# BUILDING 103 - Steam Powerhouse No. 2

Figure 1 - Building 103, view from south

## ARCHITECTURAL DESCRIPTION

*PHYSICAL DESCRIPTION*

Building 103 stands at the end of 20th Street. Its tall smokestack is a character defining feature, creating a visual anchor from the district entry at 20th and Illinois Streets (figure 1). Built in 1937, the architect and builder are unknown.

This is a tall, one-story rectangular steel frame powerhouse, with a gabled monitor roof. It measures 62'-8" long, by 38'-2" wide, by 45'-6" tall, and contains 2,258 square feet. This building has a brick-clad base over a concrete foundation, and corrugated steel cladding and roofing. It is glazed with two rows of multi-lite steel sash windows on all but the east elevation, giving an appearance of a two-story building. A black-painted steel smokestack ascends from the southeast corner with "BETHLEHEM" still barely visible on the west elevation. A large, sheet-metal funnel-shaped chimney, likely associated with the boilers, stands adjacent to the east wall; metal ducting emerges from it and runs eastward, above Building 107. Sliding double metal doors, with square panels, penetrate the north elevation. The bottom row of windows, consisting of two, triple 30-lite units, has an irregular pattern of operable ventilators. Similar glazing occurs along the south elevation, giving the building a sense of translucence. Four, fixed multi-lite steel sash windows glaze the west façade. There are no openings along the east elevation.

The interior is a single space filled with steam generating equipment, including a control panel at its center. Two rectangular boilers dominate the eastern mass. Constructed from brick masonry and steel, they tower almost to the ceiling. Metal walkways wrap the boilers at the upper window level, reached by stairs along the north wall. Flooring is checkered steel and walls are corrugated metal over brick masonry. Fink trusses support the corrugated metal roofing. Ducts, entering from the west wall, run along the entire northern length of the building to the boilers.

*HISTORIC/CURRENT USE*

Construction of Building 103 in 1937 was part of a sweeping program of shipyard modernization that took place in the late 1930s. Three air compressors with a combined capacity of 1700 cubic feet of free air per minute are installed in this new power house. In order to facilitate connection, inspection, maintenance, and repairs, a pipe trench of reinforced concrete was installed in a loop encircling the entire yard. The various pipelines, including fresh and salt water, hydraulic service pneumatic service, natural gas and fuel oil services, are carried on hangers on each side of this trench. This trench gives ample room for a man to pass between the pipes. It is covered at the top with checkered iron plates. Passing under railroad tracks it connects through 42-inch diameter corrugated steel culverts.

Building 103 continues to serve its historic function as a steam powerhouse, now for BAE Systems.

## CONDITIONS

### *EXTERIOR*

**WALLS -** CMP (corrugated metal panels) above brick base on concrete curb (figures 2-4).

CMP. Condition: Fair

Mild rust observed throughout the CMP, heaviest at the eaves and where the panels meet the brick base. The panels exhibit multiple penetrations where I-beams, metal conduit, pipes and other appurtenances exit the building.

Figure 2 - Building 103: South Elevation


Figure 3 - Building 103: West Elevation

Figure 4 - Building 103: East Elevation

Brick on concrete curb. Condition: Poor (figures 5 and 6)

Cracked and broken brick were observed on all wall areas. Horizontal steel reinforcing is rusted and expanding forcing mortar out of the joints and contributing to brick cracking, spalling and displacement. Diagonal cracks were observed at the north doorway and at the NE, NW and SW corners.

Figure 5 - Building. 103: Brick crack at NW corner.

Figure 6 - Building. 103: Brick spall/crack at fire door. Note exposed rebar below header course.

**WINDOWS**

Steel sash windows. Condition: Fair (figures 7 and 8)

Steel sash multi-lite, fixed in frame with operable portions typical. Frame, mullions, and muntins are in fair condition. Window damage and broken/cracked panes have been dealt with by glueing sheet plastic panels at cracked or broken lites. Approximately 10% of the window lites are cracked or broken.

Figure 7 - Building 103: Windows at north & west elevations

Figure 8 - Building 103: Window detail

**DOORS**

North entry doors. Condition: Fair (figure 9)

One wood 12-panel rolling double door on a metal track. The flat bars attached to both sides of the bottom edge of the door are rusted. One flat bar is missing from the bottom of the door. The paint on the door is in poor condition. The two lowermost panels at each door are in very poor condition. Molding at the panels is missing in some locations.

Small fire door at west elevation. Condition: Poor (figure 10)

Figure 9 - Building 103: Rolling door at north elevation

Figure 10 - Building 103: Fire door

Figure 11 - Building 103: Lamp at southwest corner

**APPURTENANCES**

One metal lamp. Condition: Functional, rusted (figure 11)

*INTERIOR*

Figure. 12 - Building 103: Interior view

**INTERIOR WALLS**

CMP panel on steel structure above brick base.

CMP. Condition: Fair

Brick. Condition: Poor

**CEILING**

CMP. Condition: Poor (figure 13)

CMP panels are corroded, especially at seams. There are multiple holes throughout ceiling.

Figure 13 - Building 103: View of interior ceiling.

#### INTERIOR FLOORS

Concrete. Condition: Fair

#### FIXTURES

Hanging shop lamps. Condition: Fair

## RECOMMENDED IMMEDIATE REPAIRS

### *EXTERIOR*

#### EXTERIOR WALLS

- Repair 10% CMP panels.
  1. Replace dented and damaged components in kind to match original.
  2. Install sealant at all conduit and pipe penetrations. Scrape, prime and paint rusted conduit or pipe.
- Perform two (1sf) exploratory probes at locations of rusting steel in the brick wall. **Probes and repair/reconstruction work shall be specified and monitored by a qualified historical architect. Work shall be performed by a qualified historic masonry contractor.**
  1. Architect and engineer to determine location of probes in field.
  2. Remove face brick to fully expose steel.
  3. Allow architect and engineer to review.
  4. Remove rust from rebar or plates to fullest extent possible.
  5. Allow architect and engineer to review.
  6. Based on results of probe, two repair options are outlined below.
- Repair option 1 (preferred): Install new brick at locations of spalls and cracks. Approx. 25%.
  1. Survey existing condition of all brick.
  2. Rake out mortar at existing deteriorated joints.
  3. Remove flaking rust where accessible.
  4. Paint remaining reinforcing rod with rust inhibitive paint.
  5. Install new face brick to match sound existing brick in size, color, texture and strength. Allow for three rounds of brick and mortar submittals/mock-ups.
  6. Repoint brick joints with matching mortar. Match historic joint profile.
  7. Repaint walls at areas of graffiti.
- Repair option 2 (if repair is not possible): Reconstruct entire wall to faithfully reproduce existing as described below.
  1. Provide one square foot brick and mortar mock-ups. Bricks need to be the exact size, color, texture, and strength as the originals. Any existing variations in color and texture also must be recreated. Mortar joints must match exactly in profile, color, texture and strength. Assume 3 rounds of mock-ups and mortar testing.
  2. Photo-document prior to demolition. Submit to historical architect. Carefully demo wall taking care to not disturb adjacent building elements. Protect and shore steel

CMP wall supports and steel sash windows. Assume that wall will be rebuilt in twenty foot sections. Salvage sound brick wherever possible for reuse.

3. Rebuild brick walls to match original in size color, texture, profile and bonding pattern.

#### WINDOWS

- Replace 10% window panes
- Repaint 100% of steel sash window components: frame, mullion and muntins.
  1. Remove all dirt and deteriorated glazing putty.
  2. Wire brush steel elements to remove rust.
  3. Install new glazing putty.
  4. Install new glazing where required to match existing original glazing.
  5. Prepare steel surfaces, prime with rust inhibitive primer and paint with two top coats.

#### DOORS

- Repair north elevation wood rolling doors
  1. Survey existing condition of rolling doors.
  2. Replace missing hardware and components.
  3. Prepare surfaces, prime and paint with two top coats.
- Repaint hollow metal fire door and frame.

### *INTERIOR*

#### FLOORS

- No recommendation.

#### CEILINGS

- Repaint CMP ceiling
  1. Prepare steel surfaces, prime with rust inhibitive primer and paint with two top coats.

