SITE PLAN REVIEW SHEET ENVIRONMENTAL VARIANCE REQUEST ONLY

CASE: SP-2021-0178C

ZAP COMMISSION DATE: dd/mm/yyyy

AREA: 16 acres

JURISDICTION: Full Purpose

PROJECT NAME: Stillwater - Double Creek Phase 2

APPLICANT: Lance Rosenfield, Michael Whellan AGENT:

ADDRESS OF SITE: 10801 BREZZA LANE, AUSTIN, Texas, 78748

COUNTY: Travis

WATERSHED: Onion Creek, Suburban

EXISTING ZONING: CS-MU-CO

PROPOSED DEVELOPMENT: 371-unit Multifamily

DESCRIPTION OF VARIANCE:

The applicant requests the following:

1. Request to vary from LDC 25-8-261 to develop in a critical water quality zone.

STAFF RECOMMENDATION:

Staff recommends that the required findings of fact have been met.

ENVIRONMENTAL BOARD ACTION:

11/21/2021: The Environmental Board voted in (X) favor, () against, () absentia

ZONING AND PLATTING COMMISSION ACTION:

ENVIRONMENTAL REVIEW STAFF: Mel Fuechec

PHONE: 512-974-3036

CASE MANAGER: Clarissa Davis

PHONE: 512-974-1423



ENVIRONMENTAL COMMISSION MOTION 20211117 003a

Date: November 17, 2021

Subject: Stillwater - Double Creek Phase 2, SP-2021-0178C

Motion by: Kevin Ramberg

Seconded by: Perry Bedford

RATIONALE:

WHEREAS, the Environmental Commission recognizes the applicant is requesting a variance from 25-8-261 to allow development in the Critical Water Quality Zone.

WHEREAS, the Environmental Commission recognizes the site is located in the Onion Creek, Suburban Watershed and Desired Development Zone; and

WHEREAS, the Environmental Commission recognizes that Staff recommends this variance, (with two staff conditions) having determined the required Findings of Fact have been met.

THEREFORE, the Environmental Commission recommends the variance request with the following:

Staff Conditions:

- 1. Internal low-traffic pedestrian walkways throughout the site shall be constructed with permeable pavers or porous pavement in accordance with the Environmental Criteria Manual, to decrease overall impervious cover and increase stormwater infiltration onsite and baseflow in the stream channel.
- 2. The critical water quality zone will be crossed with a span bridge design instead of the normal box culvert. This will allow for light to penetrate to the natural ground surface and for vegetation to grow thus maintaining a more natural stream channel.

and the following Environmental Commission Conditions:

- 1. The project will use biofiltration in both water quality ponds onsite.
- 2. The pond will not occur in the inner half critical water quality zone.

VOTE 8-0

For: Bedford, Qureshi, Thompson, Barrett Bixler, Bristol, Ramberg, Guerrero, and Brimer Against: None

B-8

Recuse: None Absent: Scott

Approved By:

hinde to guerrero

Linda Guerrero, Environmental Commission Chair



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WHEREAS, the Environmental Commission recognizes that Staff recommends this variance, (with two staff conditions) having determined the required Findings of Fact have been met.

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VOTE 8-0

For: Bedford, Qureshi, Thompson, Barrett Bixler, Bristol, Ramberg, Guerrero, and Brimer Against: None

B-8

5 of 34

Abstain: None Recuse: None Absent: Scott

Approved By:

hindett guerrero

Linda Guerrero, Environmental Commission Chair



ITEM FOR ENVIRONMENTAL COMMISSION AGENDA

COMMISSION MEETING DATE:	11/17/2021				
NAME & NUMBER OF PROJECT:	Stillwater - Double Creek Phase 2 SP-2021-0178C				
NAME OF APPLICANT OR ORGANIZATION:	Lance Rosenfield, Malone Wheeler Inc				
LOCATION:	10801 Brezza Lane, Austin, Texas, 78748				
COUNCIL DISTRICT:	District 5				
ENVIRONMENTAL REVIEW STAFF:	Mel Fuechec, Environmental Review Specialist Senior, DSD - Land Use Review, 512-974-3036, mel.fuechec@austintexas.gov				
WATERSHED:	Onion Creek, Suburban, Desired Development Zone				
REQUEST:	Variance request is as follows: Request to vary from LDC 25-8-261 to allow development in the critical water quality zone.				
STAFF Recommendation:	Staff recommends this variance, having determined the findings of fact to have been met.				
STAFF CONDITION:	 Internal low-traffic pedestrian walkways throughout the site shall be constructed with permeable pavers or porous pavement in accordance with the Environmental Criteria Manual, to decrease overall impervious cover and increase stormwater infiltration onsite and baseflow in the stream channel. The critical water quality zone will be crossed with a span bridge design instead of the normal box culvert. This will allow for light to penetrate to the natural ground surface and for vegetation to grow thus maintaining a more natural stream channel. 				



Development Services Department Staff Recommendations Concerning Required Findings

Project Name:	Stillwater-Double Creek Phase 2 SP-2021-0178C 10801 Brezza Ln
Ordinance Standard:	Watershed Protection Ordinance
Variance Request:	Request to vary from LDC 25-8-261 to allow development in the critical water quality zone.

- A. Land Use Commission variance determinations from Chapter 25-8-41 of the City Code:
 - 1. The requirement will deprive the applicant of a privilege or the safety of property given to owners of other similarly situated property with approximately contemporaneous development;

<u>Yes</u> The lot is zoned Commercial-Mixed Use, CS-MU-CO as are most of the surrounding lots. A similar existing multifamily development built in 2017 is located directly North of the Stillwater – Double Creek Phase 2 project lot. Without a variance to LDC-25-8-261, the applicant is deprived a privilege to develop this property given to the owners of similarly situated property with approximately contemporaneous development.

- 2. The variance:
 - *a*. Is not based on a condition caused by the method chosen by the applicant to develop the property, unless the development method provides greater overall environmental protection than is achievable without the variance;
 - Yes The variance is necessitated by fire department ingress/egress requirements set forth in the International Fire Code and Wildland-Urban Interface. Two points of emergency ingress and egress are required, and AFD will not accept both to be on Brezza Lane which is currently a dead-end street. There is no other option for a second point of ingress/egress.
 - *b.* Is the minimum change necessary to avoid the deprivation of a privilege given to other property owners and to allow a reasonable use of the property; and
 - **Yes** As mentioned above, the variance is necessitated by the fire department requirement of having two points of emergency ingress/egress, which will be a bridge crossing and is considered a minimum deviation from the code.
 - c. Does not create a significant probability of harmful environmental consequences; and

- **Yes** The proposed improvements related to the variance do not create a significant probability of harmful environmental consequences. The CWQZ will be crossed by a span bridge design instead of the normal box culvert. This will allow for light to penetrate to the natural ground surface and for vegetation to grow thus maintaining a more natural stream channel.
- 3. Development with the variance will result in water quality that is at least equal to the water quality achievable without the variance.
 - **Yes** The variance will not decrease the overall water quality associated with the development. The plans will be fully code compliant for water quality treatment. The impervious cover limit in suburban watersheds is 60%; this project is proposing impervious cover of approximately 44%. Internal, low-traffic pedestrian paths will be constructed with permeable material to increase stormwater infiltration and baseflow in the stream channel. Developed runoff will be treated by the proposed onsite water quality ponds.
- The Land Use Commission may grant a variance from a requirement of Article 7, Division 1 (*Critical Water Quality Zone Restrictions*), after determining that:
- B. Additional Land Use Commission variance determinations for a requirement of Article 7, Division 1 (Critical Water Quality Zone Restrictions):
 - 1. The criteria for granting a variance in Subsection (A) are met;

Yes / No All criteria in Subsection A are met.

- 2. The requirement for which a variance is requested prevents a reasonable, economic use of the entire property;
 - Yes / No The proposed development is consistent with the applicable zoning and surrounding properties. Austin Fire Department requires two ingress/egress locations. Brezza Lane is not acceptable for both as it is a dead-end road with no immediate plans to be extended. The North end of the site is dense trees and is proposed to be preserved as parkland. No joint use access agreement with a neighboring property for ingress/egress through to I35 is feasible.
- 3. The variance is the minimum deviation from the code requirement necessary to allow a reasonable, economic use of the entire property.
 - Yes / No The variance is necessitated by the fire department requirement of having two points of emergency ingress/egress. The emergency ingress/egress proposed across the CWQZ will be a bridge crossing and is considered a minimum deviation from the code.

<u>Staff Determination:</u> Staff determines that the findings of fact have been met. Staff recommends the following conditions:

1) Internal low-traffic pedestrian walkways throughout the site shall be constructed with permeable pavers or porous pavement in accordance with the Environmental Criteria Manual,

to decrease overall impervious cover and increase stormwater infiltration onsite and baseflow in the stream channel.

2) The critical water quality zone will be crossed with a span bridge design instead of the normal box culvert. This will allow for light to penetrate to the natural ground surface and for vegetation to grow thus maintaining a more natural stream channel.

Environmental Reviewer (DSD)	Mel Faechec Mel Fuechec	Date:10/21/2021
Environmental Review Manager (DSD)	<u>Mike McDougal</u> (print name)	Date: <u>11-4-2021</u>
Wetland Biologist / Hydrogeologist Reviewer (WPD)	(print name)	Date
Deputy Environmental Officer (WPD)	Liz Johnston (print name)	Date <u>11/05/2021</u>



ENVIRONMENTAL COMMISSION VARIANCE APPLICATION FORM

PROJECT DESCRIPTION Applicant Contact Information

Name of Applicant	Malone Wheeler Inc (Lance Rosenfield)
Street Address	5113 SOUTHWEST PKWY, STE 260
City State ZIP Code	AUSTIN TX 78735
Work Phone	512-899-0601
E-Mail Address	lancer@malonewheeler.com
Variance Case Informat	ion
Case Name	Stillwater - Double Creek Phase 2
Case Number	SP-2021-0178C
Address or Location	10801 BREZZA LN
Environmental Reviewer Name	Mel Fuechec
Environmental Resource Management Reviewer Name	Andrew Clamann
Applicable Ordinance	§ 25-8-261 - CRITICAL WATER QUALITY ZONE DEVELOPMENT.
Watershed Name	Onion Creek
Watershed Classification	UrbanX SuburbanWater Supply SuburbanWater Supply RuralBarton Springs Zone

City of Austin | Environmental Commission Variance Application Guide 1

Edwards Aquifer Recharge Zone	 Barton Springs Segment Northern Edwards Segment X Not in Edwards Aquifer Zones
Edwards Aquifer Contributing Zone	□ Yes X No
Distance to Nearest Classified Waterway	<100-FT
Water and Waste Water service to be provided by	AUSTIN WATER
Request	The variance request is as follows (Cite code references:

Impervious cover	Existing	Proposed				
square footage:	0-SF	320,120-SF				
acreage:	0-AC	7.35-AC				
percentage:	0%	45.9%				
Provide general						
description of the						
property (slope						
range, elevation	The subject site is 16.0-acres of undeveloped land that was previously cultivated					
range, summary of	for agricultural use. The land slopes at a relatively unform slope of approximately and persont (1%) from parts to could with an elevation range of 627 at the					
vegetation / trees,	north end, down to 631 at the south end. Having been agricultural land, most of the site is free of trees, except for an area about 2.3-acres in size, comprising of primarily cedar, mesquite, and hackberry trees. Adjacent to the south property line, on the adjacent lot, is an uniform engineered earthen channel constructed in recent years, which is classified as a					
summary of the						
geology, CWQZ,						
WQTZ, CEFs,						
floodplain, heritage						
trees, any other	engineered earthen channel constructed in recent years, which is classified as a minor waterway with an associated floodnlain (not yet defined) and CWO7. The					
notable or	CWQZ extends onto the subject site.					
outstanding	-					
characteristics of the						
property)						

Clearly indicate in what way the proposed project does not comply with current Code (include maps and exhibits)	The proposed project includes a private drive crossing the engineered channel with a culvert system. The private drive makes the vehicular and emergency access connection to a public access easement ultimately connecting to the southbound I-35 access road. The crossing provides compliance with fire department criteria set forth in the Wildland-Urban Interface. Additionally, a water utility connection will be made within the CWQZ, adjacent to Brezza Lane.
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FINDINGS OF FACT

As required in LDC Section 25-8-41, in order to grant a variance, the Land Use Commission must make the following findings of fact:

Include an explanation with each applicable finding of fact.

