



The following Motion and Documents were considered by the GFC Facilities Development Committee at its Thursday, April 24, 2014 meeting:

---

Agenda Title: **East Campus Village (ECV) Infill Housing Residences at 90 Avenue – Design Development Report**

CARRIED MOTION: THAT the GFC Facilities Development Committee approve, under delegated authority from General Faculties Council and on the recommendation of Planning and Project Delivery, the proposed East Campus Village (ECV) Infill Housing Residences at 90 Avenue – Design Development Report (as set forth in Attachment 2) as the basis of further engineering and development of contract documents.

Final Item: 4

---



**FINAL Item No. 4**

**OUTLINE OF ISSUE**

Agenda Title: **East Campus Village (ECV) Infill Housing Residences at 90 Avenue – Design Development Report**

**Motion:** THAT the GFC Facilities Development Committee approve, under delegated authority from General Faculties Council and on the recommendation of Planning and Project Delivery, the proposed East Campus Village (ECV) Infill Housing Residences at 90 Avenue – Design Development Report (as set forth in Attachment 2) as the basis of further engineering and development of contract documents.

**Item**

Action Requested	<input checked="" type="checkbox"/> Approval <input type="checkbox"/> Recommendation <input type="checkbox"/> Discussion/Advice <input type="checkbox"/> Information
Proposed by	Doug Dawson, Executive Director, Ancillary Services, Facilities and Operations
Presenters	Doug Dawson, Executive Director, Ancillary Services, Facilities and Operations; Emily Ball, Community Relations Officer, University Relations; Kelly Hopkin, Senior Campus Planner (Architecture), Office of the University Architect, Facilities and Operations
Subject	East Campus Village (ECV) Infill Housing Residences at 90 Avenue – Design Development Report

**Details**

Responsibility	Vice-President (Facilities and Operations)
The Purpose of the Proposal is (please be specific)	This project will increase the amount of purpose-built student housing on campus in alignment with the University’s goal of accommodating 25% of the University’s full-time enrollment in residence housing. Students who reside in purpose-built on-campus housing with supportive programming tend to have a more fulfilling and enriching academic experience at the university. Expanding on-campus housing assists the University in meeting institutional goals and objectives by providing a learning environment conducive to personal and academic success. Smart growth campus development enhances community building, student life, and campus experience, all while reducing greenhouse gas emissions. The development will be a financially-viable project enhancing the residence portfolio through resource stewardship and reducing deferred maintenance.
The Impact of the Proposal is	A total of four (4) houses (11009, 11013, 11029, and 11031) on the south side of 90 Avenue between 110 Street and 111 Street will be removed to make room for the new infill development. This development consists of two new on-campus cohort residences for 71 new graduate, international, and upper years’ student bed spaces. The façades on the new buildings will replicate the form of select existing houses in the ECV district consistent with the Preservation Plan, Design Guidelines for Infill development, and the Long Range Development Plan.
Replaces/Revises (eg, policies, resolutions)	N/A
Timeline/Implementation Date	Design Development (approval) – April 24, 2014; Construction start – Summer, 2014; Occupancy – September, 2015
Estimated Cost	N/A
Sources of Funding	N/A
Notes	N/A





**Alignment/Compliance**

<p>Alignment with Guiding Documents</p>	<p><i>Dare to Discover</i>, Academic Plan (<i>Dare to Deliver</i>); Preservation Plan; Long Range Development Plan (LRDP); University of Alberta Comprehensive Institutional Plan (CIP)</p>
<p>Compliance with Legislation, Policy and/or Procedure Relevant to the Proposal (please <u>quote</u> legislation and include identifying section numbers)</p>	<p>1. <b>Post-Secondary Learning Act (PSLA)</b>: The <i>PSLA</i> gives GFC responsibility, subject to the authority of the Board of Governors, over academic affairs (Section 26(1)) and provides that GFC may make recommendations to the Board of Governors on a building program and related matters (Section 26(1) (o)). Section 18(1) of the <i>PSLA</i> give the Board of Governors the authority to make any bylaws “appropriate for the management, government and control of the university buildings and land.” Section 19 of the <i>Act</i> requires that the Board “consider the recommendations of the general faculties council, if any, on matters of academic import prior to providing for (a) the support and maintenance of the university, (b) the betterment of existing buildings, (c) the construction of any new buildings the board considers necessary for the purposes of the university [and] (d) the furnishing and equipping of the existing and newly erected buildings [.] [...]” Section 67(1) of the <i>Act</i> governs the terms under which university land may be leased.</p> <p><b>2. GFC Facilities Development Committee (FDC) Terms of Reference – Section 3. Mandate of the Committee:</b> “[...]”</p> <p><b>2. Delegation of Authority</b></p> <p>Notwithstanding anything to the contrary in the terms of reference above, the Board of Governors and General Faculties Council have delegated to the Facilities Development Committee the following powers and authority:</p> <p><b>A. Facilities</b></p> <p>1. To approve proposed General Space Programmes (Programs) for academic units.</p> <p>2. (i) To approve proposals concerning the design and use of all new facilities and the repurposing of existing facilities and to routinely report these decisions for information to the Board of Governors.</p> <p>(ii) In considering such proposals, GFC FDC may provide advice, upon request, to the Provost and Vice-President (Academic), Vice-President (Facilities and Operations), and/or the University Architect (or their respective delegates) on the siting of such facilities. (GFC SEP 29 2003)</p> <p><b>B. Other Matters</b></p> <p>The Chair of FDC will bring forward to FDC items where the Office of the Provost and Vice-President (Academic) and/or the Office of the Vice-President (Facilities and Operations), in consultation with other units or officers of the University, is seeking the advice of the Committee. [...]”</p> <p><b>3. UAPPOL Space Management Policy and Space Management</b></p>



FINAL Item No. 4

	<p><b>Procedure:</b> The respective roles of GFC FDC and the Vice-President (Facilities and Operations) with regard to institutional space management are set out in this Board-approved Policy and attendant Procedure.</p> <p>To access this policy suite on line, go to: <a href="http://www.uappol.ualberta.ca">www.uappol.ualberta.ca</a>.</p> <p><b>4. UAPPOL Preservation of University Facilities and Grounds Policy:</b> The University of Alberta is committed to preserving its history while planning for the continued growth and expansion that facilitates its mission and vision.</p> <p>To access this policy suite on line, go to: <a href="http://www.uappol.ualberta.ca">www.uappol.ualberta.ca</a>.</p>
--	--

**Routing** (Include meeting dates)

Consultative Route (parties who have seen the proposal and in what capacity)	<ul style="list-style-type: none"> <li>• March, 2005 to September, 2008 – 12 facilitated community dialogues with Garneau resulting in the creation of the Design Guidelines for Infill Development</li> <li>• Open House Sectors 7 and 8 Sector Plans – March 19, 2012</li> <li>• Formalization of Sector Plans for Sectors 7 and 8 – March 28, 2013</li> <li>• Garneau Community League Focus Group <i>per</i> East Campus Village Implementation Plan – September 16, 2013</li> <li>• GFC Facilities Development Committee <i>per</i> East Campus Village Implementation Plan – October 24, 2013</li> <li>• Residence Life and Residence Operations <i>per</i> East Campus Village Implementation Plan – November 12, 2013</li> <li>• Ancillary Services met with the University of Alberta Students' Union and Graduate Students' Association – January 8, 2014</li> <li>• U of A's Internal and External Community Open Houses <i>per</i> East Campus Village Implementation Plan for substantial development – January 8, 2014</li> <li>• GFC Facilities Development Committee <i>per</i> East Campus Village Infill Housing Residence at 90 Avenue Proposed Concept Plans (for discussion) – January 30, 2014</li> <li>• Garneau Community League Focus Group <i>per</i> East Campus Village substantial development – March 6, 2014</li> <li>• University of Alberta's Internal and External Community Open House #2 <i>per</i> the East Campus Village Implementation Plan for substantial development – April 2, 2014</li> </ul>
Approval Route (Governance) (including meeting dates)	GFC Facilities Development Committee – April 24, 2014 (for final approval of the East Campus Village Infill Housing Residences at 90 Avenue – Design Development)
Final Approver	GFC Facilities Development Committee

1. Attachment 1 (pages 1 – 3) - Briefing Note
2. Attachment 2 (pages 1 – 64) - East Campus Village Infill Housing Residences at 90<sup>th</sup> Avenue – Design Development Report (April 24, 2014)

Prepared by: Kelly Hopkin, Senior Campus Planner (Architecture), Office of the University Architect, Facilities and Operations, [kelly.hopkin@ualberta.ca](mailto:kelly.hopkin@ualberta.ca)

## East Campus Village (ECV) Infill Housing Residences at 90<sup>th</sup> Avenue - Design Development Report

Attachment 1

### Background

Students residing on campus – and the institution at which those students are enrolled – derive numerous benefits from their living-learning communities. The students' academic experience is enriched by linking learning with other aspects of their lives, and many institutional goals are met related to student recruitment, retention and achievement.

An outline of the challenges, issues and constraints related to the development of additional student housing in Alberta was presented to the President and her team by the Vice-President, Facilities and Operations, in November 2011, as part of the President's Executive Committee (PEC) 2015 visioning exercise. In preparation for the PEC presentation, Facilities and Operations examined numerous models for the development of student housing across Canada.

The 2012 Comprehensive Institutional Plan (CIP) identifies the expansion of the student housing portfolio as a strategic priority for the University of Alberta. In support of the CIP, the proposed new residences will feature individual functional self-contained apartments in multiple bedroom configurations with natural light designed to be attractive to graduate, international and upper years' students. The buildings will contain the appropriate amount of indoor and outdoor amenity space required to support services for students residence life programs and foster a sense of community.

Following the completion of the Graduate Students Residences, Pinecrest House and Tamarack House, Facilities and Operations is proposing to construct two new multi-unit buildings for a total of 71 beds on the south side of 90<sup>th</sup> Avenue. A total of four (4) houses (11009, 11013, 11029, 11031) in the area must be removed to make room for the new development. The façades on the new buildings will replicate the form of select existing houses in the East Campus Village (ECV) district per the preservation plan and consistent with the design guidelines for infill development and the long range development plan. The proposed infill development will complement the four (4) buildings retained per the University's Preservation Plan and sector plan.

No additional parking provisions would be required beyond current surface lots between 111<sup>th</sup> and 110<sup>th</sup> Street (Lots 87, 88 and 89) based on projected residence parking demand of 6% of the total resident population, as well as the recent trend where the lots are not full.

Furthermore, Lot U (the SE portion of the large surface lot east of HUB) is dedicated to visitor parking, capacity 224 stalls, and there is also visitor capacity on 90<sup>th</sup> Avenue.

As part of the community consultation process, the University has committed to taking design options to the community for input. The proposed building concept plans being presented to Facilities Development Committee (FDC) are similar to recent East Campus Village Student Housing Projects and are in alignment with the Garneau Neighbourhood Infill Design Guidelines. The proposed infill development aims to respect the existing tree-lined grid, front yard set-backs, pedestrian movements and the street entrance off of 90<sup>th</sup> Avenue, as well as the style of architecture in the neighbourhood. Architectural elements to complement the four (4) existing houses on 90<sup>th</sup> Avenue include:

- Replication of the front façade of four (4) houses in the East Campus Village (ECV) district
- Window styling to replicate the four (4) houses and neighbouring houses to be retained
- The composition of gabled roofs is styled to reduce roof line and mirror adjacencies as buildings transition from the Garneau neighbourhood
- Building form and materials to reflect existing character (reclaimed clinker brick) and provide sustainable and durable end product

Landscape plans are developed to integrate the proposed layouts and spaces to existing site features and typography. Exterior social spaces are proposed to enhance and support residence life programs. Proposed tree and plant material lists are suitable for the neighbourhood setting and seek to preserve and enhance the quality of the natural landscape, including the allée of elm trees along 90<sup>th</sup> Avenue.

Houses designated for removal were offered to potential interested parties to relocate off campus per the House Removal Process. Only house 11051 Saskatchewan Drive will be relocated off campus by a successful proponent. Select architectural features and clinker brick from the houses to be demolished will be stripped for reuse.

In the course of the February 2014 Schematic Design presentation to FDC, the committee had provided comments on the building layouts and functionality and asked the Project Team to review:

- **Ratio of washroom to bedroom count**

*One Full Bathroom was added to each of the Lower Level and Upper Level in each residence to bring the overall ratio to slightly less than 2:1 (with one Full Bathroom dedicated to the accessible unit on the Main Level). These additions without adding area to the overall buildings were made possible by a re-evaluation of the area/equipment requirements for the Laundry Room on the Lower Levels and a refinement of the Mechanical Room design on the Upper Levels.*

- **Sinks in individual bedroom units**

*The Project Team consulted with Residence Services and Operations and determined that additional sinks in the room were not warranted in these projects.*

- **A potential circulation 'bottle neck at the Main Level corridor by the accessible Laundry Room**

*The Accessible Laundry Room, while located in the same area off the Main Level circulation corridor, has been reconfigured to make the room wider, allowing the washer and dryer to be split apart and rotated. This rearrangement permits users to pull-in off the corridor while using the machines.*

- **Usage, direction of load and control of entrances to new residences**

*The Project Team has reviewed and maintains that the current configuration of having three primary (card access) entries to each of the houses – two porch type on the north or street elevation (90<sup>th</sup> Avenue) and one south entry (with accessible ramp) is optimal. The fourth perimeter door on the main level is for house use to access both the exterior deck and patio areas for formal and informal program gatherings. This use would occur in the summer months and the shoulder seasons in early autumn and spring. The door is to be key-lock with the key in the control of the RA. The adjacency of the door provides good access for outdoor cooking and dining.*

- **Potential for upper floor 'snack nooks'**

*The east wall in the Social Commons space on the lower and upper levels of both residences have been reconfigured to incorporate a 'Reheat' style Kitchen Galley (with microwave, sink, upper &*

*lower cabinets with waste disposal incorporated) as an off hour convenience and to reduce demand on the Main Level Community Kitchen.*

- **Main Level Commons Space for potential for social interaction**

*Social Commons Space on the Main Level has been reconfigured to allow for larger opening that is directly adjacent to the Kitchen Entry and two proposed round tables capable of seating (6-8) people each. The tables can be used for dining and for small group study. The small counter for bar style seating that was shown in SD has been relocated and enlarged (to seat 8) in a revised kitchen layout.*

- **Kitchen Configuration and Operation**

*The Project Team toured comparable facilities in International House and Residence Saint-Jean and confirmed the overall dimensions of the kitchen. Further design refinement led to layout adjustments. The changes are reflected in the Revised Kitchen Layouts & Elevations (as well as commentary regarding lounge or social commons spaces, Laundry and Bathroom Storage see enlarged Plans in DD Report).*

- **Adding more dishwashers along west elevation of Kitchen**

*Further engagement with Residence Life has led to the removal of all dishwashers from the two residences. Other residences in the portfolio require the prompt washing and clean-up of dishes & utensils. This procedure becomes a part of the cooking activity and is maintained by education and reinforcement through the RAs. The provision of dishwashers (which are maintenance intensive) leads to dishes being left in machines and not being properly stored.*

- **Landscape Design to define and/or segregate open space**

*Project Team to add suitable (see planting list on DD Report Site Plan) shrub and low plantings/groundcovers to define and screen exterior deck, patio and circulation paths.*

- **Exterior Deck use in integration with functions of common use**

*The Project Team reviewed and weighed the advantages of revising the core to bring a pair of bathrooms to the east and closer to the perimeter doors that would be used during an event or gathering on the deck or patio and concluded that the convenience gained by a more direct access and slightly shorter path did not offset the complications driven into decentralizing and offsetting the vertical distribution of the mechanical system risers. On the Main Level, the flooring materials were revised from carpet tile to reflect a more maintainable Vinyl Tile treatment.*

## **Recommendation**

THAT the GFC Facilities Development Committee approve, the proposed East Campus Village (ECV) Infill Housing Residences at 90<sup>th</sup> Avenue – Design Development Report as the basis of further engineering and development of contract documents.





Existing houses (11003 & 11007 - 90th Avenue) retained as per preservation plan.



Existing houses (11019 & 11023 - 90th Avenue) retained as per preservation plan.

## East Campus Village (ECV)

### Infill Housing Residences at 90th Avenue

# Design Development Report

Facilities Design Committee - April 24, 2014





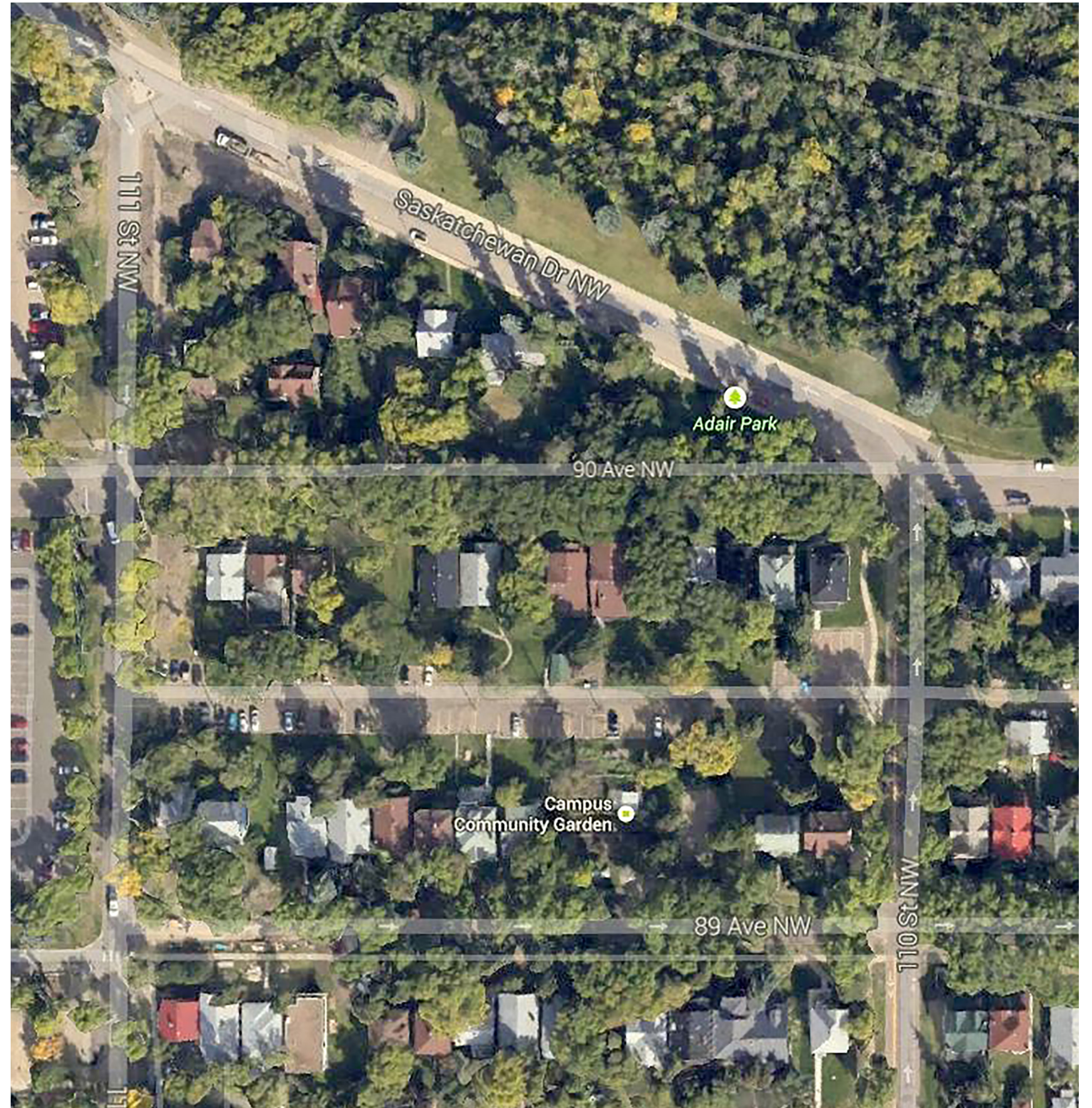


View North to City of Edmonton Adair Park from 90th Avenue.



<b>1.0 PROJECT CHARTER, CAMPUS PLAN AND DELIVERABLES</b>	<b>5</b>	<b>5.0 MECHANICAL DESIGN</b>	<b>34</b>
1.1 Introduction	5	5.1 General	34
1.2 Goals	5	5.2 Mechanical Design Criteria	34
1.3 Challenges And Opportunities	5	5.3 Heating Systems	34
1.4 Sector 8 Plan	6	5.4 Cooling Systems	34
1.5 Design Guidelines For Infill Development	8	5.5 Humidity Control Systems	34
1.6 Community Engagement	10	5.6 Ventilation Systems	34
<b>2.0 ARCHITECTURAL DESIGN</b>	<b>11</b>	5.7 Control Systems	35
2.1 Building Organization And Program	11	5.8 Domestic Water Systems	35
2.3 Sustainable Design	12	5.9 Sanitary And Storm Systems	35
2.4 Code Review	12	5.10 Natural Gas Systems	35
2.5 Operational Review	13	5.11 Fire Protection Systems	35
2.6 Interior Elevations - Kitchen	14	5.12 Sustainability Considerations	35
2.7 Interior Elevations - Laundry/Bedroom/Bathroom	16	5.13 Piping Schematic	36
2.8 Architectural Drawings - Residence B1 - Lower Level	17	5.14 Mech Room Layout & Domestic Water Risers	37
2.9 Architectural Drawings - Residence B1 - Main Level	18	5.15 Heating & Plumbing Risers	38
2.10 Architectural Drawings - Residence B1 - Upper Level	19	5.16 Mechanical Foundation Plan	39
2.11 Architectural Section - Residence B1	20	5.17 Piping Plan - Lower Level	40
2.12 Architectural Elevations - Residence B1	21	5.18 Piping Plan - Main Level	41
2.13 Floor Coverings	22	5.19 Piping Plan - Upper Level	42
2.14 Concept Sketches	23	5.20 Heating Plan - Lower Level	43
2.15 Architectural Drawings - Residence B2 - Lower Level	24	5.21 Heating Plan - Main Level	44
2.16 Architectural Drawings - Residence B2 - Main Level	25	5.22 Heating Plan - Upper Level	45
2.17 Architectural Drawings - Residence B2 - Upper Level	26	5.23 Ventilation Plan - Lower Level	46
2.18 Architectural Elevations - Residence B2	27	5.24 Ventilation Plan - Main Level	47
<b>3.0 SITE PLAN &amp; LANDSCAPE DESIGN</b>	<b>28</b>	5.25 Ventilation Plan - Upper Level	48
3.1 Architectural Site Plan	28	5.26 Fire Protection Plan - Lower Level	49
3.2 Architectural Site - Site Section & Streetscape	29	5.27 Fire Protection Plan - Main Level	50
<b>4.0 STRUCTURAL DESIGN</b>	<b>30</b>	5.28 Fire Protection Plan - Upper Level	51
4.1 Structural Design Description	30	<b>6.0 ELECTRICAL DESIGN</b>	<b>52</b>
4.2 Foundations	30	6.1 General	52
4.3 Walls	30	6.2 Electrical Design Criteria	52
4.4 Floors	30	6.3 Electrical Systems	52
4.5 Roof	30	6.4 Miscellaneous Items	54
4.6 Ramps	30	6.5 Lighting Layout - Lower Level	55
4.7 Sustainable Design	30	6.6 Lighting Layout - Main Level	56
4.8 Structural Drawings - Residence B1 - Main Level	31	6.7 Lighting Layout - Upper Level	57
4.9 Structural Drawings - Residence B1 - Upper Level	32	6.8 Power & Auxiliary Layout - Lower Level	58
4.10 Structural Drawings - Residence B1 - Roof Plan	33	6.9 Power & Auxiliary Layout - Main Level	59
		6.10 Power & Auxiliary Layout - Upper Level	60
		6.11 Power Riser Diagram	61
		6.12 Fire Alarm Riser Diagram	62
		6.13 Communication Riser Diagram	63
		6.14 Miscellaneous	64







## 1.0 PROJECT CHARTER, CAMPUS PLAN AND DELIVERABLES

### 1.1 Introduction

This Design Development Report summarizes the planning and design efforts that have taken place during the design development stage for the East Campus Village (ECV) Infill Housing Residences at 90th Avenue. The project proposes the construction of two new multi-unit student residences that will provide a total of (71) bedroom units on the south side of 90th Avenue between 110th Street and 111th Street.

Students residing on campus – and the institution at which those students are enrolled – derive numerous benefits from their living learning communities. The students' academic experience is enriched by linking learning with other aspects of their lives, and many institutional goals are met as they relate to student recruitment, retention and achievement.

The 2012 Comprehensive Institutional Plan (CIP) identifies the expansion of the student housing portfolio as a strategic priority for the University of Alberta. In support of the CIP, the proposed new residences will feature individual functional self-contained apartments in multiple bedroom configurations with natural light designed to be attractive to graduate, international and upper years' students. The buildings will contain the appropriate amount of indoor and outdoor amenity space required to support services for students' residence life programs and foster a sense of community.

A total of four houses (11009, 11013, 11029, 11031 – 90th Avenue) in the area must be removed to make room for the new development. Four (4) neighbouring houses will remain - 11003, 11007, 11019 and 11023 - 90 Ave. The façades on the new buildings will replicate the form and character of select existing houses (11029 and 10039 Saskatchewan Drive, and 11044 and 11050 – 90th Avenue) in the East Campus Village (ECV) River District per the preservation plan and consistent with the design guidelines for infill development and long range development plan (LRDP). The proposed infill development within the neighbourhood district of the Sector Plan will complement the four buildings retained per University's Preservation Plan and sector plan.

### 1.2 Goals

- The two developments in this project will increase the amount of purpose-built student housing on campus in alignment with the University's goal of accommodating 25% of the University's full time enrollment in residence housing
- Support student's academic success, leadership development, engagement, recruitment, retention and enduring relationship with Alma Mater
- Smart growth campus development enhances community building, student life and campus experience while reducing greenhouse gas emissions
- Build a financially viable project to enhance the residence portfolio through resource stewardship and reducing deferred maintenance costs

### 1.3 Challenges And Opportunities

As part of the community consultation process, the University has committed to taking design options to the community for input. The proposed Design Report is in alignment with the Design Guidelines for Infill Development (Garneau), Preservation Plan, Sector 8 Plan and LRDP.

The two proposed infill housing developments balance functionality, student life, capital cost, architectural design integrity, operations and maintenance cost and curb appeal. Achieving harmony with the new developments and existing fabric of the neighborhood will be realized through preserving building scale, character and streetscape. The proposed designs will respect and, where appropriate, enhance the existing allee of trees along 90th Avenue, front yard setbacks, pedestrian circulation routes, and the street entrance off of 90th Avenue as well as the architectural style of the area.

Architectural elements from the neighbourhood have been incorporated into the Schematic Designs for the two new residences to complement the character of the four existing houses on the south side of 90th Avenue that are to remain. The front or north facades of the two developments are replications of four houses in the ECV district. Gabled roof forms have been composed so as to reduce the massing, roof line and to mirror adjacencies as the buildings transition from the Garneau neighborhood. Fenestration styles have been retained in the proposed new developments as well as building forms and material selections (new and reclaimed) resulting in a respectful, durable and sustainable design.

The new streetscape of both infill and retained houses will be a composed, contiguous design and will continue the development of the ECV into a vibrant, student-focused neighbourhood that is walkable to both the campus and amenities in the adjacent community and will reduce parking requirements for North Campus.

The developments seek to provide student friendly interior design of social and support spaces, welcoming entrances in the vernacular of the area, and enhanced landscaping to connect proposed exterior social spaces to the existing site features and enhance the residence life program. Plant materials for use in landscape design will be from approved lists suitable for the neighborhood setting.

## 1.4 Sector 8 Plan

### 1.4.1 PRESERVATION PLANS:

Historical, Architectural and Condition Index Assessment (2006). An evaluation matrix was used to identify University-owned homes for removal, relocation, or to remain in-situ. When completed in 2006, the Preservation Plan identified nine homes as historically significant with a goal to preserve where possible.

In 2011, a more comprehensive viability evaluation was undertaken by the University in East Campus Village / Sector 8. The evaluation was based on 5 key criteria:

1. Historical integrity
2. Street presence / symbolic value
3. Financial and operational viability
4. Impact to site development potential
5. Overall building condition

The evaluation recommended the retention of 18 buildings in-situ, possible relocation of 5 buildings to other sites within the Sector, and demolition of 29 buildings. Given the limited functionality and adaptability of the potentially-relocated buildings to their new required uses, consideration will also be given to building new homes that reflect the history and architecture of the area. This will:

- Provide lower long-term operational costs
- Maintain the historical context of the neighbourhood
- Minimize disruption of residences and business units occupying existing homes
- Allow for integrated infill as/when required

### 1.4.2 SECTOR VISION:

Sector 8 will be developed as a vibrant and integrated student-residential neighbourhood, while meeting the student residence needs of the University (1500 beds) and respecting the character of the neighbourhood. In order to meet this vision, Sector 8 will include:

- increased student residences at sufficient densities;
- minimized vehicular access to and within area;
- preservation and enhancement of street/avenue grid network;
- open space of differing types and sizes;
- diversity of residents;
- supporting student services in the surrounding neighbourhood;
- affordable housing in terms of capital, operating, maintenance, and student rental; and
- integration and connectivity between Sectors 7 and 8

These elements will support place-making in a campus context. The University will celebrate the area's social history and ensure that new development is sensitive to the East Campus Villages aesthetic character and maintains the existing grid system, as well as mature landscaping along corridors.

### 1.4.3 NEIGHBOURHOOD DISTRICT:

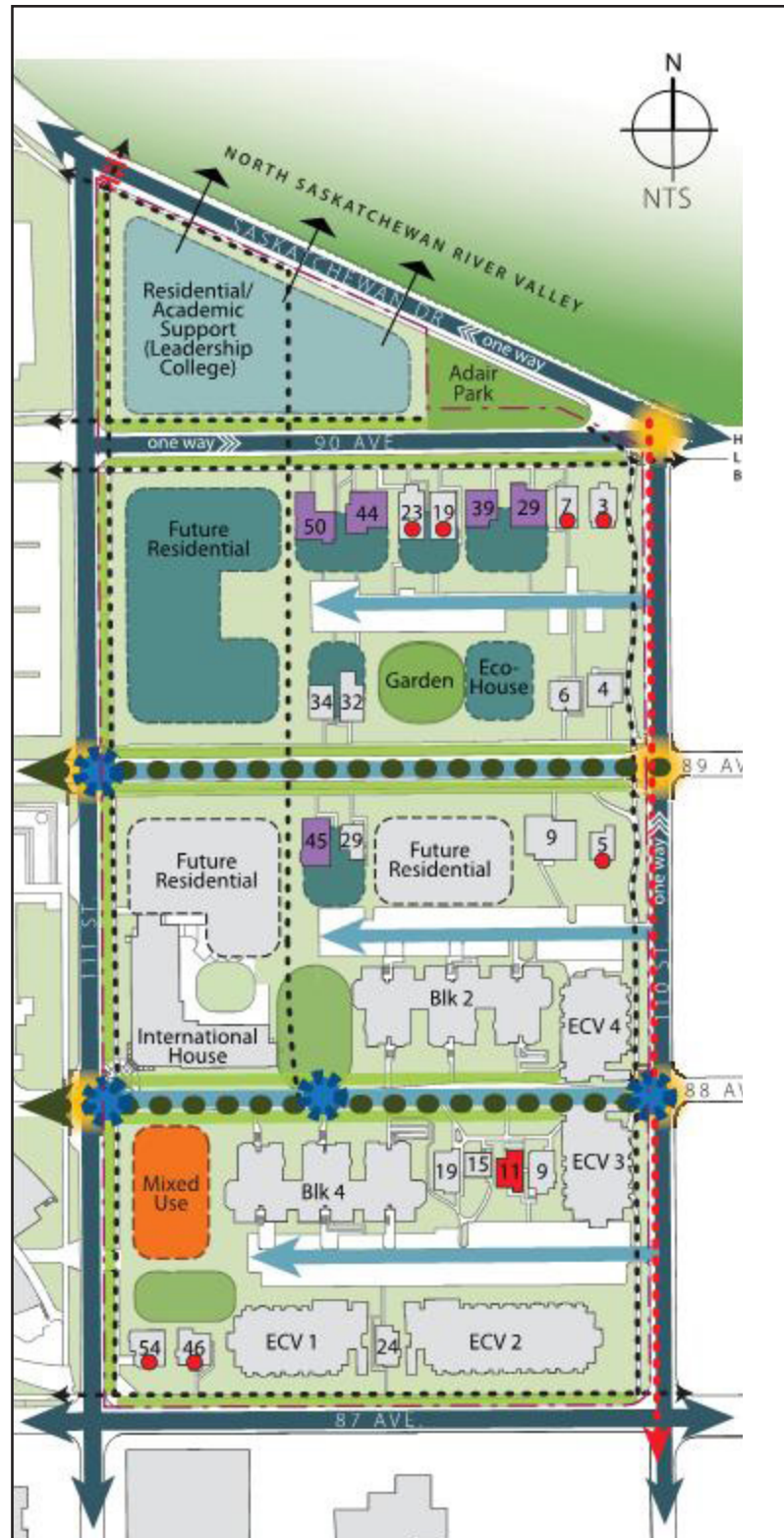
This District forms the eastern edge of the current Northern District.

Based on its location and analysis, this District will act as a buffer between the Garneau Community and redevelopment of the other Districts. Any redevelopment should respect the area's history and character, and consider the Design Guidelines for Infill Development – Garneau, as incorporated into this Plan.

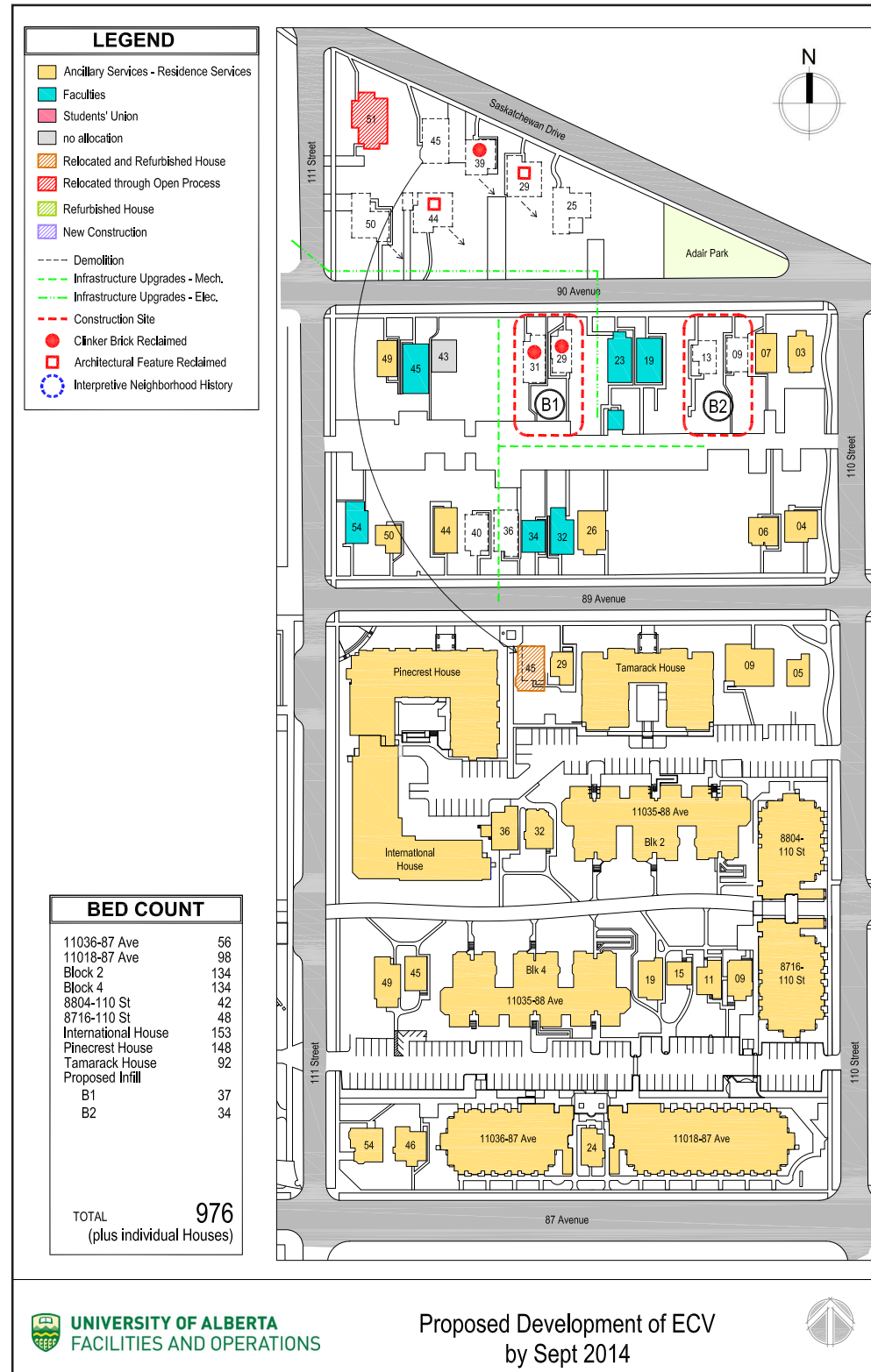
89 Avenue should be considered for closure to allow for the development of a pedestrian/bicycle connection, similar to 88 Avenue Common.

### 1.4.4 DEVELOPMENT GUIDELINES:

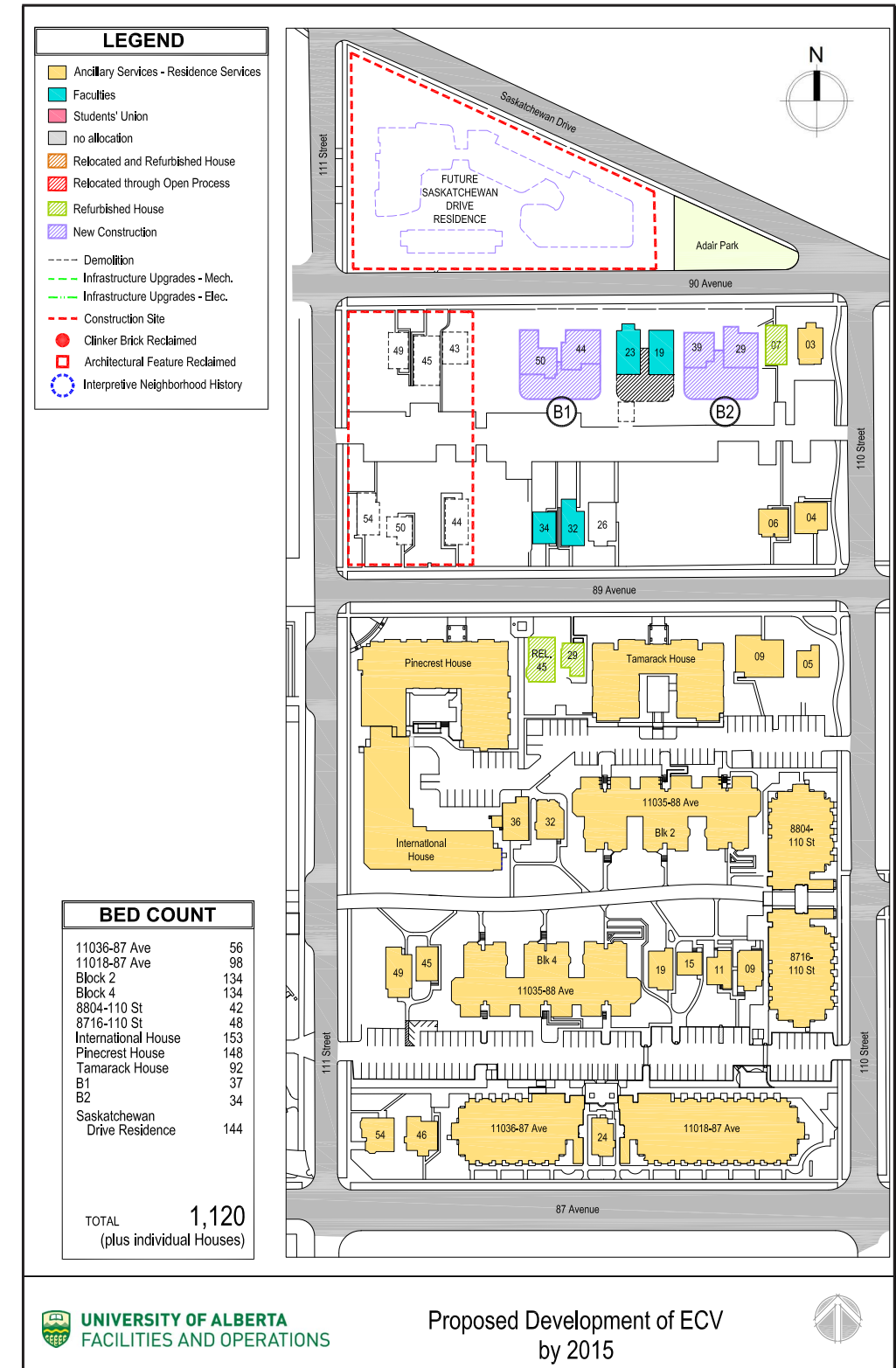
- Consider the closure of 89 Avenue to vehicular traffic.
- Develop a Community Garden north of 89 Avenue, midblock and adjacent to the EcoHouse redevelopment, to provide green space and opportunity for community interaction, research and food production.
- Support development of a townhouse-style residence south of 89 Avenue, midblock. (currently under construction)
- Ensure all new development complements the existing street character of the avenue with respect to setbacks and mature boulevard trees with pathways located between them where possible.
- Maintain existing boulevard trees.
- Consider the repurposing of existing surface parking areas
- Preserve the community garden.
- Consider complementary additions to existing homes (i.e. additions to the rear of existing buildings) that consider the Design Guidelines for Infill Development – Garneau, as incorporated into this Plan.
- Integrate this District internally and externally including 110 Street and the Garneau neighbourhood, the North Saskatchewan River Valley, Adair Park and the adjacent East Campus Village districts through pathway connections, signage, architecture, landscaping and public art.
- Undertake the planning and development of the park site in conjunction with the other two other proposed Sector parks including establishing vision, goals and needs.



Sector 8 Plan & Sector Vision



Neighbourhood District



C1 & C10 (see figure 1.5.1 on pg 8)



**1.5 Design Guidelines For Infill Development**

**1.5.1 SITE SPECIFIC GUIDELINES**

Respect the following guidelines from *Design Guidelines for Infill Development – Garneau* in all development and redevelopment in East Campus Village in order to maintain the scale and general character of the existing neighbourhood:

**OVERALL**

- Trees are to be preserved as much as possible, or replaced when diseased, aged or compromised, particularly those lining walkways and boulevards of avenues and streets.
- All effort shall be made to transition scale from the east to west to respect the scale of the neighbouring community.
- Setback of the building should fall within a zone that is consistent with a line coincident with the existing structures closest to the street and a line coincident with existing structure furthest from the street.
- Additional building and frontage landscape will enhance and protect the existing assets and will not alter the predominantly east-west pattern of landscape development.
- Maximum building height should be limited to 3-4 storeys on the easterly 2/3 of the block and to 4-5 storeys on the westerly 1/3 of the block.
- The design team should articulate any transition zones to be compatible with the architectural vocabulary of the proposed building. Large flat walls and incompatible materials are to be avoided.
- The scale of a new building needs to consider the average height and setback of existing construction (houses). Where portions of new construction exceed these limits, architectural articulation must effectively address these scale differences.
- Exemplify design excellence by incorporating, translating, and interpreting key principles to the greatest extent possible, consistent with best contemporary practices.
- The combination of existing and new buildings shall safeguard the existing “grain” of development through the use of the dormers, terraces, porches, balconies, front entrances, building articulation, and roof detail.
- Careful measures should be taken to ensure the sensitive blend of new and old;
- Future building proposals should be contextual (referencing the scale of this community, its established architectural styles and materials and colour choices).
- Windows should also be contextual; large expanses of glazing (evocative of institutional buildings) should be avoided where possible but can be used to define space typically not residential in nature (i.e. Amenities Building and support space for communities).
- A high standard of architectural literacy is required in the development of plans, site plan, elevations, and landscape development particularly with respect to massing, proportion details and use of materials.

**HEIGHTS**

Smaller Scale Infill Housing (refer to Guidelines for Illustrations)

- It is permissible to run the roof ridge either east- west or north-south.
- Raised first floor is recommended (either a basement level with windows at grade or a plenum to continue the existing floor level to remain contextual with surroundings). This also creates the opportunity to integrate wheelchair accessibility into the site design (incorporating planters, seating, lighting and other elements).

Building Height - Larger Scale Infill Housing (refer to Guidelines for Illustrations)

- A raised first floor is recommended.