#### STRUCTURAL ELEMENTS

- Repaint steel trusses, columns and CMP support structure.
  1. Verify that existing surfaces do not contain lead based paint.
  2. If lead based paints are suspected on the project, all removal must be done in accordance with the EPA Renovation, Repair and Painting rule and all applicable state and local regulations.
  3. Prepare steel surfaces, prime with rust inhibitive primer and paint with two top coats.

## RECOMMENDED LONG-TERM REPAIRS

- Provide maintenance on a regular schedule.

# BUILDING 103

## GENERAL STRUCTURAL SYSTEM DESCRIPTION

*GRAVITY SYSTEM*

The roof of the main structure is corrugated steel decking on steel purlins, supported by steel trusses and columns. Around the perimeter, there is a partial height brick masonry wall supporting the corrugated metal siding and windows and an intermediate wind girt. The ground floor is a structural concrete suspended slab that is supported by concrete columns in the crawl space below; the slab is approximately 12" thick. Reinforcing in the slab was not visible nor indicated on the drawings provided by the Port. There is a concrete slab at the bottom of the crawl space, assumed to be on grade. The foundation is not visible and is not indicated on the drawings provided by the Port.

Inside the building are two large boiler housings constructed of brick and steel, with a steel framed catwalk around each housing.

Outside the structure is a smokestack that extends upward above the roof of the structure that appears to have its own structural system, but is attached to the building via ducts.

*LATERAL SYSTEM*

In the north-south direction, lateral strength appears to be provided by the steel trusses and columns acting as truss moment frames. For lateral strength in the east-west direction, the north and south walls have four bays of steel "x" tension rod bracing and chevron bracing, from the roof level to the intermediate girt level, which appears to create truss moment frames. The roof diaphragm strength is provided by diagonal steel rod bracing connecting the top chords of the trusses. These diagonal braces follow the slope of the roof and are connected directly to the steel columns.

## CONDITIONS

- The smokestack and boilers' structural components appear to be in good condition.
- The trusses and columns appear to be in good condition
- The brick masonry wall is in poor condition. It appears water has infiltrated and resulted in rusting of the embedded steel plate, thus causing the mortar to spall out. Reinforcing is exposed at the exterior and interior in several locations and is exhibiting significant corrosion.
- The suspended ground floor slab has some significant cracking.
- One of the vertical "x" tension rod braces is missing at the south wall.

## RECOMMENDATIONS

### IMMEDIATE REPAIR RECOMMENDATIONS

- Replace the one missing "x" brace at the south wall in kind.

- Clean existing steel framing and corrugated steel roof decking to remove peeling paint, assess its condition, and re-coat. There is a potential for the presence of lead or other hazardous materials in the existing coating.
- Repair the damaged brick wall: remove brick and mortar to access the embedded steel plates, clean the plates of all rust and coat with a rust-inhibiting epoxy, replace the brick and mortar and repoint all joints. Follow the historical preservation guidelines noted in the architectural report.

## LONG-TERM REPAIR RECOMMENDATIONS

- Monitor the condition of the exterior steel framing and the smokestack.

## RECOMMENDED SEISMIC STRENGTHENING

- Given the light weight of the roof and walls, seismic demands on the structure will likely be less than the wind loads that the structure has already experienced. Therefore, based on our limited observations, it is our opinion that seismic strengthening of this building is not necessary.
- The partial height wall should be evaluated for its capacity to resist seismic loads in the out-of-plane direction. Seismic strengthening of the wall should be incorporated into the immediate repairs.

Figure 1 – Partial height masonry wall damage

Figure 2 – Typical corrosion on steel framing and CMP

# BUILDING 103 – Steam Powerhouse No. 2

## MEP DESCRIPTION AND CONDITIONS ASSESSMENT

*HVAC systems*

• There is no heating in the building.

• There is a sound-proof working enclosure within the building that is provided with mechanical ventilation (exhaust fan).

• The building has 2 boilers and 2 compressors that are operational.

• The high ceilings have continuous ventilation louvers allowing for natural ventilation & combustion air.

*Plumbing & Fire Protection Systems*

• No fire sprinkler service.

• The building has a small restroom on the East end of the building. These facilities appear to be abandoned and it is not clear if the water service is functional (See figure 103-1).

*Electrical Systems*

• The main electrical service to the building appears to be fed from the neighboring building 108 using flexible conductors (See figure 103-2).

## RECOMMENDATIONS

### IMMEDIATE REPAIR RECOMMENDATIONS

*HVAC*

- Natural ventilation currently meets code for this building. No immediate actions required.

*Plumbing & Fire Protection*

- Clean & repair existing restroom plumbing systems for a usable restroom facility.

*Electrical Systems*

- Replace the flexible cable with permanent conduit connection for electrical service from adjacent building.

## Figures

**Figure 103-1 – Non-operational Restroom.**

**Figure 103-2 – Flexible Cable Power Feed**

# BUILDING 103 Steam Power House

Fig. 1 - Building 103 view from fixed building ladder

## BUILDING DESCRIPTION AND CONDITIONS ASSESSMENT

*GENERAL ROOF DESCRIPTION*

This building is Steam Power house, the roof area is approximately 38x50 the roof appears to be very old, no signs of leaking or moisture damage on the inside. The roof access appears to be damage and in need of repairs

## CONDITIONS

*ROOF*

GENERAL NOTES: The damaged roof access may potentially allow water to access the building from the roof.

## RECOMMENDATIONS

### IMMEDIATE REPAIR RECOMMENDATIONS

*ROOF*

- Repair the roof access opening to prevent water from potentially penetrating the roof surface.

### LONG-TERM REPAIR RECOMMENDATIONS

*ROOF*

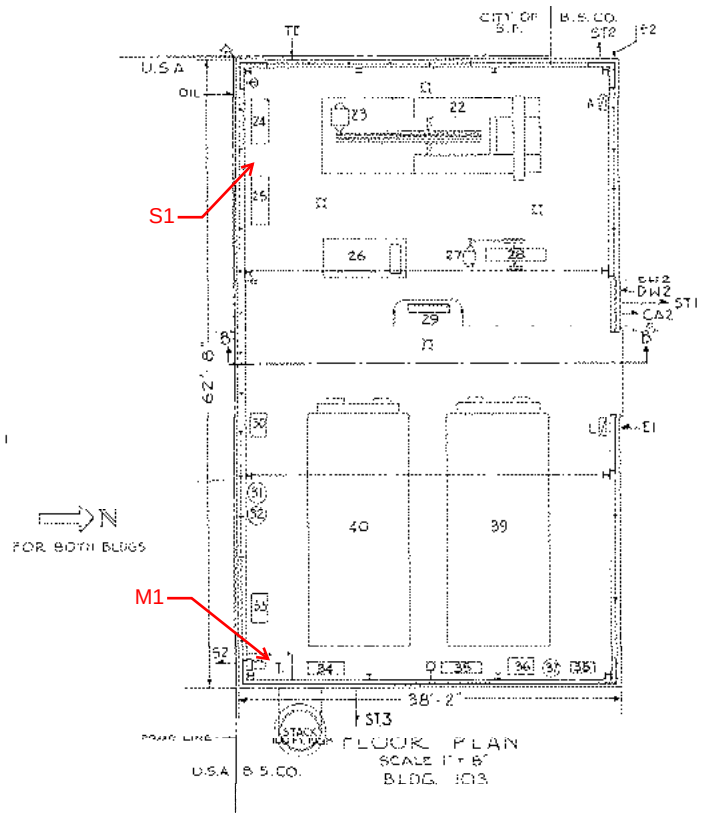
- Inspect for Leaks or penetrations twice a year caulk or patch as needed.

Structural Key:

S1: Steel rod "x" brace to replace missing brace.

Mechanical Key:

M1: Repair existing restroom plumbing system.



**BUILDING 103**

A condition assessment of Building 103 was performed by AGS Inc. on June 27th, 2017 based on the 2015 Pier 70 Building Condition Assessment Report by DCI+SDE Engineers. The purpose of the condition assessment and this addendum is to provide an update and field verification of the architectural and structural deficiencies found at Building 103, which was described in the aforementioned report by DCI+SDE Engineers. The condition assessment was based on a general visual observation of the exposed portions of the building from the ground level. No assessment was performed in areas that were not easily and/or safely accessible.

