

John Wastrom – Masonry Consultant

Existing Conditions Assessment Report and Restoration Plan

Historic Burial Grounds and Cemeteries –
Portsmouth, NH

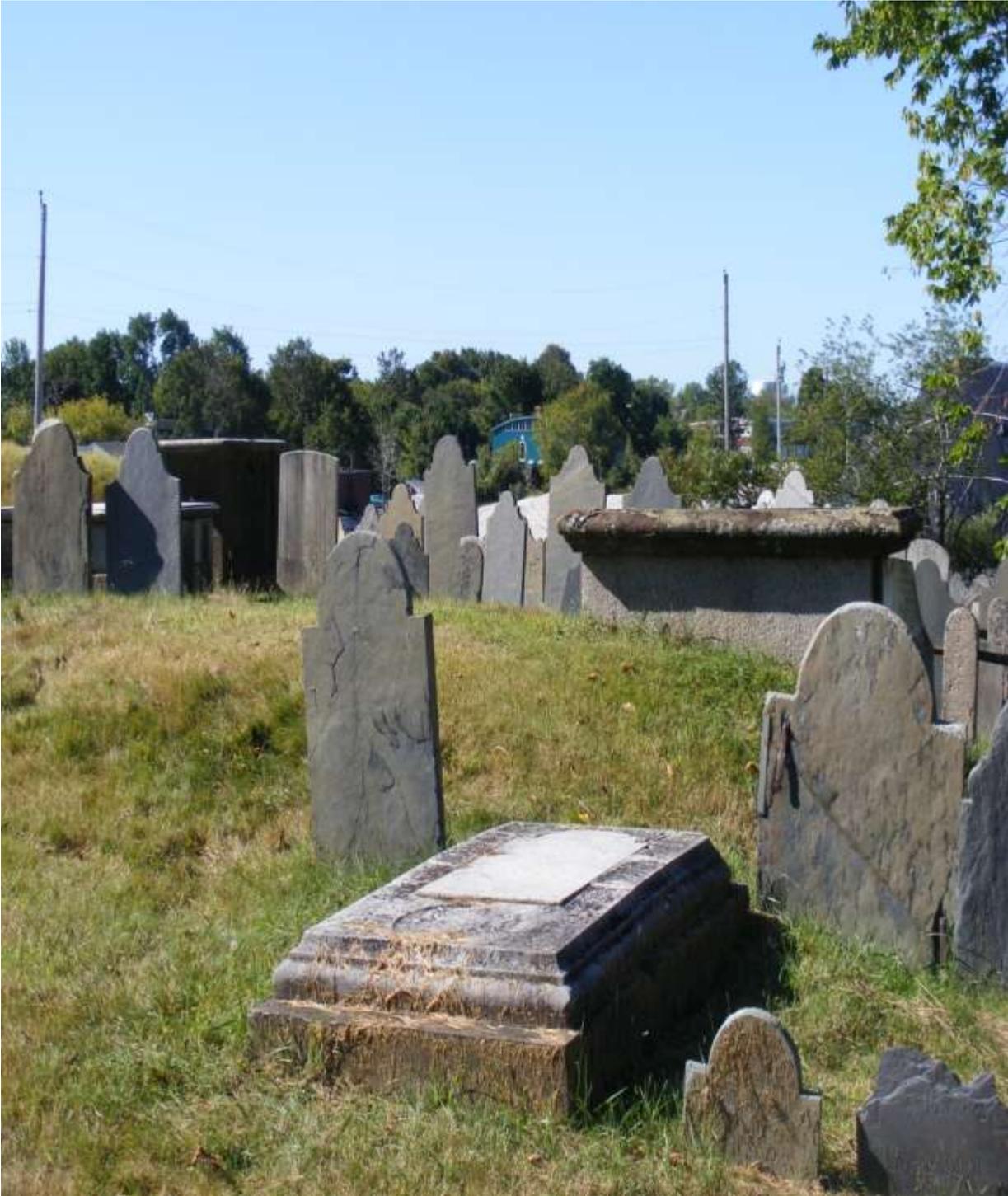
David Moore
Community Development Director
City of Portsmouth
10/25/13

Existing Conditions Assessment - Introduction: Since its origin in the early 1600's, Portsmouth has never stopped changing and rebuilding. Old houses and buildings have constantly been demolished or moved to make way for residential and commercial development. As the city grew around them, the old burial grounds and cemeteries of Portsmouth went through long periods of neglect and intermittent repair before their care was turned over to a group of local volunteers, the Cemetery Committee, who for many years fought an uphill battle to maintain the city's historic graveyards. The City of Portsmouth and the Portsmouth Historical society have begun the process of developing a long range restoration plan to maintain these historic resources by the commission of this survey. This report will document the existing conditions of the Point of Graves Burial Ground, the Old North Burial Ground, the Union Cemetery, the Pleasant Street Burial Ground, the Union Cemetery and the Cotton Cemetery. Potential conservation or repair projects will be listed with a corresponding cost estimate and priority level.



Portsmouth Athenaeum Archives

North Cemetery – Maplewood Ave. Established 1753



Existing Conditions Assessment: North Cemetery – Maplewood Ave.

Less than a century after the Point of Graves was established as a municipal burial ground, Portsmouth's population had grown to the point where another burial ground was needed. The acre and a half lot for the North Cemetery was acquired from Colonel John Hart in 1753 but there were already a few burials on the site. The land which rises up to a low hill at its center was located between the north mill pond and Mill Street, (Maplewood Avenue).

Originally surrounded by a mix of maritime related businesses and a few residences, the cemetery is now sandwiched between a very busy city street and a tired old mill pond and a storage facility for road salt. The people interred in the Old North Cemetery and the adjacent Union Cemetery represented a wider spectrum of Portsmouth's former inhabitants than the South End elite burial grounds. The North End cemeteries also continue the city's historic time line beyond the 18th century to the end of the 19th century.





Existing Conditions Assessment: North Cemetery – Maplewood Ave.



Existing Conditions Assessment: North Cemetery – Maplewood Ave.

Front Enclosure Stone Wall: The stone and brick border wall located on Maplewood Avenue was built soon after the cemetery opened in the mid 18th century. This partially freestanding wall is 300 feet in length and averages about four feet in height. The lower three feet of stonework was constructed with a mix of broken ledge stone, split fieldstones, hammered granite blocks and lime mortar in a random rubble style. The old masons only kept the front face of the stonework plumb because the back of the wall was buried. The existing rough, irregular stonework along the back of the wall was never intended to be exposed to the weather. The existing capstones on the wall are four inch thick pre cast concrete panels which average about six feet in length. These concrete caps are definitely replacements. Portland cement based pre cast concrete products were not available until the late 19th century. It is a mystery why the original capstones ended up being removed when the rest of the wall survived. The use of hammered granite slabs to cap formal stonewalls was a common building practice in New England during the 18th and early 19th centuries.



Existing Conditions Assessment: North Cemetery – Maplewood Ave.

There are five courses of red water struck bricks on the North Cemetery front wall. Like the stonework these bricks were laid up in lime mortar. The mortar joints were finished with a narrow concave jointer known to modern masons as a rat tail or slick. The 18th century masons used carved wooden dowels for this work. The existing brick wall was three courses thick and was laid up in a Flemish Cross Bond pattern. Basically masons used the Flemish Bond pattern which alternated stretcher and header bricks to connect the multiple layers of a brick wall. This variation alternated courses of Flemish Bond brickwork with one or two courses of Common Bond brickwork where only stretcher bricks were used. Approximately 5000 bricks were used to build the front wall of the North Cemetery.



Existing Conditions Assessment: North Cemetery – Maplewood Ave.

The front enclosure wall has been re pointed so many times it is impossible to comment on all the different types of repair mortar present except to say that none of them contained the original building material, lime. These Portland cement based repair mortars were too dense to allow moisture out of the wall's interior and only accelerated the deterioration of the soft old bed mortar. Virtually all the bricks and stones have lost their bonding and are now held together only by gravity and the weight of the concrete caps which are no longer bonded to the top of the wall either. The wall has settled over the years along with the surrounding landscape. That combined with the migration of deteriorated bed mortar from the interior of the wall, (due to water infiltration) has caused a large section of the wall to lean out over the sidewalk. It is very visible at its western end where a twenty foot long section of the wall appears to be close to collapse. The continued growth of the large trees behind the wall has also contributed to the outward movement of the wall.



Existing Conditions Assessment: North Cemetery – Maplewood Ave.

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**Existing Conditions Assessment: North Cemetery – Maplewood Ave.
Front Enclosure Stone Wall**



Existing Conditions Assessment: North Cemetery – Maplewood Ave.

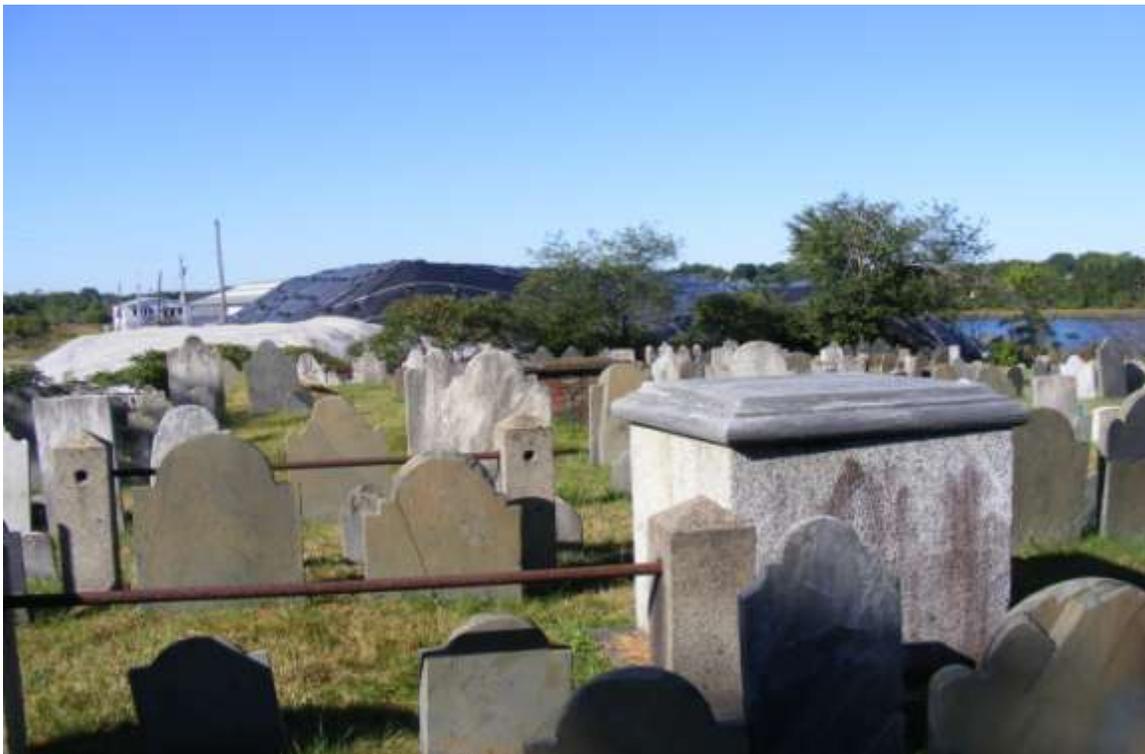
Wall #2 – Between North and Union Cemeteries: There is a remnant of a small retaining wall between the two cemeteries. This wall began behind the western end of the North Cemetery’s front wall and extended about twenty feet between the properties. It averaged about two feet in height and defined a change in elevation between the two graveyards. It was originally built as a dry laid stacked wall using a mix of weathered fieldstones but it was dismantled and rebuilt at least once. The stonework appeared to have been rebuilt with a Portland cement based mortar during the early 20th century. The existing wall is in poor condition and appeared to have been partially dismantled.