Project: Stillwater – Double Creek Phase 2

Ordinance: § 25-8-261 - CRITICAL WATER QUALITY ZONE DEVELOPMENT

- A. Land Use Commission variance determinations from Chapter 25-8-41 of the City Code:
 - 1. The requirement will deprive the applicant of a privilege available to owners of similarly situated property with approximately contemporaneous development subject to similar code requirements.

<u>Yes</u> / No

The subject site is adjacent to the north of Double Creek Multifamily Phase 1, case number SP-2018-0403C, herein called "Phase 1." Phase 1 is approved and under construction. The existing engineered channel triggering the CWQZ runs within and along the north property line of Phase 1. The approved site plan includes buildings, parking, fire lane, and paved access within the CWQZ.

- 2. The variance:
 - a) Is not necessitated by the scale, layout, construction method, or other design decision made by the applicant, unless the design decision provides greater overall environmental protection than is achievable without the variance;

Yes / No

The variance is necessitated by fire department ingress/egress requirements set forth in the International Fire Code and Wildland-Urban Interface. Two points of emergency ingress and egress are required, and AFD will not accept both to be on the dead end that is Brezza Lane. There is no other option for a second point of ingress/egress.

b) Is the minimum deviation from the code requirement necessary to allow a reasonable use of the property;

Yes / No

As mentioned above, the variance is triggered by the fire department requirement of having two points of emergency ingress/egress, which will be a culvert crossing and is considered a minimum deviation from the code.

c) Does not create a significant probability of harmful environmental consequences.

Yes / No

The proposed improvements related to the variance do not create a significant probability of harmful environmental consequences.

3. Development with the variance will result in water quality that is at least equal to the water quality achievable without the variance.

<u>Yes</u> / No

The variance will not decrease the water quality treatment associated with the improvements. The plans will be fully code compliant for water quality treatment.

- B. Additional Land Use Commission variance determinations for a requirement of Section 25-8-422 (Water Quality Transition Zone), Section 25-8-452 (Water Quality Transition Zone), Article 7, Division 1 (Critical Water Quality Zone Restrictions), or Section 25-8-368 (Restrictions on Development Impacting Lake Austin, Lady Bird Lake, and Lake Walter E. Long):
 - 1. The criteria for granting a variance in Subsection (A) are met;
 - Yes / No [provide summary of justification for determination]
 - 2. The requirement for which a variance is requested prevents a reasonable, economic use of the entire property;
 - Yes / No [provide summary of justification for determination]

- 3. The variance is the minimum deviation from the code requirement necessary to allow a reasonable, economic use of the entire property.
 - [provide summary of justification for determination] Yes / No

**Variance approval requires all above affirmative findings.



CIVIL ENGINEERING * DEVELOPMENT CONSULTING * PROJECT MANAGEMENT

August 31, 2021

Environmental Commission and Land Use Commission City of Austin 301 W 2nd Street Austin, Texas 78701

Re: Variance Request for Double Creek Multifamily Phase 2 (SP-2021-0178C)

Dear Commissioners,

In order to provide safe emergency access and with minimal disturbance, a variance to Land Development Code § 25-8-261, which limits development in a critical water quality zone, is hereby requested for Double Creek Multifamily Phase 2 site plan (case number SP-2021-0178C) and the related off-site water main improvements per SER-4280.

I. Site Summary

The Double Creek Multifamily Phase 2 project is located approximately 1,300-ft north of the intersection of E FM 1626 Rd and Old San Antonio Road, and is on Lot 3 of Double Creek Subdivision, Section 2, Austin, Travis County, and is in the City's full purpose jurisdiction. The site is zoned CS-MU-CO, per zoning case number C14-03-0053.

The project will consist of 371 multifamily units in three to four-story buildings, with surface and garage parking. Water quality ponds, driveway and fire access, utilities, grading, sidewalks, landscaping, *approximately 5.5-acres of parkland dedication*, and a culvert crossing will be included.

The site is 16.00 acres, with right-of-way frontage along Brezza Lane, for which road improvements are currently under construction (SP-2019-0161D). One point of driveway access will be on Brezza Lane. The site will also have access from I-35 via a private drive currently under construction with the site plan Double Creek Multifamily (SP-2018-0403C) and Private Roadway easement doc. no. 2018093713 and a proposed joint use access easement of similar alignment. The private drive will provide access the subject site via a proposed culvert crossing over an existing engineered channel.

The property is in the Onion Creek watershed, which is classified as a Suburban Watershed, and is outside of the Edwards Aquifer Recharge Zone. No portion of the site is within the 100-year floodplain, per FEMA map number 48453C0595k, dated January 22, 2020. The site is currently undeveloped with existing impervious cover of 0%, and the proposed impervious cover is less than 50% of the site area. The site currently surface drains from north to south and developed runoff will be treated with proposed water quality ponds and discharge into an existing engineered channel along the south boundary of the site.



During the completeness check review for Double Creek Phase 2, the City provided a comment report in June 2021 in which it was stated that a critical water quality zone is delineated about the engineered channel that was constructed in recent years (dates provided in the timeline in Part II below). Emergency and tenant vehicle access to the site is proposed with a culvert crossing over the channel. A portion of a proposed public water main as required by SER-4280 and a water meter will be within 50-ft of the centerline of the channel. These improvements would not explicitly be in compliance with LDC 25-8-261.

II. Variance

The basis for the variance request and substantiation for its approval is as follows:

- A. Under § 25-8-41 Land Use Commission Variances, the following apply
 - 1. Subsequent to the construction of the engineered channel, which was permitted in July 2015 under case number SP-2014-0103D "Stablewood Box Culvert," two site plans in the immediate vicinity were approved and permitted without identifying the artificially engineered channel as a critical water quality zone:
 - i. Double Creek Multifamily Phase 1 (SP-2018-0403C)
 - ii. Brezza Lane Improvements (SP-2019-0161D)

The two projects listed above include substantial improvements in the critical water quality zone, including apartment buildings, pavement for parking, utilities, and public roadway.

Therefore, under § 25-8-41 Land Use Commission Variances, the requirement will deprive the applicant of a privilege available to owners of other similarly situated property with approximately contemporaneous development subject to similar code requirements.

- 2. The variance:
 - (a) is not necessitated by the scale, layout, construction method, or other design decision made by the applicant, unless the design decision provides greater overall environmental protection than is achievable without the variance;
 - (b) is the minimum deviation from the code requirement necessary to allow a reasonable use of the property; and
 - (c) does not create a significant probability of harmful environmental consequences; and
- 3. The surface run-off from the improvements will be treated with city standard water quality facilities and is therefore equal to the water quality achievable without the variance.
- B. Additional Substantiation
 - 1. Austin Fire Department requires two points of ingress and egress. The applicant met with AFD on 3/17/2021 and has had follow up correspondence via email, from which the following statements were provided by AFD explaining the code related to the requirement:



Brezza Lane is a dead-end street and the project is located directly in a Wildland Urban Interface (WUI) area which is susceptible to wildfires making fire access and evacuation of the development critical during a structure fire or wildfire event.

2015 IFC:

503.1.2 Additional access. The fire code official is authorized to require more than one fire apparatus access road based on the potential for impairment of a single road by vehicle congestion, condition of terrain, climatic conditions or other factors that could limit access.

2015 Wildland Urban Interface Code Amendments (these direct you back to the fire code).

402.1.1 Access. A subdivision described in City Code Chapter 25-4 (Subdivision) that is located within in a wildland-urban interface area and platted after the effective date of this code must provide fire apparatus access roads that comply with the Fire Code.

403.3 Fire Apparatus Access Road. When required, a fire apparatus access road must Comply with the Fire Code.

- 2. Timeline of key dates described herein:
 - <u>July 2015</u>: Stablewood Box Culvert project receives permit (SP-2014-0103D). Construction of the engineered channel begins. See the attached excerpt from the culvert plans, showing the location of the channel improvements.
 - <u>March 2019</u>: Water SER-4280 is provided by Austin Water, which includes a water service connection and public improvements in the buffer area defined by the CWQZ. SER-4280 is included as an attachment.
 - <u>June 2019</u>: Double Creek Multifamily Phase 1 receives permit (SP-2018-0403C) with meaningful improvements such as buildings and parking within the recently identified critical water quality zone. The Phase 1 Overall Site Plan is enclosed.
 - <u>August 2020</u>: Brezza Lane Improvement Plans receive permit (SP-2019-0161D) with the portions of the public roadway now in the critical water quality zoned created by the human-constructed channel.
 - <u>June 2021</u>: The CWQZ delineation is brought to our attention via the site plan completeness check comments.
 - July 2021: Site Plan submitted formally to the City (SP-2021-0178C) with no buildings within the recently identified CWQZ.



• <u>August 2021</u>: Applicant revised the site plan to further minimize encroachment, specifically removing parking from the CWQZ; the only remaining improvements within the recently-identified CWQZ are the required bridge for emergency services and the water meter that is required by the Service Extension Request.

III. Conclusion

In response to the City's determination of the critical water quality zone, the applicant has modified the site plan to remove 27 parking spaces and shifted utilities away from the engineered channel to the fullest extent practical.

Taken in the aggregate, this variance request is logical and reasonable, and will create an outcome that meets the criteria set forth in § 25-8-41 Land Use Commission Variances, and will meet the requirements set forth by Austin Fire Department.

Sincerely, Malone Wheeler, Inc.

Lance Rosenfield, P.E. Senior Project Manager

Enclosures:

- 1. Completed Variance Application
- 2. Application Exhibit 1a Aerial Photo
- 3. Application Exhibit 1b Aerial Photo
- 4. Application Exhibit 2 Site Photos
- 5. Application Exhibit 3- Vicinity and Context Map
- 6. Application Exhibit 4 Topo and Tree List
- 7. Application Exhibit 5 Revised Site Plan
- 8. Application Exhibit 6 Aerial Photo with CWQZ
- 9. Application Exhibit 7 ERI by Terracon
- 10. Supplemental Exhibit 1 AFD Written Requirement (email)
- 11. Supplemental Exhibit 2 SER-4280 for Water
- 12. Supplemental Exhibit 3 Approved Site Plan "Phase 1"
- 13. Supplemental Exhibit 4 Approved Brezza Lane Excerpt Sheets









