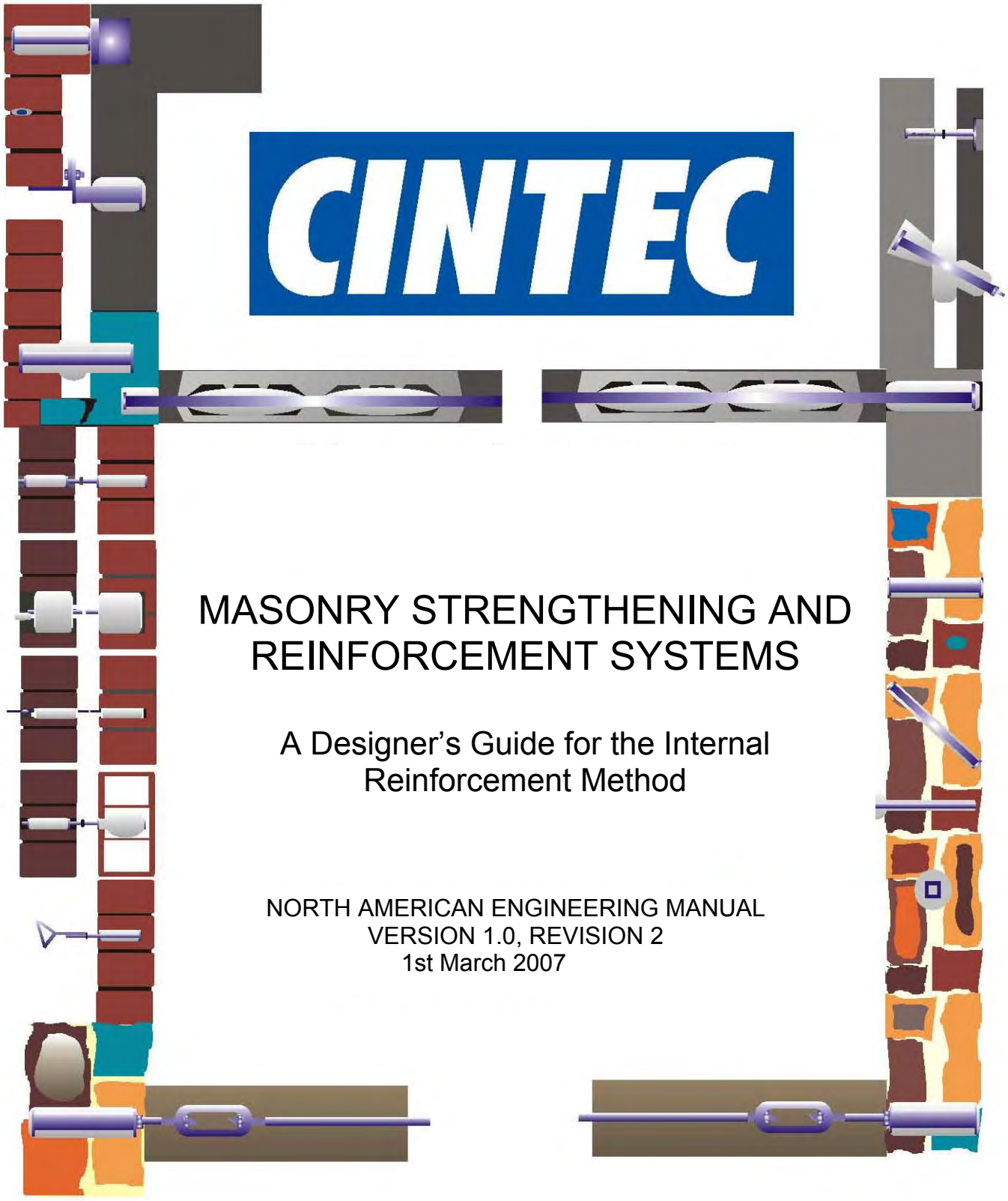

MASONRY STRENGTHENING AND REINFORCEMENT SYSTEMS

A Designer's Guide for the Internal Reinforcement Method

NORTH AMERICAN ENGINEERING MANUAL
VERSION 1.0, REVISION 2
1st March 2007

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Introduction.

This manual has been produced to Engineers and Architects
In North America to have a better understanding of the Cintec
Anchoring System.

As this is the first version, there will be areas that need clarification and additional information maybe required.

It would be very much appreciated if you could send any comments and suggestions to engineering@cintec.com so that we can incorporate them in the next revision.

Robert Lloyd-Rees, FFB
Chief Operating Officer
Cintec North America

31 December 2006

Section 1 - Introduction to Masonry Strengthening and Reinforcement

Preamble

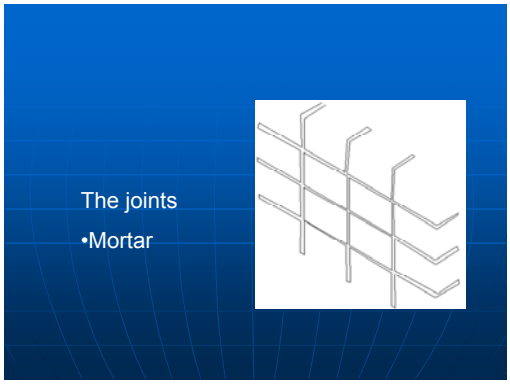
When we speak of strengthening there is an assumption that the masonry is existing and that it is deficient is some way.

This deficiency can take two forms. In the first case, the masonry may have deteriorated to the point where it can no longer perform the functions for which it was intended or safety is compromised. In the second case, it may need to be reinforced to take new loads.

Prior to the recent development of the strengthening method, standard practice was to dismantle and rebuild deficient masonry. This is a very disruptive and costly process, hence the impetus to find alternative methods.

Masonry comes in a number of configurations, including:

- Solid (single wythe)
- Composite (multiple wythes bonded together structurally)
- Cavity (multi wythe tied together)
- Rubble (two wythes with rubble fill)



The main components of masonry are masonry units, mortar and reinforcement.

Masonry units can be brick, terra cotta, CMU, adobe, stone, or precast concrete.

These units are usually bedded in and separated from each other by a bed of mortar. In some cases the masonry is laid up without mortar, such as dry stone walls.

Reinforcement can take the form of reinforced concrete elements built into the wall, embedded metal members, external reinforcement applied to the face of the wall, or external structural elements.

Engineering Considerations

General

The structural strengthening methods covered in the other chapters of this document can generally be applied to masonry.

These include section enlargement, externally bonded systems, post-tensioning, and virtual strengthening.

Masonry is not strong in tension, shear and bending. Its main value as a structural material is in compression. However, all these characteristics can be improved through strengthening.

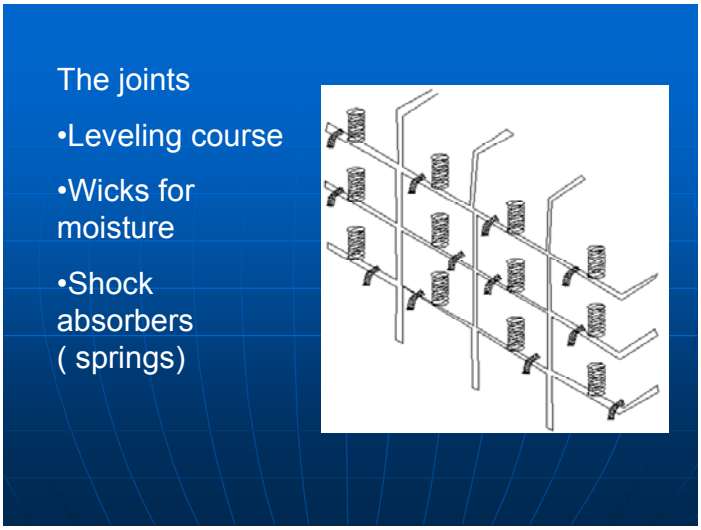
The weakest element of a masonry system is typically the mortar. This is intentional.

Mortar is intended to be the component that “wears out”. The mortar should act as a wick to allow moisture to exit the wall through evaporation. In so doing, the mortar (in northern climates) is exposed to many more cycles of freeze-thaw than are the masonry units.

If the mortar is ineffective as a wick for the moisture that may enter the wall, then the moisture is forced out through the masonry units, leading to freeze-thaw damage at both the interior (cavity) face and the exterior face. This leads to lose of the face of the unit. This type of damage can only be effectively remedied by complete replacement of the unit.

It is much easier to repair the deteriorated mortar on a regular basis than it is to replace the actual masonry units.

The mortar, when well designed, should act as a spring in the masonry system. Mortar that is more ductile and weaker than the main units will absorb uneven stress distributions. These stress concentration may be due to impact, settlement, thermal and overload.



The most common cause of masonry failure is the replacement of weak mortar with a much stronger mortar in a well intentioned but misguided attempt to “strengthen” the masonry elements.

This is common where soft, permeable lime-based heritage mortar is repointed with a very strong and dense Portland cement mortar.

The new, impermeable mortar dams up the moisture in the wall, causing it to exit through the masonry units. The salts found in Portland cement are deposited on the face of the units through evaporation. This is the unsightly efflorescence we see on the face of the units, leading to added costs for surface cleaning.

This accumulation of salts clogs the pore structure of the masonry units and accelerates the deterioration of the units when exposed to freeze-thaw conditions.

The insertion of a very hard, inflexible element at the front edge of the masonry units causes the face of the masonry units to be subjected to a very high compressive and shearing stress.

This combination of freeze- thaw damage and knife edge stress loading can cause very rapid failure of the face of the masonry units.

Failure due to hard mortar repointing.)

If the evaporation face is at the inner face of the exterior masonry units, facing a cavity, then the debris falling from the units accumulates in the cavity, leading eventually to a wedging action of the debris. This is the most common cause of bulging at lines of horizontal support.

The next most common cause of masonry failure is corrosion of ferrous metals.

Steel and iron elements are embedded in masonry for various reasons. Steel frames are embedded in masonry for fireproofing and aesthetic reasons. This was particularly prevalent in structures from the 1920's and 1930's.

Unprotected steel angles are also used as shelf angles at regular interval in structures to support masonry veneers.

We also see corrosion of galvanized material used in anchoring or another application within the masonry.

Water enters the masonry as the masonry deteriorates. This moisture promotes corrosion of the steel leading to oxide jacking. The products of corrosion can be 3 to 4 times the volume of the parent material, creating very high lateral forces. These lateral forces open up cracks and joints in the masonry, leading to more water ingress and a vicious cycle of ever accelerating deterioration.

Seismic Reinforcement

Seismic upgrading is a growing use for masonry strengthening. External and internal system can be used.

In addition to increasing the shear, axial and bending strengths of the masonry, reinforcement also increases the ductility of the masonry. This is a very important performance improvement for seismic retrofit.

Historic Masonry

Appearance and compatibility are important considerations in selecting masonry strengthening methods for historic structures.

External systems tend to disrupt the appearance of the structure. Internal systems are concealed.

As much as possible preservationists prefer using materials that are compatible with the original materials, and systems that are reversible.

Polymers are a modern material and are deemed to be incompatible. Cement based products are historically compatible.

Work on historic structures must conform to the standards of the ICOMOS Charter of Venice. This standard has been adopted by the National Parks Service, State Historic Preservation Offices (SHPO) and municipal landmark commissions.

Blast Protection.

Many of the proposed strengthening methods contribute to the resistance of the structure to blast loads, intentional or accidental.

Blast loads have a similar effect on masonry structures to seismic loads and damage levels can be comparable.

Internal reinforcement probably offers the best protection, and has the added benefit of providing post-blast intrusion protection, however it is costly.

External reinforcement has the advantage of containing shrapnel but is limited where appearance is a consideration.

Systems, Methods and Materials

Traditional Methods.

Traditional methods of strengthening masonry include:

- Replacement of mortar (repointing)
- Replacement or repair of individual units
- Rebuilding of sections of a wall

These methods may appear to be repair methods rather than strengthening methods. However, when any of these methods are required, it means the structure is deficient and these methods will increase the overall strength of the structure.

Individual Unit Strengthening

Masonry by definition is made up of prefabricated units that can normally be manhandled. They are most commonly made from naturally occurring mineral material. These prefabricated units themselves may deteriorate for various reasons, including freeze-thaw, defective fabrication and inappropriate chemical treatment or cleaning.

Strengthening of individual units can be done but this has limited application.
Mortar joints are intended to be the component that "wears out". The practice of joint repointing was developed as the main strategy for repair and strengthening. Replacement of mortar with a higher strength material is strongly discouraged.

Joints in ashlar type construction (rectangular units, straight joints) may be strengthened to increase load-bearing capacity by introducing a thin steel wire reinforcement in a slot cut in the mortar. This method is only used where there is a very specific need as the cost is high. This is used to increase the resistance of the system to out of plane loads such as seismic and wind.

Repair of masonry units usually involves replacement if the units are small.

In the case of large units, a repair using internal reinforcing anchors or applied patches of compatible material.

Hollow masonry units such as CMU and terra-cotta may be strengthened by injection (grouting) of a compatible material. Grouting systems normally require a method to contain the grout to prevent intrusion into areas where grout is not required or is undesirable.

Internal reinforcement in the form of an anchor may be part in the injected material. Fire resistance and freeze thaw resistance are criteria properties to be considered in the selecting this type of reinforcement.

Externally Bonded Reinforcement

External reinforcement is normally used where appearance in not a concern. Many masonry structures utilize the exterior and/or internal surfaces of the masonry as the architectural finish, thus limiting the use of external reinforcement.

Many masonry systems have rough or decorative faces, thus also limiting the use of external reinforcement.

Typical installations involve application of metal or composite reinforcing members on the face of the masonry. Attachment is by mechanical fasteners and/or chemical adhesives.

External reinforcement may be post-tensioned. Fireproofing of external reinforcement can be a major cost and aesthetic concern.

Section Enlargement

While section enlargement is completely feasible, it does not find widespread use.

Masonry structures are usually quite bulky by their nature and the addition of extra volume can create appearance, space and clearance problems.

Shotcrete is one of the methods of section enlargement that is available for existing masonry structures.

Internal Strengthening

Internal strengthening can be perpendicular to the face of the masonry system or in the plane of the system.

Perpendicular strengthening involves tying together the deteriorated masonry or tying the wythes of composite or cavity systems.

This type of reinforcement can be mechanical, adhesive or grouted anchors installed in holes drilled perpendicular to the wall face.

In-plane internal reinforcement can be in any direction in the plane of the wall. Most applications involve drilling of long holes and insertion of a metal anchor body, which is then grouted.

In some cases the existing void or core built into the units , such as occurs in CMU and terra cotta, can be used to accept the reinforcement.

The air space in a cavity system may also be used to accommodate in-plane reinforcement. This is not usually an accepted practice as the introduction of reinforcement in the cavity may defeat the

original design requirement for the cavity as a integral part of the building envelope. The reinforcing element is bonded and encased in an injected material, either a polymer or a cement-based grout.

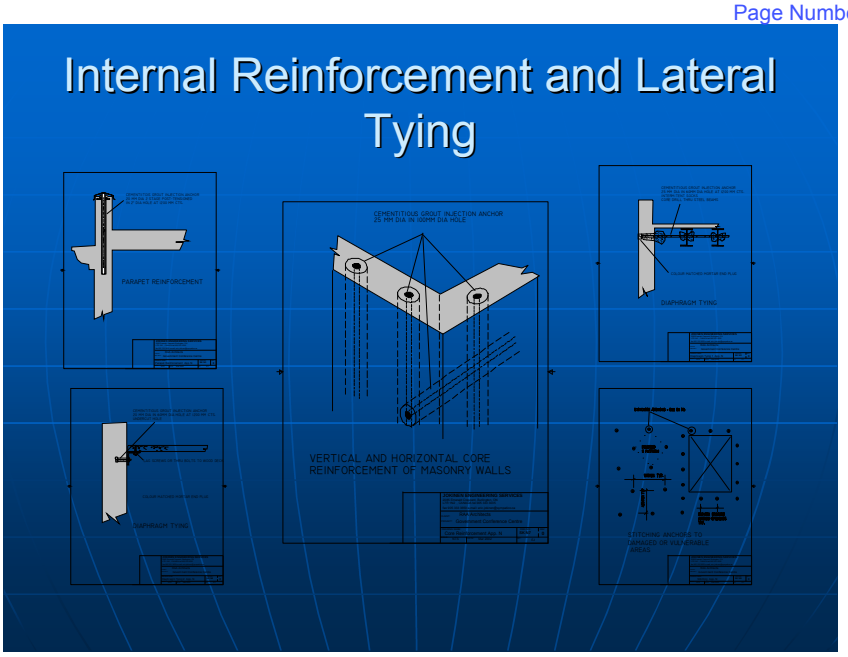
Care must be taken in this type of application, particularly in seismic zones, that the mass is not increased and the load paths are not changed.

In-plane reinforcement can increase in-plane compressive, shear and tensile strength and out-of-plane shear and bending strength.

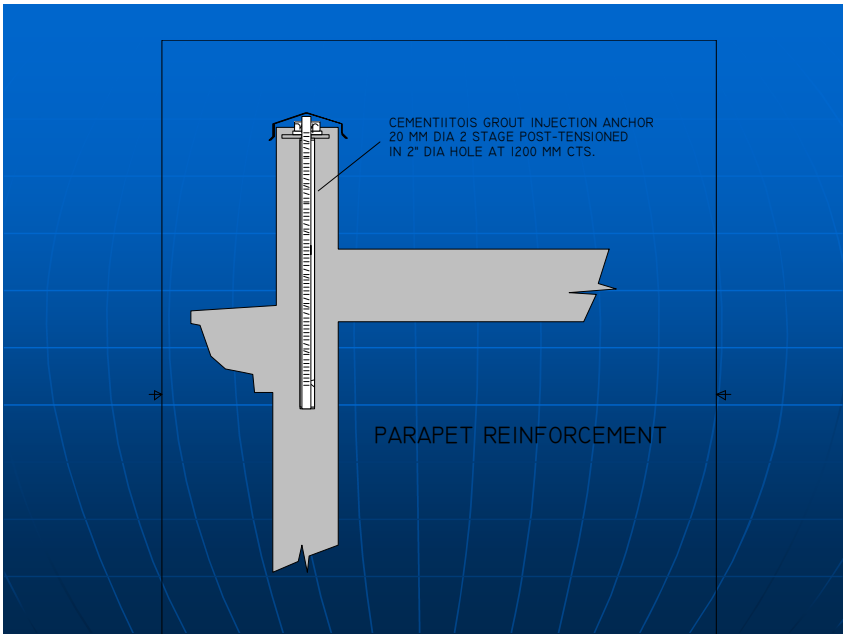
Internal reinforcement can be post tensioned. Post tensioning is advantageous as a strengthening method as it induces compressive stresses in the masonry. This reduces the occurrence of tensile cracks in the system.

As with other systems, fire resistance and resistance to freeze-thaw damage should be considered in selecting an internal reinforcement system.

Dust – free Directional Drilling



Internal Reinforcement



Parapet post tensioning

Modern Developments

Recent advances in directional drilling have lead to new applications in internal reinforcement.

Advances in material sciences related to CFR, polymer adhesives and micro-fine grouts have lead to new ways of applying strengthening methods.

Recent advances in cathodic protection provide a means to stop corrosion of embedded metals.

Virtual Strengthening

Many masonry structures were designed under empirical design rules, or even by traditional rules of thumb.

There is much scope for the use of virtual strengthening in assessing such structures.

Recent developments in codes for existing structures are now allowing greater latitude in allowable stresses for structures that have stood the test of time.

Most masonry structures also benefit from a tell-tale element built right in – the mortar.

As the weakest and most easily repairable element in the masonry system, the mortar and its condition are good indicators of the structural integrity of the entire system.

Advanced non-destructive testing (NDT) methods such as flat jacks and shove tests are a great help in assessing this. Details and discussions on these tests and many others can be found in reference websites and texts on non-destructive testing (NDT).

Full scale load testing can also be used to confirm the actual capacity of masonry systems.

Durablity

Some elements of the masonry system are intended to be maintainable – they “wear out”. (e.g. mortar). These elements are expected to be an on-going preventative maintenance task.

Ferrous metals must be protected from corrosion. Synthetics must be protected from ultraviolet rays.

The durability of any repair or strengthening will be very dependent on the successful elimination of the root cause of the deterioration or deficiency. We must treat the cause not the symptom.

A good case in point is oxide jacking of encased steel members. Elimination of water ingress through effective repairs to joints and waterproofing helps this situation.

However, there is still potential for the corrosion to continue, causing reoccurrence of the problem. Developments in cathodic protection provide a means to mitigate this problem.

Fire Considerations

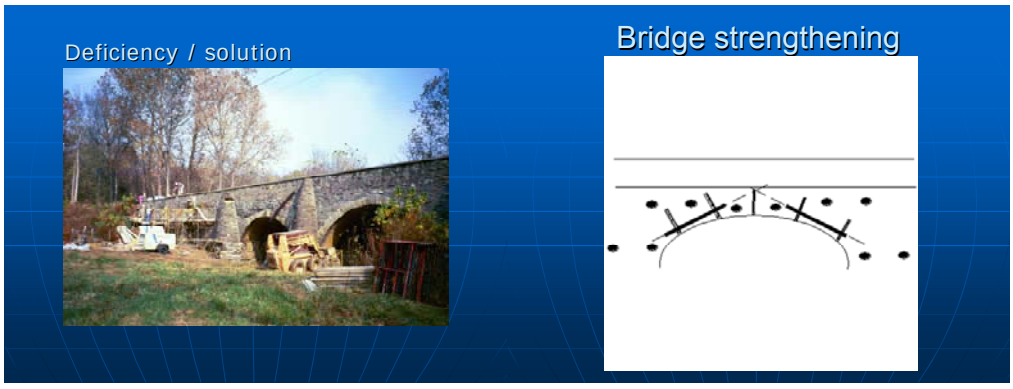
Internal reinforcement systems are normally provided with fire resistance by the original masonry system.

In the case of exposed steel, composites and adhesives, this accomplished by encapsulation with a fireproof material. Cement based grouting systems are inherently fire resistant.

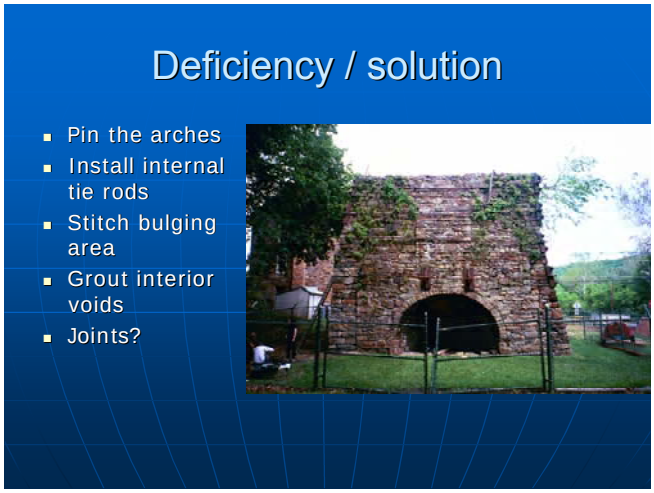
Field Applications

The masonry strengthening methods discussed here have been used for some time in North America.

The more innovative and cost effective strengthening methods are gradually replacing the traditional demolish and replace approach to masonry repair and strengthening.



Case Study 1 Bridge strengthening



Case Study 2 – Historic Blast furnace strengthening

Benefits and Limitations

Benefits

The main benefits of strengthening versus the traditional demolish and replace approach are:

- Time saving
- Cost effectiveness
- Reduction in disruption to the facility

Limitations

The cost of masonry repairs and strengthening often approaches the current Asset Replacement Value (ARV).

The biggest cost element in strengthening is usually the access (scaffold) regardless of the method of strengthening selected.

Suitable methods to strengthen masonry are limited in many cases because the surfaces are decorative, it is rough cut stone or it is protected by heritage designation.

These limitations usually preclude external reinforcement or section enlargement.

Division 2 - General Approach and Design Philosophy

Cintec Design Parameters

For stone, brick and terra cotta masonry

1. For many applications and designers, the use of Allowable Stress Design (ASD), is appropriate, and thus the focus of this manual is on that method. It is also known as Working Stress Design (WSD) in parts of North America. The same procedures can be adapted to the Limit State Design (LSD) method or Load Factored Resistance Method (LFRD) where design consistency is required with other parts of the project.

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2. Bond pull out strength is typically 65PSI (working stress) on the circumference of the drilled hole. This is based on 4x safety factor based on actual full scale load tests. This may be reduced in very dense, smooth substrates like granite to as low as 30 PSI

3. Steel is AISI Type 304 stainless with a yield of 29,000 PSI. We use 0.6 as the strength reduction factor for WSD in bending, tension and shear.

4. Safe bearing strength for shear loads and/or bending stresses from eccentric loads on sound brick masonry is 300 PSI. Bearing area is calculated on one- half the circumference of the hole, not the projection of the hole diameter.

5. The sum of the interaction formula for combined stresses shall not exceed 1.0

6. Pull out and bearing strength of the substrate is based on the ACI standard procedure using an appropriate diagonal tensile stress. Pull out strength in terra cotta units is based on a very conservative value and load tests have always proven that failure load is much higher than we calculate.

7. The anchors system tends to fail in the substrate. The steel anchor body typically does not fail, and the grout element does not fail in crushing or pull -out if the grout installation has been performed in accordance with Cintec requirements. Therefore design should focus primarily on determining the properties of the substrate.

Design Methods for Cintec Grout Anchors

The standard design checks that are performed on any design are:

Cone Pull Out Resistance To ensure that the parent material around the anchor does not fail in tension.

Tensile strength of the steel anchor body To ensure that tensile failure does not occur in the anchor body.

Shear strength of the steel anchor body To ensure that shear failure does not occur in the steel anchor body

Bond Pull-out Resistance To ensure that the bond between the Cintec grout and the substrate does not fail in pull out. In the case of hollow units (CMIU or terracotta) the shear on the enlarged grout bulb and the shear failure load of the thin wall of the hollow units must be checked.

Mortar Joint Check To ensure that the mortar has sufficient strength to transmit the loads from individual anchors into the global masonry substrate.

Bearing Resistance of the Substrate To ensure that the parent material does not fail in crushing in the vicinity of the anchor.

Shear Resistance Toward the Free Edge of the Parent Material To ensure that the parent material does not fail in shear due to anchor loads perpendicular to a free edge.

Engineering Principles.

Design procedures contained in the publications of the American Concrete Institute (ACI), the Prestressed Concrete Institute (PCI), the Portland Cement Association (PCA), masonry industry sources and the model building codes are used for calculating the loads and resistances.

A critical step in the process is the assessment of the strength of the parent material (substrate). As this can often only be undertaken by visual inspection of the materials, an educated estimate of the strengths of the material in-situ must be made by designer.

Sources for data can be derived from historic engineering and builders' textbooks and suppliers' catalogues.

Section 3 – Useful Information

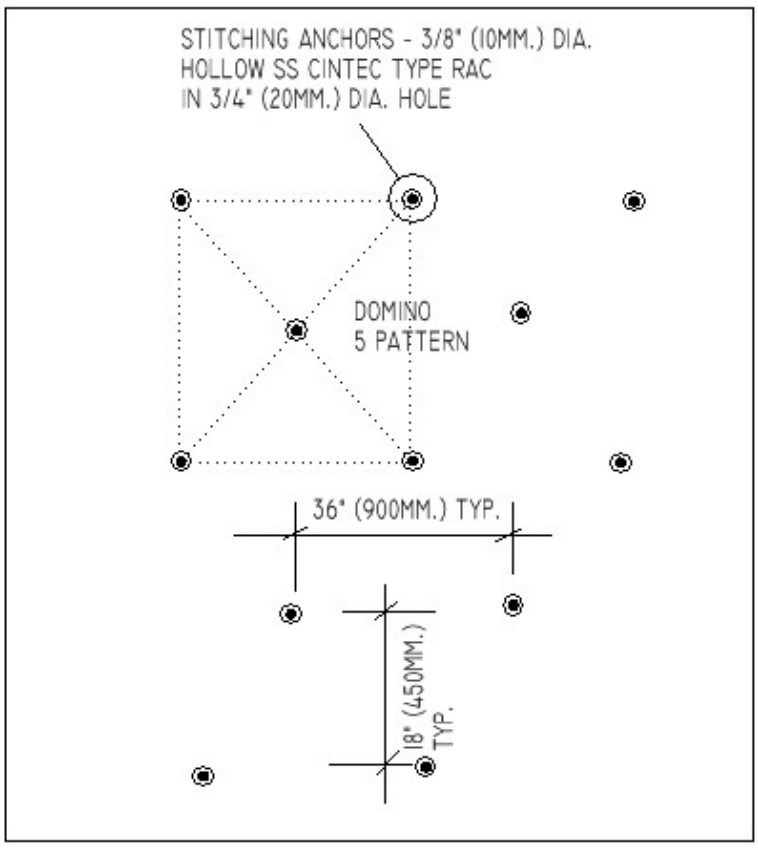
Properties of Steel Sections

Type	Size (in.)	Area (sq. in.)	Net area at root of threads (sq. in.)	Net Shear area (sq. in.)	Section modulus (in. cu.)
HSS	1 x 1 x 1/8	0.331		0.25	0.098
HSS	1 ¼ x 11/4 x 1/8	0.518		0.31	0.172
HSS	1 1/2 x 1 1/2 x 1/8	0.643		0.375	0.266
HSS	2 x 2 x 3/16	1.24		0.75	0.669
CHS	3/8 dia x .04 wall	0.05		0.05	0.0033
CHS	1/2 dia x .11 wall	0.17		0.17	0.011
SRT	3/8 dia	0.11	0.095	.095	.004
SRT	1/2 dia	0.19	0.128	0.128	.006
SRT	5/8 dia	0.31	0.206	0.206	0.013
SRT	3/4 dia	0.44	0.307	0.307	0.024
SRT	1 dia	0.78	0.56	0.560	0.059

HSS = hollow square section
CHS = circular hollow section
SRT = solid round threaded section
Threads – UNC

Areas and Anchor Spacing for Domino 5 Stitching Pattern

Configuration	Diagonal Spacing, (in.)	Area on diagonal (sq. in.)	Square Feet per anchor	# of anchors per square foot
24” Vert. x 48” Horiz.	33.9	1152.3	8.00	0.125
18” Vert. x 36” Horiz.	25.5	648.2	4.50	0.222
16” Vert. x 32” Horiz..	22.6	512.2	3.56	0.281
15” Vert x 30” Horiz..	21.2	450.1	3.13	0.320
12” Vert x 24” Horiz..	17.0	288.1	2.00	0.500



Metric Conversion - Force

Pounds to Newtons			Newtons to Pounds			Kips to KiloNewtons			KiloNewtons to Kips	
lbs. to N										
Pounds force to Newtons force	Newtons		Newtons	Pounds force		Kips	KN		KN	Kips
1	4.448		1	.225		1	4.448		1	0.225
2	8.9		2	.450		2	8.9		2	0.5
3	13.3		3	.675		3	13.3		3	0.7
4	17.8		4	.900		4	17.8		4	0.9
5	22.2		5	1.125		5	22.2		5	1.1
6	26.7		6	1.350		6	26.7		6	1.4
7	31.1		7	1.575		7	31.1		7	1.6
8	35.6		8	1.800		8	35.6		8	1.8
9	40		9	2.025		9	40		9	2
10	44.5		10	2.25		10	44.5		10	2.3
20	89		20	4.50		20	89		20	4.5
30	133		30	6.75		30	133		30	6.8
40	178		40	9.00		40	178		40	9
50	222		50	11.25		50	222		50	11.3
60	267		60	13.50		60	267		60	13.5
70	311		70	15.75		70	311		70	15.8
80	356		80	18.00		80	356		80	18
90	400		90	20.2		90	400		90	20.3
100	445		100	22.5		100	445		100	22.5
500	2,224		500	112.5		500	2,224		500	113
1,000	4,448		1,000	225.0		1,000	4,448		1,000	225
1,500	6,672		1,500	337.5		1,500	6,672		1,500	338
2,000	8,896		2,000	450.0		2,000	8,896		2,000	450
2,500	11,120		2,500	562.5		2,500	11,120		2,500	563
3,000	13,344		3,000	675.0		3,000	13,344		3,000	675
3,500	15,568		3,500	787.5		3,500	15,568		3,500	788
4,000	17,792		4,000	900.0		4,000	17,792		4,000	900
4,500	20,016		4,500	1,012.		4,500	20,016		4,500	1,013
5,000	22,240		5,000	1,125.		5,000	22,240		5,000	1,125
5,500	24,464		5,500	1,237.		5,500	24,464		5,500	1,238
6,000	26,688		6,000	1,350.		6,000	26,688		6,000	1,350
6,500	28,912		6,500	1,462.		6,500	28,912		6,500	1,463
7,000	31,136		7,000	1,575.		7,000	31,136		7,000	1,575
7,500	33,360		7,500	1,687.		7,500	33,360		7,500	1,688
8,000	35,584		8,000	1,800.		8,000	35,584		8,000	1,800
8,500	37,808		8,500	1,912.		8,500	37,808		8,500	1,913
9,000	40,032		9,000	2,025.		9,000	40,032		9,000	2,025
9,500	42,256		9,500	2,137.		9,500	42,256		9,500	2,138

Metric Conversion- Length

Length Conversion									
Inches	inches	mm	feet	Metres	inches	inches	mm	feet	metres
1/8	0.125	3.1750	0.01	0.00	35	35	889	2.92	0.89
1/4	0.25	6.4	0.02	0.01	36	36	914	3.00	0.91
3/8	0.375	9.5	0.03	0.01	37	37	940	3.08	0.94
1/2	0.5	12.7	0.04	0.01	38	38	965	3.17	0.97
5/8	0.625	15.9	0.05	0.02	39	39	991	3.25	0.99
3/4	0.75	19.1	0.06	0.02	40	40	1,016	3.33	1.02
7/8	0.875	22.2	0.07	0.02	41	41	1,041	3.42	1.04
1	1	25	0.08	0.03	42	42	1,067	3.50	1.07
2	2	51	0.17	0.05	43	43	1,092	3.58	1.09
3	3	76	0.25	0.08	44	44	1,118	3.67	1.12
4	4	102	0.33	0.10	45	45	1,143	3.75	1.14
5	5	127	0.42	0.13	46	46	1,168	3.83	1.17
6	6	152	0.50	0.15	47	47	1,194	3.92	1.19
7	7	178	0.58	0.18	48	48	1,219	4.00	1.22
8	8	203	0.67	0.20	49	49	1,245	4.08	1.24
9	9	229	0.75	0.23	50	50	1,270	4.17	1.27
10	10	254	0.83	0.25	100	100	2,540	8.33	2.54
11	11	279	0.92	0.28	150	150	3,810	12.50	3.81
12	12	305	1.00	0.30	200	200	5,080	16.67	5.08
13	13	330	1.08	0.33	250	250	6,350	20.83	6.35
14	14	356	1.17	0.36	300	300	7,620	25.00	7.62
15	15	381	1.25	0.38	350	350	8,890	29.17	8.89
16	16	406	1.33	0.41	400	400	10,160	33.33	10.16
17	17	432	1.42	0.43	450	450	11,430	37.50	11.43
18	18	457	1.50	0.46	500	500	12,700	41.67	12.70
19	19	483	1.58	0.48	550	550	13,970	45.83	13.97
20	20	508	1.67	0.51	600	600	15,240	50.00	15.24
21	21	533	1.75	0.53	650	650	16,510	54.17	16.51
22	22	559	1.83	0.56	700	700	17,780	58.33	17.78
23	23	584	1.92	0.58	750	750	19,050	62.50	19.05
24	24	610	2.00	0.61	800	800	20,320	66.67	20.32
25	25	635	2.08	0.64	850	850	21,590	70.83	21.59
26	26	660	2.17	0.66	900	900	22,860	75.00	22.86
27	27	686	2.25	0.69	950	950	24,130	79.17	24.13
28	28	711	2.33	0.71	1000	1000	25,400	83.33	25.40
29	29	737	2.42	0.74	1050	1050	26,670	87.50	26.67
30	30	762	2.50	0.76	1100	1100	27,940	91.67	27.94
31	31	787	2.58	0.79	1150	1150	29,210	95.83	29.21
32	32	813	2.67	0.81	1200	1200	30,480	100.00	30.48
33	33	838	2.75	0.84	1250	1250	31,750	104.17	31.75
34	34	864	2.83	0.86	1300	1300	33,020	108.33	33.02

Metric Conversion – Stress / Pressure

Stress (pressure)				
psi	Mpa		MPA	psi
1	0.00689		1	145
2	0.01		2	290
3	0.02		3	435
4	0.03		4	580
5	0.03		5	725
6	0.04		6	870
7	0.05		7	1015
8	0.06		8	1160
9	0.06		9	1305
10	0.07		10	1450
100	0.69		11	1595
200	1.38		12	1740
300	2.07		13	1885
400	2.76		14	2030
500	3.45		15	2175
600	4.13		16	2320
700	4.82		17	2465
800	5.51		18	2610
900	6.20		19	2755
1000	6.89		20	2900
1500	10.34		21	3045
2000	13.78		22	3190
2500	17.23		23	3335
3000	20.67		24	3480
3500	24.12		25	3625
4000	27.56		26	3770
4500	31.01		27	3915
5000	34.45		28	4060
5500	37.90		29	4205
6000	41.34		30	4350
6500	44.79		35	5075
7000	48.23		40	5800
7500	51.68		45	6525

Section 4 - Design Data

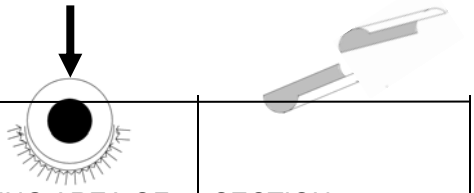
Section Capacities – Allowable Stress Design (ASD)

TYPE	SIZE (IN.)	TENSION (LBS)	SHEAR (LBS.)	BENDING MOMENT (IN-LBS.)
HSS	1 x 1 x 1/8	6335	2900	1876
HSS	1 1/4 x 1 1/4 x 1/8	9915	3596	3292
HSS	1 1/2 x 1 1/2 x 1/8	12307	4350	5091
HSS	2 x 2 x 3/16	23734	8700	12805
CHS	3/8 dia x .04 wall	957	290	63
CHS	1/2 dia x .11 wall	2680	812	211
SRT	3/8 dia	1531	959	77
SRT	1/2 dia	2871	1657	115
SRT	5/8 dia	4594	2704	249
SRT	3/4 dia	6699	3838	459
SRT	1 dia	12441	6803	1129

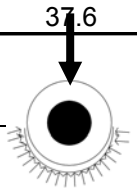
Based on ANSI Type 304 SS – 29,000 psi yield

HSS = hollow square section
CHS = circular hollow section
SRT = solid round threaded section

Properties of Drilled Holes



HOLE DIAMETER (IN.)	HOLE LENGTH (IN.)	BOND AREA (SQ. IN.)	BEARING AREA OF HALF CIRCUMFERENCE (SQ. IN.)	SECTION MODULUS OF BEARING AREA (IN. CU.)
0.75	3	7.06	3.53	5.3
1	3	9.42	4.71	11.1
1.25	3	11.7	5.88	17.3
1.5	3	14.1	7.06	25.0
2	3	18.8	9.42	44.4
2.5	3	23.5	11.7	69.3
3	3	28.2	14.1	99.8
4	3	37.6	18.8	177
5	3	47.1	23.5	277
6	3	56.5	28.2	399
0.75	4	9.4	4.71	14.8
1	4	12.5	6.28	26.3
1.25	4	15.7	7.85	41.1
1.5	4	18.8	9.42	59.2
2	4	25.1	12.5	105
2.5	4	31.4	15.7	164
3	4	37.6	18.8	236
4	4	50.2	25.1	420
5	4	62.8	31.4	657
6	4	75.3	37.6	946
0.75	5	11.7	5.88	28.9
1	5	15.7	7.8	51.4
1.25	5	19.6	9.8	80.2
1.5	5	23.5	11.7	115
2	5	31.4	15.7	205
2.5	5	39.2	19.6	321
3	5	47.1	23.5	462
4	5	62.8	31.4	821
5	5	78.5	39.2	1283
6	5	94.2	47.1	1848
0.75	6	14.1	7.06	49.9
1	6	18.8	9.42	88.7
1.25	6	23.5	11.7	138
1.5	6	28.2	14.1	199
2	6	37.6	18.8	354
2.5	6	47.1	23.5	554
3	6	56.5	28.2	798
4	6	75.3	37.6	1419
	HOLE LENGTH (IN.)	BOND AREA (SQ. IN.)		



HOLE DIAMETER (IN.)			BEARING AREA OF HALF CIRCUMFERENCE (SQ. IN.)	SECTION MODULUS OF BEARING AREA (IN. CU.)
5	6	94.2	47.1	2218
6	6	113	56.5	3194
0.75	7	16.4	8.24	79.3
1	7	21.9	10.9	140
1.25	7	27.4	13.7	220
1.5	7	32.9	16.4	317
2	7	43.9	21.9	563
2.5	7	54.9	27.4	880
3	7	65.9	32.9	1268
4	7	87.9	43.9	2254
5	7	109	54.9	3522
6	7	131	65.9	5072
0.75	8	18.8	9.42	118
1	8	25.1	12.5	210
1.25	8	31.4	15.7	328
1.5	8	37.6	18.8	473
2	8	50.2	25.1	841
2.5	8	62.8	31.4	1314
3	8	75.3	37.6	1893
4	8	100	50.2	3365
5	8	125	62.8	5258
6	8	150	75.3	7572
0.75	12	28.2	14.1	399
1	12	37.6	18.8	709
1.25	12	47.1	23.5	1109
1.5	12	56.5	28.2	1597
2	12	75.3	37.6	2839
2.5	12	94.2	47.1	4436
3	12	113	56.5	6389
4	12	150	75.3	11358
5	12	188	94.2	17747
6	12	226	113	25556
0.75	24	56.5	28.2	3194
1	24	75.3	37.6	5679
1.25	24	94.2	47.1	8873
1.5	24	113	56.5	12778
2	24	150	75.3	22716
2.5	24	188	94.2	35494
3	24	226	113	51112
4	24	301	150	90866

Pull out Strength of Grout Core (bond failure)

HOLE / SOCK DIA. (IN.)	HOLE / SOCK DIA. (IN.)	LENGTH (DEPTH) OF HOLE (IN.)	PULL OUT CAPACITY (ASD) (LBS.)
3/4	.75	3	459
1	1.00	3	612
1 1/4	1.25	3	765
1 1/2	1.50	3	918
2	2.00	3	1225
2 1/2	2.50	3	1531
3	3.00	3	1837
4	4.00	3	2449
3/4	.75	4	612
1	1.00	4	816
1 1/4	1.25	4	1021
1 1/2	1.50	4	1225
2	2.00	4	1633
2 1/2	2.50	4	2041
3	3.00	4	2449
4	4.00	4	3266
3/4	.75	6	918
1	1.00	6	1225
1 1/4	1.25	6	1531
1 1/2	1.50	6	1837
2	2.00	6	2449
2 1/2	2.50	6	3062
3	3.00	6	3674
4	4.00	6	4898
3/4	.75	8	1225
1	1.00	8	1633
1 1/4	1.25	8	2041
1 1/2	1.50	8	2449
2	2.00	8	3266
2 1/2	2.50	8	4082
3	3.00	8	4898
4	4.00	8	6531

Based on allowable bond stress of 65 psi (sound, solid masonry or concrete substrate) with a Factor of Safety of 4.

Pull out Strength of Grout Core (bond failure)

HOLE / SOCK DIA. (IN.)	HOLE / SOCK DIA. (IN.)	LENGTH (DEPTH) OF HOLE (IN.)	PULL OUT CAPACITY (ASD) (LBS.)
3/4	.75	12	1837
1	1.00	12	2449
1 1/4	1.25	12	3062
1 1/2	1.50	12	3674
2	2.00	12	4898
2 1/2	2.50	12	6123
3	3.00	12	7348
4	4.00	12	9797
3/4	.75	18	2755
1	1.00	18	3674
1 1/4	1.25	18	4592
1 1/2	1.50	18	5511
2	2.00	18	7348
2 1/2	2.50	18	9185
3	3.00	18	11021
4	4.00	18	14695

Based on allowable bond stress of 65 psi (sound, solid masonry or concrete substrate) with a Factor of Safety of 4.

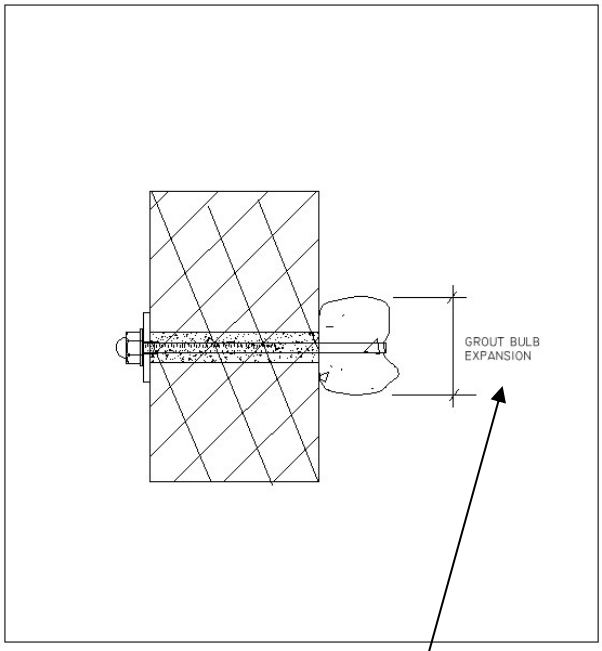
What size sock can you put in a given hole diameter with a given steel size?

We often want to have a sock which is larger than the hole diameter to ensure formation of a grout bulb in voids in the substrate. The size of sock that can be attached to the anchor body and be inserted in the drill hole limited, especially with solid round anchor bodies which require a vinyl grout feed tube.

SRT - SOLID ROUND THREADED BAR, DIA. (IN.)	HOLE DIA. (IN.)	MAX. SOCK DIA. (IN.)
3/8	1 1/4	1 1/2
1/2	1 1/4	3
5/8	1 1/2	3
3/4	2	4
1	2 1/2	5

What is the maximum expansion of the sock into a void when grouted?

We often want to have a sock which is larger than the hole diameter to ensure formation of a grout bulb in voids in the substrate.



SOCK SPECIFIED DIAMETER (IN.)	SOCK MAXIMUM EXPANSION DIA. (IN.)
1	1 1/4
1 1/4	1 1/2
1 1/2	2
2	3
3	4
4	5
6	7

What size hole is required for a given anchor size?

The minimum embedment depth of any anchor is 75mm (3") unless test anchors have been installed to determine the load achievable with a reduced embedment.

The general rule is that the bore hole must be twice the diameter of the anchor body utilised. This is only applicable up to certain lengths and the hole size must be increased on longer anchors.

The guidelines are as follows:

ANCHOR BODY SIZE (IN.)	HOLE DIA. (IN.)	MAXIMUM LENGTH (IN.)
5/16 dia. CHS	3/4	20
3/8 dia. CHS	3/4	20
3/8 dia. CHS	1	40
3/8 dia. CHS	1 1/4	78
5/8 x 5/8 HSS	1 1/4	116
3/4 x 3/4 HSS	1 1/2	116
1 3/16 x 1 3/16 HSS	2 1/2	156
3/8 dia. SRT	1 1/4	40
1/2 dia. SRT	1 1/4	40
5/8 dia. SRT	1 1/2	116
3/4 dia. SRT	2	156
1 dia. SRT	2 ½	156

What is the hole spacing for anchors in a group?

Multiple anchors (a group) may be required to attach structural members such as shelf angles, beam brackets and pipe supports.

Anchor spacing in a group is dependent on the ability of the substrate to transfer the loads in an anchor group.

Anchor holes are typically 2 times the anchor body diameter . See the Table on Page 30 for hole sizes.

As an initial design assumption use an anchor spacing of 2 times the drilled hole diameter center to center of holes.

How do we calculate bolt tension for post-tensioned applications?

Cintec anchors are tensioned by tightening the nuts to a specified torque.

The formula for torque is:

$$T = T_f \times P \times D$$

T = torque (foot-pounds)

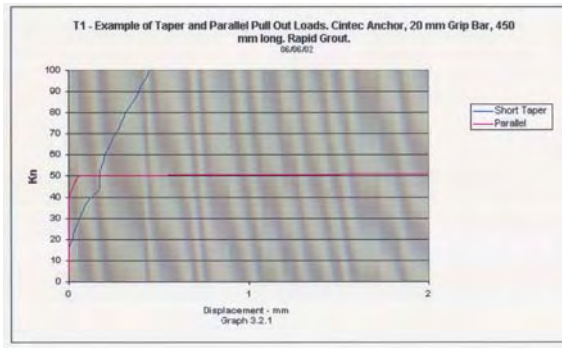
T_f = “nut factor” or coefficient of friction (approx. value 0.0167)

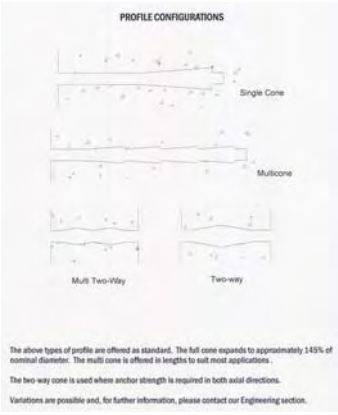
P = bolt tension (pounds)

D = bolt diameter (inches))

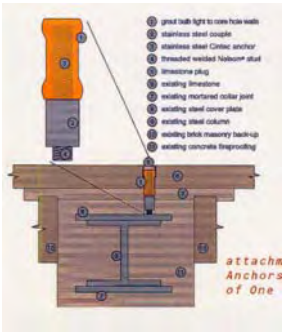
If embedment length is limited, how can pull out strength be increased?

A. Use a profiled hole using the Cintec PROFIL drill bit.

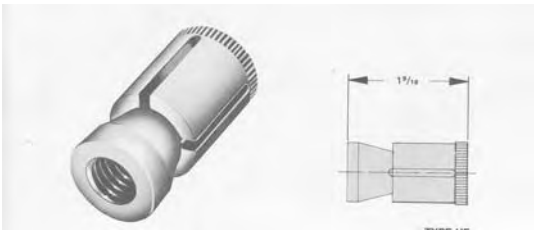




B. Attach the Cintec anchor to a steel substrate using a Nelson welded stud female ferrule .



C. Attach the Cintec anchor to a steel substrate using a Lindapter mechanical connector.



Typical Strengths of Sound Substrates.

Brick masonry
Compression at failure 2000 to 3000 psi
Allowable bearing (crushing) 300 psi
Allowable shear (diagonal tension) 30 psi

Stone
Compression at failure up to 10,000 psi
Allowable bearing (crushing) 1000 psi
Allowable shear (diagonal tension) 30 psi

Clay tile terra cotta (estimates only – very little test data is available for this material)
Compression at failure 750 to 1000 psi
Allowable bearing (crushing) 100 psi
Allowable shear (diagonal tension) 10 psi

CMU concrete block
Compression at failure 1200 to 2000 psi
Allowable bearing (crushing) 500 psi
Allowable shear (diagonal tension) 30 psi

Concrete
Compression at failure 3000 to 7000 psi
Allowable bearing (crushing) 1000 psi
Allowable shear (diagonal tension) 60 psi

A critical step in the design process is assessment of the strength of the parent material (substrate). As this can often only be done by visual inspection of the materials, an educated estimate of the strengths of the material in-situ must be made by the design engineer.

PRESSTEC™ standard
Micro Injection Grout
Manufactured Exclusively For
Cintec Anchoring & Reinforcement Systems

Presstec grout is a one component dry powder mix. Its basic ingredients include natural and Portland cements with graded aggregates, including sand and lime products. The constituents, when mixed with water, produce a non-shrink, low pressure injection grout for use with Cintec's patented anchoring system. The grout does not contain any resin binders.

Presstec grout is a proprietary pure mineral grout tested in accordance with the strict German DIN standards.

Quality Control

Each batch of grout is controlled and inspected by the producer's certified laboratory. Third party inspection is made by MPA NRW (The Quality Testing State Institute). All reports are finally checked by an independent consultant.

Features & Benefits

- Single component: easy to mix, just add water
- Factory controlled: Superior quality control and batch to batch consistency.
- Contains no resigns: Sympathetic and compatible with masonry substrates physical properties.
- Water based: Environmentally & user safe. No solvent clean up or disposal problems.
- Independently tested: 2 hour fire resistance, freeze/ thaw protection, extensive pull out/shear test verification results

Safety Requirements

Safety goggles, gloves and a dust mask equipped with P2 filters (or equivalent) should be worn for protection during mixing.

Please refer to MSDS sheet.

Packaging

Presstec is packed in twin lined 25 kg (55lb.) quality control stamped paper bags An inner lining is added for additional protection

Limitations

- Do not use Presstec grout with frozen or hot substrates. The injected grout must be protected from extreme heat and freezing conditions
- Clean water used for mixing should be within the temperature range of 10° - 24° C (50° - 75°F)
- Do not add latex bonding agents or any other additives to Presstec grout

See Contractor's Notes for cold and hot weather working.

Mixing
FOLLOW INSTRUCTIONS PRINTED ON THE BAG

The mixing ratio is approximately 6 liters to 25 kg of powder. Mix mechanically with an electric drill capable of at least 500 rpm equipped with a Jiffler type mixing paddle. After mixing, the grout should be strained through a sieve before loading into the required injection equipment. Additional or repeated agitation is necessary if the grout is allowed to sit prior to use.

Clean Up

Clean any surface spills with water before the grout has time to set. Use a clean sponge or non-staining brush and clean water. Repeat several times as needed, rinsing the sponge/brush with clean water. Check regularly for excess grout runs and spills on surrounding masonry surfaces. Remove uncured grout from tools and equipment with water.

Storage & Shelf Life

become damp or wet or store in a place where the ambient temperature can drop below 5° C (41°F).

Technical Data - Presstec Injection Grout

Compressive Strength	**28 Days**		**5800 - 7500 psi**
Tensile Strength	**28 Days**		**480 - 650 psi**

WARNING
NOT FOR INTERNAL CONSUPTION.KEEP OUT OF REACH FROM CHILDREN AND ANIMALS CONSULT MATERIAL SAFETY DATA SHEET [MSDS] FOR SPECIFIC INFORMATION

CINTEC NORTH AMERICA
TEL 1 800 363 6066
1 613 225 3381

WWW.CINTEC.COM

Section 5 – Design Tools

Cintec Design - Limits State (LFRD, USD)

Solid Threaded Rod Anchor
Basic Design Formulae

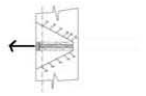
Limit State Design (Ultimate Strength)

Anchor diameter:	d_a =	0.00 mm =	0.000 in
Hole diameter:	d_h =	0.00 mm =	0.000 in
Hole length:	L_d =	0.00 mm =	0.000 in
Side cover:	check shear in substrate where anchor is near the edge		
Steel strength:	f_{su} =	200.00 MPa =	29000.0 psi
Thread factor:	t_f =	0.00 net area factor, dependent on steel diameter	
Resistance factor for steel:	ϕ_s =	0.85	
Base material strength:	f_c' =	2.00 MPa =	290.1 psi
Base material factor:	λ =	1.00	
Bond resistance factor:	α =	0.20	
Resistance factor for base material:	ϕ_c =	0.60	

NOTE: All resistances should be not less than the factored load, which is the working (service) load multiplied by the load factor (1.25 for dead laods, 1.5 for live loads).

Cone Pull-Out Resistance

$A_{net} = \pi(L_d + d_h) * L_d / 0.707$ =	0.00 mm^2 =	0.00 in^2
$P_r = 0.3*\lambda*\phi_c*(f_c')^{1/2} * A_{net}$ =	**0.000** kN =	**0.000** lb



Tensile Strength of the Anchor

$T_s = t_f*\pi*d_a^2*0.25*\phi_s*f_{su}$ =	**0.000** kN =	**0.000** lb

Bond Pull-Out Resistance

$A_{cyl} = \pi*d_h*L_d$ =	0.00 mm^2	0.00 in^2
$P_{b,Pull} = \alpha * \lambda * \phi_c * (f_c')^{1/2} * A_{cyl}$ =	**0.000** kN =	**0.000** lb

Bearing Resistance*

$A_b = d_h*L_d*0.25$ =	0.00 mm^2	0.00 in^2
$P_b = 1.4*\lambda*\phi_c*f_c' * A_b$ =	**0.000** kN =	**0.000** lb

ASD Design Tables for Typical Values.

Results for other conditions can be obtained using the Cintec Design Software.

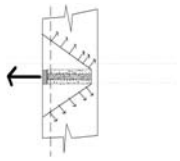
System Capacity - Pull out BRICK
Checking tensile strength of steel section, bond failure of grout and cone failure of substrate

Embed (hole depth)	10

Substrate : average BRICK 300 psi allowable bearing, grout bond 65 psi, substrate cone failure 30 psi, FS 4
Anchor body : type 304 SS fy 29 Ksi FS 1.67

Type	Size (in.)	Hole/sock dia. (in.)	System Pull Out Capacity (ASD) lbs.	System Pull Out Failure Mode
HSS	1 x 1 x 1/8	2	4082	grout bond
HSS	1 x 1 x 1/8	2	4082	grout bond
HSS	1 1/4 v 1 1/4 x 1	2	4082	grout bond
HSS	1 1/2 x 1 1/2 x 1	2	4082	grout bond
HSS	2 x 2 x 3/16	4	8164	grout bond
CHS	3/8 dia x .04	0.75	870	steel failure
CHS	1/2 dia x .11	1	2041	grout bond
SRT	3/8 dia	1.25	1392	steel failure
SRT	1/2 dia	1.5	2610	steel failure
SRT	5/8 dia	2	4082	grout bond
SRT	3/4 dia	2.5	5103	grout bond
SRT	1 dia	2.5	5103	grout bond

HSS = hollow square section
CHS = circular hollow section
SRT = solid round threaded



This application is for preliminary sizing of Cintec anchors. .
Final design must be prepared by a Registered Professional Engineer and confirmed by Cintec
Designer to check for pull out of individual or groups of masonry units

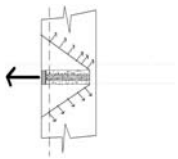
System Capacity - Pull out STONE
Checking tensile strength of steel section, bond failure of grout and cone failure of substrate

Embed (hole depth)	10

Substrate : medium STONE 600 psi allowable bearing, grout bond 65 psi, substrate cone failure 60 psi, FS 4
Anchor body : type 304 SS fy 29 Ksi FS 1.67

Type	Size (in.)	Hole/sock dia. (in.)	Embed length (in.)	System Pull Out Failure Mode
HSS	1 x 1 x 1/8	2	10	grout bond
HSS	1 x 1 x 1/8	2	10	grout bond
HSS	1 1/4 v 1 1/4 x 1/8	2	10	grout bond
HSS	1 1/2 x 1 1/2 x 1/8	2	10	grout bond
HSS	2 x 2 x 3/16	4	10	grout bond
CHS	3/8 dia x .04	0.75	10	steel failure
CHS	1/2 dia x .11	1	10	grout bond
SRT	3/8 dia	1.25	10	steel failure
SRT	1/2 dia	1.5	10	steel failure
SRT	5/8 dia	2	10	grout bond
SRT	3/4 dia	2.5	10	grout bond
SRT	1 dia	2.5	10	grout bond

HSS = hollow square section
CHS = circular hollow section
SRT = solid round threaded



This application is for preliminary sizing of Cintec anchors.
Final design must be prepared by a Registered Professional Engineer and confirmed by Cintec.
Designer to check for pull out of individual or groups of masonry units

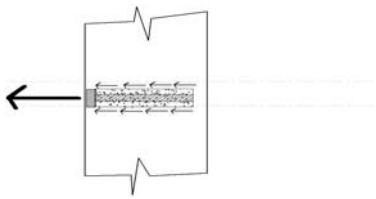
System Capacity - Pull out TERRA COTTA
Checking tensile strength of steel section, bond failure of grout and cone failure of substrate

Embed (hole depth)	10

Substrate : TERRA COTTA 50 psi allowable bearing, grout bond 10 psi, substrate cone failure 5 psi, FS 4.
Anchor body : type 304 SS fy 29 Ksi FS 1.67

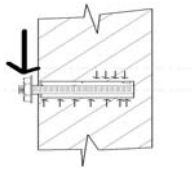
Type	Size (in.)	Hole/sock dia. (in.)	System Pull Out Capacity (ASD) lbs.	System Pull Out Failure Mode
HSS	1 x 1 x 1/8	2	628	grout bond
HSS	1 x 1 x 1/8	2	628	grout bond
HSS	1 1/4 v 1 1/4 x	2	628	grout bond
HSS	1 1/2 x 1 1/2 x	2	628	grout bond
HSS	2 x 2 x 3/16	4	1256	grout bond
CHS	3/8 dia x .04	0.75	236	grout bond
CHS	1/2 dia x .11	1	314	grout bond
SRT	3/8 dia	1.25	393	grout bond
SRT	1/2 dia	1.5	471	grout bond
SRT	5/8 dia	2	628	grout bond
SRT	3/4 dia	2.5	785	grout bond
SRT	1 dia	2.5	785	grout bond

HSS = hollow square section
CHS = circular hollow section
SRT = solid round threaded



This application is for preliminary sizing of Cintec anchors.
Final design must be prepared by a Registered Professional Engineer and confirmed by Cintec.
Designer to check for pull out of individual or groups of masonry units

System Capacity - Shear parallel to wall BRICK or STONE



Checking shear and bending strength of steel section, bearing failure of substrate in combined loading

Embed (hole depth)	6
Offset (eccentriciy from wall face)	4

Substrate: average BRICK bearing strength 300 psi FS 4.0
Anchor body : type 304 SS, fy 29 Ksi, FS 1.67

Type	Steel Size (in.)	Hole/sock dia.(in.)	Embed length (in.)	Allowable applied load for combined bearing and bending on substrate (lbs.)	Σ	Allowable applied vertical load (ASD) (lbs.)	Governing Stress
HSS	1 x 1 x 1/8	2	6	707	1.000	707	Substrate Governs
HSS	1 1/4 v 1 1/4 x 1/8	2	6	707	1.000	707	Substrate Governs
HSS	1 1/2 x 1 1/2 x 1/8	2	6	707	1.000	707	Substrate Governs
HSS	2 x 2 x 3/16	4	6	1,413	1.000	1413	Substrate Governs
CHS	3/8 dia x .04	0.75	6	265	1.000	63	Steel Governs
CHS	1/2 dia x .11	1	6	353	1.000	191	Steel Governs
SRT	3/8 dia	1.25	6	442	1.000	87	Steel Governs
SRT	1/2 dia	1.5	6	530	1.000	209	Steel Governs
SRT	5/8 dia	2	6	707	1.000	418	Steel Governs
SRT	3/4 dia	2.5	6	883	1.000	713	Steel Governs
SRT	1 dia	2.5	6	883	1.000	883	Substrate Governs

HSS = hollow square section
CHS = circular hollow section
SRT = solid round threaded

Change the number in this column until ∑ (Column V) approaches 1.00

This application is for preliminary sizing of Cintec anchors.
Final design must be prepared by a Registered Professional Engineer and confirmed by Cintec.

