Through the Eye of the Needle

Scioto River Pedestrian Bridge, Dublin Ohio

Through the Eye of the Needle:

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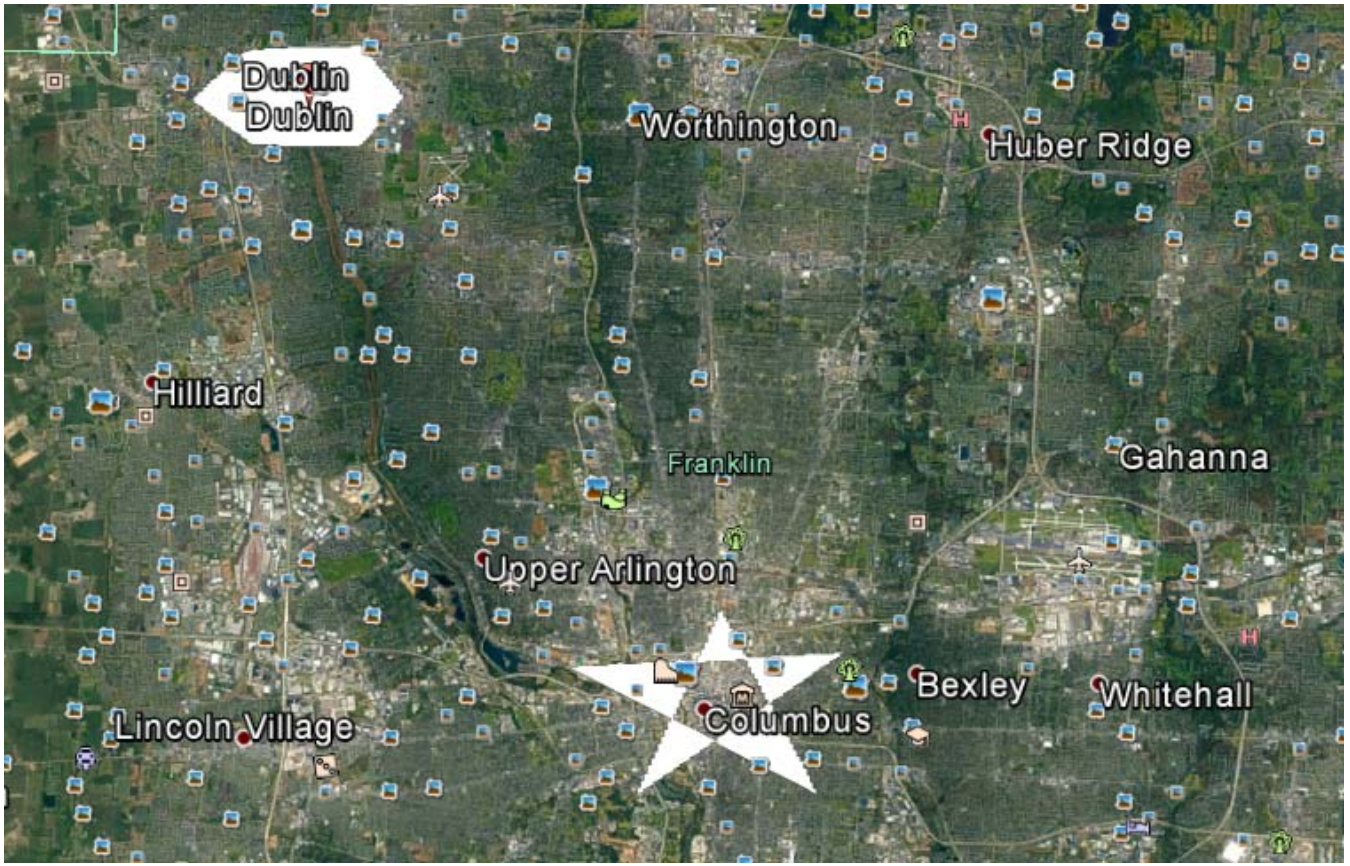
Dublin, Ohio



Dublin is located about 15 miles north west of downtown Columbus, Ohio

Historic Bridge Street District

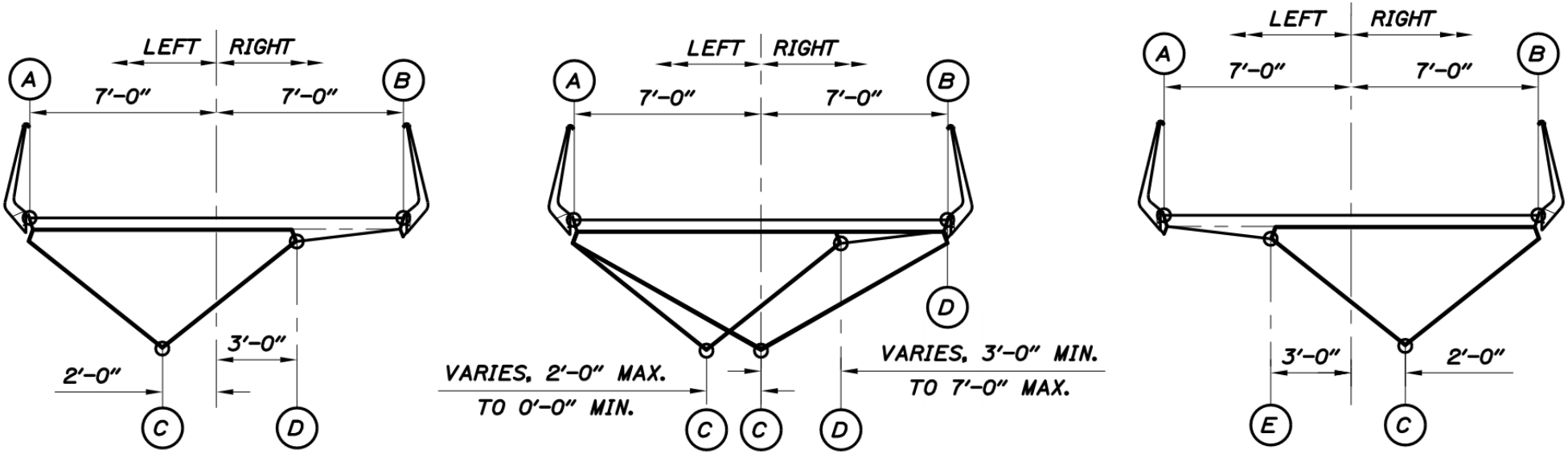
The heart of the downtown area is split by the Scioto River

