



Illinois Department of Transportation

2300 South Dirksen Parkway / Springfield, Illinois / 62764

June 5, 2014

SUBJECT: FAS 1928 (Skyline Road)
Project SR-1928(101)
Section 99-00088-00-RS
Union County
Contract No. 99139
Item 218
June 13, 2014 Letting
Addendum (A)

NOTICE TO PROSPECTIVE BIDDERS:

Due to clarify information necessary to revise the following:

- 1. Updated BDE Special Provisions Check Sheet.**
- 2. Remove BDE 80324 (LRFD Pipe Culvert Burial Tables), pages 37 – 56.**

Prime contractors must utilize the enclosed material when preparing their bid and must include any Schedule of Prices changes in their bidding proposal.

Bidders using computer-generated bids are cautioned to reflect any and all Schedule of Prices changes, if involved, into their computer programs.

Very truly yours,

John Baranzelli, P.E.
Acting Engineer of Design and Environment

A handwritten signature in black ink, appearing to read 'Ted B. Walschleger P.E.'.

By: Ted B. Walschleger, P.E.
Engineer of Project Management

BDE SPECIAL PROVISIONS
For the April 25 and June 13, 2014 Lettings

The following special provisions indicated by an "x" are applicable to this contract. An * indicates a new or revised special provision for the letting.

<u>File Name</u>	<u>Pg.</u>		<u>Special Provision Title</u>	<u>Effective</u>	<u>Revised</u>
80240			Above Grade Inlet Protection	July 1, 2009	Jan. 1, 2012
80099			Accessible Pedestrian Signals (APS)	April 1, 2003	Jan. 1, 2014
80274			Aggregate Subgrade Improvement	April 1, 2012	Jan. 1, 2013
80192	13	X	Automated Flagger Assistance Device	Jan. 1, 2008	
80173			Bituminous Materials Cost Adjustments	Nov. 2, 2006	Aug. 1, 2013
80241			Bridge Demolition Debris	July 1, 2009	
50261			Building Removal-Case I (Non-Friable and Friable Asbestos)	Sept. 1, 1990	April 1, 2010
50481			Building Removal-Case II (Non-Friable Asbestos)	Sept. 1, 1990	April 1, 2010
50491			Building Removal-Case III (Friable Asbestos)	Sept. 1, 1990	April 1, 2010
50531			Building Removal-Case IV (No Asbestos)	Sept. 1, 1990	April 1, 2010
80292			Coarse Aggregate in Bridge Approach Slabs/Footings	April 1, 2012	April 1, 2013
80310			Coated Galvanized Steel Conduit	Jan. 1, 2013	
80198			Completion Date (via calendar days)	April 1, 2008	
80199			Completion Date (via calendar days) Plus Working Days	April 1, 2008	
* 80293			Concrete Box Culverts with Skews > 30 Degrees and Design Fills ≤ 5 Feet	April 1, 2012	April 1, 2014
* 80294			Concrete Box Culverts with Skews ≤ 30 Degrees Regardless of Design Fill and Skews > 30 Degrees with Design Fills > 5 Feet	April 1, 2012	April 1, 2014
80311			Concrete End Sections for Pipe Culverts	Jan. 1, 2013	
* 80334			Concrete Gutter, Curb, Median, and Paved Ditch	April 1, 2014	
80277			Concrete Mix Design – Department Provided	Jan. 1, 2012	Jan. 1, 2014
80261			Construction Air Quality – Diesel Retrofit	June 1, 2010	Jan. 1, 2014
* 80335	15	X	Contract Claims	April 1, 2014	
80029	16	X	Disadvantaged Business Enterprise Participation	Sept. 1, 2000	Aug. 2, 2011
80265	26	X	Friction Aggregate	Jan. 1, 2011	
80229			Fuel Cost Adjustment	April 1, 2009	July 1, 2009
80329			Glare Screen	Jan. 1, 2014	
80303	30	X	Granular Materials	Nov. 1, 2012	
80304			Grooving for Recessed Pavement Markings	Nov. 1, 2012	Jan. 1, 2013
80246			Hot-Mix Asphalt – Density Testing of Longitudinal Joints	Jan. 1, 2010	April 1, 2012
80322	31	X	Hot-Mix Asphalt – Mixture Design Composition and Volumetric Requirements	Nov 1, 2013	
80323	34	X	Hot-Mix Asphalt – Mixture Design Verification and Production	Nov 1, 2013	
80315			Insertion Lining of Culverts	Jan. 1, 2013	Nov 1, 2013
* 80336			Longitudinal Joint and Crack Patching	April 1, 2014	
* 80324	37	X	LRFD Pipe Culvert Burial Tables	Nov 1, 2013	April 1, 2014
80325			LRFD Storm Sewer Burial Tables	Nov 1, 2013	
80045			Material Transfer Device	June 15, 1999	Jan. 1, 2009
80165			Moisture Cured Urethane Paint System	Nov. 1, 2006	Jan. 1, 2010
* 80337			Paved Shoulder Removal	April 1, 2014	
80330			Pavement Marking for Bike Symbol	Jan. 1, 2014	
80298			Pavement Marking Tape Type IV	April 1, 2012	
80254			Pavement Patching	Jan. 1, 2010	
80331	57	X	Payrolls and Payroll Records	Jan. 1, 2014	
80332			Portland Cement Concrete – Curing of Abutments and Piers	Jan. 1, 2014	
80326			Portland Cement Concrete Equipment	Nov 1, 2013	
* 80338			Portland Cement Concrete Partial Depth Hot-Mix Asphalt Patching	April 1, 2014	
80300			Preformed Plastic Pavement Marking Type D - Inlaid	April 1, 2012	

LRFD PIPE CULVERT BURIAL TABLES (BDE)

Effective: November 1, 2013

Revised: April 1, 2014

Revise Article 542.02 of the Standard Specifications to read as follows:

Item	Article/Section
(a) Corrugated Steel Pipe	1006.01
(b) Corrugated Steel Pipe Arch	1006.01
(c) Bituminous Coated Corrugated Steel Pipe	1006.01
(d) Bituminous Coated Corrugated Steel Pipe Arch	1006.01
(e) Zinc and Aramid Fiber Composite Coated Corrugated Steel Pipe	1006.01
(f) Aluminized Steel Type 2 Corrugated Pipe	1006.01
(g) Aluminized Steel Type 2 Corrugated Pipe Arch	1006.01
(h) Precoated Galvanized Corrugated Steel Pipe	1006.01
(i) Precoated Galvanized Corrugated Steel Pipe Arch	1006.01
(j) Corrugated Aluminum Alloy Pipe	1006.03
(k) Corrugated Aluminum Alloy Pipe Arch	1006.03
(l) Extra Strength Clay Pipe	1040.02
(m) Concrete Sewer, Storm Drain, and Culvert Pipe	1042
(n) Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe	1042
(o) Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe	1042
(p) Reinforced Concrete Arch Culvert, Storm Drain, and Sewer Pipe	1042
(q) Polyvinyl Chloride (PVC) Pipe	1040.03
(r) Corrugated Polyvinyl Chloride (PVC) Pipe with a Smooth Interior	1040.03
(s) Corrugated Polypropylene (CPP) pipe with smooth interior	1040.07
(t) Corrugated Polyethylene (PE) Pipe with a Smooth Interior	1040.04
(u) Polyethylene (PE) Pipe with a Smooth Interior	1040.04
(v) Rubber Gaskets and Preformed Flexible Joint Sealants for Concrete Pipe	1056
(w) Mastic Joint Sealer for Pipe	1055
(x) External Sealing Band	1057
(y) Fine Aggregate (Note 1)	1003.04
(z) Coarse Aggregate (Note 2)	1004.05
(aa) Packaged Rapid Hardening Mortar or Concrete	1018
(bb) Nonshrink Grout	1024.02
(cc) Reinforcement Bars and Welded Wire Fabric	1006.10
(dd) Handling Hole Plugs	1042.16

Note 1. The fine aggregate shall be moist.

Note 2. The coarse aggregate shall be wet.”

Revise the table for permitted materials in Article 542.03 of the Standard Specifications as follows:

"Class"	Materials
A	Rigid Pipes: Extra Strength Clay Pipe Concrete Sewer Storm Drain and Culvert Pipe, Class 3 Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe Reinforced Concrete Arch Culvert, Storm Drain, and Sewer Pipe
C	Rigid Pipes: Extra Strength Clay Pipe Concrete Sewer Storm Drain and Culvert Pipe, Class 3 Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe Reinforced Concrete Arch Culvert, Storm Drain, and Sewer Pipe Flexible Pipes: Aluminized Steel Type 2 Corrugated Pipe Aluminized Steel Type 2 Corrugated Pipe Arch Precoated Galvanized Corrugated Steel Pipe Precoated Galvanized Corrugated Steel Pipe Arch Corrugated Aluminum Alloy Pipe Corrugated Aluminum Alloy Pipe Arch Polyvinyl Chloride (PVC) Pipe Corrugated Polyvinyl Chloride (PVC) Pipe with a Smooth Interior Polyethylene (PE) Pipe with a Smooth Interior Corrugated Polypropylene (COP) Pipe with Smooth Interior
D	Rigid Pipes: Extra Strength Clay Pipe Concrete Sewer Storm Drain and Culvert Pipe, Class 3 Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe Reinforced Concrete Arch Culvert, Storm Drain, and Sewer Pipe Flexible Pipes: Corrugated Steel Pipe Corrugated Steel Pipe Arch Bituminous Coated Corrugated Steel Pipe Bituminous Coated Corrugated Steel Pipe Arch Zinc and Ceramic Fiber Composite Coated Corrugated Steel Pipe Aluminized Steel Type 2 Corrugated Pipe Aluminized Steel Type 2 Corrugated Pipe Arch Precoated Galvanized Corrugated Steel Pipe Precoated Galvanized Corrugated Steel Pipe Arch Corrugated Aluminum Alloy Pipe Corrugated Aluminum Alloy Pipe Arch Polyvinyl Chloride (PVC) Pipe Corrugated Polyvinyl Chloride (PVC) Pipe with a Smooth Interior Corrugated Polyethylene (PE) Pipe with a Smooth Interior Polyethylene (PE) Pipe with a Smooth Interior Corrugated Polypropylene (COP) Pipe with Smooth Interior

Revise Articles 542.03(b) and (c) of the Standard Specifications to read:

"(b) Extra strength clay pipe will only be permitted for pipe culverts Type 1, for 10 in., 12 in., 42 in. and 48 in. (250 mm, 300 mm, 1050 mm and 1200 mm), Types 2, up to and including 48 in. (1200 mm), Type 3, up to and including 18 in. (450 mm), Type 4 up to and including 10 in. (250 mm), for all pipe classes.

(c) Concrete sewer, storm drain, and culvert pipe Class 3 will only be permitted for pipe culverts Type 1, up to and including 10 in. (250 mm), Type 2, up to and including 30 in. (750 mm), Type 3, up to and including 15 in. (375 mm); Type 4, up to and including 10 in. (250 mm), for all pipe classes."

Replace the pipe tables in Article 542.03 of the Standard Specifications with the following:

**Table IA: Classes of Reinforced Concrete Pipe
for the Respective Diameters of Pipe and Fill Heights over the Top of the Pipe**

Nominal Diameter in.	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6	Type 7
	Fill Height: 3' and less 1' min cover	Fill Height: Greater than 3' not exceeding 10'	Fill Height: Greater than 10' not exceeding 15'	Fill Height: Greater than 15' not exceeding 20'	Fill Height: Greater than 20' not exceeding 25'	Fill Height: Greater than 25' not exceeding 30'	Fill Height: Greater than 30' not exceeding 35'
12	IV	II	III	IV	IV	V	V
15	IV	II	III	IV	IV	V	V
18	IV	II	III	IV	IV	V	V
21	III	II	III	IV	IV	V	V
24	III	II	III	IV	IV	V	V
30	IV	II	III	IV	IV	V	V
36	III	II	III	IV	IV	V	V
42	II	II	III	IV	IV	V	V
48	II	II	III	IV	IV	V	V
54	II	II	III	IV	IV	V	V
60	II	II	III	IV	IV	V	V
66	II	II	III	IV	IV	V	V
72	II	II	III	IV	V	V	V
78	II	II	III	IV	2020	2370	2730
84	II	II	III	IV	2020	2380	2740
90	II	III	III	1680	2030	2390	2750
96	II	III	III	1690	2040	2400	2750
102	II	III	IV	1700	2050	2410	2760
108	II	III	1360	1710	2060	2410	2770

