676 Ferguson Ave., Ste. 6, Bozeman, MT 59718 – phone: (406) 586-4365 – fax: (406) 586-4366

W.K. DWYER SCHOOL BUILDING STRUCTURAL SYSTEM EVALUATION

PROJECT BACKGROUND

The W.K. Dwyer School Building is located on the West side of Anaconda, MT at 1601 Tammany St. The school served the community of Anaconda from completion of construction in the late 1950's to the mid 2010's when School Board budget constraints necessitated its closure. With the school currently vacant, a desire to transform the building into a community center has arisen. In support of this desire, Hicks Engineering has been hired to provide documentation of structural systems present, a conditional assessment of those systems, and any foreseeable modifications to these systems required to transform the building into a safe and serviceable community center.

Site observations performed indicate that the current building consists of multiple eras of construction, with initial construction commencing in the late 1950's. Initial construction efforts produced single level (at grade) classroom spaces with an attached gymnasium above a basement that contains additional classroom and mechanical support spaces. Later phases of construction include the addition of a modular building to the Southwest of the original construction and an integral maintenance shed added to the East of the classroom space (just north of the East Building entrance). To-scale plan view drawings of the facilities observed were produced by Garvin Engineering and provided to Hicks Engineering by Plan One Architects. These drawings can be found in Appendix A of this report.

Hicks Engineering's observations, conditional assessments, and structural recommendations for the areas of the Dwyer School observed are provided in the following sections of this report. It should be noted that the modular building (Southwest of the remainder of the structure) was not observed as part of these observations.

MAIN LEVEL CLASSROOMS

This portion of the structure (West of Room 127 [Existing Kitchen]) consists of approximately 16,500 s.f. (square feet) of single-story construction. No construction drawings were provided to show original details of construction such as roof and floor connections, foundations/concrete reinforcement, decking attachments and other information important in the structural assessment of the building. With the drawings provided in Appendix A being the only documentation of the construction received, it was not possible to determine if critical construction details were installed in accordance with the design documents. The following building element descriptions, conditions, and recommendations are primarily based on observations of structural elements exposed to view (not concealed by building finishes) made during the site visit by Hicks Engineering that occurred on January 18, 2024.

The area of the building discussed in subsequent sections is shown in the figure below:

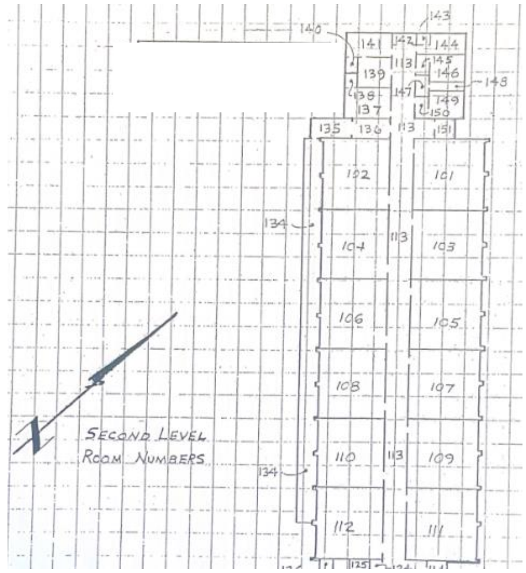


Figure 1- Main Level Classrooms (shown not to scale)

Item S1 – Foundation System

Description: The exterior foundations, below the Main Level Classrooms, were accessed from within a lower-level utility tunnel that runs the perimeter of the West section of the building (labeled Room 012 in Appendix A). From within this tunnel, it could be seen that the exterior foundations consist of 10”-thick concrete foundation walls with #3 bars @ 12” o.c. (on center) each way, centered in the wall. Foundation walls do not appear to have continuous footings beneath and were constructed as 10” wide x +/- 4’-6” tall continuous grade beams.

Small spread footings could be seen protruding beyond the wall’s base at masonry pilaster locations (above). Their width was measured as 28” (parallel to the wall), but given the one-sided access to the foundation wall, their overall dimensions could not be measured. Also coming off the bottom of the foundation walls were 12” wide grade beams that spanned the base of the utility tunnel, located between each pilaster footing location. These grade beams were spaced at roughly 15’-0” o.c. along the length of the tunnel and presumed to be bracing the bottom edges of the tunnel’s interior and exterior walls from sliding inward due to lateral earth pressure. Capping the tunnel and bracing the top of the walls was a +/- 6 ½” thick concrete slab on non-composite metal deck.

Interior to the building, foundations could not be observed due to the presence of flooring and a presumed slab-on-grade below. Size, location, and condition of these elements could not be observed.

Based on the observations performed, it was not evident if subgrade improvements had been performed prior to concrete wall / grade beam placement, or if the concrete foundation was cast on native soils.

Condition: Given their age, the exterior concrete foundation elements observed (walls, footings, and perpendicular grade beams) appeared to be in sound condition. The elements observed did not show signs of significant structural cracking, spalling, or other degradation that would indicate a loss in structural load-carrying capabilities. Despite the elements being in good condition, it is likely that due of the lack of a significant footing system below the foundations walls, the foundation system will produce excessive bearing pressures on the sub grade below relative to acceptable soil bearing capacity if analyzed under current building code requirements.

These observations of the exterior foundation systems could be indicative of similar as-built conditions at the interior of the building. When preparing to renovate this space, the project design should incorporate reinforcement details to mitigate issues associated with interior spread / continuous footings that could be undersized to resist the demands imparted by current design codes.

Although the concrete elements were in a serviceable state, the tunnel was notably cold and moist at the time of observation. This condition led to the formation of frost within the tunnel as shown in the photos at the end of this report. Presumably the atmospheric conditions that lead to this frost also contributed to the notable corrosion of the metal deck that was present on the roof of the tunnel.

Recommendations: When considering the repurposing of this structure, the design team should understand that the existing exterior foundations will likely require additional support. Post-installed helical piers with retrofit connections to the foundation walls / grade beams would be a minimally intrusive option when deployed at targeted discrete points around the exterior foundations. It is also recommended that the design team develop a plan to provide improved insulation and damp proofing to utility tunnel that wraps the building perimeter.

