT workforce centers can be found on the following link: https://www.codot.gov/business/civilrights/contractor-compliance/assets/contractor-recruitment-resources. The Colorado Recruitment Centers will be given the first opportunity to provide OJT training program candidates for journeyman tradesman and apprentices. The 5280 Connectors Employment Resource Center will meet with the agencies on a monthly basis to communicate hiring needs and provide information for job postings. These meetings will include discussions about how the agencies can be interactive with the Project team and resources available to them to best support the Project efforts. To meet our large workforce needs, our team will need to supplement workforce center engagement with other professional organizations that support the Colorado Construction Market, such as the CCA, AGC, CCI and others.

Some key strategies to developing an effective workforce for this Project are:

- Use a local employment facility that will be a center for staffing.
- Target current and former Zachry, Plenary and Skanska employees.
- Maximize the use of qualified local labor.

- Hire trainees from local labor training programs, such as the CCI, that have students already interested in construction.
- Provide comprehensive training programs that focus on trade-specific skills, mentoring, specialty equipment, safety, environmental and many other skills preparing them for a journeyman career.
- Provide a new hire orientation program that prepares individuals for daily work routine, outlines safety expectations and explains their rights as an employee.
- Place employment advertisements in local and regional areas, including:
  - Classified ads
  - Radio spot ads
  - Billboards
  - State and federal agencies
  - Build Colorado website
  - Veteran placement organizations
  - Local employment periodicals
  - Trade journals
  - Plenary, Zachry and Skanska corporate websites
  - Dedicated web page on www.5280connectors.com website, with videos of our training facility and information about job openings
  - Minority and female organization outreach
  - Online job boards (CareerBuilder, Monster, Construction Jobs, Roadtechs, Indeed, Simply Hired, Craftstaffing.com, etc.)
  - Trade schools
  - Third party staffing agencies
- Participation in locally hosted career fairs
- 5280 Connectors contractor-hosted job fairs
- Information sessions at local high schools to encourage students to join the construction trades
- Encourage the referral on individuals by current employees.

4.3.4 Using Subcontractors to Achieve the Construction Period OJT Goal and Local Hiring Goal

Subcontractors are required to participate fully in our OJT and local hiring process. Subcontractors are contractually accountable to achieve participation at a level that is at least proportionate to their contract size. Subcontractors are also required to participate in our community outreach activities and shall provide accurate reporting of their outreach and participation activities.

4.3.5 Using High School Outreach Programs to Staff Administrative, Internship, or Other Opportunities

We will regularly engage local high schools directly and through existing outreach programs, including Denver Public Schools' Career Connect and Arrupe Jesuit's Corporate Workforce Program to staff administrative, internship and other Project staffing positions. The Civil Rights Program Manager is responsible for working directly with the Design-Build Manager and other Project staff to develop and implement a plan to engage these entities and hold Project-specific events and other activities to inform potential candidates of available opportunities and identify specific hiring opportunities.

4.4 On-The-Job Training Program

The purpose of our OJT program is to provide a working experience that translates to marketable skills and prepares trainees for a construction industry career. The program will direct recruitment efforts to attract disadvantaged individuals, females and minorities, using channels such as local hiring agencies and workforce outreach events.

We will develop a local Employment Resource Center near the Project. This Employment Resource Center will staff the individuals (Civil Rights Program Manager, OJT Manager, Local Hiring Manager, Human Resources and Orientation Trainer) focused on the OJT training program, new hire orientation, local hiring and advertising. The Employment Resource Center will also host the monthly meetings with the Colorado Recruitment Sources, be the center for all internal and external training, serve as a location where individuals can apply for employment opportunities, and provide employment screening and orientation. The center will be a focus for all OJT resources as well; collaboration among the OJT managers, trainees and their supervisors as well as CDOT will take place at this facility. All documentation and tracking will be available at the Employment Resource Center.

A variety of different recruiting services will be available for use on the Central 70 Project. As previously mentioned, the CDOT-prescribed workforce centers (Colorado Recruitment Sources) will be given the first opportunity to provide skilled labor, tradesmen and apprentices. These prescribed resources will be supplemented by other local training programs such as the CCA, CCI, AGC and CCN.

Our team members have spent the last 10 years collaborating with the CCA and used their training program to deliver successful CDOT projects and help hundreds of individuals start successful construction careers. For years, our team member firms have served as members of the AGC in many Southwest states (Arizona, New Mexico and Texas, Phoenix, California, Nevada) and used their training and development programs to help staff projects and assist individuals with journeyman trades careers. We will supplement our existing program with these resources to create comprehensive training resources for the Project.

4.4.1 Trainee and Apprentice Skilled Craft Areas

Figure 2 provides anticipated levels of trainees/apprentices by skill area during the Construction Period. This figure is a representative sample per trade of the number of employees who will be part of the OJT program at any given time in the Project. As the Project progresses, the needs for different trades may be greater or lesser than what the table shows, and will be adjusted accordingly to fit the program needs. It will be possible for trade apprentices to shift from one trade to another to meet the needs of the Project as well as their skill set.

Figure 2 | Trainee and Apprentice Skilled Craft Areas

Trainee Type	Number of Trainees/Apprentices
Carpenter	6
Equipment Operator	6
Cement Mason	3
Traffic Control Technician	3
Steel Worker	3
Pile Driver	2
Surveyor	2
Pipefitter	2
Mechanic	2
Electrician	1
Traffic Control Supervisor	1
Erosion Control	1

4.4.2 Skilled Craft Training

In Figure 3, we have provided a sample length and type of training that will be offered for carpenters. The training demonstrates the amount of hours required to move to the subsequent level and shows how pay rates will change.

Our intent is to use an open house hiring process for the Central 70 Project. This will allow the Project team to better serve the needs and local hiring commitments set forth by the Project. The Employment Resource Center will be able to use Colorado Recruitment Sources, the CCA and other local training centers to find qualified individuals to enter the OJT program. It is anticipated that most of the individuals will be introduced to the program as entry-level apprentices; however, some new hires, who demonstrate higher skills and experience may start at a higher level in the OJT program. All trainees will be evaluated and, after a one-month probationary period to verify they meet the expectations of the program, they will be placed in the OJT program according to their skill set. The apprenticeship level placement will be at the sole discretion of the OJT Management Team and Project Field Supervision.

All hours worked by trainees on the Project will be counted as OJT participation hours. The training hours will be specific to the trade in which they are working toward journeyman status on. Training details for key trades are provided in the follow sections.

Figure 3 | Carpenter Apprentice (hours in the program) Sample

No.	Category of Training	Details of Training	Hours Required
1	Familiarization	• Safety • Materials • Tools/Equipment • Public Relations	100
2	Form Building and Erection	• Safety • Basic Form Design • Construction Forms • Erection and Placement Forms • Placement of Reinforcing Steel	300
3	General Construction	• Safety	2000
4	Introduction to Measuring Tools	• Safety	300
5	Structural Concrete	• Safety	500
6	Stripping Salvage	• Safety • Removal/Clearing of Materials	100
7	Concrete Work	• Safety	300
8	Concrete Demolition	• Safety • Tools and Equipment • Methods of Removal • Protection of Surroundings	200
9	Girder Erection	• Safety • Placement/Fastening • Exposure to Pile Driving, Welding, Cutting, and Minimum Heavy Equipment Operations	200
10	Clean-up	• Safety • Materials – Equipment Maintenance • General Housekeeping	200
11	Training Supplemental	• Safety	1700

4.4.2.1 Carpenter Apprentice

A carpenter in the 5280 Connectors OJT program will focus on preparation formwork and falsework for all concrete structures and flatwork. Carpenter apprentices will be trained to work on bridge and retaining wall structures, pavement formwork preparation, drainage structures, and installation of various precast components. A significant element of developing a journeyman carpenter is to create an understanding of plans and specifications. Accurate measurements and understanding of details are critical components of preparing for concrete placement and must be engrained into every journeyman carpenter. Below is a summary of training that will be implemented during the apprenticeship:

- Hands-on training under journeyman and foreman
  - Introduction to general construction – Safety, communication, teamwork, general housekeeping and cleanup, labor support, working with heavy equipment, use of construction tools, following and executing direction.

  - Measurement and mathematics – Measuring tools, plan reading, calculations, quality control requirements and understanding specifications.
  - Tools and equipment – Proper inspection and use of tools and equipment, learning the right tools for each application, how to use effectively to support labor and how to implement company-specific safety controls with each.
  - Skilled carpentry work – Constructing formwork, scaffolding, demolition, falsework, bridge formwork, retaining wall formwork and pre-pour inspections.
- Special training
  - OSHA 10 and 30 HR
  - First aid/CPR
  - Competent person training
  - Task-specific safety training
  - Fall protection
  - Plan reading
  - Quantity tracking
  - Confined space
  - Power tool awareness
  - Specialized equipment training – forklift/manlift
- A typical training program under this classification will consist of the following (at a minimum):

Figure 4 | Typical Training Program for Carpenter Apprentice

Level	Hours Worked
60% Level One	Beginning Hourly Wage (not less than $13.55/hour)
65% Level Two	1,000
70% Level Three	2,000
75% Level Four	3,000
80% Level Five	4,000
90% Level Six	5,000
100% Level Seven	6,000

4.4.2.2 Equipment Operator Apprentice

The trainee will learn many types of skills and traits used on highway and bridge construction projects. The trainee will perform a combination of tasks on bridge and road construction projects, usually working in a utility capacity.

- Hands-on training under journeyman and foreman
  - Introduction to general construction – Safety, communication, teamwork, housekeeping, labor support, working with heavy equipment, use of construction tools, following and executing direction.
  - Grade checking – Prior to spending any time operating equipment, each apprentice will spend time working with the operators and foreman preparing grade stakes, pulling slopes, setting roadway cross-slopes, and verifying that survey staking matches field conditions.

  - Equipment training – Working with maintenance staff to understand proper ways to fill out a daily visual inspection and how each piece of equipment functions.
  - Equipment operation – Each trainee will begin working with simpler pieces of equipment (skidsteer loaders, haul trucks, water trucks, backhoes) and then move to larger, more complex pieces of equipment (off-road trucks, scrapers, front end loaders). Operators with the most potential will begin to use the most complex equipment (finishing blades, excavators, cranes, etc.)
- Special training
  - OSHA 10 and 30 HR
  - First aid/CPR
  - Competent person training
  - Task-specific safety training
  - Grade control and GPS training
  - Grade checking
  - Fall protection
  - Confined space
  - Power tool awareness
  - Specialized equipment training – Forklift
- A typical training program under this classification will consist of the following (at a minimum):

Figure 5 | Typical Training for Equipment Operator Apprentice

Level	Hours Worked
60% Level One	Beginning Hourly Wage (not less than $13.55/hour)
65% Level Two	1,000
70% Level Three	2,000
75% Level Four	3,000
80% Level Five	4,000
90% Level Six	5,000
100% Level Seven	6,000

4.4.2.3 Cement Mason Apprentice

The trainee will learn many types of skills and traits used on highway and bridge construction projects. The trainee will focus on work activities specific to concrete construction, developing into a journeyman cement mason. Some of the specific work activities they will focus on are concrete pours for sidewalk, curb, bridges, Cast-In-Place (CIP) retaining walls, PCCP paving, and miscellaneous other concrete flatwork and structures. Creating an understanding of finishing tolerances, quality control measures and specifications is critical to placement of concrete and the training of a journeyman. Below is a summary of training that will be implemented during the apprenticeship:

- Hands-on training under journeyman and foreman
  - Introduction to general construction – Safety, communication, teamwork, housekeeping, labor support, working with heavy equipment, use of construction tools, following and executing direction.

  - Measurement and mathematics – Measuring tools, plan reading, calculations.
  - Use of concrete tools and applications – Vibrators, screeds, hand tools, hoppers, pumps, tines and pavement and deck finishers.
  - Skilled concrete finisher work – Bridge deck and pavement finishing, tining, cure application, concrete volume calculation and yield, pump truck setup, and pour preparation and inspection.
- Special training
  - OSHA 10 and 30 HR
  - First aid/CPR
  - Competent person training
  - Task-specific safety training
  - Deck finishing machine training (Bidwell)
  - Pavement finishing machine training
  - Tining machine training
  - Fall protection
  - Confined space
  - Power tool awareness
  - Specialized equipment training – Manlift, power screeds, vibrators
- A typical training program under this classification will consist of the following (at a minimum):

Figure 6 | Typical Training for Cement Mason Apprentice

Level	Hours Worked
60% Level One	Beginning Hourly Wage (not less than $13.55/hour)
65% Level Two	1,000 Hours Worked
70% Level Three	2,000 Hours Worked
75% Level Four	3,000 Hours Worked
80% Level Five	4,000 Hours Worked
90% Level Six	5,000 Hours Worked
100% Level Seven	6,000 Hours Worked

4.4.2.4 Traffic Control Technician Apprentice

The trainee will learn many types of skills and traits used on highway and bridge construction projects. The trainee will perform a combination of tasks on bridge and road construction projects, usually working in a utility capacity.

- Hands-on training under journeyman and foreman
  - Introduction to general construction – Safety, communication, teamwork, housekeeping, labor support, working with heavy equipment, use of construction tools, following and executing direction.
  - Traffic control plan reading and understanding of specific Manual on Uniform Traffic Control Devices (MUTCD) standards necessary for traffic setups. Understanding how far devices need to be offset from the road, device spacing, lighting requirements, etc.
  - Equipment training – Use of video message devices, crash attenuator trucks, arrow boards, speed tracking devices and other traffic setup equipment.

  - Maintenance – How and when devices need to be maintained for lights, panels, barricades and barrels. Reviewing devices to look for defects and implementing plan for device replacements.
- Special training
  - OSHA 10 and 30 HR
  - First aid/CPR
  - Competent person training
  - Task-specific safety training
  - Traffic control technician certification
  - Traffic control supervisor certification
  - MUTCD standard training
  - Fall protection
  - Power tool awareness
- A typical training program under this classification will consist of the following (at a minimum):

Figure 7 | Typical Training for Traffic Control Technician Apprentice

Level	Hours Worked
60% Level One	Beginning Hourly Wage (not less than $13.55/hour)
65% Level Two	500
70% Level Three	1,000
75% Level Four	1,500
80% Level Five	2,000
90% Level Six	2,500
100% Level Seven	3,000

4.4.2.5 Steel Worker Apprentice

The trainee will learn many types of skills and traits used on highway and bridge construction projects. The trainee will perform a combination of tasks on bridge and road construction projects, usually working in a utility capacity.

- Hands-on training under journeyman and foreman
  - Introduction to general construction – Safety, communication, teamwork, housekeeping, labor support, working with heavy equipment, use of construction tools, following and executing direction.
  - Line setting and layout – Reinforcing steel layout and spacing. Quantity take off, lap distances, cutting dimensions and clearances.
  - Shop drawing plan reading and how to read tags from fabricator.
  - Tool use and techniques for tying steel and the proper PPE to ensure hand injury risks are mitigated.
  - Equipment training – Work with maintenance staff to understand proper ways to fill out a daily visual inspection and how each piece of equipment functions.
  - Equipment operation – Forklift and handling equipment training. Understanding of crane and hand signals necessary for hoisting steel to elevated locations.

- Special training
  - OSHA 10 and 30 HR
  - First aid/CPR
  - Competent person training
  - Task-specific safety training
  - Shop drawing plan reading training
  - Crane signal and hand signal training
  - Fall protection
  - Confined space
  - Power tool awareness
  - Specialized equipment training – forklift
- A typical training program under this classification will consist of the following (at a minimum):

Figure 8 | Typical Training for Steel Worker Apprentice

Level	Hours Worked
60% Level One	Beginning Hourly Wage (not less than $13.55/hour)
65% Level Two	1,000
70% Level Three	2,000
75% Level Four	3,000
80% Level Five	4,000
90% Level Six	5,000
100% Level Seven	6,000

4.4.2.6 Pile Driver Apprentice

The trainee will learn many types of skills and traits used on highway and bridge construction projects. The trainee will perform a combination of tasks on bridge and road construction projects, usually working in a utility capacity.

- Hands-on training under journeyman and foreman
  - Introduction to general construction – Safety, communication, teamwork, housekeeping, labor support, working with heavy equipment, use of construction tools, following and executing direction.
  - Hoisting steel pile. Understand crane and hand signals for hoisting steel pile.
  - Blow counts and documenting. Understand requirements to achieve bearing for pile capacity. Label foot increments on pile to track progress.
  - Understand safety and working requirements for pile installation. Support install of pile tips and splicing pile.
  - Equipment training – Work with maintenance staff to understand proper ways to fill out a daily visual inspection and how each piece of equipment functions.
  - Equipment operation – Use of handling equipment such as forklift to deliver steel and tools to pile driving machine. Understand how to fire the pile hammer and turn it off. Learn the controls on the remote.

- Special training
  - OSHA 10 and 30 HR
  - First aid/CPR
  - Competent person training
  - Task-specific safety training
  - Pile capacity and blow count charts
  - Fall protection
  - Confined space
  - Power tool awareness
  - Specialized equipment training – Manlift and forklift
- A typical training program under this classification will consist of the following (at a minimum):

Figure 9 | Typical Training for Pile Driver Apprentice

Level	Hours Worked
60% Level One	Beginning Hourly Wage (not less than $13.55/hour)
65% Level Two	1,000
70% Level Three	2,000
75% Level Four	3,000
80% Level Five	4,000
90% Level Six	5,000
100% Level Seven	6,000

4.4.2.7 Surveyor Apprentice

The trainee will learn many types of skills and traits used on highway and bridge construction projects. The trainee will perform a combination of tasks on bridge and road construction projects, usually working in a utility capacity.

- Hands-on training under journeyman and survey manager
  - Introduction to general construction – Safety, communication, teamwork, housekeeping, labor support, working with heavy equipment, use of construction tools, following and executing direction.
  - Grade checking – Prior to spending any time operating equipment, each apprentice will spend time working with the operators and foreman preparing grade stakes, pulling slopes, setting roadway cross-slopes and verifying that survey staking matches field conditions.
  - Plan reading and understanding tolerances and specifications.
  - Work with total stations, set up backsights and data collectors, and implement data provided by the survey manager or journeyman surveyor.
  - Understand how to double-check calculations provided by the senior employment.
  - Implement pre- and post-pour checks.
  - Input data into equipment grade control systems.
- Special training
  - OSHA 10 and 30 HR

- First aid/CPR
- Competent person training
- Task-specific safety training
- Trimble GPS training
- Grade control training
- Fall protection
- Confined space
- Power tool awareness

*This individual may require additional education beyond high school or GED, such as a trade school for certain aspects of this role.

- A typical training program under this classification will consist of the following (at a minimum):

Figure 10 | Typical Training for Surveyor Apprentice

Level	Hours Worked
60% Level One	Beginning Hourly Wage (not less than $13.55/hour)
65% Level Two	1,000
70% Level Three	2,000
75% Level Four	3,000
80% Level Five	4,000
90% Level Six	5,000
100% Level Seven	6,000

Mechanic/Fueler Apprentice

The trainee will learn many types of skills and traits used on highway and bridge construction projects. The trainee will perform a combination of tasks on bridge and road construction projects, usually working in a utility capacity.

- Hands-on training under journeyman and survey manager
  - Introduction to general construction – Safety, communication, teamwork, housekeeping, labor support, working with heavy equipment, use of construction tools, following and executing direction.
  - Understanding the different types of equipment, parts and support equipment, and tools for the maintenance staff.
  - Different types of fuel – red fuel, clear fuel and gasoline – and their applications.
  - How to change oil, parts and tires. How to properly store and dispose of parts, oil and gasoline.
  - Ordering and delivering of parts necessary for repairs or replacement.
  - Understanding how to read manufacturers books.
  - Hoisting and handling of parts. Proper lifting and staging of equipment for repairs.
- Special training
  - OSHA 10 and 30 HR
  - First aid/CPR

- Competent person training
- Task-specific safety training
- Specialty equipment training and updates for different types of equipment – John Deere, CAT, Komatsu, etc.
- Fall protection
- Confined space
- Power tool awareness

***This individual may require additional education beyond high school or GED, such as a trade school for certain aspects of this role.**

- A typical training program under this classification will consist of the following (at a minimum):

Figure 11 | Typical Training for Mechanic/Fueler Apprentice

Level	Hours Worked
60% Level One	Beginning Hourly Wage (not less than $13.55/hour)
65% Level Two	1,000
70% Level Three	2,000
75% Level Four	3,000
80% Level Five	4,000
90% Level Six	5,000
100% Level Seven	6,000

4.4.2.8 Traffic Control Supervisor Apprentice

The trainee will learn many types of skills and traits used on highway and bridge construction projects. The trainee will perform a combination of tasks on bridge and road construction projects, usually working in a utility capacity.

- Hands-on training under journeyman and foreman
  - Introduction to general construction – Safety, communication, teamwork, housekeeping, labor support, working with heavy equipment, use of construction tools, following and executing direction.
  - Traffic control plan reading and understanding of specific MUTCD standards necessary for traffic setups. Understanding how far devices need to be offset from the road, device spacing, lighting requirements, etc. How to implement MUTCD standards. Understand how to resource the traffic setups, have the right equipment per plan and the right equipment to protect the employees and not affect the traveling public.
  - Equipment training – Use of video message devices, crash attenuator trucks, arrow boards, speed tracking devices and other traffic setup equipment.
  - Maintenance – How and when devices need to be maintained for lights, panels, barricades and barrels. Reviewing devices to look for defects and implementing plan for device replacements.
- Special training
  - OSHA 10 and 30 HR
  - First aid/CPR
  - Competent person training

- Task-specific safety training
- Traffic control technician certification
- Traffic control supervisor certification
- MUTCD standard training
- Fall protection
- Power tool awareness

- A typical training program under this classification will consist of the following (at a minimum):

Figure 12 | Typical Training for Traffic Control Supervisor Apprentice

Level	Hours Worked
60% Level One	Beginning Hourly Wage (not less than $13.55/hour)
65% Level Two	500
70% Level Three	1,000
75% Level Four	1,500
80% Level Five	2,000
90% Level Six	2,500
100% Level Seven	3,000

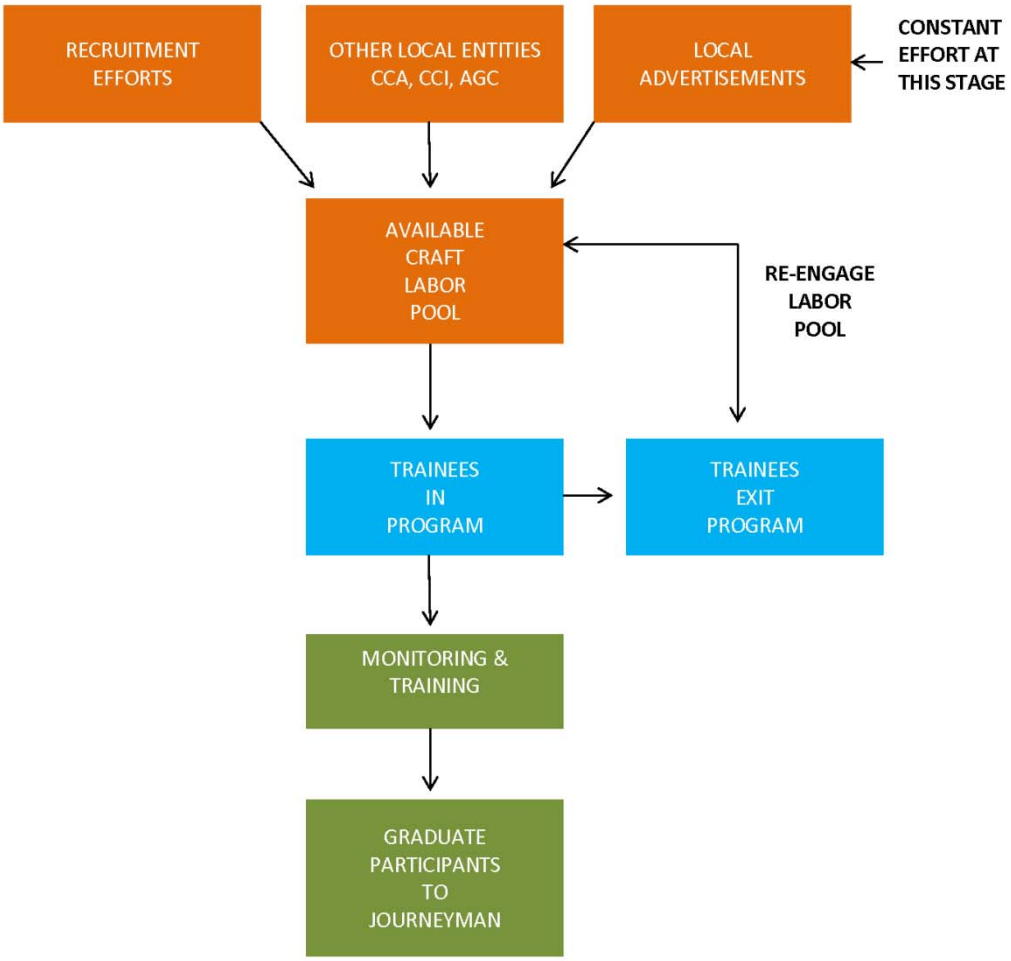
4.4.3 Monitoring and Verifying Successful Placement

4.4.3.1 Monitoring

Monitoring and verification of successful placement shall be peformed in accordance with the Project Agreement. We will require each trainee's supervisor to submit a monthly OJT progress report to the OJT Manager for verification of accuracy and completion, prior to submitting to CDOT's OJT representative assigned to the Project. The monthly OJT progress report is to be an accurate reflection of the trainee's work hours, phases of training, and progress to date. The report will then be forwarded to the Project office and payroll will submit to the agency field office. The first monthly OJT progress report should be completed following the first week of the trainee's probation, and subsequent monthly progress reports should be submitted each week for the duration of the training.

The OJT Manager is responsible for periodic review and evaluation of the trainee's progress in job performance and related instruction, as well as the maintenance of an appropriate progress record. The objective of the OJT Manager will be to verify that the trainee is receiving proper training and adequate supervision on the job. The OJT Manager is also responsible for alleviating barriers to employment, the graduation process and permanent placement. The OJT Manager will work directly with state and local agencies to facilitate accurate and complete trainee records. Our OJT cycle is provided in Figure 13.

Figure 13 | OJT Cycle



The OJT Manager will receive, process, and resolve employee-initiated complaints. The OJT Manager will work directly with the Design-Build Manager, superintendents, orientation and task-specific trainers who will be directly in charge of the trainees and who will make periodic reviews and evaluations of the trainees' progress on the job. The managers and/or supervisors will verify and forward monthly training forms, including periodic evaluations, to the OJT Manager for record maintenance and reporting. Records will establish the trainees' progress and, upon successful completion of the training program, the OJT Manager will issue a completion certificate.

4.4.4 Approach to Graduating Participants

The approach to graduating participants begins with selection of the right employees with desire to be a part of the construction industry. Our graduate target numbers are geared to maximize participating graduation rates from pre-approved trainee/apprenticeship programs during the Construction Period.

Graduation from the OJT program requires an accumulation of sufficient hours according to the training

curriculum and demonstration by the trainee of predefined proficiencies specific to the work classification. The field supervisor will inform the OJT Manager when and individual has successfully demonstrated the required proficiencies and met training hour requirements. The Compliance Manager will provide notice to CDOT of the OJT training completion and will complete the graduation request of journeyman status action on the Trainee Enrollment and Notice of Personnel Action Form.

Upon Approval by CDOT and receipt of the graduation certificate, the Compliance Manager verifies and updates the OJT plan and produces a certificate for presentation by the Design-Build Manager. The OJT Manager will provide an OJT update at the weekly staff meeting. The Compliance Manager and Design-Build Manager will present the graduate with a certificate at the monthly safety meeting and photos will be taken. The Compliance Manager is responsible for contact appropriate persons for press release regarding OJT graduates.

4.4.4.1 Recruitment and Assessment of Employees

When selecting a trainee for the OJT program, 5280 Connectors will use the following criteria:

- Abide by the Affirmative Action Plan (AAP)
- Select a category of craft that will be in use for a lengthy duration, and which meets the interests of the trainee
- Use community organizations, agencies and resources that are most likely to reach disadvantaged individuals, females and minorities
- Assess and review employment applications
- Conduct references and background verifications
- Conduct one-on-one interviews with the OJT manager/supervisor

4.4.4.2 Entrance Requirements

Applicants will meet the following minimum qualifications:

- The applicant must be a minimum of eighteen (18) years of age.
- The applicant must be physically capable of performing the essential functions of the OJT program, with or without a reasonable accommodation, and without posing a direct threat to themselves or others.
- Applicants are subject to random, post-accident and reasonable suspicion drug testing.
- No applicant will be accepted as a trainee in any classification for which he/she has successfully completed a course leading to journey worker status or in which he/she has been gainfully employed.
- No applicant will be accepted who has previously been enrolled in the OJT program for which he/she has successfully completed a course leading to journey worker status.
- A minimum of 144 hours per year is required for each occupation. The related instruction may be given in a classroom through trade, industrial or correspondence course of equivalent value education.

4.4.4.3 Probationary Period

All candidates enrolled in the OJT program are given a thirty (30) day probationary period. This period allows our team to view the candidate's work habits and attitudes, and allows the candidate to experience the work requirements of our team. The OJT Manager will review the OJT monthly progress reports during the probation period and address corrective action as necessary.

During the probationary period, each trainee will receive an orientation by the orientation trainer to specifically outline expectations for the individual's role. This will include the following:

- A copy of the approved training program, pay scale, pension and retirement benefits, health and disability benefits, promotional opportunities, other employer policies and complaint procedures
- The seasonality of construction work and the adverse weather conditions under which work may occur
- The necessity that construction workers are punctual and willing to work extra hours
- From time to time, the trainee may have an obligation to perform tasks not included in the training program outline
- Qualities or traits the company considers desirable in its workers, including work ethics
- Ways in which employees can earn a promotion within the company
- 5280 Connectors' EEO policy, Affirmative Action Plan, Complaint and Sexual Harassment policies
- Appropriate personal protective equipment (PPE) and safety requirements
- Appropriate clothing that is safe and meets project standards
- Basic hours of operation, overtime, weekend expectations
- Whom the trainee will report to (primary supervisor); whom the trainee should call in case he/she will be tardy, absent from work or need to leave the work site, specifically identifying our policies
- Disciplinary procedures, termination, and layoff policies of 5280 Connectors
- Tool Box Talk participation

4.4.4.4 Proper Supervision

The trainee will be assigned to a journey worker, supervisor, or other knowledgeable employee who will direct, observe, review and report on the trainee on a daily basis.

4.4.4.5 Apprentice Period

Work permitting, once a trainee is enrolled in a training program, the individual will be trained until they have completed the approved training program. At the end of a project, trainees will be transferred to available locations. The training will continue uninterrupted, and trainee records will remain current. All trainee hours on any job, whether Federal, State or City, etc., will be counted toward the trainee's journeyman status.

