

Campus Context  
Childcare at UBC is a recruitment and retention tool for students, faculty and staff. Currently there are 1500 applicants on the waitlist for childcare. While there are plans to provide 405 new childcare spaces by 2041, the timeline for new spaces depends on the schedule of major capital projects such as Brock Commons Phase Two. To ease the pressure on child care demand UBC will add nearly 100 childcare spaces by August 2019 using prefabricated modular construction. It is anticipated the childcare units will be sold and moved off campus by 2034.

Living Laboratory  
UBC Child Care Services operates just over six hundred licensed spaces in twenty-seven locations on campus and employs more than a hundred and sixty early childhood educators and serves as a model for other programs in the province. Architects, urban planners and licensing officers often view the facilities and make recommendations for similar services in their communities. Staff from other child care programs in the city and throughout the province request visits to their facilities. Early Childhood Education college students are eager to do practicum in their programs. In addition, they receive many visitors from around the world who are researching social programs and Early Childhood in Canada. As UBC Child Care Services is one of the first applicants for the provincial funding, it will leverage its expertise and develop a prototypical modular suitable for deployment on public land throughout the province.

Review Process  
Communities + Architecture Inc have worked closely with Child Care Services on project programming and preliminary design work. The following document accompanies the Development Permit application. The design team has reviewed the project with the campus urban designer, landscape architect, director of planning, and transportation engineer.

Design Policy Compliance  
The design of Acadia Modular Daycare complies with Part 3 of The Vancouver Campus Plan. Within the Forest Edge District Landscape, the three discrete daycare buildings have been sited within this context so as to minimize tree disturbance and embrace the existing forested landscape. Primary cladding materials have also been considered, utilizing grey metal cladding to conceal each mass into the forested landscape. Clear finish softwood highlights provide a warm and friendly character while responding to its natural forested setting. The site has accessible connections to the Public Realm Network. All main entry points for pedestrians and cyclists will be accessible from Acadia Park Lane and provide a connection to the green commons north of the site. Large street facing windows allow for visible interiors while providing views to the surrounding forested landscape. Large canopies projecting over each entrance provide outdoor rain protection.



# ACADIA MODULAR CHILDCARE

## University of British Columbia

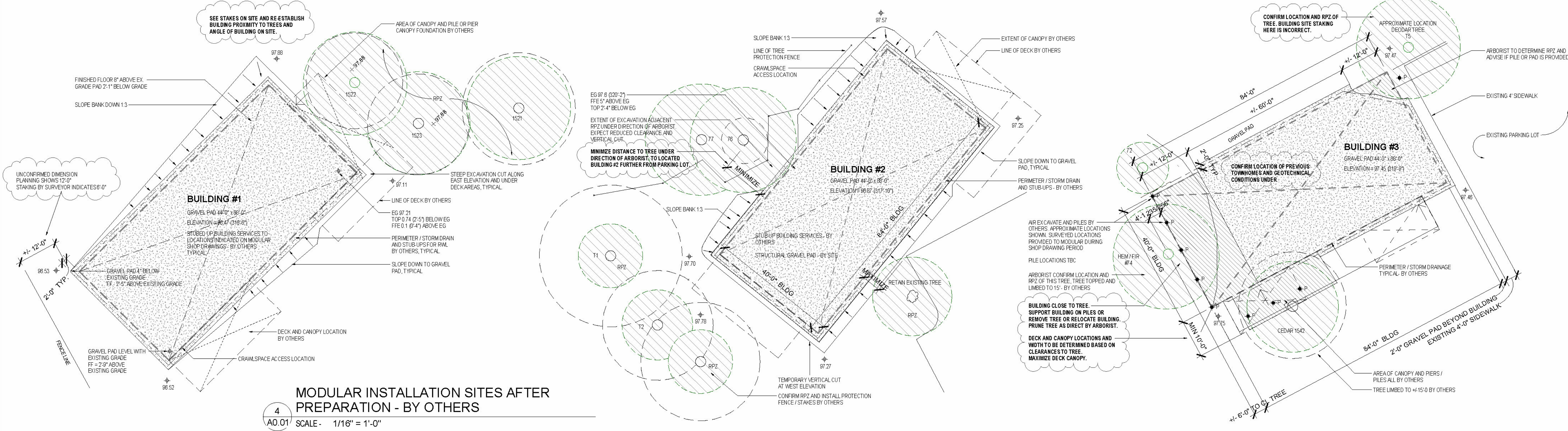
UBC STUDENT HOUSING & HOSPITALITY SERVICES  
UBC CHILDCARE SERVICES  
ACADIA PARK

### ARCHITECTURAL SHEETS

A1.0 SERIES - SITE, DEMO AND COMPLIANCE PLANS	
A0.01	Title Sheet
A0.02	Site Plan
A1.01	Floor plan - bldg 1
A1.02	Floor plan - bldg 2
A1.03	Floor plan - bldg 3
A1.05	Roof plan - bldg 1
A1.06	Roof plan - bldg 2
A1.07	Roof plan - bldg 3
A2.01	Building elevations - bldg 1
A2.02	Building elevations - bldg 2
A2.03	Building elevations - bldg 3
A2.04	Shadow Studies
A2.05	Site Photos

Total Site Area:	57110 sf
Site Coverage:	17.5 %
Gross floor area:	10 000 sf
Building Heights	
Bldg 1:	13'
Bldg 2:	13'
Bldg 3:	13'

LOCATION OF BUILDING FOOTPRINT WILL BE STAKED AND ROOT PROTECTION ZONES WILL BE FENCED BY OTHERS FOR TENDER SITE REVIEW



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Acadia Modular  
Childcare

PROJECT CODE	STATUS
1828	DP
	DATE
	190102

Title Sheet

SHEET

A0.01



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Site Plan

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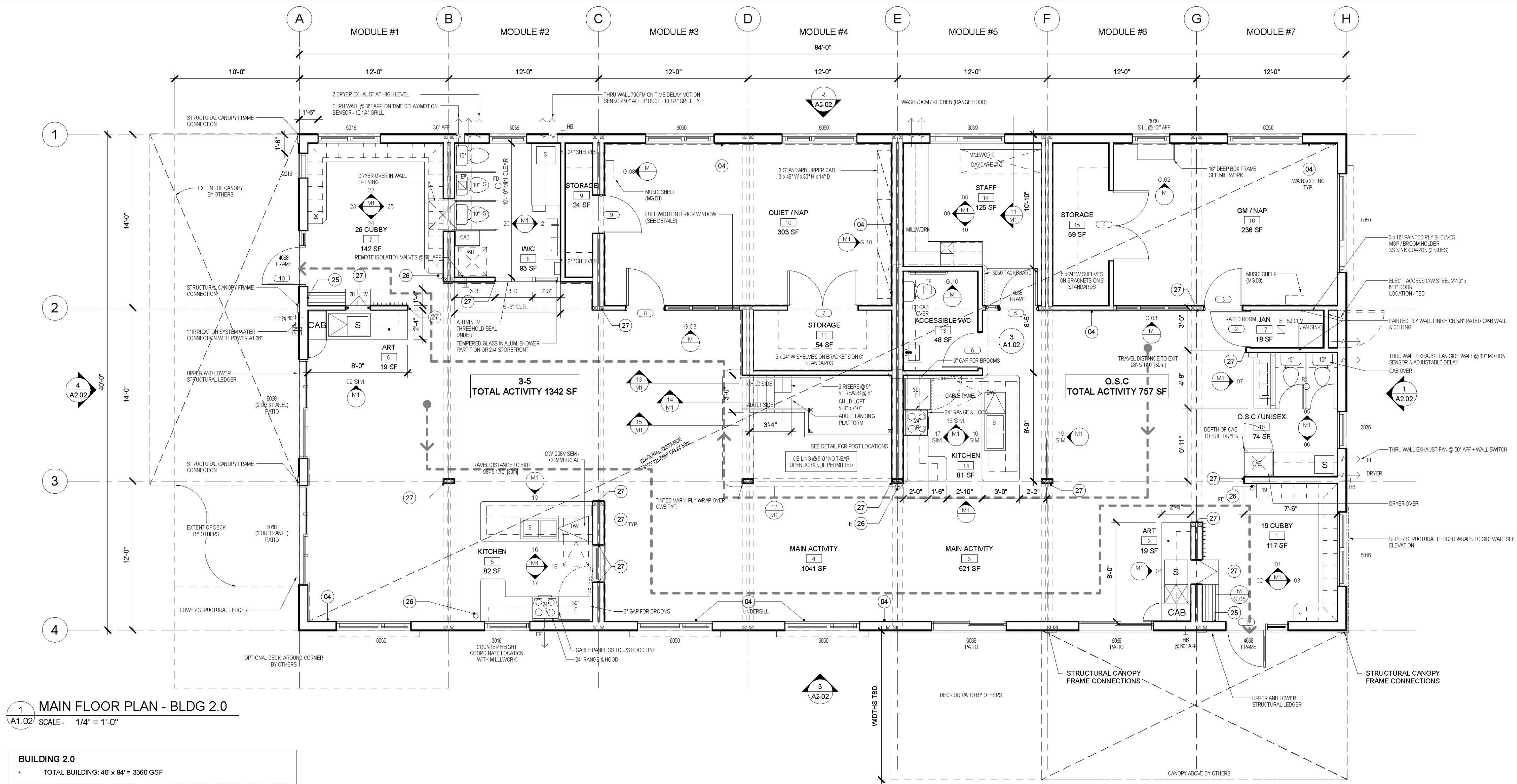
KEYNOTE	DESCRIPTION
01	TOP OF GRAVEL PAD (TOP) = EXISTING GRADE (EO) EXCAVATE TO BEARING
02	TOP BELOW EO EXCAVATE TO BEARING
03	REPAIR BELOW EO EXCAVATE TO BEARING: SET STRUCTURE ON HELICAL PILES INSTALLED BETWEEN TREE ROOTS - AIR EXCAVATE UNDER ARIORIST SUPERVISION
04	DECK BOARDS ON SLEEPER ON GRAVEL/ROCK
05	DECK BOARDS ON JOISTS ON BEAM ON FOUNDATION (PILE, PIER OR FOOTING)
06	CANOPY POSTS: EXTENDED SCREW PILES, WOOD OR STEEL COLUMN, ON SLEEPER OR CONCRETE PIER / FOOTING
07	STACK 68 RETAINING WALL MAY SUPPORT DECK AS NOTED
08	CREATED 1:3 SLOPE DOWN/UP
09	BOULDER RETAINING EDGE
10	PERIMETER / STORM DRAINS AS REQUIRED, TYPICAL
11	PROTECTED ROOT ZONE (PRZ) SEE ARBORIST REPORT







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1 MAIN FLOOR PLAN - BLDG 2.0

A1.02 SCALE - 1/4" = 1'-0"

#### BUILDING 2.0

TOTAL BUILDING: 40' x 84' = 3360 GSF

3-5 TOTAL ACTIVITY AREA = 1342 SF

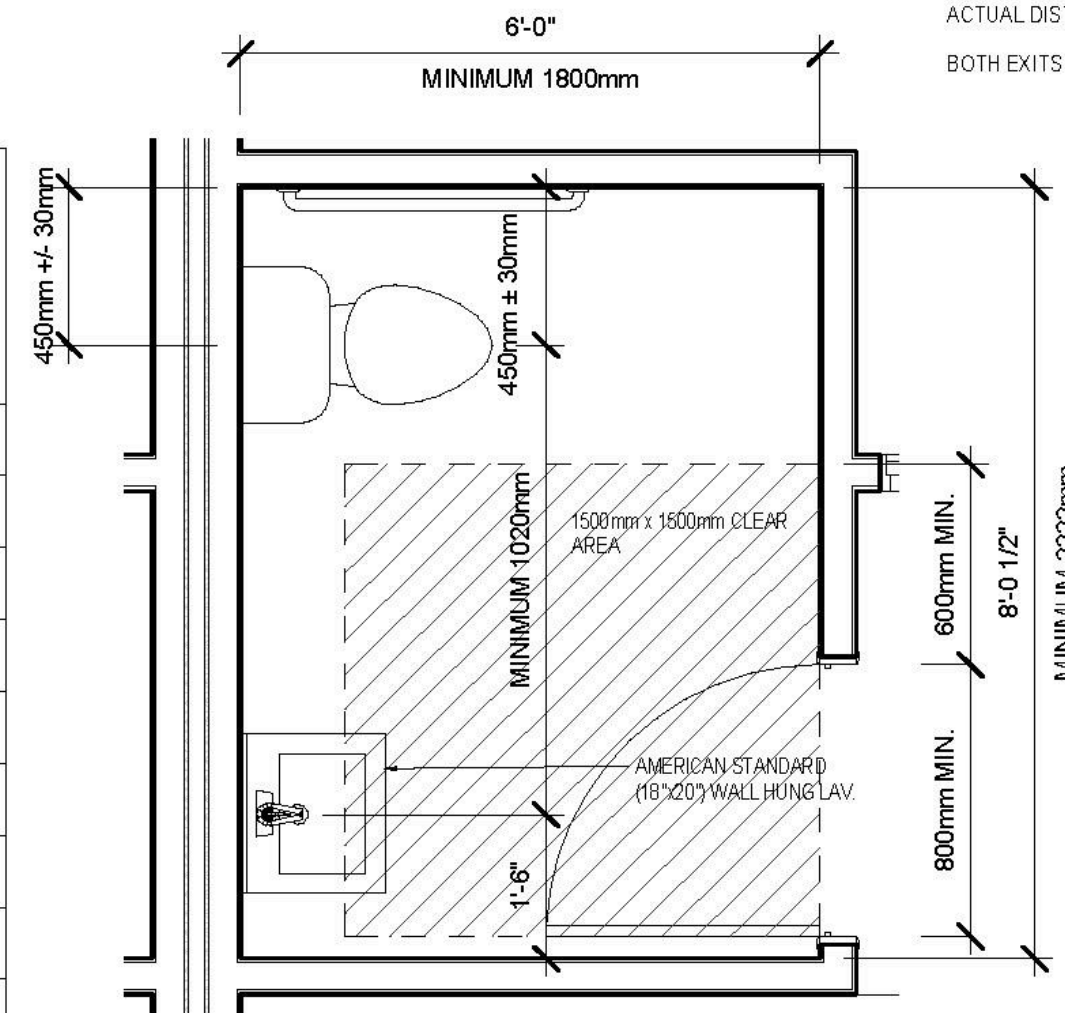
O.S.C TOTAL ACTIVITY AREA = 757 SF

3-5  
24 C @ 55.9 SF/C  
25 C @ 53.7 SF/C  
16 C @ 83.8 SF/C

O.S.C  
15 C @ 50.5 SF/C  
12 C @ 63.0 SF/C  
16 C @ 47.3 SF/C

#### DOOR SCHEDULE - BUILDING 1 / 2

	DOOR TYPE	DOOR SIZE	MINIMUM THICKNESS	FINISH	FRAME TYPE	FRAME FINISH	MATERIAL	RESIDENTIAL LEVER	NO. UNITS	STOP	ICCA PLATE	COMMENTS
1	C	3068	HMD	INSUL	PMT	F2	PMT	YES	3	W		NO CLOSER, NO PANIC (SEE NOTE 2)
2	A	3068	HMD	20mm	PMT	F1	PMT	STOR	3	YES		20 MIN. RATED, CLOSER
3	B	3068	WOOD	RES	CLR	F3	CLR	PAS	2-3	W		
4	B	5068	HOLLOW	RES	PMT	F3	PMT	STOR	2-4			DROP BOLT TO INACTIVE
5	B	3068	WOOD	RES	CLR	F4	CLR	OFF	2	W		
6	A	3068	SC	13/8"	PMT	F3	PMT	PRIV	2-3	W		
7	A	5068	HOLLOW	RES	PMT	F3	PMT	STOR	2-4			DROP BOLT TO INACTIVE
8	B	3068	WOOD	RES	CLR	F3	CLR	PAS	2-3	W		
9	A	3068	HOLLOW	RES	PMT	F3	PMT	STOR	2-3	W		DROP CANE BOLT TO INACTIVE
10	C	3068	HMD	INSUL	PMT	F2	PMT	YES	3	W		NO CLOSER, NO PANIC (SEE NOTE 2)



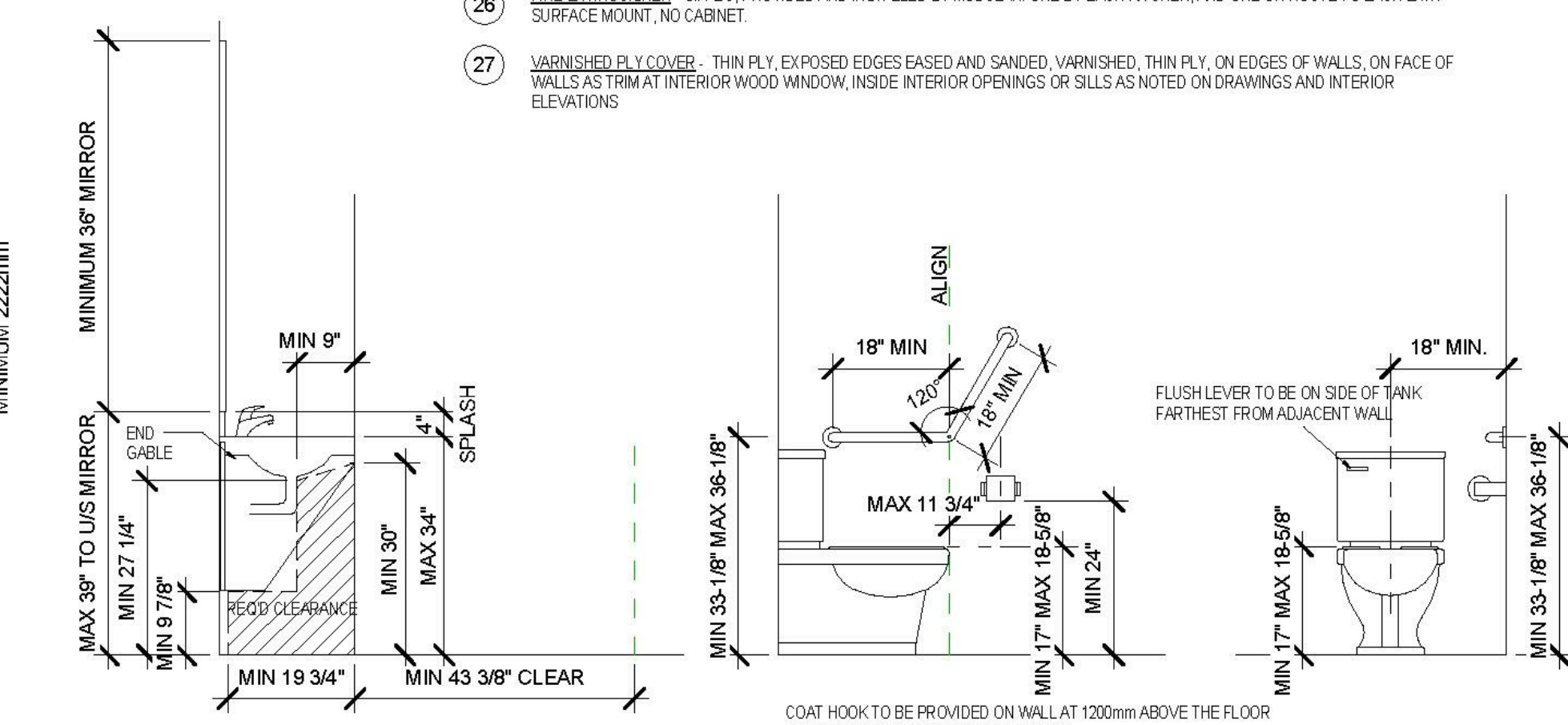
3 ACCESSIBLE WASHROOM

A1.02 SCALE - 1/2" = 1'-0"

**CODE CALCULATIONS**  
DIAGONAL DISTANCE 91'-2 1/2" (27.80m)  
HALF DIAGONAL DISTANCE 45'-6 1/4" (13.90m)  
ACTUAL DISTANCE BETWEEN EXITS 86'-11 10/16" (26.503m)  
BOTH EXITS COMPLIANT WITH 30m TRAVEL DISTANCE REQ'D

#### KEYNOTES

- WALL WAINSCOT - MIN. 36" HIGH WAINSCOT OPTIONS. VARNISHED BIRCH DOOR SKIN, VERT GRADE PLAM ON MDF, 1/2" BIRCH VENEER FLY, TOP EDGE TRIM VARNISH HARDWOOD, ALUM. AT WASHROOMS USE VERT GRADE PLAM ON THIN PLY OR MDF BACKER BOARD.
- EMERGENCY PLAN HOLDER, PROVIDED BY OWNER. MOUNT BY MODULAR.
- FIRE EXTINGUISHER - 5# ABC, PROVIDED AND INSTALLED BY MODULAR. ONE BY EACH KITCHEN AND ONE ON ROUTE TO EACH EXIT. SURFACE MOUNT, NO CABINET.
- VARNISHED PLY COVER - THIN PLY, EXPOSED EDGES EASED AND SANDED, VARNISHED, THIN PLY, ON EDGES OF WALLS, ON FACE OF WALLS AS TRIM AT INTERIOR WOOD WINDOW, INSIDE INTERIOR OPENINGS OR SILLS AS NOTED ON DRAWINGS AND INTERIOR ELEVATIONS.



