

ADDENDUM TO:
KENNECOTT COPPER CORPORATION, CONCENTRATION
MILL
(Mill)
Wrangell-St. Elias National Park & Preserve
On Copper River & Northwestern Railroad
Kennicott
Valdez-Cordova Census Area
Alaska

HAER AK-1-D
AK-1-D

PHOTOGRAPHS

REDUCED COPIES OF MEASURED DRAWINGS

FIELD RECORDS

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
U.S. Department of the Interior
1849 C Street NW
Washington, DC 20240-0001

HISTORIC AMERICAN ENGINEERING RECORD

INDEX TO PHOTOGRAPHS

KENNECOTT COPPER CORPORATION, MILL
Wrangell – St. Elias National Park & Preserve
On Copper River & Northwestern Railroad
Valdez-Cordova County
Kennicott Vicinity
Alaska

HAER No. AK-1-D

Photographs by Jet Lowe, August 2000.

- AK-1-D-1 MILL EXTERIOR, HIGH GRADE CHUTE PARTIALLY RESTORED ON THE OUTSIDE OF MILL BUILDING CENTER OF PICTURE. LOOKING NORTHEAST FROM BELOW BRIDGE.
- AK-1-D-2 MILL EXTERIOR, CLOSER IN, HIGH GRADE CHUTE VIEW TO NORTHEAST.
- AK-1-D-3 ELEVATION, TRAM DECK, BONANZA "A" FRAME AND CRUSHERS LEVEL 11.
- AK-1-D-4 VIEW TO WEST. FEED HOPPERS IN FOREGROUND FOR JAW CRUSHERS.
- AK-1-D-5 KENNECOTT MILL LEVEL 9, VIBRATING SCREENS, VIEW TO NORTHEAST.
- AK-1-D-6 LEVEL 7, LAUNDRER FEEDING VIBRATING SCREENS, VIEW TO SOUTHEAST.
- AK-1-D-7 LEVEL 7 CONVEYER AREA. STUB SHORING UNDER BIN TO APRON FEEDER.
- AK-1-D-8 LEVEL 7 MACHING # 15 ROLL CRUSHERS
- AK-1-D-9 LEVEL 6 CHUTE AND FRAMING
- AK-1-D-10 LEVEL 6 ORE PROCESSING CHUTE AND CRUSHER.
- AK-1-D-11 LEVEL 3 SETTLING BOX VIEW TO SOUTH
- AK-1-D-12 LEVEL 6 GRINDING PANS, PUMP ABOVE DORR THICKENER. VIEW TO WEST.

AK-1-D-13 LEVEL 5 WILFLEY TABLES VIEW TO SOUTH.

HISTORIC AMERICAN ENGINEERING RECORD

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Note: Photographs AK-1-D-14 through AK-1-D-68 are photogrammetric images

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Mark Schara, photographer, June 1998

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AK-1-D-18	View looking north from railroad bridge
AK-1-D-19	View looking south
AK-1-D-20	View looking south
AK-1-D-21	View looking south
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AK-1-D-23	View looking southeast, with Machine Shop in foreground
AK-1-D-24	View looking east, with Leaching Plant in foreground
AK-1-D-25	East wall of High-Grade Ore Bin at south side
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KENNECOTT COPPER CORPORATION, CONCENTRATION
HAER AK-1-D
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AK-1-D-47	West wall of north section of Train Shed
AK-1-D-48	West wall of James Tables Area
AK-1-D-49	West wall of Plat-O Slime Tables Area
AK-1-D-50	View looking east
AK-1-D-51	View looking east
AK-1-D-52	West wall of High-Grade Ore Bin at north side
AK-1-D-53	View looking southeast

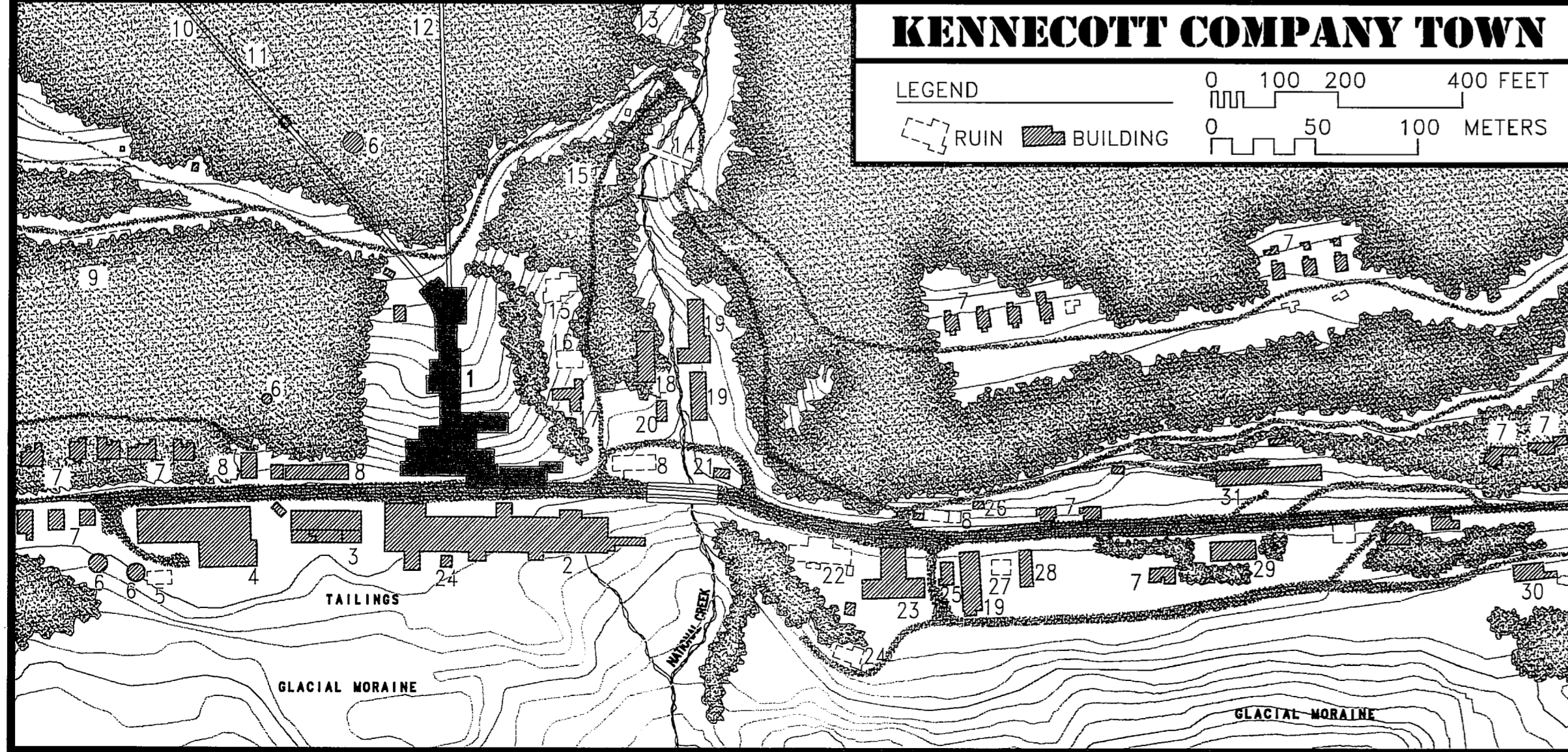
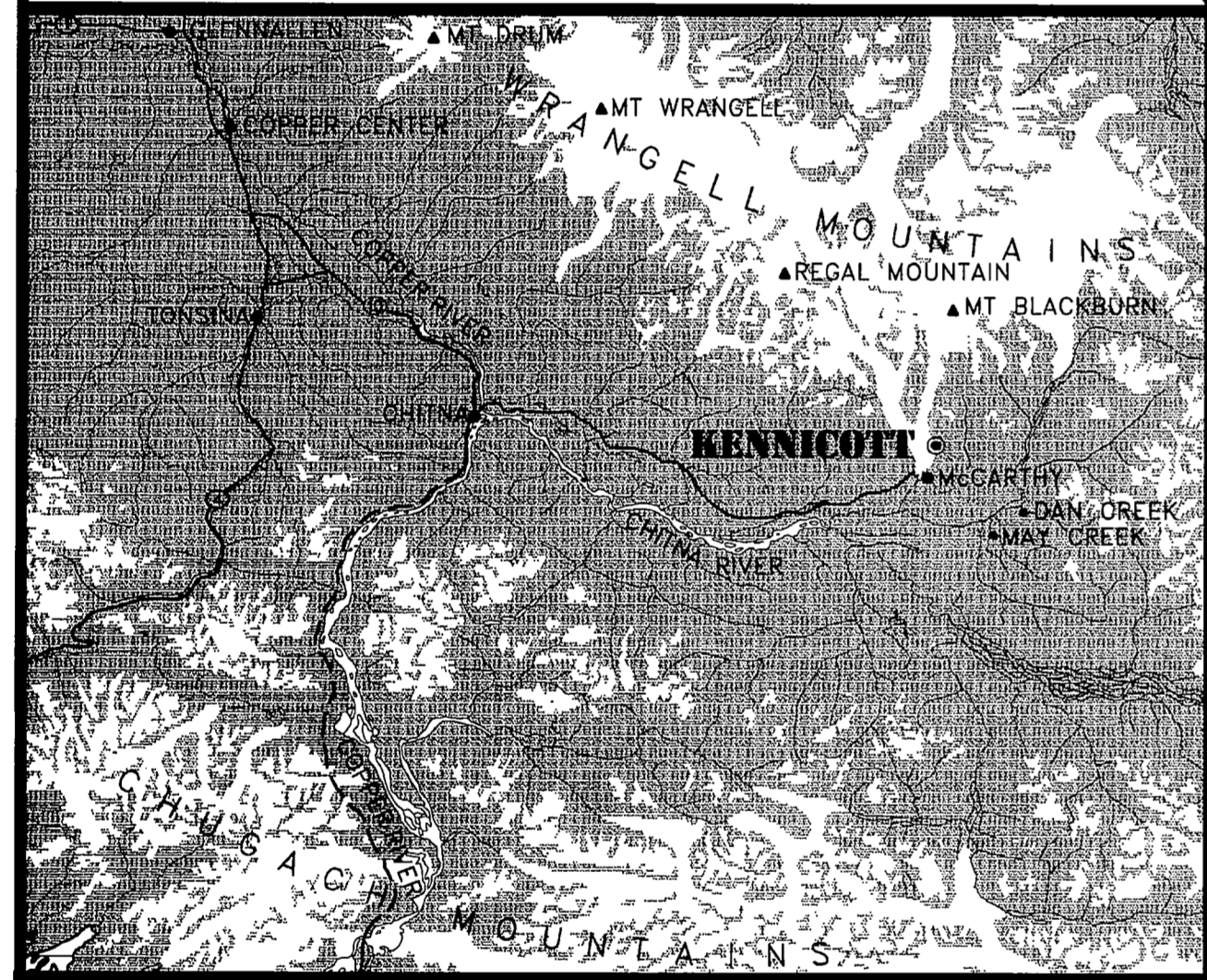
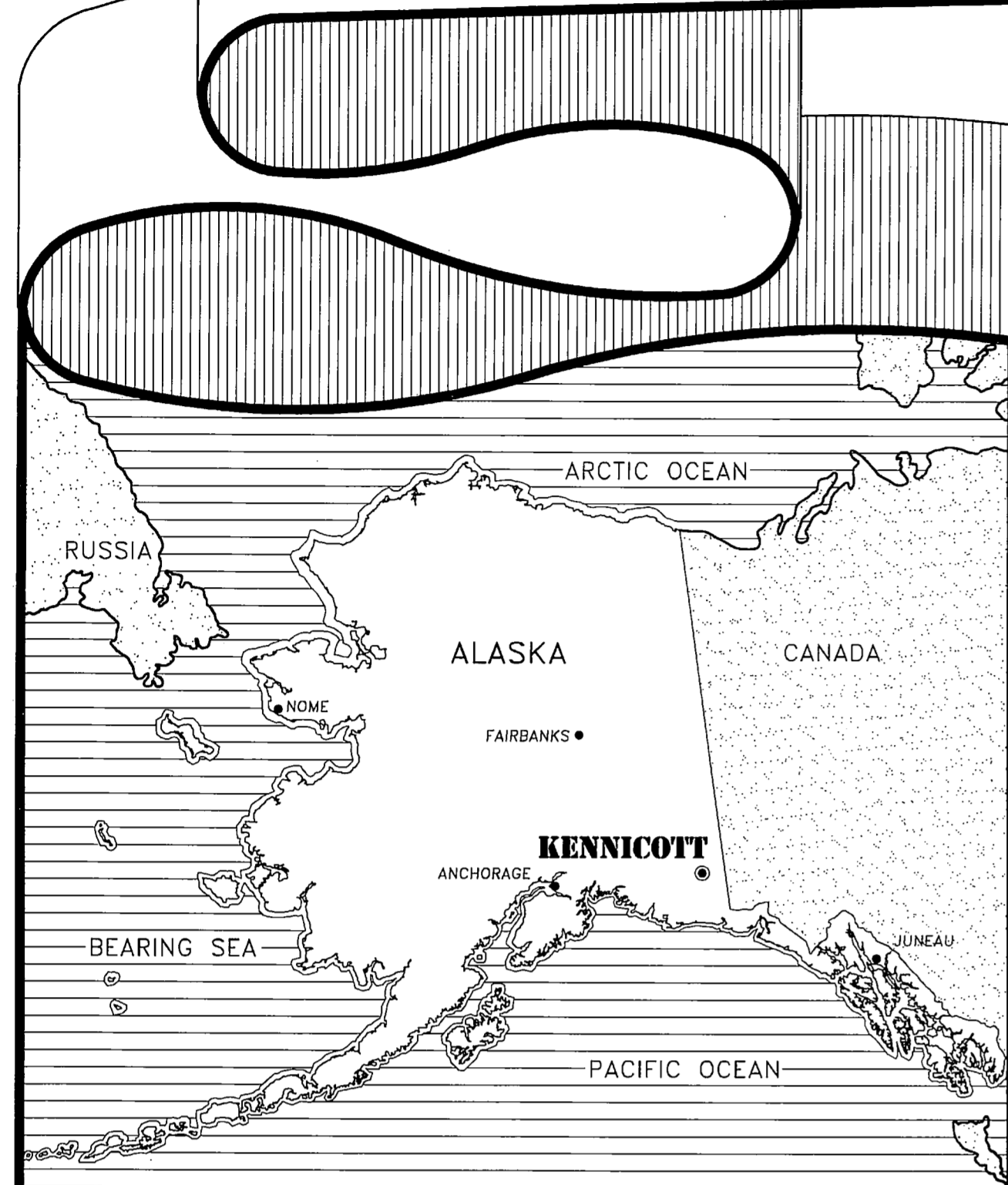
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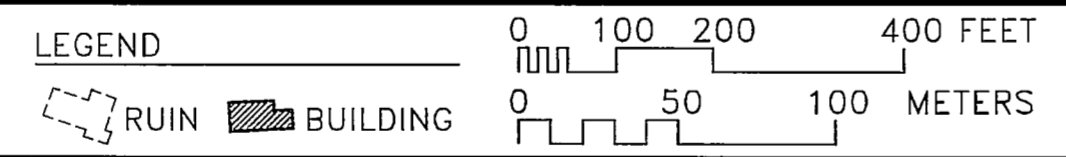
AK-1-D-54	View looking southeast
AK-1-D-55	View looking southeast
AK-1-D-56	View looking southwest toward High-Grade Ore Bin at north side
AK-1-D-57	North wall of Dorr Thickener Area
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AK-1-D-68	View looking southeast toward Tram Deck

CONCENTRATION MILL

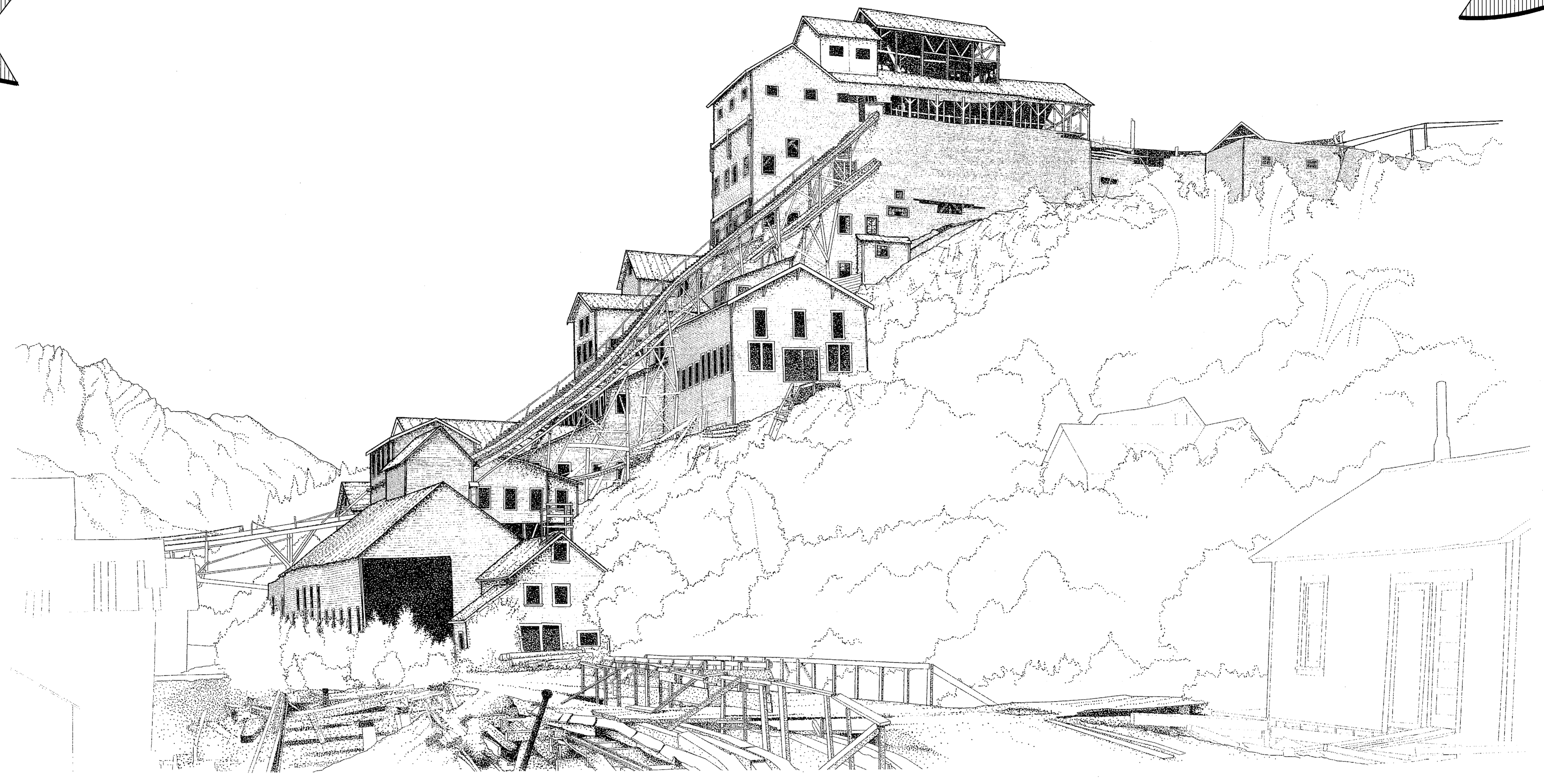
KENNICOTT, ALASKA



KENNICOTT COMPANY TOWN



- 1 CONCENTRATION MILL
- 2 AMMONIA LEACHING PLANT
- 3 MACHINE SHOP
- 4 POWER PLANT
- 5 OIL HOUSE
- 6 WATER OR OIL TANK
- 7 COTTAGES
- 8 STORAGE OR WAREHOUSE
- 9 TENNIS COURT
- 10 TRAM TO GLACIER & JUMBO MINE
- 11 WATER STORAGE POND
- 12 TRAM TO BONANZA MINE
- 13 COMMUNITY GARDEN
- 14 NATIONAL CREEK DAM
- 15 MANAGER'S HOUSE
- 16 STAFF HOUSE
- 17 GENERAL MANAGER'S OFFICE
- 18 HOSPITAL
- 19 BUNKHOUSE
- 20 ASSAY OFFICE
- 21 RAILROAD DEPOT
- 22 SAWMILL & CARPENTER'S SHOP
- 23 COMPANY STORE & WAREHOUSE
- 24 TAILINGS HOIST HOUSE
- 25 REFRIGERATION PLANT
- 26 BATH HOUSE
- 27 HANDBALL COURT
- 28 SCHOOLHOUSE
- 29 RECREATION HALL
- 30 DAIRY BARN
- 31 OLD APARTMENT HOUSE SITE



IN 1998, THE NATIONAL PARK SERVICE BEGAN TO DOCUMENT THE HISTORIC BUILDINGS OF THE KENNICOTT NATIONAL HISTORIC LANDMARK TO THE STANDARDS OF THE HISTORIC AMERICAN BUILDING SURVEY / HISTORIC AMERICAN ENGINEERING RECORD (HABS/HAER). THE PROJECT WAS EXECUTED UNDER THE PROGRAM DIRECTION OF BLAINE CLIVER, CHIEF OF HABS/HAER; AND ROBERT L. ARNBERGER, ALASKA REGIONAL DIRECTOR, NATIONAL PARK SERVICE. DOCUMENTATION WAS CARRIED OUT DURING THE SUMMERS OF 1998, 1999 AND 2000 UNDER THE GENERAL DIRECTION OF STEVEN M. PETERSON, SENIOR HISTORICAL ARCHITECT; CHRIS HOUSTON, LAURA HOUSTON AND ERIC F. DORSETT, HISTORICAL ARCHITECTURAL INTERNS WITH THE ALASKA SUPPORT OFFICE; MARK SCHARA, HELEN MUI AND MATTHEW SNOAP, HABS ARCHITECTS; AND JET LOWE, HAER PHOTOGRAPHER.

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KENNICOTT MINES DOCUMENTATION PROJECT
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

KENNICOTT COPPER CORPORATION • CONCENTRATION MILL
WRANGELL - ST. ELIAS NATIONAL PARK AND PRESERVE

ALASKA
AK-1-D
HISTORIC AMERICAN ENGINEERING RECORD
SHEET 1 OF 26 SHEETS

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SITE PLAN

THE CONCENTRATION MILL WAS A DYNAMIC, EVER CHANGING STRUCTURE. ITS FORM REFLECTED THE EVER-INCREASING COMPLEXITY OF THE ORES MINED AT KENNECOTT. THE BUILDING WAS FIRST ERECTED IN 1908 AS THE LOWER TERMINAL OF THE BONANZA AERIAL TRAMWAY. STORAGE BUNKERS AND LOADING FACILITIES BELOW THE TRAMWAY SERVED AS THE NECESSARY LINK BETWEEN THE MINES AND THE RAILWAY. SHIPMENTS OF HIGH-GRADE ORE STARTED IN 1911.

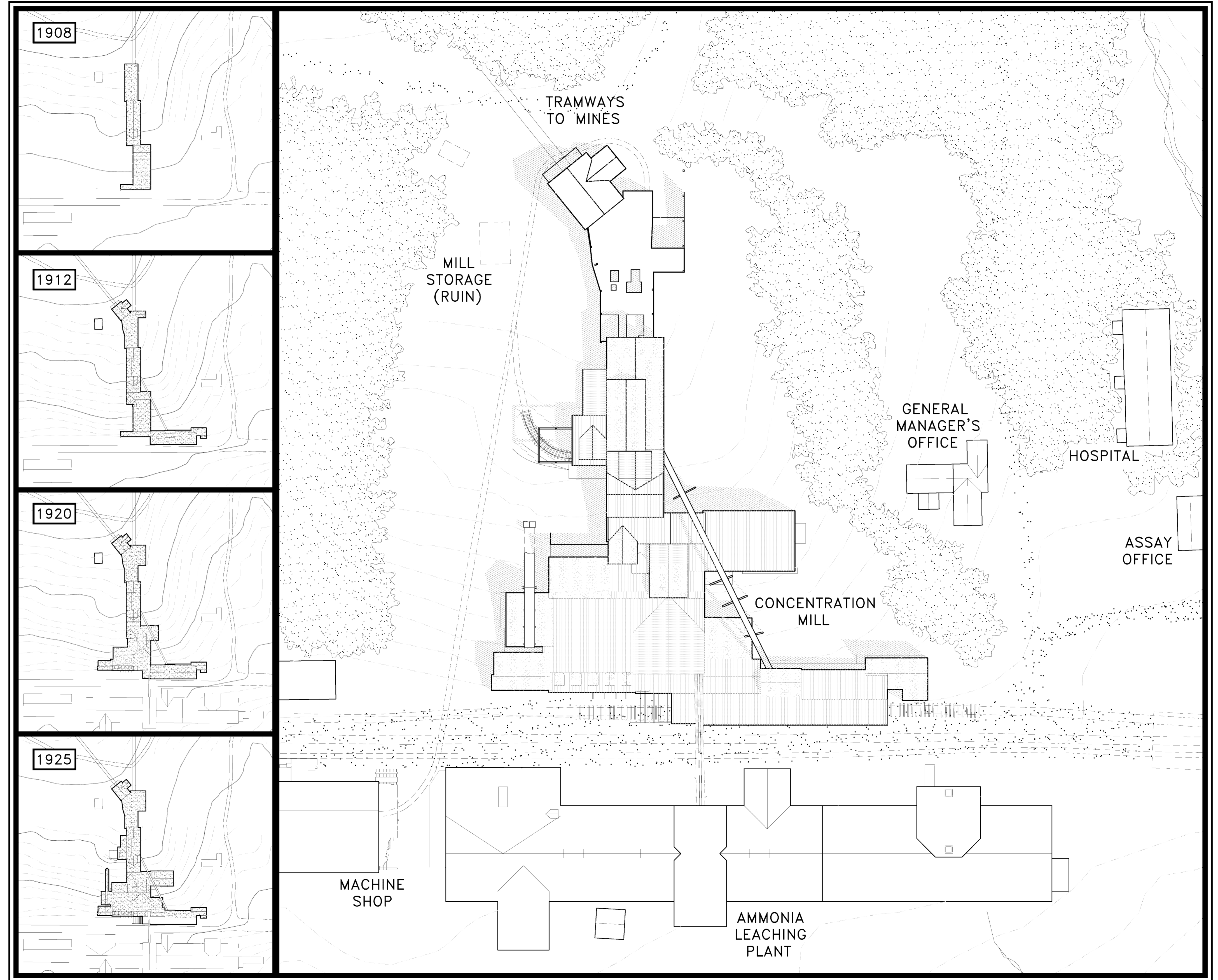
AS LOWER GRADE ORES WERE MINED, CRUSHING AND CONCENTRATING OPERATIONS WERE ADDED, STARTING IN 1912. CRUSHING AND SIZING--NECESSARY PRECURSORS TO THE CONCENTRATION OF THE ORES--TOOK PLACE IN THE UPPER PORTIONS OF THE STRUCTURE. CONCENTRATING TOOK PLACE ON THE LOWER LEVELS. INITIALLY, THESE FUNCTIONS WERE RELATIVELY SIMPLE OPERATIONS, A SIMPLICITY REFLECTED IN THE NARROW, STAIRSTEP APPEARANCE OF THE BUILDING. GRAVITY CARRIED MATERIALS DOWN THE HILLSIDE FROM ONE OPERATION TO THE NEXT.

OVER TIME, ADDITIONAL OPERATIONS WERE ADDED TO MAINTAIN OR INCREASE THE EFFICIENCY OF THE CONCENTRATION PROCESS AS THE OVERALL GRADE OF THE ORE DECLINED AND MORE COMPLEX MINERALS WERE TREATED. THE NARROW, REGULAR FORM OF THE STRUCTURE TRANSFORMED INCREMENTALLY INTO A DELTA. IN 1912, ALONG WITH THE INITIAL CONCENTRATING EQUIPMENT, A SECOND AERIAL TRAMWAY TERMINAL WAS ADDED AT THE TOP OF THE BUILDING AND A TRAIN SHED AT THE BOTTOM.

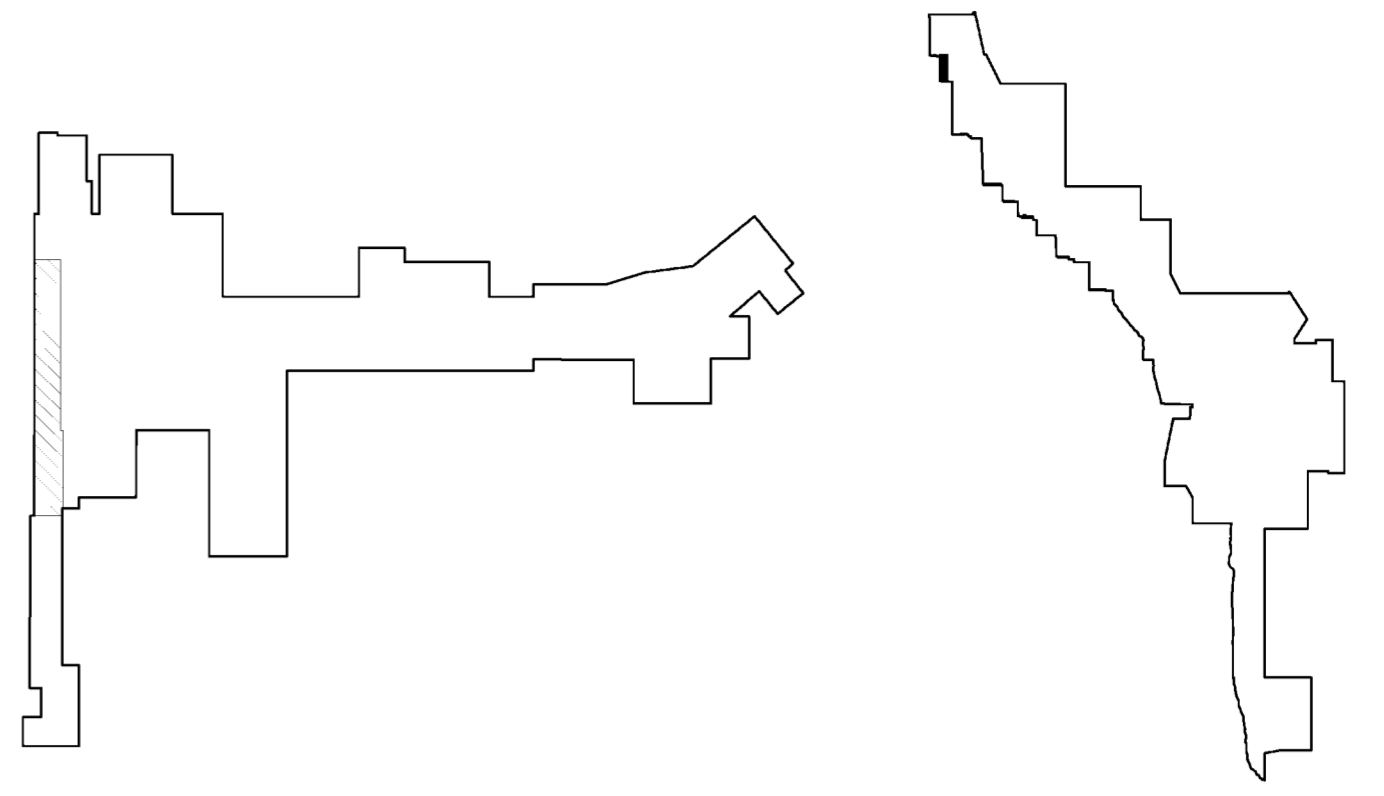
MAJOR MODIFICATIONS AND ADDITIONS TO THE MILL TOOK PLACE IN 1915 AND 1923. THE CONSTRUCTION OF THE AMMONIA LEACHING PLANT TO THE WEST OF THE CONCENTRATOR NECESSITATED CHANGES IN THE MILL TO ALLOW THE SEPARATION OF CARBONATE ORES FROM THE REST OF THE ORE. IN 1923, A SMALL FLOTATION PROCESS WAS ADDED IN THE LEACH PLANT THAT REQUIRED SIGNIFICANT ADDITIONS AND CHANGES TO THE MILL. NEW CONSTRUCTION HOUSED LARGE SETTLING TANKS AND PROCESS EQUIPMENT ON THE NORTH AND SOUTH SIDES OF THE MILL.