The following forms will be used for new trainees:

- Trainee assessment (Figure 14).
- Tracking table (Figure 15).

4.4.4.6 Graduating Employees

OJT participants who graduate from the training program are transitioned into regular non-training assignments according to experience and level of skill.

Figure 14 | Trainee Assessment Form

TRAINEE ASSESSMENT

EMPLOYEE/TRAINEE NAME:_____ **EMPLOYEE NO:** _____

ADDRESS:_____

CITY, STATE:_____ **ZIP CODE:** _____

INTERVIEWER:_____ **TITLE:**_____

What prompted you to apply to 5280 Connectors?

Which of the training classifications as listed in the OJT Handbook interest you the most?

Do you have any related experience or skills?

List any related training and/or vocational classes you have taken.

How would you describe your work style or work ethic?

What do you hope to achieve by participating in 5280 Connectors' OJT program?

What are some of the characteristics that you value in an employer?

What is your motivation to succeed?

What challenges do you foresee in this type of job?

Comments/Notes

Figure 15 | Example of Tracking Table

Title Of Training	Training Phase	Safety	Productivity	Quality	Knowledge	Training Hours
					Total Hours Trained This Month	

4.4.5 Distribution of Training Hours

Figure 16 provides our preliminary annual schedule for the distribution of training hours over each Contract Year for the duration of the Construction Period. It is a preliminary plan to meet goals.

Figure 16 | Draft OJT Yearly Scheduled Hours

Trainee Type	Training Hours by Year				
	Year 1	Year 2	Year 3	Year 4	Total by Trainee Type
Carpenter	3,000	9,000	9,000	3,000	**24,000**
Equipment Operator	2,000	10,000	10,000	2,000	**24,000**
Cement Mason	1,500	4,500	4,500	1,500	**12,000**
Traffic Control Technician	3,000	3,000	3,000	3,000	**12,000**
Steel Worker	2,000	4,000	4,000	2,000	**12,000**
Pile Driver	1,000	4,000	2,000	1,000	**8,000**
Surveyor	2,000	2,000	2,000	2,000	**8,000**
Pipefitter	2,000	1,000	1,000	0	**4,000**
Mechanic	2,000	2,000	2,000	2,000	**8,000**
Electrician	1,000	1,000	1,000	1,000	**4,000**
Traffic Control Supervisor	1,000	1,000	1,000	1,000	**4,000**
SWPPP	1,000	1,000	1,000	1,000	**4,000**
Yearly Totals	**20,500**	**41,500**	**39,500**	**18,500**	

4.4.6 Recovery Tools and Methods

When developing new employees in any training program, there will be people who do not fit the system and there will be turnover. 5280 Connectors will implement the following recovery tools and methods to prepare for that:

- The goal for the Project is to exceed OJT hours and local hiring objectives, which sets a higher standard for Project goals so even if the team crosses barriers it will give them time to reorganize and get back on track.

- Continual outreach to local hiring agencies and identification of candidates who meet the criteria of the program so they will be available if other trainees opt out of the program.
- Monthly progress will be assessed and forecasted to completion of the Project. This will help the Project team identify any shortfalls well in advance so they can plan for supplemental trainees required. In these progress meetings, the Project team can forecast graduation dates of specific trainees so replacements can be identified.
- With the enhanced effort put forth by our team to acquire, screen, orient and train the right individuals for the OJT program, the outcome will reduce turnover rate.

4.5 Local Hiring Plan

Our local hiring plan is based on getting 760,000 employment hours (380,000 from new hires) from the following ZIP codes: 80010, 80011, 80019, 80022, 80205, 80207, 80211, 80216, 80238, and 80239.

4.5.1 Strategic Approach

Our Project team will partner with the surrounding communities to make sure residents know about available open positions and careers, as well as OJT training opportunities that will be offered. We will set up a localized employment center and formalized OJT training program, which will ultimately focus on staffing the Project with qualified skilled workers.

Strategies that will be utilized by 5280 Connectors to maximize the usage of local skilled workforce:

- Develop and provide comprehensive training programs
- Hire local area residents into OJT program job positions
- Place employment and training opportunity advertisements in local newspapers, employment periodicals, and with radio stations
- Partner with list employment and training opportunities with State and Federal agencies, such as the Colorado Department of Labor and Employment
- Participate in locally hosted career fairs
- Sponsor 5280 Connectors Contractor-hosted job, training and development fairs
- Host community outreach events and information sessions to educate community residents on employment and training opportunities that exist within our team
- Collaborate with local minority and female organizations
- Partner with local trade schools

Figure 17 identifies jobs targeted for recruitment and an estimated schedule of the distribution of hours for the Construction Period. The estimated length of employment will vary depending on turnover, training program efforts and the project schedule.

Figure 17 | Jobs Targeted for Recruitment

Local Hire Type	Local Hiring Hours			
	2019	2020	2021	2022
Carpenter	6,000	12,000	12,000	6,000
Equipment Operator	6,000	12,000	12,000	6,000
Cement Mason	3,000	6,000	6,000	3,000
Traffic Control Technician	3,000	6,000	6,000	3,000
Steel Worker	3,000	6,000	6,000	3,000
Pile Driver	3,000	6,000	6,000	3,000
Surveyor	3,000	6,000	6,000	3,000
Pipefitter	1,500	3,000	3,000	1,500
Mechanic	3,000	6,000	6,000	3,000
Electrician	2,000	4,000	4,000	2,000
Traffic Control Supervisor	1,500	3,000	3,000	1,500
Yearly Totals	**35,000**	**70,000**	**70,000**	**35,000**

4.5.2 Providing Assistance to Prospective and Actual Local Employees

The Local Hiring Manager is responsible for managing the implementation and providing assistance to prospective and actual local employees. She will facilitate relationships among apprentice programs and Subcontractors to enable prompt referrals, as well as educate Subcontractors regarding implementation of our workforce development plan requirements.

The Local Hiring Manager will perform outreach to local and community area residents, disseminate Project-related job opportunities to potential local/community workers, and respond to inquiries about the job opportunities. The Local Hiring Manager is also responsible for developing and maintaining a database of targeted local and community area worker candidates, and works with community and faith-based organizations and other groups to obtain listings of potential disadvantaged workers.

4.5.3 Monitoring and Tracking Hours Worked

The Local Hiring Manager is responsible for monitoring and tracking the following items:

- Percentage of hours worked by local hires, broken down by ethnicity.
- Percentage of hours worked by apprentices.
- Percentage of apprentice hours worked by local hires.
- Records of compliance efforts, including dated copies of contacts with local recruitment sources (local WorkSource Centers, community-based organizations, etc.) and the results of those contacts.
- Documentation regarding any worker who was not hired or was terminated prematurely.
- Records of workers who inquired about opportunities, either on the job site or through other means, and the actions taken in response to those inquiries.
- Copies of informational materials created and records of when and how they were distributed.
- Records of marketing programs created or participation in community orientations, job fairs, and community outreach meetings.

4.5.3.1 Distribution of the Goal Responsibilities to Subcontractors

5280 Connectors will require major subcontractors to achieve the stated goals. Local hiring requirements will be explained during the bid solicitation process, with an emphasis on the large subcontracts. Each subcontract will include the local hire goals. During the process of executing the subcontract, our team will work with the Subcontractor to ensure they understand the goals for providing local hires.

4.5.3.2 Collecting Subcontractor Participation and Performance

Subcontractors will be required to provide monthly hiring and training documentation as party of their invoicing and payment process. Records will be maintained to provide auditable proof of hiring data and training hours achieved.

4.5.3.3 Ensuring Valid Participation

All Subcontractors must commit to achieving a local hire goal. Consistent with 5280 Connectors' overall contracting policy of accountability and transparency, our Local Hiring Manager will be responsible for verifying that Subcontractors supply the required paperwork documenting local hire and training information. Local Hiring Manager is responsible for ensuring that documentation is accurate and received from Subcontractors in a timely manner.

4.5.4 Compliance with Residency Requirements

In order to confirm residency, applicants will be required to provide current documents that establish proof of residence. These include a combination of government identification cards (Drivers License, etc.) as well as proof in the form of utility bills or other documents that confirm residency within the requisite ZIP code areas.

4.5.5 Statement Regarding No Existing Employees Removed Because of the Local Hiring Goal

5280 Connectors affirms that no existing employees of our team, including any Subcontractors within our team, will be displaced or have their employment terminated as a result of the Local Hiring Goal.

4.6 Plan Updates

The Workforce Development Plan (WDP) is a living document. We will update or revise as necessary during the course of the Construction Period. We will also update the WDP when requested by the Department. We will submit the WDP to the Department for Approval no later than 30 Calendar Days prior to the commencement of each contract year.

5.0 Part II. Advertisement of Job Openings

5280 Connectors and all our Subcontractors will advertise all job openings with Department-approved workforce development organizations for 7 Calendar Days, before the job openings are advertised by other sources. The Department-approved workforce development organizations will be pulled from the following website: https://www.codot.gov/business/civilrights/contractor-compliance/assets/contractor-recruitment-resources.

6.0 Part III. Counting Goal Participation

6.1 Counting OJT participation

5280 Connectors will calculate OJT participation on the aggregate number of employment hours on Other Construction Work (excluding, for certainty, O&M work during construction) performed by trainees and apprentices who satisfy the following requirements:

- Trainees who are enrolled in a program approved by the Department and FHWA;
- Apprentices who are enrolled and duly registered in a U.S. Department of Labor-approved program; and/or
- Trainees who are enrolled in an approved program with Colorado Contractors Association (CCA).

We will request and receive Department Approval of all proposed apprentices and trainees for the participation to be counted toward achieving the Construction Period OJT Goal. We will obtain Approval before employment hours can be counted toward the goal. To obtain Approval for each apprentice or trainee, we will submit the following to the Department:

- Evidence of the registration of the trainee or apprentice into the approved training program
- A completed CDOT form for each trainee or apprentice

We will not count any trainee/apprentice in a skilled craft toward the Construction Period OJT goal if that individual has already worked or been paid at a professional/journeyman level status for more than six months prior to Approval of his/her participation as a trainee/apprentice.

Prior to training beginning, we will provide each trainee a copy of the approved training program, pay scale, pension and retirement benefits, health and disability benefits, promotional opportunities, other employer policies and complaint procedures.

6.2 Counting Local Hiring Program Participation

To be eligible for the Local Hiring Goal, the individual will:

- Reside in one of the following ZIP codes during such individual's term of employment on the Project and for a minimum of 60 Calendar Days prior to having been accepted as a local worker by the Department: 80010, 80011, 80019, 80022, 80205, 80207, 80211, 80216, 80238, and 80239.
- Perform a function on the Project (whether as skilled or non-skilled labor).

A proposed local worker will be submitted for acceptance by the Department prior to being counted toward the Local Hiring Goal. Acceptance must occur before the participation can be counted toward the Local Hiring Goal. To gain acceptance, the developer must submit the following to the Department for each local worker:

- Completed Local Hiring Program Enrollment, in a form to be agreed between the parties (both acting reasonably);
- A self-certifying Residency Disclosure, in a form to be agreed between the parties (both acting reasonably), signed by the individual whose employment hours are to be counted toward the Local Hiring Goal; and

- Any additional documentation the Department determines as necessary to prove residency on a case-by-case basis.

Hours worked by local workers will be documented and reported to the Department in a format mutually agreed upon by 5280 Connectors and the Department.

Within 14 Calendar Days of the local worker's employer obtaining knowledge of the local worker's new residency status, 5280 Connectors will notify the Department when an accepted local worker no longer meets the eligibility requirements. Failure to notify the Department in accordance with this section may result in all of the individual local worker's hours being disqualified from counting toward the Local Hiring Goal.

7.0 Part IV. Reporting Requirements

7.1 Disclosure of Information

To monitor and enforce the requirements of Project Agreement, Schedule 15, 5280 Connectors will disclose employment records for trainees and apprentices as well as individuals who will count toward achieving the Local Hiring Goal. The Department may verify employment records and information by reviewing personnel files as well as interviewing any individual employed by 5280 Connectors or any Subcontractor.

7.2 Records

We will keep records regarding the progress of the Workforce Development Plan participation on the Project, including subcontractor participation.

7.3 Reports

We will submit a monthly report, in accordance with Schedule 8 (Project Administration), for acceptance. This monthly report will be submitted to the Department no later than the 10th working day of each month during the Construction Period. The report shall include the following:

- OTJ training reports, which shall include the following, at a minimum:

Total employment hours expended during the Construction Period to date, separated into:

  - Skilled craft employment hours
  - Professional services employment hours
  - All other employment hours

- Total employment hours expended by trainees/apprentices for work during the Construction Period
  - Updated projected employment hours by trainees/apprentices for work during the Construction Period
  - If the projected employment hours are less than the Construction Period OJT Goal, then we will provide the following:
    - An explanation detailing how it intends to meet the OJT participation projections outlined in its WDP
    - A description of activities and other proactive measures intended to facilitate increased OJT participation
  - A current list of new (since the last report) trainees/apprentices by providing the following:
    - Full name
    - Employer
    - Description of services or applicable work code
    - Start date

  - Skilled craft program registered in
  - Verification of enrollment for trainees/apprentices
  - Total hours worked in current month
  - Pay rate
  - Total hours worked to date on the Project
  - Supervisor full name
  - Description of the training and performance level
- Any performance problems with the training/apprenticeship participants, including:
  - How the problems were resolved
  - Any reasons for participants leaving the Project
- A list of trainees/apprentices who have graduated or successfully completed their training program, and last date worked on site.
- A signature by 5280 Connectors certifying the information in the report is accurate.

- Local Hiring Program reports, which shall include the following, at a minimum:
  - Employment hours expended during the Construction Period to date, separated into:
    - Skilled craft employment hours
    - Professional services employment hours
    - All other employment hours
  - Total hours worked by individuals hired locally during the Construction Period to date, separated into:
    - Skilled craft employment hours
    - Professional services employment hours
    - All other employment hours
    - Identification of each worker considered a new hire, regardless of category
    - Projected local hiring hours to be utilized during the Construction Period
  - If the projected local hiring hours worked are less than the Local Hiring Goal, then 5280 Connectors will explain how it intends to achieve the Local Hiring Goal, including any remedies necessary to meet the goal.
  - A current list of newly employed (since the last report) locally hired individuals, within that month, by providing the following:
    - Full name
    - Address
    - Employer
    - Description of services or applicable work code
    - Start date
    - Skilled craft program registered in
    - Verification of enrollment for newly employed individuals if applicable
    - Total hours worked in current month
    - Pay rate

  - Total hours worked to date on the Project
  - Supervisor full name
  - Address verification
  - Description of performance level
- Any performance problems with the locally hired individuals, including:
  - How the problems were resolved
  - Any reasons for individuals leaving the Project
- A signature by 5280 Connectors certifying the information in the report is accurate.

7.4 Semi-annual Assessment

In addition to the monthly reports, 5280 Connectors will, pursuant to Project Agreement, Schedule 15, submit an assessment of progress toward achieving the Workforce Development Goals applicable during the Construction Period. This will include the following:

- A summary of solicitation and good-faith efforts to date
- Effectiveness of the program
- ID areas for improvement and solutions
- If 5280 Connectors has achieved any of the incentive milestones listed in our Project Schedule, then there should be a notification stating so.
  - For OJT milestones reached, documentation must be submitted, which includes:
    - Proof that the trainee/apprentice has graduated from the applicable OJT program
    - Payrolls showing that the individual has worked at least six months as a full-time journeyman

7.5 Annual Performance Progress Review

5280 Connectors will participate in an annual meeting within 30 Calendar Days before the end of each contract year to review its progress with its Workforce Development Plan and achievement of the Workforce Development Goals applicable during the Construction Period. Thirty Calendar Days after the annual performance review meeting, the Department will provide a written assessment as to whether 5280 Connectors has made adequate progress toward achieving the Construction Period OJT Goal and the Local Hiring Goal. Our progress will be based on demonstrated efforts with implementing the Workforce Development Plan and meeting the schedules and milestones described within the Workforce Development Plan.

5280 Connectors will submit, for Approval, its final report on OJT and local hiring participation during the Construction Period no later than 30 Calendar Days prior to the Substantial Completion Date. The final report shall include total participation data through Substantial Completion. In the event that we failed to achieve either the Local Hiring Goal or the Construction Period OJT Goal as of the Substantial Completion Date (as determined by the Department pursuant to Section 7 of this Appendix B), then we will submit, for Approval by the Department, an updated report no later than 30 Calendar Days prior to the Final Acceptance Date.

7.6 Department Report

Following Approval of our final report (or any update thereto), submitted pursuant to Section 6 of this Appendix B, the Department will evaluate the data and issue a written report stating whether 5280 Connectors has achieved the Local Hiring Goal and the Construction Period OJT Goal. This report will confirm whether 5280 Connectors is entitled to be paid any incentive payments, the amount and relevant calculations as addressed in Part V.

8.0 Part V. Monetary Incentives for Workforce Participation

8.1 Monetary Incentives for On-the-Job Training Participation

The Enterprises will pay 5280 Connectors the applicable monetary incentive for reaching one of the following milestones by the end of the following Construction Period dates as shown in Figure 18.

Figure 18 | Monetary Incentives

Milestones (one of the following)	Third Contract Year	Fourth Contract Year	Substantial Completion
	$40,000 for achieving a total of 120,000 employment hours and graduating and retaining for at least six months after graduation 21 individuals; or	$40,000 for achieving a total of 160,000 employment hours and graduating and retaining for at least six months after graduation 31 individuals; or	$50,000 for achieving a total of 200,000 employment hours and graduating and retaining for at least six months after graduation 41 individuals; or
	$60,000 for achieving a total of 120,000 employment hours and graduating and retaining for at least six months after graduation 23 individuals; or	$60,000 for achieving a total of 160,000 employment hours and graduating and retaining for at least six months after graduation 33 individuals; or	$70,000 for achieving a total of 200,000 employment hours and graduating and retaining for at least six months after graduation 43 individuals; or
	$80,000 for achieving a total of 120,000 employment hours and graduating and retaining for at least six months after graduation 25 individuals.	$80,000 for achieving a total of 160,000 employment hours and graduating and retaining for at least six months after graduation 35 individuals.	$90,000 for achieving a total of 200,000 employment hours and graduating and retaining for at least six months after graduation 45 individuals.

For purposes of this section:

- Eligible employment hours shall be calculated in accordance with Project Agreement, Schedule 15, Appendix B, Part III, Section 1;
- Graduation means the individual has completed his or her training or apprenticeship program described in Section 1 of Part III of this Appendix and has reached full journeyman status; and
- Retention means the individual is working full time on the Project as a journeyman in the skilled craft for which he/she graduated.

Any amount payable pursuant to this Section 1 will be paid no later than 45 Calendar Days after receipt by the Enterprises of an invoice from 5280 Connectors for the relevant amount, provided that our team received the following:

- The Department has issued an assessment pursuant to Section 5 of Part IV of this Appendix confirming that 5280 Connectors is entitled to such a payment, and therefore we can submit an invoice and
- The payment is not earlier than the end of the relevant contract year by reference to which the relevant milestone is to be determined.

8.2 Monetary Incentives for Local Hiring Participation

The Enterprises will pay 5280 Connectors $125,000 for achieving the Local Hiring Goal.

The Enterprises will pay 5280 Connectors in accordance with the table in Schedule 15 Part V for On-the-Job-Training participation, with a total maximum incentive payable of $125,000.

Any amount payable pursuant to this Section 2 will be paid no later than 45 Calendar Days after receipt by the Enterprises of an invoice from 5280 Connectors for the relevant amount. Provided that 5280 Connectors is not entitled to deliver such an invoice until after the Department has issued a report pursuant to Section 7 of Part IV of this Appendix that confirms our entitlement to such a payment.

SECTION 2.1.20

APPENDIX M: DRAFT ENVIRONMENTAL COMPLIANCE WORK PLAN

Overview

This Appendix M includes 5280 Connectors Draft Environmental Compliance Work Plan, which shall comply with the requirements set out in Schedule 17, Section 2 (Environmental Requirements) to the Central 70 Project (Project) Agreement.

It describes our approach to the environmental management that will be used to meet or exceed the environmental commitments made in the Final Environmental Impact Statement (EIS) and the Record of Decision (ROD) as it applies to the Project. It specifically identifies all of the environmental goals and compliance requirements for the Project and our detailed plan to meet or exceed those goals and requirements. Our Environmental Compliance Plan and activities will be executed in compliance with the Project Agreement requirements.

Highlights

Our Environmental Compliance Work Plan:

- Identifies roles, responsibilities, and qualifications for members of the environmental management team.
- Describes the means and methods we will use to meet all Environmental Requirements during the Construction Period and the Operating Period.
- Describes our process to track and document the Project's progress.
- Includes our method of communicating progress, completion and compliance with the Environmental Requirements.
- Includes all discipline-specific management plans.
- Describes how we will conduct environmental field reviews.
- Describes how site-specific construction activities will meet all Environmental Requirements.
- Includes details of how each discipline-specific management plan will be incorporated into the overall environmental management program.

5280 Connectors commits to developing and implementing a robust environmental compliance plan that results in a safe project that protects the community and complies with appropriate environmental regulations. We are committed to being environmentally aware during our planning, design and execution of the Work and will work collaboratively with the Project team and stakeholders to achieve these goals.

Appendix M

Draft Environmental Compliance Work Plan

Central 70 Project

Volume 2
Technical Proposal

June 1, 2017

Contents

Exhibits (To be provided after award)

- Air Quality Monitoring, Maintenance, and Mitigation Plan
- Construction Noise Mitigation and Monitoring Plan
- Integrated Noxious Weed Management Plan
- Materials Management Plan
- Sampling and Analysis Plan
- Health and Safety Plan
- Spill Prevention Control Countermeasure Plan
- Black-Tailed Prairie Dog Management Plan
- Mitigation Measures Tracking Spreadsheet

Figures

Signature Page

Environmental, Health and Safety Policy Statement

Regulatory Compliance

We will evaluate and comply with all applicable federal, state, and local laws and regulations at each location where we conduct business. We will follow contractual environmental mitigations including the ROD, Schedule 17 of the Project Agreement, Colorado Department of Transportation (CDOT) Specifications, and any other requirements throughout the Project.

Accident Prevention

We will strive to identify and assess risk in all our activities, and to take actions to mitigate any high-risk conditions.

Pollution Prevention

We will seek first to cost-effectively avoid the creation of pollution and waste from our projects and operations, and second, to manage remaining waste through safe and responsible methods.

Conservation

We will strive to reduce our natural resource consumption through cost-effective use of recycled and re-used materials and energy and water conservation.

Emissions and Effluents

We will work to diminish our emissions and effluents by employing cost-effective operational controls, by diligently monitoring operational indicators, and by implementing corrective and preventive actions where necessary.

Ecology and Habitat

We will protect habitats, wetlands and other sensitive ecological resources in accordance with applicable regulations and local ordinances.

Hazardous and Toxic Substances

We will exercise caution when using hazardous materials, and will not use toxic substances if we cannot assess their human, ecological or environmental risks.

Communication

We will communicate this policy to all employees, make it available to the public, and establish procedures to receive and respond to inquiries from external interested Parties. We will also alert potentially affected individuals and authorities of any safety, health or environmental incidents in a timely and effective manner. We will conduct thorough investigations, and will implement and monitor corrective and preventive actions. 5280 Connectors senior management believes that how we care for people and the environment today affects current and future generations. We accept responsibility for doing our best to maintain awareness and to minimize adverse safety, health and environmental impacts from our operations. This is beneficial for the environment in which our families, our neighbors and we work and live and for generating new opportunities for our business.

5280 Connectors Commitment to Environmental Compliance:

I have read the Environmental Compliance Work Plan (ECWP), and acknowledge my role in maintaining environmental compliance on this project.

Role	Name (Printed)	Signature

1.0 Introduction and Overview of the Environmental Compliance Work Plan

This Environmental Compliance Work Plan (ECWP or the Plan) summarizes the intent and key features of our developed program. It outlines the overall system of controls that will provide full compliance with and an opportunity to exceed the Project Agreemnt environmental requirements. Our management team expects that all individuals (including subcontractors) who are responsible for the planning, organizing, managing and/or executing of any work related to the Project will read and understand the guidelines set forth in the ECWP and the associated exhibits.

We are attuned to the potential safety, health and environmental impacts of our operations and activities. Our management team established, implemented and currently maintains a safety, health and environmental management system that addresses these potential impacts. This management system guides our operations and activities in a manner that is protective of human health and the environment. It is designed to make safety, health and environmental care an integral part of all projects and a responsibility of all employees and any individuals working for, or on behalf of, 5280 Connectors. It allocates appropriate resources and provides the training necessary to achieve the attainment of safety, health and environmental objectives and targets. Our senior management team is committed to keeping this system effective for its intended purpose, and to continually improving it as a framework to achieve success.

2.0 Reference Documents

The following reference documents form the basis of this plan's structure:

- Central 70 contract documents
  - Project Agreement, Schedule 17, Section 2
  - Instructions to Proposers

3.0 Abbreviations and Definitions

Add capitalized terms shall have the meaning as defined in the Project Agreement unless otherwise provided herein.

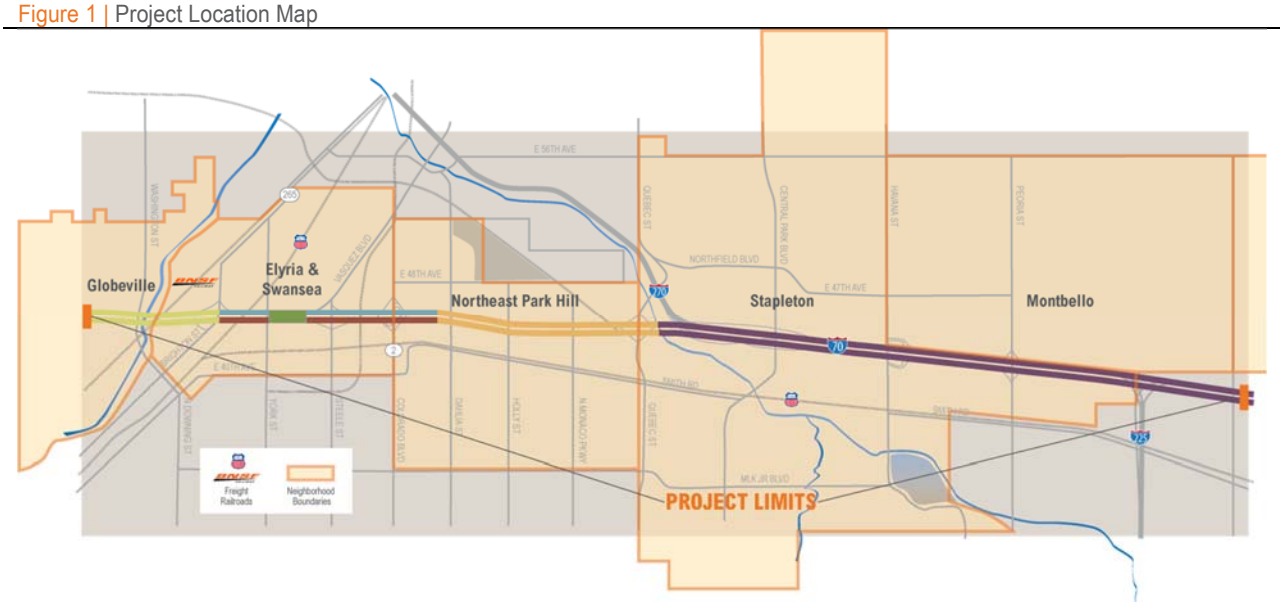
ACM	Asbestos-containing materials
APCD	Air Quality Control Division
BNSF	Burlington Northern-Santa Fe
CAR	Corrective Action Request
CCD	City and County of Denver
CDOT	Colorado Department of Transportation
CDPHE	Colorado Department of Public Health and Environment
CDPS-SCP	Colorado Discharge Permit System-Stormwater Construction Permit
CJV	Construction Joint Venture
CPW	Colorado Parks and Wildlife
D/B/O	Design/Build/Operations
DCS	Document Control System
DNRCE	Diesel Non-Road Construction Equipment
DWR	Colorado Division of Water Resources
ECT	Environmental Compliance Team
ECMTP	Environmental Compliance and Mitigation Training Program
ECWP	Environmental Compliance Work Plan
EDMS	Electronic document management system
EIS	Environmental impact statement
EM	Environmental Manager

EMR	Environmental Manager Report
EPA	Environmental Protection Agency
ESA	Environmental Site Assessments
ESR	Environmental Status Report
FEIS	Environmental impacts statement
HASP	Health and safety plan
IQC	Independent Quality Control
IQCM	Independent Quality Control Manager
IQF	Independent Quality Firm
LCP	Lead-containing paint
MMP	Materials Management Plan
MTIP	Materials Testing and Inspection Plan
NEPA	National Environmental Protection Agency
NCN	Any Nonconformance Notice
NCR	Nonconformance Report
NTP	Notice to Proceed
O&M	Operations and Maintenance
OPS	Office of Public Safety
PC	Process Control
POMA	Project On-going Mitigation Actions
PMP	Project Management Plan
PQM	Project Quality Manager
QA	Quality Assurance
QHP	Quality Hold Point
QMP	Quality Management Plan
QO	Quality organization
QRD	Quality Records Database
RFC	Released for construction
RHM	Recognized hazardous materials
RHMM	Recognized hazardous materials manager
ROD	Record of Decision
ROW	Right of way
SB	Senate Bill
SHPO	State Historic Preservation Officer
SPCC	Spill Prevention Control and Countermeasure
SWMP	Stormwater Management Plan
SWO	Stop Work Order
UPRR	Union Pacific
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
WQCD	Water Quality Control Division

4.0 Project Location

The Project is located in the I-70 Corridor, between I-25 and Chambers Road, bordering residential, commercial and industrial neighborhoods of Denver, Aurora and Commerce City. The 12-mile project area incorporates exits for I-225, I-270 and Pena Boulevard, and flies over the Burlington Northern-Santa Fe (BNSF) and Union Pacific (UPRR) freight lines. It passes through the Denver neighborhoods of Globeville, Elyria and Swansea, Northeast Park Hill, Stapleton, Montbello, and Gateway as displayed in Figure 1.

Figure 1 | Project Location Map



5.0 The ECWP and Companion Documents

This ECWP provides our approach to accommodating the environmental commitment requirements identified in Schedule 17 and the ROD. It also provides evaluation procedures, documentation processes and communication requirements to be followed during the Project's implementation of environmental protection and control measures associated with various environmental aspects of the Project's major activities. We will develop a Project On-going Mitigation Actions (POMA) process prior to construction that specifies the public communications and construction means and methods that will be employed by the project team to reduce or mitigate inconveniences that may arise as a result of construction operations. We will implement this ECWP throughout the Project's construction period. The site-specific ECWP will include, as a minimum, the mitigation measures described in this section.