The overall condition of Building 103 has remained relatively unchanged since the previous condition assessment in 2015. The building remains as a historical steam powerhouse however is no longer in service. The recommended repairs provided in the previous condition assessment report have not been addressed. With exception to further general paint degradation on the building interior (most notably on the doors), no additional deficiencies were found.


Figure 103-1 - Overall southwest view of Building 103.

Figure 103-2 – Overall northeast view of Building 103.


Figure 103-3 - View of Building 103 typical exterior window condition.


Figure 103-4 & Figure 103-5 –View of Building 103 exterior sliding door and smokestack, respectively.

Figure 103-6 – View of Building 103 roof structure and corrugated metal panels.

Figure 103-7 – View of the typical Building 103 deteriorated interior brick mortar joints.

Figure 103-8 – View of Building 103 typical interior wall corrugated metal panels.

# BUILDING 105 – Forging/Machine Shop

Figure 1 - Building 105, East elevation

## ARCHITECTURAL DESCRIPTION

*PHYSICAL DESCRIPTION*

This 223' long, 93' wide, and 63' tall, rectangular building contains 20,739 square feet. It has a gabled, monitor roof with ventilation grilles. A one-story, shed-roofed projection, with its own roof monitor, runs along the south, 20th Street side. This steel framed building has corrugated metal cladding and steel sash windows along three sides. The south elevation incorporates an earlier one-story brick wall with twelve bays of wood 24-lite hopper windows separated by projecting brick piers, dating to the late nineteenth century. The building steps back above this elevation to reveal a high ribbon of steel sash windows set in corrugated metal cladding. The remaining elevations rest on a five-foot high brick base. The north and west elevations have two levels of steel sash ribbon windows: an upper level, four lites high, and a lower level of continuous two-tier multi-lite steel sash units. A crane track is mounted over the first level of windows on the north façade and a crane extends northward. The east elevation is almost completely open, with crane rails projecting out into the yard. Rolling metal doors at the north and east elevations.

The interior consists of a two-bay open shop space with crane rails and two working crane running the entire east-west length of the northern bay. The ceiling consists of exposed steel Belgian trusses with sub-diagonals below corrugated metal roof cladding. The south wall is brick, while remaining walls are exposed steel frame with corrugated metal sheeting over a brick base. A free standing office booth fabricated of steel plate walls with steel sash windows stands at the west end. Above that is a mezzanine with a large shipping container that was repurposed as office space. The west end of the southern side shed contains an open mezzanine with lockers. The eastern most end also contains small office apparently made of found materials including sheet metal, plywood, and CMP. It is elevated two feet above the main floor on a wood platform. The floor is concrete with steel panels (figures 2 - 5).

*HISTORIC/CURRENT USE*

Building 105 was constructed in 1937, incorporating the south wall of the building original constructed circa1899. The Bethlehem Steel Company's 1944 building plan labels the structure as a forge shop. The plan shows that all the building's cranes date to 1937, and all other equipment and tools including forges, furnaces, hammers, blowers, pumps, and tanks, date to either 1937 or 1941. The building still functions as a welding shop for BAE Systems.

Figure 2 - North elevation

Figure 3 –West elevation

Figure 4 – South elevation, view looking west


Figure 5 - View from the southwest

## *EXTERIOR*

### WALLS

CMP (corrugated metal panels) - above brick base on concrete curb. Brick - the south wall is one story and has been reused from an earlier building.

CMP. Condition: Good

The CMP appears to have been recently painted and repaired.

Brick base on Concrete Curb, west, south and east elevations. Condition: Fair (figures 6 - 8)

The brick is generally sound with minor localized areas of displacement. The mortar is deteriorated, particularly at the east end of the north wall, with evidence of water intrusion causing moss and mold in the joints.

Figure 6 - North wall showing moss in joints

Figure 7 - North wall, detail, showing moss in joints

Figure 8 - North wall, detail, displaced bricks at sill

Brick, south wall, Condition: Poor (figures 9 - 12).

The one story, brick, southern wall is a remnant of an earlier late nineteenth century building which was incorporated into the 1937 construction of Building 105. The masonry in this wall is roughly contemporary with that of Building 113 across 20th Street to the south. A high percentage of the mortar joints have failed, and the fabric of the brick shows signs of severe deterioration from water intrusion, primarily from wicking ground water below. We believe the foundation of this wall is brick. In addition there is severe cracking, likely caused by seismic activity and settlement over time.

Figure 9 - South wall, typical view of bays.

Figure 10 - South wall, cracking at pilasters.

Figure 11 - South wall, displaced masonry at column base.

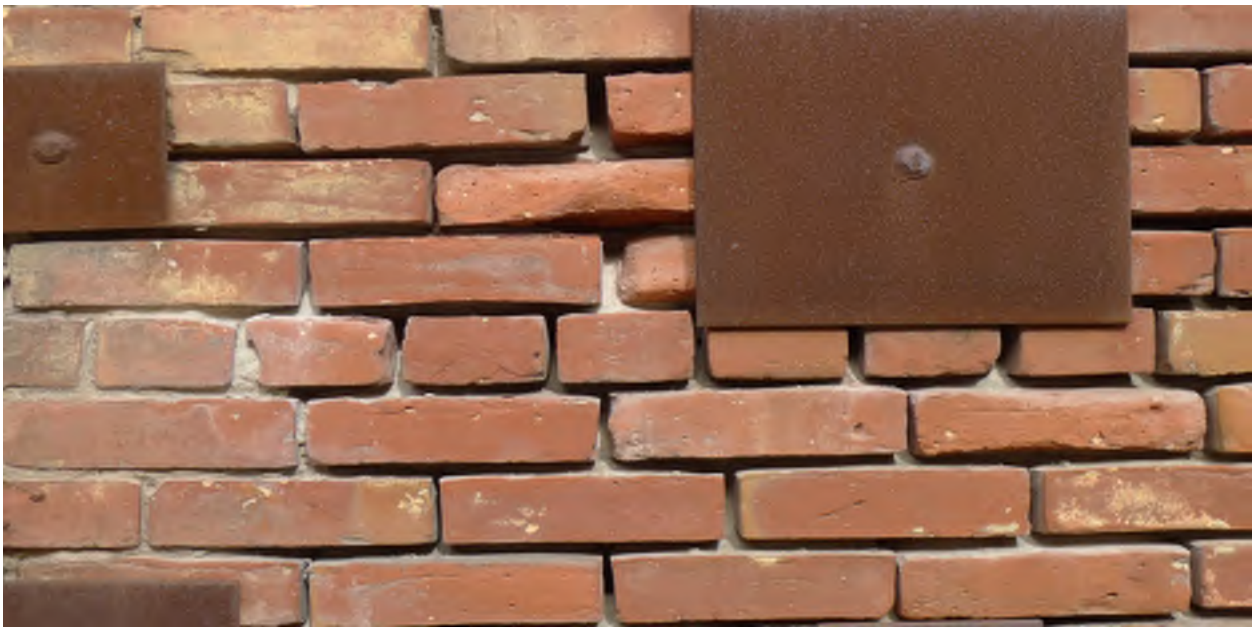


Figure 12 - South wall, deteriorated mortar from water intrusion. Reinforcing plates installed at an unknown date.

**WINDOWS**

Steel Sash Windows. Condition: Good - Fair (figures 13 and14).

Steel sash multi-lite, fixed in frame with operable portions are typical. Frame, mullions, and muntins are in fair condition with light to moderate rust. Window damage and broken/cracked panes have been dealt with by gluing sheet plastic panels at cracked or broken panes. Approximately 35 of the window panes are currently cracked or broken. All sealant joints have failed where the steel windows meet the brick wall base (figures 13 and 14).

Figure 13 – North wall, typical bay

Figure 14 – North wall, joint sealant failure

Wood Sash Windows. Condition: Good - Fair – Poor (figures 15 and16).

There are (24) wood sash, (20) lite windows found on the south elevation. All windows operate as in swinging hoppers hinged at the bottom. The jambs, heads, sills, sash, and muntins are in fair condition. All of the paint is severely deteriorated. Approximately 15 of the window panes are currently cracked or broken. All sealant joints have failed where the wood window heads and jambs and sills meet the brick (figures 15 and 16).

Figure 15 –South wall, typical bay

Figure 16 –South wall, hopper operation

**DOORS**

Personnel Doors. Condition: Good (figure 17).