Existing Conditions Assessment: North Cemetery – Maplewood Ave.



North Cemetery Tombs: The North Cemetery contained the largest number of early hill tombs and other tomb styles among the city's older graveyards. There are fourteen existing tombs sited around the low hill at the center of the graveyard.



Existing Conditions Assessment North Cemetery – Maplewood Ave.

The two brownstone hill tombs located on the eastern side of the cemetery now face a rusty chain link border fence and the RR tracks. Both of these tombs have exposed brownstone facades in front of buried brick vaults. *The Wendell Tomb, (Pleasant Street Burial Ground) is a good above ground representation of the North Cemetery vaults.* These barrel vaults were built on a wooden form known as a centring which was dismantled after the brickwork had cured properly. The vaults were at least three courses thick. The exterior surfaces of the brick vaults were finished and sealed with a thick layer of lime mortar mixed with clay.



Smaller brick vaults were also used under the chest tombs.

Existing Conditions Assessment: North Cemetery – Maplewood Ave.



The Robert Odiorne Treadwell Tomb is the first hill tomb encountered beyond the front entrance to the cemetery. The tomb appeared to be in fair condition. The facade was constructed out of three carved and finished brownstone blocks which were fourteen inches thick. Notches were cut out of the top inside corners of the two rectangular wall stones to support the arched pediment stone that crowned the facade. Located on either side of this facade are granite block wing walls capped by thick granite tread stones. The entire tomb measured 15 feet in width, 16 feet in length and 6 feet on height. The entrance to this tomb had been in filled with brickwork. The facade's lower wall stones have lost about half of their outer surfaces due to weathering. The surviving areas of the original polished surfaces are very fragile and have started to delaminate.

Existing Conditions Assessment: North Cemetery – Maplewood Ave.



The Robert Odiorne Treadwell Tomb The inscription pediment stone appeared to be in good condition. The inscription lettering was in very good condition which is unusual for this kind of stone. Although the dry laid granite wing walls have settled and shifted over the years, there was no visible displacement of the three big brownstones. There was some lichen growth on the facade stones but there is no need to remove it. These brownstones are too fragile for any type of cleaning. The wrought iron support elements for the tomb's original door have been removed except for one pintel anchored on one of the lower wall stones. This type of exterior hinge arrangement was traditionally used to support a metal or iron door.



Existing Conditions Assessment: North Cemetery – Maplewood Ave.

The **Governor John Langdon Tomb's** facade was constructed with several large cut and finished brownstones. The lower walls were made of four rectangular blocks that supported an elliptical arched, (elliptical) pediment stone. The pediment stone was framed on either side by two small triangular blocks. All of these stones were fourteen inches thick. There are also two larger triangular blocks/wing walls that flank the base of the facade. The tomb's dimensions are 13 feet in width, 14 feet in length and 6 feet in height. There has been some shifting of the facade wall stones and there has been surface loss on the facade stones. There are no visible recent repairs but a partially exposed band of the vault brickwork behind the facade stones appeared to have been reconstructed with a modern bricks and mortar. An existing iron latch pinned in place on the right face of the tomb indicate an earlier exterior mounted metal or iron door similar to the Wendell Tomb. The condition these permanently sealed subterranean vaults cannot be completely assessed. There are no indications of soil displacement or settling on top of the tombs which would indicate a partial collapse or failure of the buried masonry.





North Cemetery-Governor John Langdon Hill Tomb



Existing Conditions Assessment: North Cemetery – Maplewood Ave.



Behind the brownstone hill tombs, closer to the center of the cemetery are two hill tombs with granite facades. The **Woodbury Langdon Hill Tomb's** overall dimensions are 14 feet in width, 23 feet in length and 7 feet in height. Its facade was constructed out of three hammered finish granite blocks with two adjacent wing walls built with smaller triangular granite blocks. The original iron door appears to have been removed at some point in the 20th century although the iron pintel and latch pieces are still in place. These iron pieces have rusted and stained the granite facade stones. The marble inscription stone now imbedded in the brick doorway infill is a modern replacement. The granite facade has settled and leaned forward over the years. This process of stone displacement has also been helped along by the small tree growth between the wing walls and the facade



Existing Conditions Assessment: North Cemetery – Maplewood Ave.



Most of the tombs in the cemetery were assembled without mortar. The 19th century stonemasons inserted iron or bronze cramps into the tops of the stones to bind them together. These metal anchors were secured in place with molten lead or sulfur. An example of this old building practice can be observed on the partially dismantled, granite chest tomb adjacent to the Woodbury Langdon Tomb.



Existing Conditions Assessment:-North Cemetery – Maplewood Ave.

During our restoration of the Moses hill tomb, (Forrest Grove Cemetery Somersworth, NH) we rediscovered the old method of anchoring the dry laid facade stones to the vault masonry behind these stones. The 19th century stonemasons cut shallow channels into the tops of each course of facade stonework, (except for the pediment stones) and then drilled corresponding holes into the front wall of the vault masonry. An L shaped bronze anchor was then installed in these openings. The holes were finally sealed with molten sulfur. The use of molten sulfur to anchor heavy objects is a very old and somewhat dangerous building tradition.



Existing Conditions Assessment: North Cemetery – Maplewood Ave.

The other granite facade hill tomb in the North Cemetery was sited near the W. Langdon Tomb. The **Shelburne Hill Tomb** facade was composed of eleven hammered finish granite blocks. The side walls were constructed of eight rectangular stones and the pediment contained three cut pieces. The overall dimensions of this tomb are 13 feet in width, 20 feet in length and 6 feet in height. The wing walls are partially buried but appear to have been built with small worked granite blocks.



Existing Conditions Assessment: North Cemetery – Maplewood Ave.



The entrance to the **Shelburne Hill Tomb** was sealed up with brickwork at the same time as the Woodbury Langdon Tomb. The iron door pintels and latch piece also survive on the Shelburne Tomb and their deterioration has also caused deep staining on the granite facade. The three metal pins that anchor the inscription stone to the granite pediment stone have also rusted and stained the white marble. This tomb is in fair to good condition. There has been some settling of the granite facade and some minor displacement of the three pediment stones.

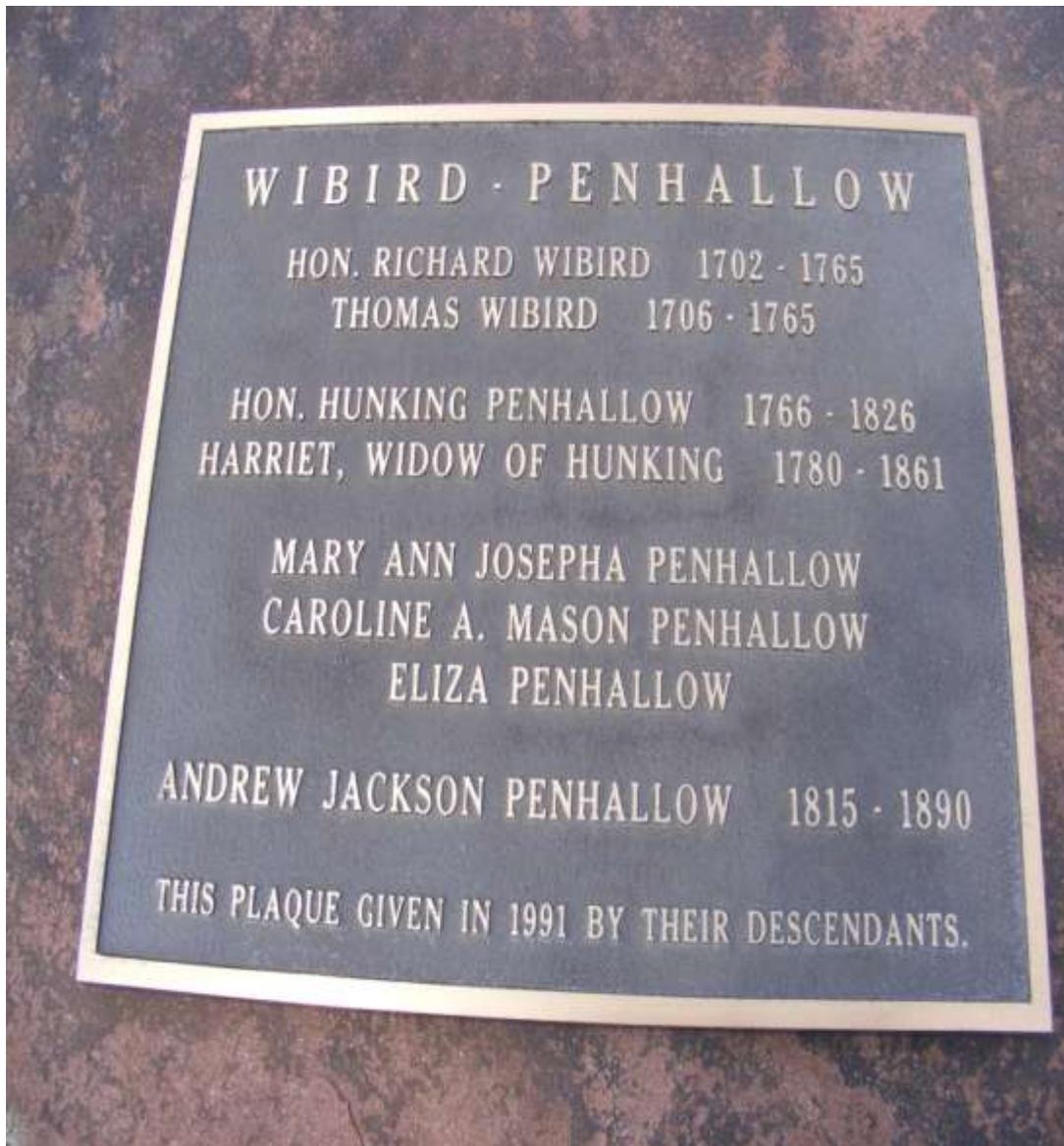


Existing Conditions Assessment: North Cemetery – Maplewood Ave.



There are two brownstone chest tombs located just southeast of the Hill Chest Tomb. The **Wibird Penhallow Tomb** was almost completely reconstructed during early 20th century. The existing chest walls are composed of modern water struck bricks and Portland cement based mortar. The ten courses of badly installed bricks were originally parged with a mortar plaster. About half of this brickwork has lost its bonding because of water infiltration and weathering... The tomb has been partially buried in the hillside and overgrown with vines for many years. The rectangular layer of macadam at the lower end of the tomb may cover part of the burial vault





The tomb's brownstone inscription slab has a similar molding profile to the other brownstone tomb covers in the cemetery. The upper part of the tomb's inscription has deteriorated because of surface loss and weathering but most of it was still intact. The existing slab was covered with lichen but there has been no cracking or shifting of the slab. The chest masonry is in poor condition. This modern brickwork may have replaced an earlier brownstone configuration. The descendants of this family attached a bronze plaque to the top of the inscription slab in 1991.

Existing Conditions Assessment: North Cemetery – Maplewood Ave.



