

CITY OF CHARLOTTESVILLE, VIRGINIA
CITY COUNCIL AGENDA



Agenda Date:	December 2, 2019
Action Required:	Approve Resolution
Presenter:	Jeff Werner, Preservation and Design Planner
Staff Contacts:	Alex Ikefuna, NDS Director Jeff Werner, Preservation and Design Planner
Title:	Approval for usage of Small Area Plan funding for the examination of possible burials near the Gilmer/Craven/Hotopp Cemetery at Pen Park - \$9,319

Background:

Staff is seeking City Council approval to use \$9,319 in funding previously appropriated to the Small Area Plans project to fund an initial, non-invasive archeological investigation to determine the presence of human graves outside the walls of a cemetery located at Pen Park. There are no stones or records to indicate these are burials, however a 2003 study of the cemetery completed for the City's Department of Parks and Recreation advised that the visible depressions may indicate graves of persons who had been enslaved at Pen Park. Staff recently consulted with qualified experts who visited the site and it is recommended that the City take steps to determine if these depressions are, in fact, human burials and the extent of any additional burials that may not be evident on the surface. If present, the City would take appropriate steps to keep them from being disturbed.

Discussion:

Acquired by the City several decades ago, Pen Park is 280-acre, City park featuring recreational activities including picnic shelters, a playground, tennis courts, and the 18-hole Meadowcreek Golf Course. Approximately 800-feet southeast of the course's Club House is a cemetery of three family plots that have long existed on the property. Within the three plots there are at least 30 known interments, spanning from the late-18th century to the most recent burial in 2008. At the north end, a low brick wall encloses the Gilmer plot; in the center, within a stone wall is the Craven family plot; at the south end, an iron fence borders the Hotopp family plot. (The Gilmers occupied the property, Pen Park, from 1786 to 1812. The Cravens, from 1819 to the mid-1800s. The Hotopps, from 1866 to the early 1900s.)

On August 20, 2019 staff was contacted by a member of the Gilmer family regarding the condition of the cemetery at Pen Park. Not being familiar with this site, staff researched the cemetery and found two qualified reports that suggested the possibility of slave burials outside of the family plots. (See attachments.)

On September 2, 2019 archeologists from Rivanna Archeological Services visited the site and outside the Craven section noticed six to eight depressions aligned east-west. In their professional opinion the depressions were “suspicious” and “worth determining” if they indicate human burials and, if there are graves, determining if there are others, outside the family plots, that are not apparent from the surface evidence. (Among their related work, RAS was involved in the work at Daughters of Zion Cemetery, in 2012 the examination of slave burials at UVA, and in 2016 the evaluation of a slave cemetery in Roanoke.)

Recommended Evaluation:

Using Ground Penetrating Radar (GPR), examine an initial *Area of Interest* extending on a 25 foot wide zone surrounding the north, west, and south sides of the cemetery enclosure and extending to a maximum width of 55 feet on the east side of the enclosure. This survey area will be covered as completely as vegetation and other immovable obstructions allow by close-interval (2 – 3 feet) GPR transects oriented parallel to the long axis of the cemetery. GPR data returns recorded digitally during the survey will be examined in both profile and plan view visualizations to enable the detection of GPR “anomalies” potentially consistent with expectations for the geophysical signatures of unmarked grave shafts.

Following the completion of GPR survey and data analysis, archeologist will undertake controlled, shallow excavations that will investigate two or more surface and/or GPR anomalies potentially indicative of unmarked grave shafts. The purpose of the archaeological test excavations is to provide more definitive evidence concerning the presence/absence of unmarked graves outside of the cemetery enclosure and is not intended to provide a full and accurate delineation of the overall extent of unmarked graves. Archaeological excavation will be extend only to a depth sufficient to determine the presence of grave shafts (< 12 inches) and does not intend or anticipate disturbing human remains and/or burial furniture that may be present.