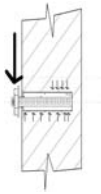
System Capacity - Shear parallel to wall CMU
Checking shear and bending strength of steel section, bearing failure of substrate in combined loading

Embed (hole depth)	5.625
Offset (eccentriciy from wall face)	4

Embed length is CMU thickness, i.e. embed full depth

Substrate: CMU bearing strength 350 psi, FS 3.33, CMU wall (shell) thickness 1 1/2"
Anchor body : type 304 SS, fy 29 Ksi, FS 1.67

Type	Steel Size (in.)	Hole/sock dia.(in.)	Allowable applied load for combined bearing and bending on substrate (lbs.)	∑	Allowable applied vertical load (ASD) (lbs.)	Governing Stress
HSS	1 x 1 x 1/8	2	706	1.000	706	Substrate Governs
HSS	1 1/4 v 1 1/4 x	2	706	1.000	706	Substrate Governs
HSS	1 1/2 x 1 1/2 x	2	706	1.000	706	Substrate Governs
HSS	2 x 2 x 3/16	4	1,312	1.000	1312	Substrate Governs
CHS	3/8 dia x .04	0.75	278	1.000	63	Steel Governs
CHS	1/2 dia x .11	1	367	1.000	191	Steel Governs
SRT	3/8 dia	1.25	454	1.000	87	Steel Governs
SRT	1/2 dia	1.5	540	1.000	209	Steel Governs
SRT	5/8 dia	2	706	1.000	418	Steel Governs
SRT	3/4 dia	2.5	866	1.000	713	Steel Governs
SRT	1 dia	2.5	866	1.000	866	Substrate Governs



HSS = hollow square section
CHS = circular hollow section
SRT = solid round threaded

Change the number in this column until ∑ (Column V) approaches 1.00

This application is for preliminary sizing of Cintec anchors.
Final design must be prepared by a Registered Professional Engineer and confirmed by Cintec.

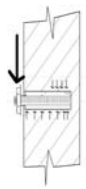
System Capacity - Shear parallel to wall TERRA COTTA
Checking shear and bending strength of steel section, bearing failure of substrate in combined loading

Embed (hole depth) in.	5.625
Offset (eccentriciy from wall face) in.	4

Substrate: T/C bearing strength 50 psi FS 3.33, T/C wall (shell) thickness 1/2"
Anchor body : type 304 SS, fy 29 Ksi, FS 1.67

Type	Steel Size (in.)	Steel Area (sq. in.)	Hole/sock dia.(in.)	Allowable applied load for combined bearing and bending on substrate (lbs.)	∑	Allowable applied vertical load (ASD) (lbs.)	Governing Stress
HSS	1 x 1 x 1/8	0.331	2	337	1.000	337	Substrate Governs
HSS	1 1/4 v 1 1/	0.518	2	337	1.000	337	Substrate Governs
HSS	1 1/2 x 1 1/	0.643	2	337	1.000	337	Substrate Governs
HSS	2 x 2 x 3/16	1.24	4	607	1.000	607	Substrate Governs
CHS	3/8 dia x .0	0.05	0.75	135	1.000	63	Steel Governs
CHS	1/2 dia x .1	0.14	1	178	1.000	178	Substrate Governs
SRT	3/8 dia	0.11	1.25	219	1.000	87	Steel Governs
SRT	1/2 dia	0.19	1.5	260	1.000	209	Steel Governs
SRT	5/8 dia	0.31	2	337	1.000	337	Substrate Governs
SRT	3/4 dia	0.44	2.5	410	1.000	410	Substrate Governs
SRT	1 dia	0.78	2.5	410	1.000	410	Substrate Governs

HSS = hollow square section
CHS = circular hollow section
SRT = solid round threaded



Change the number in this column until ∑ (Column V) approaches 1.00

This application is for preliminary sizing of Cintec anchors.
Final design must be prepared by a Registered Professional Engineer and confirmed by Cintec.

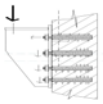
System Capacity - Beam bracket BRICK and STONE
checking tensile strength of steel section, bond failure of grout and cone failure of substrate

Embed (hole depth)	6	in
Offset (eccentriciy from wall face)	4	
Total anchors in one vertical row	4	

Substrate : average BRICK or STONE , bearing 300 psi, grout bond 65 psi, cone failure 60 psi, FS 4
Anchor body : type 304 SS fy 29 Ksi, FS 1.67

Size	Total anchors in one vertical row	Area (sq. in.)	Grout Hole & sock dia.(in.)	Vertical Spacing (in.)= 2 x hole dia.	Allowable load for shear (lbs.)	Allowable load for moment (lbs.)
	2 rows					
3/8" dia. CRT	4	0.11	1.25	2.5	5091	1523
1/2" dia. CRT	4	0.19	1.5	3	8793	3426
5/8" dia. CRT	4	0.31	2	4	14349	4286
3/4" dia. CRT	4	0.44	2.5	5	20364	6698
1" dia. CRT	4	0.78	2.5	5	36102	6698

HSS = hollow square section
CHS = circular hollow section
SRT = solid round threaded



The sum (∑) of the actual shear and moment divided by the allowable shear and moment must be less than 1.00

This application is for preliminary sizing of Cintec anchors.
Final design must be prepared by a Registered Professional Engineer and confirmed by Cintec.
Designer to check for pull out of individual or groups of masonry units

Beam Bracket in Terra Cotta and CMU

Special Design. Refer to Cintec for Engineering Solution.

Section Equivalent Capacities

Based on Type 304 SS material

TENSILE

TYPE	SIZE (IN.)	TENSILE (ASD) (LBS)	EQUIVALENT HSS	EQUIVALENT CHS
SRT	3/8 dia.	1392	1/2 x 1/2 x 1/8	1/2 dia x 0.11
SRT	1/2	2610	1/2 x 1/2 x 1/8	1/2 dia x 0.11
SRT	5/8	4176	1 x 1 x 1/8	1 dia. X 0.11
SRT	7/8	6090	1 x 1 x 1/8	1 dia. X 0.11
SRT	1	11310	1 1/2 x 1 1/2 x 1/8	1 1/2 dia x 0.188

BENDING

TYPE	SIZE (IN.)	BENDING (ASD) (IN-LBS)	EQUIVALENT HSS	EQUIVALENT CHS
SRT	3/8 dia.	87	1/2 x 1/2 x 1/8	1/2 dia x 0.11
SRT	1/2	209	3/4 x 3/4 x 1/8	3/4 dia x 0.11
SRT	5/8	418	1 x 1 x 1/8	1 dia. X 0.11
SRT	7/8	713	1 1/2 x 1 1/2 x 1/8	1 1/2 dia x 0.188
SRT	1	1705	1 1/2 x 1 1/2 x 1/8	1 1/2 dia x 0.188

Software Tools

Software tools for typical loading conditions are available to qualified Engineering Consultants.

Section 6 - Sample Specifications, Project Definitions and Details

Named Product Specification –Cintec Grout Injection Anchors Anchor System- Section 04XXX

PART 1 - Materials and Products

1.1 Cementitious Injection Grout Anchors

.1 All anchors and Presstec grout mix shall be supplied by:
Cintec America Inc
5506 Connecticut Ave NW, Suite 28
Washington DC 20015
Tel: 1-800-363-6066
Fax: 1-800-461-1862
E-mail: solutions@cintec.com

.2.1 Type of anchors to be supplied:
Anchor Type A
Cintec Corbel Anchor
A single stage anchor with xx xx xx xx type 304 stainless steel anchor
Total length for bidding purposes is xx".
The single stage sock is to be inserted in a xx" dia hole.

.2.2 Anchor Type B
Cintec Stitching Anchor
A single stage anchor with xxx" dia circular hollow section body
Total length for bidding purposes is xx"
The single stage sock to be inserted in a xx" dia hole

.3 Anchor length shall be determined in the field before placing final order.

.4 Presstec Grout shall be a mineral based non-shrink grout supplied by Cintec America Inc. Minimum 28 day compressive strength shall be 5,500 psi. The grout must have a demonstrated ability to provide the required fire resistance and 40yr durability as documented by tests of a recognized testing facility.

PART 2 - Installation

2.1 Cementitious Injection Grout Anchors

.1 Grout anchors shall be inserted in accordance with the manufacturer's written instructions and the project details.

.2 All Anchors to be installed by Cintec approved and trained contractor's.

.3 The ends of the anchors shall be sealed with a stone or Jahn mortar plug in accordance with the project details.

2.2 Weak Substrate

.1 Where a weak substrate prevents adequate bonding of the grout, the Engineer may direct that the anchor be relocated, or that the anchor hole be grooved.

.2 The contractor shall be paid for anchor relocation or grooving in accordance with the contract unit prices.

Generic Product Specification –Cementitious Grout Injection Anchors Anchor System- Section 04XXX

PART 1 - Materials and Products

1.1 Cementitious Injection Grout Anchors
.1 Anchors and grout

Design, fabrication and installation of cementitious injection grout masonry restoration anchors.

.2.1 Type of anchors to be supplied:
Anchor Type A
Corbel Anchor
A single stage anchor stainless steel anchor

.2.2 Anchor Type B
Stitching Anchor
A single stage stainless steel anchor
.3 Anchor length shall be determined in the field before placing final order.
.4 Cementitious injection grout shall be a mineral based non-shrink grout supplied as supplied by the anchor system manufacturer. Minimum 28 day compressive strength shall be 5,000 psi. The grout must have a demonstrated ability to provide the required fire resistance and 40yr freeze-thaw durability as documented by tests of a recognized testing facility.
5. The anchor system shall be designed specifically for the intended application of this project. The design shall be certified by a Licensed Professional Engineer retained by the anchor supplier.

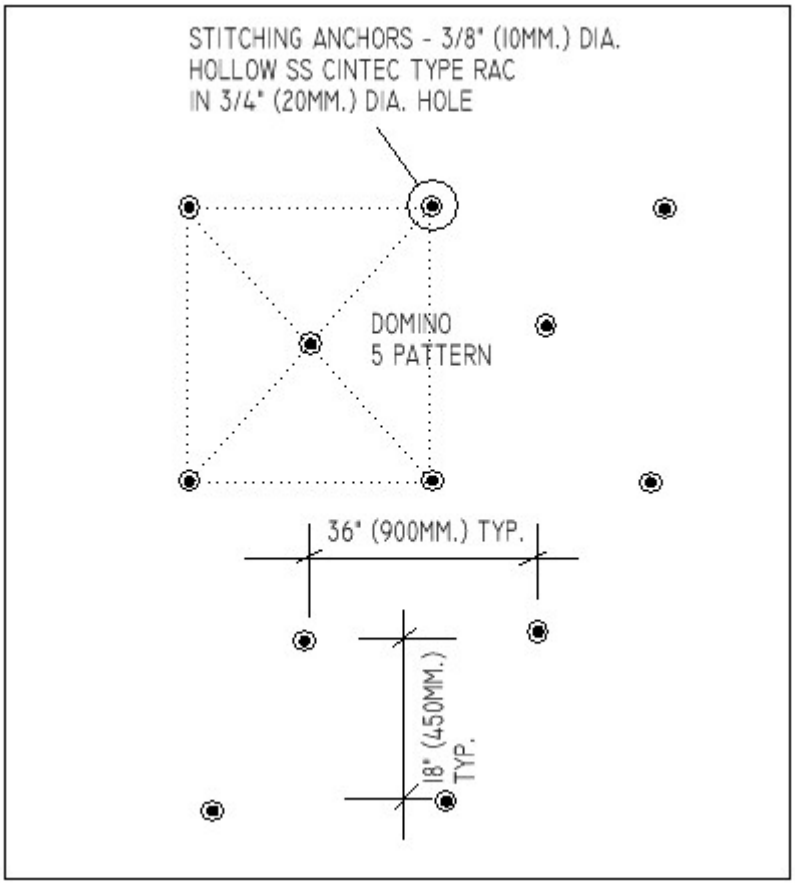
PART 2 - Installation

2.1 Cementitious Injection Grout Anchors
.1 Grout anchors shall be inserted in accordance with the manufacturer's written instructions and the project details.
.2 All Anchors to be installed by a contractor approved and trained by the manufacturer.
.3 The ends of the anchors shall be sealed in accordance with the project details.

2.2 Weak Substrate
.1 Where a weak substrate prevents adequate bonding of the grout, the Engineer may direct that the anchor be relocated, or that the anchor hole be grooved.
.2 The contractor shall be paid for anchor relocation, undercutting or grooving in accordance with the contract unit prices.

Typical Detail

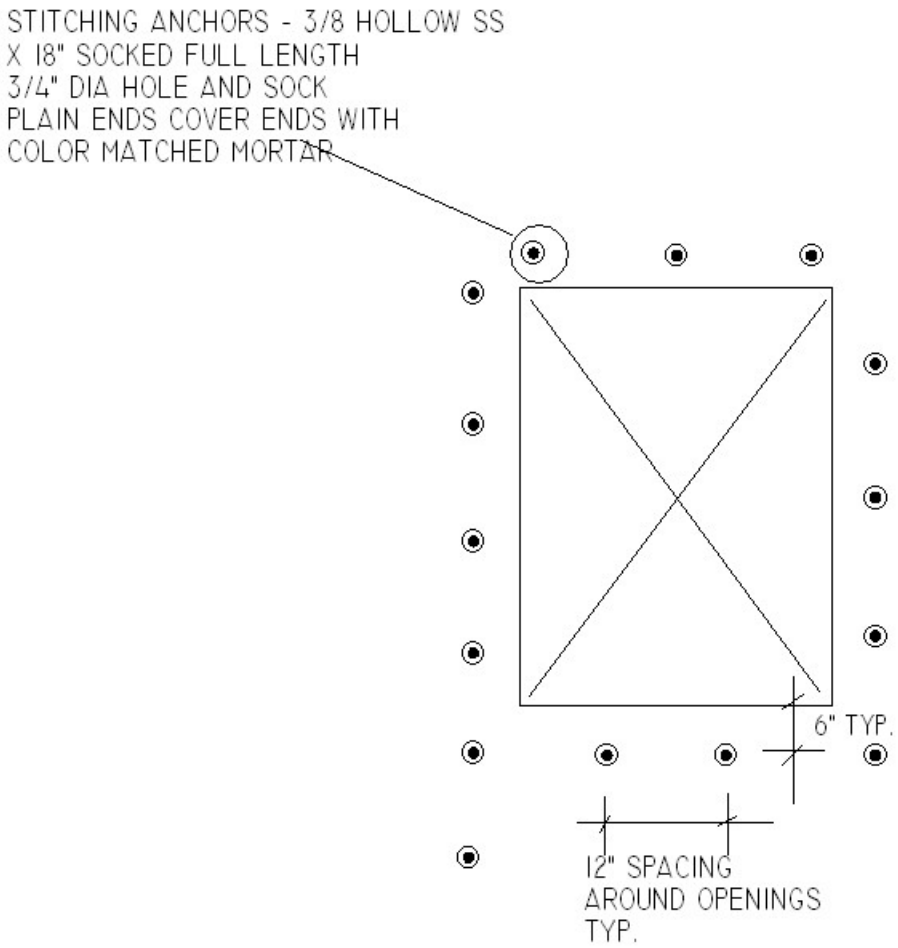
Brick Stabilization – large wall area.



Typical Detail

Brick Stabilization – wall opening

.



The Prudential Building

The Chicago Jewellery Exchange

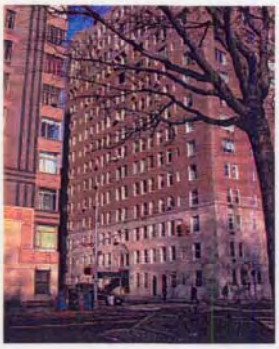
Stud-welded Masonry Retrofit Anchor System

Chicago, Illinois

Designed to restore lateral tieback to the supporting steel frame, the nelson® stud-welded masonry retrofit anchor has been successfully installed in repair applications to restore structural integrity to damaged or deteriorating masonry systems. Combining two diverse material technologies. Cintecs R&D department working with Boyd Associates, Inc. developed a masonry retrofit anchoring system which combines welded steel studs with the Cintec retrofit masonry anchor system.

The system is installed by first drilling small holes through the masonry to the surface of the structural steel member. A separate bit is then used to lightly mill away any surface rust or buildup on the surface of the steel member. A threaded stud is then fusion welded onto the steel member using a special adapter mounted on the standard stud gun. Following stud installation, a standard Cintec® masonry anchor with a special adapter is threaded onto the stud and completed in the standard manner.

This anchoring system has been used to restore ties to brick and terra cotta in situations which would have otherwise led to mare extensive and costly removal. Applications have included both short term and permanent repair of masonry in which the original tie materials were either missing or severely deteriorated. In situations where eventual removal may take place in the future, the threaded studs can remain as the permanent structural tie for the new masonry.



Cintec and fire rating concerns

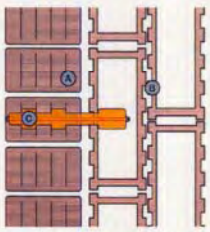
New York, N.Y.

Howard Zimmerman Architects of New York had concerns about the lack of "fire ratings" for resin based anchor systems while performing Local Law 11 specification work on high rise apartments near Central Park. After reviewing pertinent Fire Test Data (details available upon request) and performance tests done on a severely damaged building after a fire, it was determined that the Cintec System was the best anchor to meet the project engineers' concerns.

Since Cintec's anchors are based on reliable restoration materials, cementitious grout and stainless steel, they easily provided the elusive fire rating typically absent in other systems. The Cintec Masonry Reinforcement System uses a leading edge technology, a highly flexible and durable grout control sock, to combine and transform these time tested materials into an extremely versatile repair option.

The Cintec System gives all professionals working with weakened masonry additional strengthening tools that can be easily engineered to meet specific project demands.

Cintec anchoring detail



attachment of Cintec Anchors — facade repairs of One Prudential Plaza

A Case Study

stitching corner cracks

CINTEC
NORTH AMERICA

SECURING THE PAST FOR THE FUTURE

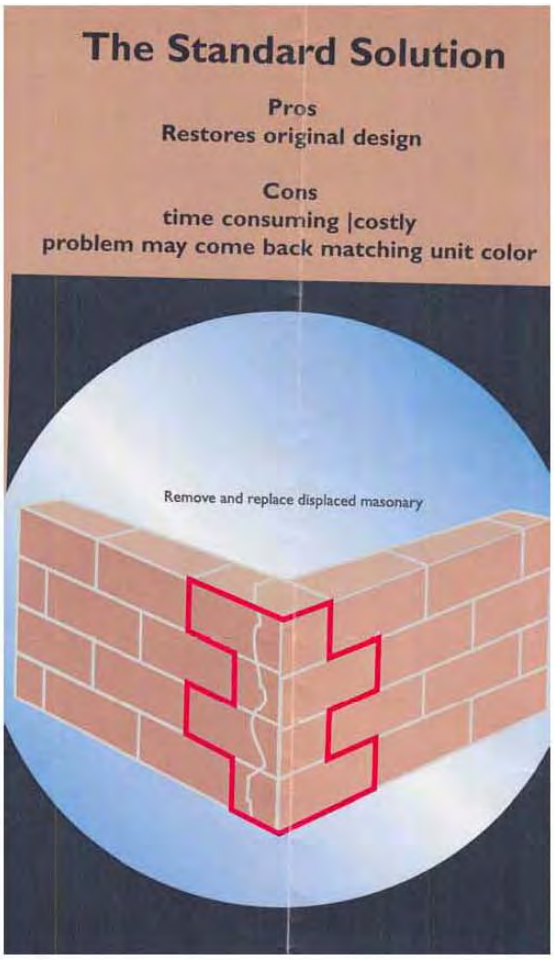
The Problem

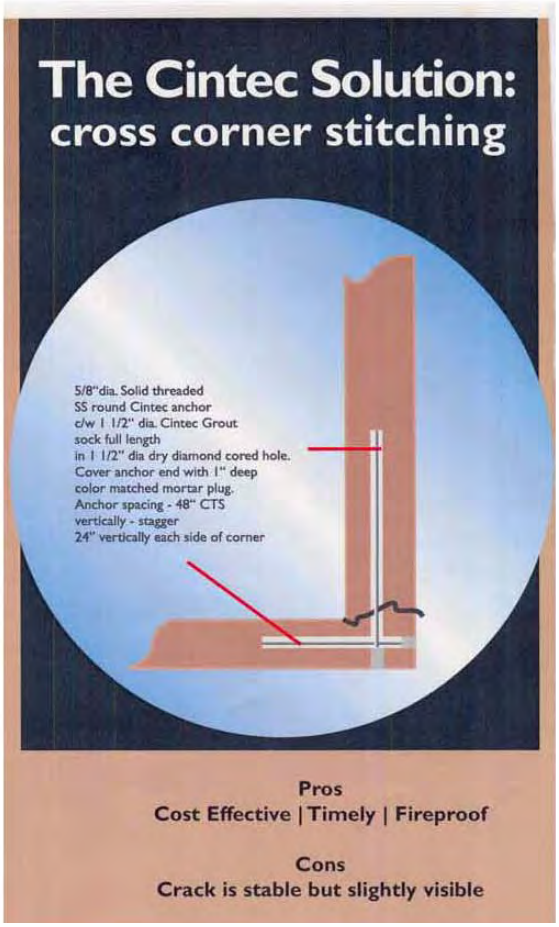
CINTEC International Limited in 1986 acquired the rights to the Cintec Anchoring System which had originally been developed in Germany.

Since then it has developed rapidly to meet the diverse requirements of the civil engineering industry in the field of strengthening and preservation.

Based in South Wales, the Company now has extensive international links with independent companies based in the United States, Canada and Australia.

The principal activity of the company is the design and manufacture of the "CINTEC" Micro Concrete and Lime Grout Anchoring and Reinforcing System.


The Standard Solution
Pros
Restores original design
Cons
time consuming |costly
problem may come back matching unit color
Remove and replace displaced masonary


The Cintec Solution:
cross corner stitching
5/8"dia. Solid threaded
SS round Cintec anchor
c/w 1 1/2" dia. Cintec Grout
sock full length
in 1 1/2" dia dry diamond cored hole.
Cover anchor end with 1" deep
color matched mortar plug.
Anchor spacing - 48" CTS
vertically - stagger
24" vertically each side of corner
Pros
Cost Effective | Timely | Fireproof
Cons
Crack is stable but slightly visible

TYPICAL PROJECT DEFINITION 1

July, 2002

Project: The Mill Restoration
Location:
Consultant:
Problem:
The interior structure of the mill as destroyed by fire in 1998.
The owners wish to stabilize the mil in order to preserve it as a ruin.
The roof was lost in the fire. The masonry has been exposed to the elements since the fire, with out maintenance.
Probable Cause(s):
Masonry was damaged by the fire. Further deterioration has taken place since the structure was exposed to the elements. The usual masonry deficiencies are evident in photos.

Possible solutions(s):

1. Dismantle and rebuild damaged areas

Main drawback – Costly and time consuming. Difficult to obtain matching units.

2. Inject cracks with epoxy repair material.

Main drawback – Cracks may reappear at another location when similar situation occurs.

3. Install helical retrofit wall ties.

Main drawback – Helical ties are not structural repair anchors. The apparent problems appear to be structural in nature and require a structural solution.

4. Install a complete structural steel frame on the interior on new footings. This is a large scale undertaking with budget to match.

Cintec Solution
The Cintec solution can be used to stabilize the standing masonry and facilitate installation of new masonry.
Stitching anchors will be 3/8'dia hollow stainless steel tube in a 1" diameter hole perpendicular to the wall face. Spacing and configuration of stitching anchors shall be a diamond 5 pattern at 36" centers. Provide anchors at 18" centers around openings.
Stabilization of door and window openings shall be by Cintec structural anchors 5/8" dia. solid threaded rod in 2" dia. hole. Typical openings shall have 3 anchors vertically up from head of opening.
Large vertical cracks shall be stabilized with 5/8 " dia Cintec anchors in 2" dia holes , spaced at 24" centers. Anchors to extend min. 24" beyond crack.
The connection of structural steel bracing members shall be by ¾" dia Solid threaded Cintec Anchor in 2 ½" dia. hole.
The Cintec solution can be:

- Cost effective as the solution eliminates labor intensive operations
- Minimal intervention that is focused on areas affected by the damage
- Proven structural repair method that provides a solution engineered for conditions specific to this site.

See enclosed sketches for details of the proposed solutions.

TYPICAL PROJECT DEFINITION 2

June, 2003

Project: Church
Location:
Consultant:

Problem:
1.Vertical cracking occurred on the interior brick faces in the tower at the level of horizontal section change from hollow square to hollow octagonal. Cracks originate at the bottom of the windows opening and run down for approximately six feet.
2. Loss of exterior facing integrity that is indicated by facing stone dislocations and loss of mortar joints
Probable Cause(s):
The most likely general cause for the distress noted is water infiltration, causing internal freeze-thaw damage and/or ice lensing, gradual deterioration of stone rubble infill binding mortar and subsequent dislocations of parts of the infill. The above caused the exterior mortar joints to open encouraging farther deterioration.
.
Possible solutions(s):

5. Dismantle and rebuild damaged areas

Main drawback – Costly and time consuming

6. Inject cracks with repair material.

Main drawback – Cracks may reappear at another location.

7. Install retrofit wall ties and new framing

Proposed solution including Cintec Solution
Install Cintec wall repair anchors in damaged areas surround the cracks. See Drawings SK-S1 and SK-S2.The proposed use of Cintec Anchors is to be accompanied by grout injection into rubble infill and repairs/reinstallation of all malfunctioning exterior mortar joints

Main advantages:

- Cost effective
- Minimal intervention
- Proven structural repair method

INFORMATION REQUIRED TO DESCRIBE A CINTEC ANCHOR:

Anchor Type

A,B,C,D,etc.....

Anchor body size

3/8" , 1/2" , 5/8", ¾" , 1" , 1 1/4" , 1 1/2" (dia.)Anchor body shape

1. Round hollow section
2. Square hollow section
3. Solid round bar
4. Solid round threaded

Anchor Body material

1. Stainless Steel (SS)*
2. Plain steel

Stainless steel type

1. ANSI Type 304*
2. ANSI Type 316

Anchor body overall length

1. xx"

Hole Size

1. xx" dia.

Anchor body end

1. Plain end
2. Nut and washers
3. Nut washers and end plate (describe size, shape, thickness and material of end plate)

Grout sock size

1. xx" dia. sock
2. Sock expands to yy" dia. in voids

Sock length

1. Full length
2. Overall length minus xx" (leaving enough thread exposed to make end connection)

Anchor end covers (when plain end anchor is used)

1. Color (colour) matched mortar plug
2. Stone core plug
3. Exposed

Configuration

1. xx" diamond 5 pattern (standard diamond 5 pattern size is 36")
2. Specify spacing
3. See drawings for anchor configuration

Notes

Contractor to confirm length in the field before ordering.*

Example :

Anchor Type A
3/8" dia. solid round threaded SS ANSI Type 304 Cintec Anchor
x 24" long c/w 2 ' 1/2" dia. sock in 1 1/2" dia. hole
c/w nut, washers and 2" x 2" x 1/2" sq. plate.

Preliminary Design Input Form
CINTEC Anchoring Systems

Project :_____ Location :_____
Consultant:_____ Owner:_____
Contractor:_____
Contact Person:_____ FAX: _____ Tel:_____
E-mail:_____ Representing:_____

Loads: Units: _____
Unfactored (WSD/ ASD) : YES / NO
Factored (USD or LFRD): YES / NO
Vertical: Down:_____ eccentricity:_____
Up:_____ eccentricity:_____
Lateral: Pull Out: _____
Compresssion: _____
Horizontal: _____
Anchor Design Mechanism:_____ (e.g. : straight pullout , direct tension, double curvature flexure, single curvature flexure, shear, eccentric bracket/corbel)

Materials
Anchor Body: _____type spec.: _____
Substrate: _____type
_____condition
_____ strength of material

Cintec sock: _____type (e.g.: expanding, oversize, 2 stage, full length)
Grout : Presstec 5000psi / 35MPa ultimate

Load Free Body Diagram :	Cross Section Detail :

Submit Design request to:
Cintec Attn: Engineering Department
Fax: 1 800 461 1862 or e-mail: engineer@cintec.com

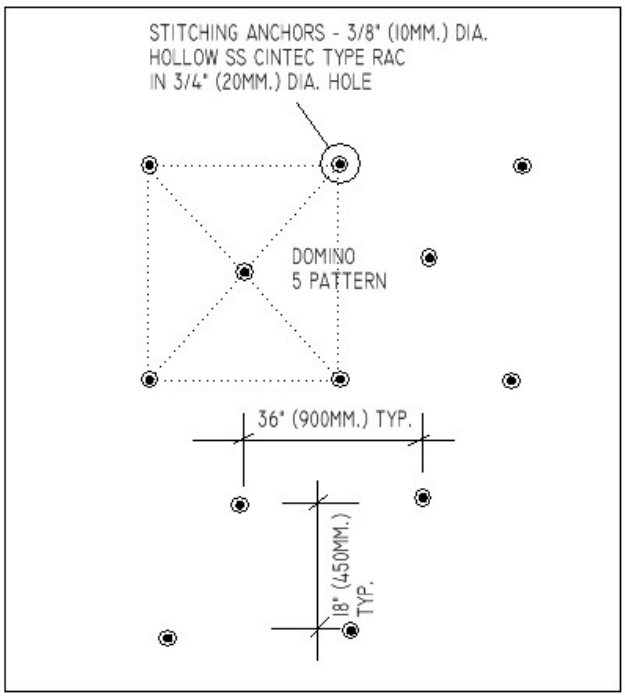
Digital or scanned photos, ACAD drawings and copies of historic drawings will greatly assist in providing a Cintec Solution.

CINTEC GROUTED ANCHOR SYSTEMS

Technical Bulletin No. 1

Retrofit Wall Ties.

One of the most common applications of Cintec Anchors is as a retrofit wall tie. These are usually installed on a domino 5 pattern with an 18” x 36” spacing.



The typical anchor is an RAC type with Type 304 Stainless Steel 3/8” diameter hollow round section with 0.04” thick wall. This anchor is installed in a ¾” diameter hole with a ¾” sock. The embedment length of the grouted sock is typically 3” less than the overall wall thickness. (2” inches cover at far end of anchor, 1” cover at near end).

One of the most common technical queries we receive is:

> “The spacing of the wall ties does not appear to meet all codes.
> Can you provide background to assist in approvals?”

The model North American building codes require that wall ties for brick or stone veneers be spaced 16” x 24” centers horizontal or vertical.

This is based on a traditional approach where thin metal ties are attached to wooden or steel wall studs at either 24” or 16” centers. The overall spacing is determined by the pull out capacity of the wood screw attaching the brick tie to the wall stud. The required and supplied pull out strength is approximately 80 pounds (unfactored).

Technical Bulletin No. 1 (cont'd.) Retrofit Wall Ties.

This approach has little relevance to a retrofit wall tie in an historic or modern masonry wall system. The 18" x 36" spacing recommended for Cintec Retrofit ties provides a pull out resistance of at least 325 pounds (unfactored). The required resistance, even at a rather high wind suction of 50 pounds (unfactored) per square

foot of wall surface, is 225 pounds (unfactored). Note that Cintec anchor designs are typically based on a factor of safety of 4.0.

The other consideration in selecting anchor spacing is the allowable distance between lateral supports. This spacing in model North American Codes, is 20 times the thickness of the wythe being tied. Using a 3 5/8" thick brick, this yields a minimum distance between ties of 72". The typical Cintec retrofit tie system provides a maximum spacing of 25", 33% of the allowable.

European model building codes are recognizing the need to apply sound engineering principles to the design of refit solutions for masonry walls. The British Standard requirements for ties in existing masonry walls uses the domino 5 pattern and similar spacing to that recommended by Cintec.

Prepared by:

Cintec North America
15 March 2005

Section 6 - Special Applications

Seismic

Cintec's seismic upgrading system is called SEISTEC.

Cintec anchors utilizing a combination of hollow sections and solid round sections are used to provide internal reinforcement to masonry structures at risk in seismic zones.

The approach can be either reactive and proactive. Earthquake damaged structures can be restored without wholesome dismantling.

Existing structures not yet damaged by seismic events can be reinforced to withstand anticipated seismic loads.

The basic approach is to tie the main lateral force resisting elements together. Buildings in active seismic zones have already demonstrated an ability to resist seismic loads. The insertion of new stiff elements such as shearwalls or frames may alter significantly the established load paths, leading to failure of critical elements and inappropriate transfer of loads to (and from) the foundations.

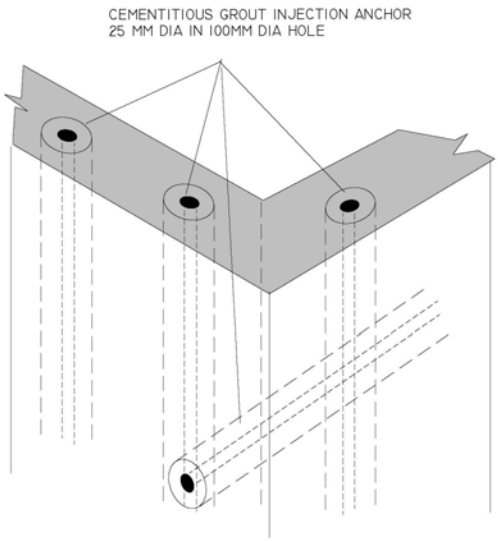
The Cintec Seismic Solution reinforces and ties together the existing elements. Schematic details illustrating the approach follow.

Cintec anchors are useful in reinforcing architectural elements such as parapets and attachment of OFC's .

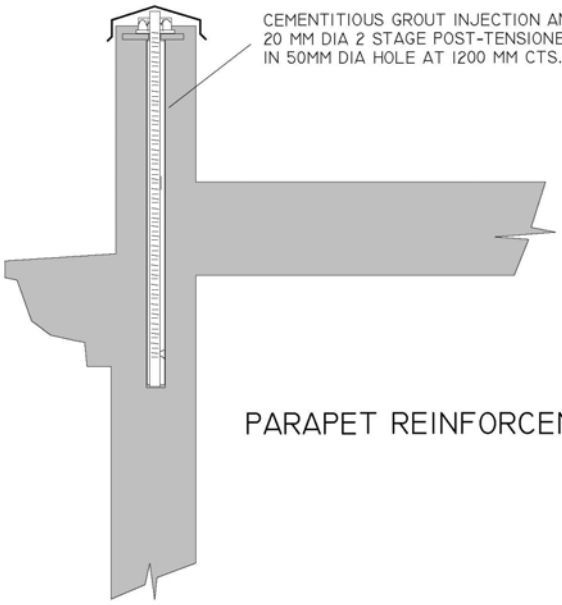
The seismic solution also provide a measure of protection against blast loads and progressive collapse.

Seismic design is a complex process. It is recommended that the designer of such projects wishing to assess the feasibility of a Cintec application contact Cintec at an early stage in the project. Cintec retains engineers experienced in seismic retrofit, particularly in historic masonry structures to provide assistance to project engineers.

Typical Cintec Seismic Interventions

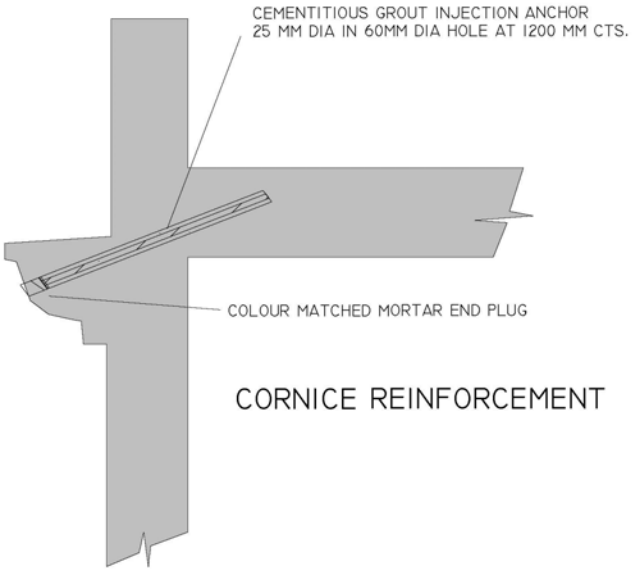


VERTICAL AND HORIZONTAL CORE
REINFORCEMENT OF MASONRY WALLS

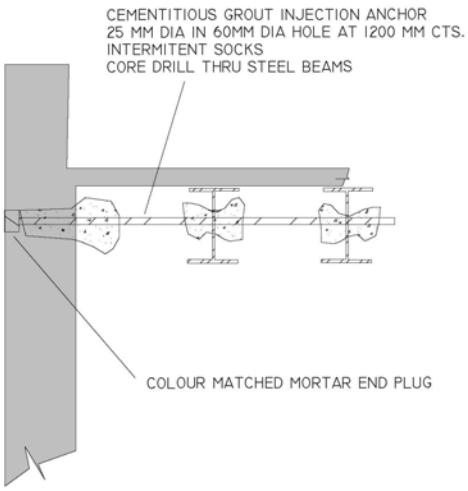


PARAPET REINFORCEMENT

Typical Cintec Seismic Interventions

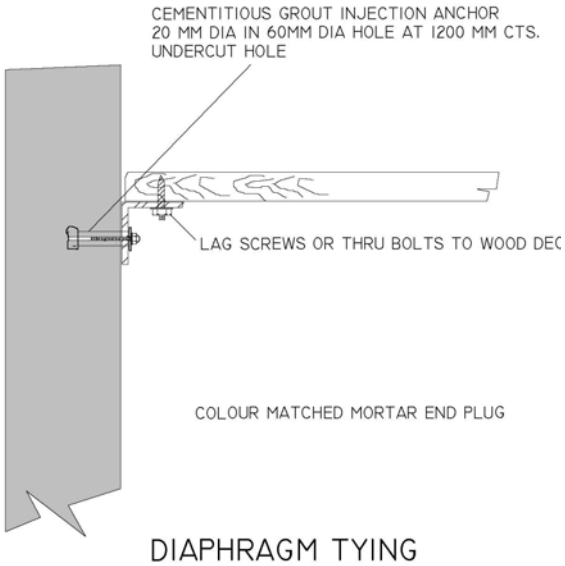


CORNICE REINFORCEMENT

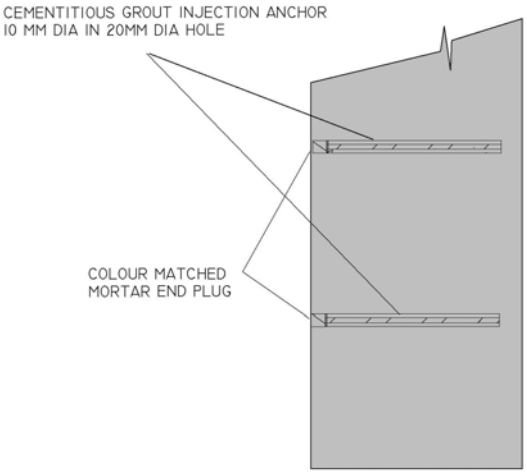


DIAPHRAGM TYING

Typical Cintec Seismic Interventions



DIAPHRAGM TYING



STITCHING ANCHORS TO DAMAGED OR VULNERABLE AREAS

Blast Protection

Cintec's blast protection upgrading system is called BLASTEC.

Cintec anchors utilizing a combination of hollow sections and solid round sections are used to provide internal reinforcement to masonry structures at risk of exposure blast loads.

The approach can be either reactive or proactive. Blast damaged structures can be restored without wholesale dismantling.

Existing structures not yet damaged by blast events can be reinforced to withstand anticipated explosive loads.

The basic approach is to tie the main lateral force resisting elements together, and to tie architectural elements such as windows to the surrounding building elements.

The Cintec Blastec Solution reinforces and ties together the building elements. Schematic details illustrating the approach follow.

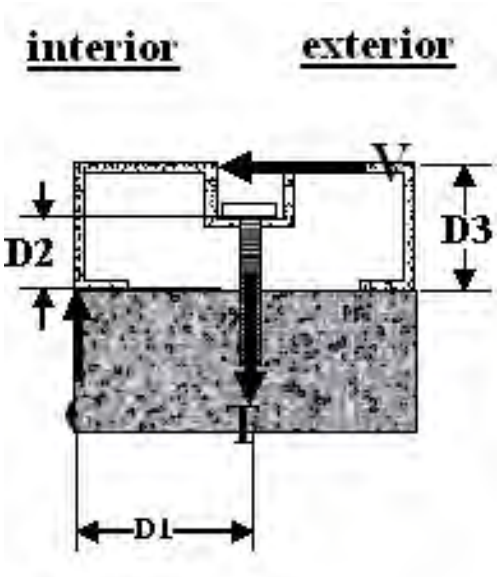
The Blastec solution also contributes to protection against seismic loads and progressive collapse.

The Cintec Blast Solution provides a good measure of protection against post-blast intrusion in the even of terrorist attack.

Design for blast loads is a complex process. It is recommended that the designer of such projects wishing to assess the feasibility of a Cintec application contact Cintec at an early stage in the project. Cintec retains blast engineers and structural engineers experienced in blast retrofit , particularly in historic masonry structures, to provide assistance to project engineers.

Blast requirements for GSA Level C blast protection can generated loads up to 4 psi (576 psf) of window area.

Level D protection yields loads up to 10 psi (1,440 psf) of window area.



Loads on Blast resistant Window Frame

Progressive Collapse

Design to prevent progressive collapse of structures is a common requirement of modern building codes. Loads leading to progressive collapse can be seismic , blast (both intentional and unintentional) and vehicle impact.

Cintec's design approach of tying together the main building elements provides good resistant to progressive .

This reinforcement is internal and will not detract from the appearance of an existing structure, particularly in the case of historic landmark sites.

Design to prevent progressive collapse is a complex process. It is recommended that the designer of such projects wishing to assess the feasibility of a Cintec application contact Cintec at an early stage in the project. Cintec retains structural engineers experienced in progressive collapse retrofit , particularly in historic masonry structures, to provide assistance to project engineers.

Civil Engineering Structures

Cintec anchors have been used for the repair and reinforcement of a number of civil engineering structures.

The ARCHTEC system for reinforcement of masonry arch bridges has been proven by full scale laboratory test to failure.

Cintec Earth anchors have been used to reinforce seawalls and railway embankments.

Cintec anchors are particularly useful in the repair of hydraulic structures such as dam. The sock retains the grout, thus preventing pollution of the watercourse.

Design of repair and upgrading of civil structures is a complex process. The applications are many and varied. It is recommended that the designer of such projects wishing to assess the feasibility of a Cintec application contact Cintec at an early stage in the project. Cintec retains structural engineers experienced in retrofit and upgrading of civil structures to provide assistance to project engineers.

Section 8 – Test Data, Technical References, Standards

Cintec Test Data

Cintec has amassed a substantial collection of physical test data for various types of applications. Test data includes full scale arch bridge tests to failure, pull out tests, shear tests, freeze-thaw durability and fire resistance testing.

Cintec's approach to testing is to use full scale test setups , replicating as close as possible the intended application

Some are controlled laboratory tests. Others are field tests of actual applications.

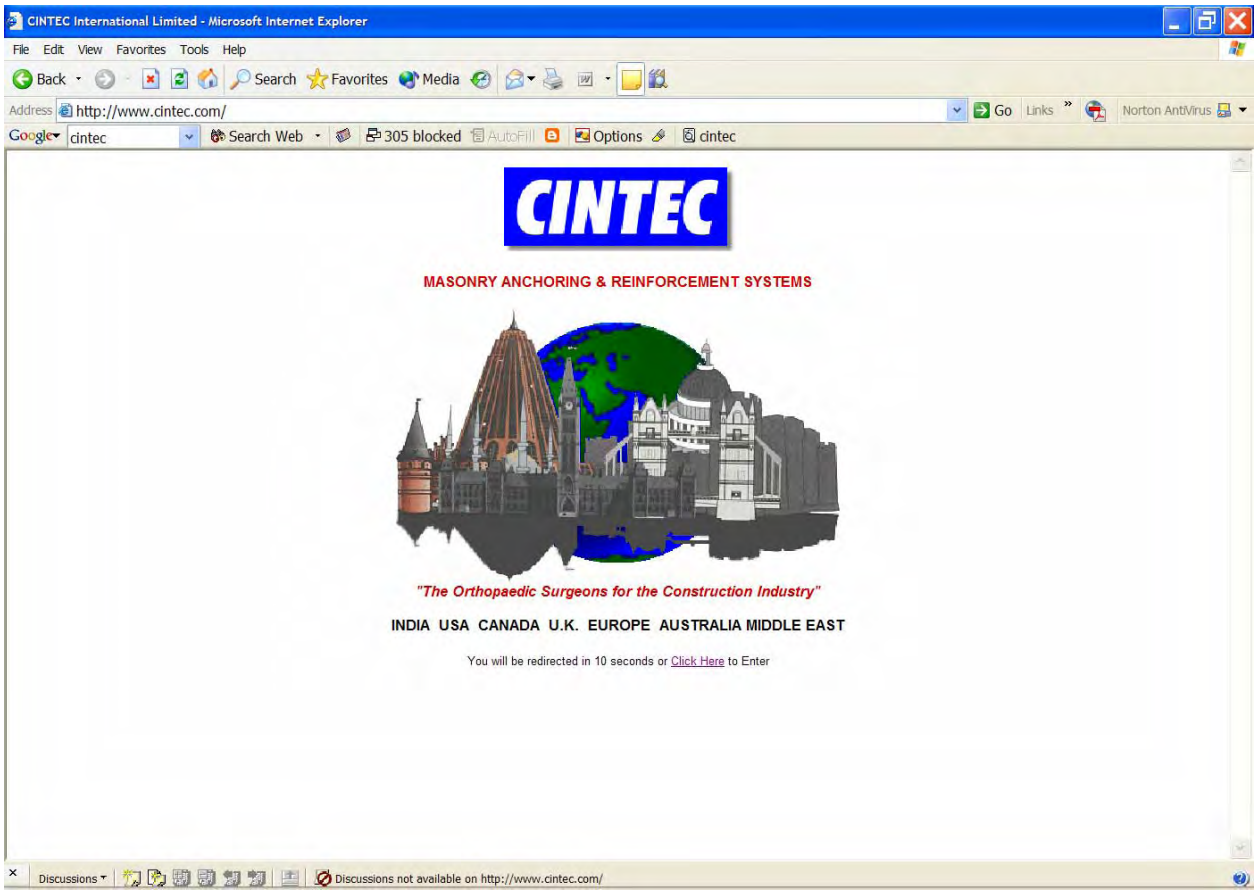
Tests have been witnessed and certified by Licensed Professional Engineers and/or Certified Testing Agencies.

Much test data information is found on Cintec's website.

A collection of hardcopy test data selected for relevance to a specific application is available on request to qualified engineers.

Cintec's Website:

www.cintec.com



Standards

Cintec is a proprietary system using standard materials.

The anchor body is typically Type 304 Stainless Steel material. This covered by ANSI standard 304 or 316.

The Presstec grout is a cementitious material covered by the relevant grout/ mortar standards relevant to the intended type of application.

The woven fabric sock, while and integral part of the anchor , does not contribute to the structural strength of the anchor and thus is not covered by constructions standards.

An ICC legacy report (copy attached) has been obtained for a specific type of anchor used in seismic reinforcement in California, and is applicable to other areas of North America.

ICC Evaluation Service Report

ICC EVALUATION SERVICE, INC.
Evaluate P Inform P Protect

Los Angeles Business/Regional Office P 5360 Workman Mill Road P Whittier, CA 90601 (562) 699-0543 phone P (562) 695-4694 fax

ICC EVALUATION SERVICE, INC.
Evaluate ■ Inform ■ Protect

Los Angeles Business/Regional Office ■ 5360 Workman Mill Road ■ Whittier, CA 90601
(562) 699-0543 phone ■ (562) 695-4694 fax

August 25, 2004
Robert Lloyd-Rees Chief Operating Officer Cintec Canada Ltd. 38 Auriga Drive, Suite 200 Nepean, Ontario K2E 8A5 Canada

RE: ER-6087 March 1, 2004

Dear Mr. Lloyd-Rees:

This letter constitutes final approval of the ICC Evaluation Service, Inc. (ICC-ES), legacy report referenced above, and authorizes use of the report in accordance with the ICC-ES Rules of Procedure for Legacy Reports. Any further changes to the report cannot be accepted unless they involve an application for an interim revision or reexamination. The report will be due for re-examination on March 1, 2005, and may not be used or referenced beyond the re-examination date except with the permission of ICC-ES. Your report will be available on our web site at www.icc-es.org.

Enclosed with this letter are electronic copies of the evaluation report and the Rules of Procedure for Legacy Reports. Use of the evaluation report and the report number must be in accordance with Section 15.0 of the Rules. The ICC-ES name or report number shall not be used in a manner which could be misleading, nor shall the name or report number appear on documents that display or indicate products or systems that are not recognized in the evaluation report. All test results noted in your literature where the ICC-ES name or report number appear shall be consistent with the evaluation report. Failure to comply with the ICC-ES Rules of Procedure can result in cancellation of your evaluation report.

If you would like some suggested text for your product literature, we offer the following:

"[Name of company] has received confirmation from ICC Evaluation Service, Inc. (ICC-ES), that its [name of product] complies with the provisions of the [list applicable codes].

This confirmation, as evidenced in ICC-ES evaluation report ER-xxxx, provides guidance to code officials faced with approving the use of [name of product] under these codes. The =evaluation report is available online at www.icc-es.org."

We appreciate this opportunity to serve you and ask that you feel free to contact us when we can be of assistance.

Gary G. Nichols

GN:ls Enclosures (evaluation report, rules for legacy reports)

LEGACY REPORT

ER-6087
Issued March 1, 2004

ICC Evaluation Service, Inc.
www.icc-es.org

Business/Regional Office ■ 5360 Workman Mill Road, Whittier, California 90601 ■ (562) 699-0543
Regional Office ■ 900 Montclair Road, Suite A, Birmingham, Alabama 35213 ■ (205) 599-9800
Regional Office ■ 4051 West Flossmoor Road, Country Club Hills, Illinois 60478 ■ (708) 799-2305

Legacy report on the 1997 *Uniform Building Code*™, the 1997 *Uniform Code for Building Conservation*, and the 2000 *International Building Code*®

DIVISION: 04—MASONRY
Section: 04080—Masonry Anchorage and Reinforcement

CINTEC PIPE ANCHOR RETROFIT SYSTEM

CINTEC CANADA LTD.
38 AURIGA DRIVE, SUITE 200
NEPEAN, ONTARIO K2E 8A5
CANADA

CINTEC AMERICA, INC.
5506 CONNECTICUT AVENUE N.W. #28
WASHINGTON, DC 20015

1.0 SUBJECT

Cintec Pipe Anchor Retrofit System for Unreinforced Masonry (URM) and Nonductile Concrete Buildings.

2.0 DESCRIPTION

2.1 General:

2.1.1 The Cintec Pipe Anchor Retrofit System is used to retrofit unreinforced masonry (URM) structures and nonductile concrete structures. Figure 1 provides details of the system.

2.1.2 Codes and Standards: The following codes and code-related documents are incorporated by reference into this report: 1997 *Uniform Code for Building Conservation* (UCBC); 1997 *Uniform Building Code*™ (UBC); 2001 ICBO Guidelines for Rehabilitation of Existing Buildings, 1st edition; 2001 ICBO Guidelines for Seismic Retrofit of Existing Buildings; 2000 *International Building Code*® (IBC); Building Code Requirements for Structural Concrete (ACI 318-99), Structural Steel Buildings—Allowable Stress Design and Plastic Design (AISC ASD, 1989); and Load and Resistance Factor Design for Structural Steel Buildings, including Supplement No. 1 dated January 1998 (AISC LRFD, 1993).

2.2 Materials:

2.2.1 Pipe Anchors: The Cintec Pipe Anchors are standard pipe or round, hollow structural sections complying with ASTM A 618 Grade 50, with dimensions and design properties described in the Manual of Steel Construction, Load and Resistance Factor Design or Allowable Stress Design, published by the American Institute of Steel Construction.

2.2.2 Concrete Fill: The interior area of the pipe shall be filled with normal-weight or structural lightweight concrete having, respectively, a minimum 3,000 psi (20.7 MPa) or a minimum 4,000 psi (27.6 MPa) compressive strength at 28 days. Concrete quality, mixing, and placing shall comply with Chapter 19 of the UBC or with ACI 318-99 (IBC).

2.2.3 Concrete Footings: Normal-weight concrete having a minimum 3,000 psi compressive strength at 28 days shall be used for footings. Concrete quality, mixing, and placing shall comply with Chapter 19 of the UBC or with ACI 318-99 (IBC).

2.2.4 Concrete Reinforcement: Deformed steel reinforcement bars shall comply with ASTM A 615, A 616, A 617, or A 706 Grade 60. Steel joint reinforcement for masonry shall comply with ASTM A 951 or UBC Standard 21-10 (Part I).

2.3 Design:

2.3.1 Design Loads:

The design loads for the structure shall be calculated in accordance with the UCBC, UBC, IBC, Guidelines for Rehabilitation of Existing Buildings, or Guidelines for Seismic Retrofit of Existing Buildings, as applicable.

2.3.2 Analysis of the Existing Structure Materials: The existing structure shall be evaluated for in-situ material strengths in accordance with the procedures in Section 1920 of the UBC, the UCBC, Section 1916 of the IBC, or the Guidelines for Seismic Retrofit of Existing Buildings, as applicable.

2.3.3 Structural Analysis Methods: The existing structural system with the Cintec Pipe Anchor System shall be evaluated using a combination of structural methodologies described in the UBC, IBC, ACI 318-99 (IBC), AISC ASD (1989) and AISC LRFD (1993). These include linear methods, nonlinear methods, and elastic design of structural elements in accordance with the referenced codes and standards. The designer may utilize either the AISC ASD (1989) or the AISC LRFD (1993) for the design of the Cintec Pipe Anchor System.

2.3.4 Composite Columns: The design requirements for composite columns are contained in Section I2 of AISC ASD (1989) or AISC LRFD (1993). In accordance with AISC LRFD (1993), the 4 percent area limitation defines the composite action behavior for s teel tube c olumns. According to the

LRFD Section I2, 4 percent of the gross area of the section allows for the column to be designed in accordance with LRFD specifications.

2.3.5 Deformation Limits and Drift Requirements: The maximum out-of-plane deformation shall be 0.005h, where h is the wall height between supports. The maximum in-plane story drift shall be 0.007h.

2.3.6 Connection Methods: The Cintec Pipe Anchor System is to be detailed in accordance with the applicable code. Holes shall be provided in horizontal pipe anchors to accommodate interaction with vertical pipe anchors. Holes shall be provided in vertical pipe anchors to accommodate wall ties.

2.3.7 Foundation Connections: The foundation connection between the Cintec Pipe Anchor and the substructure shall be the responsibility of the registered design professional and shall be detailed in accordance with the appropriate site/field conditions. The structural design shall comply with the applicable code, and structural engineering practice. Foundation connections shall be designed and installed for each specific project.

2.3.8 Design Plans and Specifications: The design plans and specifications shall be prepared by a registered design professional. Cintec shall maintain a list of registered design professionals qualified to perform the design in accordance with this report and its requirements, and only those authorized registered design professionals are allowed to utilize this system.

2.4 Installation:

Holes accommodating the anchors and wall ties shall be drilled into the concrete or masonry wall using nonpercussive drilling procedure. Wall tie holes measuring $^{3}/_{4}$ inch (19 mm) in diameter are drilled in the specified locations, and steel guides are inserted to assist in positioning anchor holes. Anchor holes measuring larger than the outside pipe anchor dimension are drilled through the wall, directed by the steel guides. Maximum vertical anchor spacings are 24 inches (610 mm). After drilling, the base of the hole is enlarged using a taper drill. Pipe anchors are placed in the holes after all debris is removed. The steel guides are then removed and wall ties are placed through the holes into the anchors. The wall ties are set in grout, which must cure before anchor interiors are injected with concrete. The drilling shall be performed only by Cintec qualified/certified drilling installers under the quality control supervision of Cintec personnel.

2.5 Quality Control and Special Inspection:

Each project shall incorporate a quality control program in accordance with Chapter 17 of the UBC or IBC. The preparation of anchors (holes and length) shall be done by fabricators approved by the building official in accordance with Section 1701.7 of the UBC or Section 1704.2.2 of the IBC. Special inspection is required in accordance with Section 1701 of the UBC or Section 1704 of the IBC. The inspector's duties include verifying that anchors were prepared by an approved fabricator; that anchors, wall ties, and concrete comply with specifications; that there are proper drilling operations, proper anchor and wall tie placement, and proper concrete placement; and that concrete test specimens are properly prepared. Under the IBC, quality assurance plans shall be submitted to the building official for approval as required by Sections 1705 and 1706.

3.0 EVIDENCE SUBMITTED

Structural calculations and installation instructions.

4.0 FINDINGS

That the Cintec Pipe Anchor Retrofit System for unreinforced masonry (URM) and nonductile concrete buildings described in this report complies with the 1997 *Uniform Building Code*™, the 1997 *Uniform Code for Building Conservation*, and the 2000 *International Building Code*® (IBC), subject to the following conditions:

4.1 Design and installation are in accordance with this report, the manufacturer's instructions and the applicable code.

4.2 Fire-resistance of the assembly must comply with Chapter 7 of the UBC or IBC. Fire protection for the assemblies shall be subject to building official approval.