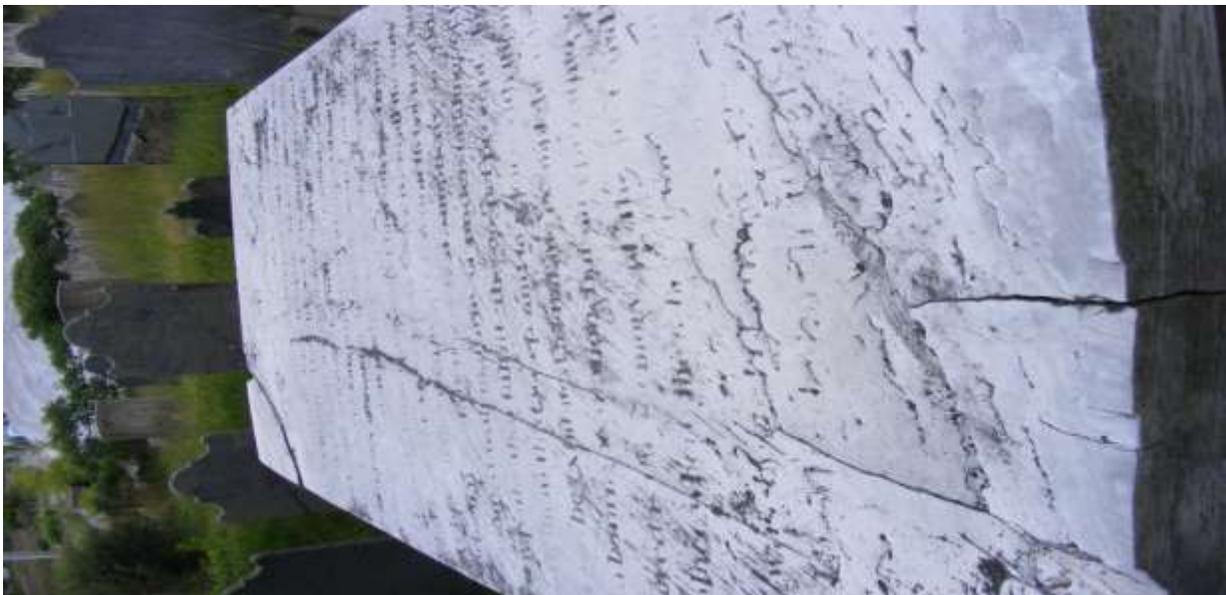
The **William Vaughn Tomb** was one of the cemetery's most ornate chest tombs. It was located between the two brownstone hill tombs. The thick square edged white marble slab inscription stone has been badly damaged by the weather. One corner of the marble slab is no longer attached to the rest of the stone.



Existing Conditions Assessment: North Cemetery – Maplewood Ave.



The walls of the **William Vaughn Tomb** were composed of white marble corner pillars and brownstone inset panels. These panels are badly eroded and have lost several outer layers. There is evidence of soluble salt encrustation on the brownstone panels just above the soil line which indicates ongoing rising damp conditions within this tomb. The subsurface re-crystallization of these salts which exist both in the soil and the stone, along with years of weathering have caused this surface loss. This tomb has been badly weathered and is in poor condition due to long term water infiltration.



Existing Conditions Assessment: North Cemetery – Maplewood Ave.



Scattered around the hill tombs are nine chest tombs and one dismantled pedestal tomb. Behind the Vaughn Tomb there is another very interesting chest tomb. The **Jeremiah Hill Tomb** was assembled with three finished stones above the soil line. While most of the chest tombs in the North Cemetery have interior masonry walls that anchor the stone walls and support the inscription slab, the Hill Tomb components are solid granite and marble. The tomb's solid hammered granite cube was set on a thick granite footing stone which covered the subterranean brick vault. The gray marble inscription stone did not weather as well as the tomb's other stones. It has started to delaminate along one of its horizontal bedding planes and there are vertical cracks through the molded edges of the slab.



Existing Conditions Assessment: North Cemetery – Maplewood Ave.



A similar solid granite memorial, the **Sheafe Tomb** was located on the opposite side of the hill closer to the Union Cemetery. This tomb which measured five feet long and three feet tall was assembled with three solid pieces of granite and crowned by a carved white marble slab. . The family name was depicted in raised block letters on either side of the chest stone. Except for some weathering on the marble inscription stone this tomb is in good condition.



Existing Conditions Assessment: North Cemetery – Maplewood Ave.

Just down the hill towards the rear of the cemetery there was another brownstone chest tomb. The partially buried **Anna Treadwell Walden Tomb** also appeared to have been rebuilt at some point in the early 20th century. The lichen covered brownstone slab is basically intact although there has been enough surface loss to obscure the inscription. The low chest walls were rebuilt with concrete blocks and then plastered over with a thick layer of Portland cement based mortar. It was not clear what the original chest walls were made of but the tomb's original dimensions were probably similar to the other chest tombs in the cemetery. The brick burial vault underneath the chest masonry has been exposed to the weather for many years. The brickwork has partially collapsed leaving a ragged opening on top of the vault. There was visual evidence of an active rodent colony in the burial chamber. The exposed section of the vault brickwork illustrated just how large these chest tomb burial chambers were.



Existing Conditions Assessment: North Cemetery – Maplewood Ave.



The **Anna Treadwell Walden Tomb** is in very poor condition in part because of the overgrown vegetation around it which encouraged water infiltration in to the brickwork. The succession of bad repairs that took place several decades ago and the removal of the original chest walls have seriously degraded this tomb. The existing, exposed breach in the burial vault could be a potential danger to the cemetery's visitors if there is an ongoing collapse of the subterranean brickwork.



Existing Conditions Assessment: North Cemetery – Maplewood Ave.



At the center of the cemetery grouped around the graveyard’s modern flagpole there are three similar granite chest tombs and one brownstone chest tomb.



Existing Conditions Assessment: North Cemetery – Maplewood Ave.

The **Joshua Bragdon and Harriet Bragdon Chest Tombs** were topped with finely carved but badly weathered white marble slabs. The dry laid granite block walls have settled and shifted over the years but the tombs are still stable. The marble slabs have lost most of their upper exterior surfaces and the inscriptions are almost illegible. Both of these chest tombs measure 6 feet in length, 3 feet in width and 2 feet in height. The Joshua Bragdon Tomb's granite chest stones were assembled on a granite footing slab. These dark granite blocks have a rough hammer finished surface which matched the exterior finish of the adjacent tomb's chest stones. The light gray granite chest blocks used to construct the Harriet Bragdon Tomb were also assembled on a granite footing. Both of these tombs have been heavily stained by a combination of biological and environmental agents, (lichens/algae and air pollution). Although this condition has been a factor in the deterioration of the marble slabs, it has not affected the granite blocks. These tombs are stable and in relatively good condition.



Existing Conditions Assessment: North Cemetery – Maplewood Ave.

The design of the **Margret Thompson Tomb** was similar to the previous brownstone chest tomb. The only marble element on this tomb was the finely carved and polished inscription stone. Finished brownstone blocks were used as footing stones, the four corner columns and four inset panels. All of these brownstones are badly weathered and in poor condition. One of the cornerstones has a large vertical crack. At some point in the early 20th century, the chest stones were plastered over with a Portland cement based mortar. This inappropriate repair accelerated the deterioration of the brownstones. There are only a few surviving remnants of this repair mortar because most of it fell off along with the surface layers of the chest stones. The marble slab appeared to have been partially shifted from the top of the tomb. It was roughly mortared into its off center position during another more recent attempt to repair the tomb. This tomb is in poor condition mostly because of all the bad repairs. Adjacent to the Margret Thompson Tomb are three similar chest tombs built with hammer finish granite blocks. These granite blocks were at least two feet thick and when assembled created an almost solid support for the inscription slabs. Two of the tombs were composed of different types of gray granite. The third tomb was assembled with a type of brown granite traditionally quarried in the South Berwick, Maine area.



Existing Conditions Assessment: North Cemetery – Maplewood Ave.



The William Whipple Tomb was composed of brown granite blocks and a four inch thick slate inscription slab. The granite walls were re pointed many years ago with a Portland cement based mortar. This tomb measured 6 feet in length, 3 feet in width and 2 feet in height. The slate slab must have become badly eroded because it was covered in 1976 with a 4 inch thick slab of light colored granite. The old slate slab appears have been partially crushed under the weight of the new stone. There are numerous horizontal cracks along its finely carved molded edge where the freeze and thaw of New England weather has caused this sedimentary stone to delaminate.



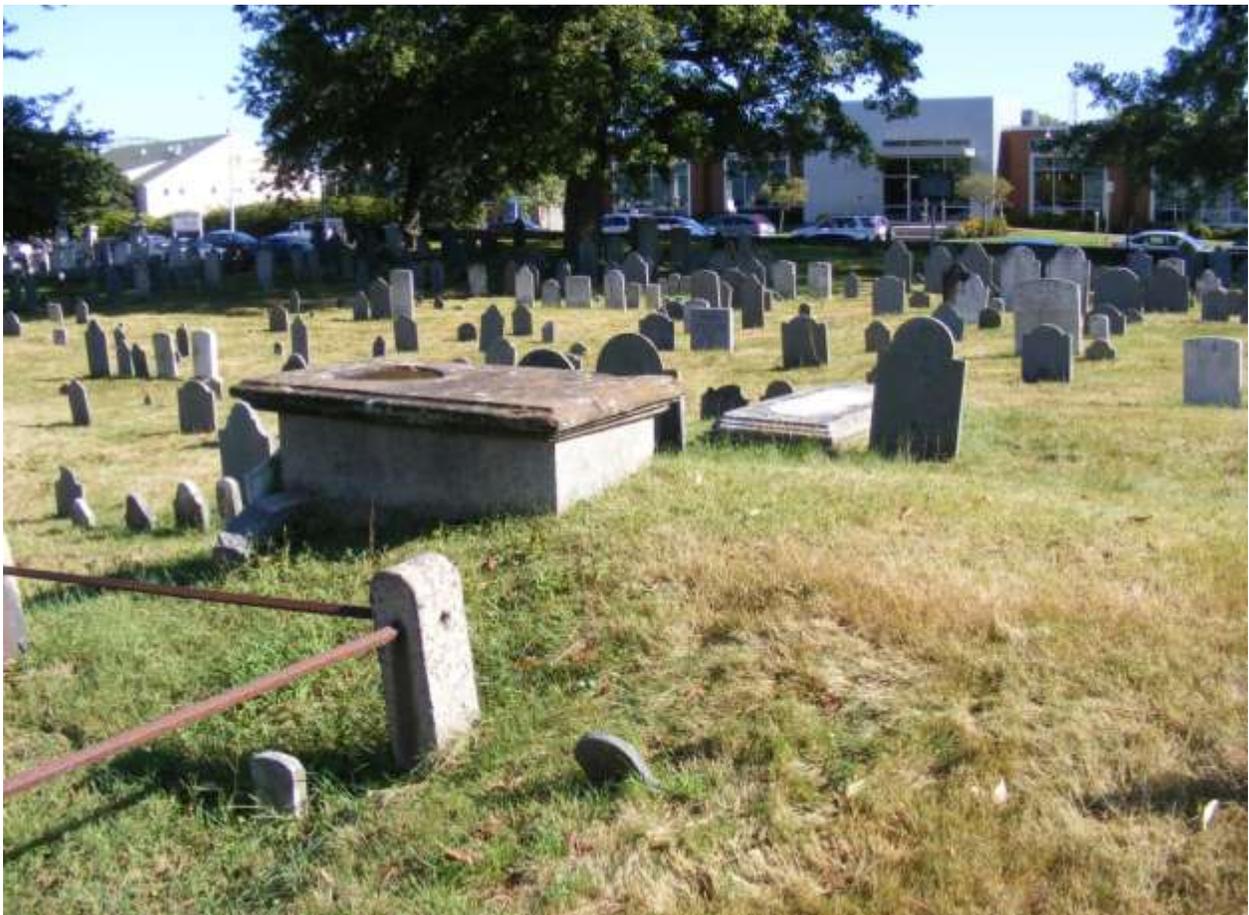
Existing Conditions Assessment: North Cemetery – Maplewood Ave.



The William Whipple Tomb

Existing Conditions Assessment: North Cemetery – Maplewood Ave.

There are two other variations of the chest tomb design located between the small group of tombs on the hill and the front border wall. The **Jotham Odiorne Tomb** was constructed with three large pieces of light gray granite. The tomb's chest was made from one rectangular light gray hammer finished granite block which is supported at its exposed end by rough finished footing stone. A similar footing stone was probably installed at the opposite end of the chest stone. It is now buried under the soil line. It appeared that the footing areas between these end stones were filled with small pieces of granite. . The overall dimensions of this tomb are six feet in length, three feet in width and approximately three feet in height. The size of the subterranean vaults underneath these chest tombs is clearly illustrated by this tomb which is in good condition except for the missing inscription stone.