If the examinations indicate burials that extend beyond the initial Area of Interest, additional discussion will be necessary to revise the scope of work and associated costs.

This process can only affirm the location of likely human burials. The grave shafts will not be disturbed nor will any human remains be disinterred. The research proposed here is in full compliance with the standards and guidelines for archaeological investigations established by the Secretary of the Interior (48 FR 44716-44742), and Section 106 of the National Historic Preservation Act (36 CFR Part 800) as well as guidelines for cultural resources surveys promoted by the Virginia Department of Historic Resources (VDHR 2011). (Note: The attached proposal fully explains the regulatory and professional protocols that will be followed.)

Furthermore, this evaluation cannot and will not determine the identity or race of any interred bodies. The available evidence strongly suggests that any graves located here are those of people once enslaved on this property. However, if graves are located, regardless of the race or identity of those interred, they are located on city-owned property and should be treated with respect and steps should be taken to prevent their disturbance.

Alignment with City Council’s Vision and Strategic Plan:

- Council’s *Vision 2025*:
 - Charlottesville cherishes and builds programming around the evolving research and interpretation of our *historic heritage and resources*.

- *City Strategic Plan:*
 - Goal 3.5: Protect historic and cultural resources.
- Additionally, from the recommendations of the BRC on Race, Memorials, & Public Spaces:
 - Highlighting and Linking Historic Places: [...] council provide financial and planning support for historic resource surveys of African American, Native American and local labor neighborhoods and sites, seeking National Register listing and zoning and design guideline protection, where appropriate.

Community Engagement:

This matter was discussed briefly by the Historic Resources Committee, but there has been no community dialogue. Furthermore, the sensitive nature of burials sites requires discretion.

Budgetary Impact:

No additional funding will need to be appropriated for this project. Funding for the recommended archeological evaluation will come from previously appropriated Capital Improvement Program funds in the Small Area Plans project.

Recommendation:

Staff recommends that Council approve the resolution authorizing the usage of \$9,319 from the Department of Neighborhood Development Services Small Area Plans fund for the initial archeological evaluation; instruct staff to coordinate and monitor that work; update Council on findings; and, should burials be confirmed, request from the Historic Resources Committee recommendations on possible next steps.

Alternatives:

Should these funds not be appropriated, there will be no confirmation that there are unmarked graves, possibly of formerly enslaved individuals, outside the established and recorded boundaries of a cemetery located on City property. Without identification and, if necessary, delineation and formal recording, any existing graves will not be protected from later disturbance.

Attachments:

1. Resolution
2. Map and photos of site
3. Excerpt from *African-American Cemeteries in Albemarle and Amherst Counties*
4. Excerpt from *Preliminary Site Evaluation, Charlottesville City Cemeteries*, study completed in 2003 by Lynette Strangstad for the Department of Parks and Recreation
5. Rivanna Archaeological Services, LLC proposal, October 28, 2019, *Ground Penetrating Radar Survey and Archaeological Ground-Truthing Excavations at the Pen Park (Gilmer-Craven-Hotopp) Cemetery Charlottesville, Virginia*

RESOLUTION

**Approval for usage of Small Area Plans funding for the examination of possible burials
near the Gilmer/Craven/Hotopp Cemetery at Pen Park
\$9,319**

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Charlottesville,
Virginia that the sum of \$9,319 be allocated from previously appropriated funds in the Small
Area Plans project for an examination of possible burials, believed to be of formerly enslaved
persons, near the Gilmer/Craven/Hotopp Cemetery at Pen Park.