We will track, implement and update the environmental elements defined in Exhibit 14 (Central 70 Project Mitigation Measures) during the Project's design, build and operational portions. The Central Mitigation Measures Status Report is located in Section 13.4 of this document.

Specific Environmental Requirements will be addressed in the ECWP through discipline-specific management plans that are incorporated by reference, and are considered part of the ECWP. The ECWP will include details of how each discipline-specific management plan will be incorporated into the overall environmental management program. The plans listed below will be submitted to the Colorado Department of Transportation (CDOT or the Department) for Approval or Acceptance as listed in *Table 3-1*. Discipline specific management plans include:

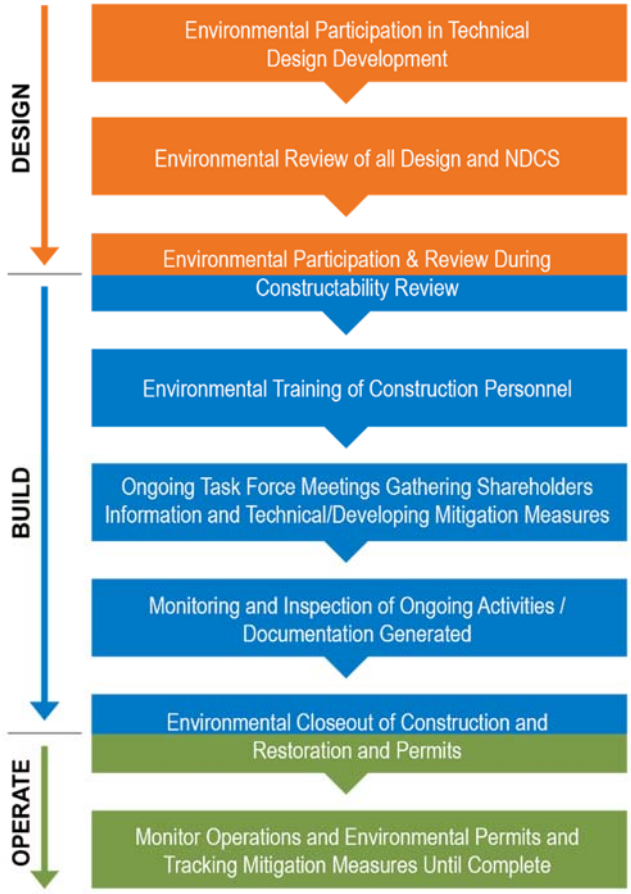
- Air Quality Monitoring, Maintenance and Mitigation Plan
- Construction Noise Mitigation and Monitoring Plan
- Integrated Noxious Weed Management Plan

- Materials Management Plan
- Sampling and Analysis Plan
- Health and Safety Plan
- Spill Prevention Control Countermeasure Plan
- Black-Tailed Prairie Dog Management Plan

6.0 Overview of the ECWP's Processes and Procedures

The ECWP has been prepared so that work activities will be completed to protect human health and the environment, to adhere to the Central 70 Project (Project) schedule during construction, and to develop the processes/procedures to ensure implementation through all phases of the project. The process and procedures will be implemented so that all phases are compliant with the Project's Environmental Requirements as stated in the Central 70 Project: Project Agreement - Schedule 17 and other associated project requirements. Figure 2 gives a visual an overview of the ECWP lifespan, project steps, and ECWP implementation, which provides a solid foundation for environmental compliance on this project.

Figure 2 | Overview of the ECWP Process and Procedures Implementation

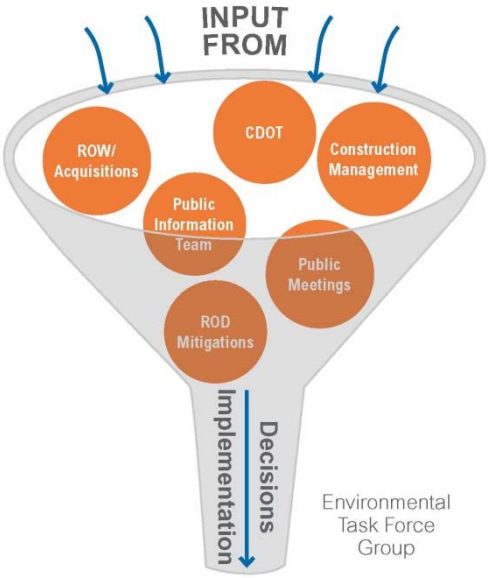


7.0 Overview of the Environmental Compliance Approach to Schedule Management

The key to meeting each project milestone and keeping the project on time is the constant interaction of the environmental compliance team with the Design/Build/Operations (D/B/O) teams throughout the project's life. The environmental compliance team will develop key milestones for environmental permits and Approvals upfront and determine the potential impacts to the project's schedule. Working together, the project team will plan and develop solutions to keep the project schedule on time. This process is proactive; however, it allows for unexpected issues to be worked out and resolved while keeping the constant lines of communication and key personnel interactions intact (Figures 3 & 4).

Figure 3 | Interactive Environmental and D/B/O Team Process

Figure 4 | Collaborative Task Force Process



8.0 Overview of Minimizing Impacts to the Public

The project documents provide the required mitigation measures based on the project's Record of Decision (ROD); however, additional mitigations will be required throughout the life of the project. The ECT will be responsible for tracking the established requirements and implementing the Project On-going Mitigation Actions (POMA) process.

9.0 Overview of Quality Management Roles with Environmental Compliance

The Independent Quality Firm (IQF) will routinely audit the Project based on the procedures and processes defined in the ECWP and the associated environmental plans. The IQF will identify if the plans are being implemented, if the processes and procedures are effective, and if the project is in compliance with the Project Agreement and environmental regulations. Based on the findings from the IQF audits, the ECT will make the necessary actions and associated revisions to the specific plans to ensure the quality of these documents stays effective throughout the project's life (see Figure 5).

Figure 5 | Independent Quality Improves Plan Effectiveness

10.0 Commitment to Meet or Exceed Environmental Goals and Uphold Compliance Requirements

The Environmental Requirements for specific environmental resources are set out in Project Agreement, Schedule 10A (Applicable Standards and Specifications), and are clarified for specific, individual environmental resources in Schedule 17. Additionally, the Central I-70 Mitigation Measures Status, based on Exhibit 14, I-70 East ROD 1: Phase 1, identifies our team's environmental commitments.

The ECWP is organized by the number of mitigation measures that represent the major components of compliance management and various environmental functions. These include designation of responsibility at each relevant function and level in the organization as well as the means and time-frame by which they are to be achieved. We will continually review and amend the ECWP mitigation measures, as necessary, so they meet current conditions and requirements. Our plan to meet or exceed each of the project compliance requirements is summarized in Figure 6. We addressed all the environmental impacts and mitigation measures identified in the ROD as assigned to the Developer.

Figure 6 | Central I-70 Mitigation Measures Status Report

Mitigation Number	Mitigation Category	Impact from Final EIS	Mitigation Commitment	Status/Resolution	Compliance Plan Implementation
1	Transportation	• Temporary road closures and traffic detours may have impacts on access to certain public services.	• Coordinate with the Regional Transportation District (RTD) for phasing of improvements to minimize disruptions to transit operations.	Developer: • Coordinate with RTD and include RTD representative as member of the Maintenance of Traffic (MOT) Task Force (Schedule 10, Section 2.2 - Maintenance of Traffic). • Minimize RTD disruption and maintain RTD access (Section 2.7).	• Initial: Include in the Environmental Requirement's readiness review. • Active: Environmental Clearance Form/Checklist.
2	Transportation	• Temporary road closures and traffic detours may have impacts on access to certain public services	• Coordinate with RTD more than 30 days in advance during construction to minimize disruptions to service areas and schedules. • Notify transit users in advance of any closures, delays or modifications in bus or rail routes, • Notify transit users of any modifications or relocations of transit stops or signage along the affected routes to maintain the required accessibility.	Developer: • Coordinate with RTD far enough in advance to allow 30 calendar days notification to transit users (Schedule 10, Section 2, Maintenance of Traffic, 2.7 RTD Transit System).	• Initial: Include in the Environmental Requirement's readiness review. • Active: Environmental Clearance Form/Checklist.
3	Transportation	• Temporary impacts to rail facilities will result from the construction of railroad bridge structures and/or the relocation of track operations.	• Coordinate with Union Pacific Railroad (UPRR), BNSF and Denver Rock Island Railroad (DRIR) to phase improvements to minimize disruptions to railroad operations.	Developer: • Obtain required written specifications, standards of practice, and construction methods from the affected railroads. Comply with the requirements of the respective railroad agreements when performing construction work (Schedule 10, Section 10.2 Railroads).	• Initial: Include in the Environmental Requirement's readiness review. • Active: Environmental Clearance Form/Checklist.
4	Transportation	• Removal of the York Street interchange and changes to the interchanges for Steele Street/Vasque Boulevard and Colorado Boulevard may have impacts to local traffic volumes.	• Coordinate with the City and County of Denver (CCD) to determine appropriate truck routes on city streets.	Developer: • Prepare a Transportation Management Plan (TMP), including a Temporary Traffic Control Plan (TCP) and Transportation Operations (TOP) Strategies (Schedule 10 Section 2.2). Involve all affected agencies in TMP development and associated plans (Schedule 10 Section 2.2.3).	• Initial: Include in the Environmental Requirement's readiness review. • Active: Environmental Clearance Form/Checklist.

Mitigation Number	Mitigation Category	Impact from Final EIS	Mitigation Commitment	Status/Resolution	Compliance Plan Implementation
5	Transportation	• Temporary road closures and traffic detours may have impacts on access to certain public services.	• Develop and implement a Transportation Demand Management (TDM) program during construction. • Components of the plan could include items such as working with the RTD on enhanced transit service and including ITS.	Developer: • Develop and implement a comprehensive TDM during construction (Schedule 10, Section 2.2.5 a and h).	• Initial: Include in the Environmental Requirement's readiness review. • Active: Environmental Clearance Form/Checklist.
6	Transportation	• Temporary road closures and traffic detours may have impacts on access to certain public services.	• Coordinate with affected local governments, residents and businesses to minimize disruptions during construction.	Developer: • Coordinate with the school and Denver Public School's Department of Transportation (Schedule 10, Section 2.2.5e). Provide a detailed approach to coordinate the TMP activities with performance of the Developer's obligations under Schedule 14 Strategic Communications (Schedule 10, Section 2.2.6). • Coordinate with CCD and other local agencies to develop mitigation for delays before, during and after special events (Schedule 10, Section 2.5.1). • Coordinate with the Department, RTD, local agencies and adjacent projects to coordinate construction traffic and detour impacts, and to minimize simultaneous lane closures or impacts to adjacent or alternate routes (Schedule 10, Section 2.8). • Work with the property owner to coordinate access restrictions. (Schedule 10, Section 2.9). • Coordinate with the Department of Public Safety (DPS) for all closures and operational impacts in the school area, and include an approach to pedestrian and bicycle movements and school traffic circulation. This plan shall be coordinated with CCD and the DPS Department of Transportation (Schedule 10, Section 2.11.7).	• Initial: Include in the Environmental Requirement's readiness review. • Active: Environmental Clearance Form/Checklist.

Mitigation Number	Mitigation Category	Impact from Final EIS	Mitigation Commitment	Status/Resolution	Compliance Plan Implementation
7	Social and Economic Conditions	• Fifty-six residential relocations and eighteen business relocations (includes one nonprofit relocation).	• Compensate any person(s) whose property needs to be acquired according to the United States (U.S.) Constitution and the Uniform Act of 1970, as amended.	Department: • Conduct all relocations in accordance with the Uniform Act. Acquire all parcels defined in accordance with the Uniform Act (Schedule 18, Section 3.1.1 and Section 3.6.1). Developer: • Acquire addition ROW and temporary easements.	Include a "Temporary Easement Clearance Request Form," including any required National Environmental Policy Act (NEPA) actions.
8	Social and Economic Conditions	• Temporary road closures and traffic detours may have impacts on access to certain public services.	• Provide safe and efficient connections through neighborhoods during construction for all modes of transportation, including pedestrians and bicycles.	Developer: • Include pedestrian and bicycle requirements in the Temporary Traffic Control Plans (Schedule 10, Section 2.11.2). • Include Safe Routes to School solutions that meet the requirements included in the Safe Routes to School Online Guide (Schedule 10, Section 2.11.7).	• Initial: Include in the Environmental Requirement's readiness review. • Active: Environmental Clearance Form/Checklist.
9	Social and Economic Conditions	• Temporary road closures and traffic detours may have impacts on access to certain public services.	• Coordinate with emergency service providers during construction to minimize effects on response times.	Developer: • Maintain emergency access and coordinate with emergency responders. (Schedule 10, Section 2, Maintenance of Traffic and Schedule 14, Strategic Communications).	• Initial: Include in the Environmental Requirement's readiness review. • Active: Environmental Clearance Form/Checklist.
10	Social and Economic Conditions	• Temporary effect to the regional economy from construction-related traffic congestion.	• Use standard measures such as phased construction, advance notice of road closures and detours, and fixed and variable signage to reduce effects on local residents, businesses and services, and on I-70 motorists.	Developer: • Adhere to Schedule 10, Section 2, Maintenance of Traffic requirements to minimize construction-related traffic congestion.	• Initial: Include in the Environmental Requirement's readiness review. • Active: Environmental Clearance Form/Checklist.
11	Social and Economic Conditions	• Temporary road closures and traffic detours may have impacts on access to certain public services.	• Use standard measures such as phased construction, advance notice of road closures and detours, and fixed and variable signage to reduce effects on local residents, businesses and services, and on I-70 motorists	Developer: • Adhere to Schedule 10, Section 2, Maintenance of Traffic requirements to maintain access to public services.	• Initial: Include in the Environmental Requirement's readiness review. • Active: Environmental Clearance Form/Checklist.
12	Social and Economic Conditions	• Temporary road closures and traffic detours may have impacts on access to certain public services.	• Provide a robust and context-sensitive communications and outreach plan throughout construction to keep residents informed.	Developer: • Implement a Construction Work Communications Plan, Maintenance and Operations Communications Plan, and a Crisis Communications Plan (Schedule 14, Strategic Communications).	• Initial: Include in the Environmental Requirement's in readiness review. • Active: Environmental Clearance Form/Checklist.

Mitigation Number	Mitigation Category	Impact from Final EIS	Mitigation Commitment	Status/Resolution	Compliance Plan Implementation
13	Social and Economic Conditions	• Temporary road closures and traffic detours may have impacts on access to certain public services.	• Coordinate with RTD more than 30 days in advance during construction to minimize disruptions to service areas and schedules. • Notify transit users in advance of any closures, delays or modifications in bus or rail routes, • Notify transit users in advance of modifications or relocations of transit stops or signage along the affected routes to maintain the required accessibility.	Developer: • Coordinate with RTD far enough in advance to allow 30 calendar days notification to transit users (Schedule 10, Section 2, Maintenance of Traffic, 2.7 RTD Transit System).	• Initial: Include in the Environmental Requirement's readiness review. • Active: Environmental Clearance Form/Checklist.
14	Social and Economic Conditions	• Temporary road closures and traffic detours may have impacts on access to certain public services.	• Use signs and notifications to reduce adverse effects from detours on access to homes, businesses and services during the construction period.	Developer: • Maintain public and private access to the local street system (Schedule 10, Section 2.2.4 Temporary Traffic Control Plan Strategies).	• Initial: Include in the Environmental Requirement's readiness review. • Active: Environmental Clearance Form/Checklist.
• 15	Social and Economic Conditions	• Acquisition of ROW from the buffer area between 46th Avenue and the field to the south of Swansea Elementary School.	• Remove the viaduct, lower the highway, and cover portions of the highway, including space for community and neighborhood activities	Department and Developer: • Implement the preferred alternative as described in the ROD. Developer: • Design changes that alter the ROD or the request for proposal's (RFP's) reference design shall require all applicable new environmental Approvals (Schedule 17, Section 8).	• Initial: Include in the Environmental Requirement's readiness review. • Active: Environmental Clearance Form/Checklist.
16	Social and Economic Conditions	• Acquisition of ROW from the buffer area between 46th Avenue and the field to the south of Swansea Elementary School.	• Redesign and reconstruct the school playground, including the adjacent parcels as part of the elementary school site. • Remove Elizabeth Street between 46th and 47th Avenues and 46th Avenue between Clayton and Columbine Streets to allow for a seamless connection between Swansea Elementary School and the landscape on the highway cover.	Department and Developer: • Implement the preferred alternative as described in the ROD. Developer: • Construct these project elements in accordance with the Project Agreement, including the I-70 Cover Plans and I-70 Cover and Swansea Elementary School outdoor areas design narrative (Schedule 10B).	• Initial: Include in the Environmental Requirement's readiness review. • Active: Environmental Clearance Form/Checklist.
17	Environmental Justice	• Eighteen business relocations (includes one non-profit relocation)	• Provide targeted assistance to encourage businesses that are crucial to low-income and minority populations to find new locations in the same neighborhoods	Department: • Provide targeted assistance to businesses to find new locations in the same neighborhoods.	• Department to complete.
18	Environmental Justice	• Fifty-six residential relocations and eighteen business relocations (includes one non-profit relocation).	• Provide funding to Community Resources and Housing Development Corporation (CRHDC) to assist displaced residents and businesses with financial counseling and procure financing needed for replacement property and to secure business and residential loans.	Department: • Provide funding to CRHDC as early mitigation. Colorado Department of Transportation (CDOT) provided funding to CRHDC.	• Department has completed this mitigation.

Mitigation Number	Mitigation Category	Impact from Final EIS	Mitigation Commitment	Status/Resolution	Compliance Plan Implementation
19	Environmental Justice	• Potential for disturbing hazmat sites during construction.	• Collect representative soil samples of recently cleaned-up residential properties pre-, during, and post-construction to test for lead and arsenic so that properties aren't re-contaminated due to construction activities.	Developer: • Implement Residential Properties Sampling Plan (Schedule 17, Section 23.18).	• ECT member will collect samples per the Residential Properties Sampling Plan.
20	Environmental Justice	• Increased noise and dust during construction.	• Provide residents located close to the highway construction (between 45th and 47th Avenues from Brighton Boulevard to Colorado Boulevard) two free portable or window-mounted air conditioning units with air filtration and assistance for the potential additional utility costs during construction	Department: • Provide air conditioning units and assistance for potential additional utility costs.	• Department to complete.
21	Environmental Justice	• Increased noise and dust during construction.	• Provide residents located close to the highway construction (between 45th and 47th Avenues from Brighton Boulevard to Colorado Boulevard) with interior storm windows.	Department: • Provide interior storm windows.	• Department to complete.
22	Environmental Justice	• Increased noise and dust during construction.	• Provide residents located close to the highway construction (between 45th and 47th Avenues from Brighton Boulevard to Colorado Boulevard) with furnace filters.	Department: • Provide furnace filters.	• Department to complete.
23	Environmental Justice	• Eighteen business relocations (includes one non-profit relocation).	• Facilitate opportunities with developers to promote hiring individuals from the local communities (job fairs).	Developer: • Implement the requirements of the Construction Period Workforce Development Goals Compliance, including the local hiring component (Schedule 15, Appendix B).	• Incorporate collaborative steps to include staff from impacted relocated businesses to the extent possible. • Establish Community Development Program including funding in amount of $700,000
24	Environmental Justice	• Eighteen business relocations (includes one non-profit relocation).	• Execute geographic-based hiring preferences (CDOT submitted an application and received Approval under Special Experiment Project 14 [SEP-14] for the U.S. Department of Transportation [DOT] pilot program).	Developer: • Meet the requirements of the local hiring goal. (Schedule 15, Section 6.3.1b.).	• Incorporate collaborative steps to include staff from impacted relocated businesses to the extent possible. • Establish Community Development Program including funding in amount of $700,000
25	Environmental Justice	• Eighteen business relocations (includes one non-profit relocation).	• Research opportunities to invest funds in a local workforce development program aimed at job readiness training prior to construction.	Developer: • Implement the requirements of the Construction Period Workforce Development Goals Compliance, including the on-the-job training component (Schedule 15, Appendix B).	• Incorporate collaborative steps to include staff from impacted relocated businesses to the extent possible. • Establish Community Development Program including funding in amount of $700,000

Mitigation Number	Mitigation Category	Impact from Final EIS	Mitigation Commitment	Status/Resolution	Compliance Plan Implementation
26	Environmental Justice	• Increased noise and dust during construction at Swansea Elementary School.	• Provide a new HVAC system, doors and windows for Swansea Elementary School.	Department: • Provide a new HVAC system, doors and windows. CDOT provided these items (Swansea School Project Phase 1).	Department has completed this mitigation.
27	Environmental Justice	• Move the highway closer to Swansea Elementary School.	• Prior to the start of roadway construction, build two new classrooms at Swansea Elementary School to enhance the overall quality of the school	Department: • Build two new classrooms. Construction is in progress (Swansea School Project Phase 2).	Department is completing this mitigation.
28	Environmental Justice	• Improve the safety of north-south pedestrian and bicycle connectivity compared to the existing conditions by eliminating unsafe crossings underneath the viaduct.	• Remove the viaduct, lower the highway, and cover portions of the highway to include space for community and neighborhood activities.	Department and Developer: • Implement the preferred alternative as described in the ROD, which will eliminate dark passages under the existing I-70.	• Initial: Include in the Environmental Requirement's readiness review. • Active: Environmental Clearance Form/Checklist
29	Environmental Justice	• Displace the Stop N Shop and Pilot Travel Center truck stop.	• Provide $100,000 to the Denver Office of Economic Development's Globeville and Elyria-Swansea (GES) Healthy Food Challenge that will help facilitate access to fresh food.	Department: • Provide $100,000 towards the GEX Healthy Food Challenge.	• Department to complete.
30	Environmental Justice	• Move the highway closer to Swansea Elementary School.	• Redesign and reconstruct the school playground, including the adjacent parcels as part of the elementary school site. • Remove Elizabeth Street between 46th and 47th Avenues and 46th Avenue between Clayton and Columbine Streets to allow for a seamless connection between Swansea Elementary School and the landscape on the highway cover.	Department: • Enter into agreements with Denver Public Schools for a new playground plan and to allow playground activities on the new highway cover. Developer: • Construct these project elements in accordance with the Project Agreement, including the I-70 East Cover and Swansea Elementary School Master Plan, Schedule 29.	• Initial: Include in the Environmental Requirement's readiness review. • Active: Environmental Clearance Form/Checklist.
31	Environmental Justice	• Relocate 56 residences.	• Provide $2 million in funding to develop affordable housing units in the Elyria and Swansea neighborhoods through available programs.	Department: • Provide $2 million in funding to develop affordable housing units.	• Department to complete.

Mitigation Number	Mitigation Category	Impact from Final EIS	Mitigation Commitment	Status/Resolution	Compliance Plan Implementation
32	Environmental Justice	• Create a financial burden for the low-income community, who may not be able to afford to use the managed lanes.	• Eligible residents of Globeville, Elyria, and Swansea will be provided mitigation for the financial burden of access to the tolled express lane through either free transponders, pre-loading of tolls, or other means determined prior to the opening of the tolled express lane. • Eligibility and the duration of the program are expected to be determined based on factors including, but not limited to, residency, financial burden, number of vehicles per resident or household, etc.	Department: • Provide mitigation for the financial burden of access to the tolled express lane.	• Department to complete.
33	Land Use	• Fifty-six point two acres converted to transportation use.	• Continue to coordinate with local jurisdictions to facilitate compatibility with land use plans, and to address any inconsistencies that may arise.	Department: • Develop a ROD and RFP in compliance with the land use plans. This task has been completed. Developer: • Design changes that alter the ROD or RFP reference design shall require all applicable new environmental Approvals (Schedule 17, Section 8).	• Initial: Include in the Environmental Requirement's readiness review. • Active: Environmental Clearance Form/Checklist.
34	Relocations and Displacements	• Fifty-six residential relocations eighteen business relocations (includes one non-profit relocation). •	• Compensate any person(s) whose property needs to be acquired according to the U.S. Constitution and the Uniform Act of 1970, as amended	Department: • Conduct all relocations in accordance with the Uniform Act. Developer: • Conduct acquisition of additional ROW and temporary easements in accordance with the Uniform Act (Schedule 18, Section 3.1.1 and Section 3.6.1).	• Initial: Include in the Environmental Requirement's readiness review. • Active: Environmental Clearance Form/Checklist
35	Relocations and Displacements	• Fifty-six residential relocations eighteen business relocations (includes one non-profit relocation). •	• Provide all impacted owners notification of the acquiring agency's intent to acquire an interest in their property, including a written offer letter of just compensation specifically describing those property interests. • Assign a ROW specialist to each assist property owners with this process	Department: • Perform this mitigation for applicable properties identified in the ROD. Developer: • Perform this mitigation for any additional acquired properties.	• These tasks will be addressed during construction, where applicable.
36	Relocations and Displacements	• Fifty-six residential relocations eighteen business relocations (includes one non-profit relocation). •	• Provide bilingual services for relocated and displaced businesses or households that need these services.	Department: • Perform this mitigation for applicable properties identified in the ROD. Developer: • Perform this mitigation for any additional acquired properties.	• These tasks will be addressed during construction, where applicable.

Mitigation Number	Mitigation Category	Impact from Final EIS	Mitigation Commitment	Status/Resolution	Compliance Plan Implementation
37	Relocations and Displacements	• Fifty-six residential relocations eighteen business relocations (includes one non-profit relocation).	• Meet directly with owners and occupants who would be relocated as a result of the proposed project. • Conduct multiple meetings with these individuals to provide an introduction and overview of the process associated with the Uniform Act. • Provide information on resources available, including assistance from local, state, and federal agencies, and private agencies in the community. Identify individual eligibility for benefits.	Department: • Perform this mitigation for applicable properties identified in the ROD. Developer: • Perform this mitigation for any additional acquired properties.	• These tasks will be addressed during construction, where applicable.
38	Historic Preservation	• Adverse Effect—13 Historic Resources	• Provide Level II archival documentation for adversely affected resources	Department: • Perform this mitigation for applicable properties identified in the ROD. Developer: • Perform this mitigation for any additional acquired properties.	• 5280 Connectors will address these tasks during construction, where applicable.
39	Historic Preservation	• Adverse Effect—13 Historic Resources	• Provide funding and participate in the creation of a documentary covering the history of I-70 East and its relationship to the Elyria and Swansea and Globeville neighborhoods	Department: • Provide funding and participate in creation of a history of I-70. This mitigation was completed. The results are available at www.i-70east.com.	• Department has completed this task.
40	Historic Preservation	• Adverse Effect—13 Historic Properties • Temporary impacts may include dust and debris, visual and auditory degradation related to construction activities, and decreased access.	• Implement other mitigation measures, as identified, in consultation with the State Historic Preservation Officers (SHPO) and consulting parties as described in the Programmatic Agreement (PA)	Developer: • Protect-in-place all identified historic resources that are to remain through the construction period. (Schedule 17, Section 12, Historic Resources.)	• 5280 Connectors will address these tasks during construction, where applicable.
41	Historic Preservation	• Cultural materials related to Indian occupation may be discovered during construction.	• Contact consulting Indian tribes if Indian cultural materials are identified at any time during construction.	Department: • Facilitate communication with SHPO and the Tribes if unexpected, historically significant remains are discovered. Developer: • Stop work in the area of discovery, and protect the resource as required by the PA and Schedule 17, Section 12, Historic Resources.	• Initial: Include in the Environmental Requirement's readiness review. • Active: Environmental Clearance Form/Checklist.

Mitigation Number	Mitigation Category	Impact from Final EIS	Mitigation Commitment	Status/Resolution	Compliance Plan Implementation
42	Historic Preservation	• Potential for construction activities to discover unanticipated, sub-surface historic resources during the course of construction, including, but not limited to, trolley tracks, sewer systems, building foundations, or historic artifacts.	• Refer to the Section 106 PA, Stipulation VI, Construction Phase Post-Review Discoveries, which sets forth a process for review of unanticipated resources uncovered during construction.	Department: • Facilitate communication with SHPO if unexpected, historically significant remains are discovered. Developer: • Stop work in the area of discovery, and protect the resource as required by the PA and Schedule 17, Section 12, Historic Resources.	• Initial: Include in the Environmental Requirement's readiness review • Active: Environmental Clearance Form/Checklist.
43	Historic Preservation	• Potential for construction activities to discover unanticipated, sub-surface historic resources during the course of construction, including, but not limited to, trolley tracks, sewer systems, building foundations, or historic artifacts.	• If trolley tracks or any other potential historic resources are discovered during construction and the impact on the resource is determined to be adverse, CDOT will follow I-70 East Corridor Programmatic Agreement Mitigation Stipulation III (6) to determine appropriate mitigation measures.	Department: • Facilitate communication with SHPO if unexpected, historically significant remains are discovered.. Developer: • Stop work in the area of discovery, and protect the resource as required by the PA and Schedule 17, Section 12, Historic Resources.	• Initial: Include in the Environmental Requirement's readiness review • Active: Environmental Clearance Form/Checklist.
44	Paleontological Resources	• Potential for encountering paleontological resources in excavated bedrock of the Denver and Arapahoe Formations.	• Perform an intensive pre-construction paleontological survey.	Department: • Perform an intensive pre-construction paleontological survey.	• The Department will complete this task.
45	Paleontological Resources	• Potential for encountering paleontological resources in excavated bedrock of the Denver and Arapahoe Formations.	• Perform spot-checking of excavations by a qualified paleontologist in areas of high paleontological potential during all phases of construction until bedrock is reached; then perform continuous paleontological monitoring.	Developer: • Perform spot-checking of excavations through all phases of construction until bedrock is reached; then perform continuous paleontological monitoring. (Schedule 17, Section 14, Paleontology)	5280 Connectors will provide a qualified paleontologist, as required.
46	Paleontological Resources	• Potential for encountering paleontological resources in excavated bedrock of the Denver and Arapahoe Formations.	• Cease work immediately upon discovery of any paleontological resources, fence off the area, and allow a qualified paleontologist to conduct sampling or excavation of specimens by hand or with mechanized equipment. • Do not resume work in the area until formal notification is received from the	Developer: • Cease work immediately upon discovery of any paleontological resources. (Schedule 17, Section 14, Paleontology)	• 5280 Connectors will implement and document a project-specific environmental compliance training program for all construction personnel. • An additional environmental training class is provided to all project foremen, supervisors and quality

Mitigation Number	Mitigation Category	Impact from Final EIS	Mitigation Commitment	Status/Resolution	Compliance Plan Implementation
			paleontologist that it is okay to resume work.		assurance (QA) Inspectors. The class is provided every quarter as new staff is brought on to the project. • Workers are provided with an "Introduction to the Denver Formation" that provides guidance on how to identify the Denver Formation for unexpected encounters.
47	Visual Resources and Aesthetic Qualities	• Ground-level noise walls or safety barriers are less intrusive to viewer's eyes compared to the No-Action and Revised Viaduct Alternatives; however, they introduce a new visual impact by blocking the view across the highway.	• Use *Attachment O, Aesthetic and Design Guidelines* of the Final EIS, developed during the EIS process, with Denver and the community during final design to help CDOT identify appropriate aesthetic design elements so there is compatibility within the community and each viewshed. • CDOT is committed to following the guidelines and continued community involvement during final design and construction.	Developer: • Design and construct the project in accordance with Schedule 10, Section 14, Landscaping and Aesthetics, and with Central I-70 Project Aesthetic Standards (Schedule 10B) that were developed based on Attachment O of the Final EIS.	• Initial: Include in the Environmental Requirement's readiness review • Active: Environmental Clearance Form/Checklist.
48	Visual Resources and Aesthetic Qualities	• Views for drivers traveling eastbound and westbound will be entirely different from the current, existing conditions.	• Use *Attachment O, Aesthetic and Design Guidelines* of the Final EIS, developed during the EIS process, with Denver and the community during final design to help CDOT identify appropriate aesthetic design elements so there is compatibility within the community and each viewshed. • CDOT is committed to following the guidelines and continued community involvement during final design and construction.	Developer: • Design and construct the project in accordance with Schedule 10, Section 14, Landscaping and Aesthetics, and with Central I-70 Project Aesthetic Standards (Schedule 10B) that were developed based on Attachment O of the Final EIS.	• Initial: Include in the Environmental Requirement's readiness review • Active: Environmental Clearance Form/Checklist.
49	Visual Resources and Aesthetic Qualities	• Tolled express lanes in • infrastructure will create new visual impacts along the project corridor.	• Use *Attachment O, Aesthetic and Design Guidelines* of the Final EIS, developed during the EIS process, with Denver and the community during final design to help CDOT identify appropriate aesthetic design elements so there is compatibility within the community and each viewshed. • CDOT is committed to following the guidelines and continued community involvement during final design and construction.	Developer: • Design and construct the project in accordance with Schedule 10, Section 14, Landscaping and Aesthetics, and with Central I-70 Project Aesthetic Standards (Schedule 10B) that were developed based on Attachment O of the Final EIS.	• Initial: Include in the Environmental Requirement's readiness review • Active: Environmental Clearance Form/Checklist.

