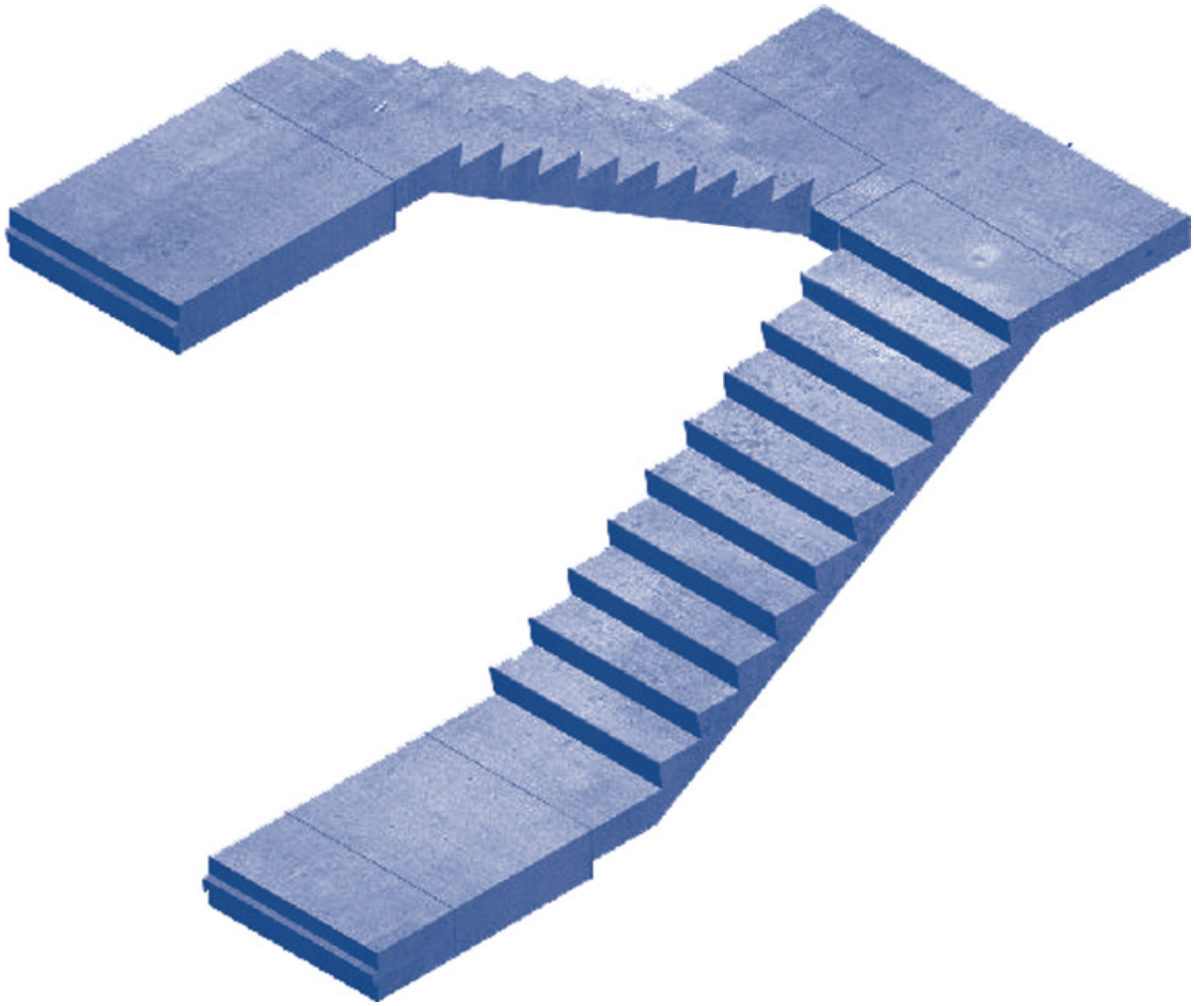
REDISTAIR®

THE SOLID ALTERNATIVE TO STEEL



REDISTAIR®

GC SOLUTIONS, LLC

7357 SNAKE RIVER RD SUITE 200 · ASOTIN, WA 99402

866.733.6220 · 509.243.6030 · WWW.REDISTAIR.COM

RediStair®

GC Solutions, LLC

RediStair® is the concrete product that can bring the value of a concrete stair to a building owner at a cost competitive with steel stair systems. The advantages of concrete stairs over steel are many; they are more durable, quiet, solid, and architecturally appealing than steel or steel frame with concrete tread systems. The tradeoff has always been the cost to upgrade from steel to concrete. RediStair® may be the answer.

What is RediStair®? RediStair® is the proprietary process that integrates pre-cast concrete stair stringers and site cast main and intermediate landings to form a "cantilevered truss." When the RediStair® stringers are set and the site-cast concrete reaches design strength, all intermediate landing shoring may be removed, with the net effect that the stair system is unsupported except at the locations of contact with the main level slabs. The unsupported landings save project cost by eliminating the direct cost of support systems (columns, beams, ledgers, hangers, etc…) and the indirect cost of the painting, fireproofing and maintenance of the support systems. The unsupported "cantilevered truss" works where there is a single intermediate landing. In situations where multiple intermediate landings or other complicating features exist, GC Solutions, LLC includes design of additional stair system support to offer a complete bidder design system.

Designed to simplify the construction process, RediStair® allows installation of the stair system as the building rises, reducing or eliminating the need for temporary stairs. Having the permanent stair system in place significantly improves jobsite safety and efficiency without the redundancy and cost of temporary stair requirements.

Easily integrated into most mild reinforced or post tensioned concrete construction, RediStair® engineers can usually design required modifications to accommodate steel frame construction with metal deck and thin slabs. Comprehensive load analysis is performed for each "cantilevered truss," and load conditions are provided the engineer of record for incorporating the stair loads into the structure.

Typically, RediStair® stringers are delivered to the jobsite on a "just in time" basis and installation ideally occurs as they are lifted off of the delivery truck. The delivery is scheduled to occur 1-3 days prior to the elevated deck pour adjacent to the stair tower. In the event concrete stairs are adjacent to core walls and a gang form interferes with the elevated slab block-out, a set may be delayed until the gang form clears the elevated slab. In situations where stairs are located within core walls, accommodations in the forming system need to be made in the pre-construction phase of the project to allow access through the top of the gang form. GC Solutions, LLC will coordinate with your form designers at no additional cost to accommodate this requirement.

Intermediate stair forming, setting of stringers, installation of re-bar, landing and block-out concrete, form stripping, and temporary handrail installation average 16 man hours/intermediate landing on projects with 30 or more RediStair® stringers. The average is slightly more (18-20mh/level) on projects with less than 30 stringers.

GC Solutions, LLC, is actively looking to license qualified pre-cast companies in various markets around the country. Subject to certification for quality and performance, GC Solutions, LLC will authorize a distributor of RediStair® in any market that an owner or contractor anticipates building in. Please let us know where you want to use RediStair®, and we will provide you a contact in the region, or initiate certification in a timely fashion.

RediStair®

GC Solutions, LLC

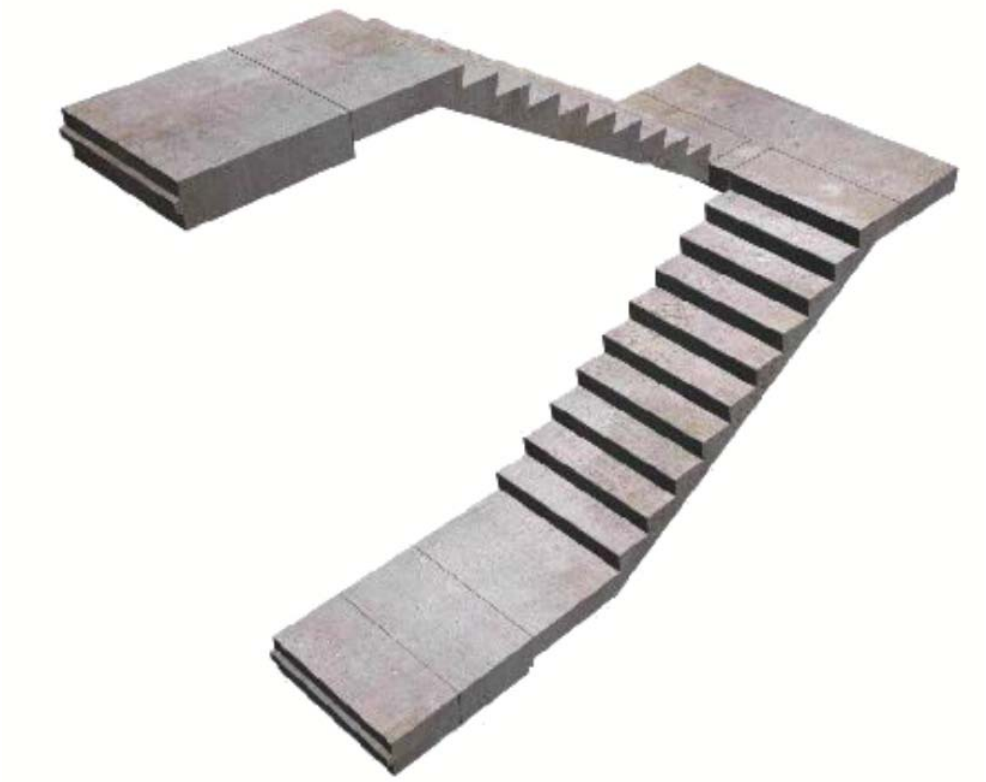
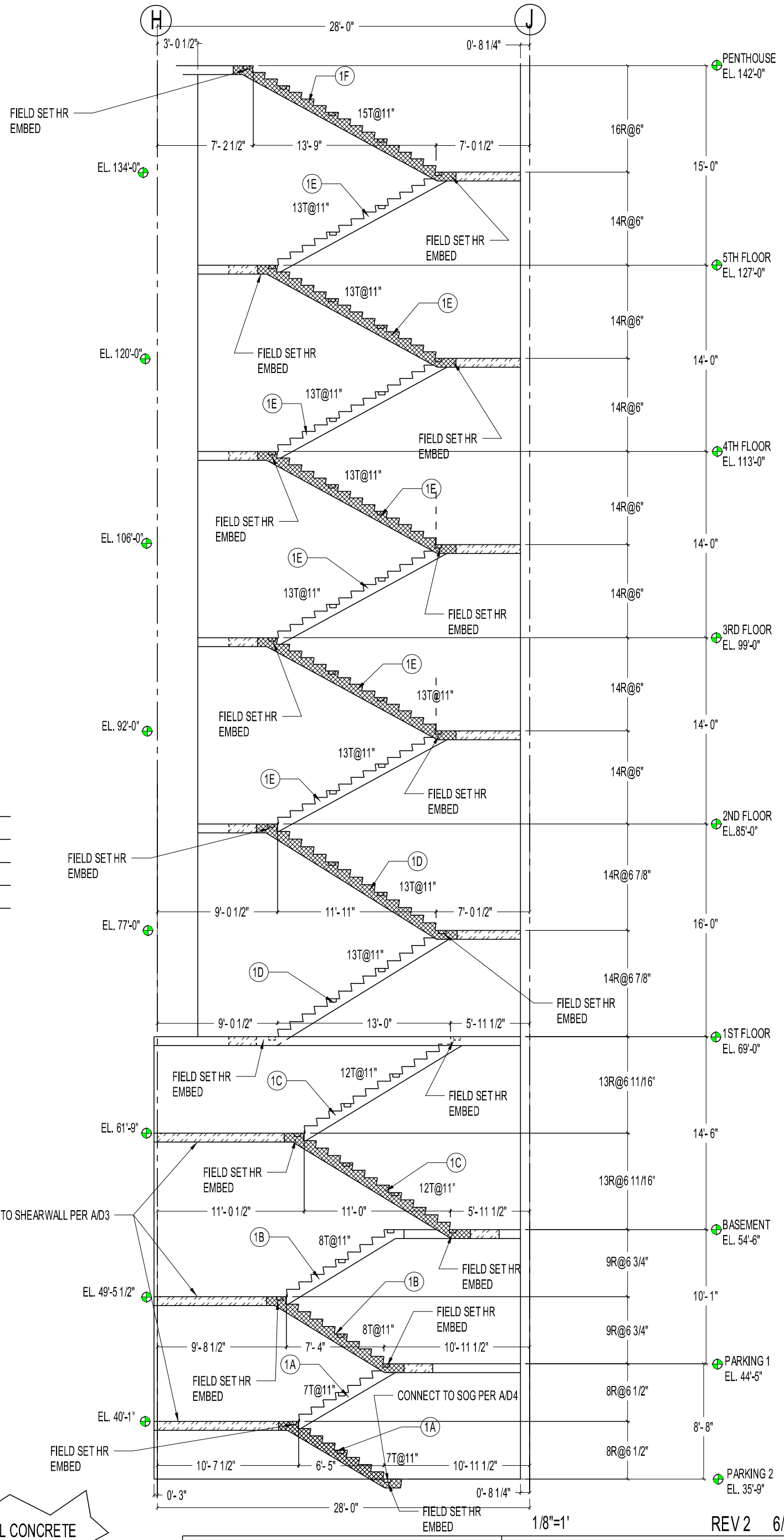


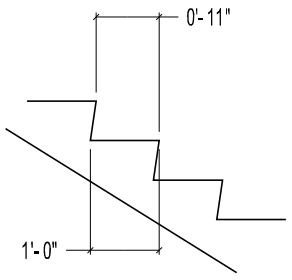
TABLE OF CONTENTS

Section I	Typical Elevation	{1S1}
Section II	Typical Plan Views	{1P1, 1P2}
Section III	Typical Details	{D1, 1B, D2-5, D7, D8, D13}
Section IV	Structural Calculations and Load Modeling	{AL6, 135-139}
Section V	3-Part Specification	{3410-01 – 3410-07}