In anticipation of structural foundation bearing capacity issues at interior structural support lines, the design team should be prepared to indicate drilled and epoxy anchorage and cast in place concrete footing extensions to existing interior footings where necessary to support post load and bearing / shear wall reactions where present.

Item S2 – Floor Framing System

Description: Although unable to be observed due to the presence of flooring above, it is anticipated that the floor system for the main level classrooms consists of slab on grade construction.

Condition: As mentioned above, the main floor could not be directly observed at the time of this field observation. However, the general good condition of the tile flooring, without cracks or separations documented, above the structural floor system and the fair state of other floor slabs throughout the rest of the building indicates the structural floor system for this area is in acceptable condition if exposed.

Recommendations: Given the uncertainties associated with this portion of the building's construction, Hicks Engineering recommends that future site observations include minimally destructive observation where flooring sections are locally removed throughout this portion of the building. With sections of flooring removed, it is hoped that the following information could be obtained from future observations:

- Verification of presence of slab on grade concrete below Main Level Classrooms
- Thickness of slab on grade concrete and reinforcement installed (if present)
- General state of repair of this floor and suitability for reuse in future operations.

Item S3 – Shear Wall System

Description: With vertical demands from the roof framing (discussed in the subsequent section) supported by a post and beam system, wall framing is assumed to primarily resist lateral wind and seismic loads. In this portion of the building, a central corridor runs East/West along the length of the building creating a North bank and South bank of classrooms. It is anticipated that these interior corridor walls act as lateral-force resisting lines, despite the presence of window openings in the top third of the wall, continuously down the length of the hallway (cantilevered posts between windows likely provide lateral force transfer from the roof diaphragm to the solid shear walls below the aforementioned windows, below the dropped ceiling. Exterior building walls on the North Side of the Main Floor Classrooms possess intermittent solid wall panels that are likely acting as shear wall panels in the building's current configuration. Given the non-destructive nature of the observations performed, makeup of these walls was not verified, but it is anticipated that these walls consist of wood framing infilled between masonry pilasters. Building walls on the South side of the building largely consist of glazing, with small sections of solid wall at roof beam pilaster support locations that likely provide minimal lateral support to the building in the east/west Direction.

In the north/south direction, full-height demising walls exist between classrooms. These walls are present in both the North and South bays of classrooms at +/- 30 ft. o.c. These walls frame to the underside of glulam beams above at roof level and are assumed to act as shear-walls in the north-south direction. Given the non-destructive nature of the observations performed, the materials used for wall framing and sheathing were not determined at the time of this site observation.

Condition: Despite the minimal presence of lateral resistance in the East / West direction, no apparent damage (cracking) was noted in the exterior walls or interior finishes of the building elements thought to act as lateral elements in this direction.

Similarly, no damage was noted in the North / South classroom demising walls that are speculated to act as lateral resistance against North / South lateral loading.

Recommendation: Despite the satisfactory condition of the walls observed in the original Main Level Classroom construction, current building design practice and building codes require framed walls that are part of the lateral force resisting system to be to be sheathed with an approved material, attached with approved fasteners at regular intervals. The site of the Dwyer School Building is classified as Seismic Design Category C and is therefore required to possess such walls, detailed for seismic resistance. By selectively infilling existing wall openings with properly sheathed framing and creating a continuous line of framing along the tops of these exterior walls, they could be brought up to current standards and used to provide effective, code compliant lateral load resistance in the East / West direction.

Understanding that future use for this space may require larger volumes, it is possible that some of the North / South walls that currently act as classroom demising walls could be removed to accommodate these bigger spaces. However, wall removal would have to be done strategically and it is likely that the remaining North/South walls would need to be re-sheathed with a code compliant structural panel. It is also possible that hold downs and new foundations will be required below remaining walls.

<u>Item S4 – Roof Framing System</u>

Description: Site observations found that roof construction over classrooms 101 to 112 consists of tongue and groove 'Car Decking' (3x5 nominal) spanning East/West and bearing on the glulam girder framing lines at +/- 15'-0" o.c. The connection of decking to framing and adjacent decking sections was not observed during this observation. At exterior walls (North and South), [7"-wide] glulam girders appear to bear on masonry pilasters or columns contained within exterior walls and cantilever beyond the exterior wall, creating a +/- 5'-0" long roof overhang. At the interior of the building, [7"-wide] glulam girders span to wood posts that reside within the interior corridor walls of Hall 113. Near the middle of the glulam span (within classrooms) two smaller [3 ¼"-wide] glulams span between framing lines. At the time of observation, it was not evident what these additional beams were intended to support. Over the hall, [7"-wide] tapered glulams rest in notches created in the beam ends at the North and South of the hallway and support the car decking above. A figure depicting this framing system can be found in Appendix B. This framing system produces a roof profile that slopes 1 ½: 12 from the eave cantilever on the North and South sides of the building up to a ridge that is centered over Hall 113. Above the roof framing resides an unballasted membrane roofing system.

To the North and South of the main bank of classrooms (101 to 112) roof construction is similar, with glulam beams supporting car decking above, but roof slopes are flat and framing supports a ballasted roof system consisting of 1-2" of 1" nominal natural gravel.

Condition: Where visible, the roof decking and framing did not show significant signs of degradation or structural distress. Beams witnessed were free of splits, large checks, and water damage within the building envelope. Where cantilevered glulam ends extended outside the building, they were painted with a thick coating that appeared to be effective in shielding them from damage incurred by the elements, but some minor water damage was present on the beam ends extruding from the building.

Preliminary calculations were performed on the main glulam girders and show that these members could be around 30% overstressed and exceeding code mandated deflection limits when subjected to design dead loads of 15 psf (pounds per square foot) and snow loads of [35 psf]. Similar calculations were performed on the car decking above these glulams and found that it could be overstressed by as much as 15% under similar design loads.

Only small portions of the interior posts supporting these main glulam girders were visible at the time of observation, but no degradation of these elements was witnessed. Preliminary calculations were run on these members and it was found that these members were highly utilized but not overstressed under design dead and snow loads. It should be noted that assumptions on material species and grade (Douglas Fir, Grade 24F-V4) were necessary to perform these calculations and future findings could alter the results of the calculations performed if our assumptions were incorrect.