There is one, steel personnel door in the west elevation. It is built out of angle iron and steel plate, and contains one, two lite window at the top. It is hinged, and contains a closer as well as a padlock hasp and a bent steel bar pull. It appears to be shop fabricated.


Figure 17 – West wall, steel personnel door

Figure 18 – North elevation, electrical equipment

Roll-up, steel vehicle doors Condition: Good - poor

There are three, roll-up 12'-6" wide by 13'-6" high, steel vehicle doors in the building in various states of repair. One on the north elevation is in fair condition, is moderately rusted on the inside and is apparently rarely used. One at the western end of the north elevation is in good condition. One at the east end of the shed portion of the building is damaged and severely bent at the bottom. It is locked in the up or coiled position, and its functionality is unknown and its condition is assumed poor. A forth opening in the west elevation in the shed at one time contained a door, but it has been removed, and the void was filled with plywood.

**APPURTENANCES**

Modern flood lights and loud speakers - Condition: Assumed good.

Electrical components- Condition: functional, rusted (figure 18)

There are numerous flood lights, and loud-speakers attached to the building, none of which are historic. There are electrical conduit runs along the north face of the building mounted to the brick base. A three box circuit breaker panel is also mounted to the brick base on a severely rusted steel plate.

*INTERIOR*

Figure. 19 - Building 105: Interior view looking west, main shed

Figure. 20 - View looking east, main shed

Figure. 21 - View looking west, main shed window wall

Figure. 22 - View looking west, south shed

Figure. 23 - View looking west, south shed ceiling

### INTERIOR WALLS

In general the interior wall surfaces are the backside of the exterior wall cladding.

CMP panel on steel structure above brick base.

CMP. Condition: Good (figure 24).

CMP panels on the interior are found primarily on the west wall and on the east and west gable ends. The panels contain a light rust coating.

Figure. 24 - View looking west, south shed CMP

Brick Base, west, north, and east elevations.

Brick and mortar joint Condition: Fair to Poor (figure 25).

Similar to the exterior, the fabric of the brick is sound, but water intrusion has degraded the mortar joints

Figure. 25 - North main shed brick base wall.

Brick south wall.

Brick and mortar joint Condition: Poor (figure 26).

Similar to the exterior, the fabric of the brick has deteriorated, and water intrusion has degraded the mortar joints. The wall is cracked in numerous locations. In addition sections of the wall have been painted, likely with lead based paint and the paint adhesion is failing.

Figure. 26 – South shed brick wall.

### CEILING

CMP ceiling.

Condition: Fair to Poor, (figure 27)

CMP panels are heavily rusted on the south side with rusting at the seams on the north side.

Figure 27 - Interior main shed ceiling looking west.

### INTERIOR FLOORS

Shop floor, concrete with steel plate

Condition: Good (figure 28)

Figure 28 - Interior main shed floor looking west.

Mezzanine floors, wood

Condition: Good (figure 29)

Figure 29 - Locker room mezzanine looking north.

### STRUCTURAL STEEL COLUMNS, TRUSSES AND BEAMS

Main shed span - trusses, built-up riveted columns and beams. South shed, rolled section and built-up riveted columns.

Condition – Good to fair (figure 30)

The structural members were all originally primed and / or painted with lead based paint. The paint is failing throughout the building, and there is moderate rusting visible in all members.

Figure 30 - Structure of main shed looking into south shed

Figure 31 - Main shed truss

Figure 31 - Rolled steel spanning sections in the south shed.

Figure 32 – Main shed north wall column

### INTERIOR SHEDS

Two steel sheds to the south, one shed to the north.

Condition: Good to fair (figures 32 and 33)

At the west elevation there are two free standing offices. One is built of plate steel with windows and the second is a shipping container built on a mezzanine over the former. At the east end is a shed on a wood platform clad in various materials. The western sheds are sheltered, and appear to be in sound condition; however the eastern shed has one exposed wall to the outside with holes that needs to be repaired.

Figure 32 – Main shed office at west wall

Figure 33 – Main shed office at east end.

**FIXTURES**

Modern hanging shop lamps, rolling cranes, wall mounted cranes, electrical panels.

Condition: Assumed good to fair (figures 34 and 35).

Figure 34 – Main shed, overhead rolling crane on tracks.

Figure 35 – Main shed, swinging arm crane.

## RECOMMENDED IMMEDIATE REPAIRS

*EXTERIOR*

### EXTERIOR WALLS

- Patch holes throughout the building.
- Seal CMP at all conduit and pipe penetrations.
- Replace deformed and deteriorated CMP with new galvanized corrugated steel to match the existing panels.
- At South Wall: Install new brick at locations of spalls and cracks and moisture deterioration. Approx. 30% of the total masonry wall area.
    1. Survey existing condition of all brick.
    2. Rake out mortar at existing deteriorated joints.
    3. Remove flaking rust where accessible.
    4. Paint remaining reinforcing rod with rust inhibitive paint.
    5. Install new face brick to match sound existing brick.
    6. Repoint approximately 80% of the brick joints with matching mortar.
- At Partial Height Masonry Wall: Perform two (1sf) exploratory probes at locations of rusting steel in the brick wall. **Probes and repair/reconstruction work shall be specified and monitored by a qualified historical architect. Work shall be performed by a qualified historic masonry contractor.**
    1. Architect and engineer to determine location of probes in field.
    2. Remove face brick to fully expose steel.
    3. Allow architect and engineer to review.
    4. Remove rust from rebar or plates to fullest extent possible.
    5. Allow architect and engineer to review.
    6. Based on results of probe, two repair options are outlined below.
- Repair option 1 (preferred): Install new brick at locations of spalls and cracks. Approx. 25%.
    1. Survey existing condition of all brick.
    2. Rake out mortar at existing deteriorated joints.
    3. Remove flaking rust where accessible.
    4. Paint remaining reinforcing rod with rust inhibitive paint.
    5. Install new face brick to match sound existing brick in size, color, texture and strength. Allow for three rounds of brick and mortar submittals/mock-ups.
    6. Repoint brick joints with matching mortar. Match historic joint profile.
- Repair option 2 (if repair is not possible): Reconstruct entire wall to faithfully reproduce existing as described below.
    1. Provide one square foot brick and mortar mock-ups. Bricks need to be the exact size, color, texture, and strength as the originals. Any existing variations in color and texture also must be recreated. Mortar joints must match exactly in profile, color, texture and strength. Assume 3 rounds of mock-ups and mortar testing.
    2. Photo-document prior to demolition. Submit to historical architect. Carefully demo wall taking care to not disturb adjacent building elements. Protect and shore steel

CMP wall supports and steel sash windows. Assume that wall will be rebuilt in twenty foot sections. Salvage sound brick wherever possible for reuse.

3. Rebuild brick walls to match original in size color, texture, profile and bonding pattern.

**WINDOWS**

- Steel Windows - Replace approximately (35) 14"x20" window panes
- Repaint 100% of steel sash window components: frame, mullion and muntins.
  1. Remove all dirt and deteriorated glazing putty.
  2. Wire brush steel elements to remove rust.
  3. Install new glazing putty.
  4. Install new glazing where required to match existing original glazing.
  5. Prepare steel surfaces, and prime with rust inhibitive primer and paint with two top coats.
  6. Flash and seal to adjacent CMP and brick sills.
- Wood Windows - Replace (12) 14"x20" window panes.
- Repair all wood frames and moveable sash (hopper operation).
  1. Remove all moveable sashes for epoxy consolidation in a shop.
  2. Salvage and repair the hardware for re-use. Replace missing or deteriorated pieces.
  3. Retain the sound glass, replace broken glass and install new glazing putty in all windows.
  4. Repair and replace missing wood frame elements and epoxy consolidate, and patch the wood in situ.
  5. Install moveable sash into restored frames and. ensure the operation of all moveable sash.
  6. Prepare the wood surfaces, and prime and paint with two top coats.
  7. Flash and seal to the adjacent CMP

**DOORS**

- Personnel doors – No Recommendation
- Roll-up vehicle doors – No recommendation
- Replace the plywood closure in the abandoned roll-up door opening on the west elevation with a permanent but reversible wood stud wall and CMP.

*INTERIOR*

**FLOORS**

- No recommendation

**WALLS**

- Repaint CMP walls
  1. Verify that existing surfaces do not contain lead based paint.