LWATER – DOUBLE CREEK PH 2\PROJECTS\20-025-AUS\DRAWINGS\PLANSET\06 EXISTING CONDITIONS.DWG, 7/14/2021, JAMES MC

22 of 34





	DESCRIPTION
93	13" HACKBERRY
.94	12" HACKBERRY
95	13" HACKBERRY
90 97	O" HACKBERRY
31	$\frac{1}{2} \frac{1}{4} \frac{1}$
90	17 MULTI-STEM CEDAR-TU,0,4,4
99	13 MULTI-STEM CEDAR-8,6,4
100	1/" MULII-SIEM CEDAR-11",6",4"
101	33" MULTI-STEM CEDAR-10",8",8",6"(X3),4"(X.
102	22" MULTI-STEM CEDAR-10",6",6",4"(X3)
103	21" MULTI–STEM CEDAR–10",10",4"(X3)
104	19" MULTI-STEM CEDAR-10".6".4"(X3)
105	24" MULTI-STEM CEDAR-9".6".5"(X4).4"
106	9" CEDAR
107	13" CEDAR
108	26" MILL TI_STEM CEDAR_12" 0" 6" 6" " " "
100	20 MOL II = 3 IEIM CEDAR = 12, 9, 0, 0, 4, 4
109	1/ MULII-SIEM CEDAR-11,4 (XS)
110	8 CEDAR
111	15" MULTI-STEM CEDAR-9",6",6"
112	18" MULTI-STEM CEDAR-12",4"(X3)
113	11" TWIN MESQUITE-8",6"
114	14" MULTI-STEM MESQUITE-8",6",6"
116	21" MULTI-STEM CEDAR-10".6".4"(X4)
117	32" M/// TI-STEM CEDAR-9" 6"(X5) 4"(X4)
118	$23^{"} M \parallel T \parallel STEM CEDAR = 9^{"} 8^{"} 6^{"} (X3)$
110	20 MOLTI-STEM CEDAR-9,0,0 (A0)
119	20 MULII-SIEM CEDAR-0,0,4(X4)
120	32 MULII-SIEM CEDAR-9,9,6,6,4 (X6)
121	25" MULII-SIEM CEDAR-10",6",4"(6)
122	26" MULTI-STEM CEDAR-8",6",6",4"(X6)
123	18" MULTI–STEM CEDAR–8",6",6",4",4"
124	10" HACKBERRY
125	9" HACKBERRY
126	21" MULTI-STEM PECAN-12".7".6".6"
127	34" MULTI-STEM CEDAR-12" 7" 6"(X3) 4"(X5)
128	13" HACKBERRY
120	11" TWINI WOOLY RUCKTHOPN-8"6"
123	$\frac{1}{2} \frac{1}{2} \frac{1}$
130	25 MULTI-STEM CEDAR-9,0,3,3,4 (X3)
152	22 MULII-SIEM CEDAR-II,0,4 (X4)
133	9 MESQUITE
134	22" MULII-SIEM CEDAR-9",6"(X3),4",4"
135	28" MULTI-STEM_CEDAR-9",6"(X3),4"(X5)
136	8" CEDAR
137	24" MULTI-STEM CEDAR-8",8",6",6",4"(X3)
138	33" MULTI-STEM CEDAR-9",9",8",6"(X4),4",4"
139	24" MULTI-STEM CEDAR-10".6".6".4"(X4)
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112	O" CEDAR
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140	IJ MULII-SIEM CEDAR-10,0,4
144	20 MULII-SIEM CEDAR-12, 0, 0, 4 (X4)
	$3(1^{\circ} M/1/1) = S(1+M)(2+1)AR = 9^{\circ} S(1\times3) = 4^{\circ}(XS)$
145	
145 146	35" MULTI-STEM CEDAR-12", 7", 6", 4"(X6)
145 146 147	35" MULTI-STEM CEDAR-12",7",7",6",4"(X6) 22" MULTI-STEM CEDAR-8",8",6",6",4",4"
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145 146 147 148 149 150 151 152	35" MULTI-STEM CEDAR-12",7",7",6",4"(X6) 22" MULTI-STEM CEDAR-8",8",6",6",4",4" 12" TWIN MESQUITE-9",6" 11" CEDAR 22" MULTI-STEM CEDAR-12",8"4"(X3) 20" MULTI-STEM CEDAR-11",6",4"(X3) 12" TWIN MESQUITE-8" 8"
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145 146 147 148 149 150 151 152 153	35" MULTI-STEM CEDAR-12",7",7",6",4"(X6) 22" MULTI-STEM CEDAR-8",8",6",6",4",4" 12" TWIN MESQUITE-9",6" 11" CEDAR 22" MULTI-STEM CEDAR-12",8"4"(X3) 20" MULTI-STEM CEDAR-11",6",4"(X3) 12" TWIN MESQUITE-8",8" 12" HACKBERRY 10" HACKBERRY
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145 146 147 148 149 150 151 152 153 154 155	35" MULTI-STEM CEDAR-12",7",7",6",4"(X6) 22" MULTI-STEM CEDAR-8",8",6",6",4",4" 12" TWIN MESQUITE-9",6" 11" CEDAR 22" MULTI-STEM CEDAR-12",8"4"(X3) 20" MULTI-STEM CEDAR-11",6",4"(X3) 12" TWIN MESQUITE-8",8" 12" HACKBERRY 9" HACKBERRY
145 146 147 148 149 150 151 152 153 154 155 156	35" MULTI-STEM CEDAR-12",7",7",6",4"(X6) 22" MULTI-STEM CEDAR-8",8",6",6",4",4" 12" TWIN MESQUITE-9",6" 11" CEDAR 22" MULTI-STEM CEDAR-12",8"4"(X3) 20" MULTI-STEM CEDAR-11",6",4"(X3) 12" TWIN MESQUITE-8",8" 12" HACKBERRY 9" HACKBERRY 9" HACKBERRY 20" MULTI-STEM MESQUITE-12",10",6"
145 146 147 148 149 150 151 152 153 154 155 156 157	35" MULTI-STEM CEDAR-12",7",7",6",4"(X6) 22" MULTI-STEM CEDAR-8",8",6",6",4",4" 12" TWIN MESQUITE-9",6" 11" CEDAR 22" MULTI-STEM CEDAR-12",8"4"(X3) 20" MULTI-STEM CEDAR-11",6",4"(X3) 12" TWIN MESQUITE-8",8" 12" HACKBERRY 9" HACKBERRY 9" HACKBERRY 20" MULTI-STEM MESQUITE-12",10",6" 8" CHINABERRY
145 146 147 148 149 150 151 152 155 155 156 157 158	35" MULTI-STEM CEDAR-12",7",7",6",4"(X6) 22" MULTI-STEM CEDAR-8",8",6",6",4",4" 12" TWIN MESQUITE-9",6" 11" CEDAR 22" MULTI-STEM CEDAR-12",8"4"(X3) 20" MULTI-STEM CEDAR-11",6",4"(X3) 12" TWIN MESQUITE-8",8" 12" HACKBERRY 9" HACKBERRY 9" HACKBERRY 20" MULTI-STEM MESQUITE-12",10",6" 8" CHINABERRY 18" MULTI-STEM CEDAR-9",7",4"(X3)
145 146 147 148 149 150 151 152 155 155 155 155 157 158 159	35" MULTI-STEM CEDAR-12",7",7",6",4"(X6) 22" MULTI-STEM CEDAR-8",8",6",6",4",4" 12" TWIN MESQUITE-9",6" 11" CEDAR 22" MULTI-STEM CEDAR-12",8"4"(X3) 20" MULTI-STEM CEDAR-11",6",4"(X3) 12" TWIN MESQUITE-8",8" 12" HACKBERRY 9" HACKBERRY 9" HACKBERRY 20" MULTI-STEM MESQUITE-12",10",6" 8" CHINABERRY 18" MULTI-STEM CEDAR-9",7",4"(X3) 16" TWIN CEDAR-13",6"
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163 164 --24" MULTI-STEM MESQUI 165 —

NOTE: SURVEYOR MAKES NO GUARANTEE AS TO THE TYPE OF TREES LISTED ABOVE. IF CRITICAL, A CERTIFIED ARBORIST SHOULD VERIFY THIS INFORMATION.

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REVISION	
0. DATE	
DOUBLE CREEK MULTIFAMILY PHASE II 10801 BREZZA LN. AUSTIN, TX 78748	TREE LIST
MALONE * WHEELER SINCE INC. 1995	CIVIL ENGINEERING ★ DEVELOPMENT CONSULTING ★ PROJECT MANAGEMENT 5113 Southwest Pkwy, Suite 260 Austin, Texas 78735 Phone: (512) 899-0601 Fax: (512) 899-0655 Firm Registration No. F-786
LANCE A.	ROSENFIELD
DESIGN BY : CHECKED BY : APPROVED BY : DATE : SHEET OF 58	? ? 7/12/2021 07

1. THIS BRIDGE HAS BEEN DESIGNED FOR GENERAL SITE CONDITIONS. THE PROJECT ENGINEER SHALL BE RESPONSIBLE FOR THE STRUCTURE'S SUITABILITY TO THE EXISTING SITE CONDITIONS AND FOR THE HYDRAULIC EVALUATION --INCLUDING SCOUR AND CONFIRMATION OF SOIL CONDITIONS.

2. PRIOR TO CONSTRUCTION, CONTRACTOR MUST VERIFY ALL ELEVATIONS SHOWNTHROUGH THE ENGINEER.

3. ONLY CONTECH ENGINEERED SOLUTIONS LLC, THE CON/SPAN® APPROVED PRECASTER IN TEXAS MAY PROVIDE THE STRUCTURE DESIGNED IN ACCORDANCE WITH THESE PLANS.

4. THE USE OF ANOTHER PRECAST STRUCTURE WITH THE DESIGN ASSUMPTIONS USED FOR THE CON/SPAN® STRUCTURE MAY LEAD TO SERIOUS DESIGN ERRORS. USE OFANY OTHER PRECAST STRUCTURE WITH THIS DESIGN AND DRAWINGS VOIDS ANY CERTIFICATION OF THIS DESIGN AND WARRANTY. CONTECH Engineered Solutions, LLC ASSUMES NO LIABILITY FOR DESIGN OF ANYALTERNATE OR SIMILAR TYPE STRUCTURES.

5. ALTERNATE STRUCTURES MAY BE CONSIDERED, PROVIDED THAT DRAWINGS AND CALCULATIONS SIGNED AND SEALED BY A PROFESSIONAL ENGINEER, REGISTERED IN THE STATE OF TEXAS, EMPLOYED BY THE PRECAST CONCRETE BRIDGE SUPPLIER, ARE SUBMITTED TO THE ENGINEER 2 WEEKS PRIOR TO THE BID DATE FOR REVIEW AND APPROVAL.

6. ALTERNATE STRUCTURES MAY BE CONSIDERED, PROVIDED THAT THE ALTERNATE DESIGN DOES NOT REDUCE THE HYDRAULIC OPENING OF THE STRUCTURE AS SHOWN ON THE DRAWINGS. AT A MINIMUM THE ALTERNATE STRUCTURE MUST PROVIDE THE SAME OR LARGER SPAN AND RISE AS THE STRUCTURE SHOWN ON THE DRAWINGS.

7. THE PRECAST ARCH SUPPLIER MUST ATTEND THE PRE-BID MEETING, IF ONE IS HELD.

8. SUPPLIER OF PROPOSED ALTERNATES TO A CON/SPAN® BRIDGE SYSTEM MUST SUBMIT AT LEAST TWO (2) INDEPENDENTLY VERIFIED FULL SCALE LOAD TESTS THAT CONFIRM THE PROPOSED DESIGN METHODOLOGY OF THE THREE SIDED/ARCH STRUCTURE(S). THE PROPOSED ALTERNATE, UPON SATISFACTORY CONFIRMATION OF DESIGN METHODOLOGY, MAY BE CONSIDERED AN ACCEPTABLE ALTERNATE.

9. PROPOSED ALTERNATE STRUCTURES MAY BE CONSIDERED, PROVIDED THAT THE PRECAST CONCRETE BRIDGE STRUCTURES ARE PROVIDED BY A SUPPLIER THAT HAS A MINIMUM OF TWO (2) REGISTERED PROFESSIONAL ENGINEERS ON STAFF THAT ARE DEDICATED TO THE DESIGN OF THESE TYPES OF STRUCTURES. SUPPLIER MUST PROVIDE THESE NAMES, P.E. LICENSE NUMBERS AND DATES OF HIRE AT TIME OF ALTERNATE SUBMITTAL.

DESIGN DATA

DESIGN LOADING:

BRIDGE UNITS: HL-93 HEADWALLS: EARTH PRESSURE ONLY WINGWALLS: EARTH PRESSURE ONLY DESIGN FILL HEIGHT: 1'-0" TO 4'-0" FROM TOP OF CROWN TO TOP OF PAVEMENT. DESIGN METHOD: LOAD RESISTANCE FACTOR DESIGN PER AASHTO LRFD SPECIFICATION ASSUMED NOMINAL BEARING RESISTANCE: 0 PSF ASSUMED FACTORED BEARING RESISTANCE: 0 PSF

*AT THE TIME OF DESIGN, A GEOTECHNICAL REPORT FOR THE PROJECT SITE WAS NOT AVAILABLE. IT IS THE PROJECT ENGINEER'S, OWNER'S AND/OR THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THAT THE ACTUAL SITE CONDITIONS AT THE TIME OF CONSTRUCTION ARE CONSISTENT WITH THE ASSUMED ALLOWABLE SOIL BEARING PRESSURE WITH A GEOTECHNICAL INVESTIGATION FROM A QUALIFIED GEOTECHNICAL ENGINEER.

MATERIALS

PRECAST UNITS SHALL BE CONSTRUCTED AND INSTALLED IN ACCORDANCE WITH CON/SPAN® SPECIFICATIONS. CONCRETE FOR FOOTINGS SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSF. REINFORCING STEEL FOR FOOTINGS SHALL CONFORM TO ASTM A615 OR A996-GRADE 60.