Fund: 426

Project: P-00819

G/L Account: 530670

Pen Park Cemetery Examination \$9,319

Approved by Council
December 2, 2019



Kyna Thomas, CMC
Clerk of Council

Gilmer/Craven/Hotopp Cemetery, Pen Park

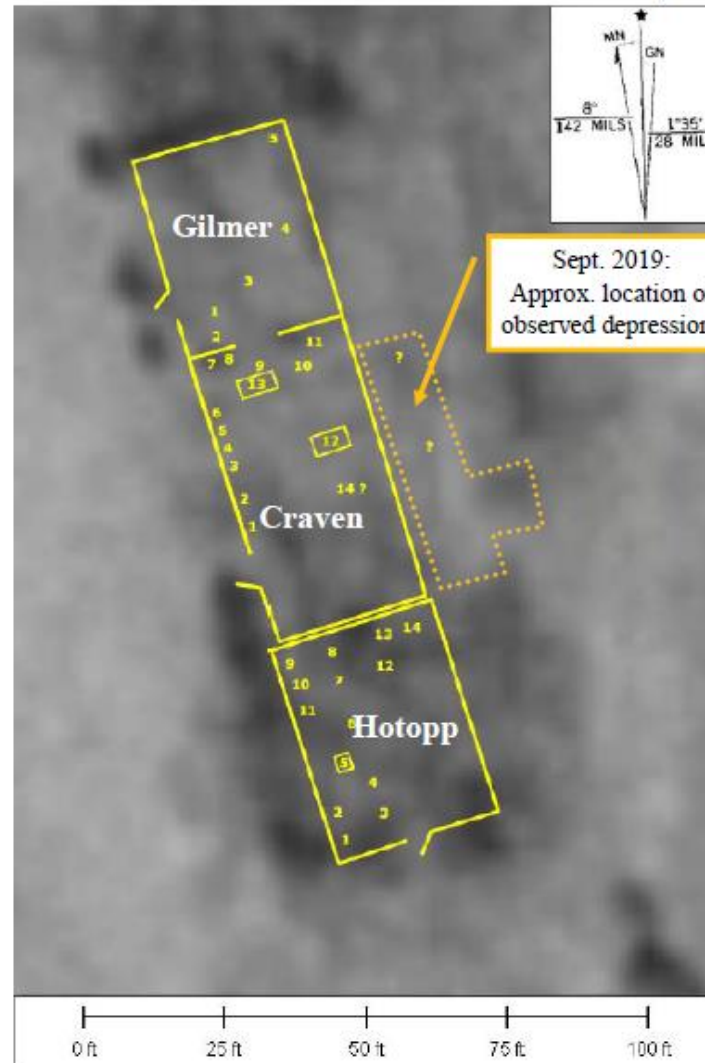


Sept. 2019: Approximate location of observed depressions—east of and outside walls of the Craven section.



Source: Bob Vernon, CVHR

Burials at Pen Park Cemetery



Gilmer Cemetery

- 1 Lucy, wife of Dr. George Gilmer; 16 May 1751-22 Apr 1800
- 2 George Gilmer, MD; 19 Jan 1742-29 Nov 1795
- 3 Mildred Gilmer Wirt; 15 Aug 1772-17 Sep 1799
- 4 Francis Walker Gilmer; 9 Oct 1790-25 Feb 1826
- 5 George Gilmer, Jr.; 7 May 1925-18 May 1991

Craven Cemetery

- 1 Sarah Ann L. Crawford; 29 Nov 1830-22 Feb 1847
- 2 William C. Crawford; 25 Jan 1845-4 Jul 1846
- 3 Dr. William S. Whitehurst; 6 Apr 1823-7 Nov 1844
- 4 Lucretia Whitehurst; d. 25 Feb 1860, aged 65
- 5 Arthur Whitehurst; d. 6 Dec 1857, aged 67
- 6 Sarah Taliaferro Lewis Craven; 26 Dec 1842-25 Jul 1843
- 7 Elizabeth N. Craven; d. 19 Dec 1819, aged 43
- 8 John Alexander Craven; 11 Feb 1839-2 Feb 1840
- 9 unreadable
- 10 Lewellyn Craven; d. 5 Jun 1825, aged 25
- 11 Mary Maria Craven; d. 20 Aug 1817, aged 1 yr 8 mo & 12 da
- 12 George W. Craven; 28 Jan 1815-10 May 1852
- 13 John H. Craven; 19 Mar 1774-7 Feb 1845
- 14 grave depression