CONTRACTOR TO VERIFY

SLAB ELEVATIONS _____
LANDING SIZES _____
DOOR LOCATIONS / INTERFERENCE _____
HEAD HEIGTH ADEQUATE _____
RISE & RUN _____



FORM SAVER BAR EXTENSION
ON LOWER SLAB INTERFACE ONLY
(TYP 8 PLACES)
(WHERE LOWER END OF STRINGER
RESTS ON FLOOR LEVEL)

SHORING TO REMAIN UNTIL CONCRETE
STRENGTH HAS REACHED 3000 PSI

CAST IN PLACE CONCRETE SECTION
PRECAST REDISTAIR SECTION

1/8"=1'

REV 2 6/10/07

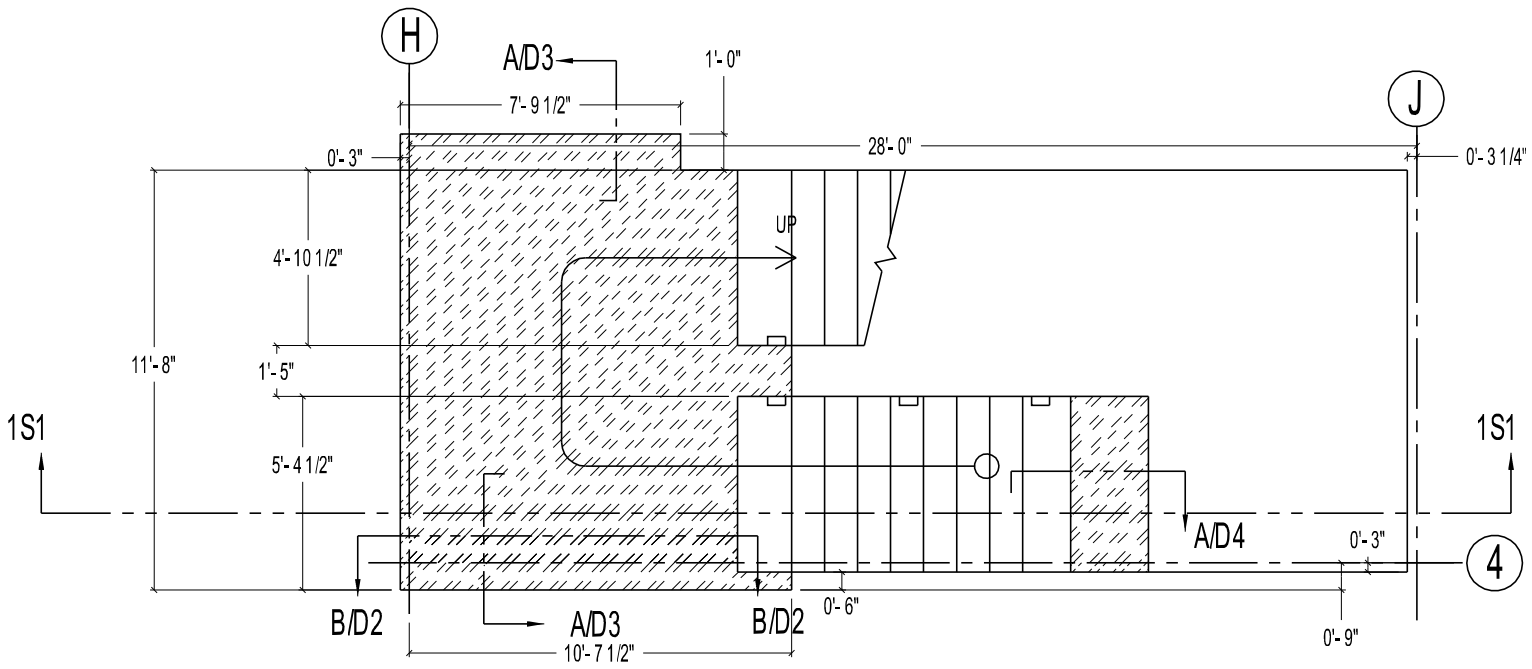
REDISTAIR™
GC SOLUTIONS, LLC
7357 SNAKE RIVER RD SUITE 200 ASOTIN, WA 99402
866.733.6220 509.243.6030 WWW.REDISTAIR.COM

Sheet Title: STAIR #1 SECTION

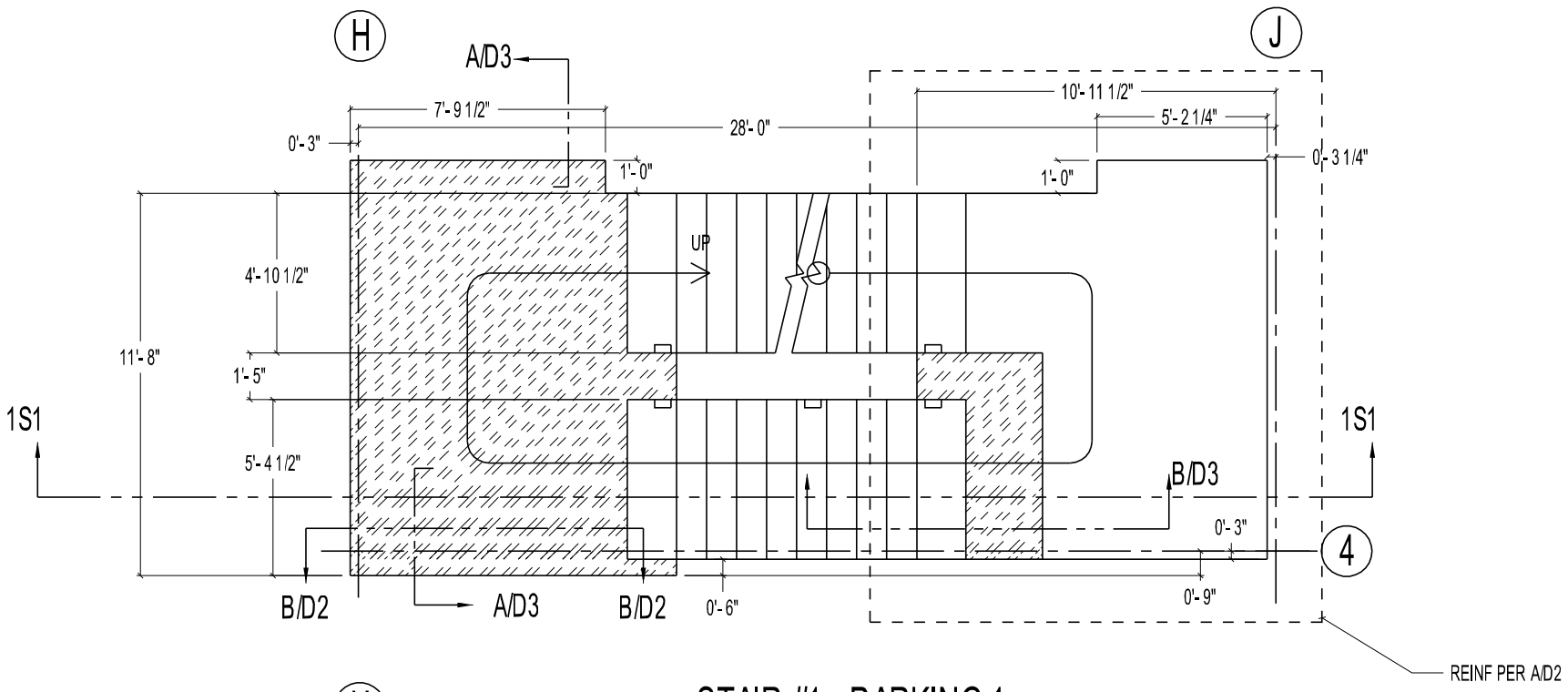
Project: TYPICAL PROJECT

Date: 8/20/07

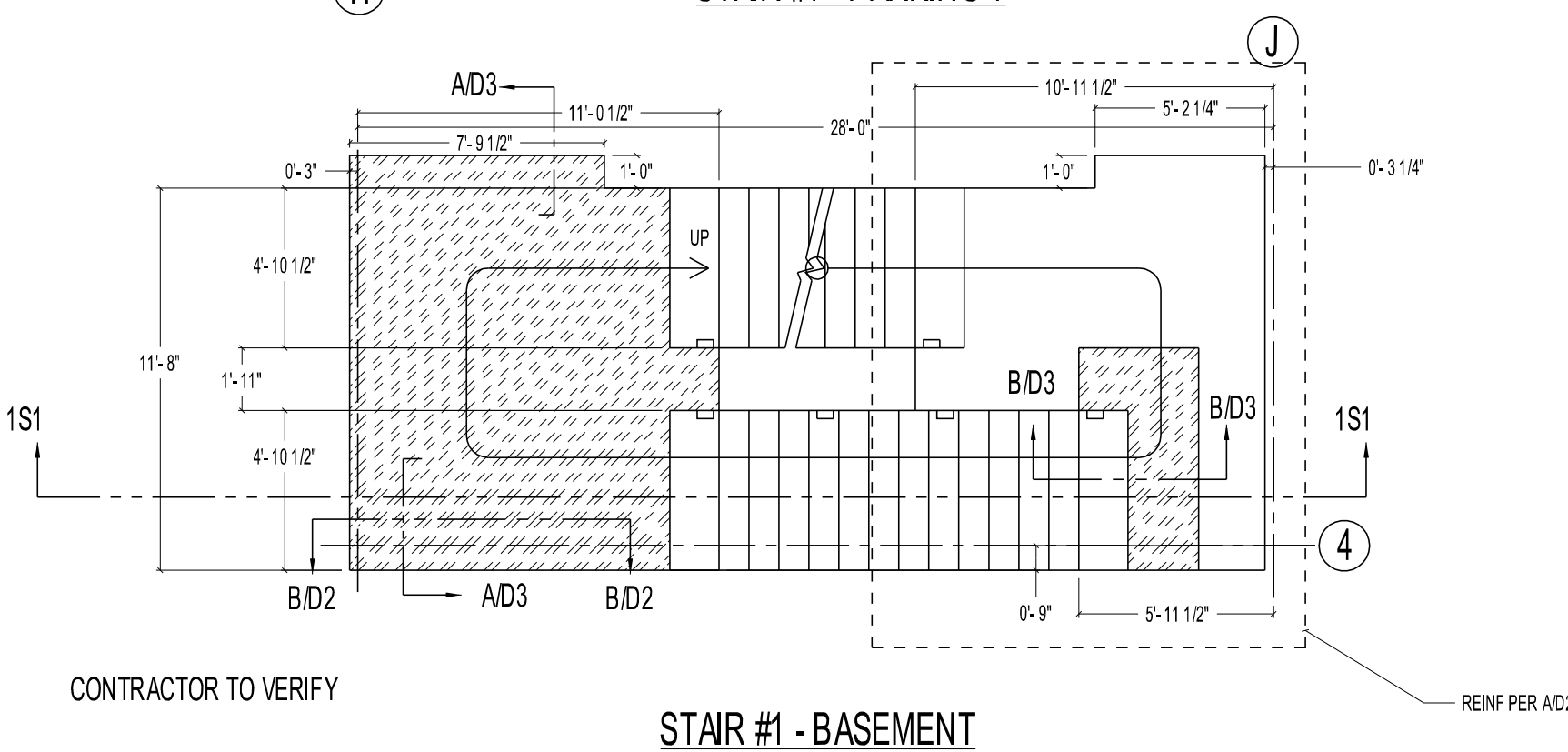
Drawing: 1S1



STAIR #1 - PARKING 2



STAIR #1 - PARKING 1



STAIR #1 - BASEMENT

CONTRACTOR TO VERIFY

SLAB ELEVATIONS _____
LANDING SIZES _____
DOOR LOCATIONS / INTERFERENCE _____
HEAD HEIGTH ADEQUATE _____
RISE & RUN _____

SHORING TO REMAIN UNTIL CONCRETE STRENGTH HAS REACHED 3000 PSI

CAST IN PLACE CONCRETE SECTION

PRECAST REDISTAIR SECTION

3/16"=1'