Notes:
 A number indicates the D-Load for the diameter and depth of fill and that a special design is required.
 Design assumptions: Water filled pipe, Type 2 bedding and Class C Walls

**Table IA: Classes of Reinforced Concrete Pipe
for the Respective Diameters of Pipe and Fill Heights over the Top of the Pipe
(Metric)**

Nominal Diameter mm	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6	Type 7
	Fill Height:	Fill Height:	Fill Height:	Fill Height:	Fill Height:	Fill Height:	Fill Height:
300	IV	II	III	IV	IV	V	V
375	IV	II	III	IV	IV	V	V
450	IV	II	III	IV	IV	V	V
525	III	II	III	IV	IV	V	V
600	III	II	III	IV	IV	V	V
750	IV	II	III	IV	IV	V	V
900	III	II	III	IV	IV	V	V
1050	II	II	III	IV	IV	V	V
1200	II	II	III	IV	IV	V	V
1350	II	II	III	IV	IV	V	V
1500	II	II	III	IV	IV	V	V
1650	II	II	III	IV	IV	V	V
1800	II	II	III	IV	V	V	V
1950	II	II	III	IV	100	110	130
2100	II	II	III	IV	100	110	130
2250	II	II	III	80	100	110	130
2400	II	III	III	80	100	110	130
2550	II	III	IV	80	100	120	130
2700	II	III	70	80	100	120	130

Notes:
 A number indicates the D-Load for the diameter and depth of fill and that a special design is required.
 Design assumptions: Water filled pipe, Type 2 bedding and Class C Walls

TABLE 1B: THICKNESS OF CORRUGATED STEEL PIPE FOR THE RESPECTIVE DIAMETER OF PIPE AND FILL HEIGHTS OVER THE TOP OF THE PIPE FOR 2'2/8"X1/2", 3"X1" AND 5"X1" CORRUGATIONS

Nominal Diameter In.	Type 1		Type 2		Type 3		Type 4		Type 5		Type 6		Type 7	
	Fill Height:	Fill Height:	Fill Height:	Fill Height:	Fill Height:	Fill Height:	Fill Height:	Fill Height:	Fill Height:	Fill Height:	Fill Height:	Fill Height:	Fill Height:	Fill Height:
	3' and less 1' min. cover	Greater than 3' not exceeding 10'	Greater than 10' not exceeding 15'	Greater than 15' not exceeding 20'	Greater than 20' not exceeding 30'	Greater than 25' not exceeding 30'	Greater than 30' not exceeding 35'							
	2'2/8" X 1/2" 3" X 1" 5" X 1"	2'2/8" X 1/2" 3" X 1" 5" X 1"	2'2/8" X 1/2" 3" X 1" 5" X 1"	2'2/8" X 1/2" 3" X 1" 5" X 1"	2'2/8" X 1/2" 3" X 1" 5" X 1"	2'2/8" X 1/2" 3" X 1" 5" X 1"	2'2/8" X 1/2" 3" X 1" 5" X 1"	2'2/8" X 1/2" 3" X 1" 5" X 1"	2'2/8" X 1/2" 3" X 1" 5" X 1"	2'2/8" X 1/2" 3" X 1" 5" X 1"	2'2/8" X 1/2" 3" X 1" 5" X 1"	2'2/8" X 1/2" 3" X 1" 5" X 1"	2'2/8" X 1/2" 3" X 1" 5" X 1"	2'2/8" X 1/2" 3" X 1" 5" X 1"
12"	0.109	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079
15	0.109	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079
18	0.109	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079
21	0.109	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079
24	0.109	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079
30	0.109	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079
36	0.109E	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079
42	0.109	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079
48	0.109	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079
54	0.109	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079
60	0.109	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079	0.079
66	0.138	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109
72	0.138	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109
78	0.168	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109
84	0.168	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109
90	0.138	0.138	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109
96	0.138	0.138	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109
102	0.138Z	0.138Z	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109
108	0.138Z	0.168Z	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109
114	0.138Z	0.168Z	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109
120	0.138Z	0.168Z	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109
126	0.168Z	0.168Z	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138
132	0.168Z	0.168Z	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138
138	0.168Z	0.168Z	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138
144	0.168Z	0.168Z	0.168	0.168	0.168	0.168	0.168	0.168	0.168	0.168	0.168	0.168	0.168	0.168

Note:
 1 1/2" x 1/4" corrugations shall be use for 6", 8", and 10" diameters.
 E Elongation according to Article 542.04(e), the elongation requirement for Type 1 fill heights may be eliminated for fills above 1'-6"
 Z 1'-6" Minimum fill
 Longitudinal seams assumed.

**TABLE 1B: THICKNESS OF CORRUGATED STEEL PIPE
FOR THE RESPECTIVE DIAMETER OF PIPE AND FILL HEIGHTS OVER THE TOP OF THE PIPE FOR 68 mm x 13 mm, 75 mm x 25 mm AND 125 mm x 25 mm CORRUGATIONS
(Metric)**