2. If lead based paints are suspected on the project, all removal must be done in accordance with the EPA Renovation, Repair and Painting rule and all applicable state and local regulations.
3. Prepare steel surfaces, prime with rust inhibitive primer and paint with two top coats.

- Repair Brick walls
  1. Verify that existing surfaces do not contain lead based paint.
  2. If lead based paints are suspected on the project, all removal must be done in accordance with the EPA Renovation, Repair and Painting rule and all applicable state and local regulations.
  3. Repair brick walls per exterior recommendations

**STRUCTURAL ELEMENTS**

- Repaint steel columns and trusses.
  1. Verify that existing surfaces do not contain lead based paint.
  2. If lead based paints are suspected on the project, all removal must be done in accordance with the EPA Renovation, Repair and Painting rule and all applicable state and local regulations.
  3. Prepare steel surfaces, prime with rust inhibitive primer and paint with two top coats.

**CEILINGS**

- Repaint CMP ceilings.
  1. Verify that existing surfaces do not contain lead based paint.
  2. If lead based paints are suspected on the project, all removal must be done in accordance with the EPA Renovation, Repair and Painting rule and all applicable state and local regulations.
  3. Prepare steel surfaces, prime with rust inhibitive primer and paint with two top coats.

**INTERIOR SHED**

- Repair interior shed.
  1. No work shed at the west end of the main shed
  2. Repair and upgrade the exterior cladding of the shed at the east end of the main shed with new CMP

**FIXTURES**

- No recommendations

## RECOMMENDED LONG-TERM REPAIRS

- Provide maintenance and repainting on a regular schedule.
- The following conditions identified in the conditions assessment should be considered for long-term repair:
  1. Re-paint all CMP surfaces.

# BUILDING 105

## GENERAL STRUCTURAL SYSTEM DESCRIPTION

*GRAVITY SYSTEM*

The roof is corrugated steel decking on steel purlins, supported by steel beams, trusses, and columns. Exterior walls are corrugated steel siding with windows and roll-up doors. There is a partial height masonry wall that supports the exterior cladding on the north side of the building. There is a full height masonry bearing wall that occurs on the south side of the building. The floor is a concrete slab on grade. The foundation indicated on the drawings provided by the Port is a concrete foundation on piles below the column lines.

*LATERAL SYSTEM*

The roof diaphragm strength is provided by diagonal steel rod bracing connected to the top and bottom chords of the truss members. The lateral strength in the north-south direction appears to be provided by steel truss moment frames. In the east-west direction the lateral strength appears to be provided by steel "x" brace frames on the north elevation and at the interior column line. On the south wall the lateral strength appears to be provided by a masonry wall, assumed to be unreinforced.

## CONDITIONS

- Moderate to severe corrosion on structural steel purlins.
- Mild to moderate corrosion on other structural steel framing members and steel corrugated roof deck.
- Masonry wall shows some major cracks and deterioration.
- Slab on grade is cracked in a few locations.
- Column bases show moderate to severe corrosion.

## RECOMMENDATIONS

### IMMEDIATE REPAIR RECOMMENDATIONS

- Clean existing rusted steel framing and corrugated roof deck to remove rust and paint, assess its condition, and re-coat with a rust-inhibiting primer and paint. There is a potential for the presence of lead or other hazardous materials in the existing coating.
- Repair the damaged partial height brick wall: remove brick and mortar to access the embedded steel plates, clean the plates of all rust and coat with a rust-inhibiting epoxy, replace the brick and mortar and repoint all joints.
- Repair cracks in slab on grade.
- Repair damaged full height masonry wall. Repoint approximately 80% of the wall and replace approximately 30% of spalled masonry bricks.

## LONG-TERM REPAIR RECOMMENDATIONS

- Monitor the full height brick wall for damage.

## RECOMMENDED SEISMIC STRENGTHENING

- The building should be analyzed to determine its performance in an earthquake. Due to the lateral system, large deflections will occur creating a possibility for the structure to sustain significant damage, especially the brick walls.
- Strengthen the full height masonry wall on the south elevation for out-of-plane flexural behavior and add anchorage to the steel beams and/or roof deck.
- The partial height wall should be evaluated for its capacity to resist seismic loads in the out-of-plane direction. Seismic strengthening of the wall should be incorporated into the immediate repairs.

Figure 1 – Typical roof framing and CMP corrosion

Figure 2 – Typical full height wall masonry damage

Figure 3 – Typical partial height wall masonry damage

# BUILDING 105 – Forge Shop / Machine Shop

## MEP DESCRIPTION AND CONDITIONS ASSESSMENT

*HVAC systems*

• Main machine shop area has not mechanical ventilation system. Spot heating is provided by gas-fired unit heaters without ductwork (See fig. 105-1).

• Enclosed offices within the building are generally provided with windows for natural ventilation & window-mounted DX cooling systems. 2nd floor office (shipping container) has window cooling unit but no natural ventilation (See fig. 105-2).

*Plumbing & Fire Protection Systems*

• No fire sprinkler service.

• Compressed gas connections are supplied throughout the building.

• 1 ½" CW serves building plumbing systems; hand sinks, drinking fountains, eye-washing stations, and a washing machine located at the East and West ends of the building. Plumbing vents currently terminate within the building and do not meet code.

*Electrical Systems*

• The building has 480V service with multiple panels.

• An abandoned electrical sub-station is located in the SW corner of the building. Current power service fed from newer substation East of the building (See fig. 105-3).

• Power is fed via an underground service.

## RECOMMENDATIONS

### IMMEDIATE REPAIR RECOMMENDATIONS

*HVAC*

- Provide ventilation to the interior offices that currently don't have access to exterior windows.

*Plumbing & Fire Protection*

- None.

*Electrical Systems*

- None.

**FIGURES**

**Figure 105-1 – Gas Radiant Heaters**

**Figure 105-2 – Window-Mounted DX Cooling at Office**

**Figure 105-3 – Abandoned Sub-Station.**

# BUILDING 105 Forging / Machine Shop

Fig. 1 - Building 103 view from N.W exterior

## BUILDING DESCRIPTION AND CONDITIONS ASSESSMENT

*GENERAL ROOF DESCRIPTION*

This building is Forging Machine Shop, this building has two roofs. One roof area is approx. 26x 190 located on the South side of the main building the main Roof Area is approx.50x190. The entire roof appears as shown in the photo in fig-1, worn and rusted with multiple pinholes throughout the entire warehouse.

## CONDITIONS

*ROOF*

GENERAL NOTES: This Building has multiple pin holes through the warehouse roof visible from the building's interior. And has what appears to be a fiberglass coated rusted corrugated metal sheathing. The smaller shed roof appears to have a recently installed corrugated metal roof.