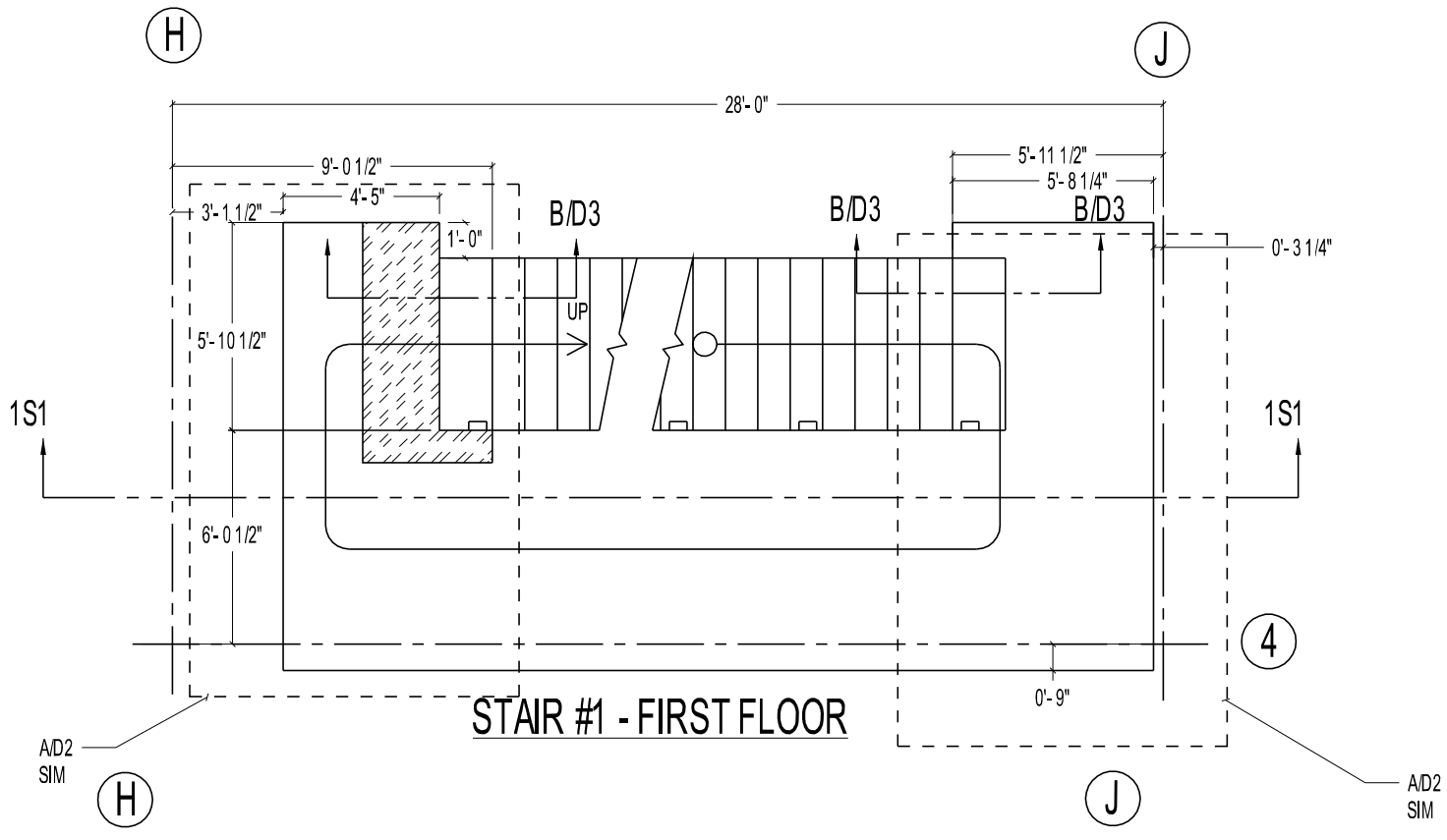
REDISTAIR™
GC SOLUTIONS, LLC
7357 SNAKE RIVER RD SUITE 200 ASOTIN, WA 99402
866.733.6220 509.243.6030 WWW.REDISTAIR.COM

Sheet Title: STAIR #1 LANDING PLANS

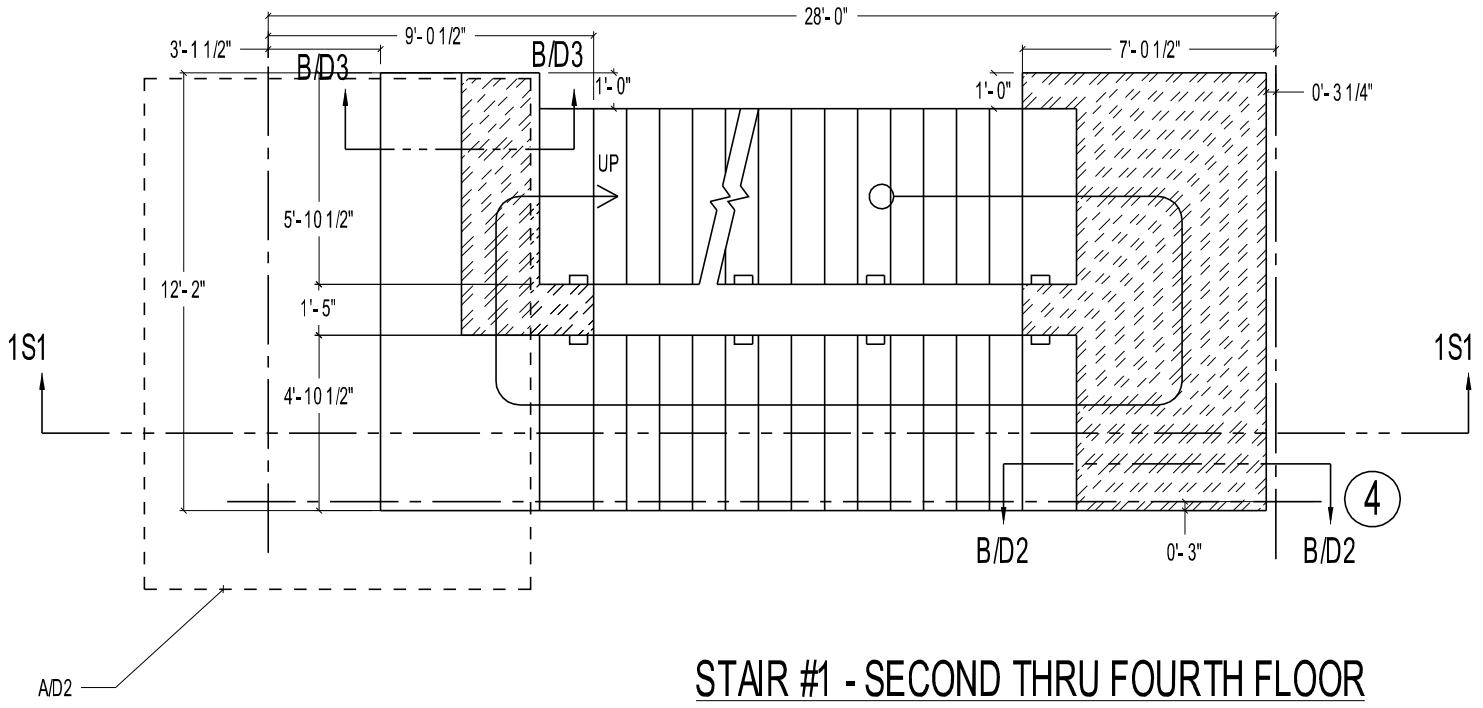
Project: TYPICAL PROJECT

Date: 8/20/07

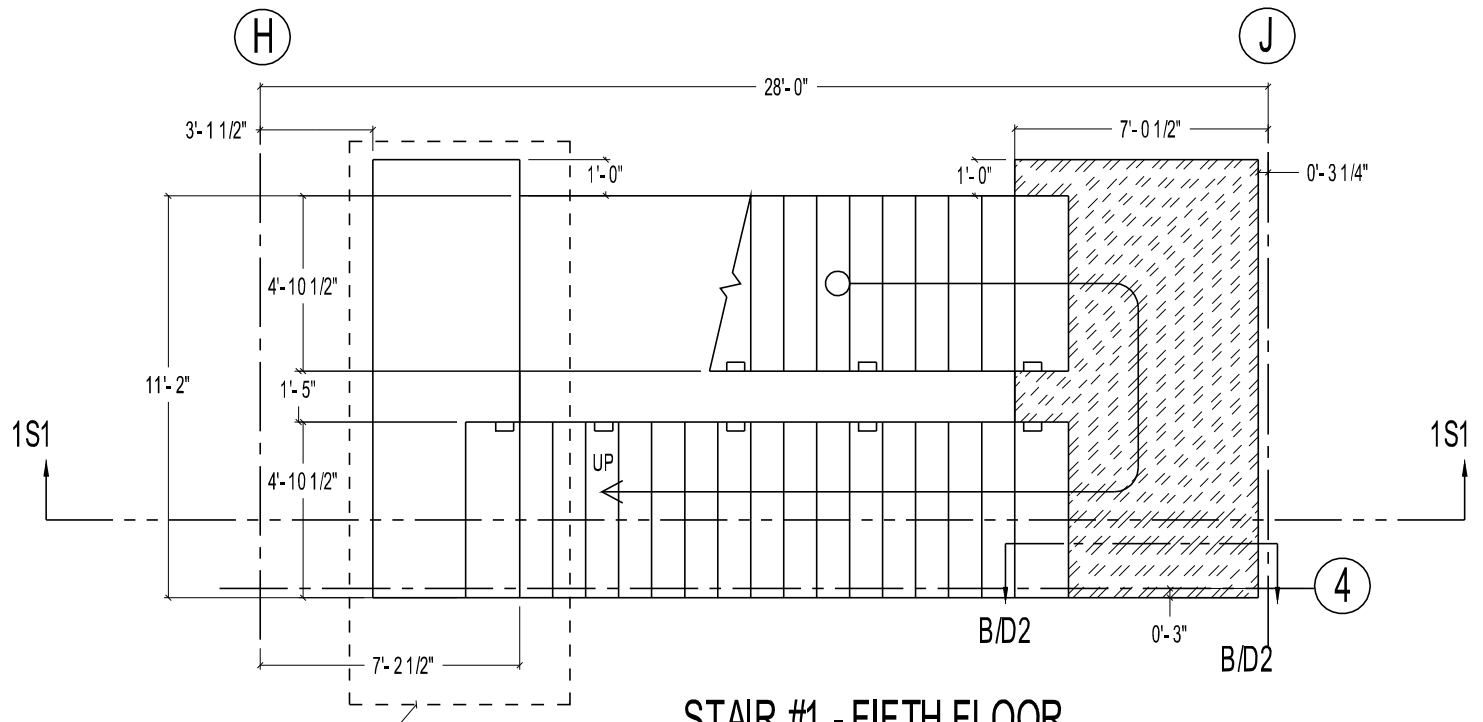
Drawing: 1P1



STAIR #1 - FIRST FLOOR



STAIR #1 - SECOND THRU FOURTH FLOOR



STAIR #1 - FIFTH FLOOR

SLAB ELEVATIONS _____
LANDING SIZES _____
DOOR LOCATIONS / INTERFERENCE _____
HEAD HEIGTH ADEQUATE _____
RISE & RUN _____

SHORING TO REMAIN UNTIL CONCRETE STRENGTH HAS REACHED 3000 PSI

CAST IN PLACE CONCRETE SECTION

PRECAST REDISTAIR SECTION

3/16"=1'

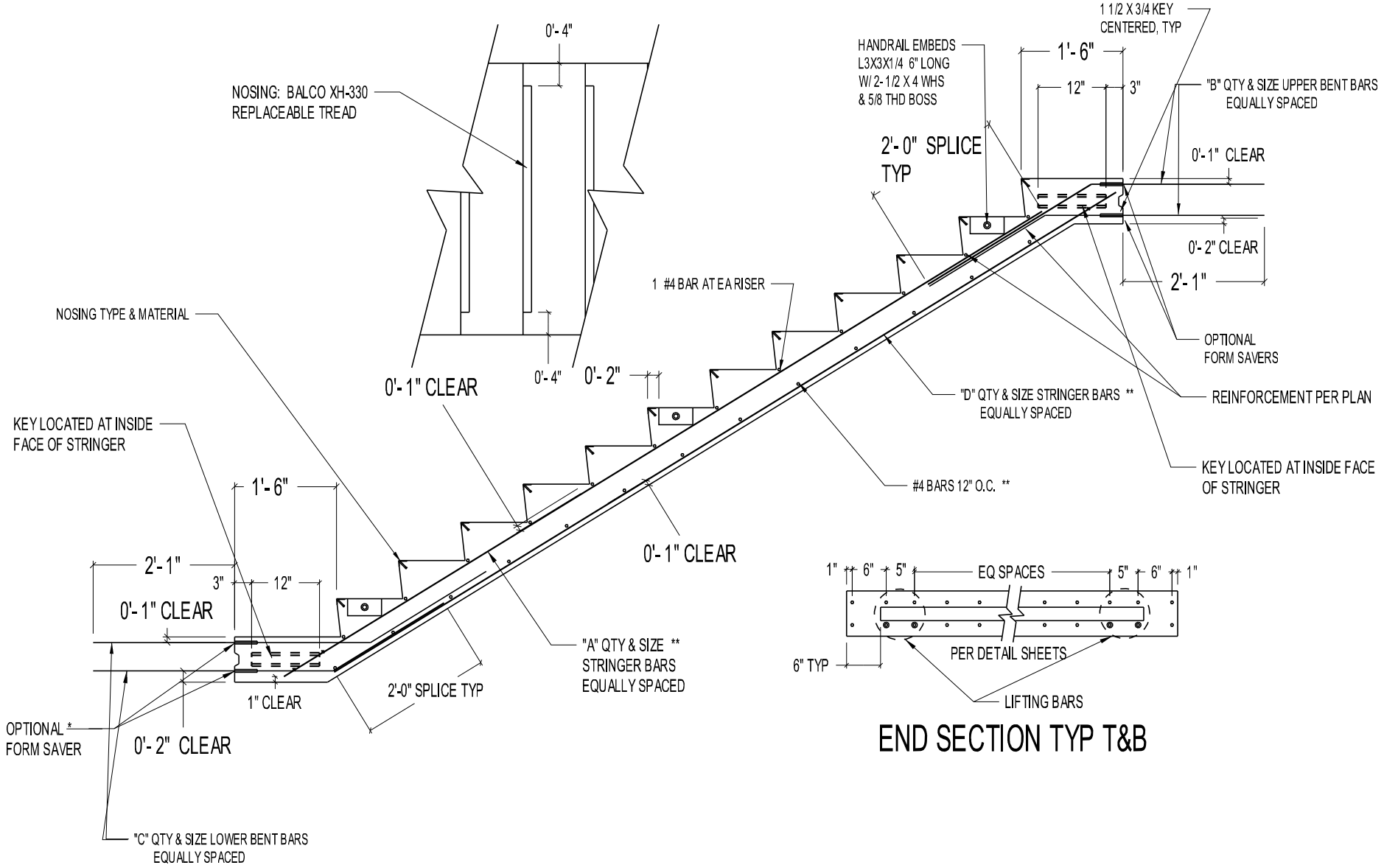
REDISTAIR™
GC SOLUTIONS, LLC
7357 SNAKE RIVER RD SUITE 200 ASOTIN, WA 99402
866.733.6220 509.243.6030 WWW.REDISTAIR.COM