Nominal Diameter mm	Type 1 Fill Height:		Type 2 Fill Height:		Type 3 Fill Height:		Type 4 Fill Height:		Type 5 Fill Height:		Type 6 Fill Height:		Type 7 Fill Height:	
	1 m and less 0.3 m min. cover	Greater than 1 m not exceeding 2.5 m	Greater than 1 m not exceeding 2.5 m	Greater than 3 m not exceeding 4.5 m	Greater than 4.5 m not exceeding 6 m	Greater than 6 m not exceeding 7.5 m	Greater than 7.5 m not exceeding 9 m	Greater than 9 m not exceeding 10.5 m	Greater than 13 m not exceeding 15 m	Greater than 15 m not exceeding 17.5 m	Greater than 20 m not exceeding 22.5 m	Greater than 25 m not exceeding 27.5 m	Greater than 30 m not exceeding 32.5 m	Greater than 35 m not exceeding 37.5 m
300*	2.77	2.77	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01
375	2.77	2.77	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01
450	2.77	2.77	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01
525	2.77	2.77	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01
600	2.77	2.77	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01
750	2.77	2.77	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01
900	2.77E	2.77	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01
1050	2.77	2.77	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01
1200	2.77	2.77	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01
1350	2.77	2.77	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01
1500	2.77	2.77	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01
1650	3.51	2.77	3.51	2.77	3.51	2.77	3.51	2.77	3.51	2.77	3.51	2.77	3.51	2.77
1800	3.51	2.77	3.51	2.77	3.51	2.77	3.51	2.77	3.51	2.77	3.51	2.77	3.51	2.77
1950	4.27	2.77	4.27	2.77	4.27	2.77	4.27	2.77	4.27	2.77	4.27	2.77	4.27	2.77
2100	4.27	2.77	4.27	2.77	4.27	2.77	4.27	2.77	4.27	2.77	4.27	2.77	4.27	2.77
2250	3.51	3.51	3.51	2.77	3.51	2.77	3.51	2.77	3.51	2.77	3.51	2.77	3.51	2.77
2400	3.51	3.51	3.51	2.77	3.51	2.77	3.51	2.77	3.51	2.77	3.51	2.77	3.51	2.77
2550	3.51Z	3.51Z	3.51Z	2.77	3.51Z	2.77	3.51Z	2.77	3.51Z	2.77	3.51Z	2.77	3.51Z	2.77
2700	3.51Z	4.27Z	4.27Z	2.77	4.27Z	2.77	4.27Z	2.77	4.27Z	2.77	4.27Z	2.77	4.27Z	2.77
2850	3.51Z	4.27Z	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77
3000	3.51Z	4.27Z	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77	2.77
3150	4.27Z	4.27Z	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51
3300	4.27Z	4.27Z	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51
3450	4.27Z	4.27Z	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51
3600	4.27Z	4.27Z	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27

Notes:

- * 38 mm x 6.5 mm corrugations shall be use for 150 mm, 200 mm, and 250 mm diameters.
 - E Elongation according to Article 542.04(e), the elongation requirement for Type 1 fill heights may be eliminated for fills above 450 mm
 - Z 450 mm Minimum Fill
- Longitudinal seams assumed.

TABLE IC: THICKNESS OF CORRUGATED ALUMINUM ALLOY PIPE FOR THE RESPECTIVE DIAMETER OF PIPE AND FILL HEIGHTS OVER THE TOP OF THE PIPE FOR 2 2/3"x1/2" AND 3"x1" CORRUGATIONS

Nominal Diameter in.	Type 1		Type 2		Type 3		Type 4		Type 5		Type 6		Type 7	
	Fill Height: 3' and less 1' min. cover	Fill Height: Greater than 3' not exceeding 15'	Fill Height: Greater than 3' not exceeding 15'	Fill Height: Greater than 10' not exceeding 15'	Fill Height: Greater than 15' not exceeding 20'	Fill Height: Greater than 15' not exceeding 20'	Fill Height: Greater than 15' not exceeding 20'	Fill Height: Greater than 15' not exceeding 20'	Fill Height: Greater than 20' not exceeding 25'	Fill Height: Greater than 20' not exceeding 25'	Fill Height: Greater than 25' not exceeding 30'	Fill Height: Greater than 25' not exceeding 30'	Fill Height: Greater than 30' not exceeding 35'	Fill Height: Greater than 30' not exceeding 35'
	2 2/3"x1/2"	3"x1"	2 2/3"x1/2"	3"x1"	2 2/3"x1/2"	3"x1"	2 2/3"x1/2"	3"x1"	2 2/3"x1/2"	3"x1"	2 2/3"x1/2"	3"x1"	2 2/3"x1/2"	3"x1"
12	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
15	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
18	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
21	0.075E	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
24	0.075E	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
30	0.105E	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075
36	0.105E	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075
42	0.105E	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
48	0.105E	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105
54	0.105E	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105
60	0.135E	0.105	0.135	0.135	0.135	0.135	0.135	0.135	0.135	0.135	0.135	0.135	0.135	0.135
66	0.164E	0.105	0.164	0.164	0.164	0.164	0.164	0.164	0.164	0.164	0.164	0.164	0.164	0.164
72	0.164E	0.135	0.164	0.164	0.164	0.164	0.164	0.164	0.164	0.164	0.164	0.164	0.164	0.164
78	0.135	0.135	0.075	0.105	0.105	0.105	0.135	0.135	0.135	0.135	0.135	0.135	0.135	0.135
84	0.135	0.135	0.105	0.105	0.105	0.105	0.135	0.135	0.135	0.135	0.135	0.135	0.135	0.135
90	0.135	0.135	0.105	0.105	0.105	0.105	0.135	0.135	0.135	0.135	0.135	0.135	0.135	0.135
96	0.135	0.135	0.105	0.105	0.105	0.105	0.135	0.135	0.135	0.135	0.135	0.135	0.135	0.135
102	0.135Z	0.135Z	0.135	0.135	0.135	0.135	0.135	0.135	0.135	0.135	0.135	0.135	0.135	0.135
108	0.135Z	0.135Z	0.135	0.135	0.135	0.135	0.135	0.135	0.135	0.135	0.135	0.135	0.135	0.135
114	0.164Z	0.164Z	0.164	0.164	0.164	0.164	0.164	0.164	0.164	0.164	0.164	0.164	0.164	0.164
120	0.164Z	0.164Z	0.164	0.164	0.164	0.164	0.164	0.164	0.164	0.164	0.164	0.164	0.164	0.164

Notes:
E Elongation according to Article 502.04(e), the elongation requirement for Type 1 fill heights may be eliminated for fills above 1'-6"