Scioto River Pedestrian Bridge Project Site

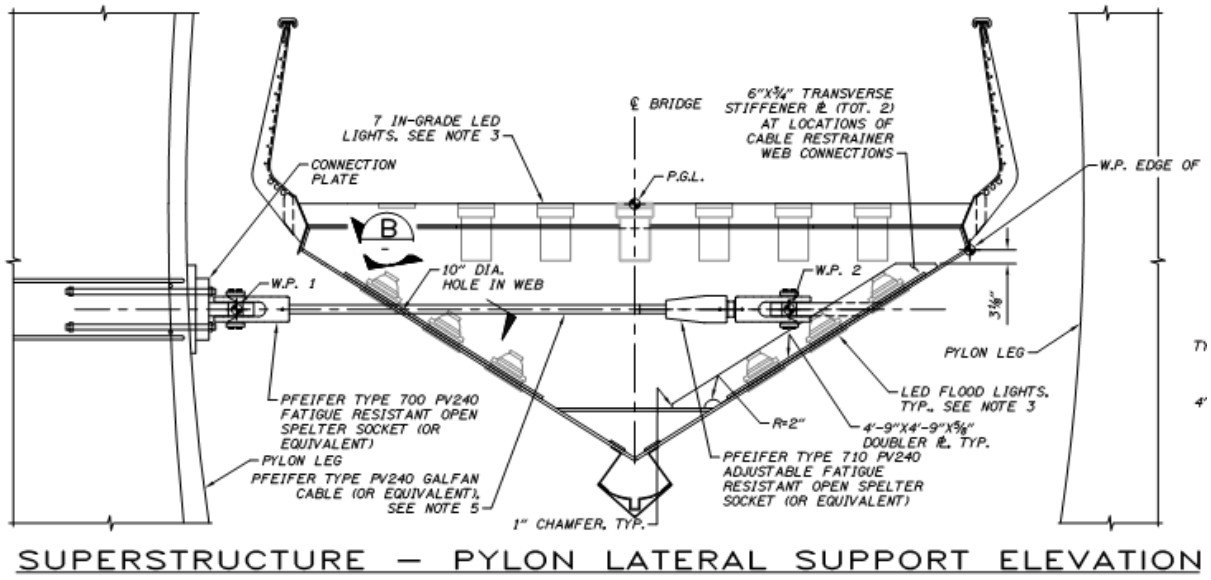
The pedestrian bridge will serve as an iconic City of Dublin landmark – representing connectivity and inclusivity


