SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Work covered by the Contract Documents.
2. Use of premises.
3. Work restrictions.
4. Specification formats and conventions.

B. Primary Importance:

1. Fort Owen is a Montana State Park surrounded by a ranch in private ownership. The contractor shall respect the rancher's privacy and property, coordinating use as necessary. The work hours shall be strictly enforced.
2. Fort Owen is recognized by the state and federal government as being individually listed in the National Register of Historic Places. All work shall comply with the Secretary of the Interior's Guidelines for the Preservation of Historic Properties.

a. **Preservation** is defined as the act or process of applying measures necessary to sustain the existing form, integrity, and materials of an historic property. Work, including preliminary measures to protect and stabilize the property, generally focuses upon the ongoing maintenance and repair of historic materials and features rather than extensive replacement and new construction. New exterior additions are not within the scope of this treatment; however, the limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to make properties functional is appropriate within a preservation project.
b. The grounds and structures within the site, not specifically called out for work in these documents, shall be protected from damage.
c. Excavation work shall be monitored by Montana Fish, Wildlife & Parks and an archaeologist. Digging in areas other than indicated on the drawings is forbidden. The Contractor shall be responsible for repairing any damage caused by the execution of this Contract.
d. Each employee of the Contractor and his sub-contractors shall be informed of the historic nature of Fort Owen. Any artifacts discovered in the course of the work – nails, glass, bones, wood, etc. – are valuable and are the property of the State of Montana. Any such findings shall be reported to Montana Fish, Wildlife & Parks and NOT be removed from site by other than Montana Fish, Wildlife & Parks.

3. All existing materials scheduled to remain will be protected from damage.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Identification: Fort Owen East Barracks Preservation – Phase II

1. Project Location: Fort Owen State Park; Stevensville, Montana

B. Owner: Montana Fish, Wildlife & Parks

1. Project Manager: Randi Rognlie, Project Manager
2. Park Manager: Ben Dickinson
3. Regional Park Manager: Loren Flynn

C. Architect: Gilmore Franzen Consulting LLC, 180 North Low Bench Road, Gallatin Gateway, MT 59730

D. The Work consists of the following Base Bid work:

1. At east façade:
   a. Removal of concrete apron above grade.
   b. Reconstruction of lower courses of adobe wall above grade, with face adobes furnished by MFWP.
   c. Excavation required for the above repairs and provision of a drainage pipe to a dry well away from the building.
   d. Backfill and seeding along the excavated areas.
   e. Linseed oil treatment of wood subsill at Window #101.
2. At west façade:
   a. Restructuring of two soil ramps (1:10) up to entry ramp and landing.
   b. Provision of biodegrable erosion control matting and seeding at the two soil ramps.

E. The Work potentially consists of the following Alternate Work:

1. Alternate No. 1: Room #101 - Replacement of adobe faces at lowest course of interior east wall. With Unit Price for additional adobe face replacement of course above the lowest course.
2. Alternate No. 2: Room #102 – Replacement of adobe faces at lowest course of interior east wall. With Unit Price for additional adobe face replacement of course above the lowest course.

1.3 TYPE OF CONTRACT

A. Project will be constructed under a single prime contract.

1.4 USE OF PREMISES

A. General: Contractor shall have full use of premises for construction operations, including use of Project site, during construction period. Contractor's use of premises is limited only by Owner's right to perform work or to retain other contractors on portions of Project.

B. Use of Site: Limit use of premises to areas within the boundaries of Fort Owen State Park. Do not disturb portions of Project site beyond areas in which the Work is indicated.

C. Use of Existing Building: Maintain existing building in a weathertight condition throughout construction period. Repair damage caused by construction operations. Protect building and its occupants during construction period.

D. Fort Owen State Park is open to the public for touring from 9:00 a.m. to 6:00 p.m. daily.

1. Contractor shall coordinate with Montana Fish, Wildlife & Parks to determine which days the park should be closed to visitors.
2. Contractor shall provide signage indicating closure.
3. Contractor shall protective barriers as required to protect the public from the Work.
4. The entrance gates at the road are closed between 6:00 pm and 9:00 am.
5. MFWP will have the ability to close the East Barracks for a few days to facilitate the work, at the request of the Contractor. Contractor shall provide two-week notice for such closing.

E. The construction site is adjacent to an active ranch and education center. Limit on-site equipment operation and other noise generating activities to the hours from 8:00 a.m. to 6:00 p.m. in any one construction day.

1. If Contractor wants longer hours on site, Contractor shall coordinate with MFWP, giving two weeks' notice.
2. The Contractor shall provide full-time continuous on-site management personnel for project oversight. Management personnel shall be properly trained and experienced in the position held. While scheduled work operations are being conducted by the Contractor or subcontractors, regardless of day or work hour, on-site management oversight by the Contractor shall be provided.
3. The Contractor shall be responsible for the safety of all workers and the quality of all work. The Contractor's designated on-site job foreman or supervisor shall be responsible for supervising and implementing the safety and quality control plans required by this Contract, the job foreman's staff or assigned technicians may assist.

F. The Contractor is responsible for proper storage of materials within the construction limits of the Park. Coordinate deliveries so that deliveries fit available storage area. Refer to Drawings for designated staging/storage area available to the Contractor. Final staging location shall be coordinated with and reviewed by MFWP.

G. The following conditions shall be followed during the Contractor's presence in the Park:

1. To prevent the unnatural attractants to animals, no foods, garbage, drinks, trash, or food and drink containers shall be placed outside trailers or buildings, except during actual use. Outside cooking at the construction site is prohibited.
2. Pets are prohibited.
3. Feeding of any wildlife or livestock is prohibited.

H. Preservation of Natural Features: Confine all operations to work limits of the project. Prevent damage to natural surroundings. Restore damaged areas, at no additional expense to the Owner.

I. Existing Utilities: Notify Architect/Engineer and utility companies of proposed locations and times for excavation.

1. Contractor shall be responsible for locating and preventing damage to known utilities. If damage occurs, repair utility at no additional expense to the Owner.
2. If damage occurs to an unknown utility, repair utility. An equitable adjustment will be made in accordance with Contract.
3. Do not interrupt existing utility services serving occupied buildings without the approval of the Owner's representative and utility authority. 72 hours-notice is required for any planned utility interruptions. Substitute utility service shall be provided for utility service

interruptions lasting more than four hours. To the greatest extent possible, utility service interruptions shall be limited to non-working hours.

1.5 FIELD VERIFICATION

A. Contractor to verify and document existing conditions prior to start of work or ordering products.

1.6 CONTRACTOR-FURNISHED ITEMS

A. All materials, including borrow and aggregates, shall be Contractor-furnished from outside the park, unless otherwise indicated.

1.7 OWNER'S OCCUPANCY REQUIREMENTS

A. The building will be occupied during the construction period.

B. Contractor shall provide protected entry into at least one of the building rooms for visiting public.

1.8 WORK RESTRICTIONS

A. On-Site Work Hours: Work shall be generally performed at the existing building during normal business working hours of 8:00 a.m. to 6:00 p.m., Monday through Friday, except as otherwise indicated by the Park.

1. If later stopping of work is required to address threatening weather, review with the Owner’s Project Coordinator.

B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Owner not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Owner's written permission.
3. Contractor shall be responsible for making **all** necessary repairs if any damage occurs to a “located” utility.

