Regular Meeting of the

Board of Trustees of the Utah Transit Authority

Wednesday, March 10, 2021, 9:00 a.m.
Remote Electronic Meeting – No Anchor Location – Live-Stream at
https://www.youtube.com/results?search_query=utaride

NOTICE OF SPECIAL MEETING CIRCUMSTANCES DUE TO COVID-19 PANDEMIC:

In accordance with the Utah Open and Public Meetings Act, (Utah Code § 52-4-207.4), the UTA Board of Trustees will make the following adjustments to our normal meeting procedures.

- All members of the Board of Trustees and meeting presenters will participate electronically.
- **Public Comment** may be given live during the meeting or through alternate means (see instructions below).
  - To give **live public comment** during the meeting:
    Use this link and follow the instructions to register for the meeting (you will need to provide your name and email address)
    https://rideuta.webex.com/rideuta/onstage/g.php?MTID=e2ebfa7bb1bd8552180ac75f4d67f836d
    - Sign on to the WebEx meeting portal through the "join event" link provided in your email following approval of your registration.
    - Sign on 10 minutes prior to the meeting start time
    - Use the hand icon in the WebEx portal to indicate that you would like to give a comment
    - Comments are limited to 3 minutes per commenter.
  - Comment online at https://www.rideuta.com/Board-of-Trustees
  - Comment via email at boardoftrustees@rideuta.com
  - Comment by telephone at 801-743-3882 option 5 (801-RideUTA option 5) – specify that your comment is for the board meeting.
  - Comments submitted before 2:00 p.m. on Tuesday, March 9th will be distributed to board members prior to the meeting:
- Meeting proceedings may be viewed remotely through the WebEx meeting platform (see above) or YouTube live-streaming. https://www.youtube.com/user/UTAride

1.	**Call to Order and Opening Remarks**	**Chair Carlton Christensen**
2.	**Safety First Minute**	**Sheldon Shaw**
3.	**Public Comment**	**Chair Carlton Christensen**
4.	**Consent**	**Chair Carlton Christensen**
	a. Approval of February 24, 2021 Board Meeting Minutes	
	b. Approval of March 2, 2021 Special Board Meeting Minutes	
5.	**Legislative Update**	**Shule Bishop**

6.	**Agency Report** a. Project Appropriations Update b. Groundbreaking for Ogden to Weber State Bus Rapid Transit (BRT) Project	**Carolyn Gonot**
7.	**Financial Report – January 2021**	**Bill Greene** **Brad Armstrong**
8.	**Contracts, Disbursements and Grants**	
	a. Change Order: Ogden to Weber State (WSU) Bus Rapid Transit (BRT) Construction Manager/General Contractor (CM/GC) Phase 2 Construction Services Amendment (Stacy and Witbeck, Inc.)	Mary DeLoretto Janelle Robertson
	b. Change Order: On-Call Infrastructure Contract - Task Order #01 Project Management/Construction Management (PM/CM) Fees (Stacy and Witbeck, Inc.)	Eddy Cumins David Hancock
	c. Change Order: On-Call Infrastructure Contract - Task Order #03 Stadium and Mario Capecchi Rail Procurement for Curve Replacements (Stacy and Witbeck, Inc.)	Eddy Cumins David Hancock
9.	**Service and Fare Approvals**	
	a. Free Fare for COVID-19 Vaccinations	Megan Waters Monica Morton
10.	**Other Business** a. Next Meeting: March 24, 2021 at 9:00 a.m.	**Chair Carlton Christensen**
11.	**Adjourn**	**Chair Carlton Christensen**

Special Accommodation: Information related to this meeting is available in alternate format upon request by contacting calldredge@rideuta.com or (801) 287-3536. Request for accommodations should be made at least two business days in advance of the scheduled meeting.

Website: https://www.rideuta.com/Board-of-Trustees
Live Streaming: https://www.youtube.com/user/UTAride

UTAH TRANSIT AUTHORITY
ELECTRONIC BOARD MEETING DETERMINATION

Consistent with the Utah Open and Public Meetings Act, (UTAH CODE § 52-4-207 [4]), as the Chair of the Board of Trustees ("Board") of the Utah Transit Authority ("UTA"), I hereby make the following written determinations in support of my decision to hold electronic meetings of the UTA Board without a physical anchor location:

1. Due to the ongoing COVID -19 pandemic, conducting Board and Board Committee meetings with an anchor location presents a substantial risk to the health and safety of those who may be present at the anchor location.
2. Federal, state, and local health authorities continue to encourage institutions and individuals to limit in-person interactions.

This written determination takes effect on March 10, 2021, and is effective until midnight on April 8, 2021 and may be re-issued by future written determinations as deemed appropriate.

Dated this 4th day of March 2021.

DocuSigned by:
Carlton Christensen
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Carlton Christensen, Chair of the Board of Trustees

MEMORANDUM TO THE BOARD

TO: Utah Transit Authority Board of Trustees
FROM: Jana Ostler, Board Manager

BOARD MEETING DATE: March 10, 2021

SUBJECT:	**Approval of February 24, 2021 Board Meeting Minutes**
AGENDA ITEM TYPE:	**Consent**
RECOMMENDATION:	Approve the minutes of the February 24, 2021 Board of Trustees meeting
BACKGROUND:	A regular meeting of the UTA Board of Trustees was held electronically and broadcast live on YouTube on Wednesday, February 24, 2021 at 9:00 a.m. Minutes from the meeting document the actions of the Board and summarize the discussion that took place in the meeting. A full audio recording of the meeting is available on the Utah Public Notice Website and video feed is available on You Tube at https://www.youtube.com/results?search_query=utaride
ATTACHMENTS:	1) 2021-02-24_BOT_Minutes_unapproved

Minutes of the Meeting
of the
Board of Trustees of the Utah Transit Authority (UTA)
held remotely via phone or video conference
and broadcast live for the public via YouTube
February 24, 2021

Board Members Participating:

Carlton Christensen, Chair
Beth Holbrook
Jeff Acerson

Also participating were UTA staff members, community members, and media representatives.

Call to Order and Opening Remarks. Chair Christensen welcomed attendees and called the meeting to order at 9:00 a.m. He then yielded the floor to Jana Ostler, UTA Board Manager, who read the electronic board meeting determination statement into the record as required by statute. The complete electronic board meeting determination statement is included as Appendix A to these minutes.

Chair Christensen mentioned today's meeting would be held in memory of David Umphenour, a UTA employee who recently passed away due to complications from COVID-19. He yielded the floor to Kim Ulibarri, UTA Chief People Officer, who shared some memories of and sentiments about Mr. Umphenour.

Safety First Minute. Sheldon Shaw, UTA Director of Safety & Security, provided a brief safety message.

Public Comment. Chair Christensen noted members of the public were invited to attend and comment during the live portion of the meeting; however, no live public comment was given. No online public comment was received for the meeting.

Consent Agenda. The consent agenda was comprised of:

a. Approval of February 10, 2021 Board Meeting Minutes
b. Approval of February 17, 2021 Special Board Meeting Minutes

A motion to approve the consent agenda was made by Trustee Holbrook and seconded by Trustee Acerson. The motion carried unanimously.

Legislative Update. Shule Bishop, UTA Government Relations Director, suggested the board publicly support the following legislation:

- Senate Concurrent Resolution 3 (SCR3), which encourages investigation of opportunities for interstate rail and forms a multi-state passenger rail commission.
- Senate Bill 217 Housing and Transit Reinvestment Zone Act (SB217), which urges cities to establish transit reinvestment zones (TRZs) that include affordable housing near commuter rail stations.

A motion to support SCR 3 and SB217 was made by Trustee Holbrook and seconded by Trustee Acerson. The motion carried unanimously.

Mr. Bishop continued his update and requested the board oppose the following legislation:

- Senate Bill 61 Third Substitute Outdoor Advertising Amendments (SB61 3S), which amends provisions related to billboard and other signage and electronic or mechanical changeable message signs. UTA has concerns with how the provisions might affect transit-oriented development (TOD). The bill's sponsor offered to work with UTA to resolve its concerns, but language suggested by the agency was not included in the third substitute.
- Senate Bill 144 Billboard Restrictions Amendments (SB144), which amends provisions relating to governmental entities' regulation of billboards. Mr. Bishop remarked that the legislation will unnecessarily complicate UTA's work with local municipalities and make it difficult to remove billboards once they are in place. UTA also has concerns about potential impacts to TOD with this bill.

A motion to oppose SB61 3S and SB144 was made by Trustee Holbrook and seconded by Trustee Acerson. The motion carried unanimously.

Agency Report.

GFOA Certificate of Achievement for Excellence in Financial Reporting. Carolyn Gonot, UTA Executive Director, mentioned UTA's recognition by the Government Finance Officers Association (GFOA) for excellence in financial reporting.

Experience Modification Rating. Ms. Gonot noted UTA recently received an experience modification rating of 0.56, which falls well below the 1.0 industry standard for transit

agencies. The rating is used by the insurance industry to gauge past cost of claims, future risk, and cost for insurance against risk.

Snow-Go Team. Ms. Gonot was joined by Eddy Cumins, UTA Chief Operating Officer. Mr. Cumins described UTA's snow-go initiative, an effort that uses employee volunteers to assist rail service units on heavy snow days. The agency currently has 15 snow-go team leaders and 142 team members. The snow-go team focuses its efforts on clearing snow at UTA buildings so that UTA facilities employees can concentrate on snow removal at customer-facing locations. Last week marked the first activation of the snow-go team. While there were some lessons learned, overall, the experience was a success and UTA plans to continue using the snow-go team in the future.

Discussion ensued. Questions on the effectiveness of covering the service district for snow removal and balancing availability of employees on snow-go teams were posed by the board and answered by Mr. Cumins.

South Salt Lake County Microtransit Q4 Report. Ms. Gonot was joined by Jaron Robertson, UTA Director of Innovative Mobility Solutions. Mr. Robertson reviewed the UTA-Via microtransit pilot metrics from the fourth quarter of 2020, including data on ridership, customer experience, and performance. He highlighted the pilot's successes and challenges and outlined next steps.

Discussion ensued. Questions on marketing plans and potential for identifying community destinations to better understand connectivity needs were posed by the board and answered by staff.

Pension Committee Report. Trustee Acerson was joined by Ms. Ulibarri. Trustee Acerson delivered a report on the recent pension committee meeting and reviewed the pension's year-end performance metrics.

Discussion ensued. A question on the optimal rate of return for the plan was posed by the board and answered by Trustee Acerson and Ms. Ulibarri.

Resolutions.

R2021-02-05 Resolution Declaring Official Intent of the Utah Transit Authority to Reimburse Itself for Certain Capital Expenditures Through Lease Financing. Bill Greene, UTA Chief Financial Officer, was joined by Emily Diaz, UTA Financial Services Administrator. Ms. Diaz explained the resolution, which allows the agency to reimburse itself for lease financing of certain capital items in 2021 as permitted by federal law. The 2021 capital budget incorporates lease financing for the replacement of the following items:

Vehicle/Equipment Replacement	Number	Amount
2020 MCI Buses (Carryover)	27	$27,800,000
Buses	23	$12,800,000
Paratransit	30	$3,053,000
Vanpool vans	58	$2,206,000
Totals	138	$45,859,000

Discussion ensued. A question on the lease carryover from 2020 was posed by the board and answered by staff.

A motion to approve R2021-02-05 was made by Trustee Acerson and seconded by Trustee Holbrook. The motion carried unanimously with aye votes from Trustee Acerson, Trustee Holbrook, and Chair Christensen.

R2021-02-06 Resolution Authorizing the Obligation and Drawdown of Coronavirus Response and Relief Supplemental Appropriations Act (CRRSAA) Grant Monies by the Executive Director. Mary DeLoretto, UTA Chief Service Development Officer, was joined by Patti Garver, UTA Program Manager – Environmental, Grants & Project Controls. Ms. Garver summarized the resolution, which authorizes the agency to obligate and drawdown $32,828,902 in CRRSAA funds apportioned to UTA by the Federal Transit Administration.

Discussion ensued. Questions on the ability to apply funds to capital items, drawdown deadlines, and planned pandemic-related projects were posed by the board and answered by staff.

A motion to approve R2021-02-06 was made by Trustee Holbrook and seconded by Trustee Acerson. The motion carried unanimously with aye votes from Trustee Holbrook, Trustee Acerson, and Chair Christensen.

R2021-02-07 Resolution Approving the 2021-2025 Service Plan. Laura Hanson, UTA Director of Planning, detailed the resolution, which approves the 2021-2025 Service Plan. She reviewed the planning process, guiding framework, and near-term planning efforts in the counties in UTA's service district. She also spoke about the plan's formation, future foci, equity considerations, and vision, and emphasized stakeholder outreach efforts related to the plan.

Discussion ensued. The board commended Ms. Hanson and her team for their work on the plan.

A motion to approve R2021-02-07 was made by Trustee Acerson and seconded by Trustee Holbrook. The motion carried unanimously with aye votes from Trustee Acerson, Trustee Holbrook, and Chair Christensen.

Contracts, Disbursements, and Grants.

Contract: On-Call Systems Maintenance (Rocky Mountain Systems Services). Mr. Cumins was joined by David Hancock, UTA Director of Asset Management. Mr. Hancock requested the board approve a contract with Rocky Mountain Systems Services to provide on-call maintenance for UTA's systems engineering and maintenance of way. The contract has a term of three years with two one-year options. The total contract value, including options, is $15,000,000.

Discussion ensued. A question on the competitiveness of the procurement was posed by the board and answered by staff.

A motion to approve the contract was made by Trustee Holbrook and seconded by Trustee Acerson. The motion carried unanimously.

Pre-Procurements. Todd Mills, UTA Senior Supply Chain Manager, was joined by Kyle Stockley, UTA Manager of Vehicle Overhaul & Bus Support, Andrea Pullos, UTA Project Manager III, and David Pitcher, UTA Claims & Insurance Manager. Mr. Mills informed the board the agency intends to procure the following items or services:

i. SD100/SD160 HVAC System and Auxiliary Power Supply Overhaul
ii. Vehicle Program Management Consulting Services
iii. 650 South Main Street TRAX Platform Construction
iv. Certificate of Insurance Tracking Services

Discussion ensued. Questions on the availability of HVAC equipment, number of HVAC units being purchased, availability of in-house expertise for vehicle program management, private commitment to funding a portion of the TRAX platform construction, options for tracking certificates of insurance, number of UTA vendors with insurance requirements, and inclusion of liability indemnification from the insurance tracking service provider were posed by the board and answered by staff.

Chair Christensen called for a ten-minute break at 10:28 a.m. The meeting resumed at 10:39 a.m.

Discussion Items.

UTA Policy UTA.06.01 Approval: Transit Asset Management and State of Good Repair. Mr. Cumins was joined by Dan Hofer, UTA Manager – State of Good Repair. Mr. Hofer highlighted the goals and key provisions of UTA.06.01 Transit Asset Management and State of Good Repair (TAM Policy). The TAM Policy calls for the formation of an Asset Management Committee, establishes project prioritization guidelines, and aligns asset-related plans across the agency.

Discussion ensued. Questions on the approach to determining replacement of assets, contemplation of seismic requirements, and TAM Policy-related process ownership were posed by the board and answered by staff.

A motion to approve UTA.06.01 was made by Trustee Holbrook and seconded by Trustee Acerson. The motion carried unanimously.

Annual Transit-Oriented Development (TOD) Report and Real Estate Inventory. Paul Drake, UTA Director of Real Estate & Transit-Oriented Development, provided a report on UTA's TOD and real estate inventory. He noted the Sandy Civic Center, Jordan Valley Station, South Jordan FrontRunner Station, and 3900 South Meadowbrook Station TODs are in the construction phase, and the Clearfield Station, Salt Lake Central, Ogden Central, and Provo Central TODs are in the planning phase. He then summarized UTA's TOD and real estate assets and highlighted results of the TOD system analysis.

Discussion ensued. Questions on initiating TOD or station area planning, inclusion of affordable housing options in TOD, internal capacity to support TOD efforts, and potential for analysis of opportunities by city were posed by the board and answered by Mr. Drake. Chair Christensen recommended proactively nurturing TOD and maintaining consistency in advancing the TOD program.

Other Business.

Farewell to Lee Davidson. Chair Christensen mentioned local reporter, Lee Davidson, is retiring and thanked him for his contributions to the community.

Next Meeting. The next meeting of the board will take place on March 10, 2021 at 9:00 a.m.

Adjournment. The meeting was adjourned by motion in memory of David Umphenour at 11:16 a.m.

Transcribed by Cathie Griffiths
Executive Assistant to the Board Chair
Utah Transit Authority
cgriffiths@rideuta.com
801.237.1945

This document is not intended to serve as a full transcript as additional discussion may have taken place; please refer to the meeting materials, audio, or video located at https://www.utah.gov/pmn/sitemap/notice/659283.html for entire content.

This document along with the digital recording constitute the official minutes of this meeting.

Approved Date:

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Carlton J. Christensen
Chair, Board of Trustees

Appendix A

UTAH TRANSIT AUTHORITY
ELECTRONIC BOARD MEETING DETERMINATION

Consistent with provisions of the Utah Open and Public Meetings Act, (UTAH CODE § 52-4-207 [4]), as the Chair of the Board of Trustees ("Board") of the Utah Transit Authority ("UTA"), I hereby make the following written determinations in support of my decision to hold electronic meetings of the UTA Board without a physical anchor location:

1. Due to the ongoing COVID -19 pandemic, conducting Board and Board Committee meetings with an anchor location presents a substantial risk to the health and safety of those who may be present at the anchor location.
2. Federal, state, and local health authorities have adopted guidelines which encourage institutions and individuals to limit in-person interactions and recommend increased virtual interactions.

This written determination takes effect on January 27, 2021, and is effective until midnight on February 26, 2021 and may be re-issued by future written determinations as deemed appropriate.

Dated this 22nd day of January 2021.

DocuSigned by:
Carlton Christensen
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Carlton Christensen, Chair of the Board of Trustees

MEMORANDUM TO THE BOARD

TO: Utah Transit Authority Board of Trustees
FROM: Jana Ostler, Board Manager

BOARD MEETING DATE: March 10, 2021

SUBJECT:	**Approval of March 2, 2021 Board of Trustees Special Meeting Minutes**
AGENDA ITEM TYPE:	**Consent**
RECOMMENDATION:	Approve the minutes of the March 2, 2021 Board of Trustees special meeting
BACKGROUND:	A special meeting of the UTA Board of Trustees was held on Tuesday, March 2, 2021 at 2:30 p.m. at UTA Headquarters. Minutes from the meeting document the actions of the Board and summarize the discussion that took place in the meeting. A full audio recording of the open portion of the meeting is available on the Utah Public Notice Website.
ATTACHMENTS:	1) 2021-03-02_BOT_Special_Minutes_UNAPPROVED

Minutes of the Special Meeting
of the
Board of Trustees of the Utah Transit Authority (UTA)
Utah Transit Authority Headquarters
669 West 200 South, Salt Lake City, Utah
March 2, 2021

Board Members Participating:

Carlton Christensen, Chair (via video conference)
Beth Holbrook
Jeff Acerson (via video conference)

Also participating were UTA staff members.

Call to Order and Opening Remarks. Chair Christensen welcomed attendees and called the meeting to order at 2:33 p.m.

Closed Session. Chair Christensen indicated there were matters to be discussed in closed session relative to pending or reasonably imminent litigation. A motion for a closed session was made by Trustee Acerson and seconded by Trustee Holbrook. The motion carried unanimously and the board entered closed session at 2:34 p.m.

Open Session. A motion to return to open session was made by Trustee Holbrook and seconded by Trustee Acerson. The motion carried unanimously and open session resumed at 3:33 p.m.

Adjournment. The meeting was adjourned at 3:34 p.m. by motion.

Transcribed by Cathie Griffiths
Executive Assistant to the Board Chair
Utah Transit Authority
cgriffiths@rideuta.com
801.237.1945

This document is not intended to serve as a full transcript as additional discussion may have taken place; please refer to the meeting materials, audio, or video located at https://www.utah.gov/pmn/sitemap/notice/661231.html for entire content.

This document along with the digital recording constitute the official minutes of this meeting.

Approved Date:

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Carlton J. Christensen
Chair, Board of Trustees

MEMORANDUM TO THE BOARD

TO: Utah Transit Authority Board of Trustees
FROM: Shule Bishop, Government Relations Director
PRESENTER(S): Shule Bishop, Government Relations Director

BOARD MEETING DATE: March 10, 2021

SUBJECT:	**Legislative Update**
AGENDA ITEM TYPE:	**Report**
RECOMMENDATION:	Informational report for discussion. Make motions regarding UTA positions on legislation as needed.
DISCUSSION:	Shule Bishop, UTA Government Relations Director will report on transit-related issues before the Utah Legislature.

MEMORANDUM TO THE BOARD

TO: Utah Transit Authority Board of Trustees
FROM: Carolyn Gonot, Executive Director
PRESENTER(S): Carolyn Gonot, Executive Director

BOARD MEETING DATE: March 10, 2021

SUBJECT:	**Agency Report**
AGENDA ITEM TYPE:	**Report**
RECOMMENDATION:	Informational report for discussion
DISCUSSION:	Carolyn Gonot, UTA Executive Director will report on recent activities of the agency and other items of interest. - Project Appropriations Update - Groundbreaking for Ogden to Weber State Bus Rapid Transit (BRT) Project

MEMORANDUM TO THE BOARD

TO: Utah Transit Authority Board of Trustees
THROUGH: Carolyn Gonot, Executive Director
FROM: Bill Greene, Chief Financial Officer
PRESENTER(S): Bill Greene, Chief Financial Officer
Brad Armstrong, Senior Manager Budget & Financial Analysis

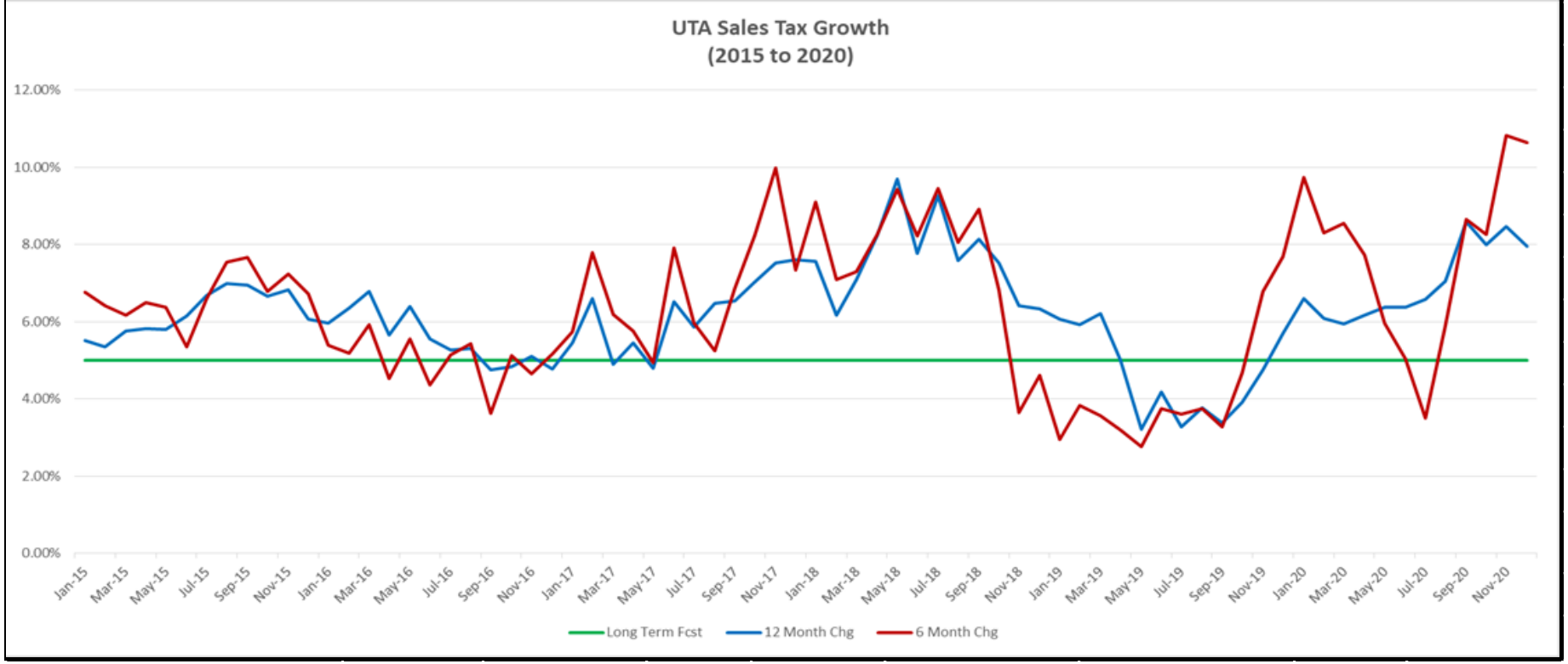
BOARD MEETING DATE: March 10, 2021

SUBJECT:	**Financial Report – January 2021**
AGENDA ITEM TYPE:	**Report**
RECOMMENDATION:	Informational report for discussion
BACKGROUND:	The Board of Trustees Policy No. 2.1, Financial Management, directs the Chief Financial Officer to present monthly financial statements stating the Authority's financial position, revenues, and expense to the Board of Trustees as soon as practical with monthly and year-to-date budget versus actual report to be included in the monthly financial report. The January 2021 Monthly Financial Statements have been prepared in accordance with the Financial Management Policy and are being presented to the Board. Also provided, is the monthly Board Dashboard which summarizes key information from the preliminary January Monthly Financial Statements.
DISCUSSION:	At the March 10, 2021 meeting, the Senior Manager Budget and Financial Analysis will review the Board Dashboard key items, passenger revenues, sales tax collections and operating expense variances and receive questions from the Board of Trustees.
ATTACHMENTS:	• January 2021 Board Dashboard • January 2021 Monthly Financial Statements

UTA Board Dashboard

January 2021

Financial Metrics	Jan Actual	Jan Budget	Fav/ (Unfav)	%	YTD Actual	YTD Budget	Fav/ (Unfav)	%
Sales Tax (Dec '20 mm $)	$ 37.3	$ 35.3	$ 1.95	5.5%	$ 361.6	$ 348.0	$ 13.54	3.9%
Fare Revenue (mm)	$ 2.7	$ 2.6	$ 0.06	2.2%	$ 2.7	$ 2.6	$ 0.06	2.2%
Operating Exp (mm)	$ 23.6	$ 27.5	3.86	14.0%	$ 23.6	$ 27.5	$ 3.86	14.0%
Subsidy Per Rider (SPR)	$ 13.06	$ 15.06	$ 2.00	13.3%	$ 13.06	$ 15.06	$ 2.00	13.3%
UTA Diesel Price ($/gal)	$ 1.74	$ 2.25	$ 0.51	22.8%	$ 1.74	$ 2.25	$ 0.51	22.8%
Operating Metrics	**Jan Actual**	**Jan-20**	**F/ (UF)**	**%**	**YTD Actual**	**YTD 2020**	**F/ (UF)**	**%**
Ridership (mm)	1.63	3.87	(2.2)	-57.9%	1.63	3.87	(2.2)	-57.9%
Alternative Fuels	**CNG Price** (Diesel Gal Equiv)		$ 1.73					

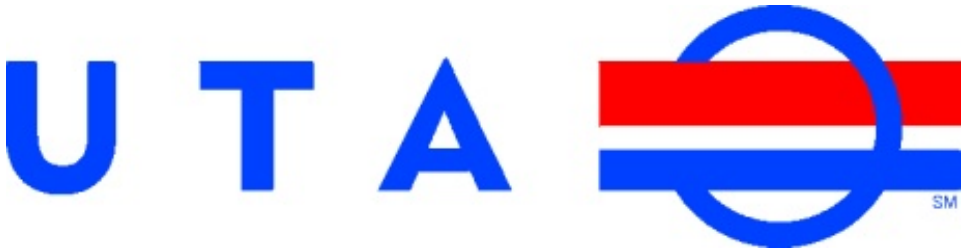


Utah Transit Authority

Financial Statement

(Unaudited)

January 31, 2021



KEY ITEM REPORT
(UNAUDITED)
As of January 31, 2021 Preliminary

EXHIBIT 1-1

		2021 YTD ACTUAL	2021 YTD BUDGET	VARIANCE FAVORABLE (UNFAVORABLE)	% FAVORABLE (UNFAVORABLE)
1	Operating Revenue	$ (2,787,608)	$ (2,747,000)	$ 40,608	1%
2	Operating Expenses	23,627,464	27,483,144	3,855,680	14%
3	Net Operating Income (Loss)	20,839,856	24,736,144	3,896,288	16%
4	Capital Revenue	(680,324)	(15,758,827)	(15,078,503)	-96%
5	Capital Expenses	1,345,255	21,301,565	19,956,311	94%
6	Net Capital Income (Loss)	664,931	5,542,738	4,877,807	88%
7	Sales Tax	(26,713,259)	(26,713,257)	2	0%
8	Other Revenue	(15,921,821)	(15,581,417)	340,404	2%
9	Debt Service	7,655,524	7,533,240	(122,284)	-2%
10	Sale of Assets	(10,126)	-	10,126	
11	Net Non-Operating Income (Loss)	(34,989,682)	(34,761,434)	228,248	1%
12	Contribution to Cash Balance	$ (13,484,895)	$ (4,482,552)	$ 9,002,343	201%
13	Amortization	(16,518)			
14	Depreciation	6,601,530			
15	Total Non-cash Items	$ 6,585,012			

STATISTICS

RIDERSHIP

	2021 Actual	January 2021	January 2020	Difference	2021 YTD	2020 YTD	Difference
16	23,530,441	1,602,424	3,869,300	-2,266,876	1,602,424	3,869,300	-2,266,876

OPERATING SUBSIDY PER RIDER -

			SPR
17	Net Operating Expense	$	(23,627,464)
18	Less: Passenger Revenue	-	2,694,085
19	Subtotal		(20,933,379)
20	Divided by: Ridership	÷	1,602,424
21	Subsidy per Rider	$	(13.06)

SUMMARY FINANCIAL DATA
(UNAUDITED)
As of January 31, 2021 Preliminary

EXHIBIT 1-2

BALANCE SHEET

		1/31/2021	1/31/2020
	CURRENT ASSETS		
1	Cash	$ 21,550,956	$ 17,474,799
2	Investments (Unrestricted)	192,807,794	101,236,358
3	Investments (Restricted)	157,870,359	180,855,165
4	Receivables	74,553,154	64,556,582
5	Receivables - Federal Grants	20,513,723	4,494,223
6	Inventories	35,440,554	36,270,517
7	Prepaid Expenses	4,448,303	1,765,673
8	TOTAL CURRENT ASSETS	$ 507,184,843	$ 406,653,317
9	Property, Plant & Equipment (Net)	2,880,441,015	2,936,565,741
10	Other Assets	153,050,246	159,079,006
11	TOTAL ASSETS	$3,540,676,104	$3,502,298,064
12	Current Liabilities	$ 68,922,725	$ 58,861,839
14	Net Pension Liability	103,864,839	131,548,114
15	Outstanding Debt	2,448,418,059	2,459,865,848
16	Net Investment in Capital Assets	679,809,325	
17	Restricted Net Position	60,625,861	
18	Unrestricted Net Position	179,035,295	852,022,263
19	TOTAL LIABILITIES & EQUITY	$3,540,676,104	$3,502,298,064

RESTRICTED AND DESIGNATED CASH AND CASH EQUIVALENTS RECONCILIATION

	RESTRICTED RESERVES		
20	Debt Service Reserves	$ 67,268	$ 33,090,772
21	2010/2015 Bond DSR Proceeds	10,338,444	
22	2018 Bond Proceeds	15,792,960	27,723,388
23	2019 Bond Proceeds	66,111,066	71,060,951
24	Debt Service Interest Payable	27,891,282	23,251,026
25	Risk Contingency Fund	8,020,910	7,946,894
26	Box Elder County ROW (sales tax)	7,269,340	6,685,963
27	Joint Insurance Trust	7,563,048	4,654,957
28	Davis County Escrow	753,677	1,231,807
29	SL County Escrow	60,888	330,895
30	Amounts held in escrow	14,001,476	4,878,512
31	TOTAL RESTRICTED RESERVES	$ 157,870,359	$ 180,855,165
	DESIGNATED GENERAL AND CAPITAL RESERVES		
32	General Reserves	$ 58,778,000	$ 27,075,157
33	Service Sustainability Reserves	9,796,000	9,595,000
34	Capital Reserve	44,338,000	10,700,000
35	Debt Reduction Reserve	30,000,000	71,341,000
36	TOTAL DESIGNATED GENERAL AND CAPITAL RESERVES	$ 142,912,000	$ 118,711,157
37	TOTAL RESTRICTED AND DESIGNATED CASH AND EQUIVALENTS	$ 300,782,359	$ 299,566,322

SUMMARY FINANCIAL DATA
(UNAUDITED)
As of January 31, 2021 Preliminary

EXHIBIT 1-3

REVENUE & EXPENSES

		ACTUAL Jan-21	ACTUAL Jan-20	YTD 2021	YTD 2020
	OPERATING REVENUE				
1	Passenger Revenue	$ 2,694,085	$ 4,629,018	$ 2,694,085	$ 4,629,018
2	Advertising Revenue	93,523	208,333	93,523	208,333
3	TOTAL OPERATING REVENUE	$ 2,787,608	$ 4,837,351	$ 2,787,608	$ 4,837,351
	OPERATING EXPENSE				
4	Bus Service	$ 8,609,561	$ 9,318,191	$ 8,609,561	$ 9,318,191
5	Commuter Rail	1,814,879	2,104,788	1,814,879	2,104,788
6	Light Rail	2,664,871	3,241,747	2,664,871	3,241,747
7	Maintenance of Way	2,130,026	1,704,668	2,130,026	1,704,668
8	Paratransit Service	1,730,367	1,785,726	1,730,367	1,785,726
9	RideShare/Van Pool Services	197,465	149,139	197,465	149,139
10	Microtransit	25,259	-	25,259	-
11	Operations Support	3,981,150	4,254,659	3,981,150	4,254,659
12	Administration	2,088,802	2,111,200	2,088,802	2,111,200
13	Planning/Capital Development/Real Estate	385,084	371,860	385,084	371,860
14	Non-Departmental	-	-	-	-
15	TOTAL OPERATING EXPENSE	$ 23,627,464	$ 25,041,978	$ 23,627,464	$ 25,041,978
16	NET OPERATING INCOME (LOSS)	$ (20,839,856)	$ (20,204,627)	$ (20,839,856)	$ (20,204,627)
	NON-OPERATING EXPENSE (REVENUE)				
17	Investment Revenue	71,632	(225,482)	71,632	(225,482)
18	Sales Tax Revenue	(26,713,259)	(22,820,400)	(26,713,259)	(22,820,400)
19	Other Revenue	(518,828)	(634,478)	(518,828)	(634,478)
20	Fed Operations/Preventative Maint. Revenue	(15,474,625)	(4,835,511)	(15,474,625)	(4,835,511)
21	Bond Interest	7,371,254	6,858,378	7,371,254	6,858,378
22	Bond Interest UTCT	162,410	163,966	162,410	163,966
23	Bond Cost of Issuance/Fees	-	-	-	-
24	Lease Interest	121,860	755,445	121,860	755,445
25	Sale of Assets	(10,126)	-	(10,126)	-
26	TOTAL NON-OPERATING EXPENSE	$ (34,989,682)	$ (20,738,082)	$ (34,989,682)	$ (20,738,082)
27	CONTRIBUTION TO RESERVES	$ 14,149,826	$ 533,455	$ 14,149,826	$ 533,455
	OTHER EXPENSES (NON-CASH)				
27	Bond Premium/Discount Amortization	(377,788)	(1,010,102)	(377,788)	(1,010,102)
28	Bond Refunding Cost Amortization	293,694	592,605	293,694	592,605
29	Future Revenue Cost Amortization	67,576	67,576	67,576	67,576
30	Depreciation	6,601,530	11,211,877	6,601,530	11,211,877
31	NET OTHER EXPENSES (NON-CASH)	$ 6,585,012	$ 10,861,956	$ 6,585,012	$ 10,861,956

BUDGET TO ACTUAL REPORT
(UNAUDITED)
As of January 31, 2021 Preliminary

EXHIBIT 1-4

CURRENT MONTH

		ACTUAL Jan-21	BUDGET Jan-21	VARIANCE FAVORABLE (UNFAVORABLE)	% FAVORABLE (UNFAVORABLE)
	OPERATING REVENUE				
1	Passenger Revenue	$ (2,694,085)	$ (2,637,000)	$ (57,085)	2%
2	Advertising Revenue	(93,523)	(110,000)	16,477	-15%
3	TOTAL OPERATING REVENUE	$ (2,787,608)	$ (2,747,000)	$ (40,608)	1%
	OPERATING EXPENSE				
4	Bus Service	$ 8,609,561	$ 9,194,962	$ 585,401	6%
5	Commuter Rail	1,814,879	2,002,241	187,362	9%
6	Light Rail	2,664,871	3,392,342	727,471	21%
7	Maintenance of Way	2,130,026	1,605,659	(524,367)	-33%
8	Paratransit Service	1,730,367	1,994,146	263,779	13%
9	RideShare/Van Pool Services	197,465	303,713	106,248	35%
10	Microtransit	25,259	258,227	232,968	90%
11	Operations Support	3,981,150	4,502,187	521,037	12%
12	Administration	2,088,802	3,149,970	1,061,168	34%
13	Planning/Capital Development/Real Estate	385,084	532,864	147,780	28%
14	Non-Departmental	-	546,833	546,833	100%
15	TOTAL OPERATING EXPENSE	$ 23,627,464	$ 27,483,144	$ 3,855,680	14%
16	NET OPERATING INCOME (LOSS)	$ (26,415,072)	$ (30,230,144)	$ 3,815,072	-13%
	NON-OPERATING EXPENSE (REVENUE)				
17	Investment Revenue	$ 71,632	$ (400,583)	$ (472,215)	-118%
18	Sales Tax Revenue	(26,713,259)	(26,713,257)	2	0%
19	Other Revenue	(518,828)	(888,583)	(369,755)	-42%
20	Fed Operations/Preventative Maint. Revenue	(15,474,625)	(14,292,250)	1,182,375	8%
21	Bond Interest	7,371,254	7,264,797	(106,457)	-1%
22	Bond Interest UTCT	162,410	163,966	1,556	1%
23	Bond Cost of Issuance/Fees	-	-	-	
24	Lease Interest	121,860	104,477	(17,383)	-17%
25	Sale of Assets	(10,126)	-	10,126	
26	TOTAL NON-OPERATING EXPENSE	$ (34,989,682)	$ (34,761,434)	$ 228,248	1%
27	CONTRIBUTION TO RESERVES	$ 8,574,610	$ 4,531,290		

BUDGET TO ACTUAL REPORT BY CHIEF
(UNAUDITED)
As of January 31, 2021 Preliminary

EXHIBIT 1-4A

CURRENT MONTH

		ACTUAL Jan-21	BUDGET Jan-21	VARIANCE FAVORABLE (UNFAVORABLE)	% FAVORABLE (UNFAVORABLE)
	OPERATING EXPENSE				
1	Board of Trustees	$ 173,800	$ 242,851	$ 69,051	28%
2	Executive Director	252,017	657,569	405,552	62%
3	Chief Planning and Engagement Officer	423,990	940,817	516,827	55%
4	Chief Finance Officer	927,155	1,155,251	228,096	20%
5	Chief Operating Officer	19,683,608	21,202,673	1,519,065	7%
6	Chief People Officer	566,065	663,392	97,327	15%
7	Chief Devlopment Officer	340,627	370,095	29,468	8%
8	Chief Enterprise Strategy Officer	1,260,202	1,703,663	443,461	26%
9	Non-Departmental	-	546,833	546,833	100%
10	TOTAL OPERATING EXPENSE	$ 23,627,464	$ 27,483,144	$ 3,855,680	14%

YEAR TO DATE

		ACTUAL Jan-21	BUDGET Jan-21	VARIANCE FAVORABLE (UNFAVORABLE)	% FAVORABLE (UNFAVORABLE)
	OPERATING EXPENSE				
1	Board of Trustees	$ 173,800	$ 242,851	$ 69,051	28%
2	Executive Director	252,017	657,569	405,552	62%
3	Chief Planning and Engagement Officer	423,990	940,817	516,827	55%
4	Chief Finance Officer	927,155	1,155,251	228,096	20%
5	Chief Operating Officer	19,683,608	21,202,673	1,519,065	7%
6	Chief People Officer	566,065	663,392	97,327	15%
7	Chief Devlopment Officer	340,627	370,095	29,468	8%
8	Chief Enterprise Strategy Officer	1,260,202	1,703,663	443,461	26%
9	Non-Departmental	-	546,833	546,833	100%
10	TOTAL OPERATING EXPENSE	$ 23,627,464	$ 27,483,144	$ 3,855,680	14%

BUDGET TO ACTUAL REPORT
(UNAUDITED)
As of January 31, 2021 Preliminary

EXHIBIT 1-5

YEAR TO DATE

		ACTUAL Jan-21	BUDGET Jan-21	VARIANCE FAVORABLE (UNFAVORABLE)	% FAVORABLE (UNFAVORABLE)
	OPERATING REVENUE				
1	Passenger Revenue	$ (2,694,085)	$ (2,637,000)	$ (57,085)	2%
2	Advertising Revenue	(93,523)	(110,000)	16,477	-15%
3	TOTAL OPERATING REVENUE	$ (2,787,608)	$ (2,747,000)	$ (40,608)	1%
	OPERATING EXPENSE				
4	Bus Service	$ 8,609,561	$ 9,194,962	$ 585,401	6%
5	Commuter Rail	1,814,879	2,002,241	187,362	9%
6	Light Rail	2,664,871	3,392,342	727,471	21%
7	Maintenance of Way	2,130,026	1,605,659	(524,367)	-33%
8	Paratransit Service	1,730,367	1,994,146	263,779	13%
9	RideShare/Van Pool Services	197,465	303,713	106,248	35%
10	Microtransit	25,259	258,227	232,968	90%
11	Operations Support	3,981,150	4,502,187	521,037	12%
12	Administration	2,088,802	3,149,970	1,061,168	34%
13	Planning/Capital Development/Real Estate	385,084	532,864	147,780	28%
14	Non-Departmental	-	546,833	546,833	100%
15	TOTAL OPERATING EXPENSE	$ 23,627,464	$ 27,483,144	$ 3,855,680	14%
16	NET OPERATING INCOME (LOSS)	$ (26,415,072)	$ (30,230,144)	$ 3,815,072	-13%
	NON-OPERATING EXPENSE (REVENUE)				
17	Investment Revenue	$ 71,632	$ (400,583)	$ 472,215	-118%
18	Sales Tax Revenue	(26,713,259)	(26,713,257)	(2)	0%
19	Other Revenue	(518,828)	(888,583)	369,755	-42%
20	Fed Operations/Preventative Maint. Revenue	(15,474,625)	(14,292,250)	(1,182,375)	8%
21	Bond Interest	7,371,254	7,264,797	(106,457)	-1%
22	Bond Interest UTCT	162,410	163,966	1,556	1%
23	Bond Cost of Issuance/Fees	-	-	-	
24	Lease Interest	121,860	104,477	(17,383)	-17%
25	Sale of Assets	(10,126)	-	10,126	
26	TOTAL NON-OPERATING EXPENSE	$ (34,989,682)	$ (34,761,434)	$ 228,248	-1%
27	CONTRIBUTION TO RESERVES	$ 8,574,610	$ 4,531,290		

CAPITAL PROJECTS
(UNAUDITED)
As of January 31, 2021 Preliminary

EXHIBIT 1-6

		2021 ACTUAL	ANNUAL BUDGET	PERCENT
	EXPENSES			
1	REVENUE AND NON-REVENUE VEHICLES	$ 3,506	$ 24,058,619	0.0%
2	INFORMATION TECHNOLOGY	35,782	16,060,000	0.2%
3	FACILITIES, MAINTENANCE & ADMIN. EQUIP.	24,144	3,696,000	0.7%
4	CAPITAL PROJECTS	639,993	71,728,984	0.9%
5	AIRPORT STATION RELOCATION	24,745	7,000,000	0.4%
6	STATE OF GOOD REPAIR	578,058	34,923,645	1.7%
7	DEPOT DISTRICT	39,028	32,400,124	0.1%
8	OGDEN/WEBER STATE BRT	0	52,580,513	0.0%
9	TIGER	0	13,170,900	0.0%
10	TOTAL	$ 1,345,255	$ 255,618,785	0.5%
	REVENUES			
11	GRANT	$ 333,886	$ 75,792,972	0.4%
12	STATE CONTRIBUTION	-	9,214,417	0.0%
13	LEASES (PAID TO DATE)	183,441	28,305,720	0.6%
14	BONDS	63,773	51,259,480	0.1%
15	LOCAL PARTNERS	99,224	24,533,340	0.4%
16	UTA FUNDING	664,931	66,512,856	1.0%
17	TOTAL	$ 1,345,255	$ 255,618,785	0.5%

FAREBOX RECOVERY & SPR
(UNAUDITED)
As of January 31, 2021 Preliminary

EXHIBIT 1-7

BY SERVICE

	CURRENT MONTH		YEAR TO DATE	
	Jan-21	Jan-20	2021	2020
UTA				
Fully Allocated Costs	23,627,464	25,041,978	23,627,464	25,041,978
Passenger Farebox Revenue	2,694,085	4,629,020	2,694,085	4,629,020
Passengers	1,602,424	3,869,300	1,602,424	3,869,300
Farebox Recovery Ratio	11.4%	18.5%	11.4%	18.5%
Actual Subsidy per Rider	$13.06	$5.28	$13.06	$5.28
BUS SERVICE				
Fully Allocated Costs	11,905,475	12,278,064	11,905,475	12,278,064
Passenger Farebox Revenue	1,424,247	1,906,175	1,424,247	1,906,175
Passengers	878,752	1,883,829	878,752	1,883,829
Farebox Recovery Ratio	12.0%	15.5%	12.0%	15.5%
Actual Subsidy per Rider	$11.93	$5.51	$11.93	$5.51
LIGHT RAIL SERVICE				
Fully Allocated Costs	6,687,066	6,933,026	6,687,066	6,933,026
Passenger Farebox Revenue	527,588	1,177,495	527,588	1,177,495
Passengers	532,615	1,377,359	532,615	1,377,359
Farebox Recovery Ratio	7.9%	17.0%	7.9%	17.0%
Actual Subsidy per Rider	$11.56	$4.18	$11.56	$4.18
COMMUTER RAIL SERVICE				
Fully Allocated Costs	2,764,260	3,538,805	2,764,260	3,538,805
Passenger Farebox Revenue	321,864	863,828	321,864	863,828
Passengers	111,331	446,426	111,331	446,426
Farebox Recovery Ratio	11.6%	24.4%	11.6%	24.4%
Actual Subsidy per Rider	$21.94	$5.99	$21.94	$5.99
PARATRANSIT				
Fully Allocated Costs	1,900,228	1,939,155	1,900,228	1,939,155
Passenger Farebox Revenue	154,915	333,484	154,915	333,484
Passengers	29,979	68,932	29,979	68,932
Farebox Recovery Ratio	8.2%	17.2%	8.2%	17.2%
Actual Subsidy per Rider	$58.22	$23.29	$58.22	$23.29
RIDESHARE				
Fully Allocated Costs	370,435	352,928	370,435	352,928
Passenger Farebox Revenue	265,471	348,038	265,471	348,038
Passengers	49,747	92,754	49,747	92,754
Farebox Recovery Ratio	71.7%	98.6%	71.7%	98.6%
Actual Subsidy per Rider	$2.11	$0.05	$2.11	$0.05

FAREBOX RECOVERY & SPR
(UNAUDITED)
As of January 31, 2021 Preliminary

EXHIBIT 1-8

BY TYPE

	CURRENT MONTH		YEAR TO DATE	
	Jan-21	Jan-20	2021	2020
FULLY ALLOCATED COSTS				
Bus Service	$11,905,475	$12,278,064	$11,905,475	$12,278,064
Light Rail Service	$6,687,066	$6,933,026	$6,687,066	$6,933,026
Commuter Rail Service	$2,764,260	$3,538,805	$2,764,260	$3,538,805
Paratransit	$1,900,228	$1,939,155	$1,900,228	$1,939,155
Rideshare	$370,435	$352,928	$370,435	$352,928
UTA	$23,627,464	$25,041,978	$23,627,464	$25,041,978
PASSENGER FAREBOX REVENUE				
Bus Service	$1,424,247	$1,906,175	$1,424,247	$1,906,175
Light Rail Service	$527,588	$1,177,495	$527,588	$1,177,495
Commuter Rail Service	$321,864	$863,828	$321,864	$863,828
Paratransit	$154,915	$333,484	$154,915	$333,484
Rideshare	$265,471	$348,038	$265,471	$348,038
UTA	$2,694,085	$4,629,020	$2,694,085	$4,629,020
PASSENGERS				
Bus Service	878,752	1,883,829	878,752	1,883,829
Light Rail Service	532,615	1,377,359	532,615	1,377,359
Commuter Rail Service	111,331	446,426	111,331	446,426
Paratransit	29,979	68,932	29,979	68,932
Rideshare	49,747	92,754	49,747	92,754
UTA	1,602,424	3,869,300	1,602,424	3,869,300
FAREBOX RECOVERY RATIO				
Bus Service	12.0%	15.5%	12.0%	15.5%
Light Rail Service	7.9%	17.0%	7.9%	17.0%
Commuter Rail Service	11.6%	24.4%	11.6%	24.4%
Paratransit	8.2%	17.2%	8.2%	17.2%
Rideshare	71.7%	98.6%	71.7%	98.6%
UTA	11.4%	18.5%	11.4%	18.5%
ACTUAL SUBSIDY PER RIDER				
Bus Service	$11.93	$5.51	$11.93	$5.51
Light Rail Service	$11.56	$4.18	$11.56	$4.18
Commuter Rail Service	$21.94	$5.99	$21.94	$5.99
Paratransit	$58.22	$23.29	$58.22	$23.29
Rideshare	$2.11	$0.05	$2.11	$0.05
UTA	$13.06	$5.28	$13.06	$5.28

SUMMARY OF ACCOUNTS RECEIVABLE EXHIBIT 1-9
(UNAUDITED)
As of January 31, 2021 Preliminary

	Classification	Total	Current	31-60 Days	61-90 Days	90-120 Days	Over 120 Days
1	Federal Grants Government [1]	$ 20,513,723	$ 20,513,723	$ -	$ -	$ -	$ -
2	Sales Tax Contributions	60,605,529	60,605,529	-	-	-	-
3	Warranty Recovery	1,162,559	1,162,559	-	-	-	-
4	Build America Bond Subsidies	1,471,127	1,471,127	-	-	-	-
5	Product Sales and Development	2,990,685	3,029,091	6,537	(131)	2,133	(46,945)
6	Pass Sales	164,528	172,489	(11,436)	58,898	42,931	(98,354)
7	Property Management	95,478	41,527	7,586	34,311	1,824	10,230
8	Vanpool/Rideshare	198,245	57,085	36,725	(23,164)	7,247	120,352
9	Salt Lake City Agreement	2,376,750	1,175,244	364,356	-	1,093,067	(255,917)
10	Planning	6,674	-	-	-	-	6,674
11	Capital Development Agreements	3,981,914	1,950,549	2,031,365	-	-	-
12	Other	1,499,665	1,499,665	-	-	-	-
13	Total	$ 95,066,877	$ 91,678,588	$ 2,435,133	$ 69,914	$ 1,147,202	$ (263,960)

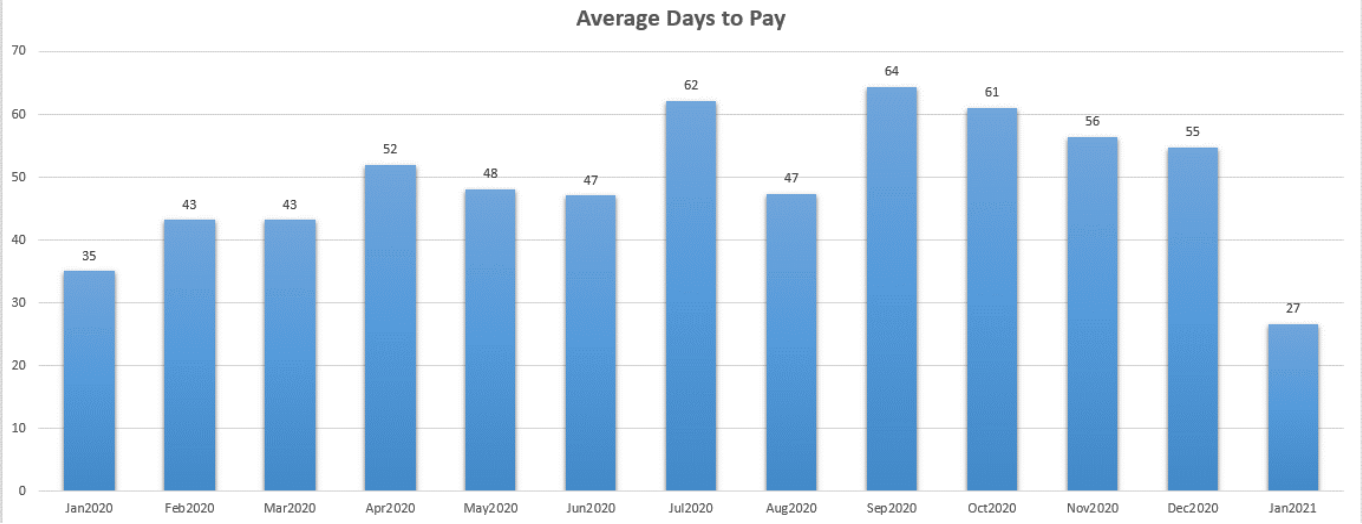
	Percentage Due by Aging					
14	Federal Grants Government [1]	100.0%	0.0%	0.0%	0.0%	0.0%
15	Sales Tax Contributions	100.0%	0.0%	0.0%	0.0%	0.0%
16	Warranty Recovery	100.0%	0.0%	0.0%	0.0%	0.0%
17	Build America Bond Subsidies	100.0%	0.0%	0.0%	0.0%	0.0%
18	Product Sales and Development	101.3%	0.2%	0.0%	0.1%	-1.6%
19	Pass Sales	104.8%	-7.0%	35.8%	26.1%	-59.8%
20	Property Management	43.5%	7.9%	35.9%	1.9%	10.7%
21	Vanpool/Rideshare	28.8%	18.5%	-11.7%	3.7%	60.7%
22	Salt Lake City Agreement	49.4%	15.3%	0.0%	46.0%	-10.8%
23	Planning	0.0%	0.0%	0.0%	0.0%	100.0%
24	Capital Development Agreements	49.0%	51.0%	0.0%	0.0%	0.0%
25	Other	100.0%	0.0%	0.0%	0.0%	0.0%
26	Total	96.4%	2.6%	0.1%	1.2%	-0.3%

[1] Federal preventive maintenance funds, federal RideShare funds, and federal CARES Act funding

SUMMARY OF APPROVED DISBURSEMENTS OVER $200,000
FROM JANUARY 1, 2021 THROUGH JANUARY 31, 2021
(UNAUDITED)

EXHIBIT 1-10

Contract # and Description		Contract Date	Vendor	Check #	Date	Check Total
UT CONTRACT#AR233	DATA COMMUNICATIONS EQUIP & SRVC	6/1/2014	CVE TECHNOLOGY GROUP INC.	885822	1/6/2021	315,424.09
15-13831BM	DIESEL AND UNLEADED FUEL	12/31/2025	KELLERSTRASS OIL	885821	1/6/2021	264,279.79
14-1109TH	ADA PARATRANSIT AND ROUTE DEVIATION	9/1/2014	MV PUBLIC TRANSPORTATION	885820	1/6/2021	255,833.33
R2020-04-02			ROCKY MOUNTAIN POWER	357409	1/6/2021	358,648.27
15-13831BM	DIESEL AND UNLEADED FUEL	12/31/2025	KELLERSTRASS OIL	885881	1/13/2021	281,505.31
R2020-04-02			ROCKY MOUNTAIN POWER	357529	1/13/2021	251,448.19
R2020-04-02			SIEMENS MOBILITY, INC.	885880	1/13/2021	252,799.86
14-1109TH	ADA PARATRANSIT AND ROUTE DEVIATION	9/1/2014	MV PUBLIC TRANSPORTATION	885954	1/20/2021	268,594.77
14-17TH	POSITIVE TRAIN CONTROL	10/6/2014	ROCKY MOUNTAIN SYSTEMS SERVICE	885953	1/20/2021	261,445.56
16-1846TP	ON-CALL MAINTENANCE	10/7/2016	STACY AND WITBECK, INC.	885956	1/20/2021	992,716.70
UT13-064GL	PROJECT MGMT SERVICES	3/3/2014	WSP USA	885955	1/20/2021	381,300.57
18-2741	DEPOT DISTRICT TECHNOLOGY CENTER	8/23/2018	BIG D CONSTRUCTION	886038	1/27/2021	1,848,104.85
18-02925BM	OGDEN - WSU BRT FINAL DESIGN	8/1/2019	JACOBS ENGINEERING	357822	1/27/2021	537,898.95
18-2705TP	AIRPORT STATION RELOCATION	5/4/2018	KIEWIT INFRASTRUCTURE WEST CO.	886035	1/27/2021	328,547.41
R2020-04-02			ROCKY MOUNTAIN POWER	357821	1/27/2021	299,668.10
16-1846TP	ON-CALL MAINTENANCE	10/7/2016	STACY AND WITBECK, INC.	886036	1/27/2021	347,330.12
01-085JL	TRANSIT SYSTEM SOFTWARE		TRAPEZE SOFTWARE GROUP, INC.	886034	1/27/2021	282,949.15
18-2800	EAST VILLAGE 3 PARKING STRUCTURE	8/3/2020	WADSWORTH BROTHERS CONSTRUCTION	357909	1/27/2021	696,885.44
UT13-064GL	PROJECT MGMT SERVICES	3/3/2014	WSP USA	886037	1/27/2021	352,028.15



MEMORANDUM TO THE BOARD

TO: Utah Transit Authority Board of Trustees
THROUGH: Carolyn Gonot, Executive Director
FROM: Mary DeLoretto, Chief Service Development Officer
PRESENTER(S): Mary DeLoretto, Chief Service Development Officer
Janelle Robertson, Project Manager

BOARD MEETING DATE: March 10, 2021

SUBJECT:	**Ogden to Weber State (WSU) Bus Rapid Transit (BRT) Construction Manager/General Contractor (CM/GC) Phase 2 Construction Services Amendment (Stacy and Witbeck, Inc.)**
AGENDA ITEM TYPE:	**Expense Contract Change Order**
RECOMMENDATION:	Approve contract amendment and authorize Executive Director to execute the contact and associated disbursements with Stacy and Witbeck, Inc. in the amount of $60,909,292 for Phase 2 construction services for the Ogden – WSU BRT Project.
BACKGROUND:	The Ogden/Weber State University (WSU) Bus Rapid Transit (BRT) is a 5.3-mile project connecting from the Ogden FrontRunner commuter rail station to Weber State University and McKay Dee Hospital. It will include 13 stations and exclusive bus lanes from 32nd Street & Harrison up to the Dee Events Center. This line will have 10-minute service from 8:00 am to 5:00 pm with 15-minute service the remainder of the day on weekdays, operating a total of 20 hours a day. Weekend service will run every 15 to 30 minutes. The project will include transit signal priority and uniquely branded stations and vehicles. The Ogden-WSU BRT Project has completed the environmental approval with the Federal Transit Administration (FTA) and is in the Project Development phase of the Small Starts Grant Agreement (SSGA) process. $78.3 million of the $120.5 million budget is anticipated to come from a Small Starts Grant. The project has previously applied for this grant and received a “medium rating” which is favorable to receiving a grant. UTA issued a CM/GC Request for Proposals on September 26, 2019 and received two proposals on October 25, 2019. A selection committee consisting of representatives from the project partner organizations selected Stacy & Witbeck on November 13, 2019. They received both the highest technical score and lowest price on their proposal. They were awarded the Phase 1 pre-construction services contract in December 2019.

	The contractor's quick involvement in the project during the pre-construction phase has provided UTA with design feedback, cost, and schedule information necessary to keep the Ogden-WSU BRT Project moving through the SSGA process.	
DISCUSSION:	Project design is complete, property acquisitions and utility relocations have begun, and bus procurement has started. UTA is now ready to issue the Phase 2 contract with Stacy & Witbeck for construction services. The Project has a goal to be open August of 2023 change day to capitalize on student riders at the beginning of the school year. The next phase of the SSGA process is to submit the final grant request, which is scheduled for this spring with an anticipated grant in summer 2021. In December 2020, UTA received a Letter of No Prejudice (LONP) which allows the project to progress through 2021 and all costs will be eligible expenses for the future grant; should the grant not be approved, UTA will be responsible for anticipated federal funds. After the contract is signed, the contractor's Notice to Proceed (NTP) will only authorize the LONP work of $21.3 million. Once we receive the SSGA the full contract amount will be authorized in a subsequent NTP. UTA has verified that there is enough local match to cover costs through the LONP phase to the end of 2021. We have utilized an independent cost estimating (ICE) team through the WSP program management contract to assist with cost negotiations to come to the final agreed to Guaranteed Maximum Price (GMP). The ICE team's cost estimate is 6.9% lower that the GMP. Typically, up to 10% difference is considered acceptable. By approving this contract, Phase 2 (major) construction can begin in spring 2021.	
CONTRACT SUMMARY:	Contractor Name: Stacy & Witbeck	
	Contract Number: 19-03114BM	Existing Contract Value: $662,884
	Base Contract Effective Dates: December 2019-March 2021	Extended Contract Dates: March 2021 - April 2024
	Amendment Amount: $60,909,292	New/Total Amount Contract Value: $61,572,176
	Procurement Method: RFP/Lump Sum	Funding Sources: Federal and Local
ALTERNATIVES:	If this contract is not executed this would cause delays in opening date of the project. This would also cause increased costs due to high escalation values in the current construction market. Moreover, it would jeopardize the grant process with the Federal Transit Administration.	

FISCAL IMPACT:	This project is included in UTA's approved five-year capital plan. Local funding commitments are identified in a signed Memorandum of Understanding and Lease/License agreements with the project partners.
ATTACHMENTS:	**1)** Ogden to Weber State (WSU) Bus Rapid Transit (BRT) Construction Manager/General Contractor (CM/GC) Phase 2 Construction Services Amendment

CONSTRUCTION SERVICES AMENDMENT

Ogden WSU Bus Rapid Transit (BRT) Project (CM/GC)
PHASE 2 AMENDMENT

UTA Contract Number 19-03114-3

This Construction Manager / General Contractor Agreement – Phase 2 Construction Services Amendment ("**Amendment**") is between UTAH TRANSIT AUTHORITY, a public transit district organized under the laws of the State of Utah ("**UTA**"), and STACY AND WITBECK, Inc., a Construction company with business headquarters located in Alameda, California ("**Contractor**").

RECITALS

A) UTA is developing a project to construct the Ogden WSU BRT Project (the "Project").

B) Pursuant to Request for Proposals No. 19-03114BM, UTA and Contractor entered into the Construction Manager/General Contractor Agreement – Phase 1 Pre-Construction Services, dated December 23, 2019 (the "**Phase 1 Agreement**").

C) As an interim measure, UTA authorized Contractor to perform preliminary work under Amendment 1 to the Phase 1Agreement, in preparation for the execution of a Phase 2 Construction Services Amendment; and

D) Pursuant to the Phase 1 Agreement, UTA and Contractor have negotiated and agreed on the lump sum price, schedule, and scope of work for the construction services for the Project, and desire to execute a Phase 2 Construction Services Amendment to the Phase 1 Agreement in order to include that scope, schedule, and price.

AGREEMENT

Therefore, the parties agree as follows:

1. **Contract Nomenclature**: Under the CM/GC method of contracting, the Phase 2 Construction Services Amendment is actually an amendment to the Phase 1 Pre-Construction Services Contract. Since there was an interim Amendment 1 to the Phase I contract described in paragraph (C) above, this Amendment is technically Amendment 2 to the Phase 1 Pre-Construction Services Contract. Nevertheless, since this is also the Amendment which officially initiates Phase 2 Construction Services, it shall be referred to in this document as the Phase 2 Construction Services Amendment or merely the "Amendment", "Contract" or "Agreement". This Amendment incorporates all terms and conditions contained in the Phase 1 Contract as well as the subsequent amendments executed prior to the date of this Amendment.

2. **Scope of Work.** Contractor shall perform the Work. In the Contract Documents, "**Work**" means all construction and other services required by the Contract Documents, including procuring and furnishing all material, equipment, services and labor reasonably inferable from the Contract Documents as necessary to complete the Project

3. **Schedule.** (a) Contractor shall commence the Work (which, for purposes of this Section, shall not include the Phase 1 Work) within seven (7) days of Contractor's receipt of a Notice to Proceed ("**NTP**") from UTA. UTA is not required to issue an NTP until all insurance, bonding, and other required documentation is submitted and deemed acceptable by UTA.

(b) UTA issued a limited NTP for the work covered under Amendment 1 and may issue additional limited Notices to Proceed on specific portions of the Work covered under this Amendment 2. Issuance of a limited NTP will not be deemed to require UTA to issue any subsequent NTPs, and will not be deemed to obligate UTA to complete the Project or to pay Contractor for any portion of the Work not encompassed by an NTP issued by UTA.

(c) The Contractor shall achieve Substantial Completion of the entire Work no later than June 1, 2023 (the "**Substantial Completion Date**"). In the Contract Documents, "**Substantial Completion**" means that the Work is sufficiently complete in accordance with the Contract Documents so that UTA can occupy and use the Project for system integration testing, training, and pre-revenue operations.

(d) The Contractor shall achieve Revenue Readiness of the Work no later than August 7, 2023 (the "**Revenue Operations Date**"). In the Contract Documents, "Revenue Readiness" means that the Work is sufficiently complete in accordance with the Contract Documents so that the Project is ready for public use.

(e) The Contractor shall achieve Final Completion of the Work as expeditiously as reasonably practicable, but in no event later than October 9, 2023 (the **"Final Completion Date"**). In this Agreement, "**Final Completion**" means that the Work is complete in accordance with the Contract Documents, including but not limited to, final completion of all punch list items and delivery of all documents in accordance with the General Conditions attached as Exhibit C.

(f) Time is of the essence with respect to the dates set forth in this section.

(g) Contractor acknowledges that if Substantial Completion is not attained by the Guaranteed Substantial Completion Date, UTA will suffer damages that are difficult to measure and determine with precision. If Substantial Completion is not attained by the Guaranteed Substantial Completion Date, Contractor shall pay UTA $1,000 as liquidated damages for each day that Substantial Completion extends beyond the Substantial Completion Date. Additional liquidated damage information is identified in the General Conditions.

4. **Compensation.** (a) Compensation shall consist of both a lump sum amount paid incrementally in progress payments as described in Exhibit A, and also an incentive fee pool as described in the following paragraph and also in Exhibit G. For purposes of this Amendment, the Contract Price does not include the Phase 1 Contract Price, which was defined by, and paid under, the Phase 1 Agreement.

(b) For purposes of calculating changes in the Contract Price pursuant to Section 7.6 of the General Conditions, Contractor will be entitled to a markup of 7.5% for home office overhead and profit. Subcontractors will be entitled to a markup of 7.5% for overhead and profit, but the cumulative markup may not exceed 20.94%.

(c) The procedures for invoicing and payment are set forth in Article 4 of the General Conditions.

5. **Incentive Fee Program.** The Contractor is eligible to earn a financial incentive based on performance. The incentive program allows UTA and stakeholders to subjectively rate the Contractor's performance in various critical areas of the project. The program is included as Exhibit G.

6. **Contract Documents**. (a) The Contract Documents consist of the following:

    (1) All written amendments and Change Orders to this Amendment executed in accordance with Article 7 of the General Conditions;

    (2) This Amendment, including its exhibits and Federal Clauses, and specifically including the General Conditions attached as Exhibit C;

(3) All written amendments and Change Orders to the Phase 1 Agreement, executed in accordance with the Phase 1 Agreement;

(4) The Phase 1 Agreement, including its exhibits;

(5) The project 100% Construction Documents including the design and specifications attached as Exhibits D and E;

(6) The project schedule attached as Exhibit F;

(7) Incentive Fee Program attached as Exhibit G;

(8) The Contractor's Proposal in response to the RFP; and

(9) The RFP.

(b) The parties intend that the Contract Documents include and provide for all aspects of the Work that are necessary for the proper initiation, performance, and Final Completion of the Work by the Contractor, by the Final Completion Date, and for the Contract Price. The parties intend that the Contract Documents be interpreted in harmony so as to avoid conflict, with words and phrases interpreted in a manner consistent with construction industry standards.

(c) If any terms of the Contract Documents contradict any other terms, the terms contained in the more recent Contract Document will govern.

(d) Contractor acknowledges that, prior to the execution of this Agreement, it has carefully reviewed the Contract Documents for errors, omissions, conflicts or ambiguities (each, a "**Discrepancy**"), and is not aware of any Discrepancies as of the execution of this Agreement. If the Contractor becomes aware of a Discrepancy, the Contractor shall immediately notify UTA's Project Manager of that Discrepancy in writing. UTA's Project Manager shall promptly resolve the Discrepancy in writing. Contractor's failure to promptly notify UTA of an apparent discrepancy will be deemed a waiver of Contractor's right to seek an adjustment of the Contract Price or Contract Times due to the discrepancy.

(e) The Contract Documents form the entire contract between UTA and the Contractor and by incorporation in this Agreement are as fully binding on the parties as if repeated in this Agreement. No oral representations or other agreements have been made by the parties except as specifically stated in the Contract Documents.

7. **Representatives of the Parties.** (a) UTA designates Janelle Robertson as its Project Manager, and Grey Turner as its Senior Representative. UTA's Contract Administrator for this Agreement is Brian Motes. Questions or correspondence regarding the contractual aspects of this Agreement should be directed to Mr. Motes, at the address set forth in section 9.

(b) Contractor designates Keith Tarkalson as its Project Manager, and Clayton Gilliland as its Senior Representative.

8. **Key Personnel.** (a) Contractor shall ensure that the following Key Personnel remain assigned to the Project until Final Completion:

(1) Project Manager : Keith Tarkalson

(2) Construction Manager : Maverick Gibbons

(3) Utilities/Third Party Manager : Rod Brocious

(4) Maintenance of Traffic Manager : Billy Johns

(5) Public Relations Manager : Andy Neff

(b) This Agreement was awarded based on Contractor's representation that such key personnel would be engaged in their respective capacities, at the commitment levels indicated, for the full duration of the Project. Contractor shall not make changes in the Key Personnel staffing without the written approval of UTA, such approval not to be withheld unreasonably. Any replacements of key personnel must have the same substantive and qualitative experience as the individuals identified in Contractor's Proposal.

(6) **Bonds and Insurance.** (a) Contractor shall obtain and maintain the insurance coverages set forth in Exhibit B, and comply with the obligations set forth in Exhibit B.

(b) The Contractor shall provide to UTA a performance bond and a payment bond (the "Bonds") issued by a surety doing business in Salt Lake County, Utah, and listed in the then current US Department of the Treasury's Circular 570. The Bonds must each be in an amount equal to 100% of the Contract Price, and in a form acceptable to UTA. Contractor shall provide the Bonds to UTA prior to commencing any Work.

(c) Upon Final Completion of the Work, UTA may, in its sole discretion, allow Contractor to replace the performance bond with a warranty bond in an amount and in a form acceptable to UTA.

(7) **Value Engineering.** Savings resulting from an approved Value Engineering Change Proposal (as defined in Article 10 of the General Conditions) subsequent to the execution of this Amendment, will be allocated 70% to UTA, and 30% to Contractor. This provision governs over conflicting language in the General Conditions.

(8) **Notices.** (a) To be deemed valid, all notices, requests, claims, demands and other communications between the parties ("**Notices**") must be in writing and addressed as follows:

If to Utah Transit Authority:
Utah Transit Authority
ATTN: Brian Motes
669 West 200 South
Salt Lake City, UT 84101

With a required copy to:
Utah Transit Authority
ATTN: General Counsel
669 West 200 South
Salt Lake City, UT 84101.

If to the Contractor:
Stacy and Witbeck
Attn: Keith Tarkalson
1958 W North Temple
Salt Lake City, UT 84116

(b) To be deemed valid, Notices must be given by one of the following methods: (i) by delivery in person (ii) by a nationally recognized next day courier service, (iii) by first class, registered or certified mail, postage prepaid.

(c) Either party may change the address at which that party desires to receive written notice by delivery of Notice of such change to the party as set forth above. Notices will be deemed effective on delivery to the notice address then applicable for the party to which the Notice is directed, provided, however, that refusal to accept delivery of a Notice or the inability to deliver a Notice because of an address change that was not properly communicated shall not defeat or delay the effectiveness of a Notice.

(9) **Counterparts.** The parties may execute this Amendment in any number of counterparts, each of which when executed and delivered will constitute a duplicate original, but all counterparts together will constitute a single agreement.

(10) **Effectiveness; Date.** The Amendment will become effective when all parties have fully signed it. The date of this Amendment will be the date it is signed by the last individual to sign it (as indicated by the date associated with that individual's signature).

Each individual is signing this Amendment on the date stated opposite that individual's signature.

UTAH TRANSIT AUTHORITY

By: _____ Date: _____
Name: _____
Title: _____

By: _____ Date: _____
Name: _____
Title: _____

By: _____ Date: _____
Name: _____
Title: _____

Approved as to Legal Form:

By: Michael L. Bell Digitally signed by Michael L. Bell Date: 2021.02.22 13:22:04 -07'00'
Utah Transit Authority
Legal Counsel

STACY AND WITBECK, Inc.

By: _____ Date: _____
Name: Keith Tarkalson
Title: Area Manager

Contractor's Federal ID Number: 94-2787950

Exhibit A

Phase 2 GMP Schedule of Values

Stacy and Witbeck, Inc.

UTA Contract Number: 19-3114BM

OGDEN WSU BRT (CM/GC)

Phase 2 - Construction Services Schedule of Values

CHANGE TYPE	CHANGE NO	SCC #	SUB SCC #	UTA ACCOUNT CODE	FUNDING	ITEM NO.	DESCRIPTION	UOM	CONTRACT QTY	CONTRACT UP	CONTRACT TOTAL	NOTES
		10					GUIDEWAY & TRACK ELEMENTS					
		10.02					GUIDEWAY: AT-GRADE SEMI-EXCLUSIVE (ALLOWS CROSS-TRAFFIC)					
							EARTHWORK EXCAVATION					
ADD	2	10.02			BASE	004	EARTHWORK EXCAVATION - GUIDEWAY - BASE	CY	16,228.00	24.14	$ 391,819.73	
ADD	2	10.02			DEE STA	005	EARTHWORK EXCAVATION - GUIDEWAY - DEE STA	CY	1,237.00	17.85	$ 22,077.56	
							EARTHWORK EMBANKMENT - ROADWAY - BASE					
ADD	2	10.02			BASE	007	EARTHWORK EMBANKMENT - GUIDEWAY - BASE	CY	6,428.00	11.14	$ 71,585.42	
ADD	2	10.02			DEE STA	008	EARTHWORK EMBANKMENT - GUIDEWAY - DEE STA	CY	2,735.00	18.50	$ 50,610.26	
							SUBGRADE PREPARATION					
ADD	2	10.02			BASE	010	SUBGRADE PREPARATION - GUIDEWAY - BASE	SY	15,224.00	10.60	$ 161,432.72	
ADD	2	10.02			DEE STA	011	SUBGRADE PREPARATION - GUIDEWAY - DEE STA	SY	4,842.00	12.06	$ 58,394.15	
							CONCRETE CURB & GUTTER					
ADD	2	10.02			BASE	013	CONCRETE CURB & GUTTER - GUIDEWAY - BASE	LF	12,729.00	41.09	$ 523,078.72	
ADD	2	10.02			DEE STA	014	CONCRETE CURB & GUTTER - GUIDEWAY - DEE STA	LF	1,650.00	50.20	$ 82,828.04	
							CONCRETE CURB TRANSITIONS					
ADD	2	10.02			BASE	016	CONCRETE CURB - TRANSITIONS - GUIDEWAY - BASE	EA	38.00	998.14	$ 37,929.23	
							CONCRETE CURB MISC					
ADD	2	10.02			BASE	018	PLOWABLE END SECTIONS	EA	26.00	2,720.65	$ 70,736.95	
							GRANULAR BORROW					
ADD	2	10.02			BASE	020	GRANULAR BORROW - GUIDEWAY - BASE	CY	5,809.00	50.01	$ 290,482.68	
ADD	2	10.02			DEE STA	021	GRANULAR BORROW - GUIDEWAY - DEE STA	CY	1,755.00	53.66	$ 94,176.38	
							UNTREATED BASE COURSE					
ADD	2	10.02			BASE	023	UNTREATED BASE COURSE - GUIDEWAY - BASE	CY	2,478.00	68.34	$ 169,352.56	
ADD	2	10.02			DEE STA	024	UNTREATED BASE COURSE - GUIDEWAY - DEE STA	CY	782.00	73.99	$ 57,858.88	
							ASPHALT PAVEMENT HMA 1/2-INCH					
ADD	2	10.02			BASE	026	ASPHALT PAVEMENT HMA 1/2-INCH - GUIDEWAY - BASE	TON	2,538.00	100.04	$ 253,907.17	
ADD	2	10.02			DEE STA	027	ASPHALT PAVEMENT HMA 1/2-INCH - GUIDEWAY - DEE STA	TON	500.00	103.57	$ 51,783.01	
							BONDED WEARING COURSE					
ADD	2	10.02			BASE	029	BONDED WEARING COURSE 1 INCH - GUIDEWAY - BASE	SY	14,336.00	7.66	$ 109,791.73	
							PORTLAND CEMENT CONCRETE PAVEMENT 8-INCH THICK					
ADD	2	10.02			BASE	031	PCCP 8-INCH - GUIDEWAY - BASE	SY	5,320.00	80.77	$ 429,711.71	
ADD	2	10.02			DEE STA	032	PCCP 8-INCH - GUIDEWAY - DEE STA	SY	2,840.00	75.10	$ 213,279.54	
							CONCRETE BARRIER					
ADD	2	10.02			BASE	034	CIP CONC CONSTANT SLOPE HALF BARRIER 42-INCH (seg 3)	LF	445.00	125.55	$ 55,870.14	
ADD	2	10.02			BASE	035	CIP CONSTANT SLOPE BARRIER 42-INCH, APPROACH END SECTION (seg 3)	EA	2.00	3,047.54	$ 6,095.08	
		10.03					GUIDEWAY: AT-GRADE IN MIXED TRAFFIC					
							REMOVE AC/PCCP PAVEMENT					
ADD	2	10.03			BASE	038	ROTOMILL ASPHALT PAVEMENT -PROFILING - GUIDEWAY	SY	5,805.00	4.61	$ 26,779.09	
		10.08					GUIDEWAY: RETAINED CUT OR FILL					

CHANGE TYPE	CHANGE NO	SCC #	SUB SCC #	UTA ACCOUNT CODE	FUNDING	ITEM NO.	DESCRIPTION	UOM	CONTRACT QTY	CONTRACT UP	CONTRACT TOTAL	NOTES
							CAST-IN-PLACE WALLS- DEE HUB					
ADD	2	10.08			DEE STA	041	SUPPORT	SF	1,362.00	1.94	$ 2,643.14	
ADD	2	10.08			DEE STA	042	EXCAVATION	CY	99.00	87.83	$ 8,695.12	
ADD	2	10.08			DEE STA	043	BACKFILL	CY	126.00	98.14	$ 12,365.52	
ADD	2	10.08			DEE STA	044	CIP CONCRETE WALL	CY	81.00	1,463.13	$ 118,513.65	
ADD	2	10.08			DEE STA	045	REBAR	LBS	6,026.00	1.64	$ 9,897.79	
ADD	2	10.08			DEE STA	046	RESTORATION	LS	1.00	2,420.68	$ 2,420.68	
							CAST-IN-PLACE WALLS- LINDQUIST PLAZA					
ADD	2	10.08			BASE	048	SUPPORT	SF	2,899.00	1.92	$ 5,569.71	
ADD	2	10.08			BASE	049	EXCAVATION	CY	176.00	92.96	$ 16,361.54	
ADD	2	10.08			BASE	050	BACKFILL	CY	316.00	102.61	$ 32,425.39	
ADD	2	10.08			BASE	051	CIP CONCRETE WALL	CY	140.00	1,911.79	$ 267,650.97	
ADD	2	10.08			BASE	052	REBAR	LBS	11,920.00	1.66	$ 19,793.16	
ADD	2	10.08			BASE	053	RESTORATION	LS	1.00	5,173.37	$ 5,173.37	
							CAST-IN-PLACE WALLS- WSU STUDENT SERVICES					
ADD	2	10.08			BASE	055	CAST-IN-PLACE WALLS- WSU STUDENT SERVICES WALL RECONSTRUCTION	LS	1.00	3,344.00	$ 3,344.00	
							CAST-IN-PLACE WALLS- CENTRAL CAMPUS MEDALLION					
ADD	2	10.08			BASE	057	SUPPORT	SF	1,929.00	1.74	$ 3,348.42	
ADD	2	10.08			BASE	058	EXCAVATION	CY	258.00	79.99	$ 20,636.22	
ADD	2	10.08			BASE	059	BACKFILL	CY	227.00	97.62	$ 22,160.47	
ADD	2	10.08			BASE	060	CIP CONCRETE WALL	CY	110.00	2,185.72	$ 240,428.79	
ADD	2	10.08			BASE	061	REBAR	LBS	9,569.00	1.62	$ 15,522.99	
ADD	2	10.08			BASE	062	RESTORATION	LS	1.00	2,644.03	$ 2,644.03	
							SHEET PILE WALLS					
ADD	2	10.08			BASE	064	SUPPORT	SF	3,973.00	0.39	$ 1,562.16	
ADD	2	10.08			BASE	065	EXCAVATION	CY	64.00	78.02	$ 4,993.27	
ADD	2	10.08			BASE	066	SHEET PILE WALL SUB	SF	3,973.00	56.67	$ 225,131.08	
ADD	2	10.08			BASE	067	LOCATE, CUT, AND CAP BURIED ELECTRIC LINE	LS	1.00	3,018.30	$ 3,018.30	
ADD	2	10.08			BASE	068	RESTORATION	LS	1.00	6,598.00	$ 6,598.00	
							MSE WALLS					
ADD	2	10.08			BASE	070	SUPPORT	SF	4,087.00	0.55	$ 2,241.07	
ADD	2	10.08			BASE	071	EXCAVATION	CY	1,244.00	51.95	$ 64,621.31	
ADD	2	10.08			BASE	072	MSE WALL (INC B'FILL)	SF	4,087.00	76.53	$ 312,786.42	
ADD	2	10.08			BASE	073	CIP BARRIER/COPING/MOMENT SLAB	CY	19.00	2,407.68	$ 45,745.94	
ADD	2	10.08			BASE	074	REBAR, MSE WALL COPING/MOMENT SLABS/BARRIER/FASCIAS	LBS	1,749.00	1.78	$ 3,109.88	
ADD	2	10.08			BASE	075	RESTORATION	LS	1.00	4,213.55	$ 4,213.55	
							BOULDER/ROCKERY RETAINING WALL					
ADD	2	10.08			BASE	077	EXCAVATION	CY	635.00	43.47	$ 27,606.50	
ADD	2	10.08			BASE	078	ROCK WALL INCL BACKFILL	SF	1,215.00	65.34	$ 79,386.52	See Shared Risk Program for boulder salvage
ADD	2	10.08			BASE	079	RESTORATION	LS	1.00	511.10	$ 511.10	
		20					**STATIONS, STOPS, TERMINALS, INTERMODAL**					
		20.01					**AT-GRADE STATION, STOP, SHELTER, MALL, TERMINAL, PLATFORM**					
							STATION MOCK-UP					
ADD	2	20.01			BASE	083	Station Mock Up - SITEWORK	LS	1.00	6,751.27	$ 6,751.27	

CHANGE TYPE	CHANGE NO	SCC #	SUB SCC #	UTA ACCOUNT CODE	FUNDING	ITEM NO.	DESCRIPTION	UOM	CONTRACT QTY	CONTRACT UP	CONTRACT TOTAL	NOTES
ADD	2	20.01			BASE	084	Station Mock Up - CONCRETE	LS	1.00	18,556.74	$ 18,556.74	
ADD	2	20.01			BASE	085	Station Mock Up - ACCESSORIES	LS	1.00	10,057.06	$ 10,057.06	
ADD	2	20.01			BASE	086	Station Mock Up - CANOPY	LS	1.00	17,281.66	$ 17,281.66	
ADD	2	20.01			BASE	087	Remove and Dispose of Station Mockup	LS	1.00	6,110.72	$ 6,110.72	
							McKAY-DEE HOSPITAL					
ADD	2	20.01			BASE	089	McKAY-DEE HOSPITAL - SITEWORK	LS	1.00	21,351.56	$ 21,351.56	
ADD	2	20.01			BASE	090	McKAY-DEE HOSPITAL - CONCRETE	LS	1.00	62,939.40	$ 62,939.40	
ADD	2	20.01			BASE	091	McKAY-DEE HOSPITAL - ACCESSORIES	LS	1.00	54,712.25	$ 54,712.25	
ADD	2	20.01			BASE	092	McKAY-DEE HOSPITAL - CANOPY	LS	1.00	90,128.73	$ 90,128.73	
ADD	2	20.01			BASE	093	McKAY-DEE HOSPITAL - ELECTRICAL	LS	1.00	96,505.12	$ 96,505.12	CVE Price includes Allowance of $135,000 to procure and install 15 Alerton Controllers, not in 100% Design, UTA to procure the controllers and CVE will wire, install, and startup; will be cleaned-up at RFC. For all station electrical items.
							WSU DEE EVENTS- OPERATOR RELIEF BUILDING					
ADD	2	20.01			DEE STA	095	WSU DEE EVENTS- OPERATOR RELIEF BUILDING	LS	1.00	151,889.03	$ 151,889.03	No info in 100% Design for Building Specifications. Priced as using the same unit as was installed for latest UTA Airport LRT Expansion. WalCon Model-2S-CW-2L-1U-NC-FR-ADA /W Assembly Area. 2.1 Driver Relief Station. Bid as 3 room prefabricated building consisting of 2 restrooms (one of which is ADA compliant) and a driver break room.
							NB WSU DEE EVENTS					
ADD	2	20.01			DEE STA	097	NB WSU DEE EVENTS - SITEWORK	LS	1.00	22,023.87	$ 22,023.87	
ADD	2	20.01			DEE STA	098	NB WSU DEE EVENTS - CONCRETE	LS	1.00	53,277.34	$ 53,277.34	
ADD	2	20.01			DEE STA	099	NB WSU DEE EVENTS - ACCESSORIES	LS	1.00	56,224.43	$ 56,224.43	
ADD	2	20.01			DEE STA	100	NB WSU DEE EVENTS - CANOPY	LS	1.00	113,163.39	$ 113,163.39	
ADD	2	20.01			DEE STA	101	NB WSU DEE EVENTS - ELECTRICAL	LS	1.00	93,254.44	$ 93,254.44	
							SB WSU DEE EVENTS					
ADD	2	20.01			DEE STA	103	SB WSU DEE EVENTS - SITEWORK	LS	1.00	22,366.74	$ 22,366.74	
ADD	2	20.01			DEE STA	104	SB WSU DEE EVENTS - CONCRETE	LS	1.00	53,310.91	$ 53,310.91	
ADD	2	20.01			DEE STA	105	SB WSU DEE EVENTS - ACCESSORIES	LS	1.00	54,765.01	$ 54,765.01	
ADD	2	20.01			DEE STA	106	SB WSU DEE EVENTS - CANOPY	LS	1.00	113,163.39	$ 113,163.39	
ADD	2	20.01			DEE STA	107	SB WSU DEE EVENTS - ELECTRICAL	LS	1.00	109,399.83	$ 109,399.83	
							NB WSU VILLAGE DRIVE					
ADD	2	20.01			BASE	109	NB WSU VILLAGE DR - SITEWORK	LS	1.00	21,422.31	$ 21,422.31	
ADD	2	20.01			BASE	110	NB WSU VILLAGE DR - CONCRETE	LS	1.00	51,701.87	$ 51,701.87	
ADD	2	20.01			BASE	111	NB WSU VILLAGE DR - ACCESSORIES	LS	1.00	51,686.91	$ 51,686.91	
ADD	2	20.01			BASE	112	NB WSU VILLAGE DR - CANOPY	LS	1.00	90,128.73	$ 90,128.73	
ADD	2	20.01			BASE	113	NB WSU VILLAGE DR - ELECTRICAL	LS	1.00	96,505.12	$ 96,505.12	
							SB WSU VILLAGE DRIVE					
ADD	2	20.01			BASE	115	SB WSU VILLAGE DR - SITEWORK	LS	1.00	20,406.44	$ 20,406.44	
ADD	2	20.01			BASE	116	SB WSU VILLAGE DR - CONCRETE	LS	1.00	52,607.04	$ 52,607.04	
ADD	2	20.01			BASE	117	SB WSU VILLAGE DR - ACCESSORIES	LS	1.00	53,296.02	$ 53,296.02	
ADD	2	20.01			BASE	118	SB WSU VILLAGE DR - CANOPY	LS	1.00	90,128.73	$ 90,128.73	
ADD	2	20.01			BASE	119	SB WSU VILLAGE DR - ELECTRICAL	LS	1.00	84,571.58	$ 84,571.58	
							NB WSU CENTRAL					
ADD	2	20.01			BASE	121	NB WSU CENTRAL - SITEWORK	LS	1.00	20,999.29	$ 20,999.29	
ADD	2	20.01			BASE	122	NB WSU CENTRAL - CONCRETE	LS	1.00	54,283.97	$ 54,283.97	
ADD	2	20.01			BASE	123	NB WSU CENTRAL - ACCESSORIES	LS	1.00	37,502.23	$ 37,502.23	
ADD	2	20.01			BASE	124	NB WSU CENTRAL - CANOPY	LS	1.00	114,210.72	$ 114,210.72	
ADD	2	20.01			BASE	125	NB WSU CENTRAL - ELECTRICAL	LS	1.00	93,254.44	$ 93,254.44	

CHANGE TYPE	CHANGE NO	SCC #	SUB SCC #	UTA ACCOUNT CODE	FUNDING	ITEM NO.	DESCRIPTION	UOM	CONTRACT QTY	CONTRACT UP	CONTRACT TOTAL	NOTES
							SB WSU CENTRAL					
ADD	2	20.01			BASE	127	SB WSU CENTRAL - SITEWORK	LS	1.00	19,728.06	$ 19,728.06	
ADD	2	20.01			BASE	128	SB WSU CENTRAL - CONCRETE	LS	1.00	53,656.50	$ 53,656.50	
ADD	2	20.01			BASE	129	SB WSU CENTRAL - ACCESSORIES	LS	1.00	53,336.91	$ 53,336.91	
ADD	2	20.01			BASE	130	SB WSU CENTRAL - CANOPY	LS	1.00	114,210.72	$ 114,210.72	
ADD	2	20.01			BASE	131	SB WSU CENTRAL - ELECTRICAL	LS	1.00	109,399.83	$ 109,399.83	
							36TH/HARRISON					
ADD	2	20.01			BASE	133	36TH/HARRISON - SITEWORK	LS	1.00	25,071.43	$ 25,071.43	
ADD	2	20.01			BASE	134	36TH/HARRISON - CONCRETE	LS	1.00	79,377.84	$ 79,377.84	
ADD	2	20.01			BASE	135	36TH/HARRISON - ACCESSORIES	LS	1.00	57,530.06	$ 57,530.06	
ADD	2	20.01			BASE	136	36TH/HARRISON - CANOPY	LS	1.00	136,972.85	$ 136,972.85	
ADD	2	20.01			BASE	137	36TH/HARRISON - ELECTRICAL	LS	1.00	107,175.11	$ 107,175.11	
ADD	2	20.01			BASE	138	36TH/HARRISON - SNOW MELT	LS	1.00	39,514.48	$ 39,514.48	
							32ND/HARRISON					
ADD	2	20.01			BASE	140	32ND/HARRISON - SITEWORK	LS	1.00	23,701.75	$ 23,701.75	
ADD	2	20.01			BASE	141	32ND/HARRISON - CONCRETE	LS	1.00	75,131.71	$ 75,131.71	
ADD	2	20.01			BASE	142	32ND/HARRISON - ACCESSORIES	LS	1.00	59,700.22	$ 59,700.22	
ADD	2	20.01			BASE	143	32ND/HARRISON - CANOPY	LS	1.00	136,972.85	$ 136,972.85	
ADD	2	20.01			BASE	144	32ND/HARRISON - ELECTRICAL	LS	1.00	107,175.11	$ 107,175.11	
ADD	2	20.01			BASE	145	32ND/HARRISON - SNOW MELT	LS	1.00	39,514.48	$ 39,514.48	
							NB 28TH/HARRISON					
ADD	2	20.01			BASE	147	NB 28TH/HARRISON - SITEWORK	LS	1.00	17,532.58	$ 17,532.58	
ADD	2	20.01			BASE	148	NB 28TH/HARRISON - CONCRETE	LS	1.00	45,118.06	$ 45,118.06	
ADD	2	20.01			BASE	149	NB 28TH/HARRISON - ACCESSORIES	LS	1.00	47,678.67	$ 47,678.67	
ADD	2	20.01			BASE	150	NB 28TH/HARRISON - CANOPY	LS	1.00	90,128.73	$ 90,128.73	
ADD	2	20.01			BASE	151	NB 28TH/HARRISON - ELECTRICAL	LS	1.00	96,505.12	$ 96,505.12	
							SB 28TH/HARRISON					
ADD	2	20.01			BASE	153	SB 28TH/HARRISON - SITEWORK	LS	1.00	16,288.86	$ 16,288.86	
ADD	2	20.01			BASE	154	SB 28TH/HARRISON - CONCRETE	LS	1.00	45,232.69	$ 45,232.69	
ADD	2	20.01			BASE	155	SB 28TH/HARRISON - ACCESSORIES	LS	1.00	49,302.45	$ 49,302.45	
ADD	2	20.01			BASE	156	SB 28TH/HARRISON - CANOPY	LS	1.00	90,128.73	$ 90,128.73	
ADD	2	20.01			BASE	157	SB 28TH/HARRISON - ELECTRICAL	LS	1.00	77,065.86	$ 77,065.86	
							WB HARRISON/25TH					
ADD	2	20.01			BASE	159	WB HARRISON/25TH - SITEWORK	LS	1.00	17,988.63	$ 17,988.63	
ADD	2	20.01			BASE	160	WB HARRISON/25TH - CONCRETE	LS	1.00	48,013.22	$ 48,013.22	
ADD	2	20.01			BASE	161	WB HARRISON/25TH - ACCESSORIES	LS	1.00	35,730.96	$ 35,730.96	
ADD	2	20.01			BASE	162	WB HARRISON/25TH - CANOPY	LS	1.00	90,128.73	$ 90,128.73	
ADD	2	20.01			BASE	163	WB HARRISON/25TH - ELECTRICAL	LS	1.00	96,505.12	$ 96,505.12	
							EB HARRISON/25TH					
ADD	2	20.01			BASE	165	EB HARRISON/25TH - SITEWORK	LS	1.00	14,853.31	$ 14,853.31	
ADD	2	20.01			BASE	166	EB HARRISON/25TH - CONCRETE	LS	1.00	44,501.82	$ 44,501.82	
ADD	2	20.01			BASE	167	EB HARRISON/25TH - ACCESSORIES	LS	1.00	43,207.37	$ 43,207.37	
ADD	2	20.01			BASE	168	EB HARRISON/25TH - CANOPY	LS	1.00	90,128.73	$ 90,128.73	
ADD	2	20.01			BASE	169	EB HARRISON/25TH - ELECTRICAL	LS	1.00	77,065.86	$ 77,065.86	

CHANGE TYPE	CHANGE NO	SCC #	SUB SCC #	UTA ACCOUNT CODE	FUNDING	ITEM NO.	DESCRIPTION	UOM	CONTRACT QTY	CONTRACT UP	CONTRACT TOTAL	NOTES
							WB MONROE/25TH					
ADD	2	20.01			BASE	171	WB MONROE/25TH - SITEWORK	LS	1.00	18,287.53	$ 18,287.53	
ADD	2	20.01			BASE	172	WB MONROE/25TH - CONCRETE	LS	1.00	47,049.86	$ 47,049.86	
ADD	2	20.01			BASE	173	WB MONROE/25TH - ACCESSORIES	LS	1.00	51,533.93	$ 51,533.93	
ADD	2	20.01			BASE	174	WB MONROE/25TH - CANOPY	LS	1.00	90,128.73	$ 90,128.73	
ADD	2	20.01			BASE	175	WB MONROE/25TH - ELECTRICAL	LS	1.00	96,505.12	$ 96,505.12	
							EB MONROE/25TH					
ADD	2	20.01			BASE	177	EB MONROE/25TH - SITEWORK	LS	1.00	17,812.10	$ 17,812.10	
ADD	2	20.01			BASE	178	EB MONROE/25TH - CONCRETE	LS	1.00	46,285.16	$ 46,285.16	
ADD	2	20.01			BASE	179	EB MONROE/25TH - ACCESSORIES	LS	1.00	33,505.89	$ 33,505.89	
ADD	2	20.01			BASE	180	EB MONROE/25TH - CANOPY	LS	1.00	90,128.73	$ 90,128.73	
ADD	2	20.01			BASE	181	EB MONROE/25TH - ELECTRICAL	LS	1.00	96,505.12	$ 96,505.12	
							WB JEFFERSON/25TH					
ADD	2	20.01			BASE	183	WB JEFFERSON/25TH - SITEWORK	LS	1.00	22,592.03	$ 22,592.03	
ADD	2	20.01			BASE	184	WB JEFFERSON/25TH - CONCRETE	LS	1.00	51,191.67	$ 51,191.67	
ADD	2	20.01			BASE	185	WB JEFFERSON/25TH - ACCESSORIES	LS	1.00	34,936.40	$ 34,936.40	
ADD	2	20.01			BASE	186	WB JEFFERSON/25TH - CANOPY	LS	1.00	90,128.73	$ 90,128.73	
ADD	2	20.01			BASE	187	WB JEFFERSON/25TH - ELECTRICAL	LS	1.00	96,505.12	$ 96,505.12	
							EB JEFFERSON/25TH					
ADD	2	20.01			BASE	189	EB JEFFERSON/25TH - SITEWORK	LS	1.00	19,606.98	$ 19,606.98	
ADD	2	20.01			BASE	190	EB JEFFERSON/25TH - CONCRETE	LS	1.00	47,367.77	$ 47,367.77	
ADD	2	20.01			BASE	191	EB JEFFERSON/25TH - ACCESSORIES	LS	1.00	35,684.22	$ 35,684.22	
ADD	2	20.01			BASE	192	EB JEFFERSON/25TH - CANOPY	LS	1.00	90,128.73	$ 90,128.73	
ADD	2	20.01			BASE	193	EB JEFFERSON/25TH - ELECTRICAL	LS	1.00	96,505.12	$ 96,505.12	
							NB 25TH/WASHINGTON					
ADD	2	20.01			BASE	195	NB 25TH/WASHINGTON - SITEWORK	LS	1.00	17,030.98	$ 17,030.98	
ADD	2	20.01			BASE	196	NB 25TH/WASHINGTON - CONCRETE	LS	1.00	46,082.97	$ 46,082.97	
ADD	2	20.01			BASE	197	NB 25TH/WASHINGTON - ACCESSORIES	LS	1.00	50,888.73	$ 50,888.73	
ADD	2	20.01			BASE	198	NB 25TH/WASHINGTON - CANOPY	LS	1.00	90,128.73	$ 90,128.73	
ADD	2	20.01			BASE	199	NB 25TH/WASHINGTON - ELECTRICAL	LS	1.00	102,336.90	$ 102,336.90	
							SB 25TH/WASHINGTON					
ADD	2	20.01			BASE	201	SB 25TH/WASHINGTON - SITEWORK	LS	1.00	19,670.24	$ 19,670.24	
ADD	2	20.01			BASE	202	SB 25TH/WASHINGTON - CONCRETE	LS	1.00	58,402.27	$ 58,402.27	
ADD	2	20.01			BASE	203	SB 25TH/WASHINGTON - ACCESSORIES	LS	1.00	46,131.54	$ 46,131.54	
ADD	2	20.01			BASE	204	SB 25TH/WASHINGTON - CANOPY	LS	1.00	90,128.73	$ 90,128.73	
ADD	2	20.01			BASE	205	SB 25TH/WASHINGTON - ELECTRICAL	LS	1.00	84,571.58	$ 84,571.58	
ADD	2	20.01			BASE	206	SB 25TH/WASHINGTON - SNOW MELT	LS	1.00	33,464.03	$ 33,464.03	
							WB KIESEL/23RD					
ADD	2	20.01			BASE	208	WB KIESEL/23RD - SITEWORK	LS	1.00	17,057.92	$ 17,057.92	
ADD	2	20.01			BASE	209	WB KIESEL/23RD - CONCRETE	LS	1.00	46,274.12	$ 46,274.12	
ADD	2	20.01			BASE	210	WB KIESEL/23RD - ACCESSORIES	LS	1.00	54,148.71	$ 54,148.71	
ADD	2	20.01			BASE	211	WB KIESEL/23RD - CANOPY	LS	1.00	90,128.73	$ 90,128.73	
ADD	2	20.01			BASE	212	WB KIESEL/23RD - ELECTRICAL	LS	1.00	96,505.12	$ 96,505.12	
							EB KIESEL/23RD					

CHANGE TYPE	CHANGE NO	SCC #	SUB SCC #	UTA ACCOUNT CODE	FUNDING	ITEM NO.	DESCRIPTION	UOM	CONTRACT QTY	CONTRACT UP	CONTRACT TOTAL	NOTES
ADD	2	20.01			BASE	214	EB KIESEL/23RD - SITEWORK	LS	1.00	18,126.94	$ 18,126.94	
ADD	2	20.01			BASE	215	EB KIESEL/23RD - CONCRETE	LS	1.00	50,802.22	$ 50,802.22	
ADD	2	20.01			BASE	216	EB KIESEL/23RD - ACCESSORIES	LS	1.00	32,940.72	$ 32,940.72	
ADD	2	20.01			BASE	217	EB KIESEL/23RD - CANOPY	LS	1.00	90,128.73	$ 90,128.73	
ADD	2	20.01			BASE	218	EB KIESEL/23RD - ELECTRICAL	LS	1.00	84,571.58	$ 84,571.58	
ADD	2	20.01			BASE	219	EB KIESEL/23RD - SNOW MELT	LS	1.00	33,464.03	$ 33,464.03	
							OGDEN TRANSIT CENTER					
ADD	2	20.01			BASE	221	OG TRANSIT CTR - SITEWORK	LS	1.00	32,604.29	$ 32,604.29	
ADD	2	20.01			BASE	222	OG TRANSIT CTR - CONCRETE	LS	1.00	89,742.04	$ 89,742.04	
ADD	2	20.01			BASE	223	OG TRANSIT CTR - ACCESSORIES	LS	1.00	49,673.68	$ 49,673.68	
ADD	2	20.01			BASE	224	OG TRANSIT CTR - CANOPY	LS	1.00	113,163.39	$ 113,163.39	
ADD	2	20.01			BASE	225	OG TRANSIT CTR - ELECTRICAL	LS	1.00	102,623.09	$ 102,623.09	
		40					**SITEWORK & SPECIAL CONDITIONS**					
		40.01					**DEMOLITION, CLEARING, EARTHWORK**					
							DEMOLITION & REMOVAL OF OBSTRUCTIONS					
ADD	2	40.01			BASE	229	DEMOLITION & REMOVAL OF OBSTRUCTIONS - BASE	LS	1.00	202,206.47	$ 202,206.47	
ADD	2	40.01			DEE STA	230	DEMOLITION & REMOVAL OF OBSTRUCTIONS - DEE STA	LS	1.00	2,822.15	$ 2,822.15	
ADD	2	40.01			OGDEN	231	DEMOLITION & REMOVAL OF OBSTRUCTIONS - OGDEN	LS	1.00	19,685.02	$ 19,685.02	
							REMOVE AC/PCCP PAVEMENT					
ADD	2	40.01			BASE	233	REMOVE ASPHALT PAVEMENT - BASE	SY	31,593.00	16.16	$ 510,488.80	Assumes no PCCP removal on Washington Ave.
ADD	2	40.01			DEE STA	234	REMOVE ASPHALT PAVEMENT - DEE STA	SY	7,190.00	11.75	$ 84,485.84	
ADD	2	40.01			OGDEN	235	REMOVE ASPHALT PAVEMENT - OGDEN	SY	21,286.00	10.36	$ 220,560.52	
ADD	2	40.01			BASE	236	ROTOMILL ASPHALT PAVEMENT 3 -INCH - ROADWAY	SY	5,753.00	5.11	$ 29,403.72	
ADD	2	40.01			BASE	237	REMOVE CONCRETE PAVEMENT- BASE	SY	2,421.00	23.23	$ 56,229.17	
ADD	2	40.01			OGDEN	238	REMOVE CONCRETE PAVEMENT- OGDEN	SY	33.00	28.12	$ 928.12	
							REMOVE CONCRETE SIDEWALKS & CURB RAMPS					
ADD	2	40.01			BASE	240	REMOVE CONC SIDEWALKS & CURB RAMPS - BASE	SY	13,034.00	16.78	$ 218,695.11	
ADD	2	40.01			DEE STA	241	REMOVE CONC SIDEWALKS & CURB RAMPS - DEE STA	SY	26.00	42.78	$ 1,112.36	
ADD	2	40.01			OGDEN	242	REMOVE CONC SIDEWALKS & CURB RAMPS - OGDEN	SY	1,873.00	16.59	$ 31,068.00	
							REMOVE CONCRETE DRIVEWAYS/MISC					
ADD	2	40.01			BASE	244	REMOVE CONCRETE DRIVEWAYS - BASE	SY	1,283.00	22.76	$ 29,199.74	
ADD	2	40.01			OGDEN	245	REMOVE CONCRETE DRIVEWAYS - OGDEN	SY	390.00	22.76	$ 8,878.12	
ADD	2	40.01			BASE	246	REMOVE STAIRS	SY	405.00	51.62	$ 20,907.96	
ADD	2	40.01			BASE	247	REMOVE RAISED CONCRETE LANDSCAPE BOX- BASE	SY	32.00	59.73	$ 1,911.49	
ADD	2	40.01			OGDEN	248	REMOVE RAISED CONCRETE LANDSCAPE BOX- OGDEN	SY	6.00	73.33	$ 439.99	
							DEMO EXISTING CURB/CURB & GUTTER					
ADD	2	40.01			BASE	250	DEMO EXISTING CURB/CURB & GUTTER - BASE	LF	19,716.00	6.86	$ 135,326.60	
ADD	2	40.01			DEE STA	251	DEMO EXISTING CURB/CURB & GUTTER - DEE STA	LF	847.00	8.26	$ 6,999.80	
ADD	2	40.01			OGDEN	252	DEMO EXISTING CURB/CURB & GUTTER - OGDEN	LF	2,556.00	6.81	$ 17,415.54	
							SAWCUT EXISTING PAVEMENT					
ADD	2	40.01			BASE	254	SAWCUT EXISTING PAVEMENT - BASE	INFT	162,535.00	0.24	$ 38,938.42	
ADD	2	40.01			DEE STA	255	SAWCUT EXISTING PAVEMENT - DEE STA	INFT	6,392.00	0.56	$ 3,611.16	
ADD	2	40.01			OGDEN	256	SAWCUT EXISTING PAVEMENT - OGDEN	INFT	5,905.00	0.62	$ 3,687.14	
							REMOVE EXISTING TREE					

CHANGE TYPE	CHANGE NO	SCC #	SUB SCC #	UTA ACCOUNT CODE	FUNDING	ITEM NO.	DESCRIPTION	UOM	CONTRACT QTY	CONTRACT UP	CONTRACT TOTAL	NOTES
ADD	2	40.01			BASE	258	REMOVE EXISTING TREE - BASE	EA	183.00	367.33	$ 67,221.71	
ADD	2	40.01			DEE STA	259	REMOVE EXISTING TREE - DEE STA	EA	5.00	367.33	$ 1,836.66	
ADD	2	40.01			OGDEN	260	REMOVE EXISTING TREE - OGDEN	EA	8.00	367.33	$ 2,938.66	
							CLEARING & GRUBBING					
ADD	2	40.01			BASE	262	CLEARING & GRUBBING- BASE	ACR	6.38	36,991.23	$ 236,004.02	
ADD	2	40.01			DEE STA	263	CLEARING & GRUBBING- DEE STA	ACR	0.38	44,012.11	$ 16,724.60	
ADD	2	40.01			OGDEN	264	CLEARING & GRUBBING- OGDEN	ACR	0.03	67,616.67	$ 2,028.50	
							EARTHWORK EXCAVATION					
ADD	2	40.01			BASE	266	EARTHWORK EXCAVATION - ROADWAY - BASE	CY	20,519.00	38.55	$ 791,000.02	
ADD	2	40.01			OGDEN	267	EARTHWORK EXCAVATION - ROADWAY - OGDEN	CY	15,095.00	35.43	$ 534,812.65	
							EARTHWORK EMBANKMENT - ROADWAY - BASE					
ADD	2	40.01			BASE	269	EARTHWORK EMBANKMENT - ROADWAY - BASE	CY	2,610.00	27.58	$ 71,987.59	
ADD	2	40.01			OGDEN	270	EARTHWORK EMBANKMENT - ROADWAY - OGDEN	CY	259.00	31.44	$ 8,143.96	
							SUBGRADE PREPARATION					
ADD	2	40.01			BASE	272	SUBGRADE PREPARATION - ROADWAY - BASE	SY	27,414.00	13.55	$ 371,547.16	
ADD	2	40.01			OGDEN	273	SUBGRADE PREPARATION - ROADWAY - OGDEN	SY	20,585.00	5.84	$ 120,133.48	
ADD	2	40.01			BASE	274	SUBGRADE PREPARATION - HMA DRIVEWAY - BASE	SY	3,088.00	26.94	$ 83,186.34	
							EARLY WORK PACKAGE					
ADD	1	40.01			BASE	276	EARLY BUILDING DEMOLITION	LS	1.00	72,999.90	$ 72,999.90	Early Building Demolition includes 44th WSU entry structure, house on Country Hills Drive, and Dry Cleaner Building. Does not include any special work needed for hazardous material.
		40.02					**SITE UTILITIES, UTILITY RELOCATION**					
							WATERLINE CONSTRUCTION					
ADD	2	40.02			OGDEN	279	23RD STREET WATERLINE REPLACEMENT	LS	1.00	513,586.44	$ 513,586.44	
ADD	2	40.02			OGDEN	280	25TH STREET WATERLINE REPLACEMENT	LS	1.00	1,011,902.08	$ 1,011,902.08	Does not include temporary water tie-in due to accelerated schedule on Washington and 25th.
ADD	2	40.02			BASE	281	UTA WATERLINE TO STATIONS - BASE	LS	1.00	265,792.87	$ 265,792.87	
ADD	2	40.02			DEE STA	282	UTA WATERLINE TO STATIONS - DEE STA	LS	1.00	19,361.74	$ 19,361.74	
ADD	2	40.02			BASE	283	WEBER STATE 10" IRRIGATION LINE - BASE	LS	1.00	151,065.93	$ 151,065.93	Includes 661LF of 10" PPR Irrigation Pipe.
ADD	2	40.02			BASE	284	WATERLINE UTILITY RELOCATIONS - BASE	LS	1.00	407,634.76	$ 407,634.76	
ADD	2	40.02			DEE STA	285	WATERLINE UTILITY RELOCATIONS - DEE	LS	1.00	98,390.48	$ 98,390.48	
ADD	2	40.02			BASE	286	LOOP WATERLINE AROUND WALL RW-CH-01	EA	4.00	4,156.18	$ 16,624.73	Allowance, not in 100% Design, will be formally priced at RFC.
							SANITARY SEWER					
ADD	2	40.02			DEE STA	288	SEWER SERVICE TO OPERATOR RELIEF BUILDING-DEE	EA	1.00	104,628.15	$ 104,628.15	
ADD	2	40.02			BASE	289	25TH AND HARRISON SEWER RELOCATE	LS	1.00	144,518.09	$ 144,518.09	
ADD	2	40.02			BASE	290	32ND AND HARRISON SEWER RELOCATE	LS	1.00	129,270.85	$ 129,270.85	
ADD	2	40.02			BASE	291	CENTRAL CAMPUS SEWER RELOCATE	LS	1.00	40,890.35	$ 40,890.35	
ADD	2	40.02			BASE	292	WASHINGTON BLVD SEWER RELOCATE	LS	1.00	115,459.16	$ 115,459.16	
ADD	2	40.02			OGDEN	293	23RD STREET SEWER RELOCATION-OGDEN	LS	1.00	435,714.20	$ 435,714.20	
							STORM SEWER CONSTRUCTION					
ADD	2	40.02			BASE	295	REMOVE/ABANDON EXISTING PIPE-BASE	LF	1,747.00	37.36	$ 65,272.10	
ADD	2	40.02			DEE STA	296	REMOVE/ABANDON EXISTING PIPE-DEE	LF	418.00	38.32	$ 16,016.74	
ADD	2	40.02			OGDEN	297	REMOVE/ABANDON EXISTING PIPE-OGDEN	LF	1,214.00	39.08	$ 47,443.59	
ADD	2	40.02			BASE	298	REMOVE/REPLACE SLOT DRAIN	LF	38.00	161.21	$ 6,125.99	
ADD	2	40.02			BASE	299	REMOVE CATCH BASIN-BASE	EA	25.00	990.10	$ 24,752.56	
ADD	2	40.02			DEE STA	300	REMOVE CATCH BASIN-DEE	EA	4.00	982.54	$ 3,930.16	
ADD	2	40.02			OGDEN	301	REMOVE CATCH BASIN-OGDEN	EA	8.00	972.24	$ 7,777.93	