2 WASHROOM ELEVATIONS

A1.02 SCALE - 1/2" = 1'-0"

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Acadia Modular  
Childcare

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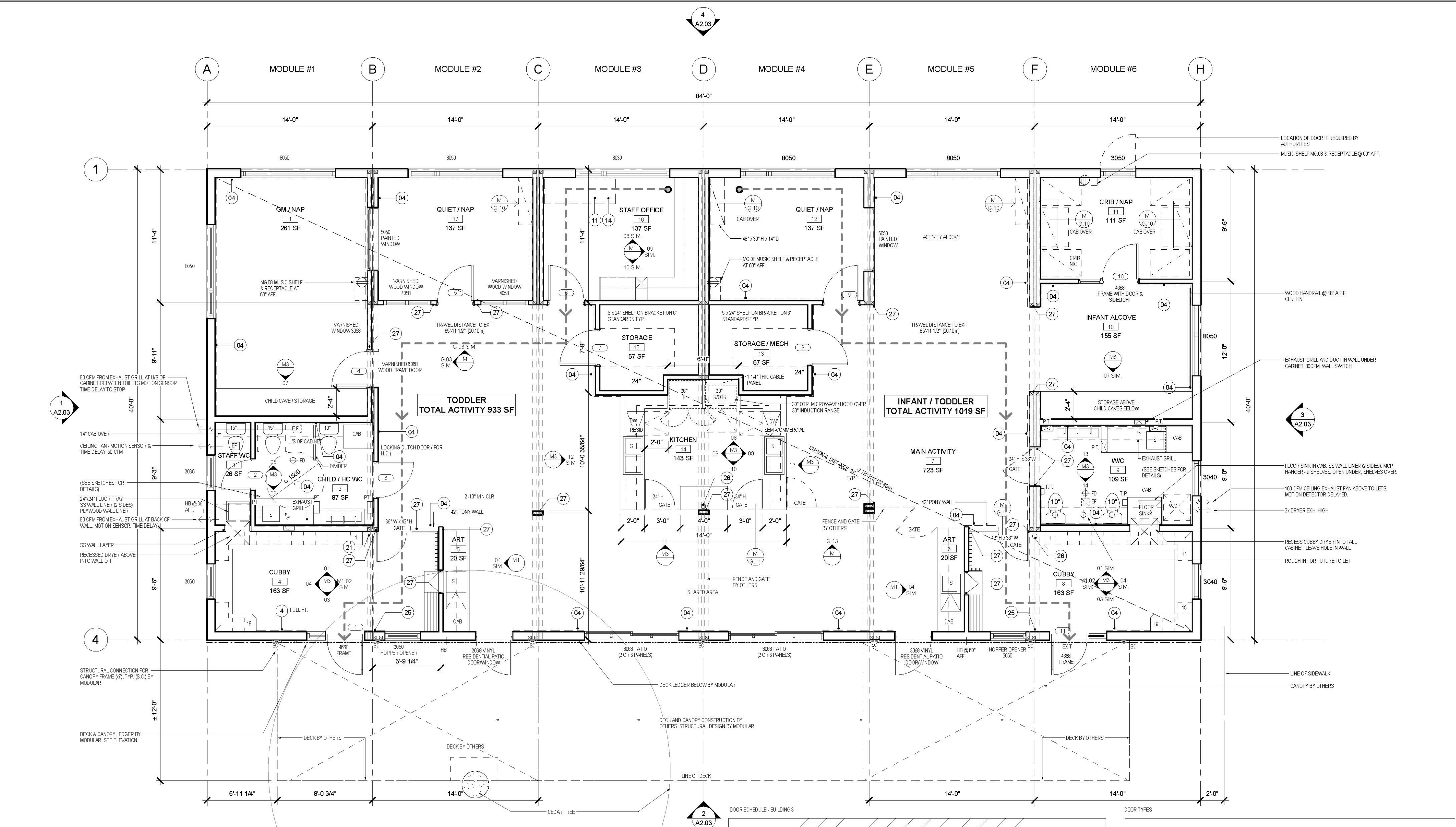
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Floor plan - bldg 2

SHEET REVISION

A1.02





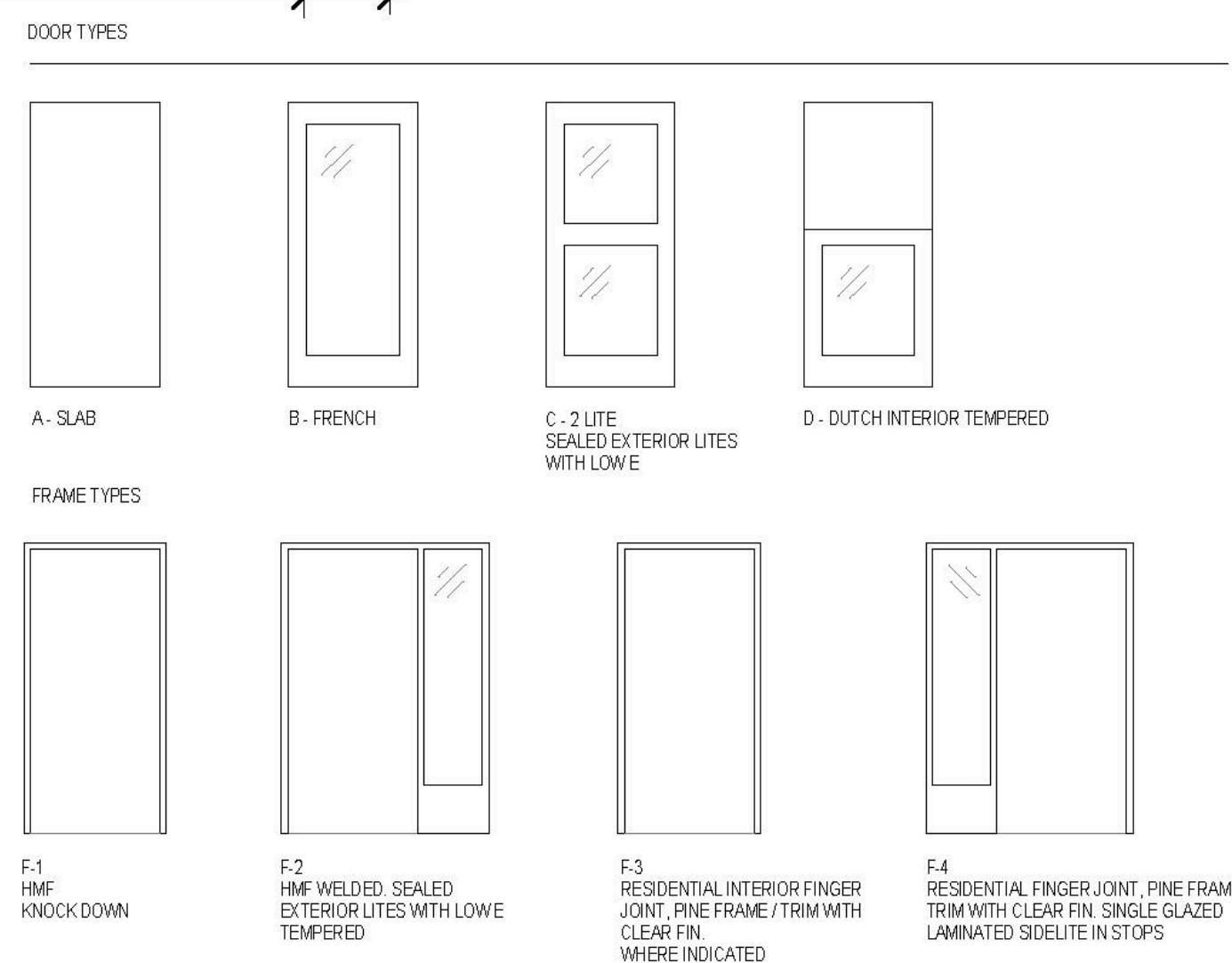
1 MAIN FLOOR PLAN - BLDG 3.0  
A1.03 SCALE - 1/4" = 1'-0"

TRAVEL DISTANCE CALCULATIONS  
DIAGONAL DISTANCE: 91'-2 1/2" (27.80m)  
HALF DIAGONAL DISTANCE: 45'-6 1/4" (13.90m)  
ACTUAL DISTANCE BETWEEN EXITS: 70'-10 1/4" (21.60m)  
BOTH EXITS COMPLIANT WITH 30m TRAVEL DISTANCE REQ'D

BUILDING 3.0			
• TOTAL BUILDING: 40' x 84' = 3280 GSF			
• A.1 - TODDLER / MIXED / 3-5			
• A.2 - INFANT / TWEEENIE / TODDLER			
TOTAL 24 - 32 CHILDS DEPENDING ON AGE			
TODDLER TOTAL ACTIVITY AREA = 1035 SF			
TODDLER 3-5	12 C @ 86 SF/C	INFANT/TODDLER MIXED/3-5	
	16 C @ 64 SF/C	12 C @ 90 SF/C EXCL. CRIB ROOM	16 C @ 67 SF/C = 1074 SF INCL. CRIB ROOM
	4 C @ 43 SF/C		

- MILLWORK & INTERIOR KEYNOTES**
- 04 WALL WAINSCOT - MIN. 36" HIGH WAINSCOT OPTIONS: VARNISHED BIRCH DOOR SKIN, VERT. GRADE PLAM ON MDF, 1/2" BIRCH VENEER PLY TOP EDGE TRIM VARNISH HARDWOOD, ALUM. AT WASHROOMS USE VERT. GRADE PLAM ON THIN PLY OR MDF BACKER BOARD.
- 25 EMERGENCY PLAN HOLDER, PROVIDED BY OWNER, MOUNT BY MODULAR.
- 26 FIRE EXTINGUISHER - 5# ABC, PROVIDED AND INSTALLED BY MODULAR, ONE BY EACH KITCHEN, AND ONE ON ROUTE TO EACH EXIT. SURFACE MOUNT, NO CABINET.
- 27 VARNISHED PLY COVER - THIN PLY, EXPOSED EDGES EASED AND SANDED, VARNISHED, THIN PLY, ON EDGES OF WALLS, ON FACE OF WALLS AS TRIM AT INTERIOR WOOD WINDOW, INSIDE INTERIOR OPENINGS OR SILLS AS NOTED ON DRAWINGS AND INTERIOR ELEVATIONS.
- SEE SPEC. BOOK FOR OTHER MILLWORK KEYNOTES
- MILLWORK BLDG 3.0
- DOOR SCHEDULE NOTES**
- 1) LINERS AT DOORS WITH CLEAR FINISH MAY BE WOOD OR G12 OR 3/8" PLY.
- 2) EXTERIOR ENTRY DOORS - SS HARDWARE, BRUSHED FINISH, WEATHER STRIP, DOOR BOTTOM 2 PART WIDE HANDICAP SILL TO LAP ONTO DECK, SUPPLY OUTER HALF TO INSTALL BY SITE CONTRACTOR. EXTERIOR DOOR LITES, SEALED LOW E UNIT.
- 3) DOOR UNDERCUTS AS REQUIRED BY MECHANICAL.

DOOR TYPE	DOOR SIZE	MATERIAL	FINISH	FRAME TYPE	FRAME FINISH	DOOR TYPE	RESIDENTIAL LITE	NO. LITES	STOP	KICK PLATE	COMMENTS
1	C	3088	134" HMD	PNT	F2	PNT	YES	SS3 NRP	W		NO CLOSER, NO PANIC (SEE DOOR NOTE 2)
2	A	2888	134" HMD	PNT	F1	PNT	PRIV	3		YES	CLOSER, 20 MIN RATED DOOR / FRAME
3	D	3088	136" SC	PNT	F3	CLR	PRIV	4	W2		DUTCH DOOR LATCH, 8" HOOK + EYE
4	B	3088	WOOD RES	CLR	F4	CLR	PAS	23	W		
5	B	3088	WOOD RES	CLR	F3	CLR	PAS	23	W		
6	B	21088	WOOD RES	CLR	F3	CLR	OFF	23	W		
7	A	21088	136" SC	PNT	F3	PNT	OFF	23	W		
8	A	21088	136" SC	PNT	F3	PNT	OFF	23	W		
9	B	3088	WOOD RES	CLR	F3	PNT	PAS	23	W		
10	B	21088	WOOD RES	CLR	F4	CLR	PAS	23	W		INTEGER SIDE/LIGHT
11	C	3088	134" JNS HMD	PNT	F2	PNT	YES	SS3 NRP	OH		CLOSER, 20 MIN RATED DOOR / FRAME



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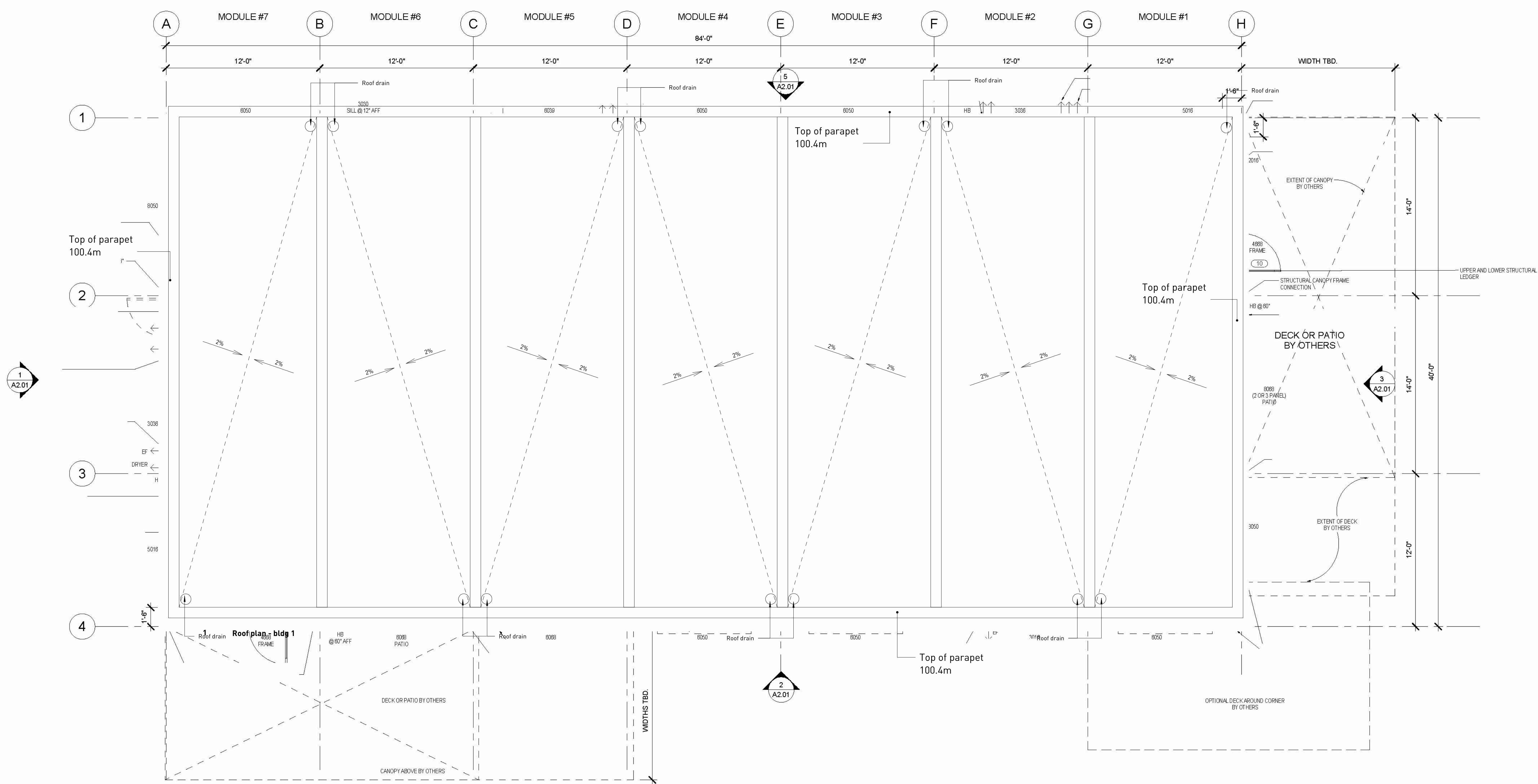
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Acadia Modular  
Childcare

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Floor plan - bldg 3  
A1.03





1  
A1.01/ SCALE - 1/4" = 1'-0"

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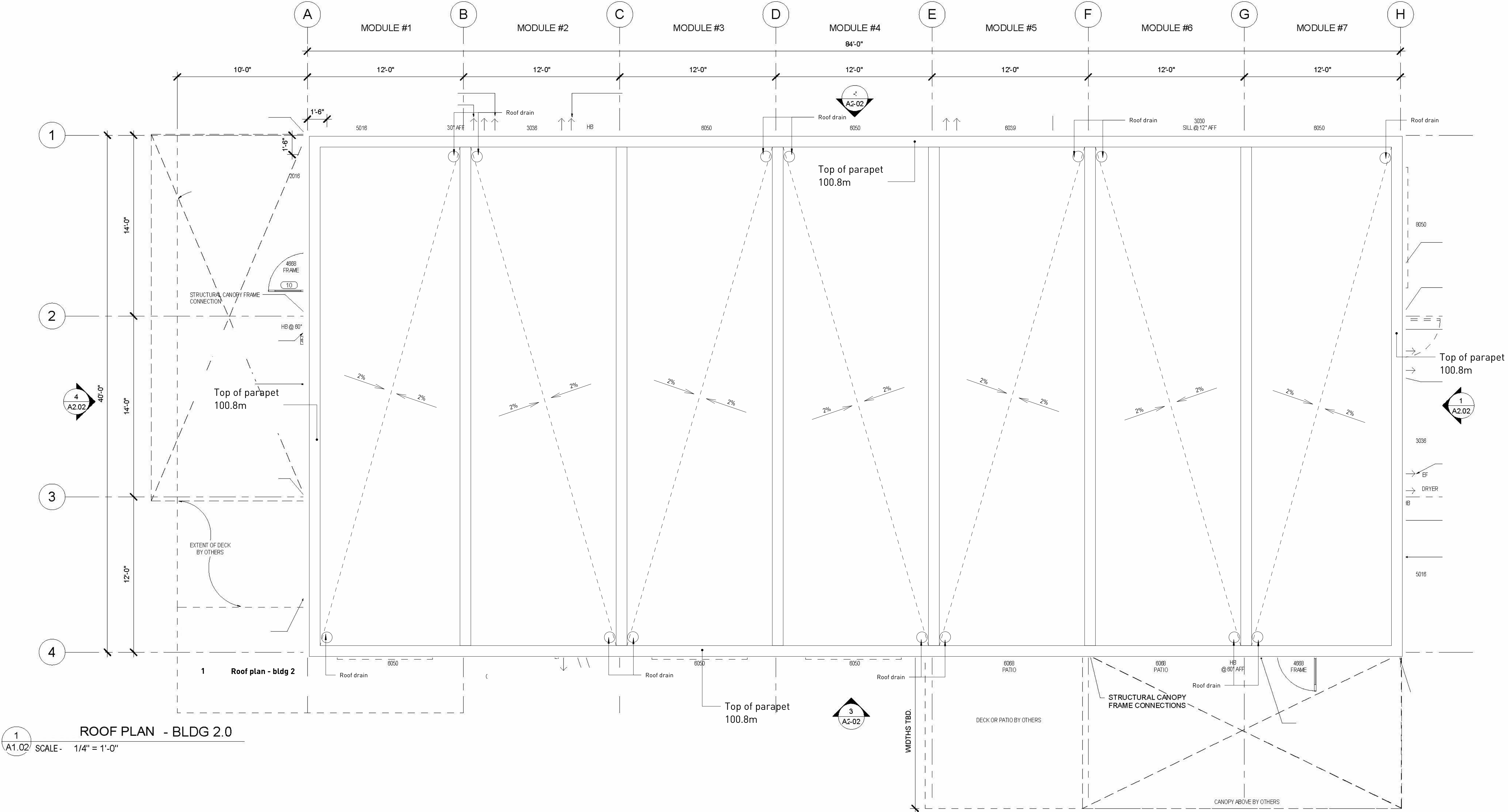
Roof plan - bldg 1

SHEET

A1.05



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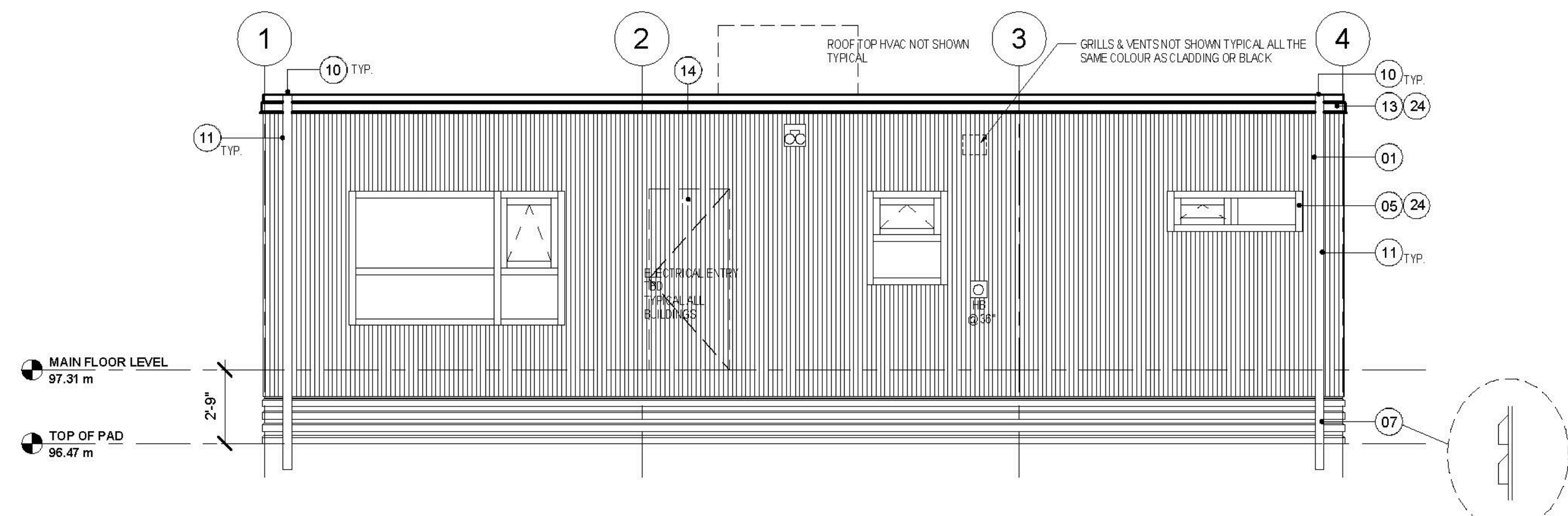
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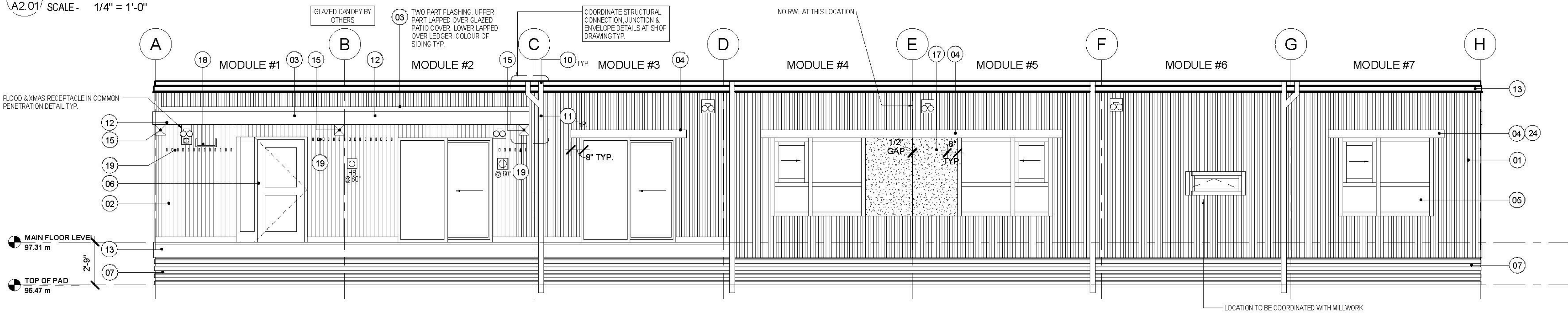
SHEET