**BUILDING SETBACKS**

Front and Rear Facade Articulation (Refer to guidelines for illustrations)

- When a larger scale infill project is proposed, the front and rear facade should be articulated to reference the community’s residential scale and rhythms.

**TERRACES**

- When proposed, outdoor terraces should be sized to be truly usable. A depth of six feet minimum is recommended (from face of terrace door or glazing, moving forward).

**ACCESS TO INDIVIDUAL SUITES**

- Multiple entrances from the street are encouraged for multi-unit dwellings to reduce apparent scale and provide a more welcoming sense of arrival for those homes adjacent to community.
- Where single or municipal street entrances are proposed (for denser developments) consideration on how the building can portray a similar street scale should be considered.

**1.5.2 SECTOR 8 FACILITIES**

(see diagram 1.5.1)

- (C1) Retain or rebuild Historically significant homes (as necessary)
- (C2) East Campus village Graduate Student Residences (1,2,3,4)
- (C3) New Mixed Use Amenity Building
- (C4) East Campus Village (2 and 4)
- (C5) International House
- (C6) New Residential Building
- (C7) New Residential Building
- (C8) New Residential Building
- (C9) Build an Eco-House for living and learning with community garden
- (C10) Retained, relocated and/or rebuild existing homes
- (C11) New Residence/Academic Support (Leadership College) Building
- (C12) Retain and create new Open Space for community Use

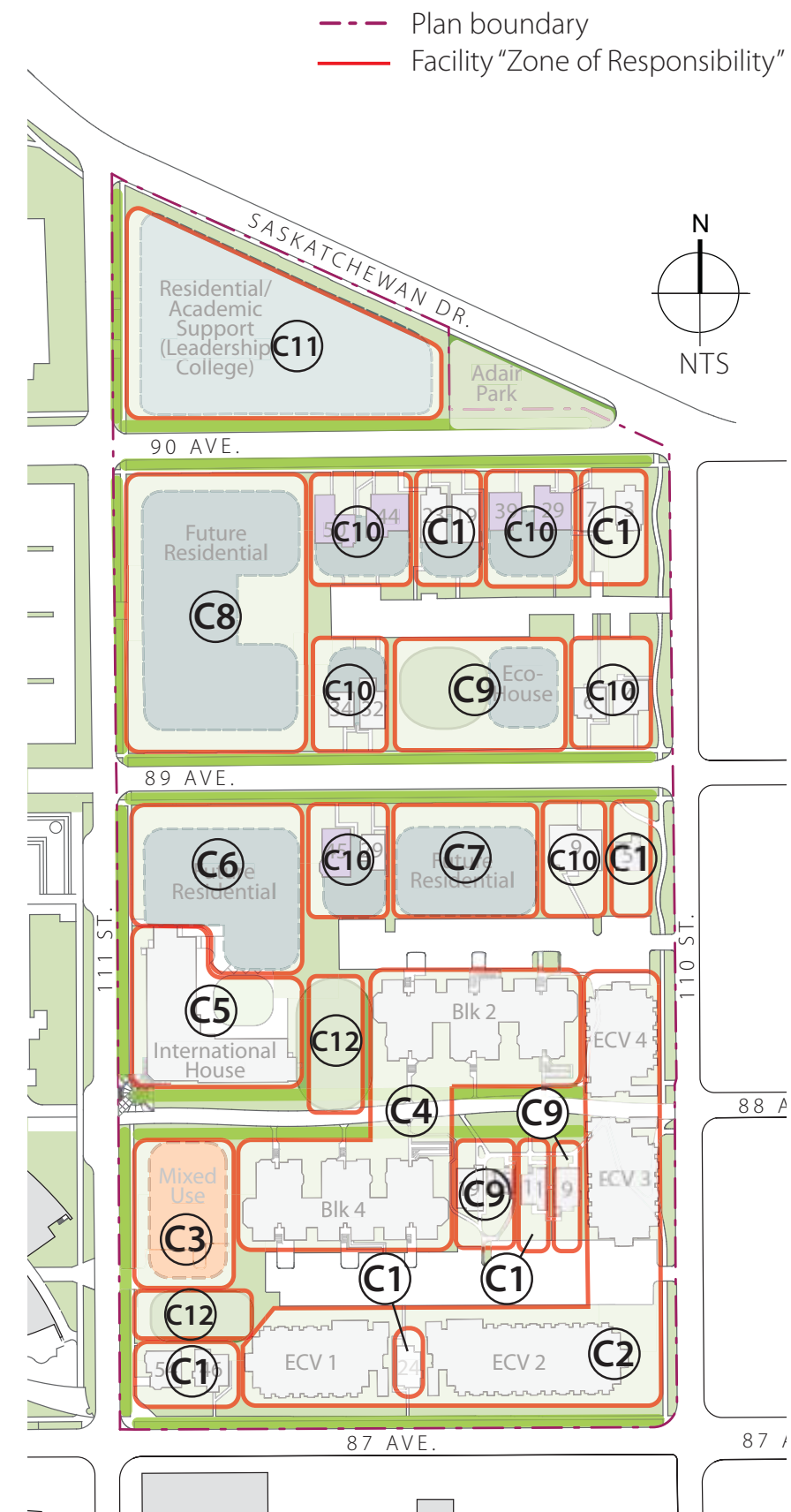
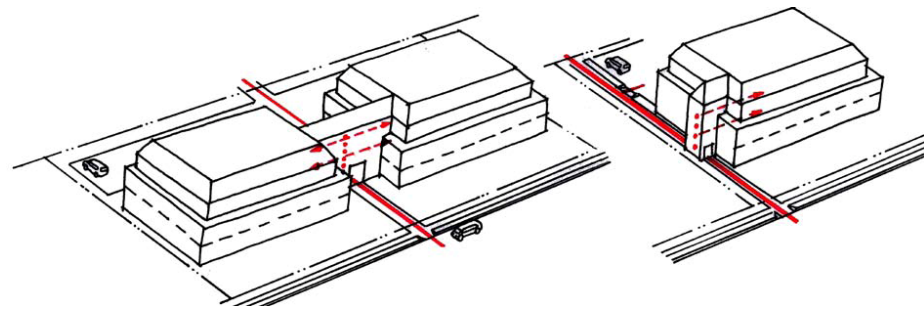


Figure 1.5.1 FACILITIES

3.1.1 Overview - Accessibility: Two Variants



Mid-block Access (Multi-Unit Example)

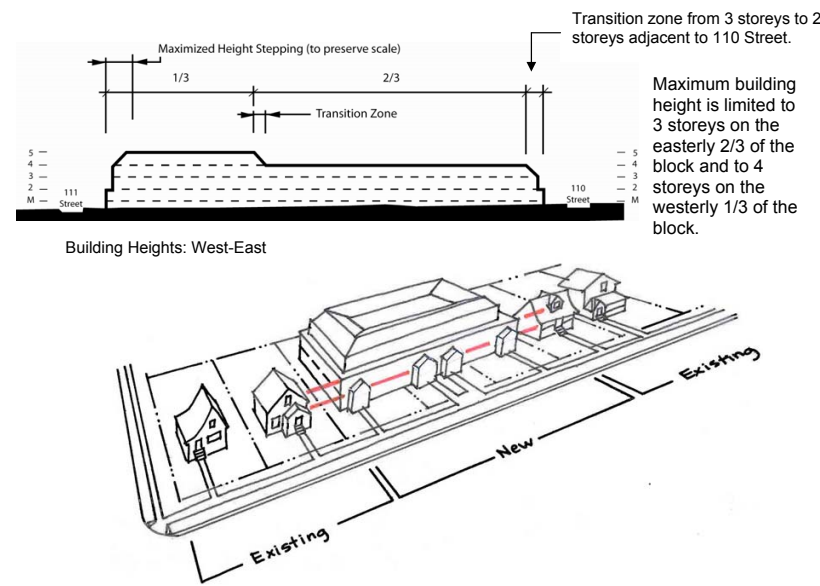
Edge-of-Property Access (Multi-Unit Example)

These illustrations show overall massing only for multi-unit projects. All proposed buildings should be articulated to include detail concepts (use of dormers, terraces, porches, etc.) noted within this document.

3.1.2 Pedestrian & Bicycle Paths



3.2 Maintain the Scale and General Character of the Existing Neighbourhood

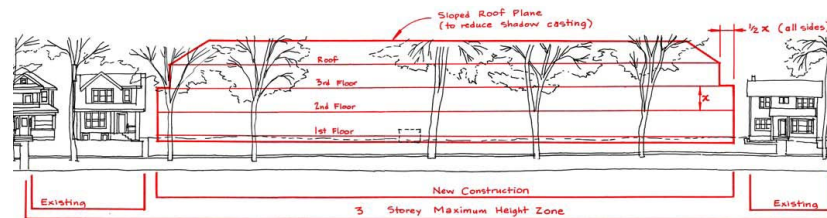


3.3 Building Heights, Setbacks and Side Yards



Building Heights: Smaller Scale Infill Housing

- Roof slope shown need not necessarily be a compound slope. It is permissible to run the roof ridge either east-west or north-south.
- Raised first floor is recommended (either a basement level with windows at grade or a plenum) to continue the existing floor level to remain contextual with surroundings). This also creates the opportunity to integrate wheelchair accessibility into the site design (incorporating planters, seating, lighting and other elements).



3.3 cont'd Building Heights: Larger Scale Infill Housing



Front and Rear Facade Articulation

When a larger scale infill project is proposed, the front and rear facade should be articulated to reference the community's residential scale and rhythms.

Side Yards

Although existing housing stock in our subject zone have side yard separations between buildings that are occasionally less than what current municipal codes prescribe, this guideline does not necessarily encourage design solutions that stand in contrast to community precedents. Even with the current municipal side yard setback of 1.2 meters (this figure becomes greater as height is factored in), it is possible to design solutions that maintain the character of this neighbourhood while protecting adjacent neighbours' privacy. Put simply, developments should maintain the neighbourhood's tradition of narrow side yards.

Terraces

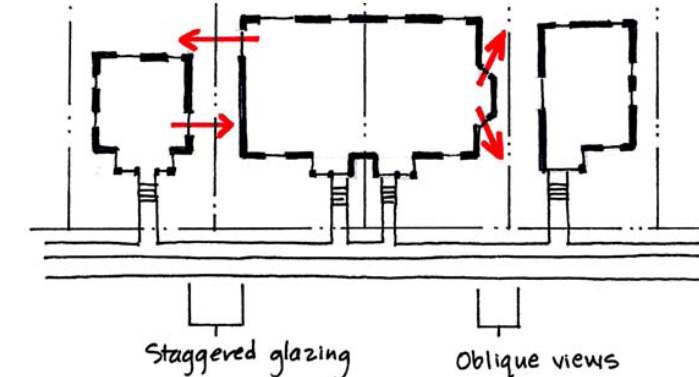
When proposed, outdoor terraces should be sized to be truly useable. A depth of six feet minimum is recommended (from face of terrace door or glazing, moving forward).

Access to Individual Suites

Multiple entrances from the street are encouraged for multi-unit dwellings to reduce apparent scale and provide a more welcoming sense of arrival.

3.5 Access to Light & Views

- Minimizing shadow, blocked views and views onto existing residential buildings and open spaces.





## **1.6 Community Engagement**

Consistent with The University of Alberta's Long Range Development Plan Appendix XVIII - University of Alberta Consultation Protocol for Substantial Development, with Appendix D: East Campus Village Consultation Process of the Design Guidelines for Infill Development, Garneau (Dec 2007), and various internal community engagement activities, the following were hosted by Community Relations Department of University Relations.

- Garneau Community League Focus Group per East Campus Village Implementation Plan - v 16, 2013
- Residence Life and Residence Operations per East Campus Village Implementation Plan - November 12, 2013
- Ancillary Services met with the University of Alberta Students' Union and Graduate Students' Association - January 8, 2014
- U of A's Internal and External community Open House #1 per East Campus Village Implementation Plan for substantial development - January 8, 2014
- GFC Facilities Development Committee per East Campus Village Infill Housing Residences at 90 Ave Proposed Concept Plans - January 30, 2014
- GFC Facilities Development Committee per East Campus Village Infill Housing Residences at 90 Ave - Schematic Design - February 27, 2014
- Garneau Community League Focus Group per East Campus Village substantial development - March 6, 2014
- U of A's Internal and External Community Open House #2 per East Campus Village Implementation Plan for substantial development - April 2, 2014
- GFC Facilities Development Committee for final approval of the East Campus Village Infill Housing Residences at 90 Ave - Design Development - April 24, 2014

## 2.0 ARCHITECTURAL DESIGN

### 2.1 Building Organization And Program

The East Campus Village Infill Housing Residences designs begin with maintaining architectural character elements typical in the Garneau area by the replication of the front elevations of four (4) homes identified by the Preservation Plan. The proposed new residences for students have been designed behind these façades by placing them side by side to create the effect of separate building forms and massing, preserving the rhythm of the streetscape, and linking the structure with a setback portion. This organization allows the development of a program with higher yield in terms of bedrooms and services than would have been possible by re-purposing the existing homes.

The reintroduction of 'in-kind' facades illustrates the effect of infilling the street to maintain a cohesive streetscape. The two buildings are proportional to the existing fabric. The rear or south elevations connect the two separate 'house' units. Care was taken to treat the massing of all the 'new' elevations with articulation and architectural elements such as bay windows, characteristic of the neighborhood. Exposure to the west of building B1 to a proposed pedestrian corridor predicated the stepped plan, which was emulated in building B2, with rear deck exposure and access to the rear parking area via an accessible ramp to the main floor.

The two residences are organized in a similar fashion. The variations required to emulate the existing home facades allowed for building B1 to achieve a slightly larger yield (37 bedrooms) than the B2 building (34 bedrooms). The interior programming is spread over 3 floors. The lower level is set half in the ground to support large windows to maintain access to natural light and provide secondary egress from the bedrooms in case of fire. The proposed new residences are both sprinklered.

The floors have bedrooms located predominantly on the exterior wall with access to light and views. A communal corridor circulating around a washroom and service core, links the bedroom units with functional social spaces and support areas. The main floor houses a large common kitchen with direct access to an outside deck for BBQ'ing and other activities that support residence life programs. The laundry is located in the lower level of the buildings, acoustically separated but conveniently connected and accessible by all floors via two staircases. There are two main entries at the main level on the North or Streetfront facade for each residence. The intercom panel, mailboxes and annunciator panel for the fire department is located on the East main entry.

Located off the rear of the main floor is an accessible ramp which connects the rear parking area to the building. West of the ramp is a grade level patio area to be used as an outdoor amenity area for the building. This area is also connected to the southwest deck location via a stair to the main level allowing residents to flow from lower patio directly to the kitchen area. Building B1 has 37 bedrooms and 20 bathrooms and building B2 has 34 bedrooms and 19 bathrooms allowing for a ratio of 1.85 bed/bath in B1 and 1.79 beds/bath in B2.

Deliveries, garbage and bicycle parking as well as minimal vehicle parking are available off the back alley. Although the original domestic architectural designs provided for front facing living rooms, it is possible to revamp the space and move towards common communal areas located in the rear of the building, making them more amenable to modern conveniences and requirements. Ample light and views to communal landscaped rear yards should enhance the livability of the buildings as well as offer a sense of internal community to residents and connection to the neighborhood and university.

### 2.2 Design Development Phase

In the course of the February 2014 Schematic Design presentation to FDC, the committee had comments on the building layouts and functionality and asked the Project Team to review the following:

- **Potential for upper floor 'snack nooks'**
  - o The East wall in the Social Commons space on the Lower and Upper Levels of both residences have been reconfigured to incorporate a 'Reheat' style Kitchen Galley (with microwave, sink, upper & lower cabinets with waste disposal incorporated) as an off hour convenience and to reduce demand on the Main Level Community Kitchen.
- **Main Level Commons Space for potential for social interaction**
  - o Social Commons Space on the Main Level has been reconfigured to allow for larger opening that is directly adjacent to the Kitchen Entry and two proposed round tables capable of seating (6-8) people each. The tables can be used for dining and for small group study. The small counter for bar style seating that was shown in SD has been relocated and enlarged (to seat 8) in a revised Kitchen layout.
- **Kitchen Configuration and Operation**
  - o The Project Team toured comparable facilities in I-House and Residence Saint-Jean and confirmed the overall dimensions of the Kitchen. Further design refinement led to layout adjustments. The changes are reflected in the Revised Kitchen Layouts & Elevations (as well as commentary regarding lounge or social commons spaces, Laundry and Bathroom Storage see enlarged Plans in DD Report).
- **Adding more dishwashers along west elevation of Kitchen**
  - o Further engagement with Residence Life has led to the removal of all dishwashers from the two residences. Other residences in the portfolio require the prompt washing and clean-up of dishes & utensils. This procedure becomes a part of the cooking activity and is maintained by education and reinforcement through the RA's. The provision of Dishwashers (which are maintenance intensive) leads to dishes being left in machines and not being properly stored.
- **Landscape Design to define and/or segregate open space**
  - o Project Team to add suitable (see planting list on DD Report Site Plan) Shrub and low plantings/groundcovers to define and screen exterior deck, patio and circulation paths
- **Exterior Deck use in integration with functions of common use**
  - o The Project Team reviewed and weighed the advantages of revising the core to bring a pair of Bathrooms to the east and closer to the perimeter doors that would be used during an event or gathering on the deck or patio and concluded that the convenience gained by a more direct access and slightly shorter path did not offset the complications driven into decentralizing and offsetting the vertical distribution of the mechanical system risers. On the Main Level, the flooring materials were revised from carpet tile to reflect a more maintainable Vinyl Tile treatment.
- **The ratio of washroom to bedroom count**
  - o One Full Bathroom was added to each of the Lower Level and Upper Level in each residence to bring the overall ratio to slightly less than 2:1 (with one Full Bathroom dedicated to the accessible unit on the Main Level). These additions without adding area to the overall buildings were made possible by a re-evaluation of the area/equipment requirements for the Laundry Room on the Lower Levels and a refinement of the Mechanical Room design on the Upper Levels.
- **Sinks in individual bedroom units**
  - o The Project Team consulted with Residence Services and Operations and determined that additional sinks in the room were not warranted.
- **A potential circulation 'bottle neck' at the Main Level corridor by the accessible Laundry Room**
  - o The Accessible Laundry Room, while located in the same area off the Main Level circulation corridor, has been reconfigured to make the room wider, allowing the washer and dryer to be split apart and rotated. This rearrangement permits users to pull-in off the corridor while using the machines.
- **Usage, direction of load and control of entrances to new residences**
  - o The Project Team has reviewed and maintains that the current configuration of having three primary (card access) Entries to each of the houses – two porch type on the North or street elevation (90th Avenue) and one south entry (with accessible ramp) is optimal. The fourth perimeter door on the Main Level is for house use to access both the exterior deck and patio areas for formal and informal program gatherings. This use would occur in the summer months, and the shoulder seasons in early autumn and spring. The door is to be Key-lock with the key in the control of the RA. The location of the door provides a good adjacency for outdoor cooking.



## 2.2 Design Development Phase cont'd

Design Development is a transitional phase from the Schematic that seeks to validate proposed concepts, coordinate major architectural, structural, mechanical and electrical systems and start the work which will comprise the Contract Documents for Construction. The following is a summary list and description of Design and Project Team major activities during this Phase:

- Facility and operations comparison of relevant existing residences within the Ancillary portfolio
  - o Ongoing and including a mid- March tour of the student support spaces (with an emphasis on Kitchen and Social Spaces) in I-House and Residence Saint-Jean.
- Investigation and selection of building systems, proposed finish materials, fixtures, furniture and equipment.
- Pursue alternative energy systems, building envelope options and innovative construction products
- Build an Energy Model to test proposed design systems against an industry Base
- Engagement of Contractor to provide Pre-Construction Services including:
  - o Develop initial order of magnitude Construction Cost Estimate Follow-up DD Estimate
  - o Construction feasibility review of proposed building systems and special details
  - o Impact of design proposal on Budget and Schedule
  - o Provide a Green Globe Resource
- Engagement with community focus group to inform of progress to date and receive feedback toward the development of the DD Report and materials for the April 2nd Open House
- Ongoing Life Safety/Code Analysis
- Ongoing Green Globe Evaluation

## 2.3 Sustainable Design

Sustainable design initiatives put forward in the Schematic Design are being evaluated for effectiveness, integration requirements, applicability to Green Globe Certification, capital cost and eligibility for EMP funding.

The proposed project will strive to lead the market and drive change towards to sustainable design through education, awareness and engagement. A Base (or market) Building Energy Model (Carrier Hourly Analysis Program V.4.60) was developed and is being used to benchmark to and review multiple energy management initiatives including (refer also to Mechanical & Electrical):

- Triple Glazed – Hi Performance Glass
- Increased R-value for walls and roof
- Ventilation heat recovery
- Drain water heat recovery
- Condensing boilers with properly matched heating system
- Optimised lighting placement, controls and high efficient luminaires
- Investigate integrated solar PV, PV tiles in particular and/or standard roof mounted solar PV modules. Solar PV shading to help lower cooling demand
- Low Consumption Plumbing fixtures
- Solar Thermal heating
- Careful consideration to electrical panels and distribution for the purpose of monitoring/metering

Initiatives (from Schematic) eliminated from consideration:

- Solar domestic hot water heating
- Underslab Insulation for Foundation Floor

## 2.4 Code Review

The buildings will be classed as Group C occupancies and be constructed with combustible material. Sprinkler systems will be installed in addition to the provision of required fire ratings. Final calculations on exposed building faces and areas of unprotected openings will be quantified. As there is a high degree of compartmentalization, no issues are expected. Exterior claddings will be non-combustible as cementitious stucco products and cement based trims and soffits will be incorporated. Stairwells and mechanical areas including shafts will receive 1 hour rated enclosures. (See excerpt below from the Alberta Building Code 2006.)

3.2.2.48. Group C, up to 3 Storeys, Sprinklered

- 1) A building classified as Group C is permitted to conform to Sentence (2) provided
  - a) except as permitted by Sentences 3.2.2.7.(1) and 3.2.2.18.(2), the building is sprinklered throughout,
  - b) it is not more than 3 storeys in building height, and
  - c) it has a building area not more than
    - i) 5400 m<sup>2</sup> if 1 storey in building height,
    - ii) 2700 m<sup>2</sup> if 2 storeys in building height, or
    - iii) 1800 m<sup>2</sup> if 3 storeys in building height.
- 2) The building referred to in Sentence (1) is permitted to be of combustible construction or noncombustible construction used singly or in combination, and
  - a) except as permitted by Sentences (3) and (4), floor assemblies shall be fire separations with a fire-resistance rating not less than 45 min,
  - b) mezzanines shall have, if of combustible construction, a fire-resistance rating not less than 45 min, and
  - c) loadbearing walls, columns and arches shall have a fire-resistance rating not less than that required for the supported assembly.
- 3) In a building that contains dwelling units that have more than one storey, subject to the requirements of Sentence 3.3.4.2.(3), the floor assemblies, including floors over basements, which are entirely contained within these dwelling units, shall have a fire-resistance rating not less than 45 min but need not be constructed as fire separations.
- 4) In a building in which there is no dwelling unit above another dwelling unit, the fire-resistance rating for floor assemblies entirely within the dwelling unit is waived.



**2.5 Operational Review**

Comments from March 12th, 2014 I-House & CSJ Tour  
(Integration into B1 & B2 Plans)

**1. KITCHENS**

- Individual storage required as some minor pilferage experienced in I-House. Added several banks of drawers to B1 and B2 in response. Floor RA saw drawing indicating lockable storage lockers and gave a favorable response.
- It was noted that there is a bus available to take housing residents to and from shopping and that there is a need to have ample storage for food stuffs as residents tend to buy in bulk. The combination of drawers and lockers will help satisfy the need for storage.
- Remove dishwashers from design – operational/educational
- Modify wet refrigeration to be (3) all fridges on the same side of the kitchen to facilitate heat recovery.
- Address Equipment exhaust noise and heat (I – House).
- Revise plans to two ranges with standard and front mount controls.
- Explore/incorporate two microwaves in the Kitchen (with one being accessible) instead of four with the addition of the reheat kitchenette snack areas off lounges on lower and upper floors for convenience and reduce demand.
- Add a full-sized chest freezer to the main floor locker alcove. (See locker attachments)
- Add more kitchen bar style seating areas to facilitate waiting and in-kitchen dining.
- Add round table seating areas adjacent to Kitchen to facilitate dining and study.

**2. LAUNDRY/BATHROOMS & STORAGE**

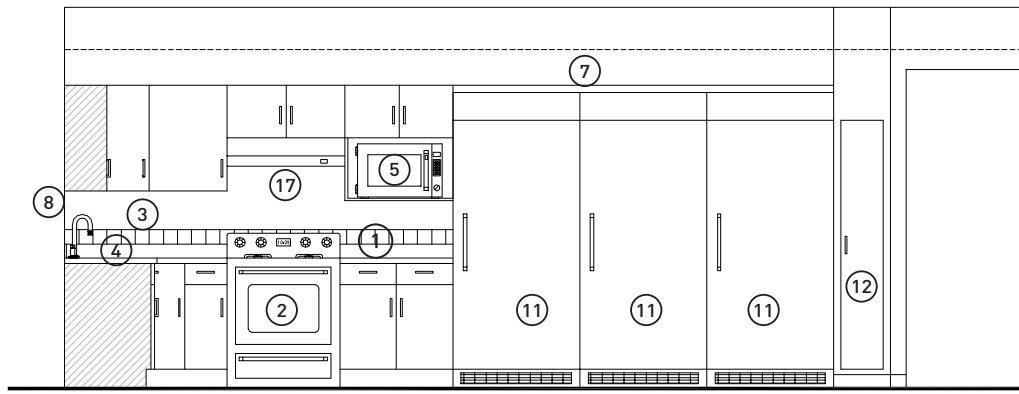
- Three machines were viewed (2 washers & 1 Dryer) per 30 people at I-House. Modify Lower level of B1 and B2 to (2) commercial stackers with space for (1) additional stacker if required in the future. (SD submission showed Laundry Room sized at Pinecrest & Tamarack ratio – reduction in Laundry Room size and configuration possible)
- Additional storage rooms to both buildings at lower laundry areas would be useful.

**3. LOUNGE/SOCIAL COMMONS**

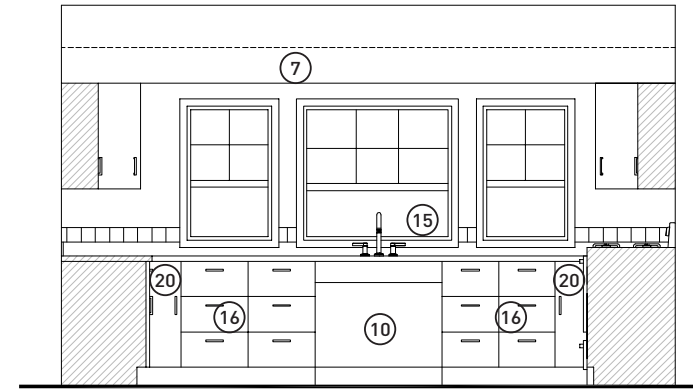
- Blinds control direct sun. Roll down perforated blinds preferred.
- Softer seating options and less hard upright table surfaces except on main floor where queuing for kitchen and social dining preferred for ECV B1 and B2.
- Open gathering area should not be closed completely to corridor.
- Small reheat style kitchens added to lower and upper floor lounge areas to help reduce peak demand on main floor kitchen.
- Options for main floor lounge could include higher centralized bar style table with higher stools or round tables at regular height for more intimate dining. Option exists for a full dining layout for the main floor of B1 & B2 & the option of using the lower and upper floor lounges as common living rooms



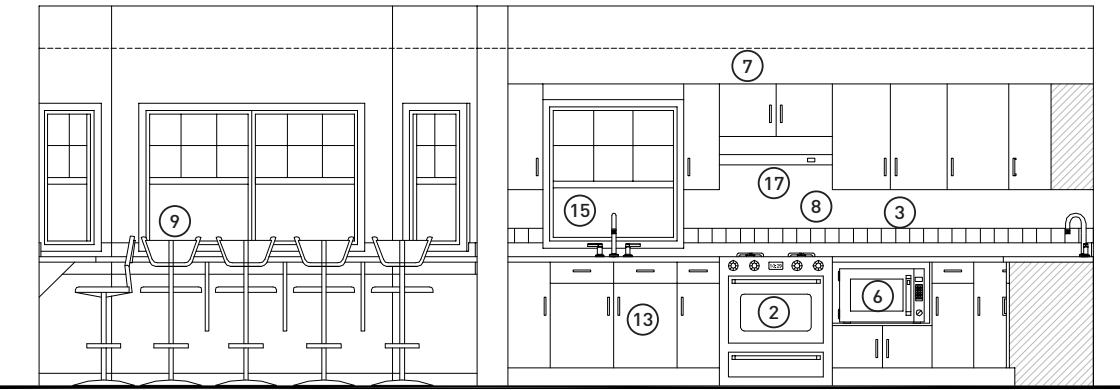




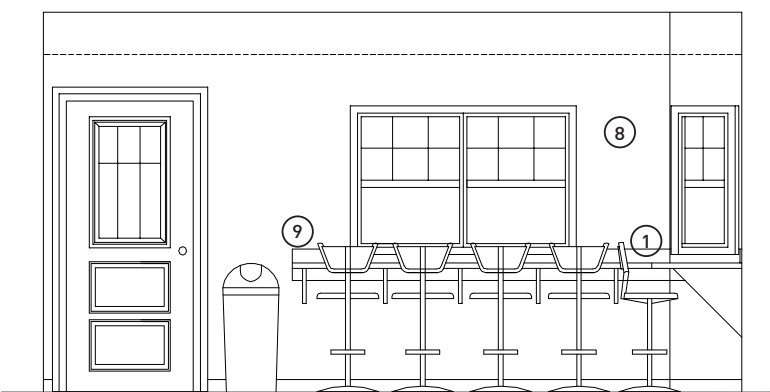
K1 KITCHEN ELEVATION  
SCALE: 1/2" = 1'-0"



K4 KITCHEN ELEVATION  
SCALE: 1/2" = 1'-0"



K2 KITCHEN ELEVATION  
SCALE: 1/2" = 1'-0"



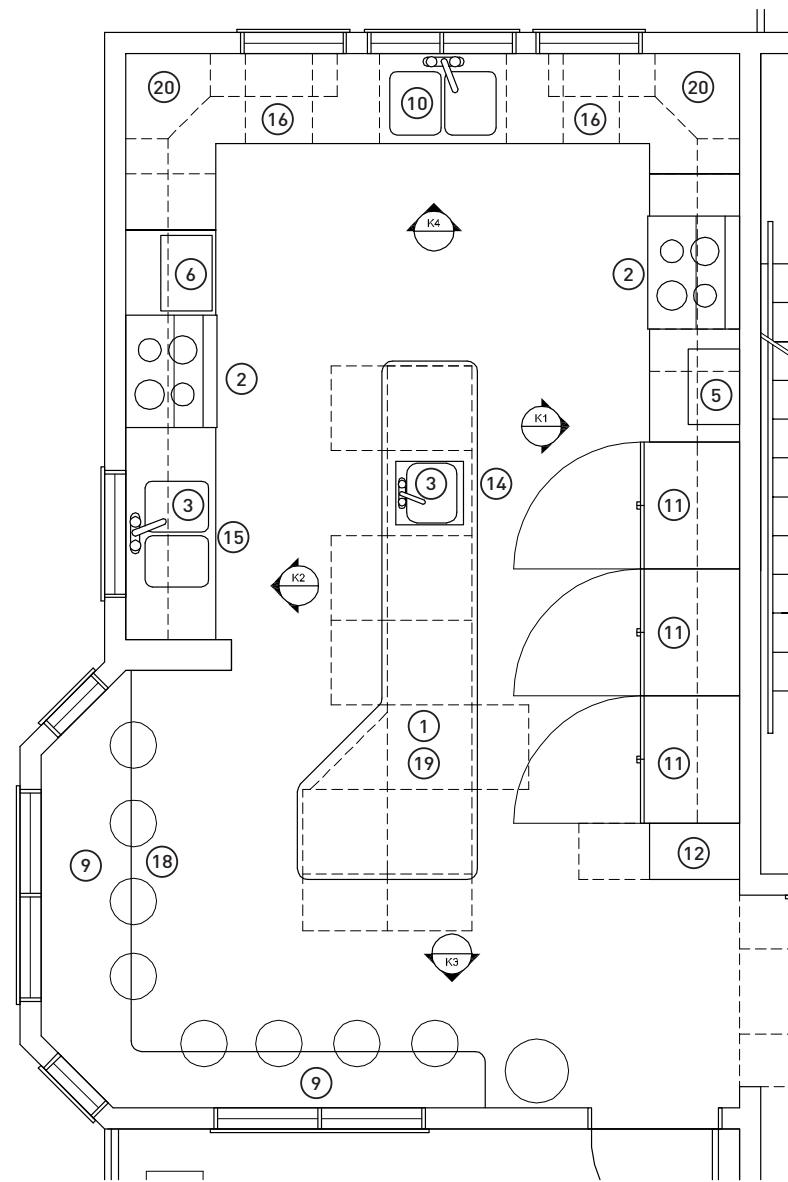
K3 KITCHEN ELEVATION  
SCALE: 1/2" = 1'-0"

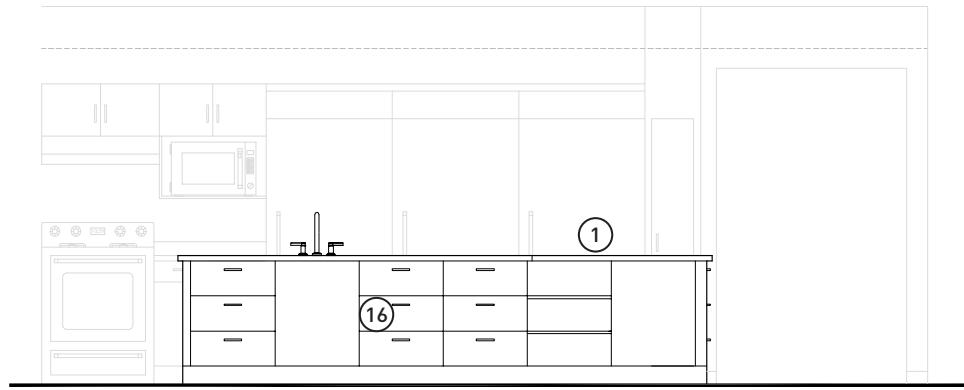


KITCHEN  
SCALE: 1/2" = 1'-0"

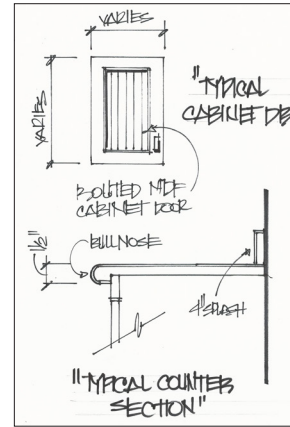
**KITCHEN KEYNOTES**

- ① PLAM COUNTER
- ② STANDARD RANGE W/ OVEN
- ③ 4" TILE ACCENT
- ④ 4" BACKSPLASH
- ⑤ MICROWAVE
- ⑥ ACCESSIBLE MICROWAVE
- ⑦ BULKHEAD
- ⑧ PAINTED DRYWALL
- ⑨ EATING BAR
- ⑩ ACCESSIBLE KNEE SPACE
- ⑪ ALL SHELVING FRIDGE
- ⑫ PANTRY SLIDEOUT
- ⑬ WASTE UNDER
- ⑭ PREP SINK
- ⑮ DOUBLE SINK
- ⑯ DRAWER BANK
- ⑰ EXHAUST HOOD
- ⑱ ISLAND
- ⑳ CORNER SHELF



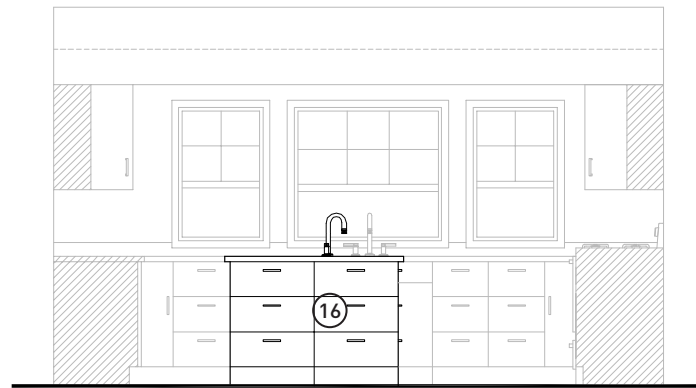


K1 KITCHEN ISLAND ELEVATION  
SCALE: 1/2" = 1'-0"

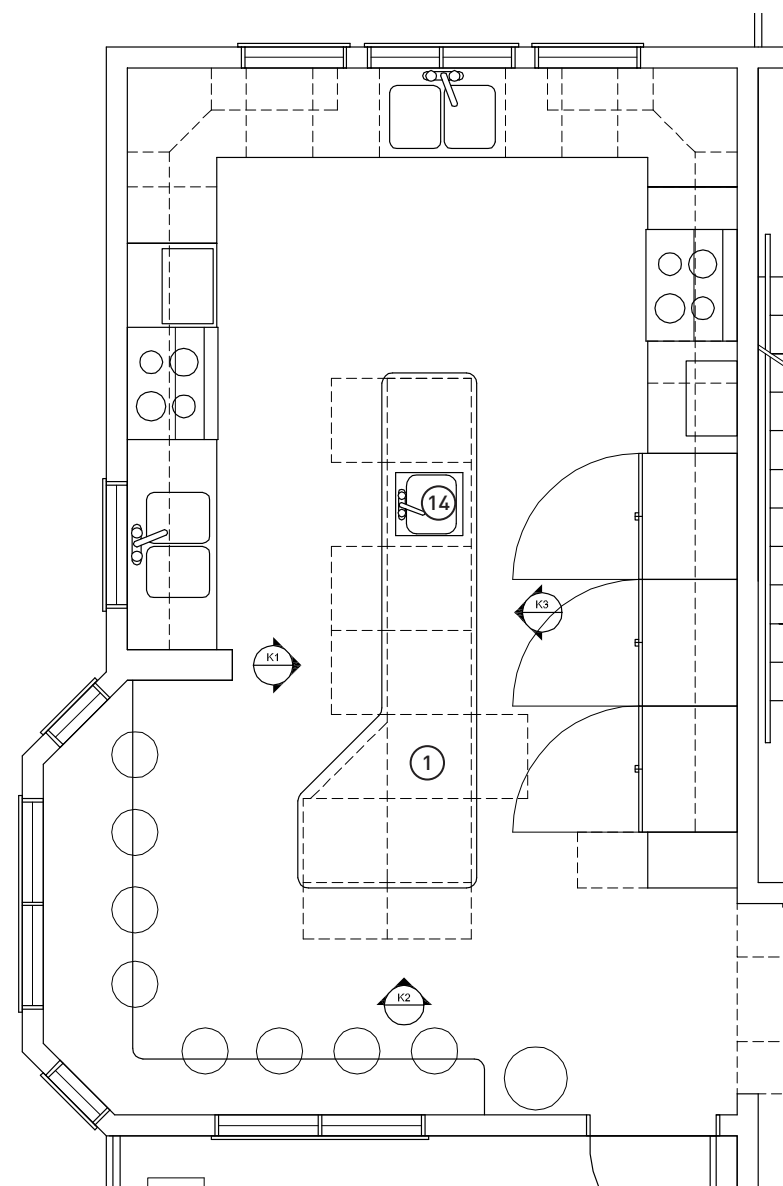


### KITCHEN KEYNOTES

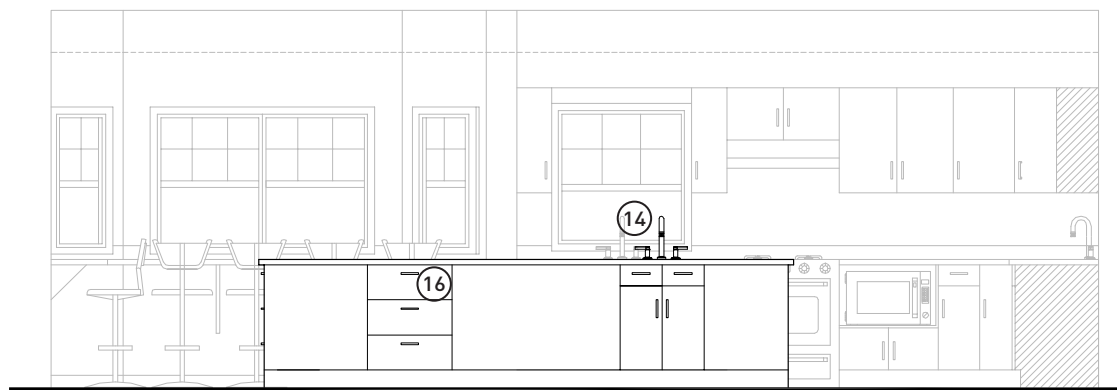
- ① PLAM COUNTER
- ② STANDARD RANGE W/ OVEN
- ③ 4" TILE ACCENT
- ④ 4" BACKSPLASH
- ⑤ MICROWAVE
- ⑥ ACCESSIBLE MICROWAVE
- ⑦ BULKHEAD
- ⑧ PAINTED DRYWALL
- ⑨ EATING BAR
- ⑩ ACCESSIBLE KNEE SPACE
- ⑪ ALL SHELVING FRIDGE
- ⑫ PANTRY SLIDEOUT
- ⑬ WASTE UNDER
- ⑭ PREP SINK
- ⑮ DOUBLE SINK
- ⑯ DRAWER BANK
- ⑰ EXHAUST HOOD
- ⑱ BAR STOOL
- ⑲ ISLAND
- ⑳ CORNER SHELF



K2 KITCHEN ISLAND ELEVATION  
SCALE: 1/2" = 1'-0"

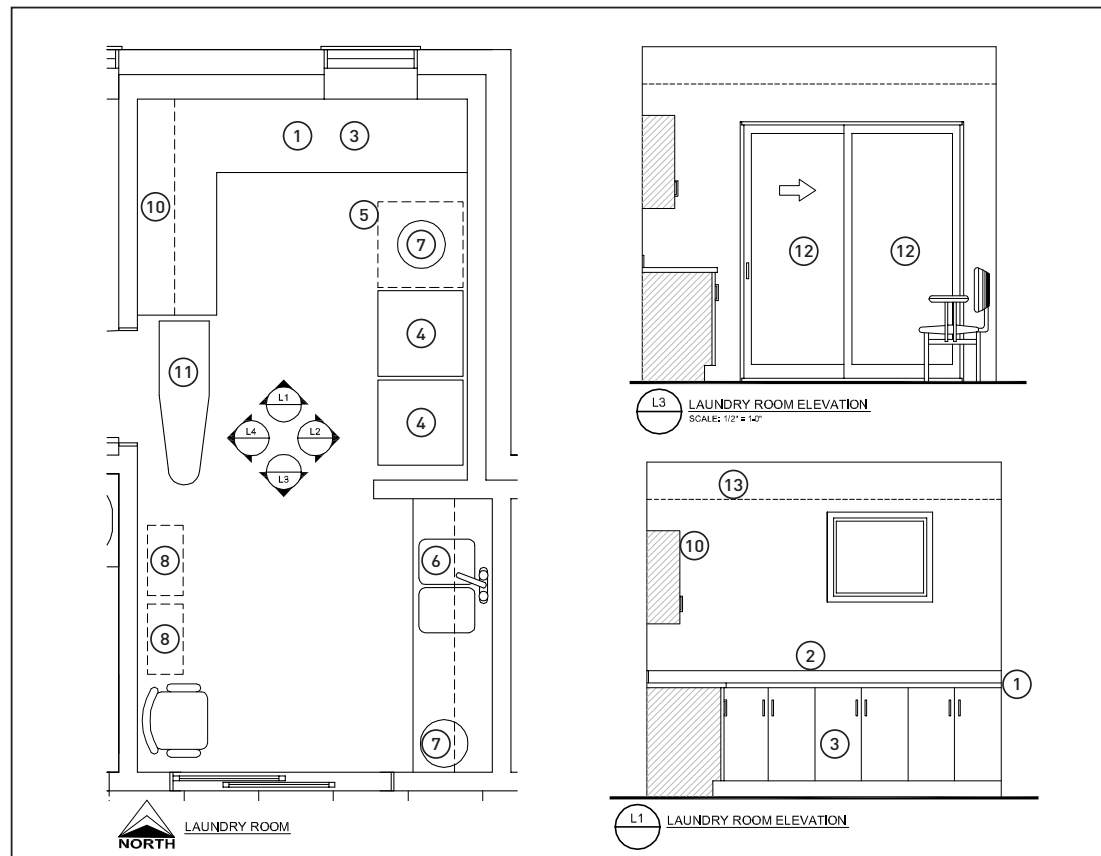


KITCHEN  
SCALE: 1/2" = 1'-0"