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		DATE	REVISION DESCRIPTION	_



PROPOSAL

DRAWING

CONSPAN O SERIES O633 MALONE WHEELER CHAN

	N	PRE	LIM R COM	
- 33'-0" X 6'-4"	Project No.: 688751	Seq N	10.: 10	Date: 9/9/2021
NEL CROSSING	Designed: JJM	1	Draw	n:
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CONSPAN O SERIES O633
MALONE WHEELER CHAN



NOTES

- FOOTING DIMENSIONS AND DETAILS SHOWN ARE CONCEPTUAL ONLY
- FINAL DIMENSIONS & DETAILS TO BE FURNISHED BY THE PROJECT ENGINEERS

PROPOSAL

DRAWING

• FOUNDATION REINFORCING TO BE DETERMINED

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CONSPAN O SERIES O633
MALONE WHEELER CHAN

AUSTIN, TEXA

26 of 34

PRELIMINARY	

NOT FOR CONSTRUCTION

- 33'-0" X 6'-4"	Project No.: 688751	Seq N Oʻ	lo.: 10	Date: 9/9/2021	
NEL CROSSING	Designed: JJM	Drawn		n:	
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4S	Sheet No.: 3 OF 10				



INLET END ELEVATION

PROPOSAL DRAWING

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disclaims any liability or responsibility for such use.				i.
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site work progresses, these discrepancies must be reported to				í
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accepts no liability for designs based on missing, incomplete or				
inaccurate information supplied by others	MADK	DATE	REVISION DESCRIPTION	i.



CONSPAN O SERIES O633
MALONE WHEELER CHAN

AUSTIN, TEXA

	N	OT FO	R CON	INARY ISTRUCTION			
- 33'-0" X 6'-4"	Project No.: 688751	Seq N O	№.: 10	Date: 9/9/2021			
INEL CROSSING	Designed: JJM	Draw		n:			
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AS	Sheet No.: 4	Sheet No.: 4 OF 10					

27 of 34

	-0-	
8:-1 1/4" WINGWALL 3 2:-0" 2:-0"		
	29'-8"	

OUTLET END ELEVATION

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inaccurate information supplied by others	MARK	DATE	



CONSPAN O SERIES O633
MALONE WHEELER CHAN

AUSTIN, TEXA

	N	PRELIMINARY NOT FOR CONSTRUCTION				
- 33'-0" X 6'-4"	Project No.: 688751	Seq N	No.: 10	Date: 9/9/2021		
NEL CROSSING	Designed: JJM		Draw	n:		
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<u>PROFILE SECTION B-B</u>			Berlywania C-r NUR C-r NUR
	<u>PROFILE SECTION B-B</u>	- 36'-0" (OUT TO OUT) <u>PROFILE SECTION B-B</u>	36-0° (OUT TO OUT) PROFILE SECTION B-B
	<u>PROFILE SECTION B-B</u>	PROFILE SECTION B-B	a 36-0" (OUT TO OUT) <u>PROFILE SECTION B-B</u>
	<u>PROFILE SECTION B-B</u>	36'-0" (OUT TO OUT) <u>PROFILE SECTION B-B</u>	36'-0" (OUT TO OUT) PROFILE SECTION B-B

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MALONE WHEELER CHA	Ν

AUSTIN, TEXAS



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ENGINEERED SOLUTIONS

9025 Centre Pointe Dr., Suite 400, West Chester, OH 4506

800-338-1122 513-645-7000 513-645-7993 FAX

PROPOSAL

DRAWING

B-8	
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MARK DATE

REVISION DESCRIPTION

BY



SPECIFICATIONS FOR MANUFACTURE AND INSTALLATION OF CON/SPAN® O-SERIES BRIDGE SYSTEMS

- 1. DESCRIPTION 1.1. TYPE THIS WORK SHALL CONSIST OF FURNISHING AND CONTRACT OF STREET STR CONSTRUCTING A CON/SPAN® O-SERIES BRIDGE SYSTEM IN ACCORDANCE WITH THESE SPECIFICATIONS AND IN REASONABLY CLOSE CONFORMITY WITH THE LINES. GRADES DESIGN AND DIMENSIONS SHOWN ON THE PLANS OR AS ESTABLISHED BY THE ENGINEER. IN SITUATIONS WHERE TWO OR MORE SPECIFICATIONS APPLY TO THIS WORK. THE MOST STRINGENT REQUIREMENTS SHALL GOVERN. 1.2. DESIGNATION - PRECAST REINFORCED CONCRETE CON/SPAN®
 - O-SERIES BRIDGE LINITS MANUEACTURED IN ACCORDANCE WITH THIS SPECIFICATION SHALL BE DESIGNATED BY SPAN AND RISE. PRECAST REINFORCED CONCRETE WINGWALLS AND HEADWALLS MANUFACTURED IN ACCORDANCE WITH THIS SPECIFICATION SHALL BE DESIGNATED BY LENGTH, HEIGHT, AND DEFLECTION ANGLE, PRECAST REINFORCED CONCRETE EXPRESS™ FOUNDATION UNITS MANUFACTURED IN ACCORDANCE WITH THIS SPECIFICATION SHALL BE DESIGNATED BY LENGTH, HEIGHT AND

2. DESIGN 2.1. SPECIFICATIONS - THE PRECAST ELEMENTS ARE DESIGNED IN EVEN DATE OF THE PRECAST ELEMENTS ARE DESIGNED IN THE PRECAST ELEMENTS ARE ACCORDANCE WITH THE "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES" 17TH EDITION, ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, 2002. A MINIMUM OF ONE FOOT OF COVER ABOVE THE CROWN OF THE BRIDGE UNITS IS REQUIRED IN THE INSTALLED CONDITION. (UNLESS NOTED OTHERWISE ON THE SHOP DRAWINGS AND DESIGNED ACCORDINGLY.)

- 3. MATERIALS 3.1. CONCRETE THE CONCRETE FOR THE PRECAST ELEMENTS 3.1. CONCRETE THE CONCRETE FOR THE PRECAST ELEMENTS SHALL BE AIR-ENTRAINED WHEN INSTALLED IN AREAS SUBJECT TO FREEZE-THAW CONDITIONS, COMPOSED OF PORTLAND CEMENT, FINE AND COARSE AGGREGATES, ADMIXTURES AND WATER AIR-ENTRAINED CONCRETE SHALL CONTAIN 6 + 2 PERCENT AIR. THE AIR- ENTRAINING ADMIXTURE SHALL CONFORM TO AASHT0 M154. THE MINIMUM CONCRETE COMPRESSIVE STRENGTH SHALL BE AS SHOWN ON THE SHOP
 - 3.1.1. PORTLAND CEMENT SHALL CONFORM TO THE REQUIREMENTS OF ASTM SPECIFICATIONS C150-TYPE I, TYPE II, OR TYPE III CEMENT.
 - 3.1.2. COARSE AGGREGATE SHALL CONSIST OF STONE HAVING A MAXIMUM SIZE OF 1 INCH. AGGREGATE SHALL MEET REQUIREMENTS FOR ASTM C33.
 - 3.1.3. WATER REDUCING ADMIXTURE THE MANUFACTURER MAY SUBMIT, FOR APPROVAL BY THE ENGINEER, A WATER-REDUCING ADMIXTURE FOR THE PURPOSE OF INCREASING WORKABILITY AND REDUCING THE WATER REQUIREMENT FOR THE CONCRETE.
 - 3.1.4. CALCIUM CHLORIDE THE ADDITION TO THE MIX OF CALCIUM CHLORIDE OR ADMIXTURES CONTAINING CALCIUM CHLORIDE WILL NOT BE PERMITTED.
 - 3.1.5 MIXTURE THE AGGREGATES CEMENT AND WATER SHALL BE PROPORTIONED AND MIXED IN A BATCH MIXER TO PRODUCE A HOMOGENEOUS CONCRETE MEETING THE STRENGTH REQUIREMENTS OF THIS SPECIFICATION THE PROPORTION OF PORTLAND CEMENT IN THE MIXTU SHALL NOT BE LESS THAN 564 POUNDS (6 SACKS) PER CUBIC YARD OF CONCRETE. 3.2. STEEL REINFORCEMENT
 - 3.2.1. THE MINIMUM STEEL YIELD STRENGTH SHALL BE 60,000 PSI
 - UNLESS OTHERWISE NOTED ON THE SHOP DRAWINGS. 3.2.2. ALL REINFORCING STEEL FOR THE PRECAST ELEMENTS
 - SHALL BE FABRICATED AND PLACED IN ACCORDANCE WITH THE DETAILED SHOP DRAWINGS SUBMITTED BY THE MANUFACTURER 3.2.3 REINFORCEMENT SHALL CONSIST OF WELDED WIRE
 - REINFORCING CONFORMING TO ASTM SPECIFICATION A 1064, OR DEFORMED BILLET STEEL BARS CONFORMING TO ASTM SPECIFICATION A 615, GRADE 60. LONGITUDINAL DISTRIBUTION REINFORCEMENT MAY CONSIST OF WELDED WIRE FABRIC OR DEFORMED BILLET-STEEL BARS 3.3. STEEL HARDWARE
 - 3.3.1.BOLTS AND THREADED RODS FOR WINGWALL
 - CONNECTIONS SHALL CONFORM TO ASTM A 307. NUTS SHALL CONFORM TO AASHTO M292 (ASTM A194) GRADE 2H. ALL BOLTS, THREADED RODS AND NUTS USED IN WINGWALL CONNECTIONS SHALL BE MECHANICALLY ZINC
 - COATED IN ACCORDANCE WITH ASTM B695 CLASS 50. 3.3.2. STRUCTURAL STEEL FOR WINGWALL CONNECTION PLATES AND PLATE WASHERS SHALL CONFORM TO AASHTO M 270 (ASTM A 709) GRADE 36 AND SHALL BE HOT DIP GALVANIZED AS PER AASHTO M111 (ASTM A123)
 - 3.3.3. INSERTS FOR WINGWALLS SHALL BE 1" DIAMETER TWO-BOLT PRESET WINGWALL ANCHORS AS MANUFACTURED BY DAYTON SUPERIOR CONCRETE ACCESSORIES, MIAMISBURG, OHIO, (800) 745-3700 AND SHALL BE MECHANICALLY ZINC COATED IN ACCORDANCE WITH ASTM B695 CLASS 50
 - 3.3.4. FERRULE LOOP INSERTS SHALL BE F-64 FERRULE LOOP INSERTS AS MANUFACTURED BY DAYTON SUPERIOR CONCRETE ACCESSORIES, MIAMISBURG, OHIO, (800)
 - 3.3.5. HOOK BOLTS USED IN ATTACHED HEADWALL CONNECTIONS SHALL BE ASTM A307 3.3.6. INSERTS FOR DETACHED HEADWALL CONNECTIONS SHALL
 - BE AISI TYPE 304 STAINLESS STEEL, EXPANDED COIL INSERTS AS MANUFACTURED BY DAYTON SUPERIOR

CONCRETE ACCESSORIES, MIAMISBURG, OHIO, (800) 745-3700, COIL RODS AND NUTS USED IN HEADWALL CONNECTIONS SHALL BE AISI TYPE 304 STAINLESS STEEL. WASHERS USED IN HEADWALL CONNECTIONS SHALL BE EITHER AISI TYPE 304 STAINLESS STEEL PLATE WASHERS OR AASHTO M270 (ASTM A709) GRADE 36 PLATE WASHERS HOT DIP GALVANIZED AS PER AASHTO M111 (ASTM A123). 3.3.7. MECHANICAL SPLICES OF REINFORCING BARS SHALL BE