**TABLE IC: THICKNESS OF CORRUGATED ALUMINUM ALLOY PIPE
FOR THE RESPECTIVE DIAMETER OF PIPE AND FILL HEIGHTS OVER THE TOP OF THE PIPE FOR 2'3"x1/2" AND 3"x1" CORRUGATIONS
(Metric)**

Nominal Diameter in.	Type 1		Type 2		Type 3		Type 4		Type 5		Type 6		Type 7	
	Fill Height: 1 m and less 0.3 m min. cover	68 x 13 mm	75 x 25 mm	Greater than 1 m not exceeding 3 m	68 x 13 mm	75 x 25 mm	Greater than 3 m not exceeding 4.5 m	68 x 13 mm	75 x 25 mm	Greater than 6 m not exceeding 7.5 m	68 x 13 mm	75 x 25 mm	Greater than 7.5 m not exceeding 9 m	68 x 13 mm
300	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52
375	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52
450	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52
525	1.91E	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52
600	1.91E	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52
750	2.67E	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.91
900	2.67E	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.91
1050	1.52	2.67	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52
1200	2.67E	2.67	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52
1350	2.67E	2.67	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52
1500	3.43E	2.67	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52
1650	4.17E	2.67	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52
1800	4.17E	3.43	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52	1.52
1950	3.43	3.43	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.91
2100	3.43	3.43	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67
2250	3.43	3.43	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67
2400	3.43	3.43	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67
2550	3.43Z	3.43Z	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43
2700	3.43Z	3.43Z	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43
2850	4.17Z	4.17Z	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17
3000	4.17Z	4.17Z	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.17

Notes:

E Elongation according to Article 542.04(e), the elongation requirement for Type 1 fill heights may be eliminated for fills above 450 mm.

Table IA: THICKNESS FOR CORRUGATED STEEL PIPE ARCHES AND CORRUGATED ALUMINUM ALLOY PIPE ARCHES FOR THE RESPECTIVE EQUIVALENT ROUND SIZE OF PIPE AND FILL HEIGHTS OVER THE TOP OF PIPE

Equivalent Round Size in.	Corrugated Steel & Aluminum Pipe Arch 2 2/3" x 1/2"			Corrugated Steel & Aluminum Pipe Arch 3" x 1"			Corrugated Steel & Aluminum Pipe Arch 5" x 1"			Min. Cover	Type 1 Fill Height: 3' and less						Type 2 Fill Height: Greater than 3' not exceeding 10'						Type 3 Fill Height: Greater than 10' not exceeding 15'					
	Span (in.)		Rise (in.)	Span (in.)		Rise (in.)	Span (in.)		Rise (in.)		Steel		Aluminum		Steel		Aluminum		Steel		Aluminum		Steel		Aluminum			
	2 2/3" x 1/2"	3" x 1"	0.079	0.109	0.109	0.109	0.109	0.109	0.109		0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109		
15	17	13	0.079	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109				
18	21	15	0.079	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109				
21	24	18	0.079	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109				
24	28	20	0.075	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109				
30	35	24	0.075	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109				
36	42	29	0.075	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109				
42	49	33	0.105	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109				
48	57	38	0.135	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109				
54	64	43	0.135	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109				
60	71	47	0.138	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109				
66	77	52	0.168	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109				
72	83	57	0.168	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109				
78	87	63	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109				
84	95	67	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109				
90	103	71	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109				
96	112	75	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109				
102	117	79	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109	0.109				
108	128	83	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138				
114	137	87	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138				
120	142	91	0.168	0.168	0.168	0.168	0.168	0.168	0.168	0.168	0.168	0.168	0.168	0.168	0.168	0.168	0.168	0.168	0.168	0.168	0.168	0.168	0.168	0.168				

Notes:
 The Type 1 corrugated steel or aluminum pipe arches shall be placed on soil having a minimum bearing capacity of 3 tons per square foot.
 The Type 2 and 3 corrugated steel or aluminum pipe arches shall be placed on soil having a minimum bearing capacity of 2 tons per square foot.
 This minimum bearing capacity will be determined by the Engineer in the field.

Table 10A: THICKNESS FOR CORRUGATED STEEL PIPE ARCHES AND CORRUGATED ALUMINUM ALLOY PIPE ARCHES FOR THE RESPECTIVE EQUIVALENT ROUND SIZE OF PIPE AND FILL HEIGHTS OVER THE TOP OF PIPE (Metric)