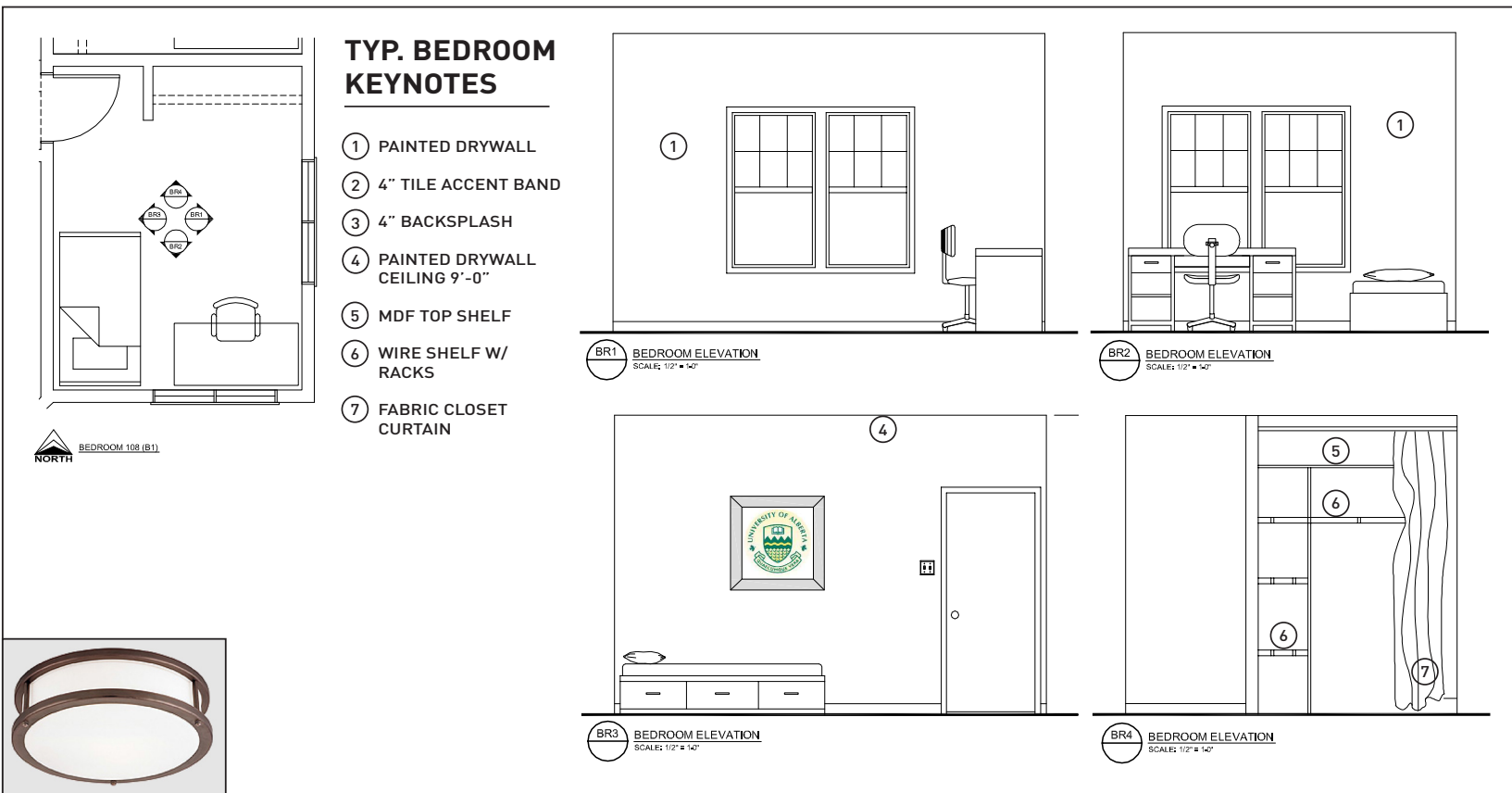
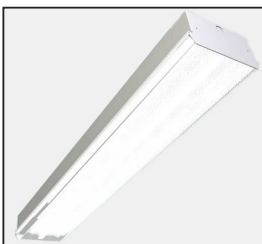
K3 KITCHEN ISLAND ELEVATION  
SCALE: 1/2" = 1'-0"





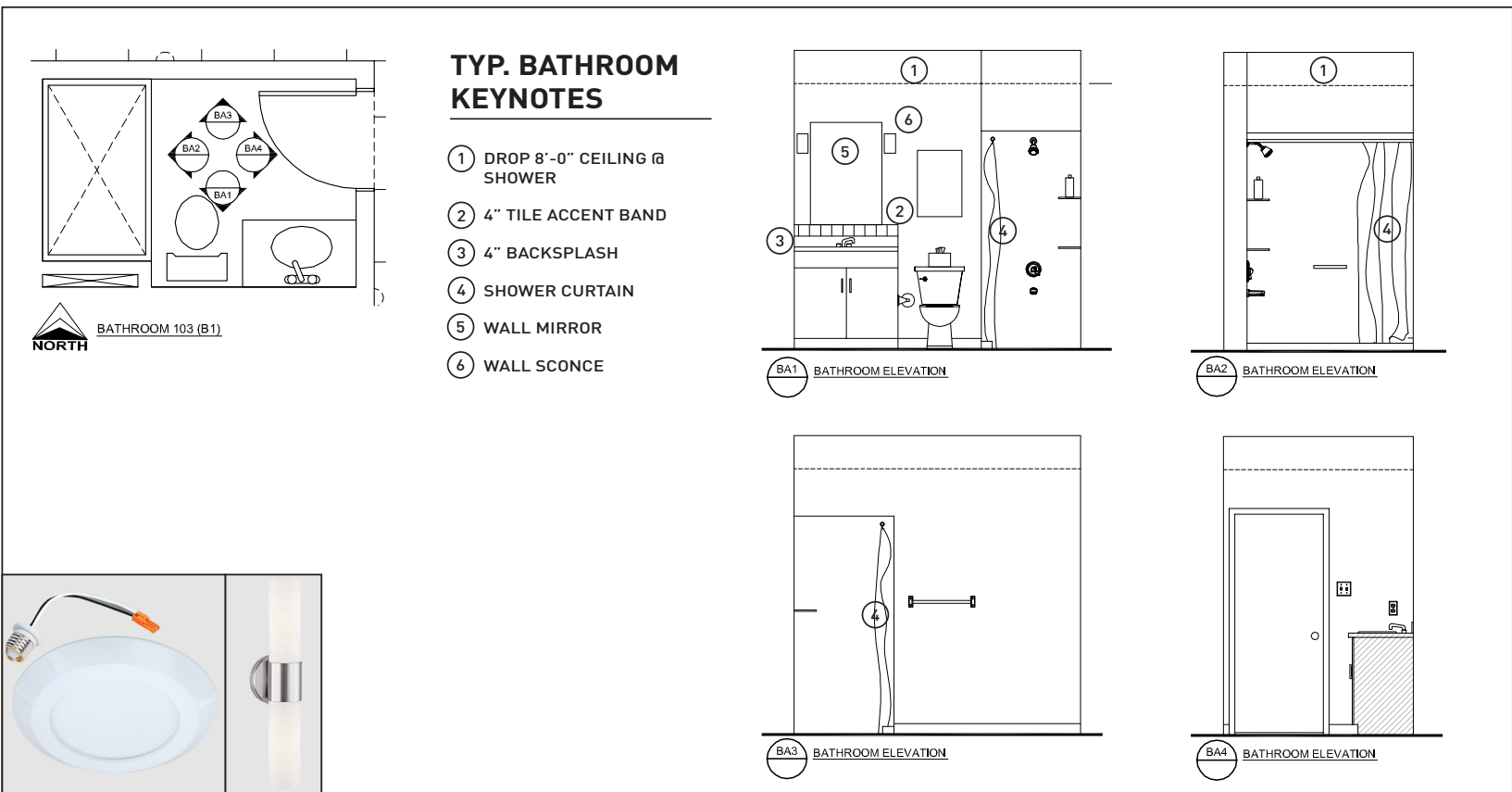
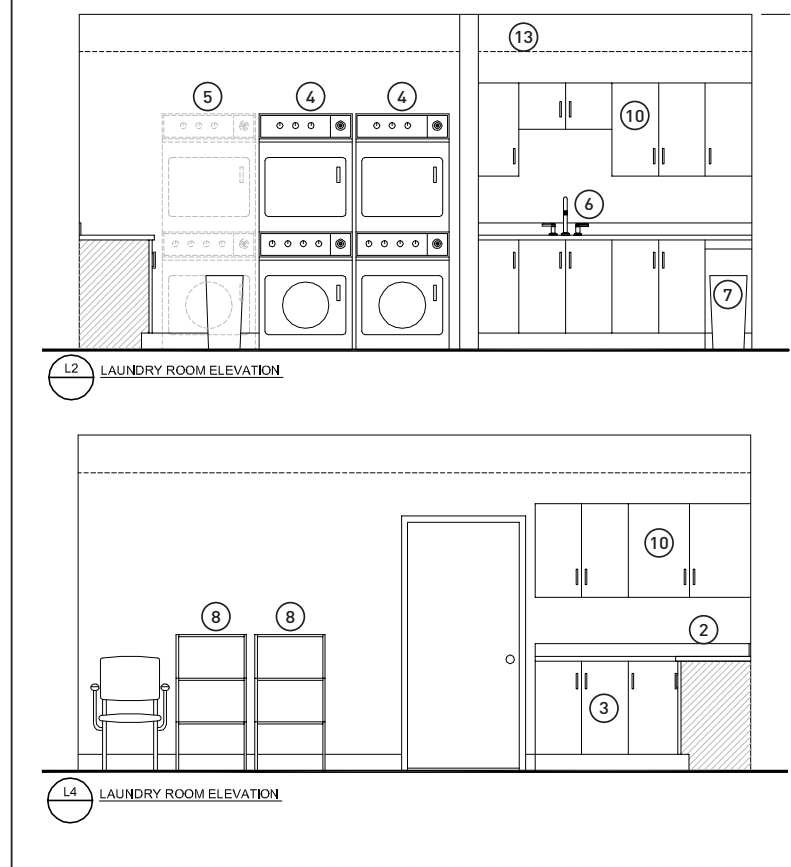
**LAUNDRY ROOM KEYNOTES**

- ① PLAM COUNTER
- ② 4" BACKSPLASH
- ③ STORAGE BELOW
- ④ STACKING WASH/DRY
- ⑤ OPTIONAL STACKER
- ⑥ DOUBLE SINK
- ⑦ WASTE
- ⑧ DRYING RACK
- ⑨ 4" MDR BASE BOARD
- ⑩ UPPER STORAGE
- ⑪ IRONING BOARD
- ⑫ CLEAR GLAZING
- ⑬ BULKHEAD



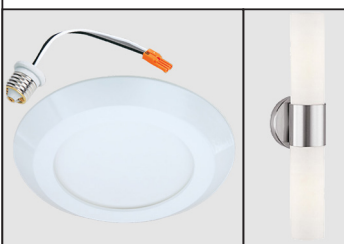
**TYP. BEDROOM KEYNOTES**

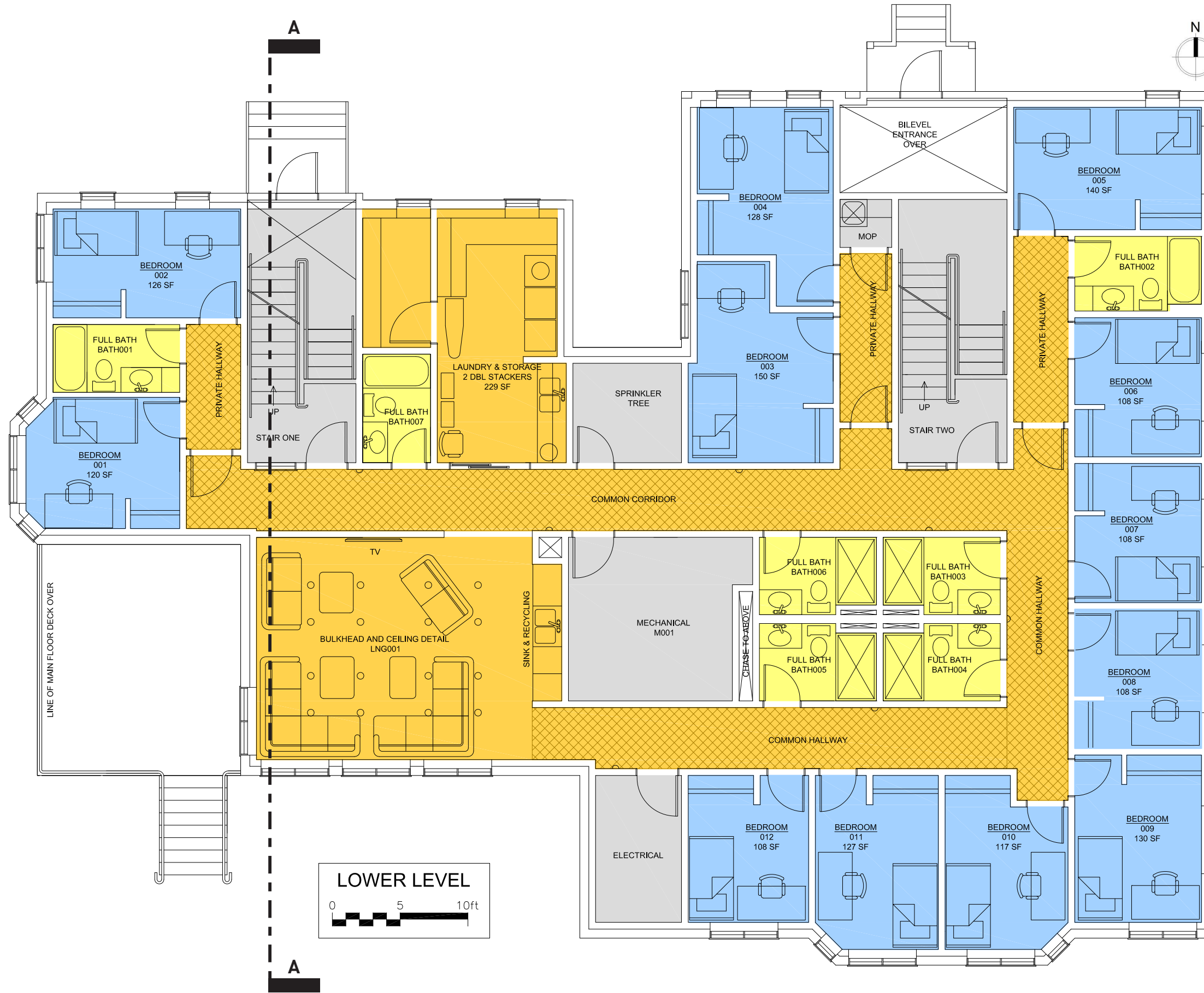
- ① PAINTED DRYWALL
- ② 4" TILE ACCENT BAND
- ③ 4" BACKSPLASH
- ④ PAINTED DRYWALL CEILING 9'-0"
- ⑤ MDF TOP SHELF
- ⑥ WIRE SHELF W/ RACKS
- ⑦ FABRIC CLOSET CURTAIN



**TYP. BATHROOM KEYNOTES**

- ① DROP 8'-0" CEILING @ SHOWER
- ② 4" TILE ACCENT BAND
- ③ 4" BACKSPLASH
- ④ SHOWER CURTAIN
- ⑤ WALL MIRROR
- ⑥ WALL SCNCE

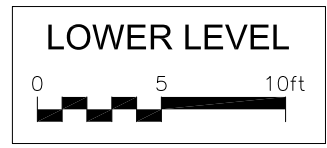


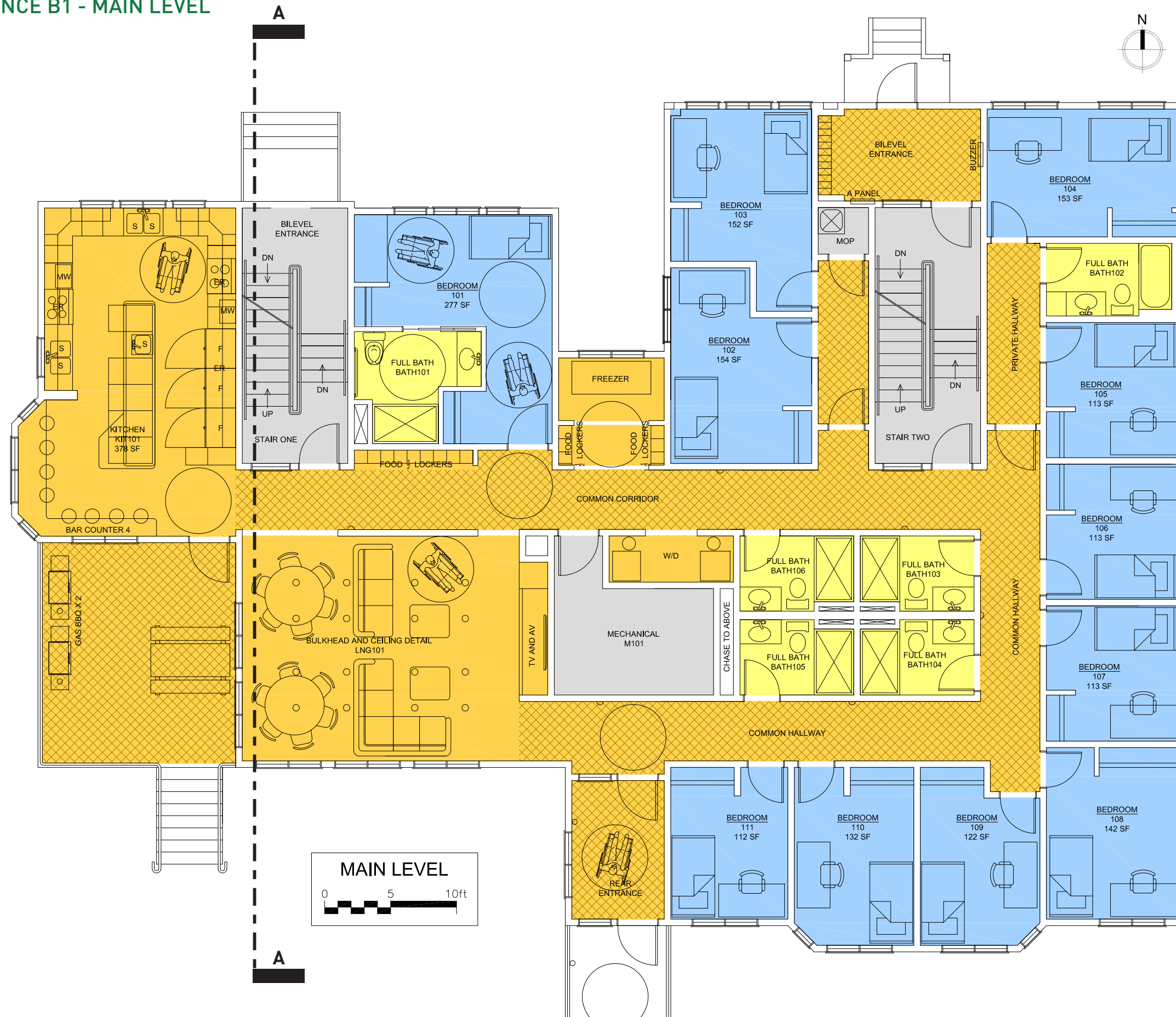


**UNIT COUNT LEVELS 1-3**

1-BED UNITS - 36  
(rooms range from 108 ft<sup>2</sup> to 252 ft<sup>2</sup>)  
ACCESSIBLE 1-BED UNITS - 1  
(277 ft<sup>2</sup>)  
TOTAL BEDS: 37  
  
GROSS FOOTPRINT AREA = 4,295 ft<sup>2</sup>  
@ 3 LEVELS = 12,885 ft<sup>2</sup>

- COMMUNAL SPACES  
(653 ft<sup>2</sup>)
- COMMUNAL CIRCULATION
- BEDROOMS  
12 Bedroom Units
- WASHROOMS
- BUILDING SERVICES /  
VERTICAL CIRCULATION



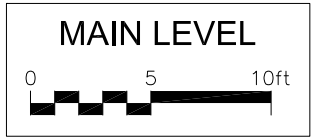


**UNIT COUNT LEVELS 1-3**

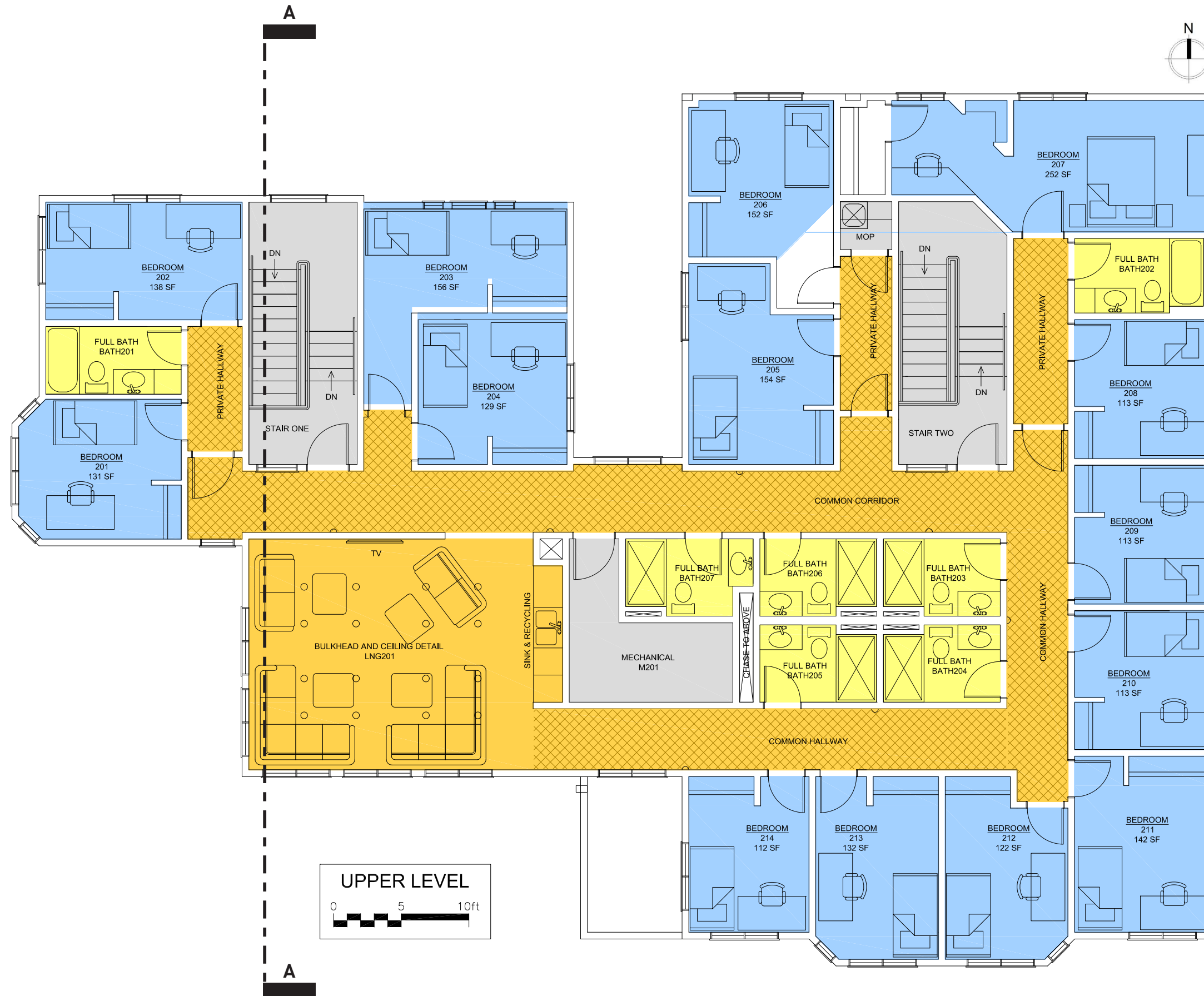
1-BED UNITS - 36  
 (rooms range from 108 ft<sup>2</sup> to 252 ft<sup>2</sup>)  
 ACCESSIBLE 1-BED UNITS - 1  
 (277 ft<sup>2</sup>)  
 TOTAL BEDS: 37

GROSS FOOTPRINT AREA = 4,295 ft<sup>2</sup>  
 @ 3 LEVELS = 12,885 ft<sup>2</sup>

- COMMUNAL SPACES  
(653 ft<sup>2</sup>)
- COMMUNAL CIRCULATION
- BEDROOMS  
11 Bedroom Units
- WASHROOMS
- BUILDING SERVICES / VERTICAL CIRCULATION







**UNIT COUNT LEVELS 1-3**

1-BED UNITS - 36  
 (rooms range from 108 ft<sup>2</sup> to 252 ft<sup>2</sup>)  
 ACCESSIBLE 1-BED UNITS - 1  
 (277 ft<sup>2</sup>)  
 TOTAL BEDS: 37

GROSS FOOTPRINT AREA = 4,295 ft<sup>2</sup>  
 @ 3 LEVELS = 12,885 ft<sup>2</sup>

- COMMUNAL SPACES  
(653 ft<sup>2</sup>)
- COMMUNAL CIRCULATION
- BEDROOMS  
14 Bedroom Units
- WASHROOMS
- BUILDING SERVICES /  
VERTICAL CIRCULATION

**UPPER LEVEL**  
 0 5 10ft



**WALL SCHEDULE**

TYPICAL EXTERIOR WALL

W1

EXTERIOR FINISHING (STUCCO/BRICK)  
BUILDING PAPER OR TYPAR  
7/16" O.S.B. SHEATHING  
2X6 STUDS @ 16" O.C.  
R20 BATT INSULATION  
6 MIL POLY VAPOR BARRIER  
5/8" TYPE X GYPSUM BOARD

TYPICAL PARTY / CORRIDOR WALL

W2

5/8" TYPE X GYPSUM BOARD,  
JOINTS FILLED & TAPED  
1/2" SOUNDBAR  
STAGGERED 2X4 STUDS @ 16" O.C.  
ON 2X6 BASE CAN CAP  
PLATES  
R12 BATT INSULATION EACH SIDE  
2 LAYERS 5/8" TYPE X GYPSUM BOARD,  
JOINTS FILLED & TAPED  
STC 55 - 45 MIN. F.R.R.

TYPICAL FOUNDATION WALL

W3

8" CONCRETE WALL REINFORCED  
ON 24" X 8" CONCRETE STIP FOOTING  
PARGING ABOVE GRADE  
DAMP PROOFING BELOW GRADE  
1/2" AIR SPACE  
2X4 STUDS @ 24" O.C.  
R12 BATT INSULATION  
6 MIL POLY VAPOR BARRIER  
5/8" TYPE X GYPSUM BOARD,  
JOINTS FILLED & TAPED

TYPICAL INTERIOR WALL

W4

1/2" GYPSUM BOARD,  
JOINTS FILLED & TAPED  
2X4 OR 2X6 @ 16" O.C. TO U/S FLOOR  
OR CEILING  
1/2" GYPSUM BOARD,  
JOINTS FILLED & TAPED

**FLOOR SCHEDULE**

TYPICAL FLOOR CONSTRUCTION

F1

FINISHED FLOORING  
23/32" OSB, GLUED & SCREWED  
11-7/8" ENG. FLOOR JOISTS AS PER  
SUPPLIER FRAMING PLAN OR  
ALT.  
1/2" SOUNDBAR @ 24" O.C.  
2 LAYERS 5/8" TYPE X GYPSUM BOARD,  
JOINTS FILLED AND TAPED  
TYPICAL CEILING FINISH  
STC 55 - 45 MIN. F.R.R.

TYPICAL FLOOR CONSTRUCTION

F2

FINISHED FLOORING  
7/8" OSB, GLUED & SCREWED  
11-7/8" ENG. FLOOR JOISTS AS PER  
SUPPLIER FRAMING PLAN OR  
ALT.  
6" R20 BATT INSULATION  
SOUNDBAR @ 16" O.C.  
2 LAYERS 5/8" TYPE X GYPSUM BOARD,  
JOINTS FILLED AND TAPED  
TYPICAL CEILING FINISH TEXTURED  
DRYWALL  
STC 55 - 45 MIN. F.R.R.

TYPICAL FLOOR CONSTRUCTION

F3

FINISHED FLOORING  
23/32" OSB, GLUED & SCREWED  
11-7/8" ENG. FLOOR JOISTS AS PER  
SUPPLIER FRAMING PLAN  
5/8" GYPSUM BOARD,  
JOINTS FILLED AND TAPED  
45 MIN. F.R.R.

TYPICAL BASEMENT CONCRETE SLAB

F4

FLOOR FINISH  
4" CONCRETE SLAB  
6 MIL POLY VAPOR BARRIER  
MIN. 6" COMPACTED GRANULAR FILL

**ROOF SCHEDULE**

TYPICAL ROOF

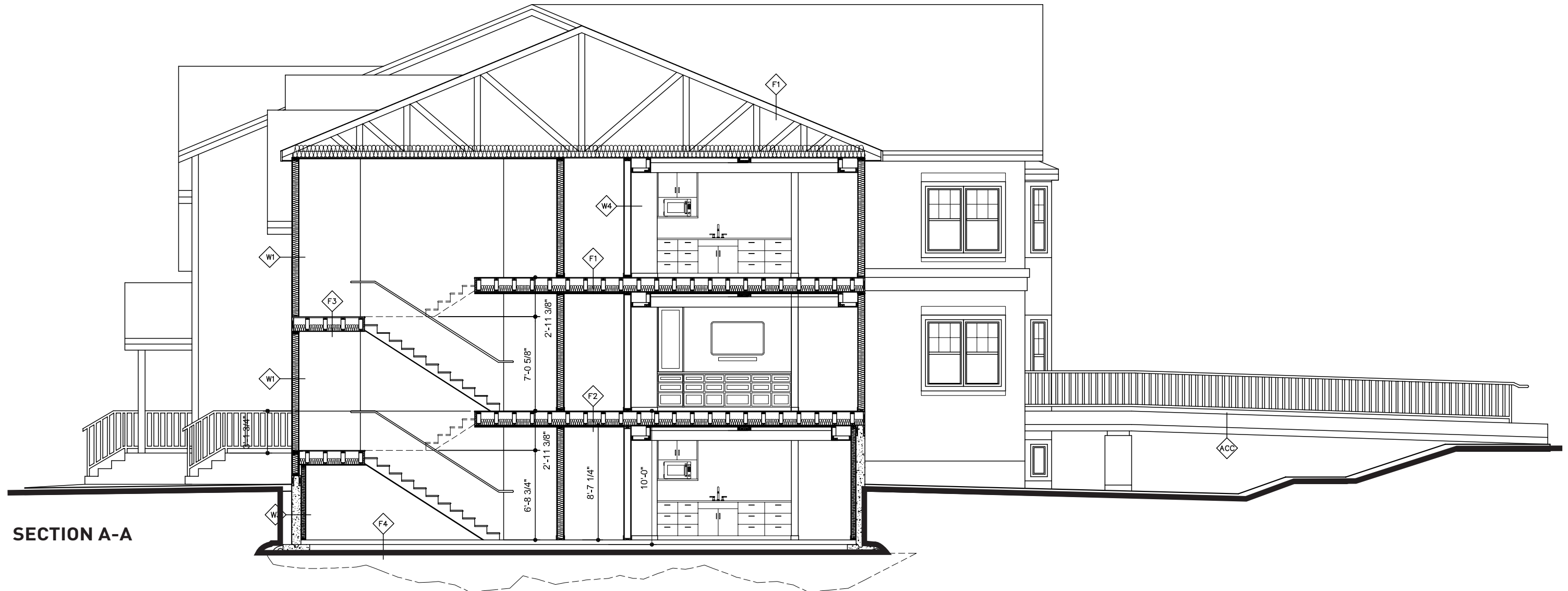
R1

(SEE ELEVATIONS & ROOF PLAN FOR SLOPE)  
ARCHITECTURAL ASPHALT SHINGLES  
1/2" O.S.B. SHEATHING WITH H-CLIPS  
PRE-ENGINEERED WOOD TRUSSES @ 24" O.C.  
R-40 LOOSE FILL CELLULOSE INSULATION  
6 MIL POLY VAPOR BARRIER  
5/8" TYPE X GYPSUM BOARD,  
JOINTS FILLED & TAPED

TYPICAL RAMP CONSTRUCTION

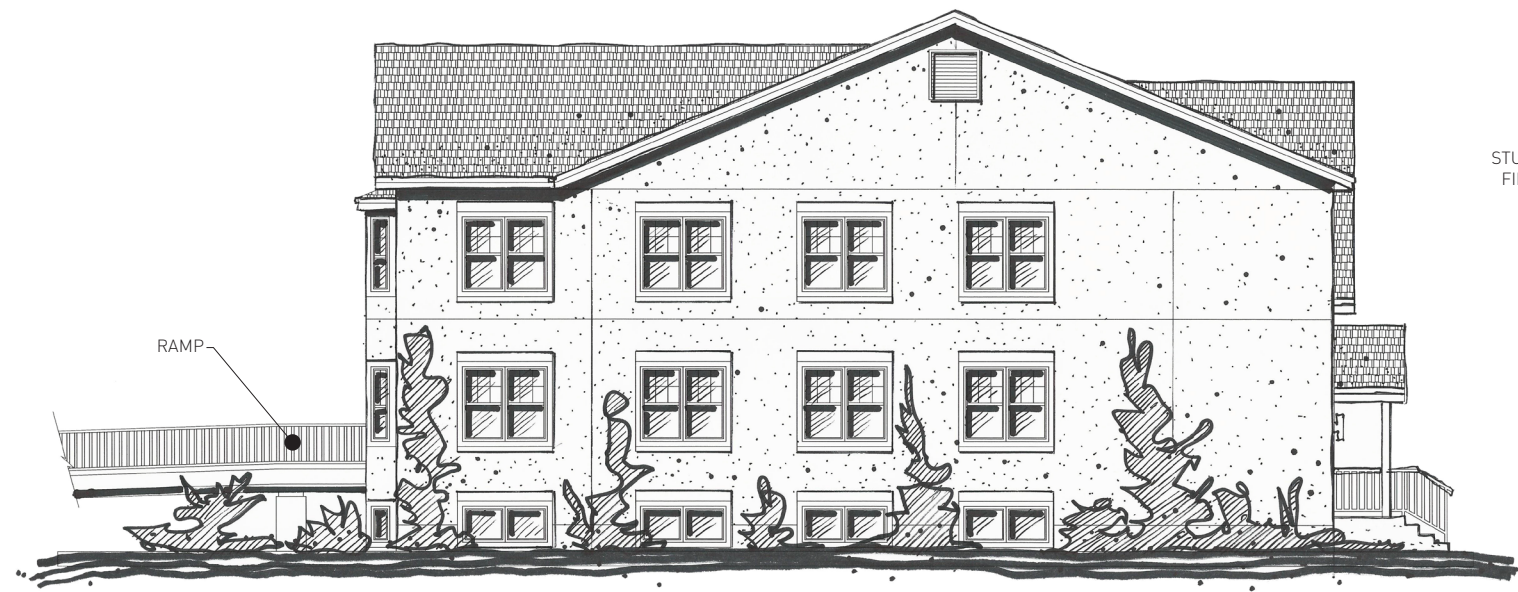
ACC

STEEL CHANNEL STRUCTURE W/  
GRATED WALKING SURFACE  
LENGTH TO BE CONFIRMED  
SUBJECT TO SITE GRADING



SECTION A-A





B1 East Elevation



B1 North Elevation

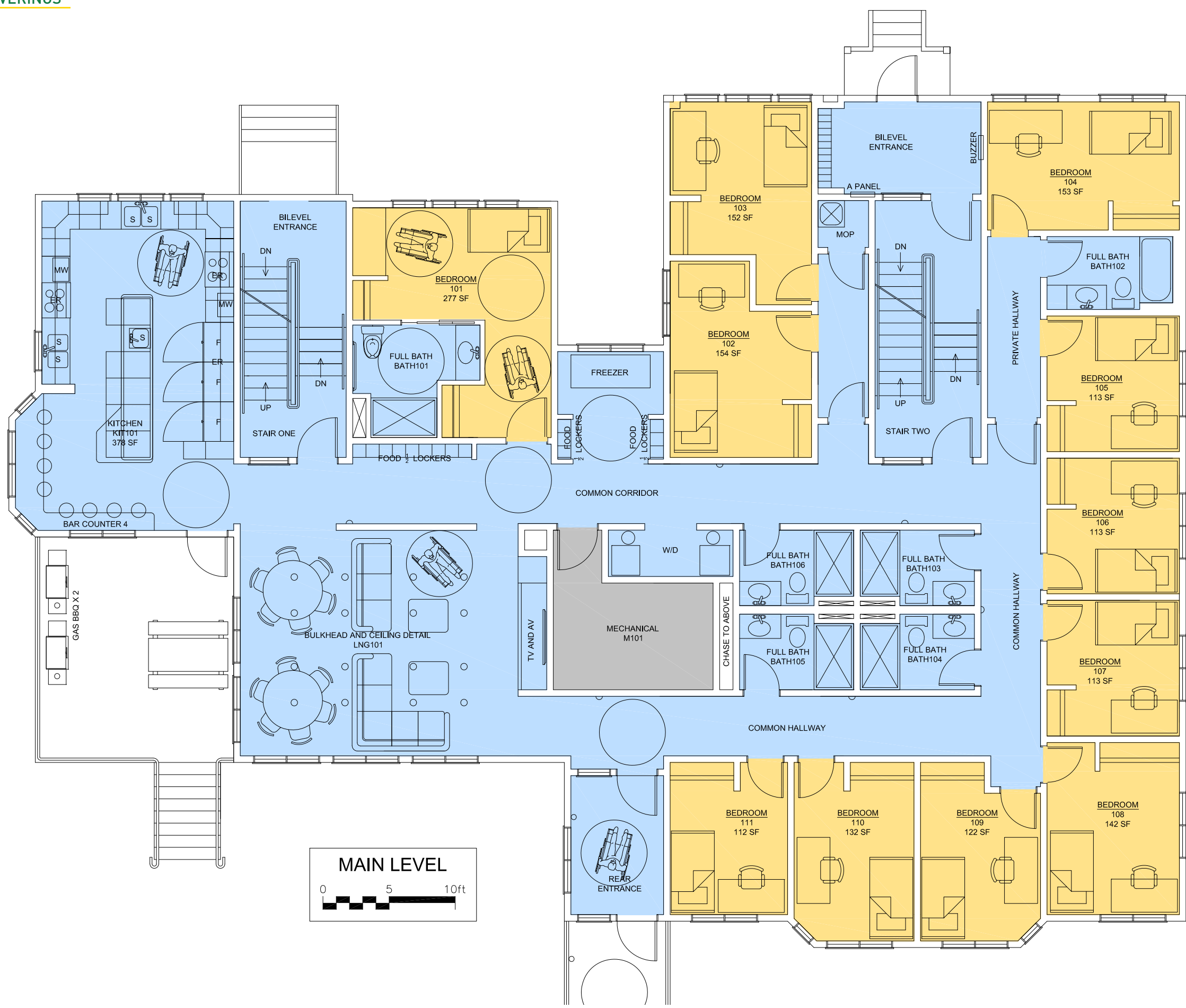


B1 South Elevation

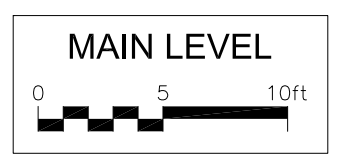


B1 West Elevation

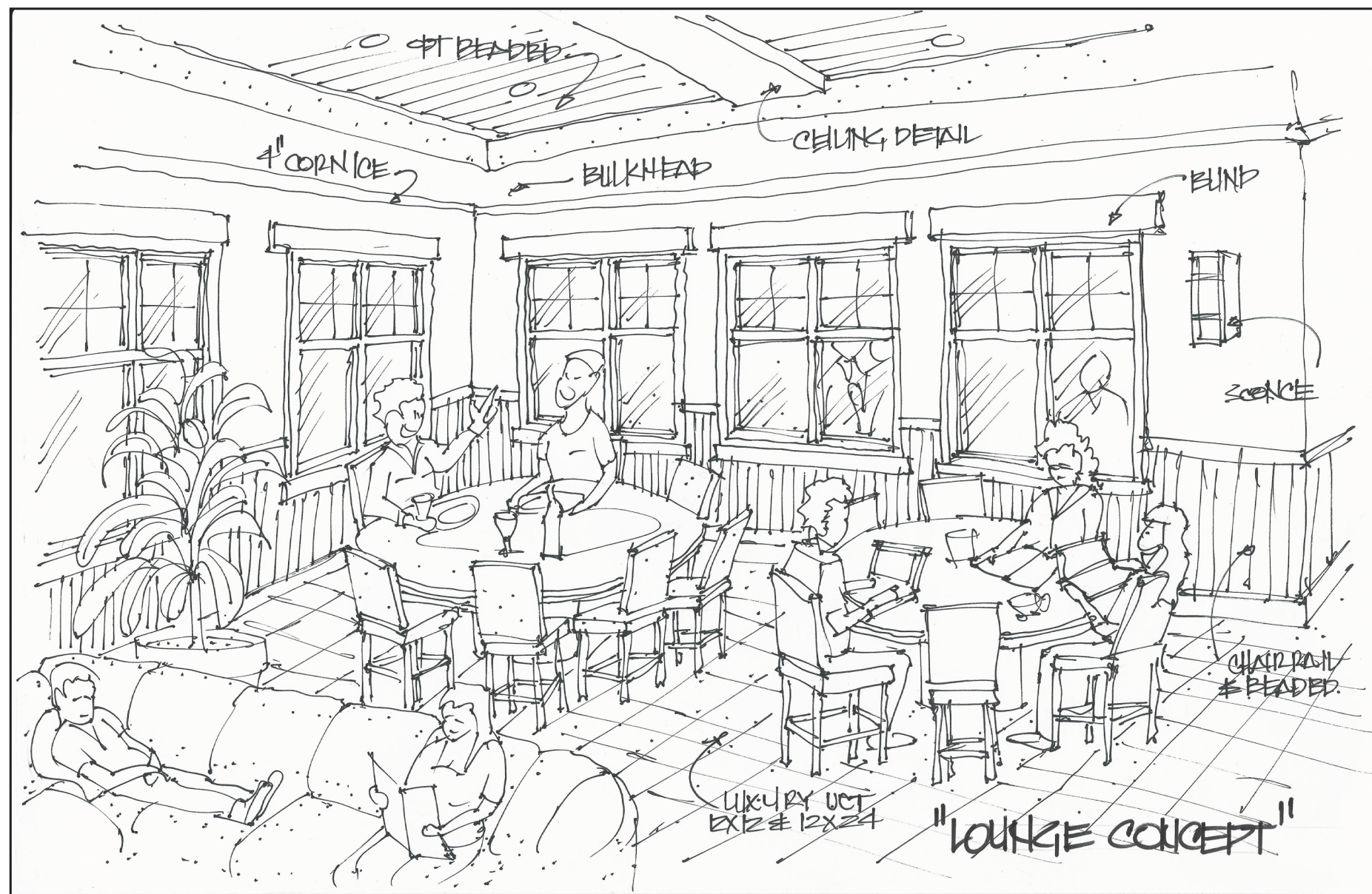
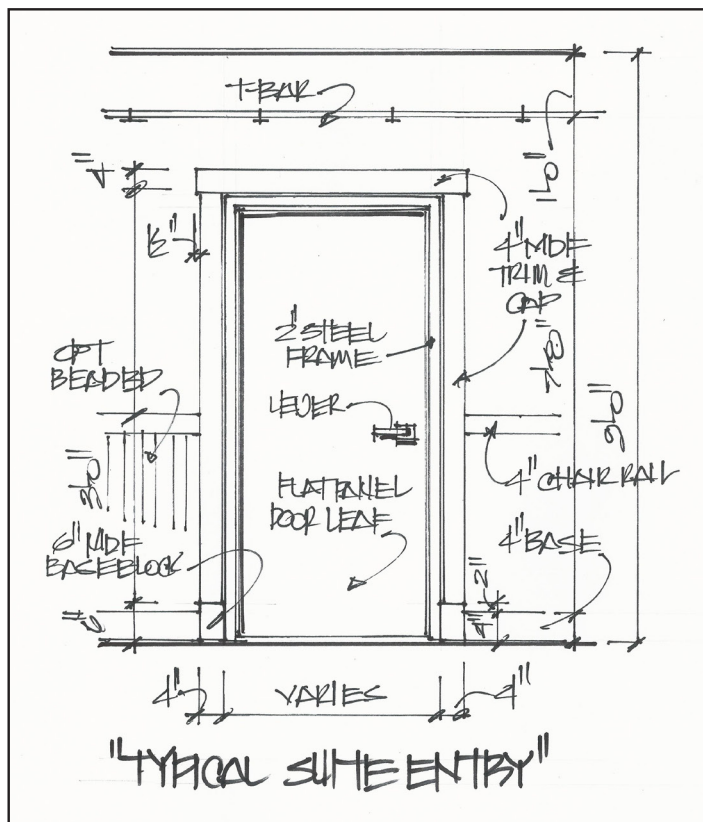
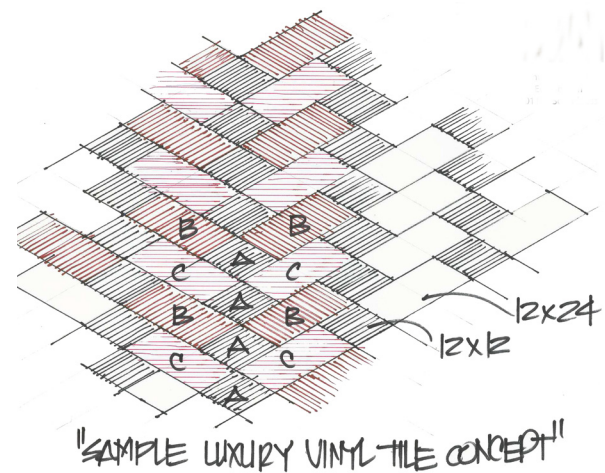
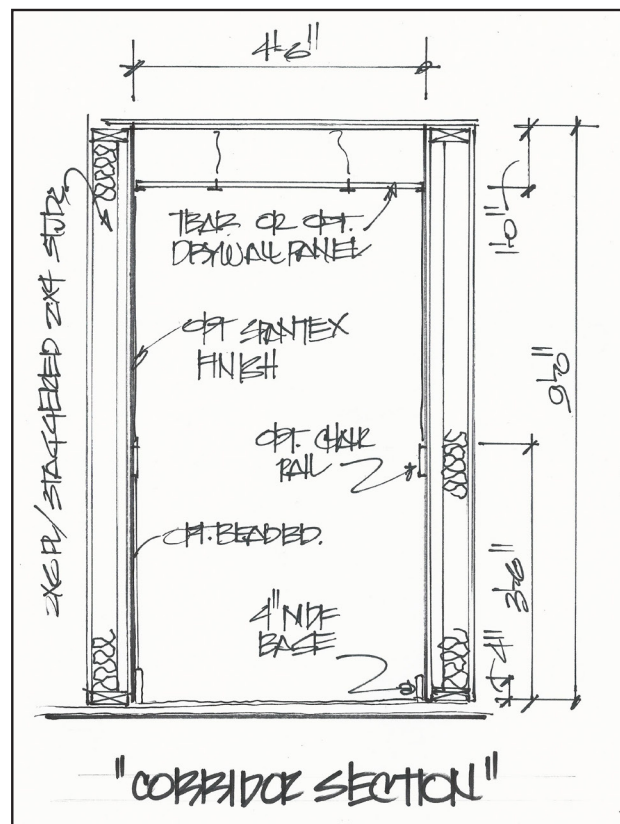