Mitigation Number	Mitigation Category	Impact from Final EIS	Mitigation Commitment	Status/Resolution	Compliance Plan Implementation
50	Parks and Recreational Resources	• The South Platte River Greenway, a Section 6(f) resource, may experience temporary impacts during construction.	• Provide adequate notice and signing to Greenway users prior to construction.	Developer: • Provide appropriate public notifications prior to construction. (Schedule 10, Section 2.11.19 Trail and Pedestrian Impacts)	• The Project On-going Mitigation Actions (POMA) process is designed to proactively collect community stakeholder concerns (restoration) to identify and implement mitigations.
51	Parks and Recreational Resources	• The South Platte River Greenway, a Section 6(f) resource, may experience temporary impacts during construction.	• Coordinate with Denver Parks and Recreation and provide trail detours and American's with Disabilities Act (ADA)-compliant detour signage during construction consistent with the *2007 Denver Construction Detour Standards for Bikeways and Multi-Use Trails*	Developer: • Prepare a TMP, including a TCP and TOP Strategies. (Schedule 10 Section 2.2). • Involve all affected agencies in the development of the TMP and associated plans. (Schedule 10 Section 2.2.3)	• Initial: Include in the Environmental Requirement's readiness review • Active: Environmental Clearance Form/Checklist.
52	Parks and Recreational Resources	• The South Platte River Greenway, a Section 6(f) resource, may experience temporary impacts during construction.	• Return the Greenway to pre-construction or a comparable state following construction completion.	Developer: • Return the Greenway to pre-construction or a comparable state following construction completion (Schedule 17, Section 15.1.3).	• Initial: Include in the Environmental Requirement's readiness review • Active: Environmental Clearance Form/Checklist.
53	Parks and Recreational Resources	• The South Platte River Greenway, a Section 6(f) resource, may experience temporary impacts during construction.	• If new trail construction or full trail reconstruction is required, coordinate with Denver Parks and Recreation during the design and construction phase to facilitate that all trail construction meets current standards.	Department: • Include representatives from the City in the design review process and construction as agreed upon in the City of Denver Intergovernmental Agreement (Denver IGA). Developer: • Maintain existing trail systems, temporary trails, sidewalks, and pedestrian routes. • Meet all requirements of the ADA for all construction work that impacts existing trails and pedestrian facilities or that will be used for temporary detour routes; Temporary trail detours shall meet requirements for trail detours as outlined in the *2007 Denver Construction Detour Standards for Bikeways and Multi-Use Trails* (Schedule 10, Section 2.11.19, Trail and Pedestrian Impacts). • Rebuild reconstructed trail segment(s) to match the existing facility (Schedule 17, Section 15.1.3).	• Initial: Include in the Environmental Requirement's readiness review • Active: Environmental Clearance Form/Checklist.

Mitigation Number	Mitigation Category	Impact from Final EIS	Mitigation Commitment	Status/Resolution	Compliance Plan Implementation
54	Parks and Recreational Resources	• There is a 0.95 acre of impact to the Swansea Elementary School.	• Use remnants of adjacent parcels obtained for ROW expansion to reconfigure the school site plan and replace all the playground facilities, including closing Elizabeth Street between 46th and 47th Avenues.	Developer: • Construct these project elements in accordance with the PA, including the I-70 Cover Plans and the I-70 Cover and Swansea Elementary School outdoor areas design narrative (Schedule 10B).	• Initial: Include in the Environmental Requirement's readiness review • Active: Environmental Clearance Form/Checklist.
55	Parks and Recreational Resources	• Part of Globeville Landing Park will be closed during construction	• Return to pre-construction or comparable state following construction completion.	Developer: • Rebuild reconstructed trail segment(s) to match the existing facility (Schedule 17, Section 15.1.3).	• 5280 Connectors will provide Section 6(f) coordination and mitigation if impacts to the Globeville Landing Park exceed those identified in the Final EIS and the ROD,
56	Parks and Recreational Resources	• The Globeville Landing Park and South Platte River Greenway may experience temporary impacts during construction	• Once final design is complete and prior to any impacts to Globeville Landing Park and the South Platte River Greenway, a Proposal Description/Environmental Screening Form for temporary non-conforming uses must be completed, submitted, and approved by Colorado Parks and Wildlife (CPW) and the National Park Service (NPS)	Department: • Complete the Proposal Description/Environmental Screening Form, submit to CPW/NPS, and conduct any other needed coordination on this impact from the ROD. Developer: • Will have responsibilities as described in Schedule 17, Section 8, Required Environmental Approvals, if impacts exceed those described in the reference design.	• These tasks will be addressed during construction, where applicable.
57	Air Quality	• Fugitive dust generated during construction could cause temporary impacts.	• Monitor for particulate matter less than 10 microns in size (PM_{10}), which will allow for the real-time modification or implementation of various dust control measures during construction.	Developer: • Conduct continuous PM_{10} monitoring during construction (Schedule 17, Section 10.1.3.a.iii and vi).	• 5280 Connectors will develop a Dust Mitigation Plan that includes regular monitoring, inspecting and sampling, if necessary.
58	Air Quality	• Fugitive dust generated during construction could cause temporary impacts.	• Cover, wet, compact, or use a chemical stabilization binding agent to control dust and excavated materials at construction sites.	Developer: • Include this Best Management Practice (BMP) as part of the Air Quality Monitoring, Maintenance and Mitigation Plan (Schedule 17, Section 10.1.3.a.viii).	• 5280 Connectors will develop a Dust Mitigation Plan that includes regular monitoring, inspecting and sampling, if necessary. • BMPs will be installed, as needed, via Stormwater Management Plan (SWMP) implementation.
59	Air Quality	• Fugitive dust generated during construction could cause temporary impacts.	• Use wind barriers and wind screens to prevent dust spreading from the site.	Developer: • Include this BMP as part of the Air Quality Monitoring, Maintenance and Mitigation Plan (Schedule 17, Section 10.1.3.a.viii).	• 5280 Connectors will develop a Dust Mitigation Plan that includes regular monitoring, inspecting and sampling, if necessary. • BMPs will be installed, as needed, via SWMP implementation.

Mitigation Number	Mitigation Category	Impact from Final EIS	Mitigation Commitment	Status/Resolution	Compliance Plan Implementation
60	Air Quality	• Fugitive dust generated during construction could cause temporary impacts.	• Have a wheel wash station and/or crushed stone apron at egress/ingress areas to prevent dirt being tracked onto public streets.	Developer: • Include this BMP as part of the Air Quality Monitoring, Maintenance and Mitigation Plan (Schedule 17, Section 10.1.3.a.viii).	• 5280 Connectors will develop a Dust Mitigation Plan that includes regular monitoring, inspecting and sampling, if necessary. • BMPs will be installed, as needed, via SWMP implementation.
61	Air Quality	• Fugitive dust generated during construction could cause temporary impacts.	• Use vacuum-powered street sweepers to remove dirt tracked onto streets.	Developer: • Include this BMP as part of the Air Quality Monitoring, Maintenance and Mitigation Plan (Schedule 17, Section 10.1.3.a.viii).	• 5280 Connectors will develop a Dust Mitigation Plan that includes regular monitoring, inspecting and sampling, if necessary. • BMPs will be installed, as needed, via SWMP implementation.
62	Air Quality	• Fugitive dust generated during construction could cause temporary impacts.	• Cover all dump trucks leaving sites to prevent dirt from spilling onto streets.	Developer: • Include this BMP as part of the Air Quality Monitoring, Maintenance, and Mitigation Plan (Schedule 17, Section 10.1.3.a.viii).	• 5280 Connectors will develop a Dust Mitigation Plan that includes regular monitoring, inspecting and sampling, if necessary. • BMPs will be installed, as needed, via SWMP implementation.
63	Air Quality	• Fugitive dust generated during construction could cause temporary impacts.	• Minimize disturbed areas, particularly in winter.	Developer: • Include this BMP as part of the Air Quality Monitoring, Maintenance and Mitigation Plan (Schedule 17, Section 10.1.3.a.viii).	• 5280 Connectors will develop a Dust Mitigation Plan that includes regular monitoring, inspecting and sampling, if necessary. BMPs will be installed, as needed, via SWMP implementation.
64	Air Quality	• Mobile source air toxics (MSATs) emissions could increase temporarily during construction.	• Prohibit unnecessary idling of construction equipment.	Developer: • Comply with the idling restrictions and opacity requirements of the CCD's Code of Ordinances, including Chapter 4 Air Pollution Control, Article IV Mobile Sources.	• The 5280 Connectors "Sustainability" team will draft an Idling Plan and MSAT Reduction Plan for implementation during construction.
65	Air Quality	• MSATs emissions could increase temporarily during construction.	• Locate construction diesel engines as far away as possible from residential areas	Developer: • Include this BMP as part of the Air Quality Monitoring, Maintenance and Mitigation Plan (Schedule 17, Section 10.1.3.a.viii).	• The 5280 Connectors "Sustainability" team will draft an Idling Plan and MSAT Reduction Plan for implementation during construction.
66	Air Quality	• MSATs emissions could increase temporarily during construction.	• Locate construction staging areas close to work sites, while situating them as far away as possible from residential use areas.	Developer: • Include this BMP as part of the Air Quality Monitoring, Maintenance and Mitigation Plan (Schedule 17, Section 10.1.3.a.viii).	• The 5280 Connectors "Sustainability" team will draft an Idling Plan and MSAT Reduction Plan for implementation during construction.
67	Air Quality	• MSATs emissions could increase temporarily during construction.	• Require heavy construction equipment to use the cleanest available engines or be retrofitted with diesel particulate control technology.	Developer: • Undertake reasonable efforts for heavy construction equipment to use the cleanest available engines or be retrofitted with diesel particulate	• The 5280 Connectors "Sustainability" team will draft an Idling Plan and MSAT Reduction Plan for implementation during construction.

Mitigation Number	Mitigation Category	Impact from Final EIS	Mitigation Commitment	Status/Resolution	Compliance Plan Implementation
				control technology (Schedule 17, Section 10.1.5 Diesel Non-road Construction Equipment).	
68	Air Quality	• MSATs emissions could increase temporarily during construction.	• Use alternatives to diesel engines and/or diesel fuels, such as biodiesel, liquefied natural gas or compressed natural gas, fuel cells, and electric engines, if applicable.	Developer: • Undertake reasonable efforts to use alternatives to diesel engines and/or diesel fuels (Schedule 17, Section 10.1.3.a,ix. Alternative Fuels).	• The 5280 Connectors "Sustainability" team will draft an Idling Plan and MSAT Reduction Plan for implementation during construction.
69	Air Quality	• MSATs emissions could increase temporarily during construction.	• Install engine pre-heater devices to eliminate unnecessary idling for wintertime construction.	Developer: • Implement diesel non-road construction equipment requirements. (Schedule 17, Section 10.1.5).	• The 5280 Connectors "Sustainability" team will draft an Idling Plan and MSAT Reduction Plan for implementation during construction.
70	Air Quality	• MSATs emissions could increase temporarily during construction.	• Prohibit tampering with equipment to increase horsepower or to defeat an emission control device's effectiveness.	Developer: • Implement diesel non-road construction equipment requirements. (Schedule 17, Section 10.1.5).	• The 5280 Connectors "Sustainability" team will draft an Idling Plan and MSAT Reduction Plan for implementation during construction.
71	Air Quality	• MSATs emissions could increase temporarily during construction.	• Require construction vehicle engines to be properly tuned and maintained.	Developer: • Implement diesel non-road construction equipment requirements. (Schedule 17, Section 10.1.5).	• The 5280 Connectors "Sustainability" team will draft an Idling Plan and MSAT Reduction Plan for implementation during construction.
72	Air Quality	• MSATs emissions could increase temporarily during construction.	• Use construction vehicles and equipment with the minimum practical engine size for the intended job.	Developer: • Include this BMP as part of the Air Quality Monitoring, Maintenance and Mitigation Plan (Schedule 17, Section 10.1.3.a.viii).	• The 5280 Connectors "Sustainability" team will draft an Idling Plan and MSAT Reduction Plan for implementation during construction.
73	Air Quality	• Construction fugitive dust could cause temporary impacts	• Continue the "sweepbox" program on the highway to achieve the current level of fugitive dust reduction. • Enhance street sweeping after snow events to reduce the particulate matter accumulated during operations.	Developer: • Post signage that storm sweeping shall be performed as required by the Denver Regional Council of Governments (Schedule 11 Section 11.4, Appendix A-1 Item 17.1, and Appendix A-2 Item 17.1)	• 5280 Connectors will develop a Dust Mitigation Plan that includes regular monitoring, inspecting and sampling, if necessary.
74	Air Quality	• MSAT emissions could increase temporarily during construction	• Optimize signal timing at intersections and along arterial streets near the freeway to reduce vehicle delay and tailpipe emissions.	Developer: • Provide an intersection analysis that includes traffic signal timing optimization and signal coordination (Schedule 10, Section 2.10.1).	• The 5280 Connectors "Sustainability" team will draft an idling plan and MSAT reduction plan to implement during construction.
75	Air Quality	• MSAT emissions could increase temporarily during construction	• Implement congestion pricing and commuter incentive programs that reduce peak-period highway congestion and emissions.	Department: • Implement dynamic pricing or managed lanes based on congestion levels.	• The Department will perform this mitigation.

Mitigation Number	Mitigation Category	Impact from Final EIS	Mitigation Commitment	Status/Resolution	Compliance Plan Implementation
76	Air Quality	• MSAT emissions could increase temporarily during construction	• Encourage Transportation Demand Management (TDM) options, such as high-occupancy vehicle lanes and agreements with major employers to promote and implement flexible work programs.	Developer: • Develop and implement a TDM program to reduce travel demand and improve traffic operating conditions during construction (Schedule 10, Section 2.2.5.g).	• The 5280 Connectors "Sustainability" team will draft an Idling Plan and MSAT Reduction Plan for implementation during construction.
77	Energy	• Approximately 5,808 billion Btu will be consumed during construction.	• Limit idling of construction equipment.	Developer: • Comply with the idling restrictions and opacity requirements of the CCD's Code of Ordinances, including Chapter 4 Air Pollution Control, Article IV Mobile Sources.	• The 5280 Connectors "Sustainability" team will draft an Idling Plan and MSAT Reduction Plan for implementation during construction.
78	Energy	• Approximately 5,808 billion Btu will be consumed during construction..	• Encourage construction workers to carpool and vanpool.	Developer: • Undertake reasonable efforts to implement carpools and vanpools.	• The 5280 Connectors "Sustainability" team will draft an Idling Plan and MSAT Reduction Plan for implementation during construction.
79	Energy	• Approximately 5,808 billion Btu will be consumed during construction.	• Encourage use of the closest material sources.	Developer: • Use reasonable efforts to optimize hauling efficiency within the parameters of contract requirements and local ordinances.	• 5280 Connectors will address this during construction, where applicable.
80	Energy	• Approximately 5,808 billion Btu will be consumed during construction..	• Locate construction staging areas close to work sites, while situating them as far away as possible from residential use areas.	Developer: • Undertake reasonable efforts to optimize staging efficiency within the parameters of contract requirements and local ordinances.	• 5280 Connectors will address this during construction, where applicable.
81	Energy	• Approximately 5,808 billion Btu will be consumed during construction.	• Encourage use of cleaner and more fuel-efficient construction vehicles (for example, low sulfur fuel, biodiesel, or hybrid technologies)	Developer: • Undertake reasonable efforts to use alternatives to diesel engines and/or diesel fuels (Schedule 17, Section 10.1.3.a.ix).	• The 5280 Connectors "Sustainability" team will draft an Idling Plan and MSAT Reduction Plan for implementation during construction.
82	Energy	• Approximately 5,808 billion Btu will be consumed during construction.	• Encourage use of alternative fuels and asphalt binders.	Developer: • Undertake reasonable efforts to use alternatives to diesel engines and/or diesel fuels. (Schedule 17, Section 10.1.3a.ix)	• The 5280 Connectors "Sustainability" team will draft an Idling Plan and MSAT Reduction Plan for implementation during construction.
83	Energy	• Approximately 5,808 billion Btu will be consumed during construction.	• Implement traffic management schemes that minimize delays and idling.	Developer: • Provide intersection analysis that includes traffic signal timing optimization and signal coordination. (Schedule 10, Section 2.10.1)	• Initial: Include in the Environmental Requirement's readiness review • Active: Environmental Clearance Form/Checklist.

Mitigation Number	Mitigation Category	Impact from Final EIS	Mitigation Commitment	Status/Resolution	Compliance Plan Implementation
84	Energy	• Approximately, 70.0 billion Btu will be consumed per day.	• Implement energy conservation measures where appropriate, such as energy-efficient electrical system specifications, lighting, mechanical equipment, and building insulation in accordance with CDOT's *Lighting Design Guide* (CDOT, 2006)	Developer: • Adhere to CDOT's *Lighting Design Guide* for Department-maintained lighting, and Excel's and Local Agency Guidelines for Local Agency maintained lighting (Schedule 10A).	• 5280 Connectors to address during construction, where applicable
85	Energy	• Approximately, 70.0 billion Btu will be consumed per day.	• Encourage energy-efficient options for the cover facilities.	Developer: • Adhere to cover design guidelines and requirements.	• The 5280 Connectors "Sustainability" team will draft an Idling Plan and MSAT Reduction Plan for implementation during construction.
86	Noise	• Construction noise will present short-term effects to those dwelling units located along the corridor and along designated construction access routes.	• Implement BMPs to minimize noise during construction, as per the Federal Highway Administration's (FHWA's) *Highway Construction Noise Handbook* (2006)	Developer: • Implement BMPs to minimize noise during construction (Schedule 17, Section 11.6.2 Construction Noise Mitigation and Monitoring).	• 5280 Connectors will implement BMPs during construction in appropriate locations.
87	Noise	• Construction noise will present short-term effects to those dwelling units located along the corridor and along designated construction access routes.	• Conduct a benefited receptor survey prior to construction to determine if the recommended noise wall is desired. • If the survey results show that the majority of benefitted receptors who respond to the survey desire the noise wall, the noise wall will be optimized and built.	Developer: • Conduct benefited receptor survey (Schedule 17, Section 11.3.3 New Noise Abatement).	• 5280 Connectors will optimize the design of the noise abatement infrastructure to maximize the number of receivers receiving a reduction of 5 dBA or greater per CDOT/FHWA guidelines. • 5280 Connectors will submit a preliminary Noise Technical Report, which contains the optimized design of the proposed noise abatement in the affected neighborhood.
88	Noise	The number of noise receptors that exceed Noise Abatement Criteria (NAC) threshold include: • Globeville: 27 • Elyria: 40 (11 that increase substantially by 10 dBA or more) • Swansea: 37 • Stapleton: 0 • Peoria Street: 0 • Montbello: 3 • Aurora: 2	• Location and height of feasible and reasonable walls: Elyria: 12 to 20 feet	Developer: • Provide new noise abatement, as required, in the Elyria area as identified in Exhibit 46 of the ROD (Schedule 17, Section 11.3.1 New Noise Abatement).	• 5280 Connectors will design and construct noise walls in locations that will accommodate the ultimate configuration as required by the Final EIS.

Mitigation Number	Mitigation Category	Impact from Final EIS	Mitigation Commitment	Status/Resolution	Compliance Plan Implementation
89	Biological Resources	• There are 369.2 acres of permanent, direct impact to wildlife habitat. • There are 0.999 acres of permanent impacts and 0.892 acre of temporary impacts to riparian areas.	• Comply with Senate Bill 40, CDOT Impacted Black-Tailed Prairie Dog (BTPD) Policy, and CDOT Standard Specifications for protection of migratory birds.	• Developer: Comply with Senate Bill 40 (Schedule 17, Section 17), the BTPD Policy (Schedule 17, Section 22); and with the Project Special Provision 240 (Schedule 17)	• Initial: Included in the Environmental Requirement's readiness review. • Active: Environmental Clearance Form/Checklist.
90	Biological Resources	• There are 369.2 acres of permanent, direct impact to wildlife habitat. • There are 0.999 acres of permanent impacts and 0.892 acre of temporary impacts to riparian areas.	• Monitor disturbed sites during construction to identify and treat any noxious weed invasions.	Developer: • Conduct regular noxious weed surveys. (Schedule 17, Section 18 Integrated Noxious Weed Management Plan)	• 5280 Connectors will address this during construction, where applicable.
91	Biological Resources	• There are 369.2 acres of permanent, direct impact to wildlife habitat. • There are 0.999 acres of permanent impacts and 0.892 acre of temporary impacts to riparian areas.	• Reclaim disturbed areas in phases throughout construction with native grasses and forbs	Developer: • Follow the stabilization requirements of Schedule 17, Project Special Provision 240 and the seeding requirements of Schedule 10 Section 14 Landscaping and Aesthetics.	• 5280 Connectors will use CDOT-approved, project-specific seed mix(es). • 5280 Connectors will provide coordination between area superintendents, erosion control supervisors and/or the reclamation subcontractor during the weekly scheduling meeting.
92	Biological Resources	• There are 0.999 acres of permanent impacts and 0.892 acre of temporary impacts to riparian areas.	• Replace riparian trees at a 1:1 ratio and riparian shrubs at a 1:1 square foot ratio.	Developer : • Replace riparian trees at a 1:1 ratio and riparian shrubs at a 1:1 square foot ratio (Schedule 17, Section 16 Vegetation, and Schedule 17, Section 17 Senate Bill 40 Wildlife Certification).	• 5280 Connectors will address and document this during construction, where applicable.
93	Biological Resources	• There are 369.2 acres of permanent, direct impact to wildlife habitat.	• Conduct a Burrowing Owl survey following CPW protocols no more than 30 days prior to construction if construction in prairie dog colonies will occur between February 1 and August 31. • If a nesting pair is discovered, no construction activity will occur within 150 feet of the nest between March 15 and October 31.	Developer: • Conduct a Burrowing Owl survey in accordance with CPW's *Recommended Survey Protocol and Actions To Protect Nesting Burrowing Owls* (Schedule 17, Section 22.5 Burrowing Owl).	• 5280 Connector's environmental team will conduct Burrowing Owl surveys prior to disturbance of proposed construction areas •

Mitigation Number	Mitigation Category	Impact from Final EIS	Mitigation Commitment	Status/Resolution	Compliance Plan Implementation
94	Biological Resources	• There are 369.2 acres of permanent, direct impact to wildlife habitat.	• Eagle nest surveys will be conducted during the appropriate seasons prior to construction. Surveys will begin near the winter range and known nest sites, and then annually between January 1 and April • 31 for the remainder of construction, if a Bald and Golden Eagle Protection Act permit is needed.	Developer: • Conduct annual raptor surveys in accordance with the Migratory Bird Treaty Act (MBTA) and CDOT Specification Section 240 (Schedule 17, Project Special Provision 240.01 (b)3.)	• 5280 Connectors will conduct annual raptor surveys, and implement seasonal buffer zones in areas with active nests.
95	Biological Resources	• There are 369.2 acres of permanent, direct impact to wildlife habitat.	• Remove or trim vegetation outside of the April 1 to August 31 migratory bird breeding season.	Developer: • Remove or trim vegetation between September 1 and March 30 (Schedule 17, Project Special Provision 240).	• 5280 Connectors will remove or trim vegetation prior to migratory bird season.
96	Biological Resources	• There are 369.2 acres of permanent, direct impact to wildlife habitat	• Clear and grub survey areas, as well as areas within 50 feet of these areas, between April 1 and August 31 for active migratory bird nests within seven days of the work being performed.	Developer: • Clear and grub survey areas, as well as areas within 50 feet of these areas (Schedule 17, Project Special Provision 240).	• 5280 Connectors will clear and grub survey areas, as well as areas within 50 feet of these areas.
97	Biological Resources	• There are 369.2 acres of permanent, direct impact to wildlife habitat	• Remove existing nests from structures after August 31 and prior to April 1.	Developer: • Remove existing nest from structures after August 31 and prior to April 1 (Schedule 17, Project Special Provision 240).	• 5280 Connectors will remove existing nests from structures after August 31 and prior to April 1.
98	Biological Resources	• There are 369.2 acres of permanent, direct impact to wildlife habitat	• Monitor structures at least once every three days for any nesting activity between April 1 and August 31.	Developer: • Provide nest monitoring once every three days for active nesting activity (Schedule 17, Project Special Provision 240).	• 5280 Connectors will provide nest monitoring once every three days for active nesting activity.
99	Biological Resources	• There are 369.2 acres of permanent, direct impact to wildlife habitat	• Prepare and implement an Integrated Noxious Weeds Management Plan	Developer: • Prepare and implement an Integrated Noxious Weeds Management Plan (Schedule 17, Section 18 Integrated Noxious Weed Management Plan).	• 5280 Connectors will submit and implement a project-wide Integrated Noxious Weed Management Plan. • Training sessions will be provided by the environmental compliance team to the construction management team on how to implement the plan. • The re-vegetation requirements must also meet the local municipality standards.
100	Biological Resources	• There are 0.999 acres of permanent impacts and 0.892 acre of temporary impacts to riparian areas.	• Perform botanical surveys for Ute ladies'-tresses orchid and Colorado butterfly plant.	Developer: • Perform botanical surveys (Schedule 17, Section 22.3 Colorado Butterfly Plant and Section 22.4 Ute-Ladies'-tresses Orchid).	• 5280 Connectors will have a qualified botanist conduct surveys within and adjacent to the areas of disturbance during flowering season and prior to any construction.

Mitigation Number	Mitigation Category	Impact from Final EIS	Mitigation Commitment	Status/Resolution	Compliance Plan Implementation
101	Floodplains and Drainage/ Hydrology	• Impact to potential ponding areas due to the increased width of the highway, which may increase runoff from I-70	• Detention and flood control ponds are required by CDOT's municipal separate storm sewer system (MS4) Permit.	Developer: • Create detention ponds and implement storm drainage for onsite drainage system improvements (Schedule 10, Section 8, Drainage).	• 5280 Connectors will create detention and storm drainage ponds.
102	Floodplains and Drainage/ Hydrology	• The potential ponding areas between Brighton Boulevard and Dahlia Street will be substantially impacted due to lowered profile of the highway.	• Build an off-site drainage system to reduce the risk of flooding within the lowered section of I-70, as well as the portion of the watershed between I-70 and the South Platte River.	Developer: • Build an offsite drainage system (Schedule 10, Section 8.4.9 Area Specific Drainage Requirements).	• 5280 Connectors will build an off-site drainage system.
103	Floodplains and Drainage/ Hydrology	• There are potential impacts to South Platte River.	• Design the outfalls to the South Platte River to have no adverse impact to the floodplain.	Developer: • Evaluate the effect of tail water in the receiving drainage way. (Schedule 10 Section 8.4.4 Drainage)	• 5280 Connectors will evaluate the effect of tail water in the receiving drainage way.
104	Floodplains and Drainage/ Hydrology	• Potential conflict with adjacent drainage projects in the project area.	• Coordinate with adjacent projects to prevent conflicts between the projects.	Developer: • Coordinate all drainage related issues with affected Governmental Authorities. (Schedule 10 Section 8.3 Administrative Requirements)	• The 5280 Connector's POMA process is designed to proactively collect community stakeholder concerns (drainage) to identify and implement mitigations.
105	Wetlands, Open Waters, and Other Waters of the U.S.	• There are 5.507 acres of permanent and 0.081 acre of temporary wetland impacts. • There are 0.219 acres of permanent and 0.556 acres of temporary impacts to other waters of the U.S. and open waters	• Mitigate unavoidable, permanent impacts at a 1:1 ratio in a wetland mitigation bank in the South Platte River watershed.	Developer: • Mitigate for permanent wetland impacts at a 1:1 ratio (Schedule 17, Section 21 Wetlands/Waters of the U.S. and Section 404 Permit).	• 5280 Connectors will address and document this during construction, where applicable.
106	Wetlands, Open Waters, and Other Waters of the U.S.	• There are 5.507 acres of permanent and 0.081 acre of temporary wetland impacts • There are 0.219 acre of permanent and 0.556 acre of temporary impacts to other waters of the U.S. and open waters	• Obtain and follow requirements of Section 404 permitting and Senate Bill 40 certification	Developer: • Meet all requirements of Section 404 permitting and Senate Bill 40 (Schedule 17, Section 17 Senate Bill 40 Wildlife Certification and Section 21 Wetlands/Waters of the U.S. and Section 404 Permit).	• Initial: Included in the Environmental Requirement's readiness review. • Active: Environmental Clearance Form/Checklist.