4.3 Quality control is provided in accordance with Section 2.5 of this report.

This report is subject to re-examination in one year.

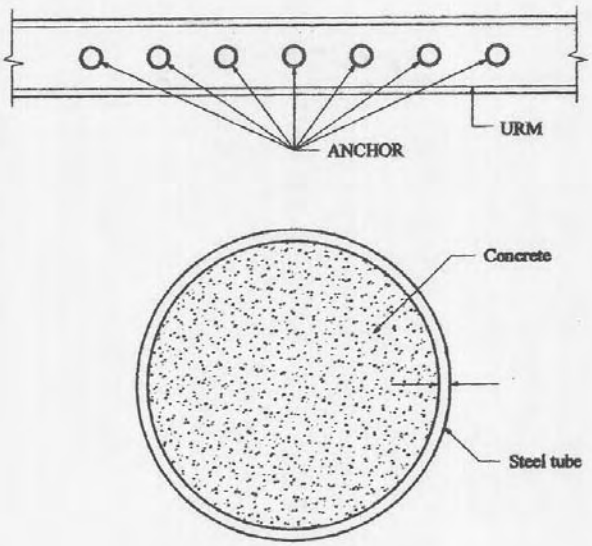


FIGURE 1—CINTEC ANCHOR

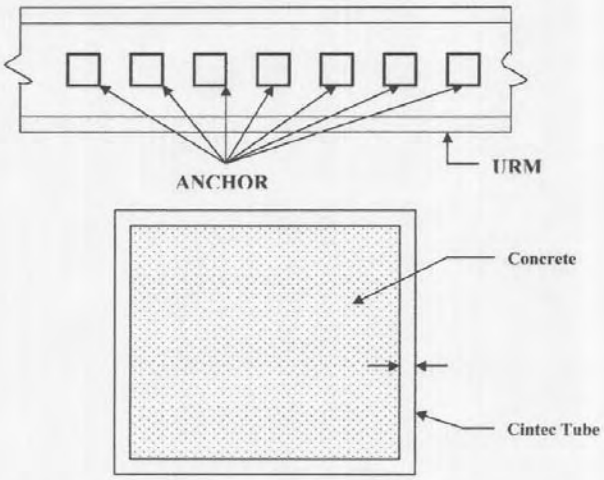


FIGURE 2—SQUARE TUBE REINFORCEMENT

Section 9 – Graphics

Graphics database
Standard Details (101 pages)

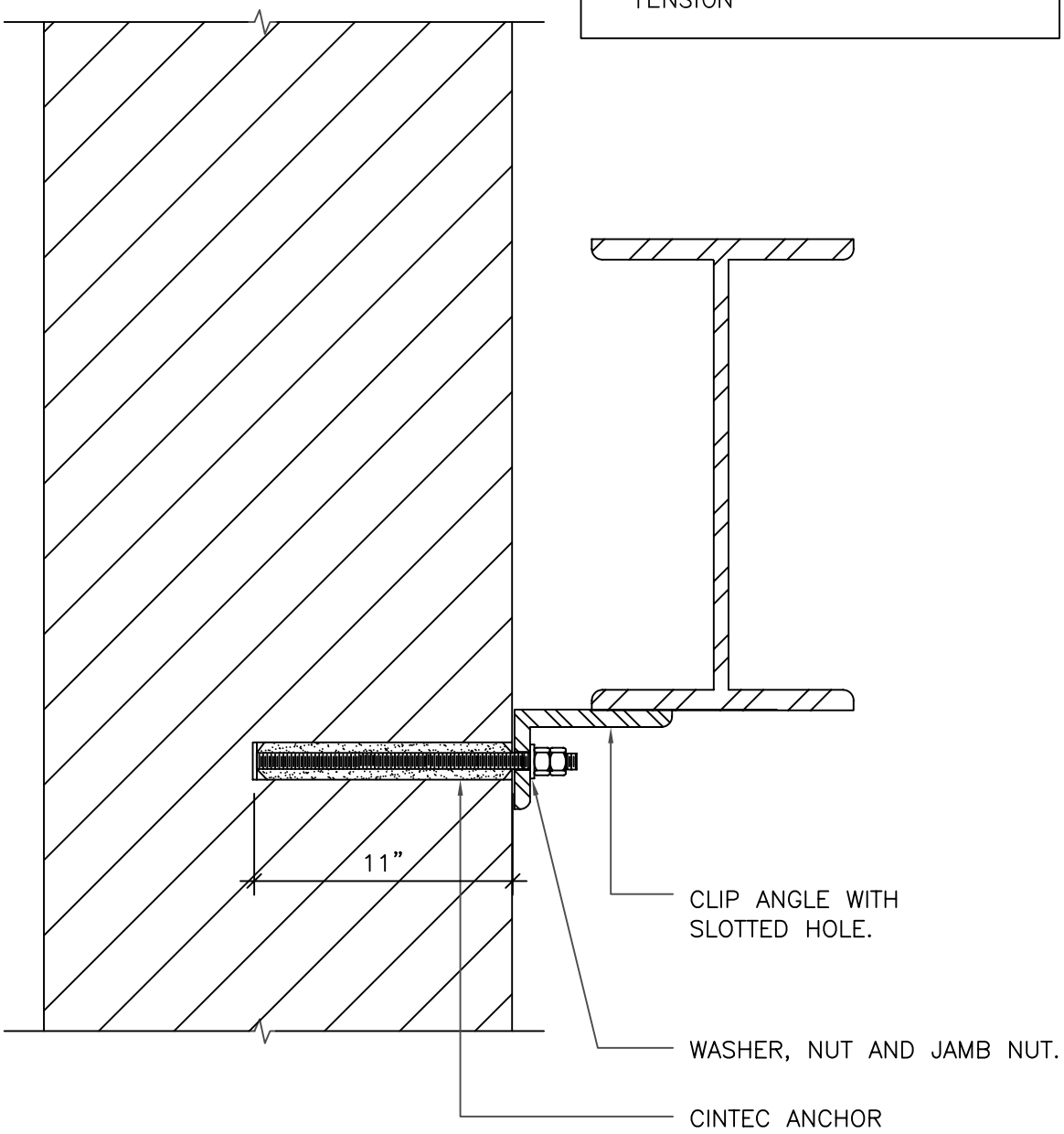
Database of Standard Detail Graphics (PDF Format)

Line#	Drwg #	Folder	Type	Location	Substrate	Anchor Body Type	Application 1	Application 2	Application 3	Loads
1	90 Park S1	90 Park	PDF	Boston	Brick	SRT	Tie	Arch		Tension
2	90 Park S2	90 Park	PDF	Boston	Brick	SRT	Tie	Arch		Tension
3	90 Park S3	90 Park	PDF	Boston	Brick	SRT	Tie	Arch		Tension
4	90 Park S4	90 Park	PDF	Boston	Brick	SRT	Tie	Arch		Tension
5	90 Park S5	90 Park	PDF	Boston	Brick	SRT	Tie	Corner		Tension
6	90 Park S6	90 Park	PDF	Boston	Brick	SRT	Tie	Arch		Tension
7	Ballet S1	Ballet	PDF	Miami	CMU	SRT	Tie	Veneer	Stone	Tension
8	Ballet S2	Ballet	PDF	Miami	CMU	SRT	Tie	Veneer	Stone	Tension
9	Ballet S3	Ballet	PDF	Miami	CMU	SRT	Tie	Veneer	Stone	Tension
10	Ballet S4	Ballet	PDF	Miami	CMU	SRT	Tie	Veneer	Stone	Tension
11	Ballet S5	Ballet	PDF	Miami	CMU	SRT	Tie	Veneer	Stone	Tension
12	C02-01	CDetails 02 (	PDF	GENERIC	Concrete	HSS	Corbel	Veneer	Brick	Shear
13	C02-02	CDetails 02 (	PDF	GENERIC	Concrete	HSS	Corbel	Veneer	Brick	Shear
14	C02-03	CDetails 02 (	PDF	GENERIC	Concrete	HSS	Corbel	Veneer	Brick	Shear
15	C02-04	CDetails 02 (	PDF	GENERIC	Concrete	HSS	Corbel	Veneer	Brick	Shear
16	C02-05	CDetails 02 (	PDF	GENERIC	Concrete	HSS	Corbel	Veneer	Brick	Shear
17	C03-01	CDetails 03 S	PDF	GENERIC	Stone	CHS	Stitch	Stone Carving		Tension
18	C03-02	CDetails 03 S	PDF	GENERIC	Stone	CHS	Stitch	Corner		Tension
19	C03-03	CDetails 03 S	PDF	GENERIC	Stone	CHS	Stitch	Corner		Tension
20	C03-04	CDetails 03 S	PDF	GENERIC	Stone	CHS	Stitch	Stone Carving		Tension
21	C03-05	CDetails 03 S	PDF	GENERIC	Stone	CHS	Stitch	Corner		Tension
22	C03-06	CDetails 03 S	PDF	GENERIC	Stone	CHS	Stitch	Corner		Tension
23	C04-01	CDetails 04 A	PDF	GENERIC	Stone	CHS	Stitch	Tie		Tension
24	C04-02	CDetails 04 A	PDF	GENERIC	Stone	CHS	Stitch	Tie		Tension
25	C04-03	CDetails 04 A	PDF	GENERIC	Stone	CHS	Stitch	Tie		Tension
26	C04-04	CDetails 04 A	PDF	GENERIC	Stone	CHS	Stitch	Tie		Tension
27	C04-05	CDetails 04 A	PDF	GENERIC	Stone	CHS	Stitch	Tie		Tension
28	C04-06	CDetails 04 A	PDF	GENERIC	Stone	CHS	Stitch	Corner		Tension
29	C05-01	CDetails 05 T	PDF	GENERIC	Concrete	SRT	Tie		A Bolt	Combined
30	C05-02	CDetails 05 T	PDF	GENERIC	Brick	SRT	Tie	Arch		Tension
31	C05-03	CDetails 05 T	PDF	GENERIC	Brick	SRT	Tie	Arch		Tension
32	C05-04	CDetails 05 T	PDF	GENERIC	Brick	SRT	Tie	Arch		Tension
33	C05-05	CDetails 05 T	PDF	GENERIC	Brick	SRT	Stitch			Tension
34	C05-06	CDetails 05 T	PDF	GENERIC	CMU	SRT	Stitch			Tension
35	C05-07	CDetails 05 T	PDF	GENERIC	Stone	SRT	Stitch			Tension
36	C05-08	CDetails 05 T	PDF	GENERIC	Brick	SRT	Stitch			Tension
37	C05-09	CDetails 05 T	PDF	GENERIC	Stone	SRT	Tie		Rock Anchor	Tension
38	C05-10	CDetails 05 T	PDF	GENERIC	Stone	SRT	Tie		Rock Anchor	Tension
39	C05-11	CDetails 05 T	PDF	GENERIC	Brick	SRT	Tie	Arch		Tension
40	C06-01	CDetails 06 I	PDF	GENERIC	Stone	SRT	Stone Carving			Combined
41	C06-02	CDetails 06 I	PDF	GENERIC	Brick	SRT	Tie	Arch		Tension
42	C06-03	CDetails 06 I	PDF	GENERIC	Brick	SRT	Tie	Arch		Tension
43	C06-04	CDetails 06 I	PDF	GENERIC	Stone	SRT	Tie		Wood Joists	Combined
44	C06-05	CDetails 06 I	PDF	GENERIC	Brick	SRT	Tie	Arch		Tension
45	C06-06	CDetails 06 I	PDF	GENERIC	Stone	SRT	Stitch	Stone Carving		Combined
46	C06-07	CDetails 06 I	PDF	GENERIC	Stone	SRT	Tie	Stone Carving		Combined
47	C06-08	CDetails 06 I	PDF	GENERIC	Brick	SRT	Tie	Arch		Tension
48	C07-01	CDetails 07 I	PDF	GENERIC	Brick	SRT	Stitch		Parapet	Combined
49	C07-02	CDetails 07 I	PDF	GENERIC	Brick	SRT	Stitch		Parapet	Combined
50	C07-03	CDetails 07 I	PDF	GENERIC	Brick	SRT	Stitch		Parapet	Combined
51	C07-04	CDetails 07 I	PDF	GENERIC	Brick	CHS	Stitch		Parapet	Tension
52	C07-05	CDetails 07 I	PDF	GENERIC	Brick	SRT	Tie		Parapet	Combined
53	C08-01	CDetails 08 I	PDF	GENERIC	Stone	SRT	Tie		Wood Joists	Tension
54	C08-02	CDetails 08 I	PDF	GENERIC	Stone	SRT	Tie		Wood Joists	Tension
55	C08-03	CDetails 08 I	PDF	GENERIC	Stone	SRT	Tie		Wood Joists	Tension
56	C08-04	CDetails 08 I	PDF	GENERIC	Brick	SRT	Tie		Wood Joists	Tension
57	C08-05	CDetails 08 I	PDF	GENERIC	Stone	SRT	Tie		Wood Joists	Tension
58	C09-01	CDetails 09 \	PDF	GENERIC	Brick	SRT	Tie		Soffit hanger	Tension
59	C09-02	CDetails 09 \	PDF	GENERIC	CMU	SRT	Attachment	Bulb Tie	Balcony Rail	Combined
60	C09-03	CDetails 09 \	PDF	GENERIC	CMU	SRT	Attachment	Bulb Tie	Wood Floor	Combined
61	C09-04	CDetails 09 \	PDF	GENERIC	CMU	HSS	Attachment	Bulb Tie	Steel Plate	Combined
62	C09-05	CDetails 09 \	PDF	GENERIC	Stone	SRT	Attachment		Steel L Support	Combined
63	C09-06	CDetails 09 \	PDF	GENERIC	Brick	SRT	Attachment		Balcony Rail	Combined
64	C09-07	CDetails 09 \	PDF	GENERIC	Brick	SRT	Attachment		Eye Bolt	Tension
65	C09-08	CDetails 09 \	PDF	GENERIC	Brick	SRT	Tie		Beam Tie	Tension
66	C09-09	CDetails 09 \	PDF	GENERIC	Stone	CHS	Tie	Bulb Tie	Steel Channel	Tension
67	C09-10	CDetails 09 \	PDF	GENERIC	Stone	SRT	Tie		Steel Channel	Tension
68	C09-11	CDetails 09 \	PDF	GENERIC	Brick	SRT	Attachment		Antenna	Combined
69	C09-12	CDetails 09 \	PDF	GENERIC	Brick	SRT	Attachment		Antenna	Tension

Database of Standard Detail Graphics (PDF Format)

Line#	Drwg #	Folder	Type	Location	Substrate	Anchor Body Type	Application 1	Application 2	Application 3	Loads
70	C09-13	CDetails 09 \	PDF	GENERIC	CMU	SRT	Tie	Bulb Tie	Stone Veneer	Combined
71	C09-14	CDetails 09 \	PDF	GENERIC	Steel	SRT	Tie	Bulb Tie	Stone Veneer	Combined
72	C09-15	CDetails 09 \	PDF	GENERIC	CMU	SRT	Tie	Bulb Tie	Stone Veneer	Combined
73	C09-16	CDetails 09 \	PDF	GENERIC	Brick	CHS	Tie		Stone Veneer	Combined
74	C09-17	CDetails 09 \	PDF	GENERIC	Tera Cotta	CHS	Tie	Bulb Tie	TC Replacement	Tension
75	C09-18	CDetails 09 \	PDF	GENERIC	Tera Cotta	CHS	Tie	Bulb Tie	TC Replacement	Tension
76	C09-19	CDetails 09 \	PDF	GENERIC	Brick	CHS	Tie	Veneer	Header	Tension
77	C09-20	CDetails 09 \	PDF	GENERIC	Concrete	HSS	Corbel	Veneer		Combined
78	C09-21	CDetails 09 \	PDF	GENERIC	Concrete	HSS	Corbel	Bulb Tie	Veneer	Combined
79	C09-22	CDetails 09 \	PDF	GENERIC	Concrete	HSS	Corbel	Bulb Tie	Veneer	Combined
80	C09-23	CDetails 09 \	PDF	GENERIC	Stone	SRT	Tie		Belt Course	Tension
81	C09-24	CDetails 09 \	PDF	GENERIC	CMU	SRT	Tie	Corner		Tension
82	C09-25	CDetails 09 \	PDF	GENERIC	Stone	SRT	Tie	Corner	Stone Carving	Tension
83	C09-26	CDetails 09 \	PDF	GENERIC	Steel	SRT	Tie	Corner	Stone Carving	Combined
84	C09-27	CDetails 09 \	PDF	GENERIC	Stone	SRT	Tie	Corner	Stone Carving	Combined
85	C09-28	CDetails 09 \	PDF	GENERIC	Steel	SRT	Tie	Corner	Stone Carving	Combined
86	C09-29	CDetails 09 \	PDF	GENERIC	Steel	SRT	Tie	Corner	Stone Carving	Combined
87	C09-30	CDetails 09 \	PDF	GENERIC	Stone	SRT	Arch		Lintel Reinforcement	Tension
88	C09-31	CDetails 09 \	PDF	GENERIC	Stone	SRT	Arch		Lintel Reinforcement	Tension
89	C09-32	CDetails 09 \	PDF	GENERIC	Stone	SRT	Arch		Lintel Reinforcement	Tension
90	C09-33	CDetails 09 \	PDF	GENERIC	Brick	SRT	Tie	Veneer	Stone	Tension
91	C09-34	CDetails 09 \	PDF	GENERIC	Steel	SRT	Tie	Veneer	Stone	Combined
92	C09-35	CDetails 09 \	PDF	GENERIC	Brick	SRT	Tie	Veneer	Stone	Tension
93	C09-36	CDetails 09 \	PDF	GENERIC	Brick	CHS	Tie	Veneer	Stone	Tension
94	C09-37	CDetails 09 \	PDF	GENERIC	Brick	SRT	Tie	Veneer	Stone	Tension
95	C09-38	CDetails 09 \	PDF	GENERIC	Brick	SRT	Tie	Arch		Tension
96	C09-39	CDetails 09 \	PDF	GENERIC	Stone	CHS	Tie		Cornice	Tension
97	C09-40	CDetails 09 \	PDF	GENERIC	Concrete	SRT	Tie	Attachment	Wall Tie Plate	Tension
98	C09-41	CDetails 09 \	PDF	GENERIC	Stone	SRT	Tie	Veneer	Undercut	Tension
99	C09-42	CDetails 09 \	PDF	GENERIC	Stone	SRT	Tie	Veneer	Lintel	Tension
100	C09-43	CDetails 09 \	PDF	GENERIC	Steel	SRT	Tie		Parapet	Tension
101	C09-44	CDetails 09 \	PDF	GENERIC	Brick	SRT	Tie		Beam Lateral Support	Tension

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: BRICK
ANCHOR TYPE: SRT STEEL
BEAM LATERAL SUPPORT
PRINCIPAL LOAD (FORCES) :
TENSION



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

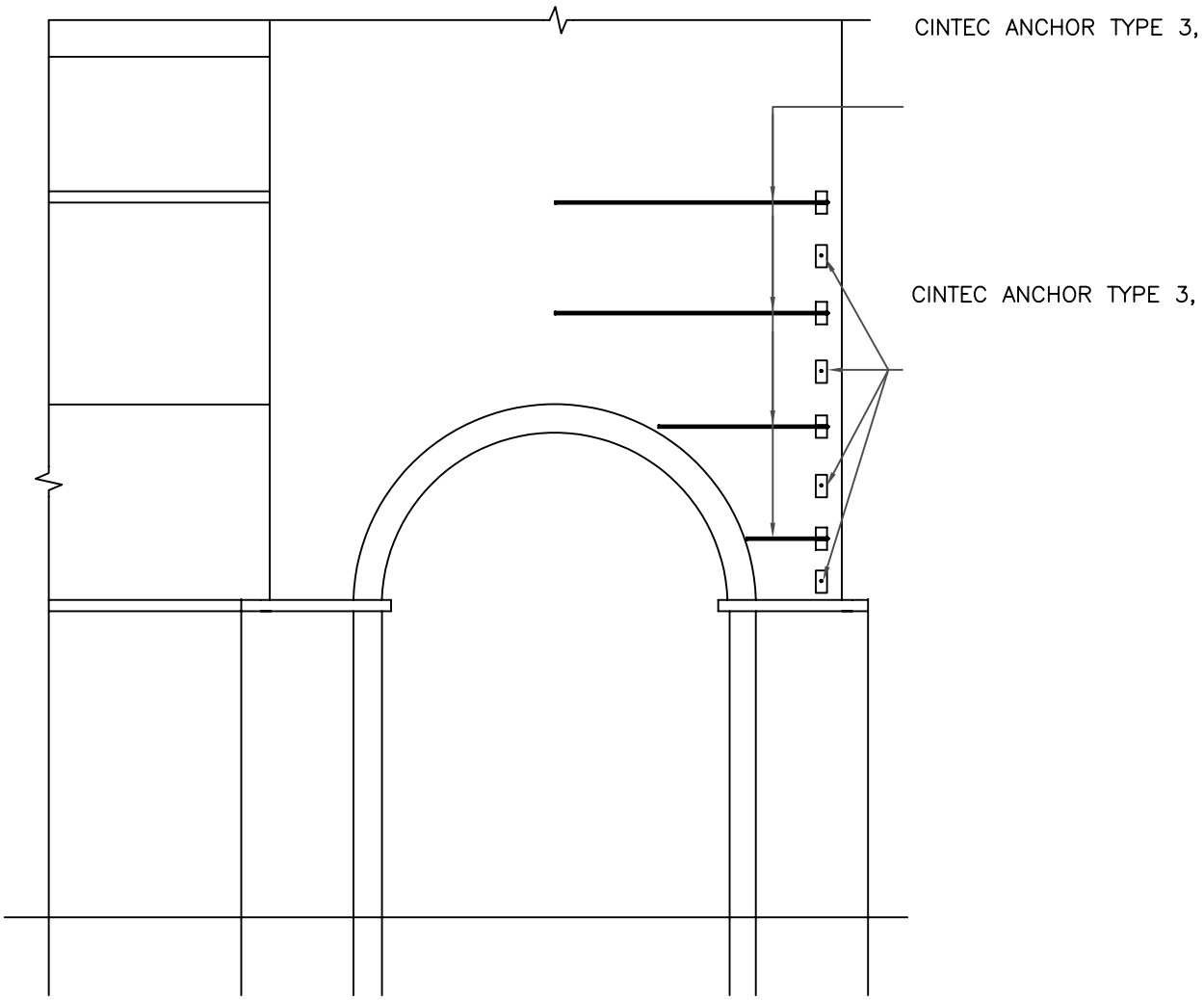
Project Title

Drawing Title
CINTEC ANCHOR DETAIL
AT GABLED ROOF

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:BOSTON
SUBSTRATE: BRICK
ANCHOR TYPE: SRT CORNER TIE
PRINCIPAL LOAD (FORCES):
TENSION



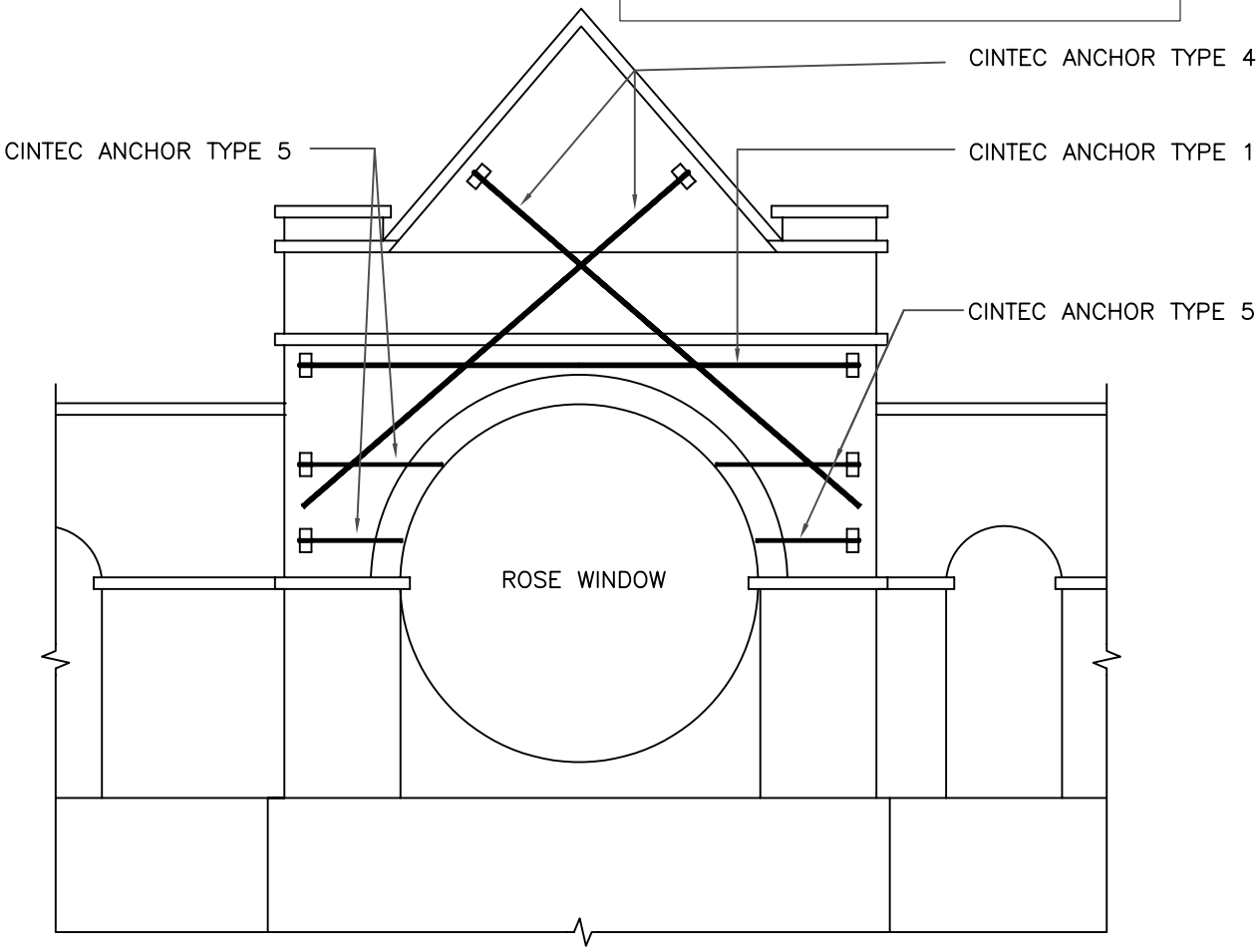
CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title
90 PARK ST.
BOSTON

Drawing Title
PARTIAL EAST ELEVATION

Job No.	
Date	
Drawn by	
Design by	
Checked by	
Scale	NTS
Revision	00
Drawing No.	S2

PROJECT DATA:
LOCATION:BOSTON
SUBSTRATE: BRICK
ANCHOR TYPE: SRT ARCH TIE
PRINCIPAL LOAD (FORCES) :
TENSION



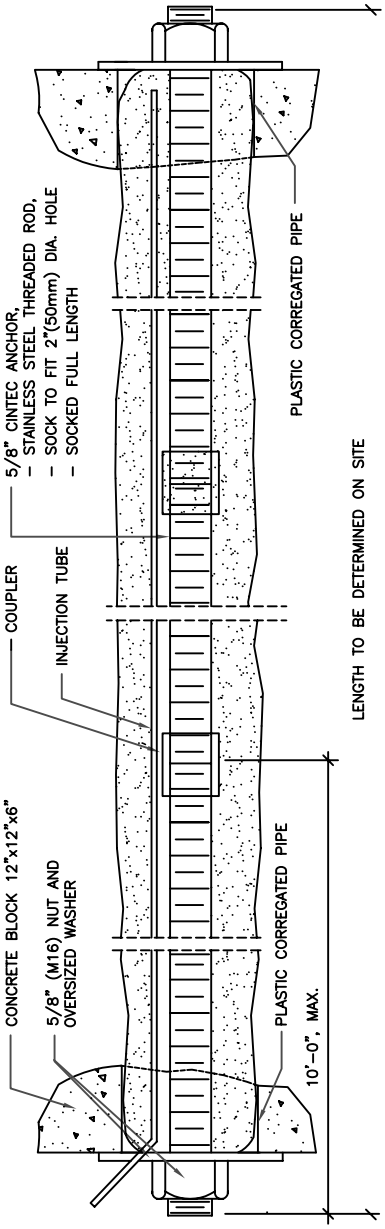
CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title
90 PARK ST.
BOSTON

Drawing Title
PARTIAL ELEVATION

Job No.
Date
Drawn by
Design by
Checked by
Scale NTS
Revision
Drawing No. S3

PROJECT DATA:
LOCATION:BOSTON
SUBSTRATE: BRICK
ANCHOR TYPE: SRT ARCH TIE
PRINCIPAL LOAD (FORCES) :
TENSION



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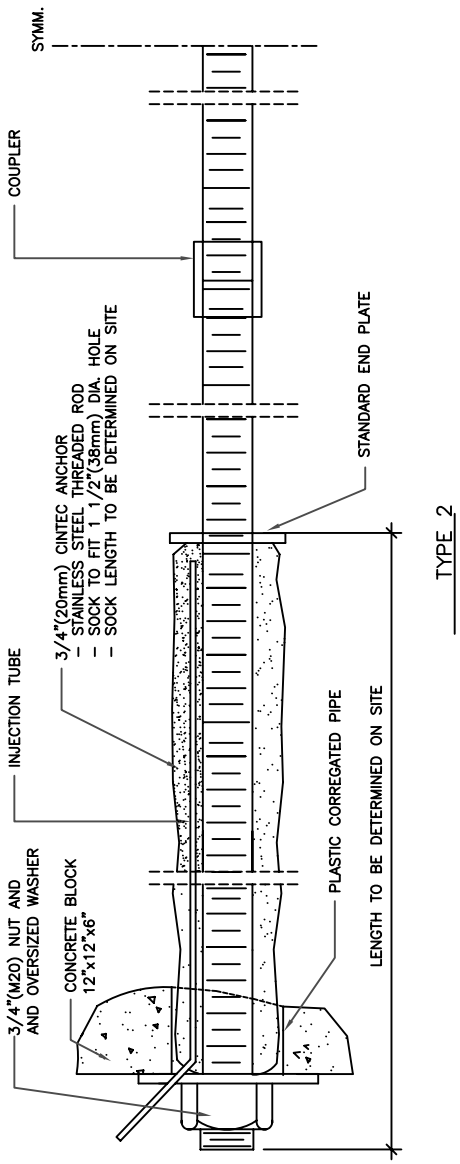


TYPE 2

CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

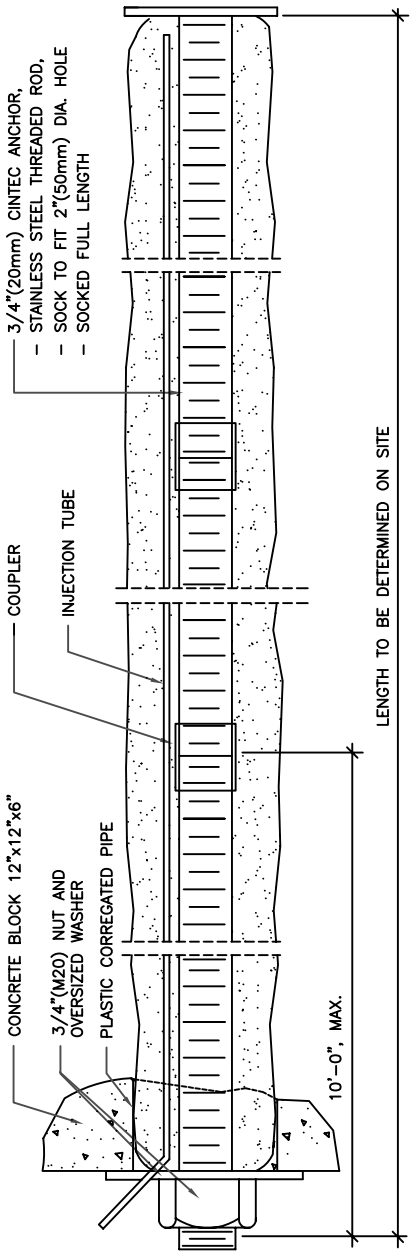
Project Title
90 PARK ST.
BOSTON

Drawing Title
CINTEC ANCHORS TYPE 1 &2

Job No.
Date
Drawn by
Design by
Checked by
Scale NTS
Revision
Drawing No. S4

PROJECT DATA:
LOCATION:BOSTON
SUBSTRATE: BRICK
ANCHOR TYPE: SRT ARCH TIE
PRINCIPAL LOAD (FORCES) :
TENSION

TYPE 4



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

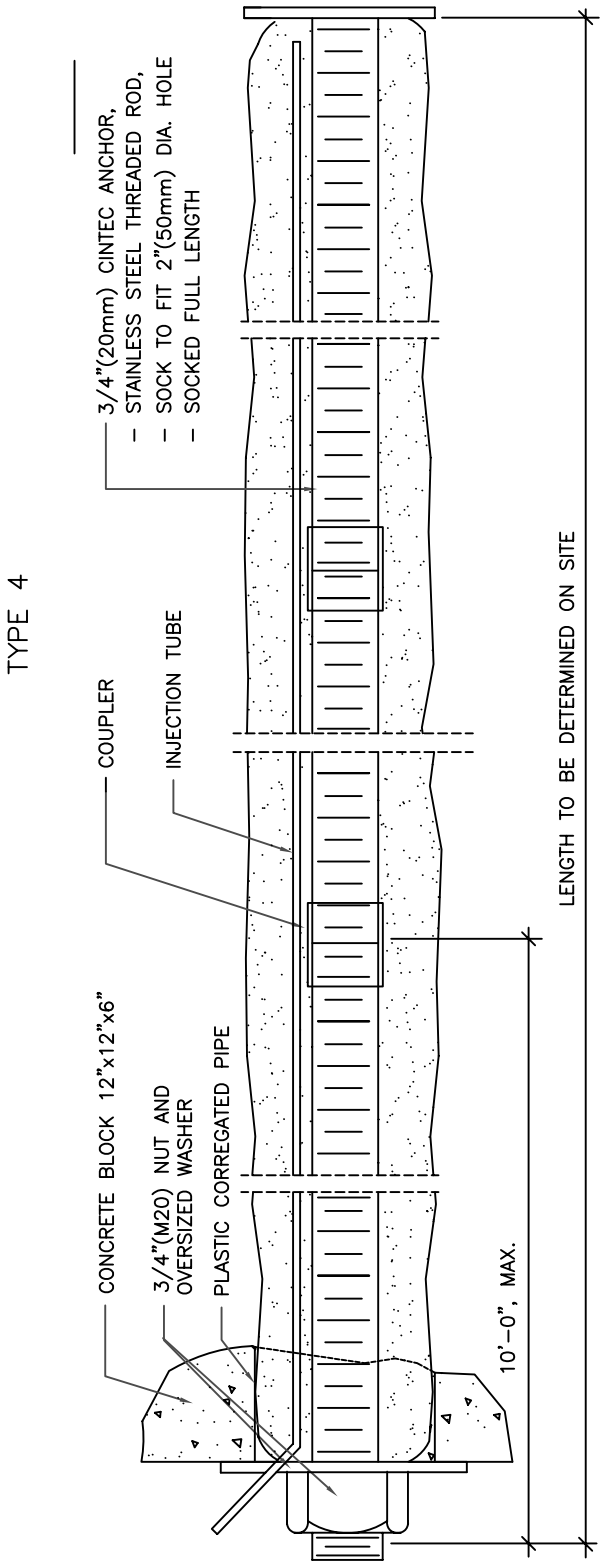
Project Title
90 PARK ST.
BOSTON

Drawing Title
CINTEC ANCHORS TYPE 4

Job No.	
Date	MAY 1997
Drawn by	
Design by	
Checked by	
Scale	NTS
Revision	00
Drawing No.	S6

PROJECT DATA:
LOCATION:BOSTON
SUBSTRATE: BRICK
ANCHOR TYPE: SRT ARCH TIE
PRINCIPAL LOAD (FORCES) :
TENSION

TYPE 4



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

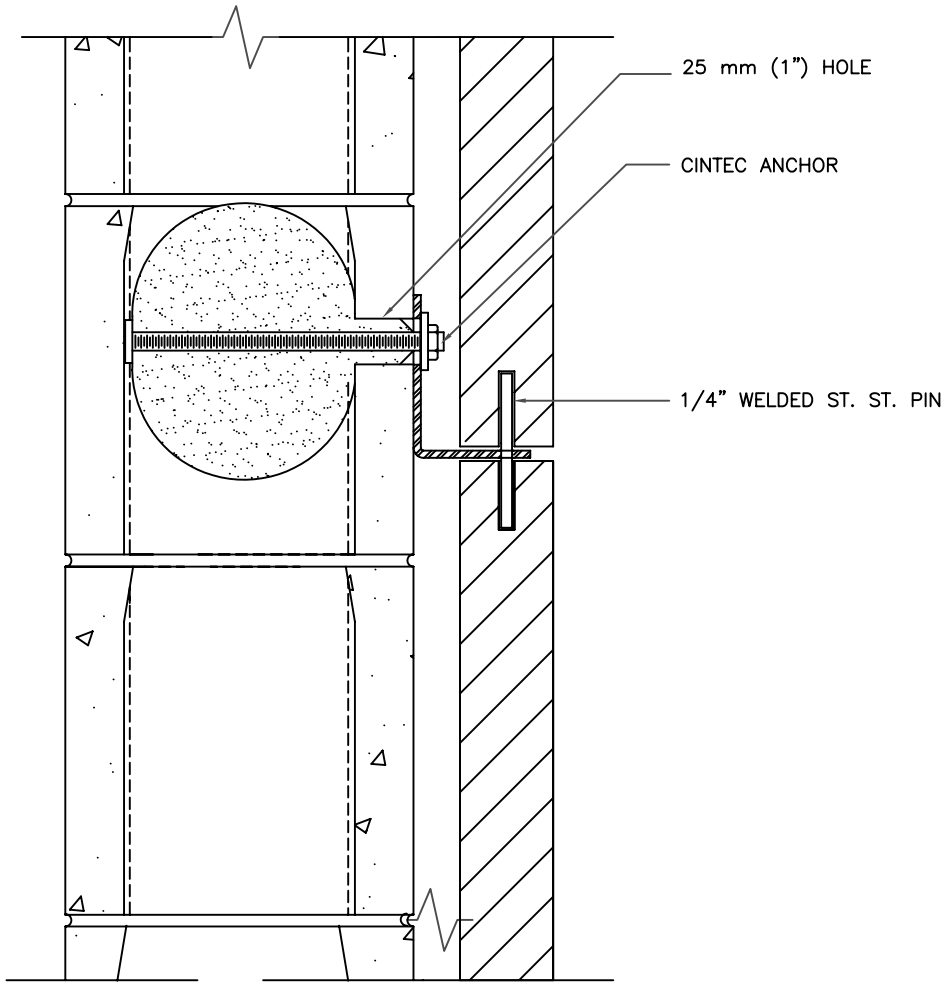
Project Title
90 PARK ST.
BOSTON

Drawing Title
CINTEC ANCHORS TYPE 4

Job No.	
Date	MAY 1997
Drawn by	
Design by	
Checked by	
Scale	NTS
Revision	00
Drawing No.	S6

- 10 mm (3/8") THREADED ROD W/STD. END PLATE C/W WASHER AND NUT AS PER DETAIL
- OVERALL LENGTH 200 mm (8")
- SOCKED LENGTH 160 mm (6 1/4")
- OVERSIZED SOCK TO FIT 150 mm (6") DIA. HOLE
- DRILL HOLE DIA. 25 mm (1")

PROJECT DATA:
LOCATION:MIAMI
SUBSTRATE: CMU
ANCHOR TYPE: SRT STONE VENEER TIE
PRINCIPAL LOAD (FORCES) : TENSION



CINTEC ANCHOR

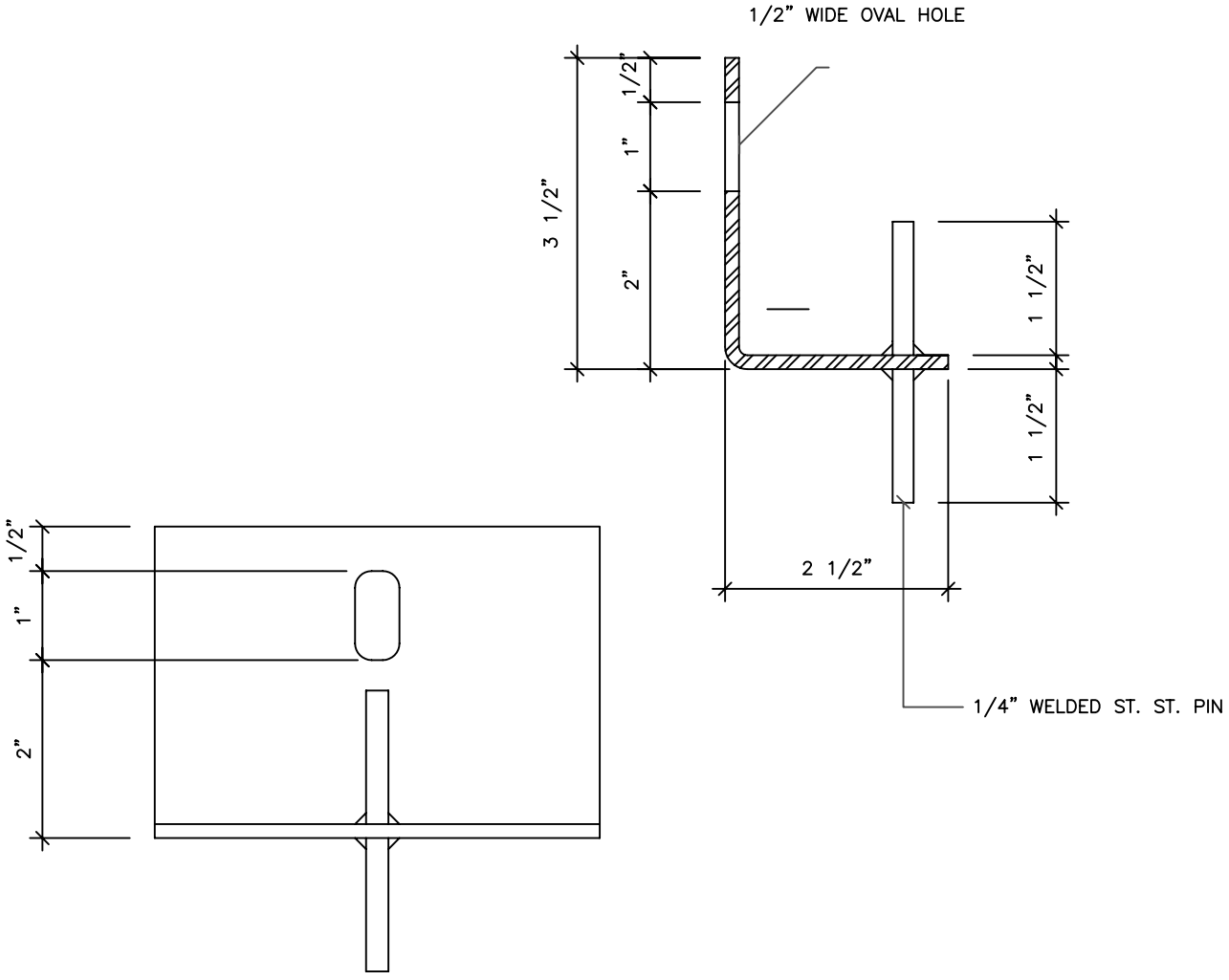
CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title
BALLET VALET RETAIL
MIAMI BEACH, FL.

Drawing Title
STONE ANCHORING DETAIL

Scale N.T.S.
Revision
Drawing No. SK.01

PROJECT DATA:
LOCATION:MIAMI
SUBSTRATE: CMU
ANCHOR TYPE: SRT STONE VENEER TIE
PRINCIPAL LOAD (FORCES) : TENSION



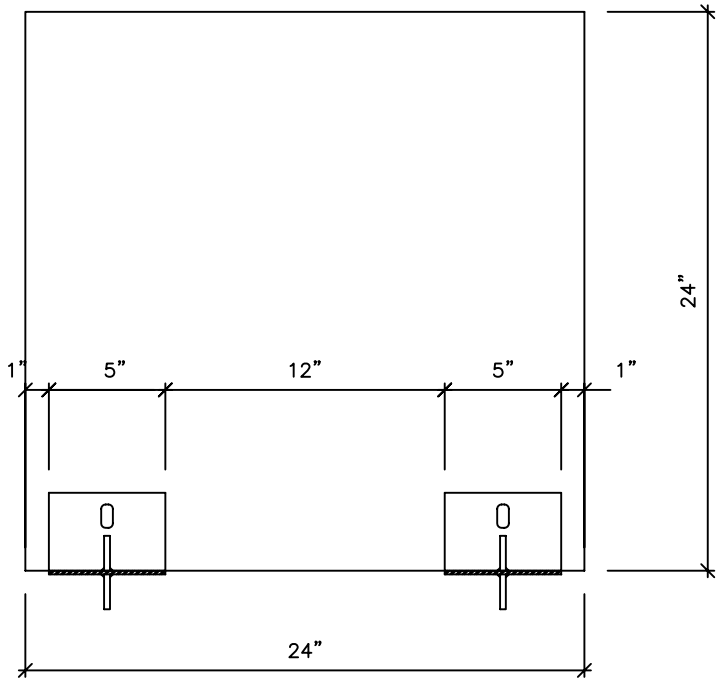
CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title
BALLET VALET RETAIL
MIAMI BEACH, FL.

Drawing Title
STONE ANCHORING DETAIL
OPTION 1

Drawn by
Design by
Checked by
Scale
Revision 00
Drawing No. SK.02

PROJECT DATA:
LOCATION:MIAMI
SUBSTRATE: CMU
ANCHOR TYPE: SRT STONE VENEER TIE
PRINCIPAL LOAD (FORCES) : TENSION



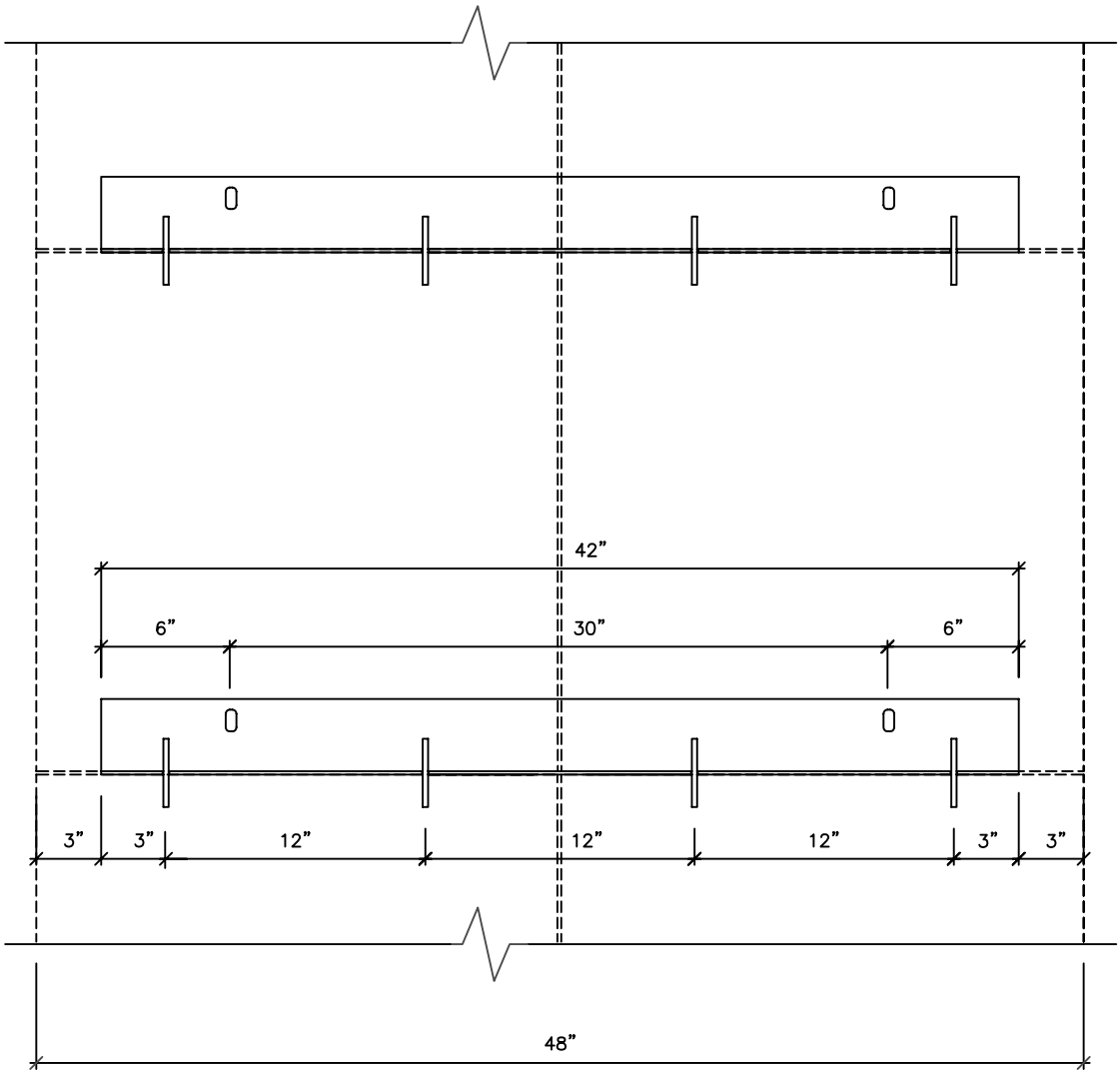
CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title
BALLET VALET RETAIL
MIAMI BEACH, FL.

Drawing Title
STONE ANCHORING DETAIL
OPTION 1

Scale N.T.S.
Revision
Drawing No. SK.03

PROJECT DATA:
LOCATION:MIAMI
SUBSTRATE: CMU
ANCHOR TYPE: SRT STONE VENEER TIE
PRINCIPAL LOAD (FORCES) : TENSION



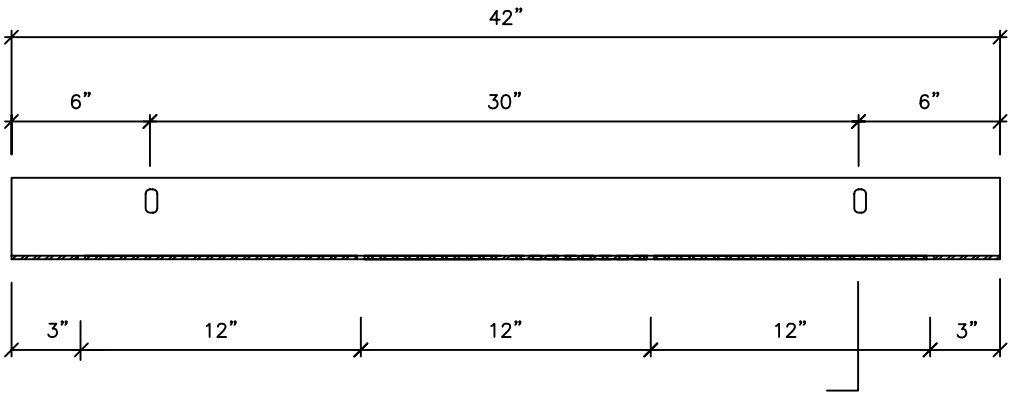
CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title
BALLET VALET RETAIL
MIAMI BEACH, FL.

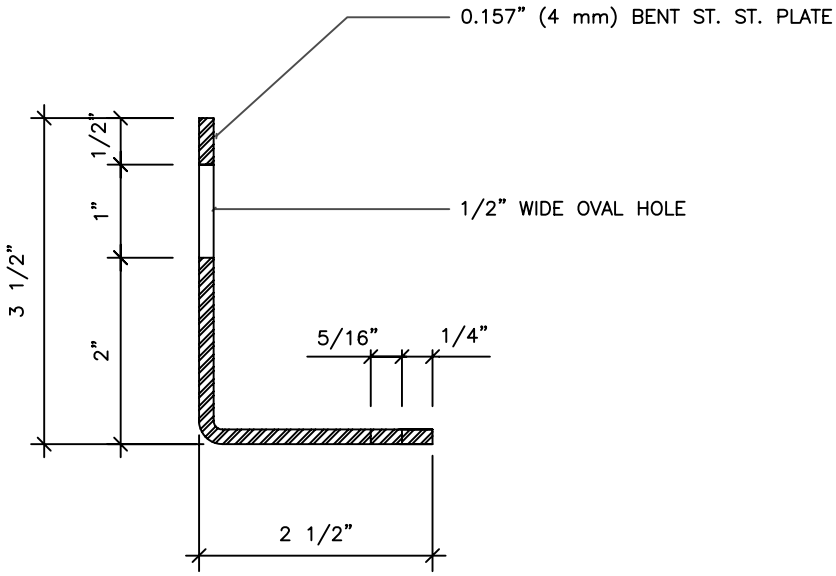
Drawing Title
STONE ANCHORING DETAIL
OPTION 2

Scale N.T.S.
Revision
Drawing No. SK.04

PROJECT DATA:
LOCATION:MIAMI
SUBSTRATE: CMU
ANCHOR TYPE: SRT STONE VENEER TIE
PRINCIPAL LOAD (FORCES) : TENSION



SECTION A – A



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

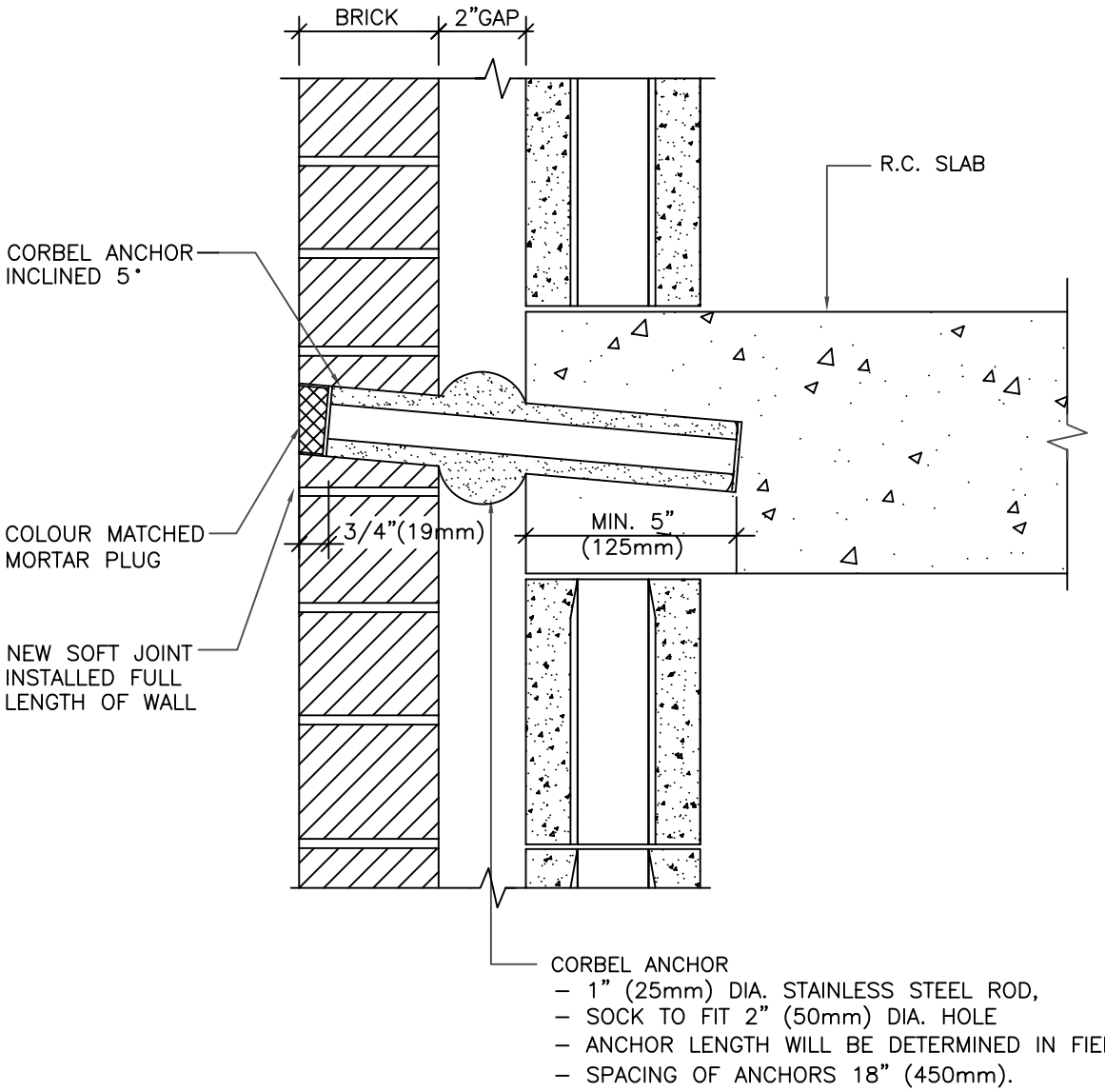
Project Title
BALLET VALET RETAIL
MIAMI BEACH, FL.

Drawing Title
STONE ANCHORING DETAIL
OPTION 2

Scale	N.T.S.
Revision	00
Drawing No.	SK.05

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: CONCRETE
ANCHOR TYPE: HSS BRICK CORBEL
PRINCIPAL LOAD (FORCES) :
SHEAR

1. ANCHORS TO BE INSTALLED @ 18" O/C AT EACH FLOOR LEVEL.
2. AT 18" O/C SPACING, 2 ANCHORS SHOULD BE INSTALLED BETWEEN EACH OF THE EXISTING 6" CLIP ANGELS.