Equivalent Round Size (mm)	Corrugated Steel & Aluminum Pipe Arch 68 x 13 mm			Corrugated Steel & Aluminum Pipe Arch 75 x 25 mm			Corrugated Steel Arch 125 x 25 mm			Cover	Type 1 Fill Height: 1 m and less						Type 2 Fill Height: Greater than 1 m not exceeding 3 m						Type 3 Fill Height: Greater than 3 m not exceeding 4.5 m					
	Span (mm)		Rise (mm)	Span (mm)		Rise (mm)	Span (mm)		Rise (mm)		Steel (mm)		Aluminum (mm)		Steel (mm)		Aluminum (mm)		Steel (mm)		Aluminum (mm)		Steel (mm)		Aluminum (mm)			
	Span (mm)	Rise (mm)	Span (mm)	Rise (mm)	Span (mm)	Rise (mm)	Span (mm)	Rise (mm)	Span (mm)		Rise (mm)	68 x 13	75 x 25	68 x 13	75 x 25	68 x 13	75 x 25	68 x 13	75 x 25	68 x 13	75 x 25	68 x 13	75 x 25	68 x 13	75 x 25			
375	430	330								Steel & Aluminum	Steel	Aluminum	Steel	Aluminum	Steel	Aluminum	Steel	Aluminum	Steel	Aluminum	Steel	Aluminum	Steel	Aluminum				
450	530	380							0.5 m	2.01	2.01	1.52	2.01	2.01	2.01	1.52	2.01	2.01	2.01	2.01	2.01	2.01	1.52	1.52				
525	610	460							0.5 m	2.77	2.01	1.52	2.01	2.01	2.01	1.52	2.01	2.01	2.01	2.01	2.01	2.01	1.52	1.52				
600	710	510							0.5 m	2.77	2.01	1.91	2.01	2.01	2.01	1.91	2.01	2.01	2.01	2.01	2.01	2.01	1.91	1.91				
750	870	630							0.5 m	2.77	2.01	1.91	2.01	2.01	2.01	1.91	2.01	2.01	2.01	2.01	2.01	2.01	1.91	1.91				
900	1060	740							0.5 m	2.77	2.01	2.67	2.01	2.01	2.01	2.67	2.01	2.01	2.01	2.01	2.01	2.01	2.67	2.67				
1050	1240	840							0.5 m	2.77	2.01	2.77	2.77	2.77	2.77	2.67	2.77	2.77	2.77	2.77	2.77	2.77	2.67	2.67				
1200	1440	970	1340	1050	1340	1050			0.5 m	2.77	2.01	3.43	2.77	2.01	2.77	1.52	2.01	2.01	2.01	2.01	2.01	2.01	1.52	1.52				
1350	1620	1100	1520	1170	1520	1170			0.5 m	2.77	2.77	3.43	2.77	2.01	2.77	1.52	2.01	2.01	2.01	2.01	2.01	2.01	1.52	1.52				
1500	1800	1200	1670	1300	1670	1300			0.5 m	3.51	2.77	4.17	2.77	3.51	2.01	1.52	2.01	2.01	2.01	2.01	2.01	2.01	1.52	1.52				
1650	1950	1320	1850	1400	1850	1400			0.5 m	4.27	2.77	4.17	2.77	4.27	2.01	2.67	2.01	2.01	2.01	2.01	2.01	2.01	1.91	2.67				
1800	2100	1450	2050	1500	2050	1500			0.5 m	4.27	2.77	4.17	2.77	4.27	2.01	2.67	2.01	2.01	2.01	2.01	2.01	2.01	2.67	2.67				
1950			2200	1620	2200	1620			0.5 m	2.77	2.77	2.77	2.77	2.77	2.01	2.67	2.01	2.01	2.01	2.01	2.01	2.01	2.77	2.67				
2100			2400	1720	2400	1720			0.5 m	2.77	2.77	2.77	2.77	2.77	2.01	2.67	2.01	2.01	2.01	2.01	2.01	2.01	2.77	2.67				
2250			2600	1820	2600	1820			0.5 m	2.77	2.77	2.77	2.77	2.77	2.01	3.43	2.01	2.01	2.01	2.01	2.01	2.01	2.77	3.43				
2400			2840	1920	2840	1920			0.5 m	2.77	2.77	4.17	2.77	4.17	2.01	4.17	2.01	2.01	2.01	2.01	2.01	2.01	2.77	4.17				
2550			2970	2020	2970	2020			0.5 m	2.77	2.77	4.17	2.77	4.17	2.01	4.17	2.01	2.01	2.01	2.01	2.01	2.01	2.77	4.17				
2700			3240	2120	3240	2120			0.5 m	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51				
2850			3470	2220	3470	2220			0.5 m	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51				
3000			3600	2320	3600	2320			0.5 m	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27	4.27				

Notes:
 The Type 1 corrugated steel or aluminum pipe arches shall be placed on soil having a minimum bearing capacity of 290 kN per square meter.
 The Type 2 and 3 corrugated steel or aluminum pipe arches shall be placed on soil having a minimum bearing capacity of 192 kN per square meter.
 This minimum bearing capacity will be determined by the Engineer in the field.

Table IIB: CLAUSES OF REINFORCED CONCRETE ELLIPTICAL AND REINFORCED CONCRETE ARCH PIPE FOR THE RESPECTIVE EQUIVALENT ROUND SIZE OF PIPE AND FILL HEIGHTS OVER THE TOP OF PIPE

Equivalent Round Size (in.)	Reinforced Concrete Elliptical pipe (in.)		Reinforced Concrete Arch pipe (in.)		Minimum Cover	Type 1		Type 2		Type 3	
	Span		Rise			Fill Height: 3' and less		Fill Height: Greater than 3' not exceeding 10'		Fill Height: Greater than 10' not exceeding 15'	
	Span	Rise	Span	Rise		HE	Arch	HE	Arch	HE	Arch
15	23	14	18	11	RCCP HE & A	HE	Arch	HE	Arch	HE	Arch
18	23	14	22	13 1/2	1'-0"	HE-III	A-III	HE-III	A-III	HE-IV	A-IV
21	30	19	26	15 1/2	1'-0"	HE-III	A-III	HE-III	A-III	HE-IV	A-IV
24	30	19	28 1/2	18	1'-0"	HE-III	A-III	HE-III	A-III	HE-IV	A-IV
27	34	22	36 1/4	22 1/2	1'-0"	HE-III	A-III	HE-III	A-III	HE-IV	A-IV
30	38	24	36 1/4	22 1/2	1'-0"	HE-III	A-III	HE-III	A-III	HE-IV	A-IV
36	45	29	43 3/4	26 5/8	1'-0"	HE-II	A-II	HE-III	A-III	HE-IV	A-IV
42	53	34	51 1/8	31 5/16	1'-0"	HE-I	A-I	HE-III	A-III	HE-IV	A-IV
48	60	38	58 1/2	36	1'-0"	HE-I	A-I	HE-III	A-III	1460	1450
54	68	43	65	40	1'-0"	HE-I	A-I	HE-III	A-III	1460	1460
60	76	48	73	45	1'-0"	HE-I	A-I	HE-III	A-III	1460	1470
66	83	53	88	54	1'-0"	HE-I	A-I	HE-III	A-III	1470	1480
72	91	58	88	54	1'-0"	HE-I	A-I	HE-III	A-III	1470	1480

Notes:
 A number indicates the D-Load for the diameter and depth of fill and that a special design is required.
 Design assumptions; Water filled pipe; AASHTO Type 2 installation per AASHTO LRFD Table 12.10.2.1-1