A1.07

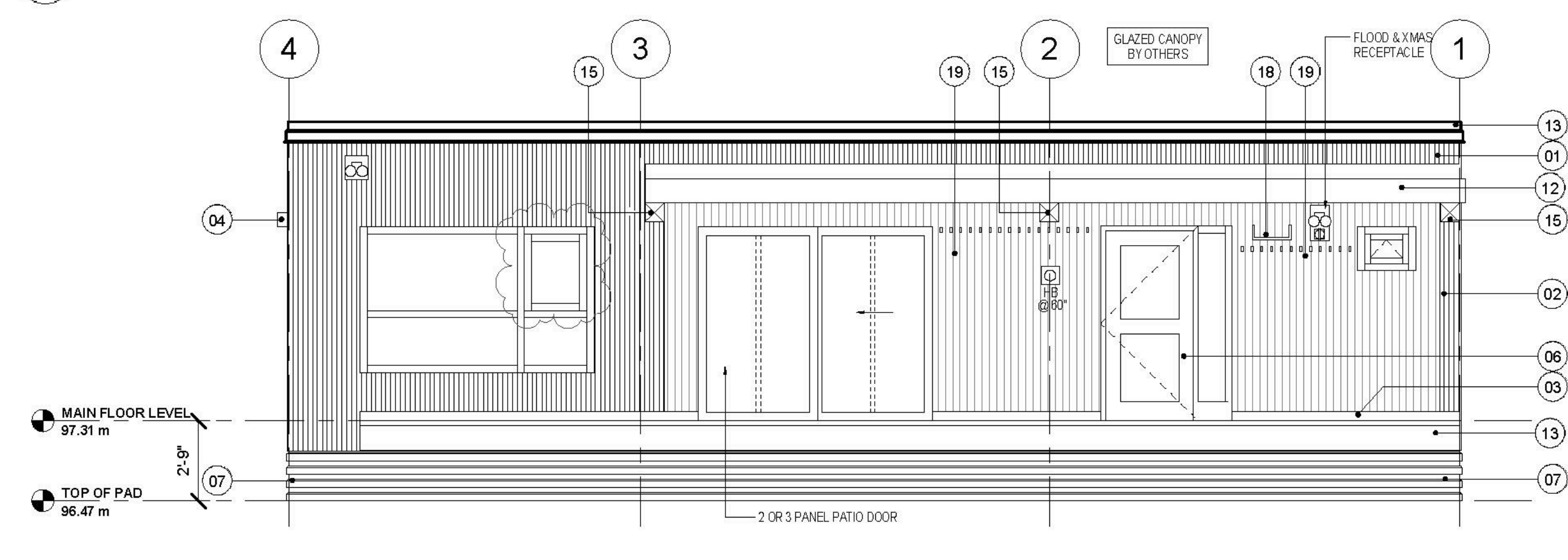




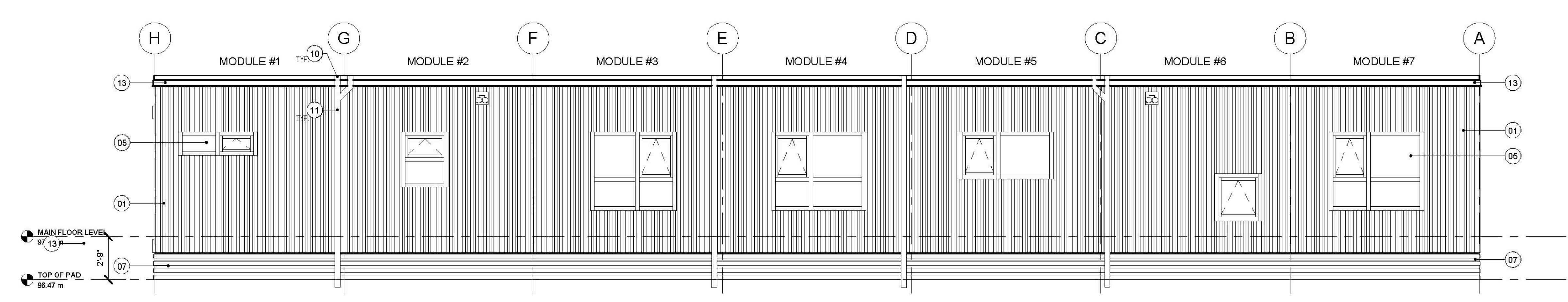
1 WEST ELEVATION - BLDG 1  
A2.01 SCALE - 1/4" = 1'-0"



2 SOUTH ELEVATION - BLDG 1  
A2.01 SCALE - 1/4" = 1'-0"



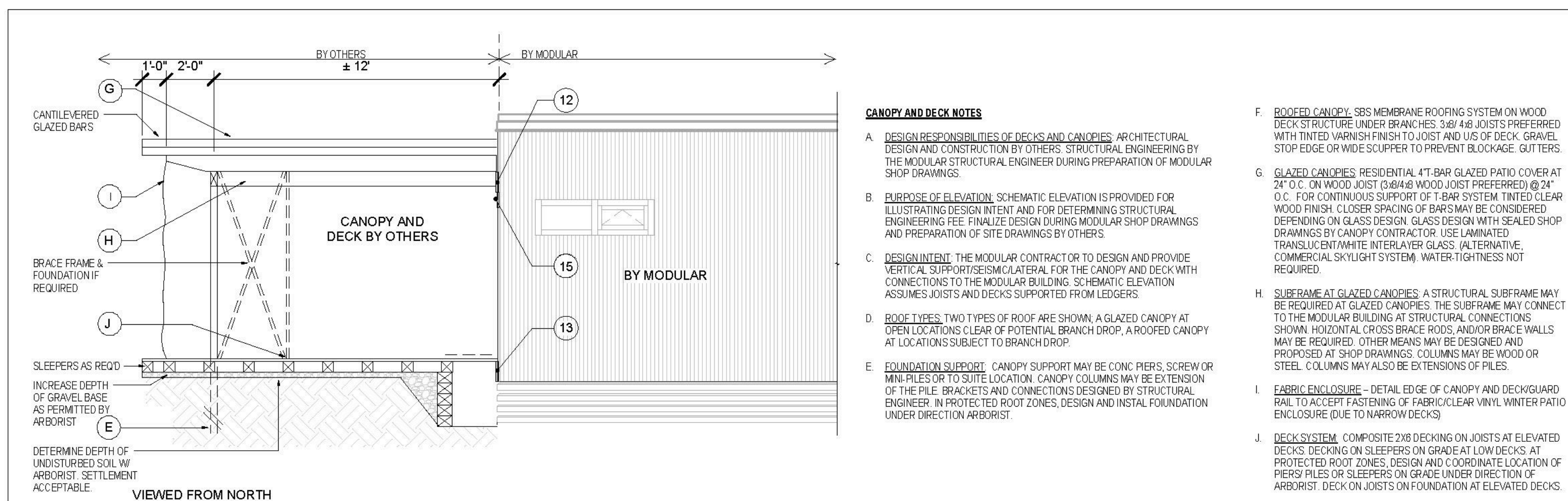
3 EAST ELEVATION - BLDG 1  
A2.01 SCALE - 1/4" = 1'-0"



4 NORTH ELEVATION - BLDG 1  
A2.01 SCALE - 1/4" = 1'-0"

- FLOOD LIGHTS - SEE SPEC  
120V GFI RECEPTACLE  
RESIDENTIAL HOSE BIB/HYDRANT - HEIGHT 80" AFF. TYP. U.N.O. HYDRANT END INTO CABINET OR WALL BEHIND  
FLOOD LIGHT WITH XMAS RECEPT.

MATERIALS LEGEND - ITEMS BY MODULAR	
* - PENETRATION DETAILS BY MODULAR ENVELOPE CONSULTANT	
Key Value	Keynote Text
01	CORRUGATED STEEL CLADDING - 7/8" - COLOUR FROM STANDARD RANGE - COLOUR MATCH CLOSURES*
02	WOOD CLADDING - TINTED VARNISH, 2x2" @ 2" TIGHT KNOT SELECT CEDAR @ 2" O.C. ON BLACK CEMENTITIOUS PANEL ON RAINSCREEN*
03	METAL FLASHING - 24 GA. - COLOUR MATCH CLADDING - 2 PIECE - SEE DETAIL*
04	METAL FLASHING, 8" x 8" PROJECTION, 22 GA. WEATHERHOOD - COLOUR BLACK*
05	VINYL RESIDENTIAL WINDOW - WEATHERHOOD WHERE SLOING OPERATOR - COLOUR BLACK CAN BLACK FLASHING*
06	2WD INSULATED DOOR AND WELDED FRAME - DOOR LITES AND SIDE LITE AS SHOWN - PAINT BLACK, BLACK FLASHING*
07	PTW SKIRTING AND TRIM STRIPS - UNPAINTED, TRIM STRIPS 2x4 w/ SLOPED TOP 3 HORIZONTAL
08	GRILLS, LOUVERS, BRACKETS, EXHAUST HOODS - NOT SHOWN - COLOUR MATCH CLADDING OR BLACK*
09	LIGHT - COLOUR BLACK*
10	SCUPPER - COLOUR BLACK*
11	RAWL - ALUM. RESIDENTIAL, PRE-PAINTED OR SITE PAINTED ON PRIMER TO MATCH CLADDING
12	CANOPY LEDGER FULLY FLASHED BLACK*
13	DECK LEDGER FULLY FLASHED BLACK*
14	ELECTRICAL ENTRY ACCESS DOOR TO UTILITY SPECS, LOCATION TBD, TYP. ALL BUILDINGS
15	CONNECTION FOR CANOPY STRUCTURAL FRAME - BY MODULAR*
16	PAINTED CEMENTITIOUS PANEL ON RAINSCREEN*
17	10" DEEP x 12" LONG CONVENIENCE SHELF MOUNT @ 12" OR AS INSTRUCTED BY STAFF, VARNISHED WOOD.
18	SMALL SINGLE PRONG SS. COAT HOOKS @ 4" O.C. SEE SPEC ITEM 31.5.2



5 TYPICAL GLAZED CANOPY - BY OTHERS  
A2.01 SCALE - 1/4" = 1'-0"

- CANOPY AND DECK NOTES**
- A. DESIGN RESPONSIBILITIES OF DECKS AND CANOPIES: ARCHITECTURAL DESIGN AND CONSTRUCTION BY OTHERS. STRUCTURAL ENGINEERING BY THE MODULAR STRUCTURAL ENGINEER DURING PREPARATION OF MODULAR SHOP DRAWINGS.
- B. PURPOSE OF ELEVATION: SCHEMATIC ELEVATION IS PROVIDED FOR ILLUSTRATING DESIGN INTENT AND FOR DETERMINING STRUCTURAL ENGINEERING FEE. FINALIZE DESIGN DURING MODULAR SHOP DRAWINGS AND PREPARATION OF SITE DRAWINGS BY OTHERS.
- C. DESIGN INTENT: THE MODULAR CONTRACTOR TO DESIGN AND PROVIDE VERTICAL SUPPORT/SEISMIC/LATERAL FOR THE CANOPY AND DECK WITH CONNECTIONS TO THE MODULAR BUILDING. SCHEMATIC ELEVATION ASSUMES JOISTS AND DECKS SUPPORTED FROM LEDGERS.
- D. ROOF TYPES: TWO TYPES OF ROOF ARE SHOWN, A GLAZED CANOPY AT OPEN LOCATIONS CLEAR OF POTENTIAL BRANCH DROP, A ROOFED CANOPY AT LOCATIONS SUBJECT TO BRANCH DROP.
- E. FOUNDATION SUPPORT: CANOPY SUPPORT MAY BE CONC. PIERS, SCREW OR MINI-PILES OR TO SUITE LOCATION. CANOPY COLUMNS MAY BE EXTENSION OF THE PILE. BRACKETS AND CONNECTIONS DESIGNED BY STRUCTURAL ENGINEER. IN PROTECTED ROOT ZONES, DESIGN AND INSTALL FOUNDATION UNDER DIRECTION ARBORIST.
- F. ROOFED CANOPY: SBS MEMBRANE ROOFING SYSTEM ON WOOD DECK STRUCTURE UNDER BRANCHES. 3x6" x 8" JOISTS PREFERRED WITH TINTED VARNISH FINISH TO JOIST AND US OF DECK. GRAVEL STOP EDGE OR WIDE SCUPPER TO PREVENT BLOCKAGE. GUTTERS.
- G. GLAZED CANOPIES: RESIDENTIAL AT-BAR GLAZED PATIO COVER AT 24" O.C. ON WOOD JOIST (3/4" x 8" WOOD JOIST PREFERRED) @ 24" O.C. FOR CONTINUOUS SUPPORT OF T-BAR SYSTEM TINTED CLEAR WOOD FINISH. CLOSER SPACING OF BARS MAY BE CONSIDERED DEPENDING ON GLASS DESIGN. GLASS DESIGN WITH SEALED SHOP DRAWINGS BY CANOPY CONTRACTOR. USE LAMINATED TRANSLUCENT/WHITE INTERLAYER GLASS. ALTERNATIVE: COMMERCIAL SKYLIGHT SYSTEM. WATER-TIGHTNESS NOT REQUIRED.
- H. SUBFRAME AT GLAZED CANOPIES: A STRUCTURAL SUBFRAME MAY BE REQUIRED AT GLAZED CANOPIES. THE SUBFRAME MAY CONNECT TO THE MODULAR BUILDING AT STRUCTURAL CONNECTIONS SHOWN. HORIZONTAL CROSS BRACE ROIDS, AND/OR BRACE WALLS MAY BE REQUIRED. OTHER MEANS MAY BE DESIGNED AND PROPOSED AT SHOP DRAWINGS. COLUMNS MAY BE WOOD OR STEEL. COLUMNS MAY ALSO BE EXTENSIONS OF PILES.
- I. FABRIC ENCLOSURE - DETAIL EDGE OF CANOPY AND DECK/GUARD RAIL TO ACCEPT FASTENING OF FABRIC/CLEAR VINYL WINTER PATIO ENCLOSURE (DUE TO NARROW DECKS).
- J. DECK SYSTEM: COMPOSITE 2x8 DECKING ON JOISTS AT ELEVATED DECKS. DECKING ON SLEEPERS ON GRADE AT LOW DECKS. AT PROTECTED ROOT ZONES, DESIGN AND COORDINATE LOCATION OF PIERS/PILES OR SLEEPERS ON GRADE UNDER DIRECTION OF ARBORIST. DECK ON JOISTS ON FOUNDATION AT ELEVATED DECKS.

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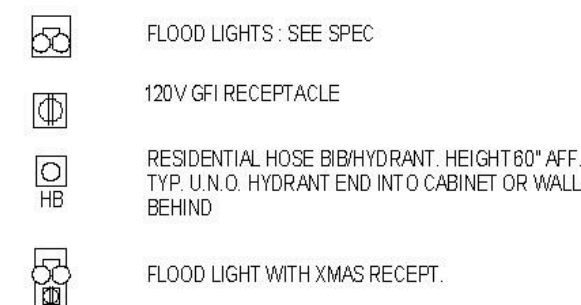
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Building elevations -  
bldg 1

SHEET  
A2.01



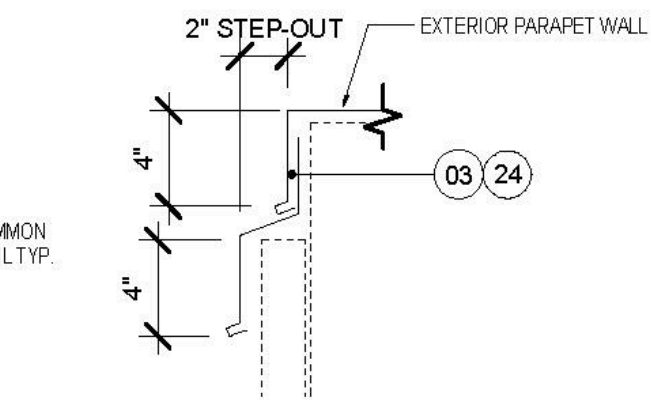


MATERIALS LEGEND - ITEMS BY MODULAR	
*. PENETRATION DETAILS BY MODULAR ENVELOPE CONSULTANT	
Key Value	Keynote Text
01	CORRUGATED STEEL CLADDING, 7/8" - COLOUR FROM STANDARD RANGE - COLOUR MATCH CLOSURES*
02	WOOD CLADDING - TINTED VARNISH, 2x2" @ 2" TIGHT JOINT SELECT CEDAR @ 2" O.C ON BLACK CEMENTITIOUS PANEL ON RAINSCREEN*
03	METAL FLASHING, 24 GA - COLOUR MATCH CLADDING, 2 PIECE - SEE DETAIL "A"
04	METAL FLASHING, 8" x 8" PROJECTION, 22 GA. WEATHERFOOD - COLOUR BLACK*
05	VINYL RESIDENTIAL WINDOW WEATHERFOOD WHERE SLIDING OPERER - COLOUR BLACK ON BLACK FLASHING*
06	HMD INSULATED DOOR AND WELDED FRAME - DOOR LITES AND SIDE LITE AS SHOWN - PAINT BLACK, BLACK FLASHING*
07	PTW SKIRTING AND TRIM STRIPS - UNPAINTED TRIM STRIPS 2x4 w/ SLOPED TOP 3" HORIZONTAL
08	GRILLS, COVERS, BRACKETS, EXHAUST HOODS - NOT SHOWN - COLOUR MATCH CLADDING OR BLACK*
09	LIGHT - COLOUR BLACK*
10	SCUPPER - COLOUR BLACK*
11	PWL - ALUM RESIDENTIAL PRE-PAINTED OR SITE PAINTED ON PRIMER TO MATCH CLADDING
12	CANOPY LEDGER FULLY FLASHED BLACK*
13	DECK LEDGER FULLY FLASHED BLACK*
14	ELECTRICAL ENTRY ACCESS DOOR TO UTILITY SPECS. LOCATION TBD. TYP. ALL BUILDINGS
15	CONNECTION FOR CANOPY STRUCTURAL FRAME - BY MODULAR
17	PAINTED CEMENTITIOUS PANEL ON RAINSCREEN*
18	17" DEEP x 12" LONG CONVENIENCE SHELF MOUNT @ 12" OR AS INSTRUCTED BY STAFF. VARNISHED WOOD
19	SMALL SINGLE PRONG SS. COAT HOOKS @ 4" O.C. SEE SPEC ITEM 31.5.2

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—2 OR 3 PANEL PATIO DOOR



Architectural elevation drawing of the main floor level of a building, showing seven modules (MODULE #1 to MODULE #7) separated by vertical grid lines A through H. The drawing includes window details, door locations, and level markers for the main floor level (97.70 m) and top of pad (96.87 m). The elevation shows various window types, including double windows and single windows, and door locations. The drawing is oriented with the main floor level at the top and the top of the pad at the bottom. The modules are labeled from left to right: MODULE #7, MODULE #6, MODULE #5, MODULE #4, MODULE #3, MODULE #2, and MODULE #1. The grid lines are labeled A through H from right to left. The drawing includes a north arrow and a scale bar.

Design consultant:



Coordinating registered professional:

public

1495 FRANCES STREET  
VANCOUVER BC V5L 1Z1  
TEL 604 738 4323  
WWW.PUBLICDESIGN.CA

## Acadia Modular Childcare

PROJECT CODE  
1828

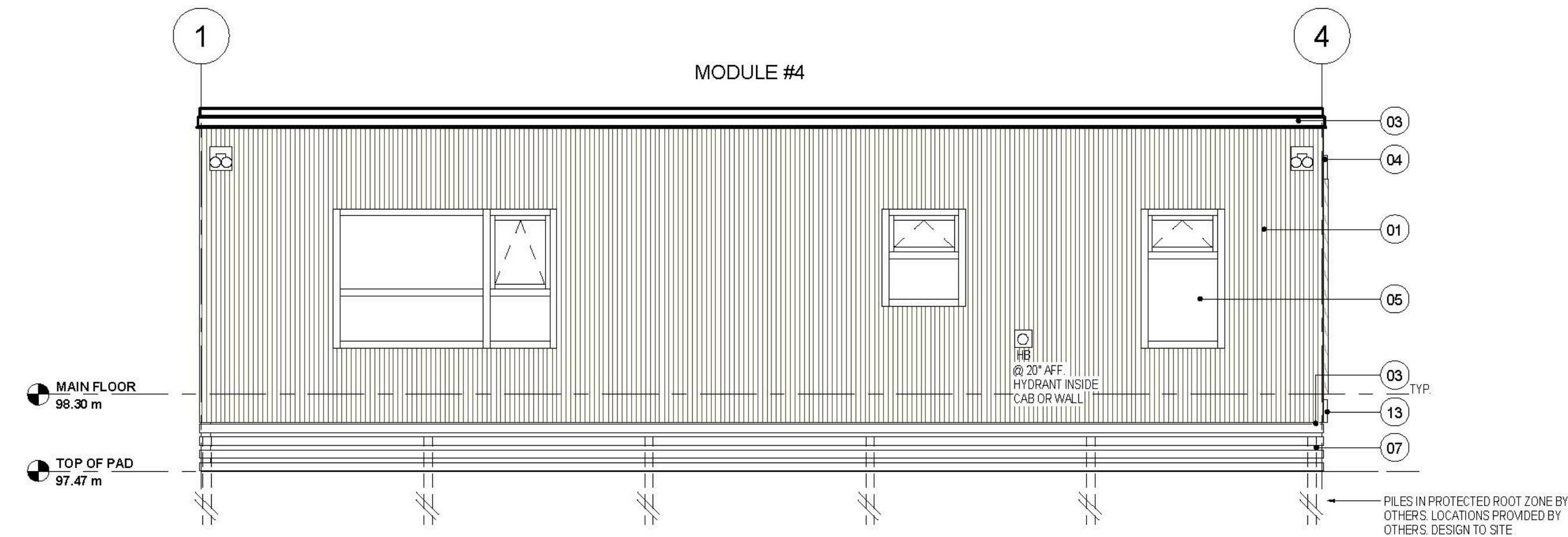
STATUS  
DP  
DATE  
190102

Building elevations -  
bldg 2

SHEET

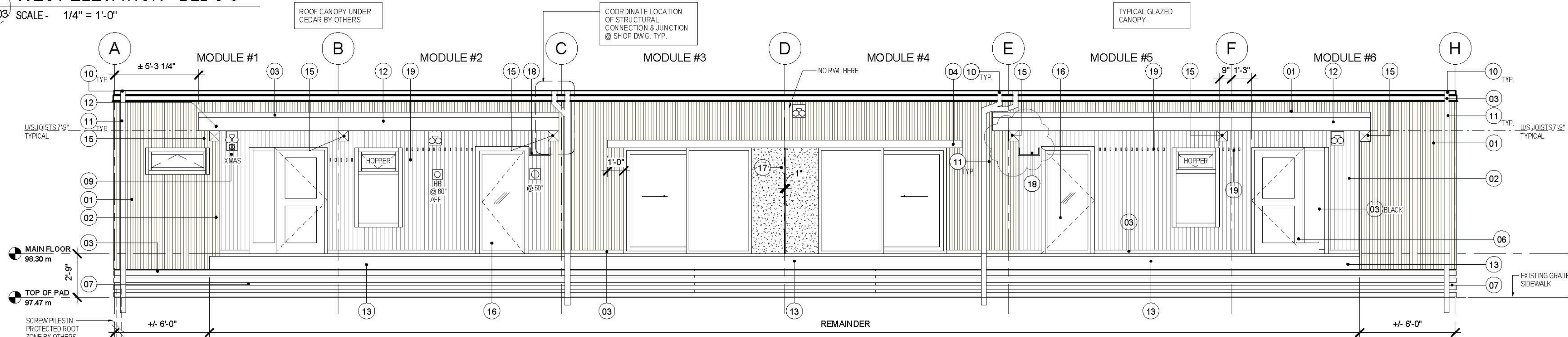
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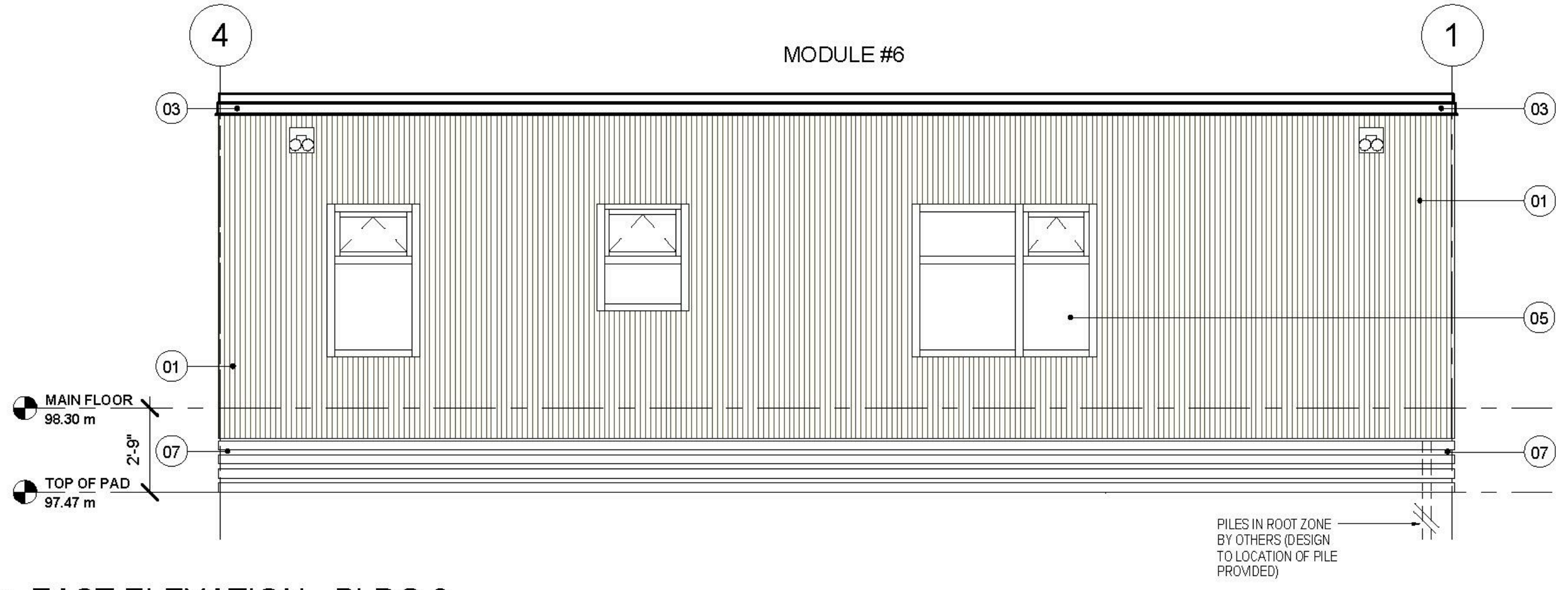
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A2.03 SCALE - 1/4" = 1'-0"



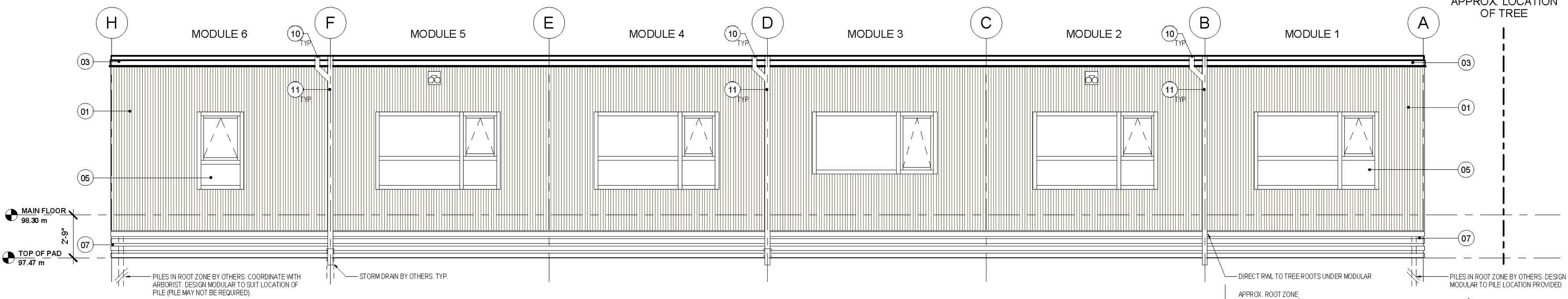
2 SOUTH ELEVATION - BLDG 3

A2.03 SCALE - 1/4" = 1'-0"



3 EAST ELEVATION - BLDG 3

A2.03 SCALE - 1/4" = 1'-0"

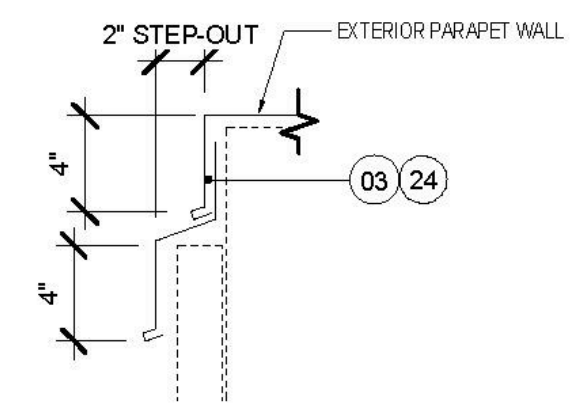


4 NORTH ELEVATION - BLDG 3

A2.03 SCALE - 1/4" = 1'-0"

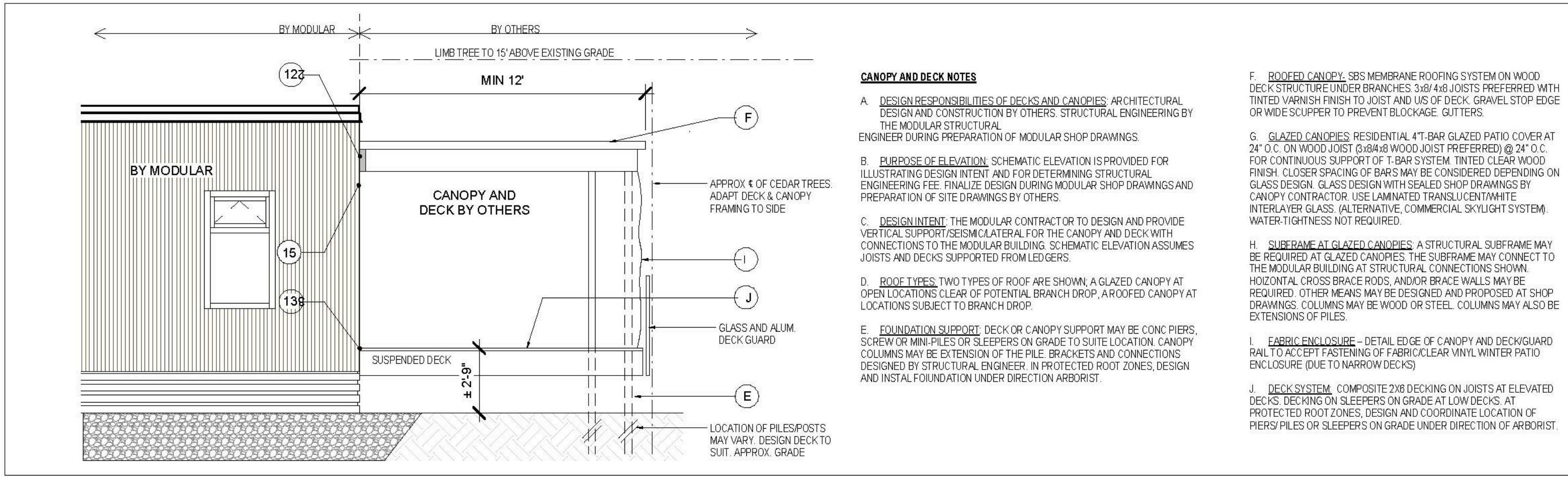
- FLOOD LIGHTS: SEE SPEC
- 120V GFI RECEPTACLE
- RESIDENTIAL HOSE BIB/HYDRANT HEIGHT 60" AFF. TYP. U.N.O. HYDRANT END INTO CABINET OR WALL BEHIND
- FLOOD LIGHT WITH XMAS/LIGHT RECEPT.

MATERIALS LEGEND - ITEMS BY MODULAR	
* - PENETRATION DETAILS BY MODULAR ENVELOPE CONSULTANT	
Key Value	Keynote Text
01	CORRUGATED STEEL CLADDING - 7/8" - COLOUR FROM STANDARD RANGE - COLOUR MATCH CLOSURES*
02	WOOD CLADDING - TINTED VARNISH 2x2 @ 2" TIGHT KNOT SELECT CEDAR @ 2" O.C. ON BLACK CEMENTITIOUS PANEL ON RAINSCREEN*
03	METAL FLASHING 2x4 GA. - COLOUR MATCH CLADDING 2 PIECE SEE DETAIL *
04	METAL FLASHING 8" IF PROJECTION 2x4 GA. WEATHERPOOD - COLOUR BLACK*
05	VINYL RESIDENTIAL WINDOW WEATHERPOOD WHERE SLIDING OPENER - COLOUR BLACK OR BLACK FLASHING*
06	HMD INSULATED DOOR AND WELDED FRAME - DOOR LITES AND SIDE LITE AS SHOWN - PAINT BLACK, BLACK FLASHING*
07	PTW SKIRTING AND TRIM STRIPS - UNPAINTED TRIM STRIPS 2x4 w/ SLOPED TOP 3 HORIZONTAL
08	GRILLS, DOWNERS, BRACKETS, EXHAUST HOODS - NOT SHOWN - COLOUR MATCH CLADDING OR BLACK*
09	LIGHT - COLOUR BLACK*
10	SCUPPER - COLOUR BLACK*
11	RWL - ALUM. RESIDENTIAL, PRE-PAINTED OR SITE PAINTED ON PRIMER TO MATCH CLADDING
12	CANDOPY LEDGER FULLY FLASHED BLACK*
13	DECK LEDGER FULLY FLASHED BLACK*
14	ELECTRICAL ENTRY ACCESS DOOR TO UTILITY SPECS LOCATION TBD. TYP. ALL BUILDINGS.
15	CONNECTION FOR CANDOPY STRUCTURAL FRAME - BY MODULAR*
16	VINYL PATIO SWING FRENCH DOOR BY WINDOW SUPPLIER
17	PAINTED CEMENTITIOUS PANEL ON RAINSCREEN*
18	18" DEEP x 12" LONG CONVENIENCE SHELF MOUNT @ 72" OR AS INSTRUCTED BY STAFF. VARNISHED WOOD
19	SMALL SINGLE PRONG SS COAT HOOKS @ 4" O.C. SEE SPEC ITEM 31.5.2
20	
21	
22	
23	



6 TYP. TOP OF PARAPET FLASHING

A2.03 SCALE - 1 1/2" = 1'-0"



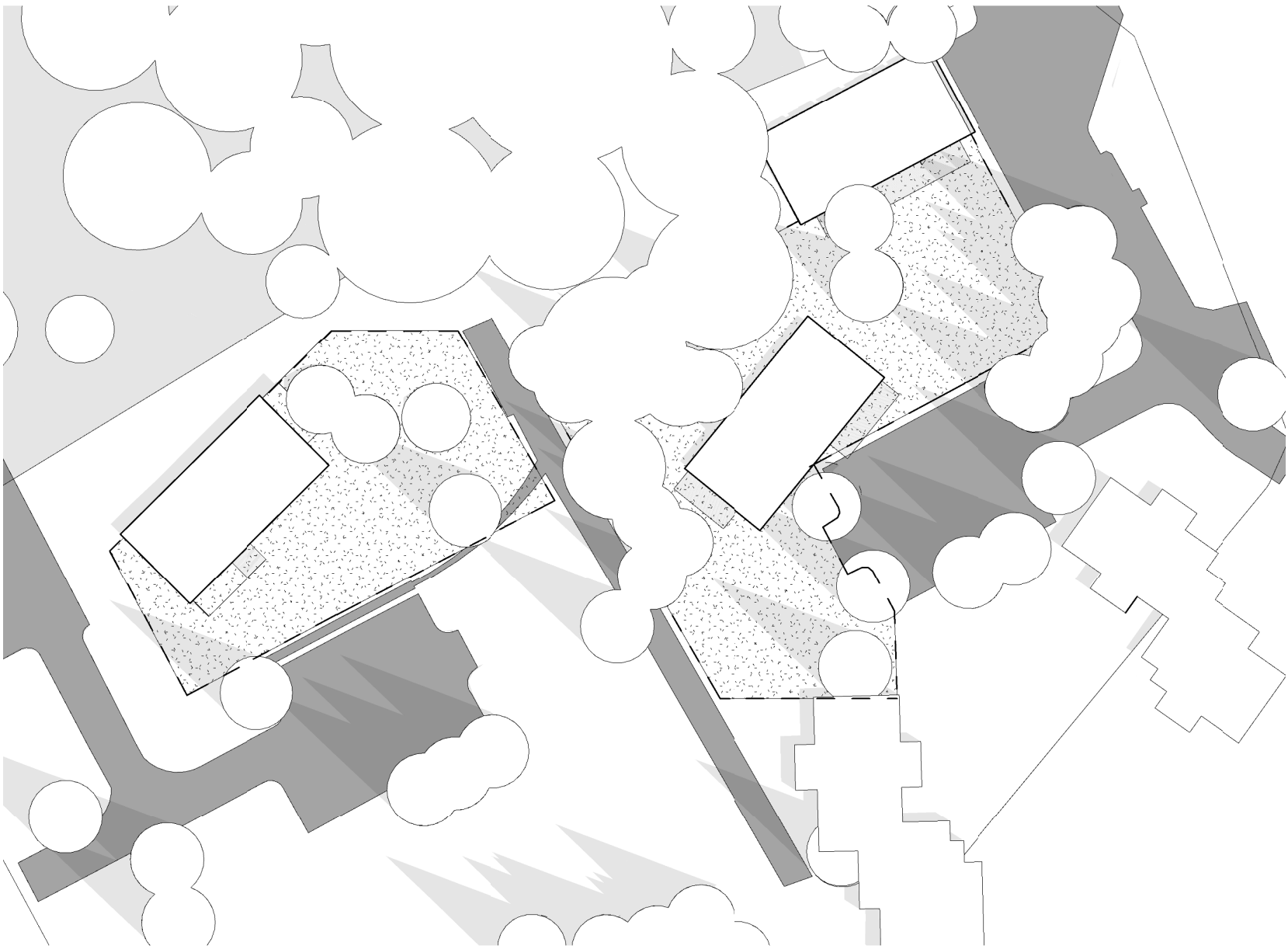
5 WOOD DECK TO CANOPY - BY OTHERS (WEST)

A2.03 SCALE - 1/4" = 1'-0"

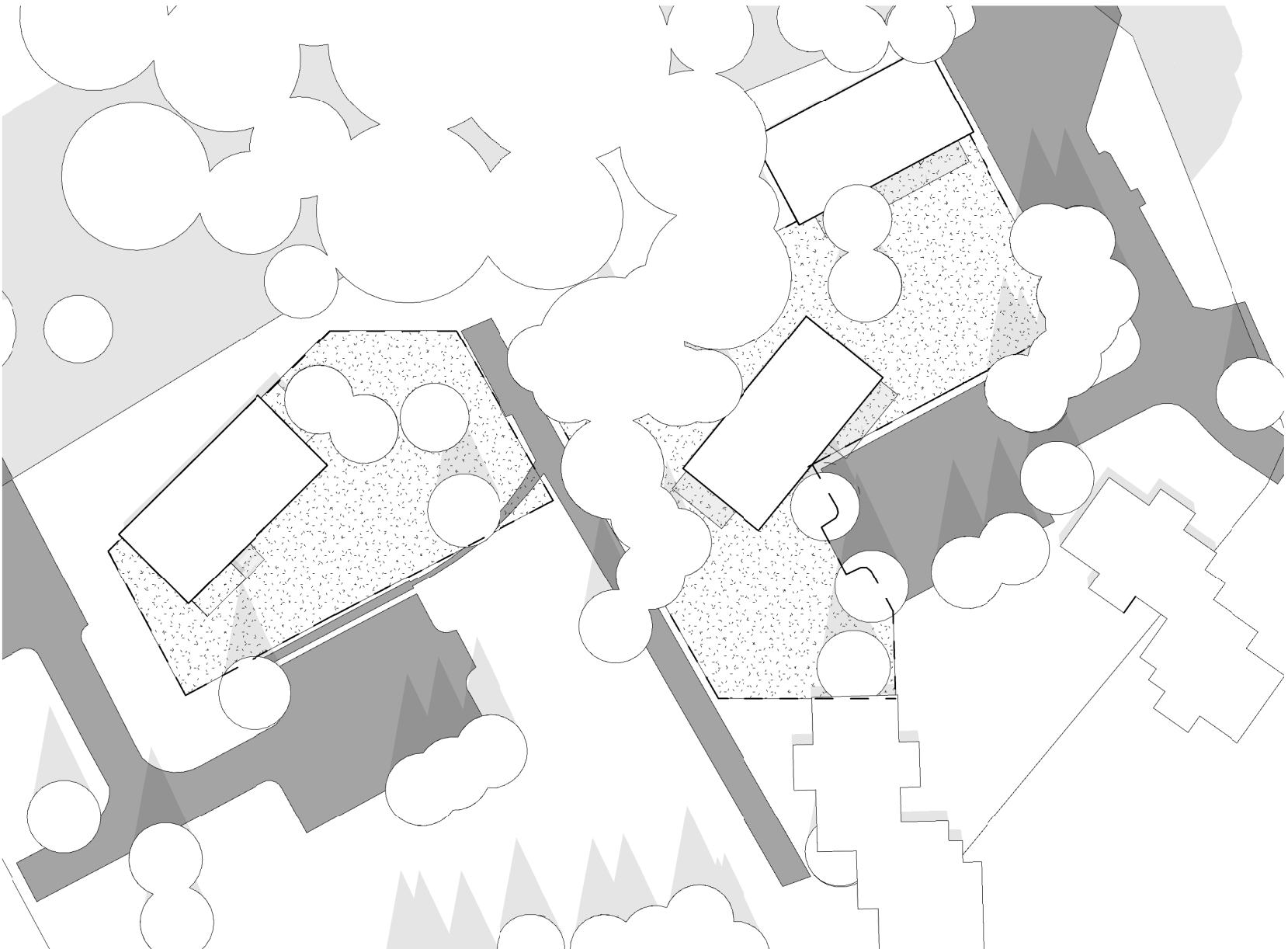
NOTE: WOOD DECK CANOPY UNDER CEDAR TREE ONLY

- CANOPY AND DECK NOTES**  
A. DESIGN RESPONSIBILITY: DECKS AND CANOPIES: ARCHITECTURAL DESIGN AND CONSTRUCTION BY OTHERS. STRUCTURAL ENGINEERING BY THE MODULAR STRUCTURAL ENGINEER DURING PREPARATION OF MODULAR SHOP DRAWINGS.  
B. PURPOSE OF ELEVATION: SCHEMATIC ELEVATION IS PROVIDED FOR ILLUSTRATING DESIGN INTENT AND FOR DETERMINING STRUCTURAL ENGINEERING FEE. FINALIZED DESIGN DURING MODULAR SHOP DRAWINGS AND PREPARATION OF SITE DRAWINGS BY OTHERS.  
C. DESIGN INTENT: THE MODULAR CONTRACTOR TO DESIGN AND PROVIDE VERTICAL SUPPORT/SEISMIC LATERAL FOR THE CANOPY AND DECK WITH CONNECTIONS TO THE MODULAR BUILDING. SCHEMATIC ELEVATION ASSUMES JOISTS AND DECKS SUPPORTED FROM LEDGERS.  
D. ROOF TYPES: TWO TYPES OF ROOF ARE SHOWN: A GLAZED CANOPY AT OPEN LOCATIONS CLEAR OF POTENTIAL BRANCH DROP; A ROOFED CANOPY AT LOCATIONS SUBJECT TO BRANCH DROP.  
E. FOUNDATION SUPPORT: DECK OR CANOPY SUPPORT MAY BE CONIC PIERS, SCREW OR MINI-PILES OR SLEEPERS ON GRADE TO SUIT LOCATION. CANOPY COLUMNS MAY BE EXTENSION OF THE PILE BRACKETS AND CONNECTIONS DESIGNED BY STRUCTURAL ENGINEER. IN PROTECTED ROOT ZONES, DESIGN AND INSTALL FOUNDATION UNDER DIRECTION ARBORIST.  
F. ROOFED CANOPY: SBS MEMBRANE ROOFING SYSTEM ON WOOD DECK STRUCTURE UNDER BRANCHES 3/8" x 4/8" JOISTS PREFERRED WITH TINTED VARNISH FINISH TO JOIST AND US OF DECK. GRAVEL STOP EDGE OR WIDE SCUPPER TO PREVENT BLOCKAGE. GUTTERS.  
G. GLAZED CANOPIES: RESIDENTIAL 4" BAR GLAZED PATIO COVER AT 24" O.C. ON WOOD JOIST (3/8" x 4/8" WOOD JOIST PREFERRED) @ 24" O.C. FOR CONTINUOUS SUPPORT OF 4" BAR SYSTEM. TINTED CLEAR WOOD FINISH. CLOSER SPACING OF BARS MAY BE CONSIDERED DEPENDING ON GLASS DESIGN. GLASS DESIGN WITH SEALED SHOP DRAWINGS BY CANOPY CONTRACTOR. USE LAMINATED TRANSLUCENT/WHITE INTERLAYER GLASS. (ALTERNATIVE COMMERCIAL SKYLIGHT SYSTEM). WATER TIGHTNESS NOT REQUIRED.  
H. SUBFRAME AT GLAZED CANOPIES: A STRUCTURAL SUBFRAME MAY BE REQUIRED AT GLAZED CANOPIES. THE SUBFRAME MAY CONNECT TO THE MODULAR BUILDING AT STRUCTURAL CONNECTIONS SHOWN. HORIZONTAL CROSS BRACE RODS, AND/OR BRACE WALLS MAY BE REQUIRED. OTHER MEANS MAY BE DESIGNED AND PROPOSED AT SHOP DRAWINGS. COLUMNS MAY BE WOOD OR STEEL. COLUMNS MAY ALSO BE EXTENSIONS OF PILES.  
I. FABRIC ENCLOSURE - DETAIL EDGE OF CANOPY AND DECK GUARD RAIL TO ACCEPT FASTENING OF FABRIC/CLEAR VINYL WINTER PATIO ENCLOSURE (DUE TO NARROW DECKS).  
J. DECK SYSTEM: COMPOSITE 2x8 DECKING ON JOISTS AT ELEVATED DECKS. DECKING ON SLEEPERS ON GRADE AT LOW DECKS. AT PROTECTED ROOT ZONES, DESIGN AND COORDINATE LOCATION OF PIERS/PILES OR SLEEPERS ON GRADE UNDER DIRECTION OF ARBORIST.