Hotopp Cemetery

- 1 Emma F. Isemann; 26 Sep 1866-4 Apr 1913
- 2 Frederick E. Hotopp; 23 Dec 1881-18 Jan 1907
- 3 Heinrich Adolph Hotopp; 23 Dec 1875-5 Nov 1902
- 4 Emma F. C. Hotopp; 29 Aug 1842-15 Mar 1914
- 5 Wilhelm Friedrich Hotopp; 13 Dec 1832-4 May 1898
- 6 Christine A. Kamlah; 1 Jan 1801-13 Dec 1880
- 7 Agnes, dau of W. & E. Hotopp; 28 Feb 1868-21 Jan 1870
- 8 Johanna A. Hotopp; 26 Mar 1800-19 Jun 1867
- 9 Pauline Agness, dau of W.D. & A.P. Duke; 1 Jul 1906-5 Jan 1907
- 10 footstone, (no headstone?)
- 11 Wm. H. Hotopp; 14 Apr 1863-7 Jan 1927
- 12 Doris L. Hotopp; 13 Apr 1883-6 Sep 1883
- 13 E.L. & H.I. Isemann [twins?]; 11 Jan 1895-12 Jan 1895
- 14 Arthur M. Tessmann, Jr.; 29 Jul 1926-10 Aug 1926

Gilmer/Craven/Hotopp Cemetery, Pen Park

September 6, 2019 (JWerner photos)

Looking west, from outside the family plots, towards the Craven section of cemetery. Yellow lines indicate depressions observed outside of wall.



Attachment 3. Excerpt from African-American Cemeteries in Albemarle and Amherst Counties

From *African-American Cemeteries in Albemarle and Amherst Counties*:

(www2.vcdh.virginia.edu/cem/db/cemetery/details/PPK/): “The cemetery is included here because there is an oral tradition that slaves were buried outside of the ‘family plot.’ Moreover, unmarked depressions in association with periwinkle are visible along the outside edge of the metal and stone boundary. Although there is no proof that these mark the burials of enslaved individuals, several of the white families who lived here owned slaves. One ante-bellum burial practice was to bury slaves within or adjacent to white cemeteries.”

Attachment 4. Excerpt from Preliminary Site Evaluation, Charlottesville City Cemeteries

From a 2003 study completed for the City’s Department of Parks and Recreation by Lynette Strangstad: *Preliminary Site Evaluation, Charlottesville City Cemeteries*

“In Addition, numerous apparent grave depressions were noted outside the enclosures of Pen Park. Periwinkle and century plant were also found outside, underscoring the likelihood of multiple burials beyond the enclosures. It is essential that these likely slave graves be included as part of the Pen Park cemetery site.

Dowsing and/or GPR are essential here to determine how many graves are here and where they are located. Once located, graves should be mapped. When true perimeters are established, the entire area must be included as part of the cemetery and effectively set aside from the surrounding golf course. A buffer zone around the graves should be included, both to protect the graves from incursion from the recreational site and also to preserve the site as a burial site. A fence or other enclosure would help to protect this important part of Pen Park.”

Attachment 5. Rivanna Archaeological Services, LLC proposal, October 28, 2019.



Ground Penetrating Radar Survey and Archaeological Ground-Truthing Excavations at the Pen Park (Gilmer-Craven-Hotopp) Cemetery Charlottesville, Virginia

Proposal and Cost Estimate
October 28, 2019

Introduction

Rivanna Archaeological Services (RAS) is pleased to submit this proposal and cost estimate to coordinate a short program of ground penetrating radar (GPR) survey coupled with archaeological ground-truthing excavations at the Gilmer-Craven-Hotopp Family Cemetery located within Pen Park in Charlottesville, Virginia. The GPR survey will be conducted on terrain immediately surrounding all sides of the ca. 130-ft by 30-ft cemetery enclosure with a particular focus on the eastern side where surface indications suggest the presence of unmarked burials, possibly of enslaved periods, outside of the walls of the historic burial ground. The total area to be examined by GPR is approximately 12,800 square feet (0.28 acre) (**Figure 1**).