C. Nonsmoking Building: Smoking is not permitted within the building or within 25 feet of entrances.

D. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.

1.9 SPECIFICATION FORMATS AND CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate.

Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.

2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.

    a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

3. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 012200 - UNIT PRICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for unit prices.

1.2 DEFINITIONS

A. Unit price is a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.3 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.

B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

A. The Unit Price numbering below matches the Item # on the Bid Proposal Form.

B. Unit Price 1: Adobe face replacement at second course of interior east wall (Room #101 and #102).

1. Description: Removal of existing adobe unit and replacement with face unit in bonding pattern to match original. Adobe is furnished by MRWP; contractor is responsible for cutting and installing.
2. Unit of Measurement: One unit of adobe, whether viewed as a stretcher or header.

END OF SECTION 012200

SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes non-technical descriptions of Alternates. Refer to specific sections of the Specifications and to Drawings for technical descriptions of Alternates.

B. Coordinate related work and modify surrounding work as required to integrate Alternates into the Work.

C. Base Bid includes all work indicated, except work described as Alternates.

D. The Owner reserves the right to award none, anyone, or more in any order, or all Alternates in combination with work covered by Base Bid.

E. Alternates will not be awarded without awarding Base Bid.

F. The Owner reserves the right to determine low bid as Base Bid alone or sum of Base Bid and any combination of Alternates.

G. Each Alternate is intended to cover all work required for a complete finished job.

H. Alternates are additive to the Base Bid. Provide costs in appropriate spaces provided on Bid Form.

I. Submit bids for Base Bid and all Alternates listed on Bid Form. Failure to quote an amount, or insertion of the words "no bid," "none" or words of similar meaning, will be considered as not completing the proposal and may constitute disqualification of entire bid, at the Owner's discretion. When there is no change in base bid due to using the Alternate, use the words "No Change". The words "No Change" will be interpreted to mean that work described in the Alternate shall be completed at no adjustment or change in cost of Base Bid.

J. Base Bid and Alternates are exclusive in their scope of work. There is no overlap between or among Base Bid and Alternates. The cost of any item of work shall be included only once, in Base Bid or in Alternates.

1.2 DESCRIPTION OF ADDITIVE ALTERNATES

A. Additive Alternate 1: Room #101 – Remove non-original interior finishes to facilitate removal and replacement of adobe at lower course of east wall.

B. Additive Alternate 2: Room #102 – Remove original and non-original interior finishes to facilitate removal and replacement of adobe at lower course of east wall.

PART 2 - PRODUCTS NOT USED

PART 3 - EXECUTION NOT USED

END OF SECTION 012300

SECTION 013591 - HISTORIC TREATMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes general protection and treatment procedures for entire Project and the following specific work:

1. Historic removal and dismantling.
2. Shoring of existing wall.

1.2 DEFINITIONS

A. Consolidate: To strengthen loose or deteriorated materials in place.

B. Dismantle: To disassemble and detach items by hand from existing construction to the limits indicated, using small hand tools and small one-hand power tools, so as to protect nearby historic surfaces; and legally dispose of dismantled items off-site, unless indicated to be salvaged or reinstalled.

C. Existing to Remain: Existing items that are not to be removed or dismantled.

D. Historic: Spaces, areas, rooms, surfaces, materials, finishes, and overall appearance which are important to the successful restoration and reconstruction as determined by Architect/Engineer. All the materials being repaired in this Project are designated historic materials.

E. Match: To blend with adjacent construction and manifest no apparent difference in material type, species, cut, form, detail, color, grain, texture, or finish; as approved by Architect/Engineer. This does not discount the inherent improvements associated with new materials, provided they are not on visible surfaces.

F. Reconstruct: To remove existing item, replicate damaged or missing components, and reinstall in original position.

G. Refinish: To remove existing finishes to base material and apply new finish to match original, or as otherwise indicated.

H. Reinstall: To protect removed or dismantled item, repair and clean it as indicated for reuse, and reinstall it in original position, or where indicated.

I. Remove: Specifically for historic spaces, areas, rooms, and surfaces, the term means to detach an item from existing construction to the limits indicated, using hand tools and hand-operated power equipment, and legally dispose of it off-site, unless indicated to be salvaged or reinstalled.

J. Repair: To correct damage and defects, retaining existing materials, features, and finishes while employing as little new material as possible. Includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials.

K. Replace: To remove, duplicate, and reinstall entire item with new material. The original item is the pattern for creating duplicates unless otherwise indicated.

L. Replicate: To reproduce in exact detail, materials, and finish unless otherwise indicated.

M. Reproduce: To fabricate a new item, accurate in detail to the original, and in either the same or a similar material as the original, unless otherwise indicated.

N. Restore: To consolidate, replicate, reproduce, repair, and refinish as required to achieve the indicated results.

O. Retain: To keep existing items that are not to be removed or dismantled.

P. Reversible: New construction work, treatments, or processes that can be removed or undone in the future without damaging historic materials unless otherwise indicated.

Q. Salvage: To protect removed or dismantled items and deliver them to Owner.

R. Stabilize: To provide structural reinforcement of unsafe or deteriorated items while maintaining the essential form as it exists at present; also, to reestablish a weather-resistant enclosure.

S. Strip: To remove existing finish down to base material unless otherwise indicated.

1.3 MATERIALS OWNERSHIP

A. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, nails and hardware, glass, antiques, and other items of interest or value to Owner that may be encountered during removal and dismantling work remain Owner's property. Carefully dismantle and salvage each item or object.

B. Coordinate with Owner's architect, who will establish special procedures for dismantling and salvage.

1.4 STORAGE AND PROTECTION OF HISTORIC MATERIALS

A. Salvaged Historic Materials:

1. Clean only loose debris from salvaged historic items.
2. Pack or crate items after cleaning; cushion against damage during handling. Label contents of containers.
3. Store items in a secure area until pick-up by Owner.

B. Historic Materials for Reinstallation:

1. Repair and clean historic items as indicated and to functional condition for reuse.
2. Pack or crate items after cleaning and repairing; cushion against damage during handling. Label contents of containers.
3. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment unless otherwise indicated. Provide connections, supports, and miscellaneous materials to make item functional for use indicated.

C. Existing Historic Materials to Remain: Protect construction indicated to remain against damage and soiling from construction work.

D. Storage and Protection: When taken from their existing locations, catalog and store historic items within a weathertight enclosure where they are protected from wetting by rain, snow, condensation, or ground water, and from freezing temperatures.

1. Identify each item with a nonpermanent mark to document its original location. Indicate original locations on plans elevations, sections, or photographs by annotating the identifying marks.
2. Secure stored materials to protect from theft.

1.5 SUBMITTALS: Submit shoring plan prior to beginning foundation work, and proposed method of building protection.

PART 2 - PRODUCTS - (Not Used)

PART 3 - EXECUTION

3.1 PREPARATION

A. Provide temporary supports and protection for parts of the structure to remain. Complete dismantling that might damage new construction before starting new work.

B. Where the drawings indicate excavation along the east wall, proceed in four-foot-long portions maximum. Provide and secure wood cribbing to support wall above.

3.2 HISTORIC REMOVAL AND DISMANTLING EQUIPMENT

A. Removal Equipment: Use only hand-held tools except as follows or unless otherwise approved by Architect on a case-by-case basis. See specific Specification sections for allowable equipment.