- LUXURY VINYL TILE
- CARPET TILE
- SHEET GOODS











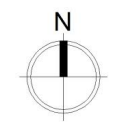
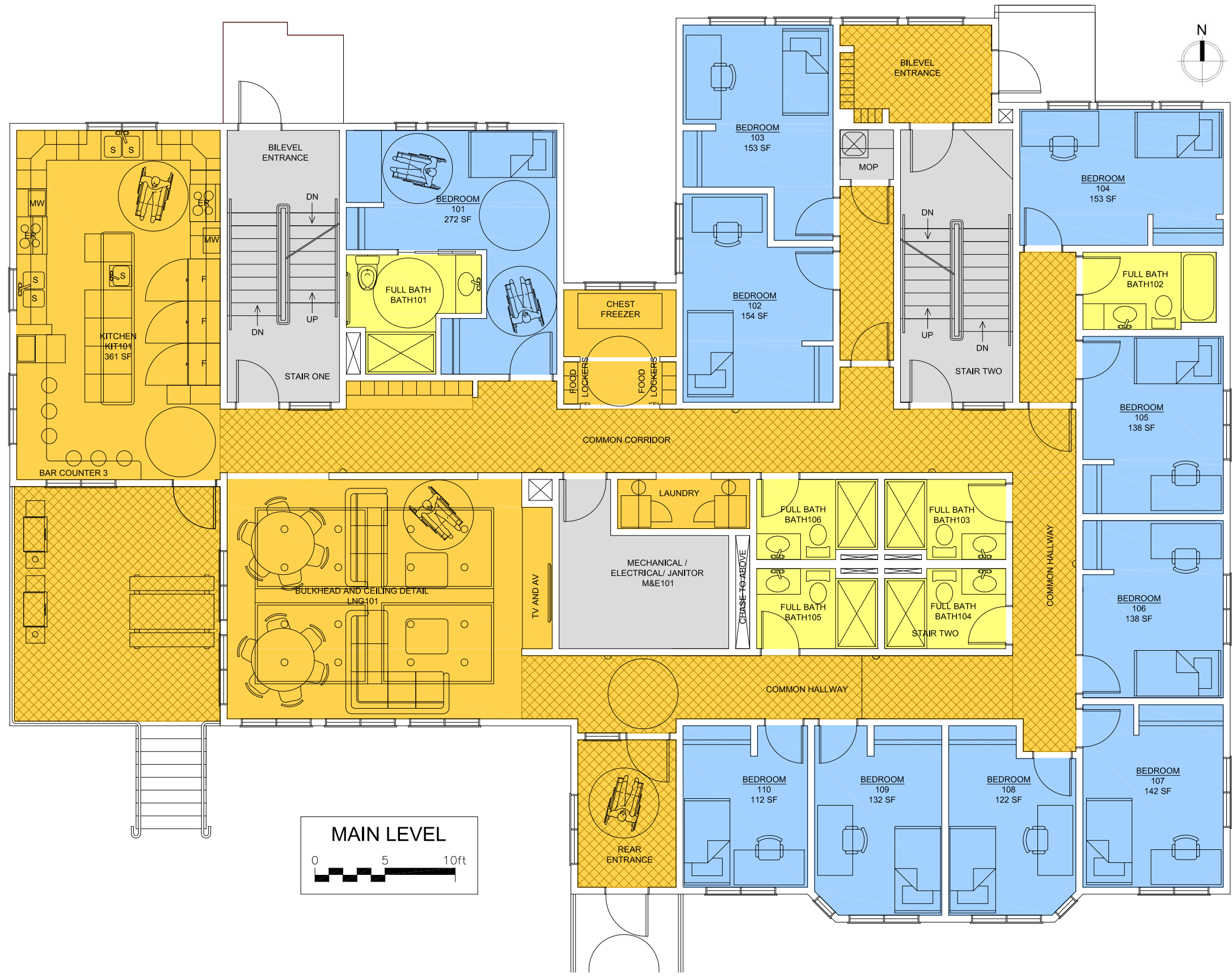
**UNIT COUNT LEVELS 1-3**

1-BED UNITS (rooms range from 103 ft<sup>2</sup> to 154 ft<sup>2</sup>)  
 Lower Level - 11  
 Main Level - 10 (including 1 Accessible - 272 ft<sup>2</sup>)  
 Upper Level - 13

TOTAL BEDS: 34

GROSS FOOTPRINT AREA = 4,185 ft<sup>2</sup>  
 @ 3 LEVELS = 12,555 ft<sup>2</sup>

- COMMUNAL SPACES (653 ft<sup>2</sup>)
- COMMUNAL CIRCULATION
- BEDROOMS
- WASHROOMS
- BUILDING SERVICES / VERTICAL CIRCULATION



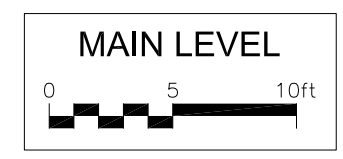
**UNIT COUNT LEVELS 1-3**

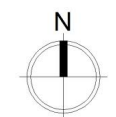
1-BED UNITS (rooms range from 103 ft<sup>2</sup> to 154 ft<sup>2</sup>)  
 Lower Level - 11  
 Main Level - 10 (including 1 Accessible - 272 ft<sup>2</sup>)  
 Upper Level - 13

TOTAL BEDS: 34

GROSS FOOTPRINT AREA = 4,185 ft<sup>2</sup>  
 @ 3 LEVELS = 12,555 ft<sup>2</sup>

- COMMUNAL SPACES (653 ft<sup>2</sup>)
- COMMUNAL CIRCULATION
- BEDROOMS
- WASHROOMS
- BUILDING SERVICES / VERTICAL CIRCULATION





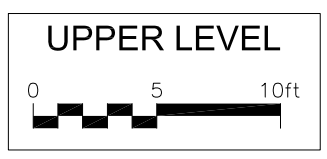
**UNIT COUNT LEVELS 1-3**

1-BED UNITS (rooms range from 103 ft<sup>2</sup> to 154 ft<sup>2</sup>)  
 Lower Level - 11  
 Main Level - 10 (including 1 Accessible - 272 ft<sup>2</sup>)  
 Upper Level - 13

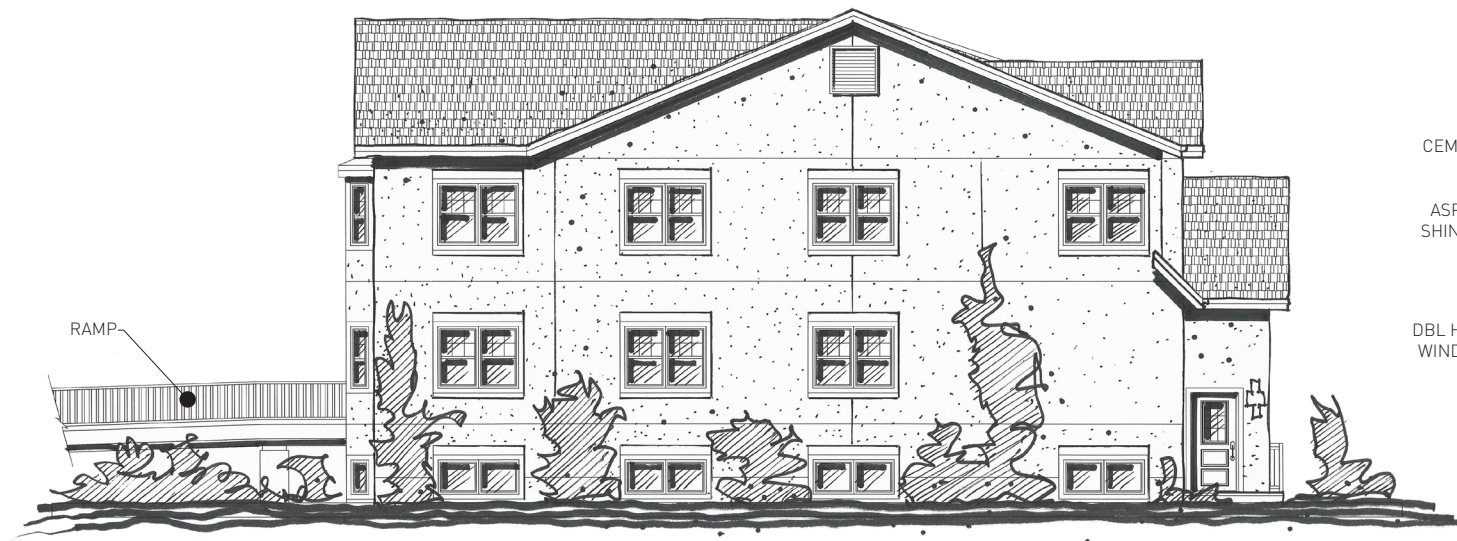
TOTAL BEDS: 34

GROSS FOOTPRINT AREA = 4,185 ft<sup>2</sup>  
 @ 3 LEVELS = 12,555 ft<sup>2</sup>

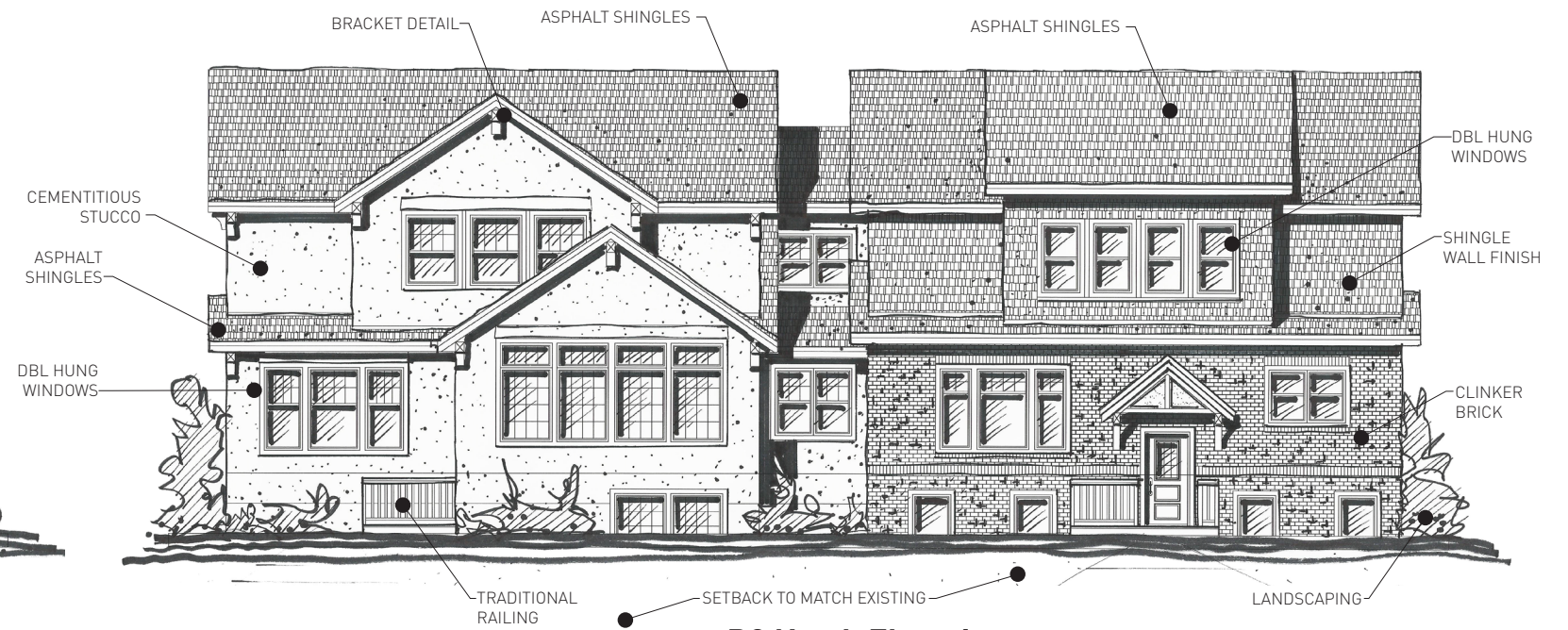
- COMMUNAL SPACES (653 ft<sup>2</sup>)
- COMMUNAL CIRCULATION
- BEDROOMS
- WASHROOMS
- BUILDING SERVICES / VERTICAL CIRCULATION







**B2 East Elevation**



**B2 North Elevation**



**B2 South Elevation**



**B2 West Elevation**

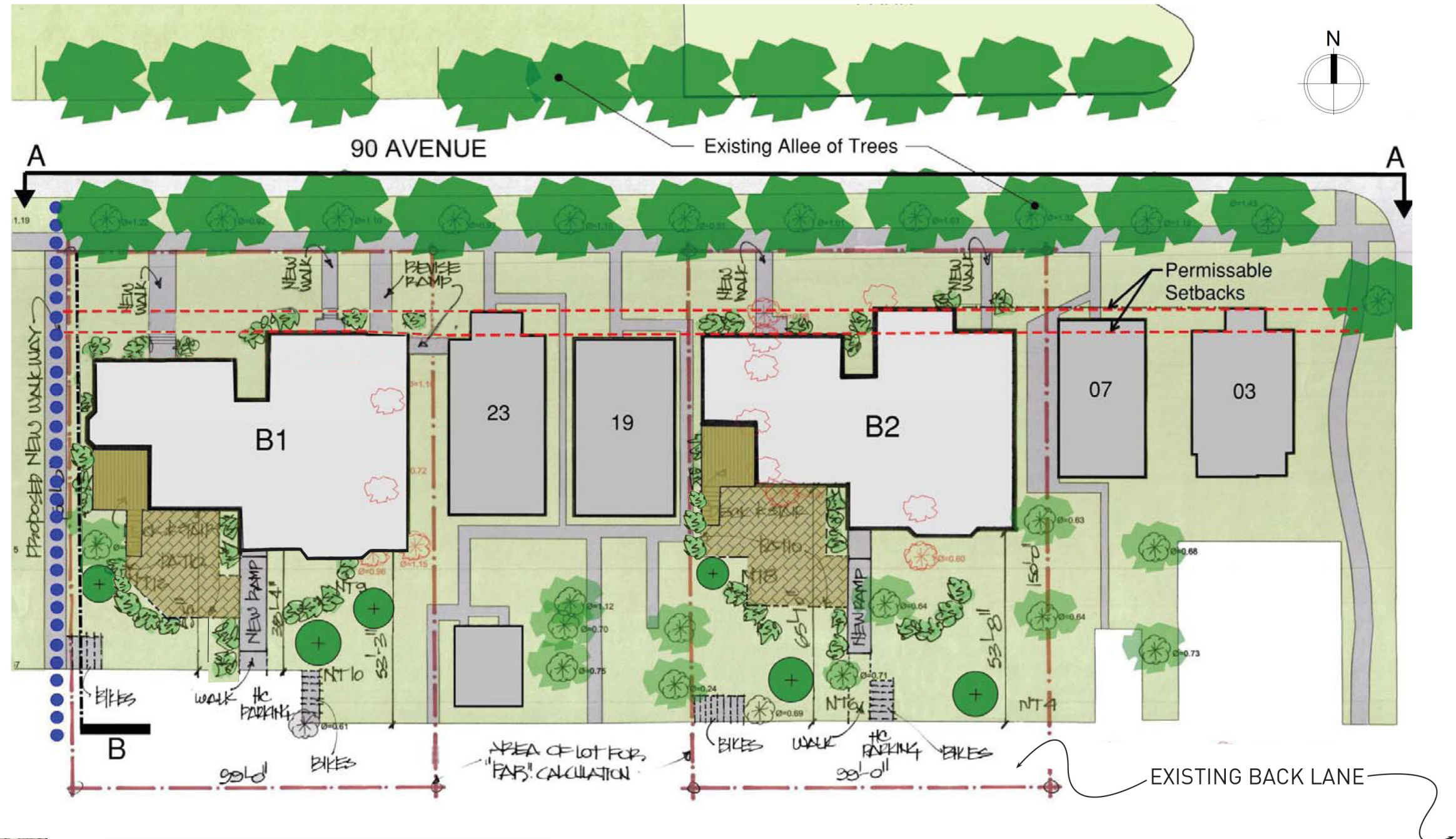


**Trees suitable for neighbourhood settings:**

- Elm
- Spruce
- Larch
- Pine
- Maple
- Flowering crab and hawthornes

**Shrubs suitable for neighbourhood settings:**

- Snowberry
- Coralberry
- Dwarf European Cranberry
- Red Twig and Yellow Twig
- Dogwood
- Dwarf Korean Lilac
- Burning Bush
- Spirea
- Meyer Lilac
- False Spirea
- Mock Orange
- Nanny Berry



**B1 F.A.R. & SITE COVERAGE**

SITE AREA:	14,850 ft <sup>2</sup> / 1,379.6 m <sup>2</sup>
BUILDING FOOTPRINT:	4,294 ft <sup>2</sup> / 398.9 m <sup>2</sup>
TOTAL BUILDING AREA:	12,728 ft <sup>2</sup> / 1,182.5 m <sup>2</sup>
F.A.R.:	0.83
SITE COVERAGE:	28.2%

**B2 F.A.R. & SITE COVERAGE**

SITE AREA:	14,850 ft <sup>2</sup> / 1,379.6 m <sup>2</sup>
BUILDING FOOTPRINT:	4,185 ft <sup>2</sup> / 388.8 m <sup>2</sup>
TOTAL BUILDING AREA:	12,272 ft <sup>2</sup> / 1,140.1 m <sup>2</sup>
F.A.R.:	0.83
SITE COVERAGE:	28.2%

**LEGEND**

- SHRUBS (42)
- TREES TO BE REMOVED (F-TOTAL)
- DENOTES (6) "NEW TREE"
- PATIO PAVERS
- PROPERTY





Site Section B Looking East at Residence B1



110th Street

B2

B1

90th Avenue Streetscape Looking South



## 4.0 STRUCTURAL DESIGN

### 4.1 Structural Design Description

The design of the new Residential Dorm B1 is subject to the National Building Code of Canada 2010 (NBCC 2010) and Alberta Building Code 2006 (ABC 2006). A revised edition of the Alberta Building Code is scheduled to be released soon, however, this schedule is not firm and the design for this structure may commence prior to the anticipated release of the new ABC. Regardless, it is anticipated that changes to the new ABC will be reflected in the NBCC 2010 and should not impact this project.

The structural design and construction of this building is subject to the clauses in Part 4 – Structural Design and Part 9 – Housing and Small Buildings of the Codes. The primary applicable CSA Standards for this project include (but not limited to):

1. A23.3-04 – “Design of Concrete Structures”;
2. A23.1-04/23.2-04 – “Concrete materials and Methods of Concrete construction/Methods of Test and Standard Practices for Concrete”;
3. O86-09 – “Engineering Design in Wood.”

The design intent for the new structure comprises of conventional residential wood framing founded on cast-in-place reinforced concrete perimeter basement walls on strip footings with concrete pads for interior columns. The framing utilizes dimensional lumber, plywood and/or OSB sheathing for the exterior walls, shear walls and flooring, and pre-engineering roof and floor trusses constructed from dimensional lumber. Utilization of dimensional lumber offers cost and scheduling benefits provided by a large and common housing construction market. The following provides additional details regarding the various building elements.

### 4.2 Foundations

The building is to be constructed on a site where existing houses and their foundations are to be removed. The resulting void shall form part of the excavation area for the new basement. It will be necessary to engage a qualified Geotechnical Engineer to inspect the site once the old houses are removed and provide recommendations for subgrade preparation to achieve proper bearing of the new structure.

Conventional residential foundations as per Part 9 of the Code comprises of cast-in-place concrete walls on strip footings with 2-10M bar placed at the top and bottom of the wall. This practice cannot be applied to this structure as the walls shall have deeper backfill and longer spans than what Part 9 pertains to. It is anticipated that some vertical reinforcing will be necessary in the foundation walls to resist the lateral earth pressure forces over the long lengths of wall. This reinforcement will provide better long term performance of the foundations from that observed in typical houses where it is not uncommon to have deleterious cracks form in the foundations within the first 20 years of life of the house.

### 4.3 Walls

The exterior walls shall comprise of 2x6 wood stud walls with plywood and/or OSB sheathing and shall act as shear walls for the building. The interior walls shall comprise of 2x4 wood studs for common space. Interior party walls shall have 2 runs of 2x4 staggered studs to facilitate in sound attenuation.

The design may establish that some lengths of interior walls will also serve as shear walls to compensate for the numerous windows in some of the exterior walls that reduce the shearwall potential of the exterior walls.

### 4.4 Floors

The design intent is to utilize pre-engineered wood trusses for floor joists which are comprised of dimensional lumber with the members oriented with the large dimension on the flat. Dimensional lumber and TJI (engineering joists) are under consideration, however, the pre-engineering wood truss system is preferred because they provide natural openings through which electrical and mechanical piping and ducting can pass through. This simplifies and expedites the mechanical and electrical installations and should preclude most unwanted destruction of structural members by the electrical and mechanical trades as they install their elements. A cost benefit is anticipated with a simpler E&M installation process.

The floor surface shall be sheathed with 1 1/8” plywood or OSB in areas that will receive tile and 3/4” sheathing in all other areas and shall be glued and screwed to the floor joist-trusses. Although conventional residential construction utilizes 5/8” floor sheathing, a thicker sheathing is intended for this building in order to improve the stiffness of the floor to minimize floor creaking. The floor truss chords placed on the flat will also facilitate in improving the stiffness of the floor system.

### 4.5 Roof

The roof is to be surfaced with asphalt or metal shingles. The roof shall comprise of pre-engineered gang-nailed wood trusses at 16 inches on-centre sheathed with 3/8” plywood or if the roof truss spacing is increased to 2’-0”, then the sheathing would increase to 1/2” in thickness. In the event that the desired roof finish is to change to clay tile, then the roof sheathing or the roof truss spacing will have to accommodate the higher dead load developed from a clay tile system.

### 4.6 Ramps

An accessible ramp will be provided from the rear parking area to the main floor of the building and will be constructed of a steel channel structure with grated decking complete with either wrought iron or pipe handrails. The ramp will be supported by cast in place reinforced concrete piles. All steel elements will be powder coated for longevity and minimize maintenance requirements.

### 4.7 Sustainable Design

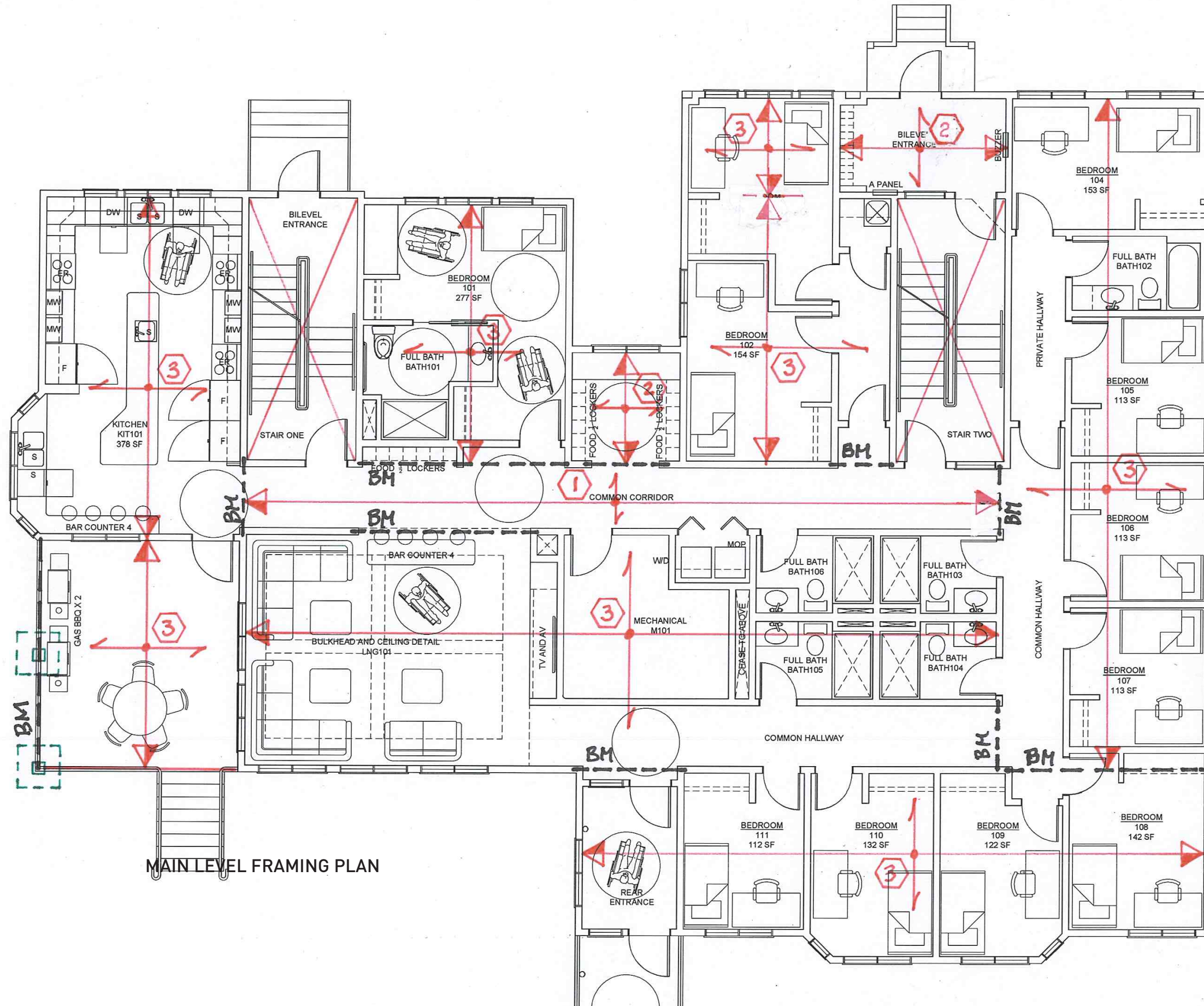
The structural design addresses sustainable design initiatives in several ways. Up to 50% of the pozzolanic volume for the concrete can be in the form of fly ash for the concrete foundations. Fly ash is a waste by-product of coal fired power generation. The superstructure is comprised of wood structural elements which consume relatively low energy for production, are biodegradable and may be used as fuel in co-generation facilities when the structure has served its lifespan and is to be disposed of.

RESIDENCE B1 - MAIN LEVEL

LEGEND:

- ① 2x6 Joists @ 16" O.C
- ② 2x8 Joists @ 16" O.C
- ③ 12" DP. TRUSS @ 1'-4" - 2'-0" O.C.

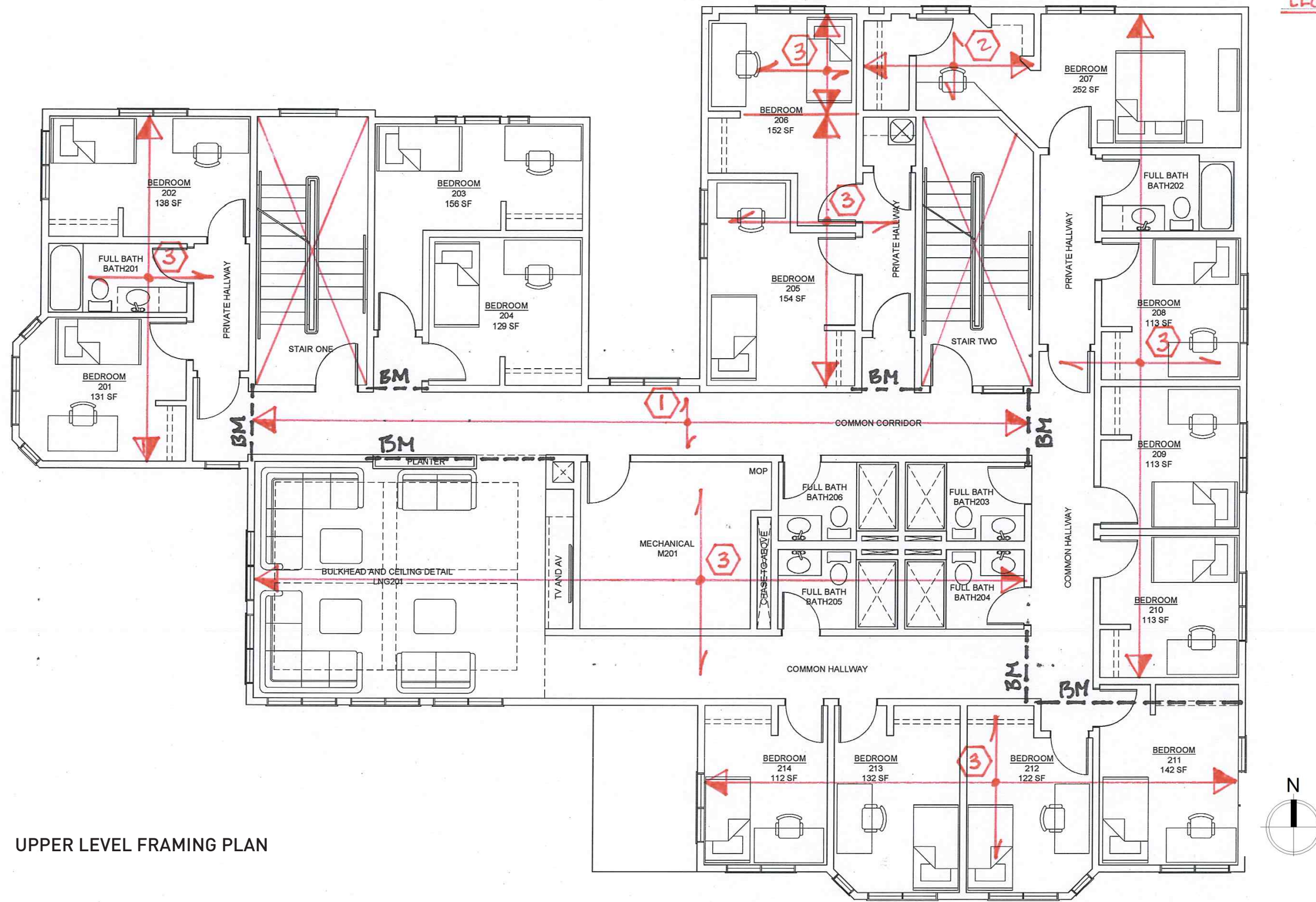
BM- BUILT-UP OR MICRO-LAM



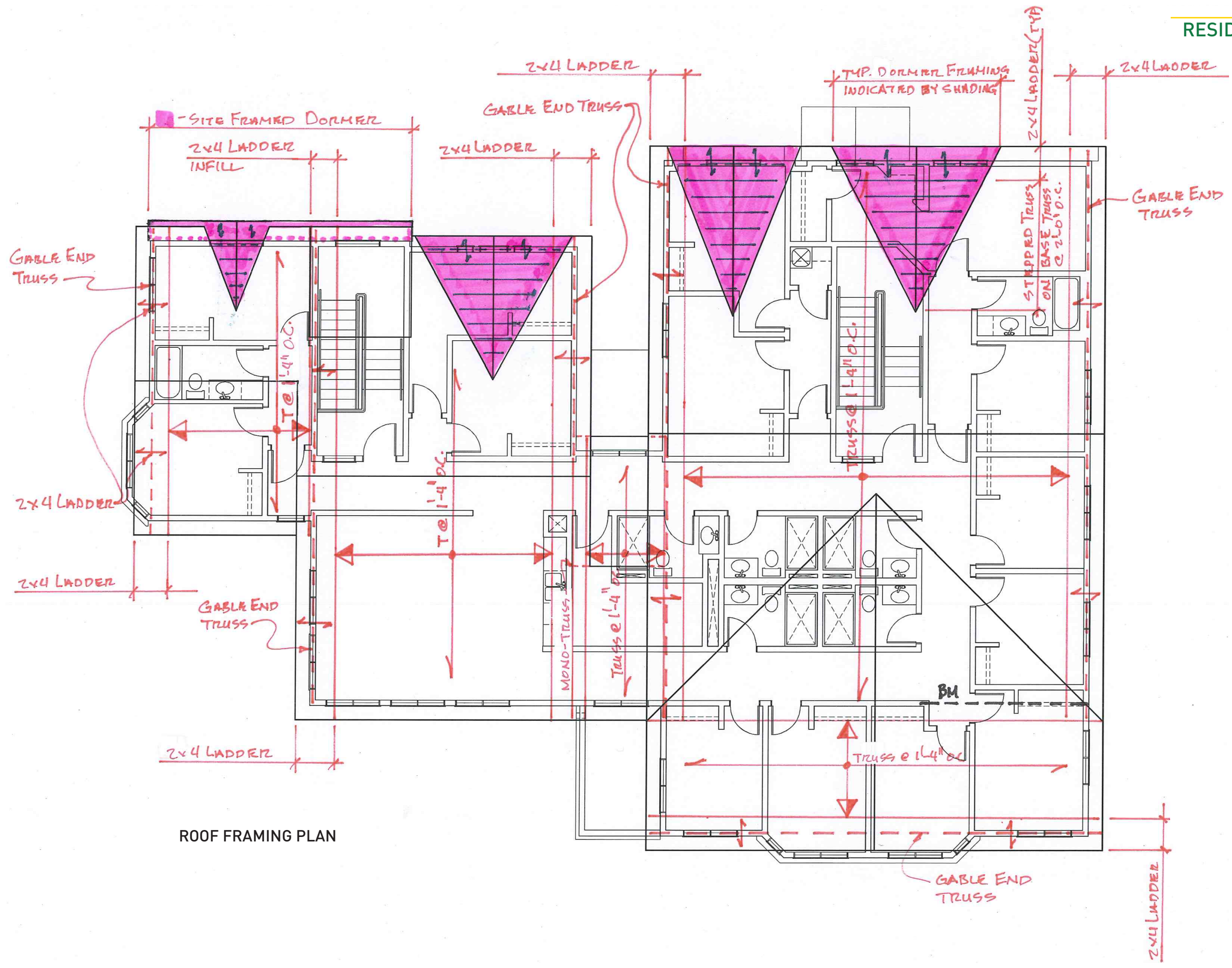
MAIN LEVEL FRAMING PLAN



LEGEND: SEE DWG. A3



UPPER LEVEL FRAMING PLAN



ROOF FRAMING PLAN



## 5.0 MECHANICAL DESIGN

### 5.1 General

The following Design Development report captures the contents of the planning discussions to date regarding the proposed mechanical systems. It describes and illustrates in detail the basis for design and the sustainability considerations which have been incorporated. This mechanical design approach will be employed for both ECV infill housing residences B1 and B2.

The mechanical systems for the infill housing residences are being designed to meet the following goals:

- Fulfill the program requirements
- Meet the operational needs of Ancillary Services
- Align with the operational need of Facilities and Operations and to explore opportunities to partner with Energy Management to demonstrate higher performance buildings
- Provide system solutions that are practical from a maintenance perspective
- Provide practical sustainability solutions that contribute to decreased overall building energy usage
- Provide life safety systems as required by the Alberta Building Code, Alberta Fire Code, and other relevant standards such as NFPA and CSA
- Provide mechanical systems consistent with the UofA Facilities and Operations (F&O) Design Guidelines as they apply

### 5.2 Mechanical Design Criteria

The following Codes and Standards will be incorporated into the mechanical design as they apply to this project:

- Alberta Building Code 2006
- National Fire Code 2010
- National Plumbing Code 2010
- CSA B149.1-10, Natural Gas and Propane Installation Code
- ASHRAE Standard 62.1-2013, Ventilation for Acceptable Indoor Air Quality
- ASHRAE Standard 90.2-2007, Energy-Efficient Design of Low-Rise Residential Buildings
- NFPA 13-2013, Standard for the Installation of Sprinkler Systems
- UofA F&O Design Guidelines

### 5.3 Heating Systems

Building energy use calculations have been performed using baseline construction standards and higher energy efficiency options for the building envelope. This data has been shared with F&O Energy Management in order to explore partnership opportunities that would allow us to incorporate higher efficiency mechanical options. Those options are reflected in the descriptions contained herein and in the accompanying mechanical sketches, unless described otherwise.

The heating design conditions are based on data for Edmonton, Alberta per the Alberta Building Code 2006 Appendix C climatic information for building design in Alberta as follows:

- Winter outside air temperature: January, 1%, -34C

Other design criteria as follows:

- Indoor air temperature: 22C

The heating system consists of two hi-efficiency condensing boilers sized for approximately 60% of the heating load requirements. Each boiler is equipped with a dedicated circulation pump on a primary loop. Building heating water supply is distributed using a secondary loop with primary/standby circulation pumps equipped with speed drives. The heating media will be chemically treated water. Refer to the Piping Schematic and Heating Plan sketches for the configuration of the heating system. The Mechanical Room Layouts show where the boilers are located within the lower level mechanical room 001. Note that what is shown reflects floor mounted boilers sized for no ventilation heat recovery option in order to demonstrate that the floor space for this mechanical room is adequate. Should plans proceed with the high efficiency ventilation heat recovery option (shown as HRV1, HRV2, and HRV3), this design will incorporate two smaller gas input wall hung boilers (not shown). Note also that there would be a reduction in the building gas load shown on the Piping Plan Level 0 sketch.

Heating is achieved throughout the building (with exception to the Electrical Room) with hydronic terminal heating units. Refer to the Heating Plan sketches. Given the low heat loss potential in the Electrical Room, an electric unit heater was chosen as a more cost effective option. Perimeter spaces are supplied with finned-tube wall-mounted radiation suitable for a dorm environment. Each perimeter room is equipped with its own thermostatic temperature control for resident comfort. Common areas with perimeter millwork cabinetry such as laundry facilities or kitchens are equipped with overhead radiant panels and hydronic forced flow under-cabinet kickspace heaters for supplemental heat as required. Bathrooms are also equipped with hydronic forced flow under-cabinet kickspace heaters to eliminate the need for baseboard radiation in the small bathroom footprint. Entrances are equipped with hydronic forced flow heaters mounted out of the way in the ceiling space above complete with wall mounted thermostats.

The hydronic terminal heating components have been sized to accommodate low supply water temperatures (54C) in order to maximize the condensing benefit of the high efficiency boilers.

Where possible, all motors have been selected with 3-phase (208 Volt) power supplies to gain slight energy consumption advantages.

### 5.4 Cooling Systems

Mechanical cooling was not a program requirement and will not be part of the mechanical system design. Natural ventilation is achieved through openable windows throughout the building. The intent of operations is to run the ventilation system continuously throughout the year which will provide more comfortable conditions to the residents in the hottest summer months.

### 5.5 Humidity Control Systems

Humidity control is only achieved through exhausting typical areas containing humidity sources such as bathrooms and kitchens and by the introduction of outside air through heat recovery ventilators. Refer to Ventilation Systems for a complete description. Humidification will not be included in this design.

### 5.6 Ventilation Systems

Ventilation has been divided into 3 zones: lower level, main level, and second level. In the Schematic Design description, each zone was to be equipped with a fan coil unit for supply air distribution and a heat recovery unit for exhaust and the introduction of outdoor air to satisfy the outdoor air requirements set out in ASHRAE Standard 62.1. The design shown in the Ventilation Plan sketches, however, illustrates that the supply air distribution/exhaust extraction/outdoor air requirements have all been met with a single mechanical device. This heat recovery ventilator which is calculated to perform at up to 87% efficiency has the fan power for both supply air distribution and exhaust extraction requirements to meet the Alberta Building Code or ASHRAE Standard 62.1, whichever is greater. Since the heat recovery ventilator will be operated continuously throughout the year, there will be continuous exhaust from the bathrooms and janitor rooms within the zone. An additional glycol reheat coil has been incorporated into the system to cover the shortfall of the heat recovery ventilator to allow for the supply of 22C air to the spaces. There will be additional energy savings with the selected heat recovery ventilator since it does not have a defrost cycle, and as such, a reduction in the size of this reheat coil can be realized. There is no dedicated corridor ventilation, air circulation will be achieved by circulating air across perimeter room door gaps into the corridors to the areas equipped with exhaust grilles.

Ventilation heat recovery is achieved from bathroom, janitor room, and general kitchen exhaust. Continuous minimum general kitchen exhaust has been taken from the ceiling at the backside of the refrigerators (source of heat gain). Supplemental exhaust for the kitchen is achieved with range hoods exhausting directly to the exterior of the building with no heat recovery. Clothes dryer exhaust ducts from each machine are directly vented to the exterior of the building with no heat recovery. Upon activation of the kitchen supplemental exhaust or the clothes dryers, variable speed fan coil units will be operated for proper make-up air requirements to prevent the building from being negatively pressurized. In the Schematic Design description, the heat recovery ventilator was planned to be operated at lower exhaust volumes to accommodate increased make-up air requirements. However, it was decided that a better operational approach would be to keep the heat recovery ventilator running with balanced amounts of supply and exhaust air volumes and to provide dedicated make-up air only as required. Doing so allowed for the selection of smaller heat recovery units and lower continuous operational costs.

Outdoor air filtration will be minimum MERV 8.

## **5.7 Control Systems**

Where equipment, such as boilers, have the capability to control other system components, such as circulating pumps and setpoint temperatures, those pieces of equipment will perform that control. Where components are standalone and require an external automation signal to be controlled, those components will be controlled by the F&O Building Automation System (BAS). Hydronic heating components that have integral heating controls or wall mounted electronic thermostats will be self-regulating and not tied into the F&O BAS. Certain monitoring points such as system component alarms and system temperatures may be included in the control system configuration as practical.

Temperature control will be achieved in each individual perimeter room with wall mounted electronic space thermostats or integral temperature controls as applicable.

## **5.8 Domestic Water Systems**

Domestic hot water demands are met with a dedicated high efficiency hot water heater and storage tank combination unit. The Schematic Design description indicated the employment of an indirect heated water storage tank using the building heating boilers as an energy source. After careful consideration, it was deemed that a separate domestic hot water system would result in more simplified mechanical controls and would allow the heating boilers to be completely shut down in the summer months.

Domestic water piping systems will be specified as copper only. All other plumbing systems will be specified in accordance with the National Plumbing Code. A domestic hot water recirculation system is incorporated into the design. Domestic hot, cold, and recirc water piping will be insulated.

As a measure of reducing water consumption, low flow fixtures such as lav faucets, kitchen sink faucets, and shower heads have been selected. Low flow EPA WaterSense rated water closets have been selected in lieu of dual flush units. The selected water closets meet the definition for High Efficiency Toilet.

Showers and shower/tub combos have been selected as two-piece acrylic units with curtains.

Domestic water supply will be taken from the City of Edmonton water supply line located at the street complete with backflow preventor in the building.

Irrigation systems will not be included in this design. Two non-freeze hose bibbs are shown on the Piping Plan Level 0 sketch to allow for outdoor maintenance purposes.

## **5.9 Sanitary And Storm Systems**

The 6" diameter sanitary line for the building will be connected below grade to the City of Edmonton sanitary sewer system. Refer to the Foundation Plan sketch for piping layouts.

The storm system consists of roof gutters and downspouts splashing on grade.

Weeping tile system, sumps, and pumps will discharge underground water on grade on both the north and south sides of the building.

## **5.10 Natural Gas Systems**

All mechanical heating appliances will utilize natural gas with a gas meter located exterior to the building along the rear entrance ramp. This location away from the building is required since all walls on the south face are equipped with openable windows and fresh air intakes.

## **5.11 Fire Protection Systems**

The building is sprinklered and has a dedicated sprinkler room. The sprinkler system will be designed and installed by a qualified sprinkler contractor in strict accordance with NFPA 13 meeting the building occupancy classification. Suggested piping routes are shown in the Fire Protection Plan sketches.

## **5.12 Sustainability Considerations**

Sustainability options that are reflected in the mechanical design on the accompanying sketches include the following:

- Heat recovery from bathroom, general kitchen, and janitor room exhaust sources
- Heat recovery from kitchen fridge heat gains
- Low temperature heating water system with high-efficiency boilers
- Low temperature hydronic terminal heating components
- High-efficiency domestic hot water heater
- Utilizing 3 phase electrical for motors where possible
- Variable speed pump on the main heating water distribution system
- Low consumption fixtures: faucets, shower heads, and water closets
- Sanitary drain heat recovery on simultaneous flows (eg: showers), where practical

Sustainability options being discussed which may affect the mechanical design are as follows:

- High performance glazing options
- Increased R-value for walls
- Metering and/or measurement and verification options

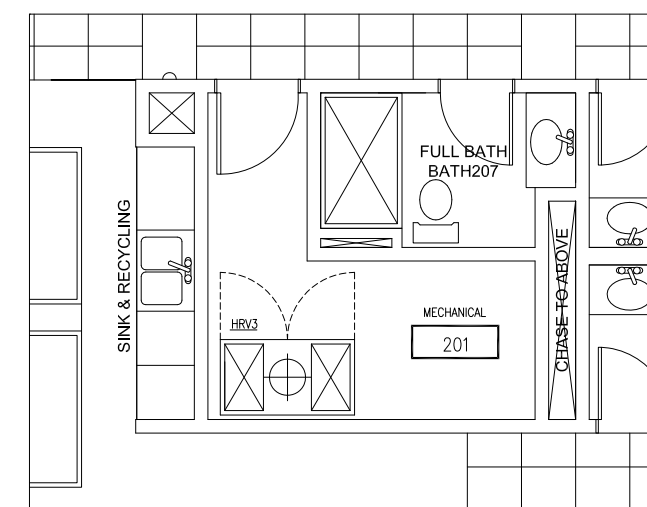
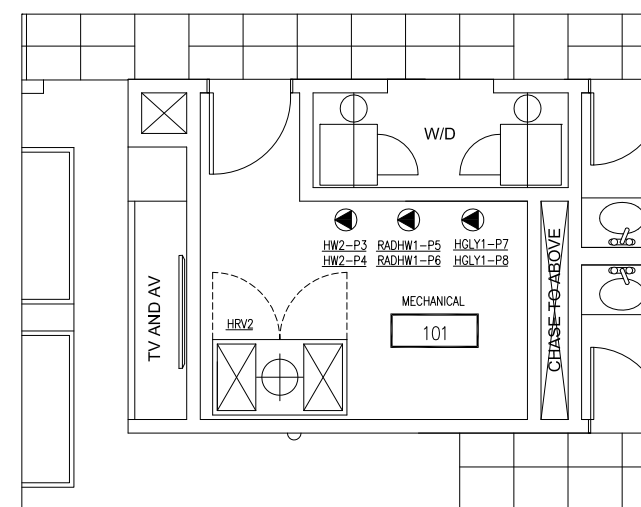
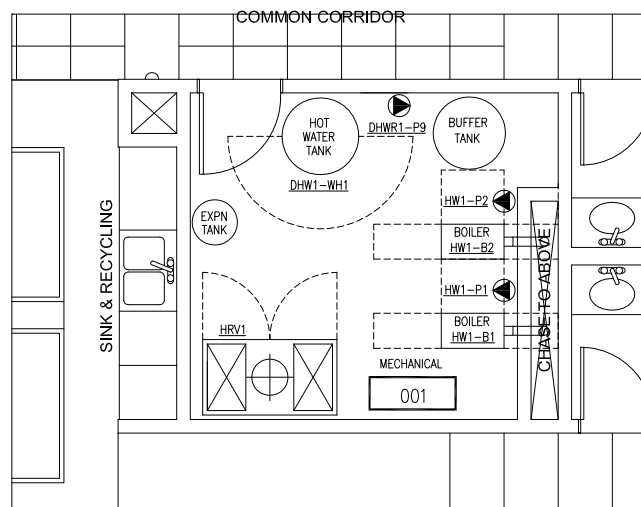
Options that were removed off the discussion table for capital cost reduction reasons are as follows:

- Solar domestic hot water heating
- Non-standard insulation options for foundation floors and walls



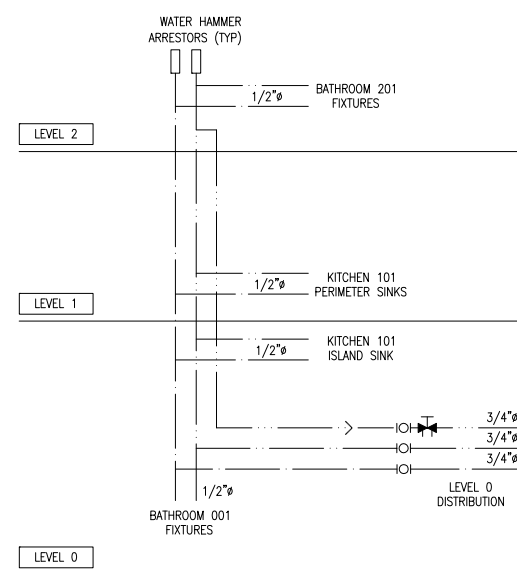


MECH ROOM LAYOUT & DOMESTIC WATER RISERS

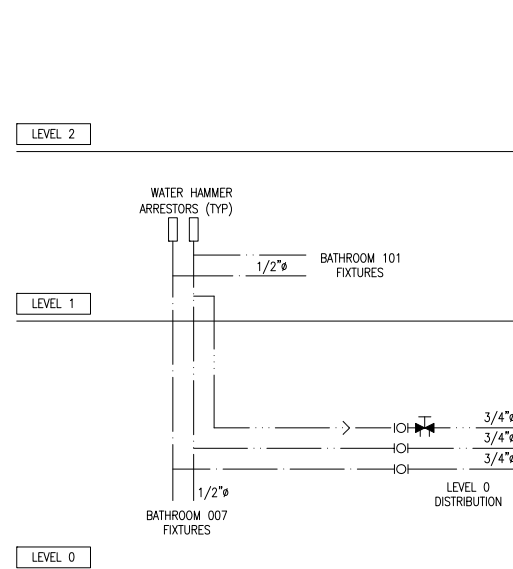


**MECHANICAL ROOM LAYOUTS**

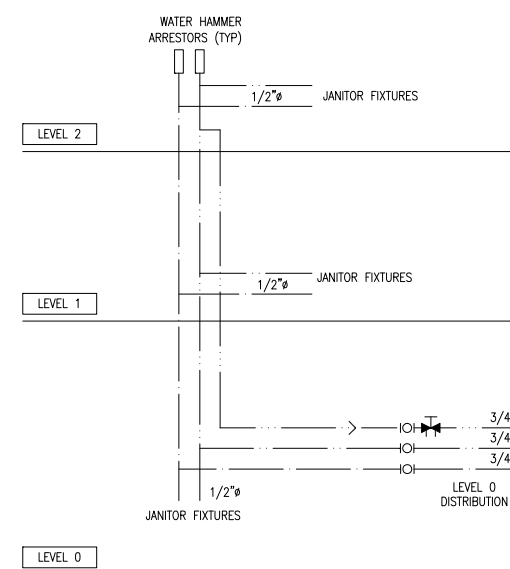
SCALE: N.T.S.



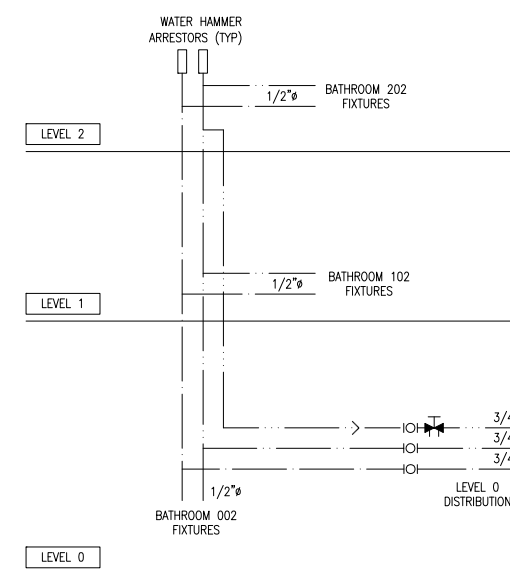
RISER W1



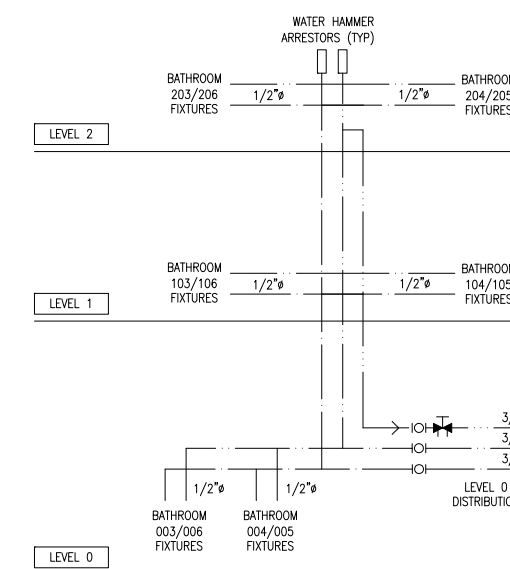
RISER W2



RISER W3



RISER W4

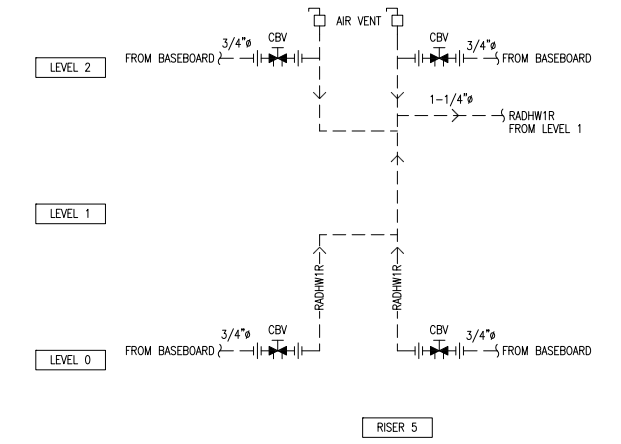
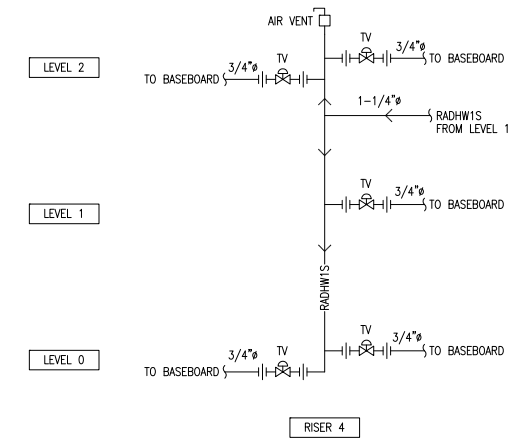
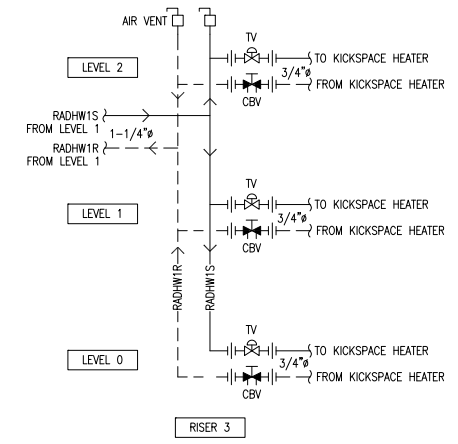
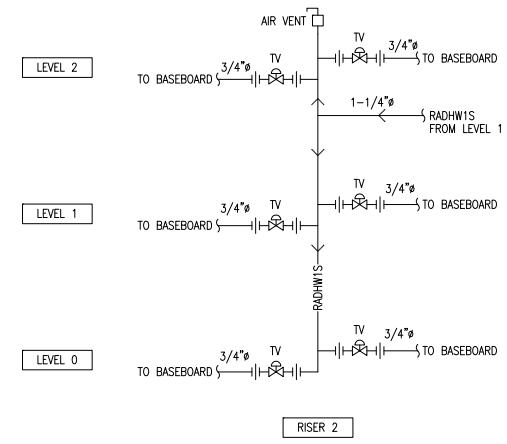
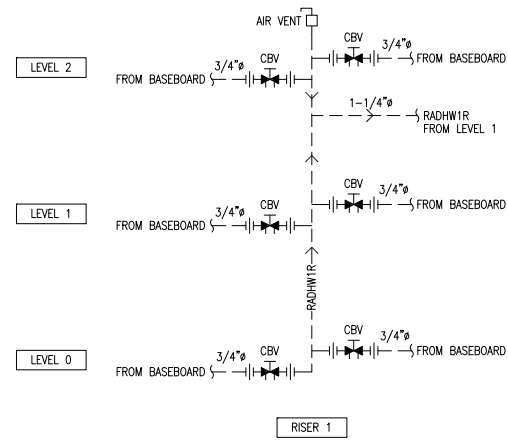


RISER W5 RISER W6

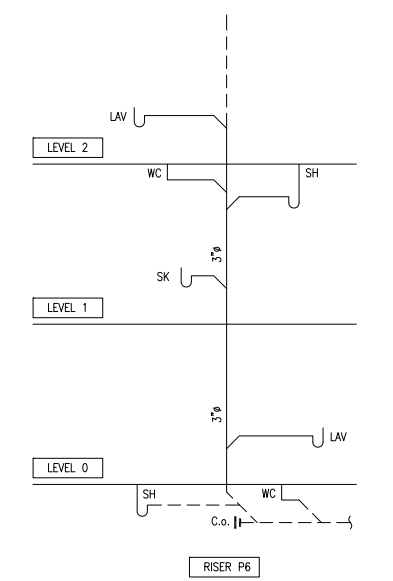
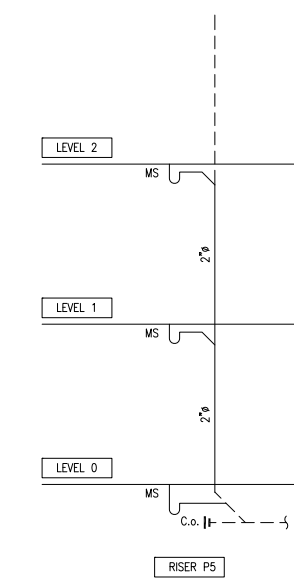
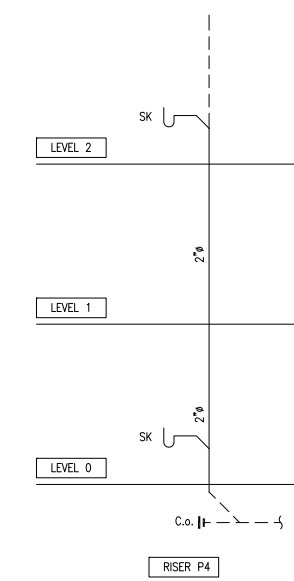
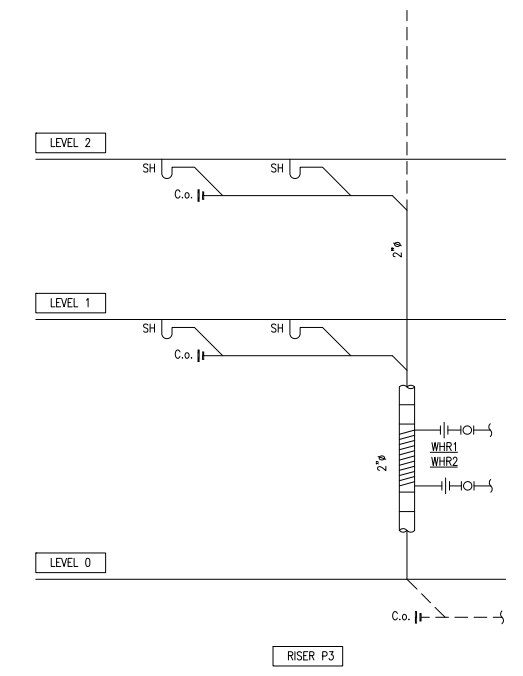
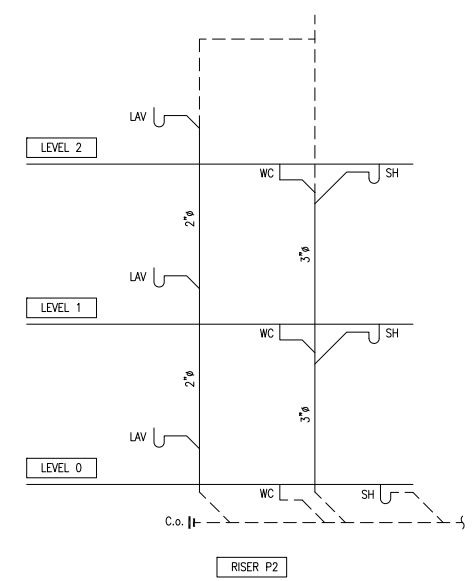
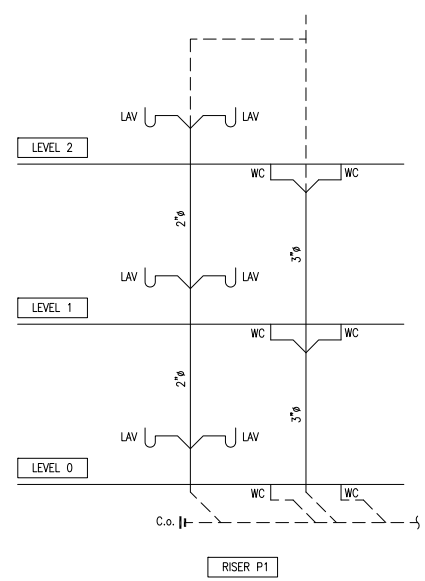
**DOMESTIC WATER RISERS**

SCALE: N.T.S.

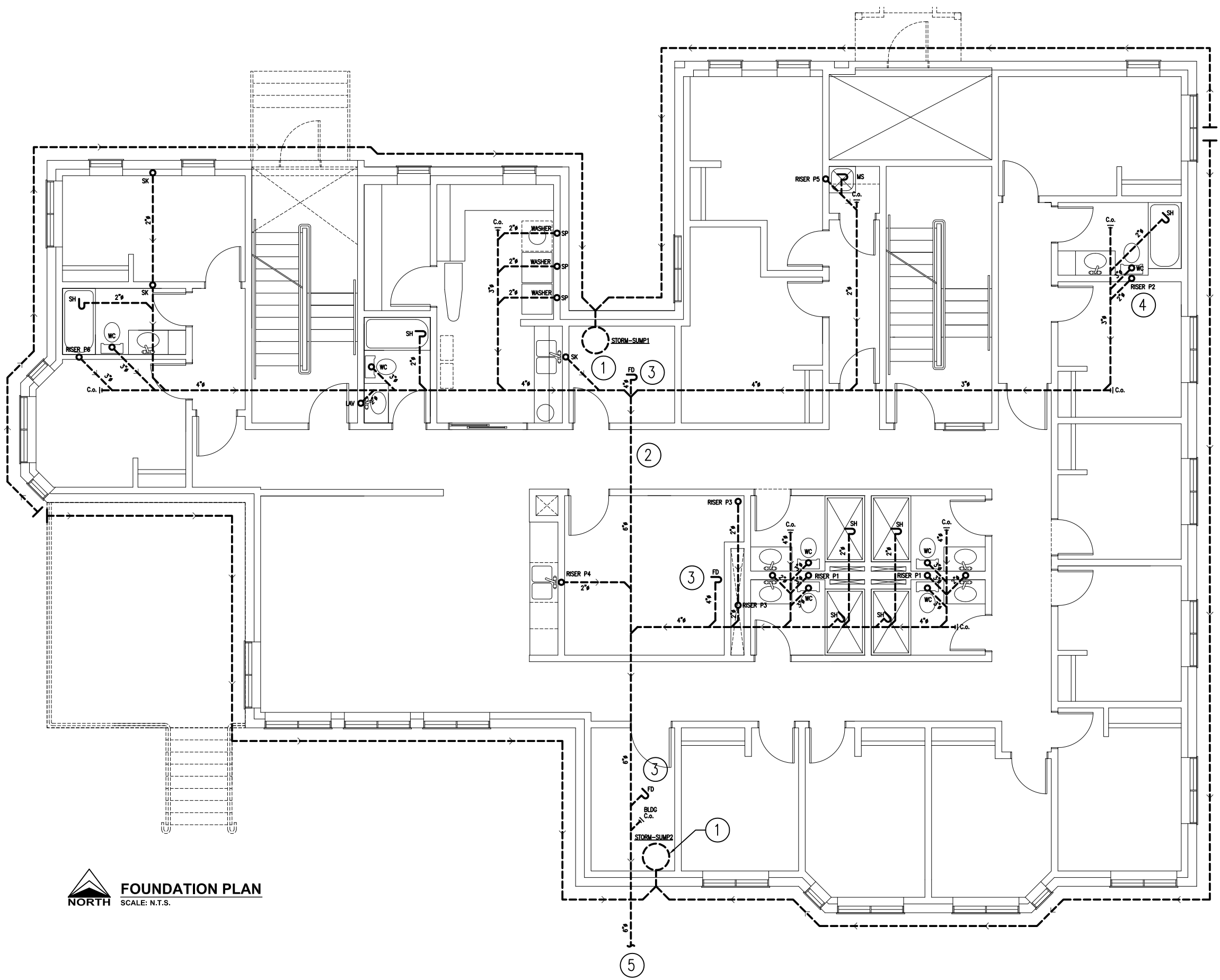




**HEATING RISERS**  
SCALE: N.T.S.



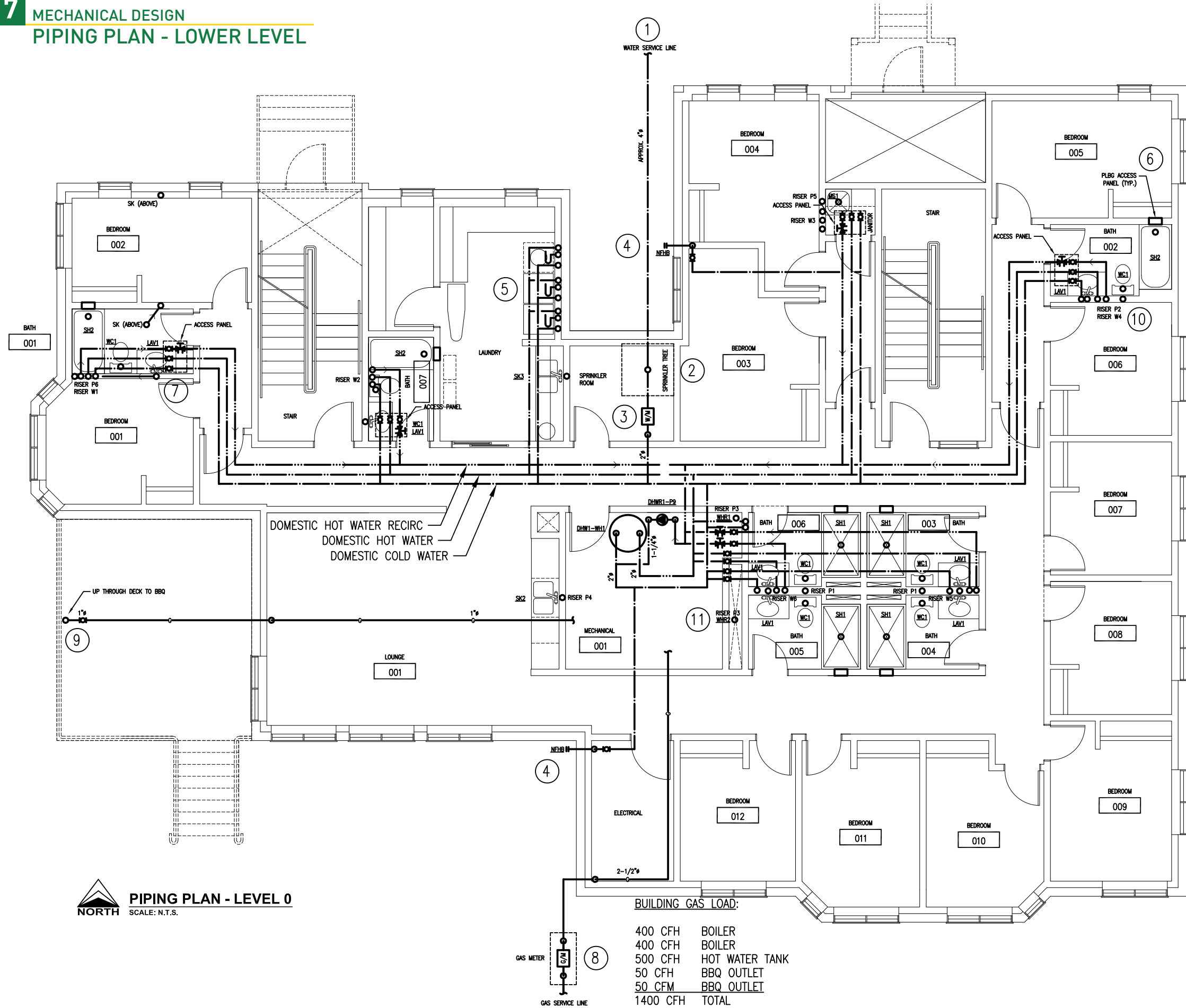
**PLUMBING RISERS**  
SCALE: N.T.S.



- KEY NOTES**
- ① WEEPING TILE SUMP AND PUMP. PUMPED DISCHARGE AT GRADE LEVEL.
  - ② UNDERGROUND SANITARY LINES SLOPED AT 2%.
  - ③ FLOOR DRAINS IN SERVICE ROOMS.
  - ④ REFER TO PLUMBING RISER DIAGRAMS. (TYP)
  - ⑤ SANITARY SERVICE OUT TO SANITARY MANHOLE AT 1% SLOPE.

**FOUNDATION PLAN**  
 NORTH SCALE: N.T.S.





- ### KEY NOTES
- ① WATER SERVICE LINE SIZED FOR SPRINKLERED PROTECTION.
  - ② SPRINKLER TREE. SEE ALSO FIRE PROTECTION PLAN.
  - ③ WATER METER.
  - ④ NON-FREEZE HOSE BIBBS - TYPICAL OF 2.
  - ⑤ ROUGH-INS FOR 3 WASHING MACHINES.
  - ⑥ ACCESS PANELS FOR SHOWER TRIM MAINTENANCE.
  - ⑦ CEILING ACCESS PANELS FOR WATER RISER SHUT-OFFS.
  - ⑧ OUTDOOR GAS METER LOCATED ADJACENT TO EXTERIOR ACCESS RAMP COMPLETE WITH PROTECTION BOLLARDS. GAS LINE CONNECTED TO SERVICE LINE SOUTH OF THE PROPERTY.
  - ⑨ GAS LINE TO PATIO BBQS. SIZED FOR TWO BBQS.
  - ⑩ SEE PLUMBING AND WATER RISER DIAGRAMS.
  - ⑪ WASTE WATER HEAT RECOVERY UNITS. (TYP 2)

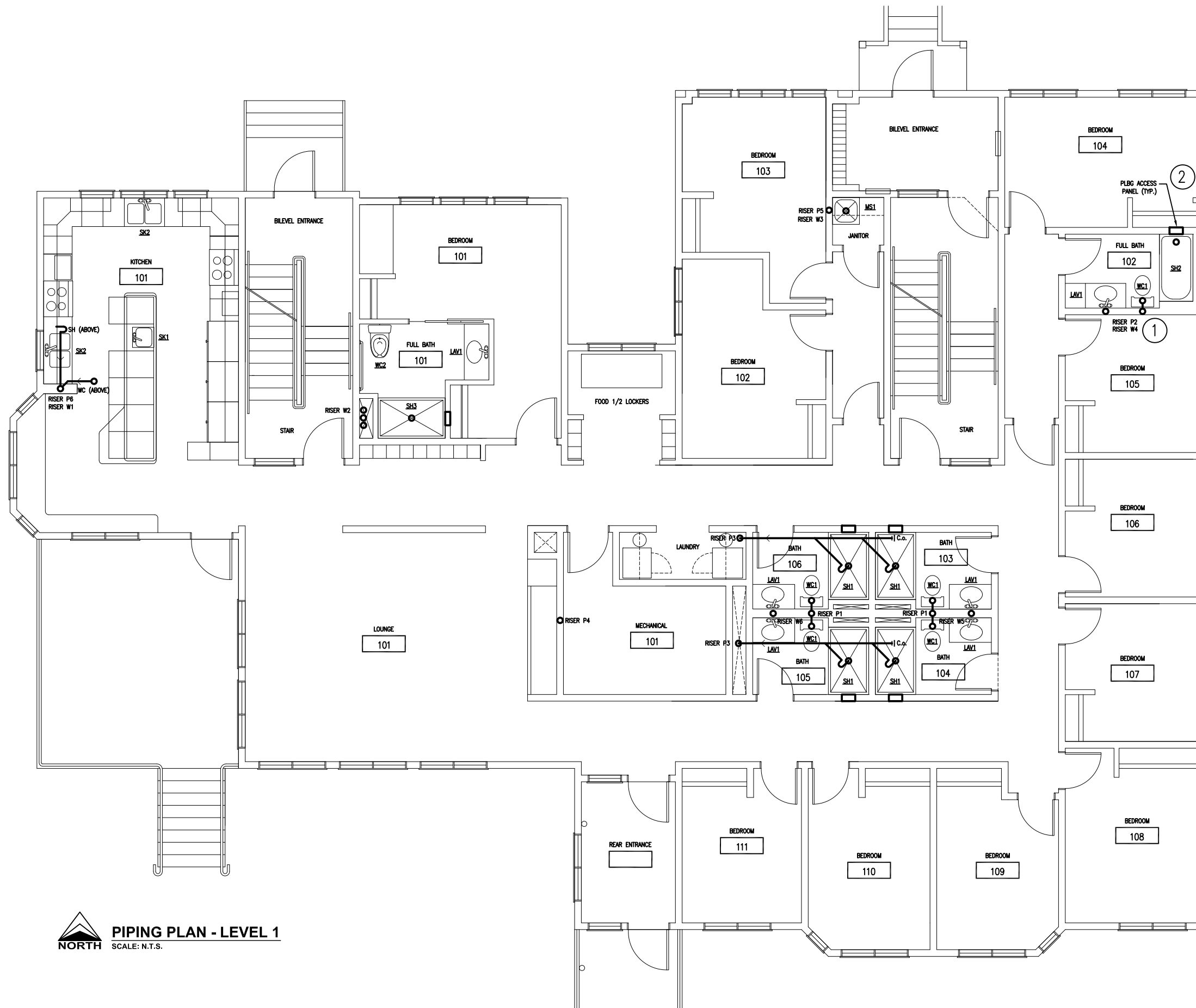
**ROUGH-IN SCHEDULE:**

	DCW	DHW	SAN	VENT
LAV	1/2"φ	1/2"φ	1-1/2"φ	1-1/4"φ
SK	1/2"φ	1/2"φ	1-1/2"φ	1-1/4"φ
MS	1/2"φ	1/2"φ	2"φ	1-1/2"φ
WC	1/2"φ	--	3"φ	2"φ
FD	--	--	4"φ	1-1/2"φ
NFHB	3/4"φ	3/4"φ	--	--
WASHER	1/2"φ	1/2"φ	2"φ	1-1/4"φ
SH	1/2"φ	1/2"φ	2"φ	1-1/2"φ
DW	--	1/2"φ	--	--

**PIPING PLAN - LEVEL 0**  
SCALE: N.T.S.

**BUILDING GAS LOAD:**

- 400 CFH BOILER
- 400 CFH BOILER
- 500 CFH HOT WATER TANK
- 50 CFH BBQ OUTLET
- 50 CFM BBQ OUTLET
- 1400 CFH TOTAL



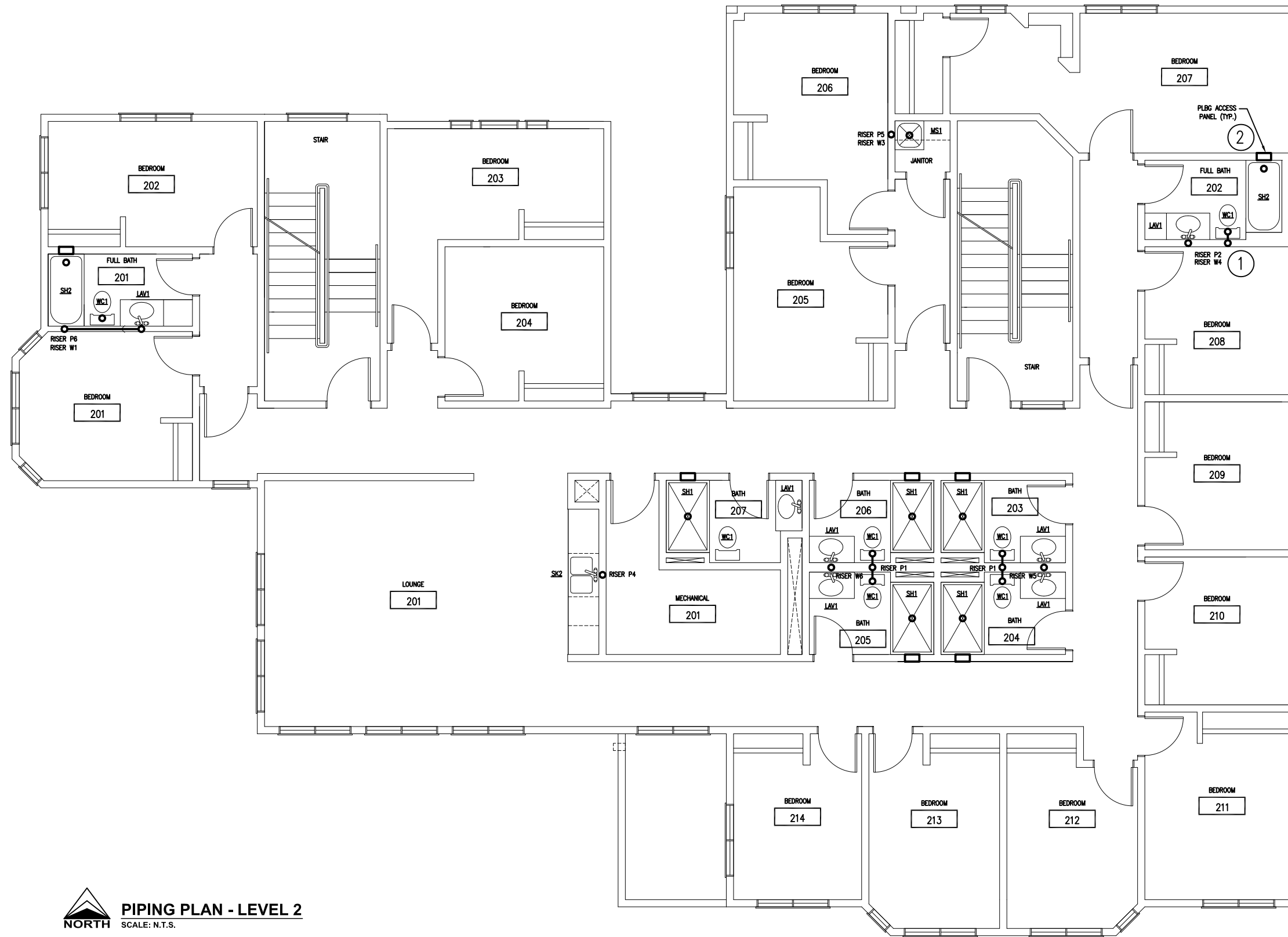
- ### KEY NOTES
- ① REFER TO PLUMBING AND WATER RISER DIAGRAMS.
  - ② ACCESS PANELS FOR SHOWER TRIM MAINTENANCE.

ROUGH-IN SCHEDULE:

	DCW	DHW	SAN	VENT
LAV	1/2"φ	1/2"φ	1-1/2"φ	1-1/4"φ
SK	1/2"φ	1/2"φ	1-1/2"φ	1-1/4"φ
MS	1/2"φ	1/2"φ	2"φ	1-1/2"φ
WC	1/2"φ	--	3"φ	2"φ
FD	--	--	4"φ	1-1/2"φ
NFHB	3/4"φ	3/4"φ	--	--
WASHER	1/2"φ	1/2"φ	2"φ	1-1/4"φ
SH	1/2"φ	1/2"φ	2"φ	1-1/2"φ
DW	--	1/2"φ	--	--

**PIPING PLAN - LEVEL 1**  
 NORTH SCALE: N.T.S.





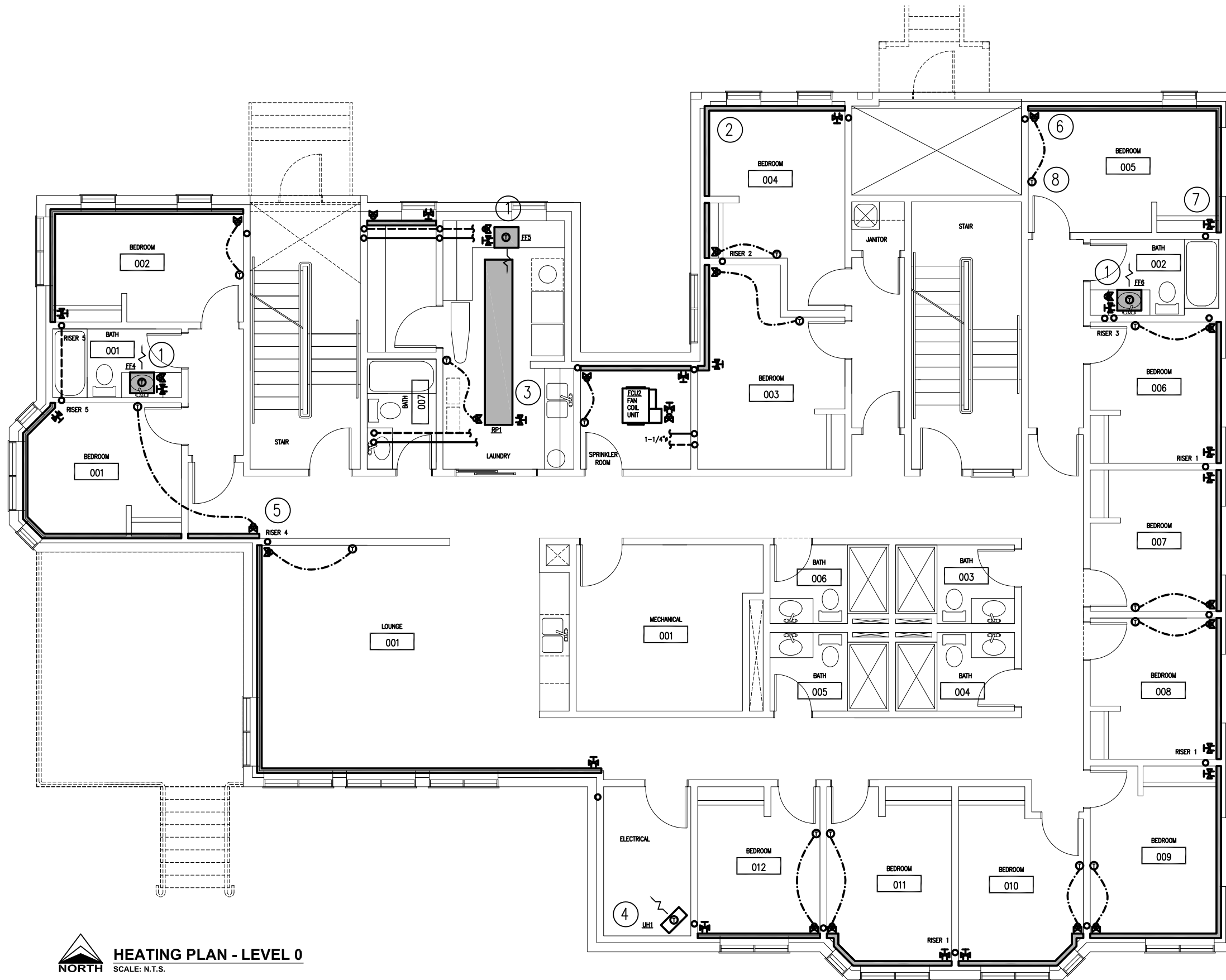
**KEY NOTES**

- ① REFER TO PLUMBING AND WATER RISER DIAGRAMS.
- ② ACCESS PANELS FOR SHOWER TRIM MAINTENANCE.

ROUGH-IN SCHEDULE:

	DCW	DHW	SAN	VENT
LAV	1/2"φ	1/2"φ	1-1/2"φ	1-1/4"φ
SK	1/2"φ	1/2"φ	1-1/2"φ	1-1/4"φ
MS	1/2"φ	1/2"φ	2"φ	1-1/2"φ
WC	1/2"φ	--	3"φ	2"φ
FD	--	--	4"φ	1-1/2"φ
NFHB	3/4"φ	3/4"φ	--	--
WASHER	1/2"φ	1/2"φ	2"φ	1-1/4"φ
SH	1/2"φ	1/2"φ	2"φ	1-1/2"φ
DW	--	1/2"φ	--	--

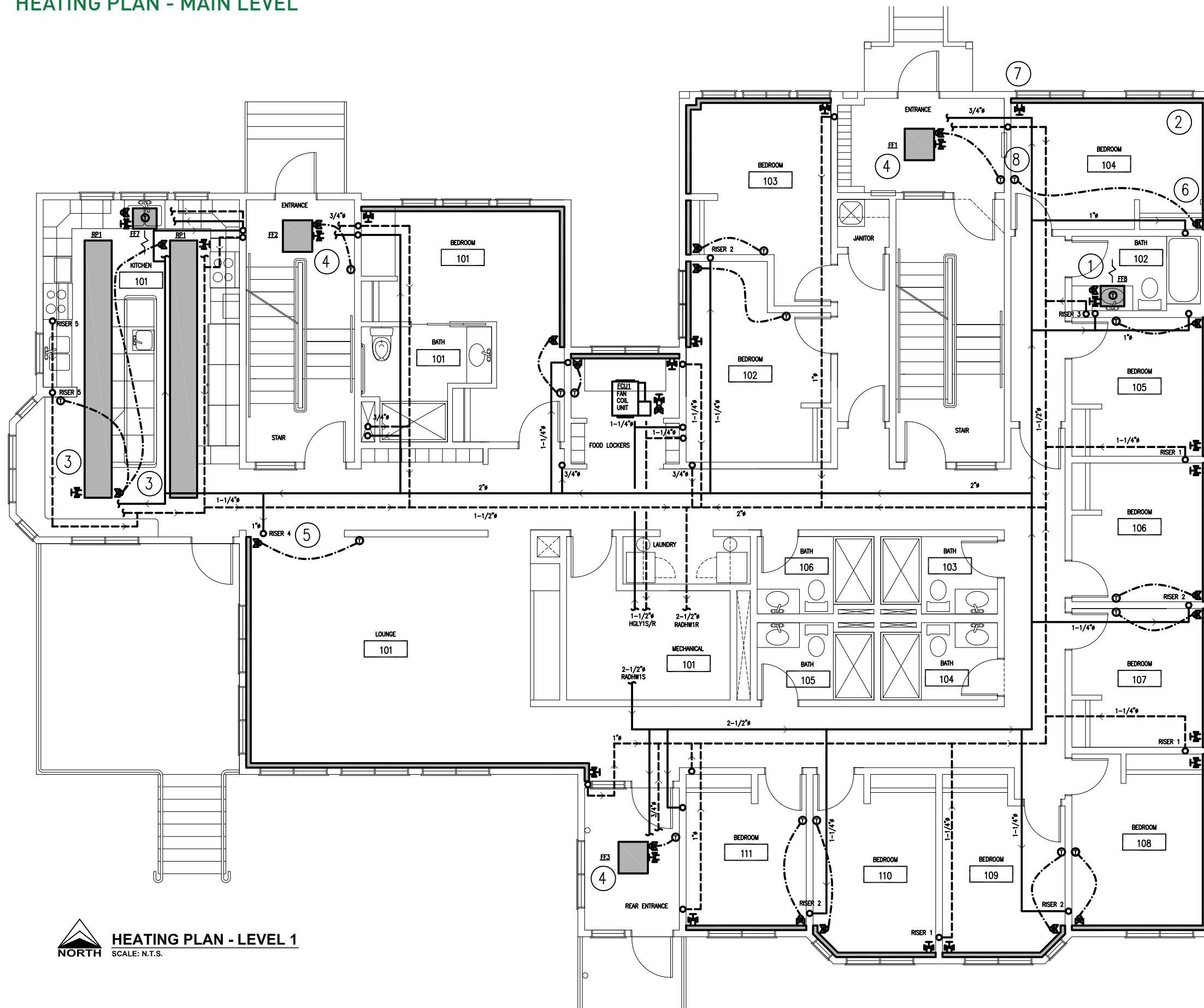
**PIPING PLAN - LEVEL 2**  
SCALE: N.T.S.