endrestudio
ARCHITECTS | ENGINEERS

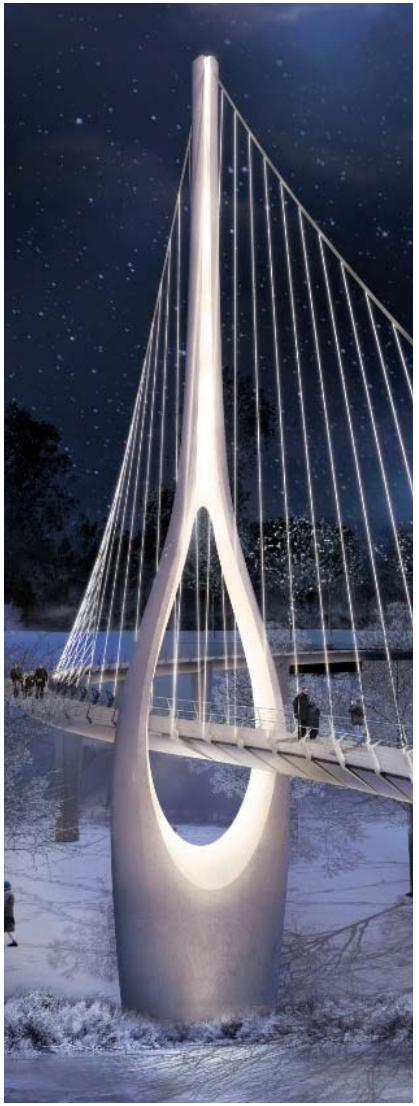
Typical Section

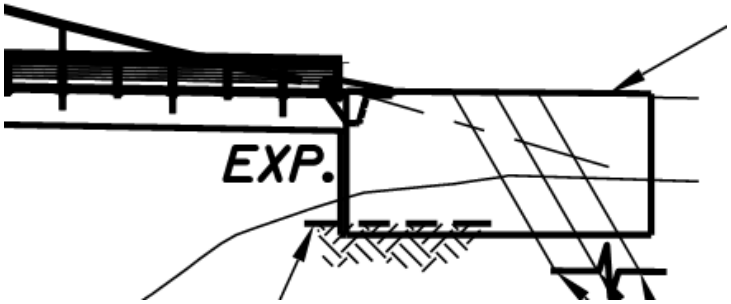


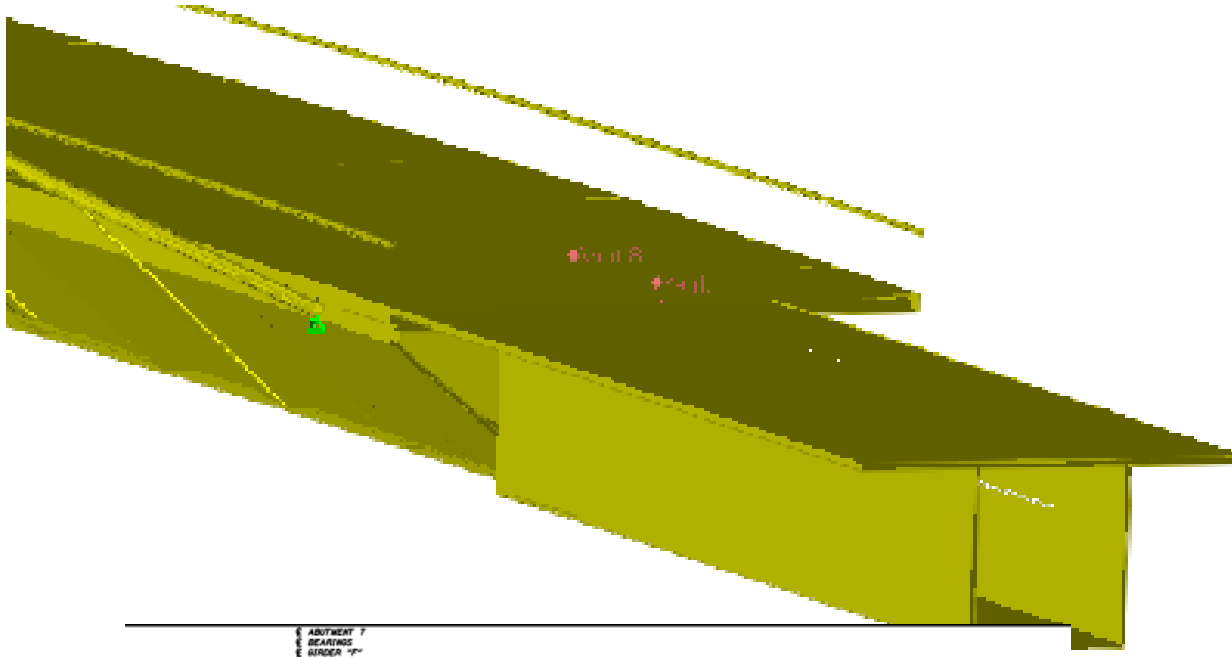
Pylon Restrainers

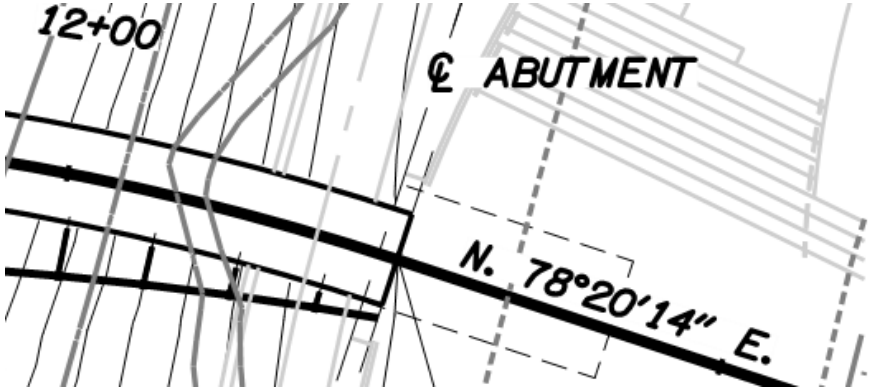


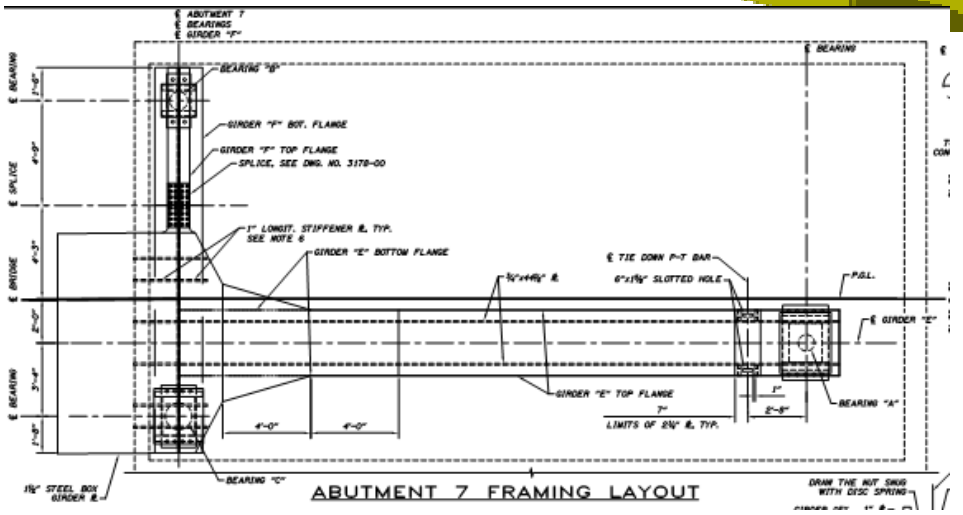
SUPERSTRUCTURE — PYLON LATERAL SUPPORT ELEVATION

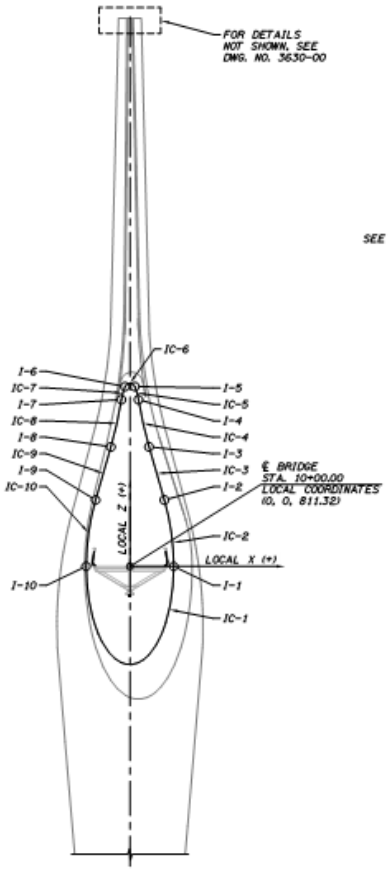


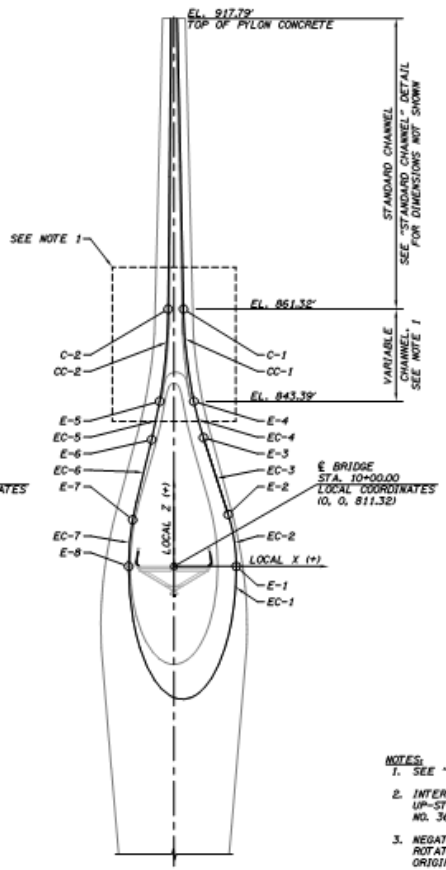

EXP.