Recommendation: It is recommended that as this project progresses, additional investigations be performed to verify the assumed condition of members of the structural systems. These investigations should also look to more accurately determine the size, species, and grades of materials that make up the system to allow for more accurate determination of structural capacities. These observations should also aim to determine the interconnection between sections of car decking and the suitability of this decking for use as a diaphragm at roof level.

Based on the conditions observed and preliminary calculations performed, it appears that the roof framing system is able to support significant portions of the imposed loads. With this being the case, it is recommended that this framing be utilized to the greatest extent possible and reinforced with additional members or components as necessary to meet the final design intent. These reinforcements could include the addition of new girders (where required to cut down deck span) and reinforcement of existing girders with steel plate or other wood members strategically placed and connected thereto that increase load carrying capacity.

Understanding it is likely desired to open up the space within these classrooms to meet future design intent, it may be necessary to install steel transfer beam/column systems at interior column locations currently present along the interior walls of Hall 113. The location and size of these systems will need to be coordinated with final design and it is likely that additional / enlarged foundation elements will be required beneath these transfer framing systems.

GYM AND BASEMENT LEVEL

This portion of the structure consists of an approximately 4,600 s.f. gymnasium and stage structure (Rooms 128 and 129, respectively, in Appendix A), an approximately 900 s.f. kitchen space (Room 127 in Appendix A), and an approximately 1,600 s.f. of janitorial / ancillary support space North of the gymnasium (Rooms 113-122 in Appendix A). Except for Room 122, a full basement exists below this portion of the structure. With the drawings provided in Appendix A being the only documentation provided to us of the construction observed, it was not possible to determine if critical construction details were installed in accordance with the design documents. The following building element descriptions, conditions, and recommendations are primarily based on observations of structural elements exposed to view (not concealed by building finishes) made during the site visit by Hicks Engineering that occurred on January 18, 2024.

The area of the building discussed in subsequent sections is shown in the figures below:

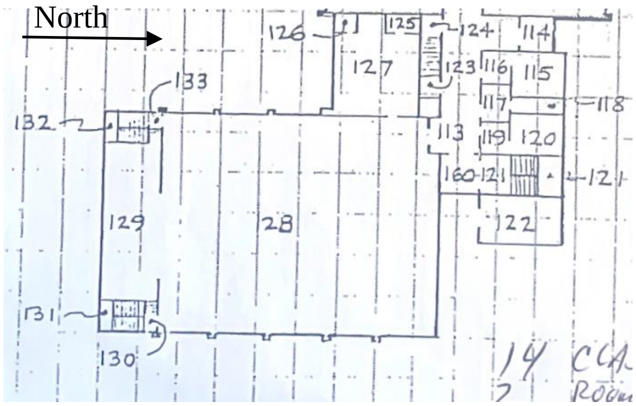


Figure 2 - Gym Area Main Level (shown not to scale)

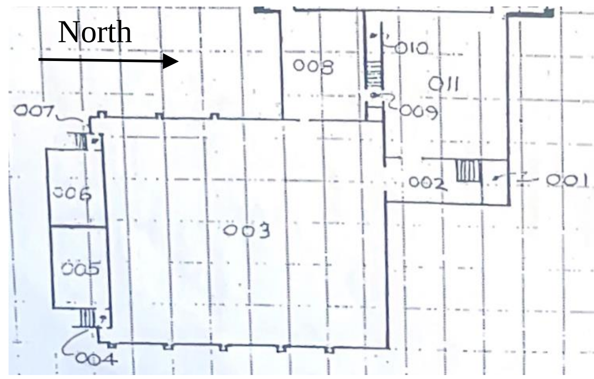


Figure 3 - Gym Area Basement (shown not to scale)

<u>Item S5 – Foundation System</u>

Description: At the time of observation, access to foundation systems within this portion of the structure was limited. However, it was determined that basement foundation walls were constructed of cast in place concrete. As part of the observations performed, a rebar locator was run across the foundation walls and the indicator showed the presence of reinforcing steel in the walls. Locations and spacings of bars within the wall were sporadic and the equipment utilized was unable to determine reinforcing steel size. With this information, it is reliably ascertained that the concrete foundation walls possess reinforcing steel, but size, spacing, and grade of this reinforcement is unknown.

With the basement walls being placed below grade and the presence of flooring / concrete slabs-on-grade in the basement space, footings below basement foundation walls and structural columns (if present) could not be observed at the time of this observation.

Foundations below Room 122 support single level construction above. With the presence of site grading around this room, foundations below could not be observed at the time of this observation.

Condition: Where foundation walls were continuous from floor to ceiling (in the basement area), these walls appeared to be in good condition with a few sporadic cracks that were of little concern. Where openings were present in the foundation wall systems (at mechanical penetrations and door openings) cracks were often seen running at 45 degrees from the corners of wall openings or in vertical orientations, up the height of the wall. Cracks in these orientations and locations are typically of less concern than cracks running horizontally along a wall that would indicate a flexural failure of the foundation wall as it works to resist lateral soil pressures from the outside.

Due to our inability to observe footing systems below this portion of the structure, the condition of these elements could not be determined as part of the observations performed.

Recommendation: Given the minimal reinforcing steel witnessed in the foundation walls below the Main Level Classrooms, it is possible that cracks witnessed are the result of inadequate shrinkage and temperature reinforcement in the basement foundation walls and are of minimal structural concern. However, without documentation on the existing reinforcement contained within the foundation walls, it will be difficult to determine with certainty if the cracks witnessed in the foundation walls are the result of structural deficiencies.

If future plans for reuse of this building include use of the basement contained within these foundation walls, it will be necessary to better understand the construction of the buildings foundation system (concrete foundation walls, continuous [strip] footings, and spread footings at column locations). The best-case scenario would be to locate design drawings for the structure that would provide insight into the reinforcement contained within the foundation elements, design concrete strengths utilized to construct the foundations, and size and location of foundation elements. However, if this data cannot be obtained from existing documentation, it is recommended that the design team work with ownership to develop a testing and observation protocol to determine the following unknowns:

- Size and extent of footing and foundation wall systems below the structure
- Grade, size, spacing, and layout of reinforcement within these elements
- General condition of currently unobserved elements.

