Harbour View Recreation Complex
1867 Springfield Road, Winnipeg, MB
Water Mitigation Study – Interim Final Report

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EXECUTIVE SUMMARY

This Report provides an analysis and evaluation of the existing City-owned Harbour View Recreation Complex buildings, courtyard and shoreline structures. This Study was performed to identify options to mitigate water damage and refurbish or replace the Harbour View buildings, courtyard and shoreline structures. The primary source of the water damage resulted from extreme high water levels in the adjacent stormwater retention basin (SRB) system after significant rainfall events.

Methods of analysis included a review of the existing documents provided by the City of Winnipeg, a new geotechnical investigation, a topographic survey to confirm the shoreline and slopes, computer modeling (SWMM) of the existing drainage system and a visual review of the buildings and surrounding structures. A detailed account of the findings can be found within the Report.

The following summarizes the findings that are fully detailed within the Report:

- The three primary existing buildings (Clubhouse, Pro Shop and Change Rooms) are currently performing generally as per their original design intent. The crawlspace of the Clubhouse is subject to flooding when water levels in the SRB rise due to significant rainfall events. Other key factors within the review are the courtyard drainage, Universal Design requirements and ground condition related structural requirements.
- The Canopy structure over the walkway between the buildings has been compromised due to ground movement and foundation heaving and is not performing as per original design intent.
- The Observation Tower has shifted out of plumb and is not currently open to the public due to access and safety concerns due to the close proximity to the retaining wall and water's edge. (Subsequent to the performance of the site investigation the Observation Tower was opened to the public)
- All three buildings and the site in general require substantial modifications to be in compliance with the Universal Design requirements of the ADS.
- The existing canopy structure, wood deck, building perimeter drainage system and retaining wall require substantial modifications or replacement to provide longevity and prevent potential undermining of the adjacent building structures.
- The geotechnical investigation identified a high level of moisture at two levels within the test holes drilled, potentially as a result of the Stormwater Retention Basin (SRB) water infiltrating the surrounding area and progressively increasing annually.

- The storm water retention system basin and outlet structure are in good condition and function generally as per original design except that backflow into the system from the Springfield Road ditch was observed during and after a significant storm event. This impacts the operation of the SRB system and increases the extent and duration of high water events. Some of the components, including the outlet culverts, require repair and modification to maintain performance. Several options are presented to improve system performance and provide better control water level peaks. There are no practical improvements that would totally eliminate flooding issues.

Results support the following three recommended options for consideration by the City:

- Modifications to the existing outflow of the SRB system should allow an improvement in the stabilization of the water levels which will in turn make the recommended modifications a more viable option. Limitations to this option include the potential for a high water event and subsequent flooding of the building crawlspaces and further damage to the building in the form of mould development and building deterioration.
- The second option is to repair or modify the existing facility to comply with the 2006 City of Winnipeg Accessibility Design Standards (ADS), make all required structural revisions to rectify existing concerns as well as repair any damage that occurred during the high water events previously encountered by the facility. This option also includes the implementation of the modifications to the SRB system as listed above.
- A third option is the construction of a new full service, accessible building combining all services in one building and locating it further away from the SRB. This would provide the Recreation Complex with a new facility that is not subject to periodic water damage and fully complies with all the requirements of Universal Design. A new building and site modifications would also be expected to better address the users' functional needs based on current actual use and practices. This would also include the requirements of the modifications to the SRB system as listed above.

The initial Study scope did not include intrusive investigation into the walls of the existing wood frame buildings. The future use of the buildings has been identified as a possible viable option to pursue and, in order to confirm that the building condition is conducive to this it is recommended that an investigation of the actual conditions of the interior of the walls be undertaken. The scope and locations identified for this recommended work are included in Appendix F.

1.0 INTRODUCTION

GENIVAR was retained by the City of Winnipeg to provide a study to identify viable options and associated budgets to address a number of issues at the Harbour View Recreation Complex including:

1. Mitigation of the water damage to the Harbour View Recreation Complex Buildings, courtyard and shoreline structures.
2. Identification of the required refurbishment or replacement of damaged buildings and shoreline structures if they are to remain.
3. Analysis of the Storm Water Retention Basin system through the development of a basic SWMM computer model of the park area to perform a storm water system assessment and analysis for the park.
4. Performance of a barrier free/universal design assessment of the courtyard and the buildings to determine modifications that would be necessary to meet current building code requirements.

The study was authorized by Mr. Lou Chubenko of the City of Winnipeg on March 8, 2012.

The intent of the study was to determine the most favorable approach to the future of the Harbour View Recreation Complex facilities including the buildings and adjacent structures.

The existing data available to GENIVAR used for background information for the Study included:

- Existing building and site drawings by IKOY Architects, dated December, 1980.
- Visual Structural Inspection Report by Accutech Engineering, dated March 4, 2003.
- KGS Group Site Investigation Report dated June 14, 2011.
- City of Winnipeg Building Asset Assessment Report
- Existing Site Survey by Phillips & Stevens, dated December 6, 2011
- Land Drainage Overview Documents provided by the City of Winnipeg

1.1 BACKGROUND

Background information included in the RFP noted that the Harbour View Recreation Complex along with Kilcona Park is located at 1867 Springfield Road and is owned by the City of Winnipeg. The property consists of a total land area of 65.80 hectares (162.6 acres) with a variety of buildings, services and amenities including a golf course,

Clubhouse, Pro Shop, Change Rooms, Observation Tower (Lighthouse) and the storm water retention basin (SRB) system.

The Clubhouse contains a restaurant and catering operation, dining room, lounge, washrooms, change rooms, banquet/conference hall and a supporting mechanical / electrical room. The facility is a one-storey wood and timber framed structure with a service crawlspace (approximately 1.1 m high) and founded on concrete grade beams and a combination of concrete and treated timber friction piles. The facility was constructed in 1982 and is comprised of approximately 845 sm (9,100 sf) of floor area with an exterior wood deck of approximately 60 sm (645 sf).

The Golf Pro Shop is a one-storey wood framed structure build with a service crawlspace (approximately 1.1 m high) which was constructed in 1982. The building is approximately 386 sm (4,152 sf).

The Change Room Building is adjacent to the Pro Shop and includes male and female changing facilities and restrooms. The facility is a one-storey wood framed structure with a service crawlspace (approximately 1.1 m high) which was constructed in 1982. The building is approximately 151 sm (1,630 sf).

The SRB system of lakes located in Kilcona Park is an integral part of the land drainage system and services approximately 162 hectares within the park itself and approximately 190 hectares to the north and west of the park boundary. The original design of this system was based on meeting the water-based recreational needs of the park, which includes balancing storm water runoff for the entire service area and providing for irrigation and evaporation depletions. The system was designed to be regulated by a concrete weir system located at the corner of Springfield Road and Lagimodiere Boulevard. High water levels, documented up to 0.45 meters above the 25 year design water level, have been reportedly caused by blockages in the drainage system beginning at the concrete weir system. This in turn has caused flooding of the building crawlspaces among other issues. This Study also identified that backflow from the Springfield Road ditch is impacting the operation of the system.

The storm water retention basin system was designed in the late 1970's with a normal water level of 228.90 meters and for a 25 year design storm. With full development, the high water level should rise 0.65 meters to 229.55 meters. The water level that was surveyed on November 9, 2011 by Phillips and Stevens was recorded at elevation 228.84 meters.

The estimated high water level elevation that occurred following the late May, 2010 rainstorm was 230.0 meters (elevations are relative to City of Winnipeg Benchmark 08-009) and was 0.45 meters above the 25 year design water level of 229.55 meters. From

a storm water pond perspective, the May 2010 rainstorm had a runoff 60% larger than what would be expected from a 1:100 design storm.

High water levels have been aggravated by blockages in the drainage system beginning at the concrete weir at the northeast corner of Springfield Road and Lagimodiere Boulevard. The inlet to the concrete weir as well as the drainage system of culverts/tunnels under the roads and associated drainage ditches to the lake requires clearing of waterways (i.e. reeds and vegetation) and removal of beaver to keep water levels in check and to allow the water to flow freely out of the SRB system.

The Clubhouse and Pro Shop Buildings have crawlspaces which in the past have filled up with water during virtually every spring runoff. In 1998, there were air quality complaints and it was reported that the crawlspaces had dead fish, decaying vegetation/organic matter and wet mud within. In addition, the water entering the building crawlspaces created numerous hazardous issues, including mould and deterioration of the crawlspace building services and components.

In 2001, the reconstruction and long term repairs of the upper framing of the Harbour View Golf Course Lighthouse structure was undertaken and completed.

In 2002, the existing HVAC ductwork in the crawlspace was relocated above and located in the ceiling spaces and other mechanical and electrical services were relocated higher within the existing crawlspaces. The level of the existing crawlspace was raised up with additional crushed limestone and gravel on polyethylene sheeting. This upgrade reportedly worked relatively well provided the lake level was monitored and properly controlled.

In 2009, the City of Winnipeg Water and Waste Department, Engineering Division, had some success with water levels being kept at the lowest level in years by clearing waterways, bulrushes and trapping animals for several months.

On August 16, 2011, Bid Opportunity 2010-388 was awarded to Paragon Industries Limited for the demolition of existing docks at Harbour View Recreation Complex. The demolition commenced on September 12, 2011 and was completed on September 23, 2011. The existing docks were in very poor condition and posed both a safety hazard to the general public and contributed to the deterioration of the courtyard retaining wall.

A number of studies were also commissioned by the City of Winnipeg and conducted as noted in the list of available documents in 2.0 above.

1.2 OBSERVATIONS

1.2.1 Structural Condition Assessment Results

A visual structural assessment was performed on the accessible and visible structural components. The scope of work performed included the following:

- Review of the existing available drawings supplied to GENIVAR as outlined in section 1.0 of this report.
- Performance of a visual assessment of the following areas of the buildings during the site visits.
  - Grade beam and exposed portion of the piles in the accessible crawlspaces.
  - Underside of the main floor slab in accessible crawlspaces.
  - Exposed areas of the main floor substructure.
  - Visible portion of the roof trusses from the roof attic access door.
- Performance of a visual investigation and a hammer test of concrete surfaces as appropriate.
- Representative photographs were taken and are included in Section 5.0.

1.2.1.1 Clubhouse

The building is a one-storey wood timber framed structure with a service crawlspace (approximately 1.1 m high) and founded on concrete grade beams and a combination of concrete and treated timber friction piles.

The dining area is mainly over the water and supported by both wooden and concrete piles. All the wooden piles are in the water and are along the perimeter of the dining area. There is no sign of a soft outer layer or loss of diameter in the wooden piles. The remaining area of the Clubhouse substructure is comprised of hollowcore slabs on concrete beams supported on concrete piles. There is no visible sign of deteriorated concrete or visible moisture in the concrete piles, grade beams and underside of the hollowcore slabs. The sump pump in the crawl space under the kitchen was in working condition. Due to high water levels at times in the SRB system, there was water ponded in several locations of the crawlspace under the kitchen area. There is minor to significant rusting of pipe hangers connected to the hollowcore slabs. Pipe insulation is missing in several locations on the pipes in the crawlspace. The rigid board insulation along the perimeter of the building is missing or detached from the grade beams in miscellaneous areas.

The superstructure in the dining area is comprised of architectural wood timber frame structure which are in good condition. The remaining areas in the Clubhouse are wood framed walls with a wood truss system for the roof structure. There are no apparent issues or visible deterioration in the structural parts of the wall and roof systems.

During the review of the crawlspace located under the kitchen area, it was observed that the existing vapour barrier and rigid perimeter insulation were compromised and not performing as per design intent. There was water located in numerous locations which was compromising the integrity of the crawlspace floor system and would develop into moisture issues for the floor structure above.

1.2.1.2 Change Room Building

The building is a one-storey wood framed structure with a service crawlspace (approximately 1.1 m high). The Change Room substructure is comprised of concrete beams and hollowcore slabs supported on concrete friction piles.

There is no visible standing water in the crawlspace but the crawlspace surface was wet. There is a sump pit in this area which was observed to be in working condition. The exposed portions of the concrete piles are good condition. There is no visible sign of deteriorated concrete or moisture in the concrete piles, grade beams and underside of hollowcore slabs. The pipe hangers connected to hollowcore slabs have minor rusting in several locations. There is missing pipe insulation on several pipe sections.

The superstructure is wood frame wall with a wood truss system supporting the roof. There are no apparent issues or visible deterioration in the structural parts of the wall and roof systems.

During the review of the crawlspace located under the Change Rooms, it was observed that there were areas of moisture apparent throughout the pea gravel layer. It is not known if the vapour barrier has been compromised or if the moisture is infiltrating through the surrounding grade beam due to high water table levels.

1.2.1.3 Pro Shop

The building is a one-storey wood framed structure with a service crawlspace (approximately 1.1 m high). The Pro Shop substructure is comprised of concrete beams and hollowcore slabs supported on concrete friction piles. There is a crawlspace under the entire building. There was no visible standing water in the crawlspace but the ground was wet. There was no sign of deteriorated concrete or visible moisture in the concrete piles, grade beams and underside of the hollowcore slabs.

The superstructure is wood frame wall with a wood truss system in the roof. There are no apparent issues or visible deterioration in the structural parts of the wall and roof systems.

During the review of the crawlspace located under the Pro Shop, it was observed that there were areas of moisture apparent throughout the pea gravel layer. It is not known if

the vapour barrier has been compromised or if the moisture is infiltrating through the surrounding grade beam due to high water table levels.

1.2.1.4 Observation Tower

The Observation Tower is constructed with a wood framed superstructure, concrete base slab founded on concrete friction piles. There are no exposed piles which could be observed. There is minor deterioration in the concrete slab at the ground level which is not deemed a structural concern. The wooden wall framing and wood stair do not show any apparent structural concerns. The vertical alignment of the tower is measured at 127mm out of plumb west towards the water. This is not a structural concern but should be monitored at least once every two years to confirm that no additional movement has occurred.

1.2.2 Barrier Free/Universal Design Assessment Results

The Barrier Free/Universal Design Assessment was based on a review of existing drawings, site observations and an on-site assessment. The visual review of the existing buildings (including the Clubhouse, Pro Shop and the Change Rooms), Observation Tower, the courtyard and the surrounding parking lot areas was performed on April 24, 2012. The assessment is categorized as follows:

1.2.2.1 Clubhouse

Exterior Doors – Single:

There are two types of exterior doors used typically throughout the building. A barrier-free single door application is required by the Manitoba Building Code to be a minimum clearance of 800mm in width, while a width of 915mm is preferred by the ADS and provides a tolerance for variances. Further to this, an 815mm door is acceptable in a retrofit situation where it is technically not feasible to provide this 915 mm clearance. The existing single doors provide a clearance of 812mm wide by 2030mm high which meets the basic requirements of the Manitoba Building Code but does not meet the ADS as detailed above. The single exterior doors are typically being utilized as secondary emergency exit doors only and are not being utilized as a public access point. Two notable exceptions are the Receiving door located on the west side of the building and the Courtyard access door. Both of these doors as noted above are compliant with the requirements of the Building Code for width but would still be a challenge to easily access with a wheelchair.

The 2010 Building Code stipulates that all barrier-free doors shall have a threshold not more than 13 mm high and the ADS stipulate that all Barrier Free Doors shall have a threshold not more than 6 mm high. The following doors currently are not in compliance with this requirement and would require modification to suit. The doors include D03, D16 and D22 respectively (refer to existing floor plan located in Appendix B).

Exterior Doors – Double:

The existing exterior double doors (D01 and D32) are being utilized for public areas for both entry and exiting requirements for the building proper. The openings consist of two 812mm x 2030mm doors with a centre vertical mullion which forms the strike side of each door leaf. The clear openings for these doors are restricted by the centre vertical mullion and results in an opening size of 812 mm similar to the single doors stated above. Both entry point thresholds have been modified to allow for wheelchair access in form of a steel plate to be code compliant but a more permanent solution should be addressed. As required by Section 4.1.6 Doors of the ADS, power door operators are required to be installed due to non-compliance with the level wheelchair-maneuvering space on both sides of the door, and clear space beside the latch.

Door D29 is being utilized for access to the Outdoor Deck and is not deemed an Exit Door. Although if the intent is to make the Outdoor Deck accessible, it would require modifications to the threshold as this exceeds the maximum 6mm height, replacement of the door hardware to allow for one-handed operation and the installation of a power operator would be recommended as well.

Interior Doors – Single:

Interior doors servicing any room are required by the Manitoba Building Code to have a minimum clearance of 800mm in width, while a width of 850mm is preferred by the ADS and provides a tolerance for error. The existing single doors provide a clearance of 812mm wide by 2030mm high which meets the basic requirements but does not comply with the ADS as detailed above.

Interior Doors – Double (Vestibules):

The existing interior double doors (D02 and D31) are being utilized for public areas for both entry and exiting requirements for the building proper and access the vestibule to the exterior doors. The openings consist of two 812mm x 2030mm doors with a centre vertical mullion which forms the strike side of each door leaf. The clear openings for these doors are restricted by the centre vertical mullion and results in an opening size of 812 mm similar to the single doors stated above. The vestibules at both locations measure 2000mm x 2000mm and are compliant as required by the Manitoba Building Code, but not in compliance in regards of the ADS. The ADS Section 4.1.6 Doors requires the minimum space between two hinged or pivoted doors in series to be 1525 mm (60 in.), plus the width of any door swinging into the space.

As required by Section 4.1.6 Doors of the ADS, power door operators are required to be installed due to non-compliance with the level wheelchair-maneuvering space on both sides of the door, and clear space beside the latch.

Interior double doors D09 and D13 located in Corridor A16 consist of two 812mm x 2030mm doors with a centre vertical mullion which forms the strike side of each door leaf. The clear openings for these doors are restricted by the centre vertical mullion and results in an opening size of 812 mm similar to the single doors stated above which is compliant for a retrofit building. Further to this, these doors also have a lockable second leaf which makes the door inactive in regards to true opening width. Power door operators are required to be installed due to non-compliance with the level wheelchair-maneuvering space on both sides of the door, and clear space besides the latch.

Washrooms

The Clubhouse is serviced by three sets of washrooms, located off the main corridor, near the restaurant and separate facilities for the kitchen staff. Currently none of the existing washrooms are compliant with either the Universal Design Standards or the ADS. Minor interior modifications to the stalls and fixtures would be required to achieve design standards for the Main Washrooms, while the other two facilities would require substantial size and layout changes to be in compliance.

4.2.1 states the following, *"In a retrofit situation where it is technically infeasible to make existing public or common use toilet facilities accessible, the installation of at least one individual washroom complying with 4.2.7 per floor, preferably located adjacent to the other existing toilet facilities, will be permitted in lieu of modifying existing toilet facilities to be accessible."*

As required by the ADS, an individual washroom complying with 4.2.1 and 4.2.7 of the standards as above is required. Currently there is no such facility located on the premises.

Corridors

The majority of the corridors located within the Clubhouse are a minimum of 1100mm wide which is in compliance with design standards. Locations at the Main Washroom Corridor and adjacent to the Kitchen Staff Areas have been modified from the original design drawings and currently do not meet this minimum standard and would be required to be widened to suit.

Fire Extinguishers and Pull Stations

There are numerous locations where the fire alarm pull stations are installed above the required 1200 mm above floor as required by the ADS Section 4.4.2 Controls and Operating Mechanisms. These would have to be lowered to suit to meet the requirements of the ADS.

1.2.2.2 Outdoor Deck and Guardrail System

The existing perimeter guardrail system for the deck was constructed at a height of 1150mm and currently is in compliance with the building code for height. The condition of the guardrail has deteriorated and is recommended to be replaced if the building remains in service due to moisture infiltration and apparent wood deterioration. Currently there is no guard rail located along the edge of the water where the old dock was removed (this area of barricaded by a temporary construction fence). This would be required to be protected with a guardrail with a minimum height of 1070mm to be code compliant if this feature is retained.

In conclusion, modifications to the washrooms, entrance doors, vestibules, corridors and some services (fire alarm pull stations) would be required to bring the existing facility up to the ADS.

1.2.2.3 Pro Shop

Exterior Doors:

There are two types of exterior doors used typically throughout the building, a single and a double door application. The single door application is 812mm wide x 2030mm high while the double door consists of two 812mm x2030 doors with no centre mullion. Both doors meet the minimum standard for width but threshold heights requirements should be lowered and hardware should be revised to incorporate exit devices or devices for one hand operation as required by the ADS. It was also noted that the doors were partially blocked by displays at the time of the review and should be cleared to provide clear exiting from the building.

Interior Doors

The existing access doors to the office and building amenities are a typical 812mm wide x 2030mm high, which is consistent with the balance of the buildings as noted above. These doors are currently in compliance with the ADS for size requirements pertaining to a retrofit building, but not in compliance with the new standard building requirements.

Washroom

There is no washroom servicing this building structure, the Pro Shop staff utilize the Change Room facilities as required.

1.2.2.4 Change Rooms

Exterior Doors

Both the Women's and Men's Change Rooms are serviced by a single exterior door sized at 812mm x 2030mm with a code-compliant threshold. Hardware consists of a door closer, push plate and pull with a dead bolt for locking. Both exterior doors enter

into a separate Entry Area prior to accessing the locker, washroom and shower facilities. These doors are currently in compliance with the ADS for size requirements pertaining to a retrofit building, but not in compliance with the new standard building requirements.

Locker Areas / Washrooms / Shower Areas

The locker areas for both change rooms consist of a series of stand up lockers in a combination of singles and/or uppers and lowers. Existing facilities do not accommodate for Specialty Change Rooms as required by the ADS.

The washrooms for both change rooms are not designed to Universal Design standards and would require significant modifications to achieve compliance with the Building Code or the ADS.

The showers for both change rooms are not designed to Universal Design standards and would require significant modifications to achieve compliance with the Building Code or the ADS.

The existing facilities currently do not have a barrier-free stall, lavatory or change room facilities that comply with the ADS. There currently is no barrier-free designed shower stall in either change room at this time.

As per the ADS, *"in a retrofit situation where it is technically infeasible to have all dressing rooms (change rooms) comply with Section 4.3.4 Specialty Change Rooms, 10% of dressing rooms, but never less than one, for each type of use in each cluster of dressing rooms shall be accessible and comply with the above noted section. Where a facility incorporates multi-user dressing rooms with integral washroom and shower facilities, at least 10% of the multi-user dressing rooms, but never less than one, shall incorporate a private dressing room in compliance with the above stated section."*

1.2.2.5 Observation Tower

The tower structure is not barrier-free accessible design compliant due to original design intent and it is not feasible to be changed to comply with Universal Design as it is accessed by a stair and has no ramp or elevator or space for such an installation

1.2.3 Site Structure Condition Assessment Results

Visual assessment was performed on the following site structures:

1.2.3.1 Walkway Canopy Frame

The Canopy frame consists of a superstructure formed with wood columns and beams connected with bolted plates. The canopy substructure consists of five meter deep (according to the original drawings) concrete friction piles c/w concrete pile cap and

grade beam system. There is significant vertical movement of several column foundations due to frost jacking. The maximum elevation difference measured is approximately 190mm. There is evidence of several weather-deteriorated wood columns and at least one cracked wood beam which should be replaced. The grade beams tying the canopy piles adjacent to the Change Room and Pro Shop show concrete deterioration and high deflection. There is concrete deterioration in the exposed portion of the several pile caps. The base plates under several wooden columns show corrosion and they may need to be replaced.

1.2.3.2 Observation Tower

The Observation Tower is built with a wood framed superstructure and concrete base slab founded on concrete piles. There are no exposed piles which could be observed. There is minor deterioration in the concrete slab at the ground level which is not deemed a structural concern. The wooden wall framing and wood stair do not show any apparent structural concerns. The vertical alignment of the tower is measured at 127mm out of plumb west towards the water. This is not a structural concern but should be monitored at least once every two years.

1.2.3.3 Outdoor Deck

The Outdoor Deck adjacent to the Dining Area is supported by wooden piles. There is no visible deterioration of the piles. Deck floor and guard rail systems show signs of weathered deterioration and should be replaced. In considering the age of the structure and deck floor conditions, we expect the deck joist system (not visually confirmed due to restricted access) will need to be replaced as well.

1.2.4 Waterfront Retaining Wall Condition Assessment Results

Visual observation was performed along with a review of the previous report as noted in Section 1.0. The guard rail along the retaining wall was removed at some point and currently the area is protected by temporary fencing. There are no visible piles under the retaining wall foundation accessible for review. The concrete of the retaining wall appeared to be in sound condition with the exception of a crack at the corner of the wall close to the Pro Shop area. The vertical alignment of the wall has varying degrees of rotation along the wall towards the water. The measured horizontal offset from the true horizontal line to the maximum point of rotation is approximately 200mm. There are gaps or voids between the wall and ground in several locations along the wall top. If the wall is to be retained, major repair or replacement is required.

1.2.5 Courtyard Condition Assessment Results

1.2.5.1 Courtyard

The courtyard consists of a combination of landscaped planter areas and concrete interlocking paving stones utilized for walkways around the buildings, to the drop-off roundabout, staff parking and to the various pathways leading to the golf course and parking areas. The entire courtyard has apparent drainage and subsurface water issues as large areas of settlement have occurred restricting water flow to the two existing drains located within the courtyard area. Large areas of pavers are missing exposing the granular fill below. A rubber mat is currently being utilized to cross one of the exposed granular areas to provide a travel path between the Clubhouse and the Pro Shop.

1.2.5.2 Employee Parking Area and Emergency Vehicle Access

The employee parking lot consists of one Handicapped stall and parking for approximately 6 or 7 employees. The Handicapped stall is not currently to ADS (4.3.12 Parking) in both length and width which requires a stall to be at least 2440 mm wide and 6100 mm long; with a 2440 mm adjacent access aisle (retrofits can be reduced to 2000 mm wide), be clearly marked with the symbol of access painted on the pavement and must be a level surface. General repair of the parking area to address pitted conditions is recommended. Handicapped ramps are recommended to be installed on both sides of the centre island pathway for easy access.

The drainage in this area currently flows to the outside of the roundabout (including towards the Clubhouse) prior to flowing towards the lake. Minimal slope is apparent and some rough areas of asphalt are apparent.

The width of the roundabout is sufficient throughout the extents but narrows at the corners and depending on the route taken could pose a problem to a larger emergency vehicle. This should be reviewed in greater detail if the facility it to be maintained to ensure access requirements are being met as required.

The passenger drop-off area currently does not meet the requirements of 4.3.13 Passenger-Loading Zones and Lay-Bys, as detailed within the ADS, and would need to be revised to suit. The current layout would cause significant issues if an emergency vehicle would need to gain access to the site during the off-loading of any larger passenger vehicle.

The access road to the restaurant delivery door consists of an asphalt ramp over the concrete pinned curb to a single vehicle-width combination asphalt and limestone driveway. Drainage is sloped back towards the building and cross flows towards the lake. The crushed limestone section of the driveway impedes the flow of a drainage

swale from the parking lot area. The asphalt is in poor condition but is still functional. Drainage should be improved to direct it away from the building proper.

1.2.5.3 Access Paths to South Parking Lots

The access paths leading to the parking lot areas are consistently constructed of asphalt paving on top of granular fill. The majority of the pathway system is heaving and has substantial cracking and would be difficult to negotiate with a wheel chair. There are also some substantial grade inclines between the Clubhouse and the south parking lots that would also impede wheelchair access and do not meet the Standards.

1.2.6 Geotechnical Investigation Results

The general soil profile near the existing concrete retaining wall, canopy columns and existing paving stone walkway revealed a predominantly clay material in the upper 3m zone. The clay material at this zone is brown and highly plastic. However, grey clay was observed at 2.3m depth followed by brown clay at 3.3m. Grey clay is again encountered at 5.5m depth. The moisture content at the first 3m zone ranges from 47% to 50%.

Typically, the color of the material is a good indicator where the actual ground water is. In this case, it is possible that there are two groundwater elevations, one at the 2m depth and another at 5.5m depth. This is supported by unusually higher moisture content in the first three meters; naturally, the moisture content of a clay in Winnipeg ranges from 30% to 40% at the first 3m zone. It is known that slight changes of moisture content in the magnitude of only 1% to 2% are sufficient to cause detrimental heaving or swelling. The higher moisture content of the upper grey clay layer could be the result of the retention pond water infiltrating the surrounding area and progressively increased (laterally) yearly.

1.2.7 Stormwater Retention Basin System Assessment Results

The stormwater retention basin system was assessed by:

- Creating a computer model of the existing components and conditions; then using the model as a general overview to test various scenarios and options to improve the capability of the system to control water levels.
- Conducting field assessments of various components where possible to assess general condition.

The assessment started with:

- Gathering existing information.

- Conducting field surveys and measurements to confirm and complement the existing information.
- General visual field observations of the system after a rainfall event.

Existing information was collected, assembled and reviewed which included:

- Background information as provided in the RFP
- The original Design Brief prepared by UMA in 1979 obtained from the City of Winnipeg Water and Waste department
- Overview of the project reviewed informally with Water and Waste (Chris Trupish) who identified several ideas for mitigation that the Department has considered.

A topographic survey of key elements of the system was conducted including:

- Elevations and locations of the shoreline edge for the basin area
- Elevations of the ditches for the adjacent streets in close proximity to the Recreation Complex.
- Elevations of the courtyard area.

Field observations:

- Various components of the stormwater system were assessed where visible. In general, the stormwater retention basin and concrete weir structure are in good condition. More of an issue is the condition of the outlet culverts and channels. The main outlet channel in the vicinity of the weir requires cleaning to remove vegetation that restricts flows. The culverts under Springfield Road require work to replace damaged ends. The Springfield Road and Lagimodiere Blvd. ditches require cleaning and vegetation control. This work would improve discharge from the system only in conjunction with further improvements to be discussed in the recommendations section.
- A recent rainfall event occurred on the weekend of May 26-27, 2012, where 32mm of rain as recorded by the City fell in 35 hours at this location and an additional trace of rain fell on Monday, May 28. No significant rainfall occurred in the area to June 6 but 35mm of rainfall had occurred in the 8 days prior to this event.
- Peak SRB level and elevations in downstream ditches were surveyed several times shortly after this event and we were able to visually assess the conditions immediately after the event. In any case, the information we were able to record was useful and was utilized in calibrating the model.

Preparation of the computer model:

- Determining the exact drainage boundary for this system was not possible without conducting further intensive topographic surveys which would be beyond the scope of this Study.
- The RFP stated that the drainage boundary for this system was comprised of 162 Ha within the park boundary and 190 Ha of residential adjacent to the park. The original UMA design brief indicated 166 Ha of park and 283 Ha of existing and future residential. It further stated that because of the slope of the land in the future residential, an area of 190 Ha of existing and future residential, as stated in the RFP, was more realistic. No boundary plan was included in the UMA report to indicate a location for this boundary but a combined area of 449 Ha (1100 Acres) would have to include nearly all of the area north of the park to the Perimeter Highway, west to Lagimodiere Blvd. and east to Wenzel St. and Four Mile Road. This area would partially overlap into the R.M. of East St Paul.
- To date, only approximately 70 Ha of residential has actually been developed as rural low density residential with the remainder of the land retained as agricultural or grasslands.
- The topographic information of the basin shoreline was used together with recent air photography to confirm the existing SRB shore locations and side slope geometry. This was done for the purpose of determining the current storage capability of the SRB system. The original design was based on an impoundment with a surface water area of 20 Ha. Our measurements confirmed this area at 19.65 Ha and side slopes of approx 5:1.

Other factors affecting preparation of the computer model included:

- Downstream channels and ditches overgrown with vegetation restricting flows.
- Drainage culverts with restricted flow capacity due to damaged ends from years of ditch cleaning and / or snow clearing.
- Varying slope of land within the park area itself and within the drainage boundary.
- Numerous contributing ditches and swales containing driveway culverts of varying size and condition, inconsistent ditch shapes and sizes.
- Potential presence of unknown culverts and swales affecting drainage.
- Numerous locations within the drainage boundary containing detention storage of various capacities.

- Unknown information relative to the stormwater basin water elevation prior to the start of a rainfall event.

For the purpose of modeling improvements to the system, the idea of preparing a computer model that replicated the exact current conditions was not feasible within the scope of this Study. There were too many variables to confirm that were beyond the scope. Design parameters were therefore used in the model that is typically used in stormwater system designs. These parameters were manipulated such that simulated system reactions and results corresponded fairly close with actual historical and recent observed events. Once this model was prepared and functional, it was modified with simulated improvements to test the reaction of the system and resulting benefit. The model was essentially functional to test the modifications to the system and the results would be relative.

The following scenarios were created to calibrate the model:

1. A 1:25 year Inflow occurring from the City of Winnipeg design event. Proposed drainage areas and parameters as per original 1979 design. Downstream conditions were free of external influence (conditions of original design).
2. The recent May 2012 event using downstream conditions as observed.
3. The May 2010 event using modified downstream conditions to simulate the conditions recently observed.

Scenarios 1 to 7 were modeled to test modifications.

The May 2010 and May 2012 events were used as the basis for analysis with various modifications to the system to test different improvements.

It should be noted that at the time of the topographic survey (April 4, 2012), the water level in the SRB was 229.27, 370mm above Normal Water Level (NWL). Approximately 29mm of rainfall had occurred in the 11 days prior to the survey.

Also of significant importance was that shortly after the May 2012 event, water levels in the Springfield Road ditch downstream of the weir were observed to be higher than the retention basin and flows were reversed. Water was observed flowing into the SRB backwards through the weir. This flow continued until equilibrium was reached several days after the event and then outflow commenced. It became evident that some of the flooding caused by high water levels in the SRB under previous events has been caused partially by contribution from inflow through the outlet and probably has for some time. Although the water elevation of the basin was unknown at the start of the May 2012 event, it was still 430mm above NWL nine days after the start of the event. Discharge

from the basin was limited because of downstream conditions in the Springfield Road ditch.

Results of computer modeling for the previously mentioned scenarios are:

Existing scenarios (calibration):

Scenario 1 – Design - SRB rise peaked approximately 530mm above normal water level under a 1:25 year design storm, similar results to the original design (no downstream influence). Peak discharge through the weir in the model was 0.46 CMS compared to 0.54 CMS in the 1979 design. The SRB returned to within 170mm of NWL in the model within 5 days compared to 150mm in the original design.

Scenario 2 – May 2012 event – SRB water level rise peaked at elevation 229.50 in the model as observed in the field, 600mm above NWL. Modeled inflow into the basin from the Springfield Road ditch was included based on actual measured downstream elevations. Conditions prior to the event were unknown. The SRB was assumed to be at 100mm above NWL prior to this event as 35mm of rainfall had occurred within 8 days prior to this event.

Scenario 3 – May 2010 event - SRB rise in the model peaked at elevation 230.00, 1100mm above NWL, which corresponds to the actual estimated peak elevation of 230.00 observed at the time. In this model, the SRB was also set at 100mm above NWL as 25mm of rainfall had occurred in the 3 days prior to this event. Outlet conditions for the May 2010 event are unknown. The parameters from the May 2012 event were used and factored to simulate outlet conditions.

Improvement scenarios:

Scenario 4 – Using Scenario 2, flap gates were added in the model to the Springfield Road culverts to prevent backflooding from downstream ditch, no other changes were made. SRB level rise peaked at elevation 229.26, approx 240mm lower than without the flap gates. The caution here is that conditions prior to and during this two day rainfall event were assumed.

Scenario 5 – Using Scenario 3, a 15% larger basin (added 3.0 Ha) was modeled with no other changes. SRB peaked at elevation 230.00, the same elevation as the May 2010 model with the existing basin size.

Scenario 6 – Using Scenario 3, flap gates were added at two locations, at the outlet culverts under Springfield Road and at a location where a smaller basin could be created by isolating the east basin immediately adjacent to the building complex. This basin would have a much smaller contributing drainage area in relation to the impoundment

size (**Fig LDS-1**). Creation of a separate basin at this location along with the potential to add a permanent pump to further control water levels within this basin were ideas suggested by Chris Trupish at the Water and Waste Department. The pump was not included in the model. Resulting peak levels were 229.64 in the small basin, 360mm below May 2010 level but the level in the remaining larger SRB was at May 2010 levels even with the flap gates at the outlet. It should be noted that the May 2010 event was modeled for reference with no outflow at all during the entire event and the result was levels at the same elevation of 230.00 as observed for this event.

Scenario 7 – Using Scenario 6, the system was modeled with the water level in the SRB at 100mm below NWL prior to the event. Resulting peak levels were 229.48 in the smaller basin and 229.88 in the remainder of the SRB.

2.0 CONCLUSIONS

2.1 BUILDING STRUCTURE CONDITION

The overall condition of all the building (Clubhouse, Pro Shop and Change Rooms) foundation systems, substructures and the roof truss system are structurally good for the age of the structures. There were no significant structural concerns observed which need immediate remediation works.

We recommend the following remediation works in order to reduce the moisture in crawl space, and improve the performance of the building systems:

- Clean all unnecessary material such as loose rigid insulation boards, polyethylene sheets, loose pipes etc from the crawl space surface.
- Remove any abandoned mechanical and electrical items from the crawl space.
- All pipes which are still in service should be checked and replaced as required along with supporting hangers.
- Check all pipe insulation and replace with new insulation as required.
- Perform a detailed review of the existing sump and ventilation systems in the crawl space and provide additional sump pit and ventilation systems as required.
- Place an additional 150 mm of new granular fill and replace vapour barrier membrane in the crawlspaces, to help control water and moisture infiltration.