Figure 1: Aerial photograph over Pen Park showing the location of the Gilmer-Craven-Hotopp Family Cemetery and the proposed GPR survey area.

Field Research Design

Ground-Penetrating Radar Survey

The GPR survey, data processing, and analysis will be performed by NAEVA Geophysics (Charlottesville, Virginia) according to the methods, equipment, and standards detailed in their “Proposal for Geophysical Investigation” appended to this document. Briefly, GPR survey as outlined in Figure 1 will focus on a 25-ft-wide zone surrounding the north, west, and south sides of the cemetery enclosure and extending to a maximum width of 55 ft on the east side of the enclosure. This survey area will be covered as completely as vegetation and other immovable obstructions allow by close-interval (2 – 3 ft) GPR transects oriented parallel to the long axis of the cemetery. GPR data returns recorded digitally during the survey will be examined in both profile and plan view visualizations to enable the detection of GPR “anomalies” potentially consistent with expectations for the geophysical signatures of unmarked grave shafts. GPR survey requires that vegetation be mowed/cropped as low as possible at the time of survey and this proposal assumes that the City of Charlottesville will ensure that all turf and other vegetation within the proposed GPR survey area will be mowed no more than one week in advance of the GPR survey.

Archaeological Test Excavations

Following the completion of NAEVA’s GPR survey and data analysis, RAS will undertake controlled, shallow excavations that will investigate two or more surface and/or GPR anomalies potentially indicative of unmarked grave shafts. The purpose of the archaeological test excavations is to provide more definitive evidence concerning the presence/absence of unmarked graves outside of the cemetery enclosure and is not intended to provide a full and accurate delineation of the overall extent of unmarked graves. Archaeological excavation will extend only to a depth sufficient to determine the presence of grave shafts (< 12 inches) and does not intend or anticipate disturbing human remains and/or burial furniture that may be present.

Total excavation area will not exceed 50 square feet and will be comprised of two 3-ft by 8-ft excavation units oriented parallel to the long axis of the cemetery and perpendicular to the presumed prevailing, roughly east-west orientation of inhumations. Excavation will be carried out manually with shovel and trowel and will include screening of all removed soil through ¼-inch wire mesh to ensure recognition and recovery of artifacts that might be present. Excavation will extend only to the upper surface of natural, red clay subsoil—anticipated at a depth of 8 – 10 inches below existing grade—at which point the outlines of back-filled grave shafts, if present, should be recognizable based on differences in soil color, texture, and compaction.

Archaeological excavations will be manually backfilled and compacted upon completion. If grave shafts are encountered during this work, prior to backfilling RAS will cover their upper, exposed surface with permeable landscaping fabric and set temporary stakes marking these feature/s. Turf removed at the onset of excavation will be replaced as possible, however the City of Charlottesville may wish to re-sod or re-seed and straw the areas disturbed by excavation.

Protocol for the Inadvertent Discovery of Human Remains

Although grave shafts not evidenced by surface indications may well be discovered within the work area, given the shallow nature of archaeological excavation proposed in this work plan, RAS does not anticipate that human remains will be encountered or disturbed during field work.

Rivanna Archaeological Services LLC

410 E. Water Street, Suite 1100, Charlottesville VA 22902

Tel: 434-293-3108; Fax: 434-293-3183; Email: info@rivarch.com

Furthermore, it is not this project's intent to recover or to relocate human remains interred in or adjacent to the Gilmer-Craven-Hotopp Cemetery at Pen Park. Nevertheless and solely as a precaution against the unlikely event that human remains are encountered, RAS will not initiate any aspect of the cemetery delineation research design described herein until the project has successfully secured a Permit for Archaeological Excavation of Human Remains from the Virginia Department of Historic Resources. Securing this permit in advance of fieldwork ensures that the delineation work plan receives an additional layer of review and oversight while also enabling RAS staff to handle and manage inadvertently encountered human remains in the unlikely event of their discovery.