Existing Conditions Assessment:-North Cemetery – Maplewood Ave



The **Jotham Odiorne Tomb**: The design and finish of the existing lichen covered brownstone inscription slab matched the other brownstone inscription stones in the cemetery. The heart shaped inscription stone has completely deteriorated or been removed. The remaining open void appeared to be constantly filled with standing water. There has been some surface loss on the top and along the molded edges of the brownstone due to weathering



Existing Conditions Assessment: North Cemetery – Maplewood Ave.



The Jotham Odiorne Tomb



Existing Conditions Assessment: North Cemetery – Maplewood Ave.



The **George Boyd Tomb**, d. 1787, was originally erected as a pedestal tomb which was essentially a deconstructed chest tomb. The marble inscription slab was supported about two feet off the ground with six carved marble balusters. .Mr. Boyd was successful businessman in colonial Portsmouth. He commissioned the carving of his tomb while sitting out the American Revolution in London. After the war he died while returning to New Hampshire with his tomb

Existing Conditions Assessment: North Cemetery – Maplewood Ave.

The George Boyd Tomb, d. 1787: The marble elements of the tomb were probably set on a stone footing which is now buried. The existing tomb is in very poor condition. The surviving marble slab is badly cracked and weathered. The pedestals which survived into the 20th century were removed and lost at some point possibly after the tomb was vandalized. The inset stone on the marble inscription slab appeared to have been removed at the same time. The marble inscription stone was eventually placed on a concrete slab about four inches off the ground. The missing gravestone shaped inset stone was eventually replaced with an inscribed granite panel.



North Cemetery Restoration Plan and Repair Cost Estimates:

The reconstruction of the North Cemetery's front enclosure wall is the highest priority repair project in the city's historic cemeteries. The existing wall is in poor condition and has become unstable. It has deteriorated beyond the point of restoration or repair. It is recommended that the entire wall be carefully dismantled and rebuilt on a concrete footing using the original stones and concrete caps. The bricks should be sorted through and re used if possible. In kind replacement bricks should be acquired to replace the deteriorated ones. A lineal photo map can be created of both sides of the wall which can be used during the reconstruction process. Also the wall stones should be arranged in a lineal grid that has been set up near the site. The biggest challenges on this site will be logistics and the narrow work area. Based on my previous cemetery projects there can be no excavation beyond the footprint of the wall and no machinery or materials can be place on or near a gravesite.



North Cemetery Restoration Plan and Repair Cost Estimates:

The cost estimate for the reconstruction of the North Cemetery front wall which includes all labor, material, excavation, trucking and police detail costs is \$375,000.00. This project will take a crew of six about eight weeks to complete.

Phase 1: Set up secure storage area near enclosure wall to store materials and the wall components. Document and remove concrete capstones, bricks and stonework. All capstones and wall stones should be numbered and photo-by the storage area so the stones can be arranged accordingly there as they are removed from the wall. All debris created by the dismantling of the wall should be removed to a landfill during this phase. **Labor: 2 masons, 2 laborers, 2 machine operators, (backhoe and dump truck) Labor rates- \$75 per hour for each mason and laborer/\$125 per hour for each machine with operator -120 hours @ \$550 per hour - \$66,000.00**

Phase 2: Excavate existing wall footing, set forms and install new concrete footing just below soil and sidewalk level. **Labor: Masonry crew and backhoe/dump truck operators: 40 hours @ \$550 per hour - \$22,000.00**
Materials: 30 yards concrete @ \$300 per yard/form materials - \$10,000.00

Total concrete footing cost - \$32,000.00

Phase 3: Rebuild stone and brickwork using photo map and other documentation. Labor: Masonry crew and backhoe/dump truck operators - 320 hours @ \$550 per hour - \$176,000.00

Materials: 5000 Morin water struck bricks - \$10,000.00

100 bags masonry cement/hydraulic lime - \$5000.00

75 yards masons' sand- \$4875.00

Miscellaneous materials - \$1625.00

Total cost for phase 3 - \$178,875.00

Police detail for the North Cemetery wall reconstruction project: 500 hours @ \$90 per hour for two officers - \$4500.00

Total cost for the reconstruction of the North Cemetery front enclosure wall plus 25% - \$375,000.00

North Cemetery Restoration Plan and Repair Cost Estimates

There are many other smaller repairs that are needed in the North Cemetery but these are low priority projects.

The most important of these repairs would be to cover and stabilize the area around the partially collapsed subterranean vault associated with the Anna Treadwell Walden Tomb.

This is a potentially dangerous situation. With the help of an archaeologist the soil should be removed from around the exposed burial vault so the top of the brick vault can be rebuilt.



The Joshua and Harriet Bragdon Tombs need to have their granite chest stones realigned which could be done without removing the marble slabs.



The heart shaped open inset pocket on the **Jotham Odiorne Tomb's** brownstone slab should be filled with a piece of brownstone set in a bed of hydraulic lime.

North Cemetery Restoration Plan and Repair Cost Estimates:

The marble slab on the **Margret Thompson Tomb** should be realigned and the cracked brownstone corner column repaired with a brownstone repair mortar, (Lithomix - made by Limeworks or Mimic -made by Conproco).



The cracked marble inscription slab on the **William Vaughn Tomb** should be repaired and sealed using a mix of un-tinted hydraulic lime mortar and marble dust.



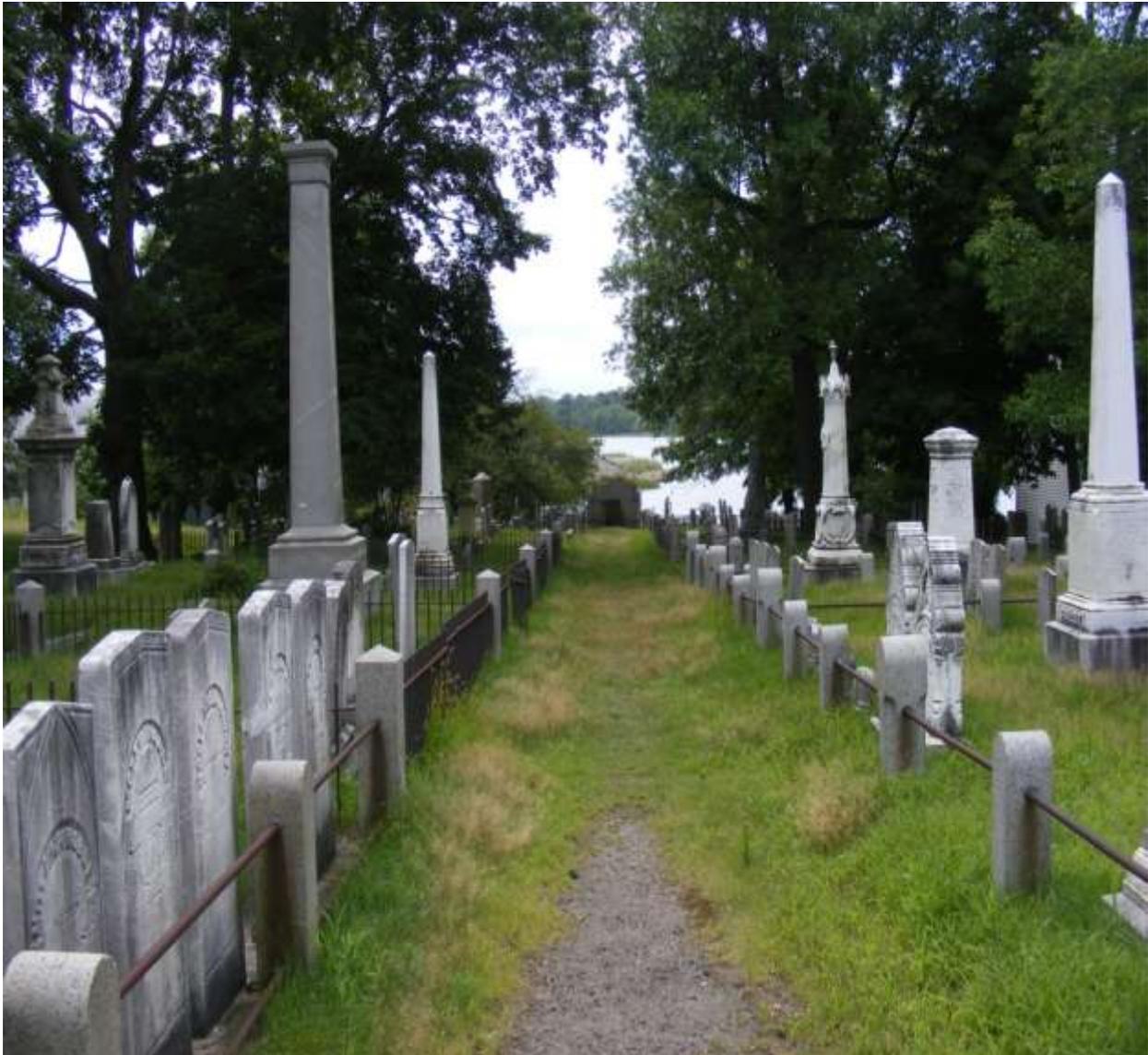
These five repairs should be planned as one project. The repair cost estimate for all five tombs which includes labor and materials is \$8000.00. The repair of these four tombs will take a crew of two masons about 50 hours to complete.

Union Cemetery – Maplewood Avenue- Established in 1844



Union Cemetery – Maplewood Avenue- Existing Conditions Assessment

It took almost a century before the city's residents began to look for more burial plots. The Union Cemetery opened in 1844 was located on a narrow lot adjacent to the North Cemetery. This Greek revival era graveyard represented one of two divergent 19th century trends in cemetery design. Possibly because of its limited space, the proprietors utilized a rectilinear layout which divided the graveyard into small square family plots. This standardized layout of the gravestones was very different from the chaotic placement of burials in the older North Cemetery. An incredibly detailed description of this cemetery can be found in the NHDHR survey form, (#POR0005). This survey was compiled by Nancy Carmer in 2000.



Union Cemetery – Maplewood Avenue - Existing Conditions Assessment



Cemetery Enclosure Fence and Stonework: Intersection between the North Cemetery and the Union Cemetery's enclosure walls.

Union Cemetery – Maplewood Avenue Existing Conditions Assessment



Cemetery Enclosure Fence and Stonework:

The Union Cemetery was enclosed on the street side by a wrought iron fence system supported by a low granite curb wall and six granite pillars. This high style structure measured about 90 feet in length. The main entrance was ten feet wide and its flanking pillars were surmounted by a wrought strap iron arch which in turn supported a thick slate keystone. The hammered finish, light gray granite components of this fence system were cut and shaped to be assembled without mortar and to be self-supporting. The unfinished granite pillar bases extend almost four feet below the soil line. These pillars provide most of the structure and support for the entire fence system.

Union Cemetery – Maplewood Avenue - Existing Conditions Assessment



Cemetery Enclosure Fence and Stonework:

There has been a noticeable subsidence of the sidewalk in front of the two cemeteries over the years. This change in elevation in the landscape around the Union Cemetery's front fence has caused some of the stonework to shift out of alignment especially at its western end. All of the pillars are no longer plumb and the westernmost pillar is now leaning noticeably.

Union Cemetery – Maplewood Avenue Existing Conditions Assessment



Cemetery Enclosure Fence and Stonework: Decorative corbel stones crowned each pillar. These smaller tablet stones were traditionally anchored with bronze pins. There is existing visual evidence that the horizontal joints between the tops of the pillars and the lower corbel stones were caulked with sheet lead.