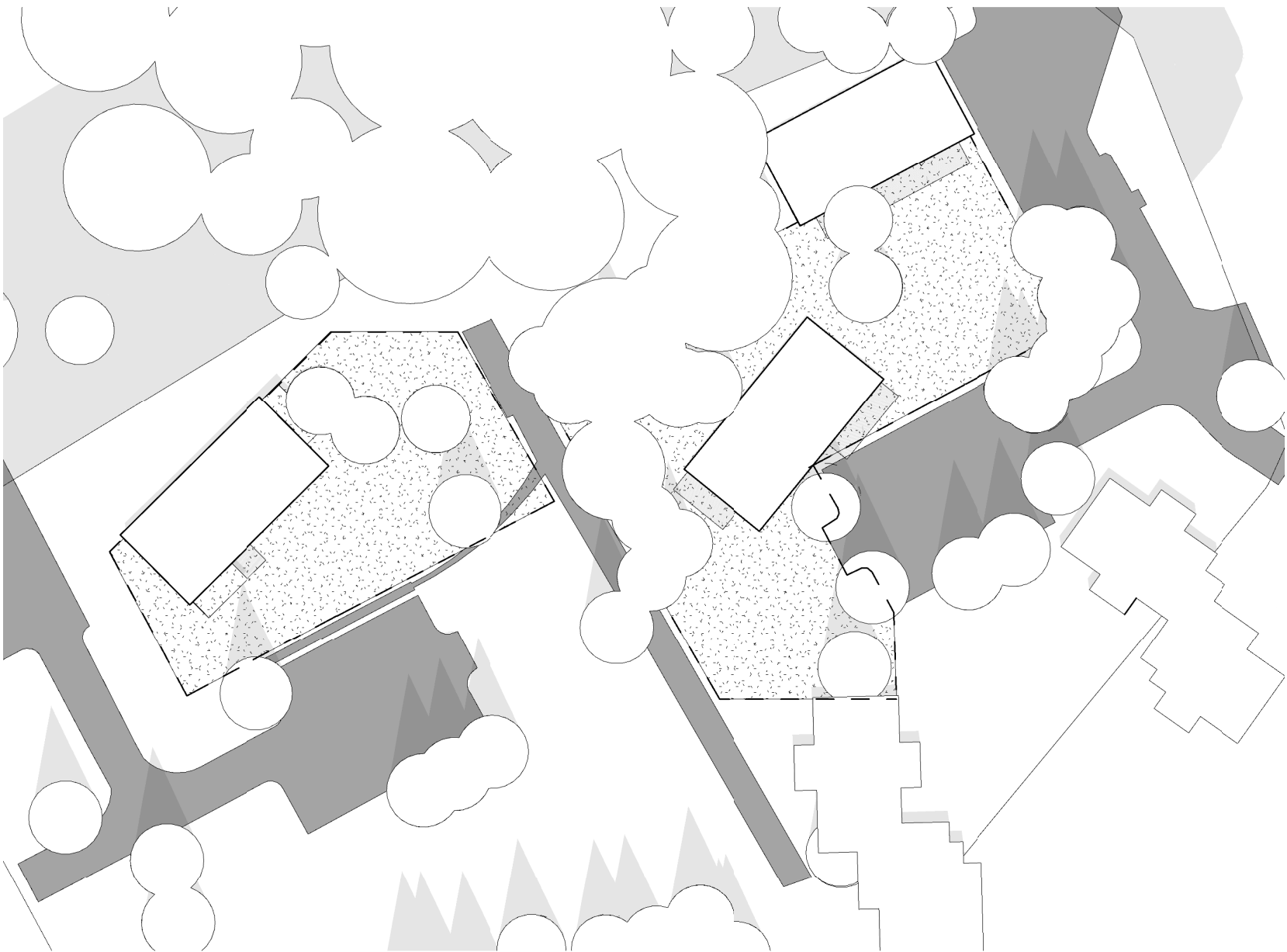
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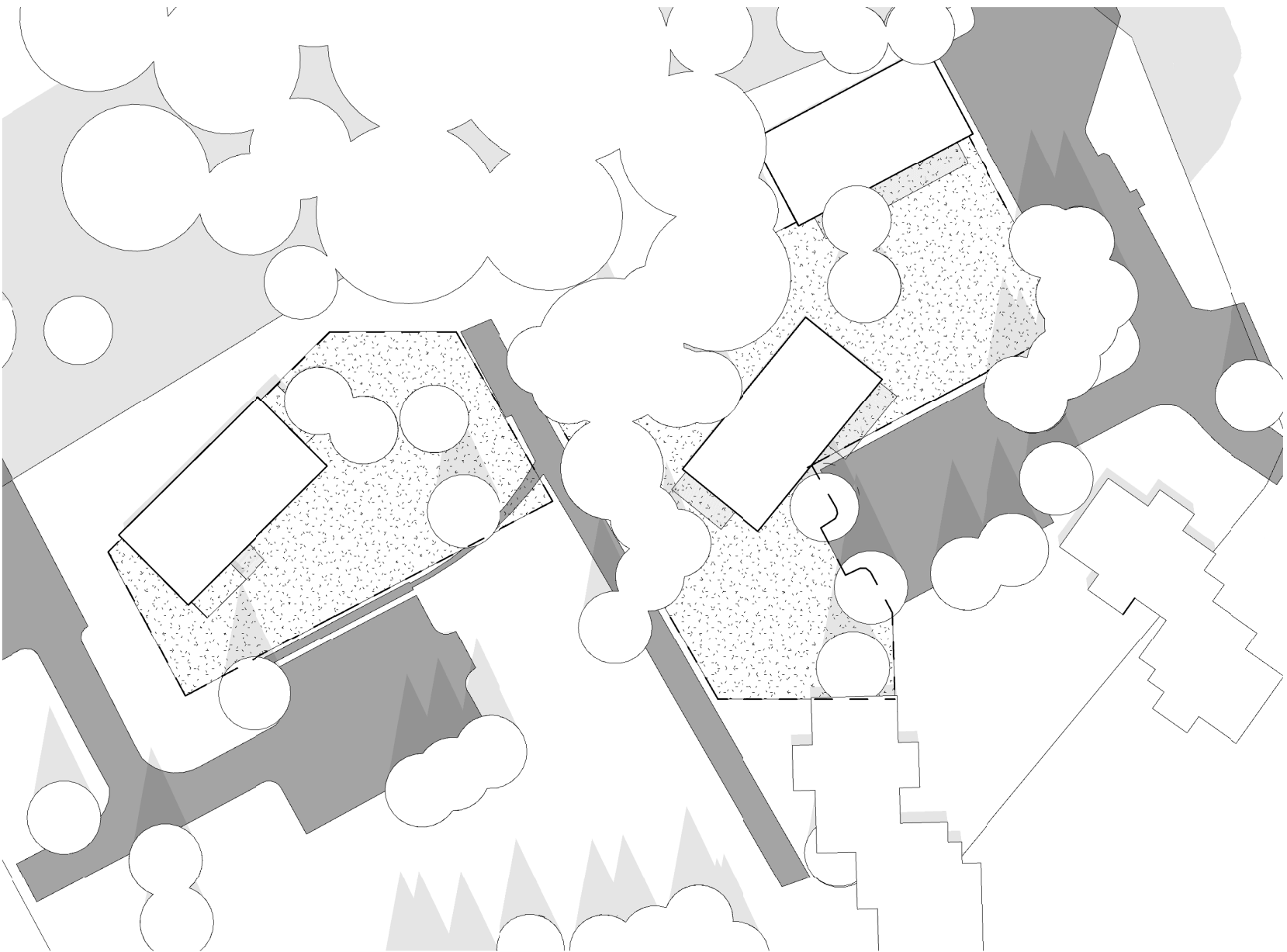
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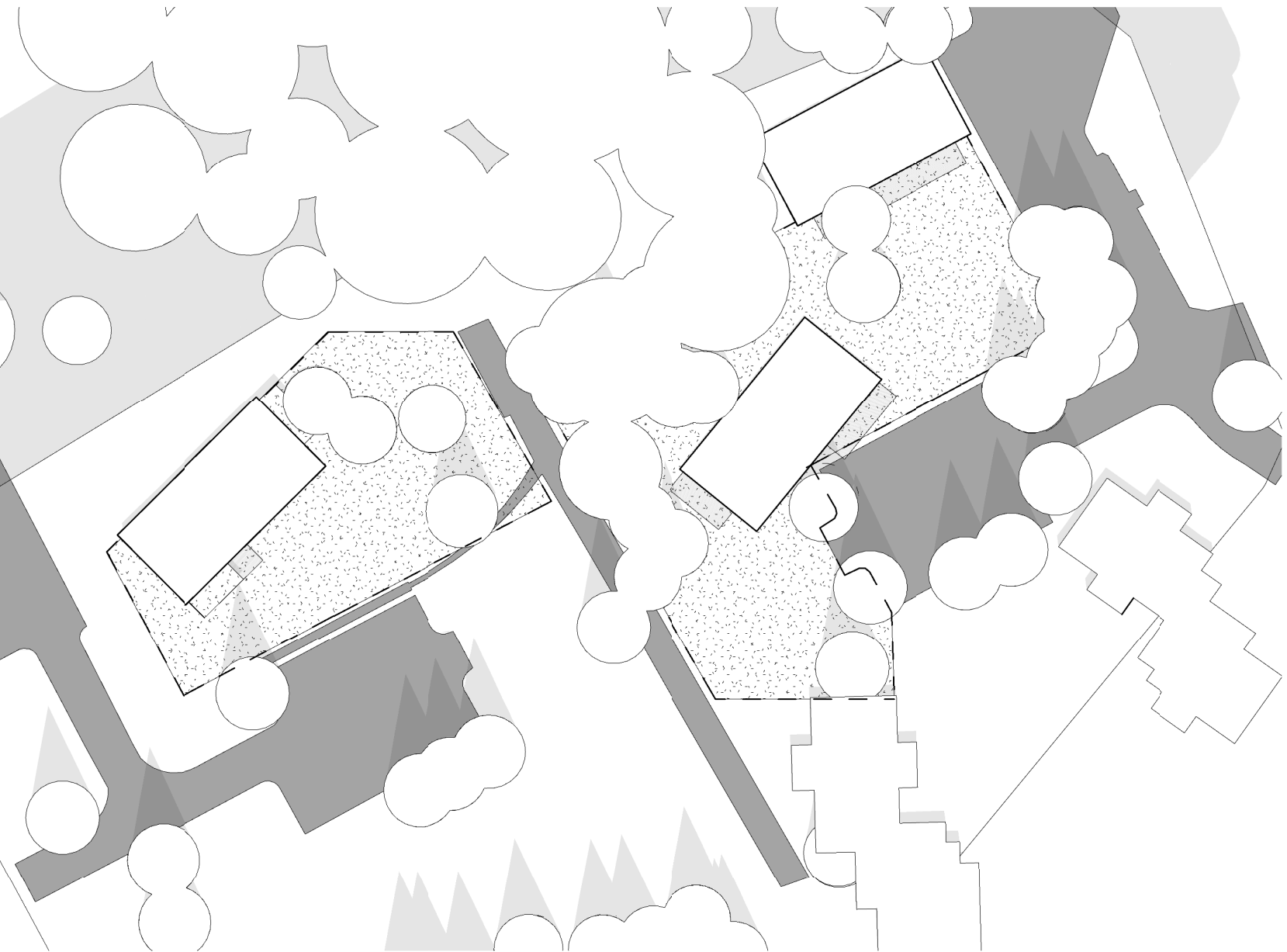
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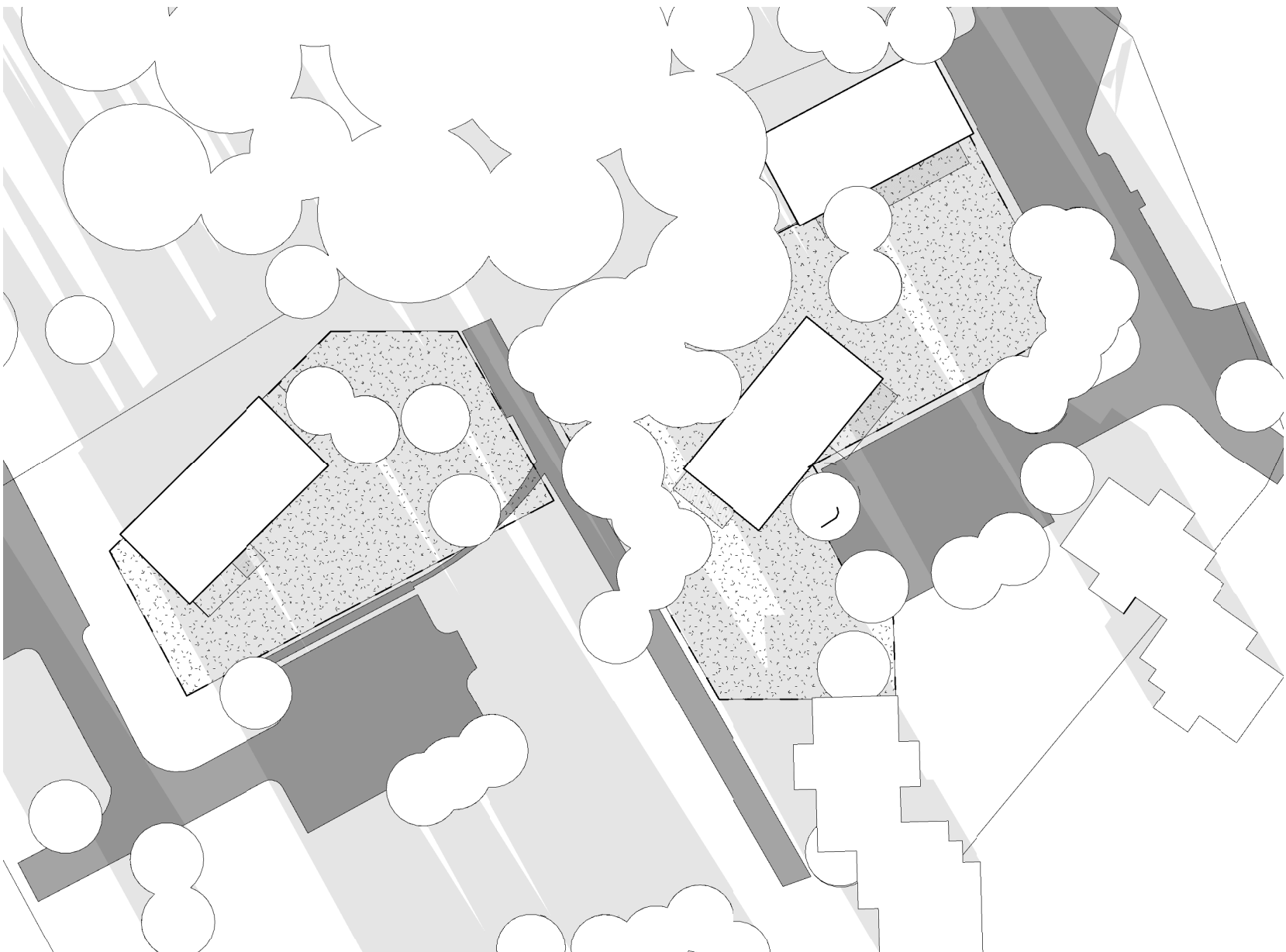
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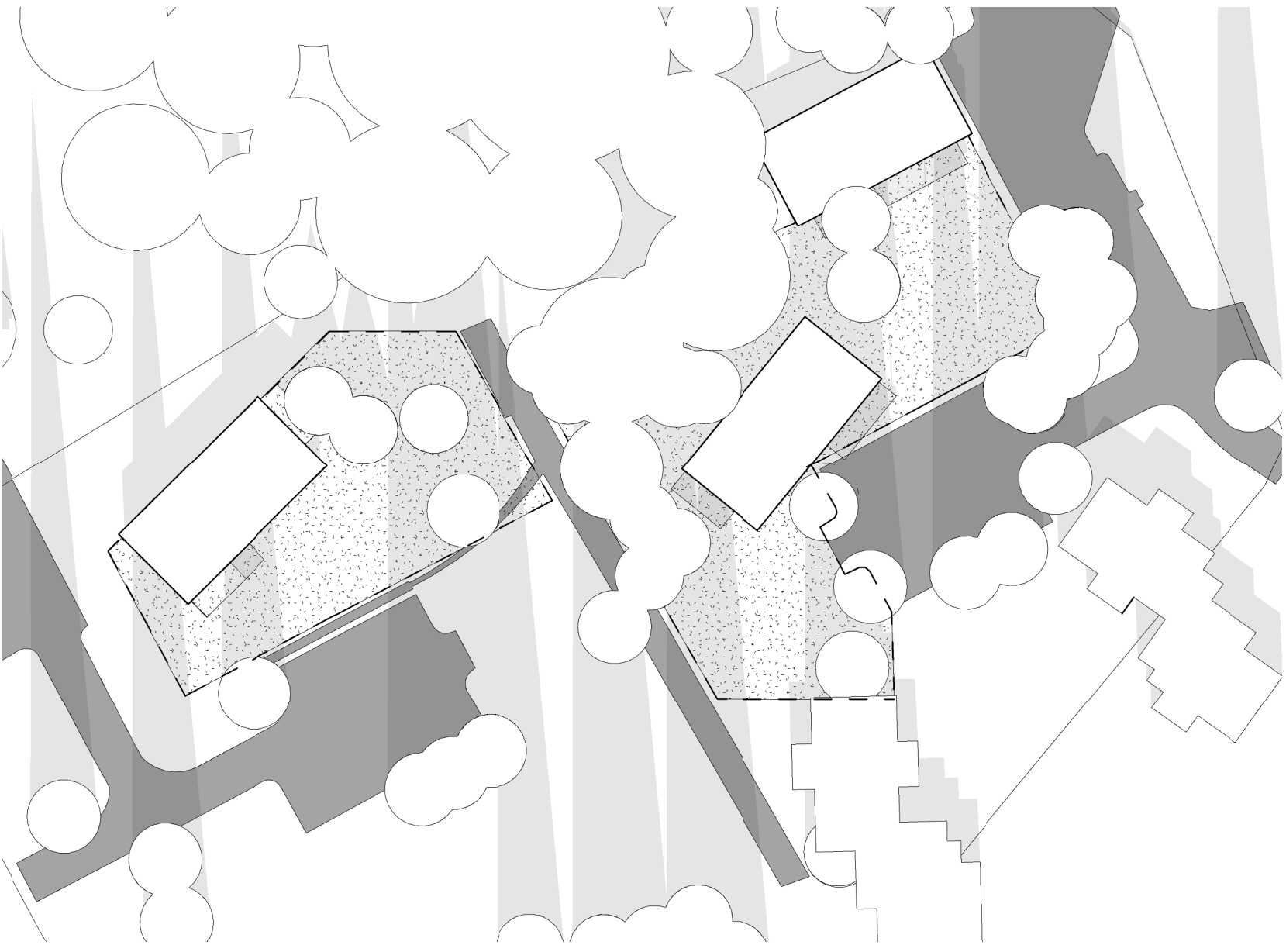
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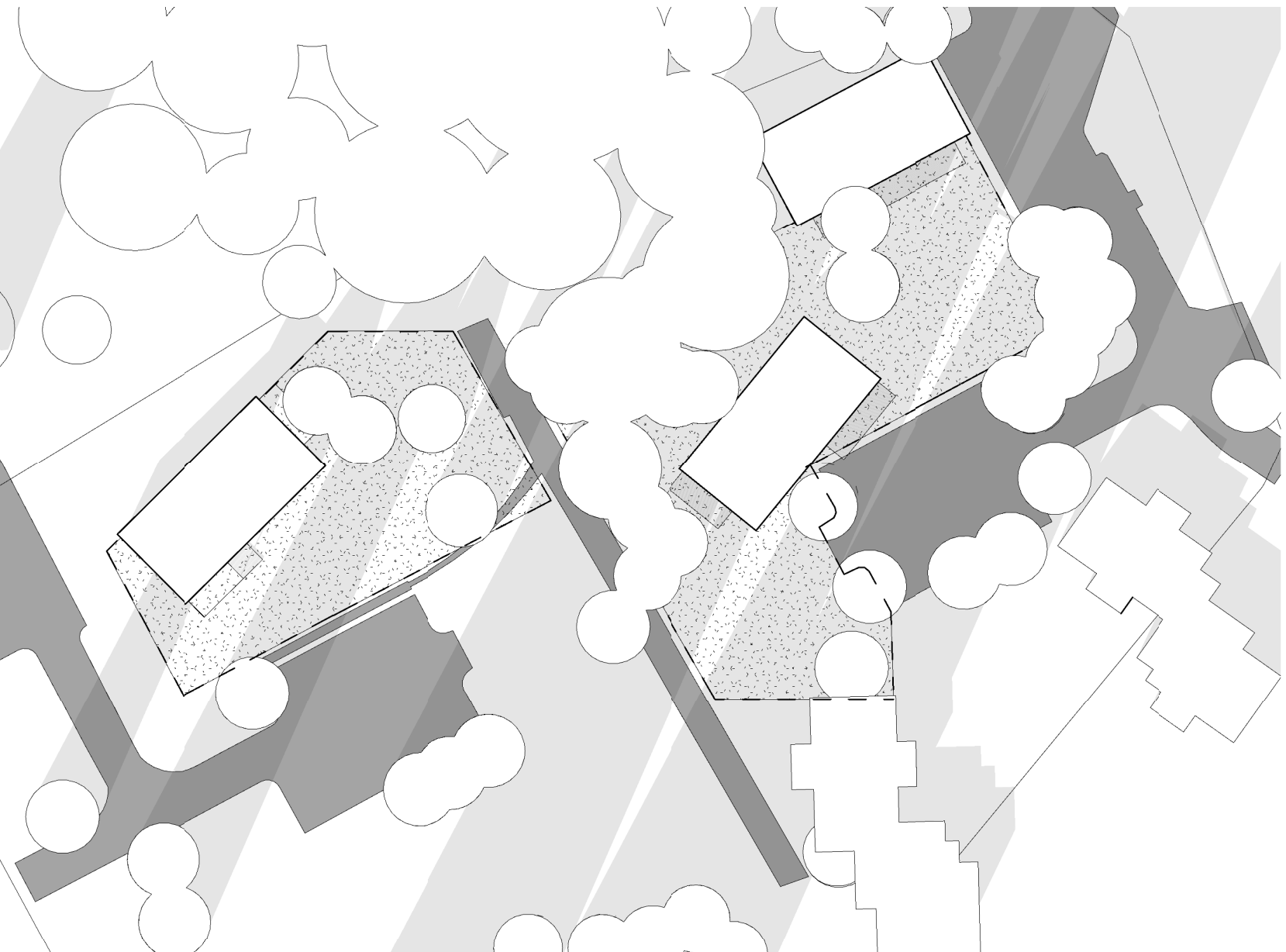
6 Aug 01 2pm



7 Dec 22 10 am



8 Dec 22 12 am



9 Dec 22 2 pm

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ISSUES + REVISIONS		
NO	DATE	DESCRIPTION
A	Jan 10, 2019	Issued for Development Permit

Design consultant:

**communities + architecture inc.**  
806-318 Homer St.  
Vancouver, BC V2B 2V2  
(604)-612-2643 pturje@gmail.com

Coordinating registered professional:

**public**  
1415 FRANCES STREET  
VANCOUVER BC V5L 1Z1  
TEL 604.738.4323  
WWW.PUBLICDESIGN.CA

Acadia Modular  
Childcare

PROJECT CODE 1828	TRUE NORTH	
STATUS DP	DATE	
	190102	

Shadow Studies

SHEET A2.04 REVISION





1 East View from central pathway



2 West view from building 3



3 East view from building 1



4 South view from building 2



5 South view from north property line



6 West view from building 2

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WWW.PUBLICDESIGN.CA

Acadia Modular  
Childcare

TRUE NORTH	
PROJECT CODE	STATUS
1828	DP
	DATE
	190102

Site Photos

SHEET  
A2.05



LEGEND

EX. WATER	<span style="color:blue">—</span>
EX. WATER – IRRIGATION	<span style="color:blue">—</span>
EX. SANITARY SEWER	<span style="color:red">—</span>
EX. STORM SEWER	<span style="color:green">—</span>
EX. GAS	<span style="color:magenta">—</span>
EX. STEAM	<span style="color:lightgreen">- - -</span>
EX. HYDRO	<span style="color:orange">—</span>
EX. TEL / COMM	<span style="color:orange">—</span>
PROP. WATER	<span style="color:black">—</span>
PROP. SANITARY SEWER	<span style="color:black">—</span>
PROP. STORM SEWER	<span style="color:black">—</span>

INFORMATION ON EXISTING UTILITIES MAY NOT BE COMPLETE OR ACCURATE. PRIOR TO CONSTRUCTION CONTRACTOR SHALL EXPOSE LOCATIONS OF ALL EXISTING UTILITIES AND ADVISE THE ENGINEER OF POTENTIAL CONFLICTS.