CHANGE TYPE	CHANGE NO	SCC #	SUB SCC #	UTA ACCOUNT CODE	FUNDING	ITEM NO.	DESCRIPTION	UOM	CONTRACT QTY	CONTRACT UP	CONTRACT TOTAL	NOTES
ADD	2	40.02			BASE	302	CONNECT TO EXISTING PIPE OR STRUCTURE-BASE	EA	77.00	879.31	$ 67,707.23	
ADD	2	40.02			DEE STA	303	CONNECT TO EXISTING PIPE OR STRUCTURE-DEE	EA	3.00	894.40	$ 2,683.20	
ADD	2	40.02			OGDEN	304	CONNECT TO EXISTING PIPE OR STRUCTURE-OGDEN	EA	7.00	772.13	$ 5,404.92	
ADD	2	40.02			BASE	305	MAJOR RECONSTRUCT STRUCTURE-BASE	EA	33.00	2,589.43	$ 85,451.27	
ADD	2	40.02			OGDEN	306	MAJOR RECONSTRUCT STRUCTURE-OGDEN	EA	10.00	2,254.66	$ 22,546.56	
ADD	2	40.02			BASE	307	REPAIR STORM DRAIN & SINKHOLE AT CLEANERS	LS	1.00	22,576.88	$ 22,576.88	
ADD	2	40.02			BASE	308	REMOVE AND REPLACE SUMP MANHOLE-BASE	EA	1.00	8,616.65	$ 8,616.65	
ADD	2	40.02			BASE	309	REMOVE/ABANDON MANHOLE-BASE	EA	3.00	1,368.17	$ 4,104.52	
ADD	2	40.02			OGDEN	310	REMOVE/ABANDON MANHOLE-OGDEN	EA	2.00	1,368.57	$ 2,737.13	
ADD	2	40.02			BASE	311	12" SD SMOOTH-BASE	LF	37.00	249.51	$ 9,232.01	
ADD	2	40.02			DEE STA	312	12" SD SMOOTH-DEE	LF	177.00	240.55	$ 42,577.52	
ADD	2	40.02			BASE	313	12" SD RCP-BASE	LF	406.00	170.35	$ 69,161.43	
ADD	2	40.02			BASE	314	15" SD CMP-BASE	LF	11.00	249.39	$ 2,743.34	
ADD	2	40.02			BASE	315	15" SD RCP-BASE	LF	561.00	211.35	$ 118,565.54	
ADD	2	40.02			OGDEN	316	15" SD RCP-OGDEN	LF	1,618.00	162.05	$ 262,197.22	
ADD	2	40.02			BASE	317	18" SD SMOOTH-BASE	LF	2,304.00	192.08	$ 442,544.16	
ADD	2	40.02			DEE STA	318	18" SD SMOOTH-DEE	LF	264.00	240.14	$ 63,396.47	
ADD	2	40.02			BASE	319	18" SD RCP-BASE	LF	1,073.00	249.86	$ 268,104.77	
ADD	2	40.02			BASE	320	24" SD RCP-BASE	LF	32.00	290.27	$ 9,288.48	
ADD	2	40.02			BASE	321	36" SD RCP-BASE	LF	135.00	357.26	$ 48,230.28	
ADD	2	40.02			BASE	322	23X14 ELIPTICAL SD RCP-BASE	LF	88.00	341.02	$ 30,009.52	
ADD	2	40.02			BASE	323	30X19 ELIPTICAL SD RCP-BASE	LF	360.00	373.03	$ 134,291.56	
ADD	2	40.02			BASE	324	STORM DRAIN MANHOLE-CB 11/SD-4 - BASE	EA	19.00	8,452.74	$ 160,602.10	
ADD	2	40.02			DEE STA	325	STORM DRAIN MANHOLE-CB 11 - DEE	EA	1.00	7,280.17	$ 7,280.17	
ADD	2	40.02			OGDEN	326	STORM DRAIN MANHOLE-SD-4 - OGDEN	EA	3.00	7,280.16	$ 21,840.47	
ADD	2	40.02			BASE	327	CATCH BASIN - BASE	EA	91.00	5,434.46	$ 494,535.83	
ADD	2	40.02			DEE STA	328	CATCH BASIN - DEE	EA	6.00	6,083.93	$ 36,503.60	
ADD	2	40.02			OGDEN	329	CATCH BASIN - OGDEN	EA	10.00	4,840.32	$ 48,403.21	
ADD	2	40.02			BASE	330	POND WALL CONNECTION - DT-DR-01-3	EA	1.00	2,736.76	$ 2,736.76	
ADD	2	40.02			DEE STA	331	RAIN GARDEN WATER STORAGE AREA-DEE	EA	1.00	54,382.04	$ 54,382.04	
ADD	2	40.02			BASE	332	OIMC DETENSION POND-BASE	EA	1.00	8,227.32	$ 8,227.32	
ADD	2	40.02			BASE	333	TEST & VIDEO NEW SD PIPE-BASE	LF	5,007.00	11.17	$ 55,906.71	
ADD	2	40.02			DEE STA	334	TEST & VIDEO NEW SD PIPE-DEE	LF	441.00	11.16	$ 4,921.40	
ADD	2	40.02			OGDEN	335	TEST & VIDEO NEW SD PIPE-OGDEN	LF	1,618.00	11.16	$ 18,064.37	
							STREET LIGHTING					
ADD	2	40.02			BASE	337	STREET LIGHTING CAMPUS FOUNDATIONS CONTRACTOR DESIGN	LS	1.00	25,289.06	$ 25,289.06	
ADD	2	40.02			BASE	338	STREET LIGHTING- BASE	LS	1.00	675,850.59	$ 675,850.59	
ADD	2	40.02			DEE STA	339	STREET LIGHTING- DEE	LS	1.00	122,442.15	$ 122,442.15	
ADD	2	40.02			OGDEN	340	STREET LIGHT CONDUIT AND BOXES - OGDEN	LS	1.00	48,138.09	$ 48,138.09	
ADD	2	40.02			OGDEN	341	STREET LIGHT CONDUCTORS, FDN AND ELECTRICAL SERVICES - OGDEN	LS	1.00	36,411.19	$ 36,411.19	
ADD	2	40.02			OGDEN	342	STREET LIGHT POLES AND FIXTURES - OGDEN	LS	1.00	205,531.28	$ 205,531.28	
							3RD PARTY UTILITIES					
ADD	2	40.02			BASE	344	POTHOLE 3RD PARTY UTILITIES	EA	100.00	1,060.54	$ 106,054.47	See details of third party scope in CVE proposal and Joe Johnson Drawings identifying scope to be done by SWI.
ADD	2	40.02			BASE	345	RELOCATE CENTURYLINK COMMUNICATIONS	LS	1.00	103,742.51	$ 103,742.51	

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ADD	2	40.02			BASE	346	RELOCATE COMCAST	LS	1.00	39,329.01	$ 39,329.01	
ADD	2	40.02			BASE	347	RELOCATE DOMINION ENERGY	LS	1.00	3,900.31	$ 3,900.31	
ADD	2	40.02			BASE	348	RELOCATE ZAYO FIBER OPTIC	LS	1.00	36,534.65	$ 36,534.65	
ADD	2	40.02			BASE	349	RELOCATE ROCKY MOUNTAIN POWER	LS	1.00	2,801.29	$ 2,801.29	
ADD	2	40.02			BASE	350	RELOCATE WSU UTILITIES	LS	1.00	45,745.16	$ 45,745.16	
ADD	2	40.02			BASE	351	NEW POWER CONDUITS FOR BRT	LS	1.00	245,370.40	$ 245,370.40	
ADD	2	40.02			BASE	352	NEW STATION GAS SERVICE SUPPORT	LS	1.00	12,222.61	$ 12,222.61	
							UTILITY RELOCATION RECLAIMATION					
ADD	2	40.02			BASE	354	LAWN REPAIR AREA	SF	6,784.00	3.02	$ 20,476.15	
ADD	2	40.02			BASE	355	REMOVE AND RESET BRICK PAVERS	SF	60.00	20.09	$ 1,205.43	
ADD	2	40.02			BASE	356	REMOVE & REPLACE ASPHALT PAVEMENT	SF	5,927.00	12.23	$ 72,499.80	
ADD	2	40.02			BASE	357	REMOVE/REPLACE CONCRETE SIDEWALK	SF	672.00	25.25	$ 16,967.32	
ADD	2	40.02			BASE	358	REMOVE/REPLACE CONCRETE CURB AND GUTTER	SF	36.00	68.92	$ 2,481.21	
ADD	2	40.02			BASE	359	SAWCUT HMA/SIDEWALK	INFT	6,395.00	0.16	$ 1,017.95	
							EARLY WORK PACKAGE					
ADD	1	40.02			BASE	361	EARLY UTILITY WORK	LS	1.00	89,222.10	$ 89,222.10	See addendum 1 for description
		40.03					**HAZ. MAT'L, CONTAM'D SOIL REMOVAL/MITIGATION, GROUND WATER TREATMENTS**					
ADD	2	40.03				363	HAZMAT AT OGDEN INTERMODAL/DRY CLEANERS	LS	1.00	72,554.73	$ 72,554.73	PPE, Hazwoper traning, & allowance to burry contaminated soils from OITC at OITC. Does not include testing or off haul of soils.
		40.05					**SITE STRUCTURES INCLUDING RETAINING WALLS, SOUND WALLS**					
							STRUCTURES					
ADD	2	40.05			BASE	366	BROWNING CENTER CANOPY REMOVE & REPLACE	LS	1.00	698,623.92	$ 698,623.92	
							CAST-IN-PLACE WALLS- HARRISON					
ADD	2	40.05			BASE	368	SUPPORT	SF	295.00	1.21	$ 355.93	
ADD	2	40.05			BASE	369	EXCAVATION	CY	178.00	61.22	$ 10,897.27	
ADD	2	40.05			BASE	370	BACKFILL	CY	164.00	75.33	$ 12,354.38	
ADD	2	40.05			BASE	371	CIP CONCRETE WALL	CY	19.00	1,923.82	$ 36,552.56	
ADD	2	40.05			BASE	372	REBAR	LBS	2,988.00	1.52	$ 4,535.49	
ADD	2	40.05			BASE	373	RESTORATION	LS	1.00	1,599.70	$ 1,599.70	
							CAST-IN-PLACE WALLS- HARRISON LANDSCAPE					
ADD	2	40.05			BASE	375	SUPPORT	SF	3,127.00	2.37	$ 7,395.52	
ADD	2	40.05			BASE	376	EXCAVATION	CY	551.00	66.63	$ 36,713.06	
ADD	2	40.05			BASE	377	BACKFILL	CY	345.00	97.47	$ 33,627.14	
ADD	2	40.05			BASE	378	CIP CONCRETE WALL	CY	159.00	1,686.19	$ 268,104.94	
ADD	2	40.05			BASE	379	REBAR	LBS	9,354.00	1.69	$ 15,780.11	
ADD	2	40.05			BASE	380	RESTORATION	LS	1.00	6,416.91	$ 6,416.91	
							SOLDIER PILE WALLS					
ADD	2	40.05			BASE	382	SUPPORT	SF	1,354.00	0.86	$ 1,160.08	
ADD	2	40.05			BASE	383	SOLDIER PILING	LBS	16,770.00	4.93	$ 82,709.68	
ADD	2	40.05			BASE	384	EXCAVATION	CY	228.00	57.35	$ 13,075.60	
ADD	2	40.05			BASE	385	BACKFILL	CY	299.00	94.64	$ 28,297.04	
ADD	2	40.05			BASE	386	CIP CONCRETE WALL	CY	44.00	2,868.64	$ 126,220.18	
ADD	2	40.05			BASE	387	REBAR- EPOXY COATED	LBS	8,547.00	1.81	$ 15,462.80	
ADD	2	40.05			BASE	388	RESTORATION	LS	1.00	3,187.32	$ 3,187.32	
							FENCING, GATES, RAILINGS					

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ADD	2	40.05			BASE	390	CHAIN LINK FENCE 6-FOOT, TYPE II	LF	1,462.00	21.73	$ 31,768.74	
ADD	2	40.05			BASE	391	CHAIN LINK FENCE 5-FOOT, TYPE I	LF	209.00	20.49	$ 4,281.37	
ADD	2	40.05			BASE	392	CHAIN LINK FENCE 3-FOOT, TYPE II	LF	30.00	22.47	$ 673.99	
ADD	2	40.05			BASE	393	CHAIN LINK FENCE 6-FOOT, TYPE II GATES	EA	4.00	570.47	$ 2,281.88	
ADD	2	40.05			BASE	394	METAL RAILINGS- BASE	LF	67.00	994.36	$ 66,621.89	Does not inluced station railing.
ADD	2	40.05			DEE STA	395	METAL RAILINGS- DEE STA	LF	452.00	202.97	$ 91,742.95	Does not inluced station railing.
ADD	2	40.05			BASE	396	HANDRAILING	LF	398.00	173.62	$ 69,102.51	Does not inluced station railing.
ADD	2	40.05			BASE	397	ORNAMENTAL FENCE	LF	174.00	88.16	$ 15,340.44	
		40.06					PEDESTRIAN / BIKE ACCESS AND ACCOMMODATION, LANDSCAPING					
							SUBGRADE PREPARATION					
ADD	2	40.06			BASE	400	SUBGRADE PREPARATION - ROADWAY - SHARED USE PATH	SY	1,953.00	7.50	$ 14,643.59	
							CONCRETE FLATWORK					
ADD	2	40.06			BASE	402	CONCRETE FLATWORK	SF	38,763.00	14.11	$ 546,752.90	
ADD	2	40.06			DEE STA	403	CONCRETE FLATWORK	SF	2,250.00	13.13	$ 29,536.28	
ADD	2	40.06			OGDEN	404	CONCRETE FLATWORK	SF	112.00	12.44	$ 1,393.48	
							CONCRETE SIDEWALK 4-INCH					
ADD	2	40.06			BASE	406	CONCRETE SIDEWALK 4-INCH - BASE	SF	65,763.00	11.92	$ 783,880.52	
ADD	2	40.06			DEE STA	407	CONCRETE SIDEWALK 4-INCH - DEE STA (seg 3)	SF	8,643.00	11.02	$ 95,246.08	
ADD	2	40.06			OGDEN	408	CONCRETE SIDEWALK 4-INCH - OGDEN (seg 1&2)	SF	13,557.00	11.95	$ 162,019.55	
ADD	2	40.06			BASE	409	SIDEWALK SNOW MELT SYSTEM @ KIESEL	SF	1,561.00	21.95	$ 34,266.88	Repair of existing snow melt carried at $15,610 ($10/SF)
							PEDESTRIAN ACCESS RAMP					
ADD	2	40.06			BASE	411	PEDESTRIAN ACCESS RAMP - BASE	SF	7,596.00	27.90	$ 211,955.77	
ADD	2	40.06			DEE STA	412	PEDESTRIAN ACCESS RAMP - DEE STA (seg 3)	SF	720.00	29.65	$ 21,351.56	
ADD	2	40.06			OGDEN	413	PEDESTRIAN ACCESS RAMP - OGDEN (seg 1&2)	SF	1,896.00	26.45	$ 50,151.76	
ADD	2	40.06			BASE	414	PEDESTRIAN ACCESS RAMP - BASE OFFSITE (seg 1&2)	SF	450.00	48.24	$ 21,706.47	
ADD	2	40.06			BASE	415	TACTILE PAVER DARK GREY	SF	337.00	36.69	$ 12,364.14	
							UNTREATED BASE COURSE					
ADD	2	40.06			BASE	417	UNTREATED BASE COURSE - SHARED USE PATH	CY	326.00	87.36	$ 28,478.97	
							ASPHALT PAVEMENT HMA 1/2-INCH					
ADD	2	40.06			BASE	419	ASPHALT PAVEMENT HMA 3/8-INCH - SHARED USE PATH	TON	326.00	128.56	$ 41,909.30	
							BRICK PAVERS					
ADD	2	40.06			BASE	421	BRICK PAVERS- BASE	SF	1,204.00	17.95	$ 21,610.89	
ADD	2	40.06			BASE	422	BRICK PAVERS - OGDEN	SF	135.00	19.09	$ 2,577.32	
							CONCRETE STAIRS					
ADD	2	40.06			BASE	424	CONCRETE STAIRS	SF	2,091.00	79.90	$ 167,067.11	
							LANDSCAPING					
ADD	2	40.06			BASE	426	BACK OF WALK LANDSCAPE RESTORATION	SF	83,465.00	2.00	$ 166,930.00	See Shared Risk Program for back of walk restoration
ADD	2	40.06			BASE	427	2483 HARRISON BLVD LANDSCAPE PER DETAIL LS-DT-01	LS	1.00	20,356.33	$ 20,356.33	
ADD	2	40.06			BASE	428	3457 HARRISON BLVD LANDSCAPE PER DETAIL LS-DT-01	LS	1.00	4,569.79	$ 4,569.79	
ADD	2	40.06			BASE	429	BROWNING CENTER STORMWATER OUTFALL	LS	1.00	4,050.50	$ 4,050.50	
							BROADCAST SEED					
ADD	2	40.06			BASE	431	BROADCAST SEED - BASE (Native Grass Seeding Areas)	SF	15,866.00	0.10	$ 1,647.36	
							TURF SOD					
ADD	2	40.06			BASE	433	TURF SOD - BASE	SF	79,944.00	0.73	$ 58,119.91	

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ADD	2	40.06			DEE STA	434	TURF SOD - DEE STA	SF	7,086.00	0.73	$ 5,151.57	
ADD	2	40.06			BASE	435	SHREDDED BARK MULCH - BASE	CY	187.00	95.76	$ 17,906.73	
ADD	2	40.06			DEE STA	436	SHREDDED BARK MULCH - DEE	CY	40.00	95.76	$ 3,830.31	
							TOPSOIL					
ADD	2	40.06			BASE	438	TOPSOIL- BASE	CY	4,397.00	68.94	$ 303,147.88	
ADD	2	40.06			DEE STA	439	TOPSOIL- DEE	CY	708.00	70.46	$ 49,886.72	
							STORMWATER FACILITY PLANT MIX					
							LANDCAPE REPAIR AREA					
ADD	2	40.06			BASE	442	LANDCAPE REPAIR AREA- BASE	SF	12,773.00	1.14	$ 14,592.21	
ADD	2	40.06			DEE STA	443	LANDCAPE REPAIR AREA- DEE	SF	4,181.00	1.14	$ 4,776.49	
							TREES					
ADD	2	40.06			BASE	445	TREES- BASE	EA	86.00	399.86	$ 34,387.66	
ADD	2	40.06			DEE STA	446	TREES- DEE	EA	31.00	389.47	$ 12,073.59	
ADD	2	40.06			BASE	447	SHRUBS- BASE	EA	807.00	28.35	$ 22,881.28	
ADD	2	40.06			DEE STA	448	SHRUBS- DEE	EA	646.00	23.47	$ 15,162.98	
ADD	2	40.06			BASE	449	GROUND COVER- BASE	SF	4,257.00	2.95	$ 12,556.38	
ADD	2	40.06			DEE STA	450	GROUND COVER- DEE	SF	1,614.00	3.68	$ 5,934.02	
ADD	2	40.06			BASE	451	ROCK MULCH- BASE	SF	25,199.00	1.89	$ 47,632.68	
ADD	2	40.06			DEE STA	452	ROCK MULCH- DEE	SF	5,516.00	1.89	$ 10,426.68	
ADD	2	40.06			OGDEN	453	OGDEN LANDSCAPE- 4 IN. DECOMPOSED GRANITE	CY	290.00	390.51	$ 113,247.66	
ADD	2	40.06			OGDEN	454	OGDEN LANDSCAPE- FILTER FABRIC	SY	2,610.00	2.86	$ 7,454.47	
							IRRIGATION					
ADD	2	40.06			BASE	456	IRRIGATION - BASE	LS	1.00	395,422.19	$ 395,422.19	
ADD	2	40.06			DEE STA	457	IRRIGATION - DEE STA	LS	1.00	52,869.65	$ 52,869.65	
ADD	2	40.06			OGDEN	458	IRRIGATION - OGDEN	LS	1.00	9,881.73	$ 9,881.73	
ADD	2	40.06			BASE	459	IRRIGATION - HARRISON PROPERTIES	LS	1.00	7,062.40	$ 7,062.40	
							LANDSCAPE ESTABLISHMENT					
ADD	2	40.06			BASE	461	LANDSCAPE ESTABLISHMENT - BASE	LS	1.00	73,332.13	$ 73,332.13	
ADD	2	40.06			DEE STA	462	LANDSCAPE ESTABLISHMENT - DEE STA	LS	1.00	12,477.03	$ 12,477.03	
		40.07					AUTOMOBILE, BUS, VAN ACCESSWAYS INCLUDING ROADS, PARKING LOTS					
							CONCRETE CURB & GUTTER					
ADD	2	40.07			BASE	465	CONCRETE CURB & GUTTER - ROADWAY - BASE	LF	17,026.00	54.18	$ 922,473.37	
ADD	2	40.07			OGDEN	466	CONCRETE CURB & GUTTER - ROADWAY - OGDEN	LF	2,462.00	36.84	$ 90,690.11	
							CONCRETE CURB TRANSITIONS					
ADD	2	40.07			BASE	468	CONCRETE CURB - TRANSITIONS - ROADWAY - BASE	EA	21.00	894.16	$ 18,777.28	
ADD	2	40.07			DEE STA	469	CONCRETE CURB - TRANSITIONS - DEE	EA	2.00	1,000.77	$ 2,001.54	
ADD	2	40.07			OGDEN	470	CONCRETE CURB - TRANSITIONS - Ogden	EA	1.00	896.82	$ 896.82	
							CONCRETE CURB MISC					
ADD	2	40.07			BASE	472	CONCRETE WATERWAY (seg 1&2)	SF	301.00	29.25	$ 8,805.49	
ADD	2	40.07			DEE STA	473	CONCRETE WATERWAY - 6 FOOT (seg 3)	SF	2,304.00	21.50	$ 49,537.82	
							CONCRETE DRIVEWAY					
ADD	2	40.07			BASE	475	CONCRETE DRIVEWAY - BASE	SF	16,506.00	15.76	$ 260,126.99	
ADD	2	40.07			OGDEN	476	CONCRETE DRIVEWAY - OGDEN	SF	4,413.00	16.80	$ 74,143.50	
							GRANULAR BORROW					

CHANGE TYPE	CHANGE NO	SCC #	SUB SCC #	UTA ACCOUNT CODE	FUNDING	ITEM NO.	DESCRIPTION	UOM	CONTRACT QTY	CONTRACT UP	CONTRACT TOTAL	NOTES
ADD	2	40.07			BASE	478	GRANULAR BORROW - ROADWAY - BASE	CY	9,557.00	53.59	$ 512,159.21	
ADD	2	40.07			OGDEN	479	GRANULAR BORROW - ROADWAY - OGDEN	CY	9,524.00	46.34	$ 441,302.94	
							UNTREATED BASE COURSE					
ADD	2	40.07			BASE	481	UNTREATED BASE COURSE - ROADWAY - BASE	CY	4,365.00	71.04	$ 310,094.82	
ADD	2	40.07			OGDEN	482	UNTREATED BASE COURSE - ROADWAY - OGDEN	CY	3,271.00	63.64	$ 208,179.16	
ADD	2	40.07			BASE	483	UNTREATED BASE COURSE - DRIVEWAYS	CY	258.00	141.53	$ 36,514.42	
							ASPHALT PAVEMENT HMA 1/2-INCH					
ADD	2	40.07			BASE	485	ASPHALT PAVEMENT HMA 1/2-INCH - ROADWAY - BASE	TON	10,622.00	98.23	$ 1,043,421.19	
ADD	2	40.07			OGDEN	486	ASPHALT PAVEMENT HMA 1/2-INCH - ROADWAY - OGDEN	TON	4,641.00	96.83	$ 449,368.81	
ADD	2	40.07			BASE	487	ASPHALT PAVEMENT HMA 1/2-INCH - DRIVEWAYS	TON	1,030.00	193.82	$ 199,635.39	
							BONDED WEARING COURSE					
ADD	2	40.07			BASE	489	BONDED WEARING COURSE 1 INCH - ROADWAY - BASE	SY	28,693.00	7.62	$ 218,613.24	
							MICRO-SURFACING					
ADD	2	40.07			BASE	491	MICRO-SURFACING - ROADWAY	SY	36,693.00	6.78	$ 248,789.89	
							PORTLAND CEMENT CONCRETE PAVEMENT 8-INCH THICK					
ADD	2	40.07			BASE	493	PCCP 8-INCH - ROADWAY - BASE	SY	3,716.00	96.89	$ 360,030.43	
ADD	2	40.07			OGDEN	494	PCCP 8-INCH - ROADWAY - OGDEN	SY	1,037.00	94.07	$ 97,547.34	
							PERMANENT PAVEMENT MARKING, STRIPING					
ADD	2	40.07			BASE	496	PERMANENT PAVEMENT MARKING, STRIPING - BASE	LS	1.00	604,289.31	$ 604,289.31	Red Epoxy Paint not Available, Priced as Standard Red Paint
ADD	2	40.07			DEE STA	497	PERMANENT PAVEMENT MARKING, STRIPING - DEE	LS	1.00	33,753.06	$ 33,753.06	Red Epoxy Paint not Available, Priced as Standard Red Paint
ADD	2	40.07			OGDEN	498	PERMANENT PAVEMENT MARKING, STRIPING - OGDEN	LS	1.00	16,663.86	$ 16,663.86	
							RUMBLE STRIPS					
ADD	2	40.07			BASE	500	LONGITUDINAL RUMBLE STRIP - ASPHALT	LF	9,304.00	0.37	$ 3,486.00	
							PERMANENT SIGNAGE					
ADD	2	40.07			BASE	502	PERMANENT SIGNAGE - BASE	LS	1.00	106,283.93	$ 106,283.93	Remove & Relocate Wayfinding Signage for 8 each at $1,000 each for Wayfinding Signage on WSU Campus, not shown in Design Documents
ADD	2	40.07			DEE STA	503	PERMANENT SIGNAGE - DEE EVENTS	LS	1.00	4,669.65	$ 4,669.65	
ADD	2	40.07			OGDEN	504	PERMANENT SIGNAGE - OGDEN	LS	1.00	6,628.02	$ 6,628.02	
							BOLLARDS					
ADD	2	40.07			BASE	506	INSTALL BOLLARDS - BASE	EA	27.00	1,533.87	$ 41,414.44	Includes Browning Center, Linquist Plaza and OITC bollards. All bollards at stations, ramps and ped refuge areas are incidental to those items.
							ADJUST VALVE BOXES/MANHOLES TO FINISH GRADE					
ADD	2	40.07			BASE	508	ADJUST METER BOX TO FINISH GRADE-BASE	EA	3.00	743.88	$ 2,231.65	
ADD	2	40.07			BASE	509	ADJUST VALVE BOXES TO FINISH GRADE - BASE	EA	18.00	836.87	$ 15,063.66	
ADD	2	40.07			OGDEN	510	ADJUST VALVE BOXES TO FINISH GRADE - OGDEN	EA	3.00	836.87	$ 2,510.61	
ADD	2	40.07			BASE	511	ADJUST WATER MANHOLE TO FINISH GRADE-BASE	EA	1.00	1,084.83	$ 1,084.83	
ADD	2	40.07			OGDEN	512	ADJUST WATER MANHOLE TO FINISH GRADE-OGDEN	EA	1.00	1,084.83	$ 1,084.83	
ADD	2	40.07			BASE	513	ADJUST MANHOLES TO FINISH GRADE - BASE	EA	19.00	1,084.83	$ 20,611.81	
ADD	2	40.07			OGDEN	514	ADJUST MANHOLES TO FINISH GRADE - OGDEN	EA	46.00	1,084.83	$ 49,902.27	
ADD	2	40.07			BASE	515	ADJUST VAULTS TO FINISH GRADE-BASE	EA	10.00	3,843.41	$ 38,434.05	
ADD	2	40.07			OGDEN	516	ADJUST VAULTS TO FINISH GRADE-OGDEN	EA	3.00	3,843.40	$ 11,530.21	
		40.08					**TEMPORARY FACILITIES AND OTHER INDIRECT COSTS DURING CONSTRUCTION**					
							SITE MAINTENANCE					
ADD	2	40.08				519	TEMP TRAFFIC SIGNALS	LS	1.00	36,326.53	$ 36,326.53	See Shared Risk Program for Temporary Signals at 36th Street
ADD	2	40.08				520	OFF DUTY POLICE OFFICERS	HR	504.00	72.00	$ 36,288.00	
ADD	2	40.08				521	MAINTENANCE OF TRAFFIC	LS	1.00	1,445,149.94	$ 1,445,149.94	See Shared Risk Program for traffic control plans

CHANGE TYPE	CHANGE NO	SCC #	SUB SCC #	UTA ACCOUNT CODE	FUNDING	ITEM NO.	DESCRIPTION	UOM	CONTRACT QTY	CONTRACT UP	CONTRACT TOTAL	NOTES
ADD	2	40.08				522	PEDESTRIAN CONTROL	LS	1.00	168,141.55	$ 168,141.55	See Shared Risk Program for pedestrian access
ADD	2	40.08				523	TRAFFIC & PEDESTRIAN FLAGGING	LS	1.00	519,969.32	$ 519,969.32	
ADD	2	40.08				524	ACCESS & HAUL ROUTE	LS	1.00	74,433.03	$ 74,433.03	
ADD	2	40.08				525	STORM WATER POLLUTION PREVENTION, SWEEPING	LS	1.00	528,027.02	$ 528,027.02	
ADD	2	40.08				526	YARD FACILITY & SUPPORT EQUIPMENT	LS	1.00	968,726.21	$ 968,726.21	
ADD	2	40.08				527	MOBE/DEMOBE/CLEANUP & FINAL PUNCHLIST	LS	1.00	314,187.40	$ 314,187.40	
ADD	2	40.08				528	WINTERIZATION	LS	1.00	166,151.12	$ 166,151.12	
							PROJECT INDIRECTS					
ADD	2	40.08				530	QC & QA (INCL STAFF)	LS	1.00	1,097,715.94	$ 1,097,715.94	
ADD	2	40.08				531	SURVEYING	LS	1.00	455,978.00	$ 455,978.00	
ADD	2	40.08				532	SAFETY (INCL STAFF)	LS	1.00	518,816.58	$ 518,816.58	
ADD	2	40.08				533	PARTNERING &/OR DRB	LS	1.00	50,000.00	$ 50,000.00	
ADD	2	40.08				534	PUBLIC RELATIONS & INFORMATION	LS	1.00	651,179.44	$ 651,179.44	
ADD	2	40.08				535	PROJECT STAFF W/VEHICLES (NO QC OR SAFETY)	LS	1.00	5,887,196.80	$ 5,887,196.80	
ADD	2	40.08				536	STAFF SUBSISTENCE/RELOCATE/TRAVEL	LS	1.00	127,000.00	$ 127,000.00	
ADD	2	40.08				537	KEY CRAFT SUBSISTENCE/TRAVEL/OVERSCALE	LS	1.00	301,474.93	$ 301,474.93	
ADD	2	40.08				538	OFFICE (INCL ALL CELL PHONES)	LS	1.00	462,528.00	$ 462,528.00	
ADD	2	40.08				539	OWNER'S/ENGINEER'S FACILITIES	LS	1.00	98,560.00	$ 98,560.00	
ADD	2	40.08				540	INSURANCE DEDUCTABLES	LS	1.00	175,000.00	$ 175,000.00	
ADD	2	40.08				541	INSURANCE	LS	1.00	744,099.23	$ 744,099.23	
ADD	2	40.08				542	BONDS	LS	1.00	378,272.24	$ 378,272.24	
ADD	2	40.08				543	ESCALATIONS	LS	1.00	(70,432.00)	$ (70,432.00)	
ADD	2	40.08				544	CONTINGENCIES	LS	1.00	1,739,189.44	$ 1,739,189.44	$300,000 has been removed from the SOV and set aside for the Shared Risk Pool
ADD	2	40.08				545	SMALL TOOLS AND SUPPLIES	LS	1.00	563,488.63	$ 563,488.63	
		50					**SYSTEMS**					
		50.02					**TRAFFIC SIGNALS AND CROSSING PROTECTION**					
ADD	2	50.02	BASE			548	COUNTRY HILLS DR & WSU BUSWAY SIGNAL (SG-01-A)	LS	1.00	85,671.00	$ 85,671.00	
ADD	2	50.02	BASE			549	VILLAGE DR & WSU BUSWAY SIGNAL (SG-01-B)	LS	1.00	86,490.75	$ 86,490.75	
ADD	2	50.02	BASE			550	WSU BUSWAY & ONE-WAY SECTIONS 1NB, 2NB, 1SB, & 2SB (SG-02-A,B,D & E)	LS	1.00	90,383.26	$ 90,383.26	
ADD	2	50.02	BASE			551	WSU BUSWAY & DIXON DR (SG-02-C)	LS	1.00	50,561.20	$ 50,561.20	
ADD	2	50.02	BASE			552	4400 SOUTH & HARRISON BLVD (SG-03-A)	LS	1.00	70,003.07	$ 70,003.07	
ADD	2	50.02	BASE			553	BRT CAMPUS ENTRANCE & HARRISON BLVD (SG-03-B)	LS	1.00	32,377.32	$ 32,377.32	
ADD	2	50.02	BASE			554	36TH STREET & HARRISON BLVD (SG-03-C)	LS	1.00	138,273.85	$ 138,273.85	
ADD	2	50.02	BASE			555	SOUTH & NORTH OF 33RD STREET (SG-03-D & E) (PED CROSSINGS)	LS	1.00	36,182.17	$ 36,182.17	
ADD	2	50.02	BASE			556	32ND STREET & HARRISON BLVD (SG-03-F)	LS	1.00	114,485.79	$ 114,485.79	
ADD	2	50.02	BASE			557	25TH STREET & HARRISON BLVD (SG-03-G)	LS	1.00	100,421.26	$ 100,421.26	
ADD	2	50.02	BASE			558	23RD STREET & LINCOLN AVE (SG-04-A)	LS	1.00	73,570.76	$ 73,570.76	
ADD	2	50.02	BASE			559	WASHINGTON BLVD & 23RD STREET (SG-04-B)	LS	1.00	16,379.42	$ 16,379.42	
ADD	2	50.02	BASE			560	WASHINGTON BLVD AND 2450 MIDBLOCK (SG-04-D) (PED CROSSING)	LS	1.00	51,752.15	$ 51,752.15	
ADD	2	50.02	BASE			561	WASHINGTON BLVD AND 25TH STREET (SG-01-E)	LS	1.00	29,213.83	$ 29,213.83	
ADD	2	50.02	BASE			562	25TH STREET & ADAMS AVE (SG-05-F)	LS	1.00	22,540.39	$ 22,540.39	
ADD	2	50.02	BASE			563	25TH STREET & MONROE BLVD (SG-05-G)	LS	1.00	25,146.04	$ 25,146.04	
ADD	2	50.02	BASE			564	RSU INSTALLATION @ WALL/23, GRANT/23, 30/HARRISON & 26/HARRISON	LS	1.00	6,599.20	$ 6,599.20	
		50.03					**TRACTION POWER SUPPLY: SUBSTATIONS**					

CHANGE TYPE	CHANGE NO	SCC #	SUB SCC #	UTA ACCOUNT CODE	FUNDING	ITEM NO.	DESCRIPTION	UOM	CONTRACT QTY	CONTRACT UP	CONTRACT TOTAL	NOTES
							OG TRANSIT CTR - BUS CHARGING					
ADD	2	50.03			BASE	567	CONDUITS - PRIMARY 6 INCH	LCF	12.00	264.93	$ 3,179.13	Allowance- No design for Bus Charging System in 100% Design
ADD	2	50.03			BASE	568	REMOVE AND RESTORE FOR PRIMARY TRENCH- AC/C&G/SIDEWALK	LF	130.00	60.37	$ 7,847.58	Allowance- No design for Bus Charging System in 100% Design
ADD	2	50.03			BASE	569	FURNISH & INSTALL TRANSFORMER PAD & VAULT	EA	1.00	9,554.38	$ 9,554.38	Allowance- No design for Bus Charging System in 100% Design
ADD	2	50.03			BASE	570	BOLLARD - REMOVABLE	EA	5.00	1,345.65	$ 6,728.23	Allowance- No design for Bus Charging System in 100% Design
ADD	2	50.03			BASE	571	CONDUITS - SECONDARY 2 INCH	LCF	858.00	21.77	$ 18,675.15	Allowance- No design for Bus Charging System in 100% Design
ADD	2	50.03			BASE	572	PULLBOXES 32" W X 19" L X 24" H	EA	3.00	1,478.01	$ 4,434.03	Allowance- No design for Bus Charging System in 100% Design
ADD	2	50.03			BASE	573	POWER CABINET FOUNDATION	EA	1.00	11,763.88	$ 11,763.88	Allowance- No design for Bus Charging System in 100% Design
ADD	2	50.03			BASE	574	CTM SWITCHGEAR FOUNDATION	EA	1.00	2,564.40	$ 2,564.40	Allowance- No design for Bus Charging System in 100% Design
ADD	2	50.03			BASE	575	PANTOGRAPH FOUNDATION	CY	11.00	1,048.61	$ 11,534.76	Allowance- No design for Bus Charging System in 100% Design
ADD	2	50.03			BASE	576	POWER CABINET INSTALLATION	EA	1.00	30,183.00	$ 30,183.00	Allowance- No design for Bus Charging System in 100% Design
ADD	2	50.03			BASE	577	CTM SWITCHGEAR INSTALLATION	EA	1.00	70,427.00	$ 70,427.00	Allowance- No design for Bus Charging System in 100% Design
ADD	2	50.03			BASE	578	PANTOGRAPH INSTALLATION	EA	1.00	40,244.00	$ 40,244.00	Allowance- No design for Bus Charging System in 100% Design
							DEE EVENTS CTR - BUS CHARGING					
ADD	2	50.03			DEE STA	580	CONDUITS- PRIMARY 6 INCH	LCF	180.00	87.35	$ 15,722.26	Allowance- No design for Bus Charging System in 100% Design
ADD	2	50.03			DEE STA	581	REMOVE AND RESTORE FOR PRIMARY TRENCH- LANDSCAPE AREA	LF	63.00	7.55	$ 475.38	Allowance- No design for Bus Charging System in 100% Design
ADD	2	50.03			DEE STA	582	FURNISH & INSTALL TRANSFORMER PAD & VAULT	EA	1.00	9,554.38	$ 9,554.38	Allowance- No design for Bus Charging System in 100% Design
ADD	2	50.03			DEE STA	583	CONDUITS- SECONDARY 2 INCH	LCF	540.00	22.72	$ 12,269.43	Allowance- No design for Bus Charging System in 100% Design
ADD	2	50.03			DEE STA	584	PULLBOXES 32" W X 19" L X 24" H	EA	3.00	1,478.01	$ 4,434.03	Allowance- No design for Bus Charging System in 100% Design
ADD	2	50.03			DEE STA	585	POWER CABINET FOUNDATION	EA	1.00	11,763.88	$ 11,763.88	Allowance- No design for Bus Charging System in 100% Design
ADD	2	50.03			DEE STA	586	CTM SWITCHGEAR FOUNDATION	EA	1.00	2,564.40	$ 2,564.40	Allowance- No design for Bus Charging System in 100% Design
ADD	2	50.03			DEE STA	587	PANTOGRAPH FOUNDATION	CY	11.00	1,048.61	$ 11,534.76	Allowance- No design for Bus Charging System in 100% Design
ADD	2	50.03			DEE STA	588	POWER CABINET INSTALLATION	EA	1.00	30,183.00	$ 30,183.00	Allowance- No design for Bus Charging System in 100% Design
ADD	2	50.03			DEE STA	589	CTM SWITCHGEAR INSTALLATION	EA	1.00	70,427.00	$ 70,427.00	Allowance- No design for Bus Charging System in 100% Design
ADD	2	50.03			DEE STA	590	PANTOGRAPH INSTALLATION	EA	1.00	40,244.00	$ 40,244.00	Allowance- No design for Bus Charging System in 100% Design
		50.05					**COMMUNICATIONS**					
ADD	2	50.05			BASE	592	F1 - ATMS DUCTBANK BORED (4-1.25)	LCF	113,281.00	7.55	$ 855,791.21	
ADD	2	50.05			BASE	593	F2 - 2-2" DUCTBANK BORED	LCF	4,555.00	5.51	$ 25,093.51	
ADD	2	50.05			BASE	594	F3 - 1-3" DUCTBANK BORED	LCF	2,772.00	5.18	$ 14,372.64	
ADD	2	50.05			BASE	595	F9 - 1.25 Conduit (UTA)	LCF	21.00	244.43	$ 5,133.08	
ADD	2	50.05			BASE	596	F14 - 1D (UDOT)	LCF	365.00	0.01	$ 4.30	
ADD	2	50.05			BASE	597	ATMS MANHOLES	LS	1.00	16,073.98	$ 16,073.98	
ADD	2	50.05			BASE	598	ATMS HANDHOLES	LS	1.00	71,981.02	$ 71,981.02	
ADD	2	50.05			BASE	599	ATMS INSTALLATION SUB	LS	1.00	407,030.89	$ 407,030.89	Per CVE and 100% Design Documents, Assumes open conduit path outside of Project Limits inside of exsisting UDOT ATMS ductbank to install new fiber.
							CM/CG FEE					
ADD	2						CM/GC FEE	LS	1.00	4,249,485.30	$ 4,249,485.30	
							TOTAL BASE					
							TOTAL ADDENDUM 1				**$ 162,222.00**	
							TOTAL ADDENDUM 2				**$ 60,747,070.00**	
							TOTAL BASE				**$ 60,909,292.00**	Does not include any betterment scope

Exhibit B

Project Minimum Insurance Requirements

Exhibit B to Construction Services Amendment
Utah Transit Authority
Project Minimum Insurance Requirements

Contractor shall procure and maintain for the duration of the contract, and for 6 years thereafter, insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder by the contractor, his agents, representatives, employees, or subcontractors.

MINIMUM SCOPE AND LIMIT OF INSURANCE

Coverage shall be at least as broad as:

1. **Commercial General Liability (CGL)**: Commercial general liability ("CGL") insurance for all operations in a form providing coverage not less than that of standard commercial general liability insurance. The CGL insurance shall be on an occurrence form and cover all operations of the contractor and its subcontractors, including independent contractors. The CGL insurance shall, at a minimum, provide coverage for bodily injury, products and completed operations coverage, contractual liability and personal injury liability with limits not less than:
    a. $10 million per occurrence for bodily injury and property damage, with a maximum deductible or self-insured retention of $100,000.
    b. $10 million per occurrence for products/completed operation coverage.
    c. $2 million per occurrence for personal and advertising injury and contractual liability.

    The CGL insurance shall not have any coverages that delete or deny coverage including, but not limited to, ISO Form 2294. The contractor shall obtain approval of the CGL policy from UTA prior to executing the contract.
2. **Automobile Liability**: Automobile liability insurance covering bodily injury and property liability exposures relating to all owned, hired or non-owned autos used in conjunction with the contract work. Such insurance shall have a combined single limit of not less than $5 Million.
3. **Workers' Compensation:** Worker's compensation insurance as required by the State of Utah, with statutory limits, and employers' liability insurance with a limit of no less than $500,000 each accident, $500,000 disease-policy limit and $500,000 disease-each employee.
4. **Builder's Risk:** Builder's risk (course of construction) insurance, covering the risk of loss for any damage or loss to the building or structure by any means or occurrence until the final completion of the contract work. Coverage shall utilize an "All Risk" (Special Perils) coverage form, with limits equal to the completed value of the project and no coinsurance penalty provisions. The coverage shall include mechanical breakdown, property in transit, property at temporary storage locations, earthquake damage and flood damage insuring the interests of UTA, SLCDA and their respective subcontractors of any tier providing equipment, materials or services for the project.
5. **Professional Liability**: Professional liability insurance with limits no less than $5 million per occurrence or claim, and $1,000,000 with a maximum deductible or self-insured retention of $100,000.

6. **Pollution Legal Liability:** Contractor's pollution legal liability and/or asbestos legal liability and/or errors and omissions (if project involves environmental hazards) with limits no less than $2,000,000 per occurrence or claim, and $4,000,000 policy aggregate.

If the contractor maintains higher limits than the minimums shown above, UTA requires and shall be entitled to coverage for the higher limits maintained by the contractor. Any available insurance proceeds in excess of the specified minimum limits of insurance and coverage shall be available to UTA.

Deductibles and Self-Insured Retentions

Any deductibles or self-insured retentions must be declared to and approved by UTA. At the option of UTA, either: the contractor shall cause the insurer to reduce or eliminate such deductibles or self-insured retentions as respects UTA, its officers, officials, employees, and volunteers; or the contractor shall provide a financial guarantee satisfactory to UTA guaranteeing payment of losses and related investigations, claim administration, and defense expenses.

Other Insurance Provisions

The insurance policies are to contain, or be endorsed to contain, the following provisions:

1. Excepting the worker's compensation and professional liability policies, UTA and their respective officers, officials, employees, and volunteers are to be covered as additional insureds with respect to liability arising out of with respect to liability arising out of work or operations performed by or on behalf of the contractor including materials, parts, or equipment furnished in connection with such work or operations and automobiles owned, leased, hired, or borrowed by or on behalf of the contractor. General liability coverage can be provided in the form of an endorsement to the contractor's insurance (at least as broad as ISO Form CG 20 10, CG 11 85 or both CG 20 10 and CG 20 37 forms if later revisions used).
2. For any claims related to this project, the contractor's insurance coverage shall be primary insurance as respects UTA, its officers, officials, employees, and volunteers. Any insurance or self-insurance maintained by UTA, its officers, officials, employees, or volunteers shall be excess of the contractor's insurance and shall not contribute with it.
3. Each insurance policy required by this clause shall provide that coverage shall not be canceled, except with notice to UTA.

Builder's Risk (Course of Construction) Insurance

Contractor may submit evidence of Builder's Risk insurance in the form of Course of Construction coverage. Such coverage shall name UTA as a loss payee as their interest may appear.

If the project does not involve new or major reconstruction, at the option of UTA, an Installation Floater may be acceptable. For such projects, a Property Installation Floater shall be obtained that provides for the improvement, remodel, modification, alteration, conversion or adjustment to existing buildings, structures, processes, machinery and equipment. The Property Installation Floater shall provide property damage coverage for any building, structure, machinery or equipment damaged, impaired, broken, or destroyed during the performance of the Work, including during transit, installation, and testing at UTA's site.

Claims Made Policies

If any coverage must be written on a claims-made coverage form:

1. The retroactive date must be shown, and this date must be before the execution date of the contract or the beginning of contract work.
2. Insurance must be maintained and evidence of insurance must be provided for at least five (5) years after completion of contract work.
3. If coverage is canceled or non-renewed, and not replaced with another claims-made policy form with a retroactive date prior to the contract effective, or start of work date, the contractor must purchase extended reporting period coverage for a minimum of five (5) years after completion of contract work.
4. A copy of the claims reporting requirements must be submitted to UTA for review.

Acceptability of Insurers

Insurance is to be placed with insurers with a current A.M. Best rating of no less than A: VII, unless otherwise acceptable to UTA.

Waiver of Subrogation

Contractor hereby agrees to waive rights of subrogation which any insurer of contractor may acquire from contractor by virtue of the payment of any loss. Contractor agrees to obtain any endorsement that may be necessary to affect this waiver of subrogation. The Workers' Compensation policy shall be endorsed with a waiver of subrogation in favor of UTA for all work performed by the contractor, its employees, agents and subcontractors.

Verification of Coverage

Contractor shall furnish UTA with original certificates and amendatory endorsements, or copies of the applicable insurance language, effecting coverage required by this contract. All certificates and endorsements are to be received and approved by UTA before work commences. However, failure to obtain the required documents prior to the work beginning shall not waive the contractor's obligation to provide them. UTA reserves the right to require complete, certified copies of all required insurance policies, including endorsements, required by these specifications, at any time.

Subcontractors

Contractor shall require and verify that all subcontractors maintain insurance meeting all the requirements stated herein, except subcontractor limits may be reduced to $2M per incident and $4M aggregate for General Liability, $2M per incident and $4M aggregate for Workers Compensation and Employer Liability, $2M per incident and $4M aggregate for Automobile Liability, and $1M for Pollution. Contractor shall ensure that UTA is an additional insured on insurance required from subcontractors. For CGL coverage subcontractors shall provide coverage with a form at least as broad as CG 20 38 04 13. Contractor may adopt a contractor controlled insurance program to meet this requirement.

Special Risks or Circumstances

UTA reserves the right to modify these requirements, including limits, based on the nature of the risk, prior experience, insurer, coverage, or other circumstances.

Exhibit C

Design and Construction General Conditions

Exhibit C to Phase 2 Construction Services Amendment
Design and Construction General Conditions

ARTICLE 1
General

1.1 **Cooperation.** UTA and Contractor commit at all times to cooperate fully with each other, and proceed on the basis of trust and good faith, so as to permit each party to realize the benefits afforded under the Contract Documents.

1.2 **Professional Standards.** Contractor shall perform the Work in a good and workmanlike manner, and shall use reasonable skill, care, and diligence. If the Work includes professional services, Contractor shall perform those services in a professional manner, using at least that standard of care, skill and judgment that can reasonably be expected from similarly situated professionals.

1.3 **Definitions.** Terms that are defined in the Agreement have the same definition in all the Contract Documents, including in these General Conditions. Unless expressly modified by the Agreement, the following definitions shall also apply to all Contract Documents:

"Agreement" means the document signed by Contractor and UTA to which these General Conditions are attached as an exhibit or into which these General Conditions are incorporated by reference.

"Application for Payment" shall mean an invoice for a progress or final payment made in accordance with the requirements of Article 4.

"Basis of Design Documents" means those preliminary drawings, concept design drawings, technical requirements, performance requirements, project criteria, or other documents that are (i) included in the Contract Documents, and (ii) serve as the basis or starting point for design services to be performed by Contractor, if any.

"Claim" has the meaning indicated in Section 8.1 of these General Conditions.

"Construction Documents" means the final drawings and specifications that set forth in detail the requirements for construction of the Project.

"Contract Documents" means those documents designated as Contract Documents in the Agreement.

"Contract Times" means the guaranteed dates for Substantial Completion, Final Completion (if applicable), and any other deadlines for completion of the Work, or a part thereof, all as set forth in the Agreement.

“Contractor” means the entity that has entered into a contract with UTA to perform construction and other services as detailed in the Contract Documents. The Contractor may be a CM/GCer, general contractor, Construction Manager/General Contractor, or other type of entity.

“Day” means a calendar day unless otherwise specifically noted in the Contract Documents.

“Differing Site Condition” has the meaning indicated in Section 3.2 of these General Conditions.

“Final Completion” has the meaning indicated in Section 4.7 of these General Conditions.

“Force Majeure Event” means a delay caused by any national or general strikes, fires, riots, acts of God, acts of the public enemy, floods, acts of terrorism, unavoidable transportation accidents or embargoes, or other events: (i) which are not reasonably foreseeable as of the date the Agreement was executed; (ii) which are attributable to a cause beyond the control and without the fault or negligence of the party incurring such delay; and (iii) the effects of which cannot be avoided or mitigated by the party claiming such Force Majeure Event through the use of commercially reasonable efforts. The term Force Majeure Event does not include a delay caused by seasonal weather conditions, inadequate construction forces, general economic conditions, changes in the costs of goods, or Contractor’s failure to place orders for equipment, materials, construction equipment or other items sufficiently in advance to ensure that the Work is completed in accordance with the Contract Documents.
“General Conditions” means this document.

“Legal Requirements” means all applicable federal, state, and local laws, codes, ordinances, rules, regulations, orders and decrees of any government or quasi-government entity having jurisdiction over the Project or Site, the practices involved in the Project or Site, or any Work including, without limitation, those related to safety and environmental protection. The terms Legal Requirements shall also include any requirements or conditions included in a permit required for, or issued in conjunction with, the Project.

“Potential Change Notice” has the meaning indicated in Section 7.3 of these General Conditions.

“Project” means the construction project described in the Agreement.

“Punchlist” means shall mean a schedule of Work items (developed in accordance with the procedures described in Article 4) which remain to be completed prior to Final Completion, but which do not adversely affect the performance, operability, capacity, efficiency, reliability, cost effectiveness, safety or use of the Project after Substantial Completion.

“Schedule of Values” means the detailed statement furnished by Contractor and approved by UTA in accordance with Section 4.1, which statement outlines the various components of the Contract Price and allocates values for all such components in a manner that can be used for preparing and reviewing invoices.

“Site” means the land or premises on which the Project is located, as more particularly defined and described in the Contract Documents.

"Subcontractor" means any person or entity (including subcontractors at any tier, design engineers, laborers and materials suppliers) retained by Contractor or any other Subcontractor to perform a portion of Contractor's obligations under the Contract Documents.

"Substantial Completion" or "Substantially Complete" has the meaning indicated in Section 4.6 of these General Conditions.

"Work" means all obligations, duties, requirements, and responsibilities for the successful completion of the Project by Contractor, including furnishing of all services and/or equipment (including obtaining all applicable licenses and permits to be acquired by Contractor) in accordance with the Contract Documents.

ARTICLE 2
Contractor's Services

2.1 General Services.

2.1.1 Contractor's Project Manager shall be reasonably available to UTA and shall have the necessary expertise and experience required to supervise the Work. Contractor's Project Manager shall communicate regularly with UTA and shall be vested with the authority to act on behalf of Contractor.

2.1.2 Contractor shall provide UTA with a monthly status report detailing the progress of the Work, including: (i) whether the Work is proceeding according to schedule; (ii) whether discrepancies, conflicts, or ambiguities exist in the Contract Documents that require resolution; (iii) whether unusual health and safety issues exist in connection with the Work; and (iv) other items that require resolution so as not to jeopardize Contractor's ability to complete the Work for the Contract Price and within the Contract Time(s).

2.1.3 Unless a schedule for the execution of the Work has been attached to the Agreement as an exhibit at the time the Agreement is executed, Contractor shall prepare and submit, within seven (7) Days of the execution of the Agreement, a schedule for the execution of the Work for UTA's review and response. The schedule must indicate the dates for the start and completion of the various stages of Work, including the required dates when UTA obligations must be completed to enable Contractor to achieve the Contract Time(s). Such UTA obligation dates may include (where contemplated in the Contract Documents): (i) Site availability requirements; and/or (ii) dates when UTA information or approvals are required. The schedule shall be revised as required by conditions and progress of the Work, but such revisions shall not relieve Contractor of its obligations to complete the Work within the Contract Time(s), as such dates may be adjusted in accordance with the Contract Documents. UTA's review of, and response to, the schedule shall not be construed as relieving Contractor of its complete and exclusive control over the means, methods, sequences and techniques for executing the Work.

2.2 **Design Services.** If the Work includes any design services, provisions 2.2.1 through 2.2.8 apply.

2.2.1 Contractor shall provide the necessary design services, including architectural, engineering and other design professional services, for the preparation of the required drawings, specifications and other design submittals to permit Contractor to complete the Work consistent with the Contract Documents. Contractor shall ensure that design services are performed by qualified, licensed design professionals employed by Contractor, or by qualified, independent licensed design consultants procured by Contractor.

2.2.2 Contractor and UTA shall, consistent with any applicable provision of the Contract Documents, agree upon any interim design submissions that UTA may wish to review, which interim design submissions may include design criteria, drawings, diagrams, and specifications setting forth the Project requirements. Interim design submissions must be consistent with the Basis of Design Documents, as the Basis of Design Documents may have been changed through the design process set forth in this Section 2.2.2. On or about the time of the scheduled submissions, Contractor and UTA shall meet and confer about the submissions, with Contractor identifying during such meetings, among other things, the evolution of the design and any changes to the Basis of Design Documents, or, if applicable, previously submitted design submissions. Changes to the Basis of Design Documents shall be processed in accordance with Article 7. Minutes of the meetings, including a full listing of all changes, will be maintained by Contractor and provided to all attendees for review. Following the design review meeting, UTA will be entitled to at least ten (10) Days to review and approve the interim design submissions and meeting minutes.

2.2.3 To the extent not prohibited by the Contract Documents or Legal Requirements, and with the approval of UTA, Contractor may prepare interim design submissions and Construction Documents for a portion of the Work to permit construction to proceed on that portion of the Work prior to completion of the Construction Documents for the entire Work.

2.2.4 Contractor shall submit proposed Construction Documents to UTA, which must be consistent with the latest set of interim design submissions, as such submissions may have been modified in a design review meeting and recorded in the meeting minutes. The parties shall have a design review meeting to discuss, and UTA shall review and approve, the Construction Documents in accordance with the procedures set forth in Section 2.2.2 above. Contractor shall submit one set of approved Construction Documents to UTA prior to commencement of construction.

2.2.5 UTA's review and approval of interim design submissions, meeting minutes, and Construction Documents is for the purpose of mutually establishing a conformed set of Contract Documents compatible with the requirements of the Work. Neither UTA's review nor approval of any interim design submissions, meeting minutes, and Construction Documents shall be deemed to: (i) relieve Contractor from its obligations to comply with the Contract Documents; (ii) relieve Contractor from its obligations with respect to the accuracy of the design submittals; or (iii) transfer any design liability from Contractor to UTA.

2.2.6 Upon completion of the Work, and as a condition to receiving final payment pursuant to Section 4.7, Contractor shall prepare and provide to UTA a final set of as-built

drawings, depicting the Project as completed, including all changes to the Project made subsequent to the approval of the Construction Documents.

2.2.7 All drawings, specifications, interim design submissions, Construction Documents, and other documents furnished by Contractor to UTA pursuant to the Contract Documents (those documents, the "Work Product") are deemed to be instruments of service and Contractor shall retain the ownership and intellectual property rights therein.

2.2.8 Once UTA has made a corresponding payment for the Work required for Contractor to prepare any Work Product, Contractor will be deemed to have granted to UTA a license to use that Work Product in connection with the construction, occupancy, and maintenance of the Project, or any other UTA project or facility.

2.3 Government Approvals, Permits, and Legal Requirements.

2.3.1 Except where the Contract Documents expressly state that UTA will be responsible for a specific entitlement, Contractor shall obtain and pay for all necessary permits, approvals, licenses, government charges and inspection fees required for the prosecution of the Work by any government or quasi-government entity having jurisdiction over the Project or Site. Contractor shall provide reasonable assistance to UTA in obtaining any permits, approvals, and licenses that the Contract Documents expressly specify to be a UTA responsibility.

2.3.2 Contractor shall perform the Work in accordance with all Legal Requirements and shall provide all notices applicable to the Work as required by the Legal Requirements.

2.3.3 Contractor shall file a notice of commencement, a notice of completion, and other notices required by Utah Code Title 38 (Liens). Contractor shall file such notices in the manner and within the time periods required by law.

2.3.4 The Contract Price and/or Contract Time(s) will be adjusted to compensate Contractor for the effects of any changes in the Legal Requirements provided that such changes: (i) materially increase Contractor's cost of, or time required for, the performance of the Work; and (ii) are enacted after the effective date of the Agreement.

2.4 Construction Services.

2.4.1 Contractor shall proceed with construction in accordance with the approved Construction Documents.

2.4.2 Except to the extent that the Contract Documents expressly identify UTA obligations related to the Work, Contractor shall provide through itself or Subcontractors the necessary supervision, labor, inspection, testing, start-up, material, equipment, machinery, temporary utilities and other temporary facilities (whether or not expressly stated or depicted in the Contract Documents or Construction Drawings) to permit Contractor to complete construction of the Project consistent with the Contract Documents.

2.4.3 Contractor is responsible for securing the Site until UTA issues a Certificate of Substantial Completion.

2.4.4 Contractor shall perform all construction activities efficiently and with the requisite expertise, skill and competence to satisfy the requirements of the Contract Documents. Contractor shall at all times exercise complete and exclusive control over the means, methods, sequences, techniques and procedures of construction.

2.4.5 Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Contractor shall take necessary precautions for the safety of, and shall provide necessary protection to prevent damage, injury or loss to the following: (i) all Contractor, Subcontractor, UTA employees, the public and other persons who may be affected thereby; (ii) all Work and all equipment and materials to be incorporated into the Work; and (iii) other property at the Site or adjacent thereto. Contractor shall comply with the minimum standards imposed by UTA's Construction Safety and Security Program Manual, as updated from time to time (UTA's Construction Safety and Security Program Manual is incorporated into the Contract Documents by reference). However, Contractor shall be responsible for all additional as necessary to comply protect persons and property and comply with applicable Legal Requirements related to safety.

2.4.6 Contractor shall employ only Subcontractors who are duly licensed and qualified to perform the Work consistent with the Contract Documents. UTA may require Contractor to remove from the Project a Subcontractor or anyone employed directly or indirectly by any Subcontractor, if UTA reasonably concludes that the Subcontractor is creating safety risks at the Site or quality risks to the Project.

2.4.7 Contractor is responsible for the proper performance of the Work by Subcontractors and for any acts and omissions in connection with such performance. Nothing in the Contract Documents is intended or deemed to create any legal or contractual relationship between UTA and any Subcontractor, including but not limited to any third-party beneficiary rights.

2.4.8 Contractor shall coordinate the activities of all of its Subcontractors. If UTA performs other work on the Project or at the Site with separate contractors under UTA's control, Contractor agrees to reasonably cooperate and coordinate its activities with those of such separate contractors so that the Project can be completed in an orderly and coordinated manner without unreasonable disruption.

2.4.9 Contractor shall keep the Site reasonably free from debris, trash and construction wastes to permit Contractor to perform its construction services efficiently, safely and without interfering with the use of adjacent land areas. Upon Substantial Completion of the Work, or a portion of the Work, Contractor shall remove all debris, trash, construction wastes, materials, equipment, machinery and tools arising from the Work or applicable portions thereof to permit UTA to occupy the Project or a portion of the Project for its intended use.

2.5 Quality Control, Quality Assurance, Inspection, Rejection and Correction of Work.

2.5.1 Contractor shall develop a Project-specific construction quality control plan as contemplated in UTA's Quality Management Plan and Construction Quality Plan. The Contractor's plan shall satisfy the minimum requirement imposed by UTA's Construction Quality Plan and shall be sufficient to ensure that Work is performed in compliance with the Contract Documents. If the Work includes any design services, Contractor shall also develop and thereafter comply with a design quality plan that meets the minimum requirements set forth in UTA Design Quality Plan. UTA Quality Management Plan, Construction Quality Plan and Design Quality Plan are incorporated into the Contract Documents by reference. The Contractor's plans shall be subject to UTA's review and approval.

2.5.2 Contractor shall comply with the approved quality control plan(s). Responsibilities shall include inspection and testing and related activities including administration, management, supervision, reports, record keeping and use of independent testing agencies and laboratories. Contractor shall provide evidence of compliance with the Contract Documents.

2.5.3 UTA will have the right to audit and spot check the Contractor's quality control procedures and documentation. This will include the Company's right to inspect and test all Work at reasonable times. Contractor shall cooperate with any inspection and testing performed by UTA. All contractor-furnished materials and supplies shall be subject to inspection at the point of manufacture.

2.5.2 Any inspection and testing performed by UTA shall be for the sole and exclusive benefit of UTA. Neither inspection and testing of Work, nor the lack of same nor acceptance of the Work by UTA, nor payment therefore shall relieve Contractor from any of its obligations under the Contract Documents.

2.5.3 At any time prior to Substantial Completion, UTA may reject Work which fails to conform to the Contract Documents. Contractor shall, at its sole expense, promptly re-perform or correct any Work so as to conform to the requirements of the Contract. Contractor shall not be entitled to an adjustment to the Contract Price and/or Contract Times with respect to any corrective action necessary to rectify non-conforming Work.

2.5.4 If Contractor fails to promptly remedy rejected Work, UTA may, without limiting or waiving any other rights or remedies it may have, self-perform (through its own forces or through other contractors) the necessary corrective action(s) and deduct all amounts so incurred from any amount then or thereafter due Contractor.

2.6 Contractor's Warranty.

2.6.1 Contractor warrants to UTA that all Work, including all materials and equipment furnished as part of the Work, shall be: (i) of good quality conforming to generally recognized industry standards; (ii) in conformance with the Contract Documents; (iii) free of defects in materials and workmanship; and (iv) consistent with applicable Legal Requirements. Without limiting the generality of the forgoing, Contractor also specifically warrants that any design, engineering or other professional services provided by Contractor shall satisfy applicable professional standards of care and that all materials and that any equipment furnished as part of

the construction shall be new (unless otherwise specified in the Contract Documents). This provision is not intended to limit any manufacturer's warranty that provides UTA with greater warranty rights than set forth in this Section 2.6. Contractor shall provide UTA with all manufacturers' warranties upon Substantial Completion. Similarly, nothing in this Article is intended to limit any other express warranties set forth in the Contract Documents or to limit any other warranties implied by law, custom or usage of trade.

2.6.2 If Contractor becomes aware of any defect in the Work, or non-conformance with the Contract Documents, Contractor shall give prompt written notice of that defect or non-conformance to UTA.

2.6.3 Except as otherwise stated in the Agreement, Contractor shall correct any Work that does not comply with the warranties provided above for a period of two years following the date of Substantial Completion.

2.6.4 Contractor shall, within seven (7) Days of receipt of written notice from UTA that the Work does not comply with the warranties provided above, take meaningful steps to commence corrective action, including the correction, removal, replacement or re-performance of the nonconforming Work and the repair of any damage to other property caused the warranty failure. If Contractor fails to commence the necessary corrective action within such seven (7) Day period (or thereafter fails to continuously and diligently pursue such corrective action to completion), UTA may (in addition to any other remedies provided under the Contract Documents) provide Contractor with written notice that UTA will self-perform (through its own forces or through other contractors) correction of the warranty failure at Contractor's expense. If UTA performs (or causes to be performed) such corrective action, UTA may collect from Contractor all amounts so incurred. If the nonconforming Work creates an emergency requiring an immediate response, the seven (7) Day period identified above shall be deemed inapplicable.

2.6.5 The two-year period referenced in Section 2.6.3 above only applies to Contractor's obligation to correct nonconforming Work and is not intended to constitute a period of limitations for any other rights or remedies UTA may have regarding Contractor's other obligations under the Contract Documents.

ARTICLE 3
Site Conditions

3.1 Hazardous Materials.

3.1.1 Unless otherwise expressly provided in the Contract Documents to be part of the Contractor's Work, Contractor is not responsible for any Hazardous Materials encountered at the Site. "Hazardous Materials" means any substance that: (i) is deemed a hazardous waste or substance under any environmental law; or (ii) might endanger the health of people exposed to it.

3.1.2 If Contractor discovers at the Site any substance the Contractor reasonably believes to be a Hazardous Material, Contractor shall immediately stop Work in the area of the discovery and immediately report the discovery to UTA Project Manager. UTA shall determine how to deal

with the Hazardous Material, and Contractor shall resume Work in the area when directed to do so by UTA Project Manager.

3.1.3 Contractor will be entitled to an adjustment to the Contract Price and/or Contract Time(s) to the extent Contractor's cost and/or time of performance have been adversely impacted by the presence of Hazardous Materials.

3.1.4 The risk allocation and change provisions of Sections 3.1.1 through 3.1.3 do not apply to any Hazardous Materials introduced to the Site by Contractor, its Subcontractors, or anyone for whose acts Contractor is responsible. Those provisions also exclude Hazardous Materials that were properly stored and/or contained at the Site but thereafter released as a result of the Contractor's negligent performance of the Work. To the extent that Hazardous Materials are introduced and/or released at the Site by Contractor as described above in this Section 3.1.4, then: (i) to the fullest extent permitted by law, Contractor shall defend and indemnify UTA from and against all claims, losses, damages, liabilities and expenses, including attorneys' fees and expenses, arising out of or resulting from such Hazardous Materials; and (ii) Contractor shall not be entitled to and extension of Contract Price and/or Contract Time(s).

3.2 Differing Site Conditions.

3.2.1 If Contractor encounters a Differing Site Condition, Contractor will be entitled to an adjustment to the Contract Price and/or Contract Time(s) to the extent Contractor's cost and/or time of performance have been adversely impacted by the Differing Site Condition. "Differing Site Condition" means concealed or latent physical conditions at the Site that: (i) materially differ from the conditions indicated in the Contract Documents; and (ii) are of an unusual nature, differing materially from the conditions ordinarily encountered and generally recognized as inherent in the Work.

3.2.2 Upon encountering a Differing Site Condition, Contractor shall provide prompt written notice to UTA of such condition, which notice shall not be later than five (5) Days after such condition has been encountered. Contractor shall, to the extent reasonably possible, provide such notice before the Differing Site Condition has been substantially disturbed or altered.

ARTICLE 4
Payment

4.1 Schedule of Values.

4.1.1 Unless required by UTA upon execution of this Agreement, within ten (10) Days of execution of the Agreement, Contractor shall submit for UTA's review and approval a Schedule of Values for all of the Work. The Schedule of Values will: (i) subdivide the Work into its respective parts; (ii) include values for all items comprising the Work; and (iii) serve as the basis for monthly progress payments made to Contractor throughout the Work.

4.1.2 UTA will timely review and approve the Schedule of Values so as not to delay the submission of the Contractor's first application for payment. UTA and Contractor shall timely

resolve any differences so as not to delay the Contractor's submission of its first application for payment.

4.2 Application for Payment.

4.2.1 To receive payment, Contractor shall submit to UTA an Application for Payment requesting payment for all Work performed as of the date of the Application for Payment. Contractor shall not submit Applications for Payment more often than once per month. The Application for Payment must be accompanied by supporting documentation sufficient to establish, to UTA's reasonable satisfaction, Contractor's entitlement to receive payment. Application for Payment shall include but may not be limited to the following:

- Updated Schedule of Values for the period
- Signed Safety report for the period
- QA/QC test results and summary report for the period
- Correct and accurate certified payroll reports for GC and all subcontractors active in the period, including summary report of CPs submitted to date
- Updated Form SR for DBE reporting for the period
- Updated schedule and scheduling report

If any portion of the Application for Payment is not complete or not up to date, UTA may withhold the entire amount or a portion amount of the Application for Payment until the supporting documentation is found by UTA to be sufficient. If certified payrolls, or DBE reports are not kept current per federal regulations the contractor or subcontractor shall as a penalty forfeit one hundred dollars ($100) per week until strict compliance is effectuated. The forfeited penalty shall be withheld from progress payments then due.

4.2.2 The Application for Payment may request payment for equipment and materials not yet incorporated into the Project, provided that: (i) UTA is satisfied that the equipment and materials are suitably stored at either the Site or another acceptable location; (ii) the equipment and materials are protected by suitable insurance; and (iii) upon payment, UTA will receive the equipment and materials free and clear of all liens and encumbrances.

4.2.3 The Application for Payment will constitute Contractor's representation that the Work described therein has been performed consistent with the Contract Documents, has progressed to the point indicated in the Application for Payment, and that title to all materials and equipment will pass to UTA free and clear of all claims, liens, encumbrances, and security interests upon the incorporation of the materials and equipment into the Project, or upon Contractor's receipt of payment, whichever occurs earlier.

4.3 Sales Tax Exemption

4.3.1 Purchases of certain materials are exempt from Utah sales tax. UTA will provide a sales tax exemption certificate to Contractor upon request. UTA will not pay Contractor for sales taxes for exempt purchases, and such taxes should not be included in Contractor's Application for Payment.

4.4 UTA's Payment Obligations.

4.4.1 UTA shall pay Contractor all amounts properly requested and documented within thirty (30) Days of receipt of an Application for Payment.

4.4.2 Notwithstanding Section 4.4.1, UTA may withhold up to 5% of each payment as retention in accordance with Utah Code Ann. § 13-8-5.

4.4.3 Notwithstanding Section 4.4.1, UTA may offset from such Application for Payment amounts any owed to UTA by Contractor pursuant to the Contract Documents.

4.4.4 If UTA determines that Contractor is not entitled to all or part of an Application for Payment as a result of Contractor's failure to meet its obligations under the Contract Documents, UTA will notify Contractor of the specific amounts UTA has withheld (or intends to withhold), the reasons and contractual basis for the withholding, and the specific actions Contractor must take to qualify for payment under the Contract Documents. If the Contractor disputes UTA's bases for withholding, Contractor may pursue its rights under the Contract Documents, including those under Article 8.

4.5 Contractor's Payment Obligations.

4.5.1 Contractor shall pay Subcontractors, in accordance with its contractual obligations to such parties, all the amounts Contractor has received from UTA on account of their work. Contractor shall indemnify and defend UTA against any claims for payment and mechanic's liens as set forth in Section 5.2 hereof.

4.5.2 If the Contract Documents include Federal Clauses, the terms of those Federal Clauses pertaining to payment of Subcontractors supersede any conflicting terms of this Article 4.

4.6 Substantial Completion.

4.6.1 Contractor shall notify UTA when it believes the entire Work is Substantially Complete. As used in the Contract Documents, "Substantially Complete" or "Substantial Completion" refers to the Contractor's satisfactory completion of all Work in accordance with the Contract Documents (excluding Punchlist items) to a point such that UTA may safely start-up, occupy or otherwise fully use the Project for its intended purposes in compliance with applicable Legal Requirements. The terms "Substantially Complete" or "Substantial Completion" also require the completion of any items of Work specifically set forth as conditions precedent to Substantial Completion in the Agreement. Within five (5) Days of UTA's receipt of Contractor's notice, UTA and Contractor will jointly inspect such Work to verify that it is Substantially Complete in accordance with the requirements of the Contract Documents. If such Work is Substantially Complete, UTA shall prepare and issue a Certificate of Substantial Completion that will set forth: (i) the date of Substantial Completion of the Work or portion thereof; (ii) the remaining Punchlist items that have to be completed before Final Completion and final payment; and (iii) provisions (to the extent not already provided in the Contract Documents) establishing

UTA's and Contractor's responsibility for the Project's security, maintenance, utilities and insurance pending Final Completion and final payment.

4.6.2 Promptly after issuing the Certificate of Substantial Completion, UTA shall release to Contractor all retained amounts, less an amount equal to two times the reasonable value of all remaining Punchlist items noted in the Certificate of Substantial Completion.

4.6.3 Upon Contractor's request or upon UTA's own initiative, UTA may, in its sole discretion, deem a discrete segment of the Project to be Substantially Complete. The provisions of Sections 4.6.1 and 4.6.2 will apply to that discrete segment of the Project. In addition, before UTA may take possession of a discrete segment of the Project, UTA and Contractor shall obtain the consent of their sureties, insurers, and any government authorities having jurisdiction over the Project.

4.6.4 Following Substantial Completion, UTA may restrict Contractor's access to the Site. UTA shall allow Contractor reasonable access to the Site in order for the Contractor to achieve Final Completion.

4.7 Final Payment.

4.7.1 When Contractor has achieved Final Completion of the Work, Contractor shall submit a Final Application for Payment. As used in the Contract Documents, "Final Completion" refers to the Contractor's satisfactory completion of all Work in accordance with the Contract Documents including completion of Punchlist items, demobilization from the Site and the transmittal of all deliverables required by the Contract Documents. The Final Application for Payment shall include (at a minimum) the items set forth below.

4.7.1.1 An affidavit that there are no claims, obligations or liens outstanding or unsatisfied for labor, services, materials, equipment, taxes or other items performed, furnished or incurred for or in connection with the Work which will in any way affect UTA's interests;

4.7.1.2 A general release executed by Contractor waiving, upon receipt of final payment, all claims, except those claims previously made in writing to UTA and remaining unsettled at the time of final payment;

4.7.1.3 All as-built drawings, redlined drawings, operating manuals, warranty assignments and other deliverables required by the Contract Documents; and

4.7.1.4 Certificates of insurance confirming that required coverages will remain in effect consistent with the requirements of the Contract Documents.

4.7.2 Deficiencies in the Work discovered after Substantial Completion, whether or not such deficiencies would have been included on the Punchlist if discovered earlier, will be deemed warranty Work. Contractor shall correct such deficiencies pursuant to Section 2.6, and UTA may

withhold from the final payment the reasonable value of completion of the deficient work until that work is completed.

ARTICLE 5
Indemnification and Loss

5.1 **Patent and Copyright Infringement**. If the Work includes any design services, provisions 5.1.1 through 5.1.3 apply.

5.1.1 Contractor shall defend any action or proceeding brought against UTA based on any claim that the Work, or any part thereof, or the operation or use of the Work or any part thereof, constitutes infringement of any United States patent or copyright, now or hereafter issued. UTA shall give prompt written notice to Contractor of any such action or proceeding and will reasonably provide authority, information and assistance in the defense of same. Contractor shall indemnify UTA from and against all damages and costs, including but not limited to attorneys' fees and expenses awarded against UTA or Contractor in any such action or proceeding. Contractor shall keep UTA informed of all developments in the defense of such actions.

5.1.2 If UTA is enjoined from the operation or use of the Work, or any part thereof, as the result of any patent or copyright suit, claim, or proceeding, Contractor shall at its sole expense take reasonable steps to procure the right to operate or use the Work. If Contractor cannot so procure such right within a reasonable time, Contractor shall promptly, at Contractor's expense, either: (i) modify the Work so as to avoid infringement of any such patent or copyright; or (ii) replace said Work with Work that does not infringe or violate any such patent or copyright.

5.1.3 Sections 5.1.1 and 5.1.2 above shall not be applicable to any suit, claim or proceeding based on infringement or violation of a patent or copyright: (i) relating solely to a particular process or product of a particular manufacturer specified by UTA and not offered or recommended by Contractor to UTA; or (ii) arising from modifications to the Work by UTA or its agents after acceptance of the Work

5.2 **Payment Claim Indemnification.** Provided that UTA is not in breach of its contractual obligation to make payments to Contractor for the Work, Contractor shall indemnify, defend and hold harmless UTA from any claims or mechanic's liens brought against UTA or against the Project as a result of the failure of Contractor, its Subcontractors, or others for whose acts Contractor is responsible, to pay for any services, materials, labor, equipment, taxes or other items or obligations furnished or incurred for or in connection with the Work. Within three (3) Days of receiving written notice from UTA that such a claim or mechanic's lien has been filed, Contractor shall commence to take the steps necessary to discharge said claim or lien. If Contractor fails to do so, UTA will have the right to discharge the claim or lien and hold Contractor liable for costs and expenses incurred, including attorneys' fees.

5.3 Contractor's General Indemnification.

5.3.1 Contractor, to the fullest extent permitted by law, shall indemnify, hold harmless and defend UTA, its officers, trustees, and employees from and against claims, losses, damages,

liabilities, including attorneys' fees and expenses, for bodily injury, sickness or death, and property damage or destruction resulting from or arising out of the negligent acts or omissions of Contractor, Subcontractors, anyone employed directly or indirectly by any of them or anyone for whose acts any of them may be liable.

5.3.2 If an employee of Contractor, a Subcontractor, anyone employed directly or indirectly by any of them or anyone for whose acts any of them may be liable has a claim against UTA, its officers, directors, employees, or agents, Contractor's indemnity obligation set forth in Section 5.3.1 above will not be limited by any limitation on the amount of damages, compensation or benefits payable by or for Contractor, Subcontractors, or other entity under any employee benefit acts, including workers' compensation or disability acts.

5.4 **Risk of Loss.** Contractor bears all risk of loss to the Project, including materials and equipment not yet incorporated into the Project, until final payment is made by UTA.

ARTICLE 6

6.0 TIME AND CONTRACTOR'S CONSTRUCTION SCHEDULES

6.1 PROGRESS AND COMPLETION

6.1.2 Time is of the essence in this Contract. By executing the Contractor's Agreement, Contractor confirms that the Contract Time is adequate to perform the Work. The Contractor shall proceed expeditiously with adequate forces to achieve Substantial Completion within the Contract Time.

6.1.2.1 Contractor shall commence and complete the Work within the Contract Time and pursuant to the schedule, an initial version of which shall be prepared and provided by Contractor to UTA prior to issuance of the Authority to Proceed. Contractor shall proceed expeditiously with adequate forces to achieve Substantial Completion within the Contract Time. All other Work shall be completed no later than the date established for Final Completion. Contractor shall notify UTA when Contractor considers the entire Work to be completed. UTA shall be entitled to a final inspection to determine whether the Work has been completed in accordance with the Contract Documents. The date of Substantial Completion shall be established by a written acknowledgement of Substantial Completion signed by UTA.

6.2 **INITIAL CONTRACT TIME**. Unless otherwise specified in the bidding documents, the initial Contract Time shall be the time identified in the Contractor's Agreement.

6.3 SCHEDULE PREPARATION

6.3.1 Promptly after being awarded the Work, Contractor shall prepare and submit for UTA's approval, a planned progress schedule for the Work. Contractor shall plan and schedule the Work to facilitate the Work and shall maintain a schedule to place proper priority to sequence the Work to complete the Work within the Contract Time. Contractor shall commence and complete the Work by the dates set forth in the agreed upon schedule and Contractor's Agreement.

6.3.2 The schedule shall include a time line for procurement, fabrication, construction, and testing activities, including manpower loading, interdependence of items necessary to complete the Work, duration

of activities, interim completion dates, milestones, closeout and commissioning, submittals, and critical path.

6.3.2.1 Contractor shall advise and consult with UTA during progress of the Work and keep UTA fully informed as to the status of the Work at intervals as required by UTA. Contractor shall provide UTA with a daily listing of personnel and equipment used on the Work. If the Work is not on schedule, Contractor shall immediately advise UTA in writing of Contractor's proposed action to bring it on schedule.

6.3.2.2 UTA reserves the right to take reasonable exception to activity duration, activity placement, construction logic, and time frame for any element of the Work to be scheduled and redirect if necessary.

6.4 SCHEDULE SUBMITTAL

6.4.1 Contractor shall develop the CPM schedule using Primavera, MS Project or Phoenix unless otherwise authorized by UTA. The critical path shall be identified, including the critical paths for interim completion dates and milestones.

6.4.2 Contractor shall update the schedule at least once a month and submit the updated schedule with each Application for Payment.

6.4.2.1 No progress payments shall be approved until Contractor has submitted a detailed CPM schedule covering the first ninety (90) days of the Work with a general CPM schedule for the entire Work. The detailed schedule for the entire Work shall be completed prior to the second Application for Payment, unless otherwise authorized in writing by UTA.

6.5 SCHEDULE CONTENT REQUIREMENTS

6.5.1 The schedule shall indicate the duration of activities and order, sequence and interdependence of all items known to be necessary to complete the Work, including construction, procurement, fabrication and delivery of materials and equipment, commissioning, submittals and approvals of submittals or other documents. Work items of UTA, other contractors, utilities, and other third parties that may affect or be affected by Contractor shall be included.

6.5.2 If UTA is required by the Contract Documents to furnish any materials, equipment, or other items to be incorporated into the Work by Contractor, Contractor shall submit, with the first schedule submittal, a letter clearly indicating the dates that such items are required at the Work site.

6.5.2.1 The schedule shall indicate an early Substantial Completion date for the Work that is no later than the Work's required Substantial Completion date.

6.5.2.2 The schedule, including duration of all activities, shall be given in calendar days and indicate all of the following:

6.5.2.3 Interfaces with the Work of outside contractors (e.g., utilities, power, and any separate contractors retained by UTA);

6.5.2.4 Description of activity including activity number/numbers;

6.5.2.5 Estimated duration time for each activity;

6.5.2.6 Early start, late start, early finish, late finish date, and predecessor/successors including stop-start relationships with lead and lag time for each activity – all activities shall have a predecessor and a successor, except for the start milestone and finish milestone;

6.5.2.7 Float available to each path of activities;

6.5.2.8 Actual start date for each activity begun;

6.5.2.9 Actual finish date for each activity completed;

6.5.2.10 The percentage complete of each activity in progress or completed;

6.5.2.11 Identification of all critical path activities;

6.5.2.12 The critical path for the Work, with the path of activities being clearly and easily recognizable on the time-scaled network diagram. The path(s) with the least amount of float must be identified. Unless otherwise authorized by UTA, no more than forty-percent (40%) of all activities may be identified as critical path items. The relationship between non-critical activities and activities on the critical path shall be clearly shown on the network diagram;

6.5.3 Unless otherwise authorized by UTA, all activities on the schedule representing construction on the site may not have a duration longer than fourteen (14) days. Construction items that require more than fourteen (14) days to complete must be broken into identifiable activities on the schedule with durations less than fourteen (14) days. The sum of these activities represents the total length required to complete that construction item; and

6.5.4 Additional requirements, if any, as specified in the Supplemental General Conditions and/or Supplementary Conditions.

6.6 **INTERIM COMPLETION DATES AND MILESTONES**. The schedule must include contractually specified interim completion dates and milestones (which completion milestones must have a "finish on or before" soft constraint added). The milestones and completion dates indicated are considered essential to the satisfactory performance of the Contractor's Agreement and to the coordination of all Work. The milestone dates listed are not intended to be a complete listing of all Work or of interfaces with other contractors.

6.7 **FLOAT TIME**. Float or slack time is defined as the amount of time between the earliest start date and the latest start date or between the earliest finish date and the latest finish date of a chain of activities on the schedule. UTA has the right to use the float time for non-critical path activities until Contractor has reallocated such time on a newly submitted schedule and approval is given.

6.8 **UPDATES**. Prior to any approval of an Application for Payment, UTA and Contractor shall review Contractor's schedule compared to the Work completed. The amount of Work completed shall be approved by UTA as supported by the schedule of values and as verified by the determination of Work completed. If necessary, Contractor shall then update and submit to UTA the schedule with the Application for Payment; all of which shall be in accordance with UTA's approval. All updates shall be provided in electronic and hard copy formats. At each scheduled meeting with UTA, Contractor shall provide a four week-look ahead, with long lead items identified. If the Work is not on schedule, Contractor shall immediately advise UTA in writing of Contractor's proposed action to bring it on schedule.

6.9 **SCHEDULE OF SUBMITTALS**. Contractor shall prepare and keep current, for UTA's review and approval, a schedule of submittals required by the Contract Documents, which shall be

coordinated with Contractor's construction schedule and allow UTA a reasonable time to review the submittals. The submittal schedule shall be included as part of the construction schedule. Submittals requiring expedited review must be clearly identified as such in the schedule of submittals. If a submittal does not pass a second review, then a meeting will be held to determine a path to proceed and expedite approval. Contractor shall notify UTA in writing if review of a submittal is critical.

6.10 **SCHEDULE RECOVERY**. If the Work represented on the critical path falls behind more than seven (7) days, Contractor shall redo the schedule within seven (7) days, showing how the Contractor shall recover the time. Contractor's schedule must have an approved baseline schedule before the schedule may be updated. A narrative that addresses the changes in the schedule from the previously submitted schedule shall be submitted along with the updated schedule in both hard copy and electronic copy formats acceptable to UTA. Contractor shall comply with the most recent schedules.

6.11 SCHEDULE CHANGES AND MODIFICATIONS

6.11.1 The Contract Time may only be shortened or extended by a written Modification executed by UTA.

6.11.2 Should Contractor, after approval of the complete detailed construction schedule, desire to change Contractor's plan of construction, Contractor shall submit its requested revisions to UTA along with a written statement of the revisions including a description of the sequence and duration changes for rescheduling the Work, methods of maintaining adherence to intermediate milestones and the completion dates, and the reasons for the revisions. Requested changes to the approved baseline schedule shall include a narrative that addresses the requested changes. If the requested changes are acceptable to UTA, which acceptance shall not be unreasonably withheld, they shall be incorporated into the schedule in the next reporting period by Contractor. If after Contractor submits a request for change in the schedule, UTA does not agree with the request, UTA shall schedule a meeting with Contractor to discuss the differences.

6.11.3 The critical path schedule, as the term is used in these General Conditions, shall be based on the current version of Contractor's schedule for the Work and accepted by UTA just prior to the commencement of a Modification, asserted delay, suspension, or interruption. If Contractor believes it is entitled to an extension of Contract Time under the Contract Documents, Contractor shall submit a PCO to the A/E and UTA accompanied by an analysis ("Requested Time Adjustment Schedule") in accordance with the Contract Documents for time extensions. The "Requested Time Adjustment Schedule" shall include "fragnets" that represent the added or changed Work to the schedule. The impact on unchanged activities caused by the changes and/or delays being analyzed shall be included in these fragnets. A "fragnet" as used in these General Conditions and when used in the context of project scheduling is a subset of project activities that are inter-related by predecessor and successor relationships that are tied into the main schedule with identified start and completion points. Each fragnet may or may not be on the critical path. An entire schedule consists of a series of inter-related fragnets.

6.12 EXCUSABLE DELAY

6.12.1 If Contractor is unreasonably delayed in the progress of the Work on the critical path schedule by an act or neglect of UTA; or separate contractors retained by UTA; or an event of force majeure that UTA reasonably determines may justify delay beyond the date for Substantial Completion, then the Contract Time shall be extended by Change Order for the period of time caused by such delay. The Contract Price shall not be increased, and the Contract Time shall not be extended for any delays created by UTA that are concurrent delays with Contractor delays.

6.12.2 Delays which according to the schedule do not affect any critical path milestone dates or the completion dates shown on the schedule at the time of the delay shall not be the basis for a change in the Contract Time.

6.12.3 Contractor shall immediately take all steps reasonably possible to lessen the adverse impact of delay. Notwithstanding the foregoing, to the extent any of the causes for delay were caused by Contractor, reasonably foreseeable by Contractor, or avoidable by Contractor, then to such extent the delay shall not be cause for a change in the Contract Time. For purposes of this Section, "Contractor" shall include all subcontractors and others under the responsibility of the Contractor. In no event shall any delays or extensions of time be construed as cause or justification for payment of extra compensation to Contractor and/or an increase in the Contract Price.

6.12.4 The determination of the total amount of time extension shall be based upon the current schedule in effect at the inception of the change and/or delay and upon all data relevant to the extension as supported by appropriate substantiating relative data in the project record. Once approved, such data shall be incorporated in the next monthly update of the schedule by Contractor.

6.12.5 The Contract Time shall not be extended for normal bad weather or any weather that is reasonably foreseeable at the time of entering into the Contractor's Agreement. The Contract Time as stated in the Contract Documents includes due allowance for days on which Work cannot be performed out of doors. Contractor acknowledges that Contractor may lose days due to weather conditions. Contract Time may be extended at no cost to UTA if all of the following are met which must be established by Contractor:

6.12.6 That the weather prevented Work from occurring that is on the critical path for the Work based upon a critical path schedule previously submitted to UTA and to the extent accepted by UTA;

6.12.7 There are no concurrent delays for which Contractor is responsible;

6.12.8 Contractor took all reasonable steps to alleviate the impact of the weather and took reasonable attempts to prevent the delay and despite such reasonable actions of Contractor, the weather impacted the critical path as described above; and

6.12.9 Either (1) the weather was catastrophic, such as a tornado, hurricane, severe wind storm, or severe hail storm; or (2) based on the full history of information published from the closest station as indicated from the Western Regional Climate Center (Desert Research Institute 2215 Raggio Parkway Reno, Nevada 89512, and as may be described on the website at http://www.wrcc.dri.edu/summary/), one or more of the following occurred: (A) for any day between November 1 and March 31, the minimum temperature fell below the average minimum temperature plus the extreme low temperature recorded for the month divided by 2; (B) for any day between November 1 and March 31, the maximum temperature fell below the monthly average for the minimum temperature; (C) the daily precipitation exceeded seventy-five percent (75%) of the historical one day maximum for the month; and/or (D) the snowfall for the month exceeded one hundred seventy-five percent (175%) of the historical average snow fall for the month.

6.13 COMPENSABLE DELAY, SUSPENSION OR INTERRUPTION

6.13.1 In addition to the other requirements of the Contract Documents, a compensable delay, suspension, or interruption of the Work occurs only when the following are met:

6.13.2 It is wholly unanticipated by Contractor and UTA at the time of execution of the Contractor's Agreement or is caused by the breach of a fundamental obligation of the Contract Documents attributable to UTA; and

6.12.3 Contractor delivers a written notice to the A/E and UTA within seven (7) days that Contractor knows or should have known of the condition giving rise to the purported compensable delay, suspension, or interruption, and the continuation affects the Contract Time as indicated by the last agreed upon critical path schedule.

6.13.4 To the extent of the compensable delay, Contractor's total entitlement for all compensable delay damages is the computed result of the following formula: Contract Price divided by Contract Time (in calendar days); the result of which is then multiplied by 0.05; and the result of which is multiplied by the number of calendar days of compensable days allowed under these General Conditions that are beyond the Contract Time (but in no event to exceed the per day liquidated damages stated in Contractor's Agreement). Notwithstanding any other provision of these General Conditions or the Contract Documents, to the extent Contractor is entitled to receive a markup under Sections 7.4.2.5.1 or 7.4.2.5.2 this provision shall be inapplicable, and the markup shall be deemed to include all the compensable delay damages provided by this Section.

6.13.5 The length and extent of compensable delay shall be determined, with the use of the Work's critical path schedule by ascertaining the number of additional days to the Contract Time that are needed in order to perform the Work in accordance with the Contract Documents as a result of the continuation of the delay, suspension, or interruption after receipt of the written notice received by the A/E and UTA under Section 4.6.12.1.2.

6.13.6 Notwithstanding any other provision of these General Conditions, to the extent a non-compensable delay occurs at the same time as a compensable delay, UTA shall not be responsible for any compensation to Contractor and the Contract Price shall not be increased for the period of the non-compensable delay.

6.14 **TIME EXTENSION REQUESTS**. Contractor shall request any and all Contract Time extensions within seven (7) days after Contractor knew or should have known about the delay and shall support its request by the critical path schedule analysis.

6.15 **LIQUIDATED DAMAGES**.

6.15.1 Time is of the essence in the Contract Documents. UTA shall suffer damages that are difficult to ascertain for each calendar day the date for Substantial Completion is delayed. Therefore, as agreed damages and not as a penalty, UTA may offset from any payments due Contractor the sum stated in the Contractor's Agreement in the case of continuing delay, for each day Substantial Completion is delayed beyond the date established for Substantial Completion of the Work by the Contract Documents.

6.15.2 For each day subsequent to the fourteenth (14^{th}) day after the date established for Substantial Completion of the Work by the Contract Documents, the liquidated damages amount stated in the Contractor's Agreement shall be increased by ½ percent (0.5%) of the amount stated in the Contractor's Agreement for each day Substantial Completion is delayed beyond the date established for Substantial Completion of the Work by the Contract Documents.

6.15.3 The sum for liquidated damages due UTA by Contractor has been agreed upon by reason of the inconvenience and added costs of administration, engineering, supervision, and other costs resulting from Contractor's default.

6.15.4 To the extent liquidated damages exceed any amounts that would otherwise be due Contractor, Contractor shall be liable for such excess to UTA.

6.15.5 Notwithstanding any other provision of these General Conditions, the availability of liquidated damages to UTA shall not limit UTA's right to seek damages or other remedies available under law or equity to the extent such damages or remedies are not based upon delay.

6.15.6 **NO WAIVER OF UTA'S RIGHTS**. Permitting Contractor to continue any part of the Work after the time fixed for completion or beyond any authorized extension thereof shall in no way operate as a waiver or estoppel on the part of UTA of any of its rights under the Contract Documents, including the right to liquidated damages or any other remedies or compensation.

ARTICLE 7
Changes

7.1 Change Orders.

7.1.1 Contractor shall not undertake any activity that materially changes the Work, or materially deviates from the requirements of the Contract Documents, except as authorized in this Article 7. Any costs incurred by Contractor without authorization as provided in this Article 7 will be considered non-compensable.

7.1.2 A Change Order is a written instrument, signed by UTA and Contractor, issued after execution of the Agreement, stating their agreement on a change in: (i) the scope of the Work; (ii) the Contract Price; and/or (iii) the Contract Time(s).

7.1.3 All changes in the Work authorized by applicable Change Order shall be performed under the applicable conditions of the Contract Documents. UTA and Contractor shall negotiate in good faith and as expeditiously as possible the appropriate adjustments for such changes.

7.2 **UTA-Directed Changes.** UTA may direct changes in the Work. Upon receipt of such direction, Contractor shall prepare an estimate of the cost and schedule impact of the change (if any). Upon agreement between UTA and Contractor on the scope of the change to the Work, and the adjustment, if any, to the Contract Price and/or Contract Times, UTA and Contractor shall execute a written Change Order.

7.3 Constructive Changes.

7.3.1 To the extent that Contractor: (i) receives a written or verbal direction or proceeding from UTA that Contractor believes to constitute a material change to the nature, character or schedule of the Work; and/or (ii) becomes aware of any circumstance or condition that expressly provides Contractor a right to a Change Order under the terms of the Contract Documents, then (in either case) Contractor shall deliver to UTA's Project Manager written notice (hereinafter a "Potential Change Notice") within ten (10) Days after Contractor becomes aware of (or should have reasonably become aware) the facts and circumstances which Contractor believes to give rise to a Change Order. The Potential Change Notice shall contain a description of the circumstances constituting the constructive change and also a reasonable best estimate of the dollar impact of the change.

7.3.2 Contractor's failure to deliver a Potential Change Notice describing both the circumstances and a reasonable best estimate of the dollar impact in a timely manner shall constitute a waiver of all of Contractor's rights to a Change Order.

7.3.3 In conjunction with the Potential Change Notice (and in no event later than 20 calendar days after submittal of the Potential Change Notice), Contractor shall submit to UTA all supporting information and documentation necessary for UTA to evaluate the contractual basis for the Potential Change Notice and to also evaluate the relief claimed by Contractor. Contractor shall promptly respond to all UTA inquiries about the Potential Change Notice and the supporting information and documentation.

7.3.4 To the extent UTA concludes that the Potential Change Notice demonstrates Contractor's entitlement to a Contract adjustment, and provided that the parties are able to negotiate mutually agreeable adjustments to the Contract Documents, then UTA and Contractor shall execute a written Change Order.

7.4 Direction or Authorization to Proceed.

7.4.1 Prior to final agreement with respect to a Change Order, UTA may issue a Direction or Authorization to Proceed ("DAP"). A DAP is a written order unilaterally prepared and signed by UTA directing the Contractor to proceed with specified Work while Change Order negotiations or Claim resolution discussions continue. UTA may issue a DAP at any time, and Contractor shall undertake the Work as set forth in the DAP, and in accordance with the Contract Documents.

7.4.2 After issuance of a DAP, UTA and Contractor shall continue to negotiate in good faith to resolve outstanding issues expeditiously.

7.5 **Requests for Information.** UTA shall have the right, from time to time, to issue clarifications to the Work of a non-material nature at any time. Contractor shall have the corresponding right to seek clarification with respect to ambiguous or conflicting provisions of the Contract Documents. Such clarifications or conflicts shall be confirmed, implemented and documented through a Request for Information ("RFI") process to be developed for the Project. The RFI process may also be used to document minor changes in the Work do not involve an adjustment in the Contract Price and/or Contract Time(s) and do not materially and adversely affect the Work, including the design, quality, performance and workmanship required by the Contract Documents.

7.6 Contract Price Adjustments.

7.6.1 The increase or decrease in Contract Price resulting from a change in the Work will be determined by one or more of the following methods:

7.6.1.1 Unit prices set forth in the Agreement or as subsequently agreed to between the parties;

7.6.1.2 A mutually accepted lump sum, properly itemized and supported by sufficient substantiating data to permit evaluation by UTA;

7.6.1.3 Costs, fees and any other markup rates set forth in the Agreement; or

7.6.1.4 If an increase or decrease cannot be agreed to as set forth in items 7.6.1.1 through 7.6.1.3 above and UTA issues a DAP, the cost of the change of the Work shall be determined by the reasonable expense and savings in the performance of the Work resulting from the change, including a reasonable overhead and profit rate, as may be set forth in the Agreement.

7.6.2 If unit prices are set forth in the Contract Documents or are subsequently agreed to by the parties, but application of such unit prices will cause substantial inequity to UTA or Contractor because of differences in the character or quantity of such unit items as originally contemplated, such unit prices shall be equitably adjusted.

7.6.3 Negotiations over changes in the Contract Price will be conducted using an open-book cost-estimating process. UTA defines "open-book" to include all elements of Contractor's costs, including labor hours and rates, units and estimated quantities, unit prices, equipment estimates, material costs, and subcontractor costs. Contractor shall openly share its detailed cost estimate, material and subcontractor quotations and any other information used to compile its cost estimate.

7.7 **Disputes Regarding Change Orders.** If the parties are not able to agree as to whether a Change Order is warranted under the Contract Documents, or cannot agree upon the extent of relief to be granted under a Change Order after good faith negotiations, either party may refer the dispute to the Claim resolution provisions of Article 8. Pending resolution of such Claim, Contractor shall proceed with the Work as directed by UTA under a reservation of rights. UTA shall continue to pay any undisputed payments related to such Claim.

7.8 **Emergencies**. In any emergency affecting the safety of persons and/or property, Contractor shall act, at its discretion, to prevent threatened damage, injury or loss. Any change in the Contract Price and/or Contract Time(s) on account of emergency work shall be determined as provided in this Article 7.

ARTICLE 8
Claims and Claim Resolution

8.1 Claims.

8.1.1 "Claim" means any disputes between UTA and the Contractor arising out of or relating to the Contract Documents including any disputed claims for Contract adjustments that cannot be resolved in accordance with the Change Order negotiation process set forth in Article 8. Claims must be made by written notice. The responsibility to substantiate claims rests with the party making the claim.

8.1.2 Unless otherwise directed by UTA in writing, Contractor shall proceed diligently with performance of the Work pending final resolution of a Claim, including litigation. UTA shall continue to pay any undisputed payments related to such Claim.

8.2 Claim Resolution.

8.2.1 The parties shall attempt in good faith to resolve promptly through negotiation any Claim arising out of or relating to the Contract Documents. If a Claim should arise, UTA's Project Manager and Contractor's Project Manager will meet at least once to attempt to resolve the Claim. For such purpose, either may request the other to meet within seven (7) Days of the date the Claim is made, at a mutually agreed upon time and place.

8.2.2 If UTA's Project Manager and Contractor's Project Manager are not able to resolve the Claim within fourteen (14) Days after their first meeting (or such longer period of time as may be mutually agreed upon), either party may request that UTA's Senior Representative and the Contractor's management representative ("Contractor's Management Representative") meet at least once to attempt to resolve the Claim.

8.2.3 If the Claim has not been resolved within sixty (60) Days of the date the Claim is made, either party may refer the Claim to non-binding mediation by sending a written mediation request to the other party. In the event that such a request is made, the Parties agree to participate in the mediation process. Non-binding mediation of claims or controversies under the Contract Documents shall be conducted by a professional mediator that is mutually acceptable to and agreed upon by both parties (the "Mediator"). The parties and the Mediator may join in the mediation any other party necessary for a mutually acceptable resolution of the Claim. The mediation procedure shall be determined by the Mediator in consultation with the parties. The fees and expenses of the Mediator shall be borne equally by the parties. Should either Party request mediation, the other Party agrees to go through the mediation process prior to pursuing any other type of dispute resolution proceeding including litigation.

8.2.4 If the Claim is not resolved within ninety (90)) days after the commencement of mediation, or if no mediation has been schedule or commenced within one hundred and eighty (180) days of the date the Claim is made, either party may commence litigation to resolve the Claim. The exclusive forum for any such litigation is the Third District Court in and for Salt Lake County, Utah.

ARTICLE 9
Suspension and Termination

9.1 UTA's Right to Stop Work.

9.1.1 UTA may, without cause and for its convenience, order Contractor in writing to stop and suspend the Work. Such suspension shall not exceed one hundred and twenty (120) consecutive Days or aggregate more than two hundred and forty (240) Days during the duration of the Project. In the event a suspension continues longer than the above-referenced periods,

Contractor shall have the right to terminate the Agreement. Any such termination shall be considered to be a termination for convenience by UTA.

9.1.2 If a suspension is directed by UTA without cause, Contractor shall be entitled to seek an adjustment of the Contract Price and/or Contract Time(s) if its cost or time to perform the Work has been adversely impacted by any suspension or stoppage of the Work by UTA.

9.1.3 In addition to its rights under Section 9.3, UTA shall have the right to order a suspension for cause if the Work at any time ceases to comply with the workmanship, safety, quality or other requirements of the Contract Documents or any Legal Requirements. Contractor shall not be entitled to seek an adjustment the Contract Price and/or Contract Time(s) with regard to any such suspension.

9.2 **UTA's Right to Terminate for Convenience.** Upon written notice to Contractor, UTA may, for its convenience and without cause, elect to terminate this Agreement. In such event, UTA shall pay Contractor for the following:

9.2.1 All Work satisfactorily completed or commenced and in process as of the effective date of termination;

9.2.2 The reasonable and demonstrable costs and expenses attributable to such termination, including demobilization costs and amounts due in settlement of terminated contracts with Subcontractors; and

9.2.3 The fair and reasonable sums for overhead and profit on the sum of items 9.2.1.1 and 9.2.1.2 above. UTA shall not be liable for anticipated profits, costs or overhead based upon Work not yet performed as of the date of termination.

9.3 UTA's Right to Terminate for Cause; Other Remedies for Default.

9.3.1 Subject to the cure provision of Section 9.3.2 below and other limitations set forth in these General Conditions, Contractor shall be in default of its obligations under the Contract Documents if Contractor: (i) fails to provide a sufficient number of skilled workers; (ii) fails to supply the materials required by the Contract Documents; (iii) fails to comply with applicable Legal Requirements; (iv) fails to timely pay its Subcontractors without proper cause; (v) makes a materially false or misleading representation or certification in conjunction with the Contract Documents; (vi) fails to prosecute the Work with promptness and diligence to ensure that the Work is completed by the Contract Time(s), as such times may be adjusted; (vii) fails to satisfy any guaranteed interim or completion milestone set forth in the Contract Documents; or (viii) fails to perform any other material obligations under the Contract Documents. In any such event, UTA (in addition to any other rights and remedies provided in the Contract Documents or by law) shall have the rights set forth in Sections 9.3.2 through 9.3.5 below.

9.3.2 Upon the occurrence of an event of default set forth in Section 9.3.1 above, UTA may provide written notice to Contractor that it intends to terminate the Agreement (in whole or in part) or pursue other available remedies unless the grounds for default are cured within ten (10)

Days of Contractor's receipt of such notice. If Contractor fails to cure the grounds for default within such period, then UTA may declare the Agreement, or portions of the Agreement, terminated for default by providing written notice to Contractor of such declaration; provided, however, that to the extent that an item included is the notice of default and demand for cure is capable of cure, but not within the ten-Day cure period, then the Agreement shall not be terminated so long as Contractor commences actions to reasonably cure such breach within the 10-Day cure period and thereafter continuously and diligently proceeds with such curative actions until completion (such additional period not to exceed 45 Days). UTA may terminate the Agreement without opportunity to cure if the breach involves the Contractor's material failure to comply with any Legal Requirements pertaining to safety or environmental compliance.

9.3.3 Upon the continuance of a breach described in Section 9.3.1 for more than ten (10) Days following delivery of written notice to Contractor (and regardless of whether the Agreement, or any portion hereof, has been terminated as provided above), UTA shall be entitled to self-perform (through its own forces or through other contractors) the corrective action necessary to cure Contractor's event of default and deduct all costs so incurred from any amount then or thereafter due to Contractor.

9.3.4 Upon the continuance of a breach described in Section 9.3.1 for more than ten (10) Days following delivery of written notice to Contractor (and regardless of whether the Agreement, or any portion hereof, has been terminated as provided above), UTA shall be entitled to seek performance by any guarantor of Contractor's obligations hereunder or draw upon any surety or security provided for in the Contract Documents.

9.3.5 Upon declaring the Agreement terminated pursuant to Section 9.3.2 above, UTA may enter upon the premises and take possession, for the purpose of completing the Work, of all materials, equipment, scaffolds, tools, appliances and other items thereon, which have been purchased or provided for the performance of the Work, all of which Contractor hereby transfers, assigns and sets over to UTA for such purpose, and to employ any person or persons to complete the Work and provide all of the required labor, services, materials, equipment and other items. In the event of such termination, Contractor shall not be entitled to receive any further payments under the Contract Documents until the Work shall be finally completed in accordance with the Contract Documents. At such time, if the unpaid balance of the Contract Price exceeds the cost and expense incurred by UTA in completing the Work, such excess shall be paid by UTA to Contractor. If UTA's cost and expense of completing the Work exceeds the unpaid balance of the Contract Price, then Contractor shall pay the difference to UTA. Such costs and expenses include not only the cost of completing the Work, but also losses, damages, costs and expenses, including attorneys' fees and expenses, incurred by UTA in connection with the reprocurement and defense of claims arising from Contractor's default.

9.3.6 All rights and remedies set forth in the Contract Documents are cumulative, and unless otherwise specifically provided in the Contract Documents are not exclusive of any other rights or remedies that may be available, whether provided by law, equity, statute, in any other agreement between the Parties or otherwise. Upon the occurrence of any such default, following the applicable process described in this Article, UTA shall be entitled to pursue any and all other

rights and remedies, including without limitation damages, that UTA may have against Contractor under the Contract Documents or at law or in equity.

9.3.7 If UTA improperly terminates the Agreement for cause, the termination for cause will be converted to a termination for convenience in accordance with the provisions of Section 9.2 above.

9.4 Bankruptcy of Contractor.

9.4.1 If Contractor institutes or has instituted against it a case under the United States Bankruptcy Code, such event may impair or frustrate the Contractor's ability to perform its obligations under the Contract Documents. Accordingly, should such event occur:

9.4.1.1 Contractor, its trustee or other successor, shall furnish, upon request of UTA, adequate assurance of the ability of the Contractor to perform all future material obligations under the Contract Documents, which assurances shall be provided within ten (10) Days after receiving notice of the request; and

9.4.1.2 Contractor shall file an appropriate action within the bankruptcy court to seek assumption or rejection of the Agreement within sixty (60) Days of the institution of the bankruptcy filing and shall diligently prosecute such action. If Contractor fails to comply with its foregoing obligations, UTA shall be entitled to request the bankruptcy court to reject the Agreement, declare the Agreement terminated and pursue any other recourse available to UTA under this Article 9.

9.4.2 The rights and remedies under Section 9.4.1 above shall not be deemed to limit the ability of UTA to seek any other rights and remedies provided by the Contract Documents or by law, including its ability to seek relief from any automatic stays under the United States Bankruptcy Code.

ARTICLE 10
Value Engineering

10.1 Value Engineering Change Proposals.

10.1.1 A Value Engineering Change Proposal ("VECP") is a proposal developed, prepared, and submitted to UTA by the Contractor, which reduces the cost of the Work without impairing essential functions or characteristics of the Project, as determined by UTA in its sole discretion. UTA encourages Contractor to submit VECPs whenever it identifies potential savings or improvements. UTA may also request the Contractor to develop and submit a specific VECP. A simple reduction of scope or simple reduction in quantities does not constitute a VECP.

10.1.2 In determining whether a VECP will impair essential functions or characteristics of the Project, UTA may consider: (i) relative service life; (ii) maintenance effort and frequency; (iii) environmental and aesthetic impacts; (iv) system service; (v) effect of other system components; and (vi) other issues as UTA deems relevant. A VECP must not be based solely on a change in quantities.

10.1.3 Contractor must include the following information in any VECP:

10.1.3.1 A narrative description of the proposed change,

10.1.3.2 A discussion of differences between existing requirements and the proposed change, together with advantages and disadvantages of each changed item;

10.1.3.3 A complete cost analysis, including the cost estimate of any additional rights-of-way or easements required for implementation of the VECP;

10.1.3.4 Justification for changes in function or characteristics of each item and effect of the change on the performance on the end item;

10.1.3.5 A description of any previous use or testing of the proposed approach and the conditions and results. If the VECP was previously submitted on another UTA project, the Contractor shall indicate the date, contract number, and the action taken by UTA;

10.1.3.6 Costs of development and implementation; and

10.1.3.7 Any additional information requested by UTA, which must be provided in a timely manner.

10.2 Review and Approval of VECPs

10.2.1 Upon receipt of a VECP, UTA shall process it expeditiously, but will not be liable for any delay in acting upon any VECP. Contractor may withdraw all or part of any VECP at any time prior to approval by UTA, but shall, in any case, be liable for costs incurred by UTA in reviewing the withdrawn VECP, or part thereof. In all other situations, each party will bear its own costs in connection with preparation and review of VECPs.

10.2.2 UTA may approve in whole or in part any VECP submitted. The decision of UTA regarding rejection or approval of any VECP will be at the sole discretion of UTA and will be final and not subject to appeal. Contractor will have no claim for any additional costs or delays resulting from the rejection of a VECP, including development costs, loss of anticipated profits, or increased material or labor costs

10.3 **Cost Savings.** UTA will be the sole beneficiary of any cost savings realized from a VECP submitted during the design scope of the Agreement. Any savings resulting from an approved VECP submitted after the design has been released for construction will accrue to the benefit of UTA and Contractor on a 50/50 cost sharing basis.

10.4 **Ownership of VECPs.** All approved or disapproved VECPs will become the property of UTA and must contain no restrictions imposed by Contractor on their use or disclosure. UTA retains the right to use, duplicate, and disclose, in whole or in part, any data necessary for the utilization of the VECP on any other projects without any obligation to Contractor. This provision is not intended to deny rights provided by law with respect to patented materials or processes.

ARTICLE 11
Health Insurance

11.1 Insurance Coverage for Employees.

11.1.1 If the Contract Price is $2,000,000 or more, Contractor shall, prior to the effective date of the Agreement, demonstrate to UTA that Contractor has and will maintain an offer of qualified health insurance coverage (as defined by Utah Code Ann. § 17B-2a-818.5) for the Contractor's employees and the employee's dependents during the duration of the Contract.

11.2.1 If the Contractor enters into any subcontracts under the Contract Documents in an amount of $1,000,000 or more, then Contractor shall also demonstrate to UTA that such subcontractor(s) have and will maintain an offer of qualified health insurance coverage for the subcontractor's employees and the employee's dependents during the duration of the subcontract

ARTICLE 12
Miscellaneous

12.1 **Confidential Information.** "Confidential Information" means information that is determined by the transmitting party to be of a confidential or proprietary nature and: (i) the transmitting party identifies in writing as either confidential or proprietary; (ii) the transmitting party takes steps to maintain the confidential or proprietary nature of the information; and (iii) the document is not otherwise available in or considered to be in the public domain. To the extent permitted by law (including specifically UCA Title 63G Chapter 2), the receiving party shall maintain the confidentiality of the Confidential Information and shall use the Confidential Information solely in connection with the Project. The parties agree that the Agreement itself (including all incorporated Contract Documents) does not constitute Confidential Information.

12.2 **Prohibited Interest.** No member, officer, agent, or employee of UTA during his or her tenure or for one year thereafter shall have any interest, direct or indirect, including prospective employment by, Contractor or the proceeds under the Contract Documents without specific written authorization by UTA.

12.3 **Assignment.** Contractor acknowledges that the Work to be performed by Contractor is considered personal by UTA. Contractor shall not assign or transfer its interest in the Contract Documents without prior written approval by UTA.

12.4 **Successors.** Contractor and UTA intend that the provisions of the Contract Documents are binding upon the parties, their employees, agents, heirs, successors and permitted assigns.

12.5 **Governing Law.** The Agreement and all Contract Documents are governed by the laws of the State of Utah, without giving effect to its conflict of law principles. Actions to enforce the terms of this Agreement may only be brought in the Third District Court for Salt Lake County, Utah.