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

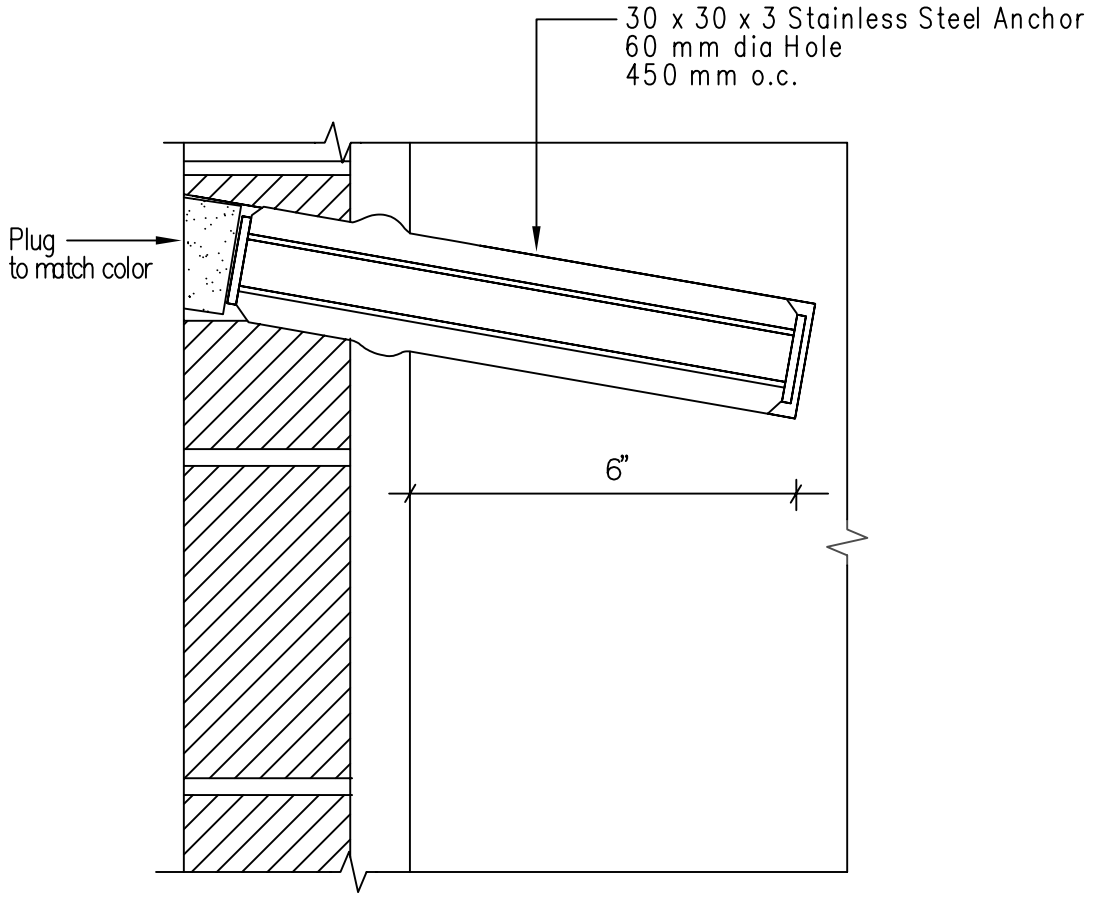
Project Title

Drawing Title

CORBEL ANCHOR

Scale NTS
Revision
Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: CONCRETE
ANCHOR TYPE: HSS BRICK CORBEL
PRINCIPAL LOAD (FORCES) :
SHEAR



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

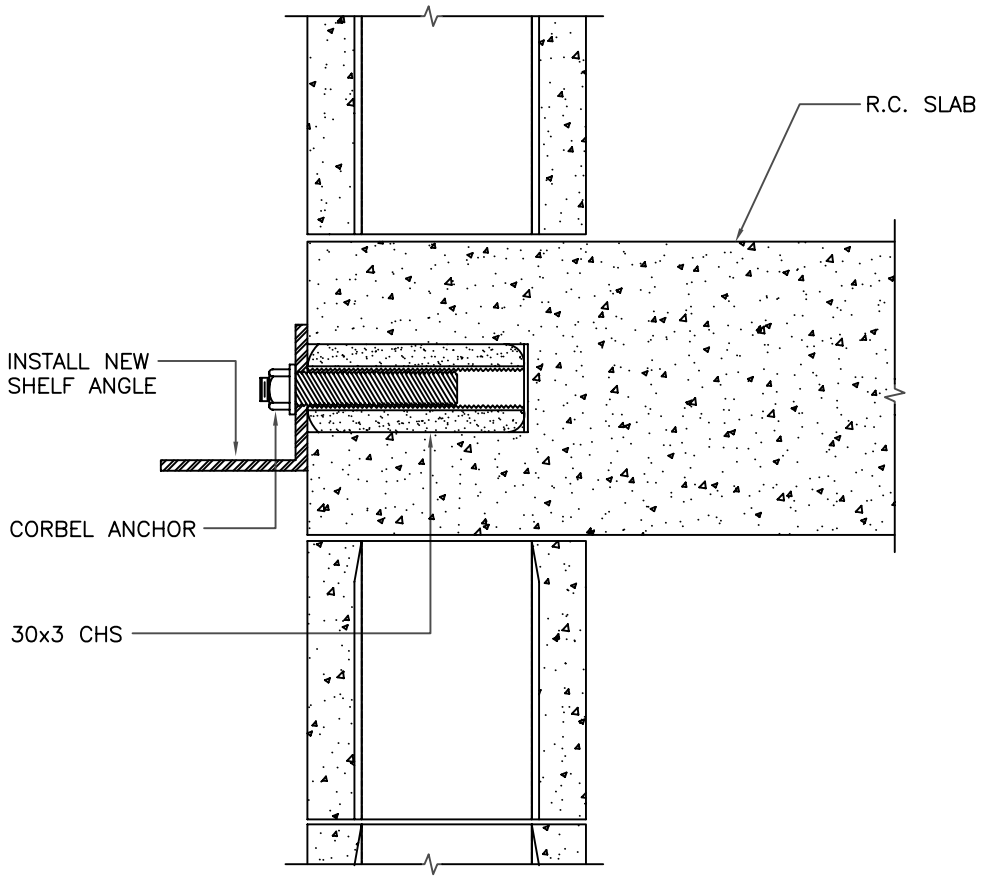
Project Title

Drawing Title
CORBEL ANCHOR DETAIL

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: CONCRETE
ANCHOR TYPE: HSS BRICK CORBEL
PRINCIPAL LOAD (FORCES) :
SHEAR



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

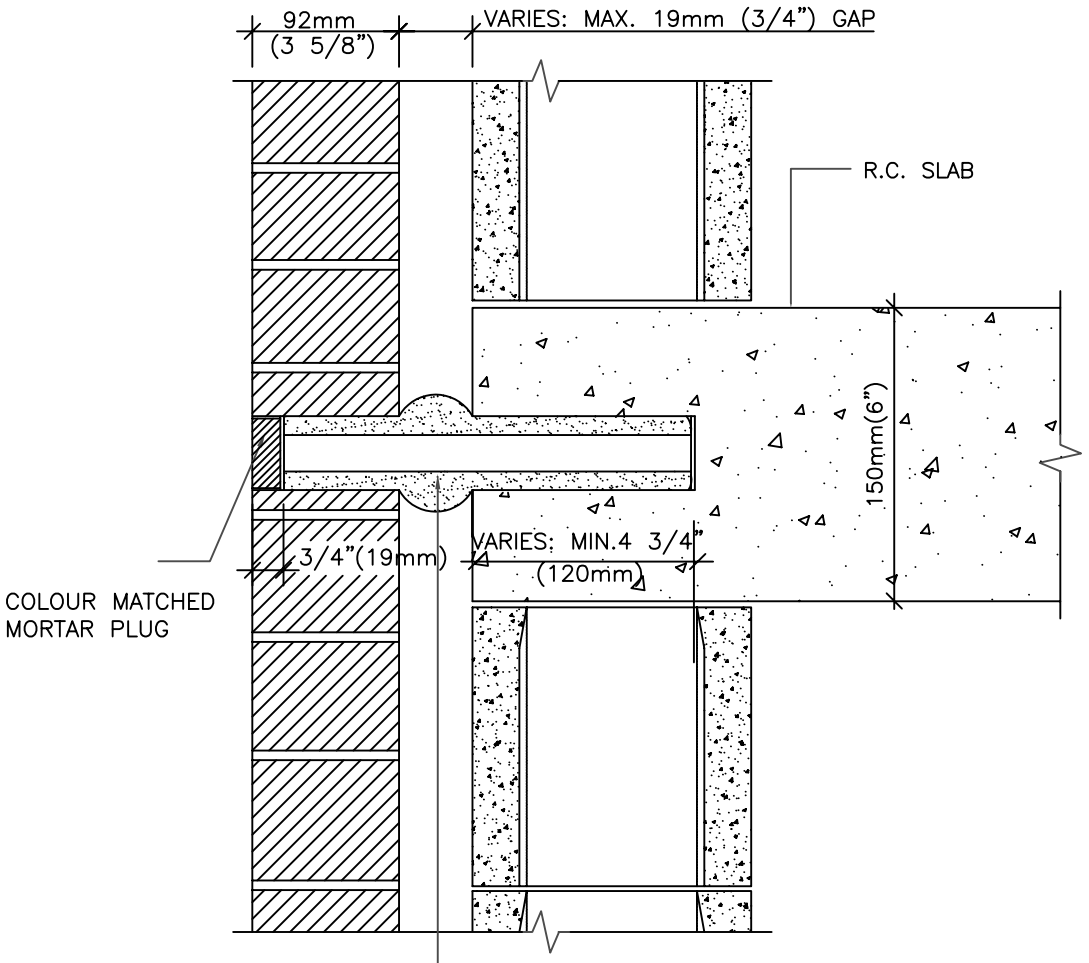
Project Title

Drawing Title
CORBEL ANCHOR

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: CONCRETE
ANCHOR TYPE: HSS BRICK CORBEL
PRINCIPAL LOAD (FORCES) :
SHEAR



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

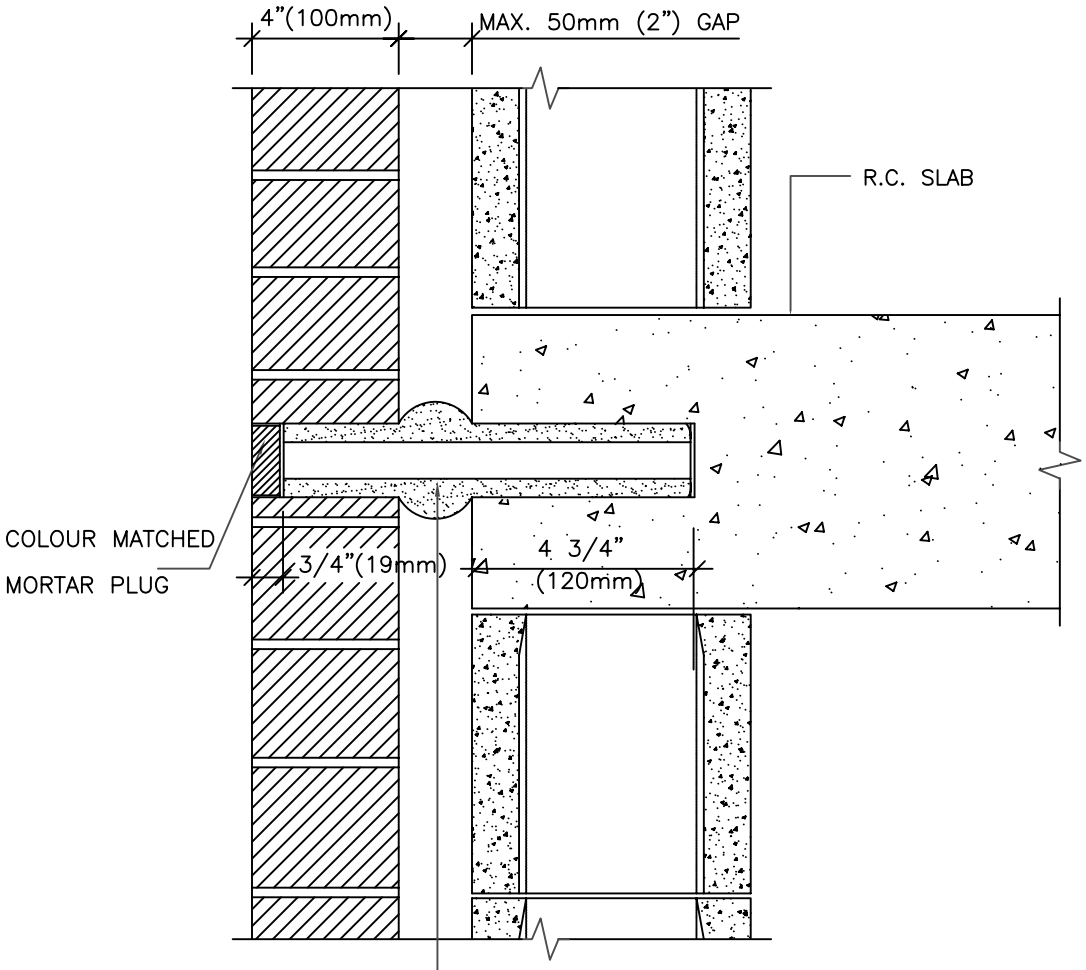
Project Title

Drawing Title

CORBEL ANCHOR

Scale NTS
Revision
Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: CONCRETE
ANCHOR TYPE: HSS BRICK CORBEL
PRINCIPAL LOAD (FORCES) :
SHEAR



CORBEL ANCHOR
– 1" (25mm) DIA. STAINLESS STEEL ROD,
– SOCK TO FIT 2" (50mm) DIA. HOLE
– ANCHOR LENGTH WILL BE DETERMINED IN FIELD
– SPACING OF ANCHORS 450mm

CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title

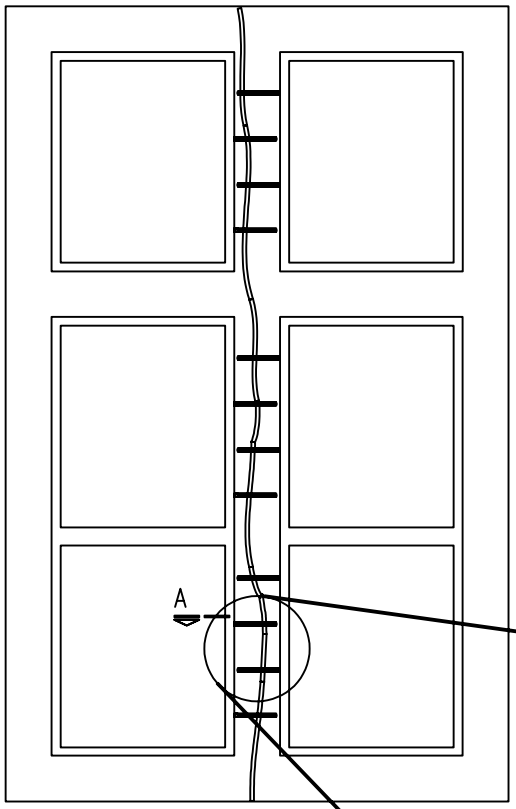
Drawing Title

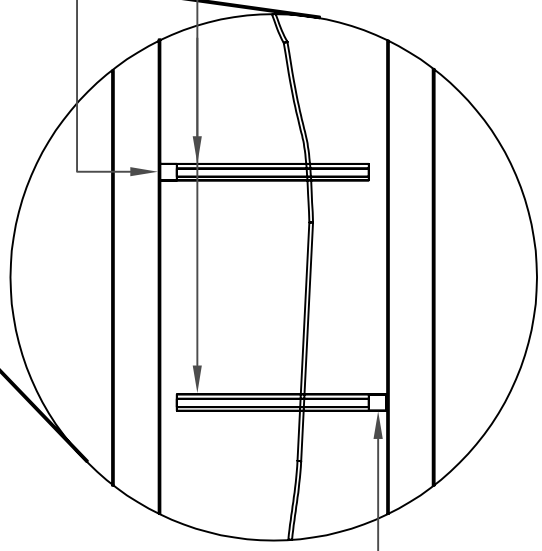
CORBEL ANCHOR

Revision

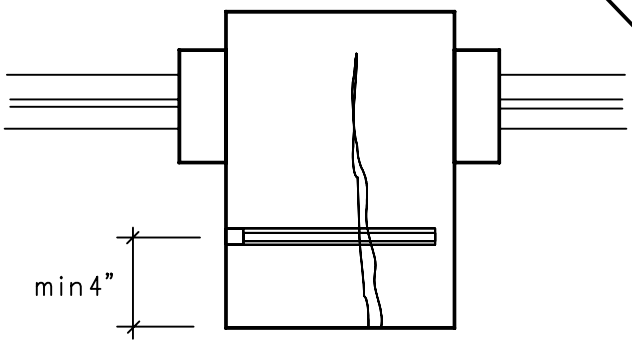
Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: STONE
ANCHOR TYPE: CHS STITCH
PRINCIPAL LOAD (FORCES) :
TENSION





A –A SECTION DETAIL



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title

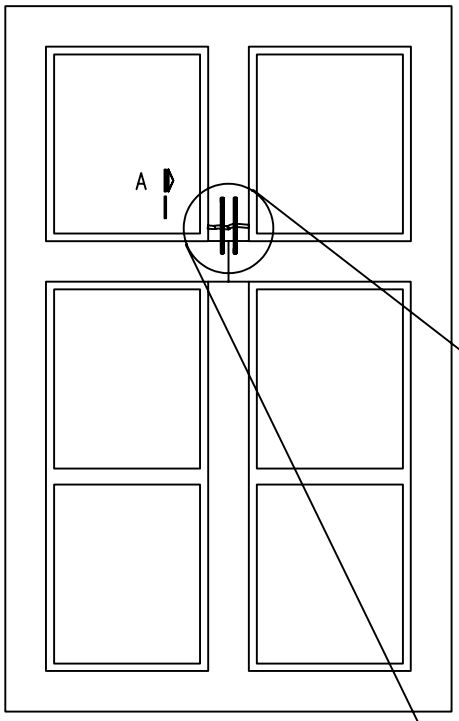
Drawing Title
MULLION STITCHING DETAIL

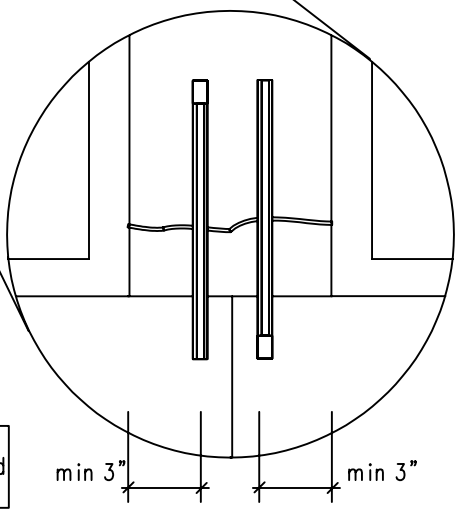
Revision

Drawing No. SK–

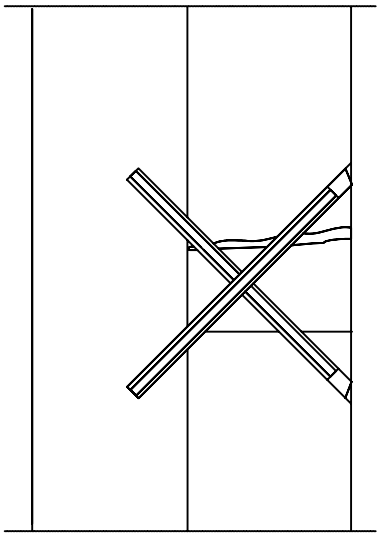
PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: STONE
ANCHOR TYPE: CHS STITCH
PRINCIPAL LOAD (FORCES) :
TENSION

10 x 1 Stainless Steel
CINTEC Anchor
20 mm dia. Hole, @ 12"o.c.
Alternate Side of Mullion.





A –A SECTION DETAIL



Colour matched plug

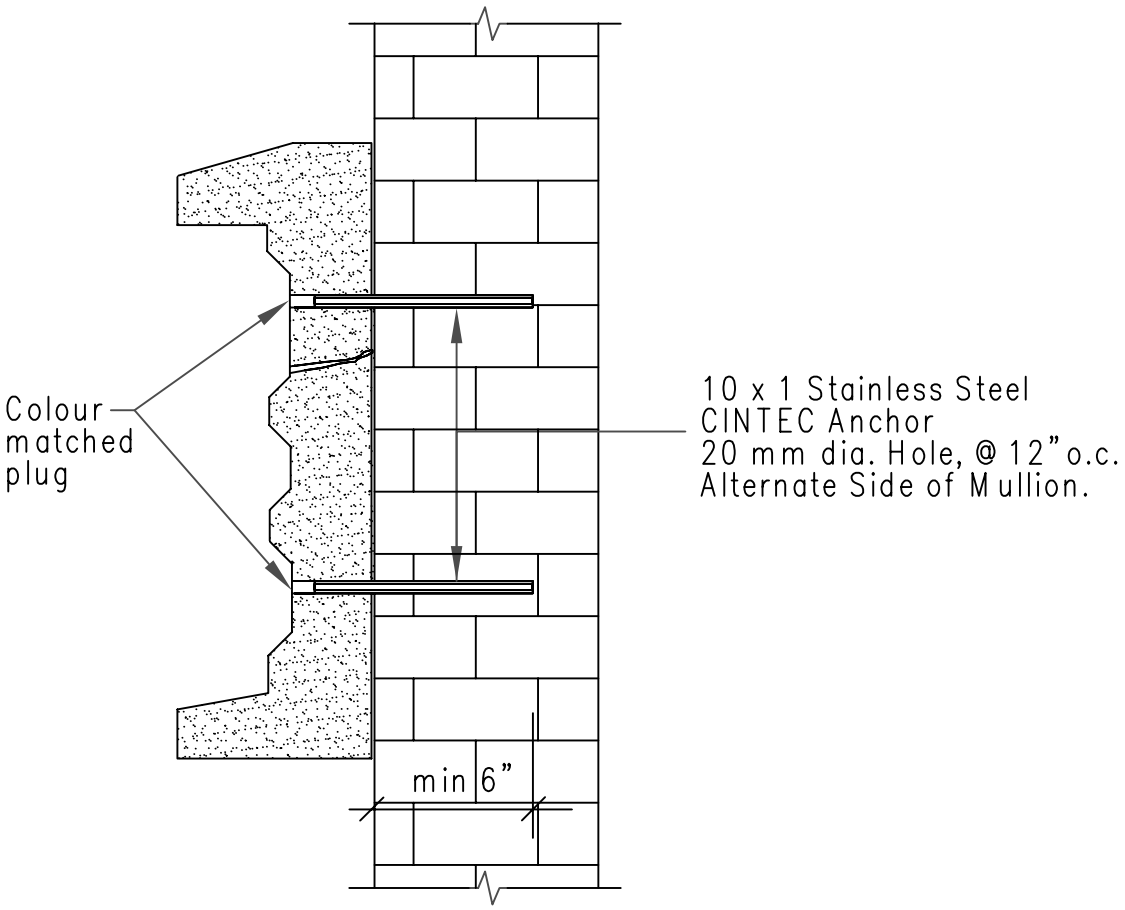
Project Title

Drawing Title
CRACKS AT WINDOWS STITCHING

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: STONE
ANCHOR TYPE: CHS STITCH
PRINCIPAL LOAD (FORCES) :
TENSION



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

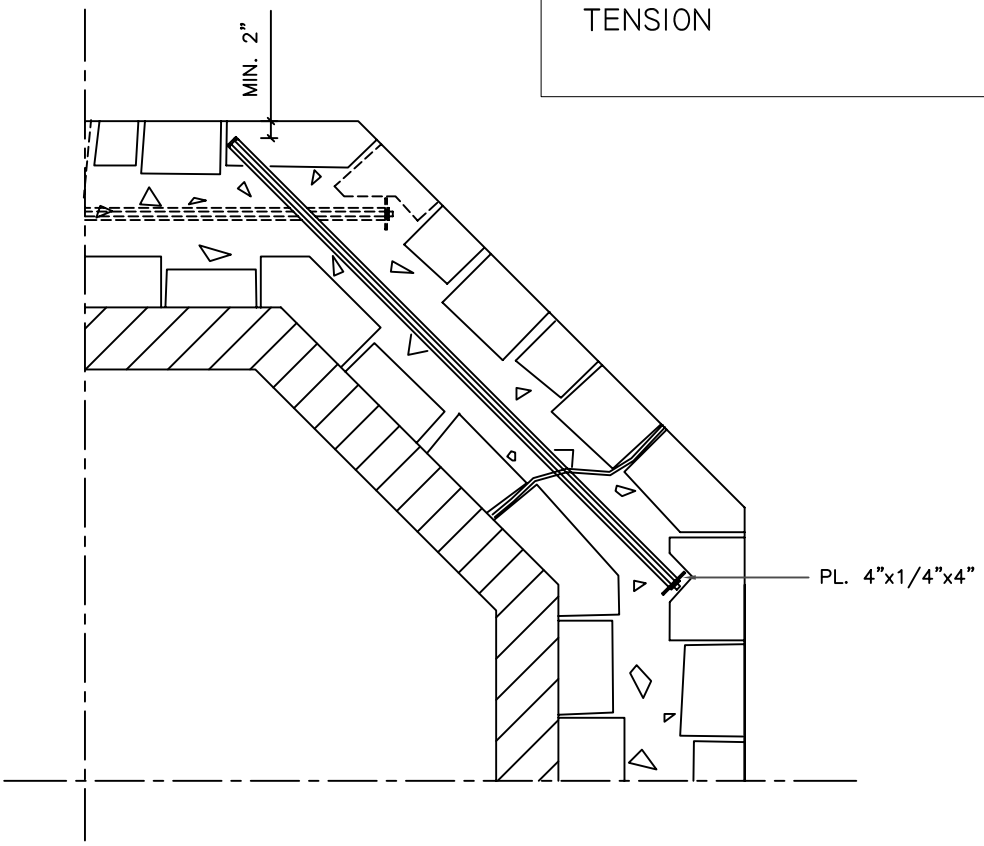
Project Title

Drawing Title
STONE RELIEF STITCHING

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: STONE
ANCHOR TYPE: CHS STITCH
PRINCIPAL LOAD (FORCES) :
TENSION



NOTES:

- REMOVE CAREFULLY OUTSIDE STONES AT ANCHOR LOCATION AND DRILL HOLE THROUGH THE WALL.
- MAKE RECESS (COUNTER SINK) IN BRICK BACKUP (RUBBLE CORE) FOR STAINLESS STEEL PLATE, WASHER AND NUT IN ORDER TO MINIMIZE STONE CUTTING.
- CUT OUT BACK OF STONE IF NECESSARY.
- INSERT CINTEC ANCHOR AND GROUT IT.
- INSTALL STAINLESS STEEL PLATE, WASHER AND NUT.
- GROUT BEHIND THE PLATE WITH NON-SHRINK GROUT.
- REINSTALL OUTSIDE STONES.

CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

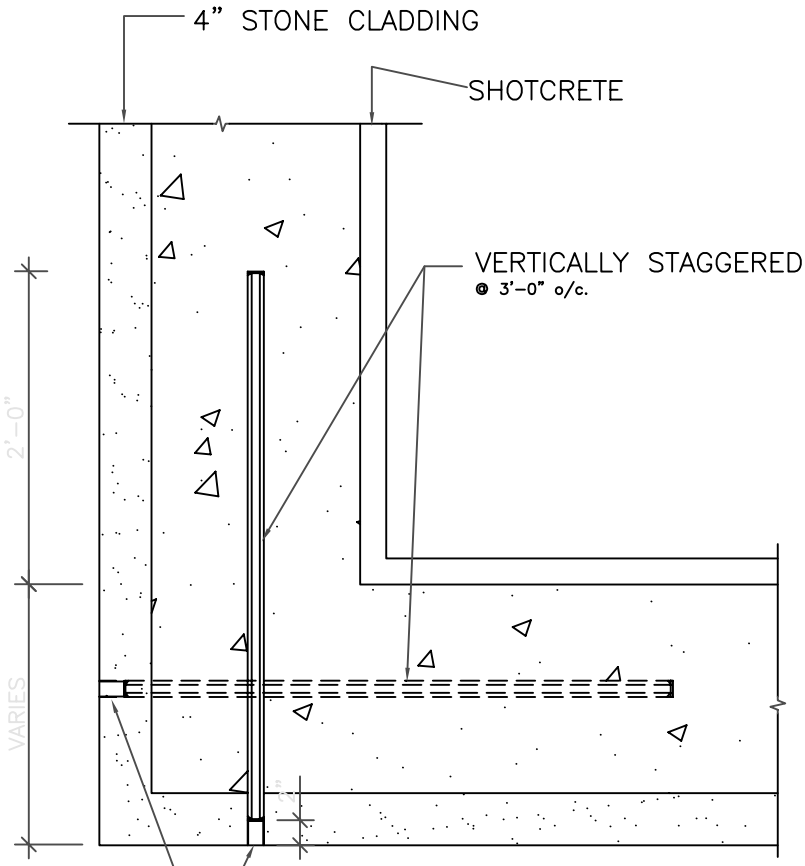
Project Title

Drawing Title
CRACKED TURRET WALL STITCHING
CRACK CLOSE TO ADJ. WALL

Revision

Drawing No. SK-

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: STONE
ANCHOR TYPE: CHS STITCH
PRINCIPAL LOAD (FORCES) :
TENSION



NOTES:

1. FOR ANCHOR DESCRIPTIONS SEE SK-08.
3. CLIENT TO CHECK TOTAL ANCHOR LENGTH PRIOR TO ORDERING.

CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

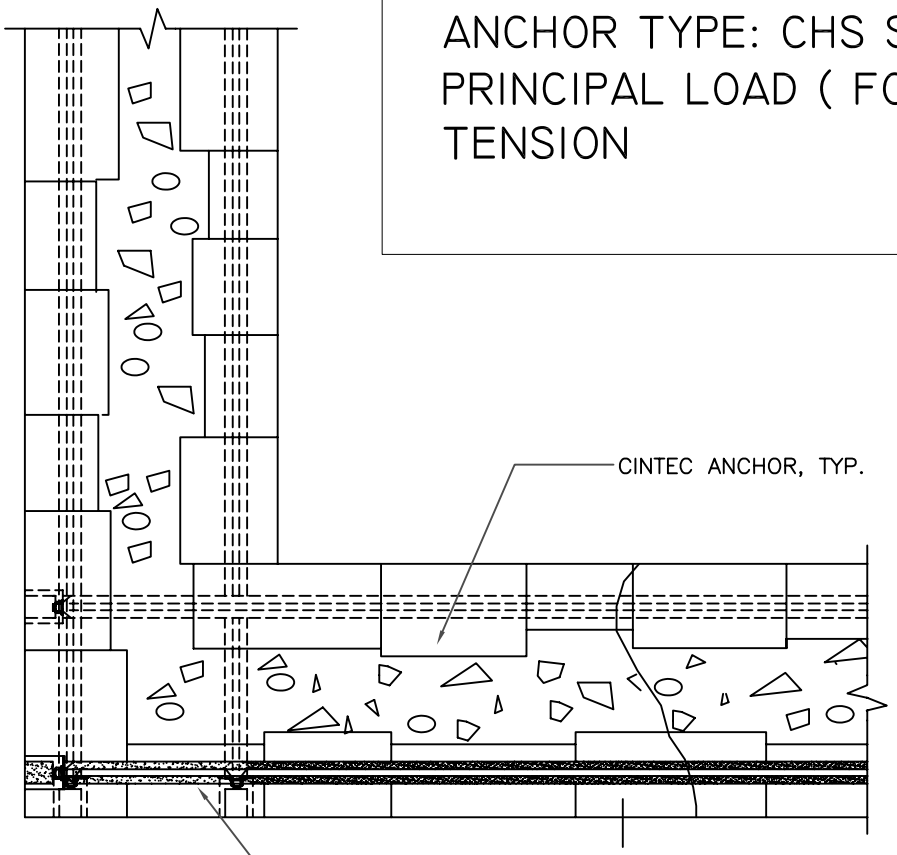
Project Title

Drawing Title
STITCHING ANCHORS AT CORNER

Revision

Drawing No. SK-

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: STONE
ANCHOR TYPE: CHS STITCH
PRINCIPAL LOAD (FORCES) :
TENSION



FINISH HOLE WITH
MORTAR PLUG,
COLOUR AND TEXTURE
TO MATCH EXISTING,
OR USE ORIGINAL STONE
CORE EPOXIED IN PLACE.

PLAN

CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

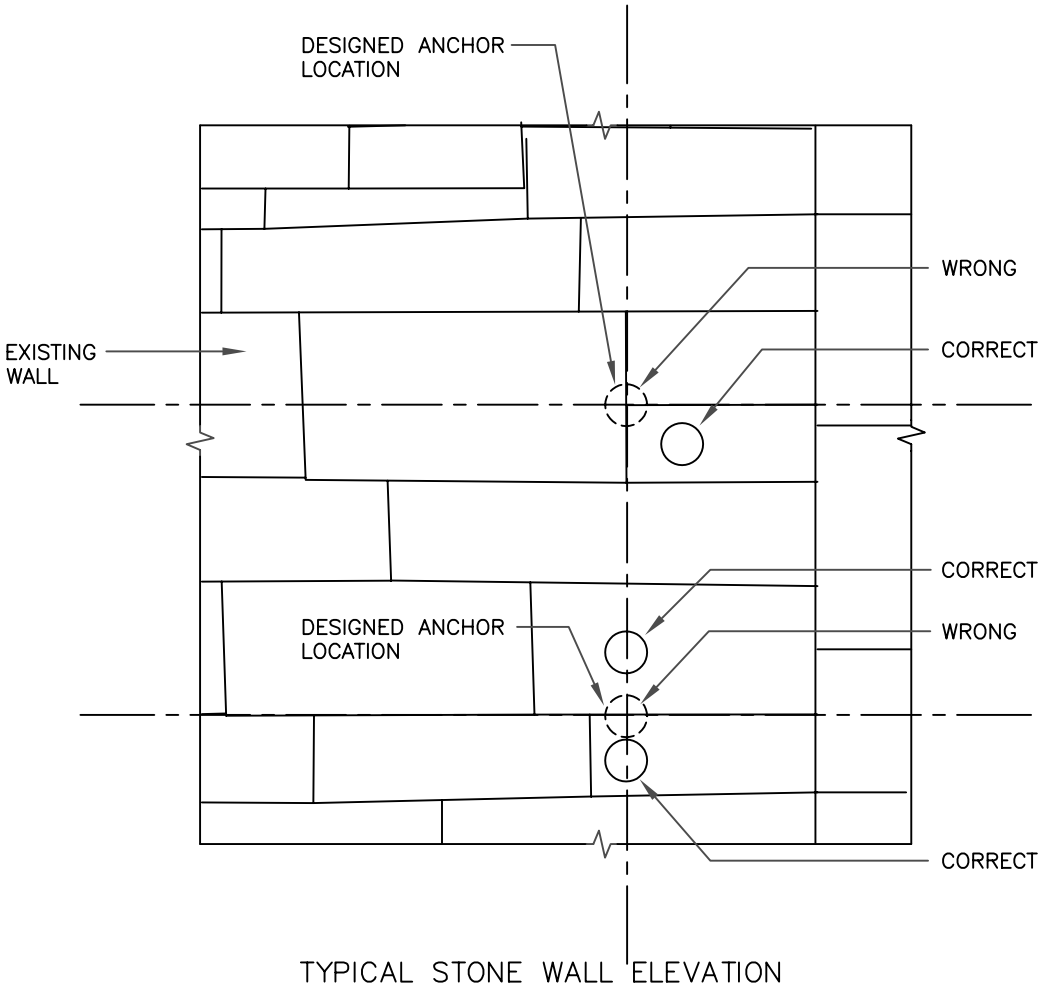
Project Title

Drawing Title
CORNER STITCHING ANCHOR
IN RUBBLE WALL

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: STONE
ANCHOR TYPE: CHS STITCH
PRINCIPAL LOAD (FORCES) :
TENSION



TYPICAL STONE WALL ELEVATION

ALLOWABLE TOLERANCE IS + 3" FROM THE DESIGNED LOCATION IN HORIZONTAL OR VERTICAL DIRECTION.

MINIMUM DISTANCE FROM ANCHOR HOLE TO EXPOSED EDGE OF STONE, I.E. AT THE BUILDING CORNER, OR WINDOW SILL, ETC., IS 4", UNLESS NOTED OTHERWISE.

CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title

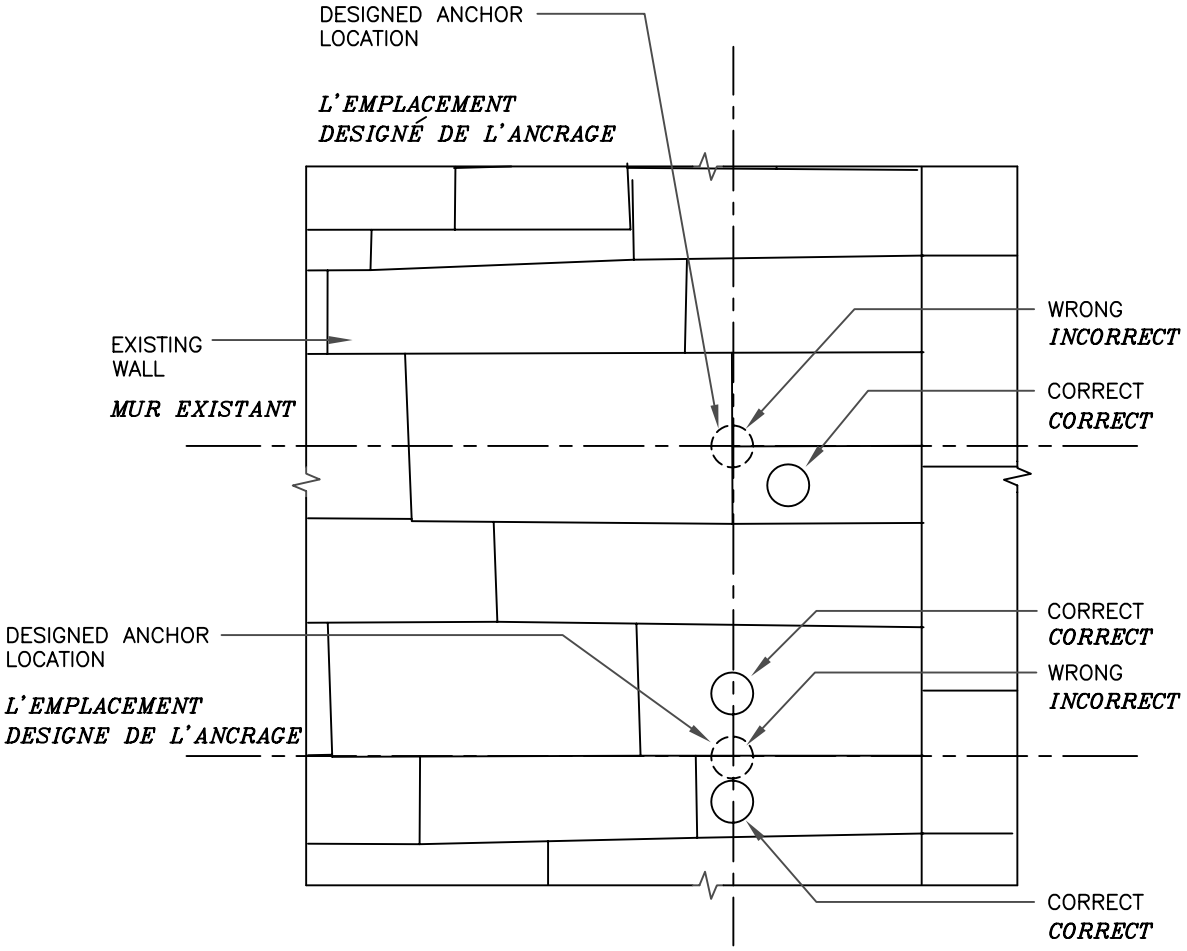
Drawing Title

ANCHOR LOCATION TOLERANCES

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: STONE
ANCHOR TYPE: CHS STITCH
PRINCIPAL LOAD (FORCES) :
TENSION



TYPICAL ELEVATION
ELEVATION TYPIQUE

CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

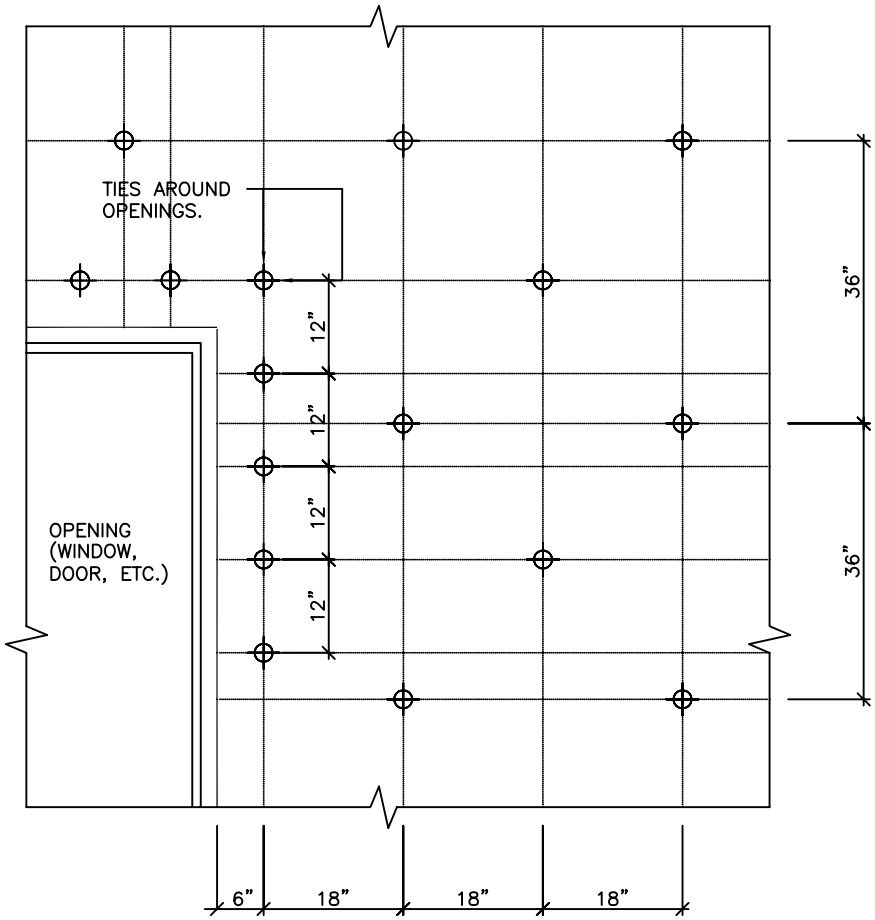
Project Title

Drawing Title
ANCHOR LOCATION TOLERANCES
TOLERANCES DE L'EMPLACEMENT DES ANCRAGES

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: STONE
ANCHOR TYPE: CHS STITCH
PRINCIPAL LOAD (FORCES) :
TENSION



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title

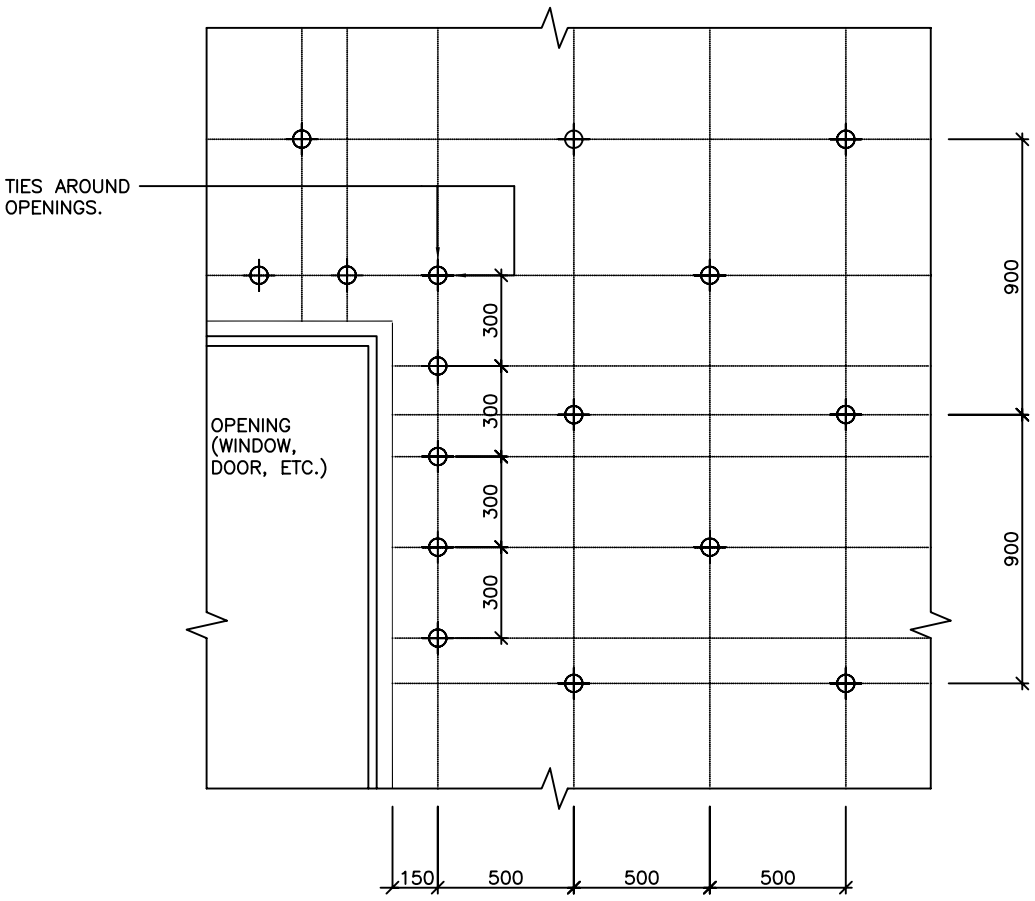
Drawing Title

WALL TIE SPACING

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: STONE
ANCHOR TYPE: CHS STITCH
PRINCIPAL LOAD (FORCES) :
TENSION



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

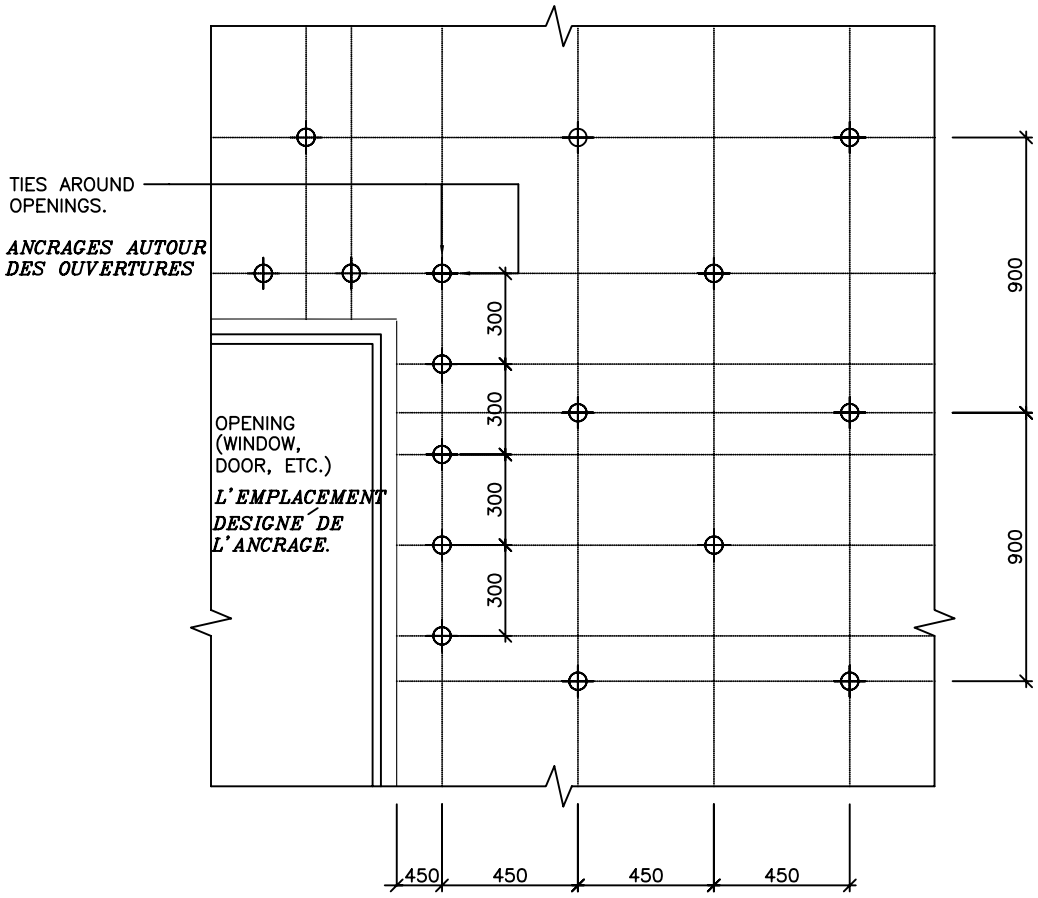
Project Title

Drawing Title
WALL TIE SPACING

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: STONE
ANCHOR TYPE: CHS STITCH
PRINCIPAL LOAD (FORCES) :
TENSION



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

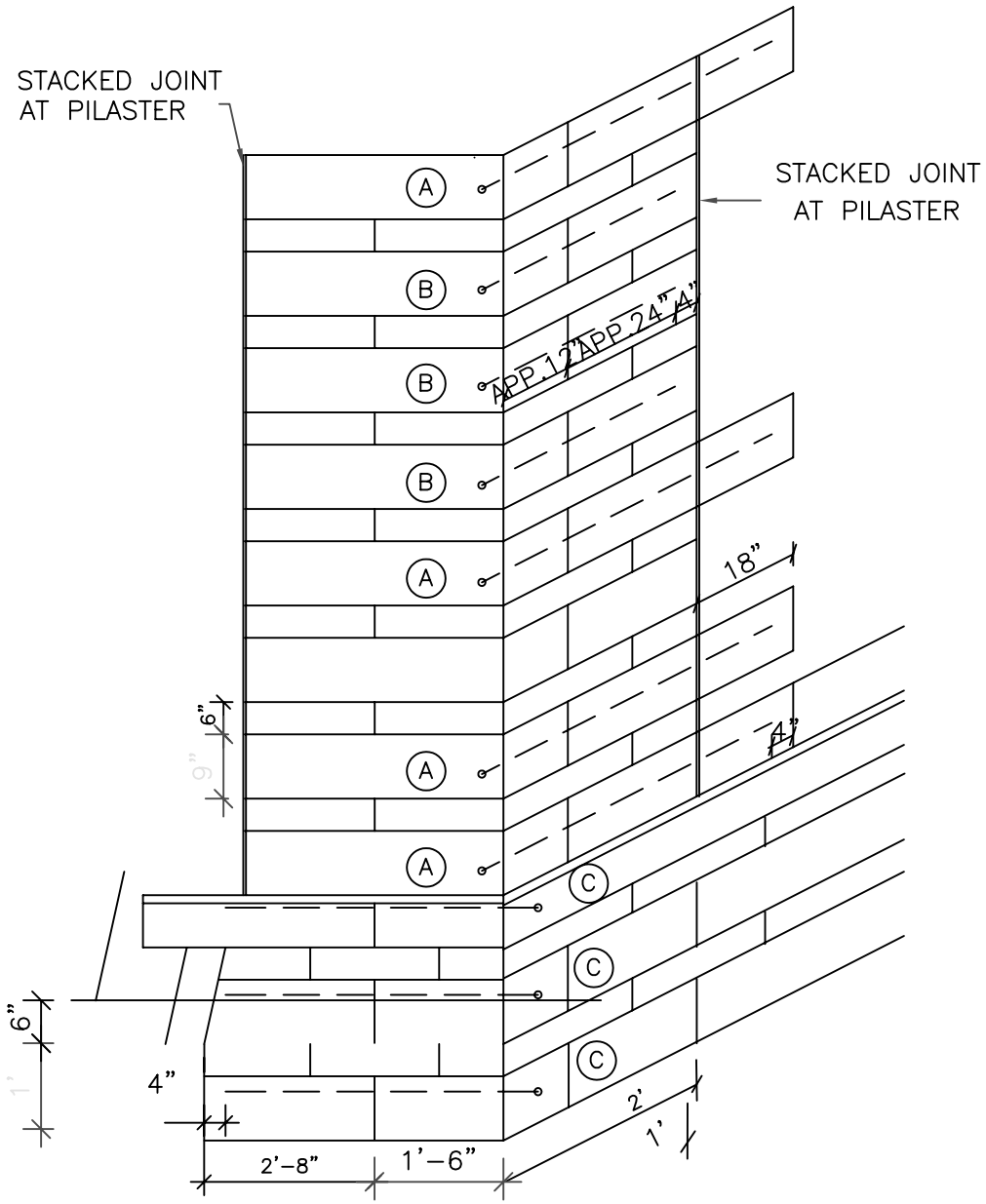
Project Title

Drawing Title
WALL TIE SPACING
ESPACEMENT DES ANCRAGES DE MUR

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: STONE
ANCHOR TYPE: CHS STITCH
PRINCIPAL LOAD (FORCES) :
TENSION



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

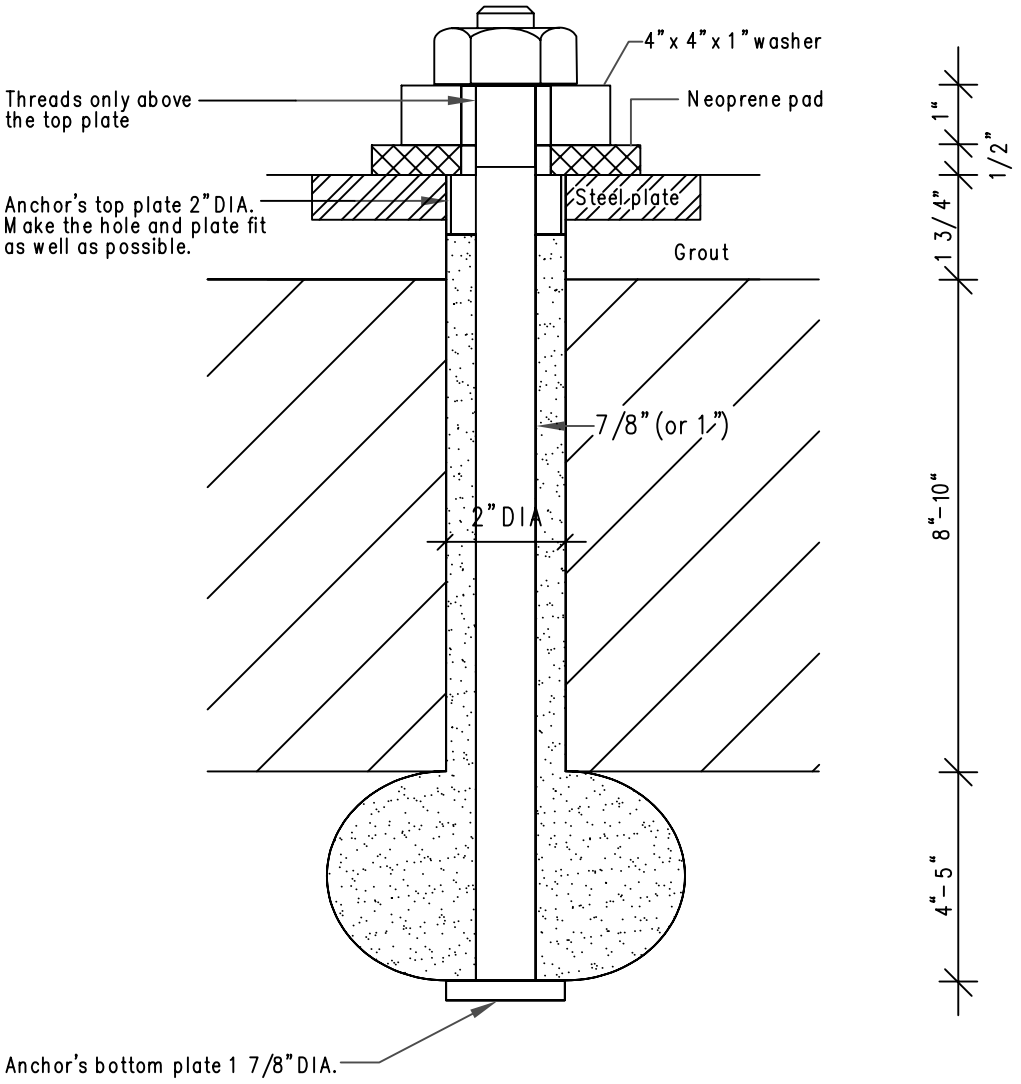
Project Title

Drawing Title
CORNER STITCHING
ANCHOR LAYOUT

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: CONCRETE
ANCHOR TYPE: SRT A BOLT
PRINCIPAL LOAD (FORCES) :
COMBINED



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

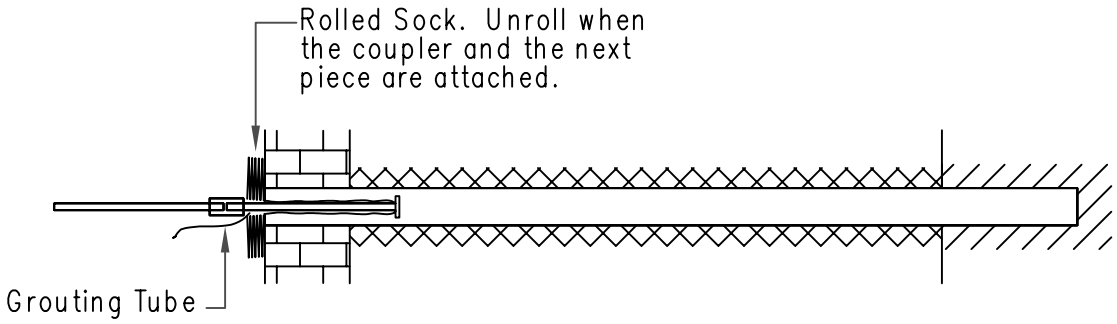
Project Title

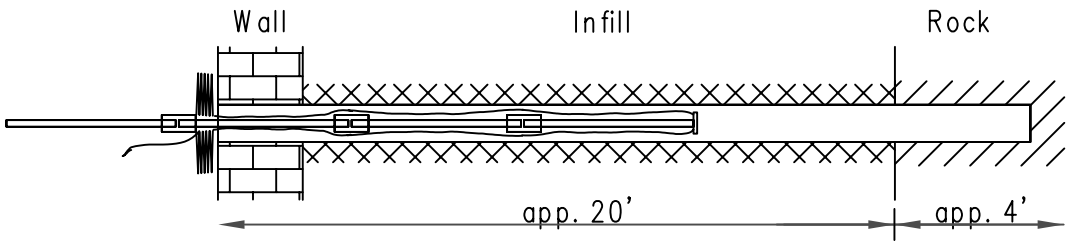
Drawing Title
PUMP ANCHOR

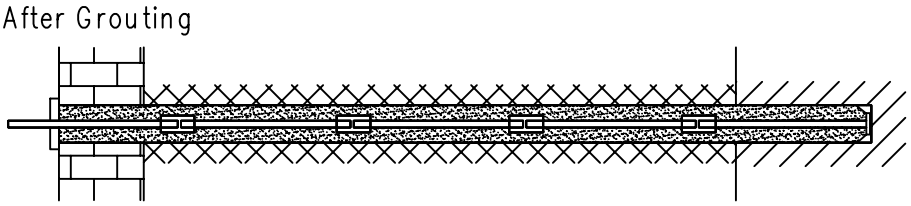
Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: ROCK
ANCHOR TYPE: SRT ROCK ANCHOR
PRINCIPAL LOAD (FORCES) : TENSION







CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

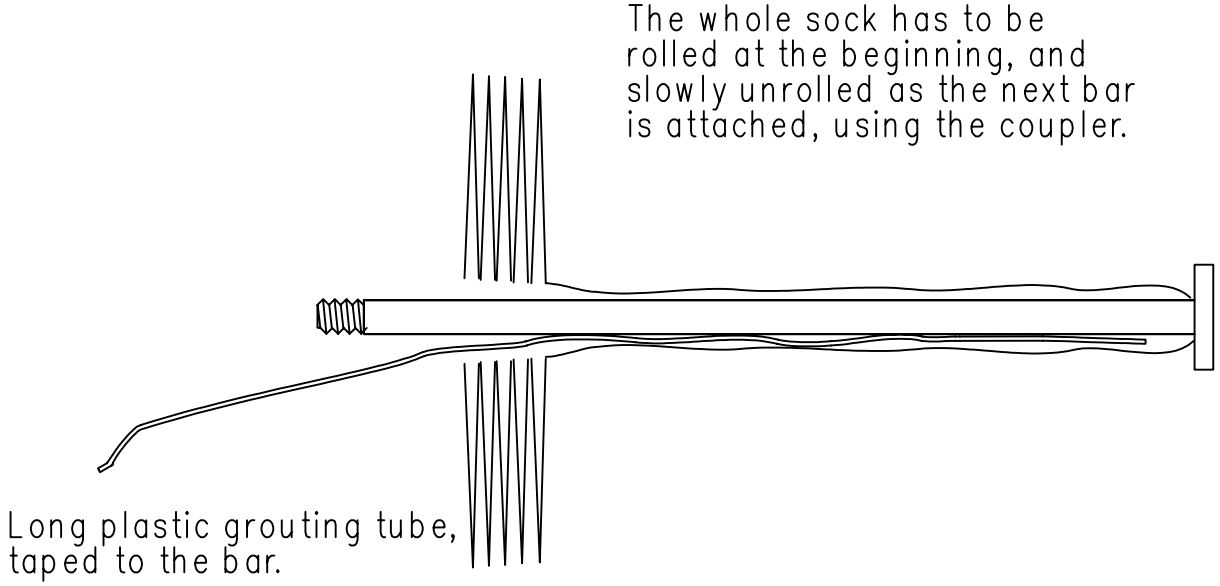
Project Title

Drawing Title
CINTEC COUPLING ROCK ANCHOR THREE PIECE STEP

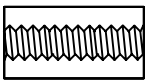
Revision

Drawing No. SK–

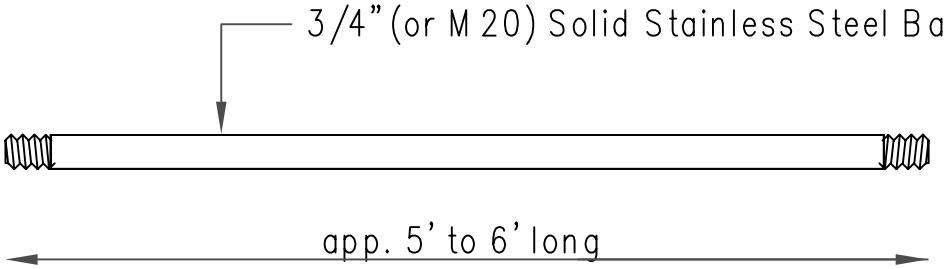
PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: ROCK
ANCHOR TYPE: SRT ROCK ANCHOR
PRINCIPAL LOAD (FORCES) : TENSION