THIS DRAWING MUST NOT BE SCALED. THE GENERAL CONTRACTOR SHALL VERIFY ALL DIMENSIONS, DATUMS AND LEVELS PRIOR TO COMMENCEMENT OF WORK. ALL ERRORS AND OMISSIONS MUST BE REPORTED IMMEDIATELY TO THE CONSULTANT. THIS DRAWING IS TO BE USED IN CONJUNCTION WITH ALL OTHER DRAWINGS AND SPECIFICATIONS. VARIATIONS AND MODIFICATIONS TO WORK SHOWN SHALL NOT BE CARRIED OUT WITHOUT WRITTEN PERMISSION FROM THE CONSULTANT. THIS DRAWING IS THE EXCLUSIVE PROPERTY OF THE CONSULTANT AND CANNOT BE REPRODUCED, COPIED, OR LOANED WITHOUT PERMISSION OF THE CONSULTANT.

CLIENT :

UBC CHILDCARE SERVICES,  
UBC STUDENT HOUSING &  
HOSPITALITY SERVICES

CONSULTANT : CIVIL

**CoreGroup**  
CONSULTANTS  
LAND DEVELOPMENT SERVICES  
320-8888 FRASERTON COURT  
BURNABY, BC V5J 5H9  
tel. (604)299 0605 fax. (604)299 0629

GRAPHIC SCALE



SCALE: 1:250

CHECK BEFORE YOU DIG

INFORMATION ON EXISTING UTILITIES MAY NOT BE COMPLETE OR ACCURATE. PRIOR TO CONSTRUCTION CONTRACTOR SHALL EXPOSE LOCATIONS OF ALL EXISTING UTILITIES AND ADVISE THE ENGINEER OF POTENTIAL CONFLICTS. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS FOR UTILITIES, SERVICE LOCATIONS, AND DETAILS. THE EXACT LOCATION OF THESE UTILITIES SHALL BE DETERMINED ON SITE.

1	2019/01/03	FOR DISCUSSION PURPOSES
NO.	DATE	DESCRIPTION

NORTH POINT : STAMP :



PROJECT :

MODULAR DAYCARES  
UBC CHILDCARE SERVICES  
UBC STUDENT HOUSING &  
HOSPITALITY SERVICES  
ACADIA PARK

UNIVERSITY OF BRITISH COLUMBIA

DRAWING :

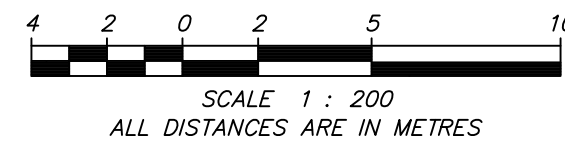
PRELIMINARY  
SITE SERVICING

PROJECT NO : 2007	SCALE : 1 : 250
DATE : JAN. 3, 2019	DRAWN BY : BC
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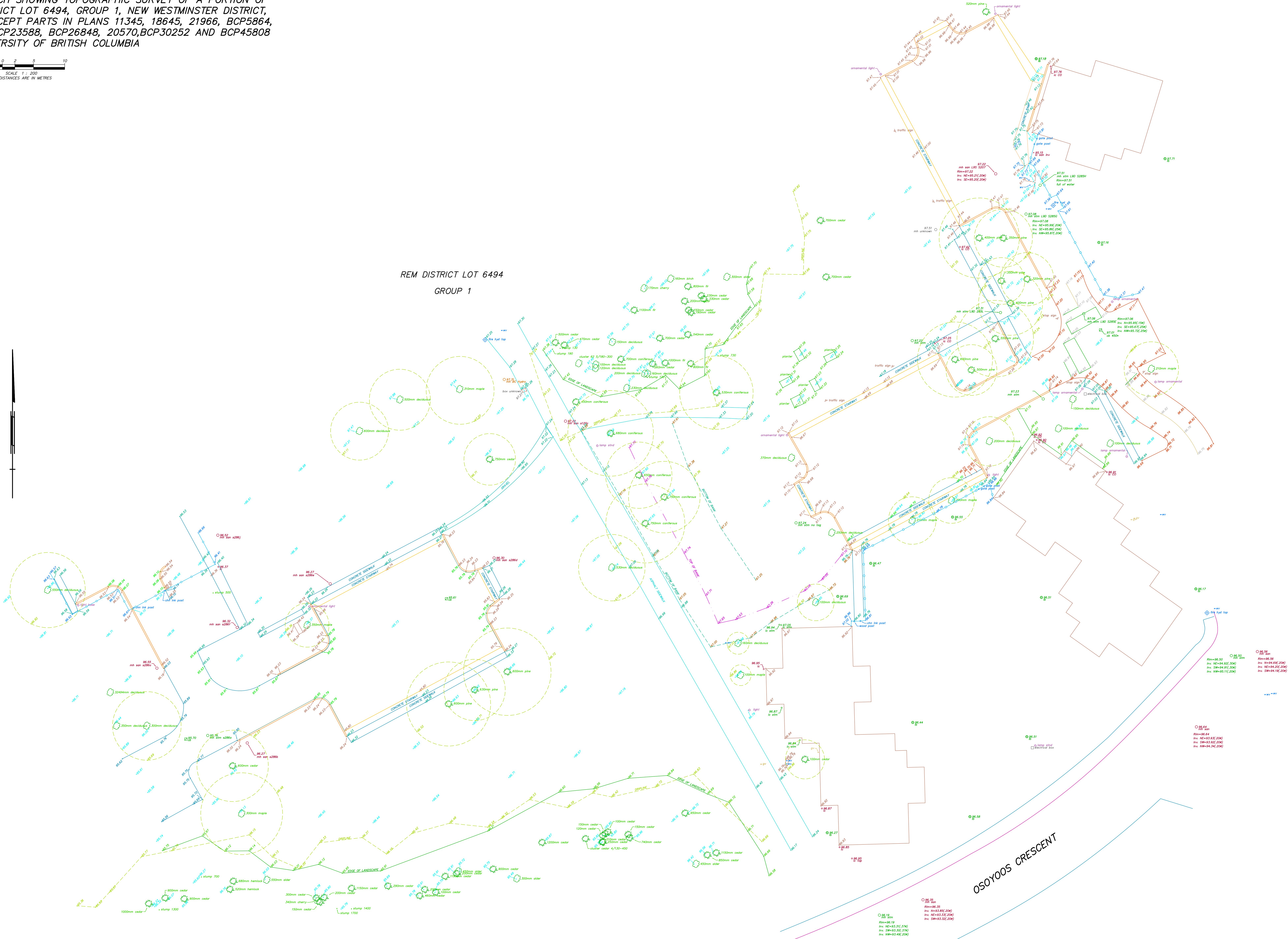
C 01



SKETCH SHOWING TOPOGRAPHIC SURVEY OF A PORTION OF DISTRICT LOT 6494, GROUP 1, NEW WESTMINSTER DISTRICT, EXCEPT PARTS IN PLANS 11345, 18645, 21966, BCP5864, BCP23588, BCP26848, 20570, BCP30252 AND BCP45808 UNIVERSITY OF BRITISH COLUMBIA



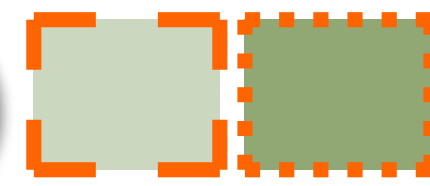
REM DISTRICT LOT 6494  
GROUP 1



**NOTES :**  
ALL ELEVATIONS AND DISTANCES SHOWN ARE IN METRES.  
ELEVATIONS ARE DERIVED FROM UBC MONUMENT W-W, LOCATED ON EAST MAUL IN FRONT OF THE GEME BUILDING (BETWEEN AGRONOMY ROAD AND UNIVERSITY BOULEVARD)  
GEODETIC ELEVATION = 93.631  
THIS PLAN SHOWS THE LOCATION OF VISIBLE FEATURES ONLY, AND DOES NOT INDICATE BURIED SERVICES THAT MAY EXIST ON OR AROUND THE SUBJECT SITE  
TREE SPECIES AND DIMENSIONS SHOULD BE CONFIRMED BY A QUALIFIED ARBORIST. TREE SYMBOLS ARE NOT AN INDICATION OF DRIP LINE LOCATION UNLESS SPECIFICALLY LABELLED.



# LEGEND:



IDENTIFIES THE 6 PLAY-YARDS

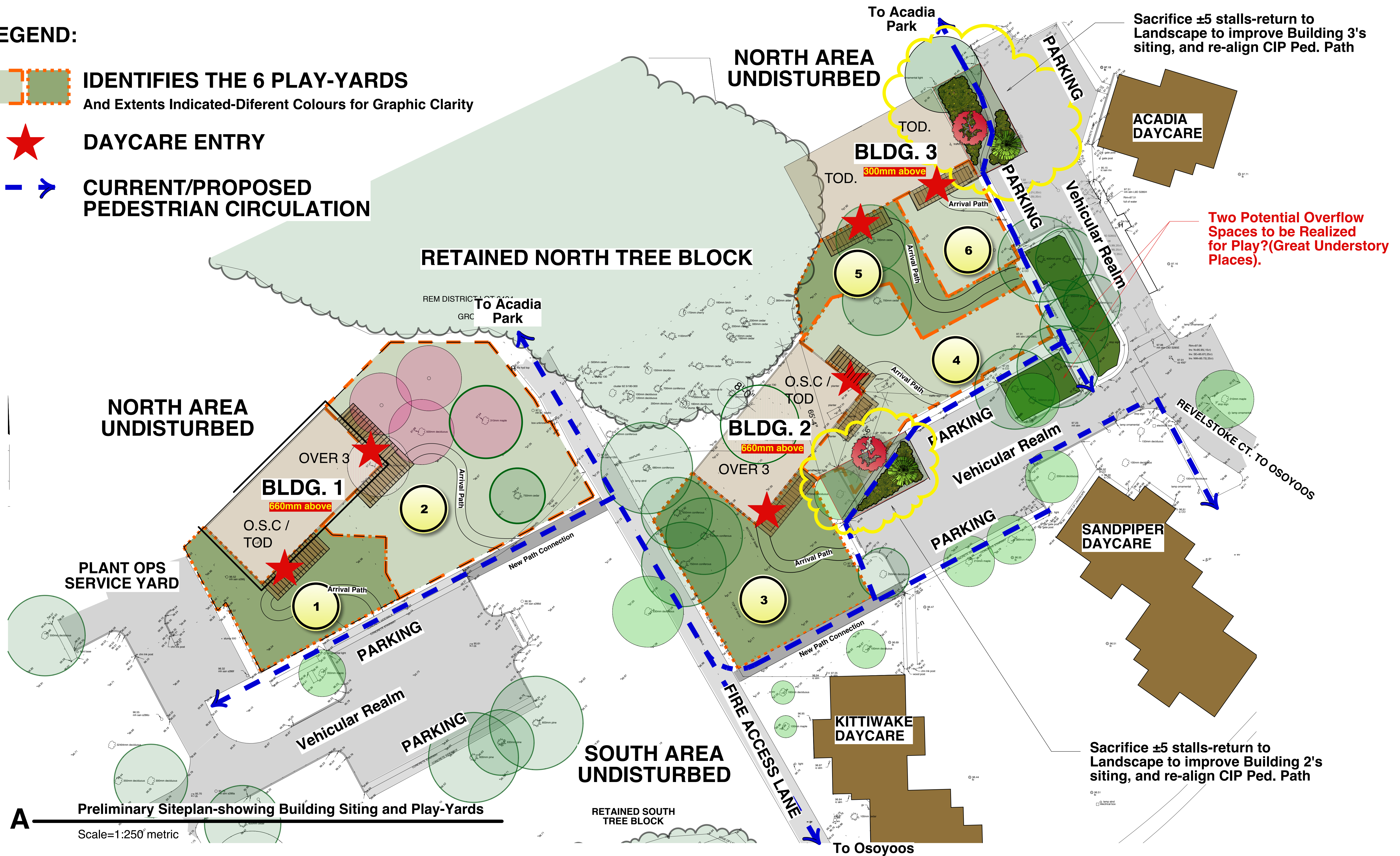
And Extents Indicated-Diferent Colours for Graphic Clarity



DAYCARE ENTRY



CURRENT/PROPOSED  
PEDESTRIAN CIRCULATION



**A** Preliminary Siteplan-showing Building Siting and Play-Yards  
Scale=1:250 metric

January 10th, 2018

## 3.1 UBC Modular Daycares -Siteplan-All Three Buildings W/ Play-Yards

scale: As Shown



# Arboricultural Inventory and Report

For:

UBC Properties Trust

Site Location:

Daycare Sites – Three Locations



---

Submitted to:

Sepehr Rad

UBC Properties Trust

Email:

Srad@ubcproperties.com

Date: 20181031

Submitted by:



**DIAMOND HEAD**

3559 Commercial Street  
Vancouver, BC 604.733.4886





The following Diamond Head Consulting staff conducted the on-site tree inventory and prepared or reviewed the report.

All general and professional liability insurance and staff accreditations are provided below for reference.

**Project Staff:**



Trevor Cox, RPP, MCIP  
ISA Certified Arborist (PN-1920A)  
ISA Tree Risk Assessment Qualified (TRAQ)  
BC Parks Wildlife and Danger Tree Assessor

Please contact us if there are any questions or concerns about the contents of this report.

**Contact Information:**

Phone: 604-733-4886  
Fax: 604-733-4879  
Email: [trevor@diamondheadconsulting.com](mailto:trevor@diamondheadconsulting.com)  
Website: [www.diamondheadconsulting.com](http://www.diamondheadconsulting.com)

**Insurance Information:**

WCB: # 657906 AQ (003)  
General Liability: Northbridge General Insurance Corporation - Policy #CBC1935506, \$10,000,000  
Errors and Omissions: Lloyds Underwriters – Policy #1010615D, \$1,000,000



### Scope of Assignment:

Diamond Head Consulting Ltd. (DHC) was retained to complete a tree inventory for an area of the UBC Vancouver campus, where daycares are proposed near Revelstoke Court. It is understood that mobile daycare centers will be brought onto site which will be supported in their proposed locations on piles that will be screwed into the soil. The installation of any piles, walkways or work within the tree protection zones will need to be supervised by the project arborist. Please note that there are also a number of large trees that are to the north and west of these proposed buildings that contain defects. Many of these mature trees appear to have had broken tops about 30 years ago. Consequently, many of them have codominant stems that may have decay or issues where they are attached. These parts have the potential to strike the building and therefore it is recommended that they be climbed and inspected by a qualified arborist and tree risk assessor. A report detailing the findings should be supplied to UBC with the recommended actions and a monitoring plan (and those that were undertaken). **Please note that a full tree survey was not provided for the site. The attached map provides their locations where they were surveyed and those that were not.**

This report is produced with the following primary limitations, detailed limitations specified in Appendix 7:

- 1) Our investigation is based solely on visual inspection of the trees during our last site visit. This inspection is conducted from ground level. We do not conduct aerial inspections, soil tests or below grade root examinations to assess the condition of tree root systems unless specifically contracted to do so.
- 2) Unless otherwise stated, tree risk assessments in this report are limited to trees with a *high* or *extreme* risk rating **in their current condition, and in context of their surrounding land use at the time of assessment.**
- 3) The scope of work is primarily determined by site boundaries and local tree-related bylaws. Only trees specified in the scope of work were assessed.
- 4) Beyond six months from the date of this report, the client must contact DHC to confirm its validity because site base plans and tree conditions may change beyond the original report's scope. Additional site visits and report revisions may be required after this point to ensure report accuracy for the municipality's development permit application process. Site visits and reporting required after the first submission are not included within the original proposal fee and will be charged to the client at an additional cost.
- 5) Assessment areas are limited to the three select areas identified in figures 2-4. These assessment areas were field assessed by the project arborist, using their best judgement. A survey was not provided, and as such all locations are approximate and based on the project arborist field assessment.



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## **1.0 Introduction**

### **1.1 Site Overview and Proposed Land Use Changes**

The three sites proposed for the daycares are located to the west of the northerner end of Revelstoke Court. The forest cover in the surrounding area consists of a larger stand of trees consisting of Douglas-fir and Western redcedar trees that are about 100 years old with several ornamental landscape trees that have been planted in the grassed areas to the south consisting of flowering cherries and deodora cedars.

### **1.2 Report Objective**

This report has been prepared to help guide tree management around the proposed daycares. Fencing has been indicated adjacent to trees where they have the potential to be impacted by construction activities. Recommendations have been made for pruning, cabling and bracing and detailed inspections of defects up in trees to reduce the risk of failure adjacent to these proposed buildings. Arborist supervision is recommended where any work is proposed within the tree protection zones, regardless of whether it is noted in the report. With the construction staging or access into the site, there may be additional trees nearby that require protection. Staging and construction access should be discussed prior to constructing the tree protection fencing.

A summary of trees proposed for removal by diameter class by species is provided. This report also outlines the existing condition of the protected trees on and adjacent to the daycares and this information is provided below.





Figure 1. The three daycare sites are to be situated in areas near the middle of the photo (Air photo from Google Earth 2018).

## 2.0 Process and Methods

### 2.1 Tree Inventory

The trees to be inventoried were identified by the project manager for UBC Properties Trust. Several stakes were in the ground indicating the edges of the proposed siting's for the Daycares under 'Option 4'. This provided guidance for the assessment of trees that could strike the potential daycares from the surrounding forest cover. On October 22, 2018 the trees on site were inventoried. Trees on site over 15cm Diameter at Breast Height were identified (if not already tagged) and assessed for attributes including: species; height; and, diameter at breast height (DBH) measured to the nearest centimeter at 1.4 m above grade. The general health and structural integrity of each tree was assessed visually and assigned to one of five categories: *excellent*; *good*; *moderate*; *poor*; or *dying/dead*. Descriptions of the health and structure rating criteria are given in Appendix 3.



Tree retention value, categorized as *high, medium, low, or nil*, was assigned to each tree or group of trees based on their health and structure rating, and potential longevity in a developed environment. Descriptions of the retention value ratings are given in Appendix 4.

## 2.2 Tree Risk Assessment

Tree risk assessments were completed following methods of the ISA Tree Risk Assessment Manual<sup>1</sup> published in 2013 by the International Society of Arboriculture, which is the current industry standard for assessing tree risk. This methodology assigns risk based on the likelihood of failure, the likelihood of impact and the severity of consequence if a failure occurs. Only on-site trees that had *high* or *extreme* risk ratings in their current condition and in context of their surrounding land use were identified and reported in section 3.2. Appendix 5 gives the likelihood and risk rating matrices used to categorize tree risk. DHC recommends that on-site trees be re-assessed for risk after the site conditions change (e.g. after damaging weather events, site disturbance from construction, creation of new targets during construction or in the final developed landscape).

## 2.3 Tree Protection

Critical root zones were calculated for each tree according to a general 6x the diameter of the tree but may be modified in some instances based on professional judgement of the project arborist to accommodate species specific tolerances and site-specific growing conditions.

# 3.0 Findings: Tree Inventory and Risk Assessment

## 3.1 Tree Inventory

The tree inventory is summarized in Table 1 and the complete tree inventory is given in Appendix 1.

### Trees Inventoried

There were 18 protected trees identified for the purposed of this plan either because they were directly adjacent to the proposed development or because they posed a possible risk. (see Appendix 1 for individual tree inventory information).

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<sup>1</sup> Dunster, J.A., Smiley, E.T., Matheny, N. and Lilly, S. (2013). Tree Risk Assessment Manual. *International Society of Arboriculture*. Champaign, Illinois.





Trees marked with a solid green dot have been surveyed. Those as a green outline with a white center have not been surveyed.



- LEGEND
- CRITICAL ROOT ZONE
  - TREE PROTECTION ZONE AND FENCING
  - TREE TO BE RETAINED
  - UN-SURVEYED TREE
  - TREE TO BE REMOVED

- NOTES
- The location of un-surveyed trees on this plan is approximate. Their location and ownership cannot be confirmed without being surveyed by a Registered BC Land Surveyor.
  - All tree protection fencing must be built to the relevant municipal bylaw specifications. The dimensions shown are from the outer edge of the stem of the tree.
  - The tree protection zone shown is a graphical representation of the critical root zone, measured from the outer edge of the stem of the tree. (1/2 the trees diameter was added to the graphical tree protection circles to accommodate the survey point being in the center of the tree)
  - Any construction activities or grade changes within the Root Protection Zone must be approved by the project arborist.
  - This plan is based on a topographic and tree location survey provided by the owners' Registered British Columbia Land Surveyor (BCLS) and layout drawings provide by the owners' Engineer (P Eng).
  - This plan is provided for context only, and is not certified as to the accuracy of the location of features or dimensions that are shown on this plan. Please refer to the original survey plan and engineering plans.