12+00
℄ ABUTMENT
N. 78°20'14" E.

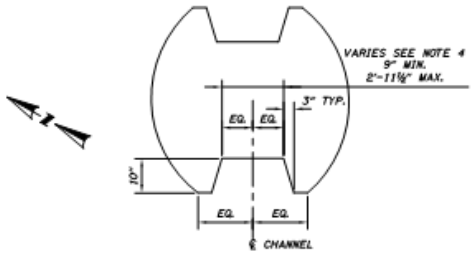

℄ ABUTMENT 7
℄ BEARINGS
℄ GIRDER "F"
℄ BEARING
BEARING "B"
GIRDER "F" BOT. FLANGE
GIRDER "F" TOP FLANGE
SPLICE, SEE DWG. NO. 3178-00
1" LONGIT. STIFFENER R. TYP. SEE NOTE 6
GIRDER "E" BOTTOM FLANGE
℄ TIE DOWN P-T BAR
6"x1⅛" SLOTTED HOLE
P.G.L.
℄ GIRDER "E"
GIRDER "E" TOP FLANGE
7" LIMITS OF 2¼" R. TYP.
BEARING "A"
4'-0"
4'-0"
BEARING "C"
1⅛" STEEL BOX GIRDER E
DRAW THE NUT SNUG WITH DISC SPRING
ABUTMENT 7 FRAMING LAYOUT





INTERIOR EYE GEOMETRY EXTERIOR EYE GEOMETRY

DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS INDICATED.



STANDARD CHANNEL SECTION

INTERIOR EYE LINE AND CURVE DATA								
CURVE	CURVE TYPE	BEGIN POINT	END POINT	RADII		CENTER POINT		
				R1	R2	X	Y	Z
IC-1	ELLIPSE	I-10	I-1	19.08	8.50	0.00	0.00	811.32
IC-2	CIRCULAR CURVE	I-1	I-2	46.67	–	-38.17	0.00	811.32
IC-3	LINEAR	I-2	I-3	–	–	–	–	–
IC-4	CIRCULAR CURVE	I-3	I-4	78.86	–	77.57	0.00	855.80
IC-5	CIRCULAR CURVE	I-4	I-5	11.26	–	-9.46	0.00	841.95
IC-6	CIRCULAR CURVE	I-5	I-6	1.03	–	0.00	0.00	845.87
IC-7	CIRCULAR CURVE	I-6	I-7	11.26	–	9.46	0.00	841.95
IC-8	CIRCULAR CURVE	I-7	I-8	78.86	–	-77.57	0.00	855.80
IC-9	LINEAR	I-8	I-9	–	–	–	–	–
IC-10	CIRCULAR CURVE	I-9	I-10	46.67	–	38.17	0.00	811.32

EXTERIOR EYE LINE AND CURVE DATA								
CURVE	CURVE TYPE	BEGIN POINT	END POINT	RADII		CENTER POINT		
				R1	R2	X	Y	Z
EC-1	ELLIPSE	E-8	E-1	25.83	10.47	1.64	-3.00	811.32
EC-2	CIRCULAR CURVE	E-1	E-2	32.84	–	-20.73	-3.00	811.32
EC-3	LINEAR	E-2	E-3	–	–	–	–	–
EC-4	CIRCULAR CURVE	E-3	E-4	67.70	–	70.14	-3.00	857.12
EC-5	CIRCULAR CURVE	E-5	E-6	113.94	–	-115.00	-3.00	863.12
EC-6	LINEAR	E-6	E-7	–	–	–	–	–
EC-7	CIRCULAR CURVE	E-7	E-8	52.50	–	43.67	-3.00	811.32

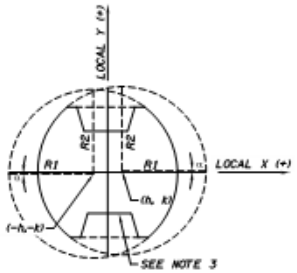
NOTES:
1. SEE "VARIABLE CHANNEL ELEVATION" ON DWG. NO. 3604-00.
2. INTERIOR AND EXTERIOR EYE GEOMETRY DEFINED LOOKING UP-STATION, NEGATIVE Y. SEE LOCAL AXIS DEFINITION ON DWG. NO. 3602-00.
3. NEGATIVE Y SIDE SHOWN ONLY, POSITIVE Y SIDE IS ROTATIONALLY SYMMETRIC ABOUT LOCAL Z AXIS AT COORDINATE ORIGIN (0, 0, 811.32).
4. WIDTH VARIES LINEARLY FROM 9" AT EL. 917.79' TO 2'-11½" AT EL. 861.32'.
5. MAXIMUM DEVIATION FROM THEORETICAL SURFACE SHALL BE ¼". MAXIMUM ANGLE DEVIATION SHALL BE 2°.