12.6 **Severability.** If any provision or any part of a provision of the Contract Documents is finally determined to be superseded, invalid, illegal, or otherwise unenforceable pursuant to any applicable Legal Requirements, such determination shall not impair or otherwise affect the validity, legality, or enforceability of the remaining provision or parts of the provision of the

Contract Documents, which shall remain in full force and effect as if the unenforceable provision or part were deleted.

12.7 **No Waiver.** The failure of either Contractor or UTA to insist, in any one or more instances, on the performance of any of the obligations required by the other under the Contract Documents shall not be construed as a waiver or relinquishment of such obligation or right with respect to future performance.

12.8 **Headings.** The headings used in these General Conditions, or any other Contract Document, are for ease of reference only and shall not in any way be construed to limit or alter the meaning of any provision.

12.9 **Amendments.** The Contract Documents may not be changed, altered, or amended in any way except in writing signed by a duly authorized representative of each party

Exhibit D

100% Design Plans are located at:

I:\BRT Projects\1-MSP185 Ogden-WSU BRT\2 Project Controls\2-4 Contracts\Stacy and Witbeck Contract CM-GC 19-03114BM\Phase 2 Amendment 2 full scope\Exhibit D 01 - OGBRT_Plans_20201120 - 100%.pdf

Exhibit E

100% Design Specifications

OGDEN-WSU BRT FINAL DESIGN
TECHNICAL SPECIFICATIONS

Contract 18-02925

November 20, 2020

Prepared By:

Jacobs

Prepared For:

UTA

UTAH TRANSIT AUTHORITY

100% Set

Ogden-WSU BRT Technical Specifications

Except as modified herein or noted in the plan set, the work for this project shall be constructed under the following specifications and standard drawings:

1. Technical Sections (beginning with Section 01500) and Standard Drawings of the Utah Department of Transportation 2020 Standard Specifications and 2020 Standard Drawings for Road and Bridge Construction found at 2020 Standard Specifications and Standard Drawings.
2. 2017 Edition of the Manual of Standard Specifications and Manual of Standard Plans by the Utah Chapter of the APWA found at 2017 APWA Standards and Specifications.
3. 2019 Edition of Ogden City's Standard Drawings Supplement to the 2017 Edition of the Manual of Standard plans by the Utah Chapter of the APWA found at 2019 Ogden City's Engineering Standards and Amendments for Public Works Projects.
4. Station Architecture and Site Furnishings Technical Specifications found herein.

They apply on this project as static Specification and Drawing Books as well as all other applicable specification and drawing changes.

1. This applies for all general items and on all roadways.
2. Refer to project Bid Item List supplied in Appendix A of this document for list of bid items and applicable specifications.
3. Refer to UDOT Special Provisions, APWA Special Provisions, and Station Architecture and Site Furnishings Technical Specifications Sections in this document for other project specific specifications.

All UDOT and APWA technical specifications shall have the same effect, application and force as if contained here in their entirety.

Suffixes are added for modified UDOT specifications as follows:
M – part of a standard UDOT specification is changed, added, or deleted
S – new section or complete replacement of a standard UDOT specification

These specifications make reference to various industry standards. In any case of conflict, the editions referenced that are current at the time these specifications are published shall be used.

The contractor will be held to obligations, requirements, and other arrangements set forth in the Ogden-WSU BRT Project CM/GC Project General Conditions. UDOT general specifications (up to and including Section 01499) do not apply to this project unless included in entirety or modified as part of the UDOT Special Provisions in this document.

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4. STATION ARCHITECTURE AND SITE FURNISHING TECHNICAL SPECIFICATIONS

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Technical Specifications Bid Item List

No.	Item Name	Station Work	Unit	Item Number	2020 UDOT Specifications	2017 APWA Specifications	Ogden City Supplemental to 2017 APWA Specifications	Architecture and Site Furnishing Technical Specifications
10	Mobilization		Lump	**01501001**	01501			
20	Public Information Services		Lump	**01540001**	01540			
30	Traffic Control		Lump	**01554001**	01554			
40	Silt Fence		Foot	**01571001**	01571			
50	Check Dam - Fiber Roll		Foot	**01571002**	01571			
60	Drop-Inlet Barrier - Fiber Roll		Foot	**01571003**	01571			
70	Gutter - Inlet Barrier		Each	**01571004**	01571			
80	Stabilized Construction Entrance		Each	**01571005**	01571			
90	Dust Control and Watering		1,000 Gal	**01572001**	01572			
100	Survey		Lump	**01721001**	01721			
110	Reconstruct Catch Basin		Each	**01892001**	01892			
120	Major Reconstruct Existing Structure - Detail A		Each	**01892002**	01892			
130	Major Reconstruct Existing Structure - Detail B		Each	**01892003**	01892			
140	Reconstruct Manhole		Each	**01892004**	01892			
150	Borrow		Ton	**02056001**	02056M			
160	Free Draining Granular Backfill		Cubic Yard	**02056002**	02056M			
170	Granular Backfill Borrow		Cubic Yard	**02056003**	02056M			
180	Granular Borrow		Cubic Yard	**02056004**	02056M			
190	3/8" Rock		Cubic Yard	**02056005**	02056M			
200	Geotextiles - Separation		Square Yard	**02075001**	02075			
210	Geotextiles - Weed Barrier		Square Yard	**02075002**	02075			
220	Abandon Pipe Culvert		Cubic Yard	**02221001**	02221			
230	Remove and Salvage Fence and Gate		Foot	**02221002**	02221			
240	Remove Asphalt Pavement		Square Yard	**02221003**	02221			
250	Remove Bollard		Each	**02221004**	02221			
260	Remove Building, Basement, and Foundation Parcel # ____		Parcel	**02221005**	02221			
270	Remove Catch Basin		Each	**02221006**	02221			
280	Remove Concrete Curb		Foot	**02221007**	02221			
290	Remove Concrete Curb and Gutter		Foot	**02221008**	02221			
300	Remove Concrete Driveway		Square Yard	**02221009**	02221			
310	Remove Concrete Pavement		Square Yard	**02221010**	02221			
320	Remove Concrete Sidewalk		Square Yard	**02221011**	02221			
330	Remove Concrete Wall		Cubic Yard	**02221012**	02221			
340	Remove Fence		Foot	**02221013**	02221			
350	Remove Gate		Each	**02221014**	02221			
360	Remove Handicap Access Ramp		Square Yard	**02221015**	02221			
370	Remove Handrail		Foot	**02221016**	02221			
380	Remove Manhole		Each	**02221017**	02221			
390	Remove Pipe		Foot	**02221018**	02221			

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Technical Specifications Bid Item List

No.	Item Name	Station Work	Unit	Item Number	2020 UDOT Specifications	2017 APWA Specifications	Ogden City Supplemental to 2017 APWA Specifications	Architecture and Site Furnishing Technical Specifications
400	Remove Pipe Culvert		Foot	**02221019**	00221			
410	Remove Raised Concrete Landscape Box		Square Yard	**02221020**	02221			
420	Remove Rockery Wall		Foot	**02221021**	02221			
430	Remove Tree		Each	**02221022**	02221			
440	Remove UGST		Each	**02221023**	02221			
450	Remove Wall		Foot	**02221024**	02221			
460	Remove and Reinstall Clock		Each	**02221025**	02221			
470	Relocate Flag Pole		Each	**02221026**	02221			
480	Remove Concrete Stairs		Square Foot	**02221027**	02221			
490	Remove Sculpture		Each	**02221028**	02221			
500	Clearing and Grubbing		Acre	**02231001**	02231			
510	Roadway Excavation		Cubic Yard	**02316001**	02316M			
520	Surface Ditch		Foot	**02318001**	02318			
530	Drainage Pipe - inch, Reinforced Concrete, Leak Resistant		Foot	**02610001**	02610			
540	Drainage Pipe - inch x inch, Reinforced Concrete, Silt-Tight		Foot	**02610002**	02610			
550	Excavate and Repair Sinkhole		Foot	**02610003**	02610			
560	Drainage Pipe - inch, Metal, Leak Resistant		Foot	**02610004**	02610			
570	Remove and Replace Slot Drain		Foot	**02610005**	02610			
580	4 Foot Standard Manhole, 11 ft to 13 ft Deep - CB 11		Each	**02633001**	02633			
590	4 Foot Standard Manhole, 3 ft to 5 ft Deep - CB 11		Each	**02633002**	02633			
600	4 Foot Standard Manhole, 5 ft to 7 ft Deep - CB 11		Each	**02633003**	02633			
610	4 Foot Standard Manhole, 7 ft to 9 ft Deep - CB 11		Each	**02633004**	02633			
620	4 Foot Standard Manhole, 9 ft to 11 ft Deep - CB 11		Each	**02633005**	02633			
630	5 Foot Standard Manhole, 5 ft to 7 ft Deep - CB 11		Each	**02633006**	02633			
640	5 Foot Standard Manhole, 7 ft to 9 ft Deep - CB 11		Each	**02633007**	02633			
650	5 Foot Standard Manhole, 11 ft to 13 ft Deep - CB 11		Each	**02633008**	02633			
660	5 Foot Standard Manhole, 15 ft to 18 ft Deep - CB 11		Each	**02633009**	02633			
670	Concrete Drainage Structure ft Wide x ft Deep - CB 9		Each	**02633010**	02633			
680	Concrete Drainage Structure 4 ft Wide X 6 ft Deep - CB 5		Each	**02633011**	02633			
690	Concrete Drainage Structure 4 ft Wide X 12 ft Deep - CB 5		Each	**02633012**	02633			
700	Concrete Drainage Structure 5 ft Wide X 12 ft Deep - CB 5		Each	**02633013**	02633			
710	Concrete Drainage Structure 5 ft Wide X 6 ft Deep - CB 5		Each	**02633014**	02633			
720	Concrete Drainage Structure 6 ft Wide X 12 ft Deep - CB 5		Each	**02633015**	02633			
730	Concrete Drainage Structure 8 ft Wide X 6 ft Deep - CB 5		Each	**02633016**	02633			
740	Concrete Drainage Structure Diversion Box - DB 3A		Each	**02633017**	02633			
750	Ogden Catch Basin, Ogden City Standard Drawing SD-1		Each	**02633018**	02633			
760	Ogden Combination Inlet, Ogden City Standard Drawing SD-3		Each	**02633019**	02633			
770	Ogden Manhole, Ogden City Standard Drawing SD-4		Each	**02633020**	02633			
780	Water Quality Insert		Each	**02633021**	02633			

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Technical Specifications Bid Item List

No.	Item Name	Station Work	Unit	Item Number	2020 UDOT Specifications	2017 APWA Specifications	Ogden City Supplemental to 2017 APWA Specifications	Architecture and Site Furnishing Technical Specifications
790	Pond Wall Connection		Each	**02633022**	02633			
800	U-Channel Gutter		Each	**02633023**	02633			
810	12 Inch Drain Basin (2812AG Nyloplast or Equivalent)		Each	**02633024**	02633			
820	12 Inch Cover Assembly (1299CGC Nyloplast or Equivalent)		Each	**02633025**	02633			
830	Concrete Drainage Structure 4 ft Wide X 6 ft Deep - CB 3		Each	**02633026**	02633			
840	Sump Manhole (DT-DR-01-3)		Each	**02633027**	02633			
850	Untreated Base Course		Ton	**02721001**	02721			
860	Untreated Base Course - Leveling		Ton	**02721002**	02721			
870	Micro-Surfacing		Square Yard	**02735001**	02735S			
880	HMA - 1/2 inch		Ton	**02741001**	02741S			
890	HMA Leveling - 1/2 inch		Ton	**02741002**	02741S			
900	Portland Cement Concrete Pavement 8 inch Thick		Square Yard	**02752001**	02752			
910	Portland Cement Colored Concrete Pavement 8 inch Thick, Dark Gray		Square Yard	**02752002**	02752M			
920	Portland Cement Colored Concrete Pavement 8 inch Thick, Buff		Square Yard	**02752003**	02752M			
930	Longitudinal Rumble Strip - Asphalt		Foot	**02761001**	02761			
940	Pavement Marking Paint		Foot	**02765001**	02765M			
950	Pavement Marking Paint (Stop line, Crosswalk - 12 inch)		Foot	**02765002**	02765M			
960	Pavement Message Paint		Each	**02765003**	02765M			
970	Remove Pavement Message		Foot	**02765004**	02765M			
980	Remove Pavement Message		Each	**02765005**	02765M			
990	Pavement Marking Paint - Red		Square Foot	**02766001**	02766S			
1000	4 inch Pavement Marking Epoxy - White, Type 1		Foot	**02768001**	02768			
1010	4 inch Pavement Marking Epoxy - Yellow, Type 1		Foot	**02768002**	02768			
1020	8 inch Pavement Marking Epoxy - White, Type 1		Foot	**02768003**	02768			
1030	8 inch Pavement Marking Epoxy - Yellow, Type 1		Foot	**02768004**	02768			
1040	Pavement Message (Preformed Thermoplastic Stop Line, Crosswalks - 12 inch)		Foot	**02768005**	02768			
1050	Pavement Message (Preformed Thermoplastic)		Each	**02768006**	02768			
1060	4 inch Pavement Marking Tape - White		Foot	**02768007**	02768			
1070	8 inch Pavement Marking Tape - White		Foot	**02768008**	02768			
1080	4 inch Pavement Marking Tape - Yellow		Foot	**02768009**	02768			
1090	8 inch Pavement Marking Tape - Yellow		Foot	**02768010**	02768			
1100	Corner Pedestrian Access Ramp		Each	**02771001**	02771			
1110	Median Break Pedestrian Access Ramp		Each	**02771002**	02771			
1120	Ogden City/APWA Pedestrian Access Ramp		Each	**02771003**	02771			
1130	Parallel Pedestrian Access Ramp		Each	**02771004**	02771			
1140	Perpendicular Pedestrian Access Ramp		Each	**02771005**	02771			
1150	Reconstruct Pedestrian Access Ramp		Each	**02771006**	02771			
1160	Detectable Warning Surface		Square Foot	**02771007**	02771M			
1170	Detectable Warning Surface with Concrete Base		Square Foot	**02771008**	02771M			

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No.	Item Name	Station Work	Unit	Item Number	2020 UDOT Specifications	2017 APWA Specifications	Ogden City Supplemental to 2017 APWA Specifications	Architecture and Site Furnishing Technical Specifications
1180	APWA Waterway Transition Structure		Square Foot	**02776001**	02776			
1190	6'-0" Waterway, APWA #211		Square Foot	**02776002**	02776			
1200	4'-0" Waterway, APWA #211		Foot	**02776003**	02776			
1210	BRT Station Approach - Concrete Safety Curb	S	Each	**02776004**	02776			
1220	BRT Station Approach - Type A	S	Each	**02776005**	02776			
1230	BRT Station Approach - Type B1	S	Each	**02776006**	02776			
1240	BRT Station Approach - Type B2-A	S	Each	**02776007**	02776			
1250	BRT Station Approach - Type B5	S	Each	**02776008**	02776			
1260	BRT Station Approach - Type M1	S	Each	**02776009**	02776			
1270	BRT Station Departure - Concrete Safety Curb	S	Each	**02776010**	02776			
1280	Colored Stamped Concrete Flatwork, 8 inch Thick		Square Foot	**02776011**	02776			
1290	Concrete Collar		Each	**02776012**	02776			
1300	Concrete Curb and Gutter APWA Type A		Foot	**02776013**	02776			
1310	Concrete Curb and Gutter APWA Type E		Foot	**02776014**	02776			
1320	Concrete Curb and Gutter APWA Type G		Foot	**02776015**	02776			
1330	Concrete Curb and Gutter Transition	S	Each	**02776016**	02776			
1340	Concrete Curb and Gutter Type B1		Foot	**02776017**	02776			
1350	Concrete Curb and Gutter Type B2-A	S	Foot	**02776018**	02776			
1360	Concrete Curb and Gutter Type M1		Foot	**02776019**	02776			
1370	Concrete Curb and Gutter Type M1 Modified		Foot	**02776020**	02776			
1380	Concrete Curb and Gutter Variable Height	S	Foot	**02776021**	02776			
1390	Concrete Curb APWA Type P		Foot	**02776022**	02776			
1400	Concrete Curb Transition		Foot	**02776023**	02776			
1410	Concrete Curb Type B4		Foot	**02776024**	02276			
1420	Concrete Curb Type B5		Foot	**02776025**	02776			
1430	Concrete Curb Type B5 Modified		Foot	**02776026**	02776			
1440	Concrete Curb Type B5 Modified (w/ Docking Guide Strip)		Foot	**02776027**	02776			
1450	Concrete Curb Type B5 Modified Variable Height	S	Foot	**02776028**	02776			
1460	Concrete Curb Type B5 Modified with Scuppers		Foot	**02776029**	02776			
1470	Concrete Curb Type B5 Variable Height	S	Foot	**02776030**	02776			
1480	Concrete Driveway Flared, 6 inch Thick		Square Foot	**02776031**	02776			
1490	Concrete Driveway Flared, 7 inch Thick		Square Foot	**02776032**	02776			
1500	Concrete Driveway Flared, 8 inch Thick		Square Foot	**02776033**	02776			
1510	Concrete Flatwork		Square Foot	**02776034**	02776			
1520	Concrete Flatwork 4 inch Thick		Square Foot	**02776035**	02776			
1530	Colored Concrete Flatwork 4 inch Thick, Dark Gray		Square Foot	**02776036**	02776M			
1540	Colored Concrete Flatwork 4 inch Thick, Buff		Square Foot	**02776037**	02776M			
1550	Concrete Flatwork 6 inch Thick		Square Foot	**02776038**	02776			
1560	Concrete Flatwork 7 inch Thick		Square Foot	**02776039**	02776			

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No.	Item Name	Station Work	Unit	Item Number	2020 UDOT Specifications	2017 APWA Specifications	Ogden City Supplemental to 2017 APWA Specifications	Architecture and Site Furnishing Technical Specifications
1570	Concrete Flush Curb		Foot	**02776040**	02776			
1580	Concrete Gutter Pan Transition APWA Type A	S	Foot	**02776041**	02776			
1590	Concrete Gutter Pan Transition Type B1	S	Foot	**02776042**	02776			
1600	Concrete Gutter Pan Transition Type M1	S	Foot	**02776043**	02776			
1610	Concrete Mountable Median Curb		Foot	**02776044**	02776			
1620	Concrete Safety Curb	S	Foot	**02776045**	02776			
1630	Concrete Sidewalk		Square Yard	**02776046**	02776			
1640	Concrete Spill Gutter Type B1		Foot	**02776047**	02776			
1650	Concrete Spill Gutter Type M1		Foot	**02776048**	02776			
1660	Concrete Stairs		Square Foot	**02776049**	02776			
1670	Concrete Valley Gutter		Foot	**02776050**	02776			
1680	Concrete Waterway		Square Foot	**02776051**	02776			
1690	Handicap Access Ramp		Square Foot	**02776052**	02776			
1700	Landscape Wall Type LW1		Foot	**02776053**	02776			
1710	Landscape Wall Type LW2		Foot	**02776054**	02776			
1720	Landscape Wall Type LW3		Foot	**02776055**	02776			
1730	Landscape Wall Type LW5		Foot	**02776056**	02776			
1740	Landscape Wall Type LW6		Foot	**02776057**	02776			
1750	Landscape Wall Type LW7		Foot	**02776058**	02776			
1760	Modified Plowable End Section	S	Each	**02776059**	02776			
1770	Narrow Plowable End Section		Each	**02776060**	02776			
1780	Ogden City/APWA Concrete Driveway		Square Foot	**02776061**	02776			
1790	APWA Bridge Concrete Driveway		Square Foot	**02776062**	02776			
1800	Ped Refuge Plowable End Section	S	Each	**02776063**	02776			
1810	Concrete Landscape Curb		Foot	**02776064**	02776			
1820	Bonded Wearing Course - Type B		Square Yard	**02787001**	02787			
1830	Irrigation Restoration/Repair		Square Foot	**02810001**	02810S			
1840	New Irrigation		Square Foot	**02810002**	02810S			
1850	Irrigation During Construction		Lump	**02810003**	02810S			
1860	Irrigation Pipe Sleeve - 25th Ave - Washington to Jefferson		Foot	**02810004**	02810S			
1870	Ornamental Fence on Structure		Foot	**02816001**	02816S			
1880	3 ft Chain Link Fence, Type II		Foot	**02821001**	02821			
1890	6 ft Chain Link Fence, Type II		Foot	**02821002**	02821			
1900	6 ft Chain Link Fence, Type III		Foot	**02821003**	02821			
1910	Chain Link Gate, H= 6 ft X W= 12 ft		Each	**02821004**	02821			
1920	MSE Retaining Wall (Str #)(Est. Lump Qty: sq ft)		Lump	**02831001**	02831S			
1930	MSE Backfill		Cubic Yard	**02832001**	02832S			
1940	Soldier Pile		Lb	**02838001**	02838S			
1950	Cast-In-Place Concrete Constant Slope Half Barrier-42 Inch		Foot	**02844001**	02844			

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Technical Specifications Bid Item List

No.	Item Name	Station Work	Unit	Item Number	2020 UDOT Specifications	2017 APWA Specifications	Ogden City Supplemental to 2017 APWA Specifications	Architecture and Site Furnishing Technical Specifications
1960	Precast Concrete Constant Slope Barrier - 42 Inch Sloped End Section (For Speeds <40 MPH)		Each	**02844002**	02844			
1970	Rockery Retaining Wall		Square Foot	**02863001**	02863S			
1980	Landscape Restoration		Square Foot	**02874001**	02874S			
1990	Landscape Restoration - 2483 Harrison Blvd - Wheeler Property		Lump	**02874002**	02874S			
2000	Landscape Restoration Parcel 135		Lump	**02874003**	02874S			
2010	Relocate Sign Less Than 20 Square Feet		Each	**02891001**	02891			
2020	Remove Sign Less Than 20 Square Feet		Each	**02891002**	02891			
2030	Convex Mirror		Each	**02891003**	02891			
2040	Sign Post P2		Each	**02891004**	02891			
2050	Sign Post P3		Each	**02891005**	02891			
2060	Flexible Sign Post and Base		Each	**02891006**	02891			
2070	Sign Type A-1		Square Foot	**02891007**	02891			
2080	Sign Type A-1, inch X inch		Each	**02891008**	02891			
2090	Sign Type A-2		Square Foot	**02891009**	02891			
2100	Sign Type A-2, inch X inch		Each	**02891010**	02891			
2110	Slipbase Sign Base (B3)		Each	**02891011**	02891			
2120	Small Sign Tubular Steel Post Base (B1)		Each	**02891012**	02891			
2130	Traffic Signal System -Wall and 23rd		Lump	**02892001**	2892M			
2140	Traffic Signal System - 23rd and Lincoln		Lump	**02892002**	2892M			
2150	Traffic Signal System - Grant and 23rd		Lump	**02892003**	2892M			
2160	Traffic Signal System - Washington Blvd and 23rd Street		Lump	**02892004**	2892M			
2170	Traffic Signal System - Washington Blvd and 2450 Midblock		Lump	**02892005**	2892M			
2180	Traffic Signal System - Washington Blvd and 25th Street		Lump	**02892006**	2892M			
2190	Traffic Signal System - 25th Street and Adams Ave		Lump	**02892007**	2892M			
2200	Traffic Signal System - 25th Street and Monroe		Lump	**02892008**	2892M			
2210	Traffic Signal System - 4400 S & Harrison Blvd		Lump	**02892009**	2892M			
2220	Traffic Signal System - BRT Campus Entrance & Harrison Blvd		Lump	**02892010**	2892M			
2230	Traffic Signal System - 36th Street & Harrison Blvd		Lump	**02892011**	2892M			
2240	Traffic Signal System - South of 33rd		Lump	**02892012**	2892M			
2250	Traffic Signal System - North of 33rd		Lump	**02892013**	2892M			
2260	Traffic Signal System - 32nd Street & Harrison Blvd		Lump	**02892014**	2892M			
2270	Traffic Signal System - 30th street and Harrison Blvd		Lump	**02892015**	2892M			
2280	Traffic Signal System - 28th Street & Harrison Blvd		Lump	**02892016**	2892M			
2290	Traffic Signal System - 26th Street & Harrison Blvd		Lump	**02892017**	2892M			
2300	Traffic Signal System - 25th Street & Harrison Blvd		Lump	**02892018**	2892M			
2310	Traffic Signal System - County Hill & WSU Busway		Lump	**02892019**	2892M			
2320	Traffic Signal System - Village Dr & WSU Busway		Lump	**02892020**	2892M			
2330	Traffic Signal System - WSU Busway & One-Way Section 1 (SB)		Lump	**02892021**	2892M			
2340	Traffic Signal System - WSU Busway & One-Way Section 1 (NB)		Lump	**02892022**	2892M			

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Technical Specifications Bid Item List

No.	Item Name	Station Work	Unit	Item Number	2020 UDOT Specifications	2017 APWA Specifications	Ogden City Supplemental to 2017 APWA Specifications	Architecture and Site Furnishing Technical Specifications
2350	Traffic Signal System - WSU Busway & Dixon Pkwy		Lump	**02892023**	2892M			
2360	Traffic Signal System - WSU Busway & One-Way Section 2 (SB)		Lump	**02892024**	2892M			
2370	Traffic Signal System - WSU Busway & One-Way Section 2 (NB)		Lump	**02892025**	2892M			
2380	Strip, Stockpile, and Spread Topsoil		Square Yard	**02912001**	02912S			
2390	Contractor Furnished Topsoil		Cubic Foot	**02912002**	02912S			
2400	Soil Testing		Each	**02912003**	02912S			
2410	Landscape Finish Grading		Square Foot	**02915001**	02915S			
2420	Seeding - Native Grass Restoration		Square Foot	**02922001**	02922S			
2430	Turf Sod		Square Foot	**02925001**	02925S			
2440	Bark Mulch		Cubic Foot	**02932001**	02932S			
2450	Deciduous Trees - 1.5" caliper B&B		Each	**02932002**	02932S			
2460	Deciduous Trees - 2.0" caliper B&B		Each	**02932003**	02932S			
2470	Decorative Rock Mulch Type 1		Cubic Foot	**02932004**	02932S			
2480	Decorative Rock Mulch Type 2		Cubic Foot	**02932005**	02932S			
2490	Decorative Rock Mulch Type 3		Cubic Foot	**02932006**	02932S			
2500	Shrub - 1 Gallon Container		Each	**02932007**	02932S			
2510	Shrub - 5 Gallon Container		Each	**02932008**	02932S			
2520	Organic Amendment		Cubic Foot	**02932009**	02932S			
2530	Fertilizer		Lb	**02932010**	02932S			
2540	Non-Organic Amendment		Lb	**02932011**	02932S			
2550	Soil Preparation		Square Yard	**02932012**	02932S			
2560	Landscape Maintenance		Square Yard	**02932013**	02932S			
2570	Landscape Boulders		Each	**02932014**	02932S			
2580	Decomposed Granite Surfacing		Square Foot	**02940001**	02940S			
2590	Rotomilling		Square Yard	**02961001**	02961			
2600	Wedge Milling		Square Yard	**02961002**	02961			
2610	Grinding for Grooved-In Pavement Marking Lines		Foot	**02983001**	02983			
2620	Grinding for Continuous Grooved-In Pavement Marking Lines		Foot	**02983002**	02983			
2630	Grinding for Grooved-In Pavement Messages		Each	**02983003**	02983			
2640	Reinforcing Steel		Lb	**03211001**	03211			
2650	Reinforcing Steel - Coated		Lb	**03211002**	03211			
2660	Structural Concrete (Est. Qty_Cu Yd)		Lump	**03310001**	03310			
2670	Sheet Pile Wall		Lump	**05120001**	05120			
2680	Ornamental Railing WSU - Guardrails - Stainless Steel		Foot	**05721001**	05721S			
2690	Ornamental Railing WSU - Handrail Stairs - Stainless Steel		Foot	**05721002**	05721S			
2700	Precast Fiber Optic Vault 4 x 6 x 6 ft		Each	**13431001**	13431			
2710	Precast Fiber Optic Vault 4 x 6 x 6 ft (WSU)		Each	**13431002**	13431			
2720	1D Conduit (UTA)		Foot	**13553001**	13553			
2730	2 inch conduit (WSU)		Foot	**13553002**	13553			

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Technical Specifications Bid Item List

No.	Item Name	Station Work	Unit	Item Number	2020 UDOT Specifications	2017 APWA Specifications	Ogden City Supplemental to 2017 APWA Specifications	Architecture and Site Furnishing Technical Specifications
2740	3 inch conduit (WSU)		Foot	**13553003**	13553			
2750	3-inch Conduit (UDOT)		Foot	**13553004**	13553			
2760	Two 2-Inch Conduit (UTA)		Foot	**13553005**	13553			
2770	Polymer Concrete Junction Box, Tier 22, Type II (Ogden City)		Each	**13554001**	13554			
2780	Polymer Concrete Junction Box, Tier 22, Type II (WSU)		Each	**13554002**	13554			
2790	Polymer Concrete Junction Box, Tier 22, Type III (UDOT)		Each	**13554003**	13554			
2800	Polymer Concrete Junction Box, Tier 22, Type III (UTA)		Each	**13554004**	13554			
2810	Polymer Concrete Junction Box, Tier 22, Type III (WSU)		Each	**13554005**	13554			
2820	144 Strand SMFO Cable (UTA)		Foot	**13594001**	13594			
2830	24 Strand SMFO Cable (UDOT)		Foot	**13594002**	13594			
2840	24 Strand SMFO Cable (UTA)		Foot	**13594003**	13594			
2850	6 Strand Pre-Terminated Drop Cable		Foot	**13594004**	13594			
2860	6 Strand Pre-Terminated Drop Cable Unit (UDOT)		Foot	**13594005**	13594			
2870	6 Strand SMFO Cable (Ogden City)		Foot	**13594006**	13594			
2880	72 Strand SMFO Cable (UDOT)		Foot	**13594007**	13594			
2890	Fiber Optic Cable Splice Enclosure		Each	**13594008**	13594			
2900	Fusion Splice (UDOT Fiber)		Each	**13594009**	13594			
2910	Fusion Splice (UTA Fiber)		Each	**13594010**	13594			
2920	PCC End Termination (UTA)		Each	**13594011**	13594			
2930	Highway Lighting System - 25th Street		Lump	**16525001**	16525			
2940	Handrail	S	Foot	**055100001**		05 51 00		
2950	Tree Pruning (Contingency)	S	Each	**320193001**		32 01 93		
2960	Brick Pavers		Square Foot	**321416001**		32 14 16		
2970	Remove and Reset Brick Pavers		Square Foot	**321416002**		32 14 16		
2980	Sewer Pipe Liner		Foot	**3301307301**		33 01 30.73		
2990	Adjust Manhole To Grade		Each	**330514001**			33 05 14	
3000	Adjust Valve Box To Grade		Each	**330514002**			33 05 14	
3010	Adjust Water Meter To Grade		Each	**330514003**			33 05 14	
3020	Cut, Cap And Abandon Water Line		Each	**331100001**			33 11 00	
3030	Install 10" PVC C900 Water Line Per Ogden City Standard Detail W-18, See Detail 1B On Sheet DT-UT-01		Foot	**331100002**			33 11 00	
3040	Install 12" PVC C900 Water Line Per Ogden City Standard Detail W-18, See Detail XX On Sheet XX		Foot	**331100003**			33 11 00	
3050	Install 12" Butterfly Valve Per Ogden City Standard Detail W-11, See Detail 2A on Sheet DT-UT-01		Each	**331100004**			33 11 00	
3060	Install 8 Inch X 8 Inch Cross		Each	**331100005**			33 11 00	
3070	Install 12 Inch X 12 Inch X 8 Inch Tee		Each	**331100006**			33 11 00	
3080	Install 24 Inch X 24 Inch X 12 Inch Tee		Each	**331100007**			33 11 00	
3090	Install 24 Inch X 24 Inch X 24 Inch Tee		Each	**331100008**			33 11 00	
3100	Install 24 Inch X 24 Inch X 10 Inch Tee		Each	**331100009**			33 11 00	
3110	Install 12 Inch X 12 Inch X 6 Inch Tee		Each	**331100010**			33 11 00	

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No.	Item Name	Station Work	Unit	Item Number	2020 UDOT Specifications	2017 APWA Specifications	Ogden City Supplemental to 2017 APWA Specifications	Architecture and Site Furnishing Technical Specifications
3120	Install 24 Inch X 24 Inch X 8 Inch Tee		Each	**331100011**			33 11 00	
3130	Install 24 Inch X 24 Inch X 6 Inch Tee		Each	**331100012**			33 11 00	
3140	Install 24 Inch X 24 Inch X 4 Inch Tee		Each	**331100013**			33 11 00	
3150	Install 24" Ductile Iron Water Line Per Ogden City Standard Detail W-18, See Detail XX On Sheet XX		Foot	**331100014**			33 11 00	
3160	Install 24" Gate Valve Per Ogden Ctiy Standard Detail W-11, See Detail XX On Sheet XX		Each	**331100015**			33 11 00	
3170	Install 24" PVC C905 Water Line Per Ogden City Standard Detail W-18, See Detail XX On Sheet XX		Foot	**331100016**			33 11 00	
3180	Install 10" PRR Irrigation Line Per APWA Standard Details 381 & 382. See Details 7A & 7B on sheet UT-DT-01		Foot	**331100017**			33 11 00	
3190	Install 12" PRR Water Line Per APWA Standard Details 381 & 382. See Details 7A & 7B on sheet UT-DT-01		Foot	**331100018**			33 11 00	
3200	Install 24-Inch X 16-Inch Reducer		Each	**331100019**			33 11 00	
3210	Install 24-Inch X 12-Inch Reducer		Each	**331100020**			33 11 00	
3220	Install 30-Degree Vertical Bend		Each	**331100021**			33 11 00	
3230	Install 45-Degree Horizontal Bend		Each	**331100022**			33 11 00	
3240	Install 45-Degree Vertical Bend		Each	**331100023**			33 11 00	
3250	Install 4" Gate Valve Per Ogden City Standard Detail W-11, See Detail 2A On Sheet DT-UT-01		Each	**331100024**			33 11 00	
3260	Install 6" Gate Valve Per Ogden City Standard Detail W-11, See Detail XX On Sheet XX		Each	**331100025**			33 11 00	
3270	Install 6" PVC C900 Water Line Per Ogden City Standard Detail W-18, See Detail XX On Sheet XX		Foot	**331100026**			33 11 00	
3280	Install 6-Inch X 8-Inch Reducer		Each	**331100027**			33 11 00	
3290	Install 8 Inch X 8 Inch X 6 Inch Tee		Each	**331100028**			33 11 00	
3300	Install 8" Gate Valve Per Ogden City Standard Detail W-11, See Detail XX On Sheet XX		Each	**331100029**			33 11 00	
3310	Install 8" PVC C900 Water Line Per Ogden City Standard Detail W-18, See Detail XX On Sheet XX		Foot	**331100030**			33 11 00	
3320	Install 90-Degree Horizontal Bend		Each	**331100031**			33 11 00	
3330	Install Hose Bib. Refer To Station Plans For Location & Details		Each	**331100032**			33 11 00	
3340	Loop Water Line, See Detail 1A on Sheet DT-UT-01		Each	**331100033**			33 11 00	
3350	Relocate Water Meter		Each	**331100034**			33 11 00	
3360	Remove Valve Box		Each	**331100035**			33 11 00	
3370	Remove Water Meter		Each	**331100036**			33 11 00	
3380	Install Fire Hydrant Per Ogden City Standard Detail W-1B, See Detail XX On Sheet XX		Each	**331219001**			33 12 19	
3390	Relocate Fire Hydrant		Foot	**331219002**			33 12 19	
3400	Remove Fire Hydrant		Each	**331219003**			33 12 19	
3410	Install 1 Inch Water Meter & Lateral Per Ogden City Standard Detail W-3, See Detail XX On Sheet XX		Each	**331233001**			33 12 33	
3420	Install 2 Inch Water Meter & Lateral Per Ogden City Standard Detail W-X, See Detail XX On Sheet XX		Each	**331233002**			33 12 33	
3430	Install 1.5" Irrigation Meter & Lateral Per Weber Basin Standard Detail XX, See Detail XX On Sheet XX		Each	**331233003**			33 12 33	
3440	Core Drill & Epoxy Grout New Sanitary Sewer Connection		Each	**333100001**			33 31 00	
3450	Install 10 Inch PVC SDR-35 Sewer Line Per Ogden City Standard Detail SS-3, See Detail 1B On Sheet DT-UT-01		Foot	**333100002**			33 31 00	

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Technical Specifications Bid Item List

No.	Item Name	Station Work	Unit	Item Number	2020 UDOT Specifications	2017 APWA Specifications	Ogden City Supplemental to 2017 APWA Specifications	Architecture and Site Furnishing Technical Specifications
3460	Install 15 Inch PVC SDR-35 Sewer Line Per Ogden City Standard Detail SS-3, See Detail 3B On Sheet DT-UT-01		Foot	**333100003**			33 31 00	
3470	Install 4 Inch PVC SDR-35 Sewer Line Per Ogden City Standard Detail SS-3, See Detail XX On Sheet XX		Foot	**333100004**			33 31 00	
3480	Install 5' Sanitary Sewer Manhole Per Ogden City Standard Detail SS-X, See Detail XX On Sheet XX		Each	**333100005**			33 31 00	
3490	Install 8 Inch PVC SDR-35 Sewer Line Per Ogden City Standard Detail SS-3, See Detail XX On Sheet XX		Foot	**333100006**			33 31 00	
3500	Install Sanitary Sewer Cleanout Per Ogden City Standard Detail SS-8, See Detail XX On Sheet XX		Each	**333100007**			33 31 00	
3510	Plug and Abandon Existing Sewer Line		Foot	**333100008**			33 31 00	
3520	Abandon Sanitary Sewer Manhole Per Ogden City Standards		Each	**333100009**			33 31 00	
3530	Abandon in Place Existing Sanitary Sewer Liner Per Ogden City Standards		Foot	**333100010**			33 31 00	
3540	Remove Sewer Lateral		Foot	**333100011**			33 31 00	
3550	Remove Sanitary Sewer Manhole Per Ogden City Standards		Each	**333100012**			33 31 00	
3560	Remove Sanitary Sewer Pipe Per Ogden City Standards		Foot	**333100013**			33 31 00	
3570	Ornamental Railing	S	Foot	**055000001**				05 5000
3580	Handrail on Access Ramp		Foot	**055000002**				05 5000
3590	Handrail on Stairs		Foot	**055000003**				05 5000
3600	Install Bollards - Stainless Steel		Each	**129300001**				12 9300
3610	New Bench - WSU standard		Each	**129300002**				12 9300
3620	New Trash Receptacle - WSU standard		Each	**129300003**				12 9300
3630	Relocate Bench		Each	**129300004**				12 9300
3640	Relocate Bench - WSU standard		Each	**129300005**				12 9300
3650	Relocate Trash Receptacle		Each	**129300006**				12 9300
3660	Relocate Trash Receptacle - WSU standard		Each	**129300007**				12 9300
3670	New Bench - UTA standard off station		Each	**129300008**				12 9300
3680	New trash Receptacle - UTA standard off station		Each	**129300009**				12 9300
3690	Bicycle Rack Inverted U Style	S	Each	**129310001**				12 9310
3700	Bicycle Rack Wave Style		Each	**129310002**				12 9310
3710	Detectable Warning Surface	S	Square Foot	**321726001**				32 1726
3720	Docking Guide Strip	S	Foot	**32711326001**				32 7113.26
3730	Driver Relief Station		Lump	**tbd**				
3740	Relocate Information Kiosk		Lump	**tbd**				
3750	Restore Underground Snow Melt System		Lump	**tbd**				
3760	Underground Snow Melt System	S	Lump	**tbd**				
	Station Canopies (21 locations)							
3770	Integral Color Concrete	**S**	Lump	**033000001**				03 3000
3780	Precast Shelter Column	S	Each	**034100001**				03 4100
3790	Precast Shelter Middle Column	S	Each	**034100002**				03 4100
3800	Roof Structure	S	Lump	**051200001**				05 1200
3810	Cold Formed Metal Framing	S	Lump	**054000001**				05 4000
3820	Roof Sheetmetal	S	Lump	**076200001**				07 6200

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Technical Specifications Bid Item List

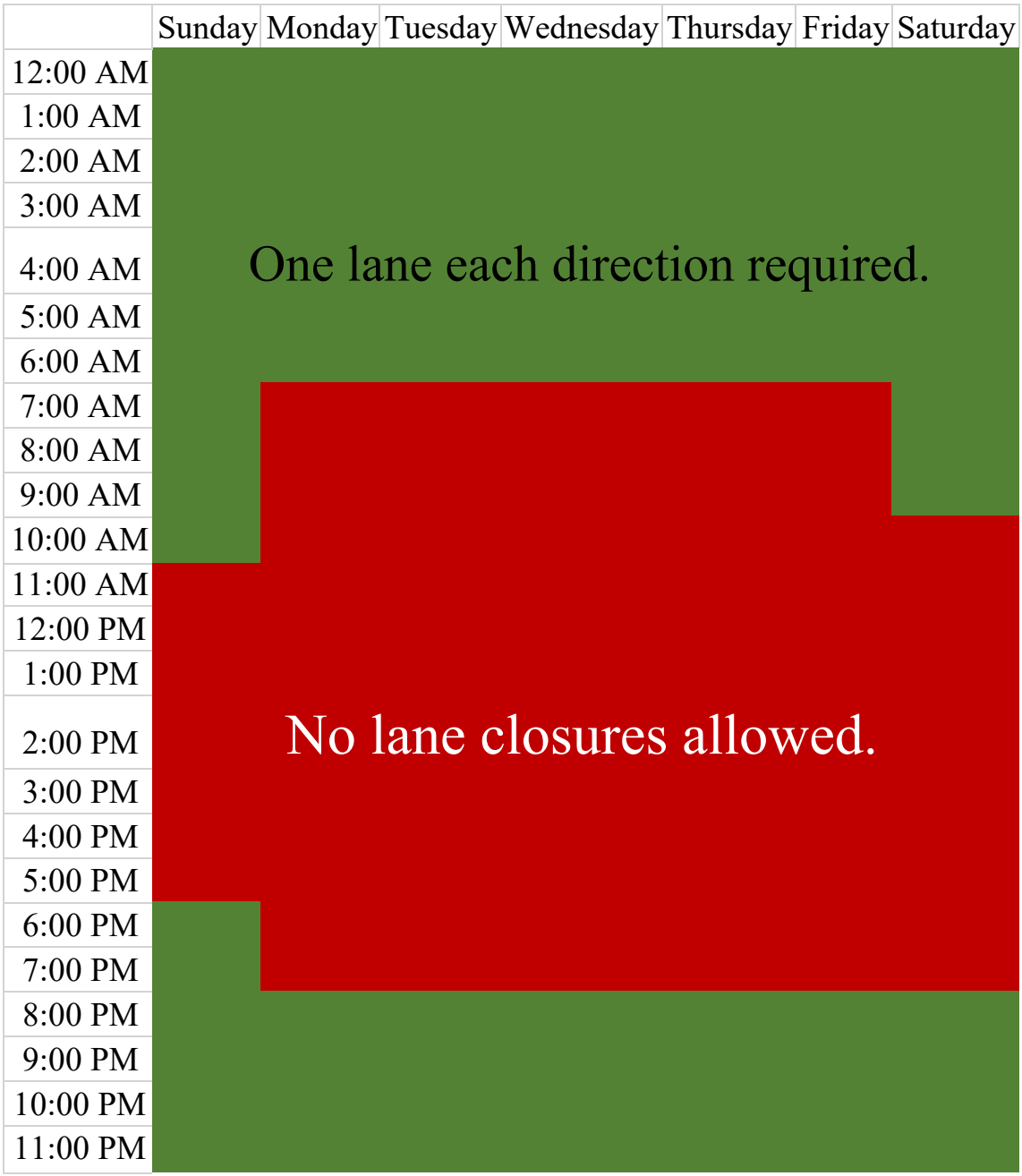
No.	Item Name	Station Work	Unit	Item Number	2020 UDOT Specifications	2017 APWA Specifications	Ogden City Supplemental to 2017 APWA Specifications	Architecture and Site Furnishing Technical Specifications
3830	Soffit	S	Lump	**076200002**				07 6200
3840	Station Windscreens	S	Foot	**088000001**				08 8000
3850	Information Kiosks	S	Each	**101400001**				10 1400
3860	Station Name Signs and Destination Signs	S	Each	**101400002**				10 1400
3870	Thermoplastic ADA and Bike Logos	S	Each	**101400003**				10 1400
3880	Benches	S	Each	**129300001**				12 9300
3890	Drainage	S	Lump	**221001001**				22 1001
3900	Point Source Light fixtures	S	Each	**tbd**				
3910	Roof Perimeter Light Strip	S	Foot	**tbd**				
	Browning Center Canopy							
3920	Demo existing canopy and curved wall	S	Lump	**024100001**				02 4100
3930	Spread Footings	S	Each	**033000002**				03 3000
3940	Upper Canopy Roof Framing	S	Lump	**051200002**				05 1200
3950	Lower Canopy Roof Framing	S	Lump	**051200003**				05 1200
3960	Curved Canopy Roof Framing	S	Lump	**051200004**				05 1200
3970	10" Columns	S	Each	**051200005**				05 1200
3980	12" Columns	S	Each	**051200006**				05 1200
3990	Fluid-Applied Waterproofing	S	Lump	**071400001**				07 1400
4000	Water Repellents	S	Lump	**071900001**				07 1900
4010	Flashing	S	Lump	**076200003**				07 6200
4020	Joint Sealants	S	Lump	**079200001**				07 9200
4030	Roof Glass Panels	S	Each	**088000002**				08 8000
4040	High-Performance Coatings	S	Lump	**099600001**				09 9600
4050	Drainage	S	Lump	**221001002**				22 1001
4060	Lighting	S	Each	**tbd**				
4070	Conduit	S	Lump	**tbd**				
4080	Snow Melt in Canopy	S	Lump	**tbd**				
4090	Connection to building	S	Lump	**tbd**				

UDOT SPECIAL PROVISION
SECTION 00555M
PROSECUTION AND PROGRESS

Add the following to Article 1.9:

E. Traffic Limitations
   1. All lanes on Harrison Blvd shall be a minimum of 11 feet width
   2. Maintain access to all businesses, residences, and parking structures during construction
   3. Lane restrictions:
      a. 25th Street
         i. Closure may be allowed upon coordination with Ogden City
         ii. Maintain pedestrian access along entire facility
      b. Jefferson Ave, Adams Ave
         i. Maintain one lane of traffic each direction
      c. Monroe Blvd
         i. Maintain access to businesses
      d. 23rd Street
         i. Closure may be allowed upon coordination with Ogden City
         ii. Access to parking structures must be maintained
      e. SR-203 (Harrison Blvd) – See tables below
      f. US-89 (Washington Blvd) – See tables below

Lane Table – Harrison Blvd NB



Lane Table – Harrison Blvd SB

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
12:00 AM	One lane each direction required.						
1:00 AM							
2:00 AM							
3:00 AM							
4:00 AM							
5:00 AM							
6:00 AM		No lane closures allowed.					
7:00 AM							
8:00 AM							
9:00 AM							
10:00 AM							
11:00 AM							
12:00 PM							
1:00 PM							
2:00 PM							
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5:00 PM							
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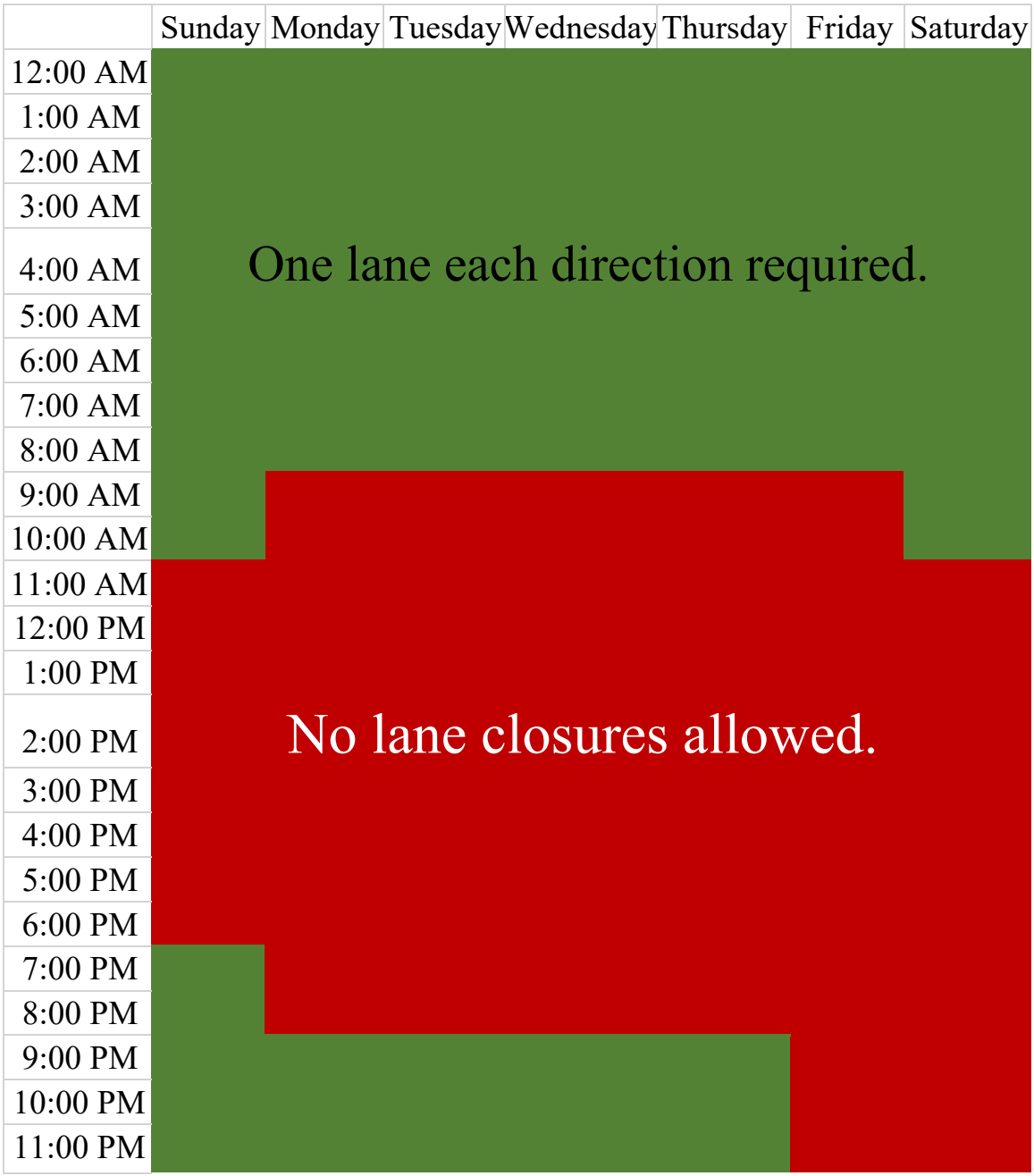
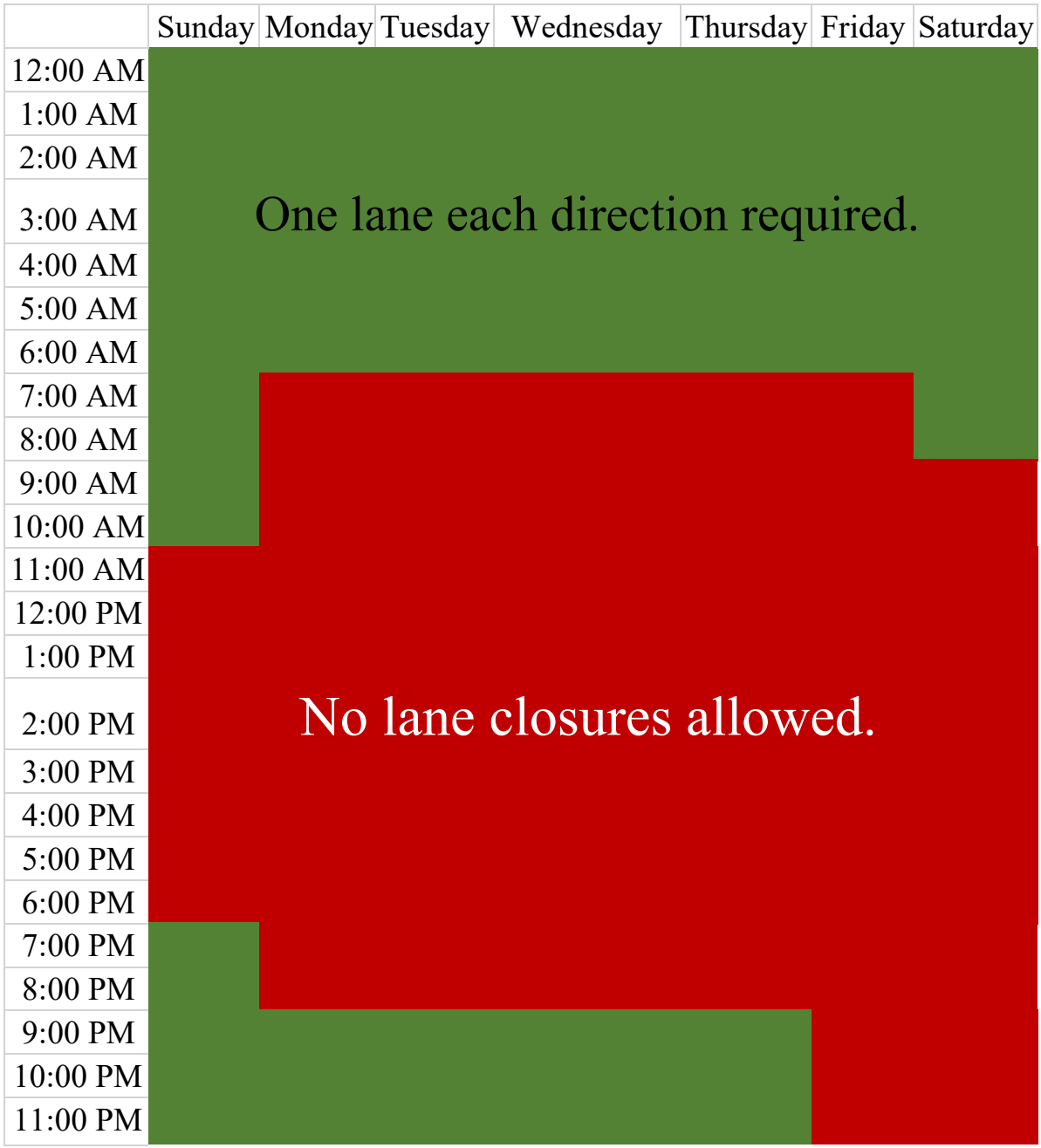
9:00 PM							
10:00 PM							
11:00 PM							

Lane Table – Washington Blvd NB



Lane Table – Washington Blvd SB



F. WSU Central Campus Limitations
   1. August 31st, 2020 to February 28th, 2021
      a. Maintain access to all buildings
   2. March 1st, 2021 to April 30th, 2021
      a. Maintain access to all buildings
      b. Lindquist Plaza may be closed
      c. Parking lot at 3848 Harrison Blvd may be partially closed (east 48 parking stalls)
      d. Adjoining sidewalks may be closed provided all building access is maintained
   3. May 1st, 2021 to June 30th, 2021
      a. Southern 2 entrances at Students Services Center may be closed
      b. South terrace access and entrance at Union Building may be closed
      c. Maintain access to Browning Center and Kimball Center
      d. Maintain main southern access to Union Building
      e. Lindquist Plaza may be closed
      f. Parking lot at 3848 Harrison Blvd may be partially closed (east 48 parking stalls)
      g. Future medallion area may be partially closed including adjoining sidewalks, roadway, and additional 4 parking stalls
      h. Maintain truck and delivery access to Union Building through construction area
      i. Maintain vehicular and pedestrian access to the Browning Center drop-off area
   4. July 1st, 2021 to August 31st, 2021
      a. Southern 2 entrances at Students Services Center may be closed
      b. South terrace access and entrance at Union Building may be closed
      c. Western 2 entrances at Browning Center may be closed
      d. Main northern and eastern entrances at Kimball Center may be closed
      e. Maintain main southern access to Union Building
         i. Surrounding sidewalks may be closed if alternate route is maintained
      f. Parking lot at 3848 Harrison Blvd may be partially closed (east 48 parking stalls)
      g. Future medallion area may be closed including adjoining sidewalks, roadway, and additional 4 parking stalls
      h. Browning Center drop-off area may be closed to vehicle and pedestrian access
      i. Maintain truck and delivery access to Union Building through construction area
      j. Lindquist Plaza may be closed until mid-July Pops Concert
         i. Coordinate completion date with WSU
   5. Other closures including building entrances, sidewalks, parking, and campus areas may be closed as needed for construction when coordinated with WSU

UDOT SPECIAL PROVISION
SECTION 02056M
EMBANKMENT, BORROW, AND BACKFILL

Add Article 1.2 Paragraph B

B. Section 02721: Untreated Base Course (UTBC)

Delete Article 1.5 Paragraph B and replace with the following:

B. Engineering proposal for alternate materials or trench configurations for drainage pipe bedding and pipe backfill as outlined in this Section, Article 2.4 B.

Delete Article 2.2 Paragraph B and replace with the following:

B. Granular Borrow
   1. Classification A-1-a. Refer to AASHTO M 145
   2. Non-plastic.
   3. Meet gradation requirements in Table 1.

Table 1

Granular Borrow Gradation Option 1	
Sieve Size	**Percent Passing**
3 inch	90 - 100
1 inch	60 - 100
1/2 inch	30 - 80
No. 4	25 - 65
No. 10	0 - 50
No. 40	0 - 30
No. 200	0 - 15

   4. UTBC meeting the requirements of Section 02721 may be used upon approval of the Engineer.

Delete Article 2.2 Paragraph D and replace with the following:

D. Free-Draining Granular Backfill
   1. Meet the following gradation:

Table 2

Free Draining Granular Backfill Gradation	
Sieve Size	**Percent Passing**
1½ inch	90-100
1 inch	20-55
¾ inch	0-15
⅜ inch	0-5

UDOT SPECIAL PROVISION
SECTION 02316M
ROADWAY EXCAVATION

Delete Article 1.2 and replace with the following:

1.2 RELATED SECTIONS

A. Section 00820: Legal Relations and Responsibility to the Public

B. Section 01282: Payment

C. Section 01355: Environmental Compliance

D. Section 01571: Temporary Environmental Controls

E. Section 01721: Survey

F. Section 02056: Embankment, Borrow, and Backfill

G. Section 02075: Geotextiles

H. Section 02231: Site Clearing and Grubbing

I. Section 02705: Pavement Cutting

J. Section 02912: Topsoil

Delete Article 2.2 and replace with the following:

2.2 USE OF ON-SITE MATERIALS

A. Refer to Section 01282.

UDOT SPECIAL PROVISION
SECTION 02735S
MICRO-SURFACING

Delete Section 02735 and replace with the following:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Products and procedures for mixing and spreading a properly proportioned homogeneous mixture of aggregate, mineral filler, additives, polymer-modified asphalt emulsion and water to an existing pavement providing a firm surface adhesion and smooth stable skid resistant texture.

1.2 RELATED SECTIONS

A. Section 02701: Pavement Smoothness

B. Section 02746: Hydrated Lime

1.3 REFERENCES

A. AASHTO M 17: Mineral Filler for Bituminous Paving Mixtures

B. AASHTO M 85: Portland Cement

C. AASHTO M 316: Polymer Modified Emulsion

D. AASHTO T 11: Materials Finer Than 75 µm (No. 200) Sieve in Mineral Aggregate

E. AASHTO T 27: Sieve Analysis of Fine and Coarse Aggregates

F. AASHTO T 49: Penetration of Bituminous Materials

G. AASHTO T 53: Softening Point of Bitumen

H. AASHTO T 59: Testing Emulsified Asphalts

I. AASHTO T 96: Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

J. AASHTO T 104: Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate

K. AASHTO T 112: Clay Lumps and Friable Particles in Aggregate

L. AASHTO T 176: Plastic Fines in Graded Aggregates and Soils by Use of the Sand Equivalent Test

M. AASHTO T 278: Surface Frictional Properties Using the British Pendulum Tester

N. AASHTO T 279: Accelerated Polishing of Aggregates Using the British Wheel

O. ASTM D 6372: Testing and Construction of Micro-Surfacing

P. International Slurry Seal Association (ISSA) Specifications and Guidelines

Q. UDOT Minimum Sampling and Testing Requirements

R. UDOT Quality Management Plans

1.4 DEFINITIONS Not Used

1.5 SUBMITTALS

A. Provide the mix design to the Engineer 10 days before beginning construction.
   1. Refer to this Section, article 2.6.
   2. Mix Design must be performed by an AMRL (AASHTO accredited) laboratory experienced in the design of micro surfacing systems.
   3. Provide the Engineer with the following for asphalt and polymer emulsion with job-mix design.
      a. Test report that meets the requirements of this Section, Article 2.1.
      b. Target gradation for combined aggregate and mineral filler.
      c. Name of the asphalt and polymer emulsion supplier.
      d. Verification the asphalt/polymer emulsion supplier adheres to UDOT Quality Management Plan Section 508 Asphalt Emulsion.

B. Certificate of analysis and compliance from the manufacturer for each batch.

C. Provide test reports for mineral aggregate.

1. Refer to this Section, article 2.2.

D. Provide Manufacturer's Certificate of Compliance for Mineral Filler.
   1. Refer to this Section, article 2.3.

E. Provide calibration documentation for each mixing unit including an individual calibration for each material at various settings that corresponds to the mixing unit metering devices.

F. Changes in the job-mix gradation.
   1. Submit a written request for a change in the job-mix gradation.
   2. Submit a new job-mix design if changes in gradation are outside the gradation band allowed by the stockpile tolerance in Table 4.

1.6 ACCEPTANCE

A. Acceptance sampling and testing of material according to UDOT Minimum Sampling and Testing Requirements.

B. The Department will assess price adjustments based on the average daily application rate of aggregate and emulsion residue per lot.
   1. A lot is defined as one day's production.
   2. Use the computerized monitoring system from the paver for the aggregate and emulsion totals per lot.
   3. Obtain square yards from the Contractors Daily Report, verified by the Engineer.
   4. Pay Factor = PF_{rate} (Table 1) x $PF_{residue}$ (Table 2)

C. Application rate pay factor (PF_{rate}) is based on application rate of dry aggregate.
   1. Aggregate application target rate is 25 lbs/yd^2

Table1

Pay Factor Application Rate	
Average Application Rate (lbs/yd^2)	**PF_{rate}**
Greater than 25.0	1.0
20.0 to 24.9	(Avg. Rate ÷ 25)
Less than 20.0	Reapplication with option to remove

D. Emulsion residue pay factor ($PF_{residue}$) is based on the residue of the emulsion placed each lot.
   1. Target Value = Residual asphalt target value for emulsion based on the mix design.
   2. Emulsion residue = Based on the Certificate of Compliance from the Emulsion Supplier.

Table2

Pay Factor Emulsion Residue Content	
Average Daily Emulsion Residue %	**$PF_{residue}$**
Target Value less than ±0.5%	1.0
Target Value ± 0.51% to Target Value ± 1.00%	0.8
Greater than 1% of Target Value	Reapplication with option to remove

E. Smoothness
1. Refer to Section 02701 for smoothness requirements.

PART 2 PRODUCTS

2.1 EMULSIFIED ASPHALT

A. Use a polymer-modified asphalt emulsion manufactured specifically for micro-surfacing.
1. Refer to AASHTO M 316 Polymer Modified Cationic Emulsified Asphalt.
2. The supplier must be on the approved list adhering to the UDOT Quality Management Plan 508 Asphalt Emulsion.

B. Mill or blend the polymer material into the asphalt or emulsifier solution before the emulsification process.
1. Obtain certification from the asphalt emulsion manufacturer that the emulsion contains at least 3.0 percent natural latex rubber (NLR) or synthetic latex rubber (SLR) based on the weight of asphalt (asphalt residual).

C. Refer to Table 3 for Modified Emulsion Residue.

D. The Department reserves the right to test the emulsion and also look at bill of ladings to verify the polymer or modifier types used.

Table 3

Modified Emulsion Residue By Distillation			
Test Method	**Description**	**Micro CQS-1P(NLR)**	**Micro CQS-1hP(NLR)**

		Or Micro CQS-1P(SLR)	Or Micro CQS-1hP(SLR) (a)
AASHTO T 49 (b)	Penetration, 25° C	70 -120	40 - 90
AASHTO T 53	Softening point	55° C Min	57° C Min
AASHTO T59	Vicosity, Saybolt 25° C	20 Min; 100 Max	20 Min; 100 Max
AASHTO T59	Particle Charge Test	Positive	Positive
AASHTO T59	Sieve Test, %	0.1 Max	0.1 Max
AASHTO T 59-modified (c)	Residue by distillation	65% Min	65% Min
AASHTO T 301 (Modified) (d)	Elastic Recovery, 5 cm per min.	60% Min recovery	60% Min recovery

(a) Generally used for Washington County
(b) Take 6 penetrations in multiple locations and use the average of the higher 3.
(c) Modified distillation procedure – Heat emulsion residue to 177 ± 5° C and maintain that temperature for 20 min. Perform the distillation within 60 ± 15 min.
(d) Modify paragraph 4.5 as follows: Stop the ductilometer after 20 cm has been reached and within 2 seconds. Sever the specimen at its center with a pair of scissors.

D. Formulate the polymer modified emulsified asphalt so the paving mixture will sufficiently cure allowing a return to traffic in one hour.

2.2 MINERAL AGGREGATE

A. Use 100 percent crushed mineral aggregates, clean and free from organic matter or other detrimental substances that meet the following requirements:
   1. Maximum clay lumps and friable particles of 2 percent for coarse and fine aggregates. Refer to AASHTO T 112.
   2. Maximum weighted sodium sulfate soundness loss of 15 percent. Refer to AASHTO T 104.
   3. Maximum loss by abrasion of 30 percent. Refer to AASHTO T 96.
   4. Sand equivalent of 65 or greater (Pre-wet method). Refer to AASHTO T 176.
   5. Minimum polishing value of 31. Refer to AASHTO T 278 and T 279.
      a. Do not use predominantly limestone or dolomite aggregates.

B. Establish a job mix or target gradation within the gradation band as specified in Table 4.
   1. Base the mix design on the target gradation.
   2. Verify the percent passing each sieve does not vary by more than the stockpile tolerance and still remains within the gradation band. Refer to AASHTO T 11 and AASHTO T 27.

Table 4

Job-Mix Gradation Design Limits		
Sieve Size	**Job Mix Gradation Target Band**	**Stockpile**

		Tolerances
⅜	100	0
#4	70-90	±5
#8	45-70	±5
#16	28-50	±5
#30	19-34	±5
#50	12-25	±4
#100	7-18	±3
#200	5-15	±2

Percent passing based on total aggregate (dry weight) and fine and coarse aggregate with approximately the same bulk specific gravities.

2.3 MINERAL FILLER

A. Use one of the following for Mineral Filler. Refer to AASHTO M 17.
   1. Non-air entrained Type I/II portland cement. Refer to AASHTO M 85.
   2. Hydrated lime, free from lumps or foreign matter. Refer to Section 02746.

B. Determine the amount of mineral filler needed through the laboratory mix design.
   1. Verify the amount of mineral filler used is between 0.5 percent and 2.0 percent by the weight of dry aggregate.
   2. Adjust the percentage of mineral filler ± 0.5 percent as necessary for better consistency or to optimize set times with Engineer's approval.
   3. Mineral Filler is considered part of the aggregate gradation.

2.4 WATER

A. Use potable water free from harmful salts, reactive chemicals, and any other contaminants.

2.5 ADDITIVES

A. Use additives as required to accelerate or retard the break-set of the micro-surfacing mix, to improve the resulting finished surface, or to increase adhesion.
   1. Determine the initial additive quantities from the mix design for the micro-surfacing mix or individual materials.
   2. Use additives compatible with the other components of the mix.

2.6 JOB-MIX DESIGN

A. Design according to ASTM D 6372.
   1. Show each ingredient amount meets the following:
      a. Residual asphalt cement content, 8.0 percent minimum by dry total weight of aggregate.
      b. Aggregate gradation (target) within the job-mix gradation design limits in Table 4.
      c. Mineral filler, percentage by total dry weight of aggregate.
      d. Polymer modifier 3.0 percent minimum solid polymer based on the residual asphalt content certified by emulsion supplier.
   2. Identify the optimum emulsion residue as a percentage of the dry weight of aggregate to meet Table 5 requirements. The job mix formula tolerance is +/- 0.5% emulsion residue.
   3. Identify additives as determined by design testing to control mix set times and cohesion.
      a. Provide acceptable limits for additives.
   4. Conform to the ISSA A143 specifications listed in Table 5.
   5. Use the same materials and aggregate gradation to be used on the project.
   6. Provide a micro-surfacing mixture that can be spread in variable thickness cross-sections, ruts, scratch courses, and surfaces.
   7. Changes in aggregate source, emulsion, or mineral filler will require a new mix design submitted for approval by the engineer. A change in aggregate source, emulsion, or mineral filler will also require a new test strip as indicated in Section 3.5.

Table 5

ISSA A 143 Specifications		
ISSA Test No.	**Description**	**Specification**
ISSA TB-139	Wet Cohesion @ 30 Minutes Minimum (Set) @ 60 Minutes Minimum (Traffic)	 12 kg-cm Minimum 20 kg-cm Minimum or Near Spin
ISSA TB-109	Excess Asphalt by LWT Sand Abrasion	50 g/ft^2 Maximum (538 g/m^2 Maximum)
ISSA TB-114	Wet Stripping	Pass (90% Minimum)
*ISSA TB-100	Wet-Track Abrasion Loss One-hour Soak Six-day Soak	 50 g/ft^2 (538 g/m^2) Maximum 75 g/ft^2 (807 g/m^2) Maximum
ISSA TB-147	Lateral Displacement	5% Maximum
ISSA TB-144	Classification Compatibility	11 Grade Points Minimum (AAA, BAA)
ISSA TB-113	Mix Time @ 77° F (25° C)	Controllable to 120 Seconds Minimum

* Perform the wet track abrasion test under laboratory conditions as a component of the mix design process.

2.7 EQUIPMENT

A. Use mixing equipment specifically designed and manufactured to mix and place micro-surfacing.
   1. Mix the material by an automatically sequenced, self-propelled micro-surfacing mixing machine with a continuous flow revolving multi-blade double shafted mixing unit that:
      a. Accurately delivers and proportions the aggregate, emulsified asphalt, mineral filler, controls setting additive, and water.
      b. Discharges the mixed product on a continuous flow basis.
   2. Use a machine with sufficient storage capacity for aggregate, emulsified asphalt, mineral filler, control additive, and water to maintain an adequate supply to the proportioning controls.
   3. Use a machine capable of self-loading materials while continuing to place micro-surfacing.
   4. Verify that the operator has full control of the forward and reverse speed during applications of the micro-surfacing material.
      a. Use original manufacturer designed equipment for the self-loading device, opposite side driver stations, and forward and reverse speed controls.

B. Use a machine with a hydraulically adjustable (while applying mixture) type spreader box with a positive screed adjustment for yield control and a positive adjustment for the joint matcher.

C. Equip the micro-surfacing spreader box with the following:
   1. Ribbon flights mounted on an adjustable shaft to continually agitate and distribute the materials throughout the box.
   2. Curb bumpers and replaceable runners with at least 5 ft long end runners.
   3. A sufficient walkway to provide access to either side of the spreader box without walking through the freshly placed material.
      a. Verify that the equipment provides sufficient turbulence to prevent the mix from setting in the box or causing excessive side buildup or lumps.
   4. Flexible seals in contact with the road, front and rear, to prevent the loss of the mixture from the box.
   5. A secondary strike-off located approximately 2 to 3 ft behind the primary strike-off to minimize transverse corrugations and to improve surface texture.
      a. Verify that the secondary strike-off has elevation and width adjustments similar to the primary strike-off and a pivot point that can be tilted for texturing or raised completely off the surface.
      b. Verify that the secondary strike-off has the same adjustments as the spreader box.
   6. Ability to side shift the box to compensate for variations in the pavement geometry.
   7. Capability of applying micro-surfacing mixture in variable widths up to 15 ft.

D. Use a rut filling spreader box specifically designed to fill ruts with an average depth greater than ½ inch. Ruts greater than ½ inch deep require multiple passes to restore the cross section.

E. Use a computerized material monitoring system with integrated material control devices such that the amount of each material can be determined at any time.
   1. Calibrate each material control device before each mix application and as often thereafter as deemed necessary by the Engineer.
   2. Use a monitoring system capable of recording, displaying, and printing the following information:
      a. Individual sensor counts for emulsion, aggregate, mineral filler, water, and additive.
      b. Aggregate, emulsion, and mineral filler output in pounds per minute.
      c. Percentages of emulsion, mineral filler, water, and additive.
      d. Cumulative totals of aggregate, emulsion, mineral filler, water, and additive.
      e. Scale factor for all materials.

F. Verify the daily totals from the computerized monitoring system for the aggregate and the daily total from the scalping screen weighing system are within 2 percent.

G. Calibrate each mixing unit in the presence of the Engineer before construction.
   1. Do not use any machine until calibration has been completed.
   2. During the project construction, any mechanical change to the equipment components that deliver micro surfacing materials to the pug mill mixer will require new calibration.

PART 3 EXECUTION

3.1 LIMITATIONS

A. Do not apply micro-surfacing during rain, within 48 hours after a rain event, when road surface moisture is present or during other adverse weather conditions.

B. Do not apply micro-surfacing if either the pavement or air temperature is below 50 degrees F.

C. Do not apply micro-surfacing when the temperature is projected below 37 degrees F within 48 hours of placing micro-surfacing.

D. Cease micro-surfacing operations when the weather or other conditions prolong opening road surface to traffic beyond two hours.

E. Remove and replace the micro-surfacing if any of the following occurs:
   1. Lumping, balling, or unmixed aggregates.
   2. Separation of the coarse aggregate from the emulsion and fines.
   3. Excessive breaking of emulsion inside the spreader box.
   4. Streaking caused by oversized aggregate.
   5. Flushing or excessively rich areas appearing in the micro-surfacing after two hours from the time of placement.
   6. Any measurable rutting, shoving, or other evidence of premature deformation when exposed to traffic.

F. Keep traffic off roadway surface until the micro-surfacing has cured.
   1. Allow for additional curing time at locations such as driveways, intersections, and where sharp turning movements may take place or where vehicles may accelerate quickly.

3.2 STOCKPILE

A. Construct individual 500-ton stockpiles of micro-surfacing aggregates.
   1. Engineer will approve stockpiles at least one and at most seven days before use.
   2. Combining, altering, or moving 500-ton stockpiles may require re-approval by the Engineer before use.

B. Notify the Engineer at least seven calendar days before micro-surfacing placement in order for the initial stockpiles to be sampled and tested for acceptance.

C. Obtain the Engineer's written acceptance of a stockpile before its use for micro-surfacing.

D. Provide stockpile Quality Control information to the Engineer for every 500 tons of aggregates to include the following:
   1. Aggregate gradation meeting job-mix formula tolerances according to Table 4.
   2. Sand Equivalency refer to AASHTO T 176.

E. Be capable of determining aggregate moisture within 10 minutes at all times.

F. Rework or remove material not meeting specifications from the stockpile area. Identify stockpiles that will be reworked.

G. The Department will retest corrected material for acceptance.

3.3 PREPARATION

A. Clean the pavement surface of all dirt, sand, dust, oil, and other objectionable material immediately before applying micro-surfacing.

B. Allow un-sealed cracks to dry thoroughly before applying micro-surfacing when using water to clean the road surface.

C. Cover manholes, valve boxes, drop inlets, and other service utility entrances before surfacing.

D. Protect all structures, including items such as guardrail, guideposts, concrete barriers, drains, and parapet walls.

3.4 APPLICATION

A. Pre-wet the pavement surface as required due to local conditions by fogging ahead of the micro-surfacing box.
   1. Do not create standing water on the pavement in front of the micro-surfacing box.

B. Place micro-surfacing mix that meets the job-mix design.
   1. Control the ingredient proportions with metering or measuring devices on the micro-surfacing equipment.
      a. Use readings from the metering or measuring devices to determine compliance with limits stated in the approved job-mix design.
   2. Limit any increase or decrease in the amount of mineral filler added to the mix during production to ± 1 percent of the job-mix design.
   3. Limit the set-control agent to ± 1 percent of the job-mix design.
   4. Verify that the emulsion submitted with the job-mix design is the same emulsion used throughout the project.
   5. Verify that emulsion asphalt residue is ±0.5 percent of the job-mix design.
      a. Engineer may require a new job-mix design and re-approval of the micro-surfacing if large disparities occur.
      b. Calculate the percent emulsion on the daily electronic printout from the calibrated paver for emulsion and aggregate quantities.

C. Produce a mixture according to the mix design and the quality control tolerances.
   1. Maintain quality control documentation and make available to the Engineer upon request or at completion of daily work.
   2. Calculate the percent asphalt content of the mixture from the equipment computer display readings randomly at least three times daily.
   3. Calculate the yield of the aggregate being placed from the equipment computer display readings randomly at least three times daily.
   4. Maintain a daily report and log sheet containing the following information:
      a. Aggregate used, ton (dry)
      b. Micro-Surfacing emulsion used, ton
      c. Bituminous materials for tack coat used, if specified, ton
      d. Mineral Filler used, lbs
      e. Water used in mixture, gallons
      f. Additive used in mixture, gallons
      g. Surface area completed (square yards)

h. Surface area application rate (dry lbs aggregate per square yard)
i. Percentage of emulsified asphalt based on dry aggregate

D. Pass the mineral aggregate over a vibratory scalping screen before transfer to the micro-surfacing mixing machine to remove oversize material.
1. Verify that the screening unit is capable of providing weigh tickets for each load of material.

E. Carry a sufficient amount of micro-surfacing in all parts of the spreader box so that full width and complete coverage is obtained with no streaks or narrow spots.
1. Avoid overloading the spreader box.
2. Do not spray water directly into the spreader box during the application of micro-surfacing under any circumstances

F. Apply micro-surfacing of proper consistency at a minimum rate of 25 lbs/yd^2 based on the dry weight of aggregate for each lot.
1. Provide to the Engineer the square yards for each lot.
2. Calculate the aggregate application rate using the daily tickets from the screening unit and daily electronic printout from the calibrated paver.

G. Apply micro-surfacing for rut filling.
1. Apply micro-surfacing as a scratch-coat pass using a steel or high density strike-off when required to fill ruts less than ½ inch deep or as directed by the Engineer.
2. Make multiple passes with the rut filling spreader box for ruts greater than ½ inch deep or as directed by the Engineer.
3. Allow 24-hour cure time after filling ruts, before placing additional micro-surfacing layer.

H. Do not apply water to freshly placed micro-surfacing.

3.5 TEST STRIP

A. Construct a test strip at least 500 ft long on the roadway before initial placement.
1. With the coordination of the Engineer, arrange for the test strip to be constructed on the project site under anticipated placement conditions (intersections, travel lanes, approaches, time of day, temperature, and humidity).
2. Construct the test strip with the job mix proportions, materials, and equipment to be used on the project.

3. Adjustments to the mixture formula will be permitted provided they do not exceed the values stated in the mix design.
    a. If modifications to the mixture formula are in excess of the values in the mix design, prepare a new mix design and construct another test strip.
4. The Engineer will evaluate the test strip owner to determine if the mixture set and cure properties as well as the equipment and placement techniques are acceptable.
    a. Verify initial set is achieved within 30 minutes and the surface shows no signs of distress when exposed to traffic after curing for 1 hour.
5. Remove and replace or repair at the Engineer's approval, at no cost to the Department, if the test strip does not meet the conditions stated above.

B. Make necessary adjustments if test strip does not perform as required.
1. Repeat the test strip process.
2. The Engineer may require a new job-mix design if failures indicate an ingredient problem.

3.6 FINISHING DETAILS

A. Verify that the depth of each micro-surfacing course does not exceed twice the maximum aggregate size.
1. Not required when using a rut filling spreader box.

B. Verify that the finished longitudinal and transverse joints are neat and uniform.
1. Construct longitudinal joints within 6 inches of the lane lines where possible.
2. Verify that overlap of micro-surfacing at any joint does not exceed 6 inches.
3. Repair the joints if any of the following conditions exist:
    a. Build-up of material at the joints.
    b. Uncovered areas at the joints.
    c. Longitudinal and transverse joints with more than ¼ inch vertical space between the surface and a 4 ft straightedge placed perpendicular to the joint.
4. Verify that the edges of the micro-surfacing follow the centerline, lane lines, shoulder lines, and curb lines.
5. Repair the edges if they vary more than 6 inches.
6. Use methods approved by the Engineer to correct deficiencies.
    a. Verify that the repaired surfaces are dense with a uniform texture.
    b. Repair sections with surface irregularities the same width as the existing pass of micro surfacing.

c. Small areas of patching are not permitted.

C. Verify that the finished micro-surfacing has a uniform texture free of scratches, tears, and other surface irregularities.
1. Repair the surface, at Contractor's expense, if any of the following conditions exist:
a. More than one surface irregularity ¼ inch or wider and 10 ft or longer in any 100 ft section.
b. More than three surface irregularities ½ inch or wider and more than 6 inches long in any 100 ft section.
c. Any surface irregularity 1 inch or wider and more than 4 inches long.
d. Any tire track damage to the fresh micro-surfacing.
e. Slick spots or any area of bleeding (surface flushing).

D. Place micro-surfacing adjacent to concrete pavements or concrete curb and gutter with a straight longitudinal edge.
1. Do not allow over-lap in these areas.

E. Maintain neat construction lines at all locations.

F. Place micro-surfacing at side streets and intersections out to right-of-way line including around radii where applicable.

G. Use hand squeegees to spread micro-surfacing in areas where micro-surfacing machine cannot operate.
1. Lightly dampen areas before mix placement.
2. Provide complete and uniform coverage.
3. Avoid unsightly appearance from handwork.
4. Use the same type of finish in hand worked areas as applied by the spreader box.

H. Use construction paper or comparable products so that beginning and ending joint lines from each construction pass are straight and neat.

I. Use construction paper or comparable products to protect all roadway utilities.

END OF SECTION

UDOT SPECIAL PROVISION
SECTION 02741S
HOT MIX ASPHALT (HMA)

Delete Section 02741 and replace with the following:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. A surface course of one or more layers of HMA comprised of aggregate, asphalt binder, hydrated lime, and other additives.

B. Option to incorporate Reclaimed Asphalt Pavement (RAP) materials into HMA pavement.

1.2 RELATED SECTIONS

A. Section 01456: Materials Dispute Resolution

B. Section 02701: Pavement Smoothness

C. Section 02742S: Project Specific Surfacing Requirements

D. Section 02745: Asphalt Material

E. Section 02746: Hydrated Lime

F. Section 02748: Prime Coat/Tack Coat

1.3 REFERENCES

A. AASHTO M 323: Superpave Volumetric Mix Design

B. AASHTO R 35: Superpave Volumetric Design for Hot-Mix Asphalt (HMA)

C. AASHTO T 11: Materials Finer Than 75 µm (No. 200) Sieve in Mineral Aggregates by Washing

D. AASHTO T 19: Bulk Density (“Unit Weight”) and Voids in Aggregate

E. AASHTO T 27: Sieve Analysis of Fine and Coarse Aggregates

F. AASHTO T 89: Determining the Liquid Limit of Soils

G. AASHTO T 90: Determining the Plastic Limit and Plasticity Index of Soils

H. AASHTO T 96: Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

I. AASHTO T 104: Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate

J. AASHTO T 112: Clay Lumps and Friable Particles in Aggregate

K. AASHTO T 176: Plastic Fines in Graded Aggregates and Soils by Use of the Sand Equivalent Test

L. AASHTO T 195: Determining Degree of Particle Coating of Asphalt Mixtures

M. AASHTO T 209: Theoretical Maximum Specific Gravity and Density of Hot Mix Asphalt (HMA)

N. AASHTO T 255: Total Evaporable Moisture Content of Aggregate by Drying

O. AASHTO T 304: Uncompacted Void Content of Fine Aggregate

P. AASHTO T 335: Determining the Percentage of Fracture in Coarse Aggregate

Q. UDOT Materials Manual of Instruction

R. UDOT Minimum Sampling and Testing Requirements

S. UDOT Quality Management Plans

1.4 DEFINITIONS

A. Longitudinal Joint – Any new asphalt lift abutting an existing paving lift. This includes joints created by echelon paving and new asphalt placed against a milled asphalt edge.

B. Lot – The number of tons of HMA placed in a Production Day.

C. Minor Target Change – A change from the verified mix design gradation target on a maximum of two sieves with the following limitations.
   1. The maximum change from the verified target gradation on the No. 8 or any coarser sieve is limited to 3 percent passing per sieve.

2. The maximum change from the verified target gradation on the No. 16 or No. 50 sieves is 2 percent passing per sieve.
3. The maximum change from the verified target gradation on the No. 200 sieve is 0.5 percent passing.
4. No target change may violate the mix design requirements in this section.

D. Overband – an 8 inch protective asphalt coating sealing the longitudinal joint of final riding surface, as proposed by the contractor and approved by the Engineer

E. Production Day – A 24 hour period in which HMA is being placed.

F. RAP – Recycled Asphalt Pavement. Crushed or milled asphalt materials that have been removed from pavements.

G. Thin Overlay Pavement – New HMA design thickness less than 2 inches.

H. Lane-Leveling – Variable depth paving to correct minor rutting and longitudinal variations in the roadway. Depth varies from the maximum aggregate size to the depth needed to correct variations.

I. Profile leveling - Variable depth paving to correct minor profile variations in the roadway. Depth varies from the maximum aggregate size to the depth needed to correct variations.

1.5 SUBMITTALS

A. Mix design for approval at least 10 working days before paving according to UDOT Materials Manual of Instruction Section 960.

B. Changes in job mix design
1. Submit a written request for any proposed change in the job-mix design
   a. Allow at least 12 hours for approval before incorporating a minor target change into production.
   b. Allow at least six working days for verification and approval of any other change.
2. Include documentation supporting correlation between suggested target changes and mix design volumetric requirements.
   a. Acceptable documentation may include Department or Contractor testing data.
3. Submit samples according to the UDOT Materials Manual of Instruction 960 for a volumetric mix design verification for anything other than approved minor target changes.

C. Corrective action plan for approval according to this Section, Article 3.3, paragraph C2 and Article 3.4, paragraph A4b.

D. Refer to this Section, Article 3.4 for laboratory correlation submittals.

E. Mat joint layout plan to the Engineer for review at least 10 calendar days before placement.

1.6 ACCEPTANCE

A. Acceptance sampling and testing of material is according to UDOT Minimum Sampling and Testing Requirements.

B. Gradation and asphalt binder content
   1. The Engineer evaluates a lot on the test results of four or more samples, except when only three samples can be taken for the production day.
   2. Evaluate the lot using the number of tests “n” in Table 3.
   3. The Engineer informs the Contractor of the time and place of sampling not more than 15 minutes before sampling.
   4. Increase sample sizes to accommodate validation or third-party testing as required.

C. Density and Thickness
   1. Obtain cores from the mat and longitudinal joint within two contract days after the pavement is placed and per UDOT Materials Manual of Instruction Section 984.
      a. The Engineer marks coring location for in-place mat density and longitudinal joint density cores.
      b. Move transversely to a point 1 ft from the edge of the pavement for in-place mat density if the random location for coring falls within 1 ft of the edge of the overall pavement section (outer part of shoulders).
      c. Fill core holes with HMA, SMA or high AC content cold mix and compact in thin lifts within 24 hours or before returning to traffic, whichever is less.
      d. The Department witnesses the coring operation, takes possession of the cores immediately, and begins testing the cores within 24 hours for density acceptance.

2. Density Requirements
   a. The target for in-place density for the mat is 93.5 percent of Theoretical Maximum Specific Gravity except for thin overlay pavements.
   b. The target for in-place density for the longitudinal joint is 91.5 percent of the Theoretical Maximum Specific Gravity (Gmm).
   c. The target for in place density is 92.5 percent of theoretical maximum specific gravity for thin overlay pavements.
      1) Do not take longitudinal joint cores for thin overlay pavements.
3. Thickness Requirements are based only on mat cores. The thickness requirement may be waived when matching up to existing pavement, curb and gutter for Pavement in or next to intersections.
   a. The Department accepts a lot for thickness when:
      1) The average thickness is not more than ½ inch greater or ¼ inch less than the total design thickness specified.
      2) No individual sublot shows a deficient thickness of more than ⅜ inch.
   b. Excess Thickness – The Engineer may allow excess thickness to remain in place or may order its removal.
      1) The Department pays for 50 percent of the mix for material in excess of the +½ inch tolerance when excess thickness is allowed to remain in place.
   c. Deficient Thickness – Place additional material where lots or sublots are deficient in thickness.
      1) The Department pays for material necessary to reach specified thickness.
      2) The Department pays for 50 percent of the mix for additional material over specified thickness necessary to achieve minimum lift thickness.
      3) Minimum compacted lift is 3 times the nominal maximum aggregate size.
   d. Thickness tolerances established above do not apply to leveling courses.
      1) Check final surfaces in staged construction.
   e. Check thickness regularly with a depth probe during placement and take corrective action as necessary.

4. Longitudinal Joint
    a. The edge of a new asphalt mat may be removed for the purpose of meeting longitudinal joint density requirements.
        1) The material wasted is still included in the payment.
        2) Up to 3 inches for a confined edge is allowed.
        3) Up to 6 inches for an unconfined edge is allowed.

D. The Department applies one Incentive/Disincentive for the lowest dollar value for Gradation/Asphalt Content, one Incentive/Disincentive for In-Place Mat Density, and one Incentive/Disincentive for Longitudinal Joint Density. The Engineer computes Incentives/Disincentives as follows for each lot
    1. Compute incentive/disincentive for Gradation/Asphalt Binder and In-place Mat Density and Longitudinal Joint Density according to Table 1.
    2. Base the incentive/disincentive on Percent within Limit (PT) computation using Tables 2, 3, and 4.
    3. Use lowest single value combined for gradation (each of the sieves) and asphalt binder content for calculating the gradation/asphalt binder content incentive/disincentive.
    4. Use Tables 2, 3, and 4 to determine PT for in-place Mat Density and Longitudinal Joint Density.
    5. Meet PT of 88 or greater for in-place mat density or the Department does not pay incentives on gradation/asphalt binder content except for lane-leveling material.
    6. The Department pays or assesses the longitudinal joint density incentive/disincentive per ton of HMA placed adjacent to, and on the hot side of the longitudinal joint for each lift:
        a. The incentive/disincentive will be calculated from the average of the core densities taken from all abutting joints if the HMA mat has a longitudinal joint on more than one side.

E. The Department applies incentive/disincentive for smoothness according to Section 02701.
    1. Refer to Section 02701 for smoothness requirements.

F. The Department rejects lots:
    1. If the PT for any individual gradation measurement is less than 52 percent as shown in Table 1.
    2. If the PT for asphalt binder content or mat density measurement is less than 60 percent as shown in Table 1.

3. The Engineer may accept a reject lot. Refer to Section 01456.
   a. A price reduction of 35 percent of the pay item or $20 per ton, whichever is greater, will be assessed.
   b. The lot will not be eligible for any incentive.

G. The Engineer may elect to accept material on visual inspection according to the MS&TR.
   1. Incentives/Disincentives are not applied to material accepted visually.
   2. The Engineer reserves the option of conducting any acceptance tests necessary to determine that the material and workmanship meets the project requirements.

H. Meet production control requirements of Table 9.
   1. Material placed within the Cease Production Limit in Table 9 is not eligible for incentives.

Table 1

Incentive/Disincentive for Asphalt Binder Content, and Mat Density	
PT Based on Min. Four Samples	**Incentive/Disincentive (Dollars/Ton)**
>99	2.00
96-99	1.50
92-95	1.00
88-91	0.00
84-87	-0.26
80-83	-0.60
76-79	-0.93
72-75	-1.27
68-71	-1.60
64-67	-1.93
60-63	-2.27
<60	Reject
Incentive/Disincentive for Gradation	
PT Based on Min. Four Samples	**Incentive/Disincentive (Dollars/Ton)**
>99	2.00
96-99	1.50
92-95	1.00
88-91	0.00
84-87	-0.26
80-83	-0.60
76-79	-0.93
72-75	-1.27
68-71	-1.60
64-67	-1.93
60-63	-2.27
56-59	-5.00
52-55	-10.00
<52	Reject
Incentive/Disincentive for Longitudinal Joint Density	
PT Based on Min Four Samples	**Incentive/Disincentive (Dollars/Ton)**
>99	2.00
96-99	1.50
92-95	1.00
88-91	0.00
84-87	-0.26
80-83	-0.60
76-79	-0.93
72-75	-1.27
68-71	-1.60
64-67	-1.93
60-63	-2.27
56-59	-2.60
52-55	-5.00
<52	The $5 penalty and Overband Longitudinal Joint if Final Surface Lift

Table 2

Upper and Lower Limit Determination	
Parameter	**UL and LL**
⅜ inch sieve for ½ inch HMA No. 4 sieve for ⅜ inch HMA	Target Value ± 6.0%
No. 8 sieve	Target Value ± 5.0%
No.50 sieve	Target Value ± 3.0%
No. 200 sieve	Target Value ± 2.0%
Asphalt Binder Content	Target Value ± 0.35%
Mat Density	Lower Limit Target Value - 2.0% Upper Limit Target Value + 4.0%
Longitudinal Joint Density	Lower Limit Target Value - 2.0% Upper Limit Target Value + 6.0%

Table 3
Use the appropriate “number of tests” column and round down to the nearest value.

Quality Index Values (QU or QL) for Estimating Percent Within Limits										
PU or PL	**n=3**	**n=4**	**n=5**	**n=6**	**n=7**	**n=8**	**n=10**	**n=12**	**n=15**	**n=20**
100	1.16	1.50	1.75	1.91	2.06	2.15	2.29	2.35	2.47	2.56
99	1.16	1.47	1.68	1.79	1.89	1.95	2.04	2.09	2.14	2.19
98	1.15	1.44	1.61	1.70	1.77	1.80	1.86	1.89	1.93	1.97
97	1.15	1.41	1.55	1.62	1.67	1.69	1.74	1.77	1.80	1.82
96	1.15	1.38	1.49	1.55	1.59	1.61	1.64	1.66	1.69	1.70
95	1.14	1.35	1.45	1.49	1.52	1.54	1.56	1.57	1.59	1.61
94	1.13	1.32	1.40	1.44	1.46	1.47	1.49	1.50	1.51	1.53
93	1.12	1.29	1.36	1.38	1.40	1.41	1.43	1.43	1.44	1.46
92	1.11	1.26	1.31	1.33	1.35	1.36	1.37	1.37	1.38	1.39
91	1.10	1.23	1.27	1.29	1.30	1.31	1.32	1.32	1.32	1.33
90	1.09	1.20	1.23	1.24	1.25	1.25	1.26	1.26	1.27	1.27
89	1.08	1.17	1.20	1.21	1.21	1.21	1.21	1.21	1.22	1.22
88	1.07	1.14	1.16	1.17	1.17	1.17	1.17	1.17	1.17	1.17
87	1.06	1.11	1.12.	1.12	1.12	1.13	1.13	1.13	1.13	1.13
86	1.05	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08
85	1.03	1.05	1.05	1.05	1.05	1.04	1.04	1.04	1.04	1.04
84	1.02	1.02	1.02	1.01	1.01	1.01	1.00	1.00	1.00	1.00
83	1.00	0.99	0.98	0.97	0.97	0.96	0.96	0.96	0.96	0.96
82	0.98	0.96	0.95	0.94	0.94	0.93	0.93	0.92	0.92	0.92
81	0.96	0.93	0.92	0.91	0.90	0.90	0.89	0.89	0.89	0.88
80	0.94	0.90	0.88	0.87	0.86	0.86	0.85	0.85	0.85	0.85
79	0.92	0.87	0.85	0.84	0.83	0.83	0.82	0.82	0.82	0.81
78	0.89	0.84	0.82	0.81	0.80	0.79	0.79	0.78	0.78	0.78
77	0.87	0.81	0.79	.0.78	0.77	0.76	0.76	0.75	0.75	0.75
76	0.84	0.78	0.76	0.75	0.74	0.73	0.72	0.72	0.72	0.72
75	0.82	0.75	0.73	0.72	0.71	0.70	0.69	0.69	0.69	0.68
74	0.79	0.72	0.70	0.68	0.67	0.67	0.66	0.66	0.66	0.65
73	0.77	0.69	0.67	0.65	0.64	0.64	0.62	0.62	0.62	0.62
72	0.74	0.66	0.64	0.62	0.61	0.61	0.60	0.59	0.59	0.59
71	0.71	0.63	0.60	0.59	0.58	0.58	0.57	0.56	0.56	0.56
70	0.68	0.60	0.58	0.56	0.55	0.55	0.54	0.54	0.54	0.53
69	0.65	0.57	0.55	0.54	0.53	0.52	0.51	0.51	0.51	0.50
68	0.62	0.54	0.52	0.51	0.50	0.50	0.48	0.48	0.48	0.48
67	0.59	0.51	0.49	0.48	0.47	0.47	0.46	0.45	0.45	0.45
66	0.56	0.48	0.46	0.45	0.44	0.44	0.43	0.42	0.42	0.42
65	0.53	0.45	0.43	0.42	0.41	0.41	0.40	0.40	0.40	0.39
64	0.49	0.42	0.40	0.39	0.38	0.38	0.37	0.37	0.37	0.37
63	0.46	0.39	0.37	0.36	0.35	0.35	0.35	0.34	0.34	0.34
62	0.43	0.36	0.34	0.33	0.33	0.33	0.32	0.31	0.31	0.31
61	0.39	0.33	0.31	0.30	0.30	0.30	0.29	0.29	0.29	0.28
60	0.36	0.30	0.28	0.27	0.26	0.26	0.25	0.25	0.25	0.25
59	0.32	0.27	0.25	0.25	0.24	0.24	0.24	0.23	0.23	0.23

Table 3 Continued										
PU/PL	**n=3**	**n=4**	**n=5**	**n=6**	**n=7**	**n=8**	**n=10**	**n=12**	**n=15**	**n=20**
58	0.29	0.24	0.23	0.22	0.21	0.21	0.21	0.21	0.21	0.20
57	0.25	0.21	0.20	0.19	0.19	0.19	0.18	0.18	0.18	0.18
56	0.22	0.18	0.17	0.16	0.16	0.16	0.16	0.16	0.15	0.15
55	0.18	0.15	0.14	0.14	0.13	0.13	0.13	0.13	0.13	0.13
54	0.14	0.12	0.11	0.11	0.11	0.11	0.10	0.10	0.10	0.10
53	0.11	0.09	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
52	0.07	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05
51	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 4

Definitions, Abbreviations, and Formulas for Acceptance	
Term	**Explanation**
Target Value (TV)	The target values for gradation and asphalt binder content are given in the Contractor's volumetric mix design. See this Section, article 1.6 for density target values.
Average (AVE)	The sum of the lot's test results for a measured characteristic divided by the number of test results–the arithmetic mean.
Standard Deviations (s)	The square root of the value formed by summing the squared difference between the individual test results of a measured characteristic and AVE, divided by the number of test results minus one.
Upper Limit (UL)	The value above the TV of each measured characteristic that defines the upper limit of acceptable production. (Table 2)
Lower Limit (LL)	The value below the TV of each measured characteristic that defines the lower limit of acceptable production (Table 2)
Upper Quality Index (QU)	QU = (UL - AVE)/s
Lower Quality Index (QL)	QL = (AVE - LL)/s
Percentage of Lot Within UL (PU)	Determined by entering Table 3 with QU.
Percentage of Lot Within LL (PL)	Determined by entering Table 3 with QL.
Total Percentage of Lot Within UL and LL (PT)	PT = (PU + PL) – 100
Incentive/Disincentive	Determined by entering Table 1 with PT or PL.

1.7 DISPUTE RESOLUTION

A. Refer to Section 01456 when disputing the validity of the Department's acceptance tests.

PART 2 PRODUCTS

2.1 ASPHALT BINDER

A. Project Specific Surfacing Requirements – Refer to Section 02742S.

B. Asphalt Material – Refer to Section 02745 and Quality Management Plan 509: Asphalt Binder.

2.2 AGGREGATE

A. Crusher produced virgin aggregate material consisting of crushed stone, gravel, or slag.

B. Refer to Table 5 to determine the suitability of the aggregate.
   1. Coarse aggregates
      a. Retained on No. 4 sieve. AASHTO T 27
   2. Fine aggregates
      a. Clean, hard grained, and angular
      b. Passing the No. 4 sieve. AASHTO T 27

Table 5

Aggregate Properties – HMA			
Test Method	**Test No.**	**75 Design Gyrations and Greater**	**Less Than 75 Design Gyrations**
One Fractured Face	AASHTO T 335	95% minimum	90% minimum
Two Fractured Faces	AASHTO T 335	90% minimum	90% minimum
Fine Aggregate Angularity	AASHTO T 304	45 minimum	45 minimum
Flakiness Index	UDOT MOI 933 (Based on 3/8 inch sieve and above)	17% maximum	17% maximum
L.A. Wear	AASHTO T 96	35% maximum	40% maximum
Sand Equivalent	AASHTO T 176 (Pre-wet method)	60 minimum	45 minimum
Plasticity Index	AASHTO T 89 and T 90	0	0
Unit Weight	AASHTO T 19	minimum 75 lb/cu ft	minimum 75 lb/cu ft
Soundness (sodium sulfate)	AASHTO T 104	16% maximum loss with five cycles	16% maximum loss with five cycles
Clay Lumps and Friable Particles	AASHTO T 112	2% maximum	2% maximum
Natural Fines	N/A	0%	10% maximum

C. Meet the gradation requirements in Table 6. (AASHTO T 11, AASHTO T 27)

Table 6

Aggregate Gradations (Percent Passing by Dry Weight of Aggregate)			
Sieve Size		**½ inch**	**⅜ inch**
Control Sieves	**¾ inch**	100.0	
	½ inch	90.0 – 100.0	100.0
	⅜ inch	< 90	90.0 - 100.0
	No. 4		< 90
	No. 8	28.0 - 58.0	32.0 - 67.0
	No. 200	2.0 – 10.0	2.0 – 10.0

2.3 ADDITIVES / STABILIZERS

A. Hydrated Lime:
Meet the requirements of Section 02746.

B. Warm Mix Additive:
Meet all the mix design requirements for Hot Mix Asphalt when used.
1. Notify the engineer of all warm mix additives used on the project.

2.4 RECLAIMED ASPHALT PAVEMENT (RAP) (OPTIONAL)

A. Do not adjust the asphalt binder grade if the lower end is already a PG XX-34.

B. Do not adjust the asphalt binder grade when RAP content is not more than 15 percent by total weight of the hot mix and RAP asphalt binder content is not more than 15 percent of the total asphalt binder content by weight.

C. Adjust asphalt binder grade according to AASHTO M 323 when RAP asphalt binder content is between 15 to 25 percent of the asphalt binder weight.
1. Select one grade softer than the grade specified. Do not adjust the asphalt binder grade if the lower end is already a PG XX-34.
2. Provide test reports indicating that the PG grade and quantity of the recovered asphalt binder is consistent throughout the stockpile.
3. Limit RAP to 25 percent of the total weight of the hot mix and RAP binder to 25 percent of the total binder.

D. RAP aggregate is required to meet Table 5 with exception of Sand Equivalent. Refer to AASHTO T 176.

2.5 VOLUMETRIC MIX DESIGN

A. Perform Superpave Volumetric Mix Design according to UDOT Materials Manual of Instruction Section 960 and the following:
1. Incorporate hydrated lime into all designs. Refer to Section 02746.
2. Comply with Table 7 and Table 8.

B. Obtain Department approval for the mix design. Refer to the UDOT Materials Manual of Instruction Section 960.
1. Submit for verification at least 10 working days before beginning paving.
2. Do not begin paving until verification is complete.

Table 7

Volumetric Design Gyrations			
Compaction Parameters			Voids Filled with Asphalt (VFA) (%)
$N_{initial}$ /% of G_{mm}*	N_{design} /% of G_{mm}*	N_{max} /% of G_{mm}*	
6 /≤ 91.5	50 / 96.5	75 /≤ 98	70 – 80
7 /≤ 90.5	75 / 96.5	115 /≤ 98	70 – 80

* G_{mm}: Theoretical maximum specific gravity of mix. Refer to AASHTO T 209.

Table 8

Mix Design Requirements	
HMA design mixing and compaction temperatures	Provided by the approved mix design
Dust Proportion Range	0.6 - 1.40
Voids in Mineral Aggregate (VMA) at N_{design} AASHTO R 35.9.2 using G_{sb} Oven Dry. Equation based on percent of total mix.	14.0% - 15.0% for ½ inch 15.0% - 16.0% for ⅜ inch
Air voids at N_{design}	3.5 %
Hamburg Wheel Tracker UDOT MOI 990	75 Design Gyrations and Greater: < 10.00 mm at 20,000 Cycles Less than 75 Design Gyrations: < 10.00 mm at 10,000 Cycles

2.6 CONTRACTOR INITIATED CHANGES TO MIX DESIGN

A. The Department may allow up to two minor target changes to the most current verified mix design per project, per mix design, without penalty to the Contractor.
   1. The Department charges $1,000 for each additional minor target change.

B. The Department performs up to two volumetric mix design verifications per project, per mix design, at no cost to the Contractor.
   1. The Department charges $3,000 for each additional laboratory or field verification required including all laboratory or field volumetric mix design verifications required due to contractor initiated target changes.

C. Submit requests in writing to the Engineer at least 12 hours before incorporating changes into production.

1. Include documentation supporting correlation between suggested minor target change and mix design volumetric requirements.
2. Acceptable documentation may include Department or Contractor testing data.
3. The Region Materials Engineer approves the target change if the mix meets the requirements.

D. Do not make changes to production mix until the request is reviewed and approved.

E. Submit a new laboratory volumetric mix design for any change made to mix design properties other than gradation.
1. When adding or modifying an additive/stabilizer to the mix design, only the portions of the verification affected by the addition or modification of the additive/stabilizer need to be verified.

F. The Engineer may require Hamburg Wheel-Track testing after a minor target change to evaluate the performance of the mix with the target change.

2.7 TACK COAT

A. Refer to Section 02748.

PART 3 EXECUTION

3.1 HMA

A. Dry aggregate to an average moisture content of not more than 0.2 percent by weight.
1. May be verified by AASHTO T 255.
2. Adjust burners to avoid damage or soot contamination of the aggregate.

B. Treat aggregate with hydrated lime. Refer to Section 02746.
1. Method A or B
2. The Department applies a deduction for mix produced by a non-certified supplier to cover the costs of inspection.
3. The deduction is applied according to the UDOT Quality Management Plan 514 Hot-Mix Asphalt.

C. Coat with asphalt binder 100 percent of the particles passing and 98 percent of the particles retained on the No. 4 sieve.
   1. May be verified by AASHTO T 195.
   2. Discontinue operation and make necessary corrections if material is not properly coated.

D. Maintain temperature of the HMA between the limits identified on the Volumetric Mix Design Verification Letter for mixing and compacting.
   1. The Department rejects materials heated over the identified limits.
   2. Remove all material rejected by the Department for overheating.

E. Minimum compacted lift thickness is 3 times the nominal maximum aggregate size.

3.2 HMA PLANT

A. Provide the following:
   1. Positive means to determine the moisture content of aggregate on a daily basis.
   2. Positive means to sample all material components.
   3. Sensors to measure the temperature of the HMA at discharge.
   4. The ability to maintain discharge temperature of the mix according to the mix design.

B. Asphalt Binder Storage Tanks
   1. Provide a positive means for separating and identifying asphalt grades when multiple products are used in mix production.
   2. Provide positive means of determining the quantity of material in the tank at any time.
   3. Provide a positive means of sampling the asphalt binder from the tanks.
      a. The Engineer determines a common sampling point where multiple products are used in mix production.

3.3 PRODUCTION CONTROL LIMITS

A. Apply the production control requirements as outlined in Table 9.

B. Action Limit
   1. Take appropriate action when air voids or VMA at N_{des} averaged for each lot are within the Action Limit.
   2. Continue paving the next scheduled work day at the Contractors discretion.
   3. Enter into the Cease Production Limit after three (3) consecutive production lots within the Action Limit.

C. Cease Production Limit
1. Take appropriate action when air voids or VMA at N_{des} averaged for each lot are within the cease Production Limit.
2. Submit a letter to the Engineer providing information on production changes to be made along with Contractor volumetric data verifying the results.
3. Suspend paving until Contractor provides test results from a minimum of two samples meeting the gradation and asphalt content requirements in Table 2 and air void and VMA requirements for the proceed limit in Table 9
   a. Produce and place material for Cease Production evaluation at a location outside of the project limits.
   b. Allow UDOT 24 hours to review the volumetric data.
   c. Up to two (2) occurrences per project per year of cease production, contract time may be added for the necessary days missed to correct the cease production item(s).
      1) Submit critical path information for evaluation.
      2) Maximum ten (10) calendar days per project.
      3) Additional cease production occurrences per project will not be provided with additional contract time.
4. The Engineer may require a new mix design after two (2) cease-production lots.

Table 9

Production Control for VMA		
VMA (%) Range from Target Value (TV) X = Average Value (Minimum of three Samples)	**Air Voids (%) Range from Target Value (TV) X = Average Value (Minimum of three Samples)**	**Action**
X > TV - 1.3 and X < TV + 1.3	X > TV - 1.0 and X < TV + 1.3	Proceed Limit
X ≦ TV - 1.3 and X ≥ TV - 1.5 or X ≥ TV + 1.3 and X ≦ TV + 1.5	X ≦ TV - 1.0 and X > TV - 1.5 or X ≥ TV + 1.3 and X < TV + 1.8	Action Limit This Section, Article 3.3.B
X < TV - 1.5 or X > TV + 1.5	X ≦ TV - 1.5 or X ≥ TV + 1.8	Cease Production Limit This Section, Article 3.3.C

3.4 LABORATORY CORRELATION

A. Perform split-sample, paired *t*-testing with the Department based on project quality control testing using Department qualified lab.
   1. Perform split-sample, paired *t* analysis on all mix acceptance tests and tests related to volumetric properties.
   2. Perform paired *t* analysis as defined in the UDOT Materials Manual of Instruction, Appendix C.
   3. Continue paired *t*-testing until at least two consecutive production days meet $\alpha = 0.05$ for a two tailed distribution.
   4. Resolve discrepancies in lab results within the first five production days.
      a. Cease production if the requirements for two consecutive days of the first five days cannot be met.
      b. Submit a corrective action plan to the Engineer before production continues indicating the changes in procedures that will be implemented to correct the deficiencies.
      c. Both Contractor and Department labs must make paired *t* test results available within 24 hours of sampling.

3.5 SURFACE PREPARATION

A. Locate, reference, and protect all utility covers, monuments, curb and gutter, and other components affected by the paving operations.

B. Remove all moisture, dirt, sand, leaves, and other objectionable material from the prepared surface before placing the tack coat and mix.

C. Complete spot leveling, lane-leveling or profile leveling before placing pavement courses.
   1. Place, spread, and compact leveling mix on portions of the existing surface.
   2. Fill and compact any localized potholes more than 1 inch deep.
   3. Allow compacted mix to cool sufficiently to below 150 degrees F to provide a stable structural platform before placing additional lifts of HMA.

D. Apply tack coat to all paved surfaces and longitudinal and transverse joints before applying a leveling course or pavement lift as required in Section 02748.

E. Allow sufficient cure time for prime coat/tack coat before placing HMA. Refer to Section 02748.

3.6 SURFACE PLACEMENT

A. Adjust the production of the mixing plant and material delivery until a steady paver speed is maintained.

B. Refer to Section 01554, Project Plans, and TC Series Standard Drawings for pavement edge slope required to safely maintain traffic.

C. Do not allow construction vehicles, general traffic, or rollers to pass over the uncompacted end or edge of freshly placed mix until the mat temperature drops to a point where damage or differential compaction will not occur

D. Echelon paving is the preferred method for constructing a longitudinal joint. When full-width or Echelon paving is impractical and more than one pass is required, provide a compactable sloped edge adjacent to the next lane.
   1. Coat edge with tack coat according to Section 02748 at the same application rate as the surface placement.
      a. Angle nozzle to allow for proper application on the vertical edge.
      b. Provide a 6 inch overlap of tack coat beyond the longitudinal and transverse joints.

E. Construct the longitudinal joint to within 6 inches of the centerline, the lane lines or at the center of the lane but never in a wheel path. Offset longitudinal joints 6 to 12 inches in succeeding courses.
   1. Core and test all longitudinal joints for compaction according to the specification if the lift is 2 or more inches thick.
   2. Verify all edges of the adjacent areas to through lanes have straight and uniform longitudinal lines and neat vertical edges.
   3. Fill core holes with HMA, SMA, or high AC content cold mix and compact.

F. Offset transverse construction joints at least 6 ft longitudinally.

G. Taper the end of a course subjected to traffic at approximately 50:1 (horizontal to vertical).
   1. Make a transverse joint by saw or wheel cutting and remove the portion of the pass that contains the tapered end before placing fresh mix.
   2. Tack the contact surfaces before fresh mix is placed against the compacted mix.

H. Use a motor grader, spreader box, or other approved spreading methods for projects under 180 yd^2, irregular areas, or for miscellaneous construction such as detours and sidewalks.

I. Use a laydown machine for all lane-leveling and profile leveling activities.
   1. Place and drag the screed of the paving machine along the high portions of the roadway when lane-leveling to correct, rutting, minor variations and covering roadway crack seal material.
   2. Use a string line or follow a given profile when profile leveling to establish a best fit profile from high point to high point.

3.7 COMPACTION

A. Use a small compactor or vibratory roller in addition to normal rolling at structures.

B. Operate in a transverse direction next to the back wall and approach slab.

3.8 LIMITATIONS

A. Do not place HMA on frozen base or subbase or during adverse climatic conditions such as precipitation or when roadway surface is icy or wet.

B. Use a release agent that does not dissolve asphalt and is satisfactory to the Engineer for all equipment and hand tools used to mix, haul, and place the HMA.

C. Place HMA from April 15 through October 15, and when the air temperature in the shade and the roadway surface temperature are above 50 degrees F.
   1. The Department determines if it is feasible to place HMA outside these dates and temperature limits.
   2. Obtain authorization from the Engineer before paving outside these requirements.