- KEY NOTES**
- ① KICKSPACE HEATER W/ INTEGRAL THERMOSTAT BENEATH MILLWORK.
  - ② HYDRONIC BASEBOARD HEATERS ALONG PERIMETER.
  - ③ OVERHEAD CEILING MOUNTED HYDRONIC RADIANT PANELS.
  - ④ SUSPENDED ELECTRIC UNIT HEATER WITH INTEGRAL THERMOSTAT.
  - ⑤ REFER TO HEATING RISER DIAGRAMS.
  - ⑥ CONTROL VALVE FOR EACH ZONE.
  - ⑦ CIRCUIT BALANCING VALVE FOR EACH ZONE.
  - ⑧ TEMPERATURE CONTROL FOR EACH ZONE.

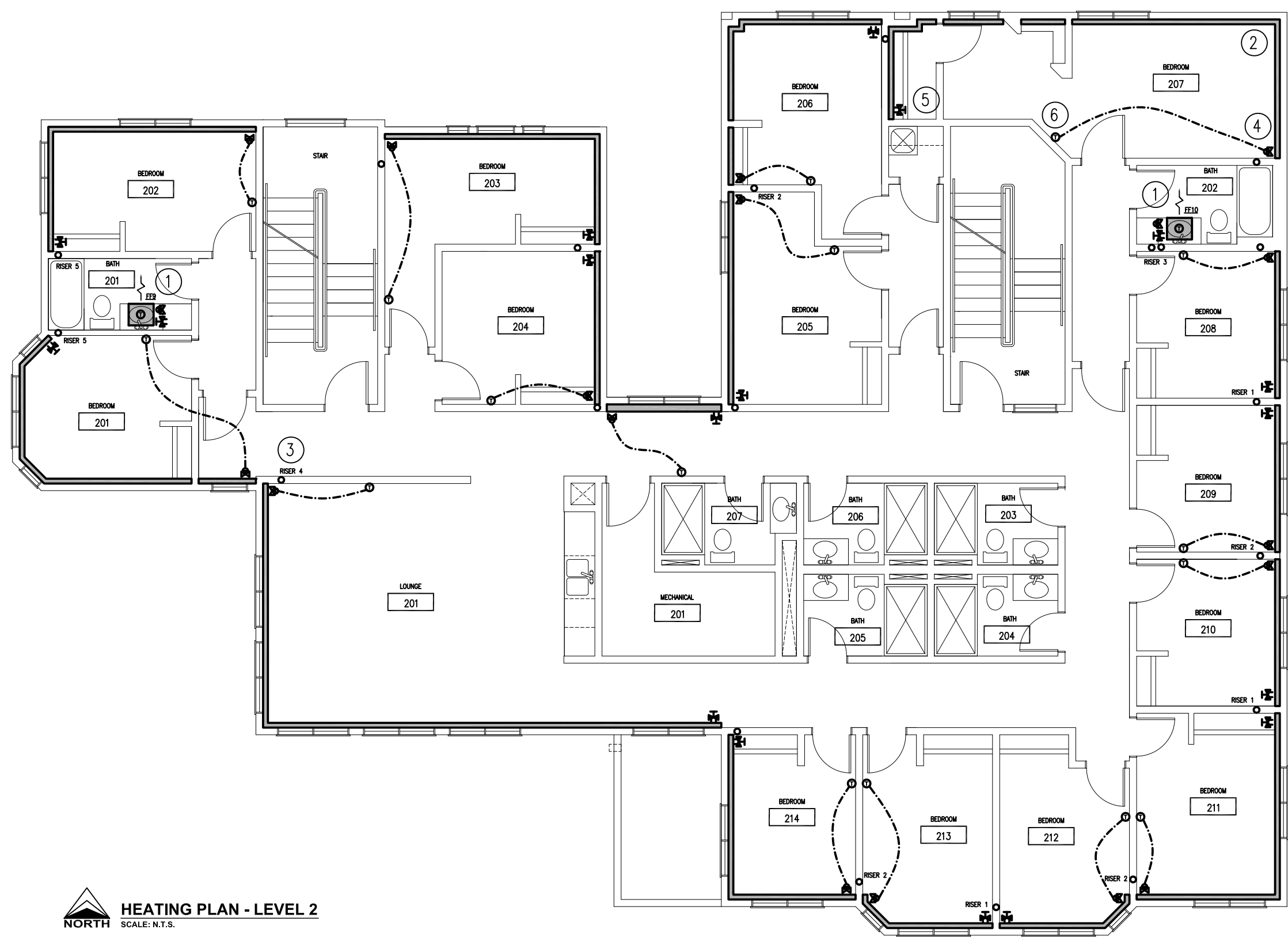
**HEATING PLAN - LEVEL 0**  
 NORTH SCALE: N.T.S.





- ### KEY NOTES
- ① KICKSPACE HEATER W/ INTEGRAL THERMOSTAT BENEATH MILLWORK.
  - ② HYDRONIC BASEBOARD HEATERS ALONG PERIMETER.
  - ③ OVERHEAD CEILING MOUNTED HYDRONIC RADIANT PANELS.
  - ④ CEILING MOUNTED HYDRONIC FORCED FLOW HEATER.
  - ⑤ REFER TO HEATING RISER DIAGRAMS.
  - ⑥ CONTROL VALVE FOR EACH ZONE.
  - ⑦ CIRCUIT BALANCING VALVE FOR EACH ZONE.
  - ⑧ TEMPERATURE CONTROL FOR EACH ZONE.

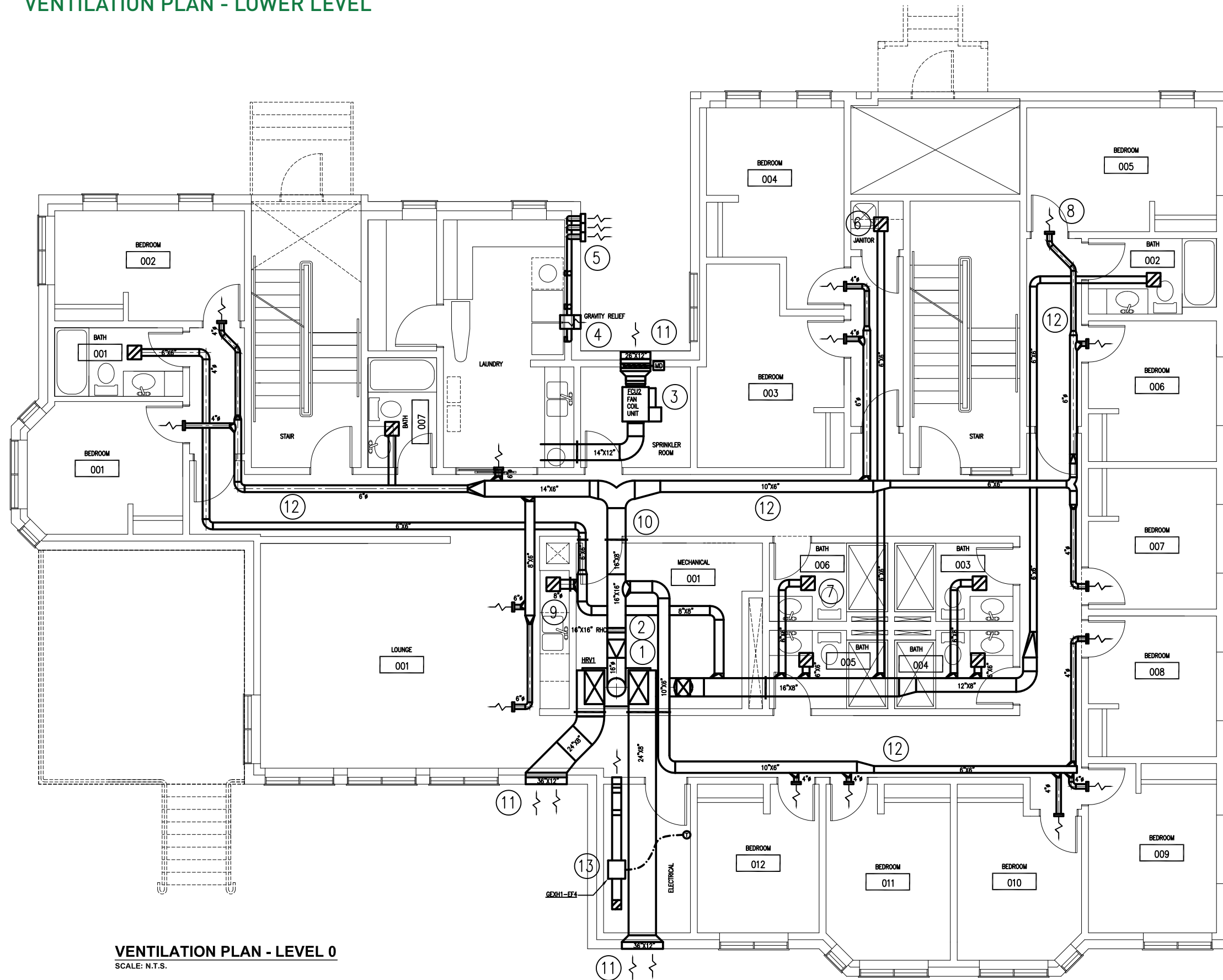
**HEATING PLAN - LEVEL 1**  
SCALE: N.T.S.



- KEY NOTES**
- ① KICKSPACE HEATER W/ INTEGRAL THERMOSTAT BENEATH MILLWORK.
  - ② HYDRONIC BASEBOARD HEATERS ALONG PERIMETER.
  - ③ REFER TO HEATING RISER DIAGRAMS.
  - ④ CONTROL VALVE FOR EACH ZONE.
  - ⑤ CIRCUIT BALANCING VALVE FOR EACH ZONE.
  - ⑥ TEMPERATURE CONTROL FOR EACH ZONE.

**HEATING PLAN - LEVEL 2**  
 NORTH SCALE: N.T.S.

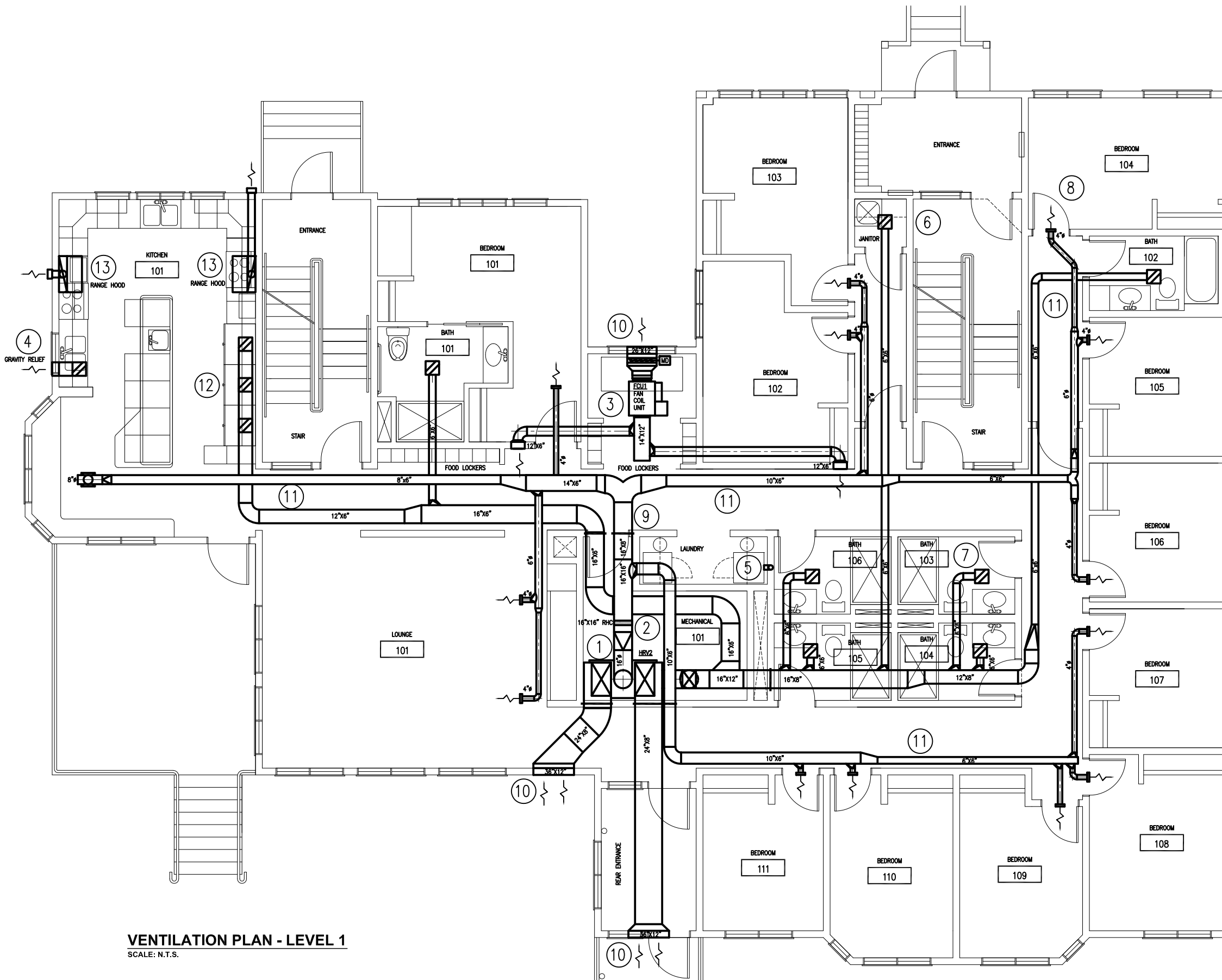




**VENTILATION PLAN - LEVEL 0**  
SCALE: N.T.S.

**KEY NOTES**

- ① VENTILATION PROVIDED BY HEAT RECOVERY VENTILATOR WHICH HAS A SUPPLY FAN FOR ROOM DISTRIBUTION AND AN EXHAUST FAN FOR EXHAUST DISTRIBUTION. HRV UNIT DESIGNED FOR 10% POSITIVE PRESSURIZATION OF BUILDING. 2" PLEATED FILTERS ON OUTDOOR AIR, 2" PLEATED FILTERS ON EXHAUST AIR TO PROTECT HRV CORE. (BASED ON TEMPEFF RGSP 1800 HRV - 87% EFFICIENCY)
- ② GLYCOL REHEAT COIL SIZED FOR REHEATING TEMPERED AIR FROM HEAT RECOVERY UNIT.
- ③ FAN COIL UNIT PROVIDING MAKE-UP AIR (UP TO 600 CFM) WHEN CLOTHES DRYERS ARE IN OPERATION. COIL SIZED FOR DESIGN OUTDOOR AIR CAPACITY HEATING. FAN COIL EQUIPPED WITH VARIABLE SPEED ECM MOTOR WHICH IS CONTROLLED OFF DIFFERENTIAL PRESSURE BETWEEN INDOORS AND OUTDOORS (SEE GRAVITY RELIEF DAMPER).
- ④ GRAVITY RELIEF DAMPER FOR CLOTHES DRYER MAKE-UP AIR OPERATION.
- ⑤ ROUGH-IN FOR 3 CLOTHES DRYERS. STANDARD WALL CAPS (METAL).
- ⑥ HEAT RECOVERY OFF EXHAUST GRILLE IN JANITORIAL ROOMS (75 CFM). BALANCING DAMPERS ON GRILLES.
- ⑦ HEAT RECOVERY OFF EXHAUST GRILLES IN WASHROOMS (85 CFM). BALANCING DAMPERS ON GRILLES.
- ⑧ VENTILATION AIR (100% OUTDOOR FROM HRV) TO EACH BEDROOM (50 CFM). BALANCING DAMPERS ON DIFFUSERS.
- ⑨ HEAT RECOVERY OFF NUTRITION NOOK GENERAL EXHAUST (120 CFM).
- ⑩ FIRE DAMPERS ON ALL WALL ASSEMBLIES WITH FIRE RATINGS.
- ⑪ EXTRUDED ALUMINUM DRAINABLE 39 DEGREE BLADE LOUVERS.
- ⑫ DUCTWORK HUNG TIGHT TO UNDERSIDE OF STRUCTURE AND TO EITHER SIDE OF CORRIDOR TO MAKE ROOM FOR PIPING RUNS DOWN THE CENTER OF THE CORRIDORS.
- ⑬ EXHAUST FAN (200 CFM) FOR MODERATE TEMPERATURE CONTROL OF ELECTRICAL ROOM OPERATED OFF REVERSE ACTING THERMOSTAT. INTAKE GRILLE DOWN LOW INTO ROOM FROM CORRIDOR. DISCHARGE UP HIGH BACK INTO CORRIDOR. ACOUSTIC LINED DUCT FOR SOUND CONTROL.

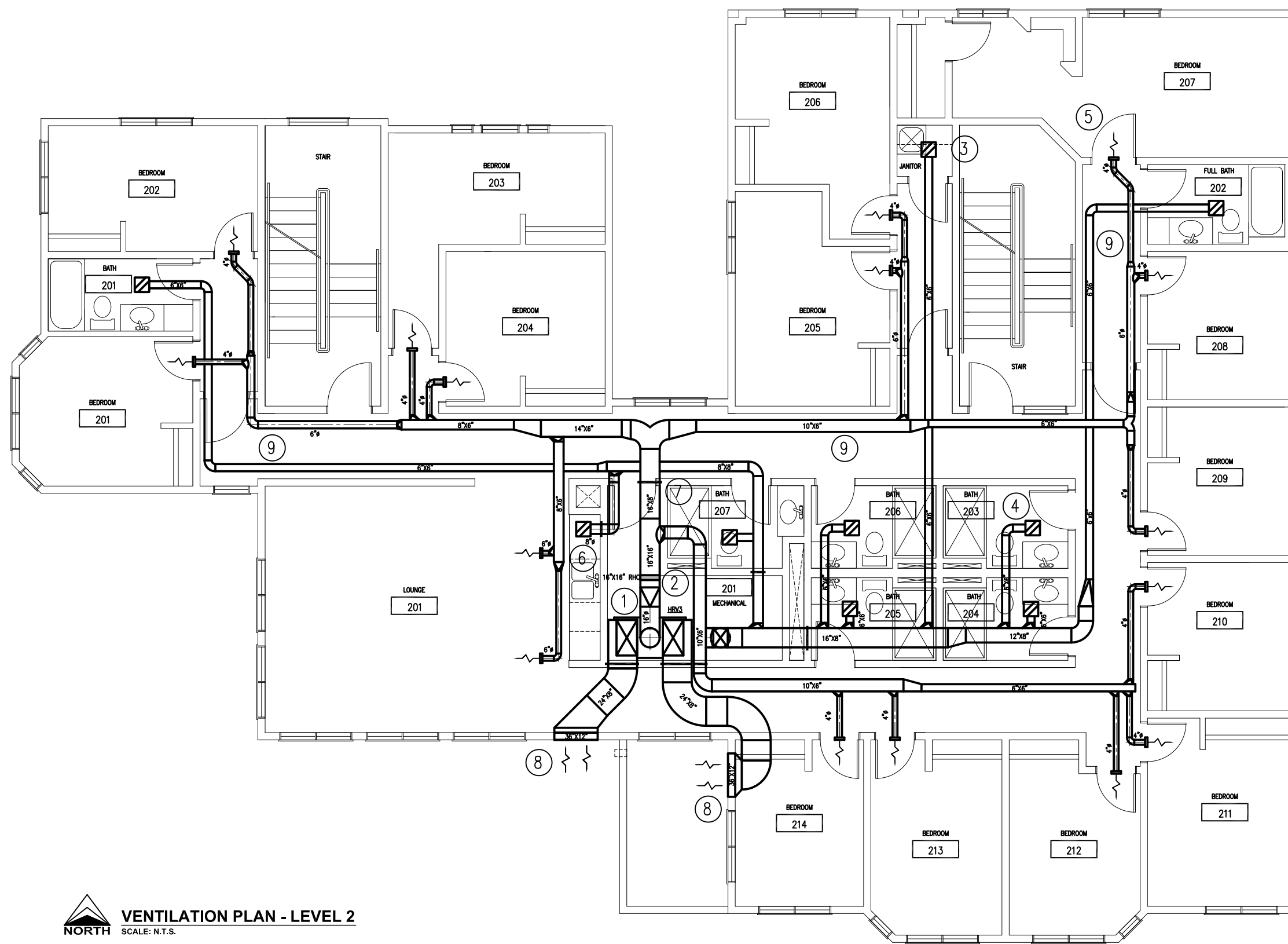


**VENTILATION PLAN - LEVEL 1**  
SCALE: N.T.S.

**KEY NOTES**

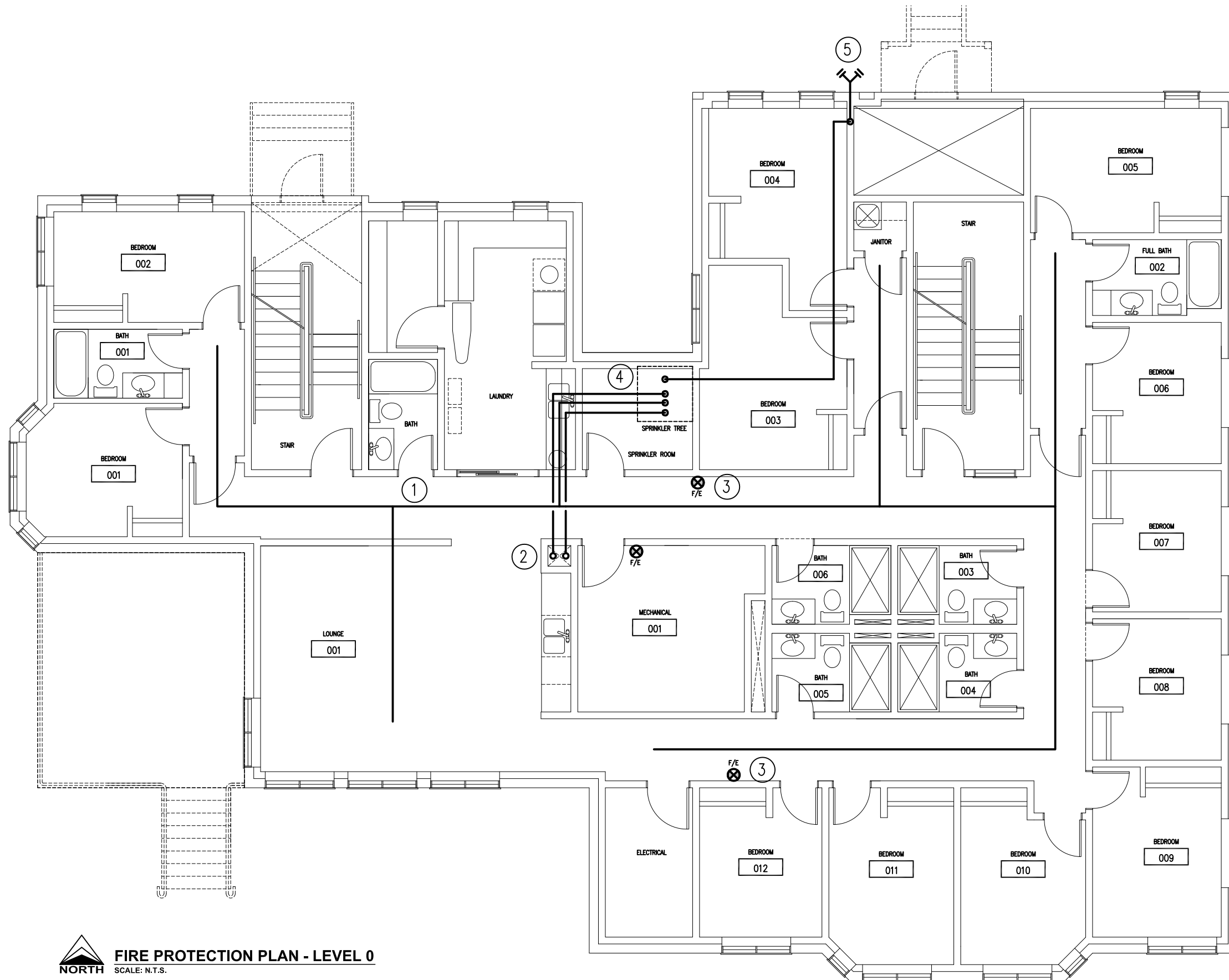
- ① VENTILATION PROVIDED BY HEAT RECOVERY VENTILATOR WHICH HAS A SUPPLY FAN FOR ROOM DISTRIBUTION AND AN EXHAUST FAN FOR EXHAUST DISTRIBUTION. HRV UNIT DESIGNED FOR 10% POSITIVE PRESSURIZATION OF BUILDING. 2" PLEATED FILTERS ON OUTDOOR AIR, 2" PLEATED FILTERS ON EXHAUST AIR TO PROTECT HRV CORE. (BASED ON TEMPEFF RGSP 1800 HRV - 87% EFFICIENCY)
- ② GLYCOL REHEAT COIL SIZED FOR REHEATING TEMPERED AIR FROM HEAT RECOVERY UNIT.
- ③ FAN COIL UNIT PROVIDING MAKE-UP AIR (UP TO 600 CFM) WHEN CLOTHES DRYER OR RANGE HOODS ARE IN OPERATION. COIL SIZED FOR DESIGN OUTDOOR AIR CAPACITY HEATING. FAN COIL EQUIPPED WITH VARIABLE SPEED ECM MOTOR WHICH IS CONTROLLED OFF DIFFERENTIAL PRESSURE BETWEEN INDOORS AND OUTDOORS (SEE GRAVITY RELIEF DAMPER).
- ④ GRAVITY RELIEF DAMPER FOR CLOTHES DRYER / RANGE HOOD MAKE-UP AIR OPERATION.
- ⑤ ROUGH-IN FOR 1 CLOTHES DRYERS. DISCHARGE THROUGH ROOF.
- ⑥ HEAT RECOVERY OFF EXHAUST GRILLE IN JANITORIAL ROOMS (75 CFM). BALANCING DAMPERS ON GRILLES.
- ⑦ HEAT RECOVERY OFF EXHAUST GRILLES IN WASHROOMS (85 CFM). BALANCING DAMPERS ON GRILLES.
- ⑧ VENTILATION AIR (100% OUTDOOR FROM HRV) TO EACH BEDROOM (50 CFM). BALANCING DAMPERS ON DIFFUSERS.
- ⑨ FIRE DAMPERS ON ALL WALL ASSEMBLIES WITH FIRE RATINGS.
- ⑩ EXTRUDED ALUMINUM DRAINABLE 39 DEGREE BLADE LOUVERS.
- ⑪ DUCTWORK HUNG TIGHT TO UNDERSIDE OF STRUCTURE AND TO EITHER SIDE OF CORRIDOR TO MAKE ROOM FOR PIPING RUNS DOWN THE CENTER OF THE CORRIDORS.
- ⑫ HEAT RECOVERY OFF EXHAUST GRILLES OVER FRIDGES TO REMOVE SOME HEAT GAIN FROM THE APPLIANCES (205 CFM TOTAL).
- ⑬ RANGE HOOD, APPROXIMATELY 200 CFM CAPACITY. METAL OUTLET CAP ON EXTERIOR OF BLDG.





- ### KEY NOTES
- ① VENTILATION PROVIDED BY HEAT RECOVERY VENTILATOR WHICH HAS A SUPPLY FAN FOR ROOM DISTRIBUTION AND AN EXHAUST FAN FOR EXHAUST DISTRIBUTION. HRV UNIT DESIGNED FOR 10% POSITIVE PRESSURIZATION OF BUILDING. 2" PLEATED FILTERS ON OUTDOOR AIR, 2" PLEATED FILTERS ON EXHAUST AIR TO PROTECT HRV CORE. (BASED ON TEMPEFF RGSP 1800 HRV - 87% EFFICIENCY)
  - ② GLYCOL REHEAT COIL SIZED FOR REHEATING TEMPERED AIR FROM HEAT RECOVERY UNIT.
  - ③ HEAT RECOVERY OFF EXHAUST GRILLE IN JANITORIAL ROOMS (75 CFM). BALANCING DAMPERS ON GRILLES.
  - ④ HEAT RECOVERY OFF EXHAUST GRILLES IN WASHROOMS (85 CFM). BALANCING DAMPERS ON GRILLES.
  - ⑤ VENTILATION AIR (100% OUTDOOR FROM HRV) TO EACH BEDROOM (50 CFM). BALANCING DAMPERS ON DIFFUSERS.
  - ⑥ HEAT RECOVERY OFF NUTRITION NOOK GENERAL EXHAUST (120 CFM).
  - ⑦ FIRE DAMPERS ON ALL WALL ASSEMBLIES WITH FIRE RATINGS.
  - ⑧ EXTRUDED ALUMINUM DRAINABLE 39 DEGREE BLADE LOUVERS.
  - ⑨ DUCTWORK HUNG TIGHT TO UNDERSIDE OF STRUCTURE AND TO EITHER SIDE OF CORRIDOR TO MAKE ROOM FOR PIPING RUNS DOWN THE CENTER OF THE CORRIDORS.

**VENTILATION PLAN - LEVEL 2**  
 NORTH SCALE: N.T.S.

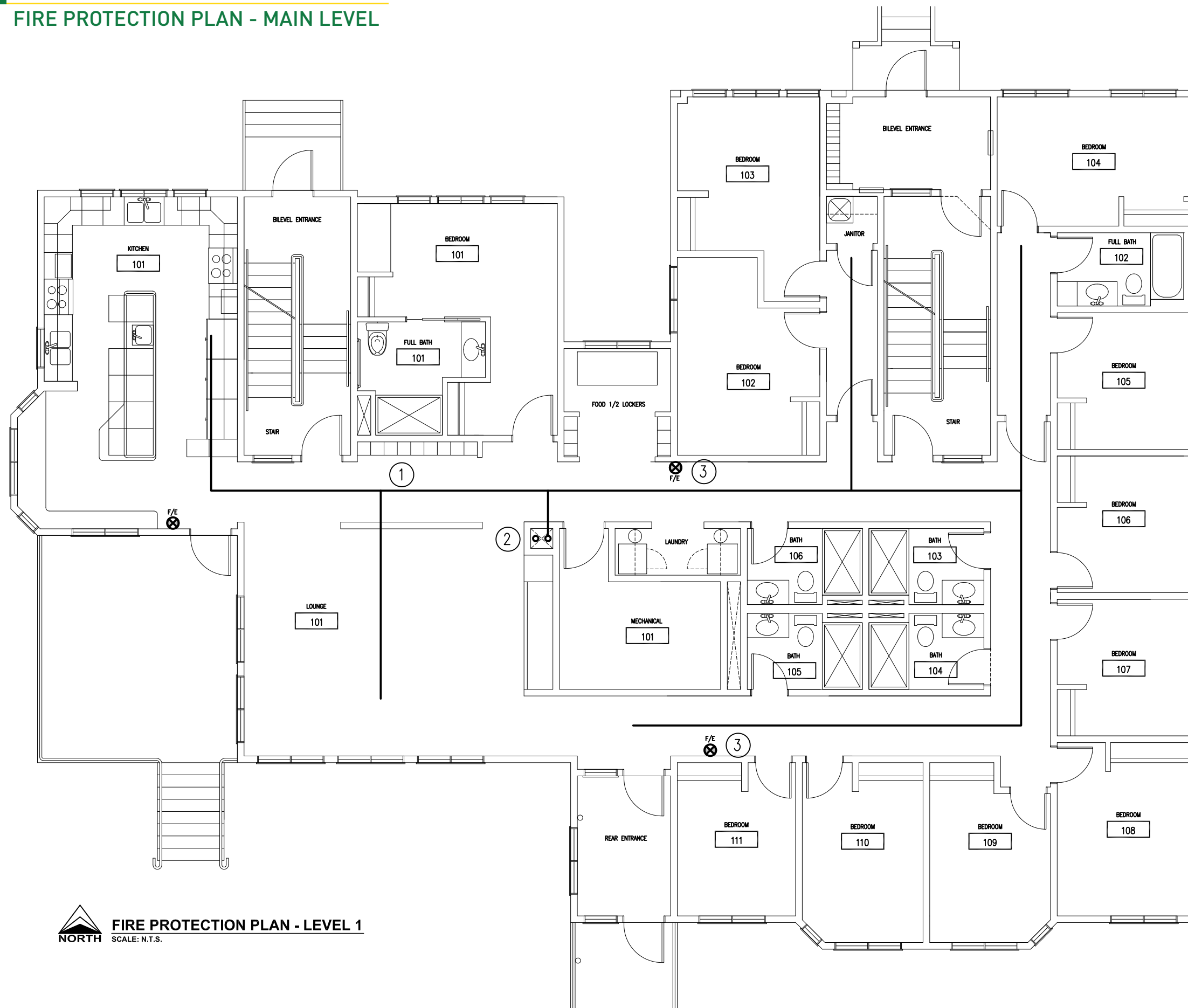


- KEY NOTES**
- ① ENGINEERED SPRINKLER DESIGN BY QUALIFIED SPRINKLER CONTRACTOR. SUGGESTED ROUTING FOR DISTRIBUTION MAINS.
  - ② SHAFT FOR SPRINKLER MAIN DISTRIBUTION TO EACH FLOOR.
  - ③ WALL MOUNT HANDHELD FIRE EXTINGUISHERS IN ACCORDANCE WITH NFPA.
  - ④ SPRINKLER TREE WITH THREE ZONES WITH ALL FLOW ALARM DEVICES LOCATED IN THE SPRINKLER ROOM.
  - ⑤ FIRE DEPARTMENT SIAMESE CONNECTION.

**FIRE PROTECTION PLAN - LEVEL 0**  
 NORTH SCALE: N.T.S.

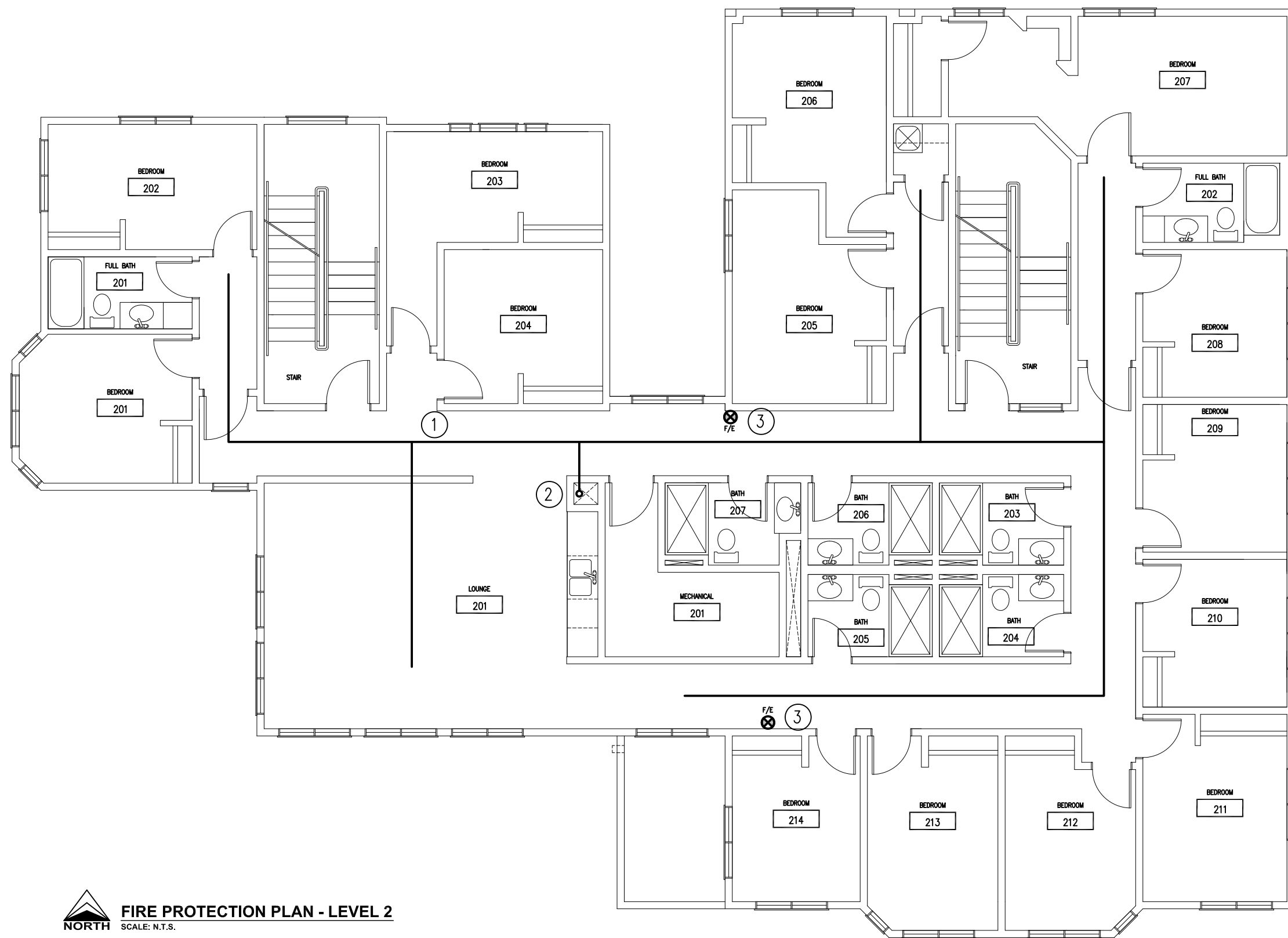


FIRE PROTECTION PLAN - MAIN LEVEL



- KEY NOTES**
- ① ENGINEERED SPRINKLER DESIGN BY QUALIFIED SPRINKLER CONTRACTOR. SUGGESTED ROUTING FOR DISTRIBUTION MAINS.
  - ② SHAFT FOR SPRINKLER MAIN DISTRIBUTION TO EACH FLOOR.
  - ③ WALL MOUNT HANDHELD FIRE EXTINGUISHERS IN ACCORDANCE WITH NFPA.

**FIRE PROTECTION PLAN - LEVEL 1**  
 SCALE: N.T.S.



- KEY NOTES**
- ① ENGINEERED SPRINKLER DESIGN BY QUALIFIED SPRINKLER CONTRACTOR. SUGGESTED ROUTING FOR DISTRIBUTION MAINS.
  - ② SHAFT FOR SPRINKLER MAIN DISTRIBUTION TO EACH FLOOR.
  - ③ WALL MOUNT HANDHELD FIRE EXTINGUISHERS IN ACCORDANCE WITH NFPA.

**FIRE PROTECTION PLAN - LEVEL 2**  
 NORTH SCALE: N.T.S.



## 6.0 ELECTRICAL DESIGN

### 6.1 General

The following design development report captures the current state of design regarding proposed electrical systems for the two East Campus Village Infill houses. These facilities will reflect a residential "house-like" living environment in two, approximately 13,000 square foot, three level structures. Each one will house approximately 35 residents. Both inside and out the facility should emulate a standard residential house as closely as possible. For this report one unit, ECV7 infill house A(B1), is being presented as representative.

As required please reference floor layouts for lighting and power & auxiliary systems as well as schematics, risers, and details; all provided at the end of the electrical section.

The work shall include but not limited to the following:

- Complete power distribution system. Grounding system, panelboards, wiring, etc. provided and installed by the electrical contractor;
- Power connections to mechanical equipment including boilers, hotwater heaters, fancoils, HRVs, starters, contactors and disconnect switches;
- Complete infrastructure and wiring for building wide battery backed night/emergency lighting system;
- Complete indoor and outdoor lighting systems, including local control/occupancy switches & sensors;
- Complete power supplies, motor starters, contactors and disconnect switches for all equipment supplied by others, as required;
- Complete life safety systems (voice communication fire alarm system, CO detection, emergency lighting (as mentioned), and exit lighting);
- Complete infrastructure for datacom, telecommunications, A/V, and security/intercom systems (raceways, cabling, wall jacks, all head end and terminal devices, etc);
- Commissioning, start-up and training.

### 6.2 Electrical Design Criteria

#### 6.2.1 OVERALL GOALS

- Fulfill the program requirements
- Meet the operational needs of Ancillary Services
- Align with the operational need of Facilities and Operations
- Provide electrical systems consistent with the UofA Facilities and Operations (F&O) Design Guidelines
- Provide system solutions that are practical from a maintenance perspective
- Provide practical sustainability solutions that reduce overall building energy usage
- Provide life safety systems as required by the Alberta Building Code, Alberta Fire Code, and other relevant standards including NFPA and CSA.

### 6.2.2 GENERAL DESIGN PROVISIONS

#### 6.2.2.1. APPLICABLE CODES & REGULATIONS

The electrical systems is designed in accordance and in keeping with the intent of all applicable codes, ordinances, standards and regulations. The following are incorporate into the electrical design as appropriate to this facility:

- Alberta Building Code 2010; (in anticipation of adoption)
- Alberta Fire Code 2010; (in anticipation of adoption)
- WorkSafe Alberta Regulations;
- Applicable NFPA Regulations;
- Canadian Electrical Code 2012 & Municipal Affairs Standata Amendments;
- Other applicable CSA Standards;
- CAN/ULC Standards for Fire Alarms;
- IESNA (Illuminating Engineering Society) Recommended Practices;
- UofA Facility and Operations Design Guidelines and Ancillary Services & Utilities standards and requirements.

#### 6.2.2.2. SCOPE

Complete, fully tested and operational electrical systems are provided to meet the requirements described herein and in complete accordance with applicable codes and ordinances, and good installation practices.

Connection to equipment specified in other sections and to equipment supplied and installed by other contractors and/or by the Owner.

#### 6.2.2.3. SUSTAINABLE DESIGN

The design and operation of an energy efficient facility is an important goal. The following are energy efficient design elements are incorporated into the project design:

- Lights on occupancy sensing in bathroom and hallways; vacancy sensing for bedrooms, kitchen, and lounge areas. Exterior lights on timeclock.
- LED & Fluorescent luminaries/lamps throughout with architectural coordination in terms of luminaire efficiency, paint reflectivity and other finishes.
- Exterior light pollution and glare reduction for exterior/site lighting;
- Building electrical distribution configured to accept the connection of a roof mounted solar photovoltaic (PV) array.

#### 6.2.2.4. MATERIALS

All materials and equipment specified and installed to be new and of a heavy duty residential or institutional grade and sourced from a manufacturer with a significant North American presence and history.

All major equipment is to have a complete nameplate with manufacturer's name, model number, and serial number. All major pre-assembled equipment or systems is to be supplied with operations and maintenance manuals/instructions.

Materials and equipment of a similar type (e.g. panelboards, wall switches, etc.) shall be supplied by the same manufacturer.

### 6.3 Electrical Systems

#### 6.3.1 POWER DISTRIBUTION

##### 6.3.1.1. UTILITY FEED

The main utility feed is a 400A-120/208V, 3 phase underground services supplied from a new outdoor UofA utilities substation panel located within 25m of the buildings. The new substation will also serve current and future demands on the block. Primary cable will be supplied and installed by the electrical contractor as directed by the U of A. Service entrance will be in the building's lower floor electrical/datacom room. All secondary cable, duct and terminations supplied and installed by the electrical contractor. Of note is that, for budget and space consideration reducing this to 200A (a break point on equipment size and metering) is being investigated. A 200A-120/208V 3 phase service for this size facility would be quite conservative and would not support any major scaling of demand. For example any future installation of air conditioning is precluded if this option is chosen.

##### 6.3.1.2. METERING

Each building shall have a single inline, or external with current transformers, interior utility meter on the feed to the main building distribution panelboard. Supplied as specified by UofA Utilities.