Should human remains or possible human remains be encountered during field work associated with cemetery delineation, RAS will initiate the following action plan:

- 1) Immediately halt all excavation and other work within 25 feet of the discovered remains, record the location on project maps, record the conditions and items of discovery with photographs and notes, secure all human remains and any associated artifacts within a sealed container, cover the discovery area with plastic sheeting, and mark the perimeter with barricade tape;
- 2) Similarly record, cover, and mark with barricade tape all spoil piles that may contain additional human remains;
- 3) Contact Virginia Department of Historic Resources and City of Charlottesville staff (Neighborhood Development and Parks & Recreation departments) to notify them of the unanticipated discovery of human (or potentially human) remains and to seek guidance on the temporary care of the recovered material; if so directed, contact and/or provide assistance to law enforcement personnel in further securing the location;
- 4) As directed, facilitate examination of all recovered bone by a qualified physical anthropologist and/or a State Medical Examiner;
- 5) If approved by VDHR and other project stakeholders, RAS will initiate controlled, manual cleaning and shallow excavation across the discovery area to delineate potential surviving burial features and to determine whether additional human remains are, or are likely to be, present in near-surface contexts;
- 6) In consultation with VDHR and other project stakeholders, RAS will develop, as directed, a broader work plan that more fully considers further examination of the discovery locale, the temporary treatment of human remains, and that establishes through consultation and deliberation a suitable place and process for the reinternment of inadvertently recovered human remains and associated burial artifacts.

Documentary Research

This project will draw heavily on existing historical studies of the Pen Park estate and associated Gilmer-Craven-Hotopp Family Cemetery, including research already completed by RAS staff in association with other projects. Documentary research is anticipated to concern primarily secondary sources sufficient to provide a general historical context for the cemetery. Limited research into primary sources may be conducted but will not be extensive or exhaustive.

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410 E. Water Street, Suite 1100, Charlottesville VA 22902
Tel: 434-293-3108; Fax: 434-293-3183; Email: info@rivarch.com

Laboratory Processing, Analysis, and Artifact Curation

Minimal quantities of artifacts or other objects of enduring material culture are anticipated to be collected during this project. Should marker stones or other significant funerary or memorial objects be encountered during archaeological fieldwork, every effort will be made to leave them in or return them to their original locations. Small artifacts recovered during excavation and screening of surface soils will be returned to RAS's lab in Charlottesville for cleaning, analysis, and cataloging following the completion of fieldwork.

Reporting and Project Documentation

Following completion of fieldwork, Rivanna Archaeological Services will prepare a brief technical report summarizing the history of the Pen Park plantation property, the background and objectives of the current project, and presenting its findings, conclusions, and recommendations regarding future treatment and management of the Gilmer-Craven-Hotopp Family cemetery and immediately surrounding area. The report will be illustrated, as needed, with photographs and scaled drawings. The report will be provided in both printed and bound (one copy) and digital (pdf) format. One printed and bound and one digital copy of the report will also be provided to the Virginia Department of Historic Resources for inclusion in the Department's archives. In addition, a Virginia Department of Historic Resources site form will be completed for the cemetery project using the VDHR's online V-CRIS system.

Investigation Standards and Relevant Project Experience

The research proposed here is in full compliance with the standards and guidelines for archaeological investigations established by the Secretary of the Interior (48 FR 44716-44742), and Section 106 of the National Historic Preservation Act (36 CFR Part 800) as well as guidelines for cultural resources surveys promoted by the Virginia Department of Historic Resources (VDHR 2011). One or more archaeologists meeting or exceeding the Secretary of the Interior's minimum professional requirements and with significant first-hand experience with cemetery delineation will be present at all times during all components of the field research design proposed here, including the initial stage of tree and debris clearing. Past projects undertaken by Rivanna Archaeological Services in which machine-assisted wide-area clearing of surface soils has been employed to identify human burials and delineate cemetery boundaries include the following:

As detailed in the accompanying itemized budget, RAS will coordinate GPR survey, archaeological test excavations, and reporting for a total cost, inclusive of NAEVA's work, of **\$9,319.00**.