Sheet Title: STAIR #1 LANDING PLANS

Project: TYPICAL PROJECT

Date: 8/20/07

Drawing: 1P2



END SECTION TYP T&B

* SEE SECTION SHEETS FOR FORMSAVER LOCATIONS

** SEE DETAIL SHEETS FOR OPTIONAL WWF

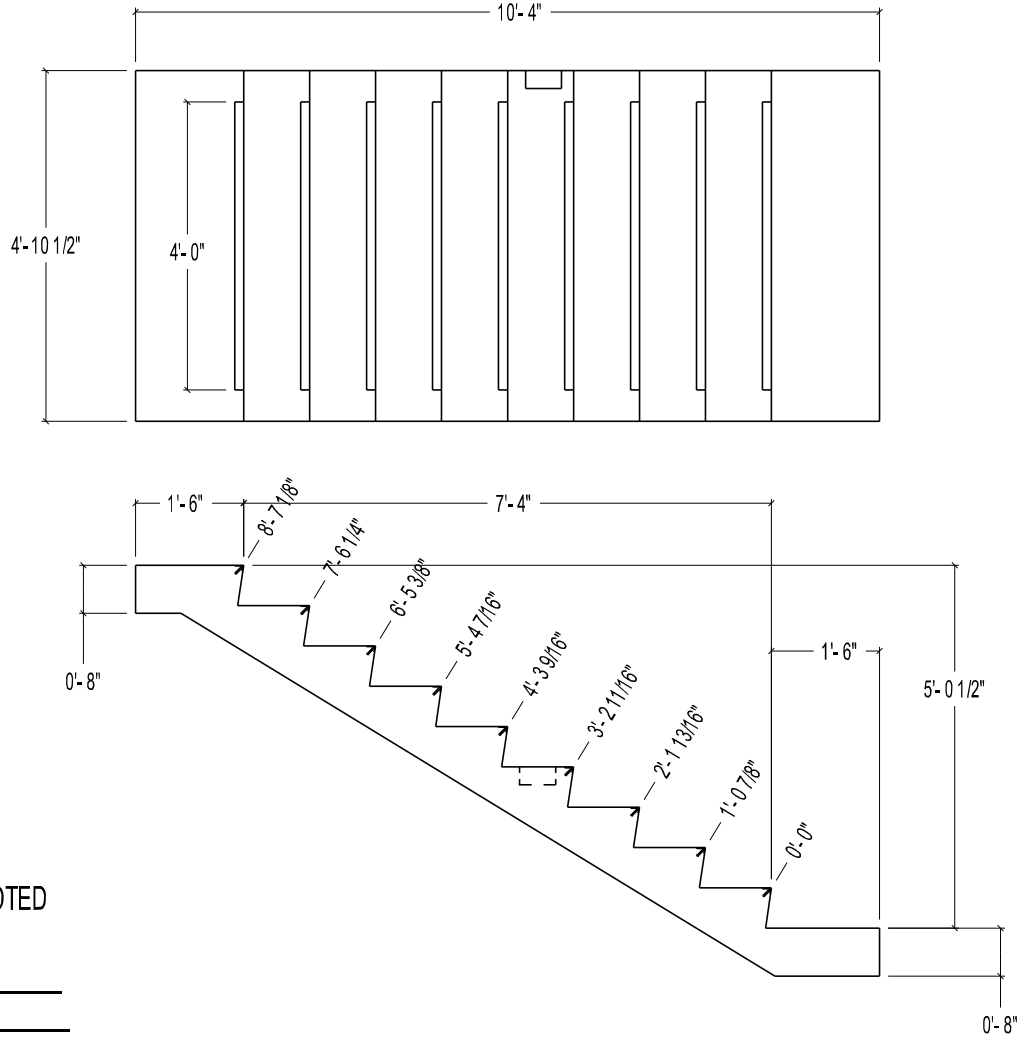
REDISTAIR™

GC SOLUTIONS, LLC

7357 SNAKE RIVER RD SUITE 200 ASOTIN, WA 99402

866.733.6220 509.243.6030 WWW.REDISTAIR.COM

Sheet Title: STRINGER	
Project: STANDARD DETAILS	
Date: 8/20/07	Drawing: D1



2 REQUIRED

SCALE 3/8"=1'

AS BUILT MEASUREMENTS

DATE:		
RISER HEIGTH		TREAD
RH	LH	LENGTH
OA HEIGTH		
OA LENGTH		
CYLINDER #		
PHOTO #		

NUSPL GAUGE SETTING _____
25.4 MM / INCH

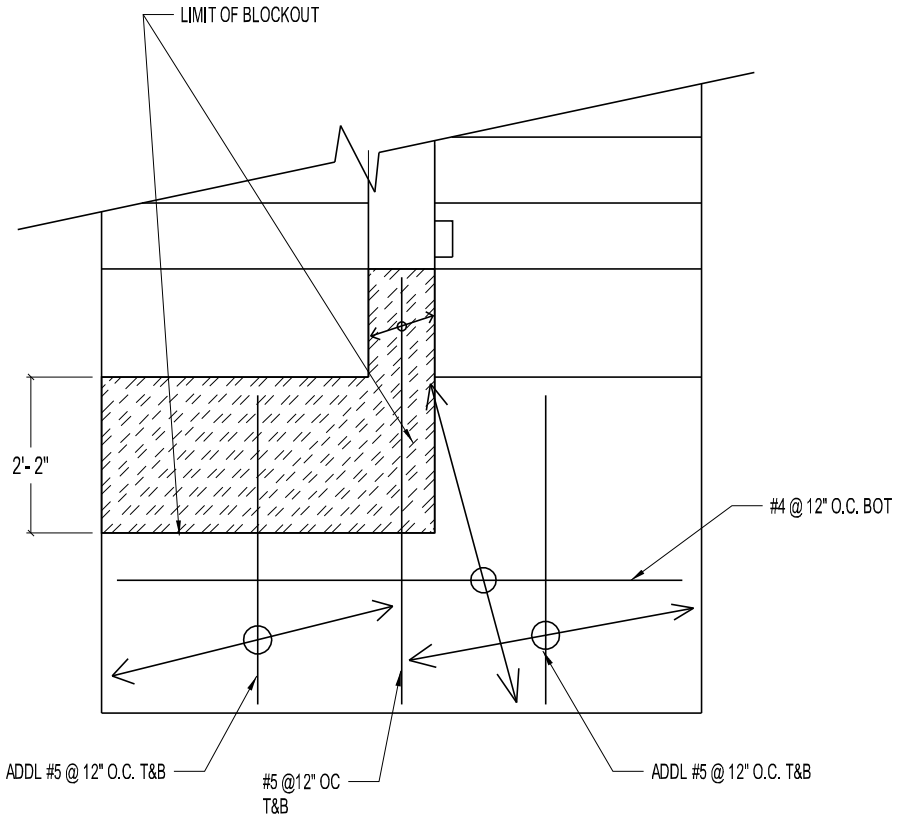
WEIGHT 6394#
CONCRETE @ 150 PCF

SEE TYPICAL DETAIL SHEET D1
FOR REINFORCING & DETAILS NOT NOTED

"A" STRINGER BARS (10) #5 T&B
"B" UPPER BENT BARS (10) #5 T&B
"C" LOWER BENT BARS (10) #5 T&B
"D" STRINGER BARS (10) #5 T&B
OPTIONAL WWF INSTEAD OF STRINGER BARS
3.5 x 6 - D17.8 x D10
NOSINGS BALCO XH-330
STAIR FINISH STEEL FORM SMOOTH
BAR EXTENSIONS ON
NOTES FORM SAVER BAR EXTENSION
ON LOWER SLAB INTERFACE ONLY
(SEE STAIR SECTIONS)

REDISTAIR™
GC SOLUTIONS, LLC
7357 SNAKE RIVER RD SUITE 200 ASOTIN, WA 99402
866.733.6220 509.243.6030 WWW.REDISTAIR.COM

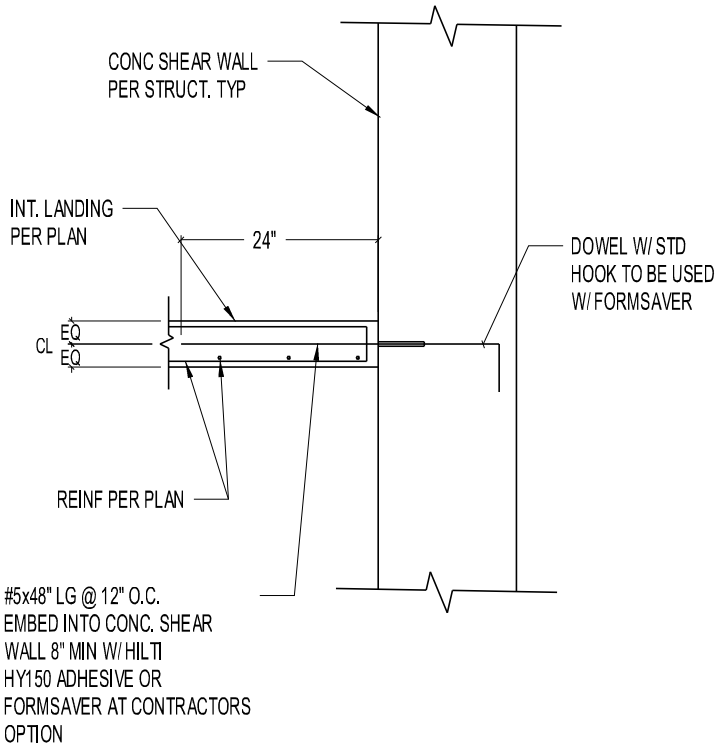
Sheet Title: STAIR DETAIL
Project: TYPICAL PROJECT
Date: 8/20/07
Drawing: 1B



TYP MAIN LANDING REINF DETAIL

REDISTAIR™
GC SOLUTIONS, LLC
7357 SNAKE RIVER RD SUITE 200 ASOTIN, WA 99402
866.733.6220 509.243.6030 WWW.REDISTAIR.COM

Sheet Title:	MAIN LANDING REINF
Project	STANDARD DETAILS
Date: 8/20/07	Drawing: D2



INT. LANDING TO CONC. SHEAR WALL CONNECTION

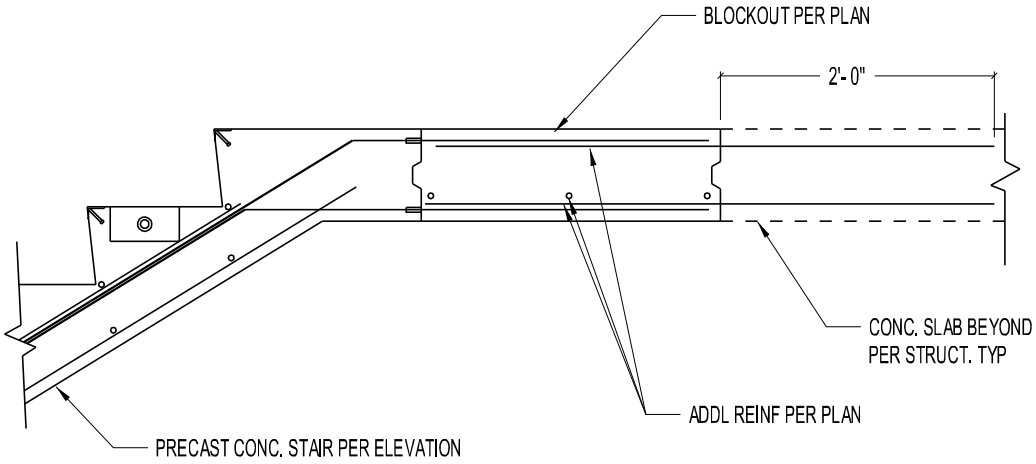
REDISTAIR™
GC SOLUTIONS, LLC
7357 SNAKE RIVER RD SUITE 200 ASOTIN, WA 99402
866.733.6220 509.243.6030 WWW.REDISTAIR.COM