- REFERENCE DRAWINGS
- Base Survey by: Architect to UBCPT



#### Tree Risk Assessment

There were no trees on this site that posed a *high* or *extreme* risk at the time of assessment.



## Appendix 1 Complete Tree Inventory Table

The complete tree inventory below contains information on tree attributes and recommendations for removal or retention. Tree ownership in this inventory table is not definitive, its determination here is based on information available from the legal site survey, GPS locations, and field assessment during site visits. Critical Root Zones are measured from the outer edge of a tree's stem and are generally used to delineate the Tree Protection Zone. If using these measurements for mapping the tree protection zone, ½ the tree's diameter must be added to the distance to accommodate a survey point at the tree's center. Where Tree Protection Zones are proposed to vary from the CRZ, comments will be included in the Retention/TPZ comments and shown on the Tree Retention and Removal Plan. Trees T1-T4 have not been tagged in the field.

Tag #	Location	Species	DBH (cm)	Height (m)	Health and Structure Rating	Comments	Retention Value Rating	Retain/Remove	Retention/TPZ Comments	CRZ
70	onsite	Douglas-fir (P. menziesii)	79	32	Moderate	Codom stem with u union at 20 m	Medium	Retain	Requires that building piles are placed out of root zone and tree is lift pruned on north side. Arborist supervision required for footing work.	4.7
71	onsite	Cedar (T. plicata)	38	15	Moderate	At forest edge. Under canopy of cedar behind. Supressed Live crown pruned to 3m	Medium	Remove	Survey has not been completed but stakes indicate that this tree is right up against building edge. Not feasible to retain or work around.	2.3
72	onsite	Cedar (T. plicata)	38	15	Moderate	At forest edge. Under canopy of cedar behind. Supressed Large scar at 2 m on southwest side. Solid wood behind. Live crown pruned to 3m. Only live on south side.	Medium	Retain	Tree has not been surveyed. Appears that arborist lift pruning will be required	2.3
73	onsite	Cedar (T. plicata)	18	11	Poor	Second stem of tree to northwest. Very little live crown- shaded out. Large decay cavity at base and at 1m	Low	Remove	Remove only the tagged stem.	2



Tag #	Location	Species	DBH (cm)	Height (m)	Health and Structure Rating	Comments	Retention Value Rating	Retain/ Remove	Retention/TPZ Comments	CRZ
74	onsite	Douglas-fir (P. menziesii)	80	32	Moderate	Kink in stem at 20m inspect to retain. With the proximity to the building requires monitoring if it is retained.	Medium	Retain	Tree has not been surveyed. Appears to have sufficient space in relation to stakes. Tree protection fencing required. Inspect and Monitor/Prune	4.7
75	onsite	Douglas-fir (P. menziesii)	85	32	Moderate	Defect - Codominant stem at 20m- inspect to retain. With the proximity to the building requires monitoring if it is retained.	Medium	Retain	Inspect and Prune	4.7
76	onsite	Douglas-fir (P. menziesii)	90	32	Moderate	Single stem to 20m then splits. Inspect unions. With the proximity to the building requires monitoring if it is retained.	Medium	Retain	Inspect and Prune	4.7
77	onsite	Douglas-fir (P. menziesii)	83	32	Good	Single stem with two large kinks. Inspect at 20m . With the proximity to the building requires monitoring if it is retained.	Medium	Retain	Inspect and Prune/Monitor. The root zone conflicts with the building placement. Requires arborist supervision of any work within this zone.	5
78	onsite	Cedar (T. plicata)	95	29	Poor	Codom at. 15 m with severe inclusion Little live - tree is in decline. With the proximity to the building requires monitoring if it is retained.	Nil	Remove	Inspect maybe reduce codom on out side by 2/3	5.7
79	onsite	Cedar (T. plicata)	120	30	Moderate	Included seam at 3-8m requires brace and cablng. With the proximity to the building requires monitoring if it is retained.	Medium	Retain	Inspect and Prune/Cable and Brace/Monitor.	7.2
536	onsite	Douglas-fir (P. menziesii)	76	33	Moderate	Tree was not surveyed. Forked top, U-union at about 18m. Requires assessment to determine extent of decay and potential for pruning. With the proximity to the building requires monitoring if it is retained.	Medium	Retain	Inspect and Monitor/Prune	4.6
1521	onsite	Cherry (P. x yedoensis)	46	7	Moderate	No leaves at the time of assessment. Has black canker growth. Single stem with little dieback	Medium	Retain	Protect as required. Arborist supervision required for any work within tree protection fencing	2.8



Tag #	Location	Species	DBH (cm)	Height (m)	Health and Structure Rating	Comments	Retention Value Rating	Retain/ Remove	Retention/TPZ Comments	CRZ
1522	onsite	Cherry (P. x yedoensis)	36	7	Moderate	No leaves at the time of assessment. Has black canker growth. Single stem with little dieback	Medium	Retain	Protect as required. Arborist supervision required for any work within tree protection fencing	2.2
1523	onsite	Cherry (P. x yedoensis)	40	7	Moderate	No leaves at the time of assessment. Has black canker growth. Single stem with little dieback	Medium	Retain	Protect as required. Arborist supervision required for any work within tree protection fencing	2.4
1524	onsite	Cherry (P. x yedoensis)	41	7	Moderate	No leaves at the time of assessment. Has black canker growth. Single stem with little dieback	Medium	Remove	Within building envelope.	2.5
1538	onsite	Cedrus (C. deodara)	48	23	Moderate	Compacted at base, trail 2.5m south. Heavy lean south but corrected. Likely root failure in past; scar at base and 2m. Lifts pruned to 4m	Medium	Remove	Within building envelope.	2.9
1541	onsite	Cedar (T. plicata)	68	22	Moderate	Slight compaction around base. Lift pruned to 4m. Upper canopy has 3 stems emerging at 18m. 10cm attachments. Prune to retain. Could use mulch around base within dripline.	Medium	Retain	Protect as required. Arborist supervision required for any work within tree protection fencing	4.1
1542	onsite	Cedar (T. plicata)	81	23	Good	Slight compaction around base. Lift pruned to 3m. Could use mulch around base within dripline.	High	Retain	Protect as required. Arborist supervision required for any work within tree protection fencing	4.9
T1	onsite	Cedrus (C. deodara)	48	23	Moderate	Compacted around base. Trail to the west. Single stem.	Medium	Retain	Protect as required. Arborist supervision required for any work within tree protection fencing	2.9
T2	onsite	Cedrus (C. deodara)	52	23	Moderate	Compacted around base. Trail to the west. Single stem.	Medium	Retain	Protect as required. Arborist supervision required for any work within tree protection fencing	3.1
T3	onsite	Cedrus (C. deodara)	47	23	Moderate	Compacted around base. Trail to the west. Single stem.	Medium	Retain	Protect as required. Arborist supervision required for any work within tree protection fencing	2.8



Tag #	Location	Species	DBH (cm)	Height (m)	Health and Structure Rating	Comments	Retention Value Rating	Retain/ Remove	Retention/TPZ Comments	CRZ
T4	onsite	Cedrus (C. deodara)	56	23	Moderate	Compacted around base. Trail to the west. Single stem.	Medium	Retain	Protect as required. Arborist supervision required for any work within tree protection fencing	3.4



## Appendix 2      Site Photographs



Photo 1. Looking at tree 1524 to the right and 1521-1523 in the background.



Photo 2. Looking up into the ‘U’ union located in tree #70. Note that many of the trees have similar attachments that require inspection were noted in the tree tables.





Photo 3. Looking up into trees 76 and 77. Both have similar topping points that require inspection.



Photo 4. Looking at trees 1541 and 1542.



## Appendix 3      Tree Health and Structure Rating Criteria

The tree health and structure ratings used by Diamond Head Consulting summarize each tree based on both positive and negative attributes using five stratified categories. These ratings indicate health and structural conditions that influence a tree's ability to withstand local site disturbance during the construction process (assuming appropriate tree protection) and benefit a future urban landscape.

**Excellent:** Tree of possible specimen quality, unique species or size with no discernible defects.

**Good:** Tree has no significant structural defects or health concerns, considering its growing environment and species.

**Moderate:** Tree has noted health and/or minor to moderate structural defects. This tree can be retained, but may need mitigation (e.g., pruning or bracing) and monitoring post-development. A moderate tree may be suitable for retention within a stand or group, but not suitable on its own.

**Poor:** Tree is in serious decline from previous growth habit or stature, has multiple defined health or structural weaknesses. It is unlikely to acclimate to future site use change. This tree is not suitable for retention within striking distance of most targets.

**Dying/Dead:** Tree is in severe decline, has severe defects or was found to be dead.



## Appendix 4      Tree Retention Value Rating Criteria

The tree retention value ratings used by Diamond Head Consulting provide guidance for tree retention planning. Each tree in an inventory is assigned to one of four stratified categories that reflect its value as a future amenity and environmental asset in a developed landscape. Tree retention value ratings take in to account the health and structure rating, species profile\*, growing conditions and potential longevity assuming a tree's growing environment is not compromised from its current state.

**High:** Tree suitable for retention. Has a good or excellent health and structure rating. Tree is open grown, an anchor tree on the edge of a stand or dominant within a stand or group. Species of *Populus*, *Alnus* and *Betula* are excluded from this category.

**Medium:** Tree suitable for retention with some caveats or suitable within a group\*\*. Tree has moderate health and structure rating, but is likely to require remedial work to mitigate minor health or structural defects. Includes trees that are recently exposed, but wind firm, and trees grown on sites with poor rooting environments that may be ameliorated.

**Low:** Tree has marginal suitability for retention. Health and structure rating is moderate or poor; remedial work is unlikely to be viable. Trees within striking distance of a future site developments should be removed.

**Nil:** Tree is unsuitable for retention. It has a dying/dead or poor health and structure rating. It is likely that the tree will not survive, or it poses an unacceptable hazard in the context of future site developments.

\* The species profile is based upon mature age and height/spread of the species, adaptability to land use changes and tree species susceptibility to diseases, pathogen and insect infestation.

\*\* Trees that are 'suitable as a group' have grown in groups or stands that have a single, closed canopy. They have not developed the necessary trunk taper, branch and root structure that would allow them to be retained individually. These trees should only be retained in groups.



## Appendix 5 Risk Rating Matrices

Trees with a *probable* or *imminent* likelihood of failure, a *medium* or *high* likelihood of impacting a specified target, and a *significant* or *severe* consequence of failure have been assessed for risk and included in this report (Section 3.2). These two risk rating matrices showing the categories used to assign risk are taken without modification to their content from the International Society of Arboriculture Tree Risk Assessment Qualification Manual.

**Matrix 1: Likelihood**

Likelihood of Failure	Likelihood of Impacting Target			
	Very Low	Low	Medium	High
<b>Imminent</b>	Unlikely	Somewhat Likely	Likely	Very Likely
<b>Probable</b>	Unlikely	Unlikely	Somewhat Likely	Likely
<b>Possible</b>	Unlikely	Unlikely	Unlikely	Somewhat Likely
<b>Improbable</b>	Unlikely	Unlikely	Unlikely	Unlikely

**Matrix 2: Risk Rating**

Likelihood of Failure and Impact	Consequences of Failure			
	Negligible	Minor	Significant	Severe
<b>Very Likely</b>	Low	Moderate	High	Extreme
<b>Likely</b>	Low	Moderate	High	High
<b>Somewhat Likely</b>	Low	Low	Moderate	Moderate
<b>Unlikely</b>	Low	Low	Low	Low



## Appendix 6      Construction Guidelines

Tree management recommendations in this report are made under the expectation that the following guidelines for risk mitigation and proper tree protection will be adhered to during construction.

Respecting these guidelines will prevent changes to the soil and rooting conditions, contamination due to spills and waste, or physical wounding of the trees. Any plans for construction work and activities that deviate from or contradict these guidelines should be discussed with the project arborist so that mitigation measures can be implemented.

### **Critical Root Zones**

Critical root zones (CRZs) are specifically intended to protect a tree's roots from negative construction impacts. CRZs are required to retain good health and vigor of the tree during development and in the future landscape. The CRZ boundary is measured as a radius in all directions from the outer surface of the tree's stem. The CRZ radius is typically determined according to local municipal bylaw specifications or guidelines and may be modified based on professional judgement of the project arborist to accommodate species specific tolerances and site specific growing conditions.

### **Tree Protection Zones**

Tree protection zones (TPZs) are fenced areas around the recommended CRZ. Within a TPZ, no construction activity, including materials storage, grading or landscaping, may occur without project arborist approval. Within the TPZ, the following are tree preservation guidelines based on industry standards for best practice and local municipal requirements:

- No soil disturbance or stripping.
- Maintain the natural grade.
- No storage, dumping of materials, parking, underground utilities or fires within TPZs or tree driplines.
- Any planned construction and landscaping activities affecting trees should be reviewed and approved by a consulting arborist.
- Install specially designed foundations and paving when these structures are required within TPZs.
- Route utilities around TPZs.
- Excavation within the TPZs should be supervised by a consultant arborist.
- Surface drainage should not be altered in such a way that water is directed in or out of the TPZ.
- Site drainage improvements should be designed to maintain the natural water table levels within the TPZ.

### **Tree Protection Fences**

Prior to any construction activity, tree protection fences must be constructed at the root protection zone perimeter. The protection barrier or temporary fencing must be at least 1.2 m in height and constructed of 2" by 4" lumber with orange plastic mesh screening. Tree protection fences must be



constructed prior to tree removal, excavation or construction and remain intact throughout the entire duration of construction.

### **Tree Crown Protection and Pruning**

All heavy machinery (excavators, cranes, dump trucks, etc.) working within five meters of a tree's crown should be made aware of their proximity to the tree. If there is to be a sustained period of machinery working within five meters of a tree's crown, a line of colored flags should be suspended at eye-level of the machinery operator for the length of the protected tree area. Any concerns regarding the clearance required for machinery and workers within or immediately outside tree protection zones should be referred to the project arborist so that a zone surrounding the crowns can be established or pruning measures undertaken. Any wounds incurred to protected trees during construction should be reported to the project arborist immediately.

### **Unsurveyed Trees**

Unsurveyed trees identified by DHC in the Tree Retention Plan have been hand plotted for approximate location only using GPS coordinates and field observations. The location and ownership of unsurveyed trees cannot be confirmed without a legal survey. The property owner or project developer must ensure that all relevant on- and off-site trees are surveyed by a legally registered surveyor, whether they are identified by DHC or not.

### **Removal of logs from sites**

Private timber marks are required to transport logs from privately-owned land in BC. It is property owner's responsibility to apply for a timber mark prior to removing any merchantable timber from the site. Additional information can be found at: <http://www.for.gov.bc.ca/hth/private-timber-marks.htm>

### **Regulation of Soil Moisture and Drainage**

Excavation and construction activities adjacent to TPZs can influence the availability of moisture to protected trees. This is due to a reduction in the total root mass, changes in local drainage conditions, and changes in exposure including reflected heat from adjacent hard surfaces. To mitigate these concerns the following guidelines should be followed:

- Soil moisture conditions within the tree root protection zones should be monitored during hot and dry weather. When soil moisture is inadequate, supplemental irrigation should be provided that penetrates soil to the depth of the root system or a minimum of 30 cm.
- Any planned changes to surface grades within the TPZs, including the placement of mulch, should be designed so that any water will flow away from tree trunks.
- Excavations adjacent to trees can alter local soil hydrology by draining water more rapidly from TPZs more rapidly than it would prior to site changes. It is recommended that when excavating within 6 m of any tree, the site be irrigated more frequently to account for this.



### **Root Zone Enhancements and Fertilization**

Root zone enhancements such as mulch, and fertilizer treatments may be recommended by the project arborist during any phase of the project if they deem it necessary to maintain tree health and future survival.

### **Paving Within and Adjacent to TPZs**

If development plans propose the construction of paved areas and/or retaining walls close to TPZs, measures should be taken to minimize impacts. Construction of these features would raise concerns for proper soil aeration, drainage, irrigation and the available soil volume for adequate root growth. The following design and construction guidelines for paving and retaining walls are recommended to minimize the long-term impacts of construction on protected trees:

- Any excavation activities near or within the TPZ should be monitored by a certified arborist. Structures should be designed, and excavation activities undertaken to remove and disturb as little of the rooting zone as possible. All roots greater than 2 cm in diameter should be hand pruned by a Certified Arborist.
- The natural grade of a TPZ should be maintained. Any retaining walls should be designed at heights that maintain the existing grade within 20 cm of its current level. If the grade is altered, it should be raised not reduced in height.
- Compaction of sub grade materials can cause trees to develop shallow rooting systems. This can contribute to long-term pavement damage as roots grow. Minimizing the compaction of subgrade materials by using structural soils or other engineered solutions and increasing the strength of the pavement reduces reliance on the sub-grade for strength.
- If it is not possible to minimize the compaction of sub-grade materials, subsurface barriers should be considered to help direct roots downward into the soil and prevent them from growing directly under the paved surfaces.

### **Plantings within TPZs**

Any plans to landscape the ground within the TPZ should implement measures to minimize negative impacts on the above or below ground parts of a tree. Existing grass layer in TPZs should not be stripped because this will damage surface tree roots. Grass layer should be covered with mulch at the start of the project, which will gradually kill the grass while moderating soil moisture and temperatures. Topsoil should be mixed with the mulch prior to planting of shrubs, but new topsoil layer should not be greater than 20 cm deep on top of the original grade. Planting should take place within the newly placed topsoil mixture and should not disturb the original rooting zone of the trees. A two-meter radius around the base of each tree should be left unplanted and covered in mulch; a tree's root collar should remain free from any amendments that raise the surface grade.

### **Monitoring during construction**

Ongoing monitoring by a consultant arborist should occur for the duration of a development project. Site visits should be more frequent during activities that are higher risk, including the first stages of construction when excavation occurs adjacent to the trees. Site visits will ensure contractors are



respecting the recommended tree protection measures and will allow the arborist to identify any new concerns that may arise.

During each site visit the following measures will be assessed and reported on by a consulting arborist:

- Health and condition of protected trees, including damage to branches, trunks and roots that may have resulted from construction activities, as will the health of. Recommendations for remediation will follow.
- Integrity of the TPZ and fencing.
- Changes to TPZ conditions including overall maintenance, parking on roots, and storing or dumping of materials within TPZ. If failures to maintain and respect the TPZ are observed, suggestions will be made to ensure tree protection measures are remediated and upheld.
- Review and confirmation of recommended tree maintenance including root pruning, irrigation, mulching and branch pruning.
- Changes to soil moisture levels and drainage patterns; and
- Factors that may be detrimentally impact the trees.



## Appendix 7      Report Assumptions and Limiting Conditions

- 1) Unless expressly set out in this report or these Assumptions and Limiting Conditions, Diamond Head Consulting Ltd. (“Diamond Head”) makes no guarantee, representation or warranty (express or implied) regarding this report, its findings, conclusions or recommendations contained herein, or the work referred to herein.
- 2) The work undertaken in connection with this report and preparation of this report have been conducted by Diamond Head for the “Client” as stated in the report above. It is intended for the sole and exclusive use by the Client for the purpose(s) set out in this report. Any use of, reliance on or decisions made based on this report by any person other than the Client, or by the Client for any purpose other than the purpose(s) set out in this report, is the sole responsibility of, and at the sole risk of, such other person or the Client, as the case may be. Diamond Head accepts no liability or responsibility whatsoever for any losses, expenses, damages, fines, penalties or other harm (including without limitation financial or consequential effects on transactions or property values, and economic loss) that may be suffered or incurred by any person as a result of the use of or reliance on this report or the work referred to herein. The copying, distribution or publication of this report (except for the internal use of the Client) without the express written permission of Diamond Head (which consent may be withheld in Diamond Head’s sole discretion) is prohibited. Diamond Head retains ownership of this report and all documents related thereto both generally and as instruments of professional service.
- 3) The findings, conclusions and recommendations made in this report reflect Diamond Head’s best professional judgment given the information available at the time of preparation. This report has been prepared in a manner consistent with the level of care and skill normally exercised by arborists currently practicing under similar conditions in a similar geographic area and for specific application to the trees subject to this report on the date of this report. Except as expressly stated in this report, the findings, conclusions and recommendations it sets out are valid for the day on which the assessment leading to such findings, conclusions and recommendations was conducted. If generally accepted assessment techniques or prevailing professional standards and best practices change at a future date, modifications to the findings, conclusions, and recommendations in this report may be necessary. Diamond Head expressly excludes any duty to provide any such modification if generally accepted assessment techniques and prevailing professional standards and best practices change.
- 4) Conditions affecting the trees subject to this report (the “Conditions”, include without limitation, structural defects, scars, decay, fungal fruiting bodies, evidence of insect attack, discolored foliage, condition of root structures, the degree and direction of lean, the general condition of the tree(s) and the surrounding site, and the proximity of property and people) other than those expressly addressed in this report may exist. Unless otherwise stated information contained in this report covers only those Conditions and trees at the time of inspection. The inspection is limited to visual examination of such Conditions and trees without dissection, excavation, probing or coring. While



every effort has been made to ensure that any trees recommended for retention are both healthy and safe, no guarantees, representations or warranties are made (express or implied) that those trees will not be subject to structural failure or decline. The Client acknowledges that it is both professionally and practically impossible to predict with absolute certainty the behavior of any single tree, or groups of trees, in all given circumstances. Inevitably, a standing tree will always pose some risk. Most trees have the potential for failure and this risk can only be eliminated if the risk is removed. If Conditions change or if additional information becomes available at a future date, modifications to the findings, conclusions, and recommendations in this report may be necessary. Diamond Head expressly excludes any duty to provide any such modification of Conditions change or additional information becomes available.

- 5) Nothing in this report is intended to constitute or provide a legal opinion and Diamond Head expressly disclaims any responsibility for matters legal in nature (including, without limitation, matters relating to title and ownership of real or personal property and matters relating to cultural and heritage values). Diamond Head makes no guarantee, representation or warranty (express or implied) as to the requirements of or compliance with applicable laws, rules, regulations, or policies established by federal, provincial, local government or First Nations bodies (collectively, "Government Bodies") or as to the availability of licenses, permits or authorizations of any Government Body. Revisions to any regulatory standards (including bylaws, policies, guidelines an any similar directions of a Government Bodies in effect from time to time) referred to in this report may be expected over time. As a result, modifications to the findings, conclusions and recommendations in this report may be necessary. Diamond Head expressly excludes any duty to provide any such modification if any such regulatory standard is revised.
- 6) Diamond Head shall not be required to give testimony or to attend court by reason of this report unless subsequent contractual arrangements are made, including payment of an additional fee for such services as described in the fee schedule and contract of engagement.
- 7) In preparing this report, Diamond Head has relied in good faith on information provided by certain persons, Government Bodies, government registries and agents and representatives of each of the foregoing, and Diamond Head assumes that such information is true, correct and accurate in all material respects. Diamond Head accepts no responsibility for any deficiency, misinterpretations or fraudulent acts of or information provided by such persons, bodies, registries, agents and representatives.
- 8) Sketches, diagrams, graphs, and photographs in this report, being intended as visual aids, are not necessarily to scale and should not be construed as engineering or architectural reports or surveys.
- 9) Loss or alteration of any part of this report invalidates the entire report.