Rivanna Archaeological Services LLC

410 E. Water Street, Suite 1100, Charlottesville VA 22902
Tel: 434-293-3108; Fax: 434-293-3183; Email: info@rivarch.com

**Ground Penetrating Radar Survey and Archaeological Ground-Truthing Excavations
at the Gilmer-Craven-Hotopp Cemetery
Pen Park, Charlottesville, Virginia
Acceptance of Proposal and Fee**

By my signature below, I accept the scope of work, work schedule, and **\$9,319.00** fee detailed herein for a Ground Penetrating Radar survey, archaeological test excavations, and associated reporting the grounds of Pen Park in Charlottesville, Virginia. I further agree that payment for these services will be made in full to Rivanna Archaeological Services, LLC within 30 days of receipt of invoice. Invoices not paid within 30 days of receipt will be assessed a late payment fee of \$250. Any legal costs and any other expenses that may be incurred by Rivanna Archaeological Services to recover payment for work performed under this agreement will be borne by City of Charlottesville.

Signature: _____

Title: _____

Date: _____



**GPR and Archaeological Investigations
Pen Park
Charlottesville, Virginia**

Cost Estimate
October 28, 2019
submitted to City of Charlottesville

Component	Task	Personnel	Hours	Rate	Cost
RAS Project Planning & Administration					
	Planning & Administration	Project Archaeologist	2	\$75.00	\$150
				<i>subtotal</i>	\$150

Background Research

	Document Acquisition & Review	Project Archaeologist	8	\$75.00	\$600
				<i>subtotal</i>	\$600

RAS Archaeological Fieldwork

	Unit Excavation (48 sq.ft.)	Project Archaeologist (1)	24	\$75.00	\$1,800
		Field Technician (2)	48	\$36.00	\$1,728
				<i>subtotal</i>	\$3,528

NAEVA Fieldwork, Data Processing, Reporting

(proposal attached)

	Travel	two-person crew	1	\$100.00	\$100
	GPR Field Survey	two-person crew	4	\$160.00	\$640
	GPR Equipment Cost		0.5-day	\$600/day	\$300
	GPR Data Processing		4	\$90.00	\$360
	Materials Charge			LS	\$40
	Reporting		2	\$80.00	\$160
				<i>subtotal</i>	\$1,600

RAS Report Preparation

	Analysis & Write-up	Project Archaeologist	40	\$75.00	\$3,000
	Graphics	GIS / Graphics Tech.	6	\$61.00	\$366
	VDHR Site Form completion	Project Archaeologist	1	\$75.00	\$75
				<i>subtotal</i>	\$3,441

Summary of Estimated Costs

RAS Planning & Coordination	\$150
Background Research	\$600
RAS Fieldwork	\$3,528
NAEVA Fieldwork, Data Processing, Reporting	\$1,600
RAS Report Preparation	\$3,441
TOTAL PROJECT COST	\$9,319

GPR
 MAGNETICS
 ELECTROMAGNETICS
 SEISMICS
 RESISTIVITY
 UTILITY LOCATION
 UXO DETECTION
 BOREHOLE CAMERA
 STAFF SUPPORT

October 24, 2019

Dr. Stephen Thompson
 Rivanna Archaeological Services, LLC
 410 E. Water Street, Suite 1100
 Charlottesville, VA 22902
 434-293-3108 (office) | 434-981-9466 (mobile)

RE: Proposal for Geophysical Investigation

Dear Dr. Thompson:

NAEVA Geophysics Inc. is pleased to submit for your review the following scope of work associated with a geophysical investigation to be conducted at Pen Park, in Charlottesville, Virginia. The purpose of the survey is to attempt to detect the presence and map the locations of historic burials in the area immediately adjacent to the marked Gilmer-Craven-Hotopp cemetery.