COUPLER



Intermediate Piece



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

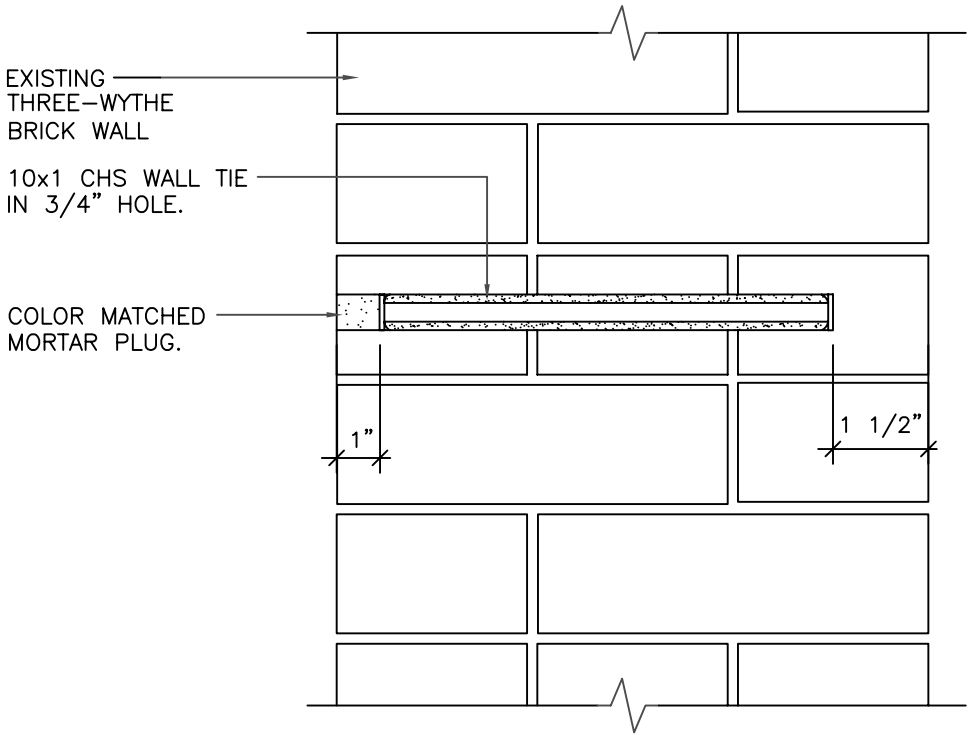
Project Title

Drawing Title
CINTEC ANCHOR DETAIL

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: BRICK
ANCHOR TYPE: CHS STITCH
PRINCIPAL LOAD (FORCES) :
TENSION



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

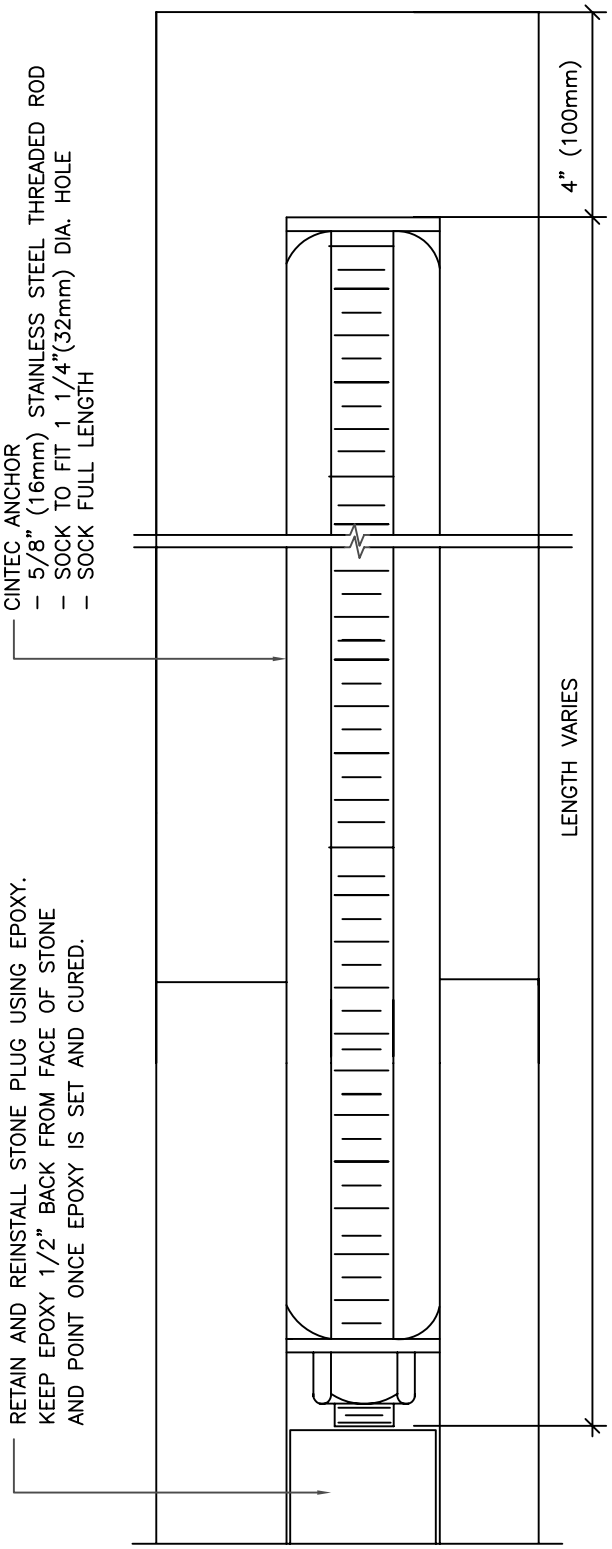
Project Title

Drawing Title

BRICK WALL STABILIZATION

Revision

Drawing No. SK–1



PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: STONE
ANCHOR TYPE: SRT STITCH
PRINCIPAL LOAD (FORCES) :
TENSION

CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title

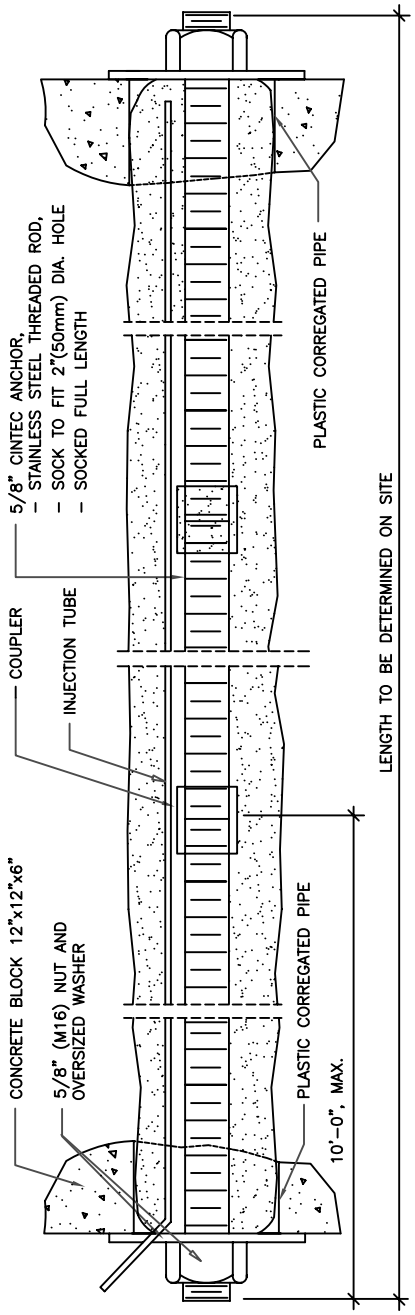
Drawing Title

TYPICAL ANCHOR INSTALLATION

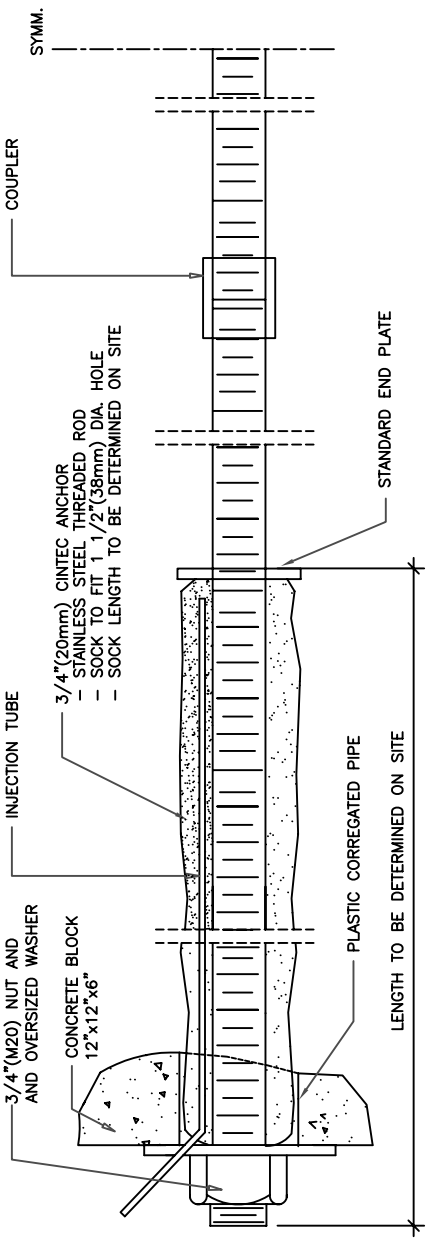
Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: CMU
ANCHOR TYPE: SRT STITCH
PRINCIPAL LOAD (FORCES) :
TENSION



TYPE 1



TYPE 2

CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title

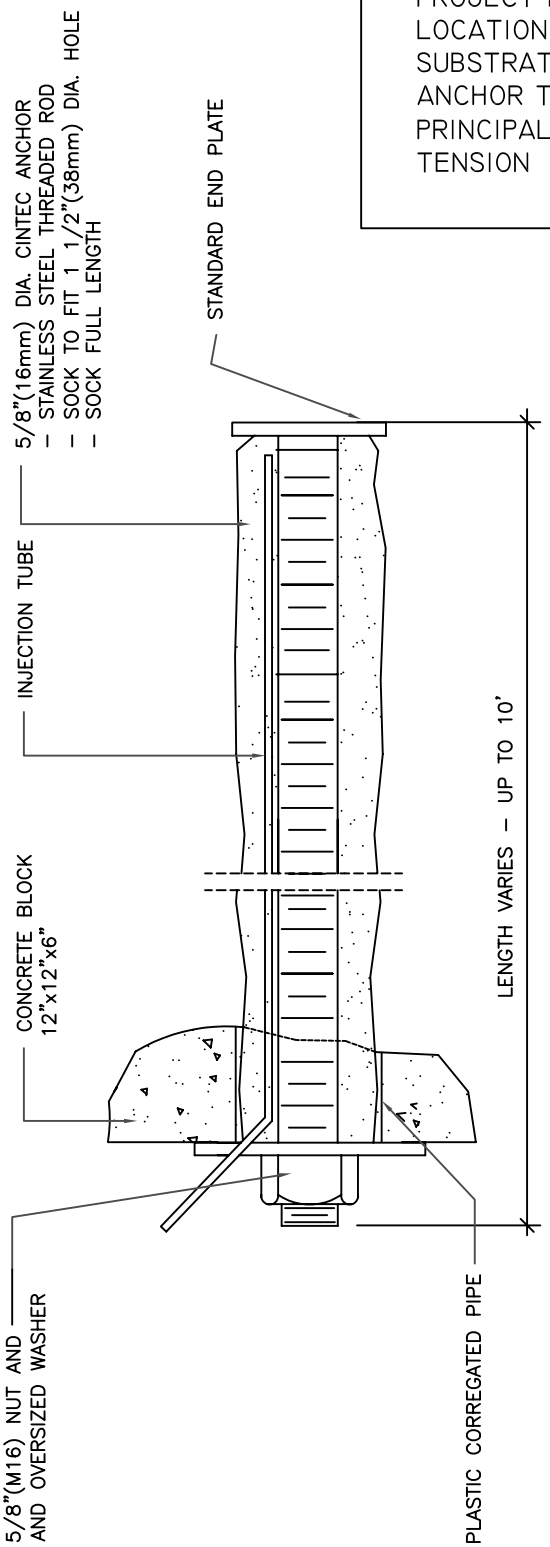
Drawing Title

CINTEC ANCHORS

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: BRICK
ANCHOR TYPE: SRT ARCH TIE
PRINCIPAL LOAD (FORCES) :
TENSION



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title

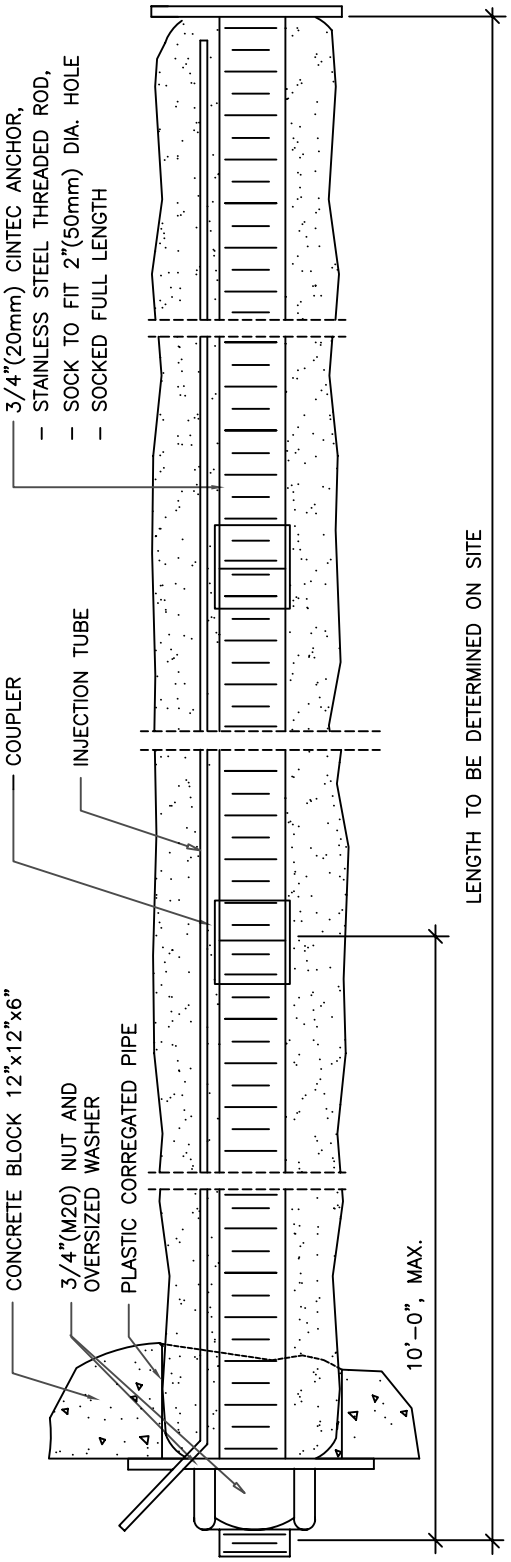
Drawing Title

CINTEC ANCHORS

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: BRICK
ANCHOR TYPE: SRT ARCH TIE
PRINCIPAL LOAD (FORCES) :
TENSION



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title

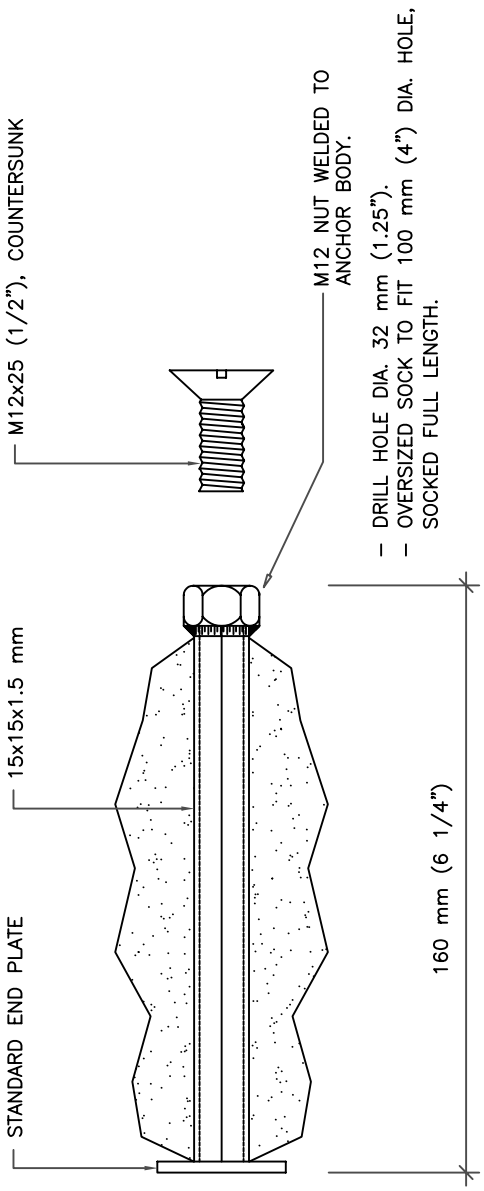
Drawing Title

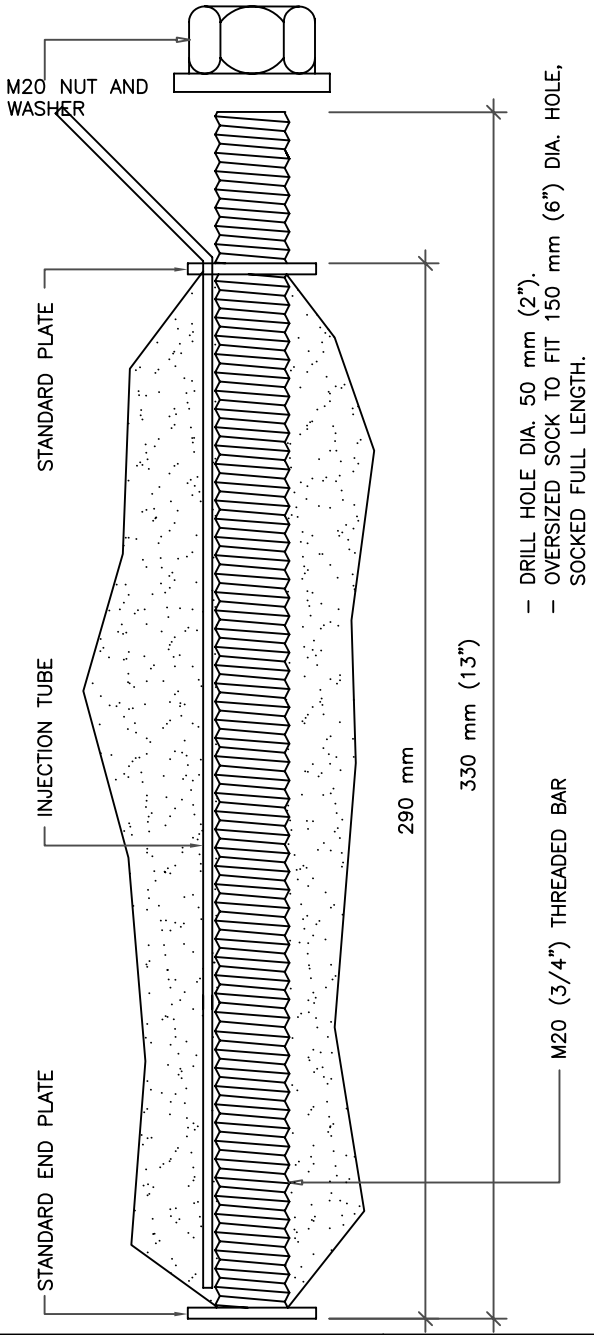
CINTEC ANCHOR

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: BRICK
ANCHOR TYPE: SRT ARCH TIE
PRINCIPAL LOAD (FORCES) :
TENSION





CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

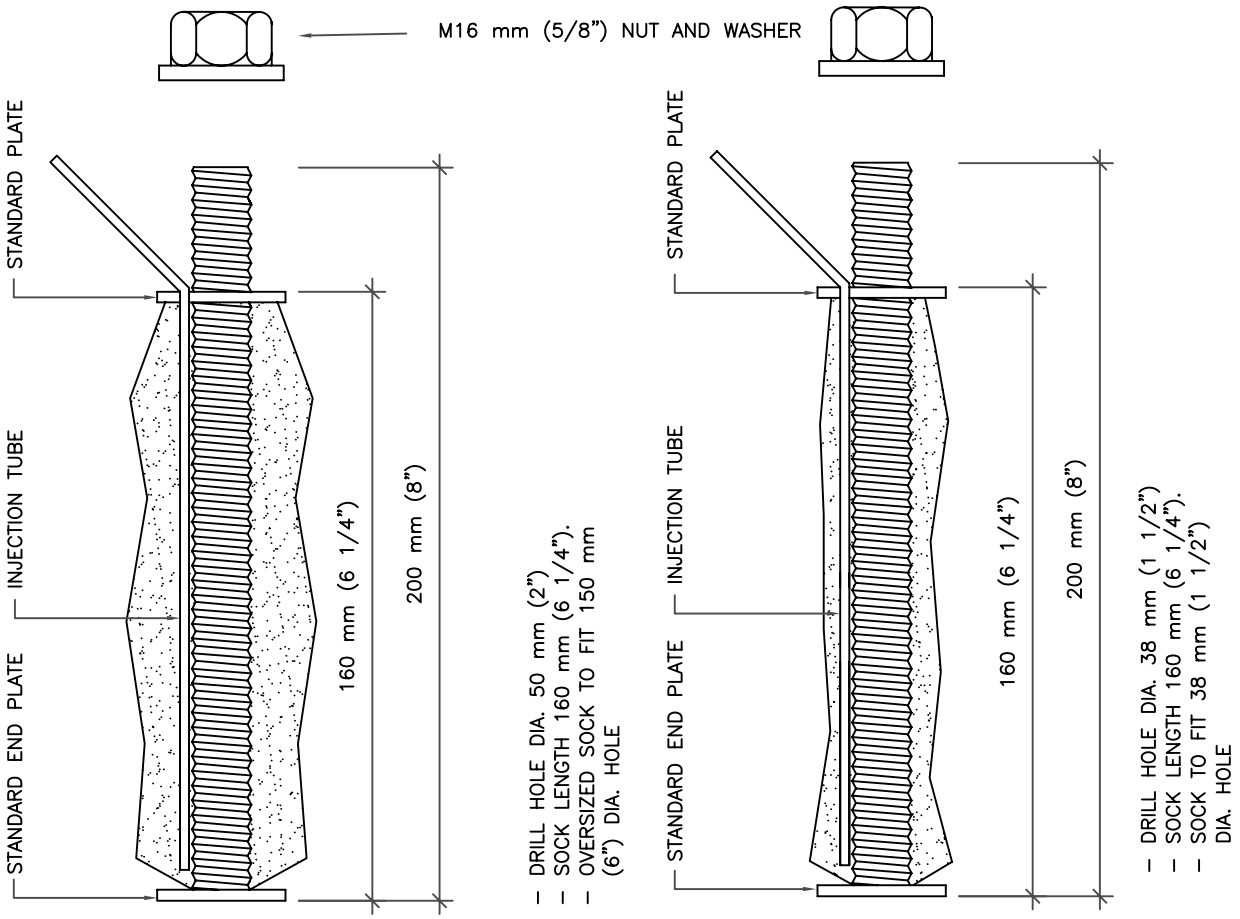
Project Title

Drawing Title
CINTEC ANCHORS

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: BRICK
ANCHOR TYPE: SRT ARCH TIE
PRINCIPAL LOAD (FORCES) :
TENSION



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

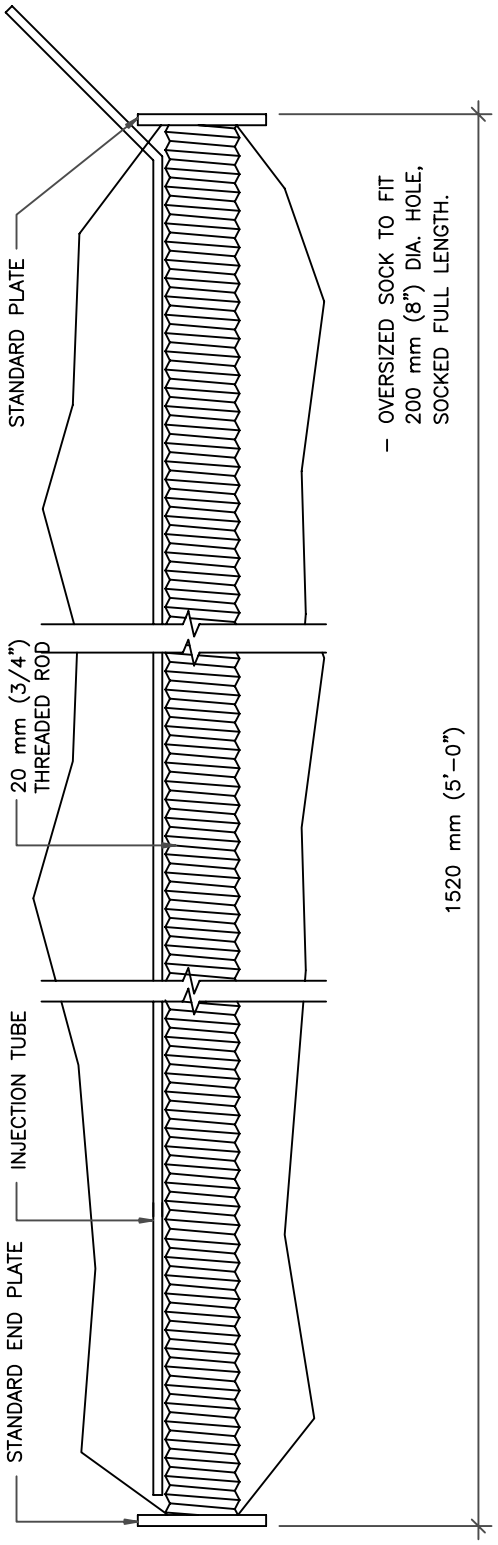
Project Title

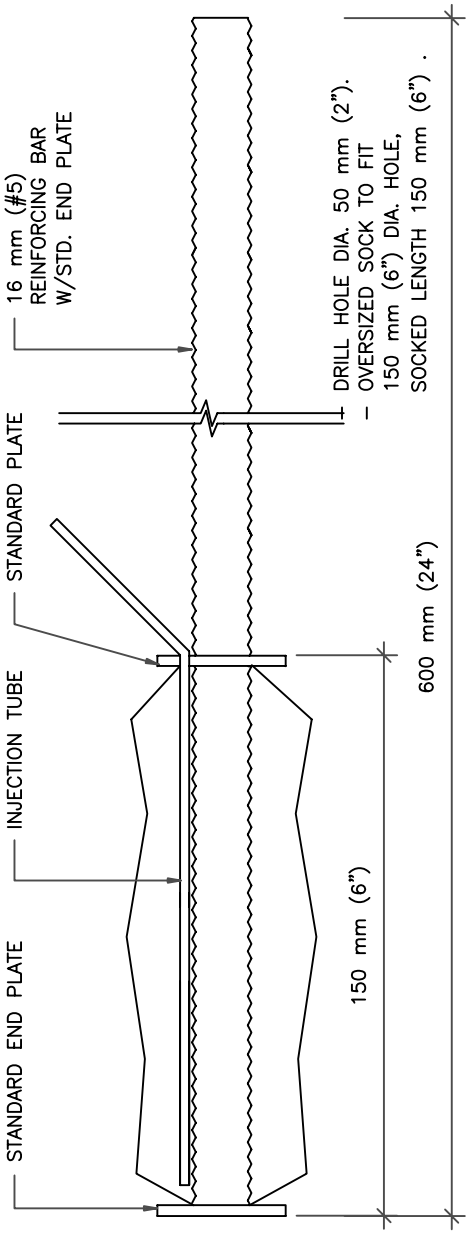
Drawing Title

CINTEC ANCHORS

UMA Job No.
Date
Drawn by
Design by
Checked by
Scale NTS
Revision
Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: BRICK
ANCHOR TYPE: SRT ARCH TIE
PRINCIPAL LOAD (FORCES) :
TENSION





CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title

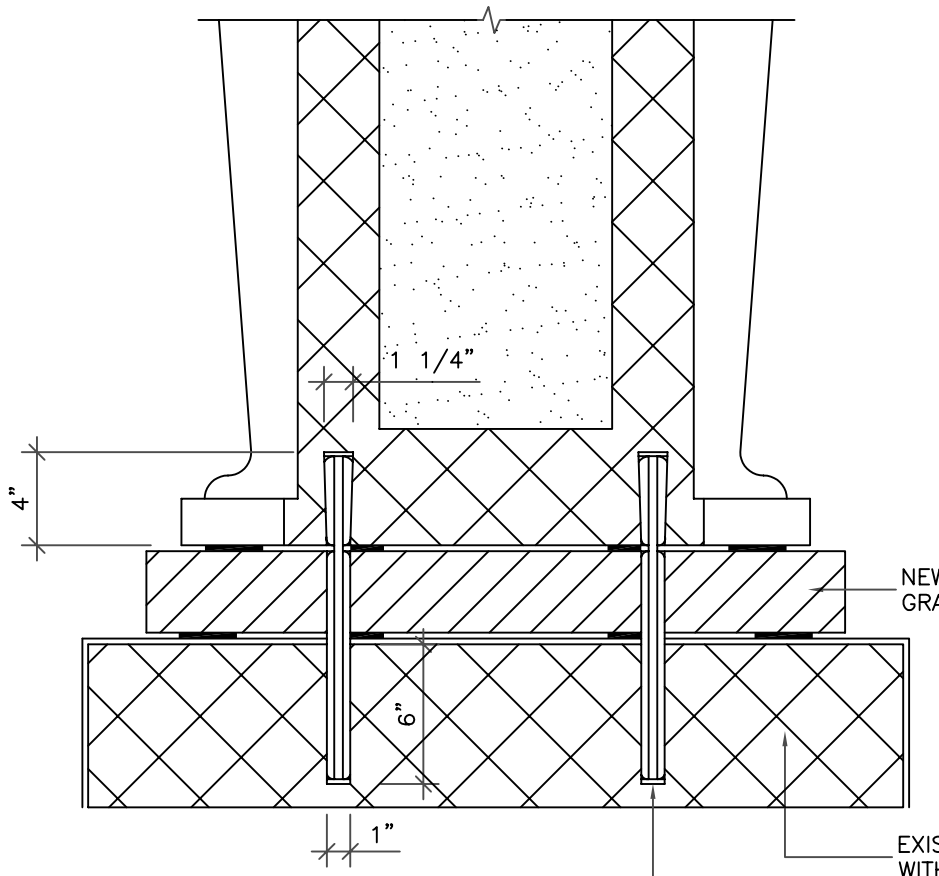
Drawing Title

CINTEC ANCHORS

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: STONE
ANCHOR TYPE: SRT STONE CARVING
PRINCIPAL LOAD (FORCES) : COMBINED



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

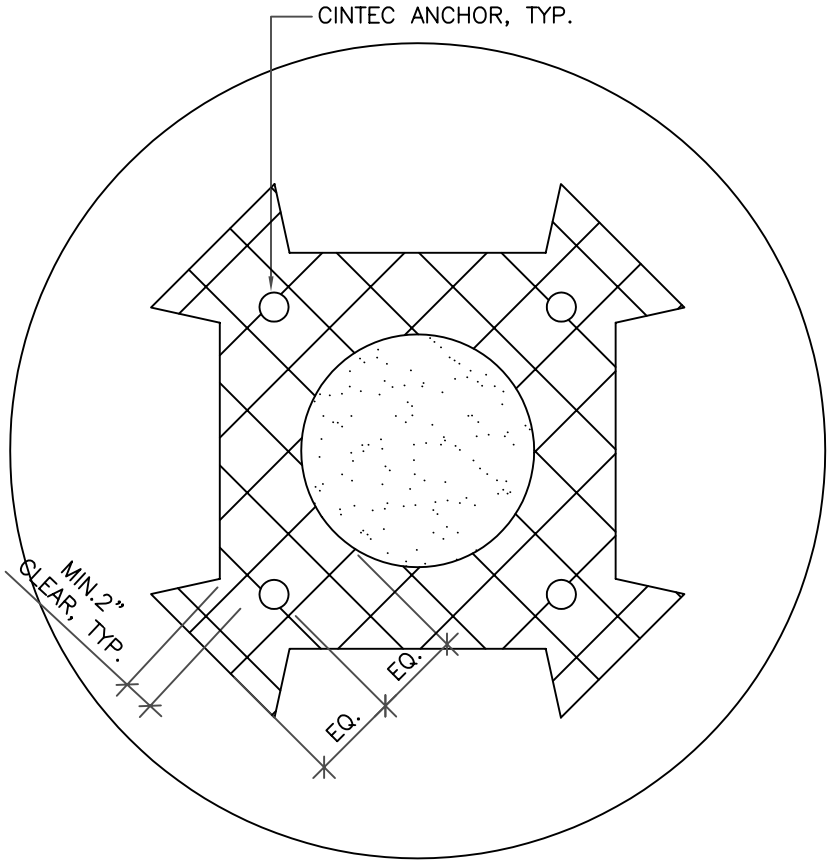
Project Title

Drawing Title
SECTION THROUGH MARBLE URNS

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: STONE
ANCHOR TYPE: SRT STONE CARVING
PRINCIPAL LOAD (FORCES) : COMBINED



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

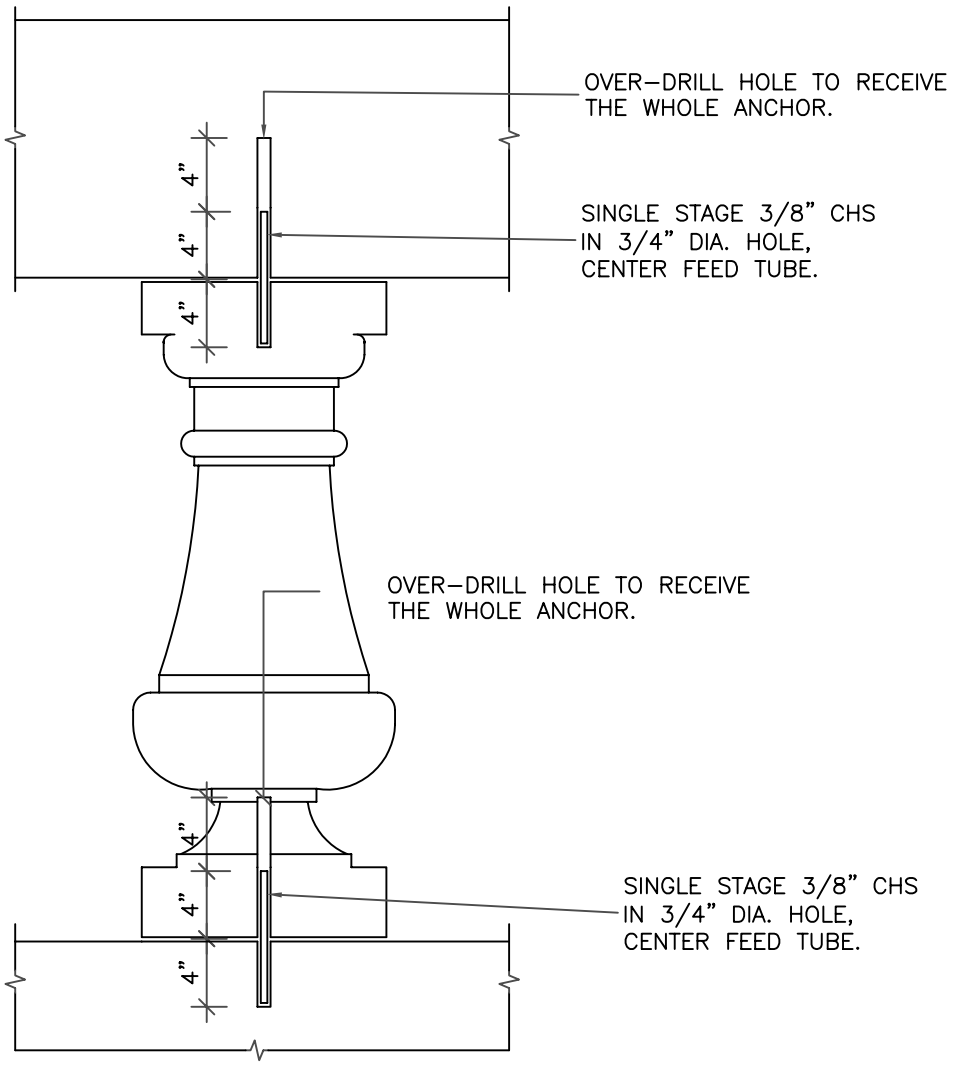
Project Title

Drawing Title
SECTION THROUGH MARBLE URNS PLAN

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: STONE
ANCHOR TYPE: SRT STONE CARVING
PRINCIPAL LOAD (FORCES) : COMBINED



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

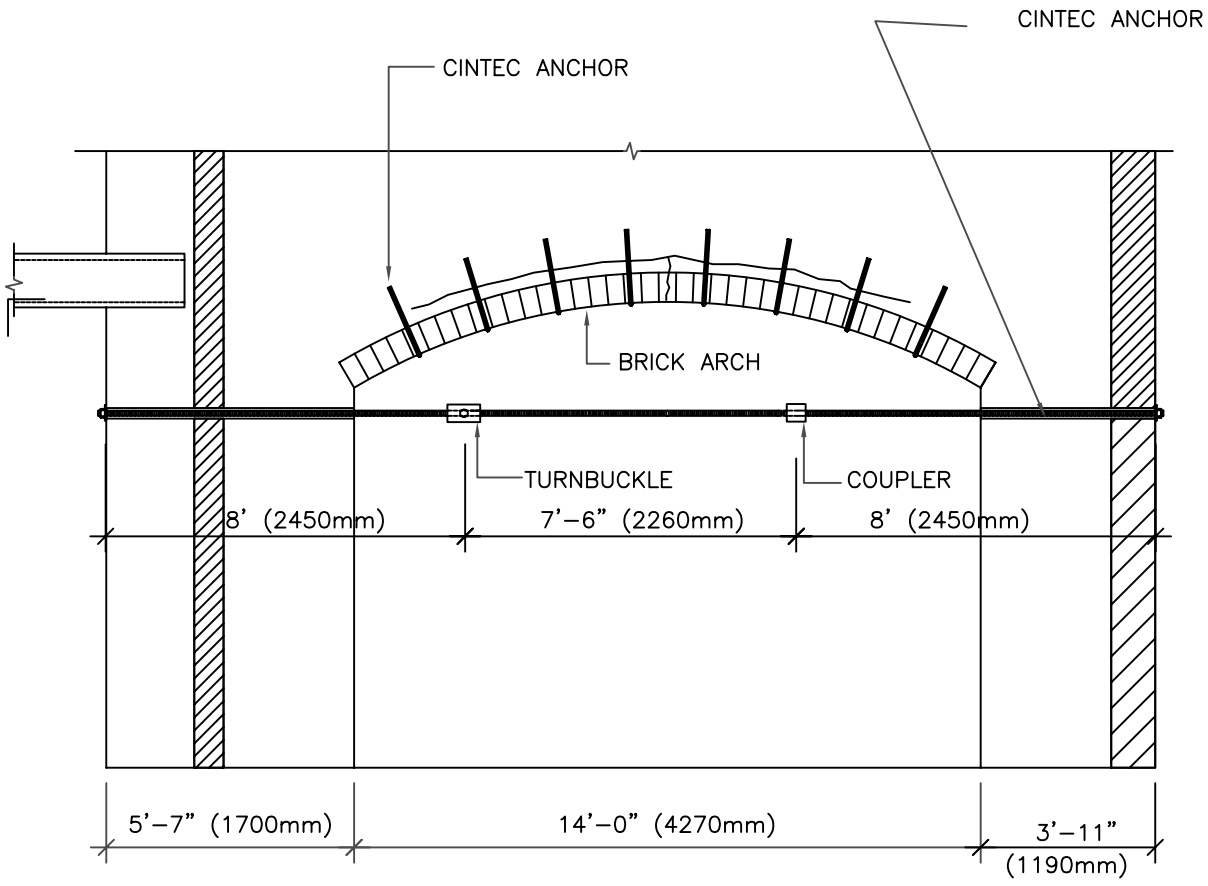
Project Title

Drawing Title
BALUSTER REPLACEMENT SECTION

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: BRICK
ANCHOR TYPE: SRT ARCH TIE
PRINCIPAL LOAD (FORCES) : TENSION



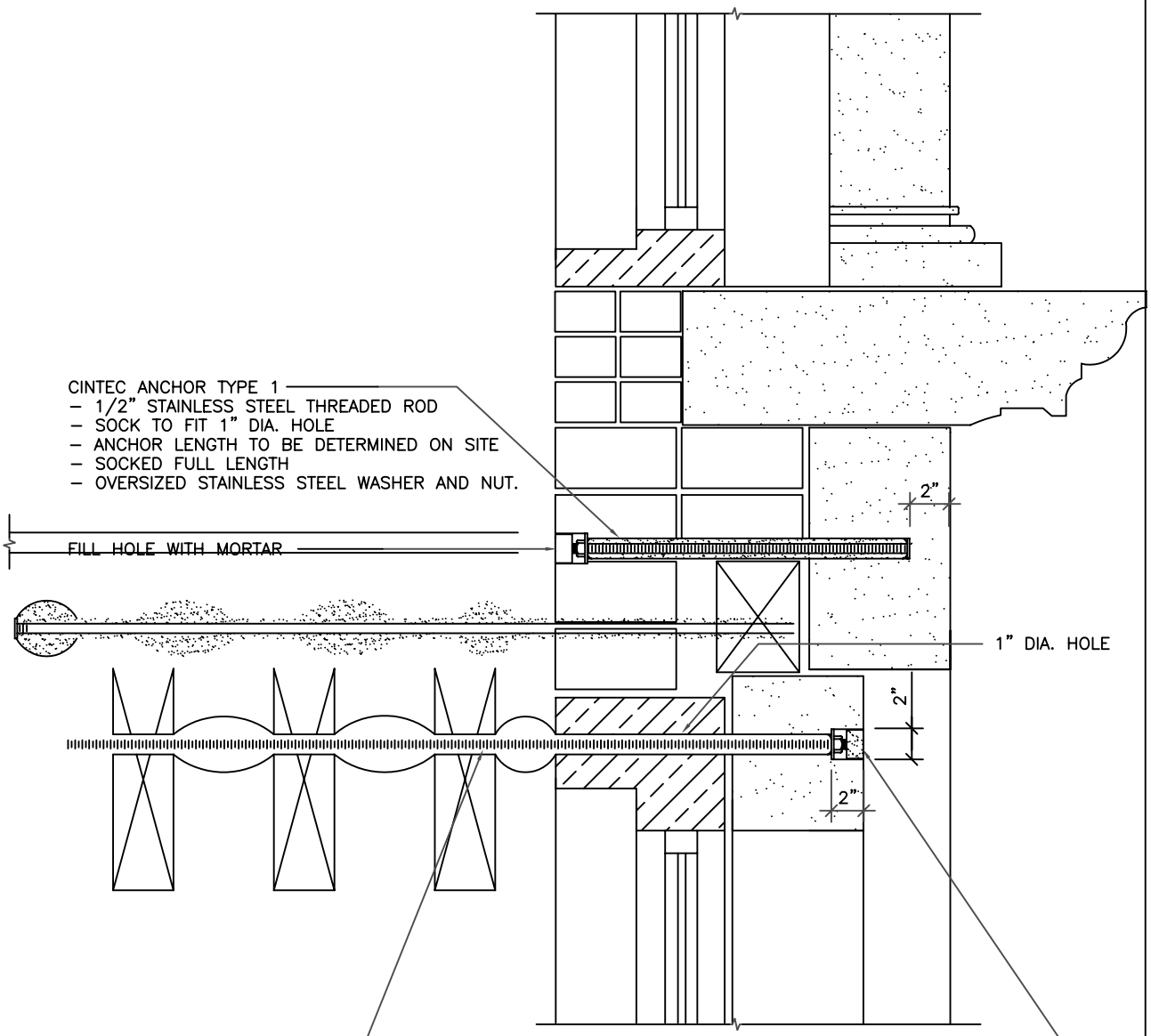
CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title

Drawing Title
ANCHOR LAYOUT

NTS
Revision
Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: BRICK WOOD
ANCHOR TYPE: SRT STONE
PRINCIPAL LOAD (FORCES) :
COMBINED



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

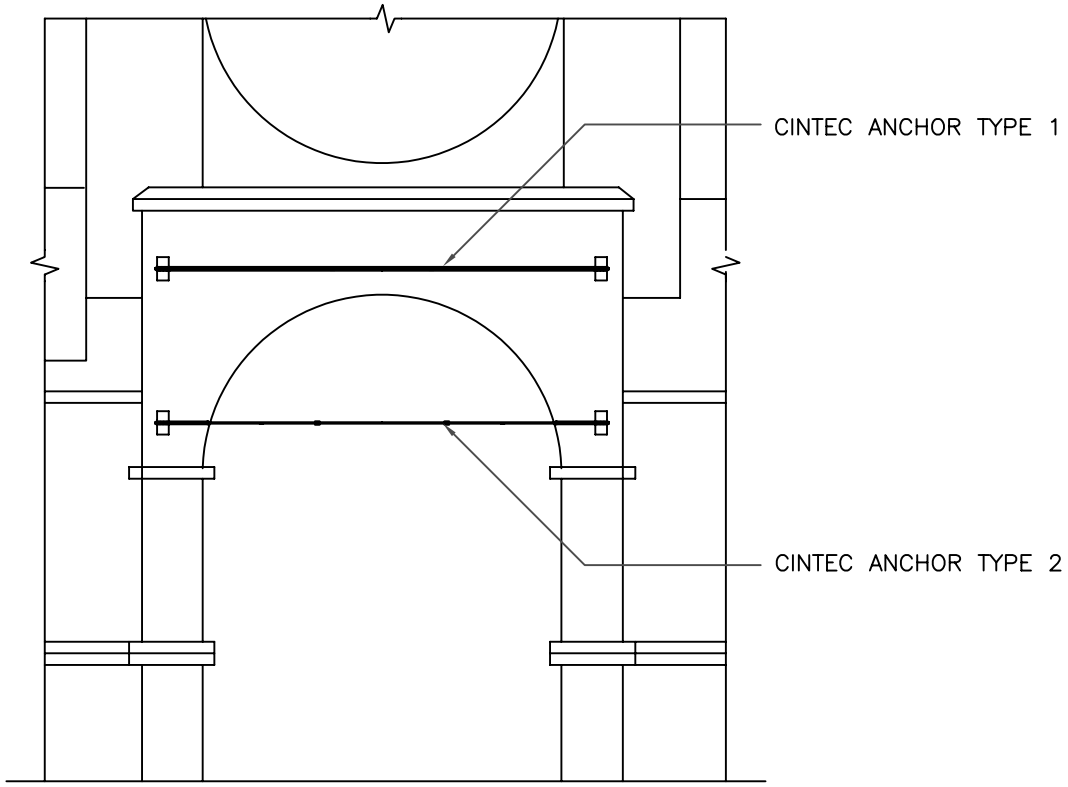
Project Title

Drawing Title
CINTEC ANCHORS
STONE STABILIZATION

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: BRICK
ANCHOR TYPE: SRT ARCH TIE
PRINCIPAL LOAD (FORCES) : COMBINED



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title

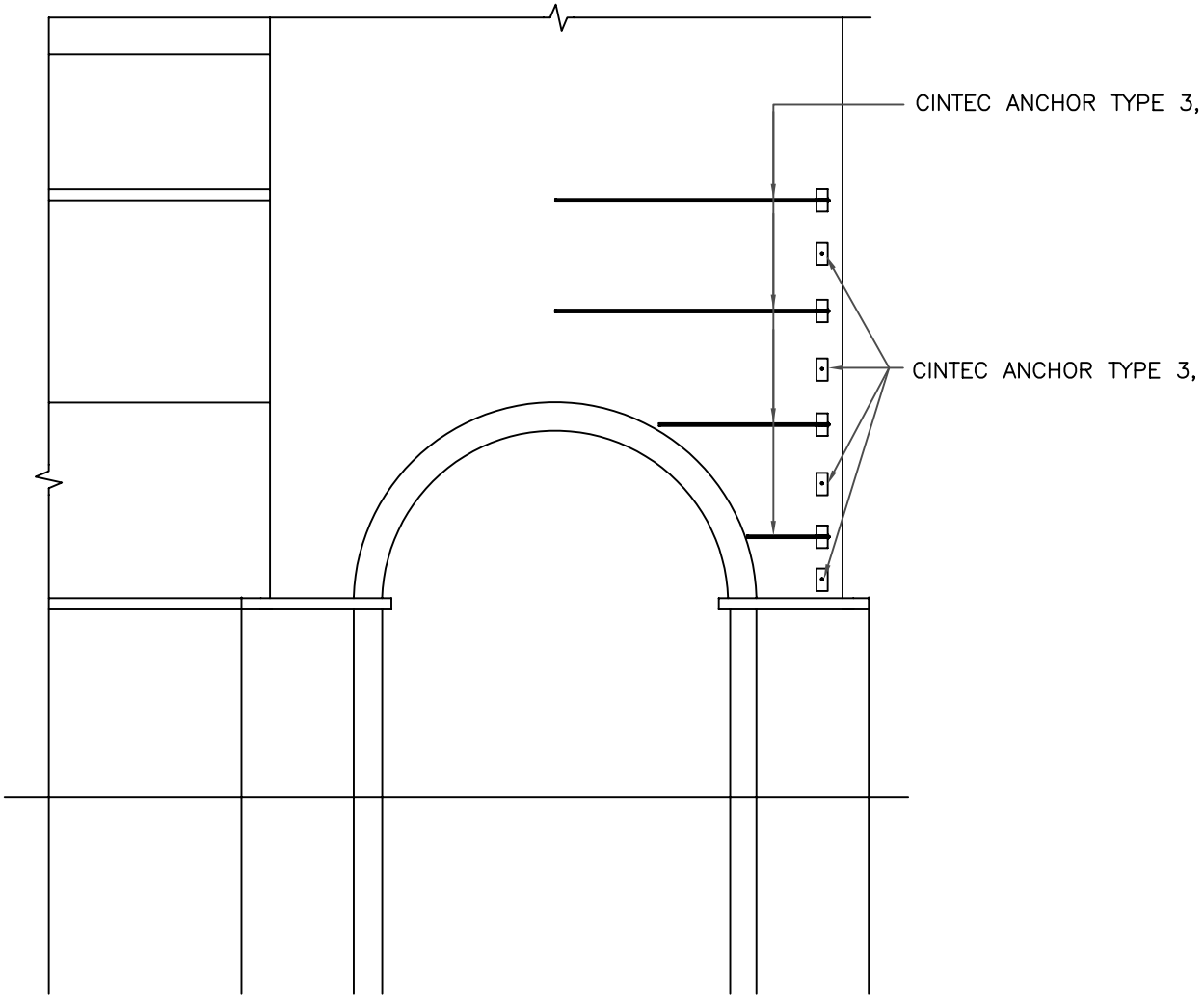
Drawing Title

PARTIAL EAST ELEVATION

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: BRICK
ANCHOR TYPE: SRT CORNER TIE
PRINCIPAL LOAD (FORCES) : TENSION



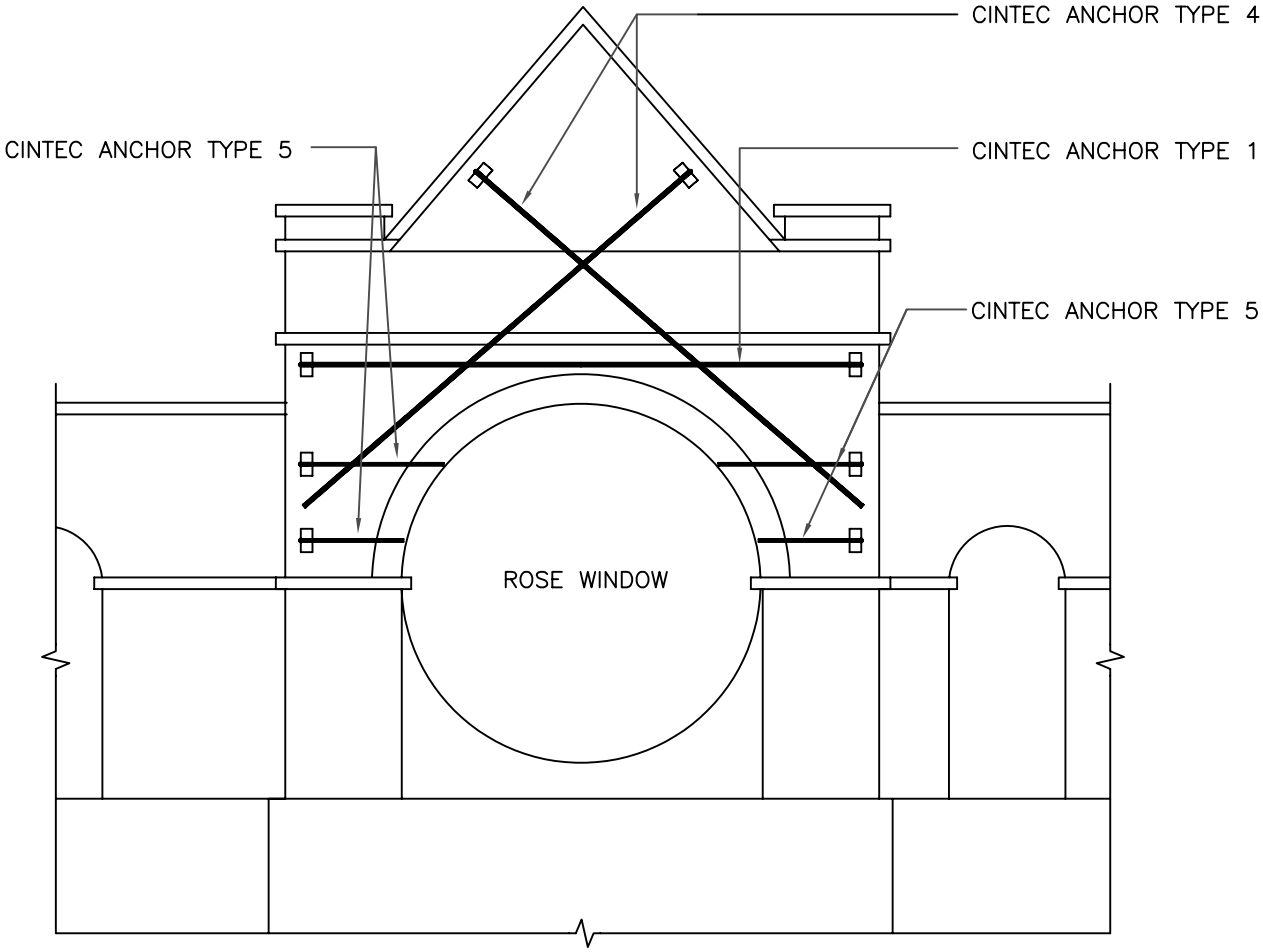
CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title

Drawing Title
PARTIAL EAST ELEVATION

UMA Job No.
Date
Drawn by
Design by
Checked by
Scale NTS
Revision
Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: BRICK
ANCHOR TYPE: SRT ARCH TIE
PRINCIPAL LOAD (FORCES) : TENSION



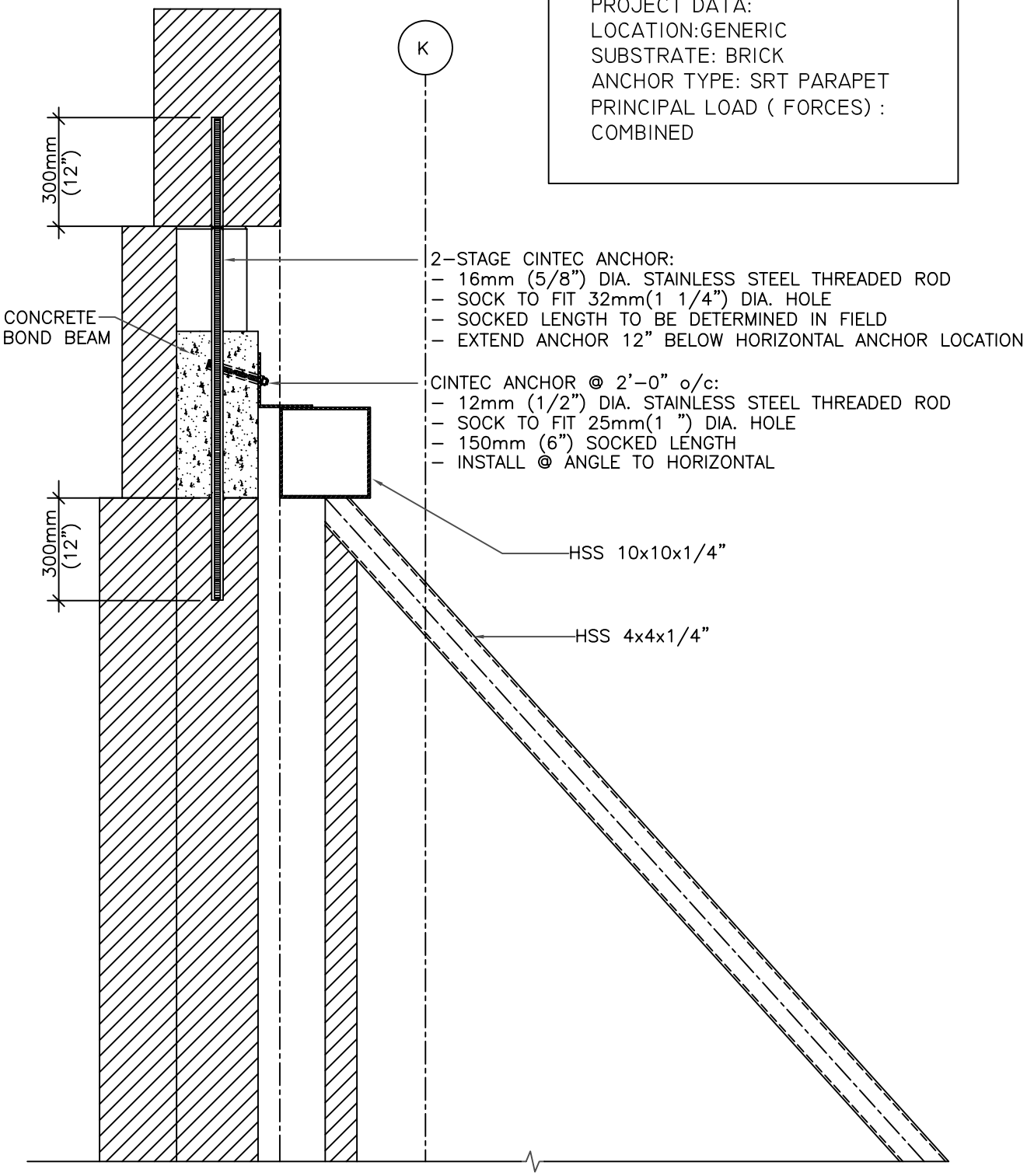
CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title

Drawing Title
PARTIAL ELEVATION

Revision

Drawing No. S3



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title

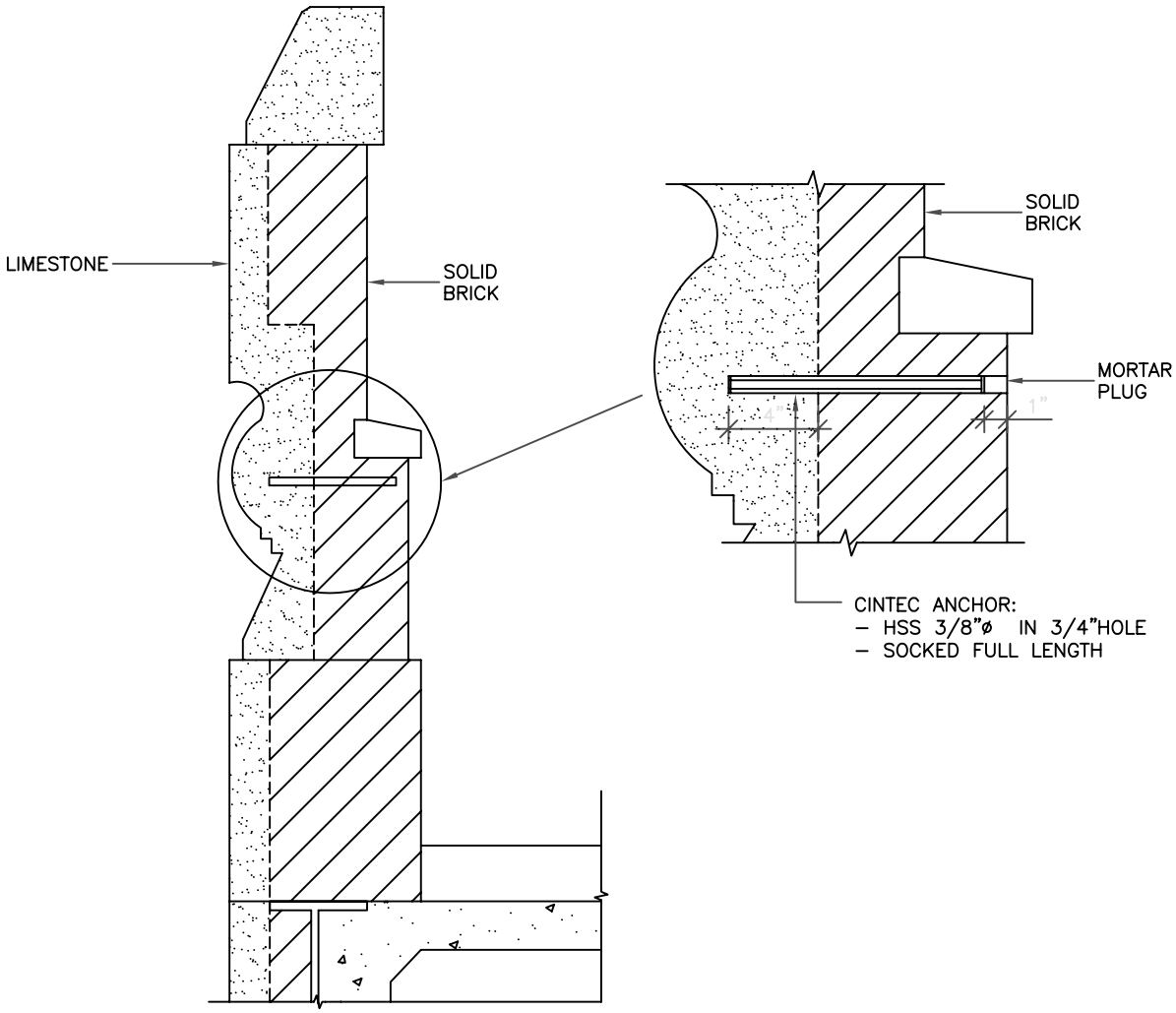
Drawing Title

PARAPET WALL SUPPORT ANCHORS

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: BRICK
ANCHOR TYPE: CHS PARAPET
PRINCIPAL LOAD (FORCES) :
TENSION



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title

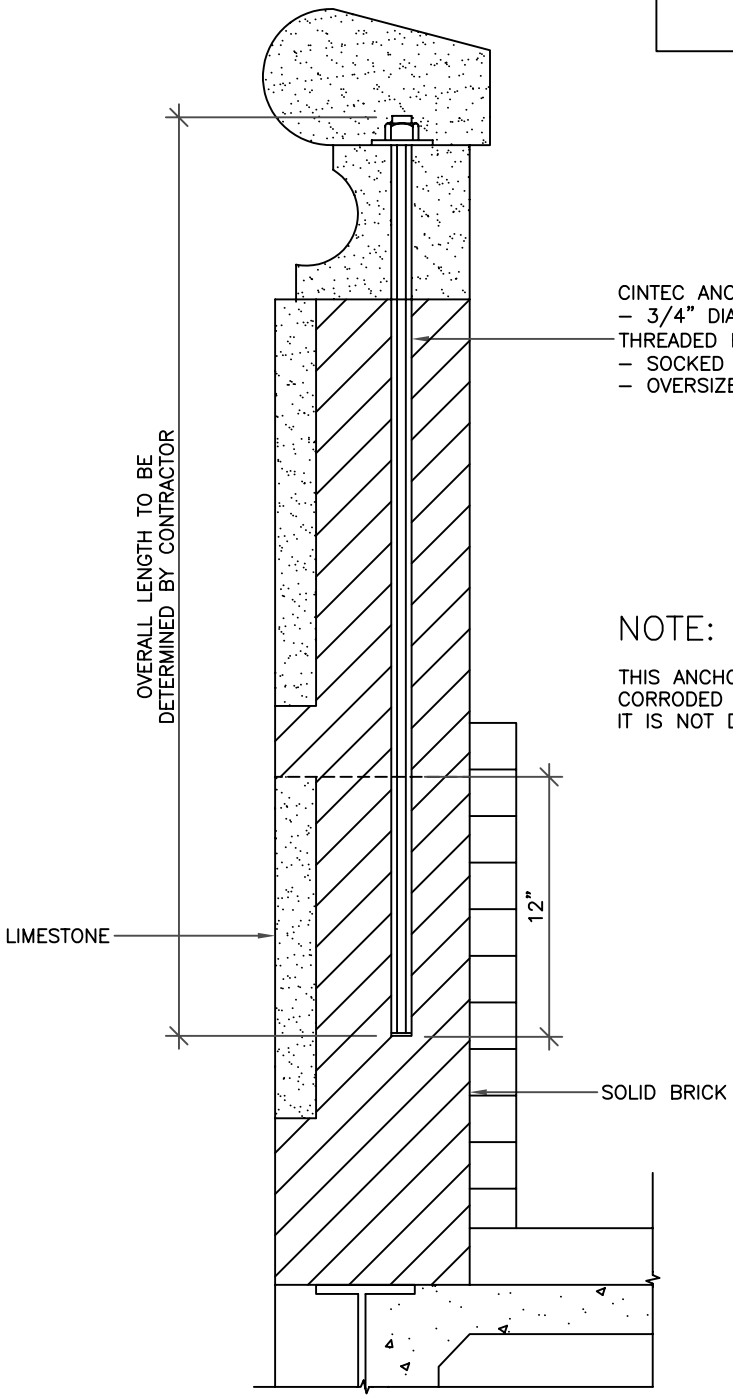
Drawing Title

PARAPET ANCHOR

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: CMU
ANCHOR TYPE: SRT PARAPET
PRINCIPAL LOAD (FORCES) :
SHEAR



CINTEC ANCHOR:
– 3/4" DIA. STAINLESS STEEL
THREADED ROD IN 1 3/4"DIA. HOLE,
– SOCKED FULL LENGTH
– OVERSIZED WASHER AND NUT ON TOP.