Mitigation Number	Mitigation Category	Impact from Final EIS	Mitigation Commitment	Status/Resolution	Compliance Plan Implementation
107	Wetlands, Open Waters, and Other Waters of the U.S.	• There are 5.507 acres of permanent and 0.081 acre of temporary wetland impacts. • There are 0.219 acres of permanent and 0.556 acre of temporary impacts to other waters of the U.S. and open waters.	• Install temporary erosion control and sediment control BMPs before ground-disturbing activities; permanently stabilize completed areas within seven days.	Developer: • Install temporary erosion control and sediment control BMPs before ground-disturbing activities. • Permanently stabilize completed areas within seven days. • The following apply: Schedule 17, Section 20 Water Quality Control and Water Resources and Section 21 Wetlands / Waters of the U.S. and Section 404 Permit	• 5280 Connectors will implement wetland protection and minimize impacts by the use of sediment and erosion controls, fencing, and excavation techniques.
108	Wetlands, Open Waters, and Other Waters of the U.S.	• There are 5.507 acres of permanent and 0.081 acre of temporary wetland impacts • There is 0.219 acres of permanent and 0.556 acre of temporary impacts to other waters of the U.S. and open waters.	• Restore wetlands temporarily affected during construction to preconstruction conditions.	Developer: • Remove temporary fills in their entirety... • The areas affected by temporary fills must be re-vegetated. • The following apply: NW Permit 14, Schedule 17, Section 21.1.2	• 5280 Connectors will follow the Implementation methods in ECWP 4.2.7: Reclamation Measures for Construction in Wetlands and Other Waters.
109	Water Quality	• Stormwater runoff can create erosion and degradation of water quality during and after construction.	Implement the following BMPs for erosion and sediment control, dust control, stormwater control, and expansive soils during and after construction: • Silt fences, erosion control blankets • Sediment traps, sediment basins • Soil stockpile management • Temporary diversion structures • Spill prevention and control measures • Re-grading • Seeding and re-vegetating soils and slopes • Mulch protection for new plantings • Stormwater control channels	Developer: • Implement the appropriate BMPs (Schedule 17, Environmental Requirements, Schedule 10, Section 8, Drainage, and CDOT Standard Specifications).	• 5280 Connectors will implement the appropriate BMPs in accordance with the Colorado Department of Public Health and Environment (CDPHE) stormwater discharge permit and CDOT M-201-1 Standard Plans. • In areas requiring alternative controls, 5280 Connectors will submit non-standard BMPs, for Approval.
110	Water Quality	• Winter maintenance activities use solutions and compounds that could lead to water quality issues due to runoff.	• Prevent over-treating by applying liquid deicer at the beginning of snowfall and no longer pre-treating roads.	Developer: • Follow CDOT Guidance, which advises against using liquids or solids on bare roads prior to precipitation. (CDOT Standard Operating Guide [SOG] for Winter Maintenance and Operations, August 2010).	• 5280 Connectors will address this during construction, where applicable.

Mitigation Number	Mitigation Category	Impact from Final EIS	Mitigation Commitment	Status/Resolution	Compliance Plan Implementation
111	Water Quality	• Winter maintenance activities use solutions and compounds that could lead to water quality issues due to runoff.	• Reduce the application rate of sand and salt mixtures from historic rates.	Developer: • Conform to the requirements of the CDPHE, Air Quality Control Commission's Regulation 16 and Denver Regional Council of Governments (DRCOG) sweeping requirements (Schedule 17, Section 10.1.1 and Schedule 11, Section 11.4).	• 5280 Connectors will address this during construction, where applicable.
110	Water Quality	• Winter maintenance activities use solutions and compounds that could lead to water quality issues due to runoff.	• Prevent over-treating by applying liquid deicer at the beginning of snowfall and do not pretreat roads	Developer: • Follow CDOT Guidance, which advises against using liquids or solids on bare roads prior to precipitation (CDOT Standard Operating Guide (SOG) for Winter Maintenance and Operations, August 2010).	• 5280 Connectors will address this during construction, where applicable.
111	Water Quality	• Winter maintenance activities use solutions and compounds that could lead to water quality issues due to runoff.	• Reduce the application rate of sand and salt mixtures from historic rates.	Developer: • Conform to the requirements of the CDPHE, Air Quality Control Commission's Regulation 16 and DRGOG sweeping requirements (Schedule 17, Section 10.1.1 and Schedule 11, Section 11.4).	• 5280 Connectors will address this during construction, where applicable.
112	Water Quality	• Winter maintenance activities use solutions and compounds that could lead to water quality issues due to runoff.	• Apply liquid deicer products at the lowest application rate that it will remain effective. • Adhere to CDOT's Standard Operating Guide for Winter Maintenance and Operations.	Developer: • Follow CDOT Guidance, which advises against exceeding 80 gallons per lane mile (CDOT Standard Operating Guide (SOG) for Winter Maintenance and Operations, August 2010).	• 5280 Connectors will address this during construction, where applicable.
113	Water Quality	• Winter maintenance activities use solutions and compounds that could lead to water quality issues due to runoff.	• Completely remove sand/salt within the "core" sweeping area within four days of snow events, as per DRCOG and CDOT regulations. • Only 35 percent removal outside the "core" areas is required. • For the past two years, it has been CDOT practice to remove all remaining sand/salt from the study area even though it is not in the "core" sweeping area. CDOT will continue this practice.	Developer: • Perform post-storm sweeping as required by the DRCOG (Schedule 11 Section 11.4, Appendix A-1 Item 17.1, and Appendix A-2 Item 17.1).	• 5280 Connectors will address this during construction, where applicable.

Mitigation Number	Mitigation Category	Impact from Final EIS	Mitigation Commitment	Status/Resolution	Compliance Plan Implementation
114	Water Quality	• Winter maintenance activities use solutions and compounds that could lead to water quality issues due to runoff.	Perform fleet upgrades that include: • On-board computers to track the amount of mixture being applied, and the rates of application of deicing materials. This technology prevents over-treating. • The majority of the CDOT Region 1 fleet is currently equipped with these computers.	Developer: • Equip all winter operations spreading equipment with an onboard electronic Spreader control system designed to control the application of highway deicing chemicals (Schedule 11, Section 11.6).	• 5280 Connectors will address this during construction, where applicable.
115	Water Quality	• Winter maintenance activities use solutions and compounds that could lead to water quality issues due to runoff.	• Utilize only deicing and anti-icing products that are on the Pacific Northwest Snow Fighters Approved Product List. • Use product application rates that conform to the manufacturer's recommendations and air and water quality regulations.	Developer: • All deicing and anti-icing chemical materials introduced into the environment shall meet or exceed Pacific Northwest Snow Fighters (PNS) criteria. • Materials used shall be materials identified on the PNS-approved products list. (Schedule 11, Section 11.8).	• 5280 Connectors will address this during construction, where applicable.
116	Water Quality	• Winter maintenance activities use solutions and compounds that could lead to water quality issues due to runoff.	• Stockpile solid mixtures at the I-70 and Havana Street CDOT maintenance facility. • The mixtures are kept under domes to protect them from precipitation preventing water high in salts from running off into receiving waters.	Developer: • Manage all stockpiled material in accordance with applicable permits, including the requirements for Facility Runoff Control Measures (FRCM) referenced in the MS4 Permit (Schedule 11, Section 2.2.4).	• 5280 Connectors will address this during construction, where applicable.
117	Water Quality	• Winter maintenance activities use solutions and compounds that could lead to water quality issues due to runoff.	• Perform quality assurance audits on deicing mixtures several times per year so that elevated levels of harmful anti-caking compounds are not found in the mixtures.	Developer: • Perform deicer sampling (CDOT SOG for Winter Maintenance and Operations, August 2010).	• 5280 Connectors will address this during construction, where applicable.
118	Water Quality	• Winter maintenance activities use solutions and compounds that could lead to water quality issues due to runoff.	• Train snowplow drivers annually, stressing the importance of meeting or exceeding water quality and air quality permit requirements.	Developer: • Provide environmental compliance requirements training for winter operations (Schedule 11, Section 11.9 Winter Operations Environmental Training).	• 5280 Connectors will address this during construction, where applicable.
119	Water Quality	• Winter maintenance activities use solutions and compounds that could lead to water quality issues due to runoff.	• Use temperature gauges built into trucks and roadway surfaces to assist with making decisions related to deicing application rates and mixes.	Developer: • Install and utilize a Road Weather Information System (RWIS) and environmental friction sensors (Schedule 10, Section 3.8.17) • Equip winter operations equipment with digital infrared a temperature indicating system (Schedule 11, Section 11.6.6).	• 5280 Connectors will address this during construction, where applicable.

Mitigation Number	Mitigation Category	Impact from Final EIS	Mitigation Commitment	Status/Resolution	Compliance Plan Implementation
120	Water Quality	• Winter maintenance activities use solutions and compounds that could lead to water quality issues due to runoff.	• Use vacuum sweepers, not side-cast sweepers, as part of ongoing fleet upgrades. • Pick up trash within ROW prior to each sweeping. • Sweeping with a kick broom (side-cast sweeper) is prohibited.	Developer: • Use a vacuum sweeper (Schedule 17 Project Special Provision 208.04 [f]) • Developer shall pick up trash prior to sweeping. (Schedule 11 Appendix A-1 17.2 and Appendix A-2 17.2)	• 5280 Connectors will address this during construction, where applicable.
121	Water Quality	• Winter maintenance activities use solutions and compounds that could lead to water quality issues due to runoff.	• Rely on cameras/ Intelligent transportation systems (ITS) systems to determine problem areas during each storm event	Developer: • Shall use all available resources to assess weather conditions and make decisions and direct actions that maintain the travel ways as safe as possible during and after the occurrence of any Precipitation Event. (Schedule 11, Section 11 Snow and Ice Services)	• 5280 Connectors will address this during construction, where applicable.
122	Water Quality	• Increase the runoff of total suspended solid (TSS) loads of six percent to the South Platte River. • Increase the runoff TSS loads of 18 percent to Sand Creek.	• Provide permanent water quality control features (i.e., extended detention pond) as part of the project to treat stormwater runoff from the highway	Developer: • Comply with CDOT's MS4 Permit, which includes a requirement for Permanent Water Quality Control (Schedule 10, Section 8.3.3 and multiple additional locations).	• 5280 Connectors will obtain and implement a CDPHE Construction General Permit.
123	Water Quality	• Increase the runoff of total suspended solid (TSS) loads of six percent to the South Platte River.	• Consider environmentally-friendly techniques to provide water quality treatment	Developer: • Design permanent water quality features for stormwater runoff to the Urban Drainage and Flood Control District's (UDFCD) Urban Storm Drainage Criteria Manual (Schedule 10, Section 8.3.3i).	• 5280 Connectors will design permanent weather quality features for stormwater runoff. .
124	Water Quality	• Increase the runoff TSS loads of 18 percent to Sand Creek.	• Treat runoff entering the South Platte River and Sand Creek in conformance with CDOT's MS4 Permit and New Development and Redevelopment Program	Developer: • Treat runoff entering the South Platte River and Sand Creek (Schedule 10, Section 8, Drainage, and Schedule 17, Environmental Requirements).	• 5280 Connectors will obtain and implement a CDPHE Construction General Permit.
125	Geology and Soils	• Excavation is anticipated to extend below the depth of groundwater from approximately the UPRR to Columbine Street	• Prevent groundwater infiltration into the lowered section of the highway; install underdrain pipes below the pavement to drain any additional groundwater that still enters the lowered section	Developer: Shall design, construct, and operate a system that prevents groundwater infiltration into the lowered section. (Schedule 10, Section 8, Drainage.)	• 5280 Connectors will design, construct and operate a system to prevent groundwater infiltration.

Mitigation Number	Mitigation Category	Impact from Final EIS	Mitigation Commitment	Status/Resolution	Compliance Plan Implementation
126	Geology and Soils	• Temporary impacts to groundwater during excavation	• Dewater during the construction process	Developer: • Obtain and be the designated entity for all the water quality permits related to construction activities. • If required, obtain a Substitute Water Supply Plan from the Colorado Division of Water Resources for all temporary or permanent dewatering activities (Schedule 17, Section 20)	• This is included in the Dewatering Plan
127	Hazardous Materials	• There are 34 hazardous materials sites affected. • There are 750 acres of land disturbed.	• Before ROW acquisition, conduct a Phase I Environmental Site Assessment (ESA) or initial site assessment (ISA) for those properties identified for acquisition. • Based on these assessments, additional subsurface investigation may be required depending on the recognized environmental conditions identified and potential risk to the project.	Department: • Has completed Phase I ESA • Has completed a Limited Subsurface Investigation Report, which is included in Schedule 29. Developer: • Complete any required Phase I ESAs beyond those that the Department has agreed to do, and that have been identified (Schedule 18 Right-of-Way).	• 5280 Connectors will this during construction, where applicable
128	Hazardous Materials	• Temporary impacts to groundwater during excavation	• Avoid contaminated sites wherever practical; where unavoidable, initiate further site investigation and coordination with affected property owners	Developer: The Developer shall minimize impacts to hazardous materials sites. When unavoidable, the Developer shall follow the requirements specified in Schedule 17, Section 23.	• Initial: Included in the Environmental Requirement's readiness review. • Active: Environmental Clearance Form/Checklist.
129	Hazardous Materials	• There are 34 hazardous materials sites affected. • There are 750 acres of land disturbed.	• Follow CDOT *Standard Specifications for Road and Bridge Construction*, Section 250, Environmental, Health and Safety Management	Developer: • Complete all work activities in accordance with the 250 Specification (Schedule 17, Section 23.1.2).	• A project-specific environmental compliance training program for all construction personnel is implemented and documented. • An additional environmental training class is provided to all foremen, supervisors, and QA Inspectors involved with the project. The class is provided every quarter as new staff is brought on to the project.
130	Hazardous Materials	• Potential impact to Vasquez Boulevard/ I-70 Superfund site.	• Coordinate with and obtain Approval from the U.S. Environmental Protection Agency (EPA) and CDPHE, as necessary, when construction occurs in the Vasquez Boulevard/I-70 Superfund site.	Developer: • Follow the approved Beneficial Use and Materials Management Plan approved by CDPHE. (Schedule 17, Section 23.8).	• 5820 Connectors will follow the Beneficial Use and implement measures identified in the Materials Management Plan.

Mitigation Number	Mitigation Category	Impact from Final EIS	Mitigation Commitment	Status/Resolution	Compliance Plan Implementation
131	Hazardous Materials	• Extensive excavation through a known landfill that contains contaminants.	• Follow Tri-County Health Department Health and Safety Practices during construction on or near former landfills.	Developer: • Coordinate with all governmental authorities and obtain the required Approvals (Schedule 17, Section 23.5).	• 5820 Connectors will leverage its relationship with regulatory agencies by involving them early and keeping the correct people informed at all times.
132	Hazardous Materials	• There are 34 hazardous materials sites affected. • There are 750 acres of land disturbed.	• Conduct appropriate surveys for asbestos, lead-based paint, and universal wastes prior to demolition of any building structures and bridges or elevated structures. • If these materials are encountered, remove them in accordance with applicable regulations and guidelines. • If asbestos-containing materials (ACM) is encountered, including buried utilities, follow CDOT Specification 250.07, Asbestos-Containing Material Management and CDOT Asbestos-Contaminated Soil Management Standard Operating Procedure. • Depending on the type of ACM, clean up the material in accordance with either Section 5.5 of the Solid Waste Regulations, or Regulation No. 8 of the Air Quality Control Commission Regulations.	Department: In accordance with Appendix A of Schedule 18, the Department is completing building surveys for Department assigned parcels. Developer: The Developer • Complete building surveys for Developer-assigned parcels. (Schedule 18, Sections 2.2 and 2.3 and Schedule 17, Section 23.13) • Complete surveys for other elements (e.g., bridges) that will be impacted by construction activities (Schedule 17, Section 23.13.) • Follow requirements defined in Schedule 17, Section 23.14 for areas with asbestos-contaminated soils.	• Initial: Included in the Environmental Requirement's readiness review. • Active: Environmental Clearance Form/Checklist.
133	Hazardous Materials	• There are 34 hazardous materials sites affected. • There are 750 acres of land disturbed.	• Update contaminated sites search databases to reflect most the recent records	Department: • Provide updated database reports as part of the Phase I ESAs that the Department is completing. Developer: • Report and notify with respect to RHMs required by governmental authorities (Schedule 17, Section 23.20.1.).	• 5280 Connectors will address and document during construction, where applicable.
134	Hazardous Materials	• There are 34 hazardous materials sites affected. • There are 750 acres of land disturbed.	• Prepare and implement a project-specific Health and Safety Plan and Materials Management Plan to address potential hazardous materials that are encountered during construction. • The plans will contain specific measures to protect employee's and the public's health and safety, • The plans will also contain programs to manage contaminated materials during construction.	Developer: • Prepare and implement a project-specific Health and Safety Plan (Schedule 17, Section 23.110). • Prepare and implement a Materials Management Plan (Schedule 17, Section 23.8).	• 5280 Connectors will develop a project-specific Health and Safety Plan and a Materials Management Plan prior to construction start.

Mitigation Number	Mitigation Category	Impact from Final EIS	Mitigation Commitment	Status/Resolution	Compliance Plan Implementation
135	Hazardous Materials	• Construction at hazardous materials sites also may affect the construction budget and schedule, particularly if previously unidentified contamination is found.	• Stop work In the event that unknown contaminated media is encountered during construction until the contamination is properly evaluated and measures are developed to protect worker health and safety in accordance with the project-specific Health and Safety Plan and Materials Management Plan.	Developer: • Develop and implement a Materials Management Plan and a Health and Safety Plan (Schedule 17, Sections 23 and 23.8, and 23.110).	• Initial: Included in the Environmental Requirement's readiness review. • Active: Environmental Clearance Form/Checklist.
136	Hazardous Materials	• Construction activities at hazardous materials sites have the potential to spread soil or groundwater contamination.	• Implement standard construction measures for fugitive dust control and stormwater erosion and sediment controls, to minimize the spread of contaminated soil. • File and abide by a dust management plan to minimize the effects of dust on surrounding communities during construction. • Conduct air monitoring to determine whether dust control efforts are successful in preventing violations of air quality standards.	Developer: • Develop management plans and utilize BMPs for fugitive dust control (Schedule 17, Section 10). • Develop management plans and utilize BMPs for stormwater erosion (Schedule 17, Section 20).	• 5280 Connectors will develop management plans and BMPS prior to construction operation start.
137	Hazardous Materials	• Construction activities at hazardous materials sites have the potential to spread soil or groundwater contamination.	• Obtain a CDPHE Colorado Discharge Permit System (CDPS) Construction Dewatering Permit, as required. • Obtain a Remediation Activities Discharging to Surface Water Permit, as required. • Obtain a Construction Activities Discharging to Ground Water Permit, as required.	Developer: • Obtain permits and provide for treatment, management and disposal related to water quality (Schedule 17, Section 23.4). • Obtain Approvals related to consumptive use (Schedule 17, Sections 20.1.9 and 20.1.10.).	• 5280 Connectors will obtain appropriate permits prior to construction start and amend, as necessary. • 5820 Connectors will follow the permit requirements. • Implementation methods are addressed in ECWP 4.1 Dewatering Procedure.
138	Hazardous Materials	• Construction activities at hazardous materials sites have the potential to spread soil or groundwater contamination	• Obtain CDPS Dewatering Permits, if this alternative requires permanent dewatering. • Treat and discharge source water onsite in accordance with temporary construction and permanent feature dewatering permits, or characterize and remove source water offsite to a permitted disposal facility.	Developer: • Obtain permits and provide for treatment, management and disposal related to water quality and consumptive use (Schedule 17, Section 20.1.9, 20.1.10, and 23.4).	• 5280 Connectors will obtain appropriate permits prior to construction operations and amend, as necessary. • Implementation methods are addressed in ECWP 4.1 Dewatering Procedure.
139	Hazardous Materials	• Construction at hazardous materials sites also may affect the construction budget and schedule, particularly if previously unidentified contamination is found.	• Properly abandon and close monitoring wells or septic systems disturbed during construction activities in accordance with applicable regulations and guidelines. • Replace existing monitoring wells, as necessary, if they are impacted during construction.	Developer: • Abandon or relocate wells (Schedule 17, Section 23.20.2). • Abandon and close septic systems (Schedule 18, Sections 2.2 and 2.3.).	• 5280 Connectors will address and document this during construction, where applicable.

Mitigation Number	Mitigation Category	Impact from Final EIS	Mitigation Commitment	Status/Resolution	Compliance Plan Implementation
140	Utilities	• All utility types will be affected to some extent. • Construction impacts to utilities will be substantial to accommodate the lowered highway and increased width. • The offsite stormwater drainage system south of I-70 will cause additional impacts to utilities and result in major benefit to address an existing deficiency.	• Minimize service disruptions by connecting to active utilities. • Adjust the schedule to coincide with periods of lower demand.	Developer: • Use reasonable efforts to anticipate and avoid utilities, and to otherwise minimize and/or mitigate the consequences of utility work. (Schedule 10 Section 4 Utilities)	• 5280 Connectors will address this during construction, where applicable.
141	Utilities	• All utility types will be affected to some extent. • Construction impacts to utilities will be substantial to accommodate the lowered highway and increased width. • The offsite stormwater drainage system south of I-70 will cause additional impacts to utilities and result in major benefit to address an existing deficiency.	• Encase or provide protective cover over any impacted underground utilities.	Developer: • Obtain written specifications, standards of practice and construction methods, and other information and materials constituting the utility relocation standards from the utility owners. (Schedule 10, Section 4.2.13 Utilities)	• 5280 Connectors will address this during construction, where applicable. • 5280 Connectors will comply with the relevant utility owner's utility relocation standards for all utility work furnished or performed, except as otherwise provided in the applicable utility relocation agreement (URA) or utility work order.
142	Utilities	• All utility types will be affected to some extent.	• Coordinate with utility owners and operators to identify construction requirements and financial responsibilities for relocations.	Developer: • Coordinate and cooperate with the Department and the utility owners to facilitate utility relocations. Perform all utility work the applicable URA and utility work order. (Schedule 10 Section 4 Utilities).	• 5280 Connectors will address this during construction, where applicable.
143	Utilities	• Construction impacts to utilities will be substantial to accommodate the lowered highway and increased width.	• Identify and improve any utility concerns that can be addressed as part of project implementation.	Developer: • Coordinate the performance of all utility work with utility owners (Schedule 10 Section 4 Utilities).	• Initial: Included in the Environmental Requirement's readiness review. • Active: Environmental Clearance Form/Checklist.

Mitigation Number	Mitigation Category	Impact from Final EIS	Mitigation Commitment	Status/Resolution	Compliance Plan Implementation
144	Utilities	• The offsite stormwater drainage system south of I-70 will cause additional impacts to utilities and result in major benefit to address an existing deficiency.	• Integrate above-ground utilities impacted by the project into the design, hide them from sight within the design, and/or design them to be aesthetically pleasing to the greatest extent practical.	Developer: • Coordinate with CDD and utility owners on the design of underground portions of the distribution system. (Utility Matrix and Preliminary Utility Plans, Schedule 29).	• 5280 Connectors will address this during construction, where applicable.
145	Utilities	• All utility types will be affected to some extent.	• Move above-ground utilities underground to the greatest extent practical.	Developer: • Coordinate with CDD and utility owners on the design of underground portions of the distribution system. (Utility Matrix and Preliminary Utility Plans, Schedule 29).	• Initial: Included in the Environmental Requirement's readiness review. • Active: Environmental Clearance Form/Checklist.
• 146	Section 4(f) – Recreation Resources	• Use of Swansea Elementary School public playground.	• Use remnants of adjacent parcel's obtained ROW expansion to reconfigure the school site plan and replace all the playground facilities, including closing Elizabeth Street between 46th and 47th Avenues.	Developer: • Design and construct the I-70 Cover Plans, the I-70 Cover and Swansea Elementary School outdoor areas, in accordance with the RFP's design narrative. (Schedule 10B)	• 5280 Connectors will address this during construction, where applicable.
147	Section 4(f) – Recreation Resources	• Use of Globeville Landing Park	• Return to pre-construction or a comparable state following construction completion.	Department: • Perform mitigation for the impacts identified in the ROD for the preferred alternative for all Globeville Landing Park. Developer: • Shall have responsibilities described in Schedule 17, Section 8, Required Environmental Approvals, if impacts exceed those described in the reference design.	• 5280 Connectors will address this during construction, where applicable.
148	Section 4(f)— Historic Resources	• Use of 22 historic resources, which includes 9 *de minimis* impact determinations	• Implement other mitigation measures, as identified, in consultation with SHPO and consulting parties as described in the PA.	Department: • Comply with the terms of SHPO's Programmatic Agreement. Developer: • Perform all requirements of the RFP, including those in Schedule 17 Section 12 Historic Requirements.	• 5280 Connectors will address this during construction, where applicable.

11.0 Environmental Law and Approvals

11.1 Environmental Plans and Deliverables

Schedule 17 and the ROD identify the minimum environmental commitment requirements. This section covers all environmental resources within and adjacent to the Site, which are to be protected from disturbance during construction. This ECWP provides a general approach for our team to accommodate these requirements by means of sub-discipline plans and the deliverables listed in Figure 7. ECWP deliverables will be continually reviewed and amended, as necessary, to keep the project team, environmental compliance team and CDOT informed of current conditions and requirements.

Figure 7 | Environmental Plans and Deliverables

Deliverable	Information, Acceptance, or Approval	Schedule	Anticipated Submittal Date	Information, Acceptance, or Approval Date
Environmental Status Report	Acceptance	Ten working days following the end of the reporting period.		
Mitigation Completion Report	Acceptance	Prior to final acceptance.		
Environmental Compliance and Mitigation Training Program	Acceptance	Sixty days following issuance of notice to proceed 1 (NTP1).		
Environmental Compliance and Mitigation Training Program Annual Update and Report	Acceptance	Prior to issuance of NTP2; annually, 30 calendar days after reporting period end.		
Air Quality Monitoring, Maintenance and Mitigation Plan	Acceptance	Prior to issuance of NTP2, updated annually.		
Proposed Locations of PM10 Monitors	Acceptance	Two weeks prior to operating the monitor.		
Environmental Approvals	Information	Per the requirements of Environmental Law and the PA.		
Migratory Bird Nest Survey	Information	Prior to impacting existing structures or vegetation that may contain active bird nests, and prior to specific activities (e.g., clearing), consistent with CDOT and CPW guidance and policy.		
Preliminary Technical Noise Report	Acceptance	Prior to conducting the Benefited Receptor Preference Survey.		
Benefited Receptor Preference Survey Supporting Material	Approval	Fourteen calendar days prior to conducting the Benefited Receptor Preference Survey.		
Final Noise Technical Report	Acceptance	Prior to issuance of RFC Documents		
Construction Noise Mitigation and Monitoring Plan	Acceptance	Prior to issuance of NTP2, updated annually.		
Paleontological Annual Reports	Acceptance	Annually, 60 calendar days after reporting period end.		

Deliverable	Information, Acceptance, or Approval	Schedule	Anticipated Submittal Date	Information, Acceptance, or Approval Date
Paleontological Summary Report	Acceptance	Sixty calendar days after earthwork is completed.		
SB40 Certification Application Package	Approval	Prior to construction work in the SB 40 area.		
Integrated Noxious Weed Management Plan	Acceptance	Prior to issuance of NTP2, updated annually.		
Wetland Finding Report	Approval	Prior to impacting wetlands.		
BTPD Management Plan	Acceptance	Prior to impacting BTPD, updated annually.		
RHM Abatement Reports	Approval	Prior to issuance of NTP2.		
Materials Management Plan	Approval	Prior to issuance of NTP2, updated annually.		
Long-Term Clean-Up Plans	Approval	As and when required.		
Sampling and Analysis Plan	Approval	Prior to issuance of NTP2, updated annually.		
Residential Soils Sampling Plan	Acceptance	Prior to issuance of NTP2, updated annually.		
Health and Safety Plan	Acceptance	Prior to issuance of NTP2, updated annually.		
Spill Prevention Control Countermeasures Plan	Acceptance	Prior to issuance of NTP2, updated annually.		
Structure Survey Assessment Plan	Acceptance	Prior to the demolition of any structure or other relevant components of the Project.		
Structure Survey Assessment Report	Acceptance	Prior to the demolition of any structure.		
Structure Survey Completion Report	Acceptance	Within 30 calendar days after completion of abatement activities.		
Import Materials Documentation	Approval	Prior to bringing the materials onto the site.		
Remedial Plan	Approval	As part of Schedule 21 (Form of Supervening Event Submission).		
Environmental Approval	Approval	Prior to conducting work where an environmental Approval is required, including any work that has not been approved in the ROD.		
Monthly Statement of Recognized Hazardous Materials Management	Acceptance	Ten working days after the end of each month		
Recognized Hazardous Materials Management Completion Report	Acceptance	Sixty calendar days after substantial completion.		

Deliverable	Information, Acceptance, or Approval	Schedule	Anticipated Submittal Date	Information, Acceptance, or Approval Date
Schedule of Planned Noxious Weed Management Activities	Information	Monthly, five Calendar Days prior to the beginning of each month (March through October)		
Noxious Weed Survey and Summary of Treatment Activities Report	Acceptance	Monthly, within 10 working days of the end of each month (March through October) during the construction period. Three times per year during the operating period.		
Protected Environmental Resources (shown in all plan sets)	Acceptance	To be included with each plan set submittal.		
Asbestos, Lead-Based Paint and Regulated Materials Survey Report	Acceptance	Fifteen working days prior to demolition.		
Dewatering or Remediation Plan	Acceptance	Prior to discharge, as required by the permit.		
Summary Report of Independent Quality Control (IQC) Water Quality Documentation Audit	Information	Monthly, within seven calendar days of the end of the month.		
Diesel Non-Road Construction Equipment (DNRCE)	Information	Quarterly, within 10 working days of the end of the reporting period.		
Level II Historic Archival Photographs and Measured	Acceptance	Ten working days prior to demolition or construction activities on affected parcels.		
Level II Historic Documentation for Submittals to SHPO	Acceptance	Within six months of resource demolition.		

11.2 Environmental Permits and Government Approvals

5820 Connectors, and all subcontractors will comply with the requirements of all CDOT-obtained permits. Our team will be responsible for obtaining all governmental and agency permits required for the work not otherwise obtained by the Colorado Department of Transportation (CDOT), including, but not limited to, the environmental permits listed in Figure 8. Should project design require a modification of any of the project permits obtained by CDOT, we will obtain all necessary agency Approvals for the permit modifications. Permits, and modifications of permits previously obtained by CDOT, will be subject to CDOT Approval prior to submission to the agency responsible for the permit Approval.