INTERIOR EYE POINTS			
POINT	X	Y	Z
I-1	8.50	0.00	811.32
I-2	6.68	0.00	824.23
I-3	3.71	0.00	834.54
I-4	1.67	0.00	843.72
I-5	0.95	0.00	846.27
I-6	-0.95	0.00	846.27
I-7	-1.67	0.00	843.72
I-8	-3.71	0.00	834.54
I-9	-6.68	0.00	824.23
I-10	-8.50	0.00	811.32

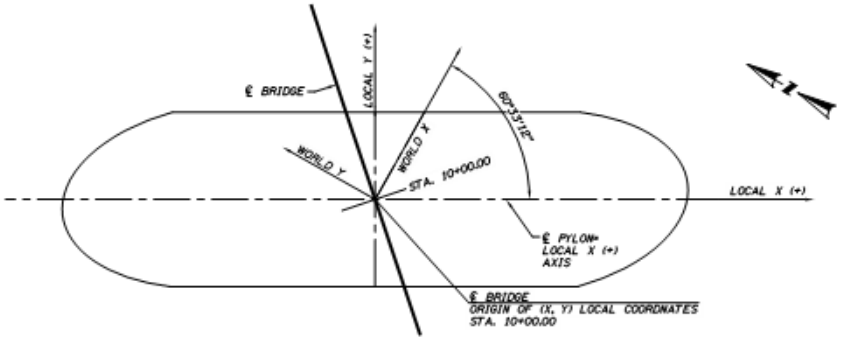
EXTERIOR EYE POINTS			
POINT	X	Y	Z
E-1	12.11	-3.00	811.32
E-2	10.52	-3.00	821.41
E-3	5.71	-3.00	836.33
E-4	3.85	-3.00	843.39
E-5	-2.78	-3.00	843.39
E-6	-4.35	-3.00	835.93
E-7	-7.32	-3.00	823.84
E-8	-8.83	-3.00	811.32

NOTES:

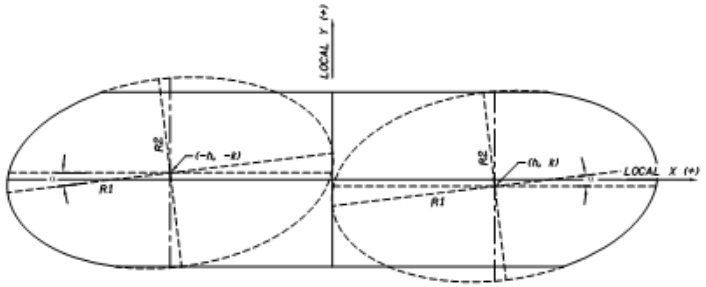
1. SECTION GEOMETRY IS DEFINED IN THE X-Y PLANE IN THE FORM OF EQUATIONS. THE EXTERIOR ROUNDED SHAPES ARE DEFINED BY AN ELLIPSE WITH THE CENTER AT (h, k) WITH A PRIMARY AXIS OF RADIUS "R1" AND A SECONDARY AXIS OF RADIUS "R2". EACH ELLIPSE IS ROTATED ABOUT THE Z-AXIS WITH AN ANGLE "α". WHERE THE ELLIPSE CROSSES THE PLANES Y=-5 AND Y=+3 THEY ARE TRIMMED TO A FLAT PLANE BETWEEN ELEVATIONS 745.00 AND 843.39. PYLON THICKNESS VARIES LINEARLY ABOVE ELEVATION 843.39 PER "SIDE ELEVATION" AS SHOWN ON DWG. NO. 3601-00.
2. POSITIVE "α" IS DEFINED AS COUNTER CLOCKWISE ABOUT THE CENTER OF EACH ELLIPSE (h, k).
3. FOR INTERIOR AND EXTERIOR EYE GEOMETRY SEE DWG. NO. 3603-00.
4. THE SECTIONS SHOWN ARE REPRESENTATIVE OF SECTIONS AT THE BASE, MIDDLE, AND TOP OF THE PYLON.
5. FOR LOCATIONS OF CONTROL POINTS A THROUGH G SEE DWG. NO. 3601-00.
6. FOR LOCATION AND RADII OF CIRCULAR CURVE 1 AND CIRCULAR CURVE 2 SEE DWG. NO. 3601-00.