Sheet Title: SHEAR WALL CONNECTION

Project: STANDARD DETAILS

Date: 8/20/07

Drawing: D4



STAIR TO SLAB CONNECTION

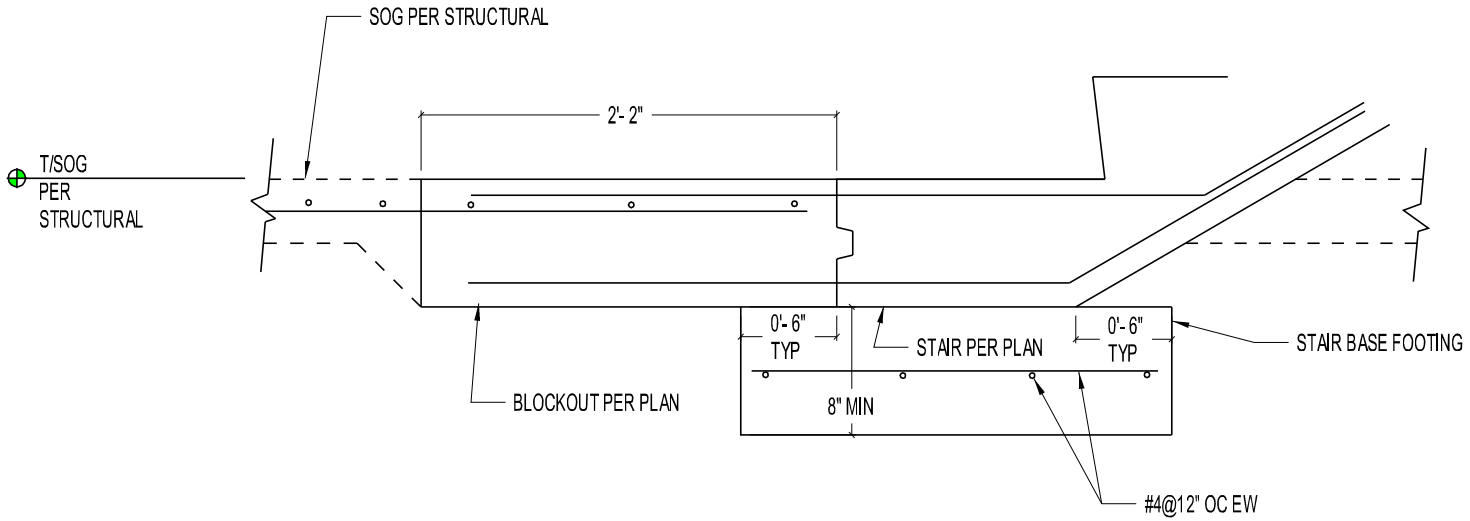
REDISTAIR™
GC SOLUTIONS, LLC
7357 SNAKE RIVER RD SUITE 200 ASOTIN, WA 99402
866.733.6220 509.243.6030 WWW.REDISTAIR.COM

Sheet Title: STAIR TO SLAB CONNECTION

Project: STANDARD DETAILS

Date: 8/20/07

Drawing: D5



STAIR TO SOG CONNECTION

SCALE 1" : 1'-0"

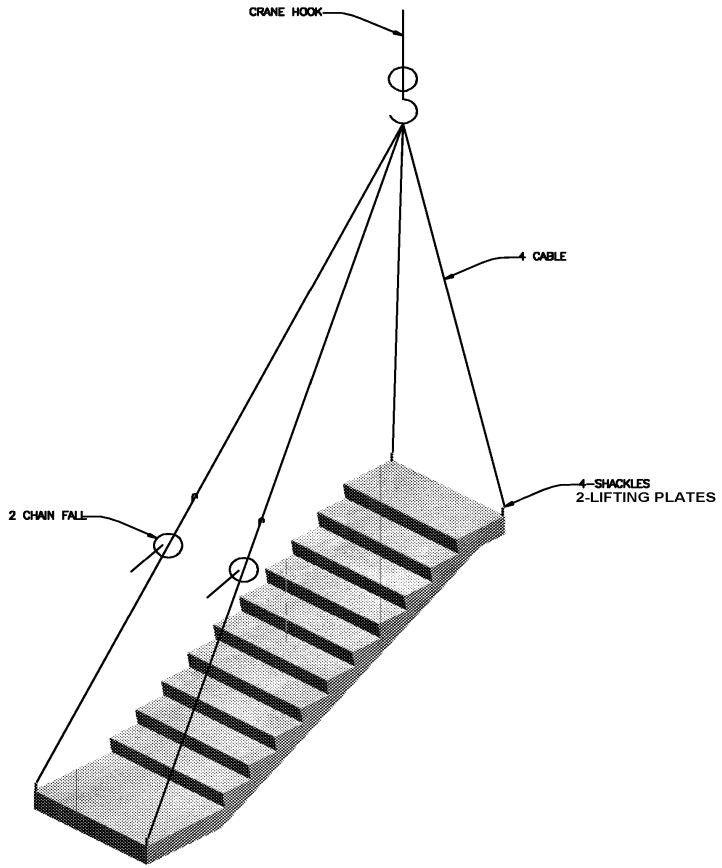
REDISTAIR™
GC SOLUTIONS, LLC
7357 SNAKE RIVER RD SUITE 200 ASOTIN, WA 99402
866.733.6220 509.243.6030 WWW.REDISTAIR.COM

Sheet Title: STAIR BOTTOM TO SLAB

Project: STANDARD DETAILS

8/20/07

Drawing: D7



NOTE:

1. MAX TOTAL WT = 4982# STRINGER 1F
2. CONTRACTOR RESPONSIBLE FOR LIFTING.
3. USE A MIN. SAFETY FACTOR OF (4).

REDISTAIR™
GC SOLUTIONS, LLC
7357 SNAKE RIVER RD SUITE 200 ASOTIN, WA 99402
866.733.6220 509.243.6030 WWW.REDISTAIR.COM

Sheet Title: LIFTING DIAGRAM

Project: STANDARD DETAILS

Date: 8/20/07

Drawing: D8

RediStair ™ Specifications

STANDARD STRINGER: Maximum risers 15; Maximum width 59"

GOVERNING CODE: The "International Building Code (IBC)", 2003 Edition, as adopted and modified by the City of Seattle shall govern design and construction.

REFERENCE STANDARDS: Reference to a specific section in a code does not relieve the contractor from compliance with the entire standard. The latest edition of the standard shall be used unless a specific date is indicated.

SPECIFICATIONS: Refer to the contract specifications for information in addition to that contained in these notes and the structural drawings.

STRUCTURAL DETAILS: The structural drawings are intended to show the general character and extent of the project and are not intended to show all details of the work.

ARCHITECTURAL DRAWINGS: Refer to the architectural drawings for information including but not limited to: dimensions, elevations, stairs, elevators, curbs, drains, depressions, railings, penetrations, finishes and other nonstructural items.

STRUCTURAL RESPONSIBILITIES: The structural engineer is responsible for the strength and stability of the stair structure in its completed form.

CONTRACTOR RESPONSIBILITIES: The contractor is responsible for the means and methods of construction and all job related safety standards such as OSHA and WSHA including those steel erection items specifically addressed in the latest OSHA regulations. The contractor is responsible for the strength and stability of the structure during construction and shall provide temporary shoring, bracing and other elements required to maintain stability until the structure is complete. It is the contractor's responsibility to be familiar with the work required in the construction documents and the requirements for executing it properly. The contractor shall at his discretion employ a Washington State registered structural engineer PE, for design of temporary bracing and shoring. Bolting and field welding at all member connections is to be completed prior to the release of the member from the hoisting mechanism unless reviewed and approved by the General Contractor's temporary bracing and shoring design engineer. Submit construction sequence to Architect/Engineer for review.

The contractor shall submit plans per DEFERRED SUBMITTAL section below, showing the location, load, size and anchorage of all hangers supporting all mechanical, electrical, plumbing or sprinkler loads or penetrations) in excess of 400 pounds.

DISCREPANCIES: In case of discrepancies between the General Notes, contract specifications and reference standards, the Architect/Engineer shall determine which shall govern. Discrepancies shall be brought to the attention of the Architect/Engineer before proceeding with the work. Should any discrepancy be found in the Contract Documents, the Contractor will be deemed to have included in the price the most expensive way of completing the work, unless prior to the submission of the price, the Contractor asks for a decision from the Architect as to which shall govern. Accordingly, any conflict in or between the Contract Documents shall not be a basis for adjustment in the Contract Price.

SITE VERIFICATION: The contractor shall verify all dimensions and conditions at the site. Conflicts between the drawings and actual site conditions shall be brought to the attention of the Architect/Engineer before proceeding with the work.

CONSTRUCTION LOADS: Loads on the structure during construction shall not exceed the design loads as noted in DESIGN LOADS below or the capacity of partially completed construction.

ALTERNATES: Alternates for specified items may be submitted to the Engineer for review.

HANDRAILS/GUARDRAIL EMBEDS: Contractor to coordinate embed location with Miscellaneous Metals Supplier.

DESIGN LOADS

DESIGN LIVE LOADS:

AREA	LIVE LOADS
Stairs & Landings	100 PSF

Stair treads designed for 300 lb concentrated load placed to produce maximum stress.

TESTS AND INSPECTIONS

INSPECTIONS: All construction is subject to inspection by the Building Official in accordance with IBC Sec. 108. The contractor shall coordinate all required inspections with the Building Official.

SPECIAL INSPECTIONS: In addition to inspections required by the local jurisdiction per IBC Sec. 109, special inspectors shall, in accordance with IBC Sec. 109, shall be reviewed and approved by the Architect and EOR prior to commencement of work. Special inspectors shall be listed with WABO or shall submit their credentials for review by the GC and design team. Additionally, the special inspectors shall, in accordance with IBC Chapter 17, inspect the following structural work:

Concrete

- Periodic inspection of reinforcing steel.
- Periodic inspection during the placing of reinforcing steel.
- Inspection of concrete pour backs shall be as specified on the Engineer of Record Documents
- During grouting of adhesive anchors and reinforcing bars- Hilti HY150 ER #5193 or Simpson SET ER #5279. The special inspection shall comply with Sec. 1704 of the code. For adhesive anchors, the special inspector must record product description (including product name), adhesive expiration date, concrete type and strength, anchor diameter and steel grade, compliance of drill bit with this report, hole diameter, hole edge distance and spacing, cleanliness of hole and anchor, adhesive application (including verification of properly mixed adhesive) and anchor embedment. Additionally, the special inspector must state in the report supplied to the building official whether the anchor installation is in accordance with the manufacturer's published instructions and this evaluation report. The manufacturer's instructions are included in each unit package of adhesive.

INSPECTION SUBMITTALS: Special inspection reports shall be provided on a weekly basis. Final special inspection reports will be required by each special inspection firm per IBC 1704.1.2. Submit copies of all inspection reports to the Architect/Engineer and the City of Seattle Building Department for review.

CAST-IN-PLACE CONCRETE

REFERENCE STANDARDS: Conform to:
(1) ACI 301-96 "Standard Specifications for Structural Concrete",
(2) IBC Chapter 19-Concrete,
(3) ACI 318-02/318R-02

FIELD REFERENCE: The contractor shall keep a copy of ACI Field Reference manual, SP-15, "Standard Specifications for Structural Concrete (ACI 301) with Selected ACI and ASTM References."

CONCRETE MIXTURES: Conform to ACI 301 Sec. 4 "Concrete Mixtures."

MATERIALS: Conform to ACI 301 Sec. 4.2.1 "Materials" for requirements for cementitious materials, aggregates, mixing water and admixtures.

SUBMITTALS: Provide all submittals required by ACI 301 Sec. 4.1.2. Submit mix designs for each mix in the table below.

TABLE OF MIX DESIGN REQUIREMENTS

Member Type/Location	Strength (psi)	Test Age (days)	Maximum Aggregate	Maximum W/C Ratio	Air Content
Precast Stair Stringers					
• Stair Stringers	4000	28	¾"	—	—
• Pourbacks and landings	Comply with Structural Documents				

Mix Design Notes:

(1) W/C Ratio: Water–cementitious material ratios shall be based on the total weight of cementitious materials. Ratios not shown in the table above are controlled by strength requirements.

(2) Cementitious Content:
(a) The use of fly ash, other pozzolans, silica fume, or slag shall conform to ACI 301 Sec 4.2.2.8.b. Maximum amount of fly ash shall be 20% of total cementitious content unless reviewed and approved otherwise by SER.

(b) For concrete used in elevated floors, portland cement content shall conform to ACI 301 Sec 4.2.2.1. Acceptance of lower cement content is contingent on providing supporting data to the Architect/Engineer for review and acceptance.

FORMWORK: Conform to ACI 301 Sec. 2 "Formwork and Form Accessories." Removal of Forms shall conform to Sec. 2.3.2 except strength indicated in Sec. 2.3.2.5 shall be 0.75 f' c. Reshoring shall conform to Sec. 2.3.3.

EMBEDDED ITEMS: Position and secure in place expansion joint material, anchors and other structural and non-structural embedded items before placing concrete. Contractor shall refer to mechanical, electrical, plumbing and architectural drawings and coordinate other embedded items.

GROUTED REBAR AND ANCHOR BOLTS: Follow manufacturer's written instructions: drill holes in existing concrete to depth noted on plans or to depth as necessary to develop the strength of the rebar listed in the manufacturer's ICBO report. UNO by the manufacturer, make the holes 3/8 to 1/2 inch greater than bolt or dowel diameter. Roughen sides of holes by percussive drilling methods. Holes shall be brushed and blown free of debris and surface residue before grouting operation. Special inspection required.

TESTING AND ACCEPTANCE:

Testing: Obtain samples and conduct tests in accordance with ACI 301 Sec. 1.6.4.2. Additional samples may be required to obtain concrete strengths at alternate intervals than shown below.

- Cure 4 cylinders for 28-day test age [(6 cylinders for post-tensioned concrete)]. Test 2 cylinders at 2 or 3 days for post-tensioned concrete only,] test 1 cylinder at 7 days, test 2 cylinders at 28 days, and hold 1 cylinder in reserve for use as the Engineer directs. After 56 days, unless notified by the Engineer to the contrary, the reserve cylinder may be discarded without being tested for specimens meeting 28-day strength requirements.

Acceptance. Strength is satisfactory when:

(1) The averages of all sets of 3 consecutive tests equal or exceed the specified strength.

(2) No individual test falls below the specified strength by more than 500 psi.

A "test" for acceptance is the average strength of the two cylinders tested at the specified test age.