Table 11B: CLASSES OF REINFORCED CONCRETE ELLIPTICAL AND REINFORCED CONCRETE ARCH PIPE FOR THE RESPECTIVE EQUIVALENT ROUND SIZE OF PIPE AND FILL HEIGHTS OVER THE TOP OF PIPE (Metric)

Equivalent Round Size (mm)	Reinforced Concrete Elliptical pipe (mm)		Reinforced Concrete Arch pipe (mm)		Minimum Cover	Type 1		Type 2		Type 3	
	Span	Rise	Span	Rise		Fill Height: 1 m and less		Fill Height: Greater than 1 m not exceeding 3 m		Fill Height: Greater than 3 m not exceeding 4.5 m	
						HE	Arch	HE	Arch	HE	Arch
375	584	356	457	279	RCCP	HE	Arch	HE	Arch	HE	Arch
450	584	356	559	343	0.3 m	HE-III	A-III	HE-III	A-III	HE-IV	A-IV
525	762	483	660	394	0.3 m	HE-III	A-III	HE-III	A-III	HE-IV	A-IV
600	762	483	724	457	0.3 m	HE-III	A-III	HE-III	A-III	HE-IV	A-IV
686	864	559	921	572	0.3 m	HE-III	A-III	HE-III	A-III	HE-IV	A-IV
750	965	610	921	572	0.3 m	HE-III	A-III	HE-III	A-III	HE-IV	A-IV
900	1143	737	1111	676	0.3 m	HE-II	A-II	HE-II	A-III	HE-IV	A-IV
1050	1346	864	1299	795	0.3 m	HE-I	A-I	HE-III	A-III	HE-IV	A-IV
1200	1524	965	1486	914	0.3 m	HE-I	A-I	HE-III	A-III	70	70
1350	1727	1092	1651	1016	0.3 m	HE-I	A-II	HE-III	A-III	70	70
1500	1930	1219	1854	1143	0.3 m	HE-I	A-II	HE-III	A-III	70	70
1676	2108	1346	2235	1372	0.3 m	HE-I	A-II	HE-III	A-III	70	70
1800	2311	1473	2235	1372	0.3 m	HE-I	A-II	HE-III	A-III	70	70

Notes:
 A number indicates the D-Load for the diameter and depth of fill and that a special design is required.
 Design assumptions; Water filled pipe, AASHTO Type 2 installation per AASHTO LRFD Table 12.10.2.1-1

**TABLE IIIA: PLASTIC PIPE PERMITTED
FOR A GIVEN PIPE DIAMETER AND FILL HEIGHT OVER THE TOP OF THE PIPE**

Nominal Diameter (in.)	Type 1 Fill Height: 3' and less, with 1' min						Type 2 Fill Height: Greater than 3', not exceeding 10'						Type 3 Fill Height: Greater than 10', not exceeding 15'						Type 4 Fill Height: Greater than 15', not exceeding 20'									
	PVC		CPVC		PE		CPE		CPP		PVC		CPVC		PE		CPE		CPP		PVC		CPVC		PE		CPP	
	10	X	X	X	X	NA	X	X	X	X	NA	X	X	X	X	X	X	X	X	NA	X	X	X	X	X	X	X	NA
12	X	X	X	X	NA	X	X	X	X	NA	X	X	X	X	X	X	X	X	NA	X	X	X	X	X	X	X	NA	NA
15	X	X	NA	X	NA	X	X	X	X	NA	X	X	X	X	NA	X	X	X	NA	X	X	X	X	X	X	NA	NA	X
18	X	X	X	X	NA	X	X	X	X	NA	X	X	X	X	NA	X	X	X	NA	X	X	X	X	X	X	NA	NA	NA
21	X	X	X	X	NA	X	X	X	X	NA	X	X	X	X	NA	X	X	X	NA	X	X	X	X	X	X	NA	NA	NA
24	X	X	X	X	NA	X	X	X	X	NA	X	X	X	X	NA	X	X	X	NA	X	X	X	X	X	X	NA	NA	NA
30	X	X	X	X	NA	X	X	X	X	NA	X	X	X	X	NA	X	X	X	NA	X	X	X	X	X	X	NA	NA	NA
36	X	X	X	X	NA	X	X	X	X	NA	X	X	X	X	NA	X	X	X	NA	X	X	X	X	X	X	NA	NA	NA
42	X	NA	X	X	NA	X	X	X	X	NA	X	X	X	X	NA	X	X	X	NA	X	X	X	X	X	NA	NA	NA	NA
48	X	NA	X	X	NA	X	X	X	X	NA	X	X	X	X	NA	X	X	X	NA	X	X	X	X	X	NA	NA	NA	NA

Notes:
PVC Polyvinyl Chloride (PVC) pipe with a smooth interior
CPVC Corrugated Polyvinyl Chloride (CPVC) pipe with a smooth interior
PE Polyethylene (PE) pipe with a smooth interior
CPE Corrugated Polyethylene (PE) pipe with a smooth interior
CPP Corrugated Polypropylene (CPP) pipe with a smooth interior
X This material may be used for the given pipe diameter and fill height
NA Not Available

**TABLE IIIIB: PLASTIC PIPE PERMITTED
FOR GIVEN PIPE DIAMETER AND FILL HEIGHT OVER THE TOP OF THE PIPE**

Nominal Diameter (in.)	Type 5				Type 6				Type 7
	Fill Height: Greater than 20', not exceeding 25'		Fill Height: Greater than 25', not exceeding 30'		Fill Height: Greater than 25', not exceeding 30'		Fill Height: Greater than 30', not exceeding 35'		Fill Height: Greater than 30', not exceeding 35'
	PVC	CPVC	PVC	CPVC	PVC	CPVC	PVC	CPVC	CPVC
10	X	X	X	X	X	X	X	X	X
12	X	X	X	X	X	X	X	X	X
15	X	X	X	X	X	X	X	X	X
18	X	X	X	X	X	X	X	X	X
21	X	X	X	X	X	X	X	X	X
24	X	X	X	X	X	X	X	X	X
30	X	X	X	X	X	X	X	X	X
36	X	X	X	X	X	X	X	X	X
42	X	NA	X	NA	X	NA	X	NA	NA
48	X	NA	X	NA	X	NA	X	NA	NA