END OF SECTION

UDOT SPECIAL PROVISION
SECTION 02742S
PROJECT SPECIFIC SURFACING REQUIREMENTS

Add Section 02742:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Required PG Asphalt Binder or emulsion

B Required minimum asphalt binder content for SMA mixes

C. Number of gyrations (N_{values}) to use for Superpave Mix Design

D. PCCP Pavement Texture Type

E. Acceptance criteria for pavement smoothness

1.2 RELATED SECTIONS Not Used

1.3 REFERENCES Not Used

1.4 DEFINITIONS

A. Category 1 Pavements
   1. Newly constructed pavement surfaces having two or more opportunities for improving ride.

B. Category 2 Pavements
   1. Newly constructed pavement surfaces without two or more opportunities for improving ride.

C. Opportunity to Improve Ride
   1. Placing Granular Borrow, Untreated Base Course, Treated Base Course, Open-Graded Surface Course (OGSC), Bonded Wearing Course (BWC), Stone Matrix Asphalt (SMA), Cold-In-Place Recycling, Hot-In-Place Recycling, and each lift of paving.
   2. Rotomilling greater than1.5 inches in depth.
   3. Lane leveling is not considered an opportunity to improve ride.

1.5 SUBMITTALS Not Used

1.6 ACCEPTANCE

A. The Department applies the following Incentives/Disincentives for Category 1 Pavement Sections and Structure Sections.

Table 1

Incentives and Disincentives for Category 1 Pavements		
MRI Range (inches/mile by pavement section)	**Dollars/Pavement Section**	
	Asphalt Pavements	Portland Cement Concrete
≤ 40.0	$750	$1000
40.1 - 50.0	$500	$750
50.1 – 60.0	$250	$500
60.1 – 70.0	0	0
70.1 – 80.0	-$125	-$250
80.1 – 90.0	-$250	-$500
>90.0	Corrective Action	

Table 2

Incentives and Disincentives for Structure Sections	
MRI Range (inches/mile by structure section)	**Dollars/Structure Section**
≤ 40.0	$1000
40.1 - 50.0	$750
50.1 – 60.0	$500
60.1 – 70.0	0
70.1 – 80.0	-$250
80.1 – 90.0	-$500
>90.0	Corrective Action

B. Localized Roughness Limits

Table 3

Localized Roughness Limits	
Roadway	**IRI w/base length of 25 ft. (in./mile)**
Interstate including ramps	≤ 190
Bridge decks, approach slabs & transitions, manholes and valves	≤ 250
Non-interstate	≤ 190
Urban roadways with speed limits less than 45 mph	≤ 190
Shoulders and Bike Lanes	≤ 250 (single profile)

C. The Department applies the following Incentives/Disincentives for Category 2 Pavement Sections.

Table 4

Incentives/Disincentives for Category 2 Pavements	
% Improvement per Pavement Section	Incentive/Disincentive Dollars/Pavement Section
≥60	$750
50 to 59.9	$500
40 to 49.9	$250
30 to 39.9	$0
20 to 29.9	-$250
<20.0	Corrective Action

D. The Department applies the following Incentives/Disincentives for micro-surfacing pavement sections.

Table 5

Incentives/Disincentives for Micro-surfacing	
Percent Improvement per Pavement Section	Incentive/Disincentive per Pavement Section
≥ 0	$250
-0.1 to -10	0
< -10	-$250

PART 2 PRODUCTS

2.1 MIXES

A. Hot Mix Asphalt (HMA): (Refer to bid item for size)
   1. PG 64-34 Asphalt
   2. $N_{initial}$ 7 N_{design} 75 N_{final} 115

B. Stone Matrix Asphalt (SMA):
   1. PG 70-28 Asphalt

C. Open-Graded Surface Course:
   1. PG_____Asphalt

D. Bonded Wearing Course
   1. Gradation Type: Type B
   2. Asphalt Binder: PG 64-34
   3. Minimum Thickness: 1”
   4. PMEM Application Rate: 0.19 gal/sq. yd.

E. Chip Seal
   1. Type of Asphalt Emulsion _____
   2. Flush Coat Emulsion _____

PART 3 EXECUTION

3.1 TEXTURE

A. PCCP Pavement Texture
   1. Texture Type_____

END OF SECTION

UDOT SPECIAL PROVISION
SECTION 02745M
ASPHALT MATERIAL

Delete Tables 1-9 and replace with the following:

Specification, Compliance, and Rejection Limits for Performance-Graded Asphalt Binders (Applied to the Mix)			
Property	**Specification Limit**	**Compliance Limit**	**Rejection Limit**
G*/sinδ of the original PGAB at high grade temp, (kPa) Rule of 86 or lower	1.00 Min.	0.84 Min.	0.70 Min.
G* of the original PGAB at high grade temp, (kPa)	1.30 Min.	1.25 Min.	1.11 Min.
δ (phase angle) of the original PGAB at high grade temperature, (degrees C). Rule of 92 Binders Rule of 98 Binders	 74.0 Max. 71.0 Max.	 75.0 Max. 72.0 Max.	 77.0 Max. 74.0 Max.
G*/sinδ of the RTFO Residue, (kPa)	2.20 Min.	1.87 Min.	1.53 Min.
Elastic Recovery of RTFO Residue, (%) Rule of 92 Binders Rule of 98 Binders Rule of 104 Binders	 80 Min. 85 Min. 90 Min.	 75 Min. 80 Min. 85 Min.	 65 Min. 70 Min. 75 Min.
G*/sinδ of the PAV Residue, (kPa)	5000 Max.	5250 Max.	5700 Max.
Stiffness of the PAV Residue at the specified low grade temperature +10ºC, (MPa)	300 Max.	311 Max.	355 Max.
	150 Min.	145 Min.	125 Min.
Slope (m-value) of the Creep Curve at the specified low grade temperature +10ºC	0.300 Min.	0.295 Min.	0.266 Min.
Failure Strain of PAV Residue in Direct Tension at the specified low grade temperature +10ºC, (%) Rule of 92, 98, or 104 Binders	Report		
Failure Stress of PAV Residue in Direct Tension at the specified low grade temperature +10ºC, (MPa) Rule of 92, 98, or 104 Binders	Report		
Delta Tc of PAV Residue from additional BBR test (use two BBR tests). Rule of 92, 98, or 104 Binders	-1.0 Min.	-2.0 Min.	-3.0 Min.

Table 2

PG58-34		
Original Binder		
Dynamic Shear Rheometer, AASHTO T-315	@ 58° C, G*, kPa	1.30 Min.
	@ 58° C, phase angle, degrees	74.0 Max.
Rotational Viscometer, AASHTO T 316	@ 135° C, Pa.s	3 Max.
Flash Point, AASHTO T 48	°C	260 Min.
RTFO Residue, AASHTO T 240		
Dynamic Shear Rheometer, AASHTO T 315	@ 58° C, G*/sinδ, kPa	2.20 Min.
Elastic Recovery, AASHTO T 301 mod (a)	%	80 Min.
PAV Residue, 20 hours, 2.10 MPa, 100° C, AASHTO R 28		
Dynamic Shear Rheometer, AASHTO T 315	@ 16° C, kPa	5,000 Max.
Bending Beam Rheometer, AASHTO T 313	@ -24° C, S, MPa	300 Max. 150 Min.
	@ -24° C, m-value	0.300 Min.
Direct Tension Test, AASHTO T 314	@ -24° C, Failure Strain, %	(c)
	@ -24° C, Failure Stress (b), MPa	(c)
Delta Tc from additional BBR test, ASTM D7643	@ -30° C	-1.0 Min.

(a) Modify paragraph 4.5 as follows: Stop the ductilometer after 20 cm has been reached and within 2 seconds. Sever the specimen at its center with a pair of scissors.

(b) No allowances will be given for passing at a colder grade.

(c) Report test results for DTT with acceptance testing, DTT not required for qc testing

Table 3

PG64-28		
Original Binder		
Dynamic Shear Rheometer, AASHTO T-315	@ 64° C, G*, kPa	1.30 Min.
	@ 64° C, phase angle, degrees	74.0 Max.
Rotational Viscometer, AASHTO T 316	@ 135° C, Pa.s	3 Max.
Flash Point, AASHTO T 48	°C	260 Min.
RTFO Residue, AASHTO T 240		
Dynamic Shear Rheometer, AASHTO T 315	@ 64° C, G*/sinδ, kPa	2.20 Min.
Elastic Recovery, AASHTO T 301 mod (a)	%	80 Min.
PAV Residue, 20 hours, 2.10 MPa, 100° C, AASHTO R 28		
Dynamic Shear Rheometer, AASHTO T 315	@ 22° C, kPa	5,000 Max.
Bending Beam Rheometer, AASHTO T 313	@ -18° C, S, MPa	300 Max. 150 Min.
	@ -18° C, m-value	0.300 Min.
Direct Tension Test, AASHTO T 314	@ -18° C, Failure Strain, %	(c)
	@ -18° C, Failure Stress (b), MPa	(c)
Delta Tc from additional BBR test, ASTM D7643	@ -24° C	-1.0 Min.

(a) Modify paragraph 4.5 as follows: Stop the ductilometer after 20 cm has been reached and within 2 seconds. Sever the specimen at its center with a pair of scissors.

(b) No allowances will be given for passing at a colder grade.

(c) Report test results for DTT with acceptance testing, DTT not required for qc testing

Table 4

PG64-34		
Original Binder		
Dynamic Shear Rheometer, AASHTO T-315	@ 64° C, G*, kPa	1.30 Min.
	@ 64° C, phase angle, degrees	71.0 Max.
Rotational Viscometer, AASHTO T 316	@ 135° C, Pa.s	3 Max.
Flash Point, AASHTO T 48	°C	260 Min.
RTFO Residue, AASHTO T 240		
Dynamic Shear Rheometer, AASHTO T 315	@ 64° C, G*/sinδ, kPa	2.20 Min.
Elastic Recovery, AASHTO T 301 mod (a)	%	85 Min.
PAV Residue, 20 hours, 2.10 MPa, 100° C, AASHTO R 28		
Dynamic Shear Rheometer, AASHTO T 315	@ 19° C, kPa	5,000 Max.
Bending Beam Rheometer, AASHTO T 313	@ -24° C, S, MPa	300 Max. 150 Min.
	@ -24° C, m-value	0.300 Min.
Direct Tension Test, AASHTO T 314	@ -24° C, Failure Strain, %	(c)
	@ -24° C, Failure Stress (b), MPa	(c)
Delta Tc from additional BBR test, ASTM D7643	@ -30° C	-1.0 Min.

(a) Modify paragraph 4.5 as follows: Stop the ductilometer after 20 cm has been reached and within 2 seconds. Sever the specimen at its center with a pair of scissors.

(b) No allowances will be given for passing at a colder grade.

(c) Report test results for DTT with acceptance testing, DTT not required for qc testing

Table 5

PG70-22		
Original Binder		
Dynamic Shear Rheometer, AASHTO T-315	@ 70° C, G*, kPa	1.30 Min.
	@ 70° C, phase angle, degrees	74.0 Max.
Rotational Viscometer, AASHTO T 316	@ 135° C, Pa.s	3 Max.
Flash Point, AASHTO T 48	°C	260 Min.
RTFO Residue, AASHTO T 240		
Dynamic Shear Rheometer, AASHTO T 315	@ 70° C, G*/sinδ, kPa	2.20 Min.
Elastic Recovery, AASHTO T 301 mod (a)	%	80 Min.
PAV Residue, 20 hours, 2.10 MPa, 100° C, AASHTO R 28		
Dynamic Shear Rheometer, AASHTO T 315	@ 28° C, kPa	5,000 Max.
Bending Beam Rheometer, AASHTO T 313	@ -12° C, S, MPa	300 Max. 150 Min.
	@ -12° C, m-value	0.300 Min.
Direct Tension Test, AASHTO T 314	@ -12° C, Failure Strain, %	(c)
	@ -12° C, Failure Stress (b), MPa	(c)
Delta Tc from additional BBR test, ASTM D7643	@ -18° C	-1.0 Min.

(a) Modify paragraph 4.5 as follows: Stop the ductilometer after 20 cm has been reached and within 2 seconds. Sever the specimen at its center with a pair of scissors.

(b) No allowances will be given for passing at a colder grade.

(c) Report test results for DTT with acceptance testing, DTT not required for qc testing

Table 6

PG70-28		
Original Binder		
Dynamic Shear Rheometer, AASHTO T-315	@ 70° C, G*, kPa	1.30 Min.
	@ 70° C, phase angle, degrees	71.0 Max.
Rotational Viscometer, AASHTO T 316	@ 135° C, Pa.s	3 Max.
Flash Point, AASHTO T 48	°C	260 Min.
RTFO Residue, AASHTO T 240		
Dynamic Shear Rheometer, AASHTO T 315	@ 70° C, G*/sinδ, kPa	2.20 Min.
Elastic Recovery, AASHTO T 301 mod (a)	%	85 Min.
PAV Residue, 20 hours, 2.10 MPa, 100° C, AASHTO R 28		
Dynamic Shear Rheometer, AASHTO T 315	@ 25° C, kPa	5,000 Max.
Bending Beam Rheometer, AASHTO T 313	@ -18° C, S, MPa	300 Max. 150 Min.
	@ -18° C, m-value	0.300 Min.
Direct Tension Test, AASHTO T 314	@ -18° C, Failure Strain, %	(c)
	@ -18° C, Failure Stress (b), MPa	(c)
Delta Tc from additional BBR test, ASTM D7643	@ -24° C	-1.0 Min.

(a) Modify paragraph 4.5 as follows: Stop the ductilometer after 20 cm has been reached and within 2 seconds. Sever the specimen at its center with a pair of scissors.

(b) No allowances will be given for passing at a colder grade.

(c) Report test results for DTT with acceptance testing, DTT not required for qc testing

Table 7

PG70-34		
Original Binder		
Dynamic Shear Rheometer, AASHTO T-315	@ 70° C, G*, kPa	1.30 Min.
	@ 70° C, phase angle, degrees	71.0 Max.
Rotational Viscometer, AASHTO T 316	@ 135° C, Pa.s	3 Max.
Flash Point, AASHTO T 48	°C	260 Min.
RTFO Residue, AASHTO T 240		
Dynamic Shear Rheometer, AASHTO T 315	@ 70° C, G*/sinδ, kPa	2.20 Min.
Elastic Recovery, AASHTO T 301 mod (a)	%	90 Min.
PAV Residue, 20 hours, 2.10 MPa, 100° C, AASHTO R 28		
Dynamic Shear Rheometer, AASHTO T 315	@ 22° C, kPa	5,000 Max.
Bending Beam Rheometer, AASHTO T 313	@ -24° C, S, MPa	300 Max. 150 Min.
	@ -24° C, m-value	0.300 Min.
Direct Tension Test, AASHTO T 314	@ -24° C, Failure Strain, %	(c)
	@ -24° C, Failure Stress (b), MPa	(c)
Delta Tc from additional BBR test, ASTM D7643	@ -30° C	-1.0 Min.

(a) Modify paragraph 4.5 as follows: Stop the ductilometer after 20 cm has been reached and within 2 seconds. Sever the specimen at its center with a pair of scissors.

(b) No allowances will be given for passing at a colder grade.

(c) Report test results for DTT with acceptance testing, DTT not required for qc testing

Table 8

PG76-22		
Original Binder		
Dynamic Shear Rheometer, AASHTO T-315	@ 76° C, G*, kPa	1.30 Min.
	@ 76° C, phase angle, degrees	71.0 Max.
Rotational Viscometer, AASHTO T 316	@ 135° C, Pa.s	3 Max.
Flash Point, AASHTO T 48	°C	260 Min.
RTFO Residue, AASHTO T 240		
Dynamic Shear Rheometer, AASHTO T 315	@ 76° C, G*/sinδ, kPa	2.20 Min.
Elastic Recovery, AASHTO T 301 mod (a)	%	85 Min.
PAV Residue, 20 hours, 2.10 MPa, 100° C, AASHTO R 28		
Dynamic Shear Rheometer, AASHTO T 315	@ 31° C, kPa	5,000 Max.
Bending Beam Rheometer, AASHTO T 313	@ -12° C, S, MPa	300 Max. 150 Min.
	@ -12° C, m-value	0.300 Min.
Direct Tension Test, AASHTO T 314	@ -12° C, Failure Strain, %	(c)
	@ -12° C, Failure Stress (b), MPa	(c)
Delta Tc from additional BBR test, ASTM D7643	@ -18° C	-1.0 Min.

(a) Modify paragraph 4.5 as follows: Stop the ductilometer after 20 cm has been reached and within 2 seconds. Sever the specimen at its center with a pair of scissors.

(b) No allowances will be given for passing at a colder grade.

(c) Report test results for DTT with acceptance testing, DTT not required for qc testing

Table 9

PG76-28		
Original Binder		
Dynamic Shear Rheometer, AASHTO T-315	@ 76° C, G*, kPa	1.30 Min.
	@ 76° C, phase angle, degrees	71.0 Max.
Rotational Viscometer, AASHTO T 316	@ 135° C, Pa.s	3 Max.
Flash Point, AASHTO T 48	°C	260 Min.
RTFO Residue, AASHTO T 240		
Dynamic Shear Rheometer, AASHTO T 315	@ 76° C, G*/sinδ, kPa	2.20 Min.
Elastic Recovery, AASHTO T 301 mod (a)	%	90 Min.
PAV Residue, 20 hours, 2.10 MPa, 100° C, AASHTO R 28		
Dynamic Shear Rheometer, AASHTO T 315	@ 28° C, kPa	5,000 Max.
Bending Beam Rheometer, AASHTO T 313	@ -18° C, S, MPa	300 Max. 150 Min.
	@ -18° C, m-value	0.300 Min.
Direct Tension Test, AASHTO T 314	@ -18° C, Failure Strain, %	(c)
	@ -18° C, Failure Stress (b), MPa	(c)
Delta Tc from additional BBR test, ASTM D7643	@ -24° C	-1.0 Min.

(a) Modify paragraph 4.5 as follows: Stop the ductilometer after 20 cm has been reached and within 2 seconds. Sever the specimen at its center with a pair of scissors.

(b) No allowances will be given for passing at a colder grade.

(c) Report test results for DTT with acceptance testing, DTT not required for qc testing

UDOT SPECIAL PROVISION
SECTION 02752M
PORTLAND CEMENT CONCRETE PAVEMENT

Add the following to Article 1.5:

G. Colored Concrete Pavement

1. Samples and Colors: Full range of manufacturer's dry pigment colors for integrally color concrete ready mix product.

2. Samples: Provide up to three (3) cast 4' x 4' samples of each color of colored concrete section and sidewalk section for review by the Owner's Representative prior to placement. Cast mockup to demonstrate joints, surface finish, texture, color and standard of workmanship.

3. Material certificates in lieu of material laboratory test reports when permitted by Owner's Representative. Material certificates shall be signed by manufacturer and Contractor certifying that each material item complies with or exceeds requirements. Provide certification from admixture manufacturers that chloride content complies with requirements

Add Article 2.10 Colored Concrete Pavement

A. Integral Coloring Agent: Chromix by LM Scofield Co., Davis Color, Solomon ColorFlo, or approved equal. Color as scheduled. Admixture shall conform to ASTM C979.

B. Curing compound: Product recommended by Color Admixture manufacturer for conditions of use.

UDOT SPECIAL PROVISION
SECTION 02765M
PAVEMENT MARKING PAINT

Delete Article 1.3, paragraphs M through S and replace with the following:

M. ASTM E 1710: Test Method for Measurement of Retroreflective Pavement Marking Materials Using a Portable Retroreflectometer

N. Environmental Protection Agency Testing Methods

O. Federal Specification

P. Federal Standards

Q. Manual on Uniform Traffic Control Devices (MUTCD)

R. UDOT Materials Manual of Instruction

S. UDOT Minimum Sampling and Testing Requirements

T. UDOT Quality Management Plans

Delete Article 1.6 paragraphs D and E and replace with the following:

D. The Engineer will:
   1. Visually inspect longitudinal lines and transverse markings to verify compliance with the required dimensions.
   2. Inspect at the end of each production day or more frequently as required.
   3. Verify quantities applied by one of the following methods for paint and one of the methods for beads.
      a. Methods for paint:
         1) Measure paint tanks before and after application
         2) Witness the meter readings before and after application. A print out of meter readings instead of witnessing may be accepted at the Engineer's discretion.
      b. Method for beads:
         1) Measure bead tanks before and after application.
         2) Accept beads according to retroreflectivity Performance criteria. Refer to this Section, Article 3.2, paragraph E2 below.

4. Sample in the field according to the UDOT Quality Management Plan 513, Pavement Marking Paint, and the UDOT Minimum Sampling and Testing Requirements.

E. Repaint any line or legend failing to meet bead application rates or retroreflectivity requirements and dimensional requirements.
   1. Do not remove earlier application.

Delete Article 3.2, paragraphs E and replace with the following:

E. Glass Sphere (Beads) –
   1. Apply at least 8 lb/gal of paint, the full length and width of line and pavement markings.
      a. Calibrate bead guns and measure bead distribution according to UDOT Materials Manual of Instruction 932, Procedure for Sampling and Accepting Pavement Marking Paint and Beads.
      b. Do not apply glass beads to contrast lines (black paint).
   2. Performance option for bead measurement and acceptance.
      a. Measure retroreflectivity within 7 days of pavement marking application.
      b. Use a portable retroreflectometer that meets requirements of ASTM E 1710
      c. Identify three 400-foot sections per 10 miles of pavement marking. For pavement markings less than 2 miles sample only one 400-foot section.
      d. Take a minimum of 16 approximately evenly spaced readings for edge lines, lane lines and centerlines throughout each section in each direction of travel.
      e. The Engineer may select the sections to be tested.
      f. Average all readings of each line to determine the retroreflectivity measurement for each line.
      g. UDOT may verify with quality assurance testing within 21 days of pavement marking application

h. Determine the acceptability and pay factors for retroreflectivity using Table 5.

Table 5

Pay Adjustments for Retroreflectivity Requirements		
Material Type	Retroreflectivity (R)	Pay Factor
Waterborne Traffic Paint (White)	>249	1.0
	225 - 249	.75
	200 - 224	.50
	< 200	0*
Waterborne Traffic Paint (Yellow)	>174	1.0
	150-174	.75
	125-149	.50
	< 125	0*

* Repaint pavement markings at no cost to the Department. Do not remove earlier application.

UDOT SPECIAL PROVISION
SECTION 02766S
PAVEMENT MARKING, DURABLE

Add Section 02766S:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Methods and materials for installing durable red pavement marking materials for transit lanes, consisting of a two-component, epoxy-modified, acrylic, waterborne coating with a UV-stable pigment. The material must have anti-slip properties or contain an anti-slip additive. The material does not need to be retro-reflective.

1.2 REFERENCES

A. The manufacturer must be ISO 9001:2008 certified for design, development and manufacturing of colored pavement materials, and provide proof of current certification.

1.3 SYSTEM DESCRIPTION

A. Properly designed roadway pavement coatings have been scientifically formulated to provide the optimal balance of performance properties for a durable, long lasting color and texture to a roadway pavement surface. Some of these key properties include wear and crack resistance, color retention, adhesion, minimal water absorption and increased friction properties. As well, the roadway pavement coating must be environmentally safe and meet EPA requirements for Volatile Organic Compounds (VOC).
B. The material shall be capable of being applied on bituminous and/or Portland cement concrete pavements and must be able to be applied on a recent slurry seal coat, 30 days after the seal coat. The use of a compactor or similar equipment shall not be necessary. The material must be able to be applied to asphalt and concrete surfaces without preheating the application surface to a specific temperature.
C. The material must be capable of conforming to pavement contours, breaks and faults through the action of traffic at normal pavement temperatures. It shall not be necessary to use a grid template or to make pattern grooves or other indentations in the asphalt or concrete surface prior to applying the material. It shall not be necessary to inlay the material in grooves or indentations. It shall not be necessary to heat the pavement or application surface to a specific temperature.

1.4 SUBMITTALS

A. Confirmation of coating color
   1. **Red:** The color must meet the FHWA guidance for chromaticity coordinates for red pavement coloration of transit lanes:
      a. The daytime chromaticity coordinates for the color used for red-colored pavement shall be as follows:

1		2		3		4	
X	Y	x	y	x	y	x	Y
0.420	0.330	0.450	0.380	0.560	0.370	0.540	0.320

      b. There is no nighttime chromaticity requirement for red-colored pavement.
      c. Red-colored pavement may be retroreflective, but there is no requirement or recommendation that it be retroreflective.

B. Confirmation of anti-skid/anti-slip properties of coating material.
C. Proof in a form suitable to the ENGINEER of contractor's or sub-contractor's ability to install roadway coating. List texturing and coating projects done in the last two years.
D. Material Warranty
   1. Manufacturer provides a full warranty covering 100 percent of the pavement marking materials.
   2. Contractor is responsible for quality control of the proper placement of the materials and all other factors that affect the service life of the materials.
   3. Contractor removes and replaces 100 percent of the markings for all failed sections at no cost to OWNER in the event of a performance failure. Failed sections for each pavement marking materials are defined in this Section, Part 2.

1.5 DELIVERY, STORAGE, AND HANDLING

A. According to manufacturer's recommendations.
B. Provide Material Safety Data Sheets (MSDS) when material is delivered.

1.6 ACCEPTANCE

A. Provide documentation of the manufacturer and production batch identification for the covering used.

PART 2 PRODUCTS

2.1 MATERIAL

A. Must be must be resistant to the detrimental effects of motor fuels, antifreeze, lubricants, hydraulic fluids composed of an ester modified rosin impervious to degradation by motor fuels, lubricants, etc. in conjunction with aggregates, pigments, binders, and anti-skid/anti-slip elements.
B. Pigments and anti-skid/anti-slip elements must be uniformly distributed throughout the material.
   1. Pigments: The pigment system must not contain heavy metals nor any carcinogen, as defined in 29 CFR 1910.1200 in amounts exceeding permissible limits as specified in relevant Federal Regulations.
   2. Skid Resistance: The surface of the epoxy acrylic paint shall contain anti-skid material. Upon application the material shall provide a minimum skid resistance value of 60 BPN when tested according to ASTM E 303 or minimum value of 40 when tested according to ASTM E 274.
C. C. Hardness: The material must meet a minimum hardness value of 50 per ASTM D2240.
D. Environmental Resistance: The material must be resistant to deterioration due to exposure to sunlight, water, salt or adverse weather conditions and impervious to oil and gasoline.
E. The material must be able to be applied in temperatures down to 50 ºF.
F. Performance Measures for Durability.
   1. Minimum Durability – 90 percent of each colored area, legend, or symbol must be present.
   2. Failure to meet any of the specified performance measures on at least 90 percent of the colored area is considered a failure. ENGINEER may require partial or complete replacement of the colored area under the warranty terms.
   3. Failure to meet any of the specified performance measures on at least 90 percent of the legend or symbol is considered a complete failure of that legend or symbol. Replace under the warranty terms.

PART 3 EXECUTION

3.1 PREPARATION

A. Depending upon the condition and age, existing roadway pavement may or may not be suitable for the successful application of pavement coating. CONTRACTOR can advise whether the roadway pavement is suitable or not. ENGINEER shall make the final determination as to the suitability of the existing roadway pavement.
B. CONTRACTOR is responsible for all surface preparation such as de-greasing, sweeping, power blowing, or power washing, in accordance with manufacturer's instructions.
C. Line control.
   1. Establish control points prior to application; points to be reviewed in the field by ENGINEER prior to application.
   2. Pavement markings that are to be left in place, utilities, drainage structures, curbs and any other structure within or adjacent to the treatment location shall be masked to protect from application.
   3. Maintain line within 2 inches of the established control points and mark the roadway between control points as needed. Remove paint that is not placed within tolerance of the established control points and replace at no expense to the OWNER.

3.2 APPLICATION GUIDELINE

A. Completely dry the pavement surface and thoroughly clean before application of the pavement coating. The material must cover the entire application area and be flush across the surface. Once applied, no part of the pavement surface must be visible in the application area.
B. Asphalt: The material shall be applied using equipment recommended by the manufacturer. The material must be able to be applied at ambient and road temperatures down to 50 ºF without any preheating of the pavement to a specific temperature. A sealer or primer specified by the manufacturer may be applied to the substrate prior to material application to ensure proper adhesion, and to provide reinforcement for larger volumes of material. A thermometer shall not be required during the application process. The pavement shall be clean, dry and free of debris. Supplier must enclose application instructions with each box/package or make available on website.
C. Portland Cement Concrete: The same application procedure shall be used as described above, with the addition of a concrete primer recommended by the colored coating manufacturer.
D. Final thickness for both Green and Tan: The material must be supplied at a minimum thickness of 20 mil (0.5 mm) +/- 5 mil.

3.3 OPENING TO TRAFFIC

A. Minimally, the material must be dry and solid before the colored area is opened to traffic. The area should be opened to traffic within 14 hours after drying.

END OF SECTION

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UDOT SPECIAL PROVISION
SECTION 02771M
PEDESTRIAN ACCESS RAMP

Add the following to Article 2.3.D Acceptable products for installation with following:

1. For Detectable Warning Surface installed on WSU central campus and shown on Drawings: Polymer Composite Cast-in-Place Panel as specified on sheet SP-S3-05 in the Drawings.

UDOT SPECIAL PROVISION
SECTION 02776M
CONCRETE FLATWORK

Delete Article 1.5 SUBMITTALS and substitute with following:

A. Samples and Colors: Full range of manufacturer's dry pigment colors for integrally color concrete ready mix product.

B. Samples: Provide up to three (3) cast 4' x 4' samples of each color of colored concrete section and sidewalk section for review by the Owner's Representative prior to placement. Cast mockup to demonstrate joints, surface finish, texture, color and standard of workmanship. Cast 1 sample of each color for review to determine if an adjustment to the admixture is required prior to casting additional samples.

C. Material certificates in lieu of material laboratory test reports when permitted by Owner's Representative. Material certificates shall be signed by manufacturer and Contractor certifying that each material item complies with or exceeds requirements. Provide certification from admixture manufacturers that chloride content complies with requirements

Delete Article 2.1.B CONCRETE and substitute with following:

D. Color Admixture for all specialty Portland cement colored concrete paving by Davis Colors, or approved equal. Refer to sheet SP-S3-05 in the Drawings for specific color admixtures.
    a. Davis Colors, 3700 East Olympic Blvd. Los Angeles, CA 90023. Phone 323-265-8323. Web site: https://www.daviscolors.com/
E. Color Admixture for concrete sidewalks, bus way, stairs and flush curbs shall contain color pigment in quantities as specified by manufacturer to produce specified color admixture. As noted in Section 1.5, up to three (3) cast 4' x 4' samples of each color will be reviewed be Owner's Representative prior to placement.

UDOT SPECIAL PROVISION
SECTION 02810S
IRRIGATION SYSTEM

Add Section 02810S:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. This Section includes valves, piping, sprinklers, drip emitters, drip tubing, drip accessories, specialties, accessories, controls, and wiring for irrigation systems.

B. Field verify capacity of the existing irrigation system complete including but not limited to flow, capacity, controller operation etc.

C. System Performance Requirements

D.
1. Location of Sprinkler and Devices: Design location is approximate. Make minor adjustments necessary to avoid planting and obstructions such as signs and light standards.
2. Minimum Water Coverage: Not less than:
   a. Turf Areas: 100 percent.
   b. Other Planting Areas: 100 percent.
3. Components and Installation: Capable of producing piping systems with the following minimum working pressure ratings except where indicated otherwise.
   a. Pressure Piping: 150 psig (1035 kPa).
   b. Circuit and Drain Piping: 100 psig (690 kPa).

E. Valves, piping, drip tube, sprinklers, specialties and accessories for drip irrigation systems.
   a. Field verify capacity of the existing irrigation system complete including but not limited to flow, capacity, controller operation, water quality and etc.

F. Drip System Requirements
1. Point source with 1” supply, ½” distribution lines, and ½” emitters with check valves and flow rate stamped.
2. All drip circuit valves shall be installed with individual filtration, pressure reduction, and unions before valve and after filter in a U loop configuration.
3. All drip circuits shall have indicator sprinkler heads installed.
4. Location of Drip line, Emitters and Devices: Design location is approximate. Make minor adjustments necessary to avoid planting and obstructions such as signs and light standards

1.2 RELATED SECTIONS

A. Section 02922S: Seed and Turf Seed

B. Section 02925S: Sodding

C. Section 02932S: Trees, Shrubs, and Groundcovers

1.3 DEFINITIONS

A. Piping sizes used in this Section are normal pipe size (NPS) in inches. Tube sizes are standard size in inches. Equivalent SI (metric) sizes are indicated in millimeters (mm) in parentheses.

B. Supply Piping: Piping from water source to connection to irrigation system pressure piping. Piping is under same pressure as water supply. Piping in this category is not included in this Section.

C. Pressure Piping: Piping downstream from supply piping to and including control valves. Piping is under irrigation system pressure. Piping in this category includes pressure regulators, water meters, and backflow preventers, when used.

D. Circuit Piping: Piping downstream from control valves to irrigation system sprinklers, emitters, devices, and drain valves. Piping is under pressure (less than pressure piping) during flow.

E. Control Valve: Manual or automatic (electrically operated) valve for control water flow to irrigation system zone, including isolation or zone valves.

F. Drain Piping: Downstream from circuit or pressure piping drain valves. Piping is not under pressure.

G. Drain Valve: Manual drain valve for draining of irrigation system circuit piping.

1.4 SUBMITTALS

A. General: Submit the following according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product data including pressure rating, rated capacity, settings, and electrical data of selected models for the following:
   1. Pressure Regulator.
   2. Filter equipment.
   3. Valves, including general-duty, underground, manual and automatic control, and quick-coupler types, and valve boxes.
   4. Sprinklers, including emitters, drip tubes, and devices.
   5. Controls, including controller wiring diagrams.
   6. Wiring.
   7. Flow Sensor Decoder.
   8. Pipe, including sleeves, lateral, supply, conduit and drain.
   9. Drip emitters.
   10. Pressure regulators.
   11. Flush Valves.
   12. Drip Filters.
   13. Air/Vacuum Relief Valves

C. Wiring diagrams for electrical controllers, valves, and devices.

D. Maintenance data for the following:
   1. All product literature and customer service information for products used / installed on project
   2. Pressure regulator
   3. Automatic control valves.
   4. Sprinklers.

5. Controllers & central control equipment.
6. Filters
7. Flow sensor
8. A description of system start up and winterization process.

E. Irrigation Schedule: A monthly Irrigation Schedule shall be prepared that covers the initial 120-day plant establishment period and the typical long-term use period. This schedule shall consist of a table with the following information for each valve:
1. Plant type (for example, turf, trees, low water use plants);
2. Irrigation type (for example, sprinklers, drip, bubblers);
3. Flow rate in gallons per minute;
4. Precipitation rate in inches per hour (sprinklers only);
5. Run time in minutes per day;
6. Number of water days per week, and
7. Cycle time to avoid runoff.

The irrigation schedule shall rely on the estimated landscape water use calculations and shall be adjusted as necessary for irrigation efficiency, soil conditions, slope, and microclimate conditions.

F. Water Use Efficiency Review: Following construction a Water Use Efficiency Review (Audit) will be conducted by a certified Landscape Irrigation Auditor. The auditor shall be independent of the contractor, design firm and owner / developer of the project. The water performance audit will verify that the irrigation system complies with the minimum standards required by the DFCM Water Allowance Work Sheet ordinance. The auditor shall furnish a certificate to the DFCM, Landscape Architect and installer certifying compliance with the minimum distribution requirements and an irrigation schedule.

1.5 QUALITY ASSURANCE

A. Comply with requirements of utility supplying water for prevention of backflow and back siphonage.

B. Comply with requirements of authority with jurisdiction for irrigation systems.

C. Installer Qualifications: Engage an experienced installer who has completed minimum of 6 irrigation systems similar in material, design, and extent to that indicated for Project that have resulted in construction with a record of successful in-service performance.

D. Listing/Approval Stamp, Label, or Other Marking: On equipment, specialties, and accessories made to specified standards.

E. Listing and Labeling: Equipment, specialties, and accessories that are listed and labeled.
a. The Terms “Listed” and “Labeled”: As defined in “National Electrical Code,” Article 100.
b. Listing and Labeling Agency Qualifications: A “Nationally Recognized Testing Laboratory” (NRTL) as defined in OSHA Regulation 1910.7.

F. Product Options: Irrigation system piping, specialties, and accessories are based on specific types, manufacturers, and models indicated. Components with equal performance characteristics produced by other manufacturers may be considered, provided deviations in dimensions, operation, and other characteristics do not change design concept or intended performance as judged by the Architect, unless noted “No Substitute”. The burden of proof of product equality is on the Contractor. Refer to Division 1 Section “Product Substitutions.” No requests for substitutions will be reviewed after bids have been received by Owner.

1.6 PROJECT CONDITIONS

A. Perform site survey, research public utility records, and verify existing utility locations. Verify that irrigation system piping may be installed in compliance with original design and referenced standards.

B. Site Information: Reports on subsurface condition investigations made during design of the Project are available for informational purposes only; data in reports are not intended as representations or warranties of accuracy or continuity of conditions (between soil borings). Owner assumes no responsibility for interpretations or conclusions drawn from this information.

1.7 SEQUENCING AND SCHEDULING

A. Maintain uninterrupted water service to building during normal working hours. Arrange for temporary water shutoff with Owner.

B. Coordinate irrigation systems work with landscape work specified in Division 2 Section 02900S - Landscape Planting.

1.8 EXTRA MATERIALS

A. Deliver extra materials to Owner. Furnish extra materials matching products installed as described below. Package them with protective covering for storage and label clearly describing contents.
   1. Quick Couplers: Furnish quantity of units equal to 10% of amount of each size installed, but not less than 1.
   2. Sprinklers: Furnish quantity of units equal to 10% of amount of each type installed, but not less than 10.
   3. Dripper Tube: Furnish quantity of units equal to 10% of amount of each type installed.
   4. Valve Keys: Furnish quantity of tee-handle units equal to 25% of amount of each type key-operated, control valve installed, but not less than 2 each.
   5. Quick Coupler Hose Swivels: Furnish quantity of units equal to 25% of amount of each type quick coupler installed, but not less than 2.
   6. Quick Coupler Operating Keys: Furnish quantity of units equal to 25% of amount of each type quick coupler installed, but not less than 3.

1.9 WARRANTY/GUARANTEE

A. During the period of one (1) year from and after the final acceptance of the completed irrigation system, the Contractor shall at his own expense, make all needed repairs or replacement due to defective workmanship or materials which in the judgement of the Owner or Owner's representative, shall become necessary during such period. If, within seven (7) calendar days after mailing of the written notice or verified communication by the Owner to the Contractor or his agent, requesting such repairs or replacement, the Contractor shall neglect to make repairs, Owner may make such repairs at the Contractor's expense. In the case of emergency where, in the judgement of the Owner, delay could cause serious loss, hazard or damage to persons or property, then repairs, replacement and security, both temporary and/or permanent, may be provided by such persons as the Owner may employ, after verbal communication with Contractor without notice being sent to the Contractor, and the Contractor shall pay all costs related thereto.

B. The guarantee shall be in the form of a letter from the Contractor addressed to the Owner. The letter shall incorporate the language stated above and be signed by an authorized officer/agent or Owner of the Contractor.

C. During the guarantee period, the Contractor will drain the system in the fall and put the system back into operation in the Spring. This work shall be done in the presence of the Owner's representative and maintenance personnel.

1.10 RECORD DRAWINGS:

A. Any deviation from plan layout should be indicated on the final "Record" Drawings. This Contractor shall make an exact measured and dimensioned drawing showing locations of all piping, wiring, control, valves and quick coupler valves.

B. Record Drawings shall be furnished to the Landscape Architect at the time of Substantial Completion Inspection before a letter of Substantial Completion for the irrigation sprinkler system will be issued.

C. The Contractor shall supply the Landscape Architect with record drawing information in AutoCad format before final acceptance of the irrigation system. The following shall be included on Irrigation Record Drawings. In addition, provide a reduced color-coded drawing(s) showing all zones and assigned valves.
   1. Note all points of connection (P.O.C.) include tap size, line size and static water pressure (P.S.I.) of service.
   2. Provide name and phone number of the servicing water purveyor include the name and date the installer was completed and the date the as-built drawing was approved.
   3. Accurately locate the following major components by dimension and their size as installed on the project. (But not limited to the Following):
      a. Water Meters
      b. Backflow Preventers
      c. Pressure Reducing Valves (note pressure settings)
      d. Filters
      e. Stop and Waste
      f. Master Control Valves
      g. Control wire junction boxes
      h. Pumps
      i. Flow Sensors
      j. Remote Control Valves (note station assignment, size flow rate, pressure setting. D.U. and actual flow rates. If available from water audit).
      k. Drip System Pressure Regulators and Filters
      l. Quick Couplers and Hose Bibs
      m. Pressure Main Lines and Future P.O.C.'s
      n. Manual Drain Valves and Sumps
      o. Remote Control Wire (label both ends and in junction box)
      p. Controller Location(s) (Note manufacturer, model, size and number of stations used)
      q. Central Control
      r. Rain Sensors
      s. Moisture Sensors
      t. Note and identify location(s) of existing utility systems as encountered during installation, i.e.; gas, phone, sewer, etc.
      u. Air Release Valves
   4. Indicate and show the following additional components installed on the project:
      a. All Sprinkler Heads
      b. Lateral Lines and sizes
      c. Lateral Lines Sleeves and sizes
      d. Manual or Automatic Flush Valves

1.11 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver irrigation system components in manufacturer's original undamaged and unopened containers with labels intact and legible.

B. Deliver plastic piping in bundles, packaged to provide adequate protection of pipe ends, both threaded or plain.

C. Store and handle materials to prevent damage and deterioration.

D. Provide secure, locked storage for valves, sprinkler heads, and similar components that cannot be immediately replaced, to prevent installation delays.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the work include, but are not limited to, the following.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Backflow Preventers
    a. Backflow preventers located in Ogden City ROW: per Ogden City Standards
2. Backflow Preventers on WSU campus/private property
    a. Conbraco Industries, Inc.
    b. Febco.
    c. Watts Regulator Co.
    d. Wilkins Regulator Div., Zurn Industries, Inc.
3. Gate Valves for Underground Installation:
    a. American Darling Valve Div., American Cast Iron Pipe Co.
    b. Clow Valve Co. Div., McWane, Inc.
    c. Kennedy Valve Div., McWane, Inc.
    d. Stockham Valves & Fittings, Inc.
    e. Waterous Co.
4. Corporation Stops for Underground Installation
    a. Ford Meter Box Co., Inc.
    b. Hays Div., Romac Industries.
    c. A.Y. McDonald Mfg. Co.
    d. Mueller Co., Grinnell Corp.
5. Valves for Aboveground and Pit Installation
    a. Grinnell Supply Sales Co., Grinnell Corp.
    b. Nibco, Inc.
    c. Stockham Valves & Fittings, Inc.
    d. Walworth Co.
    e. Watts Regulator Co.
6. Automatic Control Valves
    a. Rain Bird Sprinkler Mfg. Corp.
    b. Toro Co.
7. Control Valve Boxes
    a. Ametek by Plymouth Products Div., AMETEK
    b. Brooks Products, Inc., Polyplastics Div.
    c. Carson Industries, inc.
    d. DFW/HPI by Hefco Plastics, Inc.
    e. National Diversified Sales, Inc.
8. Quick Couplers
    a. Rain Bird Sprinkler Mfg. Corp.

   b. Toro co.
9. Sprinklers
   a. Hunter Industries.
   b. Rain Bird Sprinkler Mfg. Corp.
10. Dripper Tubes, and Devices
   a. Rain Bird Sprinkler Mfg. Corp.
   b. Netafim, Inc.
11. Controllers
   a. Rainmaster Corporation (proprietary)
12. Pipe
   a. Pacific Western Extruded Plastics Co.
   b. Eagle Pacific Industries, Inc.
   c. J-M Manufacturing Company, Inc.
13. Master Valve
   a. Raphael
14. Filters
   a. Amiad Corporation
15. Flow Sensor
   a. Rainmaster Corporation
16. Drip Zone Filters
   a. Rain Bird Sprinkler Mfg. Corp.
   b. Or preapproved equal
17. Drip Zone Pressure Reducing Valve
   a. Rain Bird Sprinkler Mfg. Corp.
   b. Or preapproved equal

2.2 PIPES AND TUBES

A. Refer to Part 3 Article “Piping Applications” for identification of systems where pipe and tube materials specified below are used.

B. Polyvinyl Chloride (PVC) Plastic Pipe: ASTM D 1785, PVC 1120, Schedule 40, 160 psig (1100 kPa) minimum pressure rating for 3-inch (100-mm) and smaller sizes, with plain, threaded or bell ends.
   1. PVC Socket Fittings: Schedule 40: ASTM D 2466.

C. Polyvinyl Chloride (PVC) Plastic Pipe: ASTM D 1785, PVC 1120 compound, Schedule 80.
   1. PVC Socket Fittings: Schedule 80: ASTM D 2467.
   2. PVC Threaded Fittings: Schedule 80: ASTM D 2464.

D. PVC, Pressure-Rated Pipe: ASTM D 2241, PVC 1120 compound, SDR 21 Bell and Ring for pipe 4” and larger.

E. Drip Emitter Tubing: Shall be made of linear low density Polythylene and shall be sufficiently flexible to bend on a radius of one-quarter inch without kinking or suffering a permanent set which would affect its flow capacity. The polyethylene tubing shall be extruded from linear low density material with an antioxidant component. The tubing has an algae and ultraviolet radiation inhibitor. The tubing is to be uniformly black in color, homogeneous throughout and smooth inside and outside, free from foreign materials, cracks, holes, dents, wrinkles, and blisters. The tubing shall withstand a minimum steady state internal pressure to 60 psi, at 68 degree Fahrenheit, without failure.

2.3 PIPE AND TUBE FITTINGS

A. Refer to Part 3 Article “Piping Applications” for identification of systems where pipe and tube fitting materials specified below are used.

B. Cast-Bronze Flanges: ASME B16.24, Class 150, raised ground face, bolt holes spot faced.

C. Polyvinyl Chloride (PVC) Plastic Pipe Fittings: ASTM D2467, Schedule 80, socket-type and ASTM D2464, Schedule 80, threaded fittings.

D. Polyvinyl Chloride (PVC) Plastic Pipe Fittings: ASTM D2467, Schedule 40, socket-type and ASTM D2464, Schedule 40, threaded fittings.

E. E. Polyvinyl Chloride (PVC) Plastic Pipe Fittings: ASTM D2241, PVC 1120 compound, SDR 21.

F. Polyvinyl Chloride (PVC) Plastic Pipe Fittings: ASTM D2467, Schedule 40, socket-type.

G. Ductile Iron: Deep Socket Cast Iron Fittings: ASTM A536.

2.4 JOINING MATERIALS

A. Refer to Division 15 Section “Basic Mechanical Materials and Methods” for joining materials not included in this Section.

B. Solvent Cement: ASTM F656 primer and ASTM D2564 solvent cement in color other than orange.

C. Gaskets for Plastic Flanged Joints: Materials recommended by plastic pipe and fittings manufacturer.

D. Gaskets for Plastic Joints: Trans gaskets as recommended the fittings manufacturer.

2.5 VALVES

A. General: Valves are for general-duty and underground applications. Refer to “Valve Applications” Article for locations of various valve types specified in this Article. Refer to “Control Valves” Article for control valves and accessories and “Backflow Preventers” Article for backflow preventer valves.

B. Nonrising Stem Gate Valves 3-inches (DN 80) and Larger: AWWA C500, cast-iron double disc, bronze disc and seat rings or AWWA C509, resilient seated; bronze stem, cast-iron, or ductile-iron body and bonnet, stem nut, 200 psig (1380 kPa) working pressure; and ends that fit NPS dimension, PVC pipe. Include elastomeric gaskets.

C. Valve Boxes: Cast-iron box with top section and cover with lettering “WATER,” bottom section with base to fit over valve and barrel approximately 5-inches (127 mm) in diameter, and adjustable cast-iron extension of length required for depth of bury of valve.
   1. Provide steel tee-handle shutoff rod with each valve box. Include tee-handle, shutoff rod with one pointed end, stem of length to operate valve, and end fitting valve operating nut.

D. Curb Stops 2-inches (DN 50) and Smaller: Bronze body, ground key plug or ball, 150 psig (1035 kPa) minimum pressure rating, wide tee head, with inlet and outlet to match service piping material
.

E. Service Boxes for Curb Stops: Cast-iron box with telescoping top section of length required for depth of bury of valve. Include cover with lettering “WATER” and bottom section with base of size to fit over curb stop and barrel approximately 3-inches (75 mm) in diameter.

a. Provide steel tee-handle shutoff rod with each service box. Include tee-handle, shutoff rod with one pointed end, stem of length to operate curb stop, and slotted end fitting curb stop head.

F. Bronze, Nonrising Stem Gate Valves, 2-inches (DN 50) and Smaller: MSS SP-80, Type 1, solid wedge; nonrising, copper-silicon-alloy stem; Class 125, body and screw bonnet of ASTM B 62 cast bronze, with threaded or solder-joint ends. Include polytetrafluoroethylene (PTFE) – impregnated packing, brass packing gland, and malleable-iron handwheel.

G. Plastic Valves: Polyvinyl Chloride (PVC) Plastic, with 150 psig (1035 kPa) minimum pressure rating, ends compatible to piping where valve is to be installed, and tee handle.

H. Automated Control Valve: All automated control valves shall be brass rated for dirty water and minimum pressure of 200 psi. This valve shall have a reverse flow feature ensuring valve fails in the closed position. It shall have a fluid resistor through the solenoid, a manual internal and external bleed, and adjustable flow control. In addition, it shall be contamination proof, self-flushing,nylon or stainless steel screen on solenoid.

I. Ball Valves: Ball valves shall be solid bronze meeting Federal Specification WW-V-35C, TYPE II, COMPOSITION: BZ, STYLE: 3. Size shall be the same size as the main line on which it is installed. Valves shall be installed on the up-stream side of the electric remote control valve manifold and in the same valve box. NOTE: Only one (1) ball valve required per manifold.

J. Drain Valves: All drain valves shall be ¾" brass full turn ball cocks and installed as per details on the Drawings. Valves shall be tested for 150 psi working pressure. This valve is to be installed on mainlines only.

K. Master Valves: Electric remote control operated valve. Class 125, Main valve and actuator cast iron ASTM A 126 class B.

2.6 CONTROL VALVES

A. Description: Manufacturer's standard control vales for circuits, of type and size indicated, and as follows:
   1. Provide cast-bronze bodies, unless otherwise indicated.
   2. Manual Control Valves: MSS SP-80, Class 125, globe valves.
   3. Key-Operated, Manual Control Valves: MSS Sp-80, Class 125, globe valves, fitted for key operation.
   4. Automatic Control Valves: Diaphragm-type, normally closed, with manual flow adjustment, and operated by 24-volt-a.c. solenoid.
   5. Automatic Drain Valves: Designed to open for drainage when line pressure drops below 3 psig (20 kPa). Not for use on pressure piping.
   6. Quick-Couplers: Factory-fabricated, 2-piece assembly. Include coupler water-seal valve; removable upper body with spring-loaded or weighted, rubber-covered cap; hose swivel with ASME B1.20.7, ¾-11.5NH Threads for garden hose on outlet; and operating key.
      f. Locking Top Option: Include vandal-resistant, locking feature with two matching keys.

B. Control Valve boxes: Polyethylene (PE), acrylonitrile-butadiene-styrene (ABS), fiberglass, polymer concrete, or precast concrete box and cover. Size as required for application.
   1. Drainage Backfill: Cleaned gravel or crushed stone, graded form 3-inches (75 mm) maximum to ¾-inch (19 mm) minimum.
   2. Valve boxes shall be of sufficient size to house two (2) electric remote control valves with unions, and still allow room for maintenance without having to excavate or perform similar operations. Boxes shall have lock down lids and shall meet ASTM D638 for tensile strength of 4,300 pounds per square inch.

C. Service Boxes for Key-Operated Control Valves: Cast-iron box with telescoping top section of length required for depth of bury of valve. Include cover with lettering “WATER,” and bottom section with base of size to fit over curb stop and barrel approximately 3-inches (75 mm) in diameter.
   1. Include valve key, 36-inches (915 mm) long with tee handle and key end to fit valve.

2.7 DRIP LINE AND INTEGRAL DRIPPER LINE COMPONENTS

A. The dripper line shall be Techline pressure compensating dripperline with check valve as manufactured by Netafim irrigation, Inc. Dripper flow rate spacing shall be as indicated on drawings.

B. Techline: All Techline connections shall be made with approved Techline insert fittings.

C. Soil Staples: 9” pvc coated galvanized supply tubing staked compatible with proper tubing size.

D. Pressure Regulator: A pressure regulator shall be installed at each zone valve to ensure operating pressures do not exceed system requirements. The pressure regulator shall be a Rainbird Pressure Regulator. Model number as indicated on drawings.

E. Drip Zone Filter: Shall be 1” with a clear indicator top that goes from green to red when filter is full. Filter shall have a threaded top for easy removal of filtration element. It shall be rated up to 150 psi and have a 200 micron stainless steel mesh screen with polypropylene ribs for reinforcement.

F. Drip Emitter: Emitter shall ensure total pressure compensation from 5 psi to 50 psi. It shall have internal spring check valve with 4 psi cracking pressure. Emitter shall have anti-siphon operation to prevent back flowing into supply line. Emitter shall be half inch threaded.

2.8 FLOW SENSOR

A. Provide a Rainmaster 2” flow sensor compatible with the RainMaster DX48 Controller.

2.9 FILTER

A. Provide an Amiad 2” 2-0200 super steel inline filter assembly with brushaway cleaning system and weavewire screen (80 micron) in aluminum enclosure.

2.10 SPRINKLERS

A. Description: Manufacturer’s standard sprinklers designed to provide uniform coverage over entire area of spray shown on Drawings at available water pressure, as follows:
   1. Housings: plastic, except where material is specified.
   2. Pop-up, Spray: Fixed pattern, with screw-type flow adjustment and stainless steel retraction spring.
   3. Pop-up, Rotary Spray: Gear drive, full-circle and adjustable part-circle type.
   4. Bubblers: Fixed pattern, with screw type flow adjustment.

2.11 AUTOMATIC CONTROL SYSTEM

A. Description: Low-voltage controller system made for control of irrigation system automatic control valves. Controller operates on 120 volts a.c. building power system, provides 24 volts a.c. power to control valves.

B. Exterior Control Enclosures: Pedestal mount weatherproof enclosure with locking cover and two matching keys. Enclosure construction complies with NFPA 70 and NEMA 250, Type 4, and includes provision for grounding.
   1. Material: Enameled-steel, sheet metal.

C. Transformer: Internal-type, and suitable for converting 120 volts a.c. building power to 24 volts a.c. power.

D. Controller Stations for Automatic Control Valves: Include switch for manual or automatic operation of each station.

E. Timing Device: Adjustable, 24-hour, 14-day clock to operate any time of day. See Irrigation Schedule and Legend for model and manufacturer.

F. Lightning Protection: Provide manufacturer's standard lightning protection on each controller. Coordinate with electrical.

G. Wiring: UL 493, solid copper conductor, insulated cable, suitable for direct burial.
   1. Feeder Circuit Cables: Type UF, No. 14 AWG minimum, between valves and controllers.
   2. Control Wiring: Rain Bird, MaxiCom approved signal communication wire, Type PE39.

H. Rainmaster controller to have the following equipment:
   1. EV-Ground-Rod.
   2. DX Radio Kit
   3. EV-Ant-FD-KIT
   4. PMR-Rainmaster-Kit
   5. UPED-T Pedestal

2.12 IDENTIFICATION

A. Refer to Division 2 Section "Earthwork" for plastic underground warning tapes.

2.13 THRUST BLOCKS

A. All main lines shall have a thrust block of poured concrete installed at each change of direction. The thrust block shall be of sufficient size for the pipe involved and rest on undisturbed ground. Construct as follows:

STEP 1.
Multiply the working pressure by the appropriate value shown in the following table to obtain total thrust in N (lb.):

PIPELINE THRUST FACTORS * ^

Pipe size		Dead end	90º	45º	22º
in.	mm	or tee	elbow	elbow	elbow
3"	89	9.80	13.90	7.51	3.82
3 1/2"	102	12.80	18.10	9.81	4.99
4"	114	16.20	23.00	12.40	6.31
5"	141	24.70	35.00	18.90	9.63
6"	168	34.80	49.20	26.70	13.60
8"	219	59.00	83.50	45.20	23.00
10"	273	91.50	130.00	70.00	35.80

12”	324	129.00	182.00	98.50	50.30

* Based on thrust per kPa (PSI) pressure.
^ Blocking for cross may not be needed with long branch lines.

STEP 2.
Determine the bearing strength of the soil from the table below:

BEARING STRENGTH OF SOILS

Soils and safe bearing loads	lb/ft5	kPa
Sound shale	10,000	500
Cemented gravel and sand difficult to pick	4,000	200
Coarse and fine compact sand	3,000	150
Medium clay - can be spaded	2,000	100
Soft clay	1,000	50
Muck	0	0

See Soils Report for soil type

STEP 3.
Divide the total thrust obtained in Step 1 by the bearing strength of the soil to get the area needed, m5(ft5).

SIDE THRUST ALTERNATIVE PROCEDURE

Pipe size		Side thrust per degree.	
in.	mm	lb	N
3”	89	17.10	76.10
3 1/2”	102	22.40	99.60
4”	114	28.30	125.90
5”	141	43.10	191.70
6”	168	60.80	270.50
8”	219	103.00	458.20
10”	273	160.00	711.70
12”	324	225.00	1,000.80

* Based on side thrust per 689 kPa (100 PSI) pressure per degree of deflection.
NOTE: Multiply side thrust from table by degree of deflection times kPa (PSI) divided by 100 to obtain total side thrust in N(lb).

PART 3 EXECUTION

3.1 EXAMINATION

A. Investigate and determine available water supply, water pressure and flow characteristics.

3.2 PREPARATION

A. Set stakes or flags to identify proposed sprinkler locations. Obtain Architect’s approval before excavation.

3.3 PAVING WORK

A. Cutting and patching of asphalt paving is specified in Division 2 Section “Hot-Mixed Asphalt Paving.”

B. Cutting and patching of concrete paving is specified in Division 2 Section “Portland Cement Concrete Paving.”

C. Install piping in sleeves where crossing sidewalks, roadways, parking lots, and railroads.

3.4 PIPING APPLICATIONS

A. Refer to Part 2 of this Section for detailed specifications for pipe and fittings products listed below. Use pipe, tube, fittings, and joining methods according to the following applications. Piping in pits and aboveground may be joined with flanges instead of joints indicated.

B. Use pipe, tube, fittings, and joining methods according to the following applications.

C. Pressure Piping Underground: Use the following:
1. 3-inches (DN 80) and Smaller: ASTM D 1785, Schedule 40, polyvinyl chloride (PVC) plastic pipe; ASTM D 2466, Schedule 40, PVC plastic, socket-type pipe fittings; and solvent-cemented joints.
2. 3-inches (DN 80) and Larger: ASTM D 2241, Class 200, polyvinyl chloride (PVC) plastic pipe; with flanged or deep socket fittings.

D. Circuit Piping: Use the following:
1. All Sizes: ASTM D 1785, Schedule 40, polyvinyl chloride (PVC) plastic pipe; ASTM D 2466, Schedule 40, PVC plastic, socket-type fittings; and solvent-cemented joints.

E. Branches and Offsets at Sprinkler and Devices: ASTM D 1785, Schedule 80, polyvinyl chloride (PVC) plastic pipe with threaded ends; ASTM D 2464, Schedule 80, PVC plastic, threaded fittings; and threaded joints.

F. Drain Piping: ASTM D 1485, Schedule 40, polyvinyl chloride (PVC) plastic pipe; ASTSM D 2466, Schedule 40 PVC plastic, socket-type fittings; and solvent-cemented joints.

G. Sleeves: ASTM D 1785, Schedule 40, polyvinyl chloride (PVC) plastic pipe; ASTM D 2466, Schedule 40, PVC plastic, socket-type fittings; and solvent-cemented joints.

3.5 JOINT CONSTRUCTION

A. Flanged Joints: Align flanges and install gaskets. Assemble joints by sequencing bolt tightening. Use lubricant on bolt threads.

B. Threaded Joints: Thread pipes with tapered pipe threads according to ASME B1.20.1, apply tape or joint compound, and apply wrench to valve ends into which pipes are being threaded.

C. Polyvinyl Chloride (PVC) Piping Gasketed Joints: Construct joints between underground AWWA-type, cast-iron valves and NPS PVC pipe; with elastomeric seals that fit pipe diameter and valve ends; and lubricant, according to ASTM D 3139.

D. Polyvinyl Chloride (PVC) Piping Solvent-Cemented Joints: Construction joints according to ASTM D 2672 and ASTM D 2855.
1. Handling of Solvent Cements, Primers, and Cleaners: Comply with procedures in ASTM F 402 for safe handling when joining plastic pipe and fittings with solvent cements.

E. All drip system piping must use manufacturer’s recommended solvent cements and joints.

3.6 PIPING SYSTEMS – COMMON REQUIREMENTS

A. General Locations and Arrangements: Drawings indicated general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate

friction loss, and in other design considerations. Install piping as indicated, except where deviations to layout are approved on coordination drawings. No piping shall be installed within the drip line of any trees or shrubs without approval fromProject Manager.

B. Install piping at a uniform slope of 6-inches per 100-feet (1:200) minimum, down to drain points.

C. Install components having pressure rating equal to or greater than system operating pressure.

D. Install piping free of sags and bends.

E. Locate groups of pipes parallel to each other, spaced to permit valve servicing.

F. Install fittings for changes in direction and branch connections.

G. Piping Connections: Except as otherwise indicated make piping connections as specified below.

1. Install unions, in piping 2-inches (DN 50) and smaller, adjacent to each valve and at final connection to each piece of equipment having 2-inch (DN 50) or smaller threaded pipe connection.
2. Install flanges, in piping 2½-inches (DN 65) and larger, adjacent to flanged valves and at final connection to each piece of equipment having flanged pipe connection.
3. Install dielectric fittings to connect piping of dissimilar metals.

3.7 TRENCHES:

A. Trenches shall be dug as wide and deep as necessary to properly place the sprinkling system according to the requirements herein. Any rock uncovered in this excavation shall not be left in the backfill. All excess rock shall be removed from the site by this Contractor and legally disposed of off the property. All trenches shall be backfilled and compacted to insure no settling of the surface, after the lawn is planted.

B. If backfill soil is rocky or lumpy, protect the pipe and the pipe conduit with 8” of sand or loose, rock free, soil under, over and on sides of pipe. Avoid putting large rocks against pipe during backfilling operation.

C. All trenches must be compacted to 90% in 6” lifts and watered in. Lines from control valves shall be installed after topsoil is in place and properly graded.

D. The Contractor, in placing the sprinkling lines, etc., may uncover material not suitable for finished grading. This material shall be removed from the site by this Contractor. After the installation of the lines, the finished grading shall be smoothed over and restored to its original condition, using additional topsoil at this Contractor's expense, if this is necessary. The upper 6” of topsoil removed in the excavation of trenches for pipeline shall be conserved and kept separate from subsoil and reinstalled without mixing with other soil.

E. Trenches where more than one pipe is to be installed, a distance of 6” is to be maintained between each pipe.

F. All trenches are to be 12” away from all curbs, buildings and sidewalks. No exceptions.

G. All trenches shall be outside the drip line of the tree. Exceptions will be made only with prior WSU Representative approval.

3.8 PIPING INSTALLATION

A. Install underground polyvinyl chloride (PVC) plastic pipe according to ASTM D 2774.

B. Lay piping on solid sub-base, uniformly sloped without humps or depressions.
   1. Slope circuit piping down toward drain valve minimum of ½-inch in 10-feet (1:240).
   2. Install polyvinyl chloride (PVC) plastic pipe in dry weather when temperature is above 40 deg. F (4 deg. C). Allow joints to cure at least 24-hours at temperature above 40 deg. F (4 deg. C) before testing, unless otherwise recommended by manufacturer.

C. Drain Pockets: Excavate to sizes indicated. Backfill with cleaned gravel and crushed stone, graded from 3-inches (75 mm) to ¾-inch (19mm) minimum, drain material to 12-inches (300 mm) below grade. Cover drain material with sheet of ASTM D 226, Type II, asphalt-saturated felt and backfill remainder with excavated material. Drain pocket to be minimum 6 cubic feet.

D. Minimum Cover: Provide following minimum cover over top of buried piping:
   1. Pressure Piping: Greater depth of minimum of 24-inches (600 mm) below finished grade.
   2. Circuit Piping: 15-inches (380 mm).
   3. Drain Piping: 15-inches (380 mm).
   4. Sleeves: 24-inches (600 mm).

E. Install piping under sidewalks and paving in sleeves.

3.9 DRIP LINE INSTALLATION

A. No more than 10 emitters shall be installed per 1" pvc supply line. All lines and emitters shall be installed on grade and below mulch layer. All lines must be installed to manufacturer's recommendations.
   1. 1 gallon plants shall have 1 emitter per plant.
   2. 5 gallon plants shall have 2 emitters per plant.
   3. Trees shall have 6 emitters per tree.

B. When installing drip line on-surface, install soil staples as listed below:
   1. Clay Soil:- One staple every five (5') feet and two (2') staples on each change of direction(tee, elbow or cross).
   2. Sand Soil:- One staple every three (3') feet and two (2) staples on each change of direction (tee, elbow, or cross).
   3. Loam Soil:- One staple every four(4') and two (2') staples on each change of direction (tee, elbow or cross).

C. Cap or plug all openings as soon as lines have been installed to prevent the entrance of materials that would obstruct the pipe. Leave in place until removal is necessary for completion of installation.

D. Thoroughly flush all water lines before installing valves and other hydrants.

E. Test in accordance with Manufacturer's recommendations.

3.10 DRIP FILTERS:

A. Filters shall be installed immediately after the electric valve and before the pressure regulator. An appropriate valve box shall be used to insure easy access to the filter for cleaning purpose.
B. Filter must have exterior status indicator.

3.11 DRIP SYSTEM PRESSURE REGULATORS

A. The regulators shall be installed after the filters and must not be buried but shall be accessible for inspections and maintenance.

3.12 VALVE APPLICATIONS

A. Drawings indicate valve types to be used. Where specific valve types are not indicated, following requirements apply:
   1. Buried Valves 3-inches (DN 80) and Larger: AWWA, gate valves, non-rising stem, with stem nut and valve box.
   2. Buried Valves 2-inches (DN 50) and Smaller: Bronze-body, curb stop, with tee head, service box and shutoff rod.

3.13 VALVE INSTALLATION

A. Valves: Install underground valves in valve boxes or pits.
   1. Install valves and polyvinyl chloride (PVC) pipe with restrained, gasketed joints.

B. Curb Stops: Install underground curb stops in service boxes.

C. Control and Ball Valves: Install in valve control valve boxes, arranged for easy adjustment and removal. Install unions with one (1) on upstream side at each valve manifold.

3.14 FLOW SENSOR

A. Install the flow sensor as per manufacturers literature and recommendations.

3.15 FILTER

A. Install the filter as per manufacturers detail and recommendations inside the specified controller.

3.16 AUTOMATIC CONTROL SYSTEM INSTALLATION

A. Install controllers according to manufacturer’s written instructions and as indicated.

B. Install controllers on Unistrut or similar mounting system. Attach to wall where shown. Provide and install wire gutter for wiring connections at controller.

C. Run one extra wire from the adjacent controller to each group of valves for future use and stub into the valve box.

D. Install control wiring in same trench with piping.

E. Install the entire system complete to operate compatibly with the Rain Master central control system.

3.17 CONNECTIONS

A. Connect piping to sprinklers, devices, valves, control valves, specialties, and accessories.

B. Connect water supplies to irrigation systems. Include backflow preventers on potable water supplies. Include automatic filters on secondary water supplies.

C. Electrical Connections: Connect to power source, controllers, and automatic control valves.

D. Minimum requirements for electrical installations are specified in Division 16.

E. Ground systems according to Division 16 Section “Grounding.”

3.18 FIELD QUALITY CONTROL

A. Testing: Perform hydrostatic test of piping and valves before backfilling trenches. Piping may be tested in sections to expedite work.
   1. Cap and subject the piping system to a static water pressure of 50 psig (345 kPa) above the operating pressure without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for 4-hours. Leaks and loss in test pressure constitute defects that must be repaired.
   2. Repair leaks and defects with new materials and retest system or portion thereof until satisfactory results are obtained.
   3. Notify Architect 24 hour in advance of pressure testing so test may be observed.

3.19 CLEANING AND ADJUSTING

A. Flush dirt and debris from piping before installing sprinklers and other devices.

B. Adjust automatic control valves to provide flow rate of rated operating pressure required for each sprinkler circuit.

C. Carefully adjust lawn sprinklers so they will be flush with, or not more than ½-inch (13 mm) above, finish grade after completion of landscape work.

D. Adjust settings of controllers and automatic control valves.

3.20 COMMISSIONING

A. Starting Procedures: Follow manufacturer’s written procedures. If no procedures are prescribed by manufacturers, proceed as follows:
   1. Verify that specialty vales and their accessories have been installed correctly and operate correctly.
   2. Verify that specified test of piping are complete.
   3. Check that sprinklers and devices are correct type.
   4. Check that damaged sprinklers and devices have been replaced with new materials.
   5. Check that potable water supplies have correct type backflow preventers.
   6. Energize circuits to electrical equipment and devices.
   7. Adjust operating controls.

B. Operational Testing: Perform operational testing after hydrostatic testing is completed, backfill is in place, and sprinklers are adjusted to final position.

C. Provide irrigation system layout and diagram in CADD format with water zones clearly identified. Layout to be color coded with a maximum of 5 colors for easy legibility. Record water budget for each irrigation control zone and current settings. Provide laminated copy and mount near controller. Verify location with Architect.

3.21 DEMONSTRATION

A. Demonstrate to Architect that system meets coverage requirements and that automatic controls function properly.

B. Demonstrate to Owner's maintenance personnel operation of equipment, sprinklers, specialties, and accessories. Review operating and maintenance information.

C. Provide 7-days' written notice in advance of demonstration.

End of Section

UDOT SPECIAL PROVISION
SECTION 02816S
ORNAMENTAL FENCE ON STRUCTURE

Add Section 02816S:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Materials and procedures for installing ornamental fence.

1.2 RELATED SECTIONS

A. Section 03055: Portland Cement Concrete

1.3 REFERENCES

A. AASHTO M 111: Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

B. AASHTO M 270: Carbon and High Strength Low Alloy Structural Steel, Shapes, Plates and Bars and Quenched-and Tempered Alloy Structural Steel Plates for Bridges

C. ASTM A 36: Carbon Structural Steel

D. ASTM A 563: Specification for Carbon and Alloy Steel Nuts

E. ASTM A 653: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

F. ASTM B 117: Standard Practice for Operating Salt Spray (Fog) Apparatus

G. ASTM C 1107: Packaged Dry, Hydraulic-Cement Grout (Nonshrink)

H. ASTM D 1654: Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments

I. ASTM D 2244: Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates

J. ASTM D 2794: Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)

K. ASTM D 3359: Standard Test Methods for Measuring Adhesion by Tape Test

L. ASTM D 523: Standard Test Method for Specular Gloss

M. ASTM D 714: Test Method for Evaluating Degree of Blistering of Paints

N. ASTM D 822: Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings

O. ASTM F 1554: Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength

P. ASTM F 2329: Specification for Zinc Coating, Hot-Dip, Requirements for Application to Carbon and Alloy Steel Bolts, Screws, Washers, Nuts, and Special Threaded Fasteners

Q. ASTM F 2408: Standard Specification for Ornamental Fences Employing Galvanized Steel Tubular Pickets

R. ASTM F 436: Specification for Hardened Steel Washers

S. AWS D1.1 Structural Welding Code – Steel

1.4 DEFINITIONS

A. Working Drawings – Drawings produced by the Contractor that supplement the contract drawings to provide information not included in the contract documents but required to fabricate and install ornamental fence.
   1. Working drawings do not supersede the contract drawings.

B. Approval of Working Drawings – Acceptance by the Department for use on the project. The Department will review working drawings for general conformance with the design concept and compliance with the contract documents. Review and approval do not relieve the Contractor from responsibility for errors, correctness of details, conformance to the contract, and the successful completion of the work.

1.5 SUBMITTALS

A. Working Drawings
   1. Detailed shop drawings for installation of fabricated materials for approval.
      a. Do not begin work until receiving approval of the shop drawings.
   2. Prepare Drawings
      a. Submit drawings electronically in PDF format. Use 11 x 17 inch sheets with a 1½ inch blank margin on the left edge. Place the following information in the title block in the lower right corner of each sheet:
         1) State Project Designation
         2) State Project Name
         3) State Structure Number
         4) Contractor, Fabricator, or Erector Name
         5) Contractor, Fabricator, or Erector Drawing Number
         6) Contractor, Fabricator, or Erector Sheet Number
      b. Revise and resubmit drawings when directed by the Department.
   3. Allow the Engineer 14 calendar days to review and approve working drawings and supporting calculations.
      a. The Engineer may grant an increase in the number of working days for the project when that time is exceeded.
      b. This review period applies each time the drawings and calculations are submitted.

4. Do not deviate from the approved drawings unless authorized in writing by the Engineer. Assume the responsibility for costs incurred due to faulty detailing or fabrication.

B. Submit fence product literature from the manufacturer to the Engineer for approval prior to installation.

C. Submit manufacturer's Certificate of Compliance showing that furnished ornamental fence meets or exceeds the requirements in this Section.

D. Submit manufacturer's Warranty to the Engineer prior to installation.

PART 2 PRODUCTS

2.1 GENERAL

A. Use a black, 2-rail style ornamental steel fence system with an extended picket bottom rail treatment.

B. Provide steel fence panels (pickets, rails, brackets and base plates) and posts conforming to the requirements of ASTM A 653 or ASTM A 36, with a minimum yield strength of 36,000 psi and a minimum zinc (hot-dip galvanized) coating weight of 0.90 oz/ft^2, Coating Designation G-90.

C. Use details shown in plans for pickets, rails, and posts.

D. Provide base plates conforming to AASHTO M 270 and weld to posts according to AWS D1.1 and as shown on the plans.

E. Provide all other material required for fence installation including, but not limited to:
1. Anchor Bolts – Refer to ASTM F 1554
2. Nuts – Refer to ASTM A 563
3. Washers – Refer to ASTM F 436
4. Anchor Plates – Refer to AASHTO M 270 and ASTM A36
5. Grout – Refer to ASTM C 1107

F. Class B Concrete – Refer to Section 03055.

2.2 FABRICATION

A. Pre-cut pickets, rails and posts to required lengths. Pre-punch rails to accept pickets.

B. Insert pickets into the pre-punched holes in the rails. Align pickets to standard spacing using a specially calibrated alignment fixture. Join pickets and rails at each picket-to-rail intersection by welding.

C. Coat the manufactured panels, base plates and posts with an inline electrodeposition coating (E-Coat) process consisting of a multi-stage pretreatment/wash, followed by a duplex application of an epoxy primer and an acrylic topcoat. Provide a minimum cumulative coating thickness of epoxy and acrylic of 2 mils. Meet the performance requirements for the quality characteristics for the coated panels and posts shown in Table 1.

Table 1 – Coating Performance Requirements

Quality Characteristics	ASTM Test Method	Performance Requirements
Adhesion	D3359 – Method B	Adhesion (retention of coating) over 90% of test area (tape and knife kit test).
Corrosion Resistance	B117, D714, and D1654	Corrosion resistance over 1,500 hours (scribed per D1654; failure mode is accumulation of 1/8" coating loss from scribe or medium #8 blisters).
Impact Resistance	D2794	Impact resistance over 60 inch lb. (forward impact using 0.625" ball).
Weathering Resistance	D822, D2244, and D523 (60˚ Method)	Weathering resistance over 1,000 hours (failure mode is 60% loss of gloss or color variance of more than 3 delta-E color units).

D. Meet the vertical load, horizontal load, and infill performance requirements for Industrial weight fences under ASTM F2408.

PART 3 EXECUTION

3.1 DELIVERY, HANDLING, AND STORAGE

A. Check all materials upon delivery to ensure that no damage occurred during shipping.

B. Store materials in such as manner to ensure proper ventilation and drainage, and to protect against damage, weather, vandalism, and theft.

3.2 FENCE INSTALLATION

A. Do not exceed the fence post spacing shown on the plans. Measure the post spacing dimension along the grade for installations that must be raked to follow sloping grades.

B. Set fence posts in concrete bases as shown in the plans.

C. Attach fence posts to curb walls as shown in the plans.

D. Set posts plumb.

E. Connect fence panels to posts with brackets supplied by the manufacturer and in accordance with the manufacturer's instructions.

F. Repair and seal exposed surfaces in accordance with fence manufacturer's requirements to maintain warranty.

3.3 WARRANTY

A. Provide manufacturer warranty, within specified limitations, for all structural fence components (i.e. rails, pickets, and posts) for a period of 20 years from date of original purchase. Provide warranty covering any defects in material finish, including cracking, peeling, chipping, blistering or corroding.

B. Include in warranty the reimbursement for labor necessary to restore or replace components that have been found to be defective under the terms of manufacturer's warranty for 5 years from date of original purchase.

END OF SECTION

UDOT SPECIAL PROVISION
SECTION 02831S
MSE RETAINING WALLS – GENERAL REQUIREMENTS

Add Section 02831.

PART 1 GENERAL

1.1 SECTION INCLUDES

A. General requirements for mechanically stabilized earth (MSE) retaining walls of the following types:
   1. Concrete panel MSE retaining walls using metal or geogrid soil reinforcement.
   2. Modular block MSE retaining walls using metal or geogrid soil reinforcement.
   3. Permanent Wire Face MSE retaining walls using metal soil reinforcement.

1.2 RELATED SECTIONS

A. Section 02832: MSE Backfill

B. Section 02833: Concrete Panel MSE Retaining Wall

C. Section 02835: Modular Block MSE Retaining Wall

D. Section 02837: Wire Face MSE Retaining Wall

1.3 REFERENCES

A. AASHTO M 111: Zinc (Hot-dip Galvanized) Coatings on Iron and Steel Products

B. AASHTO LRFD Bridge Design Specifications

C. UDOT Geotechnical Manual of Instruction (GMOI)

1.4 DEFINITIONS **Not Used**

1.5 SUBMITTALS

A. Contractor-selected retaining wall system for information before the preconstruction conference.
   1. Refer to this Section, Article 2.1.

2. Include the name and experience for the Wall Company technical representative assigned to the project.
3. Include the Wall Company's construction manual for the selected wall system.

B. Samples for verification.
   1. Concrete Panel MSE Retaining Walls
      a. Panel surface texture before casting of the panels.
   2. Modular Block MSE Retaining Walls
      a. Modular block unit that meets the face pattern, texture and color requirements shown.

C. Working Drawings
   1. Retaining wall drawings for review.
      a. Include the following:
         1) Plans, profiles, cross-sections, quantities, and details for each retaining wall.
         2) Cast-in-place concrete coping or cap to the facing panels or blocks.
            a) Aesthetically pleasing
            b) Adequately supports fence, barrier, or both as shown.
            c) Do not use precast coping without the Engineer's prior approval.
         3) Measures for protecting metal soil reinforcement and metal reinforcement connections from corrosion.
         4) Provisions for facilities that penetrate the wall face or soil reinforcement, such as drainage catch basins, piping, foundation elements, guard-rail posts, and other buried facilities.
         5) Surface and subsurface drainage details.
         6) Architectural treatment details for wall facing elements and concrete color as shown.
         7) Structure number details
      b. Include supporting calculations sufficient to demonstrate that the retaining walls are designed according to the required criteria.
      c. Provide the seal of a Professional Engineer (PE) or Professional Structural Engineer (SE) licensed in the State of Utah on the drawings and calculations.

D. Casting and Shipping Schedules
   1. A tentative casting schedule for information at least 14 calendar days in advance to make inspection and testing arrangements.
   2. A tentative shipping schedule for information at least 14 calendar days before shipping precast elements to the job site.

E. Certificate of compliance for incorporated materials with test results of tests performed. Include at least the following in addition to the certificate of compliance general requirements:
   1. Modular blocks and cap blocks.
      a. Include certified test reports for compressive strength, freeze-thaw durability, absorption, density, and dimensional tolerances.
   2. Metal soil reinforcement (strips, welded wire and grid, wire facing, cap mesh, woven wire mesh) and other steel elements (loop embeds, fasteners, tie strips, lifting devices, connector rods, hairpin connectors)
      a. Signed Mill Test Reports with at least the following:
         1) Ultimate tensile strength
         2) Ultimate weld strength for mesh soil reinforcement
         3) Galvanization coverage including amount applied and average thickness
   3. Geogrid soil reinforcement
      a. Manufacturer's product data sheet and installation instructions
      b. Certified test reports that demonstrate the average roll value for each geogrid product is greater than or equal to the geogrid ultimate wide width tensile strength published in the manufacturer's product data sheet and installation instructions.
      c. Include the Long Term Factored Tensile Design Strength and the following reinforcement reduction factors:
         1) Long term tension creep
         2) Durability
         3) Installation damage
   4. Filter fabric, filter fabric adhesive, cap block adhesive, concrete panel bearing pads, facing infill rock, and modular block fill
      a. Certify compliance with specified requirements.
      b. Include test results for tests performed by the Contractor or the manufacturer that are necessary to verify compliance with the specified requirements.
   5. Include a statement that the products used satisfy the design requirements for the authorized retaining wall drawings.

F. Test results for source material of MSE Backfill for review. Include the following:
   1. Organic content
   2. Sodium sulfate soundness
   3. Gradation
   4. Plasticity Index
   5. Internal friction angle

6. Electrochemical properties

G. Request to use MSE backfill meeting the metal reinforcement gradation in a wall that uses geogrid reinforcement for review, when applicable.
   1. Include test results and calculations for determining the installation damage reduction factor.
   2. Refer to Section 02832.

H. Final Field Observations Report from the Wall Company that certifies that the completed wall(s) meet(s) Department and Wall Company requirements.

1.6 ACCEPTANCE

A. Non-Conformance of MSE Backfill
   1. MSE backfill placed and found to be out of conformance with the electrochemical property requirements in Section 02832 may be allowed to remain in place at a reduced price according to this article as determined by the Engineer.
   2. Evaluate the MSE backfill to determine whether the wall system meets the required design life when deviations exceed those listed for a pay factor of 0.50 in Table 1.
      a. The wall may be accepted with a pay factor less than 0.50 if the Wall Company and the Engineer determine that the wall system meets the required design life.

B. Wall facing measurements for acceptance will be at Substantial Completion of the Project.

C. Non-Conformance for Out-of-Tolerance Wall Facing Elements
   1. Wall facing elements that do not conform to the specified tolerances may be allowed to remain in place at a reduced price provided structural adequacy can be demonstrated.

2. The Wall Company and the Engineer will evaluate wall facing element cases when deviations exceed those listed for a pay factor of 0.50 in Table 2 to determine whether the wall system has sufficient structural integrity and is aesthetically acceptable.
    a. The wall may be accepted at a pay factor less than 0.50 if the Wall Company and the Engineer determine that the wall system has sufficient structural integrity and is aesthetically acceptable.

D. Price adjustment calculation.
1. The lowest applicable pay factor from Table 1 or Table 2 will be applied to the entire wall.
    a. The Engineer will apply only the lowest pay factor due to non-conforming backfill (resistivity, pH, chlorides, or sulfates) or out-of-tolerance MSE wall facing elements (horizontal alignment, vertical alignment, plumbness, levelness, joint width, or joint offset).
    b. The Engineer may determine the controlling deviation by visual inspection.
2. The Engineer will use the price in the Contractor’s bid schedule and the lowest applicable pay factor from Table 1 or Table 2 to calculate the price adjustment.

Table 1

Pay Factors For Non-Conforming MSE Backfill						
Electro-chemical Property	**Pay Factor**	**Deviations of MSE Backfill Electrochemical Test Results from the Limits Specified in Section 02832***				
		1 Test	**Avg. of 2 Tests**	**Avg. of 3 Tests**	**Avg. of 4 Tests**	**Avg. of 5 or More Tests**
Resistivity (ohm-cm)	1.00	0 to 200	0 to 190	0 to 180	0 to 170	0 to 150
	0.95	201 to 400	191 to 380	181 to 360	171 to 340	151 to 300
	0.90	401 to 600	381 to 570	361 to 540	341 to 510	301 to 450
	0.80	601 to 800	571 to 760	541 to 720	511 to 680	451 to 600
	0.70	801 to 1000	761 to 950	721 to 900	681 to 850	601 to 750
	0.60	1001 to 1200	951 to 1140	901 to 1080	851 to 1020	751 to 900
	0.50[a]	over 1200	over 1140	over 1080	over 1020	over 900
	[a] No one test below 1600 ohm-cm will be accepted.					
pH	1.00	0 to 0.20	0 to 0.18	0 to 0.16	0 to 0.14	0 to 0.12
	0.90	0.21 to 0.40	0.19 to 0.36	0.17 to 0.32	0.15 to 0.28	0.13 to 0.24
	0.80	0.41 to 0.60	0.37 to 0.54	0.33 to 0.48	0.29 to 0.42	0.25 to 0.36
	0.70	0.61 to 0.80	0.55 to 0.72	0.49 to 0.64	0.43 to 0.56	0.37 to 0.48
	0.60	0.81 to 1.00	0.73 to 0.90	0.65 to 0.80	0.57 to 0.70	0.49 to 0.60
	0.50[b]	---	over 0.90	over 0.80	over 0.70	over 0.60
	[b] No one test below 5.0 or above 10.0 will be accepted					
Chlorides (ppm)	1.00	0 to 14	0 to 12	0 to 10	0 to 8	0 to 6
	0.95	15 to 28	13 to 24	11 to 20	9 to 16	7 to 12
	0.90	29 to 42	25 to 36	21 to 30	17 to 24	13 to 18
	0.80	43 to 56	37 to 48	31 to 40	25 to 32	19 to 24
	0.70	57 to 70	49 to 60	41 to 50	33 to 40	25 to 30
	0.60	71 to 84	61 to 72	51 to 60	41 to 48	31 to 36
	0.50[c]	over 84	over 72	over 60	over 48	over 36
	[c] No one test above 200 ppm will be accepted.					
Sulfates (ppm)	1.00	0 to 50	0 to 45	0 to 40	0 to 35	0 to 30
	0.95	51 to 90	46 to 80	41 to 70	36 to 60	31 to 50
	0.90	91 to 130	81 to 115	71 to 100	61 to 85	51 to 70
	0.80	131 to 170	116 to 150	101 to 130	86 to 110	71 to 90
	0.70	171 to 210	151 to 185	131 to 160	111 to 135	91 to 110
	0.60	211 to 250	186 to 220	161 to 190	136 to 160	111 to 130
	0.50[d]	over 250	over 220	over 190	over 160	over 130
	[d] No one test above 500 ppm will be accepted.					
* Refer to Section 02832 for electrochemical property requirements and minimum sampling and testing frequency. The Engineer determines locations and additional tests required to evaluate the overall MSE backfill mass.						

Table 2

Pay Factors For Out-Of-Tolerance MSE Wall Facing Elements*						
Measurement Type	**Pay Factor**	**Wall Facing Measurements**				
		1 to 5%**	**6 to 10%****	**11 to 20%****	**21 to 30%****	**30% or more****
Applicable to Concrete Panel and Modular Block MSE Wall Types						
Horizontal Alignment (percent) Spec: 0.7%	1.00	Up to 1.10	Up to 1.05	Up to 1.00	Up to 0/95	Up to 0.90
	0.90	over 1.10	over 1.05	over 1.00	over 0.95	over 0.90
	0.80	over 1.50	over 1.40	over 1.30	over 1.20	over 1.10
	0.70	over 1.90	over 1.75	over 1.60	over 1.45	over 1.30
	0.60	over 2.30	over 2.10	over 1.90	over 1.70	over 1.50
	0.50	over 2.80	over 2.50	over 2.30	over 2.00	over 1.80
Vertical Alignment* (percent)** Spec: 0.7%	1.00	up to 1.10	up to 1.05	up to 1.00	up to 0.95	up to 0.90
	0.90	over 1.10	over 1.05	over 1.00	over 0.95	over 0.90
	0.80	over 1.50	over 1.40	over 1.30	over 1.20	over 1.10
	0.70	over 1.90	over 1.75	over 1.60	over 1.45	over 1.30
	0.60	over 2.30	over 2.10	over 1.90	over 1.70	over 1.50
	0.50	over 2.80	over 2.50	over 2.30	over 2.00	over 1.80
Plumbness (percent) Spec: Positive: 0.7% Negative: -0.3%	0.50	up to 2.20	up to 2.00	up to 1.80	up to 1.60	up to 1.50
	0.60	over 1.90	over 1.70	over 1.50	over 1.40	over 1.20
	0.70	over 1.57	over 1.42	over 1.30	over 1.18	over 1.06
	0.80	over 1.32	over 1.21	over 1.12	over 1.03	over 0.94
	0.90	over 1.07	over 1.00	over 0.94	over 0.88	over 0.82
	0.95	over 0.82	over 0.79	over 0.76	over 0.73	over 0.70
	1.00	0.82 to -0.42	0.79 to -0.39	0.76 to -0.36	0.73 to -0.33	0.70 to -0.30
	0.95	over -0.57	over -0.52	over -0.47	over -0.43	over -0.39
	0.90	over -0.72	over -0.65	over -0.58	over -0.53	over -0.48
	0.80	over -0.87	over -0.78	over -0.69	over -0.63	over -0.57
	0.70	over -1.02	over -0.91	over -0.80	over -0.73	over -0.66
	0.60	over -1.20	over -1.20	over -1.00	over -0.90	over -0.80
	0.50	up to -1.50	up to -1.35	up to -1.20	up to -1.10	up to -1.00
Levelness (percent) Spec: 0.5%	1.00	up to 0.85	up to 0.80	up to 0.76	up to 0.73	up to 0.70
	0.90	over 0.85	over 0.80	over 0.76	over 0.73	over 0.70
	0.80	over 1.25	over 1.15	over 1.06	over 0.98	over 0.90
	0.70	over 1.65	over 1.50	over 1.36	over 1.23	over 1.10
	0.60	over 2.05	over 1.85	over 1.66	over 1.48	over 1.30
	0.50	over 2.60	over 2.30	over 2.10	over 1.80	over 1.60

Table 2 (continued)

Pay Factors For Out-Of-Tolerance MSE Wall Facing Elements*						
Measurement Type	**Pay Factor**	**Wall Facing Measurements**				
		1 to 5%**	**6 to 10%****	**11 to 20%****	**21 to 30%****	**30% or more****
Applicable to Concrete Panel MSE Retaining Walls Only						
Joint Width (inches) Spec: 0.5 to 1.2	0.80	under 0.02	under 0.08	under 0.14	under 0.20	under 0.26
	0.90	under 0.22	under 0.26	under 0.30	under 0.34	under 0.38
	0.95	under 0.42	under 0.44	under 0.46	under 0.48	under 0.5
	1.00	0.42 to 1.28	0.44 to 1.26	0.46 to 1.24	0.48 to 1.22	0.50 to 1.20
	0.95	over 1.28	over 1.26	over 1.24	over 1.22	over 1.20
	0.90	over 1.48	over 1.44	over 1.40	over 1.36	over 1.32
	0.80	over 1.68	over 1.62	over 1.56	over 1.50	over 1.44
	0.70	over 1.88	over 1.80	over 1.72	over 1.64	over 1.56
	0.60	over 2.08	over 1.98	over 1.88	over 1.78	over 1.68
	0.50	over 2.30	over 2.20	over 2.10	over 2.00	over 1.90
Joint Offset (inches) Spec: 0.4	1.00	up to 0.48	up to 0.46	up to 0.44	up to 0.42	up to 0.40
	0.90	over 0.48	over 0.46	over 0.44	over 0.42	over 0.40
	0.80	over 0.76	over 0.70	over 0.64	over 0.58	over 0.52
	0.70	over 1.04	over 0.94	over 0.84	over 0.74	over 0.64
	0.60	over 1.32	over 1.18	over 1.04	over 0.90	over 0.76
	0.50	over 1.70	over 1.50	over 1.30	over 1.10	over 0.90

* The applicable pay factor for any one tolerance is the lowest pay factor value from the five percentage ranges of out-of-tolerance wall measurements. Tolerances are according to Sections 02833, 02835, and 02837.

** Wall percentage corresponding to out-of-tolerance measurements. Wall percentage is based on face area, lineal footage, or number of joints, as applicable.

*** For modular block walls, vertical alignment measurements are from the specified wall batter in Section 02835.

1.7 WALL COMPANY'S TECHNICAL REPRESENTATIVE

A. Provide a qualified technical representative from the selected Wall Company. The Wall Company's technical representative must:
   1. Have at least five years of experience with MSE wall design and construction.
   2. Provide technical support and training to the Contractor's wall construction crew(s) and Department inspectors regarding proper quality control for construction of the walls.
      a. The Wall Company's technical representative trains new crew member(s) if one or more construction crew members change.
   3. Be directly involved and provide technical assistance during all phases of wall construction.
   4. Be present during wall construction for at least the first five working days of wall construction and until all aspects of wall construction have been satisfactorily demonstrated to the Wall Company's technical representative and the Engineer.
      a. The Wall Company's technical representative must subsequently visit the site at least once every 10,000 sq ft of wall face construction, or as otherwise determined by the Engineer.
      b. The Wall Company's technical representative must be at the project site for at least the first five working days of both the first and second stage of wall construction for two-stage wall systems.
   5. Meet with the Engineer near the conclusion of each site visit to report on the observed wall construction procedures and provide a copy of the field report.

PART 2 PRODUCTS

2.1 MSE RETAINING WALL TYPES

A. Use a Department approved retaining wall system of the retaining wall type shown.
   1. A list of approved retaining wall systems is maintained by the Department.
      a. Refer to: http://www.udot.utah.gov/go/standardsreferences
   2. Provide a complete retaining wall system from the Wall Company.
      a. Obtain wall system components from the Wall Company or the Wall Company's authorized supplier.

3. Wall system and system components must meet the Wall Company's published requirements.

B. Concrete Panel MSE Retaining Wall
   1. Refer to Section 02833.

C. Modular Block MSE Retaining Wall
   1. Refer to Section 02835.

D. Wire Face MSE Retaining Wall
   1. Refer to Section 02837.

E. Use only one retaining wall system for each wall type shown.
   1. Do not change the wall system after the preconstruction conference without the Engineer's approval.

2.2 DESIGN REQUIREMENTS

A. Design retaining walls according to the UDOT GMOI and the AASHTO LRFD Bridge Design Specifications, as modified by the following:
   1. Provide seismic design according to the UDOT GMOI.
   2. Design retaining wall panel and block connections in all cases to hold the facing elements in place during the seismic event corresponding to 3 percent probability of exceedance in 75 years.
      a. Use the factored site acceleration, as shown.
   3. The Wall Company is responsible for all stability calculations, except global stability and bearing capacity.
   4. Provide a service life of at least 75 years.
   5. The Wall Company is responsible to verify that drainage features do not negatively impact the wall system.
   6. Design the retaining wall to accommodate drainage features to function properly through/beneath the wall without negatively impacting the wall system.
      a. This includes checking the drainage system details, and developing appropriate MSE soil reinforcement design details in the vicinity of the drainage features (pipes, catch basins, for example) within the reinforcement mass, and for the outlet point at the wall face.
   7. Provide corrosion protection for metal soil and exposed facing reinforcement by one of the following two measures:
      a. Design the metal soil reinforcement to provide sacrificial steel sufficient for a corrosion rate of at least 0.80 mils per exposed surface per year after 16 years of corrosion protection service provided by the galvanized coating.

b. Provide a protective geomembrane (either PVC or HDPE) of at least 30 mils thickness at least 2 ft below the base of the pavement section (below the bottom of the granular borrow layer).
   1) Slope the geomembrane at a grade of 4 percent downwards towards the back of the reinforced mass (for example, away from the wall face), and lap upward against the back side of the wall facing.
   2) Design the metal soil reinforcement to provide sacrificial steel sufficient for the following minimum corrosion rates per exposed surface per year after 16 years of corrosion protection service provided by the galvanized coating:
      a) Above the Geomembrane: 0.80 mils
      b) Below the Geomembrane: 0.50 mils

8. Use a vertical spacing of primary soil reinforcement not exceeding 30 inch for single-stage walls, or 24 inch for two-stage walls to provide a coherent MSE reinforced soil mass.
   a. This may require modification of panels.
9. Provide horizontal benches with at least a 4 ft width at the base of walls founded on earth slopes as shown.

B. Modify the soil reinforcement design using one of the following alternatives where the soil reinforcement conflicts with obstructions in the wall soil reinforcement zone, such as piles, drilled shafts, guardrail posts, catch basins, drop inlets, and culverts:
   1. Design the surrounding soil reinforcement layers to carry the additional load that would have been carried by the severed reinforcement.
   2. Place a structural frame around the obstruction that is capable of transferring loads from the soil reinforcement on one side of the obstruction to the soil reinforcement on the other side of the obstruction.
   3. Splay the soil reinforcement around the obstruction if the soil reinforcement consists of discrete strips or bar mats rather than continuous sheets.

C. Structure Number Details
   1. Locate the structure number on the exposed face of the retaining wall as shown using one of the following methods.
      a. Cast the structure number into the concrete face (panel or modular block unit).

b. Cut the structure number into a steel plate and attach the steel plate to the wall face.
   1) Completely remove excess material from the outline of each character.
   2) Hot dip galvanize the plate after cutting the numbers into the plate.
      a) Refer to AASHTO M 111.

PART 3 EXECUTION Not Used

END OF SECTION

UDOT SPECIAL PROVISION
SECTION 02832S
MSE BACKFILL

Add Section 02832.

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Mechanically Stabilized Earth (MSE) backfill used in constructing MSE retaining walls and Reinforced Soil Slopes (RSS).

1.2 RELATED SECTIONS

A. Section 02056: Embankment, Borrow, and Backfill

1.3 REFERENCES

A. AASHTO T 27: Sieve Analysis of Fine and Coarse Aggregates

B. AASHTO T 90: Determining the Plastic Limit and Plasticity Index of Soils

C. AASHTO T 99: Moisture-Density Relations of Soils Using a 2.5-kg (5.5-lb) Rammer and a 305-mm (12 in.) Drop

D. AASHTO T 104: Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate

E. AASHTO T 236: Direct Shear Test of Soils Under Consolidated Drained Conditions

F. AASHTO T 267: Determination of Organic Content in Soils by Loss on Ignition

G. AASHTO T 288: Determining Minimum Laboratory Soil Resistivity

H. AASHTO T 289: Determining pH of Soil for Use in Corrosion Testing

I. AASHTO T 290: Determining Water-Soluble Sulfate Ion Content in Soil

J. AASHTO T 291: Determining Water-Soluble Chloride Ion Content in Soil

K. AASHTO T 310: In-Place Density and Moisture Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

L. FHWA Publication No. FHWA-NHI-09-087, Corrosion/Degradation of Soil Reinforcements for Mechanically Stabilized Earth Walls and Reinforced Soil Slopes

1.4 DEFINITIONS

A. Light Equipment Zone – Zone within 3 ft of the back face of the wall facing units, and within 2 ft of obstructions such as driven piles and drilled shafts.

1.5 SUBMITTALS Not Used

1.6 ACCEPTANCE

A. The Engineer will obtain on-site samples during construction and perform testing at the following frequencies:
   1. Gradation: Every 5,000 yd^3 of backfill used
   2. Electrochemical: Every 10,000 yd^3 of backfill used

B. Density
   1. The Engineer will perform at least one in-place moisture/density determination per lift of backfill for each 100 ft of wall length (at least two tests per lift) tested according to AASHTO T 310.
      a. Tests will be conducted at random locations or at specific locations or both as determined by the Engineer.

PART 2 PRODUCTS

2.1 MSE BACKFILL

A. Use backfill that:
   1. Is free from frozen, organic, and otherwise deleterious materials.
   2. Has an organic content less than one-half of one percent as determined by AASHTO T 267 on the portion of the material finer than the No. 10 sieve.
   3. Is substantially free of shale or other soft particles of poor durability.
   4. Has soundness loss meeting one of the following when tested according to AASHTO T 104:
      a. No more than 15 percent after a test duration of five cycles when using a sodium sulfate solution.
      b. No more than 30 percent after a test duration of four cycles when using a magnesium sulfate solution.

B. Conform to the gradation limits in Table 1 as determined by AASHTO T 27.

Table 1

MSE Backfill Gradation (percent passing)		
Sieve Size	**Metal Reinforcement**	**Geogrid Reinforcement**
4 inch	100	–
¾ inch	–	100
No. 40	0 – 60	0 – 60
No. 200	0 –15	0 –15

1. The MSE backfill gradation for metal reinforcement in Table 1 may be used with geogrid reinforcement under the following conditions:
   a. The Wall Company performs site and material specific installation damage testing using a representative sample of the proposed MSE backfill material.
      1) Refer to FHWA-NHI-09-087 for testing protocols.
   b. The installation damage reduction factor determined by the test is not less than 1.2.
      1) Refer to FHWA-NHI-09-087 for determination of the installation damage reduction factor.
   c. The test results are certified by a professional engineer licensed in the State of Utah.
   d. The Engineer may request additional material specific installation damage testing when a change in the backfill characteristics from the original tested representative sample is suspected.

C. Use backfill with a Plasticity Index (PI) of 6 or less, as determined by AASHTO T 90.

D. Use backfill with an internal friction angle of not less than 34 degrees as determined by AASHTO T 236.
   1. Use a sample of the material compacted to 95 percent of maximum density at optimum moisture content as determined by AASHTO T 99, Method D.
   2. Internal friction angle testing is not required for backfill material that has at least 80 percent of the material retained on the ¾ inch sieve.

E. Meet the electrochemical properties in Table 2.

Table 2

Electrochemical Properties			
Property	**Metal Reinforcement**	**Geogrid Reinforcement**	**Test Method**
Resistivity	Minimum 3000 ohm-cm, at 100% saturation*	N/A	AASHTO T 288
pH	6.0 – 10.0	5.5 – 10.0**	AASHTO T 289
Chlorides	Maximum 100 ppm	N/A	AASHTO T 291
Sulfates	Maximum 200 ppm	N/A	AASHTO T 290

* Do not follow Note 6 of AASHTO T 288 to find lowest possible resistivity (where soil is in a slurry state). Saturate soil to 100% saturation where a sheen of water is observed at the top surface of the sample in the soil box.

** Maximum pH value for polyester geogrid is 9.0 unless long-term immersion testing performed according to FHWA-NHI-09-087 shows acceptable performance. For pH > 8.0, use a durability reduction factor (RF_D) of 1.3 for polyester geogrid.

2.2 MSE FREE DRAINING BACKFILL

A. Conform to the gradation limits in Table 3 as determined by AASHTO T 27.

Table 3

MSE Free Draining Backfill Gradation (percent passing)		
Sieve Size	**Metal Reinforcement**	**Geogrid Reinforcement**
2 inch	100	–
1 $^1/_2$ inch	90 – 100	–

Table 3

MSE Free Draining Backfill Gradation (percent passing)		
Sieve Size	**Metal Reinforcement**	**Geogrid Reinforcement**
3/4 inch	–	100
3/8 inch	20 – 75	20 – 75
No. 4	0 – 15	0 – 15
No. 200	0 – 5	0 – 5

B. Meet the electrochemical properties in Table 2.

PART 3 EXECUTION

3.1 BACKFILL PLACEMENT

A. General
1. Closely follow the erection of each course of wall facing units (concrete panel, modular block, or welded wire) with backfill placement.
2. Complete backfilling in front of single-stage walls and the first-stage of two-stage walls before backfilling more than 6 ft above the bottom of the wall.
   a. Wire facing: Place MSE backfill in lifts not to exceed 10 inch thickness before compaction.
   b. Compact backfill to at least 95 percent of the maximum dry density, according to AASHTO T 99.
   c. Provide positive drainage away from the wall.
3. Place backfill in a manner to avoid damage or disturbance of the wall materials, misalignment of facing panels or modular blocks, and damage to soil reinforcement and facing members.
4. Place backfill using methods that verify that no voids exist directly beneath the soil reinforcing elements.
5. Place MSE backfill in lifts not to exceed 12 inch thickness before compaction.
   a. Decrease the lift thickness as necessary to obtain the specified density.
   b. Place backfill in uniformly thick layers.
6. Begin MSE backfill placement 3 ft from the wall face and proceed away from the wall when placing backfill over the soil reinforcement

to prevent the soil reinforcement from bunching towards the wall face.

7. Place each layer of MSE backfill in a level manner before placing subsequent backfill layers.
8. Operate placement and compaction equipment parallel to the wall face.
    a. Rubber-tired equipment may be used over the reinforcement at speeds less than 5 mph.
        1) Avoid sudden braking and sharp turning.
    b. Do not use sheeps-foot or other grid-type rollers for compacting backfill within the limits of the soil reinforcement.
9. Do not place or compact backfill against the facing units until the soil reinforcement has been installed and one lift of MSE backfill has been placed and compacted over the reinforcement layer to avoid pushing the facing units out of alignment.
10. Place and compact the MSE backfill to an elevation 2 inch above the reinforcement connection from a point approximately 24 inch behind the back face of the wall facing element to the end of the soil reinforcement zone, unless otherwise shown at specific locations in the authorized retaining wall drawings.
11. Do not proceed with the placement of each layer of soil reinforcement and overlying lift of MSE backfill until the Engineer indicates and records that MSE backfill placement and density requirements (including in the light equipment zone) have been met.
12. Slope the top of the MSE backfill along the wall such that the upper soil reinforcement layer is covered with at least 16 inch of MSE backfill.

B. MSE Free Draining Backfill
1. Place MSE free draining backfill behind the wall facing to a width of at least 18 inch.
2. Place and compact according to the light equipment zone requirements.

C. Compaction
1. Compact MSE backfill to at least 95 percent of the maximum density, according to AASHTO T 99, Method D.
2. Light equipment zones
    a. Use a maximum lift thickness within this zone as warranted by the type of compaction equipment used, but not greater than 8 inch.
    b. Compact backfill using at least three passes of a suitable lightweight or medium-weight (hand-held or hand-guided) mechanical roller, tamper, or vibratory compactor.

c. Use compaction equipment with a static weight of less than 800 lb within this zone when compacting a thin leveling lift along the reinforcement connections level.
d. Compact to within 3 inch of the facing units.
e. Exercise care in the compaction process to avoid misalignment of the facing units.

D. Moisture Content
1. Place MSE backfill with the moisture content at optimum moisture, or between optimum moisture and four percent below optimum moisture.
a. Determine the optimum moisture content according to AASHTO T 99, Method D.
b. Remove MSE backfill with placement moisture content in excess of the optimum moisture content.
1) MSE backfill may be reused, provided it is aerated or otherwise reworked until the moisture content is uniform and acceptable throughout the entire lift.
2. Maintain the moisture content of the MSE backfill uniform throughout each layer during placement and compaction.

3.2 PROTECTION OF THE WORK

A. Remove water to a depth of at least 1 ft below the lowest point of the wall excavation at least 24 hours before placing MSE backfill.
1. Continue to remove water until:
a. Backfill placement in front of the wall facing (including for the first stage of two-stage walls) is complete, and
b. MSE backfill height exceeds 4 ft.

B. At the end of each day's operation, slope the backfill away from the wall to direct runoff of rainwater away from the wall face.

C. Do not allow surface runoff from adjacent areas or groundwater to enter the wall construction site, including at the front face of the wall.

END OF SECTION

UDOT SPECIAL PROVISION
SECTION 02833S
CONCRETE PANEL MSE RETAINING WALL

Add Section 02833.

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Concrete panel mechanically stabilized earth (MSE) retaining wall using metal or geogrid soil reinforcement.

1.2 RELATED SECTIONS

A. Section 02317: Structural Excavation and Backfill

B. Section 02832: MSE Backfill

C. Section 03055: Portland Cement Concrete

D. Section 03211: Reinforcing Steel and Welded Wire

E. Section 03310: Structural Concrete

F. Section 03390: Concrete Curing

1.3 REFERENCES

A. AASHTO M 111: Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

B. AASHTO M 232: Zinc Coating (Hot-Dip) on Iron and Steel Hardware

C. ASTM A 572: High-Strength Low-Alloy Columbium-Vanadium Structural Steel

D. ASTM A 641: Zinc-Coated (Galvanized) Carbon Steel Wire

E. ASTM A 709: Structural Steel for Bridges

F. ASTM A 1011: Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength

G. ASTM A 1064: Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete

H. ASTM D 3960: Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings

I. ASTM D 5262: Evaluating the Unconfined Tension Creep and Creep Rupture Behavior of Geosynthetics

J. ASTM D 6637: Determining Tensile Properties of Geogrids by the Single or Multi-rib Tensile Method

K. ASTM F 3125: High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi and 105 ksi Minimum Tensile Strength

L. UDOT Quality Management Plan

1.4 DEFINITIONS Not Used

1.5 SUBMITTALS Not Used

1.6 ACCEPTANCE

A. Concrete Wall Panels
   1. Meet 28-day minimum compressive strength of 4000 psi.
   2. Visually free of defects and will be rejected if they have:
      a. Defects due to imperfect molding.
      b. Honeycombing.
      c. Open texture on front face.
      d. Cracks or spalls that exceed the limits specified in this Section, Article 3.5.

PART 2 PRODUCTS

2.1 MATERIALS

A. Concrete.
   1. Precast Panels
      a. Class AA(AE). Refer to Section 03055.
   2. Coping
      a. Class AA(AE). Refer to Section 03055.
   3. Leveling Pad
      a. Class A or Class B. Refer to Section 03055.

B. Reinforcing Steel
   1. Use coated reinforcing steel according to Section 03211.

C. Form-Liner Materials
   1. Use a form-liner that produces uniform texture and patterns and releases the sculpted concrete surface without damage.
   2. Provide solid backing and form supports so that the form-liners remain in place during concrete placement.
   3. Use a form release agent that meets the following:
      a. A manufacturer's recommended liquid-release agent that will not bond with, stain, or adversely affect precast concrete surfaces and will not impair subsequent surface or joint treatments of precast concrete.
      b. A non-petroleum release agent meeting EPA requirements.
         1) Limit Volatile Organic Compound (VOC) content to 250 grams/liter or less. Refer to ASTM D 3960.
      c. A release agent that is not detrimental to concrete strength or durability and that does not impart color, tint, or texture to the finished product.

D. Soil Reinforcement
   1. Metal reinforcing elements
      a. Strips
         1) Hot rolled from steel bars according to ASTM A 572; or cold-formed according to ASTM A 572 or ASTM A 1011.
         2) Grade 65.
      b. Welded Wire and Grid
         1) Refer to ASTM A 1064.
      c. Galvanize according to AASHTO M 111 or ASTM A 641 with a coating thickness of at least 3.4 mils.

2. Geogrid reinforcing elements
    a. Use geogrid consisting of a regular grid network of integrally connected, discontinuous, select high-density polyethylene or polypropylene resin polymer tensile elements.
        1) Aperture geometry sufficient to permit significant mechanical interlock with the surrounding soil or rock or both.
        2) Geogrid structure to be dimensionally stable and be able to retain its geometry under manufacture, transport, and installation.
    b. Meet creep rupture test for 75 year design life according to ASTM D 5262.
    c. Meet the ultimate tensile strength from wide-width tests based on minimum average roll values, according to ASTM D 6637.
        1) Utilize geogrid reinforcement reduction factors as appropriate for the project.

E. Loop Embeds
1. As provided by the Wall Company.
2. Galvanize according to AASHTO M 111 with a coating thickness of at least 3.4 mils.

F. Tie Strips
1. Shop fabricated, hot rolled steel conforming to ASTM A 709, Grade 50, ASTM A 1011 Grade 50 or equivalent.
2. Galvanize according to AASHTO M 111 with a coating thickness of at least 3.4 mils.

G. Panel Fasteners
1. Bolts and nuts to be hexagonal cap screw and galvanize coated, meeting ASTM F 3125, Grade A 325 and AASHTO M 232.

H. Other Fasteners
1. Fasteners to wingwalls and abutment walls, if required, are provided by the Wall Company.

I. Filter Fabric
1. Type and grade recommended by the Wall Company.

J. Filter Fabric Adhesive
1. According to Wall Company's standard.

K. Bearing Pads
1. Horizontal rubber bearing pads of the type and grade recommended and supplied by the Wall Company.

L. Lifting Devices
1. According to Wall Company's standard.

M. Two-Stage Retaining Wall Systems
1. Wire Facing
a. Shop fabricated of cold-drawn steel wire conforming to the minimum requirements of ASTM A 1064.
1) Galvanize according to ASTM A 641 or AASHTO M 111 with a coating thickness of at least 3.4 mils.
2. Connector Rods
a. Fabricated from cold-drawn steel wire according to ASTM A 1064.
1) Galvanize according to ASTM A 641 or AASHTO M 111 with a coating thickness of at least 3.4 mils.
3. Hairpin Connectors
a. Shop fabricated of hot-rolled steel according to ASTM A 572, Grade 50 or equivalent.
1) Galvanize according to AASHTO M 111 with a coating thickness of at least 3.4 mils.

N. MSE Backfill
1. Refer to Section 02832.

O. MSE Free Draining Backfill
1. Refer to Section 02832.

2.2 PRECAST CONCRETE WALL PANELS

A. Follow the authorized retaining wall drawings.

2.3 FABRICATION

A. Use a Department prequalified supplier of precast concrete products according to the UDOT Quality Management Plan 505: Precast/ Prestressed Concrete Structures.

B. Precast Concrete Panels
1. Cast the panels to dimensional tolerances according to Precast Concrete Institute (PCI) or National Precast Concrete Association (NPCA), and as shown.
a. Do not cast panels on site.
b. Cast in metal forms.
c. Achieve uniformity of appearance, color, texture, and pattern.

d. Produce a concrete panel with smooth, solid surfaces free of voids and air pockets.

2. Permanently mark each panel with the casting date, and the panel identification number on the rear of each panel so it is legible during installation.
3. Provide the surface texture architectural treatment as shown.
   a. The thickness of the architectural treatment is in addition to the required design thickness.
   b. Use a concrete form-liner to achieve the required concrete texture.
   c. Provide panel faces that are free of joint marks, grain, and other obvious defects. Provide corners including false joints that are uniform, straight, and sharp.
4. Concrete Finish
   a. Provide an ordinary surface finish according to Section 03310 for front face of panels.
   b. Provide a uniform surface finish for the back face of panels.
      1) Roughly screen the finish to eliminate open pockets of aggregate and surface distortions in excess of $^1/_4$ inch.
5. Provide concrete cover to the reinforcing steel of at least 2 inch.
6. Set tie strip guides at back face.
7. Cast panels on a flat area or approved architectural treatment, with the front face down.
8. Place concrete in each unit without interruption.
   a. Vibrate with equipment that prevents stone pockets or cleavage planes.
   b. Use clean, unused form oil.
9. Cure according to Section 03390.