2.2 UNIVERSAL DESIGN / BARRIER FREE

It is recommended that the following items be addressed:

2.2.1 Doors – Exterior and Interior:

All entrance and exit doors are currently in compliance with the minimum standards allowed by the ADS for retrofitted buildings for width and height. But as this is a City of Winnipeg facility it would be recommended that the openings are revised to suit the new construction standards for Universal Design where feasible. This would include the widening of doors, revised hardware and compliant thresholds as detailed in Section 4.1.6 Doors. This would also require the modification of the exterior vestibules to meet clearance requirements, as well as the addition of power door operators to all public entry points.

2.2.2 Washrooms / Change Room Facilities

The existing washrooms and change rooms all require either minor modifications or complete revisions to be in compliance with the Universal Design requirements stipulated within the ADS. The main washrooms within the Clubhouse do satisfy some of the Universal Design requirements but modifications are still required to achieve complete compliance including but not limited to reorientation of the existing H/CAP stalls and revised stall door, replacement of existing accessories to correct height and in compliance with requirements. The balance of the washrooms, change rooms and shower rooms are not compliant and require substantial modifications to achieve compliance with Sections 4.2.1 through 4.2.10 of the above ADS.

2.2.3 Corridors / General Layout

It was apparent after the site review that the area surrounding the main washrooms within the Clubhouse were revised from the original design documents. With this revision the corridor currently does not meet the minimal requirements of 1100 mm. This will be required to be modified to suit to be in compliance with the minimum standards of 4.1.4 Accessible Routes, Paths and Corridors. Other modifications to walls and opening widths will be need to be addressed to ensure compliance to access requirements to staff amenities located adjacent the Dining Room Kitchen.

2.3 SITE STRUCTURES CONDITION

2.3.1 Canopy Frame

We recommend the following repair works to be performed based on our site observation and review of the previous investigation reports supplied by owner:

- The frost jacking of the concrete piles should be minimized by either of following methods.
    - Reinforce the canopy columns with metal underpinning bearing at 4.6m depth.

- Alternately, remove the existing fill down to the subgrade and place high density rigid board insulation around the canopy piles followed by new compacted subbase and base material as recommended by the geotechnical report, attached.
- Alternately, the top 1.5m of all canopy piles will need to be exposed and placement of a double layer of poly wrap complete with grease at the top 1.5m of pile. Back fill material shall be structured and compacted as part of the recommended courtyard paving remediation work.

- Replace (at least 5) canopy wood posts which have deteriorated due to prolonged weather exposure.
- The canopy posts which have experienced significant frost jacking should be shortened in order to level the canopy. Due to signs of corrosion in some of the post base connection plates, we anticipate some may need to be replaced. This should be reviewed during the remedial works process.
- Replacement of cracked wooden beams is recommended. There was one cracked beam identified during the visual assessment.
- There is potential failure of the grade beams under the canopy column adjacent the Change Room and Pro Shop buildings. We recommend further assessment by exposing the grade beams and repair or replace as required.
- Remove the loose and pitted concrete from the deteriorated pile caps and patch with new concrete.

2.3.2 Observation Tower

No remedial work is necessary at this point. The vertical alignment of the tower is measured at 127mm out of plumb west towards the water. This is not a structural concern but should be monitored at least once every two years.

2.3.3 Outdoor Deck

The deck boards, guardrail system, and likely the deck joists need to be replaced. The joist hangers along the building sides should be reviewed during the construction and will need to be replaced if deteriorated.

2.4 WATERFRONT RETAINING WALL

From the visual observation and review of the previous reports, we believe that the retaining wall has rotated further from the last review. In order to bring the retaining wall to a safe and stable condition, we recommend having remedial repairs completed on the retaining wall system.

- If the wall is to be retained, our recommendation is to utilize an earth anchoring system by installing a series of screw piles which would be connected to the top of the existing retaining wall. We anticipate a permanent hold of the retaining wall from further rotation with this remedial method. This may not result in the straightening of the existing retaining wall but it will prevent further deflection from occurring.
- We also recommend the provision of a weeping tile drainage system complete with free draining granular fill at the inside face of the retaining wall in order to reduce the moisture level in the ground.
- Also suggested within a previous report, another alternate option would be to replace the existing retaining wall with a new retaining wall system.
- Another option is to remove the existing retaining wall and create an earth embankment by filling in the lake with clay materials to move the edge of the water line back.

2.5 SITE AND COURTYARD CONDITIONS

It is recommended that the following items be addressed:

2.5.1 Courtyard

The existing courtyard consists of a combination of planters and concrete paving stones. It is recommended that the existing paving stones and granular base be removed and replaced. The new base should consist of a combination of granular and crushed stone with a minimum total thickness of 450mm. Any granular fill should be compacted to 98% STD proctor density. A geotextile, preferably non-woven, is suggested to separate the granular fill from the clay subgrade. Any prepared subgrade should be proof rolled with a non-vibratory roller (equivalent to 95% STD Proctor density) and inspected by a qualified geotechnical engineer prior to placement of the overlying granular fills. Unsuitable and soft areas should be excavated and the material replaced with suitable sub-base material. A positive graded surface and subgrade drainage pattern throughout the area is recommended to be implemented. If feasible, the area of the courtyard could be reduced to reduce reconstruction costs.

2.5.2 Building Perimeter

To assist in prevention the penetration of water to the existing crawlspaces the installation of a weeping tile system around the perimeter of the buildings is recommended. To promote adequate site drainage away from the building a 10% slope should be considered for the first 1.8m from any foundation wall and grade away from the building complete with a swale system to direct water away from the buildings.

Downspout extensions should be utilized to ensure water is directed away from the walls, with the provision of splash blocks to prevent erosion and ponding.

2.5.3 Employee Parking / Emergency Vehicle Access

General repairs of the parking area to address deteriorated conditions and ensure compliance to Universal Design Standards (including new layout, widening, restriping of lines and compliant signage) is recommended. Barrier-free ramps are recommended to be installed on both sides of the centre island pathway for easy access.

Modifications and improvements for drainage are required to ensure proper water shedding towards the SRB from the roundabout and parking areas as required. General widening of the loading area and corners is required to ensure proper clearances are met.

The delivery access road is recommended to be modified to provide proper access and drainage design including the removal of the existing asphalt and limestone structures and replacement with a new road structure complete with adequate drainage away from the building to suit the existing conditions.

2.5.4 Access Paths to Parking Areas:

All current path systems that access the different services and parking areas should be upgraded including removal of the existing asphalt structure and shaping of the current route to ensure ease of travel and a more direct access to the services provided including the building areas.

2.6 STORMWATER RETENTION BASIN SYSTEM CONDITIONS

The original design of the Harbour View system was based on a 600mm rise under a 1 in 25 year event with a return to within 150mm of NWL within 5 days under full development. Significant industrial development has occurred along Springfield Road east of Lagimodiere Blvd. and in the upper reaches of the Cordite Drain since the time of the original design of the Harbour View drainage system. This has put a burden on the drainage system immediately downstream of the park outlet which is evident from the length of time that the water levels remain high in this ditch after an event. Ditch elevation prevents discharge from the SRB during an event but more importantly, prevents complete drawdown within a reasonable amount of time to prepare for the next event. Field observations have indicated that the Springfield Road ditch remained a minimum of 400mm above the SRB NWL for 8 days after an event of a lesser magnitude.

While the May 2010 event is considered as having a 1 in 100 year return frequency, a rise of 1100 mm from this event to elevation 230.00 would be considered acceptable in

other SRB designs by today's standards. What made the event worse were the saturated ground conditions as well as the likelihood that the SRB may have been as much as 300 mm above NWL prior to the start of the event.

For the Harbour View Park system, this event along with many others before it has created problems related to high water tables and flooding within the complex buildings because of their elevation relationship to the SRB water levels. Given what has happened over recent years with storm events seeming to get increasingly more severe, there are no simple fixes that would guarantee to prevent flooding in the future.

The modeling of the system using various scenarios suggests that several concepts could be further examined which would help control water levels to reduce severity and potentially flooding frequency. The modeling also confirmed that simply cleaning channels and repairing culverts would not mitigate the issues.

Repairing or replacing the existing outlet culverts together with adding flap gates as modeled in Scenario 4 is recommended along with cleaning of the outlet ditches in Springfield Road and Lagimodiere Blvd. Note that culvert repair and channel cleaning within the basin area without adding the flap gates could actually increase flooding as the backflooding flow conditions would be improved. In conjunction with this work, several culverts that are installed under Springfield Road east of the outlet should be removed or plugged to further prevent inflow into the SRB from the south ditch along this road. (Fig LDS-1) It is estimated that the addition of the flap gates could lower peak levels in the basin by as much as 240mm depending on specific conditions.

To promote a more reliable drawdown method, consideration could be given to a piped connection from this SRB directly to the Bunn's Creek Pond west of Lagimodiere Blvd. in conjunction with the existing surface ditch drain system. (Fig LDS-2) A direct piped connection would function earlier in the spring and could help reduce flooding caused by backups that have occurred at that time of year.

In conjunction with the piped connection, a separate control structure could be installed at the SRB that could provide the option to operate the SRB at a lower normal water level whether it is temporary or permanent, thus providing additional storage capacity. Further, under near to peak conditions measured after the May 2012 event, the Bunn's Creek SRB elevation was 1.5m lower than the Harbour View Park SRB indicating that a piped connection could be discharging the SRB even during the time that the Springfield ditch is higher than the SRB.

Worth considering is isolating a separate basin adjacent to the Complex as analyzed in Scenario 6. This would create a small basin where inflow could be reduced by modifying drainage upstream to reduce the overall drainage area to the small basin. Optionally, a permanent pump station could be installed to further control peak water levels.

3.0 RECOMMENDATIONS

Results support the following three recommended options for consideration by the City:

- Modifications to the existing outflow from the SRB system including isolation of the pond adjacent to the Buildings should allow an improvement in the stabilization of the water levels which will in turn make the recommended modifications a more viable option. Limitations to this option include the potential for an extreme high water event and subsequent flooding of the building crawlspaces and further damage to the building in the form of mould development and building deterioration.

- The second option is to repair or modify the existing facility to comply with the ADS, make all required structural revisions to rectify existing concerns as well as repair any damage that occurred during the high water table events previously encountered by the facility. This option also includes the implementation of the modifications to the SRB system as listed above.

- A third option is the construction of a new full service, accessible building combining all services in one building and locating it further away from the SRB. This would provide the Recreation Complex with a new facility that is not subject to periodic water damage and fully complies with all the requirements of Universal Design. A new building and site modifications would also be expected to better address the users' functional needs based on current actual use and practices. This would also include the requirements of the modifications to the SRB system as listed above.

As the continued use of the buildings is a possible alternative, it is recommended that an intrusive investigation to determine the actual conditions in the interior of the building walls be undertaken. This will allow confirmation of an indication of any hidden repairs and remediation needed if the buildings are retained. The scope and identified locations for these investigations is identified in Appendix F.

4.0 CLASS 'D' OPINION OF PROBABLE COSTS

4.1 PURPOSE

This Class 'D' Opinion of Probable Cost (OPC) is intended to provide a realistic indication of direct and indirect construction costs for the Harbour View Recreation Complex. The Class 'D' OPC is an Order of Magnitude Opinion only and includes engineering fees and a contingency allowance.

4.2 METHODOLOGY

From the documentation and information provided, quantities of all major elements were assessed or measured where possible and priced at rates considered competitive for a project of this type based on the existing amenities, existing building size and standard design practices for the Winnipeg, Manitoba area.

4.3 SUMMARY OF OPTIONS:

1. Option 1 (Water Mitigation Only):

Repair outlet culverts and installation of flap gates:	$110,000
Isolate small basin with dyke in the SRB with CMP and flap gate	$360,000
Installation of a pump station	$1,260,000
Piped discharge connection to Bunn's Creek SRB	$1,530,000
Stabilization of Existing Retaining Wall	$113,000
Total	**$3,373,000**

2. Option 2 (Remediation / Repair of the Existing Facility and Water Mitigation Requirements)

Water Mitigation Requirements (Option 1 above)	$3,373,000
Building Structure (Moisture Control in Crawlspaces)	$250,000
Universal Design Modifications / Upgrades	$563,000
Site Structure Repair	$125,000
Outdoor Deck Repairs	$95,000
Courtyard Condition	$751,000
Total	**$5,157,000**

3. Option 3 (Replacement of Building and Revising of Site)

Water Mitigation Requirements	$3,373,000
Demolition of existing building and construction of new	$11,875,000
Total	**$15,248,000**

4.3.1 Water Mitigation Only

The following details the options for improvements to control the water levels:

Repair outlet culverts and install flap gates **$110,000**

- This work is required in any case and cost is not prohibitive. Some repair work has already been contemplated by the Water and Waste Department.

Isolate a small basin with dyke in the SRB near the complex with a CMP and flap gate. **$360,000**

Construiton of a pump station if necessary **$1,260,000**

- Pros: Will be most effective in controlling water in the vicinity of the Complex
- Cons: Pump likely required to further control levels, costly, requires electric power which could be out during storm unless standby power provided, cuts off physical water-based access to remainder of SRB and aesthetically takes away from the large SRB appeal. Does not provide overall SRB level control. Operating and maintenance costs to consider.

Piped discharge connection to Bunn's Creek SRB **$1,530,000**

- Pros: Improves discharge of SRB to improve available storage prior to an event and provides opportunity to manipulate operating levels in SRB.
- Cons: High cost, would have to be augered. Alignment issues along Springfield Rd.

Stabilization of the existing retaining wall **$113,000**

- Utilization of a screw pile earth anchoring system to prevent further rotation.
- Provide a weeping tile drainage system complete with free draining granular fill at the inside face of the retaining wall.

4.3.2 Remediation/Repair of the Existing Facility and Water Mitigation Requirements

This option would be recommended only if the concerns of the water level of the Stormwater Retention Basin are addressed and rectified and the City of Winnipeg is willing to allow for the potential repairs from a future extreme high water event. Further to this, numerous maintenance issues should be reviewed for the exterior of the building due to extended periods of contact with moisture including deterioration of the lower portion of the wood cladding and potential moisture infiltration into the wall systems. It is

recommended that a closer review of these systems should be completed to assess the existing conditions that were beyond the scope of this Study.

Building Structure **$250,000**

The probable cost for controlling the moisture level, removing and providing the new gravel bed, cleaning up any unnecessary materials, replacing rusted/damaged piping systems, placing new rigid insulation systems along the building perimeter in the crawl space. This includes the installation of a new perimeter weeping tile system around the perimeter of the buildings.

Universal Design / Barrier Free **$563,000**

This option would be a significant endeavor as there are many areas of all three buildings that would require upgrading to be in compliance with the ADS. Although the above design standards do have some allowances for retrofit buildings that would reduce the scope of works required to achieve basic compliance, washroom, change room and some exit door revisions would still be required at the very least.

Site Structure Condition **$125,000**

The probable cost to repair the canopy frame foundation systems with metal post systems, repairing grade beams and replacement of columns and beams.

Outdoor Deck Repairs **$95,000**

The probable cost to remove and replace the existing wood decking, joists and replacement of guard rail around perimeter.

Courtyard Condition **$751,000**

The existing courtyard, roundabout and adjacent pathway systems would require substantial modification currently to assist in controlling drainage issues for the current facilities including the removal of the existing concrete pavers and replacement of the new system as detailed within the recommendations above. Opinion of Probable Costs would be approximately $175 per sq. m, this taking into account the approximate area of the pavers and landscape area alone at 600 sq. m.

Replacement of Building and Revising of Site **$15,248,000**

The raising of the building in our opinion is not an option, due to the condition of the building and it structural components. It should be considered to build a new one storey facility comprising of all the services of the existing buildings of a similar size further back from the SRB complete with revised amenities that will better service the complex.

This will also remove any potential future moisture concerns due to high levels of water within the retention system. Opinion of Probable Costs for the demolition of the existing facility and the construction of a new 2,500 sq. m facility at $4,750 per sq. m would be approximately $11,875,000 for a new facility and associated site modifications.

5.0 REFERENCE PHOTOS

View of the Harbour View Facility from the Southwest

View of the main courtyard area of the Harbour View Facility

Missing insulation around the pipe

Rust on pipes and pipe hangers in the crawlspace

Loose rigid insulation floating on the water under the kitchen area

View of retaining wall along water's edge

Crack at corner of retaining wall

General view of roof trusses

Crack in the Canopy beam

Deterioration in canopy pile cap

Heaving of canopy column

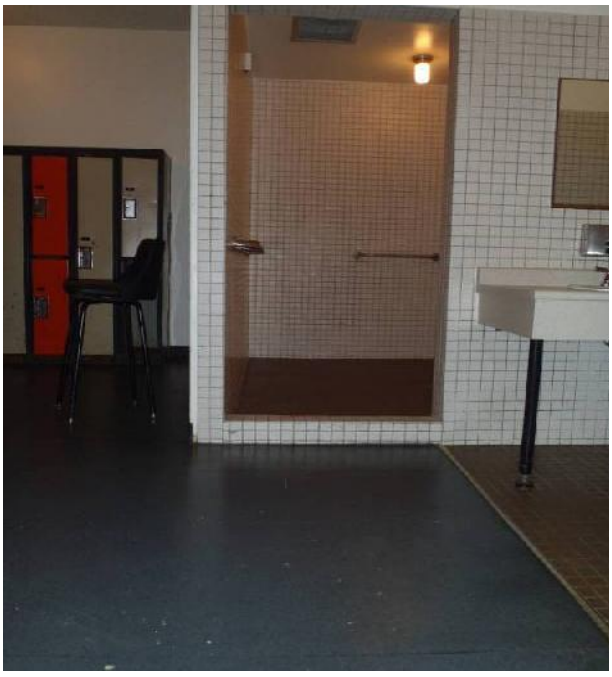
Aged deck floor and guard rail systems

Clubhouse double exit door c/w permanent centre door mullion. Vestibule length is not in compliance with ADS

Typical single exit door sized at 812mm wide, ADS require a 915mm door width minimum for new buildings and will allow an 810mm opening for a retrofit building

No guard rail installed along the edge of the retaining wall

Existing Washroom / Change Room Facilities do not comply with Universal Design Requirements



Entry into shower stall area not barrier-free

Areas of paving stones needing replacement

Pathway to Clubhouse from south parking lot area

Existing Access point to H/CAP Parking Stall

Existing H/CAP parking stall located adjacent the buildings

View of Courtyard from the Observation Tower

Water flowing into SRB outlet weir after May 29, 2012 event

Blockage of outlet with overgrown vegetation

6.0 CLOSURE

The findings and recommendations provided in this report were prepared by GENIVAR (the Consultant) in accordance with generally accepted professional engineering principles and practices. The information contained in this report represents the professional opinion of the Consultant and their best judgment under the natural limitations imposed by the Scope of Work.

This report is limited in scope to only those items that are specifically referenced in this report. There may be existing conditions that were not recorded in this report. Such conditions were not apparent to the Consultant due to the limitations imposed by the scope of work. The Consultant, therefore, accepts no liability for any costs incurred by the Client for subsequent discovery, manifestation or rectification of such conditions.

This report is intended solely for the Client named as a general indication of the visible or reported physical condition of the items addressed in the report at the time of the assessment. The material in this report reflects the Consultant's best judgment in light of the information available to it at the time of preparation.

This report and the information and data contained herein are to be treated as confidential and may be used only by the Client and its officers and employees in relation to the specific project that it was prepared for. Any use a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. The Consultant accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

The report has been written to be read in its entirety, do not use any part of this report as a separate entity.

All files, notes, source data, test results and master files are retained by GENIVAR and remain the property of the Consultant.

GENIVAR Inc.

B. Emberley

Bruce Emberley, C.E.T,
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M. Hogue

Mohammad Hogue, P. Eng.
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Appendix A

Geotechnical Assessment Report

GENIVAR

LETTER REPORT

DATE: June 4, 2012

FILE: 121-15064- 00

TO: **Mr. Lou Chubenko**
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PAGES: 8

RE: GEOTECHNICAL ASSESSMENT FOR HARBOUR VIEW RECREATION COMPLEX

A geotechnical assessment was conducted on May 18, 2012 at Harbour View Recreation Complex, Winnipeg. Based on geotechnical assessment, it was requested that subsurface conditions be determined near the existing concrete retaining wall, canopy columns and existing paving stone-walkway and comment on the proposed recommendations for remedial work.

A total of three testholes (one to refusal, 12.2m depth and two to 1.5m depth) revealed a general soil profile consisting of a layer of fill underlain by a thick clay layer over a thin till layer which extended to the depth explored. Moderate seepage and caving conditions was measured at 9.1m depth from the TILL layer after completion of drilling. Detailed descriptions of the subsurface conditions are attached as well as the testhole location plan and laboratory test results.

Findings and Comments

The general soil profile near the existing concrete retaining wall, canopy columns and existing paving stone walkway revealed a predominant clay material in the upper 3m zone. The clay material at this zone is brown and highly plastic. However, grey clay was observed at 2.3m depth followed by brown clay at 3.3m. Grey clay is again encountered at 5.5m depth. The moisture content at the first 3m zone ranges from 47% to 50%.

Typically, the color of the material is a good indicator where the actual ground water is. In this case, it is possible that there are two groundwater elevations, one at the 2m depth and another at 5.5m depth. This is backed up by unusual higher moisture content on the first three meters; naturally, the moisture content of a clay in Winnipeg ranges from 30% to 40% at the first 3m zone. It is known that slight changes of moisture content in the

magnitude of only 1 to 2% are sufficient to cause detrimental heaving or swelling. The higher moisture content and the upper grey clay layer could be the result of the retention pond water infiltrating the surrounding area and progressively increased (laterally) yearly.

Recommendations

Based on our review of the existing reports and construction drawing, the foundation system used for the retaining wall, canopy columns, docks, restaurant and golf pro store are comprised of cast-in-place(CIP) friction piles and driven treated timber friction pile (docks). The system is performing well with the exception of the canopy columns foundation; the CIP friction pile for the canopy columns are frost jacking due to shortened pile length (5m depth).

The following suggestions are supplement to the recommendations of the other consultant.

- Future wall movement could be reinforced by installation of Techno-Metal Post bearing either at a depth of 6.1m or 7.6m. The allowable bearing capacities are 86.2 and 71.8 kPa respectively for 6.1m and 7.6m depth. To minimize any potential seepage, a weeping tile placed near the underside of the retaining wall should be installed.
- Canopy columns could also be reinforced with Techno-Metal Post bearing at 4.6m depth at an allowable bearing capacity of 119.7 kPa. Otherwise, placement of rigid insulation surrounding the columns should minimize the frost penetration.
- The subgrade underneath the required granular fill of the paving stone walkway should be compacted to at least 95% STD Proctor density. Provide a positive surface drainage at this area.
- Prevent the penetration of water to crawlspaces by installation of weeping tile around the perimeter of the buildings.

Additional Consideration

Any granular fill should be compacted to 98% STD proctor density. A geotextile, preferably non-woven, is suggested to separate the granular fill from the clay subgrade. Any prepared subgrade should be proof rolled with a non-vibratory roller (equivalent to 95%STD Proctor density) and inspected by a qualified geotechnical engineer prior to placement of the overlying granular fills.

The granular material should include organic-free, non-frozen aggregate conforming to City of Winnipeg granular specifications.

Where soft but dry spots are encountered at the subgrade level, construction traffic should be restricted. Soft spots should be excavated to at least 300mm and covered with geotextile. The excavation should be replaced with a 300mm thick of 150mm down limestone. Any saturated subgrade conditions should be dried off quickly by excavation of sump pit or installation of permanent subdrains (600mm below the subgrade level) connected to positive outlet (catch basin) prior to placing the granular fill structure.

Sieve analysis and compaction testing of the granular materials should be conducted by qualified geotechnical personnel to ensure that the materials supplied and percent compactions attained are in accordance with design specifications.

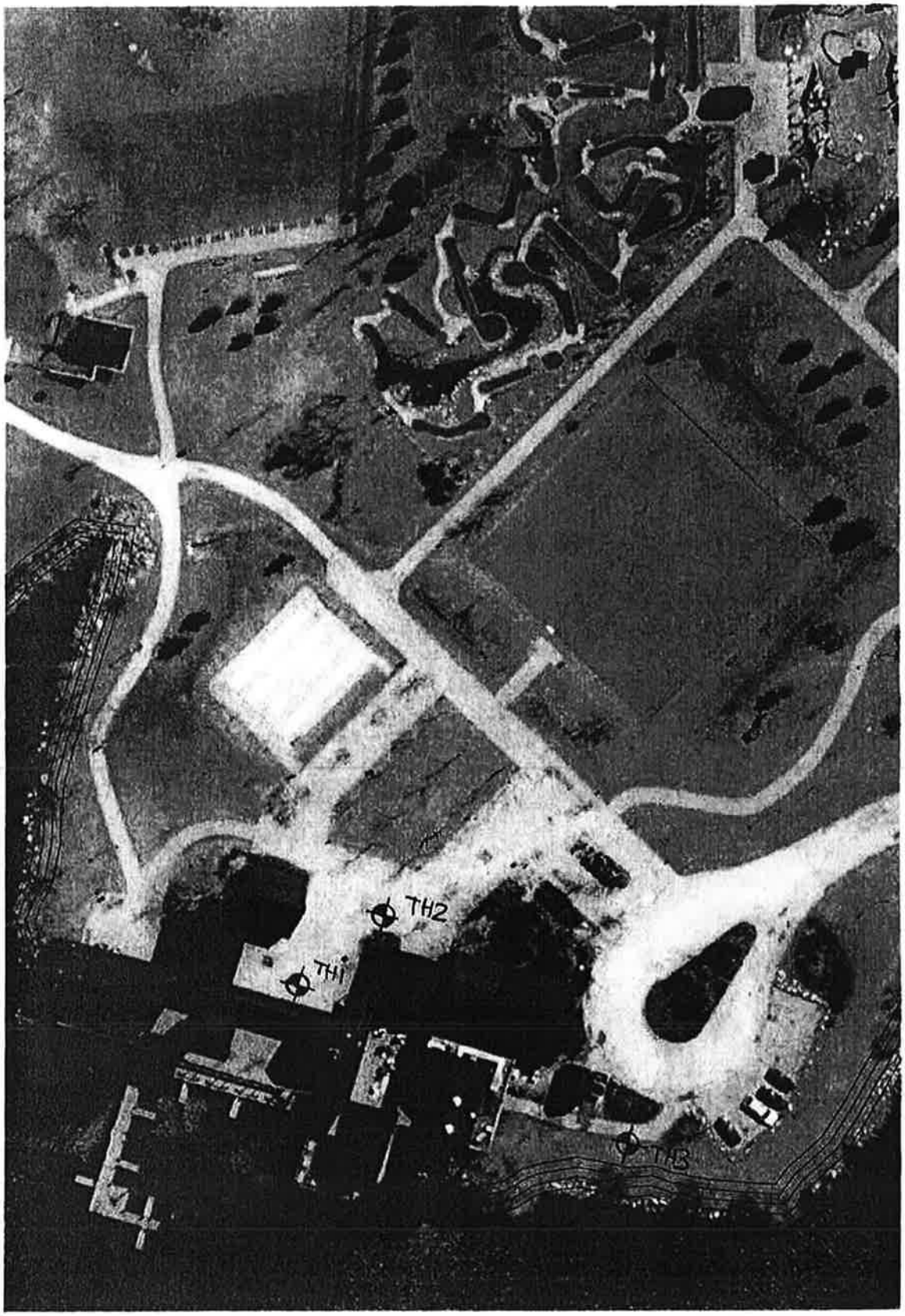
To ensure adequate site drainage, the following recommendations are made:

- A 10% slope (8 in. in 6.5 ft) should be considered for the first 1.8m(6 ft) from any foundation wall. It may be necessary to regrade at the end of the first year.
- Make sure that downspout extensions direct water away from walls. Provide splashblocks away from walls to prevent erosion and ponding.
- On a sloping site, grade from the centre out to the corners of the buildings. Provide a swale.

Concrete should be manufactured with sulphate-resistant (Type 50) cement, minimum compressive strength of 32 mPa and air content between 4% and 7%. Any concrete subject to cycles of freezing and thawing should be air entrained in accordance with the latest edition of CSA A23.1, Concrete Materials and Methods of Concrete Construction.

The findings and recommendations provided in this report were prepared in accordance with generally accepted professional engineering principles and practices. The recommendations are based on the results of field and laboratory investigations. If conditions encountered during construction appear to be different than those shown by the testholes at this site, this office should be notified immediately in order that the recommendations can be reviewed.

This report has been prepared by GENIVAR for the benefit of the client to whom it is addressed. The information and data contained herein represent GENIVAR's best professional judgment in light of the knowledge and information available to GENIVAR at the time of preparation. Except as required by law, this report and the information and data contained herein are to be treated as confidential and may be used and relied upon only by the client, its officers and employees. GENIVAR denies any liability whatsoever to other parties who may obtain access to this report for any injury, loss or damage suffered by such parties arising from their use of, or reliance upon, this report or any of its contents without the express written consent of GENIVAR and the client.


TH2
TH1
TH3

GENIVAR

Project No: 121-15064-00

TH1

Project: Harbourview Rec. Complex Assessment

Client: City of Winnipeg

Enclosure:

Location: Springfield, Winnipeg

Engineer: SSU

SUBSURFACE PROFILE

Depth (ft / m)	Symbol	Description	Elevation, m	Field Vane(m-kg)	Blows/0.3m	Pocket Penetrometer Test kPa	Water Content %
0 / 0		Ground Surface	100				
1 / 0		***FILL*** 450mm of 19mm down limestone granular fill over 150mm of CLAY FILL, mixed brown and black	99.5				
3 / 1						125	
6 / 2							
9 / 3						80	
13 / 4							
16 / 5		***CLAY*** stiff, brown, fissured; GREY at 2.4m, firm; brown at 3.3m, stiff; GREY at 5.5m, trace of fine gravel; firm at 6.1m; very soft at 10m, trace of till inclusions				120	
19 / 6						70	
23 / 7							
26 / 8						50	
29 / 9						50	
33 / 10			89.7				
36 / 11		***TILL*** medium dense, gravelly, beige, trace of cobbles and boulder; dense at 11.9m. A.R. AT 12.2M ON SUSPECTED BOULDER. WATER WAS MEASURED AT 9.1M AFTER COMPLETION OF DRILLING.					
39 / 12			87.9				
40 /							

Pocket Penetrometer Test kPa: 50 150 250 350

Water Content %: Wp 20 40 60 80 Wl

Drill Method: S/S Auger

Drill Date: 05/18/12

Hole Size: 125mm

GENIVAR
#10 Prairie Way
Winnipeg, Mb.
R2J 3J8

Datum:

Checked by: SSU

Sheet: 1 of 1

GENIVAR

Project No: 121-15064-00 **TH2**

Project: Harbourview Rec. Complex Assessment

Client: City of Winnipeg **Enclosure:**

Location: Springfield, Winnipeg **Engineer:** SSU

SUBSURFACE PROFILE

Depth (ft / m)	Symbol	Description	Elevation (ft)	Field Vane, ft-lbs	SPT (blows/0.3m)	Pocket Penetrometer Test kPa (50 150 250 350)	Water Content % (Wp 20 40 60 80 Wl)
0 / 0		Ground Surface	100				
		FILL 62.5mm of PAVING STONE over 75mm of SAND over 125mm of 19mm down of LIMESTONE GRANULAR FILL followed by NON-WOVEN GEOTEXTILE	99.8			125	
1 /							
2 /						100	
3 / 1		*CLAY* stiff, grey-black, fissured; brown at 0.8m					
4 /							
5 /			98.6			100	
		End of Testhole					
6 / 2							
7 /							
8 /							
9 /							
10 / 3							

Drill Method: S/S Auger

Drill Date: 05/18/12

Hole Size: 125mm

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#10 Prairie Way
Winnipeg, Mb.
R2J 3J8

Datum:

Checked by: SSU

Sheet: 1 of 1

GENIVAR

Project No: 121-15064-00 **TH3**

Project: Harbourview Rec. Complex Assessment

Client: City of Winnipeg **Enclosure:**

Location: Springfield, Winnipeg **Engineer:** SSU

SUBSURFACE PROFILE

Depth	Symbol	Description	Elevation(ft)	Field Vane, ft-lbs	SPT(blows/0.3m)	Pocket Penetrometer Test kPa (50 150 250 350)	Water Content % (Wp 20 40 60 80 Wl)
ft | m		Ground Surface	100				
0 – 0		***FILL*** 50mm of TOPSOIL FILL over 390mm thick of CLAY FILL, mixed brown and black	99.6			150	
1 – 2 – 3 – 1 – 4		***CLAY*** stiff, brown, fissured	98.6			100	
5 – 6 – 2 – 7 – 8 – 9 – 3 – 10		End of Testhole					

Drill Method: S/S Auger

Drill Date: 05/18/12

Hole Size: 125mm

GENIVAR
#10 Prairie Way
Winnipeg, Mb.
R2J 3J8

Datum:

Checked by: SSU

Sheet: 1 of 1

TBT ENGINEERING
CONSULTING GROUP

TBT Engineering Limited
LABORATORY
110 Paramount Road, Wpg., MB R2X 2W3
PH: 204 633-6008 Fax: 204 633-6620

Natural Moisture Content Determination

Client:	GENIVAR	TBTE Project No.:	W12-705 K
Project:	Harbour View	Lab Sample No's:	8244 - 8253
		Reported By:	VM
Report To:	Silvestre Urbano, P. Eng.	Report Date:	May 31, 2012
		Reviewed By:	P. Bern

Lab No.:	8244	8245	8246	8247	8248	8249
Borehole No	TH1	TH1	TH1	TH1	TH1	TH1
Sample ID:						
Depth, (ft):	5	10	15	20	25	30
% Moisture	47.0	49.6	46.8	47.3	55.3	49.3
Remarks:						

Lab No.:	8250	8251	8252	8253
Borehole No.	TH1	TH2	TH2	TH2
Sample ID:				
Depth, (ft):	34	0.5	1.5	5
% Moisture	27.3	5.5	31.8	44.4
Remarks:				

Lab No.:	
Borehole No.	
Sample ID:	
Depth, (ft):	
% Moisture	
Remarks:	

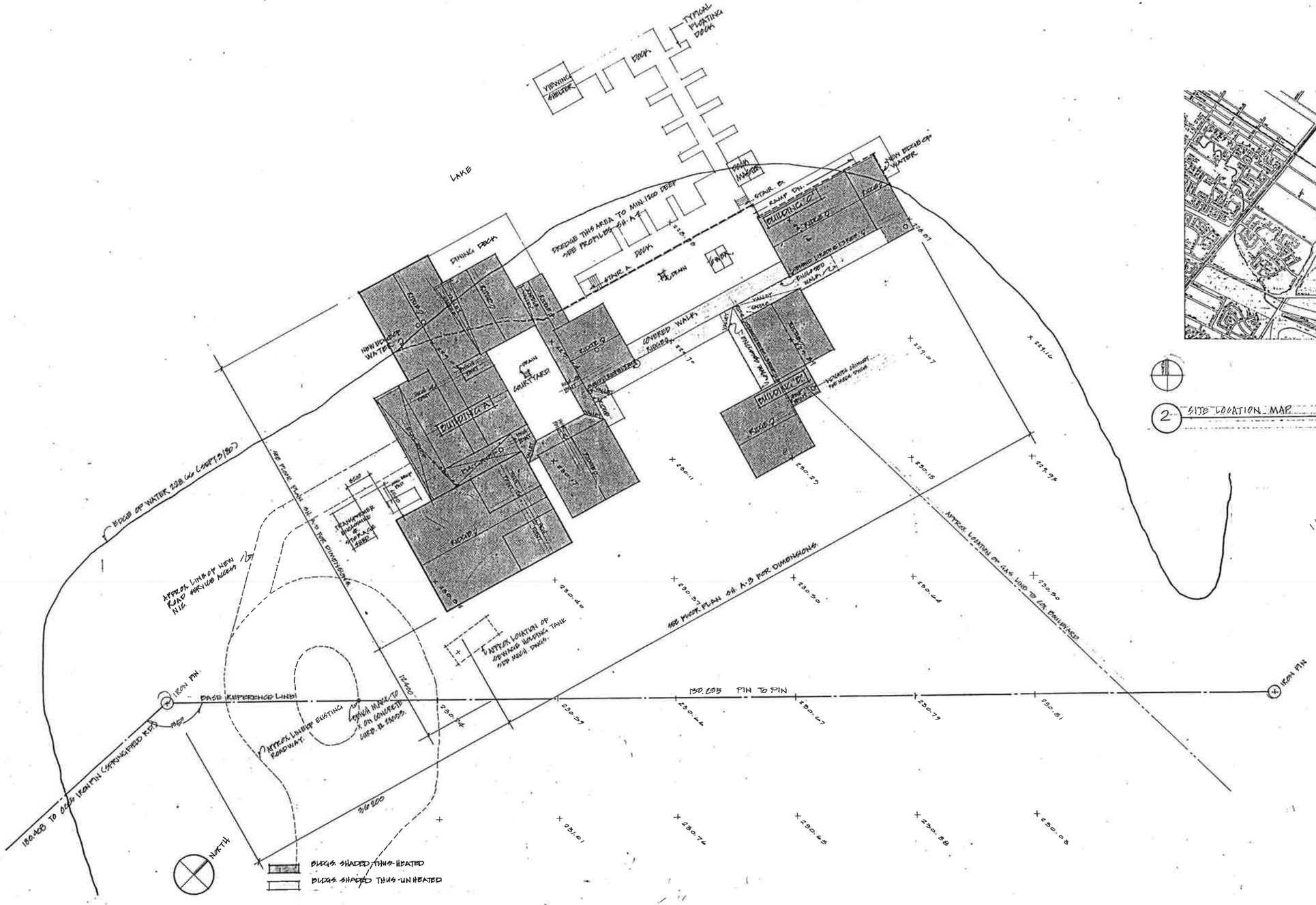
Test Procedure: ASTM D 2216

Remarks:

CCIL & CSA Certified

Appendix B

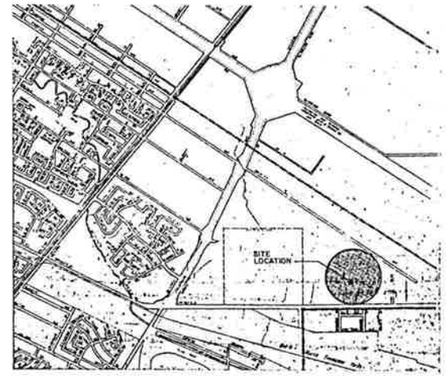
Existing IKOY Reference Drawings



1 SITE PLAN GENERAL

1:600

NOTE: GRADES SHOWN BASED ON SURVEY DRAWING DATED SEPT 4, 1980 BY CITY OF WINNIPEG.
SEE SH. A-2 SITE PLAN FOR GRADING.
SEE FLOOR PLAN SH. A-3 FOR DIMENSIONS.