A ground penetrating radar (GPR) survey will be conducted in the area outlined in blue below, covering a total of approximately 0.28 acres. Closely spaced parallel transects will be surveyed across the areas to attempt to image burials in the area of interest.

VIRGINIA
 P.O. Box 7325
 Charlottesville
 Virginia 22906
 (434) 978-3187
 (434) 973-9791 Fax

NEW YORK
 225 N. Route 303, Suite 102
 Congers, New York 10920
 (845) 268-1800
 (845) 268-1802 Fax



Proposed GPR Survey Area

The aerial imagery shows the presence of vegetative canopy, precluding the use of Real Time Kinematic (RTK) GPS for data location. NAEVA will use measuring tapes, pin flags and spray paint for ground control, with fiducial marks placed in the data for local coordinates. NAEVA will mark the corners of the surveyed area, however we will not record the locations of the surveyed area using GPS or other methods.

GPR depth penetration is affected by soil type, soil moisture, and the presence of conductive fluids. In general, dry sandy soils offer the best penetration, while wet clay soil permits only very shallow penetration. Residual clay soil developed over Piedmont metamorphic rocks is typically not conducive to deep penetration of GPR signals. Detection of a burial site is dependent on contrasts between the soil and the remains or enclosure, which may be affected by the condition of the materials. Interference from cultural sources such as steel reinforced concrete, underground utilities, power lines, nearby surface metal, tree roots, etc. may degrade the GPR signal.

NAEVA will use a Sensors and Software Noggin Plus GPR system, equipped with a 250 MHz antenna. The Noggin system uses shielded antennas making it well suited for use in urban environments. Data will be stored in the electronics consoles of the instruments for later review and processing.

Below are the estimated costs for this scope of work:

Item	Rate	Cost
1 Hour Travel	\$100/hour	\$ 100.00
4 Hours labor (crew of 2)	\$160/hour	\$ 640.00
1/2 Day GPR	\$300/ half day	\$ 300.00
4 Hours Data Processing	\$90/hour	\$ 360.00
Materials Charge	LS	\$ 40.00
2 Hours Report	\$80/hour	\$ 160.00
TOTAL		\$ 1,600.00

CONSIDERATIONS

The above estimated cost is based on the information provided; assumes smooth and level ground, sparse vegetation, minimal snow cover, and easy vehicle access. Please also note the following considerations.

Investigations Using Ground Penetrating Radar (GPR)

- GPR is affected by site conditions such as the building material and moisture content, therefore, the depth of penetration and usefulness of GPR data cannot be known until our arrival on site.
- If NAEVA is awarded this contract and a subcontract with your company is required, please fax a copy of the agreement to:

Mr. John J. Breznick
NAEVA Geophysics Inc.
Post Office Box 7325
Charlottesville, Virginia 22906
(434) 978-3187 and (434) 973-9791 Fax

Please allow time for contract negotiation.

- The terms and conditions on the reverse side of purchase orders are considered contracts and sufficient time should be allowed for their negotiation.
- No purchase orders which include terms and conditions or subcontracts will be accepted after the fieldwork begins.
- Once fieldwork has commenced, no additional terms or conditions may be appended to this proposal.

Billing

- This estimate does not include stand-by time, which will be charged at the normal labor rate.
- Payment terms are net 30 days. Late payments are subject to 1.5% monthly fee.
- Unless otherwise notified, this project will be billed on a time and materials basis.

Thank you for the opportunity to submit this proposal. We look forward to working with you soon. Please call me if I may answer any questions.

Best Regards,



Mark Howard
Senior Geologist/Project Manager
NAEVA Geophysics, Inc.
Charlottesville, Virginia