- MADE USING THE DOWEL BAR SPLICER SYSTEM AS MANUFACTURED BY DAYTON SUPERIOR CONCRETE ACCESSORIES MIAMISBURG OHIO (800) 745-3700 AND SHALL CONSIST OF THE DOWEL BAR SPLICER (DB-SAE) AND DOWEL-IN (DI).
- 4. MANUFACTURE OF PRECAST ELEMENTS SUBJECT TO THE PROVISIONS OF SECTION 5. BELOW. THE PRECAST ELEMENT DIMENSION AND REINFORCEMENT DETAILS SHALL BE AS PRESCRIBED IN THE PLAN AND SHOP DRAWINGS PROVIDED BY THE MANUFACTURER
 - 4.1. FORMS THE FORMS USED IN MANUFACTURE SHALL BE SUFFICIENTLY RIGID AND ACCURATE TO MAINTAIN THE REQUIRED PRECAST ELEMENT DIMENSIONS WITHIN THE PERMISSIBLE VARIATIONS GIVEN IN SECTION 5 OF THES SPECIFICATIONS. ALL CASTING SURFACES SHALL BE OF A SMOOTH MATERIAL
 - 4.2. PLACEMENT OF REINFORCEMENT 4.2.1. PLACEMENT OF REINFORCEMENT IN PRECAST BRIDGE UNITS - THE COVER OF CONCRETE OVER THE OUTSIDE CIRCUMFERENTIAL REINFORCEMENT SHALL BE 2" MINIMUM THE COVER OF CONCRETE OVER THE INSIDE CIRCUMFERENTIAL REINFORCEMENT SHALL BE 1%" MINIMUM, UNLESS OTHERWISE NOTED ON THE SHOP DRAWINGS. THE CLEAR DISTANCE OF THE END CIRCUMFERENTIAL WIRES SHALL NOT BE LESS THAN 1" NOR MORE THAN 2" FROM THE ENDS OF EACH SECTION REINFORCEMENT SHALL BE ASSEMBLED UTILIZING SINGLE OR MULTIPLE LAYERS OF WELDED WIRE FABRIC (NOT TO EXCEED 3 LAYERS). SUPPLEMENTED WITH A SINGLE LAYER OF DEFORMED BILLET-STEEL BARS, WHEN NECESSARY WELDED WIRE FABRIC SHALL BE COMPOSED OF CIRCUMFERENTIAL AND LONGITUDINAL WIRES MEETING THE SPACING REQUIREMENTS OF 4.3, BELOW, AND SHALL CONTAIN SUFFICIENT LONGITUDINAL WIRES EXTENDING THROUGH THE BRIDGE UNIT TO MAINTAIN THE SHAPE AND POSITION OF THE REINFORCEMENT. LONGITUDINAL DISTRIBUTION REINFORCEMENT MAY BE WELDED WIRE FABRIC OR DEFORMED BILLET-STEEL BARS AND SHALL MEET THE SPACING REQUIREMENTS OF 4.3, BELOW. THE ENDS OF THE LONGITUDINAL DISTRIBUTION REINFORCEMENT SHALL BE NOT MORE THAN 3" AND NOT
 - LESS THAN 1½" FROM THE ENDS OF THE BRIDGE UNIT. 4.2.2. BENDING OF REINFORCEMENT FOR PRECAST BRIDGE UNITS - THE OUTSIDE AND INSIDE CIRCUMFERENTIAL REINFORCING STEEL FOR THE CORNERS OF THE BRIDGE SHALL BE BENT TO SUCH AN ANGLE THAT IS APPROXIMATELY EQUAL TO THE CONFIGURATION OF THE BRIDGE'S OUTSIDE CORNER.
 - 4.2.3. PLACEMENT OF REINFORCEMENT FOR PRECAST WINGWALLS AND HEADWALLS THE COVER OF CONCRETE OVER THE LONGITUDINAL AND TRANSVERSE REINFORCEMENT SHALL BE 2" MINIMUM. THE CLEAR DISTANCE FROM THE END OF EACH PRECAST ELEMENT TO THE END OF REINFORCING STEEL SHALL NOT BE LESS THAN 11/2" NOR MORE THAN 3". REINFORCEMENT SHALL BE ASSEMBLED UTILIZING A SINGLE LAYER OF WELDED WIRE FABRIC, OR A SINGLE LAYER OF DEFORMED BILLET-STEEL BARS. WELDED WIRE FABRIC SHALL BE COMPOSED OF TRANSVERSE AND LONGITUDINAL WIRES MEETING THE SPACING REQUIREMENTS OF 4.3, BELOW, AND SHALL CONTAIN SUFFICIENT LONGITUDINAL WIRES EXTENDING THROUGH THE ELEMENT TO MAINTAIN THE SHAPE AND POSITION OF THE REINFORCEMENT. LONGTUDINAL REINFORCEMENT MAY BE WELDED WIRE FABRIC OR DEFORMED BILLET-STEEL BARS AND SHALL MEET THE SPACING REQUIREMENTS OF 4.3, BELOW
 - 4.2.4. PLACEMENT OF REINFORCMENT FOR PRECAST FOUNDATION UNITS - THE COVER OF CONCRETE OVER THE BOTTOM REINFORCEMENT SHALL BE 3 INCHES MINIMUM. THE COVER OF CONCRETE FOR ALL OTHER REINFORCEMENT SHALL BE 2 INCHES MINIMUM. THE CLEAR DISTANCE FROM THE END OF EACH PRECAST ELEMENT TO THE END OF REINFORCING STEEL SHALL NOT BE LESS THAN 2 INCHES NOR MORE THAN 3 INCHES. REINFORCEMENT SHALL BE ASSEMBLED UTILIZING A SINGLE LAYER OF WELDED WIRE EARRIC OR A SINGLE LAYER OF DEFOREMED BILLET-STEEL BARS. WELDED WIRE FABRIC SHALL BE COMPOSED OF TRANSVERSE AND LONGITUDINAL WIRES MEETING THE SPACING REQUIREMENTS OF 4.3, BELOW, AND SHALL CONTAIN SUFFICIENT LONGITUDINAL WIRES EXTENDING THROUGH THE ELEMENT TO MAINTAIN THE SHAPE AND POSITION OF THE REINFORCEMENT. LONGITUDINAL REINFORCEMENT MAY BE WELDED WIRE FABRIC OR DEFORMED BILLET-STEEL BARS AND SHALL MEET THE SPACING REQUIREMENTS OF 4.3, BELOW.
 - 4.3. LAPS, WELDS, SPACING 4.3.1.LAPS, WELDS, AND SPACING FOR PRECAST BRIDGE UNITS TENSION SPLICES IN THE CIRCUMFERENTIAL REINFORCEMENT SHALL BE MADE BY LAPPING. LAPS MAY BE TACK WELDED TOGETHER FOR ASSEMBLY PURPOSES. FOR SMOOTH WELDED WIRE FABRIC, THE

OVERLAP SHALL MEET THE REQUIREMENTS OF AASHTO 5.11.2.5.2 AND 5.11.6.2. FOR DEFORMED WELDED WIRE FABRIC, THE OVERLAP SHALL MEET THE REQUIREMENTS OF AASHTO 5.11.2.5.1 AND 5.11.6.1. THE OVERLAP OF WELDED WIRE FABRIC SHALL BE MEASURED BETWEEN THE OUTER-MOST LONGITUDINAL WIRES OF EACH FABRIC SHEET. FOR DEFORMED BILLET-STEEL BARS, THE OVERLAP SHALL MEET THE REQUIREMENTS OF AASHTO 5.11.2.1 FOR SPLICES OTHER THAN TENSION SPLICES, THE OVERLAP SHALL BE A MINIMUM OF 1'-0" FOR WELDED WIRE FABRIC OR DEFORMED BILLET-STEEL BARS. THE SPACING CENTER TO CENTER OF THE CIRCUMFERENTIAL WIRES IN A WIRE FABRIC SHEET SHALL BE NOT LESS THAN 2" NOR MORE THAN 4". THE SPACING CENTER TO CENTER OF THE LONGITUDINAL WIRES SHALL NOT BE MORE THAN 8". THE SPACING CENTER TO CENTER OF THE LONGITUDINAL DISTRIBUTION STEEL FOR EITHER LINE OF REINFORCING IN THE TOP SLAB SHALL BE NOT MORE THAN 1'-4".

- 4.3.2 LAPS, WELDS, AND SPACING FOR PRECAST WINGWALLS HEADWALLS AND FOUNDATIONS - SPLICES IN THE REINFORCEMENT SHALL BE MADE BY LAPPING. LAPS MAY BE TACK WELDED TOGETHER FOR ASSEMBLY PURPOSES. FOR SMOOTH WELDED WIRE FABRIC, THE OVERLAP SHALL MEET THE REQUIREMENTS OF AASHTO 5.11.2.5.2 AND 5.11.6.2. FOR DEFORMED WELDED WIRE FABRIC, THE OVERLAP SHALL MEET THE REQUIREMENTS OF AASHTO 5.11.2.5.1 AND 5.11.6.1. FOR DEFORMED BILLET-STEEL BARS, THE OVERLAP SHALL MEET THE REQUIREMENTS OF AASHTO 5.11.2.1. THE SPACING CENTER-TO-CENTER OF THE WIRES IN A WIRE FABRIC SHEET SHALL BE NOT LESS THAN 2" NOR MORE THAN 8".
 4.4. CURING - THE PRECAST CONCRETE ELEMENTS SHALL BE CURED
- FOR A SUFFICIENT LENGTH OF TIME SO THAT THE CONCRETE WILL DEVELOP THE SPECIFIED COMPRESSIVE STRENGTH IN 28 DAYS OR LESS. ANY ONE OF THE FOLLOWING METHODS OF
- CURING OR COMBINATIONS THERE OF SHALL BE USED: 4.4.1. STEAM CURING - THE PRECAST ELEMENTS MAY B LOW-PRESSURE STEAM CURED BY A SYSTEM THAT WILL
- MAINTAIN A MOIST ATMOSPHERE. 4.4.2. WATER CURING THE PRECAST ELEMENTS MAY BE WATER CURED BY ANY METHOD THAT WILL KEEP THE SECTIONS MOIST
- 4.4.3. MEMBRANE CURING A SEALING MEMBRANE CONFORMING TO THE REQUIREMENTS OF ASTM SPECIFICATION C309 MAY BE APPLIED AND SHALL BE LEFT INTACT UNTIL THE REQUIRED CONCRETE COMPRESSIVE STRENGTH IS ATTAINED. THE CONCRETE TEMPERATURE AT THE TIME OF APPLICATION SHALL BE WITHIN +/- 10 DEGREES F OF THE ATMOSPHERIC TEMPERATURE. ALL SURFACES SHALL BE KEPT MOIST PRIOR TO THE APPLICATION OF THE COMPOUNDS AND SHALL BE DAMP WHEN THE COMPOUND IS APPLIED.
- 4.5. STORAGE, HANDLING & DELIVERY 4.5.1.STORAGE PRECAST CONCRETE BRIDGE ELEMENTS SHALL BE LIFTED AND STORED IN "AS-CAST" POSITION. PRECAST CONCRETE HEADWALL AND WINGWALL UNITS ARE CAST, STORED AND SHIPPED IN A FLAT POSITION. THE PRECAST ELEMENTS SHALL BE STORED IN SUCH A MANNER TO PREVENT CRACKING OR DAMAGE. STORE ELEMENTS USING TIMBER SUPPORTS AS APPROPRIATE. THE UNITS SHALL NOT BE MOVED UNTIL THE CONCRETE COMPRESSIVE STRENGTH HAS REACHED A MINIMUM OF 2500 PSI, AND THEY SHALL NOT BE STORED IN AN UPRIGHT POSITION
- 4.5.2. HANDLING HANDLING DEVICES SHALL BE PERMITTED IN EACH PRECAST ELEMENT FOR THE PURPOSE OF HANDLING AND SETTING, SPREADER BEAMS MAY BE REQUIRED FOR THE LIFTING OF PRECAST CONCRETE BRIDGE ELEMENTS TO PRECLUDE DAMAGE FROM BENDING OR TORSION FORCES.
- 4.5.3. DELIVERY PRECAST CONCRETE ELEMENTS MUST NOT BE SHIPPED UNTIL THE CONCRETE HAS ATTAINED THE SPECIFIED DESIGN COMPRESSIVE STRENGTH, OR AS DIRECTED BY THE DESIGN ENGINEER. PRECAST CONCRETE ELEMENTS MAY BE UNLOADED AND PLACED ON THE GROUND AT THE SITE UNTIL INSTALLED. STORE ELEMENTS USING TIMBER SUPPORTS AS APPROPRIATE. 4.6. QUALITY ASSURANCE - THE PRECASTER SHALL DEMONSTRATE
- ADHERENCE TO THE STANDARDS SET FORTH IN THE NPCA QUALITY CONTROL MANUAL. THE PRECASTER SHALL MEET EITHER SECTION 4.6.1 OR 4.6.2
- 4.6.1.CERTIFICATION THE PRECASTER SHALL BE CERTIFIED BY THE PRECAST/PRESTRESSED CONCRETE INSTITUTE PLANT CERTIFICATION PROGRAM OR THE NATIONAL PRECAST CONCRETE ASSOCIATION'S PLANT CERTIFICATION PROGRAM PRIOR TO AND DURING PRODUCTION OF THE PRODUCTS COVERED BY THIS SPECIFICATION
- 4.6.2. QUALIFICATIONS, TESTING AND INSPECTION 4.6.2.1. THE PRECASTER SHALL HAVE BEEN IN THE BUSINESS OF PRODUCING PRECAST CONCRETE PRODUCTS SIMILAR TO THOSE SPECIFIED FOR A MINIMUM OF THREE YEARS. HE SHALL MAINTAIN A PERMANENT QUALITY CONTROL DEPARTMENT OR RETAIN AN INDEPENDENT TESTING AGENCY ON A CONTINUING BASIS. THE AGENCY SHALL ISSUE A REPORT, CERTIFIED BY A LICENSED ENGINEER, DETAILING THE ABILITY OF THE PRECASTER TO PRODUCE QUALITY PRODUCTS CONSISTENT WITH INDUSTRY STANDARDS
 - 4.6.2.2. THE PRECASTER SHALL SHOW THAT THE FOLLOWING TESTS ARE PERFORMED IN CORDANCE WITH THE ASTM STANDARDS INDICATED, TESTS SHALL BE PERFORMED AS

PROPOSAL

DRAWING

INDICATED IN SECTION 6 OF THESE SPECIFICATIONS.