B. Dismantling Equipment: Use manual, hand-held tools, except as follows or otherwise approved by Architect/Engineer on a case-by-case basis:

1. Hand-held power tools and cutting torches are permitted only as submitted in the historic treatment program. They must be adjustable so as to penetrate or cut only the thickness of material being removed.
2. Pry bars more than 18 inches long and hammers weighing more than 2 lb are not permitted for dismantling work.
3. No vibrating equipment that would damage the historic masonry shall be permitted.

3.3 EXAMINATION

A. Preparation for Removal and Dismantling: Examine construction to be removed or dismantled to determine best methods to safely and effectively perform removal and dismantling work. Examine adjacent work to determine what protective measures will be necessary. Make explorations, probes, and inquiries as necessary to determine condition of construction to be

removed or dismantled and location of utilities and services to remain that may be hidden by construction that is to be removed or dismantled.

1. Verify that affected utilities have been disconnected and capped.
2. Inventory and record the condition of items to be removed and dismantled for reinstallation or salvage.
3. Before removal or dismantling of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

B. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs.

3.4 PROTECTION, GENERAL

A. Ensure that supervisory personnel are on-site and on duty when historic treatment work begins and during its progress.

B. Protect persons, motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm resulting from historic treatment procedures.

1. Use only proven protection methods, appropriate to each area and surface being protected.
2. Provide barricades, barriers, and temporary directional signage to exclude public from areas where historic treatment work is being performed.
3. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during course of historic treatment work.
4. Contain dust and debris generated by removal and dismantling work and prevent it from reaching the public or adjacent surfaces.
5. Provide shoring, bracing, and supports as necessary. Do not overload structural elements.
6. Protect nearby adjacent components of the building, such as other masonry units, windows, trim, doorways, etc.
7. Protect floors and other surfaces along haul routes from damage, wear, and staining.

C. Scaffolding: Scaffolding shall not be allowed to be anchored to the masonry units of the building. If scaffolding is leaning against the building, all such contact points shall be securely isolated from the building with protective cushioning that is stable.

D. Temporary Protection of Historic Materials:

1. Protect existing historic materials with temporary protections and construction. Do not deface or remove existing materials.
2. Do not attach temporary protection to historic surfaces except as indicated as part of the historic treatment program and approved by Architect.

E. Comply with each product manufacturer's written instructions for protections and precautions. Protect against adverse effects of products and procedures on people and adjacent materials, components, and vegetation.

F. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

1. Extend cover a minimum of 24 inches down both sides of walls and hold cover securely in place.
2. See Masonry Specification sections for further protection requirements.

G. Utility and Communications Services:

1. Notify Owner, Architect, authorities having jurisdiction, and entities owning or controlling wires, conduits, pipes, and other services affected by the historic treatment work before commencing operations.
2. Disconnect and cap pipes and services as required by authorities having jurisdiction, as required for the historic treatment work.
3. Maintain existing services unless otherwise indicated; keep in service and protect against damage during operations. Provide temporary services during interruptions to existing utilities.

3.5 PROTECTION FROM FIRE

A. General: Follow:

1. Comply with NFPA 241 requirements unless otherwise indicated.
2. Remove and keep area free of combustibles including, rubbish, paper, waste, and chemicals, except to the degree necessary for the immediate work.
   a. If combustible material cannot be removed, provide fire blankets to cover such materials.
3. Prohibit smoking by all persons within Project work and staging areas.

B. Fire Extinguishers, Fire Blankets, and Rag Buckets: Maintain fire extinguishers, fire blankets, and rag buckets for disposal of rags with combustible liquids. Maintain each as suitable for the type of fire risk in each work area. Ensure that nearby personnel and the fire watch are trained in fire-extinguisher and blanket operation.

C. No flamecutting or explosives shall be permitted.

3.6 GENERAL HISTORIC TREATMENT

A. Ensure that supervisory personnel are present when historic treatment work begins and during its progress.

B. Halt the process of deterioration and stabilize conditions unless otherwise indicated. Perform work as indicated on Drawings. The following tenets have guided the preparation of the bid documents and shall be respected by the contractors:

1. Retain as much existing material as possible; existing divots and holes are to remain. Holes caused by removal of concrete patches shall be repaired.
2. Use additional material or structure to reinforce, strengthen, prop, tie, and support existing material or structure.

3. Use reversible processes wherever possible.
4. Use historically accurate repair and replacement materials and techniques unless otherwise indicated.

C. Record existing work before each procedure (preconstruction) and progress during the work with digital preconstruction documentation photographs. The photographs will be labeled with building name and keyed to the associated location on the building. Each of the following shall be documented with a minimum of three photographs before, during, and after restoration:

1. Each material type.
2. Each damage/repair type.
3. Each building elevation.

D. Notify Architect of visible changes in the integrity of material or components whether due to environmental causes including biological attack, UV degradation, freezing, or thawing; or due to structural defects including cracks, movement, or distortion.

1. Do not proceed with the work in question until directed by Architect.

E. Where missing features are indicated to be repaired or replaced, provide features whose designs are based on accurate duplications rather than on conjectural designs, subject to approval of Architect.

F. Where Work requires existing features to be removed or dismantled and reinstalled, perform these operations without damage to the material itself, to adjacent materials, or to the substrate.

G. Identify new and replacement materials and features with permanent marks hidden in the completed work to distinguish them from original materials. Record a legend of identification marks and the locations of the items on record Drawings.

3.7 HISTORIC REMOVAL AND DISMANTLING

A. General: Have removal and dismantling work performed by a qualified historic removal and dismantling specialist. Ensure that historic removal and dismantling specialist's field supervisors are present when removal and dismantling work begins and during its progress.

B. Removing and Dismantling Items on or near Historic Surfaces:

1. Do not use pry bars. Protect historic surface from contact with or damage by tools.
2. Unfasten items to be removed, in the opposite order from which they were installed.
3. Support each item as it becomes loosened to prevent stress and damage to the historic surface.
4. Dismantle anchorages.

C. Masonry Walls:

1. Remove masonry carefully and erect temporary bracing and supports as needed to prevent collapse of materials being removed.
2. Remove wall in easily managed pieces.

3. During removal, Contractor is responsible for the stability of the partially remaining wall. Notify Architect of the condition of temporary bracing for wall if work is temporarily stopped during the wall's removal.

END OF SECTION 013591

SECTION 029000 – SITE LANDSCAPING

PART 1 – GENERAL

1.1 SUMMARY

A. The work includes the following:

1. General Contractor shall provide the following:

a. Soil regrading and compacting.
b. Erosion control.
c. Seeding.
d. Initial maintenance of landscape materials.

1.2 QUALITY ASSURANCE

A. Single Source Responsibility: Subcontract landscape work to a single firm specializing in landscape work.

B. Source Quality Control: Ship landscape materials with certificates of inspection required by governing authorities. Comply with regulations applicable to landscape materials.

1. Do not make substitutions. If specified landscape material is not obtainable, submit proof of non-availability to the Architect, together with proposal for use of equivalent material.

1.3 PROJECT CONDITIONS

A. Utilities: Determine location of underground utilities and perform work in a manner which shall avoid possible damage. Hand excavate, as required. Maintain grade stakes set by others until removal is mutually agreed upon by parties concerned.

B. Excavation: When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, notify the Architect before proceeding with work.