NOTE:

THIS ANCHOR ONLY REPLACES EXISTING
CORRODED ANCHOR.
IT IS NOT DESIGNED FOR LATERAL LOAD.

CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title

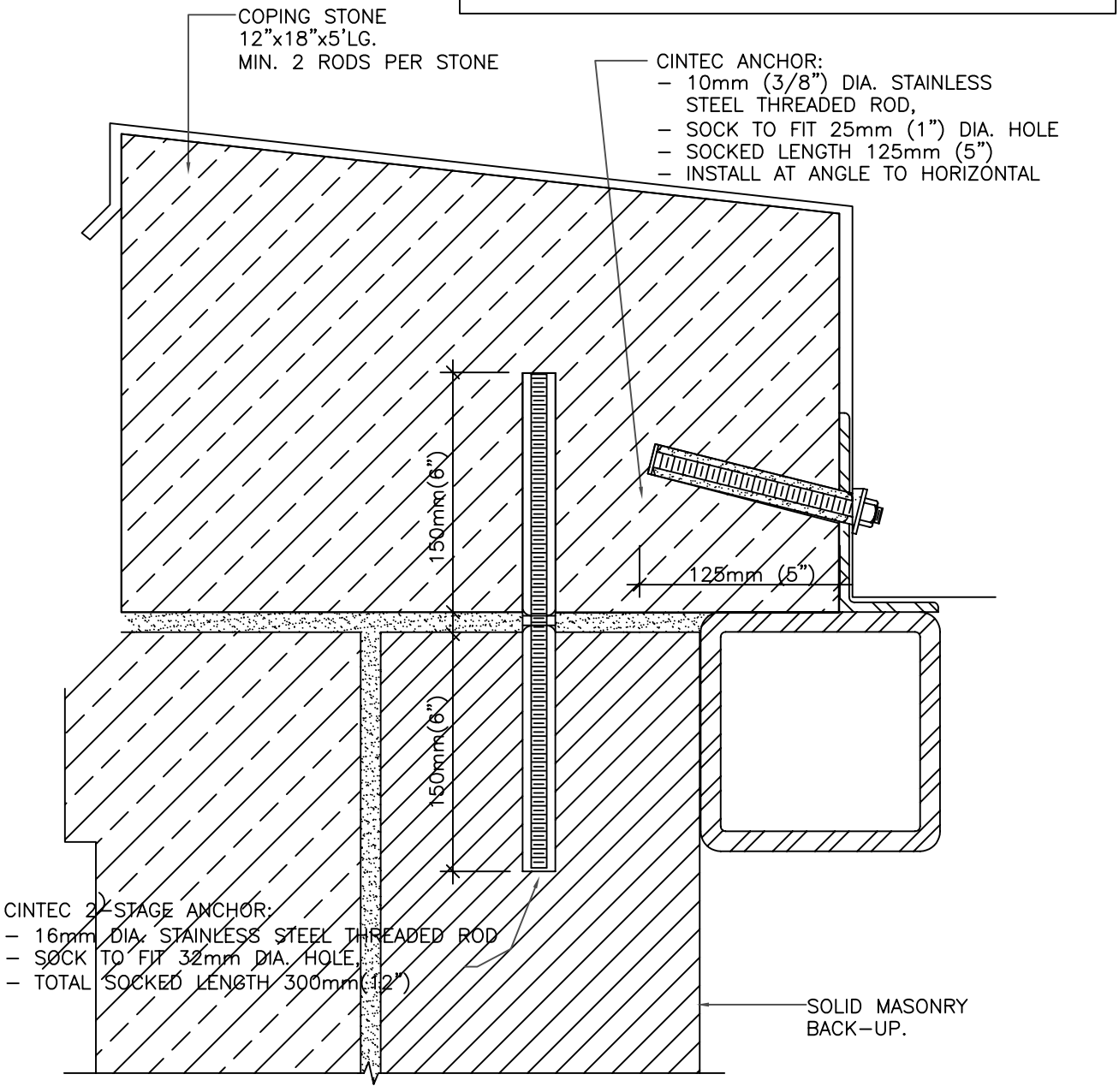
Drawing Title

PARAPET STITCHING

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: BRICK
ANCHOR TYPE: SRT
PARAPET COPING
PRINCIPAL LOAD (FORCES) :
COMBINED



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

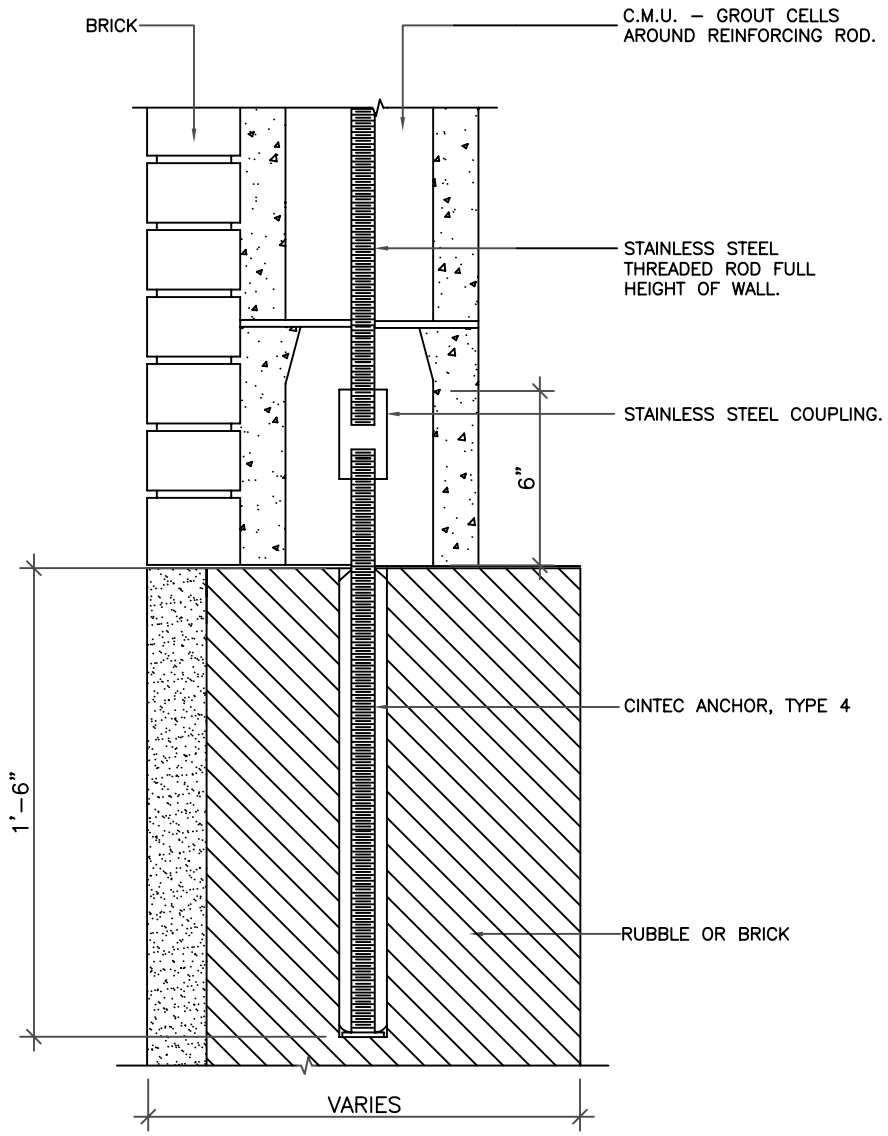
Project Title

Drawing Title
COPING STONE ANCHORS

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: CMU
ANCHOR TYPE: SRT PARAPET
PRINCIPAL LOAD (FORCES) :
COMBINED



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

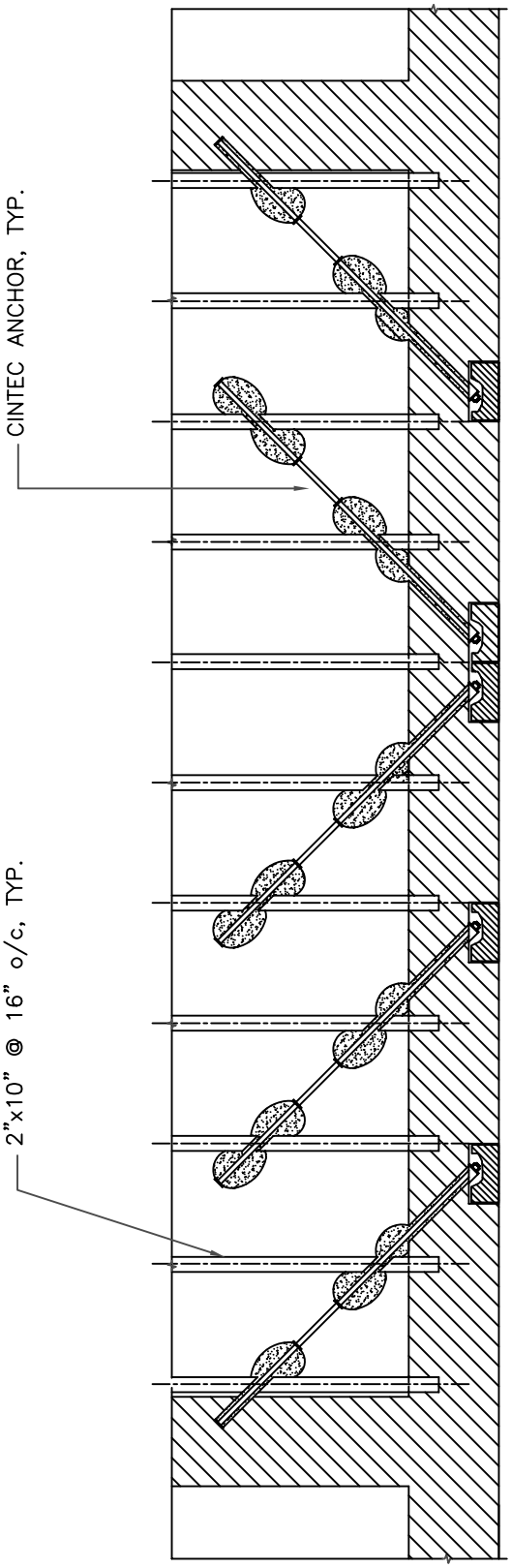
Project Title

Drawing Title
REINFORCING ANCHOR DETAIL
FOR PARAPET WALL

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: STONE WOOD
ANCHOR TYPE: SRT WOOD
JOIST TIE
PRINCIPAL LOAD (FORCES) :
TENSION



FLOOR JOIST PARTIAL PLAN

CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title

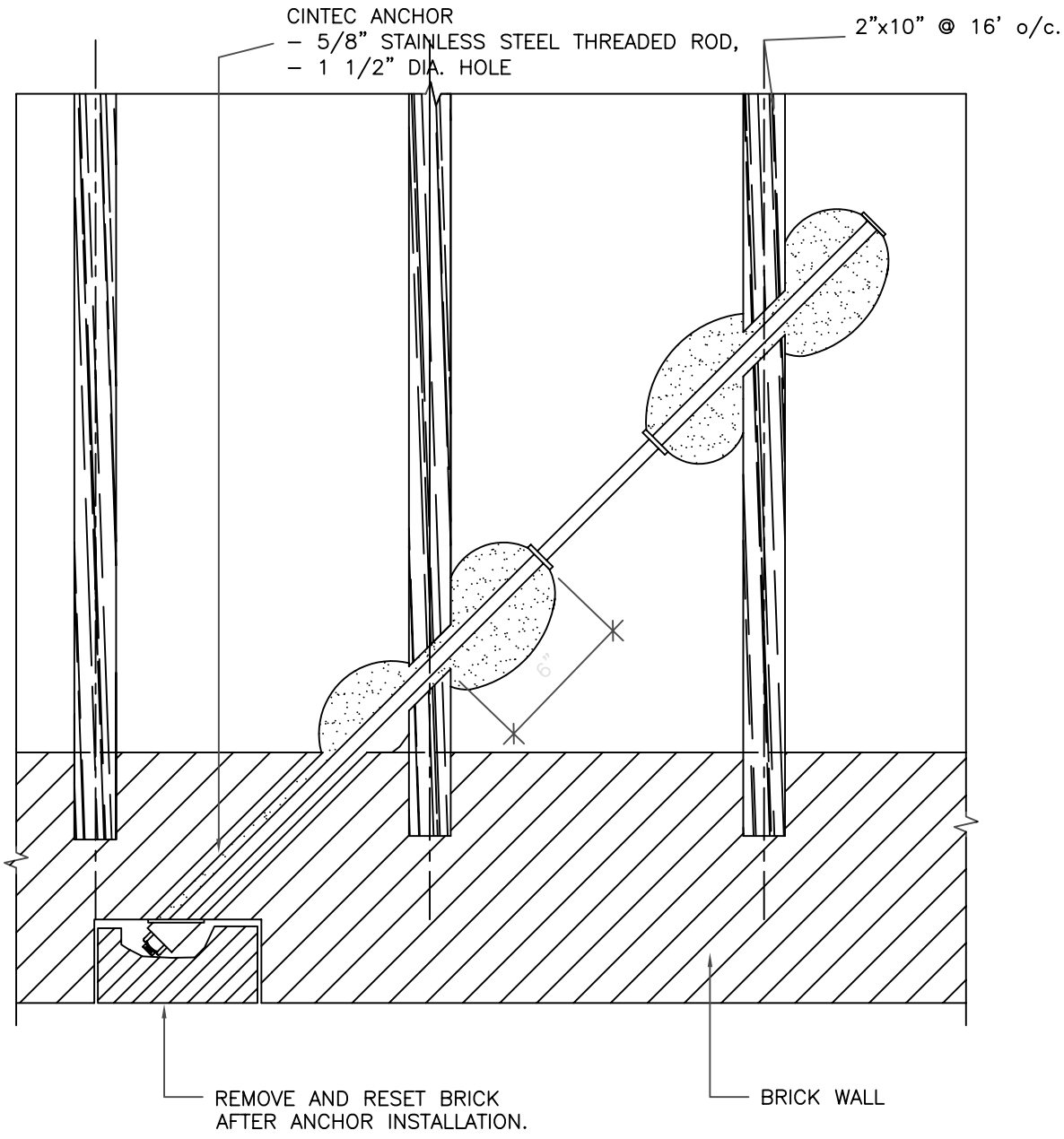
Drawing Title

BRICK WALL TO WOOD FLOOR DIAPHRAGM STABILIZATION

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: STONE WOOD
ANCHOR TYPE: SRT WOOD
JOIST TIE
PRINCIPAL LOAD (FORCES) :
TENSION



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title

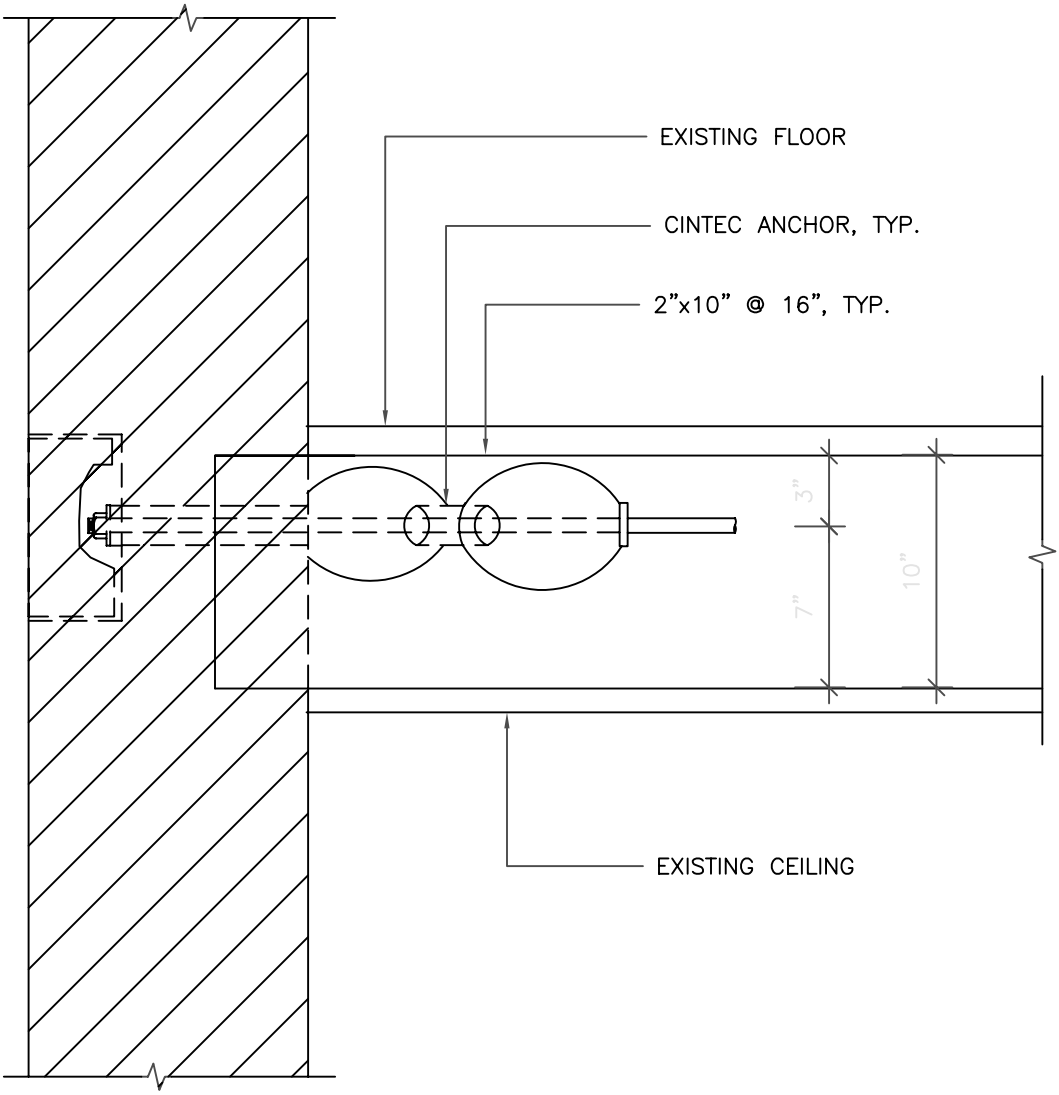
Drawing Title

BRICK WALL TO WOOD FLOOR DIAPHRAGM STABILIZATION

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: STONE WOOD
ANCHOR TYPE: SRT WOOD
JOIST TIE
PRINCIPAL LOAD (FORCES) :
TENSION



SECTION

CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title

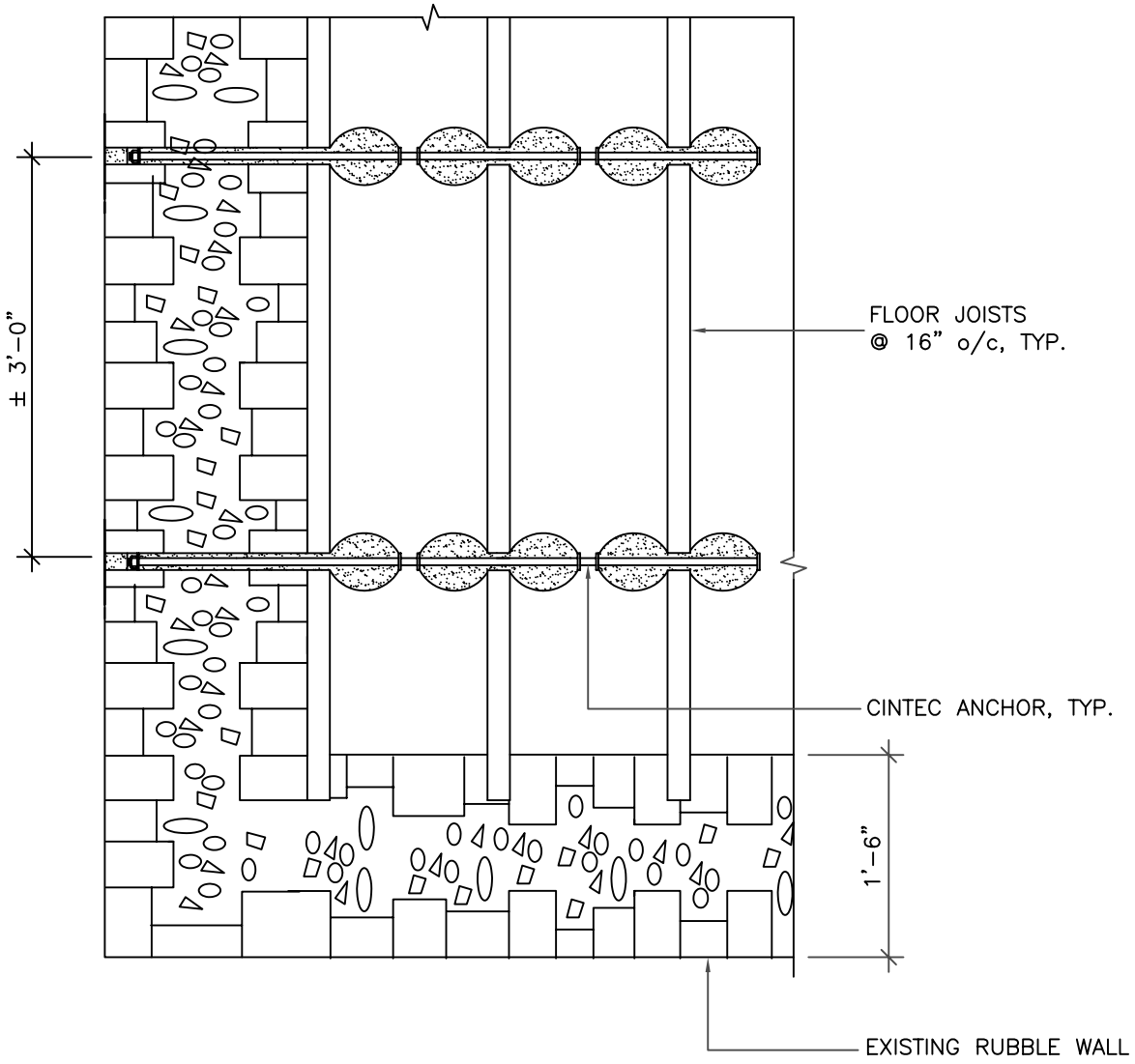
Drawing Title

BRICK WALL TO WOOD FLOOR DIAPHRAGM STABILIZATION

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: STONE WOOD
ANCHOR TYPE: SRT WOOD
JOIST TIE
PRINCIPAL LOAD (FORCES) :
TENSION



FLOOR JOIST PARTIAL PLAN

CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title

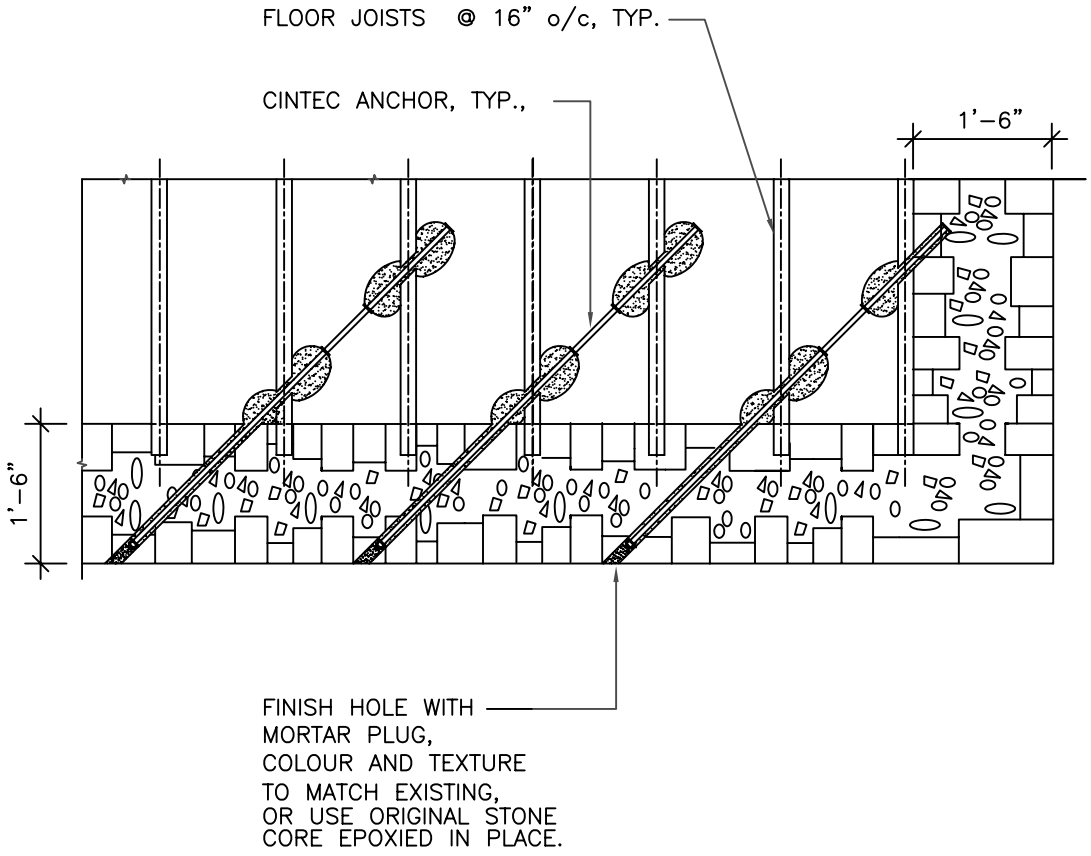
Drawing Title

RUBBLE WALL TO WOOD FLOOR DIAPHRAGM STABILIZATION

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: STONE WOOD
ANCHOR TYPE: SRT WOOD
JOIST TIE
PRINCIPAL LOAD (FORCES) :
TENSION



FLOOR JOIST PARTIAL PLAN

CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title

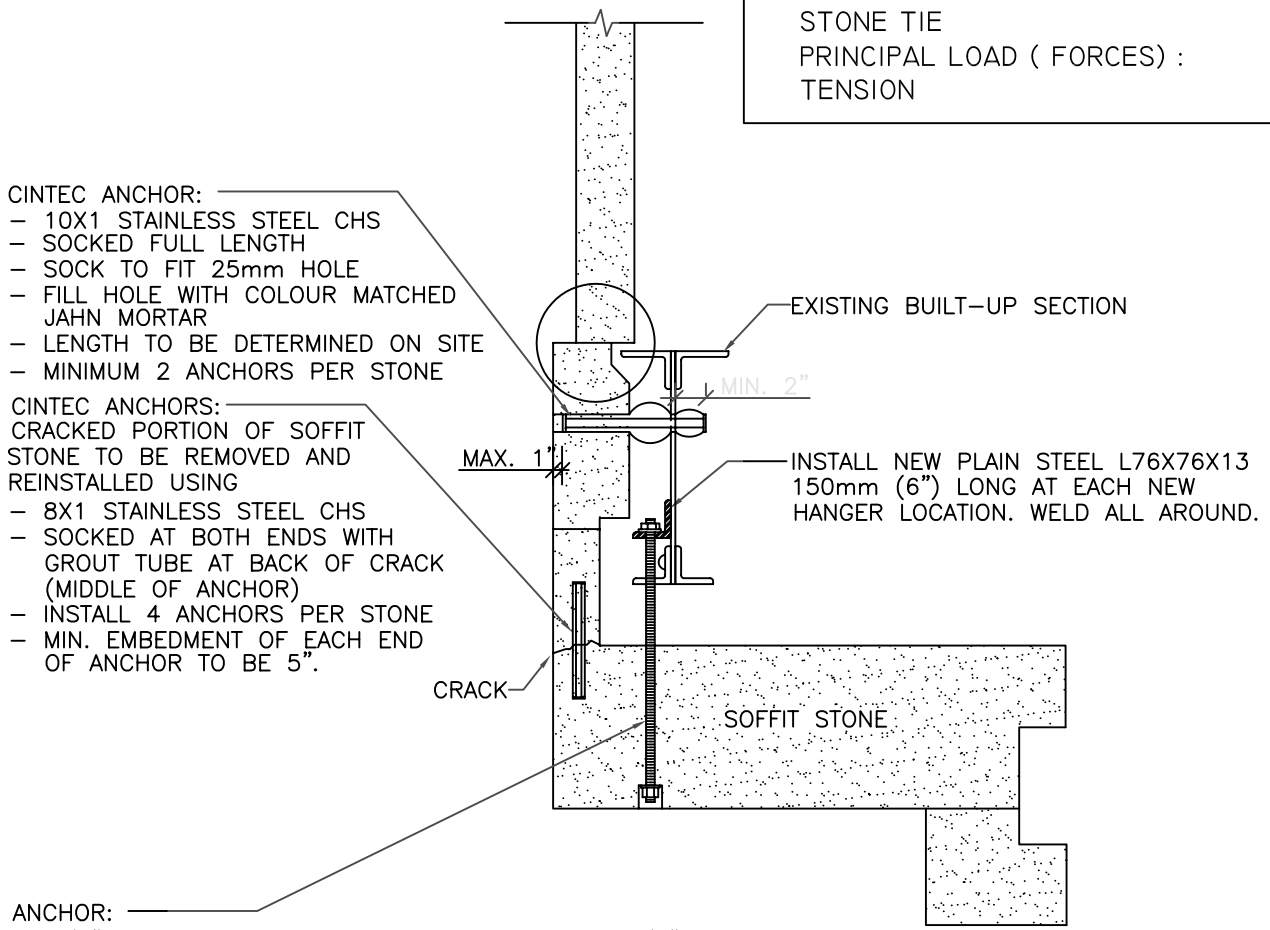
Drawing Title

RUBBLE WALL TO WOOD FLOOR DIAPHRAGM STABILIZATION

Revision

Drawing No. SK-

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: STEEL
ANCHOR TYPE: SRT SOFFOT STONE TIE
PRINCIPAL LOAD (FORCES) : TENSION



NOTES:

1. ENSURE ALL SOFFIT STONES ARE SHORED PRIOR TO THE COMMENCEMENT OF ANY WORK.
2. NOTE EXISTING STEEL BEAM DATES TO APPROX. 1935. HAVE ALL WELDS INSPECTED BY CERTIFIED WELDING INSPECTOR.
3. GRIND LOOSE RUST OFF EXISTING BEAM BOTTOM ANGLE WITH WIRE WHEEL. TREAT EXISTING EXPOSED STEEL AND NEW ANGLE BRACKETS WITH RUST CONVERTER (BLUE STEEL)
4. FOR HANGER LOCATIONS SEE SK–

CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title

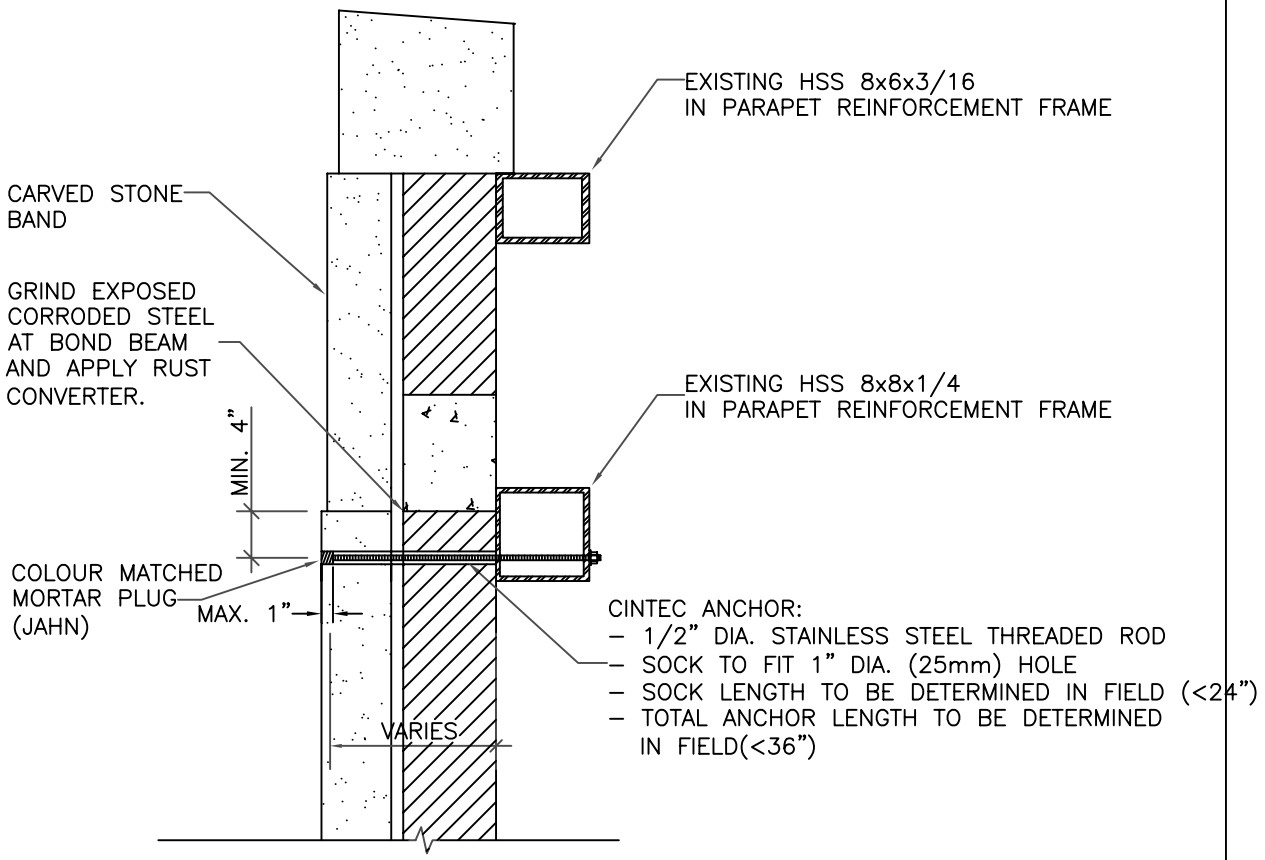
Drawing Title

SOFFIT STONE SUPPORTS AND REPAIR ANCHORS

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: STEEL
ANCHOR TYPE: SRT
PARAPET TIE
PRINCIPAL LOAD (FORCES) :
TENSION



TYPICAL DETAIL

INSTALL A MINIMUM OF TWO (2) ANCHORS PER STONE.

CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title

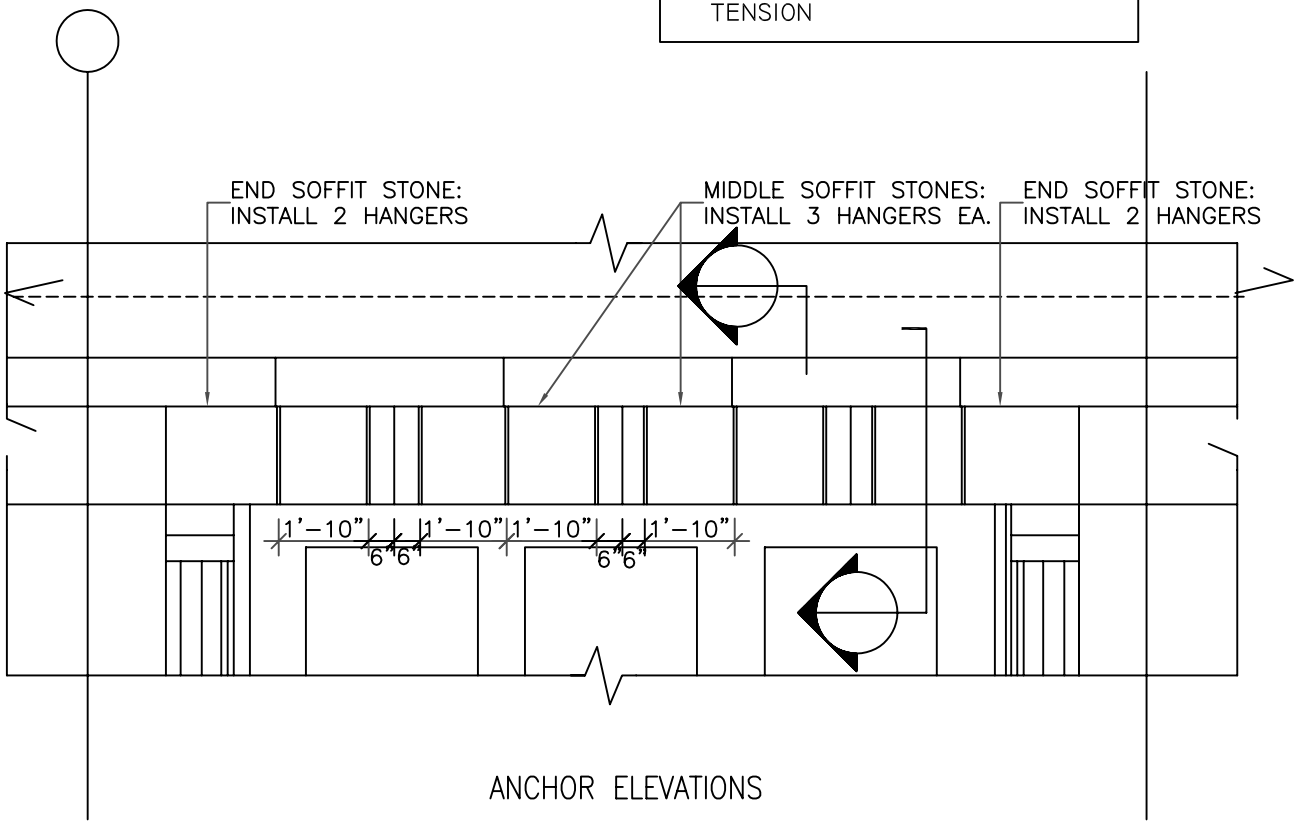
Drawing Title

STONE CLADDING SUPPORT ANCHORS

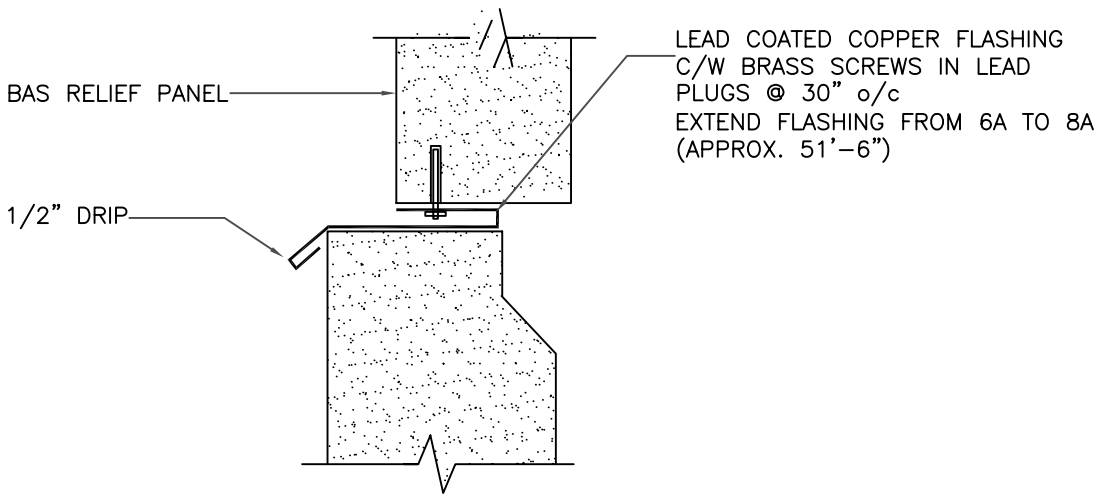
Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: STONE
ANCHOR TYPE: SRT LINTEL
STONE TIE
PRINCIPAL LOAD (FORCES) :
TENSION



ANCHOR ELEVATIONS



DETAIL 2

CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title

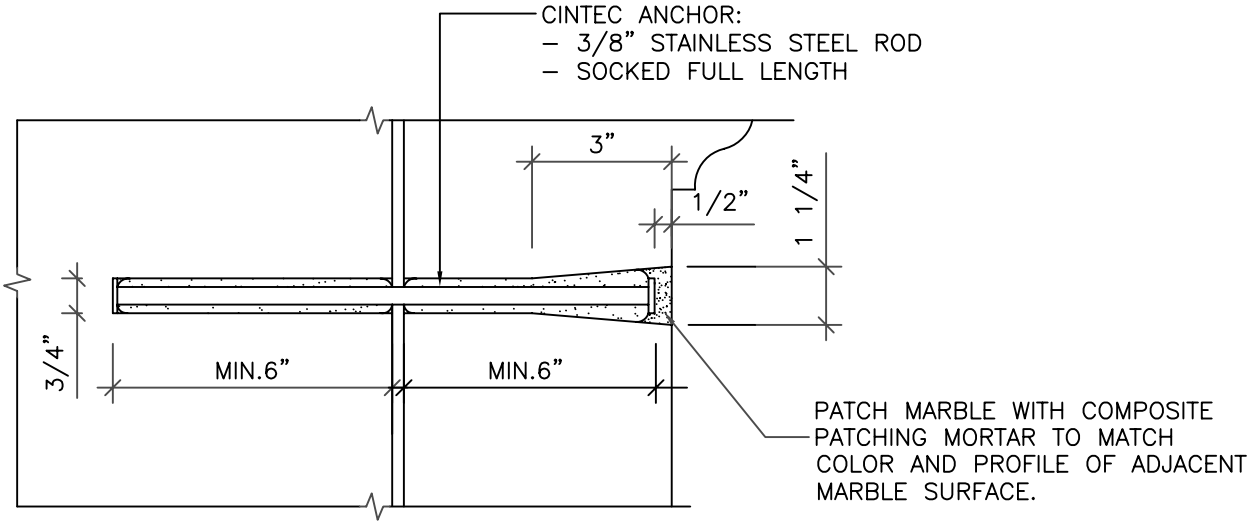
Drawing Title

ANCHOR LOCATIONS

Revision

Drawing No. SK-

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: STONE
ANCHOR TYPE: SRT STONE
VENEER TIE
PRINCIPAL LOAD (FORCES) :
TENSION



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

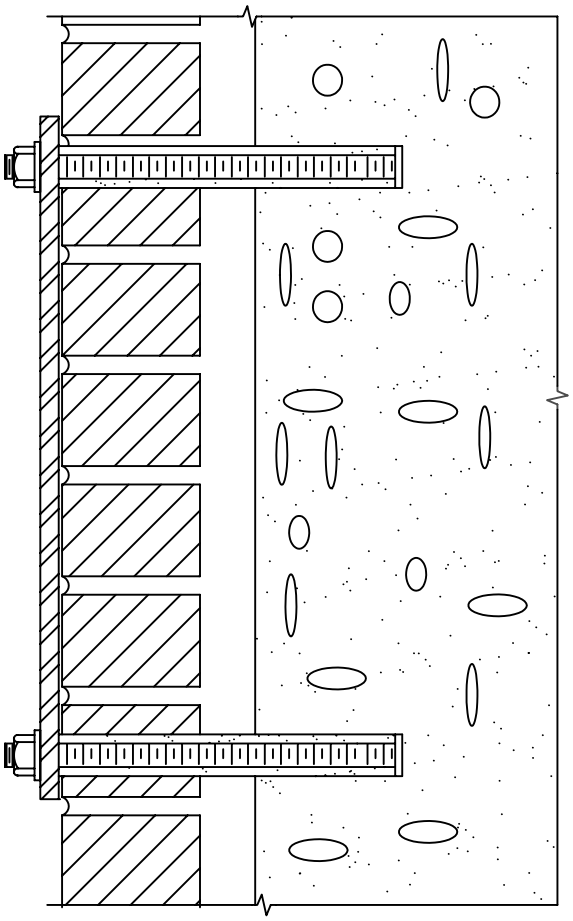
Project Title

Drawing Title
TYPICAL RECESSED
CINTEC ANCHOR DETAIL

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: CONCRETE
ANCHOR TYPE: SRT WALL TIE
PRINCIPAL LOAD (FORCES) :
TENSION



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title

Drawing Title

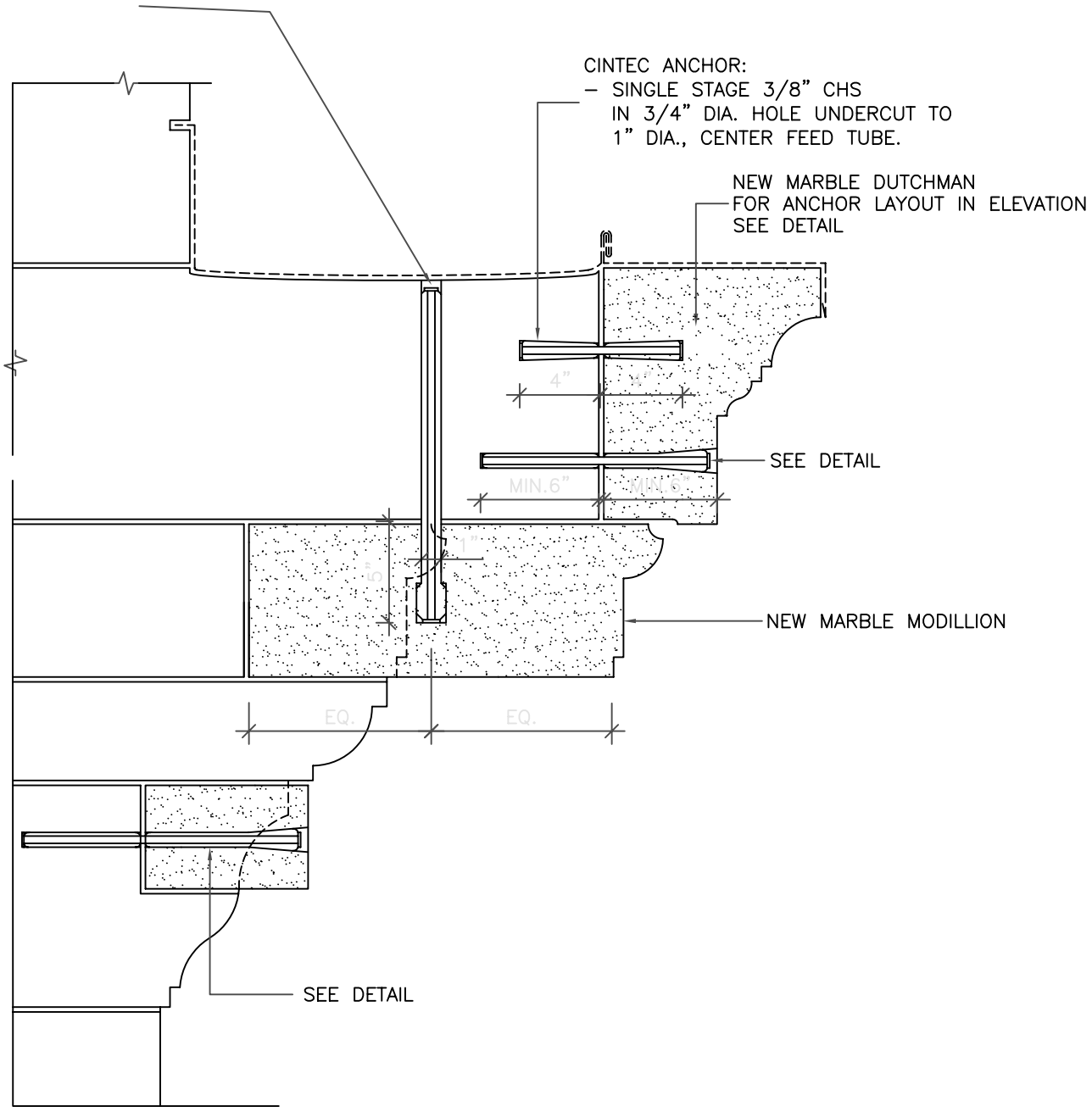
BTICK STABILIZATION

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: STONE
ANCHOR TYPE: SRT CORNICE STONE TIE
PRINCIPAL LOAD (FORCES) : TENSION

CINTEC ANCHOR:
– 3/8" SOLID ST. STEEL ROD WITH WELDED END PLATES IN 1" DIA. HOLE UNDERCUT LOWER END TO 1 1/4" DIA.