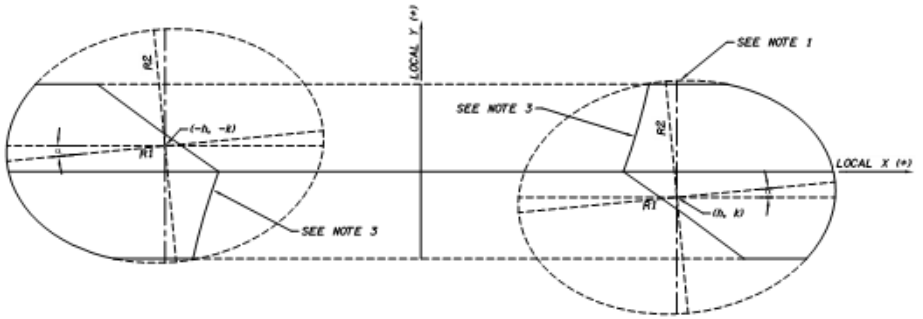
REPRESENTATIVE SECTION NEAR TOP



LOCAL COORDINATE DEFINITION PLAN



REPRESENTATIVE SECTION NEAR BASE



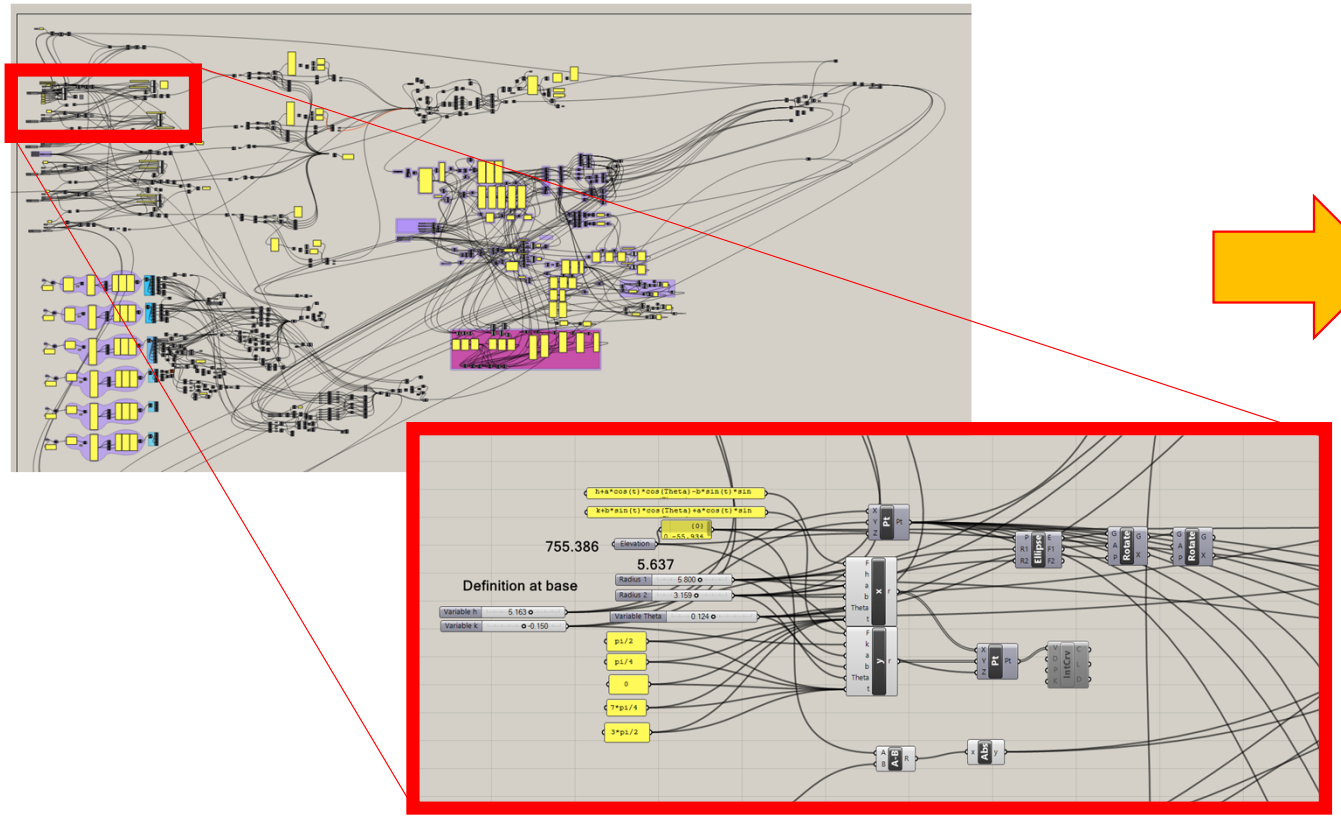
REPRESENTATIVE SECTION NEAR MIDDLE

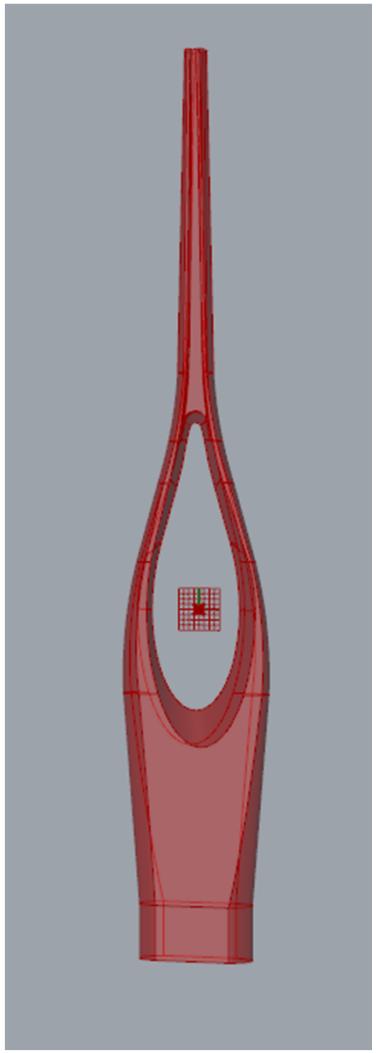
PYLON EXTERIOR GEOMETRY CONTROL TABLE

	CONTROL POINT	Ⓐ	A—B VARIATION	Ⓑ	B—C VARIATION	Ⓒ	C—D VARIATION	Ⓓ	D—E VARIATION	Ⓔ	E—F VARIATION	Ⓕ	F—G VARIATION	Ⓖ
CONTROL PARAMETERS	EL.	745.000	–	755.386	–	795.386	–	820.386	–	835.386	–	857.320	–	917.790
	h (ft)	5.163	–	5.163	LINEAR	8.534	CIRCULAR CURVE 1	7.000	LINEAR	2.750	CIRCULAR CURVE 2	−0.450	LINEAR	−0.481
	k (ft)	−0.150	–	−0.150	LINEAR	−0.800	LINEAR	−1.250	LINEAR	−0.878	LINEAR	−0.423	LINEAR	0.000
	R1 (ft)	5.800	–	5.800	–	5.800	LINEAR	4.810	–	4.810	LINEAR	4.000	LINEAR	2.694
	R2 (ft)	3.159	–	3.159	LINEAR	4.000	LINEAR	4.750	–	4.750	LINEAR	3.850	LINEAR	2.694
	α (rad)	0.124	–	0.124	LINEAR	0.000	–	0.000	–	0.000	–	0.000	–	0.000
	α (deg)	7.105	–	7.105	LINEAR	0.000	–	0.000	–	0.000	–	0.000	–	0.000

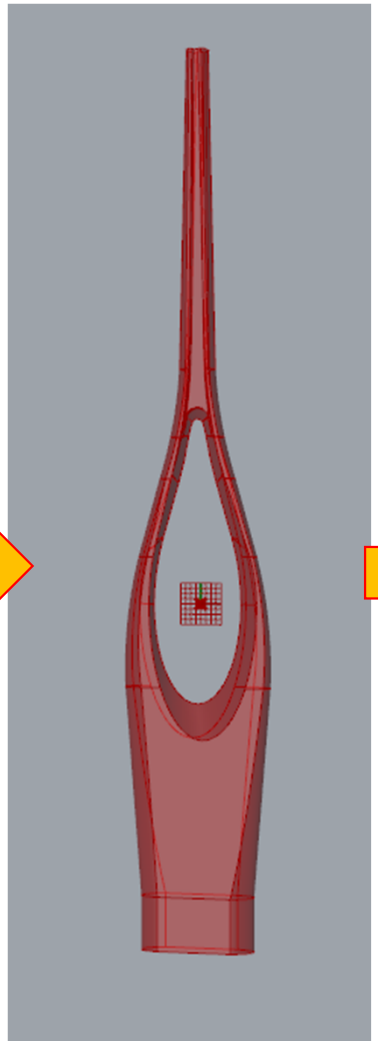
DO NOT SCALE THIS DRAWING.
FOLLOW DIMENSIONS INDICATED.