Union Cemetery – Maplewood Avenue - Existing Conditions Assessment



Cemetery Enclosure Fence and Stonework: Exposed wall support masonry



Union Cemetery – Maplewood Avenue Existing Conditions Assessment



Cemetery Enclosure Fence and Stonework: Slots were cut into the sides of the pillars to support the iron fence panels. Shelves were also cut into the unfinished pillar bases to support the ends of the curb stones. The curb stones were also supported by a rubble stone footing and rough granite blocks. There are two flat landing stones in the front entrance opening that have a chamfered edge on the street side.

Union Cemetery – Maplewood Avenue Existing Conditions Assessment



Because of its size and its location on a city sidewalk, the poor condition of the stone components of this fence would make their realignment a high priority repair. The decorative wrought iron fence sections, gates and entrance arch appeared to have not been maintained for many years. The fence has rusted enough to stain the curb stones in places but overall this ironwork is intact enough to restore.

Union Cemetery – Maplewood Avenue - Existing Conditions Assessment



Granite Posts: The Union Cemetery was originally designed to contain forty individual family lots aligned on either side of a central pathway. This layout was altered as the cemetery was filled in. Some of the lots were combined and a few were subdivided. The wrought iron fences around these lots were supported by granite posts.

Union Cemetery – Maplewood Avenue - Existing Conditions Assessment



Granite Posts: These posts were intricately carved and their tops were finished with several different arched and faceted designs. Out of the 80 existing granite posts in the cemetery, nine of them have been cracked by the rust expansion or displacement of the iron fence rails. Three of these damaged stones are located in the first two family lots, (Fernald and Godfrey) beyond the front gate. The remaining six damaged posts are located at the rear of the property around the Fernald and Atkinson plots.



Union Cemetery – Maplewood Avenue - Existing Conditions Assessment



Burial Plot enclosure fence and granite posts



Union Cemetery – Maplewood Avenue - Existing Conditions Assessment



Granite Posts: Damage caused by expansion of rusted iron fence rail



Union Cemetery – Maplewood Avenue - Existing Conditions Assessment



White marble was the stone of choice in the Union Cemetery. The existing marble gravestones and monuments are for the most part in fair to good condition although all of them have suffered from the New England climate. Because it is a soft porous stone, marble has been very susceptible to Biological and environmental staining which can be observed in this cemetery.



Union Cemetery – Maplewood Avenue Existing Conditions Assessment

Granite and Marble Obelisks There are eleven marble and two granite obelisks. Most of these monuments have been installed on granite bases. They are badly weathered and stained but they have not settled or shifted.



Union Cemetery – Maplewood Avenue Existing Conditions Assessment



Granite and Marble Obelisks: Two of the obelisks have been vandalized and are missing the tops of their shafts.

Union Cemetery – Maplewood Avenue - Existing Conditions Assessment



Receiving Tomb and Retaining Wall: Based on the documents and memos that related to this freestanding tomb, its survival has been a controversial subject for many years. The stone retaining wall that defined the western end of the cemetery also supported part of this tomb. The overall failure and partial collapse of this wall also played a part in this story.

Union Cemetery – Maplewood Avenue - Existing Conditions Assessment



The actual date of this tomb's construction has also been a topic of debate but its location appeared to be an integral part of the cemetery's original design. The tomb's granite facade was immediately visible upon entering the cemetery. The original tomb was probably constructed when the cemetery was enclosed in 1844. The existing tomb measured 12 feet in length, 6 feet in height and was 10 feet wide. It is in very poor condition.

Union Cemetery – Maplewood Avenue Existing Conditions Assessment



The two surviving brick side walls are badly cracked and unstable. The rear wall of the tomb has collapsed into the pond along with its supporting stonework and several of its granite roof stones. The light gray hammered finish granite facade was composed of four large wall stones spanned by an arched pediment stone. The tomb's iron door has been gone for a long time and the doorway has been filled in with concrete block.

Union Cemetery – Maplewood Avenue - Existing Conditions Assessment



This tomb probably collapsed and was rebuilt at the beginning 20th century. The existing exterior side wall bricks and mortar are modern materials. The surviving section of the rear wall contained a mix of recycled older bricks and Portland cement based mortar. Two of the existing granite roof slabs were discolored and appeared to have been retrieved from the mill pond.

Union Cemetery – Maplewood Avenue - Existing Conditions Assessment



At some point in the mid 20th century, the entrance door opening was filled with concrete block. This block work served as an anchoring point for one end of a 13 foot long iron rod which spanned the interior. The other end of the iron rod was inserted through the rear wall and secured. This was an attempt to anchor the masonry to the rest of the tomb. The rear wall showed evidence that it had been repaired and partially rebuilt several times after that.

Union Cemetery – Maplewood Avenue - Existing Conditions Assessment



In response to the last more recent collapse of the tomb's rear wall, the Portsmouth DPW installed a section of chain link fence over the opening. This barrier has been pulled off and the tomb is being used as a shelter for homeless people. The campaign to deconstruct this tomb and create a sitting area by the river was not successful and the long term problem of vandalism and unauthorized use of the old tomb have continued to this day.

Union Cemetery – Maplewood Avenue - Existing Conditions Assessment



The stability problems of the receiving tomb can be traced to the stone wall that supported it. This mid-19th century wall also appeared to have long-term stability problems. The existing stone work measured 50 feet in length but was originally almost twice that length. Its present height averaged four feet but it must have been originally at least six feet tall.



Union Cemetery – Maplewood Avenue - Existing Conditions Assessment



This wall has shifted and settled over the years. There has been a long term problem with erosion behind this wall. There are large sections at either end of the wall that have also collapsed into the pond. The top course of stones along the entire wall has fallen into the water. This retaining wall was probably built when the Union Cemetery was opened.



Union Cemetery – Maplewood Avenue - Existing Conditions Assessment



Most of the granite boulders were drilled and split with feathers and wedges before their installation. The size and shape of the remaining drill marks indicate a mid 19th century building technology. The dry laid retaining wall at the back of the Union Cemeteries is in very poor condition and there is ongoing soil loss through this failing stonework. There is a large area behind the north western corner of the wall where the soil banking has been completely washed out.

Union Cemetery Restoration Plan and Repair Cost Estimates:

The restoration of the Union Cemetery's front enclosure fence and the partial removal of the receiving tomb are also high priority projects. After

measuring, photo documenting and numbering the front enclosure fence, the four iron fence panels, the two gates and the iron strap arch, (and the slate keystone) should be carefully removed to an offsite area where these pieces can be cleaned and conserved. This process will also require the removal of the existing lead anchoring material in the stone pillars. *It recommended that these fence components not be sand or shot blasted. They should be wire brushed and cleaned with a mild detergent. The wrought iron should then paint with diluted ferric acid, (made by the Osvo Co.)*

which will treat the surface rust. The prepared fence components should be finished with a coat of Sherwin Williams's Industrial primer, (red) and two coats of Sherwin Williams Industrial gloss black paint, (Peter Hapny-Blacksmith).

Most of this removal and reconstruction work will be completed with a small crane, a flatbed truck and a small excavator. In addition to the machine operators, two stonemasons and one laborer will be needed for the project. To safely remove the fence components the masonry crew will also need to excavate around the stone pillars to free them up. This will make their eventual realignment possible. It will also allow for the removal of the fence panels and horizontal footing stones. Basically this enclosure wall/fence was originally constructed in sequence. Based on prior experience this project will be a challenging puzzle to solve. Because of the stonework's self-supporting design, an extensive new concrete footing will not be needed. After the granite curbstones are removed and cleaned, (rust staining), a compacted crushed stone footing will be installed except where the granite footing blocks are located. These stones will be re-installed on concrete footings. The two existing concrete footing blocks will be replaced with an in kind granite piece.

After the pillar bases have been excavated, the pillars will be wrapped in quilted blankets/canvas tarps and lifted with canvas straps using the small crane. They will be realigned and reset in place as a mix of crushed stone and stone dust is compacted around the pillar bases. This is a time consuming process and each pillar will require a different strategy. The front entrance



**Union Cemetery Restoration Plan and Repair Cost Estimates:
Front Enclosure Fence Restoration Project**

Labor Costs: 160 hours - 2 masons and 1 laborer @ \$225 per hour-\$36,000.00

Machine/Trucking/Operator Costs: 13 days @ \$1600 per day-\$20,800.00

Material Costs for stonework and iron fence conservation: \$3000.00

Police Detail: 20 days @ \$360 per day-\$7200.00

Total Cost: \$64,000.00

Union Cemetery Receiving Tomb Restoration -This is another high priority project because the tomb's unstable masonry is a potential public safety hazard. Also the presence of people in the cemetery at night increases the chances of vandalism.

It is recommended that the North Cemetery's receiving tomb not be totally dismantled and removed. The highly visible granite facade of the tomb is important to the historic integrity of the cemetery. It can be seen as soon as one enters the front gate. There is a way to deal with the badly damaged tomb walls, prevent the tomb's use as gathering spot for the homeless and retain the original view shed of the cemetery. The receiving tomb's granite facade could be left in place while the rest of the tomb was dismantled. The granite roof stones could be re - used as support walls at either end of the granite facade to support the remaining stonework. The modern concrete block masonry in the doorway should also be removed. Besides two stonemasons, the project would require the use of a small excavator, a dump truck and one operator. The deteriorated brick walls could be recycled as clean fill behind the adjacent stone retaining. This would help to slow down the soil loss in this area and save on trucking costs. The granite roof stones from the tomb and the ones on the beach will be installed on compacted crushed stone footings to create two supporting wing walls behind the tomb's granite facade.

Labor Costs: Two masons @ \$150 per hour – 80 hours- \$12000.00

Machine/Operator Costs: 7 days @ \$1000 per day-\$7000.00

Material Costs: \$1500.00 Total Project Cost: \$20,500.00

**Pleasant Street Burial Ground –
Pleasant Street
Existing Conditions Assessment**

The demand for urban burial plots in mid-18th century Portsmouth induced the growing colonial city to enclose another plot of South End land in 1754; just a year after the North Cemetery was opened. This long narrow lot terminated on the North Mill Pond in an area known as Pickering's Neck.



Pleasant Street Burial Ground – Pleasant Street Existing Conditions Assessment



Pleasant Street Burial Ground Front Enclosure Wall:

The masonry walls that enclose the Point of Graves Burial Ground, the Pleasant Street Burial Ground and the North Cemetery are alike in their construction and composition. The late 19th and early 20th century photographs of the Point of Graves perimeter wall depict a tall formal masonry wall of similar design. The lime mortars used to build the Pleasant Street Burial Ground and the North Cemetery enclosure walls were very similar. A basic mortar analysis of these two mortars revealed comparable sand samples. It is possible these three walls were built during the same mid-18th century building campaign which enclosed the two recently opened graveyards and also upgraded the older burial ground's enclosure. The Pleasant Street graveyard's wall was the only one of the three enclosure walls that retained all of its original granite capstones.

Pleasant Street Burial Ground – Pleasant Street Existing Conditions Assessment



Pleasant Street Burial Ground Front Enclosure Wall:

The front entrance to this burial ground was not centered in the enclosure masonry so it was flanked by two asymmetrical walls... The existing eastern section of the wall measured 10 feet long and averaged 42 inches in height. There were two existing partially finished, 20 inch wide/8 inch thick granite capstones on this section of the wall. One stone was 6 feet long and the other was 4 feet long. The longer western section of the enclosure wall measured 30 feet in length and averaged 42 to 60 inches in height. There were five granite capstones on this leg of the enclosure wall. They ranged from 4 feet to 8 feet in length. The entrance was flanked by two hammered finish granite pillars. These vertical stones were installed as part of the enclosure walls and were also covered by the capstones.