Notes:
 PVC Polyvinyl Chloride (PVC) pipe with a smooth interior
 CPVC Corrugated Polyvinyl Chloride (CPVC) pipe with a smooth interior
 X This material may be used for the given pipe diameter and fill height
 NA Not Available

**TABLE IIIB: PLASTIC PIPE PERMITTED
FOR A GIVEN PIPE DIAMETER AND FILL HEIGHT OVER THE TOP OF THE PIPE
(metre)**

Nominal Diameter (mm)	Type 5		Type 6		Type 7
	Fill Height: Greater than 6 m, not exceeding 7.5 m		Fill Height: Greater than 7.5 m, not exceeding 9 m		Fill Height: Greater than 9 m, not exceeding 10.5 m
	PVC	CPVC	PVC	CPVC	CPVC
250	X	X	X	X	X
300	X	X	X	X	X
375	X	X	X	X	X
450	X	X	X	X	X
525	X	X	X	X	X
600	X	X	X	X	X
750	X	X	X	X	X
900	X	X	X	X	X
1000	X	NA	X	NA	NA
1200	X	NA	X	NA	NA

Notes:
PVC Polyvinyl Chloride (PVC) pipe with a smooth interior
CPVC Corrugated Polyvinyl Chloride (CPVC) pipe with a smooth interior
PE Polyethylene (PE) pipe with a smooth interior
X This material may be used for the given pipe diameter and fill height
NA Not Available"

Revise the first sentence of the first paragraph of Article 542.04(c) of the Standard Specifications to read:

"Compacted aggregate, at least 4 in. (100 mm) in depth below the pipe culvert, shall be placed the entire width of the trench and for the length of the pipe culvert, except compacted impervious material shall be used for the outer 3 ft (1 m) at each end of the pipe culvert."

Revise the seventh paragraph of Article 542.04(d) of the Standard Specifications to read:

"PVC, PE and CPP pipes shall be joined according to the manufacturer's specifications."

Replace the third sentence of the first paragraph of Article 542.04(h) of the Standard Specifications with the following:

"The total cover required for various construction loadings shall be the responsibility of the Contractor."

Delete "Table IV : Wheel Loads and Total Cover" in Article 542.04(h) of the Standard Specifications.

Revise the first and second paragraphs of Article 542.04(i) of the Standard Specifications to read:

"(i) Deflection Testing for Pipe Culverts. All PE, PVC and CPP pipe culverts shall be tested for deflection not less than 30 days after the pipe is installed and the backfill compacted. The testing shall be performed in the presence of the Engineer.

For PVC, PE, and CPP pipe culverts with diameters 24 in. (600 mm) or smaller, a mandrel drag shall be used for deflection testing. For PVC, PE, and CPP pipe culverts with diameters over 24 in. (600 mm), deflection measurements other than by a mandrel shall be used."

Revise Articles 542.04(i)(1) and (2) of the Standard Specifications to read:

"(1) For all PVC pipe: as defined using ASTM D 3034 methodology.

(2) For all PE and CPP pipe: the average inside diameter based on the minimum and maximum tolerances specified in the corresponding ASTM or AASHTO material specifications."

Revise the second sentence of the second paragraph of Article 542.07 of the Standard Specifications to read:

"When a prefabricated end section is used, it shall be of the same material as the pipe culvert, except for polyethylene (PE), polyvinylchloride (PVC), and polypropylene (PP) pipes which shall have metal end sections."

Revise the first paragraph of Article 1040.03 of the Standard Specifications to read:

"1040.03 Polyvinyl Chloride (PVC) Pipe. Acceptance testing of PVC pipe and fittings shall be accomplished during the same construction season in which they are installed. The section properties shall be according to the manufacturer pre-submitted geometric properties on file with the Department. The manufacturer shall submit written certification that the material meets those properties. The pipe shall meet the following additional requirements."

Delete Articles 1040.03(e) and (f) of the Standard Specifications.

Revise Articles 1040.04(c) and (d) of the Standard Specifications to read:

"(c) PE Profile Wall Pipe for Insertion Lining. The pipe shall be according to ASTM F 894. When used for insertion lining of pipe culverts, the pipe liner shall have a minimum pipe stiffness of 46 psi (317 kPa) at five percent deflection for nominal inside diameters of 42 in. (1050 mm) or less. For nominal inside diameters of greater than 42 in. (1050 mm), the pipe liner shall have a minimum pipe stiffness of 32.5 psi (225 kPa) at five percent deflection. All sizes shall have wall construction that presents essentially smooth internal and external surfaces.

(d) PE Pipe with a Smooth Interior. The pipe shall be according to ASTM F 714 (DR 32.5) with a minimum cell classification of PE 335434 as defined in ASTM D 3350. The section properties shall be according to the manufacturer pre-submitted geometric properties on file with the Department. The manufacturer shall submit written certification that the material meets those properties and the resin used to manufacture the pipe meets or exceeds the minimum cell classification requirements."

Add the following to Section 1040 of the Standard Specifications:

"1040.08 Polypropylene (PP) Pipe. Storage and handling shall be according to the manufacturer's recommendations, except in no case shall the pipe be exposed to direct sunlight for more than six months. Acceptance testing of the pipe shall be accomplished during the same construction season in which it is installed. The section properties shall be according to the manufacturer pre-submitted geometric properties on file with the Department. The manufacturer shall submit written certification that the material meets those properties. The pipe shall meet the following additional requirements.

(a) Corrugated PP Pipe with a Smooth Interior. The pipe shall be according to AASHTO M 330 (nominal size – 12 to 60 in. (300 to 1500 mm)). The pipe shall be Type S or D.

(b) Perforated Corrugated PP Pipe with A Smooth Interior. The pipe shall be according to AASHTO M 330 (nominal size – 12 to 60 in. (300 to 1500 mm)). The pipe shall be

Type SP. In addition, the top centerline of the pipe shall be marked so that it is readily visible from the top of the trench before backfilling, and the upper ends of the slot perforations shall be a minimum of ten degrees below the horizontal."

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