Portions of this plan may include additional non-destructive testing, such as further mapping of reinforcing steel elements within foundation elements using more-sensitive rebar locating devices than available during our initial site visit to determine typical reinforcing steel layouts. Other portions of this plan may require destructive testing such as obtaining concrete cores to determine concrete strength and reinforcing steel sizes and grades. With the results of these tests a much clearer understanding of the structural adequacy of this portion of the structure can be obtained and clearer recommendations for reuse can be provided. With the limited information available, no clear recommendations for reuse of these foundation systems can be provided. Although in general, our professional opinion is the existing foundation system is serviceable and capable of continued use as long as load demands aren't significantly increased.

Item S6 – Floor Framing Systems

Description: The structural floor system at the lower level (basement) of the building consists of a concrete slab-on-grade. The floor system for the upper level (at grade) consists of presumably precast concrete "Longspan Channel Slab" planks spanning between lines of +/- approximately 18"-wide x 14" deep either pre-cast or cast-in-place concrete beams supported on +/- 12" diameter concrete columns. It is anticipated that a concrete topping slab was poured over the top of the precast planks, due to the presence of concrete seepage in the joints between planks. However, the thickness of this topping was not determined as part of these observations.

Above basement Room 003, the aforementioned concrete planks span East / West from exterior foundation walls to two interior concrete beam / column lines that are each located +/- 17'-4" from exterior foundation walls with a +/- 17'-4" spacing between these two beam / column lines. This creates three plank-spans across the floor of the gym. A figure, depicting this framing system, can be found in Appendix C and a representation of the concrete planks can be found in the figure below.

Longspan Channel Slab (Source: Structural Precast Company)

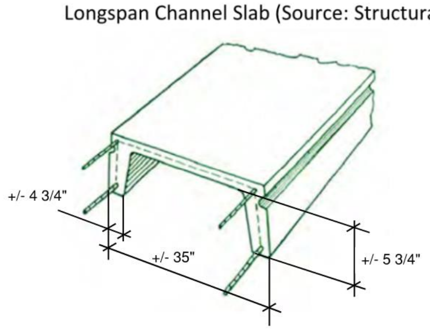


Figure 4 – Longspan Channel Slab Plank Figure

Above Room 008 the aforementioned concrete planks span North / South to wall lines that reside on the North and South sides of the room. Above Room 011 these same style of planks span North / South and are supported by concrete foundation walls on the North and South sides of the room and at an interior concrete beam / column line (similar to those in Room 003) that resides +/- 19'-6" off the North wall of room 011.

Condition: Where visible in the mechanical spaces of the basement area, the slab on grade floor system showed minor cracking, but appeared to be serviceable for reuse. Where observed, the upper floor planks appeared to be free of any signs of structural distress (Cracking and spalling). Similarly, the beams and columns providing support at interior locations appeared to be free of cracking or other signs of structural inadequacy.

Recommendation: Although the structural floor systems observed appeared to be in sound condition, it is difficult to determine if the elevated (main level) floor system would be adequate to support design level loading of 100 psf (assembly-level live loads required for Recreation Center use). It is apparent that this reinforced concrete floor system contains reinforcing steel, but without existing design drawings the size, location, and grade of this reinforcement could not be determined at the time of observation. Without information on concrete strength and reinforcing steel, structural calculations to determine the load carrying capacity of these elements cannot be performed. The best source of information to aid in future calculations would be the existing drawings for this portion of the structure. If these drawings cannot be found, it is recommended that future efforts to determine the suitability of reuse include the development of a plan to obtain additional information on concrete strengths used in these systems and locations and size and grades of reinforcing steel by means of additional observations and possible localized destructive testing. See Item S5 discussions for additional information.

Item S7 – Bearing / Shear Wall System

Description: Above grade, site observations found that exterior gym walls are constructed of CMU (Concrete Masonry Units) with pilasters on East and West walls, supporting glulam roof girders. Field measurements show that this CMU was 8" nominal and with information obtained from the reinforcing steel locating tool, horizontal joint reinforcement was found approximately 16" o.c. Efforts to locate vertical reinforcing steel with this equipment did not show the presence of vertical reinforcing steel within these walls (although unverified vertical reinforcement may be present). East and West gym walls are divided into (6) sections of wall bounded by the masonry pilasters. The Northern and Southern-most sections of wall are full height CMU and the interior (4) sections of wall appear to have CMU terminating at approximately 2/3 of the wall height with infill / EIFS (Exterior Insulation Finish System) in the upper third.

North of the gym, bearing / shear walls supporting the lower roof appeared to be of similar construction to the walls observed in the Main Level Classroom space. With a variation of brick color and full height masonry joints around Room 122, it appears that construction of this room may be of a later era than the rest of the building.

Condition: With the exception of Room 122's exterior walls, observation of the main wall systems around this portion of the structure produced no visible signs of cracking or other degradation. As a result, the condition of the gym's primary building walls observed appeared to be satisfactory.

The exterior walls around Room 122 showed signs of potential settlement. Issues observed include cracking and subsequent repair of veneer mortar joints on the room's East wall. On the room's North wall, a gap of varying thickness is present between the top of the veneer and the roof decking above, indicating possible differential foundation settlement.

Recommendation: Although the condition of the walls observed around the gym appeared satisfactory, current building design practice and building codes require special detailing and reinforcing steel patterns for CMU shear walls. Therefore, Hicks Engineering recommends a full seismic analysis be performed on this portion of the building to determine lateral force resisting requirements. It is likely that these analyses will determine that additional lateral force resisting elements, meeting code required detailing, be added to supplement the lateral force resisting system. These elements may come in the form of additional wood or CMU wall segments or braced frames placed immediately adjacent to the existing walls.