Pleasant Street Burial Ground – Pleasant Street

Existing Conditions Assessment



Pleasant Street Burial Ground Front Enclosure Wall: The Pleasant Street Burial Ground’s enclosure walls are essentially stable and intact. These masonry walls are 259 years old. They have definitely settled and moved since their original construction. These walls lean back slightly and the concrete bulkheads were probably installed to arrest this condition.



Pleasant Street Burial Ground -Existing Conditions Assessment



Pleasant Street Burial Ground Front Enclosure Wall:

Based on the mortar samples collected from the city's oldest graveyards, there appeared to be a definite campaign during the first half of the 20th century to stabilize and repair the deteriorated tombs and walls. The installation of the concrete buttress behind the Pleasant Street Burial Ground's enclosure walls was part of this effort to shore up the aging infrastructure of the city's cemeteries and burial grounds. In addition to the installation of the concrete bulkhead, the masonry walls facing Pleasant Street were plastered with a thick layer of Portland cement based mortar and then painted with what looked like a combination of gypsum and lime whitewash. This rigid covering has developed many cracks and has lost its bonding to the old brickwork underneath

Pleasant Street Burial Ground – Existing Conditions Assessment



Pleasant Street Burial Ground Front Enclosure Wall:

The exposed brickwork above the concrete bulkhead on the rear face of the wall appeared to have been removed and completely replaced with modern brickwork. The existing overgrown cedar hedges located directly behind the enclosure walls have also contributed to the masonry's ongoing deterioration by not allowing the masonry to ever dry out.



Pleasant Street Burial Ground – Existing Conditions Assessment

Pleasant Street Burial Ground - Tombs and Gravestones: In contrast **to** the crowded landscape in the contemporary North Cemetery, this burial ground appeared to be underutilized. There are just 72 existing gravestones and tombs in this graveyard. Most of the gravestones are grouped haphazardly at the front of the long narrow lot. Most of the burials, (55) date from the mid to late 18th century and are marked by intricately carved slate gravestones.



Pleasant Street Burial Ground – Existing Conditions Assessment



Pleasant Street Burial Ground - Tombs and Gravestones: The surviving slate stones in this burial ground are in fair condition. Most of them exhibit small areas of stone loss and partial delimitation along their top edges due to weathering. Most of these stones also have small nicks and scratches along the soil line caused by the lawnmowers.

Pleasant Street Burial Ground – Existing Conditions Assessment



Pleasant Street Burial Ground - Tombs and Gravestones: The most significant existing slate stone marked the grave of Mary Manning, d.1773. This unusual stone which was crowned in part by a bas relief of the grim reaper portrayed as a complete skeleton. This stone had been badly damaged at some point in the past and only partially repaired with cement mortar.

Pleasant Street Burial Ground - Existing Conditions Assessment

Pleasant Street Burial Ground - Tombs and Gravestones: There are eight additional early 19th century marble gravestones one of which had been broken in half and glued back together in the recent past. These marble stones are badly deteriorated



Pleasant Street Burial Ground – Existing Conditions Assessment



Pleasant Street Burial Ground - Tombs and Gravestones: There are two existing hill tombs and one brownstone chest tomb in the Pleasant Street Burial Ground. The early 19th century **Barrell Chest Tomb** closely matched the design and construction of the North Cemetery chest tombs. There were a number of late 18th and early 19th century stone carving shops located near the historic brownstone quarries in southern Connecticut who custom made these tomb components. Eight hammer finished brown granite chest stones provided a solid support stone platform for the carved brownstone inscription slab.

Pleasant Street Burial Ground - Existing Conditions Assessment



Pleasant Street Burial Ground - Tombs and Gravestones: These granite blocks were originally assembled without mortar but the tomb was badly re-pointed with a modern mortar at some point. These stones have settled and shifted over the years but the tomb is still intact and stable.



Pleasant Street Burial Ground – Existing Conditions Assessment



Pleasant Street Burial Ground - Tombs and Gravestones: The moss covered brownstone slab is still in place but has been badly weathered. The original outer surface appeared to have partially delaminated and lifted off the rest of the stone. The existing marble fragment on this stone may have been the original inscription panel for this tomb. It must have been removed and broken at some point. The damaged stone was placed back in its inset pocket which is full of standing water.

Pleasant Street Burial Ground – Existing Conditions Assessment



Pleasant Street Burial Ground - Tombs and Gravestones: Buried under the roots of one of the trees that line the burial ground's eastern border are the ruins of a small granite hill tomb. The top of a brick burial vault can be viewed among the roots.



Pleasant Street Burial Ground - Existing Conditions Assessment



Pleasant Street Burial Ground - Tombs and Gravestones: The brick vault appeared to have been completely deteriorated and broken apart by the tree as it grew up alongside the tomb



Pleasant Street Burial Ground - Existing Conditions Assessment

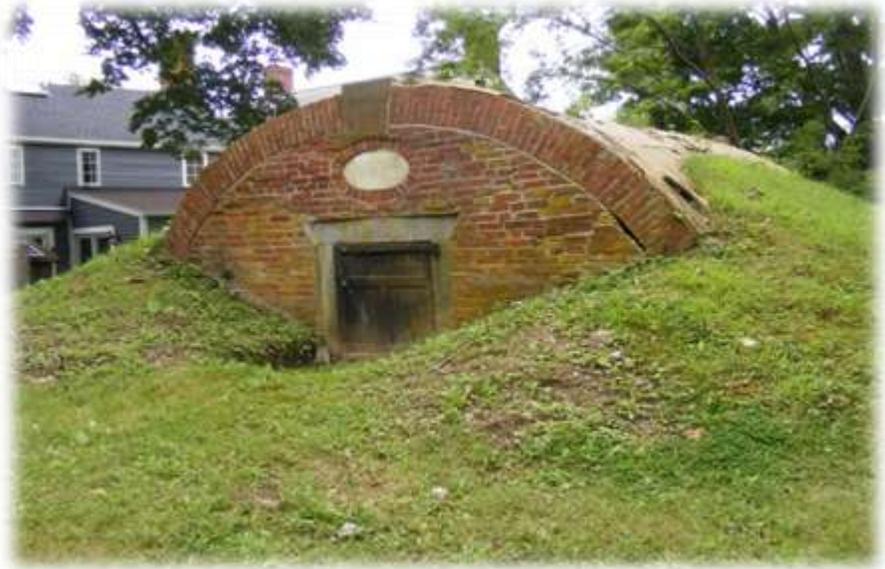


Pleasant Street Burial Ground - Tombs and Gravestones: The three hammer finished granite blocks that compose the tomb's facade have been partially buried. The original entrance door has been removed at some point in the 20th century and the doorway was filled with concrete block. The tomb is essentially a ruin

Pleasant Street Burial Ground - Tombs and Gravestones:

Located toward the rear of the burial ground, the **John Wendell Tomb d.1818** appeared to be a hill tomb that was never completely covered over.

The existing barrel vaulted tomb was also unusual because it lacked a stone facade. The existing tomb appeared to be intact and stable despite the poor condition of its exterior surface. This tomb had suffered from water infiltration for most of its existence. The brick vault had been extensively



altered and repaired over the last 75 years. The tomb's original covering of lime mortar mixed with clay has long since weathered away and was replaced with multiple layers of cement based mortars. The last covering was applied less than a decade ago. All of these repairs have failed.



**Pleasant Street
Burial Ground –
Existing
Conditions
Assessment**

**Pleasant Street
Burial Ground -
Tombs and
Gravestones:**

The vault's end walls were completely rebuilt using a mix of recycled and modern

bricks. The main entrance to the tomb has been completely reconstructed. The existing granite door frame, the old iron door, the brownstone date stone and the marble inscription stone had all been salvaged from the earlier deteriorated brick wall which is still there behind the rebuilt entrance wall. The reconstructed brickwork was not built on the tomb's original foundation. This lack of support and physical connection to the older masonry structure has allowed the newer brick wall to settle and lean away from the rest of the tomb. This gradual failure has caused a three to four inch wide gap between the back of the rebuilt wall and the tomb to open up. This has increased the already large amount of water infiltration into the tomb. The rear wall of the tomb was also dismantled and rebuilt but this wall aside from some deteriorated mortar joints appeared to be intact and stable.



Pleasant Street Burial Ground - Existing Conditions Assessment



Pleasant Street Burial Ground - Tombs and Gravestones: Wendell Tomb-Original Door and Inscription Stones



Pleasant Street Cemetery Restoration Plans and Repair Cost Estimates

Although the Wendell Tomb is in need of attention there are no other high priority projects in the Pleasant Street Cemetery. A relatively simple project that could be carried out in this graveyard would be to remove the cedar hedge behind the front enclosure wall. This would allow the back of the walls to dry out and slow down the masonry's deterioration. It would also open up the view of the cemetery from the street and possibly prevent further acts of vandalism.

The Pleasant Street Front Wall: This wall is still intact enough to delay its restoration until the North and Union Cemetery walls are restored. When that time comes it is recommended that this wall be documented and then completely dismantled. Most of the existing bricks will be too deteriorated to re-use. The Morin Brick Company manufactures red - water struck bricks that are a close visual match for the wall's old bricks. Five thousand bricks will be needed to rebuild these walls. **The cost estimate to dismantle and rebuild the Pleasant Street enclosure walls is \$57,000.00 which includes all labor and material costs. This reconstruction project would be very similar to the reconstruction of the North Cemetery front enclosure wall.**



Pleasant Street Cemetery Restoration Plans and Repair Cost Estimates

Wendell Tomb Restoration

Project: The reconstruction of the Wendell Tomb project would be a compelling project.



The initial removal of soil from the sides of this tomb should be done under the supervision of the state archaeologist. It is recommended that the existing brick front entrance wall be carefully dismantled to expose the original entrance wall behind it. Care should be taken when removing the original doorway stones, the iron door and the two inscription stones from the outer wall. These will be used to restore the tomb's end wall in its original position. The opposite end wall should be left intact and repaired. All the removed bricks should be sorted and re used if they match the tomb's original bricks. All the layers of deteriorated mortar should be carefully removed from the top of the brick burial vault. The exposed brickwork should then be cleaned and re pointed with a hydraulic lime mortar. Care should be taken during this work not to damage the structural integrity of the vault. After the exterior brickwork has been repaired and allowed to cure, the top of the vault should be covered with two coats of a mortar made from lime and Rosendale Cement. This repair mortar will be more weather resistant than a pure lime mortar but does not have as high a compressive strength as a Portland cement based mortars that were present on the vault. The plastered vault should be covered with canvas tarps and kept damp for a few weeks while it cures.

Labor Costs: 2 masons and 1 laborer @ \$225 per hour - \$45,000.00

Material Costs: 40 bags hydraulic lime at \$48 per bag, 40 bags Rosendale Cement at \$48 per bag and 15 yards masons sand @ \$65 per yard- \$4815.00

Total Labor and Material Costs - Wendell Tomb Restoration Project - \$49,815.00.

Pleasant Street Cemetery Restoration Plans and Repair Cost Estimates



Barrell Chest Tomb The restoration of this tomb is not a high priority but a smaller repair to the inscription stone could slow down its deterioration. The surviving marble inscription tablet should be reset in its original location in the stone on a bed of hydraulic lime. This will prevent rainwater from collecting on the stone. The cost estimate for this repair is \$100.00.

**Existing Conditions Assessment - Point of Graves Burial Ground
Mechanics Street Established 1671**



Existing Conditions Assessment - Point of Graves Burial Ground -

Mechanics Street: This burial ground was the earliest municipal graveyard in Portsmouth. Captain John Pickering deeded this half acre of land to the town in 1671. He retained the right to pasture his cattle there among the graves for several years after it was enclosed. The burial ground is enclosed on two sides by a masonry wall which is 306 feet long with an average height of four feet. The wall was crowned with cast concrete slabs which average about five feet in length. There are several granite slabs that cover the wall's southern corner. These stones may be remnants of an older wall. The existing wall, (above the soil line) is a 1930's Colonial Revival era reproduction of an earlier mid-18th century wall. The older wall which may partially survive under all the modern repairs was an 18th century replacement of the original 17th century enclosure. This earlier enclosure could have been a wood fence or a low dry laid stone wall.