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title

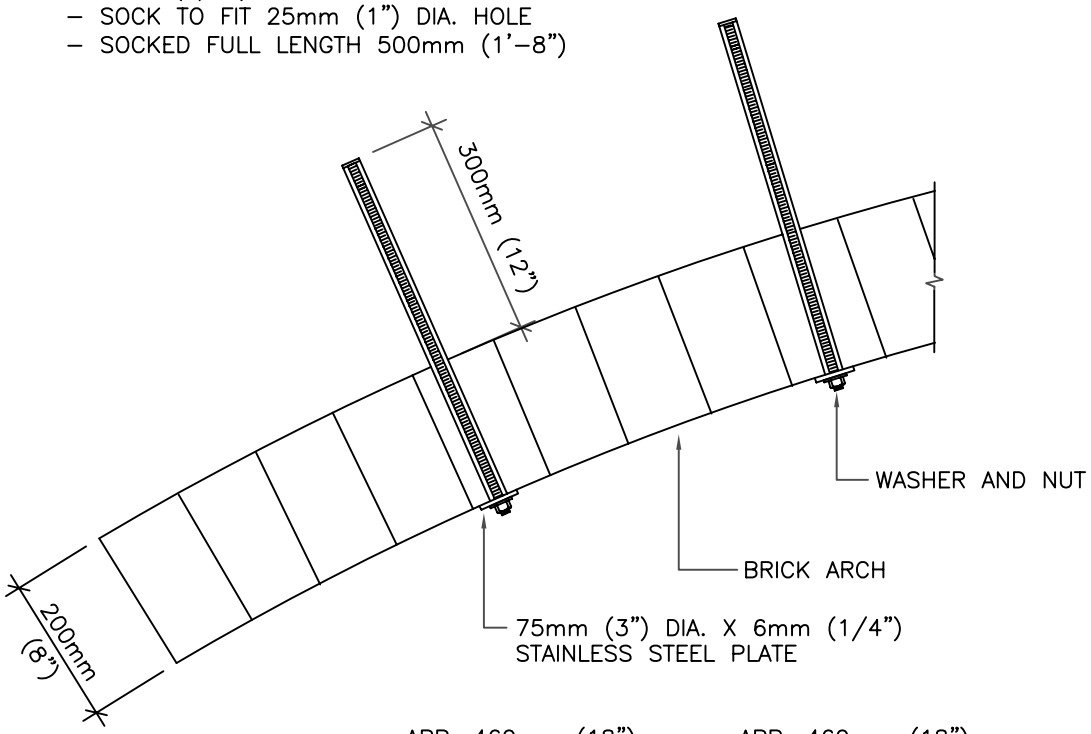
Drawing Title
CORNICE SECTION
CINTEC ANCHOR LAYOUT

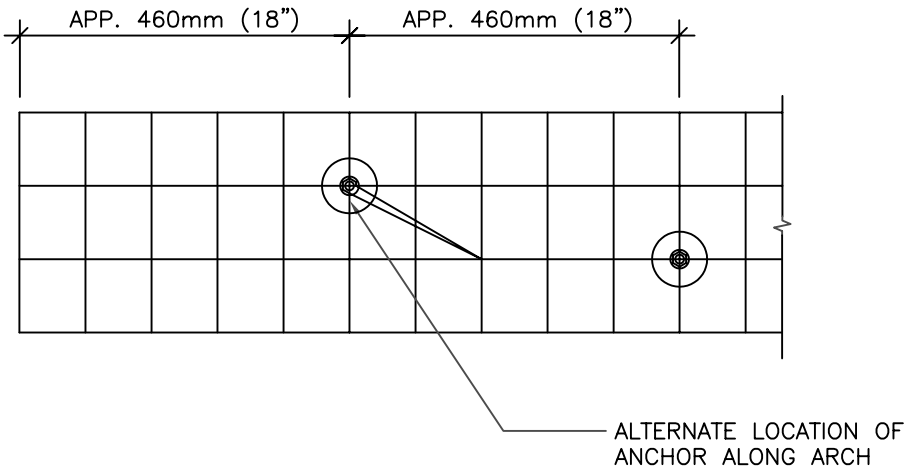
Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: BRICK
ANCHOR TYPE: SRT ARCH TIE
PRINCIPAL LOAD (FORCES) :
TENSION

CINTEC ANCHOR:
– 12mm(1/2") DIA. STAINLESS STEEL THREADED ROD
– SOCK TO FIT 25mm (1") DIA. HOLE
– SOCKED FULL LENGTH 500mm (1'–8")





SECTION 1–1

CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

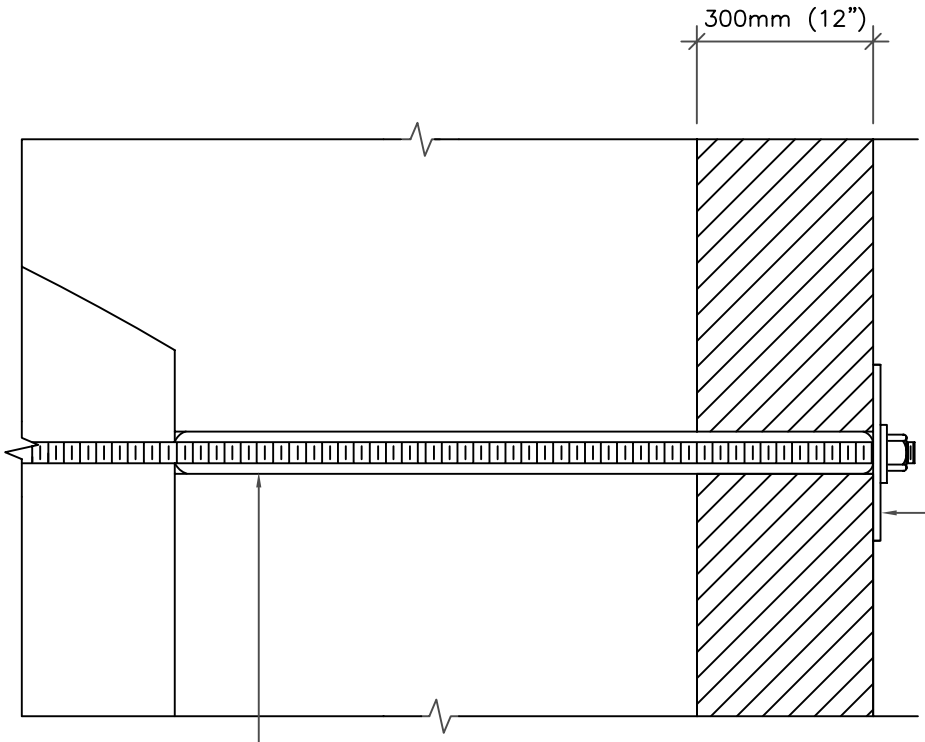
Project Title

Drawing Title
ARCH ANCHORS

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: BRICK
ANCHOR TYPE: SRT STONE WALL TIE
PRINCIPAL LOAD (FORCES) : TENSION



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

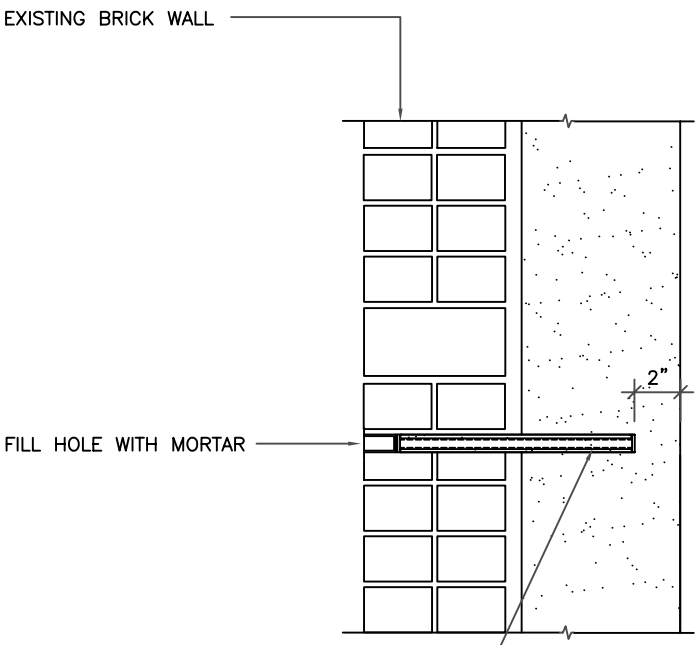
Project Title

Drawing Title
EXTERIOR PLATE

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: BRICK
ANCHOR TYPE: CHS WALL TIE
PRINCIPAL LOAD (FORCES) :
TENSION



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

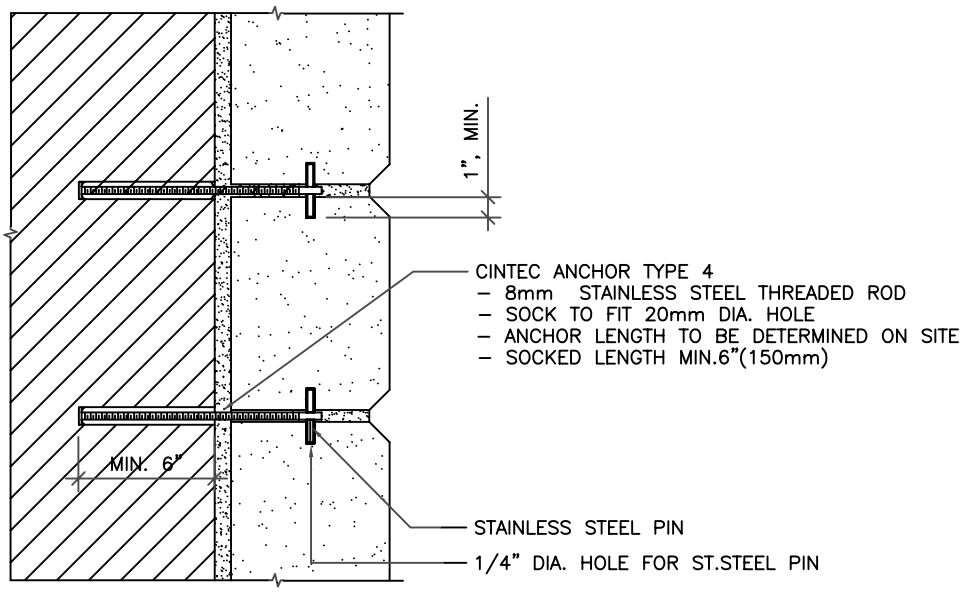
Project Title

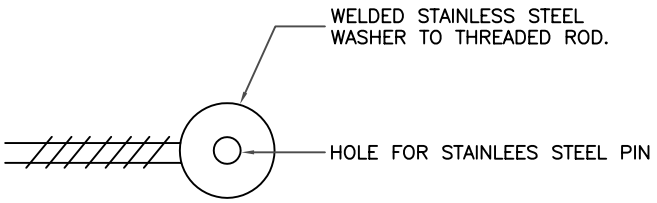
Drawing Title
CINTEC ANCHOR

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: BRICK
ANCHOR TYPE: CHS WALL TIE
PRINCIPAL LOAD (FORCES) :
TENSION





DETAIL A
NTS

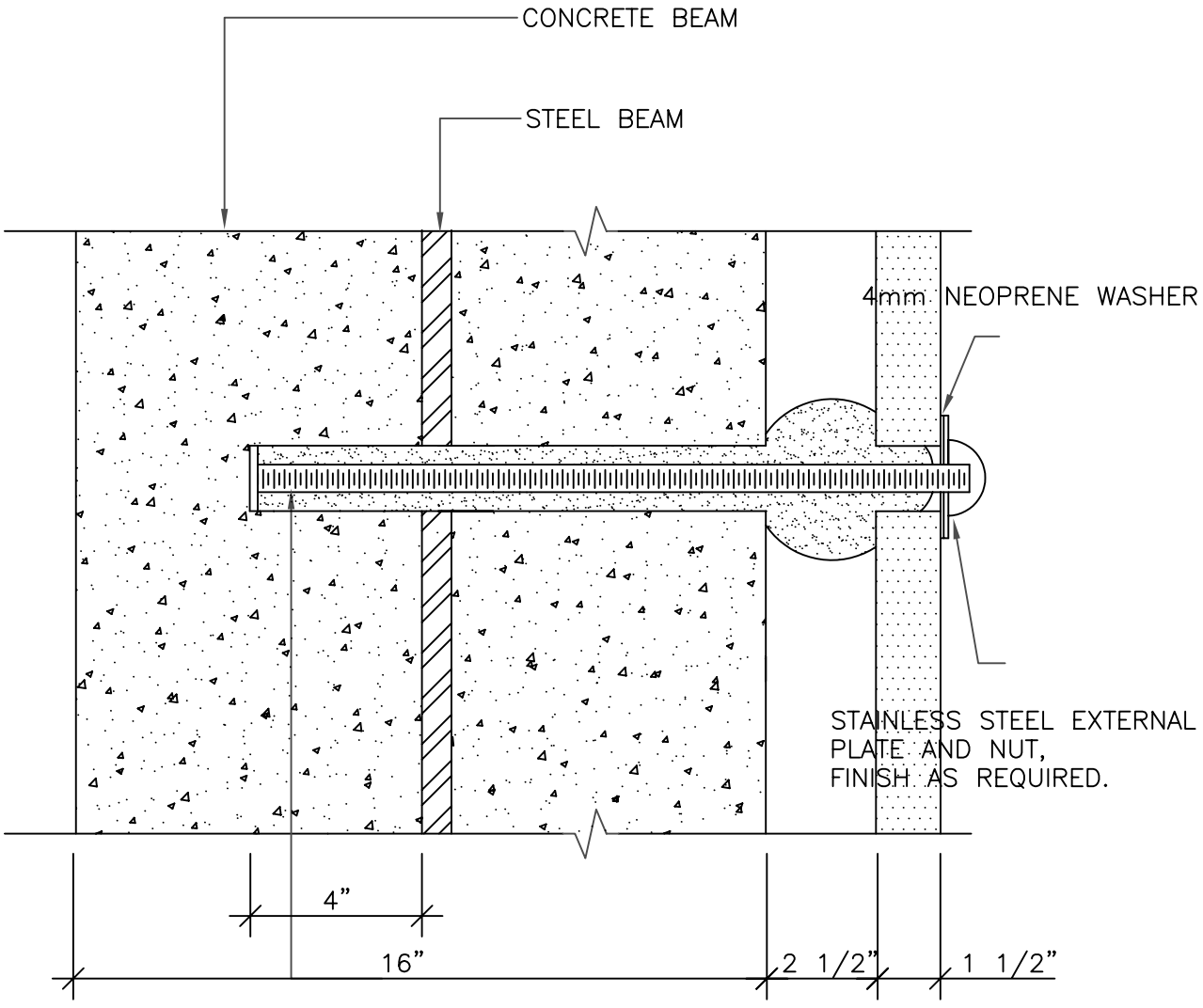
CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title

Drawing Title
CINTEC ANCHOR
STONE STABILIZATION

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: STEEL
ANCHOR TYPE: SRT STONE VENEER TIE
PRINCIPAL LOAD (FORCES) : TENSION



CINTEC ANCHOR
M16 THREADED ROD FOR SUPPORT ANCHORS AT BOTTOM OF PANEL.
M8 THREADED ROD FOR TIE ANCHORS AT TOP OF PANEL.

CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

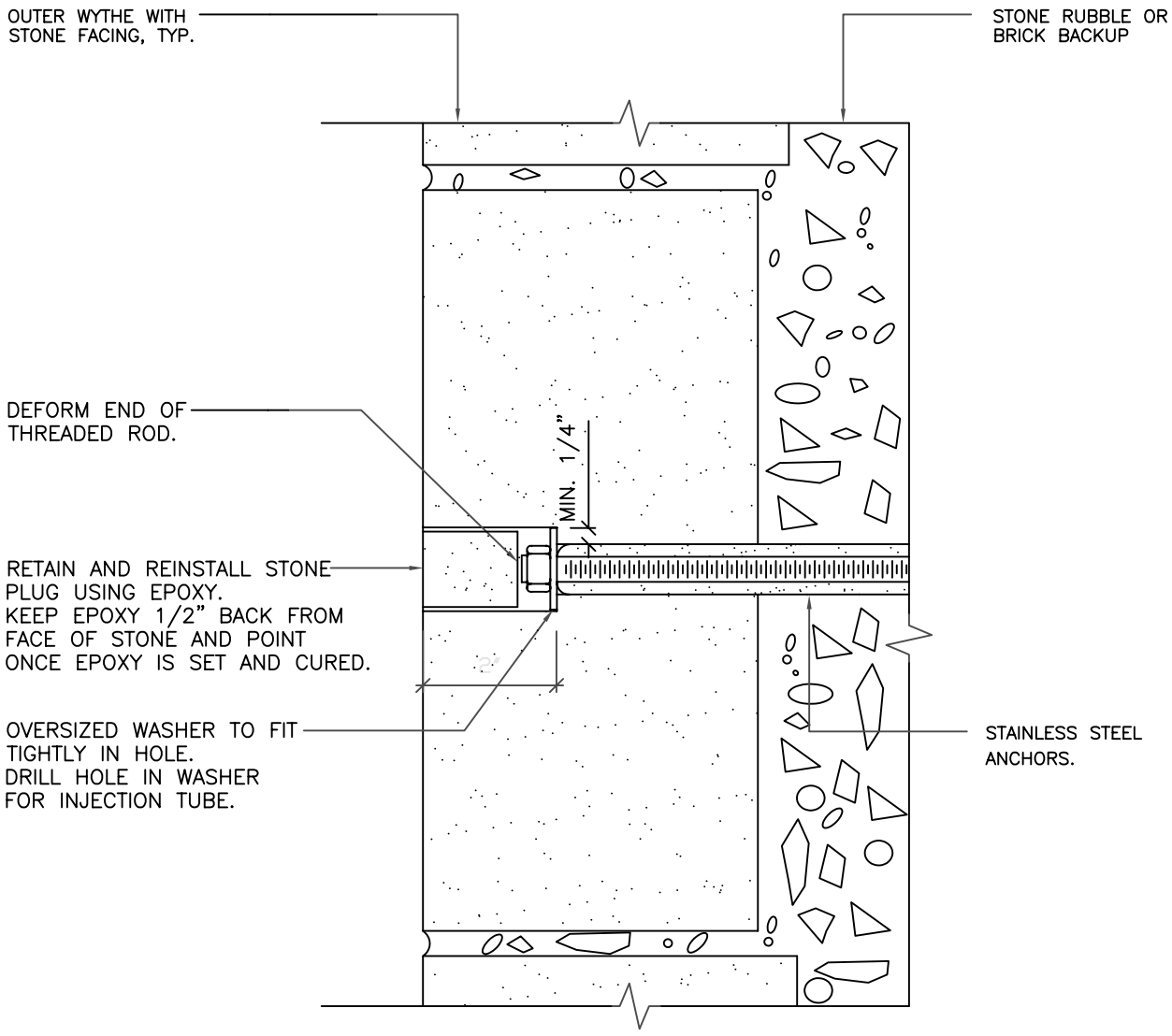
Project Title

Drawing Title
THIN FACADE SUPPORT ANCHOR

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: BRICK
ANCHOR TYPE: SRT STONE VENEER TIE
PRINCIPAL LOAD (FORCES) : TENSION



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

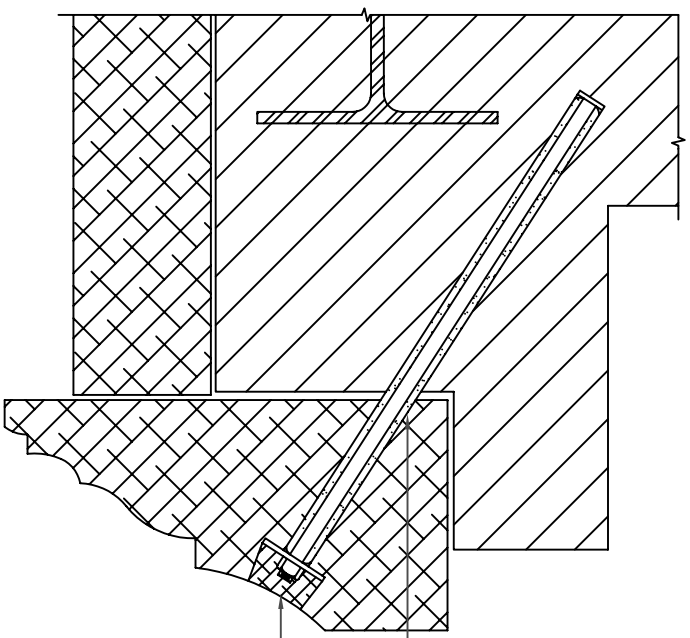
Project Title

Drawing Title
STONE VENEER STABILIZATION

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: BRICK
ANCHOR TYPE: SRT STONE
LINTEL REINFORCEMENT
PRINCIPAL LOAD (FORCES) :
TENSION



RETAIN AND REINSTALL MARBLE PLUG USING EPOXY, OR USING MORTAR PLUG TO MATCH EXISTING MARBLE. KEEP EPOXY 1/2" BACK FROM FACE OF MARBLE AND POINT ONCE EPOXY IS SET AND CURED.

CINTEC ANCHOR:
- STAINLESS STEEL THREADED ROD
- SOCK TO FIT
- SOCK FULL LENGTH
- OVERSIZED WASHER

CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title

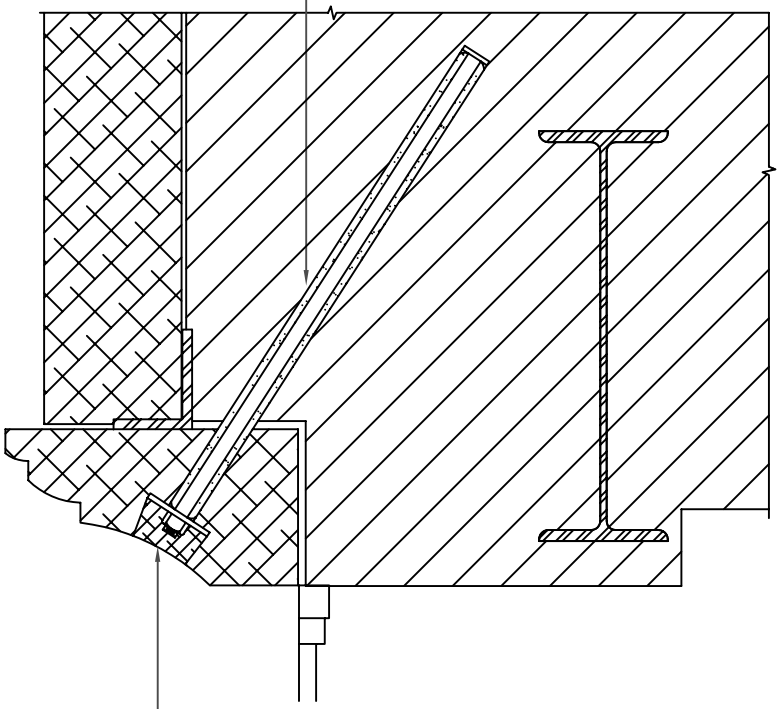
Drawing Title
LINTEL ANCHORS

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: BRICK
ANCHOR TYPE: SRT STONE
LINTEL REINFORCEMENT
PRINCIPAL LOAD (FORCES) :
TENSION

CINTEC ANCHOR:
– STAINLESS STEEL THREADED ROD
– SOCK TO FIT
– SOCK FULL LENGTH
– OVERSIZED WASHER



RETAIN AND REINSTALL MARBLE PLUG USING EPOXY,
OR USING MORTAR PLUG TO MATCH EXISTING MARBLE.
KEEP EPOXY 1/2" BACK FROM FACE OF MARBLE
AND POINT ONCE EPOXY IS SET AND CURED.

CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

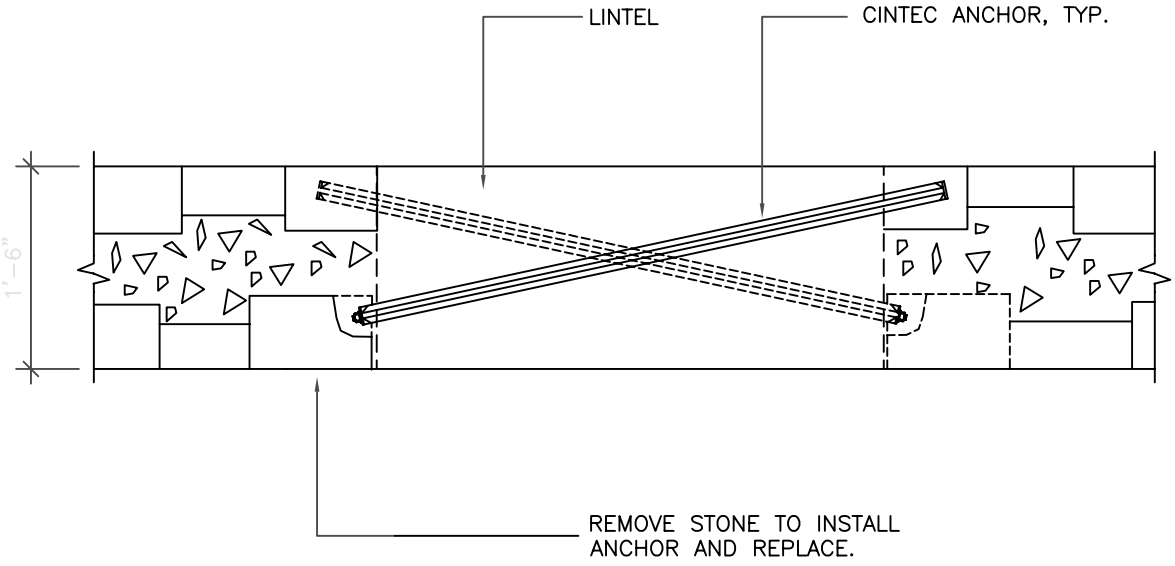
Project Title

Drawing Title
LINTEL ANCHORS

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: STONE
ANCHOR TYPE: SRT STONE
LINTEL REINFORCEMENT
PRINCIPAL LOAD (FORCES) :
TENSION



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

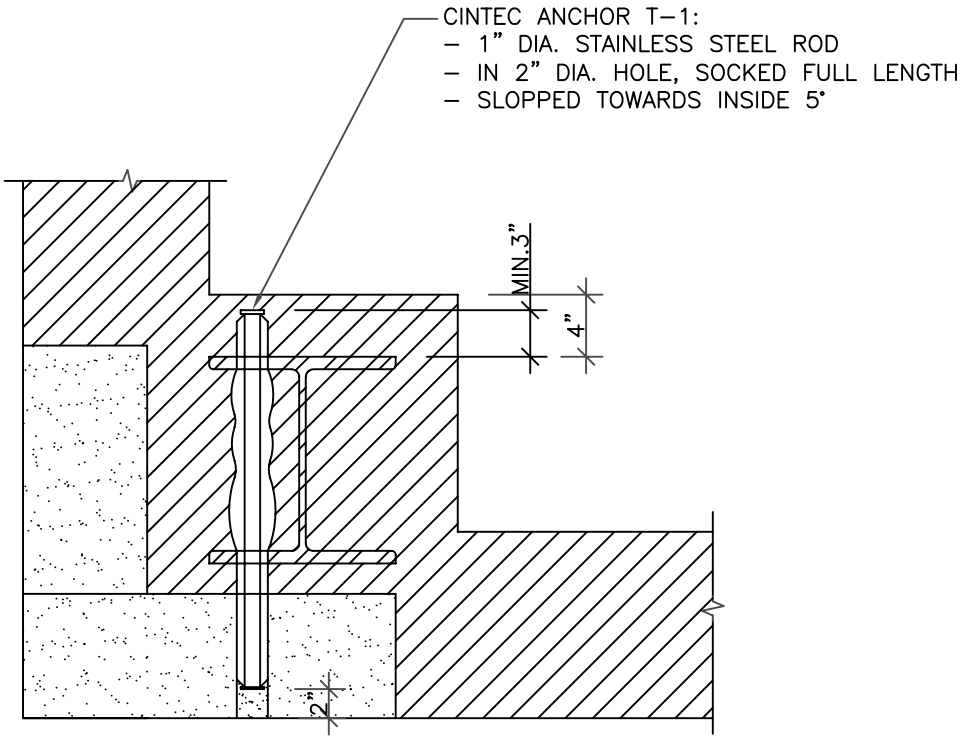
Project Title

Drawing Title
STONE LINTEL ANCHORS

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: STEEL
ANCHOR TYPE: SRT STONE
CORNER CARVING
PRINCIPAL LOAD (FORCES) :
COMBINED



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

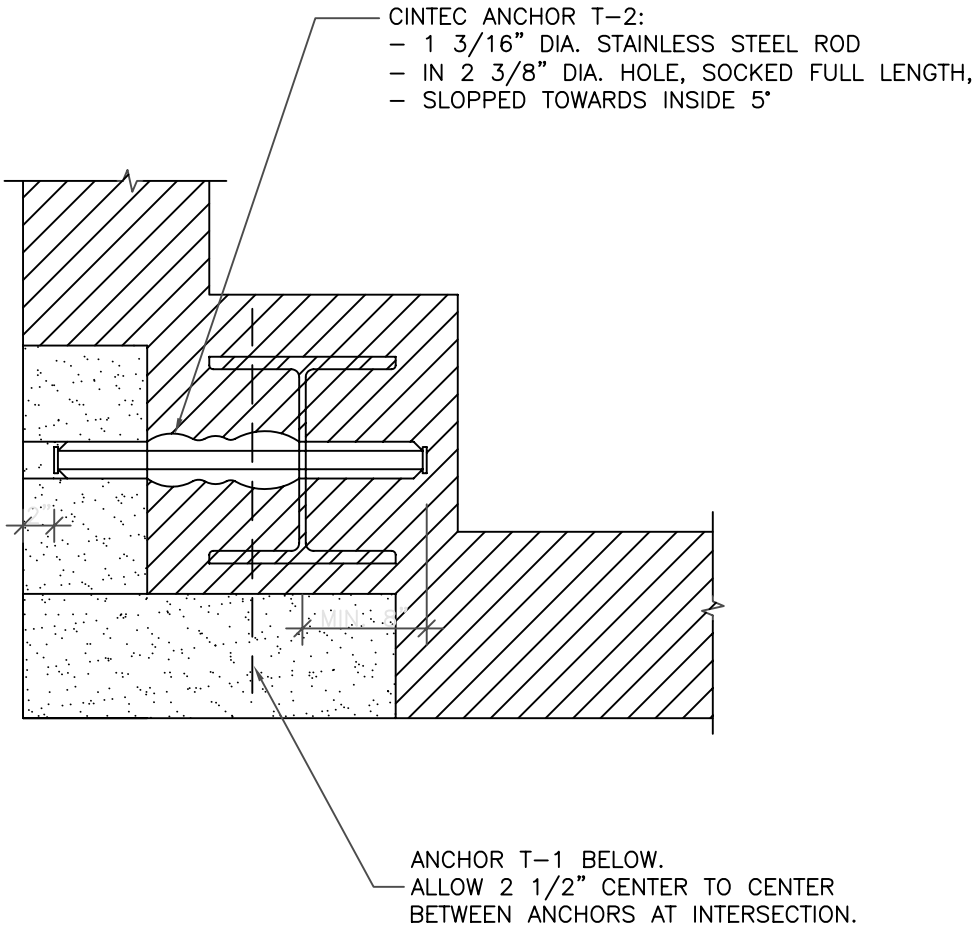
Project Title

Drawing Title
CORNER STONE ANCHORAGE

Revision

Drawing No. SK.01

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: STEEL
ANCHOR TYPE: SRT STONE
CORNER CARVING
PRINCIPAL LOAD (FORCES) :
COMBINED



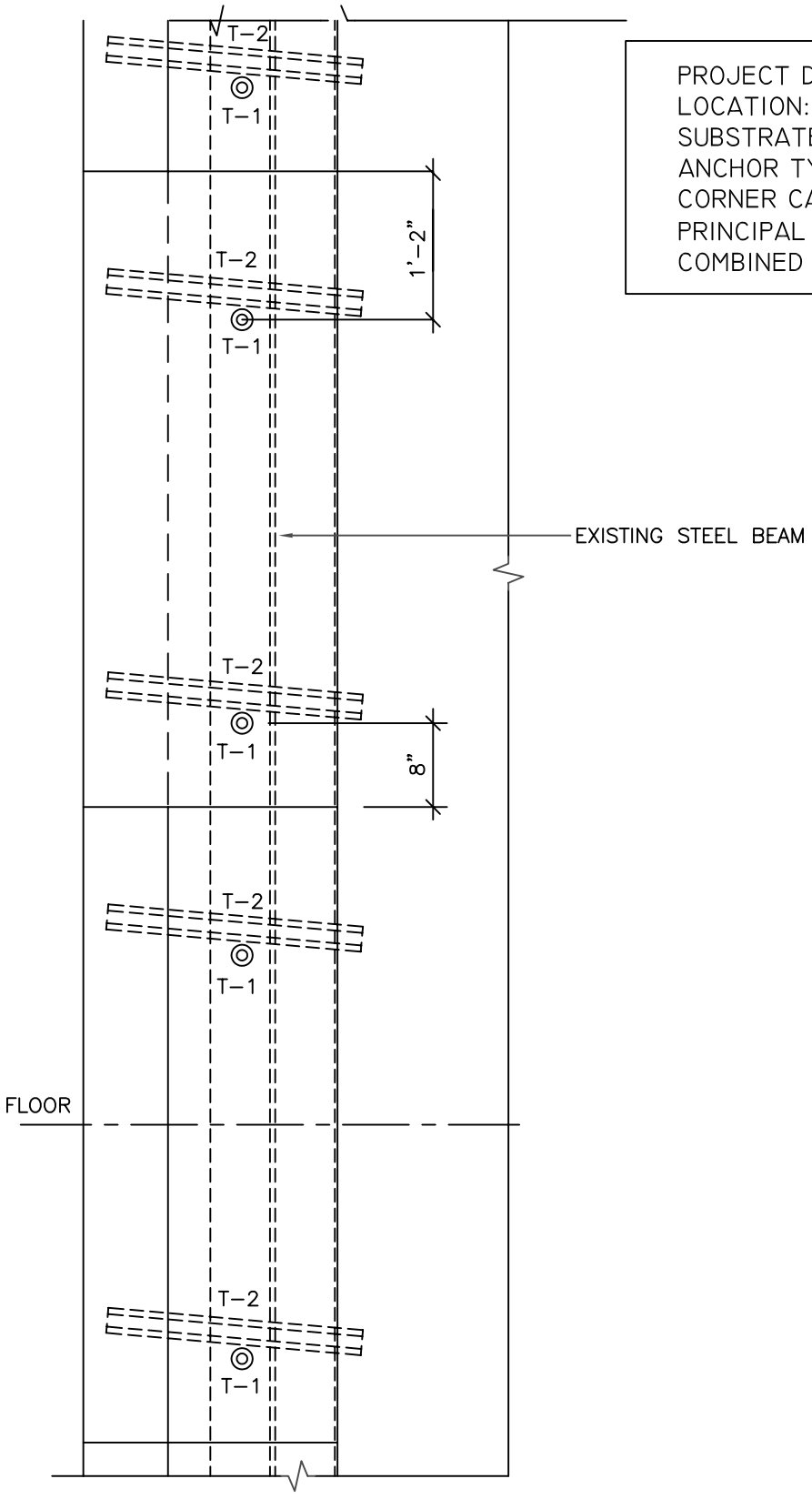
CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title

Drawing Title
CORNER STONE ANCHORAGE

Revision

Drawing No. SK–



PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: STEEL
ANCHOR TYPE: SRT STONE
CORNER CARVING
PRINCIPAL LOAD (FORCES) :
COMBINED

CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

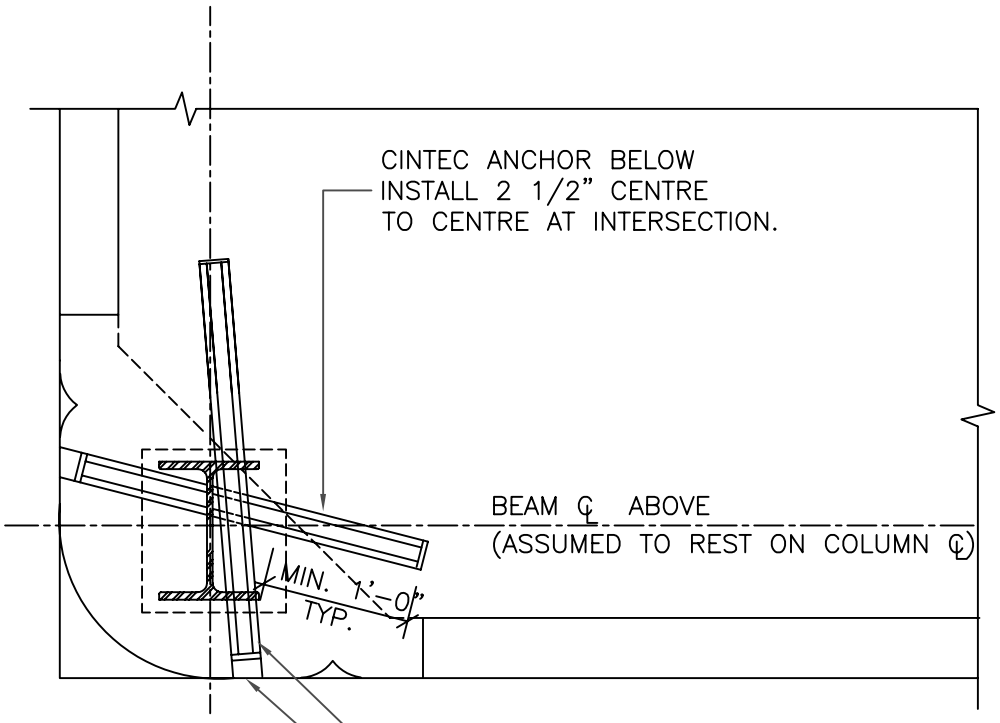
Project Title

Drawing Title
CORNER STONE ANCHORAGE

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: STEEL
ANCHOR TYPE: SRT STONE
CORNER CARVING
PRINCIPAL LOAD (FORCES) :
COMBINED



RETAIN AND REINSTALL STONE PLUG USING EPOXY. KEEP EPOXY 1/2" BACK FROM FACE OF STONE AND POINT ONCE EPOXY IS SET AND CURED, OR COLOR MATCHED MORTAR PLUG.

CINTEC ANCHOR:
- 30mmø STAINLESS STEEL ROD (1 1/4"ø)
- 60mmø HOLE (2 1/2"ø)
- SOCKED FULL LENGTH

NOTES:

1. ORIENTATION OF STEEL COLUMN SHOULD BE DETERMINED PRIOR TO ANCHOR INSTALLATION.
2. IN EACH PAIR OF ANCHORS UPPER ANCHOR SHALL BE INSTALLED THROUGH BOTH COLUMN FLANGES.

CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

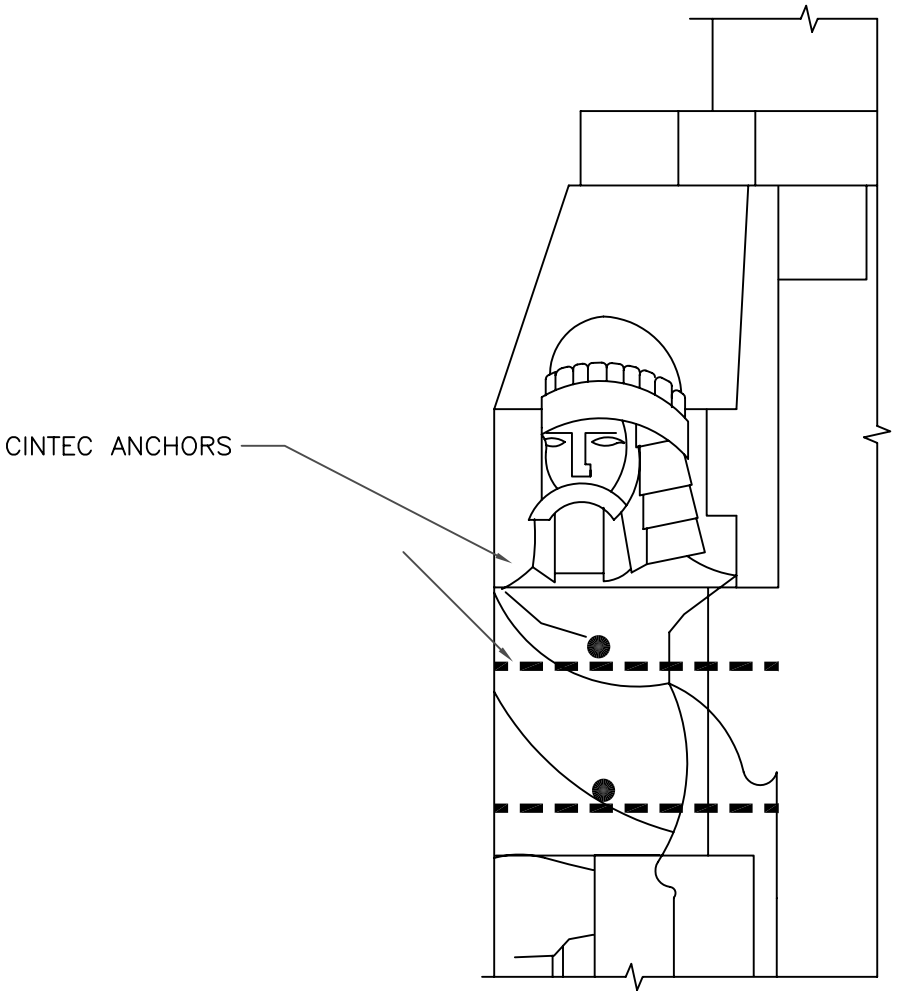
Project Title

Drawing Title
CORNER STONE ANCHORAGE

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: BRICK
ANCHOR TYPE: SRT CORNER STONE CARVING
PRINCIPAL LOAD (FORCES) : TENSION



NOTES:

– 4 CINTEC ANCHORS PER STONE

CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

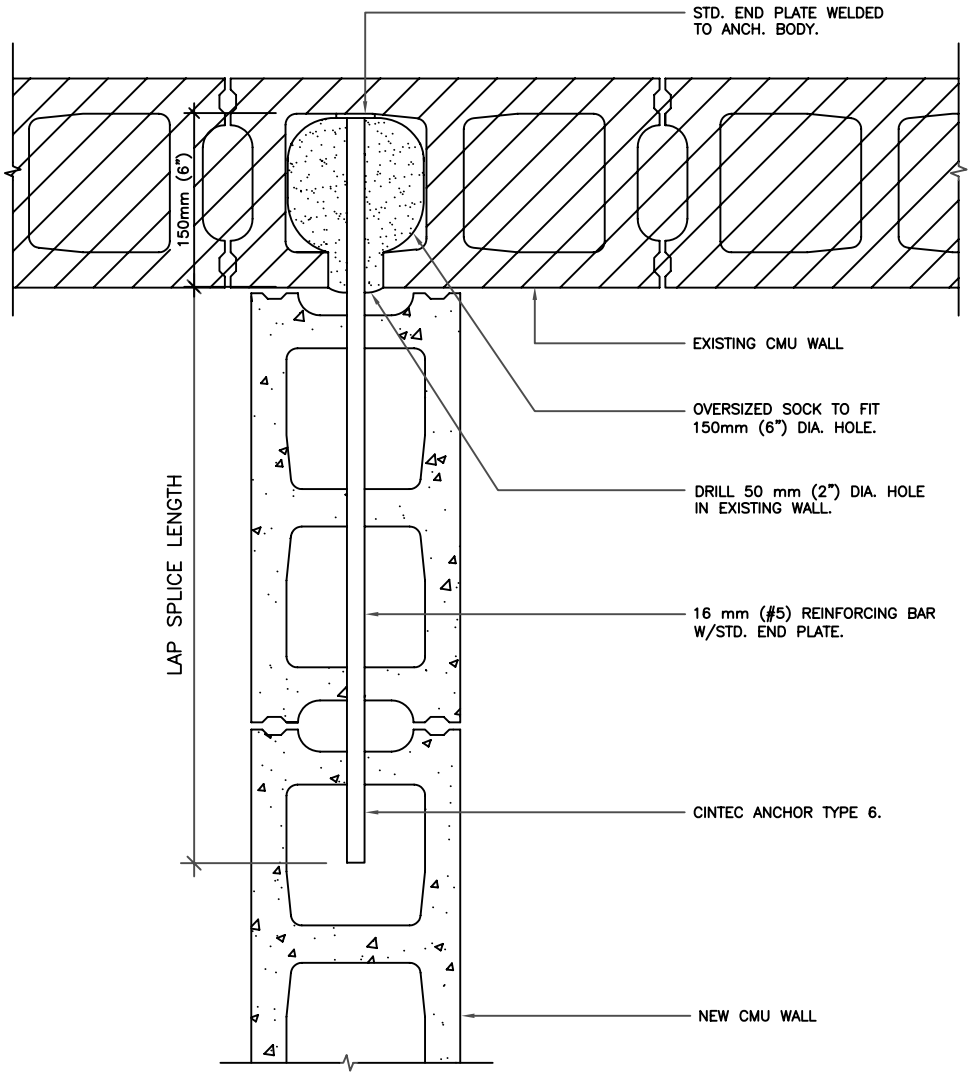
Project Title

Drawing Title
CORNER STONE ANCHORAGE

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: CMU
ANCHOR TYPE: SRT CMU
CORNER TIE
PRINCIPAL LOAD (FORCES) :
TENSION



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title

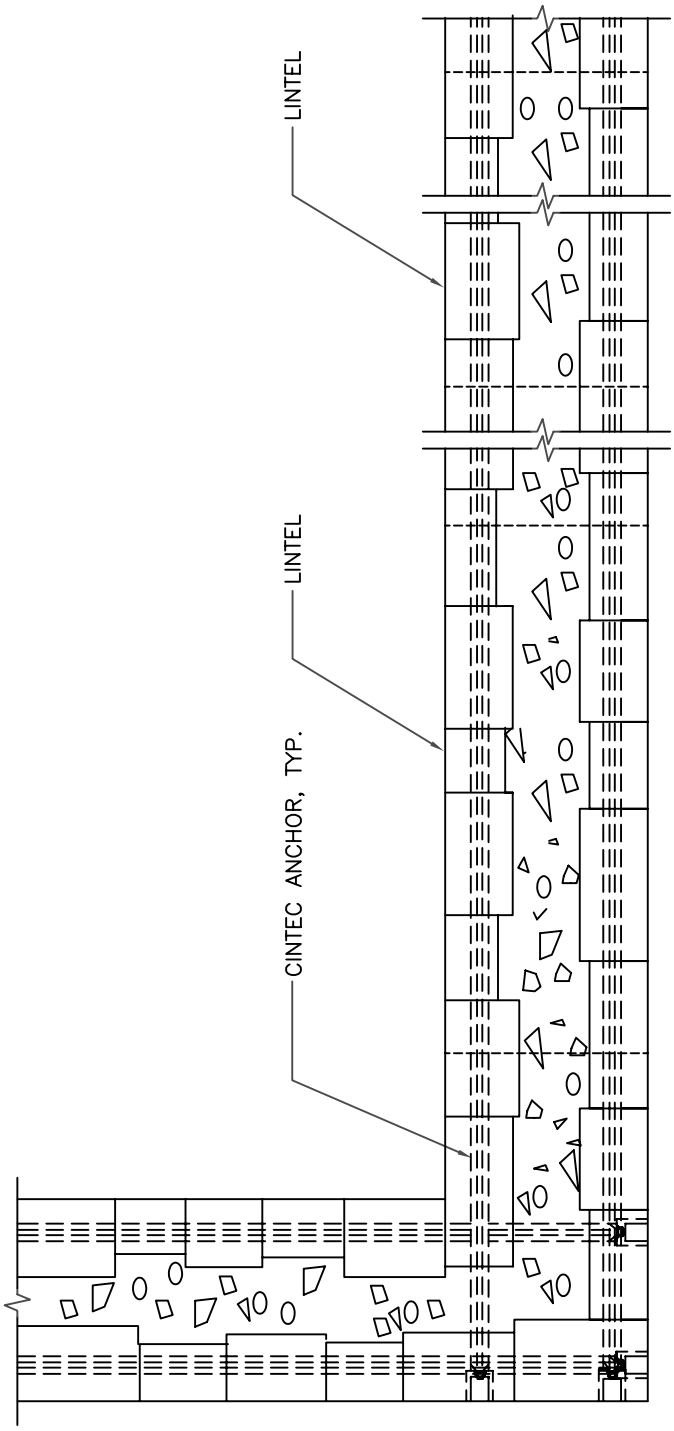
Drawing Title

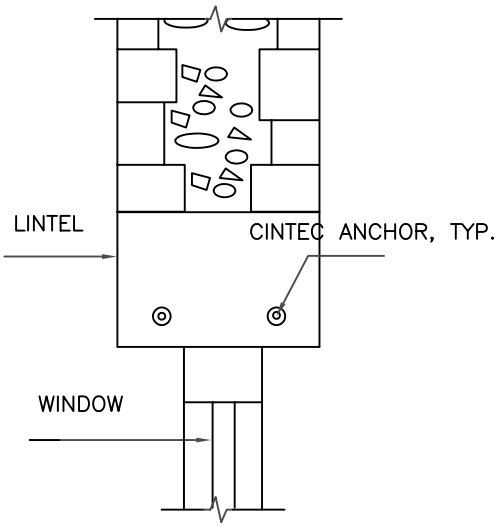
CINTEC ANCHOR

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: STONE
ANCHOR TYPE: SRT STONE
BELT COURSE
PRINCIPAL LOAD (FORCES) :
TENSION





CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title

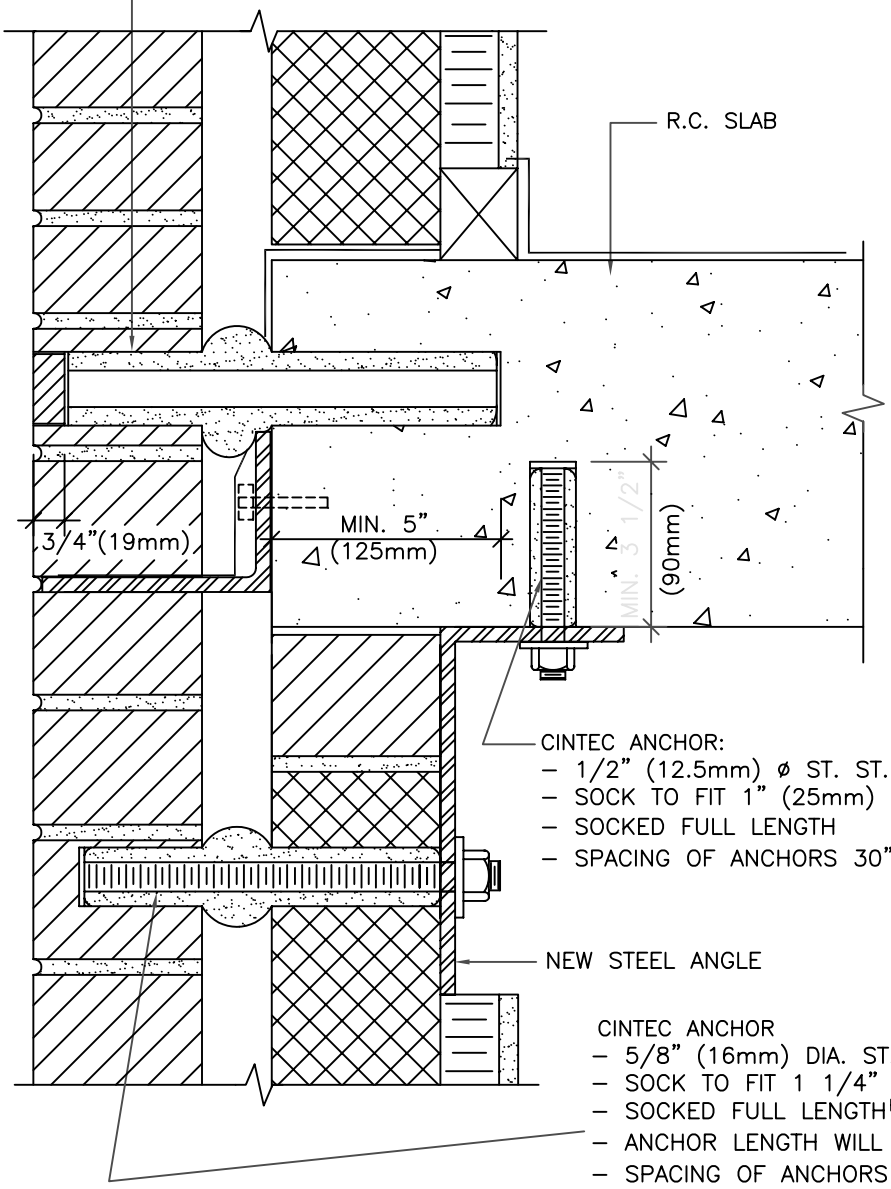
Drawing Title
CREATE "BELT COURSE" AROUND BUILDING

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: CONCRETE
ANCHOR TYPE: HSS BRICK CORBEL
PRINCIPAL LOAD (FORCES) :
COMBINED

CINTEC ANCHOR:
– 1" (25mm) DIA. STAINLESS STEEL ROD,
– SOCK TO FIT 2" (50mm) DIA. HOLE
– SOCKED FULL LENGTH
– ANCHOR LENGTH WILL BE DETERMINED BY CLIENT
– SPACING OF ANCHORS 18" (450mm).



Project Title

CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

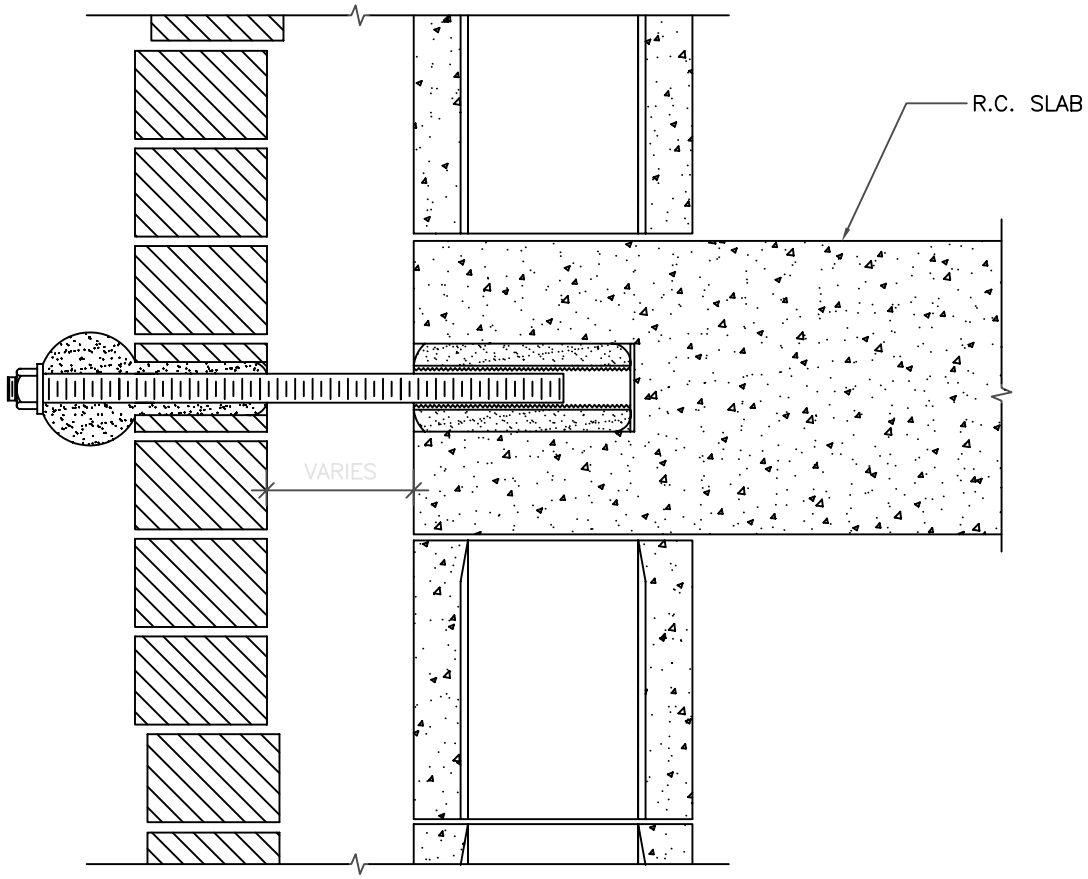
Drawing Title

BRICK PANEL
STABILIZATION ANCHORS

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: CONCRETE
ANCHOR TYPE: HSS BRICK CORBEL
PRINCIPAL LOAD (FORCES) :
COMBINED



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

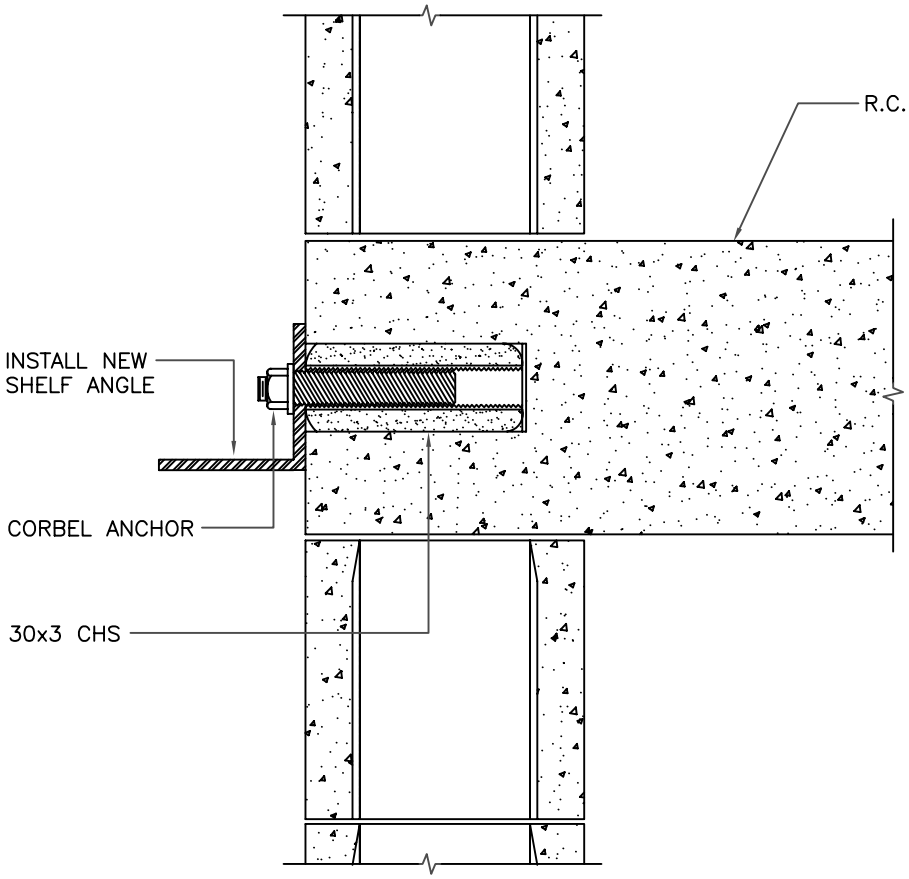
Project Title

Drawing Title
STABILIZATION PRIOR TO DISMANTLING

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: CONCRETE
ANCHOR TYPE: HSS BRICK CORBEL
PRINCIPAL LOAD (FORCES) :
COMBINED



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

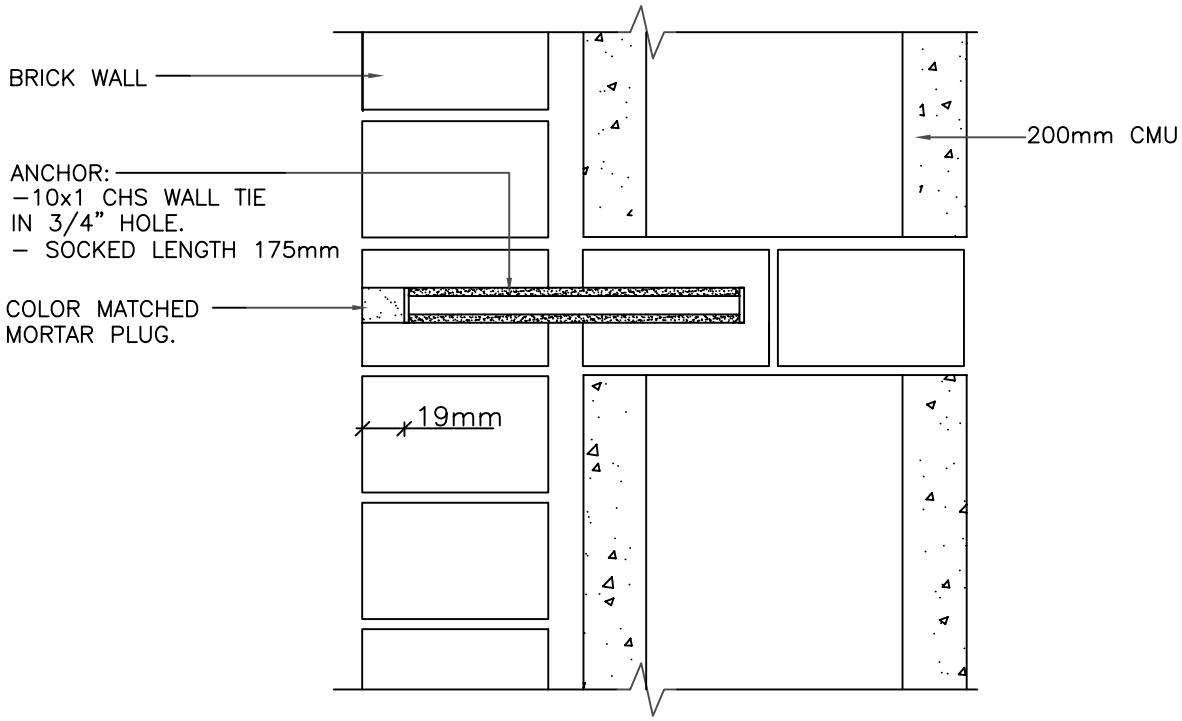
Project Title

Drawing Title
CORBEL ANCHOR

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: BRICK
ANCHOR TYPE: CHS BRICK HEADER TIE
PRINCIPAL LOAD (FORCES) : TENSION



NOTES:
1. WALL TIE ANCHOR TO BE INSTALLED AT 600mm VERTICAL SPACING AND 1000mm HORIZONTAL SPACING
2. ANCHORS SHOULD BE INSTALLED IN BRICK HEADER COURSES OR CONCRETE BLOCK

CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

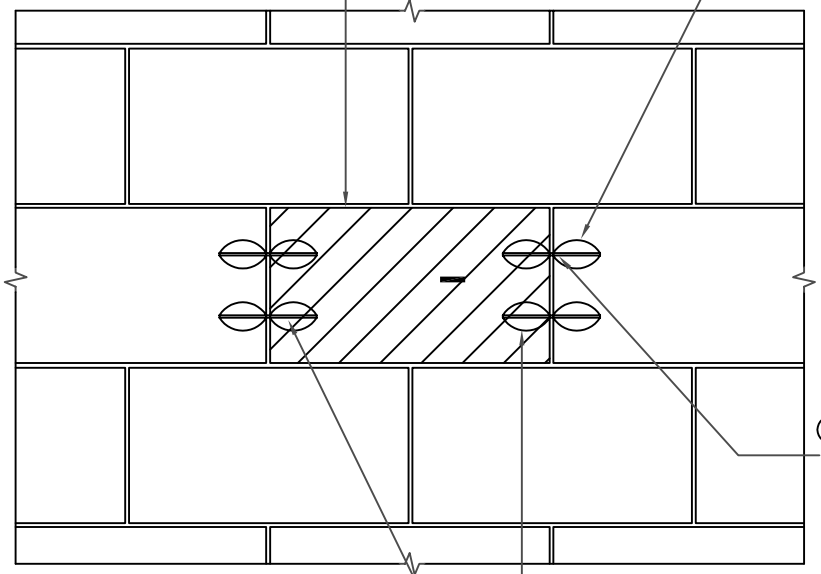
Project Title

Drawing Title
BRICK WALL STABILIZATION

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE:TERRA COTTA
ANCHOR TYPE: CHS TC
BLOCK REPLACEMENT TIE
PRINCIPAL LOAD (FORCES) :
TENSION