Parametric 3D geometric control



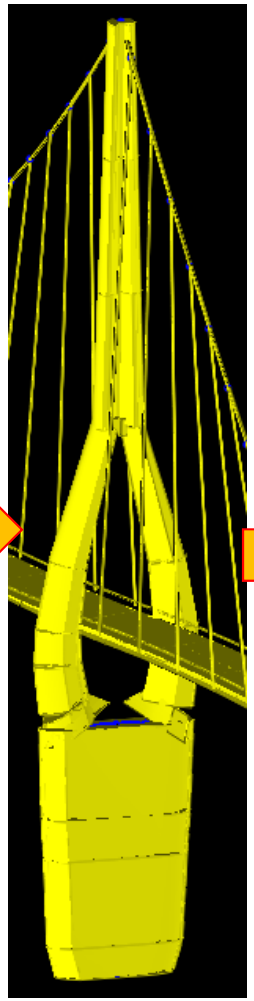


Architectural model

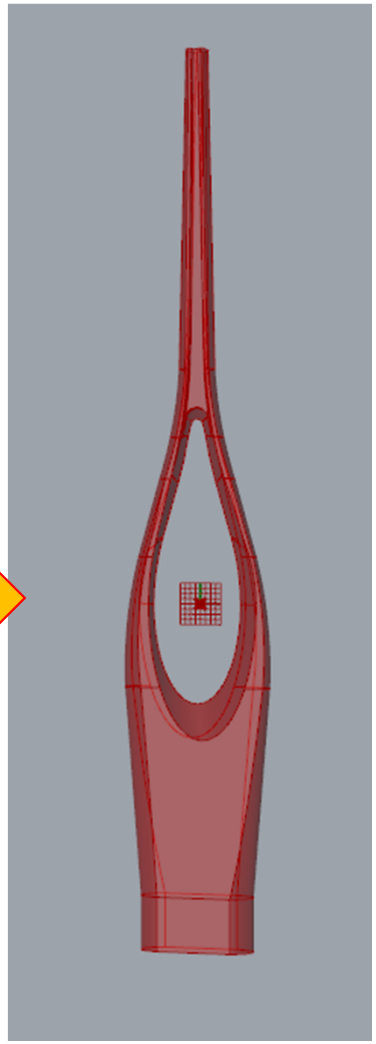


Mathematical model

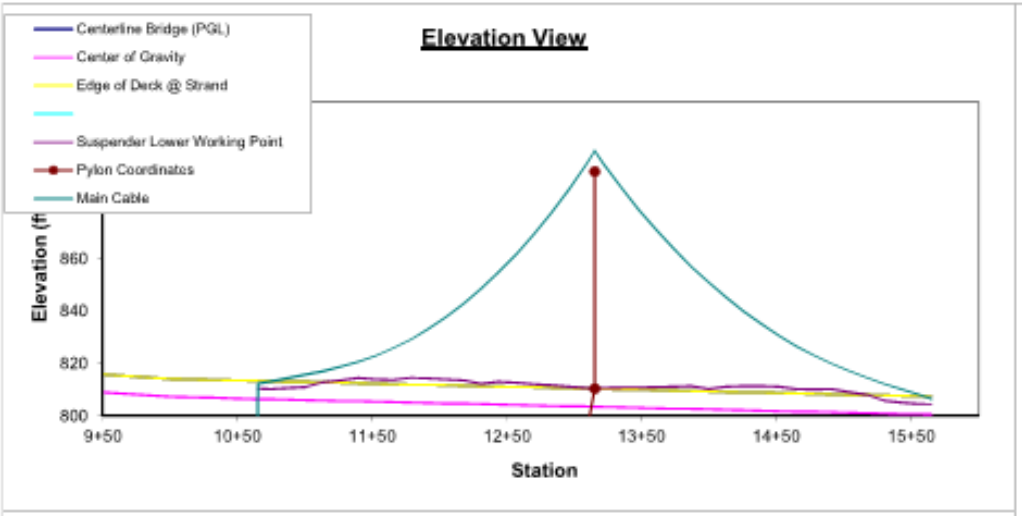
Physical model

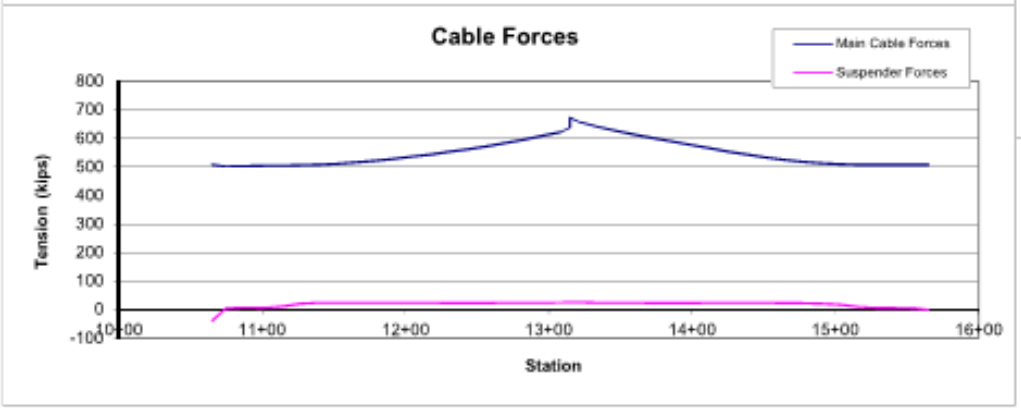


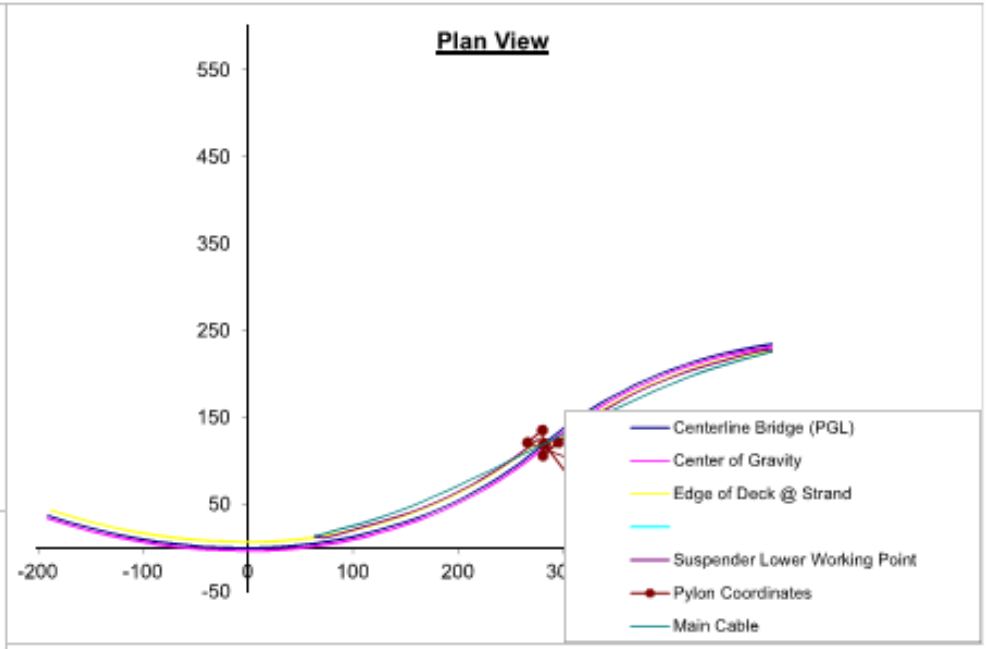
Analysis model

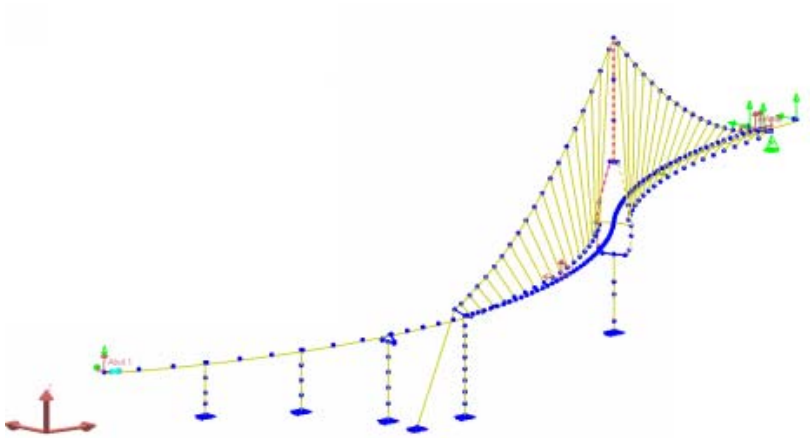


Mathematical model

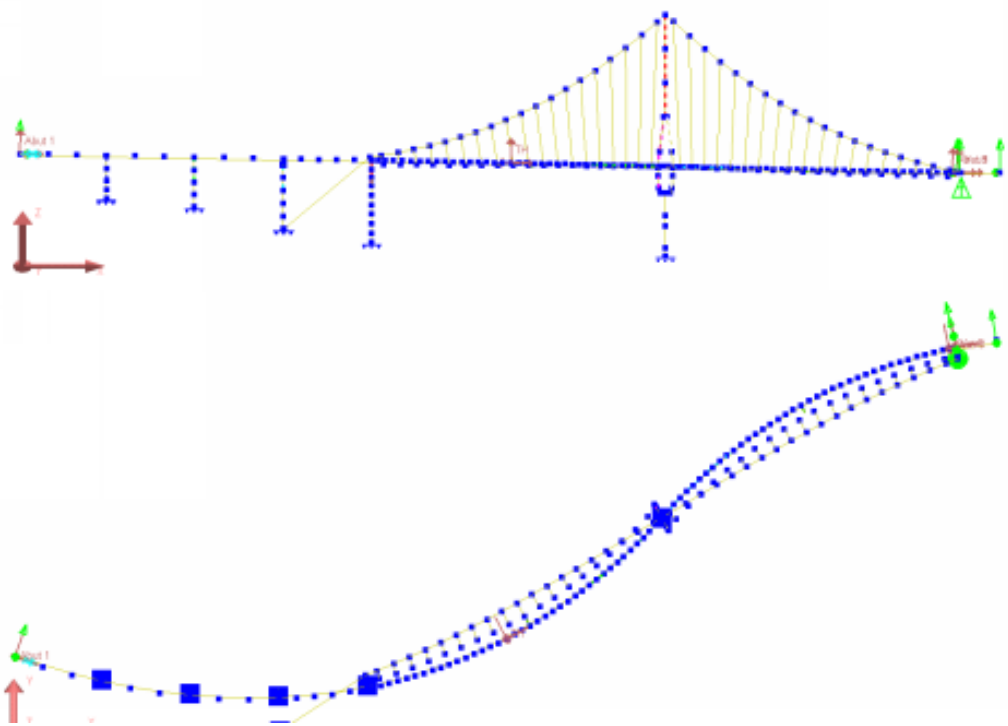

Elevation View
Centerline Bridge (PGL)
Center of Gravity
Edge of Deck @ Strand
Suspender Lower Working Point
Pylon Coordinates
Main Cable
Elevation (ft
860
840
820
800
9+50
10+50
11+50
12+50
13+50
14+50
15+50
Station


Cable Forces
Main Cable Forces
Suspender Forces
Tension (kips)
800
700
600
500
400
300
200
100
0
-100
10+00
11+00
12+00
13+00
14+00
15+00
16+00
Station


Plan View
550
450
350
250
150
50
-50
-200
-100
0
100
200
Centerline Bridge (PGL)
Center of Gravity
Edge of Deck @ Strand
Suspender Lower Working Point
Pylon Coordinates
Main Cable



FE Model for Dublin Pedestrian Bridge in LARSA



Views of the 1:15 scale sectional model in the wind tunnel		Figure 3-1	RWDI
Iconic Scioto River Pedestrian Bridge	Project #1600463	November 14, 2016	

Views of the sectional model with guide vane		Figure 3-3	RWDI
Iconic Scioto River Pedestrian Bridge	Project #1600463	November 14, 2016