2 SITE LOCATION MAP

IKOY
WINNIPEG REGINA THUNDER BAY

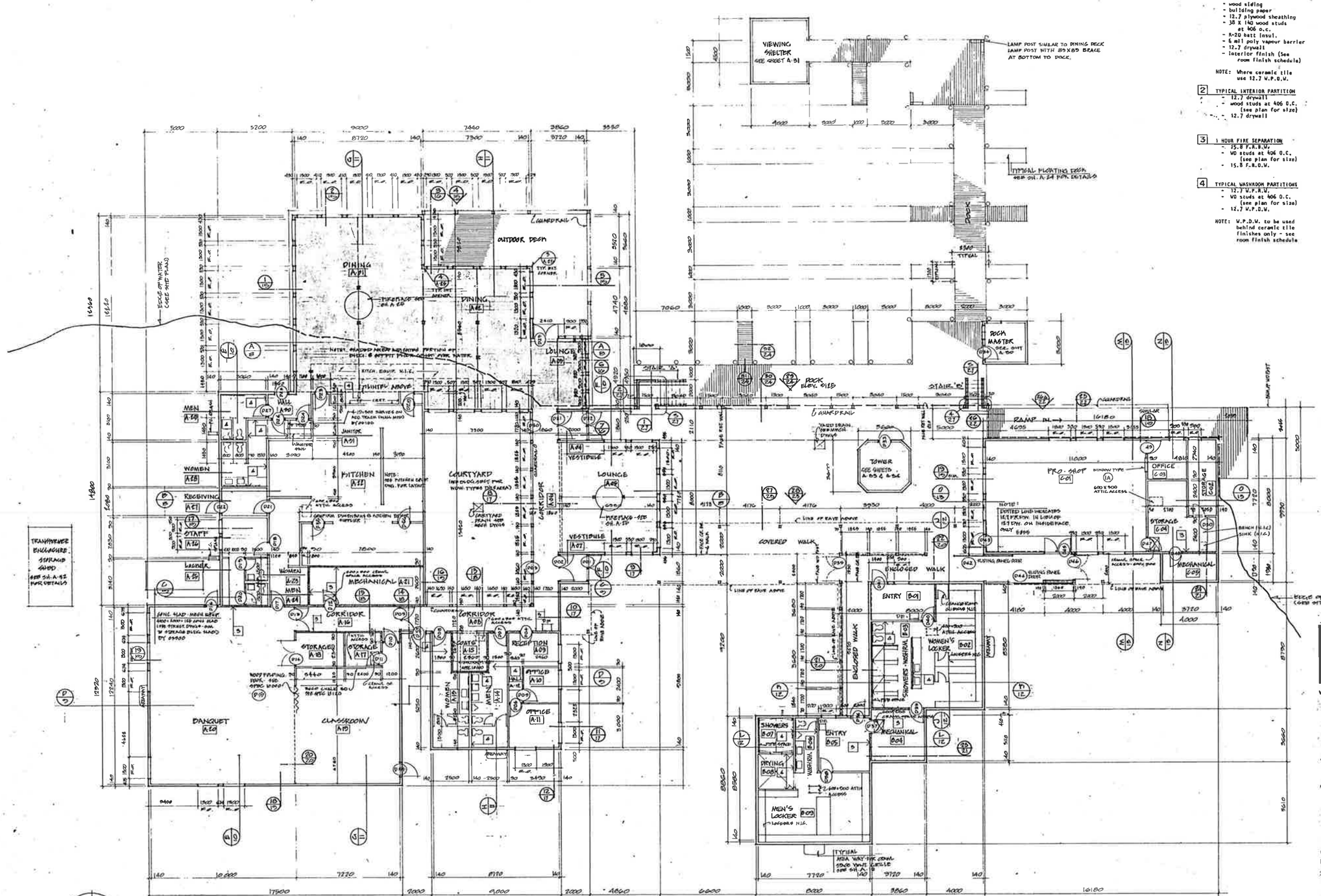
PROVINCE OF MANITOBA
A.S. YAMASHITA
REGISTERED ARCHITECT

R.D. KEENBERG
Designer
Approved by
General Manager
Parks and Recreation
City of Winnipeg
Director of Civic Properties
City of Winnipeg

PROJECT
NORTHEAST PARK RECREATION BUILDING
FOR
THE CITY OF WINNIPEG

SHEET TITLE
SITE PLAN - GENERAL

DRAWN BY
CHECKED
DATE NOV 80
FILE 80 107
SHEET NO. A1



1 FLOOR PLAN

SCALE: 1:100

NOTE: SEE SH. A-14 FOR ENLARGED FLOOR PLAN BLDG 'B' (LOCKER ROOM)
SEE SH. A-14 FOR WASHROOM ELEVATIONS
SEE SH. A-25 FOR WINDOW ELEVATIONS & TYPES

GENERAL NOTES

- All dimensions are to face of stud or face of concrete unless otherwise noted.
- See sheet A-27 for stair notes and details.
- See sheet A-14 for large scale floor plan building 'B' and all washroom elevations.
- See spec. for door and room finish and colour schedules.
- See floor plan or spec. for wall type, floor type, roof type and suspended ceiling type schedules.
- All exterior wall to be wall type [1] unless otherwise noted.
- All interior partitions to be type [2] unless otherwise noted.

[1] TYPICAL EXTERIOR WALL
- wood siding
- building paper
- 12.7 plywood sheathing
- 38 X 140 wood studs at 406 o.c.
- R-20 batt insul.
- 6 mil poly vapour barrier
- 12.7 drywall
- interior finish (See room finish schedule)

NOTE: Where ceramic tile use 12.7 W.P.B.W.

[2] TYPICAL INTERIOR PARTITION
- 12.7 drywall
- wood studs at 406 O.C. (see plan for size)
- 12.7 drywall

[3] 1 HOUR FIRE SEPARATION
- 15.8 F.R.B.W.
- WD studs at 406 O.C. (see plan for size)
- 15.8 F.R.B.W.

[4] TYPICAL WASHROOM PARTITIONS
- 12.7 W.P.R.W.
- WD studs at 406 O.C. (see plan for size)
- 12.7 W.P.B.W.

NOTE: W.P.B.W. to be used behind ceramic tile finishes only - see room finish schedule

Letter indicates building section

Number indicates wall section

Indicates elevation

Indicates wall type

Indicates door number

Indicates window type

IKOY
WINNIPEG REGINA THUNDER BAY

PROVINCE OF MANITOBA — A. S. YAMASHITA — REGISTERED ARCHITECT

R D KEENBERG
Designer

Approved
General Manager
Parks and Recreation
City of Winnipeg

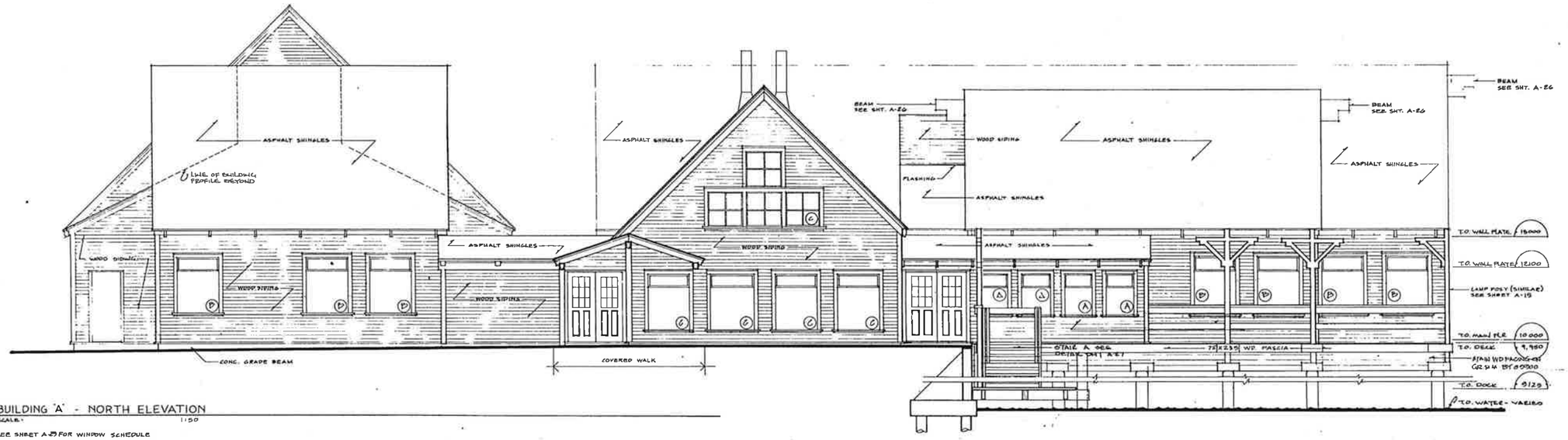
Director of Civic Properties
City of Winnipeg

PROJECT
NORTHEAST PARK RECREATION BUILDING
FOR
THE CITY OF WINNIPEG

SHEET TITLE
FLOOR PLAN

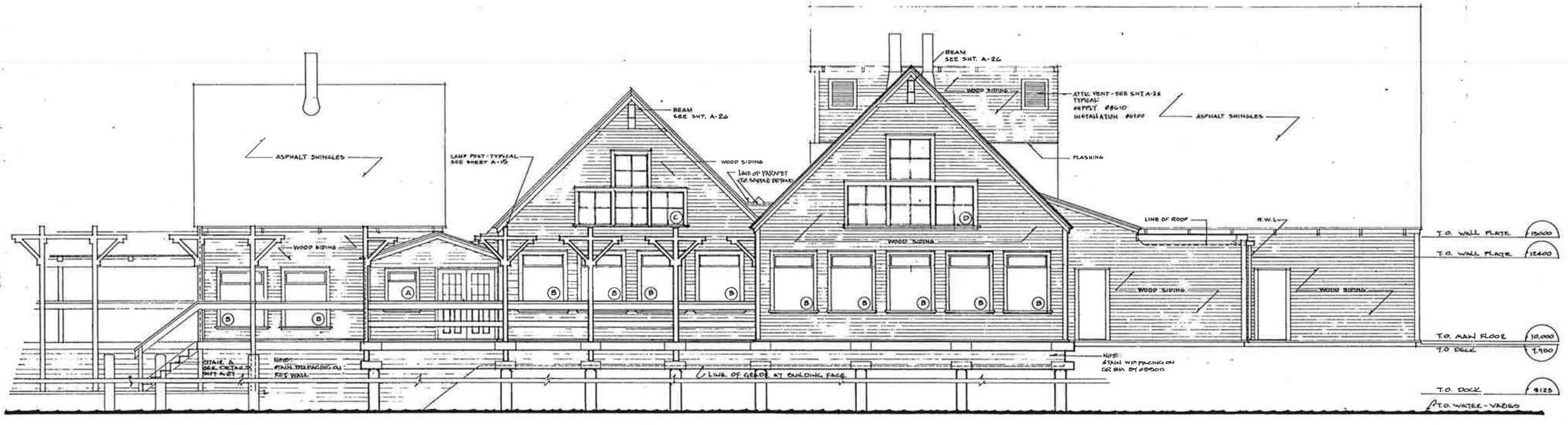
DRAWN BY
DATE NOV 80
CHECKED
FILE 80 107

SHEET NO
A3



1 BUILDING 'A' - NORTH ELEVATION
SCALE: 1:50

*SEE SHEET A-29 FOR WINDOW SCHEDULE



2 BUILDING 'A' - WEST ELEVATION
SCALE: 1:50

*SEE SHEET A-29 FOR WINDOW SCHEDULE

IKOY
WINNIPEG REGINA THUNDER BAY

R D KEENBERG
Designer

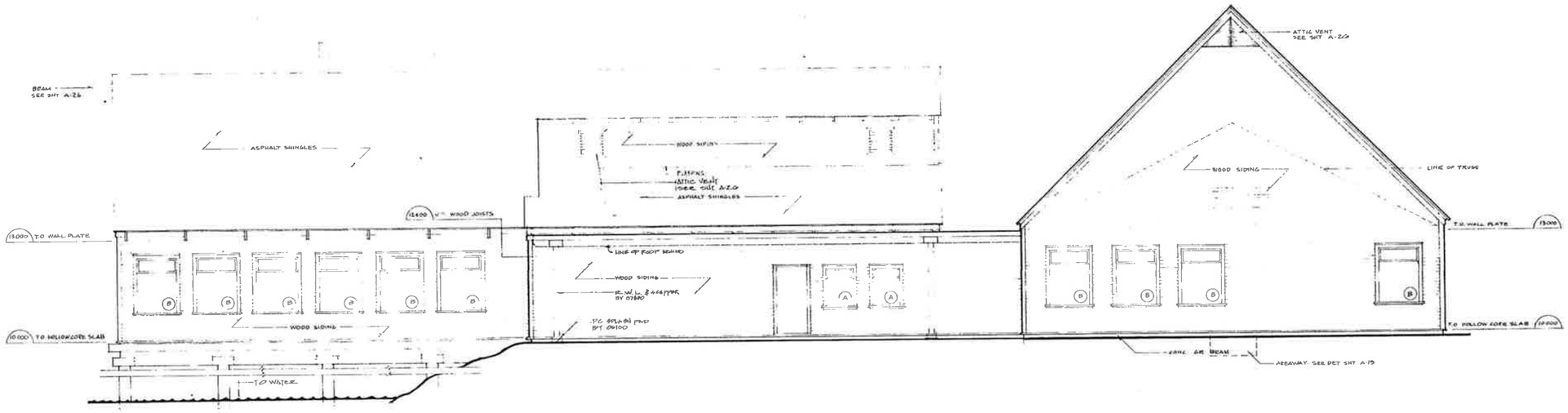
Approved by
J. O. YAMASHITA
REGISTERED ARCHITECT
General Manager
Parks and Recreation
City of Winnipeg

Director of Civic Properties
City of Winnipeg

PROJECT
NORTHEAST PARK RECREATION BUILDING
FOR
THE CITY OF WINNIPEG

SHEET TITLE
ELEVATIONS
BUILDING A
NORTH & WEST

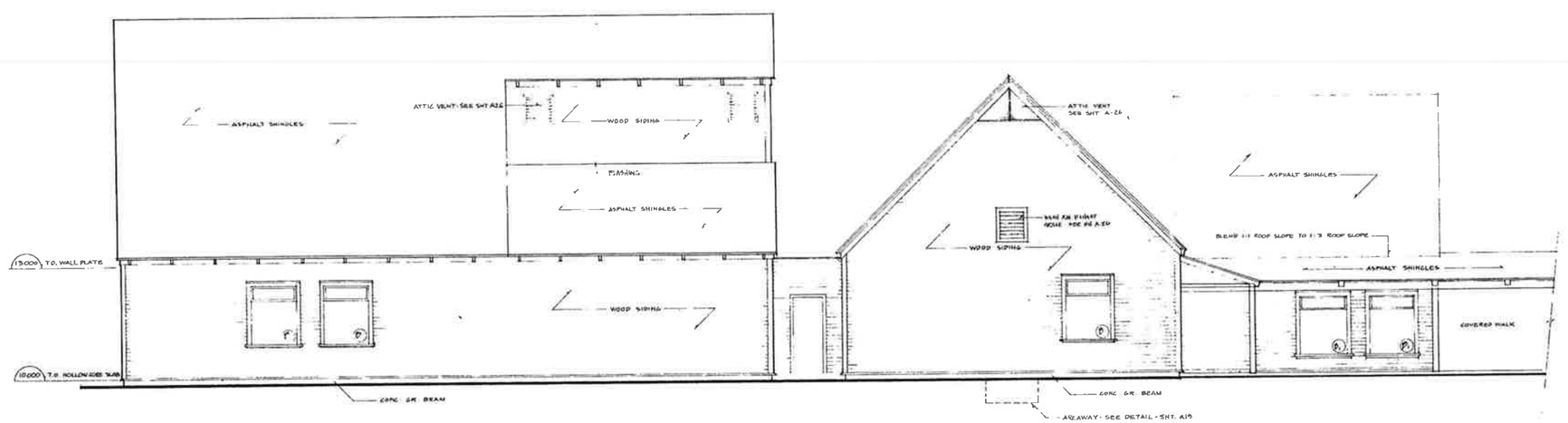
DRAWN BY
DATE NOV 80
CHECKED
FILE 80 107
SHEET NO A4



1 BUILDING 'A' - SOUTH ELEVATION

SCALE 1:50

SEE SHEET A-29 FOR WINDOW SCHEDULE



2 BUILDING 'A' - EAST ELEVATION

SCALE - 1:50

SEE SHEET A-29 FOR WINDOW SCHEDULE

IKOY

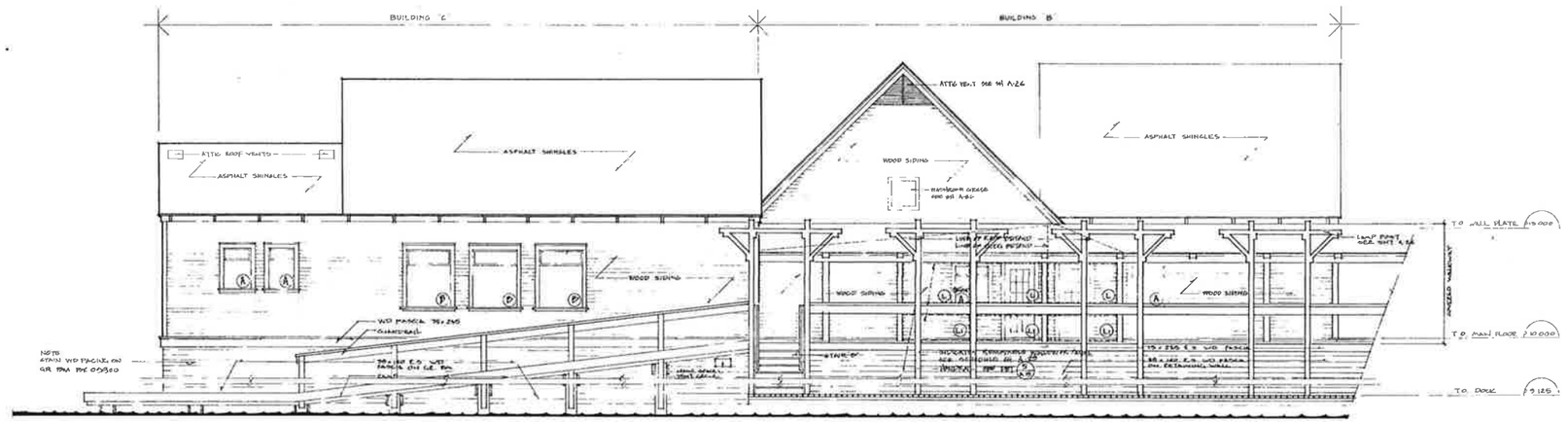
WINNIPEG REGINA THUNDER BAY

R.D. REENBORG

PROJECT
NORTHEAST PARK RECREATION BUILDING
FOR
THE CITY OF WINNIPEG

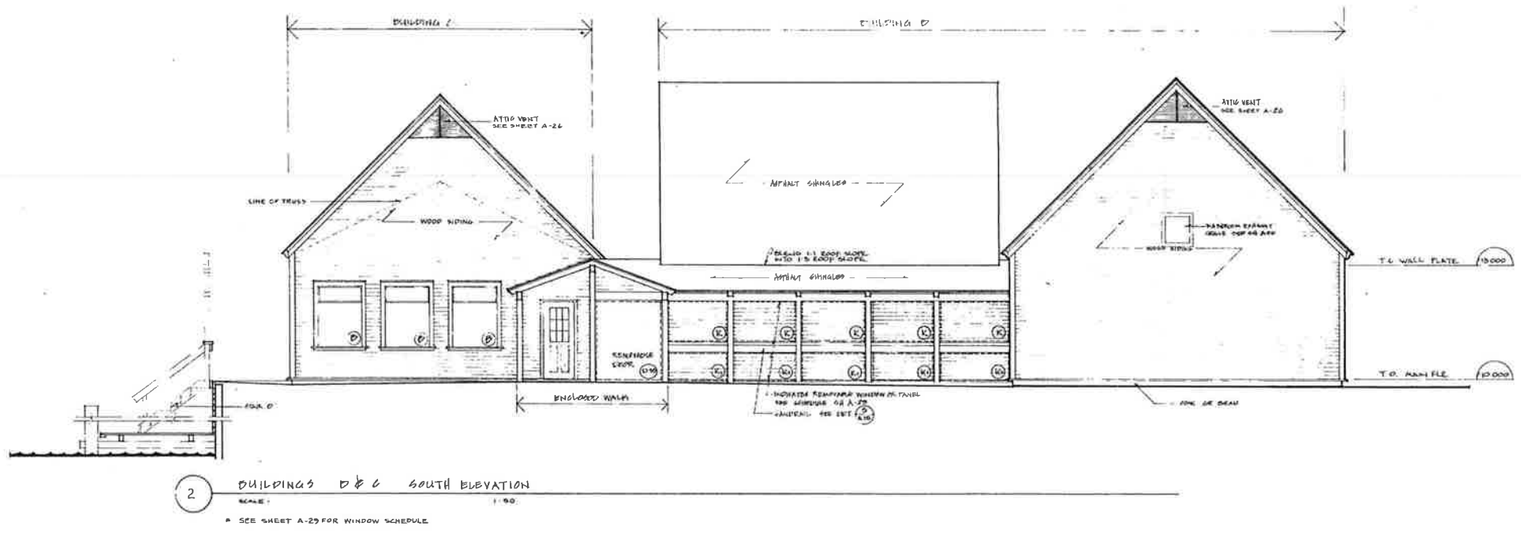
SHEET TITLE
ELEVATIONS BUILDING 'A' SOUTH & EAST

DRAWN BY SHEET NO.
CHECKED DATE
A5



1 BUILDINGS B&C - WEST ELEVATION
SCALE 1:50

* SEE SHEET A-29 FOR WINDOW SCHEDULE



2 BUILDINGS D & C SOUTH ELEVATION
SCALE 1:50

* SEE SHEET A-29 FOR WINDOW SCHEDULE

IKOY
WINNIPEG REGINA THUNDER BAY

R.D. KEEMBERG
Designer

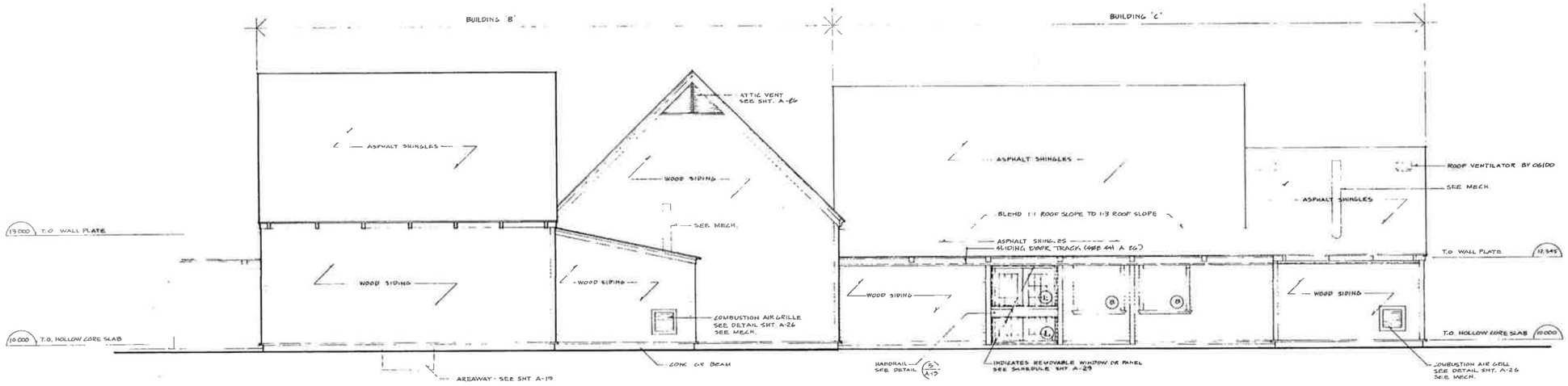
General Manager
Parks and Recreation
City of Winnipeg

General Civic Properties
City of Winnipeg

PROJECT
NORTHEAST PARK RECREATION BUILDING
FOR
THE CITY OF WINNIPEG

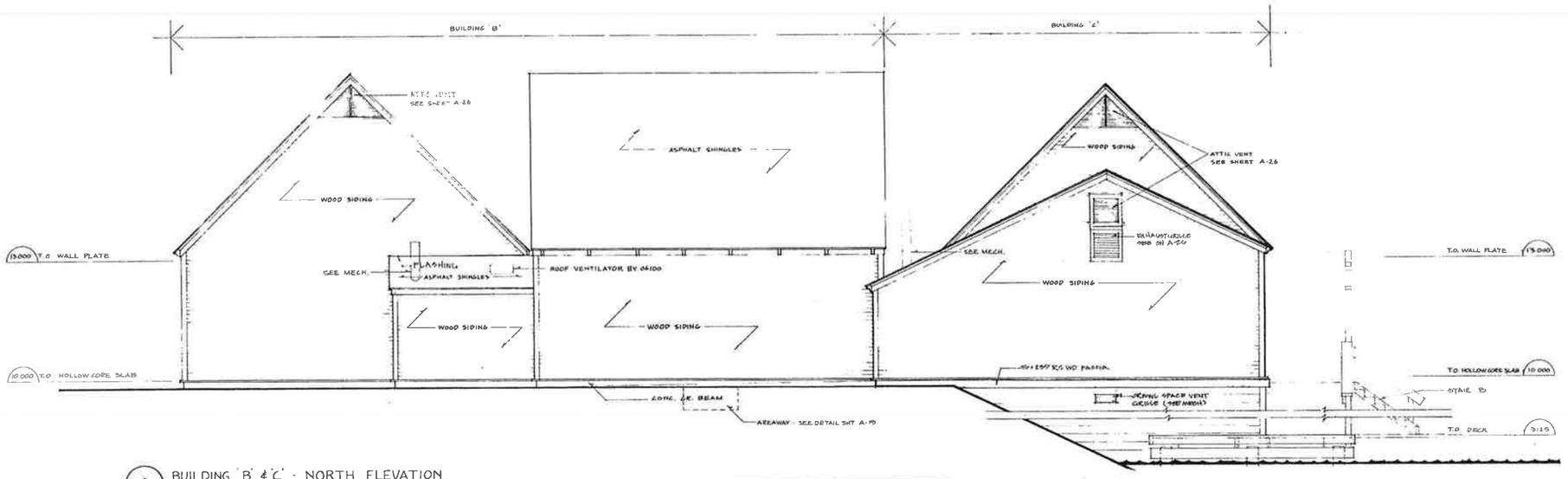
SHEET TITLE
ELEVATIONS
BUILDINGS B&C
WEST & SOUTH

DRAWN BY
CHECKED
DATE NOV 80
FILE 80.107
SHEET NO A6



1 BUILDINGS 'B & C' - EAST ELEVATION
SCALE 1:50

* SEE SHEET A-29 FOR WINDOW SCHEDULE



2 BUILDING 'B' & 'C' - NORTH ELEVATION
SCALE 1:50

IKOY

WINNIPEG REGINA THUNDER BAY

R D KEENBERG
Designer
Approved by

General Manager
Parks and Recreation
City of Winnipeg

Director of Civic Properties
City of Winnipeg

PROJECT
NORTHEAST PARK RECREATION BUILDING
FOR
THE CITY OF WINNIPEG

SHEET TITLE
ELEVATIONS
BUILDINGS B & C
EAST & NORTH

DRAWN BY
DATE
SCALE
SHEET NO
A7

PILE DIA. ~ PILE LENGTH

CONCRETE FRICTION PILES

TREATED TIMBER PILES
300 BUTT / 200 TIP
DRIVEN TO DEVELOP 30 KIPS
MAXIMUM LOADING

- GENERAL NOTES ON DRWG S3
- FOUNDATION NOTES ON DRWG S-2
- MAIN FLOOR EL. 10.000
- DOCK LEVEL 9125
- DOCK MASTERS BLDG. 9175
- ELEVATION TOP OF PILES 9.200 UNLESS SHOWN OTHERWISE

EL. TOP OF POSTS TO SUIT ARCH. DETAILS

ELEVATION TOP OF PILES VARIES

APPROX. LOCATION OF WATER LINE

PROVIDE 4 - 400 DIA. X 5000 PILES @ 212, 213, 214 & 215 FOR TRANSFORMER PADS SEE S7

110 PILES ±

110½ PILES

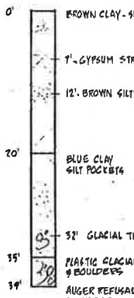
FOUNDATION PLAN

SCALE 1:100

For Answers To All Questions Relating To Structural Drawings, Phen Drawings or Site Inspection Please Contact Mr. N. Penner of: Penner & Keeler Partners, Winnipeg (775 8527

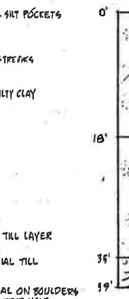
AS BUILT DRAWING APRIL 15/82

TEST HOLE LOGS



AUGER REFUSAL ON BOULDERS 1' WATER IN TEST HOLE IMMEDIATELY.

TEST HOLE NO. 1

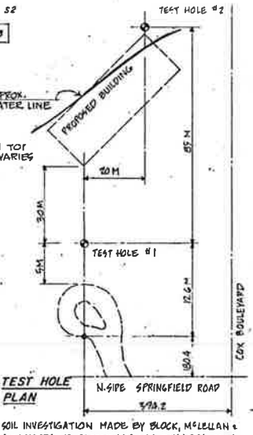


AUGER REFUSAL ON BOULDERS. 11' WATER IN TEST HOLE IMMEDIATELY.

TEST HOLE NO. 2

FOUNDATION NOTES DRWG S2

GENERAL NOTES ON DRWG. S3



TEST HOLE PLAN

N-SIDE SPRINGFIELD ROAD

SOIL INVESTIGATION MADE BY BLOCK, McLELLAN & ASSOCIATES, 18 SWEETWOOD BAY, WINNIPEG, MAN. REFER TO THEIR REPORT DATED OCT. 20, 1980.

W. H. MILLEY AND ASSOCIATES
CONSULTING STRUCTURAL ENGINEERS
1383 PEMBINA HIGHWAY WINNIPEG 453-1475

IKOY
WINNIPEG REGINA THUNDER BAY

General Manager
Parks and Recreation
City of Winnipeg

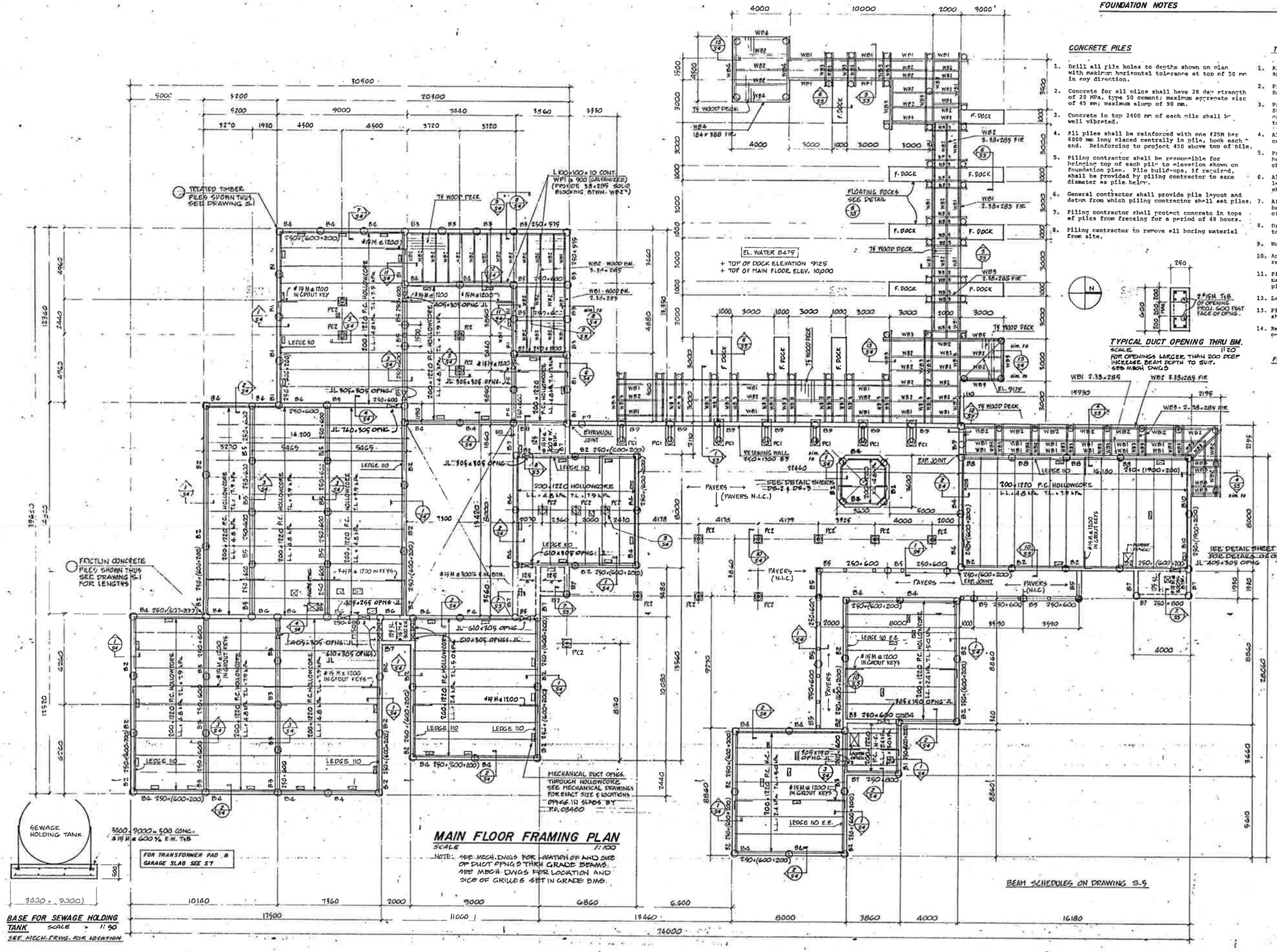
Director Of Civic Properties
City of Winnipeg

PROVINCE OF MANITOBA
8043
W. H. MILLEY
REGISTERED ENGINEER

PROJECT
NORTHEAST PARK RECREATION BUILDING
FOR
THE CITY OF WINNIPEG

FOUNDATION PLAN

DRAWN BY	DATE	SHEET NO.
K.D.	DEC. 1980	S-1
ISSUED	FILE	
	80.43	



MAIN FLOOR FRAMING PLAN

SCALE 1:100

NOTE: SEE MECH. DWGS FOR LOCATION OF AND SIZE OF DUCT OPNGS THRU GRADE BEAMS. SEE MECH DWGS FOR LOCATION AND SIZE OF GRILLES SET IN GRADE BMS.