Given the height (and weight) of the walls bounding the gym and the apparent lack of vertical reinforcement within, further structural analyses may require strengthening of the walls to resist out-of-plane seismic and wind forces and additional connection components to attach the tops of these walls to the roof diaphragm above. Multiple options exist for bolstering the walls, including the construction of a secondary support wall (interior or exterior) to the existing walls, or the strategic addition of FRP (Fiber Reinforced Polymer) reinforcing strips to the existing wall structure.

Given the presence of differential settlements observed around the exterior walls of Room 122, it is possible that foundations beneath these walls are inadequate to resist the loads imparted. Future renovations of this building should investigate the need for foundation reinforcement below this portion of the building. These strengthening efforts may include the addition of helical piers, as discussed in item S1.

Item S8 –Roof Framing System

Description: The existing roof framing system for this portion of the structure is similar to the Main Level Classroom roof system. Tongue and Groove Car Decking (3x5 nominal, assumed) appears to span North/South between 8 ¾” tapered glulam girders that bear on CMU pilasters present in the CMU walls. Glulam members taper from +/- 21” deep at bearing points on supporting CMU pilasters to +/- 30” deep at roof ridge. At the time of observation, access to the top side of the roof was not possible and observations were made from the underside, within the building. A figure depicting this framing system can be found in Appendix C.

Condition: The condition of the gym roof framing and ceilings observed appeared to be satisfactory. No other cracking or serviceability issues appeared to be present in the remainder of this portion of building at the time of our visit to the site. Despite the lack of visual distress in the roof framing system, preliminary calculations show that roof framing elements (deck and glulam girders) could be overstressed by as much as 10% under design level loading.

Similar to the gym roof, lower roofs (to the North and West of the gym) did not show visual signs of structural distress in the areas observed. However, given the likelihood of drifts collecting on these lower roofs and observation of other roof member overstress in preliminary calculations, it is probable that roof framing members in these sections of the building would be overstressed when subject to design level loading.

Recommendation: Given the observed overstress in roof framing shown preliminary calculations, it is possible that existing roof framing will require strengthening efforts to resist the design level loading mandated by current codes. This strengthening could come in the form of the addition of supplementary framing members and / or the addition of steel plates or additional wood sections to be added to the existing members.

In conjunction with the seismic analysis recommended in the previous item, various blocking, strapping, and other lateral force transfer connection elements may be required to update the roof framing system to meet current building code requirements.

Item S9 – Northwest Gym Chimney

Description: On the Northwest corner of the gym, there exists a clay brick chimney that extends from the lower roof system below to +/- 7’-0” above the upper gym roof.

Condition: In the lower reaches of the chimney, the existing brick appears to be in sound condition. However, higher up on the chimney the brick appears to be deteriorating, with portions spalling away and efflorescence present above the upper gym roof level. The presence of reinforcing steel within the masonry was not verified at the time of observation.

Recommendation: In Hicks Engineering’s experience, masonry chimneys constructed in this era are often unreinforced and present a risk of collapse in seismic event. It is recommended that future design efforts aim to remove this chimney from the structure or provide sufficient strengthening to sufficiently adhere the chimney to the structure to preclude the danger of collapse onto lower levels in a seismic or wind event.

W.K. DWYER SCHOOL BUILDING
STRUCTURAL EVALUATION PHOTOS

MAIN LEVEL CLASSROOMS

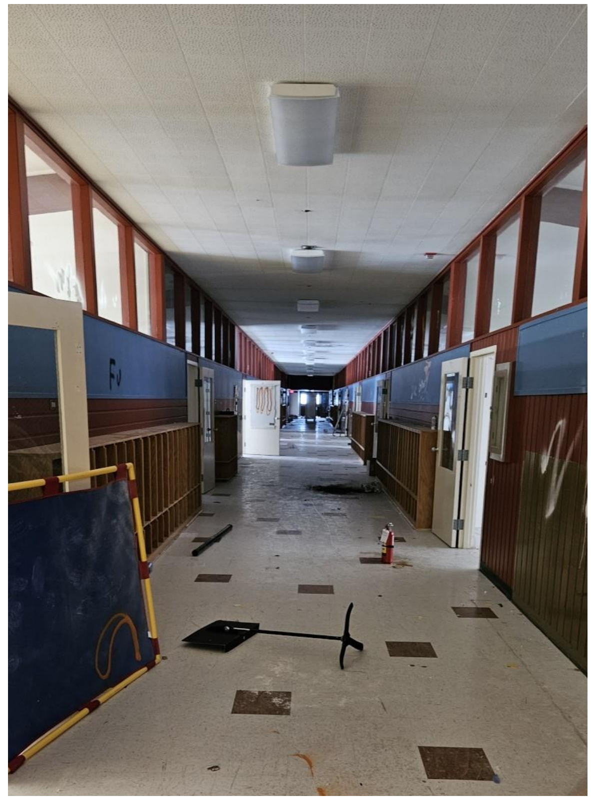
Item S1 – Typical Main Level Classroom Foundation wall. Reinforcing steel protruding from wall.

Item S1 – Typical Main Level Foundation wall base. No continuous wall footing present.

Item S1 – Typical spread footing below masonry pilaster at Main Level Classrooms.

Item S1 – Typical utility tunnel around exterior of Main Level Classroom space. Grade beam tie between foundation walls beyond.

Item S1 – Frost and deteriorating metal deck over utility tunnel located around perimeter of Main Level Classroom space.

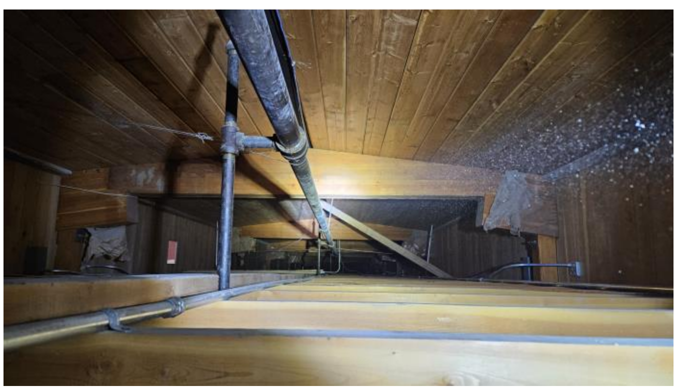

Item S3 – Main Level Classroom interior corridor, looking West. Note continuous windows in top reaches of walls.