MINOR ADDITIONS OCCURRED ANNUALLY. INITIALLY, THE MILL COULD PROCESS 300 TONS OF ORE IN 24 HOURS. BY 1923, IT WAS 1200 TONS PER DAY. TYPICALLY, NEW MACHINERY WAS ADDED INCREMENTALLY. MOST ADDITIONS EXPANDED THE FOOTPRINT AND CHANGED THE APPEARANCE OF THE BUILDING. EXTERIOR WALLS BECAME INTERIOR WALLS AS THE BUILDING WAS WIDENED. NEW LEVELS WERE ESTABLISHED BETWEEN EXISTING LEVELS TO ALLOW INTERMEDIATE STEPS TO THE CONCENTRATION PROCESS. AS THE BUILDING WIDENED THE REGULAR, STEP-LIKE ROOF LINES ALSO EVOLVED INTO A JUMBLE OF GABLE ENDS AND BROKEN LINES. THE EXTERIOR APPEARANCE REFLECTED THE CHANGES AND ADDITIONS TO THE INTERIOR.

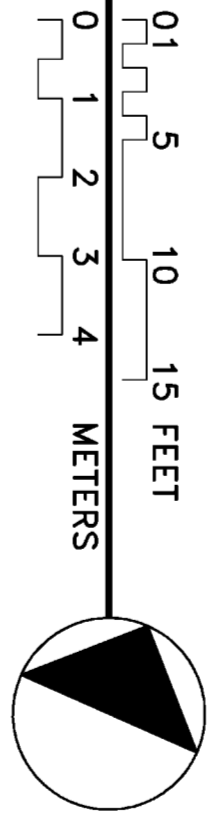
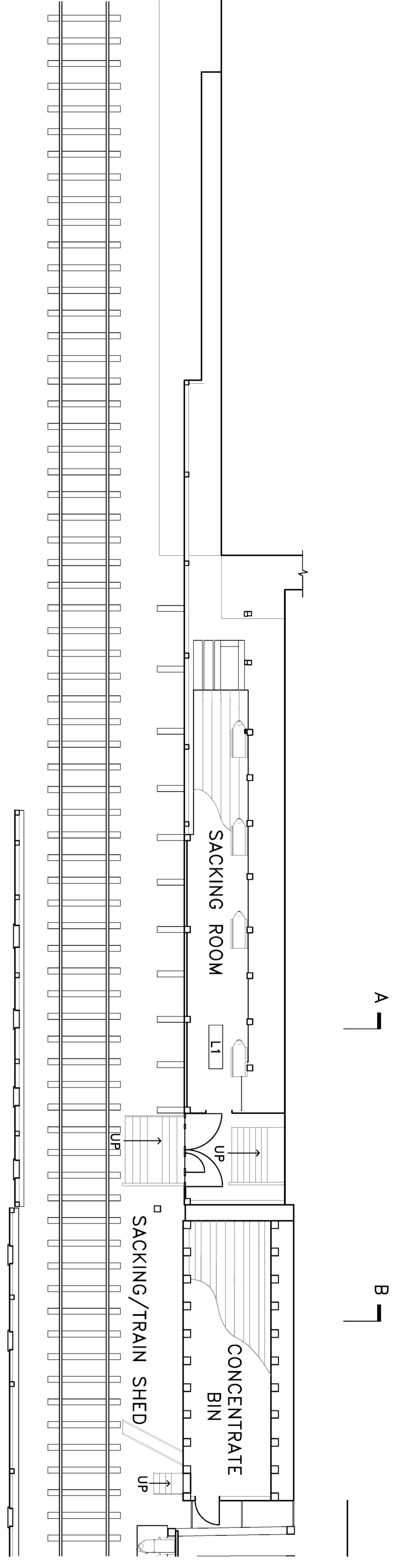
AFTER THE MINES CLOSED IN 1938, LITTLE CHANGED IN THE MILL UNTIL THE 1950S WHEN THE TOP OF THE BUILDING WAS PARTIALLY DISMANTLED. SINCE THAT TIME EXPOSURE TO THE WEATHER AND SCAVENGING HAVE CONTRIBUTED TO THE FURTHER DETERIORATION OF THE BUILDING WHILE STABILIZATION EFFORTS HAVE RETARDED THE PROCESS.



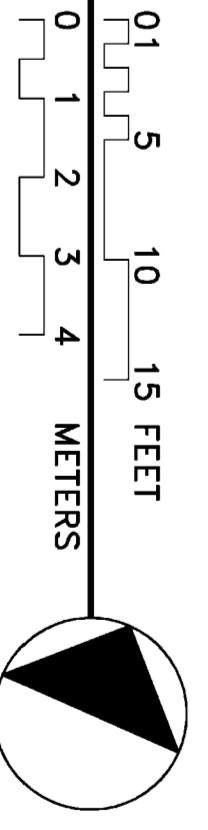
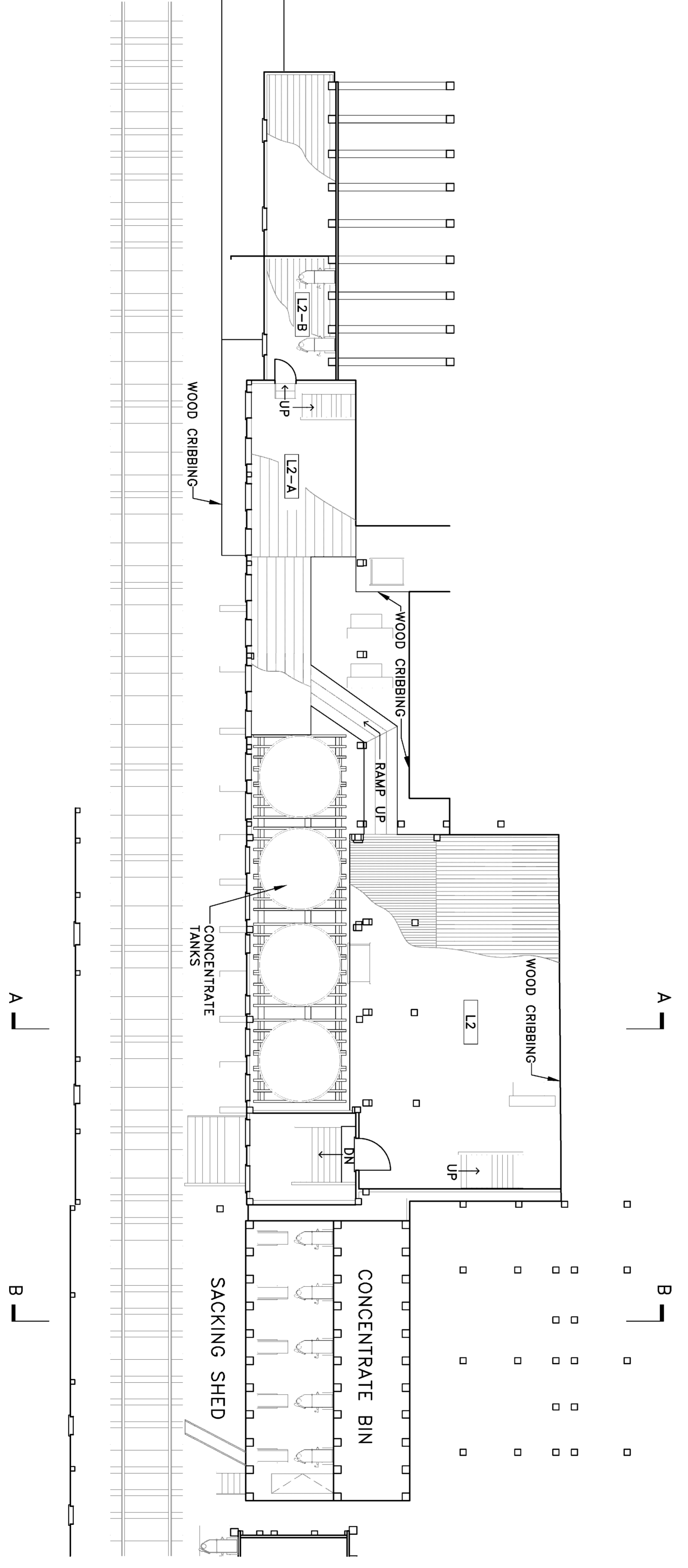
SITE PLAN
SCALE: 1/32" = 1'-0"



LEVEL ONE-NORTH FLOOR PLAN
SCALE: 1/8" = 1'-0"



LEVEL TWO-NORTH FLOOR PLAN
SCALE: 1/8" = 1'-0"



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KENNECOTT

KENNECOTT COPPER CORPORATION · CONCENTRATION MILL

WRANGELL - ST. ELIAS NATIONAL PARK AND PRESERVE

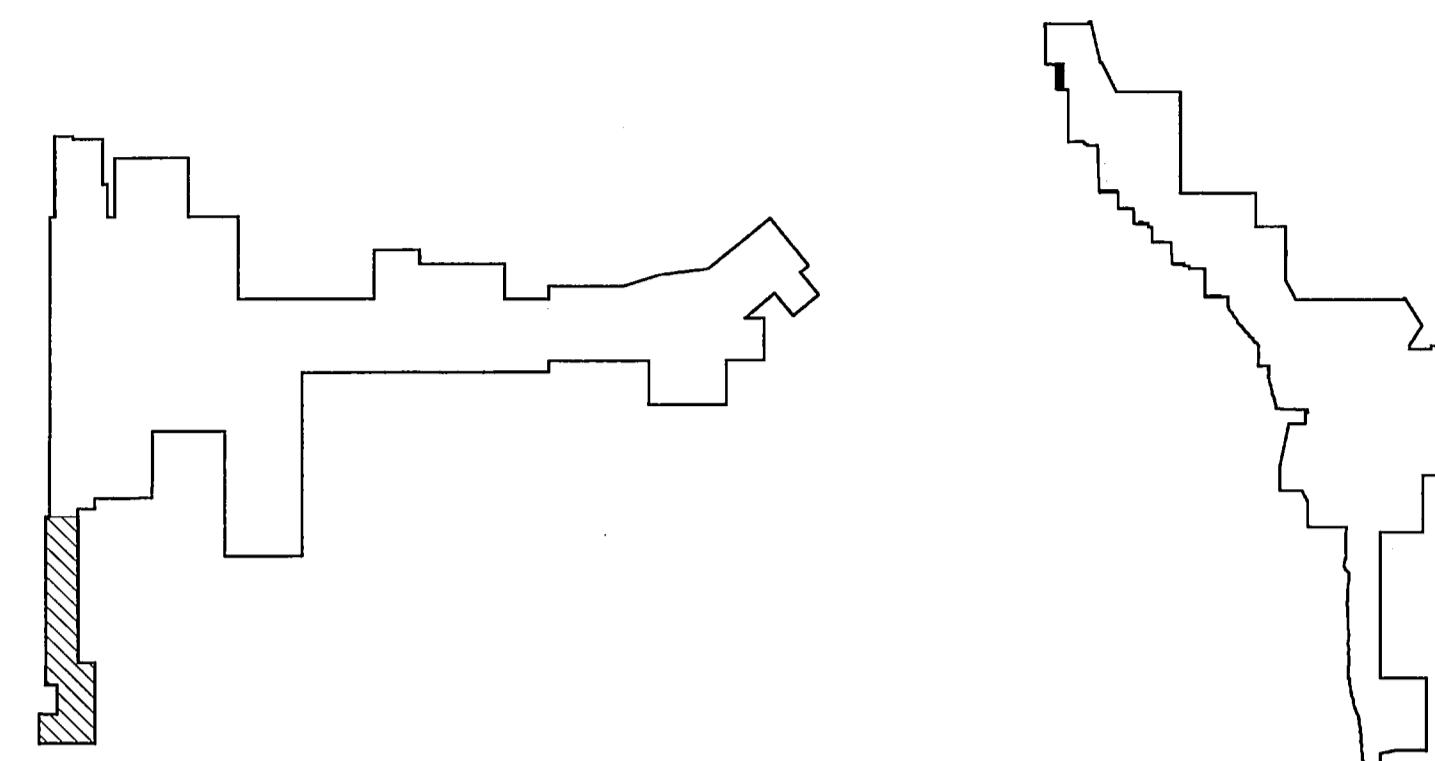
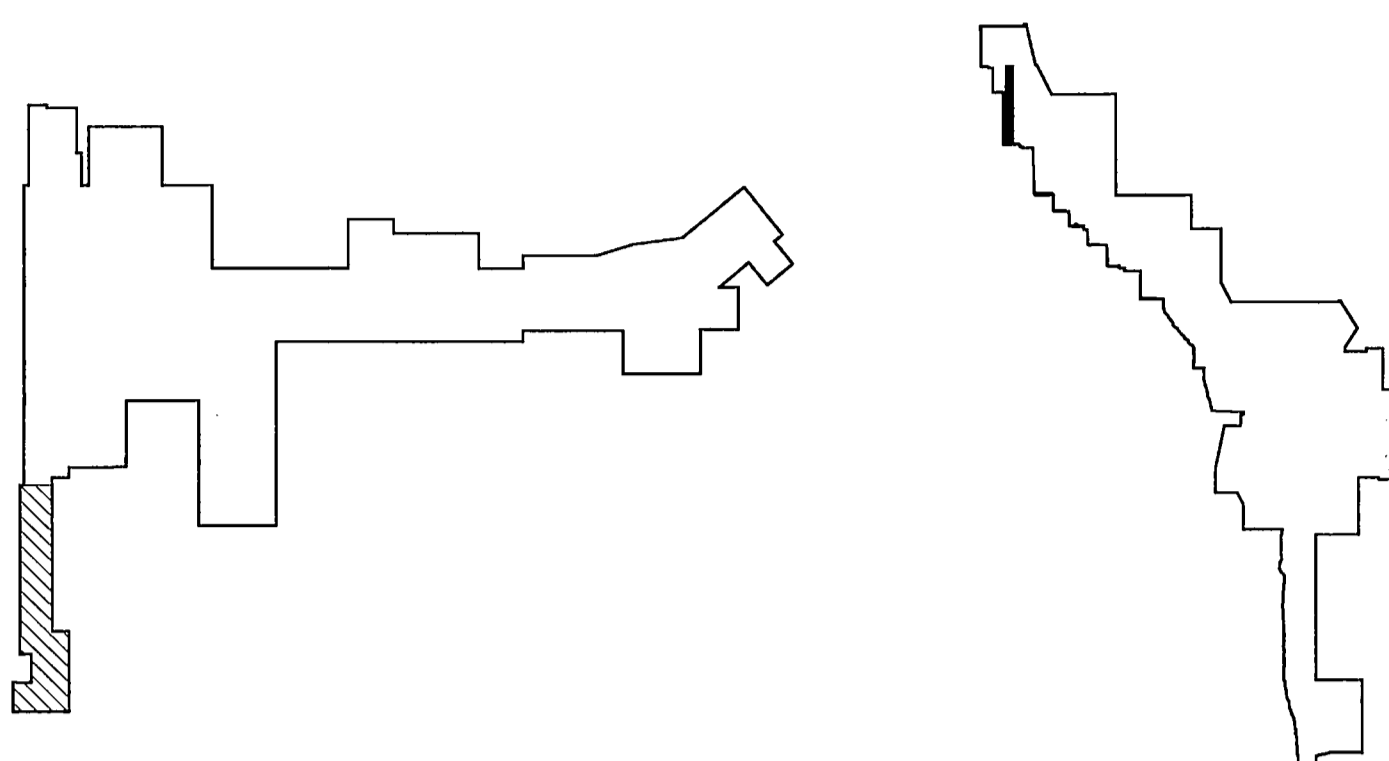
ALASKA

SURVEY NO.
AK-1-D

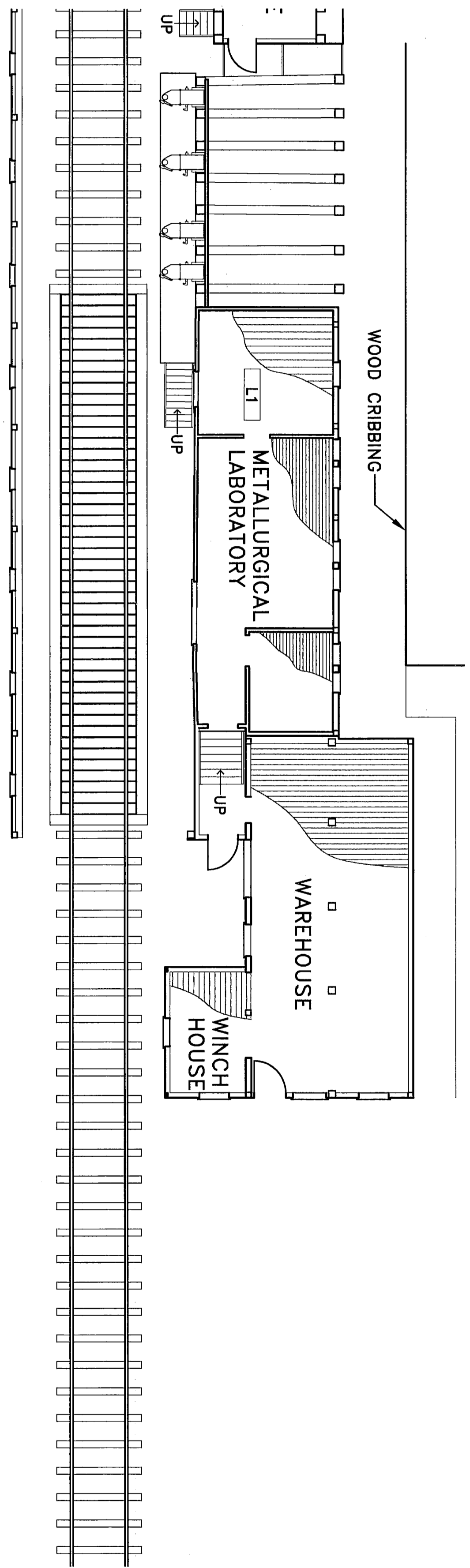
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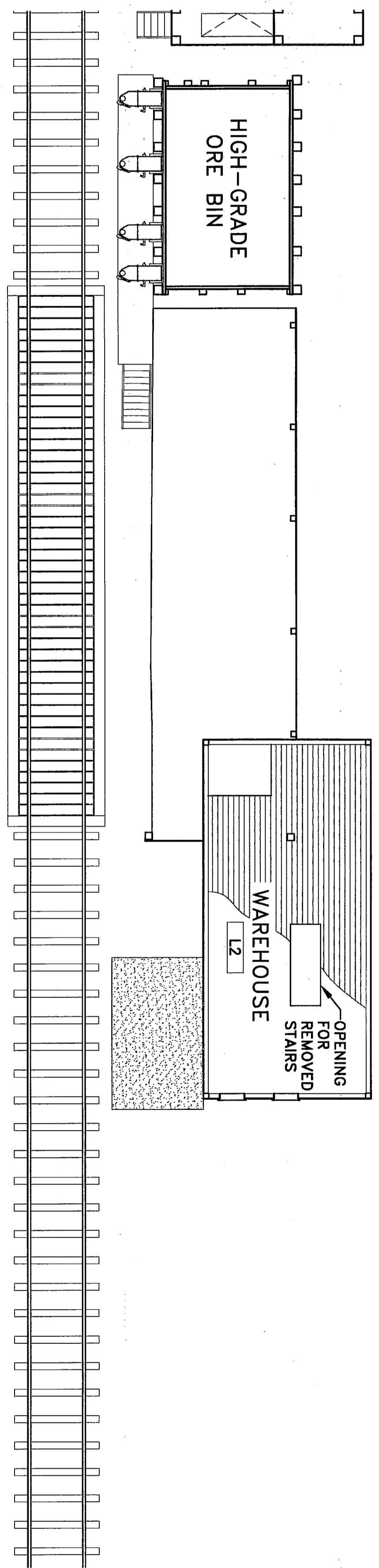
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LEVEL ONE - SOUTH FLOOR PLAN
SCALE: 1/8" = 1'-0"



LEVEL TWO - SOUTH FLOOR PLAN
SCALE: 1/8" = 1'-0"



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KENNECOTT COPPER CORPORATION · CONCENTRATION MILL

WRANGELL - ST. ELIAS NATIONAL PARK AND PRESERVE

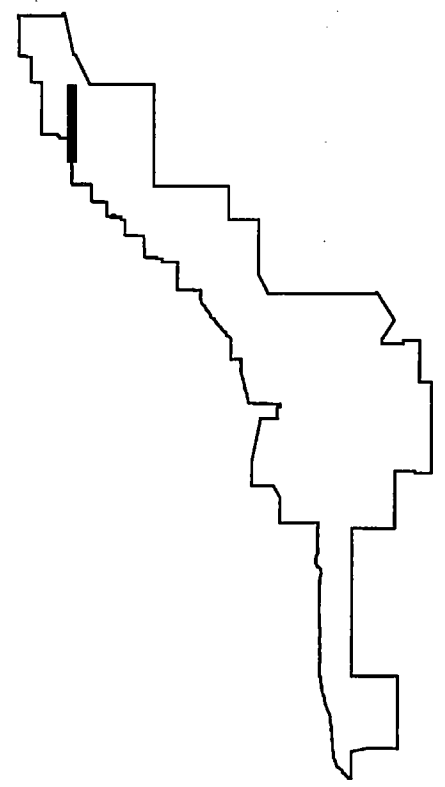
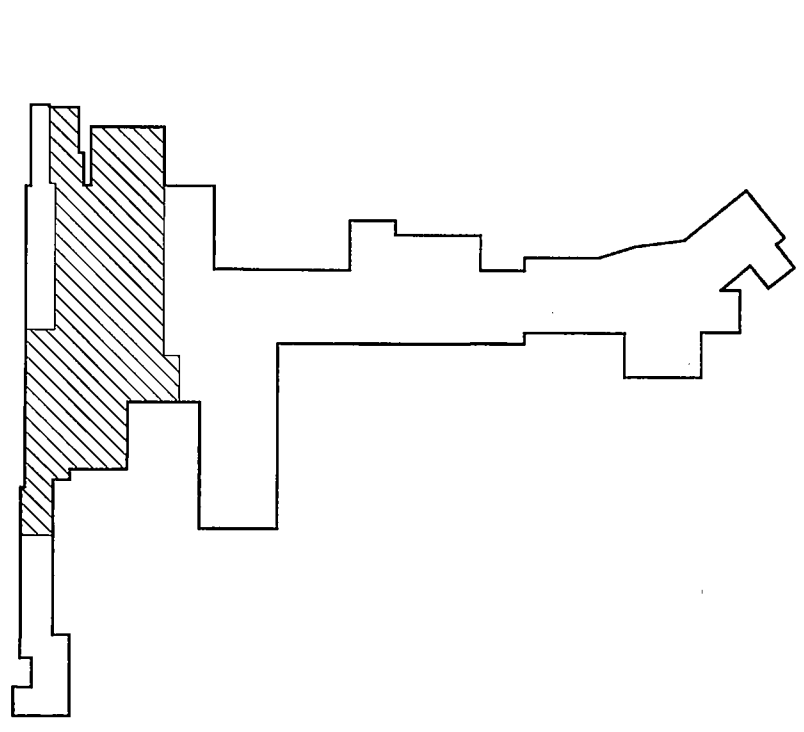
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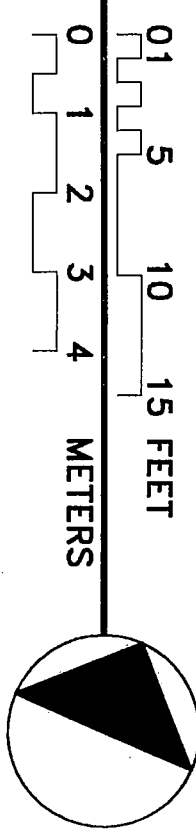
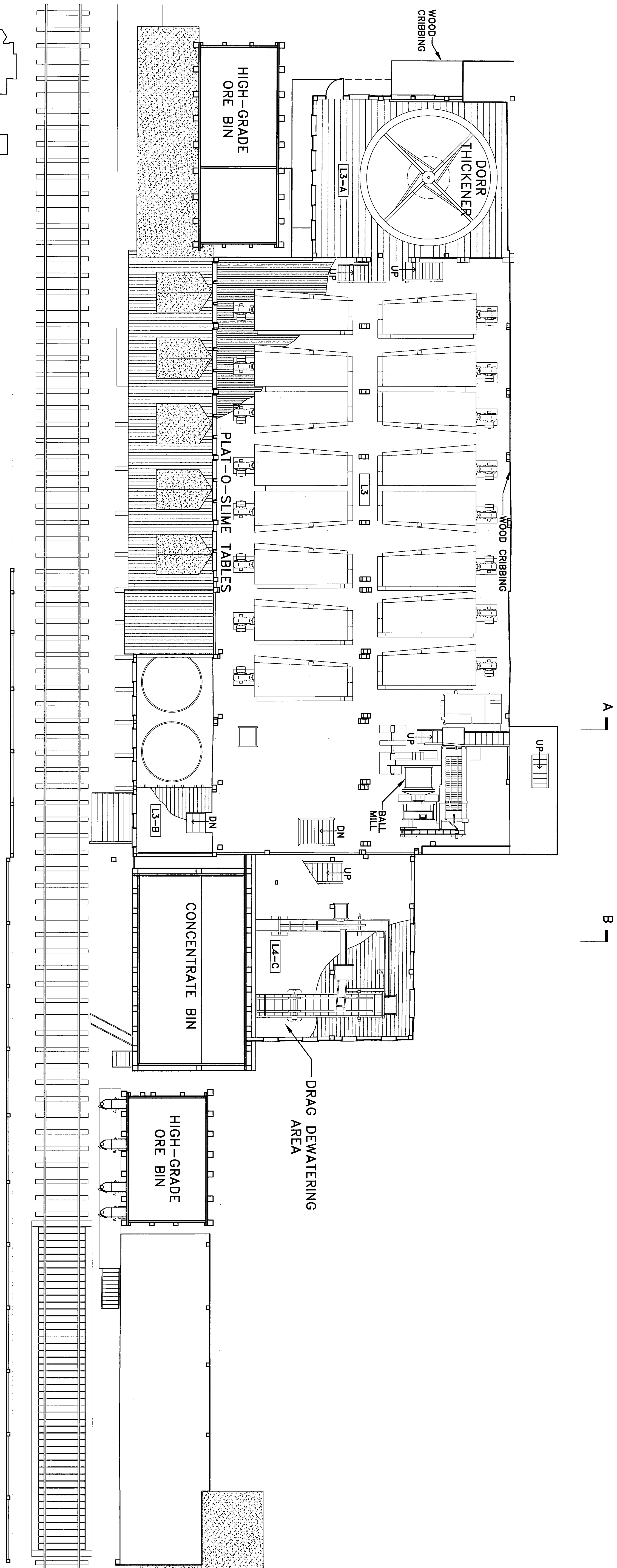
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LEVEL THREE FLOOR PLAN
SCALE: 1/8" = 1'-0"



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KENNECOTT COPPER CORPORATION · CONCENTRATION MILL

WRANGELL - ST. ELIAS NATIONAL PARK AND PRESERVE

ALASKA

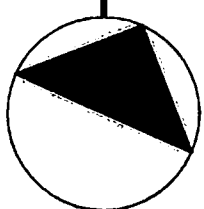
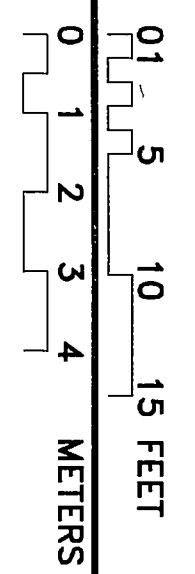
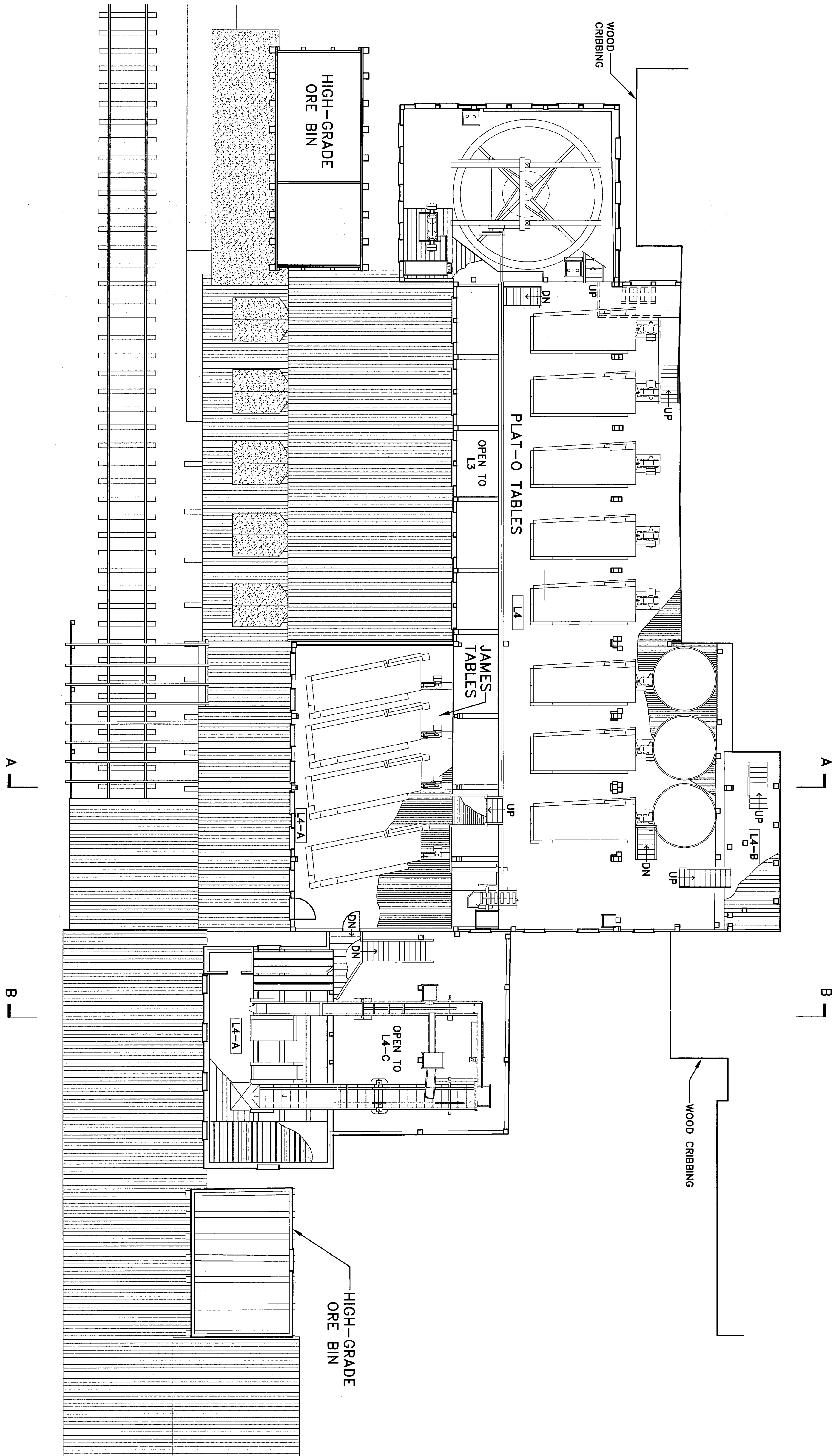
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LEVEL FOUR FLOOR PLAN
SCALE: 1/8" = 1'-0"



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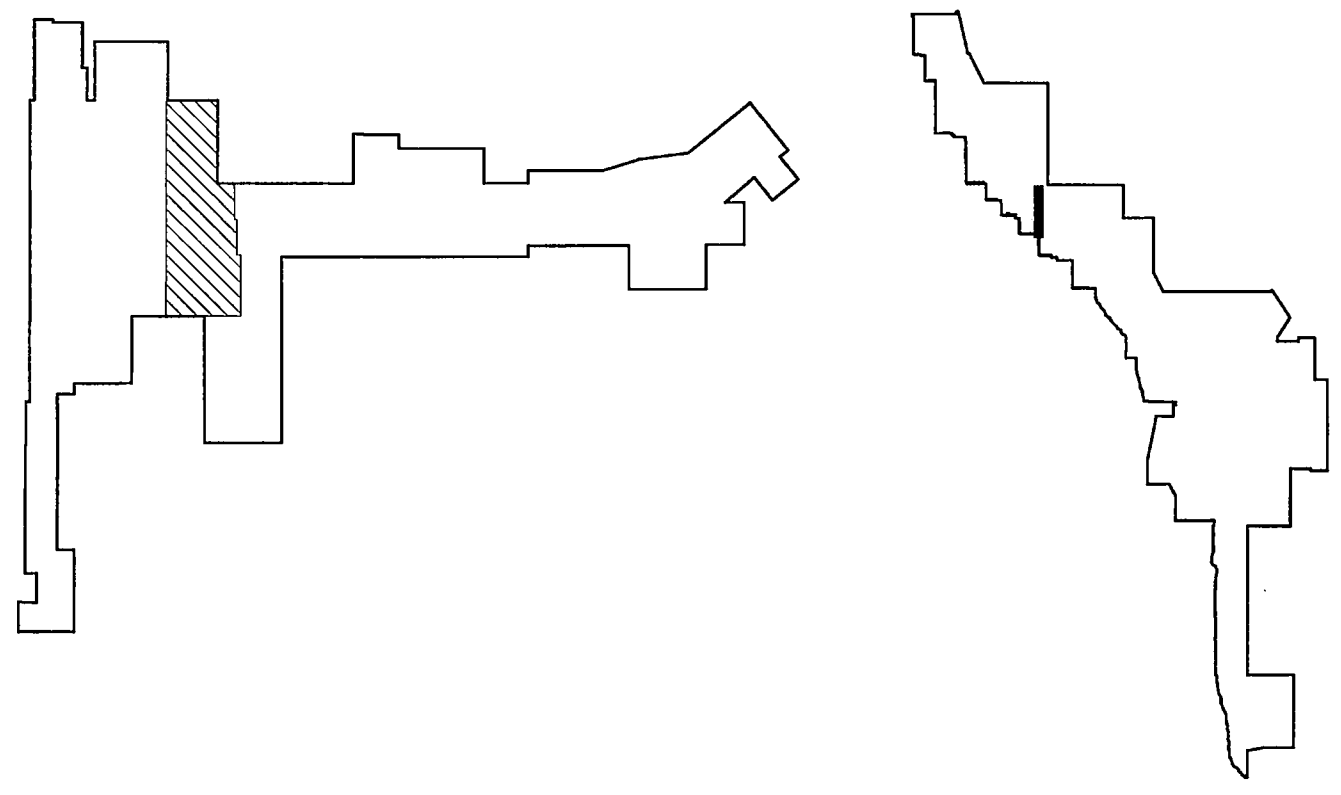
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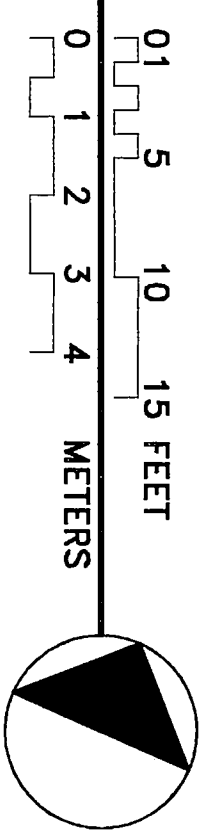
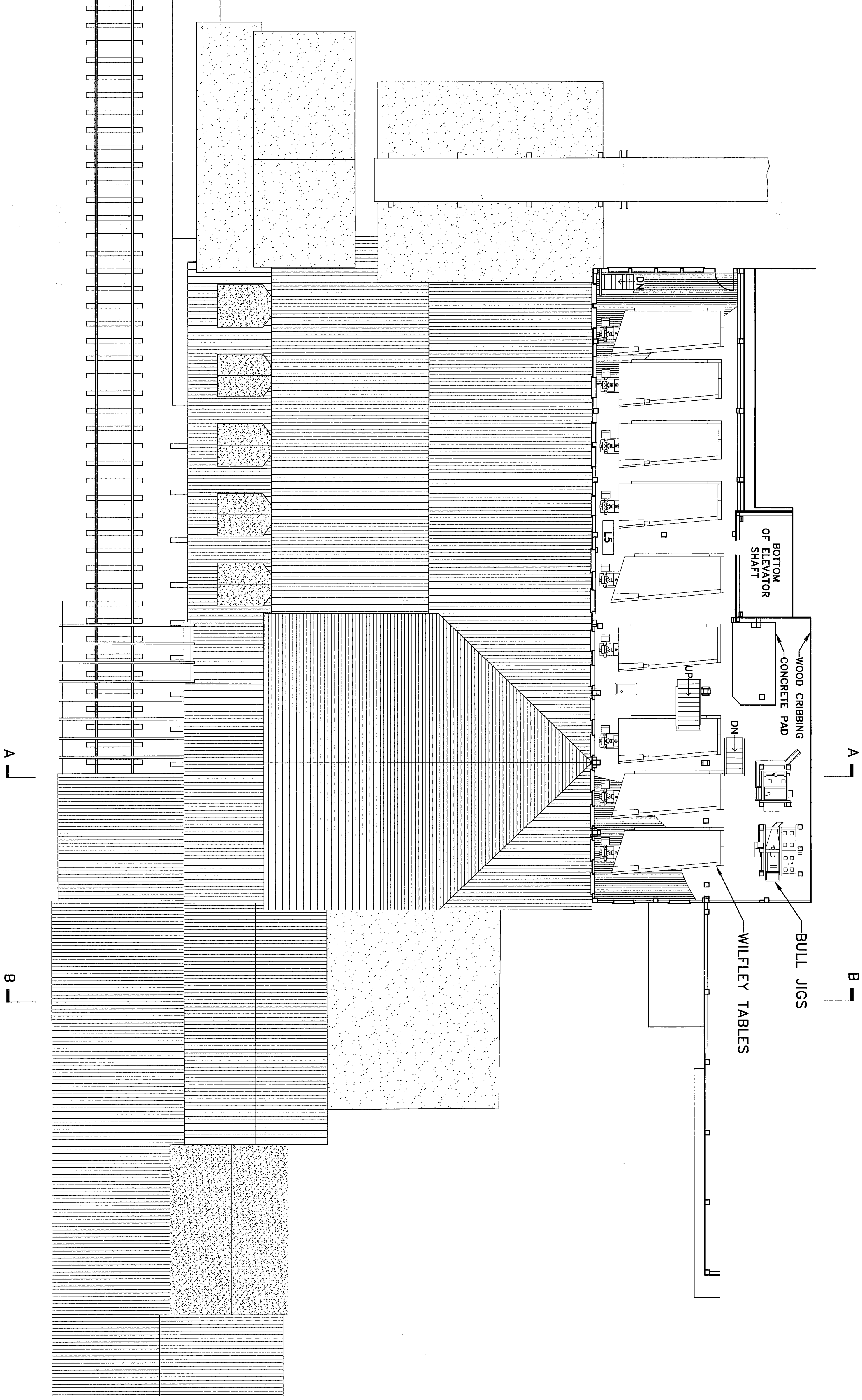
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LEVEL FIVE FLOOR PLAN
 SCALE: 1/8" = 1'-0"



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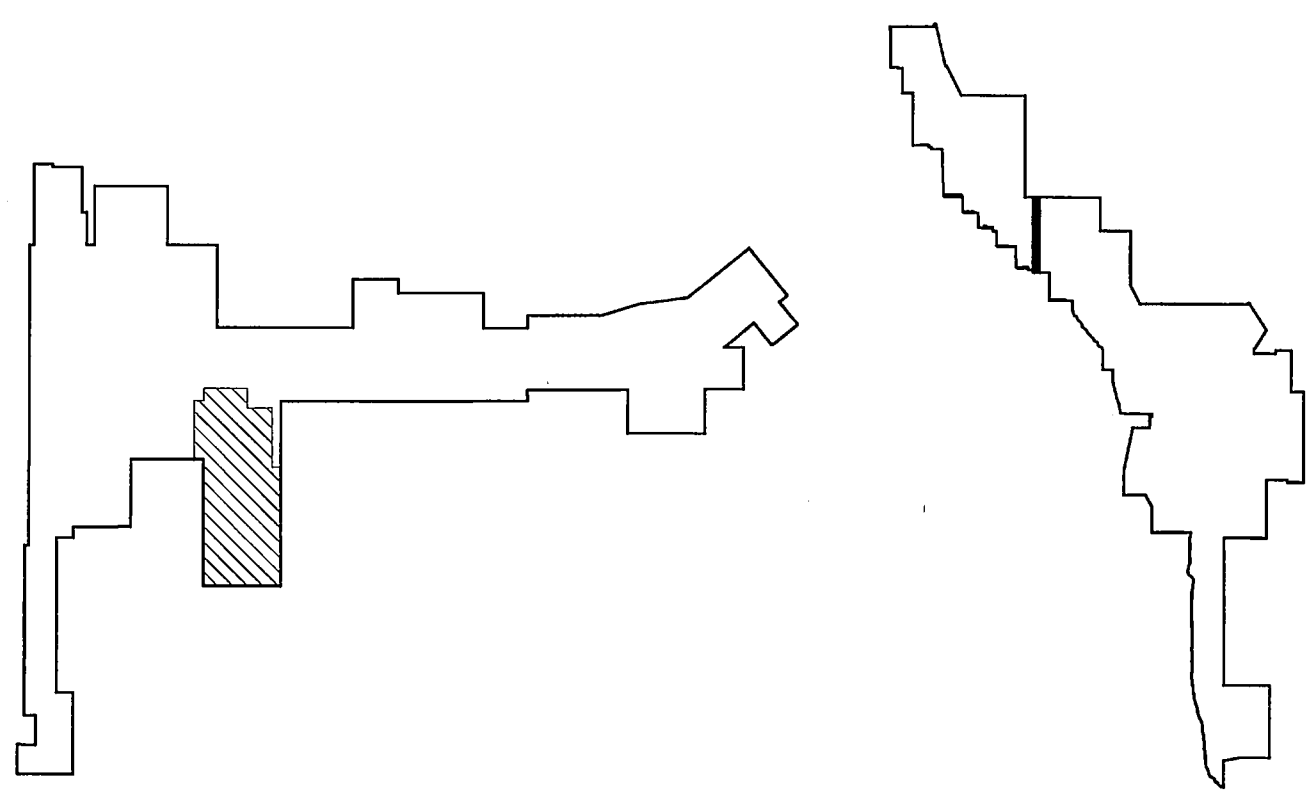
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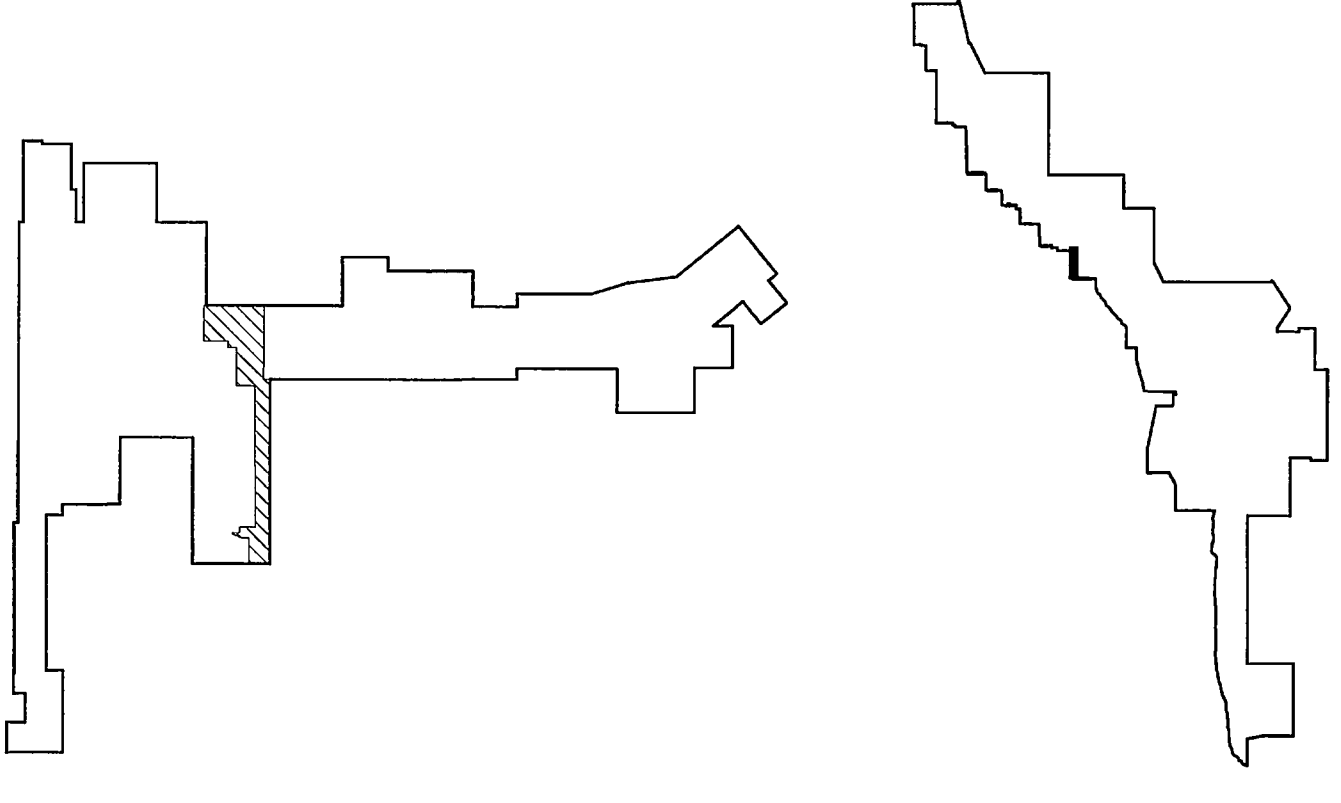
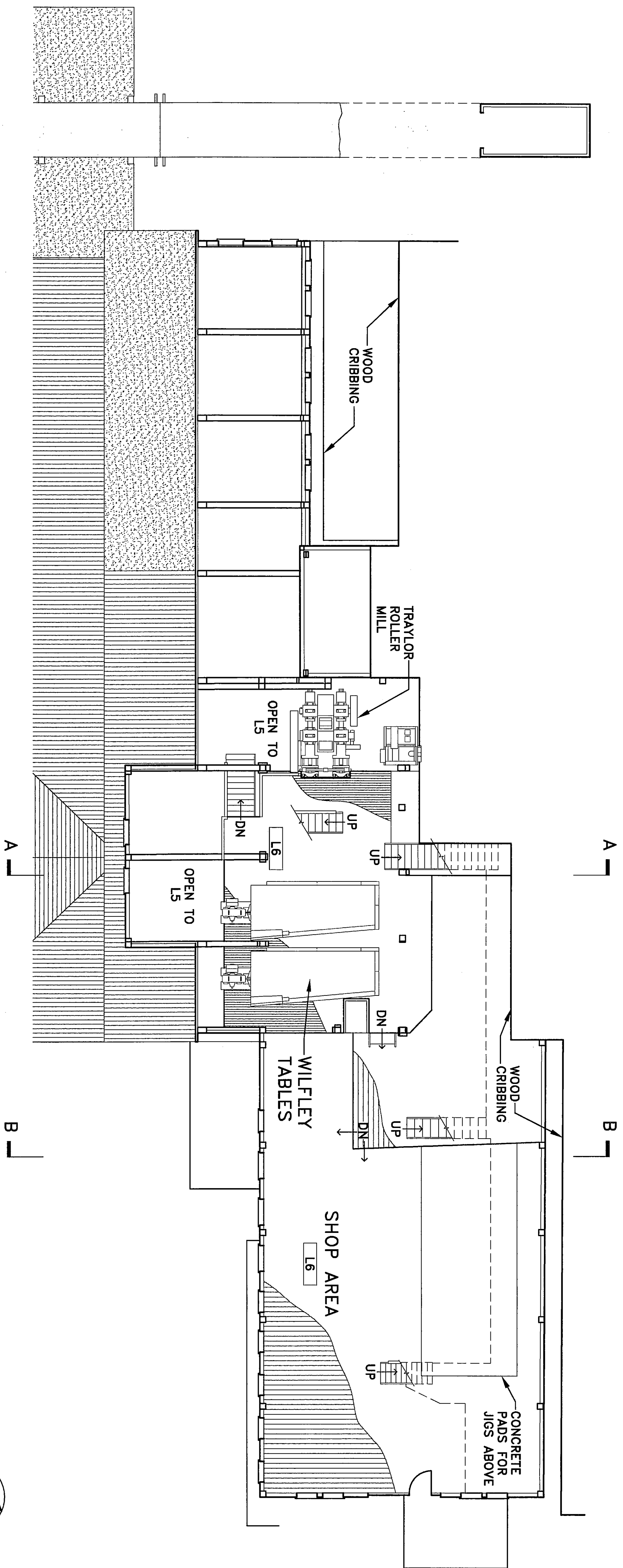
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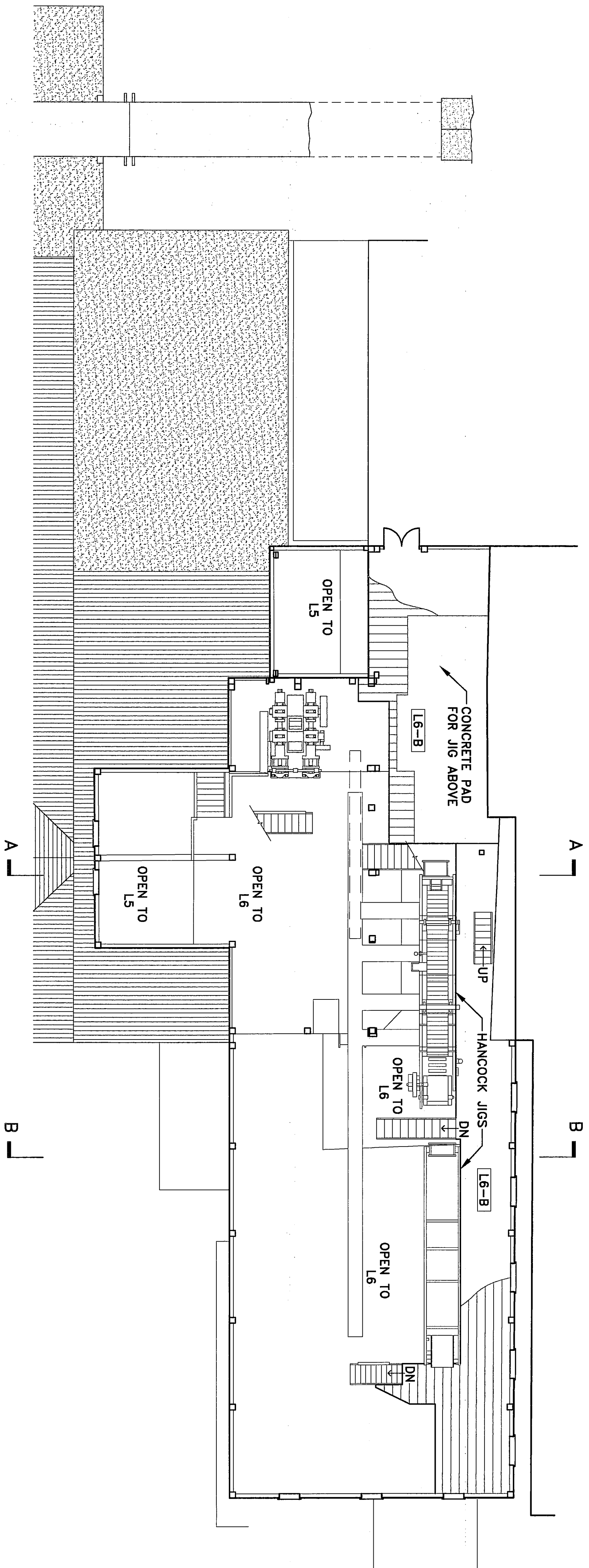
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LEVEL SIX FLOOR PLAN
SCALE: 1/8" = 1'-0"



LEVEL SIX-B FLOOR PLAN
SCALE: 1/8" = 1'-0"



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KENNECOTT COPPER CORPORATION · CONCENTRATION MILL
WRANGELL - ST. ELIAS NATIONAL PARK AND PRESERVE

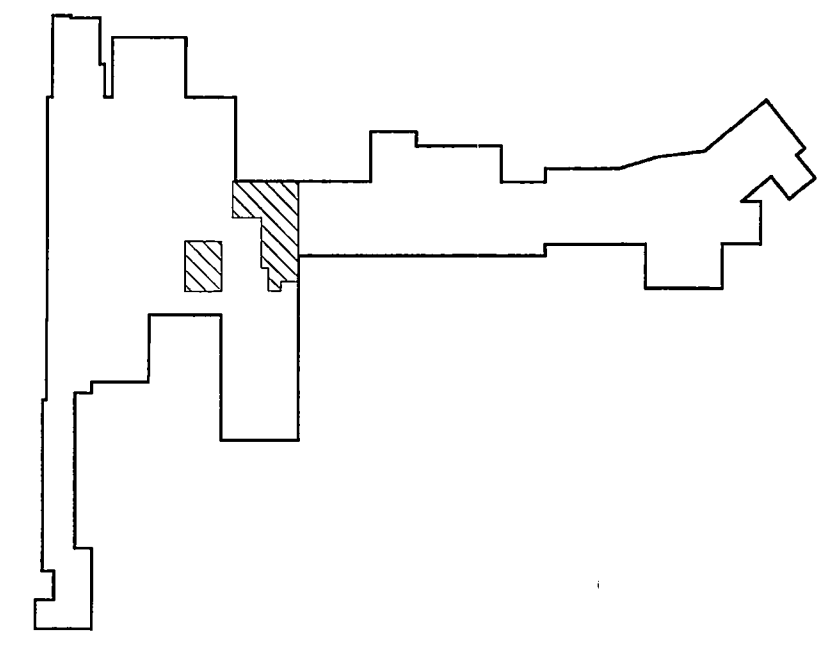
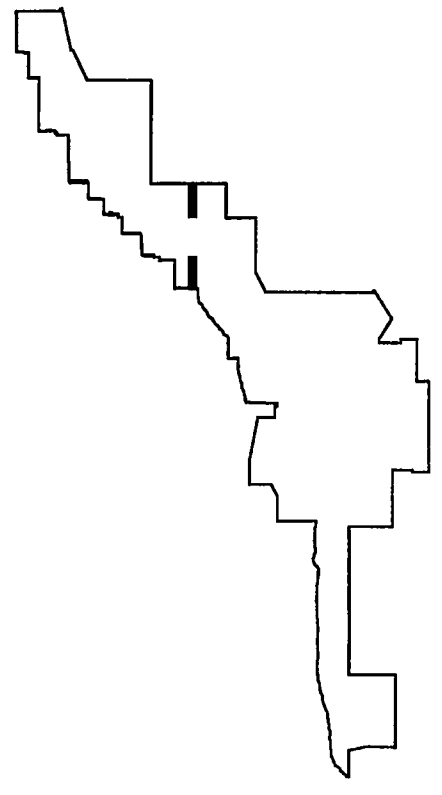
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ALASKA

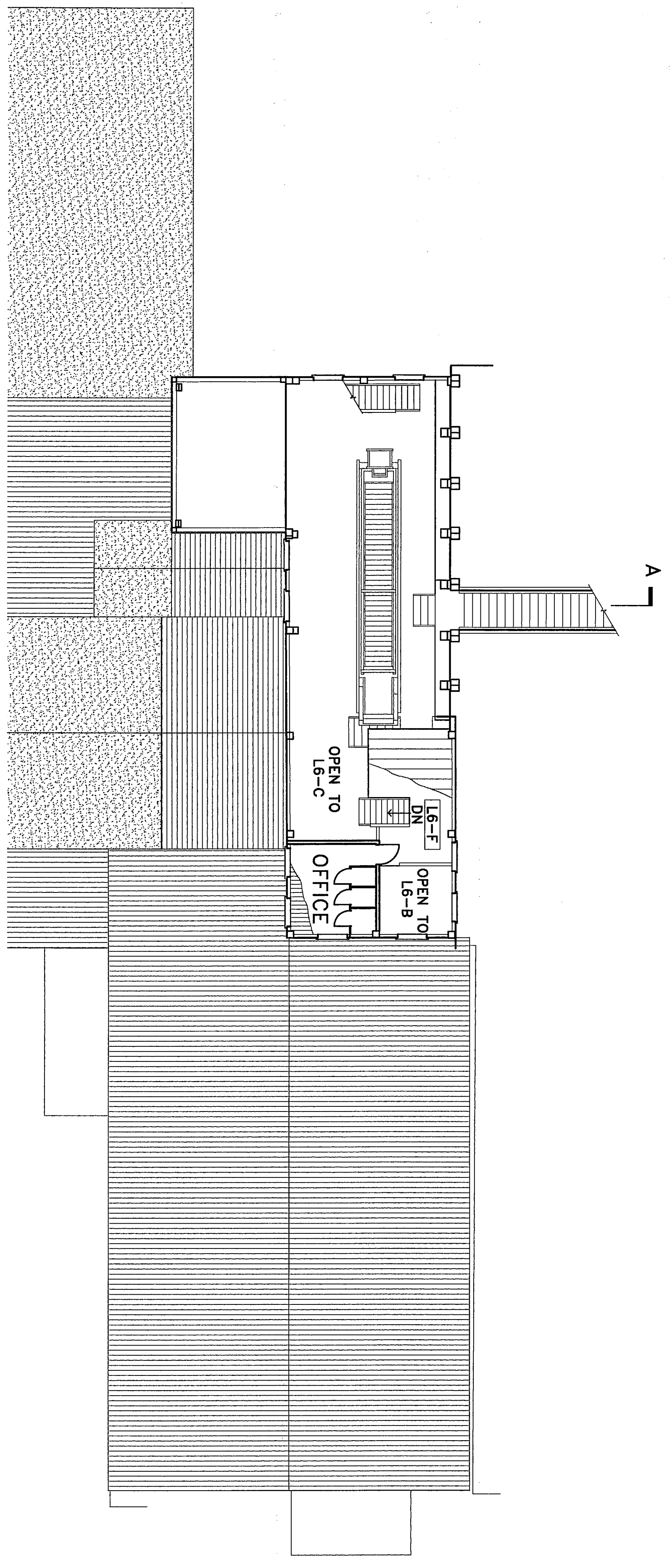
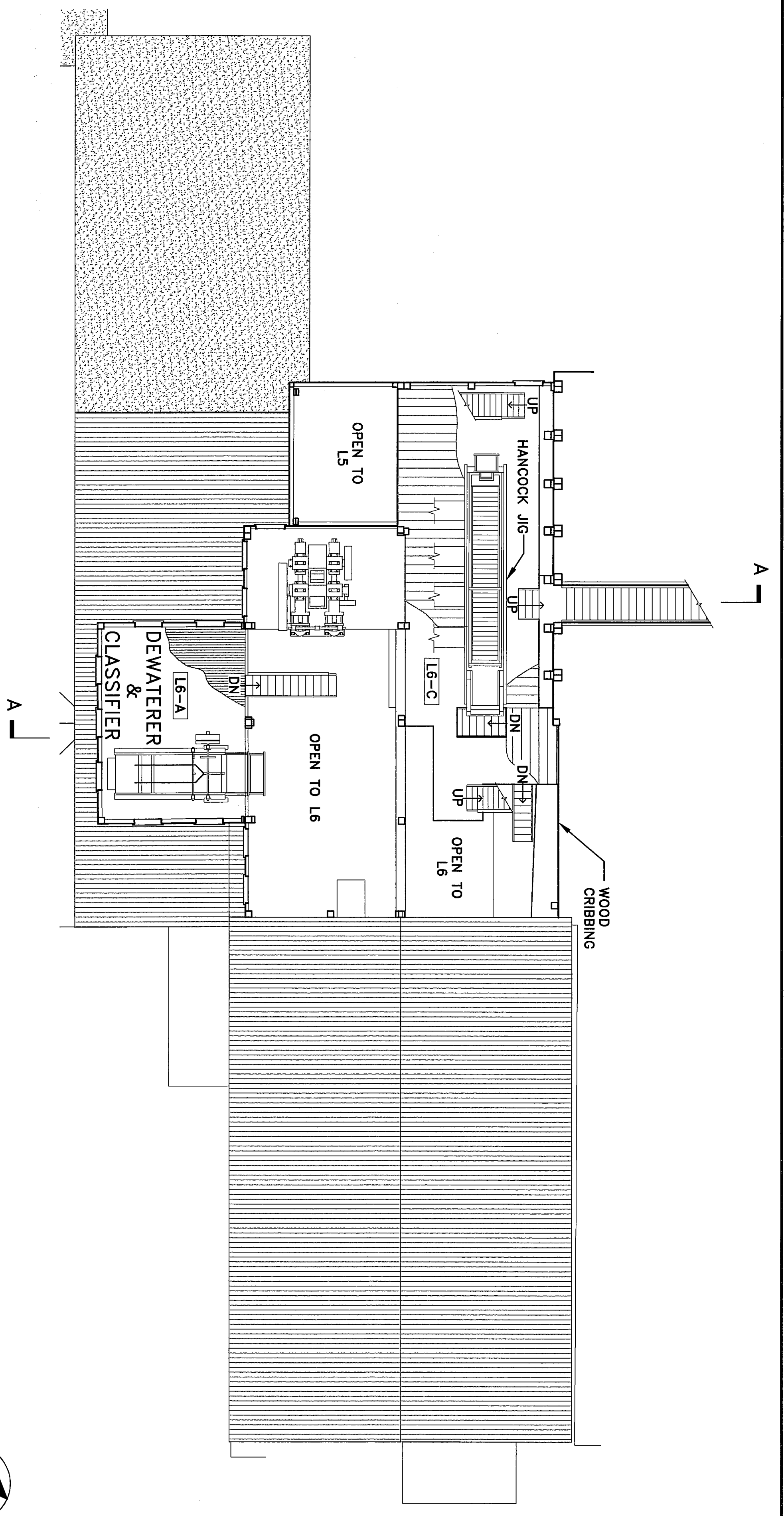
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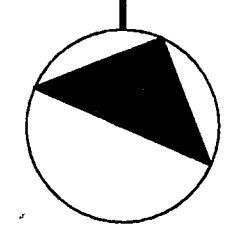
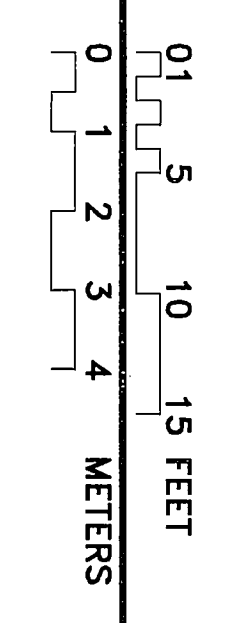
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LEVEL SIX-A AND C FLOOR PLAN
SCALE: 1/8" = 1'-0"



LEVEL SIX-F FLOOR PLAN
SCALE: 1/8" = 1'-0"



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KENNICOTT

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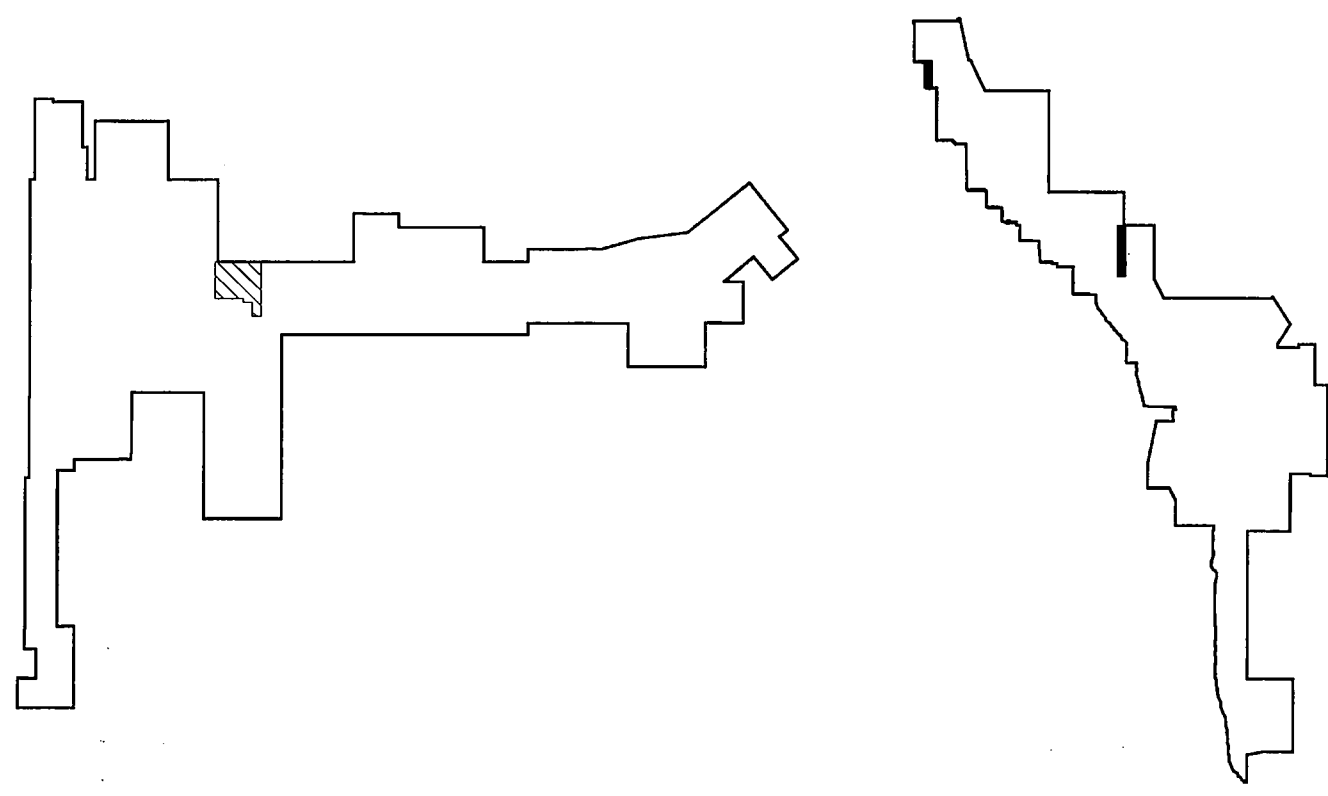
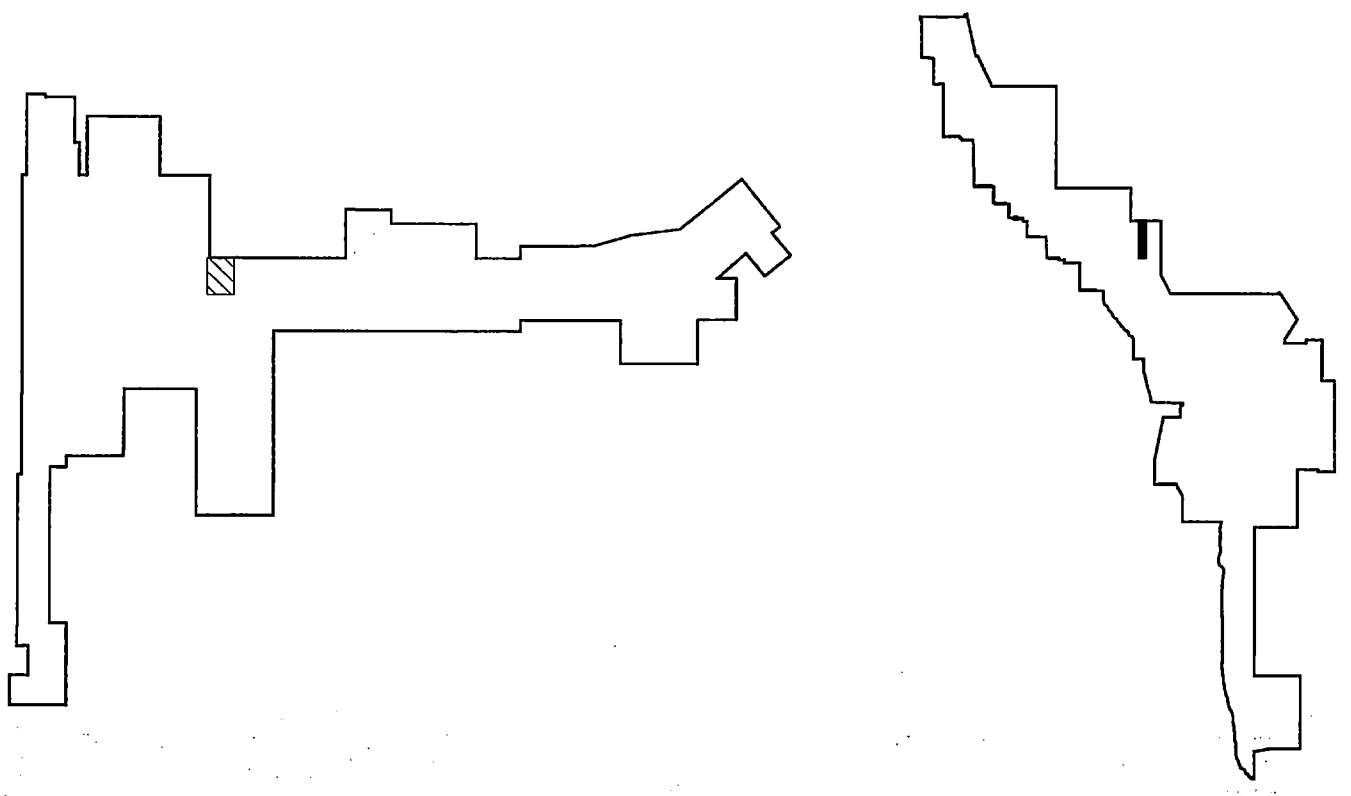
ALASKA

SURVEY NO.
AK-1-D

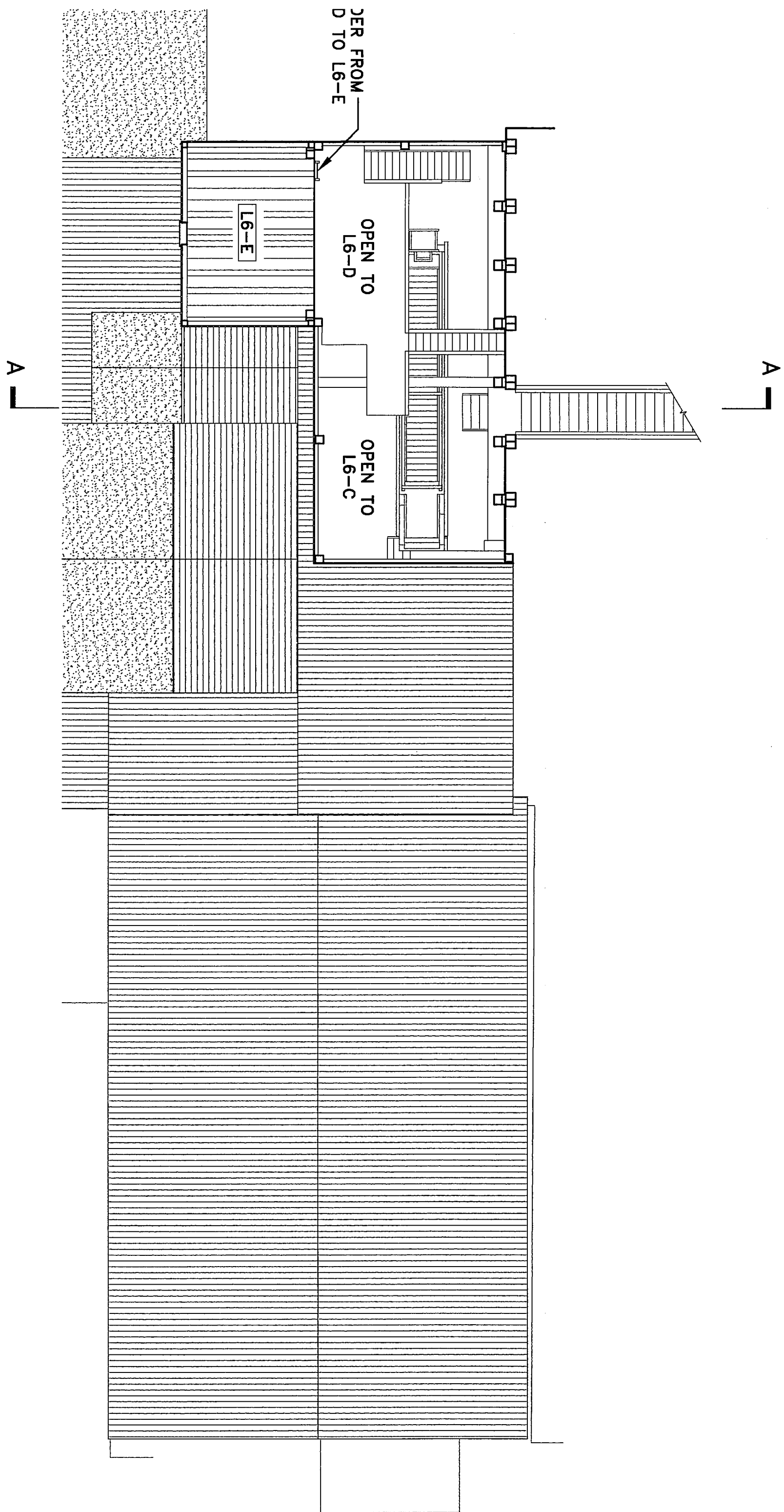
HISTORIC AMERICAN
ENGINEERING RECORD
SHEET 9 OF 26 SHEETS

LIBRARY OF CONGRESS
INDEX NUMBER

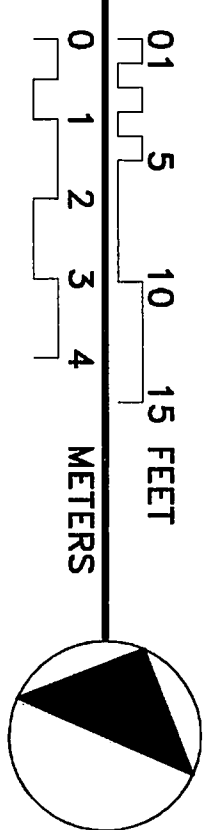
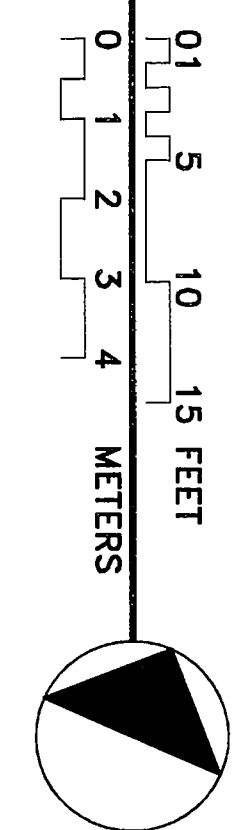
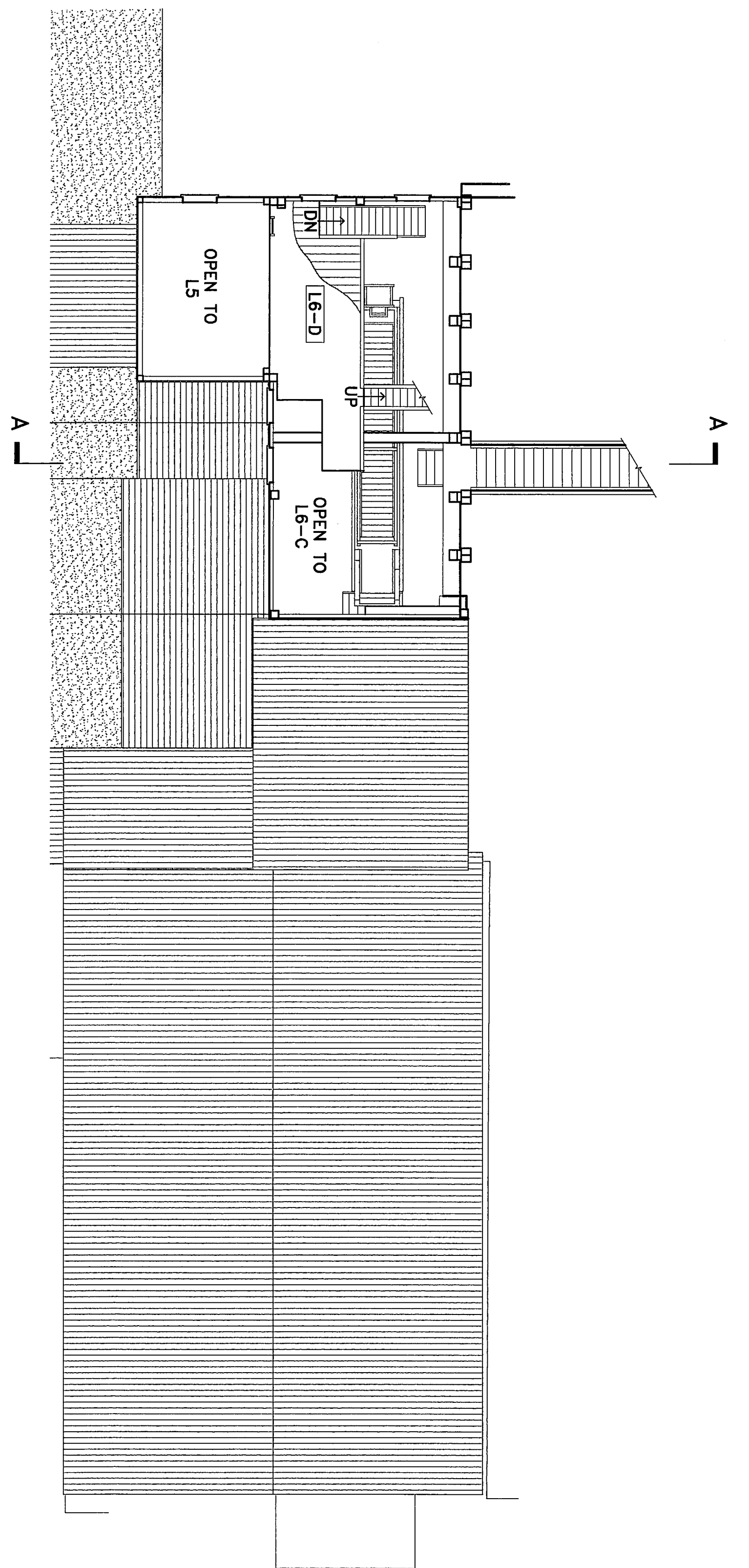
IF REPRODUCED, PLEASE CREDIT THE HISTORIC AMERICAN ENGINEERING RECORD, NATIONAL PARK SERVICE, NAME OF DELINEATOR, DATE OF DRAWING



LEVEL SIX-E FLOOR PLAN
SCALE: 1/8" = 1'-0"



LEVEL SIX-D FLOOR PLAN
SCALE: 1/8" = 1'-0"



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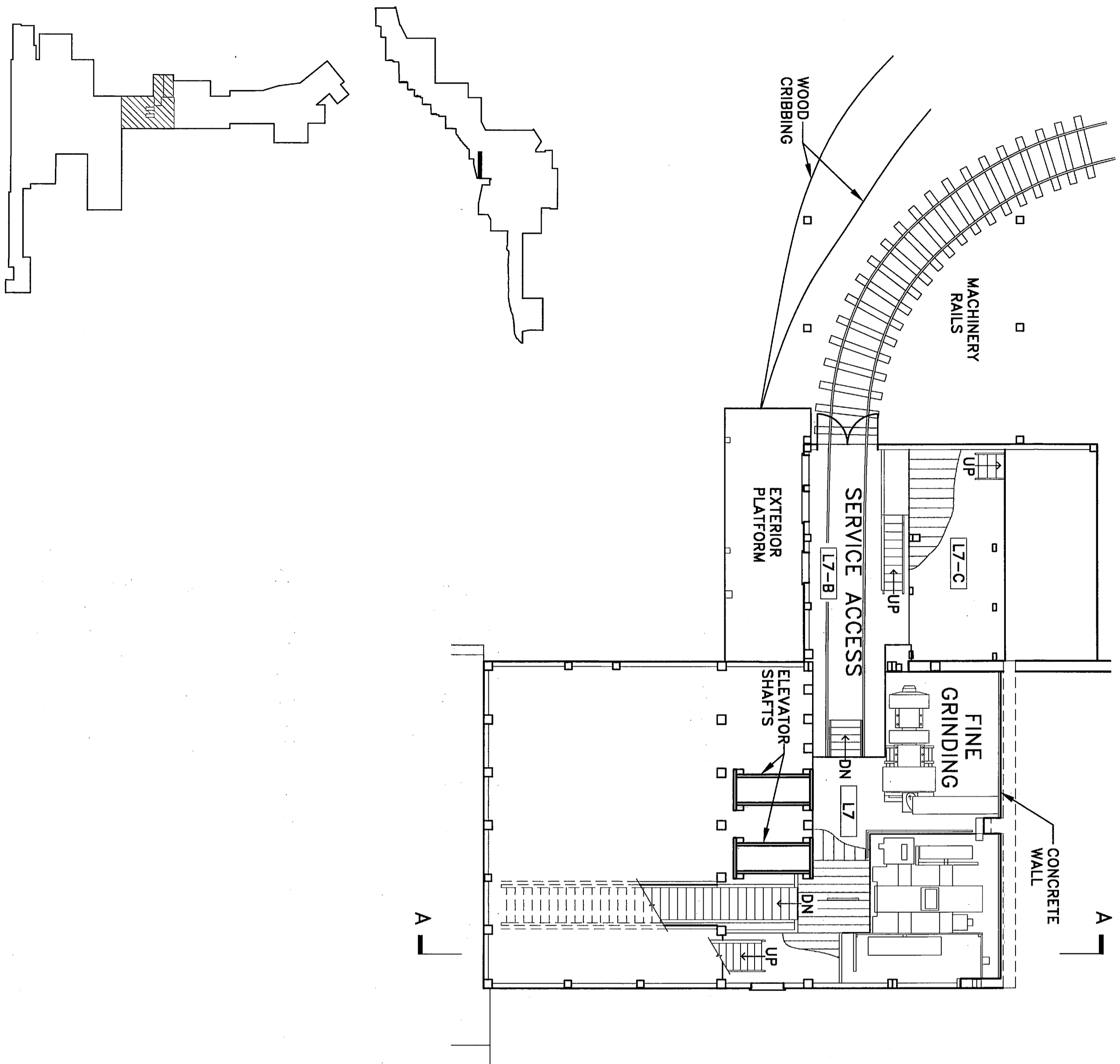
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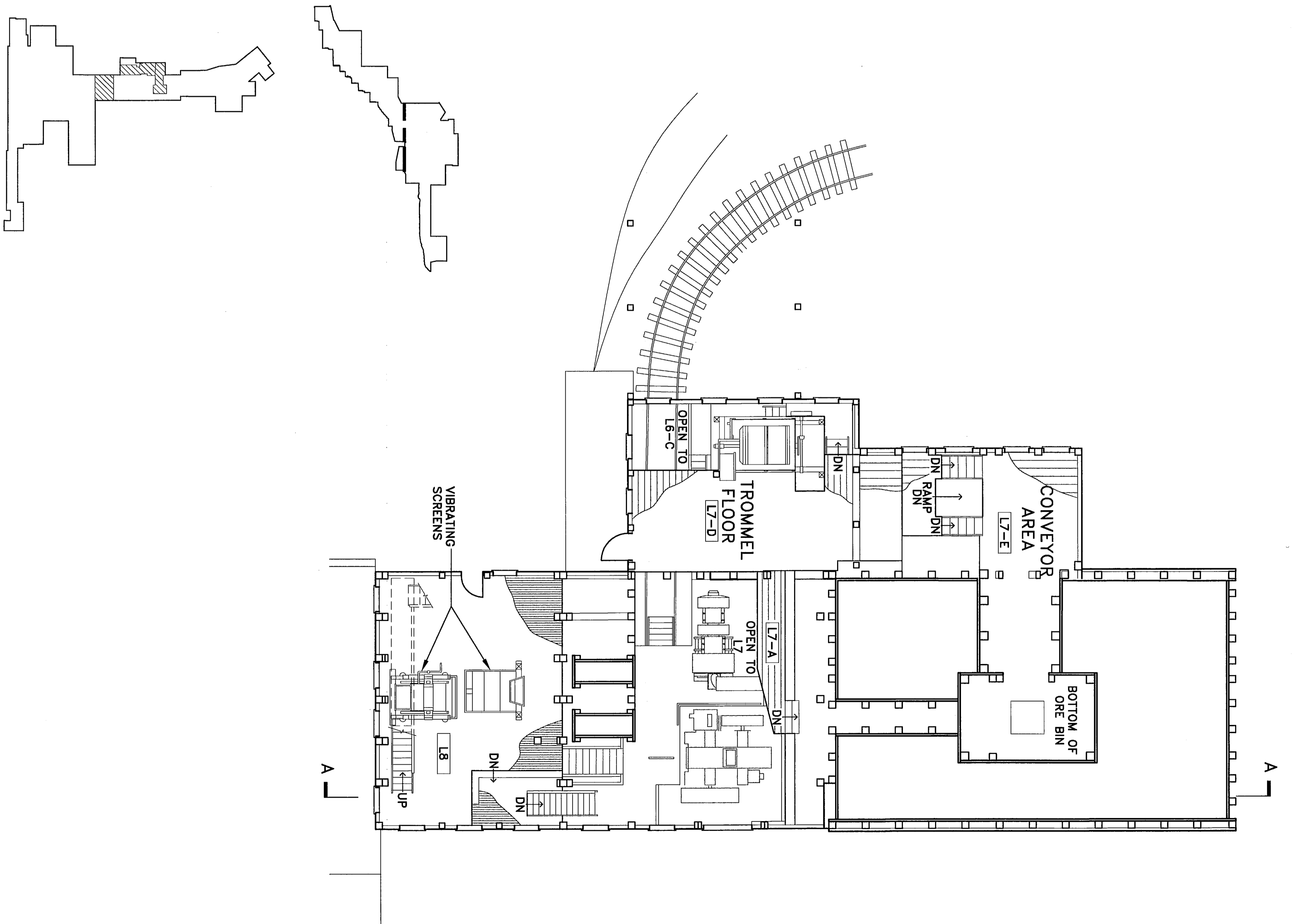
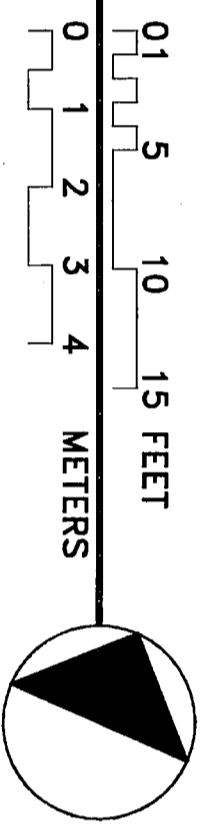
SURVEY NO.
AK-1-D

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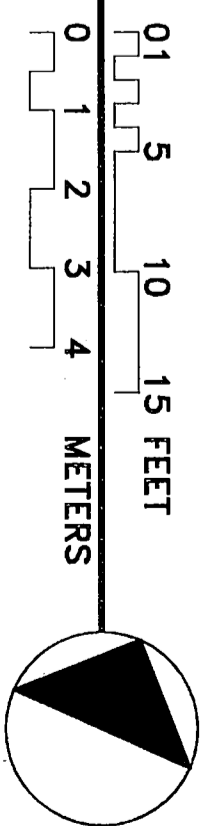
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INDEX NUMBER



LEVEL SEVEN-B AND C FLOOR PLAN
SCALE: 1/8" = 1'-0"



LEVEL SEVEN-D, E, A AND LEVEL EIGHT FLOOR PLAN
SCALE: 1/8" = 1'-0"



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SURVEY NO.
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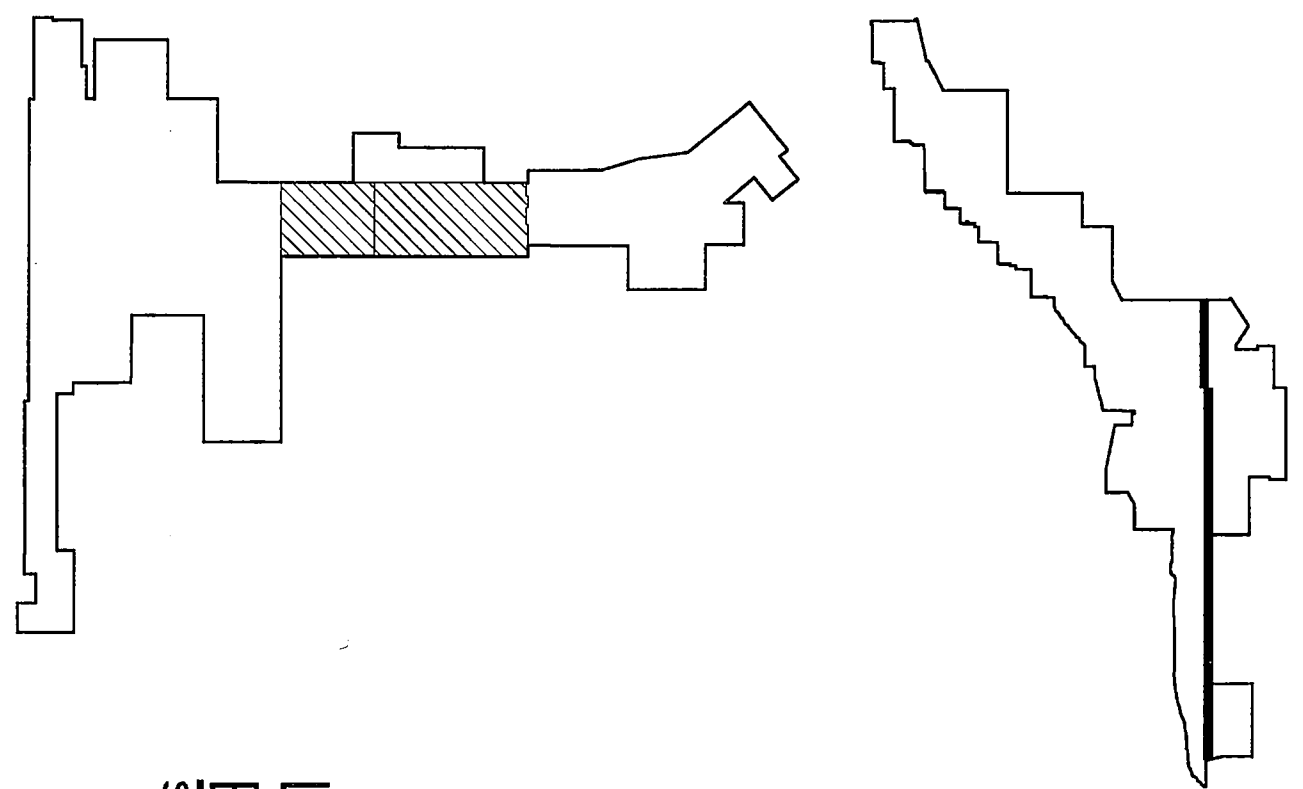
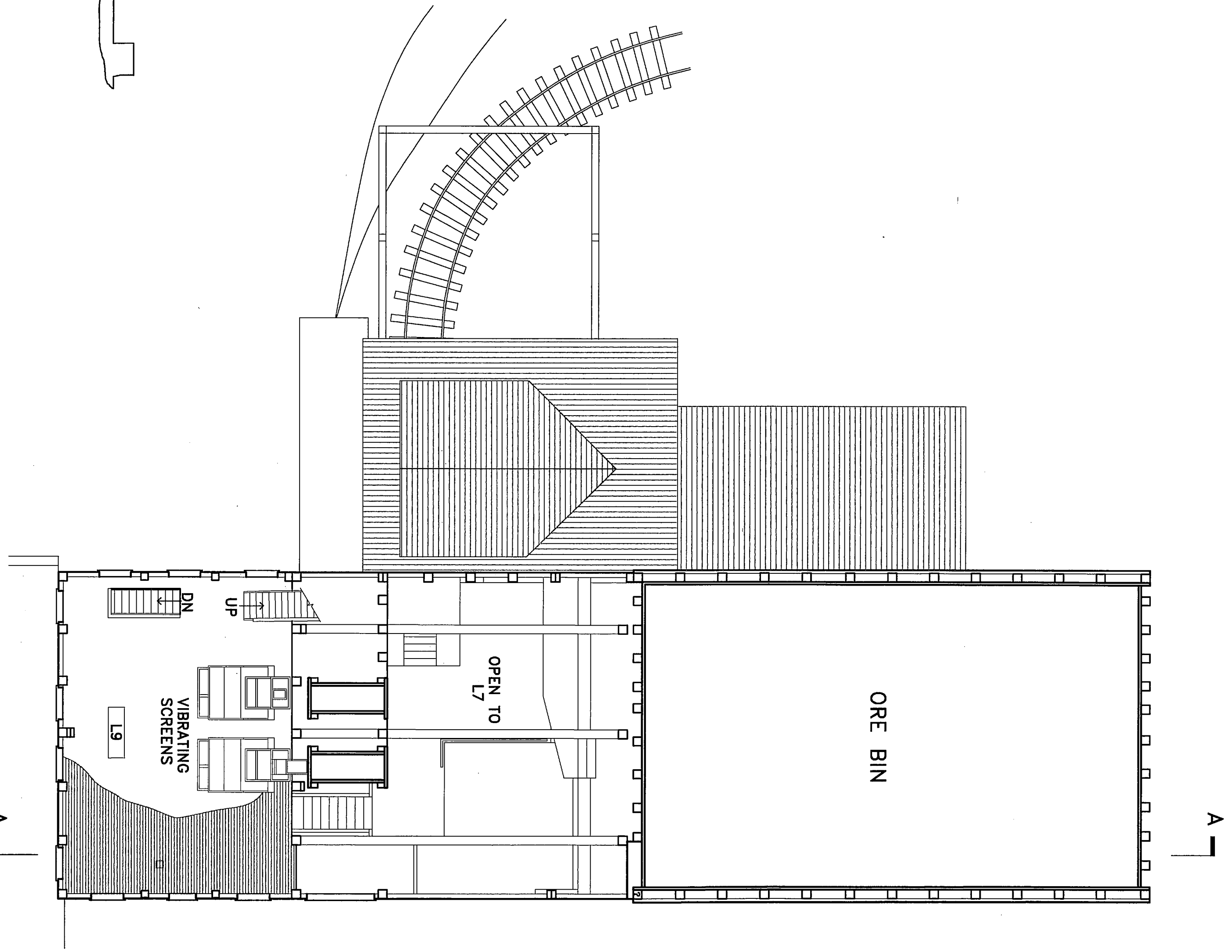
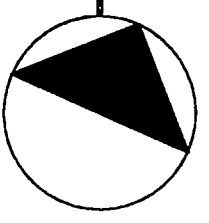
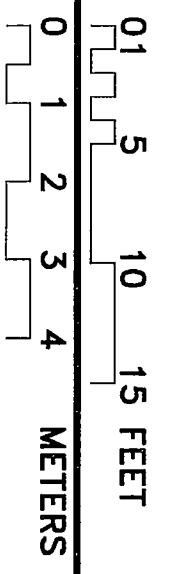
HISTORIC AMERICAN
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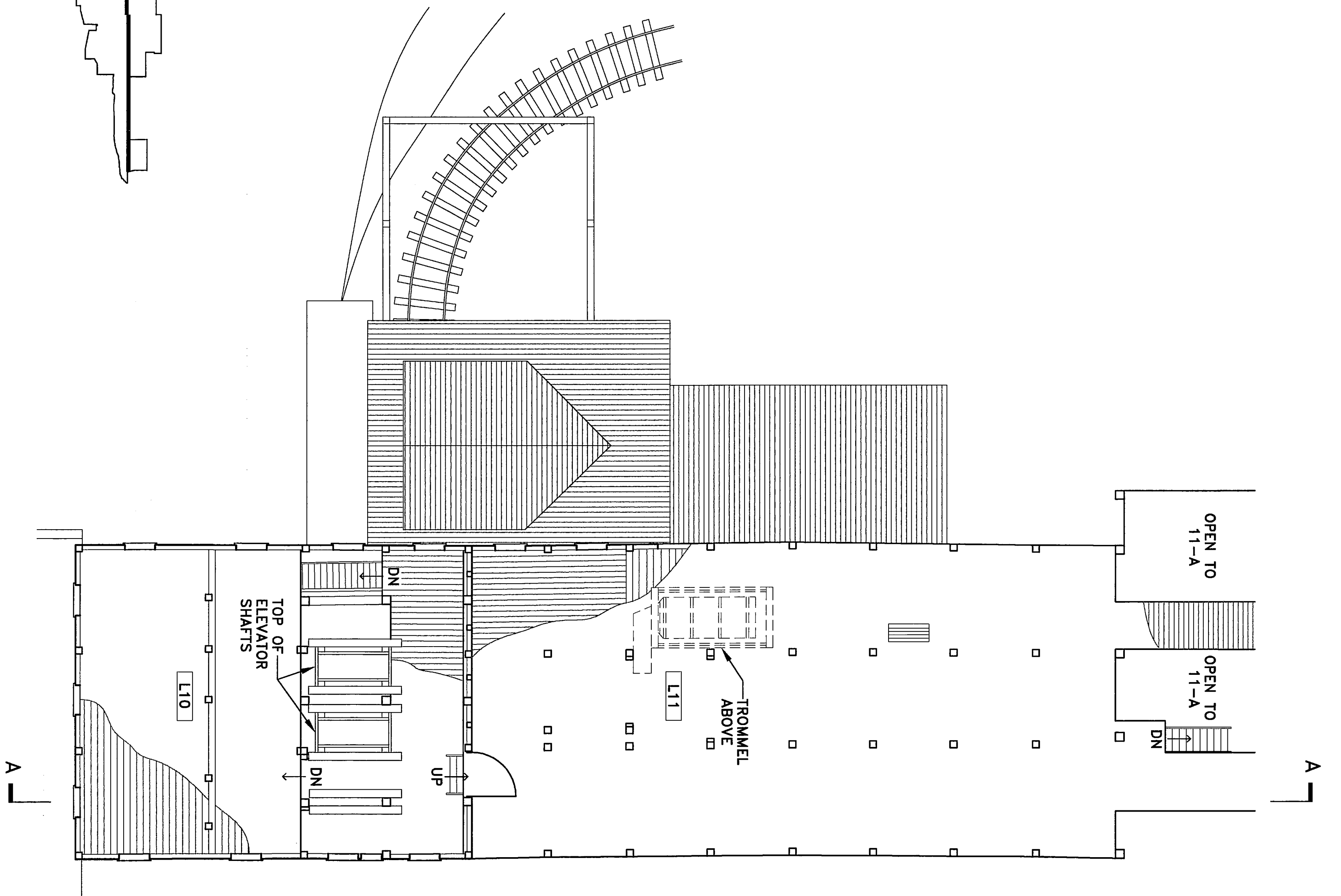
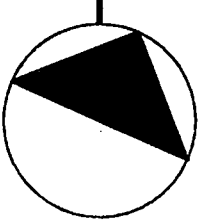
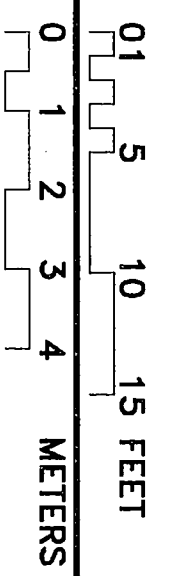
LEVEL NINE FLOOR PLAN

SCALE: 1/8" = 1'-0"



LEVEL TEN AND LEVEL ELEVEN-WEST FLOOR PLAN

SCALE: 1/8" = 1'-0"



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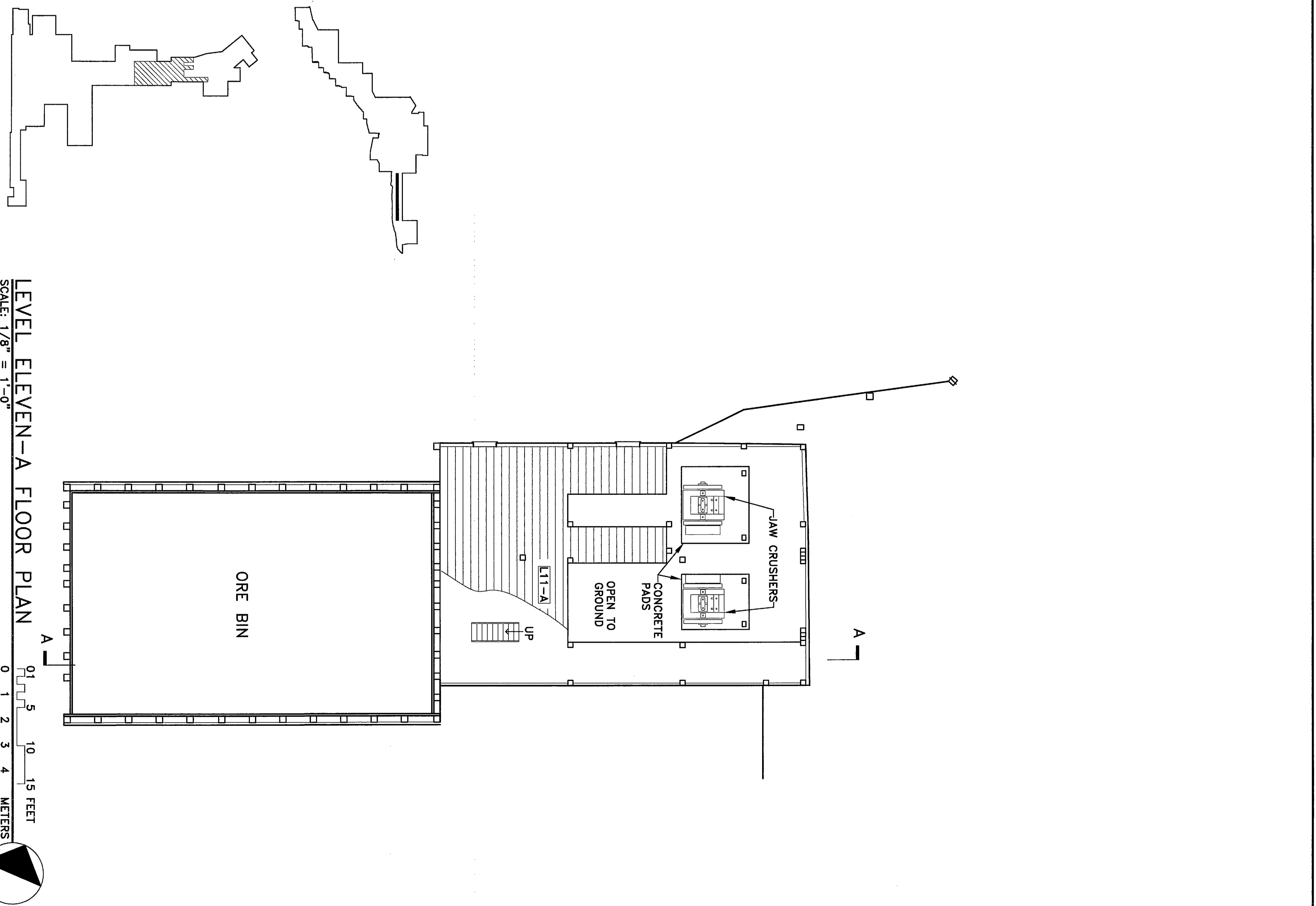
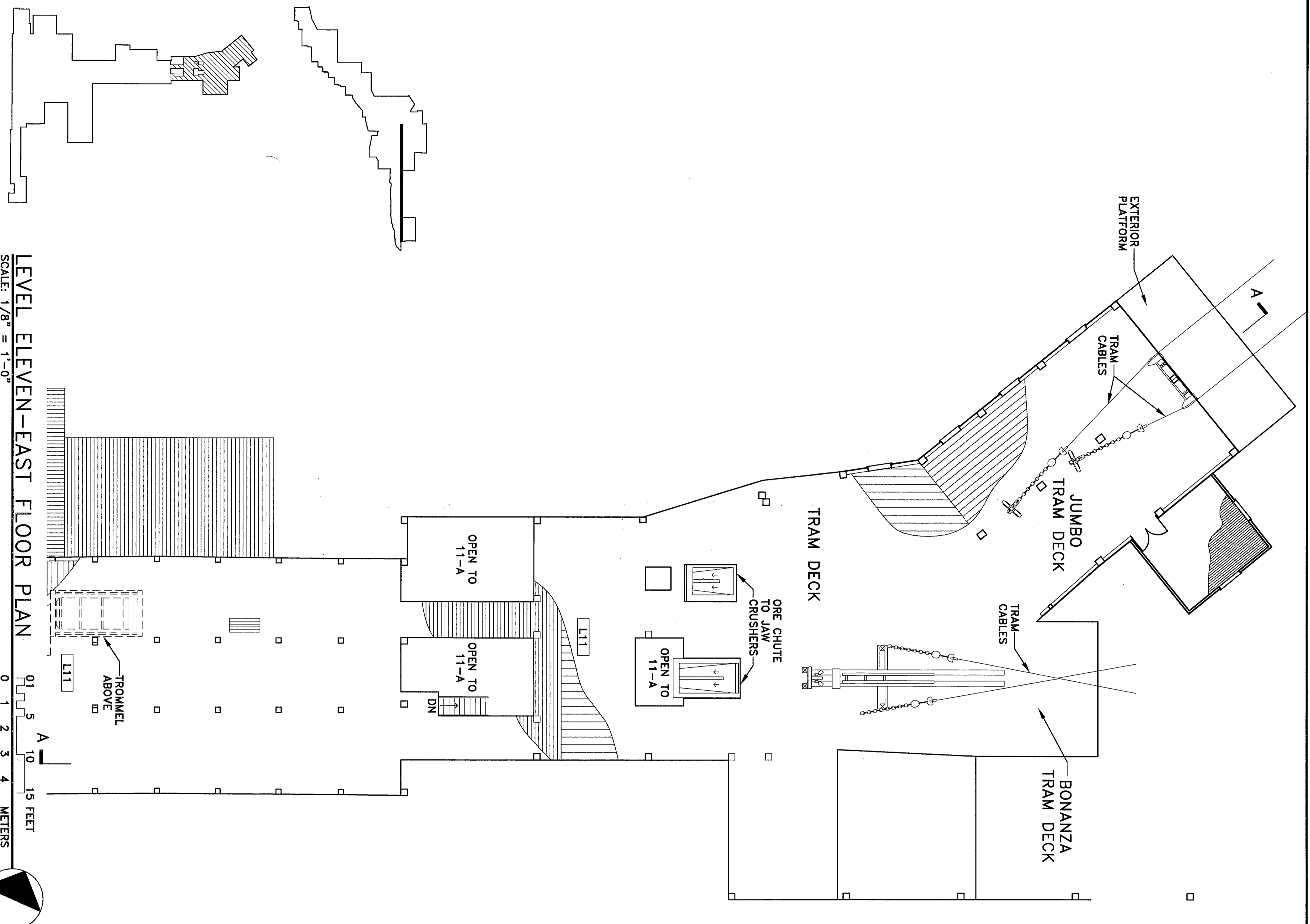
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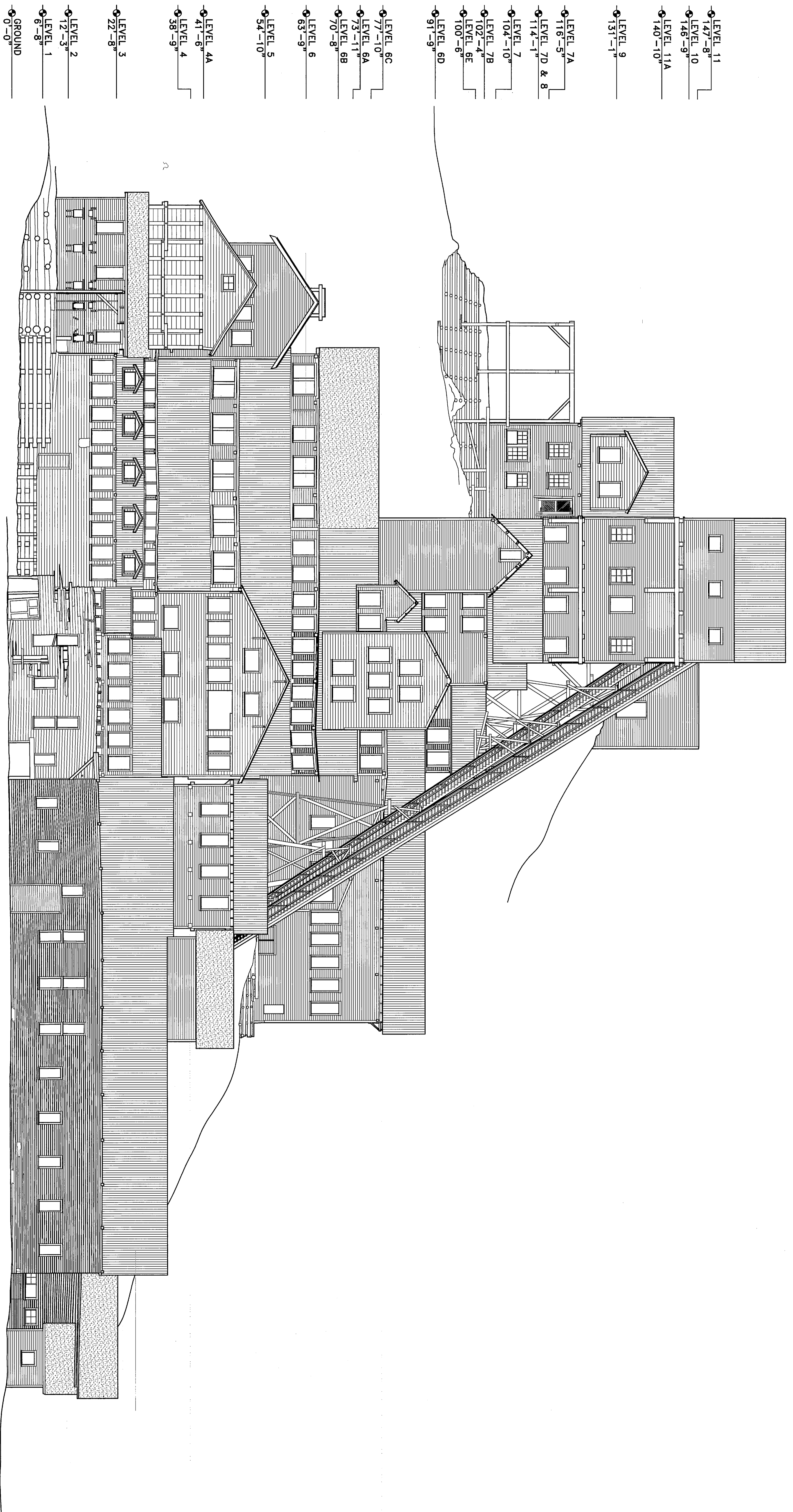
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SURVEY NO.
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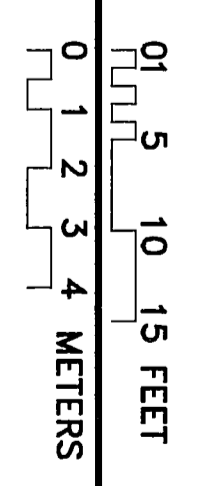
HISTORIC AMERICAN
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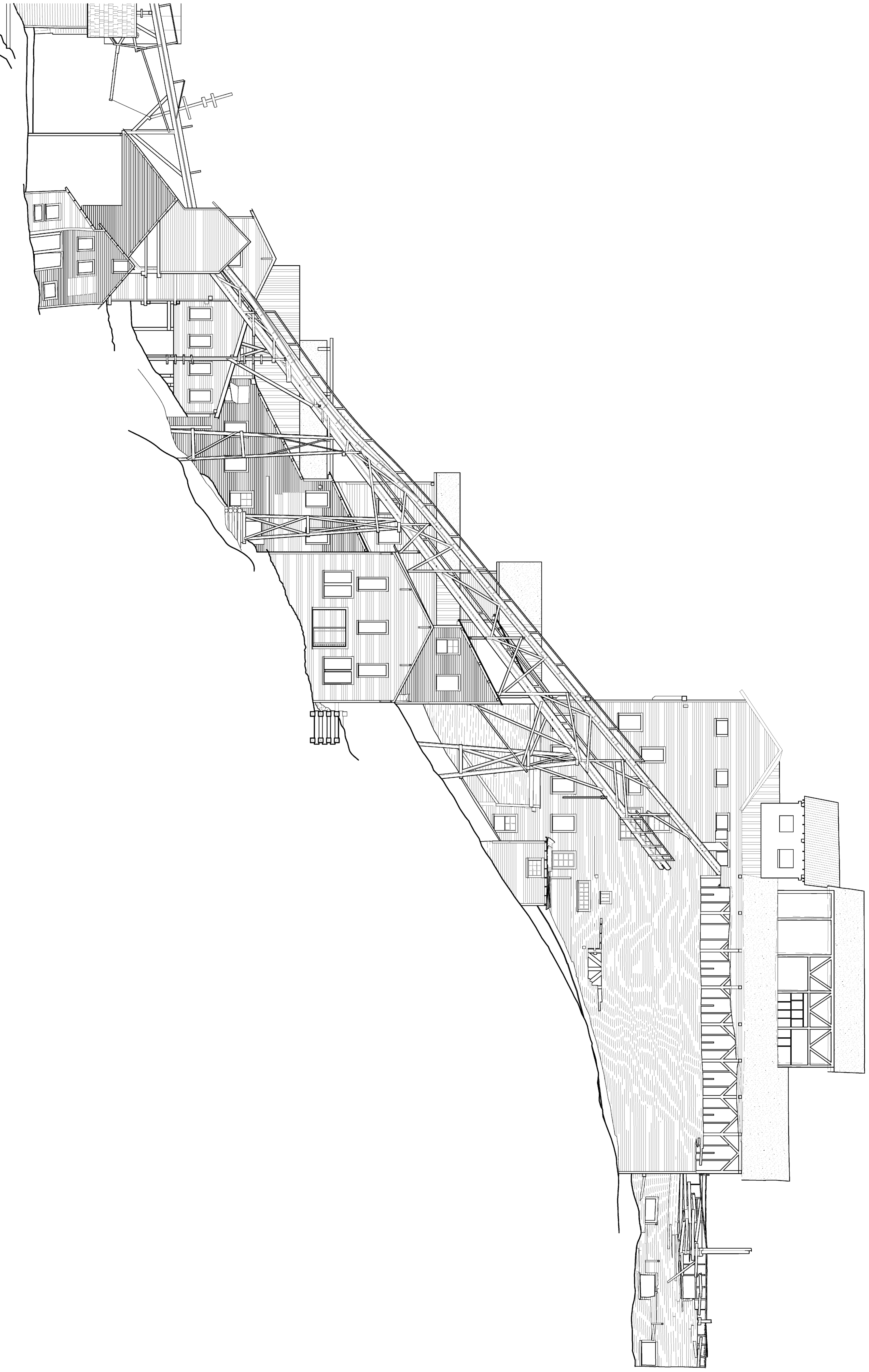
- LEVEL 11
147'-8"
- LEVEL 10
146'-9"
- LEVEL 11A
140'-10"
- LEVEL 9
131'-1"
- LEVEL 7A
116'-5"
- LEVEL 7D & 8
114'-1"
- LEVEL 7
104'-10"
- LEVEL 7B
102'-4"
- LEVEL 6E
100'-6"
- LEVEL 6D
91'-9"
- LEVEL 6C
77'-10"
- LEVEL 6A
73'-11"
- LEVEL 6B
70'-8"
- LEVEL 6
63'-9"
- LEVEL 5
54'-10"
- LEVEL 4A
41'-6"
- LEVEL 4
38'-9"
- LEVEL 3
22'-8"
- LEVEL 2
12'-3"
- LEVEL 1
6'-8"
- GROUND
0'-0"

WEST ELEVATION
SCALE: 3/32" = 1'-0"

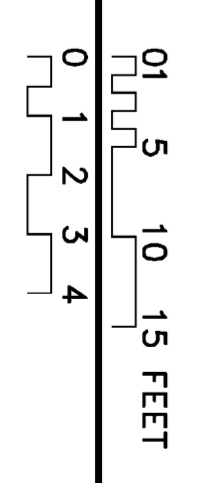


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- LEVEL 11
147'-8"
- LEVEL 10
146'-9"
- LEVEL 11A
140'-10"
- LEVEL 9
131'-1"
- LEVEL 7A
116'-5"
- LEVEL 7D & 8
114'-1"
- LEVEL 7
104'-10"
- LEVEL 7B
102'-4"
- LEVEL 6E
100'-6"
- LEVEL 6D
91'-9"
- LEVEL 6
63'-9"
- LEVEL 5
54'-10"
- LEVEL 6C
77'-10"
- LEVEL 6A
73'-11"
- LEVEL 6B
70'-8"
- LEVEL 4
38'-9"
- LEVEL 4A
41'-6"
- LEVEL 3
22'-8"
- LEVEL 2
12'-3"
- LEVEL 1
6'-8"
- GROUND
0'-0"



SOUTH ELEVATION
SCALE: 3/32" = 1'-0"



DRAWN BY: HELEN MUI (1998), MATTHEW SNOAP (1998), CHRIS HOUSTON (1999), ERIK DORSETT (1999) & LAURA HOUSTON (2000)

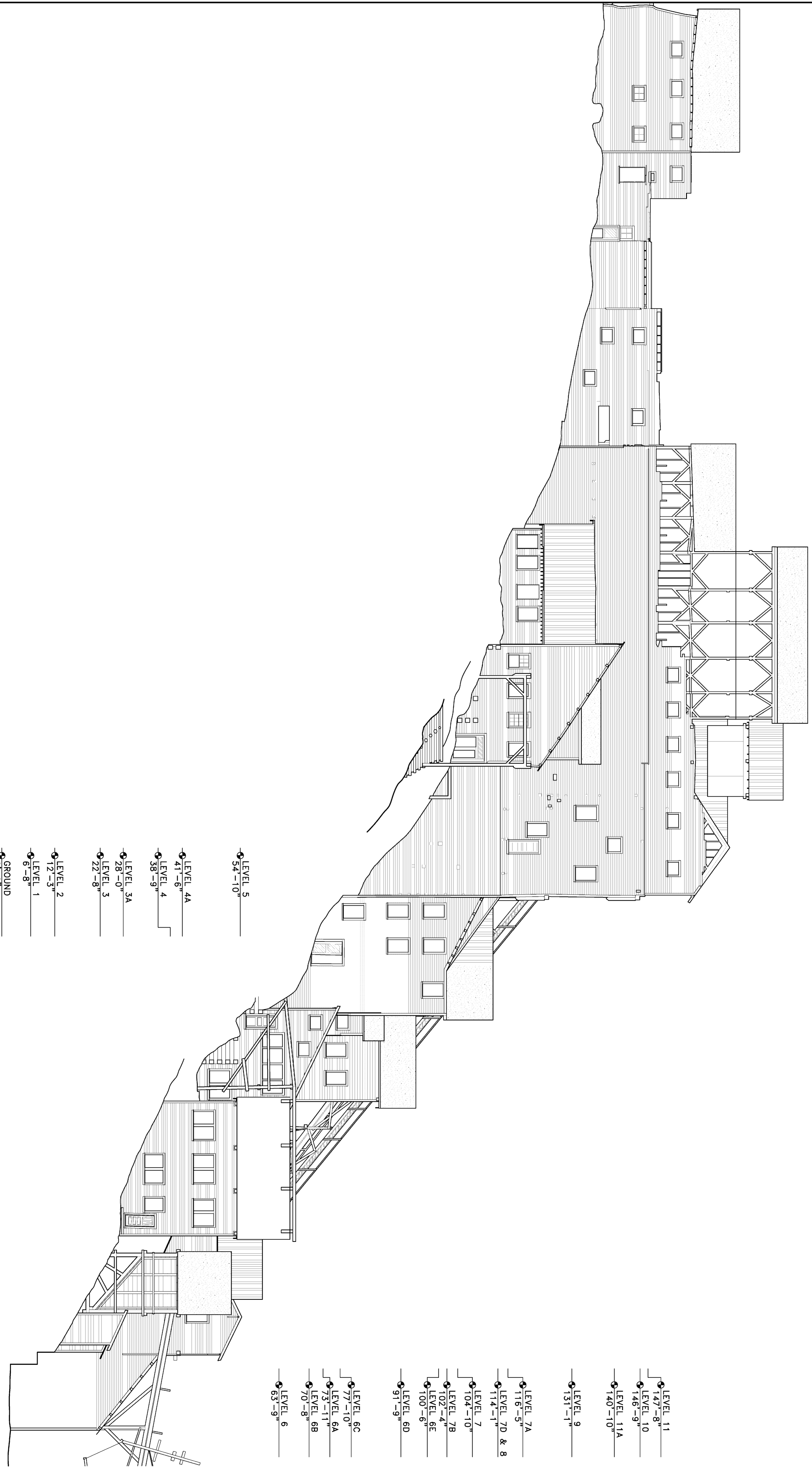
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NORTH ELEVATION
SCALE: 3/32" = 1'-0"

- LEVEL 5
54'-10"
- LEVEL 4A
41'-6"
- LEVEL 4
38'-9"
- LEVEL 3A
28'-0"
- LEVEL 3
22'-8"
- LEVEL 2
12'-3"
- LEVEL 1
6'-8"
- GROUND
0'-0"

- LEVEL 11
147'-8"
- LEVEL 10
146'-9"
- LEVEL 11A
140'-10"
- LEVEL 9
131'-1"
- LEVEL 7A
116'-5"
- LEVEL 7D & 8
114'-1"
- LEVEL 7
104'-10"
- LEVEL 7B
102'-4"
- LEVEL 6E
100'-6"
- LEVEL 6D
91'-9"
- LEVEL 6C
77'-10"
- LEVEL 6A
73'-11"
- LEVEL 6B
70'-8"
- LEVEL 6
63'-9"

0' 5' 10' 15' FEET
0 1 2 3 4 METERS

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LEVEL 6B
70'-8"

LEVEL 6
63'-9"

LEVEL 5
54'-10"

LEVEL 4A
41'-6"

LEVEL 4
38'-9"

LEVEL 3
22'-8"

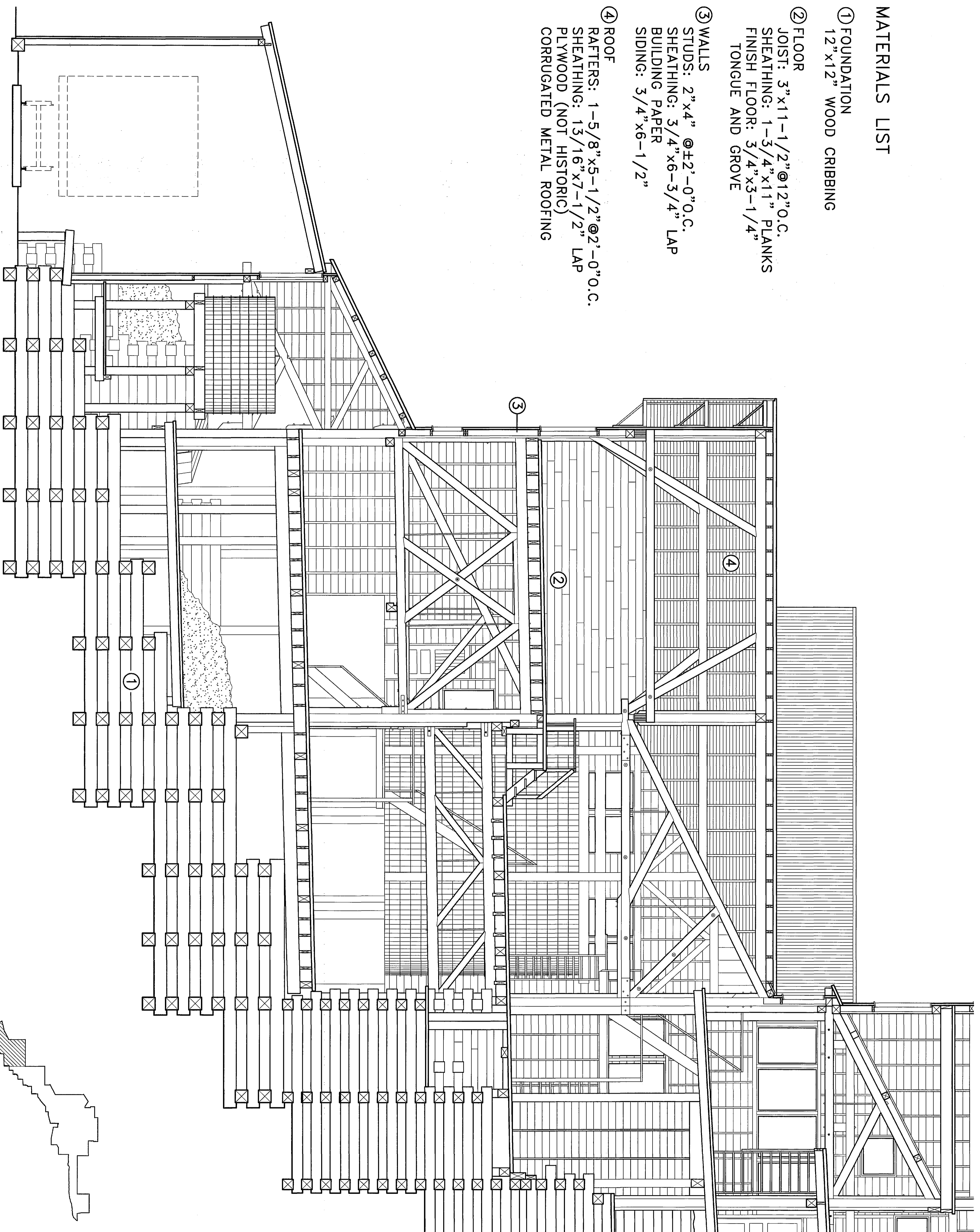
LEVEL 2
12'-3"

LEVEL 1
6'-8"

GROUND
0'-0"

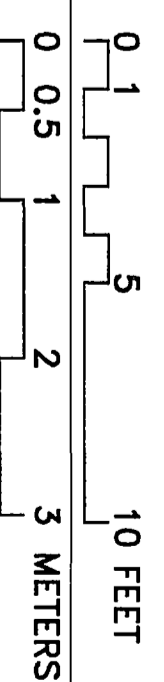
MATERIALS LIST

- ① FOUNDATION
12" x 12" WOOD CRIBBING
- ② FLOOR
JOIST: 3" x 11-1/2" @ 12" O.C.
SHEATHING: 1-3/4" x 11" PLANKS
FINISH FLOOR: 3/4" x 3-1/4"
TONGUE AND GROOVE
- ③ WALLS
STUDS: 2" x 4" @ ± 2'-0" O.C.
SHEATHING: 3/4" x 6-3/4" LAP
BUILDING PAPER
SIDING: 3/4" x 6-1/2"
- ④ ROOF
RAFTERS: 1-5/8" x 5-1/2" @ 2'-0" O.C.
SHEATHING: 1 3/16" x 7-1/2" LAP
PLYWOOD (NOT HISTORIC)
CORRUGATED METAL ROOFING



SECTION A-A

SCALE: 1/4" = 1'-0"



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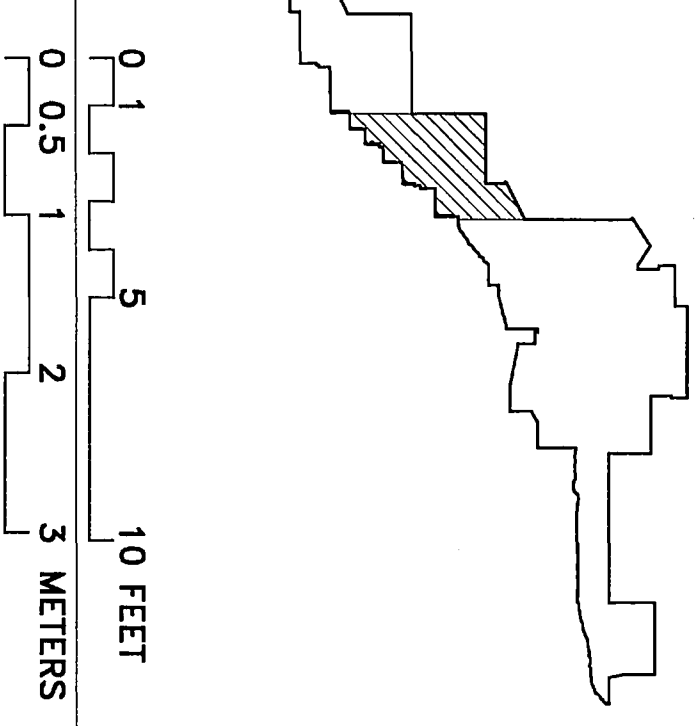
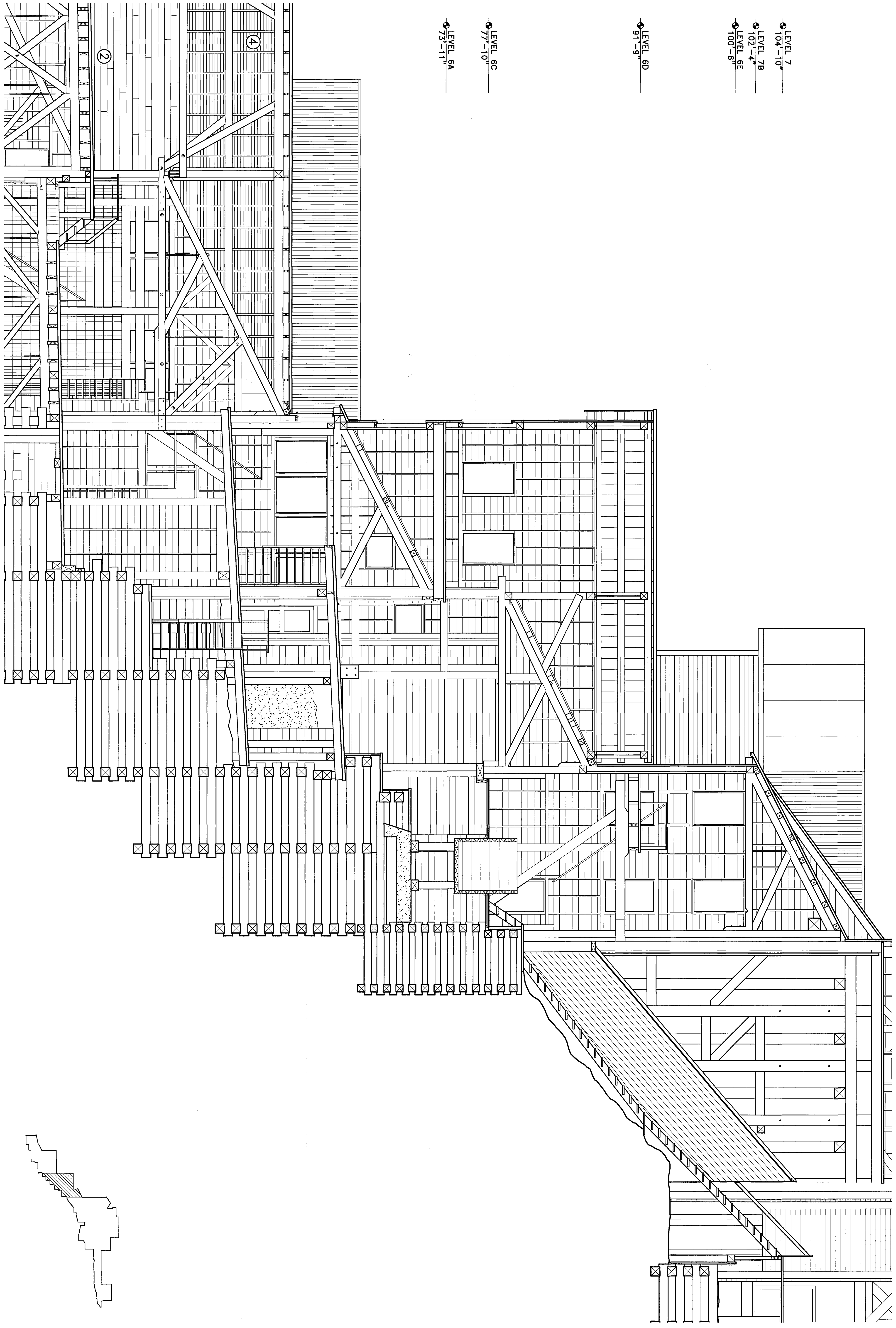
ALASKA

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SECTION A-A
SCALE: 1/4" = 1'-0"



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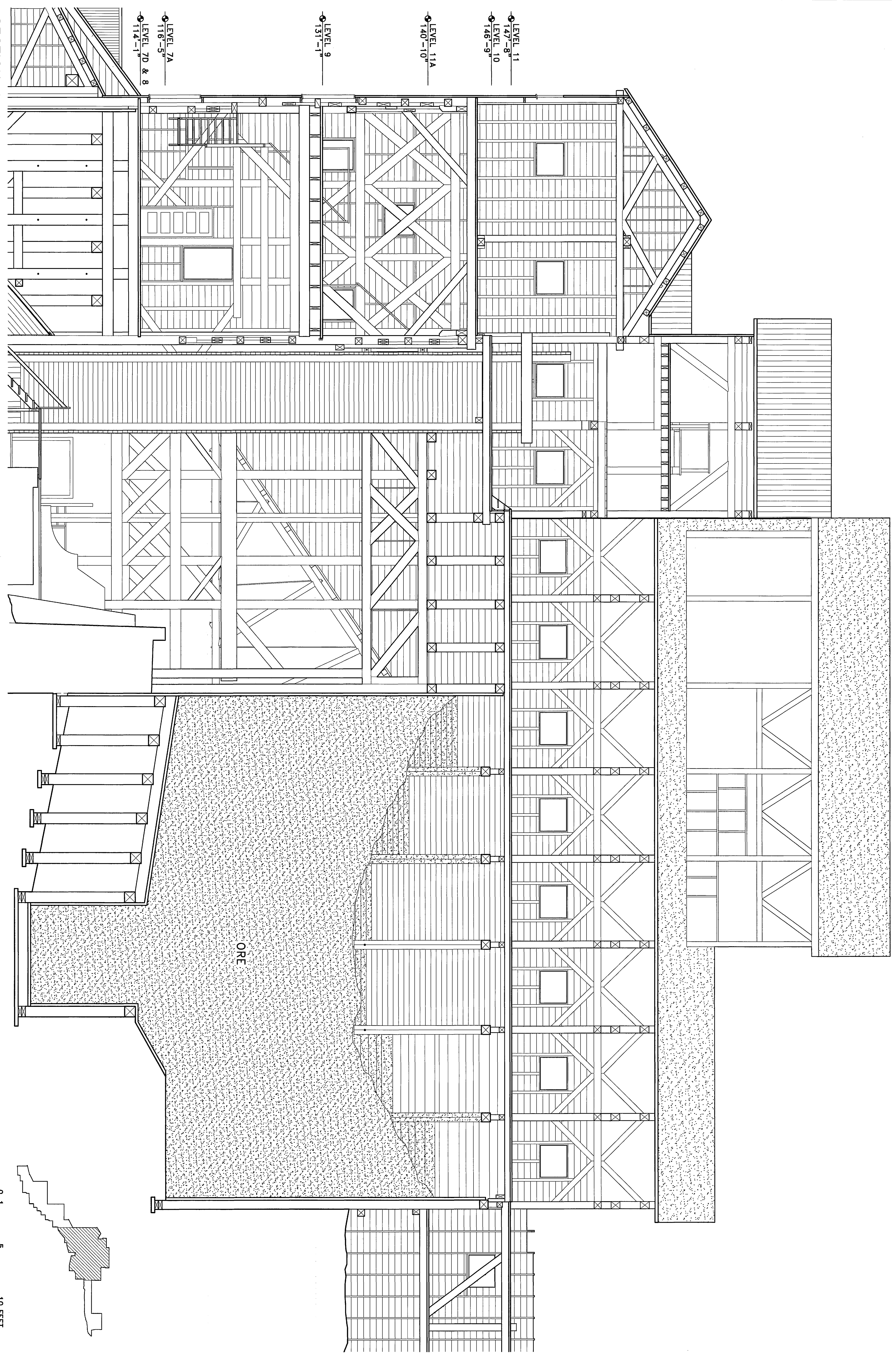
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SECTION A-A
SCALE: 1/4" = 1'-0"



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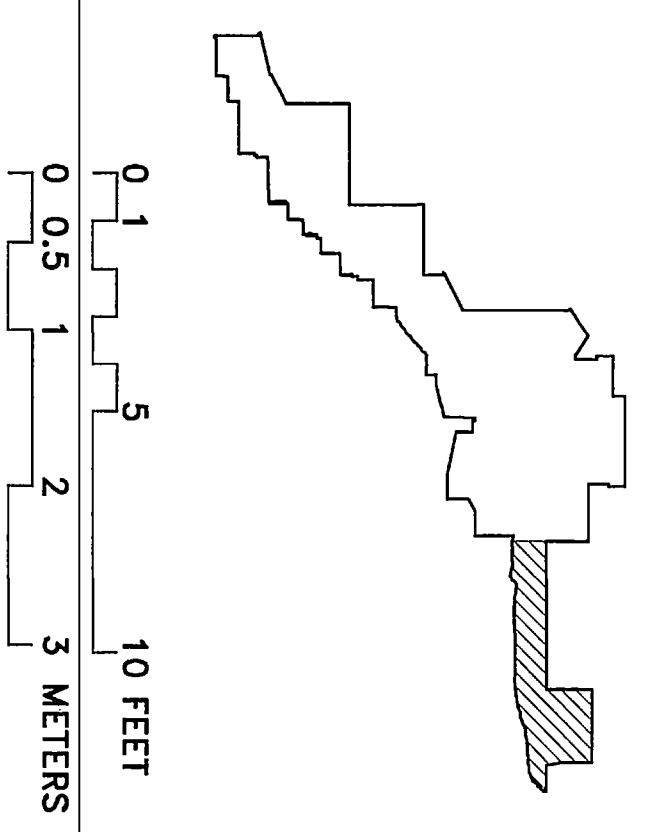
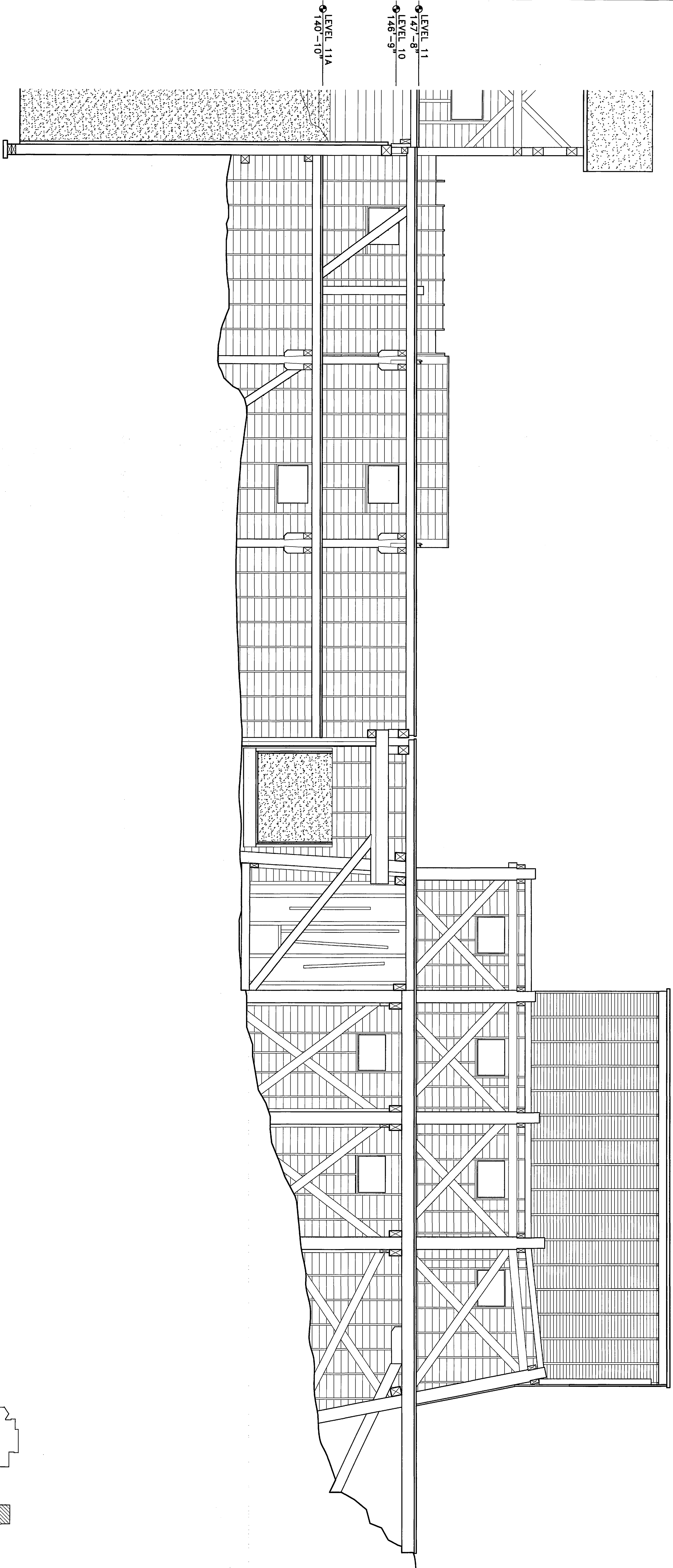
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AK-1-D

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SECTION A-A
SCALE: 1/4" = 1'-0"



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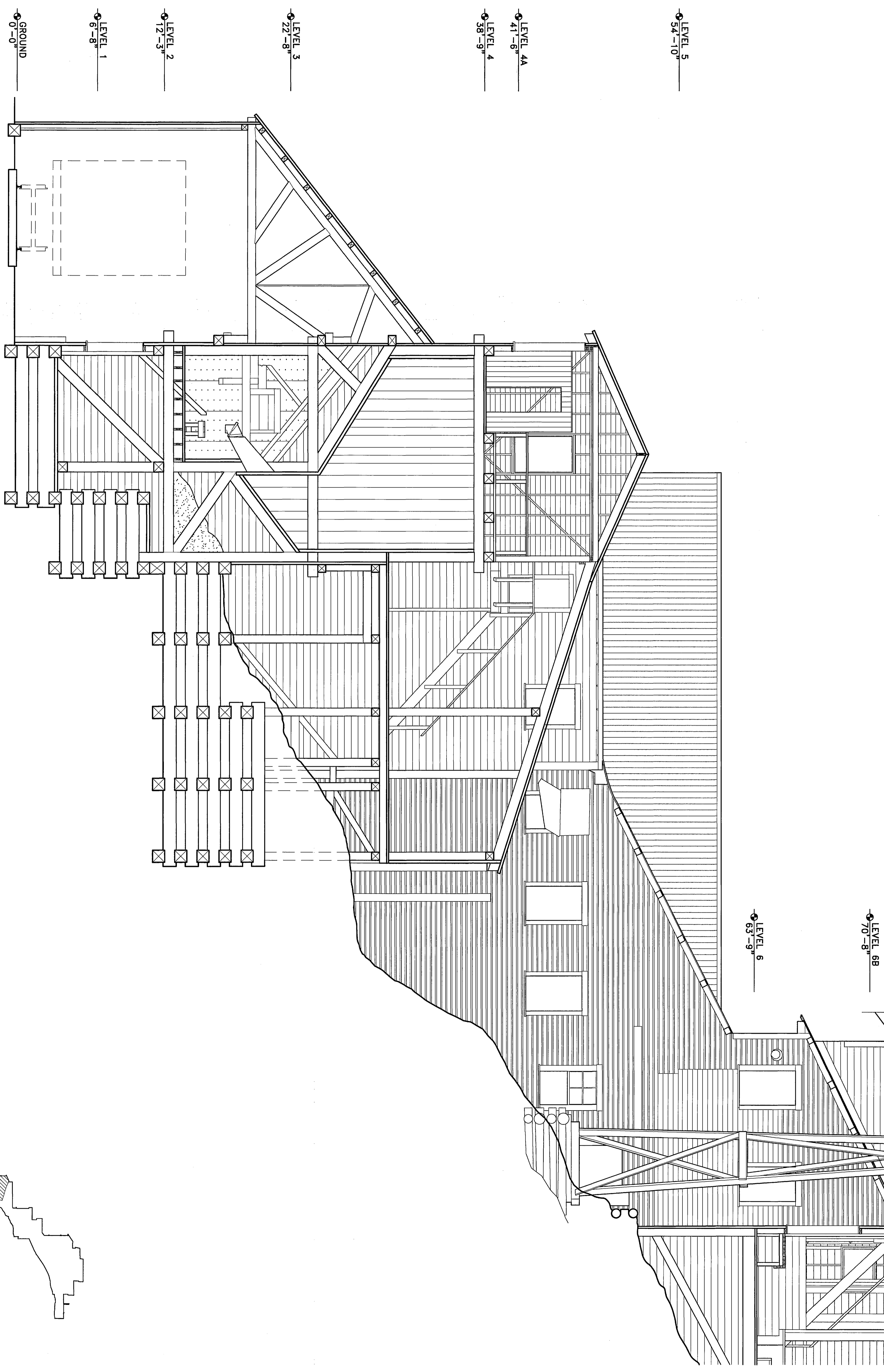
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SURVEY NO.
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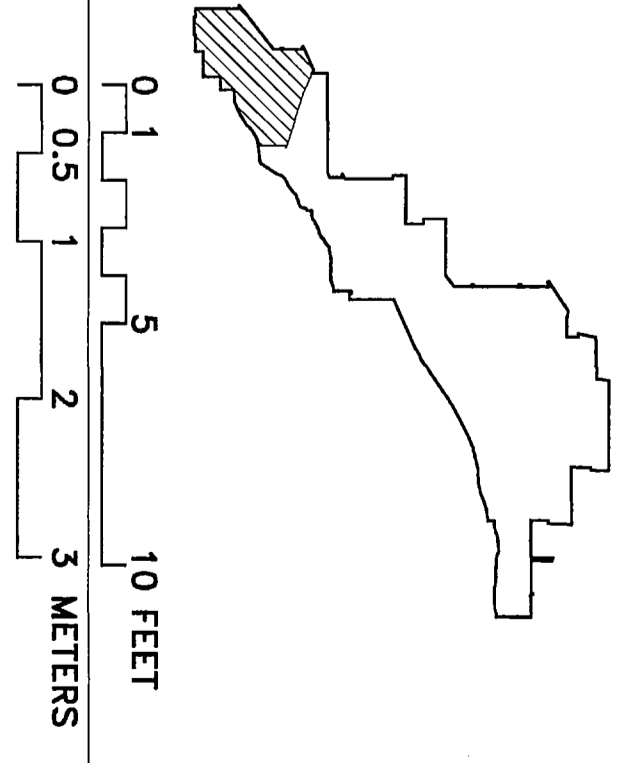
HISTORIC AMERICAN
ENGINEERING RECORD
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SECTION B-B
SCALE: 1/4" = 1'-0"



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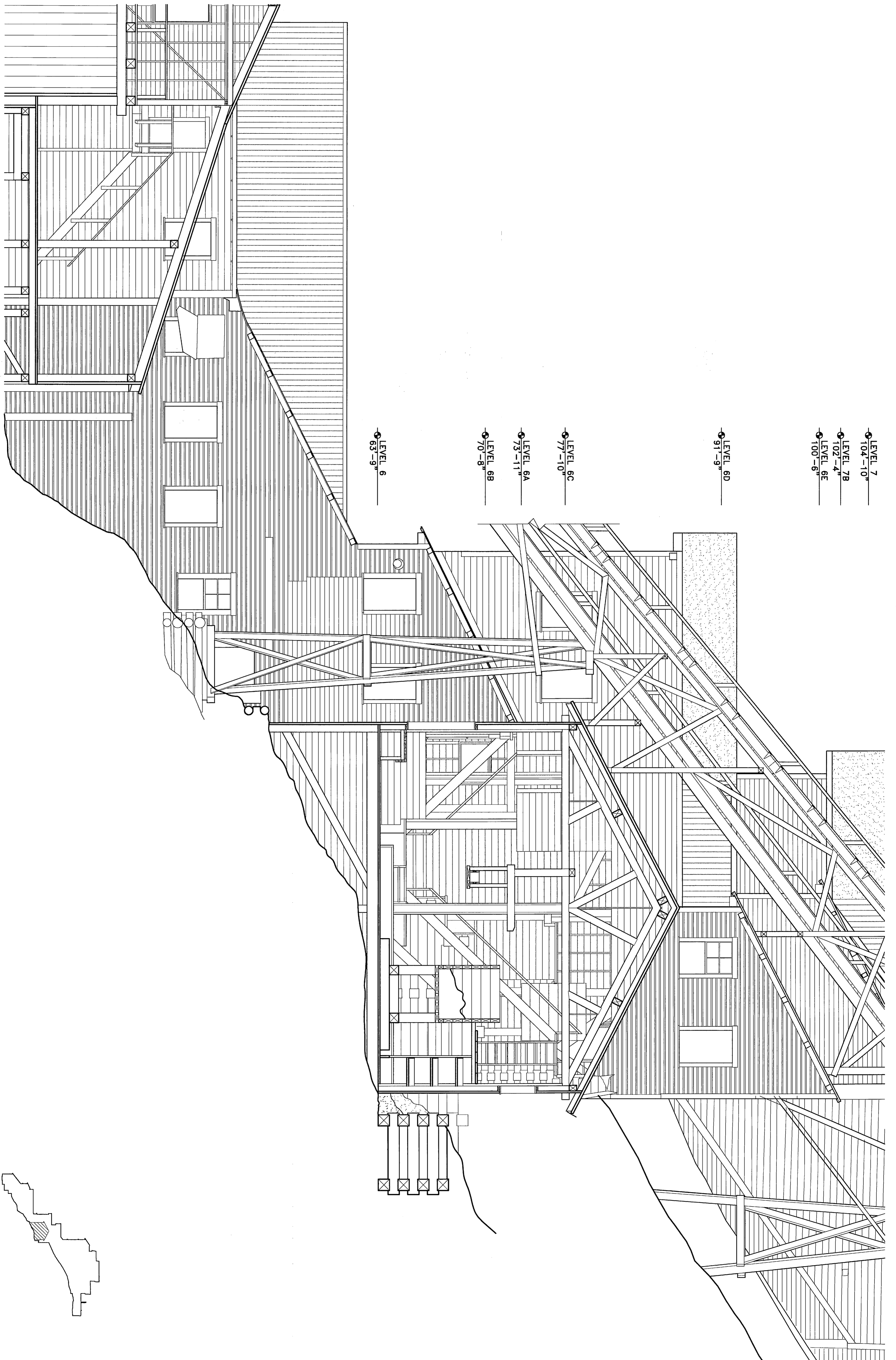
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SECTION B-B
SCALE: 1/4" = 1'-0"



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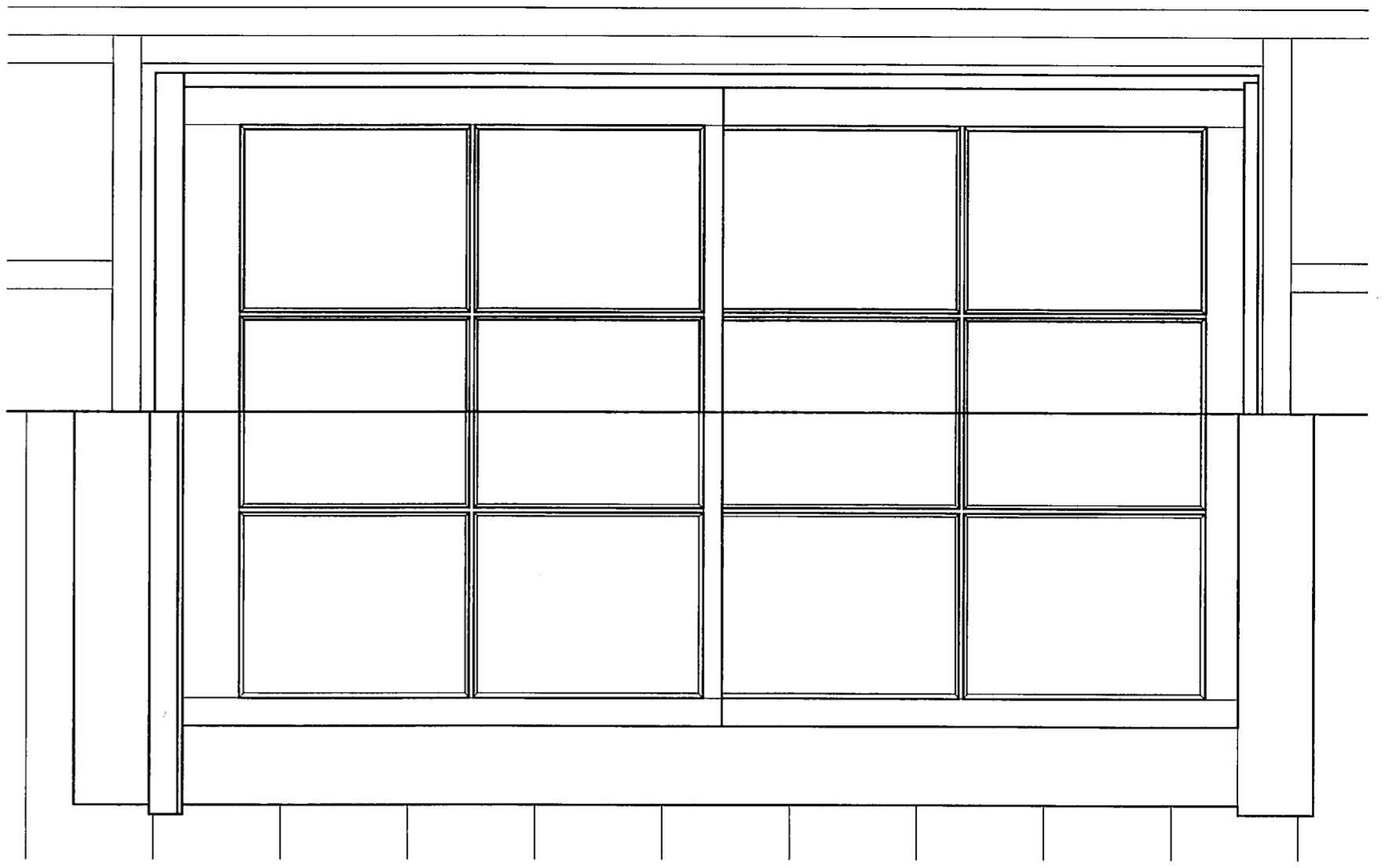
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ALASKA

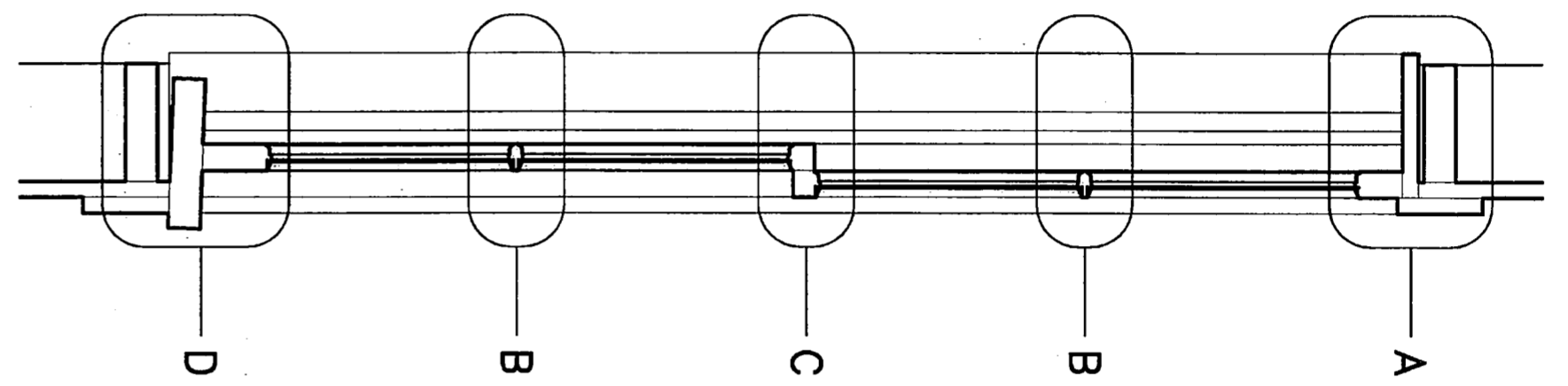
SURVEY NO.
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INDEX NUMBER

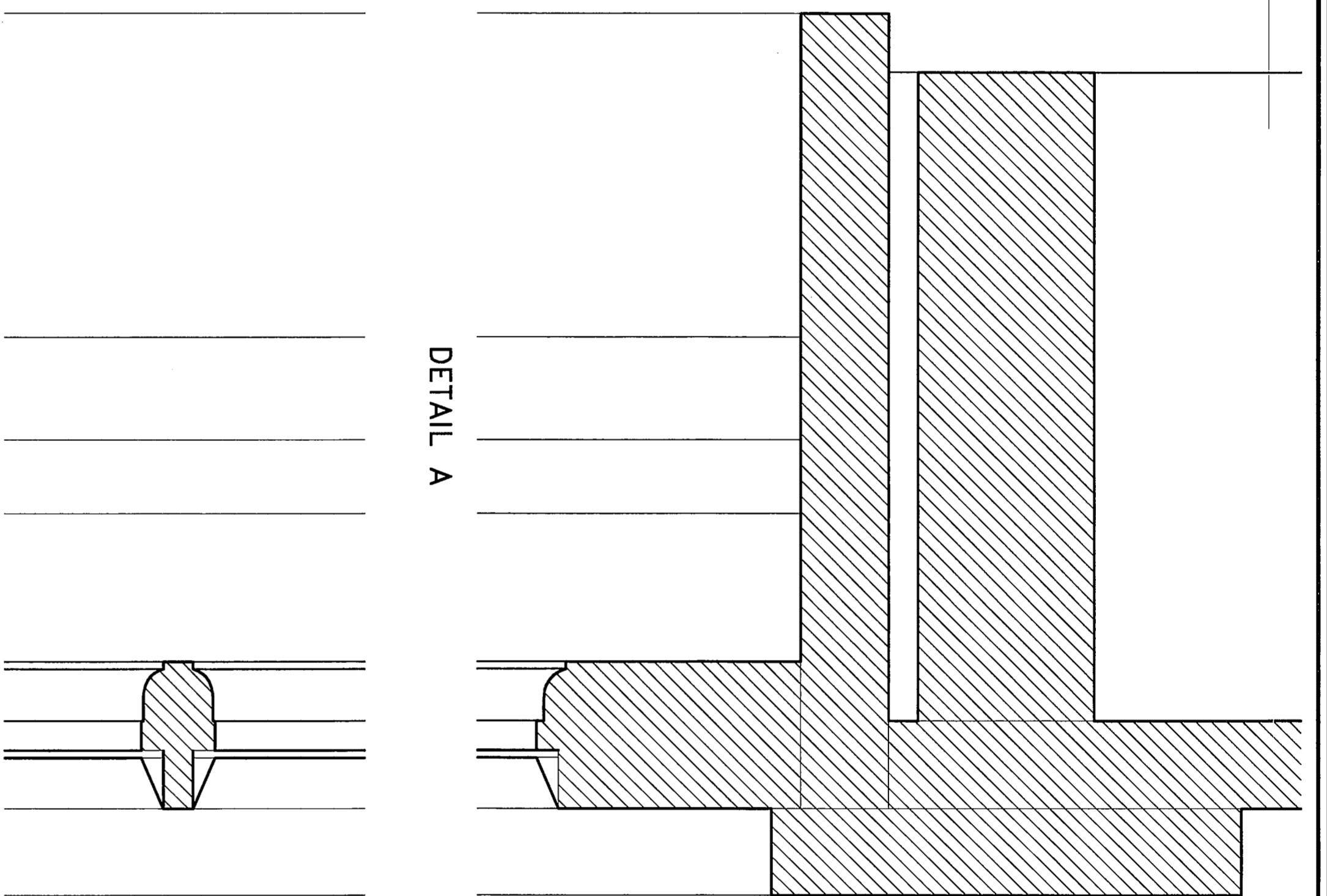
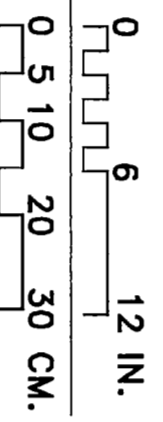


ELEVATION

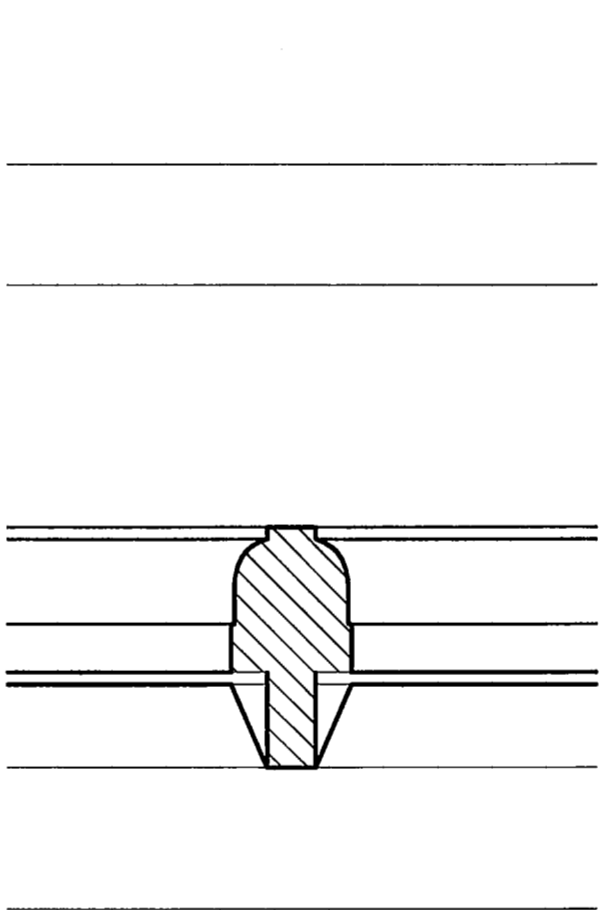


SECTION

TYPICAL WINDOW
SCALE: 1-1/2" = 1'-0"

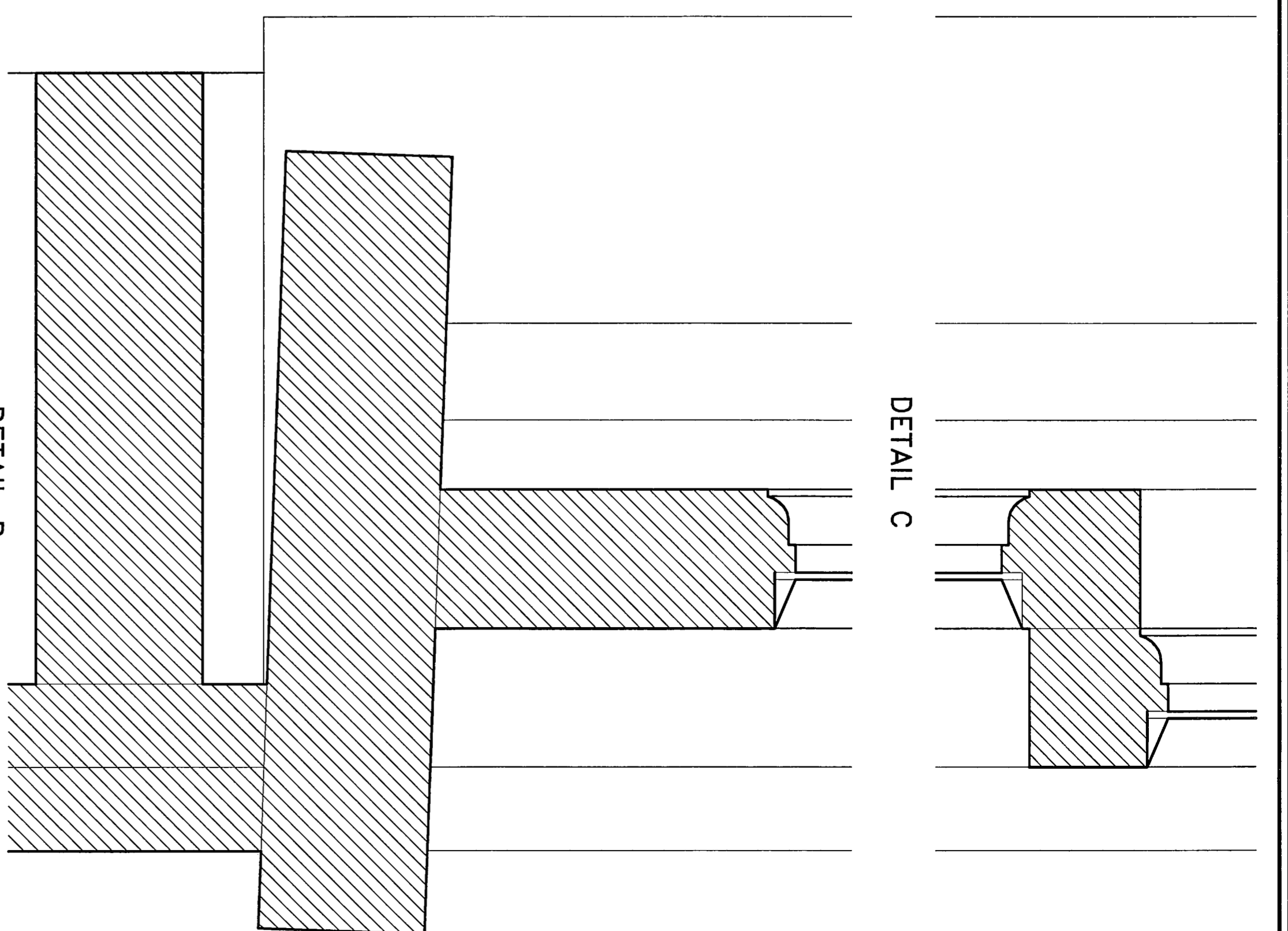


DETAIL A

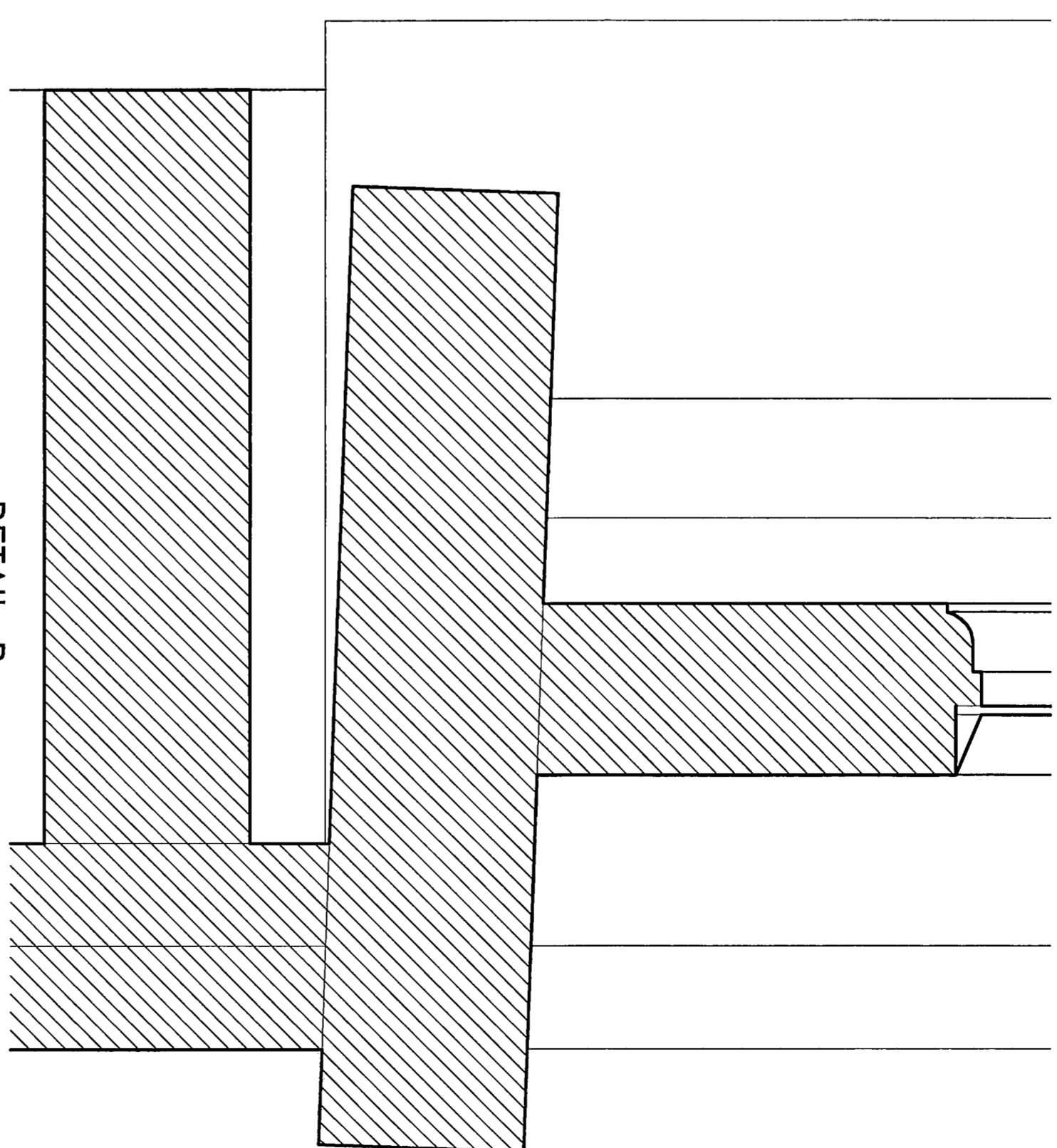


DETAIL B

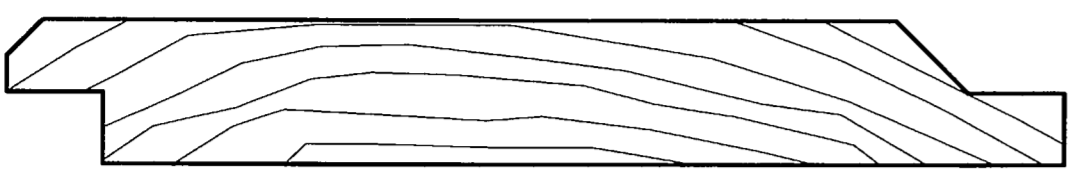
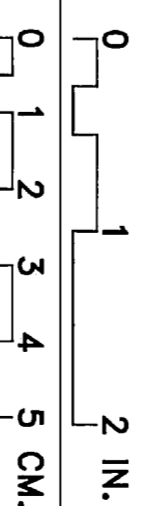
TYPICAL WINDOW-DETAILS
SCALE: FULL SIZE



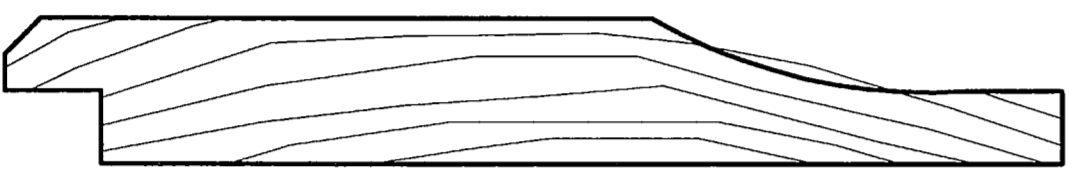
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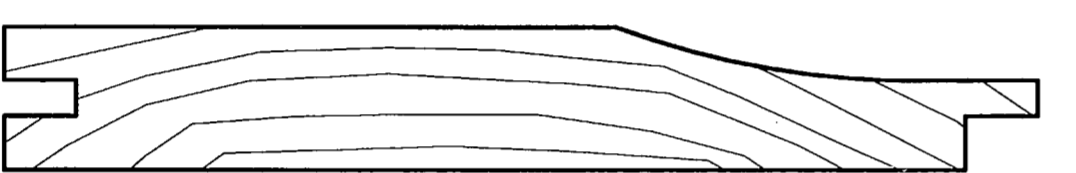
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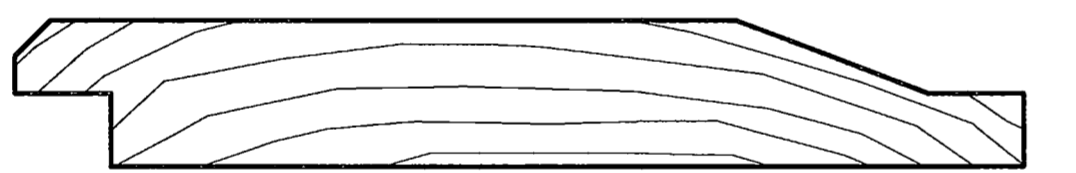
TYPE-A



TYPE-B

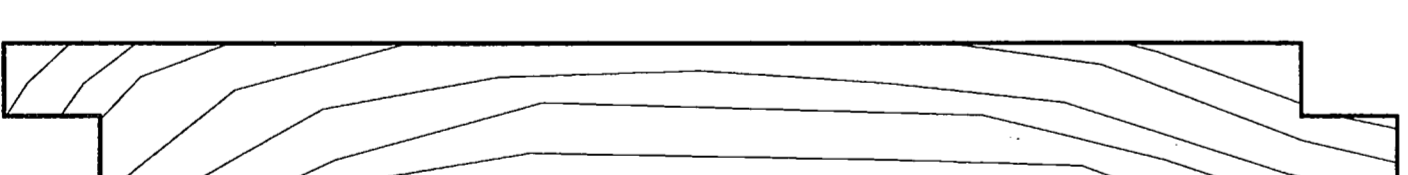
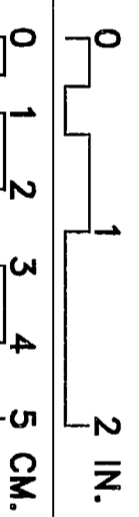


TYPE-C

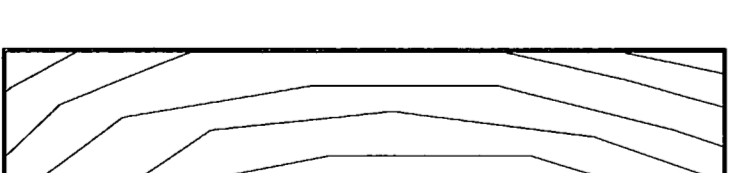


TYPE-D

SIDING TYPES
SCALE: FULL SIZE

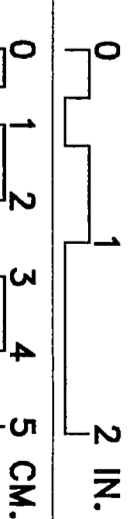


TYPE-A



TYPE-B

SHEATHING TYPES
SCALE: FULL SIZE



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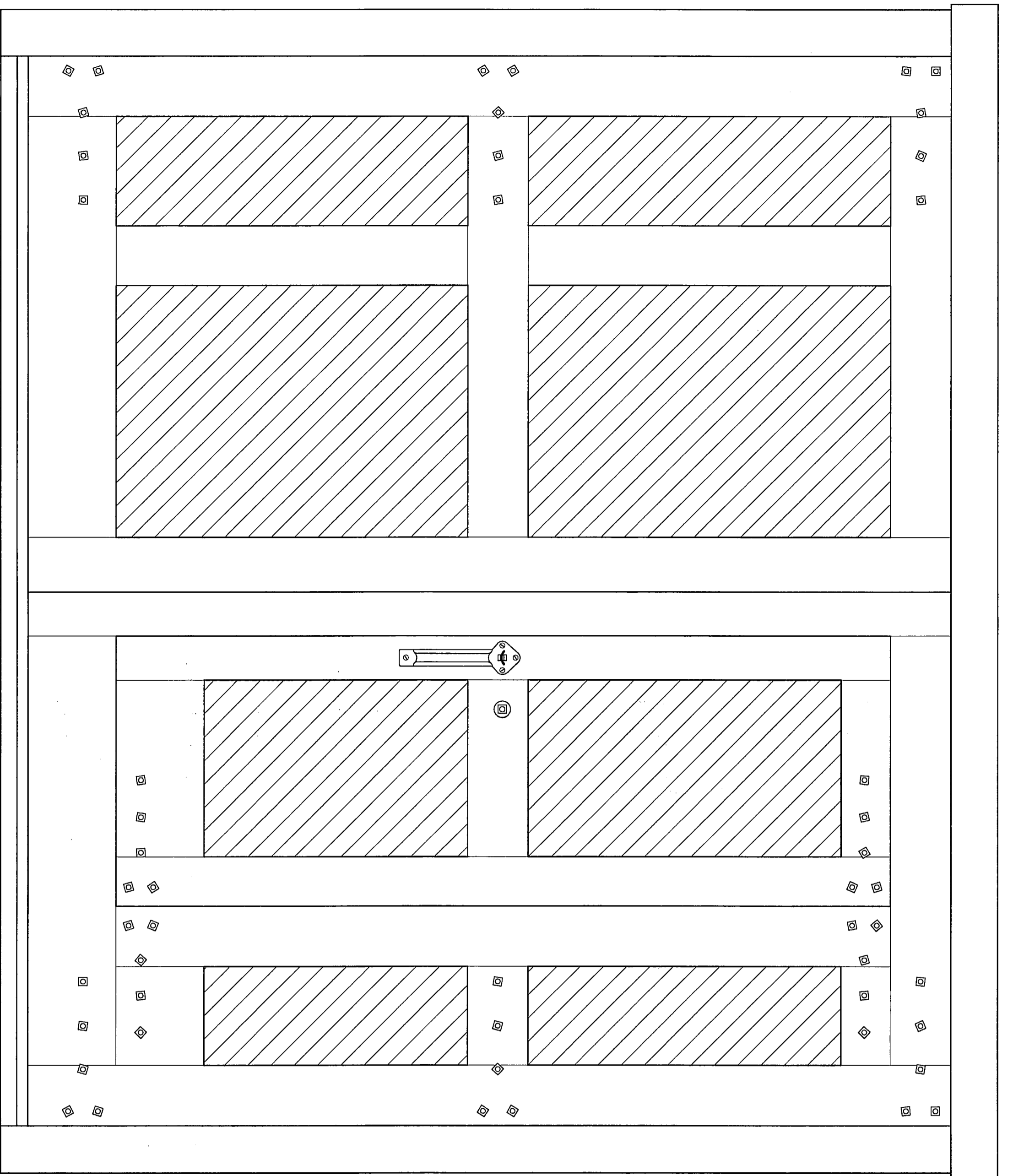
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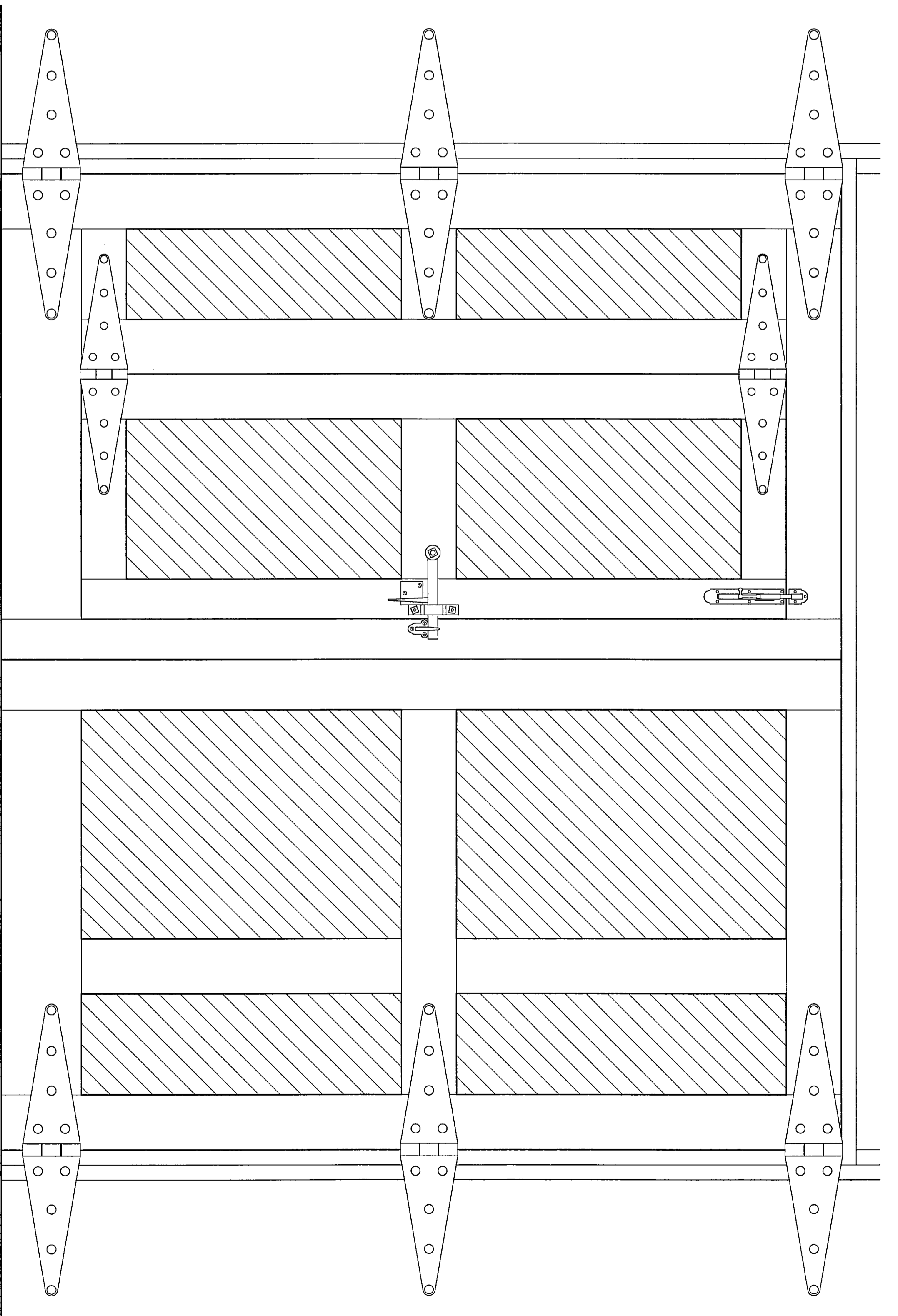
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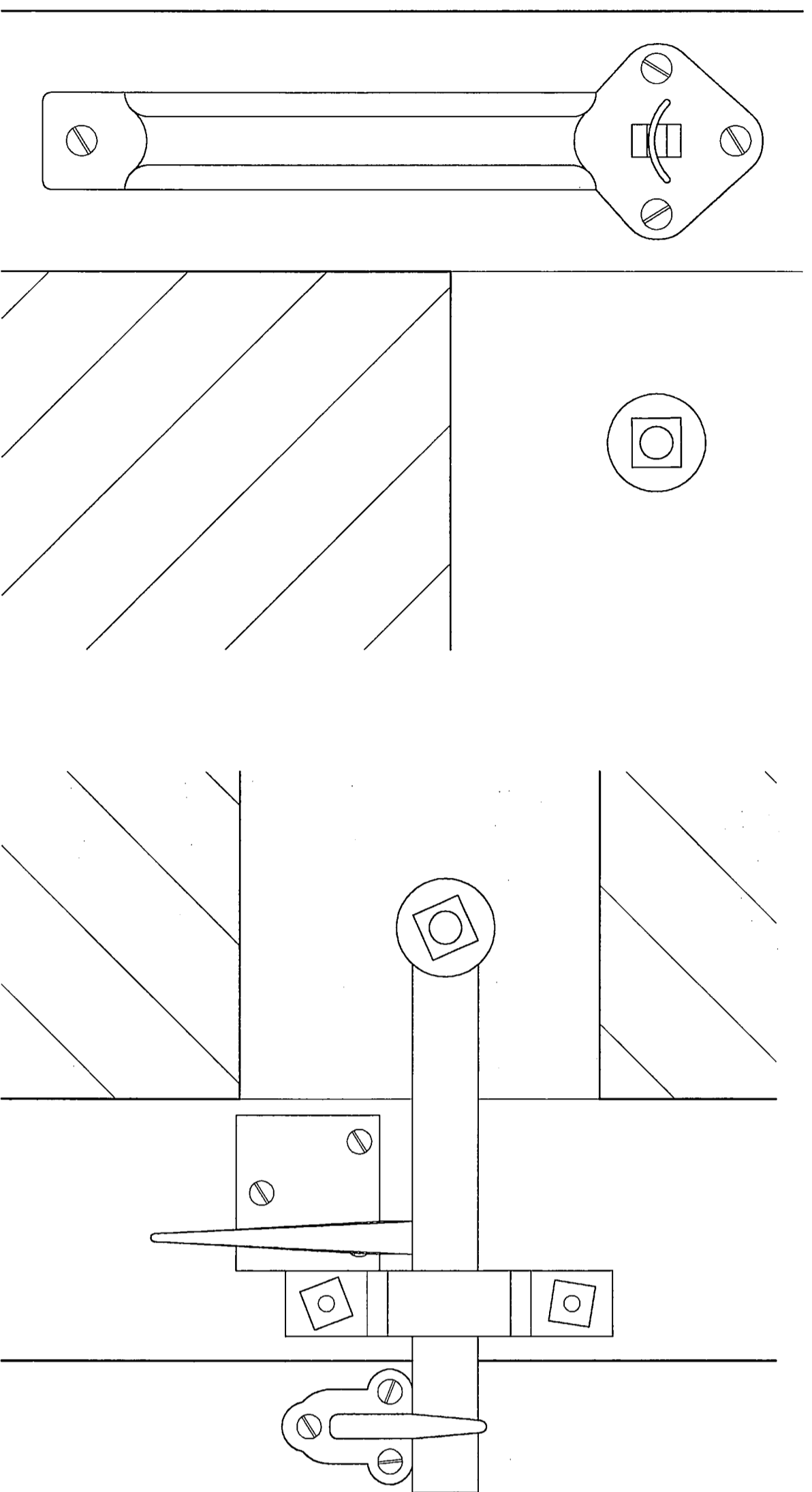
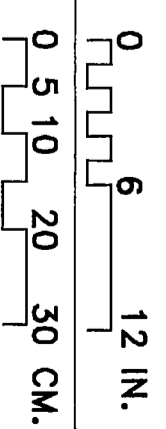
EXTERIOR



INTERIOR

LEVEL ONE-FRONT DOOR

SCALE: 1-1/2" = 1'-0"

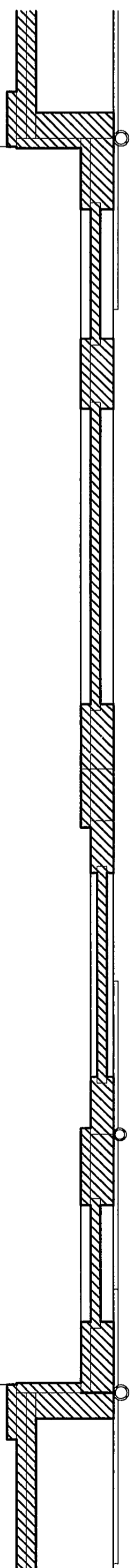
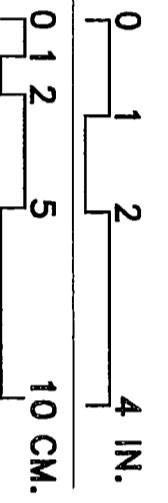


EXTERIOR

INTERIOR

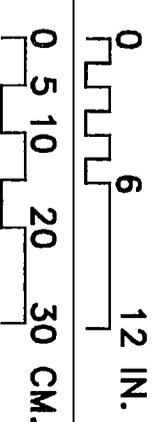
FRONT DOOR-HARDWARE

SCALE: HALF SIZE



LEVEL ONE-FRONT DOOR-PLAN

SCALE: 1-1/2" = 1'-0"



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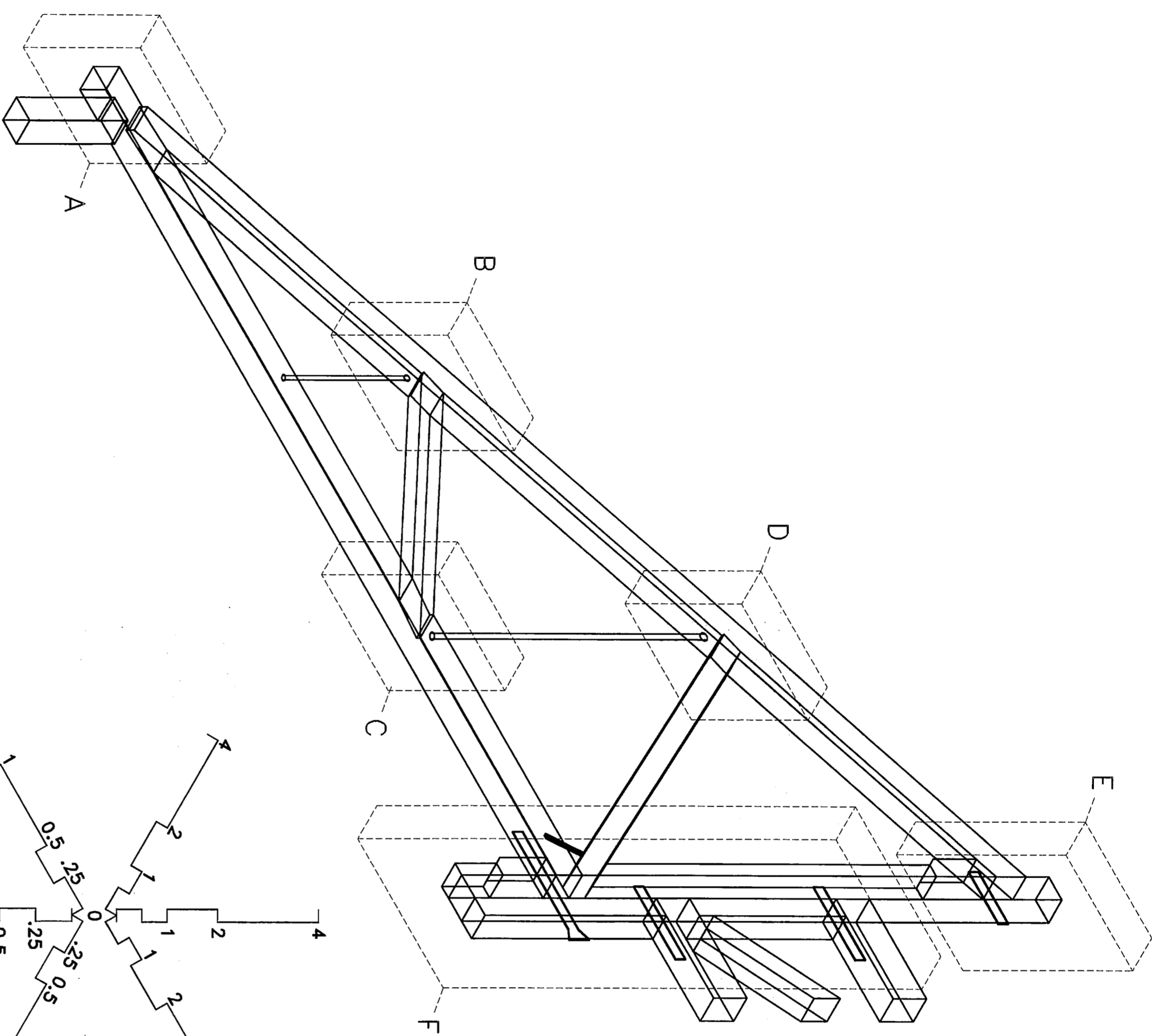
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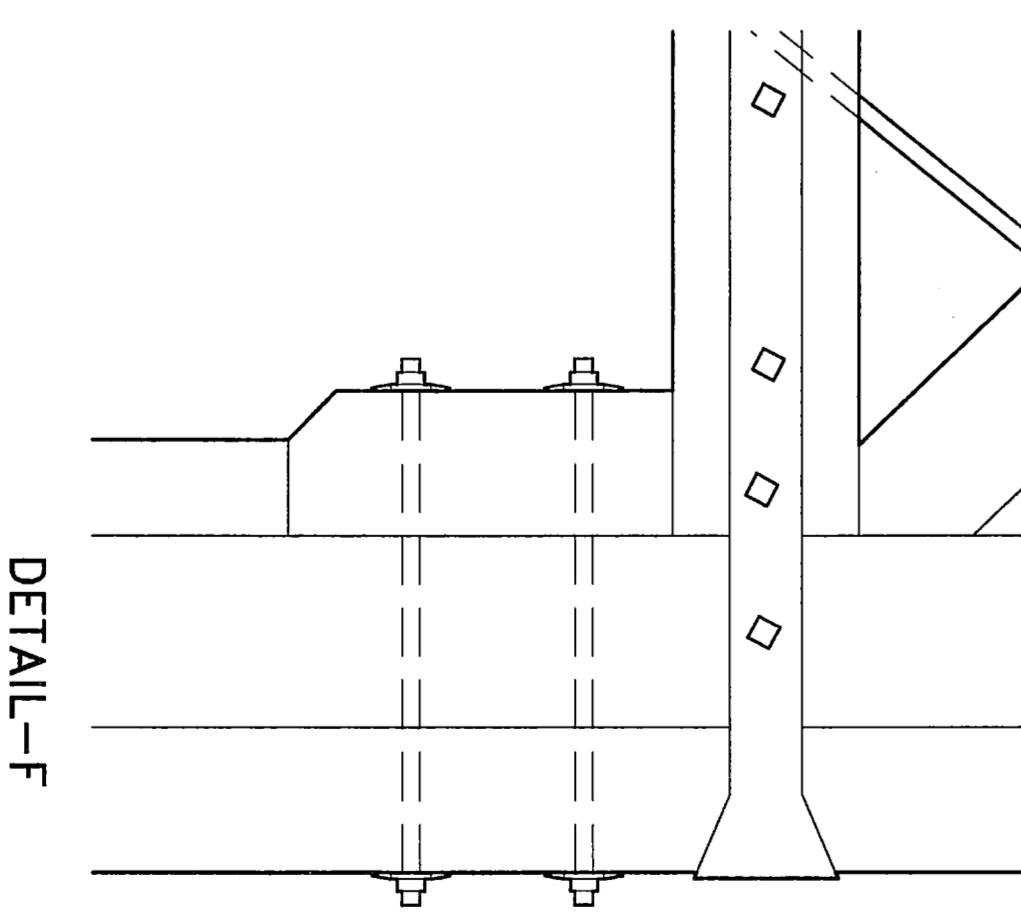
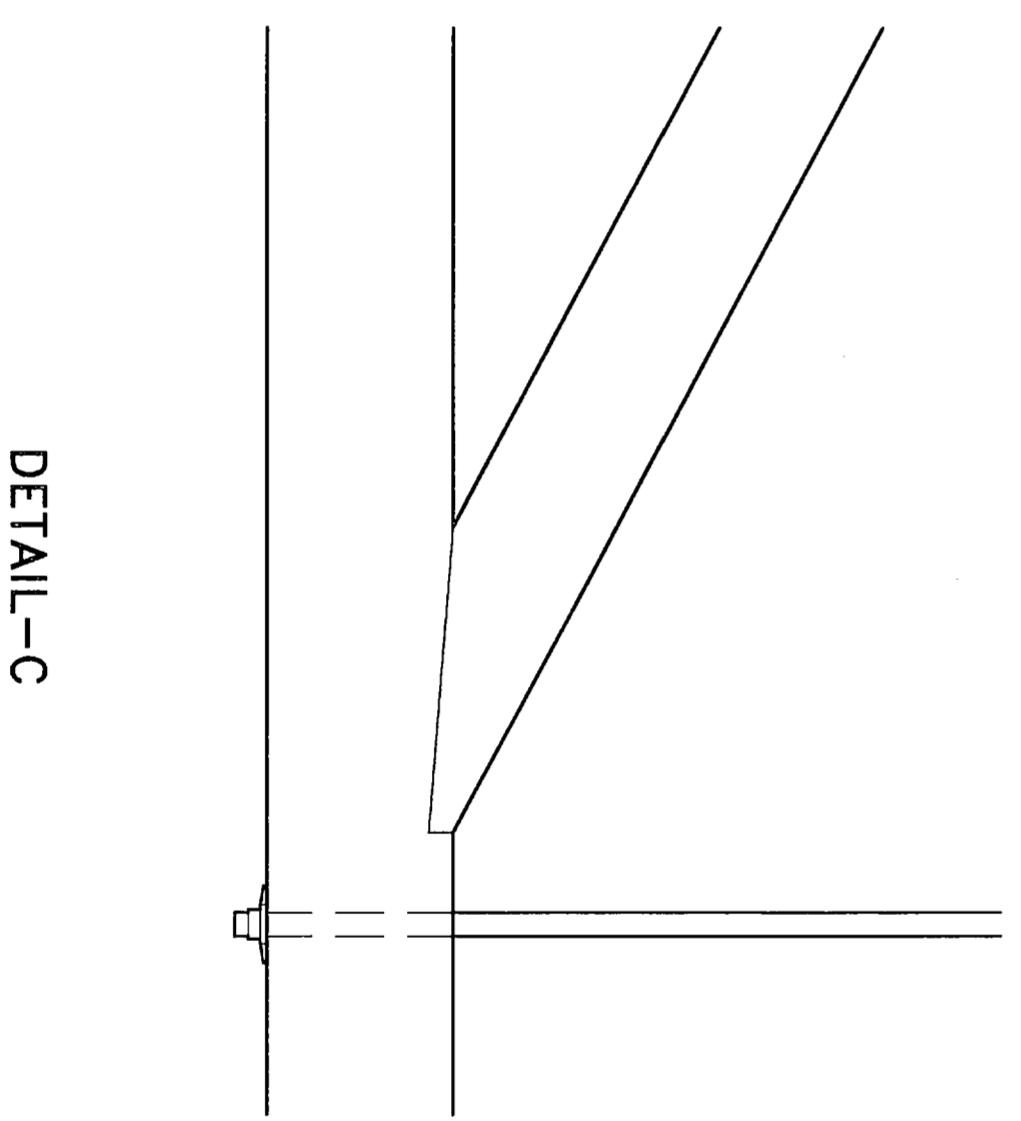
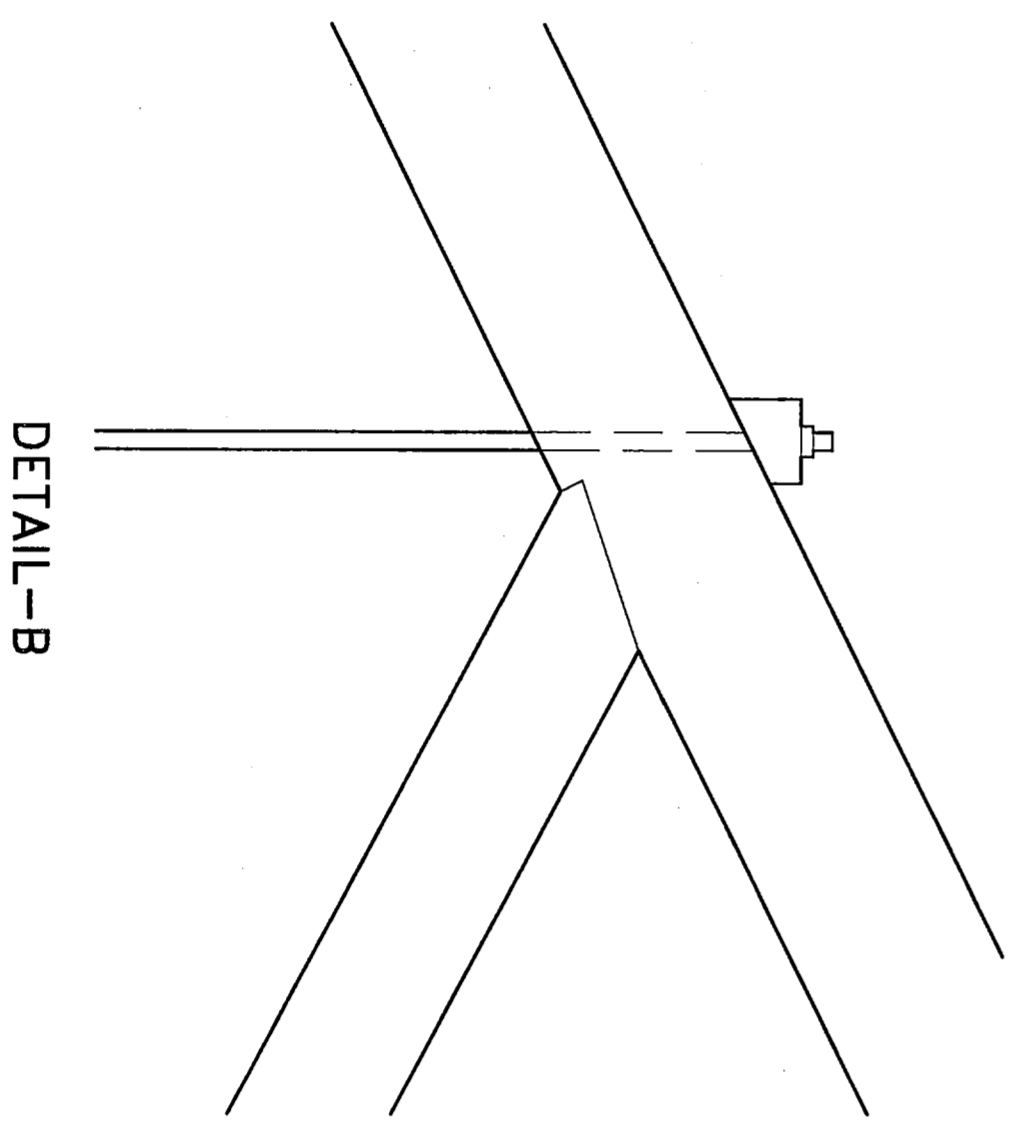
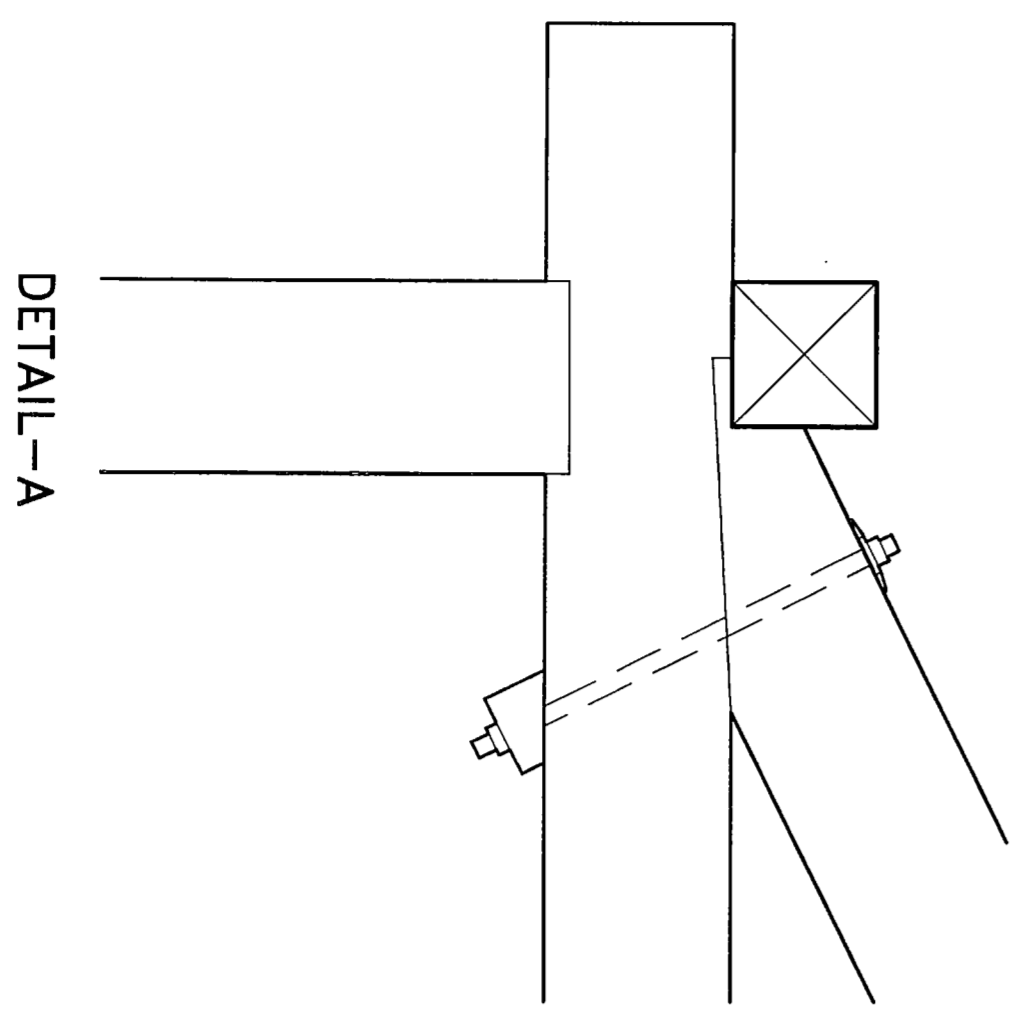
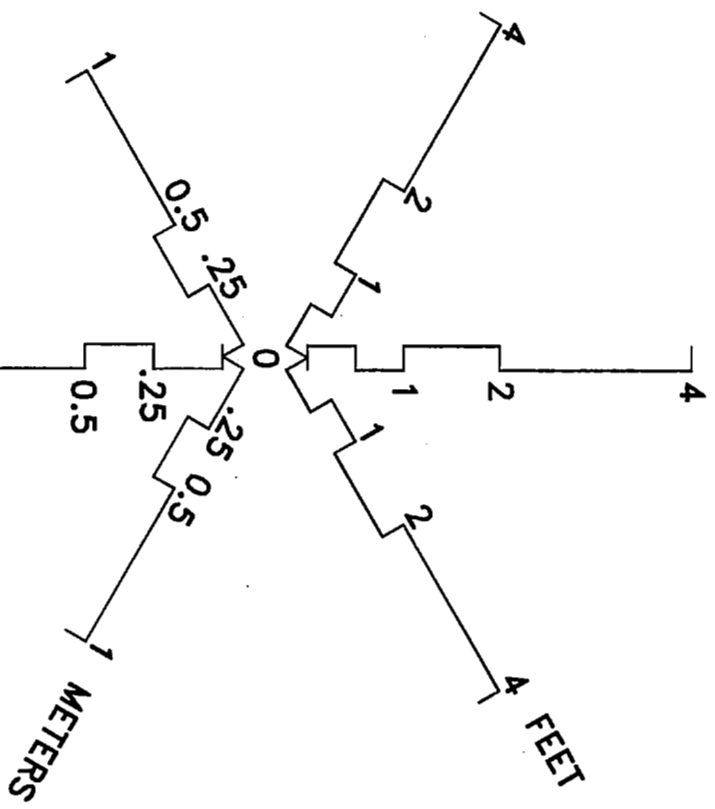
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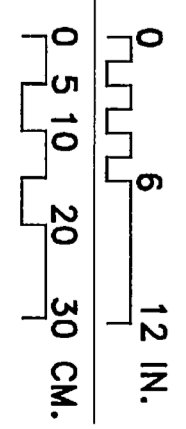
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TYPICAL TRUSS-CONSTRUCTION
SCALE: 1/2"=1'-0"

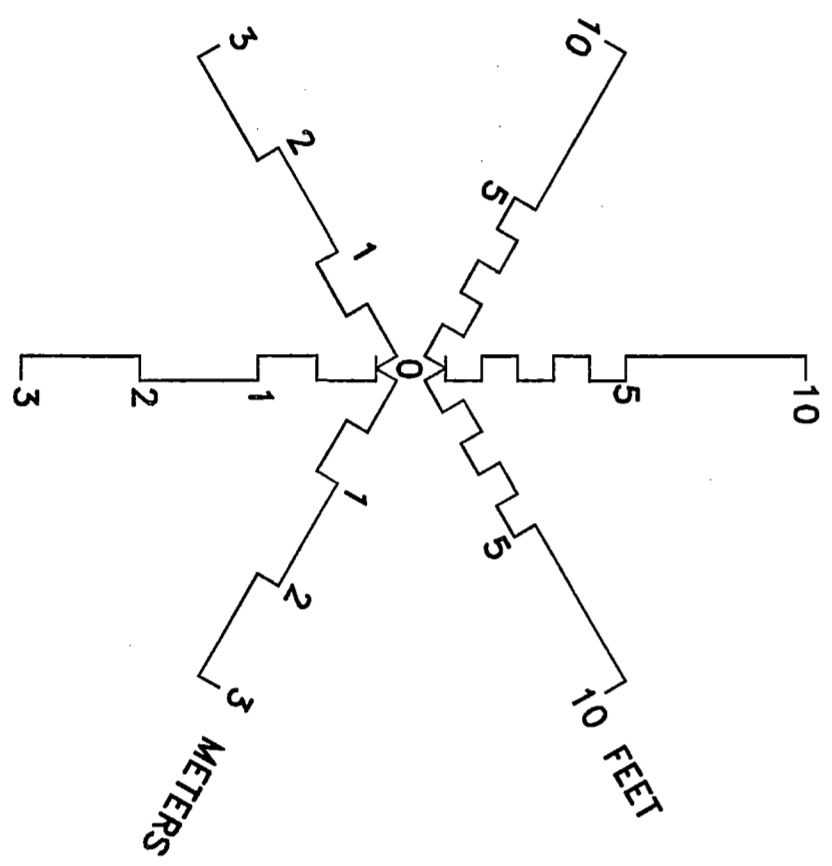
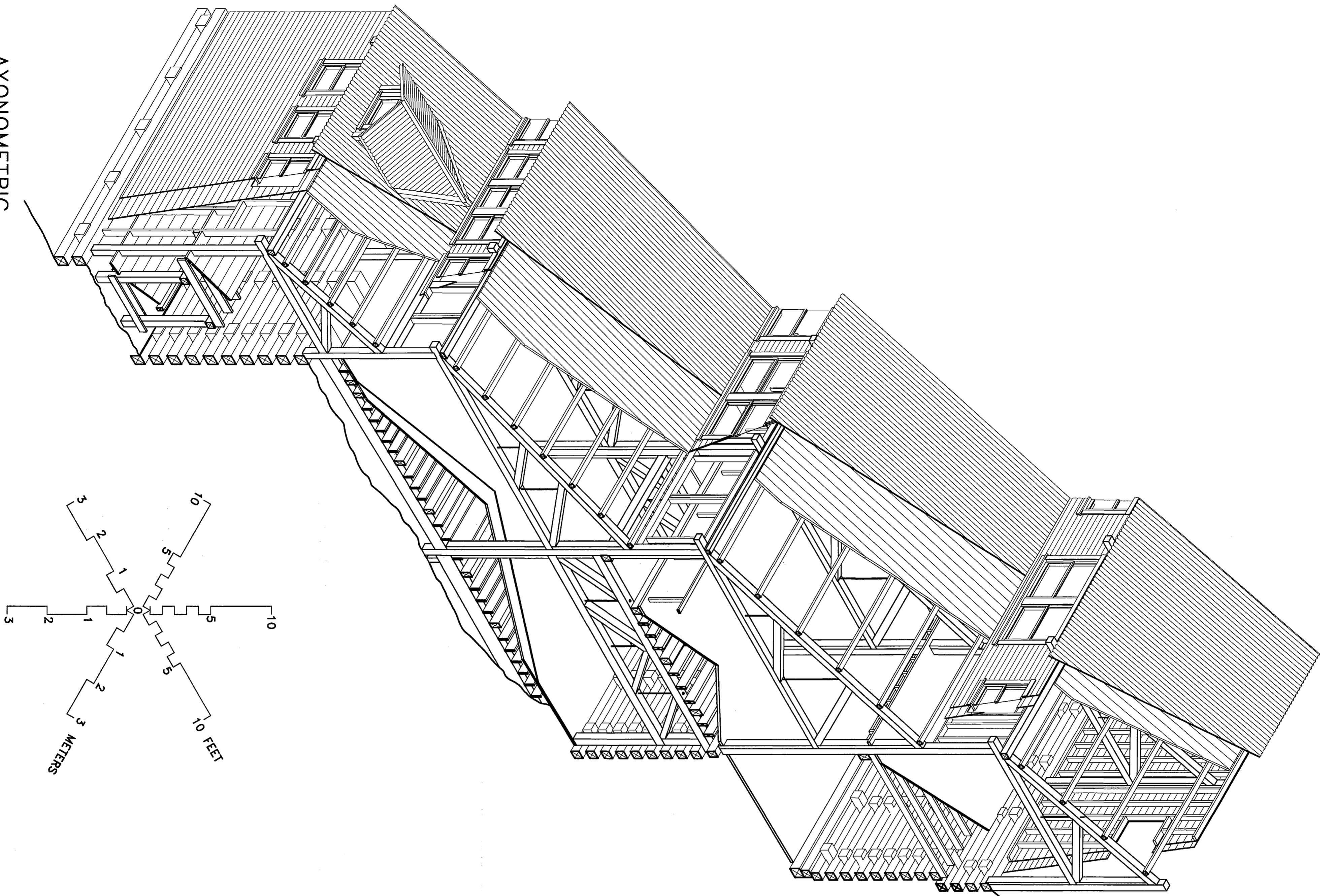


TYPICAL TRUSS-DETAILS
SCALE: 1-1/2" = 1'-0"

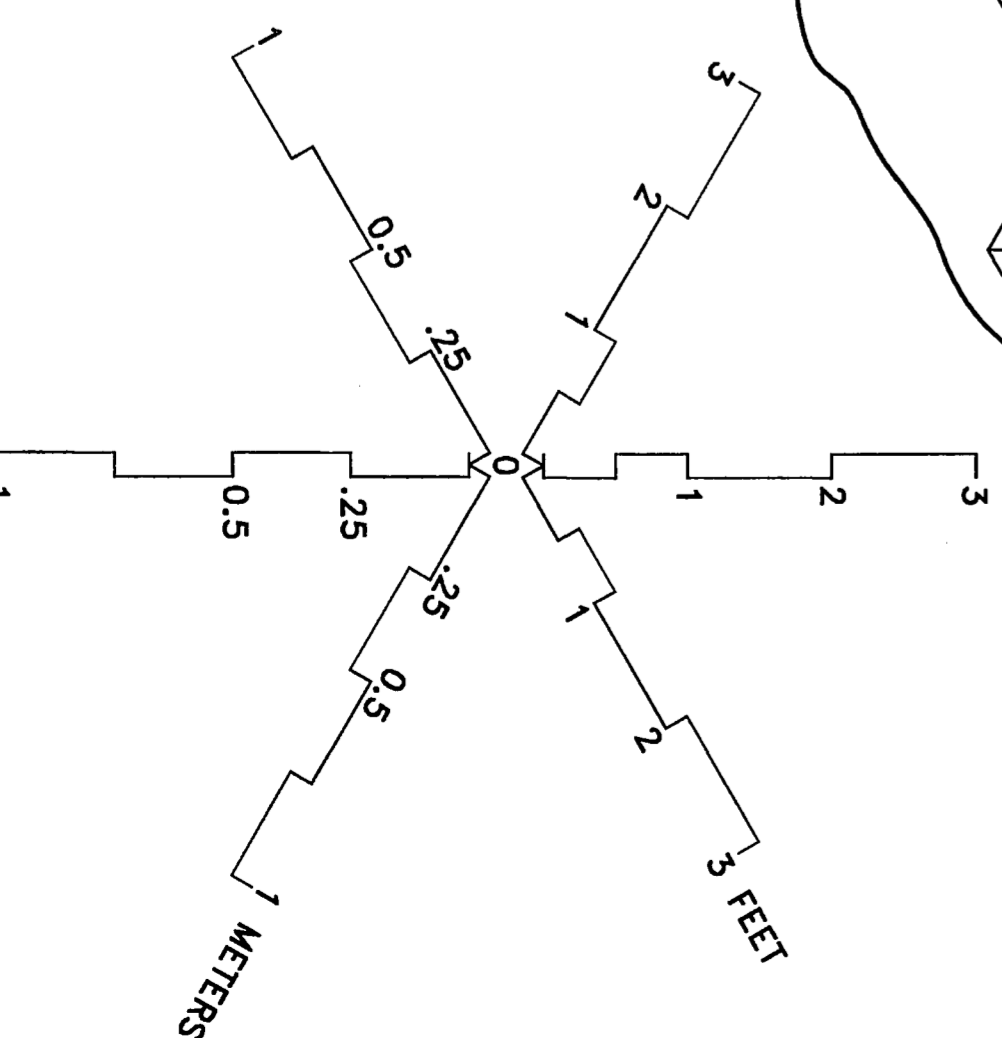
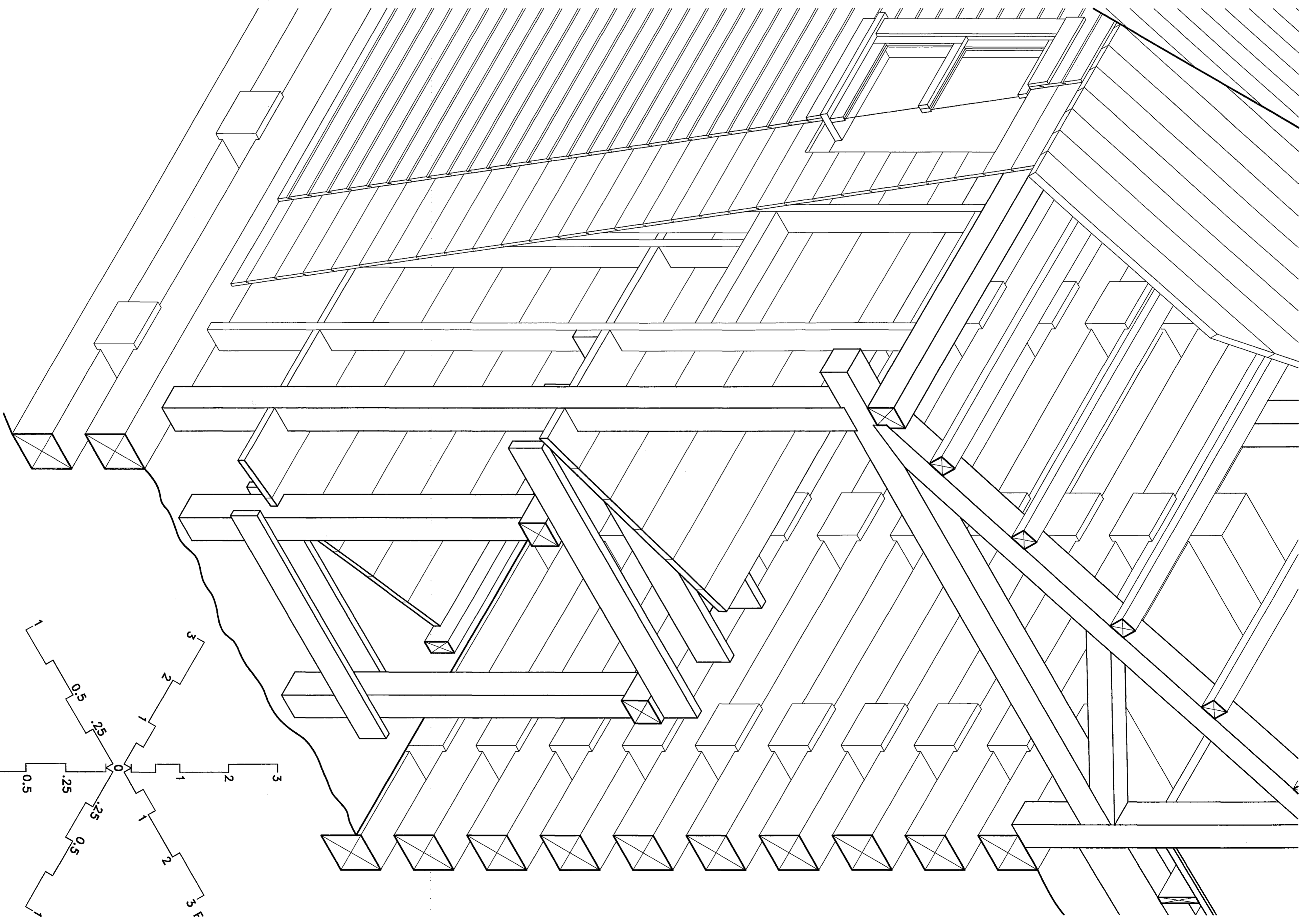


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AXONOMETRIC
SCALE: 3/16"=1'-0"



AXONOMETRIC—DETAIL
SCALE: 3/4"=1'-0"



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