BASE FOR SEWAGE HOLDING TANK SCALE = 1:50
SEE MECH. DRWG. FOR LOCATION

FOUNDATION NOTES

CONCRETE PILES

1. Drill all pile holes to depths shown on plan with maximum horizontal tolerance at top of 50 mm in any direction.
2. Concrete for all piles shall have 28 day strength of 20 MPa, type 50 cement; maximum aggregate size of 45 mm; maximum slump of 90 mm.
3. Concrete in top 2400 mm of each pile shall be well vibrated.
4. All piles shall be reinforced with one 25M bar 6000 mm long placed centrally in pile, hook each end. Reinforcing to project 450 above top of pile.
5. Piling contractor shall be responsible for bringing top of each pile to elevation shown on foundation plan. Pile build-ups, if required, shall be provided by piling contractor to same diameter as pile below.
6. General contractor shall provide pile layout and datum from which piling contractor shall set piles.
7. Piling contractor shall protect concrete in tops of piles from freezing for a period of 48 hours.
8. Piling contractor to remove all boring material from site.

TIMBER PILES

1. All wood piles shall conform with CSA 056-1962 spec. with min. butt size of 305 mm & tip 200mm.
2. Piles may be Pacific coast Douglas Fir, Jack Pine, Red Norway Pine or Lodgepole Pine, all peeled.
3. Pressure treat all piles to CSA Spec. 080-1970, Standard 080.3 to a net retention of 190 kg. of creosote per M^3 of wood. Creosote shall conform to CSA Spec. 080-P1-1970.
4. All timber piles shall be driven to a safe load capacity of 30 kips in friction capacity.
5. Predrill holes for timber piles so that maximum horizontal tolerance of top of pile from position shown shall be 75 mm.
6. All piles must be driven so that tops are above levels shown on drawings. Final pile cut-off shall be by general contractor.
7. After pile cut-off, general contractor shall bevel tops of piles as shown and apply two coats of hot creosote, brushed liberally into wood.
8. Drilling and placement of all steel anchors in tops of piles shall be by general contractor.
9. No pile load test required for this project.
10. Any damaged or out-of-alignment piles shall be removed and replaced by piling contractor.
11. Piling contractor shall be responsible for all materials, methods and equipment necessary for placement of timber piles in water location.
12. Layout of piles by general contractor.
13. Pile driving record shall be kept at site and shall be available to consultants at any time.
14. Removal of pile top cut-offs shall be by the general contractor.

FOR GENERAL NOTES SEE S3

TYPICAL DUCT OPENING THRU BM.
SCALE 1:20
FOR OPENINGS LARGER THAN 200 DEEP INCREASE BEAM DEPTH TO SUIT. SEE MECH DWGS

W. H. MILLEY AND ASSOCIATES
CONSULTING STRUCTURAL ENGINEERS
1383 PEMBINA HIGHWAY WINNIPEG 452-1473

IKOY
WINNIPEG REGINA THUNDER BAY

Approved
General Manager Parks and Recreation City of Winnipeg
Director Public Properties City of Winnipeg

PROVINCE OF MANITOBA 2043 W. H. MILLEY REGISTERED ENGINEER

PROJECT
NORTHEAST PARK RECREATION BUILDING
FOR
THE CITY OF WINNIPEG

SHEET TITLE
MAIN FLOOR FRAMING PLAN

DRAWN BY	DATE	SHEET NO
K.D.	DEC. 1980	S2
TRACED	FILE	
wm	80.43	

AS BUILT DRAWING APRIL 15 82

Appendix C

Figure LDS-1 & Figure LDS-2

GENIVAR
10 PRAIRIE WAY, WINNIPEG, MANITOBA R3J 3J8
PH: (204)-477-6650 FAX: (204)-474-2864

City of Winnipeg
HARBOURVIEW RECREATION COMPLEX
LAND DRAINAGE SYSTEM ANALYSIS

DATE:	SCALE:	REFERENCE JOB. NO.	FIG NO.
JUNE 6/12	N.T.S.	121-15064-00	LDS-1

GENIVAR

10 PRAIRIE WAY, WINNIPEG, MANITOBA R3J 3J8
PH: (204)-477-6650 FAX: (204)-474-2864

City of Winnipeg

HARBOURVIEW RECREATION COMPLEX

LAND DRAINAGE SYSTEM ANALYSIS

DATE:	SCALE:	REFERENCE JOB. NO.	FIG NO.
JUNE 6/12	N.T.S.	121-15064-00	LDS-2

Appendix D

Recreation Complex Topographic Survey

GENIVAR

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City of Winnipeg

HARBOURVIEW RECREATION COMPLEX

WATER MITIGATION STUDY – COURTYARD AREA

DATE:	SCALE:	REFERENCE JOB. NO.	FIG NO.
JUNE 6/12	N.T.S.	121-15064-00	3

Appendix E

City of Winnipeg Design Guidelines

2006 CITY OF WINNIPEG ACCESSIBILITY DESIGN STANDARDS

4.1.4 ACCESSIBLE ROUTES, PATHS & CORRIDORS

RATIONALE

Routes of travel to and through a *facility* should address the full range of individuals that may use them. They must provide the *clear* width necessary for persons using wheelchairs or scooters, those pushing strollers or those traveling in pairs. Consideration should be given not just to the width of items, such as wheelchairs and scooters, but also to their maneuverability. While a corridor may be wide enough for a person to drive a scooter in a straight line, it may not be possible to make a turn around a corner.

Gradual sloped walkways are the preferred means of changing level, rather than *ramps* or lifts.

Street furniture such as benches, newspaper boxes, utility boxes or bike racks, should not infringe on the *clear* width of access routes, paths or corridors.

Minimum *clear* widths should be maintained when temporary barriers are erected around a construction *site*.

Strong *colour contrasts* and/or *tactile* pathways set into floors or sidewalks may be used to assist individuals with a visual *impairment* to negotiate an environment. Edge protection that guards a change in level is an important safety feature for all users.

Covered routes are preferred in exterior locations, or alternatively the incorporation of snow-melting systems. Snow accumulation at routes should be removed completely after each snow fall.

Accessible routes should be designed to reflect good wayfinding principles. Wayfinding is a term used to describe the spatial problem-solving process that a persons uses to reach a destination. A mental 'map' is formed of the overall setting and the desired destination. This map is based on information obtained from orientation cues that are available from the setting's environment. These cues include not only *signage*, but also overall spatial forms, structures, sounds, surface textures, colours, illumination levels, architectural features, etc.

Tactile maps and/or recorded instructions can augment orientation cues and enable people to find their way throughout a *facility* independently, even in complex settings. A well-designed setting can thus be spatially gratifying and simple enough for persons to

'wayfind' if there are adequate, varied, and non-conflicting wayfinding cues available to the individual user.

APPLICATION

Wherever possible, all routes, paths or corridors shall comply with this section.

At least one *accessible route* complying with this section shall be provided within the boundary of the *site* from *accessible* parking *spaces*, passenger-loading zones (if provided), and public streets or sidewalks to the *accessible facility entrance* they serve. The *accessible route* shall, to the maximum extent feasible, coincide with the route for the general public.

At least one *accessible route* shall connect *accessible buildings*, *facilities*, *elements* and *spaces* that are on the same site. It is preferable to have all routes *accessible*.

Accessible routes are permitted to include *ramps*, *curb ramps*, *stairs*, elevators or other elevating devices (as permitted in 4.1.15) where there exists a difference in elevation.

Where a *facility* is on a sloped site and is accessible from street level at different floors, persons with *disabilities* shall not be required to travel outside to gain access to another floor.

Except where essential obstructions in a work area would make an *accessible route* hazardous, an *accessible route* shall connect *accessible entrances* with all *accessible spaces* and *elements* within the *facility*. An *accessible route* complying with this section shall be provided within all normally *occupiable* floor areas. It is not appropriate to have only some areas *accessible*. Exceptions: The provision of an *accessible route* does not apply

- to *service* rooms
- to elevator machine rooms
- to janitor rooms
- to *service spaces*
- to crawl *spaces*
- to *attic* or *roof spaces*
- to high-hazard industrial occupancies
- within portions of a floor area with fixed seats in an *assembly occupancy* where these portions are not part of an *accessible route* to *spaces* designated for wheelchair use; or
- within a suite of residential occupancy.

DESIGN REQUIREMENTS

The minimum *clear* width of *accessible routes* shall be 1100 mm (43-1/4 in.) except

- for exterior routes, it shall be 1220 mm (48 in.);
- at *ramps* - refer to 4.1.9;
- at doors - refer to 4.1.6;

- where additional maneuvering *space* is required at doorways (See 4.1.6);
- at U-turns around obstacles less than 1220 mm (48 in.) wide, it shall be 1220 mm (48 in.); and
- where *space* is required for two wheelchairs to pass, it shall be 1830 mm (72 in.).

Every *accessible route* less than 1830 mm (72 in.) wide shall be provided with an unobstructed passing *space* of not less than 1830 mm (72 in.) in width and 1830 mm (72 in.) in length, located not more than 30 meters (98 ft. 5 in.) apart.

Accessible *routes* shall
- have a longitudinal grade not steeper than 1:20 (5%); and
- have minimal *cross slope*, but never steeper than 1:50 (2%).

(Where *technically infeasible* to achieve 2%, maximum shall never exceed 1:30 (3.3%).
Accessible routes, paths or corridors having a longitudinal grade steeper than 1:20 (5%) shall be designed as *ramps*, in compliance with 4.1.9.

Wherever possible, dead-end corridors should be avoided. Where dead-end corridors cannot be avoided, they shall be no greater than 6000 mm (19 ft.-8 in.) in length, and feature a 2440 mm (96 in.) diameter turn-around space at the end of the corridor.

Where the edges of *accessible routes* are adjacent to a vehicular route, they shall be separated from it by
- a curb with a *curb ramp*;
- a railing or barrier; or
- a *truncated dome detectable warning* surface in compliance with 4.1.8

Except at sidewalks along roadways, stairs and at elevated platforms such as performance areas or loading docks, where the edges of *accessible* routes, paths or corridors are more than 200 mm (7-7/8 in.) above an adjacent surface, they shall be protected by

- a continuous *colour contrasting* curb at least 75 mm (3 in.) high, or
- by a continuous *tuncated dome detectable warning surface* which is at least 600 mm (23-1/2 in.) wide and in compliance with 4.1.8.

Except at stairs and at elevated platforms such as performance areas or loading docks, where the edges of *accessible routes*, paths or corridors are more than 460 mm (18 in.) above with the adjacent surface, they shall incorporate

- an 865-915 mm (34-36 in.) high *handrail* in compliance with 4.1.8, or
- a *guard* which meets the requirements of the Manitoba Building Code.

Accessible routes shall not require people to pass behind parked vehicles unless the *accessible* route is separated from the parking space by a curb, railing or other barrier.

Where there is a change in direction along an *accessible route* and the intended destination of the route is not evident, directional *signage* shall be provided.

All portions of *accessible routes* shall be equipped to provide a level of illumination of at least 50 lux (4.6 ft-candles). Exception: Outdoor *park* settings where routes are not normally illuminated.

Provide designated areas for snow piling from all major exterior routes, away from pedestrian routes.

Accessible routes shall incorporate level rest areas that

- are spaced no more than 30 metres (98 ft. - 5 in.) apart; and
- incorporate bench seating in compliance with 4.3.15.

RELATED SECTIONS

4.1.2 Ground and Floor Surfaces
4.1.9 Ramps
4.3.3 Elevated Areas and Platforms
4.3.15 Benches
4.3.17 Streetscape
4.4.7 Signage
4.4.8 Detectable Warning Surfaces
4.4.12 Glare and Light Sources
4.4.13 Lighting
4.4.14 Materials and Finishes
4.4.15 Texture and Colour

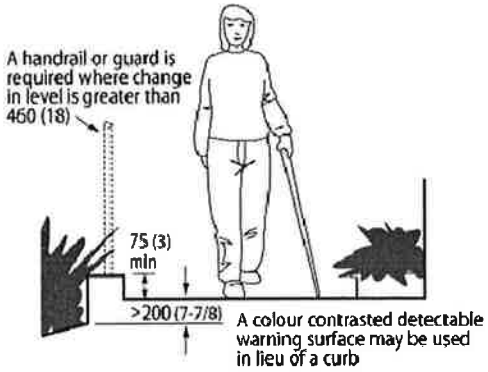

Figure 4.1.4.1

Edge Protection

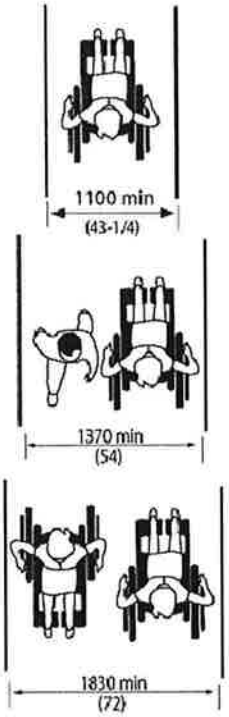

Figure 4.1.4.2

Recommended Minimum Access Widths (Refer also to 4.3.17 for widths of public sidewalks)

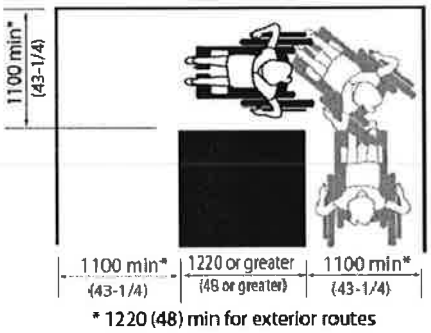

Figure 4.1.4.3

Turn around an Obstacle

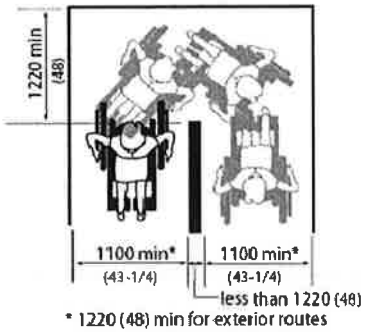

Figure 4.1.4.4

Turn around an Obstacle

Please see 5.0 IMPLEMENTATION AND ENFORCEMENT

Last update: January 15, 2010

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2006 CITY OF WINNIPEG ACCESSIBILITY DESIGN STANDARDS

4.1.5 ENTRANCES

RATIONALE

Design decisions concerning *entrances* will have an immediate impact on the independence and dignity of everyone entering a *facility*. Entrances that address the full range of individuals using the *facility* promote a spirit of inclusion that separate accessible *entrances* do not.

Features such as canopies are recommended to minimize the impact of weather conditions and also make an *entrance* more obvious to someone with a cognitive *disability* or someone *unfamiliar* with the *facility*.

APPLICATION

All *entrances* used by staff or the public shall be *accessible* and comply with this section. In *retrofit* situations where it is *technically infeasible* to make all staff and public *entrances* accessible, at least 50% of all staff *entrances* and 50% of all public *entrances* shall be accessible and comply with this section.

In *retrofit* situations where it is *technically infeasible* to make all staff and public *entrances accessible*, the primary *entrances* used by staff and the public shall be *accessible* and comply with this section.

Accessible public *entrances* must be provided in a number at least equivalent to the minimum number of exits required by the Manitoba Building Code. (This paragraph does not require an increase in the total number of public *entrances* required for a *facility*.)

An *accessible* public *entrance* must be provided to each tenancy in a *facility*.

In police stations subject to 4.5.8, public *entrances* that are secured shall be *accessible* as required in 4.5.8.

If direct access is provided for pedestrians from an enclosed parking garage to the *facility*, at least one direct *entrance* from the parking garage to the *facility* must be *accessible*.

If access is provided for pedestrians from a pedestrian tunnel or elevated walkway, one *entrance* to the *facility* from each tunnel or walkway must be *accessible*.

If the only *entrance* to a *facility* or tenancy is a *service entrance*, that *entrance* shall be *accessible*.

Entrances which are not *accessible* shall have directional *signage* complying with 4.5.7 which indicates the nearest *accessible entrance*.

Accessible entrances shall be identified with *signage* complying with applicable provisions of 4.5.7.

RELATED SECTIONS

4.1.1 Space and Reach Requirements
4.1.6 Doors
4.1.7 Gates, Turnstiles and Openings
4.1.8 Windows, Glazed Screens and Sidelights
4.3.17 Streetscape
4.4.2 Controls and Operating Mechanisms
4.4.7 Signage
4.4.10 Information Systems
4.4.11 Card Access, Safety and Security Systems
4.4.13 Lighting

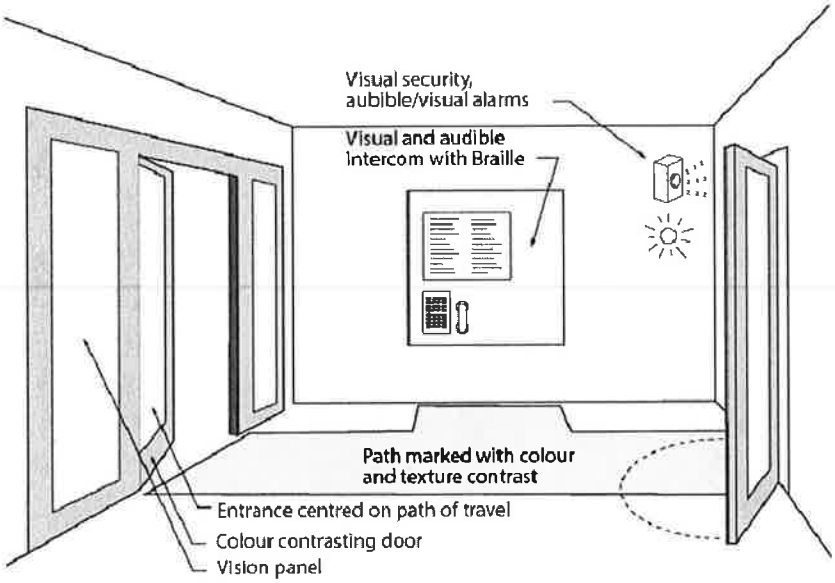

Figure 4.1.5.1

Typical Entrance Foyer

Please see 5.0 IMPLEMENTATION AND ENFORCEMENT

Last update: August 21, 2009

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2006 CITY OF WINNIPEG ACCESSIBILITY DESIGN STANDARDS

4.1.6 DOORS

RATIONALE

Sufficiently wide doorways will be advantageous to individuals using wheelchairs, pushing strollers, or making a delivery. However, a raised threshold at the base of the door could impede any one of these same individuals. This same group, with the addition of children, seniors or even someone carrying packages, would have difficulty opening a heavy door and would benefit from some form of *automatic door* opener. *Entrances* without doors are preferred.

Independent use of doors is desirable. Reliance on assistance from others to open doors is not an *accessible* or dignified solution. Automatic hands-free doors provide the most independence.

Careful thought to the direction of the door swing can enhance the usability and limit the hazard to other pedestrians. Sliding doors can be easier for some individuals to operate, and can also require less wheelchair maneuvering *space*. Doors that require two hands to operate are not considered to be accessible. Revolving doors are not accessible for persons using wheelchairs and strollers. Also, the coordination required to use such doors may be difficult for children or someone with a cognitive *disability*.

Glazed doors can present a hazard to all individuals and especially those with a visual *impairment*. The inclusion of colour-contrast strips across the glass, mounted at eye level, as well as colour-contrasting door frames and door hardware, will increase the safety and visibility of a glazed door for a person with a visual *impairment*. Etching on glass may not provide adequate contrast. Frameless glass doors are not recommended.

APPLICATION

All doors used by staff or the public shall comply with this section. In a *retrofit* situation where it is *technically infeasible* to make all doors *accessible*, at least one door at each *accessible space* shall comply with this section.
Exception: Doors not requiring full user passage, such as shallow closets, may have the *clear* opening reduced to 510 mm (20 in.) minimum.

Each door that is an *element* of an *accessible route* shall comply with this section.

Each door required by 4.4.1 (Emergency Exits, Fire Evacuation and Areas of Rescue Assistance) shall comply with this section.

Where a door system incorporates a multiple-leaf door at a single location, at least one door leaf shall comply with this section.

Power operators shall be provided at the following door locations:

- *entrances* required by 4.1.5;
- washrooms that include an *accessible* toilet stall, where there is no individual washroom on the same floor. Exception: Where there is at least one other male and female washroom with accessible toilet stalls on the same floor, that are equipped with a power door operator;
- *accessible* individual washrooms;
- *accessible* change rooms;
- intermediate doorways across primary circulation routes within a *facility*. Exception: Doors that are held-open using electromagnetic hold-open devices; and
- *entrances* into primary functional areas within a *facility*, as designated by the *City of Winnipeg*. Exception: Doors that are held -open using electromagnetic hold-open devices.

Mats and mat sinkages at doors shall comply with this section.

Revolving doors or turnstiles shall not be the only means of passage at an *accessible entrance* or along an *accessible route*. An accessible gate or door shall be provided adjacent to the turnstile or revolving door and shall be designated to facilitate the same use pattern.

Context	Floor *Space* Required (in mm)		
	Depth	Width	*Space* beside latch
Side-hinged door - Front approach (Figure 4.1.6.4)			
Pull side	1525 (60 in.)	1600 (63 in.) (*1525 (60 in.))	600 (23-5/8 in.)
Push side	1370 (54 in.)	1250 (49-1/4 in.) (*1220 (48 in.))	300 (11-3/4 in.)
Side-hinged door - Latch-side approach (Figure 4.1.6.3)			
Pull side	1370 (54 in.) (*1220 (48 in.))	1600 (63 in.) (*1525 (60 in.))	600 (23-5/8 in.)
Push side	1370 (54 in.) (*1100 (43-1/4 in.))	1525 (60 in.)	600 (23-5/8 in.)
Side-hinged door - Hinge-side approach (Figure 4.1.6.2)			
Pull side	2440 (96 in.) (*1525 (60 in.))	2440 (96 in.) (*1525 (60 in.))	600 (23-5/8 in.)
Push side	1370 (54 in.) (*1100 (43-1/4 in.))	1830 (72 in.)	450 (17-3/4 in.)
Sliding door (Figure 4.1.6.5)			
Front approach	1370 (54 in.)	1100 (43-1/4 in.) (*920 (36 in.))	50 (2 in.)
Side approach	1370 (54 in.) (*1100 (43-1/4 in.))	1550 (61 in.) (*1370 (54 in.))	540 (21-1/2 in.)

Table 4.1.6

Maneuvering *Space* at Doors (In *retrofit* situations where it is *technically infeasible* to provide the required clearances at doors, the clearances may be reduced as shown by the asterisk [*])

DESIGN REQUIREMENTS

Door hardware on all doors throughout a *facility* (not only those deemed *accessible*), shall comply with the door hardware requirements of this section.

Accessible doors shall be on an *accessible route* that complies with 4.1.4.

The minimum *clear* opening at doorways in *accessible* door systems shall be 915 mm (36 in.). In *retrofit* situations where it is *technically infeasible* to provide this clearance, the minimum *clear* opening at doorways in *accessible* door systems shall be 810 mm (32 in.).

Unless equipped with a power door operator, doors shall have level wheelchair-maneuvering *space* on both sides of the door, and *clear space* beside the latch, as described in Table 4.1.6.
Exception: The *clear space* is not required on the inactive side of a door, where access is provided from one side only - such as to a closet.

The required *clear space* beside the latch is to be unobstructed for the full height of the door.

The minimum *space* between two hinged or pivoted doors in series shall be 1525 mm (60 in.), plus the width of any door swinging into the *space*.

Thresholds shall be not more than 6 mm (1/4 in.) high.

Door hardware (operating devices such as handles, pulls, latches, and locks) shall
- be operable by one hand;
- not require fine finger control, tight grasping, pinching, or twisting of the wrist to operate; and
- be mounted with its centre located 850 - 950 mm (33-1/2 - 37-3/8 in.) from the floor.

Operating hardware on sliding doors shall be exposed and usable from both sides when sliding doors are fully open.

The maximum door opening force for pushing or pulling open a door shall be
- 38 N (8.5 lb.) for exterior hinged doors;
- 22 N (4.6 lb.) for interior hinged doors; and
- 22 N (4.6 lb.) for sliding or folding doors.

Door closers shall be adjusted to the least pressure possible, but never more than the opening forces noted above.

The sweep period of door closers shall be adjusted so that, from an open position of 90 degrees, the door will take not less than 3 seconds to move to a semi-closed position of approximately 12 degrees.

Power-assisted swinging doors shall
• take not less than 3 seconds to move from the closed to the fully open position; and
• require a force of not more than 66 N (13.8 lb.) to stop door movement.

Permanent mats and metal gratings at *entrances* and in vestibules shall be sunk level with the floor, so as not to create a tripping hazard.

Occasional mats (e.g. runners used in bad weather) should be level with the floor surface and/or have a gently beveled edge, so as not to create a tripping hazard.

Where power door operators are provided, operator controls shall

• be located to allow a person using a wheelchair or scooter to stop immediately adjacent to the control (refer to 4.1.1);
• be located no closer than 700 mm (27-1/2 in.) from an inside corner, for side-access;
• be located no closer than 400 mm (15-3/4 in.) from an inside corner, for front-access.
• if located on hinge side of door it controls, be located not less than 600 mm (23-5/8 in.) beyond the door swing, where the door opens towards the control;
• be operable at two heights

  - one with its center located 850 - 950 mm (33-1/2 - 37-3/8 in.) from the floor; and
  - the other with its center located 225 mm (9 in.) from the floor. (Note: A single control bar that can be activated from either height is acceptable)

• incorporate controls that are clearly visible which are at least 150 mm (5-7/8 in.) in diameter;
• incorporate the International Symbol of Access for Persons with *Disabilities*;
• where pressure-sensitive mats, overhead beams or proximity scanners are used to detect traffic, incorporate systems that will detect individuals using wheelchairs; and
• where exterior doors swing open into a pedestrian area, incorporate safety *guards* that comply with 4.1.3, projecting a minimum of 300 mm (11-3/4 in.) beyond both sides of the open door. (See Figure 4.1.6.8)

Where doors are not equipped with a closing device, the edge of door shall be *colour contrasted* to the face of the door. (See Figure 4.1.6.10)

On *accessible routes*, the bottom of doors shall incorporate a smooth, uninterrupted kick plate, at least 300 mm (11-3/4 in.) high.

Doors shall incorporate pronounced *colour contrast*, to differentiate them from the surrounding environment. Door

handles and other operating mechanisms shall incorporate pronounced *colour contrast*, to differentiate them from the door itself.

Where a door incorporates glazing or is fully glazed, it shall comply with Section 4.1.8 (Windows, Glazed Screens and Sidelights).

Frameless glass doors shall comply with 4.1.8.

RELATED SECTIONS

4.1.1 Space and Reach Requirements
4.1.7 Gates, Turnstiles and Openings
4.1.8 Windows, Glazed Screens and Sidelights
4.4.2 Controls and Operating Mechanisms
4.4.7 Signage
4.4.10 Information Systems
4.4.11 Card Access, Safety and Security Systems

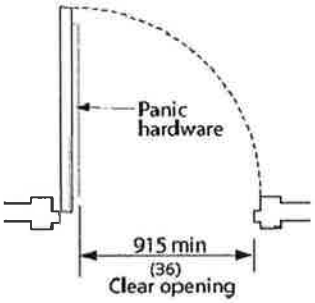

Figure 4.1.6.1

Minimum *Clear* Opening at Doors

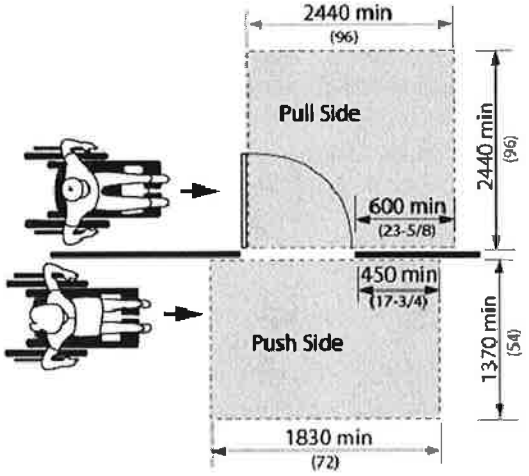

Figure 4.1.6.2

Hinge Side Approach at Hinged Doors

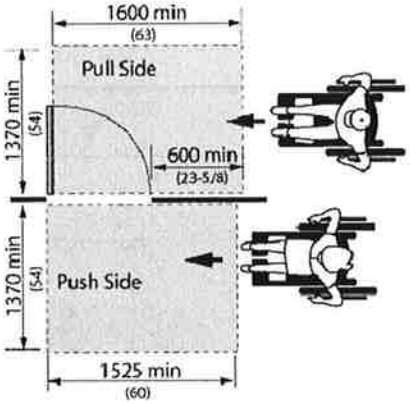

Figure 4.1.6.3

Latch Side Approach at Hinged Doors

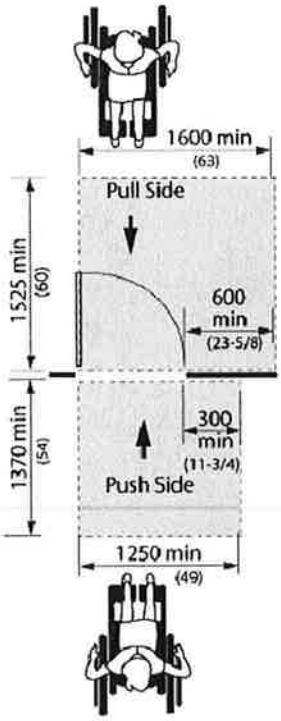

Figure 4.1.6.4

Front Approach at Hinged Doors

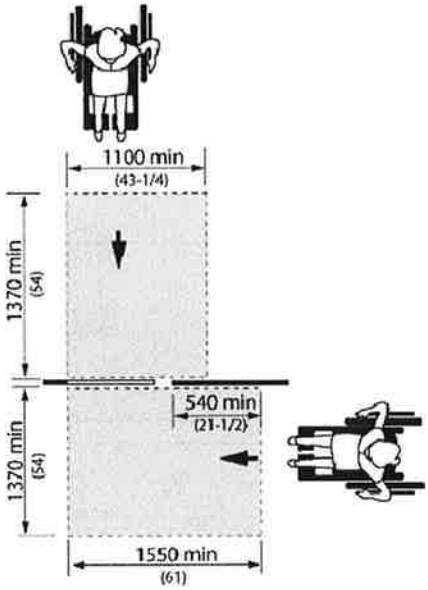

Figure 4.1.6.5

Front and Side Approach at Sliding Doors

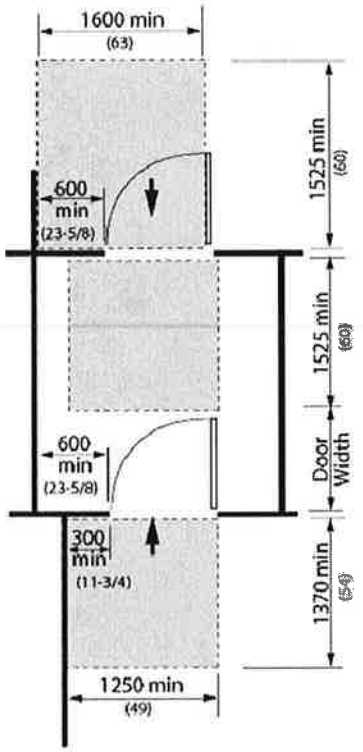

Figure 4.1.6.6

Maneuvering *Space* at Doors in Series

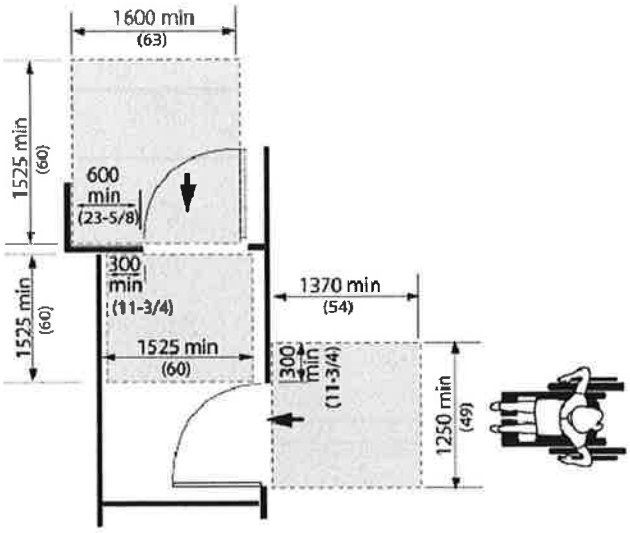

Figure 4.1.6.7

Maneuvering *Space* at Doors in Series

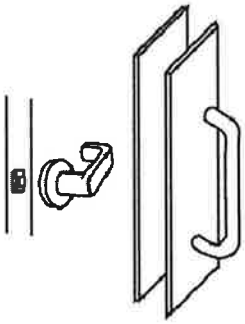

Figure 4.1.6.8

Examples of *Accessible* Hardware

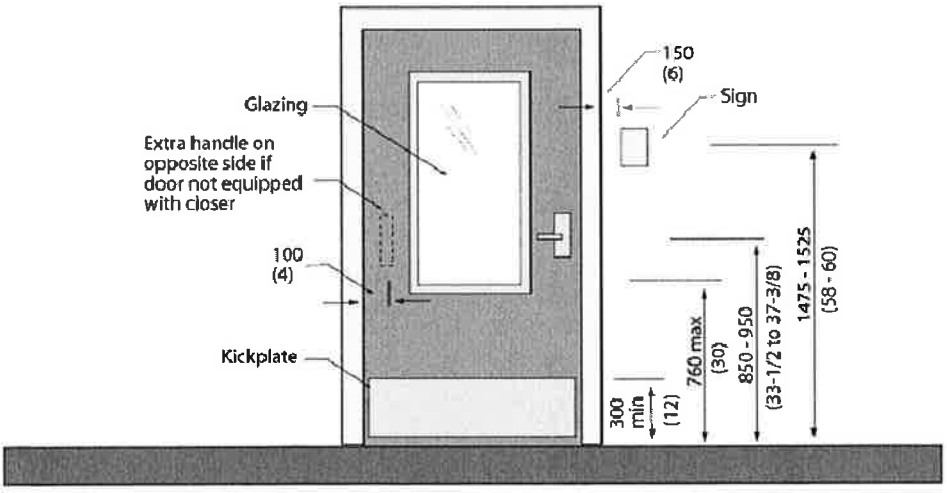

Figure 4.1.6.9

Door Features

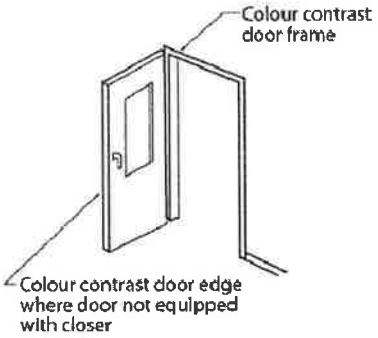

Figure 4.1.6.10

Colour Contrast at Doors

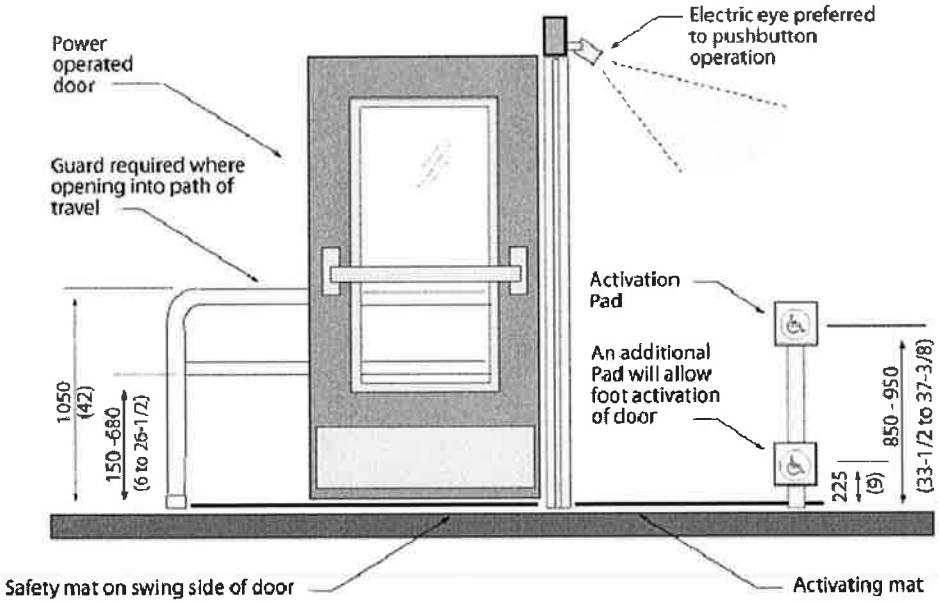

Figure 4.1.6.11

Power Door Features

Please see 5.0 IMPLEMENTATION AND ENFORCEMENT

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4.2.1 TOILET AND BATHING FACILITIES

RATIONALE

As an integral feature of a *facility*, washroom *facilities* should accommodate the range of people that will use the *space*. In some cases, a person with a *disability* may require assistance to use toilet and bathing *facilities*. Where the individual providing assistance is of the opposite gender then typical gender-specific washrooms are awkward and an individual washroom is preferred.

Circumstances such as wet surfaces and the act of transferring between toilet and wheelchair can make bathrooms accident-prone areas. Because of the risk of accidents, design decisions such as door swings have safety implications. An individual falling in a bathroom with a door that swings inward could prevent his or her own rescuers from opening the door. Due to the risk of accidents, bathrooms are prime locations for emergency call switches - consider also related response procedures. The appropriate design of all features will increase the usability and safety of the *space*.