Item S3 – South exterior wall line of Main Level Classroom space. Limited full height wall present on this line.


Item S3 – North exterior wall line of Main Level Classroom space. Full height walls present between window openings.

Item S4 – Typical roof framing observed from within classroom space.

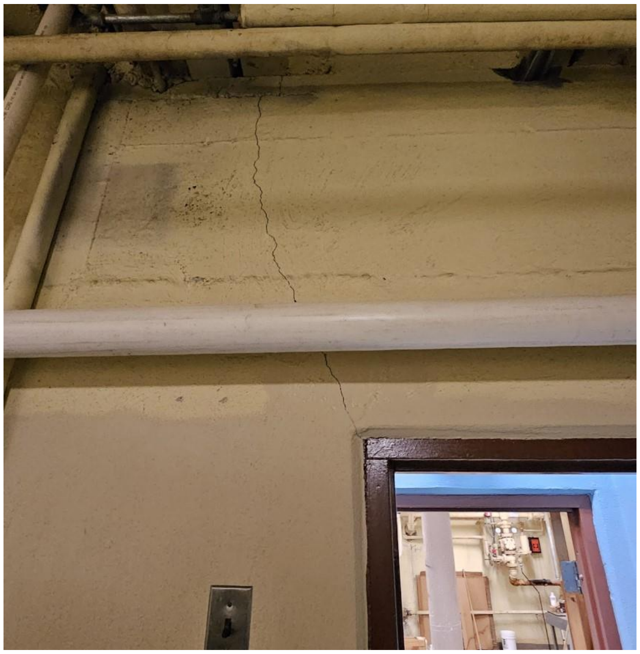
Item S4 – Typical roof framing cantilever outside Main Level Classroom space.



Item S4 – Typical Roof Framing over Main Level Classroom Hall 113.

Item S4 – Classroom roof beam support and hallway beam connection at edge of Hall 113.

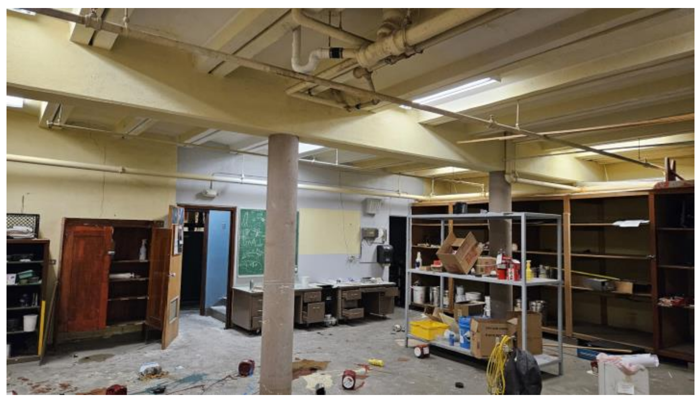
GYM AND BASEMENT LEVEL



Item S5 – Typical foundation wall crack at door opening.

Item S5 – Typical foundation wall crack over cabinet in room 011

Item S6 – Typical gym floor construction above Room 003 at interior beam / column bearing line.



Item S6 – Typical floor construction above Room 011. Precast Longspan Channel Slab planks spanning to interior beam / column line.


Item S7 – View of gymnasium, looking North from stage.


Item S7 – North half of East gym wall. Full height CMU wall section can be seen to left with partial-height infill shown (3) bays to the right.

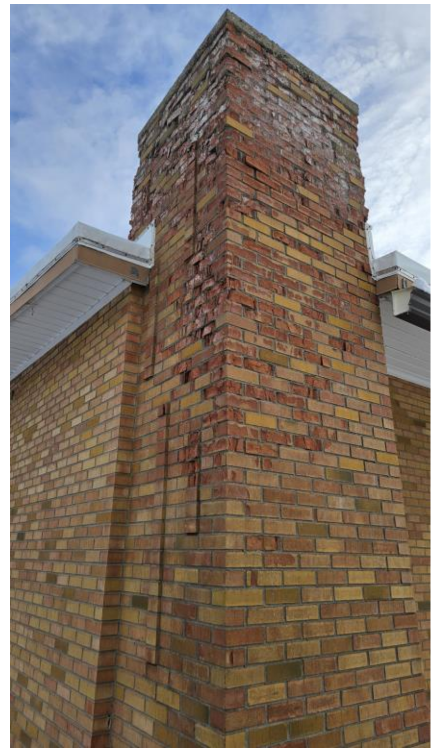

Item S7 – East Wall of Room 122. Damaged and subsequently repaired mortar joints can be seen.


Item S7 – Masonry joint on north wall of Room 122. Variation in brick and differential movement can be seen between left wall (Room 122) and right wall (Stair 121).


Item S7 – Top of Room 122 North wall. Gap between top of wall and roof deck varies in depth.


Item S8 – Typical gym roof framing. Car decking spanning between tapered glulam girders that reside on CMU pilasters.

Item S8 – Ballasted lower roof, North of upper gym roof.

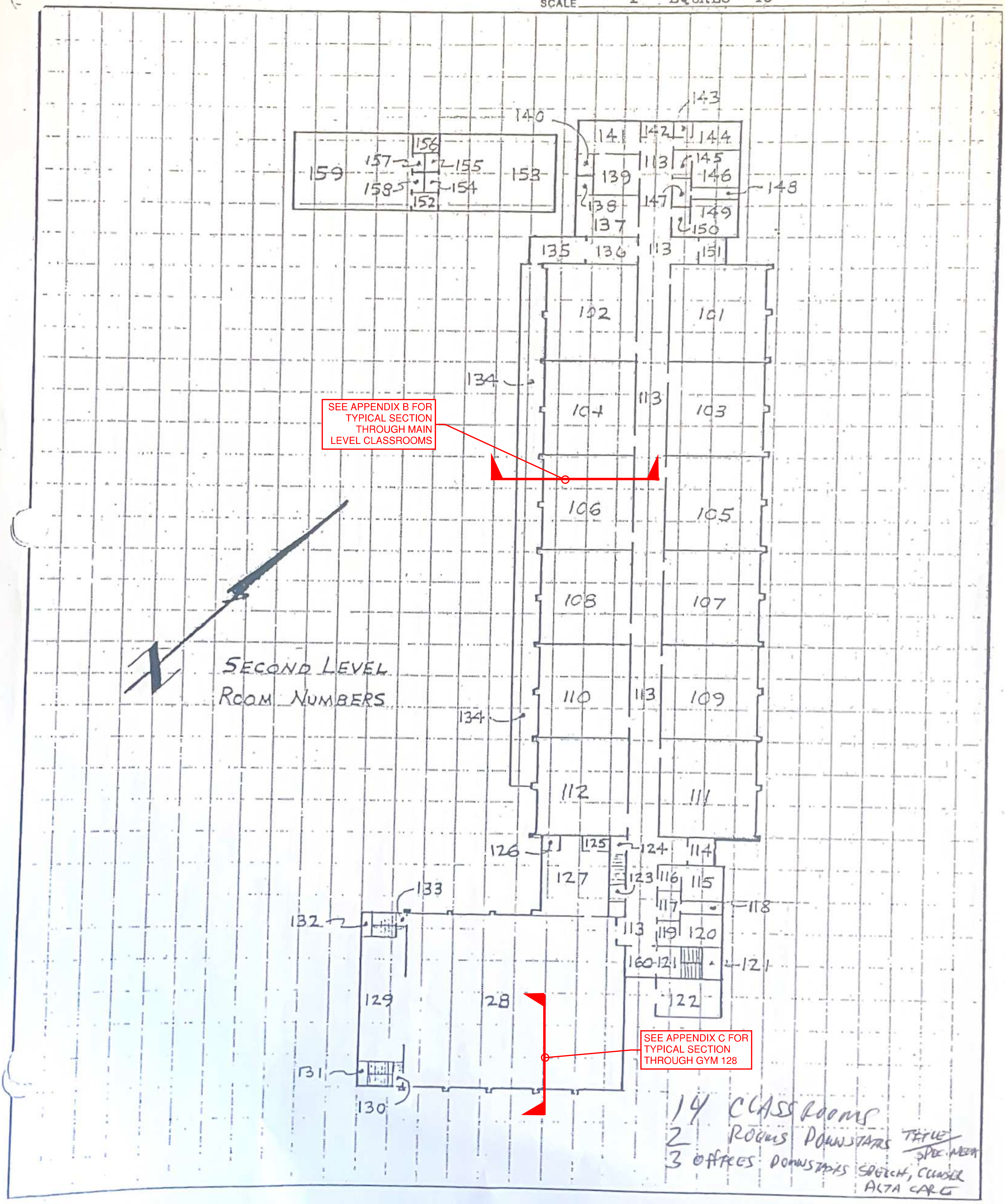


Item S9 – Deteriorating brick chimney at Northwest corner of gym roof.

APPENDIX A – EXISTING BUILDING DRAWINGS

GARVIN ENGINEERING
HELENA, MONTANA

JOB: DWYER SCHOOL - ANACONDA
SHEET NO.:
OF:
CALCULATED BY: WHG
DATE: 5 JUL 88
CHECKED BY:
DATE:
SCALE: 1" EQUALS 40'