C. Soil Reinforcement Connections
1. Cast at least two soil reinforcement connection levels into all full-size concrete panels.
   a. Where only two connection levels are cast in panels, locate the levels in two different horizontal planes separated by at least one-third the panel height.

2.4 QUALITY CONTROL

A. Precast Concrete Wall Panels
1. Document test results. The quality control file will contain at least the following information:
   a. Element identification
   b. Date and time of cast
   c. Concrete cylinder test results
   d. Quantity of used concrete and the batch printout

e. Form stripping date and repairs if applicable
f. Location and number of blockouts and lifting inserts
g. Temperature and moisture of curing period
h. Lifting device details, requirements, and inserts

PART 3 EXECUTION

3.1 GENERAL

A. Haul, store, and ship wall materials in a manner that minimizes the potential of producing defects.
   1. Store panels to avoid damage to connection pieces, such that the tie strips do not bend.
   2. Store soil reinforcement products as recommended by the Wall Company.
   3. Inspect soil reinforcement and attachment devices to verify they are true to size and free from defects that may impair their strength and durability.
   4. Prevent mud, wet concrete, epoxy, and other contaminants from coming in contact with and affixing to the soil reinforcement and connections.

B. Construct the retaining wall system according to the authorized retaining wall drawings, and the Wall Company's construction manual and recommendations.
   1. Apply the stricter of the two requirements where the Department's and the Wall Company's requirements differ.

3.2 EXCAVATION AND FOUNDATION PREPARATION

A. Excavate and prepare foundation to the lines and grades shown, or as directed by the Engineer.
   1. Refer to Section 02317.
   2. Make the width of excavation equal to or greater than the length of soil reinforcement.
   3. Compact the foundation using at least three passes of a lightweight, steel, smooth-drum vibratory roller, or as determined by the Engineer before the wall construction.
   4. Over-excavate unsuitable foundation soils and replace with MSE backfill, or with other suitable material as directed by the Engineer.

3.3 LEVELING PAD

A. Place the cast-in-place concrete leveling pad upon a properly placed and compacted foundation.

1. A gap no more than 3 inch wide may be left between the end of the leveling pad and the adjacent higher concrete panel where the wall steps up if shown in the authorized retaining wall drawings.
   a. Fully retain the backfill in the zone behind the gap.
   b. Properly backfill the gap before the remaining backfill in front of the wall face is placed.
2. Place leveling pad to a thickness of at least 6 inch.
   a. Place after the required settlement has been achieved from the first-stage wall construction for two-stage wall systems.
3. Provide a level surface so that the concrete panels are in complete contact with the leveling pad.

B. Do not place concrete panels until leveling pad has been placed for at least 12 hours.

3.4 WALL CONSTRUCTION

A. Backfilling Single-Stage Retaining Walls
   1. Place panels on successive horizontal lifts in the sequence shown in the authorized retaining wall drawings as backfill placement proceeds.
   2. Place panels initially at a slight batter towards the backfill as recommended by the Wall Company to compensate for outward rotation of the panels from fill placement and compaction.

B. Backfilling Two-Stage Retaining Walls
   1. Closely follow the erection of each course of wire facing when placing MSE backfill for the first stage of two-stage retaining walls.
      a. Place the MSE backfill in two approximately equal lifts and compact with lightweight equipment according to Section 02832.
      b. Avoid damage or disturbance to the wall materials or misalignment of the wire facing.
   2. Construct the first-stage facing within 2 inch of the design vertical and horizontal alignments (excluding bulging).
   3. Prevent significant bulging of the first-stage facing between reinforcing layers.
      a. Where bulging exceeds 3 inch between reinforcing layers, remove and reconstruct this portion of the wall.
      b. Measure bulging by holding a plumb straight-edge, or a plumb-bob string in front of the wall face.
         1) The bulge measurement is the horizontal distance between the straight edge or plumb-bob string set at the location of maximum bulge and the reinforcement layer immediately above or below the bulge (whichever is greater).

4. Proceed with placement of the second-stage wall panels after receiving notification from the Engineer that the required first-stage settlement has been achieved.

C. Place bearing pads as required by the Wall Company to prevent concrete-to-concrete contact between panels.

D. Use rubber, wood, or metal shims as necessary to make final adjustments to the wall panel to facilitate level placement of the panel.
   1. Do not leave wood shims at any location.

E. Soil Reinforcement
   1. Place soil reinforcement normal to the face of the wall in plan view where possible.
   2. Skew discrete reinforcement where required to splay the reinforcement around obstructions.
      a. Limit the skew angle to no more than 15 degrees, unless authorized by the Engineer.
         1) Follow the Wall Company's requirements when a skew angle exceeding 15 degrees is authorized.
   3. Provide at least 2 inch clear distance between metal soil reinforcement and piles or other metallic obstructions.
   4. Do not exceed horizontal spacing between soil reinforcement of 7 ft.
   5. Use a crescent or socket-head ratchet wrench to securely hand-tighten the nut where reinforcement elements are connected using bolts and nuts.
      a. Place the nut on top of the connection.
      b. Do not use pneumatic equipment.
   6. Place the top level of soil reinforcement a distance below the top of the wall as shown in the authorized retaining wall drawings.
      a. Place the top level of soil reinforcement at least 3 inch below the bottom of the barrier slab lip or the bottom of the concrete gutter behind the coping.
   7. Gradually deflect the top soil reinforcement elements downward to avoid conflicts with paving and subgrade preparation.
      a. Consider special conditions such as where roadway super-elevation is anticipated.
      b. Limit the deflection of the reinforcement elements to not more than 8 inch or as otherwise shown in the authorized retaining wall drawings.

F. Geogrid Soil Reinforcement Installation
   1. Verify the correct orientation (roll direction) of the geogrid.
   2. Place geogrid on compacted backfill.
   3. Connect geogrid to the concrete panels.

4. Pull the geogrid taut to eliminate loose folds and remove slack in the geogrid at the wall unit connections, pretension the geogrid, and stake or otherwise secure the back edge of the geogrid before and during backfill and compaction.
5. Follow the Wall Company's overlap requirements for uniaxial and biaxial geogrids.

G. Limit the skew angle of the connector rods between the concrete panels and the first stage facing in two-stage retaining walls to not more than 15 degrees horizontally and vertically, unless authorized by the Engineer.
1. Follow the Wall Company's requirements when a skew angle exceeding 15 degrees is authorized.

H. Construct wall facing to the following tolerances:
1. Horizontal alignment
   a. Not to exceed 0.7 percent (for example, 2.5 inch in 30 ft).
2. Vertical alignment
   a. Not to exceed 0.7 percent (for example, 0.85 inch in 10 ft).
3. Plumbness from top of wall to bottom of wall
   a. Positive (into the retained mass)
      1) Not to exceed 0.7 percent (for example, 1.7 inch in 20 ft of wall height).
   b. Negative (away from the retained mass)
      1) Not to exceed 0.3 percent (for example, 0.7 inch in 20 ft of wall height).
4. Levelness
   a. Not to exceed 0.5 percent (for example, 1.2 inch in 20 ft).
5. Panel Joints
   a. Install concrete wall panels so that joints are uniform.
   b. Maximum allowable offset in any panel joint is 0.40 inch.
   c. Joint width is 1.2 inch maximum and 0.50 inch minimum.

I. Check panel tolerance and reset before placement of the next panel if out of tolerance.

J. Cover horizontal and vertical joints between panels with filter fabric.
1. Attach using filter fabric adhesive.

3.5 WALL COPING

A. Refer to Section 03310 for concrete placing and finishing.

B. Refer to Section 03390 for concrete curing.

3.6 CRACK AND SPALL REPAIR CRITERIA FOR CONCRETE PANELS

A. A fully penetrating crack is defined as a crack extending through the cross-section of the precast panel from the front face to the back face of the unit.

B. Cracks at Front Face of Panel:
   1. Panels with one or two partially penetrating cracks with widths less than or equal to 12 mils are acceptable.
   2. Reject panels with fully penetrating cracks, or cracks wider than 12 mils.
   3. No more than two cracks per individual panel are allowed without further evaluation.

C. Cracks at Back Face of Panel:
   1. Partially penetrating cracks with widths less than or equal to 12 mils are acceptable.
   2. Partially penetrating cracks with widths between 12 mils and 30 mils are acceptable when repaired with surface sealant according to paragraph F, Crack Repair Procedures.
   3. Evaluate partially penetrating cracks wider than 30 mils for acceptance with epoxy injection according to paragraph F, Crack Repair Procedures.
   4. No more than two repairable cracks per individual panel are allowed without further evaluation.

D. Spalls at Front Face of Panel:
   1. Spalls with widths less than 4 inch and depths less than 2 inch may be repaired with a patching material acceptable to the Engineer of the same color as panel concrete. Resultant repair to be approved by the Engineer.
   2. Reject panels with spalls wider than 4 inch or deeper than 2 inch.
   3. Measure spall depth from the structural thickness of the panel excluding architectural surface finish.
   4. Panels with more than two spalls are subject to further evaluation before acceptance.

E. Spalls at Back Face of Panel:
   1. Spalls with widths less than 4 inch and depths less than 2 inch may be repaired with a patching material acceptable to the Engineer. Resultant repair to be approved by the Engineer.
   2. Reject panels with spalls wider than 4 inch or deeper than 2 inch.
   3. Panels with more than four spalls are subject to further evaluation before acceptance.

F. Crack Repair Procedures:
   1. Surface Sealing: Prepare surface and apply a sealant acceptable to the Engineer according to manufacturer's instructions.
   2. Epoxy Injection: Prepare surface and inject cracks with Department-approved product according to manufacturer's instructions.

G. Spall Repair Procedures:
   1. Prepare surface and apply patching material according to Manufacturer's instructions, and as acceptable to the Engineer.

END OF SECTION

UDOT SPECIAL PROVISION
SECTION 02838S
SOLDIER PILE

Add Section 02838S:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Materials and procedures for installing Soldier pile in drilled hole.

1.2 RELATED SECTIONS

A. Section 02056: Embankment, Borrow and Backfill

B. Section 03055: Portland Cement Concrete

C. Section 03211: Reinforcing Steel and Welded Wire

D. Section 03390: Concrete Curing

E. Section 09972: Painting for Structural Steel

1.3 REFERENCES

A. AASHTO LRFD Bridge Construction Specifications

B. AWS D 1.1: Structural Welding Code – Steel

C. American Institute of Steel Construction (AISC)

D. ASTM A 706: Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement

E. UDOT Steel and Concrete Construction Manual

1.4 DEFINITIONS

A. Contaminated Concrete – Concrete where localized mix proportions have been changed by the placement process, such as with excess water or segregation; or concrete containing unintended materials, such as soil or rock from the excavation.

B. Centralizer – A device attached to the reinforcing steel cage to maintain an offset distance between the reinforcing steel and the wall of the drilled hole.

1.5 SUBMITTALS

A. Material Submittals
   1. Certified mill test reports (MTR) for soldier pile products, seven calendar days before fabrication, including materials manufactured outside of the United States. Clearly indicate country of origin on MTR.

PART 2 PRODUCTS

2.1 STRUCTURAL STEEL

A. Follow AASHTO LRFD Bridge Construction Specifications, Article 11.3, unless otherwise indicated.

2.2 FABRICATION

A. Fabricate according to AASHTO LRFD Bridge Construction Specifications Section 11, UDOT Steel and Concrete Construction Manual, and AWS D 1.1.

B. Provide shop or field drilled holes in soldier piles for reinforcement.
   1. Flame cut holes are prohibited.

C. Provide non-spliced soldier pile sections to required length as shown.

D. Surface preparation of steel
   1. Painted Steel
      a. Refer to Section 09972.

2.3 CONCRETE

A. Class B Concrete – Refer to Section 03055.
   1. Air entrainment requirements are waived.
   2. Provide a target slump of 6.5 inch.
   3. Modify as follows when placed under water:
      a. Use high range water reducers.

2.4 REINFORCING STEEL

A. Vertical bars
   1. Uncoated. Use one of the following:
      a. ASTM A 706, Grade 60. Refer to Section 03211.
      b. AASHTO M 31, Grade 60. Refer to Section 03211.

B. Spiral bars
   1. Uncoated. AASHTO M 31, Grade 60.
      a. Refer to Section 03211.

PART 3 EXECUTION

3.1 SOLDIER PILE HOLE

A. Excavation
   1. Drill straight, vertical holes to the depth shown or as determined by Engineer.
   2. Do not use slurry or rely on water for drilled hole support during drilling operations.
   3. Do not begin drilling for a hole located three diameters center to center, or closer, to an adjacent completed soldier pile until at least 48 hours after placing concrete for the completed soldier pile hole.
   4. Do not begin drilling for a hole located between three and five diameters center to center from an adjacent completed soldier pile until at least 24 hours after placing concrete for the completed soldier pile hole.
   5. Drill hole in a continuous operation without interruption.

a. Notify the Engineer and protect the soldier pile hole if the excavation operation is stopped.
   1) Install a safety cover.
   2) Use a temporary casing to protect the safety of the hole excavation, surrounding soil, adjacent facilities, and stability of the sidewalls.
   3) The Engineer will evaluate design impacts to the soldier pile due to delays in completion.

6. Provide a clean, flat, and level bottom surface.
   a. Remove loose material from the bottom of the soldier pile holes before placing concrete.
   b. The maximum depth permitted of loose or disturbed material at any location is 1 inch.
7. Excavate soldier pile hole to diameter of the hole and the required depth shown.

B. Casing
   1. Furnish and place temporary casing when necessary to prevent the drilled hole from caving
      a. Full length casings are required where groundwater is present
      b. Have full length casings on site where groundwater is anticipated
      c. Drill or oscillate casing to provide direct contact with the soil throughout its length

C. Spoils
   1. Drilling spoils and their disposal are the responsibility of the Contractor.

3.2 CONSTRUCTION TOLERANCES

A. Plan location
   1. Top of hole within 3 inch horizontally of plan.
   2. Top of soldier pile within 1 ½ inch horizontally of plan.

B. Alignment of hole and soldier pile
   1. Not more than 2 percent (1:50) from vertical.

C. Reinforcing steel cage
   1. No more than 3 inch above or below the plan elevation.

3.3 REINFORCING STEEL PLACEMENT

A. Verify hole bottom cleanliness immediately before placement of the reinforcing steel.

B. Rigidly brace the reinforcing steel cage with additional reinforcing steel as needed to retain its configuration during handling and installation.
   1. Do not use loose bars.
   2. Provide an opening in between the soldier pile and the cage to allow tremie access.
   3. Use centralizers to maintain reinforcing steel cage position in soldier pile hole.
   4. Pick cage in several locations as necessary to maintain cage shape and alignment during placement.

C. Do not allow temporary bracing to free-fall when cut loose.

3.4 SOLDIER PILE INSTALLATION

A. Do not use spliced soldier pile

B. Shop Fabricate steel soldier piles to required length and details shown.

C. Shop paint steel soldier piles to the limits shown in plans with one coat of inorganic zinc primer according.
   1. Apply the one coat of primer according to Section 09972.

D. Lower prefabricated steel soldier piles into the hole and secure the soldier piles in position.
   1. Rigidly brace soldier pile projecting above the top of hole.
   2. Provide minimum of 4 inch concrete cover

3.5 SOLDIER PILE HOLE CONCRETE PLACEMENT

A. Dry Hole Placement
   1. Place concrete immediately after placing the reinforcing steel cage.
      a. Begin concrete placement within 16 hours of completion of drilling the soldier pile hole.
      b. Place concrete in a continuous operation.
   2. Use a tremie or spout to prevent concrete from striking the reinforcing steel cage.
      a. Do not allow the free-fall of concrete to exceed 5 ft.
   3. Vibrate the concrete within at least 10 ft from top of hole.
   4. Remove contaminated concrete from the top of the hole.
      a. Remove and dispose of muck, laitance, and contaminated concrete.

B. Water In Hole Placement
   1. Place concrete immediately after placing the reinforcing steel cage.
      a. Begin concrete placement within 16 hours of completion of drilling the hole.
      b. Place concrete in a continuous operation.
   2. Use a tremie to place concrete.
      a. Purge the tremie pipe of water.
         1) Insert a sturdy plastic ball or equivalent into the top of the pump hose extension before connecting the hose from the concrete pump.
         2) The ball must fit snugly into the pump hose extension when the hose is filled. The hose must be strong enough to resist rupture.
         3) Prime the hose and pipe with cement slurry.
   3. Lower a small diameter pole with an attached flat plate into the hole to determine the top surface of concrete.
      a. Mark both pole and tremie pipe so that the length of penetration can be immediately determined.
      b. Prevent the end of the tremie pipe from becoming plugged with soil from the bottom of the hole.
   4. Begin pumping the concrete immediately after setting the reinforcing steel cage and tremie pipe in the hole.
      a. Do not begin raising the tremie pipe until the concrete surface is 10 ft above the bottom of the pipe.
   5. Keep the bottom of the tremie pipe at least 5 ft below the top of the concrete until the placement is complete.
      a. Provide a positive hold down to maintain distance below top of concrete if the pipe floats.
   6. Remove casing as the concrete is placed.
      a. Keep the bottom of the casing between 5 ft and 8 ft below the top of the concrete surface when withdrawing.
      b. Prevent concrete separation when withdrawing the casing.
   7. Do the following if the tremie pipe plugs, equipment breaks down or loss of the seal at the end of the tremie pipe occurs:
      a. Pull the tremie pipe, reset it 2 ft below the top of the concrete, and purge it.

b. Lower the tremie pipe to at least 5 ft below the top of the placement and continue pumping concrete until all contaminated concrete has lifted to the top of the hole.

8. Continue pumping concrete until the water and contaminated concrete is expelled.
   a. Remove and dispose of muck, laitance, and contaminated concrete.

C. Finishing
1. Remove scum, laitance, loose gravel, and sediment from the surface of the hole concrete before finishing.
2. Cure exposed concrete according to Section 03390.

END OF SECTION

UDOT SPECIAL PROVISION
SECTION 02863S
ROCKERIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Construction of rockery structures at the locations and to the dimensions shown on the plans. Rockeries are formed of interlocking, dry-stacked rocks without reinforcing steel, mortar, or concrete. Rockeries may be constructed as either single structures or in tiers.

1.2 RELATED SECTIONS

A. Section 02056: EMBANKMENT, BORROW, AND BACKFILL

B. Section 02075: GEOTEXTILES

C. Section 02231: SITE CLEARING AND GRUBBING

D. Section 02316: ROADWAY EXCAVATION

E. Section 02317: STRUCTURAL EXCAVATION AND BACKFILL

F. Section 02622: PIPE UNDERDRAINS

1.3 REFERENCES

A. AASHTO T 85: Specific Gravity and Absorption of Coarse Aggregate

B. AASHTO T 96: Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

C. AASHTO T 210: Aggregate Durability Index

D. AASHTO T 104: Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate

E. AASHTO M 288: Geosynthetic Specification for Highway Applications

1.4 DEFINITIONS

A. Base Rock: The base rock is the lowermost rock in the rockery and bears directly on the soil/rock subgrade.

B. Facing Rock: The facing rocks comprise the bulk of the rockery and are stacked above the base rock.

C. Cap Rock: The cap rock is the uppermost rock in the rockery section and “caps” the rockery.

1.5 SUBMITTALS

A. Rock source sample inspection and test results

B. Rock production sample measurements and test results

C. Non-woven geotextile and free-draining granular backfill material properties

1.6 ACCEPTANCE

A. See Table 02863S-1 for sampling and testing requirements for acceptance.

B. Material for rockeries will be evaluated by:
   1. Visual Inspection.
      a. Acceptance is based on visual inspection of the work for compliance with the contract and prevailing industry standards.
   2. Measured or Tested for Conformance.
      a. Perform necessary measurements and tests to ensure work complies with the contract.
      b. Use prevailing industry standards in the absence of contract requirements or tolerances.
      c. Submit measurements, tests, and supporting data for acceptance.

1.7 PAYMENT

A. The accepted quantities will be paid at the contract price per unit of measurement for pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section.

1.8 MEASUREMENT

A. Measure pay items listed in the bid schedule and in this specification according to the following, as applicable:
   1. When measuring rockeries by the square feet (square meter) of rockery front face; measure the rockery from the bottom of the base rock elevation to the top of the cap rock elevation. Measure front face on a plane parallel to the rockery face.
   2. Free-draining granular backfill, pipe underdrains, and geotextile are not measured for payment and are considered incidental to the rockeries.

PART 2 PRODUCTS

2.1 GRANULAR BACKFILL BORROW

A. Conform to Section 02056

2.2 FREE-DRAINING GRANULAR BACKFILL

A. Conform to Section 02056

2.3 STABILIZATION GEOTEXTILE

A. Conform to Section 02075

2.4 ROCK FOR ROCKERIES

A. Furnish hard, angular, and durable rock that consists of a solid mass without open fractures, foliation, or other planes of weakness that are generally cubical, tabular, or rectangular in shape. Do not furnish crushed river rock or rock with rounded surfaces.

B. Source material that is aesthetically similar to other rockeries along the project corridor and meets acceptance criteria.
   1. Existing rockeries include landscape boulders from nearby quarries (Tower Sand and Gravel in Pleasant View, Utah and Stansbury Island, in the Great Salt Lake).

C. Conform to the following:
   1. AASHTO T85, 2.40 minimum apparent specific gravity,
   2. AASHTO T85, 4.0 percent maximum absorption,
   3. AASHTO T96, 50 percent maximum degradation,
   4. AASHTO T210, 52 minimum durability index (course),
   5. AASHTO T104, 12 percent loss maximum using sodium sulfate (5 cycles)
   6. Size and shape:
      a. Rock length, see plans
      b. Rock breadth and thickness, at least one-third of rock length
      c. Rock dimension, 18 in (460 mm) minimum
      d. Cap rock mass 200 lb. (90 kg) minimum

PART 3 EXECUTION

3.1 GENERAL

A. Verify the limits of the rockeries. Notify the Engineer if planned rockery lengths, and/or heights are inadequate to intersect with adjacent slopes. Submit cross-sections verifying intersections for approval.

3.2 SALVAGE

A. Stockpile, test for acceptance criteria, and reuse material from existing rockeries being demolished as part of the current scope, when possible.

3.3 EXCAVATION

A. Perform the work under Sections 02231, 02316, and 02317 as needed. Excavate a foundation trench at least 12 inches below the bottom of the wall, running the full length of the proposed rockery. Deeper embedment may be needed where a tow slope is present or where a leveling pad is specified. Excavate the foundation to a minimum width equal to the specified base rock width plus 12 inches to include the granular rock back drain behind the rockery.

B. Excavate the foundation in sections such that the rockery can be constructed in one shift or one day's work, unless shoring is provided to support the excavation or unless the engineer determines the back cut is stable as excavated.

C. Exercise care during excavation of the back cut. Stability of temporary slopes is the responsibility of the Contractor. Protect backslopes from damage by surface water.

3.4 CONSTRUCTION

A. Back drain
   1. Install the granular rock back drain between the rockery and the back cut face being supported. The granular rock back drain layer is 12 inches thick, or more, measured horizontally from the back of the base rock to the face of the back cut.
   2. Remove sharp objects from the backslope before installing non-woven geotextile, according to Subsection 02075.3.4, between the back slope and the free-draining granular backfill.

3. Furnish and install drain systems according to Section 02622. Do not connect pipe underdrains to storm water retention systems unless approved by Engineer.
4. Position pipe so outflow from daylighted end of pipe is less than 6 in above finished grade elevation.
5. Direct underdrain pipe outflow away from rockery and towards swales or storm water drainage systems.
6. Place granular rock back drain concurrent with rockery so that at no time is either more than 24 inches higher than the other.
7. Cap the granular rock back drain with 12 inches, or more, of native, relatively impermeable soil. Place non-woven geotextile between the soil cover and the granular rock back drain.

B. Rockery
1. Stockpile a sufficient number of rocks to provide adequate selection for placement.
   a. To obtain a better fit, place rocks which do not match the spaces offered by the previous course in a different location.
2. Securely place facing rocks so that the rocks are unable to be moved with a pry bar after the rockery is complete.
3. Use base rock and facing rock that provides the required rockery width with a single rock.
   a. Allowable tolerance for rock widths is 6 inches; however, do not place two or more consecutive rocks with a width less than specified on the plans.
   b. The minimum rockery thickness is based on minimum base rock width, as specified on the plans, and allowable face batter.
   c. Place rock so the longest rock dimension is perpendicular to the face of the rockery, the second largest dimension is parallel to the layout line of the rockery, and the smallest rock dimension is its vertical dimension.
4. Seat first course of rock (base rock) on firm, unyielding soil or bedrock with full contact between the rock and the subgrade.
   a. Check alignment and levelness.
   b. The base rock is important to verify accurate and acceptable results.
5. Place rocks to avoid continuous joints in either the vertical or horizontal direction.
   a. Locate at least one bearing point a distance no more than 6 inches (150 millimeters) from the face of the rockery.
   b. Place each rock to ensure it bears on at least two rocks below.
   c. Place incrementally smaller rocks as construction proceeds in successive lifts.
   d. Slope the top surface of each rock towards the back of the rockery at an inclination of 5 percent or more.
6. Backfill with Free-Draining Granular Backfill concurrent with rock placement until level with the top of Rock. Place each layer according to Subsection 02056.3.6. Compact areas not accessible to rollers with other approved methods.

C. Voids
1. Choke voids from the drain side of the rockery in each successive lift. Choke voids greater than 6 inches (150 millimeters) with a rock large enough to fill the void.
2. Chinking rocks do not provide primary structural support for the overlying rock.
3. Chinking rocks can not be moved or removed by hand after rockery is complete.
4. Reset loose chinking rocks until securely placed or grouted in place.
   a. Do not allow grout to be visible from the face of rockery.

Table 02863S-1
Sampling, Testing, and Acceptance Requirements

Material or Product	Type of Acceptance	Characteristic	Test Method Specifications	Sampling Frequency	Point of Sampling	Split Sample	Reporting Time	Remarks
Source								
Rock for rockeries	Measured and Tested for Conformance	Apparent Specific Gravity	AASHTO T85	1 per rock type	Source of material	Yes	Before using in work	--
		Absorption						
		LA abrasion	AASHTO T96					
		Durability Index (course)	AASHTO T210					
		Soundness using sodium sulfate	AASHTO T104					
Production								
Rock for rockeries	Process Control	Size	See Note	2 per lift of rock per rockery	In-place	No	24 hours	--

Note: Verify rock size by confirming that the largest accessible rock has a width longer than the minimum width specified in the project plans.

END OF SECTION

UDOT SPECIAL PROVISION
SECTION 02874S
RESTORE LANDSCAPING

Add Section 02874S:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Furnish and install landscaping, including but not limited to planting trees and shrubs, decorative landscaping, planter box, boulders, mulch, replacement of existing landscape walls, replacement of minor curbwork, pavers, and sprinkler systems along private property parcels per the Engineers and local property owners recommendations and requirements.

B. Establishment of plants to be the responsibility of the property owner after acceptance of work completed.

1.2 RELATED SECTIONS

A. Section 02776M; Concrete Flatwork
B. Section 02810S; Irrigation System
C. Section 02912S; Topsoil
D. Section 02922S; Seed and Turf Seed
E. Section 02925S; Sodding
F. Section 02932S; Trees, Shrubs, and Groundcovers

1.3 REFERENCES Not Used

1.4 DEFINITIONS Not Used

1.5 SUBMITTALS

A. Landscape existing conditions report documenting existing conditions of landscape on each parcel prior to construction. Report shall include the following:
   1. Photos of each parcel to be restored documenting condition of parcel landscape and type of landscape (turf, shrubs, trees, mulch, irrigation, etc.)
   2. A brief descriptive narrative of relevant information, such as tree and shrub species identification.

B. Provide to the Engineer and property owners a detailed layout of:
   1. Connection location to existing water line piping system.
   2. Control valves, sprinkler pipe, and sprinkler head locations
   3. Location and types of plants provided.

C. Provide to the Engineer the signed acceptance from the property owner and/or Engineer, of the completed landscaping work.

PART 2 PRODUCTS

2.1 Concrete Landscape Curb

A. Concrete landscape curb per section 02776M

2.2 Irrigation

A. Irrigation systems per Section 02810S

2.3 Topsoil

A. Topsoil per Section 02912S

2.4 Lawn

A. Lawn per Section 02925S Sodding or Section 02922S Seed, Turf Seed, and Turf Sod where seeding is required.

2.5 Plants

A. Plants and mulch per section 02932S.

PART 3 EXECUTION NOT USED

3.1 Landscaping Restoration

A. Coordinate with property owners to determine the type of landscaping requirements necessary to re-establish landscaping features.

B. Requests for betterments must be brought to the Engineer.

C. Lawn areas shall be restored with sod unless seeding is required by the Engineer.

3.2 New Landscape

A. New landscape is to be installed at properties located at 2483 Harrison Blvd - Wheeler property, and 3457 Harrison Blvd – Hair Salon.

B. Refer to landscape details for new landscape design for these two properties.

C. Confirm design and coordinate with property owner prior to construction

3.3 Installation

A. Place topsoil per Section 02912S

B. Install sprinkling system per Section 02810S.

C. Install plants per Section 02932S.

D. Install sod per Section 02925S.

E. Install curb work per Section 02776M.

F. Install other landscape features including but not limited to pavers, decorative rock, mulch, boulders, retaining wall systems per coordination with the property owner.

3.4 TESTING

A. Test sprinkling systems after installation for leaks and to verify total water coverage of the turf sod and plants.

UDOT SPECIAL PROVISION
SECTION 02892M
TRAFFIC SIGNAL

Delete Article 3.13, Paragraph B and replace with the following:

B. Trenching Paved Surface
   1. Refer to SL Series Standard Drawings
   2. Do not trench through paved surface without approval from the Engineer.
   3. Maximum trench width: 6 inches.
   4. Use flowable fill to bottom of pavement or to within 3 inches of the roadway surface when pavement is less than 3 inches thick.
   5. Apply tack coat evenly before final backfill when surface is asphalt.
   6. Match the composition, density, and elevation within ± $^{3}/_{16}$ inch of the existing pavement section.

Delete Article 3.16, Paragraph B and replace with the following:

B. Bonding Conductor (Ground)
   1. Run continuously and bond to each metal signal pole or luminaire pole.
   2. Attach one wire around the signal pole base bolt with a washer. Each additional wire will be attached with a split-bolt.
   3. Bond the grounding system conductor to the ground rod in each junction box where 50 V or greater is present.
      a. Ground rod clamps (acorns) are required for connecting the bond/ground wire to the ground rod.
      b. Only (1) wire per clamp is allowed. Only (1) clamp per ground rod is allowed.
      c. Combine additional wires using split-bolts.
      d. Wire terminal busses of any type are not allowed in signal related junction boxes or poles.

UDOT SPECIAL PROVISION
SECTION 02912S
TOPSOIL

Delete Section 02912 and replace with the following:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Furnish and spread topsoil on prepared areas.

B. Strip topsoil from on-site locations and place in stockpile.

C. Spread stockpiled topsoil on prepared areas.

1.2 RELATED SECTIONS Not Used

1.3 REFERENCES

A. AASHTO T 194: Determination of Organic Matter in Soils by Wet Combustion

B. Textural Triangle National Soils Handbook

1.4 DEFINITIONS Not Used

1.5 SUBMITTALS

A. Contractor-furnished topsoil laboratory test results from each topsoil source to be used to the Engineer a minimum of seven working days before soil delivery.

PART 2 PRODUCTS

2.1 CONTRACTOR FURNISHED TOPSOIL

A. Determine PH, EC, and SAR with a saturated soil paste or 1:1 soil/water testing method. Meet the following:
1. PH 6.0 to 8.0
2. Electrical Conductivity (EC) Less than 4 ds/m
3. Sodium Adsorption Ratio (SAR) Less than 10

B. Organic Matter

1. For soils in shrub and turf plantings: 5 to 20 percent. For soils in hydro-seeded areas: 1 to 20 percent.
2. Determined by the release upon combustion Walkley-Black or modified Walkley-Black testing method. Refer to AASHTO T 194.

C. Textural Classification
1. Loam, sandy loam, silt loam, or sandy clay loam not exceeding the percentiles in Table 1. Refer to Textural Triangle National Soils Handbook, Part 603-5.

Table 1

Textural Classification	
Soil Component	**Percentile Range**
Sand	20 to 70
Silt	20 to 70
Clay	10 to 30

2. Determine particle size analysis by the hydrometer testing method.

D. Topsoil free of:
1. Subsoils (no B or C horizon soils)
2. Coarse sand and gravel
3. Stiff clay, hard clods, or hard pan soils
4. Rock larger than 1 inches in any dimension
5. Trash, litter, or refuse
6. Noxious weeds and weed seeds

E. Topsoil may contain a maximum of five percent rock smaller than 1 inch.

F. Borron less than one ppm

G. Water holding capacity between 40 and 55 percent

2.2 SOURCE QUALITY CONTROL – CONTRACTOR FURNISHED MATERIAL

A. Obtaining Soil Samples
1. Obtain soil samples while the Engineer is present. Provide no less than ½ lb per soil sample.
2. Obtain samples from a thin slice of soil cut from the side of a freshly dug hole or by using a soil auger or sampling tube.
3. Mix the several small samples taken from various places around the source together to produce a composite sample.
4. More than one composite sample may be required if the topsoil horizon changes significantly across the source.
5. Store samples in a clean container at room temperature and out of direct sunlight.
6. Label the location and date on each sample container.
7. Provide additional soil samples for verification if requested by the Engineer.

B. Soil Testing
1. Engineer will submit soil samples to an approved independent soil testing laboratory capable of performing the tests listed in this section, article 2.1. A partial list of acceptable testing laboratories includes:

Brigham Young University
Soil and Plant Analysis Laboratory
255 WIDB
Provo, UT 84602
(801) 422-2147
USU Analytical Laboratory
4830 Old Main Hill
Logan, UT 84322-4830
(435) 797-2217
http://www.udot.utah.gov/go/standardsreferences
QA Consulting and Testing, LLC
PO Box 627

645 South 240 East
Salem, UT 84653
(801) 423-1116
(801) 423-1813 (fax)

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

A. Complete final grading, trench settling, and surface preparation before placing topsoil.

B. Place and spread topsoil as the slope is being constructed on steep cut slopes steeper than 2:1 and higher than 15 ft that require the placement of topsoil. Finish according to this Section, article 3.3, paragraph D.

C. Provide a suitable topsoil surface just before seeding on the remaining top soiled areas not covered under this article, paragraph B. Obtain approval of the top soil surface from the Region Landscape Architect through the Engineer. Suitable topsoil surface is:
   1. Non-compacted and finished according to this Section, article 3.3.
   2. Weed free.
   3. Finish grade uniform surface with smooth transitions between grade changes and disturbed areas.

D. Do not strip or handle wet topsoil.

E. Establish finish grade at 1 inch below the top of all walks, curbs, mow strips, and other hard surfaces for areas receiving seed or turf seed and 1½ inch for areas receiving turf sod.

3.2 STRIP AND STOCKPILE TOPSOIL

A. Strip the topsoil:
   1. Only from areas identified on the plans or approved by Engineer.
   2. To a depth approved by the Engineer.

B. Remove and dispose of any roots larger than 2 inches in diameter or 12 inches in length.

C. Stockpile stripped topsoil:
   1. At locations acceptable to the Engineer.
   2. So that placement or activity around the stockpile does not damage or impact any existing trees, shrubs, or environmentally sensitive areas. Obtain appropriate clearances if such impacts are unavoidable.

D. Grade to minimize erosion on and around the stockpiles.

3.3 SPREAD STOCKPILED AND CONTRACTOR-FURNISHED TOPSOIL

A. Clear area to receive topsoil of all trash, debris, weeds, and rock 3 inches or larger and dispose of objectionable material in an approved manner.

B. Place and spread the stockpiled topsoil over the prepared slopes to the plan depths. Use 4 inches if no depth is indicated in the plans.

C. Disc or harrow the placed topsoil along the contour on slopes 3:1 and flatter or cat-track the slopes to create continuous cleat tracks that run parallel with the contours.

D. Cat-track slopes steeper than 3:1 to create continuous cleat tracks that run parallel with

the contours.

END OF SECTION

UDOT SPECIAL PROVISION
SECTION 02915S
LANDSCAPE FINISH GRADING

Add Section 02915S:

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Weeding and finish grading of lawn and planting areas.

B. Related Sections:
   1. 1. Section 02932S – Trees, Shrubs, and Groundcovers.

1.2 DEFINITIONS

A. Finish Grading: Finish grading shall consist of finishing surfaces by raking smoothly and evenly, removing, and disposal of extraneous matter to facilitate natural run-off water.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

1.3 EXAMINATION

A. Verification of Conditions: Prior to Work of this Section, examine the installed work of other trades and verify that such work is complete or properly corrected to the point where this installation may properly commence.

1.4 PREPARATION

A. Preliminary Grading: Grades in planting areas shall be established within plus or minus 0.10-foot under other sections prior to beginning of landscape construction.

B. Weeding: Before and during finish grading, weeds and grasses shall be dug out by the root and disposed of off-site.

1.5 INSTALLATION

A. General: When preliminary grading and weeding has been completed and the soil has dried sufficiently to be readily worked, lawn and planting areas shall be graded to the elevations indicated on the Drawings. Grades not otherwise indicated shall be uniform levels or sloped between points where elevations are given. Minor adjustments of finish grades if required shall be made at the direction of Owner's Representative. Finish grade shall be a smooth, even, and uniform plane with no abrupt change of surface. Soil areas adjacent to building shall slope away from the building to allow a natural run-off of water, and surface drainage shall be directed as indicated on the Drawings by remodeling surfaces to facilitate the natural run-off water. Low spots and pockets shall be graded to drain properly. Irrigation and utility trenches shall receive special attention during compaction to avoid post installation subsidence.

B. Drainage: Finish grade with proper slope to drains. Flow lines, designated or not, shall be graded and maintained to allow free flow of surface water. Conform to grades indicated on

Drawings after thorough settlement and compactment of the soil.

C. Moisture Content: The soil shall not be worked when the moisture content is so great that excessive compaction will occur, not when it is so dry that dust will form in the air or that clods will not break readily. Water shall be applied, if necessary, to provide ideal moisture content for tilling and planting operations.

D. Shrubs and Ground Cover: The finish grade of shrubbery and ground cover areas shall be 2-inches below grade of adjacent pavement, walks, curbs, or headers and 6-inches below adjacent walls, except when drainage conditions may require flush grades, as directed by Owner's Representative.

E. Lawn Areas: The finish grade of lawn areas shall be 1 inch below grade of adjacent pavement walks, curbs or headers, except when drainage conditions may require flush grade as directed by Owner's Representative. Roll lawn areas with 300 pound roller until a uniformly compact and even surface is obtained.

F. Immediately prior to planting operations, planting areas shall be cleaned of weeds, debris, rocks over 1-inch in diameter, and clumps of earth that will not break up. Adjust any areas disturbed by installation of sprinkler irrigation system.

1.6 FIELD QUALITY CONTROL

A. Reviews: Conform to review requirements of Section 02932S.

END OF SECTION

UDOT SPECIAL PROVISION
SECTION 02922S
SEED and TURF SEED

Delete Section 02922 and replace with the following:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Seed AND turf seed.

B. Surface preparation.

1.2 RELATED SECTIONS

A. Section 02912S: Topsoil

1.3 REFERENCES

A. Utah Seed Law

1.4 DEFINITIONS Not Used

1.5 SUBMITTALS

A. Copy of the purchase order to the Engineer documenting that all seeds, including substitutions, have been acquired before the seeding window begins.
   1. Refer to this Section, article 1.6 for seeding information.
   2. List the common and botanical name for each seed species on the purchase order.

B. Fertilizer labels to Engineer.

C. Legible copy of Seed Certification Reports to Region Landscape Architect through the Engineer.

D. Seed certification – Include the following on seed certification reports and labels:
   1. Botanical name (include variety if applicable)
   2. Common name
   3. Name of seed testing laboratory
   4. Lot number and address of the seed company
   5. Weed seed (percent)
   6. Other crop seed (percent)
   7. Inert matter (percent)
   8. Pure live seed (percent)
   9. Noxious weed seed (name and rate of occurrence)
   10. Date tested (month and year)
   11. Germination (percent)
   12. Hard seed (percent)
   13. Net weight (do not include container weight)
   14. Pure live seed weight
   15. Percentage by weight

16. Collection locations for native shrub and tree species (state, county, elevation)

E. Manufacturer's directions on drill calibration to the Engineer two working days before seeding. Refer to this Section, article 3.3.

1.6 1.6 DELIVERY, STORAGE, AND HANDLING

A. Mixing Seed
   1. Notify Engineer seven calendar days before mixing seed.
   2. Engineer will verify that the seed certification report or label represents the seed lot from which the seed is furnished.
   3. Mix the different seed varieties to provide an even blend.
   4. Bag the mixed seed, seal the container, and attach a signed Department label to the exterior.

B. Deliver seed or turf seed to job site in original containers showing analysis of seed mixture, net weight, and date and location of packaging. Damaged packages are not acceptable.

C. Deliver fertilizer in containers showing weight, chemical analysis, and name of manufacturer. Store fertilizer in a weatherproof location.

1.7 SCHEDULE

A. Pre-measure the area to be seeded before ordering seed from supplier. The Engineer must approve the measuring technique and determined quantity.

B. Seeding Window
   1. Complete all general roadside seeding within the appropriate seeding window.
   2. Postpone seeding until the following year if the seeding is not completed within the given window.
   3. A late winter exception to the seeding window may be obtained from the Region Landscape Architect through the Engineer if suitable weather and soil conditions exist.

Elevation	Seeding Window
Below 4,000 ft	October 1 – December 31
4,000 to 6,000 ft	September 15 – December 1
Above 6,000 ft	September 1 – November 15

C. Turf seed and can be placed only after irrigation system is installed and operational.

D. Topsoil
   1. Refer to Section 02912S.
   2. Place topsoil just before seeding to eliminate competition from weeds.
   3. Coordinate topsoil placement with the above seeding window.

PART 2 PRODUCTS

2.1 SEED AND TURF SEED

A. Meet the Utah Seed Law – Utah Code - Title 4, Chapter 16.

B. Supply seed on a pure live seed (PLS) basis.

C. Obtain seed from lots that have been tested by a state certified seed testing laboratory such as Association of Seed Analyst (AOSA) or Society of Commercial Seed Technologists (SCST).
   1. Seed germination test older than 18 months for grass seed and 9 months for shrub or tree seed are not acceptable.
   2. Based on the amount or type of seed required on a project, the Department may require additional testing by the Department of Agriculture.

D. Do not use wet, moldy, or otherwise damaged seed.

E. Seed Substitutions
   1. Contact the major seed brokers in the state to verify that the seed is unavailable before requesting a seed substitution.
   2. Engineer will contact the Region Landscape Architect to verify the seed is unavailable and to recommend a seed substitution.
   3. Replace originally specified seed with seed of equal or greater cost.

2.2 TURF SOD (not used)

2.3 FERTILIZER (turf seed areas only)

A. Uniform in composition, dry, and free flowing.
   1. Turf seed – Elemental nitrogen in granular form. Phosphorus and potassium are optional and may be applied with nitrogen in granules. Use a slow release form of a minimum 50 percent nitrogen such as sulfur coated urea or urea formaldehyde.
   2. Apply elemental nitrogen with a concentration ranging from 21-34 percent if hydroseeding method is used.

PART 3 EXECUTION

3.1 PREPARATION

A. Complete all final grading, irrigation work, trench settling, topsoil placement, and surface preparation before seed application.

B. Prepare general seedbed for all seeded areas.
   1. Verify that a suitable topsoil surface has been prepared according to Section 02912 and approved by the Engineer before seeding.
   2. Do not work topsoil or seed when the soil is saturated or frozen.

C. Prepare Turf Seedbed
   1. Review finish grade to confirm that topsoil is 1 inch below the top of all walks, curbs, mow strips, and other hard surfaces.
   2. Apply fertilizer at the rate of 2 lb/100 yd2 and mix thoroughly into upper 2 inches of topsoil.
   3. Do not apply fertilizer and seed at the same time in the same machine.

3.2 SEEDING – GENERAL

A. Notify the Engineer seven working days before seeding.

B. Apply seed at the rate indicated in the Seed Schedule shown in the plans. Note that drill

C. seed and broadcast seed are applied at different rates.

3.3 DRILL SEEDING METHOD

A. Use the drill method of seeding on accessible slopes 3:1 and flatter.

B. Use a drill equipped with the following:
   1. Depth band
   2. Seed box agitator
   3. Seed metering device
   4. Furrow opener
   5. Packer wheels or drag chains

C. Use the drill manufacturer's directions in the presence of the Engineer. Calibrate the drill to apply seed at the rate indicated in the seeding schedule.

D. Space drill rows a minimum of 6 inches and a maximum of 8 inches.

E. Fill the seed boxes no more than half full when drilling on a slope.

F. Set depth bands to drill seeds to a ½ inch depth.

G. Drill along the contour.

H. Maintain the drill at the calibrated setting throughout the seeding operation.

I. Allow the furrows that are created by the drill to remain.

3.4 BROADCAST SEEDING METHOD

A. Use the broadcast method of seeding under the following conditions:
   1. Slopes steeper than 3:1.
   2. Slopes 3:1 and flatter where the area to be seeded is inaccessible to drill.
   3. The area to be seeded is not large enough to justify using a drill.
   4. Rocky surface conditions will damage a drill.

B. Obtain approval of the broadcast method by demonstrating the procedure on a 100 yd2 area.

C. Evenly broadcast seed using either:
   1. A cyclone seeder or other approved mechanical seeder.
   2. A hydroseeder.
      a. Apply seed, water, and 300 lb of cellulose fiber mulch (tracer) per acre.

D. Do not seed during windy weather or when soil is saturated.

E. Incorporate the seed into the soil by one of three methods:
   1. Cat-tracking by running the dozer up and down the slope creating continuous cleat tracks that run parallel with the contours.
   2. Hand raking the seed in ½ inch deep and along the contours of the slope.
   3. Slope chaining by pulling the chain along the contour until the seed is covered.

F. Obtain written approval from the Engineer that the seed has been adequately incorporated into the soil before applying wood fiber mulch, erosion control blanket, flexible growth medium, flexible channel liner, or other topdressing. Failure to obtain written approval will be justification for non-payment.

3.5 TURF SEEDING

A. Apply turf seed after seedbed preparation. Refer to this Section, article 3.4, paragraph C.

B. Roll seeded areas using a hand roller half filled with water.

C. Lightly water and program the irrigation system to maintain a moist seedbed.

D. Rope off newly seeded areas along walkways using bright plastic ribbon tape attached to stakes.

END OF SECTION

UDOT SPECIAL PROVISION
SECTION 02925S
SODDING

Add Section 02925S:

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Preparation of subsoil.
   2. Placing topsoil.
   3. Fertilizing.
   4. Sod installation.

B. Related Sections:
   1. Section 02810S – Irrigation System.
   2. Section 02915S - Landscape Finish Grading.

1.2 REFERENCES

A. American Society for Testing and Materials:
   1. ASTM C602 - Standard Specification for Agricultural Liming Materials.

B. Turfgrass Producers International:
   1. TPI - Guideline Specifications to Turfgrass Sodding.

1.3 DEFINITIONS

A. Weeds: Include Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

1.4 SUBMITTALS

A. Control of Work (General Conditions).

B. Product Data: Submit data for sod grass species, fertilizer, mulch, and other accessories.

C. Submit a small container sample of the proposed topsoil. Contractor to forward sample to approved testing laboratory in sealed containers to prevent contamination.

D. Test Reports: Indicate topsoil nutrient and pH levels with recommended soil supplements and application rates.

E. Manufacturer's Certificate: Certify Products meet or exceed the specified requirements.

F. Certification that turf sod is nursery grown and contains a minimum of three varieties of Kentucky Blue Grass.

G. Certification indicating the date and time sod was cut at the nursery.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Submit maintenance instructions, cutting method and maximum grass height; application frequency, and recommended coverage of fertilizer and water requirements.

1.6 QUALITY ASSURANCE

A. Sod: Root development capable of supporting its own weight without tearing, when suspended vertically by holding upper two corners.

B. Perform Work in accordance with landscape industry standards.

C. See sections 02900 and 02955 for maintenance requirements.

1.7 QUALIFICATIONS

A. Sod Producer: Company specializing in manufacturing Products specified in this section with minimum 5 years documented experience.

B. Installer: Company specializing in performing work of this section with minimum 3 years documented experience and approved by sod producer.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Control of Materials

B. Deliver sod in rolls. Protect exposed roots from dehydration.

C. Do not deliver more sod than can be laid within 24 hours.

1.9 COORDINATION

A. Control of Work (General Conditions).

B. B. Coordinate with installation of underground system piping and irrigation heads.

PART 2 PRODUCTS

2.1 SOD

A. Sod Growers:
   1. As approved by owner's representative
   2. Substitutions: No substitutions will be allowed.

B. Sod: Certified and Approved Field grown grade; cultivated grass sod; type indicated in plans; with strong fibrous root system, free of stones, burned or bare spots; containing no weeds.

2.2 SOIL MATERIALS

A. Topsoil: Fertile, agricultural soil, typical for locality, capable of sustaining vigorous plant growth, taken from well drained site; free of subsoil, clay, or impurities, rocks, plants,

weeds and roots; pH value of minimum 6.0 and maximum 8.0. See section 02912.

2.3 ACCESSORIES

A. Fertilizer: Commercial grade; recommended for grass, with fifty percent of elements derived from organic sources; of proportion necessary to eliminate deficiencies of topsoil to the following proportions: nitrogen 16 percent, phosphoric acid 16 percent, soluble potash 8 percent. Refer to agricultural soils report.

B. Lime: ASTM C602, Class T agricultural limestone containing a minimum 80 percent calcium carbonate equivalent.

C. Water: Clean, fresh and free of substances or matter capable of inhibiting vigorous growth of grass.

2.4 HARVESTING SOD

A. Machine cut sod and load rolls on pallets.

B. Cut sod in rolls not exceeding 42” in width and 105’ in length with topsoil base

2.5 SOURCE QUALITY CONTROL

A. Control of Materials (General Conditions).

B. Analyze to ascertain percentage of nitrogen, phosphorus, potash, soluble salt content, organic matter content, and pH value.

C. Provide recommendation for fertilizer and lime application rates for specified sod species as result of testing.

D. Testing is not required when recent tests are available for imported or native topsoil. Submit these test results to testing laboratory. Indicate, by test results, information necessary to determine suitability.

PART 3 EXECUTION

3.1 EXAMINATION

A. Control of Work (General Conditions).

B. Verify prepared soil base is ready to receive the Work of this section.

3.2 PREPARATION OF SUBSOIL

A. Prepare sub-soil and eliminate uneven areas and low spots.

B. Maintain lines, levels, profiles and contours. Make changes in grade gradual. Blend slopes into level areas.

C. Remove foreign materials and undesirable plants and their roots. Do not bury foreign material beneath areas to be sodded.

D. Remove contaminated subsoil and concrete and asphalt debris.

E. Scarify sub-soil to depth of 6 inches where topsoil is to be placed.

F. Repeat cultivation in areas where equipment, used for hauling and spreading topsoil, has compacted subsoil.

3.3 PLACING TOPSOIL

A. Spread topsoil to minimum depth of 6 inches over area to be sodded.

B. Place topsoil during dry weather and on dry unfrozen subgrade.

C. Remove vegetable matter and foreign non-organic material from topsoil while spreading.

D. Grade topsoil to eliminate rough, low or soft areas and to ensure positive drainage.

E. Install edging at periphery of sodded areas in straight lines to consistent depth.

3.4 FERTILIZING

A. Apply lime at application rate recommended by soil analysis. Work lime into top 6 inches of soil.

B. Apply fertilizer at application rate recommended by soil analysis.

C. Apply fertilizer after smooth raking of topsoil and prior to installation of sod.

D. Apply fertilizer no more than 24 hours before laying sod.

E. Mix fertilizer thoroughly into upper 6 inches of topsoil.

F. Lightly water soil to aid dissipation of fertilizer.

3.5 LAYING SOD

A. Moisten prepared surface immediately prior to laying sod.

B. Lay sod immediately after delivery to site within 24 hours after harvesting to prevent deterioration.

C. Lay sod tight with no open joints visible, and no overlapping; stagger end joints 12 inches minimum. Do not stretch or overlap sod pieces.

D. Remove all netting from the base of the sod prior to installation.

E. Lay smooth. Align with adjoining concrete mow curb or hardscape.

F. Place top elevation of sod flush with adjoining concrete mow curb or hardscape.

G. Do not place sod when temperature is lower than 32 degrees or above 100 degrees.

H. Water sodded areas immediately after installation. Saturate sod to 6 inches of soil.

I. After sod and soil have dried, roll sodded areas to bond sod to soil and to remove minor depressions and irregularities.

J. Roll before first watering.

3.6 SCHEDULE

A. Sod species and type as per plan

END OF SECTION

UDOT SPECIAL PROVISION
SECTION 02932S
TREES, SHRUBS, AND GROUNDCOVERS

Delete Section 02932 and replace with the following:

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Soil preparation and fertilization.
   2. Planting operations.
   3. Landscape planting materials.
   4. Imported topsoil and planter mix.
   5. Maintenance.

B. Provide landscape plantings in the areas shown on Drawings with plants in a healthy, vigorous growing condition. Items not specifically shown in Drawings or specified, but normally required to conform with such intent, are considered part of the Work.

C. Include labor and equipment required to place, amend, and fine grade the soil. Include the cost of fertilizer as specified. If the final soils analysis results in a change to the specified amendments, a Change Order will be issued.

D. Related Sections:
   1. Section 02810S – Irrigation System
   2. Section 02912S – Topsoil
   3. Section 02915S - Landscape Finish Grading
   4. Section 02925S - Sodding

1.2 REFERENCES:

A. American Joint Committee on Horticulture Nomenclature (AJCHN):
   1. Standardized Plant Names, latest edition.

B. American Association of nurserymen, Inc. (AAN):
   1. American Standard for Nursery Stock, latest edition.

C. Agricultural Code of Utah.

1.3 SUBMITTALS

A. Plant and Material Certifications:
   1. Certificates of inspection required by governmental authorities.
   2. Manufacturer's or vendor's certified analysis for soil amendments and fertilizer materials.
   3. Label data substantiating that plants, trees, shrubs and planting materials comply with specified requirements.

B. Product Data: Submit complete lists of materials proposed for use, giving the manufacturer's name, catalog number, and catalog cut for each item where applicable.

C. Substitutions: Substitutions of plant materials will not be permitted unless authorized by the

Owner's Representative in writing.

D. Selection, Tagging and Ordering Plant Material:
   1. Submit a request for inspection and documentation to the Owner's Representative at least one month prior to start of landscape planting work that plant material has been ordered.
   2. Plants shall be subject to inspection and rejection by the Owner's Representative at place of growth, and after delivery, for conformity to this Specification.

E. Imported Topsoil:
   1. Before delivery of topsoil, furnish the source of imported topsoil to the Owner's Representative for approval.
   2. Before delivery of topsoil, submit test results and schedule of recommended soil amendment adjustment to the Owner's Representative for review.

F. Agronomic Soils Test Report: An agronomic soil test and report shall be provided by the Contractor for the on-site soil and imported soil. See Section 02912 for additional requirements.

G. Certificates:
   1. Submit certificates for the following items upon delivery to the job site:
      a. Quantity of commercial fertilizer and organic fertilizer.
      b. Quantity of soil amendments.
      c. Quantity of other soil additives per agronomic soils test report.
   2. Submit Certificate of Delivery of container or bulk materials.
   3. Submit written certificate of soil balance.
   4. Submit written certification of quantity and quality of plant materials.
   5. Submit sod certification for grass species and location of sod source.

H. Pre-Installation Conference: Provide a written projected planting schedule noting the estimated completion date, number of working days required, and special coordination requirements.

I. Submit copies of all invoices or receipts for materials used on the project, which cannot be visually verified. These include, but are not limited to, backfill mix material, fertilizer, fertilizer tablets, mulches, soil stabilizers, water holding agents, herbicides, etc. All invoices or receipts must list the item, quantity, job location, date and the supplier. Submit as items are delivered to the site. Substantial completion will not be given without all receipts being submitted.

J. Samples of Rock Mulch Types 1, 2 and 3. Provide 1 CU FT sample of each.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements, Codes, and Standards:
   1. Comply with appropriate regulatory agencies for fertilizer and herbicide composition.

B. Source Quality Control:
   1. Ship landscape materials with certificates of inspection required by governing authorities. Comply with regulations applicable to landscape materials.
   2. Do not make substitutions. If specified landscape material is not obtainable, submit proof of non-availability to Owner's Representative, together with proposal for use of equivalent material.
   3. Analysis and Standards: Package standard products with manufacturer's certified analysis. For other materials, provide analysis by recognized laboratory made in accordance with methods established by the Association of Official Agriculture Chemists,

wherever applicable.

C. Provide trees, shrubs and ground cover of quantity, size, genus, species, and variety shown and scheduled for landscape work and complying with recommendations and requirements of ANSI Z60.1 American Standard for Nursery Stock. Provide healthy, vigorous stock, grown in recognized nursery in accordance with good horticultural practice and free of disease, insects, eggs, larvae, and defects such as knots, sunscald, injuries, abrasions, or disfigurement. The Owner's Representative shall inspect trees and shrubs either at the place of growth or at the site prior to planting for compliance with requirements for genus, species, variety, size, and quality. The Owner's Representative reserves the right to further inspect trees and shrubs for size and condition of root ball and root system, insects, injuries and latent defects, and to reject unsatisfactory or defective material at any time during the progress of the work. Remove rejected trees, shrubs or ground cover immediately from the project site.

   All sizes and caliper shall comply with the American Standard for Nursery Stock.

D. Test soil sample after grading operations are complete, at Contractor's expense.

E. Materials shall conform to the requirements of this Section.

F. Sole Source Responsibility: Subcontract landscape work to a single firm specializing in landscape work.
   1. Nursery: Firm specializing in growing and cultivating plants with minimum 3 years documented experience.
   2. Tree, Plant, Ground Cover Installer: Firm specializing in installing and planting the plants with minimum 3 years documented experience approved by nursery.

G. Coordinate with installation of underground sprinkler system piping and watering heads.

H. Reviews: On site review will be conducted by the Owner's Representative to observe Contractor's interpretation of Contract Documents and to address questions regarding installation.
   1. Contractor to inform owner's representative minimum 2 working days prior to review.
   2. Scheduled Landscape Reviews:
      a. Delivery of plant material to site.
      b. Location of installed plant material.
      c. Establishment of final landscape grade.
      d. Substantial completion of landscape work.
      e. End of contracted maintenance period.
   3. Impromptu reviews may occur at any time during the project.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Handling Plants: Contractor shall notify the Owner 24 hours prior to any plant material being delivered to the site. Protect plant material from deterioration during delivery and while stored at the site. Do not bend or bind-tie trees or shrubs in such a manner as to damage bark, break branches, or destroy natural shape. Provide protective covering during delivery. Do not drop boxes during delivery. Do not prune prior to delivery unless otherwise approved by the Owner's Representative. Deliver plant material after preparations for planting have been completed and plant immediately. Do not install plant life when ambient temperatures may drop below 35 degrees F or above 100 degrees F. Do not install plants when wind velocity exceeds 20 mph.

B. Furnish a Certificate of Delivery slip with each delivery of material in containers or in bulk. Certificate shall state source, quantity, or weight, type and analysis, and date of delivery.

C. Deliver trees and shrubs after preparations for planting have been completed and plant immediately. If planting is delayed more than 6 hours after delivery, set trees and shrubs in shade, protect from weather and mechanical damage, and keep roots moist by covering with mulch, burlap or other acceptable means of retaining moisture.

D. Do not remove container-grown stock from containers until planting time.

1.6 PROJECT CONDITIONS

A. Prior to excavation for planting or placing of stakes, locate utilities, electric cables, conduits, sprinkler lines, heads, valves, and valve control wires so that proper precautions may be taken not to damage such improvements. Hand excavate, as required. Maintain grade stakes set by others until parties concerned mutually agree upon removal. In the event of a conflict between such lines and plant locations, promptly notify the Owner's Representative to arrange for relocation of one or the other. Failure to follow this procedure places the responsibility on the Contractor for making repairs at his expense for damages resulting from Work hereunder.

B. Excavation: When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, notify Owner's Representative before planting.

1.7 SEQUENCING AND SCHEDULING

A. Planting Time: Proceed with, and complete landscape work as rapidly as portions of site become available, working within seasonal limitations for each kind of landscape work required.
   1. Plant or install materials during normal planting seasons for each type of plant material required.
   2. Correlate planting with specified maintenance periods to provide maintenance from date of substantial completion.

B. Coordination with Lawns: Plant trees and shrubs after final grades are established and prior to planting of lawns, unless otherwise acceptable to Engineer. If planting of trees and shrubs occurs after lawn work, protect lawn areas and promptly repair damage to lawns resulting from planting operations.

1.8 WARRANTY

A. Plant Material:
   1. Plant materials furnished or relocated under this Section shall be warranted in writing, for a period of 1 year from the date of substantial completion for all material, against improper installation, against defective, unsound, or diseased conditions that may appear, and except for defects resulting from neglect, abuse or damage by others, or unusual incidents beyond the installer's control. Contractor is to make every reasonable effort to protect plant material from trampling or other damage.
      a. Act of God may become an acceptable reason for warranty to be void. However, the contractor must make every reasonable attempt to prevent potential damage. Act of God damage will include unseasonable freeze, winds above 75 mph, and flooding from excessive rain.
   2. Dead or obviously unhealthy materials shall be replaced without delay. Replace plant material, which are in doubtful condition at the end of the warranty period, unless, in the opinion of the Owner's Representative, it is advisable to extend the warranty period for a full growing season. The opinion of the Owner's

Representative will be final in determining plant material to be replaced due to an unhealthy condition.

a. Another warranty inspection will be conducted at end of extended warranty period, if any, to determine acceptance or rejection. Only one replacement (per tree, shrub or plant) will be required at end of warranty period, except for losses or replacements due to failure to comply with specified requirements.

3. Upon receipt of written notice from Owner of the death of any warranted plant materials during the warranty period, the subject plant materials shall be promptly replaced with the same species originally planted, and of a size closely approximating the size of the plant if normal growth had occurred since the original planting. Replacements shall be subject to the requirements of this Specification.
4. When plants are replaced, advise the Owner in writing, of the necessary establishment maintenance which must be performed.
5. Replacement of plant materials during the warranty period shall be at no additional cost to the OWNER.
6. Replacement shall continue to be made until each plant has successfully established itself for the required guaranty period.
7. Warranty lawns through specified maintenance period and until final acceptance by the owner.
8. Warranty all non-organic material and equipment for a period of one year from date of Final completion.

1.9 MAINTENANCE

A. Once Certificate of Substantial Completion has been awarded, owner assumes responsibility for upkeep and landscape maintenance.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Design of soil amendments and fertilizers shall be based on agricultural soils report. See section 02912S.

B. Materials shall be the product of one manufacturer and shall be either the ones upon which the design is based or the products of a manufacturer accepted in advance.

2.2 MATERIALS

A. Topsoil, Import or Native:
   1. Prior to delivery of topsoil, furnish the Owner's Representative with a written statement giving the location from which the topsoil is to be obtained and an agricultural analysis of the topsoil to be used. Imported topsoil shall be from local sources acceptable to the Owner's Representative.
   2. Provide an agricultural soils test for both import and native soils to be used. All soil used for plantings, whether on-site or import shall meet the requirements of Section 2912S and be amended as per the agricultural soils report.
   3. Samples of the import and native soils shall be submitted to the soils testing laboratory for analysis, interpretation, and recommendations prior to blending or backfilling.

B. Pre-planting Herbicide: Non-Selective herbicide such as Round-Up or equal.

C. Pre-Emergent Weed Control: Shall be used on this project before and after the bark mulch has been installed.

D. Organic Amendment: “Nutri-Mulch” organic composted manure, weed free, no particle size over one-half inch, pH level 7.5 or less, providing naturally one percent of available nitrogen, phosphorous and potassium. Amend soils as per agricultural soils report and planting notes.

E. Soil Sulfur: In quantities necessary to eliminate any deficiencies of topsoil as indicated in the agricultural soils report.

F. Ferrous Iron Sulfate: In quantities necessary to eliminate any deficiencies of topsoil as indicated in the agricultural soils report.

G. Conditioning Fertilizer: Apply as per agricultural soils report or a Gro-Power Plus- humus with soil penetrates added, providing five-percent nitrogen, three percent phosphorous, and one percent potassium. Select the conditioning fertilizer which best suits the soil conditions present.

H. Water: Clean, fresh and free of substance or matter, which could inhibit vigorous growth of plants.

I. Root Hormone: Super Thrive or equal.

J. Backfill mix for general use shall be in accordance with the planting notes and agricultural soils report.

K. Excess soil shall be removed or redistributed before application of fertilizer. Where soil is to be replaced by plants, allowance shall be made so that when finish grading has begun, there shall be no deficiency in the specified depth of mulched planting beds.

2.3 PLANT MATERIALS: Requirements: Plants shall also be in accordance with American Standard for Nursery Stock, latest Edition for tree, shrub and groundcover material. All plants shall be nursery grown.

All plants shall be hardy under climate conditions similar to those in the locality of the project. Container sizes listed are minimums. Minimum height, spread and caliper sizes shall be met. Measure height and spread to the average overall size of the plant, not the longest branch. Caliper shall be measured six inches above graft or six inches above the root ball. Conform to the requirements of ANSI Z60.1 for tree branching configuration and shrub cane quantities for the type and species of each plant specified.

All plants shall be typical of their species or variety and shall have a normal habit of growth. They shall be sound, healthy and vigorous, well branched and densely foliated when in leaf. They shall also be free of insect eggs, or larvae. They shall have healthy, well-developed root systems.

Tag a minimum of 10 percent of the plants of each variety with its botanical name and cultivar name (cultivar name is required only when a cultivar is called out on the plans) to the name of the American Joint Committee on horticultural nomenclature. Patented or trademark plants must all bear appropriate tag.

A. Identification: Plant material shall be true to type and nomenclature in accordance with AJCHN Standardized Plant Names, and each bundle or plant shall be properly identified with durable, legible labels.

B. Quality and Size of Plants: In accordance with rules and grading of AAN American Standard for Nursery Stock and as shown on the Drawings.

1. Trees, shrubs, and ground covers shall have a normal habit of growth and shall be sound, healthy, vigorous, and free from insect infestations.
2. Plants that meet the measurements specified, but do not possess a normal configuration or balance of height and spread, will be rejected.
3. Trees and shrubs shall have been grown in containers of the size stated on Drawings, and shall have sufficient roots to hold the root ball together after removal from containers without being rootbound.
4. Trees will be straight and of uniform shape without damaged, crooked, or multiple leaders. Trees with abrasions of the bark, sunscald, disfiguring knots, or fresh cuts of limbs over 1/2-inch which have not been pruned and painted or completely callused, will be rejected.
5. Ground cover plants shall be grown in 1 gallon containers as indicated on the Drawings. 1 gallon plants shall remain in original containers until transplanting. Soil shall contain sufficient moisture so that it will not fall apart when lifting the plants.

C. Miscellaneous Landscape Materials:

2.4 MULCH

A. Bark Mulch on WSU Campus: shall be coarse shredded bark or wood product, nitrogen stabilized. Mulch must be 100% bio-degradable.
   1. Bark Mulch shall match WSU Standard – DT Waste: Dark Brown (provided by Mountain States) or preapproved equal.

B. Bark Mulch off WSU Campus: Medium natural organic decorative bark mulch from Fir and Pine bark, screened with nuggets 1" to 2" length in any direction.

C. Rock Mulches Type 1, 2 and 3: Refer to planting plans for rock type, size, color and shape.

2.5 LANDSCAPE BOULDERS

A. Landscape boulders that are a size, shape and rock type as described on the planting drawings.

2.6 WEED BARRIER FABRIC

A. Fabric shall be UV resistant, woven spunbond needle punch, polyproplene, wt. 5 oz, per square yard, color black. Use Typar or Dewitt Pro 5 Weed Barrier or preapproved equal.

2.7 GUYING AND STAKING MATERIAL

A. Hose: High quality braided rubber or plastic hose, ¾” diameter and suitable length (Color Black).

B. Wire: 12 gauge galvanized steel.

C. Guying cable: galvanized steel, #9 gauge, Timbles and clips shall be used for connections and splices.

D. Turnbuckles: Galvanized or zinc dip painted with an 8” lengthwise opening fitted with eye bolts and spot welded or fitted with a locking device to prevent vandalism.

E. Guying stakes: 2” x 2”, notched hardwood.

F. Duckbill tree support system by Foresight Industries (800-325-5360) shall be used for trees larger than 3” caliper.

2.8 ANTI-TRANSPIRANT

A. Anti-TRANSPIRANT solution for horticultural spray application. Use Bio-Plex, by Bioplex Organics, Inc. (800-441-3573).

2.9 SOURCE QUALITY CONTROL

A. Agronomic Soils Testing: As per Section 02912.

PART 3 EXECUTION

3.1 EXAMINATION:

A. Verification of Conditions: Inspect and accept the condition of the site relative to this Section before commencing Work. If not acceptable, notify the Owner in writing. By proceeding with the Work of this Section, the Contractor indicates his acceptance of previous related work.

B. Landscape work shall not begin until construction adjacent to planting areas has been completed and irrigation systems have been installed and approved by Owner's Representative.

3.2 PREPARATION

A. Protection:
   1. Provide necessary safeguards and exercise caution against injury or defacement of existing site improvements.
   2. Be responsible for any damage resulting from landscape planting operations. Repair damage and return the area to the previous condition at no cost to the Owner.
   3. Tree Protection shall be in place prior to any planting.

3.3 WEED CONTROL

A. Apply pre-planting herbicide to visible weeds, before and after soil placement.

B. Pre-emergent herbicide shall be a non-selective pre-emergent herbicide appropriate for the season for use around shrubs, ground covers, and trees in granite mulch. Apply preemergent
herbicide before and after installation of bark or rock mulch. Apply preemergent herbicide to all areas after irrigation and planting are completed. Apply preemergent as per product label and as per governmental regulations.

C. Protect existing plants from damage. Replace any plants damaged during construction.

D. After application of weed killer, before and during preliminary and finish grading, remaining weed and grasses shall be dug out by the roots and disposed of off-site. Weeds and grasses not of the perennial type, less than 2-1/2 inches high and not bearing seed, may be turned under. Perennial weeds and grasses to be removed include, but are not limited to the following:
   1. Nut Grass.
   2. Alfalfa.
   3. St. Augustine.
   4. Puncture Vine.
   5. Kikuya Grass.
   6. Mustard Plant.
   7. Johnson Grass.

8. Wirewood.
9. Morning Glory.
10. Spurge.
11. Bermuda Grass
12. Cheese Weed
13. Common Rye Grass
14. Tamarisk

E. Grub all weed growth from areas to owner's approval. Repeat entire procedure if directed by Owner's Representative. Contractor shall grub and remove all weeds throughout the construction phase and warranty period.

3.4 SOIL PREPARATION

A. Cross-rip on grade planting areas.

B. Broadcast the organic soil amendments uniformly, as per agricultural soils report, to evenly distribute the amendments and conditioners into the soil.

C. Moisture Content: The soil shall not be worked when the moisture content is so great that excessive compaction will occur, not when it is so dry that dust will form in the air. Water shall be applied, if necessary, to provide ideal moisture conditions.

D. Before mixing, clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials over 1 inch diameter, and other materials harmful or toxic to plant growth.

E. Mix specified soil amendments and fertilizers with topsoil at rates specified. Delay mixing of fertilizer if planting will not follow placing of planting soil within a few days.

F. For pit and trench type backfill, mix planting soil prior to back-filling, and stockpile at site.

G. For planting beds and lawns, mix planting soil either prior to planting or apply on surface of topsoil and mix thoroughly before planting.

3.5 PLANTING OPERATIONS

A. Finish Grading: Prior to commencement of planting operations, complete finish grading as specified in Section 02915S.
   1. When preliminary grading, including weeding and fertilizing has been completed and the soil has dried sufficiently to be readily worked, planting areas shall be graded to uniform levels or slopes at a minimum of 2 percent. Minor adjustments to finish grades shall be made in the direction of the water. Low spots and pockets shall be graded to drain properly. Grading shall be done when soil is at optimum moisture content for working. Planting areas shall be scarified to a depth of 3 inches below grade prior to placing fertilizers. During the preparation of planting areas, excavate holes for planting as described herein and remove all clods, rocks, or other debris over 1 inch in largest dimension from the excavated material and dispose off site in an approved disposal site. Utilize imported and native soil material for backfill as required per agricultural soils report. Dispose of surplus excavated material at an approved disposal site.

B. General: Prior to installation of irrigation system specimen trees shall be located as directed by Owner's Representative.
   1. Preparation of Lawn beds: At the time of planting, lawn bed shall be raked lightly to an even surface, removing any deleterious materials. Care shall be taken not to change the drainage pattern. The lawn bed shall be inspected by the Owner's

Representative to determine suitability for planting prior to sodding. The Contractor shall obtain such approval before sodding. Restore lawn areas to specified condition, if eroded or otherwise disturbed, after fine grading and prior to planting.

2. Watering: Immediately after planting, sodded areas shall be watered, care being taken to avoid erosion, and the planted areas kept moist until the sod has rooted and the sod has become established.
3. Watering Basins: Construct a firmly compacted mound of soil around each tree and plant to form a watering basin at the edge of and following the shape of the planting pit area. Mounds for trees and shrubs from 5 gallons or larger containers, shall be at least 2 inches high. Excavated earth may be used. Refill any settlement.

C. Plant Pits: All holes shall be hand or mechanically excavated. Holes shall be dug at the location of each individual plant, the stake or marking being considered the center of the hole. The holes shall have sloping sides and horizontal bottoms and shall be dimensioned as follows, unless otherwise specified:

Trees: Layout plant material per plan for Owner's Representative acceptance/approval prior to planting. Place trees for best appearance. Mark the area three times the diameter of the root ball. Excavate pit to the depth of the root ball. Excavate an additional 6 inches in pit beyond perimeter of where root ball shall be placed. Bottom center of pit shall be no deeper than the root ball of plant and shall provide a firm and stable base for trees. The root ball shall sit slightly higher than the surrounding finish grade (not including berm for watering basin). Any tree with the root ball flush with finish grade will be rejected. Walls of the undisturbed soil shall be rough and sloping (see planting details). Scarified any smooth walls from excavation. Completely remove nonbiodegradable root containers and boxes. Prune, thin out or shape trees in accordance with standard horticultural practice. Prune trees to retain required height and spread. Unless otherwise directed by Owner's Representative, do not cut any tree leaders from any tree. Remove only injured or dead branches from flowering trees. Do not shear plant material.

Shrubs: Layout plant material per plan for Owner's Representative acceptance/approval prior to planting. Place shrub for best appearance. Mark the area two times the diameter of the root ball. Excavate pit to 1 1/2 the depth of the root ball. Fill the bottom of the pit with the appropriate fill so that the root ball shall sit slightly higher than the surrounding finish grade (not including berm for watering basin). Any shrub with the root ball flush with finish grade will be rejected. Walls of the undisturbed soil shall be rough and sloping (see planting details). Set plants vertical unless otherwise specified. Completely remove non-biodegradable root containers and boxes. Prune, thin out or shape shrubs in accordance with standard horticultural practice. Prune shrubs to retain natural character. Do not shear plant material.

After excavation and prior to backfilling, the plant pits shall be filled with water, twice. Should the plant pits fail to drain in 24 hours of second filling, or if caliche is encountered give notification of this condition. The contractor shall comply with the following: If impervious layer is less than 6" thick remove completely. If layer is 6"-18" thick, auger a hole through the layer and install a 4" diameter PVC pipe (chimney) filled with 3/8" pea gravel through the caliche layer at the bottom of the planting pit. If layer is greater than 18", notify the owner for potential plant relocation or owner's credit. Do not proceed with the planting operations until directed.

Add the required amendments, fertilizer, and other additives to the backfills at the rates specified herein and mix thoroughly until a uniform homogenous mixture is achieved. Provide a sample of the backfill mixes and mixing procedures for approval. These samples shall be used as reference material for the backfill mixes as the project progresses. Prepare the backfill near the planting hole or mix the backfill off-site. Either

option must be approved by the Owner's Representative prior to beginning planting operations.

D. Setting Container and Larger Plants:
   1. Apply amended topsoil soil mix at top 12 inches depth around plant root balls for plants from 1-gallon through 5 Gallon materials. For Trees 15 gallon and larger, backfill with amended soil for the entire depth of the plant pit.
   2. All plant materials shall be amended with slow release 21 gram fertilizer tablets 20-10-5 with micronutrients, Agriform, Best, or approved equal, per manufacturer recommendations.
   3. After backfilling the holes, saturate the material with water to the full depth of the hole and until ponding appears in the basin. Place sufficient backfill material so that after planting and settlement has taken place, the basin will conform to the section as shown on the plans.
   4. For Plants balled and burlap, remove the burlap from rootball edges after placement in the planting hole. Do not break root ball. If root ball breaks, tree shall be rejected and replaced. Gently firm the earth around it to remove all air pockets immediately after the burlap removal.

E. Miscellaneous Landscape Work:
   1. Install Concrete Landscape Curbs Type 1 and Type 2 where indicated per Section 02776 – Concrete Flatwork. Keep top of curbs flush with adjacent walks or curbs. Depress curbs in drainage swale areas to prevent damming of water. Concrete Landscape Curbs shall be installed prior to beginning all landscape construction activities.

F. Install Weed Barrier Fabric in all shrub bed areas and areas to receive only rock mulch, with the exception of perennial and ground cover areas

3.6 GROUND COVER

A. Space ground cover plants as indicated or scheduled.

B. Dig holes large enough to allow for spreading of roots and backfill with planting soil. Work soil around roots to eliminate air pockets. Water thoroughly after planting, taking care not to cover crowns or trunks of plants with wet soils.

3.7 LANDSCAPE BOULDER PLACEMENT

A. Prior to planting and placing mulch, place landscape boulder as shown on planting drawings.

3.8 MULCHING

A. Bark Mulch and Rock Mulch shall not be placed until the irrigation system; topsoil and planting operations have been completed within the area indicated to receive mulch. Surface upon which the mulch is to be placed shall be graded, compacted to the density as indicated on the drawings and treated with a pre-emergent herbicide. Place at depth indicated on drawings.

B. Areas with rock mulch: after soil preparation and prior to placing rock mulch, place a layer of Weed Barrier fabric over all exposed soil. Overlap seams a minimum of 6-inches.

3.9 TREE STAKING AND GUYING

A. Staking of trees shall be done immediately after they are planted. Plants shall stand plumb after staking. All stakes shall be removed by this Contractor after the guarantee period has concluded.

B. Trees 2 ½" caliper or less shall be supported by two 3" hardwood stakes placed diametrically opposite at perimeter line of ball and to sufficient depth to hold tree rigid. Stakes shall be driven vertically and not twisted or pulled. Tree shall be wired to each stake as indicated on staking details.

3.10 FIELD QUALITY CONTROL

A. General: Notify Owner's Representative at least 48 hours in advance when requesting onsite reviews.

B. Schedule for On-Site Reviews:
1. Pre-job conference.
2. At completion of finish grading.
3. At completion of roto-tilling.
4. At completion of fine grading.
5. At delivery of plant materials.
6. At plant layout prior to excavating pits.
7. After planting pits have been excavated, but prior to backfilling.
8. After initial planting operations. (One tree with each type of specified staking shall be approved prior to planting of trees.)

C. Pre-maintenance Review:
1. At the completion of landscape planting operations and prior to the beginning of the formal maintenance, the Pre-maintenance review shall be held.
2. Request on-site review of Owner's Representative five working days prior to the completion of work in order that a mutually agreeable time for review may be arranged.
3. At the time of review, the areas under the Contract shall be free of weeds, dead leaves and trash, neatly cultivated and raked. Stakes, guys and plant basins shall be in good order.
4. If, after the Pre-maintenance review, Owner's Representative is of the opinion that the work has been performed in accordance with the Drawings and Specifications, written notice of substantial completion will be given. This report will note any items which must be corrected. When inspected landscape work does not comply with requirements, replace rejected work and continue specified maintenance until re-inspected by Owner's Representative and found to be acceptable. Remove rejected plants and materials promptly from project site.

D. Establishment Period: Perform in accordance as specified by Owner.

E. Final Review: Perform Final Review in accordance as specified by Owner.

3.11 CLEAN UP AND PROTECTION

A. During landscape work store materials and equipment where directed. Keep pavement clean and work area in an orderly condition.

B. Protect landscape areas, work and materials from damage due to operations by other contractors and trades, trespassers. Maintain protection during installation and maintenance periods. Treat, repair or replace damaged landscape work as directed.

C. Keep the site free from accumulation of waste material. At the time of completion, all areas must be swept and washed clean and all rubbish removed to the satisfaction of the Engineer and WSU representative.

D. Temporary occupancy of the project shall not relieve the contractor of any of the obligations enumerated in the Contract Documents.

3.12 LANDSCAPE MAINTENANCE

A. As part of this Contract, this Contractor shall be responsible for the continuous maintenance of all landscape areas, i.e., weeding, watering, mowing, fertilization, etc. from the time that each section of lawn is required to be planted (see Drawings) until the Project Date of Substantial Completion (See Section 01100 – Summary) If any lawn area is deemed not to be substantially complete by the Project Date of Substantial Completion, all required maintenance shall be provided by this Contractor after the Project Substantial Completion date, until said area is substantially complete. Any deficiencies noted by the owner need to be resolved within 24 hours of notification and or a plan provided for remediation.

B. Maintain plants in a vigorous, thriving condition by watering, cultivating, weeding, pruning, spraying and other necessary operations. No trees or shrubs will be accepted unless they are healthy and show satisfactory foliage conditions. Plants shall be maintained through the length of the total site maintenance period.

1. All planted areas shall be cultivated at least every two (2) weeks and raked smooth, to present a neat appearance.
2. Spray as required to keep plant materials free of disease and insects with supervision by Engineer and WSU representative.
3. Replace mulch to maintain specified depth.

C. The Contractor shall instruct the Owner as to the watering requirements and shall monitor such operations at all times. The Contractor shall be held responsible for failure to monitor the watering requirements and shall be held responsible to replace any or all plants that are lost due to improper application of water.

D. Lawns shall be maintained for as much time as necessary to establish over the entire lawn a close stand of grass of the varieties specified, free of weeds and undesirable coarse, native grasses, but in no case less than four growing months or two mowings after substantial completion of landscape and irrigation work.

E. All lawns shall be fertilized every three (3) weeks with six (2) pounds of 16-16-8 commercial fertilizer per 1000 sq ft until the end of the maintenance period required. It shall be the responsibility of this Contractor to notify the Engineer and Owner in writing 48 hours prior to fertilizing to provide visual verification of work.

F. Maintenance shall include, in addition to the above, cleaning, edging and repair to erosion and all other necessary work of maintenance. Sidewalks and other paved areas shall be kept clean when planting and maintenance are in progress.

G. Any and all sprinkler lines broken or disrupted during the construction and maintenance period shall be replaced to proper working order and be acceptable to the Owner.

H. Once the written form of the Certificate of Substantial Completion has been issued. Owner assumes full responsibility for all landscape maintenance hereafter.

3.13 FINAL INSPECTION AND ACCEPTANCE

A. Inspection will be made of the entire site periodically and at the conclusion of the maintenance period required.

B. The landscape work may be inspected for acceptance in parts agreeable to the Engineer or WSU Representative, provided the work offered for inspection is complete; including maintenance and that the area comprises one unit or area of substantial size.

C. Written notice requesting final inspection shall be submitted to the Engineer or WSU Representative at least ten (10) days prior to the anticipated inspection date.

D. Where inspected landscape work does not comply with the requirement, replace rejected work and continue specified maintenance until re-inspected by the Engineer or WSU Representative and found to be acceptable. Remove rejected plants and materials promptly from the project site.

E. Final Acceptance: The work under this contract will be accepted upon written approval by the Engineer and the Owner, on the satisfactory completion of all work, including maintenance.

F. All work done under this contract shall be left in good order to the satisfaction of the Owner and the Engineer and the Contractor shall without additional expense, replace any trees, etc. which develop defects or die within one year of the substantial completion.

1. A written guarantee that covers the above provisions shall be signed by the Contractor and delivered to the Engineer or WSU Representative upon acceptance of the work.
2. The guarantee shall not be binding upon the Contractor if any failure should be proved to the satisfaction of the Engineer or WSU Representative to result from circumstances or negligence of parties over whom the Contractor has no control.

END OF SECTION

UDOT SPECIAL PROVISION
SECTION 02940S
DECOMPOSED GRANITE SURFACE

Add Section 02940S:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Material and labor requirements for construction of decomposed granite and crushed stone surfacing with binder for Decomposed Granite Surface as shown on Drawings and specified herein. Includes sub-grade, geotextile separation fabric underlayment and related accessories.

1.2 RELATED SECTIONS

A. Section 02075 – Geotextiles

B. Section 02915S – Landscape Finish Grading

1.3 REFERENCES

A. ASTM C136 – Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

B. ASTM D448 – Standard Classification for Sizes of Aggregate for Road and Bridge Construction.

1.4 DEFINITIONS (Not Used)

1.5 SUBMITTALS

A. Comply with Section 01450 – Submittals

B. Product Data: Manufacturer's literature completely describing all components of the decomposed granite surfacing system, including:
   1. Preparation instructions and recommendations.
   2. Installation methods and application procedures.

C. Samples for Verification:
   1. Submit samples of each of the following:
      a. Three pound sample of each type and color of decomposed granite surfacing material

D. Certification
   1. Manufacturer and Installer Qualifications

1.6 Quality Assurance

A. Comply with Section 01455 – Material Quality Requirements

B. Manufacturer: Company specializing in manufacturing Work of this Section with minimum 25 years documented experience.

C. Single Source Responsibility: Obtain decomposed granite surfacing from single manufacturer

D. Mock Up: Provide a mock-up for evaluation of surface preparation, installation techniques and quality of application.
   1. Install a 4-feet x 4-feet minimum of decomposed granite surfacing, including subbase course and edging, at location approved by Engineer.
   2. Do not proceed with remaining work until installation of decomposed granite surfacing is approved by Engineer.
   3. Approved mock-up may remain as part of completed Work.

1.7 Delivery, Storage, and Handling

A. Bagged Materials: Accept delivery of materials only in unopened and undamaged containers bearing the brand name and manufacturer's identification.

B. Bulk Materials: Each load of decomposed granite surfacing material arriving at the job site in bulk shall be accompanied by a delivery ticket containing the following minimum information:
   1. Quarry of origin.
   2. Amount, weight and type of material.
   3. Brand name and manufacturer's identification.

C. Protect decomposed granite surface surfacing materials from contamination until ready for installation. Store under cover.

1.8 PROJECT CONDITIONS

A. Surfaces to receive decomposed granite surfacing shall be frost free and free of oil or any other foreign matter, which may impair the proper installation of the surfacing system.

B. Do not install decomposed granite surfacing when subbase course is muddy or saturated with standing water.

C. Perform work in dry weather when subgrade is sufficiently stable to be properly compacted.

PART 2 PRODUCTS

2.1 DECOMPOSED GRANITE SURFACING MATERIALS

A. Decomposed Granite and Crushed Stone Aggregate: Provide high quality materials consisting of sound, angular, durable stone particles, free from clay lumps, organic materials, frozen materials, or other deleterious substances.

B. Gradation: Manufacturer's standard mix of well-graded materials in accordance with ASTM C136. Blends of coarse sand and rock dust are not acceptable.

Standard Decomposed Granite Surface Optimal Gradation		
Sieve	**Sieve Size (mm)**	**Percent Passing**
3/8"	9.51	100%
#4	4.76	80-100%
#8	2.36	65-90%
#16	1.18	40-60%
#30	0.6	25-55%
#50	0.3	15-35%
#100	0.149	10-20%
#200	0.074	7-15%

2.2 Binder

A. Non-toxic, organic binder that is a colorless and odorless concentrated powder that binds decomposed granite or crushed 3/8” or 1/4" minus aggregate.

B. Product to have 64% pre-consumer recycled content.

C. Stabilizer® Binder by Stabilizer Solutions, or approved equal

2.3 ACCESSORIES

D. Water: Clean and potable, free from contaminants that would be deleterious to the decomposed granite.

E. Herbicide: Commercial chemical for weed control, registered by the EPA, and not classified as "restricted use" for locations and conditions of application. Application of the herbicide shall pose no short or long term health threats to the installer or the general public.

PART 3 EXECUTION NOT USED

3.1 EXAMINATION

A. Examine areas and conditions under which Work of this Section will be performed. Notify Engineer of unsatisfactory preparation before proceeding.

B. Correct conditions detrimental to timely and proper completion of Work.

C. Do not proceed until unsatisfactory conditions are corrected.

D. Lay out work prior to the commencement of installation.

3.2 PREPARATION

A. Excavation: Excavate to depth required so edges of decomposed granite surfacing will match adjacent grades and have a maximum cross-slope of 2 percent. Ensure edges and bottom of excavation are in a smooth and even line.

B. Subgrade Preparation: compact to 95% of the maximum laboratory dry density as determined by the Standard Proctor test.

C. Herbicide: Apply herbicide per manufacturer’s written instructions. Limit the application to the area to receive decomposed granite surfacing.

D. Place Separation Geotextile per Section 02075 over all surfaces to receive Decomposed Granite Surface.

3.3 SUBGRADE

A. The surface of the completed subgrade shall be bladed to a smooth and uniform texture.

B. The finished subgrade shall be uniform and free from deleterious debris such as organic materials, nails, stones and loose soil.

3.4 BLENDING BINDER

A. Binder shall be thoroughly pre-mixed with aggregate at a rate per manufacturer instructions. Verify with manufacturer correct binder rate for project and climate. Drop spreading of binder over pre-placed aggregate or mixing by rototilling is not acceptable. Binder shall be mechanically pre-mixed per manufacturer’s recommendations using an approved mechanical

blending unit to adequately blend binder with aggregate (Bucket blending is not an approved blending apparatus). Always blend binder and aggregate DRY.

3.5 INSTALLATION OF DECOMPOSED GRANITE SURFACING

A. Spread decomposed granite surfacing material over geotextile fabric. Spread the mix evenly and smoothly before compacting. Allow for 20-25% compaction. Screed if possible.

B. Wet the mix to ensure water has penetrated the full depth of the decomposed granite surfacing material, and roll each lift to form a uniform, smooth surface with a cross slope of 2% maximum. Compact each lift to a minimum 95% density.

C. Grade and smooth to the required elevation. Finished surface shall be a maximum of 1/2" below adjacent paved surfaces.

D. Minimum compacted thickness is 4 inches.

E. Surface shall follow grades per plans. Remove crown, allow 1-2% cross pitch.

F. Completed surface shall be of consistent quality and shall not have depressions or humps greater than 1/4-inch in 10-feet.

3.6 INSTALLATION TOLERANCES

A. Decomposed Granite Surfacing Thickness: Allow for 20-25% compaction.
   1. Surface Course: Plus 1/4-inch, no minus.

B. Decomposed Granite Surfacing Smoothness: Produce a surface smoothness within 1/4-inch tolerance when measured with a 10-foot straightedge.

3.7 CLEAN-UP AND PROTECTION

A. Thoroughly clean all areas where work has occurred. Remove from site excess material, debris and rubbish.

B. Take all precautions necessary to protect completed work until Substantial Completion of project.

END OF SECTION

UDOT SPECIAL PROVISION
SECTION 03055S
PORTLAND CEMENT CONCRETE

Delete Section 03055 in its entirety and replace with the following:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Portland Cement Concrete.

1.2 RELATED SECTIONS

A. Section 03390: Concrete Curing

1.3 REFERENCES

A. AASHTO M 6: Fine Aggregate for Hydraulic Cement Concrete

B. AASHTO M 80: Coarse Aggregate for Hydraulic Cement Concrete

C. AASHTO M 85: Portland Cement

D. AASHTO M 154: Air-Entraining Admixtures for Concrete

E. AASHTO M 157: Ready-Mixed Concrete

F. AASHTO M 194: Chemical Admixtures for Concrete

G. AASHTO M 295: Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete

H. AASHTO M 307: Silica Fume Used in Cementitious Mixtures

I. AASHTO T 160: Length Change of Hardened Hydraulic Cement Mortar and Concrete

J. AASHTO T 325: Estimating the Strength of Concrete in Transportation Construction by Maturity Tests

K. AASHTO T 358: Surface Resistivity Indication of Concrete's Ability to Resist Chloride Ion Penetration

L ASTM C 150: Portland Cement

M. ASTM C 595: Blended Hydraulic Cements

N. ASTM C 1157: Hydraulic Cement

O. ASTM C 1567: Determining the Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method)

P. ASTM C 1602: Mixing Water Used in the Production of Hydraulic Cement Concrete

Q. American Concrete Institute (ACI) Manual of Concrete Practice

R. UDOT Materials Manual of Instruction

S. UDOT Minimum Sampling and Testing Requirements

T. UDOT Quality Management Plan

U. AASHTO T 121: Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete

V. ASTM C 1116: Fiber-Reinforced Concrete

W. ASTM C 1609: Flexural Performance of Fiber-Reinforced Concrete (Using Beam With Third-Point Loading)

X. ICC Evaluation Service (ICC-ES) AC32: Concrete with Synthetic Fibers

1.4 DEFINITIONS

A. Cold Weather Protection Period: The required time during which the concrete is maintained at or above a specific temperature to prevent freezing of the concrete and to provide the necessary strength development for structural safety.

B. Fibrillated Microfiber – Fibrillated synthetic fibers with diameters or equivalent diameters less than 0.012 inch.

C. Macrosynthetic Fiber – Synthetic fibers with diameters or equivalent diameters greater than 0.012 inch.

1.5 SUBMITTALS

A. Mix design for all AAA, AA, and A concrete classes to be used for approval.
   1. The Department approves concrete mix designs based on trial batch test results or on Department project history.
      a. The Department will monitor approved mix designs on the performance of compressive strength on all projects, according to the UDOT Materials Manual of Instruction. The Department will revoke approval if a mix is determined to be uncontrolled.
   2. Include at least the following:
      a. The proposed mix design.
      b. Target slump value.
      c. Trial batch test results.
      d. Test results verifying that coarse and fine aggregates meet this Section, Article 2.2, paragraph B.
      e. Test results for the proposed mix design for potential reactivity of coarse and fine aggregates according to UDOT Quality Management Plan 506: Ready-Mix Concrete.
      f. Test results demonstrating the ability of the combinations of cementitious materials and aggregates to control the reactivity when using potentially reactive aggregates in a mix design.
      g. Written plan for admixtures. Refer to this Section, Article 2.2, paragraph D.
      h. Well-graded combined aggregate gradation for the mix design when used.
         1) Provide targets for each required sieve (listed in Tables 6) for control and acceptance.
         2) Include the sum of the percent retained on the #8, #16 and #30 sieves. Submit the sum of the percent retained on each of the #30-200 sieves listed in Table 6.
         3) Identify the aggregate size and number of component stockpiles.
         4) Provide gradations for each component stockpile and the target percentages of each stockpile used to achieve the total combined gradation.
      i. Test results establishing a density (unit weight) target of freshly mixed concrete according to AASHTO T 121 when using Class AA(LSF) and AA(ES) concrete.

B. Mix design, manufacturer's product data, or manufacturer's labeling for Class B concrete for approval.

C. Cold Weather Concreting Plan and Hot Weather Concreting Plan for review.
   1. Include the following:

a. Detailed procedures for the placement, protection, curing, and temperature monitoring of concrete during cold and hot weather.
b. Procedures to be implemented upon abrupt changes in weather conditions or equipment failures.
c. Refer to this Section, Article 3.1, paragraph D for cold weather concreting requirements and Article 3.1, paragraph E for hot weather concreting requirements.

2. Allow the Engineer 10 calendar days to review the plans.
   a. The Engineer may grant an increase in contract time when this review and approval time is exceeded.
   b. This review period applies each time the plans are submitted.
3. Do not begin cold weather concreting before the Cold Weather Concreting Plan is approved.
4. Do not begin hot weather concreting before the Hot Weather Concreting Plan is approved.
5. Not required for precast concrete members provided by prequalified suppliers. Refer to this Section, Article 3.1, subparagraph D1 for cold weather. Refer to this Section, Article 3.1 paragraph E3 for hot weather.

1.6 ACCEPTANCE

A. Sampling and testing for strength, air entrainment, and slump is according to UDOT Minimum Sampling and Testing Requirements.
   1. The following exceptions apply when using Class AA(LSF) and AA(ES) concrete mixes:
      a. Slump tests are suspended.
      b. Test fresh concrete density (unit weight) according to AASHTO T 121 at the same frequency as Air Content and Concrete Temperature.
         1) Batch fails if the unit weight of the fresh concrete in the field varies more than ± 5 lb/ft^3 from the target density for fresh concrete established by the mix design.

B. The Department rejects the portion of a lot represented by a strength test that is more than 500 psi below the 28 Day Minimum Compressive Strength *f 'c* (psi) in Table 1.
   1. The Engineer may accept reject material based on the materials dispute resolution process. The Department applies a 0.50 pay factor to the pay item for the quantity represented if reject material is allowed to remain in-place.

PART 2 PRODUCTS

2.1 CONCRETE CLASSES AND MIX REQUIREMENTS

A. Use only concrete mixes that have a Department approved mix design.
1. Refer to the requirements in Table 1.

Table 1

Concrete Classes and Mix Requirements							
Class	**Coarse Aggregate Size**	**Maximum Water / Cementi-tious Ratio******	**Maximum Percent Shrinkage at 28 days AASHTO T 160**	**Chloride Ion Penetration AASHTO T 358 Table 1**	**Air Content Percent (%)**	**Mix Design Compressive Strength *f'*cr (psi)**	**28 Day Minimum Compressive Strength *f'*c (psi) ****
AAA(AE)	1" to No. 4 ¾" to No. 4	0.40	N/A	N/A	5.0 - 7.5	6,200 or f'c +1200	5,000 or as shown
AA(LSF)	1" to No. 4 ¾" to No. 4	0.42	0.035	Low to Negligible	5.0 - 7.5	5,200	4,000
AA(LS)	1" to No. 4 ¾" to No. 4	0.40	0.035	Low to Negligible	5.0 - 7.5	5,200	4,000
AA(P)	2" to No. 4 1½" to No. 4 1" to No. 4	0.44	0.042	N/A	4.0 - 7.0 4.5 - 7.5 5.0 - 7.5	5,200	4,000
AA(ES)***	1½" to No. 4 1" to No. 4 ¾" to No. 4	0.42	0.035	Low to Negligible	4.5 - 7.5 5.0 - 7.5 5.0 - 7.5	5,200	4,000
AA(AE)	2" to No. 4 1½" to No. 4 1" to No. 4 ¾" to No. 4	0.44	N/A	N/A	4.0 - 7.0 4.5 - 7.5 5.0 - 7.5 5.0 - 7.5	5,200	4,000
A	1½" to No. 4 1" to No. 4 ¾" to No. 4	0.53 0.53 0.48	N/A	N/A	N/A	3,900	3,000
A(AE)	1½" to No. 4 1" to No. 4 ¾" to No. 4	0.53 0.53 0.48	N/A	N/A	4.5 - 7.5	3,900	3,000
B or B(AE)		0.62	N/A	N/A	N/A 3.0 - 6.0	3,250	2,500

Table 1 Notes:

* Values listed represent in-place air content. Make necessary adjustments for impacts to air content due to placement.

** For *f* 'c over 4,000 psi, design and proportion mixes according to ACI Manual of Concrete Practice 301: Specifications for Concrete and project specific criteria. Use air content percent in Table 1 for these mixes according to the class specified and the coarse aggregate size.

*** For Class AA(ES), achieve at least 3,000 psi at 24 hr.

****The Water/Cementitious ratios in this table are the maximum allowed. The mix design w/c ratio is established in the trial batch and will remain within the tolerances of this Section Article 2.6 during production.

Acronym Definitions:

AE = air-entrained
LSF = low shrinkage with fiber
LS = low shrinkage
P = pavement
ES = early strength

B. Maximum nominal size of coarse aggregate:
   1. Not larger than $^1/_5$ the narrowest dimension between sides of forms.
   2. Not larger than ⅓ the depth of slabs.
   3. Not larger than ¾ the minimum clear distance between reinforcing bars or between bars and forms, whichever is less.

C. Do not exceed water/cementitious ratio.
   1. Calculate the water/cementitious ratio (w/c) by weight according to the following formula:

$$\frac{w}{c} = \frac{Water}{Cement + Pozzolan}$$

D. Do not exceed 30 percent total pozzolan in any mix unless approved or otherwise specified.

E. Use 94 lb additional cementitious material per cubic yard to the amounts determined in the mix design for concrete deposited in water.

F. Slump tolerance
   1. Establish the target slump by mix design trial batch.
   2. The target slump tolerance is the acceptable variation from the maximum target slump.
   3. Do not exceed a 9 inch slump.

Table 2

Target Slump Tolerance (inch)		
	Target Slump	
	3 inch or less	More than 3 inch
Plus tolerance	0	0
Minus tolerance	1 ½ inch	2 ½ inch

G. Class AA(LSF) and AA(ES) concrete mixes require the following in addition to the requirements in Table 1:
   1. Synthetic Fiber Reinforcement according to this Section, paragraph 2.2F.
      a. Provide fibrillated microfibers and macrosynthetic fibers
   2. A well-graded combined aggregate gradation according to this Section, paragraph 2.2 B3.

2.2 MATERIALS

A. Cement
   1. Use Type II Portland Cement or equivalent according to Table 3 unless otherwise specified. Type III Portland Cement or equivalent may be used for precast items.
   2. Blended Hydraulic Cement
      a. Blended hydraulic cement substituted for Portland Cement:
         1) Use ASTM C 1567 to verify that expansion is less than 0.1 percent 14 days after the zero reading.
         2) Refer to the equivalent cements listed in Table 3.
      b. Do not exceed 30 percent total pozzolan limit when adding fly ash to a blended hydraulic cement.
         1) Submit documentation of the total pozzolan content with the mix design.

Table 3

Portland Cement/Blended Hydraulic Cement Equivalencies		
AASHTO M 85 Equivalent Alkalis 0.80 max percent	**ASTM C 595**	**ASTM C 1157**
*Type I	IP, IL, IT	GU
Type II	IP(MS), IT(MS)	MS
Type III	-	HE
*Type V	IP(HS), IT(HS)	HS

*Use only when specified

   3. Do not mix cements originating from different sources.
   4. Do not use air-entrained cement.

B. Aggregate

1. Coarse Aggregate

a. Use coarse aggregate that meets AASHTO M 80 physical properties. Use one of the gradations in Table 4.

b. Do not exceed percentages of deleterious substances as specified in AASHTO M 80, Table 1, for Class A aggregates.

Table 4

Coarse Aggregate Gradations - Percent Passing (by weight)									
Aggregate Size (inches or sieve size)	**2½**	**2**	**1½**	**1**	**¾**	**½**	**⅜**	**No. 4**	**No. 200**
2 to No. 4	100	95-100		35-70		10-30		0-5	0-1
1½ to No. 4		100	95-100		35-70		10-30	0-5	0-1
1 to No. 4			100	95-100		25-60		0-10	0-1
¾ to No. 4				100	90-100		20-55	0-10	0-1

2. Fine Aggregate

a. Use fine aggregate that meets AASHTO M 6 physical properties. Use the gradation in Table 5.

b. Do not exceed percentages of deleterious substances as specified in AASHTO M 6, Table 1, for class A aggregates, using option “b” for material finer than the No. 200 sieve.

Table 5

Fine Aggregate Gradation	
Sieve Size	**Percent Passing (by weight)**
⅜ inch	100
No. 4	95 to 100
No. 16	45 to 80
No. 50	10 to 30
No. 100	2 to 10
No. 200	0 to 3.0

3. A well-graded combined aggregate gradation is required for AA(LSF) and AA(ES) concrete classes and may replace the gradation requirements in Tables 4 and 5 for other concrete classes when designed and approved as such.

a. Proportion well-graded combined aggregates to meet the Tarantula Curve Gradation Band in Table 6. The combined gradation must be within the boundary limits for each sieve size. Refer to the UDOT Materials Manual of Instruction,

Section 975: Guidelines for Well-Graded Combined Aggregate Gradations for a graphical representation of the Tarantula Curve.

1) Slip formed pavements: retain at least 15 percent on the sum of the #8, #16 and #30 sieves.
2) Slip formed pavements: retain between 24 and 34 percent of fine sand on the sum of the #30 through #200 sieves.
3) Flowable applications: retain at least 20 percent on the sum of the #8, #16 and #30 sieves.
4) Flowable applications: retain between 25 and 40 percent of fine sand on the sum of the #30 through #200 sieves.

Table 6

Tarantula Curve Gradation Band	
Sieve Size	**Individual Percent Retained**
2 in.	0
1 ½ in.	0 to 5
1 in.	0 to 16
¾ in.	0 to 20
½ in.	4 to 20
3/8 in.	4 to 20
No. 4	4 to 20
No. 8	0 to12
No. 16	0 to 12
No. 30	4 to 20
No. 50	4 to 20
No. 100	0 to 10
No. 200	0 to 2.3

C. Water
1. Use potable water or water that meets ASTM C 1602, including Table 1.

D. Admixtures
1. Do not use calcium chloride.
2. Air Entrainment according to AASHTO M 154, including Section 5.
3. Water Reducing Agents
   a. Refer to AASHTO M 194.
   b. High Range Water Reducer (HRWR) – Submit a written plan for approval with the trial batch that details ingredients, production methods, handling, and placing.
4. Accelerators – Refer to AASHTO M 194.
5. Set Retarding and Hydration Stabilizing Admixtures – Refer to AASHTO M 194.

a. Establish and inform the Engineer of the effective life of the set-retarding or stabilizing admixture by trial batch if admixtures are required due to haul times exceeding the time limitations in this Section, Article 3.1, paragraph A.
b. Do not exceed manufacturer's recommendations for the use of the set retarding admixture.
c. Do not re-dose the concrete with additional set retarding admixture.
d. Add admixture at the batch plant at the time of initial batching operations.
e. Show on batch tickets the amount of admixture used.
f. Time of placement is established by the trial batch and supersedes the requirements in this Section, Article 3.1, paragraph A.

6. Site-added air-entrainment – Refer to AASHTO M 154.
   a. Limit the use of site-added air-entraining agents to one addition per load, regardless of quantity.
   b. Use pre-measured admixtures.
   c. Record amount used on batch ticket.
   d. Rotate the drum at least 30 revolutions at the mixing speed recommended by the manufacturer.

E. Pozzolan
1. Fly Ash
   a. Class F according to AASHTO M 295 except Table 1.
      1) Loss on Ignition (LOI) Not to exceed 3 percent.
      2) Allowable CaO content Not to exceed 15 percent.
      3) Label the storage silo for fly ash to distinguish it from cement.
      4) Use different size unloading hoses and fittings for cement and fly ash.
2. Natural Pozzolan (Class N)
   a. Refer to AASHTO M 295.
   b. May use instead of fly ash provided that the expansion does not exceed 0.1 percent. Refer to ASTM C 1567.
3. Silica Fume
   a. Refer to AASHTO M 307.

F. Synthetic Fiber Reinforcement
1. Fibrillated microfiber
   a. Use fibrillated polypropylene fibers at 1 lb/yd^{3}of concrete mix.
2. Macrosynthetic fiber
   a. Use 4 lb/yd^3 of concrete mix.
   b. Provide a minimum flexural strength ratio ($R_{e,3}$) of 25 percent when tested according to ASTM C 1609.

3. Store the fibers in a dry, covered area, free of contamination.
4. Evaluate trial batches to verify workability of the concrete.
5. Conform to ASTM C 1116, Type III and the requirements of ICC-ES AC32 Section 3.1.1 (plastic shrinkage reinforcement) and Section 3.1.2 (shrinkage and temperature reinforcement).
6. Do not introduce fibers at the same time as the cement is being introduced.
7. Mix for at least five minutes after the addition of the fibers.

2.3 MIX DESIGN

A. Design mixes to meet the requirements of this Section and project specific criteria.

B. The Contractor assumes responsibility for the compatibility of admixtures with the mix design and their potential effects on concrete properties.

C. Design the cementitious system to mitigate potential alkali-aggregate reactivity.
   1. Use at least 20 percent pozzolan by weight of the total cementitious system.

D. Obtain approval from the Engineer for the project specific application of an approved mix design.

2.4 TRIAL BATCHES

A. Use the same components in the trial batches that will be used in the project.
   1. Accelerators and site-added air-entrainment can be incorporated in the trial batch but are not required.

B. Use Department certified TTQP Concrete and Concrete Strength Testing personnel to perform trial batches and strength tests.

C. The Department or its certified representative may witness the trial batch.

D. Mix concrete trial batches according to the UDOT Materials Manual of Instruction 974: Guidelines for Portland Cement Concrete Mix Design Trail Batches.

E. Use a Department qualified laboratory to verify trial batch compressive and flexural strength testing.

2.5 AGGREGATE STOCKPILES

A. Construct stockpile platforms so that subgrades are prevented from intruding into aggregates.

B. Build stockpiles at least two days before use.

C. Provide an operator and front-end loader to help the Engineer take aggregate samples.

D. Provide separate stockpiles for coarse and fine aggregates.

E. Construct stockpiles to minimize segregation of aggregates

F. Allow washed aggregates to drain to uniform moisture content before use (12 hours minimum).

2.6 BATCH MATERIALS

A. Batch Tolerances. Refer to AASHTO M 157.
1. Cementitious Material : ± 1 percent of the required mass
2. Aggregate: ± 2 percent of the required mass
3. Total Water: ± 3 percent of the required mix amount

B. Batch Size
1. Do not load trucks in excess of the rated mixing capacity.
2. Maintain an accurate and legible truck load-rating plate on the truck.
3. Maintain a minimum individual batch size of 2 yd^3.

PART 3 EXECUTION

3.1 LIMITATIONS

A. Timing – Deliver, place, and consolidate concrete as follows unless otherwise specified:
1. Within 90 minutes of batching when the air temperature is below 80 degrees F.
2. Within 75 minutes of batching when the air temperature is between 80 and 85 degrees F.
3. Within 60 minutes of batching when the air temperature is above 85 degrees F.

B. Concrete Temperature – Place concrete when the concrete temperature is between 50 and 90 degrees F unless otherwise specified.

C. Pumping and Conveying Equipment
   1. Do not use equipment or a combination of equipment and the configuration of that equipment that causes a loss of entrained air content that exceeds one-half of the range of air content allowed by specification.
      a. Replace, reconfigure, or repair equipment that does not meet this requirement.

   2. Contractor is responsible to verify and monitor air loss.

D. Cold Weather – Comply with the following when placing, finishing, curing, and protecting concrete exposed to cold weather during the protection period. Cold weather applies when the temperature is forecast to fall below 35 degrees F during the protection period.
   1. Provide necessary cold weather protection for placing, finishing, curing and protecting in-place concrete such as covers, insulation, and heat.
      a. Follow the authorized Cold Weather Concreting Plan when placing cast-in-place concrete.
      b. Follow the prequalified supplier's approved Quality Control Plan when fabricating precast concrete members.
   2. Concrete materials
      a. Do not use chemical anti-freeze additives in the concrete. This does not apply to normal accelerators. Refer to AASHTO M 194.
      b. Remove and replace concrete damaged by frost action at no additional cost to the Department.
      c. Do not use material containing frost or lumps.
   3. Determine the concrete compressive strength by one of the following methods:
      a. Field cured cylinders cured and protected the same as the concrete being protected.
      b. Maturity method. Refer to AASHTO T 325.
   4. Maintain the temperature of the concrete at or above 50 degrees F during and after placement until the end of the protection period.
      a. Measure the specified concrete temperature at the concrete surface. Use surface thermometers insulated from the surrounding air.
   5. Placing concrete
      a. Do not place concrete during adverse weather including rain, snow, and high winds without adequate protection approved by the Engineer.

b. Do not proceed with concrete placement if the temperature of a contact surface, such as reinforcement or formwork, is less than 36 degrees F or greater than 95 degrees F.
c. Cease placement operations when the ambient temperature is 40 degrees F and decreasing unless adequate precautions are taken according to the approved Cold Weather Concreting Plan.

6. Protection of in-place concrete
   a. Maintain the concrete above 50 degrees F during placement and until the end of the protection period.
      1) The protection period is the time required for the concrete to reach a compressive strength of at least 3,500 psi.
      2) Extend the duration of the protection period at least 24 hours beyond the termination of the cure before exposing the concrete to freezing temperatures when curing by the water method. Refer to Section 03390.
   b. Comply with the following when heating is required.
      1) Adequately vent combustion-type heaters that produce carbon monoxide.
      2) Position heaters and ducts so the hot dry air does not cause areas of the concrete surface to overheat or dry.
      3) Keep concrete surfaces moist to avoid excessive loss of moisture from the concrete when applying external heat.
7. Termination of protection
   a. Limit the drop in temperature of concrete surfaces to 40 degrees F during any 24 hour period when removing cold weather protection until the surface temperature of the concrete reaches that of the ambient air temperature.

E. Hot Weather – Comply with the following when placing, finishing, curing, and protecting concrete exposed to hot weather during the protection period.
1. Hot weather limitations apply at any time of the year when a combination of high ambient temperature, high concrete temperature, low relative humidity, and high wind speed have the potential to impair the quality of freshly mixed or hardened concrete by accelerating the rate of moisture loss and the rate of cement hydration, or otherwise causes detrimental results.
2. Monitor site conditions, including air temperature, relative humidity, and wind speed, to assess the need for evaporation control measures.
   a. Begin monitoring no later than 1 hour before beginning concrete placing operations.

b. Continue to monitor site conditions at intervals of 20 minutes or less until required curing procedures are applied.

3. Provide necessary hot weather protection.
   a. Follow the approved Hot Weather Concreting Plan when placing cast-in-place concrete.
   b. Follow the prequalified supplier's approved Quality Control Plan when fabricating precast concrete members.

   c. Initiate evaporation control measures when concrete and air temperatures, relative humidity of the air, and wind speed have the capacity to evaporate free water from the fresh concrete surface at a rate equal to or greater than 0.2 $lb/ft^2/hr$.
      1) Determine the evaporation rate of surface moisture using the NRMCA Nomograph in Appendix B of ACI 305.1.
4. Cool all surfaces that will come in contact with the concrete to below 95 degrees F

3.2 CYLINDER STORAGE DEVICE

A. Provide and maintain cylinder storage device.
   1. Maintain cylinders at a temperature range of 60 degrees F to 80 degrees F for the initial 16 hour curing period.
   2. Do not move the cylinders during this period.
   3. Equip the storage device with an automatic 24 hour temperature recorder that continuously records on a time/temperature chart with an accuracy of ±1 degree F.
   4. Have the storage device available at the point of placement at least 24 hours before placement.
   5. Stop placement of concrete if the storage device is not provided or cannot accommodate the required number of test cylinders. Cylinder strength results may not be disputed if storage devices are not provided.
   6. Use water containing hydrated lime if water is to be in contact with cylinders.
   7. The Engineer may require a 24 hour test run to determine the storage device capability to maintain and record temperature.