Figure 8 | Environmental Permits and Governmental Approvals

Permit	Permitting Approval	When Required	Status
Air Pollutant Emission Notice	CDPHE[2], APCD[3]	Prior to Construction	
Stationary Source Air Quality Permit	CDPHE, APCD	As Required	
Fugitive Dust Permit	CDPHE, APCD	Prior to Construction	
Asbestos Abatement Permit	CDPHE, APCD	Prior to Activity	
Demolition Permits	CDPHE and all applicable Governmental Authorities	Prior to Activity (within 30 days)	

Permit	Permitting Approval	When Required	Status
Historic Structures Demolition Permit	CCD[4] Landmark Preservation Commission	Prior to Activity	
Construction Noise Permit	All Applicable Governmental Authorities	Prior to Activity	
Temporary Noise Variance	All Applicable Governmental Authorities	Prior to Activity	
Clean Water Act Section 402 Construction Dewatering Permit	CDPHE, WQCD[5]	Prior to Activity	
Construction Activities Stormwater Discharge Permit	CCD Wastewater Management	Prior to Construction	
Colorado Discharge Permit System – Stormwater Construction Permit	CDPHE, WQCD	Prior to Construction	
MS4[1] Discharge Permit (Outside CDOT ROW)	CDPHE, WQCD	Prior to Construction	
Subterranean Groundwater Permit	All Applicable Governmental Authorities	As Required	
Construction Dewatering Permit	CDPHE, WQCD	Prior to Discharge (allow 30 days for Approval)	
Remediation Activities Discharging to Surface Waters Permit	CDPHE, WQCD	Prior to Discharge (allow 45 days for Approval)	
Remediation Activities Discharging to Groundwater	CDPHE, WQCD	Prior to Discharge (allow 45 days for Approval)	
Individual Permit	CDPHE, WQCD	As required	
Substitute Water Supply Plan	CDPHE, WQCD	As required	
Notice of Intent to Construction Dewatering Wells	DWR[6]	Prior to Activity (3-90 days before drilling any test hole)	
Well Construction and Test Reports	DWR	Construction	
Dewatering Systems Well Report	DWR	As Required	
RCRA Generator Notification	CDPHE Hazardous Materials and Waste Management Division	Prior to Activity	
Stormwater Quality Discharge Permit for Construction Activities	City of Aurora	Prior to Construction	
Sewer Use and Drainage Permit	CCD	Prior to Activity	
Well Abandonment Report	DWR	Upon Completion of Well Use (for more than one year use)	
Black-Tailed Prairie Dog Removal Permit	CPW[7] and City of Aurora	Prior to Activity	
SB40 Certification/Approval	CPW	Prior to Construction	
Nest Take Permit	USFWS[8]	Emergency Nest-Take Permit (2 to 5 days) Standard (90 days) Standard or Programmatic Permit Requiring an Environmental	

Permit	Permitting Approval	When Required	Status
		Assessment (4 to 6 months) Standard or Programmatic Permit with EIS (18 to 24 months)	
Clean Water Act Section 404 Permit	USACE[9]	Prior to Activity	
Special Use Permit	CDOT	Prior to Activity	

[1] Municipal Separate Storm Sewer System (MS4)

[2] Colorado Division of Public Health and Environment (CDPHE)

[3] Air Pollution Control Division (APCD)

[4] City and County of Denver (CCD)

[5] Water Quality Control Division (WQCD)

[6] Colorado Division of Water Resources or Office of State Engineer (DWR)

[7] Colorado Parks and Wildlife (CPW)

[8] United States Fish and Wildlife (USFWS)

[9] United States Army Corps of Engineers (USACE)

11.3 Environmental Clearance of Construction Activities

Each area of planned construction activity will include a process of environmental clearance prior to the start of work. This process provides verification and documentation that all permit requirements and resource evaluations have been completed prior to the start of work.

We will complete this using the Environmental Clearance Request Form to request environmental clearance from the Environmental Manager (EM) for specific construction areas. This form is used by the EM to document that all permits, permit-related submittals, plan Approvals, field surveys, evaluations and any other required clearances and Approvals are in place for the construction area for which clearance is requested. The environmental clearance process includes an environmental walk-through or field meeting by the Project Manager and environmental staff for locations comprising sensitive resources. CDOT will be invited to the walk-through and can participate, if available. The walk-through provides an opportunity to view, discuss and document site-specific issues (i.e., potential site dewatering, black-tailed prairie dog habitat, wetlands, etc.).

The environmental walk-through results and any special provisions that were agreed upon will be recorded on the Environmental Clearance Request Form. The EM will approve the request following verification of all necessary environmental permits and other clearances, with or without specific conditions. If any necessary clearances remain outstanding, the Environmental Clearance Request Form may be returned to our team with an explanation of what is needed so that the clearance can be approved. The EM will work with the team and CDOT to quickly resolve issues to keep environmental concerns out of the critical path and allow the work to progress on schedule.

12.0 [redacted]

[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]

[redacted]	[redacted]	[redacted]
	[redacted]	
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]

[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]

[redacted]

- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]

[redacted]

- [redacted]
- [redacted]

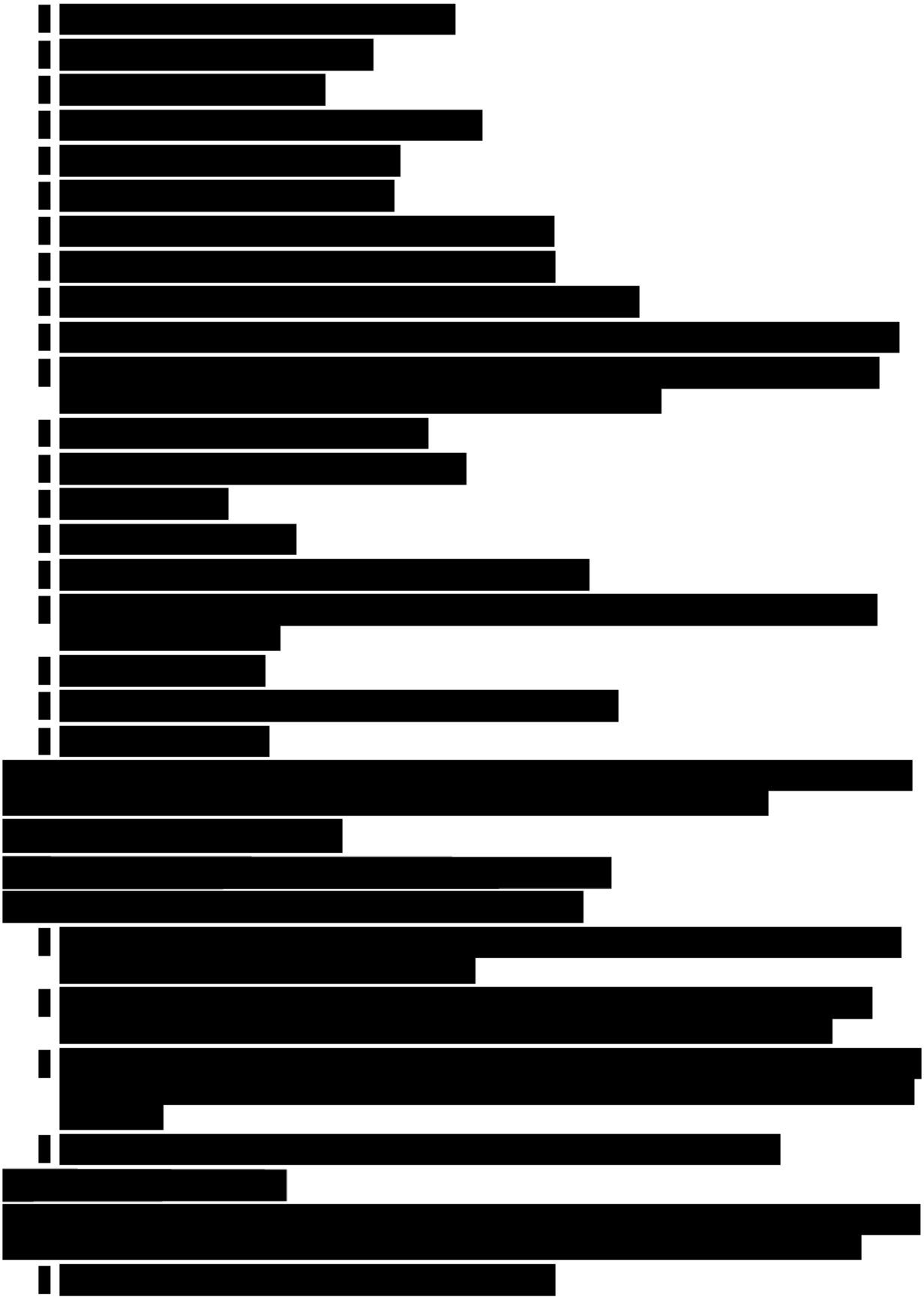
[redacted]

[redacted]

[redacted]

[redacted]

[redacted]



[redacted]

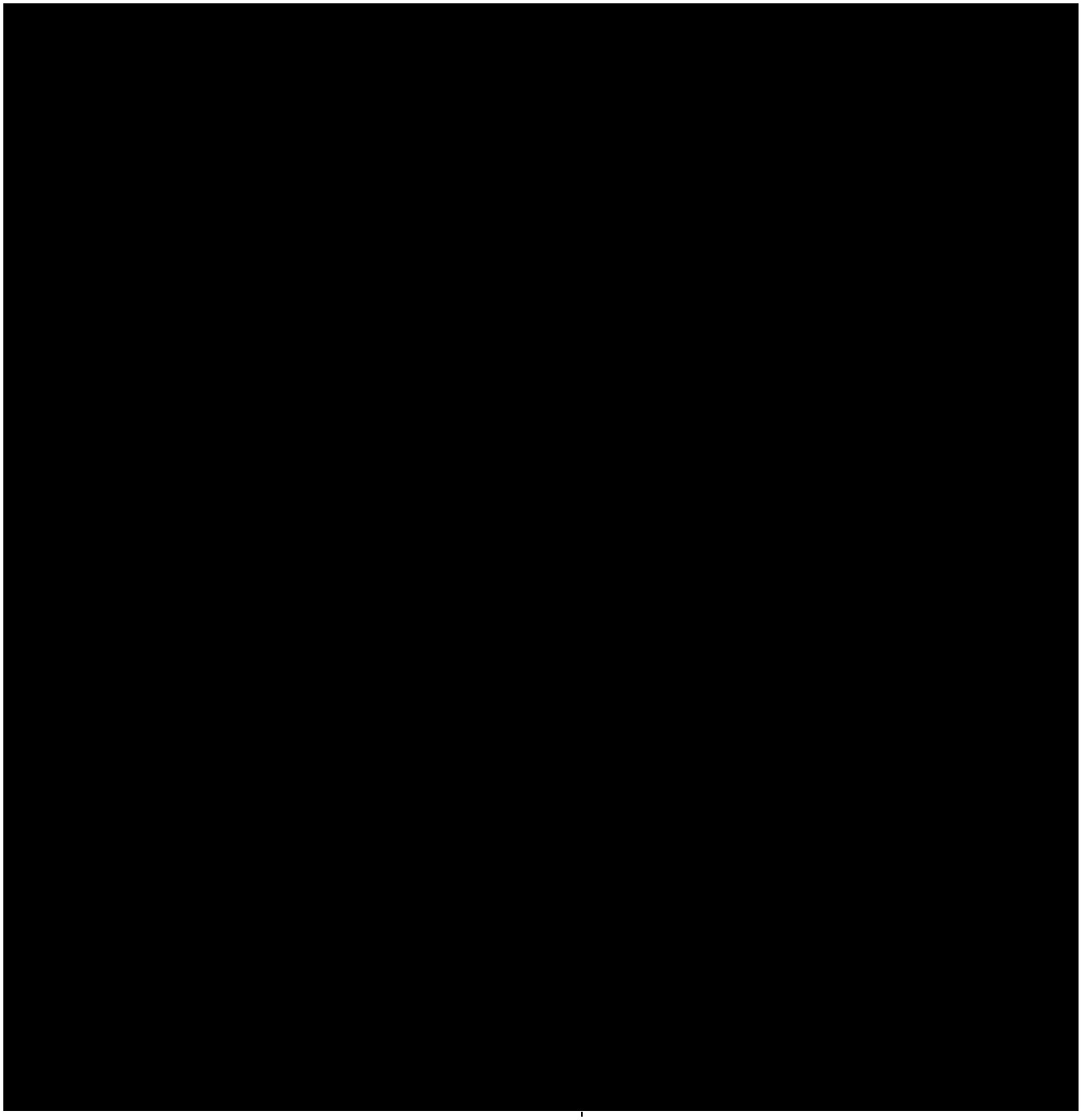
[redacted]

[redacted]

[redacted]

[redacted]

[redacted]



A copy of the above reevaluation form is included in this document as Exhibit 4.

15.0 Project Communications and Document Control

15.1 Communication Requirements Between Project Parties and Agencies

Our communications team will use methods fine-tuned during our work on previous transportation projects

to collaborate with CDOT, institutions, organizations and the local community. We will hold weekly coordination meetings with CDOT to develop and update outreach strategies and tactics. We will solicit CDOT's feedback and Approval, openly communicating the effectiveness of the public outreach campaign and making any adjustments that may be needed. Our plan is flexible and tailored to meet the Project's needs. Figure 15 outlines an example of our communication trees for each type of environmental discipline/resource encountered on the project. Maintaining a defined line of communication on the project means that the proper personnel are notified for each environmental concern. Figure 16 outlines the document control lifecycle, and illustrates our quality process on how reports and inspection field notes will be tracked and uploaded.

Figure 15 | Communication Trees

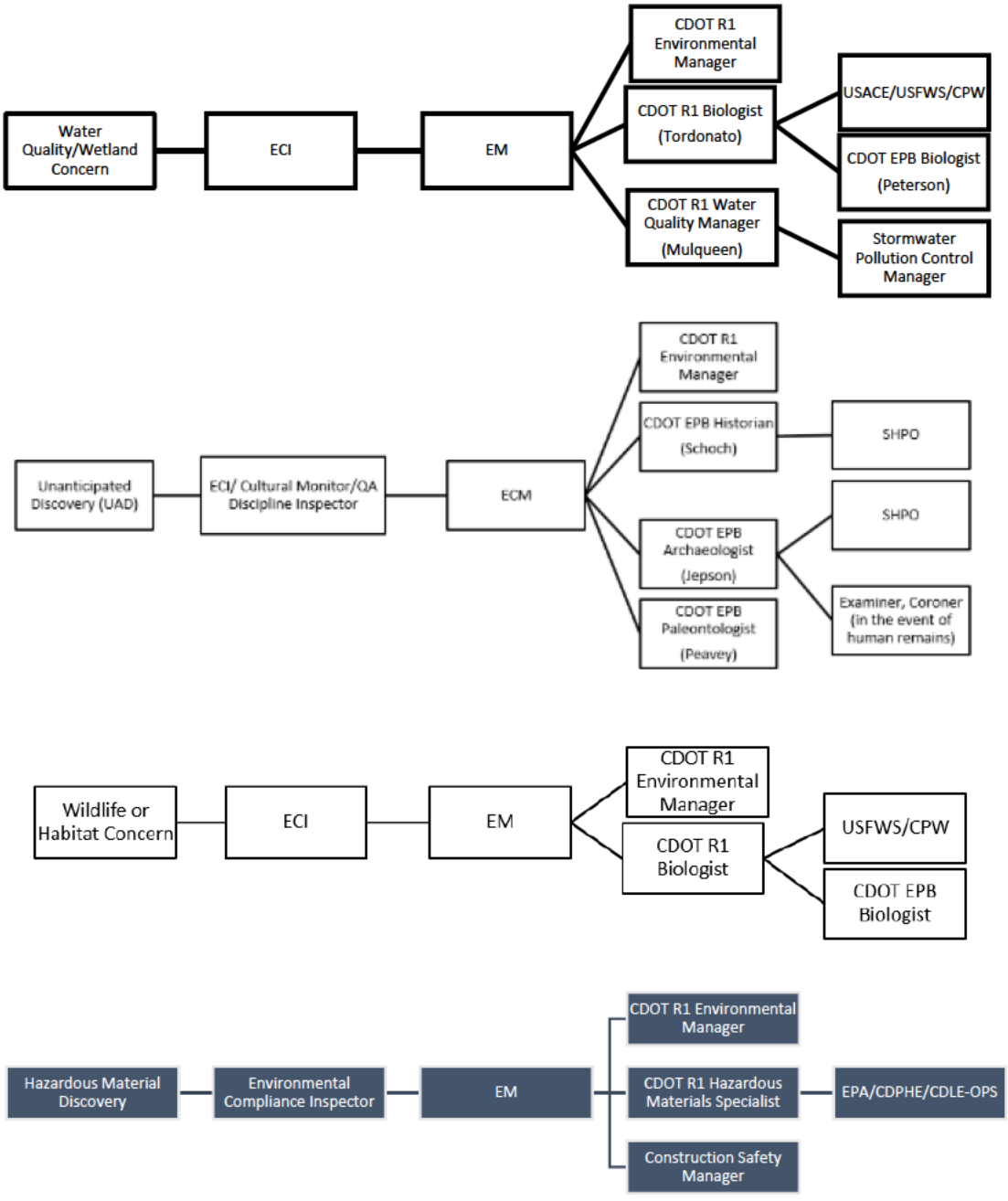
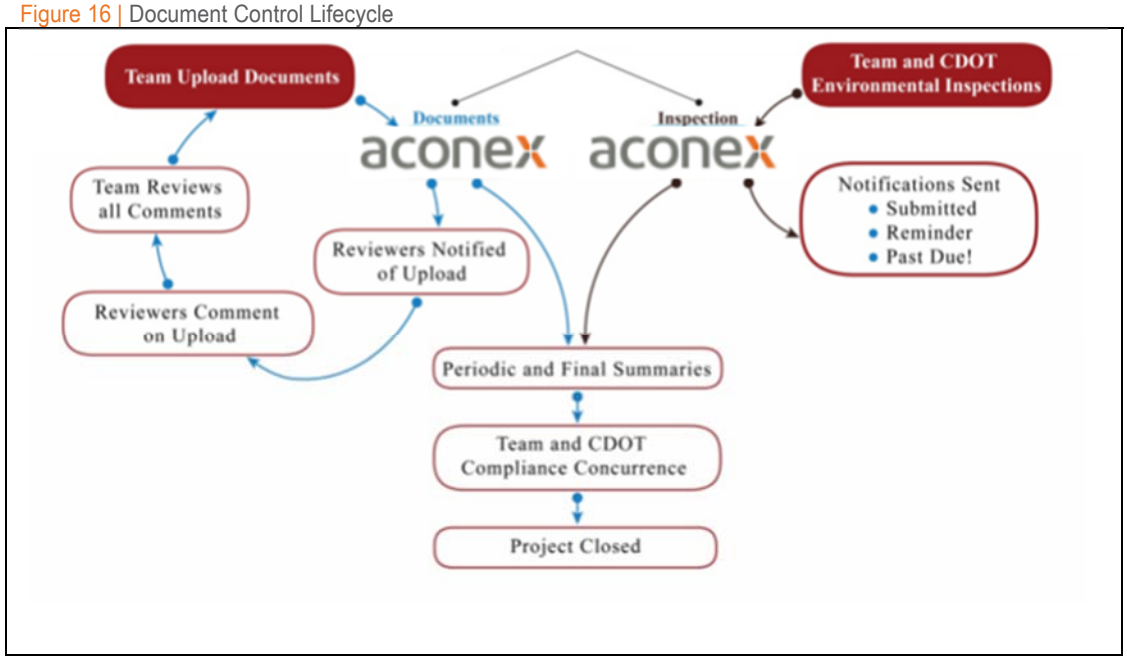


Figure 16 | Document Control Lifecycle



15.1.1 Communication with CDOT

The Environmental Manager will act as a liaison between our team and CDOT's environmental. The Environmental Compliance Team (ECT) will conduct and document the following activities as required by Schedule 17.5 of the Project Agreement:

- Lead (Environmental Manager) a monthly field review with CDOT to evaluate the Project and environmental issues.
- Coordinate (Environmental Manager) participation with the appropriate team members and lead weekly environmental task force meetings during the construction period.
- Provide Environmental Status (monthly) and Mitigation Completion Reports (as required) to:
- Document and certify the completion of all Environmental Requirements.
- Provide a summary for any stakeholder or governmental authority communications that have occurred during the reporting period.
- Invite CDOT to all meetings with government authorities regarding the management or disposal of recognized hazardous materials (RHMs) associated with the Project. Copy CDOT on all communications to governmental authorities.
- Perform reviews equivalent to those described in Schedule 17, Section 5.1.1ji with respect to and as required by the terms of an Enterprise Change Notice.

15.1.2 Communication with Regulatory Agencies

Communication with regulatory agencies is required to resolve environmental compliance question as they relate to proper interpretation of regulatory requirements as well as notice that our team is required to provide under the Project Agreement as it relates to certain environmental conditions and permits.

Recognized Hazardous Materials Communication For the quarterly agency meetings, the Environmental Manager and/or the recognized hazardous materials manager (RHMM) will report and

notify if any RHM are discovered as required by governmental authorities, including CDPHE, Environmental Protection Agency (EPA), Office of Public Safety (OPS), and Tri-County Health in accordance with Schedule 17, Section 23 of the Project Agreement. The ECT will forward any communication, coordination, or guidance received from the following agencies to CDOT:

- USFWS
- USACE
- DWR or Office of State Engineer
- CPW
- CDPHE
  - APCD
  - Hazardous Materials and Waste Management Division
  - WQCD

The Environmental Manager and/or the RHMM will report and notify if any RHMs are discovered as required by governmental authorities, including CDPHE, EPA, OPS, and Tri-County Health in accordance with the Schedule 17, Section 23.20.1 of Project Agreement. Each quarter the Environmental Manager and the RHMM will invite all applicable regulatory agencies to participate in the routine Environmental Task Force Group meeting. This will allow CDOT, our team, and any agency that wants to participate, a chance to discuss upcoming, current and potential challenges on the project. These meetings will also include an update on the project's progress and upcoming milestones.

15.1.3 Communication with Municipalities

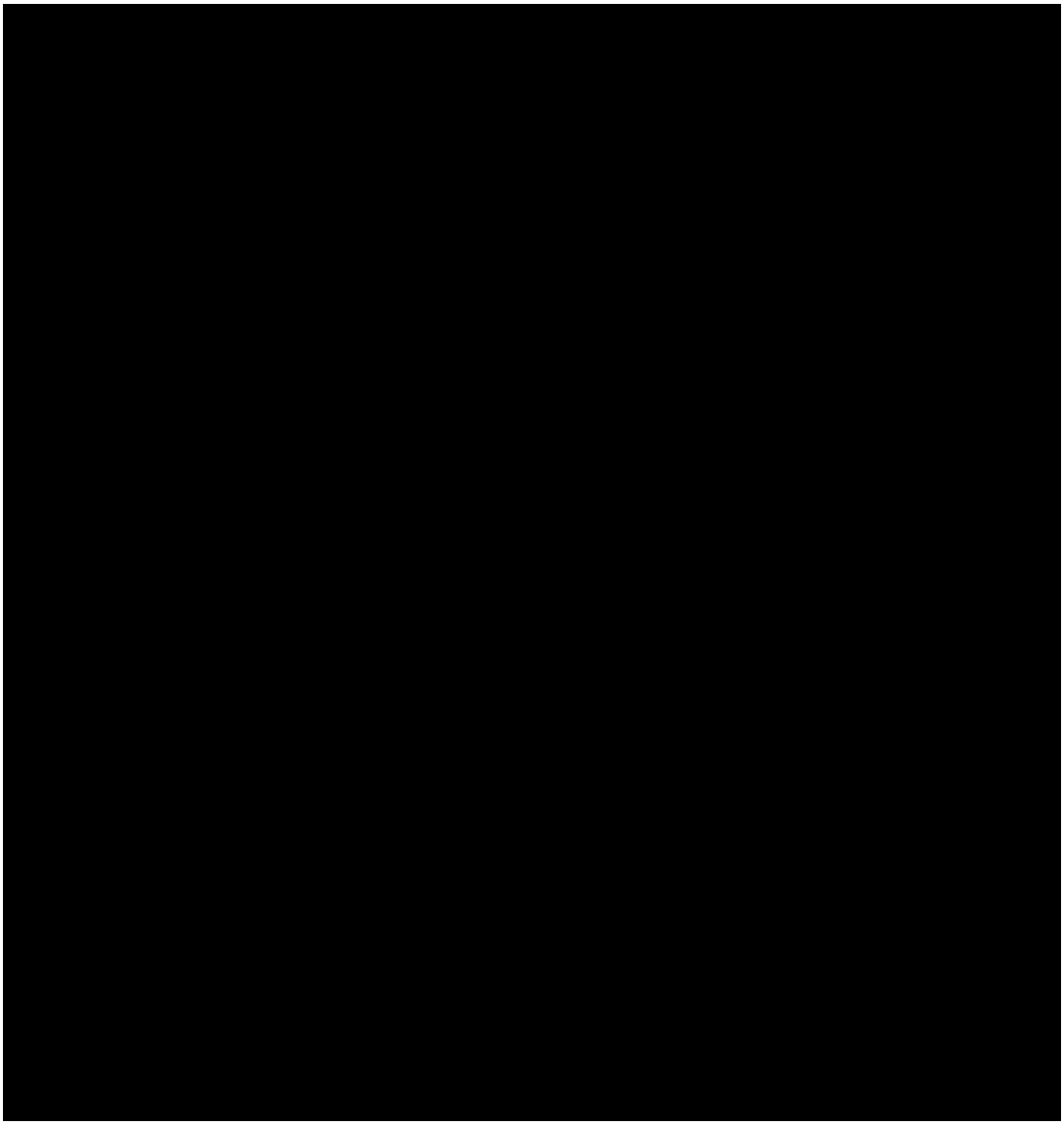
The Environmental Manager and/or the RHMM will report and notify if any RHMs are discovered as required by governmental authorities, including CCD and the CDPHE. Open communication of relevant environmental issues occurring within the CCD or City of Aurora ROW will be engaged during the Quarterly Agency Meeting, and as necessary.

15.1.4 Communication with Stakeholders

Working with CDOT and the project stakeholders, our public involvement team will implement a meaningful multi-lingual communication strategy that provides timely, factual and clear information to a broad audience across multiple platforms. The methods of receiving and responding to information have changed drastically in just the last 10 years. While still appropriate, it is not enough to just develop newsletters, hold open houses, or update the typical static website. We propose working with CDOT to disseminate information quickly and effectively by deploying technological and personalized communication platforms

15.1.5 Development and Implementation of Environmental Mitigation Actions

Figure 17 provides a process flow, including information procurement, decisions generated and reviewed, documentation of the mitigation plan, and field implementation.



15.2 Document Control

Preparation, issuance, and change of documents specifying quality requirements or prescribing activities affecting quality (such as instructions, procedures or drawings) will be controlled by relevant QMP procedures. Changes to documents will be reviewed and approved by the same organizations that performed the original review and Approval. The reviewing organizations will have access to pertinent background data or information upon which to base their Approval. Quality records will be stamped, signed and dated, as required.

We will safeguard quality records during design, construction, assembly, installation and testing. Quality records will be submitted to CDOT for review and archival in the project electronic database in accordance with the Project Agreement submittal requirements.

Quality records will be:

- Maintained and readily available.
- Retained, as required, past the Project Agreement completion date.

- Subjected for review by CDOT QA auditors.
- Collected, stored and preserved in a manner that precludes damage, loss or deterioration in accordance with storage requirements defined in the various contracts and specifications.

The documents essential for effective work performance are available at all locations where operations are performed. Additionally, all documentation to support the work is kept at a central location. Obsolete documents are superseded in the project's electronic database.

15.3 Environmental Task Force Group

The Environmental Manager will conduct weekly task force meetings to coordinate the design development within the Developer's organizations, CDOT, and other affected agencies. At a minimum, we will prepare an agenda and conduct each meeting to discuss the following:

- Design status
- Design development coordination between design disciplines
- Constructability issues
- Identify any questions associated with design requirements

Meeting minutes will be recorded for all task force meetings and provided to CDOT for acceptance within four working days after each meeting. The final minutes will be provided on a monthly basis to CDOT via its document management system.

15.3.1 Design Coordination

15.3.1.1 Design Working Groups

The Environmental Manager shall work with design working groups, as needed, to identify conflicts with the final environmental impacts statement (FEIS)/ROD mitigations and potential permitting issues. Any changes to the design that will conflict with the ROD will be coordinated with CDOT as described in the Notice of Design Change process. A thorough review of alternatives will be researched prior to proposing any design change affecting the ROD.

The Environmental Manager will participate in the development of the SWMP design for the entire project and consult with the construction team for feasibility, limits of disturbance, access points, etc. The Environmental Manager will work to assist and track the permitting of each Stormwater Management Plan (SWMP).

15.3.1.2 Construction Coordination

The Environmental Manager will work with and facilitate, as necessary, construction feasibility work groups, or discuss in weekly construction planning meetings the environmental responsibilities associated with each work area as it is planned and discussed in the construction look-ahead meetings.

15.3.1.3 Operations and Maintenance

Operations Period design activities will be coordinated with qualified construction and environmental staff to include construction and environmental considerations. Depending on the scope of design activities, task forces will be established and tailored to the relevant design and construction disciplines as well as the areas of environmental impact affected by such work.

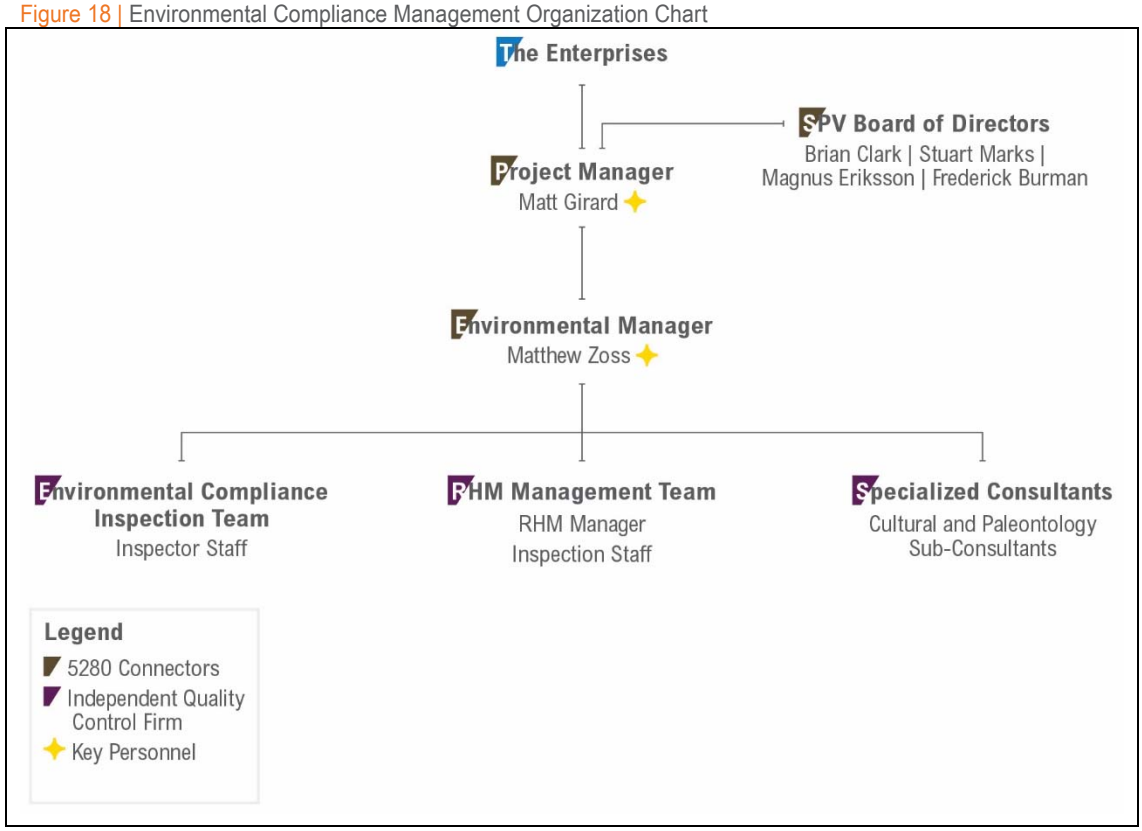
16.0 Roles, Responsibilities and Qualifications of the Environmental Management Team

16.1 Environmental Compliance Team Organization

The ECT includes water quality and noise mitigation specialists, hazardous materials managers,

biologists, and National Environmental Protection Agency (NEPA) compliance specialists with local Denver experience and transportation industry expertise. Figure 18 presents the environmental compliance management organizational chart.