Signs that used to identify washrooms should consider the needs of a variety of users. For children or someone who cannot read text, a symbol is preferred. A person with a visual *impairment* would also benefit from accessible *signage*. Features such as colour-contrasting doorframes and door hardware will also increase accessibility.

Washroom *entrances* that do not incorporate doors are preferred.

APPLICATION

Where toilet *facilities* are provided, each public or *common use* toilet *facility* shall comply with this section. Other toilet rooms provided for the use of occupants of specific *spaces* (i.e., a private toilet room for the occupant of a private office) shall be *adaptable*.

In a *retrofit* situation where it is *technically infeasible* to make existing public or *common use* toilet *facilities accessible*, the installation of at least one individual washroom complying with 4.2.7 per floor, preferably located adjacent to the other existing toilet *facilities*, will be permitted in lieu of modifying existing toilet *facilities* to be *accessible*.

In *addition* to any *accessible* public or *common use* toilets, at least one individual washroom complying with 4.2.7 shall be provided in a public area of all public *buildings*.

In *addition* to any *accessible* public or *common use* toilets, at least one individual washroom complying with 4.2.7 shall be provided on every floor in *assembly areas* where the floor incorporates *common* or *public use* washroom containing four or more toilet and/or urinal fixtures.

If individual washrooms are not visible from the common or *public use* washrooms, directional *signage* complying with 4.4.7 shall be provided.

If bathing *facilities* are provided on a *site*, then each such public or *common use* bathing *facility* shall comply with this section.

For single-user portable toilet or bathing units clustered at a single location, at least 5%, but no less than one, toilet unit or bathing unit complying with this section shall be provided at cluster wherever typical inaccessible units are provided. (Exception: Portable toilet units at construction *sites* used exclusively by construction personnel are not required to comply with this section.)

Where an individual washroom is provided primarily for the use of persons of both sexes with physical *disabilities*, in lieu of *facilities* for persons with physical *disabilities* in washrooms used by the general public, the individual washroom shall be provided on the same floor level within 15 m (50 ft.) of the washrooms used by the general public.

DESIGN REQUIREMENTS

Accessible toilet and bathing *facilities* shall be on an *accessible route* complying with 4.1.4.

All doors to *accessible* toilet and bathing rooms shall comply with 4.1.6. Doors shall not swing into the *clear floor space* required for any fixture.

The *accessible* fixtures and controls within toilet and bathing *facilities* shall be located on an *accessible route* which is at least 1200 mm (47-1/4 in.) wide and in compliance with 4.1.4.

Toilet and bathing *facilities* shall incorporate a *clear floor space* in compliance with 4.1.1 to allow a person in a wheelchair or scooter to make a 180-degree turn.

Toilet and bathing *facilities* shall incorporate a *clear floor space* of at least 1525 x 1525 mm (60 x 60 in.) in front of *accessible* toilet stall doors and in front of *accessible* lavatories.

Accessible toilet and bathing *facilities* shall be identified with *signage* complying with applicable provisions of 4.4.7.

Toilet and bathing facilities shall incorporate even illumination throughout of at least 100 lux (10 ft-candles).

RELATED SECTIONS

4.1.1 Space and Reach Requirements
4.1.2 Ground and Floor Surfaces
4.1.3 Protruding & Overhead Objects
4.1.6 Doors
4.2.2 Toilet Stalls
4.2.3 Toilets
4.2.4 Lavatories
4.2.5 Urinals
4.2.6 Washroom Accessories
4.2.7 Individual Washrooms
4.2.8 Bathtubs
4.2.9 Shower Stalls
4.2.10 Grab Bars
4.4.2 Controls and Operating Mechanisms
4.4.7 Signage
4.4.12 Glare and Light Sources
4.4.13 Lighting
4.4.14 Materials and Finishes
4.4.15 Texture and Colour

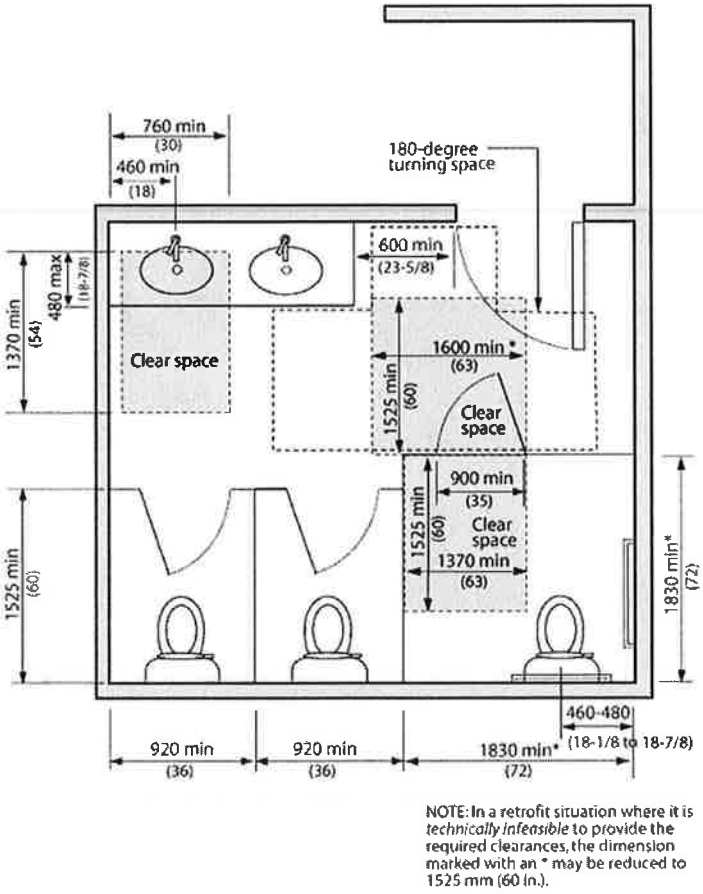

Figure 4.2.1.1

Washroom Dimensions

Please see 5.0 IMPLEMENTATION AND ENFORCEMENT

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4.2.3 TOILETS

RATIONALE

Automatic flush controls are preferred. If flushing mechanisms are not automated, then consideration must be given to the ability to reach a switch and the hand strength or dexterity to operate it. Lever style handles on the transfer side of the toilet facilitate this. Appropriate placement of grab bars makes sitting and standing or transfers between toilet and wheelchair safer.

APPLICATION

Accessible toilets shall comply with this section. Wall-mounted toilets are preferred.

DESIGN REQUIREMENTS

Toilet fixtures shall have

- the top of the seat between 400 and 460 mm (15-3/4 and 18-1/8 in.) from the floor;
- no spring-activated seat;
- a back support where there is no seat lid or tank; and
- the tank top securely attached.

Toilets shall be located so that the clearance between the fixture and the wall on one side is 285 - 305 mm (11-1/4 - 12 in.). A minimum 920 mm (36 in.) - wide *clear* transfer *space* shall be provided on the other side of the toilet fixture. In a *retrofit* situation where it is *technically infeasible* to provide a 920 mm (36 in.)- wide clear transfer *space*, the *space* may be reduced to 760 mm (30 in.).

The *clear transfer space* shall be clear of obstructions (such as garbage bins or baby change tables).

Toilet flush controls shall be

- hand-operated on the transfer side of the toilet; or
- be electronically automatically controlled.

Hand-operated flush controls shall comply with 4.4.2.

Toilets shall be equipped with grab bars that

- comply with 4.2.10;
- are mounted horizontally on the side wall closest to the toilet

fixture, extending not less than 450 mm (17-3/4 in.) in both directions from the most forward point of the toilet fixture, 840 - 920 mm (33-36 in.) above the floor;
• are at least 760 mm (30 in.) long, mounted vertically on the side wall closest to the toilet fixture, 150 (5-7/8 in.) in front of the most forward point of the toilet fixture, with its lowest edge no closer than 60 mm (2-3/8 in.) above the horizontal bar; and
• are at least 600 mm (23-5/8 in.) in length, mounted horizontally on the wall behind the toilet fixture, centred on the toilet bowl, 840 - 920 mm (33-36 in.) above the floor.

When a toilet-paper dispenser is provided, the dispenser shall

• be wall mounted;
• be located below the grab bar, with it's highest surface no closer than 60 mm (2-3/8 in.) from the horizontal bar;
• dispense paper 0 - 300 mm (0 - 11-3/4 in.) in front of the toilet seat and not less than 600 mm (23-5/8 in.) above the floor; and
• be contrasting in colour to the wall.

RELATED SECTIONS

4.1.1 Space and Reach Requirements
4.2.2 Toilet Stalls
4.2.10 Grab Bars
4.4.2 Controls and Operating Mechanisms
4.4.13 Lighting
4.4.15 Texture and Colour

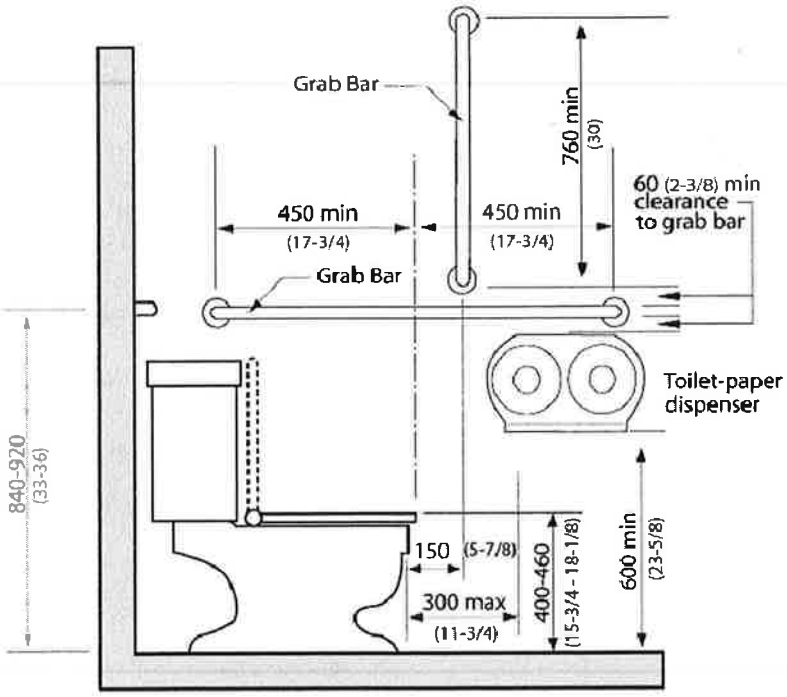

Figure 4.2.3.1

Grab Bar Configuration

Please see 5.0 IMPLEMENTATION AND ENFORCEMENT

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4.2.7 INDIVIDUAL WASHROOMS

RATIONALE

The provision of a separate individual washroom is advantageous in a number of instances. For an individual using a wheelchair, the extra *space* provided with a separate washroom is preferred to an accessible stall. Should an individual require an attendant to assist them in the washroom then the complication of a woman entering a men's washroom or vice versa is avoided. This same scenario would apply to a parent with a young child of a different gender. In the event of an accident or fall by a single individual in this form of washroom, an emergency call switch and a means of unlocking the door from the outside are important safety features.

APPLICATION

Individual washrooms shall be provided as required by 4.2.1.

Accessible individual washrooms shall comply with this section.

DESIGN REQUIREMENTS

Accessible individual washrooms shall be on an *accessible route* complying with 4.1.4.

Accessible individual washrooms shall be identified with *signage* complying with applicable provisions of 4.4.7.

Individual washrooms shall

- be designed to permit a wheelchair to turn in an *open space* that has a diameter of not less than 2440 mm (96 in.);
- be equipped with a door that
  - complies with 4.1.6;
  - is capable of being locked from the inside with one hand and being released from the outside in case of emergency by authorized personnel;
  - has graspable latch operating and locking mechanisms located not less than 900 mm (35 in.) and not more than 1000 mm (39-3/8 in.) above the floor; and
  - where the door is outswinging, has a minimum 140 mm (5-1/2 in.) long D-shaped handle mounted either horizontally or

vertically on the inside, located 100 mm (4 in.) from the hinge edge of the door and 900 mm (35-1/1 in.) from the floor.

- be provided with a lavatory conforming to 4.2.4;
- be equipped with a toilet conforming to 4.2.3 and located
  - so that its centre line is not less than 460 mm (18-1/8 in.) and not more than 480 mm (18-7/8 in.) from an adjacent wall on one side; and
  - so that its centre line is not less than 1060 mm (42 in.) to any wall, fixture or other obstruction on the other side;
- be equipped with grab bars conforming to 4.2.10;
- have fixture clearances conforming to 4.2.3 and 4.2.4;
- be designed to permit a wheelchair to back into the required *clear space* beside the toilet fixture;
- be equipped with
  - a collapsible coat hook mounted not more than 1200 mm (47 in.) from the floor on a side wall and projecting not more than 50 mm (2 in.) from the wall; and
  - a mirror and washroom accessories complying with 4.2.6.

OPTIONAL:

- be equipped with a fold-down grab bar at least 760 mm (30 in.) in length at the open side of the toilet, mounted 420 - 440 mm (16-1/2 - 17-3/8 in.) from the centre line of the toilet and 630 - 690 mm (24-3/4 - 27-1/8 in.) above the floor

Where *accessible* individual washrooms are provided in assembly *buildings*, such as recreation centres, the washroom shall incorporate an emergency call system linked to a central monitoring location (e.g., office or switchboard).

Accessible individual washrooms in assembly *buildings* shall incorporate a change table

- at least 760 mm (30 in.) wide by 1830 (72 in.) long;
- located with the change surface no higher than 865 mm (34 in.);
- which incorporates an adjacent *clear floor space* not less than 760 mm (30 in.) by 1370 mm (54 in.);
- designed to support 2.27 kN (500 pounds);
- located on an *accessible route* in compliance with 4.1.4; and
- if of the fold-down type, have no *operable portions* higher than 1200 mm (47 in.).

RELATED SECTIONS

4.1.1 Space and Reach Requirements
4.1.2 Ground and Floor Surfaces
4.1.3 Protruding & Overhead Objects
4.1.6 Doors
4.2.3 Toilets

4.2.4 Lavatories
4.2.5 Urinals
4.2.6 Washroom Accessories
4.2.10 Grab Bars
4.4.2 Controls and Operating Mechanisms
4.4.7 Signage
4.4.11 Card Access, Safety and Security Systems
4.4.12 Glare and Light Sources
4.4.13 Lighting
4.4.14 Materials and Finishes
4.4.15 Texture and Colour

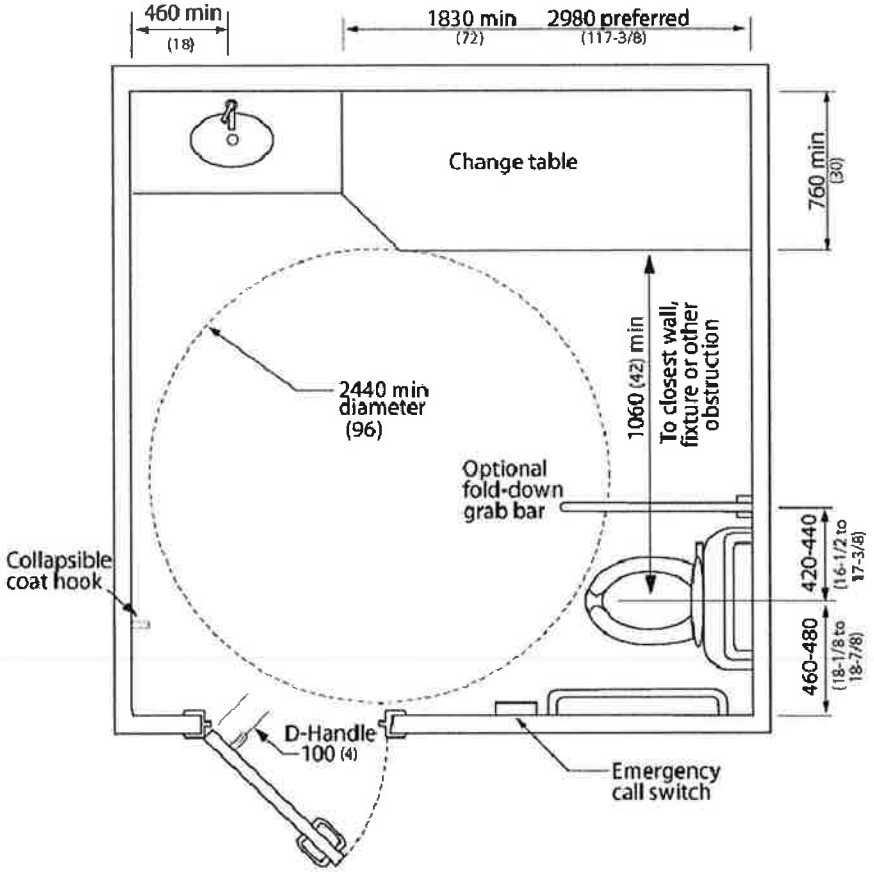

Figure 4.2.7.1

Individual Washrooms

Please see 5.0 IMPLEMENTATION AND ENFORCEMENT

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4.2.9 SHOWER STALLS

RATIONALE

Grab bars and non-slip materials are safety measures which will assist everyone. Additional equipment such as a hand-held shower or bench, may be an asset to someone with a *disability* but also convenient for others. Equipment that contrasts in colour from the shower stall itself assists individuals with a visual *impairment*. Roll -in or curbless shower stalls eliminate the hazard of stepping over a threshold and are essential for persons with *disabilities* who use wheelchairs in the shower.

APPLICATION

Where shower stalls are provided, 50% of shower stalls shall comply with this section. In a *retrofit* situation where it is *technically infeasible* to have 50% of shower stalls comply with this section, at least 10%, but never less than one, in each bathing area shall comply with this section.

DESIGN REQUIREMENTS

Accessible shower stalls shall

- be on an *accessible route* complying with 4.1.4;
- be at least 1525 mm (60 in.) in width and 920 mm (36 in.) in depth;
- have a *clear floor space* at the entrance to the shower of at least 920 mm (36 in.) in depth and the same width as the shower, except that fixtures are permitted to project into that *space*, provided they do not restrict access to the shower;
- have a slip-resistant floor surface;
- have no threshold, or a beveled threshold not exceeding 6 mm (1/4 in.) above the finished floor;
- be equipped with a wall-mounted folding seat that is not spring-loaded, or make provisions for a portable seat that is
  - 450 mm (17-3/4 in.) wide and 400 mm (15 in.) deep;
  - mounted approximately 450 mm (17-3/4 in.) above the floor;
  - colour-contrasted with the background; and
  - designed to carry a minimum load of 1.33 kN (300 lbs.);
- be equipped with an L-shaped grab bar that
  - has a horizontal component of at least 920 mm (36 in.), mounted horizontally approximately 700 - 800 mm (27-1/2 -

31-1/2 in.) above the floor, located on the wall so at least 300 mm (11-3/4 in.) of its length is reachable from one side of the seat;
- has a vertical component of at least 760 mm (30 in), located at the opposite end to the seat; and
- conforms to 4.2.10;

- be equipped with a vertical grab bar that shall
  - be at least 760 mm (30 in.) in length;
  - be mounted 80 - 120 mm (3-1/8 - 4-3/4 in.) from the front edge, starting between 700 and 800 mm (27-1/2 and 31-1/2 in.) from the floor; and
  - conforms to 4.2.10;
  - be equipped with an individually controllable pressure-equalizing or thermostatic-mixing valve in compliance with 4.4.2, delivering water at a temperature no greater than 49 degree Celsius (120 degree Fahrenheit);
  - have the shower control/mixing valve located above the grab bar but no higher than 1000 mm (39-3/8 in.), maximum 685 mm (27 in.) from the seat wall;
  - be equipped with a shower head with at least 1525 mm (60 in.) of flexible hose that can be used both as a fixed position shower head and as a hand held shower head. The shower spray unit shall be reachable from the seated positions and have an on/off control. EXCEPTION: The use of two fixed-height shower heads with the capability of adjusting the direction of water flow is permitted instead of a hand-held spray unit in *facilities* that may be subject to vandalism. The height of the higher shower head to be 1825 mm (72 in.). The height of the lower shower head to be 1400 mm (55-1/8 in.). A valve to direct water between the shower heads, in compliance with 4.4.2, to be located adjacent to the shower control/mixing valve; and
  - have soap holder(s) which can be reached from the seated position, ideally fully recessed.

Where the showerhead is mounted on a vertical bar, the bar shall be installed so as not to obstruct the use of the grab bar.

Floor drains to be level with the finished floor, located below the seat, off to one side or off to one end.

Enclosures for shower stalls shall not obstruct controls or obstruct transfer from wheelchairs onto shower seats

RELATED SECTIONS

4.2.10 Grab Bars
4.4.2 Controls and Operating Mechanisms
4.4.13 Lighting
4.4.15 Texture and Colour

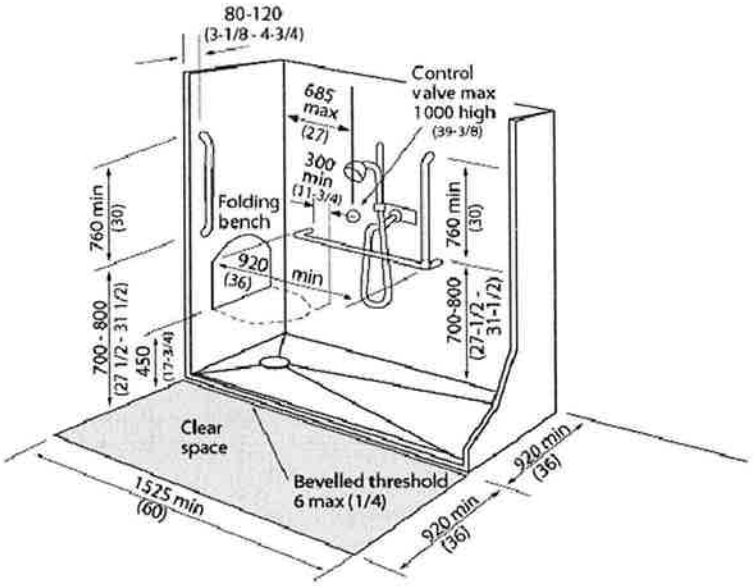

Figure 4.2.9.1

Shower Stall

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4.3.4 SPECIALTY CHANGE ROOMS

RATIONALE

In addition to *accessible common use* dressing rooms, a separate unisex dressing room is useful. This is valuable in a scenario where an attendant of the opposite sex or a parent is assisting a child. Sufficient space should be allowed for two people and a wheelchair, along with benches and accessories.

The provision of *handrails* along circulation routes from dressing rooms to pool, gymnasium and other activity areas, will be of benefit to many people.

APPLICATION

Where dressing rooms are provided for use by the general public, patients, customers or employees, they shall comply with this section. In a *retrofit* situation where it is *technically infeasible* to have all dressing rooms comply with this section, 10% of dressing rooms, but never less than one, for each type of use in each cluster of dressing rooms shall be *accessible* and comply with this section.

Where a facility incorporates multi-user dressing rooms with integral washroom and shower facilities, at least 10% of the multi-user dressing rooms, but never less than one, shall incorporate a private dressing room in compliance with this section.

DESIGN REQUIREMENTS

Accessible dressing rooms shall be located on an *accessible route* complying with 4.1.4.

A *clear floor space* allowing a person using a wheelchair to make a 180-degree turn shall be provided within every *accessible* dressing room, accessed through either a hinged or sliding door. No door shall swing into any part of the required turning *space* within the dressing room. Turning *space* is not required within a private dressing room accessed through a curtained opening at least 950 mm (37-1/2 in.) wide, if *clear floor space* complying with section 4.1.1 renders the dressing room usable by a person in a wheelchair.

All doors to *accessible* dressing rooms shall be in compliance with 4.1.6. Outward swinging doors shall not constitute a hazard to persons using adjacent circulation routes.

Every *accessible* dressing room shall have a 760 mm (30 in.) x 1830 mm (72 in.) bench fixed to the wall along the longer dimension. The bench shall

- be mounted 450 to 500 mm (17-3/4 in. to 19-5/8 in.) above the finished floor;
- have *clear floor space* provided alongside the bench to allow a person using a wheelchair to make a parallel transfer onto the bench;
- be designed to carry a minimum load of 2.27 kN (500 lb.); and
- where installed in conjunction with showers, swimming pools, or other wet locations, be designed so that

  - water shall not accumulate upon the surface of the bench; and
  - the top surface is slip-resistant.

The *accessible* change bench shall be equipped with a grab bar that

- complies with 4.2.10; and
- is L-shaped with 760 mm (30 in.) long horizontal and vertical components mounted with the horizontal component 630-690 mm (24-3/4 - 27-1/8 in.) above the floor and the vertical component 150 mm (6 in.) in front of the bench.

At least one waste receptacle, coat hook and shelf must be reachable from the *accessible* bench.

Where mirrors are provided in dressing rooms of the same use, then in an *accessible* dressing room, a full-length mirror measuring at least 460 mm (18 in.) wide by 1370 mm (54 in.) high shall be mounted in a position affording a view to a person on the bench, as well as to a person in a standing position.

Dressing rooms shall incorporate even illumination throughout of at least 100 lux (10 ft-candles).

RELATED SECTIONS

4.1.1 Space and Reach Requirements
4.1.2 Ground and Floor Surfaces
4.1.3 Protruding & Overhead Objects
4.1.4 Accessible Routes, Paths And Corridors
4.2.7 Individual Washrooms
4.4.13 Lighting
4.4.14 Materials and Finishes
4.4.15 Texture and Colour

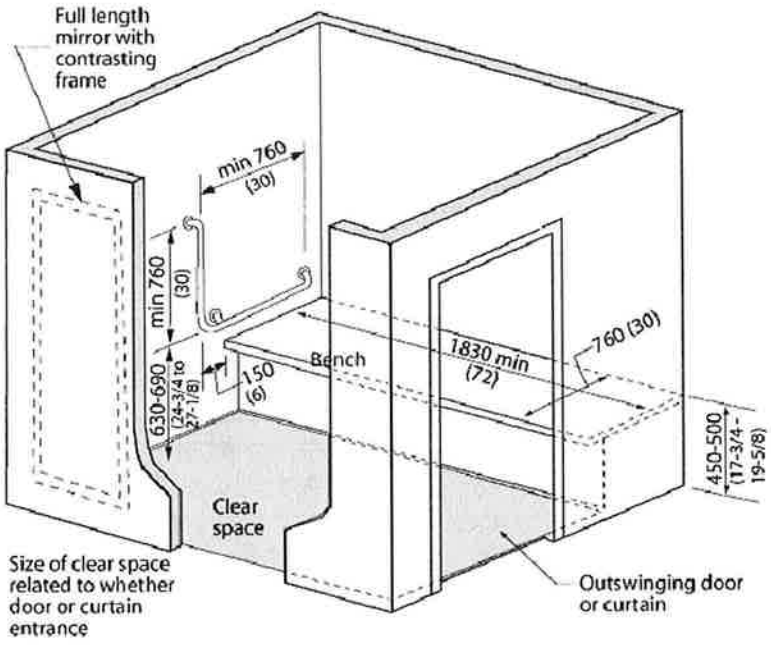

Figure 4.3.4.1

Accessible Dressing Room

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4.3.5 OFFICES, WORK AREAS & MEETING ROOMS

RATIONALE

Offices should be *accessible* to all, regardless of mobility or functional profile. Furthermore, office and related support areas should be *accessible* to staff and visitors with varying levels of ability.

All persons, but particularly those with a hearing *impairment*, would benefit from having a quiet acoustic environment - background noise from mechanical equipment such as fans, should be minimal. Telephone equipment for individuals with hearing *impairments* may also be required.

Tables and workstations should address the knee *space* requirements of an individual in a wheelchair. Circulation areas also need to consider the spatial needs of mobility equipment as large as scooters.

Natural coloured task lighting is a design feature that will facilitate use by all, especially persons with vision *impairments*. In locations where reflective glare might be problematic, such as large expanses of glass with reflective flooring, consideration should be given to providing blinds that can be louvered upwards.

APPLICATION

Wherever offices, work areas or *meeting rooms* are provided for use by the general public, employees, clients or customers, they shall comply with this section.

DESIGN REQUIREMENTS

Where offices, work areas and *meeting rooms* are provided for use by the general public, clients or customers, they shall

- be located on an *accessible route* complying with 4.1.4;
- where equipped with a door, the door shall comply with 4.1.6;
- incorporate a *clear floor space* allowing a person in a wheelchair to make a 180-degree turn;
- incorporate an *accessible route* through the *space* that does not require the person in a wheelchair to travel backwards to enter/leave the *space*;

- incorporate an *accessible route* in compliance with 4.1.4 that connects the primary activity *elements* within the office, work area or *meeting room*;
- incorporate knee clearances below work surfaces that comply with 4.3.7;
- incorporate access in compliance with 4.3.9 to storage, shelving or display units for use by the general public, clients or customers;
- provide a *clear floor space* in front of the equipment that complies with 4.1.1, where equipment such as photocopiers are provided for use by the general public, clients or customers, ; and
- be equipped with an assistive listening system that complies with 4.4.6, where an assistive listening system is required.

RELATED SECTIONS

All relevant parts of, 4.2, 4.3 and 4.4.

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4.3.10 LOCKERS AND BAGGAGE STORAGE

RATIONALE

In schools, recreational facilities, transit facilities, etc., or wherever public or private storage lockers are provided, at least some of the storage units should be usable by persons using wheelchairs.

The provision of lockers at lower heights serves the reach restrictions of children or persons using wheelchairs. The operating mechanisms should also be at an appropriate height and operable by individuals with restrictions in hand dexterity.

APPLICATION

If lockers or baggage storage units are provided in *accessible* public or *common use* areas, at least 10%, but not less than one, of the lockers or baggage storage units shall comply with this section.

DESIGN REQUIREMENTS

Accessible lockers and baggage storage units shall be located on an *accessible route* complying with 4.1.4.

Lockers and baggage storage units shall have their bottom shelf no lower than 400 mm (15-3/4 in.) and their top shelf no higher than 1200 mm (47 in.) above the floor or ground.

Locks for *accessible* lockers and baggage storage units shall be mounted no higher than 1060 mm (42 in.) from the floor or ground and shall comply with 4.4.2.

Numbers or names on lockers and baggage storage units should be in clearly legible lettering, raised or recessed and of a highly contrasting colour or tone (in compliance with the relevant parts of 4.4.7).

Baggage racks or carousels for suitcases, etc. shall have the platform surface no higher than 460 mm (18 in.) from the floor and shall incorporate a continuous colour-contrasting strip at the edge of the platform surface.

Aisle *spaces* in front of lockers, baggage compartments and carousels should be a minimum of 1370 mm (54 in.) deep, to permit forward and lateral approach by wheelchair users.

RELATED SECTIONS

4.1.1 Space and Reach Requirements
4.1.4 Accessible Routes, Paths And Corridors
4.4.2 Controls and Operating Mechanisms
4.4.7 Signage
4.4.13 Lighting
4.4.15 Texture and Colour

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4.2.2 TOILET STALLS

RATIONALE

Maneuverability of a wheelchair or scooter is a principal consideration in the design of an accessible stall. The increased size of the stall is required to ensure there is sufficient *space* to facilitate the proper placement of a wheelchair or scooter to accommodate a transfer onto the toilet fixture. Not only is *space* required for the mobility equipment but there may also be instances where an individual requires assistance and the stall will have to accommodate a second person.

Door swings are normally outward for safety reasons and *space* considerations, but this makes it difficult to close the door once inside. A handle mounted part way along the door makes it easier for someone to close the door behind them.

Minimum requirements for non-*accessible* toilet stalls are included to ensure that persons who do not use wheelchairs or scooters can be adequately accommodated within any toilet stall. Universal features include *accessible* hardware and minimum a stall width to accommodate persons of large stature.

APPLICATION

If toilet stalls are provided in a toilet or bathing *facility*, then the number of *accessible* toilet stalls designated to accommodate persons with *disabilities* shall comply with Table 4.2.2.

Accessible toilet stalls shall comply with this section.

All other toilet stalls within a facility (i.e., those considered to be non-*accessible*) shall be minimum 920 mm (36 in.) wide by 1525 mm (60 in.) long, and shall incorporate door-locking mechanisms in compliance with this section.

DESIGN REQUIREMENTS

Accessible toilet stalls shall

- be on an *accessible route* complying with 4.1.4.
- have internal dimensions at least 1830 x 1830 mm (72 x 72 in.). (In a *retrofit* situation where providing the required internal dimensions is *technically infeasible*, the internal dimensions may be reduced to 1525 x 1525 mm (60 x 60 in.);
- have a toilet complying with 4.2.3; and
- be equipped with a collapsible coat hook mounted not more than

1200 mm (47 in.) from the floor on a side wall and projecting not more than 50 mm (2 in.) from the wall.

Toilet stall doors shall

- be capable of being locked from the inside by a device that is operable with one hand; does not require fine finger control, tight grasping, pinching, or twisting of the wrist; requires a force of not more than 22 N (4.9 lb.) to activate (e.g., sliding bolt or lever); and can be opened from the outside in an emergency situation by an authorized person.
- provide a *clear* opening of at least 900 mm (35 in.) with the door in the open position. In a *retrofit* situation where it's *technically infeasible* to provide the required *clear* opening, the *clear* opening may be reduced to 810 mm (32 in.);
- swing outward, unless additional *clear space* of at least 760 mm x 1370 mm (30 in. x 54 in.) is provided within the stall, outwith the arc of the door swing;
- be aligned with the *clear floor space* adjacent to the toilet fixture;
- be equipped with gravity hinges so that the door closes automatically;
- be provided with a "D"-type contrasting-coloured door pull, at least 140 mm (5-1/2 in.) long, on the inside of an out-swinging door, located so that the centre line is between 200 and 300 mm (7-7/8 in. and 11-3/4 in.) from the hinged side of the door, located 900 mm (35-1/2 in.) above the finished floor; and
- be provided with a "D"-type contrasting-coloured door pull at least 140 mm (5-1/2 in.) long, on both sides of the door, located near the latch, 900 mm (35-1/2 in.) above the finished floor.

Where more than one *accessible* toilet stall is provided within a washroom, at least one *accessible* stall shall be configured to provide the required transfer *space* on the left side of the toilet fixture, and at least one *accessible* stall shall be configured to provide the required transfer *space* on the right side of the toilet fixture.

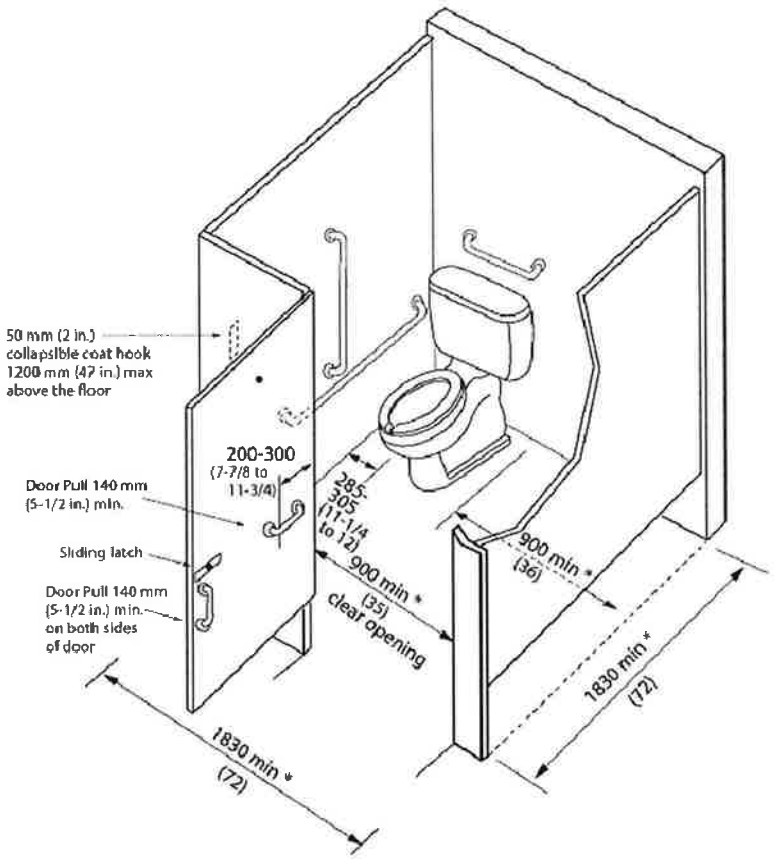
The transfer *space* adjacent to the toilet fixture, as required by 4.2.3, shall be *clear* of obstructions (such as garbage bins or baby change tables).

Toilet stall doors shall be colour-contrasted with the toilet partitions.

RELATED SECTIONS

4.1.1 Space and Reach Requirements
4.1.3 Protruding & Overhead Objects
4.1.6 Doors
4.2.3 Toilets
4.2.6 Washroom Accessories
4.2.10 Grab Bars
4.4.2 Controls and Operating Mechanisms

4.4.13 Lighting
4.4.15 Texture and Colour



NOTE: In a retrofit situation where it is *technically infeasible* to provide the required clearances, the dimensions marked with an * may be reduced. Refer to 4.2.2 - Design Requirements.

