OWNER/CLIENT:

YALE UNIVERSITY

LANDSCAPING & GROUNDS MANAGEMENT 2 WHITNEY AVENUE NEW HAVEN, CT 06510

ARCHITECT:

DBVW ARCHITECTS, INC.

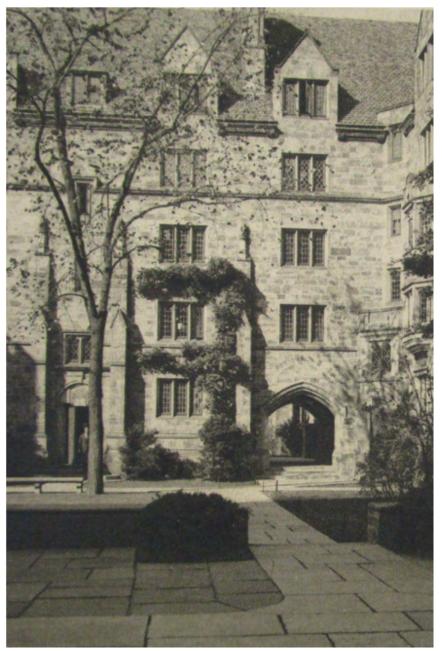
111 CHESTNUT STREET PROVIDENCE, RI 02903 T: 401.831.1240 F: 401.331.1945

STRUCTURAL ENGINEER:

YODER + TIDWELL, LTD

333 SMITH STREET PROVIDENCE, RI 02908 T: 401.751.2460 F: 401.274.7517

PLANT SUPPORT PROTOTYPE



HARKNESS MEMORIAL QUADRANGLE, KILLINGWORTH COURT, 1940, PHOTO BY CHAMBERLAIN

DRAWING LIST

GENERAL COVER A000

ARCHITECTURAL A001 SUPPORT TYPE 1 - BRONZE ROD A002 SUPPORT TYPE 2 - STEEL CABLE A003 PROTOTYPE CALCULATIONS

GENERAL NOTES:

1. THE SYSTEMS SHOWN IN THESE DRAWINGS ARE INTENDED TO BE PROTOTYPES FOR INSTALLATION IN STONE, COMPOSITE MASONRY BUILDINGS ON THE YALE CAMPUS. THE INFORMATION SHOWN IS FOR REFERENCE ONLY: THE SYSTEMS HAVE NOT BEEN DESIGNED FOR A SPECIFIC SIZE OR TYPE OF PLANT OR SPECIFIC INSTALLATION LOCATION. THE PROTOTYPES ARE BASED ON THE PARAMETERS NOTED BELOW.

2. ALL COMPONENTS FOR SUPPORT TYPE 1 SHALL BE FABRICATED FROM BRONZE EXTRUSIONS, ASTM B455, ALLOY UNS NO. C38500.

3. ALL COMPONENTS FOR SUPPORT TYPE 2 SHALL BE TYPE 316 STAINLESS STEEL. WIRE ROPE FITTINGS SHALL HAVE THE CAPABILITY TO SUSTAIN. WITHOUT FAILURE, A LOAD EQUAL TO THE MINIMUM BREAKING STRENGTH OF WIRE ROPE WITH WHICH THEY ARE USED.

4. TYPE 1 (BRONZE ROD) IS INTENDED FOR VERTICAL AND HORIZONTAL INSTALLATION.

INSTALLATION ONLY.

6. THE SUPPORTS SHALL BE INSTALLED IN STONE MASS MASONRY ASSEMBLIES WITH JOINTS WIDE ENOUGH TO ACCOMMODATE A 1/2-INCH THICK PLATE WITHOUT DAMAGING THE EXISTING MASONRY. IF A THINNER PLATE IS REQUIRED FOR ASSEMBLIES WITH NARROWER JOINTS, THE SYSTEM WILL REQUIRE SOME COMBINATION OF WIDER PLATE, SHORTER OFFSET, AND/OR SHORTER SPAN.

7. THE SUPPORTS ARE DESIGNED FOR INSTALLATION IN STONE MASONRY THAT CAN ADEQUATELY SUPPORT THE WEIGHT OF THE SYSTEM. INSTALLATION IN BRICK, AND SOME SOFTER VARIETIES OF STONE (SUCH AS BROWNSTONE), WILL REQUIRE COMPRESSIVE TESTING OF THE MATERIAL TO CONFIRM WHETHER IT CAN WITHSTAND THE STRESS AT EACH EMBEDDED ANCHOR.