1.4 SEQUENCING AND SCHEDULING

A. Planting Time for Work that is unrelated to the construction: The sloped soil and planting at the west side of the building, to slope to the ramp and landing, can begin as early as May 15, 2023.

B. Planting Time for Work that needs to precede the landscaping. Work by others that will precede landscape operations includes restoration of the east adobe wall and installation of the foundation drain. These other operations should be completed by August 1, 2023. Proceed with landscape work as rapidly as portions of site become available thereafter, working within seasonal limitations for each kind of landscape work required. Landscape operations shall be completed by September 30, 2023.

1. Plant or install materials during normal planting seasons for each type of plant material required.
2. Correlate planting with specified maintenance periods to provide maintenance from date of Substantial Completion.

C. Coordination with Lawns: Plant grasses after other trades have substantially completed their work on site, unless otherwise acceptable to the Landscape Architect. Protect existing grass areas and promptly repair damage to grass resulting from planting operations.

1.5 WARRANTY

A. Warranty grasses through specified grass maintenance period, and until final acceptance.

B. Remove and replace plants found to be dead or in unhealthy condition during warranty period. Make replacements during growth season following end of warranty period.

1. Another warranty inspection shall be conducted at end of extended warranty period, if any, to determine acceptance or rejection. Only one replacement (per plant) shall be required at end of warranty period, except for losses or replacements due to failure to comply with specified requirements.

2. PART 2 – PRODUCTS

2.1 TOPSOIL

A. Topsoil for landscape work is available at site from the soil removed.

2.2 SEED/GRASS MIX

A. Lolo C Forest Mix, as furnished by Westland Seed. Percentage of Seeds/sf is noted below:

1. Annual Ryegrass: 13%.
2. Mountain Brome: 4%.
3. Bluebunch Wheatgrass: 10%.
4. Rough Fescue (Sub Idaho): 9%.
5. Idaho Fescue: 19%.
6. Slender Wheatgrass: 11%.
7. Prairie Junegrass: 33%.

2.3 BIODEGRADABLE EROSION CONTROL MATTING

A. Characteristics:

1. Biodegradable coir or straw matting for stabilization of low slope.
2. Neutral pH. Excellent moisture retention, weed free.
3. ASTM D4594 for elongation at failure and tensile strength.

4. Duration 6 months minimum.

B. Acceptable products are not limited to the following:

1. Ecomatting 40 by EcoDepot.
2. Erosion Control Blanket by ACF Environmental.
3. Erosion Control Matt Coir Mat 40 by One Clarion.
4. Straw Erosion Control Blanket by One Clarion.

2.4 MISCELLANEOUS LANDSCAPE MATERIALS

A. Gravel: Provide water-worn, hard, durable gravel, washed free of loam, sand, clay, and other foreign substances, and of following size range and color:

B. Size Range: 2½ inches maximum, ½ inch minimum.

3. PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions under which the work is to be installed, and notify MFWP in writing of any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 PREPARATION OF PLANTING SOIL

A. At ramped soil areas, hand tamp the soil – and additional soil as required for slope, height, and stability – until the slope is stable and ready for seed.

B. Before mixing, clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful or toxic to plant growth.

C. For pit and trench type backfill, mix planting soil prior to backfilling, and stockpile at site.

3.3 MAINTENANCE

A. Begin maintenance immediately after planting.

B. Maintain grasses until final acceptance, but in no case, less than the following period: 60 days after substantial completion of planting.

C. Maintain grasses by weeding and watering as required for healthy growth.

D. Maintain grasses by watering, mowing, trimming, and other operations such as rolling, re-grading, and replanting as required to establish a smooth, acceptable grassy area, free of eroded or bare areas.

E. Contractor shall provide maintenance as described above for the period of 6/1/2023 through 9/30/2023.

3.4 CLEAN-UP AND PROTECTION

A. During landscape work, keep work area in an orderly condition.

B. Protect landscape work and materials from damage due to landscape operations, operations by other contractors and trades, and trespassers. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged landscape work as directed.

3.5 INSPECTION AND ACCEPTANCE

A. When landscape work is completed, including maintenance, the Architect will, upon request, make an inspection to determine acceptability.

B. Landscape work may be inspected for acceptance in portions as agreeable to the Architect, provided each portion of work offered for inspection is complete, including maintenance.

C. When inspected landscape work does not comply with requirements, replace rejected work and continue specified maintenance until re-inspected by the Architect and found to be acceptable. Remove rejected materials promptly from the Project site.

END OF SECTION 029000

SECTION 040150 – ADOBE REPOINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings of the Contract apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Repointing and pointing of adobe.

B. Related Sections: Section 045000 “Adobe Repair.”

1.3 ALTERNATE PRICES

A. Additive Alternate 1: Room #101 – Remove non-original interior finishes to facilitate removal and replacement of adobe at lower course of east wall.

B. Additive Alternate 2: Room #102 – Remove original and non-original interior finishes to facilitate removal and replacement of adobe at lower course of east wall.

1.4 UNIT PRICES

Work of this Section is affected by unit prices specified in Section 012200 "Unit Prices."

1. Unit prices apply to authorized work covered by estimated quantities.
2. Unit prices apply to additions to and deletions from Work as authorized by Change Orders.

1.5 DEFINITIONS

A. Adobe: Clay-based unbaked masonry unit.

B. Rebuilding (Setting) Mortar: Mortar used to set and anchor masonry in a structure, distinct from pointing mortar installed after masonry is set in place.

1.6 SEQUENCING

A. See Section 045000 “Adobe Repair” for sequencing of work.

1.7 QUALITY ASSURANCE

A. Contractor shall provide skilled labor in accordance with the requirements stated in Section 045000 “Adobe Repair.”

B. Adobe Mortar Testing:

1. Compressive Strength: Contractor shall cast 2" mortar cubes from mortar trial mixtures for testing to verify strength. Test specimens shall be sun-dried and ambient-cured for seven (7) days prior to testing.

C. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for materials and execution.

1. Repointing of adobe:
   a. 24 lineal inches of joint preparation.
   b. 24 lineal inches of pointing.

2. Protect accepted mockups from the elements with weather-resistant membrane.
3. Approval of mockups is for color, texture, and quality of repointing; and aesthetic qualities of workmanship.

   a. Approval of mockups is also for other material and construction qualities specifically approved by Architect in writing.
   b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

B. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

C. Store hydrated lime in manufacturer's original and unopened containers. Discard lime if containers have been damaged or have been opened for more than two days.

D. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.9 FIELD CONDITIONS

A. Protection of Masonry: During construction, cover partially completed masonry when construction is not in progress.

B. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.

1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.

2. Protect sills, ledges, and projections from mortar droppings.
3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

C. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.

D. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

2.2 ADOBE MORTAR MATERIALS

A. Same as adobe mix, with modifications noted below. Referred to as “mud mortar.”

B. Sand:
1. From Yoder Gravel. If sand is sourced from a location other than Yoder Gravel, contractor shall be responsible for having the proposed sand checked for mineralogy and particle shape.
2. As per testing, major constituents shall be as follows, in approximate order of decreasing abundance:
   a. Quartz
   b. Feldspars (plagioclase and potassium feldspars in approximately equal amounts)
   c. Micas (biotite, chlorite, and white mica)
   d. Iron oxides/hydroxides
   e. Amphibole and tourmaline
3. Sand particles shall be predominantly angular and of a geologically young source.
4. Maximum size of 1.5mm, with an estimated 90-95% of particles passing No.16 US standard sieve.
5. Blend several sands as necessary to achieve suitable match.