##### 6.3.1.3. POWER DISTRIBUTION

A main 400A-120/208V, service entrance rated, distribution panel is provided in the electrical room and houses the main circuit breaker, lower floor distribution breakers, and secondary panel breakers. Any locally generated PV or similar power will also connect here. Two secondary power panels are installed in the combined mechanical/electrical rooms on the main floor (225A-120/208V feed) and second floor (100A-120/208V feed) floors.

All bedroom suites and bathrooms have one 20A-120V circuit for plug loads. These are dedicated to that location for isolation and potential load monitoring. The assumption is also that for safety and efficiency we are not sizing the bedrooms feeds to support space heaters or kettles. The typical loads in these spaces will be user electronics and a task and/or bedside light. In a peak bedroom load situation, with the addition of a small "bar" style fridge, the further simultaneous use a cloths iron my result in a trip but this is considered a very unusual and acceptable situation. Bedroom breakers are of the AFCI type. Kitchen and laundry areas are circuited as appropriate for appliances. Other common areas have circuits for

equipment there and convenience use. Lighting circuits are dedicated for that use, with the exception of negligible smoke alarm loads, which also allows for future monitoring.

#### 6.3.1.3.1.1. RECEPTACLES

All receptacles are of the tamper resistant (TR) T-type. GFCI receptacles are specified where required by code and otherwise prudent. No GFCI breakers are specified. Public spaces have sufficient outlets for entertainment equipment and laptop/portable device charging. Select receptacles in public areas and possibly suite bedside outlets may be upgraded 5V USB charging outlets.

### 6.3.2 LIGHTING

#### 6.3.2.1. EXTERIOR

Exterior lighting in the front either building or pole mounted reflect residential sensibilities and be of that architectural type. Back of house, any pole lighting in yard or parking areas will follow existing UofA site lighting standards and fed off block site lighting circuits. Spill light attenuation patterns will be used as appropriate. Exterior, building mounted, entry and deck lights are configured as night lights only on during in the dark and on a single, building fed, timeclock circuit or possibly configured with local photocells.

#### 6.3.2.2. INTERIOR

All fixtures are specified with T8 linear fluorescent lamps and electronic ballasts; LED E26 or GU10 Base lamps; or fixed LED sources. Color temperature are in the 2700K – 3100K in living areas and 4100K in service, laundry, and pantry areas. Light fixtures of residential or hospitality style surface ceiling mounted or wall mounted. Some LED surface mount, semi-recessed style, are used in shower areas, lounge areas, and to highlight bedroom entries. Fixtures are controlled using standard 120V switches/dimmers/sensors. To conserve energy bedroom suites, kitchen, lounge, laundry, pantry, etc. have motion sensing wall switches configured for 30 minute vacancy sensing. Further all bathroom and some hallway lighting will be configured for occupancy sensing for safety and convenience. For night lighting safety some corridor lights remain energized 24 hours and also function as combined emergency lighting, fed from central UPS circuits.

### 6.3.3 AUXILIARY SYSTEMS

#### 6.3.3.1. INFRASTRUCTURE

In general to provision the auxiliary systems the following infrastructure has been designed:

- 3 fibre optic cable feeds from the UofA to lower level electrical/datacom room – FMnet, IST, & Fire alarm network.
- Fibre optic and/or copper feeds from telecom services providers/ISPs (eg. Telus) to lower level electrical/datacom room are allowed for.
- Distribution cabling for Fire alarm system (armoured FAS cable or FAS WIC) between panel and devices.
- Distribution cabling for Lenel access control system between lower level electrical/datacom room and main floor doors.
- CAT 6 cable from lower level electrical/datacom room patch panel to locations of any equipment plus common room jacks and two jacks per suite.
- Intercom cabling from main door panels to suites and other locations.

#### 6.3.3.2. SECURITY AND SURVEILLANCE

These services are provisioned over a connection to the UofA facilities network, FMnet. A fiber optic cable is pulled to lower floor electrical/datacom room from a site pullbox near utility site power distribution for connection to FMnet. The UofA will provide final direction to the tie in location. Fiber cables and terminations are provided by the electrical contractor along with a UPS backed, 24 port PoE switch, fibre to Cat6, for distribution.

##### 6.3.3.2.1. ACCESS CONTROL

UofA standard Lenel card access readers and electric strikes/latches is provided on all external doors. All access control equipment, including door position switches, electric strikes, main building controller, wiring, & installation, etc. included in project and to meet UofA specifications. Head end equipment for building operations and connecting local system to FMnet installed in lower level electrical/datacom room..

##### 6.3.3.2.2. INTRUSION DETECTION

NO PROVISION.

##### 6.3.3.2.3. CCTV

A total of 4 IP style security cameras (3 exterior and 1 interior) are provided and installed in this project and connected to UAPS surveillance system via FMnet PoE switch. CCTV cameras are located at exterior entrance doors. Allow for complete installation including cameras, camera equipment, and wiring with terminations to UofA specifications.

##### 6.3.3.2.4. EMERGENCY "BLUE" PHONES

NO PROVISION.

#### 6.3.3.3. DATACOM/TELECOM

##### 6.3.3.3.1. INTERCOM

A standalone intercom panel system is provided at the main entrance with remote stations in each room and one outside of each common area on the floors. This will not tie into any other datacom system.

##### 6.3.3.3.2. CATV

There will be no provision of cable TV via RG6/RG59 coaxial cable in the buildings. See Telephone & Data section.

##### 6.3.3.3.3. SATELLITE

NO PROVISION.

##### 6.3.3.3.4. WIFI

Ancillary services supplementary UofA 'UWS' wireless access provisioned throughout the building so as to be available to all subscribed residents. Rough-in and cabling is provided for 3 WAPs per floor from basement electrical/datacom room. End devices not included; to be provided and commissioned by IST and Ancillary Services.

##### 6.3.3.3.5. TELEPHONE & DATA

External duct to, and back board space in, lower level electrical/datacom room is provided for Telecom providers/ISPs to run and locate services. These services could include Telephone, Data, & Television/Streaming.

Provisions are made for private telephone and/or data service (including television over cat6 cable) to each bedroom. This is via 2 CAT6 cable runs to each unit from lower level electrical/datacom room patch pane in rack. Also there are provisions for same in entertainment and other public areas as appropriate. In particular one shared public phone line will be provided near common area on each floor proximate to intercom station.

The above runs are connected as required to UofA/IST services or Telecom provider's equipment.



## 6.3.3.4. LIFE SAFETY

## 6.3.3.4.1. FIRE ALARM SYSTEM

The fire alarm system is designed and to be installed in accordance with UofA Fire Alarm System Design Guidelines and all applicable municipal, provincial, and national codes.

UofA F/A systems are networked to provide notification to the Facilities Control Centre and UAPS and thus allow for fire department dispatch. As such a fibre optic cable is provisioned for connection to that network. The fibre optic cable will be pulled to lower floor electrical/datacom room from nearest building/tunnel location for connection to the F/Anet. One external VOIP line via UofA ACS is also to be provisioned to the F/A panel.

F/A system is an addressable Simplex model 4100U with emergency communications capability. UAPS will have access to the emergency paging functionality via network connection.

F/A annunciator panel is located in main, front entrance vestibule adjacent to intercom system.

F/A system configured for single stage operation.

## 6.3.3.4.1.1. SIGNALING DEVICES

Fire alarm speaker and/or speaker/strobe units are provided in bedroom suites, corridors, and common areas to ensure adequate audibility for occupants in each sleeping room suite and allow emergency paging for fire fighters & UAPS. Exterior weather proof fire alarm speakers are provided on the exterior of the building one located in the front near the fire alarm response point and the other in the rear of the building. Speaker circuits in bedroom suites will be configured to silence after 60 seconds and then retrigger after 10 minutes as per code and to eliminate the requirement for local silence devices and wiring.

## 6.3.3.4.1.2. INITIATING DEVICES

## 6.3.3.4.1.2.1. FIRE DETECTORS

## 6.3.3.4.1.2.1.1. HEAT DETECTORS

Building is sprinklered throughout and does not require heat detectors except in select areas such as kitchen and mechanical rooms where localization of alarm is desired.

## 6.3.3.4.1.2.1.2. SMOKE DETECTORS

For early detection and localization smoke detectors are installed in electrical/datacom room. Also as required by code on all egress routes from sleeping rooms.

## 6.3.3.4.1.2.2. SPRINKLER FLOW

Sprinkler flow switch alarms for each floor zone are installed at sprinkler tree.

## 6.3.3.4.1.2.3. MANUAL PULL STATIONS

Located on every floor beside shared exits to stairs and/or exterior as per code.

## 6.3.3.4.2. SMOKE ALARMS

Local smoke alarms in each bedroom suite are provided and wired to the proximate 120V lighting circuits in each room. They will also have local 9V battery backup and silence button.

## 6.3.3.4.3. CO DETECTOR ALARMS

CO detection and alarm is required for central boiler room. This will be coupled to, and alert through, F/A system. With hydronic heating system detectors are not required in each sleeping unit but due to small incremental cost combination smoke and CO alarms are currently planned for each bedroom.

## 6.3.4. ELEVATORS

NO PROVISION

6.4 Miscellaneous Items

## 6.4.1. UNIVERSAL ACCESS

Universal access or barrier free suites are provided as indicated on the architectural drawings. To accommodate this, electrical device locations are adjusted in these suites as per ADA guidelines. Also in wheelchair and 2 other suites F/A speaker-strobes are provided for the hard of hearing.

## 6.4.2. "ONE CARD" PAYMENT SYSTEM

Network connection via IST fiber to UofA Ancillary Services "One Card" payment system provided. Some nominal rack space and/or back board space has been allowed for in the datacom/electrical room to accommodate any vending system local head end requirements.

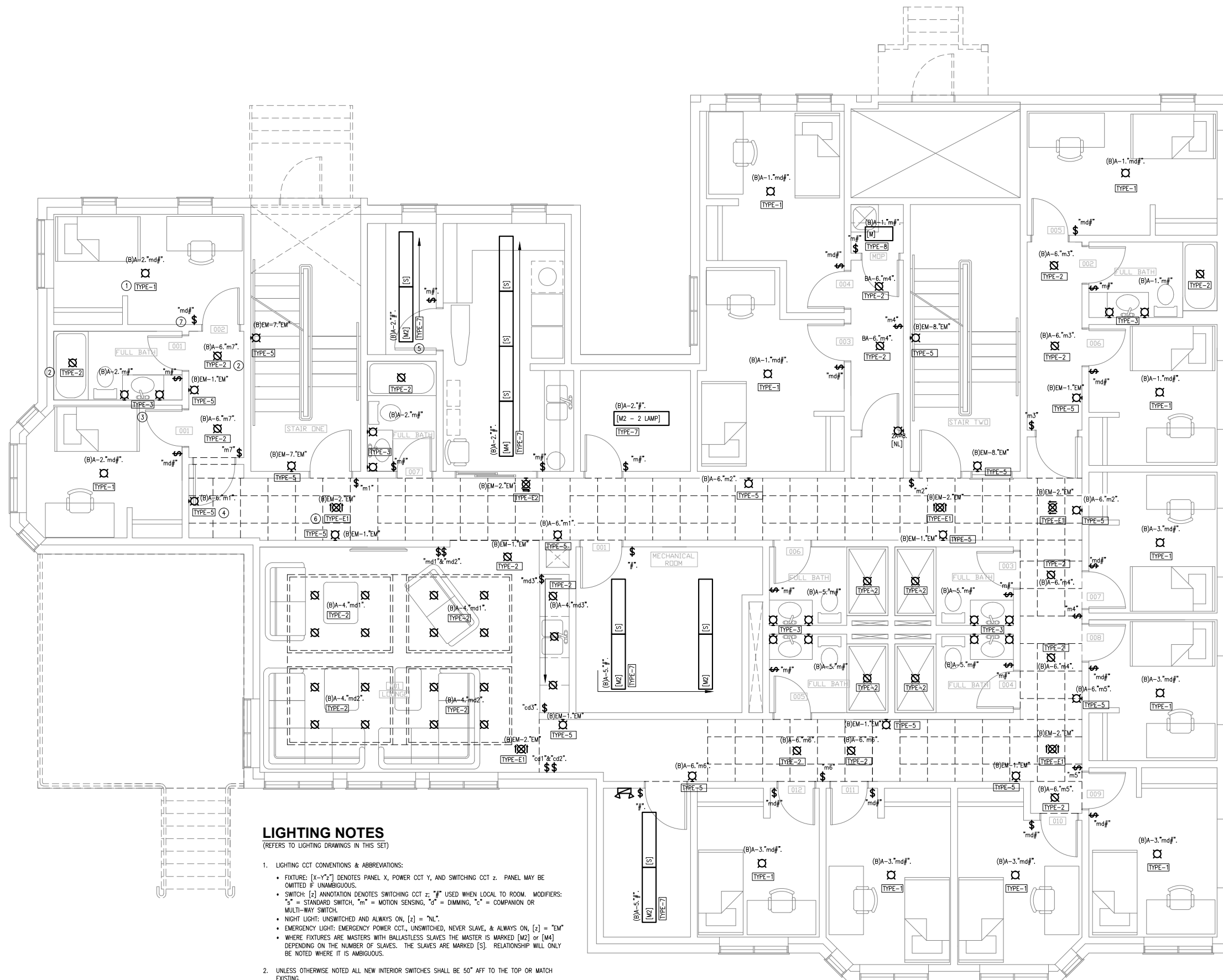
## 6.4.2.1. LAUNDRY EQUIPMENT

Laundry equipment in this project will be installed such that users can pay for use via UofA "One Card" payment system. As such CAT 6 datacom runs back to the lower floor electrical/datacom room have been provided for card readers at both locations and one per each washer and dryer. Card readers are also provided with a 120V cct.

## 6.4.3. EXISTING CONDITIONS

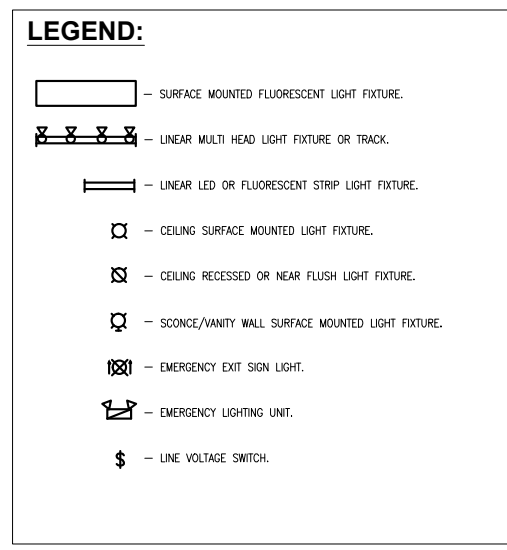
It is the responsibility of the electrical contractor and design team to identify and include in contract resolving any conflicts between new construction and existing equipment such as (but not limited to): pedestals, landscape receptacles, phone booths, lighting, vaults etc. identify existing gas lines, steam lines, water lines, hydrants, sanitary lines, storm lines etc. and ensure proper clearances are maintained.

LIGHTING LAYOUT - LOWER LEVEL



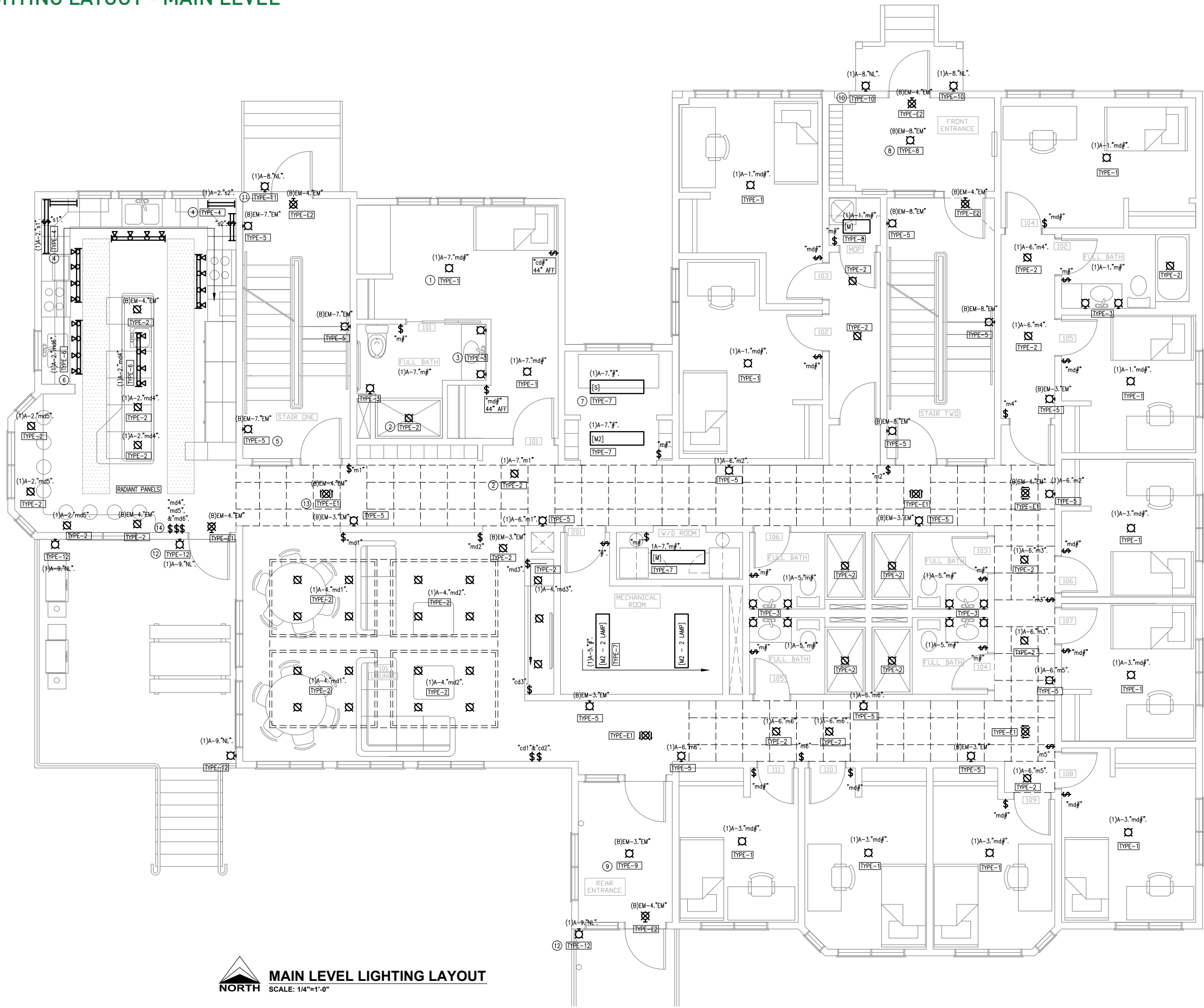
- ### KEY NOTES FOR LIGHTING
- TYPICAL NEW "TYPE-1" CEILING SURFACE MOUNT LIGHT FIXTURES:  
CEILING SURFACE MOUNTED FLUSH LUMINAIRE ~19" DIAMETER & 6" DEEP; 3 x E-26, MEDIUM BASE SOCKETS; BRUSHED ALUMINUM/STAINLESS FINISH; WHITE ACRYLIC/POLYCARBONATE/GLASS TRANSLUCENT DIFFUSER. LAMPED WITH 3 x 11W, 830 LUMEN, 2700K, E-26 BASE, A-19 LED DIMMABLE BULB.
  - TYPICAL NEW "TYPE-2" LOW PROFILE SURFACE DOWNLIGHT FIXTURES:  
LOW PROFILE SURFACE DOWNLIGHT LUMINAIRE; 4" NOMINAL DIAMETER; LED SOURCE <13W, >850 LUMEN, ~3000K, DIMMABLE; SUITABLE FOR MOUNTING DIRECTLY ON CEILING BOX, SUITABLE FOR DAMP & WET LOCATION WHEN CEILING MOUNTED.
  - TYPICAL NEW "TYPE-3" VANITY WALL SCONCE FIXTURES:  
WALL SCONCE LUMINAIRE ~20" HIGH & 5" DEEP; 2 x E-26, MEDIUM BASE SOCKETS; BRUSHED ALUMINUM/STAINLESS FINISH; WHITE ACRYLIC/POLYCARBONATE/GLASS TRANSLUCENT DIFFUSER, SUITABLE FOR DAMP LOCATION. LAMPED WITH 2 x 11W, 830 LUMEN, 2700K, E-26 BASE, A-19 LED DIMMABLE BULB.
  - TYPICAL NEW "TYPE-5" WALL SCONCE FIXTURES:  
WALL SCONCE LUMINAIRE ~18" HIGH & 5" DEEP; 2 x E-26, MEDIUM BASE SOCKETS; BRUSHED ALUMINUM/STAINLESS FINISH; WHITE ACRYLIC/POLYCARBONATE/GLASS TRANSLUCENT DIFFUSER. LAMPED WITH 2 x 11W, 830 LUMEN, 2700K, E-26 BASE, A-19 LED DIMMABLE BULB.
  - TYPICAL NEW "TYPE-7" 1'x4'x2" SURFACE MOUNTED FLUORESCENT LIGHT FIXTURES:  
SURFACE MOUNTED 1-LAMP (OR 2-LAMP WHERE NOTED) 120V AC FLUORESCENT LIGHT FIXTURE WITH 20 GA MRO IV 95% REFLECTANCE SPECULAR REFLECTOR AND K12 LENS FLUORESCENT LIGHT FIXTURE.
  - TYPICAL NEW "TYPE-E1" LED EXIT SIGN LIGHT FIXTURES:  
CEILING OR WALL SURFACE MOUNTED 120V AC LED EXIT LIGHT FIXTURE WITH FIELD ADJUSTABLE DIRECTIONAL ARROWS. ALUMINUM HOUSING AND UNIVERSAL MOUNTING OPTION.
  - TYPICAL:  
SWITCHING VIA LINE VOLTAGE DECORA STYLE SWITCHES, SOME SIMPLE SWITCHES (s); OTHERS WITH MOTION SENSING (m), DIMMING (d), OR BOTH (md) AS NOTED. COMES WITH APPROPRIATE 3-WAY COMPANION (c) MODULES AS REQUIRED & NOTED. SUITABLE FOR DIMMING LED LOADS. EQUIVALENT TO LUTRON MS-0PSS, MACL-153M, OR MACL-0P153M. STAINLESS STEEL COVERPLATES THROUGHOUT.

- ### LIGHTING NOTES
- (REFERS TO LIGHTING DRAWINGS IN THIS SET)
- LIGHTING CCT CONVENTIONS & ABBREVIATIONS:
    - FIXTURE: [X-Y-Z] DENOTES PANEL X, POWER CCT Y, AND SWITCHING CCT Z. PANEL MAY BE OMITTED IF UNAMBIGUOUS.
    - SWITCH: [Z] ANNOTATION DENOTES SWITCHING CCT z; "F" USED WHEN LOCAL TO ROOM. MODIFIERS: "s" = STANDARD SWITCH, "m" = MOTION SENSING, "d" = DIMMING, "c" = COMPANION OR MULTI-WAY SWITCH.
    - NIGHT LIGHT: UNSWITCHED AND ALWAYS ON, [z] = "NL".
    - EMERGENCY LIGHT: EMERGENCY POWER CCT, UNSWITCHED, NEVER SLAVE, & ALWAYS ON, [z] = "EM"
    - WHERE FIXTURES ARE MASTERS WITH BALLASTLESS SLAVES THE MASTER IS MARKED [M2] OR [M4] DEPENDING ON THE NUMBER OF SLAVES. THE SLAVES ARE MARKED [S]. RELATIONSHIP WILL BE NOTED WHERE IT IS AMBIGUOUS.
  - UNLESS OTHERWISE NOTED ALL NEW INTERIOR SWITCHES SHALL BE 50" AFF TO THE TOP OR MATCH EXISTING.
  - ALL COVER PLATES SHOULD BE STAINLESS STEEL.
  - BRANCH CCT WIRING HOME RUNS TO BE EITHER BX IF FROM A SINGLE LOCATION (EG. BEDROOM POWER CCTS) OR WIRE IN CONDUIT IF CCT DISTRIBUTED WITH BX TAPS (EG. LIGHTING CCTS).



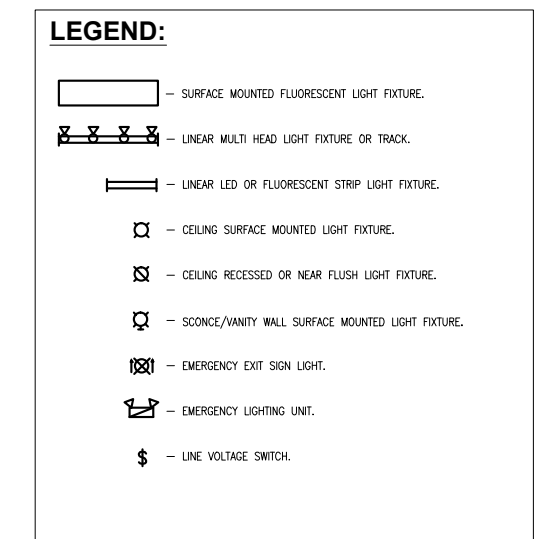
**LOWER LEVEL LIGHTING LAYOUT**  
SCALE: 1/4"=1'-0"



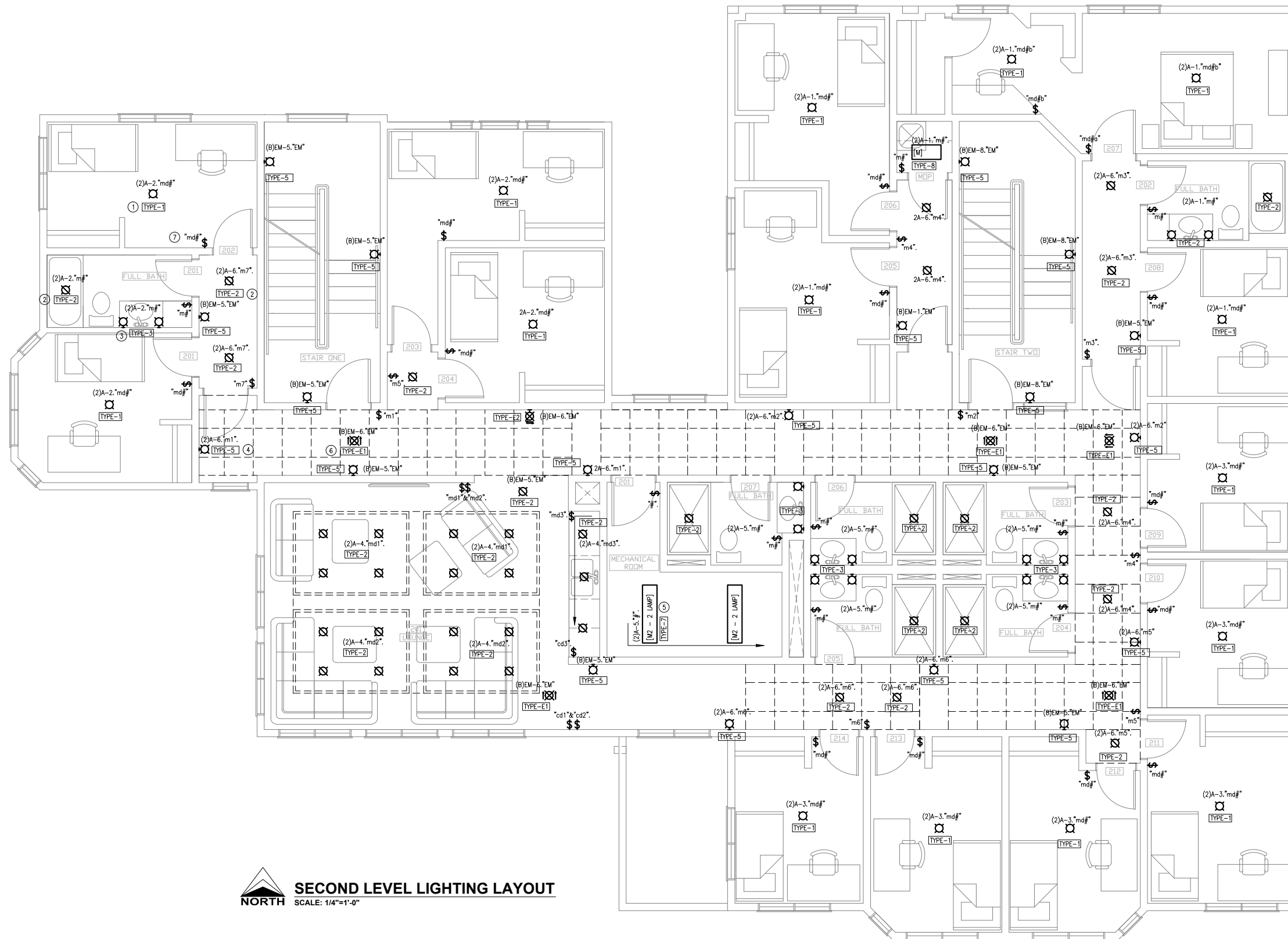


**MAIN LEVEL LIGHTING LAYOUT**  
SCALE: 1/4"=1'-0"

- ### KEY NOTES FOR LIGHTING
- TYPICAL NEW "TYPE-1" CEILING SURFACE MOUNT LIGHT FIXTURES:  
CEILING SURFACE MOUNTED FLUSH LUMINAIRE ~19" DIAMETER & 6" DEEP; 3 x E-26, MEDIUM BASE SOCKETS; BRUSHED ALUMINUM/STAINLESS FINISH; WHITE ACRYLIC/POLYCARBONATE/GLASS TRANSLUCENT DIFFUSER. LAMPED WITH 3 x 11W, 830 LUMEN, 2700K, E-26 BASE, A-19 LED DIMMABLE BULB.
  - TYPICAL NEW "TYPE-2" LOW PROFILE SURFACE DOWNLIGHT FIXTURES:  
LOW PROFILE SURFACE DOWNLIGHT LUMINAIRE; 4" NOMINAL DIAMETER; LED SOURCE <13W, >850 LUMEN, ~3000K, DIMMABLE; SUITABLE FOR MOUNTING DIRECTLY ON CEILING BOX, SUITABLE FOR DAMP & WET LOCATION WHEN CEILING MOUNTED.
  - TYPICAL NEW "TYPE-3" VANITY WALL SCONCE FIXTURES:  
WALL SCONCE LUMINAIRE ~20" HIGH & 5" DEEP; 2 x E-26, MEDIUM BASE SOCKETS; BRUSHED ALUMINUM/STAINLESS FINISH; WHITE ACRYLIC/POLYCARBONATE/GLASS TRANSLUCENT DIFFUSER; SUITABLE FOR DAMP LOCATION. LAMPED WITH 2 x 11W, 830 LUMEN, 2700K, E-26 BASE, A-19 LED DIMMABLE BULB.
  - TYPICAL NEW "TYPE-4" UNDER CABINET LINEAR LED FIXTURES:  
LINKABLE LINEAR UNDER CABINET FIXTURE SYSTEM. LED SOURCE.
  - TYPICAL NEW "TYPE-5" WALL SCONCE FIXTURES:  
WALL SCONCE LUMINAIRE ~18" HIGH & 5" DEEP; 2 x E-26, MEDIUM BASE SOCKETS; BRUSHED ALUMINUM/STAINLESS FINISH; WHITE ACRYLIC/POLYCARBONATE/GLASS TRANSLUCENT DIFFUSER. LAMPED WITH 2 x 11W, 830 LUMEN, 2700K, E-26 BASE, A-19 LED DIMMABLE BULB.
  - TYPICAL NEW "TYPE-6" CEILING MOUNTED, 4 HEAD LINEAR LIGHT FIXTURES:  
CEILING FLUSH MOUNTED 4 HEAD LINEAR FIXTURE WITH 120V-GU10 SOCKETS FOR FOUR (4) LAMPS; INDIVIDUALLY AIMABLE HEADS; BRUSHED ALUMINUM/STAINLESS FINISH. LAMPED WITH 4 x 6W, 300+ LUMEN, 3000K, GU-10/120V BASE, LED DIMMABLE BULB.
  - TYPICAL NEW "TYPE-7" 1'-4"/2' SURFACE MOUNTED FLUORESCENT LIGHT FIXTURES:  
SURFACE MOUNTED 1-LAMP (OR 2-LAMP WHERE NOTED) 120V AC FLUORESCENT LIGHT FIXTURE WITH 20 GA MIRO IV 95% REFLECTANCE SPECULAR REFLECTOR AND K12 LENS FLUORESCENT LIGHT FIXTURE.
  - TYPICAL NEW "TYPE-8" PENDANT LED FIXTURE:  
TBD.
  - TYPICAL NEW "TYPE-9" CEILING SURFACE MOUNT LED LIGHT FIXTURE:  
TBD.
  - TYPICAL NEW "TYPE-10" OUTDOOR WET LOCATION RATED LED WALL SCONCE FIXTURE:  
TBD.
  - TYPICAL NEW "TYPE-11" OUTDOOR WET LOCATION RATED LED WALL SCONCE FIXTURE:  
TBD.
  - TYPICAL NEW "TYPE-12" OUTDOOR WET LOCATION RATED LED WALL SCONCE FIXTURE:  
TBD.
  - TYPICAL NEW "TYPE-E1" LED EXIT SIGN LIGHT FIXTURES:  
CEILING OR WALL SURFACE MOUNTED 120V AC LED EXIT LIGHT FIXTURE WITH FIELD ADJUSTABLE DIRECTIONAL ARROWS. ALUMINUM HOUSING AND UNIVERSAL MOUNTING OPTION.
  - TYPICAL:  
SWITCHING VIA LINE VOLTAGE DECORA STYLE SWITCHES, SOME SIMPLE SWITCHES (S); OTHERS WITH MOTION SENSING (M), DIMMING (d), OR BOTH (md) AS NOTED. COMES WITH APPROPRIATE 3-WAY COMPANION (c) MODULES AS REQUIRED & NOTED. SUITABLE FOR DIMMING LED LOADS. EQUIVALENT TO LUTRON MS-OP55, MACL-153M, OR MACL-OP153M. STAINLESS STEEL COVERPLATES THROUGHOUT.



LIGHTING LAYOUT - UPPER LEVEL

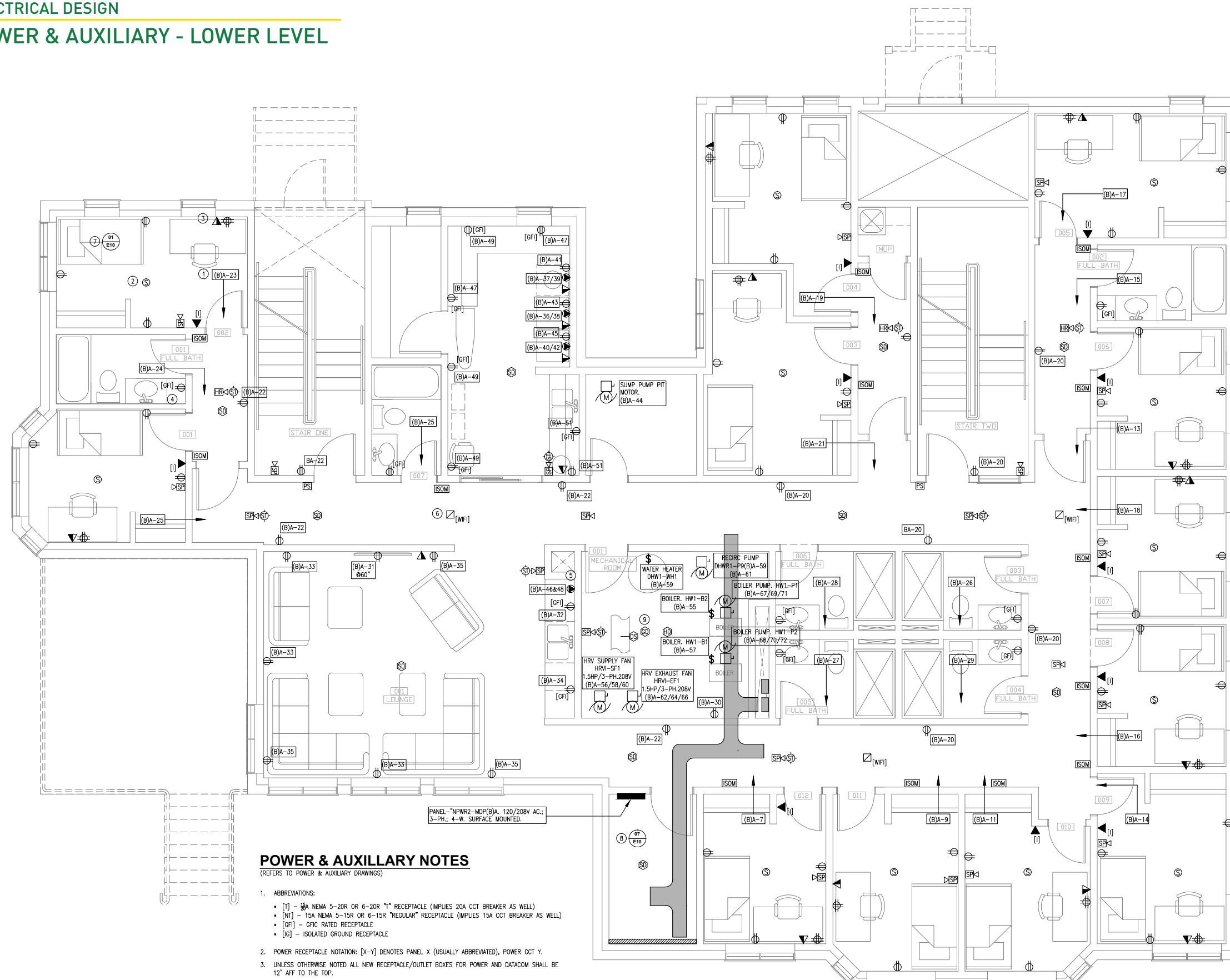


**SECOND LEVEL LIGHTING LAYOUT**  
SCALE: 1/4"=1'-0"

- KEY NOTES FOR LIGHTING**
- 1 TYPICAL NEW "TYPE-1" CEILING SURFACE MOUNT LIGHT FIXTURES:  
CEILING SURFACE MOUNTED FLUSH LUMINAIRE ~19" DIAMETER & 6" DEEP; 3 x E-26, MEDIUM BASE SOCKETS; BRUSHED ALUMINUM/STAINLESS FINISH; WHITE ACRYLIC/POLYCARBONATE/GLASS TRANSLUCENT DIFFUSER. LAMPED WITH 3 x 11W, 830 LUMEN, 2700K, E-26 BASE, A-19 LED DIMMABLE BULB.
  - 2 TYPICAL NEW "TYPE-2" LOW PROFILE SURFACE DOWNLIGHT FIXTURES:  
LOW PROFILE SURFACE DOWNLIGHT LUMINAIRE; 4" NOMINAL DIAMETER; LED SOURCE <13W, >850 LUMEN, ~3000K, DIMMABLE; SUITABLE FOR MOUNTING DIRECTLY ON CEILING BOX, SUITABLE FOR DAMP & WET LOCATION WHEN CEILING MOUNTED.
  - 3 TYPICAL NEW "TYPE-3" VANITY WALL SCONCE FIXTURES:  
WALL SCONCE LUMINAIRE ~20" HIGH & 5" DEEP; 2 x E-26, MEDIUM BASE SOCKETS; BRUSHED ALUMINUM/STAINLESS FINISH; WHITE ACRYLIC/POLYCARBONATE/GLASS TRANSLUCENT DIFFUSER; SUITABLE FOR DAMP LOCATION. LAMPED WITH 2 x 11W, 830 LUMEN, 2700K, E-26 BASE, A-19 LED DIMMABLE BULB.
  - 4 TYPICAL NEW "TYPE-5" WALL SCONCE FIXTURES:  
WALL SCONCE LUMINAIRE ~18" HIGH & 5" DEEP; 2 x E-26, MEDIUM BASE SOCKETS; BRUSHED ALUMINUM/STAINLESS FINISH; WHITE ACRYLIC/POLYCARBONATE/GLASS TRANSLUCENT DIFFUSER. LAMPED WITH 2 x 11W, 830 LUMEN, 2700K, E-26 BASE, A-19 LED DIMMABLE BULB.
  - 5 TYPICAL NEW "TYPE-7" 1'x4'/'2" SURFACE MOUNTED FLUORESCENT LIGHT FIXTURES:  
SURFACE MOUNTED 1-LAMP (OR 2-LAMP WHERE NOTED) 120V AC FLUORESCENT LIGHT FIXTURE WITH 20 OR 40 WATT IV 95% REFLECTANCE SPECULAR REFLECTOR AND K12 LENS FLUORESCENT LIGHT FIXTURE.
  - 6 TYPICAL NEW "TYPE-E1" LED EXIT SIGN LIGHT FIXTURES:  
CEILING OR WALL SURFACE MOUNTED 120V AC LED EXIT LIGHT FIXTURE WITH FIELD ADJUSTABLE DIRECTIONAL ARROWS. ALUMINUM HOUSING AND UNIVERSAL MOUNTING OPTION.
  - 7 TYPICAL:  
SWITCHING VIA LINE VOLTAGE DECORA STYLE SWITCHES, SOME SIMPLE SWITCHES (s); OTHERS WITH MOTION SENSING (m), DIMMING (d), OR BOTH (md) AS NOTED. COMES WITH APPROPRIATE 3-WAY COMPANION (c) MODULES AS REQUIRED & NOTED. SUITABLE FOR DIMMING LED LOADS. EQUIVALENT TO LUTRON MS-OPSS, MACL-153M, OR MACL-OP153M. STAINLESS STEEL COVERPLATES THROUGHOUT.

- LEGEND:**
- SURFACE MOUNTED FLUORESCENT LIGHT FIXTURE.
  - LINEAR MULTI HEAD LIGHT FIXTURE OR TRACK.
  - LINEAR LED OR FLUORESCENT STRIP LIGHT FIXTURE.
  - CEILING SURFACE MOUNTED LIGHT FIXTURE.
  - CEILING RECESSED OR NEAR FLUSH LIGHT FIXTURE.
  - SCONCE/VANITY WALL SURFACE MOUNTED LIGHT FIXTURE.
  - EMERGENCY EXIT SIGN LIGHT.
  - EMERGENCY LIGHTING UNIT.
  - LINE VOLTAGE SWITCH.





KEY NOTES FOR POWER & AUXILIARY

- 1 TYPICAL: ONE 20A CCT ON ARC FAULT CIRCUIT BREAKER PER BEDROOM. 4 DECORA STYLE 5-20R RECEPTACLES LOCATIONS AROUND THE PERIMETER OF EACH SPACE FOR FLEXIBILITY. SINGLE DUPLEX AT FORECAST BEDSIDE LOCATION AND QUAD AT FORECAST DESK LOCATION.
- 2 TYPICAL: ONE COMBINATION SMOKE AND CARBON MONOXIDE ALARM WITH LOCAL 9V BATTERY BACKUP. WIRED TO ROOM 120V LIGHTING CCT. UNSWITCHED.
- 3 TYPICAL: TWIN RJ45 JACK FOR VOICE OR DATA USE; WIRED BACK TO HOUSE COMMUNICATIONS RACK.
- 4 TYPICAL: ONE 20A CCT PER BATHROOM WITH 1 DECORA STYLE 5-20R GFCI DUPLEX RECEPTACLE AT VANITY.
- 5 TYPICAL: ONE 208V-20A CCT AND SINGLE 6-20R RECEPTACLE FOR HEAVY DUTY MICROWAVE OVEN.
- 6 TYPICAL: WIRELESS ACCESS POINT. CAT6 CABLE TO LOCATION WIRED BACK TO HOUSE COMMS RACK. POWER SUPPLIED BY POE ON CAT6 CABLE.
- 7 SEE DETAIL 1 ON DETAILS SHEET.
- 8 SEE DETAIL 7 ON DETAILS SHEET.
- 9 CARBON MONOXIDE GAS DETECTOR TIED INTO CENTRAL F/A SYSTEM.