Figure 18 | Environmental Compliance Management Organization Chart



16.2 Key Roles and Responsibilities

- Our team is responsible for performing and documenting that all work is performed in accordance with Schedule 17 of the Project Agreement by providing the necessary processes, resources and the ECT team members needed to assure that Developer obligations meet the Environmental Requirements. The following is a list of required responsibilities for our ECT team.

Project Developer

- Implement the ECWP throughout all phases of the project.
- Provide resources to the ECT, as necessary.
- Lead the project team to exceed the Project Agreement environmental compliance requirements.

Project Manager

- Implement the ECWP throughout all project phases.
- Communicate regularly with the Environmental Manager to help lead the project team to exceed the Project Agreement environmental compliance requirements.

Environmental Manager

- Ensure full compliance with all Environmental Requirements in the work.
- Update the ECWP monthly.

- Ensure applicable permits are submitted/approved prior to commencing relative construction.
- Schedule 10.8.4.9.j Groundwater.
- Provide the Construction Period Communications Plan, including:
  1) Plan for stakeholder coordination.
  2) Provide the ECWP is available online on monthly basis.
- Act as the primary liaison between the project team and CDOT on environmental issues.
- Act as the lead responder to any noncompliance findings for Environmental Requirements issued by CDOT or the IQCM for the work.
- Provide support to the IQCM to ensure compliance with Environmental Requirements is included in inspections or audits.
- Conduct a weekly field review of the entire project. A summary of the field reviews shall be included in the monthly ESR.
- Coordinate procedures implementation to meet all Environmental Requirements.
- Ensure that environmental tasks are performed by qualified environmental professionals and provide the resources to perform the work needed to meet the Environmental Requirements
  - Activities performed by the environmental professionals shall be reported in the ESR and include the resumes of the individuals performing the work.
- Lead the environmental cross-disciplinary reviews of all design submittals to confirm compliance with all Environmental Requirements and environmental design commitments. A summary of these shall be included in the ESR.
- Perform reviews of proposed Developer changes prior to the submittal to CDOT of any related Developer Change Notice pursuant to Schedule 24 (Change Mechanism). The submittal of a proposed Developer Change Notice by the project team to CDOT shall include documentation that the Environmental Manager has performed due diligence and that the proposed Developer change complies with the Environmental Requirements. A summary of these reviews shall be reported in the ESR.
- Perform reviews with respect to any Enterprise Change Notice as required by the terms of an Enterprise Change Notice.
- Measure the number and severity of nonconformances with the Environmental Requirements and include a summary of the findings in the ESR.
- Implement improvement strategies to reduce the number and severity of nonconformances with the Environmental Requirements. A summary of these reviews shall be reported in the ESR.
- Monitor work for conformance with Environmental Requirements, and include a summary of findings in the ESR.
- Plan and implement the Environmental Compliance and Mitigation Training Program.
- Lead a monthly field review with CDOT to assess the Project and environmental issues. This field review can be counted as a substitute for the Environmental Manager's weekly field review for the relevant week.
- The Environmental Manager will lead weekly environmental task force meetings during the construction period, and will coordinate with the appropriate project team member's for their participation in the meeting.
- Attend all public and stakeholder meetings related to the Project and participate, as needed.

- Provide Mitigation Completion Reports documenting and certify the completion of all Environmental Requirements.

Recognized Hazardous Materials Manager

- Implement the Materials Management Plan (MMP).
- Make sure our project team follows all Environmental Requirements applicable to RHMs.
- Lead bi-weekly meetings with CDOT to review the RHM status.
- Notify CDOT in writing within eight hours of any encounter or discovery of hazardous substances (including releases thereof) affecting the work site.

Health and Safety Officer

- Develop health and safety plans (HASPs).
- Evaluate worker safety relative to RHMs.

Quality Manager

- Develop the QMP to include:
  - Procedures that address all elements of design, including environmental.
  - A process for environmental review prior to submission of final plan packages showing how the Developer's design meets the Environmental Requirements, including Schedule 17.
  - A section detailing the IQC activities that will be performed to ensure compliance during construction of all environmental requirements. IQC staff oversight of all Schedule 17 Environmental Requirement elements that apply to construction is required. These elements include but are not limited to: construction air quality, water quality, construction noise, noxious weed management, landscape plants and plant establishment, wetlands protection and other sensitive areas, hazardous materials, and environmental hardscapes such as noise walls.
- Develop the Materials Testing and Inspection Plan (MTIP), which shall define procedures that outline the environmental conditions that are suitable for calibrating test equipment.
- Develop the QHPs (established by the Developer):
  - At each environmental stage.
  - After establishment of water quality BMPs and prior to initial ground disturbances.
  - Upon completion of surveys for nesting birds and protected species, prior to ground disturbance, in accordance with Schedule 17, Project Special Provision 240.
  - Upon completion of environmental resources protection, prior to ground disturbance, where fencing and other appropriate protection mechanism is required, in accordance with Schedule 17.
  - At the end of each month review the Developer's weekly and post-storm inspections
  - Work with CDOT as it performs Quality Assurance Oversight Process Audits on the implementation of all the Developer's work activities, including environmental compliance.
  - Identify environmental exposure conditions as part of the Durability Plan.

IQC Inspection Staff

- The IQC Program shall include compliance with water quality requirements as part of all inspection and field reviews and shall issue NCR's, if required, to bring the Project into compliance with the CDPS-SCP, MS4 permit, and CDOT specifications.
- IQC Inspectors will audit the SWMP notebook monthly from issuance of NTP2 until Final Acceptance. These items shall be scanned into the DCS using an electronic format. A summary of

the audit, findings and scanned material shall be submitted to CDOT on a monthly basis. Audit items include:

- CDOT Form 1388 — Daily Inspection Form
- CDOT Form 1176 — Routine and Post-Storm Inspection Form
- CDOT Form 105 — Speed Memo
- All other correspondence related to water quality and spills

Other Environmental Professionals

- Where the Project Agreement requires work to be completed upon project award by an environmental professional (e.g., a wildlife biologist) the individual shall have the appropriate educational credentials and a minimum of two years professional experience in the specific discipline, unless higher standards are specified. The qualifications of the professional performing the work shall be submitted in the prior month's ESR.

16.3 Discipline Specific Management Plans

Upon project award, the Environmental Team will write discipline-specific work plans, referenced in Schedule 17, Section 2.1.2 of the Project Agreement, and incorporate each in the ECWP exhibits, which include the following:

- Air Quality Monitoring, Maintenance, and Mitigation Plan
- Construction Noise Mitigation and Monitoring Plan
- Integrated Noxious Weed Management Plan
- MMP
- Sampling and Analysis Plan
- HASP
- Spill Prevention Control Countermeasure Plan
- BTPD Management Plan

16.4 Frequency and Purpose of Environmental Field Reviews

The Environmental Manager will complete weekly environmental field reviews to make sure the ECWP requirements are being met and the appropriate documentation is being presented by the ECT. These reviews will include the following:

- Implement a policy of dual and independent reporting of environmental conditions and violations identified by the ECWP to the project team and CDOT.
- Establish and implement an effective communication, reporting and documentation system, including procedures for regular communication with design and construction personnel.
- Make sure that any violations of applicable laws, regulations or policies are immediately reported pursuant to the procedures outlined in the ECWP Environmental Reporting Contact Tree (Figure 15).

16.5 Meeting Environmental Requirements for Site-Specific Construction Activities

The 5280 Connectors Environmental Management Team will ensure site-specific areas of the project will meet each Environmental Requirement by:

- Acquiring the proper environmental permits and government approvals
- Tracking the Mitigation Measures Status Report
- Utilizing the Environmental Clearance Checklist
- Implementing and updating POMA's

Additionally, POMA's can be split into general categories (i.e., clear and grub work, work in or near wetlands, cultural resources, reclamation, etc.) or broken down into more discreet detail locations to ensure each segment of work the project is compliant with regulations.

17.0 Environmental Compliance Work Plan Updates

17.1 Monitoring and Improving ECWP

Upon the completion of the original ECWP, we will monitor its effectiveness, update it as necessary to meet requirements, and resubmit to CDOT for annual Approval in accordance with Schedule 17, Section 2.1.3 of the Project Agreement. Anticipated ECWP updates include, but are not limited to:

- A plan or procedure no longer adequately addresses the matters it was originally intended to address.
- A plan or procedure does not conform to the Project Agreement.
- An audit by the Developer or CDOT identifies a deficiency in the ECWP that requires an update.
- Organizational structure changes require revision to the ECWP.
- The Developer is undertaking or is about to undertake activities that are not covered within the current ECWP.

17.2 Annual Submittals to CDOT

Annual ECWP updates and ongoing discipline-specific management plans submitted to CDOT for Approval will include a cover sheet identifying the changes made to expedite the review process in accordance with Schedule 17, Section 2.1.3 of the Project Agreement. We will submit a redlined copy of the ECWP to CDOT in addition to the "clean," revised ECWP.

Exhibit 1.
ROD Tracking Sheet

Example Mitigation Tracking Sheet

Exhibit XX | Mitigation Measures Tracking Spreadsheet

Mitigation Commitment	Mitigation Category	Activity Triggering Mitigation	Location of Activity Triggering Mitigation	Impact per NEPA Document	Commitment From Mitigation Table In Source Document	Responsible Agency	Life Cycle Phase Mitigation to be Implemented	Location of Mitigation(s) in Plan Sheets/Specs Include All Page Numbers that Apply	Agency Coordination	Status	Tracking Notes
1	Transportation		Project wide			CDOT Design/CDOT Construction	Design/ Construction	Std Spec 104.04, 107.10	CDOT, FHWA	Completed	
2	Transportation		Project wide			CDOT Design/CDOT Construction	Design/ Construction	Std Spec 104.04, 107.10	CDOT, FHWA	In progress	
3	Transportation		Project wide			CDOT Design/CDOT Construction	Design/ Construction	Std Spec 104.04, 107.10	CDOT, FHWA	In progress	
4	Transportation		Project wide			CDOT Design/CDOT Construction	Design/ Construction	Std Spec 104.04, 107.10	CDOT, FHWA	In progress	
5	Transportation		Project wide, multiple locations			CDOT Construction	Construction	Std Spec 104.04	CDOT, FHWA	Not started	
6	Transportation		SH 103 and Exit 241			CDOT Design/CDOT Construction	Design/ Construction	Std Spec 104.04, 107.07,107.10	CDOT, FHWA	Completed	
7	Social and Economic Conditions		SH 103 and Exit 241			CDOT Construction	Construction	Std Spec 104.04, 107.07,107.10	CDOT, FHWA	Completed	
8	Social and Economic Conditions		Project wide			CDOT Design/CDOT Construction	Design/ Construction	Std Spec 104.04, 107.07,107.10	CDOT, FHWA	Not started	
9	Social and Economic Conditions		Project wide			CDOT Design/CDOT Construction	Design/ Construction	Std Spec 104.04, 107.07,107.10	CDOT, FHWA	Completed	

Exhibit 2.
Standard Preventative Action Request Forms

To be provided after award

Exhibit 3.
Stop Work Order (SWO) Form

To be provided after award

Exhibit 4.
Reevaluation Form

COLORADO DEPARTMENT OF TRANSPORTATION **REEVALUATION FORM**	Original NEPA Approval Date:	Reevaluation Date:	Project Code:
Project Name and Location:			
NEPA Document Title:			
Region/Program/Residency:			
Project Description:			
Project Phasing Plan and Portions Completed (if warranted):			
Portion of Project Currently Being Advanced:			
Date(s) of Prior Reevaluations:			

I. Document Type

- ☐ Categorical Exclusion (CE)
- ☐ Environmental Assessment (EA)
- ☐ Finding of No Significant Impacts (FONSI)
- ☐ Draft Environmental Impact Statement (DEIS)
- ☐ Final Environmental Impact Statement (FEIS)
- ☐ Supplemental Environmental Impact Statement (SEIS)
- ☐ Record of Decision (ROD)
- ☐ Other (such as: local funding, etc.) _____

II. Reason for Reevaluation

- ☐ Project is proceeding to the next major approval or action [23 CFR 771.129(c)]
- ☐ Project changes such as laws, policies, guidelines, design, environmental setting, impacts or mitigation (describe:)
- ☐ Greater than three years have elapsed since FHWA's approval of the DEIS [23 CFR 771.129(a)] or FHWA's last major approval action for the FEIS [23 CFR 771.129(b)]
- ☐ Other:

_____

Distribution: Edition # 2 (06-09-2011) CDOT Form # 1399
RPEM (original); copies to Project Manager, Region Right of Way (if ROW required), Environmental Programs Branch, Central Files, and Federal Highway Administration

APPENDIX M

ENVISION RATING SYSTEM
SELF-ASSESSMENT CHECKLIST

Central -70

Project Location: Denver, CO

Project Score: 40%

Project ID: 2153

Project Stage: Unregistered

Created: 05/13/2017

Project Team: Justin DuMond
Ryan Prime
Shannon Tynan
Justin Moen
Simon Reuterswaerd
Kate Kelly

40

Gold Ready
(current assessment)

Project Contact: Justin DuMond
justin.dumond@skanska.com
303-749-6020

ENV SP: Ryan Prime
ryan.prime@skanska.com
347-404-1523

Project Description:

The project replaces the exis ing I-70 viaduct, which was constructed in the 1950's and is functionally and structurally obsolete. I-70 is the main east/west route through Denver and carries very heavy traffic volumes. The scope includes removing the existing viaduct (elevated section) and replacing it with a significantly wider lowered section, allowing for addition of tolled express lanes in each direction. A four acre concrete lid and a city park will be placed over a portion of the lowered section to re-unite neighborhoods that were separated by the viaduct.

Target Certification Goal:

The 5280 Connectors' targeted Envision certification goal is **PLATINUM**.

Who	Step	Agree	Level	Comments	Files
QUALITY OF LIFE					
QL1.1 - Improve Community Quality of Life					
ENV SP	Initial Submittal		Restorative (25/25)		
QL1.2 - Stimulate Sustainable Growth and Development					
ENV SP	Initial Submittal		Superior (5/16)		
QL1.3 - Develop Local Skills and Capabilities					
ENV SP	Initial Submittal		Conserving (12/15)		
QL2.1 - Enhance Public Health and Safety					
ENV SP	Initial Submittal		NA (0/0)		
QL2.2 - Minimize Noise and Vibration					
ENV SP	Initial Submittal		Conserving (8/11)		
QL2.3 - Minimize Light Pollution					
ENV SP	Initial Submittal		Conserving (8/11)		
QL2.4 - Improve Community Mobility and Access					
ENV SP	Initial Submittal		Enhanced (4/14)		
QL2.5 - Encourage Alternative Modes of Transportation					
ENV SP	Initial Submittal		Improved (1/15)		
QL2.6 - Improve Site Accessibility, Safety and Wayfinding					
ENV SP	Initial Submittal		Conserving (12/15)		
QL3.1 - Preserve Historic and Cultural Resources					
ENV SP	Initial Submittal		Superior (7/16)		
QL3.2 - Preserve Views and Local Character					
ENV SP	Initial Submittal		Restorative (14/14)		
QL3.3 - Enhance Public Space					
ENV SP	Initial Submittal		Conserving (11/13)		
QL0.0 - Innovate or Exceed Credit Requirements					
ENV SP	Initial Submittal		(0/8)		

LEADERSHIP

LD1.1 - Provide Effective Leadership and Commitment

ENV SP	Initial Submittal	Conserving (17/17)

LD1.2 - Establish a Sustainability Management System

ENV SP	Initial Submittal	Conserving (14/14)

LD1.3 - Foster Collaboration and Teamwork

ENV SP	Initial Submittal	Enhanced (4/15)

LD1.4 - Provide for Stakeholder Involvement

ENV SP	Initial Submittal	Enhanced (5/14)

LD2.1 - Pursue Byproduct Synergy Opportunities

ENV SP	Initial Submittal	Enhanced (3/15)

LD2.2 - Improve Infrastructure Integration

ENV SP	Initial Submittal	Conserving (13/16)

LD3.1 - Plan for Long-term Monitoring and Maintenance

ENV SP	Initial Submittal	Conserving (10/10)

LD3.2 - Address Conflicting Regulations and Policies

ENV SP	Initial Submittal	Enhanced (2/8)

LD3.3 - Extend Useful Life

ENV SP	Initial Submittal	Superior (6/12)

LD0.0 - Innovate or Exceed Credit Requirements

RESOURCE ALLOCATION

RA1.1 - Reduce Net Embodied Energy

ENV SP	Initial Submittal	No Level (0/18)

RA1.2 - Support Sustainable Procurement Practices

ENV SP	Initial Submittal	Improved (2/9)

RA1.3 - Use Recycled Materials

ENV SP	Initial Submittal	Enhanced (5/14)

RA1.4 - Use Regional Materials

ENV SP	Initial Submittal	Conserving (10/10)

RA1.5 - Divert Waste From Landfills

ENV SP	Initial Submittal	Improved (3/11)

RA1.6 - Reduce Excavated Materials Taken Off Site

ENV SP	Initial Submittal	Improved (2/6)

RA1.7 - Provide for Deconstruction and Recycling

ENV SP	Initial Submittal	No Level (0/12)

RA2.1 - Reduce Energy Consumption

ENV SP	Initial Submittal	No Level (0/18)

RA2.2 - Use Renewable Energy

ENV SP	Initial Submittal	No Level (0/20)

RA2.3 - Commission and Monitor Energy Systems

ENV SP	Initial Submittal	Conserving (11/11)

RA3.1 - Protect Fresh Water Availability

ENV SP	Initial Submittal	No Level (0/21)

RA3.2 - Reduce Potable Water Consumption

ENV SP	Initial Submittal	No Level (0/21)

RA3.3 - Monitor Water Systems

ENV SP	Initial Submittal	Superior (6/11)

RA0.0 - Innovate or exceed credit requirements

NATURAL WORLD

NW1.1 - Preserve Prime Habitat

ENV SP	Initial Submittal	Superior (9/18)

NW1.2 - Protect Wetlands and Surface Water

ENV SP	Initial Submittal	Improved (1/18)

NW1.3 - Preserve Prime Farmland

ENV SP	Initial Submittal	NA (0/0)

NW1.4 - Avoid Adverse Geology

ENV SP	Initial Submittal	Improved (1/5)

NW1.5 - Preserve Floodplain Functions

ENV SP	Initial Submittal	Enhanced (5/14)

NW1.6 - Avoid Unsuitable Development on Steep Slopes

ENV SP	Initial Submittal	No Level (0/6)

NW1.7 - Preserve Greenfields

ENV SP	Initial Submittal	Restorative (23/23)

NW2.1 - Manage Stormwater

ENV SP	Initial Submittal	No Level (0/21)

NW2.2 - Reduce Pesticide and Fertilizer Impacts

ENV SP	Initial Submittal	Superior (5/9)

NW2.3 - Prevent Surface and Groundwater Contamination

ENV SP	Initial Submittal	Superior (9/18)

NW3.1 - Preserve Species Biodiversity

ENV SP	Initial Submittal	Improved (2/16)

NW3.2 - Control Invasive Species

ENV SP	Initial Submittal	Restorative (11/11)

NW3.3 - Restore Disturbed Soils

ENV SP	Initial Submittal	Conserving (8/10)

NW3.4 - Maintain Wetland and Surface Water Functions

ENV SP	Initial Submittal	Improved (3/19)

NW0.0 - Innovate or Exceed Credit Requirements

CLIMATE AND RISK

CR1.1 - Reduce Greenhouse Gas Emissions

ENV SP	Initial Submittal	No Level (0/25)

CR1.2 - Reduce Air Pollutant Emissions

ENV SP	Initial Submittal	No Level (0/15)

CR2.1 - Assess Climate Threat

ENV SP	Initial Submittal	No Level (0/15)

CR2.2 - Avoid Traps and Vulnerabilities

ENV SP	Initial Submittal	No Level (0/20)

CR2.3 - Prepare for Long-Term Adaptability

ENV SP	Initial Submittal	No Level (0/20)

CR2.4 - Prepare for Short-Term Hazards

ENV SP	Initial Submittal	Conserving (17/21)

CR2.5 - Manage Heat Island Effects

ENV SP	Initial Submittal	Improved (1/6)

CR0.0 - Innovate or Exceed Credit Requirements

	Submitted Score Information			Verified Score Information		
Credit Category	**Applicable**	**Submitted**	**Percentage**	**Applicable**	**Verified**	**Percentage**
QUALITY OF LIFE	107	0%	181	0	0%	
LEADERSHIP	74	0%	121	0	0%	
RESOURCE ALLOCATION	39	0%	182	0	0%	
NATURAL WORLD	77	0%	203	0	0%	
CLIMATE AND RISK	18	0%	122	0	0%	
Total Points / %	809	0	0%	809	0	0%

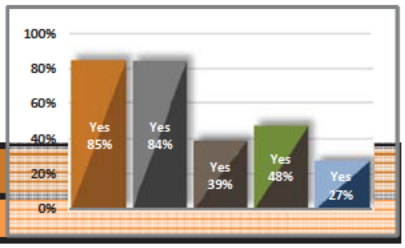
Central-70 Project

Envision Rating System
Self-Assessment Checklist
For Public Comment Only - Not for Project Use

				Y	N	NA		
1	QUALITY OF LIFE	PURPOSE	QL1.1 Improve community quality of life	3	0	0	3 of 3	NA 0%
2			QL1.2 Stimulate sustainable growth and development	3	0	0	3 of 3	
3			QL1.3 Develop local skills and capabilities	3	0	0	3 of 3	
4		COMMUNITY	QL2.1 Enhance public health and safety	0	1	0	0 of 1	
5			QL2.2 Minimize noise and vibration	1	0	0	1 of 1	
6			QL2.3 Minimize light pollution	1	0	0	1 of 1	
7			QL2.4 Improve community mobility and access	3	0	0	3 of 3	
8			QL2.5 Encourage alternative modes of transportation	1	1	0	1 of 2	
9			QL2.6 Improve site accessibility, safety and wayfinding	3	0	0	3 of 3	
10		WELLBEING	QL3.1 Preserve historic and cultural resources	1	1	0	1 of 2	
11			QL3.2 Preserve views and local character	2	0	0	2 of 2	
12			QL3.3 Enhance public space	1	1	0	1 of 2	
			TOTAL	**22**	**4**	**0**	22 of 26	NA 0% No 15% Yes 85%
13	LEADERSHIP	COLLABORATION	LD1.1 Provide effective leadership and commitment	3	0	0	3 of 3	NA 0%
14			LD1 2 Establish a sustainability management system	1	0	0	1 of 1	
15			LD1 3 Foster collaboration and teamwork	2	1	0	2 of 3	
16			LD1.4 Provide for stakeholder involvement	2	1	0	2 of 3	
17		MANAGEMENT	LD2.1 Pursue by-product synergy opportunities	1	0	0	1 of 1	
18			LD2 2 Improve infrastructure integration	3	0	0	3 of 3	
19		PLANNING	LD3.1 Plan for long-term monitoring and maintenance	2	0	0	2 of 2	
20			LD3 2 Address conflicting regulations and policies	1	1	0	1 of 2	
21			LD3 3 Extend useful life	1	0	0	1 of 1	
			TOTAL	**16**	**3**	**0**	16 of 19	No 16% Yes 84%
22	RESOURCE ALLOCATION	MATERIALS	RA1.1 Reduce Net Embodied Energy	0	2	0	0 of 2	NA 0%
23			RA1.2 Support Sustainable Procurement Practices	1	2	0	1 of 3	
24			RA1.3 Use Recycled Materials	1	1	0	1 of 2	
25			RA1.4 Use Regional Materials	2	0	0	2 of 2	
26			RA1.5 Divert Waste from Landfills	2	1	0	2 of 3	
27			RA1.6 Reduce Excavated Materials Taken off Site	1	2	0	1 of 3	
28			RA1.7 Provide for Deconstruction and Recycling	0	3	0	0 of 3	
29		ENERGY	RA2.1 Reduce energy consumption	0	3	0	0 of 3	
30			RA2.2 Use renewable energy	0	2	0	0 of 2	
31			RA2.3 Commission and monitor energy systems	3	0	0	3 of 3	
32		WATER	RA3.1 Protect fresh water availability	2	5	0	2 of 7	
33			RA3.2 Reduce potable water consumption	1	3	0	1 of 4	
34			RA3.3 Monitor water systems	3	1	0	3 of 4	
			TOTAL	**16**	**25**	**0**	16 of 41	NA 0% No 61% Yes 39%
35	NATURAL WORLD	SITING	NW1.1 Preserve prime habitat	2	3	0	2 of 5	NA 0%
36			NW1.2 Protect wetlands and surface water	1	2	0	1 of 3	
37			NW1.3 Preserve prime farmland	0	0	1	0 of 0	
38			NW1.4 Avoid adverse geology	1	2	0	1 of 3	
39			NW1.5 Preserve floodplain functions	3	3	0	3 of 6	
40			NW1.6 Avoid unsuitable development on steep slopes	1	1	0	1 of 2	
41			NW1.7 Preserve greenfields	2	0	0	2 of 2	
42		LAND & WATER	NW2.1 Manage stormwater	0	2	0	0 of 2	
43			NW2.2 Reduce pesticide and fertilizer impacts	4	1	0	4 of 5	
44			NW2.3 Prevent surface and groundwater contamination	2	2	-1	2 of 4	
45		BIODIVERSITY	NW3.1 Preserve species biodiversity	2	2	0	2 of 4	
46			NW3.2 Control invasive species	3	0	0	3 of 3	
47			NW3.3 Restore disturbed soils	1	1	0	1 of 2	
48			NW3.4 Maintain wetland and surface water functions	0	5	0	0 of 5	
			TOTAL	**22**	**24**	**0**	22 of 46	NA 0% No 52% Yes 48%
49	CLIMATE	EMISSION	CR1.1 Reduce greenhouse gas emissions	0	2	0	0 of 2	NA 0%
50			CR1.2 Reduce air pollutant emissions	0	2	0	0 of 2	
51			CR2.1 Assess climate threat	0	1	0	0 of 1	
52			CR2.2 Avoid traps and vulnerabilities	0	2	0	0 of 2	
53		RESILIENCE	CR2.3 Prepare for long-term adaptability	0	1	0	0 of 1	
54			CR2.4 Prepare for short-term hazards	2	0	0	2 of 2	
55			CR2.5 Manage heat islands effects	1	0	0	1 of 1	
			TOTAL	**3**	**8**	**0**	3 of 11	No 52% Yes 48%

Envision Rating System
Self-Assessment Checklist

5280 Connectors
Linking I-70 Communities



Quality of Life

1. Purpose

QL 1.1 Improve Community Quality of Life

Intent: Improve the net quality of life of all communities affected by the project and mitigate negative impacts to communities.

Metric: Measures taken to assess community needs and improve quality of life while minimizing negative impacts.

Assessment Questions:	Yes	No	N/A	
Are the relevant community needs, goals and issues being addressed in the project?	◉	○	○	?
Are the potentially negative impacts of the project on the host and nearby communities been reduced or eliminated?	◉	○	○	?
Has the project design received broad community endorsement, including community leaders and stakeholder groups?	◉	○	○	?
Total	3	of	3	

QL 1.2 Stimulate Sustainable Growth and Development

Intent: Support and stimulate sustainable growth and development, including improvements in job growth, capacity building, productivity, business attractiveness and livability.

Metric: Assessment of the project's impact on the community's sustainable economic growth and development.

Assessment Questions:	Yes	No	N/A	
Will the project contribute significantly to local employment?	◉	○	○	?
Will the project make a significant increase in local productivity?	◉	○	○	?
Will the project make the community more attractive to people and businesses?	◉	○	○	?
Total	3	of	3	

QL 1.3 Develop Local Skills and Capabilities

Intent: Expand the knowledge, skills and capacity of the community workforce to improve their ability to grow and develop.

Metric: The extent to which the project will improve local employment levels, skills mix and capabilities.

Assessment Questions:	Yes	No	N/A	
Does the project team intend to hire and train a substantial number of local workers?	◉	○	○	?

Does the project team intend to use a substantial number of local suppliers and specialty firms?	◉	○	○	?
Will the project, through local employment, subcontracting and education programs, make a substantial improvement in local capacity and competitiveness?	◉	○	○	?
Total	**3**	**of**	**3**	

2. Wellbeing

QL 2.1 Enhance Public Health and Safety

Intent: Take into account the health and safety implications of using new materials, technologies or methodologies above and beyond meeting regulatory requirements.

Metric: Efforts to exceed normal health and safety requirements, taking into account additional risks in the application of new technologies, materials and methodologies.

Assessment Questions:	**Yes**	**No**	**N/A**	
Does the owner and the project team intend to identify, assess and institute new standards to address additional risks and exposures created by the application of new technologies, materials, equipment and/or methodologies?	○	◉	○	?
Total	**0**	**of**	**1**	

QL 2.2 Minimize Noise and Vibration

Intent: Minimize noise and vibration generated during construction and in the operation of the completed project to maintain and improve community livability.

Metric: The extent to which noise and vibration will be reduced during construction and operation.

Assessment Questions:	**Yes**	**No**	**N/A**	
Will the project reduce noise and vibration to levels substantially below local permissable levels during construction and operation?	◉	○	○	?
Total	**1**	**of**	**1**	

QL 2.3 Minimize Light Pollution

Intent: Prevent excessive glare, light at night, and light directed skyward to conserve energy and reduce obtrusive lighting and excessive glare.

Metric: Lighting meets minimum standards for safety but does not spill over into areas beyond site boundaries, nor does it create obtrusive and disruptive glare.