## RECOMMENDATIONS

### IMMEDIATE REPAIR RECOMMENDATIONS

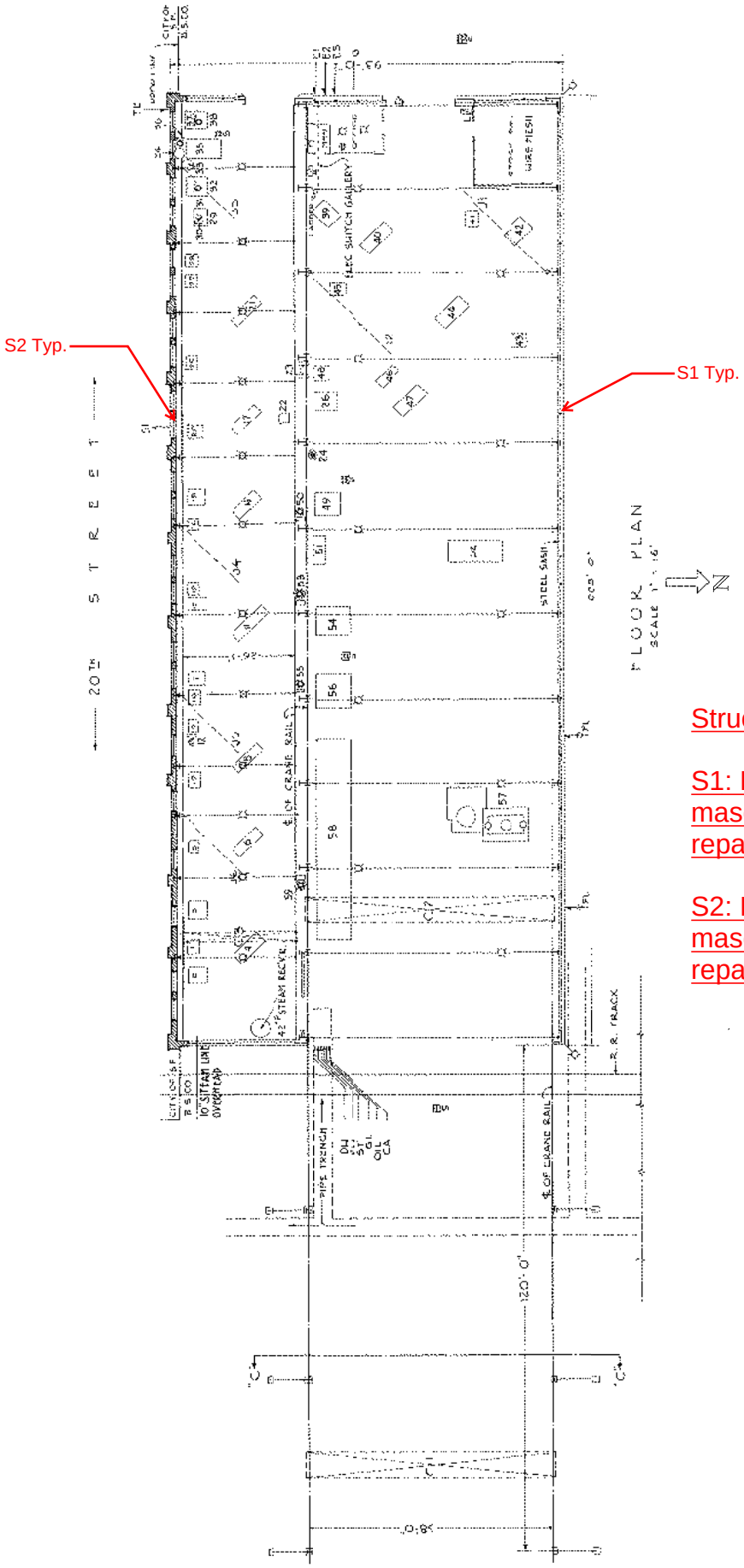
*ROOF*

- No new Roof or roof repairs required at this time.

### LONG-TERM REPAIR RECOMMENDATIONS

*ROOF*

- Inspect for leaks & penetrations twice a year, caulk or patch as needed.


S2 Typ.
S1 Typ.
20TH STREET
FLOOR PLAN
SCALE 1" = 16'
N
Structural Key:
S1: Partial height masonry wall to be repaired per reports.
S2: Full height masonry wall to be repaired per reports.

**BUILDING 105**

A condition assessment of Building 105 was performed by AGS Inc. on June 27th, 2017 based on the 2015 Pier 70 Building Condition Assessment Report by DCI+SDE Engineers. The purpose of the condition assessment and this addendum is to provide an update and field verification of the architectural and structural deficiencies found at Building 105, which was described in the aforementioned report by DCI+SDE Engineers. The condition assessment was based on a general visual observation of the exposed portions of the building from the ground level. No assessment was performed in areas that were not easily and/or safely accessible.

The overall condition of Building 105 appears to have worsened since the previous condition assessment in 2015. The building continues to serve as a historical forge shop with a majority of the original building equipment and crane intact. The recommended repairs provided in the previous condition assessment report have not been addressed. In general, the degradation in the brick mortar joints appeared to have worsened due to continuous weathering. The steel channel support between the top and bottom rows of windows at the north side of the building has completely failed due to major corrosion. The bottom edge of the windows above the channel is no longer supported and is bulging out towards the exterior. Collapse and failure of the windows above the failed steel channel is possible in the near future. Minor to moderate surface corrosion was also identified (which was not noted in the previous condition assessment) along the interior bottom edge where the corrugated metal panels meet the top of the steel window sashes. There were originally four sets of braced frames, spaced at every third bay, along the interior column line. Three of the four sets of braced frames have been cut. The remaining braced frame located at the west end was intentionally bent and damaged, likely to provide overhead clearance.

Figure 105-1 - Overall northwest view of Building 105.

Figure 105-2 – Overall southwest view of Building 105.

Figure 105-3 - View of Building 105 typical exterior steel window condition.

Figure 105-4 –View of the top row of windows that is bulging out towards the exterior.

Figure 105-5 - View of Building 105 typical exterior brick mortar joint deterioration.


Figure 105-6 – Overall view of Building 105 interior, looking southwest.

Figure 105-7 – View of the typical Building 105 deteriorated interior brick mortar joints.

Figure 105-8 – View of Building 105 interior structure and wall corrugated metal panels.


Figure 105-9 – View of Building 105 roof structure and corrugated metal panels

Figure 105-10 – View of Building 105 cut interior braced frames.

Figure 105-11 – View of the remaining bent braced frame at the west end of Building 105.

# BUILDING 107 - Pipe Storage

Figure 1 - Building 107, view from north

## ARCHITECTURAL DESCRIPTION

*GENERAL PHYSICAL DESCRIPTION*

Dating to 1937 and standing just north of Building 19, Building 107 is a 3,461 square-foot rectangular plan, narrow steel frame shed measuring 124' long, 33' wide, and 20' 8" tall. It is clad and roofed with corrugated sheet metal, and has a 4' tall brick base at the western and southern elevations. The eastern portion attaches to Building 108 and infills the southwest corner of Building 108's rectangular floor plan. Approximately 50 feet of Building 107 extends westward from Building 108 toward Building 103. Portions of the north elevation are open. Metal ducting runs east-west on triangular truss supports approximately 8 feet above the roof. Most of the southern elevation is concealed by Building 19.

A compressor room lies near the western end of the building; it is enclosed by corrugated sheet metal and has a metal door facing north. Building 107 shares its northern wall with Building 108, and multi-lite windows and doorways currently connect the two buildings. Building 107 also includes a gate that provides access between the east and west portions of the yard.

*HISTORIC/CURRENT USE*

Built in 1937 by Bethlehem Steel, this building was used for lumber and tube storage for work occurring in Building 108. It is part of the late 1930s upgrades to the yard that increased storage space and organization of materials. Building 107 is currently used by BAE Systems, mainly for storage.

## CONDITIONS

### *EXTERIOR*

**WALLS** (figures 2 - 4)

**WALLS -** CMP (corrugated metal panels) above brick base on south and west side.

CMP. Condition: Fair

The CMP is painted on the north elevations that face the yard. The west (figure 2) and visible portions of the south elevation are unpainted and in somewhat poorer condition with corrosion and open seams especially where the panels meet the brick base. Most of the south wall was inaccessible for inspection. The narrow space between building 107 and the north wall of building 19 was boarded up with plywood. The east wall of building 107 abuts the interior of building 108.

Figure 2 - Building 107: West Elevation

Brick. Condition: Poor (figure 3 and 4)

Cracked and broken brick were observed on all wall areas. Horizontal steel reinforcing is rusted and expanding forcing mortar out of the joints and contributing to brick cracking, spalling and displacement. Diagonal cracks were observed at the north doorway and at the NE, NW and SW corners.

Figure 3 - Building 107: Brick at west wall. Figure 4 - Building 107: Brick at south wall.

#### WINDOWS

There is a window on the east wall which leads to the interior of 108. It is blocked and was unsurveyed.

#### DOORS

There is a door on the east wall which leads to the interior of 108. It is blocked and secured shut.

### *INTERIOR*

#### INTERIOR WALLS

CMP (corrugated metal panels). Condition: Fair (see exterior description)

Wood diagonal paneling. Condition: Poor

Deteriorated paint. (figure 5)


Figure 5 - Building 107: Interior wood wall.

#### INTERIOR FLOORS

Concrete. Condition: Poor

#### INTERIOR CEILING

CMP, Condition: Poor

#### STRUCTURAL ELEMENTS

Steel columns, beams, braces and purlins. Condition: Poor

The steel exhibits significant rust and corrosion, heaviest at purlins. The steel angle at the base of the CMP wall has significant rust and corrosion.