LEGEND:

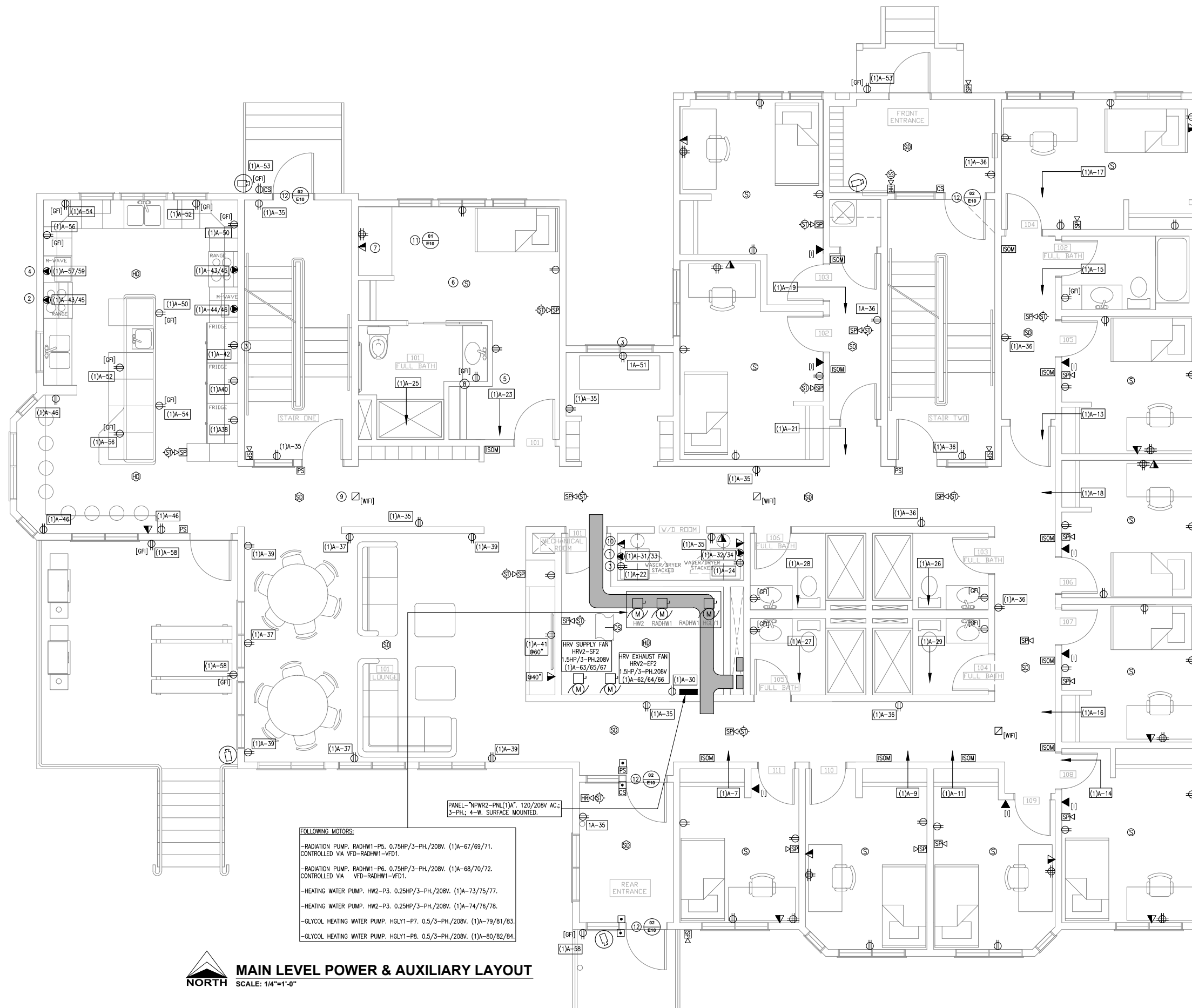
- ⊕ — 20A/120V AC NEMA TYPE 5-20R "T" DUPLEX OR QUAD RECEPTACLE (15A/120V AC NEMA TYPE 5-15R WHEN MARKED "NT"); TYPICALLY WALL MOUNTED.
- ⊖ — SPECIAL RATING RECEPTACLE OUTLET; WALL MOUNTED.
- ▽ — COMBO DATACOM OUTLET. TWO (2) RJ45 JACKS SUITABLE FOR VOICE OR DATA.
- — WIRELESS ACCESS POINT.
- ⊙ — COMBO SMOKE/CARBON MONOXIDE ALARM.
- ⊠ — DOOR OPERATOR BUTTON
- ⊞ — DOOR CARDSWIPE
- ⊡ — SURVEILLANCE SYSTEM CAMERA
- ⊞ — SMOKE DETECTOR
- ⊞ — TAMPER SWITCH
- ⊞ — FLOW SWITCH
- SPK — FIRE ALARM SPEAKER-STROBE
- SPK — FIRE ALARM SPEAKER
- EOLM — END OF LINE MODULE
- ISOM — ISOLATION MODULE
- FAAP — FIRE ALARM ANNUNCIATOR PANEL
- ⊞ — DUCT SMOKE DETECTOR
- ⊞ — HEAT DETECTOR
- ⊞ — CO GAS DETECTOR
- ▽ — FIRE ALARM PHONE

POWER & AUXILIARY NOTES

- (REFERS TO POWER & AUXILIARY DRAWINGS)
1. ABBREVIATIONS:
    - [T] — 20A NEMA 5-20R OR 6-20R "T" RECEPTACLE (IMPLIES 20A CCT BREAKER AS WELL)
    - [NT] — 15A NEMA 5-15R OR 6-15R "REGULAR" RECEPTACLE (IMPLIES 15A CCT BREAKER AS WELL)
    - [GFI] — GFCI RATED RECEPTACLE
    - [IG] — ISOLATED GROUND RECEPTACLE
  2. POWER RECEPTACLE NOTATION: [X-Y] DENOTES PANEL X (USUALLY ABBREVIATED), POWER CCT Y.
  3. UNLESS OTHERWISE NOTED ALL NEW RECEPTACLE/OUTLET BOXES FOR POWER AND DATACOM SHALL BE 12" AFF TO THE TOP.
  4. UNLESS OTHERWISE NOTED ALL STANDARD SINGLE, DUPLEX OR QUAD RECEPTACLES SHALL BE 15A/120V NEMA TYPE 5-20R "T" STYLE. WHEN RUN AS MBC, OVERSIZE HOMERUN NEUTRAL TO #10 AWG.
  5. ALL RECEPTACLES, INCLUDING DATACOM, AND COVER PLATES SHOULD BE STAINLESS STEEL.
  6. ALL RECEPTACLES SHALL BE LABELED AS TO PANEL AND CCT NUMBER.
  7. BRANCH CCT WIRING HOME RUNS TO BE EITHER BX IF FROM A SINGLE LOCATION (EG. BEDROOM POWER CCTS) OR WIRE IN CONDUIT IF CCT DISTRIBUTED WITH BX TAPS (EG. LIGHTING CCTS).

NORTH SCALE: 1/4"=1'-0" LOWER LEVEL POWER & AUXILIARY LAYOUT

POWER & AUXILIARY - MAIN LEVEL



KEY NOTES FOR POWER & AUXILIARY

- ① TYPICAL: ONE 120/208V-30A CCT AND SINGLE 14-30R RECEPTACLE FOR CLOTHES DRYER.
- ② TYPICAL: ONE 120/208V-50A CCT AND SINGLE 14-50R RECEPTACLE FOR ELECTRIC OVEN WITH RANGE TOP.
- ③ TYPICAL: ONE DEDICATED 120V-20A CCT AND SINGLE 5-20R RECEPTACLE FOR CLOTHES WASHER, REFRIGERATOR, OR FREEZER.
- ④ TYPICAL: ONE 208V-20A CCT AND SINGLE 6-20R RECEPTACLE FOR HEAVY DUTY MICROWAVE OVEN.
- ⑤ TYPICAL: ONE 20A CCT ON ARC FAULT CIRCUIT BREAKER PER BEDROOM. 4 DECORA STYLE 5-20R RECEPTACLES LOCATIONS AROUND THE PERIMETER OF EACH SPACE FOR FLEXIBILITY. SINGLE DUPLEX AT FORECAST BEDSIDE LOCATION AND QUAD AT FORECAST DESK LOCATION.
- ⑥ TYPICAL: ONE COMBINATION SMOKE AND CARBON MONOXIDE ALARM WITH LOCAL 9V BATTERY BACKUP. WIRED TO ROOM 120V LIGHTING CCT. UNSWITCHED.
- ⑦ TYPICAL: TWIN RJ45 JACK FOR VOICE OR DATA USE; WIRED BACK TO HOUSE COMMUNICATIONS RACK.
- ⑧ TYPICAL: ONE 20A CCT PER BATHROOM WITH 1 DECORA STYLE 5-20R GFCI DUPLEX RECEPTACLE AT VANITY.
- ⑨ TYPICAL: WIRELESS ACCESS POINT. CAT6 CABLE TO LOCATION WIRED BACK TO HOUSE COMMS RACK. POWER SUPPLIED BY POE ON CAT6 CABLE.
- ⑩ TYPICAL: TWIN RJ45 JACK FOR DATA USE; WIRED BACK TO HOUSE COMMUNICATIONS RACK. THESE LOCATIONS IN LAUNDRY ROOMS USED FOR ELECTRONIC LAUNDRY CYCLE PAYMENT SYSTEM.
- ⑪ SEE DETAIL 1 ON DETAILS SHEET.
- ⑫ SEE DETAIL 2 ON DETAILS SHEET FOR DOOR CARLOCK AND/OR OPENER SYSTEM.

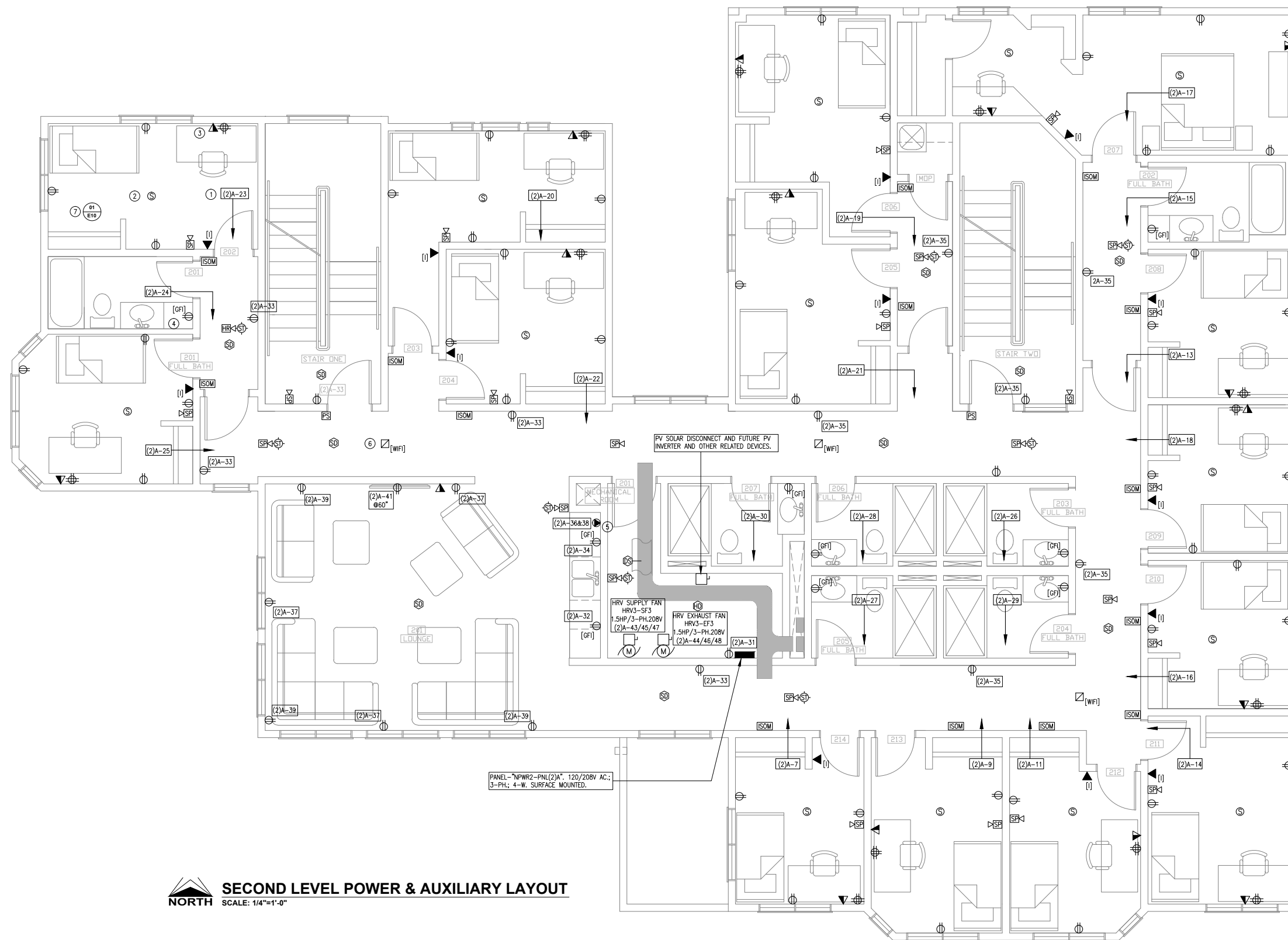
LEGEND:

- ⊕ ⊕ — 20A/120V AC NEMA TYPE 5-20R "I" DUPLEX OR QUAD RECEPTACLE (15A/120V AC NEMA TYPE 5-15R WHEN MARKED "NI"); TYPICALLY WALL MOUNTED.
- ⊕ — SPECIAL RATING RECEPTACLE OUTLET; WALL MOUNTED.
- ▽ — COMBO DATACOM OUTLET. TWO (2) RJ45 JACKS SUITABLE FOR VOICE OR DATA.
- ⊠ — WIRELESS ACCESS POINT.
- ⊕ — COMBO SMOKE/CARBON MONOXIDE ALARM.
- ⊕ — DOOR OPERATOR BUTTON
- ⊕ — DOOR CARDSWIPE
- ⊕ — SURVEILLANCE SYSTEM CAMERA
- ⊕ — SMOKE DETECTOR
- ⊕ — TAMPER SWITCH
- ⊕ — FLOW SWITCH
- ⊕ — FIRE ALARM SPEAKER-STROBE
- ⊕ — FIRE ALARM SPEAKER
- ⊕ — END OF LINE MODULE
- ⊕ — ISOLATION MODULE
- ⊕ — FIRE ALARM ANNUNCIATOR PANEL
- ⊕ — DUCT SMOKE DETECTOR
- ⊕ — HEAT DETECTOR
- ⊕ — CO GAS DETECTOR
- ▽ — FIRE ALARM PHONE

FOLLOWING MOTORS:  
 -RADIATION PUMP. RADHW1-P5. 0.75HP/3-PH./208V. (1)A-67/69/71. CONTROLLED VIA VFD-RADHW1-VFD1.  
 -RADIATION PUMP. RADHW1-P6. 0.75HP/3-PH./208V. (1)A-68/70/72. CONTROLLED VIA VFD-RADHW1-VFD1.  
 -HEATING WATER PUMP. HW2-P3. 0.25HP/3-PH./208V. (1)A-73/75/77.  
 -HEATING WATER PUMP. HW2-P3. 0.25HP/3-PH./208V. (1)A-74/76/78.  
 -GLYCOL HEATING WATER PUMP. HGLY1-P7. 0.5/3-PH./208V. (1)A-79/81/83.  
 -GLYCOL HEATING WATER PUMP. HGLY1-P8. 0.5/3-PH./208V. (1)A-80/82/84.

**MAIN LEVEL POWER & AUXILIARY LAYOUT**  
 NORTH SCALE: 1/4"=1'-0"





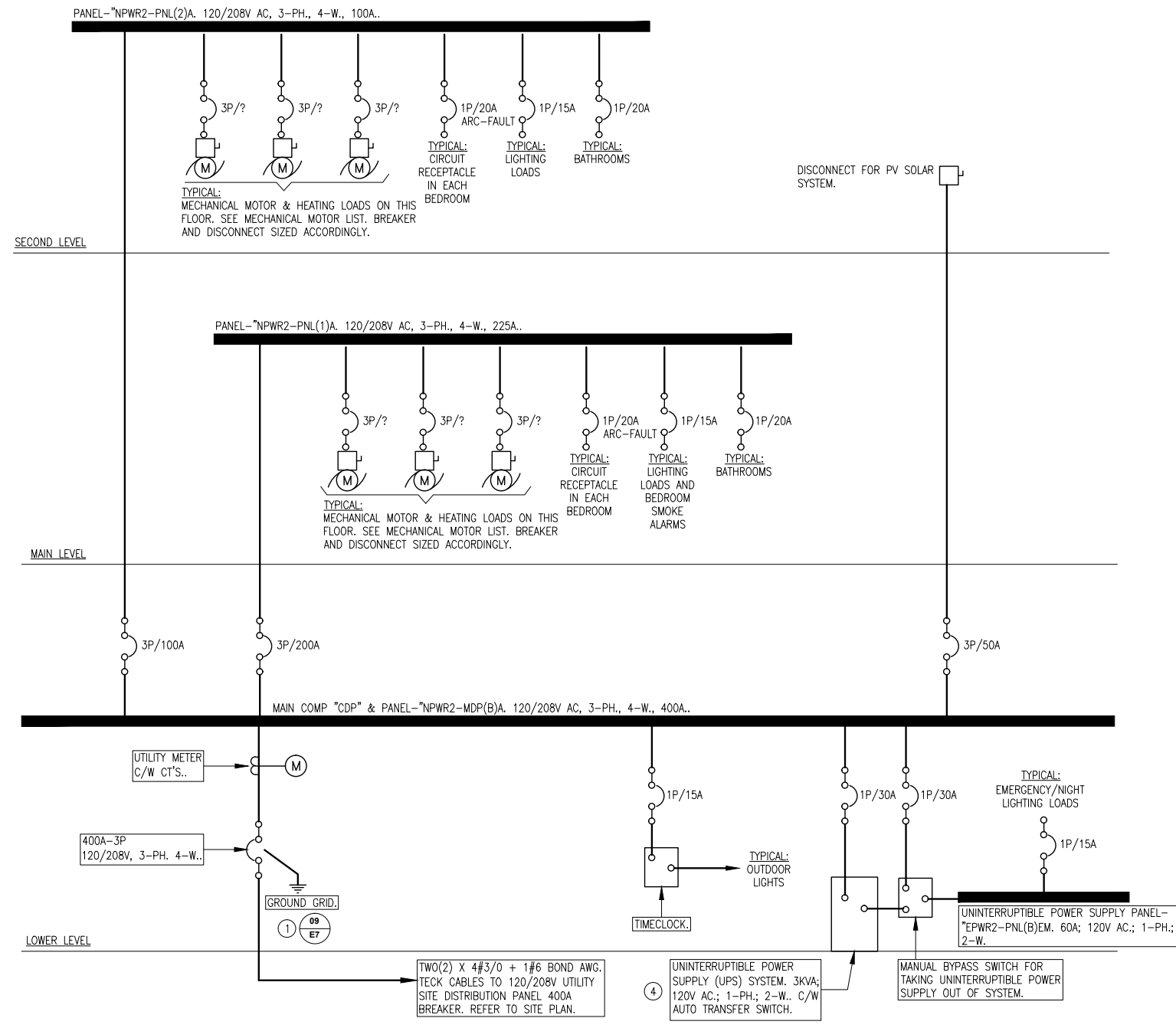
**SECOND LEVEL POWER & AUXILIARY LAYOUT**  
 NORTH SCALE: 1/4"=1'-0"

**KEY NOTES FOR POWER & AUXILIARY**

- ① TYPICAL: ONE 20A CCT ON ARC FAULT CIRCUIT BREAKER PER BEDROOM. 4 DECORA STYLE 5-20R RECEPTABLES LOCATIONS AROUND THE PERIMETER OF EACH SPACE FOR FLEXIBILITY. SINGLE DUPLEX AT FORECAST BEDSIDE LOCATION AND QUAD AT FORECAST DESK LOCATION.
- ② TYPICAL: ONE COMBINATION SMOKE AND CARBON MONOXIDE ALARM WITH LOCAL 9V BATTERY BACKUP. WIRED TO ROOM 120V LIGHTING CCT. UNSWITCHED.
- ③ TYPICAL: TWIN RJ45 JACK FOR VOICE OR DATA USE; WIRED BACK TO HOUSE COMMUNICATIONS RACK.
- ④ TYPICAL: ONE 20A CCT PER BATHROOM WITH 1 DECORA STYLE 5-20R GFCI DUPLEX RECEPTABLE AT VANITY.
- ⑤ TYPICAL: ONE 208V-20A CCT AND SINGLE 6-20R RECEPTABLE FOR HEAVY DUTY MICROWAVE OVEN.
- ⑥ TYPICAL: WIRELESS ACCESS POINT. CAT6 CABLE TO LOCATION WIRED BACK TO HOUSE COMMS RACK.. POWER SUPPLIED BY POE ON CAT6 CABLE.
- ⑦ SEE DETAIL 1 ON DETAILS SHEET.

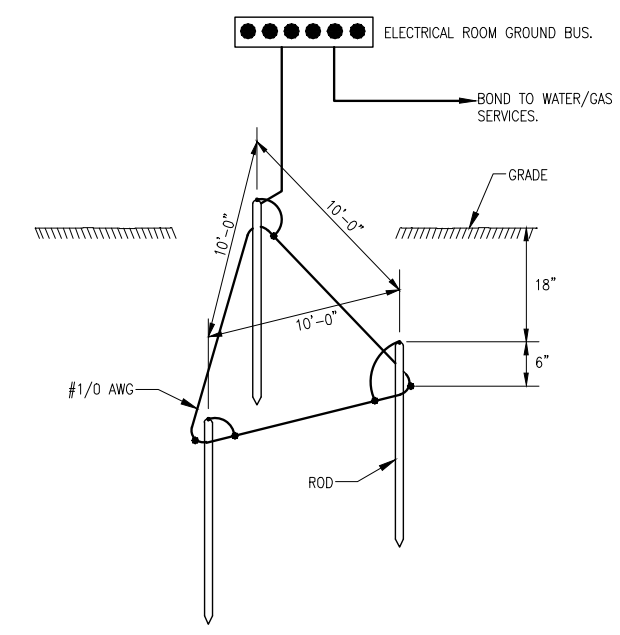
**LEGEND:**

- ⊕ — 20A/120V AC NEMA TYPE 5-20R "T" DUPLEX OR QUAD RECEPTACLE (15A/120V AC NEMA TYPE 5-15R WHEN MARKED "NIT"); TYPICALLY WALL MOUNTED.
- ⦿ — SPECIAL RATING RECEPTACLE OUTLET; WALL MOUNTED.
- ▽ — COMBO DATACOM OUTLET. TWO (2) RJ45 JACKS SUITABLE FOR VOICE OR DATA.
- ⊠ — WIRELESS ACCESS POINT.
- ⊙ — COMBO SMOKE/CARBON MONOXIDE ALARM.
- ⊠ — DOOR OPERATOR BUTTON
- ⊠ — DOOR CARDSWIPE
- ⊠ — SURVEILLANCE SYSTEM CAMERA
- ⊙ — SMOKE DETECTOR
- ⊙ — TAMPER SWITCH
- ⊙ — FLOW SWITCH
- SP-1 — FIRE ALARM SPEAKER-STROBE
- SP-1 — FIRE ALARM SPEAKER
- EOLM — END OF LINE MODULE
- ISOM — ISOLATION MODULE
- FAAP — FIRE ALARM ANNUNCIATOR PANEL
- ⊙ — DUCT SMOKE DETECTOR
- ⊙ — HEAT DETECTOR
- ⊙ — CO GAS DETECTOR
- ▽ — FIRE ALARM PHONE

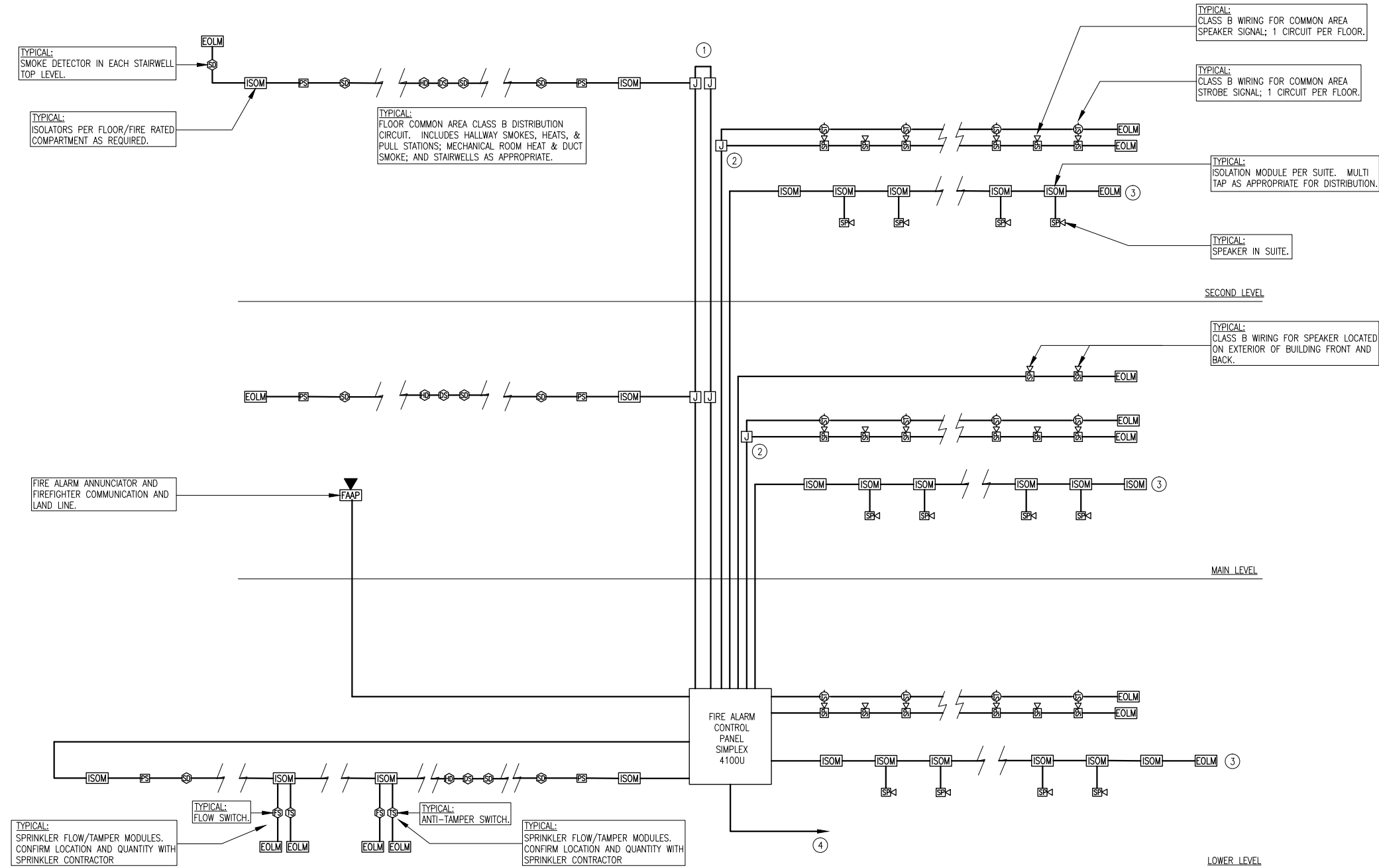


**POWER RISER DIAGRAM**  
 SCALE: (N.T.S.)

- KEY NOTES FOR POWER RISER & GND**
- SEE DETAIL 9 ON THIS SHEET.
  - GROUND ROD, COPPER CLAD, 3/4"X1120
  - GROUND ROD TO CABLE CONNECTOR, BURNDY CAT. #.YGLR29C34 OR APPROVED EQUAL.
  - UPS EQUAL TO 'APC' MINI-TOWER STYLE 3KVA-120V "SUA3000XL" WITH EXTERNAL BATTERY PAC "SUA48LBP" AND HARDWIRE KIT "SUA031". RUNTIME 30 MINUTES AT FULL LOAD, ~60M @ DESIGN LOAD OF ~1600W.



**09 GROUND ROD CLUSTER**  
 E-7 SCALE: (N.T.S.)



- ### KEY NOTES FOR FIRE ALARM RISER
- ① MAIN AND SECOND FLOOR INITIATING DEVICES WIRED AS HYBRID CLASS A RISER AND CLASS B FLOOR DISTRIBUTION.
  - ② TWO CIRCUITS TO THESE JUNCTION BOXES WITH SPEAKER AND STROBE WIRING.
  - ③ TYPICAL: ROOM SIGNALING DEVICES ON SEPARATE CIRCUIT AND CONFIGURED TO AUTO SILENCE AFTER 60 SECONDS AND THEN RE-ACTIVATE IN 10 MINUTES IF SYSTEM STILL IN ALARM STATE. SPEAKER STILL ACTIVE FOR FIRE FIGHTER COMMUNICATIONS AND MASS NOTIFICATION.
  - ④ CONNECTIONS TO UOFA CAMPUS F/A NETWORK VIA FIBRE OPTIC CABLE AND ANALOG LAND LINE.

### LEGEND:

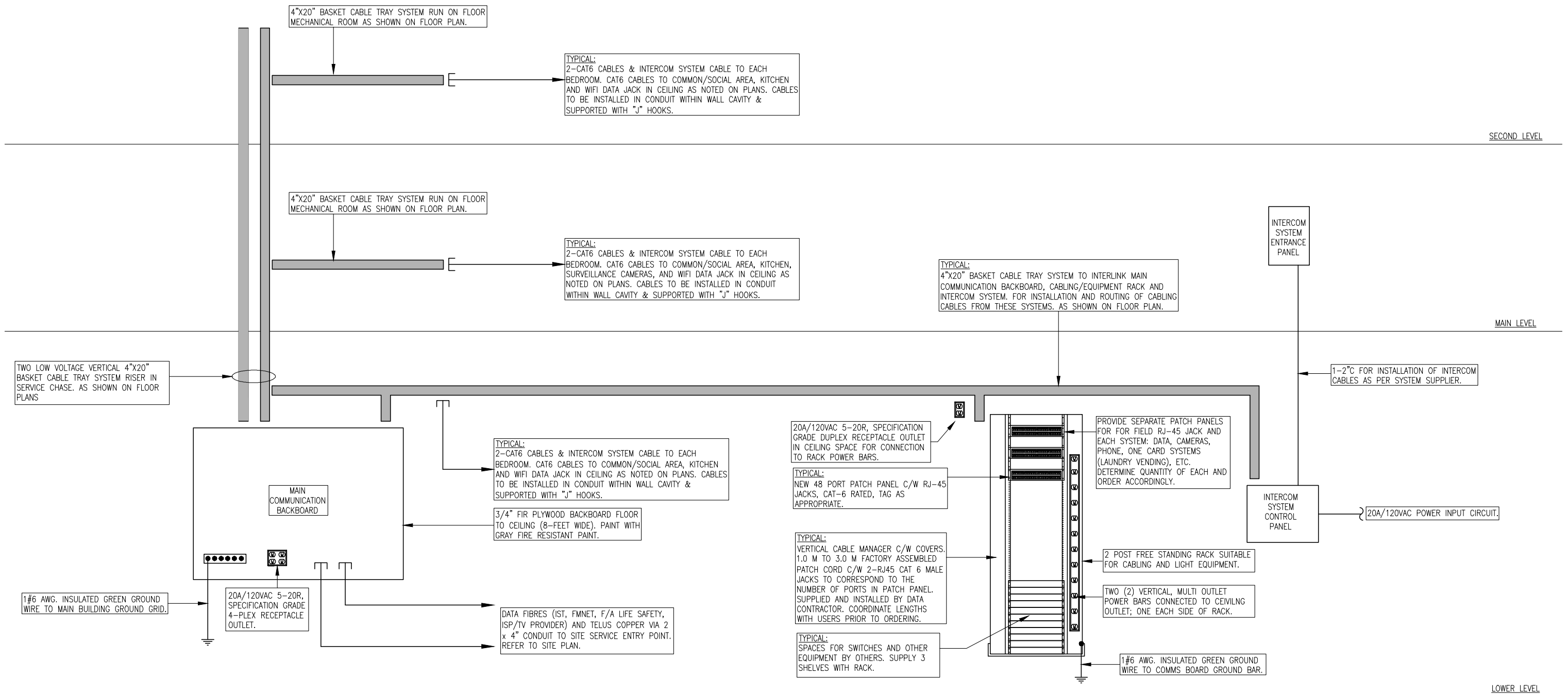
	PULL STATION
	SMOKE DETECTOR
	TAMPER SWITCH
	FLOW SWITCH
	FIRE ALARM SPEAKER-STROBE
	FIRE ALARM SPEAKER
	END OF LINE MODULE
	ISOLATION MODULE
	FIRE ALARM ANNUNCIATOR PANEL
	DUCT SMOKE DETECTOR
	HEAT DETECTOR
	CO GAS DETECTOR

- ### FIRE ALARM NOTES
- (REFERS TO FIRE ALARM RISER DIAGRAM ON THIS SHEET)
1. RISER IS FOR SCHEMATIC PURPOSES ONLY. REFER TO FLOOR PLAN DRAWINGS FOR DEVICES / MODULES QUANTITIES AND LOCATIONS.
  2. REFER TO MOTOR SCHEDULE FOR MECHANICAL INTERFACES SUCH AS DUCT DETECTORS, SHUTDOWNS ETC..
  3. SIZE AND LIMIT LOAD ON ALL INITIATING AND SIGNALING CIRCUITS TO ALLOW FOR THE FUTURE EXPANSION AND ADDITION OF DEVICES.

**FIRE ALARM RISER DIAGRAM**  
SCALE: (N.T.S.)



## COMMUNICATION RISER DIAGRAM



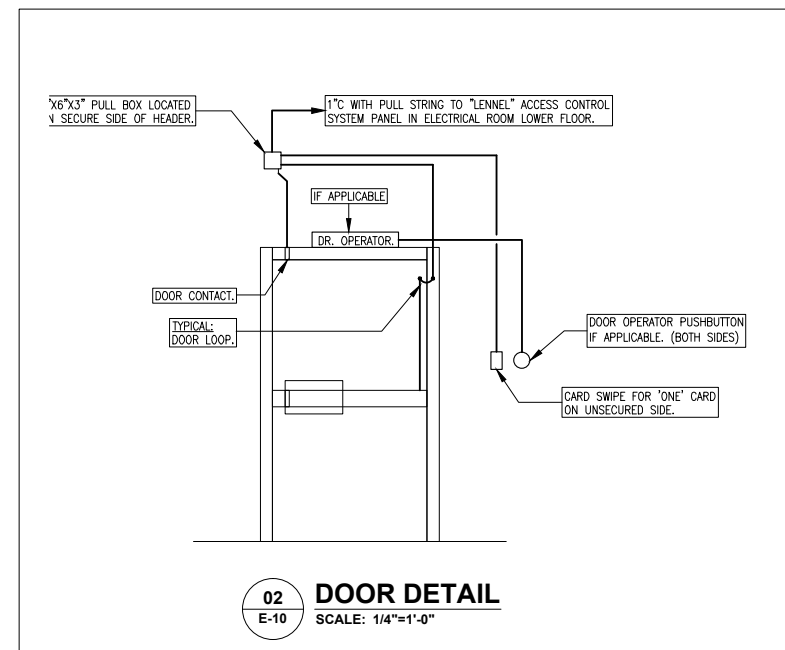
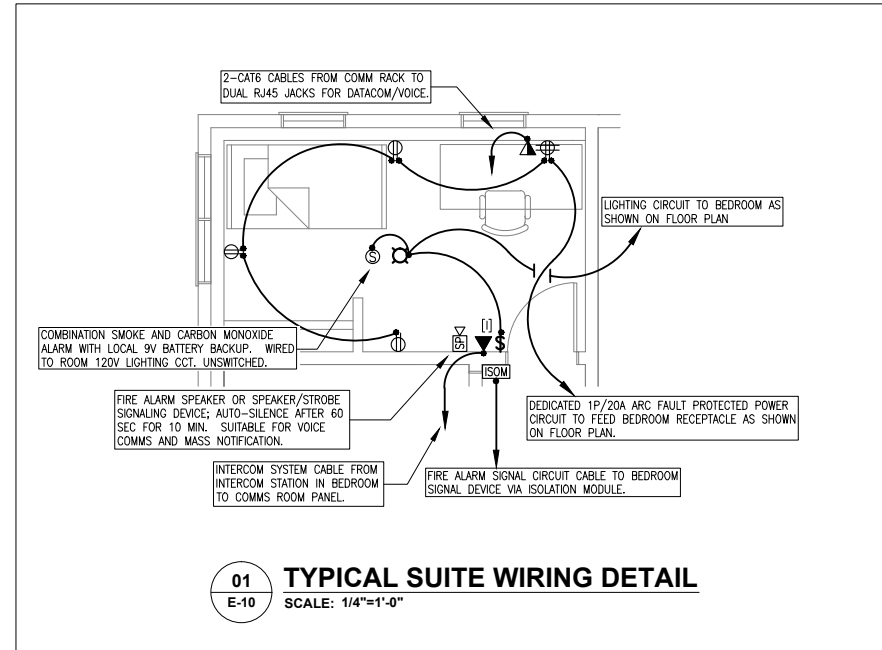
## DATACOM SYSTEM NOTES

(REFERS TO DATACOM RISER DIAGRAM ON THIS SHEET)

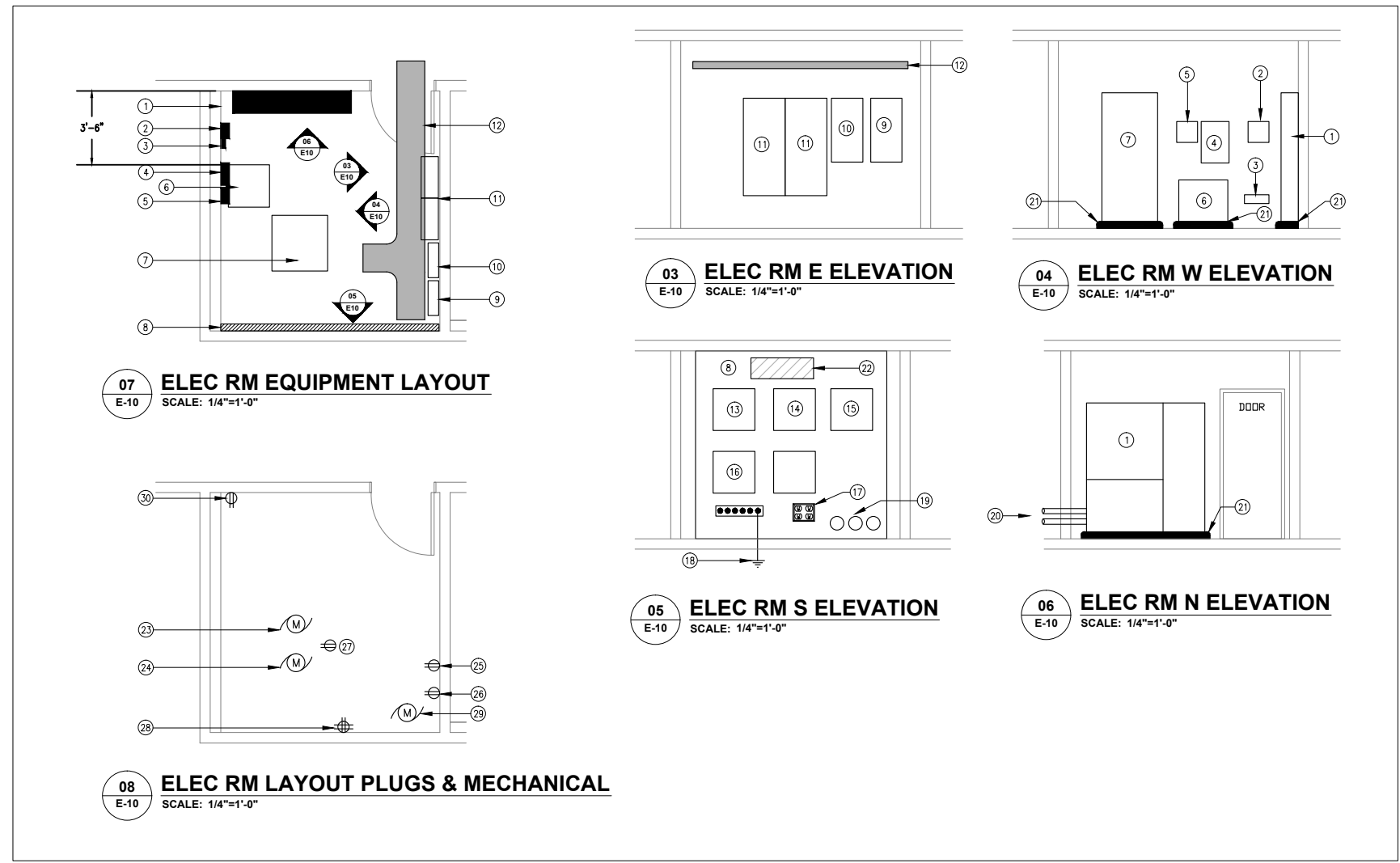
1. RISER IS FOR SCHEMATIC PURPOSES ONLY. REFER TO FLOOR PLAN DRAWINGS FOR DEVICES / MODULES QUANTITIES AND LOCATIONS.
2. ENSURE NO DATA CABLE LENGTH EXCEEDS 90M. PLAN ROUTING ACCORDINGLY AND CONFIRM PRIOR TO RUNNING CABLES.
3. PLASTIC TIE WRAPS ARE NOT PERMITTED FOR STRAPPING OF DATA CABLING. USE VELCRO STRAPS FOR STRAPPING.

## COMMUNICATION RISER DIAGRAM

SCALE: (N.T.S.)



- KEY NOTES FOR ELEC ROOM:**
- 1 PANEL-NPWR2-MDP(B)A. 400A; 120/208V AC; 3-PH; 4-W. SURFACE MOUNTED.
  - 2 HOUSE METER.
  - 3 BUILDING GROUND GRID.
  - 4 UPS EMERGENCY PANEL-EPWR2-PNL(B)EM. 60A; 120V AC; 1-PH; 2-W. SURFACE MOUNTED.
  - 5 MANUAL BYPASS SWITCH FOR TAKING UNINTERRUPTIBLE POWER SUPPLY OUT OF SYSTEM.
  - 6 UNINTERRUPTIBLE POWER SUPPLY (UPS) SYSTEM. 3KVA; 120V AC; 1-PH; 2-W. C/W AUTO TRANSFER SWITCH. SEE POWER RISER FOR DETAILS.
  - 7 CABLING AND EQUIPMENT FREE STANDING COMMS RACK.
  - 8 MAIN COMMUNICATION BACKBOARD. 3/4" FIR PLYWOOD BACKBOARD FLOOR TO CEILING (8-FOOT WIDE). PAINT WITH GRAY FIRE RESISTANT PAINT.
  - 9 INTERCOM CONTROL SYSTEM MAIN PANEL.
  - 10 LEVEL DOOR CONTROL AND VIDEO MONITORING SYSTEM PANEL.
  - 11 FIRE ALARM CONTROL SYSTEM PANELS.
  - 12 LOW VOLTAGE CABLE TRAY SYSTEM.
  - 13 F/A CABLE. FIBRE SPLITTER INSIDE A 16"x12"x7" SINGLE DOOR ENCLOSURE.
  - 14 FM NET CABLE INSIDE A 16"x12"x7" SINGLE DOOR ENCLOSURE.
  - 15 ICT FIBRE NET SPLITTER INSIDE A 16"x12"x7" SINGLE DOOR ENCLOSURE.
  - 16 300 PAIR BIX BLOCK FOR TELEPHONE CABLE.
  - 17 20A/120VAC TYPE -T, SPECIFICATION GRADE 4-PLEX RECEPTACLE OUTLET.
  - 18 1#6 AWG. INSULATED GREEN GROUND WIRE TO MAIN BUILDING GROUND GRID.
  - 19 THREE 4"DIA. DUCTS WITH MAIN SERVICES TELEPHONE CABLE, FM NET FIBRE, ICT FIBRE AND FIRE & LIFE SAFETY FIBRE CABLE FROM SITE SERVICE ENTRY POINT.
  - 20 TECK CABLES TO UTILITY 120/208V SITE DISTRIBUTION PANEL. SEE RISER FOR DETAILS.
  - 21 CONCRETE HOUSEKEEPING PAD.
  - 22 MECHANICAL AIR MAKE DUCT PENETRATION TO OUTSIDE.
  - 23 DEDICATED CIRCUIT (1P/15A) FROM PANEL-NPWR2-MDP(B)A TO FEED COOLING EXHAUST FAN MOTOR VIA THERMOSTAT.
  - 24 DEDICATED CIRCUIT (1P/20A) FROM PANEL-NPWR2-MDP(B)A TO FEED OVERHEAD CABINET HEATER UNIT VIA THERMOSTAT.
  - 25 DEDICATED CIRCUIT (1P/20A) FROM PANEL-NPWR2-MDP(B)A TO FEED LEVEL SYSTEM PANEL.
  - 26 DEDICATED CIRCUIT (1P/20A) FROM PANEL-NPWR2-MDP(B)A TO FEED INTERCOM SYSTEM PANEL.
  - 27 DEDICATED CIRCUIT (1P/20A) FROM PANEL-NPWR2-MDP(B)A TO FEED CEILING PLUG FOR COMMS RACK.
  - 28 DEDICATED CIRCUIT (1P/20A) FROM PANEL-NPWR2-MDP(B)A TO FEED COMMUNICATION BACKBOARD RECEPTACLE OUTLETS.
  - 29 DEDICATED CIRCUIT (1P/15A) FROM PANEL-NPWR2-MDP(B)A TO FEED SUMP PUMP PIT MOTOR.



**ROOM & DOOR DETAILS**  
SCALE: AS NOTED