END OF SECTION

UDOT SPECIAL PROVISION
SECTION 05721S
EXTERIOR ORNAMENTAL RAILINGS

Add Section 05721S:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fabrication and installation of exterior ornamental handrails and guardrails located on WSU campus and off station.

1.2 RELATED SECTIONS

A. Section 02776M; Concrete Flatwork

1.3 REFERENCES (Not Used)

1.4 DEFINITIONS

A. Railings: Guardrails, handrails, and similar devices used for protection of occupants at open-sided floor areas, pedestrian guidance and support, visual separation, or wall protection.

1.5 PERFORMANCE REQUIREMENTS

A. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:
   1. Stainless Steel: 60 percent of minimum yield strength.

B. Structural Performance: Provide railings capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
   1. Handrails:
      a. Uniform load of 50 lbf/ ft. (0.73 kN/m) applied in any direction.
      b. Concentrated load of 200 lbf (0.89 kN) applied in any direction.
      c. Uniform and concentrated loads need not be assumed to act concurrently.

C. Thermal Movements: Provide exterior railings that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

D. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.6 SUBMITTALS

A. Product Data: For the following:
   1. Manufacturer's product lines of railings assembled from standard components.
   2. Grout, anchoring cement, and paint products.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
   1. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Samples for Initial Selection: For products involving selection of color, texture, or design, including mechanical finishes.

D. Samples for Verification: For each type of exposed finish required.
   1. Sections of each distinctly different linear railing member, including handrails, top rails, posts, and balusters.
   2. Fittings and brackets.
   3. Welded connections.
   4. Assembled Samples of railing systems, made from full-size components, including top rail, post, handrail, and infill. Show method of finishing members at intersections. Samples need not be full height.

E. Mill Certificates: Signed by manufacturers of stainless-steel products certifying that products furnished comply with requirements. Mill certificates should come directly from the Mill to WSU for verification.

F. Welding certificates.

G. Qualification Data: For professional engineer.

H. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, according ASTM E 894 and ASTM E 935.

1.7 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of railing through one source from a single manufacturer.

B. Product Options: Attached detail indicates size and the style of railings
   1. Do not modify intended aesthetic effects, as judged solely by WSU Project Manager, except with Project Manager's approval. If modifications are proposed, submit comprehensive explanatory data to Project Manager for review.

C. Welding: Qualify procedures and personnel according to the following:
   1. AWS D1.6, "Structural Welding Code--Stainless Steel."

D. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
   1. Build mockup for each type of railing to be provided (guardrail, handrail, etc…)
   2. Build mockups that show weld quality, bends, and tube thickness of each tube diameter.
   3. Each mockup must include at least one seamless butt joint, one tee joint, and one corner joint or bend.

1.8 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication and indicate measurements on Shop Drawings.

1.9 COORDINATION AND SCHEDULING

A. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

B. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

PART 2 PRODUCTS

2.1 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

B. Brackets, Flanges, and Anchors: Same metal and finish as supported rails, unless otherwise indicated.
   1. Provide cast-metal brackets with flange tapped for concealed anchorage to threaded hanger bolt.
   2. Provide either formed- or cast-metal brackets with predrilled hole for exposed bolt anchorage.
   3. Provide formed-steel brackets with predrilled hole for bolted anchorage and with snap-on cover that matches rail finish and conceals bracket base and bolt head.
   4. Provide extruded-aluminum brackets with interlocking pieces that conceal anchorage. Locate set screws on bottom of bracket.

2.2 STAINLESS STEEL

A. Tubing: ASTM A 554, Grade MT 316L, 33 ksi minimum.

2.3 FASTENERS

A. General: Provide the following:
   1. Stainless-Steel Components: Type 316 stainless-steel fasteners.

B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.

C. Provide concealed fasteners for attaching railings to other work, unless otherwise indicated.
   1. Provide tamper-resistant flat-head machine screws for exposed fasteners, unless otherwise indicated.

D. Anchors: Provide cast-in-place chemical or torque-controlled expansion anchors, fabricated from corrosion-resistant materials with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

2.4 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.5 FABRICATION

A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.

B. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces. All field connections shall be welded.

C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm), unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

D. Form work true to line and level with accurate angles and surfaces.

E. Fabricate exposed connections to be weather tight. Provide weep holes where water may accumulate.

F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.

G. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Provide continuous weld at all connections and fittings.
   1. Use materials and methods that minimize distortion and maintain strength and corrosion resistance of base metals. Ensure that stainless steel does not contact non stainless steel materials during the fabrication process to prevent surface contamination.
   2. Obtain fusion without undercut or overlap.
   3. Remove flux immediately.
   4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.

H. Form changes in direction as follows:
   1. By bending or by inserting prefabricated elbow fittings.

I. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

J. Close exposed ends of hollow railing members with prefabricated end fittings

K. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns, unless clearance between end of rail and wall is 1/4 inch (6 mm) or less.

L. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work, unless otherwise indicated.
   1. At brackets and fittings fastened to plaster or gypsum board partitions, provide fillers made from crush-resistant material, or other means to transfer wall loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.

M. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.

2.6 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipment. All protection shall be removed and disposed by the contractor prior to completion of project.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.7 STAINLESS-STEEL FINISHES

A. Remove tool and die marks and stretch lines or blend into finish.

B. Grind and polish surfaces to produce uniform finish indicated, free of cross scratches.

C. Helically Polished Satin Finish: No. 4.

D. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean

PART 3 EXECUTION

3.1 INSTALLATION, GENERAL

A. Fit exposed connections together to form tight, hairline joints.

B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
   1. Unless intended for field welded connection, do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication.
   2. Set posts plumb within a tolerance of 1/16 inch in 3 feet (2 mm in 1 m).
   3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet (5 mm in 3 m).

C. Adjust railings before anchoring to ensure matching alignment at abutting joints.

D. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.2 RAILING CONNECTIONS

A. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in Part 2 "Fabrication" Article whether welding is performed in the shop or in the field.

3.3 ANCHORING POSTS

A. Form or core-drill holes not less than 6 inches (152 mm) deep and 3 inch (76 mm) diameter for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions.

B. Anchor posts to metal surfaces with flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:
   1. For stainless-steel railings, weld flanges to posts and bolt to metal-supporting surfaces.

C. Install removable railing sections, where indicated, in slip-fit stainless steel sockets cast in concrete.

3.4 ANCHORING RAILING ENDS

A. Anchor railing ends to concrete and masonry with stainless steel sleeves concealed within railing ends and anchored to wall construction with 316 stainless steel anchors and bolts.

B. Anchor railing ends to metal surfaces with stainless steel flanges bolted to metal surfaces and welded to railing ends.

3.5 ATTACHING HANDRAILS TO WALLS

A. Attach handrails to walls with wall brackets. Provide brackets with 1-1/2-inch (38-mm) clearance from inside face of handrail and finished wall surface.

B. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.

C. Secure stainless steel wall brackets to building construction as follows:
   1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
   2. For hollow masonry anchorage, use toggle bolts.

3.6 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports. Payment for these services will be made by Owner.

B. Extent and Testing Methodology: Testing agency will randomly select completed railing assemblies for testing that are representative of different railing designs and conditions in the completed Work. Railings will be tested according to ASTM E 894 and ASTM E 935 for compliance with performance requirements.

C. Remove and replace railings where test results indicate that they do not comply with specified requirements unless they can be repaired in a manner satisfactory to Architect and will comply with specified requirements.

D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.7 CLEANING

A. Clean aluminum and stainless steel by washing thoroughly with clean water and soap, rinsing with clean water, and wiping dry.

3.8 PROTECTION

A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in field to shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION

SECTION 00 0101
PROJECT TITLE PAGE

PROJECT INFORMATION

PROJECT NAME

PROJECT NAME

Ogden-WSU Bus Rapid Transit

DATE OF ISSUE

November 20, 2020 - 100% Station Documents

PROJECT OWNER

Utah Transit Authority

OWNER'S PROJECT NUMBER

18-02925

ARCHITECT'S PROJECT NUMBER

1925

BUILDING NAME

Transit Stations

PROJECT ADDRESS

Ogden, Utah

ARCHITECT

PIVOT Architecture, 44 West Broadway, Suite 300, Eugene, OR 97401

Phone (541) 342-7291

Principal in Charge: Kari G. Turner, AIA - kturner@pivotarchitecture.com

Project Manager: Scott Clarke, AIA - sclarke@pivotarchitecture.com

ARCHITECT'S SEAL AND SIGNATURE

END OF SECTION

SECTION 02 4100
DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Selective demolition of built site elements.

B. Selective demolition of building elements for alteration purposes.

C. Abandonment and removal of existing utilities and utility structures.

1.02 REFERENCE STANDARDS

A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.

B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2019.

1.03 SUBMITTALS

A. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.
   1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences.
   2. Identify demolition firm and submit qualifications.

B. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

1.04 QUALITY ASSURANCE

A. Demolition Firm Qualifications: Company specializing in the type of work required.
   1. Minimum of 5 years of documented experience.

PART 3 EXECUTION

2.01 SCOPE

A. Remove existing canopy and support wall as indicated on Drawings

B. Temporarily remove cladding at building face where canopy is attached to building. Store removed elements for reinstalation following installation of new canopy.

C. Remove other items indicated, for recycling.

D. Fill excavations, open pits, and holes in ground areas generated as result of removals, using specified fill._____.

E. Coordinate demolition work specified in this section with related demolition of adjacent site areas as described in Civil and/or Landscape documents.

2.02 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
   1. Obtain required permits.
   2. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
   3. Provide, erect, and maintain temporary barriers and security devices.
   4. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
   5. Do not close or obstruct roadways or sidewalks without permit.
   6. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.

B. Do not begin removal until receipt of notification to proceed from Owner.

C. Do not begin removal until built elements to be salvaged or relocated have been removed.

D. Protect existing structures and other elements that are not to be removed.
   1. Provide bracing and shoring.
   2. Prevent movement or settlement of adjacent structures.
   3. Stop work immediately if adjacent structures appear to be in danger.

E. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

F. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.

G. Perform demolition in a manner that maximizes salvage and recycling of materials.
   1. Dismantle existing construction and separate materials.
   2. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.

203 EXISTING UTILITIES

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.

E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.

F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

204 SELECTIVE DEMOLITION FOR ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
   1. Verify that construction and utility arrangements are as indicated.
   2. Report discrepancies to Architect before disturbing existing installation.
   3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.

B. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.

C. Remove existing work as indicated and as required to accomplish new work.
   1. Remove items indicated on drawings.

D. Services (Including but not limited to HVAC, Plumbing, and Electrical): Remove existing systems and equipment as indicated.
   1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
   2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
   3. Verify that abandoned services serve only abandoned facilities before removal.
   4. Remove abandoned pipe, ducts, conduits, and equipment; remove back to source of supply where possible, otherwise cap stub and tag with identification.

E. Protect existing work to remain.
   1. Prevent movement of structure; provide shoring and bracing if necessary.
   2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
   3. Repair adjacent construction and finishes damaged during removal work.
   4. Patch as specified for patching new work.

205 DEBRIS AND WASTE REMOVAL

A. Remove debris, junk, and trash from site.

B. Leave site in clean condition, ready for subsequent work.

C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

SECTION 03 1000
CONCRETE FORMING AND ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Formwork for cast-in-place concrete base walls and footings
B. Openings for other work
C. Form accessories
D. Form stripping
E. Placement of anchor bolts, embed plates, and anchorages

1.02 RELATED REQUIREMENTS

A. Section 03 2000 - Concrete Reinforcing.
B. Section 03 3000 - Cast-in-Place Concrete.
C. Section 05 1200 - Structural Steel Framing: Steel anchors and plates in cast-in-place concrete.
D. Section 07 9200 - Joint Sealants
E. Section 13 3423 - Station Platform: Work included in Station Platforms.
F. Division 22 - Plumbing: downspouts and plumbing embedded in concrete.
G. Electrical Drawings: items embedded in concrete.

1.03 REFERENCE STANDARDS

A. ACI 117 - Specifications for Tolerances for Concrete Construction and Materials; 2010 (Reapproved 2015).
B. ACI 301 - Specifications for Structural Concrete; 2016.
C. State of Utah Building Code (International Building Code with State of Utah Amendments), most recent adopted edition.

1.04 SUBMITTALS

A. Provide digital submittals for review by Architect. Do not proceed with work of this section without written approval.
B. Product Data: Provide data on void form materials and installation requirements.

1.05 MOCK-UP

A. Construct Mock-up of Canopy Column Type 1, adjacent concrete paving and finishes, and associated windscreen base wall as specified in Section 03 3000 - Cast-in-Place Concrete.

PART 2 PRODUCTS

2.01 FORMWORK - GENERAL

A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.
B. Design and construct concrete that complies with design with respect to shape, lines, and dimensions.
C. Comply with applicable state and local codes with respect to design, fabrication, erection, and removal of formwork.

2.02 FORM MATERIALS

A. Wood Form Materials
    1. At exposed vertical surfaces: MDO plywood, smooth and free of any surface texture
    2. At other locations: Contrctor discretion in accordance with ACI 347

B. Preformed Steel Forms: Minimun 16 gage, 0.0598 inch thick, matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.

2.03 FORMWORK ACCESSORIES

A. Form Release Agent: Capable of releasing forms from hardened concrete without staining or discoloring concrete or forming bugholes and other surface defects, compatible with concrete and form materials, and not requiring removal for satisfactory bonding of coatings to be applied.
   1. Composition: Colorless, reactive, water-based or solvent-based compound.

B. Reveal/Chamfer Strips: Rigid plastic or wood strip type; 3/4 x 3/4 inch size unless otherwise noted on Drawings; maximum possible lengths. Mill wood strips from straight-grained lumber and surface all sides.

C. Embedded Anchor Shapes, Plates, Angles and Bars: As specified in Section 05 1200.

D. Sealants: Type specified in Section 07 9200 - Joint Sealants. For use in sealing form joints.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify subgrade is at proper depth to accomodate footing and slab thickness.

B. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.02 EARTH FORMS

A. Earth forms are not permitted.

3.03 ERECTION - FORMWORK

A. Erect formwork, shoring, and bracing to achieve design requirements in accordance with requirements of ACI 301.

B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.

C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.

D. Align joints and make watertight. Keep form joints to a minimum.

E. All form joints must be taped or sealed with a suitable material (sealant) to prevent leakage.

F. Coordinate this section with other sections of work that require attachment of components to formwork.

G. If formwork is placed after reinforcement, resulting in insufficient concrete cover over reinforcement, request instructions from Architect before proceeding.

H. Provide chamfer strips at the following locations:
   1. External corners
   2. Reveals where indicated on Drawings
   3. Locations indicated on Drawings

3.04 APPLICATION - FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.05 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Provide formed openings where required for items to be embedded in passing through concrete work.

B. Locate and set in place items that will be cast directly into concrete.

C. Place anchor bolts in accordance with AISC Code of Standard Practice.

D. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.

E. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.

F. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.

G. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

H. Seal openings in formwork at penetrations, utilities, and anchorages.

3.06 FORM CLEANING

A. Clean forms as erection proceeds, to remove foreign matter within forms.

B. Clean formed cavities of debris prior to placing concrete.

3.07 FORMWORK TOLERANCES

A. Construct formwork to maintain tolerances required by ACI 117, unless otherwise indicated.

3.08 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests. Provide timely notices of work requiring testing to testing agency.

B. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and to verify that supports, fastenings, wedges, ties, and items are secure.

3.09 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.

B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

END OF SECTION

SECTION 03 2000
CONCRETE REINFORCING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Reinforcing steel for cast-in-place concrete.

B. Supports and accessories for steel reinforcement.

1.02 RELATED REQUIREMENTS

A. Section 03 1000 - Concrete Forming and Accessories

B. Section 03 3000 - Cast-in-Place Concrete

C. Section 05 5000 - Metal Fabrications: Epoxy adhesive and expansion anchors for concrete

D. Section 08 8000 - Glazing: Anchorage of windscreen base to concrete

E. Section 13 3423 - Station Platform: Work included in Station Platforms

F. Division 22 - Plumbing, downspouts and plumbing embedded in concrete

G. Electrical Drawings: items embedded in concrete

1.03 REFERENCE STANDARDS

A. ACI 301 - Specifications for Structural Concrete; 2016.

B. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2018).

C. ACI SP-66 - ACI Detailing Manual; 2004.

D. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2018.

E. ASTM A706/A706M - Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement; 2016.

F. CRSI (DA4) - Manual of Standard Practice; 2009.

G. State of Utah Building Code (International Building Code with State of Utah Amendments), most recent adopted edition.

1.04 SUBMITTALS

A. Provide digital submittals for review by Architect. Do not proceed with work of this section without written approval.

B. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.

1.05 MOCK-UP

A. Construct Mock-up of Canopy Column Type 1, adjacent concrete paving and finishes, and associated windscreen base wall as specified in Section 03 3000 - Cast-in-Place Concrete.

1.06 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301.

B. Provide 48 hours of notice to Architect and Engineer for review of completed reinforcement. Allow 24 hours for Architect and Engineer's review. Alow sufficient time in construction schedule for corrections to reinforcement prior to placement of concrete.

PART 2 PRODUCTS

2.01 REINFORCEMENT

A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) (420 MPa).
   1. Deformed billet-steel bars.
   2. Unfinished.

3. Minimum 95 percent post-industrial recycled content.

B. Reinforcing Steel: ASTM A706/A706M, deformed low-alloy steel bars.

C. Steel Dowels: ASTM A615, 60ksi yield grade, smooth; where shown on drawings, wrap or coat 1/2 of length with grease or coating designed to eliminate bond with concrete, allowing free movement of bar.

D. Reinforcement Accessories:
1. Tie Wire: Annealed, minimum 16 gage, 0.0508 inch (1.29 mm).
2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
3. Provide stainless steel components for placement within 1-1/2 inches (38 mm) of weathering surfaces.
4. Mechanical couplers capable of developing 125% of the specified strength of connected elements.

2.02 FABRICATION

A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice.

B. Welding of reinforcement is not permitted unless shown on Drawings.

PART 3 EXECUTION

3.01 PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position.

B. Accommodate placement of formed openings.

C. Conform to Structural Drawings and applicable code for concrete cover over reinforcement.

D. In locations where new concrete is doweled to exisitng work, drill holes in existing concrete, insert steel dowls and pack solid with non-shrink grout, except where doewls are specifically permitted to be ungrouted or required to be epoxied as shown on the Drawings.

E. Do not "wet-set" reinforcing bars or anchor bolts.

3.02 SPECIAL REINFORCEMENT INSTALLATION, UNLESS OTHERWISE SHOW ON DRAWINGS

A. At Foundation Wall Corners and Intersections:
1. Splice horizontal wall reinforcing with splice bars and corner bars: space and size to match horizontal wall reinforcing.
2. Extend beyond corner or interseciton 48 bar diameters: 24 inches minimum.

B. At Wall Openings:
1. Provide 2 each #5 bars around openings; extend vertical bars full wall height and horizontal bars 24 inches minimim beyond opening corners.
2. Where not possible, hook bar ends.

C. At Structural Slab-On-Grade Openings:
1. Provide 2 each #4 bars around openings; extend short direction reinforcing bars full slab width and perpendicularbars 24 inches minimim beyond opening corners.
2. Provide 1 eash #5 x 4'-0" long diagonal bars centered at opening coners.
3. Where not possible, hook bar ends.

3.03 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests. Provide timely notices of work requiring testing to testing agency.

B. An independent testing agency will inspect installed reinforcement for conformance to contract documents before concrete placement.

C. An independent testing agency will provide special inspection for all expoxy adhesive installation in accordance with the manufacturer's ICBO report.

END OF SECTION

SECTION 03 3000
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Shelter footings, structural slab-on-grade including integral platform edge elements
B. Shelter elements including base walls
C. Joint devices associated with concrete work
D. Concrete curing
E. Cast-in-place stair treads, nosing, and abrasive strips

1.02 RELATED REQUIREMENTS

A. UDOT Specifications for Concrete Station Platforms: Integral color, jointing, expansion joint filler, finishing, curing, casting and pouring of concrete platforms and topping slabs
B. Section 03 1000 - Concrete Forming and Accessories: Forms and accessories for formwork
C. Section 03 2000 - Concrete Reinforcing
D. Section 05 12 00 - Structural Steel: Grouting under base plates
E. Section 07 1900 - Water Repellents: Concrete
F. Section 07 9200 - Joint Sealants: Products and installation for sealants and joint fillers for saw cut joints and isolation joints in slabs
G. Section 08 8000 - Framless Glass Windscreen: components cast into concrete.
H. Section 13 3423 - Station Platform: Work Included in Station Platforms
I. Electrical Drawings: conduit and raceways cast into basewalls
J. Section 32 1726 - Tactile Warning Surfacing: cast in place tactile warning.

1.03 REFERENCE STANDARDS

A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; 1991 (Reapproved 2009).
B. ACI 301 - Specifications for Structural Concrete; 2016.
C. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000 (Reapproved 2009).
D. ACI 305R - Guide to Hot Weather Concreting; 2010.
E. ACI 306R - Guide to Cold Weather Concreting; 2016.
F. ACI 308R - Guide to External Curing of Concrete; 2016.
G. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2018).
H. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete; 2012.
I. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2018.
J. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2018.
K. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2019a.
L. ASTM C150/C150M - Standard Specification for Portland Cement; 2018.
M. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2016.
N. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a (Reapproved 2016).

O. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2017.

P. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2019.

Q. ASTM C685/C685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing; 2017.

R. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete; 2013.

S. State of Utah Building Code (International Building Code with State of Utah Amendments), most recent adopted edition.

1.04 SUBMITTALS

A. Provide digital submittals for review by Architect. Do not proceed with work of this section without written approval.

B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.

C. Mix Design: Submit proposed concrete mix design.
   1. Indicate proposed mix design complies with requirements of ACI 318, Chapter 5 - Concrete Quality, Mixing and Placing.

D. Test Reports: Submit report for each test or series of tests specified.

E. Sustainable Design Submittal: If any fly ash, ground granulated blast furnace slag, silica fume, rice hull ash, or other waste material is used in mix designs to replace Portland cement, submit the total volume of concrete cast in place, mix design(s) used showing the quantity of portland cement replaced, reports showing successful cylinder testing, and temperature on day of pour if cold weather mix is used.

F. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

1.05 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301 and ACI 318.

B. Follow recommendations of ACI 305R when concreting during hot weather.

C. Follow recommendations of ACI 306R when concreting during cold weather.

1.06 MOCK-UP

A. Construct a mock-up of Canopy Column Type 1, adjacent concrete paving, tooled joints, finishes, and associated windscreen base wall and windscreen. Include Work of This Section and coordinate with other trades listed below.
   1. Provide concrete footing suitable for supporting mock-up.
   2. Formwork as specified in Section 03 1000 - Concrete Formwork.
   3. Reinforcement, ties and accessories specified in Section 03 2000.
   4. Cast in place concrete in accordance with provisions of Section 03 3000.
   5. Cure concrete in accordance with provisions of Section 03 3000.
   6. Platform finish in accordance with provisions of Section 03 3000.
   7. Precast concrete column in accordance with Section 03 4100. Provide mock up of surface finish treatments including sandblasted or acid etched on differing portions of the same concrete mock-up.
      a. Locations of specific textures to be identified by architect.
   8. Water Repellents as specified in Section 07 1900.
      a. Specific colors to be identified by architect.
   9. Windscreens as specified in Section 08 8000.

B. Mock-up may not remain as part of the Work.

C. Locate mock-up where directed.

D. Accepted mock-up panel is considered basis of quality for the finished work. Keep mock-up exposed to view for duration of concrete work.

E. Remove mock-up after project completion.

PART 2 PRODUCTS

201 FORMWORK

A. Comply with requirements of Section 03 1000.

202 REINFORCEMENT MATERIALS

A. Comply with requirements of Section 03 2000.

203 CONCRETE MATERIALS

A. Cement: ASTM C150/C150M, Type I - Normal Portland type

B. Fine and Coarse Aggregates: ASTM C33/C33M

C. Fly Ash: ASTM C618, Class C or F

D. Slag: Ground Gradulated Blast Furnace Slag; ASTM C989, Grade 100 or 120

E. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete

F. Consistency: Use cement, sand, and aggregate from the same source for exposed concrete throught the project

204 ADMIXTURES

A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

B. Air Entrainment Admixture: ASTM C260/C260M

C. High Range Water Reducing and Retarding Admixture: ASTM C494/C494M Type G

D. High Range Water Reducing Admixture: ASTM C494/C494M Type F

E. Water Reducing Admixture: ASTM C494/C494M Type A

205 COLORED CONCRETE

A. Integral Coloring Agent: Chromix by LM Scofield Co., Davis Color, or approved. Color as scheduled.

B. Curing compound: Product recommended by Color Admixture manuracturer for conditions of use.

206 ACCESSORY MATERIALS

A. Factory Fabricated Abrasive Strip
   1. Materials: Extruded aluminum type 6063-T5, mill finish
      a. Tread Abrasive Filler: Virgin grain aluminum oxide epoxy-bonded to tread base
      b. Tread Type: Full abrasive
      c. Types: 2 1/4 inch strip
      d. Poured Concrete: Nosing shall terminate no more than 3 inches from end of platform
      e. Length: Longest practical length to minimize total numbers of sections
      f. Mounting: Contractor's choice; Integral Extruded Anchor or Drilled Holes
         1) Anchors and Related Components: Same material and finish as item to be anchored, except where specifically indicated otherwise; provide all anchors and fasteners required.
      g. Color: Safety Yellow
   2. Products:
      a. Nystrom, Inc; Abrasive Stair Nosing Model STSF-N2.25D: www.nystrom.com.
      b. Babcock-Davis; Ramps and Walkways - No Nosing Model BSTSF-N2.25: www.babcockdavis.com

c. Substitutions: Substitutions: An equivalent product produced by a manufacturer not listed above may be submitted for approval prior to bidding for Architect review. Provide complete information to Architect describing how substitute product complies with specifications. Indicate effect of substitute product on work of others. Do not proceed with substitute product without written approval of Architect.

B. Concrete sealant per Section 07 9200

C. Preformed expansion joint filler with self-leveling joint sealant

207 BONDING AND JOINTING PRODUCTS

A. Latex Bonding Agent: Non-redispersable acrylic latex, complying with ASTM C1059/C1059M, Type II.
   1. Manufacturers:
      a. Kaufman Products Inc; SureBond: www.kaufmanproducts.net/#sle.
      b. SpecChem, LLC; Strong Bond Acrylic Bonder: www.specchemllc.com/#sle.
      c. W. R. Meadows, Inc; ACRY-LOK-: www.wrmeadows.com/#sle.
      d. Substitutions: An equivalent product produced by a manufacturer not listed above may be submitted for approval prior to bidding for Architect review. Provide complete information to Architect describing how substitute product complies with specifications. Indicate effect of substitute product on work of others. Do not proceed with substitute product without written approval of Architect.

208 CURING MATERIALS

A. Curing Compound, Naturally Dissipating: Clear, water-based, liquid membrane-forming compound; complying with ASTM C309, Type 1.
   1. Ensure compatibility with Hardeners, Sealers, or Coatings specified elsewhere.

B. Water: Potable, not detrimental to concrete.

209 CONCRETE MIX DESIGN

A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
   1. Replace as much Portland cement as possible with fly ash, ground granulated blast furnace slag, silica fume, or rice hull ash as is consistent with ACI recommendations.

B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
   1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.
   2. Supplier is respoinsible for achieving or exdeeding concrete design strengths.

C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.
   1. Use accelerating admixtures in cold weather only when approved by Architect. Use of admixtures will not relax cold weather placement requirements.
   2. Use set retarding admixtures during hot weather only when approved by Architect.

D. Add air entraining agent to normal weight concrete mix for horizontal work exposed to exterior.

E. Normal Weight Concrete:
   1. See Structural Drawings

F. Mix Consistency: Make all concrete batches for exposed concrete from same mix design to insure consistent finish color and appearance.

210 MIXING

A. On Project Site: Mix in drum type batch mixer, complying with ASTM C685/C685M. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.

B. Transit Mixers: Comply with ASTM C94/C94M.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.02 PREPARATION

A. Verify that forms are clean and free of rust before applying release agent.

B. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.

C. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent in according to bonding agent manufacturer's instructions.
   1. Use latex bonding agent only for non-load-bearing applications.

D. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

3.03 PLACING CONCRETE

A. Place concrete in accordance with ACI 304R.

B. Notify Architect not less than 24 hours prior to commencement of placement operations.

C. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

D. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.

E. Vibrating Exposed Concrete: Do not insert vibrator closer than 3 inches from the form. Do not touch reinforcing steel with vibrator.

3.04 CONCRETE FINISHING

A. Repair surface defects, including tie holes, immediately after removing formwork.

B. Exposed Slab on Grade: Light broom finish. Do all brooming in same direction and parallel to joints unless otherwise shown on drawings. At sloped walkways, broom concrete perpendicular to slope.

C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch (6 mm) or more in height. Provide finish as follows:
   1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.

3.05 CONCRETE JOINT CONTROL

A. Per UDOT Specification 03152 except as noted below.

B. Provide tooled joint on mock-up samples for approval by Architect.

C. Deviations to architectural platform paving plans need to be approved by Architect.

3.06 CURING AND PROTECTION

A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

3.07 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests. Provide timely notices of work requiring testing to testing agency.

B. Provide free access to concrete operations at project site and cooperate with appointed firm. Notify Architect, Engineer and Testing Lab at least 48 hours before intended concrete placement.

C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.

D. Tests of concrete and concrete materials may be performed at any time to ensure compliance with specified requirements.

E. Compressive Strength Tests: ASTM C39/C39M, for each test, mold and cure three concrete test cylinders. Obtain test samples for every 150 cubic yards (115 cu m) or less of each class of concrete placed in each day.
   1. Perform compressive strength tests on sets of cylinders at their respective age as follows:
      a. One at seven days
      b. One at 14 days
      c. Two at 28 days, and
      d. Hold one for future use
   2. If at the end of the project all of the concrete reaches the required compressive strength, the held cylinders may be discarded without being tested.

F. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.

G. Perform one air content test for each set of cylinders taken for air-entrained concrete, following procedures of ASTM C173/C173M.

3.08 DEFECTIVE CONCRETE

A. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.

B. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

3.09 PROTECTION

A. Do not permit traffic over unprotected concrete floor surface until fully cured.

END OF SECTION

SECTION 03 4100
PRECAST STRUCTURAL CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Precast station shelter columns

B. Form accessories

1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-place Concrete

B. Section 05 1200 - Structural Steel Framing: embeds in Precast Concrete Columns

C. Section 07 1900 - Water Repellants

D. Section 22 1001- Plumbing Piping and Accessories: downspouts embeded in concrete

E. Electrical Drawings: conduit embedded in concrete

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS

A. Provide digital submittals for review by Architect. Do not proceed with work of this section without written approal.

B. Product Data: Indicate standard component configurations, design loads, deflections, cambers, and bearing requirements.

C. Shop Drawings: Indicate layout, unit locations, fabrication details, unit identification marks, reinforcement, integral insulation, insulated panel system connectors, connection details, support items, dimensions, openings, and relationship to adjacent materials. Indicate design loads, deflections, cambers, bearing requirements, and special conditions.

D. Samples: Submit two 2, 6 inch by 6 inch (150 mm) in size, illustrating surface color and surface finish treatment for each surface treatment.

E. Design Data: Submit design data reports indicating calculations for loadings and stresses of fabricated, designed framing.

F. Designer's Qualification Statement

G. Fabricator's Qualification Statement: Provide documentation showing precast concrete fabricator is accredited under IAS AC157.

H. Erector's Qualification Statement

1.05 MOCK-UP

A. Construct Mock-up of Canopy Column Type 1, adjacent concrete paving and finishes, and associated windscreen base wall as specified in Section 03 3000 - Cast-in-Place Concrete.

1.06 QUALITY ASSURANCE

A. Designer Qualifications: Design precast concrete members under direct supervision of a Professional Structural Engineer experienced in design of precast concrete and licensed in the State in which the Project is located.

B. Fabricator Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

C. Fabricator Qualifications: Precast concrete fabricator accredited by IAS according to IAS AC157.

D. Erector Qualifications: Company specializing in erecting products of this section with not less than 5 years experience.

E. Welder Qualifications: Qualified within previous 12 months in accordance with AWS

D1.1/D1.1M and AWS D1.4/D1.4M.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Handle precast members in position consistent with their shape and design. Lift and support only from support points.

B. Lifting or Handling Devices: Capable of supporting member in positions anticipated during manufacture, storage, transportation, and erection.

C. Protect members to prevent staining, chipping, or spalling of concrete.

D. Mark each member with date of production and final position in structure.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Structural Precast Concrete:
   1. Any manufacturer holding a PCI Group C Plant Certification for the types of products specified; see www.pci.org/find/manufacturer.

2.02 PRECAST UNITS

A. Precast Structural Concrete Units: Comply with PCI MNL-116, PCI MNL-120, PCI MNL-123, PCI MNL-135, ACI 318 and applicable codes.
   1. Design components to withstand dead loads and design loads in the configuration indicated on drawings and as follows:
      a. Columns: Loads indicated on drawings.
   2. Calculate structural properties of framing members in accordance with ACI 318.
   3. Replace as much Portland cement as possible with fly ash, ground granulated blast furnace slag, silica fume, or rice hull ash as is consistent with strength requirements.
   4. Design members exposed to the weather to provide for movement of components without damage, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to seasonal or cyclic day/night temperature ranges.
   5. Design system to accommodate construction tolerances, deflection of other building structural members and clearances of intended openings.

2.03 MATERIALS

A. Cement: Gray Portland type, complying with ASTM C150/C150M, Type I.

B. Other Cementitious Materials:
   1. Fly Ash or Natural Pozzolans: Comply with ASTM C618.
   2. Ground Granulated Blast Furnace Slag: ASTM C989/C989M.
   3. Silica Fume: Comply with ASTM C1240.

C. Coloring Admixture:
   1. Type: Provide concentrated pigments specially processed for mixing into concrete and complying with ASTM C979. Color admixtures containing carbon black are acceptable.
   2. Manufacturer: Davis Colors, Phone: 800-356-4848 or 323-269-7311; E-mail: info@daviscolors.com; Web Site: www.daviscolors.com.
   3. Color: To be selected by Architect from manufacturer's standard colors.
   4. Substitutions: An equivalent product produced by a manufacturer not listed above may be submitted for approval prior to bidding for Architect review. Provide complete information to Architect describing how subsitute product complies with specifications. Indicate effect of substitute product on work of others. Do not proceed with substitute product without written approval of Architect

D. Aggregate, Sand, Water, Admixtures: Determined by precast fabricator as appropriate to design requirements and PCI MNL-116.

2.04 REINFORCEMENT

A. Reinforcing Steel: ASTM A615/A615M, Grade 40 (40,000 psi) (280 MPa).
   1. Plain billet-steel bars
   2. Unfinished

3. Galvanized in accordance with ASTM A767/A767M, Class I
4. Epoxy coated in accordance with ASTM A775/A775M

B. Steel Welded Wire Reinforcement: ASTM A1064/A1064M plain type or deformed type; in flat sheets; unfinished

2.05 FABRICATION

A. Comply with fabrication procedures specified in PCI MNL-116.

B. Fabricate and handle epoxy-coated reinforcing bars in accordance with ASTM D3963/D3963M.

C. Maintain plant records and quality control program during production of precast members. Make records available upon request.

D. Ensure reinforcing steel, anchors, inserts, plates, angles, and other cast-in items are embedded and located as indicated on shop drawings.

2.06 FABRICATION TOLERANCES

A. Comply with fabrication tolerances specified in PCI MNL-135, except as specifically amended below.
1. Variation From Nominal Dimension: Plus or minus 1/4 inch (6 mm).
2. Variation From Intended Camber: Plus or minus 1/4 in per 10 ft (6 mm per 3 m), plus or minus 5/8 inch (15 mm) maximum.
3. Variation from End Squareness: Plus or minus 1/8 inch/12 in (3 mm/300 mm), maximum 3/8 in (9 mm).
4. Maximum Misalignment of Anchors, Inserts, Openings: Plus or minus 1/8 inch (3 mm).
5. Sweep: Plus or minus 1/4 inch (6 mm).

2.07 FINISHES

A. Ensure exposed-to-view finish surfaces of precast concrete members are uniform in color and appearance.

B. Cure members under identical conditions to develop required concrete quality, and minimize appearance blemishes such as non-uniformity, staining, or surface cracking.

C. Finish members to PCI MNL-116 Commercial grade.

D. Rubbed Finish: Surface holes or bubbles over 1/4 inch (6 mm) filled with matching cementitious paste, fins or protrusions removed and surface ground smooth, surface then rubbed with neat cementitious paste to smooth and even color and texture.

2.08 ACCESSORIES

A. Connecting and Supporting Devices; Anchors and Inserts: Plates, angles, items cast into concrete, items connected to steel framing members, and inserts complying with PCI MNL-123, and as follows:
1. Material: Carbon steel complying with ASTM A36/A36M.
2. Finish: Prime painted, except where device surfaces will be in contact with concrete or will require field welding.

B. Grout: Non-shrink, non-metallic, minimum yield strength of 10,000 psi (69 MPa) at 28 days.
1. Type: Epoxy.

C. Bearing Pads: High density plastic, Vulcanized elastomeric compound molded to size, Neoprene (Chloroprene), or Tetrafluoroethylene(TFE); Shore A Durometer_____; 1/8 inch (3 mm) thick, smooth both sides.

D. Bolts, Nuts and Washers: High strength steel type recommended for structural steel joints.

E. Flashing Reglets: Galvanized steel, at least 22 gauge, 0.0299 inch (0.76 mm) thick, longest possible lengths, with alignment splines for joints, foam filled, release tape sealed slots, anchors for securing to concrete formwork.

F. Conduit and downspout: see Section 22 1001 and electrical Drawings.

2.09 SOURCE QUALITY CONTROL

A. Section 01 4000 - Quality Requirements: Provide mix design for concrete.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that site conditions are ready to receive work and field measurements are as indicated on shop drawings.

3.02 PREPARATION

A. Prepare support equipment for the erection procedure, temporary bracing, and induced loads during erection.

3.03 ERECTION

A. Erect members without damage to structural capacity, shape, or finish. Replace or repair damaged members.

B. Align and maintain uniform horizontal and vertical joints, as erection progresses.

C. Maintain temporary bracing in place until final support is provided. Protect members from staining.

D. Provide temporary lateral support to prevent bowing, twisting, or warping of members.

E. Adjust differential camber between precast members to tolerance before final attachment.

F. Install bearing pads.

3.04 TOLERANCES

A. Erect members level and plumb within allowable tolerances.

B. Comply with PCI MNL-135 for erection tolerances, except as specifically amended below.
   1. Plan Location from Building Grid Datum: Plus or minus 3/4 in (19 mm).
   2. Top Elevation from Building Elevation Datum at Plank Ends: Plus or minus 1/2 inch (12.5 mm).
   3. Maximum Jog in Alignment of Matching Ends: Plus or minus 1/2 inch (12.5 mm).
   4. Differential Top Elevation As Erected: Plus or minus 3/8 inch (9 mm).
   5. Differential Bottom Elevation of Exposed Members: Plus or minus 3/16 inch (4.5 mm).

C. When members cannot be adjusted to comply with design or tolerance criteria, cease work and advise Architect. Execute modifications as directed.

3.05 PROTECTION

A. Protect members from damage caused by field welding or erection operations.

B. Provide non-combustible shields during welding operations.

3.06 CLEANING

A. Clean weld marks, dirt, or blemishes from surface of exposed members.

END OF SECTION

SECTION 05 1200
STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Structural steel framing members, support members and struts
B. Base plates and brackets
C. Anchor bolts and setting templates for structural steel
D. Grouting under base plates
E. Clevises

1.02 RELATED REQUIREMENTS

A. Section 03 1000 - Concrete Forms and Accessories: Placement of Anchor Bolts & Embeds
B. Section 05 3100 - Steel Decking: Support framing for small openings in deck
C. Section 05 5000 - Metal Fabrications: Steel fabrications affecting structural steel work
D. Section 08 8000 - Glazing
E. Section 09 9600 - High Performance Coatings: Primer and finishes for Structural Steel
F. Section 13 3423 - Station Platform: Work Included in Station Platforms
G. Division 22 - Plumbing: Roof drain piping concealed within structure
H. Electrical Drawings

1.03 REFERENCE STANDARDS

A. AISC (MAN) - Steel Construction Manual; 2017.
B. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges; 2016.
C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
E. ASTM A242/A242M - Standard Specification for High-Strength Low-Alloy Structural Steel; 2013 (Reapproved 2018).
F. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014, with Editorial Revision (2017).
G. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2018.
H. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts; 2015.
I. ASTM A563M - Standard Specification for Carbon and Alloy Steel Nuts (Metric); 2007 (Reapproved 2013).
J. ASTM A588/A588M - Standard Specification for High-Strength Low-Alloy Structural Steel, up to 50 ksi (345 MPa) Minimum Yield Point, with Atmospheric Corrosion Resistance; 2019.
K. ASTM A992/A992M - Standard Specification for Structural Steel Shapes; 2011 (Reapproved 2015).
L. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2017.
M. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength; 2019.

N. ASTM F436/F436M - Standard Specification for Hardened Steel Washers Inch and Metric Dimensions; 2019.

O. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength; 2018.

P. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.

Q. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).

R. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel; 2018.

S. RCSC (HSBOLT) - Specification for Structural Joints Using High-Strength Bolts; Research Council on Structural Connections; 2014, with Errata (2015).

T. SSPC-SP 6 - Commercial Blast Cleaning; 2007.

U. State of Utah Building Code (International Building Code with State of Utah Amentdments), most recent adopted eddition.

1.04 SUBMITTALS

A. Provide digital submittals for review by Architect. Do not proceed with work of this section without written approal.

B. Shop Drawings:
   1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners, and finish.
   2. Connections not detailed.
   3. Indicate cambers and loads.
   4. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.
   5. Indicate locations, critical dimensions, requried clearances, constrcutions details, threaded fasteners, and welds.
   6. Indicate which members are considered as Architecturaly Exposed Structural Steel.
   7. Indicate members to be galvanized, location and size of drain holes, and which members are to recieve field finish painting that may affect the galvanizing process.
   8. Inidcate portions of members not to be painted due to member reciving fire proofing, in contact with concrete, or connected with slip-critical bolts.

C. Mill Test Reports: Indicate structural strength, destructive test analysis and non-destructive test analysis.

D. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

E. Materials Samples:
   1. Submit sample of fastener assembly; including steel rod, clevis and pin.
   2. Submit sample of all required welds. Approved sample will be used as the standard for all welding.
   3. Submit sample of custom shapes illustrating quality and finish of cut edges. Approved sample will be used as the standard for all cut or sheared elements.

1.05 QUALITY ASSURANCE

A. Fabricate structural steel members in accordance with AISC (MAN) "Steel Construction Manual."

B. Fabricator: Company specializing in performing the work of this section with minimum five years of documented experience.

C. Fabricator Qualifications: A qualified steel fabricator that is accredited by the International Accreditation Service (IAS) Fabricator Inspection Program for Structural Steel in accordance with IAS AC172.

PART 2 PRODUCTS

201 MATERIALS

A. Recycled Content: Steel W, T, HSS, Pipe, Angles, Plates, Channels, and Bars are to meet or exceed the industry standards for recycled content for the electric arc furnace process. Post-consumer content of 56%, Pre-consumer content of 32%.

B. Steel Angles, Plates, Channels, and Bars: ASTM A36/A36M unless otherwise noted on Drawings.

C. Steel W Shapes and Tees: ASTM A992/A992M (Fy=50ksi).

D. Rolled Steel Structural Shapes: ASTM A992/A992M.

E. Steel Shapes, Plates, and Bars: ASTM A242/A242M high-strength, corrosion-resistant structural steel.

F. Cold-Formed Structural Tubing: ASTM A500/A500M, Grade B.

G. Structural Bolts and Nuts: Carbon steel, ASTM A307, Grade A and galvanized in compliance with ASTM A153/A153M, Class C.

H. High-Strength Structural Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, with matching compatible ASTM A563 or ASTM A563M nuts and ASTM F436/F436M washers.

I. Unheaded Anchor Rods: ASTM F1554, Grade 36, plain, with matching ASTM A563 or ASTM A563M nuts and ASTM F436/F436M Type 1 washers, unless otherwise noted.

J. Threaded Studs: Fusion welded, Nelson CPL typem size as noted on Drawings, length as required for full engagement of nut with washer. Stainless steel 18-8 threaded studs where noted on Drawings for connection to stainless steel material.

K. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

L. Grout: ASTM C1107/C1107M; Non-shrink; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
   1. Minimum Compressive Strength at 48 Hours: 2,000 pounds per square inch (13.7 MPa).
   2. Minimum Compressive Strength at 28 Days: 7,000 pounds per square inch (48 MPa).

M. Shop and Touch-Up Primer: As specified in Section 09 9600 - High Performance Coatings.

N. Touch-Up Primer for Galvanized Surfaces: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.

O. Clevises: #2 plain finished clevises with 5/8" right hand tap at one end of each roof truss rod, and left hand tap at opposite end. 3/4" grip and 3/4" pin.

202 FABRICATION

A. Shop fabricate and assemble to greatest extent possible.

B. Continuously seal joined members by continuous welds. Grind exposed welds smooth.

C. Fabricate connections for bolt, nut, and washer connectors. Hole size 1/16 inch larger than bolt diameter unless shown otherwise, 1/8 inch larger that bolt at base plates.

D. Grinding of cut or sheared edges: Fabricator shall grind all edges of sheared, punched, or flame cut steel to match approved mockup.

E. Seal weld open ends of round and rectangular hollow structural section with 3/8" closure plates. Provide continuous, sealed welds at angle to gusset plate conections and similar locations where steel is exposed to weather.

F. Fabricate items with joints tightly fitted and secured.

G. Form bends to uniform radii, free from buckles and twists.

H. Provide holes and connections for work of other trades.

I. Fabricate connections not specifically detailed on Drawings as instructed by Architect. If instructions are not obtained, at no additional cost to Owner, fabricate connections consistent with balance of desighn and strong enough to fully develop members involved.

J. Mill Mark Removal: Fabricator shall deliver steel with no mill marks (stenciled, stamped, raised etc) in exposed locations. Mill marks shall be omitted by cutting of mill material to appropriate lengths where possible. Where not possible, the fabricator can fill and/or grind to a surface finish consistent with the approved mock up.

K. Visible seams of hollow structural sections shall be acceptable as produced. Seams shall be oriented away from view.

L. Rolled Members: Member specified to be rolled to a final curved shape shall be fully shaped in the shop and tied during shipping to prevent stress relieving. Distortion of the web or stem, and of outstanding flanges or legs of angles shall be visibly acceptable to the Architect from a distance of 20’ under any lighting condition determined by the Architect.

2.03 FINISH

A. Prepare structural component surfaces in accordance with SSPC-SP 6.

B. Shop prime structural steel members as specified in Section 09 9600 - High Performance Coatings. Do not prime surfaces that will be field welded, in contact with concrete, or high-strength bolted.

C. Where indicated, galvanize steel members to comply with ASTM A123/A123M. Provide minimum 1.7 oz/sq ft galvanized coating. Provide vent holes in closed shapes. Clip end plates, tab plates, and other features to prevent accumulation or pooling of galvanized material.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that conditions are appropriate for erection of structural steel and that the work may properly proceed.

3.02 ERECTION

A. Erect structural steel in compliance with AISC 303.

B. Allow for erection loads, and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.

C. Field weld components indicated on shop drawings.

D. Use carbon steel bolts only for temporary bracing during construction, unless otherwise specifically permitted on drawings. Install high-strength bolts in accordance with RCSC (HSBOLT) "Specification for Structural Joints Using High-Strength Bolts".

E. Do not field cut or alter structural members without approval of Architect and Engineer.

F. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete in accordance with Section 09 9600.

G. Treat field welded areas of galvanized members with zinc solder to replace galvanized protection.

H. Touch-up Field Connections and damaged Shop Treatment areas as erection proceeds. Immediately prior to final covering, remove Rust and retreat any Members showing evidence of Rust through Shop Treatment over approximatley 5% or more to total Shop Treatment area.

I. Remove loose rust, heavy MIll Scale, Oil, Dirt, and other bond-reducing Foreign Substances from Members scheduled to receive Finish Painting, or other direct-to-steel coatings.

J. Grout solidly between column plates and bearing surfaces, complying with manufacturer's instructions for nonshrink grout. Trowel grouted surfaces smooth, splaying neatly to 45 degrees.

3.03 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch (6 mm) per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch (6 mm).

3.04 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests. Provide timely notices of work requiring testing to testing agency.

B. An independent testing agency will perform special inspection for stuctural welding in accordance with the State of Utah Building Code.

C. See structual drawings for inspection of welds and high strength bolt requirements.

END OF SECTION

SECTION 05 3100
STEEL DECKING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Roof deck

B. Bearing plates and angles

C. Cold-formed accessories including closures and blocking

1.02 RELATED REQUIREMENTS

A. Section 05 1200 - Structural Steel Framing: Roof framing.

B. Section 07 4113 - Metal Roof and Soffit Panels: Attachment to Steel Decking.

C. Section 13 3423 - Station Platform: Work Included in Station Platforms.

1.03 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2019a.

C. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).

D. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; 2018.

E. SDI (DM) - Publication No.30, Design Manual for Composite Decks, Form Decks, and Roof Decks; 2007.

F. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).

G. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

H. State of Utah Building Code (International Building Code with State of Utah Amendments), most recent adopted edition.

1.04 SUBMITTALS

A. Provide digital submittals for review by Architect. Do not proceed with work of this section without written approal.

B. Product Data: Provide deck profile characteristics, dimensions, structural properties, and finishes.

C. Shop Drawings: Indicate deck plan, support locations, projections, openings, reinforcement, pertinent details, and accessories.

D. Certificates: Certify that products furnished meet or exceed specified requirements.

E. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.05 QUALITY ASSURANCE

A. Layout deck, spans, fastening, and joints as shown on the drawings and in accordance with the manufacturer's ICC Evaluation Services Report and recommendations.

B. Installer Qualifications: Company specializing in performing the work of this Section with minimum two years of experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Cut plastic wrap to encourage ventilation.

B. Separate sheets and store deck on dry wood sleepers; slope for positive drainage.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Steel Deck:
   1. Basis of Design: Verco, "Shallow Vercor"
   2. Other Manufacturers able to match Basis of Design:
      a. ASC Pacific
      b. Epic Metals Corporation
      c. AEP Span
      d. Nucor-Vulcraft Group

B. Substitutions: An equivalent product produced by a manuracturer not listed above may be submitted for approval prior to bidding for Architect review. Provide complete information to Architect desribing how substitute product complies with specifications. Indicate effect of substitute product on work of others. Do not proceed with substitute product without writen approval of Architect.

2.02 STEEL DECK

A. All Deck Types: Select and design metal deck in accordance with SDI Design Manual.
   1. Calculate to structural working stress design and structural properties specified.
   2. Maximum Vertical Deflection of Roof Deck: 1/240 of span.

B. Roof Deck: Non-composite type, fluted steel sheet:
   1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 33/230, with G90/Z275 galvanized coating.
   2. Minimum Base Metal Thickness: 22 gage, 0.0299 inch (0.76 mm).
   3. Nominal Height: 9/16 inch (14 mm).
   4. Profile: Fluted; SDI NR.
   5. Formed Sheet Width: 24 inch (600 mm).
   6. Side Joints: Self-tapping screws..
   7. End Joints: Self-tapping screws.

2.03 ACCESSORY MATERIALS

A. Bearing Plates and Angles: ASTM A36/A36M steel, unfinished.

B. Welding Materials: AWS D1.1/D1.1M.

C. Fasteners: Galvanized hardened steel, self tapping.

D. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

E. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, complying with VOC limitations of authorities having jurisdiction.

2.04 FABRICATED DECK ACCESSORIES

A. Sheet Metal Deck Accessories: Metal closure strips, wet concrete stops, and cover plates, 22 gage, 0.0299 inch (0.76 mm) thick sheet steel; of profile and size as indicated; finished same as deck.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions prior to beginning work.

3.02 INSTALLATION

A. Erect metal deck in accordance with SDI Design Manual and manufacturer's instructions. Align and level.

B. On steel supports provide minimum 1-1/2 inch (38 mm) bearing.

C. Fasten deck to steel support members at ends and intermediate supports as specified on the structural drawings.

D. Screw together seam side laps.

E. If necessary, weld deck in accordance with AWS D1.3/D1.3M.

F. At openings between deck and columns and openings, provide sheet steel closures and angle flashings to close openings.

G. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up primer.

END OF SECTION

SECTION 05 4000
COLD-FORMED METAL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Framing for Metal Soffit Panels

1.02 RELATED REQUIREMENTS

A. Section 05 1200 - Structural Steel Framing

B. Section 07 4133 - Metal Roof and Soffit Panels: Framing to support soffit

C. Section 13 3423 - Station Platform: Work included in Station Platforms

1.03 REFERENCE STANDARDS

A. AISI S100-12 - North American Specification for the Design of Cold-Formed Steel Structural Members; 2012.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.

C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2019a.

D. ASTM C1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories; 2011a (Reapproved 2015).

E. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).

F. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).

G. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

H. State of Utah Building Code (International Building Code with State of Utah Amendments) most recent adopted edition.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with work of other sections that is to be installed in or adjacent to the metal framing system, including but not limited to structural anchors, cladding anchors, utilities, soffits, and lighting.

1.05 SUBMITTALS

A. Provide digital submittals for review by Architect. Do not proceed with work of this section without written approal.

B. Product Data: Provide data on standard framing members; describe materials and finish, product criteria, limitations.

1. ICC Evaluation Services Reports for proprietary clips, deflection connection and accessories if different than shown on the Drawings. Products and connections shall have the same or greater structural capacity as those shown on the Drawings.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, and with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience and approved by manufacturer.

C. Welders: Qualitied in accordance with AWS D1.3 for welding porcess, position, type of weld, and type of steel.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Metal Framing, Connectors and Accessories:
   1. Contractor's choice meeting requirements of this specification.

B. Framing Connectors and Accessories:
   1. Same manufacturer as metal framing.

2.02 FRAMING SYSTEM

A. Provide primary and secondary framing members, bridging, bracing, plates, gussets, clips, fittings, reinforcement, and fastenings as required to provide a complete framing system.

2.03 FRAMING MATERIALS

A. Studs and Track: ASTM C955; studs formed to channel, C- or Sigma-shaped with punched web; U-shaped track in matching nominal width and compatible height.
   1. Gage: 20 gage, 0.0359 inch (.912 mm).
   1. Galvanized in accordance with ASTM A653/A653M, G90/Z275 coating.

B. Framing Connectors: Factory-made, formed steel sheet.
   1. Material: ASTM A653/A653M SS Grade 33 and 40 (minimum), with G90/Z275 hot dipped galvanized coating for base metal thickness less than 10 gage, 0.1345 inch (3.42 mm), and factory punched holes and slots.
   2. Structural Performance: Maintain load and movement capacity required by applicable code, when evaluated in accordance with AISI S100-12.
   3. Movement Connections: Provide mechanical anchorage devices that accommodate movement using slotted holes, shouldered screws or screws and anti-friction or stepped bushings, while maintaining structural performance of framing. Provide movement connections where indicated on drawings.
   4. Fixed Connections: Provide non-movement connections for joist hangers, gusset plates, and stiffeners.

2.04 ACCESSORIES

A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered; finish to match framing components.

B. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

C. Rolled Steel Angles: 2X2 inch: 14 gage, galvanized rolled steel angles. Locate where shown on Drawings. "Model RA" by Dale/Incor, or approved.

D. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.05 FASTENERS

A. Self-Drilling, Self-Tapping Screws, Bolts, Nuts, and Washers: Hot dip galvanized per ASTM A15/A153M.
   1. ITW Buildex, "Dri-flex" by ELCO, or approved. Sheet metal scre, treated to maintain screw ductility.
   2. Hilti Kwik-Flex or approved for connections to structural steel, Heavy Duty hex head type screw (TEK screw), treated to maintian screw ductility.

B. Welding: In conformance with AWS D1.1/D1.1M.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

B. Coordinate framing with the work and products of other Sections.

3.02 INSTALLATION

A. Install components in accordance with manufacturers' instructions and ASTM C1007 requirements.

B. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.

C. Touch-up field welds and damaged galvanized surfaces with primer.

END OF SECTION

SECTION 05 5000
METAL FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Shop fabricated steel items.

B. Bollards

C. Railings

D. Other items indicated

E. Expansion anchors and epoxy anchors installed in concrete and masonry.

1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.

B. Section 05 1200 - Structural Steel Framing: Structural steel column anchor bolts.

C. Section 09 9600 - High Performance Coatings

D. Section 13 3423 - Station Platform: Work included in Station Platforms

1.03 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.

C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.

D. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2018.

E. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.

F. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).

G. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel; 2018.

H. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).

I. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

1.04 SUBMITTALS

A. Provide digital submittals for review by Architect. Do not proceed with work of this section without written approal.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
   1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
   2. Indicate members to be galvanized, location and size of drain holes, and which members are to receive field finish painting that may affect the galvanizing porcess.

C. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

D. Furnish anchor bolt setting drawings and installation details for steel items provided by this Section.

E. Material Samples: provide the following material samples unless the fabricator supplying the work of this section is also supplying the work in section 05 1200 - Structural Steel.

1. Submit sample of all required welds. Approved sample will be used as the standard for all welding.

1.05 QUALITY ASSURANCE

A. Fabricator Qualifications: A qualified steel fabricator that is accredited by IAS AC172.

1.06 1.06 MOCK-UP

A. Minimum 4 linear feet of steel railing & minimum of 2 stanchions complete with brackets and connections

B. Notify Architect when the mock-up is ready fo view and prior to preparation for finishing.

C. Accepted mock-up may be used as part of the final project.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

A. Steel Sections: ASTM A36/A36M.

B. Steel channels, angles, bars, and plates: ASTM A 36A 36M unless othewiese noted on Drawings.

C. Steel W Shapes and Tees: ASTM A992/A992M (Fy=20ksi).

D. Steel Tubing and Hollow Steel Sections: ASTM A 500, Grade B cold-formed structural tubing.

E. Steel Pipe: ASTM A 53/A 53M, Grade B, with sulfur not exceeding 0.05%, (Fy=35 ksi). Finish black. Type S where exposed to view, type E where concealed from view.

F. Bolts, Nuts, and Washers: ASTM A325 (ASTM A 325M), Type 1, galvanized to ASTM A 153/A 153M where connecting galvanized components.

G. Anchor Bolts, Headed Anchor Rods: ASTM A 307, Grade C, plain.

H. Stainless Steel Tubing: Type 316

I. Stainless Steel, Rods & Plates: ASTM A167, Type 316.

J. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

K. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

2.02 FASTENERS, BOLTS, ANCHORS

A. Powder-Driven Fasteners: HIlti DX system, or approved. Similar to Hilti DS Heavy Duty Pins.

B. Post-Installed Concrete Bolts: Simpson Titen HD, Powers Wedge-Bolt, or approved.

C. Post-Installed Concrete Bolt: Simpson Titen Concrete and Masonry Screws, HIlti Kwik-Con II or approved.

D. Expansion Anchors: Hilti KB-TZ, ITW Ramset/Redhead Power-Stud, Simpson Strong Bolt Wedge Anchor, or approved: See drawings for size. Hot-dipped galvanized. Stainless steel for attachment into masonry, were exposed, or where noted.
   1. Seismic qualification tested in accordance with ACI 355.2 and ICC-ES AC 193.
   2. Meets ductility requirements of ACI 318 D 3.3.
   3. Meets ICC-ES ESR-1917.
   4. Anchors to be used in locations, configurations, and materials only as approved by the manufacturer.

E. Self-Drilling Screws: ITW Buildex, or approved; type and drill point as required for materials being fastened.

F. Epoxy Adhesive Anchors for Concrete and Concrete Block:
   1. Hilti RE 500 SD, Simpson SET XP, or approved.
   2. Concrete and Epoxy preparation as required by epoxy manufacturer's ICBO report.

2.03 FABRICATION

A. Fit and shop assemble items in largest practical sections for delivery to site.

B. Provide materials which are smooth and free of surface blemishes.

C. Fabricate items with joints tightly fitted and secured.

D. Provide holes and conections for work of other trades.

E. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

F. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

G. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

H. Fabricate any Structural Connections not specifically detailed on Drawings as Directed by Architect and at no additioal cost to Owner. If Directions are not obtained, fabricate consistent with balance of Design and strong enough to fully develop Members involved.

I. Form elbows and bends to uniform radii, free from buckles and twists, and with finished surfaces smooth.

J. Cap and fully weld exposed ends of pipe and tubing.

K. Mill Mark Removal: Fabricator shall deliver steel with no mill marks (stenciles, stamped, raised, etc.) in esposed locations. Mill marks shall be omitted by cutting of mill material to apporpriate lengths where possible. Where not possible, the fabricator can fill and/or grind to a surface finish consistent with the approved mock up.

2.04 HANDRAILS AND RAILINGS

A. Stainless steel tube, seamless, size and dimensions as indicated on drawings.

B. Finish number 4, uniformly brushed stainless steel.

2.05 FABRICATION TOLERANCES

A. Squareness: 1/8 inch maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch.

C. Maximum Misalignment of Adjacent Members: 1/16 inch.

D. Maximum Bow: 1/8 inch in 48 inches.

E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.03 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Field weld components as indicated on drawings.

D. Perform field welding in accordance with AWS D1.1/D1.1M.

E. Obtain approval prior to site cutting or making adjustments not scheduled.

F. Touch-up Field Connections and damaged Shop Treatment areas as errection proceeds. Immediately prior to final covering, remove Rust and retreat any Members showing evidence of Rust through Shop Treatment over approximately 5% or more to total Shop Treatment area.

G. Remove loose rust, heavy Mill Scale, Oil, Dirt, and other bond-reducing Foreign Substances from Members scheduled to recieve Finish Painting, or other direct-to-steel Coatings.

H. Remove loose rust, heavy Mill Scale, Oil, Dirt, and other Foreign Substances from stainless steel members. Touch-up finish for uniform and consistent appearance.

3.04 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch (6 mm) in 10 feet, non-cumulative.

B. Maximum Offset From True Alignment: 1/8 inch (3 mm).

C. Maximum Out-of-Position: 1/8 inch (3 mm).

END OF SECTION

SECTION 07 1400
FLUID-APPLIED WATERPROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fluid-Applied Waterproofing: Applied to Browning canopy gutter
   1. Cold-applied polyurethane-methacrylate (PUMA) waterproofing system.

1.02 RELATED REQUIREMENTS

A. Section 05 1200 - Structural Steel Framing

B. Electrical Drawings: snow melt system

1.03 REFERENCE STANDARDS

A. ASTM D638 - Standard Test Method for Tensile Properties of Plastics; 2014.

B. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2015, with Editorial Revision (2017).

C. NRCA (WM) - The NRCA Waterproofing Manual; 2005.

1.04 SUBMITTALS

A. Product Data: Provide data for membrane, surface conditioner, flexible flashings, joint cover sheet, and joint and crack sealants.

B. Certificate: Certify that products meet or exceed specified requirements.

C. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and acceptable installation temperatures.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.06 FIELD CONDITIONS

A. Maintain ambient temperatures above 40 degrees F (5 degrees C) for 24 hours before and during application and until cured.

1.07 WARRANTY

A. Contractor shall correct defective Work within a five year period after Date of Substantial Completion; remove and replace materials concealing waterproofing at no cost to Owner.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Cold-Applied Polyurethane-Methacrylate (PUMA) Waterproofing System:
   1. Henry Company; Henry Pumadeq System: www.henry.com/#sle.

B. Substitutions: An equivalent product produced by a manufacturer not listed above may be submitted for approval prior to bidding for Architect review. Provide complete information to Architect describing how substitute product complies with specification. Indicate effect of substitute product on work.

2.02 FLUID APPLIED WATERPROOFING MATERIALS

A. Cold-Applied Polyurethane-Methacrylate (PUMA) Waterproofing System: Consists of a primer, base coat, and topcoat.
   1. Cured Thickness: 97 mils, 0.097 inch (2.46 mm), minimum, with applied base coat and top coat.

2. Suitable for installation over concrete and steel substrates properly prepared in accordance with manufacturers requirements.
3. Primer: Two-component, methyl-methacrylate (MMA) based.
4. Base Coat: Modified polyurethane-methacrylate (PUMA) that bonds firmly to primer.
   a. Elongation: 407 percent in accordance with ASTM D638.
   b. Tensile Strength: 425 PSI at 75 degrees F in accordnce with ASTM D638.
   c. Durometer Hardness, Type D: 35, minimum, in accordance with ASTM D2240.
5. Top Coat: Methyl-methacrylate (MMA) based, with excellent abrasion resistance, UV stability and chemical resistance.
   a. Elongation: 130 percent in accordance with ASTM D638.
   b. Tensile Strength: 986 psi (6.8 MPa) at 75 degrees F (24 degrees C) in accordance with ASTM D638.
   c. Durometer Hardness, Type D: 55, minimum, in accordance with ASTM D2240.
   d. Color: White.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify substrate surfaces are free of frozen matter, dampness, loose particles, cracks, pits, projections, penetrations, or foreign matter detrimental to adhesion or application of waterproofing system.

C. Verify that substrate surfaces are smooth, free of honeycomb or pitting, and not detrimental to full contact bond of waterproofing materials.

D. Verify items that penetrate surfaces to receive waterproofing are securely installed.

3.02 INSTALLATION

A. Install waterproofing to specified minimum thickness in accordance with manufacturers instructions and NRCA (WM) applicable requirements.

B. Apply primer or surface conditioner at a rate recommended by manufacturer, and protect conditioner from rain or frost until dry.

C. At joints and cracks less than 1/2 inch (13 mm) in width including joints between horizontal and vertical surfaces, apply 12 inch (300 mm) wide strip of joint cover sheet.

D. At joints from 1/2 inch to 1 inch (12.7 mm to 25.4 mm) in width, loop joint cover sheet down into joint between 1-1/4 inch to 1-3/4 inch (31.8 mm to 44.5 mm), and extend sheet at least 6 inches (152 mm) on either side of expansion joint.

E. Center joint cover sheet over joints, roll sheet into 1/8 inch (3.2 mm) thick coating of waterproofing material and apply second coat over sheet extending at least 6 inches (152 mm) beyond sheet edges.

F. Apply extra thickness of waterproofing material at corners, intersections, and angles.

G. Seal membrane and flashings to adjoining surfaces.

END OF SECTION

SECTION 07 1900
WATER REPELLENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Water repellents and anti-graffiti coatings applied to exterior concrete surfaces

B. Pressure washing

1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast in Place Concrete, substrate to recieve water repellent and anti-graffiti coating

B. Section 03 4100 - Precast Structural Concrete

C. Section 07 9200 - Joint Sealants

D. Section 13 3423 - Station Platform: Work inlcuded in Station Platforms

1.03 REFERENCE STANDARDS

A. ASTM D5095 - Standard Test Method for Determination of the Nonvolatile Content in Silanes, Siloxanes, and Silane-Siloxane Blends Used in Masonry Water Repellent Treatments; 1991 (Reapproved 2013).

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a meeting at least one week prior to starting work; require attendance of affected installers; invite Architect and Owner.

1.05 SUBMITTALS

A. Provide digital submittals for review by Architect. Do not proceed with work of this section without written approal.

B. Product Data: Provide product description, limitations, and chemical composition.

C. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention; cautionary procedures required during application. Provide specific recommensations for drying time, application rates, and conditions of applying water repellent and anti-graffiti coating.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements. Certify submitted products are chemically compatible with one another and suitable for intended use.

E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. Extra Water Repellent Material: Two gallons (9 liters) of type installed.
   2. Solvent for removal of graffiti: Two gallons of type recommended by manufacturer.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than 20 years documented experience.

B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience

1.07 MOCK-UP

A. Construct Mock-up of Canopy Column Type 1, adjacent concrete paving and finishes, and associated windscreen base wall as specified in Section 03 3000 - Cast-in-Place Concrete.

B. Verify that water repellent will effectively repel moisture from surface, and will produce no surface stains.

C. For proposed substitutions, prepare side-by-side mock-ups of specified and substitute products.

D. Demonstrate removal of graffiti and restoration of coating.

1.08 FIELD CONDITIONS

A. Protect liquid materials from freezing.

B. Do not apply water repellent when ambient temperature is lower than 50 degrees F (10 degrees C) or higher than 100 degrees F (38 degrees C).

C. Do not apply water repellents when wind velocity is higher than 10 mph (16 kph).

1.09 WARRANTY

A. Provide five year manufacturer warranty for water repellency.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Water Repellent and Anti-Graffiti Coating: Clear drying, water based silicone emulsion for Water Repellents and Anti-Graffiti Coatings suitable for use on Brick Masonry and Cast-in-Place Concrete.
   1. PROSOCO, Inc: Product Blok-Guard & Graffiti Control II: www.prosoco.com.
   2. Substitution: An equivalent product produced by a manufacturer not listed above may be submitted for approval prior to bidding for Architect review. Provide complete information to Architect describing how substitute product complies with specification. Indicate effect of substitute product on work of others. Do not proceed with sustitute product without written approval of Architect.

2.02 MATERIALS

A. Water Repellent and Anti-Graffiti Coating: Non-glossy, colorless, penetrating, water-vapor-permeable, non-yellowing sealer, that dries invisibly leaving appearance of substrate unchanged.
   1. Applications: Vertical surfaces.
   2. Substrates: Suitable for application on Cast-in-Place Concrete and Precast Structural Concrete.
   3. Allows removal of graffiti using recommended solvents without damage to substrate.
   4. Maintains dry appearance when wetted.
   5. Cleaner: Type recommended by water repellent and adnti-graffiti manufactuer.
   6. Defacer Eraser Graffiti Wipe or Enviro Klean.
   7. Graffiti Removal: Type recommended by water repellent and anti-graffiti manufacturer. PROSOCO's Defacer Eraser Graffiti Wipe or Enviro Klean SafStrip.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify joint sealants are installed and cured.

C. Verify surfaces to be coated are dry, clean, and free of efflorescence, oil, or other matter detrimental to application of water repellent.

3.02 PREPARATION

A. Protection of Adjacent Work:
   1. Protect adjacent landscaping, property, and vehicles from drips and overspray.
   2. Protect adjacent surfaces not intended to receive water repellent.

B. Prepare surfaces to be coated as recommended by water repellent manufacturer for best results.

C. Do not start work until concrete is cured a minimum of the number of days recommended by the coating manufacturer.

D. Remove oil and foreign substances with a chemical solvent that will not affect water repellent.

E. Verify that surfaces to recive Work had a neutral pH.

F. Pressure wash surfaces to be coated.
   1. Concrete: High pressure wash at 1,500 to 4,000 psi (10 to 30 MPa), at 6 to 12 inches (150 to 300 mm) from surface.

G. Allow surfaces to dry completely to degree recommended by water repellent manufacturer before starting coating work.

3.03 APPLICATION

A. Apply water repellent in accordance with manufacturer's instructions, using procedures and application methods recommended as producing the best results.

B. Apply water repellent to achieve appearance matching approved mock-up.

C. Apply at rate recommended by manufacturer, continuously over entire surface.

D. Apply number of coats recommended by manufacturer at their coverage rates and to match appearance of mock-up.

E. Remove water repellent from unintended surfaces immediately by a method instructed by water repellent manufacturer.

3.04 DEMONSTRATION

A. Provide demonstration and training of graffiti removal to Owner. Owner will apply graffiti consisting of up to 4 separate media. Graffiti to be applied to mock-up of concrete wall bases. Anti-Graffiti manufacturer to demonstrate removal of graffiti using reommended products.

3.05 SCHEDULE

A. Water Repellent and Anti-Graffiti Coating: At exposed Cast-in-Place concrete walls and curbs and at precast structural concrete columns. Do not apply to slabs.

B. Anti-Graffiti Remover: Provide to owner, 2 gallons in manuracturer's unopened containers.

3.06 DISPOSAL

A. Contain and neutralize excess water repellent to Department of Environmental Quality Standards.

B. Dispose of neutralized excess repellent properly. Do not discharge into Sanitary Sewer or Storm Sewer Systems.

END OF SECTION

SECTION 07 4113
METAL ROOF AND SOFFIT PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Structural roofing system of preformed steel panels
B. Metal Panel System for soffits with related flashings and components
C. Fastening system
D. Factory finshing
E. Accessories and miscellaneous components

1.02 RELATED REQUIREMENTS

A. Section 05 1200 - Structural Steel Framing: Roof framing and purlins
B. Section 05 3100 - Steel Decking: Substrate for metal roofing
C. Section 05 4000 - Cold Formed Metal Framing: substrate for metal soffit
D. Section 07 6200 - Sheet Metal Flashing and Trim
E. Section 07 9200 - Joint Sealants: Sealing joints between metal roof panel system and adjacent construction
F. Section 13 3423 - Station Platform: Work included in Station Platforms
G. Electrical Drawings: snow melt system and Lighting

1.03 REFERENCE STANDARDS

A. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
B. ASTM E1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference; 2005 (Reapproved 2017).
C. ASTM E1646 - Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference; 2011 (Reapproved 2018).
D. UL 580 - Standard for Tests for Uplift Resistance of Roof Assemblies; Current Edition, Including All Revisions.
E. State of Utah Building Code (International Building Code with State of Utah Amendments), most recent adopted edition.

1.04 SUBMITTALS

A. Provide digital submittals for review by Architect. Do not proceed with work of this section without written approval.
B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Storage and handling requirements and recommendations
   2. Installation methods
   3. Specimen warranty
C. Shop Drawings: Include layouts of roof and soffit panels, details of edge and penetration conditions, spacing and type of connections, flashings, underlayments, and special conditions.
   1. Show work to be field-fabricated or field-assembled.
   2. Include structural analysis signed and sealed by qualified structural engineer, indicating compliance of roofing system to specified loading conditions.
D. Verification Samples: For each roofing and soffit system specified, submit samples of minimum size 12 inches (305 mm) square, representing actual roofing and soffit metal, thickness, profile, color, and texture.
   1. Include typical panel joint in sample.

2. Include typical fastening detail.

E. Test Reports: Indicate compliance of metal roofing system to specified requirements.

F. Warranty: Submit specified manufacturer's warranty and ensure that forms have been completed in Owner's name and are registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Company specialiaing in the manufacture of roofing systems similar to those required for this project.
   1. Not less than 5 years of documented experience.

B. Installer Qualifications: Company trained and aothorized by roofing system manufacturer.

C. Perform work in accordance with SMACNA Architectural Sheet Metal Manual requirements and standard details, except as otherwise noted. Maintain one copy on project site.

1.06 MOCK-UP

A. Construct mock-up of sheet metal roofing, span of shelter by 36" wide, illustrating associated attachments. Mock up to inlcude at least one roof corner.

B. Construct mock-up of soffit assembly, span of shelter by 36" wide, illustrating associated attachments. Mock up to include at least one roof corner.

C. Locate where directed.

D. Acceptable mock-up represents expected quality level of remaining work.

E. Mock-up may remain as part of the work.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Provide strippable plastic protection on prefinished roofing panels for removal after installation.

B. Store roofing panels on project site as recommended by manufacturer to minimize damage to panels prior to installation.

1.08 WARRANTY

A. Finish Warranty: Provide manufacturer's special warranty covering failure of factory-applied exterior finish on metal roof and soffit panels and agreeing to repair or replace panels that show evidence of finish degradation, including significant fading, chalking, cracking, or peeling within specified warranty period of five years from Date of Substantial Completion.

B. Waterproofing Warranty: Provide manufacturer's warranty for weathertightness of roofing system, including agreement to repair or replace roofing that fails to keep out water within specified warranty period of five years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Metal Roof Panels and Soffit Panels:
   1. Basis of Design: MBCI; www.mbci.com
   2. Other Manufacurers:
      a. AEP Span; www.aep-span.com

B. Substitutions: An equivalent product produced by a manufacturer not listed above may be submitted for approval prior to bidding for Architect review. Provide complete information to Architect describing how subsitute product complies with specifications. Incidate effect of substitute product on work of others. Do not proceed with substitute product without written approval of Architect.

2.02 STRUCTURAL METAL ROOF PANELS

A. Design is based on BattenLok HS, manufactured by MBCI

B. Structural Metal Roofing: Provide complete roofing assemblies, including roof panels, clips, fasteners, connectors, and miscellaneous accessories, tested for compliance with the following minimum standards:

1. Structural Design Criteria: Provide panel assemblies designed to safely support design loads at support spacing indicated, with deflection not to exceed L/180 of span length(L) when tested in accordance with ASTM E1592.
   a. Dead Loads: Weight of roofing system, and roof-mounted components where indicated.
   b. Live Loads: As required by ASCE 7.
2. Overall: Complete weathertight system tested and approved in accordance with ASTM E1592.
3. Wind Uplift: Class 90 wind uplift resistance of UL 580.
4. Water Penetration: No water penetration when tested according to procedures and recommended test pressures of ASTM E1646.
5. Thermal Movement: Design system to accommodate without deformation anticipated thermal movement over ambient temperature range of 100 degrees F (56 degrees C).

C. Metal Panels: Factory-formed panels with factory-applied finish.
   1. Type: Single skin, uninsulated.
   2. Steel Panels:
      a. Steel Thickness: Minimum 22 gage (0.03 inch).
   3. Profile: Standing seam, wiht minimum 1.0 inch seam height: concealed fastener system for field seaming with special tool.
   4. Texture: Smooth.
   5. Length: Full length of roof slope, without lapped horizontal joints.
   6. Width: Maximum panel coverage of 16 inches.
   7. Color: To be selected by Architect from manufacturer's standard colors.

203 METAL SOFFIT PANELS

A. Design is based on Artisan Series, manufactured by MBCI

B. Soffit Panels: Factory-formed panels with factory applied-finish.

C. Profile: Flat - no pencil ribs.

D. Dimensions:
   1. Nominal exposed width: 12"
   2. Depth: 1"
   3. One piece full length as indicated on drawings.

E. Base Metal Material: Steel, conforming to ASTM A792 Zincalume, minimum yield 40,000 psi

F. Steel Thickness: 22 gage

G. Lenght: Full length of soffit slope, without lapped horizontal joints.

H. Color: To be selected by Architect from manufacturer's standard colors.

204 ATTACHMENT SYSTEM

A. Concealed System: Provide manufacturer's standard galvanized steel concealed anchor clips designed for specific roofing system and engineered to meet performance requirements, including anticipated thermal movement.
   1. Anchor clips shall be tested to establish that the clips will have 75% of he material thickness remaining after 100,000 cycles of the full range of motion.

B. Bearing Plates: 24 gauge 4"x 6" Zincalume coated steel bearing plate. Install plates at each metal roofing anchor. Secure plate to Steel Deck substrate.

205 SECONDARY FRAMING

A. Miscellaneous Secondary Framing: Light gauge steel framing incidental to structural supports; fabricated from steel sheet.

206 FABRICATION

A. Panels: Fabricate panels and accessory items at factory, using manufacturer's standard processses as required to achieve specified appearance and performance requirements.

B. Form secions true to shape, accurate in size, square, and free from distortion or defects.

C. Fabricate cleats of same material as sheet, same gauge as roofing sheet, interlockable with sheet.

D. Fabricate starter strips, interlockable with sheet.

E. Form pieces in single length sheets.

F. Hem exposed edges on undeside 1/2 inch; miter and seam corners.

2.07 PANEL FINISH

A. Flouropolymer Coating System: Manufacturer's standard multi-coat thermocured coating system, inlcuding minimum 70 percent flouropolymer color topcoat with minimum total dry film thickness of 0.9 mil; color and gloss as scheduled.

B. Underside finish: Manufacturer's standard off-white enamel.

2.08 ACCESSORIES AND MISCELLANEOUS ITEMS

A. Miscellaneous Sheet Metal Items - Roof: Provide flashings, trim, moldings, closure strips, preformed crickets, caps, and equipment curbs of the same material, thickness, and finish as used for the roofing panels. Items completely concealed after installation may optionally be made of stainless steel.

B. Mischellaneous Sheet Metal Items-Soffit: Provide trims and sheet metal end panels, etc, of the same material, thickness, and finish as used for the soffit panels, unless noted otherwise.

C. Rib and Ridge Closures: Provide prefabricated, close-fitting components of steel with corrosion resistant finish or combination steel and closed-cell foam.

D. Sealants:
   1. Exposed Sealant: Elastomeric; silicone, polyurethane, or silyl-terminated polyether/polyurethane.
   2. Concealed Sealant: Non-curing butyl sealant or tape sealant.

E. Fasteners: Galvanized hardened steel, hex-head, self tapping, where noted on drawings.
   1. Size: 1/2" #8

F. Standing Seam Accessory Clamp
   1. See electrical Drawings for roof clamp and associated hardware for mounting of rooftop light fixtures and snow melt system.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation of preformed metal roof panels until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Broom clean metal deck prior to installation of roofing system.

B. Coordinate roofing work with provisions for roof drainage, flashing, trim, penetrations, and other adjoining work to assure that the completed roof will be free of leaks.

C. Remove protective film from surface of roof and soffit panels immediately prior to installation. Strip film carefully, to avoid damage to prefinished surfaces.

D. Separate dissimilar metals by applying a bituminous coating, self-adhering rubberized asphalt sheet, or other permanent method approved by roof panel manufacturer.

E. Where metal will be in contact with wood or other absorbent material subject to wetting, seal joints with sealing compound and apply one coat of heavy-bodied bituminous paint.

F. Coordinate soffit work with provisions for flashing, trim, penetrations, lighting and other adjoining work to assure that the completed soffit is free of defects and excessive penetrations.

3.03 INSTALLATION

A. Overall: Install roofing system and soffit in accordance with approved shop drawings and panel manufacturer's instructions and recommendations, as applicable to specific project conditions. Anchor all components of roofing and soffit systems securely in place while allowing for thermal and structural movement.
   1. Install roofing system with concealed clips and fasteners, except as otherwise recommended by manufacturer for specific circumstances.
   2. Minimize field cutting of panels. Where field cutting is absolutely required, use methods that will not distort panel profiles. Use of torches for field cutting is absolutely prohibited.

B. Accessories: Install all components required for a complete roofing and soffit assembly, including flashings, gutters, trim, moldings, closure strips, preformed crickets, caps, rib closures, ridge closures, and similar roof accessory items.

C. Provide roof underlayment, product as recommended by metal roof manufacturer.

D. Roof Panels: Install panels in strict accordance with manufacturer's instructions, minimizing transverse joints except at junction with penetrations.
   1. Form weathertight standing seams incorporating concealed clips.

3.04 CLEANING

A. At completion of each day's work, sweep panel, flashings, and gutters clean. Do not allow fasteners, cuttings, filings, or scraps to accumulate on sheet metal or adjacent surfaces.

B. Clean exposed sheet metal work at completion of installation. Remove grease and oil films, excess joint sealer, handling marks, and debris from installation, leaving the work clean and unmarked, free from dents, creases, waves, scratch marks, or other damage to the finish.

3.05 PROTECTION

A. Do not permit storage of materials or roof traffic on installed roof panels. Provide temporary walkways or planks as necessary to avoid damage to completed work. Protect roofing until completion of project.

B. Touch-up, repair, or replace damaged roof panels or accessories before Date of Substantial Completion. Panels or flashings that have severe paint and/or substrate damage shall be replaced as directed by the Architect's or Owner's representative.

END OF SECTION

SECTION 07 6200
SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fabricated sheet metal items, including flashings, counterflashings, and other items indicated in Schedule.

B. Sealants for joints within sheet metal fabrications specified in Section 07 9200.

1.02 RELATED REQUIREMENTS

A. Section 03 4100 - Precast Structural Concrete

B. Section 05 1200 - Structural Steel

C. Section 05 5000 - Metal Fabrication: Cold-rolled steel gutters, scuppers, downspouts.

D. Section 07 4113 - Metal Roof and Soffit Panels: Flashings associated with roofing system.

E. Section 07 9200 - Joint Sealants: Sealing non-lap joints between sheet metal fabrications and adjacent construction

F. Section 13 3424 - Station Platform: Work included in Station Platforms

G. Division 22 - Plumbing: Connections at pipes and downspouts

1.03 REFERENCE STANDARDS

A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.

B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2019a.

C. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.

D. ASTM B32 - Standard Specification for Solder Metal; 2008 (Reapproved 2014).

E. ASTM D2178/D2178M - Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing; 2015a.

F. ASTM D4479/D4479M - Standard Specification for Asphalt Roof Coatings - Asbestos-Free; 2007 (Reapproved 2018).

G. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2018).

H. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week before starting work of this section.

1.05 SUBMITTALS

A. Provide digital submittals for review by Architect. Do not proceed with work of this section without written approal.

B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

C. Samples: Submit two samples 6 by 6 inch (150 by 150 mm) in size illustrating metal finish color.

1.06 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.

B. Fabricator and Installer Qualifications: Company specializing in sheet metal work with 5 years of documented experience

1.07 DELIVERY, STORAGE, AND HANDLING

A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

B. Prevent contact with materials that could cause discoloration or staining.

1.08 WARRANTY

A. Provide two year warranty.

B. Include material, installation, and repairs resulting from weather tightness failure.

PART 2 PRODUCTS

2.01 SHEET MATERIALS

A. Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24 gage, (0.0239 inch) (0.61 mm) thick base metal.

B. Pre-Finished Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24 gage, (0.0239) inch (0.61 mm) thick base metal, shop pre-coated with PVDF coating.
   1. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system.
   2. Color: Match adjacent roof or soffit color, unless noted otherwise on drawings.

C. Stainless Steel: ASTM A666, Type 316 alloy, soft temper, 24 gage, (0.0239) inch (0.6 mm) thick; smooth No. 4 - Brushed finish. Fully annealed.

2.02 FABRICATION

A. Form sections true to shape, accurate in size, square, and free from distortion or defects.

B. Fabricate cleats of same material as sheet, minimum 2 inches (50 mm) wide, interlocking with sheet.

C. Form pieces in longest possible lengths.

D. Hem exposed edges on underside 1/2 inch (13 mm); miter and seam corners.

E. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.

F. Fabricate corners from one piece with minimum 18 inch (450 mm) long legs; seam for rigidity, seal with sealant.

G. Fabricate vertical faces with bottom edge formed outward 1/4 inch (6 mm) and hemmed to form drip.

2.03 ACCESSORIES

A. Fasteners: Stainless steel, with soft neoprene washers.

B. Provide underlayment, product as recommended by metal roof manufacturer.

C. Primer: Zinc chromate type

D. Protective Backing Paint: Asphaltic mastic, ASTM D4479 Type I.

E. Sealant: Type specified in Section 07 9200 - Joint Sealants.

F. Plastic Cement: ASTM D4586/D4586M, Type I

G. Solder: ASTM B32; Sn50 (50/50) type

H. Flux: Rosin, cut Muriatic Acid, or commercial preparation suitable for use

I. Strainers: Stainless steel. Provide within gutter at each downspout.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify roof openings, curbs, pipes, and sleeves through roof are solidly set, reglets in place, and nailing strips located.

B. Verify roofing termination and base flashings are in place, sealed, and secure.

C. Beginning of installation indicates acceptance of conditions.

3.02 PREPARATION

A. Install starter and edge strips and cleats before starting installation.

B. Back-paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil (0.4 mm).

3.03 INSTALLATION

A. Comply with drawing details.

B. Install Work watertight, without waves, warps, buckles, tool maks, fastening stresses, distortion, or defects which impair strength or mar appearance.

C. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted.

D. Apply plastic cement compound between metal flashings and felt flashings.

E. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.

F. Seal metal joints watertight.

G. Install planes and lines in true alignment. Allow for sheet metal expansion and contraction.

H. Copings:
   1. Install copings with continuous cleat on the exterior side, fastened at 16 inches on center. Use exposed fasteners with neoprene washers through elongated holes on the roof side, at 24 inches on center.

I. Touch-up: Only minor scratches and abrasions will be allowed to be touched up. Any other damaged material shall be replaced.

J. Soldering at Precoated Sheetmetal: Remove paint from surfaces to be soldered. Clean and flux metals prior to soldering. Sweat solder completely through seam widths.

K. Apply primer and paint soldered or otherwise damaged factory finished sheet metal as recommended by coating manufacturer. Repairs to match adjacent color.

3.04 SCHEDULE

A. All flashings to be 24 gage unless otherwise noted on indicated on drawings.

END OF SECTION

SECTION 07 9200
JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Nonsag gunnable joint sealants.

B. Self-leveling pourable joint sealants.

C. Joint backings and accessories.

1.02 RELATED REQUIREMENTS

A. UDOT Standard Specification 03 152 - Expansion Joint Filler

B. Section 03 3000 - Cast-in-Place Concrete

C. Section 07 4113 - Metal Roof and Soffit Panels

D. Section 07 6200 - Sheet Metal Flashing and Trim

E. Section 13 3423 - Station Platform: Work Included in Station Platforms

1.03 REFERENCE STANDARDS

A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2015.

B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.

C. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.

D. ASTM C1521 - Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints; 2019.

1.04 SUBMITTALS

A. Provide digital submittals for review by Architect. Do not proceed with work of this section without written approal.

B. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.
   1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability
   2. List of backing materials approved for use with the specific product
   3. Substrates that product is known to satisfactorily adhere to and with which it is compatible
   4. Substrates the product should not be used on
   5. Substrates for which use of primer is required

C. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.

D. Samples for Verification: Where custom sealant color is specified, obtain directions from Architect and submit at least two physical samples for verification of color of each required sealant.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience

B. Installer Qualifications: Company specializing in performing the work of this section and with at least three years of documented experience and approved by manufacturer

C. Field Adhesion Tests of Joints: Test for adhesion using most appropriate method in accordance with ASTM C1521, or other applicable method as recommended by manufacturer

1.06 WARRANTY

A. Special Manufacturer's Warranty: Manufactuer's standard form in which joint sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
   1. Warranty Period for Silicone Sealants: 20 years from date of Substantial Completion
   2. Warranty Period for all other types of Sealants: 5 years from date of Substantial Completion
   3. Include coverage for installed sealants and accessories that fail to achive waterright seal, exhibit loss of adhesion or cohesion, or do not cure

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Non-Sag Sealants: Permits application in joints on vertical surfaces without sagging or slumping.
   1. Sika Corporation: www.usa-sika.com
   2. Bostik Inc: www.bostik-us.com/#sle.
   3. Dow Chemical Company: consumer.dow.com/en-us/industry/ind-building-construction.html/#sle.
   4. Pecora Corporation: www.pecora.com/#sle.
   5. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com/#sle.
   6. Substitutions: An equivalent product produced by a manufacturer not listed above may be submitted for approval prior to bidding for Architect review. Provide complete information to Architect describing how subsitute product complies with specifications. Incidate effect of substitute product on work of others. Do not proceed with substitute product without written approval of Architect.

2.02 JOINT SEALANTS - GENERAL

A. Colors: As selected by Architect from manuacturer's stnadard colors.

B. Definitions from ASTM C 920:
   1. Grade: Characteristics of sealant during installation. P-Pourable, NS-Non-Sag,SL - Self-Leveling
   2. Class: Measurement of movement, as a percentage
   3. Uses: A - appropriate for Aluminum, G - appropriate for glass, I - continuously submerged, M - appropriate for Mortar, NT - for non-traffic areas, T - for traffic areas, O - for use with other substrates not listed otherwise
   4. Type: Type S - Single Component, Type M - Multi-Component

2.03 JOINT SEALANT APPLICATIONS

A. A. Scope:
   1. Exterior Joints: Seal open joints, whether or not the joint is indicated on the drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
      a. Joints between cast-in-place concrete elements
      b. Joints between sheet metal components.
      c. Joints in platform paving.
      d. Joints between different exposed materials.
      e. Other joints indicated below.
   2. Do not seal the following types of joints.
      a. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
      b. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
      c. Joints where installation of sealant is specified in another section.

B. Exterior Joints: Use nonsag non-staining silicone sealant, unless otherwise indicated.

2.04 NONSAG JOINT SEALANTS

A. Type S1 - Non-Staining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
   1. Movement Capability: Plus and minus 50 percent, minimum.
   2. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.
   3. Hardness Range: 15 to 35, Shore A, when tested in accordance with ASTM C661.
   4. Color: To be selected by Architect from manufacturer's standard range.
   5. Service Temperature Range: Minus 65 to 180 degrees F.
   6. Products:
      a. Dow Chemical Company; DOWSIL 791 Silicone Weatherproofing Sealant: consumer.dow.com/en-us/industry/ind-building-construction.html/#sle
      b. Pecora Corporation; Pecora 890 NST (Non-Staining Technology): www.pecora.com/#sle
      c. Sika Corporation; Sikasil WS-290: www.usa-sika.com/#sle
      d. Substitutions: An equivalent product produced by a manufacturer not listed above may be submitted for approval prior to bidding for Architect review. Provide complete information to Architect describing how substitute product complies with specifications. Indicate effect of substitute product on work of others. Do not proceed with substitute product without written approval of Architect

2.05 SELF-LEVELING SEALANTS

A. Type S2 - Self-Leveling Polyurethane Sealant: ASTM C920, Grade P, Uses M and A; single or multi-component; explicitly approved by manufacturer for traffic exposure; not expected to withstand continuous water immersion
   1. Movement Capability: Plus and minus 25 percent, minimum
   2. Hardness Range: 35 to 55, Shore A, when tested in accordance with ASTM C661
   3. Color: To be selected by Architect from manufacturer's standard range
   4. Service Temperature Range: Minus 40 to 180 degrees F (Minus 40 to 82 degrees C).
   5. Products:
      a. Sika Corporation; Sikaflex-1c SL: www.usa-sika.com/#sle
      b. Substitutions: An equivalent product produced by a manufacturer not listed above may be submitted for approval prior to bidding for Architect review. Provide complete information to Architect describing how substitute product complies with specifications. Indicate effect of substitute product on work of others. Do not proceed with substitute product without written approval of Architect.

2.06 ACCESSORIES

A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application

B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that joints are ready to receive work.

B. Verify that backing materials are compatible with sealants.

C. Verify that backer rods are of the correct size.

3.02 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

3.03 INSTALLATION

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Perform installation in accordance with ASTM C1193.

C. Install bond breaker backing tape where backer rod cannot be used.

D. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.

E. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.

F. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

3.04 FIELD QUALITY CONTROL

A. Perform field quality control inspection/testing as specified in PART 1 under QUALITY ASSURANCE article.

B. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.

END OF SECTION

SECTION 08 8000
GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Glazing units for canopy windscreens.
B. Browning Center canopy roof glass.
C. Frameless Glass Mounting System and Clips.
D. Delegated Design.
E. Glazing compounds and accessories.
F. Acid etching of glass.

1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast in Place Concrete: Mounting surface for glass windscreens and windscreen mock-up requirements.
B. Section 05 1200 - Structural Steel Framing
C. Section 13 3423 – Station Platform : Work included in Station Platforms.

1.03 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.
B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015.
C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
D. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2015).
E. ASTM C1036 - Standard Specification for Flat Glass; 2016.
F. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.
G. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2014.
H. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.
I. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2016.
J. GANA (SM) - GANA Sealant Manual; 2008.
K. IGMA TB-3001 - Guidelines for Sloped Glazing; 2001.
L. ASTM B 221/ASTM B221M, Alloy 6063-T52: Standard specifications for Aluminum components.
M. ASTM A 666, Type 316: Stainless Steel Components.
N. State of Utah Building Code (International Building Code with State of Utah Amendments), most recent adopted edition.

1.04 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design work of this section, including comprehensive engineering analysis by a qualified professional engineer licensed in the State of Utah, using performance requirements and design criteria indicated.

1.05 SUBMITTALS

A. Provide digital submittals for review by Architect. Do not proceed with work of this section without written approval.

B. Product Data on Glazing Unit and Frameless Glass Mounting System Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.

C. Delegated-Design Submittal: Comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation. Provide design bearing engineers seal.

D. Qualification Data: For installers.

E. Certificate: Submit certificates from respective manufacturers attesting that glass and glazing materials furnished for project comply with requirements.

F. Provide complete shop drawings showing windscreen installation, mounting, connectors, anchors, added reinforcement of concrete if needed, Provide separate drawings for each kind of connector.

G. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.

H. Samples: Submit one sample 12 by 12 inch (300 by 300 mm) in size of glass units. Include acid-etch pattern.

I. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

J. Provide electronic record drawings in AutoCAD (.dwg) format of exact shape of each windscreen for Owner's use in future replacement of panels.

1.06 MOCK-UPS

A. Construct Mock-up of Canopy Column Type 1, adjacent concrete paving and finishes, and associated windscreen base wall as specified in Section 03 3000 - Cast-in-Place Concrete.

1.07 FIELD CONDITIONS

A. Do not install glazing when ambient temperature is less than 40 degrees F (4 degrees C).

B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.08 WARRANTY

A. Laminated Glass: Provide a five (5) year manufacturer warranty to include coverage for delamination, including providing products to replace failed units.

B. Etched Glass: Provide a five (5) year manufacturer warranty to include coverage for replacement of failed units.

C. Heat Soaked Tempered Glass: Provide a five (5) year manufacturer warranty to include coverage for spontaneous breakage of fully tempered glass caused by nickel sulfide (NiS) inclusions.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Glass Manufacturers:
   1. Cardinal Glass Industries: www.cardinalcorp.com.
   2. Guardian Industries Corp: www.sunguardglass.com.
   3. Pilkington North America Inc: www.pilkington.com/na.
   4. PPG Industries, Inc: www.ppgideascapes.com.
   5. Substitutions: An equivalent product produced by a manufacturer not listed above may be submitted for approval prior to bidding for Architect review. Provide complete information to Architect describing how substitute product complies with specifications. Indicate effect of substitute product on work of others. Do not proceed with substitute product without written approval of Architect.

B. Glass Windscreen System Manufacturers:
   1. Basis of Design, Posts and Glass Clips for Windscreen system: CR Laurence Co., Inc.(CRL) www.crl.com
   2. Other Glass Windscreen Manufacturers:
      a. Wagner Architectural Glass Systems; www.wagnerarchitectural.com
   3. Substitutions: An equivalent product produced by a manufacturer not listed above may be submitted for approval prior to bidding for Architect review. Provide complete information to Architect describing how substitute product complies with specifications. Indicate effect of substitute product on work of others. Do not proceed with substitute product without written approval of Architect.

C. Glass Manufacturers:
   1. Type recommended by Glass Windscreen Manufacturer.

202 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES

A. Design Criteria: Comply with applicable building codes and standards of the State of Utah and local jurisdictions for wind load, impact loads, lateral forces, glazing design, structural analysis. 2018 edition of the International Building Code (IBC), to include Appendix J, Issued by the International Code Council plus State and Local Amendments. Comply with standard specifications and standards of the Utah Transit Authority. Design to suit local climatic conditions.

   Windscreens:
   1. Wind Exposure and Speed: As identified on structural drawings.
   2. Support distributed load of 50 pounds per lineal foot applied horizontally at right angles in any direction to the windscreen.
   3. Support concentrated horizontal load of 200 pounds applied in any direction at any point along the windscreen at a height of 42 inches above finished grade.
   4. Support a load of 50 pounds on 1 square foot perpendicular to glass at any location.
   5. Seismic zone and hazard class: As identified on structural drawings.
   6. Glazing safety standards: As stated in applicable codes.
   7. Additional requirements as contained in these specifications.

   Canopy Roof:
   1. Wind Exposure and Speed: As identified on structural drawings.
   2. Support distributed load of 50 pounds per lineal foot applied horizontally at right angles in any direction to the windscreen.
   3. Support concentrated horizontal load of 200 pounds applied in any direction at any point along the windscreen at a height of 42 inches above finished grade.
   4. Support a load of 50 pounds on 1 square foot perpendicular to glass at any location.
   5. Seismic zone and hazard class: As identified on structural drawings.
   6. Glazing safety standards: As stated in applicable codes.
   7. Additional requirements as contained in these specifications.

B. Select type and thickness of exterior glazing assemblies to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of glass.
   1. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
   2. Seismic Loads: Design and size glazing components to withstand seismic loads and sway displacement in accordance with the requirements of ASCE 7.
   3. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
   4. Glass thicknesses listed are minimum.

C. Thermal and Optical Performance: Provide glass products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:

1. Solar Optical Properties: Comply with NFRC 300 test method.

203 GLASS MATERIALS

A. Float Glass: Provide float glass based glazing unless noted otherwise.
   1. Windscreen Glass: FT (Fully Tempered).
      a. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality-Q3.
         1) Kind HS - Heat-Strengthened Type: Complies with ASTM C1048.
         2) Quality: 13 (glazing select).
         3) Fully Tempered Safety Glass: Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.
         4) Thicknesses: As indicated; provide greater thickness as required for exterior glazing wind load design.

B. Laminated Glass: Float glass laminated in accordance with ASTM C1172.
   1. Laminated Safety Glass: Complies with ANSI Z97.1 - Class B or 16 CFR 1201 - Category I impact test requirements.
   2. Polyvinyl Butyral (PVB) Interlayer: 0.030 inch (0.762 mm) thick, minimum.

204 GLAZING UNITS

A. Windscreens - Monolithic Exterior Vision Glazing:
   1. Applications: Windscreen Glazing.
   2. Glass Type: FT (fully tempered) float glass.
      a. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear.
      b. Heat-Strengthened and Fully Tempered Types: ASTM C1048, Kind HS and FT.
      c. Quality: q3 (glazing select)
      d. Thickness: 1/2 inch, nominal, minimum thickness. Increase thickness as required for compatibility with frameless glazing supports and to resist code-required loads.
      e. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.
      f. Grind smooth and polish exposed glass edges of end panels to 1/8 inch radius.
   3. Acid-Etching: Etch one face of all glass with hydrofluoric and hydrochloric acids, enelty applied, according to manufacturer's standard process.
      a. Pattern to be provided by Architect.
      b. Approximaetly 25% of surface area to be etched.

B. Browning Center Canopy Roof Glazing- Laminated Glass Roof Panels
   1. Applications: Canopy Roof Glass.
   2. Glass Type: FT (fully tempered) and Laminated float glass.
      a. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear.
      b. Heat-Strengthened and Fully Tempered Types: ASTM C1048, Kind HS and FT.
      c. Quality: q3 (glazing select)
      d. Thickness: 1/2 inch, nominal, minimum thickness. Increase thickness as required to resist code-required loads.
      e. Tint: Clear.
      f. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.
      g. Grind smooth and polish exposed glass edges of end panels to 1/8 inch radius.

205 WINDSCREEN MULLION SYSTEM AND POINT SUPPORTS

A. Point Support: Stainless steel barrel point support with smooth round stainless steel caps. Similar to CR Laurence S0B1124BS. Length as shown on Drawings
   1. Size: 1.5 inch diameter by length indicated on drawings
   2. Materials and Finish: Brushed 316 stainless steel
   3. Glazing: As specified above
   4. Fasteners, gaskets, shoulder washers, and accessories: Type recommended by Manufacturer

B. Aluminum Windscreen System
   1. Basis of design is the AWS Windscreen System by C.R. Laurence
   2. 180 Degree 72" x 2" x 2 5/8" rectangular center posts
   3. 90 degree 72" x 2" x 2 5/8" rectangular end posts
   4. Notched post caps
   5. Finish to be selected by Architect from manufacturer's standard colors.

C. HR painted stanchions sized for design live loads

2.06 ACCESSORIES

A. Aluminum Drip Edge: aluminum flatbar, 3/4" by 1/8" thick, with an anodized finish, silver as selected by Architect.
   1. Adhere to the edge of the laminated glass panels with Dow Corning 791 Silicone Sealant, gray
   2. Provide drip edge at upper and lower edges of Browning Center canopy roof glass.
   3. Do not apply drip edge at glass edges adjacent to plate rafters.

B. Glazing Gaskets: Provide at top and bottom of all Browning Center canopy roof glass edges retained by steel angle members.

C. As required to provide waterproof assembly

D. Glazing Tape: Neoprene, hight density closed cell foam tape, adhesive ose side. 3/16" thick.

PART 3 EXECUTION

3.01 VERIFICATION OF CONDITIONS

A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.

B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.

3.02 PREPARATION

A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.03 INSTALLATION, GENERAL

A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.

B. Install glazing sealants in accordance with ASTM C1193, GANA Sealant Manual, and manufacturer's instructions.

C. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.

D. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.

E. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, painting, concrete staining and sealing, mortar droppings, etc.

F. Protect glass from edge damage during handling and installation; use a rolling block in rotating glass units to prevent damage to glass corners. Do not impact glass with metal framing. Use suction cups to shift glass units within openings. Do not raise or drift glass with a pry bar. Rotate glass with flares or bevels along one horizontal edge which would occur in vicinity of setting blocks so that these are located at top of opening. Remove from project and dispose of

glass units with edge damage or other imperfections of kind that, when installed, weakens glass and impairs performance or appearance.

G. At Browning Center roof canopy glass, provide waterproof assembly.

3.04 CLEANING

A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.

B. Remove non-permanent labels immediately after glazing installation is complete.

C. Clean glass and adjacent surfaces after sealants are fully cured.

D. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.05 PROTECTION

A. After installation, mark pane with an 'X' by using removable plastic tape or paste.

B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

END OF SECTION

SECTION 09 9600
HIGH-PERFORMANCE COATINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. High performance coatings also referred to as HPC.

B. Surface preparation.

1.02 RELATED REQUIREMENTS

A. Section 05 1200 - Structural Steel Framing

B. Section 13 3423 – Station Platform : Work included in Station Platforms.

1.03 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

B. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.

C. SSPC V1 (PM1) - Good Painting Practice: Painting Manual, Volume 1; 2016.

D. SSPC V2 (PM2) - Systems and Specifications: Steel Structures Painting Manual, Volume 2; 2015.

E. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).

F. SSPC-SP 2 - Hand Tool Cleaning; 2018.

G. SSPC-SP 6 - Commercial Blast Cleaning: Society for Protective Coatings; 2007

1.04 SUBMITTALS

A. Provide digital submittals for review by Architect. Do not proceed with work of this section without written approval.

B. Product Data: Provide complete list of all products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
   2. MPI product number (e.g. MPI #47).
   3. Cross-reference to specified coating system(s) product is to be used in; include description of each system.
   4. Manufacturer's installation instructions.

C. Installation Instructions: Manufacturer's written installation instructions for the products and coating systems specified.

D. Qualifications of Applicator: Proof of acceptability of Applicator by Manufacturer.

E. Samples: Submit two samples 8 x 8 inch (200 x 200 mm) in size illustrating colors available for selection.

F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

G. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

H. Maintenance Data: Include cleaning procedures and repair and patching techniques.

I. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. Extra Coating Materials: 1 gallon (4 liters) of each type and color.
   2. Label each container with manufacturer's name, product number, color number, and room names and numbers where used.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

B. Applicator Qualifications: Company specializing in performing the work of this section with minimum 5 years documented experience.

C. Primer and undercoat material produced by the same manufacturer as the finish coats shall be provided for each type of coating, for single source responsibility. Use only thinners recommended by the manufacturer and only within recommended limits.

D. Applicator shall establish quality control procedures and practices to monitor phases of storage, surface preparation, mixing, application, and inspection throughout the duration of the project.

E. Applicator's quality control procedures and practices shall include the following items:
   1. Training of personnel in the proper surface preparation requirements.
   2. Training of personnel in the proper storing, mixing, and application and quality control testing.
   3. Training of personnel in the propoer thickness application of coatings.

F. Pre-Installation Conference:
   1. Before start of Work - Applicator, and Manufacturer's Technical Representative shall meet on-site with Architect/Owner to discuss approved products and workmanship to ensure proper surface preparation and application of the coatings.
   2. Review foreseeable methods and procedures related to the coating Work including but not necessarily limited to the following.
      a. Review Project requirements and the Contract Documents.
      b. Review required submittals.
      c. Review requirements of on-site quality control inspection and testing.
      d. Review the requirements for preparing the quality control report as specified herein.
      e. Review availability of materials, tradesmen, equipment and facilities needed to make progress and avoid delays.
      f. Review material storage and staging.
      g. Review equipment storage and staging.
      h. Review waste management and disposal.
      i. Review environmental conditions, other Project conditions, and procedures for coping with unfavorable conditions.
      j. Review regulations concerning code compliance, environmental protection, health, safety, fire and similar considerations.
      k. Review procedures required for the protection of the completed work during the remainder of the construction period.
   3. Regulatory Requirements: Conform to applicable codes and ordinances for flame, fuel, smoke and volatile organic compounds (VOC) ratings requirements for finishes at time of application.

1.06 MOCK-UP

A. Provide mock-up of one shelter canopy, illustrating coating, for each specified item.

B. Locate where directed.

C. Mock-up may remain as part of the work.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of coating, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Coating Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

1.08 FIELD CONDITIONS

A. Do not install materials when temperature is below 55 degrees F (13 degrees C) or above 90 degrees F (32 degrees C).

B. Maintain this temperature range, 24 hours before, during, and 72 hours after installation of coating.

C. Restrict traffic from area where coating is being applied or is curing.

1.09 WARRANTY

A. Correct defective Work within a five year period after Date of Substantial Completion.

B. Warranty: Include coverage for bond to substrate.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. High-Performance Coatings:
1. Sherwin-Williams Company: www.protective.sherwin-williams.com/industries/#sle.
2. Tnemec Company, Inc: www.tnemec.com.
3. Substitutions: An equivalent product produced by a manufacturer not listed above may be submitted for approval prior to bidding for Architect review. Provide complete information to Architect describing how substitute product complies with specifications. Indicate effect of substitute product on work of others. Do not proceed with substitute product without written approval of Architect.

2.02 HIGH PERFORMANCE COATINGS - GENERAL

A. Coatings - General: Provide complete multi-coat systems formulated and recommended by manufacturer for the applications indicated, in the thicknesses indicated; number of coats specified does not include primer or filler coat.

B. Materials Compatibility: Provide shop and field primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

C. Sheen or gloss: Provide the sheen or gloss specified; where sheen is not specified, sheen or gloss will be selected by Architect from the manufacturer's full line.

2.03 REFERENCED GLOSS LEVELS

A. Some of the following Gloss Level references may be used in the Paint Systems outlined below and are defined here for reference. Gloss units are as measured at 60 degrees from perpendicular, per ASTM D523.
1. Gloss Level 1 a traditional matte finish - flat: maximum 5 units.
2. Gloss Level 2 a high side sheen flat - a 'velvet-like' finish: maximum 10 units.
3. Gloss Level 3 a traditional 'eggshell-like' finish: 10-25 units.
4. Gloss Level 4 a 'satin: 20-35 units.
5. Gloss Level 5 a traditional semi-gloss: 35-70 units.
6. Gloss Level 6 a traditional gloss: 70-85 units.
7. Gloss Level 7 a high gloss: more than 85 units.

2.04 HIGH PERFORMANCE COATINGS PRODUCTS

A. System 1 - Structural Steel/Ferrous Metal - Canopy elements to remain concealed in soffit - 2-part system:
1. Shop applied zinc-rich primer:
a. Series 90-97 Tneme-Zinc by Tnemec
b. Zinc Clad XI by Sherwin Williams

c. Other products meeting the standards of MPI #19 or MPI #20
d. Applied 2.5-4.0 mils dry film thickness; 3.5-5.0 mils wet.

2. Intermediate/Top Coat: Series N69/V69 Hi-Build Epoxoline II
a. Series N69/V69 Hi-Build Epoxoline II by Tnemec
b. Macropoxy 646 Fast Cure Epoxy by Sherwin Williams
c. Other products meeting the standards of MPI #108
d. Applied 3.0-5.0 mils dry film thickness; 4.0-6.0 mils wet.

B. System 2 - Structural Steel/Ferrous Metal - Canopy elements to remain exposed - 3-part system:
1. Shop applied zinc-rich primer:
a. Series 90-97 Tneme-Zinc by Tnemec
b. Zinc Clad XI by Sherwin Williams
c. Other products meeting the standards of MPI #19 or MPI #20
d. Applied 2.5-4.0 mils dry film thickness; 3.5-5.0 mils wet.
2. Intermediate coat epoxy primer:
a. Series N69/V69 Hi-Build Epoxoline II by Tnemec
b. Macropoxy 646 Fast Cure Epoxy by Sherwin Williams
c. Other products meeting the standards of MPI #108
d. Applied 3.0-5.0 mils dry film thickness; 4.0-6.0 mils wet.
3. Finish coat aliphatic urethane:
a. 740 UVX by Tnemec
b. Hi-Solids Polyurethane 250 by Sherwin Williams
c. Other products meeting the standards of MPI #72
d. Applied 2.0-3.0 mils dry film thickness; 3.2-4.8 mils wet, or greater if recommended by manufacturer for even color.
e. Gloss: MPI gloss level 6-7
f. Color: to be determined by Architect

C. System 3 - Structural Steel/Ferrous Metal - Canopy element field weld touch-up:
1. Field Touch-up Primer:
a. Series 90-97 Tneme-Zinc by Tnemec
b. Zinc Clad XI by Sherwin Williams
2. Additional Intermediate and Finish Coats as required to match application identified in System 1 or System 2 above.

D. Provide Intermediate and finish coats at exposed steel where indicated on drawings.

E. Provide Shop Primer and Field Touch-Up coat at all concealed Metal Fabrications and Structural steel not specified to be galvanized.

2.05 ACCESSORY MATERIALS

A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of coated surfaces.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Do not begin application of coatings until substrates have been properly prepared.

C. Verify that substrate surfaces are ready to receive work as instructed by the coating manufacturer. Obtain and follow manufacturer's instructions for examination and testing of substrates.

D. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

E. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

F. Test shop-applied primer for compatibility with subsequent cover materials.

G. Proceed with coating application only after unacceptable conditions have been corrected.
   1. Commencing coating application constitutes Contractor's acceptance of substrates and conditions.

3.02 PREPARATION

A. Clean surfaces of loose foreign matter.

B. Remove substances that would bleed through finished coatings. If unremovable, seal surface with shellac.

C. Remove finish hardware, fixture covers, and accessories and store.

D. Galvanized Surfaces:
   1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
   2. Prepare surface according to SSPC-SP 2.