- 4.6.2.2.1. AIR CONTENT: C231 OR C173 4.6.2.2.2. COMPRESSIVE STRENGTH: C31
- 4.6.2.3. THE PRECASTER SHALL PROVIDE DOC
- DEMONSTRATING COMPLIANCE WITH T TO CONTECH® ENGINEERED SOLUTION
- REGULAR INTERVALS OR UPON REQUE
- 4.6.2.4. THE OWNER MAY PLACE AN INSPECTO PLANT WHEN THE PRODUCTS COVERE
- SPECIFICATION ARE BEING MANUFACT
- 4.6.3. DOCUMENTATION THE PRECASTER SHALL SUE PRECAST PRODUCTION REPORTS TO CONTECH ENGINEERED SOLUTIONS AS REQUIRED.

ERMISSIBLE VARIATIONS

- 5.1.1. INTERNAL DIMENSIONS THE INTERNAL DIMENS VARY NOT MORE THAN 1% FROM THE DESIGN D
- NOR MORE THAN 1/2" WHICHEVER IS LESS. 5.1.2. SLAB AND WALL THICKNESS THE SLAB AND WA THICKNESS SHALL NOT BE LESS THAN THAT SHO DESIGN BY MORE THAN ½". A THICKNESS MORE REQUIRED IN THE DESIGN SHALL NOT BE CAUSI REJECTION.
- 5.1.3. LENGTH OF OPPOSITE SURFACES VARIATIONS LENGTHS OF TWO OPPOSITE SURFACES OF TH UNIT SHALL NOT BE MORE THAN 1/2" IN ANY SECT EXCEPT WHERE BEVELED ENDS FOR LAYING OF ARE SPECIFIED BY THE PURCHASER.
- 5.1.4.LENGTH OF SECTION THE UNDERRUN IN LENG SECTION SHALL NOT BE MORE THAN X" IN ANY E 5.1.5.POSITION OF REINFORCEMENT THE MAXIMUM IN POSITION OF THE REINFORCEMENT SHALL B
- CASE SHALL THE COVER OVER THE REINFORC LESS THAN 12" FOR THE OUTSIDE CIRCUMFERE OR BE LESS THAN 1" FOR THE INSIDE CIRCUMF STEEL AS MEASURED TO THE EXTERNAL OR IN SURFACE OF THE BRIDGE. THESE TOLERANCES REQUIREMENTS DO NOT APPLY TO MATING SUF THE JOINTS
- 5.1.6. AREA OF REINFORCEMENT THE AREAS OF ST REINFORCEMENT SHALL BE THE DESIGN STEEL SHOWN IN THE MANUFACTURER'S SHOP DRAW AREAS GREATER THAN THOSE REQUIRED SHAL CAUSE FOR REJECTION. THE PERMISSIBLE VAR DIAMETER OF ANY REINFORCEMENT SHALL CO THE TOLERANCES PRESCRIBED IN THE ASTM SPECIFICATION FOR THAT TYPE OF REINFORCE
- 5.2. WINGWALLS & HEADWALLS 5.2.1. WALL THICKNESS THE WALL THICKNESS SHAL
- FROM THAT SHOWN IN THE DESIGN BY MORE T 5.2.2. LENGTH/HEIGHT OF WALL SECTIONS THE LENG HEIGHT OF THE WALL SHALL NOT VARY FROM T IN THE DESIGN BY MORE THAN 2". 5.2.3. POSITION OF REINFORCEMENT - THE MAXIMUM
- IN THE POSITION OF THE REINFORCEMENT SHA IN NO CASE SHALL THE COVER OVER THE REIN
- BE LESS THAN 1½". 5.2.4. SIZE OF REINFORCEMENT THE PERMISSIBLE V DIAMETER OF ANY REINFORCING SHALL CONFO TOI FRANCES PRESCRIBED IN THE ASTM SPEC FOR THAT TYPE OF REINFORCING. STEEL AREA THAN THAT REQUIRED SHALL NOT BE CAUSE FO REJECTION
- 5.3. FOUNDATION UNITS
- 5.3.1. WALL THICKNESS THE WALL THICKNESS SHAI FROM THAT SHOWN IN THE DESIGN BY MORE 5.3.2. LENGTH/ HEIGHT/WIDTH OF FOUNDATION SEC LENGTH, HEIGHT AND WIDTH OF THE FOUNDAT SHALL NOT VARY FROM THAT SHOWN IN THE D
- MORE THAN $\frac{1}{2}$ ". 5.3.3. POSITION OF REINFORCEMENT THE MAXIMUM IN THE POSITION OF THE REINFORCEMENT SHA NO CASE SHALL THE COVER OVER THE REINFO LESS THAN 12". 5.3.4. SIZE OF REINFORCEMENT - THE PERMISSIBLE V
- DIAMETER OF ANY REINFORCING SHALL CONFO TOLERANCES PRESCRIBED IN THE ASTM SPECI FOR THAT TYPE OF REINFORCING. STEEL AREA THAN THAT REQUIRED SHALL NOT BE CAUSE F REJECTION.

6. TESTING/ INSPECTION

- 6.1.1. TYPE OF TEST SPECIMEN CONCRETE COMPRE STRENGTH SHALL BE DETERMINED FROM COMP TESTS MADE ON CYLINDERS OR CORES. FOR CY TESTING, A MINIMUM OF 4 CYLINDERS SHALL BE EACH BRIDGE ELEMENT, EACH ELEMENT SHALL CONSIDERED SEPARATELY FOR THE PURPOSE AND ACCEPTANCE.
- 6.1.2. COMPRESSION TESTING CYLINDERS SHALL BE TESTED AS PRESCRIBED BY THE ASTM C39 SPE CYLINDERS SHALL BE CURED IN THE SAME ENV AS THE BRIDGE ELEMENTS. CORES SHALL BE C AND TESTED FOR COMPRESSIVE STRENGTH IN ACCORDANCE WITH THE PROVISIONS OF THE A SPECIFICATION.
- 6.1.3. ACCEPTABILITY OF CYLINDER TESTS WHEN TH COMPRESSIVE STRENGTH OF ALL CYLINDERS EQUAL TO OR GREATER THAN THE DESIGN COM

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31 of 34

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/ARIATION IN DRM TO THE IFICATION GREATER OR	HALF THE THICKNESS OF THE WALL. 10.2.DEFECTS THAT INDICATE PROPORTIC MOLDING NOT IN COMPLIANCE WITH SPECIFICATIONS. 10.3.HONEYCOMBED OR OPEN TEXTURE. 10.4.DAMAGED ENDS, WHERE SUCH DAMA MAKING A SATISFACTORY JOINT.	DNING, MIXING, A SECTION 4 OF T GE WOULD PRE	AND HESE EVENT		
VARIATION LL BE $\pm \frac{1}{2}$ ". IN RCEMENT BE	INDIVIDUAL PRECAST ELEMENTS MAY BE ANY OF THE FOLLOWING: 10.1.FRACTURES OR CRACKS PASSING TH EXCEPT FOR A SINGLE END CRACK T	REJECTED BEC ROUGH THE WA HAT DOES NOT	AUSE ALL, EXCE	OF ED ON	E
L NOT VARY HAN ½". IONS - THE ION UNITS ESIGN BY	REPAIRS ARE SOUND, PROPERLY FINISHE REPAIRED SECTION CONFORMS TO THE F SPECIFICATION. 10. <u>REJECTION</u> THE PRECAST ELEMENTS SHALL BE SUB, ACCOUNT OF ANY OF THE SPECIFICATION	D AND CURED, EQUIREMENTS ECT TO REJECT REQUIREMEN	AND T OF TH FION C	THE HIS DN	
DRM TO THE FICATION GREATER OR	DEFECTS SHALL BE CONSIDERED AS PAR FORM FINISH. 9. <u>REPAIRS</u> PRECAST ELEMENTS MAY BE REPAIRED, IMPERFECTIONS IN MANUFACTURE OR HA BE ACCEPTABLE IF, IN THE OPINION OF TH	T OF A SMOOTH F NECESSARY, NDLING DAMAG IE PURCHASER	BECA	EL USE O D WILL	F
ALL BE ± ½". FORCEMENT	HEADWALLS SHALL BE PARALLEL TO EAC OF VARIATIONS GIVEN IN SECTION 5, ABO PRECAST ELEMENTS SHALL BE A SMOOTI TROWELED SURFACE. TRAPPED AIR POC	H OTHER, WITHI VE. THE SURFAG H STEEL FORM C KETS CAUSING	N THE CE OF DR SURF	E LIMIT THE ACE	S
GTH AND THAT SHOWN VARIATION	THE BRIDGE UNITS SHALL BE NORMAL TO CENTERLINE OF THE BRIDGE SECTION, W VARIATIONS GIVEN IN SECTION 5, ABOVE, ENDS ARE SPECIFIED. THE FACES OF THE	THE WALLS AN ITHIN THE LIMIT EXCEPT WHER WINGWALLS AN	D S OF E BEV ND	THE ELED	
EMENT. .L NOT VARY HAN ½".	ADJACENT PRECAST UNITS SHALL NOT E 8. WORKMANSHIP/FINISH THE BRIDGE UNITS, WINGWALLS, HEADW, UNITS SHALL BE SUBSTANTIALLY FREE OF	XCEED ¾". ALLS AND FOUN FRACTURES. T	DATIC	N NDS O	F
LAREAS AS INGS. STEEL LL NOT BE RIATION IN NFORM TO	THE BRIDGE UNITS SHALL BE PRODUCED THE ENDS OF THE BRIDGE UNITS SHALL I SECTIONS ARE LAID TOGETHER THEY WI LINE WITH A SMOOTH INTERIOR FREE OF IRREGULARITIES, ALL COMPATIBLE WITH VARIATIONS IN SECTION 5, ABOVE. THE J	WITH FLAT BUT BE SUCH THAT W LL MAKE A CON" APPRECIABLE THE PERMISSIB DINT WIDTH BET		DS. THE DUS	
TERNAL S OR COVER RFACES OF EEL	REQUIRED. 6.2. INSPECTION - THE QUALITY OF MATEI MANUFACTURE, AND THE FINISHED P BE SUBJECT TO INSPECTION BY THE 7. JOINTS	RIALS, THE PRO RECAST ELEME PURCHASER.	CESS NTS S	OF SHALL	
STH OF A BRIDGE UNIT. VARIATION E ± ½". IN NO EMENT BE ENTIAL STEEL ERENTIAL	MEET ALL OF THE TEST SPECIFICATION. PRECA SHALL BE CONSIDERED 6.1.4.3. TEST EQUIPMENT - EVE FURNISHING PRECAST SPECIFICATION SHALL PERSONNEL NECESSAF	REQUIREMENT ST ELEMENTS S SATISFACTOR'S RY MANUFACTU ELEMENTS UND FURNISH ALL FA	S OF SO SE FOR JRER ER TH CILITI	IL THIS ALED USE. IS IES AN E TES	D
S IN LAYING E BRIDGE TION, F CURVES	STRENGTH, THE PRECA THAT CORE WAS TAKED 6.1.4.2. PLUGGING CORE HOLE BE PLUGGED AND SEAL BLA MANYED OLIVITION	ST ELEMENT FF I SHALL BE REJI S - THE CORE HI ED BY THE MAN	ROM V ECTEI OLES IUFAC	VHICH D. SHALL TURE	२
ALL IOWN IN THE E THAN THAT E FOR	OR GREATER THAN THE DESIGN THE COMPRESSIVE STRENGTH BRIDGE ELEMENT IS ACCEPTAB 6.1.4.1. WHEN THE COMPRESSI RECORE IS LESS THAN	CONCRETE ST DF THE CONCRE LE. VE STRENGTH (THE DESIGN CO	RENG ETE IN OF AN	TH, I THAT Y	
SION SHALL DIMENSIONS	STRENGTH, WHEN THE COMPRE CORE TESTED IS LESS THAN TH STRENGTH, THE PRECAST ELEM CORE WAS TAKEN MAY BE RE-C COMPRESSIVE STRENGTH OF TI	SSIVE STRENG E DESIGN CONC ENT FROM WHI ORED. WHEN TH HE RE-CORE IS	TH OF RETE CH TH HE EQUA	A IAT L TO	
D BY THIS URED. 3MIT 1®	6.1.4, BELOW. 6.1.4. ACCEPTABILITY OF CORE TESTS STRENGTH OF THE CONCRETE I ACCEPTABLE WHEN THE AVERA IS FOUAL TO OR GREATER THAN	G - THE COMPRI N A BRIDGE ELE GE CORE TEST	ESSIV EMEN STRE	E F IS NGTH RETE	
C39,C497 UMENTATION 'HIS SECTION NS AT EST. R IN THE	HAS A COMPRESSIVE STRENGT DESIGN COMPRESSIVE STRENG SHALL BE ACCEPTED. WHEN TH OF THE CYLINDERS TESTED DO ACCEPTANCE CRITERIA, THE AC ELEMENT MAY BE DETERMINED	H LESS THAN 80 TH, THEN THE E E COMPRESSIVE ES NOT CONFOR CEPTABILITY O AS DESCRIBED	% OF ELEME E STR RM TC F THE IN SE	THE NT ENGTI THES CTION	H E
000 0 /07	STRENGTH, AND NOT MORE THA TESTED HAVE A COMPRESSIVE DESIGN CONCRETE STRENGTH,	N 10% OF THE (STRENGTH LES AND NO CYLINE	CYLIN S THA DER TI	DERS	