Portsmouth Athenaeum Archives

**Existing Conditions Assessment - Point of Graves Burial Ground -
Mechanics Street:**



Portsmouth Athenaeum Archives

During our research, we found the earliest images of this wall in the Portsmouth Athenaeum archives. They dated back to the late 19th and early 20th centuries. These images depicted a badly deteriorated masonry wall crowned with granite slabs. The brick and stonework had been covered with several layers of lime plaster. The early 20th century photograph also revealed how much taller the wall was then and also disclosed a much lower surrounding road bed.

**Existing Conditions Assessment - Point of Graves Burial Ground -
Mechanics Street:**

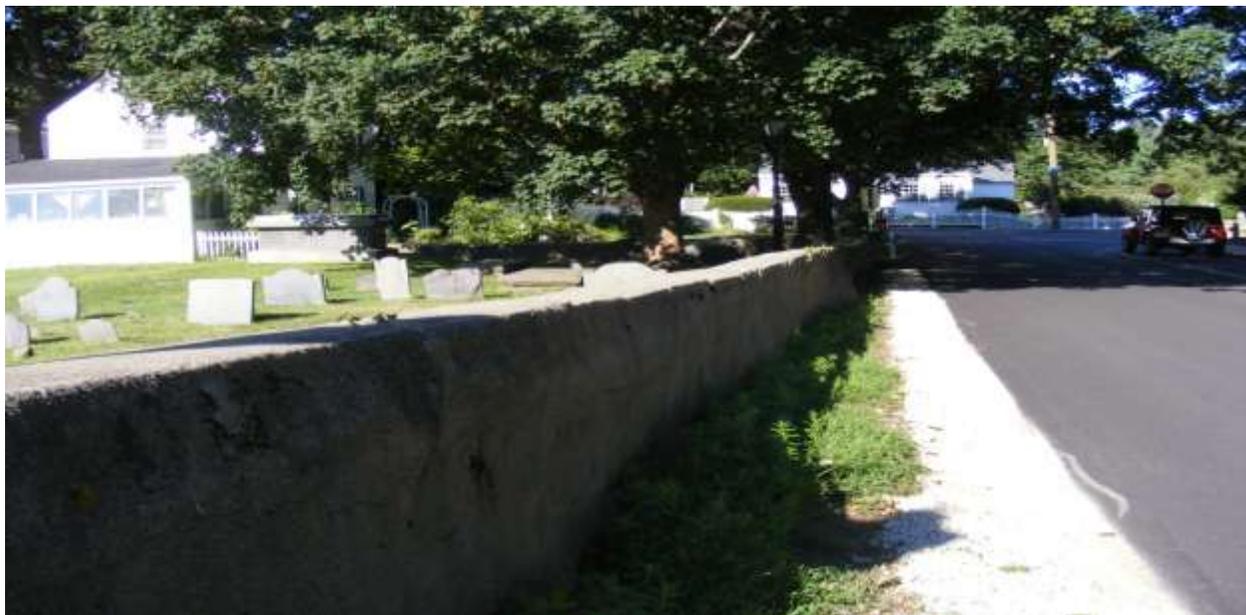


Richard Candee was able to locate a series of early 20th century paintings of the burial ground in his private collection. These paintings by the Maine artist, Russell Cheney depicted the wall completely parged over with mortar except for the cap stones. The paintings were dated 1938 and appear to illustrate the wall just after it was re-built for the second time.

Existing Conditions Assessment - Point of Graves Burial Ground - Mechanics Street:

The most recent attempt to stabilize the wall took place over twenty years ago when the entire wall was covered with a sprayed on concrete. This rigid Concrete skin developed many cracks over the years and accelerated the deterioration of the old wall by trapping moisture inside the brick and stonework. The concrete skin's interior surface has lost its bond to the exterior of the old wall. There have been more recent attempts to seal the cracked concrete skin with a pre-mix masonry cement but these repairs have also failed. The early 20th

century reconstruction of the upper wall utilized red water struck bricks and Portland cement based mortar. The existing brickwork appeared to be in very poor condition. The type of "restoration" brick used here first became popular during the Colonial Revival Era and is still produced today by the Morin brickyard in southern Maine. A basic mortar analysis revealed the existing brick mortar to be a mix of sand, lime and Portland cement, (6 parts sand to one part lime and one part Portland cement). This mix was a traditional early 20th century brick mortar recipe.



**Existing Conditions Assessment - Point of Graves Burial Ground -
Mechanics Street:**



Point of Graves Enclosure Wall: Modern Concrete Covering



**Existing Conditions Assessment - Point of Graves Burial Ground -
Mechanics Street:**



**Existing Conditions Assessment - Point of Graves Burial Ground -
Mechanics Street:**



Point of Graves Enclosure Wall

**Existing Conditions Assessment - Point of Graves Burial Ground -
Mechanics Street:**

**Existing Conditions Assessment - Point of Graves Burial Ground -
Mechanics Street:**



Point of Graves Enclosure Wall

**Existing Conditions Assessment - Point of Graves Burial Ground -
Mechanics Street:**



Point of Graves Enclosure Wall

Existing Conditions Assessment - Point of Graves Burial Ground - Mechanics Street:

Point of Graves Enclosure

Wall: The existing entrance to the burial ground was located at the center of the perimeter wall facing Prescott Park. It was created by infilling a larger earlier entrance with four mismatched granite pillars, a short section of wrought iron fence and a wrought iron turnstile. This work appeared to have been installed during the late 19th century. The smooth granite landing stones in front of the gate and the cobble stone terrace located just inside the gate appear to be modern additions to this old burial ground. The nearby granite seat also is a recent installation although the granite slab looks old. It has an interesting set of random lines cut into its surface.



Existing Conditions Assessment - Point of Graves Burial Ground -

Mechanics Street: There are 112 surviving gravestones in the Point of Graves burial ground. Many of these finely carved slate stones represent the highly refined skills of the Massachusetts based carvers who were commissioned to do the work. There are also 36 graves marked with rough fieldstones which are not inscribed. There are six early brownstone ledger tombs and one 19th century granite tomb located among the other gravestones. Ledger tombs are carved and inscribed flat stones that covered and sealed the burial enclosures... Sometimes they are raised slightly off the ground with low masonry walls.



Existing Conditions Assessment - Point of Graves Burial Ground - Mechanics Street:



Brownstone Ledger Tombs: Four of the brownstone ledger tombs sit directly on the ground. Their inscription stones which were originally inset into the top of tombs have been removed. These small tablets were probably made of marble or slate. The ledger tombs are heavily incrustated with lichen growth and one of them is missing the lower portion of its slab. All of the brownstone slabs are badly weathered and have significant surface loss.



Existing Conditions Assessment - Point of Graves Burial Ground Mechanics Street:

The two other brownstone tombs were raised off the ground by low stone walls. These masonry walls were typically built to mimic the curved shape of a shrouded human body the inscribed slab of the **Samuel Wentworth Tomb** is supported by a low rectangular wall composed of fifty small stone blocks which in turn are supported by the subsurface masonry walls of the burial enclosure. There is existing visual evidence that these stones were originally mortared in place at one time. The carved exterior features of this brownstone ledger



tomb are in better condition than the other similar tombs in the burial ground but most of its inscription has weathered away. There has been very little apparent movement of the large slab but some of its support stones have shifted out of alignment and are no longer holding up the tomb. This has also provided access for rodents to enter underneath the slab

Existing Conditions Assessment - Point of Graves Burial Ground - Mechanics Street:

The adjacent brownstone **John Dennet, (d.1700) ledger tomb**, was extensively altered in 2000. The original brownstone slab was removed and rectangular wooden form was installed. This form was used to seal the top of the burial enclosure with concrete. The old slab was then reinstalled in the wet concrete and a new inscribed polished granite slab was placed on top of the older stone. The wooden form was never removed and has almost completely deteriorated, exposing the concrete infill. The weight of the granite slab has crushed the old brownstone tomb underneath it.



Existing Conditions Assessment - Point of Graves Burial Ground -

Mechanics Street: The **Vaughn Tomb** is the most elaborate gravesite in this old burial ground. The granite and marble chest tomb, located at the southern end of the Point of Graves was a 19th century re interment of a 17th century burial. It was not unusual for 19th century families to upgrade their ancestor's gravestones or burial sites. These chest tombs had interior brick walls which provided additional support and an anchoring point for the exterior stonework... The tomb's base and wall stones were granite which is very durable while the inscription slab was a thick piece of white marble which is very vulnerable to weathering. Although the lettering is still very clear, this stone is badly cracked and is allowing water infiltration into the interior of the tomb.



Point of Graves Restoration Plan and Repair Cost Estimates:

There are no high priority repair projects at the Point of Graves Burial Ground but there are important smaller repairs to the seven tombs which should be planned and completed within the next few years.

Because of its age and its importance to New Hampshire's citizens, the restoration of this enclosure wall would be a worthy recipient of an LCHIP grant. Other grants could be found to fund its appropriate documentation under the supervision of a historic archaeologist.



There are approximately 20,000 water struck bricks in the Point of Graves perimeter wall. If any of the original 18th century brickwork still survives in the lower part of the wall, they have probably completely deteriorated due to the constant water infiltration. Most of the wall's existing bricks are modern replacements and these are also in poor condition.

The repair cost estimate to document, dismantle and rebuild the wall with the replacement of the existing concrete capstones with granite slabs is \$108,600.00. This estimate includes the in kind replacement bricks, all the other materials, (granite, sand and hydraulic lime), police detail, excavation costs and labor.

Labor Costs: 2 masons and 1 laborer @ \$225 per hour- 280 hours - \$63,000.00

Excavator/Trucking and Operator Costs: 15 days @ \$1000.00 per day - \$15,000.00

Material Costs: 20,000 red water struck bricks, (Morin Co.)-\$20,000.00, 80 bags of masonry cement-\$1600.00, 10 yards masons sand-\$1000.00, granite capstones-\$8000.00

Total Costs: \$108,600.00

Point of Graves Restoration Plan and Repair Cost Estimates:

The four brownstone ledger tombs need a fairly simple repair to slow down their deterioration. The missing inscription stones should be replaced with an appropriate material to prevent the retention of rainwater in these pockets.



The best stone to use would be brownstone which can still be found in demolition and architectural salvage yards throughout New England. There are no working brownstone quarries left in the US. I recently found a large block of Connecticut brownstone. It is a simple procedure to cut and fit pieces of thin brownstone and then install them into the inscription stone pockets using a hydraulic lime mortar, (St. Astier from Limeworks or Virginia Lime). It is important not to use a much harder stone like granite and a modern Portland cement based mortar. These materials have a higher compressive strength than the brownstone and the lime mortar and would eventually accelerate the deterioration of the tombs. The repair cost estimate to seal the inscription pockets on these four tombs is \$1800.00

The low support walls of Samuel Wentworth box tomb could be repaired without removing the brownstone slab. The small stones should be carefully removed and cleaned one corner at a time after a temporary support was set up. The stones should be re installed using a hydraulic lime mortar. This repair would stabilize and seal this tomb.



The repair cost estimate for this tomb is \$1000.00. There is not much that can be done to undo the inappropriate repairs of the John Dennet tomb except to remove the deteriorated wood from its concrete base.