GARVIN ENGINEERING
HELENA, MONTANA

JOB: DWYER SCHOOL - ANACONDA

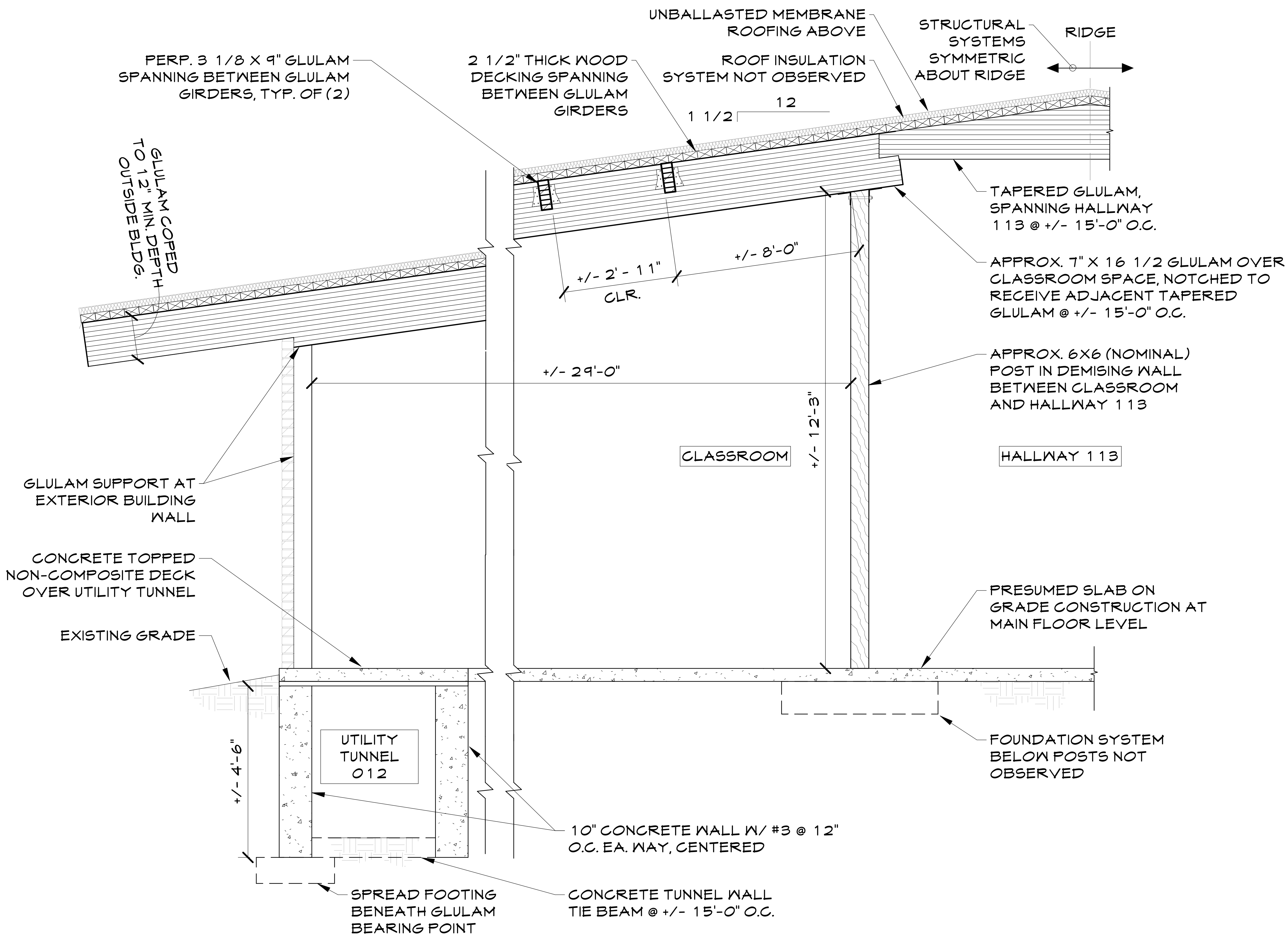
SHEET NO. ______ OF ______

CALCULATED BY: WHG DATE: 6 JUL 88

CHECKED BY: ______ DATE: ______

SCALE: 1" EQUALS 40'

APPENDIX B – MAIN LEVEL CLASSROOM FRAMING SECTION



NOTE: SECTION IS NOT TO SCALE

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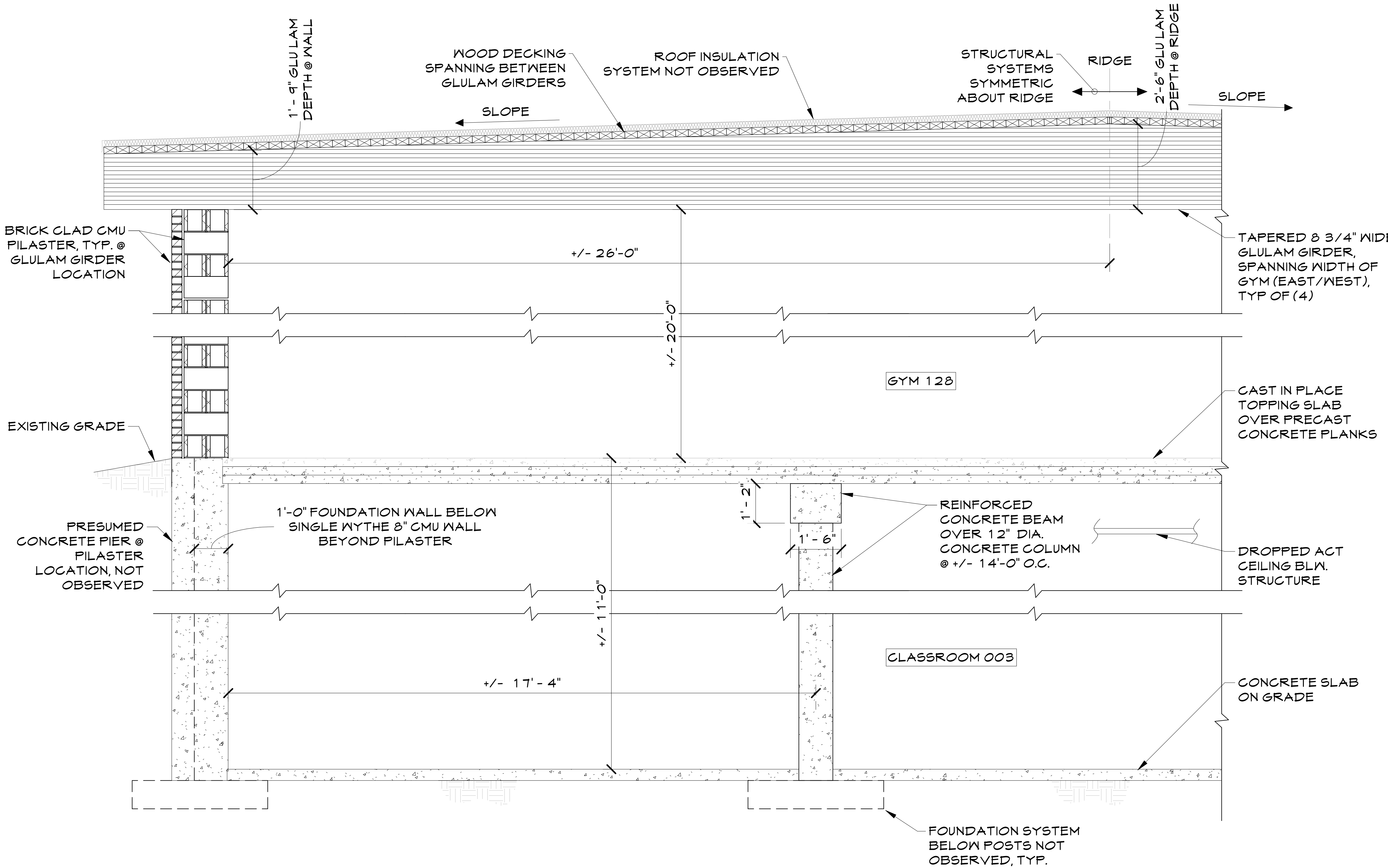
MAIN LEVEL CLASSROOM FRAMING SECTION

DRAWN BY: KDV
CHECKED BY: JMH
APPROVED BY: JMH
DATE: 01/31/2024

PROJECT NO.: 258.043

DRAWING NO.: APPENDIX B

APPENDIX C – GYM / BASEMENT FRAMING SECTION



NOTE: SECTION IS NOT TO SCALE

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GYM / BASEMENT FRAMING SECTION

DRAWN BY: KDV
CHECKED BY: Checker
APPROVED BY: Approver
DATE: 01/29/24

PROJECT NO.: 258.043

DRAWING NO.: APPENDIX C