CONCRETE REINFORCEMENT

REFERENCE STANDARDS: Conform to:
(1) ACI 301-99 "Standard Specifications for Structural Concrete", Section 3 "Reinforcement and Reinforcement Supports."
(2) ACI SP-66 "ACI Detailing Manual" including ACI 315 "Details and Detailing of Concrete Reinforcement."
(3) CRSI MSP-2-98 "Manual of Standard Practice."
(4) ANSI/AWS D1.4 "Structural Welding Code - Reinforcing Steel."
(5) IBC Chapter 19-Concrete.
(6) ACI 318-latest edition.

LIFTING REQUIREMENTS for Precast Stair Stringers: The general contractor is responsible for rigging and lifting insert locations.

MATERIALS:

Reinforcing Bars	ASTM A615, Grade 60, deformed bars.
Bar Supports	CRSI MSP-2-98, Chapter 3 "Bar Supports."
Tie Wire	16.5 gage or heavier, black annealed.
Deformed Welded Wire Fabric	ASTM A497
Smooth Welded Wire Fabric	ASTM A185

FABRICATION: Conform to ACI 301, Sec 3.2.2. "Fabrication", and ACI SP-66 "ACI Detailing Manual."

PLACING: Conform to ACI 301, Sec. 3.3.2 "Placement." Placing tolerances shall conform to Sec. 3.3.2.1 "Tolerances."

CONCRETE COVER: Conform to the following cover requirements from ACI 301, Table 3.3.2.3:

Bars in slabs and walls	1"

FIELD BENDING: Conform to ACI 301 Sec. 3.3.2.8. "Field Bending or Straightening." Bar sizes #3 through #5 may be field bent cold the first time. Other bars require preheating. Do not twist bars.

STRUCTURAL STEEL

DESIGN STANDARDS: Structural steel for this project is designed in accordance with: AISC – "Manual of Steel Construction, Allowable Stress Design (ASD), Ninth Edition (1989), Type 2, "Unrestrained Free-Ended Framing".

REFERENCE STANDARDS: Conform to:
(1) AISC Specification: AISC–ASD (1989) "Specification for Structural Steel Buildings - Allowable Stress Design and Plastic Design".
(2) AISC Code: "Code of Standard Practice for Steel Buildings & Bridges." March 7, 2000.
(3) Bolt Specification: RCSC "Specification for Structural Joints using ASTM A325 or A490 Bolts" June 23, 2000, Appendix B, ASD Alternative.
(4) Welding Code: AWS D1.1-98 "Structural Welding Code - Steel."
(5) ASCE 3-84 "Standard for the Structural Design of Composite Slabs."
(6) AISC Seismic: Seismic Provisions for Structural Steel Buildings including Supplement No. 2, Nov. 10, 2000.

SUBMITTALS:
(1) Submit welder's certificates verifying qualification within past 12 months.

MATERIALS:

Other Structural Shapes	ASTM A36	Fy = 36 ksi
Bars & Plates	ASTM A36	Fy = 36 ksi
Structural Tubing – Square/Rect HSS	ASTM A500, Grade B	Fy = 46 ksi
High-Strength Bolts	ASTM A325 or ASTM F1852, Type 1, Plain	
Nuts	ASTM A563 or ASTM A194 Grade 2H	
Washers (flat or beveled)	ASTM F436	
Anchor Rods (J-type, headed or threaded)	ASTM F1554, Grade 36	
Threaded Rods (ASTM F1554, Gr 36)	ASTM A36, Gr 36, Fy = 36 ksi	
Welded Headed Studs (WHS)	ASTM A108	
Headed Concrete Anchors (HCA)	ASTM A108	
Welding Electrodes	E70XX	
Expansion Anchors	Hilti or SER approved equal with current ICBO report	
Adhesive Anchors	Hilti HY-150, or SER approved equal with current ICBO report	

WELDING: Conform to AWS D1.1. Welders shall be certified in accordance with WABO requirements. Use E70 electrodes of type required for materials to be welded.

HIGH-STRENGTH BOLTING: High Strength bolts shall be installed per Joint Type ST - "snug tight" per RCSC Specification Section 4. ASTM A325 bolts shall conform to the RCSC Specification Section 2 designed with ASTM A325-N bolts – "threads included in the shear plane".

ANCHORAGE to CONCRETE: Anchor Bolts shall conform to IBC 2205.

- ANCHORS RODS and BASE PLATES:. Anchor rods shall be provided cast-in-place as indicated on drawings unless otherwise approved by the Engineer. All columns (vertical member assemblies weighing over 300 pounds) shall be provided with a minimum of four anchor rods.

- HEADED CONCRETE ANCHORS (HCA):. All headed concrete anchors welded to plates embedded or cast into concrete, shall be 1/2" diameter x 6" long unless noted otherwise on drawings. Nominal stud lengths shall be as shown on drawing. Headed steel studs shall be welded in accordance with AWS D1.1 Chapter 7 "Stud Welding."

- EXPANSION or ADHESIVE ANCHORS: Expansion and adhesive anchors shall be as specified or SER approved equal with current ICBO report Install anchors in strict accordance to ICBO report and manufacturers instructions. Drilled-in anchor embedment lengths shall be as shown on drawings, or not less than 9 times the anchor nominal diameter (9D). Cast-in-place anchors shall not be less than 12 times the anchor diameter (12D) unless shown otherwise on the drawings. Use acrylic anchors of equivalent strength when base material falls below 40 degrees F. Expansion or adhesive anchors shall not be installed in post-tensioned slabs without verification of tendon location and approval form the SER.

FABRICATION / ERECTION: Conform to AISC Specification Sec. M2 "Fabrication" and AISC Code Sec. 6 "Fabrication and Delivery" and AISC Code Sec. 8 "Quality Control." The fabricator and erector shall maintain a quality control program to the extent deemed necessary so that all of the work is performed in accordance with this Code, the AISC Specification, and the contract documents. The fabricator has the option to use the AISC Quality Certification Program in establishing and administering the quality control program.

SHOP PAINTING: Conform to AISC Specification Sec. M2 and AISC Code Sec. 6.5 unless a multi-coat system is required per the project specifications. Do not paint steel to be embedded in

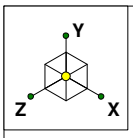
REDISTAIR™
GC SOLUTIONS, LLC
7357 SNAKE RIVER RD SUITE 200 ASOTIN, WA 99402
866.733.6220 509.243.6030 WWW.REDISTAIR.COM

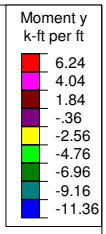
Sheet Title: SPECIFICATIONS

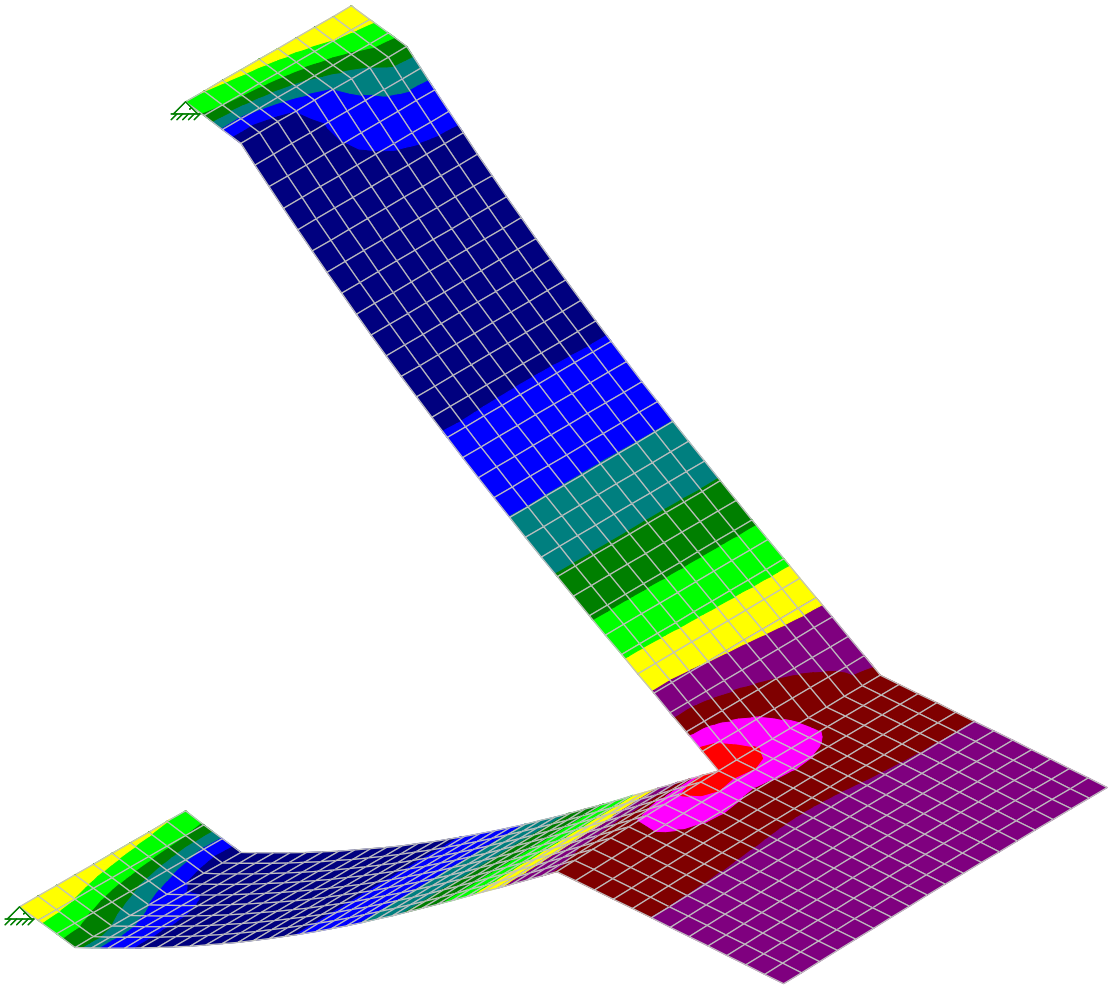
Project: STANDARD DETAILS

Date: 8/20/07

Drawing: D13







Results for LC 2, 1.2D + 1.6L

		Mar 25, 2009 at 9:46 AM
		Stair A L6-Roof.r3d

Load Combinations

	Description	So...	PDelta	SRSS	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac...
1	1.4D	Yes			1	1.4																
2	1.2D + 1.6L	Yes			1	1.2	2	1.6														
3	1.2D + Seismic Long +	Yes			3	.64	4	.64	1	1.2												
4	1.2D + Seismic Long -	Yes			5	.64	6	.64	1	1.2												
5	1.2D + Seismic Short +	Yes			7	.64	8	.64	1	1.2												
6	1.2D + Seismic Short -	Yes			9	.64	10	.64	1	1.2												
7	Dead	Yes			1	1																
8	Live	Yes			2	1																

Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	N10	4.708	3.935	.905	0	0	0
2	1	N11	-2.482	-.388	.196	0	0	0
3	1	N12	-4.708	3.935	.905	0	0	0
4	1	N13	2.482	-.388	.196	0	0	0
5	1	N14	-6.922	3.591	.585	0	0	0
6	1	N15	-5.654	2.489	.311	0	0	0
7	1	N16	-4.554	2.165	.055	0	0	0
8	1	N17	-3.373	1.932	-.152	0	0	0
9	1	N18	-2.011	1.602	-.331	0	0	0
10	1	N19	-.421	1.251	-.511	0	0	0
11	1	N20	1.375	.907	-.615	0	0	0
12	1	N21	3.246	.491	-.444	0	0	0
13	1	N50	-3.246	.491	-.444	0	0	0
14	1	N51	-1.375	.907	-.615	0	0	0
15	1	N52	.421	1.251	-.511	0	0	0
16	1	N53	2.011	1.602	-.331	0	0	0
17	1	N54	3.373	1.932	-.152	0	0	0
18	1	N55	4.554	2.165	.055	0	0	0
19	1	N56	5.654	2.489	.311	0	0	0
20	1	N57	6.922	3.591	.585	0	0	0
21	1	Totals:	0	35.952	0			
22	1	COG (ft):	X: 8.018	Y: 8.33	Z: 0			
23	2	N10	8.541	7.038	1.633	0	0	0
24	2	N11	-4.465	-.797	.36	0	0	0
25	2	N12	-8.541	7.038	1.633	0	0	0
26	2	N13	4.465	-.797	.36	0	0	0
27	2	N14	-12.558	6.416	1.035	0	0	0
28	2	N15	-10.233	4.444	.537	0	0	0
29	2	N16	-8.213	3.859	.083	0	0	0
30	2	N17	-6.06	3.436	-.28	0	0	0
31	2	N18	-3.596	2.839	-.594	0	0	0
32	2	N19	-.737	2.206	-.908	0	0	0
33	2	N20	2.483	1.58	-1.087	0	0	0
34	2	N21	5.835	.8	-.78	0	0	0
35	2	N50	-5.835	.8	-.78	0	0	0
36	2	N51	-2.483	1.58	-1.087	0	0	0
37	2	N52	.737	2.206	-.908	0	0	0
38	2	N53	3.596	2.839	-.594	0	0	0
39	2	N54	6.06	3.436	-.28	0	0	0
40	2	N55	8.213	3.859	.083	0	0	0
41	2	N56	10.233	4.444	.537	0	0	0
42	2	N57	12.558	6.416	1.035	0	0	0
43	2	Totals:	0	63.644	0			
44	2	COG (ft):	X: 8.226	Y: 8.33	Z: 0			