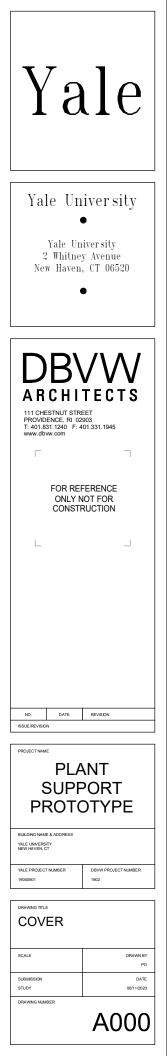
8. THE SUPPORTS SHALL NOT BE INSTALLED IN CAVITY WALL CONSTRUCTION.

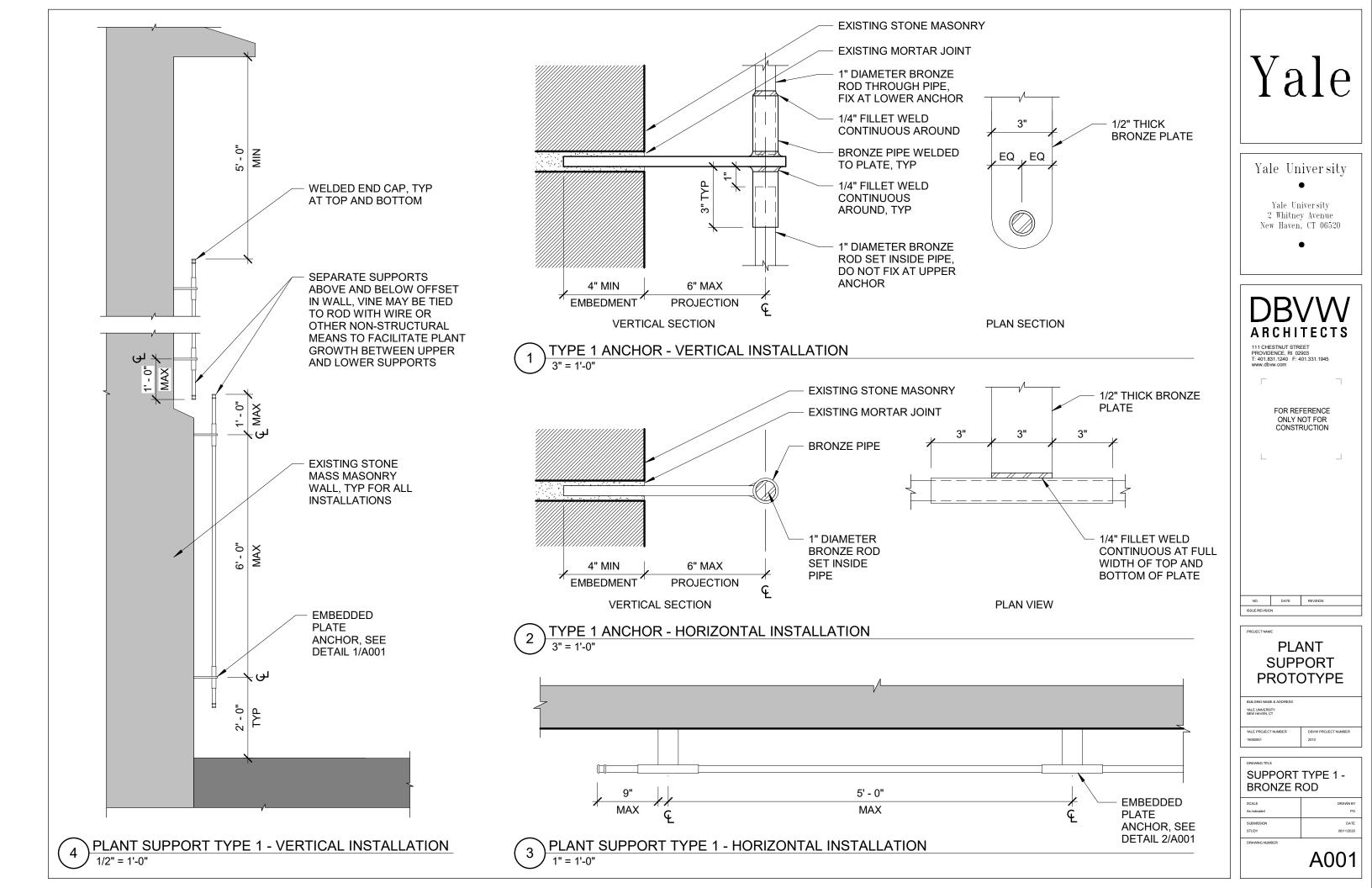
9. THE FOLLOWING DESIGN PARAMETERS WERE USED TO CALCULATE THE CAPACITY OF THE PROTOTYPE SYSTEMS (MAXIMUM LOADS - SEE SHEET A003):

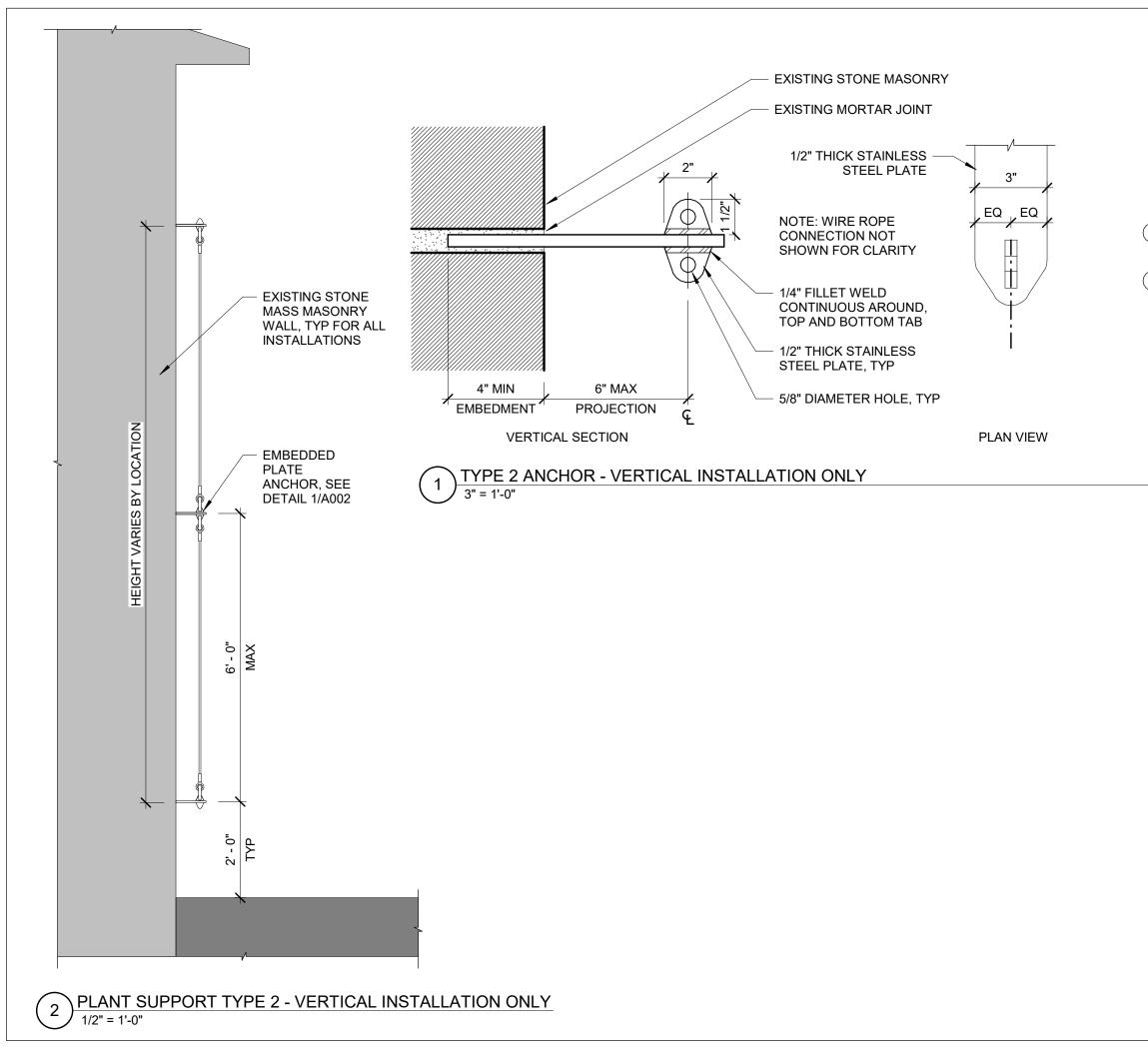
- WEIGHT OF THE PLANT)

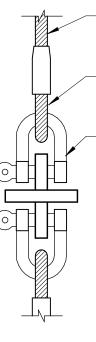
5. TYPE 2 (STAINLESS STEEL CABLE) SHALL BE USED FOR VERTICAL

WEIGHT OF THE PLANTS TO BE SUPPORTED: 5.5 POUNDS PER SQUARE FOOT SPREAD OF PLANTS TO BE SUPPORTED: 3 FEET ON EACH SIDE, OR 6 FEET IN TOTAL WIDTH WEIGHT OF SNOW OR ICE CARRIED BY THE PLANTS: 4 POUNDS PER SQUARE FOOT (IN ADDITION TO THE WIND LOAD CARRIED BY THE SUPPORT SYSTEM: 5 POUNDS PER SQUARE FOOT OF PLANT AREA









STAINLESS STEEL WIRE ROPE, TYP

STAINLESS STEEL THIMBLE AT LOOP, TYP

1/2" DIAMETER STAINLESS STEEL SHACKLE THROUGH TAB, TYP

ELEVATION

Yale
Yale University Yale University 2 Whitney Avenue New Haven, CT 06520
CONSTRUCTION
NO. DATE REVSION ISSUE-REVSION
PRJECTINANE PLANT SUPPORT PROTOTYPE
BULDNOR NAME & ADDRESS YALE LIANGERSTY VALE PROJECT NUMBER 1960901 2010 DRAWNIG TILE
SUPPORT TYPE 2 - STEEL CABLE SCALE DRAWN BY As indicated Pro SUBMISSICM DATE STUDY 000110200 DRAWNIG MARBER A0002

Plant Support Prototype Calculations

Type 1: Bronze Rod (Vertical and Horizontal)

Design Variables:		
Contributing Width of Vine Spread	6.0	ft
Dead Weight of Vines	5.5	psf
Snow/Ice Surcharge on Vines	4.0	psf
Wind Load on Vines	5.0	psf
Material Properites:		
Yield Strength of Bronze (Fy)	35.0	ksi
Elasticity of Bronze (E)	14000	ksi

Vertical Installations:			
Vertical Spacing Between Supports	6.0	ft	
Offset from face of Wall	6.0	in	
Flat Plate Bracket:			
Thickness of Plate	0.500	in	
Width of Plate	3.000	in	
Moment of Inertial (Ix)	0.031	in^4	
Section Modulus (Sx)	0.125	in^3	
Material Yield Strength (Fy)	35.0	ksi	Bronze
Material Elasticity E	14000.0	ksi	Bronze
Load on Bracket	342.0	lbs	
Bending Moment on Bracket	2052.0	in*lbs	Due to Vertical Load
Stress in Bracket	16416.0	psi	ОК
Allowable Material Stress	21000.0	psi	
Deflection of Bracket	0.06	in	
Embedment Depth in Masonry	4.000	in	
Stress in Masonry	256.5	psi	
Vertical Pipe or Rod:			
Outside Diameter of Pipe or Rod	1.000	in	
Inside Diameter of Pipe or Rod	0.000	in	Solid Rod
Moment of Inertial (Ix)	0.049	in^4	
Section Modulus (Sx)	0.098	in^3	
Material Yield Strength (Fy)	35.0	ksi	Bronze
Material Elasticity E	14000.0	ksi	Bronze
Bending Moment in Pipe or Rod	1620.0	in*lbs	Due to Wind Load
Stress in Pipe or Rod	16509.6	psi	ОК
Allowable Material Stress	21000.0	psi	
Deflection of Pipe or Rod	1.27	in	

Horizontal Installations:			
Horizontal Spacing Between Supports	4.5	ft	
Offset from face of Wall	6.0	in	
Horizontal Pipe or Rod:			
Outside Diameter of Pipe or Rod	1.000	in	
Inside Diameter of Pipe or Rod	0.000	in	Solid Rod
Moment of Inertial (Ix)	0.049	in^4	
Section Modulus (Sx)	0.098	in^3	
Material Yield Strength (Fy)	35.0	ksi	Bronze
Material Elasticity E	14000.0	ksi	Bronze
Bending Moment in Pipe or Rod	1731.4	in*lbs	Due to Vertical Load
Stress in Pipe or Rod	17644.6	psi	ОК
Allowable Material Stress	21000.0	psi	
Deflection of Pipe or Rod	0.77	in	

Type 2: Stainless Steel Cable (Vertical Only)

Design Variables:

Contributing Width of Vine Spread Dead Weight of Vines Snow/Ice Surcharge on Vines Wind Load on Vines

Material Properites:

Yield Strength of Stainless Steel (Fy) Elasticity of Stainless Steel (E)

Vertical Installations:

Vertical Spacing Between Supports Offset from face of Wall

Flat Plate Bracket:

Thickness of Plate Width of Plate Moment of Inertial (Ix) Section Modulus (Sx) Material Yield Strength (Fy) Material Elasticity E Load on Bracket Bending Moment on Bracket Stress in Bracket Allowable Material Stress Deflection of Bracket Embedment Depth in Masonry Stress in Masonry

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	4.000	in	
		psi	

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Yale Un Yale Un 2 Whitney New Haven,	iversity Avenue
111 CHESTNUT STRE PROVIDENCE, RI 02 T: 401.831.1240 F: 4 www.dbw.com	903
NO. DATE	REVISION
PROJECTINAME PLANT SUPPORT PROTOTYPE	
BUILDING NAME & ADDRESS YALE UNIVERSITY NEW HAVEN, CT YALE PROJECT NUMBER	DBWW PROJECT NUMBER
YALE PROJECT NUMBER	2010
PROTOTYF CALCULAT	
SCALE 12" = 1'-0" SUBMISSION	DRAWN BY BL DATE
SUBMISSION STUDY DRAWING NUMBER	06/11/2020
	A003