UBC Properties Trust  
200 – 3313 Shrum Lane  
Vancouver, BC  
V6S 0C8

November 13, 2018  
File: 16595

Attention: Sepher Rad

**Re: Geotechnical Investigation Report, Proposed Childcare Modular Development  
Osoyoos Crescent and Revelstoke Court, UBC Campus, Vancouver, B.C.**

## **1.0 INTRODUCTION**

We understand that a modular childcare development is proposed for the above referenced location. There are presently no design drawings available, however we have been advised that the proposed development will include of at-grade wood framed construction. We anticipate loads induced by the new development to be relatively light.

This report presents the results of our field investigation and makes geotechnical recommendations for the design and construction of the proposed development. This report has been prepared exclusively for UBC Properties Trust, for their use, and for the use of others within their design and construction team although it remains the property of GeoPacific.

## **2.0 SITE DESCRIPTION**

The site is located northwest of the intersection of Osoyoos Crescent and Revelstoke Court at UBC campus. The site is bounded by the Osoyoos Crescent to the south, Revelstoke Court to the east and landscape in all other directions.

The site is presently undeveloped and is covered with grass, shrubs and trees. The topography of the site consists of landscape mounds which are elevated above other improvements in the area and are observed to be about 1 to 2 m higher than Acadia Park Lane. It was observed that an existing childcare modular structures are presently located along southeast side of the site.

The location of the site relative to the surrounding improvements is shown on our Drawing No. 16595-1 included with this report.

## **3.0 FIELD INVESTIGATION**

### **3.1 Site Investigation**

GeoPacific completed a geotechnical site investigation for this project on October 29, 2018. The investigation consisted of a review of geological maps, visual inspection, and augered test hole supplemented with dynamic cone penetration test (DCPT) soundings. A drill permit from UBC Campus & Community Planning department was obtained prior to drilling.

Prior to drilling, the test hole location was cleared of underground services using geophysical methods by



GeoPacific's utility locating personnel. The test hole was logged by a geotechnical staff member from our office and backfilled after logging and sampling.

Five test holes were advanced using the subcontracted drilling services of Uniwide Drilling from Prince George, BC. The test holes were advanced to a depth of 6.1 m below grade. Two of the test holes were supplemented with DCPT soundings to help characterize the in-situ density of the soil.

The test hole locations are shown on our Drawing No. 16595-01 included with this report.

## **4.0 SUBSURFACE CONDITIONS**

### **4.1 Soil Profile**

The general geology of the region under investigation is described as Vashon glacial drift, overlying Quadra fluvial deposits with reference to the Geological Survey of Canada's map 1484A. The glacial drift is characterized as lodgement and minor flow till with lenses and interbeds of substratified glaciofluvial sand and gravel, including lenses and interbeds of glaciolacustrine stony silt. The Quadra fluvial deposits consist of channel fill and floodplain deposits; crossbedded sand with minor silt and gravel lenses.

A general description of the soils encountered at our test hole locations is given below.

#### **Topsoil**

Grass and topsoil was identified in all of our test holes and found to be about 0.2 m thick.

#### **Sand and Gravel (Fill)**

The topsoil is underlain by loose to compact sand and gravel fill with trace to some organics and trace silt. The fill extended to depths of 0.3 to 1.8 m below grade.

#### **Silt**

The fill is underlain by soft to firm with trace sand and fine gravel. The silt was identified at test holes TH18-01 and TH18-02. The silt layer extended to depths of 1.2 to 1.5 m below grade.

#### **Silty Sand (Glacial Till)**

Glacial till was identified underlying all of the materials described above. The glacial till comprised of silty sand with trace to some fine gravel. Some cobbles and occasional boulders are expected to be encountered within the till. In-situ testing and drill observations indicate that this stratum is dense to very dense. These deposits were found to extend to the full depth of our investigation.

Detailed soil descriptions are included on the test hole log included in Appendix A.

### **4.2 Groundwater Conditions**

The groundwater table was not identified in our investigation and is expected to be well below development grades. Perched groundwater may be encountered overlying the dense native soils within the fill materials.



## **5.0 DISCUSSION**

### **5.1 General**

We expect that the proposed structures will be constructed relatively close to existing site grades. We envisage prefabricated one storey wood framed structures constructed over reinforced concrete foundations. Other anticipated improvements related to the development will likely include a playground area, curbs, sidewalks and landscape features.

Structural drawings are not yet available, however, we expect that the loads imposed by the structures to be relatively light. We anticipate loads induced by the new development to be relatively light column and wall loads in the range of 100 kN and 15 kN/m, respectively. Based on the observed ground conditions, the proposed development can be constructed on conventional pad and strip foundations that are placed on competent dense to very dense glacial till or engineered fill.

The area is overlain by up to 1.8 m of variable fill materials mixed with trace to some organics which are not considered to be suitable subgrade and will require removal. Final site grades are yet to be determined, however we anticipate that some grade reinstatement will likely be required to achieve desirable footing elevations.

The removal of the unsuitable materials on site will require over-excavation. We expect that the excavation would be sloped where possible. We understand that there are no adjacent improvements in the vicinity of the site that may impede the excavation and will require shore excavation. In the event where the excavation is in close proximity to existing structures, roads and utilities, shored excavation or lock block wall may be required. Our design recommendations for temporary excavations are provided in Section 6.5.

Some perched groundwater will likely be encountered while excavating and will need to be controlled. A graded excavation with sumps at low points should be adequate to control the anticipated groundwater inflow.

We confirm, from a geotechnical stand point, that the proposed building development is feasible provided the recommendations in this report are incorporated into the overall design.

## **6.0 DESIGN RECOMMENDATIONS**

### **6.1 Site Preparation**

Site preparation associated with foundations and grade supported slabs includes removing any organic topsoil, variable fill materials, and any other material considered to compromise the design recommendations stated herein. The fill materials contained organic matter and the silt are not suitable to support the proposed structures. The fill and the silt should be excavated to expose the underlying native dense to very dense till-like soils, identified in our investigation. Additional test pits could be carried out during construction to determine the quality of the existing fill materials prior to their removal.

Stripping should extend beyond the outer edge of the foundations, concrete slabs or sidewalks at a distance equal to the total thickness of fill required including all engineered subgrade fill and base materials. For example, if 1 m of fill is to be placed beneath the building's foundations, then stripping should extend a minimum distance of 1 m beyond the outer edge of the foundations.



The anticipated founding soils are susceptible to softening when exposed to water. We recommend blinding foundation subgrades with a 100 mm thick layer of 19 mm clear crush gravel immediately after excavation, with lots graded to inhibit ponding water. The exposed subgrade must be reviewed by GeoPacific prior to the placement of additional fill.

Should grade reinstatement be required to achieve desirable foundation elevations, we recommend the use of engineered fill. "Engineered Fill" is generally defined as clean sand to sand and gravel containing silt and clay less than 5 % by weight, compacted in 300 mm loose lifts to a minimum of 95% Modified Proctor maximum dry density at a moisture content that is within 2% of optimum for compaction.

*Stripped subgrades and engineered fill materials and compaction must be reviewed by the geotechnical engineer.*

## **6.2 Building Foundations**

Footings which are founded on competent dense to very dense glacial till stratum, as described in Section 4.1, can be designed on the basis of a serviceability limit state (SLS) bearing pressure of 400 kPa for strip or pad footings.

Foundations which are placed on engineered fill, as defined in Section 6.1, may be designed on the basis of an SLS bearing pressure of 100 kPa.

Factored ultimate limit state (ULS) bearing pressures, for transient loads such as those induced by wind and earthquakes, may be taken as 1.5 x the SLS bearing pressures provided above.

We estimate for foundations designed as recommended, settlements will not exceed 25 mm total and 2 mm per metre differential.

Irrespective of the allowable bearing pressures given, pad footings should not be less than 600 mm by 600 mm and strip footings should not be less than 450 mm in width. Footings should also be buried a minimum of 450 mm below the surface for frost protection.

Any foundations near any permanent slope must be reviewed by GeoPacific well in advance of construction.

*Foundation subgrades must be inspected by the geotechnical engineer prior to footing construction.*

## **6.3 Seismic Design of Foundations**

In accordance with the 2012 BC Building Code the buildings are to be designed for a seismic hazard with 2% probability of exceedance over a 50 year period which equates to an earthquake with a return period of 1 in 2,475 years. The design seismic hazard considers ground motions which would have a peak firm ground horizontal acceleration of 0.46 g at this location.

The soils at this site are not considered susceptible to liquefaction triggering or strain softening in consideration of the seismic hazard defined in the 2012 British Columbia Building Code (BCBC).

The seismic design parameters for this project should be based on "Site Class C" as defined in Table 4.1.8.4.A of the 2012 BC Building Code.



#### **6.4 Grade Supported Concrete Slabs**

We recommend that any fill material placed under the slab should conform to our recommendation for engineered fill in Section 6.1 above and be compacted to 98% Standard Proctor Density.

The floor slab should be directly underlain by a polyethylene moisture barrier and a minimum of 150 mm of 19 mm clear crushed gravel fill to inhibit upward migration of moisture beneath the slab.

#### **6.5 Temporary Excavation and Shoring**

We expect that temporary excavations would be sloped where possible since it is typically more economical to do so. We expect that slopes of 3:4 (H:V) in the existing native dense to very dense till-like soils and 1.5:1 (H:V) in the surficial topsoil, silt and fill materials.

It should be appreciated that temporary cut slopes are only suitable when located a safe distance away from existing structures, roads and utilities. Where the proposed development encroaches on existing structures, property lines and utilities, shoring may be required to support the excavations. Vertical cuts may be supported with the use of conventional shotcrete tied back with post-tensioned soil anchors. Alternatively, a lock block wall could be used as a temporary retention system. Further recommendations can be provided upon a review of the final site plan.

As required by UBC Planning and Infrastructure, erosion and sediment control plan and regular site reviews should be carried out during the excavation.

Water seepage into the excavation from within the surficial fill and more permeable zones of the glacial till should be expected. We expect that groundwater inflows could be controlled with conventional sumps and sump pumps.

Temporary cut slopes in excess of 1.2 m in height must be covered with poly sheeting and require inspection by a professional engineer in accordance with Work Safe B.C. (WSBC) guidelines, prior to man-entry.

#### **6.6 Utility Installation**

Site utilities may be required for the proposed development. The design of these systems must consider the locations and elevations of the foundations. The service trenches and excavations required for the installation of the underground pipes, vaults and/or manholes must be located outside of a 1.5:1 (H:V) slope measured downward and outward from the edge of foundations.

All excavations and trenches must conform to the latest Occupational Health and Safety Regulation supplied by the Work Safe B.C. (WSBC). Any excavation in excess of 1.2 m in depth requiring worker-entry must be reviewed by a professional geotechnical engineer.

#### **6.7 Foundation Drainage**

Foundation drainage is not required for any geotechnical purposes for slab-on-grade structures if the site is graded away from the building at a slope of at least 2% and the slab is at least 150 mm above exterior grades. Surface water should be directed to catch basins and lawn basins directed to the site storm water system. If these requirements cannot be met then perimeter drainage should be installed.



## 7.0 FIELD REVIEWS

As required for Municipal "Letters of Assurance", GeoPacific Consultants Ltd. will carry out sufficient field reviews during construction to ensure that the Geotechnical Design recommendations contained within this report have been adequately communicated to the design team and to the contractors implementing the design. These field reviews are not carried out for the benefit of the contractors and therefore do not in any way effect the contractors obligations to perform under the terms of his/her contract.

It is the contractors' responsibility to advise GeoPacific Consultants Ltd. (a minimum of 48 hours in advance) that a field review is required. Field reviews are normally required at the time of the following activities:

- |                    |   |
|--------------------|---|
| 1. Stripping       | Review of stripping depth.                          |
| 2. Excavation      | Review of temporary slopes and soil conditions.     |
| 3. Engineered Fill | Review of materials and compaction degree.          |
| 4. Foundation      | Review of foundation subgrade.                      |
| 5. Slab-on Grade   | Review of under slab fill materials and compaction. |
| 6. Backfill        | Review of placement of backfill.                    |

It is critical that these reviews are carried out to ensure that our intentions have been adequately communicated. It is also critical that contractors working on the site view this document in advance of any work being carried out so that they become familiarised with the sensitive aspects of the works proposed. It is the responsibility of the developer to notify GeoPacific Consultants Ltd. when conditions or situations not outlined within this document are encountered.

## 8.0 CLOSURE

This report is prepared solely for use by our client's Design Team for this project as described to the general standards of similar work for similar projects in this area and no other warranty of any kind is expressed or implied. GeoPacific Consultants Ltd. accepts no responsibility for any other use of this report.


We are pleased to assist you with this project and we trust this information is helpful and sufficient for your purposes at this time. However, please do not hesitate to call the undersigned if you should require any clarification or additional details.

For:  
**GeoPacific Consultants Ltd.**

Arye Lipshitz  
Project Manager

Reviewed by:

NOV 13 2018



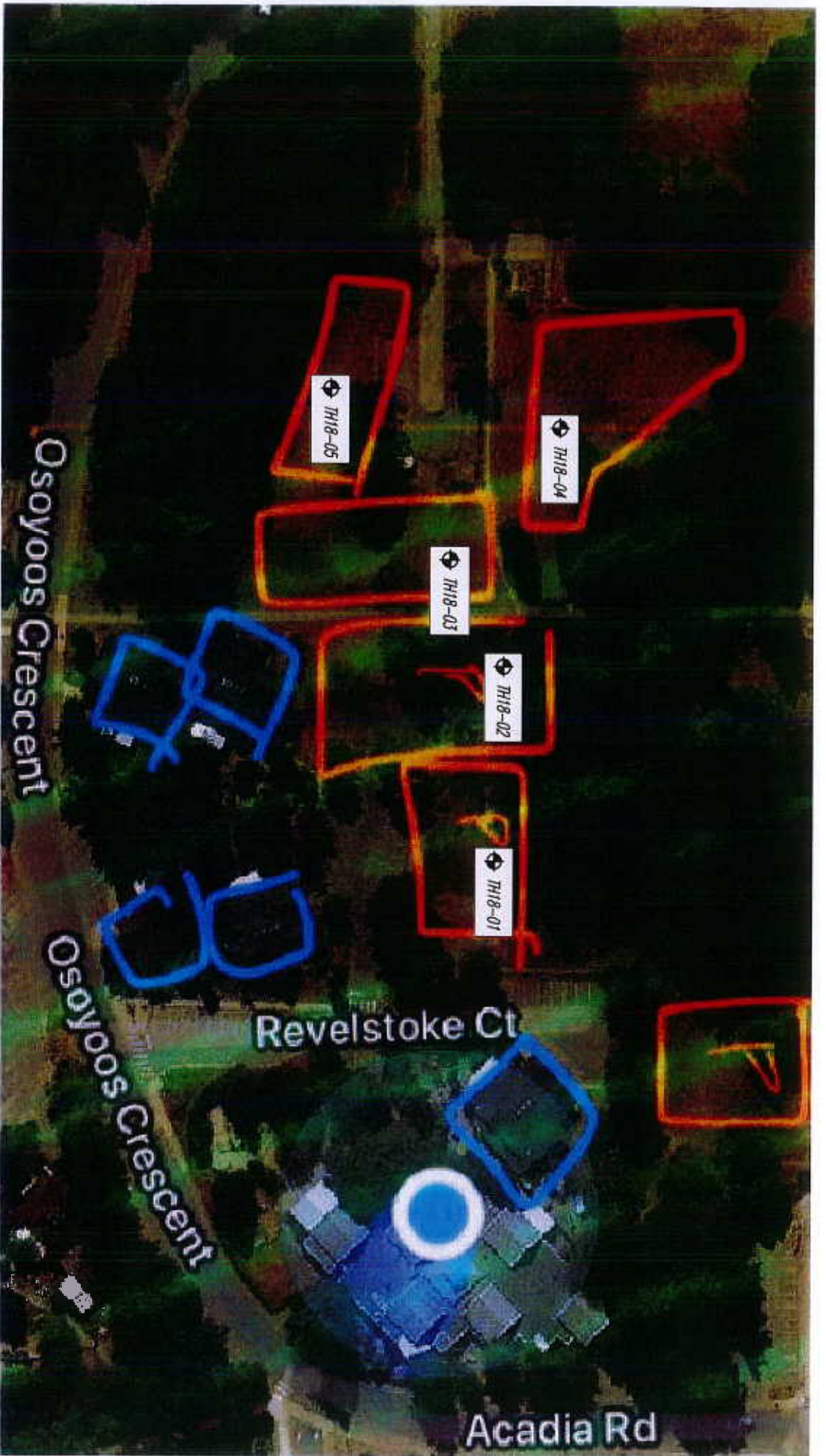
Marian Letavay, M. Sc., P.Eng.  
Senior Geotechnical Engineer



## **Appendix A**

### **Test Hole Logs**





LEGEND:

TH18-# - TEST HOLE (TH) LOCATIONS

**SITE PLAN**  
SCALE = NTS



REFERENCE:

DATE:

November 13, 2018

DRAWN BY:

ML

APPROVED BY:

ML

REVIEWED BY:

SCALE:

SEE ABOVE

FILE NO.:

16595

DWG. NO.:

01

REVISIONS:

A.

B.

C.



**GEO PACIFIC**  
VANCOUVER ENGINEERING LIMITED

17714 HWY. 70A, SUITE 100  
VANCOUVER, BC V6V 0A2  
P 604.100.0922  
F 604.100.0900







# Test Hole Log: TH18-02

File: 16595

Project: Modular Childcare Development

Client: UBC Properties Trust

Site Location: Osoyoss Crescent & Revelstoke Court, UBC



**GEOPACIFIC**  
CONSULTANTS

1779 West 75th Avenue, Vancouver, BC, V6P 6P2  
Tel: 604-439-0922 Fax: 604-439-9189

INFERRED PROFILE				Moisture Content (%)	DCPT (blows per foot) 10 20 30 40	Groundwater / Well	Remarks
Depth	Symbol	SOIL DESCRIPTION	Depth (m)/Elev (m)				
0		Ground Surface	0.0				
1		<b>Topsoil</b> Grass on top, sand, organics, dark brown, wet	0.6				
2		<b>Sand and Gravel (Fill)</b> Compact, trace silt, trace organics, medium grained sand, brown-grey, wet	1.2				
3		<b>Silt</b> Firm to stiff, trace sand, trace fine gravel, light, moist to wet					
4		<b>Silty Sand (Till)</b> Dense to very dense, trace to some fine gravel, fine to medium grained sand, grey, moist					
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21		End of Borehole	6.1				
22							
23							
24							
25							
26							
27							
28							
29							
30							

Logged: AL

Method: Solid stem auger

Date: October 29, 2018

Datum: Ground surface

Figure Number: A.2.

Page: 1 of 1



# Test Hole Log: TH18-03

File: 16595

Project: Modular Childcare Development

Client: UBC Properties Trust

Site Location: Osoyoss Crescent & Revelstoke Court, UBC



**GEOPACIFIC**  
CONSULTANTS

1779 West 75th Avenue, Vancouver, BC, V6P 6P2  
Tel: 604-439-0922 Fax: 604-439-9180

INFERRED PROFILE				Moisture Content (%)	DCPT (blows per foot) 10 20 30 40	Groundwater / Well	Remarks
Depth	Symbol	SOIL DESCRIPTION	Depth (m)/Elev (m)				
0		Ground Surface	0.0				
1		<b>Topsoil</b> Grass on top, sand, organics, dark brown, wet					
2		<b>Sand and Gravel (Fill)</b> Loose to compact, trace to some organics, trace silt, medium grained sand, brown-grey, wet					
3							
4							
5							
6							
7		<b>Silty Sand (Till)</b> Dense to very dense, trace to some fine gravel, fine to medium grained sand, grey, moist	1.8				
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21		End of Borehole	6.1				
22							
23							
24							
25							
26							
27							
28							
29							
30							

Logged: AL

Method: Solid stem auger

Date: October 29, 2018

Datum: Ground surface

Figure Number: A.3.

Page: 1 of 1



# Test Hole Log: TH18-04

File: 16595

Project: Modular Childcare Development

Client: UBC Properties Trust

Site Location: Osoyoss Crescent & Revelstoke Court, UBC



**GEOPACIFIC**  
CONSULTANTS

1779 West 75th Avenue, Vancouver, BC, V6P 6P2  
Tel: 604-439-0922 Fax: 604-439-9189

INFERRED PROFILE				Moisture Content (%)	DCPT (blows per foot) 10 20 30 40	Groundwater / Well	Remarks
Depth	Symbol	SOIL DESCRIPTION	Depth (m)/Elev (m)				
0		Ground Surface	0.0				
0.5		<b>Topsoil</b> Grass on top, sand, organics, dark brown, wet					
1.0		<b>Sand and Gravel (Fill)</b> Loose to compact, trace to some organics, trace silt, medium grained sand, brown-grey, wet					
2.1		<b>Silty Sand (Till)</b> Dense to very dense, trace to some fine gravel, fine to medium grained sand, grey, moist	2.1				
6.1		End of Borehole	6.1				
7.0							DCPT refusal at 7'

Logged: AL  
Method: Solid stem auger  
Date: October 29, 2018

Datum: Ground surface  
Figure Number: A.4.  
Page: 1 of 1



# Test Hole Log: TH18-05

File: 16595

Project: Modular Childcare Development

Client: UBC Properties Trust

Site Location: Osoyoss Crescent & Revelstoke Court, UBC



**GEOPACIFIC**  
CONSULTANTS

1779 West 75th Avenue, Vancouver, BC, V6P 6P2  
Tel: 604-439-0922 Fax: 604-439-9189

INFERRED PROFILE				Moisture Content (%)	DCPT (blows per foot) 10 20 30 40	Groundwater / Well	Remarks
Depth	Symbol	SOIL DESCRIPTION	Depth (m)/Elev (m)				
0		Ground Surface	0.0				
1		<b>Topsoll</b> Grass on top, sand, organics, dark brown, wet					
2		<b>Sand and Gravel (Fill)</b> Loose to compact, trace to some organics, trace silt, medium grained sand, brown-grey, wet					
3							
4							
5							
6		<b>Silty Sand (Till)</b> Dense to very dense, trace to some fine gravel, fine to medium grained sand, grey, moist	1.5				
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21		End of Borehole	6.1				
22							
23							
24							
25							
26							
27							
28							
29							
30							

Logged: AL

Method: Solid stem auger

Date: October 29, 2018

Datum: Ground surface

Figure Number: A.5.

Page: 1 of 1