Joint Reactions (By Combination) (Continued)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
45	3	N10	-1.668	-.815	-.293	0	0	0
46	3	N11	3.575	3.855	-.901	0	0	0
47	3	N12	1.668	-.815	-.293	0	0	0
48	3	N13	-3.575	3.855	-.901	0	0	0
49	3	N14	1.63	.307	-.203	0	0	0
50	3	N15	.214	.913	-.334	0	0	0
51	3	N16	-.971	1.222	-.543	0	0	0
52	3	N17	-1.93	1.432	-.736	0	0	0
53	3	N18	-2.686	1.598	-.89	0	0	0
54	3	N19	-3.293	1.706	-1.028	0	0	0
55	3	N20	-3.882	1.999	-1.127	0	0	0
56	3	N21	-4.781	3.192	-1.085	0	0	0
57	3	N50	4.781	3.192	-1.085	0	0	0
58	3	N51	3.882	1.999	-1.127	0	0	0
59	3	N52	3.293	1.706	-1.028	0	0	0
60	3	N53	2.686	1.598	-.89	0	0	0
61	3	N54	1.93	1.432	-.736	0	0	0
62	3	N55	.971	1.222	-.543	0	0	0
63	3	N56	-.214	.913	-.334	0	0	0
64	3	N57	-1.63	.307	-.203	0	0	0
65	3	Totals:	0	30.816	-14.277			
66	3	COG (ft):	X: 8.018	Y: 8.33	Z: 0			
67	4	N10	9.738	7.56	1.845	0	0	0
68	4	N11	-7.83	-4.52	1.237	0	0	0
69	4	N12	-9.738	7.56	1.845	0	0	0
70	4	N13	7.83	-4.52	1.237	0	0	0
71	4	N14	-13.496	5.849	1.205	0	0	0
72	4	N15	-9.907	3.355	.867	0	0	0
73	4	N16	-6.835	2.489	.637	0	0	0
74	4	N17	-3.853	1.881	.476	0	0	0
75	4	N18	-.762	1.149	.322	0	0	0
76	4	N19	2.571	.439	.152	0	0	0
77	4	N20	6.24	-.443	.074	0	0	0
78	4	N21	10.345	-2.35	.323	0	0	0
79	4	N50	-10.345	-2.35	.323	0	0	0
80	4	N51	-6.24	-.443	.074	0	0	0
81	4	N52	-2.571	.439	.152	0	0	0
82	4	N53	.762	1.149	.322	0	0	0
83	4	N54	3.853	1.881	.476	0	0	0
84	4	N55	6.835	2.489	.637	0	0	0
85	4	N56	9.907	3.355	.867	0	0	0
86	4	N57	13.496	5.849	1.205	0	0	0
87	4	Totals:	0	30.816	14.277			
88	4	COG (ft):	X: 8.018	Y: 8.33	Z: 0			
89	5	N10	3.861	3.237	.739	0	0	0
90	5	N11	-2.902	-.64	.337	0	0	0
91	5	N12	-4.21	3.508	.813	0	0	0
92	5	N13	1.353	-.025	0	0	0	0
93	5	N14	-6.333	3.298	.526	0	0	0
94	5	N15	-5.368	2.357	.255	0	0	0
95	5	N16	-4.541	2.102	-.005	0	0	0
96	5	N17	-3.631	1.927	-.215	0	0	0
97	5	N18	-2.552	1.66	-.391	0	0	0
98	5	N19	-1.273	1.362	-.565	0	0	0
99	5	N20	.175	1.072	-.674	0	0	0
100	5	N21	1.636	.771	-.541	0	0	0
101	5	N50	-3.928	.071	-.22	0	0	0

Joint Reactions (By Combination) (Continued)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
102	5	N51	-2.183	.484	-.38	0	0	0
103	5	N52	-.551	.783	-.311	0	0	0
104	5	N53	.896	1.087	-.176	0	0	0
105	5	N54	2.152	1.386	-.045	0	0	0
106	5	N55	3.265	1.609	.099	0	0	0
107	5	N56	4.324	1.911	.278	0	0	0
108	5	N57	5.533	2.858	.477	0	0	0
109	5	Totals:	-14.277	30.816	0			
110	5	COG (ft):	X: 8.018	Y: 8.33	Z: 0			
111	6	N10	4.21	3.508	.813	0	0	0
112	6	N11	-1.353	-.025	0	0	0	0
113	6	N12	-3.861	3.237	.739	0	0	0
114	6	N13	2.902	-.64	.337	0	0	0
115	6	N14	-5.533	2.858	.477	0	0	0
116	6	N15	-4.324	1.911	.278	0	0	0
117	6	N16	-3.265	1.609	.099	0	0	0
118	6	N17	-2.152	1.386	-.045	0	0	0
119	6	N18	-.896	1.087	-.176	0	0	0
120	6	N19	.551	.783	-.311	0	0	0
121	6	N20	2.183	.484	-.38	0	0	0
122	6	N21	3.928	.071	-.22	0	0	0
123	6	N50	-1.636	.771	-.541	0	0	0
124	6	N51	-.175	1.072	-.674	0	0	0
125	6	N52	1.273	1.362	-.565	0	0	0
126	6	N53	2.552	1.66	-.391	0	0	0
127	6	N54	3.631	1.927	-.215	0	0	0
128	6	N55	4.541	2.102	-.005	0	0	0
129	6	N56	5.368	2.357	.255	0	0	0
130	6	N57	6.333	3.298	.526	0	0	0
131	6	Totals:	14.277	30.816	0			
132	6	COG (ft):	X: 8.018	Y: 8.33	Z: 0			
133	7	N10	3.363	2.81	.647	0	0	0
134	7	N11	-1.773	-.277	.14	0	0	0
135	7	N12	-3.363	2.81	.647	0	0	0
136	7	N13	1.773	-.277	.14	0	0	0
137	7	N14	-4.944	2.565	.418	0	0	0
138	7	N15	-4.039	1.778	.222	0	0	0
139	7	N16	-3.253	1.546	.039	0	0	0
140	7	N17	-2.41	1.38	-.108	0	0	0
141	7	N18	-1.437	1.145	-.236	0	0	0
142	7	N19	-.301	.894	-.365	0	0	0
143	7	N20	.982	.648	-.439	0	0	0
144	7	N21	2.318	.351	-.317	0	0	0
145	7	N50	-2.318	.351	-.317	0	0	0
146	7	N51	-.982	.648	-.439	0	0	0
147	7	N52	.301	.894	-.365	0	0	0
148	7	N53	1.437	1.145	-.236	0	0	0
149	7	N54	2.41	1.38	-.108	0	0	0
150	7	N55	3.253	1.546	.039	0	0	0
151	7	N56	4.039	1.778	.222	0	0	0
152	7	N57	4.944	2.565	.418	0	0	0
153	7	Totals:	0	25.68	0			
154	7	COG (ft):	X: 8.018	Y: 8.33	Z: 0			
155	8	N10	2.816	2.291	.536	0	0	0
156	8	N11	-1.461	-.29	.12	0	0	0
157	8	N12	-2.816	2.291	.536	0	0	0
158	8	N13	1.461	-.29	.12	0	0	0

Joint Reactions (By Combination) (Continued)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
159	8	N14	-4.141	2.086	.334	0	0	0
160	8	N15	-3.366	1.444	.169	0	0	0
161	8	N16	-2.693	1.252	.022	0	0	0
162	8	N17	-1.98	1.113	-.094	0	0	0
163	8	N18	-1.17	.916	-.194	0	0	0
164	8	N19	-.235	.708	-.294	0	0	0
165	8	N20	.815	.501	-.35	0	0	0
166	8	N21	1.908	.237	-.25	0	0	0
167	8	N50	-1.908	.237	-.25	0	0	0
168	8	N51	-.815	.501	-.35	0	0	0
169	8	N52	.235	.708	-.294	0	0	0
170	8	N53	1.17	.916	-.194	0	0	0
171	8	N54	1.98	1.113	-.094	0	0	0
172	8	N55	2.693	1.252	.022	0	0	0
173	8	N56	3.366	1.444	.169	0	0	0
174	8	N57	4.141	2.086	.334	0	0	0
175	8	Totals:	0	20.517	0			
176	8	COG (ft):	X: 8.422	Y: 8.33	Z: 0			

Typical Redistair Stringer

Date:	3/25/2009
Job #	xx-xx-xxx
Designer:	BSM

Vu (k) =	1
Mu (k*ft) =	11.36

b = bw (in) =	12	β1 =	0.85
height (in) =	8	φv =	0.75
cover (in) =	1.00	φb =	0.900
bar dia (in) =	0.625	f'c (psi) =	4000
d (in) =	6.69	fy (psi) =	60000
		tie bar dia (in) =	0

Shear Check

φVn ≥ Vu φVn = φ(Vc+Vs)

φVc (k) = 2*sqrt(f'c)*bw*d ~ ACI 11.3.1.1
φVc (k) = 7.61
φVs req (k) = -6.61
No shear reinforcing needed

φVs (k) = φv*Av*fy*d/s ~ ACI 11.5.6.2
φVs (k) = 0.00

Av (in²) =	
Av,min (in²) =	0.060
Smax (in) =	0
Sactual (in) =	6

Shear ok

Moment Check

φMn ≥ Mu

As (in²) = 0.85*b*d*f'c/fy*(1-sqrt(1-2.353*Mu/(φ*f'c*b*d^2))
As (in²) = 0.395
As, min (in²) = Min(As*4/3, Max(3*sqrt(f'c)/fy*bw*d or 200*bw*d/fy or 0.0018*bw*d)
As, min (in²) = 0.268 ~ ACI 10.5.1-3
As, req (in²) = 0.395

Use #5 @ 9" OC T&B
As (in²) = 0.413

a (in) = As*fy/(0.85*f'c*b)
a (in) = 0.607
a/d = 0.091
atcl/dt = 0.375*β1
atcl/dt = 0.319
ab/d = β1*(87000/(87000+fy))
ab/d = 0.503
abrl/dt = 0.429*β1
abrl/dt = 0.365

fs=fy

φMn (k*ft) = φb*As*fy*(d-a/2) **or** 0.85*f'c*a*b*(d-a/2) **if a/d>ab/d**
φMn (k*ft) = 11.9

Moment Capacity > Ultimate Moment

Use #5 @ 9" OC T&B

SECTION 03410

PLANT-PRECAST STRUCTURAL CONCRETE

PART 1 GENERAL

1.1 SUMMARY

A. Provide precast structural concrete RediStair™ units.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for RediStair™ stringers and chosen stair nosing products.

B. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.
   1. Shop drawings shall be prepared and stamped by a qualified engineer licensed in the jurisdiction of the project.
   2. Provide preliminary shop drawing indicating elevations, horizontal grid locations, and line loads. Submit for approval prior to production of complete shop drawing.

1.3 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers appropriately licensed to provide RediStair™ pre-cast concrete stringers. Use qualified installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

B. Casting: Plant cast.

C. Standards: ACI 318 Building Code Requirements for Reinforced Concrete, and CRSI Manual of Standard Practice.

D. Testing: Independent testing laboratory.

E. Erection Tolerance Limits: PCI MNL 127.

PART 2 PRODUCTS

2.1 MATERIALS

A. Plant-Precast RediStair™ Structural Concrete Stair Stringers and associated site concrete:

STANDARD STRINGER: Maximum risers 15; Maximum width 59”

GOVERNING CODE: The "International Building Code (IBC)", 2003 Edition, as adopted and modified by the City of Seattle shall govern design and construction.

REFERENCE STANDARDS: Reference to a specific section in a code does not relieve the contractor from compliance with the entire standard. The latest edition of the standard shall be used unless a specific date is indicated.

SPECIFICATIONS: Refer to the contract specifications for information in addition to that contained in these notes and the structural drawings.

STRUCTURAL DETAILS: The structural drawings are intended to show the general character and extent of the project and are not intended to show all details of the work.

ARCHITECTURAL DRAWINGS: Refer to the architectural drawings for information including but not limited to: dimensions, elevations, stairs, elevators, curbs, drains, depressions, railings, penetrations, finishes and other nonstructural items.

STRUCTURAL RESPONSIBILITIES: The structural engineer is responsible for the strength and stability of the stair structure in its completed form.

CONTRACTOR RESPONSIBILITIES: The contractor is responsible for the means and methods of construction and all job related safety standards such as OSHA and WSHA including those steel erection items specifically addressed in the latest OSHA regulations. The contractor is responsible for the strength and stability of the structure during construction and shall provide temporary shoring, bracing and other elements required to maintain stability until the structure is complete. It is the contractor's responsibility to be familiar with the work required in the construction documents and the requirements for executing it properly. The contractor shall at his discretion employ a Washington State registered structural engineer PE, for design of temporary bracing and shoring. Bolting and field welding at all member connections is to be completed prior to the release of the member from the hoisting mechanism unless reviewed and approved by the General Contractor's temporary bracing and shoring design engineer. Submit construction sequence to Architect/Engineer for review.

The contractor shall submit plans per DEFERRED SUBMITTAL section below, showing the location, load, size and anchorage of all hangers supporting all mechanical, electrical, plumbing or sprinkler loads or penetrations) in excess of 400 pounds.

DISCREPANCIES: In case of discrepancies between the General Notes, contract specifications and reference standards, the Architect/Engineer shall determine which shall govern. Discrepancies shall be brought to the attention of the Architect/Engineer before proceeding with the work. Should any discrepancy be found in the Contract Documents, the Contractor will be deemed to have included in the price the most expensive way of completing the work, unless prior to the submission of the price, the Contractor asks for a decision from the Architect as to which shall govern. Accordingly, any conflict in or between the Contract Documents shall not be a basis for adjustment in the Contract Price.

SITE VERIFICATION: The contractor shall verify all dimensions and conditions at the site. Conflicts between the drawings and actual site conditions shall be brought to the attention of the Architect/Engineer before proceeding with the work.

CONSTRUCTION LOADS: Loads on the structure during construction shall not exceed the design loads as noted in DESIGN LOADS below or the capacity of partially completed construction.