Figure 4.2.2.1

Accessible Toilet Stall

# of toilet stalls within the washroom	Required # of *accessible* toilet stalls
1-5	1
More than 5	2

Table 4.2.2

Number of Accessible Toilet Stalls

Please see 5.0 IMPLEMENTATION AND ENFORCEMENT

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2006 CITY OF WINNIPEG ACCESSIBILITY DESIGN STANDARDS

4.3.12 PARKING

RATIONALE

The provision of parking *spaces* near the *entrance* to a facility is important to accommodate persons with a variety of *disabilities*. *Disabling* conditions, such as arthritis or heart conditions, using crutches or pushing a wheelchair, all make it difficult to travel long distances. Minimizing travel distances is particularly important outdoors, where weather conditions and ground surfaces can make travel both difficult and hazardous. The *accessible route* of travel connecting the parking to the *entrance* should be well marked and free of steps and curbs.

In addition to the proximity to *entrances*, the spatial requirements of accessible parking *spaces* is important. A person using a mobility aid such as a wheelchair requires a wider parking stall to accommodate the maneuvering of the wheelchair beside the car or van. A van may also require additional *space* to deploy a lift or *ramp* through the side or back door. An individual would then require *space* for the deployment of the lift itself as well as additional *space* to maneuver on/off the lift.

Heights along the routes to accessible parking is a factor. Accessible vans may incorporate a raised roof resulting in the need for additional overhead clearance. Alternatively, the floor of the van may be lowered, resulting in lower tolerances for speed bumps and pavement slope transitions.

The number of *accessible* parking *spaces* required by this section may not be sufficient in some *facilities* (such as seniors' centres) where increased numbers of persons with *disabilities* might be expected.

APPLICATION

This standard is applicable to all new parking structures and surface parking lots. For existing structures and surface parking lots undergoing renovations/*alterations*, standards should be employed whenever feasible.

The number of parking *spaces* designated to accommodate *disabled* persons shall be in accordance with Table 4.3.12.

All designated *spaces* shall be located on the shortest possible circulation route, with minimal traffic flow crossing, to an *accessible facility entrance* (e.g., in lots serving a particular

facility) or to an *accessible* pedestrian *entrance* of the parking *facility* (e.g., in lots not serving a particular *facility*).

In *facilities* with multiple *accessible entrances* with adjacent parking, *accessible* parking *spaces* shall be dispersed and located closest to the *accessible entrances*.

DESIGN REQUIREMENTS

An *accessible route* shall be provided from each *accessible* parking area to an *accessible entrance* into the *facility*.

Accessible parking *spaces* shall

- be located on an *accessible route* complying with 4.1.4;
- be at least 2440 mm (96 in.) wide and 6100 mm (240 in.) long;
- have an adjacent *access aisle* at least 2440 mm (96 in.) wide. In a *retrofit* situation where it is *technically infeasible* to provide a 2440 mm (96 in.) *access aisle*, the aisle may be reduced to 2000 mm (78-3/4 in.);
- have a firm, level surface with a maximum of 2% longitudinal grade for drainage;
- where surfaces are paved, have *access aisles* clearly indicated by markings (Refer to Figures);
- have a maximum *cross slope* of 2%; and
- have a height clearance of at least 2750 mm (9 ft.) at the parking *space* and along the vehicle access and *egress* routes.

Accessible parking *spaces* shall be designated as being reserved for use by persons with *disabilities*.

Signage of parking *spaces* should incorporate the following components:

- a designated *disabled* parking *space* sign as specified in the Manual of Uniform Traffic Control Devices for Canada, mounted vertically; and

&15.01.2010access on the pavement of the stall.

Vertical parking *space* designation signs shall

- be at least 300 mm (12 in.) wide x 450 mm (18 in.) high; and
- be installed at a height of 1500 mm (47 in.) to 2500 mm (98 in.) from the ground/floor surface to the centre line of the sign.

The symbol of access shall be painted on the pavement of each designated off-street parking *space* and shall

- be at least 1000 mm (3'-4") long;
- be located in the centre of the *space*; and
- be painted white on a background field of blue.

Paint used on the surface of parking *spaces* must be slip-resistant.

Where the location of designated parking *spaces* for persons with *disabilities* is not obvious or is distant from the approach viewpoints, directional signs shall be placed along the route leading to the designated parking *spaces*. Such directional *signage* will incorporate the symbol of access and the appropriate directional arrows.

Where the location of the nearest *accessible entrance* is not obvious or is distant from the approach viewpoints, directional signs shall be placed along the route leading to the nearest *accessible entrance* to the *facility*. Such directional *signage* will incorporate the symbol of access and the appropriate directional arrows.

In multi-level parking *facilities*, signs must be provided indicating the floors than have accessible parking.

RELATED SECTIONS

4.1.1 Space and Reach Requirements
4.1.2 Ground and Floor Surfaces
4.1.3 Protruding & Overhead Objects
4.1.4 Accessible Routes, Paths And Corridors
4.1.10 Curb Ramps
4.3.17 Streetscape
4.4.3 Vending and Ticketing Machines
4.4.7 Signage
4.4.8 Detectable Warning Surfaces
4.4.13 Lighting
4.4.14 Materials and Finishes
4.4.15 Texture and Colour

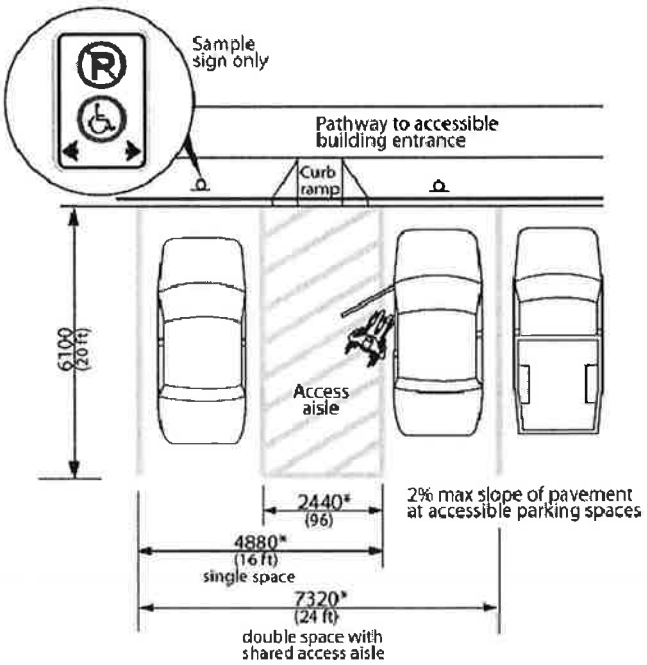

Figure 4.3.12.1

Side-by-side Parking *Space*

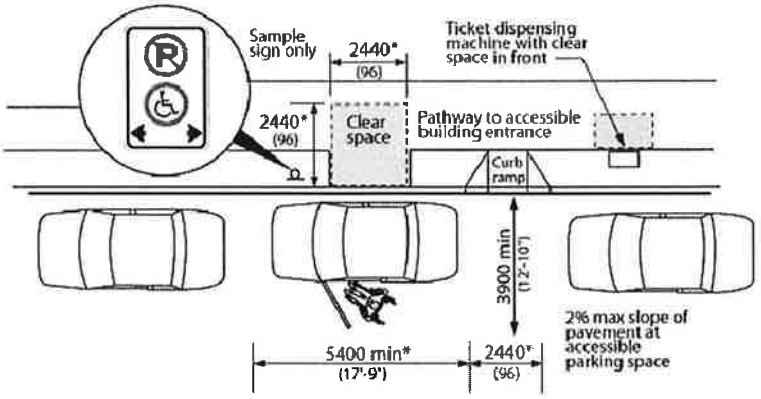

Figure 4.3.12.2

Parallel Parking *Space*

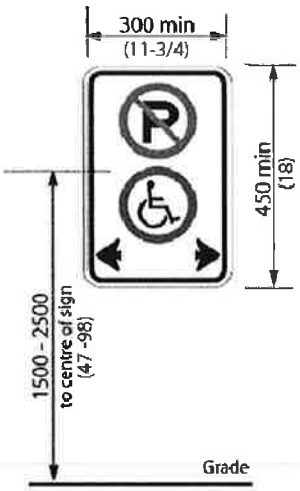

Figure 4.3.12.3

Parking Sign (Sample Sign Only)

Number of Automobile Parking *Spaces*	Number of Designated Parking *Spaces*
1-25	1
26-50	3
51-75	4
76-100	5
101-150	6
151-200	7
201-300	8
301-400	9
401-500	10
501-1000	2% of total
1001 and over	20 plus 1 for each 100 over 1000

Table 4.3.12

Designated Accessible Parking *Spaces*

*NOTE: In a *retrofit* situation where it is *technically infeasible* to provide the required *access aisle* width, the aisle width may be reduced to 2000 mm (78-3/4 in.)

Please see 5.0 IMPLEMENTATION AND ENFORCEMENT

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4.3.13 PASSENGER-LOADING ZONES AND LAY-BYS

RATIONALE

Passenger-loading zones are important features for individuals who may have difficulty in walking distances or those who use parallel transit systems. *Accessible* transit vehicles typically require *space* for the deployment of lifts or ramps and overhead clearances. Protection from the *elements* will be beneficial to all users and particularly those that may have difficulty with mobility.

It is beneficial to provide interior and exterior waiting areas adjacent to passenger loading zones, preferably with *clear* sight-lines to approaching vehicles.

APPLICATION

Where passenger-loading zones are provided, at least one shall comply with this section.

Accessible passenger-loading zones shall be identified with *signage* complying with applicable provisions of 4.4.7.

If the passenger-loading zone is a designated mobility transit stop zone, it shall comply with all relevant municipal bylaws.

DESIGN REQUIREMENTS

Passenger-loading *zones* shall

- be on an *accessible route* complying with 4.1.4;
- provide an *access aisle* at least 2000 mm (78-3/4 in.) wide and 7000 mm (23 ft.) long, adjacent and parallel to the vehicle pull-up *space*;
- have a *curb ramp* complying with 4.1.10 where there are curbs between the *access aisle* and the vehicle pull-up *space*; and
- have a minimum vertical clearance of 3600 mm (11 ft. - 10 in.) at the loading zone and along the vehicle access route to such areas to and from the *site entrances*.

RELATED SECTIONS

4.1.1 Space and Reach Requirements
4.1.2 Ground and Floor Surfaces
4.1.3 Protruding & Overhead Objects

4.1.4 Accessible Routes, Paths And Corridors
4.1.10 Curb Ramps
4.3.17 Streetscape
4.4.7 Signage
4.4.8 Detectable Warning Surfaces
4.4.13 Lighting
4.4.14 Materials and Finishes
4.4.15 Texture and Colour

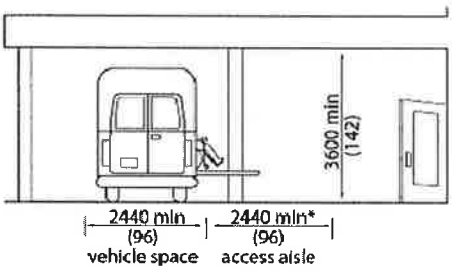

Figure 4.3.13.1

Height Clearances at Passenger Loading Zone

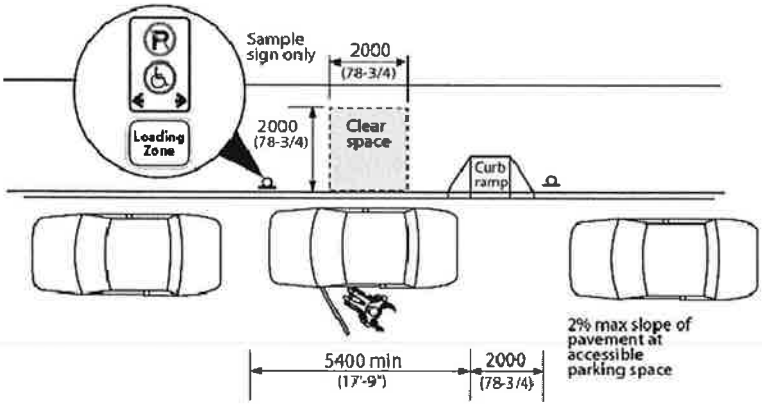

Figure 4.3.13.2

On-Street Passenger Loading Zone

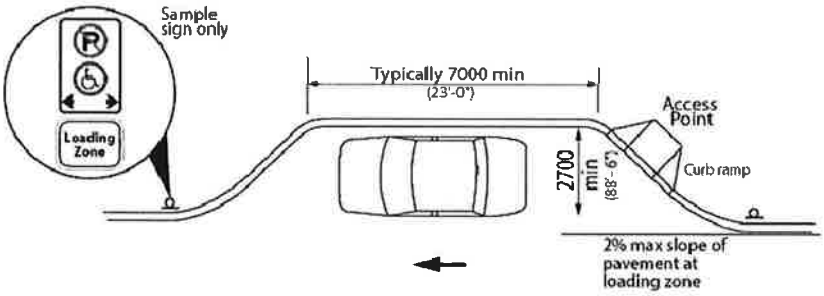

Figure 4.3.13.3

Off-Street Lay-by Passenger Loading Zone

Please see 5.0 IMPLEMENTATION AND ENFORCEMENT

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Appendix F

Recommended Building Wall Investigation

GENIVAR

RE: Additional Engineering Services for
Harbour View Complex Water Damage Mitigation Study
Exterior Wall Investigation

Further to your request, GENIVAR is pleased to present this outline of the additional engineering services to perform an investigation of the condition of the exterior walls at selected locations on the four (4) buildings involved in this Study.

Engineering Services

We anticipate the following additional scope of engineering work related to the exposure and assessment of selected locations of the wall assemblies accessed from the exterior of the building.

1. Determination of assessment locations and provision of photographic guide (already provided) (6 hours).

2. Meet with Contractor on site to review locations and discuss the approach to the work. (2 hours time allowance).

3. Attend the site daily during the wall exposure period to view, photograph and assess the conditions inside the walls and document findings back in the office. We anticipate, and have based our fees on, the contractor being able to open up and close approximately 10 locations per day. We would expect the contractor to expose the 10 locations in the early part of each day, we would attend the site after all 10 are open, perform our work and the contractor would then close up the day's openings by the end of the day. This would ensure that no locations are left open overnight and should minimize any potential water infiltration to the assessment locations. We have allowed for 8 visits to the site on 8 days in our fee proposal. (32 hours time allowance).

4. While on site each day during the assessment period, we would identify if there are any areas that should be further explored based on the condition of the areas opened up. This would be done in consultation with the City and approval would be provided for any agreed upon additional areas. It may be a good idea to include about 6 additional typical areas when obtaining pricing from the contractor to accommodate this within your contract with him.

5. Following the assessment we would tabulate and document the condition of each location on the photographic guide as well as provide photographs of each area identifying its condition and showing any evident deterioration. (16 hours time allowance).

6. We will prepare a section for the overall Report outlining the assessment and the results. The photographic record will be added to the report as an appendix. We will update the Conclusions, Recommendations, Opinion of Probable Costs and Executive Summary of the Report to include the results and impact of the assessment. (12 hours time allowance).

7. We have included for one additional meeting to review and discuss the assessment results and impact. (4 hours time allowance).

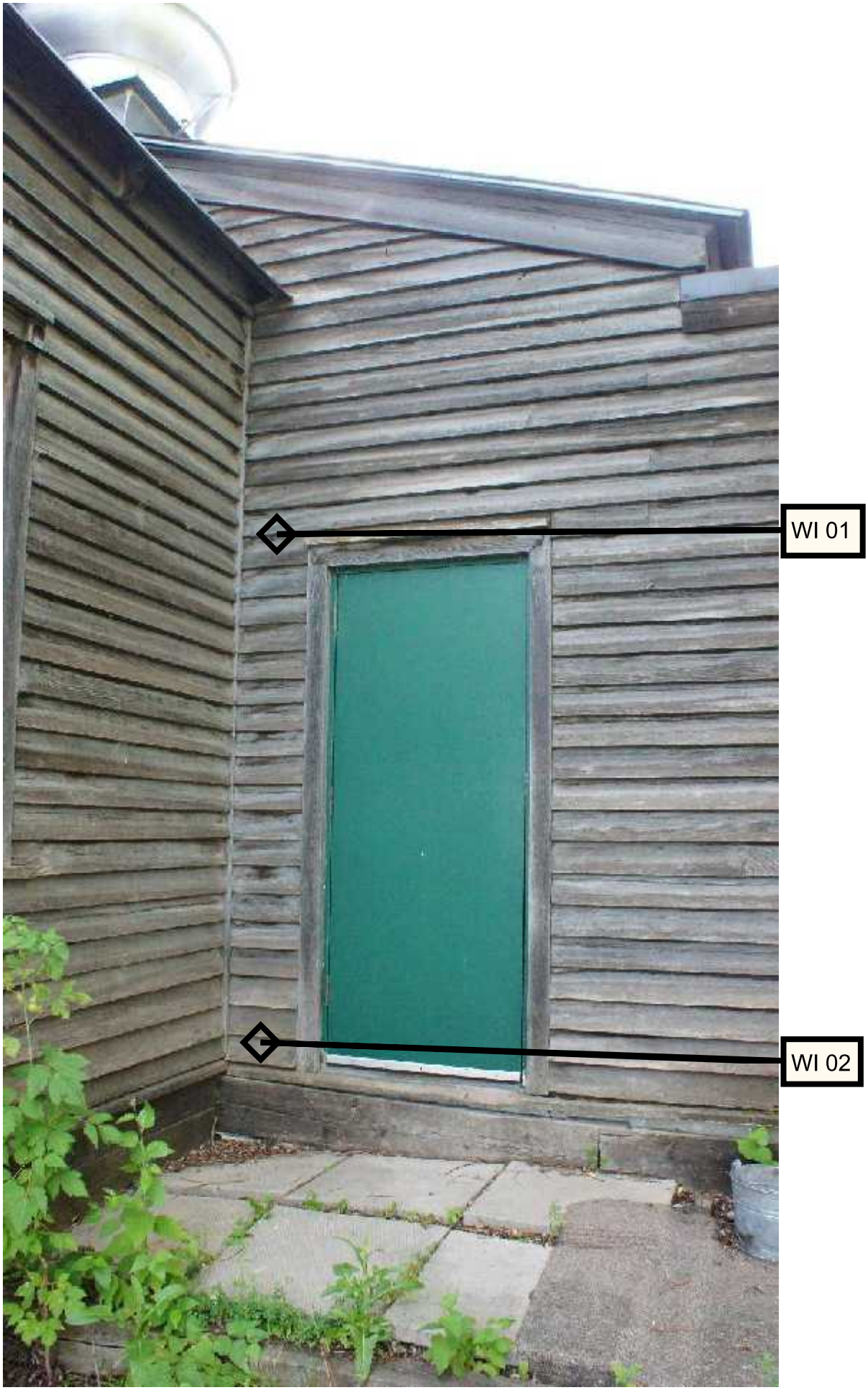
We have discussed the work with the contractor and advised that the typical wall section, as noted on the original drawings, includes:

- Exterior Wood Siding
- Building paper
- 12.7 mm plywood sheathing
- 38 x 140 wood stud walls
- Batt insulation
- Vapour barrier
- Interior finish

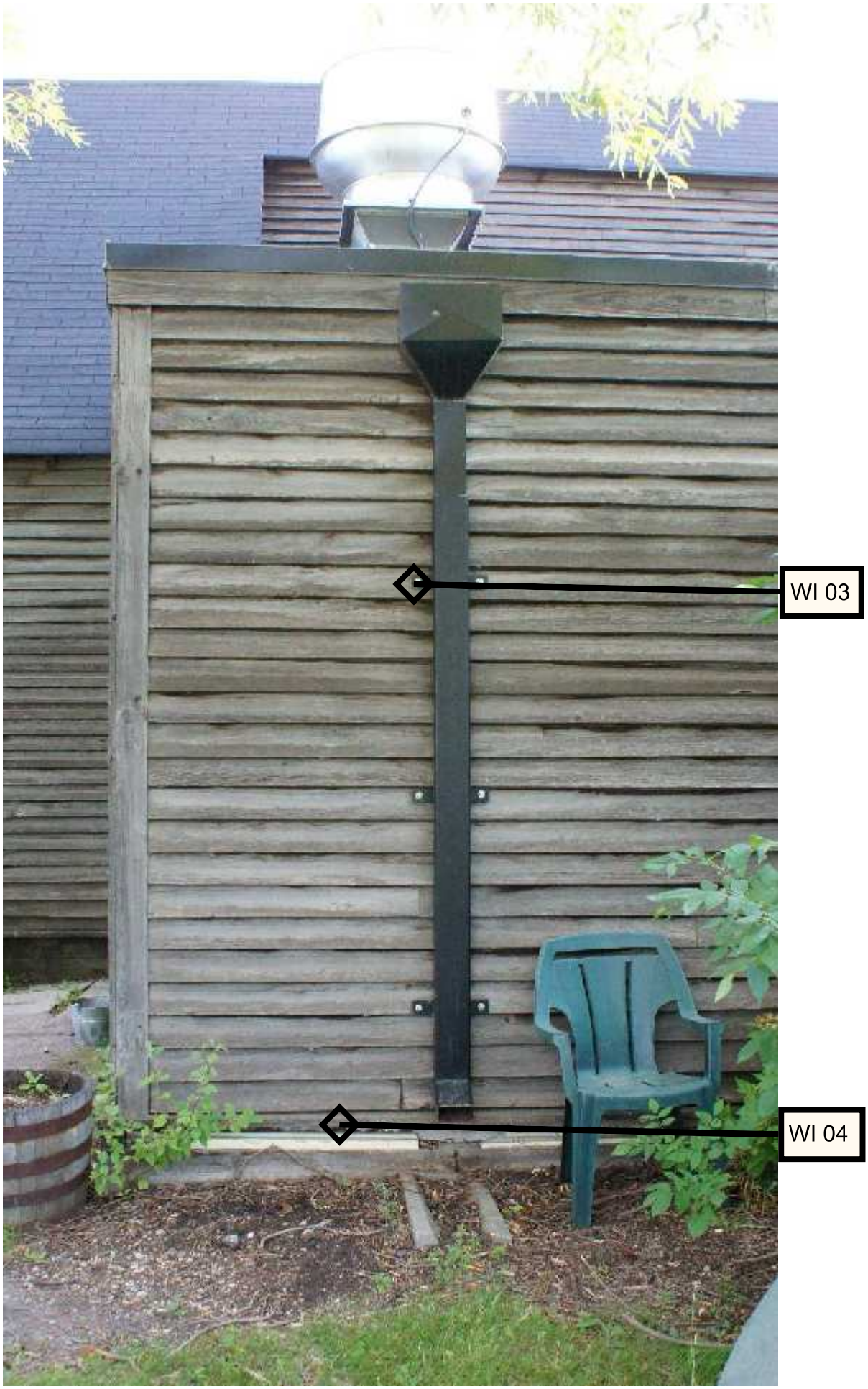
His proposed approach at each location to expose the interior condition of the wall is:

- Removal of any attachments at the location to be assessed (such as downspouts, etc.).
- Careful removal of several pieces of cladding, ideally to existing joints where possible.
- Careful cutting of the building paper leaving at least one side uncut if possible.
- Drill a 100 mm hole in the sheathing at the location.
- After our review, patch the hole and building paper.
- Careful replacement of the removed cladding such that it is not split or damaged when reattached.
- Caulking as applicable.
- Locations that require further exposure of the wall interior would be additional based on the actual scope of the work.

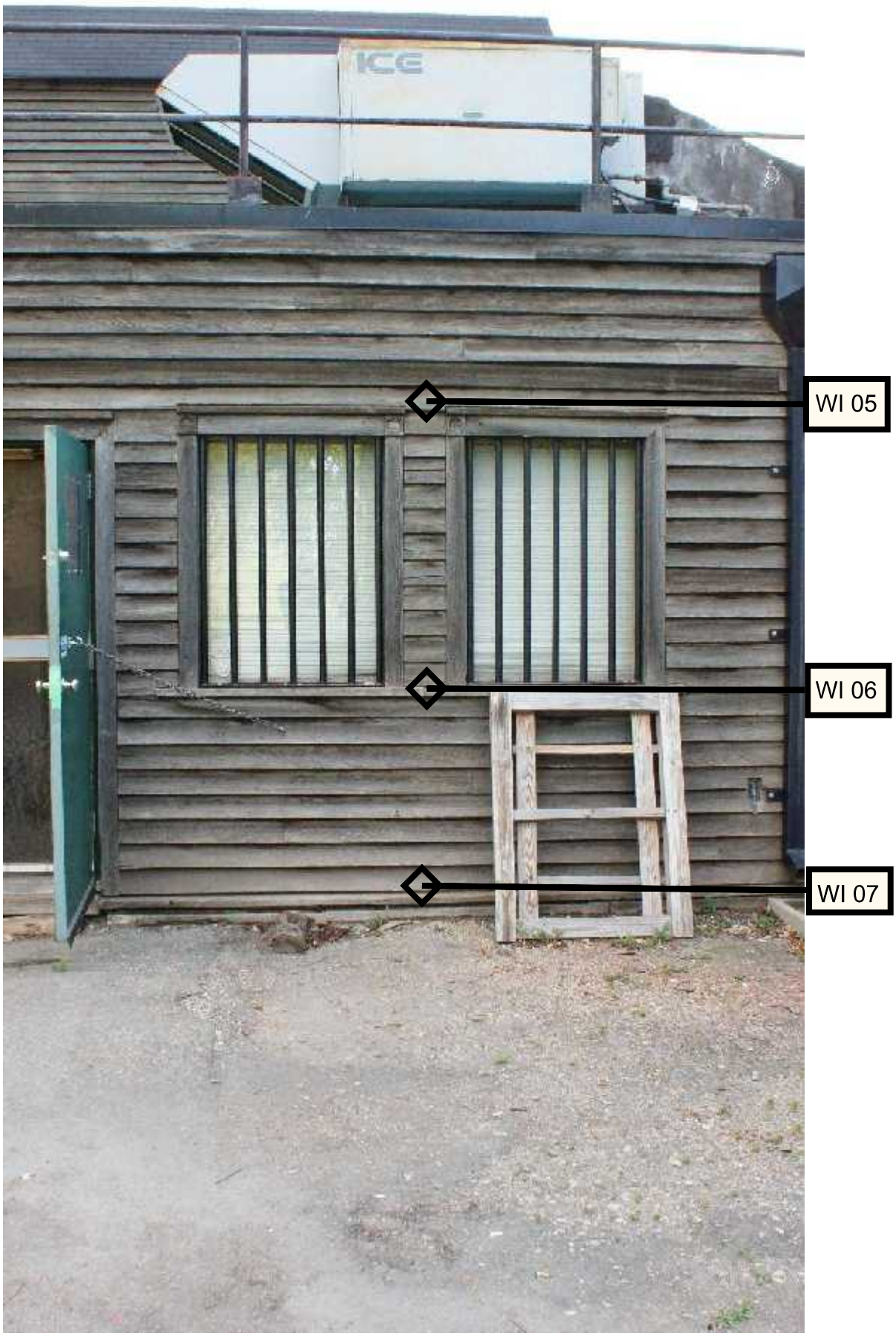
There are 76 identified locations in total.



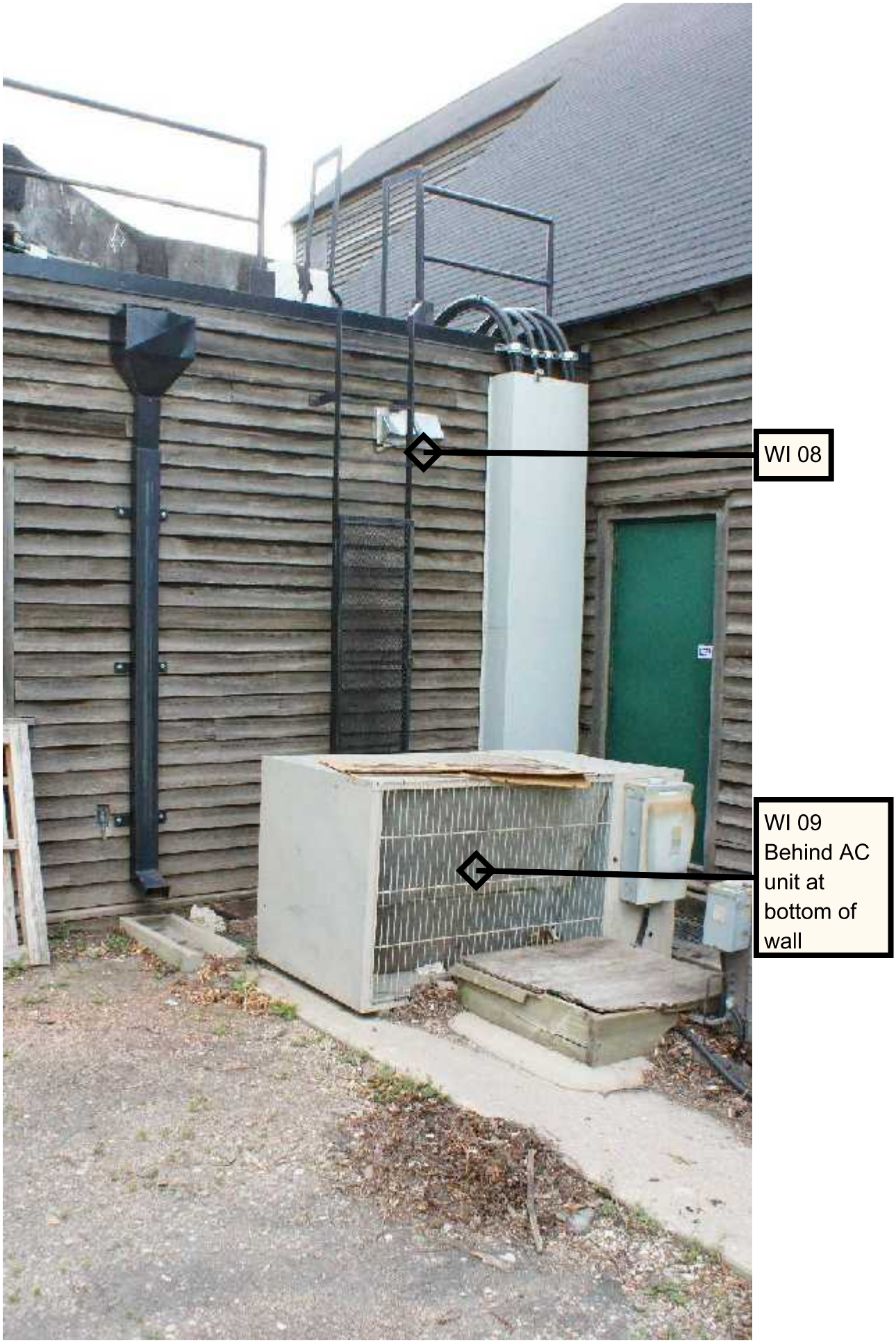
01-South-West Entry Main Building.JPG



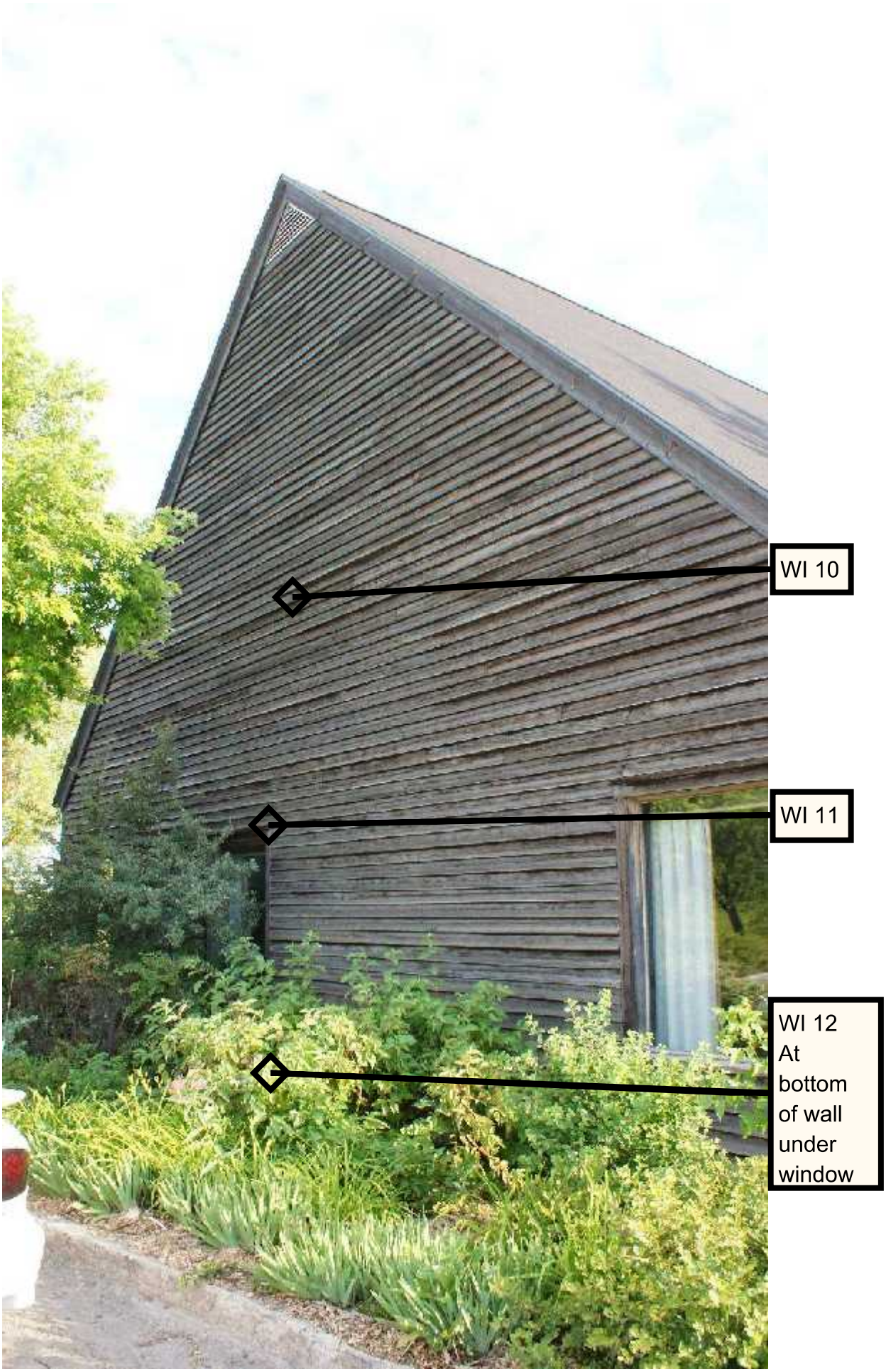
02-South (west) Side Main Building.JPG



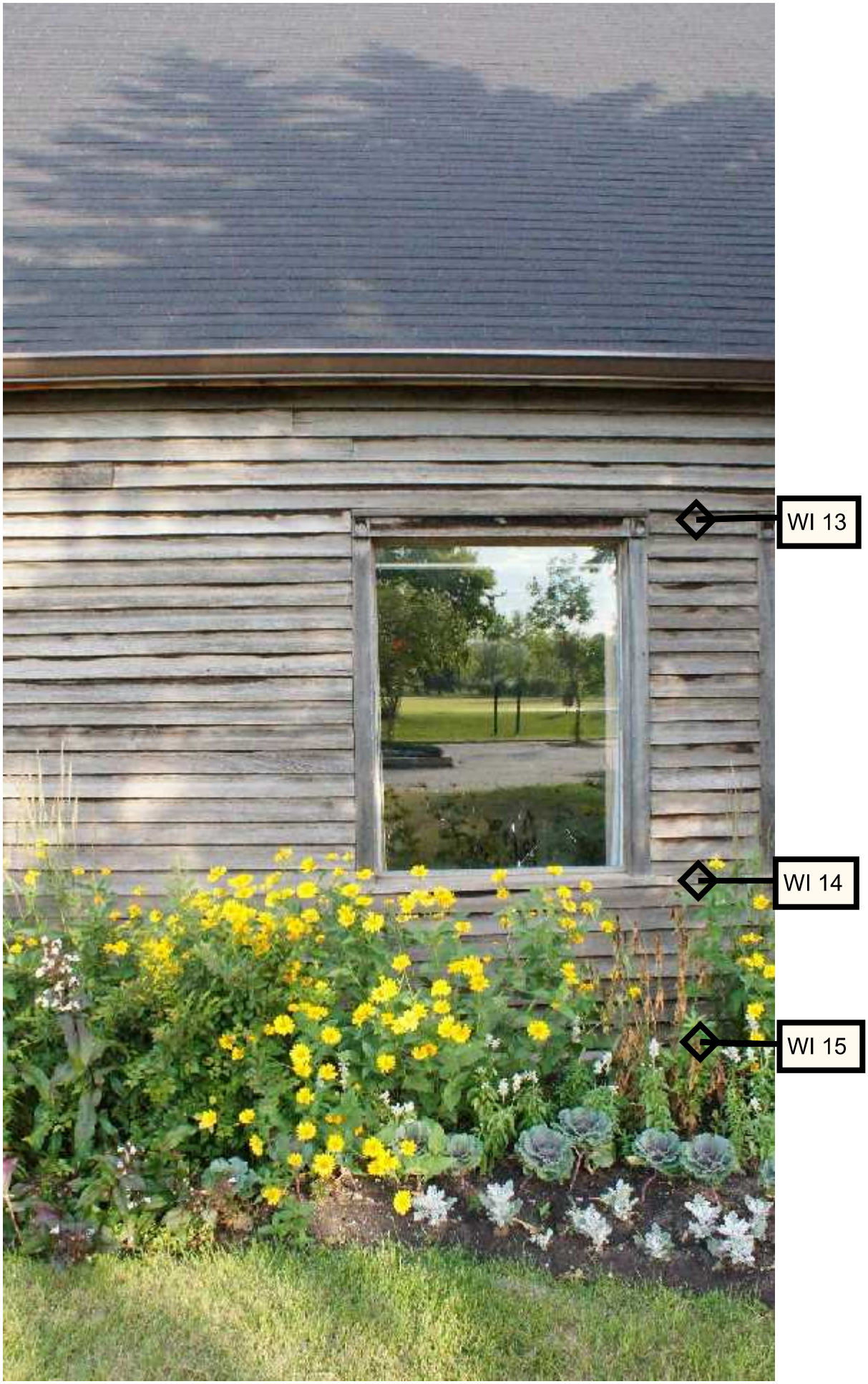
03-South Side Main Building Windows.JPG



04-South Side Main Building Interior Corner.JPG

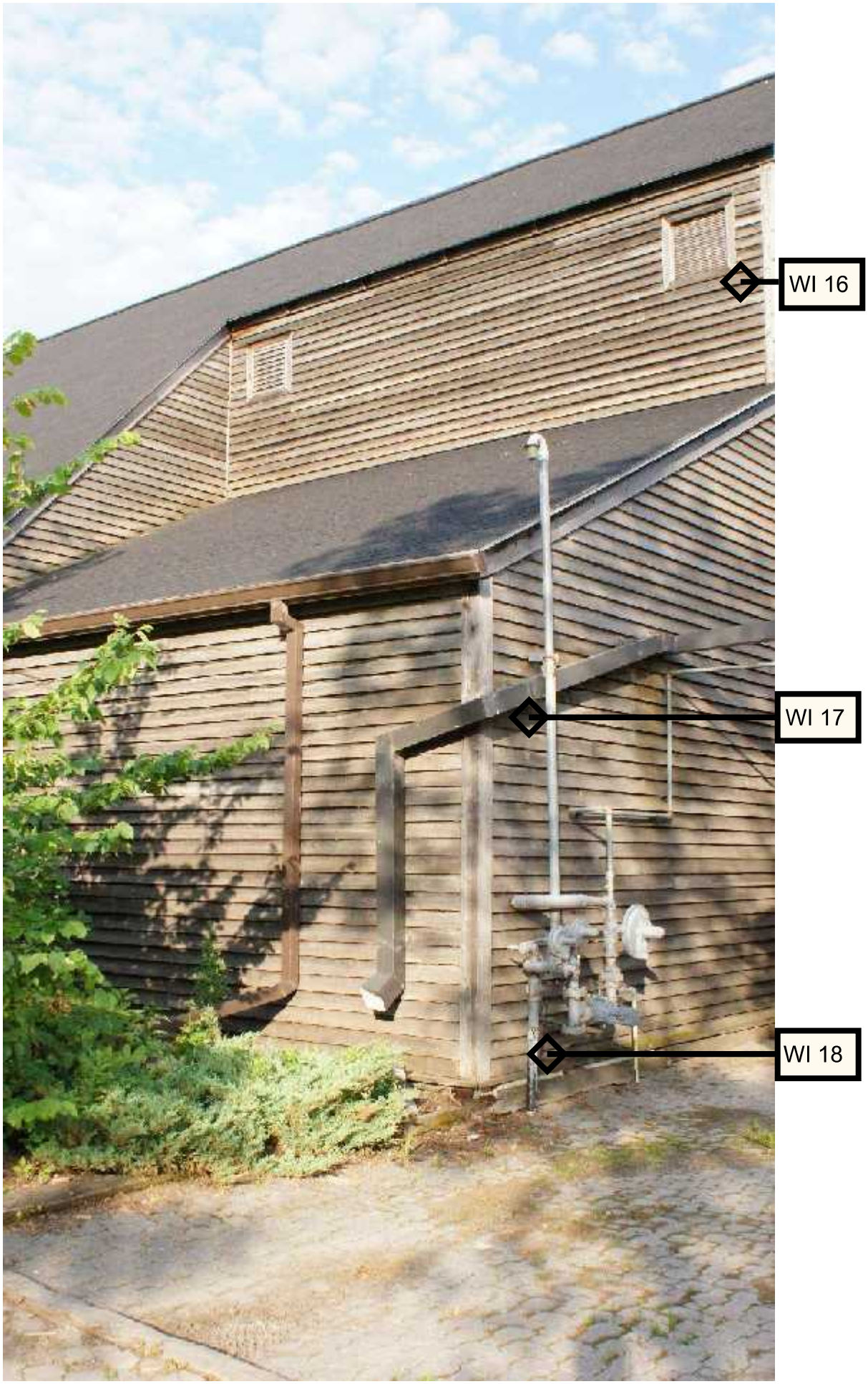


05-South (east) Side Main Building.JPG



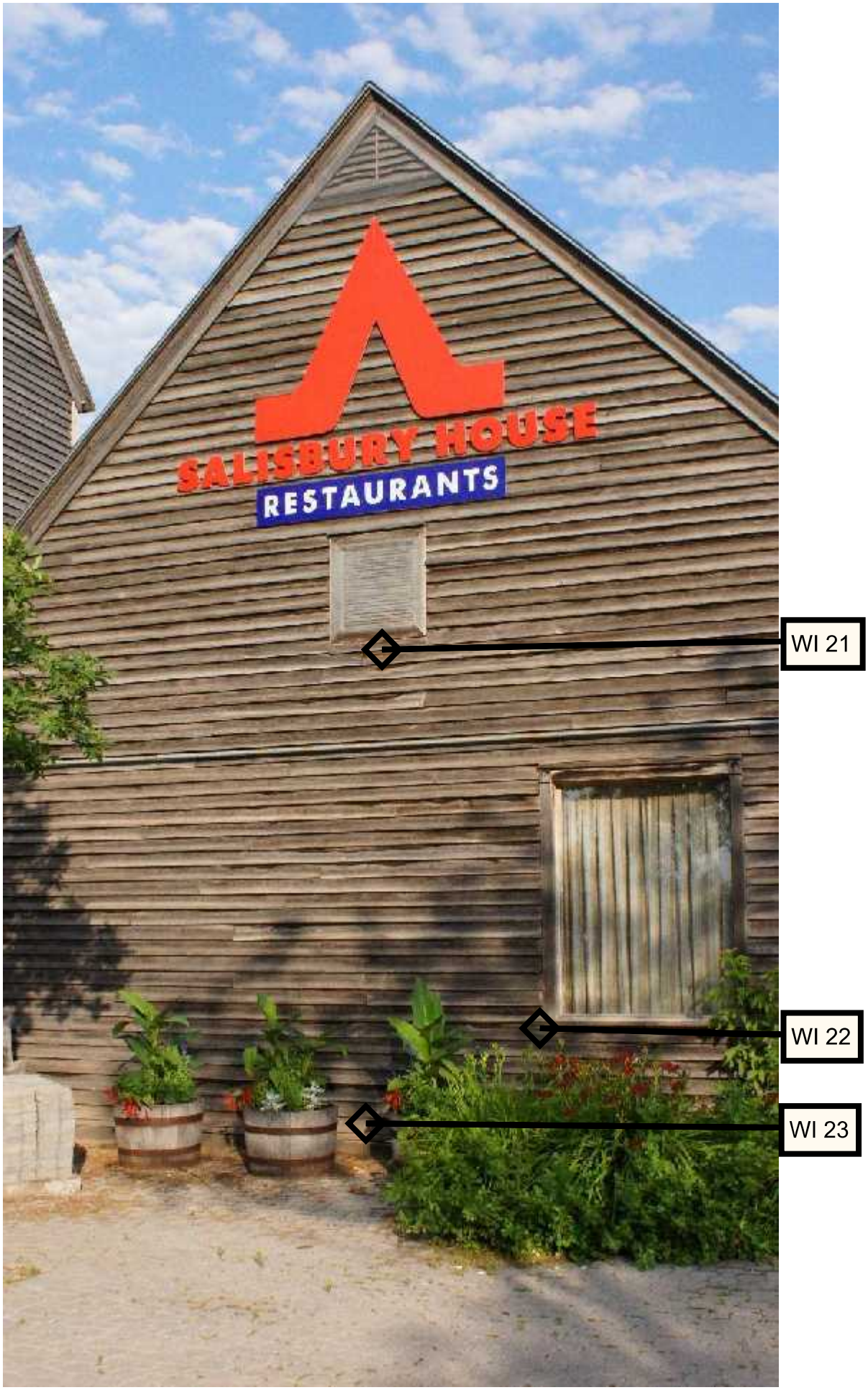
06-East (south) Side Main Building.JPG

07-East (centre) Side Main Building.JPG

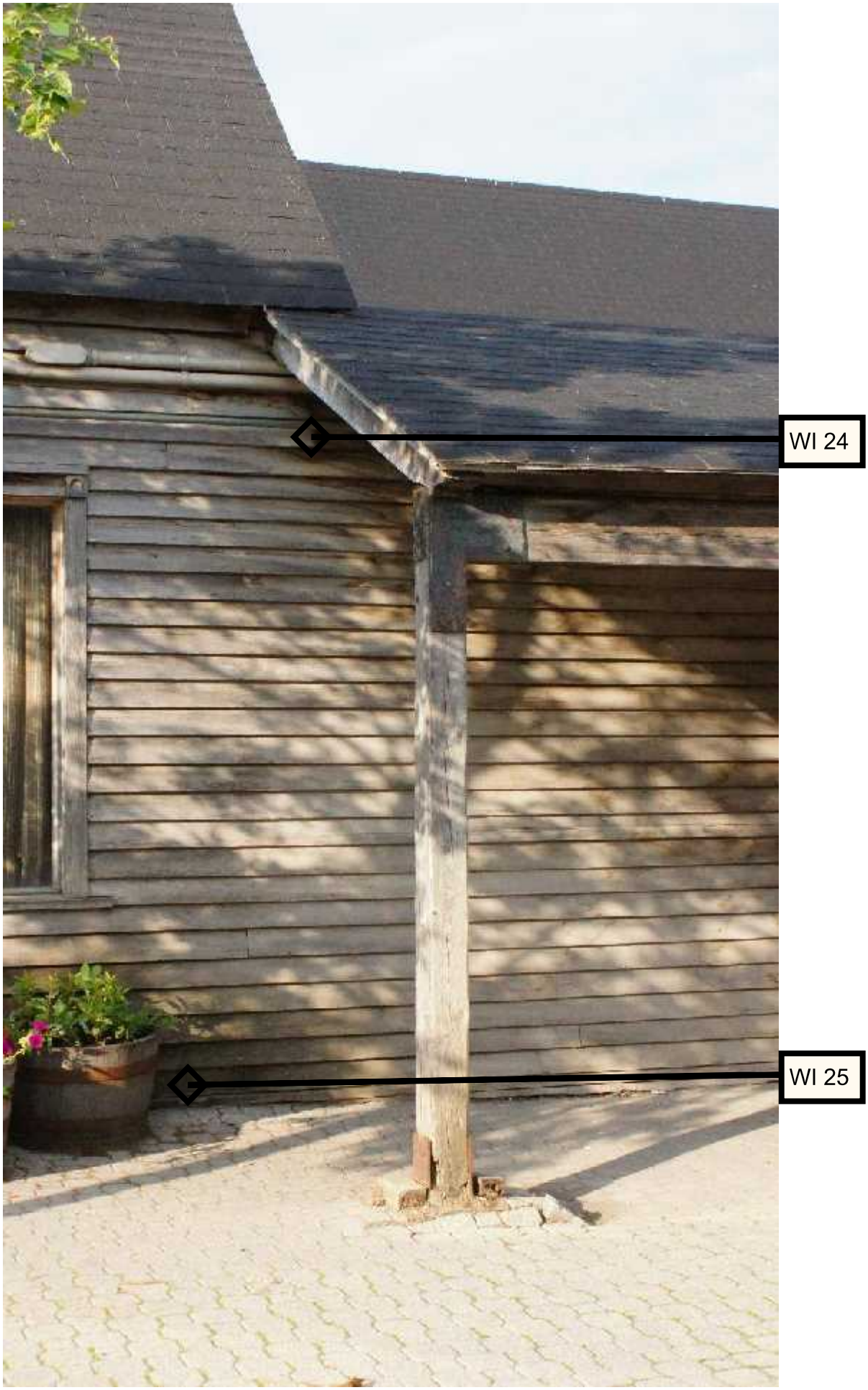


08-East (north) Side Main Building.JPG

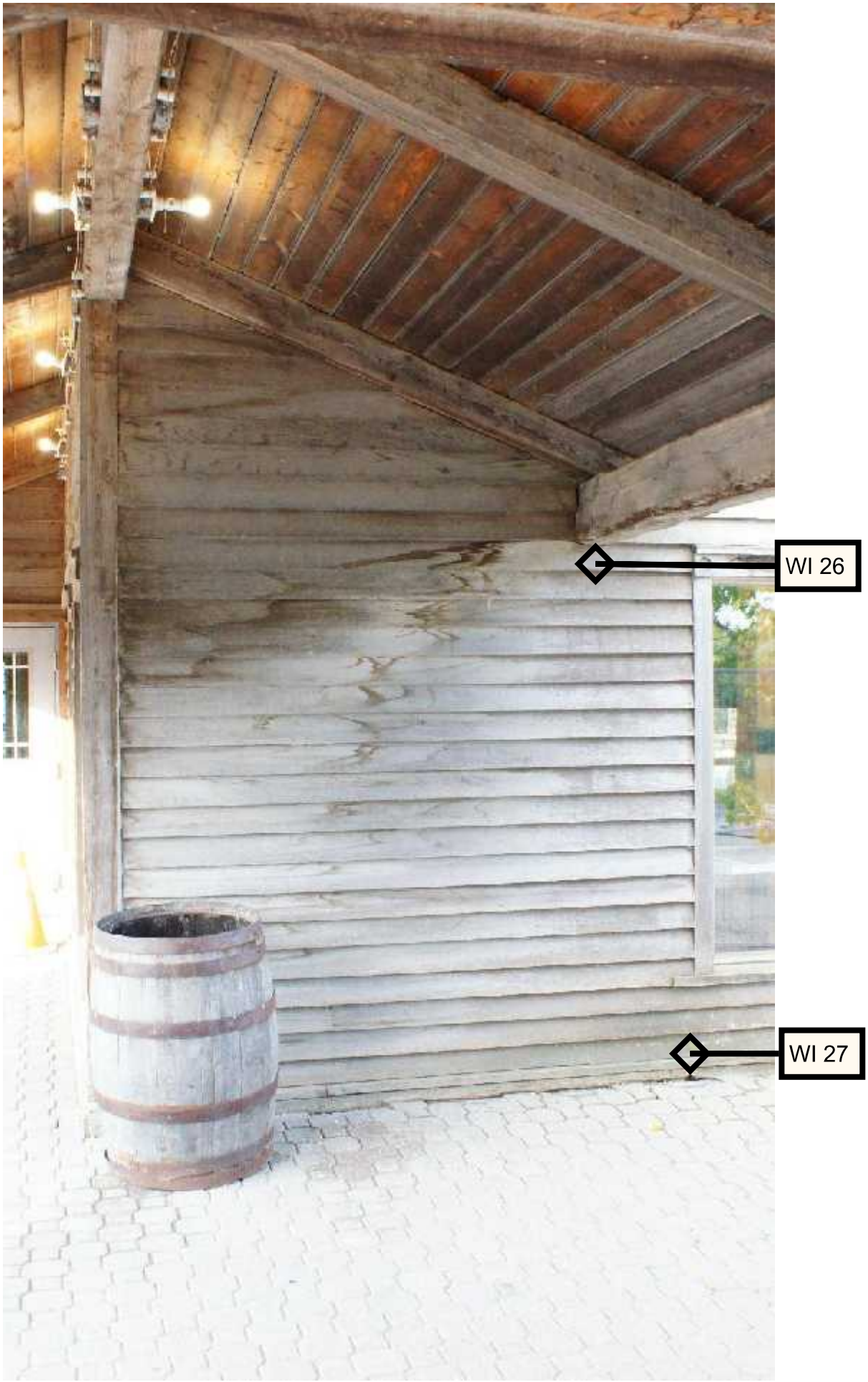
09-North-west Corner Breezeway Main Building.JPG



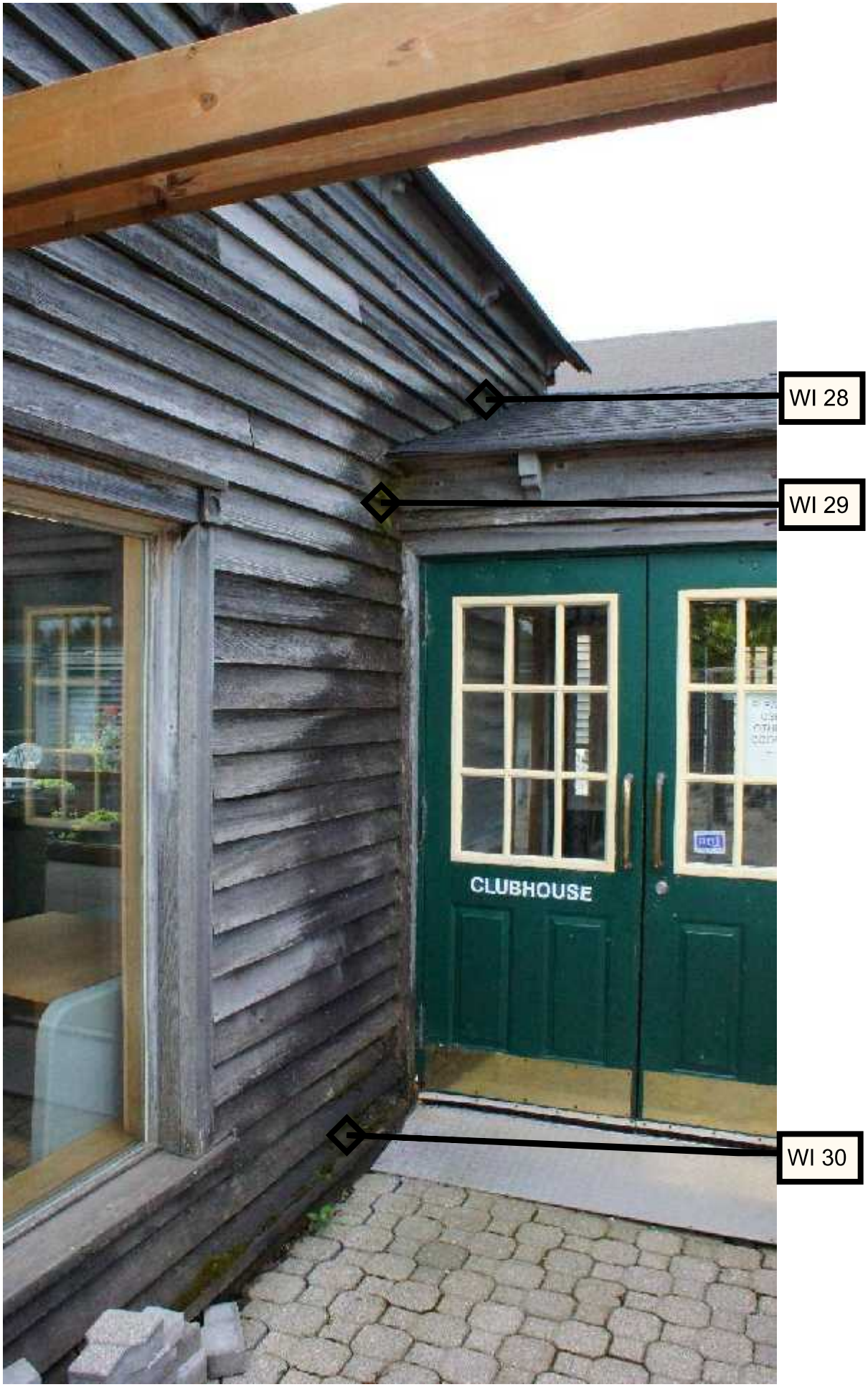
10-East Side (north) Main Building.JPG



11-North (east) Side Main Building.JPG



12-North Side Main Building Under Canopy.JPG



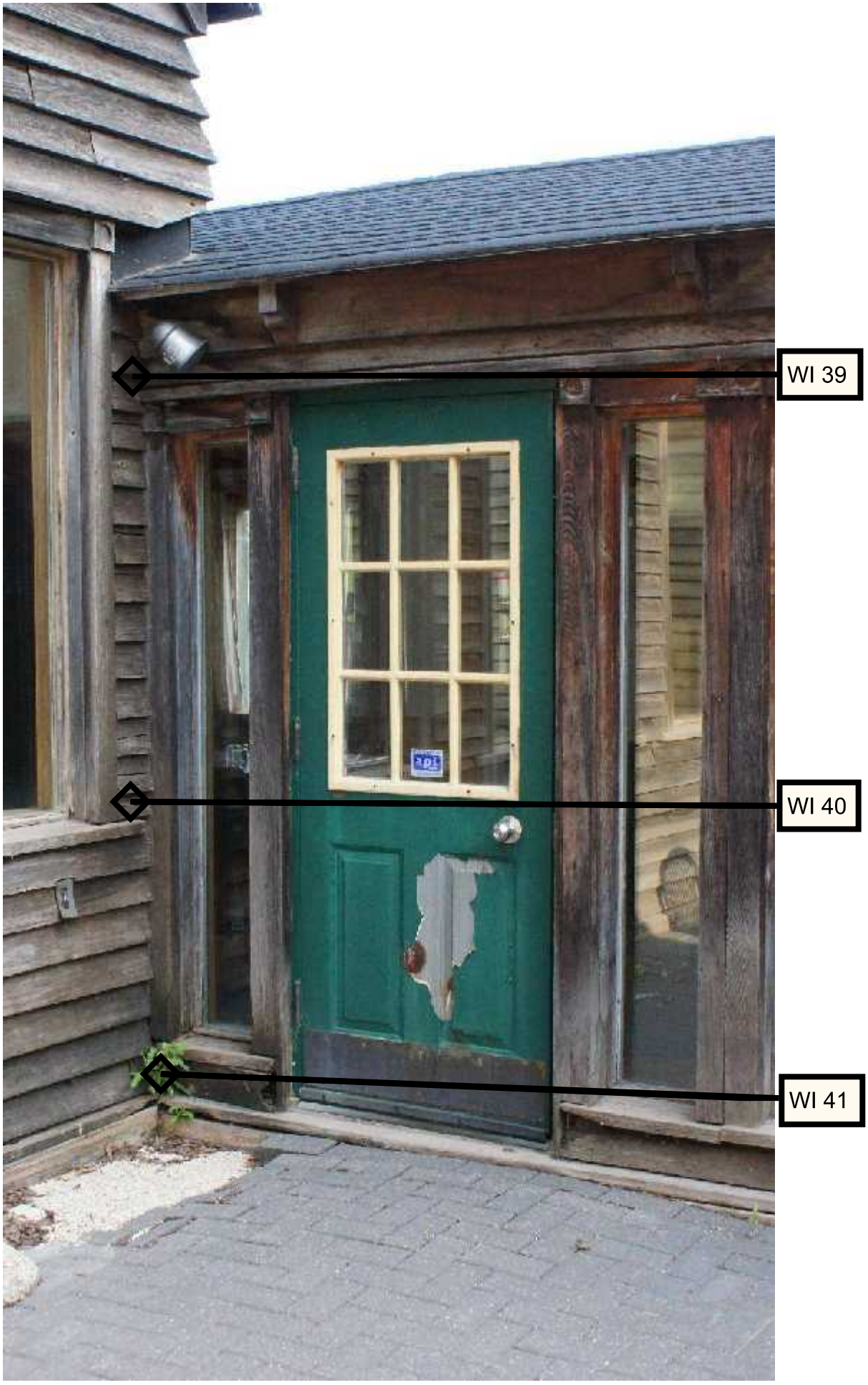
13-North (west) Side at Cafeteria Entry Main Building.JPG

14-North Side (over water at west) Main Building.JPG

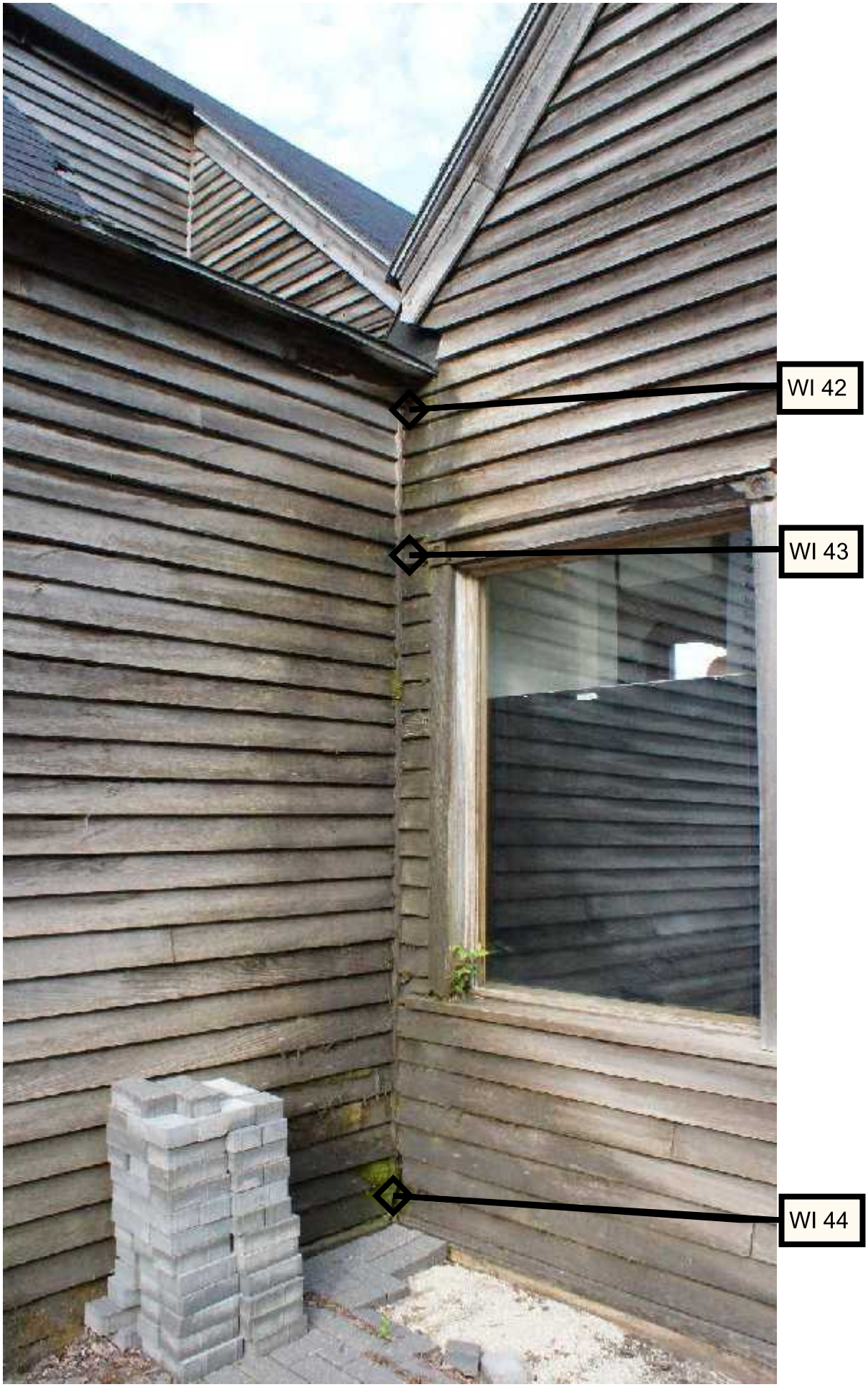
15-North (at entry to deck) Main Building.JPG

16-North (west side on deck) Main Building.JPG

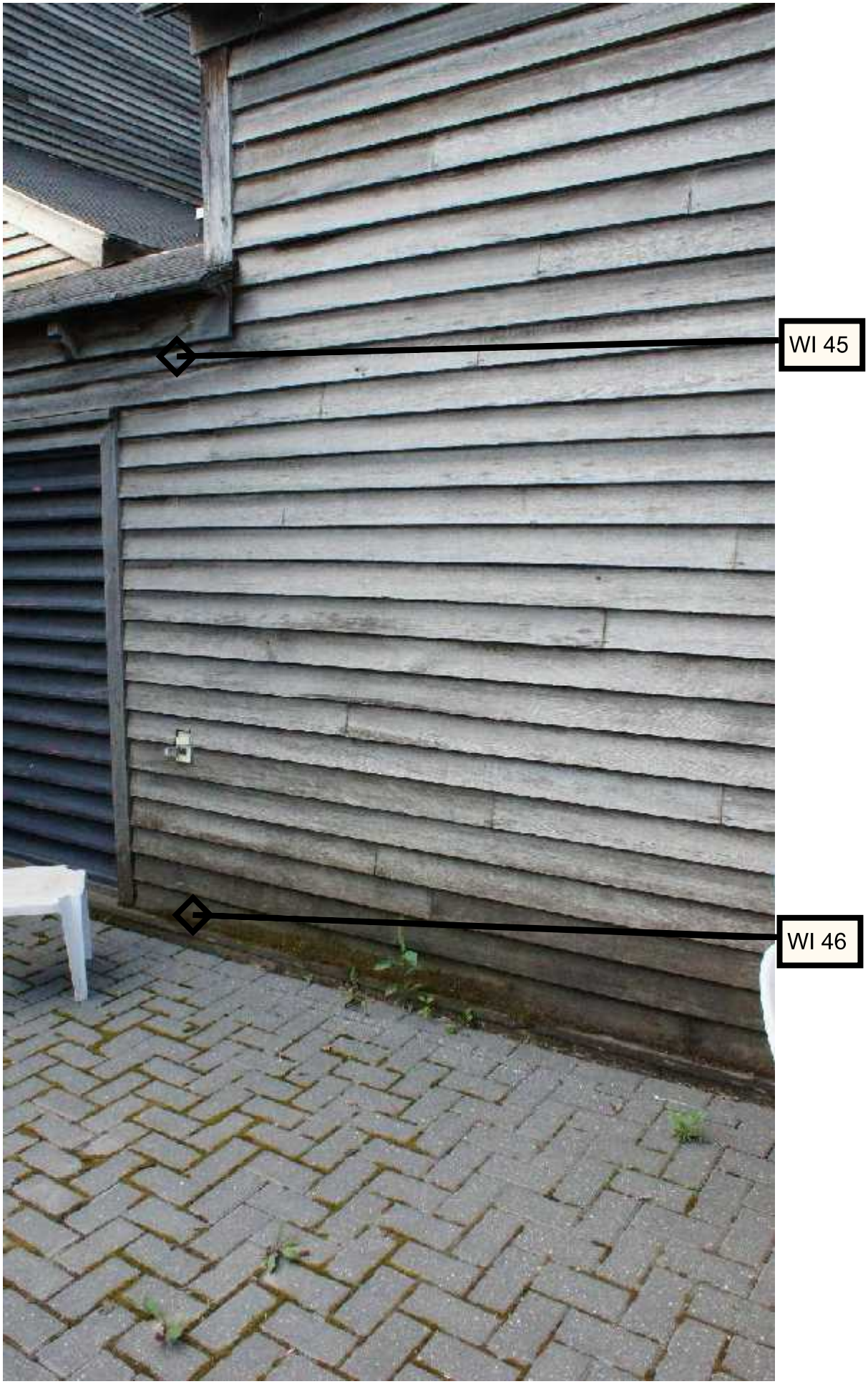
17-West (on deck) Side Main Building.JPG



18-North West Corner Courtyard Main Building.JPG



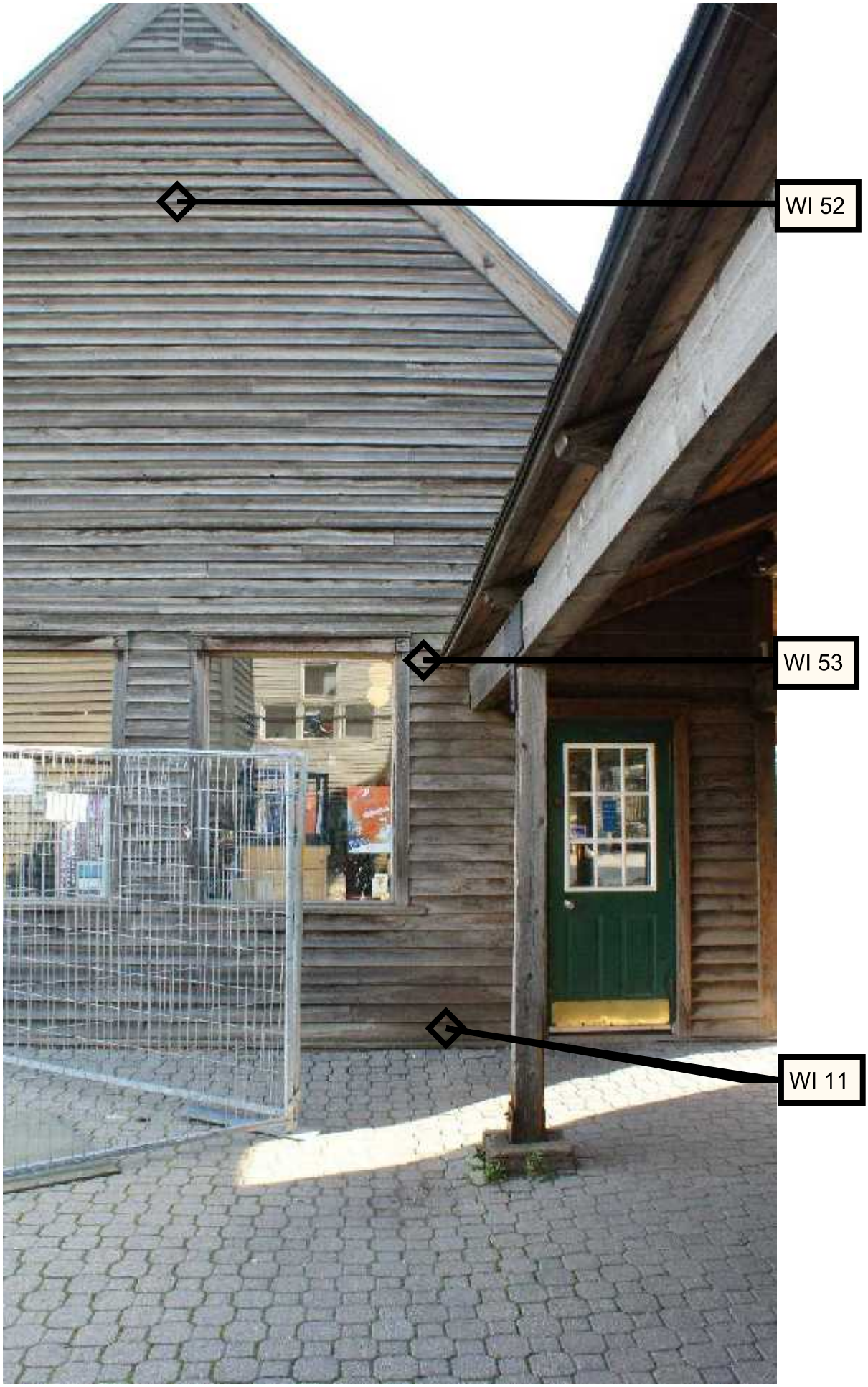
19-South-west Corner Courtyard Main Building.JPG