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

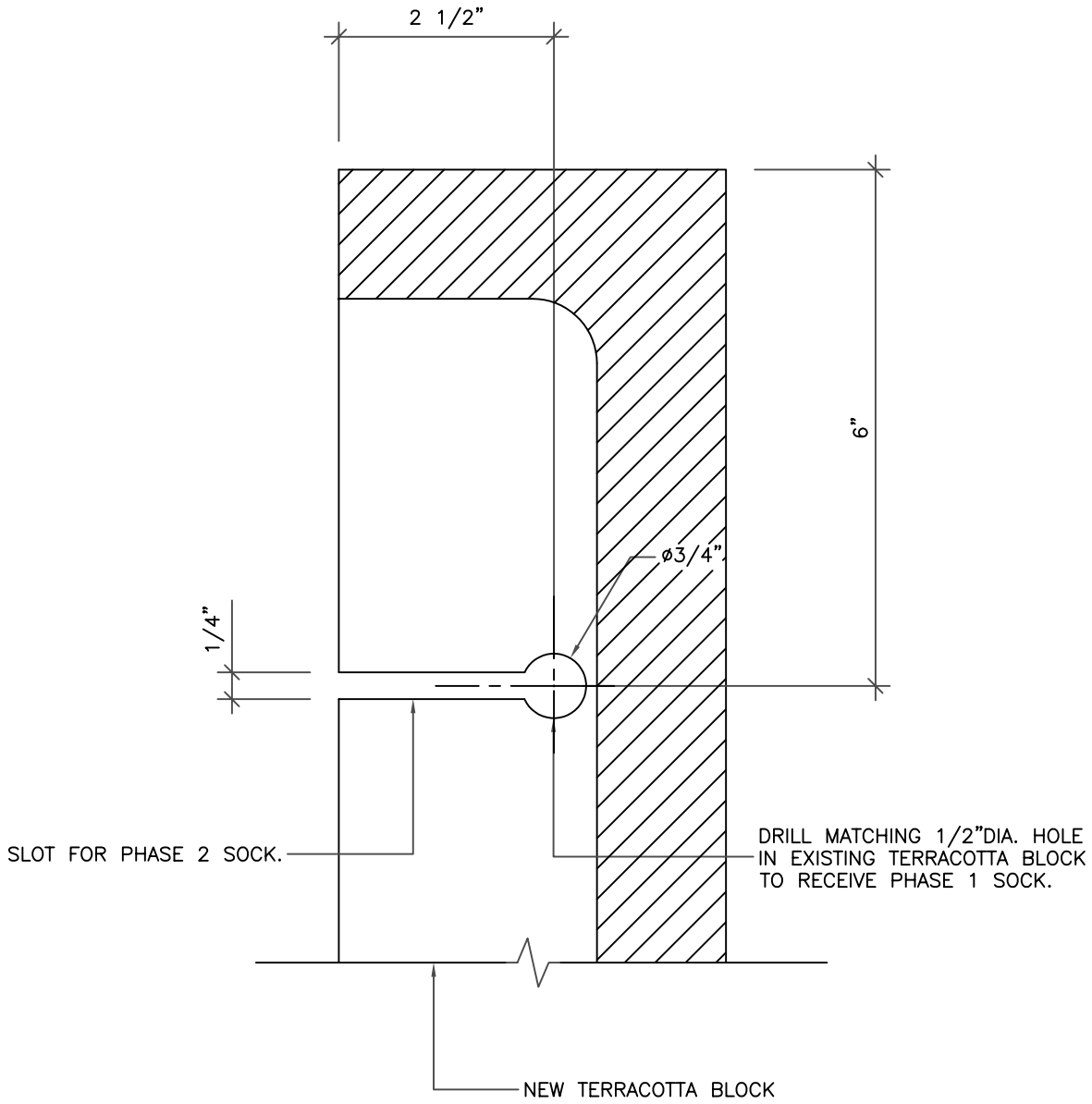
Project Title

Drawing Title
NEW TERRACOTTA BLOCK INSTALLATION

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: TERRA COTTA
ANCHOR TYPE: CHS TC
BLOCK REPLACEMENT TIE
PRINCIPAL LOAD (FORCES) :
TENSION



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

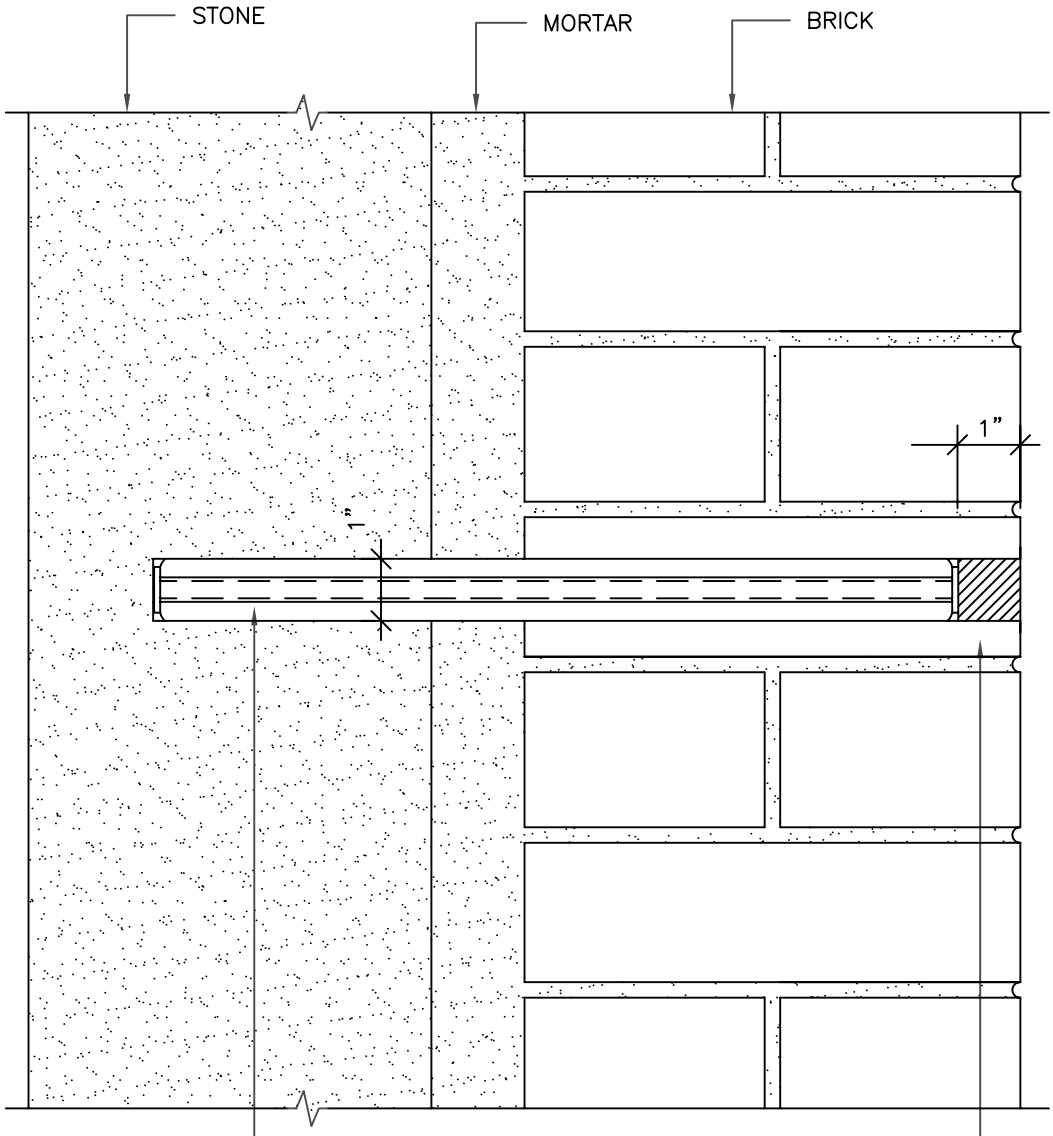
Project Title

Drawing Title
NEW TERRACOTTA BLOCK INSTALLATION DETAIL

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: BRICK
ANCHOR TYPE: CHS STONE VENEER TIE
PRINCIPAL LOAD (FORCES) : COMBINED



CINTEC ANCHOR:
– 3/8" DIA. CHS
– SOCKED FULL LENGTH
– LENGTH TO BE DETERMINED ON SITE

RESTORE HOLE AS PER ARCHITECT'S INSTRUCTION

CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

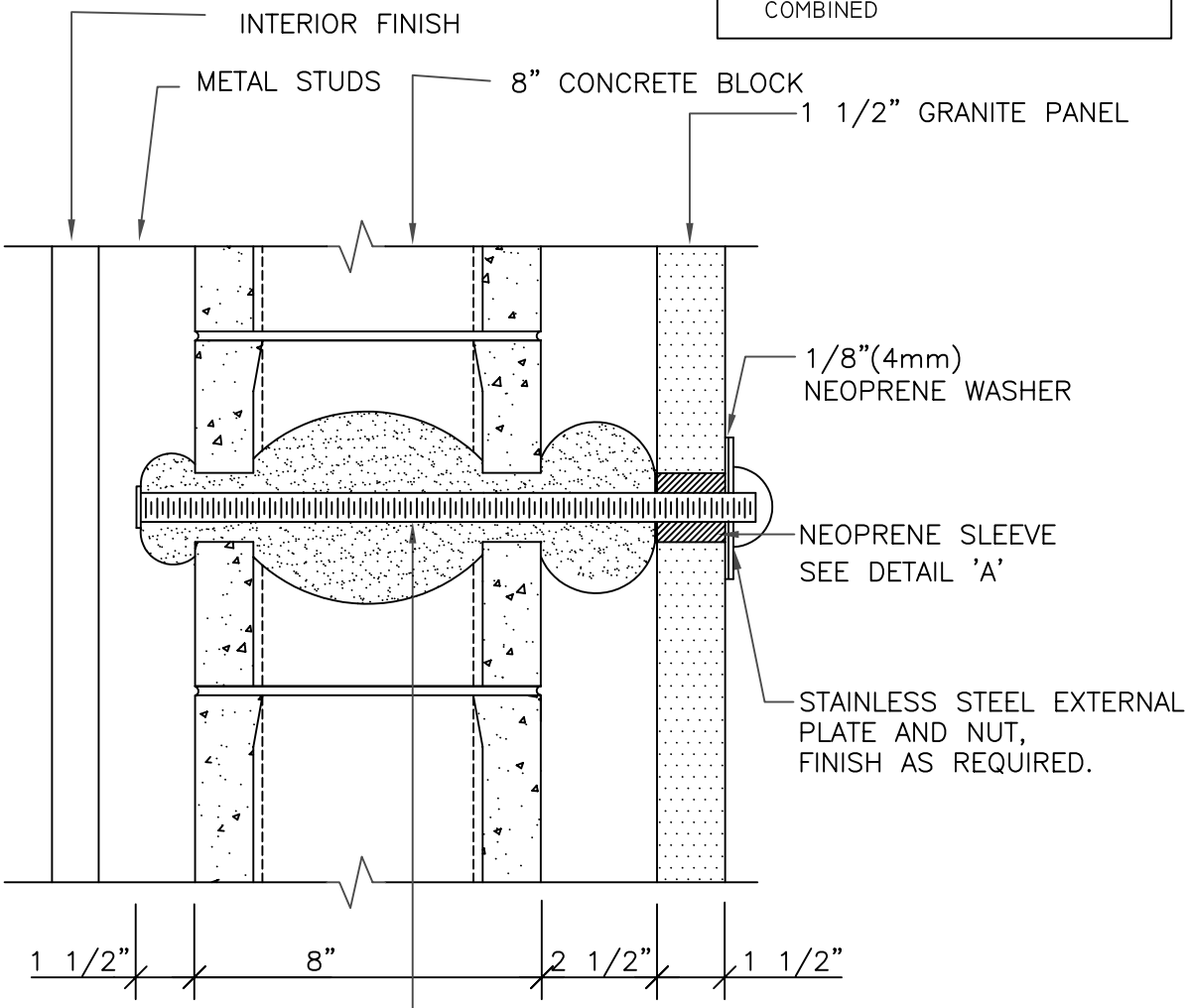
Project Title

Drawing Title
CINTEC ANCHOR

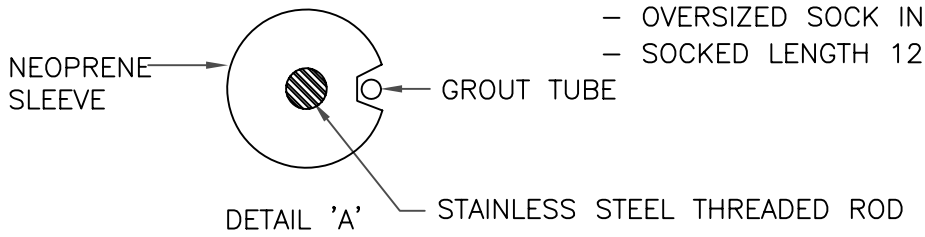
Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: CMU
ANCHOR TYPE: SRT STONE VENEER TIE
PRINCIPAL LOAD (FORCES) : COMBINED



SUPPORT ANCHORS AT BOTTOM OF PANEL:
– 7/8"ø(22mm) STAINLESS STEEL THREADED ROD
– OVERSIZED SOCK IN 1 3/4" ø HOLE
– SOCKED LENGTH 12"(300mm)



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

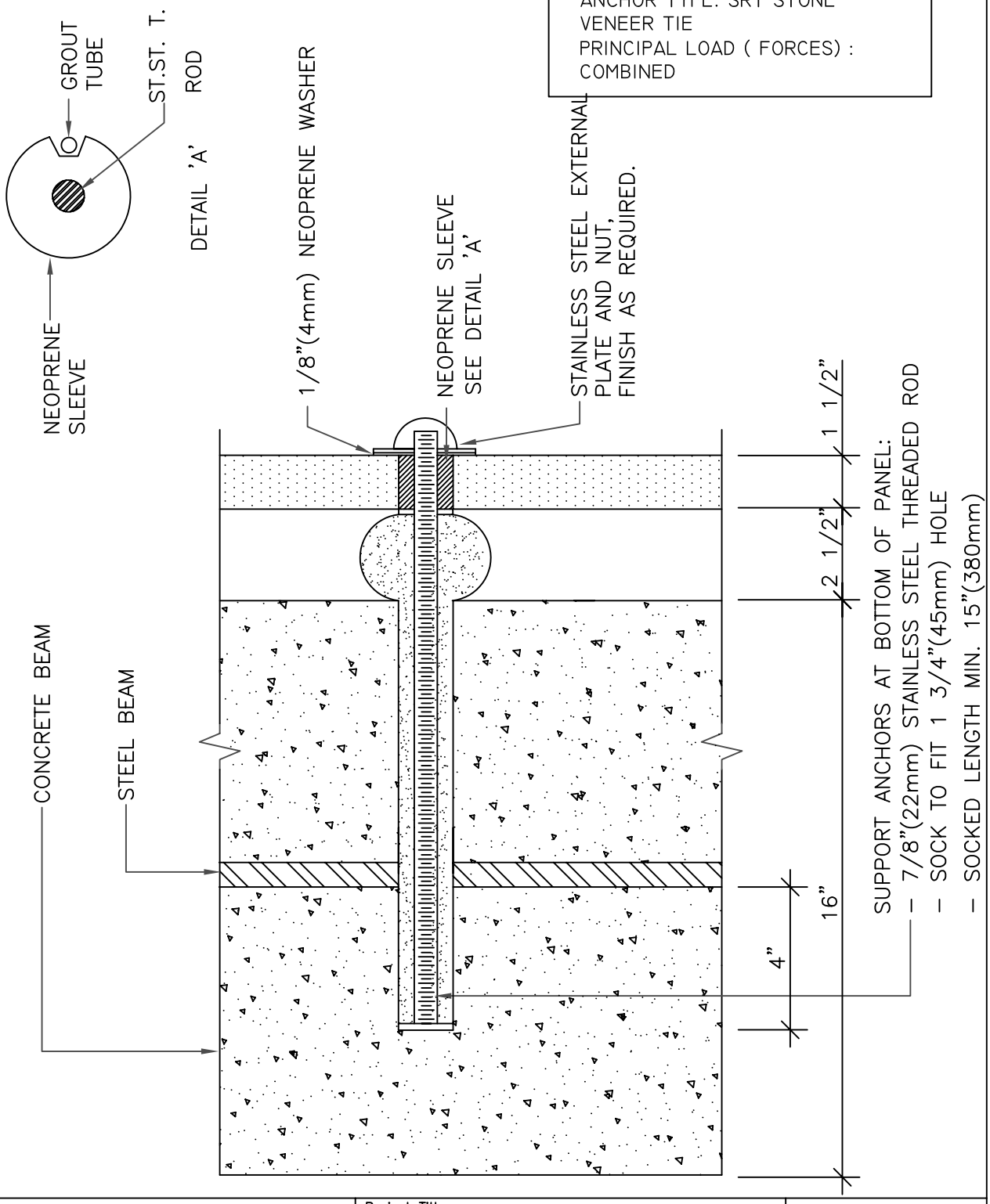
Project Title

Drawing Title
PANEL SUPPORT ANCHOR IN CONCRETE BLOCK

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: STEEL
ANCHOR TYPE: SRT STONE VENEER TIE
PRINCIPAL LOAD (FORCES) : COMBINED



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

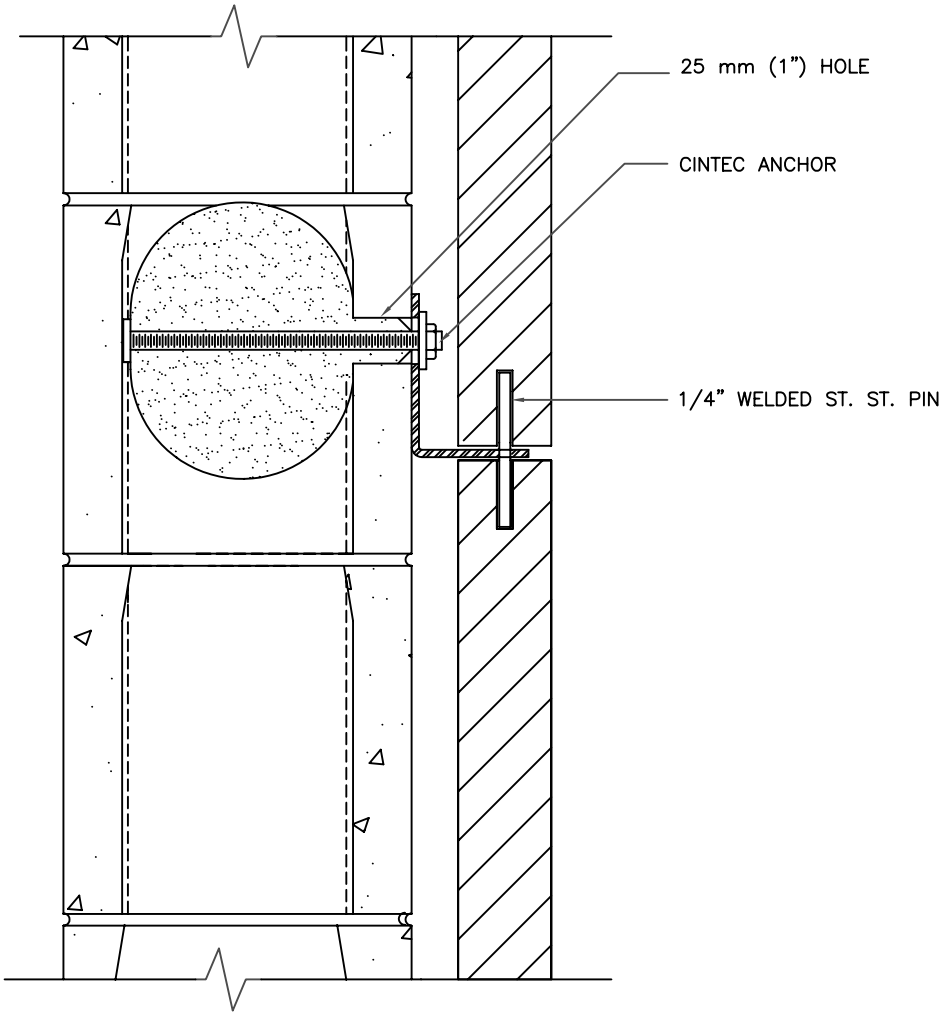
Project Title

Drawing Title
PANEL SUPPORT ANCHOR IN CONCRETE BEAM

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: CMU
ANCHOR TYPE: SRT STONE VENEER TIE
PRINCIPAL LOAD (FORCES) : COMBINED



CINTEC ANCHOR

- 10 mm (3/8") THREADED ROD W/STD. END PLATE C/W WASHER AND NUT AS PER DETAIL
- OVERALL LENGTH 200 mm (8")
- SOCKED LENGTH 160 mm (6 1/4")
- OVERSIZED SOCK TO FIT 150 mm (6") DIA. HOLE
- DRILL HOLE DIA. 25 mm (1")

CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title

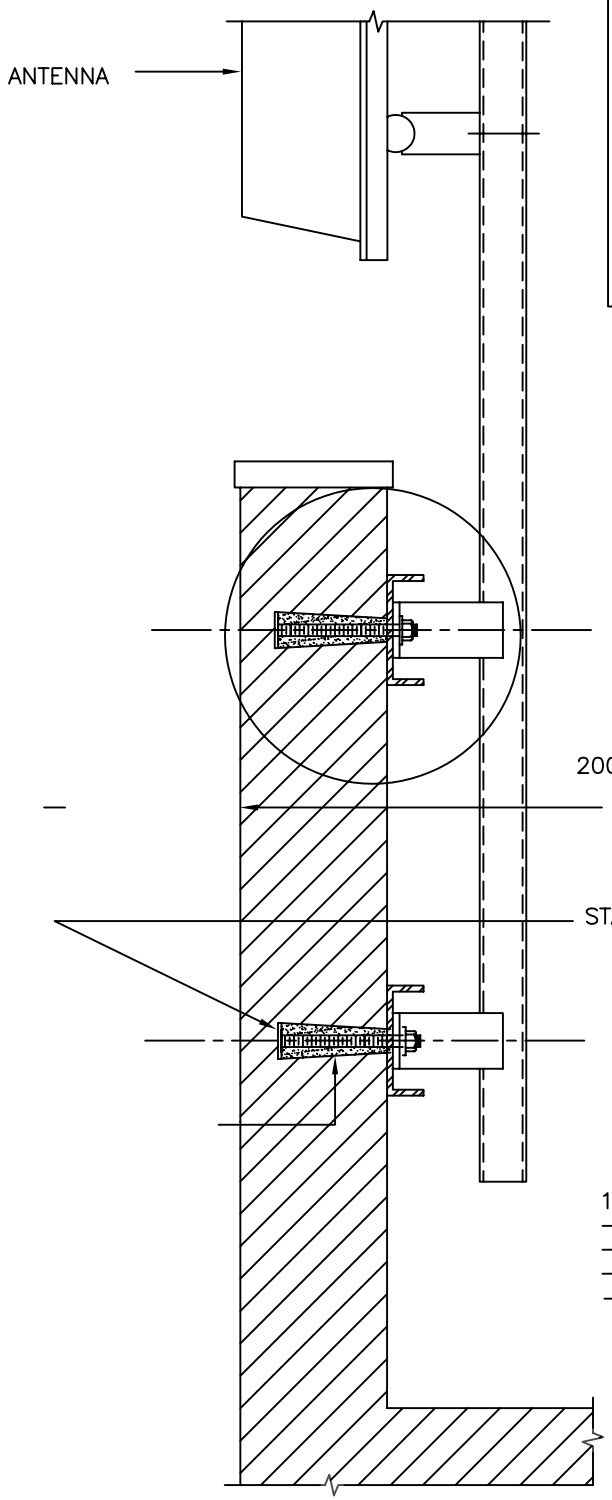
Drawing Title

STONE ANCHORING DETAIL

Revision 00

Drawing No. SK.01

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: BRICK
ANCHOR TYPE: SRT
PARAPET ANTENNA
MOUNTING ANCHOR
PRINCIPAL LOAD (FORCES) :
COMBINED



16mm (5/8") CINTEC ANCHOR
- STAINLESS STEEL THREADED ROD
- SOCK TO FIT 32mm (1 1/4") DIA. HOLE
- SOCK LENGTH 150mm (6")
- UNDER-CUT HOLE BY 5° BY ROTATING THE TIP OF THE DRILL BIT.

CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

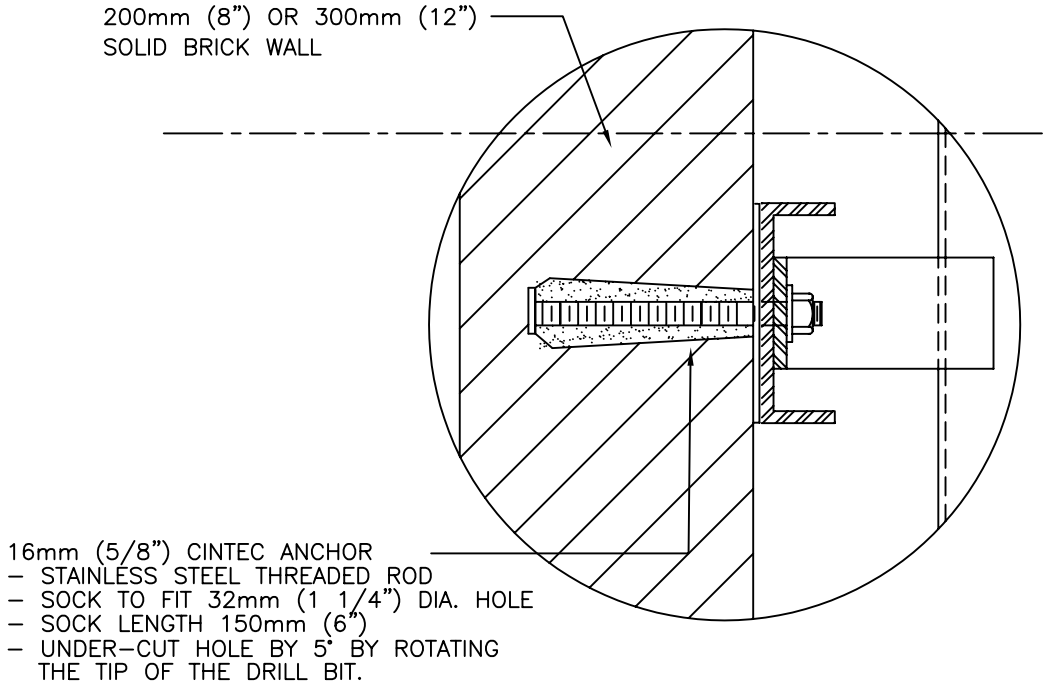
Project Title

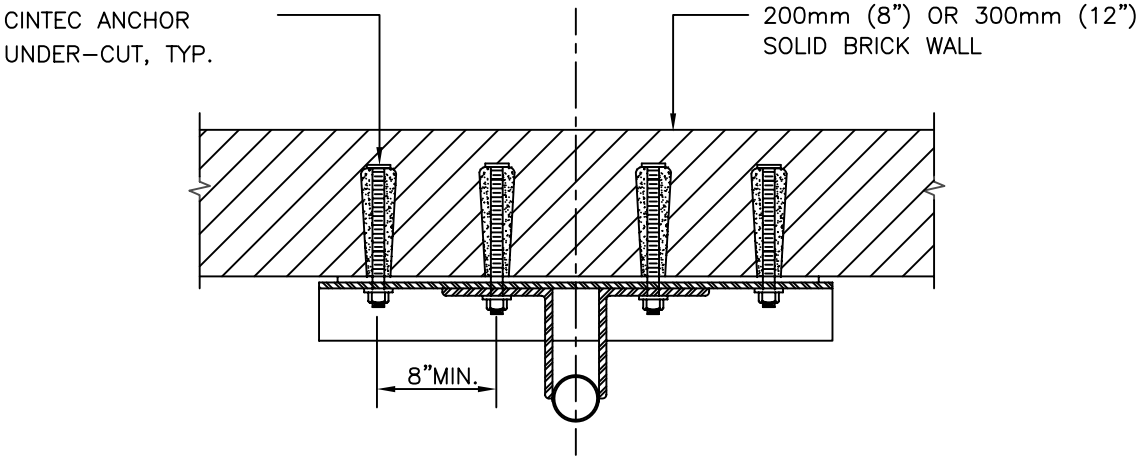
Drawing Title
CINTEC ANCHOR
TYPICAL DETAIL

Revision

Drawing No. SK-

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: BRICK
ANCHOR TYPE: SRT
PARAPET ANTENNA
MOUNTING ANCHOR
PRINCIPAL LOAD (FORCES) :
COMBINED





CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

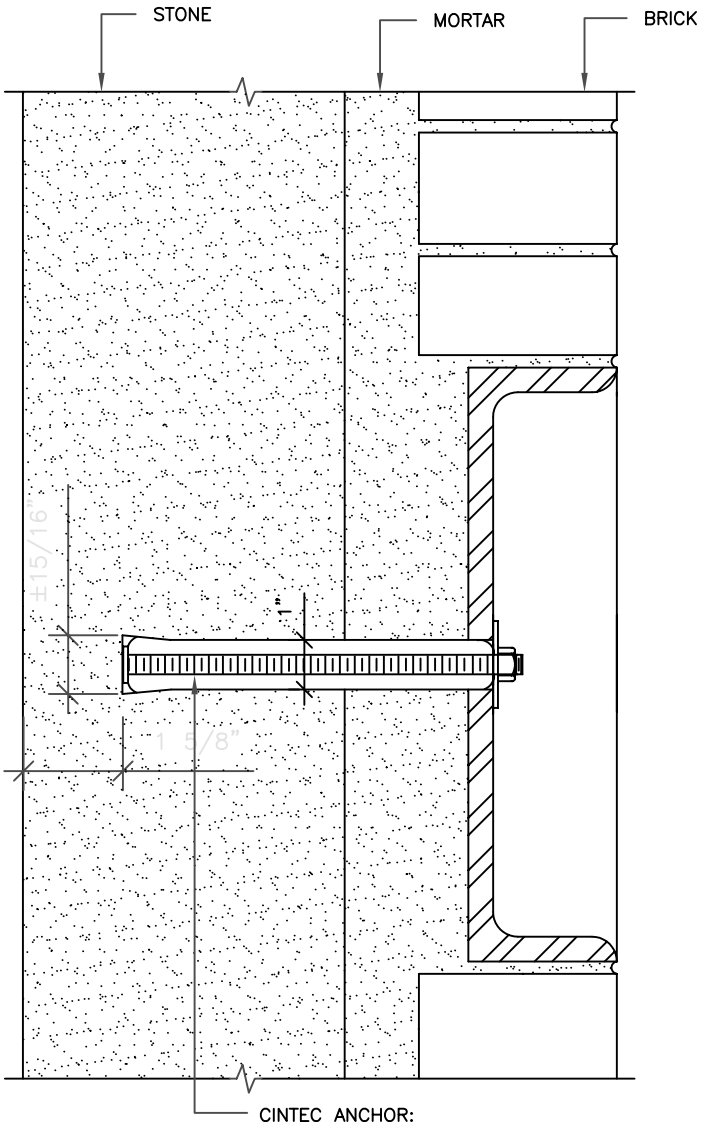
Project Title

Drawing Title
CINTEC ANCHOR
SECTION

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: STONE
ANCHOR TYPE: SRT STEEL
CHANNEL TIE
PRINCIPAL LOAD (FORCES) :
TENSION



CINTEC ANCHOR:
– 3/8" STAINLESS STEEL THREADED ROD
– 1–3/4" FRONT WASHER AND NUT
– 3/4" DIA. BACK PLATE
– SOCKED FULL LENGTH
– LENGTH TO BE DETERMINED ON SITE

CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

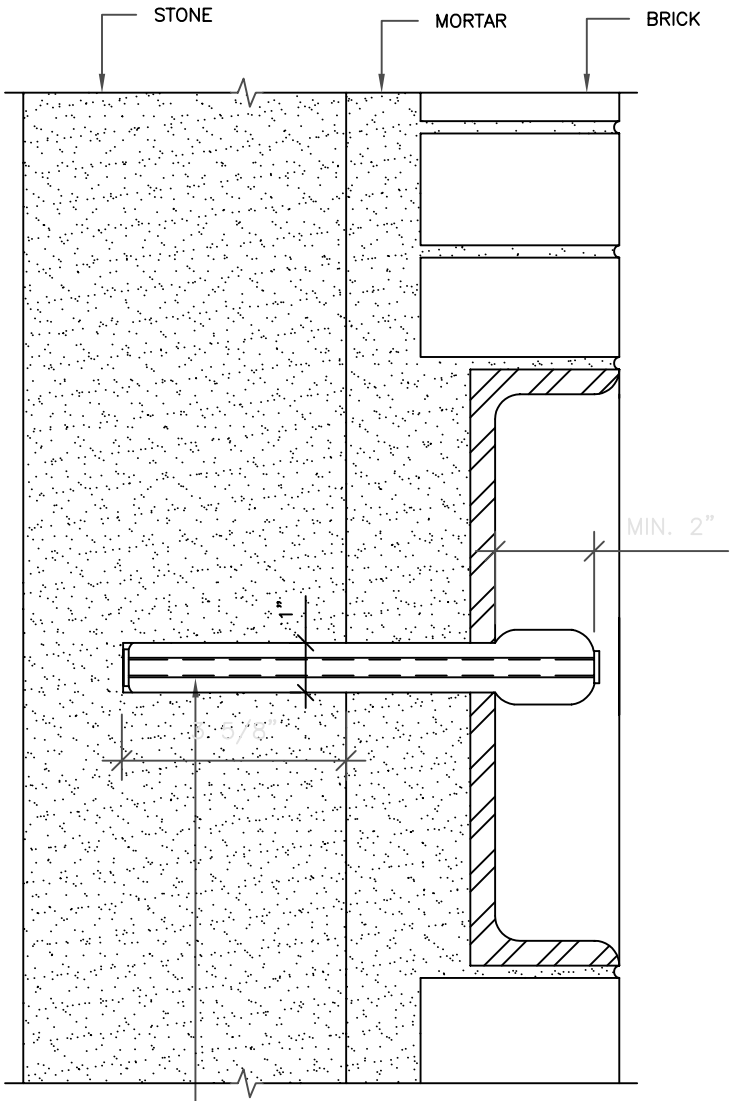
Project Title

Drawing Title
CINTEC ANCHOR

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: STONE
ANCHOR TYPE: CHS STEEL CHANNEL TIE
PRINCIPAL LOAD (FORCES) : TENSION



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

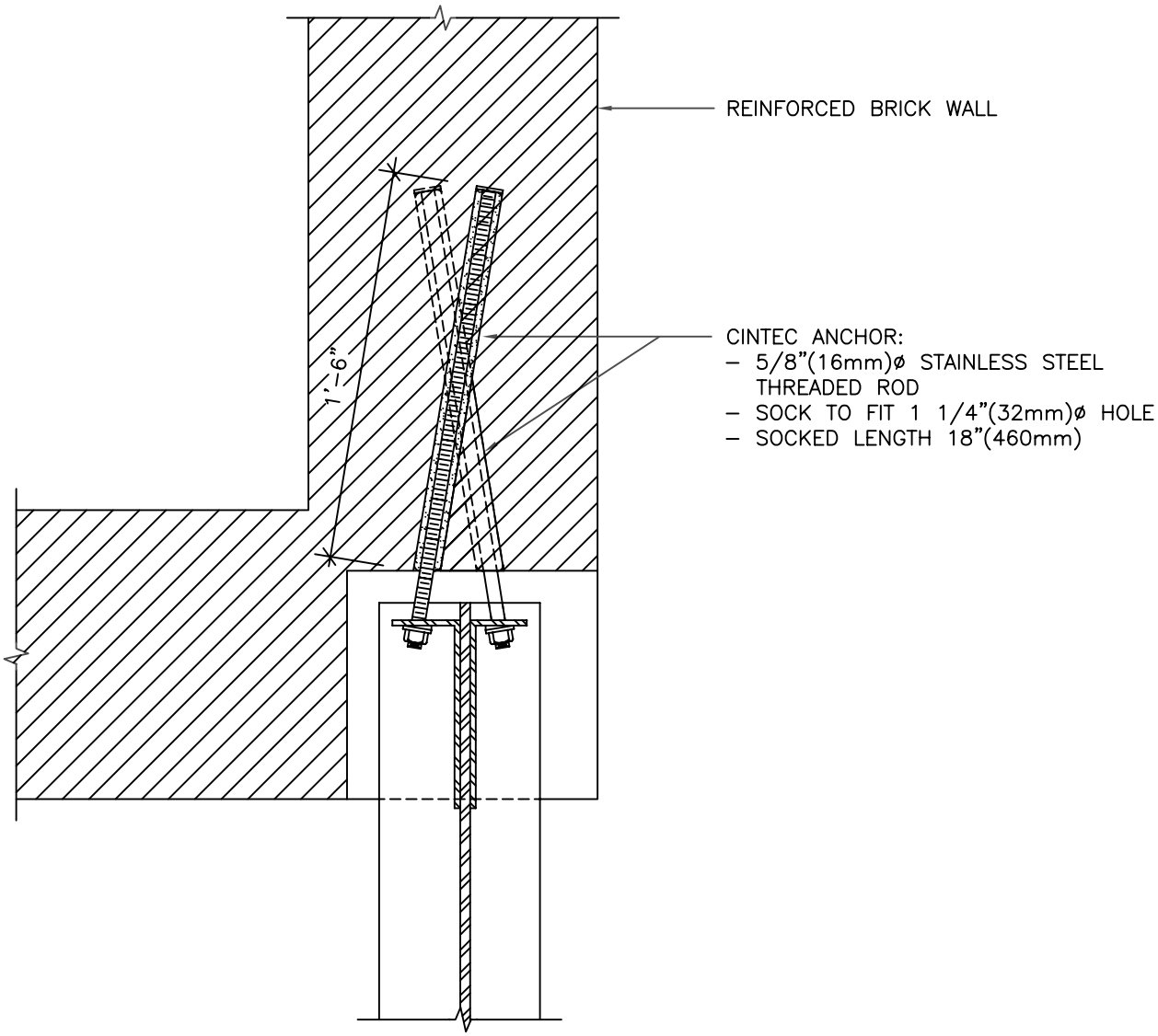
Project Title

Drawing Title
CINTEC ANCHOR

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: BRICK
ANCHOR TYPE: SRT STEEL
BEAM TIE
PRINCIPAL LOAD (FORCES) :
TENSION



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

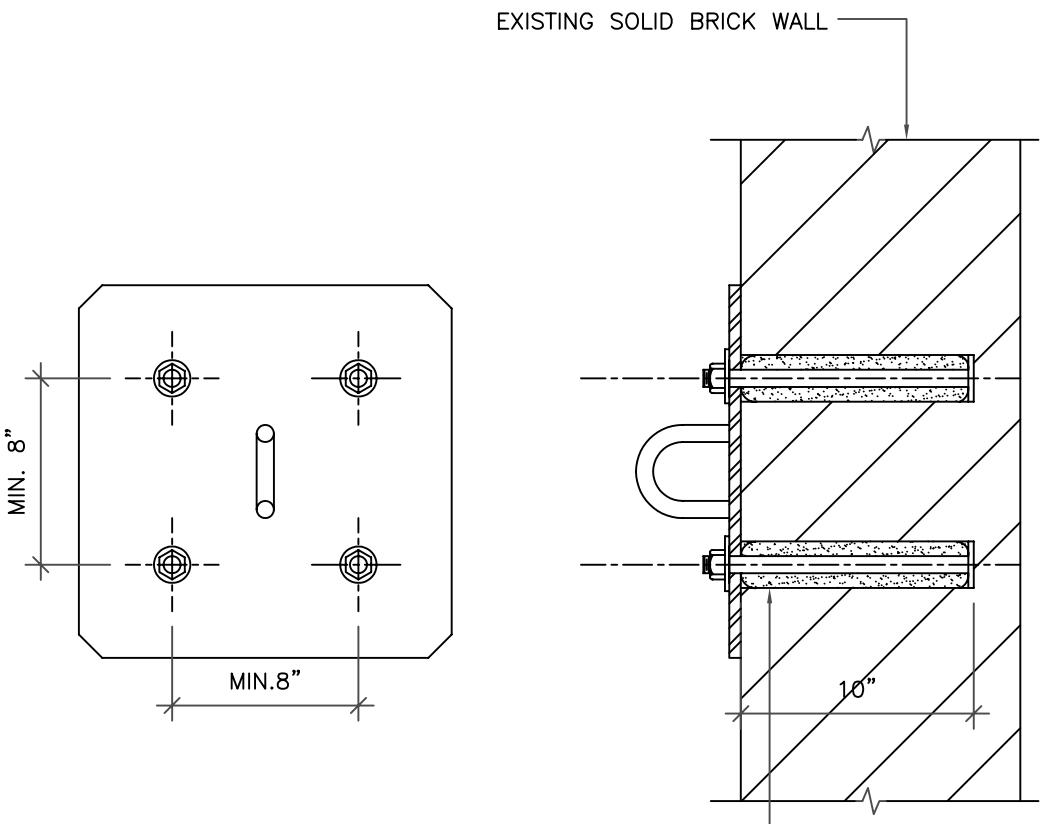
Project Title

Drawing Title
BEAM/PIER CONNECTION
ANCHOR DETAIL

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: BRICK
ANCHOR TYPE: SRT EYE BOLT
PRINCIPAL LOAD (FORCES) : TENSION



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

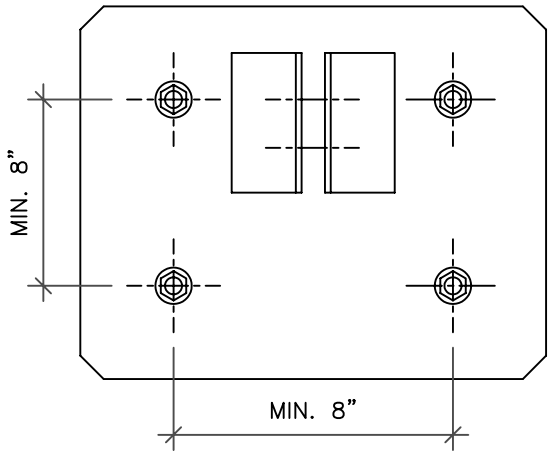
Project Title

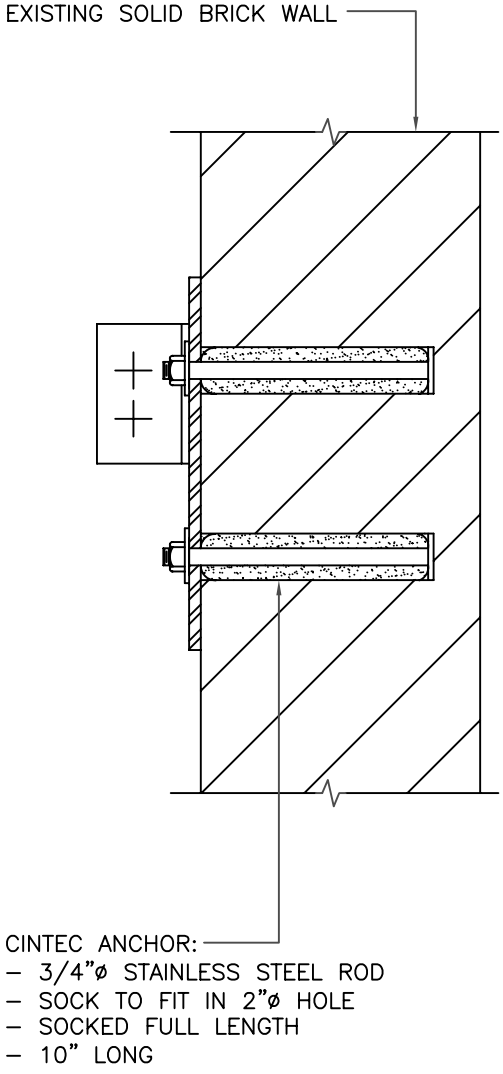
Drawing Title
BALCONY SUPPORTS
TOP PLATE

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: BRICK
ANCHOR TYPE: SRT
BALCONY RAIL
PRINCIPAL LOAD (FORCES) :
TENSION





CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

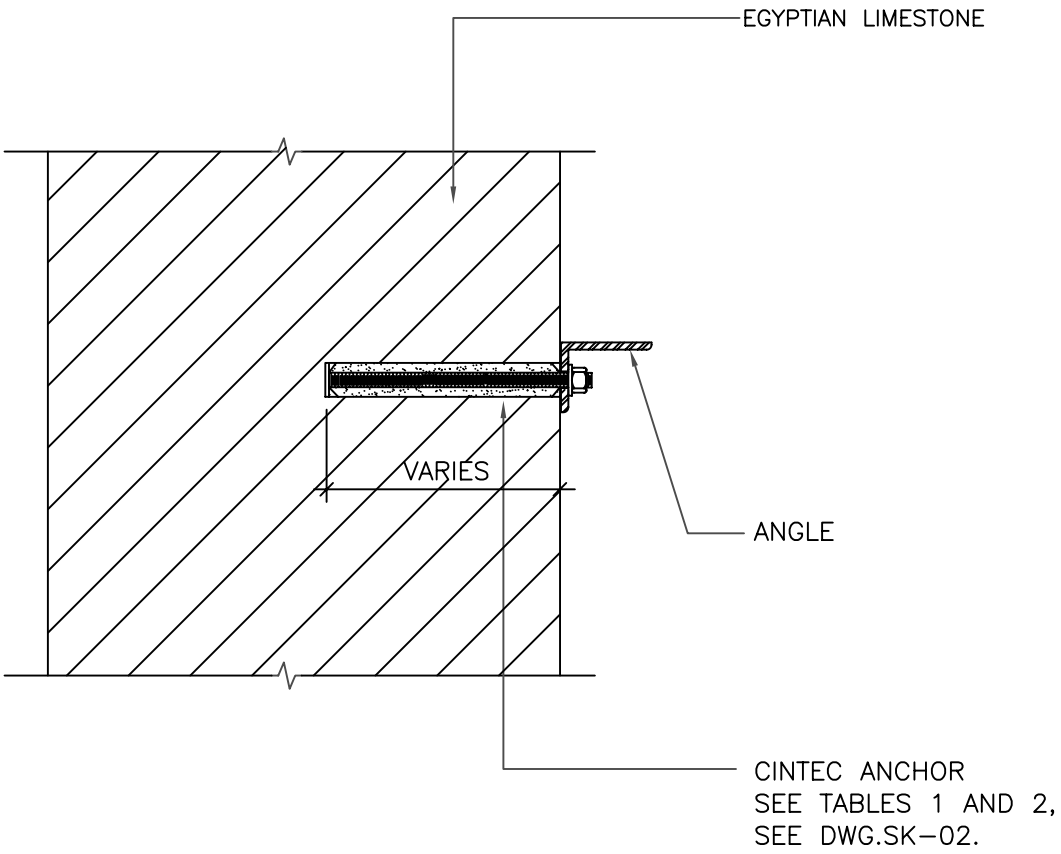
Project Title

Drawing Title
BALCONY SUPPORTS
BOTTOM PLATE

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: STONE
ANCHOR TYPE: SRT STEEL
ANGLE SUPPORT
PRINCIPAL LOAD (FORCES) :
COMBINED



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

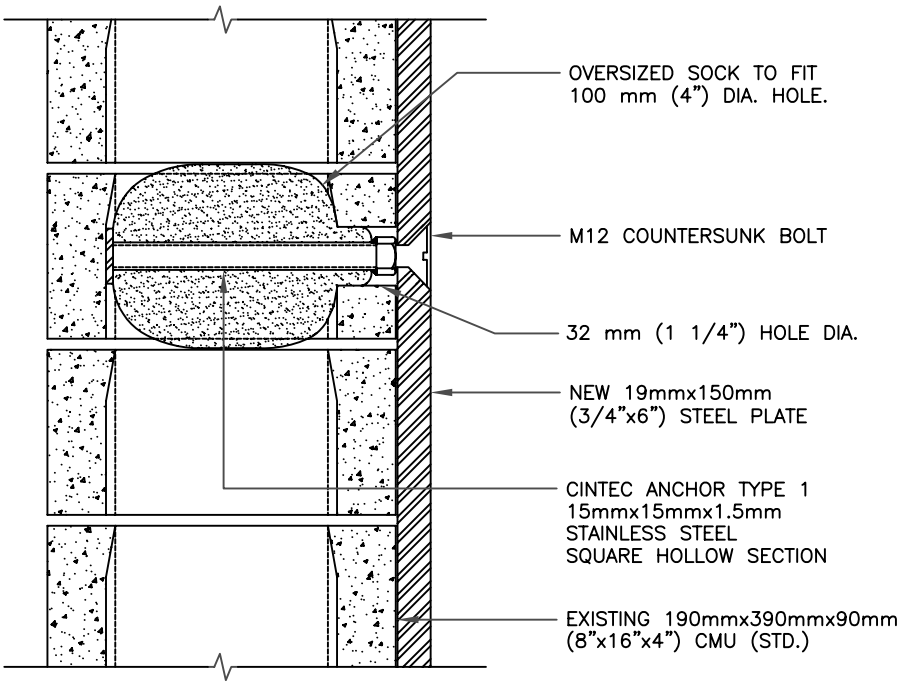
Project Title

Drawing Title
TYPICAL ANCHOR DETAIL

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: CMU
ANCHOR TYPE: SRT
COUNTERSUNK STEEL PLATE ATTACHMENT
PRINCIPAL LOAD (FORCES) :
COMBINED



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title

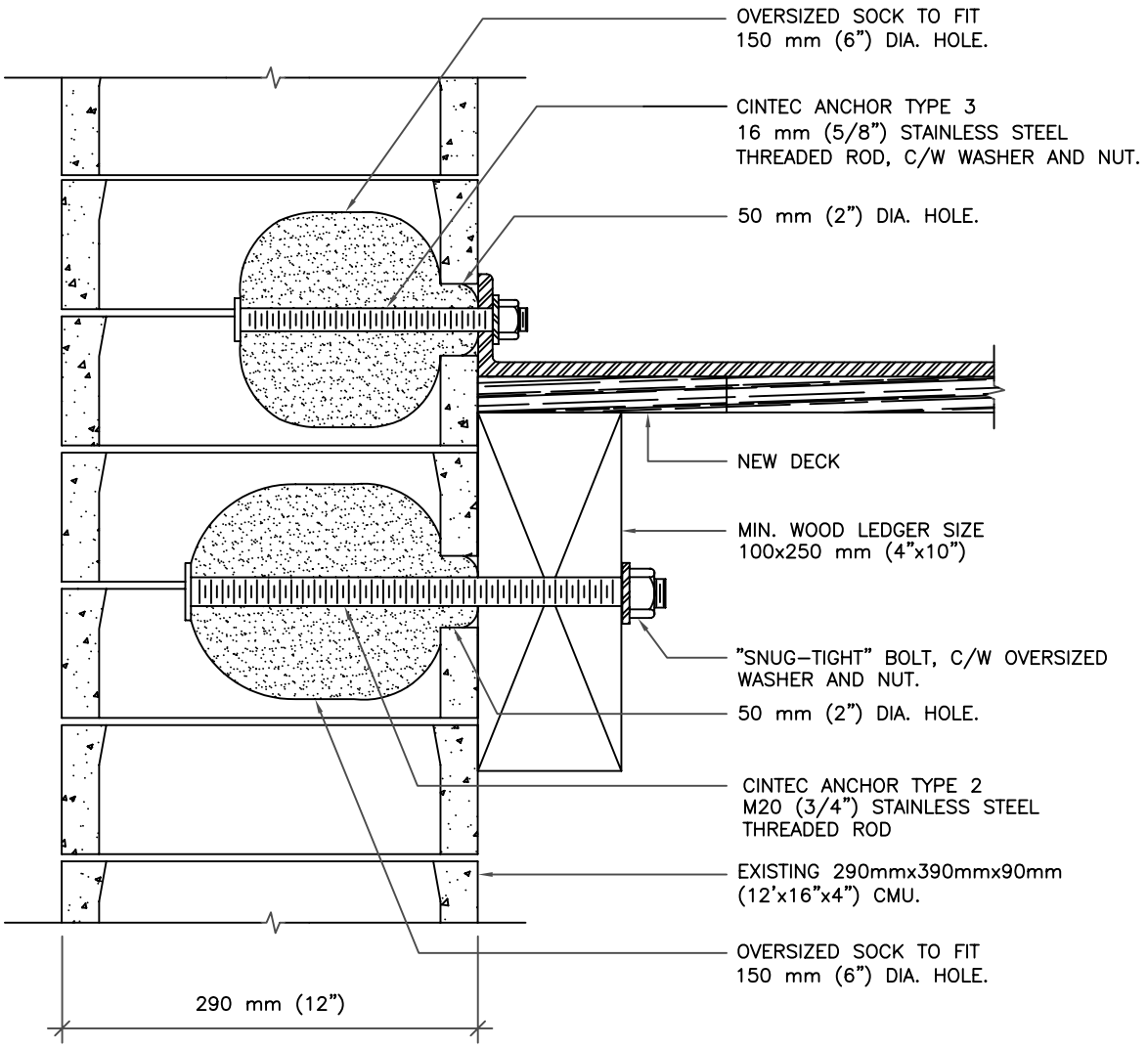
Drawing Title

CINTEC ANCHOR

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: CMU
ANCHOR TYPE: SRT WOOD FLOOR SUPPORT
PRINCIPAL LOAD (FORCES) : COMBINED



NOTE:
DO NOT ALIGN TWO ANCHORS VERTICALLY. MIN. HORIZONTAL SPACING OF ANCHORS TYPE 2 AND 3 IS 300mm (12").

CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

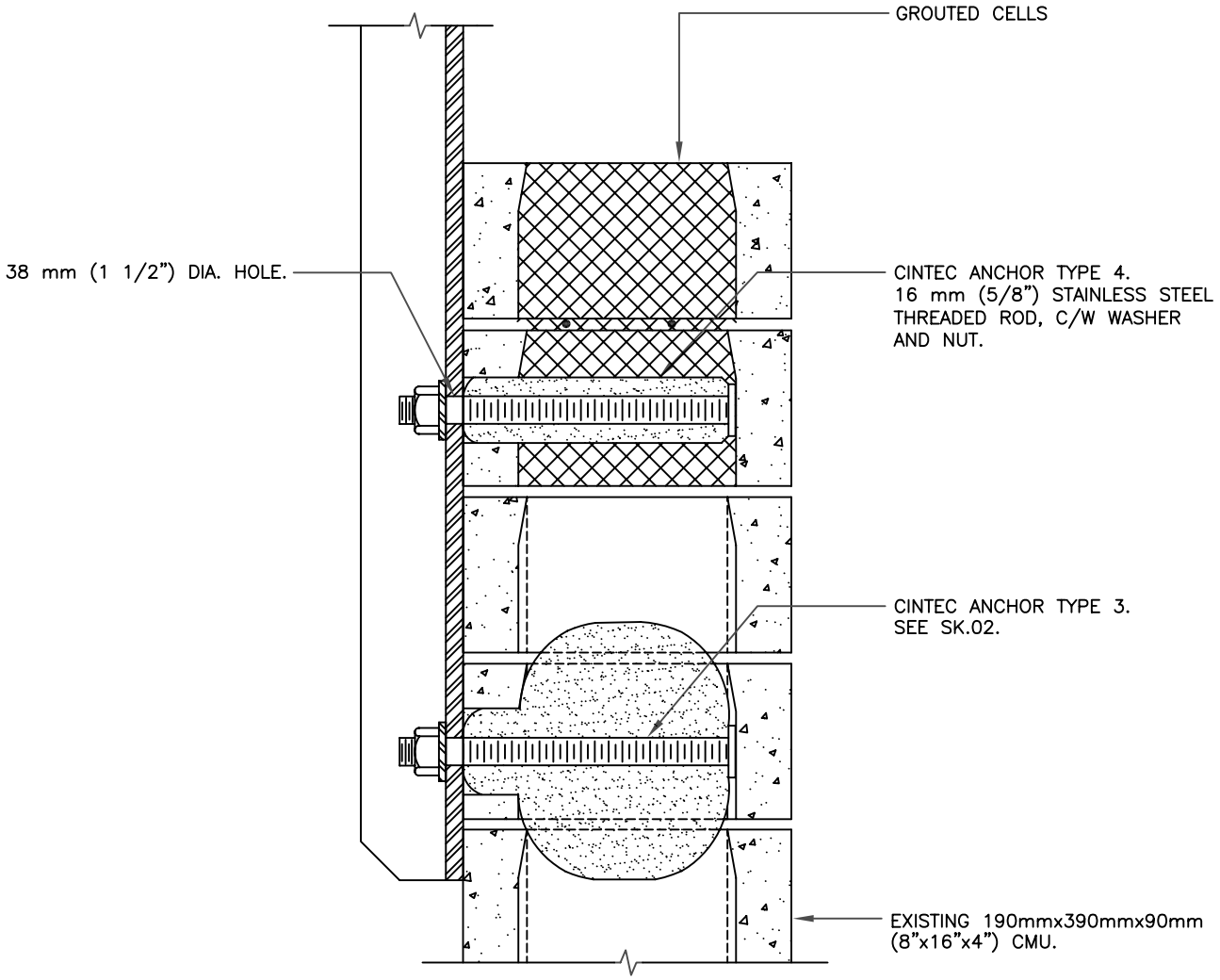
Project Title

Drawing Title
CINTEC ANCHORS

Revision

Drawing No. SK-

PROJECT DATA:
LOCATION:GENERIC
SUBSTRATE: CMU
ANCHOR TYPE: SRT
BALCONY RAIL
PRINCIPAL LOAD (FORCES) :
COMBINED



CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title

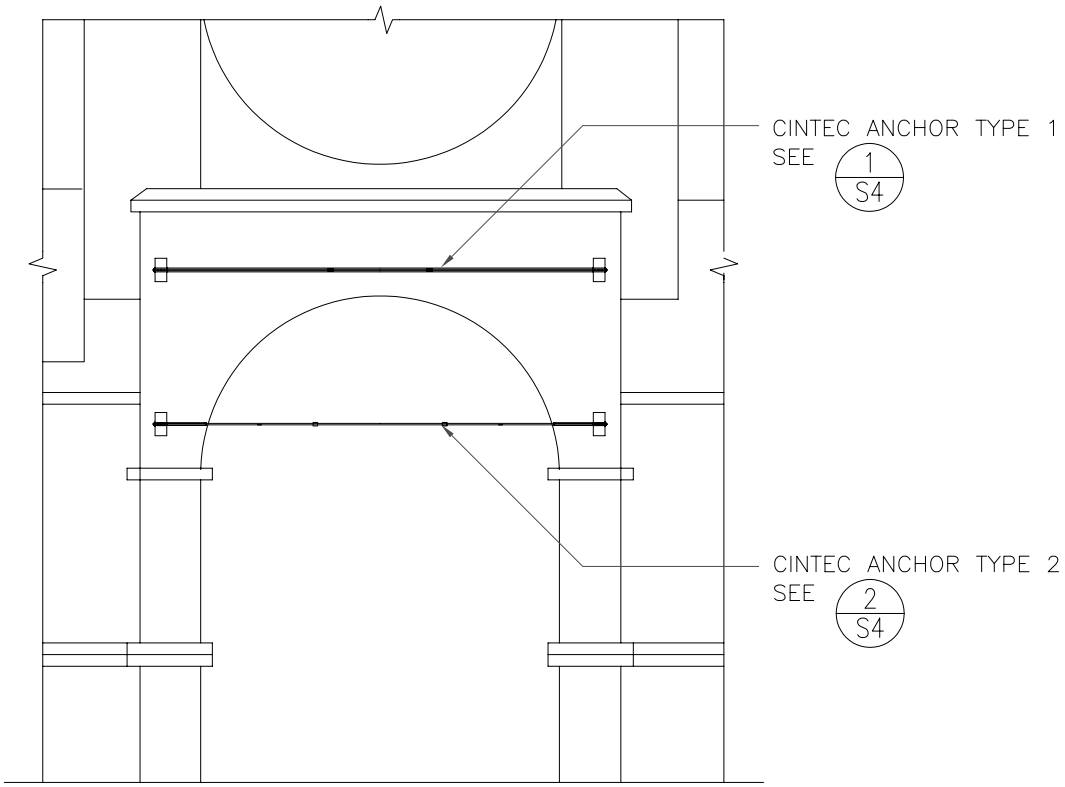
Drawing Title

CINTEC ANCHOR

Revision

Drawing No. SK–

PROJECT DATA:
LOCATION:BOSTON
SUBSTRATE: BRICK
ANCHOR TYPE: SRT TIE ROD
PRINCIPAL LOAD (FORCES) : TENSION



NOTES:

1. ANCHOR LENGTHS TO BE DETERMINED IN FIELD PRIOR TO ORDERING.

CINTEC NORTH AMERICA
SECURING THE PAST FOR THE FUTURE

Project Title
90 PARK
BOSTON

Drawing Title
PARTIAL EAST ELEVATION

Job No.
Date
Drawn by
Design by
Checked by
Scale NTS
Revision
Drawing No. S1