#### FIXTURES

Four 8 foot (2 bulb) fluorescent light fixtures. Condition: Fair (one defunct)

Two 4 foot (4 bulb) fluorescent light fixtures. Condition: Good

## RECOMMENDED IMMEDIATE REPAIRS

### *EXTERIOR*

#### EXTERIOR WALLS

- Perform two (1sf) exploratory probes at locations of rusting steel in the brick wall. **Probes and repair/reconstruction work shall be specified and monitored by a qualified historical architect. Work shall be performed by a qualified historic masonry contractor.**
    1. Architect and engineer to determine location of probes in field.
    2. Remove face brick to fully expose steel.
    3. Allow architect and engineer to review.
    4. Remove rust from rebar or plates to fullest extent possible.
    5. Allow architect and engineer to review.
    6. Based on results of probe, two repair options are outlined below.
- Repair option 1 (preferred): Install new brick at locations of spalls and cracks. Approx. 25%.
    1. Survey existing condition of all brick.
    2. Rake out mortar at existing deteriorated joints.
    3. Remove flaking rust where accessible.
    4. Paint remaining reinforcing rod with rust inhibitive paint.
    5. Install new face brick to match sound existing brick in size, color, texture and strength. Allow for three rounds of brick and mortar submittals/mock-ups.
    6. Repoint brick joints with matching mortar. Match historic joint profile.

- Repair option 2 (if repair is not possible): Reconstruct entire wall to faithfully reproduce existing as described below.
  1. Provide one square foot brick and mortar mock-ups. Bricks need to be the exact size, color, texture, and strength as the originals. Any existing variations in color and texture also must be recreated. Mortar joints must match exactly in profile, color, texture and strength. Assume 3 rounds of mock-ups and mortar testing.
  2. Photo-document prior to demolition. Submit to historical architect. Carefully demo wall taking care to not disturb adjacent building elements. Protect and shore steel CMP wall supports and steel sash windows. Assume that wall will be rebuilt in twenty foot sections. Salvage sound brick wherever possible for reuse.
  3. Rebuild brick walls to match original in size color, texture, profile and bonding pattern.

*INTERIOR*

**INTERIOR CEILING**

- No recommendation. Structural engineering report recommends 100% replacement.

**STRUCTURAL ELEMENTS**

- Repaint steel rafters, purlins, columns and CMP support structure.
  1. Verify that existing surfaces do not contain lead based paint.
  2. If lead based paints are suspected on the project, all removal must be done in accordance with the EPA Renovation, Repair and Painting rule and all applicable state and local regulations.
  3. Prepare steel surfaces, prime with rust inhibitive primer and paint with two top coats.

## RECOMMENDED LONG-TERM REPAIRS

- Provide maintenance and repainting on a regular schedule.

# BUILDING 107

## GENERAL STRUCTURAL SYSTEM DESCRIPTION

*GRAVITY SYSTEM*

The roof is corrugated steel decking on steel purlins supported by steel beams and columns. There is no decking at the westernmost bay, leaving the steel framing exposed to the weather. Exterior walls are corrugated steel siding. There is a partial height brick wall at the rear wall. The floor is a concrete slab on grade. The foundation is not visible and is not indicated on the drawings provided by the Port.

*LATERAL SYSTEM*

The roof diaphragm strength is provided by diagonal steel rod bracing connected to the top of the steel beams. In the north-south direction, lateral strength appears to be provided by the steel beams and columns acting as moment frames. In the east-west direction, lateral strength is provided by steel rod "x" brace frames on the south elevation and steel knee braces on the north elevation.

## CONDITIONS

- Mild corrosion on some structural steel purlins under the roof decking.
- Mild to moderate corrosion on structural steel members exposed to weather in the bay furthest to the west.
- Severe corrosion on structural purlin and roof deck at cooling stacks.
- Moderate to severe corrosion of the steel roof decking. Rust holes are present in multiple locations.
- The bottom of the column located at the north end of the first large bay is extremely damaged due to corrosion and possibly also due to vehicle impact. The baseplate is not visible but is also likely to be severely corroded.
- The brick masonry wall is damaged where it appears water has infiltrated and resulted in rusting of the embedded steel plates, thus causing the mortar to spall out.

## RECOMMENDATIONS

### IMMEDIATE REPAIR RECOMMENDATIONS

- Clean existing rusted steel framing to remove rust and paint, assess its condition, and re-coat with a rust-inhibiting primer and paint. There is a potential for the presence of lead or other hazardous materials in the existing coating.
- Replace approximately 10% of purlins in kind.
- Repair the one damaged steel column and baseplate by removing the lower three feet of column and replacing it with the same size (estimated to be W10x30), with a complete penetration weld at the splice and with a new baseplate and anchor bolts.
- Replace in kind the corrugated galvanized steel roof decking.

- Repair the damaged brick wall: remove brick and mortar to access the embedded steel plates, clean the plates of all rust and coat with a rust-inhibiting epoxy, replace the brick and mortar and repoint all joints.

**LONG-TERM REPAIR RECOMMENDATIONS**

- No long-term repairs are required at this time.

**RECOMMENDED SEISMIC STRENGTHENING**

- Given the light weight of the roof and walls, seismic demands on the overall structure will likely be less than the wind loads that the structure has already experienced. Therefore, based on our limited observations, it is our opinion that overall seismic strengthening of this building is not necessary.
- The partial height wall should be evaluated for its capacity to resist seismic loads in the out-of-plane direction. Seismic strengthening of the wall should be incorporated into the immediate repairs.

Figure 1 – CMP corrosion at cooling units

Figure 2 – CMP and purlin corrosion at cooling units

Figure 3 – Partial height masonry wall damage

Figure 4 – Column damage at north end

Figure 5 – Typical CMP corrosion with rust holes

Figure 6 – Typical corrosion to steel framing members in open area

# BUILDING 107 – Pipe Storage

## MEP DESCRIPTION AND CONDITIONS ASSESSMENT

*HVAC systems*

• This building stores (2) Cooling Towers used for process equipment (see fig. 107-1).

• (2) Utility Type fans are mounted on a ledge used for sawdust collection from the neighboring woodshop (see fig. 107-2).

• A gas-fired unit heater is located for spot heating, but no gas connection is piped to the heater (see fig.107-3).

• There is no mechanical ventilation equipment, the building relies on natural ventilation.

*Plumbing & Fire Protection Systems*

• The building has no fire protection service.

• The building has no plumbing service.

*Electrical Systems*

• The building contains multiple electrical panels that are fed from the neighboring woodshop building.

## RECOMMENDATIONS

### IMMEDIATE REPAIR RECOMMENDATIONS

*HVAC*

- None.

*Plumbing & Fire Protection*

- None.

*Electrical Systems*

- None.

**Figures**

**Figure 107-1 – Cooling Towers**

**Figure 107-2 – Utility Fans Serving Woodshop**

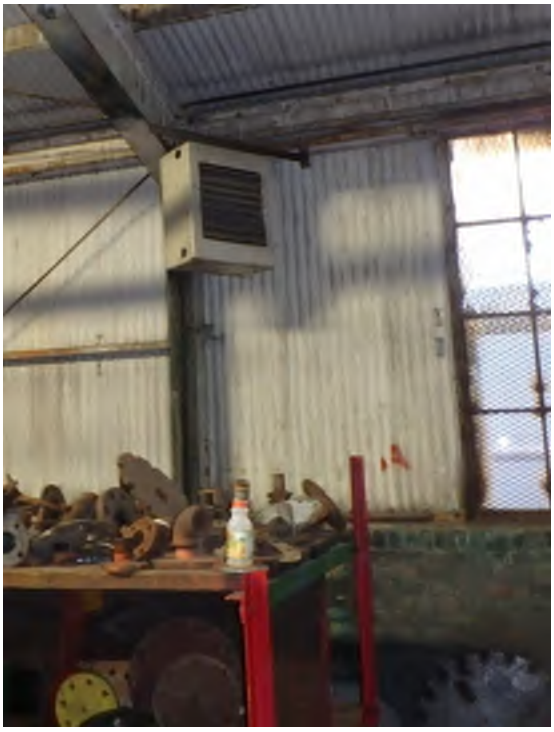


**Figure 107-3 – Unit Heater without Gas Connection**

# BUILDING 107 Pipe Storage

Fig. 1 - Building 107 view from interior.

## BUILDING DESCRIPTION AND CONDITIONS ASSESSMENT

GENERAL ROOF DESCRIPTION

This is the Pipe Storage Bldg. The roof area is approximately 38x 50 this roof appears to be very old

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## CONDITIONS

ROOF

GENERAL NOTES: The roof area is 32 x100 this roof has pinholes visible from the building's interior. There is no counter flashing around the comp units for cooling towers 1&2 were they penetrate the roof. The roof also has a lot of rusting at overlapping seams

## RECOMMENDATIONS

### IMMEDIATE REPAIR RECOMMENDATIONS

*ROOF*

- Minor patching or caulking and installation of flashing and counter flashing is recommended.

### LONG-TERM REPAIR RECOMMENDATIONS

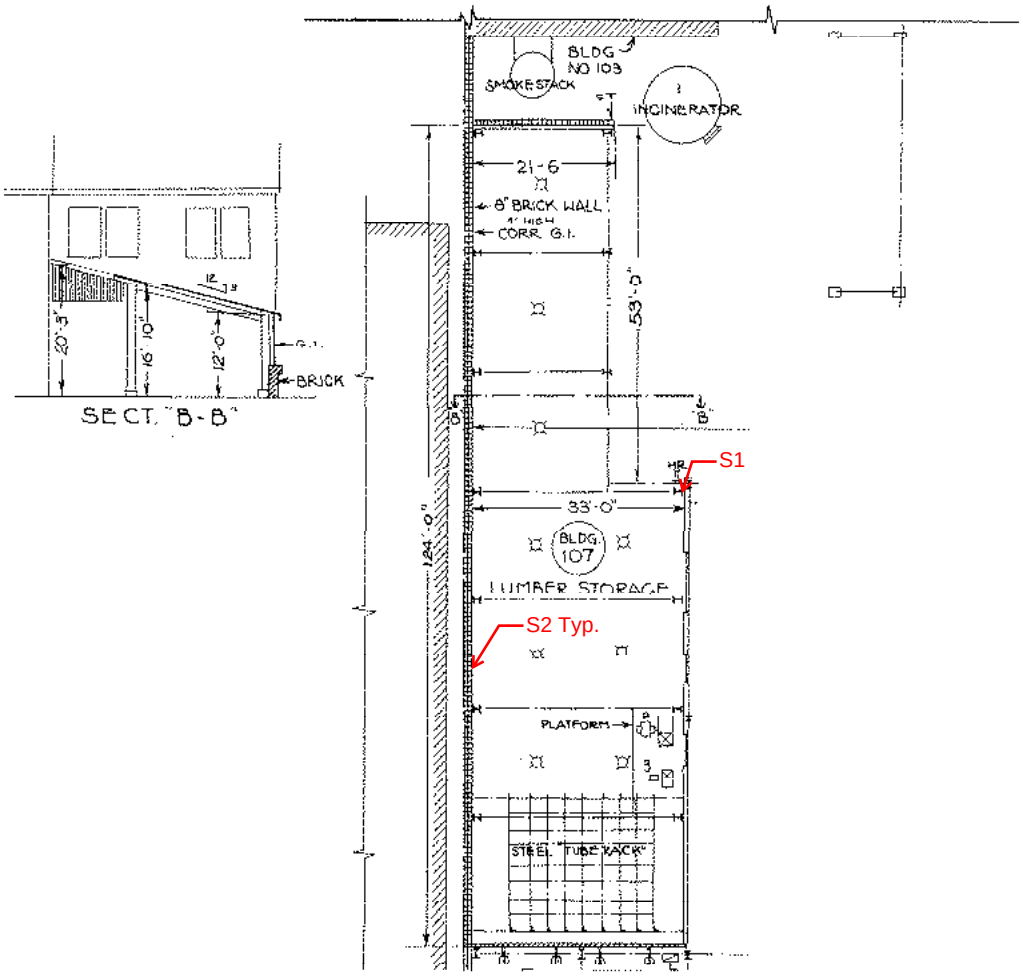
*ROOF*

- Replace entire roof with newer more energy efficient roof.

Structural Key:

S1: Steel column to be replaced per report.

S2: Repair partial height masonry wall per report.



**BUILDING 107**

A condition assessment of Building 107 was performed by AGS Inc. on June 28th, 2017 based on the 2015 Pier 70 Building Condition Assessment Report by DCI+SDE Engineers. The purpose of the condition assessment and this addendum is to provide an update and field verification of the architectural and structural deficiencies found at Building 107, which was described in the aforementioned report by DCI+SDE Engineers. The condition assessment was based on a general visual observation of the exposed portions of the building from the ground level. No assessment was performed in areas that were not easily and/or safely accessible.

The overall condition of Building 107 has remained unchanged since the previous condition assessment in 2015. The building continues to be used as a general storage facility and the recommended repairs provided in the previous condition assessment report have not been addressed. No deficiencies in addition to the deterioration identified in the previous condition assessment were found.

Figure 107-1 - Overall northwest view of Building 107.


Figure 107-2 – Typical view of Building 107 exterior corrugated metal panels.

Figure 107-3 - View of Building 107 typical exterior brick mortar joint deterioration.

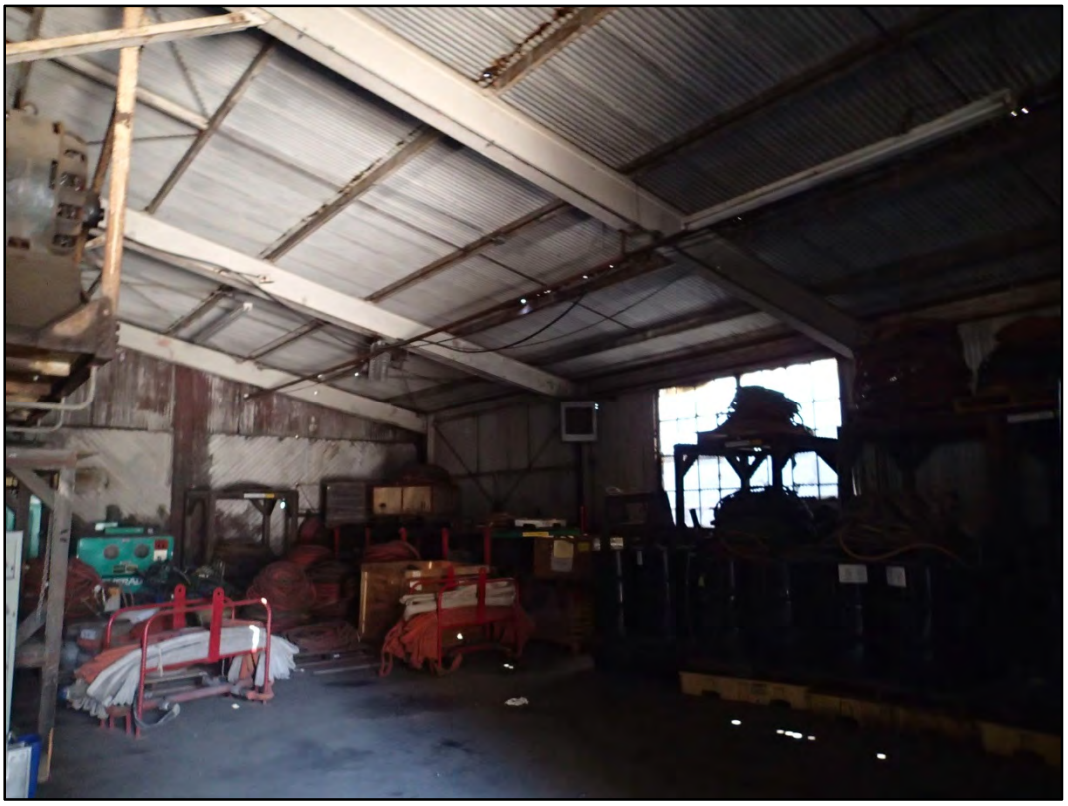


Figure 107-4 – Overall view of Building 107 east interior storage area, looking southeast.

Figure 107-5 – Overall view of Building 107 west interior shed area, looking southwest.

Figure 107-6 – View of Building 107 concrete slab located at the western end.

Figure 107-7 – View of the heavily corroded column base at north side of Building 107.