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SPECIFICATIONS FOR MANUFACTURE AND INSTALLATION OF CON/SPAN® O-SERIES BRIDGE SYSTEMS (CONT'D)

11. MARKING EACH BRIDGE UNIT SHALL BE CLEARLY MARKED BY WATERPROOF PAINT. THE FOLLOWING SHALL BE SHOWN ON THE INSIDE OF THE VERTICAL LEG OF THE BRIDGE SECTION: BRIDGE SPAN x BRIDGE RISE DATE OF MANUFACTURE

B-8

NAME OR TRADEMARK OF THE MANUFACTURER 12. INSTALLATION PREPARATION TO ENSURE CORRECT INSTALLATION OF THE PRECAST CONCRETE

- BRIDGE SYSTEM, CARE AND CAUTION MUST BE EXERCISED IN FORMING THE SUPPORT AREAS FOR BRIDGE UNITS, HEADWALL, WINGWALL ELEMENTS, EXERCISING SPECIAL CARE WILL FACILITATE THE RAPID INSTALLATION OF THE PRECAST COMPONENTS. 12.1.
- FOOTINGS DO NOT OVER EXCAVATE FOUNDATIONS UNLESS DIRECTED BY SITE SOIL ENGINEER TO REMOVE UNSUITABLE SOIL

THE SITE SOILS ENGINEER SHALL CERTIFY THAT THE BEARING CAPACITY MEETS OR EXCEEDS THE FOOTING DESIGN REQUIREMENTS, PRIOR TO THE CONTRACTOR POURING OF THE

THE BRIDGE UNITS AND WINGWALLS SHALL BE INSTALLED ON EITHER PRECAST OR CAST-IN-PLACE CONCRETE FOOTINGS. THE SIZE AND ELEVATION OF THE FOOTINGS SHALL BE AS DESIGNED BY THE ENGINEER. A KEYWAY SHALL BE FORMED IN THE TOP SURFACE OF THE BRIDGE FOOTING AS SPECIFIED ON THE PLANS NO KEYWAY IS REQUIRED IN THE WINGWALL FOOTINGS, UNLESS OTHERWISE SPECIFIED ON THE PLANS.

THE FOOTINGS SHALL BE GIVEN A SMOOTH FLOAT FINISH AND SHALL REACH A COMPRESSIVE STRENGTH OF 2,000 PSI BEFORE PLACEMENT OF THE BRIDGE AND WINGWALL ELEMENTS. BACKFILLING SHALL NOT BEGIN UNTIL THE FOOTING HAS REACHED THE FULL DESIGN COMPRESSIVE STRENGTH.

THE FOOTING SURFACE SHALL BE CONSTRUCTED IN ACCORDANCE WITH GRADES SHOWN ON THE PLANS. WHEN TESTED WITH A 10'-0" STRAIGHT EDGE, THE SURFACE SHALL NOT VARY MORE THAN ${\not\!\!\!\!{\cal X}}^{\! {\scriptscriptstyle T}}$ IN

IF A PRECAST CONCRETE FOOTING IS USED, THE CONTRACTOR SHALL PREPARE A 4" THICK BASE LAYER OF COMPACTED GRANULAR MATERIAL THE FULL WIDTH OF THE FOOTING PRIOR TO PLACING THE PRECAST FOOTING.

THE FOUNDATIONS FOR PRECAST CONCRETE BRIDGE ELEMENTS AND WINGWALLS MUST BE CONNECTED BY REINFORCEMENT TO FORM ONE MONOLITHIC BODY. EXPANSION JOINTS SHALL NOT BE

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CONSTRUCTION OF THE FOUNDATIONS PER THE PLANS AND SPECIFICATIONS

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- 13. INSTALLATION 13.1. GENERAL THE INSTALLATION OF THE PRECAST CONCRETE ELEMENTS SHALL BE AS EXPLAINED IN THE PUBLICATION CON/SPAN BRIDGE SYSTEMS INSTALLATION HANDBOOK.
- LIFTING IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT A CRANE OF THE CORRECT LIFTING CAPACITY IS AVAILABLE TO HANDLE THE PRECAST CONCRETE UNITS. THIS CAN BE ACCOMPLISHED BY USING THE WEIGHTS GIVEN FOR THE PRECAST CONCRETE COMPONENTS AND BY DETERMINING THE LIFTING REACH FOR EACH CRANE UNIT. SITE CONDITIONS MUST BE CHECKED WELL IN ADVANCE OF SHIPPING TO ENSURE PROPER CRANE LOCATION AND TO AVOID ANY LIFTING RESTRICTIONS. THE LIFT ANCHORS OR HOLES PROVIDED IN EACH UNIT ARE THE ONLY MEANS TO BE USED TO LIFT THE ELEMENTS. THE PRECAST CONCRETE ELEMENTS MUST NOT BE SUPPORTED OR RAISED BY OTHER MEANS THAN THOSE GIVEN IN THE MANUALS AND DRAWINGS WITHOUT WRITTEN APPROVAL FROM CONTECH® ENGINEERED SOLUTIONS.
- CONSTRUCTION EQUIPMENT WEIGHT RESTRICTIONS IN NO 13.1.2 CASE SHALL EQUIPMENT OPERATING IN EXCESS OF THE DESIGN LOAD (HS20 OR HS25) BE PERMITTED OVER THE BRIDGE UNITS UNI ESS APPROVED BY CONTECH® ENGINEERED SOLUTIONS
- 13.1.2.1. IN THE IMMEDIATE AREA OF THE BRIDGE UNITS, THE FOLLOWING RESTRICTIONS FOR THE USE OF HEAVY CONSTRUCTION MACHINERY DURING BACKFILLING OPERATIONS APPLY:
- NO CONSTRUCTION EQUIPMENT SHALL CROSS THE BARE PRECAST CONCRETE BRIDGE UNIT. • AFTER THE COMPACTED FILL LEVEL HAS REACHED A MINIMUM OF
- 4" OVER THE CROWN OF THE BRIDGE, CONSTRUCTION EQUIPMENT WITH A WEIGHT OF LESS THAN 10 TONS MAY CROSS THE BRIDGE.
- AFTER THE COMPACTED FILL LEVEL HAS REACHED A MINIMUM OF 1-0" OVER THE CROWN OF THE BRIDGE, CONSTRUCTION EQUIPMENT WITH A WEIGHT OF LESS THAN 30 TONS MAY CROSS THE BRIDGE
- AFTER THE COMPACTED FILL LEVEL HAS REACHED THE DESIGN COVER, OR 2'-0" MINIMUM, OVER THE CROWN OF THE PRECAST CONCRETE BRIDGE, CONSTRUCTION EQUIPMENT WITHIN THE DESIGN LOAD LIMITS FOR THE ROAD MAY CROSS THE PRECAST CONCRETE BRIDGE
- 13.2. LEVELING PAD/SHIMS THE BRIDGE UNITS AND WINGWALLS SHALL BE SET ON HARDBOARD SHIMS CONFORMING TO ASTM D1037 OR PLASTIC SHIMS (DAYTON SUPERIOR P-80, P-81 OR APPROVED EQUAL) MEASURING 5" x 5", MINIMUM, UNLESS SHOWN OTHERWISE ON THE PLANS, A MINIMUM GAP OF 1/2" SHALL BE PROVIDED BETWEEN THE FOOTING AND THE BOTTOM OF THE BRIDGE'S

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REVISION DESCRIPTION

VERTICAL LEGS OR THE BOTTOM OF THE WINGWALL, ALSO, A SUPPLY OF 1/4", 1/2" AND 1/6" THICK HARDBOARD OR PLASTIC SHIMS FOR VARIOUS SHIMMING PURPOSES SHALL BE ON SITE. 13.3. PLACEMENT OF BRIDGE UNITS - THE BRIDGE UNITS SHALL BE PLACED AS SHOWN ON THE ENGINEER'S PLAN DRAWINGS. SPECIAL CARE SHALL BE TAKEN IN SETTING THE ELEMENTS TO THE TRUE LINE AND GRADE. THE JOINT WIDTH BETWEEN ADJACENT PRECAST UNITS SHALL NOT EXCEED 3/1"

- 13.4. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAINTAIN THE STRUCTURE SPAN DURING ALL PHASES OF INSTALLATION. DUE TO THE ARCH SHAPE, BRIDGE ELEMENTS WILL TEND TO SPREAD UNDER SELF-WEIGHT. IT IS IMPERATIVE THAT ANY LATERAL SPREADING OF THE BRIDGE ELEMENTS BE AVOIDED DURING AND AFTER THEIR PLACEMENT. GENERALLY, HORIZONTAL CABLE TIES OR TIE RODS ARE SHIPPED IN THE LARGER BRIDGE ELEMENTS TO ASSIST IN PREVENTING THIS SPREADING, CABLE TIES/TIE RODS SHALL NOT BE REMOVED UNTILL BRIDGE UNITS ARE GROUTED AND GROUT HAS CURED. IT IS RECOMMENDED THAT TEMPORARY HARDWOOD BLOCKS BE USED IN CONJUNCTION WITH THE CABLE TIES/TIE RODS TO MAINTAIN SPAN. IF, HOWEVER, DUE TO SITE RESTRICTIONS. THESE CABLE TIES/TIE RODS MUST BE REMOVED PRIOR TO PLACEMENT OF THE BRIDGE ELEMANTS, THE CONTRACTOR MUST NOTIFY CONTECH (MANUFACTURER) AND REQUEST A SUGGESTED INSTALLATION PROCEDURE
 - IN ADDITION, IF THE CABLE TIES/TIE RODS MUST BE REMOVED PRIOR TO SETTING ARCH UNITS, THE FOLLOWING QUALITY CONTROL PROCEDURE MUST BE FOLLOWED
 - 1) FIND "MEASURED SPAN" UPON ARCH UNIT'S DELIVERY TO SITE, PRIOR TO LIFTING FROM TRUCK AND REMOVING CABLE TIES/TIE RODS. "MEASURED SPAN" SHALL BE THE AVERAGE OF (3) SPAN MEASUREMENTS ALONG THE LAY LENGTH OF THE ARCH UNIT
 - 2) AFTER SETTING OF BRIDGE UNIT ON THE FOUNDATION, VERIFY THE SPAN, THIS "INSTALLED SPAN MEASUREMENT" SHALL NOT EXCEED THE MAXIMUM OF

A) THE NOMINAL SPAN +½" OR B) THE "MEASURED SPAN" IF THE "INSTALLED SPAN MEASUREMENT" EXCEEDS THIS AMOUNT, THE ARCH UNIT SHALL BE LIFTED AND RE-SET UNTIL THE 'INSTALLED SPAN MEASUREMENT" MEETS THE LIMITS