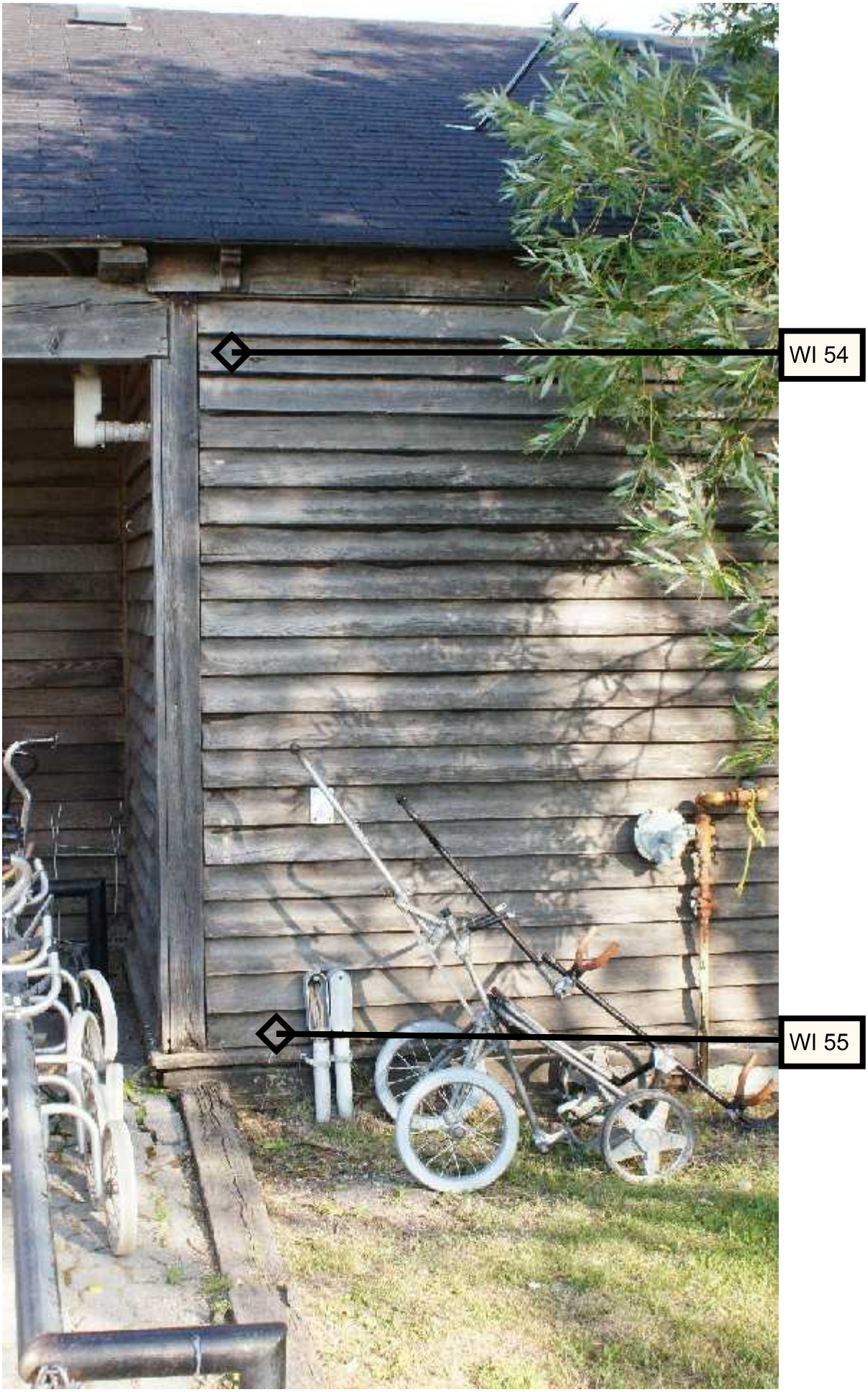
20-South (at east) Side Courtyard Main Building.JPG

21-South-East Corner Courtyard Main Building.JPG

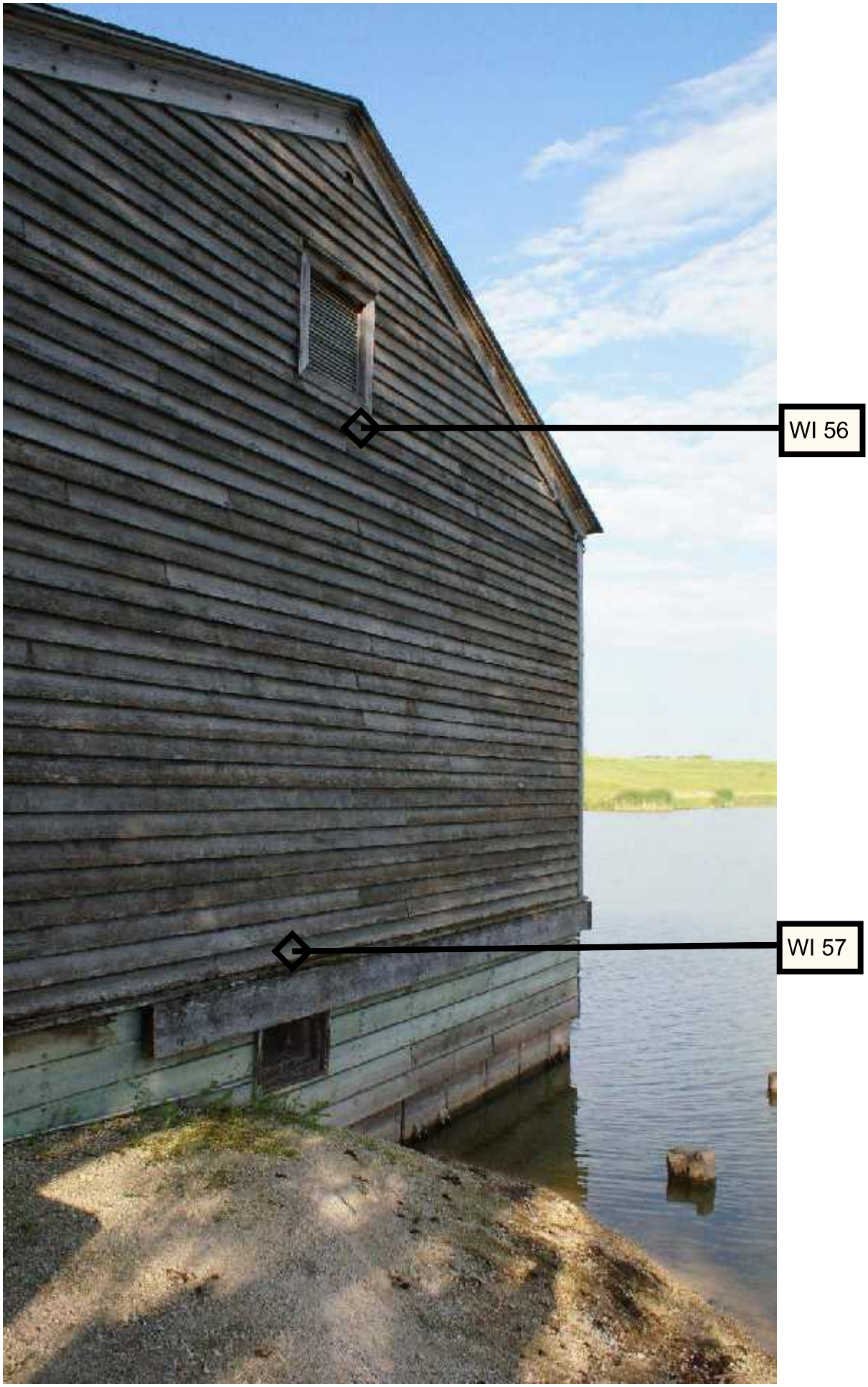
22-South-East Corner Tower.JPG



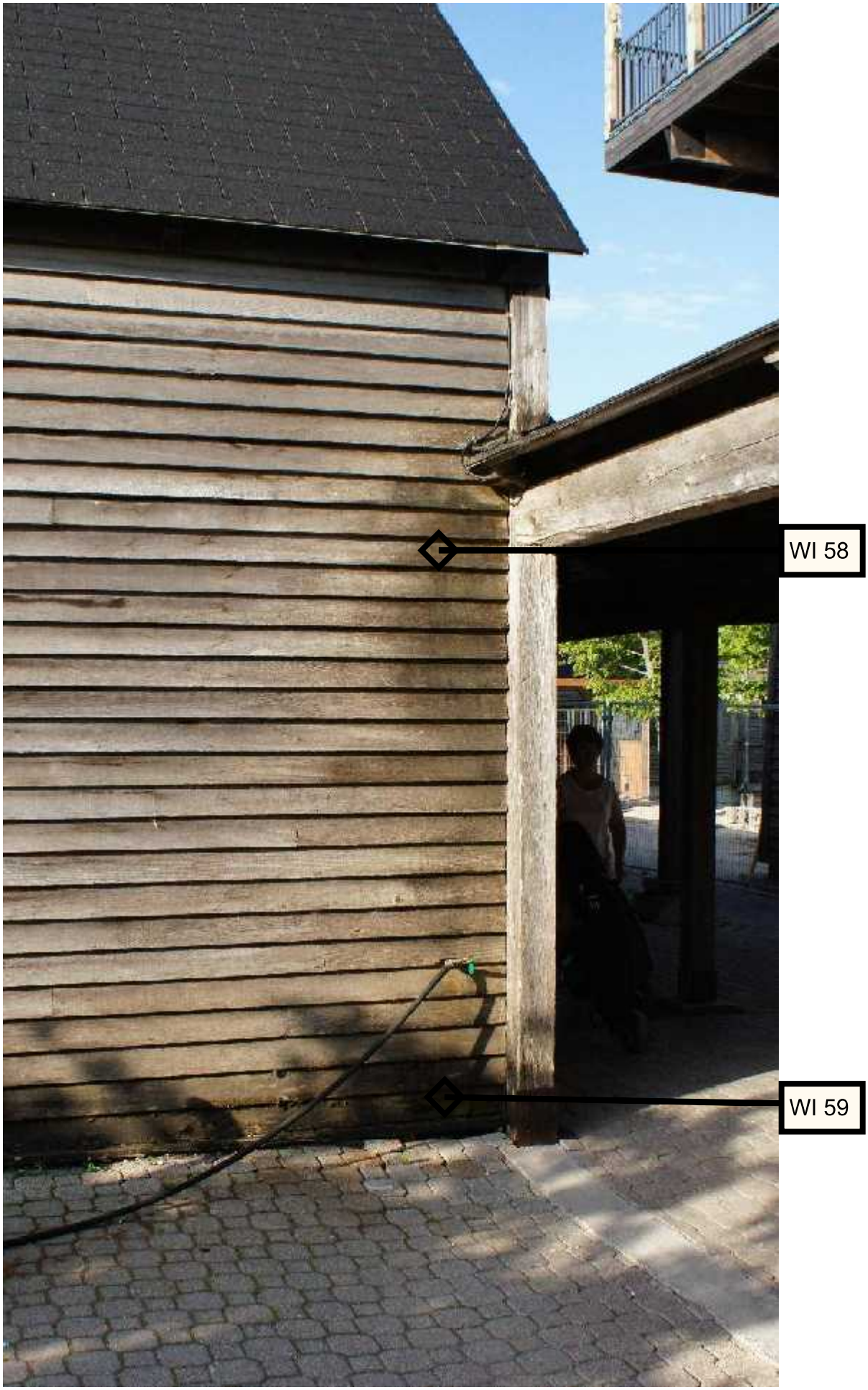
23-South Side Pro Shop.JPG



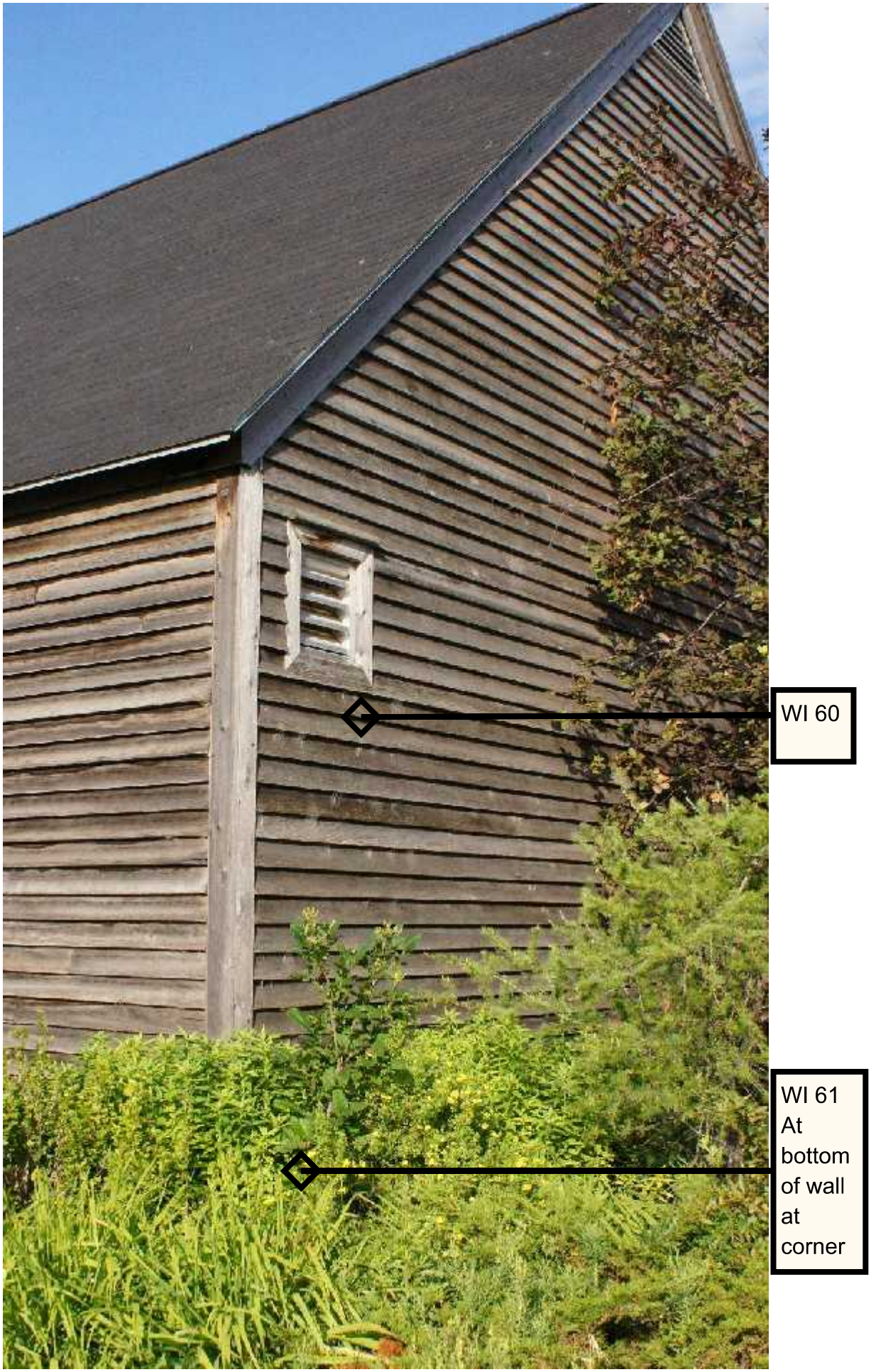
24-East (at north) Side Pro Shop.JPG



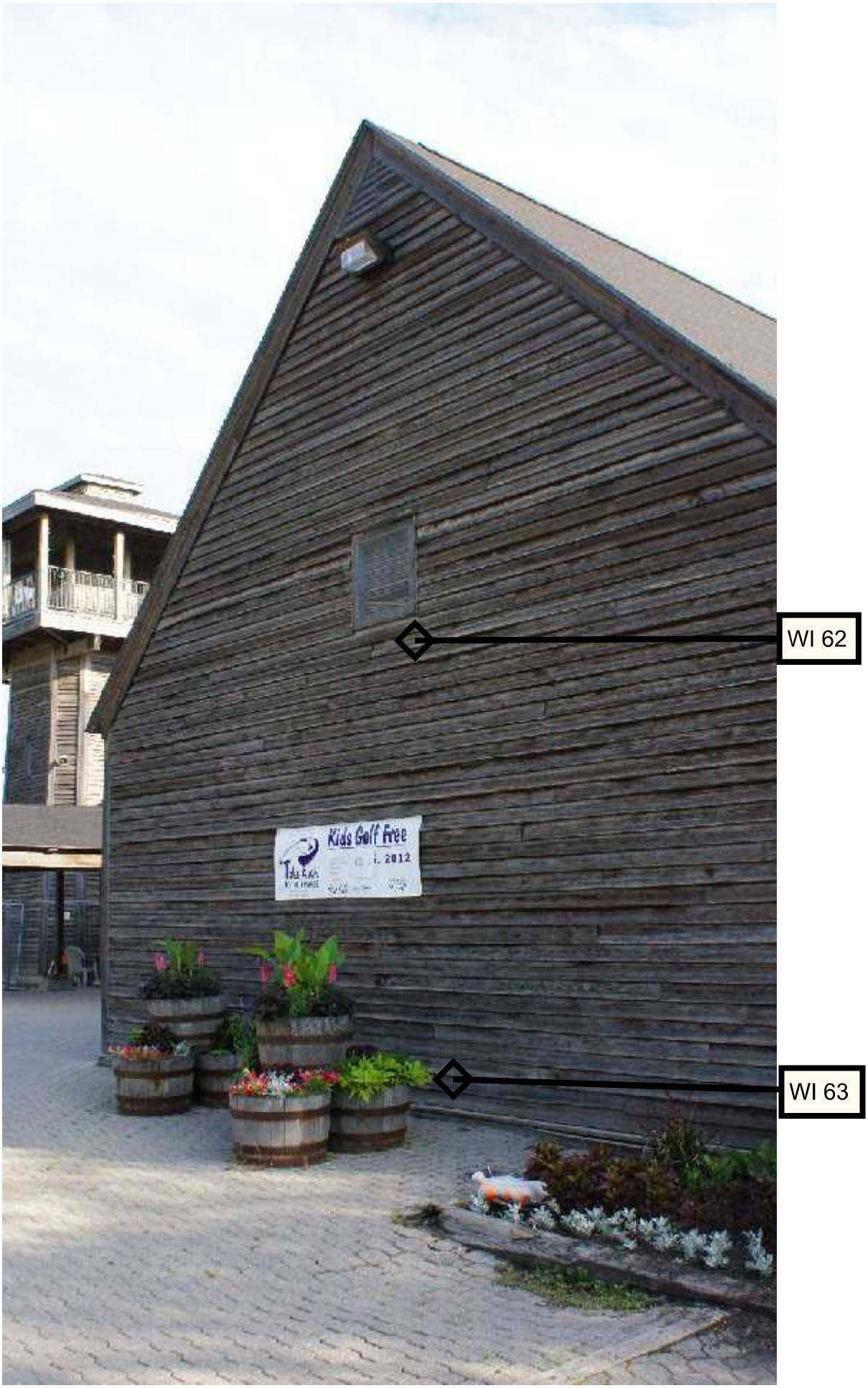
25-North Side Pro Shop.JPG



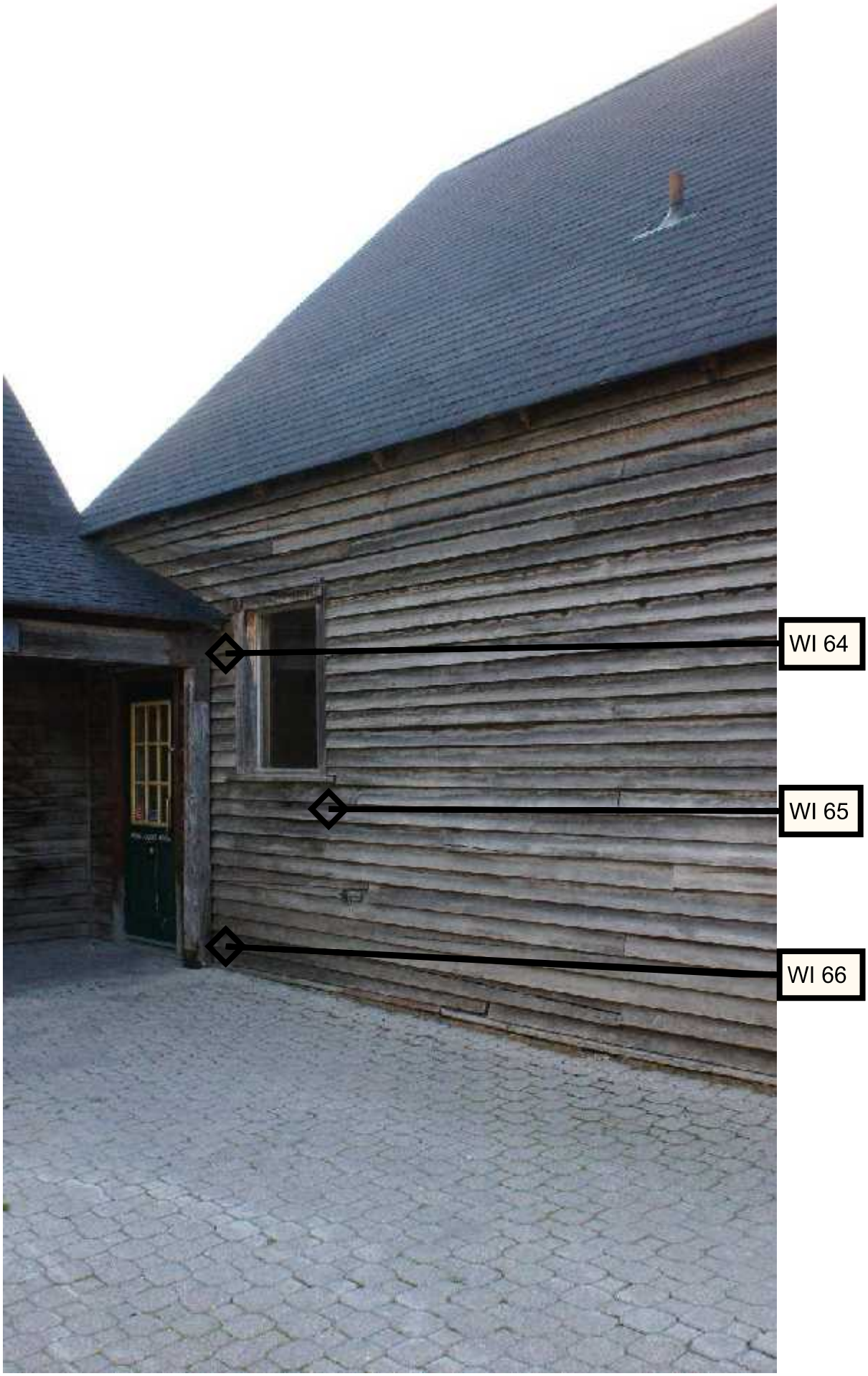
26-North West Corner Change Room Building.JPG



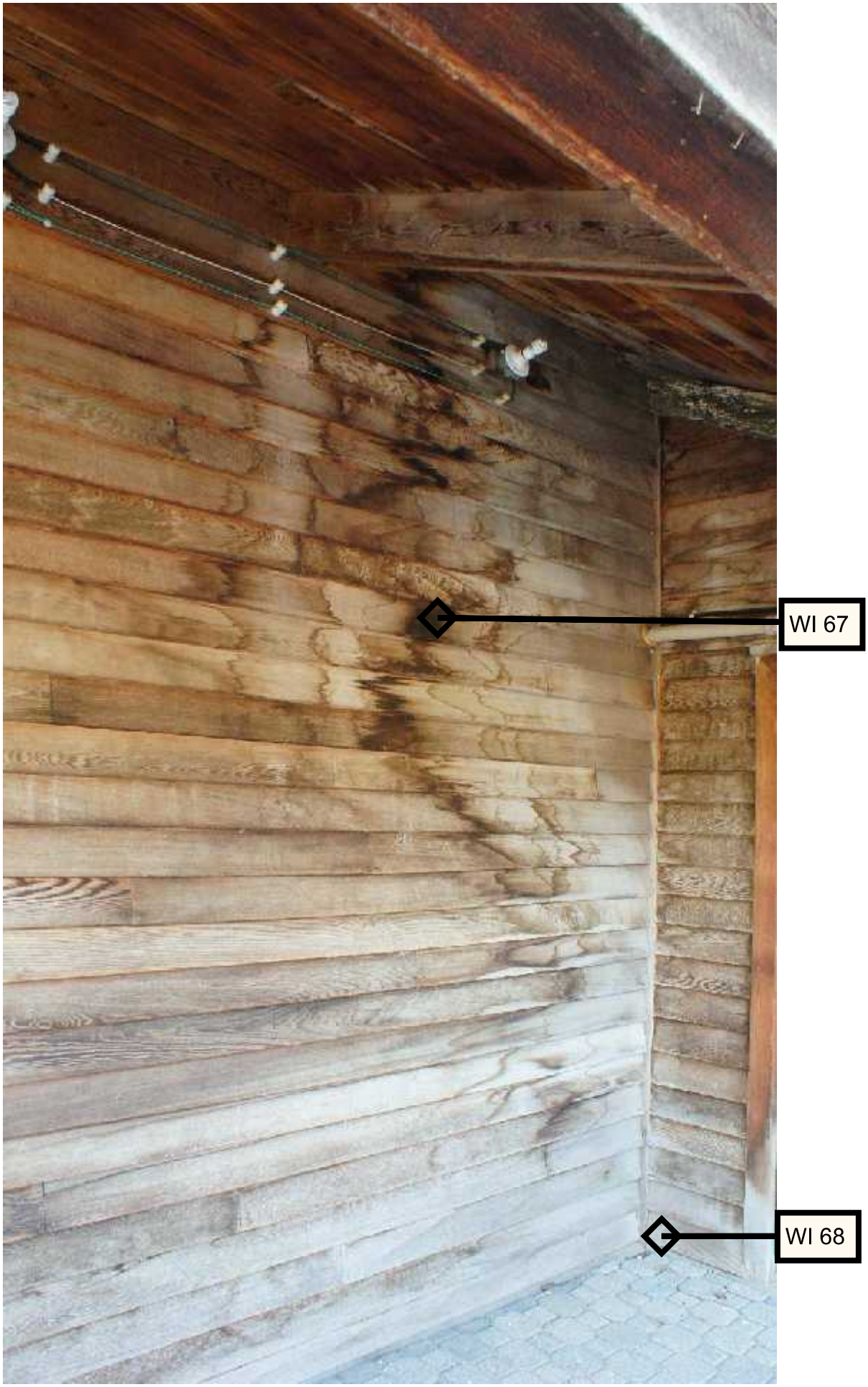
27-North East Corner Change Room Buildng.JPG



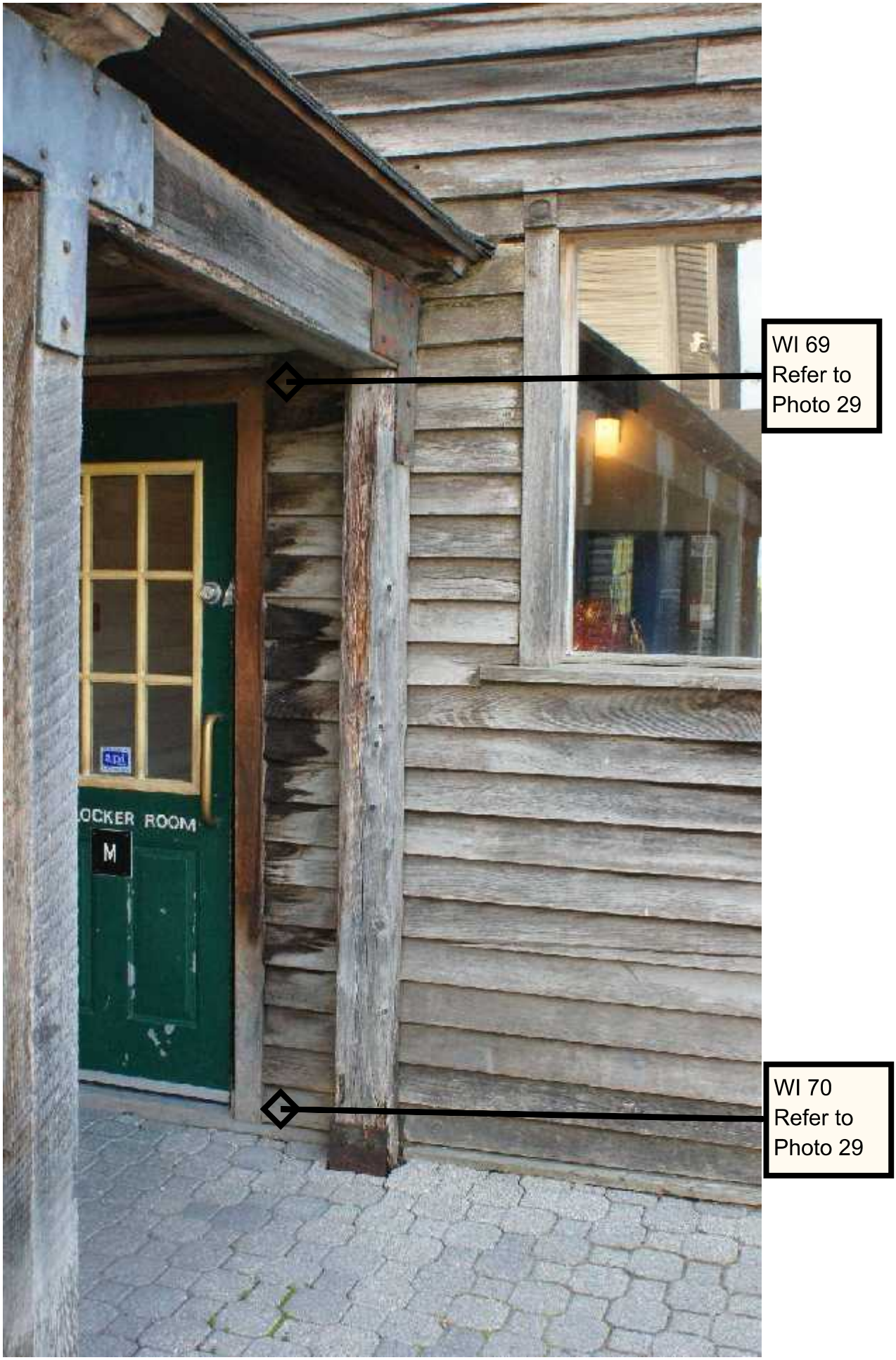
28-South (east) Side Change Room Building.JPG



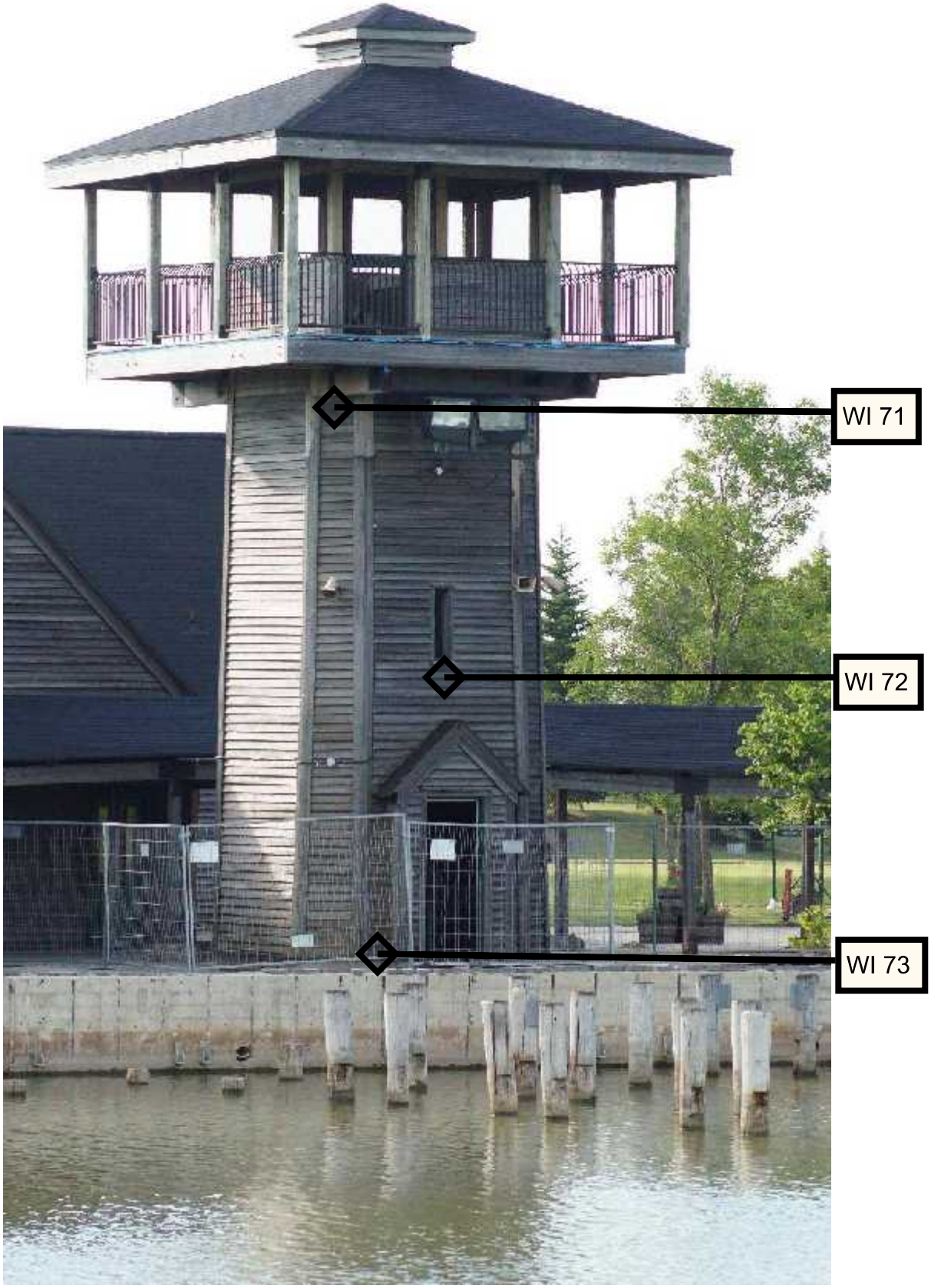
29-West (south) Side Change Room Building.JPG



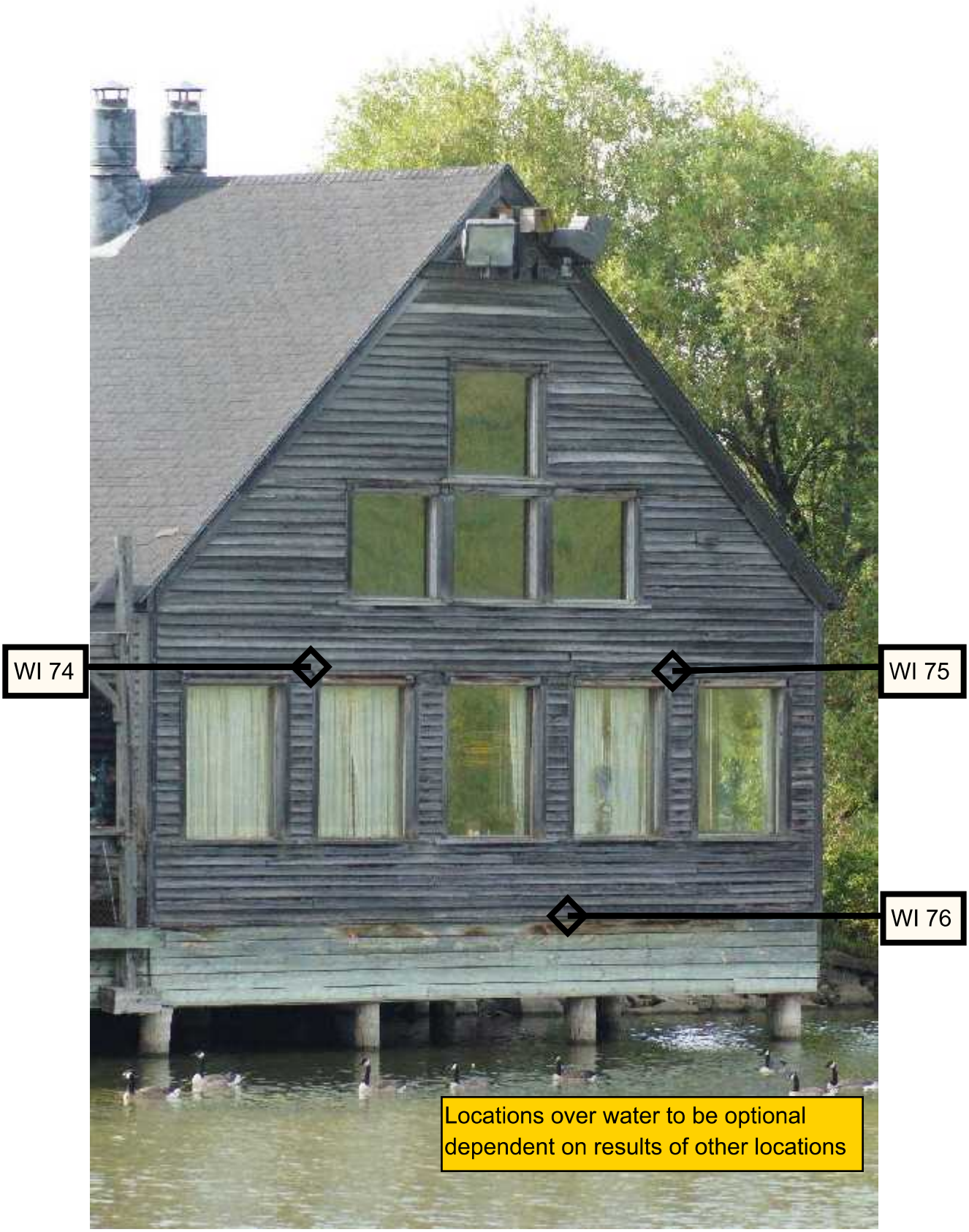
30-South (under overhang) Side Change Room Building.JPG



31-West (at south overhang) Side Change Room Building.JPG



32-West Side Tower.JPG



33-West (over water) Side Main Building.JPG