E. Ferrous Metal:
   1. Solvent clean according to SSPC-SP1.
   2. Remove rust, loose mill scale, and other foreign substances using using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning", and protect from corrosion until coated.
   3. Field touch-up preparation: remove light rust, and shop primer, if any to bare metal using power tools according to SSPC-SP 11 "Power Tool Cleaning to Bare Metal", and protect from corrosion until coated.

F. Protect adjacent surfaces and materials not receiving coating from spatter and overspray; mask if necessary to provide adequate protection. Repair damage.

3.03 PRIMING

A. Apply primer to all surfaces, unless specifically not required by coating manufacturer. Apply in accordance with coating manufacturer's instructions.

3.04 COATING APPLICATION

A. Apply coatings in accordance with manufacturer's written instructions, to thicknesses specified and recommendations in "MPI Architectural Painting and Specification Manual".

B. Apply in uniform thickness coats, without runs, drips, pinholes, brush marks, or variations in color, texture, or finish. Finish edges, crevices, corners, and other changes in dimension with full coating thickness.

C. Apply coatings in the shop to the greatest extent possible, including Primer Coat, Intermediate Coat, and Finish Coat.

D. Uniformly apply coatings at spreading rate required to achieve specified Dry Film Thickness (DFT).

E. In accordance with SSPC-PA11 Stripe paint with brush critical locations on steel such as welds, corners, and edges using specified primer.

3.05 FIELD QUALITY CONTROL, INSPECTION AND TESTING

A. The Applicator shall perform the quality control procedures listed below in conjunction with the requirements of this section.
   1. Inspect materials upon receipt to ensure that products are supplied by the approved Manufacturer.
   2. Surface Profile and Degree of Surface Cleanliness: Inspect and record substrate profile (anchor pattern) and degree of cleanliness. Surfaces shall meet the manufacturer’s recommended anchor profile and degree of blast cleaning.
      a. Visually confirm the specified degree of surface cleanliness of the ferrous metal surface in accordance with SSPC-VIS 1.

b. The specified surface profile of the prepared substrate shall be verified in accordance with ASTM D4417 - Method C Replica Tape.

3. Measure and record ambient air temperature, relative humidity and dew point temperature once every two hours of work shift.
4. Measure and record substrate temperature once every two hours using an infrared or other surface thermometer.
5. Verify surface preparation and coating application is as specified.
6. Dry-Film Thickness:
   a. Wet-Film Thickness shall be taken every 100 square feet in accordance with ASTM D4414 or other agreed-upon method.
   b. The Dry-Film Thickness (DFT) shall be measured in accordance with SSPC-PA2 Measurement of Dry Coating Thickness. Verify DFT of each coat and total DFT of each coating system are as specified.
7. The Applicator is responsible for keeping the Architect/Owner informed of progress so that Architect/Owner may provide additional quality control at their discretion.
8. Inspection by the Architect/Owner or others does not absolve the applicator from his responsibilities for quality control inspection and testing as specified herein or as required by the Manufacturer's instructions.

3.06 MANUFACTURER'S FIELD SERVICES

A. Manufacturer's technical representative shall provide technical assistance and guidance for surface preparation and application of coating systems.

3.07 REPAIR

A. Damaged Materials: Repair or replace damaged materials and surfaces not scheduled to be coated.

B. Damaged Coatings: Touch-up or repair damaged coatings. Touch-up of minor damage shall be acceptable where result is not visibly different from adjacent surfaces. Recoat entire surface where touch-up result is visibly different, either in sheen, texture, or color.

C. Coating Defects: Repair in accordance with manufacturer's instructions coatings that exhibit film characteristics or defects that would adversely affect performance or appearance of coating systems.

3.08 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

B. Clean surfaces immediately of overspray, splatter, and excess material.

C. After coating has cured, clean and replace finish hardware, fixtures, and fittings previously removed.

3.09 PROTECTION

A. Protect finished work from damage.

END OF SECTION

SECTION 10 1400
SIGNAGE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Station Name Signs

B. Station Destination Signs

C. Station Information Kiosk

D. Cast Aluminum Letters at Browning Center Canopy

E. Platform Pavement Symbols

F. Installation of Owner Furnished Real Time Sign

1.02 RELATED REQUIREMENTS

A. Sexction 03 3000 - Cast in Place Concrete: attachment of signs to cast in place concrete

B. Section 13 3423 - Station Platform: Work Included in Station Platforms.

C. Electrical Drawings - Electrical connections to signs.

D. UDOT Specification 02768: Epoxy Paint for Platform Pavement Markings

1.03 REFERENCE STANDARDS

A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.

B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

C. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

D. State of Utah Building Code (International Building Code with State of Utah Amendments), most recent edition

1.04 SUBMITTALS

A. Provide digital submittals for review by Architect. Do not proceed with work of this section without written approal.

B. Product Data: Manufacturer's printed product literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign.

C. Shop Drawing - Graphics: Provide information sufficient to completely define each sign for fabrication, including spacing between letters and words, space around edges, and relationship to mounting substrate.

D. Shop Drawing - Fabrication: Submit shop drawings for fabrication indicating all materials, sizes, configurations, mounting holes, and applicable substrate mountings. Include plans, elevations, and details of sections and connections. Show anchorages and accessory items.

E. Shop Drawing - Cast Aluminum Letters: Provide drawings indicating text layout, spacing, mounting and typeface options for Cast Aluminum Letters. Provide layout drawings for up to three typefaces.

F. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including station name, other text to be applied, sign and letter sizes, fonts, and colors.
   1. When content of signs is indicated to be determined later, request such information from Owner through Architect at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.

G. Samples: Submit two samples of each type of sign, of size similar to that required for project, illustrating sign style, font, and method of attachment.

H. Samples - Porcelain Enamel Signs: Submit two representative samples showing texture and quality of manufacture including graphics for each color.

I. Samples - sign attachment: Provide two samples of rod and attachment assembly required to hand signs from shelters.

J. Samples - Cast Aluminum Letters: Provide two representative letters showing texture and quality of manufacturer and color.

K. Verification Samples: Submit samples showing colors specified.

L. Manufacturer's Installation Instructions: Include installation templates and attachment devices.

M. Manufacturer's Qualification Statement

1.05 MOCK-UP

A. Station name sign: Fabricate one station name sign with edge illumination and ability to connect to power. Test light proximity and illumination through acrylic. Obtain approval of Architect, confim a single light source will sufficiently illuminate the station name for legibility from the viewpoint of a passenger on the platform below and on the bus parked at the station.

B. Locate mock-up where directed.

C. Accepted mock-up panel is considered basis of quality for the finished work. Keep mock-up exposed to view for duration of concrete work.

D. Mock-up may remain as part of the work.

1.06 WARRANTY

A. Provide a written warranty issued in the name of the Owner. Warranty to begin on the date of Substantial Completion.
   1. Provide one-year warratnty on general workmanship and fabrication and leak protection for all sign types.
   2. Provide five-year warranty on porcelain enamel system against manufacturing defects inlcuding fading, spawling, pinholes, discolorations, staining, gloss reductions, or rusting.
   3. Provide one-year warranty on light builds and lighting components.

1.07 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Package signs as required to prevent damage before installation.

B. Store tape adhesive at normal room temperature.

1.09 FIELD CONDITIONS

A. Verify that field measurements are as indicated on drawings. If field measurements differ slightly from drawings and dimensions, modify work as required for accurate fite. If measurements differ substantially, notify Architect prior to fabrication.

B. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.

C. Maintain this minimum temperature during and after installation of signs.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Cast Aluminum Letters:
   1. Cosco Industries; Cast Aluminum: www.coscoarchitecturalsigns.com/#sle.
   2. FASTSIGNS: www.fastsigns.com/#sle.
   3. Gemini Sign Letters, www.geminisignletters.com
   4. Substitutions: An equivalent product produced by a manufacturer not listed above may be submitted for approval prior to bidding for Architect review. Provide complete information to Architect describing how subsitute product complies with specifications. Incidate effect

of substitute product on work of others. Do not proceed with substitute product without written approval of Architect.

B. Station Information Kiosk:
   1. APCO; Visuline Directories: www.apcosigns.com
   2. Substitutions: An equivalent product produced by a manufacturer not listed above may be submitted for approval prior to bidding for Architect review. Provide complete information to Architect describing how subsitute product complies with specifications. Incidate effect of substitute product on work of others. Do not proceed with substitute product without written approval of Architect.

2.02 SIGNAGE APPLICATIONS

A. Accessibility Compliance: Signs are required to comply with ADA Standards and ICC A117.1 and applicable building codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.

B. Tolerances: All work should be machine fabricated to produce signage in straight lines, with square corners or smooth bends, free of twists, kinks, warps, dents, and other imperfections. Panels should be flat within 1mm over the concave surface and shall not be more than 1mm out.

2.03 SIGN TYPES

A. Station Name Signs: Porcelain enamel sign assembly with cut out letters and integral illumination.
   1. Material: Acrylic plastic sheet with laser cut aluminum sheet.
      a. Acrylic plastic: Acrylite LED (EndLighten) by Acrylite, clear, thickness 3/8 inch.
      b. Reflective Interlay: Opaque, white 1/8 inch.
      c. Aluminum Sheet: Smooth aluminum sheet meeting requiements defined by ASTM A424 Type 1 suitable for porcelain enamel.
         1) Thickness 1/4 inch.
         2) Porcelain enamel finish with laser cut letters.
         3) Text: to be confirmed by Owner.
   2. Suspended Mounting: Stainless steel suspension tubes, with hardware as shown on drawings for attachment to ceiling construciton indicated. Fabricate to allow concealed drawings for attachment to ceiling construction indicated. Fabricate to allow concealed routing of wiring within tubes.
      a. Finish: Brushed stainless.
   3. Top, Bottom and Side Frames: Smooth 3/8" aluminum meeting requirements defined by ASTM A424 Type 1 suitable for porcelain enamel. Size and shape as indicated on drawings.
   4. Provide LED edge light with remote transformer.
   5. Fabrication: Fabricate as indicated on drawings.
   6. Color and Font: Unless otherwise indicated:
      a. Character Font: Whitney Semibold.
      b. Character Case: Upper case only.
      c. Background Color: As shown on drawings.
   7. Text: Station Names to be provided by Owner.
   8. Frits/Glazes/Oxides: Specially formulated porcelain enamel frits, glazes, and oxides as supplied by Ferro, Chivit, APEC, or Cerdek. Materials shall be acid resistant to an A or AA rating in final form.
   9. Enamel in conformance with manufacturer recommendations and common practices. Form all necessary holes and cutouts prior to enameling.

B. Station Destination Signs: Porcelain enamel sign with color contrasting letters
   1. Aluminum Sheet: Smooth aluminum sheet meeting requirements defined by ASTM A424 Type 1 suitable for porcelain enamel.
      a. Thickness: 1/4 inch.

b. Edges: Square.
c. Corners: Square.

2. Fabrication: Fabricate as indicated on drawings.
3. Mounting: To Real Time Sign, as indicated on drawings. Match mounting holes provided by Real Time Sign supplier. Provider tamper resistant fasteners.
4. Color and Font: Unless otherwise indicated:
   a. Character Font: Whitney Semibold.
   b. Character Case: Upper case only.
   c. Background Color: As shown on drawings.
   d. Character Color: As shown on drawings.
5. Text:
   a. Ogden Intermodal Center
   b. McKay Dee Hospital
   c. Verify text with Owner prior to fabrication.
6. Frits/Glazes/Oxides: Specially formulated porcelain enamel frits, glazes, and oxides as supplied by Ferro, Chivit, APEC, or Cerdek. Materials shall be acid resistant to an A or AA rating in final form.
7. Enamel in conformance with manufacturer recommendations and common practices. Form all necessary holes and cutouts prior to enameling.

C. Station Information Kiosks
1. Illuminated directories fixed on top of concrete walls, complete with components by single manufacturer at exterior locations indicated.
2. Acceptable product:
   a. APCO; Visuline Directories; 388 Grant Street SE, Atlanta, Georgia, 30312, USA. Phone; (404) 688-9000. Telex; 752098. Fax; (404) 577-3847.
   b. Substitutions: An equivalent product produced by a manufacturer not listed above may be submitted for approval prior to bidding for Architect review. Provide complete information to Architect describing how substitute product complies with specification. Indicate effect of substitute product on work.
   c. Type, Map: APCO; Model #2400 Visuline with Display Light. Single sided.
   d. Aluminum structural channel base by manufacturer.
   e. Aluminum back panel finished to match aluminum cabinet.
   f. Finish: powder coat, custom color to be selected by Architect.
3. Accessories Provided and installed by Contractor
   a. Anchor Bolts: 1/2 inch diameter by 12 inch long headed bolts, conforming to ASTM F1554 grade 55
   b. Electrical conduit and wire as specified in Electrical Drawings.

D. Electronic Passenger Information Signs - Real Time Signs
1. Provided by Owner and installed by Contractor.
2. Accessories Provided and installed by Contractor
   a. Electrical conduit and wire as specified in Electrical Drawings

E. Platform Pavement Thermoplastic Symbols
1. ADA Symbol: white symbol on blue thermoplastic square, 1'-6" x 1'-6"
2. Bicycle Symbol: white symbol on bright green thermoplastic circle base, 1'-6" diameter.

204 DIMENSIONAL LETTERS

A. Cast Aluminum Letters:
1. Metal: Aluminum casting.
2. Metal Thickness: 7/8 inch minimum (22 mm).
3. Letter Height: 12 inches (305 mm).
4. Text and Typeface:
   a. Character Font: Helvetica, Arial, or other sans serif font.
   b. Character Case: Upper case only.

5. Spacing: To be established in submitted shop drawings and approved by Architect.
6. Finish: Brushed, satin.
7. Mounting: Bottom rail mount.

2.05 ACCESSORIES

A. Concealed Screws: Stainless steel, galvanized steel, chrome plated, or other non-corroding metal.

B. Exposed Screws: Stainless steel.

C. Tape Adhesive: Double sided tape, permanent adhesive.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Ensure electrical conduits are in correct location for signs requiring power and/or data prior to starting installation.

C. At Information Kiosk, make final connection to junction box for correct operation of directory lights; test for correct operation.

D. Install neatly, with horizontal edges level.

E. Locate signs where indicated:
   1. If no location is indicated, obtain Owner's instructions.

F. Protect from damage until Substantial Completion; repair or replace damaged items.

G. Platform Pavement Thermoplastic Symbols:
   1. Clean/Roughen the concrete surface to receive thermoplastic applied signs
   2. Preheat surface
   3. Install when temperature is 50 degrees and rising.
   4. Applied heat per manufacturer recommendations.

END OF SECTION

SECTION 12 9300
SITE FURNISHINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Waste receptacles furnished by Owner for Installation by Contractor.

B. Skate deterrents.

C. Benches

1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete

B. Section 05 5000 - Metal Fabrications: Anchors to attach site furnishings to mounting surfaces.

C. Section 13 3423 – Station Platform : Work included in Station Platforms.

1.03 REFERENCE STANDARDS

A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.

B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

D. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2018.

E. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2018.

1.04 SUBMITTALS

A. Provide digital submittals for review by Architect. Do not proceed with work of this section without written approval.

B. Product Data: Provide manufacturer's specifications and descriptive literature, installation instructions, and maintenance information.

C. Samples: Submit two sets of manufacturer's available colors and finishes for prefinished furnishings.

1.05 WARRANTY

A. Provide manufacturer’s warranty against defects in materials or workmanship for ductile iron castings for a period of 10 years from Date of Substantial Completion.

PART 2 PRODUCTS

2.01 METAL FURNISHINGS

A. Waste Receptacles
   1. Furnished by Owner for installation by Contractor
   2. Witt Outdoor - Expanded metal Receptacles, EXP-52 Standard Model with # 5555 dome top, www.witt.com
   3. Accessories provided by Contractor: Anchors as required by manufacturer.
   4. Waste Receptacles (OFCI): Steel frame with see through metal mesh and removable lid.
      a. Capacity: 48 gallons (182 liters).
      b. Shape: tapered cylinder.
      c. Diameter: 23 inches (584 mm).
      d. Height: 33 inches (838 mm).
      e. Lids:
         1) Material: Steel.
         2) Type: Domed.
      f. Mounting: Surface.

B. Skate Deterrents:
   1. Basis of Design: Barrett Robinson, Fixed Radius Skate Deterrent FRO.12.
      a. Skate Deterrents: clear anodized aluminum with tamper-resistant fasteners.
   2. Substitutions: An equivalent product produced by a manufacturer not listed above may be submitted for approval prior to bidding for Architect review. Provide complete information to Architect describing how substitute product complies with specifications. Indicate effect of substitute product on work of others. Do not proceed with substitute product without written approval of Architect.

C. Benches
   1. Knight Bench by Forms+Surfaces.
   2. Manufacturer Contact:
      Forms+Surfaces
      30 Pine Street
      Pittsburgh, PA 15223
      phone: 800-451-0410
      fax: 412-781-7840
      email: sales@forms-surfaces.com
      website: www.forms-surfaces.com
   3. Materials:
      a. Seat slats: Extruded aluminum.
      b. Bench frame: solid aluminum with invisible welds.
      c. Slat fasteners: recessed stainless steel.
      d. Optional armrests: solid aluminum.
   4. Finishes:
      a. Bench slats: Standard Texture from Forms+Surfaces Powdercoat Chart.
      b. Bench frame (outer frame edges): polished aluminum.
      c. Bench frame (inner surfaces): polyester powdercoat
         1) Standard Texture from Forms+Surfaces Powdercoat Chart.
      d. Armrests (outer edges): polished aluminum.
      e. Armrests (flat surfaces): polyester powdercoat to match frame.
      f. Color: to be selected from Manufacturer's standard color by Architect.
   5. Dimensions
      a. Backed bench, six foot, surface mount
         1) Overall dimensions: 72" long x 22.7" deep x 31.1" high.
         2) Seat dimensions: 15.2" deep x 18" high.
         3) Back height: 15.2".
         4) Armrest height: 20.8".
         5) Armrest locations: at center and ends of each bench.
      b. Backed bench, eight foot, surface mount
         1) Overall dimensions: 96" long x 22.7" deep x 31.1" high.
         2) Seat dimensions: 15.2" deep x 18" high.
         3) Back height: 15.2".
         4) Armrest height: 20.75".
         5) Armrest locations: at center and ends of each bench.
      c. See architectural drawings for locations and quantities
   6. Mounting:
      a. Surface mount. Provide threaded anchors and stainless steel mounting hardware.
   7. Substitutions: An equivalent product produced by a manufacturer not listed above may be submitted for approval prior to bidding for Architect review. Provide complete information to Architect describing how substitute product complies with specifications. Indicate effect of substitute product on work of others. Do not proceed with substitute product without written approval of Architect.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that mounting surfaces, preinstalled anchor bolts, or other mounting devices are properly installed; and ready to receive site furnishing items.

B. See Section 05 5000 for anchors to attach site furnishings to mounting surfaces.

C. Do not begin installation until unacceptable conditions are corrected.

3.02 INSTALLATION

A. Install site furnishings in accordance with approved shop drawings, and manufacturer's installation instructions.

B. Provide level mounting surfaces for site furnishing items.

C. Install in conformance to applicable ADA guidelines and End User’s established Accessibility policies.

END OF SECTION

SECTION 12 9310
BIKE RACKS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Inverted-U Bike Racks

B. Wave Bike Racks

1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete

B. Section 05 5000 - Metal Fabrications: Anchors to attach site furnishings to mounting surfaces.

1.03 REFERENCE STANDARDS

A. C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

B. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.

C. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2013.

1.04 SUBMITTALS

A. Provide digital submittals for review. Do not proceed with work of this section without written approval.

B. Product Data: Provide manufacturer's specifications and descriptive literature, installation instructions, and maintenance information.

1.05 WARRANTY

A. Provide manufacturer's warranty against defects in materials or workmanship for a period of 1 year from Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Inverted-U Bike Racks:
   1. Sportworks – Tofino; HD Inverted-U: http://www.sportworks.com/product/tofino-no-scratch-bike-rack
   2. Dero - Hoop Rack or Downtown Rack – Stainless or Thermoplastic coating: https://www.dero.com/product/hoop-rack/ or https://www.dero.com/brochures/downtown-rack.pdf
   3. Saris – Bike Dock – Stainless or Thermoplastic Coating; 2.38" Round Tube: https://www.sarisparking.com/product/bike-dock/
   4. Substitutions: An equivalent product produced by a manufacturer not listed above may be submitted for approval. Provide complete information describing how substitute product complies with specifications. Do not proceed with substitute product without written approval.

B. Wave Bike Racks:
   1. Dero – Rolling Rack – 9 Bike – RR4H, Surface mount, Powder coated, 2.38" Round Tube: https://www.dero.com/product/rolling-rack/
   2. Park Warehouse – ParkTastic 9 Bike Wave Bike Rack 766br115 –Thermoplastic coating color black green, 2.38" Round Tube, Surface mount: https://parkwarehouse.com/product/parktastic-9-bike-wave-bike-rack/
   3. Belson – HD Challenger Wave Bike Rack, H36-9-P-SF, 2.38" Round Tube, Surface mount: https://www.belson.com/Heavy-Duty-Challenger-Wave-Bike-Racks
   4. Substitutions: An equivalent product produced by a manufacturer not listed above may be submitted for approval. Provide complete information describing how substitute product

complies with specifications. Do not proceed with substitute product without written approval.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that mounting surfaces, preinstalled anchor bolts, or other mounting devices are properly installed; and ready to receive site furnishing items.

B. See Section 05 5000 for anchors to attach site furnishings to mounting surfaces.

C. Do not begin installation until unacceptable conditions are corrected.

3.02 INSTALLATION

A. Install bike racks in accordance with approved shop drawings, and manufacturer's installation instructions.

END OF SECTION

SECTION 13 3423
STATION PLATFORM

PART 1 – GENERAL

1.01 SUMMARY

A. Description

1. Work of this Section includes the complete construction of all stations in the project. This secton does not pertain to the Browning Center entrance canopy. The construction includes all station platform elements as identified on the Contract Drawings including but not limited to the following:
2. Architectural and Structural Work
   a. Concrete
      1) Foundations at stations
      2) Concrete Shelter Base.
      3) Concrete work and curbs at platform edges
      4) Stair and edge protection abrasive strips
      5) Precast Structural Concrete Columns
      6) Tactile Warning Surfacing
   b. Metals
      1) Structural Steel framing for canopy roof and columns
      2) Steel deck at canopy roof.
      3) Cold formed metal framing supporting soffits and associated work.
      4) Metal fabrications including railings, bollards, etc.
   c. Water repellents and anti-graffiti coatings
      1) Applied to concrete work
   d. Metal Roofing and Soffits
      1) Standing seam metal roofing at canopies
      2) Metal soffit panels and underside of canopy
   e. Sheet Metal Flashing & Trim
      1) Reglets, flashings, metal trim, and gutters at canopy roof
   f. Joint Sealants
      1) Sealants at concrete joints
      2) Sealants at canopy roof and soffit
   g. Glazing
      1) Glass canopy windscreens with acid etch
      2) Glass mullion supports and clips
   h. Painting and finishing
      1) High performance paint coatings applied to station components
   i. Signage
      1) Fabrications and installation of signage
      2) Installation of certain signage items provided by Owner.
      3) Platform pavement markings
   j. Site Furnishings
      1) Benches
      2) Installation of trash receptacles provided by Owner
      3) Skate Deterrents
      4) Bike Racks
3. Electrical Work within Stations and Platforms
   a. Electrical and communications service to stations and platforms
   b. Lighting: lighting and controls within stations and platforms
   c. Electrical distribution including panels, vaults, conduits, boxes, wire, cable, etc.
   d. Connection to signs and equipment
   e. Snow melt system for canopy

4. Plumbing Work within Stations and Platforms
    a. Roof drain and downspout piping to storm sewer
    b. Hose bibs at station platforms
5. Civil Work within Stations and Platforms
    a. Subgrade and structural fills below station and platforms
    b. Topping slab and slabs on grade at platforms and ramps
    c. Ramp safety walls and end blocks
    d. Expansion joint fillers and jointing of slabs
    e. Curing and sealing of concrete topping slabs and slabs on grade
    f. Tactile Warning surfacing: Plastic detectable warning tiles
    g. Concrete steps where indicated
    h. Platform snow melt system

B. Items specifically excluded from the lump sum determination are all items designated as owner furnished:
1. Items furnished by Owner including items listed below. Note that installation by contractor is to be included above.
2. Landscaping at Stations including irrigation
3. Work outside the footprint of the station and platform
4. Security equipment and wiring

C. Items Furnished by Owner for Installation by Contractor (OFCI):
1. Trash Receptacles: OFCI
2. Real Time Signs - digital display, ceiling mounted: OFCI

D. Items Furnished by Owner and Installed by Owner (OFOI): Contractor to provide conduit and wiring to device locations. Devices, installation, and final connections to be provided by Owner.
1. Security Cameras and CCTV System: OFOI, system furnished and installed through separate UTA contract
2. Tap-on/tap-off machine (platform mounted card reader): OFOI
3. Ticket Vending Machine (TVM): OFOI. Ticket Vending Machine to be installed on Contractor installed pedestal
4. Emergency Call Button and support post - platform mounted: OFOI

E. Related Sections: This Section applies to all other sections of these specifications.

1.02 QUALITY CONTROL

A. See individual specification sections

B. Mock-Ups: Complete mock-ups and obtain approval of Architect before proceeding

PART II – PRODUCTS (NOT APPLICABLE)

PART III – EXECUTION (NOT APPLICABLE)

END OF SECTION

SECTION 22 1001
PLUMBING PIPING AND ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Storm drain and downspout connections and accessories

1.02 RELATED REQUIREMENTS

A. Section 03 3000 – Cast-in-Place Concrete

B. Section 03 4100 - Precast Structural Concrete: Downspouts with precast concrete

C. Section 05 1200 – Structural Steel Framing: Downspouts within structural steel

D. Section 13 3423 – Station Platform: Work included in Station Platforms

1.03 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American National Standards Institute (ANSI).
2. American Public Works Association (APWA): Uniform Color Code.
3. American Society of Sanitary Engineering (ASSE):
   a. 1050, Performance Requirements for Stack Air Admittance Valves for Sanitary Drainage Systems.
   b. 1070, Performance Requirements for Water Temperature Limiting Devices.
4. ASTM International (ASTM):
   a. A74, Standard Specification for Cast Iron Soil Pipe and Fittings.
   b. A888, Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.
   c. C564, Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
   d. C1277, Standard Specification for Shielded Couplings Joining Hubless Cast Iron Soil Pipe and Fittings.
   e. C1460, Standard Specification for Shielded Transition Couplings for use with Dissimilar DWV Pipe and Fittings Above Ground.
   f. C1540, Standard Specification for Heavy Duty Shielded Couplings Joining Hubless Cast Iron Soil Pipe and Fittings.
5. Cast Iron Soil Pipe Institute (CISPI):
   a. 301, Standard Specification for Hubless Cast Iron Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.
   b. 310, Specification for Couplings for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Strom Drain, Waste, and Vent Piping Applications.

1.04 DESIGN REQUIREMENTS

A. Where pipe diameter, thickness, pressure class, pressure rating, or thrust restraint is not shown or specified, design piping system in accordance with the following:

1. State of Utah Building Code (International Building Code with State of Utah Amendments), most recent adopted edition.

1.05 SUBMITTALS

A. Action Submittals:

1. Product data sheets.
2. Shop Drawings:
   a. Show Contractor recommended changes in location of fixtures or equipment.
3. Isometric riser diagrams.

B. Informational Submittals:

1. Changes in location of equipment or piping that affect connecting or adjacent work, before proceeding with the work.
2. Complete list of products proposed for installation.
3. Test records produced during testing.
   a. Certifications of Calibration: Approved testing laboratory certificate if pressure gauge for hydrostatic test has been previously used. If pressure gauge is new, no certificate is required.
   b. Test report documentation.

PART 2 PRODUCTS

2.01 HUBLESS, CAST-IRON SOIL PIPE AND FITTINGS

A. Pipe and Fittings: ASTM A 888 and CISPI 301.

B. Tensile Strength: 21,000 psig minimum.

C. Pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute ® and listed by NSF International.

D. Each length of pipe and each fitting shall be plainly marked with size, country of origin, and name of manufacturer, or manufacturer's registered trademark by which the manufacturer can be readily identified after installation.

E. CISPI, Hubless-Piping Couplings:
1. Manufacturers: Subject to compliance with requirements. Provide products by one of the following:
   a. Ideal Tridon
   b. ANACO-Husky
   c. Tyler Couplings
   d. Mission Rubber Company
2. Standards: ASTM C 1277 and CISPI 310.
3. Description: Shield Assemblies shall consist of stainless-steel bi-directional corrugated shield with stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve with integral, center pipe stop. Couplings shall bear the trademark NSF International.

F. Heavy-Duty, Hubless-Piping Couplings:

1. Manufacturers: Subject to compliance with requirements. Provide products by one of the following:
   a. Ideal Tridon
   b. ANACO-Husky
   c. Tyler Couplings
   d. Mission Rubber Company
2. Standards: ASTM C 1540.
3. Description: Shield Assemblies shall consist of stainless-steel bi-directional corrugated shield with stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve with integral, center pipe stop.

G. Rubber Pipe Coupling shall consist of 316 Stainless steel pipe clamps to connect gutter piping to CISP at gutter termination.

PART 3 EXECUTION

3.01 GENERAL

A. Install plumbing systems to meet applicable plumbing code.

B. Field Obstructions:

1. Drawings do not attempt to show exact details of piping. Provide offsets around obstructions.
2. Do not modify structural components, unless approved by Engineer.

C. Sleeves:

1. Pipe sizes shown are nominal sizes, unless shown or specified otherwise.
2. Provide piping passing through walls, floors, or ceilings with standard-weight pipe sleeves.
3. Provide pipes passing through finished walls with chrome-plated canopy flanges.
4. Dry pack sleeves in existing work in-place and provide finished appearance.
5. Pack holes left by removal of existing piping with grout and finish to match adjacent surface.

3.02 INSTALLATION STORM DRAINS PIPING

A. Installation:

1. Set internal risers at locations shown on details.
2. Slope drain lines at minimum 2 percent slope, unless otherwise noted. Vent lines shall be installed level or sloped, with no low spots.
3. Provide cleanouts where shown and where required by code. Provide cleanout in vertical pipe to allow for storm drainage pipe maintenance. Provide cleanout access and cover plate. Coordinate material and color of cover plate with architect prior to installation.

3.03 INSTALLATION—CONCRETE ENCASED

A. Where horizontal piping is encased in concrete such as a floor or equipment slab, rigidly mount pipe to rebar and subbase to prevent lateral movement, sagging, and uplifting during concrete installation and finishing. Provide at least two temporary strut supports

wired to rebar and supported from the engineered fill or subbase below for each section of pipe.

B. Where vertical piping is encased in concrete such as support columns, rigidly mount pipe to rebar to prevent lateral movement, and uplifting during concrete installation and finishing.

3.04 INTERIM CLEANING

A. Prevent accumulation of weld rod, weld spatter, pipe cuttings and filings, gravel, cleaning rags, and other foreign material within piping during fabrication and assembly.

B. Examine piping to assure removal of foreign objects prior to assembly.

C. Conventional commercial cleaning methods of cleaning are acceptable if method and cleaning material does not corrode, deform, swell, or otherwise alter physical properties of material being cleaned.

3.05 TESTING

A. General:

1. Conduct pressure and leakage tests on newly installed pipelines.
2. Provide necessary equipment and material, and make taps in pipe, as required.
3. Engineer will monitor tests. Provide 24-hour advance notice of start of testing.
4. Test Pressures: As specified herein and in Piping Schedule.
5. Test Records: Make records of each piping system installation during test to document the following:
    a. Date of test.
    b. Description and identification of piping tested.
    c. Test fluid.
    d. Test pressure.
    e. Remarks, including:
        1) Leaks (type, location).
        2) Repairs made on leaks.
    f. Certification by Contractor and signed acknowledgment by Engineer that tests have been satisfactorily completed.

B. Preparation and Execution:

1. Buried Pressure Piping:
    a. An initial service leak test may be conducted with a partially backfilled trench and the joints left open for inspection, if field conditions permit, as determined by Engineer.
    b. Expose joints for the acceptance test on buried pressure piping to be pneumatically tested or subjected to an initial service leak test.
    c. Conduct final hydrostatic acceptance tests after trench has been completely backfilled.
2. Exposed Piping: Conduct tests after piping has been completely installed including supports, hangers, and anchors, but prior to insulation.

C. Hydrostatic Leak Tests:

1. Equipment: Provide the following:

Amount	Description
2	Graduated containers
2	Pressure gauges
1	Hydraulic force pump
	Suitable hose and suction pipe as required

2. Procedure:
   a. Use water as the hydrostatic test fluid.
   b. Provide clean test water of such quality as to minimize corrosion of the materials in the piping system.
   c. Open vents at high points of the piping system to purge air pockets while the piping system is filling.
   d. Venting during filling of system may also be provided by loosening flanges with a minimum of four bolts or by the use of equipment vents.
   e. Test piping systems at test pressure specified in Piping Schedule.
   f. Maintain hydrostatic test pressure continuously for 30 minutes minimum and for such additional time as necessary to conduct examinations for leakage.
   g. Examine joints and connections for leakage.
   h. Piping system, exclusive of possible localized instances at pump or valve packing, shall show no visual evidence of weeping or leaking.
   i. Correct visible leakage and retest to satisfaction of Engineer.

3. Buried Piping:
   a. A limited amount of leakage is permissible according to formula specified.
   b. Conduct hydrostatic testing as follows:
      1) Pipe with Concrete Thrust Blocking: Do not make pressure test until a minimum of 5 days after thrust blocking is installed.
      2) If high-early strength cement is used for thrust blocking, time may be reduced to 2 days.
   c. Cement-Lined Piping: Slowly fill test section with water and allow to stand for 24 hours under slight pressure to allow cement lining to absorb water.
   d. Expel air from piping system prior to testing.
   e. Apply and maintain specified test pressure with hydraulic force pump.
   f. Valve off the piping system when test pressure is reached.
   g. Conduct pressure test for 2 hours, reopening isolation valve only as necessary to restore test pressure.
   h. Accurately measure amount of water required to maintain test pressure by placing pump suction in a barrel or similar device, or by metering.
   i. The measurement represents leakage, defined as the quantity of water necessary to maintain the specified test pressure for the duration of the test period.
   j. Determine maximum allowable leakage in gallons per hour from the following formula:

$$L = \frac{ND(P)^{1/2}}{7400}$$

where:

L = Allowable leakage, in gallons per hour
N = Number of joints in the length of pipe tested

D = Nominal diameter of pipe, in inches
P = Test pressure during the leakage test, in pounds per square inch

k. Correct leakage greater than the allowable determined under this formula, and retest to satisfaction of **Engineer.**

4. Test Pressure for Water: 1-1/2 times system pressure.
5. Gravity Sewers and Drains:
   a. Test by water or air exfiltration tests as prescribed by local or state plumbing codes and visually examine for leaks.
   b. Repair leaks and retest system until no further leakage is evident.

D. Pneumatic Leak Tests:

1. Perform on compressed air, natural gas, and vacuum piping.
2. Equipment: Provide the following:

Amount	Description
1	Pneumatic compressor separator-dryer system capable of providing oil-free dry air and equipped with one or more full capacity safety relief valves set at a pressure of not more than 105 percent of the required primary test pressure
1	Calibrated test gauge

3. Procedure:
   a. Perform pneumatic testing using accurately calibrated instruments and oil-free, dry air.
   b. Perform tests only on exposed piping, after piping has been completely installed, including supports, hangers and anchors, and inspected for proper installation.
   c. Test piping system at test pressure specified in Piping Schedule.
   d. Protect test personnel and Owner's operating personnel from hazards associated with air testing.
   e. Secure piping to be tested to prevent damage to adjacent piping and equipment in event of a joint failure.
   f. Prior to test, remove or suitably isolate appurtenant instruments or devices that could be damaged by test.
   g. Apply maximum 25 psig preliminary pneumatic test to piping system prior to final leak testing, to locate major leaks.
   h. Examine joints and connections for leakage with soap bubbles.
   i. Correct visible leaks and retest.
   j. Gradually increase pressure in system to not more than one-half of test pressure.
   k. Thereafter increase pressure in steps of approximately 1/10 of maximum test pressure until required test pressure is reached.
   l. Maintain pneumatic test pressure continuously for minimum 10 minutes and for such additional time as necessary to conduct a soap bubble examination for leakage.
   m. Piping system, exclusive of possible localized instances at pump or valve packing, shall show no evidence of leakage.
   n. Correct visible leakage and retest to satisfaction of Engineer.
   o. Following pneumatic testing, thoroughly purge lines that are to carry flammable gases with nitrogen to assure no explosive mixtures will be present in system during filling process.

3.06 PROTECTION OF INSTALLED WORK

A. Protective Covers:

1. Provide over floor and shower drains during construction, to prevent damage to drain strainers and keep foreign material from entering drainage system.
2. Cover roof drains and emergency overflow drains during roofing process so roofing material and gravel do not enter drain piping.
3. Remove at time of Substantial Completion.

3.07 FIELD FINISHING

3.08 SUPPLEMENTS

A. The supplements listed below, following "End of Section," are part of this specification.

1. Plumbing Piping Data Sheets.

Section Number	Title
22 10 01.03	Cast Iron Soil Pipe (CISP) and Fittings

END OF SECTION

SECTION 22 10 01.03 CAST IRON SOIL PIPE (CISP) AND FITTINGS		
Item	Size	Description
Pipe	6" and smaller	Hubless, CISPI 301, service weight, no-hub ends.
Joints	6" and smaller	Coupling: Conform to ASTM C564, ASTM C1277, [ASTM C1540] and CISPI 310. Compression: Neoprene sealing sleeve with 24-gauge Type 304 stainless steel shield and clamp assembly. Joints to dissimilar material shall comply with ASTM C1460.
Fittings	6" and smaller	Conform to ASTM A888 and CISPI 301
Coating	All	Bituminous-coated inside and out; marked with manufacturer's name or trademark and CISPI symbol.

SECTION 32 1726
TACTILE WARNING SURFACING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Plastic tactile and detectable warning tiles for pedestrian walking surfaces.

B. Wet set installation.

1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete: Concrete for sidewalks and platforms.

B. Section 13 3423 - Station Platform: Work Included in Station Platforms

1.03 REFERENCE STANDARDS

A. 49 CFR 37 - Transportation Services for Individuals with Disabilities (ADA); current edition.

B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

C. ATBCB PROWAG - Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way; 2011.

D. SAE AMS-STD-595 - Colors Used in Government Procurement; 2017a.

1.04 SUBMITTALS

A. Provide digital submittals for review by Architect. Do not proceed with work of this section without written approval.

B. Product Data: Submit manufacturer's product data, standard details, details specific to this project; written installation and maintenance instructions.

C. Samples: For each product specified provide two samples, 12 inches (305 mm) square, minimum; show actual product, color, and patterns.

D. Shop Drawings: Submit plan and detail drawings. Indicate:
   1. Locations on project site. Demonstrate compliance with referenced accessibility standards.
   2. Sizes and layout.
   3. Pattern spacing and orientation.
   4. Attachment and fastener details, if applicable

E. Warranty: Submit manufacturer warranty; complete forms in Owner's name and register with manufacturer.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years documented experience.

B. Installer Qualifications: Company certified in writing by product manufacturer as having successfully completed work substantially similar to the work of this section.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver to project site in manufacturer's protective wrapping and in manufacturer's unopened packaging.

B. Store covered and elevated above grade and in manufacturer's unopened packaging until ready for installation. Maintain at ambient temperature between 40 and 90 degrees F (4 and 32 degrees C).

1.07 WARRANTY

A. Plastic Tiles: Provide manufacturer's standard five year warranty against manufacturing defects, breakage or deformation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Plastic Tactile and Detectable Warning Surface Tiles:
   1. Armor-Tile, a brand of Engineered Plastics, Inc: www.armortiletransit.com/#sle.
   2. Substitutions: An equivalent product produced by a manufacturer not listed above may be submitted for approval prior to bidding for Architect review. Provide complete information to Architect describing how subsitute product complies with specifications. Incidate effect of substitute product on work of others. Do not proceed with substitute product without written approval of Architect.

2.02 TACTILE AND DETECTABLE WARNING DEVICES

A. Plastic Tactile and Detectable Warning Tiles: ADA Standards compliant, glass fiber and carbon fiber reinforced, exterior grade, matte finish polyester sheet with truncated dome pattern, solid color throughout, internal reinforcing of sheet and of truncated domes, integral radius cut lines on back face of tile; with factory-applied removable protective sheeting.
   1. Installation Method: Cast in place.
   2. Shape: Square.
   3. Dimensions: 24 inches by 24 inches (610 mm by 610 mm).
   4. Pattern: In-line pattern of truncated domes complying with ADA Standards.
   5. Color: SAE AMS-STD-595, Table IV, Federal Yellow No. 33538.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that work area is ready to receive work:
   1. If existing conditions are not as required to properly complete the work of this section, notify Architect.
   2. Do not proceed with installation until deficiencies in existing conditions have been corrected.

B. Verify that dimensions, tolerances, and attachment methods for work in this section are properly coordinated with other work on site.

3.02 INSTALLATION, GENERAL

A. Install in accordance with manufacturer's written instructions.
   1. Do not install damaged, warped, bowed, dented, abraded, or otherwise defective units.
   2. Do not install when ambient or substrate temperature has been below 40 degrees F (4 degrees C) during the preceding 8 daylight hours.

B. Field Adjustment:
   1. Locate relative to curb line in compliance with ATBCB PROWAG, Sections 304 and 305.
   2. Orient so dome pattern is aligned with the direction of ramp.
   3. Align truncated dome pattern between adjacent units.

C. Install units fully seated to substrate, square to straight edges and flat to required slope.

3.03 INSTALLATION, CAST IN PLACE PLASTIC TILES

A. Concrete:
   1. See Section 03 3000.
   2. Slump: 4 to 7 percent.

B. Tamp and vibrate units as recommended by manufacturer.

C. Place and position weights on units while concrete cures as recommended by manufacturer. Ensure no voids or air pockets exist between top surface of concrete and underside of units.

3.04 CLEANING PLASTIC UNITS

A. Remove protective plastic sheeting within 24 hours of installation.

B. Remove excess sealant or adhesive from joints and edges.

C. Clean four days prior to date of scheduled inspection.

3.05 PROTECTION

A. Protect installed units from traffic, subsequent construction operations or other imposed loads until concrete is fully cured.

B. Touch-up, repair or replace damaged products prior to Date of Substantial Completion.

END OF SECTION

SECTION 32 7113.26
DOCKING GUIDE STRIP

PART 1 – GENERAL

1.01 SUMMARY

A. Description
   1. Work of this Section includes the complete construction of all UHMW PE dockingguide strips in the project. The construction includes providing and installing docking guide strips on all existing and proposed BRT station platforms as identified on the Contract Drawings including but not limited to the following:
      a. Metal fabrications including anchor bolts, washers, etc.
      b. Composite boards for mounting on BRT Station Approach curbing.
   2. Tapers shall be provided at the ends as shown on plans.

B. Related Sections:
   1. 03 1000 Concrete Forming and Accessories
   2. 03 3000 Cast-in-Place Concrete
   3. 07 1900 Water Repellents and Stain
   4. 07 9200 Joint Sealants

1.02 QUALITY CONTROL

A. See project general conditions and individual specification sections.

B. Mock-Ups: Complete mock-ups, including gaps for drainage if any are proposed on the project, and obtain approval of Architect before proceeding.

PART II – PRODUCTS

2.01 UHMW PE DOCKING GUIDE STRIP

A. See individual specification sections for all products not listed below.

B. Product submittals shall be provided per the General Conditions of the project.

C. UHMW PE is Ultra High Molecular Weight Polyethylene blend with additives to protect it from ultra violet degradation. The docking guide strip shall be POLYSLICK® BUS CURB-S as manufactured by Polymer Industries, Tacoma, WA – 253-272-1217, or approved equal,having the physical characteristics listed in Table 1.
   1. Provide lock washers and anchorages as recommended by the manufacturer, Section 03 3000 Cast-in-Place Concrete, and as shown on the plans.
   2. Exposed edges shall have ½” fillet.
   3. Docking guide strips shall be 5” tall.
   4. Color shall be yellow.

Table 1 - Average Property Values for UHMW PE

Property	Method	Unit	Typical Value
Specific Gravity (Relative Hardness)	ASTM D 792	g/cm^3	0.932
Hardness	ASTM D 2240	Shore D	65
Tensile Break	ASTM D 638	psi	4,350
Elongation at Break	ASTM D 638	%	300
Abrasion	Internal	Steel=100	16
IZOD Impact			
Notched	ASTM D 256	ft.-lbs./in.	No Break
Double Notched	ASTM D 256A	ft.-lbs./in.	18
Linear Coefficient of Thermal Expansion	ASTM D 696	$°K^{-1}$	2×10^{-4}
Coefficient of Friction			
Static	ASTM D 1894	Unitless	0.2
Dynamic	ASTM D 1894	Unitless	0.15

PART III – EXECUTION

3.01 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section.

B. Confirm acceptance of structural concrete prior to drilling anchorages.

C. Verify good condition of existing curbs at Intermodal Center. Notify Engineer of any issues that may need repair or adjustments prior to drilling anchorages.

3.02 PREPARATION

A. Review reinforcing details to avoid drilling anchorages into steel.

B. Provide joint sealant where concrete is adjacent the top of the UHMW PE Docking guide strip.

3.03 ANCHORING UHMW PE DOCKING GUIDE STRIP

A. See individual specification sections for execution of products not listed below.

B. UHMW PE Docking guide strip shall be installed per the manufacturer's recommendations.
   1. Special attention shall be made to the installation requirements regarding thermal expansion. Countersunk holes for attachment shall be drilled to accommodate the expansion.
   2. Lock washers and/or adhesives shall be installed per manufacturer's recommendations.
   3. Four-foot transitions shall be constructed so as to provide all curb edges as flush.

C. Plastic composite board installation procedures shall match that of UHMW PE.

END OF SECTION

Exhibit F

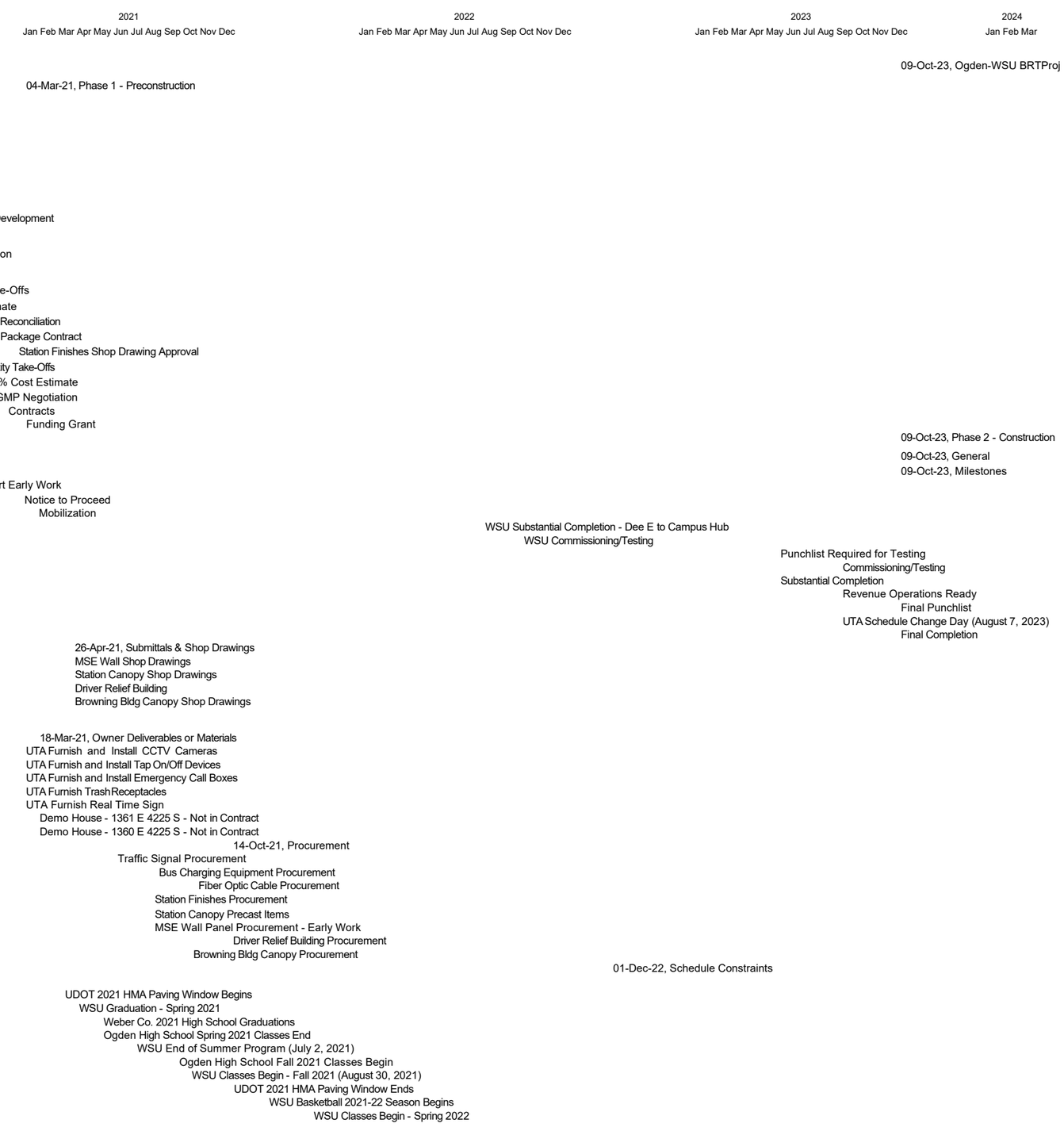
100% Construction Schedule

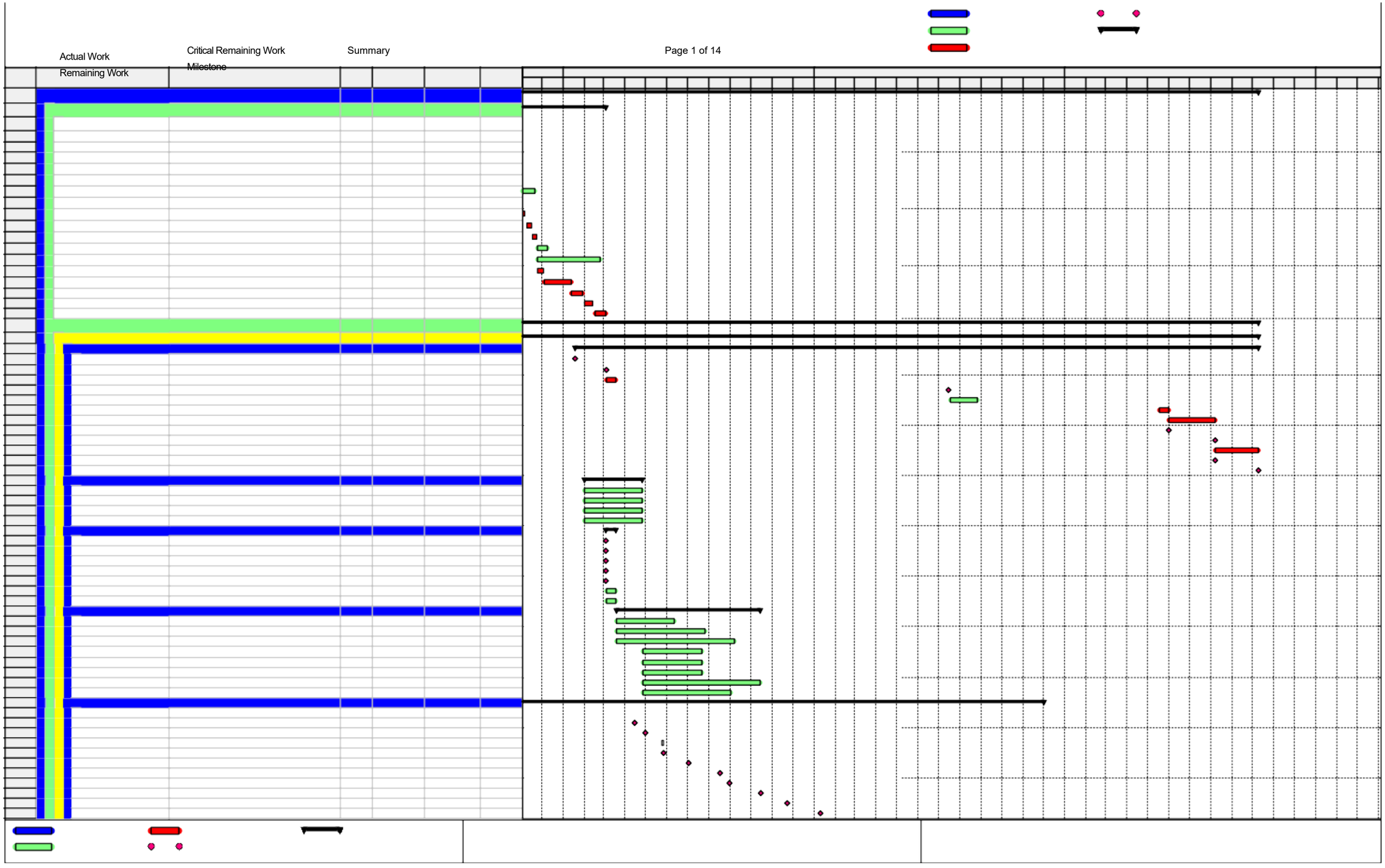
Stacy and Witbeck Inc

Ogden BRT, 2-17-21
Baseline Contract Schedule
Full Detail

Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

#	Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
1		**Ogden-WSU BRT Project - 100%-2 2-5-21**	952	06-Jan-20 A	09-Oct-23	0
2		**Phase 1 - Preconstruction**	293	06-Jan-20 A	04-Mar-21	252
3	P1000	Precon Phase 1 NTP	0	06-Jan-20 A		
4	P1010	60% Design Development	58	06-Jan-20 A	26-Mar-20 A	
5	P1055	90% Station Design	8	27-Mar-20 A	28-Sep-20	35
6	P1020	60% Quantity Take-Offs	16	27-Mar-20 A	17-Apr-20 A	
7	P1050	90% Design Development	60	27-Mar-20 A	30-Jul-20 A	
8	P1030	60% Cost Estimate	15	20-Apr-20 A	15-May-20 A	
9	P1090	100% Design Development	60	31-Jul-20 A	20-Nov-20	7
10	P1040	60% Estimate Reconciliation	5	17-Sep-20	23-Sep-20	6
11	P1060	90% Quantity Take-Offs	32	24-Sep-20	06-Nov-20	6
12	P1070	90% Cost Estimate	6	09-Nov-20	16-Nov-20	6
13	P1080	90% Estimate Reconciliation	5	17-Nov-20	23-Nov-20	6
14	P1150	Early Work Package Contract	10	24-Nov-20	09-Dec-20	140
15	P1140	Station Finishes Shop Drawing Approval	60	24-Nov-20	23-Feb-21	259
16	P1100	100% Quantity Take-Offs	6	24-Nov-20	03- Dec-20	6
17	P1110	100% Cost Estimate	25	04-Dec-20	12-Jan-21	6
18	P1120	GMP Negotiation	13	13-Jan-21	29-Jan-21	6
19	P1130	Contracts	10	01-Feb-21	12-Feb-21	6
20	P1160	Funding Grant	13	16-Feb-21	04- Mar-21	6
21		**Phase 2 - Construction**	774	07-Aug-20 A	09-Oct-23	0
22		**General**	774	07-Aug-20 A	09-Oct-23	0
23						
24	C1000	Start Early Work	0	18-Jan-21*		116
25	C1110	Notice to Proceed	0	05-Mar-21		6
26	C1100	Mobilization	10	05-Mar-21	18-Mar-21	13
27	C1220	WSU Substantial Completion - Dee E to Campu	0		15-Jul-22	193
28	C1230	WSU Commissioning/Testing	30	18-Jul-22	26-Aug-22	193
29	C1250	Punchlist Required for Testing	10	18-May-23	01-Jun-23	0
30	C1260	Commissioning/Testing	45	01-Jun-23	07-Aug-23	0
31	C1240	Substantial Completion	0		01-Jun-23	0
32	C1270	Revenue Operations Ready	0		07-Aug-23	0
33	C7410	Final Punchlist	45	07-Aug-23	09-Oct-23	0
34	C7420	UTA Schedule Change Day (August 7, 2023)	0		07-Aug-23*	0
35	C7400	Final Completion	0		09-Oct-23	0
36						
37	C1040	MSE Wall Shop Drawings	60	01-Feb-21	26-Apr-21	148
38	C1030	Station Canopy Shop Drawings	60	01-Feb-21	26-Apr-21	215
39	C1020	Driver Relief Building	60	01-Feb-21	26-Apr-21	382
40	C1010	Browning Bldg Canopy Shop Drawings	60	01-Feb-21	26-Apr-21	414
41						
42	C1090	UTA Furnish and Install CCTV Cameras	0		04-Mar-21	554
43	C1080	UTA Furnish and Install Tap On/Off Devices	0		04-Mar-21	554
44	C1070	UTA Furnish and Install Emergency Call Boxes	0		04-Mar-21	554
45	C1060	UTA Furnish Trash Receptacles	0		04-Mar-21	554
46	C1050	UTA Furnish Real Time Sign	0		04-Mar-21	554
47	C1130	Demo House - 1361 E 4225 S - Not in Contract	10	05-Mar-21	18-Mar-21	190
48	C1120	Demo House - 1360 E 4225 S - Not in Contract	10	05-Mar-21	18-Mar-21	190
49						
50	C1160	Traffic Signal Procurement	60	19-Mar-21	11-Jun-21	52
51	C1150	Bus Charging Equipment Procurement	90	19-Mar-21	26-Jul-21	419
52	C1140	Fiber Optic Cable Procurement	120	19-Mar-21	07-Sep-21	339
53	C1210	Station Finishes Procurement	60	27-Apr-21	21-Jul-21	452
54	C1200	Station Canopy Precast Items	60	27-Apr-21	21-Jul-21	215
55	C1190	MSE Wall Panel Procurement - Early Work	60	27-Apr-21	21-Jul-21	148
56	C1180	Driver Relief Building Procurement	120	27-Apr-21	14-Oct-21	382
57	C1170	Browning Bldg Canopy Procurement	90	27-Apr-21	01-Sep-21	414
58						
59	SC-1000	Tour of Utah	0	07-Aug-20 A		
60	SC-1010	UDOT 2021 HMA Paving Window Begins	0		15-Apr-21*	0
61	SC-1020	WSU Graduation - Spring 2021	0		30-Apr-21*	0
62	SC-1030	Weber Co. 2021 High School Graduations	4	24-May-21	27-May-21*	0
63	SC-1040	Ogden High School Spring 2021 Classes End	0		27-May-21*	0
64	SC-1180	WSU End of Summer Program (July 2, 2021)	0		02-Jul-21*	0
65	SC-1050	Ogden High School Fall 2021 Classes Begin	0		17-Aug-21*	0
66	SC-1060	WSU Classes Begin - Fall 2021 (August 30, 20	0		30-Aug-21*	0
67	SC-1070	UDOT 2021 HMA Paving Window Ends	0		15-Oct-21*	0
68	SC-1080	WSU Basketball 2021-22 Season Begins	0		22-Nov-21*	0
69	SC-1090	WSU Classes Begin - Spring 2022	0		10-Jan-22*	0



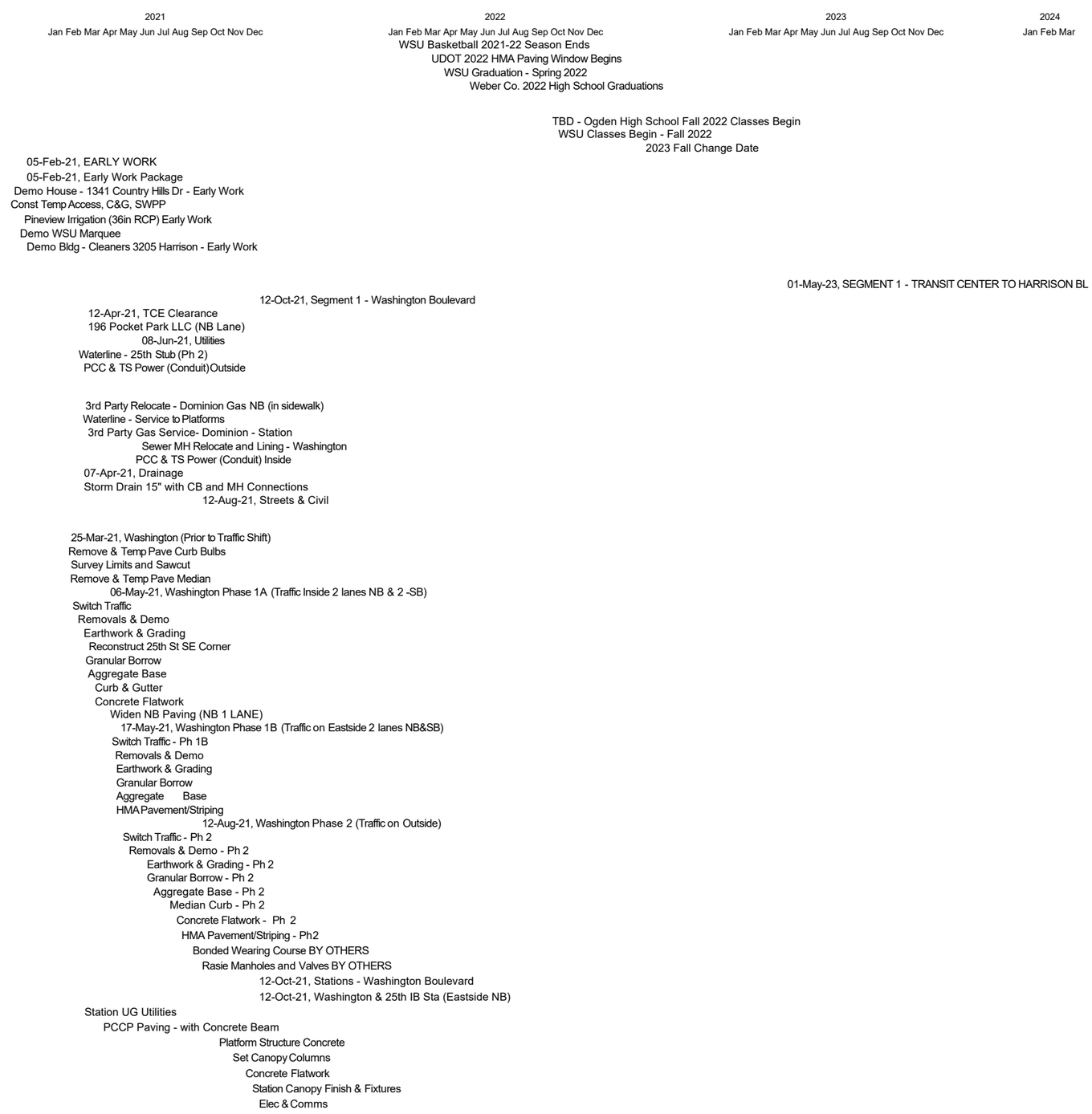

Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

Stacy and Witbeck Inc

Ogden BRT, 2-17-21
Baseline Contract Schedule
Full Detail

Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

#	Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
70	SC-1100	WSU Basketball 2021-22 Season Ends	0		11-Mar-22*	0
71	SC-1110	UDOT 2022 HMA Paving Window Begins	0		15-Apr-22*	0
72	SC-1120	WSU Graduation - Spring 2022	0		29-Apr-22*	0
73	SC-1130	Weber Co. 2022 High School Graduations	4	23-May-22	26-May-22*	0
74	SC-1140	TBD - Ogden High School Fall 2022 Classes Be	0		22-Aug-22*	0
75	SC-1150	WSU Classes Begin - Fall 2022	0		29-Aug-22*	0
76	SC-1170	2023 Fall Change Date	0		01-Dec-22*	0
77	**EARLY WORK**		15	18-Jan-21	05-Feb-21	218
78						
79	C2010	Demo House - 1341 Country Hills Dr - Early Wo	5	18-Jan-21	22-Jan-21	116
80	C2000	Const Temp Access, C&G, SWPP	2	18-Jan-21	19-Jan-21	221
81	C2020	Pineview Irrigation (36in RCP) Early Work	10	20-Jan-21	02-Feb-21	221
82	C2030	Demo WSU Marquee	5	25-Jan-21	29-Jan-21	116
83	C2040	Demo Bldg - Cleaners 3205 Harrison - Early Wo	5	01-Feb-21	05-Feb-21	116
84	**SEGMENT 1 - TRANSIT CENTER TO HARRISON BLVD**		537	19-Mar-21	01-May-23	12
85						
86						
87	ROW-2860	196 Pocket Park LLC (NB Lane)	0		12-Apr-21*	0
88						
89	C3130	Waterline - 25th Stub (Ph 2)	5	29-Mar-21	02-Apr-21	70
90	C3210	PCC & TS Power (Conduit)Outside	4	02-Apr-21	07-Apr-21	67
91	C3180	3rd Party Relocate - Dominion Gas NB (in sidew	6	02-Apr-21	09-Apr-21	67
92	C3250	Waterline - Service to Platforms	2	05-Apr-21	06-Apr-21	70
93	C3260	3rd Party Gas Service- Dominion - Station	3	08-Apr-21	12-Apr-21	67
94	C3840	Sewer MH Relocate and Lining - Washington	8	26-May-21	08-Jun-21	61
95	C3830	PCC & TS Power (Conduit) Inside	4	26-May-21	02-Jun-21	79
96						
97	C3200	Storm Drain 15" with CB and MH Connections	4	02-Apr-21	07-Apr-21	69
98						
99	**Washington (Prior to Traffic Shift)**		5	19-Mar-21	25-Mar-21	62
100	C3060	Remove & Temp Pave Curb Bulbs	2	19-Mar-21	22-Mar-21	61
101	C3050	Survey Limits and Sawcut	5	19-Mar-21	25-Mar-21	62
102	C3080	Remove & Temp Pave Median	2	23-Mar-21	24-Mar-21	61
103	**Washington Phase 1A (Traffic Inside 2 lanes NB & 2 -SB)**		31	25-Mar-21	06-May-21	67
104	C3100	Switch Traffic	2	25-Mar-21	26-Mar-21	61
105	C3140	Removals & Demo	4	29-Mar-21	01-Apr-21	61
106	C3220	Earthwork & Grading	4	02-Apr-21	07-Apr-21	67
107	C3170	Reconstruct 25th St SE Corner	8	02-Apr-21	13-Apr-21	78
108	C3270	Granular Borrow	2	08-Apr-21	09-Apr-21	67
109	C3290	Aggregate Base	1	12-Apr-21	12-Apr-21	67
110	C3310	Curb & Gutter	6	12-Apr-21	20-Apr-21	69
111	C3300	Concrete Flatwork	5	12-Apr-21	19-Apr-21	82
112	C3380	Widen NB Paving (NB 1 LANE)	6	29-Apr-21	06- May-21	61
113	**Washington Phase 1B (Traffic on Eastside 2 lanes NB&SB)**		7	07-May-21	17-May-21	61
114	C3470	Switch Traffic - Ph 1B	1	07-May-21	07- May-21	61
115	C3530	Removals & Demo	2	10-May-21	11- May-21	61
116	C3590	Earthwork & Grading	1	12-May-21	12- May-21	61
117	C3620	Granular Borrow	1	13-May-21	13- May-21	61
118	C3630	Aggregate Base	1	14-May-21	14- May-21	61
119	C3640	HMA Pavement/Striping	1	14-May-21	17-May-21	77
120	**Washington Phase 2 (Traffic on Outside)**		61	17-May-21	12-Aug-21	297
121	C3720	Switch Traffic - Ph 2	2	17-May-21	19-May-21	61
122	C3740	Removals & Demo - Ph 2	5	19-May-21	26-May-21	61
123	C3970	Earthwork & Grading - Ph 2	4	08-Jun-21	14-Jun-21	71
124	C4030	Granular Borrow - Ph 2	3	14-Jun-21	17-Jun-21	71
125	C4040	Aggregate Base - Ph 2	2	17-Jun-21	21-Jun-21	71
126	C4200	Median Curb - Ph2	3	06-Jul-21	09-Jul-21	62
127	C4270	Concrete Flatwork -Ph 2	5	09-Jul-21	16-Jul-21	62
128	C4320	HMA Pavement/Striping - Ph 2	4	16-Jul-21	21-Jul-21	77
129	C4340	Bonded Wearing Course BY OTHERS	10	21-Jul-21	02-Aug-21	220
130	C4540	Rasie Manholes and Valves BY OTHERS	10	02-Aug-21	12-Aug-21	220
131						
132	**Washington & 25th IB Sta (Eastside NB)**		135	02-Apr-21	12-Oct-21	404
133	STA-1000	Station UG Utilities	5	02-Apr-21	08-Apr-21	61
134	STA-1010	PCCP Paving - with Concrete Beam	14	09-Apr-21	28-Apr-21	61
135	STA-1190	Platform Structure Concrete	12	13-Aug-21	30-Aug-21	404
136	STA-1250	Set Canopy Columns	10	31-Aug-21	14-Sep-21	404
137	STA-1310	Concrete Flatwork	10	15-Sep-21	28-Sep-21	404
138	STA-1390	Station Canopy Finish & Fixtures	5	29-Sep-21	05-Oct-21	404
139	STA-1410	Elec & Comms	5	06-Oct-21	12-Oct-21	404



Actual Work
Remaining Work
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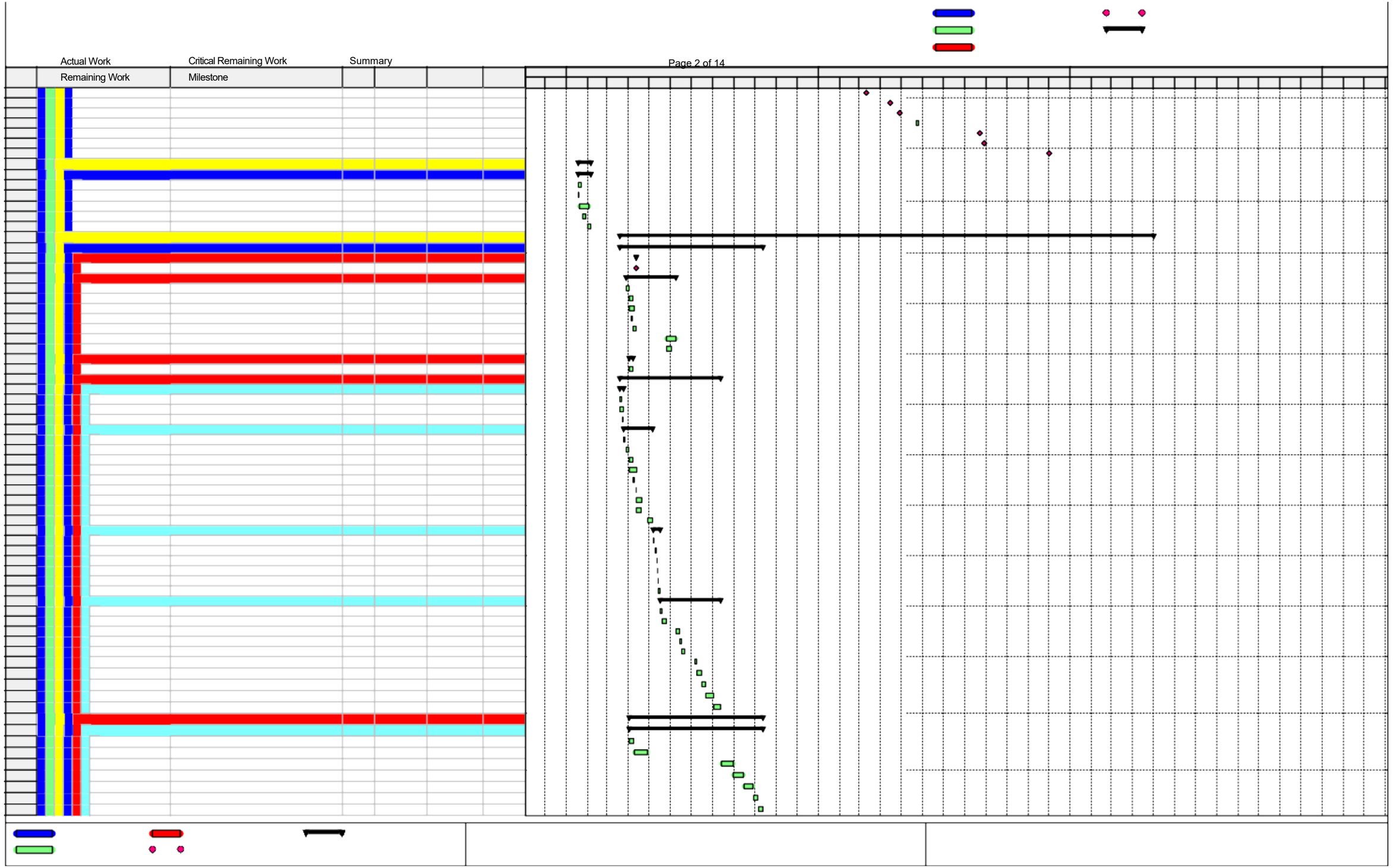
Milestone
Summary

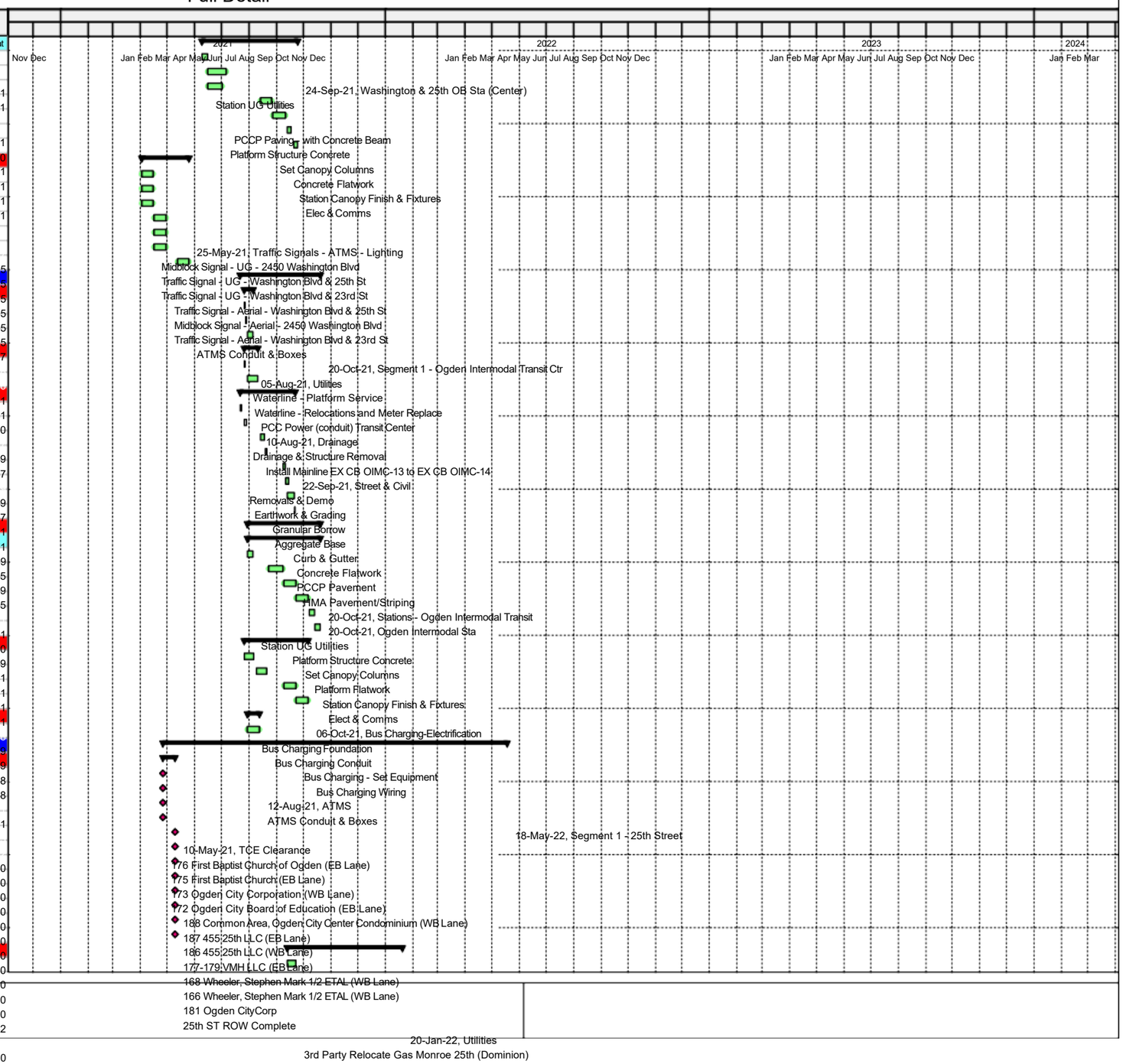


Stacy and Witbeck Inc

Ogden BRT, 2-17-21
Baseline Contract Schedule
Full Detail

Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

#	Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
140		**Washington & 25th OB Sta (Center)**	76	08-Jun-21	24-Sep-21	411
141	STA-1070	Station UG Utilities	5	08-Jun-21	15-Jun-21	61
142	STA-1100	PCCP Paving - with Concrete Beam	14	15-Jun-21	06-Jul-21	61
143	STA-1090	Platform Structure Concrete	12	15-Jun-21	01-Jul-21	440
144	STA-1180	Set Canopy Columns	10	13-Aug-21	26-Aug-21	411
145	STA-1220	Concrete Flatwork	10	27-Aug-21	10-Sep-21	411
146	STA-1290	Station Canopy Finish & Fixtures	5	13-Sep-21	17-Sep-21	411
147	STA-1330	Elec & Comms	5	20-Sep-21	24-Sep-21	411
148						
149	C3240	Midblock Signal - UG - 2450 Washington Blvd	10	02-Apr-21	15-Apr-21	115
150	C3230	Traffic Signal - UG - Washington Blvd & 25th St	10	02-Apr-21	15-Apr-21	115
151	C3190	Traffic Signal - UG - Washington Blvd & 23rd St	10	02-Apr-21	15-Apr-21	115
152	C3350	Traffic Signal - Aerial - Washington Blvd & 25th S	10	16-Apr-21	29-Apr-21	115
153	C3340	Midblock Signal - Aerial - 2450 Washington Blvd	10	16-Apr-21	29-Apr-21	115
154	C3330	Traffic Signal - Aerial - Washington Blvd & 23rd S	10	16-Apr-21	29-Apr-21	115
155	C3600	ATMS Conduit & Boxes	10	12-May-21	25-May-21	97
156						
157						
158	C4390	Waterline - Platform Service	2	26-Jul-21	27-Jul-21	181
159	C4450	Waterline - Relocations and Meter Replace	2	28-Jul-21	29-Jul-21	181
160	C4470	PCC Power (conduit) Transit Center	5	30-Jul-21	05-Aug-21	170
161						
162	C4400	Drainage & Structure Removal	2	26-Jul-21	27-Jul-21	169
163	C4480	Install Mainline EX CB OIMC-13 to EX CB OIMC	8	30-Jul-21	10-Aug-21	167
164						
165	C4350	Removals & Demo	2	22-Jul-21	23- Jul-21	159
166	C4420	Earthwork & Grading	4	26-Jul-21	29-Jul-21	167
167	C4620	Granular Borrow	4	13-Aug-21	18-Aug-21	171
168	C4650	Aggregate Base	2	19-Aug-21	20-Aug-21	171
169	C4850	Curb & Gutter	2	08-Sep-21	10-Sep-21	119
170	C4870	Concrete Flatwork	2	10-Sep-21	14-Sep-21	345
171	C4910	PCCP Pavement	6	13-Sep-21	20-Sep-21	159
172	C4940	HMA Pavement/Striping	2	20-Sep-21	22-Sep-21	215
173						
174		**Ogden Intermodal Sta**	58	30-Jul-21	20-Oct-21	161
175	STA-1160	Station UG Utilities	5	30-Jul-21	05-Aug-21	170
176	STA-1200	Platform Structure Concrete	12	23-Aug-21	08-Sep-21	159
177	STA-1280	Set Canopy Columns	10	09-Sep-21	22-Sep-21	161
178	STA-1350	Platform Flatwork	10	23-Sep-21	06-Oct-21	161
179	STA-1420	Station Canopy Finish & Fixtures	5	07-Oct-21	13-Oct-21	161
180	STA-1460	Elect & Comms	5	14-Oct-21	20-Oct-21	161
181						
182	C4410	Bus Charging Foundation	10	26-Jul-21	06-Aug-21	159
183	C7340	Bus Charging Conduit	10	09-Aug-21	20-Aug-21	159
184	C4860	Bus Charging - Set Equipment	10	09-Sep-21	22-Sep-21	408
185	C7350	Bus Charging Wiring	10	23-Sep-21	06- Oct-21	408
186						
187	C4460	ATMS Conduit & Boxes	10	30-Jul-21	12-Aug-21	171
188						
189						
190	ROW-1450	176 First Baptist Church of Ogden (EB Lane)	0		26-Apr-21*	0
191	ROW-1460	175 First Baptist Church (EB Lane)	0		26-Apr-21*	0
192	ROW-1470	173 Ogden City Corporation (WB Lane)	0		26-Apr-21*	0
193	ROW-1480	172 Ogden City Board of Education (EB Lane)	0		26-Apr-21*	0
194	ROW-1400	188 Common Area, Ogden City Center Condo	0		10-May-21*	0
195	ROW-1410	187 455 25th LLC (EB Lane)	0		10-May-21*	0
196	ROW-1420	186 455 25th LLC (WB Lane)	0		10-May-21*	0
197	ROW-1440	177-179 VMH LLC (EB Lane)	0		10-May-21*	0
198	ROW-1490	168 Wheeler, Stephen Mark 1/2 ETAL (WB Lan	0		10-May-21*	0
199	ROW-1500	166 Wheeler, Stephen Mark 1/2 ETAL (WB Lan	0		10-May-21*	0
200	ROW-2660	181 Ogden CityCorp	0		10-May-21*	0
201	ROW-2840	25th ST ROW Complete	0		10-May-21	252
202						
203	C4900	3rd Party Relocate Gas Monroe 25th (Dominion	8	13-Sep-21	22-Sep-21	220



Actual Work
Remaining Work
Critical
Remaining Work Milestone

Stacy and Witbeck Inc

Ogden BRT, 2-17-21
Baseline Contract Schedule
Full Detail

Actual Work
Remaining Work
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Summary

#	Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
204	C4890	PCC Power (Conduit) Monroe 25th	3	13-Sep-21	15-Sep-21	225
205	C4880	PCC Power (Conduit) Monroe 25th	3	13-Sep-21	15-Sep-21	225
206	C4990	Ogden Waterline Mainline	15	28-Sep-21	18-Oct-21	167
207	C7360	Ogden Waterline Laterals	15	19-Oct-21	08-Nov-21	173
208	C5250	Irrigation Sleeves	5	19-Oct-21	25-Oct-21	167
209	C5110	3rd Party Relocate Century Link (Relash to new	6	22-Oct-21	29-Oct-21	215
210	C5100	3rd Party Relocate Comcast (Relash to new Pol	6	22-Oct-21	29-Oct-21	215
211	C5090	PCC Power (Conduit) Jefferson 25th	3	22-Oct-21	26-Oct-21	218
212	C5080	Relocate RMP (Relocate and Relash Poles)	5	22-Oct-21	28-Oct-21	216
213	C7370	Ogden Waterline Testing Commision	10	09-Nov-21	22-Nov-21	173
214	C5190	3rd Party Relocate Dominion (SD Loops)	10	11-Nov-21	24-Nov-21	175
215	C5180	Relocate Century Link (8 Ea Expose and Lower	11	11-Nov-21	29-Nov-21	174
216	C7320	Sewer Replacement (25th & Harrison)	15	23-Nov-21	15-Dec-21	173
217	C5430	3rd Party Relocate Gas Harrison 25th (Dominio	6	13-Jan-22	20-Jan-22	160
218	C5420	PCC Power (Conduit) Harrison 25th	3	13-Jan-22	17-Jan-22	163
219						
220	C5070	Install Mainline Drainage MH WASH 01 to MH 2	15	21-Oct-21	10-Nov-21	161
221	C5200	MH Reconstruction & CB Install Washington to A	9	11-Nov-21	23-Nov-21	161
222	C5270	Drainage Removal/Abandon Washington to Ad	5	24-Nov-21	02- Dec-21	193
223	C5260	Install Mainline Drainage MH 25JE-01 @ Adams	16	24-Nov-21	17-Dec-21	161
224	C5320	MH Reconstruction & CB Install Adams to Jeffer	5	20-Dec-21	27-Dec-21	161
225	C5330	Install Laterals Adams to Jefferson	4	28-Dec-21	03- Jan-22	161
226	C5370	Drainage Removal/Abandon Adams to Jefferso	6	04-Jan-22	11-Jan-22	167
227	C5360	Install Mainline Drainage MH @ Monroe	10	04-Jan-22	17-Jan-22	161
228	C5480	Drainage Removal/Abandon @ Monroe	2	18-Jan-22	19-Jan-22	161
229						
230	C4970	Removals & Demo	23	21-Sep-21	21-Oct-21	159
231	C5290	Earthwork & Grading	30	05-Nov-21	20- Dec-21	159
232	C5460	Granular Borrow	22	21-Dec-21	21- Jan-22	159
233	C5570	Aggregate Base	7	24-Jan-22	01- Feb-22	159
234	C5580	Curb & Gutter	11	16-Feb-22	02- Mar-22	153
235	C5700	Concrete Flatwork	40	03-Mar-22	27-Apr-22	225
236	C5730	Median Curb - 25th St & Harrison Blvd	3	15-Mar-22	17-Mar-22	271
237	C5860	HMA Pavement/Striping	6	15-Apr-22	21-Apr-22	153
238	C5880	Raise Manholes and Valves	5	21-Apr-22	27-Apr-22	153
239	C5930	Rock Mulch (Decomposed Granite)	5	06-May-22	12-May-22	257
240						
241	**Jefferson St Station**		87	22-Oct-21	28-Feb-22	310
242	**25th & Jefferson OB Sta**		82	22-Oct-21	18-Feb-22	310
243	STA-1470	Station UG Utilities	5	22-Oct-21	28-Oct-21	202
244	STA-1670	Platform Structure Concrete	12	21-Dec-21	07- Jan-22	167
245	STA-1740	Set Canopy Columns	10	10-Jan-22	21-Jan-22	167
246	STA-1810	Platform Flatwork	10	24-Jan-22	04-Feb-22	167
247	STA-1860	Station Canopy Finish & Fixtures	5	07-Feb-22	11-Feb-22	310
248	STA-1920	Elect & Comms	5	14-Feb-22	18-Feb-22	310
249	**25th & Jefferson IB Sta**		87	22-Oct-21	28-Feb-22	310
250	STA-1480	Station UG Utilities	5	22-Oct-21	28-Oct-21	202
251	STA-1680	Platform Structure Concrete	12	21-Dec-21	07-Jan-22	167
252	STA-1750	Set Canopy Columns	10	10-Jan-22	21-Jan-22	167
253	STA-1820	Platform Flatwork	10	24-Jan-22	04-Feb-22	167
254	STA-1870	Station Canopy Finish & Fixtures	5	07-Feb-22	11-Feb-22	315
255	STA-1970	Elect & Comms	5	22-Feb-22	28-Feb-22	310
256	**Monroe St Station**		91	09-Sep-21	19-Jan-22	337
257	267					
258	**25th & Monroe OB**			**25th & Monroe OB Station**	S	t
259				STA-	T	a
260				1270	A	t
261					-	i
262					1	o
263				Rem	3	n
264				ovals	0	U
265				&	0	G
266				Dem		U
				o	S	t

49	16-Nov-21	379					twork Set Canopy
09-Sep-21	10-Sep-21	160	6-Nov-21, 25th & Monroe Obstation Removal & Demo Station Utilities Earthwork & Gradi	1	ng	Platform Structure Concrete Granular Bo	Columns
2	17-Sep-21	160					HMA Tie-in
09-Sep-21	24-Sep-21	160					
5	12-Oct-21	160					
13-Sep-21	01-Oct-21	167					
5	08-Oct-21	167					
20-Sep-21	15-Oct-21	167					
12	26-Oct-21	160					
27-Sep-21	26-Oct-21	389					
5	02-Nov-21	160					
27-Sep-21							
5							
04-Oct-21							
5							
11-Oct-21							
10							
13-Oct-21							
10							
13-Oct-21							
5							
27-Oct-21							

rrow Aggregate Base PCCP Paving Concrete Fla

Actual Work
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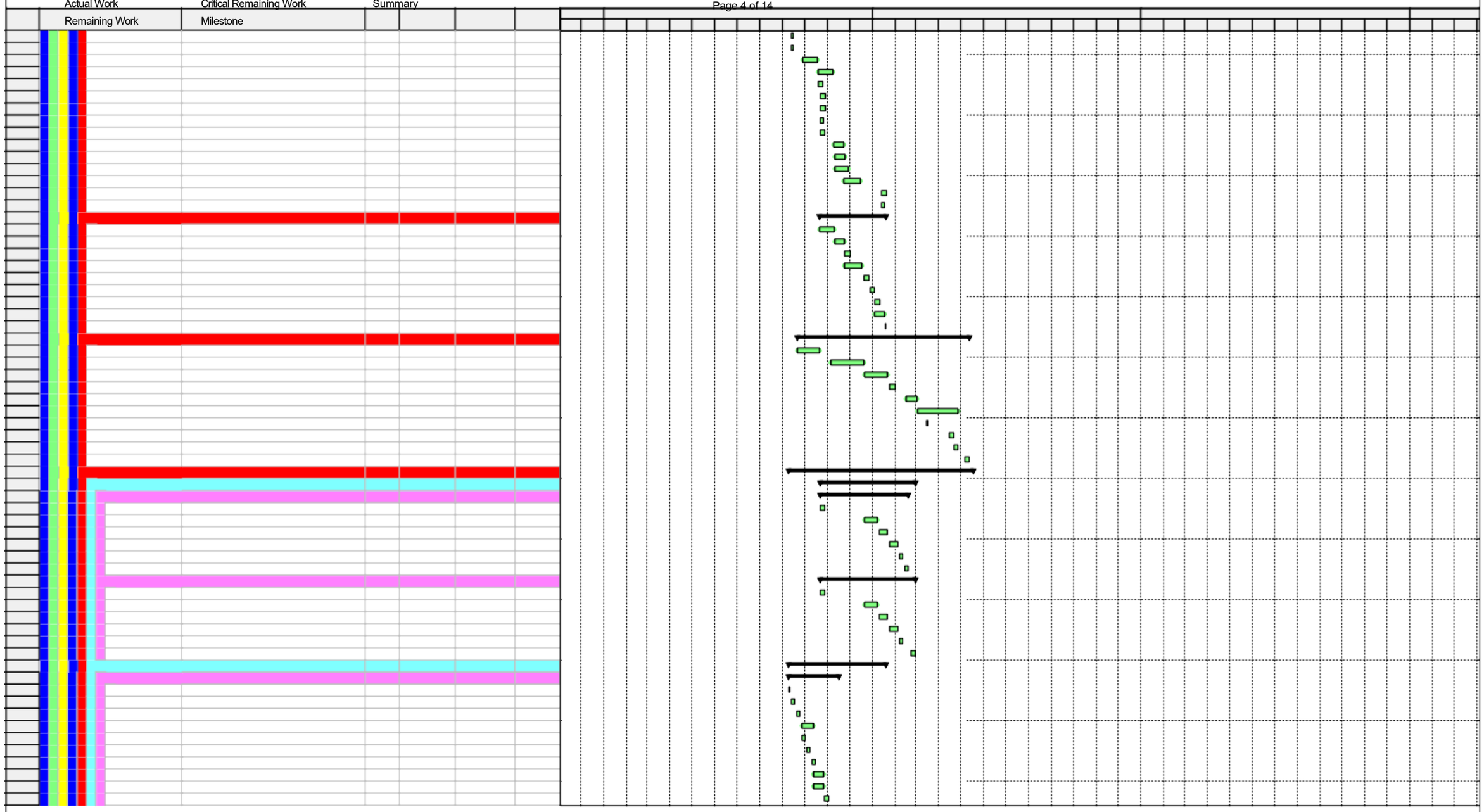

Stacy and Witbeck Inc

Ogden BRT, 2-17-21
Baseline Contract Schedule
Full Detail

Actual Work
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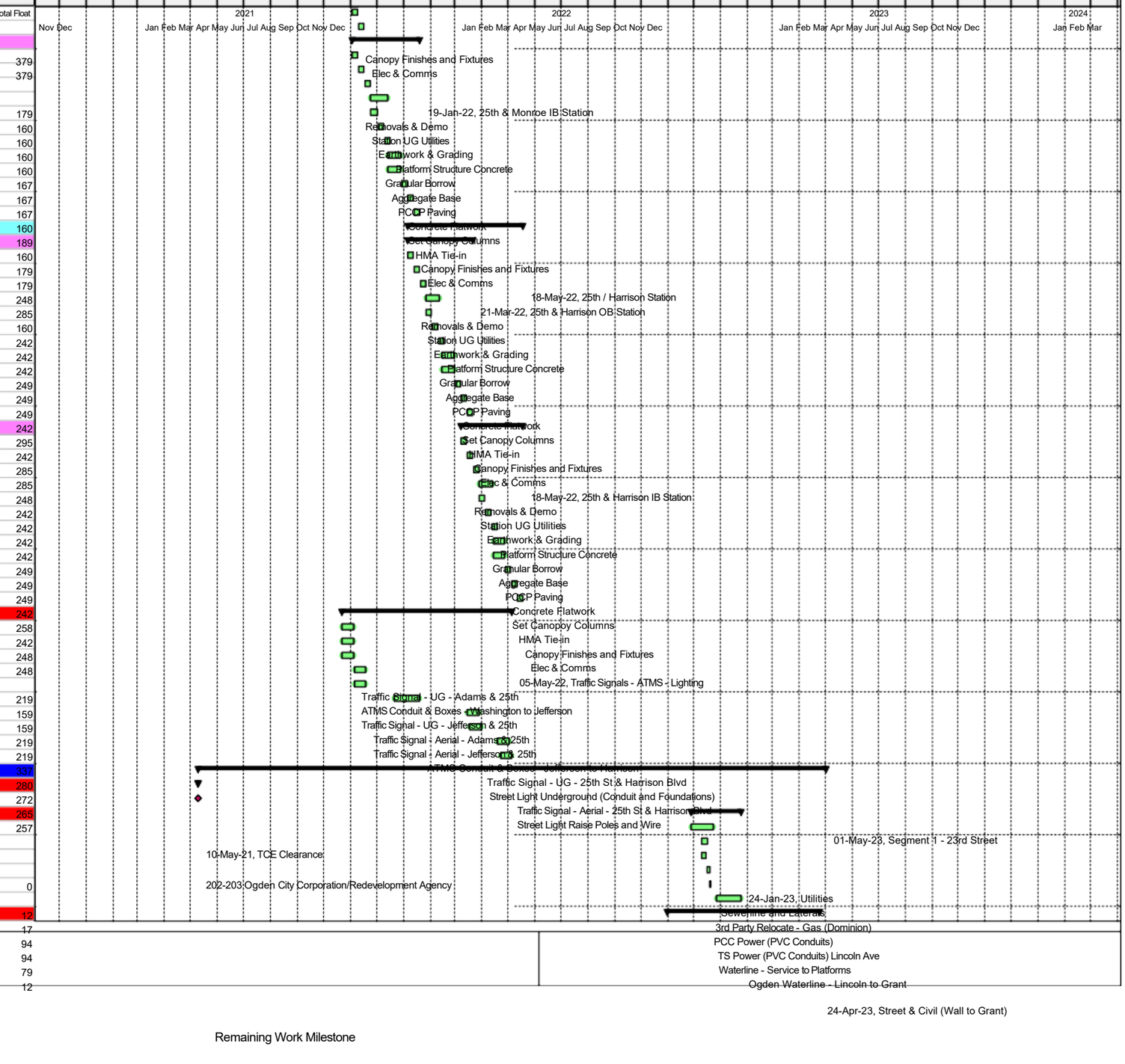
#	Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
268	STA-1510	Canopy Finishes and Fixtures	5	03-Nov-21	09-Nov-21	379
269	STA-1530	Elec & Comms	5	10-Nov-21	16-Nov-21	379
270		25th & Monroe IB Station	52	03-Nov-21	19-Jan-22	179
271	STA-1500	Removals & Demo	5	03-Nov-21	09-Nov-21	160
272	STA-1520	Station UG Utilities	5	10-Nov-21	16-Nov-21	160
273	STA-1540	Earthwork & Grading	5	17-Nov-21	23-Nov-21	160
274	STA-1560	Platform Structure Concrete	12	24-Nov-21	13-Dec-21	160
275	STA-1550	Granular Borrow	5	24-Nov-21	02-Dec-21	167
276	STA-1570	Aggregate Base	5	03-Dec-21	09-Dec-21	167
277	STA-1580	PCCP Paving	5	10-Dec-21	16-Dec-21	167
278	STA-1600	Concrete Flatwork	10	14-Dec-21	28-Dec-21	160
279	STA-1590	Set Canopy Columns	10	14-Dec-21	28-Dec-21	189
280	STA-1610	HMA Tie-in	5	29-Dec-21	05-Jan-22	160
281	STA-1640	Canopy Finishes and Fixtures	5	06-Jan-22	12-Jan-22	179
282	STA-1660	Elec & Comms	5	13-Jan-22	19-Jan-22	179
283		25th / Harrison Station	94	06-Jan-22	18-May-22	248
284		25th & Harrison OB Station	52	06-Jan-22	21-Mar-22	285
285	STA-1620	Removals & Demo	5	06-Jan-22	12-Jan-22	160
286	STA-1650	Station UG Utilities	5	13-Jan-22	19-Jan-22	242
287	STA-1690	Earthwork & Grading	5	20-Jan-22	26-Jan-22	242
288	STA-1710	Platform Structure Concrete	12	27-Jan-22	11-Feb-22	242
289	STA-1700	Granular Borrow	5	27-Jan-22	02-Feb-22	249
290	STA-1760	Aggregate Base	5	03-Feb-22	09-Feb-22	249
291	STA-1780	PCCP Paving	5	10-Feb-22	16-Feb-22	249
292	STA-1800	Concrete Flatwork	10	14-Feb-22	28-Feb-22	242
293	STA-1790	Set Canopy Columns	10	14-Feb-22	28-Feb-22	295
294	STA-1850	HMA Tie-in	5	01-Mar-22	07-Mar-22	242
295	STA-1910	Canopy Finishes and Fixtures	5	08-Mar-22	14-Mar-22	285
296	STA-1940	Elec & Comms	5	15-Mar-22	21-Mar-22	285
297		25th & Harrison IB Station	52	08-Mar-22	18-May-22	248
298	STA-1890	Removals & Demo	5	08-Mar-22	14-Mar-22	242
299	STA-1930	Station UG Utilities	5	15-Mar-22	21-Mar-22	242
300	STA-1980	Earthwork & Grading	5	22-Mar-22	28-Mar-22	242
301	STA-2000	Platform Structure Concrete	12	29-Mar-22	13-Apr-22	242
302	STA-1990	Granular Borrow	5	29-Mar-22	04-Apr-22	249
303	STA-2030	Aggregate Base	5	05-Apr-22	11-Apr-22	249
304	STA-2040	PCCP Paving	5	12-Apr-22	18-Apr-22	249
305	STA-2060	Concrete Flatwork	10	14-Apr-22	27-Apr-22	242
306	STA-2050	Set Canopy Columns	10	14-Apr-22	27-Apr-22	258
307	STA-2080	HMA Tie-in	5	28-Apr-22	04- May-22	242
308	STA-2090	Canopy Finishes and Fixtures	5	05-May-22	11-May-22	248
309	STA-2120	Elec & Comms	5	12-May-22	18-May-22	248
310						
311	C5140	Traffic Signal - UG - Adams & 25th	10	22-Oct-21	04-Nov-21	219
312	C5130	ATMS Conduit & Boxes - Washington to Jefferso	10	22-Oct-21	04-Nov-21	159
313	C5120	Traffic Signal - UG - Jefferson & 25th	10	22-Oct-21	04-Nov-21	159
314	C5170	Traffic Signal - Aerial - Adams & 25th	10	05-Nov-21	18-Nov-21	219
315	C5160	Traffic Signal - Aerial - Jefferson & 25th	10	05-Nov-21	18- Nov-21	219
316	C5450	ATMS Conduit & Boxes - Jefferson to Harrison	20	21-Dec-21	19- Jan-22	337
317	C5720	Traffic Signal - UG - 25th St & Harrison Blvd	10	15-Mar-22	28-Mar-22	280
318	C5740	Street Light Underground (Conduit and Founda	10	18-Mar-22	31-Mar-22	272
319	C5870	Traffic Signal - Aerial - 25th St & Harrison Blvd	10	19-Apr-22	02-May-22	265
320	C5890	Street Light Raise Poles and Wire	10	22-Apr-22	05-May-22	257
321						
322						
323	ROW-1110	202-203 Ogden City Corporation/Redevelopme	0		10-May-21*	0
324						
325	C6990	Sewerline and Laterals	20	28-Nov-22	23-Dec-22	12
326	C7030	3rd Party Relocate - Gas (Dominion)	6	09-Dec-22	16-Dec-22	17
327	C7020	PCC Power (PVC Conduits)	5	09-Dec-22	15-Dec-22	94
328	C7050	TS Power (PVC Conduits) Lincoln Ave	2	16-Dec-22	19-Dec-22	94
329	C7060	Waterline - Service to Platforms	2	19-Dec-22	20-Dec-22	79
330	C7070	Ogden Waterline - Lincoln to Grant	20	27-Dec-22	24-Jan-23	12
331						



Actual Work
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Stacy and Witbeck Inc

Ogden BRT, 2-17-21
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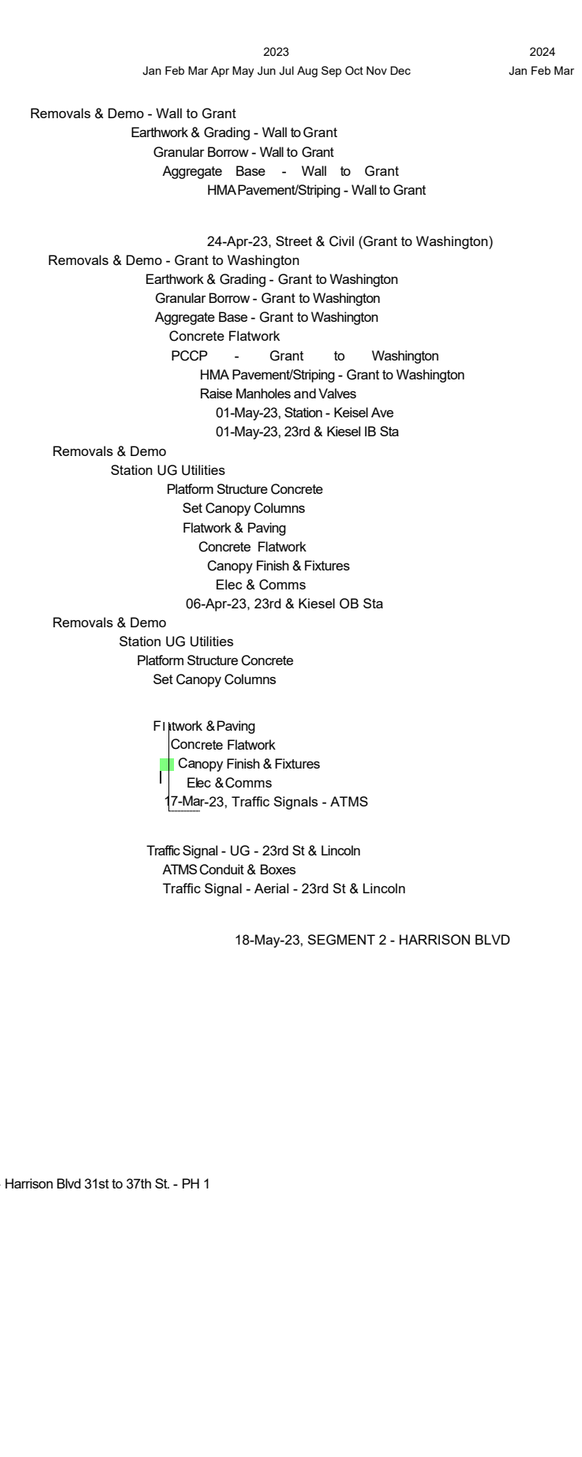
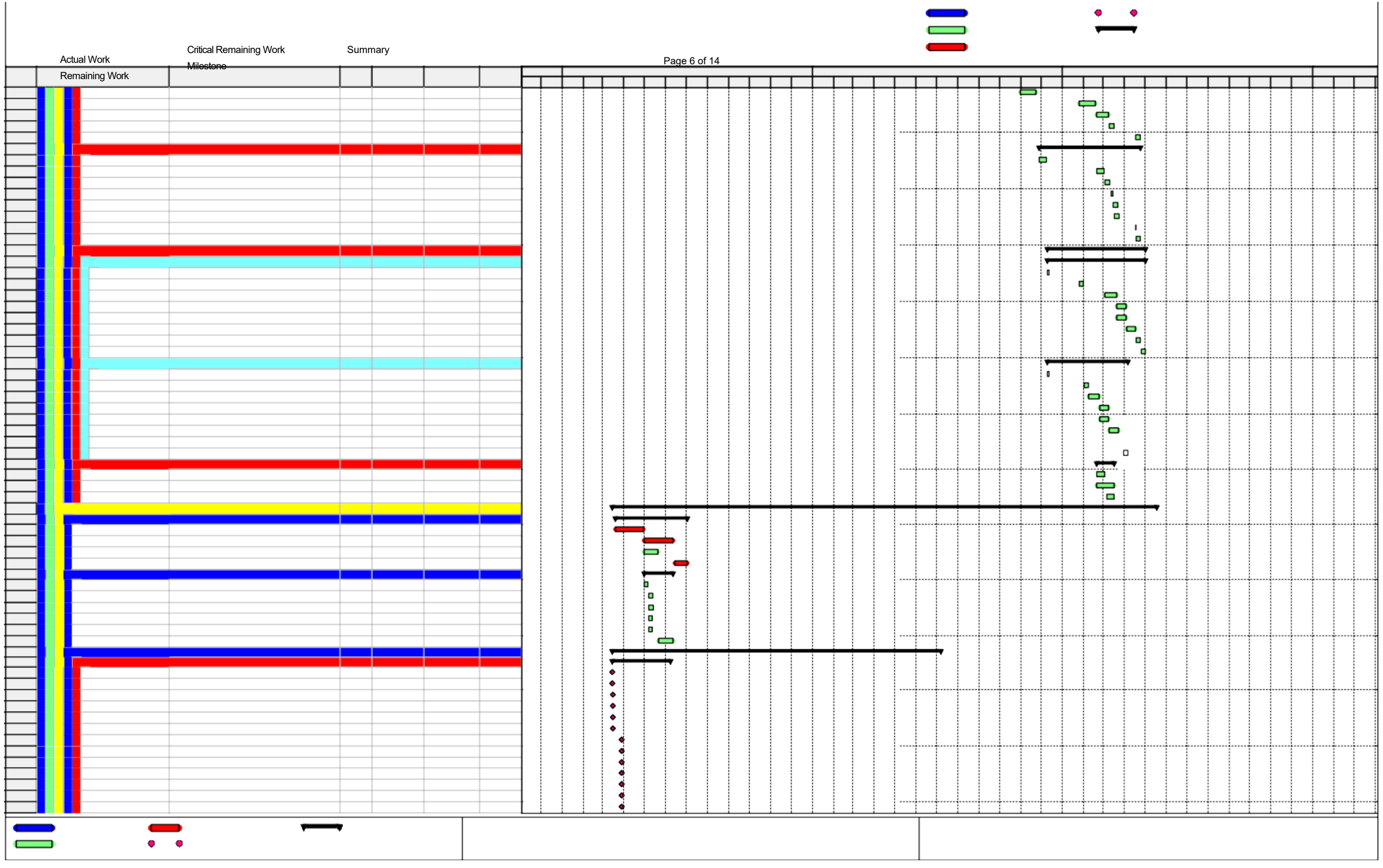
#	Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
332	C6940	Removals & Demo - Wall to Grant	18	31-Oct-22	23-Nov-22	12
333	C7090	Earthwork & Grading - Wall to Grant	18	25-Jan-23	17-Feb-23	12
334	C7130	Granular Borrow - Wall to Grant	14	20-Feb-23	09-Mar-23	38
335	C7190	Aggregate Base - Wall to Grant	6	10-Mar-23	17-Mar-23	38
336	C7260	HMA Pavement/Striping - Wall to Grant	7	17-Apr-23	24-Apr-23	22
337						
338	C7000	Removals & Demo - Grant to Washington	9	28-Nov-22	08-Dec-22	17
339	C7120	Earthwork & Grading - Grant to Washington	9	20-Feb-23	02-Mar-23	12
340	C7170	Granular Borrow - Grant to Washington	6	03-Mar-23	10-Mar-23	35
341	C7200	Aggregate Base - Grant to Washington	3	13-Mar-23	15-Mar-23	35
342	C7210	Concrete Flatwork	5	15-Mar-23	22-Mar-23	35
343	C7220	PCCP - Grant to Washington	5	17-Mar-23	24-Mar-23	33
344	C7240	HMA Pavement/Striping - Grantto Washington	2	17-Apr-23	18-Apr-23	22
345	C7270	Raise Manholes and Valves	5	18-Apr-23	24-Apr-23	22
346						
347	**23rd & Kiesel IB Sta**		100	09-Dec-22	01-May-23	12
348	STA-2490	Removals & Demo	2	09-Dec-22	12-Dec-22	58
349	STA-2540	Station UG Utilities	5	25-Jan-23	31-Jan-23	29
350	STA-2650	Platform Structure Concrete	12	03-Mar-23	20-Mar-23	12
351	STA-2680	Set Canopy Columns	10	21-Mar-23	03-Apr-23	12
352	STA-2670	Flatwork & Paving	10	21-Mar-23	03-Apr-23	27
353	STA-2710	Concrete Flatwork	10	04-Apr-23	17-Apr-23	12
354	STA-2720	Canopy Finish & Fixtures	5	18-Apr-23	24-Apr-23	12
355	STA-2730	Elec & Comms	5	25-Apr-23	01-May-23	12
356	**23rd & Kiesel OB Sta**		83	09-Dec-22	06-Apr-23	29
357	STA-2480	Removals & Demo	2	09-Dec-22	12-Dec-22	63
358	STA-2560	Station UG Utilities	5	01-Feb-23	07-Feb-23	29
359	STA-2580	Platform Structure Concrete	12	08-Feb-23	23-Feb-23	29
360	STA-2630	Set Canopy Columns	10	24-Feb-23	09-Mar-23	29
361	STA-2620	Flatwork & Paving	10	24-Feb-23	09-Mar-23	44
362	STA-2660	Concrete Flatwork	10	10-Mar-23	23-Mar-23	29
363	STA-2690	Canopy Finish & Fixtures	5	24-Mar-23	30-Mar-23	29
364	STA-2700	Elec & Comms	5	31-Mar-23	06-Apr-23	29
365						
366	C7150	Traffic Signal - UG - 23rd St & Lincoln	10	20-Feb-23	03-Mar-23	43
367	C7140	ATMS Conduit & Boxes	20	20-Feb-23	17-Mar-23	33
368	C7180	Traffic Signal - Aerial - 23rd St & Lincoln	10	06-Mar-23	17-Mar-23	43
369	**SEGMENT 2 - HARRISON BLVD**		552	15-Mar-21	18-May-23	0
370						
371	C3070	Waterline 32nd-33rd Replacement	30	19-Mar-21	29-Apr-21	13
372	C3440	Waterline 35th-36th Replacement	30	30-Apr-21	11-Jun-21	13
373	C3420	Waterline Service Meter Replacments 32-33	15	30-Apr-21	20-May-21	28
374	C4020	Waterline Service Meter Replacments 35-36	15	14-Jun-21	02-Jul-21	13
375						
376	C3430	Storm Drain 23x14 RCP Pipe	5	30-Apr-21	06-May-21	47
377	C3510	Storm Drain 30x19 RCP Pipe	5	07-May-21	13-May-21	48
378	C3500	3rd Party Relocate CenturyLink (35th overhead	6	07-May-21	14-May-21	47
379	C3490	3rd Party Relocate Comcast (35th overhead)	4	07-May-21	12-May-21	49
380	C3480	3rd Party Relocate Dominion Gas (36th)	4	07-May-21	12-May-21	49
381	C7330	Sewer Replacement (32nd Harrison)	15	21-May-21	11-Jun-21	28
382						
383						
384	ROW-2200	150 - 3225 (Credit Union) (Waterline)	0		15-Mar-21*	0
385	ROW-2240	155 to 158 - 3159 (Parking Lot Area)	0		15-Mar-21*	0
386	ROW-2140	143 - 3329 (St. Paul Luthern Church)	0		16-Mar-21*	0
387	ROW-2150	145 - 3293 (Harrison Blvd LLC) (Waterline)	0		16-Mar-21*	0
388	ROW-2160	147 - 3257 (Harrison Pointe LLC)	0		16-Mar-21*	0
389	ROW-2170	148 & 149 - 3245 (Car Wash) (Waterline)	0		16-Mar-21*	0
390	ROW-2100	131 - 3487 (Equity Growth Group) (Waterline)	0		29-Mar-21*	0
391	ROW-2110	133 - 3475 (Ogden Vision Center) (Waterline)	0		29-Mar-21*	0
392	ROW-2120	135 - 3457 (Sun Stop Station) (Waterline)	0		29-Mar-21*	0
393	ROW-2030	125 - 3585 (Parking Lot to Plaza)	0		29-Mar-21*	0
394	ROW-2040	126 - 3565 (Key Bank) (Waterline)	0		29-Mar-21*	0
395	ROW-2050	127 - 3531 (Family Dollar)	0		29-Mar-21*	0
396	ROW-2060	129 - 3511 (Big Jim's Burger)	0		29-Mar-21*	0



Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary



Ogden BRT, 2-17-21
Baseline Contract Schedule
Full Detail

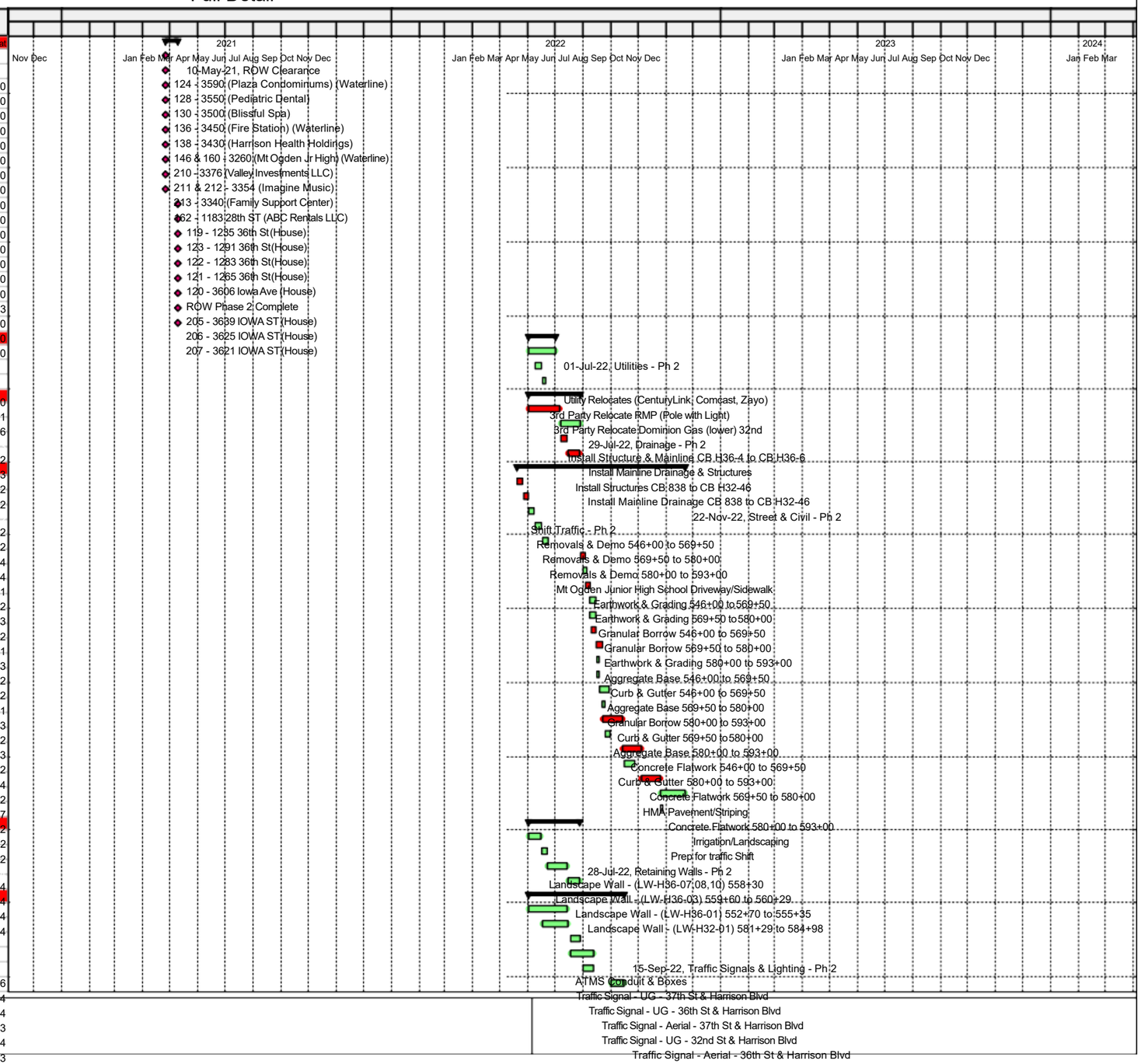
Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

#	Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
397	ROW-2250	159 - 3103 (State Farm)	0		29-Mar-21*	0
398	ROW-2010	112 - 3625 (Living Scripture Bldg)	0		12-Apr-21*	0
399	ROW-2020	113 - 3605 (FedEx Office)	0		12-Apr-21*	0
400	ROW-2690	139 - 3425 (Consortium Enterprises LLC)	0		12-Apr-21*	0
401	ROW-2700	140 - 3415 (Mirador Meredith LLC)	0		12-Apr-21*	0
402	ROW-2710	141 - 3385 (Safa Real Estate LLC)	0		12-Apr-21*	0
403	ROW-2720	142 - 3377 (Waterfall Canyon Office)	0		12-Apr-21*	0
404	ROW-2670	ROW for Waterline Complete	0		13-Apr-21*	0
405	ROW-2210	151 - 3225 (Goldenwest Credit Union) Ogden C	0		26-Apr-21*	0
406	ROW-2130	137 - 3453 (Afton Manor)	0		27-Apr-21*	0
407	ROW-2680	110 - 3685 (Glossy Cover LLC)	0		10-May-21*	0
408	ROW-2230	153 - 3195 (7-Eleven)	0		07-Jun-21*	0
409	ROW-2620	ROW Phase 1 Complete	0		07-Jun-21	32
410						
411	C4490	Utility Relocates (Power Conduits)	15	02-Aug-21	20-Aug-21	43
412	C4610	PCC Power (32nd St)	3	13-Aug-21	17-Aug-21	97
413	C4580	3rd Party Relocate Dominion Gas (New Trench	15	13-Aug-21	02-Sep-21	85
414	C4640	PCC Power (36th St)	3	18-Aug-21	20-Aug-21	102
415	C7380	Utility Relocates (CenturyLink)	15	23-Aug-21	13-Sep-21	43
416	C4780	Utility Joint Trench (near 32nd)	15	30-Aug-21	20-Sep-21	60
417	C7390	Utility Relocates (Comcast)	16	14-Sep-21	05-Oct-21	43
418	C4960	3rd Party Relocate Century Link (New Trench)	22	21-Sep-21	20-Oct-21	60
419	C4950	3rd Party Relocate Comcast (New Trench)	22	21-Sep-21	20-Oct-21	60
420	C4840	3rd Party Relocate RMP (Pole and Transformer	20	06-Oct-21	02-Nov-21	43
421						
422	C4600	Install Laterals 2 Locations	10	13-Aug-21	26-Aug-21	90
423	C4590	Install Structure & Lateral Mainline CB H36-1 to	4	13-Aug-21	18-Aug-21	96
424	C5000	Install Mainline Drainage CB H32-34.1 to CB H3	10	05-Oct-21	18-Oct-21	13
425	C5050	Install Structures CB H32-34.1 to CB H32-50	6	19-Oct-21	26-Oct-21	13
426	C5150	Reconstruct MH & CB's	12	27-Oct-21	11-Nov-21	13
427	C5210	Remove and Replace Slot Drain @ 573+75 to 5	5	12-Nov-21	18-Nov-21	13
428	C5240	Install CB's & Connections	18	19-Nov-21	16-Dec-21	13
429						
430	C4190	Shift Traffic - Ph 1	5	06-Jul-21	12-Jul-21	13
431	C4290	Removals & Demo 580+00 to 593+00	14	13-Jul-21	30-Jul-21	13
432	C4520	Removals & Demo 569+50 to 580+00	4	02-Aug-21	05-Aug-21	24
433	C4550	Removals & Demo 546+00 to 569+50	5	06-Aug-21	12-Aug-21	24
434	C5310	Earthwork & Grading 546+00 to 569+50	8	17-Dec-21	29-Dec-21	13
435	C5350	Granular Borrow 546+00 to 569+50	4	30-Dec-21	05- Jan-22	85
436	C5340	Earthwork & Grading 569+50 to 580+00	5	30-Dec-21	06- Jan-22	13
437	C5380	Aggregate Base 546+00 to 569+50	4	06-Jan-22	11- Jan-22	85
438	C5410	Granular Borrow 569+50 to 580+00	4	07-Jan-22	12- Jan-22	65
439	C5400	Earthwork & Grading 580+00 to 593+00	15	07-Jan-22	27-Jan-22	13
440	C5440	Aggregate Base 569+50 to 580+00	2	13-Jan-22	14-Jan-22	65
441	C5490	Granular Borrow 580+00 to 593+00	8	28-Jan-22	08-Feb-22	13
442	C5540	Aggregate Base 580+00 to 593+00	4	09-Feb-22	14-Feb-22	13
443	C5550	Curb & Gutter 580+00 to 593+00	8	16-Feb-22	25-Feb-22	13
444	C5600	Curb & Gutter 569+50 to 580+00	6	28-Feb-22	07-Mar-22	36
445	C5590	Concrete Flatwork 580+00 to 593+00	29	28-Feb-22	07- Apr-22	13
446	C5640	Curb & Gutter 546+00 to 569+50	5	08-Mar-22	14-Mar-22	47
447	C5830	Concrete Flatwork 569+50 to 580+00	27	08-Apr-22	16-May-22	13
448	C5840	HMA Pavement/Striping	10	15-Apr-22	26-Apr-22	34
449	C5950	Concrete Flatwork 546+00 to 569+50	17	17-May-22	08- Jun-22	132
450	C5940	Prep for Traffic Shift	3	17-May-22	19-May-22	12
451	C6270	Irrigation/Landscaping	20	09-Jun-22	07-Jul-22	128
452						
453	C4500	Retaining Wall - Soldier Pile 583+25 (Prop #149	20	02-Aug-21	27-Aug-21	13
454	C4570	Retaining Wall - CIP 566+00 (Prop #127)	10	13-Aug-21	26-Aug-21	70
455	C4770	Landscape Walls - (6 Each)	20	27-Aug-21	24-Sep-21	70
456	C4790	Retaining Wall - Soldier Pile 560+00	25	30-Aug-21	04-Oct-21	13
457						
458	C4510	ATMS Conduit & Boxes	30	02-Aug-21	13-Sep-21	299
459	C4630	Traffic Signal - UG - 32nd St & Harrison Blvd	10	13-Aug-21	26-Aug-21	170
460	C5710	Traffic Signal - Aerial - 32nd St & Harrison Blvd	10	15-Mar-22	28-Mar-22	47
461						

Ogden BRT, 2-17-21
Baseline Contract Schedule
Full Detail

Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

#	Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
462						
463	ROW-2310	124 - 3590 (Plaza Condominums) (Waterline)	0		26-Apr-21*	0
464	ROW-2320	128 - 3550 (Pediatric Dental)	0		26-Apr-21*	0
465	ROW-2400	130 - 3500 (Blissful Spa)	0		26-Apr-21*	0
466	ROW-2430	136 - 3450 (Fire Station) (Waterline)	0		26-Apr-21*	0
467	ROW-2440	138 - 3430 (Harrison Health Holdings)	0		26-Apr-21*	0
468	ROW-2500	146 & 160 - 3260 (Mt Ogden Jr High) (Waterline	0		26-Apr-21*	0
469	ROW-2730	210 - 3376 (Valley Investments LLC)	0		26-Apr-21*	0
470	ROW-2740	211 & 212 - 3354 (Imagine Music)	0		26-Apr-21*	0
471	ROW-2750	213 - 3340 (Family Support Center)	0		26-Apr-21*	0
472	ROW-2760	162 - 1183 28th ST (ABC Rentals LLC)	0		26-Apr-21*	0
473	ROW-2300	119 - 1235 36th St (House)	0		10-May-21*	0
474	ROW-2330	123 - 1291 36th St (House)	0		10-May-21*	0
475	ROW-2340	122 - 1283 36th St (House)	0		10-May-21*	0
476	ROW-2350	121 - 1265 36th St (House)	0		10-May-21*	0
477	ROW-2360	120 - 3606 Iowa Ave (House)	0		10-May-21*	0
478	ROW-2630	ROW Phase 2 Complete	0		10-May-21	273
479	ROW-2770	205 - 3639 IOWA ST (House)	0		10-May-21*	0
480	ROW-2780	206 - 3625 IOWA ST (House)	0		10-May-21*	0
481	ROW-2790	207 - 3621 IOWA ST (House)	0		10-May-21*	0
482						
483	C6170	Utility Relocates (CenturyLink, Comcast, Zayo)	22	02-Jun-22	01-Jul-22	30
484	C6250	3rd Party Relocate RMP (Pole with Light)	6	09-Jun-22	16-Jun-22	41
485	C6310	3rd Party Relocate Dominion Gas (lower) 32nd	2	17-Jun-22	20-Jun-22	46
486						
487	C6200	Install Structure & Mainline CB H36-4 to CB H36	24	02-Jun-22	06-Jul-22	12
488	C6440	Install Mainline Drainage & Structures	17	07-Jul-22	29-Jul-22	13
489	C6430	Install Structures CB 838 to CB H32-46	6	07-Jul-22	14-Jul-22	12
490	C6480	Install Mainline Drainage CB 838 to CB H32-46	10	15-Jul-22	28-Jul-22	12
491						
492	C6090	Shift Traffic - Ph 2	5	20-May-22	26-May-22	12
493	C6160	Removals & Demo 546+00to 569+50	3	27-May-22	01-Jun-22	12
494	C6220	Removals & Demo 569+50to 580+00	5	02-Jun-22	08-Jun-22	14
495	C6260	Removals & Demo 580+00to 593+00	6	09-Jun-22	16-Jun-22	14
496	C6330	Mt Ogden Junior High School Driveway/Sidewal	5	17-Jun-22	23-Jun-22	71
497	C6600	Earthwork &Grading 546+00 to 569+50	4	29-Jul-22	03-Aug-22	12
498	C6630	Earthwork & Grading 569+50 to 580+00	5	01-Aug-22	05-Aug-22	13
499	C6640	Granular Borrow 546+00 to 569+50	4	04-Aug-22	09-Aug-22	12
500	C6680	Granular Borrow 569+50 to 580+00	6	08-Aug-22	15-Aug-22	21
501	C6670	Earthwork & Grading 580+00 to 593+00	6	08-Aug-22	15-Aug-22	13
502	C6710	Aggregate Base 546+00 to 569+50	4	10-Aug-22	15-Aug-22	12
503	C6740	Curb & Gutter 546+00 to 569+50	5	15-Aug-22	22-Aug-22	12
504	C6760	Aggregate Base 569+50 to 580+00	4	16-Aug-22	19-Aug-22	21
505	C6750	Granular Borrow 580+00 to 593+00	4	16-Aug-22	19-Aug-22	13
506	C6780	Curb & Gutter 569+50 to 580+00	7	19-Aug-22	30-Aug-22	22
507	C6790	Aggregate Base 580+00 to 593+00	4	22-Aug-22	25-Aug-22	13
508	C6800	Concrete Flatwork 546+00 to 569+50	16	22-Aug-22	13-Sep-22	12
509	C6820	Curb & Gutter 580+00 to 593+00	4	25-Aug-22	31-Aug-22	14
510	C6860	Concrete Flatwork 569+50 to 580+00	15	13-Sep-22	04- Oct-22	12
511	C6870	HMA Pavement/Striping	10	15-Sep-22	27-Sep-22	17
512	C6880	Concrete Flatwork 580+00 to 593+00	15	04-Oct-22	25-Oct-22	12
513	C6910	Irrigation/Landscaping	20	26-Oct-22	22-Nov-22	122
514	C6900	Prep for traffic Shift	3	26-Oct-22	28-Oct-22	12
515						
516	C6180	Landscape Wall - (LW-H36-07,08,10) 558+30	10	02-Jun-22	15-Jun-22	74
517	C6260	Landscape Wall - (LW-H36-03) 559+60 to 560+	5	16-Jun-22	22-Jun-22	74
518	C6370	Landscape Wall - (LW-H36-01) 552+70 to 555+	15	23-Jun-22	14-Jul-22	74
519	C6470	Landscape Wall - (LW-H32-01) 581+29 to 584+	10	15-Jul-22	28-Jul-22	74
520						
521	C6210	ATMS Conduit & Boxes	30	02-Jun-22	14-Jul-22	26
522	C6340	Traffic Signal - UG - 37th St & Harrison Blvd	20	17-Jun-22	15-Jul-22	14
523	C6510	Traffic Signal - UG - 36th St & Harrison Blvd	10	18-Jul-22	29-Jul-22	14
524	C6500	Traffic Signal - Aerial - 37th St & Harrison Blvd	20	18-Jul-22	12-Aug-22	63
525	C6620	Traffic Signal - UG - 32nd St & Harrison Blvd	10	01-Aug-22	12-Aug-22	14
526	C6850	Traffic Signal - Aerial - 36th St & Harrison Blvd	10	01-Sep-22	15-Sep-22	13

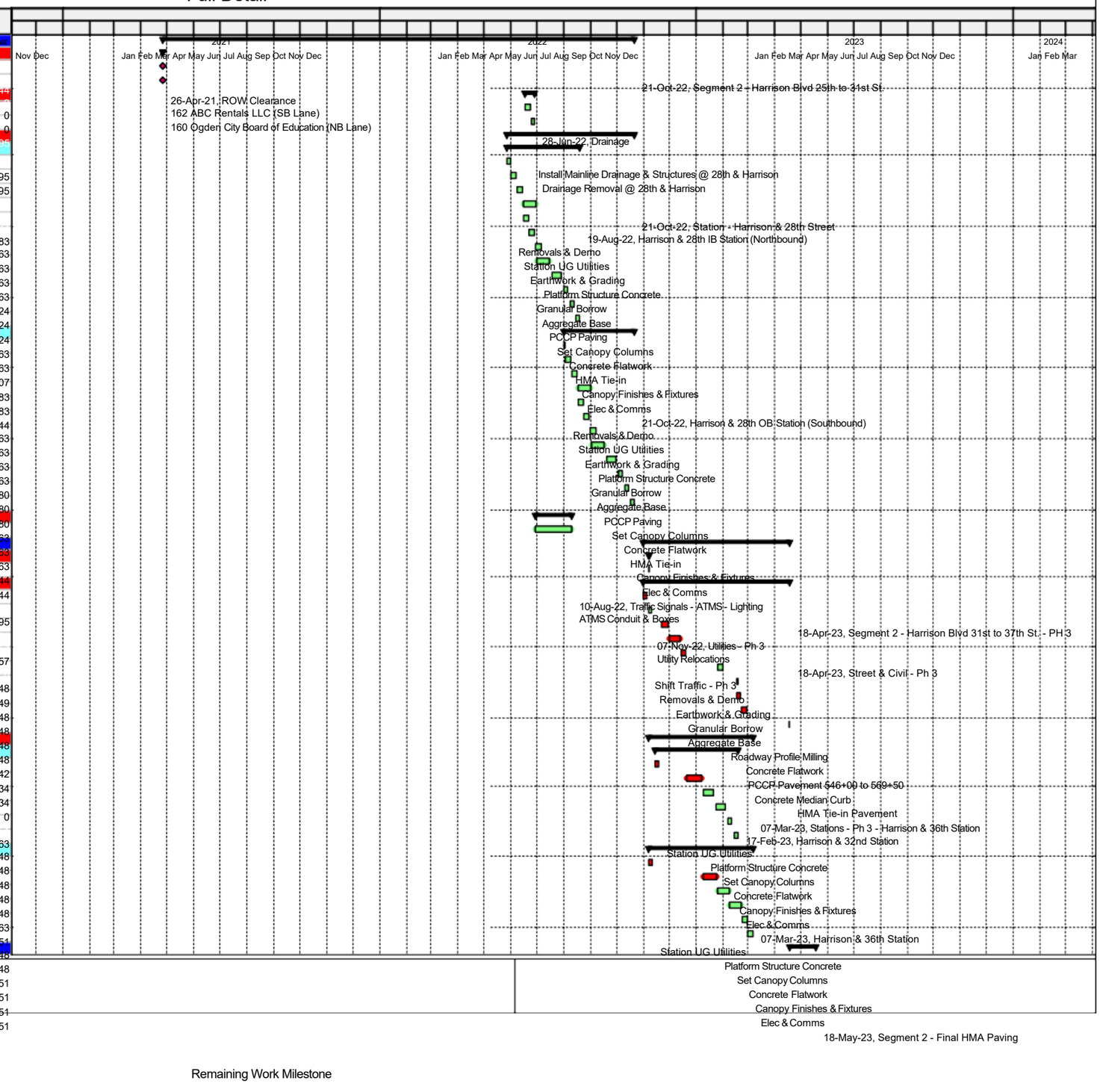


Stacy and Witbeck Inc

Ogden BRT, 2-17-21
Baseline Contract Schedule
Full Detail

Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

#	Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
527		Segment 2 - Harrison Blvd 25th to 31st St.	379	26-Apr-21	21-Oct-22	144
528		ROW Clearance				
529	ROW-2600	162 ABC Rentals LLC (SB Lane)	0		26-Apr-21*	0
530	ROW-2610	160 Ogden City Board of Education (NB Lane)	0		26-Apr-21*	0
531		Drainage	8	17-Jun-22	28-Jun-22	195
532	C6320	Install Mainline Drainage & Structures @ 28th &	5	17-Jun-22	23-Jun-22	195
533	C6380	Drainage Removal @ 28th & Harrison	3	24-Jun-22	28-Jun-22	195
534						
535		Harrison & 28th IB Station (Northbound)	59	27-May-22	19-Aug-22	183
536	STA-2150	Removals & Demo	2	27-May-22	31-May-22	63
537	STA-2160	Station UG Utilities	5	01-Jun-22	07-Jun-22	63
538	STA-2180	Earthwork & Grading	5	08-Jun-22	14-Jun-22	63
539	STA-2200	Platform Structure Concrete	12	15-Jun-22	30-Jun-22	63
540	STA-2190	Granular Borrow	5	15-Jun-22	21-Jun-22	124
541	STA-2210	Aggregate Base	5	22-Jun-22	28-Jun-22	124
542	STA-2220	PCCP Paving	5	29-Jun-22	06-Jul-22	124
543	STA-2230	Set Canopy Columns	10	01-Jul-22	15-Jul-22	63
544	STA-2240	Concrete Flatwork	10	18-Jul-22	29-Jul-22	63
545	STA-2250	HMA Tie-in	5	01-Aug-22	05-Aug-22	107
546	STA-2280	Canopy Finishes & Fixtures	5	08-Aug-22	12-Aug-22	183
547	STA-2300	Elec & Comms	5	15-Aug-22	19-Aug-22	183
548		Harrison & 28th OB Station (Southbound)	59	01-Aug-22	21-Oct-22	144
549	STA-2260	Removals & Demo	2	01-Aug-22	02-Aug-22	63
550	STA-2270	Station UG Utilities	5	03-Aug-22	09-Aug-22	63
551	STA-2290	Earthwork & Grading	5	10-Aug-22	16-Aug-22	63
552	STA-2320	Platform Structure Concrete	12	17-Aug-22	01-Sep-22	63
553	STA-2310	Granular Borrow	5	17-Aug-22	23-Aug-22	80
554	STA-2330	Aggregate Base	5	24-Aug-22	30-Aug-22	80
555	STA-2350	PCCP Paving	5	31-Aug-22	07-Sep-22	80
556	STA-2370	Set Canopy Columns	10	02-Sep-22	16-Sep-22	63
557	STA-2380	Concrete Flatwork	10	19-Sep-22	30-Sep-22	63
558	STA-2400	HMA Tie-in	5	03-Oct-22	07-Oct-22	63
559	STA-2420	Canopy Finishes & Fixtures	5	10-Oct-22	14-Oct-22	144
560	STA-2430	Elec & Comms	5	17-Oct-22	21-Oct-22	144
561						
562	C6410	ATMS Conduit & Boxes	30	29-Jun-22	10-Aug-22	195
563						
564						
565	C6960	Utility Relocations	1	07-Nov-22	07-Nov-22	57
566						
567	C6930	Shift Traffic - Ph 3	5	31-Oct-22	04-Nov-22	48
568	C6970	Removals & Demo	4	07-Nov-22	10-Nov-22	49
569	C6980	Earthwork & Grading	5	21-Nov-22	29-Nov-22	48
570	C7010	Granular Borrow	10	30-Nov-22	13-Dec-22	48
571	C7040	Aggregate Base	4	14-Dec-22	19-Dec-22	48
572	C7080	Roadway Profile Milling	5	25-Jan-23	31-Jan-23	48
573	C7110	Concrete Flatwork	2	16-Feb-23	17-Feb-23	42
574	C7100	PCCP Pavement 546+00 to 569+50	3	16-Feb-23	20-Feb-23	34
575	C7160	Concrete Median Curb	5	21-Feb-23	27-Feb-23	34
576	C7250	HMA Tie-inPavement	2	17-Apr-23	18-Apr-23	0
577						
578		Harrison & 32nd Station	66	14-Nov-22	17- Feb-23	63
579	STA-2470	Station UG Utilities	5	14-Nov-22	18- Nov-22	48
580	STA-2500	Platform Structure Concrete	12	20-Dec-22	06-Jan-23	48
581	STA-2520	Set Canopy Columns	10	09-Jan-23	20-Jan-23	48
582	STA-2530	Concrete Flatwork	10	23-Jan-23	03-Feb-23	48
583	STA-2570	Canopy Finishes & Fixtures	5	06-Feb-23	10-Feb-23	48
584	STA-2600	Elec & Comms	5	13-Feb-23	17-Feb-23	63
585		Harrison & 36th Station	83	07-Nov-22	07-Mar-23	51
586	STA-2460	Station UG Utilities	5	07-Nov-22	11-Nov-22	48
587	STA-2510	Platform Structure Concrete	12	09-Jan-23	24-Jan-23	48
588	STA-2550	Set Canopy Columns	10	25-Jan-23	07-Feb-23	51
589	STA-2590	Concrete Flatwork	10	08-Feb-23	21-Feb-23	51
590	STA-2610	Canopy Finishes & Fixtures	5	22-Feb-23	28-Feb-23	51
591	STA-2640	Elec & Comms	5	01-Mar-23	07-Mar-23	51
592						



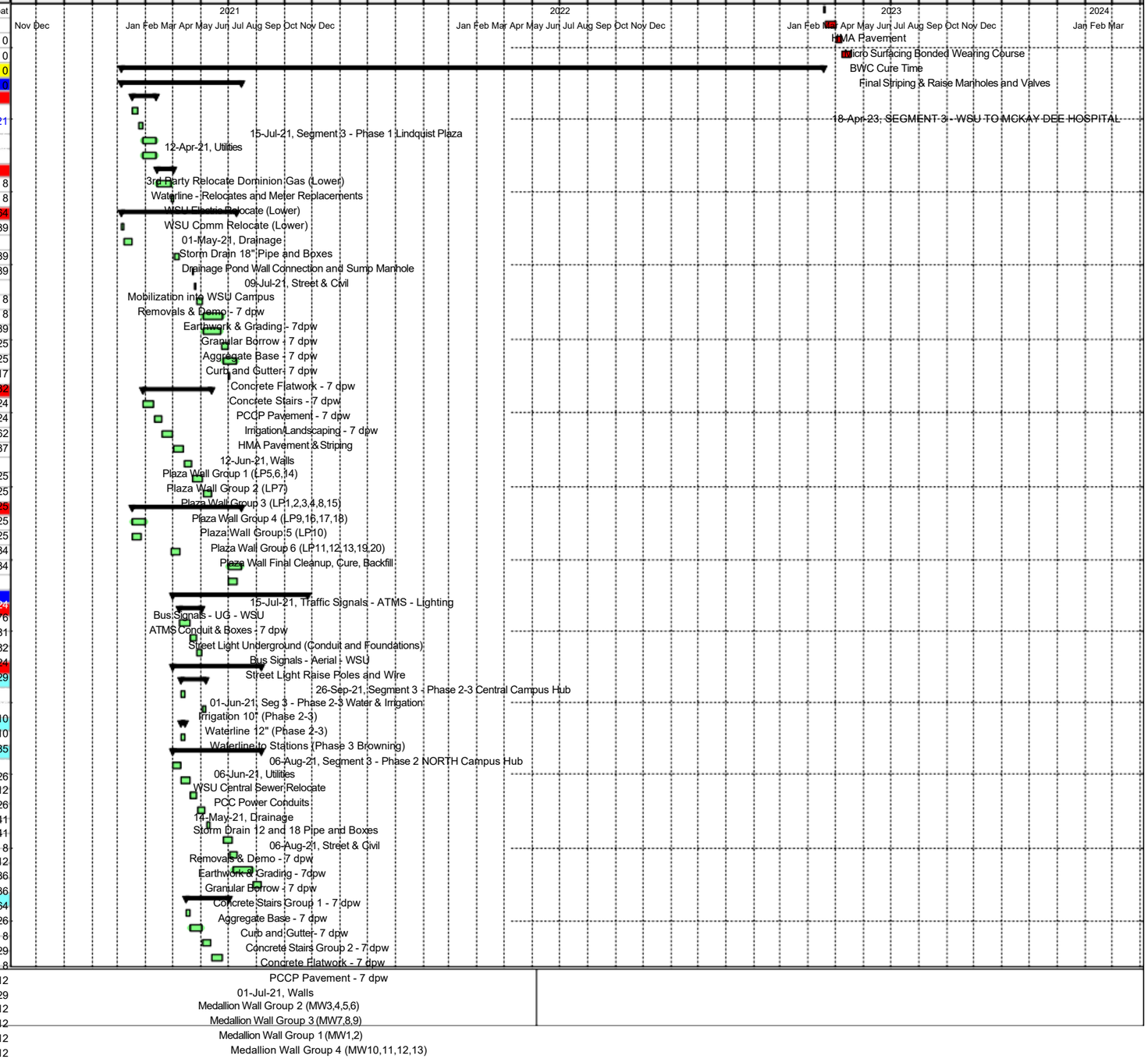
Actual Work
Remaining Work
Critical
Remaining Work Milestone

Stacy and Witbeck Inc

Ogden BRT, 2-17-21
Baseline Contract Schedule
Full Detail

Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

#	Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
593	C7280	HMA Pavement	2	18-Apr-23	20-Apr-23	0
594	C7290	Micro Surfacing Bonded Wearing Course	10	20-Apr-23	02-May-23	0
595	C7300	BWC Cure Time	5	02-May-23	08-May-23	0
596	C7310	Final Striping & Raise Manholes and Valves	10	08-May-23	18-May-23	0
597		SEGMENT 3 - WSU TO MCKAY DEE HOSPITAL	538	05-Mar-21	18-Apr-23	21
598						
599						
600	C3020	3rd Party Relocate Dominion Gas (Lower)	7	17-Mar-21	23-Mar-21	8
601	C3090	Waterline - Relocates and Meter Replacements	5	24-Mar-21	28-Mar-21	8
602	C3160	WSU Electric Relocate (Lower)	15	29-Mar-21	12-Apr-21	64
603	C3150	WSU Comm Relocate (Lower)	15	29-Mar-21	12-Apr-21	39
604						
605	C3320	Storm Drain 18" Pipe and Boxes	16	13-Apr-21	28-Apr-21	39
606	C3400	Drainage Pond Wall Connection and Sump Ma	3	29-Apr-21	01-May-21	39
607						
608	C3000	Mobilization into WSU Campus	3	05-Mar-21	07-Mar-21	8
609	C3010	Removals & Demo - 7 dpw	9	08-Mar-21	16-Mar-21	8
610	C3460	Earthwork & Grading - 7dpw	6	02-May-21	07-May-21	39
611	C3810	Granular Borrow - 7 dpw	2	22-May-21	23-May-21	25
612	C3820	Aggregate Base - 7 dpw	3	24-May-21	26-May-21	25
613	C3850	Curb and Gutter- 7 dpw	5	27-May-21	02-Jun-21	17
614	C3940	Concrete Flatwork - 7 dpw	16	03-Jun-21	24-Jun-21	382
615	C3930	Concrete Stairs - 7 dpw	20	03-Jun-21	22-Jun-21	24
616	C4080	PCCP Pavement - 7 dpw	8	23-Jun-21	30-Jun-21	24
617	C4110	Irrigation/Landscaping - 7 dpw	15	25-Jun-21	09-Jul-21	662
618	C4120	HMA Pavement & Striping	2	01-Jul-21	02-Jul-21	37
619						
620	C3120	Plaza Wall Group 1 (LP5,6,14)	12	29-Mar-21	09-Apr-21	25
621	C3280	Plaza Wall Group 2 (LP7)	9	10-Apr-21	18-Apr-21	25
622	C3360	Plaza Wall Group 3 (LP1,2,3,4,8,15)	12	19-Apr-21	30-Apr-21	25
623	C3450	Plaza Wall Group 4 (LP9,16,17,18)	12	01-May-21	12-May-21	25
624	C3610	Plaza Wall Group 5 (LP10)	9	13-May-21	21-May-21	25
625	C3790	Plaza Wall Group 6 (LP11,12,13,19,20)	12	22-May-21	02-Jun-21	34
626	C3920	Plaza Wall Final Cleanup, Cure, Backfill	10	03-Jun-21	12-Jun-21	34
627		Traffic Signals - ATMS - Lighting	121	17-Mar-21	15-Jul-21	24
628	C3040	Bus Signals - UG - WSU	15	17-Mar-21	31-Mar-21	76
629	C3030	ATMS Conduit & Boxes - 7 dpw	10	17-Mar-21	26-Mar-21	81
630	C3390	Street Light Underground (Conduit and Founda	10	29-Apr-21	08-May-21	82
631	C4140	Bus Signals - Aerial - WSU	15	01-Jul-21	15-Jul-21	24
632	C4130	Street Light Raise Poles and Wire	10	01-Jul-21	10-Jul-21	29
633						
634						
635	C3520	Irrigation 10" (Phase 2-3)	12	07-May-21	19-May-21	10
636	C3750	Waterline 12" (Phase 2-3)	8	19-May-21	27-May-21	10
637	C3860	Waterline to Stations (Phase 3 Browning)	5	27-May-21	01-Jun-21	35
638						
639		Utilities	28	10-May-21	06-Jun-21	26
640	C3570	WSU Central Sewer Relocate	5	10-May-21	14-May-21	12
641	C3910	PCC Power Conduits	5	02-Jun-21	06-Jun-21	26
642		Drainage	5	10-May-21	14-May-21	41
643	C3580	Storm Drain 12 and 18 Pipe and Boxes	5	10-May-21	14-May-21	41
644		Street & Civil	69	30-Apr-21	06-Aug-21	8
645	C3410	Removals & Demo - 7 dpw	10	30-Apr-21	09-May-21	12
646	C3560	Earthwork & Grading - 7dpw	10	10-May-21	19-May-21	36
647	C3780	Granular Borrow - 7 dpw	8	20-May-21	27-May-21	36
648	C3880	Concrete Stairs Group 1 - 7 dpw	9	28-May-21	05-Jun-21	64
649	C3960	Aggregate Base - 7 dpw	4	07-Jun-21	10-Jun-21	26
650	C4100	Curb and Gutter- 7 dpw	7	25-Jun-21	05- Jul-21	8
651	C4150	Concrete Stairs Group 2 - 7 dpw	9	02-Jul-21	10-Jul-21	29
652	C4180	Concrete Flatwork - 7 dpw	16	06-Jul-21	27-Jul-21	8
653	C4440	PCCP Pavement - 7 dpw	10	28-Jul-21	06- Aug-21	12
654		Walls	48	15-May-21	01-Jul-21	29
655	C3650	Medallion Wall Group 2 (MW3,4,5,6)	5	15-May-21	19-May-21	12
656	C3760	Medallion Wall Group 3 (MW7,8,9)	13	20-May-21	01-Jun-21	12
657	C3900	Medallion Wall Group 1 (MW1,2)	10	02-Jun-21	11-Jun-21	12
658	C4000	Medallion Wall Group 4 (MW10,11,12,13)	13	12-Jun-21	24-Jun-21	12

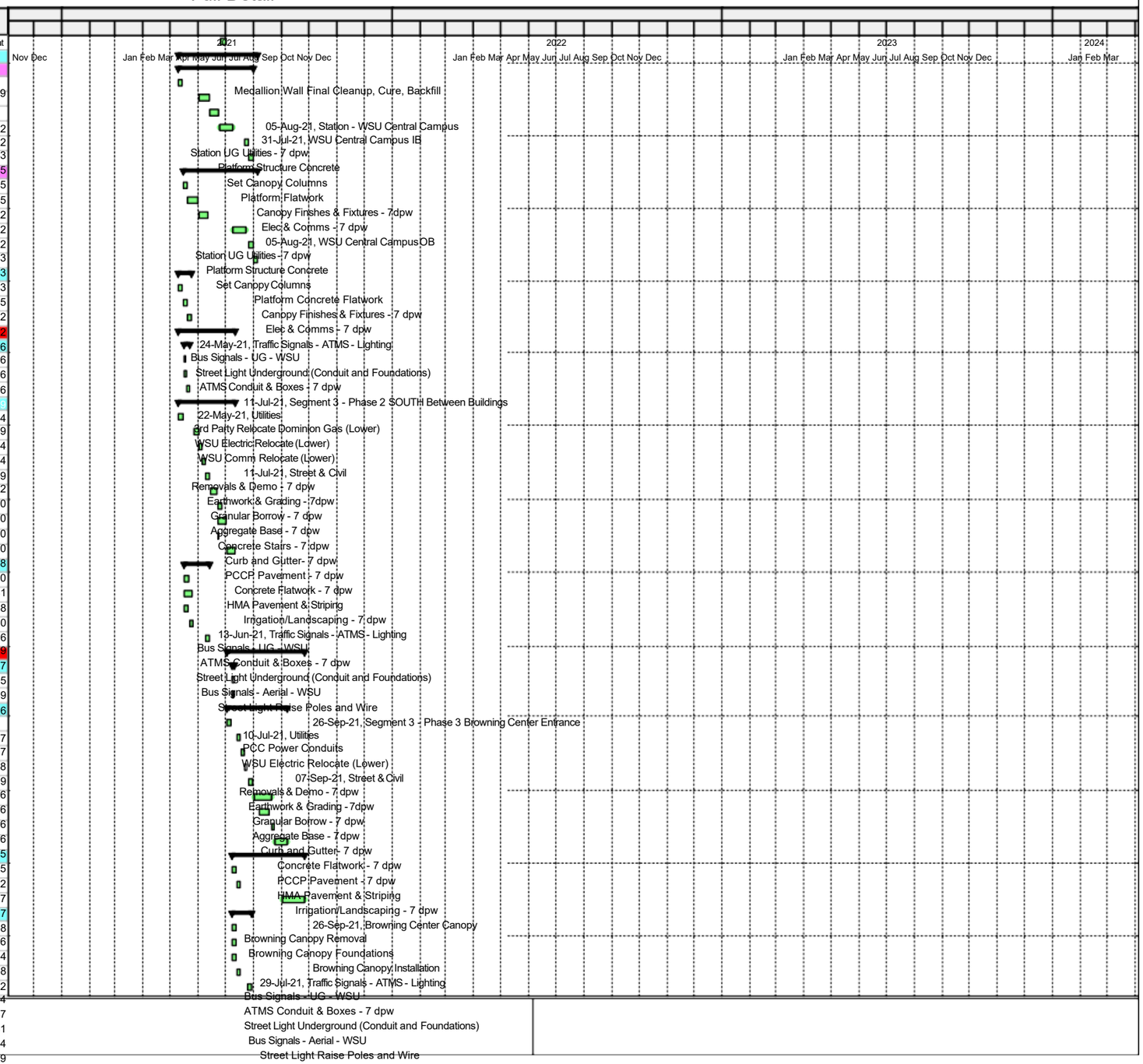


Actual Work
Remaining Work
Critical
Remaining Work Milestone

Ogden BRT, 2-17-21
Baseline Contract Schedule
Full Detail

Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

#	Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
659	C4090	Medallion Wall Final Cleanup, Cure, Backfill	7	25-Jun-21	01-Jul-21	29
660		**Station - WSU Central Campus**	88	10-May-21	05- Aug-21	622
661		**WSU Central Campus IB**	83	10-May-21	31-Jul-21	622
662	STA-1020	Station UG Utilities - 7 dpw	5	10-May-21	14-May-21	53
663	STA-1060	Platform Structure Concrete	12	01-Jun-21	13-Jun-21	35
664	STA-1080	Set Canopy Columns	10	13-Jun-21	23-Jun-21	35
665	STA-1110	Platform Flatwork	15	24-Jun-21	08-Jul-21	35
666	STA-1130	Canopy Finshes & Fixtures -7dpw	5	21-Jul-21	26-Jul-21	622
667	STA-1140	Elec & Comms - 7 dpw	5	26-Jul-21	31-Jul-21	622
668		**WSU Central Campus OB**	83	15-May-21	05-Aug-21	622
669	STA-1030	Station UG Utilities - 7 dpw	5	15-May-21	19-May-21	63
670	STA-1040	Platform Structure Concrete	12	20-May-21	31-May-21	63
671	STA-1050	Set Canopy Columns	10	01-Jun-21	11-Jun-21	63
672	STA-1120	Platform Concrete Flatwork	15	09-Jul-21	23-Jul-21	35
673	STA-1150	Canopy Finishes & Fixtures - 7 dpw	5	26-Jul-21	31-Jul-21	622
674	STA-1170	Elec & Comms - 7 dpw	5	31-Jul-21	05-Aug-21	622
675		**Traffic Signals - ATMS - Lighting**	15	10-May-21	24-May-21	76
676	C3550	Bus Signals - UG - WSU	5	10-May-21	14-May-21	76
677	C3660	Street Light Underground (Conduit and Founda	5	15-May-21	19-May-21	76
678	C3770	ATMS Conduit & Boxes - 7 dpw	5	20-May-21	24-May-21	76
679		Segment 3 - Phase 2 SOUTH Between Buildings	43	10-May-21	11-Jul-21	459
680		**Utilities**	7	16-May-21	22-May-21	24
681	C3680	3rd Party Relocate Dominion Gas (Lower)	2	16-May-21	17- May-21	29
682	C3670	WSU Electric Relocate (Lower)	3	16-May-21	18- May-21	24
683	C3730	WSU Comm Relocate (Lower)	4	19-May-21	22-May-21	24
684		**Street & Civil**	43	10-May-21	11-Jul-21	459
685	C3540	Removals & Demo - 7 dpw	6	10-May-21	15-May-21	22
686	C3870	Earthwork & Grading - 7dpw	5	27-May-21	01-Jun-21	10
687	C3890	Granular Borrow - 7 dpw	4	01-Jun-21	05-Jun-21	10
688	C3950	Aggregate Base - 7 dpw	3	05-Jun-21	08-Jun-21	10
689	C3980	Concrete Stairs - 7 dpw	5	08-Jun-21	13-Jun-21	10
690	C4010	Curb and Gutter- 7 dpw	6	14-Jun-21	21-Jun-21	8
691	C4070	PCCP Pavement - 7 dpw	6	22-Jun-21	27-Jun-21	10
692	C4060	Concrete Flatwork - 7 dpw	8	22-Jun-21	01-Jul-21	381
693	C4050	HMA Pavement & Striping	2	22-Jun-21	23-Jun-21	668
694	C4160	Irrigation/Landscaping - 7 dpw	10	02-Jul-21	11-Jul-21	660
695		**Traffic Signals - ATMS - Lighting**	29	16-May-21	13-Jun-21	676
696	C3710	Bus Signals - UG - WSU	6	16-May-21	21-May-21	689
697	C3700	ATMS Conduit & Boxes - 7 dpw	10	16-May-21	25-May-21	37
698	C3690	Street Light Underground (Conduit and Founda	5	16-May-21	20-May-21	695
699	C3800	Bus Signals - Aerial - WSU	5	22-May-21	26-May-21	689
700	C3990	Street Light Raise Poles and Wire	5	08-Jun-21	13-Jun-21	676
701						
702		**Utilities**	3	08-Jul-21	10-Jul-21	17
703	C4240	PCC Power Conduits	3	08-Jul-21	10-Jul-21	17
704	C4210	WSU Electric Relocate (Lower)	2	08-Jul-21	09-Jul-21	18
705		**Street & Civil**	46	02-Jul-21	07-Sep-21	429
706	C4170	Removals & Demo - 7 dpw	6	02-Jul-21	07-Jul-21	6
707	C4310	Earthwork & Grading - 7dpw	5	13-Jul-21	17-Jul-21	6
708	C4330	Granular Borrow - 7 dpw	4	18-Jul-21	21-Jul-21	6
709	C4360	Aggregate Base - 7 dpw	3	22-Jul-21	24-Jul-21	6
710	C4380	Curb and Gutter- 7 dpw	5	26-Jul-21	30-Jul-21	5
711	C4530	Concrete Flatwork - 7 dpw	15	02-Aug-21	20-Aug-21	5
712	C4560	PCCP Pavement - 7 dpw	12	07-Aug-21	18-Aug-21	12
713	C4660	HMA Pavement & Striping	3	21-Aug-21	23-Aug-21	7
714	C4760	Irrigation/Landscaping - 7 dpw	15	24-Aug-21	07-Sep-21	617
715		**Browning Center Canopy**	81	08-Jul-21	26-Sep-21	598
716	C4220	Browning Canopy Removal	5	08-Jul-21	12-Jul-21	6
717	C4280	Browning Canopy Foundations	5	13-Jul-21	17-Jul-21	644
718	C4810	Browning Canopy Installation	25	01-Sep-21	26-Sep-21	598
719		**Traffic Signals - ATMS - Lighting**	22	08-Jul-21	29-Jul-21	32
720	C4260	Bus Signals - UG - WSU	5	08-Jul-21	12-Jul-21	44
721	C4250	ATMS Conduit & Boxes - 7 dpw	5	08-Jul-21	12-Jul-21	37
722	C4230	Street Light Underground (Conduit and Founda	5	08-Jul-21	12-Jul-21	41
723	C4300	Bus Signals - Aerial - WSU	5	13-Jul-21	17-Jul-21	44
724	C4370	Street Light Raise Poles and Wire	5	25-Jul-21	29-Jul-21	29



Stacy and Witbeck Inc

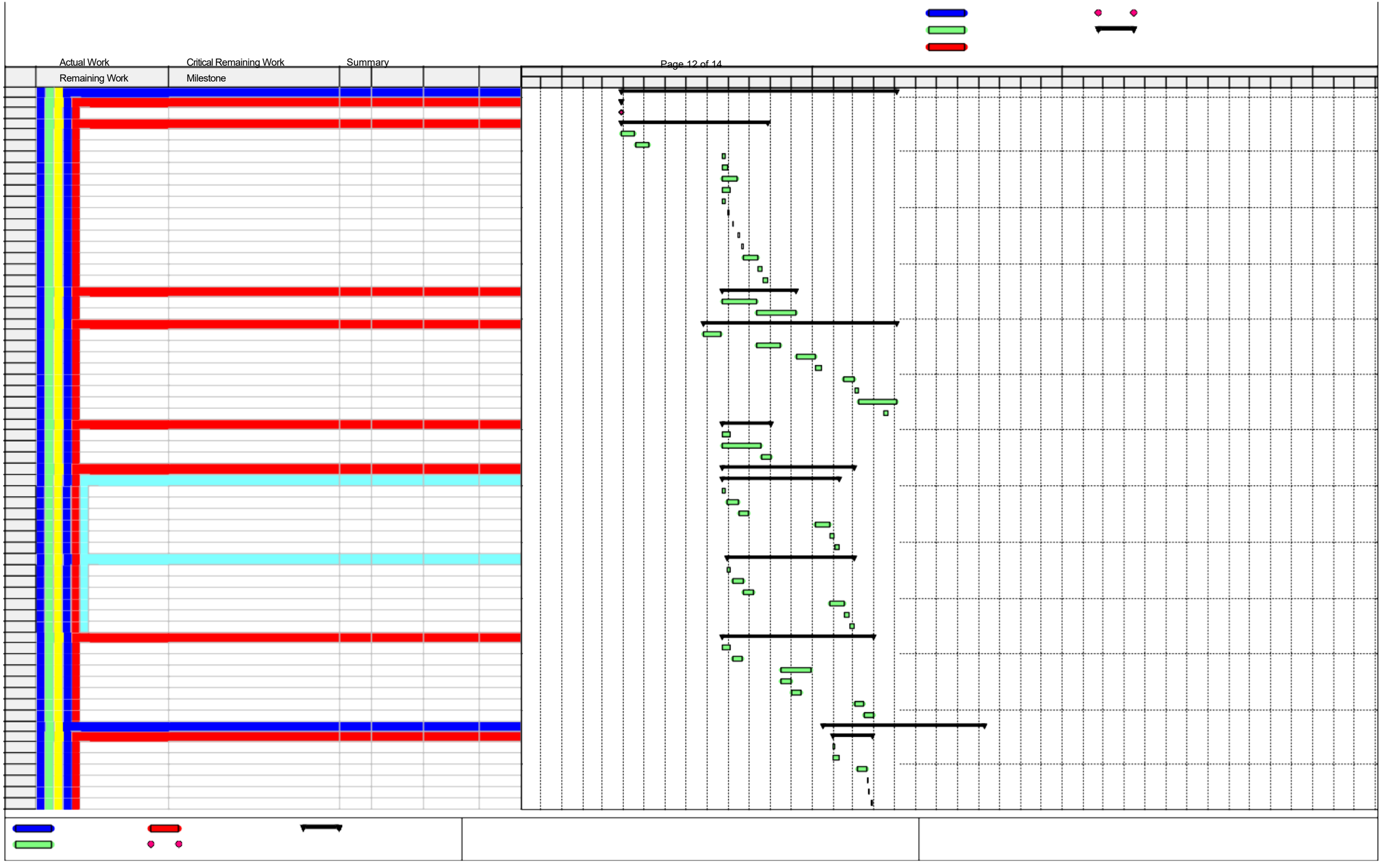
Ogden BRT, 2-17-21
Baseline Contract Schedule
Full Detail

Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

#	Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
725						
726						
727	ROW-2800	107 - 1348 Country Hills Dr (House)	0		29-Mar-21*	0
728						
729	C3110	Irrigation 10"	15	29-Mar-21	16-Apr-21	6
730	C3370	Waterline 12"	15	19-Apr-21	07-May-21	6
731	C4720	3rd Party Relocate Comcast (overhead)	5	23-Aug-21	27-Aug-21	146
732	C4710	3rd Party Relocate Dominion Gas (Lower)	6	23-Aug-21	30-Aug-21	168
733	C4700	Relocate UG G1 (CenturyLink, WSU Comm/Ele	15	23-Aug-21	13-Sep-21	128
734	C4680	Waterline Relocates and Meter Replacements	10	23-Aug-21	03-Sep-21	164
735	C4670	3rd Party Relocate RMP (Pole)	5	23-Aug-21	27-Aug-21	171
736	C4800	3rd Party Relocate Dominion Gas (SD Loop)	2	31-Aug-21	01-Sep-21	168
737	C4820	Waterline Service to Platforms	2	07-Sep-21	08-Sep-21	164
738	C4920	Relocate UG G2 (CenturyLink)	4	14-Sep-21	17-Sep-21	128
739	C4930	Relocate UG G3 (WSU Elec Lower)	3	20-Sep-21	22-Sep-21	128
740	C4980	Relocate UG G4 (CenturyLink, WSU Comm/Ele	15	23-Sep-21	13-Oct-21	128
741	C5030	TS Power (conduit) G5	5	14-Oct-21	20-Oct-21	128
742	C5060	PCC Power (Conduit)	6	21-Oct-21	28-Oct-21	128
743						
744	C4730	Storm Drain @ Village Area	35	23-Aug-21	11-Oct-21	101
745	C5020	Storm Drain CB CH-08 to EX MH VG-665 @ Co	40	12-Oct-21	08-Dec-21	101
746						
747	C4430	Clear/Grub/Demo	20	26-Jul-21	20-Aug-21	101
748	C5010	Earthwork & Grading	25	12-Oct-21	15-Nov-21	116
749	C5300	Granular Borrow	18	09-Dec-21	05- Jan-22	101
750	C5390	Aggregate Base	7	06-Jan-22	14-Jan-22	101
751	C5560	Concrete Flatwork	12	16-Feb-22	03-Mar-22	139
752	C5620	PCCP Pavement	4	04-Mar-22	09-Mar-22	152
753	C5690	Irrigation/Landscaping	40	10-Mar-22	04-May-22	263
754	C5850	HMA Pavement/Striping	6	15-Apr-22	21-Apr-22	162
755						
756	C4750	Sheet Pile Retaining Wall (Ball Field)	10	23-Aug-21	03-Sep-21	141
757	C4690	MSE Retaining Wall	40	23-Aug-21	18-Oct-21	126
758	C5040	Boulder/Rock Retaining Wall	10	19-Oct-21	01-Nov-21	126
759						
760	**WSU Village Drive IB**		118	23-Aug-21	09-Feb-22	317
761	STA-1210	Station UG Utilities	5	23-Aug-21	27-Aug-21	373
762	STA-1240	Platform Structure Concrete	12	30-Aug-21	15-Sep-21	373
763	STA-1320	Set Canopy Columns	10	16-Sep-21	30-Sep-21	373
764	STA-1630	Platform Concrete Flatwork	15	06-Jan-22	26-Jan-22	307
765	STA-1730	Canopy Finishes & Fixtures	5	27-Jan-22	02-Feb-22	317
766	STA-1770	Elec & Comms	5	03-Feb-22	09-Feb-22	317
767	**WSU Village Drive OB**		128	30-Aug-21	03-Mar-22	307
768	STA-1230	Station UG Utilities	5	30-Aug-21	03-Sep-21	383
769	STA-1260	Platform Structure Concrete	12	07-Sep-21	22-Sep-21	383
770	STA-1360	Set Canopy Columns	10	23-Sep-21	07-Oct-21	383
771	STA-1720	Platform Concrete Flatwork	15	27-Jan-22	16-Feb-22	307
772	STA-1830	Canopy Finahes & Fixtures	5	17-Feb-22	24-Feb-22	307
773	STA-1840	Elec & Comms	5	25-Feb-22	03-Mar-22	307
774						
775	C4740	Traffic Signal - UG - Village Dr & BRT	10	23-Aug-21	03-Sep-21	259
776	C4830	Traffic Signal - UG - Country Hills Dr & BRT	10	07-Sep-21	20-Sep-21	259
777	C5230	ATMS Conduit & Boxes	30	16-Nov-21	30-Dec-21	195
778	C5220	Street Light Underground (Conduit and Founda	10	16-Nov-21	01-Dec-21	209
779	C5280	Street Light Raise Poles and Wire	10	02-Dec-21	15-Dec-21	209
780	C5610	Traffic Signal - Aerial - Village Dr & BRT	10	04-Mar-22	17-Mar-22	136
781	C5750	Traffic Signal - Aerial - Country Hills Dr & BRT	10	18-Mar-22	31-Mar-22	136
782						
783						
784	C5510	Relocate Comcast UG Fiber	4	31-Jan-22	03-Feb-22	142
785	C5500	PCC Power (Conduit)	8	31-Jan-22	09-Feb-22	138
786	C5660	Waterline (Dee Station)	10	08-Mar-22	21-Mar-22	111
787	789	C5760 C5780 C5790		Waterline	Platform	Wat
788				Service to	and Bldg	erlin

2	23-Mar-22	119	Water Line Service to Platform and Bldg	Water Line to Driver Bldg
22-Mar-22	25-Mar-22	119		
2	29-Mar-22	119		
24-Mar-22				
2				
28-Mar-22				

Water Line Relocate and Meter Replacment Sewer Lat


Actual Work
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Milestone
Summary

Stacy and Witbeck Inc

Ogden BRT, 2-17-21
Baseline Contract Schedule
Full Detail

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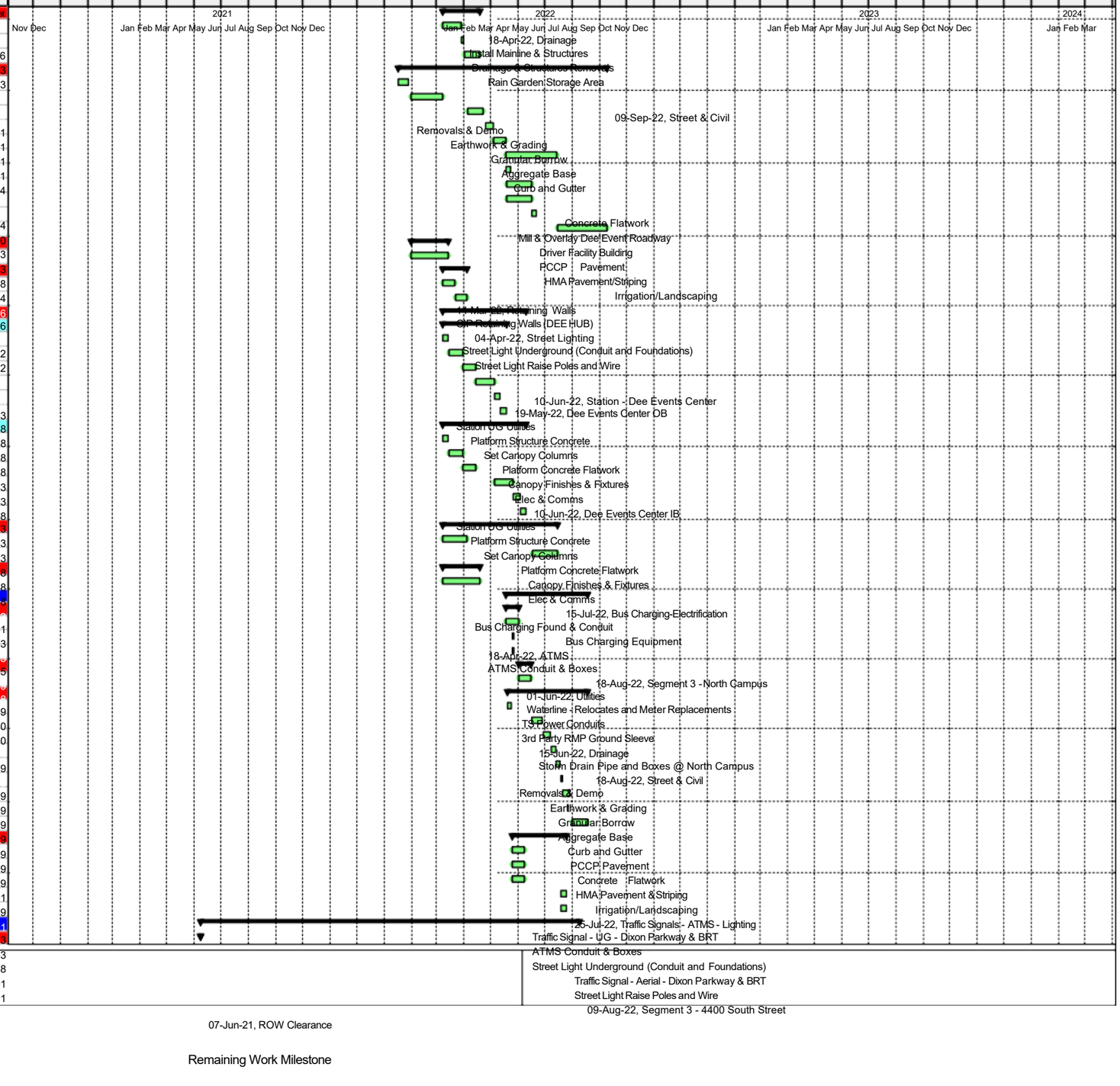
Summary

#	Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
790						
791	C5670	Install Mainline & Structures	15	08-Mar-22	28-Mar-22	106
792	C5800	Drainage & Structures Removals	3	29-Mar-22	31-Mar-22	113
793	C5810	Rain Garden Storage Area	12	01-Apr-22	18-Apr-22	113
794						
795	C5470	Removals & Demo	10	17-Jan-22	28-Jan-22	101
796	C5530	Earthwork & Grading	25	31-Jan-22	07-Mar-22	101
797	C5820	Granular Borrow	14	05-Apr-22	22-Apr-22	101
798	C5900	Aggregate Base	8	25-Apr-22	04-May-22	101
799	C5910	Curb and Gutter	10	04-May-22	18-May-22	104
800	C5980	Concrete Flatwork	41	18-May-22	14-Jul-22	134
801	C5970	Mill & Overlay Dee Event Roadway	4	18-May-22	23-May-22	130
802	C6050	Driver Facility Building	20	19-May-22	16-Jun-22	233
803	C6030	PCCP Pavement	20	19-May-22	16-Jun-22	193
804	C6300	HMA Pavement/Striping	4	16-Jun-22	21-Jun-22	108
805	C6490	Irrigation/Landscaping	40	15-Jul-22	09-Sep-22	174
806		Retaining Walls	30	31-Jan-22	14-Mar-22	116
807	C5520	CIP Retaining Walls (DEE HUB)	30	31-Jan-22	14-Mar-22	116
808						
809	C5630	Street Light Underground (Conduit and Founda	10	08-Mar-22	21-Mar-22	262
810	C5770	Street Light Raise Poles and Wire	10	22-Mar-22	04- Apr-22	262
811						
812		Dee Events Center OB	52	08-Mar-22	19-May-22	253
813	STA-1900	Station UG Utilities	5	08-Mar-22	14-Mar-22	238
814	STA-1950	Platform Structure Concrete	12	15-Mar-22	30-Mar-22	238
815	STA-2010	Set Canopy Columns	10	31-Mar-22	14-Apr-22	238
816	STA-2070	Platform Concrete Flatwork	15	14-Apr-22	05- May-22	238
817	STA-2110	Canopy Finishes & Fixtures	5	05-May-22	12-May-22	253
818	STA-2130	Elec & Comms	5	12-May-22	19-May-22	253
819		Dee Events Center IB	67	08-Mar-22	10-Jun-22	238
820	STA-1880	Station UG Utilities	5	08-Mar-22	14-Mar-22	253
821	STA-1960	Platform Structure Concrete	12	15-Mar-22	30-Mar-22	253
822	STA-2020	Set Canopy Columns	10	31-Mar-22	14-Apr-22	253
823	STA-2100	Platform Concrete Flatwork	15	05-May-22	26-May-22	238
824	STA-2140	Canopy Finishes & Fixtures	5	26-May-22	03- Jun-22	238
825	STA-2170	Elec & Comms	5	03-Jun-22	10-Jun-22	238
826		Bus Charging-Electrification				
827	C5680	Bus Charging Found & Conduit	20	08-Mar-22	04- Apr-22	101
828	C6350	Bus Charging Equipment	20	17-Jun-22	15-Jul-22	193
829		ATMS				
830	C5650	ATMS Conduit & Boxes	30	08-Mar-22	18-Apr-22	215
831		Segment 3 - North Campus				
832		Utilities				
833	C5960	Waterline - Relocates and Meter Replacements	10	18-May-22	01-Jun-22	189
834	C6120	TS Power Conduits	3	25-May-22	27-May-22	210
835	C6110	3rd Party RMP Ground Sleeve	3	25-May-22	27-May-22	210
836						
837	C6190	Storm Drain Pipe and Boxes @ North Campus	10	02-Jun-22	15-Jun-22	189
838						
839	C6080	Removals & Demo	3	20-May-22	24-May-22	189
840	C6290	Earthwork & Grading	9	16-Jun-22	28-Jun-22	189
841	C6400	Granular Borrow	6	29-Jun-22	07- Jul-22	189
842	C6450	Aggregate Base	4	08-Jul-22	13-Jul-22	189
843	C6460	Curb and Gutter	3	13-Jul-22	18-Jul-22	149
844	C6540	PCCP Pavement	3	19-Jul-22	21-Jul-22	189
845	C6560	Concrete Flatwork	6	21-Jul-22	29-Jul-22	149
846	C6590	HMA Pavement & Striping	2	26-Jul-22	27-Jul-22	191
847	C6610	Irrigation/Landscaping	14	01-Aug-22	18-Aug-22	189
848		Traffic Signals - ATMS - Lighting	42	25-May-22	25-Jul-22	191
849	C6140	Traffic Signal - UG - Dixon Parkway & BRT	10	25-May-22	08- Jun-22	203
850	C6130	ATMS Conduit & Boxes	10	25-May-22	08-Jun-22	203
851	C6100	Street Light Underground (Conduit and Founda	10	25-May-22	08- Jun-22	218
852	C6530	Traffic Signal - Aerial - Dixon Parkway & BRT	5	19-Jul-22	25-Jul-22	191
853	C6520	Street Light Raise Poles and Wire	5	19-Jul-22	25- Jul-22	191
854						
855						



Actual Work
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Stacy and Witbeck Inc

Ogden BRT, 2-17-21
Baseline Contract Schedule
Full Detail

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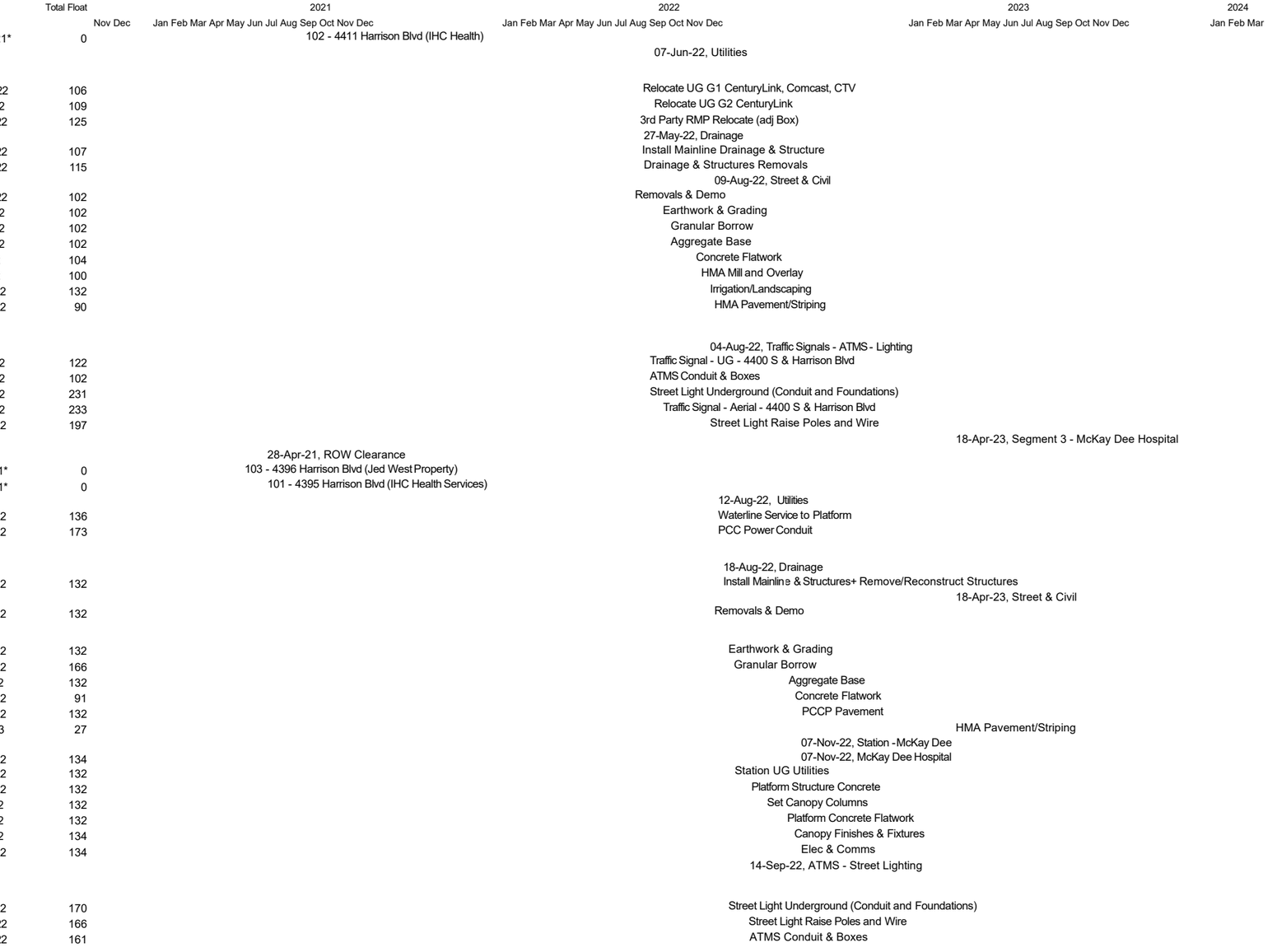
Milestone
Summary

#	Activity ID		Activity Name	Original Duration	Start	Finish	Total Float
856		ROW-2810	102 - 4411 Harrison Blvd (IHC Health)	0		07-Jun-21*	0
857							
858		C6060	Relocate UG G1 CenturyLink, Comcast, CTV	6	19-May-22	26- May-22	106
859		C6000	Relocate UG G2 CenturyLink	13	19-May-22	07-Jun-22	109
860		C5990	3rd Party RMP Relocate (adj Box)	3	19-May-22	23-May-22	125
861							
862		C6070	Install Mainline Drainage & Structure	5	19-May-22	25-May-22	107
863		C6150	Drainage & Structures Removals	2	26-May-22	27-May-22	115
864							
865		C5920	Removals & Demo	10	05-May-22	18-May-22	102
866		C6240	Earthwork & Grading	10	03-Jun-22	16-Jun-22	102
867		C6360	Granular Borrow	6	17-Jun-22	24-Jun-22	102
868		C6390	Aggregate Base	4	27-Jun-22	30-Jun-22	102
869		C6420	Concrete Flatwork	15	30-Jun-22	21-Jul-22	104
870		C6550	HMA Mill and Overlay	3	21-Jul-22	26-Jul-22	100
871		C6580	Irrigation/Landscaping	10	22-Jul-22	04-Aug-22	132
872		C6650	HMA Pavement/Striping	3	04-Aug-22	09-Aug-22	90
873							
874		C6040	Traffic Signal - UG - 4400 S & Harrison Blvd	10	19-May-22	02-Jun-22	122
875		C6020	ATMS Conduit & Boxes	10	19-May-22	02-Jun-22	102
876		C6010	Street Light Underground (Conduit and Founda	10	19-May-22	02-Jun-22	231
877		C6230	Traffic Signal - Aerial - 4400 S & Harrison Blvd	10	03-Jun-22	16-Jun-22	233
878		C6570	Street Light Raise Poles and Wire	10	22-Jul-22	04-Aug-22	197
879							
880							
881		ROW-2830	103 -4396 Harrison Blvd (Jed West Property)	0		05-Apr-21*	0
882		ROW-2820	101 - 4395 Harrison Blvd (IHC Health Services)	0		28-Apr-21*	0
883							
884		C6720	Waterline Service to Platform	3	10-Aug-22	12-Aug-22	136
885		C6690	PCC Power Conduit	3	10-Aug-22	12-Aug-22	173
886							
887		C6730	Install Mainline & Structures+ Remove/Reconstr	7	10-Aug-22	18-Aug-22	132
888							
889		C6660	Removals & Demo	3	05-Aug-22	09-Aug-22	132
890		C6770	Earthwork & Grading	3	19-Aug-22	23-Aug-22	132
891		C6810	Granular Borrow	4	24-Aug-22	29-Aug-22	166
892		C6890	Aggregate Base	2	24-Oct-22	26-Oct-22	132
893		C6920	Concrete Flatwork	4	26-Oct-22	01-Nov-22	91
894		C6950	PCCP Pavement	5	01-Nov-22	08-Nov-22	132
895		C7230	HMA Pavement/Striping	2	17-Apr-23	18-Apr-23	27
896							
897		**McKay Dee Hospital**		52	24-Aug-22	07-Nov-22	134
898		STA-2340	Station UG Utilities	5	24-Aug-22	30-Aug-22	132
899		STA-2360	Platform Structure Concrete	12	31-Aug-22	16-Sep-22	132
900		STA-2390	Set Canopy Columns	10	19-Sep-22	03-Oct-22	132
901		STA-2410	Platform Concrete Flatwork	15	03-Oct-22	24-Oct-22	132
902		STA-2440	Canopy Finishes & Fixtures	5	24-Oct-22	31-Oct-22	134
903		STA-2450	Elec & Comms	5	31-Oct-22	07-Nov-22	134
904							
905		C6700	Street Light Underground (Conduit and Founda	10	10-Aug-22	23-Aug-22	170
906		C6830	Street Light Raise Poles and Wire	10	30-Aug-22	13- Sep-22	166
907		C6840	ATMS Conduit & Boxes	10	31-Aug-22	14- Sep-22	161



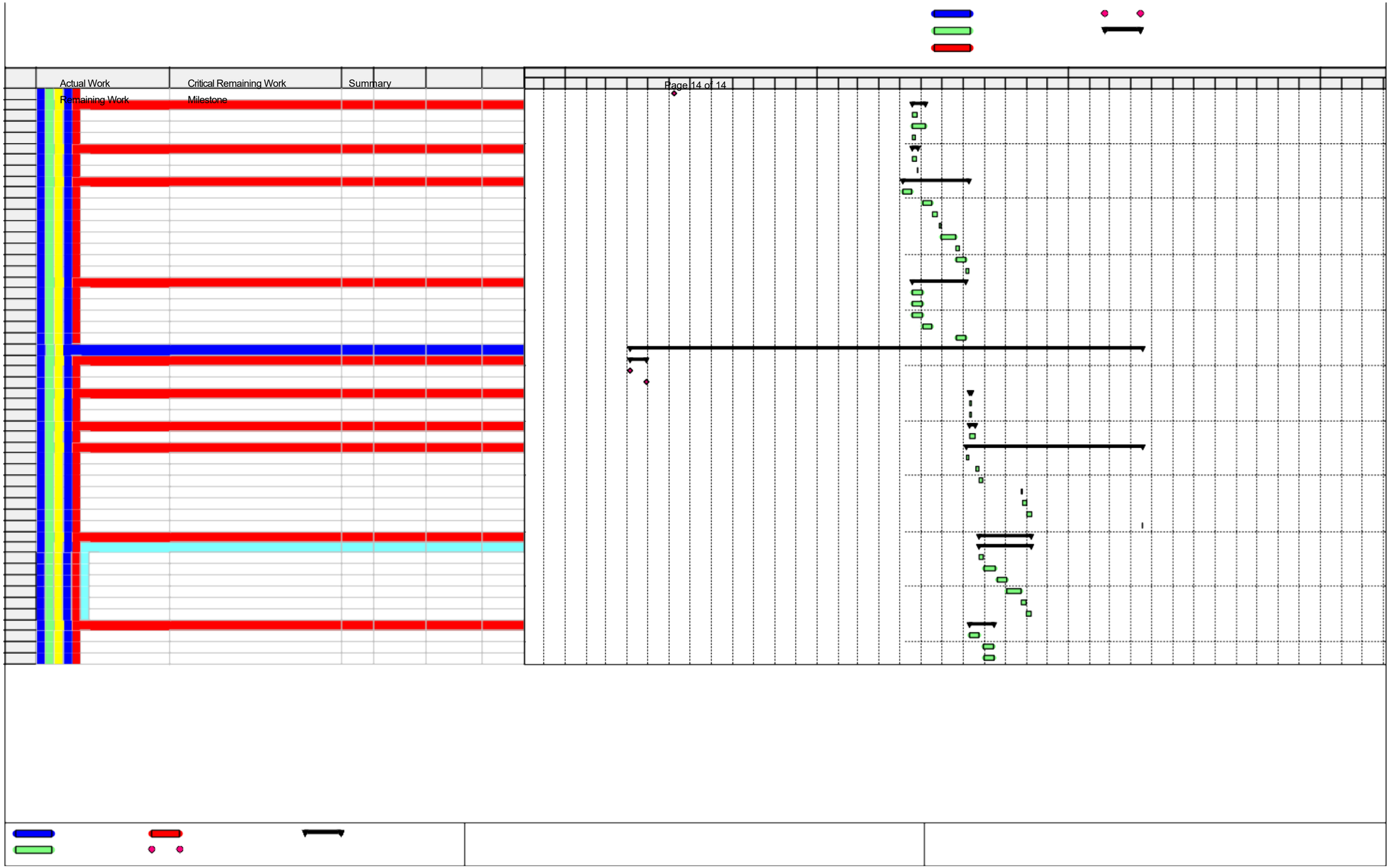

Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

Exhibit G

Incentive Fee Program

Contractor Incentive Fee Program
Ogden/WSU BRT Project
February 12, 2021

The following incentive fee program is proposed to encourage high levels of contractor performance in constructing and administering the Ogden/WSU BRT project.

The incentive pool totals $600,000 and is funded 50/50 by Stacy and Witbeck, Inc. (SWI) and Utah Transit Authority (UTA). SWI has the opportunity to win any amount of the incentive fund, based on the performance criteria and total scoring. Listed below are the major incentive categories, the maximum values, and the intended primary reviewers.

Category	Max Value	Reviewer(s)
1. Safety	$150,000	UTA, SWI, Ogden, UDOT, WSU
2. Quality	$150,000	UTA, SWI, Ogden, UDOT, WSU
3. Public and Stakeholder Relations	$150,000	UTA, SWI, Ogden, UDOT, WSU
4. Cost Containment/Schedule	$150,000	UTA, SWI, Ogden, UDOT, WSU

It is intended that selected individuals from each entity (collectively the Incentive Committee) review SWI performance against the program stated criteria on a quarterly basis. There will be 10 (generally quarterly) review periods, beginning with the second quarter of 2021 and ending with project completion – regardless of the duration of the final period. Applicable incentive payments will be processed quarterly as applicable.

The incentive fee rating evaluation factors will be rated on qualitative/descriptive (adjectival) method. Reference material and narratives will be provided to the panel to assist in scoring the performance for each period. The scoring will be communicated, and calculated in the following format.

- Exceptional 100%
- Exceptional - 92%
- Good + 83%
- Good 75%
- Good - 67%
- Acceptable + 58%
- Acceptable 50%
- Acceptable - 42%
- Needs Improvement + 33%
- Needs Improvement 25%
- Unacceptable 0%

In most major categories, subcategories are used to further define the criteria and performance. In all cases, the average of the subcategory scores equals the score for the major category.

EVALUATION CATEGORIES:

1. SAFETY:

Two subcategories will be used to score safety. First, a statistical score will be based on the recordable incident count for the period. Secondly, a subjective score will be developed based on the overall project culture, response, and general safety performance and attention. Both subcategories are equally weighted.

1A. Recordable Incident Rate
An OSHA recordable incident is any personal injury that is more severe than routine first aid. For example if stitches or prescription medication is required, it is a recordable incident. For the purpose of this incentive, a recordable incident count (not rate) for the period of less than 2 is considered exceptional. From two to four incidents is considered good. Four or five is considered acceptable, and above five needs improvement. Subcontractor activity is included. Any incident of Lost Time will automatically receive a rating of "needs improvement" for the quarter. Since the quarterly incident rate will have peaks and valleys, sometimes significant, panel participants may also consider the overall project recordable incident (to date) rate to influence this score, at their own discretion.

1B. Safety Culture
The score in this category is purely subjective. It is based on the overall perception by the stakeholders of SWI overall safety program performance. Contributing items might be such things as; reporting, response, injury prevention, outside audits, awareness programs, utility or equipment damage, etc. Incident reporting logs and other reference information will be provided in order to assist in this scoring.

2. QUALITY:
Three subcategories (evenly weighted) will be used to communicate and score quality performance; pre-planning, inspection, and correction.

2A. Pre-Planning
This category will focus on efforts to improve quality before the work starts. This would include technical submittals (timeliness and accuracy), pre-construction meetings (timeliness, consistency, content), and general knowledge of the work being contemplated. This score should reflect the general preparedness of the activities from a quality perspective. Since this category initiates the level of quality on the job the resulting number of (and severity of) any non-conformance reports will be realized here in this score. Any non-conformance report in the quarter will result in an automatic "needs improvement" rating. SWI's rework log and ratio (total rework cost per project manhour) could be used to season this score at the panel's discretion.

2B. Inspection, Identification, Monitoring
This category will score SWI's efforts to cover the work with qualified personnel; both quality and supervision that are active in identifying issues before, during, or even after work completes in order to communicate the issues across the project thereby avoiding or minimizing rework. Documentation and narrative can be provided that would provide the panel with insight on work coverage. A high frequency of quality control actions that avoid rework is considered exceptional.

2C. Problem Correction & Prevention
This category is focused on SWI efforts to swiftly inventory the problem, develop and gain approval for a corrective action plan, and resolve the open issue. A deficiency log with age status will be provided. Resolution of all items within two weeks is considered exceptional.

3. PUBLIC AND STAKEHOLDER RELATIONS:
The following criteria will be utilized to evaluate the public and stakeholder relations portion of the project, in four equally weighted subcategories:

3A. Public Relations/Public Information – To be evaluated against contract requirements or special needs and the timeframe of response/correction by SWI. Scoring evaluation includes any proactive measures done in advance to mitigate public concerns, or appropriate responses which might include further interaction with originator of the issue (i.e. communication), a change in construction methods, crew training, equipment methods, or any other satisfactory response to a particular issue. Quick

response is a basic requirement, whereas further modifications or adjustments may require a reasonable amount of time to implement. In some cases this may require administrative procedures (i.e. change order, permits, etc) but some form of response to mitigate the issue should be possible in the meantime. Each issue will have to be addressed individually to determine what the most appropriate action is to mitigate the problem and what a reasonable timeframe might be. Scoring will include performance of the contractor PIM personnel in communicating project information and responding to calls.

3B. Partnering
A joint consolidated report card (partnering survey) will be developed to evaluate the partnering process between the contractor, stakeholders, designers, and the UTA in resolving issues and disputes. This report card will be the basis for evaluating the rating of this category. Areas where disputes will be monitored include commercial terms, stakeholder issues, technical and specification issues, payment issues, quality issues and contractor management issues. The objective is to mitigate issues and to resolve any that arise quickly and effectively, and to contribute to a true teamwork environment where affiliations with a certain entity are blurred. Scoring is based on SWI's commitment to partnering and overall willingness to be flexible and proceed quickly to agreements, ultimately facilitating the work.

3C. Maintenance of Traffic / UDOT, Ogden City and WSU
This item will be tracked to determine effective handling of access issues for the traveling public on local streets and highways as well as existing UTA bus service that might be affected by construction. This scoring category should consider the interface with Utah Department of Transportation, Ogden City and Weber State University on traffic control approvals and implementation.

3D. Access Accommodation
The contractor continues to provide assistance to the UTA in the resolution of issues, scheduled and unplanned events that allow UTA to continue to maintain a strong positive opinion from the public affected by the project. This could include specific third party interface such as adjacent property owners, private utilities, and canal companies.

4. COST CONTAINMENT/SCHEDULE:
The cost containment/schedule category will be evaluated using the following four (evenly weighted) subcategories; response/early identification, contractor initiated changes and schedule performance. The contractor initiated changes category can be discussed quarterly, but payment will be deferred until project completion in order to collect all the necessary data to initiate payment.

4A. Response / Early Identification
UTA needs prompt and accurate response on many estimating related items such as value engineering proposals, proposed change orders, design revisions, and force account extensions in order to effectively manage project budget. This category scores SWI performance in responding accurately and timely to these items. Completing all items in this category within one month from obtaining all information to complete the item is considered exceptional.

Also, SWI can assist UTA overall budget efforts by promptly and appropriately identifying and communicating items that could have an impact on project cost. This could include such things as examining revised engineering drawings and other related documents, forwarding third-party requests, and generally being attentive to these items and communicating. A late (after the fact) indication or quantification of a significant cost impact is unacceptable.

4B. Contractor Initiated Changes
It is the intent of the Guaranteed Maximum Price format that change orders would generally be limited to scope changes by UTA, and that contractor initiated change orders for such things as delays,

inefficiencies, changed conditions, etc. be minimized or avoided.

4C. Schedule Performance
Schedule performance is broken into two, equally weighted areas; milestone schedule performance and four-week schedule management.

4.C.1. Milestone Schedule Performance: This section will be used to grade SWI ability to meet critical milestones that effect operations of the WSU campus, UDOT planned maintenance work on Washington and Harrison Boulevards, and scheduled annual events requiring access through the project corridor. For UTA, meeting the scheduled milestone dates for project construction, and the scheduled date for Substantial Completion that would allow for pre-revenue testing and the initiation of revenue service.

4.C.2. Four-week Schedule Management**:** This section will be used to grade SWI ability to provide accurate and timely information in their four-week schedule updates to provide the public information team, inspectors and stakeholders the information needed to plan their work and accurately inform the public.

APPROVAL AND PAYMENT OF INCENTIVE FEE

Final Approval of the Incentive Panel Evaluation

Within ten (10) working days, the UTA Executive Director will review the recommendations of the Incentive Committee, the final determination of the earned incentive fee as determined by the UTA and SWI members of the Incentive Committee, and any other pertinent information and will determine if the score of the earned Incentive Fee is acceptable. The Contractor will be notified in writing of the score within 15 working days after the UTA Executive Director receives the Incentive Committee's recommendations.

Payment of Incentive Fee

Pursuant to Contract Provisions the earned Incentive Fee shall be approved for payment upon the Incentive Fee Determination. The earned Incentive Fee will be included in the construction contract via change order and payment will be made with the subsequent Interim Payment.

Evaluation Criteria

The Contractor may make recommendations for changes for subsequent periods Evaluation subcriteria to the UTA Chief Service Development Officer. The decision of the UTA Chief Service Development Officer regarding adjustments to evaluation sub-criteria will be final and not subject to appeal or review.

Changes to the Incentive Fee evaluation criteria may be made without executing Change Order(s) or any other formal modification of the Contract. The Contractor will be notified in writing by the UTA Chief Service Development Officer of any changes in the evaluation criteria at least fifteen (15) calendar days prior to the start of each Incentive evaluation point in the process. If the Contractor is not provided with this notification, or if the notification is not provided within the number of days specified before the beginning of the next period, the existing evaluation criteria and Incentive Fee allocation will continue in effect for that period of the process.

Notification at a later date or alteration of evaluation criteria (including added criteria) after an evaluation has begun must be agreed to by both parties.

EXHIBIT H

ATTACHMENT A-1:

DISADVANTAGED BUSINESS ENTERPRISE PARTICIPATION FORM

DBE PROJECT GOAL: 7%

The Bidder / Proposer must check the appropriate box, provide the information requested, and sign this form certifying to the accuracy of the information provided, and submit this form with its bid. Failure to complete and submit this form may result in rejection of the bid/proposal as non-responsive. Race neutral procurements do not require good faith effort documentation.

☒ **Bidder / Proposer *will meet or exceed* the DBE goal for this contract**. If awarded this contract, Bidder / Proposer will subcontract with the DBEs listed below, which will be performing a total of $4,263,651 **percent (** 7 **%)** of the total dollar amount of the contract work.

Bidders/Proposers shall submit and attach evidence with this form that the DBEs being submitted for work on this project are presently certified by the Utah Uniform Certification Program (UUCP). The DBE Letters of Intent (Attachment A- 2) are included with this DBE Participation Form.

DBE Name & Address	Description of Work	$ Amount of Participation	% of Total Price
See Attached		$	%
		$	%
		$	%
		$	%

(Attach additional sheets if necessary)

☐ Bidder / Proposer ***does not*** meet the DBE goal for this contract. **Bidder / Proposer certifies that it has made good faith efforts** in accordance with the bid/proposal instructions to meet the DBE goal, but, despite those efforts, has been unable to meet the goal. The Good Faith Efforts Documentation Form (Attachment A-3) is attached to this DBE Participation Form. **Please list above ANY DBE participation your firm has committed to.**

☐ Bidder / Proposer ***does not*** meet the DBE goal for this contract. **Bidder / Proposer certifies that there exists no opportunity for subcontracting as part of this project**. It is the general practice of Bidder / Proposer's firm to perform all work of this nature solely with its own work force and to do otherwise would constitute a violation of industry standards. Attachment A-3, Good Faith Effort Documentation Form, is not required under this selection.

Date: 02/18/2021

Company Name: Stacy and Witbeck, Inc.

Signature: _____

Printed Name: Keith Tarkalson

Title: Area Manager

DBE Name	Address	Description of Work	$ Amount of Participation	% of Total Price
CONSTRUCTION TRUCKING INC	314 WEST 2400 SOUTH, BOUNTIFUL UT, 84010	Trucking	$ 3,171,183.00	5.2064%
D G & S CONSTRUCTION, INC.	P.O. BOX 730, WEST JORDAN UT, 84084	Rebar	$ 230,597.00	0.3786%
WASATCH FRONT FENCE	155 W. Central Ave. #B , Millcreek UT, 84107	Fencing	$ 52,396.00	0.0860%
JACKETTA SWEEPING SERVICE, INC.	2475 South 2570 West, PO BOX 25656 SL,	Street Sweeping	$ 250,000.00	0.4104%
REDCON, INC.	25 South Main Street #200, Centerville UT, 84014	Survey	$ 148,025.00	0.2430%
DG&S Via CVE	P.O. BOX 730, WEST JORDAN UT, 84084	Rebar	$ 76,450.00	0.1255%
COP Lower Tier DBEs			$ 135,000.00	0.2216%
Stapp Lower Tier DBE			$ 50,000.00	0.0821%
GMAC Lower Tier DBE			$ 150,000.00	0.2463%
		TOTAL	**$ 4,263,651.00**	**7.0000%**

ATTACHMENT A-3:

GOOD FAITH EFFORTS DOCUMENTATION FORM

Whether a Bidder / Proposer meets or does not meet the DBE goal, the Bidder / Proposer must submit this form with its DBE Participation Form (Attachment A-1). **In the case of a race neutral project, the Bidder / Proposer is not required to submit good faith efforts documentation.** The Bidder / Proposer must submit a copy of the document(s) sent to DBE's. Failure to submit this form with its bid/proposal and requested additional documentation may render the bid/proposal non-responsive. UTA's DBE Liaison Officer may require that the Bidder / Proposer provide additional substantiation of good faith efforts.

Firm Name	Contact Person	Area of Expertise	Date	Response
See Attached				

By submitting and signing this form, including any continuation form(s), the Bidder / Proposer certifies that it has contacted the identified DBE firms in good faith (per 49 CFR 26 Appendix A or see DBE Requirements, Terms and Conditions) to discuss contracting opportunities.

Date: February 18, 2021

Signature: _____

Printed Name: Keith Tarkalson

Title: Area Manager

FRIM NAME	CONTACT PERSON	AREA OF EXPERTISE	DATE	RESPONSE
BRINKERHOFF EXCAVATING AND CONSTRUCTION	Linda Brinkerhoff	E 19 - . Pipe Culverts, Drainage, Sewer & Water	10/12/2020	BIDDING
KW EXCAVATION, INC.	JANEICE WHITAKER	E 19 - . Pipe Culverts, Drainage, Sewer & Water	10/21/2020	BIDDING
B T GALLEGOS CONSTRUCTION, INC.	B. JARED GALLEGOS	E 19 - . Pipe Culverts, Drainage, Sewer & Water	11/19/2020	NOT BIDDING
JACOBSON EXCAVATION, LLC	Gaylene Jacobson	E 07 - . Excavation	11/19/2020	NOT BIDDING
JLS CONSTRUCTION ASSOCIATES, INC.	JACOB L. SMITH	E 19 - . Pipe Culverts, Drainage, Sewer & Water	11/19/2020	NOT BIDDING
NOLAND & SON CONSTRUCTION CO INC	Kathleen Noland-Dots	E 19 - . Pipe Culverts, Drainage, Sewer & Water	10/26/2020	NOT BIDDING
CONSTRUCTION MATERIAL RECYCLING, INC	STACY JONES	E 22 - . Paving - Rotomilling	10/14/2020	BIDDING
CONSTRUCTION TRUCKING INC	Katie Walton	H 01 - . Trucking (hauling)	11/19/2020	BIDDING
COWBOY RED TRANSPORT, LLC	Lisa Martinez	H 01 - . Trucking (hauling)	11/19/2020	BIDDING
BENSON CONSTRUCTION & TRUCKING	Joan Benson	H 01 - . Trucking (hauling)	10/20/2020	NO RESPONSE
FOWERS TRUCKING, LLC	Lisa Fowers	H 01 - . Trucking (hauling)	10/20/2020	NOT BIDDING
ROMERO CONSTRUCTION	ABELARDO ROMERO	E 01 - . Concrete - Curb, Gutter, Flatwork, Inlet Boxes, Etc.	12/17/2020	NO RESPONSE
COMERS CONCRETE LLC	Jessica Brownlow	E 01 - . Concrete - Curb, Gutter, Flatwork, Inlet Boxes, Etc.	10/15/2020	NOT BIDDING
MOUNTAIN WEST PRECAST	STEPHANIE LOUD	E 01 - . Concrete - Curb, Gutter, Flatwork, Inlet Boxes, Etc.	12/17/2021	NOT BIDDING
ALL STAR STRIPING LLC.	Lauren Rogers	E 15 - . Painting - Highway Striping & Painted Messages	11/10/2020	NO RESPONSE
ALL STAR STRIPING LLC.	Lauren Rogers	E 24 - . Signs - Permanent Signs	10/29/2020	NOT BIDDING
STRAIGHT STRIPE PAINTING INC	Karen J. Cheever	E 15 - . Painting - Highway Striping & Painted Messages	11/10/2020	NO RESPONSE
STRAIGHT STRIPE PAINTING INC	Karen J. Cheever	E 24 - . Signs - Permanent Signs	11/10/2020	NO RESPONSE
D G & S CONSTRUCTION, INC.	GLORIA BARELA	E 25 - . Steel - Reinforcing	11/19/2020	BIDDING
MOUNTAIN WEST PRECAST	STEPHANIE LOUD	S 01 - . Suppliers	12/1/2020	BIDDING
WASATCH FRONT FENCE	ANTHONY SALAZAR	E 08 - . Fencing	12/15/2020	BIDDING
NAKAI CONSTRUCTION AND LANDSCAPING	Rosemary N. Giles	E 08 - . Fencing	12/16/2020	BIDDING
TIMP SPRINKLER	GLEN FISO	E 11 - . Landscaping & Erosion Control	12/17/2020	BIDDING
A C E LANDSCAPE	Alan Jay Christensen	E 11 - . Landscaping & Erosion Control	12/30/2020	NOT BIDDING
NAKAI CONSTRUCTION AND LANDSCAPING	Rosemary N. Giles	E 11 - . Landscaping & Erosion Control	12/16/2020	NOT BIDDING
ROMERO CONSTRUCTION	ABELARDO ROMERO	E 11 - . Landscaping & Erosion Control	10/21/2020	NOT BIDDING
CHICK OF ALL TRADES	Valerie Solorzano	E 28 - . Traffic Control - Maintainer/Flagging/Airport Gate Guard	11/3/2020	BIDDING
AAA BARRICADE COMPANY, LLC.	Sara Ofahengaue	E 28 - . Traffic Control - Maintainer/Flagging/Airport Gate Guard	11/19/2020	BIDDING
WORKZONE TRAFFIC SAFETY	Heidi Maclellan	E 28 - . Traffic Control - Maintainer/Flagging/Airport Gate Guard	12/21/2020	BIDDING
AMERICAN TRAFFIC SERVICE, LLC	SANDRA D KELTNER	E 28 - . Traffic Control - Maintainer/Flagging/Airport Gate Guard	10/28/2020	NOT BIDDING
CC ENTERPRISES TRAFFIC CONTROL, INC	CINDY YORK	E 28 - . Traffic Control - Maintainer/Flagging/Airport Gate Guard	10/28/2020	NOT BIDDING
EXPRESS ENVIRONMENTAL SERVICES, LLC	ALFREDO GALLEGOS	E 11 - . Landscaping & Erosion Control	10/19/2020	NO RESPONSE
JACKETTA SWEEPING SERVICE, INC.	Debbie J.Dunham	E 13 - . Construction - Miscellaneous & Incidental	10/15/2020	BIDDING
GEOSTRATA, LLC	Hiram Alba	F 07 - . Construction - Proj Mgmt, Quality Control, Public Info, facilitation.	11/16/2020	BIDDING
REDCON, INC.	Lance Hori	E 27 - . Surveying	10/28/2020	BIDDING

MEMORANDUM TO THE BOARD

TO: Utah Transit Authority Board of Trustees
THROUGH: Carolyn Gonot, Executive Director
FROM: Eddy Cumins, Chief Operating Officer
PRESENTER(S): Eddy Cumins, Chief Operating Officer
David Hancock, Director of Engineering and Maintenance Support

BOARD MEETING DATE: March 10, 2021

SUBJECT:	**On-Call Infrastructure Contract - Task Order #01 Project Management/Construction Management (PM/CM) Fees (Stacy and Witbeck, Inc)**
AGENDA ITEM TYPE:	**Expense Contract Change Order**
RECOMMENDATION:	Approve task order to on-call infrastructure contract and authorize Executive Director to execute contract and associated disbursements with Stacy and Witbeck, Inc. to pay 2021 construction management fees.
BACKGROUND:	UTA recently executed an On-Call Infrastructure Contract with Stacy and Witbeck for the years 2021-2023 with a possibility to go two additional years at UTA's discretion. As part of the contract, UTA retains the services of a Project Manager and Track Superintendent full time. Specific services provided include: • Field evaluations for upcoming task orders • Providing bid estimates for project proposals • Managing construction projects • Coordinating resources for emergency response This task order authorizes UTA to pay the construction management fees for the 2021 calendar year.
DISCUSSION:	UTA Staff is requesting approval of task order #1 with Stacy and Witbeck, Inc. to pay the cost for the Project Manager & Track Superintendent on retainer for the duration of the calendar year in accordance with the executed contract. Invoices will be submitted monthly for actual hours worked on task orders, not to exceed 40 hours per week.
CONTRACT SUMMARY:	Contractor Name: Stacy and Witbeck Inc.
	Contract Number: 20-03349 — Existing Contract Value: $0

	Base Contract Effective Dates: January 1, 2021 through December 31, 2023	Extended Contract Dates: N/A
	Amendment Amount: $504,160	New/Total Amount Contract Value: $504,160
	Procurement Method: RFP best value modification	Funding Sources: SGR and Capital Projects 2021 Budget
ALTERNATIVES:	N/A	
FISCAL IMPACT:	This budget is included in the 2021 Capital Program.	
ATTACHMENTS:	1) Contract	

TASK ORDER NO. 01

TASK ORDER NAME: 2021 Pre-construction and Construction Management Fees

PROJECT CODE: SGR405; Various account numbers

This is Task Order No. 01 to the On Call Maintenance Contract entered into by and between Utah Transit Authority (UTA) and Stacy and Witbeck, Inc. (Contractor) as of February 2nd, 2021.

This Task Order is part of the On Call Maintenance Contract and is governed by the terms thereof.

The purpose of this Task Order is to specifically define the scope, schedule, lump sum price, and other terms applicable to the work identified herein.

UTA and Contractor hereby agree as follows:

1.0 SCOPE OF SERVICES

The scope of work for the Task Order #01 is hereby attached and incorporated into this Task Order.

2.0 SCHEDULE

The Substantial Completion Date for this Task is December 31st, 2021. The Final Acceptance Date for this Task is December 31st, 2021.

3.0 LUMP SUM PRICE

The price for this task order is a not to exceed $504,160.00. Invoices will be billed on monthly basis for work completed to date.

Exhibit B – Pricing

A. Pre-Construction and Construction Management Fees:

List in the table below the fully loaded hourly rate for the proposed PM and IS for each year of the Contract. In lieu of proposing a defined rate for later years, Proposers may propose a method or process for determining the rate for later years (e.g., an escalation factor or index).

	Contract Year One	Contract Year Two	Contract Year Three	Option Year One	Option Year Two
Infrastructure Project Manager	$115.00	$120.00	$125.50	$131.00	$137.00
Infrastructure Superintendent	$138.00	$144.00	$150.50	$157.25	$164.50

Payment will be based on actual hours expended (except that no more than 8 hours per day will be charged regardless of the hours worked on that day, nor more than 40 hours per week will be charged, regardless of the hours worked that week), plus appropriate and authorized direct expenses. UTA anticipates needing the IPM and IS on a full-time basis, but that is not guaranteed.

4.0 APPLICABILITY OF FEDERAL CLAUSES

This Task Order does ☐ does not ☒ [Check Applicable] include federal assistance funds which requires the application of the Federal Clauses appended as Exhibit D to the On Call Maintenance Contract.

IN WITNESS WHEREOF, this Task Order has been executed by UTA and the Contractor or its appointed representative

UTAH TRANSIT AUTHORITY:

By: _____
Carolyn M Gonot, Executive Director Date
> $100,000

By: _____
D. Eddy Cumins, Chief Operating Officer Date
< 100,000

By: _____
David Hancock, Director of Asset Mgt. Date
< $50,000

By: _____
Jared Scarbrough, Project Manager Date
< $10,000

Michael L. Bell Digitally signed by Michael L. Bell Date: 2021.03.01 16:39:30 -07'00'
Legal Review

_____
Procurement Review

STACY AND WITBECK, INC.:

By: _____

Date: _____

UTAH TRANSIT AUTHORITY

UTA

Date 12-February-2021

SGR406 On-Call Infrastructure Task #1- Pre-construction and Construction Management Fees
Scope of Work
Contract: 20-03349VW

To whom it may concern,

Utah Transit Authority (UTA) has an On-Call Maintenance and Professional Services Contract with Stacy and Witbeck Inc., contract 20-03349VW. This document describes the scope of work that is being requested for the following task within the contract:

- Pre-construction and Construction Management Fees

This is Task # 1 under this contract.

This task included the time for two full-time contractor support persons as described in the RFP for this contract. This includes the following staff:

- Infrastructure Project Manager (PM)
  - Manages contract, tasks, schedules, budget, cost estimating, contractor resource management and scheduling, and other Project Manager duties as required by this contract
  - **Rate (with contractor fee and insurance): $115.00**
- Infrastructure Superintendent
  - Support the PM, acts as subject matter expert for track construction and general construction activities. Manages contractors field personnel and task order coordination with UTA operations.
  - **Rate (with contractor fee and insurance): $138.00**

For Contract year 2020, the hours will be accrued from February 1, 2021 until Dec. 31, 2021. **The total estimate for this task is $504,160**.

Please contact Kyle Stockley via email at kstockley@rideuta.com if you have any questions.

Sincerely,

DocuSigned by:
Kyle Stockley
40657239372242E...

(Signature)

Kyle Stockley
Rail Infrastructure Project Manager
Utah Transit Authority

MEMORANDUM TO THE BOARD

TO: Utah Transit Authority Board of Trustees
THROUGH: Carolyn Gonot, Executive Director
FROM: Eddy Cumins, Chief Operating Officer
PRESENTER(S): Eddy Cumins, Chief Operating Officer
David Hancock, Director of Engineering and Maintenance Support

BOARD MEETING DATE: March 10, 2021

SUBJECT:	**On-Call Infrastructure Contract - Task Order #03 Stadium and Mario Capecchi Rail Procurement for Curve Replacements (Stacy and Witbeck, Inc)**	
AGENDA ITEM TYPE:	**Expense Contract Change Order**	
RECOMMENDATION:	Approve task order to on-call infrastructure contract and authorize Executive Director to execute contract and associated disbursements with Stacy and Witbeck, Inc. to procure six curves for replacement this summer on the University TRAX extension.	
BACKGROUND:	UTA recently executed an On-Call Infrastructure Contract with Stacy and Witbeck for the years 2021-2023 with a possibility to go two additional years at UTA's discretion. As part of the planned activities this year, UTA desires to replace six curved track areas at Stadium station and Mario Capecchi Drive. The curves are approaching the end of the useful life expectancy and require replacement.	
DISCUSSION:	UTA Staff is requesting approval of task order #3 with Stacy and Witbeck, Inc. to procure six curves for replacement this summer on the University TRAX extension. Pre-curved rail materials are long lead items and will take approximately six months to arrive. Materials need to be ordered as soon as possible to ensure arrival prior to curve replacement. The new curves will be installed on both sides of the Stadium station (4 total) and at the curve at South Campus Drive and Mario Capecchi Drive (2 total). These curves typically have a useful life of 20 years given current conditions.	
CONTRACT SUMMARY:	Contractor Name: Stacy and Witbeck Inc.	
	Contract Number: 20-03349	Existing Contract Value: $696,499
	Base Contract Effective Dates: January 1, 2021 through December 31, 2023	Extended Contract Dates: N/A

	Amendment Amount: $461,091	New/Total Amount Contract Value: $1,157,590
	Procurement Method: RFP best value modification	Funding Sources: SGR and Capital Projects 2021 Budget
ALTERNATIVES:	Delay replacement of curves	
FISCAL IMPACT:	This budget is included in the 2021 Capital Program.	
ATTACHMENTS:	1) Contract	

TASK ORDER NO. 03

TASK ORDER NAME: Stadium & Mario Capecchi Curve Procurement

PROJECT CODE: SGR385 40-7385.68912

This is Task Order No. 03 to the On Call Maintenance Contract entered into by and between Utah Transit Authority (UTA) and Stacy and Witbeck, Inc. (Contractor) as of February 2nd, 2021.

This Task Order is part of the On Call Maintenance Contract and is governed by the terms thereof.

The purpose of this Task Order is to specifically define the scope, schedule, lump sum price, and other terms applicable to the work identified herein.

UTA and Contractor hereby agree as follows:

1.0 SCOPE OF SERVICES

The scope of work for the Task Order #03 is hereby attached and incorporated into this Task Order.

2.0 SCHEDULE

The Substantial Completion Date for this Task is December 31st, 2021. The Final Acceptance Date for this Task is December 31st, 2021.

3.0 LUMP SUM PRICE

The price for this task order is a not to exceed $461,091.00. Invoices will be billed on monthly basis for work completed to date.

4.0 APPLICABILITY OF FEDERAL CLAUSES

This Task Order does ☐ does not ☒ [Check Applicable] include federal assistance funds which requires the application of the Federal Clauses appended as Exhibit D to the On Call Maintenance Contract.

IN WITNESS WHEREOF, this Task Order has been executed by UTA and the Contractor or its appointed representative

UTAH TRANSIT AUTHORITY:

By: _____
Carolyn M Gonot, Executive Director Date
> $100,000

By: _____
D. Eddy Cumins, Chief Operating Officer Date
< 100,000

By: _____
David Hancock, Director of Asset Mgt. Date
< $50,000

By: _____
Jared Scarbrough, Project Manager Date
< $10,000

Michael L. Bell Digitally signed by Michael L. Bell Date: 2021.03.01 16:42:31 -07'00'
Legal Review

_____
Procurement Review

STACY AND WITBECK, INC.:

By: _____

Date: _____

Stacy and Witbeck

January 20, 2021 OCS

Mr. Dave Hancock, PE
Utah Transit Authority
2264 South 900 West
Salt Lake City, UT 84119

Reference: On-Call Transit Infrastructure Construction, Maintenance and Repair

Subject: 21-601 - Stadium and Mario Capecchi Curve Procurement

Dear Dave:

We are pleased to provide pricing to procure the pre-curved rail and restraining rail required to replace the curves on both sides of the Stadium Platform on the Red Line, and the Mario Capecchi curves, also on the Red Line.

Exclusions:

- Davis Bacon Wages
- Quality Control Testing and Supervision
- Railroad Flagging, EIC, or Maintainers
- Sales Tax on Permanent Materials

Clarifications:

- Please see detailed list of each bid item below
- The unit costs for each bid item includes the costs of insurance, bond, and risk at the agreed upon rates.
- The scope of work is inclusive of only the items and scope that are listed below. Any other items of work or changes to the below scope will need to be repriced.

Summary of Costs and Scope for each item:

Bid Item 1000 – Field Engineering & Project Controls - 1.00 LS - Total of $1,542.00 - This bid item includes Stacy and Witbeck field support from field engineer to manage construction, and portable toilets. This item also includes office manager time for payroll and accounts payable and estimating time.

Bid Item 2000 – Safety Program & Administration - 1.00 LS - Total of $437.00 - This bid item includes cost of safety officer, safety officer pickup and cell phone, and safety supplies and drug tests.

1958 West North Temple St.
Salt Lake City, UT 84116
t: 801-666-7840 f: 801-432-7489

Stacy and Witbeck

Bid Item 20000 – Pre-Curved Rail Procurement - 1.00 LS - Total of $419,200.00 - This bid item includes cost to purchase the pre-curved rail and restraining rail, cost for crews to unload curves as they are delivered, and materials to store the rail until time of installation.

Bid Item 25000 – Laydown Inspections of Special Trackwork - 1.00 LS - Total of $7,743.00 - This bid item includes the cost of flights to curve manufacturer's plant, as well as meals, rental car, and hotel. Also includes wages for SWI personnel while on inspection trip

Bid Item 100000 - Fee (7.5%) - 1.00 LS - Total of $32,169.00 - This is the agreed to CMGC fee that is part of the new On Call Services Contract on the above bid items.

The total price for this scope of work is **$461,091.00.**

Please contact me with questions or concerns.

Sincerely,
Stacy and Witbeck, Inc.

Collin Christensen
Project Manager

1958 West North Temple St.
Salt Lake City, UT 84116
t: 801-666-7840 f: 801-432-7489

01/20/2021 14:09
21-601 Stadium & M.Capecchi Curve Procurement
*** Collin Christensen, CC **BID TOTALS**

Biditem	Description	Quantity	Units	Unit Price	Bid Total
1000	Field Engineering & Project Controls	1.000	LS	1,542.00	1,542.00
2000	Safety Program & Administration	1.000	LS	437.00	437.00
20000	Pre-curved Rail Procurement	1.000	LS	419,200.00	419,200.00
25000	Laydown Inspections of Special Trackwork	1.000	LS	7,743.00	7,743.00
		Subtotal			$428,922.00
100000	Fee (7.5%)	1.000	LS	32,169.00	32,169.00
		Bid Total	========>		$461,091.00

Progress Rail
A Caterpillar Company

Company Address 1600 Progress Dr.
Albertville, Alabama 35950
United States

Quote Information

Quote Number	00059085	Prepared By	Patrick Juelich
Opportunity Name	UTA Curve Quote - Stadium and Mario Capecchi	Email	pjuelich@progressrail.com
Created Date	1/19/2021		
Account	Stacy and Witbeck		
Contact Name	Collin Christensen		
Phone	(510) 748-1870		
Email	cchristensen@stacywitbeck.com		

Quote Line Items

QTY	U/M	Line Description	Alt. Price	Sales Price	Total Price
2,767.00	LF	PRE-CVD 115RE RUNNING RAIL	USD 0.00	USD 60.00	USD 166,020.00
1,417.00	LF	115RE RESTRAINING RAIL WITH 4" SEP BLOCKS & 2'-0" REST. JT	USD 0.00	USD 138.00	USD 195,546.00
12.00	EA	12" 115RE SOLID FLARED END BLOCK ASSY	USD 0.00	USD 538.00	USD 6,456.00

Grand Total USD 368,022.00

Shipping Information and Notes

Shipping Info. Delivered by truck to Salt Lake City, UT.

* Pricing does not include for any increases due to tariffs on steel and aluminum imports imposed by the US Government. These will be assessed if tariffs are applied and prices adjusted accordingly.

Terms and Conditions

FOB Origin – Prepay

Payment Terms Net 30

Remarks
- Sales tax is not included.
- Pricing and Deliveries are subject to change at the time of order placement.
- Quote is based upon the above quantity and specifications. Any changes may affect pricing.
- Freight rates are based on time of quotation and are subject to change at time of order placement and at time of shipment.
- Acceptance of an order is governed by the Progress Rail Services Sales Order Terms And Conditions which are attached to this quote.

Quote Acceptance Information

Signature: _____ **Title:** _____

Name: _____ **Date:** _____

Terms and Conditions

Effective as of July 1, 2014

voestalpine Railway Systems Nortrak Inc.

1740 Pacific Ave.
Cheyenne WY 82007
T. 206-255-4134
www.voestalpine.com/nortrak

Date: January 11, 2021
Customer: Stacy & Witbeck
Contact: Collin Christensen
Email: cchristensen@stacywitbeck.com
Phone: (801) 420-1708
Quote No: LF2021-050
Project: UTA Curves

Sales Contact: Linnea Frary
Email: Linnea.Frary@voestalpine.com
Phone: 206-255-4134

Dear Collin,
Please find below the quoted price for the curves for UTA.

Qty	Description	Unit Price	Ext Price
	Total Pre-curve Rail: 2766.56 LF/Total RR 1416.28 LF		
1 Each	Curve C144 – Curve length 161.85	$53,878.00	$53,878.00
1 Each	Curve C145 – Curve length 113.25	$41,960.00	$41,960.00
1 Each	Curve C245 – Curve length 162.61	$54,063.00	$54,063.00
1 Each	Curve C246 – Curve length 114.28	$39,313.00	$39,313.00
1 Each	Curve C146 – Curve length 192.65	$64,547.00	$64,547.00
1 Each	Curve C247 – Curve length 191.08	$64,189.00	$64,189.00
1 Each	Curve C157 – Curve length 168.28	$58,597.00	$58,597.00
1 Each	Curve C260 – Curve length 168.28	$58,597.00	$58,597.00

CONDITIONS OF ACCEPTANCE:

1. **Quotation Term:**
   - 1.1 Pricing given in this quotation is firm for 60 days.
   - 1.2 Quote is based on the attached Terms & Conditions
   - 1.3 Pricing is based on scope of work being ordered. If quantities or items change then price and lead time are subject to change.
   - 1.4 Price does not include the cost of a supply bond. If a supply bond is needed then we can obtain one at the expense of the customer. We do not issue payment bonds.

2. **Payment Terms:**
   - 2.1 Net 30 days from receipt of Invoice. Subject to credit approval at time of order.

3. **Taxes:**
   - 3.1 Price quoted **does not** include any taxes, but can be added at time of invoicing at the current rate.

4. **Delivery:**
   - 4.1 Provided an order is placed by 2/1/21 and submittals are returned within 21 days of submission, we can deliver in 7 months of receipt of order.
   - 4.2 Final delivery will be confirmed at time order is received.

MEMORANDUM TO THE BOARD

TO: Utah Transit Authority Board of Trustees
THROUGH: Carolyn Gonot, Executive Director
FROM: Nichol Bourdeaux, Chief Planning and Engagement Officer
PRESENTER(S): Megan Waters, Community Engagement Manager
Monica Morton, Fares Director

BOARD MEETING DATE: March 10, 2021

SUBJECT:	**Free Fare for COVID-19 Vaccinations**
AGENDA ITEM TYPE:	**Fare Approval**
RECOMMENDATION:	Approve the complimentary fare to implement free fare for customers taking transit to access COVID-19 vaccinations.
BACKGROUND:	To support our community in accessing the COVID-19 vaccination, UTA, working with the counties in UTA's service area, would like to offer free fare for customers taking transit to obtain a COVID-19 vaccine. Offering free fare will increase transit access to support logistical challenges, including parking and mobility, presented by mass vaccination clinics. There is precedence for this initiative as other transit agencies across the country have adopted similar processes to increase vaccination rates. This effort would support public health and community safety, including on our system, by increasing access to vaccinations. Added benefits include improved partnerships, increased ridership, less cars/parking issues, and improved mobility for vaccination sites.
DISCUSSION:	UTA will coordinate with local health departments in the implementation of this program, providing an easily accessible free fare voucher through vaccination appointment confirmation. All modes, including paratransit, will be included in this access initiative throughout our service area. Staff plans to offer the program through June 30, 2021 and will follow the State of Utah's Department of Health's vaccination rollout plan. If the timeframe is longer, we will extend the promotion based on Board concurrence.
ALTERNATIVES:	Not offer free fare for vaccination access.
FISCAL IMPACT:	The fiscal impact will be presented at the March 10, 2021 Board meeting