- 13.5. PLACEMENT OF WINGWALLS, HEADWALLS AND FOUNDATION UNITS - THE WINGWALLS, HEADWALLS AND FOUNDATIONS SHALL BE PLACED AS SHOWN ON THE PLAN DRAWINGS. SPECIAL CARE SHALL BE TAKEN IN SETTING THE ELEMENTS TO THE TRUE LINE AND GRADE
- 13.6. WATERPROOFING/JOINT PROTECTION AND SUBSURFACE DRAINAGE
- 13.6.1. EXTERNAL PROTECTION OF JOINTS THE BUTT JOINT MADE BY TWO ADJOINING BRIDGE UNITS SHALL BE COVERED WITH A %" x 1%" PREFORMED BITUMINOUS JOINT SEALANT AND A MINIMUM OF A 9" WIDE JOINT WRAP. THE SURFACE SHALL BE FREE OF DIRT BEFORE APPLYING THE JOINT MATERIAL. A PRIMER COMPATIBLE WITH THE JOINT WRAP TO BE USED SHALL BE APPLIED FOR A MINIMUM WIDTH OF 9" ON EACH SIDE OF THE JOINT. THE EXTERNAL WRAP SHALL BE CS212 BY CONCRETE SEALANTS INC., EZ-WRAP RUBBER BY PRESS-SEAL GASKET CORPORATION, SEAL WRAP BY MAR MAC MANUFACTURING CO. INC. OR APPROVED EQUAL. THE JOINT SHALL BE COVERED CONTINUOUSLY FROM THE BOTTOM OF ONE BRIDGE SECTION LEG. ACROSS THE TOP OF THE BRIDGE AND TO THE OPPOSITE BRIDGE SECTION LEG, ANY LAPS THAT RESULT IN THE JOINT WRAP SHALL BE A MINIMUM OF 6" LONG WITH THE OVERLAP RUNNING DOWNHILL
- IN ADDITION TO THE JOINTS BETWEEN BRIDGE UNITS, THE 13.6.2. JOINT BETWEEN THE END BRIDGE UNIT AND THE HEADWALL SHALL ALSO BE SEALED AS DESCRIBED ABOVE. IF PRECAST WINGWALLS ARE USED, THE JOINT BETWEEN THE END BRIDGE UNIT AND THE WINGWALL SHALL BE SEALED WITH A 2'-0" STRIP OF FILTER FABRIC ALSO, IF LIFT HOLES ARE FORMED IN THE BRIDGE UNITS, THEY SHALL BE PRIMED AND COVERED WITH A 9" x 9" SQUARE OF JOINT WRAP
- 13.6.3. DURING THE BACKFILLING OPERATION, CARE SHALL BE TAKEN TO KEEP THE JOINT WRAP IN ITS PROPER LOCATION OVER THE JOINT
- 13.6.4. SUBSOIL DRAINAGE SHALL BE AS DIRECTED BY THE
- ENGINEER
- 13.7. <u>GROUTING</u> 13.7.1. GROUTING SHALL NOT BE PERFORMED WHEN TEMPERATURES ARE EXPECTED TO GO BELOW 35° FOR A PERIOD OF 72 HOURS. THE OPIDOE FOLINDATION KEYWAY WITH CEMENT GROUT 13.7. (PORTLAND CEMENT AND WATER OR CEMENT MORTAR COMPOSEL OF PORTLAND CEMENT, SAND AND WATER) WITH A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 3000 PSI, VIBRATE AS REQUIRED TO ENSURE THAT THE ENTIRE KEY AROUND THE BRIDGE ELEMENT IS COMPLETELY FILLED. IF BRIDGE ELEMENTS HAVE BEEN SET WITH TEMPORARY TIES (CABLES BARS ETC.) GROUT MUST ATTAIN A MINIMUM COMPRESSIVE STRENGTH OF 1500 PSI BEFORE TIES MAY BE REMOVED.
- 13.7.2. ALL GROUT SHALL HAVE A MAXIMUM AGGREGATE SIZE OF //". 13.7.3. LIFTING AND ERECTION ANCHOR RECESSES SHALL BE FILLED WITH GROUT. AFTER GROUT HAS REACHED ITS DESIGN STRENGTH THE 13.7.4.
- TEMPORARY HARDWOOD WEDGES SHALL BE REMOVED AND THEIR HOLES FILLED WITH GROUT. 13.8. BACKFILL 13.8.1. DO NOT PERFORM BACKFILLING DURING WET OR FREEZING

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ENGINEERED SOLUTIONS

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13.8.2. NO BACKFILL SHALL BE PLACED AGAINST ANY STRUCTURAL

ELEMENTS UNTIL THEY HAVE BEEN APPROVED BY THE ENGINEER. 3.3. BACKFILL SHALL BE CONSIDERED AS ALL REPLACED 13.8.3. EXCAVATION AND NEW EMBANKMENT ADJACENT TO THE PRECAST CONCRETE ELEMENTS. THE PROJECT CONSTRUCTION AND MATERIAL SPECIFICATIONS, WHICH INCLUDE THE SPECIFICATIONS FOR EXCAVATION FOR STRUCTURES AND ROADWAY EXCAVATION AND EMBANKMENT CONSTRUCTION, SHALL APPLY EXCEPT AS MODIFIED IN THIS SECTION. 13.8.4. BACKFILL ZONES:

IN-SITU SOIL

- ZONE A: CONSTRUCTED EMBANKMENT OR OVEREILL ZONE B: FILL THAT IS DIRECTLY ASSOCIATED WITH PRECAST CONCRETE BRIDGE INSTALLATION. ZONE C' ROAD STRUCTURE
- REQUIRED BACKFILL PROPERTIES
- 13.8.5.1, IN-SITU SOIL NATURAL GROUND IS TO BE SUFFICIENTLY STABLE TO ALLOW EFFECTIVE SUPPORT TO THE PRECAST CONCRETE BRIDGE UNITS. AS A GUIDE, THE EXISTING NATURAL GROUND SHOULD BE OF SIMILAR QUALITY AND DENSITY TO ZONE B MATERIAL FOR MINIMUM LATERA DIMENSION OF ONE BRIDGE SPAN OUTSIDE OF THE BRIDGE FOOTING
- 13.8.5.2. ZONE A ZONE A REQUIRES FILL MATERIAL WITH SPECIFICATIONS AND COMPACTING PROCEDURES EQUAL TO
- THAT FOR NORMAL ROAD EMBANKMENTS. 13.8.5.3. ZONE B GENERALLY, SOILS SHALL BE REASONABLY FREE OF ORGANIC MATTER, AND, NEAR CONCRETE SURFACES, FREE OF STONES LARGER THAN 3" IN DIAMETER SEE CHARTS FOR DETAILED DESCRIPTIONS OF ACCEPTABLE SOILS.
- 13.8.5.4 ZONE C ZONE C IS THE ROAD SECTION OF GRAVEL ASPHALT OR CONCRETE BUILT IN COMPLIANCE WITH LOCAL ENGINEERING PRACTICES.
- 13.8.5.5. GEOTECHNICAL ENGINEER SHALL REVIEW GRADATIONS OF ALL INTERFACING MATERIALS AND, IF NECESSARY, RECOMMEND GEOTEXTILE FILTER FABRIC (PROVIDED BY CONTRACTOR
- 13.8.6. PLACING AND COMPACTING BACKFILL DUMPING FOR BACKFILLING IS NOT ALLOWED ANY NEARER THAN 3'-0" FROM THE BRIDGE LEG.

THE FILL MUST BE PLACED AND COMPACTED IN LAYERS NOT EXCEEDING 8". THE MAXIMUM DIFFERENCE IN THE SURFACE LEVELS OF THE FILL ON OPPOSITE SIDES OF THE BRIDGE MUST NOT EXCEED 2'-0'

THE FILL BEHIND WINGWALLS MUST BE PLACED AT THE SAME TIME AS THAT OF THE BRIDGE FILL. IT MUST BE PLACED IN PROGRESSIVELY PLACED HORIZONTAL LAYERS NOT EXCEEDING 8" PER LAYER

THE BACKFILL OF ZONE B SHALL BE COMPACTED TO A MINIMUM DENSITY OF 95% OF THE STANDARD PROCTOR, AS REQUIRED BY AASHTO T-99

SOIL WITHIN 1'-0" OF CONCRETE SURFACES SHALL BE HAND-COMPACTED. ELSEWHERE, USE OF ROLLERS IS ACCEPTABLE. IF VIBRATING ROLLER-COMPACTORS ARE USED, THEY SHALL NOT BE STARTED OR STOPPED WITHIN ZONE B AND THE VIBRATION FREQUENCY SHOULD BE AT LEAST 30 REVOLUTIONS PER SECOND

THE BACKFILL MATERIAL AND COMPACTING BEHIND WINGWALLS SHALL SATISFY THE CRITERIA FOR THE BRIDGE BACKFILL, ZONE B

BACKFILL AGAINST A WATERPROOFED SURFACE SHALL BE PLACED CAREFULLY TO AVOID DAMAGE TO THE WATERPROOFING MATERIAL

BRIDGE UNITS 13.8.7.

FOR FILL HEIGHTS OVER 12 FEET (AS MEASURED FROM TOP CROWN OF BRIDGE TO FINISHED GRADE), NO BACKFILLING MAY BEGIN UNTIL A BACKFILL COMPACTION TESTING PLAN HAS BEEN COORDINATED WITH AND APPROVED BY CONTECH® ENGINEERED SOLUTIONS

- 13.8.8. WINGWALLS
- BACKFILL IN FRONT OF WINGWALLS SHALL BE CARRIED TO GROUND LINES SHOWN IN THE PLANS. 13.8.9. MONITORING
- THE CONTRACTOR SHALL CHECK SETTLEMENTS AND HORIZONTAL DISPLACEMENT OF FOUNDATION TO ENSURE THAT THEY ARE WITHIN THE ALLOWABLE LIMIT PROVIDED BY THE ENGINEER. THESE MEASUREMENTS SHOULD GIVE AN INDICATION OF THE SETTLEMENTS AND DEFORMATIONS ALONG THE LENGTH OF THE FOUNDATIONS

THE FIRST MEASUREMENT SHOULD TAKE PLACE AFTER THE ERECTION OF ALL PRECAST BRIDGE SYSTEM ELEMENTS, A SECOND AFTER COMPLETION OF BACKFILLING, AND A THIRD BEFORE OPENING OF THE BRIDGE TO TRAFFIC, FURTHER MEASUREMENTS MAY BE MADE ACCORDING TO LOCAL CONDITIONS

PROPOSAL

DRAWING



TYPICAL	AASHTO	AASHTO	PEF	RCENT PASS JS SIEVE NC	ING).	CHARACTER PASSING I	R OF FRACTION NO. 40 SIEVE	
MATERIALS	GROUP	SUBGROUP	#10	#40	#200	LIQUID LIMIT	PLASTICITY INDEX	SOIL DESRIPTION
GW, GP, SP	A1	A-1a	50 MAX	30 MAX	15 MAX		6 MAX	LARGELY GRAVEL BUT CAN INCLUDE SAND AND FINES
GM, SW, SP, SM		A-1b		50 MAX	25 MAX		6 MAX	GRAVELLY SAND OR GRADED SAND, MAY INCLUDE FINES
GM, SM, ML, SP, GP	Δ2	A-2-4			35 MAX	40 MAX	10 MAX	SANDS, GRAVELS WITH LOW- PLASTICITY SILT FINES
SC, GC, GM	A2	A-2-5			35 MAX	41 MIN	10 MAX	SANDS, GRAVELS WITH PLASTIC SILT FINES
SP, SM, SW	A3			51 MIN	10 MAX		NON- PLASTIC	FINE SANDS
ML, SM, SC	A4				36 MIN	40 MAX	10 MAX	LOW-COMPRESSIBILTY SILTS



SPAN	FILL HE
≤ 24'-0"	≥ 12
≤ 24'-0"	< 12
> 24'-0"	AL



CONSPAN O SERIES O633
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OF 10

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ACCEPTABLE SOILS FOR USE IN ZONE B BACKFILL

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B-8

MARK

DATE

REVISION DESCRIPTION

BY



AUSTIN, TEXAS



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_ CRUSSING	JJM			
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34 of 34





Subject Tract

Base Map

CASE NO: SP-2021-0178C ADDRESS: 10801 BREZZA LANE



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