Assessment Questions:	**Yes**	**No**	**N/A**	
Will the project be designed to reduce excessive lighting, prevent light spillage and preserve/restore the night sky?	◉	○	○	?
Total	**1**	**of**	**1**	

QL 2.4 Improve Community Mobility and Access

Intent: Locate, design and construct the project in a way that eases traffic congestion, improves mobility and access, does not promote urban sprawl, and otherwise improves community livability.

Metric: Extent to which the project improves access and walkability, reductions in commute times, traverse times to existing facilities and transportation. Improved user safety considering all modes, e.g., personal vehicle, commercial vehicle, transit and bike/pedestrian.

Assessment Questions:	Yes	No	N/A	
Will the project provide good, safe access to adjacent facilities, amenities and transportation hubs?	●	○	○	?
Will the project design take into consideration the expected traffic flows and volumes in and around the project site to improve overall mobility and efficiency?	●	○	○	?
Has the project team coordinated the design with other infrastructure assets to reduce traffic congestion, and improve walkability and livability?	●	○	○	?
	Total	3	of 3	

QL 2.5 Encourage Alternative Modes of Transportation

Intent: Improve accessibility to non-motorized transportation and public transit. Promote alternative transportation and reduce congestion.

Metric: The degree to which the project has increased walkability, use of public transit, non-motorized transit.

Assessment Questions:	Yes	No	N/A	
Will the project be within walking distance of accessible multi-modal transportation?	○	●	○	?
Through its design, will the project encourage the use of transit and/or non-motorized transportation?	●	○	○	?
	Total	1	of 2	

QL 2.6 Improve Accessibility, Safety and Wayfinding

Intent: Improve user accessibility, safety, and wayfinding of the site and surrounding areas.

Metric: Clarity, simplicity, readability and broad-population reliability in wayfinding, user benefit and safety.

Assessment Questions:	Yes	No	N/A	
Will the project contain the appropriate signage for safety and wayfinding in and around the constructed works?	●	○	○	?
Will the project address safety and accessibility in and around the constructed works for users and emergency personnel?	●	○	○	?
Will the project extend accessibility and intuitive signage to protect nearby sensitive sites or neighborhoods?	●	○	○	?
	Total	3	of 3	

3. Community

QL 3.1 Preserve Historic and Cultural Resources

Intent: Preserve or restore significant historical and cultural sites and related resources to preserve and enhance community cultural resources.

Metric: Summary of steps taken to identify, preserve or restore cultural resources.

Assessment Questions:	Yes	No	N/A	
Will the project minimize negative impacts on historic and cultural resources?	●	○	○	?
Will the project be designed so that it fully preserves and/or restores historic/cultural resources on or near the project site?	○	●	○	?
Total	1	of	2	

QL 3.2 Preserve Views and Local Character

Intent: Design the project in a way that maintains the local character of the community and does not have negative impacts on community views.

Metric: Thoroughness of efforts to identify important community views and aspects of local landscape, including communities, and incorporate them into the project design.

Assessment Questions:	Yes	No	N/A	
Will the project be designed in a way that preserves views and local character?	●	○	○	?
Will the project be designed to improve local character, views or the natural landscape through preservation and/or restorative actions?	●	○	○	?
Total	2	of	2	

QL 3.3 Enhance Public Space

Intent: Improve existing public space including parks, plazas, recreational facilities, or wildlife refuges to enhance community livability.

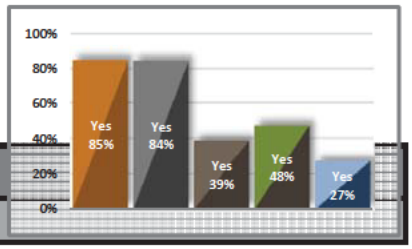
Metric: Plans and commitments to preserve, conserve, enhance and/or restore the defining elements of the public space.

Assessment Questions:	Yes	No	N/A	
Will the project make meaningful enhancements to public space?	●	○	○	?
Will the project result in a substantial restoration to public space?	○	●	○	?
Total	1	of	2	

CONTINUE ON TO THE LEADERSHIP CATEGORY →

Central-70 Project

Envision Rating System
Self-Assessment Checklist



Leadership

1. Collaboration

LD1.1 Provide Effective Leadership and Commitment

Intent: Provide effective leadership and commitment to achieve project sustainability goals.

Metric: Demonstration of meaningful commitment of the project owner and the project team to the principles of sustainability and sustainable performance improvement.

Assessment Questions:	Yes	No	N/A	
Has the project team issued public statements stating their commitment to sustainability?	●	○	○	?
Is the project team's commitment to sustainability backed up by examples of actions taken or to be taken?	●	○	○	?
Does these commitments and actions demonstrate sufficiently that sustainability is a core value of the project team?	●	○	○	?
Total	3	of	3	

LD 1.2 Establish a Sustainability Management System

Intent: Create a project management system that can manage the scope, scale and complexity of a project seeking to improve sustainable performance.

Metric: The organizational policies, authorities, mechanisms and business processes that have been put in place and the judgment that they are sufficient for the scope, scale and complexity of the project.

Assessment Questions:	Yes	No	N/A	
Does the project team intend to establish a sound, workable sustainability management system that meets the requirements of the project?	●	○	○	?
Total	1	of	1	

LD 1.3 Foster Collaboration and Teamwork

Intent: Eliminate conflicting design elements, and optimize system by using integrated design and delivery methodologies and collaborative processes.

Metric: The extent of collaboration within the project team and the degree to which project delivery processes incorporate whole systems design and delivery approaches.

Assessment Questions:	Yes	No	N/A	
Are the project owner and the project team intending to take a systems view of the project, considering the performance relationship of this project to other community infrastructure elements?	●	○	○	?
Will the project owner and the project team establish a collaborative relationship on the project to achieve higher levels of sustainable performance?	●	○	○	?
Will the project owner and the project team institute a whole systems design and delivery process with the objective of maximizing sustainable performance?	○	●	○	?

Total	**2 of 3**

LD 1.4 Provide for Stakeholder Involvement

Intent: Establish sound and meaningful programs for stakeholder identification, engagement and involvement in project decision making.

Metric: The extent to which project stakeholders are identified and engaged in project decision making. Satisfaction of stakeholders and decision makers in the involvement process.

Assessment Questions:	Yes	No	N/A	
Will key stakeholders in the project be identified and lines of communication established?	●	○	○	?
Does the project team plan to engage with stakeholders and solicit stakeholder feedback?	●	○	○	?
Will the project team establish a strong stakeholder involvement process designed to involve the public meaningfully in project decision-making?	○	●	○	?
Total	**2 of 3**			

2. Management

LD 2.1 Pursue By-Product Synergy Opportunities

Intent: Reduce waste, improve project performance and reduce project costs by identifying and pursuing opportunities to use unwanted by-products or discarded materials and resources from nearby operations.

Metric: The extent to which the project team identified project materials needs, sought out nearby facilities with by-product resources that could meet those needs and capture synergy opportunities.

Assessment Questions:	Yes	No	N/A	
Will the project team establish a program to locate, assess and make use of unwanted by-products and materials on the project?	●	○	○	?
Total	**1 of 1**			

LD 2.2 Improve Infrastructure Integration

Intent: Design the project to take into account the operational relationships among other elements of community infrastructure which results in an overall improvement in infrastructure efficiency and effectiveness.

Metric: The extent to which the design of the delivered works integrates with existing and planned community infrastructure, and results in a net improvement in efficiency and effectiveness.

Assessment Questions:	Yes	No	N/A	
Will the project team seek to optimize sustainable performance at the infrastructure component level?	●	○	○	?
Will the project team seek to optimize sustainable performance by designing the project as an integrated system?	●	○	○	?
Will the project be planned and designed so that its operation and functions are fully integrated with all infrastructure elements in the community?	●	○	○	?
Total	**3 of 3**			

3. Planning

LD 3.1 Plan For Long-term Maintenance and Monitoring

Intent: Put in place plans and sufficient resources to ensure as far as practical that ecological protection, mitigation and enhancement measures are incorporated in the project and can be carried out.				
Metric: Comprehensiveness and detail of long-term monitoring and maintenance plans, and commitment of resources to fund the activities.				
Assessment Questions:	**Yes**	**No**	**N/A**	
Will the project have a plan for long term monitoring and maintenance?	●	○	○	?
Will that plan be sufficiently comprehensive, covering all aspects of long-term monitoring and maintenance?	●	○	○	?
Total	**2**	**of**	**2**	

LD 3.2 Address Conflicting Regulations and Policies

Intent: Work with officials to Identify and address laws, standards, regulations or policies that may unintentionally create barriers to implementing sustainable infrastructure.				
Metric: Efforts to identify and change laws, standards, regulations and/or policies that may unintentionally run counter to sustainability goals, objectives and practices.				
Assessment Questions:	**Yes**	**No**	**N/A**	
Will an assessment of applicable regulations, policies and standards be done, identifying those that may run counter to project sustainable performance goals, objectives and targets?	●	○	○	?
Do the owner and the project team intend to approach decision-makers to resolve conflicts?	○	●	○	?
Total	**1**	**of**	**2**	

LD 3.3 Extend Useful Life

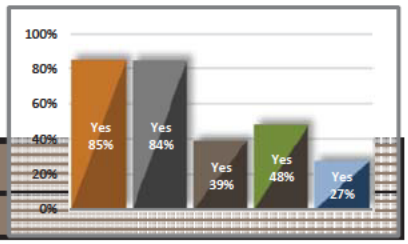
Intent: Meet energy needs through renewable energy sources.				
Metric: Extent to which renewable energy resources are incorporated into the design, construction and operation.				
Assessment Questions:	**Yes**	**No**	**N/A**	
Will the project be designed in ways that extend substantially the useful life of the project?	●	○	○	?
Total	**1**	**of**	**1**	

CONTINUE ON TO THE RESOURCE ALLOCATION CATEGORY →

Central-70 Project

Envision Rating System
Self-Assessment Checklist

5280 Connectors
Linking I-70 Communities



Resource Allocation

1. Materials

RA1.1 Reduce Net Embodied Energy

Intent: Conserve energy by reducing the net embodied energy of project materials over the project life.

Metric: Percentage reduction in net embodied energy from a life cycle energy assessment.

Assessment Questions:	Yes	No	N/A	
Does the project team plan to conduct an assessment of the embodied energy of key materials over the project life?	○	●	○	?
Will the project achieve a significant reduction in net embodied energy over the life of the project?	○	●	○	?
Total	0	of	2	

RA 1.2 Support Sustainable Procurement Practice

Intent: Obtain materials and equipment from manufacturers and suppliers who implement sustainable practices.

Metric: Percentage of materials sourced from manufacturers who meet sustainable practices requirements.

Assessment Questions:	Yes	No	N/A	
Will the project team establish a preference for using manufacturers, suppliers and service companies that have strong sustainable policies and practices?	●	○	○	?
Will the project team establish a sound and viable sustainable procurement program?	○	●	○	?
Does the project team intend to source a significant proportion of project materials, equipment, supplies and services from these companies?	○	●	○	?
Total	1	of	3	

RA 1.3 Use Recycled Materials

Intent: Reduce the use of virgin materials and avoid sending useful materials to landfills by specifying reused materials, including structures, and material with recycled content.

Metric: Percentage of project materials that are reused or recycled.

Assessment Questions:	Yes	No	N/A	
Will the project team consider the appropriate reuse of existing structures and materials and incorporated them into the project?	●	○	○	?
Will the project team specify that a significant amount of materials with recycled content be used on the project?	○	●	○	?
Total	1	of	2	

RA 1.4 Use Regional Materials

Intent: Minimize transportation costs and impacts and retain regional benefits through specifying local sources.

Metric: Percentage of project materials by type and weight or volume sourced within the required distance.

Assessment Questions:	Yes	No	N/A	
Will the project team work to identify local/regional sources of materials?	●	○	○	?
Does the project utilize a significant amount of locally sourced materials?	●	○	○	?
Total	2	of	2	

RA 1.5 Divert Waste from Landfills

Intent: Reduce waste, and divert waste streams away from disposal to recycling and reuse.

Metric: Percentage of total waste diverted from disposal.

Assessment Questions:	Yes	No	N/A	
Will the project team identify potential recycling and reuse destinations for construction and demolition waste generated on site?	●	○	○	?
Will the project team develop an operations waste management plan to decrease and divert project waste from landfills and incinerators during construction and operation?	●	○	○	?
Will the project divert a significant amount of project waste from landfills?	○	●	○	?
Total	2	of	3	

RA 1.6 Reduce Excavated Materials Taken Off Site

Intent: Minimize the movement of soils and other excavated materials off site to reduce transportation and environmental impacts.

Metric: Percentage of excavated material retained on site.

Assessment Questions:	Yes	No	N/A	
Will the project be designed to balance cut and fill to reduce the amount of excavated material taken off site?	●	○	○	?
When necessary, will the project team taken steps to identify local sources/receivers of excavated material?	○	●	○	?
Will the project reuse a significant amount of suitable excavated material onsite?	○	●	○	?
Total	1	of	3	

RA 1.7 Provide for Deconstruction and Recycling

Intent: Encourage future recycling, up-cycling, and reuse by designing for ease and efficiency in project disassembly or deconstruction at the end of its useful life.

Metric: Percentage of components that can be easily separated for disassembly or deconstruction.

Assessment Questions:	Yes	No	N/A	
Will the project team assess whether materials specified can be easily recycled or reused after the useful life of the project has ended?	○	●	○	?
Will the project be designed so that a significant amount of project materials be easily separated for recycling or readily reused at the end of the project's useful life?	○	●	○	?

Will the project team incorporate methods for increasing the likelihood of materials recycling when the project is operating?	○	◉	○	?
Total	**0**	**of**	**3**	

2. Energy

RA 2.1 Reduce Energy Consumption

Intent: Conserve energy by reducing overall operation and maintenance energy consumption throughout the project life cycle.

Metric: Percentage of reductions achieved.

Assessment Questions:	**Yes**	**No**	**N/A**	
Will the project team conduct reviews to identify options for reducing energy consumption during operations and maintenance of the constructed works?	○	◉	○	?
Will the project team conducted feasibility studies and cost analyses to determine the most effective methods for energy reduction and incorporated them into the design?	○	◉	○	?
Is the project expected to achieve significant reductions in energy consumption?	○	◉	○	?
Total	**0**	**of**	**3**	

RA 2.2 Use Renewable Energy

Intent: Meet energy needs through renewable energy sources.

Metric: Extent to which renewable energy resources are incorporated into the design, construction and operation.

Assessment Questions:	**Yes**	**No**	**N/A**	
Will the owner and project team identify and analyze options to meet operational energy needs through renewable energy?	○	◉	○	?
Will the project meet a significant amount of its energy needs through renewable energy?	○	◉	○	?
Total	**0**	**of**	**2**	

RA 2.3 Commission and Monitor Energy Systems

Intent: Ensure efficient functioning and extend useful life by specifying the commissioning and monitoring of the performance of energy systems.

Metric: Third party commissioning of electrical/mechanical systems and documentation of system monitoring equipment in the design.

Assessment Questions:	**Yes**	**No**	**N/A**	
Does the owner and project team intend to conduct an independent commissioning of the project's energy and mechanical systems?	◉	○	○	?
Will the project team assemble the necessary information needed to train operations and maintenance workers in a way that facilitates proper training and operations?	◉	○	○	?
Will the design incorporate advanced monitoring systems, such as energy sub-meters, to enable more efficient operations?	◉	○	○	?
Total	**3**	**of**	**3**	

3. Water

RA 3.1 Protect Fresh Water Availability

Intent: Reduce the negative net impact on fresh water availability, quantity and quality.

Metric: The extent to which the project uses fresh water resources without replenishing those resources at its source.

Assessment Questions:	Yes	No	N/A	
Will the project team assess project water requirements?	●	○	○	?
Does the project team plan to onduct a comprehensive assessment of the project's long-term impacts on water availability?	○	●	○	?
Will the project only access water that can be replenished in both quantity and quality?	○	●	○	?
Will the project consider the impacts of fresh water withdrawal on receiving waters?	○	●	○	?
Will the project discharge into receiving waters meet quality and quantity requirements for high value aquatic species?	●	○	○	?
Will the project achieve a net-zero impact on water supply quantity and quality?	○	●	○	?
Will the project restore the quantity and quality of fresh water surface and groundwater supplies to an undeveloped native ecosystem condition?	○	●	○	?
Total	**2**	**of**	**7**	

RA 3.2 Reduce Potable Water Consumption

Intent: Reduce overall potable water consumption and encourage the use of greywater, recycled water, and stormwater to meet water needs.

Metric: Percentage of water reduction.

Assessment Questions:	Yes	No	N/A	
Will the project team conduct planning or design reviews to identify potable water reduction strategies?	●	○	○	?
Will the project team conduct feasibility and cost analysis to determine the most effective methods for potable water reduction and incorporated them into the design?	○	●	○	?
Will the project achieve a substantial reduction in potable water consumption?	○	●	○	?
Will the project result in a net positive generation of water, and water up-cycling, as a result of on-site purification or treatment?	○	●	○	?
Total	**1**	**of**	**4**	

RA 3.3 Monitor Water Systems

Intent: Implement programs to monitor water systems performance during operations and their impacts on receiving waters.

Metric: Documentation of system in the design

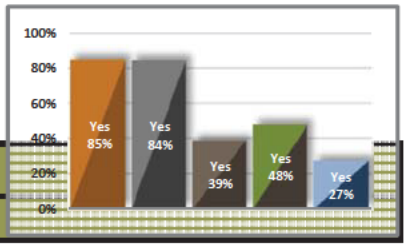
Assessment Questions:	Yes	No	N/A	
Will the owner and project team conduct an independent commissioning/monitoring of the project's water systems in order to validate the design objectives?	●	○	○	?

Will the project design incorporate the means to monitor water performance during operations?	◉	○	○	?
Will the project integrate long-term operations and impact monitoring to mitigate negative impacts and improve efficiency?	◉	○	○	?
Will specific strategies be put in place to utilize monitoring and leak detection in order for the project to be more responsive to changing operating conditions?	○	◉	○	?
Total	3	of	4	

CONTINUE ON TO THE NATURAL WORLD CATEGORY →

Central-70 Project

Envision Rating System
Self-Assessment Checklist



Natural World

1. Siting

NW 1.1 Preserve Prime Habitat

Intent: Avoid placing the project – and the site compound/temporary works – on land that has been identified as of high ecological value or as having species of high value.

Metric: Avoidance of high ecological value sites and establishment of protective buffer zones.

Assessment Questions:	Yes	No	N/A	
Will the project team take steps to identify and document areas of prime habitat near or on the site?	●	○	○	?
Will the project avoid development on land that is judged to be prime habitat?	●	○	○	?
Will the project establish a minimum 300 ft. natural buffer zone around all areas deemed prime habitat?	○	●	○	?
Will the project significantly increase the area of prime habitat through habitat restoration?	○	●	○	?
Will the project improve habitat connectivity by linking habitats?	○	●	○	?
	Total	2	of 5	

NW 1.2 Protect Wetlands and Surface Water

Intent: Protect, buffer, enhance and restore areas designated as wetlands, shorelines, and waterbodies by providing natural buffer zones, vegetation and soil protection zones.

Metric: Size of natural buffer zone established around all wetlands, shorelines, and waterbodies.

Assessment Questions:	Yes	No	N/A	
Will the project avoid development on wetlands, shorelines, and waterbodies?	●	○	○	?
Will the project maintain soil protection zones (VSPV) around all wetlands, shorelines, and waterbodies?	○	●	○	?
Will the project restore degraded existing buffer zones to a natural state?	○	●	○	?
	Total	1	of 3	

NW 1.3 Preserve Prime Farmland

Intent: Identify and protect soils designated as prime farmland, unique farmland, or farmland of statewide importance.

Metric: Percentage of prime farmland avoided during development.

Assessment Questions:	Yes	No	N/A	
Will this project avoid development on land designated as prime farmland.	○	○	●	?

	Total 0 of 0

NW 1.4 Avoid Adverse Geology

Intent: Avoid development in adverse geologic formations and safeguard aquifers to reduce natural hazards risk and preserve high quality groundwater resources.

Metric: Degree to which natural hazards and sensitive aquifers are avoided and geologic functions maintained.

Assessment Questions:	Yes	No	N/A	
Will the project team identify and address the impacts of sensitive or adverse geology?	●	○	○	?
Will the project be designed to reduce the risk of damage to sensitive geology?	○	●	○	?
Will the project be designed to reduce the risk of damage from adverse geology?	○	●	○	?
Total 1 of 3				

NW 1.5 Preserve Floodplain Functions

Intent: Preserve floodplain functions by limiting development and development impacts to maintain water management capacities and capabilities.

Metric: Efforts to avoid floodplains or maintain predevelopment floodplain functions.

Assessment Questions:	Yes	No	N/A	
Will the project avoid or limit development within the design frequency floodplain?	●	○	○	?
Will the project maintain pre-development floodplain infiltration and water quality?	●	○	○	?
Will the project design incorporate a flood emergency operations and/or evacuation plan?	●	○	○	?
Will the project maintain or enhance riparian and aquatic habitat, including aquatic habitat connectivity?	○	●	○	?
Will the project maintain sediment transport?	○	●	○	?
Does the project team intend to modify or remove infrastructure subject to frequent damage by floods?	○	●	○	?
Total 3 of 6				

NW 1.6 Avoid Unsuitable Development on Steep Slopes

Intent: Protect steep slopes and hillsides from inappropriate and unsuitable development in order to avoid exposures and risks from erosion and landslides, and other natural hazards.

Metric: The degree to which development on steep slopes is avoided, or to which erosion control and other measures are used to protect the constructed works as well as other downslope structures.

Assessment Questions:	Yes	No	N/A	
Will the project team use best management practices to manage erosion and prevent landslides?	●	○	○	?

Will the project team minimize or avoid all development on or disruption to steep slopes?	○	◉	○	?
Total	**1**	**of**	**2**	

NW 1.7 Preserve Greenfields

Intent: Conserve undeveloped land by locating projects on previously developed greyfield sites and/or sites classified as brownfields.

Metric: Percentage of site that is a greyfield or the use and cleanup of a site classified as a brownfield.

Assessment Questions:	Yes	No	N/A	
Will the project team consider how the project can conserve undeveloped land?	◉	○	○	?
Will a significant amount of the project development be located on previously developed sites, that is, sites classified as greyfields or brownfields?	◉	○	○	?
Total	**2**	**of**	**2**	

2. Land and Water

NW 2.1 Manage Stormwater

Intent: Minimize the impact of infrastructure on stormwater runoff quantity and quality.

Metric: Infiltration and evapotranspiration capacity of the site and return to pre-development capacities.

Assessment Questions:	Yes	No	N/A	
Will the project be designed to reduce storm runoff to pre-development conditions?	○	◉	○	?
Will the project be designed to significantly improve water storage capacity?	○	◉	○	?
Total	**0**	**of**	**2**	

NW 2.2 Reduce Pesticides and Fertilizer Impacts

Intent: Reduce non-point source pollution by reducing the quantity, toxicity, bioavailability and persistence of pesticides and fertilizers, or by eliminating the need for the use of these materials.

Metric: Efforts made to reduce the quantity, toxicity, bioavailability and persistence of pesticides and fertilizers used on site, including the selection of plant species and the use of integrated pest management techniques.

Assessment Questions:	Yes	No	N/A	
Will operational policies be put in place to control and reduce the application of fertilizers and pesticides?	◉	○	○	?
Will the project include runoff controls to minimize contamination of ground and surface water?	◉	○	○	?
Will the project team select landscaping plants to minimize the need for fertilizer or pesticides?	◉	○	○	?
Will the project team select fertilizers and pesticides appropriate for site conditions with low-toxicity, persistence, and bioavailability?	◉	○	○	?
Will the project designed to eliminate the need for pesticides or fertilizers?	○	◉	○	?
Total	**4**	**of**	**5**	

NW 2.3 Prevent Surface + Groundwater Contamination

Intent: Preserve fresh water resources by incorporating measures to prevent pollutants from contaminating surface and groundwater and monitor impacts over operations.

Metric: Designs, plans and programs instituted to prevent and monitor surface and groundwater contamination.

Assessment Questions:	Yes	No	N/A	
Will the project team conduct or aquire hydrologic delineation studies?	●	○	○	?
Will spill and leak prevention and response plans and design be incorporated into the design?	●	○	○	?
Will the project design reduce or eliminate potentially polluting substances from the project?	○	●	○	?
Will the project team seek to reduce future contamination by cleaning up areas of contamination and instituting land use controls to limit the introduction of future contamination sources?	○	●	○	?
	Total	2	of 4	

3. Biodiversity

NW 3.1 Preserve Species Biodiversity

Intent: Protect biodiversity by preserving and restoring species and habitats.

Metric: Degree of habitat protection.

Assessment Questions:	Yes	No	N/A	
Will the project team identify existing habitats on and near the project site?	●	○	○	?
Will the project protect existing habitats?	●	○	○	?
Will the project increase the quality or quantity of existing habitat?	○	●	○	?
Will the project preserve, or improve, wildlife movement corridors?	○	●	○	?
	Total	2	of 4	

NW 3.2 Control Invasive Species

Intent: Use appropriate non-invasive species and control or eliminate existing invasive species.

Metric: Degree to which invasive species have been reduced or eliminated.

Assessment Questions:	Yes	No	N/A	
Will the project team specify locally appropriate and non-invasive plants on the site?	●	○	○	?
Will the project team implement a comprehensive management plan to identify, control, and/or eliminate, invasive species?	●	○	○	?
Will the project team implement a comprehensive management plan to prevent or mitigate the future encroachment of invasive species?	●	○	○	?
	Total	3	of 3	

NW 3.3 Restore Disturbed Soils

Intent: Restore soils disturbed during construction and previous development to bring back ecological and hydrological functions.				
Metric: Percentage of disturbed soils restored.				
Assessment Questions:	**Yes**	**No**	**N/A**	
Will the project restore 100% of soils disturbed during construciton?	●	○	○	?
Will the project restore 100% of soils disturbed by previous development?	○	●	○	?
	Total	1	of 2	

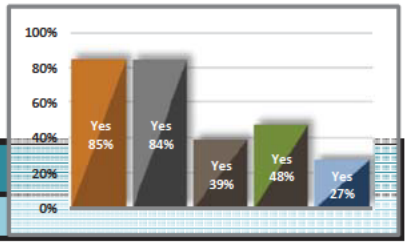
NW 3.4 Maintain Wetland & Surface Water Functions				
Intent: Maintain and restore the ecosystem functions of streams, wetlands, waterbodies and their riparian areas.				
Metric: Number of functions maintained and restored.				
Assessment Questions:	**Yes**	**No**	**N/A**	
Will the project maintain or enhance hydrologic connetion?	○	●	○	?
Will the project maintain or enhance water quality?	○	●	○	?
Will the project maintain or enhance habitat?	○	●	○	?
Will the project maintain or restore sediment transport?	○	●	○	?
Will wetlands and surface water be maintained or restored so as to have a fully functioning aquatic and riparian ecosystem?	○	●	○	?
	Total	0	of 5	

CONTINUE ON TO THE CLIMATE AND RISK CATEGORY →

Central-70 Project

Envision Rating System
Self-Assessment Checklist

5280 Connectors
Linking I-70 Communities



Climate and Risk

1. Emissions

CR1.1 Reduce Greenhouse Gas Emissions

Intent: Conduct a comprehensive life-cycle carbon analysis and use this assessment to reduce the anticipated amount of net greenhouse gas emissions during the life cycle of the project, reducing project contribution to climate change.

Metric: Life-cycle net carbon dioxide equivalent (CO_2e) emissions.

Assessment Questions:	Yes	No	N/A	
Will a life-cycle carbon assessment be conducted on the project?	○	●	○	?
Based on that assessment, will the project be designed in a way that substantially reduces carbon emissions?	○	●	○	?
Total	**0**	**of**	**2**	

CR 1.2 Reduce Air Pollutant Emissions

Intent: Reduce the emission of six criteria pollutants; particulate matter (including dust), ground level ozone, carbon monoxide, sulfur oxides, nitrogen oxides, lead, and noxious odors.

Metric: Measurements of air pollutants as compared to standards used.

Assessment Questions:	Yes	No	N/A	
Will the project be designed in a way that substantially reduces dust and odors on the site?	○	●	○	?
Will the project be designed in a way that substantially exceeds the National Ambient Air Quality Standards (NAAQS) for the six criteria pollutants?	○	●	○	?
Total	**0**	**of**	**2**	

2. Resilience

CR 2.1 Assess Climate Threat

Intent: Develop a comprehensive Climate Impact Assessment and Adaptation Plan.

Metric: Summary of steps taken to prepare for climate variation and natural hazards.

Assessment Questions:	Yes	No	N/A	
Will the project team develop a Climate Impact Assessment and Adaptation Plan?	○	●	○	?
Total	**0**	**of**	**1**	

CR 2.2 Avoid Traps and Vulnerabilities

Intent: Avoid traps and vulnerabilities that could create high, long-term costs and risks for the affected communities.

Metric: The extent of the assessment of potential long-term traps, vulnerabilities and risks due to long-term changes such as climate change and the degree to which these were addressed in the project design and in community design criteria.

Assessment Questions:	Yes	No	N/A	
Will a comprehensive review be conducted to identify the potential risks and vulnerabilities that would be created or made worse by the project?	○	●	○	?
Is there an intent by the owner or the project team to alter the design to reduce or eliminate these risks and vulnerabilities?	○	●	○	?
Total	0	of	2	

CR 2.3 Prepare for Long-Term Climate Adaptability

Intent: Prepare infrastructure systems to be resilient to the consequences of long-term climate change, perform adequately under altered climate conditions, or adapt to other long-term change scenarios.

Metric: The degree to which the project has been designed for long-term resilience and adaptation.

Assessment Questions:	Yes	No	N/A	
Will the project be designed to accommodate a changing operating environment throughout the project life cycle?	○	●	○	?
Total	0	of	1	

CR 2.4 Prepare for Short-Term Hazards

Intent: Increase resilience and long-term recovery prospects of the project and site from natural and man-made short-term hazards.

Metric: Steps taken to improve protection measures beyond existing regulations.

Assessment Questions:	Yes	No	N/A	
Will a hazard analysis be conducted covering the likely natural and man-made hazards in the project area area?	●	○	○	?
Will the project be designed so that is it is able to recover quickly and cost-effectively from short-term hazard events?	●	○	○	?
Total	2	of	2	

CR 2.5 Manage Heat Island Effects

Intent: Minimize surfaces with a high solar reflectance index (SRI) to reduce localized heat accumulation and manage microclimates.

Metric: Percentage of site area that meets SRI Criteria.

Assessment Questions:	Yes	No	N/A	
Will the project be designed to reduce heat island effects by reducing the percentage of low solar reflectance index (SRI) surfaces?	●	○	○	?
Total	1	of	1	

5280 Connectors
Linking Communities

1700 Lincoln Street, Suite 3000
Denver, CO 80203

www.5280Connectors.com