ODOT Conduit Durability Design July 2021

County	Trumbull	Route	193	Section	23.897	PID	122339	Shape	Elliptical
Station	55+23	Station						Span x Rise	

Span and Rise not Required for Elliptical Shape

User Input	
pH_w	Abrasion Level
8.2	1.0

Constants and Calculated Values			
pHs	Sediment/Rise	End of Service Life GA	Service Life Required
7.6	0	4	75

Metal Conduit Durability Results

Material		707.01 , 707.02, or 707.03 Metallic coated (galvanized)	707.01 or 707.02 or 707.03 Metallic coated (galvanized) with Concrete Field Paving	707.01 or 707.02 Metallic coated (Aluminized)	***707.01 or 707.02 Metallic coated (aluminized) with Concrete Field Paving	707.04 Polymeric Coated over galvanized steel	***707.04 Polymeric Coated with Concrete Field Paving	707.05 or 707.07 (707.01 or 707.02 galvanized) 1/2 Bituminous coated with Bituminous paved invert	***707.05 or 707.07 (707.01 or 707.02 aluminized) 1/2 Bituminous coated with Bituminous paved invert	**707.11 Polymer Precoated spiral rib steel	**707.12 or 707.17 Aluminum coated spiral rib steel	707.13 or 707.14 (707.01 or 707.02 galvanized) Bituminous lined galvanized steel	707.13 or 707.14 (707.01 or 707.02 aluminized) Bituminous lined aluminized steel	707.15 Galvanized steel box	**707.18 Polymer Precoated, Galvanized Steel Conduits with precoated galvanized smooth steel interior liner	**707.19 Aluminum coated Steel Conduits with precoated galvanized smooth steel interior liner	**707.20 Galvanized Coated Steel Conduits with precoated galvanized smooth steel interior liner	**748.06 Steel Casing Pipe non-galvanized	707.21 or 707.22 Aluminum	707.23 Aluminum Structural Plate	707.24 Aluminum Spiral Rib	707.25 Aluminum Box	707.21, 707.22, or 707.23 Aluminum Alloy or Aluminum Alloy Structural Plate with Concrete Invert Paving
Conduit Use and Shape		Culvert or Liner Pipe - Round or Pipe Arch	Culvert-Round, Pipe Arch, and Arch	Culvert or Liner Pipe -Round or Pipe Arch	Culvert -Round or Pipe Arch	Culvert or Liner Pipe - Round or Pipe Arch	Culvert-Round or Pipe Arch	Culvert -Round or Pipe Arch	Culvert -Round or Pipe Arch	Storm Sewer or Liner Pipe- Round	Liner Pipe- Round or Pipe Arch	Storm Sewer - Round or Pipe Arch	Storm Sewer -Round or Pipe Arch	Culvert -Box	Liner Pipe -Round	Liner Pipe -Round	Liner Pipe - Round	Culvert or Liner Pipe-Round, Pipe Arch, or Box	Culvert or Liner Pipe-Round or Pipe Arch	Culvert or Liner Pipe - Round, Pipe Arch, and Arch	Storm Sewer or Liner Pipe -Round	Culvert -Box	Culvert - Round or Pipe Arch
	Corr. Depth (inches)																					
min gauge or thickness	1/4 or 1/2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.5	N/A	N/A	N/A	N/A	N/A
	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A
	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A
	3/4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A
max gauge or thickness	1/4 or 1/2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.5	N/A	N/A	N/A	N/A	N/A
	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A
	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A
	3/4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A
Gauge	*Thickness (inches)*																						
16	0.064																						
14	0.079																						
12	0.109																						
10	0.138																						
8	0.168																						
7	0.188																						
5	0.218																						
3	0.249																						
1	0.28																						
Casing	0.5																						

Concrete Conduit Durability Results

Material	**706.01 Non-reinforced Concrete Pipe	**706.02 Reinforced Concrete Circular Pipe	**706.03 Reinforced Concrete Pipe, Epoxy Coated	**706.04 Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe	**706.05 Precast Reinforced Concrete Box Sections	706.08 Clay Drain Tile
Conduit Use and Shape	Culvert or Storm Sewer - Round	Culvet or Storm Sewer -Round	Culvert or Storm Sewer - Round or Elliptical	Culvert or Storm Sewer -Elliptical	Culvert or Storm Sewer - Box	Culvert or Storm Sewer - Round

Plastic Conduit Durability Results

Material	707.33 Corrugated Polyethylene Smooth Lined Pipe	707.34 Polyethylene Plastic Pipe Based on Outside Diameter (OD)	707.35 Polyethylene Profile Wall Pipe	707.42 Polyvinyl Chloride Corrugated Smooth Interior Pipe	707.43 Polyvinyl Chloride Profile Wall Pipe	707.45 Polyvinyl Chloride Solid Wall Pipe	707.46 Polyvinyl Chloride Drain Waste and Vent Pipe	707.47 ABS and Polyvinyl Chloride Composite Pipe	707.48 Polyvinyl Chloride Large-Diameter Solid Wall Pipe	707.65 Corrugated Polypropylene Smooth Lined Pipe	707.75 Glass-Fiber-Reinforced Polymer Mortar Pipe	707.85 Steel Reinforced Thermoplastic Ribbed Pipe	748.02 Polyvinyl Chloride (PVC) Pipe, Joints, and Fittings
Conduit Use and Shape	Culvert, Storm Sewer, or Liner Pipe - Round	Culvert, Storm Sewer, or Liner Pipe - Round	Culvert, Storm Sewer, or Liner Pipe - Round	Storm Sewer or Liner Pipe - Round	Storm Sewer or Liner Pipe - Round	Storm Sewer - Round	Storm Sewer - Round	Storm Sewer - Round	Storm Sewer - Round	Culvert or Storm Sewer - Round	Culvert, Storm Sewer, or Liner Pipe - Round	Culvert or Liner Pipe - Round	Storm Sewer - Round

Notes:

- Many metal options are eliminated when abrasion level equals 4 or greater
- Aluminum is only available between pH levels ranging from 5.0 to less than 9.0
- Alumized protective coating is 0 years when pH levels are outside of allowable for Aluminum
- Polymeric coated is only available for pH ranges greater than 5.0 and less than 9.0
- Options were emiminated when the NCSPA online Service Life Calculator did not recommend option; typically due to abrasive conditions or pH limitations
- Epoxy is required on all concrete surfaces when pH<5
- ** Smooth lined conduit
- ***Minimum gauges set per industry comments; see Reference Data
- Provide concrete field paving on corrugated metal conduits 60" or larger where the invert is always submerged due to tail water conditions from a body of water
- Designer is responsible to ensure the required gage thickness is available for the given pipe size

Constants	
Protective Coating Constants-Initial Service Life (years)	
Concrete Invert Paving=	20
Aluminized=	35
Aluminized Spiral Rib=	35
Polymeric=	50
Bituminous coated w/ bitum. paved invert=	10
Bituminous lined =	25
Galvanized=	0