C. Hydrated Lime: ASTM C207 Type SA. Bondcrete by Graymont.

D. Water: Potable.

E. Mix:
1. Clay: 2 parts.
2. Sand: 2 parts, with potential for another part during mixing
3. Base soil: 2 parts.
4. Straw: 1 part.
5. Cow Manure: 1 part.
6. Ash: ½ part.
7. Potable water.
8. No other additives.
9. Compressive strength: no more than 300 psi.
10. Moisture content: no more than 15% at the time of installation.
11. The actual quantities of the above should be determined in the field by evaluating the plasticity or workability that can be achieved by combining the clay with incremental amounts of water and grit.

2.3 DRY-PACK MORTAR

A. As recommended by Cornerstones:

1. Dry dirt (with clay content) that has been screened.
2. Do not use sand.
3. Add screened dry dirt to the normal wet mortar mix until the wet mortar mix feels almost completely dry to the touch.
4. The resulting mix will hold its shape when a handful of it is squeezed together. The moisture content will be about 5%.

B. Dry-packing allows repairs to occur with a minimal amount of shrinkage.

C. Dry-pack mortar: dry dirt that has been screened. Do not use sand. Add the screened dry dirt to the normal, wet mortar mis until the wet mortar mix feels almost completely dry to the touch, i.e., the resulting mix will hold it s shape when a handful of it is squeezed together (moisture content of about 5%).

D. Always moisten all surfaces before dry-packing to create good adhesion.

E. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C 979/C 979M. Use only pigments with a record of satisfactory performance in masonry mortar.

F. Aggregate for Mortar: ASTM C 144.

1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
3. White-Mortar Aggregates: Natural white sand or crushed white stone.
4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

G. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.

H. Water: Potable.

2.4 MORTAR MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated. See Repointing specification for mortar for face brick.

B. Mortar for Adobe: Same mix as for the adobe units. See Specification Section 045000.

PART 3 - EXECUTION

3.1 REPAIR SPECIALIST

A. Historic Masonry Repair Specialist: Firm to have at least five years of experience in similar scope and size project on buildings listed in the National Register of Historic Places. Firm shall submit Qualifications Form S0045X as part of the bid package.

3.2 INSTALLATION, GENERAL

A. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.

B. Wetting of Masonry Unit: Wet unit before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested according to ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.

3.3 TOLERANCES

A. Dimensions and Locations of Elements:

1. Match existing tolerances. The wall is not intended to be straight and true like new.

B. Lines and Levels:

1. Match existing tolerances. The wall is not intended to be straight and true like new.

C. Joints:

1. Match existing joint widths.
2. The joint widths of the adobe vary from 1” – 1¾”.

3.4 REPOINTING ADOBE

A. Raking shall be performed by hand methods. Power tools are not allowed.

B. Rake out and repoint joints to the following extent:

1. All joints in areas indicated.
2. Joints with the following defects:

    a. Holes and missing mortar.
    b. Cracks that can be penetrated 1/4 inch or more by a knife blade 0.027 inch thick.
    c. Cracks 1/8 inch or more in width and of any depth.
    d. Hollow-sounding joints when tapped by metal object.
    e. Eroded surfaces 1/4 inch or more deep.
    f. Deterioration to point that mortar can be easily removed by hand, without tools.
    g. Joints filled with substances other than mortar.

C. Do not rake out and repoint joints where not required.

D. Rake out joints as follows, according to procedures demonstrated in approved mockup:

1. Use small-headed chisel no wider than half the width of the joint to remove the loose mortar, using a rubber hammer to drive the chisel.
2. Remove mortar from joints to depth of 2-1/2 times joint width, but not less than 3/4 inch or not less than that required to expose sound, unweathered mortar. At some joints, this will be as deep as 4”-5”.
3. Remove mortar from adobe surfaces within raked-out joints to provide reveals with square backs and to expose adobe for contact with pointing mortar. Brush, vacuum, or flush joints to remove dirt and loose debris.
4. Do not spall edges of adobes or widen joints. Replace or patch damaged adobes as directed by Architect.

E. Notify Architect of unforeseen detrimental conditions including voids in mortar joints, cracks, loose stone, rotted wood, rusted metal, and other deteriorated items.

F. Pointing with Mortar:

1. Rinse joint surfaces with water to remove dust and mortar particles. Time rinsing application so, at time of pointing, joint surfaces are damp but free of standing water. If rinse water dries, dampen joint surfaces before pointing.
2. Apply pointing mortar first to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8 inch until a uniform depth is formed. Fully compact each layer and allow it to become thumbprint hard before applying next layer.
3. After deep areas have been filled to same depth as remaining joints, point joints by placing mortar in layers not greater than 3/8 inch. Fully compact each layer and allow to become thumbprint hard before applying next layer. Where existing stone has worn or rounded edges, slightly recess finished mortar surface below face of stone to avoid widened joint faces. Take care not to spread mortar beyond joint edges onto exposed stone surfaces or to featheredge the mortar.
4. When mortar is thumbprint hard, tool joints to match original appearance of joints as demonstrated in approved mockup. Remove excess mortar from edge of joint by brushing.
5. Cure mortar by maintaining in thoroughly damp condition for at least 72 consecutive hours, including weekends and holidays.

6. Hairline cracking within mortar or mortar separation at edge of a joint is unacceptable. Completely remove such mortar and repoint.

G. After mortar has fully hardened, thoroughly clean exposed stone surfaces of excess mortar and foreign matter; use wood scrapers, stiff-nylon or -fiber brushes, and clean water, applied by low-pressure spray.

1. Do not use metal scrapers or brushes.
2. Do not use acidic or alkaline cleaners.

3.5 MORTAR BEDDING AND JOINTING

A. Lay adobe with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

3.6 REPAIRING, POINTING, AND CLEANING

A. See other Sections for specific repairs of adobe.

B. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

C. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

D. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

E. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.

3.7 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Montana Fish Wildlife and Parks' property. At completion of unit masonry work, package for removal from Project site, or for storage in Room #104. Coordinate with MFWP.

B. Waste Disposal: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and legally dispose of off Owner's property.

END OF SECTION 040150

SECTION 045000 – ADOBE REPAIR

PART 1 - GENERAL

1.1 SUMMARY

A. Description: The East Barracks has one remaining wall of original adobe remaining – the east elevation. The adobe at the south, west, and north walls was replaced with a similar size concrete masonry unit c. 1948. The concrete block shall remain; repairs are included herein.

B. Definitions:

1. Adobe: Sun-dried, earthen brick.
2. Apron: Concrete poured up next to the base of an eroded historic adobe wall. Also called a collar or contra pared.

C. This Section includes the following Base Bid work:

1. Rebuilding adobe, including replacing partial units.
2. **Adobe are being furnished by MFWP**. The contractor is responsible only for cutting to fit and installing the adobe faces.

D. Related Sections:

1. Section 029000 “Site Landscaping.”
2. Section 040150 “Repointing.”

1.2 ALTERNATE PRICES

A. Additive Alternate 1: Room #101 – Remove non-original interior finishes to facilitate removal and replacement of adobe at lower course of east wall.

B. Additive Alternate 2: Room #102 – Remove original and non-original interior finishes to facilitate removal and replacement of adobe at lower course of east wall.

C. See Alternate Section 012300 for further information.

1.3 UNIT PRICES

Work of this Section is affected by unit prices specified in Section 012200 "Unit Prices."

1. Unit prices apply to authorized work covered by estimated quantities.
2. Unit prices apply to additions to and deletions from Work as authorized by Change Orders.

1.4 DEFINITIONS

A. Low-Pressure Spray: 100 to 400 psi at 4 to 6 gpm

B. As scaffolding is removed, patch anchor holes used to attach scaffolding. NOTE: anchoring into existing walls is NOT allowed. Patch holes in masonry units according to "Masonry Unit Patching" Article.

1.5 SEQUENCING AND SCHEDULING

A. Work Sequence: Perform adobe rebuilding work in the following sequence, which includes work specified in this and other Sections:

1. Coordinate with archaeological consultant.
2. Excavate along length of east wall as shown on drawings.
3. Rebuild lower courses of exterior wall with adobe faces. MFWP is furnishing the adobe for the contractor to cut and install.
4. Apply bentoseal to irregular faces of foundation wall. Provide gravel bed and install drain pipe to dry well. Backfill and seed soil.
5. Provide subsill at window #101. Pre-treat with FPL linseed oil finish.
6. Rebuild base of interior adobe walls per Alternate No. 1 and No. 2.

B. The sequence listed above is intended to allow time for the setting of the adobe, east wall foundation work, and protecting the concrete foundation wall without being subjected to rain. The Contractor may propose a different sequence for review and approval by MFWP and the architect.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Include recommendations for product application and use. Include test data substantiating that products comply with requirements.

B. Samples for Verification: For the following:

1. Each type of adobe unit to be used for replacing existing units. Include sets of Samples to show the full range of shape, color, and texture to be expected. For each brick type, provide straps or panels containing at least four bricks. Include multiple straps for brick with a wide range.
2. Accessories: Each type of accessory and miscellaneous support.

1.7 QUALITY ASSURANCE

A. Historic Masonry Specialist Qualifications: Engage an experienced masonry repair firm to perform work of this Section. Firm shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance. Experience in only installing masonry is insufficient experience for masonry repair work. Contractor shall provide documentation of these qualifications on the S0045X form submitted with the Proposal.

1. Field Supervision: Adobe repair specialist firm shall maintain experienced full-time supervisors on Project site during times that brick masonry repair work is in progress.

2. Adobe Repair Worker Qualifications: When masonry units are being patched, assign at least one worker per crew who is trained and qualified.

B. Mockups: Prepare mockups of adobe repair to demonstrate aesthetic effects and to set quality standards for materials and execution and for fabrication and installation.

1. Adobe Repair: Prepare sample areas for each type of masonry repair work performed. If not otherwise indicated, size each mockup not smaller than two adjacent whole units or approximately 24 inches in least dimension. Construct sample areas in locations in existing walls where directed by Architect unless otherwise indicated. Demonstrate quality of materials, workmanship, and blending with existing work. Include the following as a minimum:

a. Replacement: Two stretcher (half-depth or less) adobe units replaced.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

C. Adobe Testing:

1. Compressive Strength: Contractor shall cast 2” mortar cubes from mortar trial mixtures for testing to verify strength. Test specimens shall be sun-dried and ambient-cured for seven (7) days prior to testing.
2. Moisture:
   a. Moisture content shall be measured in accordance with ASTM D 2216. Specimens are dried to constant weight in an oven at 230 degrees F. Constant weight is typically achieved after 24 hours.
   b. Moisture content % = [(initial weight – dry weight)/ Dry weight] x 100.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver masonry units to Project site strapped together in suitable packs or pallets or in heavy-duty cartons and protected against impact and chipping.

B. Deliver packaged materials to Project site in manufacturer's original and unopened containers, labeled with manufacturer's name and type of products.

C. Store adobe materials on elevated platforms, under cover, and in a dry location.

D. Store hydrated lime in manufacturer's original and unopened containers. Discard lime if containers have been damaged or have been opened for more than two days.

E. Store sand where grading and other required characteristics can be maintained and contamination avoided.

F. Handle masonry units to prevent overstressing, chipping, defacement, and other damage.

1.9 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit brick masonry repair work to be performed according to product manufacturers' written instructions and specified requirements.

B. Temperature Limits, General: Repair masonry units only when air temperature is between 40 and 90 deg F and is predicted to remain so for at least seven days after completion of the Work unless otherwise indicated.

C. Cold-Weather Requirements: Comply with the following procedures for masonry repair unless otherwise indicated:

1. When air temperature is below 40 deg F, heat mortar ingredients, masonry repair materials, and existing masonry walls to produce temperatures between 40 and 120 deg F.
2. When mean daily air temperature is below 40 deg F, provide enclosure and heat to maintain temperatures above 32 deg F within the enclosure for seven days after repair.

D. Hot-Weather Requirements: Protect masonry repairs when temperature and humidity conditions produce excessive evaporation of water from mortar and repair materials. Provide artificial shade and wind breaks, and use cooled materials as required to minimize evaporation. Do not apply mortar to substrates with temperatures of 90 deg F and above unless otherwise indicated.

E. For manufactured repair materials, perform work within the environmental limits set by each manufacturer.

1.10 ARCHAEOLOGICAL COORDINATION

A. To expose the east foundation wall, the Contractor shall carefully hand dig with trowels and shovels. Discovery of artifacts shall be brought to the attention of MFWP who will contact the archaeological consultant that they have engaged.

B. Montana Fish Wildlife and Parks engaged an archaeological consultant to dig test pits at the base of the east wall of the East Barracks. These test pits have been retained, protected with plywood cover, and are available for Bidders to uncover and view during the pre-bid meeting. The archaeological consultant will be available to monitor the Contractor’s digging.

C. This archaeological monitoring will include screening a representative sample of removed material.

D. Information from previous archaeological investigations at Fort Owen will guide the archaeological consultant’s current work. If few artifacts are found other than building materials (glass and nails), this will be the extent of testing work. However, if an abundance (over 5-10) of diagnostic artifacts (ceramics, beads, buttons, pipe fragments, other personal items) are found, or if the unit includes features, the unit may be expanded 50 cm in whichever direction is indicated by the finds. Decisions to expand the excavations will occur in consultation with the Heritage Program Manager and will be based on previous work at Fort Owen and the consultant’s archaeological expertise.

E. The Contractor shall be prepared to stop work upon the discovery of diagnostic artifacts. The Contractor shall also be prepared to call to the archaeological consultant's attention the discover of diagnostic artifacts.

F. The archaeological consultant's monitors need not remain on-site for the entirety of the construction work, just for initial ground disturbance. Re-filling around the rebuilt foundation wall, for example, can occur without a monitor present.

G. The archaeological consultant's monitoring days will not occur concurrently. It is assumed that the construction Contractor will first excavate a small portion of the wall to evaluate the conditions of the wall below grade, then return to excavate the remainder and undertake repairs approximately 1-2 months later.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Source Limitations: Obtain each type of material for repairing adobe (adobe, clay, lime putty, sand, etc.) from single source with resources to provide materials of consistent quality in appearance and physical properties.

2.2 ADOBE MATERIALS AND MORTAR

A. Adobe: Furnished by MFWP.

1. Half and full units are available for use. Contractor is responsible for cutting to fit.
2. Units include date stamps. Contractor shall cut adobe so that date stamp will be visible at one of the unexposed faces.

B. Mortar: See Specification Section 040150 - Repointing.

C. Adobe Repair Materials: See Specification Section 040150 – Repointing.

2.3 ACCESSORY MATERIALS

A. Setting Buttons and Shims: Resilient plastic, nonstaining to masonry, sized to suit joint thicknesses and bed depths of masonry units, less the required depth of pointing materials unless removed before pointing.

2.4 APRON REMOVAL

A. Bentonamit, the non-explosive cracking agent.

2.5 FOUNDATION WATERPROOFING

A. Bentoseal Trowel-Grade Sodium Bentonite Sealant.

B. Sand stop: Nonwoven geotextile fabric.

2.6 THROUGH-WALL FLASHING

A. Total Flash by Mortar Net Solutions, at 12" height with built-in metal drip edge.

1. Drip edge: Type 304 stainless steel, 28 gauge., with 3/8" hemmed edge.
2. Built-in termination bar of Type 304 stainless steel, 1¼" wide, 16 gauge, with ¼" lip.
3. EPDM membrane.

2.7 JOINT SEALANT

A. Multicomponent, Nonsag, Two-Part Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25, for Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:

a. BASF Building Systems; Sonolastic NP 2.
b. Bostik, Inc.; Chem-Calk 500.
c. May National Associates, Inc.; Bondaflex PUR 2 NS.
d. Pecora Corporation; Dynatred.
e. Sika Corporation, Construction Products Division.
f. Tremco Incorporated; Vulkem 227.

PART 3 - EXECUTION

3.1 REPAIR SPECIALIST

A. Historic Masonry Repair Specialist: Firm to have at least five years of experience in similar scope and size project on buildings listed in the National Register of Historic Places. Firm shall submit Qualifications Form S0045X as part of the bid package.

3.2 PROTECTION

A. Prevent mortar from staining face of surrounding masonry and other surfaces.

1. Cover sills, ledges, and other projecting items to protect them from mortar droppings.
2. Keep wall area wet below rebuilding and repair work to discourage mortar from adhering.
3. Immediately remove mortar splatters in contact with exposed masonry and other surfaces.

3.3 CONCRETE APRON REMOVAL

A. General: Concrete apron removal method is at the discretion of the Contractor. It shall cause no harm to the existing adobe. Two methods are provided below as options. Contractor may make use of both methods. Contractor is free to propose another method.

1. Whichever method is selected, Contractor shall prepare a small-scale on-site mock-up to demonstrate its efficacy and lack of harm to the existing historic adobe wall. The mock-up may be performed on the same day that the removal work progresses. Mock-up shall demonstrate the method's efficacy and lack of harm to the existing historic adobe wall. Contractor shall be responsible for scheduling the mock-up and subsequent work.
2. Tools that **vibrate or cause movement** in the adjacent adobe wall are NOT allowed. Contractor may demonstrate that certain removal tools can be effectual and non-harmful. Small vibrations will be preferable to large concussive ones.

3. The existing concrete apron installed next to eroded adobe is exacerbating the moisture problem. The crack along the top of this concrete apron, which was allowing water to penetrate the wall, has been temporarily sealed with adobe mortar. Moisture at the inside face of the adobe is apparent and damaging the adobe.
4. Before removing the apron, remove the delaminating concrete along the top of the apron. This will provide for a horizontal surface of concrete to work with per the instructions below.
5. CAVEAT: If archaeological remains or artifacts are exposed during the excavation process, stop work and call Montana Fish, Wildlife & Parks immediately.

B. Concrete Removal Method Option One: Use of expansive Calcium Oxide-based Material. Cornerstones Community Partnerships provides the following method for the concrete apron removal (see *Adobe Conservation: A Preservation Handbook*, Sunstone Press, 2006, pages 95-98).
1. Process: as water is added to Betonamit (calcium oxide), the material swells and splits the concrete, allowing it to be removed in sections.
2. Before starting this procedure, call Cornerstones at (505) 982-9521.
3. Beginning near the outside corner, define the four-foot long section to be removed.
4. Excavate a six-foot long trench to depth below the section of concrete apron.
5. Always shim underneath the concrete to prevent it from shearing off the wall and collapsing into the trench.
6. To avoid the possibility of the wall's collapsing, dig the trenches in alternate sections with a minimum of four feet between each section.
7. Remove the concrete via one of these three methods, noting that cracks are weak areas ideal for drilling:
    a. Option 1:
        1) Drill holes, at a slight downward angle, 12" on center, down the vertical face of the wall where you want it to break.
        2) If the section is small enough, break it completely away from the wall using a wood block for torque and a small sledge hammer an chisel. Then break it into smaller chunks and remove.
    b. Option 2: Using a hammer drill, drill 1" – 1½" diameter holes 12" deep along the center of the top of the four-foot section.
    c. Option 3: Drill holes at a 45 degree downward angle 12"-16" on center all the way across the four-foot vertical face of the section.
8. Bentonamit Application:
    a. Wearing gloves, goggles, and a mask, carefully mix the Bentonamit following the manufacturer's instructions exactly. This includes monitoring the exterior air temperature as well as the temperature of the air in the holes drilled in the concrete.
    b. Remember to remove the shims from beneath the apron section to allow the concrete the necessary freedom of movement once the clay-based chemical begins to expand. Cover the four-foot section with plywood, a tarp or blanket to protect from flying debris as the chemical expands and the concrete begins to move. Allow the chemical process to completely finish its work, approximately 48 hours.
    c. Use common sense at all times and when in doubt, call Cornerstones for advice.
9. Concrete removal: When the concrete has cracked, remove pieces of the concrete with a sledgehammer and chisel.
10. Complete the repairs to one section prior to opening the next section.

C. Concrete Removal Method Option Two: Sawcutting of concrete, which shall be performed by a cutting specialist.

1. The intent is to remove enough of the concrete face, above grade, to allow for installation of wall of adobe faces. Contractor shall take care to not remove more than a depth of 5".
2. Set up rig to provide sawcutting at an angle, 4 passes across the length of wall, approximately 4"-5" apart vertically.
3. 14" saw blade.
4. Clean out the void remaining. It will include concrete and adobe debris.

D. Tools that vibrate or cause movement in the adjacent adobe wall are NOT allowed.

E. CAVEAT: If archaeological remains or artifacts are exposed during the excavation process, stop work and call Montana Fish, Wildlife & Parks immediately.

3.4 ADOBE REMOVAL AND REPLACEMENT

A. CAVEAT: If archaeological remains or artifacts are exposed during the excavation process, stop work and call Montana Fish, Wildlife & Parks immediately.

B. Clean adobe surrounding removal areas by removing mortar, dust, and loose particles in preparation for adobe replacement.

C. Install replacement adobe into bonding and coursing pattern of existing adobe following the existing contours. If cutting is required, use a motor-driven saw designed to cut masonry with clean, sharp, unchipped edges.

D. Cutting adobe to fit. Use brick splitter and hammer to shape the adobe to fit the opening in the wall.

1. Groove the adobe all the way around with a nail.
2. Place the splitter at various places along the groove and tap it with the hammer.
3. Hit progressively harder until the adobe splits along the groove.
4. The tapping creates a plane of weakness.

E. Cornerstones Community Partnerships provides the following method for the replacing the deteriorated adobe exposed by removal of the apron (see *Adobe Conservation: A Preservation Handbook*, Sunstone Press, 2006, pages 101-106).

1. Provide shoring to exterior and interior (where accessible, do not remove plaster) to support the walls.
2. Remove deteriorated adobe in sections that are a maximum of four feet long. This will prevent removal of too much at one time which might cause structural failure.
3. Use the existing small trench at the base of the wall for access.
4. While cleaning out the deteriorated debris (adobe melt) shim the existing adobes to prevent collapse, fractures, or cracks using wood blocks and shims. Establish a flat base or a base that is slightly inclined into the wall for the new adobes. If rain is expected, keep trench covered with plywood or sheet metal, or to otherwise keep rainwater from accumulating in the trench. See Figure 1 below.
5. Expose the area where the new adobe is to be installed. Insert adobe into new opening and allow a space of @ ¾" around the adobe in order to insert mortar. Remove the adobe and dampen the side of the adobe facing down, or any face that will be in contact with mortar, and the area receiving the mud mortar. Place mud mortar over dampened area and

set the new adobe(s) into the wall. Push and press adobe over mortar and install wood shims snugly along upper mortar gap.

6. When new adobe is in place, install wood blocks and shims to prevent existing adobes from loosening, collapsing or fracturing while new mud mortar dries and sets.
7. Repeat step five and shim.

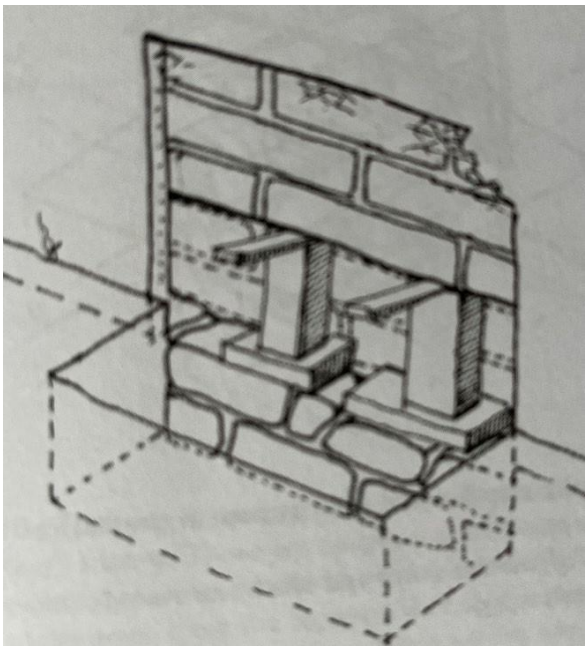

Figure 1: Provide wood blocking and shims to support the adobe wall above the work area. Image courtesy of Cornerstones (page 103).

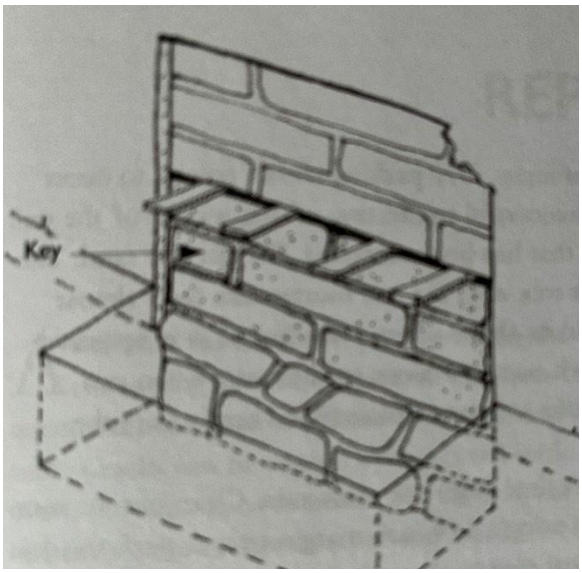

Figure 2: Provide short temporary "keys" at end of course. Replace keys later when tying the repaired wall segments together. Image courtesy of Cornerstones (page 105).

8. Once the mud mortar has dried, the upper mortar gap should be dry packed. Use a margin trowel or a slender piece of wood to push the dry pack mortar into the void and fill it tightly.
9. When all adobes have been dry packed and the wall cavity shimmed, repeat the process in step five. The overlap between vertical joints should be no less than 4 inches.
10. Install “key” adobes. See Figure 2 above. The keys are laid in mud mortar and dry packed. Once dry and in place, the last course of adobes should be shimmed tightly, allowing the mortar to dry.
11. When the mortar has completely dried, drypack the remaining gap or opening and allow to dry. Do not remove wood shims from the gap all at once; remove only enough shims to be able to dry pack a segment at a time.

F. Coordinate with new flashing, installing it in similar section lengths, allowing for 4” minimum overlap between lengths.

3.5 FLASHING

A. General: Install embedded flashing where indicated.

B. Install flashing as follows unless otherwise indicated:

1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
2. Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 4 inches.

3.6 LAYING ADOBE WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with matching joint thicknesses.

B. Bond Pattern for Exposed Adobe: Lay exposed masonry in bond pattern to match adjacent work; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.

C. Lay concealed adobe with all units in a wythe in running bond or bonded by lapping not less than 2 inches. Bond and interlock each course of each wythe at corners. Do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.

D. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet adobe if required before laying fresh masonry.

E. Notify Architect of unforeseen detrimental conditions including large voids, cracks, bulges, and loose units in existing adobe wall, rotted wood, rusted metal, and other deteriorated items.

1. Most of the replacement adobe will be at the area of concrete apron removal. The removal and replacement shall be performed in 4’-long sections.
2. Maintain joint width for replacement units to match existing joints.
3. Use setting buttons or shims to set units accurately spaced with uniform joints.

3.7 WATERPROOFING BELOW-GRADE WALLS

A. Trowel on the specified waterproofing at minimum thickness of ¼” per manufacturer’s written product literature.

B. Compact backfill soils to an 85% modified Proctor density.

3.8 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property.

B. Masonry Waste: Remove masonry waste and legally dispose of off Owner's property.

END OF SECTION 045000

SECTION 099300 - STAINING AND TRANSPARENT FINISHING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes:

1. Surface preparation and the application of FPL finish on the new wood subsill for Window #101.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Filling Compounds: Linseed oil putty for wood (FS TT-P-00791), as used on the building previously.

B. Linseed Oil: Boiled, ASTM D260.

C. Mix:

1. Boiled linseed oil: 40% of weight
2. Mineral spirits: 60% of weight
3. Shaved paraffin for waterproofing properties at the horizontal surfaces.

PART 3 - EXECUTION

3.1 PREPARATION

A. Washing exterior woodwork:

1. Dry woodwork with natural bristle brush or broom,
2. If dirt remains, wet wash to remove dirt. Use the brush to remove dirt, using as little water as possible.
3. Allow wood to dry.
4. If general cleaning is possible, begin at a lower corner and work across, then up.
5. Always work on the shady side of the building.

3.2 APPLICATION

A. Apply finishes with natural bristle and hair brushes only. No roller or spray application will be allowed.

1. Treat wood sill with two coats of boiled linseed oil.

B. Apply finishes to produce surface films without cloudiness, holidays, lap marks, brush marks, runs, ropiness, or other surface imperfections.

3.3 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing finish application, clean spattered surfaces. Remove spattered materials by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from finish application. Correct damage by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced finished wood surfaces.

END OF SECTION 099300