Point of Graves Restoration Plan and Repair Cost Estimates:

The cracked marble inscription slab on top of the Mary Vaughn box tomb should be repaired before the ongoing water infiltration into the tomb further affects the stability of the stones. This repair should be carried out using a mortar that is compatible with the softer marble but is still resistant to weathering., Epoxy adhesives even when mixed with an aggregate to create a mortar will not work in this situation. These products will cause moisture buildup within the marble slab especially in the repaired areas and will eventually fail and also accelerate the deterioration of the stone



I have recently started to work with a hydraulic lime based proprietary mortar created by the Limeworks Company called Lithomix. This weather resistant mortar can be thickened with marble dust and then used to fill the cracks in the tomb's horizontal inscription slab. Another traditional material, water-glass, (calcium silicate) can be used to strengthen the exposed broken edges of the slab before they are re-pointed. The repair cost estimate to re point the cracked marble slab with the Lithomix mortar is \$2700.00.

The Point of Graves Burial Ground is at present a well maintained graveyard. The restoration of the enclosure wall would be a very compelling project which would certainly attract the interest of the state's LCHIP program. The smaller repairs to the tombs in this graveyard should be carried out within the next few years to ensure their long term survival

Cotton Cemetery – *South Street* - Established 1671



Cotton Cemetery – *South Street*- Existing Conditions Assessment



The Cotton Cemetery occupied a low hill at one corner of what would become the largest organized cemetery complex in the city, the Proprietors Cemetery. It was established at the same time as the Point of Graves Burial Ground, (1671).



Cotton Cemetery – *South Street*- Existing Conditions Assessment



There is no indication of what may have originally enclosed the Cotton Burial Ground. The existing stone retaining wall that enclosed the South Street side of the cemetery was probably constructed in 1831 when the adjacent Proprietors Cemetery perimeter wall was being built. The South Street section of the Cotton enclosure wall averaged about five feet in height and was constructed in a random rubble style using locally quarried ledge stone and a lime based mortar.

Cotton Cemetery – *South Street*- Existing Conditions Assessment



The wall is capped with rectangular 12 inch thick split granite slabs which averaged four to six feet in length. The 19th century stonemasons built this section of the wall near the top of the hillside. This stonework is in poor condition. The subsidence of the burial ground behind the wall has shifted the wall outward. This displacement allowed water infiltration into the wall's interior masonry which in turn deteriorated the stonework's bed mortar. Most of the stones in this wall have lost their bonding. There is a bulge in the wall near the NW corner which has shifted one of the large capstones out over the hillside. A collapse in this area would roll the capstone onto South Street. The Cotton Cemetery wall has been re pointed and repaired many times since its original construction. The repair mortars on the exterior of this wall represent at least three different types of early cements including a 19th century variant of hydraulic lime known as Rosendale cement.

Cotton Cemetery – *South Street*- Existing Conditions Assessment



Adjacent to this wall there are several interesting mid-19th century structures facing South Street. Although one of these buildings has been covered with wooden clapboards, these are all masonry structures. The wooden cladding covered a brick building which may have been a chapel or office.



Cotton Cemetery – *South Street*- Existing Conditions Assessment

The other building was a crematorium. Its facade was constructed with a mix of different sized granite blocks. The granite wall was crowned by a pediment of red water struck bricks and rusticated granite. It is unclear what material was used to roof this structure because it is now covered with a thick layer of roofing tar. There was an existing brick single flue chimney located at the back of the building. It measured five feet in height above the roofline. It was capped with a metal cover. This mid-19th century structure appeared to be intact although the condition of the roof should be investigated further. There was a significant amount of plant growth on the roof and the flashing between the two buildings has completely deteriorated. The iron door to the crematorium was in poor condition. Its strap hinges have separated from the door panel. The chimney stack was in fair condition above the roofline. Unfortunately we could not get access to the interiors of these buildings.



Cotton Cemetery – *South Street*- Existing Conditions Assessment



Beyond the two buildings are three wall tombs housed in two connected stone structure. These were the Daniel Loyd and the Leonard Cotton Tombs. Both of these men were interred in 1839. The hammered finish granite block facade was constructed on an exposed dry laid rubble wall. The granite blocks were caulked with sheet lead. The two large rectangular granite blocks that crown this facade have shifted outward slightly but this beautiful stonework is in good condition.

**Cotton Cemetery
– South Street-
Existing
Conditions
Assessment**

The third tomb is a receiving tomb which was added on to the end of the other tombs in 1854. Its matching granite facade is also

intact and in good condition. The side of this tomb was supported with a dry laid wing wall composed of large split granite blocks. Although there has been some shifting of this stonework over the years it is in good condition.



Cotton Cemetery – *South Street*- Existing Conditions Assessment

Hidden from view, there is a long section of enclosure wall that protected the northern border of the Cotton Cemetery. This wall also followed the top of the hillside and appeared to have been built section by section. About half of this wall was built at the same time as the South Street section of wall. The wall averaged five feet in height and was in good condition. It appeared to have been completely re pointed at least once.



Cotton Cemetery – *South Street*- Existing Conditions Assessment



Beyond the early 19th century part of the wall there was a long section of dry laid stonework that had almost completely collapsed and fallen down the hillside. This low stonewall may have been part of an earlier enclosure wall. At the far end of this side of the cemetery, a low modern freestanding wall was constructed composed of granite blocks and Portland cement based mortar.



Cotton Cemetery Restoration Plan and Repair Cost Estimates

The retaining wall on the South Street side of the Cotton Cemetery will need to be repaired but this project should not take place until the enclosure walls at the North and Union Cemeteries are restored.



This repair will be difficult. This retaining wall cannot be dismantled because there are burials directly behind the wall. State Laws prohibit the disturbance of any gravesite especially in an organized graveyard. The wall should be repaired in place by carefully removing all the failed repair mortars and then re pointing the wall with a mix of lime and Rosendale cement.

Labor Costs: 2 masons and 1 laborer @ \$225 - \$200 hours - \$45,000.00

Small crane w/operator @ \$800 per day - 5 days - \$4000.00

Material Costs- \$2500.00

Police Detail Cost- \$3600.00

Total Cost: \$55,100.00

The only other repair needed in the Cotton cemetery is to re -point the crematorium building's brick chimney. Hydraulic lime should be used for this repair since the existing chimney bricks are soft. The cost estimate for this repair is \$1200.00.



Existing Conditions Assessment
Restoration Plans and Repair Cost Estimates
Conclusion

The conservation of historic burial grounds and cemeteries has evolved in recent years into a mix of rediscovered traditional building practices and modern technologies.

The current trend in gravestone and monument conservation has moved beyond the use of strong epoxy based adhesives which ultimately cause more damage to the stones. Conservators at the Vatican Museums Studio for the Restoration of Marble have been experimenting with a combination of weaker adhesives and small threaded pins to restore old monuments. While the conservation of the old gravestones in Portsmouth's historic graveyards is very important, it is recommended that non reversible repairs with epoxy based adhesives be reconsidered.

The highest priority projects are the walls and fences in front of the North and Union Cemeteries. Another high priority project would be the partial removal and repair of the Union Cemetery's receiving tomb.

In conclusion I would like to thank David Moore, (Community Development Director; City of Portsmouth) and his staff for their help with this report. I would also like to thank Todd Croteau, (Portsmouth DPW), Nicole Cloutier, (Portsmouth Public Library, Special Collections), Richard Candee and Matt Reilly for their help in gathering public records and other data on the old cemeteries.

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Priority List - Portsmouth Historic Cemeteries Repair Cost Estimates

1. North Cemetery Front Enclosure Wall: \$375,000.00

The cost estimate for the reconstruction of the North Cemetery front wall which includes all labor, material, excavation, trucking and police detail costs is \$375,000.00. This project will take a crew of six about eight weeks to complete.

Phase 1: Document and dismantle wall

Labor: 2 masons, 2 laborers, 2 machine operators, (backhoe and dump truck) *Labor rates-\$75 per hour for each mason and laborer/\$125 per hour for each machine with operator -120 hours @ \$550 per hour - \$66,000.00*

Phase 2: Excavate existing wall footing, set forms and install new concrete footing just below soil and sidewalk level. Labor: Masonry crew and backhoe/dump truck operators: 40 hours @ \$550 per hour - \$22,000.00
Materials: 30 yards concrete @ \$300 per yard/form materials - \$10,000.00
Total concrete footing cost - \$32,000.00Phase

Phase 3: Rebuild stone and brickwork using photo map and other documentation. **Labor: Masonry crew and backhoe/dump truck operators - 320 hours @ \$550 per hour - \$176,000.00**

Materials: 5000 Morin water struck bricks - \$10,000.00

100 bags masonry cement/hydraulic lime - \$5000.00

75 yards masons' sand- \$4875.00

miscellaneous materials - \$1625.00

Total cost for phase 3 - \$178,875.00

Police detail for the North Cemetery wall reconstruction project: 500 hours @ \$90 per hour for two officers - \$4500.00

Total cost for the reconstruction of the North Cemetery front enclosure wall plus 25% - \$375,000.00

Priority List

Portsmouth Historic Cemeteries Repair Cost Estimates

2. Union Cemetery Front Entrance Fence and Stonework

The restoration of the Union Cemetery's front enclosure fence and the partial removal of the receiving tomb are also high priority projects.

Labor Costs: 160 hours - 2 masons and 1 laborer @ \$225 per hour-\$36,000.00

Machine/Trucking/Operator Costs: 13 days @ \$1600 per day-\$20,800.00

Material Costs for stonework and iron fence conservation: \$3000.00

Police Detail: 20 days @ \$360 per day-\$7200.00

Total Project Cost: \$64,000.00

3. Union Cemetery Receiving Tomb

Labor Costs: Two masons @ \$150 per hour – 80 hours- \$12000.00

Machine/Operator Costs: 7 days @ \$1000 per day-\$7000.00

Material Costs: \$1500.00

Total Project Cost: \$20,500.00

4. North Cemetery Tomb Repairs:

Labor costs: \$6500.00

Material costs: \$1500.00

Total Repair Cost: \$8000.00

Priority List

Portsmouth Historic Cemeteries Repair Cost Estimates

5. Pleasant Street Cemetery – Wendell Tomb Repair:

Labor Costs: 2 masons and 1 laborer @ \$225 per hour - \$45,000.00

Material Costs: 40 bags hydraulic lime at \$48 per bag, 40 bags Rosendale Cement at \$48 per bag and 15 yards masons sand @ \$65 per yard- \$4815.00

Total Project Cost: - Wendell Tomb Restoration Project - \$49,815.00.

6. Pleasant Street Cemetery Front Enclosure Wall

Labor Costs: Two masons @ \$150 per hour – 300 hours - \$36,000.00

Material Costs: \$10,000.00

Machine/Operator Costs: 11 days @ \$1000 per day - \$11,000.00

Total Project Cost: \$57,000.00

7. Pleasant Street Cemetery Barrell Chest Tomb Repair

Total Project Cost: \$100.00

Priority List

Portsmouth Historic Cemeteries Repair Cost Estimates

8. Cotton Cemetery Front Enclosure Wall Restoration

Labor Costs: 2 masons and 1 laborer @ \$225 - \$200 hours - \$45,000.00

Small crane w/operator @ \$800 per day - 5 days - \$4000.00

Material Costs- \$2500.00

Police Detail Cost- \$3600.00

Total Project Cost: \$55,100.00

9. Point of Graves Enclosure Wall Restoration

Labor Costs: 2 masons and 1 laborer @ \$225 per hour- 280 hours - \$63,000.00

Excavator/Trucking and Operator Costs: 15 days @ \$1000.00 per day - \$15,000.00

Material Costs: 20,000 red water struck bricks, (Morin Co.)- \$20,000.00, 80 bags of masonry cement-\$1600.00, 10 yards masons sand-\$1000.00, granite capstones-\$8000.00

Total Cost: \$108,600.00

Priority List

Portsmouth Historic Cemeteries Repair Cost Estimates

10. Point of Graves Tomb Repairs

Total Project Cost: \$5500.00

11. Union Cemetery Granite Pillar Repair

Total Project Cost: \$1000.00

12. Cotton Cemetery Chimney Repair

Total Project Cost: \$1200.00.