ALTERNATES: Alternates for specified items may be submitted to the Engineer for review.

HANDRAILS/GUARDRAIL EMBEDS: Contractor to coordinate embed location with Miscellaneous Metals Supplier.

DESIGN LOADS

DESIGN LIVE LOADS:

AREA	LIVE LOADS
Stairs & Landings	100 PSF

Stair treads designed for 300 lb concentrated load placed to produce maximum stress.

TESTS AND INSPECTIONS

INSPECTIONS: All construction is subject to inspection by the Building Official in accordance with IBC Sec. 108. The contractor shall coordinate all required inspections with the Building Official.

SPECIAL INSPECTIONS: In addition to inspections required by the local jurisdiction per IBC Sec. 109, special inspectors shall, in accordance with IBC Sec. 109, shall be reviewed and approved by the Architect and EOR prior to commencement of work. Special inspectors shall be listed with WABO or shall submit their credentials for review by the GC and design team. Additionally, the special inspectors shall, in accordance with IBC Chapter 17, inspect the following structural work:

Concrete

- Periodic inspection of reinforcing steel.
- Periodic inspection during the placing of reinforcing steel.
- Inspection of concrete pour backs shall be as specified on the Engineer of Record Documents
- During grouting of adhesive anchors and reinforcing bars- Hilti HY150 ER #5193 or Simpson SET ER #5279. The special inspection shall comply with Sec. 1704 of the code. For adhesive anchors, the special inspector must record product description (including product name), adhesive expiration date, concrete type and strength, anchor diameter and steel grade, compliance of drill bit with this report, hole diameter, hole edge distance and spacing, cleanliness of hole and anchor, adhesive application (including verification of properly mixed adhesive) and anchor embedment. Additionally, the special inspector must state in the report supplied to the building official whether the anchor installation is in accordance with the manufacturer's published instructions and this evaluation report. The manufacturer's instructions are included in each unit package of adhesive.

INSPECTION SUBMITTALS: Special inspection reports shall be provided on a weekly basis. Final special inspection reports will be required by each special inspection firm per IBC 1704.1.2. Submit copies of all inspection reports to the Architect/Engineer and the City of Seattle Building Department for review.

CAST-IN-PLACE CONCRETE

REFERENCE STANDARDS: Conform to:

(1) ACI 301-96 "Standard Specifications for Structural Concrete",
(2) IBC Chapter 19-Concrete,
(3) ACI 318-02/318R-02

FIELD REFERENCE: The contractor shall keep a copy of ACI Field Reference manual, SP-15, "Standard Specifications for Structural Concrete (ACI 301) with Selected ACI and ASTM References."

CONCRETE MIXTURES: Conform to ACI 301 Sec. 4 "Concrete Mixtures."

MATERIALS: Conform to ACI 301 Sec. 4.2.1 "Materials" for requirements for cementitious materials, aggregates, mixing water and admixtures.

SUBMITTALS: Provide all submittals required by ACI 301 Sec. 4.1.2. Submit mix designs for each mix in the table below.

TABLE OF MIX DESIGN REQUIREMENTS

Member Type/Location	Strength (psi)	Test Age (days)	Maximum Aggregate	Maximum W/C Ratio	Air Content

Precast Stair Stringers

- Stair Stringers 4000 28 ¾" — —
- Pourbacks and landings Comply with Structural Documents

Mix Design Notes:

(1) W/C Ratio: Water–cementitious material ratios shall be based on the total weight of cementitious materials. Ratios not shown in the table above are controlled by strength requirements.

(2) Cementitious Content:
   (a) The use of fly ash, other pozzolans, silica fume, or slag shall conform to ACI 301 Sec 4.2.2.8.b. Maximum amount of fly ash shall be 20% of total cementitious content unless reviewed and approved otherwise by SER.

   (b) For concrete used in elevated floors, portland cement content shall conform to ACI 301 Sec 4.2.2.1. Acceptance of lower cement content is contingent on providing supporting data to the Architect/Engineer for review and acceptance.

FORMWORK: Conform to ACI 301 Sec. 2 "Formwork and Form Accessories." Removal of Forms shall conform to Sec. 2.3.2 except strength indicated in Sec. 2.3.2.5 shall be 0.75 f' c. Reshoring shall conform to Sec. 2.3.3.

EMBEDDED ITEMS: Position and secure in place expansion joint material, anchors and other structural and non-structural embedded items before placing concrete. Contractor shall refer to mechanical, electrical, plumbing and architectural drawings and coordinate other embedded items.

GROUTED REBAR AND ANCHOR BOLTS: Follow manufacturer's written instructions: drill holes in existing concrete to depth noted on plans or to depth as necessary to develop the strength of the rebar listed in the manufacturer's ICBO report. UNO by the manufacturer, make the holes 3/8 to 1/2 inch greater than bolt or dowel diameter. Roughen sides of holes by percussive drilling methods. Holes shall be brushed and blown free of debris and surface residue before grouting operation. Special Inspection required.

TESTING AND ACCEPTANCE:

Testing: Obtain samples and conduct tests in accordance with ACI 301 Sec. 1.6.4.2. Additional samples may be required to obtain concrete strengths at alternate intervals than shown below.

- Cure 4 cylinders for 28-day test age [(6 cylinders for post-tensioned concrete)]. Test 2 cylinders at 2 or 3 days for post-tensioned concrete only,] test 1 cylinder at 7 days, test 2 cylinders at 28 days, and hold 1 cylinder in reserve for use as the Engineer directs. After 56 days, unless notified by the Engineer to the contrary, the reserve cylinder may be discarded without being tested for specimens meeting 28-day strength requirements.

Acceptance. Strength is satisfactory when:

(1) The averages of all sets of 3 consecutive tests equal or exceed the specified strength.

(2) No individual test falls below the specified strength by more than 500 psi.

A "test" for acceptance is the average strength of the two cylinders tested at the specified test age.

CONCRETE REINFORCEMENT

REFERENCE STANDARDS: Conform to:

(1) ACI 301-99 "Standard Specifications for Structural Concrete", Section 3 "Reinforcement and Reinforcement Supports."
(2) ACI SP-66 "ACI Detailing Manual" including ACI 315 " Details and Detailing of Concrete Reinforcement."
(3) CRSI MSP-2-98 "Manual of Standard Practice."
(4) ANSI/AWS D1.4 "Structural Welding Code - Reinforcing Steel."
(5) IBC Chapter 19-Concrete.
(6) ACI 318-latest edition.

LIFTING REQUIREMENTS for Precast Stair Stringers: The general contractor is responsible for rigging and lifting insert locations.

MATERIALS:

Reinforcing Bars	ASTM A615, Grade 60, deformed bars.
Bar Supports	CRSI MSP-2-98, Chapter 3 "Bar Supports."
Tie Wire	16.5 gage or heavier, black annealed.

FABRICATION: Conform to ACI 301, Sec 3.2.2. "Fabrication", and ACI SP-66 "ACI Detailing Manual."

PLACING: Conform to ACI 301, Sec. 3.3.2 "Placement." Placing tolerances shall conform to Sec. 3.3.2.1 "Tolerances."

CONCRETE COVER: Conform to the following cover requirements from ACI 301, Table 3.3.2.3:

Bars in slabs and walls	1"

FIELD BENDING: Conform to ACI 301 Sec. 3.3.2.8. " Field Bending or Straightening." Bar sizes # 3 through #5 may be field bent cold the first time. Other bars require preheating. Do not twist bars.

STRUCTURAL STEEL

DESIGN STANDARDS: Structural steel for this project is designed in accordance with: AISC – "Manual of Steel Construction, Allowable Stress Design (ASD), Ninth Edition (1989), Type 2, " Unrestrained Free-Ended Framing".

REFERENCE STANDARDS: Conform to:
(1) AISC Specification: AISC–ASD (1989) " Specification for Structural Steel Buildings - Allowable Stress Design and Plastic Design".
(2) AISC Code: "Code of Standard Practice for Steel Buildings & Bridges." March 7, 2000.
(3) Bolt Specification: RCSC "Specification for Structural Joints using ASTM A325 or A490 Bolts" June 23, 2000, Appendix B, ASD Alternative.
(4) Welding Code: AWS D1.1-98 "Structural Welding Code - Steel."
(5) ASCE 3-84 "Standard for the Structural Design of Composite Slabs."
(6) AISC Seismic: Seismic Provisions for Structural Steel Buildings including Supplement No. 2, Nov. 10, 2000.

SUBMITTALS:
(1) Submit welder's certificates verifying qualification within past 12 months.

MATERIALS:

Other Structural Shapes	ASTM A36	Fy = 36 ksi
Bars & Plates	ASTM A36	Fy = 36 ksi
Structural Tubing – Square/Rect HSS	ASTM A500, Grade B	Fy = 46 ksi
High-Strength Bolts	ASTM A325 or ASTM F1852, Type 1, Plain	
Nuts	ASTM A563 or ASTM A194 Grade 2H	
Washers (flat or beveled)	ASTM F436	

Anchor Rods (J-type, headed or threaded) ..... ASTM F1554, Grade 36
Threaded Rods (ASTM F1554, Gr 36) ..... ASTM A36, Gr 36, Fy = 36 ksi
Welded Headed Studs (WHS)..... ASTM A108
Headed Concrete Anchors (HCA) ..... ASTM A108
Welding Electrodes..... E70XX
Expansion Anchors..... Hilti or SER approved equal with current ICBO report
Adhesive Anchors..... Hilti HY-150, or SER approved equal with current ICBO report

WELDING: Conform to AWS D1.1. Welders shall be certified in accordance with WABO requirements. Use E70 electrodes of type required for materials to be welded.

HIGH-STRENGTH BOLTING: High Strength bolts shall be installed per Joint Type ST - "snug tight" per RCSC Specification Section 4. ASTM A325 bolts shall conform to the RCSC Specification Section 2 designed with ASTM A325-N bolts – "threads included in the shear plane".

ANCHORAGE to CONCRETE: Anchor Bolts shall conform to IBC 2205.

- ANCHORS RODS and BASE PLATES:. Anchor rods shall be provided cast-in-place as indicated on drawings unless otherwise approved by the Engineer. All columns (vertical member assemblies weighing over 300 pounds) shall be provided with a minimum of four anchor rods.

- HEADED CONCRETE ANCHORS (HCA):. All headed concrete anchors welded to plates embedded or cast into concrete, shall be 1/2" diameter x 6" long unless noted otherwise on drawings. Nominal stud lengths shall be as shown on drawing. Headed steel studs shall be welded in accordance with AWS D1.1 Chapter 7 "Stud Welding."

- EXPANSION or ADHESIVE ANCHORS: Expansion and adhesive anchors shall be as specified or SER approved equal with current ICBO report Install anchors in strict accordance to ICBO report and manufacturers instructions. Drilled-in anchor embedment lengths shall be as shown on drawings, or not less than 9 times the anchor nominal diameter (9D). Cast-in-place anchors shall not be less than 12 times the anchor diameter (12D) unless shown otherwise on the drawings. Use acrylic anchors of equivalent strength when base material falls below 40 degrees F. Expansion or adhesive anchors shall not be installed in post-tensioned slabs without verification of tendon location and approval form the SER.

FABRICATION / ERECTION: Conform to AISC Specification Sec. M2 "Fabrication" and AISC Code Sec. 6 "Fabrication and Delivery" and AISC Code Sec. 8 "Quality Control." The fabricator and erector shall maintain a quality control program to the extent deemed necessary so that all of the work is performed in accordance with this Code, the AISC Specification, and the contract documents. The fabricator has the option to use the AISC Quality Certification Program in establishing and administering the quality control program.

SHOP PAINTING: Conform to AISC Specification Sec. M2 and AISC Code Sec. 6.5 unless a multi-coat system is required per the project specifications. Do not paint steel to be embedded in concrete, fireproofed, or concealed by the interior building finish. Do not paint surfaces to be field welded or where slip-critical bolts are specified. All other interior steel shall be painted with one coat of shop primer. All exposed exterior steel shall be painted with an exterior multi-cost system as per the project specifications. Field touch-up painting shall be with primer for exposed interior surfaces. All steel shall be painted gray unless noted otherwise on the drawings or in the project specifications.

ERECTION: Conform to AISC Specification Sec. M4 "Erection" and AISC Code Sec.7 "Erection." Steel work shall be carried up true and plumb within the limits defined in AISC Code Sec. 7.11.

BRACING and SAFETY PROTECTION: The contractor shall provide temporary bracing and safety protection required by AISC Specification Sec. M4.2 "Bracing" and AISC Code Sec. 7.10 and 7.11 for "Temporary Support of Structural Steel Frames" and "Safety Protection."

ARCHITECTURALLY EXPOSED STRUCTURAL STEEL: Steel identified by the Architect on the architectural drawings as Architecturally Exposed Structural Steel, (AESS) shall conform to Sec. 10 of AISC Code.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install RediStair™ stringers and systems in accordance with manufacturer's instructions and approved submittals. Install materials and systems in proper relation with adjacent construction and with uniform appearance. Coordinate with work of other sections.

B. Provide temporary shoring and bracing as required.

C. Tolerances: 1/4 inch in 20 feet for plumb and location. Comply with requirements of PCI MNL-127 Recommended Practice for Erection of Precast Concrete.

D. Restore damaged units and finishes. Clean and protect work from damage.

END OF SECTION

REDISTAIR®
GC SOLUTIONS, LLC
7357 Snake River Rd Suite 200 · Asotin, WA 99402
866.733.6220 · 509.243.6030 · www.REDISTAIR.com

Sheet Title:

Project

Date:

Drawing: