

INVITATION TO BID
ITB 4272

GALLUP PARK IMPROVEMENTS



Due Date: Thursday, February 21, 2013
By 10:30 a.m.

Issued by: City of Ann Arbor
Procurement Unit
301 E. Huron Street
Ann Arbor, Michigan 48104

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**ADVERTISEMENT FOR
GALLUP PARK IMPROVEMENTS
CITY OF ANN ARBOR, MICHIGAN**

Sealed Bids that include an original bid document and one additional proposal section copy will be received by the **Procurement Office, Finance Services, located on the 5th floor of the Guy Larcom Municipal Building, Ann Arbor, Michigan on or before Thursday, February 21, 2013 by 10:30 a.m.** local time for renovations to Gallup Park Improvements and all associated work as specified and detailed. Bids will be publicly opened and read aloud at this time. Prospective submitters are responsible for timely receipt of their proposal. Late proposals will not be considered.

Work to be done includes renovations to the asphalt park service drive, new pathway installation, brick paver installation, kayak and fishing docks, concrete pathways, interior renovations to Livery building, landscaping. A grant from the Michigan Department of Natural Resources Trust Fund was procured for the implementation of this project, and all relevant State requirements will apply.

Bid documents entirely downloadable on the Michigan Governmental Trade/BidNet (MITN) website at www.mitn.info and on the Purchasing page of the City of Ann Arbor's website at www.a2gov.org/government/financeadminservices/procurement/Pages/OpenBidsandProposals.aspx on or after or after Wednesday, February 6, 2013. The City will not be distributing paper copies of the plan or specifications.

Each proposal shall be accompanied by a certified check, or Bid Bond by a recognized surety, in the amount of 5% of the total of the bid price. A proposal, once submitted, becomes the property of the City. In the sole discretion of the City, the City reserves the right to allow a bidder to reclaim submitted documents provided the documents are requested and retrieved no later than 48 hours prior to the scheduled bid opening.

The successful Bidder will be required to furnish satisfactory performance and labor and material bonds in the amount of 100% of the bid price and satisfactory insurance coverage.

Precondition for entering into a contract with the City of Ann Arbor is compliance with Chapter 112 of Title IX of the Code of the City of Ann Arbor. The successful Bidder may also be required to comply with Chapter 23 of Title I of the Code of the City of Ann Arbor. Further information is outlined in the contract documents.

After the time of opening, no Bid may be withdrawn for a period of 45 days. The City reserves the right to accept any Bid, to reject any or all Bids, to waive irregularities and/or informalities in any Bid, and to make the award in any manner the City believes to be in its best interest.

Any further information on bid documents may be obtained from the Procurement Office, (734) 794-6576

NOTICE OF PRE-BID CONFERENCE

A pre-bid meeting will be held at the Gallup Park Livery in the meeting room, located at 3000 Fuller Road on **Wednesday, February 13 at 10:30 a.m.**

Attendance at this conference is optional, but highly recommended. Administrative and technical questions regarding this project will be answered at this time. The pre-bid meeting is for information only. Any answers furnished will not be official until verified in writing by the Financial Service Area, Procurement Unit. Answers that change or substantially clarify the bid will be affirmed in an addendum.

INSTRUCTIONS TO BIDDERS

General

Work to be done under this Contract is generally described through the detailed specifications and must be completed fully in accordance with the contract documents. All work to be done under this Contract is located in or near the City of Ann Arbor.

The City shall make available to all prospective Bidders, prior to receipt of the Bids, access to the area in which the work is to be performed. Advance notice should be given to the Administering Department in cases where access to the site must be arranged by the City.

Any proposal which does not fully conform with these instructions may be rejected.

Preparation of Bids

Bids should be prepared providing a straight-forward, concise description of the Bidder's ability to meet the requirements of the ITB. Bids shall be written in ink or typewritten. No erasures are permitted. Mistakes may be crossed out and corrected and must be initialed and dated in ink by the person signing the Bid.

Bidders must submit The Invitation to Bid Form and the "Bid Forms" provided with each blank properly filled in. If forms are not fully completed it may disqualify the bid.

Each person signing the Bid certifies that he/she is the person in the Bidder's firm/organization responsible for the decision as to the fees being offered in the Bid and has not and will not participated in any action contrary to the terms of this provision

Questions or Clarification on ITB Specifications

All questions regarding this ITB shall be submitted via email. Emailed questions and inquires will be accepted from any and all prospective Bidders in accordance with the terms and conditions of the ITB.

All questions shall be due on or before Friday, February 15, 2013 by 3:00 pm and should be addressed as follows:

Specification/Scope of Work questions emailed to Amy Kuras at akuras@a2gov.org.

Bid Process and HR Compliance questions emailed to Lnewton@a2gov.org.

Addenda

If it becomes necessary to revise any part of the ITB, notice of the Addendum will be posted to Michigan Inter-governmental Trade Network (MITN) www.mitn.info and/or City of Ann Arbor web site www.A2gov.org for all parties to download.

Each Bidder must in its Bid, to avoid any miscommunications, acknowledge all addenda which it has received, but the failure of a Bidder to receive, or acknowledge receipt of; any addenda shall not

relieve the Bidder of the responsibility for complying with the terms thereof.

The City will not be bound by oral responses to inquiries or written responses other than written addenda.

Bid Submission

All Bids are due and must be delivered to the City of Ann Arbor Procurement Unit on or before Thursday, February 21, 2013 by 10:30 AM. Bids submitted late or via oral, telephonic, telegraphic, electronic mail or facsimile **will not** be considered or accepted.

Each Bidder must submit one (1) original Bid and one (1) Bid copy in a sealed envelope clearly marked: **ITB 4272 – Gallup Park Improvements.**

Bids must be addressed and delivered to:

City of Ann Arbor
Procurement Unit, 5th Floor
301 East Huron Street
P.O. Box 8647
Ann Arbor, MI 48107

All Bids received on or before the Due Date will be publicly opened and recorded immediately. No immediate decisions are rendered.

Hand delivered Bids should be date/time stamped/signed by the Procurement Unit at the address above in order to be considered. Normal business hours are 9:00 a.m. to 4:00 p.m. Monday through Friday. The City will not be liable to any Bidder for any unforeseen circumstances, delivery or postal delays. Postmarking to the Due Date will not substitute for receipt of the Bid. Each Bidder is responsible for submission of their Bid.

Additional time will not be granted to a single Bidder; however, additional time may be granted to all Bidders when the City determines that circumstances warrant it.

Award

The City intends to award a Contract(s) to the lowest responsible Bidder(s). On multi-divisional contracts, separate divisions may be awarded to separate Bidders. The City may also utilize discounts offered in the Bid Forms, if any, to determine the lowest responsible Bidder on each division, and award multiple divisions to a single Bidder, so that the lowest total cost is achieved for the City. For unit price bids, the contract will be awarded based upon the lump sum and unit prices stated by the bidder for the work items specified in the bid documents, with consideration given to any alternates selected by the City. If the City determines that the unit price for any item is materially different for the work item bid than either other bidders or the general market, the City, in its sole discretion, in addition to any other right it may have, may reject the bid as not responsible or non-conforming.

The acceptability of major subcontractors will be considered in determining if a Bidder is responsible. In comparing proposals, the City will give consideration to alternate proposals for items listed in the forms, or other alternates which the Bidder may wish to submit, but preference will be

given to Base Bid Proposals.

The City reserves the right to accept any Bid, to reject any or all Bids, to waive irregularities and/or informalities in any Bid, and to make the award in any manner the City believes to be in its best interest.

Official Documents

The City of Ann Arbor shall accept no alternates to the bid documents made by the Bidder unless those alternatives are set forth in the "Alternate" section of Bid form.

The City of Ann Arbor officially distributes bid documents from the Procurement Unit or through the Michigan Intergovernmental Trade Network (MITN). Copies of the bid documents obtained from any other source are not Official copies. Addenda and other bid information will only be posted to these official distribution sites. . If you obtained City of Ann Arbor Bid documents from other sources, it is recommended that you register on www.MITN.info and obtain an official Bid.

Bid Security

Each proposal must be accompanied by a certified check, or Bid Bond by a surety licensed and authorized to do business within the State of Michigan, in the amount of 5% of the total of the bid price.

Withdrawal of Bids

After the time of opening, no Bid may be withdrawn for the period of days specified in the Advertisement.

Contract Time

Time is of the essence in the performance of the work under this Contract. The available time for work under this Contract is indicated on page C-1, Article III of the Contract. If these time requirements can not be met, the Bidder must stipulate on Bid Form Section 3 - Time Alternate its schedule for performance of the work. Consideration will be given to time in evaluating bids.

Liquidated Damages

A liquidated damages clause, as given on page C-2, Article III of the Contract, provides that the Contractor shall pay the City as liquidated damages, and not as a penalty, a sum certain per day for each and every day that the Contractor may be in default of completion of the specified work, within the time(s) stated in the Contract, or written extensions.

Liquidated damages clauses, as given in the General Conditions, provide further that the City shall be entitled to impose and recover liquidated damages for breach of the obligations under Chapter 112 of the City Code.

The liquidated damages are for the non-quantifiable aspects of any of the previously identified events and do not cover actual damages that can be shown or quantified nor are they intended to preclude recovery of actual damages in addition to the recovery of liquidated damages.

Human Rights Information

Section 5, beginning at page GC-3, outlines the requirements for fair employment practices under City of Ann Arbor Contracts. To establish compliance with this Ordinance, the Bidder must complete and return with its bid completed copies of the two pages of Human Rights Division Contract Compliance Forms (copy attached) or an acceptable equivalent.

Wage Requirements

Section 4, beginning at page GC-1, outlines the requirements for payment of prevailing wages or of a living wage to employees providing service to the City under this contract. The successful bidder must comply with all applicable requirements and may be required to provide documentary proof of compliance when requested.

Major Subcontractors

The Bidder shall identify each major subcontractor it expects to engage for this Contract if the work to be subcontracted is 15% or more of the bid sum or over \$50,000, whichever is less. The Bidder also shall identify the work to be subcontracted to each major subcontractor.

Debarment

Submission of a Bid in response to this ITB is certification that the Bidder is not currently debarred, suspended, proposed for debarment, and declared ineligible or voluntarily excluded from participation in this transaction by any State or Federal departments or agency. Submission is also agreement that the City will be notified of any changes in this status.

Disclosures

After bids are opened, all information in a submitter's bid is subjected to disclosure under the provisions of Michigan Public Act No. 442 of 1976, as amended (MCL 15.231 et seq.) know as the "Freedom of Information Act." The Freedom of Information Act also provides for the complete disclosure of contracts and attachments thereto except where specifically exempted.

Bid Protest

All Bid protests must be in writing and filed with the Purchasing Agent within five (5) business days of the award action. The vendor must clearly state the reasons for the protest. If a vendor contacts a City Service Area/Unit and indicates a desire to protest an award, the Service Area/Unit shall refer the vendor to the Purchasing Agent. The Purchasing Agent will provide the vendor with the appropriate instructions for filing the protest. The protest shall be reviewed by the City Administrator or designee whose decision shall be final.

Reservation of Rights

The City of Ann Arbor reserves the right to accept any bid or alternative bid proposed in whole or in part, to reject any or all bids or alternatives bids in whole or in part and to waive irregularity

and/or informalities in any bid and to make the award in any manner deemed in the best interest of the City.

INVITATION TO BID

City of Ann Arbor
Guy C. Larcom Municipal Building
Ann Arbor, Michigan 48107

Ladies and Gentlemen:

The undersigned, as Bidder, declares that this Bid is made in good faith, without fraud or collusion with any person or persons bidding on the same Contract; that this Bidder has carefully read and examined the bid documents, including Advertisement, Human Rights Division Contract Compliance Forms, Notice of Pre-Bid Conference, Instructions to Bidders, Proposal, Bid Forms, Contract, Bond Forms, General Conditions, Standard Specifications, Detailed Specifications, all Addenda, and the Plans and understands them. The Bidder declares that it conducted a full investigation at the site and of the work proposed and is fully informed as to the nature of the work and the conditions relating to the work's performance. The Bidder also declares that it has extensive experience in successfully completing projects similar to this one.

The Bidder acknowledges that it has not received or relied upon any representations or warrants of any nature whatsoever from the City of Ann Arbor, its agents or employees, and that this Bid is based solely upon the Bidder's own independent business judgment.

The undersigned proposes to perform all work shown on the plans or described in the bid documents, including any addenda issued, and to furnish all necessary machinery, tools, apparatus, and other means of construction to do all the work, furnish all the materials, and complete the work in strict accordance with all terms of the Contract of which this proposal is one part.

In accordance with these bid documents, and Addenda numbered _____, the undersigned, as Bidder, proposes to perform at the sites in and/or around Ann Arbor, Michigan, all the work included herein for the amounts set forth in the Bid Forms.

The Bidder declares that it has become fully familiar with the liquidated damage clauses for completion times and for compliance with City Code Chapter 112, understands and agrees that the liquidated damages are for the non-quantifiable aspects of non-compliance and do not cover actual damages that may be shown and agrees that if awarded the Contract, all liquidated damage clauses form part of the Contract.

The Bidder declares that it has become fully familiar with the provisions of Chapter 14, Section 1:319 (Prevailing wages) and Chapter 23 (Living Wage) of the Code of the City of Ann Arbor and that it understands and agrees to comply, to the extent applicable to employees providing services to the City under this Contract, with the wage and reporting requirements stated in the City Code provisions cited. Bidder further agrees that the cited provisions of Chapter 14 and Chapter 23 form a part of this Contract.

The Bidder encloses a certified check or Bid Bond in the amount of 5% of the total of the Bid Price. The Bidder agrees both to contract for the work and to furnish the necessary Bonds and insurance documentation within 10 days after being notified of the acceptance of the Bid.

If this Bid is accepted by the City and the Bidder fails to contract and furnish the required Bonds and insurance documentation within 10 days after being notified of the acceptance of this Bid, then the Bidder shall be considered to have abandoned the Contract and the certified check or Bid Bond accompanying this Proposal shall become due and payable to the City.

If the Bidder enters into the Contract in accordance with this Proposal, or if this Proposal is rejected, then the accompanying check or Bid Bond shall be returned to the Bidder.

In submitting this Bid, it is understood that the right is reserved by the City to accept any Bid, to reject any or all Bids, to waive irregularities and/or informalities in any Bid, and to make the award in any manner the City believes to be in its best interest.

SIGNED THIS _____ DAY OF _____, 201_.

Bidder's/Contractor Name

Authorized Signature of Bidder

Official Address

Printed Name of Authorized Signature

Telephone Number

Email Address for Bid Award Notice

LEGAL STATUS OF BIDDER

(The Bidder shall fill out the appropriate form and strike out the other two.)

Bidder declares that it is:

* A corporation organized and doing business under the laws of the state of _____, for whom _____, bearing the office title of _____, whose signature is affixed to this proposal is authorized to execute contracts.

* A partnership, list all members and the street and mailing address of each:

Also identify the County and State where partnership papers are filed:

County of _____, State of _____

* An individual, whose signature with address, is affixed to this proposal: _____
(initial here)

BID FORMS
GALLUP PARK IMPROVEMENTS ITB #4272

Section 1 – Base Bid

Total base bid \$ _____ **Dollars \$** _____
Use words Use numbers

Section 2 - Owner's Unit Prices, Alternates and Allowances

All **unit price items** listed below shall be quoted.

1. Provide a unit cost per square foot to Provide and install the Paver Type A units (Town Hall stone with associated (permeable applications) setting bed materials):

UNIT COST \$ _____ per SF

2. Provide a unit cost per square foot to Provide and install the Paver Type B units (Cophorne stone with associated (standard applications) setting bed materials):

UNIT COST \$ _____ per SF

3. Provide a unit cost per EACH sign to be provided and installed. Quantity in lump sum, Base Bid price is 10 Total.

UNIT COST \$ _____ per EACH

4. Provide a unit cost per TON for non-motorized pathway bituminous pavement (3" depth, 13A Mix). Quantity in lump sum, Base Bid price is 130 TON.

UNIT COST \$ _____ per TON

5. Provide a unit cost per SY for non-motorized pathway aggregate (8" depth, 21AA limestone). Quantity in lump sum, Base Bid price is 850 SY.

UNIT COST \$ _____ per SY

6. Provide a unit cost per TON for entry drive - City of Ann Arbor typical Pavement section (4.5" depth, 13A Mix). Quantity in lump sum, Base Bid price is 295 TON.

UNIT COST \$ _____ per TON

7. Provide a unit cost per SY for entry drive aggregate (8" depth, 21AA limestone). Quantity in lump sum, Base Bid price is 1,270 SY.

UNIT COST \$ _____ per SY

8. Provide a unit cost per SF for Commercial Drivable Grass Pavers. Quantity in lump sum, Base Bid price is 6,362 SF.

UNIT COST \$ _____ per SF

9. Provide a unit cost per SF of wall face for the boulder retaining wall. Quantity in lump sum, Base Bid price is 456 SF of wall face.

UNIT COST \$ _____ per SF of wall face

10. Provide a unit cost for EACH concrete bumper block, provided and installed.

UNIT COST \$ _____ per EACH

END OF UNIT PRICE SCHEDULE

All **Alternates** listed below shall be quoted.

1. **Provide and install** the Paver Type B units (Cophthorne stone with Standard Applications setting bed materials) in lieu of the Base Bid Paver Type A. Note below whether this work is an **Add or Deduct** to the Base Bid Contract.

#1 - ALTERNATE ADD/DEDUCT COST \$ _____

2. **Provide and Install** the larger (10' x 16') Fishing Dock as noted on the Documents.

#2 - ALTERNATE ADD COST \$ _____

3. **Provide and install 8"** MDOT 21AA crushed limestone section in lieu of the 36" MDOT 6A stone section under the Commercial Drivable Grass Pavers as shown in the details on Sheet C.9.

#3 - ALTERNATE DEDUCT COST \$ _____

4. **Provide and install** the City of Ann Arbor Typical Pavement Section (4.5" of 13A bituminous and 8" MDOT 21AA crushed limestone) in lieu of the Commercial Drivable Grass Pavers for the Livery Drive. Install 4" concrete sidewalk section in lieu of the Commercial Drivable Grass Pavers for the Livery Drive border walk.

#4 - ALTERNATE DEDUCT COST \$ _____

END OF ALTERNATES SCHEDULE

All **Allowances** listed below shall be quoted.

A. **The following are Allowances:**

1. **Include an Allowance for Material and Labor of \$750.00** associated with replacing deteriorated, existing fittings and connections in the Pergola – not associated with Work specifically noted in the Contract Documents which shall be in Base Bid. Coordinate with the Architect and Owner for associated Work.

END OF ALLOWANCES SCHEDULE

BID FORMS

Section 2 – Contractor’s Option - Material and Equipment Alternates

The Base Bid proposal price shall include materials and equipment selected from the designated items and manufacturers listed in the bidding documents. This is done to establish uniformity in bidding and to establish standards of quality for the items named.

If the Contractor wishes to quote alternate items for consideration by the City, it may do so under this Section. A complete description of the item and the proposed price differential must be provided. Unless approved at the time of award, substitutions where items are specifically named will be considered only as a negotiated change in Contract Sum.

<u>Item Number</u>	<u>Description</u>	<u>Add/Deduct Amount</u>
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If the Bidder does not suggest any material or equipment alternate, the Bidder **MUST** complete the following statement:

For the work outlined in this request for bid, the bidder does NOT propose any material or equipment alternate under the contract.

Signature of Authorized Representative of Bidder

BID FORM

Section 3 - Time Alternate

If the Bidder takes exception to the time stipulated in Article III of the Contract, Time of Completion, page C-1, it is requested to stipulate below its proposed time for performance of the work. Consideration will be given to time in evaluating bids.

If the Bidder does not suggest any time alternate, the Bidder **MUST** complete the following statement:

For the work outlined in this request for bid, the bidder does NOT propose any time alternate under the contract.

Signature of Authorized Representative of Bidder

BID FORM

Section 4 - Major Subcontractors

For purposes of this contract, a Subcontractor is anyone (other than the Contractor) who performs work (other than or in addition to the furnishing of materials, plans or equipment) at or about the construction site, directly or indirectly for or on behalf of the Contractor (and whether or not in privity of contract with the Contractor), but shall not include any individual who furnishes merely the individual 's own personal labor or services.

For the work outlined in these documents the Bidder expects to engage the following major subcontractors to perform the work identified:

<u>Subcontractor (Name and Address)</u>	<u>Work</u>	<u>Amount</u>
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If the Bidder does not expect to engage any major subcontractor, the Bidder **MUST** complete the following statement:

For the work outlined in this request for bid, the bidder does NOT expect to engage any major subcontractor to perform work under the contract.

Signature of Authorized Representative of Bidder

CONTRACT

THIS AGREEMENT is made on the _____, 2013, between the CITY OF ANN ARBOR, a Michigan Municipal Corporation, 301 E. Huron St., Ann Arbor, Michigan 48104 (“City”) and

Based upon the mutual promises below, the Contractor and the City agree as follows:

ARTICLE I - Scope of Work

The Contractor agrees to furnish all of the materials, equipment and labor necessary; and to abide by all the duties and responsibilities applicable to it for the project titled “GALLUP PARK LIVERY IMPROVEMENTS” in accordance with the requirements and provisions of the following documents, including all written modifications incorporated into any of the documents, which are incorporated as part of this Contract:

Human Rights Division Contract	General Conditions
Compliance Forms	Standard Specifications
Living Wage Declaration of	Detailed Specifications
Compliance Forms	Plans
(if applicable)	Addenda
Bid Forms	
Proposal	
Contract and Exhibits	
Bonds	

ARTICLE II - Definitions

Administering Service area means Parks and Recreation Services

Supervising Professional means Sumedh Bahl or other persons acting under the authorization of the Director of the Administering Department.

Project means **Gallup Park Improvements – ITB #4272**

ARTICLE III - Time of Completion

- (A) The work to be completed under this Contract shall begin immediately after the Contractor’s receipt of a fully executed Contract.
- (B) The entire work for this Contract shall be completed within 30 consecutive calendar days.
- (C) Failure to complete all the work within the time specified above, including any extension granted in writing by the Supervising Professional, shall obligate the

ARTICLE VII - Relationship of the Parties

The parties of the Contract agree that it is not a contract of employment but is a contract to accomplish a specific result. Contractor is an independent contractor performing services for the City. Nothing contained in this Contract shall be deemed to constitute any other relationship between the City and the Contractor.

Contractor certifies that it has no personal or financial interest in the project other than the compensation it is to receive under the Contract. Contractor certifies that it is not, and shall not become, overdue or in default to the City for any contract, debt, or any other obligation to the City including real or personal property taxes. City shall have the right to set off any such debt against compensation awarded for services under this agreement.

ARTICLE VIII - Notice

All notices given under this contract shall be in writing, and shall be by personal delivery or by certified mail with return receipt requested to the parties at their respective addresses as specified in the contract documents or other address the Contractor may specify in writing..

ARTICLE IX - Indemnification

To the fullest extent permitted by law, for any loss not covered by insurance under this contract, Contractor shall indemnify, defend and hold harmless the City, its officers, employees and agents harmless from all suits, claims, judgments and expenses including attorney's fees resulting or alleged to result, in whole or in part, from any act or omission, which is in any way connected or associated with this contract, by the Contractor or anyone acting on the Contractor's behalf under this contract. Contractor shall not be responsible to indemnify the City for losses or damages caused by or resulting from the City's sole negligence.

ARTICLE X - Entire Agreement

This Contract represents the entire understanding between the City and the Contractor and it supersedes all prior representations or agreements whether written or oral. Neither party has relied on any prior representations in entering into this Contract. This Contract may be altered, amended or modified only by written amendment signed by the City and the Contractor.

FOR CONTRACTOR

By: _____

Its:

FOR THE CITY OF ANN ARBOR

By _____
John Hieftje, Mayor

By _____
Jacqueline Beaudry, City Clerk

Approved as to substance

By _____
Steven D. Powers, City Administrator

By _____
Sumedh Bahl, Community Services
Administrator

Approved as to form and content

Stephen K. Postema, City Attorney

PERFORMANCE BOND

- (1) _____ of _____ (referred to as "Principal"), and _____, a corporation duly authorized to do business in the State of Michigan (referred to as "Surety"), are bound to the City of Ann Arbor, Michigan (referred to as "City"), for \$ _____, the payment of which Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, by this bond.
- (2) The Principal has entered a written contract with the City dated _____, for: _____ and this bond is given for that contract in compliance with Act No. 213 of the Michigan Public Acts of 1963, as amended, being MCL 129.201 et seq.
- (3) Whenever the Principal is declared by the City to be in default under the contract, the Surety may promptly remedy the default or shall promptly:
- (a) complete the contract in accordance with its terms and conditions; or
 - (b) obtain a bid or bids for submission to the City for completing the contract in accordance with its terms and conditions, and upon determination by Surety of the lowest responsible bidder, arrange for a contract between such bidder and the City, and make available, as work progresses, sufficient funds to pay the cost of completion less the balance of the contract price; but not exceeding, including other costs and damages for which Surety may be liable hereunder, the amount set forth in paragraph 1.
- (4) Surety shall have no obligation to the City if the Principal fully and promptly performs under the contract.
- (5) Surety agrees that no change, extension of time, alteration or addition to the terms of the contract or to the work to be performed thereunder, or the specifications accompanying it shall in any way affect its obligations on this bond, and waives notice of any such change, extension of time, alteration or addition to the terms of the contract or to the work, or to the specifications.

SIGNED AND SEALED this _____ day of _____, 2013.

(Name of Surety Company)

By _____
(Signature)

Its _____
(Title of Office)

(Name of Principal)

By _____
(Signature)

Its _____
(Title of Office)

Approved as to form:

Stephen K. Postema, City Attorney

Name and address of agent:

LABOR AND MATERIAL BOND

- (1) _____ of _____,
(referred to as "Principal"), and _____,
a corporation duly authorized to do business in the State of Michigan, (referred to as "Surety"), are
bound to the City of Ann Arbor, Michigan (referred to as "City"), for the use and benefit of claimants
as defined in Act 213 of Michigan Public Acts of 1963, as amended, being MCL 129.201 et seq., in
the amount of
\$ _____, for the payment of which Principal and Surety bind themselves, their heirs, executors,
administrators, successors and assigns, jointly and severally, by this bond.
- (2) The Principal has entered a written contract with the City, dated _____, for:
_____; and this bond is given for that contract in compliance with
Act No. 213 of the Michigan Public Acts of 1963 as amended;
- (3) If the Principal fails to promptly and fully repay claimants for labor and material reasonably required
under the contract, the Surety shall pay those claimants.
- (4) Surety's obligations shall not exceed the amount stated in paragraph 1, and Surety shall have no
obligation if the Principal promptly and fully pays the claimants.

SIGNED AND SEALED this _____ day of _____, 2013.

(Name of Surety Company)

(Name of Principal)

By _____
(Signature)

By _____
(Signature)

Its _____
(Title of Office)

Its _____
(Title of Office)

Approved as to form:

Name and address of agent:

Stephen K. Postema, City Attorney

GENERAL CONDITIONS

Section 1 - Execution, Correlation and Intent of Documents

The contract documents shall be signed in 3 copies by the City and the Contractor.

The contract documents are complementary and what is called for by any one shall be binding. The intention of the documents is to include all labor and materials, equipment and transportation necessary for the proper execution of the work. Materials or work described in words which so applied have a well-known technical or trade meaning have the meaning of those recognized standards.

In case of a conflict among the contract documents listed below in any requirement(s), the requirement(s) of the document listed first shall prevail over any conflicting requirement(s) of a document listed later.

(1) Addenda in reverse chronological order; (2) Detailed Specifications; (3) Standard Specifications; (4) Drawings/Plans; (5) General Conditions; (6) Contract; (7) Bid Forms; (8) Bond Forms; (9) Proposal.

Section 2 - Order of Completion

The Contractor shall submit with each invoice, and at other times reasonably requested by the Supervising Professional, schedules showing the order in which the Contractor proposes to carry on the work. They shall include the dates at which the Contractor will start the several parts of the work, the estimated dates of completion of the several parts, and important milestones within the several parts.

Section 3 - Familiarity with Work

The Bidder or its representative shall make personal investigations of the site of the work and of existing structures and shall determine to its own satisfaction the conditions to be encountered, the nature of the ground, the difficulties involved, and all other factors affecting the work proposed under this Contract. The Bidder to whom this Contract is awarded will not be entitled to any additional compensation unless conditions are clearly different from those which could reasonably have been anticipated by a person making diligent and thorough investigation of the site.

The Bidder shall immediately notify the City upon discovery, and in every case prior to submitting its Bid, of every error or omission in the bidding documents that would be identified by a reasonably competent, diligent Bidder. In no case will a Bidder be allowed the benefit of extra compensation or time to complete the work under this Contract for extra expenses or time spent as a result of the error or omission.

Section 4 - Wage Requirements

Under this Contract, the Contractor shall conform to Chapter 14 of Title I of the Code of the City of Ann Arbor as amended; which in part states "...that all craftsmen, mechanics and laborers employed directly on the site in connection with said improvements, including said employees of subcontractors, shall receive the prevailing wage for the corresponding classes of craftsmen, mechanics and laborers, as determined by statistics for the Ann Arbor area compiled by the United States Department of Labor. At the request of the City, any contractor or subcontractor shall provide satisfactory proof of compliance with the contract provisions required by the Section."

Where the Contract and the Ann Arbor City Ordinance are silent as to definitions of terms required in determining contract compliance with regard to prevailing wages, the definitions provided in the Davis-Bacon Act as amended (40 U.S.C. 278-a to 276-a-7) for the terms shall be used.

1:814. Applicability.

- (1) This Chapter shall apply to any person that is a contractor/vendor or grantee as defined in Section 1:813 that employs or contracts with five (5) or more individuals; provided, however, that this Chapter shall not apply to a non-profit contractor/vendor or non-profit grantee unless it employs or contracts with ten (10) or more individuals.
- (2) This Chapter shall apply to any grant, contract, or subcontract or other form of financial assistance awarded to or entered into with a contractor/vendor or grantee after the effective date of this Chapter and to the extension or renewal after the effective date of this Chapter of any grant, contract, or subcontract or other form of financial assistance with a contractor/vendor or grantee.

1:815. Living Wages Required.

- (1) Every contractor/vendor or grantee, as defined in Section 1:813, shall pay its covered employees a living wage as established in this Section.
 - (a) For a covered employer that provides employee health care to its employees, the living wage shall be \$11.83 an hour, or the adjusted amount hereafter established under Section 1:815(3).
 - (b) For a covered employer that does not provide health care to its employees, the living wage shall be \$13.19 a hour, or the adjusted amount hereafter established under Section 1:815(3).
- (2) In order to qualify to pay the living wage rate for covered employers providing employee health care under subsection 1:815(1)(a), a covered employer shall furnish proof of said health care coverage and payment therefor to the City Administrator or his/her designee.
- (3) The amount of the living wage established in this Section shall be adjusted upward no later than April 30, 2012, and every year thereafter by a percentage equal to the percentage increase, if any, in the federal poverty guidelines as published by the United States Department of Health and Human Services for the year 20 12. Subsequent annual adjustments shall be based upon the percentage increase, if any, in the United States Department of Health and Human Services poverty guidelines when comparing the prior

calendar year's poverty guidelines to the present calendar year's guidelines. The applicable percentage amount will be converted to an amount in cents by multiplying the existing wage under Section 1.815(1)(b) by said percentage, rounding upward to the next cent, and adding this amount of cents to the existing living wage levels established under Sections 1:815(1)(a) and 1:815(1)(b). Prior to April 1 of each calendar year, the City will notify any covered employer of this adjustment by posting a written notice in a prominent place in City Hall, and, in the case of a covered employer that has provided an address of record to the City, by a written letter to each such covered employer.

Section 5 - Non-Discrimination

The Contractor agrees to comply with the nondiscrimination provisions of Chapter 112 of the Ann Arbor City Code and to take affirmative action to assure that applicants are employed and that employees are treated during employment in a manner which provides equal employment opportunity and tends to eliminate any inequality based upon race, national origin or sex. The Contractor agrees to comply with the provisions of Section 9:161 of Chapter 112 of the Ann Arbor City Code and in particular the following excerpts:

9:161 NONDISCRIMINATION BY CITY CONTRACTORS

- (1) All contractors proposing to do business with the City of Ann Arbor shall satisfy the nondiscrimination administrative policy adopted by the City Administrator in accordance with the guidelines of this section. All contractors shall receive approval from the Director prior to entering into a contract with the City, unless specifically exempted by administrative policy. All City contractors shall take affirmative action to insure that applicants are employed and that employees are treated during employment in a manner which provides equal employment opportunity and tends to eliminate inequality based upon race, national origin or sex.
- (2) Each prospective contractor shall submit to the City data showing current total employment by occupational category, sex and minority group. If, after verifying this data, the Director concludes that it indicates total minority and female employment commensurate with their availability within the contractor's labor recruitment area, i.e., the area from which the contractor can reasonably be expected to recruit, said contractor shall be accepted by the Director as having fulfilled affirmative action requirements for a period of one year at which time the Director shall conduct another review. Other contractors shall develop an affirmative action program in conjunction with the Director. Said program shall include specific goals and timetables for the hiring and promotion of minorities and females. Said goals shall reflect the availability of minorities and females within the contractor's labor recruitment area. In the case of construction contractors, the Director shall use for employment verification the labor recruitment area of the Ann Arbor-Ypsilanti standard metropolitan statistical area. Construction contractors determined to be in compliance shall be accepted by the Director as having fulfilled affirmative action requirements for a period of six (6) months at which time the Director shall conduct another review.
- (3) In hiring for construction projects, contractors shall make good faith efforts to employ local persons, so as to enhance the local economy.
- (4) All contracts shall include provisions through which the contractor agrees, in addition to any other applicable Federal or State labor laws:

- (a) To set goals, in conference with the Human Resources Director, for each job category or division of the work force used in the completion of the City work;
 - (b) To provide periodic reports concerning the progress the contractor has made in meeting the affirmative action goals it has agreed to;
 - (c) To permit the Director access to all books, records and accounts pertaining to its employment practices for the purpose of determining compliance with the affirmative action requirements.
- (5) The Director shall monitor the compliance of each contractor with the nondiscrimination provisions of each contract. The Director shall develop procedures and regulations consistent with the administrative policy adopted by the City Administrator for notice and enforcement of non-compliance. Such procedures and regulations shall include a provision for the posting of contractors not in compliance.
- (6) All City contracts shall provide further that breach of the obligation not to discriminate shall be a material breach of the contract for which the City shall be entitled, at its option, to do any or all of the following:
- (a) To cancel, terminate, or suspend the contract in whole or part and/or refuse to make any required periodic payments under the contract;
 - (b) Declare the contractor ineligible for the award of any future contracts with the City for a specified length of time;
 - (c) To recover liquidated damages of a specified sum, said sum to be that percentage of the labor expenditure for the time period involved which would have accrued to minority group members had the affirmative action not been breached;
 - (d) Impose for each day of non-compliance, liquidated damages of a specified sum, based upon the following schedule:

<u>Contract Amount</u>	<u>Assessed Damages Per Day of Non-Compliance</u>
\$ 10,000 - 24,999	\$ 25.00
25,000 - 99,999	50.00
100,000 - 199,999	100.00
200,000 - 499,999	150.00
500,000 - 1,499,999	200.00
1,500,000 - 2,999,999	250.00
3,000,000 - 4,999,999	300.00
5,000,000 - and above	500.00

- (e) In addition the contractor shall be liable for any costs or expenses incurred by the City of Ann Arbor in obtaining from other sources the work and services to be rendered or performed or the goods or properties to be furnished or delivered to the City under this contract.

Section 6 - Materials, Appliances, Employees

Unless otherwise stipulated, the Contractor shall provide and pay for all materials, labor, water, tools, equipment, light, power, transportation, and other facilities necessary or used for the execution and completion of the work. Unless otherwise specified, all materials incorporated in the permanent work shall be new, and both workmanship and materials shall be of the highest quality. The Contractor shall, if required, furnish satisfactory evidence as to the kind and quality of materials.

The Contractor shall at all times enforce strict discipline and good order among its employees, and shall seek to avoid employing on the work any unfit person or anyone not skilled in the work assigned.

Adequate sanitary facilities shall be provided by the Contractor.

Section 7 - Qualifications for Employment

The Contractor shall employ competent laborers and mechanics for the work under this Contract. For work performed under this Contract, employment preference shall be given to qualified local residents.

Section 8 - Royalties and Patents

The Contractor shall pay all royalties and license fees. It shall defend all suits or claims for infringements of any patent rights and shall hold the City harmless from loss on account of infringement except that the City shall be responsible for all infringement loss when a particular process or the product of a particular manufacturer or manufacturers is specified, unless the City has notified the Contractor prior to the signing of the Contract that the particular process or product is patented or is believed to be patented.

Section 9 - Permits and Regulations

The Contractor must secure and pay for all permits, permit or plan review fees and licenses necessary for the prosecution of the work. These include but are not limited to City building permits, right-of-way permits, lane closure permits, right-of-way occupancy permits, and the like. The City shall secure and pay for easements shown on the plans unless otherwise specified.

The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the work as drawn and specified. If the Contractor observes that the contract documents are at variance with those requirements, it shall promptly notify the Supervising Professional in writing, and any necessary changes shall be adjusted as provided in the Contract for changes in the work.

Section 10 - Protection of the Public and of Work and Property

The Contractor is responsible for the means, methods, sequences, techniques and procedures of construction and safety programs associated with the work contemplated by this contract. The Contractor, its agents or sub-contractors, shall comply with the "General Rules and Regulations for the Construction Industry" as published by the Construction Safety Commission of the State of Michigan and to all other local, State and National laws, ordinances, rules and regulations pertaining to safety of persons and property.

The Contractor shall take all necessary and reasonable precautions to protect the safety of the public. It shall continuously maintain adequate protection of all work from damage, and shall take all necessary and reasonable precautions to adequately protect all public and private property from injury or loss arising in connection with this Contract. It shall make good any damage, injury or loss to its work and to public and private property resulting from lack of reasonable protective precautions, except as may be due to errors in the contract documents, or caused by agents or employees of the City. The Contractor shall obtain and maintain sufficient insurance to cover damage to any City property at the site by any cause.

In an emergency affecting the safety of life, or the work, or of adjoining property, the Contractor is, without special instructions or authorization from the Supervising Professional, permitted to act at its discretion to prevent the threatened loss or injury. It shall also so act, without appeal, if authorized or instructed by the Supervising Professional.

Any compensation claimed by the Contractor for emergency work shall be determined by agreement or in accordance with the terms of Claims for Extra Cost - Section 15.

Section 11 - Inspection of Work

The City shall provide sufficient competent personnel for the inspection of the work.

The Supervising Professional shall at all times have access to the work whenever it is in preparation or progress, and the Contractor shall provide proper facilities for access and for inspection.

If the specifications, the Supervising Professional's instructions, laws, ordinances, or any public authority require any work to be specially tested or approved, the Contractor shall give the Supervising Professional timely notice of its readiness for inspection, and if the inspection is by an authority other than the Supervising Professional, of the date fixed for the inspection. Inspections by the Supervising Professional shall be made promptly, and where practicable at the source of supply. If any work should be covered up without approval or consent of the Supervising Professional, it must, if required by the Supervising Professional, be uncovered for examination and properly restored at the Contractor's expense.

Re-examination of any work may be ordered by the Supervising Professional, and, if so ordered, the work must be uncovered by the Contractor. If the work is found to be in accordance with the contract documents, the City shall pay the cost of re-examination and replacement. If the work is not in accordance with the contract documents, the Contractor shall pay the cost.

Section 12 - Superintendence

The Contractor shall keep on the work site, during its progress, a competent superintendent and any necessary assistants, all satisfactory to the Supervising Professional. The superintendent will be responsible to perform all on-site project management for the Contractor. The superintendent shall be experienced in the work required for this Contract. The superintendent shall represent the Contractor and all direction given to the superintendent shall be binding as if given to the Contractor. Important directions shall immediately be confirmed in writing to the Contractor. Other directions will be confirmed on written request. The Contractor shall give efficient superintendence to the work, using its best skill and attention.

Section 13 - Changes in the Work

The City may make changes to the quantities of work within the general scope of the Contract at any time by a written order and without notice to the sureties. If the changes add to or deduct from the extent of the work, the Contract Sum shall be adjusted accordingly. All the changes shall be executed under the conditions of the original Contract except that any claim for extension of time caused by the change shall be adjusted at the time of ordering the change.

In giving instructions, the Supervising Professional shall have authority to make minor changes in the work not involving extra cost and not inconsistent with the purposes of the work, but otherwise, except in an emergency endangering life or property, no extra work or change shall be made unless in pursuance of a written order by the Supervising Professional, and no claim for an addition to the Contract Sum shall be valid unless the additional work was ordered in writing.

The Contractor shall proceed with the work as changed and the value of the work shall be determined as provided in Claims for Extra Cost - Section 15.

Section 14 - Extension of Time

Extension of time stipulated in the Contract for completion of the work will be made if and as the Supervising Professional may deem proper under any of the following circumstances:

- (1) When work under an extra work order is added to the work under this Contract;
- (2) When the work is suspended as provided in Section 20;
- (3) When the work of the Contractor is delayed on account of conditions which could not have been foreseen, or which were beyond the control of the Contractor, and which were not the result of its fault or negligence;
- (4) Delays in the progress of the work caused by any act or neglect of the City or of its employees or by other Contractors employed by the City;
- (5) Delay due to an act of Government;
- (6) Delay by the Supervising Professional in the furnishing of plans and necessary information;
- (7) Other cause which in the opinion of the Supervising Professional entitles the Contractor to an extension of time.

The Contractor shall notify the Supervising Professional within 7 days of an occurrence or conditions which, in the Contractor's opinion, entitle it to an extension of time. The notice shall be in writing and submitted in ample time to permit full investigation and evaluation of the Contractor's claim. The Supervising Professional shall acknowledge receipt of the Contractor's notice within 7 days of its receipt. Failure to timely provide the written notice shall constitute a waiver by the Contractor of any claim.

In situations where an extension of time in contract completion is appropriate under this or any other section of the contract, the Contractor understands and agrees that the only available adjustment for events that cause any delays in contract completion shall be extension of the required time for contract completion and that there shall be no adjustments in the money due the Contractor on account of the delay.

Section 15 - Claims for Extra Cost

If the Contractor claims that any instructions by drawings or other media issued after the date of the Contract involved extra cost under this Contract, it shall give the Supervising Professional written notice within 7 days after the receipt of the instructions, and in any event before proceeding to execute the work, except in emergency endangering life or property. The procedure shall then be as provided for Changes in the Work-Section 13. No claim shall be valid unless so made.

If the Supervising Professional orders, in writing, the performance of any work not covered by the contract documents, and for which no item of work is provided in the Contract, and for which no unit price or lump sum basis can be agreed upon, then the extra work shall be done on a Cost-Plus-Percentage basis of payment as follows:

- (1) The Contractor shall be reimbursed for all reasonable costs incurred in doing the work, and shall receive an additional payment of 15% of all the reasonable costs to cover both its indirect overhead costs and profit;
- (2) The term "Cost" shall cover all payroll charges for employees and supervision required under the specific order, together with all worker's compensation, Social Security, pension and retirement allowances and social insurance, or other regular payroll charges on same; the cost of all material and supplies required of either temporary or permanent character; rental of all power-driven equipment at agreed upon rates, together with cost of fuel and supply charges for the equipment; and any costs incurred by the Contractor as a direct result of executing the order, if approved by the Supervising Professional;
- (3) If the extra is performed under subcontract, the subcontractor shall be allowed to compute its charges as described above. The Contractor shall be permitted to add an additional charge of 5% percent to that of the subcontractor for the Contractor's supervision and contractual responsibility;
- (4) The quantities and items of work done each day shall be submitted to the Supervising Professional in a satisfactory form on the succeeding day, and shall be approved by the Supervising Professional and the Contractor or adjusted at once;
- (5) Payments of all charges for work under this Section in any one month shall be made along with normal progress payments. Retainage shall be in accordance with Progress Payments-Section 16.

No additional compensation will be provided for additional equipment, materials, personnel, overtime or special charges required to perform the work within the time requirements of the Contract.

When extra work is required and no suitable price for machinery and equipment can be determined in accordance with this Section, the hourly rate paid shall be 1/40 of the basic weekly rate listed in the Rental Rate Blue Book published by Dataquest Incorporated and applicable to the time period the equipment was first used for the extra work. The hourly rate will be deemed to include all costs of operation such as bucket or blade, fuel, maintenance, "regional factors", insurance, taxes, and the like, but not the costs of the operator.

Section 16 - Progress Payments

The Contractor shall submit each month, or at longer intervals, if it so desires, an invoice covering work performed for which it believes payment, under the Contract terms, is due. The submission shall be to the City's Finance Department - Accounting Division. The Supervising Professional will, within 10 days following submission of the invoice, prepare a certificate for payment for the work in an amount to be determined by the Supervising Professional as fairly representing the acceptable work performed during the period covered by the Contractor's invoice. To insure the proper performance of this Contract, the City will retain a percentage of the estimate in accordance with Act 524, Public Acts of 1980. The City will then, following the receipt of the Supervising Professional's Certificate, make payment to the Contractor as soon as feasible, which is anticipated will be within 15 days.

An allowance may be made in progress payments if substantial quantities of permanent material have been delivered to the site but not incorporated in the completed work if the Contractor, in the opinion of the Supervising Professional, is diligently pursuing the work under this Contract. Such materials shall be properly stored and adequately protected. Allowance in the estimate shall be at the invoice price value of the items. Notwithstanding any payment of any allowance, all risk of loss due to vandalism or any damages to the stored materials remains with the Contractor.

In the case of Contracts which include only the Furnishing and Delivering of Equipment, the payments shall be; 60% of the Contract Sum upon the delivery of all equipment to be furnished, or in the case of delivery of a usable portion of the equipment in advance of the total equipment delivery, 60% of the estimated value of the portion of the equipment may be paid upon its delivery in advance of the time of the remainder of the equipment to be furnished; 30% of the Contract Sum upon completion of erection of all equipment furnished, but not later than 60 days after the date of delivery of all of the equipment to be furnished; and payment of the final 10% on final completion of erection, testing and acceptance of all the equipment to be furnished; but not later than 180 days after the date of delivery of all of the equipment to be furnished, unless testing has been completed and shows the equipment to be unacceptable.

With each invoice for periodic payment, the Contractor shall enclose a Contractor's Declaration - Section 43, and an updated project schedule per Order of Completion - Section 2.

Section 17 - Deductions for Uncorrected Work

If the Supervising Professional decides it is inexpedient to correct work that has been damaged or that was not done in accordance with the Contract, an equitable deduction from the Contract price shall be made.

Section 18 - Correction of Work Before Final Payment

The Contractor shall promptly remove from the premises all materials condemned by the Supervising Professional as failing to meet Contract requirements, whether incorporated in the work or not, and the Contractor shall promptly replace and re-execute the work in accordance with the Contract and without expense to the City and shall bear the expense of making good all work of other contractors destroyed or damaged by the removal or replacement.

If the Contractor does not remove the condemned work and materials within 10 days after written notice, the City may remove them and, if the removed material has value, may store the material at the expense of the Contractor. If the Contractor does not pay the expense of the removal within 10 days thereafter, the City may, upon 10 days written notice, sell the removed materials at auction or private sale and shall pay to the Contractor the net proceeds, after deducting all costs and expenses that should have been borne by the Contractor. If the removed material has no value, the Contractor must pay the City the expenses for disposal within 10 days of invoice for the disposal costs.

The inspection or lack of inspection of any material or work pertaining to this Contract shall not relieve the Contractor of its obligation to fulfill this Contract and defective work shall be made good. Unsuitable materials may be rejected by the Supervising Professional notwithstanding that the work and materials have been previously overlooked by the Supervising Professional and accepted or estimated for payment or paid for. If the work or any part shall be found defective at any time before the final acceptance of the whole work, the Contractor shall forthwith make good the defect in a manner satisfactory to the Supervising Professional. The judgment and the decision of the Supervising Professional as to whether the materials supplied and the work done under this Contract comply with the requirements of the Contract shall be conclusive and final.

Section 19 - Acceptance and Final Payment

Upon receipt of written notice that the work is ready for final inspection and acceptance, the Supervising Professional will promptly make the inspection. When the Supervising Professional finds the work acceptable under the Contract and the Contract fully performed, the Supervising Professional will promptly sign and issue a final certificate stating that the work required by this Contract has been completed and is accepted by the City under the terms and conditions of the Contract. The entire balance found to be due the Contractor, including the retained percentage, shall be paid to the Contractor by the City within 30 days after the date of the final certificate.

Before issuance of final certificates, the Contractor shall file with the City:

- (1) The consent of the surety to payment of the final estimate;
- (2) The Contractor's Affidavit in the form required by Section 44.

In case the Affidavit or consent is not furnished, the City may retain out of any amount due the Contractor, sums sufficient to cover all lienable claims.

The making and acceptance of the final payment shall constitute a waiver of all claims by the City except those arising from:

- (1) unsettled liens;
- (2) faulty work appearing within 12 months after final payment;

- (3) hidden defects in meeting the requirements of the plans and specifications;
- (4) manufacturer's guarantees.

It shall also constitute a waiver of all claims by the Contractor, except those previously made and still unsettled.

Section 20 - Suspension of Work

The City may at any time suspend the work, or any part by giving 5 days notice to the Contractor in writing. The work shall be resumed by the Contractor within 10 days after the date fixed in the written notice from the City to the Contractor to do so. The City shall reimburse the Contractor for expense incurred by the Contractor in connection with the work under this Contract as a result of the suspension.

If the work, or any part, shall be stopped by the notice in writing, and if the City does not give notice in writing to the Contractor to resume work at a date within 90 days of the date fixed in the written notice to suspend, then the Contractor may abandon that portion of the work suspended and will be entitled to the estimates and payments for all work done on the portions abandoned, if any, plus 10% of the value of the work abandoned, to compensate for loss of overhead, plant expense, and anticipated profit.

Section 21 - Delays and The City's Right to Terminate Contract

If the Contractor refuses or fails to prosecute the work, or any separate part of it, with the diligence required to insure completion, ready for operation, within the allowable number of consecutive calendar days specified plus extensions, or fails to complete the work within the required time, the City may, by written notice to the Contractor, terminate its right to proceed with the work or any part of the work as to which there has been delay. After providing the notice the City may take over the work and prosecute it to completion, by contract or otherwise, and the Contractor and its sureties shall be liable to the City for any excess cost to the City. If the Contractor's right to proceed is terminated, the City may take possession of and utilize in completing the work, any materials, appliances and plant as may be on the site of the work and useful for completing the work. The right of the Contractor to proceed shall not be terminated or the Contractor charged with liquidated damages where an extension of time is granted under Extension of Time - Section 14.

If the Contractor is adjudged a bankrupt, or if it makes a general assignment for the benefit of creditors, or if a receiver is appointed on account of its insolvency, or if it persistently or repeatedly refuses or fails except in cases for which extension of time is provided, to supply enough properly skilled workers or proper materials, or if it fails to make prompt payments to subcontractors or for material or labor, or persistently disregards laws, ordinances or the instructions of the Supervising Professional, or otherwise is guilty of a substantial violation of any provision of the Contract, then the City, upon the certificate of the Supervising Professional that sufficient cause exists to justify such action, may, without prejudice to any other right or remedy and after giving the Contractor 3 days written notice, terminate this Contract. The City may then take possession of the premises and of all materials, tools and appliances thereon and without prejudice to any other remedy it may have, make good the deficiencies or finish the work by whatever method it may deem expedient, and deduct the cost from the payment due the Contractor. The Contractor shall not be entitled to receive any further payment until the work is finished. If the expense of finishing the work, including compensation for additional managerial and administrative services exceeds the unpaid balance of the Contract Sum, the Contractor and its surety are liable to the City for any excess cost incurred.

The expense incurred by the City, and the damage incurred through the Contractor's default, shall be certified by the Supervising Professional.

Section 22 - Contractor's Right to Terminate Contract

If the work should be stopped under an order of any court, or other public authority, for a period of 3 months, through no act or fault of the Contractor or of anyone employed by it, then the Contractor may, upon 7 days written notice to the City, terminate this Contract and recover from the City payment for all acceptable work executed plus reasonable profit.

Section 23 - City's Right to Do Work

If the Contractor should neglect to prosecute the work properly or fail to perform any provision of this Contract, the City, 3 days after giving written notice to the Contractor and its surety may, without prejudice to any other remedy the City may have, make good the deficiencies and may deduct the cost from the payment due to the Contractor.

Section 24 - Removal of Equipment and Supplies

In case of termination of this Contract before completion, from any or no cause, the Contractor, if notified to do so by the City, shall promptly remove any part or all of its equipment and supplies from the property of the City, failing which the City shall have the right to remove the equipment and supplies at the expense of the Contractor.

The removed equipment and supplies may be stored by the City and, if all costs of removal and storage are not paid by the Contractor within 10 days of invoicing, the City upon 10 days written notice may sell the equipment and supplies at auction or private sale, and shall pay the Contractor the net proceeds after deducting all costs and expenses that should have been borne by the Contractor and after deducting all amounts claimed due by any lien holder of the equipment or supplies.

Section 25 - Responsibility for Work and Warranties

The Contractor assumes full responsibility for any and all materials and equipment used in the construction of the work and may not make claims against the City for damages to materials and equipment from any cause except negligence or willful act of the City. Until its final acceptance, the Contractor shall be responsible for damage to or destruction of the project (except for any part covered by Partial Completion and Acceptance - Section 26). The Contractor shall make good all work damaged or destroyed before acceptance. All risk of loss remains with the Contractor until final acceptance of the work (Section 19) or partial acceptance (Section 26). The Contractor is advised to investigate obtaining its own builders risk insurance.

The Contractor shall guarantee the quality of the work for a period of one year. The Contractor shall also unconditionally guarantee the quality of all equipment and materials that are furnished and installed under the contract for a period of one year. At the end of one year after the Contractor's receipt of final payment, the complete work, including equipment and materials furnished and installed under the contract, shall be inspected by the Contractor and the Supervising Professional. Any defects shall be corrected by the Contractor at its expense as soon as practicable but in all cases within 60 days. Any defects that are identified prior to the end of one year shall also be inspected by

the Contractor and the Supervising Professional and shall be corrected by the Contractor at its expense as soon as practicable but in all cases within 60 days.

The Contractor shall assign all manufacturer or material supplier warranties to the City prior to final payment. The assignment shall not relieve the Contractor of its obligations under this paragraph to correct defects.

Section 26 - Partial Completion and Acceptance

If at any time prior to the issuance of the final certificate referred to in Acceptance and Final Payment - Section 19, any portion of the permanent construction has been satisfactorily completed, and if the Supervising Professional determines that portion of the permanent construction is not required for the operations of the Contractor but is needed by the City, the Supervising Professional shall issue to the Contractor a certificate of partial completion, and immediately the City may take over and use the portion of the permanent construction described in the certificate, and exclude the Contractor from that portion.

The issuance of a certificate of partial completion shall not constitute an extension of the Contractor's time to complete the portion of the permanent construction to which it relates if the Contractor has failed to complete it in accordance with the terms of this Contract. The issuance of the certificate shall not release the Contractor or its sureties from any obligations under this Contract including bonds.

If prior use increases the cost of, or delays the work, the Contractor shall be entitled to extra compensation, or extension of time, or both, as the Supervising Professional may determine.

Section 27 - Payments Withheld Prior to Final Acceptance of Work

The City may withhold or, on account of subsequently discovered evidence, nullify the whole or part of any certificate to the extent reasonably appropriate to protect the City from loss on account of:

- (1) Defective work not remedied;
- (2) Claims filed or reasonable evidence indicating probable filing of claims by other parties against the Contractor;
- (3) Failure of the Contractor to make payments properly to subcontractors or for material or labor;
- (4) Damage to another Contractor.

When the above grounds are removed or the Contractor provides a Surety Bond satisfactory to the City which will protect the City in the amount withheld, payment shall be made for amounts withheld under this section.

Section 28 - Contractor's Insurance

- A. The Contractor shall procure and maintain during the life of this Contract, including the guarantee period and during any warranty work, such insurance policies, including those set

forth below, as will protect itself from all claims for bodily injuries, death or property damage which may arise under this Contract; whether the acts were made by the Contractor or by any subcontractor or anyone employed by them directly or indirectly. The following insurance policies are required:

1. Worker's Compensation Insurance in accordance with all applicable state and federal statutes. Further, Employers Liability Coverage shall be obtained in the following minimum amounts:

Bodily Injury by Accident - \$500,000 each accident

Bodily Injury by Disease - \$500,000 each employee

Bodily Injury by Disease - \$500,000 each policy limit

2. Commercial General Liability Insurance equivalent to, as a minimum, Insurance Services Office form CG 00 01 07 98. The City of Ann Arbor shall be named as an additional insured. There shall be no added exclusions or limiting endorsements including, but not limited to: Products and Completed Operations, Explosion, Collapse and Underground coverage or Pollution. Further, the following minimum limits of liability are required:

\$1,000,000 Each occurrence as respect Bodily Injury Liability or Property Damage Liability, or both combined.

\$2,000,000 Per Job General Aggregate

\$1,000,000 Personal and Advertising Injury

\$2,000,000 Products and Completed Operations Aggregate

3. Motor Vehicle Liability Insurance, including Michigan No-Fault Coverages, equivalent to, as a minimum, Insurance Services Office form CA 00 01 07 97. The City of Ann Arbor shall be named as an additional insured. There shall be no added exclusions or limiting endorsements. Coverage shall include all owned vehicles, all non-owned vehicles and all hired vehicles. Further, the limits of liability shall be \$1,000,000 for each occurrence as respects Bodily Injury Liability or Property Damage Liability, or both combined.

4. Umbrella/Excess Liability Insurance shall be provided to apply excess of the Commercial General Liability, Employers Liability and the Motor Vehicle coverage enumerated above, for each occurrence and for aggregate in the amount of \$1,000,000.

B. Insurance required under Section A.2 and A.3 of this Contract shall be considered primary as respects any other valid or collectible insurance that the City may possess, including any self-insured retentions the City may have; and any other insurance the City does possess shall be considered excess insurance only and shall not be required to contribute with this insurance. Further, the Contractor agrees to waive any right of recovery by its insurer against the City.

C. In the case of all Contracts involving on-site work, the Contractor shall provide to the City before the commencement of any work under this Contract documentation demonstrating it has obtained the above mentioned policies. Documentation must provide and demonstrate an unconditional 30 day written notice of cancellation in favor of the City of Ann Arbor.

Further, the documentation must explicitly state the following: (a) the policy number; name of insurance company; name and address of the agent or authorized representative; name and address of insured; project name; policy expiration date; and specific coverage amounts; (b) any deductibles or self-insured retentions which shall be approved by the City, in its sole discretion; (c) that the policy conforms to the requirements specified. An original certificate of insurance may be provided as an initial indication of the required insurance, provided that no later than 21 calendar days after commencement of any work the Contractor supplies a copy of the endorsements required on the policies. Upon request, the Contractor shall provide within 30 days a copy of the policy(ies) to the City. If any of the above coverages expire by their terms during the term of this Contract, the Contractor shall deliver proof of renewal and/or new policies to the Administering Department at least ten days prior to the expiration date.

- D. Any Insurance provider of Contractor shall be admitted and authorized to do business in the State of Michigan and shall carry and maintain a minimum rating assigned by A.M. Best & Company 's Key Rating Guide of ' A ' Overall and a minimum Financial Size Category of ' V '. Insurance policies and certificates issued by non-admitted insurance companies are not acceptable unless approved in writing by the City.

Section 29 - Surety Bonds

Bonds will be required from the successful bidder as follows:

- (1) A Performance Bond to the City of Ann Arbor for the amount of the bid(s) accepted;
- (2) A Labor and Material Bond to the City of Ann Arbor for the amount of the bid(s) accepted.

Bonds shall be executed on forms supplied by the City in a manner and by a Surety Company satisfactory to the City Attorney.

Section 30 - Damage Claims

The Contractor shall be held responsible for all damages to property of the City or others, caused by or resulting from the negligence of the Contractor, its employees, or agents during the progress of or connected with the prosecution of the work, whether within the limits of the work or elsewhere. The Contractor must restore all property injured including sidewalks, curbing, sodding, pipes, conduit, sewers or other public or private property to not less than its original condition with new work.

Section 31 - Refusal to Obey Instructions

If the Contractor refuses to obey the instructions of the Supervising Professional, the Supervising Professional shall withdraw inspection from the work, and no payments will be made for work performed thereafter nor may work be performed thereafter until the Supervising Professional shall have again authorized the work to proceed.

Section 32 - Assignment

Neither party to the Contract shall assign the Contract without the written consent of the other. The Contractor may assign any monies due to it to a third party acceptable to the City.

Section 33 - Rights of Various Interests

Whenever work being done by the City's forces or by other contractors is contiguous to work covered by this Contract, the respective rights of the various interests involved shall be established by the Supervising Professional, to secure the completion of the various portions of the work in general harmony.

The Contractor is responsible to coordinate all aspects of the work, including coordination of, and with, utility companies and other contractors whose work impacts this project.

Section 34 - Subcontracts

The Contractor shall not award any work to any subcontractor without prior written approval of the City. The approval will not be given until the Contractor submits to the City a written statement concerning the proposed award to the subcontractor. The statement shall contain all information the City may require.

The Contractor shall be as fully responsible to the City for the acts and omissions of its subcontractors, and of persons either directly or indirectly employed by them, as it is for the acts and omissions of persons directly employed by it.

The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the work to bind subcontractors to the Contractor by the terms of the General Conditions and all other contract documents applicable to the work of the subcontractors and to give the Contractor the same power to terminate any subcontract that the City may exercise over the Contractor under any provision of the contract documents.

Nothing contained in the contract documents shall create any contractual relation between any subcontractor and the City.

Section 35 - Supervising Professional's Status

The Supervising Professional has the right to inspect any or all work. The Supervising Professional has authority to stop the work whenever stoppage may be appropriate to insure the proper execution of the Contract. The Supervising Professional has the authority to reject all work and materials which do not conform to the Contract and to decide questions which arise in the execution of the work.

The Supervising Professional shall make all measurements and determinations of quantities. Those measurements and determinations are final and conclusive between the parties.

Section 36 - Supervising Professional's Decisions

The Supervising Professional shall, within a reasonable time after their presentation to the Supervising Professional, make decisions in writing on all claims of the City or the Contractor and on all other matters relating to the execution and progress of the work or the interpretation of the contract documents.

Section 37 - Storing Materials and Supplies

Materials and supplies may be stored at the site of the work at locations agreeable to the City unless specific exception is listed elsewhere in these documents. Ample way for foot traffic and drainage must be provided, and gutters must, at all times, be kept free from obstruction. Traffic on streets shall be interfered with as little as possible. The Contractor may not enter or occupy with agents, employees, tools, or material any private property without first obtaining written permission from its owner. A copy of the permission shall be furnished to the Supervising Professional.

Section 38 - Lands for Work

The Contractor shall provide, at its own expense and without liability to the City, any additional land and access that may be required for temporary construction facilities or for storage of materials.

Section 39 - Cleaning Up

The Contractor shall, as directed by the Supervising Professional, remove at its own expense from the City's property and from all public and private property all temporary structures, rubbish and waste materials resulting from its operations unless otherwise specifically approved, in writing, by the Supervising Professional.

Section 40 - Salvage

The Supervising Professional may designate for salvage any materials from existing structures or underground services. Materials so designated remain City property and shall be transported or stored at a location as the Supervising Professional may direct.

Section 41 - Night, Saturday or Sunday Work

No night or Sunday work (without prior written City approval) will be permitted except in the case of an emergency and then only to the extent absolutely necessary. The City may allow night work which, in the opinion of the Supervising Professional, can be satisfactorily performed at night. Night work is any work between 8:00 p.m. and 7:00 a.m. No Saturday work will be permitted unless the Contractor gives the Supervising Professional at least 48 hours but not more than 5 days notice of the Contractor's intention to work the upcoming Saturday.

Section 42 - Sales Taxes

Under State law the City is exempt from the assessment of State Sales Tax on its direct purchases. Contractors who acquire materials, equipment, supplies, etc. for incorporation in City projects are not likewise exempt. State Law shall prevail. The Bidder shall familiarize itself with the State Law and prepare its Bid accordingly. No extra payment will be allowed under this Contract for failure of the Contractor to make proper allowance in this bid for taxes it must pay.

Section 43

CONTRACTOR'S DECLARATION

I hereby declare that I have not, during the period _____, 201____, to
_____, 20___, performed any work, furnished any materials, sustained any loss, damage or
delay, or otherwise done anything in addition to the regular items (or executed change orders) set
forth _____ in _____ the _____ Contract _____ titled

_____,
for which I shall ask, demand, sue for, or claim compensation or extension of time from the City,
except as I hereby make claim for additional compensation or extension of time as set forth on the
attached itemized statement. I further declare that I have paid all payroll obligations related to this
Contract that have become due during the above period and that all invoices related to this Contract
received more than 30 days prior to this declaration have been paid in full except as listed below.

There is/is not (Contractor please circle one and strike one as appropriate) an itemized statement
attached regarding a request for additional compensation or extension of time.

Contractor _____ Date

By
(Signature)

Its
(Title of Office)

Past due invoices, if any, are listed below.

Section 44

CONTRACTOR'S AFFIDAVIT

The undersigned Contractor, _____, represents that on _____ 20__, it was awarded a contract by the City of Ann Arbor, Michigan to _____ under the terms and conditions of a Contract titled _____.

The Contractor represents that all work has now been accomplished and the Contract is complete.

The Contractor warrants and certifies that all of its indebtedness arising by reason of the Contract has been fully paid or satisfactorily secured; and that all claims from subcontractors and others for labor and material used in accomplishing the project, as well as all other claims arising from the performance of the Contract, have been fully paid or satisfactorily settled. The Contractor agrees that, if any claim should hereafter arise, it shall assume responsibility for it immediately upon request to do so by the City of Ann Arbor.

The Contractor, for valuable consideration received, does further waive, release and relinquish any and all claims or right of lien which the Contractor now has or may acquire upon the subject premises for labor and material used in the project owned by the City of Ann Arbor.

This affidavit is freely and voluntarily given with full knowledge of the facts.

Contractor
By
(Signature)
Its
(Title of Office)

Subscribed and sworn to before me, on this _____ day of _____, 2012
_____, _____ County, Michigan

Notary Public
My commission expires on:

STANDARD SPECIFICATIONS

All work under this contract shall be performed in accordance with the Public Services Department Standard Specifications in effect at the date of availability of the contract documents stipulated in the Advertisement. All work under this Contract which is not included in these Standard Specifications, or which is performed using modifications to these Standard Specifications, shall be performed in accordance with the Detailed Specifications included in these contract documents.

A copy of the Public Services Department Standard Specifications may be purchased from the Engineering Division, (Fourth Floor, City Hall, Ann Arbor, Michigan), for \$35.00 per copy. In addition, a copy of these Standard Specifications is available for public viewing at the Engineering Division office, for review Monday through Friday between the hours of 8:30 a.m. and 4:00 p.m. In addition, a copy of these Standard Specifications is available for public viewing on the City of Ann Arbor Website:
www.a2gov.org/government/publicservices/project_management/privatedev/Pages/Standardspecificationbook.aspx

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See Document Sheets

SECTION 00910 - UNIT PRICES

PART 1 - UNIT PRICES

The Owner has requested unit pricing for the listed items below.

PART 2 - GENERAL

- A. Unit pricing is requested for Project Work that may occur or be modified, after the contract has been awarded.
- B. Unit pricing shall include all additional costs of labor, materials, overhead, profit, fees and such other costs necessary for the work described.
- C. Unit prices shall be used for items already indicated on the Drawings and in the Specifications, and as installation costs for items whose quantity is yet to be determined. Unit Prices may also be used as repair items, the scope of which may vary.
- D. Unit prices shall be used for items that are found to be unacceptable during field surveys and inspections after the contract has been awarded and prior to performing the actual work.
- E. Refer to Section 00100 – Instructions to Bidders for General Contractor, and/or sub contractor responsibilities pertaining to Specification inconsistencies.

PART 3 - EXECUTION

- A. All **unit price** items listed below shall be quoted. **See the Bid Form, previously included, and fill-in all information where it is reprinted in its entirety.**

- 11. Provide a unit cost per square foot to Provide and install the Paver Type A units (Town Hall stone with associated (permeable applications) setting bed materials):

UNIT COST \$ _____ per SF

- 12. Provide a unit cost per square foot to Provide and install the Paver Type B units (Cophorne stone with associated (standard applications) setting bed materials):

UNIT COST \$ _____ per SF

- 13. Provide a unit cost per EACH sign to be provided and installed. Quantity in lump sum, Base Bid price is 10 Total.

UNIT COST \$ _____ per EACH

- 14. Provide a unit cost per TON for non-motorized pathway bituminous pavement (3" depth, 13A Mix). Quantity in lump sum, Base Bid price is 130 TON.

UNIT COST \$ _____ per TON

- 15. Provide a unit cost per SY for non-motorized pathway aggregate (8" depth, 21AA limestone). Quantity in lump sum, Base Bid price is 850 SY.

UNIT COST \$ _____ per SY

- 16. Provide a unit cost per TON for entry drive - City of Ann Arbor typical Pavement section (4.5" depth, 13A Mix). Quantity in lump sum, Base Bid price is 295 TON.

UNIT COST \$ _____ per TON

17. Provide a unit cost per SY for entry drive aggregate (8" depth, 21AA limestone). Quantity in lump sum, Base Bid price is 1,270 SY.

UNIT COST \$_____per SY

18. Provide a unit cost per SF for Commercial Drivable Grass Pavers. Quantity in lump sum, Base Bid price is 6,362 SF.

UNIT COST \$_____per SF

19. Provide a unit cost per SF of wall face for the boulder retaining wall. Quantity in lump sum, Base Bid price is 456 SF of wall face.

UNIT COST \$_____per SF of wall face

20. Provide a unit cost for EACH concrete bumper block, provided and installed.

UNIT COST \$_____per EACH

END OF SECTION 00910

SECTION 00920 - ALTERNATES

PART 1 - GENERAL

- A. An Alternate is an amount proposed by Bidders and stated on the Bid Form, or noted herein and attached to the Bid Form, for certain items that may be added to or deducted from Base Bid amount if the Owner decides to accept the corresponding change in either the amount of construction to be completed, or in the products, materials, equipment, systems or installation methods described in Contract Documents.
- B. Coordination: Coordinate related Work and modify or adjust adjacent Work as necessary to ensure that Work affected by each accepted Alternate is complete and fully integrated into the Project.
- C. Notification: Immediately following Contract award, prepare and distribute to each party involved, notification of the status of each Alternate. Indicate whether Alternates have been accepted, rejected or deferred for consideration at a later date. Include a complete description of negotiated modifications to Alternates if applicable.
- D. Schedule: An "**Alternate Schedule**" is included at the end of this Section.
 - 1. Include as part of each Alternate, miscellaneous devices, accessory objects and similar items incidental to or required for a complete installation whether or not mentioned as part of the alternate.
 - 2. Specification Sections may be referenced in the Schedule and may contain requirements for materials and methods necessary to achieve the Work described under each alternate.
- E. Refer to Section 00100 – Instructions to Bidders for General Contractor, Construction Manager, and/or sub contractor responsibilities pertaining to Specification inconsistencies

PART 2 - EXECUTION

- B. **The Contract Work may include all Alternates, which are listed below, and shall be appropriately included in the Base Bid and submitted as part of the complete scope of Work as described below.**
- C. Provide all of the requested **Alternate** pricing.
 - 1. **Alternate** pricing shall be used to allow the **Owner** the option to add/delete work to the base construction pricing noted as Base Bid.
 - 2. The **Alternate pricing** shall be included in the Contract at the sole discretion of the Owner after the review of the budget and before awarding the contract.
 - 3. Bid Proposals shall be ranked and evaluated by the Owner based on "Base Bid" pricing, and any modifications to rankings base on the acceptance or rejection of Alternates shall be at the discretion of the Owner.
 - 4. **Included in the Alternate Bid shall be: labor, materials, equipment, services, facilities and all items required to complete the Work and/or as further indicated on the drawings and in the specifications.**
- D. **Alternates Schedule follows on the next page. All ALTERNATE items shall be quoted herein.**

All Alternates listed below shall be quoted. See the Bid Form, previously included, and fill-in all information where it is reprinted in its entirety.

PART 3 - ALTERNATES SCHEDULE:

1. **Provide and install** the Paver Type B units (Cophorne stone with Standard Applications setting bed materials) in lieu of the Base Bid Paver Type A. Note below whether this work is an **Add or Deduct** to the Base Bid Contract.

#1 - ALTERNATE ADD/DEDUCT COST \$ _____

2. **Provide and Install** the larger (10' x 16') Fishing Dock as noted on the Documents.

#2 - ALTERNATE ADD COST \$ _____

3. **Provide and install 8"** MDOT 21AA crushed limestone section in lieu of the 36" MDOT 6A stone section under the Commercial Drivable Grass Pavers as shown in the details on Sheet C.9.

#3 - ALTERNATE DEDUCT COST \$ _____

4. **Provide and install** the City of Ann Arbor Typical Pavement Section (4.5" of 13A bituminous and 8" MDOT 21AA crushed limestone) in lieu of the Commercial Drivable Grass Pavers for the Livery Drive. Install 4" concrete sidewalk section in lieu of the Commercial Drivable Grass Pavers for the Livery Drive border walk.

#4 - ALTERNATE DEDUCT COST \$ _____

END OF SECTION 00920

SECTION 00930 - ALLOWANCES

PART 1 - GENERAL

- A. Allowance items noted herein are in addition to possibly related items shown or noted in the drawings and/or specifications. Inclusion of these items on the Bid Form shall not relieve the Contractor from the responsibility to furnish and install work shown on the drawings and in other specification sections, including coordination and all related costs.
- B. Material Allowances:
1. For items noted in the 'Material Allowance' category in Part 2, below, the Contractor shall include, as a **Base Bid** amount, the following costs: Note, these costs are separate from the actual cost(s) of the product(s) listed in Part 2, below.
 - a. Costs which shall be included in Contractor's Base Bid Amount include, but are not limited to the following:
 - 1) all costs associated with shop drawings; product ordering; product delivery to site; product handling at the site (including unloading uncrating), storage, protection from elements and from damage, all necessary labor for installation and finishing of described product, warranty, and final inspection approval.
 - 2) Any other misc. or process driven cost other than the Material Cost of the material noted below.
 - b. The Contractor shall provide separate lines on the Schedule of Values for amounts pertaining to Part 1, sub-paragraph B.1.a.i (for each allowance item) and to items listed in the Material Allowance category in Part 2.
 2. **The Material Costs noted in the Allowances category in Part 2 are the actual cost of the material from the supplier, including shipping costs and taxes, and do not include any of the above noted Contractor's delivery, processing and installation costs which are included in the Contractor's Base Bid Amount.**
- C. Cash Allowances:
1. For items noted in the 'Cash Allowance' category in Part 2, below, the Contractor shall assume that the Allowance includes all material, labor, handling etc. that shall be the contractor's cost for a complete installation/product.
- D. Architect/Engineer Responsibilities:
1. Consult with contractor in consideration and selection of products.
 2. Select products in consultation with owner and transmit decision to contractor.
 3. Prepare change order.
- E. **Contractor Responsibilities:**
1. **Include each Allowance on the Schedule of Values within the amount for each related trade.**
 2. Assist architect in selection of products.
 3. Obtain proposals from suppliers and offer recommendations.
 4. On notification of selection by architect, execute purchase agreement with designated supplier.
 5. Prepare Change Order which reflects the actual cost of the Specified material.
 6. Arrange for and process shop drawings, product data and samples. Arrange for delivery.
 7. Promptly inspect products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.

PART 2 - EXECUTION

All **Allowances** listed below shall be quoted. **See the Bid Form, previously included, and note the Allowance check-box.**

A. The following are Allowances:

1. **Include an Allowance for Material and Labor of \$750.00** associated with replacing deteriorated, existing fittings and connections in the Pergola – not associated with Work specifically noted in the Contract Documents which shall be in Base Bid. Coordinate with the Architect and Owner for associated Work.

END OF SECTION 00930

SECTION 01010 - SUMMARY OF THE WORK

PART 1 - GENERAL

1.01 DESCRIPTION OF THE PROJECT:

- A. Provide all material and labor to complete the construction of Ann Arbor Gallup Park Renovation as described and intended by the complete body of work represented in these Contract Documents – including:
 - 1. Demolition
 - 2. New Construction – etc
- B. Refer to specifically to **Section IB1 - 3 – Instructions to Bidders** for General Contractor, Construction Manager, and/or sub contractor responsibilities pertaining to this Project. Other Section may also apply herein.

1.02 DESCRIPTION OF CONTRACT REQUIREMENTS

- A. Summary:
 - 1. The work can be summarized by reference to the requirements of the various Contract Documents, which in turn make reference to the requirements of other applicable provisions which control or influence the work; and these references can be summarized but are not necessarily limited to the following:
 - a. The Executed Owner-Contractor Agreement (typically not bound herewith).
- B. The General and Supplementary Conditions - which are included by reference in this project Manual.
- C. The Drawings - which are listed as "Plan Sheets" on the Table of Contents as of the date of these Contract Documents - attached.
- D. The Specification Sections - that are listed in the Table of Contents sheet and bound herewith in this Project Manual.
- E. Any Addenda or Modifications to the Contract Documents, which may have been bound herewith (in this Project Manual) or distributed subsequent to the binding hereof.
- F. Governing regulations, which have a bearing on the performance of the work; copies can be obtained from or reviewed at the local, State or Federal Agency responsible for the regulation in each case.
- G. Submittals (of every kind), copies of which are retained by the Contractor at the site.
- H. Miscellaneous elements of information having a bearing on the performance of the work, such as reports of general trade union negotiations: copies must be obtained by the Contractor through normal channels of information.
- I. **It is every Contractor's responsibility to inspect the City of Ann Arbor website and the Michigan Inter-Governmental Trade Network (MITN) website for all Addenda, Plan Holder information, Walk-thru Sign-in Documents, etc. that pertain to published documentation for this Project. This information will not be published or transmitted to individuals.**

PART 2 - SPECIAL CONSIDERATIONS:

2.01 GENERAL:

- A. All products incorporated into the building construction shall be asbestos free. Construction managers and/or contractors shall submit a signed and notarized statement to the Owner to this effect for incorporation into the asbestos management plan.
- B. All painted/coated products and plumbing components incorporated into the building construction shall be lead free. Construction managers and/or contractors shall submit a signed statement to the Owner to this effect for incorporation into the lead inspection plan.
- C. All adhesives, coatings and paints may not contain any Volatile Organic Compounds, unless a waiver is obtained from the Owner.

2.02 OCCUPANCY OF GALLUP PARK LIVERY

- A. The Contractor may coordinate with the Owner for additional access (beyond normal work times) for the following times:
 - 1) Saturday and Sundays

- 2) The Owner may define construction schedule parameters and Use of the Site in the Contract Agreement previously herein.
- 3) **The Livery must be entirely operational between May 24 and September 2, 2013. Access to Gallup Park, to the Livery, and all of the amenities surrounding the Livery must remain open to the public.**

2.03 WORK SEQUENCE and COORDINATION WITH OTHERS:

A. Outline Schedule:

1. **This Project is anticipated to consist of a Spring and Fall phase. To accommodate the Livery schedule, work shall take place prior to Memorial Day (May 24, 2013), and after Labor Day (September 2, 2013). Any work to take place from May 24 – September 2, 2013 must not disturb the Livery operations, and any work, both timing and type, must meet the approval of City of Ann Arbor.**
 2. All Bidders are to maintain a Construction Schedule that will meet the start and end dates noted herein.
 3. If no “end date” for the Fall, 2013 work is noted, but the Contractor has submitted a number of days for construction on the Bid Form, the Contractor shall create and maintain a schedule that reflects their submitted time period.
- B. Should it become necessary to interrupt and/or shutdown any service (mechanical, plumbing, electrical, etc.) which effects any building area or adjacent site outside the immediate work area, the contractor shall do such work only after notifying the Owner, and all relevant adjacent property owners, a minimum of 48 hours prior to such anticipated interruption and/or shutdown and then only after receiving the Owner's approval to do so.

END OF SECTION 01010

SECTION 01019 - CONTRACT CONSIDERATIONS

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. **In General - Particular requirements of the Contractor to complete appropriate Schedules, Applications and Forms as Records of the Project. The use of AIA documents is strongly encouraged. Any other proprietary forms should be approved by the Owner/Architect prior to being introduced into record by the Contractor.**
- B. Schedule of Values
- C. Applications for Payment – AIA form G702, including Substantial Completion
- D. Project Change Procedures – AIA forms G701, G710, G714 & G716
- E. **Coordinate with all requirements of the City of Ann Arbor as noted in these Documents, and as attached. The stated requirements of the City of Ann Arbor shall take precedence in all areas if conflict shall arise herein.**

1.02 RELATED SECTIONS:

- A. Section 01010 – Summary of Work
- B. Section 01039 – Project Coordination
- C. Section 01300 - Submittals

PART 2 - CONTRACT REQUIREMENTS:

2.01 SCHEDULE OF VALUES:

- A. Submit a complete **Schedule of Values** in duplicate within 10 days after date of Owner-Contractor Agreement, unless requested previously by the Owner or Architect.
 - 1. The Schedule of Values shall be used as a basis for determining progress payments for the contract or any designated lump sum bid item, and shall be in such form and sufficient detail to correctly represent a reasonable apportionment of the Contract Sum.
 - 2. Each activity in the Schedule of Values shall delineate one construction activity. The costing for each activity should include all costs for the labor and materials or equipment required to complete the activity. The sum of the values for the construction activities, within a bid item, must equal the total bid amount for that item.
 - 3. Prior to submitting an Application for Payment, the Contractor shall have submitted a detailed Schedule of Values and obtained approval from the Owner/Architect.
- B. Revise Schedule of Values to list approved Change Orders with each Application for Payment as the Project progresses.
- C. The Contractor may be required to provide certification from the Subcontractors certifying the subcontract amounts.

2.02 APPLICATION FOR PAYMENT

- A. Submit typed application on **AIA Form G702 - Application and Certificate for Payment**, including any required Continuation Sheets. Contractor's standard form or electronic media printout will be considered only if previously approved by the Architect.
- B. Format:
 - 1. Break Contract Sum down in enough detail to facilitate evaluation of Applications for Payment at the discretion of the Architect/Owner.
 - 2. Include each Allowance from Section 00930 – Allowances on the Schedule of Values within the amount for each related trade.
 - 3. Include separately from each line item, a directly proportional amount of Contractor's overhead and profit.
 - 4. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions have been made.
 - 5. Include amounts of Change Orders and Construction Change Directives issued prior to the last day of the period covered by the application.
 - 6. All forms shall have a signature line for the Architect, for approval prior to submission to the Owner.

7. Provide 3 notarized originals for Architect's signature. After signing - one original will be retained by the Architect; one retained by the Owner; and one returned with the payment to the Contractor.
- C. Payment Period: Typically - one calendar month
- D. Waiver of Liens shall be provided ascertaining payment to subcontractors of monies distributed from previous month's application.
- E. **Where deemed appropriate by the Owner, Applications for Payment shall be accompanied by certified payroll records to verify that Wage Decision Guidelines applicable to the project are being adhered to by the Contractor (where required herein by these Documents).**
- F. **Initial Application for Payment:** Administrative actions and submittals that must precede or coincide with submittal of the first Application for Payment include:
 1. List of subcontractors
 2. List of suppliers and fabricators
 3. Schedule of Values
 4. Contractor's Construction Schedule (preliminary if not final).
 5. Submittal Schedule (preliminary if not final).
 6. List of Contractor's staff assignments
 7. Copies of building permits
 8. Copies of licenses from governing authorities
 9. Certificates of insurance and insurance policies
 10. Performance and payment bonds (if required).
- G. **Final Payment Application** - Actions and submittals that must precede or coincide with submittal of the final Application for Payment include the following:
 1. Submission of **Certificate of Substantial Completion AIA G704**
 2. Completion of Project closeout requirements
 3. Completion of items specified for completion after Substantial Completion.
 4. Transmittal of required Project construction records to the Owner.
 5. Removal of surplus materials, rubbish and similar elements
 6. See **Section 01700 – Contract Close-outs** for additional information.

2.03 CHANGE PROCEDURES:

- The following items describe the possible Requests for Information, Field Changes, and other subsequent procedures and documentation requirements involving the Work as authorized by AIA A201, 2007 Edition.
- A. **Architectural Supplemental Instructions (ASI)** - The Architect may advise of minor changes in the work not involving an adjustment to Contract Sum or Contract Time as authorized by AIA A201, 2007 Edition, Paragraph 7.4 by issuing an **Architectural Supplemental Instructions (ASI) on AIA Form G710**.
 - B. **Proposal Request** - The Architect may issue a Request for Proposal (RFP) that includes a detailed description of a proposed change with supplementary or revised drawings and specifications. The Contractor shall prepare and submit an itemized quote within 10 working days. All quotes shall include detailed labor and materials costs from all related sub contractors, shall separately itemize the Contractor's overhead and profit, and shall indicate, with explanation, the associated affect on Project Schedule.
 1. **Note: compensation for extended General Conditions is not considered customary and will be granted solely at the Owner's discretion.**
 2. RFPs which are returned without full itemization shall be considered to be non-responsive. Delays resulting from the Architect or Owner's subsequent requests for itemization and the time taken to provide same shall be caused solely by the Contractor.
 - C. **The Contractor may propose a change** by submitting request for change to the Architect, describing the proposed change and its full effect on the Work. Include a statement describing the reason for the change, and the effect on the contract sum and contract time with full documentation document any requested substitutions in accordance with Section 01600.
 1. Comply with requirements in Section 01600 – Product Substitutions if the change requires substitution of one product or system for products or systems specified.
 - D. **Request for Information (RFI)** - The Contractor may submit a **Request for Information (RFI) G716**, which may generate a change in the Work as detailed by the Architect. All RFI's

shall be generated by the General Contractor (or the Construction Manager) who shall coordinate all subcontractors and issue sequentially numbered documents. All RFI's shall provide the Architect with existing field conditions and/or possible resolutions to facilitate a prompt and effective response. It is the Contractor's responsibility to review the field issues, dimensions, conflicts, etc. to provide as much information as possible to the Architect for resolution. The Contractor shall take an active role in resolving these issues with the Architect.

- E. **Construction Change Directives (CCD)** – the Architect may issue a directive, **on AIA Form G714 Construction Change Directive (CCD)**, that when signed by the Owner, instructs the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order. The Document will describe changes in the Work, and designate method of determining any change in contract sum or contract time. Promptly execute the change when authorized by the Owner. Construction Change Directives may be issued in the field as a "Draft" which allows the Contractor to estimate the Work and/or cost as well as informing the contractor to allow for potential changes being issued.
- F. **Change Order Forms (CO)** – The Contractor shall prepare Change Orders, based on approved quotes from RFPs, using the **AIA G701 Change Order** form. Unless otherwise provided in the Conditions of the Contract, the Contractor shall distribute three signed originals to the Architect for approval and further distribution to the Owner.
- G. **Allowance Adjustment:** Base each Change Order proposal request for an allowance cost adjustment on the difference between the actual purchase amount and the allowance, multiplied by the final measurement of work-in-place, with reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections and similar margins.
 - 1. Include installation costs in the purchase amount only where indicated as part of the allowance.
 - 2. When requested, prepare explanations and documentation to substantiate margins claimed.
 - 3. Submit substantiation of a change in scope of work claimed in the change orders related to unit-cost allowances.
 - 4. The Owner reserves the right to establish the actual quantity of work-in-place by independent quantity survey, measure or count.
 - 5. Submit claims for increased costs because of change in scope or nature of the allowance described in contract documents, whether for purchase amount or Contractor's handling, labor, installation, overhead and profit, within 20 days of receipt of change order or construction change directive authorizing work to proceed. Claims submitted later than 20 days will be rejected.
 - a. Change order cost amount shall not include Contractor's or subcontractor's indirect expense except when clearly demonstrated that the nature or scope of work required was changed from what could have been foreseen from the allowance description and other information in contract documents.
 - b. No change to the Contractor's indirect expense is permitted for selection of higher or lower priced materials or systems, of the same scope and nature as originally indicated.

END OF SECTION 01019

CAD FILE REQUEST FORM

DATE OF REQUEST: _____

COMPANY: _____

ADDRESS OF COMPANY: _____

Re: Letter of Authorization for CAD File Use for the following Project:
Gallup Livery MaMA Project No. 1116

*Per your request, Mitchell and Mouat Architects, Inc. will transmit the requested AutoCAD files copied to a CD-ROM, or e-mailed as directed, upon receipt of an original signed copy of this letter with conditions of agreement as stated. **We can only guarantee electronic files in .DWG format for the Architectural portion of the Project and can not be responsible for Consultant's .DWG files.***

1. *By acceptance it is understood and agreed that the data and medium being supplied is to be used only for the project referenced.*
2. *It is further understood and agreed that the undersigned will hold Mitchell and Mouat Architects harmless and indemnify Mitchell and Mouat Architects from all claims, liabilities, losses, etc., including attorney's fees, arising out of the use, misuse, or misinterpretation of the requested files.*
3. *It is understood and agreed that the files transmitted are prepared from AutoCAD files, saved in a .dwg format current at the time of preparation. All files are AutoCAD LT v.2009 or later.*
4. *This information does not waive the responsibility of the Requester to review and verify all actual field conditions.*
5. *When a requested AutoCAD file is used for the purpose of preparing Shop Drawing Submittals, discrepancies between the information contained in the file and actual field conditions are to be clearly highlighted in the Shop Drawing Submittals. Use of these files for Shop Drawing Submittals without prior field verification is not acceptable. (Note: the status of Addenda and/or Bulletin documentation shall also be included in the Shop Drawing Submittals.)*
6. *As a record of information to be transmitted, Mitchell and Mouat Architects will prepare a duplicate back-up for our files, which may be electronic or hard-copy.*
7. *Compensation for providing this material will be as follows: Base Fee of \$75 for 1 to 3 sheets and a Base Fee of \$150 for 4 to 10 sheets; for each additional sheet after 10 the fee is \$25.00 per sheet (i.e., 11 sheets = \$175). Payment must be provided along with a signed copy of this form before files will be released. Please remit to Mitchell and Mouat and allow five working days for processing.*

Bid Pack No. : _____ **Sheets Requested:** _____

Signed: _____ Fee: _____

Printed Name/Title: _____ Phone: _____ Fax: _____

E-mail address: _____

Released (signed by): _____	Mitchell and Mouat Architects, Inc.
Printed Name/Title: _____	Date _____

SECTION 01039 – PROJECT COORDINATION

PART 1 - GENERAL

1.01 DESCRIPTION OF REQUIREMENTS

- A. **The following are responsibilities of the Contractor during construction.**
- B. It is the responsibilities of the General Contractor to determine the best pathway for material installations based on the Schematic locations indicated by the Documents and schedule the appropriate trades to minimize the interferences and to make all systems and installations come together in the allowed space. See below for additional information.

1.02 SECTION INCLUDES:

- A. Contractor's responsibility to Coordinate and Schedule Inspections
- B. Coordination Responsibilities
- C. Alteration Project Procedures
- D. Administrative and supervisory personnel
- E. General installation provisions

1.03 RELATED SECTIONS:

- A. Section 01010 – Summary of Work
- B. Section 01019 – Contract Considerations
- C. Section 01120 – Project Alteration Procedures
- D. Section 01300 – Submittals
- E. Section 01600 - Product Substitutions

PART 2- PROJECT COORDINATION RESPONSIBILITY:

2.01 COORDINATION OF TESTING AND AGENCY INSPECTIONS:

- A. It is the Contractor's responsibility to coordinate and schedule all testing and sampling required of the Work and Contract Documents.
- B. It is the Contractor's responsibility to coordinate and schedule the appropriate State/Local Review Agency inspections as required by the Work.
- C. Coordinate with the Owner/Architect whether the governing agencies is Local or State.
- D. Determine construction schedule and inform the Architect and Owner of timely/required inspections and time periods.
 - 1. Verify the number of inspections required and when in the construction process inspections shall be made.
 - 2. Coordinate with Architect for requirements of Inspection Applications per Agency requirements.
 - 3. **The Contractor shall be aware and coordinate: some Agencies may require that the Architect submit Inspection Application requests.**
- E. Inform the Architect and Owner of scheduled inspections at least 3 days in advance for their participation as required.

2.02 COORDINATION RESPONSIBILITIES:

- A. **The work of Mechanical, Electrical, Plumbing, Fire Suppression, Security, etc. trades is indicated diagrammatically on the drawings. It is the responsibility of the General Contractor/Architectural Trades Contractor to address the installation of this equipment in a 3-dimensional space and schedule the sequence of installations to allow all parts to fit according to the concept of the Documents.**
- B. **Organize, coordinate, and direct the installation of building elements involved in the work of Mechanical, Electrical, Plumbing, Fire Suppression, Security, etc. trades, including all required clearances. The contractor shall be responsible for the layout and coordination between elements of these trades and all other architectural components so that all will fit within the available interstitial spaces, chases, shafts, etc.**

1. **Prepare and submit coordination drawings indicating the work of Mechanical, Electrical, Plumbing, Fire Suppression, Security, etc. trades and any required access panels.**
2. **Pay special attention to avoid conflicts between architectural layout of lighting, diffusers, etc. (visible, architecturally coordinated items) and other elements installed in available interstitial spaces, chases, shafts, etc.**
3. Coordinate locations of all access panels with Architect prior to finishes being applied.
4. Schedule activities in the sequence required to obtain the best results, and in keeping with the intent of the documents. Do not allow one trade to "force out" of proper alignment, fit or coordination based on lack of scheduling.
5. Where space is limited, coordinate installation of different components to assure maximum accessibility for maintenance, service and repair.
6. Make provisions to accommodate items scheduled for later installation.
7. Distribute memoranda to each trade involved outlining required coordination procedures. Include required notices, reports and attendance at meetings.
 - a. Prepare similar memoranda for the Owner and the Owner's separate Contractors where coordination of their Work is required.
8. Coordinate administrative procedures with other activities to avoid conflicts and ensure orderly progress. Such activities include:
 - a. Preparation of schedules.
 - b. Installation and removal of temporary facilities.
 - c. Delivery and processing of submittals.
 - d. Progress meetings.
 - e. Project closeout activities.
9. Verify locations with future work and Code requirements.
- C. Follow routing shown for pipes, ducts, conduit, etc, as closely as practicable. Place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. **Any conflicts shall be brought to the attention of the Architect prior to installation of any element, or they become the responsibility of the contractor who must then eliminate any conflicts to the satisfaction of the Architect.**
- E. Verify that utility requirement characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- F. Verify that rated floor, wall or ceiling assemblies, as referenced by UL or other Standards, are installed in accordance with referenced standard, including structural, mechanical and electrical components of referenced assembly. Coordinate installation of referenced assembly components with all affected trades.
- G. In finished areas, except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- H. Coordinate completion and clean up of work of separate sections in preparation for substantial completion and for portions of work designated for Owner's partial occupancy.
- I. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with contract documents, to minimize disruption of Owner's activities.

2.03 ALTERATION PROJECT COORDINATION AND PROCEDURES:

- A. See **Section 01120 – Project Alteration Procedures** for additional requirements associated with demolition and separations of Work in the scope of the Project.
- B. The Contractor is responsible for complying with the above requirements as required by the particular Scope of Work herein described.

2.04 ADMINISTRATIVE AND SUPERVISORY PERSONNEL AND RESPONSIBILITIES:

- A. Staff Names: Within 15 days of Notice to Proceed, submit a list of Contractor's staff assignments, including Superintendent and personnel at the site; identify individuals, their duties and responsibilities, addresses and telephone numbers.
 1. Post copies in the Project meeting room, the field office, and at each temporary telephone.

2. The Owner and Architect shall be informed in writing of changes to supervisory staff positions, responsibilities or management changes.
- B. It is the sole responsibility of the Contractor's representative to keep all Documents, Schedules and Approvals in an orderly fashion and available at the Project Site.
- C. All Documents originating at the office of the Architect shall be available on-site to the Owner and Architect for reference as needed during the progress of the Project.

PART 3- GENERAL INSTALLATION PROVISIONS:

3.01 INSPECTION OF CONDITIONS:

- A. The Installer/Contractor of each component shall inspect the substrate and conditions under which Work is performed and by continuation, accept previous conditions. Do not proceed until unsatisfactory conditions have been corrected.
- B. Visual Effects: Provide uniform joint widths in exposed Work. Arrange joints to obtain the best effect. Refer questionable choices to the Architect for decision.
- C. Recheck measurements and dimensions, before starting installation.
- D. Install each component during weather conditions and project status that will ensure the best results. Isolate each part from incompatible material as necessary to prevent deterioration.
- E. Coordinate temporary enclosures with inspections and tests, to minimize uncovering completed construction for that purpose.

3.02 MOUNTING HEIGHTS:

- A. Where mounting heights of equipment are not specifically indicated, install components at standard heights for the application indicated. **Refer to 'Typical Barrier-Free Mounting Heights and Clearances' Detail in Documents, and refer any questionable decisions to the Architect. Any conditions affecting accessibility of Public areas shall default to the Michigan Building Code and referenced ANSI 117.1 requirements – which shall be strictly followed.**

3.03 LIMITING EXPOSURES:

- A. Supervise operations to ensure that no part of construction completed or in progress, is subject to harmful or deleterious exposure. Such exposures include:
 1. Excessive static or dynamic loading
 2. Excessive internal or external pressures
 3. Excessive weathering.
 4. Excessively high or low temperatures or humidity.
 5. Air contamination or pollution.
 6. Water or ice.
 7. Chemicals or solvents.
 8. Heavy traffic, soiling, staining and corrosion.
 9. Rodent and insect infestation.
 10. Unusual wear or other misuse.
 11. Contact between incompatible materials.
 12. Theft or vandalism

END OF SECTION 01039

SECTION 01045 - CUTTING AND PATCHING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions, and Division 1 Specification Sections, apply to the work of this Section.

1.02 DESCRIPTION OF REQUIREMENTS

- A. **"Cutting and Patching"** is hereby defined to include, but is not necessarily limited to, the cutting and patching of nominally completed and/or previously existing work, in order to:
- accommodate the coordination of new or revised work;
 - the installation of other work;
 - to uncover other work for access or inspection;
 - to obtain samples for testing or for similar purposes;
 - and is defined to exclude integral cutting and patching during the manufacturing, fabricating, erecting and installing process for individual units of work which may be defined in other areas of these specifications.
1. Drilling the work to install fasteners and similar operation are excluded from the definition of cutting and patching, but may have similar requirements.
 2. Alteration work as specified for existing work in order to accomplish revisions or to accommodate new work is specified separately, and may require cutting and patching but is not specified primarily as cutting and patching work.
 3. Excavating and associated operations of boulder removal, dewatering, shoring and bracing, removal of underground debris, penetration of rock and other barriers, backfilling, and similar work may be required as special forms of cutting and patching, but are recognized primarily as examples of related but separate categories of work not specified in this section.
 4. Restoring or removing and replacing non-complying work is specified separately from cutting and patching, but may require cutting and patching operations as specified herein.
- B. Refer to other sections of these Specifications, including Divisions 15 and 16 – if applicable, for additional cutting and patching requirements and limitations applicable to individual parts of the Work.
- C. **Notwithstanding additional directions, no other reference to 'Cutting and Patching' herein included shall exclude or modify the fact that the required Work shall be done by tradesmen skilled in dealing with the particular material/installation process requiring the Work.**

1.04 QUALITY ASSURANCE

- A. The Contractor is responsible to maintain all systems/structures required for the continuation, reuse or future use of the system/structure, as inferred by the Documents. Failure to coordinate these elements during 'cutting and patching' will not relieve the contractor from the responsibility and cost of repairing to acceptable use.
- B. Requirements for Structural Work:
1. Do not cut and patch structural work in a manner resulting in a reduction of load carrying capacity or load/deflection ratio.
 2. Prior to cutting and patching the following categories of work, obtain Architect's/Engineer's approval to proceed.
 - a. Major structural members including trusses, beams and columns.
 - b. Miscellaneous structural members, including lintels, equipment supports and similar categories or work.
 - c. Bearing walls.
- C. Operational and Safety Limitations:
1. Do not cut and patch operational elements or safety related components in a manner other than intended (including energy performance), in decreased operational life, in increased maintenance, or in decreased safety.
 2. Prior to cutting and patching the following categories of work and similar categories where directed, obtain Architect's/Engineer's approval to proceed with cutting and patching as proposed in submittal by Contractor:

- a. Primary operational systems and equipment
 - b. Control, communication, conveying, and electrical wiring systems
- D. Visual Requirements:
- 1. Do not cut and patch work exposed on the building's exterior or in the building's occupied spaces in a manner that would, in the Architect's opinion, result in lessening the building's aesthetic qualities. Do not cut and patch work in a manner that would result in substantial visual evidence of cut and patch work. Remove and replace work judged by the Architect to be cut and patched in a visually unsatisfactory manner.

1.05 SUBMITTALS:

- A. Proposals for Cutting and Patching: Where prior approval of cutting and patching is required, submit proposal well in advance of time work will be performed, and request approval to proceed. Include the following information, as applicable, in the proposal:
- 1. Describe the nature of the work and how it is to be performed, indicating why cutting and patching is called for. Describe anticipated results of the work in terms of changes to existing work. Where applicable, include cost proposal and suggested alternatives to proposed cutting and patching procedure.
 - 2. List products to be used and firms/tradesmen to perform the work.
 - 3. Provide dates when work is expected to be performed.
 - 4. List utilities that will be disturbed or otherwise be affected by the work, including those that will be relocated and those that will be out of service temporarily. Indicate how long utility service will be disrupted.
 - 5. Where cutting and patching of structural work involves major structural members including trusses, beams and columns; miscellaneous structural members, including lintels, equipment supports and similar categories or work; bearing walls or the addition of or removal of reinforcement; submit details and engineering calculations to show how the cutting and patching is integrated with original structure to satisfy requirements.
 - 6. Architect's approval of cutting and patching work proposal does not waive the Architect's right to require subsequent complete removal and replacement of work found to be cut and patched in an unsatisfactory manner.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. General: Except as otherwise indicated, such directed by these Specifications or directed by the Project Architect, use materials for cutting and patching that are identical to existing materials. If identical materials are not available, or cannot be used, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials for cutting and patching that will result in equal-or-better performance characteristics.
- 1. Obtain approval of the Architect before using materials other than original or specified for patching and repairing.

PART 3 - EXECUTION

3.01 INSPECTION:

- A. Before cutting, examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed. Take corrective action before proceeding if unsafe or unsatisfactory conditions are encountered.
- B. Pre-Cutting and Patching Coordination Meeting: Before the start of cutting work, meet at the work site with all parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict between the various trades. Coordinate layout of the work and resolve potential conflicts before proceeding with the work.

3.02 PREPARATION:

- A. Temporary Support:
- 1. Provide adequate temporary support for work to be cut to prevent any form of structural failure. Do not endanger other work. It is the contractor's responsibility to have a qualified Engineer review/approve all shoring required to maintain the existing

construction.

B. Protection:

1. **Provide adequate protection of other work and existing construction during cutting and patching to prevent damage.**
2. **Provide enclosures to limit exposure of adjacent areas to all debris – air-borne and solid. Keep adjacent areas, not a part of the Work, protected from all associated debris.**
3. **Provide protection of exterior work from adverse weather exposure.**
4. **Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas during normal work hours.**
5. Take all precautions to avoid cutting existing pipe, conduit or ductwork serving the building, but scheduled to be removed or relocated until provisions have been made to bypass them.

3.02 PERFORMANCE:

A. General: Employ skilled trades people to perform cutting and patching. Except as otherwise indicated or approved by Architect/Engineer, proceed with cutting and patching at earliest feasible time in each instance, and complete work without delay.

B. Cutting:

1. Cut work/existing construction by methods least likely to damage work/existing construction to be retained and work/existing construction adjoining. Review proposed procedure with original installer where possible, and comply with their recommendations.
2. In general, where physical cutting action is required, cut work with sawing and grinding tools, not with hammering and chopping tools. Cut holes and slots to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces. Coordinate with other Sections of these Specifications for specialized cutting relative to particular material and installations.
3. Cut through concrete and masonry using a cutting machine such as a carborundum saw or a diamond core drill, unless required to tooth in other Sections of the Documents.
4. Comply with requirements of applicable sections of Division 2 where cutting and patching requires excavating and backfilling.
5. Before cutting, by-pass utility services such as pipe or conduit where services are shown or required to be removed, relocated or abandoned. Cut-off pipe or conduit in walls or partitions shall be removed. Cap, valve or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.

C. Patching:

1. Patch with seams that are durable and as invisible as possible. Comply with specified tolerances for the Work.
2. Where feasible, inspect and test patched areas to demonstrate integrity of installation.
3. Restore exposed finishes of patched areas; extend, where necessary, finish restoration to retained adjoining work/existing construction in a manner that will eliminate evidence of patching and refinishing.
 - a. **Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing the patch, after the patched area has received primer and second coat to a natural termination point or corner.**
4. Patch, repair or re-hang existing ceilings, scheduled to remain, as necessary to provide an even plane surface of uniform appearance against area of patch.

D. Cleaning:

1. Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Remove paint, mortar, oils, putty, and similar items. Thoroughly clean piping, conduit and similar features before painting or finishing is applied. Restore damaged pipe covering to its original condition.

END OF SECTION 01045

SECTION 01120 – PROJECT ALTERATION PROCEDURES

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK:

- A. Making all material, installations, alterations, relocations and temporary installations come together with existing construction.
- B. Removing or altering existing construction as indicated or required to complete the Work intended on the Documents.
- C. Providing “seamless matching” of existing construction with new installations.
- D. Providing temporary controls or barriers to protect personnel and property during construction
- E. Coordinate with **Section 01045 – Cutting and Patching** for additional information and more specifics of patching materials and Work.

1.02 SECTION INCLUDES:

- A. Products and installation for patching and extending Work.
- B. Transition and adjustments.
- C. Repair of damaged surfaces, finishes, and cleaning.
- D. Revision to existing Work as part of a Renovation.
- E. Temporary installations – dust partitions, fire separations, etc. – to be removed prior to occupancy.

1.03 RELATED SECTIONS:

- A. Section 01010 – Summary of Work
- B. Section 01039 – Project Coordination
- C. Section 01045 – Cutting and Patching

1.04 DEFINITIONS OF REQUIREMENTS:

- A. The following are definitions and examples of terms used herein and in the Construction Documents to describe construction procedures noted on the Documents.
- B. Removals:
 1. Removals shall be as indicated and as specified herein and in other sections of these Specifications and shall be performed in a neat and workmanlike manner to limits indicated or specified, or to minimum extent necessary or required for proper removal of existing material and installation of new work. Existing surfaces remaining after demolition, to which new work is to be applied, shall be left in a condition suitable for application of new work.
 2. Removals shall be performed without damage to adjacent retained work; however, where such work is damaged, Contractor shall patch, repair or otherwise restore same to its original or better condition in terms of performance characteristics and visual effect. In all cases the repair shall blend with the requirements of the new construction.
 3. All existing materials, fixtures, and equipment which have been removed or disconnected, but which are not indicated or specified for reuse in new work or called for to be turned over to Owner shall become property of Contractor and shall be removed from site by Contractor at his expense and legally disposed of. On-site storage or sale of salvaged items not designated for Owner reuse will not be permitted.
- C. Demolition:
 1. Demolition shall be the partial or complete elimination of existing construction.
 2. Whereas the Documents may show the limits of demolition, the contractor shall be responsible to determine the exact extent to complete the intent of the Documents and complete all Work required.
- D. Salvage:
 1. To be removed from present location with the intent of re-installation of the material/assembly in the Project at another location.
 2. The Contractor shall take care in the removal and shall store/preserve the material/assembly in its present state until re-installation.
 3. Any material that is scheduled to be salvaged and will not allow reuse shall be immediately brought to the attention of the Architect for direction.
- E. Salvage/Turn over to Owner:

1. The Contractor shall take care in the removal and shall store/preserve the material/assembly in its present state until it is claimed by the Owner.
 2. Coordinate with Owner for location of storage or if material should be immediately turned over to the Owner.
- F. Debris:
1. Debris is the remains of a demolition, relocation or temporary installation procedure.
 2. Debris shall be placed in approved containers to prevent the spread and accumulation of dust and dirt. Debris shall be removed from the area of work as often as necessary, but not less than at least once at end of each work day. All such debris shall be removed from site by Contractor and legally disposed of.
 3. Construction areas, interior and exterior, must be kept in a neat and orderly fashion. Trash, debris and all unusable items must be removed from the site daily. Removal must be supervised.
- G. Protection:
1. Contractor shall take all necessary precautions to adequately protect personnel, and public and private property in the areas of work. Approved barriers and warning signs shall be provided to reroute personnel around areas of dangerous work.
 2. Temporary partitions (noted below) may be required of proper protection methods.
 3. Close openings in exterior surfaces to protect existing work from weather and extremes of temperature and humidity.
- H. Dust Control:
1. Dust resulting from removals shall be controlled so as to prevent its spread to occupied portions of the building and to avoid creation of a nuisance in surrounding areas.
 2. Existing spaces occupied by Owner's personnel shall be isolated from removal operations by means of temporary dust-tight barriers. Dust seals shall be installed on doors entering spaces of human occupancy. Gaskets or other means may be used provided whatever method is used will not impede the use of these exits in any manner during an emergency.
- I. Maintaining access to Site and Buildings:
1. The premises may be occupied during part of the period of alteration and renovation work. Contractor shall not restrict access to building or site by employees, the Public, delivery operations, etc.
 2. Access may be restricted as needed, but all barriers shall be coordinated with the Owner for required occupancies and shall not restrict the emergency egress pathways required for occupancy.

PART 2 -PRODUCTS

2.01 PRODUCTS FOR PATCHING AND EXTENDING WORK:

- A. New Materials: As typically specified in product sections; match existing Products and Work by patching and extending work in a uniform way.
 1. Particular Specifications Sections may be included only for reference for material patching requirements, and should be used as needed.
- B. Type and Quality of Existing Products: Determine by inspecting and testing Products where necessary, referring to existing Work as a standard.

PART 3 -EXECUTION:

3.01 EXAMINATION:

- A. Coordinate with the existing construction and material to establish schedule and/or requirements of new installations.
- B. Verify that demolition/renovation is complete and areas are ready for installation of new Work if demolition is carried out by separate contractor.
- C. Beginning of alteration/restoration Work means acceptance of existing conditions.
- D. General:
 1. See Drawings for notes, schedules, details, plans, etc. and see other Sections of these specifications to establish full extent of removal work required.

2. It is the Contractor's responsibility to coordinate the exact extent of modification with the intent of the Documents.
- E. Masonry Walls and Portions of Masonry Walls for New Openings:
 1. **Materials and methods** required to safely support and prevent any displacement or distress of masonry walls and structural elements during removal of existing masonry walls or portions of existing masonry walls for new openings shall be responsibility of the Contractor. Any damages incurred by displacement or distress of walls or structural elements shall be repaired to as new condition by the Contractor at no additional cost to the Owner.
 2. Once demolition begins the Contractor assumes the responsibility to safely remove and then properly install new construction required to complete the stabilization of the Work.
 3. If conditions noted in the Documents are not present in the field, the Contractor shall make the Architect aware of any inconsistencies before demolition starts.

3.02 PREPARATION:

- A. Cut, move, or remove items as necessary for access to alterations and renovation Work. Replace and restore at completion.
- B. Remove unsuitable material not marked for salvage, such as rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified or required for finished Work.
- C. Remove debris and abandoned items from area and from concealed spaces.
- D. Prepare surface and remove surface finishes to provide for proper installation of new Work and finishes.
- E. Close openings in exterior surfaces to protect existing work [and salvage items] from weather and extremes of temperature and humidity. Insulate duct work and piping to prevent condensation in exposed areas.

3.03 REMOVALS:

- A. General – removing Work or materials from present construction:
 1. See Drawings for notes, schedules, details, plans, etc. and see other Sections of these specifications to establish full extent of removal work required.
- B. Masonry Walls and Portions of Masonry Walls for New Openings:
 1. See Section 3.01.E – above – for requirements of masonry work.

3.04 RELOCATIONS:

- A. General – removing Work or materials from present construction and reinstalling in future Work or other locations:
 1. See Drawings for notes, schedules, details, plans, etc. and see other sections of these specifications to establish full extent of work required.
 2. For items to be removed from existing construction or building, and to be relocated under this contract see Drawings and Sections 02070 or 02072 - if applicable.

3.05 INSTALLATION:

- A. Coordinate work of alterations and renovations to expedite completion sequentially and to accommodate continued Owner occupancy.
- B. Remove, cut, and patch Work in a manner to minimize damage and to provide a means of restoring Products and finishes to original or specified condition in accordance with Section 01045 – Cutting and Patching.
- C. Refinish visible existing surfaces to remain in renovated rooms and spaces, to specified condition for each material, with a neat transition to adjacent finishes in accordance with Section 01045 – Cutting and Patching.
- D. Project work areas: Complete including operational mechanical and electrical work and related services.
- E. In addition to specified replacement of equipment and fixtures, restore existing plumbing, heating, ventilation, air conditioning, electrical, and related systems to full operational condition.
- F. Re-cover and refinish Work that exposes mechanical and electrical work exposed accidentally during the work.
- G. Install Products as specified in individual sections.

H. **See Section 01045 – Cutting and Patching for additional requirements.**

3.06 TRANSITIONS:

- A. Where new Work abuts or aligns with existing, perform a smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.
- B. When finished surfaces are cut so that a smooth transition with new Work is not possible, terminate existing surface along a straight line and at a natural line of division, and make recommendation to Architect/Engineer.

3.07 ADJUSTMENTS TO EXISTING CONSTRUCTION:

- A. Where removal of partitions, bulkheads, walls and or other material results in adjacent spaces becoming one: rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
- B. Where a change of plane of 1/4 inch or more occurs, submit recommendation for providing a smooth transition for Architect/Engineer review.
- C. Trim existing doors as necessary to clear new floor finish. Refinish trim as required.
- D. Fit work at penetrations of surfaces as specified in Section 01045.

3.08 REPAIR OF DAMAGED SURFACES:

- A. Patch or replace portions of existing surfaces that are damaged, lifted, discolored, or showing other imperfections due to the installation or modifications of the Construction Manager.
- B. Repair substrate prior to patching finish.
- C. Where removals leave holes or otherwise damaged surfaces that will be exposed in the finished work, these holes and damaged surfaces shall be patched and repaired with materials and by methods which will result in equal or better work than the work being patched, both in performance characteristics and visual affect. Where work is to be applied to existing surfaces, removals and patching shall produce surfaces that are suitable for the provision of the new work. Patching shall be performed by workmen skilled in the trade involved and shall be performed in a neat and workmanlike manner. Finished surfaces of patched area shall match the existing adjacent surfaces as closely as possible as to texture and finish.
 - 1. **See Section 01045 – Cutting and Patching for additional requirements.**

3.09 FINISHES:

- A. Finish surfaces as specified in individual Product sections.
- B. Specification sections may be included for reference only providing information for finishing of existing materials or surfaces.
- C. Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest natural intersection, transition to different material or terminus.

3.10 TEMPORARY PARTITIONS

- A. These can be temporary walls or construction to keep dust from entering occupied areas during construction operations. Install where required by construction to protect Owner occupied areas and equipment.
- B. **Construct required fire-partitions in compliance with UL Design No. U305 – at a minimum** - to separate areas of construction from continuing occupancy, and with the following details:
 - 1. Pack safing insulation tightly around all conduits, pipes, ducts and other obstructions passing through the partitions.
 - 2. Where partition will be exposed to weather, paint side exposed to the weather.
 - 3. Install fiberglass sill sealer between sole plate and floor, between top plate and ceiling or structural framing system and between studs and abutting vertical surfaces of wall, columns, etc.
- C. Repair any damage to any work that will be the final surface caused by erection and removal of temporary partitions. Repair to match adjacent existing surfaces to satisfaction of Architect.

3.11 PATCHING

- A. Where removals leave holes or otherwise damaged surfaces that will be exposed in the finished work, these holes and damaged surfaces shall be patched and repaired with materials and by methods which will result in equal or better work than the work being patched, both in performance characteristics and visual affect. Where work is to be applied to existing surfaces, removals and patching shall produce surfaces that are suitable for the provision of the new work.
- B. Patching shall be performed by workmen skilled in the trade involved and shall be performed in a neat and workmanlike manner.
- C. Finished surfaces of patched areas shall match the existing adjacent surfaces as closely as possible as to texture and finish.
- D. **See Section 01045 – Cutting and Patching for additional requirements.**

END OF SECTION 01120

SECTION 01300 - SUBMITTALS

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. Construction progress schedules.
- B. Product Submittal Procedures and Schedules
- C. Shop Drawings.
- D. Dimensions
- E. Proposed Products list
- F. Samples
- G. Manufacturers' instructions
- H. Manufacturers' certificates

1.02 RELATED SECTIONS:

- A. Section 01039 - Project Coordination.
- B. Section 01600 - Material and Equipment: For Product substitutions.

1.03 CONSTRUCTION PROGRESS SCHEDULES:

- A. Submit initial progress schedule in duplicate within 15 days after date of Owner-Contractor Agreement for Architect review.
- B. Revise and resubmit as required.
- C. Submit revised schedules with each Application for Payment, identifying changes since previous version.
- D. Submit a horizontal bar chart with a separate line for each major section of work or operation, identifying first workday of each week.
- E. Show complete sequence of construction by activity, identifying work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, float dates, and duration.
- F. Indicate estimated percentage of completion for each item of work at each submission.
- G. Indicate submittal dates required for shop drawings, product data, samples, and product delivery dates, including those furnished by Owner and under allowances.
- H. Indicate key dates for coordination of vacation of contract limits, removal of existing building components designated as the responsibility of the Owner, and other milestones affecting construction progress which require coordination with the Owner's operation.

1.04 PRODUCT/SHOP DRAWING SUBMITTAL PROCEDURES:

- A. Prepare Submittal and Shop Drawing Schedule and submit to the Architect/Engineer for review within 15 days after date of Owner-Contractor Agreement. Schedule shall include a tabular breakdown, by specification Section, of all required submittals as listed in each Section, the anticipated submittal date of each item, and when return is required in order to meet construction schedules.
- B. **Allow a minimum of ten (10) working days for Architect/Engineer review of submittals.**
- C. Transmit each submittal with AIA Form G810, or Contractor's standard transmittal form as acceptable to Architect.
 - 1. Transmit the Submittal/Product sample directly to the responsible party. Example - If the submittals are Mechanical, send directly to the Mechanical Engineer with a copy transmitted to the Architect for their record/file. This procedure shall be similar for all other consulting parties. Subsequently, the Engineer shall transmit all reviewed Submittals to the Architect for their review/comment and final transmittal to the Contractor. This shall be the normal procedure for all Product Submittals. Coordinate with the Architect for products that do not have a clearly defined responsibility.
 - 2. Submit two (2) copies of each shop drawing submitted, plus one original that will be used as a master to be copied and distributed by the Contractor to all pertinent parties. The Contractor shall be responsible for duplications so that the Architect/Engineer/Owner has appropriate information.
 - 3. **Electronic files are preferred for Shop Drawing Review Submittals.**
 - a. Submit an electronic file in the form of a .PDF file or a series of .DPF files.

- b. If the particular Shop Drawing is the responsibility of an Architect's consultant, transmit to consultant and simultaneously to the Architect for record.
 - c. Transmit an electronic copy of a transmittal with all information similar to AIA G810.
 - d. The contractor shall have "stamped and noted" all of his responsibilities on the electronic version of the document.
 - e. The Architect will make all notes, comments and stamps electronically in the .PDF file.
 - f. The Contractor shall receive and subsequently transmit to appropriate subcontractors the Shop Drawings in paper or electronic form as required.
- D. Sequentially number the transmittal forms. Resubmittals shall have original number with an alphabetic suffix.
- 1. Revise and resubmit submittals as required, identify all changes made since previous submittal. Renumber the subsequent submittals accordingly.
- E. Identify project, Contractor, subcontractor or supplier; pertinent drawing sheet and detail number(s), and specification Section number, as appropriate.
- F. **Apply Contractor's stamp, signed or initialed, certifying that review, verification of products required, field dimensions, adjacent construction work, and coordination of information, is in accordance with the requirements of the work and Contract Documents. Submittals not Approved and stamped by the Contractor prior to delivery to the Architect shall be returned unreviewed.**
- G. Schedule submittals to expedite the project, and deliver to the appropriate business address. As agreed to by the Architect/Contractor – send Review copies directly to the Engineer and a transmittal/record copy to the Architect. Coordinate submission of related items.
- H. Provide space for Contractor and Architect/Engineer review stamps.
- I. Identify variations from contract documents and product or system limitations that may be detrimental to successful performance of the completed work.
- J. Distribute copies of reviewed submittals to concerned subcontractors/Owner. Instruct parties to promptly report any inability to comply with provisions.

1.05 SHOP DRAWINGS RESPONSIBILITIES:

- A. The Architect is limited in responsibility of Shop Drawing Review as stated in AIA Document A201-2007 – General Conditions of the Contract for Construction, as herein stated, and referenced elsewhere in these Specifications.
- B. **The Architect will not accept Shop Drawings unless properly reviewed by the subcontractor/supplier and the General Contractor/Construction Manager. The Architect is responsible for design concept as expressed in the Contract Documents. The Contractors are responsible for installation means and integration into other work of the Project. The Architect will not review submitted Shop Drawings unless the Contractor has Approved and stamped each submittal, and noted their responsibility to 'Field Verify' dimensions where applicable, prior to submission to the Architect.**
- C. Refer to Section 01600 – Product Substitutions for proper procedures regarding Substitution Requests.
- D. Prior to and after review, reproduce and distribute in accordance with Article on Product Submittal Procedures noted above and for Record Documents described in Section 01700 - Contract Closeout.

1.06 DIMENSIONS:

- A. The Contractor shall be solely responsible to field measure project conditions prior to submitting Shop Drawings and shall be solely responsible to ensure that dimensions noted on Shop Drawings will be properly accommodated by related construction that takes place after Shop Drawings have been approved.
- B. Any dimensions noted by the Architect on any Shop Drawings shall be determined to be a requirement of the particular detail or installation and shall be coordinated with Field Conditions by the Contractor to be sure that all dimensions and material fit. Any required changes shall be noted to the Architect immediately.
- C. The Architect shall not be requested to fill in dimensions that should be associated with Field Conditions. This is the responsibility of the Contractor.

1.07 PROPOSED PRODUCTS LIST:

- A. Within 15 days after date of Owner-Contractor Agreement, submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
- B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.08 SAMPLES:

- A. Submit samples to illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
- B. Submit samples of finish from the full range of manufacturers' standard colors (unless noted otherwise in individual section), textures, and patterns for Architect's selection.
- C. Include identification on each sample, with full project information.
- D. Submit the number or samples specified in individual specification sections; one of which will be retained by Architect/Engineer.
- E. Reviewed samples that may be used in the work are indicated in individual specification sections.

1.09 MANUFACTURER'S INSTRUCTIONS:

- A. When specified in individual specification sections, submit manufacturer's printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, in quantities specified for product data.
- B. The Contractor shall identify conflicts between manufacturer's instructions and contract documents.

1.10 MANUFACTURER'S CERTIFICATES:

- A. When specified in individual specification sections, submit manufacturer's certificate to Architect for review, in quantities specified for product data.
- B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.

END OF SECTION 01300

SECTION 01500 - CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. Temporary Utilities: Electricity, lighting, heat, ventilation, telephone service, water and sanitary facilities.
- B. Temporary Controls: Barriers, enclosures and fencing, protection of the work and water control.
- C. Construction Facilities: Site access, parking, progress cleaning, project signage, and temporary buildings.

1.02 RELATED SECTIONS:

- A. Section 01010 – Summary of Work
- B. Section 01019 – Contract Considerations
- C. Section 01039 – Project Coordination
- D. Section 01200 – Project Meetings

1.03 TEMPORARY ELECTRICITY:

- A. Connect to existing power service. Power consumption shall not disrupt Owner's need for continuous service.
- B. Provide temporary electric feeder from existing building electrical service at location as directed. Power consumption shall not disrupt Owner's need for continuous service.
- C. Owner will pay cost of energy used. Exercise measures to conserve energy.
- D. Permanent convenience receptacles may be utilized during construction.
- E. Provide adequate distribution equipment, wiring and outlets to provide single-phase branch circuits for power and lighting
- F. If available electrical service is not adequate for Contractor's equipment, the Contractor shall provide temporary power sources and devices on site for his equipment at no cost to the Owner.

1.04 TEMPORARY LIGHTING:

- A. Provide and maintain lighting for construction operations.
- B. Provide and maintain 1 watt/sq. ft. lighting to exterior staging and storage areas after dark for security purposes.
- C. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.
- D. Maintain lighting and provide routine repairs.
- E. Permanent building lighting may be utilized during construction.

1.05 TEMPORARY HEAT:

- A. Utilize Owner's existing heat plant, extend and supplement with temporary heat devices as required to maintain specified conditions for construction operations.
- B. Owner will pay cost of energy used. Exercise measures to conserve energy. Enclose building prior to activating temporary heat in accordance with Article 1.13 - Exterior enclosures in this section.
- C. Prior to operation of permanent equipment for temporary heating purposes, verify that installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.
- D. Maintain minimum ambient temperature of 50 degrees F in areas where construction is in progress, unless indicated otherwise in specifications.

1.06 TEMPORARY VENTILATION:

- A. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes vapors, or gases.
- B. Utilize existing ventilation equipment. Extend and supplement equipment with temporary fan units as required to maintain clean air for construction operations. After any construction use

of Owner's equipment – replace all filters and pads that may have become contaminated by construction debris.

1.07 TELEPHONE SERVICE:

A. Provide, maintain and pay for telephone service to field office at time of project mobilization.

1.08 TEMPORARY WATER SERVICE:

A. Connect to existing water source for construction operations.

B. Owner will pay cost of water used. Exercise measures to conserve water.

C. Extend branch piping with outlets located so water is available by hoses with threaded connections. Provide temporary pipe insulation to prevent freezing.

1.09 TEMPORARY SANITARY FACILITIES:

A. Provide and maintain required facilities and enclosures.

B. Existing facilities shall not be used. Provide and maintain required facilities outside of the existing Park Building. Locate in a discrete area away from the building's main entry. Coordinate with Owner for exact location.

C. Existing facilities shall not be used.

PART 2 – CONTROLS

2.01 BARRIERS:

A. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.

B. Provide protection for plant life designated to remain. Replace damaged plant life.

C. Protect non-owned vehicular traffic, stored materials, site and structures from damage.

2.02 WATER CONTROL:

A. Grade site to drain. Maintain excavations free of water. Provide, operate and maintain pumping equipment.

B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

C. Coordinate with requirements of State and County jurisdictions for barriers and controls.

2.03 INTERIOR ENCLOSURES:

A. Provide temporary partitions as required to separate work areas from Owner-occupied areas, to prevent penetration of dust and moisture into Owner-occupied areas, and to prevent damage to existing materials and equipment.

B. Construction: Framing and gypsum board sheet materials with closed joints and sealed edges at intersections with existing surfaces.

C. Provide a one (1) hour fire resistance rating and 1-" TFSB sound insulation within the wall to provide an STC rating of 45 in accordance with ASTM E90 for all separations between Owner occupied areas and construction.

D. Paint surfaces exposed to view from Owner-occupied areas.

2.04 PROTECTION OF INSTALLED WORK:

A. Protect installed work and provide special protection where specified in individual specification Sections.

B. Provide temporary and removable protection for installed products. Control activity in immediate work area to minimize damage.

C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

D. Protect finished floors, stairs and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

E. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

F. Prohibit traffic from landscaped areas.

- 2.05 PROGRESS CLEANING:
- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
 - B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
 - C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
 - D. Remove waste materials, debris, and rubbish from site periodically and dispose off-site.

- 2.06 SECURITY:
- A. Provide security and facilities to protect work, and existing facilities and Owner's operations from unauthorized entry, vandalism, or theft.
 - B. Coordinate with Owner's security program, if applicable.

PART 3 - FACILITIES

- 3.01 ACCESS ROADS:
- A. Designated existing on-site roads shall be used for construction traffic.
- 3.02 PARKING
- A. Coordinate with the Owner for availability of existing parking on-site.
- 3.03 FIELD OFFICES AND/OR SHEDS:
- A. Coordinate with Owner for an existing location that may be used for an Office. Provide office equipment (FAX, copiers, etc.) and do not use equipment of the Owner.

END OF SECTION 01500

SECTION 01600 - PRODUCT SUBSTITUTIONS

PART 1 - GENERAL

- A. Requests proposed by the Contractor **after award of the Contract** for deviation from specified products, materials, equipment, and/or methods of construction required by Contract Documents are considered "**substitution**" requests.
- B. A Contractor's "Substitution Request Form" (attached herein) may be considered by the Architect when one or more of the following conditions are satisfied, as determined by the Architect. Otherwise, requests will be returned without action except to record noncompliance with these requirements.
1. Extensive revisions to Contract Documents are not required.
 2. Proposed changes are in keeping with the general intent of Contract Documents.
 3. The request is timely, fully documented and properly submitted.
 4. The request is directly related to a "similar or equal" clause or similar language in the Contract Documents.
 5. The specified product or method of construction cannot be provided within the Contract Schedule as previously established. The request will not be considered if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.
 6. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
 7. A substantial advantage is offered the Owner, in terms of cost, time, energy conservation or other considerations of merit, after deducting offsetting responsibilities the Owner may be required to bear. Additional responsibilities for the Owner may include additional compensation to the Architect for redesign and evaluation services, increased cost of other construction by the Owner or separate contractors, and similar considerations.
 8. The specified product or method of construction cannot be provided in a manner that is compatible with other materials, and where the Contractor certifies that the substitution will overcome the incompatibility.
 9. The specified product or method of construction cannot be coordinated with other materials, and where the Contractor certifies that the proposed substitution can be coordinated.
 10. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution shall provide the required warranty.
- C. Substitution requests are permitted under the following terms:
1. All substitution requests must be made directly by the General Contractor (GC) to the Architect. No substitution requests will be accepted from sub-contractors.
 2. **All substitution requests must be accompanied by a signed, fully completed "Substitution Request Form" found at the end of this Section.**
 - a. Submit 3 copies of the "Substitution Request Form" completely filled out.
 - b. In addition, provide the following information, as appropriate:
 - i. Samples, where applicable or requested.
 - ii. A statement indicating the substitution's effect on the Construction Schedule compared to the Schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall Contract Time.
 - iii. Contractor's waiver of rights to additional payment or time that may be necessary because of the substitution's failure to perform adequately.
 3. The General Contractor has reviewed the Request and feels it is necessary or preferable for the completion of the Project, and the GC confirms that the schedule will not be negatively impacted.
 4. Requests for substitution will be considered if received within 60 days after commencement of the Work. Requests received more than 60 days after commencement of the Work may be considered or rejected at the discretion of the Architect.
 5. **The Architect shall be compensated for the time involved in evaluating the Substitution Request and for any and all revisions to the Documents required by the aforementioned change, except where the substitution is required due to the Architect's responsibilities.** The rate of compensation shall be: \$100/hr per staff time involved.

- D. Architect's Actions:
1. Within one week of receipt of the Substitution Request Form, the Architect may request additional information necessary for evaluation.
 2. Within 2 weeks of receipt of the request, or one week of receipt of additional information, which ever is later, the Architect will notify the Contractor of acceptance or rejection.
 3. **If a decision on use of a substitute cannot be made within the time allocated, the product specified shall be incorporated into the Work.**
 4. Acceptance of the Substitution Request Form will be in the form of a Change Order issued by the GC after incorporation into the Work.
- E. The following are not considered substitutions:
1. When an item or material is generic and the Contractor's proposed item is different only in its name, size, color, etc., and not specifically required to comply with an 'or equal' standard.
 2. Substitutions requested made during the bidding period or included with the Bid Form on the Bid Due Date, and accepted prior to award of Contract. See Section 00100 – Instructions to Bidders for additional information.
 3. Revisions to Contract Documents requested by the Owner or Architect.
 4. Specified options of products and construction methods included in Contract Documents.
 5. Compliance with governing regulations and orders issued by governing authorities.
- F. **The Contractor's submittal and, if applicable, the Architect's acceptance of Shop Drawings, Product Data, and/or or Samples which do not comply with the Specifications, does not constitute an acceptable or valid request for substitution, nor does it transfer responsibility for meeting all provisions set forth in these Contract Documents from the Contractor to the Architect.**
- G. **The Architect/Owner maintains the right to reject any and all Substitution Requests at their own discretion.**

END OF SECTION 01600

SECTION 01700 CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to the work of this section.

1.02 SECTION INCLUDES:

- B. Final Acceptance
- C. Starting Systems
- D. Operation and Maintenance Manuals
- E. Warranties

1.03 RELATED SECTIONS:

- A. Section 01019 – Contract Considerations
- B. Section 01039 – Project Coordination
- C. Section 01200 – Project Meetings
- D. Section 01400 – Field Engineering and Quality Control Services

PART 2 – FINAL ACCEPTANCE

2.01 SECTION INCLUDES:

- A. Substantial Completion
- B. Final Inspection

2.02 SUBSTANTIAL COMPLETION

- A. Before requesting inspection for certification of Substantial Completion, the Contractor shall complete the following:
 - 1. In the Application for Payment that coincides with the date for which Substantial Completion is claimed, show 100% completion for the portion of the Work claimed substantially complete.
 - 2. Submit specific warranties and similar documents.
 - 3. Submit record drawings and similar record information.
 - 4. Complete final clean-up.
- B. When contractor considers that the work is substantially complete, he shall prepare for the Architect a list of items to be complete or corrected.
- C. Upon request by the Owner, the Architect will make an inspection to determine the status of completion.
- D. When the Architect, on basis of inspection, concurs that the work is substantially complete, he will:
 - 1. Prepare a Certificate of Substantial Completion of AIA Form G704, accompanied by Contractor's list of items to be completed or corrected, as verified and amended by the Architect.
 - 2. Submit the Certificate to Owner and Contractor for their written acceptance of the responsibilities assigned to them in the Certificate.

2.03 PROJECT COMPLETION REQUIREMENTS:

- A. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit an Application for Payment; reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions. Administrative actions and submittals that precede or coincide with this application include:
 - 1. Occupancy permits.
 - 2. Warranties and maintenance agreements
 - 3. Test/adjust/balance records
 - 4. Maintenance instructions
 - 6. Change-over information related to Owner's occupancy.
 - 7. Final cleaning

- 8. Application for reduction of retainage, and consent of surety
- B. Final Payment Application: Administrative actions and submittals that must precede or coincide with submittal of the final payment application include:
 - 10. Completion of Project closeout requirements
 - 11. Completion of items specified for completion after Substantial Completion.
 - 12. Transmittal of required Project construction records to Owner.
 - 13. Proof that tax, fees and similar obligations have been paid.
 - 14. Change of door locks to Owner's access.

2.03 FINAL INSPECTION

- A. Before requesting inspection for certification of final acceptance and final payment, the Contractor shall submit the following to the Architect:
 - 1. Guarantees and warranties as required by other sections.
 - 2. Evidence of payment and release of liens, per all requirements stated in the General and Supplementary Conditions.
 - 3. A final statement, accounting for changes to the Contract Sum.
 - 4. A copy of the final inspection list stating that each item has been completed or otherwise resolved for acceptance.
 - 5. Consent of surety to final payment.
 - 6. Evidence of continuing insurance coverage complying with insurance requirements.
- B. When the Contractor considers that the work is complete, he shall submit written notice to the Architect that the Work is ready for final inspection and acceptance, and also include a final Application for Payment.
- C. The Architect will make an inspection to verify the status of completion with reasonable promptness.
- D. When the Architect finds the Work acceptable under the Contract Documents, he will issue a Project Certificate for Payment that will approve the final payment due the Contractor.

PART 3 – STARTING SYSTEMS

3.01 SECTION INCLUDES:

- A. Starting systems
- B. Demonstration and instructions
- C. Testing, adjusting, and balancing

3.02 STARTING SYSTEMS:

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Architect/Engineer and Owner seven days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify that wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable manufacturer's representative and General Contractor/Construction Managers' personnel in accordance with manufacturers' instructions.
- G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- H. Submit a written report in accordance with Section 01300 that equipment or system has been properly installed and is functioning correctly.

3.03 DEMONSTRATION AND INSTRUCTIONS:

- A. Demonstrate operation and maintenance of Products to Owner's personnel two weeks prior to date of final inspection.
- B. Demonstrate Project equipment and instruct in a classroom environment located at the project site and instructed by a qualified manufacturers' representative knowledgeable about the Project.

- C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months of substantial completion.
- D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owners' personnel in detail to explain all aspects of operation and maintenance.
- E. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.
- F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- G. The amount of time required for instruction on each item of equipment and system is that specified in individual sections.

3.04 TESTING, ADJUSTING, AND BALANCING:

- A. The contractor will employ, and pay for services of an independent firm to perform testing, adjusting, and balancing. These services shall be coordinated by the Construction Manager.

PART 4 – OPERATION AND MAINTANANCE MANUALS

4.01 SECTION INCLUDES:

- A. Format and content of manuals
- B. Instruction of Owner's personnel
- C. Schedule of submittals

4.02 RELATED SECTIONS:

- A. Section 01300 - Submittals:
- B. Section 01400 - Quality Control: Manufacturers' instructions
- C. Section 01610 - Material and Equipment: Systems demonstration
- D. Individual Specifications Sections: Specific requirements for operation and maintenance data

4.03 GENERAL FORMAT:

- A. Prepare data in the form of an instructional manual.
- B. Binders: Commercial quality, 8-1/2 x 11 inch, three D side ring binders with durable covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- C. Cover: Identify each binder with typed or printed title **OPERATION AND MAINTENANCE INSTRUCTIONS**; identify title of Project; identify subject matter of contents.
- D. Provide tabbed dividers for each separate product and system, with typed description of product and major component parts of equipment.
- E. Text: Manufacturer's printed data, or typewritten data on 20-pound paper.
- F. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- G. Contents: Prepare a Table of Contents for each volume, with each Product or system description identified, in three parts as follows:
 1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect/Engineer, Construction Manager, Subcontractors, and major equipment suppliers.
 2. Part 2: Operation and maintenance instructions arranged by system and/or process flow and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
 - a. Significant design criteria.
 - b. List of equipment.
 - c. Parts list for each component.
 - d. Operating instructions.
 - e. Maintenance instructions for equipment and systems.
 - f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
 3. Part 3: Project documents and certificates, including the following:
 - a. Shop drawings and product data.

- b. Air and water balance reports.
- c. Certificates.
- d. Photocopies of warranties.

4.04 MANUAL FOR MATERIALS AND FINISHES:

- A. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. Provide information for re-ordering custom manufactured Products.
- B. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- C. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.
- D. Additional Requirements: As specified in individual Product specification sections.
- E. Provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

4.05 MANUAL FOR EQUIPMENT AND SYSTEMS:

- A. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.
- B. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
- C. Include color-coded wiring diagrams as installed.
- D. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shutdown, and emergency instructions. Include summer, winter, and any special operating instructions.
- E. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- F. Provide servicing and lubrication schedule, and list of lubricants required.
- G. Include manufacturer's printed operation and maintenance instructions.
- H. Include sequence of operation by controls manufacturer.
- I. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- J. Provide control diagrams by controls manufacturer as installed.
- K. Provide General Contractor's coordination drawings, with color-coded piping diagrams as installed.
- L. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- M. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- N. Include test and balancing reports as specified in Section 01400.
- O. Additional Requirements: As specified in individual Product specification sections.
- P. Provide a listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.

4.06 INSTRUCTION OF OWNER PERSONNEL:

- A. Before final inspection, instruct Owner's designated personnel in operation, adjustment, and maintenance of products, equipment, and systems, at agreed upon times.
- B. For equipment requiring seasonal operation, perform instructions for other seasons within six months.
- C. Use operation and maintenance manuals as basis for instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.
- D. Prepare and insert additional data in Operation and Maintenance Manual when need for such data becomes apparent during instruction.

- 4.07 SUBMITTALS:
- A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect/Engineer will review draft and return one copy with comments.
 - B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.
 - C. Submit 1 copy of completed volumes 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect/Engineer comments. Revise content of all document sets as required prior to final submission.
 - D. Submit two sets of revised final volumes in final form within 10 days after final inspection.

PART 5 - WARRANTIES

5.01 SECTION INCLUDES:

- A. Preparation and submittal of warranties.
- B. Time and schedule of initial operation of equipment

5.02 RELATED SECTIONS:

- A. General Conditions - AIA Document A201: Warranties and correction of work
- B. Section 01019 – Contract Considerations
- C. Individual Specifications Sections: Warranties required for specific Products or Work.

5.03 FORM OF WARRANTY SUBMITTALS:

- A. Bind in commercial quality 8-1/2 x 11 inches, three D side ring binders with durable covers.
- B. Cover: Identify each binder with typed or printed title WARRANTIES with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.
- C. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of Product or work item.
- D. Separate each warranty with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

5.04 PREPARATION OF SUBMITTALS:

- A. Obtain warranties executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties until time specified for submittal.

5.05 TIME OF SUBMITTALS:

- A. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.
- B. Make other submittals within ten days after Date of Substantial Completion, prior to final Application for Payment. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within ten days after acceptance, listing the date of acceptance as the beginning of the warranty period. Coordinate with the Construction Manager for exact time of submittal.

END OF SECTION 01700

SECTION 02062 - SITE DEMOLITION AND REMOVAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the demolition, removal and proper disposal, including end disposal fees, for bituminous pavement and aggregate base; concrete pavement and sidewalk; curb and gutter; sidewalk; brick pavement and concrete underlayment, fence and posts, including fence and post foundation removal; signs and sign foundations; trees and tree roots; buried piping as required; the termination, cutting, plugging and/or capping of all buried utilities as required; and the demolition, removal and disposal of any miscellaneous items required to complete the project.

1.3 REFERENCES

- A. City of Ann Arbor Public Services Department Standard Specifications
- B. Michigan Department of Transportation's (MDOT) 2003 Standard Specifications for Construction

1.4 MEASUREMENT AND PAYMENT

- A. Payment for Site Demolition and Removal shall be included in the Lump Sum price bid for this project.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Not applicable.

PART 3 - EXECUTION

3.1 GENERAL

- A. Areas which have been excavated to below grade shall be adequately protected with barricades or fencing at all times.
- B. Removed materials not to be incorporated into the work shall become the property of this Contractor and shall be disposed of in a proper and approved manner meeting all local, state and federal laws, or as otherwise directed.

- C. The locating of disposal areas and the proper disposal of asphalt and concrete shall be the responsibility of this Contractor at his expense. At no time shall this Contractor stockpile excavated material overnight on or adjacent to the site without the City's permission.
- D. The Contractor shall be responsible for providing and maintaining all temporary pumping necessary to maintain existing utility line flows. The Contractor shall provide pump(s) sized to maintain peak flow condition. Pumps shall be manned 24 hours. Backup pumps for each pumping location shall be maintained and readily available.
- E. All existing utilities, including drainage through existing sewers and drains shall be maintained at all times during demolition and construction and all nearby gutters shall be kept open for drainage. Where existing sewers are encountered in the line of the work which interfere with the construction, the flow in the sewers, including both dry weather flow and storm flow, shall be maintained.
- F. The Contractor shall coordinate intermediate site grading work with site removal items. The site is to be maintained at all times in a condition of maintainable site grades to allow application of temporary soil erosion control measures. (See Section 02213, Soil Erosion and Sedimentation Control.)

3.2 REMOVAL OF TREES, STUMPS AND ROOTS

- A. Trees, stumps and roots shall be removed and disposed of in conformance with MDOT Specification 2.03.09.

3.3 BITUMINOUS PAVEMENT REMOVAL

- A. Site demolition includes removing bituminous surface/base of any thickness from any aggregate and/or concrete base course without the removal of the aggregate or concrete base.
- B. The locating of disposal areas and the proper disposal of asphalt and concrete shall be the responsibility of the Contractor at his expense. At no time shall this Contractor stockpile excavated material overnight on or adjacent to the site without the City's permission, due to the minimal size of the construction area.
- C. Cutting of bituminous surface for removal shall be by saw or jack hammer or other methods approved by the Engineer. Backhoe teeth and jackhammers equipped with spike points are not acceptable for cutting pavement along the edges of each patch; however, they may be used to break-up pavement within the patch for removal.
- D. The edges of the patch shall be as straight and uniform as possible, using the above means and without disturbance to the adjacent pavement.
- E. Any damage to the adjacent pavement, pavement base, sub-base, or utility structures caused as a result of the removal of the bituminous surface is the complete responsibility of the Contractor and shall be corrected by the Contractor, at his expense.
- F. Prior to filling the excavated areas with patching material, if the base has become damp/wet due to rain or due to the Contractor's operation, it shall be dried by aerating or other approved method(s), by the Contractor, at his expense. Prior to patch placement, the excavation(s) shall be cleaned with compressed air to remove dirt and loose material. The Contractor shall use an air source which provides a minimum 90 psi and 150 cubic feet per minute of oil-free air at the nozzle. The base shall then be recompact to 95% of its maximum unit weight as determined

by AASHTO T-180 test with a vibratory plate compactor or other approved method(s), and the exposed edges of each patch shall be tacked by a power sprayer.

- G. Butt joints must be trimmed just prior to bituminous paving and will be included in the Lump Sum payment for Bituminous Removal.

3.4 CONCRETE PAVEMENT, SIDEWALK AND CURB AND GUTTER REMOVAL

- A. In removing concrete pavement, curb, gutter, curb and gutter, sidewalk, crosswalk, and similar structures, removal shall be to existing joints or to a sawed joint. The concrete shall be cut full depth with a concrete saw. The removal procedures used adjacent to structures that are to remain in place, shall be such that no damage occurs to the structure. The use of a crane and ball-type pavement breaker will not be permitted. Sufficient removal shall be made to provide for proper grades and connections in the new work. Earth which may be removed when removing concrete shall be replaced with a similar material at the Contractor's expense.
- B. Concrete pavement, curb, gutter, curb and gutter, integral curb, shall be removed as part of Site Demolition regardless of the type and thickness.
- C. The removal of curb and gutter of any type and ramps shall include full depth saw-cutting at the removal limits, as indicated on the Plans or as directed by the Engineer. All cuts shall be made at the locations specified by the Engineer, and as marked for removal.
- D. Reinforcement bars shall be cut as required, including at all areas of removal. This work shall be included in the removal items, regardless of the size and quantities.
- E. Removed materials not to be incorporated into the work shall become the property of the Contractor and shall be disposed of off-site. Removal units may not be stockpiled overnight on or adjacent to the site.
- F. Removal of sub-base or subgrade, not authorized by the Engineer, shall be replaced and compacted by the Contractor, using materials specified by the Engineer. This work will be completed at the Contractor's expense.
- G. Remove brick paving, mortar bed, concrete underlayment, concrete edging, aggregate base and pavement underdrainage system.

3.5 CONCRETE, ASPHALT, AND SAWCUTTING WORK

- A. The following requirements apply to concrete, sawcutting, and asphalt work (cutting, grinding, drilling, hydro-demolition, etc.):
 1. Discharge of water, dust or debris from concrete saw cutting to storm or sanitary systems is prohibited.
 2. Storm and sanitary drains must be protected from dust and debris.
 3. Any water used during concrete and asphalt work (including sweeping and sawcutting) must be contained and collected for proper disposal. Suggested controls include wet vacuum or absorbents.
 4. Good housekeeping practices must be employed at the jobsite. Minimize dust.

3.6 REMOVING RETAINING WALLS AND DOCKS

- A. Retaining walls and docks shall be removed in such a manner as not to damage work or materials which are to be salvaged or any new work under construction. Explosives shall NOT be used. Portion of existing structures not interfering with the new construction outside of construction limits shall only be removed as indicated on the plans.

- B. Breaking down of the existing structure shall be done in a manner that does not disrupt adjacent building facilities or operations. Coordination with the Construction Manager is necessary to limit disturbance to adjacent buildings and facilities.
- C. It shall be the responsibility of the Contractor to find and pay for suitable off-site disposal areas and fees. No overnight stockpiling of disposed materials shall be allowed.
- D. Concrete required for fill or plugging shall be a minimum 3000 psi, 8-day strength.

END OF SECTION 02062

SECTION 02206 - EARTHWORK SOIL MATERIALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Subsoil and topsoil materials.

1.3 REFERENCES

- A. AASHTO T180 - Moisture-Density Relations of Soils Using a 10-lb (4.54 kg) Rammer and an 18-inch (457 mm) Drop.
- B. ASTM D2487 - Classification of Soils for Engineering Purposes.
- C. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
- D. ASTM D3017 - Test Methods for Moisture Content of Soil and Soil-Aggregate Mixtures.

1.4 SUBMITTALS

- A. Materials Source: Submit name of imported materials suppliers. Provide materials from same source throughout the work. Change of source requires Engineer approval.

1.5 MEASUREMENT AND PAYMENT

- A. Payment for Earthwork Soil Materials shall be included in the Lump Sum bid price for this project.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. Satisfactory soil materials are defined as those complying with ASTM D 2487, designated by group symbols as follows: GW, GP, GM, GC, SM, SW, SC, ML, CL, and SP.

GW: Well-graded gravels and gravel-sand mixtures, little or no fines.

GP: Poorly-graded gravels and gravel-sand mixtures, little or no fines.

- GM: Silty gravels, gravel-sand-silt mixtures.
 - GC: Clayey gravels, gravel-sand-clay mixtures.
 - SM: Silty sands, sand-silt mixtures.
 - SW: Well-graded sands and gravelly sands, little or no fines.
 - SC: Clayey sands, sand-clay mixtures.
 - ML: Inorganic silts, very fine sands, rock flour, silty or clayey fine sands.
 - CL: Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
 - SP: Poorly-graded sands and gravelly sands, little or no fines.
- Unsatisfactory soil materials are defined as those complying with ASTM D 2487, designated by group symbols as follows: MH, CH, OL, OH, and PT.
- MH: Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts.
 - CH: Inorganic clays of high plasticity, fat clays.
 - OL: Organic silts and organic silty clays of low plasticity.
 - OH: Organic clays of medium to high plasticity.
 - PT: Peat, muck and other highly organic soils.

2.2 SOURCE QUALITY CONTROL

- A. Tests and analysis of supplied soil material will be performed in intervals of 1000 cubic yards of supplied material.
- B. If it is determined that materials do not meet specified requirements, change material and retest at no cost to Owner.

2.3 STOCKPILING

- A. Stockpiles will not be allowed on site due to the minimal construction area.
- B. All excavated material will be removed from the site and new specified material provided for any required backfill.

END OF SECTION 02206

SECTION 02212 - SITE EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Excavation of topsoil and removal from the site.
- B. Cutting, grading, filling, embankment construction, removal of excess material from the site and contouring of the site to applicable road, parking lot, landscape, grass surface or structure subgrade.
- C. Furnishing of structural fill from off-site sources as required.
- D. All intermediate site excavation and backfill required to maintain a stable site during demolition phases.

1.3 REFERENCES

- A. AASHTO T180 - Moisture Density Relations of Soils Using a 10 lbs (4.54 kg) rammer and an 18-inch (457mm) drop.
- B. MDOT refers to MDOT 1990 standard Specifications for Construction - Division 2 "Earthwork".
- C. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (shallow depth).
- D. ASTM D3017 - Test Methods for Moisture Content of Soil and Soil-Aggregate Mixtures.

1.4 SUBMITTALS

- A. Submit supplied material testing reports as directed by Construction Manager for all supplied materials.

1.5 MEASUREMENT AND PAYMENT

- A. Payment for Site Earthwork shall be included in the Lump sum price bid for this project.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Structural Fill: As specified in Section 02206.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify existing site conditions are consistent with grading plan cut and fill indications.
- B. Verify that survey benchmark and intended elevations for the work are as indicated. Any discrepancies are to be brought to the Engineer's attention prior to the commencement of grading activities.

3.2 PREPARATION

- A. Identify required lines, levels, contours, and datum.
- B. Stake and flag locations of known utilities.
- C. Locate, identify, and protect utilities that remain from damage.
- D. Protect above and below grade utilities that remain.
- E. Protect benchmarks, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

3.3 EXCAVATION

- A. Cut and grade to within 0.10 of a foot of finished subgrades. Compact resulting subgrades to 95 percent maximum density, as applicable. Smooth transition to be accomplished between existing grade areas and new grades with slopes not steeper than (1) vertical to (4) horizontal, unless otherwise shown. All excavation shall be performed as noted and per MDOT "Earth Excavation", Specification 2.08.09.
- B. Remove excess or unusable excavated material from the site and legally dispose of.

3.4 FILLING

- A. Fill areas to plan contours and elevations with unfrozen materials to within 0.10 of a foot of finished subgrade.
- B. All fill soil under curbs, roadways, structures, walks and parking areas shall be compacted to maximum density as specified in MDOT Section 2.08d1 - Controlled Density Method, before succeeding layers are deposited. In areas to be topsoiled, fill shall be compacted to 90 percent maximum density. Maximum density determined by AASHTO T-180. All filling work shall be performed as noted and per MDOT Section 2.08 for Roadway Related Earthwork for Structure

Embankment. This section requires 100 percent maximum density for structure fills and 95 percent maximum density for roadway related fills.

- C. Maintain allowable range of moisture content of fill materials to attain required compaction density. Contractor shall manipulate soil including disking as required to maintain required moisture range for compaction.
- D. Winter grading per MDOT Specification 2.08.10c.

3.5 SUBGRADE TOLERANCES

- A. Finished grades are shown in the plan with solid contour lines and/or spot elevations. The subgrade elevations shall be as noted on the plan cross-sections and shall be constructed to plus or minus 0.10 foot. Subgrade in lawn areas to be 0.5 foot below finish grade.

3.6 INTERMEDIATE SITE GRADING

- A. The Contractor shall perform all earthwork operations necessary related to intermediate site conditions resulting from the removal of site work items designated for removal. This includes all excavation, backfilling, removal of excess site excavated material, and importing to the site fill material as necessary to create maintainable intermediate site grades that can be stabilized. Intermediate slopes shall be no steeper than 2H to 1V and stabilized as directed in the soil erosion control specification, Section 02213.

3.7 FIELD QUALITY CONTROL

- A. Field inspection will be performed by the Owner.
- B. Compaction testing will be performed in accordance with ASTM D2922 by an independent testing agency retained by the Owner.
- C. If tests indicate work does not meet specified requirements, remove work, replace at Contractor's expense.
- D. Frequency of Tests: One (1) per 500 sq ft of lift and/or per cut surface. The testing grid to be shifted with each successive lift.

END OF SECTION - 02212

SECTION 02213 - SUBGRADE UNDERCUTTING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. This work includes the removal of unsuitable subgrade materials to a depth as required by the Engineer and placing and compacting backfill of the type specified.

1.02 RELATED DOCUMENTS

- A. Attention is directed to Division 00, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.03 BASIS OF PAYMENT

- A. The work covered under these items shall include, but not be limited to, preparation of the subgrade as specified herein; the furnishing, placement, trimming and compaction of the backfill material; and the removal and proper disposal on-site by the Contractor of all excavated material.

1.04 REFERENCES

- A. Michigan Department of Transportation 2003 Standard Specifications.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. MDOT Class II Sand
- B. Selected clay or other on-site materials approved by the Engineer for backfill.

PART 3 - EXECUTION

- A. After the subgrade has been established, the Engineer will promptly inspect the grade to determine the undercutting areas and to determine the limits of such undercutting. After excavation is completed to a required depth, excavated areas shall be evenly graded and compacted. Any excess removed material shall become the property of the Contractor.
- B. Subgrade Undercutting Type I shall be backfilled with selected clay or other material approved by the Engineer for backfill, as directed by the Engineer. The backfill material shall be compacted to not less than 95 percent of its maximum unit weight per AASHTO T-180. Subgrade Undercutting Type II shall be backfilled with MDOT Class II sand and compacted to 95% of its maximum unit weight per AASHTO T-180.

END OF SECTION 02213

SECTION 02215 - SOIL EROSION AND SEDIMENTATION CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2.1 SECTION INCLUDES

- A. This Section includes conducting earthwork and earth change activity operations in a manner to protect Waters of the State of Michigan, storm drains, and adjacent properties from soil erosion and sedimentation. This Section also includes furnishing all materials and placing all temporary and permanent erosion control measures.

1.3 DEFINITIONS

- A. "Waters of the State of Michigan" include the Great Lakes and their connecting waters, lakes, ponds and streams which may or may not be serving as a County drain as defined by the drain code; or any other body of water that has definite banks, a bed and visible evidence of a continued flow or continued occurrence of water or wetlands regulated under Part 303.

1.4 REFERENCES

- A. MDOT refers to the Michigan Department of Transportation 2003 Standard Specifications.
- B. Guidebook of Best Management Practices for Michigan Watersheds.
http://www.michigan.gov/deq/0,1607,+7-135-3313_3682_3716-103496--,00.html

1.5 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies: For earth changes, comply with the following:
 - 1. Part 91, Soil Erosion and Sedimentation Control (SESC) of the Natural Resources & Environmental Protection Act, 1994, PA 451, as amended (Part 91).
 - 2. The U of M Soil Erosion & Sedimentation Control Procedures.

1.6 SUBMITTALS

- A. Submit product information for materials proposed for use.

1.7 PERFORMANCE REQUIREMENTS

- A. Implement the soil erosion and sedimentation control plan including required maintenance during construction and final removal as directed in the plans, and as needed per site conditions and as required by site inspections by U of M Occupational Safety and Environmental Health (OSEH).
- B. Control runoff, soil erosion, and sedimentation. No sediment should leave the site.
- C. Prevent wind erosion. No visible emissions (dust) should leave the site.
- D. Comply with the U of M Soil Erosion and Sedimentation Control Procedures.

1.8 MEASUREMENT AND PAYMENT

- A. Payment for placing, maintaining temporary and permanent soil erosion control measures, and for removing temporary soil erosion control measures shall be included in the Lump Sum price bid for the project.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. All materials to be provided in accordance with MDOT Specifications.

PART 3 - PLACEMENT

3.1 EXAMINATION

- A. Examine site and notify the Owner's representative of any issues that will not allow placement of temporary soil erosion control measures as directed herein.

3.2 GENERAL

- A. Where the following events result in the need for additional or modified soil erosion and sedimentation control installations to meet the objective of the referenced procedures, provide remedial installations on a timely basis.
- B. Unanticipated alterations to the construction schedule.
- C. Unanticipated site conditions except Acts of God such as a tornado or fire.

- D. Install temporary erosion and sedimentation control measures prior to or upon commencement of earthwork activities.
- E. Install an entrance anti-tracking pad with a minimum of 50 feet in length. A geotextile filter fabric should be placed under six (6) inches of limestone aggregate.
- F. Install temporary inlet protection at all adjacent and down-gradient stormwater inlets, catch basins and manholes that may be impacted.
- G. Install silt fence with stakes on the site down gradient from the disturbed area. Toe in six (6) inches of the fencing material.
- H. Place stockpiles and other spoil piles away from the drainage system to minimize sediment transport. Keep as few stockpiles as possible during the course of the project. If the stockpile and/or spoil pile must remain on-site overnight, or if the weather conditions indicate the change for precipitation:
 - 1. Cover the pile with water repellent material to prevent erosion (tarp with sandbags on a rope); or
 - 2. Install silt fencing around the base of the pile to prevent transport of sediment to the stormwater system and wet the pile as needed to prevent wind erosion; or
 - 3. Apply other control methods as appropriate to the site.
- I. Where runoff enters the existing stormwater system, protect the storm system from sedimentation.
 - 1. Temporary inlet protection must prevent the release of sediment and allow for proper drainage:
 - Use of burlap is not acceptable as a SESC measure.
 - If filter fabric is used on drains, ensure the filter fabric is placed over (not under) the storm grates to facilitate maintenance (cleaning) of the controls.
 - If high stormwater flows are expected, use silt sacks in lieu of filter fabric for drain protection. Based on site conditions select regular or high flow silt sacks as appropriate.
- J. Utilize a water truck as needed for dust control.
- K. Utilize a sweeping machine to remove sediment tracked onto the pavement on a daily basis at minimum. Use sweeper more frequently as dictated by site conditions.
- L. Maintain erosion and sedimentation controls on a daily basis until the contract has been completed and accepted. Maintenance shall include:
 - 1. Repair of damaged installations.
 - 2. Replacement of lost soil erosion and sedimentation control measures.
 - 3. Periodic removal of collected silt and sedimentation as required or directed to maintain effectiveness of the silt traps, filters and basins.
- M. Correct non-conforming soil erosion and sedimentation control work on a timely basis within 24 hours, if Waters of the State are being impacted or within five (5) days if not impacting Waters of the State.

- N. Complete permanent soil erosion control measures for all slopes, channels, ditches, or any disturbed land area within five (5) calendar days after final grading or the final earth change has been completed. Maintain temporary control measures until permanent soil erosion control measures are in place and the area is stabilized.
- O. Place all temporary soil erosion control measures. Placement, maintenance and ultimate removal of all temporary measures shall be per U of M Standard Specifications.
- P. All permanent measures shall be placed as soon as practical based on construction scheduling for the project.
- Q. All temporary measures shall be maintained until the Owner's representative determines that the site is stable enough to allow removal.
- R. The Contractor shall place cereal rye seeding at 200 lbs/acre as directed by Engineer as a temporary soil stabilization means in those areas that are not part of the work staging or work areas, but which have been disturbed. Cereal rye seeding, including mulching, shall be performed per MDOT Specification 6.53 for turf establishment.
- S. Intermediate slopes created as a result of phased site removals shall also have mulch blankets for slopes 3H to 1V or steeper. Materials and placement shall be per Spec. Section 02920, Lawns and Grasses. The Contractor shall include up to 400 square yards of high velocity mulch blankets in addition to the amount shown on the plans for intermediate grading use purposes.
- T. The Contractor shall include in his Bid up to 150 feet of silt fence for intermediate soil erosion control work in excess of the amount shown on the plans.
- U. The Contractor shall cooperate and coordinate with the site stormwater inspector in regard to maintenance of erosion control measures.

PART 4 - CLEANUP

- A. Remove temporary erosion control measures after permanent soil erosion measures are in place and the area is stabilized, unless ordered by the Owner's Representative to remain in place. Care shall be taken during removal to prevent soil erosion and sedimentation.

END OF SECTION - 02215

SECTION 02225 - TRENCHING

PART 1 - GENERAL

1.1 **SECTION INCLUDES**

- A. Excavating trenches for utilities from outside building to connection to existing municipal utilities or to outlet or end points.
- B. Bracing, sheeting and supporting the sides of the trench.
- C. Pumping and drainage of groundwater (dewatering).
- D. Compacting fill from top of utility bedding to subgrade elevations.
- E. Backfilling and compaction.
- F. Remove excess material from site and/or utilize excess suitable trench material in site earthwork operations as directed by the Engineer.

1.02 **RELATED DOCUMENTS**

- A. Attention is directed to Conditions of the Contract and to Division 1, General Requirements, which are hereby made a part of this Section.

1.03 **QUALITY ASSURANCE**

- A. AASHTO T180 - Moisture-Density Relations of Soils Using a 10-lb (4.54 kg) Rammer and an 18-inch (457 mm) Drop.
- B. ANSI/ASTM C136 - Method for Sieve Analysis of Fine and Coarse Aggregates.
- C. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
- D. ASTM D3017 - Test Methods for Moisture Content of Soil and Soil-Aggregate Mixtures.
- E. Michigan Department of Transportation (MDOT) - 2003 Standard Specifications for Construction.

1.04 **DEFINITIONS**

- A. Utility: Any buried water main pipe, sanitary sewer pipe, storm sewer pipe, culvert, conduit, or cable and their appurtenances.
- B. Backfill: That material placed into trench from the top of the standard pipe bedding to the ground surface or top of subgrade if under a paved surface.

1.05 FIELD MEASUREMENTS

- A. Verify that survey benchmark and intended elevations for the work are as shown on drawings.

1.06 COORDINATION

- A. Verify that work associated with lower elevation utilities is complete before placing higher elevation utilities.

1.07 MEASUREMENT AND PAYMENT

- A. Payment for Trenching shall be included in the Lump sum price bid for this project.

PART 2 - PRODUCTS

2.01 FILL MATERIALS

- A. As specified in sections governing utility installation or as noted on the plans.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Identify required lines, levels, contours, and datum.
- B. Protect plant life, lawns, and other features remaining as a portion of final landscaping.
- C. Protect benchmarks, existing structures, fences, sidewalks, paving, and curbs from excavation equipment and vehicular traffic.
- D. In crossing over or under any main or lateral sewer, sewer connection, catch basin, water main, service connection, gas main, gas connection, conduit, or any underground improvement, the Contractor shall use all possible care in protecting the same from injury, damage or the free unobstructed continuous use of the same as far as possible, and the Contract work shall be performed in such a manner as will affect the least damage or interference with such improvements or the free and unobstructed use of the same.
- E. Where, through the Contractor's construction procedure or because of poor existing conditions, it is impossible to maintain alignment and grade properly, the Contractor shall, at his own expense, excavate below grade and refill the trench to the proper grade with a compacted 1-1/2" maximum size aggregate, such aggregate to consist of angular shaped, crushed stone or blast furnace slag containing sufficient smaller size aggregate to provide "keying" of the material together in order to insure that the pipe, when laid, will maintain correct alignment and grade.

3.02 EXCAVATION

- A. Excavate subsoil required for all proposed utility lines.
- B. Trenches shall be of sufficient widths and depths to provide adequate room for construction and installation of the work to lines, grades, and dimensions called for on the plans, except the width of a trench from the invert to a height twelve inches (12") above the top of the pipe barrel, shall not be greater than one foot plus the outside diameter of the pipe barrel for pipes 12" to 36" in diameter and 2 foot plus the outside diameter for pipes 42" in diameter and larger, except for 4" to 12" inclusive pipes the width of the trench may be 30". If the maximum trench width, as specified above, is exceeded, unless otherwise shown on the drawings, the Contractor shall install, at his own expense, such concrete cradling or other bedding, as is approved by the Engineer, to support the added load of the backfill.
- C. Where the condition of the ground requires, the sides of the trench shall be securely held by bracing and sheeting which may be removed in units when the level of the backfill has reached a point where it is safe to pull the sheeting.
- D. Sheeting, bracing and shoring shall not be left in place after the completion of the work. Where required to protect the work, adjacent structures or property, sheeting, bracing and shoring shall be left in place, but shall be cut off or left not less than two feet (2') below the established surface grade. Sheeting, bracing, or shoring so required to be left in place shall be considered as incidental to the work.
- E. Do not interfere with 45° bearing splay of foundations.
- F. Adequately protect any newly-laid concrete from injury resulting from ground water or sewage or from the handling of water or sewage. No drainage ditches shall be placed within the area to be occupied by any structure, except as permitted by the Engineer.
- G. Hand trim excavation as necessary. Remove loose matter.
- H. Remove lumped subsoil, boulders, and rocks.
- I. Stockpile excavated material and remove excess or unsuitable material not being used from site, unless otherwise directed by the Engineer. Excavated material may be used in backfilling around pipes and other structures provided it is suited for such a purpose.

3.03 BACKFILLING

- A. Prior to backfilling, all underground utilities encountered shall be adequately protected by the use of supporting concrete or timber bents (to be left in place) of such a size and construction as to effectively prevent failure of the utility in settlement.
- B. Backfill trenches to contours and elevations with unfrozen materials according to one of the following specified manners as determined by the location of the trench or the edge of trench nearest the existing pavement, roadway, sidewalk, driveway or parking areas.

Near or Under Proposed or Existing Pavement (Under or within a 1:1 influence line of the bottom of any pavement).

Granular Fill: Place and compact MDOT Class II or 2NS granular materials in continuous layers not exceeding 6 inches compacted depth with each layer compacted to not less than 95% of maximum unit weight at optimum moisture content per AASHTO-T180.

Open Space Areas (Outside a 1:1 influence of the bottom of any pavement)

Native Soil Fill: Place and compact material in continuous layers not exceeding 8 inches compacted depth with each layer compacted to 85% of maximum unit weight. This material is to be clean non-organic with unit weight exceeding 125 lbs/ft³.

Utility Structure Backfill. Backfill (granular fill as specified in paragraph (i) above) shall not be placed against any portion of a structure until the structure has passed inspection and has been approved by the Engineer for backfilling. All trenches should be backfilled as soon as inspection is completed in order to avoid unnecessary risk or damage to the structure and also to reduce the risk of accidents involving the public.

- C. Frozen backfill materials are not permitted under any circumstance whatsoever.
- D. Wherever compaction is required, it shall be accomplished by suitable mechanical compaction equipment. If a bulldozer or other machine is used to place the backfill material, no material shall be pushed or dropped into the trench, but shall be placed on the sloping ends of the completed backfill, and allowed to roll in place to the bottom of the trench.
- E. Contractor shall regrade the trench backfill as necessary during the life of the Contract.
- F. Remove surplus fill materials from site.

3.04 TOLERANCES

- A. Top Surface of Backfilling: See plan typical cross-section. Fill to appropriate subgrade elevation.

3.05 FIELD QUALITY CONTROL

- A. Compaction testing will be performed by Owner-employed testing agency.
- B. Compaction testing will be performed in accordance with ASTM D2922 and AASHTO T-180.
- C. If tests indicate work does not meet specified requirements, remove work, replace and re-compact at Contractor's expense.
- D. Field inspection shall be performed by the Owner's Representative or the Construction Manager.

3.06 PROTECTION OF FINISHED WORK

- A. Protect finished work from construction loading.
- B. Reshape and re-compact fills subjected to vehicular traffic during construction.

END OF SECTION 02225

SECTION 02231 - AGGREGATE BASE COURSE AND SUBBASE COURSE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. This Section includes furnishing and placing aggregate base and sub-base courses.

1.3 REFERENCES

- A. AASHTO T180 - Moisture-Density Relations of Soils Using a 10-lb (4.54 kg) Rammer and an 18-inch (457 mm) Drop.
- B. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
- C. ASTM D3017 - Test Methods for Moisture Content of Soil and Soil-Aggregate Mixtures.
- D. Michigan Department of Transportation - Division 3 - 2003 Standard Specifications for Construction.
- E. City of Ann Arbor Public Sewer Department Standard Specifications.

1.4 MEASUREMENT AND PAYMENT

- A. Payment for Aggregate Base Course will be included in the lump sum price for the project.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. All materials shall meet the City of Ann Arbor Public Sewer Department Standard Specifications Division III for City Roadwork and MDOT Specifications for Site Work.
- B. Aggregate Base: As specified on the plan.
- C. Aggregate Sub-Base: As specified on the plan.
- D. Site Fill: Materials per "Earthwork Soil Materials", Section 02206.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify substrate has been inspected, gradients and elevations are correct, and dry.

3.1.1 AGGREGATE PLACEMENT

- A. Spread aggregate over prepared substrate to the required total compacted thickness.
- B. Place aggregate in maximum eight (8) inch layers and compact to 95 % M.D.
- C. Level and contour surfaces to elevations and gradients indicated.
- D. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.
- E. Use mechanical tamping equipment in areas inaccessible to compaction equipment.
- F. Placement shall conform to MDOT Specification 2:11, Subbase and 3.01, Aggregate Base Course for Site Work.
- G. Placement shall conform to City of Ann Arbor Public Services Department Standard Specifications for City street work.

3.2 TOLERANCES

- A. Flatness: Maximum variation of 1/2 inch measured with 10 foot straight edge.
- B. Scheduled Compacted Thickness: Within 1/2 inch.
- C. Variation from True Elevation: Within 1/4 inch.

3.3 FIELD QUALITY CONTROL

- A. Field inspection and materials testing will be performed by the Construction Manager.
- B. Field compaction testing will be performed in accordance with ASTM D2922 and AASHTO T180.
- C. If tests indicate Work does not meet specified requirements, remove Work and replace at Contractor's expense.
- D. Frequency of Tests: As determined by Engineer.

END OF SECTION - 02231

SECTION 02509 - BITUMINOUS PAVEMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. This Section includes furnishing and placing bituminous pavement.

1.3 REFERENCES

- A. City of Ann Arbor Public Sewer Standard Specifications for City Streets and Roads.
- B. MDOT refers to Michigan Department of Transportation 2003 Standard Specifications for Construction - Division 4 for Site Work.

1.4 QUALITY ASURANCE

- A. Perform work in accordance with City of Ann Arbor Public Services Division Standard Specifications and MDOT Specifications as referenced.

1.5 MEASUREMENT AND PAYMENT

- A. Payment for bituminous pavements shall be included in the Lump Sum price bid for this project.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. All materials to be in accordance with City of Ann Arbor Public Services Division Standard Specifications Division III Material Standards for City Streets and MDOT Division 4 Specifications for Site Work.

2.2 ASPHALT PAVING MIX

- A. Leveling Course: As specified on plans and typical details.
- B. Wearing Course: As specified on plans and typical details.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify base conditions under provisions of Section 02231.
- B. Verify that compacted granular base is dry and ready to support paving and imposed loads.
- C. Verify gradients and elevations of base are correct.

3.2 SUBBASE

- A. Section 02231 - Aggregate Base Course forms the base construction for work of this Section.

3.3 PLACING ASPHALT PAVEMENT

- A. Place leveling course to compacted thickness as noted on plan cross-sections. Lifts as noted on plans.
- B. Place wearing course within 24 hours of placing and compacting leveling course.
- C. Place wearing course to compacted thickness as noted on plan cross-section lifts as noted on plans.
- D. Install gutter drainage castings and frames and manholes castings and frames in correct position and elevation.
- E. Compact site work pavement by rolling per MDOT Specification 4.00. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.
- F. City street work placement to conform to the City of Ann Arbor Public Services Division Standard Specifications Division V.
- G. If temporary paving is utilized the Contractor can place any type mix. The temporary paving is to be removed and replaced with hot mix asphalt or concrete pavement per plan requirements when project final work is performed.

3.4 TOLERANCES

- A. Flatness: Maximum variation of 1/4-inch measured with 10-foot straight edge.
- B. Scheduled Compacted Thickness: Within 1/4-inch.

3.5 FIELD QUALITY CONTROL

- A. Field inspection and testing shall be performed by the Construction Manager per MDOT Specification 4.00.
- B. Materials testing shall conform to MDOT Specification 4.00 for Site Work and per City of Ann Arbor Public Services Division Standards Specifications for City Street Work. Testing performed by the Construction Manager.

3.6 PROTECTION

- A. Immediately after placement, protect pavement from mechanical injury for two (2) days.

END OF SECTION - 02509

SECTION 02511 - PAVEMENT MARKING

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. The work of this section shall include the application of Reflectorized Pavement markings as indicated herein.

1.02 RELATED DOCUMENTS

- A. Attention is directed to Division 00, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.03 BASIS OF PAYMENT

- A. Includes all labor, material and equipment costs associated with the pavement marking as specified herein.

1.04 REFERENCES

- A. Michigan Department of Transportation 2003 Standard Specifications.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. All materials shall meet Michigan Department of Transportation Specification 811.02 and 811.03.

Paint and Glass Beads:811.03 for Fast Dry Paints. Requirements for testing are waived, and the materials will be accepted for quality on the basis of a written certification from the supplier or Contractor that the materials should meet specification requirements. The right is reserved to make check tests of materials as may be deemed necessary, and a confirmed pattern of non-compliance with Specifications will be grounds for Contract Unit Price adjustments.

- B. Cold Plastic Tape

The materials shall meet the current MDOT specification for cold plastic tape 811.03.

- C. Hot Applied Thermoplastic

Materials shall meet the current MDOT specifications for thermoplastic material per Specification 811.03.

PART 3 - EXECUTION

- A. Application rates and methods for pavement marking material shall be per MDOT Specification Table 811-1 and conform to Specification 811.03.

- B. Application Limitation:
- (i) Fast-Dry Paint - Pavement temperature to be 41° or higher.
 - (ii) Markings shall not be placed when the surface is damp.
 - (iii) Markings to be performed during the period April 1 to November 15.
 - (iv) Pavement shall be 49° or higher per thermoplastic markings.
 - (v) The inlay method will be utilized for installation of cold plastic tape unless otherwise approved by Engineer per MDOT Specification 811.
- C. Layout for markings shall be the responsibility of Contractor.
- D. New markings and/or retraced markings shall be placed, with reasonable tolerance, in their proper locations. Where existing skip lines are to be retraced with lines of equal length, per this Contract, they shall be retraced with a longitudinal tolerance of one (1) foot and a transverse tolerance of two (2) inches. Where existing skip lines are to be retraced with lines of a shorter length, per this Contract, the new lines shall be painted within the length of the previous line. Incorrect or misplaced markings shall be obliterated and remarked in accordance with Engineer's instructions.
- E. Prior to the application of pavement marking, it shall be the Contractor's responsibility that the pavement surfaces are clean, dry, and free of all foreign materials. The Contractor shall be responsible for removal of heavy and/or hardened deposits of foreign material, not easily removed by a power broom, such as, but not limited to, shoulder pull-back gravel deposits at driveways and road intersections.
- F. Skip Line
- Skip line of the color specified shall be applied as a four (4) inch minimum width line on a cycle of 12-1/2 feet of line and 37-1/2 feet of skip. The paint shall be applied uniformly at a minimum rate of four (4) gallons of paint per mile of skip line.
- G. Double Line - Yellow
- Double line of the color specified shall be applied as one solid or one solid and one skip four (4) inch minimum lines separated by a 2-8 inch space. The paint shall be applied uniformly at a minimum rate of thirty-two (32) gallons per mile of double line.
- H. Pavement Edge Lines - White and Yellow
- Pavement edge line of the color specified shall be applied as a solid four (4) inch minimum width line. The paint shall be applied uniformly at a minimum rate of sixteen (16) gallons per mile of edge line.
- I. Equipment
- Per MDOT Specification 811.03.

END OF SECTION

SECTION 02515 - UNIT PAVERS

PART 1 - GENERAL

1.01 **DESCRIPTION OF WORK:**

- A. Provide all material (accessories required, whether specifically noted or not) for a complete installation of unit pavers as recommended by the manufacturer and/or noted herein.
- B. Preparing all base and setting beds for installation of pavers.
- C. Providing and installing all perimeter edge-restraint.
- D. Providing and installing all perimeter drainage material and systems.

1.02 **RELATED SECTIONS:**

- A. Section 02212 – Earthwork
- B. Section 02509 – Bituminous Pavements
- C. Section 02521 - Concrete Paving
- D. Section 06070 – Pressure-Treated Wood Products

1.03 **SUBMITTALS FOR REVIEW:**

- A. Submit under provisions of Section 01300.
- B. Shop Drawings
 - 1. Unit paver samples indicating full range of color and texture to be expected in completed work.
 - 2. Edge restraints.
 - 3. Clearly show proposed cuts, header courses and installation details.
- B. Product Data: Submit manufacturer's product data for each product and process specified as work of this Section and incorporated into items of site pavers during installation.
- C. Erect field-constructed mock-up on site in location and size indicated.

1.04 **QUALITY ASSURANCE:**

- A. Weather Limitations: Protect unit paver work against freezing when temperature is 40 deg F (4 deg C) and falling. Protect unit paver work in hot weather to prevent excessive evaporation of setting beds and grout.

1.05 **FIELD MEASUREMENTS:**

- A. Verify that field measurements are as indicated on drawings and as instructed by the manufacturer.
- B. Provide/coordinate layout of all material with boundaries and other site equipment/installations prior to start of paver installation.
- C. Coordinate the work with plumbing/electrical rough-in and installation of associated and adjacent components.

PART 2 – GENERAL PAVER PRODUCTS:

2.01. **GENERAL MATERIALS:**

- A. Concrete Pavers: ASTM C 936, solid concrete interlocking units, made from normal weight aggregates in sizes and shapes indicated.
 - 1. Paver Type A (**Base Bid**) - Field and Borders
 - Paver: Unilock – 'Town Hall' stone 4" x 9-3/4" x 2-3/4" nominal
 - Color: 3 color blend (blended at site).
 - Pattern: Running bond with header
 - 2. Paver Type B (**Alternate Bid**) – Field and Borders
 - Paver: Unilock - 'Cophorne' stone 2-1/2" x 7-7/8" x 2-3/8" nominal
 - Color: 3 color blend (blended at site).

Pattern: Running bond with header

2.02. ACCEPTABLE MANUFACTURERS:

- A. UNILOCK: 12591 Emerson Drive, Brighton, Michigan 248-437-7037.
- B. or approved equal

2.03. GENERAL REQUIREMENTS:

- A. Pavers Physical Requirements:
 - 1. Minimum 4000 psi compressive strength
 - 2. Maximum absorption of 5%, tested per ASTM C-140.
 - 3. Freeze/Thaw Requirements: no breakage and not greater than 1% less in dry weight of any individual unit through 50 freeze/thaw cycles; tested per ASTM C-67, Section 8.
 - 4. Dimensional Variation: length, width and height of specimens shall not differ by more than 1/8" from approved samples.

2.04. INSTALLATION METHODS:

- A. Setting Materials for Permeable Applications (**Base Bid**):
 - 1. Aggregate for Setting Bed: 2" min. 29A.
 - 2. Aggregate for Base Course: 6" min. 6AA.
 - 3. Weed-Block: non-woven fabric installed above undisturbed earth
 - 4. Joint Filler Material: Joint sand meeting ASTM C 144.
- B. Setting Materials for Standard Applications (**Alternate Bid**):
 - 1. Aggregate for Setting Bed: 1" min. 2NS.
 - 2. Aggregate for Base Course: 6" min. 21AA.
 - 3. Weed-Block: non-woven fabric installed above undisturbed earth
 - 4. Joint Filler Material: 2NS or jointing sand.

2.05. ACCESSORIES:

- A. Plastic Edge Restraints: Triangular-shaped polyvinyl chloride extrusions,
 - 1. 1-3/4 inches high (or as required to coordinate with particular paver) by 3-1/2 inches wide by 15 feet long, rigid type for straight edges and flexible type for curved edges.
 - 2. Pipe connectors and 3/8 inch by 12 inch long steel spikes.
 - 3. As manufactured by:
 - a. Snap Edge
 - b. Pave Tech Inc.
 - c. or equal
- B. Sand for Joints: ASTM C 144 except use aggregate graded with 100 percent passing the No. 8 sieve and 95 percent, the No. 16 sieve.

PART 3 - EXECUTION

3.01 INSPECTION AND PREPARATION:

- A. Examine the areas and conditions under which work of this section will be installed. Verify that adjacent materials are dry and ready to receive insulation. Verify mechanical and electrical services within the above ceiling space have been tested and inspected.

3.02 GENERAL INSTALLATION:

- A. Paving stone installation shall begin from a corner, straight edge or base line as shown on the drawings. Layout limits of each type of paver and place them in patterns shown on the drawings.
- B. All edges of pavers shall be butted tight to concrete paving, installed edges or curbs as shown on the drawings.
- C. String lines shall be used to insure that paving stones are set true to grade.
- D. Paving stones must be set to meet elevations of adjacent units and paving.

- E. **Cutting:** all cuts required where paving stone units do not fit at joints shown on the plan and/or adjacent concrete paving shall be done neatly, with a masonry saw, to leave a clean edge and similar appearing 'hand tight' joint. **No single paver shall be installed that is less than 1/3 the size of a full paver without cutting/modifying multiple units.** Contractor shall review all cutting in field with Architect.
- F. Paving stones shall be placed 'hand tight' and level on the loose base or leveling course.
- G. The leveling course must not be disturbed nor individual units pre-compacted.
- H. A minimum three passes of a plate vibrator (minimum 5,000 pounds compaction force) shall be made to set paving stones in leveling course prior to filling joints.
- I. All voids and joints are to be filled by sweeping and vibrating sand into them as specified.
- J. Sweeping and vibrating shall be done alternately and continued until all joints are full.
- K. Pavement shall be swept clean and excess sand removed.

3.03 PAVER INSTALLATION:

- A. Set paving units in patterns indicated with uniform joints of width indicated.
- B. Expansion and Control Joints: Of width and at locations recommended/required by paver manufacturer.
- C. Provide edging for all locations not restrained by other, fixed construction. Install edging prior to placing masonry paving units.
- D. Tamp and beat pavers with a wooden block or rubber mallet to obtain full contact with setting bed.

3.04 SETTING SYSTEM:

- A. Place weed block over existing sub-base material.
- B. Place and compact aggregate for base over compacted subgrade and weed block to thickness required to accept leveling course (setting bed) and concrete masonry paving units. Compact base to 95 percent of ASTM D 1557 laboratory density.
- C. Place aggregate for leveling course and screed loose to thicknesses specified for particular installation.
- D. Treat leveling course with soil sterilizer.
- E. Set concrete masonry paving units with a minimum joint width of 1/16 inch and a maximum of 3/16 inch or hand tight against units with spacer bars.
- F. Vibrate unit into base with plate vibrator capable of 3,000 to 5,000 lb. compaction force.
- G. Fill joints with sand.

3.05 COMPLETION:

- A. Site Cleanup: All unused materials, cutting remnants and other debris shall be removed from the job site upon completion of the installation. Left over pavers from bundle shall be turned over to Owner.

END OF SECTION 02515

SECTION 02521 - CONCRETE PAVING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section includes the following:
 - 1. Concrete sidewalks, concrete curb and gutter.

1.03 REFERENCES

- A. Michigan Department of Transportation (MDOT) 2003 Standard Specifications for Construction – Division 6 and 7.
- B. ACI 304 - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.
- C. ANSI/ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement.
- D. ANSI/ASTM D1751 - Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction.
- E. ASTM C33 - Concrete Aggregates.
- F. ASTM C94 - Ready Mix Concrete.
- G. ASTM C150 - Portland Cement
- H. ASTM C260 - Air-Entraining Admixtures for Concrete.
- I. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.
- J. ASTM C494 - Chemical Admixtures for Concrete.
- K. FS TT-C-800 - Curing Compound, Concrete, for New and Existing Surfaces.

1.04 QUALITY ASSURANCE

- A. Perform work in accordance with MDOT Specifications.
- B. Obtain cementitious materials from same source throughout.

PART 2 - PRODUCTS

2.01 CONCRETE MATERIALS

- A. Concrete Materials: As specified on plan details. Provide in accordance with MDOT Specifications - Sections 601.02, 701.02.

2.02 CONCRETE MIX - BY PERFORMANCE CRITERIA

- A. Mix and deliver concrete in accordance with MDOT 601.03.
- B. Provide concrete to the following criteria: As specified on plan details.
- C. Use accelerating admixtures in cold weather only when approved by Architect/Engineer. Use of admixtures will not relax cold weather placement requirements.
- D. Use calcium chloride only when approved by Architect/Engineer.
- E. Use set retarding admixtures during hot weather only when approved by Architect/Engineer.

2.03 SOURCE QUALITY CONTROL

- A. Submit proposed mix design of each class of concrete to Engineer for review prior to commencement of work.
- B. Tests on cement and aggregates will be performed by the Contractor to ensure conformance with specified requirements.
- C. Test samples in accordance with MDOT Specifications.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify base conditions under provisions of Section 02231.
- B. Verify compacted granular base is acceptable and ready to support paving and imposed loads.
- C. Verify gradients and elevations of base are correct.

3.02 SUBBASE

- A. Section 02231 - Aggregate Base and Subbase Courses forms the base construction for work of this Section.

3.03 PREPARATION

- A. Moisten base to minimize absorption of water from fresh concrete.
- B. Coat surfaces of manhole, catch basin frames with oil to prevent bond with concrete pavement.

- C. Notify Engineer a minimum 24 hours prior to commencement of concreting operations.

3.04 FORMING

- A. Place and secure forms to correct location, dimension, and profile.
- B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.
- C. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

3.05 REINFORCEMENT

- A. Place reinforcement in accordance with plans and per MDOT Specifications.

3.06 PLACING CONCRETE

- A. Place concrete in accordance with MDOT Specifications.
- B. Ensure reinforcement, inserts, embedded parts, and formed joints are not disturbed during concrete placement.
- C. Place concrete continuously between predetermined construction joints.

3.07 JOINTS

- A. Place expansion and contraction joints as shown on plans. Align curb, gutter, and sidewalk joints.
- B. Place joint filler between paving components and building or other appurtenances. Recess top of filler 1/4 inch.
- C. Provide keyed joints as indicated.

3.08 FINISHING

- A. Sidewalk Paving: Light broom, radius to 1/2-inch and trowel joint edges.
- B. Curbs and Gutters: Light broom.
- C. Inclined Ramps: Broom perpendicular to slope.
- D. Place curing compound on exposed concrete surfaces immediately after finishing. Apply in accordance with manufacturer's instructions.

3.09 FIELD QUALITY CONTROL

- A. The owners representative shall employ a testing firm to take cylinders and perform slump and air entrainment tests in accordance with ACI 301.
- B. One (1) additional test cylinder will be taken during cold weather and cured on-site under same conditions as concrete it represents.

- C. One (1) slump test will be taken for each set of test cylinders taken.
- D. The testing firm shall maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

3.10 PROTECTION

- A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.

END OF SECTION 02521

SECTION 02608 - MANHOLES AND COVERS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. This Section includes installation of pre-cast and masonry concrete manhole structures and lid frames and covers.

1.02 RELATED DOCUMENTS

- A. Attention is directed to Conditions of the Contract and to Division 1, General Requirements, which are hereby made a part of this Section.

1.03 QUALITY ASSURANCE

- A. ANSI/ASTM C55 - Concrete Building Brick.
- B. ASTM A48 - Gray Iron Castings.
- C. ASTM C478 - Pre-cast Reinforced Concrete Manhole Sections.
- D. ASTM C923 - Resilient Connectors Between Reinforced Concrete Manhole Structures and Pipes.
- E. International Masonry Industry All-Weather Council (IMIADC): Recommended Practices and Guide Specification for Cold Weather Masonry Construction.
- F. Michigan Department of Transportation (MDOT) 2003 Standard Specifications for Construction.
- G. City of Ann Arbor Public Services Department Standard Specifications.

1.04 ENVIRONMENTAL REQUIREMENTS

- A. Cold Weather Requirements: IMIADC - Recommended Practices and Specifications for Cold Weather Masonry Construction.

1.05 SUBMITTALS

- A. Submit shop drawings for all manhole structures for review by Engineer.
- B. Product information and/or manufacturer's certification showing design requirements for material removals are met with product(s) provided.

1.06 MEASUREMENT AND PAYMENT

- A. Payment for manholes and covers shall be included in the Lump Sum bid price for this project.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Manhole Sections: Reinforced pre-cast concrete in accordance with ASTM C478 with gaskets in accordance with ASTM C923; manhole section joints shall be of the O-ring type. Precast manhole in City right-of-way shall conform to City of Ann Arbor Standard Specification for Construction Division II, Design Standard and Division III Materials Standard.
- B. Concrete brick and concrete block masonry units shall conform to City of Ann Arbor Public Services Department Standard Specifications Division II - Design Standards and Division III Materials in City right-of-way and to MDOT Specification 8.04 for site work.

2.02 COMPONENTS

- A. Lid and Frame: As noted on drawings.
- B. Manhole Steps: Plastic coated steel unless otherwise noted on the plans.
- C. Base Pad: Pre-cast concrete with mesh reinforcement unless otherwise approved by the Engineer.

2.03 CONFIGURATION

- A. Shaft Construction: As noted on plans.
- B. Clear Inside Dimensions: As noted on plans.
- C. Step location and spacing: As noted on plans.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify excavation for manholes is correct.

3.02 PREPARATION

- A. Coordinate placement of inlet and outlet pipes.

3.03 MANHOLES - GENERAL

- A. Manholes shall be constructed of the type and in accordance with the details shown on the plans, and at all locations shown on the plans, or as laid out in the field by the Engineer.

- B. Connections to manholes shall be properly supported and braced where not resting on original ground so that any settlement will not disturb the connection.
- C. Excavation shall be carried to the depth required to permit the construction of the required base and bottom of excavation shall be trimmed to a uniform horizontal bed. The excavation shall be sufficiently wide to allow for shoring, bracing, or form work, should any or all be necessary.
- D. Place pre-cast base pad. A poured 3500 psi (Class A) concrete base without steel reinforcement may be substituted for a pre-cast base when approved by the Engineer.
- E. Place manhole sections plumb and level.
- F. Construct flow channel with MDOT 3000 psi conc. Shape as required. Trowel smooth.
- G. Set cover frames and covers level to required elevations so that no subsequent adjustment shall be necessary.

3.04 MANHOLES - MASONRY

- A. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- B. Concrete block manholes and inlets shall be built of the size and dimensions shown on the drawings. The block shall be clean, laid in a full bed of mortar and thoroughly bonded by completely filling the vertical end grooves with mortar so as to interlock with the adjacent block. The mortar beds and joints shall not exceed 3/4-inch thickness. The vertical joints are to be completely filled with the joints on the inside face rubbed full and struck smooth as the manhole is built up. Blocks used in the top cone sections of manholes shall be as designed, laid and spaced so that only full-length units are required to lay any one (1) course. The outside surface of each sanitary manhole shall be plastered with mortar to a depth of not less than 1/2-inch. The cement mortar shall be one (1) part Portland cement, blended with 10% of hydrated lime and two (2) parts of mason sand, thoroughly mixed by hand or machine with sufficient clean water for a stiff, workable mix. All masonry materials, sand and water shall be heated to over 50° during freezing weather, and the completed work shall be covered and protected from damage by freezing.
- C. Form flush mortar joints.
- D. Lay masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- E. Cut and fit for pipe.
- F. Set cover frames and covers level to required elevations so that no subsequent adjustment shall be necessary.
- G. Construct channels with MDOT 3000 psi concrete. Shape as required. Trowel smooth.

3.05 MANHOLES - PRE-CAST

- A. All sanitary manholes shall be precast. Contractor may construct storm sewer manholes with pre-cast reinforced concrete units in lieu of concrete, brick and block manholes in accordance with the following conditions:
- (i) Maximum diameter of sewer outlet in any pre-cast unit shall be 18-inch.
 - (ii) No openings shall be made in pre-cast units which would leave less than 24 inches of undisturbed pre-cast pipe or would remove more than 30% of the circumference along any horizontal plane.
 - (iii) Structures for sewers larger than 18-inch, or those not meeting the opening requirements, shall be built of block or brick up to a minimum of 8 inches above the top of sewer, with pre-cast units being used above this point. Where pre-cast units rest on the block or brick, the groove in the pre-cast unit shall be filled with mortar.
 - (iv) Openings for the outlet sewer shall be pre-cast with a diameter of 3 inches larger than the outside diameter of the outlet pipe. All other openings shall be made in the field after manhole has been constructed. When pre-cast units are used for manhole construction, the manhole casting shall be placed on at least three (3) courses of masonry work for future adjusting purposes.
 - (v) All vertical openings in concrete block structure walls shall be completely filled with mortar. All vertical wall joints shall be cement pointed.
 - (vi) Lids and frames shall be as called for or shown on the Details as standard, except that bolted water-tight frames and covers shall be used whenever manholes are constructed in easements and/or water courses or as noted on the plans.
 - (vii) When completed, manholes shall be cleared of scaffolds and cleaned of surplus mortar or other foreign materials.

3.06 SCHEDULES

- A. Storm Sewer Manholes: Pre-cast concrete sections or masonry units, plastic coated steel steps, minimum 48-inch inside dimension or as noted, to depth indicated, with castings and frames indicated on the drawings.
- B. Sanitary Sewer Manholes: Pre-cast concrete sections, plastic coated steel steps, minimum 48-inch inside dimension or as noted, depth as indicated on the drawings.

3.07 WASTE MANAGEMENT

- A. Separate and recycle waste materials, packaging, and all other materials in accordance with the Waste Management Plan and to the maximum extent possible, send to reuse or recycle centers.

END OF SECTION 02608

SECTION 02667 - SITE WATER MAIN, SERVICES AND APPURTENANCES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. This Section includes installation of water main, piping, and fittings and/or water services and appurtenances, including excavation and the placing of compacting backfill.

1.02 RELATED DOCUMENTS

- A. Attention is directed to Conditions of the Contract and to Division 1, General Requirements, which are hereby made a part of this Section.

1.03 QUALITY ASSURANCE

- A. AASHTO T180 - Moisture-Density Relations of Soils Using a 10-lb (4.54 kg) Rammer and an 18-inch (457 mm) Drop.
- B. ANSI/AWWA C104 - Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
- C. ANSI/AWWA C111- Rubber-Gasket Joints for Ductile Iron and Grey-Iron Pressure Pipe and Fittings.
- D. ANSI/AWWA C600 - Installation of Ductile-Iron Water Mains and Appurtenances.
- E. City of Ann Arbor Public Services Department Standard Specifications.

1.04 DEFINITIONS

- A. Bedding: Fill placed under, beside and 12 inches over top of pipe, prior to subsequent backfill operations.

1.05 SUBMITTALS

- A. Manufacturer's Installation Instructions: Document special procedures to install products specified.
- B. Pipe Certification
 - (i) All pipe and fittings delivered to the job shall be accompanied by certification papers showing that the pipe and fittings have been tested in accordance with the applicable specifications and that pipe and fittings meet the City of Ann Arbor Public Services Department Standard Specifications Division IV Materials for Ductile Iron Pipe.
 - (ii) Each piece of ductile iron pipe shall have its own weight and class designation conspicuously painted or cast on it. All other pipe materials shall have the class designation painted thereon. Where required, other designation marks shall be painted

on pipe or fittings to indicate correct location in the pipe line in conformity to a detailed laying schedule.

1.06 PROJECT RECORD DOCUMENTS

- A. Contractor to identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.07 REGULATORY REQUIREMENTS

- A. Conform to City of Ann Arbor Public Services Department Standard Specifications.

1.08 MEASUREMENT AND PAYMENT

- A. Payment for Site Water Main Services and Appurtenances shall be included in the Lump Sum bid price for this project.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Pipe
 - (i) Water Main, Joints, and Miscellaneous Fittings: All water main, joints and appurtenances shall conform to the current design standards and specifications of AWWA, ANSI and the City of Ann Arbor Public Services Department Division IV Materials
 - (ii) Copper Water Pipe, Fittings, and Appurtenances: Water pipes 2-inch and smaller in diameter shall be Type "K" copper water tube conforming to ASTM Specification B88-49.
 - (iii) Fittings and specials shall be flared tube connectors conforming to Mueller Models No. H-15200 and H-10386 with rod 84140, unless otherwise specified on the plans.
- B. Bedding Materials
 - (i) Bedding: Granular material meeting MDOT Class II Sand or 2NS.
- C. Concrete and Mortar
 - (i) Class A concrete shall meet City of Ann Arbor Public Services Department Standard Specifications.
 - (ii) Class X concrete shall meet City of Ann Arbor Public Services Department Standard Specifications.

- (iii) Cement mortar shall meet City of Ann Arbor Public Services Department Standard Specifications.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that building service connection and municipal utility watermain size, location, and elevation are as indicated.
- B. Inspect all materials before placing in the trench; and if defective, mark "REJECTED" and remove from the site.
- C. All water main construction installation shall conform to City of Ann Arbor Public Services Department Division IV Specifications.

3.02 PREPARATION

- A. Trenching to be performed per Section 02225.
- B. Hand trim excavations to required elevations. Correct over-excavation with MDOT Class II sand or as directed by Engineer.
- C. Remove large stones or other hard matter which could damage piping or impede consistent backfilling or compaction.
- D. Distribute the pipe at the site as required. Care shall be exercised to prevent injury to the pipe in handling. Proper tools and implements, satisfactory to the Engineer for safely handling the pipe and other materials, shall be provided by the Contractor. Pipe must be protected from falling, either from truck to ground or into the trench, and when distributed along the line or stored near a road must be kept clear of danger for damage to passing vehicles.
- E. Remove scale, dirt and any foreign material on inside of pipes before lowering into trench and assembling.

3.03 BEDDING

- A. Excavate pipe trench. Hand trim excavation for accurate placement of pipe to elevations indicated.
- B. Place bedding material at trench bottom, level fill materials in one continuous layer not exceeding 6 inches compacted depth with granular material sand, and compact to 95 percent maximum unit weight by AASHTO T-180.
- C. Backfill around sides and to 12 inches above top of pipe with granular material, tamped-in-place, and compacted to 95 percent. Particular care shall be taken to assure fitting all spaces under, around, and above top of the pipe.

- D. Maintain optimum moisture content of bedding material to attain required compaction density.

3.04 INSTALLATION - PIPE

- A. In general, pipe shall be installed per the City of Ann Arbor Public Services Department Standard Specifications Division IV and the following conditions:
- B. The construction and testing of the water main must be completed prior to the removal of the existing water main. Upon the completion and testing of the new or relocated water main, the tie-ins at the existing water main will be completed simultaneously to minimize the time necessary to shut down the existing water main. The Contractor must coordinate with the City and the University and provide written notice 72 hours prior to shutting down the existing water main.
- C. Pipe shall be laid to depths to provide cover over the top of the pipe as noted on the plans.
- D. Unless otherwise directed, pipe shall be laid with bell ends facing in the direction of laying. After a length of pipe is placed in the trench, the spigot shall be centered in the bell of the adjacent pipe, the pipe shoved into position and brought to a true alignment, and secured with sand tamped under and on each side of the pipe, excepting at bell holes. No earth or other foreign matter shall be allowed to enter the joint space. Copper pipe tubing may be laid starting at its point of connection with the main.
- E. Wherever deflections at joints are required by changes in grade or alignment or to plumb valve stems, the deflection at any bell and spigot joint or mechanical joint shall not exceed maximum deflection recommended by the manufacturer of the pipe and joint used or as specified in the City of Ann Arbor Standard Specifications Division IV.
- F. Where necessary to cut pipe, cutting shall be done with approved tools. Cut ends of pipe shall be square and regular. Cutting shall be done in a manner to avoid damage to lining and coating and per City of Ann Arbor specifications.
- G. To prevent trench water from entering the pipe, joints which for any reason may not be completed as the pipe is laid shall be thoroughly packed with approved material in a manner so as to make them watertight. Open ends of fittings shall be tightly closed with approved plugs and well packed as shall the end of the last pipe laid whenever work is not in progress.
- H. Tools or other objects shall not be stored or left in the pipe.
- I. Connection of existing public water main will be accomplished in the procedures as detailed in the City of Ann Arbor Public Services Department Standard Specifications Division IV.
- J. Joint Restraint
 - (i) Concrete thrust blocks shall be placed at all bends, dead-ends, fittings, tees, hydrants, and at crosses as indicated on the plans or as required by the

Engineer. Thrust blocks shall bear against undisturbed soil in all instances and shall have sufficient bearing area to withstand the full resultant axial thrust of the pipe at test pressure. In no case shall the block be smaller than the size indicated on the standard detail plans of the local unit of government having jurisdiction over the same. All thrust blocks shall be approved by the Engineer before backfilling.

(ii) Where noted on plans to restrain the joints, MEGA-LUG or Field-Lok gaskets shall be used. Concrete thrust blocks will also be required as noted in (i) above.

K. In unstable soil conditions, unless other means of restraint are provided, thrust blocks are to be supported by piling driven to solid foundations or by removal of the unstable soils and replacement with ballast of sufficient stability to resist the thrusts. Any method used shall be approved by the Engineer.

L. The balance of the backfill shall be completed in accordance with the backfill requirements as indicated in these plans and Specifications and per the City of Ann Arbor Public Services Department Standard Specifications Division IV.

M. Pipe Placed in Casings:

(i) Pipes shall be placed in casing pipe in the location shown on the drawings. Under this work, the Contractor shall place the carrier pipe, place bulkheads, and complete all backfilling.

(ii) All casing pipe installed shall be per the City of Ann Arbor Public Services Department Standard Specifications and Plan details.

(iii) The annular space at the ends of the casing pipe shall be bulkheaded with a minimum of 8-inch thick solid masonry with a 1/2-inch fiberboard cushion between the masonry and carrier pipe.

(iv) All necessary skidding materials required to protect the carrier pipe shall be furnished.

3.05 INSTALLATION - APPURTENANCES

A. Hydrant, gate well covers, valve boxes, free-standing fire department connection and other structures shall be set to grade as noted on the plans, and installed per the City of Ann Arbor Public Services Department Standard Specifications Division IV.

B. Hydrants

(i) At points indicated on the drawings, a hydrant assembly shall be installed consisting of a hydrant, 6-inch gate valve, a 3-piece adjustable cast iron valve box, and all pipe necessary for a complete job. Valves shall be located 3+ feet from hydrant, as shown on typical setting detail on the standard drawings.

(ii) Each hydrant shall be set truly plumb and held firmly braced in this position. Connection of the hydrant to the branch shall be made by means of mechanical joints, as

herein specified under jointing. All joints between the hydrant and the main shall be restrained by the same means as used for water main as specified under "Joint Restraint."

(iii) After hydrants have been set and tested, the part above ground shall be painted with two (2) coats of first quality metal protective paint. Color will be the standard of the City of Ann Arbor.

C. Gate Valves, Boxes, and Wells

(i) Gate valves shall be of the size, and installed at the location, as shown on the plans. They shall be set square with the line of the main; and, unless otherwise directed by the Engineer, all gate valves shall be set with stems plumb. At each side of each gate valve installed, the Contractor shall furnish and install in the main, a corporation stop the size of which is to be shown on the detail drawing.

(ii) Gate valve boxes or curb boxes shall be set plumb with top at proposed grade.

(iii) Gate wells shall be constructed of pre-cast reinforced concrete sections to the size as shown on the water main Standard Detail Plans.

D. Fittings, Valves, Hydrants and Adapters

(i) Valves, fittings and hydrants shall be installed per the City of Ann Arbor Public Services Department Standard Specifications Division IV.

E. Service Connection and Taps

(i) Water main shall be tapped for corporation cocks where shown on the drawings or required for testing and sterilization of the completed water main. For ductile iron pipe, the cocks shall be threaded directly into the pipe.

F. Fire Department Connection

(i) Free-standing fire department connection shall be installed per the City of Ann Arbor Public Services Department Standard Specifications Division IV.

3.06 TESTING

A. All water main and appurtenances installed shall be pressure tested and chlorinated per the City of Ann Arbor Public Services Department Standard Specifications. The testing work shall be considered included in the Lump Sum project bid price. The Contractor shall furnish all labor, material, and equipment necessary to properly test the water main system.

B. Hydrant Testing: Each hydrant assembly shall be tested by the Contractor. The test shall consist of flushing the hydrant for a minimum of 10 minutes. During the testing period the 6-inch gate valve shall be closed and opened. The Contractor shall furnish the necessary hoses for disposal of Construction Manager-furnished water. A testing schedule and method of disposing of flushing water shall be submitted to the Engineer for approval. The Contractor shall coordinate the testing schedule with the local fire department.

- C. Flushing, Hydrostatic Testing and Sterilization: Flushing and sterilization of water main shall be conducted per the City of Ann Arbor Public Services Department Standard Specifications Division IV.

3.07 WASTE MANAGEMENT

- A. Separate metal waste, packaging, and all other materials in accordance with the Waste Management Plan and place in designated areas for recycling or reuse.
- B. Close and tightly seal all partly used containers and store protected in well-ventilated, fire-safe area at moderate temperature. Set aside for reuse by Owner or deliver to reuse and/or recycle facilities if not removed from site for Contractor's reuse.

END OF SECTION 02667

SECTION 02723 - STORMWATER SEWERAGE SYSTEM

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. This Section includes installation of stormwater sewer piping, trench drains, fittings and accessories; connecting storm sewer drainage systems to outfalls; and constructing of drainage structure inlets and catch basins.

1.02 RELATED DOCUMENTS

- A. Attention is directed to Conditions of the Contract and to Division 1, General Requirements, which are hereby made a part of this Section.

1.03 REFERENCES

- A. AASHTO T180 - Moisture-Density Relations of Soils Using a 10-lb (4.54 kg) Rammer and an 18-inch (457 mm) Drop.
- B. ANSI/ASTM C76 - Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
- C. ANSI/ASTM C443 - Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.
- D. ANSI/ASTM D2321 - Recommended Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe.
- E. ANSI/ASTM D2729 - PolyVinyl Chloride (PVC) Sewer Pipe and Fittings.
- F. ANSI/ASTM D3034 - Type PSM PolyVinyl Chloride (PVC) Sewer Pipe and Fittings.
- G. Michigan Department of Transportation (MDOT) 2003 Standard Specifications for Construction.
- H. City of Ann Arbor Public Services Department Standard Specifications.

1.04 DEFINITIONS

- A. Bedding: Fill placed under, beside, and 12 inches over top of pipe, prior to subsequent backfill operations.

1.05 SUBMITTALS

- A. Manufacturer's Installation Instructions: Indicate special procedures required to install products specified.
- B. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.06 PROJECT RECORD DOCUMENTS

- A. Contractor to identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.07 REGULATORY REQUIREMENTS

- B. Conform to City of Ann Arbor Public Services Department Standards Specifications.

1.08 MEASUREMENT AND PAYMENT

- A. Payment for site stormwater sewerage system shall be included in the Lump Sum bid price for this project.

1.09 DELIVERY, STORAGE AND HANDLING

- A. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Pipe
 - (i) Pipe: as noted on the plans
 - (ii) Trench Drains: as detailed on the plans
- B. Concrete and Mortar
 - (i) Cement Mortar , Class A and X: Concrete shall meet the City of Ann Arbor Public Services Department Standard Specifications for Public Street Work.
 - (ii) Concrete shall meet MDOT 2003 Standard Specifications for 35S concrete for site work.
- C. Drainage Structures:
 - (i) Lid and Frame: As specified on drawings.
 - (ii) Precast concrete manholes and grade rings shall conform to the current ASTM Specifications for precast reinforced concrete manhole sections, Serial Designation C478. Manhole section joints shall be of the O-ring type. Manholes constructed of

concrete block or brick shall be constructed in accordance with the structure details in the Contract Drawings and Section 02608.

- D. Bedding Materials
 - (i) Bedding: MDOT Class II or 2NS granular material.

PART 3 - EXECUTION

3.01 GENERAL

- A. All site stormwater sewerage systems installed shall conform to the City of Ann Arbor Public Services Division for Public Street Work and MDOT Specifications as referenced for Site Work. Additionally, the following conditions shall also apply.

3.02 EXAMINATION

- A. Contractor to verify that trench cut is ready to receive work; and excavations, dimensions, and elevations are as indicated on drawings.
- B. All materials will be inspected before placing in the trench, and if defective, marked "REJECTED", and removed from the site by the Contractor.

3.03 PREPARATION

- A. Trenching to be performed per Section 02225.
- B. Hand trim excavations to required elevations. Correct over excavation as directed by Engineer.
- C. Remove large stones or other hard matter which could damage piping or impede consistent backfilling or compaction.
- D. The pipe shall be distributed at the site by the Contractor as required and care shall be used to prevent damage to the pipe. Equipment for safely handling the pipe and other materials shall be provided by the Contractor. Pipe must be protected from falling, either from truck to ground or into the trench; and when distributed along the line or stored near a road, pipe must be kept clear of danger of damage to passing vehicles.

3.04 TRENCHING AND BEDDING

- A. Excavate pipe trench in accordance with Section 02225. Hand trim excavation for accurate placement of pipe to elevations indicated.
- B. Place bedding material at trench bottom, level materials in continuous layer not exceeding four (4) inches compacted depth.
- C. Maintain optimum moisture content of bedding material to attain required compaction density.

3.05 INSTALLATION - PIPE

- A. Contractor shall maintain sewer service at all times. Therefore, Contractor shall provide temporary pumping sewerage as required to complete the sanitary sewer installation.
- B. All pipe shall be laid to the line and grade called for on the plans. The finished work shall be straight and shall be sighted through between manholes. Maximum variation from plan slope shall be 1/8-inch in 10 feet. (0.10%).
- C. Construction shall begin at the outlet end of whichever run of pipe, in whichever project(s), deemed most appropriate for beginning of construction by the Engineer, and shall proceed upgrade with spigot ends pointing in the direction of flow. The pipe shall be laid on a sand or stone cushion per standard details shown on plans. The pipes shall be centered in the bells or grooves and pushed tight together to form a smooth and continuous invert. After laying of pipe, care shall be taken so as not to disturb its line and grade. Any pipe found off grade or out of line shall be relaid properly by the Contractor.
- D. The remainder of the pipe bedding, free from large stones and lumps, shall be placed with care in 6-inch layers to an elevation providing 12 inches of cover over the pipe. Each layer shall be thoroughly compacted by power tamping.
- E. If through carelessness, or for other reasons, the subgrade may have been disturbed and refilling is necessary, the Contractor shall install, at his own expense, concrete cradling or other bedding as approved by the Engineer.
- F. Completion of the pipe bedding and backfilling the remainder of the trench shall follow closely behind the laying of the pipe. In no case shall more than 100 lineal feet of trench remain open during construction. All sewer built during any work period shall be completely backfilled before work is completed for such period and before the crew leaves the site.
- G. Where pipe is laid in wet trenches or trenches with running sand, the Contractor shall provide and use mechanical means for pulling the pipe home in making up the joint and for holding the pipe joint tight until completion of the line. Mechanical means shall consist of a cable placed inside of the pipe with a suitable winch, jack, or come-along for pulling the pipe home and holding the pipe in position.
- H. Mechanical means shall be used for pulling home all rubber gasketed pipe regardless of trench condition where manual means, in the opinion of the Engineer, will not result in pushing and holding the pipe home. However, mechanical means shall be provided for pulling home and holding all rubber gasketed pipe 24-inch in diameter or less, regardless of the trench condition.
- I. All pipe joints on sewers 36-inch diameter and larger shall be pointed on the inside with approved non-shrink cement mortar composed of one (1) part cement and two (2) parts sand. On bituminous mastic joints, the compound shall be removed to a depth of 3/4 of an inch from the inside of the joint and pointed as described above.

3.06 CONNECTIONS TO EXISTING STRUCTURES

- A. Where the plans call for connections to existing manholes or sewer laterals, the Contractor shall exercise due care to insure that the structure as a whole is not damaged.

The Contractor shall drill holes at 4" center to center around periphery of opening to create a plane of weakness before breaking section out. New channels in the bottom of the manhole shall be constructed using Class A concrete. Upon completion of the connection, the Contractor shall repair any damage done and shall restore the structure to its original condition, including all patching and cement plastering necessary.

3.07 INSTALLATION – TRENCH DRAINS, INLET, AND CATCH BASIN STRUCTURES

- A. Trench drains, catch basins and inlets shall be constructed at the locations as indicated by the plans of the type and material as given in these Specifications and as shown on the plans.
- B. Form bottom of excavation clean and smooth to correct elevation.
- C. Form and place cast-in-place or pre-cast concrete base pad, with provision for storm sewer pipe end sections.
- D. Level top surface of base pad to receive pre-cast concrete or block structure wall sections.
- E. Establish elevations and pipe inverts for inlets and outlets as indicated.
- F. If pre-cast catch basin units are used, the catch basin casting shall be set on at least three (3) courses of masonry for future adjusting purposes.
- G. Mount lid and frame level in grout, secured to top cone section to elevation indicated.
- H. Refer to Section 02608 for manhole construction.

3.08 STUBS, CONNECTIONS, BULKHEADS, AND MISCELLANEOUS ITEMS OF WORK

- A. The Contractor shall furnish all material, labor, dewatering devices, sheeting/shoring, and shall install and/or construct the stubs, connections, bulkheads, and miscellaneous items of work called for on the plans and/or Specifications.
- B. Unless otherwise noted on the drawings, stubs shall consist of one full length of sewer pipe, 4 ft or longer properly bedded, with watertight plug or brick and cement bulkhead.
- C. Bulkheads installed per Section 02725.

3.09 FIELD QUALITY CONTROL

- A. Field inspection and pipe testing will be performed by the Contractor and performed per the City of Ann Arbor Public services Department Standard Specifications Division IV.
- B. Request inspection 48 hours prior to beginning construction.
- C. Compaction testing will be performed in accordance with AASHTO-T180 method by an independent testing agency retained by the Owner or Construction Manager.

3.10 PROTECTION

- A. Protect finished Work.
- B. Protect pipe and aggregate cover from damage or displacement while backfilling operation is in progress.

3.11 WASTE MANAGEMENT

- A. Separate and recycle waste materials, packaging, and all other materials in accordance with the Waste Management Plan and to the maximum extent possible, send to reuse or recycle centers.

END OF SECTION 02723

SECTION 02832- CONCRETE SEGMENTAL RETAINING WALL

PART 1 - GENERAL

1.01 WORK/SECTION INCLUDES:

- A. The work covered by this section includes the furnishing of all labor, materials, equipment and incidentals for the design, inspection and construction of a modular concrete retaining wall including drainage system as shown on the Construction Drawings and as described by the Contract Specifications. The work included in this section consists of, but is not limited, to the following:
 - 1. Design, inspection and certification by a registered professional engineer.
 - 2. Excavation and foundation soil preparation.
 - 3. Furnishing and placement of the leveling base.
 - 4. Furnishing and placement of the drainage system.
 - 5. Furnishing and placement of geotextiles.
 - 6. Furnishing and placement of segmental retaining wall facing units.
 - 7. Furnishing and compaction of drainage and retained soils.
- B. This Work shall be a Concrete Paver Wall, vertical stack, with no offset – refer to Drawings.
- C. Products and installation requirements herein are as required by Unilock for supply and installation of their RETAINING WALL system. These specifications do not exclude other manufacturers from supply products that meet the **Design Intent** and these specifications.

1.02 GENERAL CONDITIONS:

- A. All Drawings and general provisions of Contract, including General Conditions, Supplementary Conditions, Division 0, and Division 1 Specification sections apply to the Work of this Section.

1.03 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION:

- A. Section 03200 - Concrete Reinforcement: Supply of accessories for placement by this section.

1.04 RELATED SECTIONS:

- A. Section 02212 – Earthwork
- B. Section 02509 – Bituminous Pavements
- C. Section 02521 - Concrete Paving
- D. Section 06070 – Pressure-Treated Wood Products

1.05 REFERENCE STANDARDS:

- A. Engineering Design:
 - 1. NCMA Design Manual for Segmental Retaining Walls, Second Edition.
 - 2. NCMA TEK 2-4 - Specifications for Segmental Retaining Wall Units.
 - 3. NCMA SRWU-2 - Determination of Shear Strength between Segmental Concrete Units.
- B. Segmental Retaining Wall Units:
 - 1. ASTM C 140 - Sampling and Testing Concrete Masonry Units
 - 2. ASTM C 1262 - Evaluating the Freeze - Thaw Durability of Manufactured Concrete Masonry Units and Related Concrete Units.
 - 3. ASTM C 33 - Specification for Concrete Aggregates
 - 4. ASTM C 90 - Standard Specification for Load-Bearing Concrete Masonry Units
 - 5. ASTM C 150- Specification for Portland Cement
 - 6. ASTM C 595 - Specification for Blended Hydraulic Cements
- C. Geotextile Filter;
 - 1. ASTM D 4751 - Standard Test Method for Apparent Opening Size
- D. Soils;
 - 1. ASTM D 698 - Moisture Density Relationship for Soils, Standard Method
 - 2. ASTM D 422 - Gradation of Soils
 - 3. ASTM D 424 - Atterberg Limits of Soils

4. ASTM D G51 - Soil pH
 - E. Drainage Pipe
 1. ASTM D 3034 - Specification for Polyvinyl Chloride (PVC. Plastic Pipe
 2. ASTM D 1248 - Specification for Corrugated Plastic Pipe
 - F. Where specifications and reference documents conflict, the Owner or Owner's representative shall make the final determination of applicable document.
- 1.06 SUBMITTALS:
- A. Submit under provisions of Section 01300.
 - B. The Contractor shall submit the following information for approval thirty (30) days prior to the construction of the segmental retaining wall.
 1. Design Submittal – Provide three (3) sets of stamped construction drawings and detailed design calculations, completed and sealed by the Engineer in accordance with the design requirements outlined in Part 3 of this specification.
 2. Materials Submittal – Manufacturer's certifications, stating that the SRW units and imported aggregates and soils meet the requirements of this specification and the Engineer's design.
 3. Installer Qualifications - The Contractor must be able to demonstrate that their field construction supervisor has the necessary experience for the project by providing documentation showing that they have successfully completed projects of similar scope and size.
- 1.07 QUALIFICATIONS:
- A. Applicator: Company specializing in performing the work of this Section with minimum 5 years documented experience.
 - B. Design work of this section under direct supervision of a Professional Engineer experienced in design of this work and licensed in the State of Michigan.
- 1.08 DELIVERY, STORAGE, AND HANDLING:
- A. Deliver, store, protect, and handle products to site under provisions of Section 01600.
 - B. The Contractor shall store and handle all materials in accordance with Unilock's recommendations and in a manner to prevent deterioration or damage due to moisture, temperature changes, contaminants, breaking, chipping or other causes
 - C. Deliver materials in manufacturer's packaging including application instructions.
- 1.09 MOCKUP:
- A. Provide mockup of the base and stone layup and related work under provisions of Section 01400.
 - B. Locate where directed.
 - C. Mockup may remain as part of the Work if acceptable to the Architect/Owner.
- 1.10 FIELD MEASUREMENTS:
- A. It is the Contractor's responsibilities to verify that field measurements are as shown on Drawings and shop drawings.
- 1.11 COORDINATION:
- A. The term Engineer shall refer to the individuals or firms who have been retained by the Contractor to provide design and inspection services for the retaining wall. The Design Engineer may be a different individual or firm from the Inspecting Engineer as Unilock® may provide this service. The Engineer(s) must be qualified in the area of segmental retaining wall design and construction and must be licensed to practice engineering in the State of Michigan.
 - B. The Engineer(s) will perform the following tasks:
 1. Produce sealed construction drawings and detailed design calculations, completed in accordance with the design requirements outlined in Part 3 of these specifications.

2. Review the site soil and geometric conditions to ensure the designed wall is compatible with the site prior to construction.
 3. Inspect the site conditions, materials incorporated into the retaining wall, and the construction practices used during the construction.
 4. Provide the Contractor with a letter after completion, certifying the design meets the requirements of this specification, the design was compatible with the site and the wall was constructed according to design
- C. Coordinate Work under provisions of Section 01039.
D. Coordinate with proposed grades and associated or adjacent materials.

1.12 INCONSISTENCIES:

- A. Refer to Section 00100 – Instructions to Bidders for General Contractor, Construction Manager, and/or sub contractor responsibilities pertaining to Specification inconsistencies.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Estate Wall - Segmental Retaining Wall System as supplied by Unilock®
1. Include all shapes as required: Corners, Coping and 3-sized wedge shapes.
 2. Typical concrete stone size is: 6" high x 9" deep x 8 & 12 & 16" wide (all sizes nominal).
- B. Unilock® 12591 Emerson Dr., Brighton Mi. 48116 (248) 437 7030
C. Color to be Sierra

2.02 DEFINITIONS

- A. Modular concrete retaining wall units are dry-cast solid concrete units that form the external fascia of a modular unit retaining wall system.
- B. Coping units are the last course of concrete units used to finish the top of the wall.
- C. Retained soil is an in-situ soil or a specified soil that is placed behind the wall drainage material.
- D. Foundation soil is the in-situ soil beneath the wall structure.
- E. Drainage aggregate is a free draining soil with natural soil filtering capabilities, or a free draining soil encapsulated in a suitable geotextile, or a combination of free draining soil and perforated pipe all wrapped in a geotextile, placed directly behind the modular concrete units.
- F. Drainage pipe, as required, is a perforated polyethylene pipe used to carry water, collected at the base of the retaining wall, to outlets in order to prevent pore water pressures from building up behind the wall facing modules.
- G. Non-woven geotextiles are permeable synthetic fabrics formed from a random arrangement of fibers in a planar structure. They allow the passage of water from one soil medium to another while preventing the migration of fine particles that might clog a drainage medium.
- H. All values stated in metric units shall be considered as accurate. Values in parenthesis stated in imperial units are the nominal equivalents.

2.03 PRODUCTS

- A. Concrete Segmental Retaining Wall Units.
1. The concrete wall modules shall be 6 x 8 x 12 inches with a maximum tolerance of plus or minus 1/8 in. for each dimension.
 2. The retaining wall modules shall be solid units and have a minimum weight of 45 lbs. per unit.
 3. This wall system shall be full-contact unit, straight stacked in a vertical wall. See drawings for wall configuration. The concrete wall modules shall have a minimum 28-day compressive strength of 5000 psi. as tested in accordance with ASTM C 140. The concrete shall have a maximum moisture absorption rate of 5 percent to ensure adequate freeze-thaw protection
- B. Retained Soil

1. The retained soil shall be on site soils unless specified otherwise in the Construction Specifications or as directed by the Owner or Owner's Representative. If imported fill is required, it shall be examined and approved by the Engineer.
 - C. Foundation Soil
 1. The foundation soil shall be the native undisturbed on site soils. The foundation soil shall be examined and approval by the Engineer prior to the placement of the base material.
 - D. Base Material:
 1. The setting material shall be 21AA aggregate.
 - E. Leveling Material
 1. The footing material shall be non-frost susceptible, well graded compacted crushed stone (GW-Unified Soil Classification System), or a concrete leveling base, or as shown on the Construction Drawings.
 - F. Drainage Soil
 1. The drainage soil shall be a free draining angular granular material of uniform particle size smaller than 1 in. separated from the retained soil by a geotextile filter. The drainage soil shall be installed directly behind the SRW units.
 - G. Drainage Pipe (where required)
 1. The drainage pipe shall be perforated corrugated HDPE or PVC pipe, with a minimum diameter of 4 inches, protected by a geotextile filter to prevent the migration of soil particles into the pipe, or as specified on the construction drawings.
 - H. Geotextile Filter
 1. The non-woven geotextile shall be installed as specified on the construction drawings. Although selection of the appropriate geotextile specifications is site soil specific, a commonly used geotextile for filtration will have an Apparent Opening Size ranging between U.S. Sieve Sizes 100 to 70 and a minimum unit weight of 4.0 oz /square yard. The coefficient of permeability will typically range between 0.1 and 0.3 cm/second.
 - I. Concrete Stone Adhesive:
 1. The adhesive is used to permanently secure the stone to stone and the coping stone to the top course of the wall. The adhesive must provide sufficient strength and remain flexible.
 2. High-strength, structural grade construction adhesive. Water resist and freeze-thaw stable. Applies as gun-grade mastic.
 - a. SB-10 Paver Bond by SEK Surebond
 - b. or equal
- 2.04 MANUFACTURERS:
- A. Proprietary names and/or model numbers used to designate products or materials are not intended to imply that products of named manufacturers are required to exclusion of equivalent products of other accepted manufacturers. Pre-bid requests for approval of other products may be accepted in accordance with Section 00100 – Instructions to Bidders. Post-Bid substitutions may be accepted in accordance with Section 01600 – Product Substitutions.
 - B. Acceptable Manufacturers:
 1. Unilock www.unilock.com
 2. or equal

PART 3 – WALL DESIGN:

3.01 DESIGN STANDARD:

- A. The Design Engineer is responsible for providing a design that shall consider the external stability, internal stability, and local stability of the SRW System. It is the responsibility of the Certifying Engineer or Site Geotechnical Engineer to determine if further design considerations must be implemented to ensure adequate global/overall slope stability, and/or, if the foundation soils will require special treatment to control total and differential settlement. The design life of the structure shall be 75 years unless otherwise specified in the construction drawings.

B. The segmental retaining wall shall be designed in accordance with recommendations of the NCMA Design Manual for Segmental Retaining Walls, Second Edition. The following is a summary of the minimum factors of safety for the various modes of failure evaluated in the proposed design

1. External Stability:

Base Sliding	1.5
Overturning	2.0
Bearing Capacity	2.0
Global Stability	1.3
2. Internal Stability:

Shear Capacity	1.5
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3.03 DESIGN GEOMETRY

- A. The length, height, and overall elevations of the retaining wall must comply with the requirements of the proposed elevation detail, station information and site grading plan.
- B. The structures' design height, H, shall be measured from the top of the leveling pad to the top of the wall where ground surface intercepts the wall facing.
- C. Slopes above and below all sections of the segmental retaining wall are detailed in the site grading plan.
- D. The minimum wall embedment shall be the greater of :
 1. The height of a SRW unit,
 2. 0.5 ft or,
 3. The minimum embedment required because of the slope below the wall:

Slope Below Wall	Minimum Embedment
Level	H/10
3 : 1 (18.4 deg)	H/10
2 : 1 (26.5 deg)	H/7

- E. The following surcharges shall be applied to the top of each design cross section based on the following proposed uses above the wall.

Use Above Wall	Minimum Surcharge
No Traffic	0 lb/sq. ft
Light Traffic	100 lb/sq. ft
Heavy Traffic	250 lb/sq. ft

3.04 STATE OF STRESS

- A. The lateral earth pressure to be resisted by the self weight of the retaining wall shall be calculated using the Coulomb coefficient of earth pressure, K_a , times the vertical stress at the base of the wall. The coefficient of active earth pressure, K_a , shall be used from the top to the bottom of the wall. The coefficient of active earth pressure, K_a , shall be assumed independent of all external loads except sloping fills. For sloping fills, the coefficient of active earth pressure, K_a , appropriate for the sloping condition, using Coulomb earth pressure shall be used in the analysis

3.05 INCLINATION OF FAILURE SURFACE

- A. A Coulomb failure surface passing through the base of the wall behind the facing units up to the ground surface at or above the top of wall shall be assumed in design of walls.

3.06 SETTLEMENT CONTROL

- A. It is the responsibility of the Certifying Engineer or Site Geotechnical Engineer to determine if the foundation soils will require special treatment to control total and differential settlement.

3.07 GLOBAL STABILITY

- A. It is the responsibility of the Certifying Engineer or Site Geotechnical Engineer to determine if further design considerations must be implemented to ensure adequate global/overall slope stability.

PART 4 - EXECUTION:

4.01 INSPECTION

- A. The Engineer is responsible for verifying that the contractor meets all the requirements of the specification. This includes the use of approved materials and their proper installation.
- B. The Contractor's field construction supervisor shall have demonstrated experience and be qualified to direct all work related to the retaining wall construction.

4.02 CONSTRUCTION TOLERANCES

- A. The following tolerances are the maximum allowable deviation from the planned construction:
 - Vertical Control: +/- 1.25 inches over a 10 ft distance, +/- 3 inches total
 - Horizontal Control: +/- 1.25 inches over a 10 ft distance, +/- 3 inches total
 - Rotation: +/- 2 degrees from planned wall batter
 - Bulging: 1.0 inch over a 10 ft distance

4.03 SITE PREPARATION

- A. The foundation soil shall be excavated or filled as required to the grades and dimensions shown on the Construction Drawings or as directed by the Owner or Owner's Representative.
- B. The foundation soil shall be proof rolled and examined by the Engineer to ensure that it meets the minimum strength requirements according to the design assumptions. If unacceptable foundation soil is encountered, the contractor shall excavate the affected areas and replace with suitable quality material under the direction of the Engineer.
- C. In cut situations, the native soil shall be excavated to the lines and grades shown on the Construction Drawings and removed from the site or stockpiled for reuse as retained soil.

4.04 INSTALLING DRAINAGE SYSTEM

- A. The approved non-woven geotextile shall be set against the back of the first retaining wall unit, over the prepared foundation, and extend towards the back of the excavation, up the excavation face and back over the top of the drainage material to the retaining wall, or as shown in the Construction Drawings.
- B. The drainage pipe shall be placed behind the leveling base, or lower course of facing units as shown in the Construction Drawings or as directed by the Engineer. The pipe shall be laid at a minimum gradient of 2% to ensure adequate drainage to free outlets.
- C. T - Sections and outlet pipes shall be installed on the drainage pipe at 50 ft. centers or as shown on the Construction Drawings.
- D. The remaining length of geotextile shall be pulled taut and pinned over the face of the retained soil. Geotextile overlaps shall be a minimum of 1 ft. and shall be shingled down the face of the excavation in order to prevent the infiltration of retained soil into the drainage layer.

4.05 LEVELING BASE OR SPREAD FOOTING PLACEMENT

- A. The leveling base material shall be crushed stone compacted to 98% Standard Proctor Density, or vibrated concrete along the grades and dimensions shown on the Construction Drawings or as directed by the Engineer. The minimum thickness of the leveling base shall be 6 inches.

4.06 INSTALLATION OF MODULAR CONCRETE RETAINING WALL UNITS

- A. The bottom row of retaining wall modules shall be placed on the prepared leveling base as shown on the Construction Drawings. Care shall be taken to ensure that the wall modules are aligned properly, leveled from side to side and front to back and are in complete contact with the base material.
- B. The wall modules above the bottom course shall be placed such that the tongue and groove arrangement provides the design batter (i.e. setback) of the wall face. Successive courses shall be placed to create a running bond pattern with the edge of all units being approximately aligned with the middle of the unit in the course below it.

- C. The wall modules shall be swept clean before placing additional levels to ensure that no dirt, concrete or other foreign materials become lodged between successive lifts of the wall modules.
- D. A maximum of 4 courses of wall units can be placed above the level of the drainage material at any time.
- E. The contractor shall check the level of wall modules with each lift to ensure that no gaps are formed between successive lifts.
- F. Care shall be taken to ensure that the wall are not broken or damaged during handling and placement.

4.07 DRAINAGE SOIL

- A. The drainage soil will be placed behind the retaining wall modules with a minimum width of 1 ft. and separated from other soils using the approved non-woven geotextile.
- B. Drainage soil shall be placed behind the wall facing in maximum lifts of 6 inches and compacted to a minimum density of 95% Standard Proctor.
- C. No heavy compaction equipment shall be allowed within 3 ft. of the back of the wall fascia.

4.08 RETAINED SOIL

- A. Retained soils shall be placed and compacted behind the drainage material in maximum lift thickness of 6 inches. The retained soils shall be undisturbed native material or engineered fill compacted to a minimum density of 95% Standard Proctor.
- B. No heavy compaction equipment shall be allowed within 3 ft. of the back of the wall modules.

4.09 FINISHING WALL

- A. Items 4.5 to 4.8 shall be repeated until the grades indicated on the Construction Drawings are achieved.
- B. Coping units shall be secured to the top of the wall with two 3/8 inch beads of the approved flexible concrete adhesive positioned 2 inches in front and behind the tongue of the last course of retaining wall units.
- C. Finish grading above the wall to direct surface run off water away from the segmental retaining wall. Use a soil with a low permeability to restrict the rate of water infiltration into the retaining wall structure.

4.10 SUPPLIER/INSTALLERS:

- A. Supplier and installers with 5 years of documented experience in the State of Michigan, with all design by an engineer registered in the State of Michigan.

4.11 FIELD QUALITY CONTROL:

- A. Field testing will be performed under provisions of Section 01400
- B. Prior to start of work, testing firm will verify mix proportions, gradation, and quality of aggregate.
- C. Provide additional test panels during the course of the work as may be requested by the testing and inspection firm.

4.12 PROTECTION OF FINISHED WORK:

- A. Protect finished Work under provisions of Section 01500
- B. Do not permit applied work to damage adjacent surfaces.

END OF SECTION 02832

SECTION 02924 - LANDSCAPE PREPARATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Finish grade subsoil including any temporary stockpiles that will be permanently left in place. Grading of stockpiles will be permanently left in place and shall be as directed by the Engineer. Stockpiles to be left as permanent landscape features shall be as noted on the Plans, with 1:4 ft side slopes.
- B. Place, level, and compact topsoil.

1.02 RELATED DOCUMENTS

- A. Attention is directed to Division 0, Bidding and Contract Requirements and to Division 1, General Requirements, which are hereby made a part of this Section.

1.03 BASIS OF PAYMENT

- A. Includes all labor, material and equipment costs associated with finish grading and placing topsoil in all disturbed areas and stockpile locations that will be left as landscape berms, as specified herein including, but not limited to, the removal and proper disposal off-site of excess excavated material by the Contractor.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Topsoil, from off-site, shall meet the following criteria:
 - (i) pH range between 5.0 and 7.5
 - (ii) soluble salts maximum 500 parts per million (ppm)
 - (iii) organic content between 5 - 30 percent
 - (iv) clay content between 5 - 25 percent
- B. Additional topsoil from off-site, if required, shall be fertile, loamy sandy, clay loam, sandy clay loam without admixture of subsoil, and shall be free of stones 2 inches in diameter or larger, roots, sticks, or other extraneous materials, including viable plants or plant parts or Bermuda or quack grass, poison ivy, etc.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify site conditions and note irregularities affecting work of this Section.

- B. Beginning work of this Section means acceptance of existing conditions.

3.02 SUBSOIL PREPARATION

- A. Eliminate uneven areas and low spots. Remove debris, roots, branches, stones in excess of 1/2-inch in size. Remove subsoil contaminated with petroleum products.
- B. Scarify subgrade to depth of 2 inches where topsoil is scheduled. Scarify in areas where equipment used for hauling and spreading topsoil has compacted subsoil.

3.03 PLACING TOPSOIL

- A. Spread topsoil to a minimum depth of 4 inches and as located per Plans.
- B. Use topsoil in relatively dry state. Place during dry weather.
- C. Fine grade topsoil eliminating rough or low areas. Maintain levels, profiles, and contours or subgrade.
- D. Remove stone, roots, grass, weeds, debris and foreign materials while spreading.
- E. Manually spread topsoil around trees to prevent damage.
- F. Lightly compact placed topsoil.
- G. Remove surplus subsoil and topsoil from area being finished to areas of site as directed by Owner.
- H. Leave stockpile area and site clean and raked, ready to receive landscaping.

3.04 PROTECTION

- A. Protect landscaping and other features remaining as final work.
- B. Protect existing structures, fences, roads, sidewalks, paving and curbs.

3.05 SUBMITTALS

- A. Submit a certified analysis of topsoil from each off-site source prior to delivery. Deficiencies in pH shall be corrected.

3.06 TOLERANCES

- A. Top of topsoil: plus or minus 0.05 foot.

END OF SECTION 02924

SECTION 02936 – SEEDING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Preparation of subsoil.
- B. Placing topsoil (from Site Stockpile).
- C. Furnishing and placing seeding, mulching, and fertilizer.
- D. Placing topsoil (off-site source).

1.02 RELATED DOCUMENTS

- A. Attention is directed to Division 00, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.03 BASIS OF PAYMENT

- A. Includes all labor, material and equipment costs associated with preparation of subsoil, placing topsoil from on-site stockpile, seeding, fertilizing and mulching, and as specified herein. Providing topsoil from off-site source as needed is incidental to this work.

1.04 DEFINITIONS

- A. Weeds: Includes Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.
- B. MDOT: Michigan Department of Transportation.

1.05 QUALITY ASSURANCE

- A. Provide seed mixture data showing percentage of seed mix, year of production, net weight, date of packaging, and location of packaging.

1.06 MAINTENANCE SERVICE

- A. Maintain seeded areas immediately after placement until grass is well established and exhibits a vigorous growing condition.

PART 2 - PRODUCTS

1.07 SEED MIXTURE

- A. Seed Mixture: As specified on the plans.

1.08 SOIL MATERIALS

- A. Topsoil: Excavated from site or from approved off-site location and free of weeds.

1.09 ACCESSORIES

- A. Mulching Material: Oat or wheat straw, free from weeds, foreign matter detrimental to plant life, and dry. Hay or chopped cornstalks are [not] acceptable.
- B. Fertilizer: As specified on the plans.
- C. Water: Clean, fresh and free of substances or matter which could inhibit vigorous growth of grass.

PART 3 - EXECUTION

1.10 EXAMINATION

- A. Verify that prepared soil base is ready to receive the work of this Section.

1.11 PREPARATION OF SUBSOIL

- A. Prepare sub-soil to eliminate uneven areas and low spots. Maintain lines, levels, profiles and contours. Make changes in grade gradual. Blend slopes into level areas.
- B. Remove foreign materials, weeds and undesirable plants and their roots. Remove contaminated sub-soil.
- C. Scarify subsoil to a depth of 2 inches where topsoil is to be placed. Repeat cultivation in areas where equipment, used for hauling and spreading topsoil, has compacted sub-soil.

1.12 PLACING TOPSOIL

- A. Spread topsoil to a minimum depth of 4 inches over area to be seeded. Rake until smooth.
- B. Place topsoil during dry weather and on dry unfrozen sub-grade.
- C. Remove vegetable matter and foreign non-organic material from topsoil while spreading.
- D. Grade topsoil to eliminate rough, low or soft areas, and to ensure positive drainage.

1.13 FERTILIZING

- A. Apply fertilizer at a rate as noted on plans.
- B. Apply after smooth raking of topsoil.
- C. Do not apply fertilizer at same time or with same machine as will be used to apply seed.
- D. Mix thoroughly into upper 2 inches of topsoil.
- E. Lightly water to aid the dissipation of fertilizer.

1.14 SEEDING

- A. Apply seed at a rate as specified on plans, evenly in two intersecting directions. Rake in lightly.
- B. Do not seed areas in excess of that which can be mulched on the same day.
- C. Planting Season: As specified on plans.
- D. Do not sow immediately following rain, when ground is too dry, or during windy periods.
- E. Roll seeded area with roller not exceeding 112 lbs.
- F. Immediately following seeding and compacting, apply mulch to a uniform thickness at the rate of 2 tons per acre.
- G. Apply water with a fine spray immediately after each area has been mulched. Saturate to 4 inches of soil.
- H. Apply mulching anchor per plans.

1.15 MAINTENANCE

- A. Water to prevent grass and soil from drying out.
- B. Immediately reseed areas which show bare spots.
- C. Protect seeded areas with warning signs during maintenance period.

END OF SECTION 02936

SECTION 02939 - INLET FILTERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. This Section includes installation, maintenance and removal at the end of the construction of gravel filters, curb and gutter inlet filters.

1.3 RELATED DOCUMENTS

- A. Attention is directed to Conditions of the Contract and to Division 1, General Requirements, which are hereby made a part of this Section.

1.4 REFERENCES

- A. City of Ann Arbor Public Services Department Standard Specifications.
- B. Michigan Department of Transportation 2003 Standard Specifications.

1.5 MEASUREMENT AND PAYMENT

- A. Payment for Inlet Filters shall be included in the Lump Sum bid price for this project.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Silt sacks shall be per plan detail.
- B. Curb inlets will have additional protection per plan detail.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Silt sacks will be placed at all inlet structures. Silt sacks to be placed per manufacturer's instructions.

END OF SECTION - 02939

SECTION 02940 - SILT FENCING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. This Section includes installing silt fences and posts.

1.3 QUALITY ASSURANCE

- A. ASTM Specification D4632, 4491, 4751 and 4355.

1.4 MEASUREMENT AND PAYMENT

- A. Payment for silt fencing shall be included in the Lump Sum price bid for this project.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Posts: Posts shall be a minimum of 4 feet long and constructed of either pressure-treated wood or steel posts. If wood posts are used, the size may be 1-1/2" x 1-1/2" with a minus tolerance of 1/8" providing the cross sectional area is a minimum of 2.25 square inches. Steel posts shall be round, U.T., or C-shaped with a minimum weight of 1.3 lbs/foot and have projections for fastening the wire to the fence.
- B. Geotextile Fabric: Fabric shall be composed of strong rot-proof synthetic fibers formed into a fabric of either the woven or non-woven type. The fabric shall contain stabilizer and/or inhibitors to make the filaments resistant to deterioration from exposure to sunlight or heat. The edges of the fabric shall be finished to prevent the outer yarn from pulling away from the fabric. The fabric shall be free of defects or flaws, which significantly affect its physical and/or filtering properties. The fabric shall have a minimum width of 24 inches. Sheets of fabric may be sewn or bonded together. No deviation from any physical requirements will be permitted due to the presence of seams.

The fabric shall be manufactured with pockets for posts, hems with cord, or with posts reattached using staples or button head nails.

During all periods of shipment and storage, the fabric shall be wrapped in a heavy-duty protected covering which will protect the cloth from sunlight, mud, dust, dirt, and debris. The fabric shall not be exposed to temperatures greater than 140° F.

The fabric shall meet the physical requirements of Table 1 below.

Table 1 Physical Requirements for Temporary Silt Fence Geotextiles		
Property	Test Method	Standard Fence Requirements
Tensile Strength, lbs.	ASTM D 4632	90
Elongation; %	ASTM D 4632	40 max.
Permittivity, gal/min/ft ²	ASTM D 4491	15
Apparent Opening Size, Max.	ASTM D 4751	20
Ultraviolet Degradation, 4%	ASTM D 4355	70

- C. Wire staples will be No. 17 gauge (minimum) and shall have a crown at least 3/4-inch wide and legs at least 1/2-inch long. Staples shall be evenly spaced with at least five (5) per post.
- D. Nails shall be 14 gauge (minimum), 1-inch long with 3/4-inch button heads. Nails shall be evenly spaced with at least four (4) per post.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. The Contractor shall install temporary silt fence according to this Specification, as shown on the Plans, or as directed by the Engineer.
- B. A 6-inch deep trench shall be constructed by either a trenching machine, motor grader, or if equipment cannot be operated on the site, by hand.
- C. Post installation shall start at the center of the low point (if applicable) with the remaining posts spaced six (6) feet apart. Post shall be installed with at least 18 inches in the ground. Where an 18-inch depth is impossible to achieve, the posts shall be adequately secured to prevent overturning of the fence due to sediment loading.
- D. Filter fabric shall be attached to posts by wire, cord, pockets, staples, or other acceptable means. The filter fabric shall be installed such that, 6 to 8 inches of fabric is left at the bottom to be buried and a minimum overlap of 18 inches is provided at all splice joints. The fabric shall be installed in a trench, and 2 to 4 inches across the bottom of the trench in the upstream direction, respectively. The trench shall then be backfilled and compacted to prevent any flow from passing under the barrier.
- E. During installation, the fabric will be rejected if it is found to have defects, rips, holes, flaws, deterioration, or damage incurred during manufacture, transportation, or storage.

- F. Maintenance and Removal: The Contractor shall maintain the silt fence free from damage and/or defects until the project is either accepted or removed at the direction of the Engineer. The Contractor shall remove and properly dispose of accumulated silt as directed by the Engineer. Filter fabric shall be removed and replaced whenever it has deteriorated to such extent that it reduces the effectiveness of the silt fence.
- G. Silt fence shall remain in place until the Engineer directs that it be removed. Silt fence which has been removed will remain the property of the Contractor and may be used at other locations provided it is in a condition acceptable to the Engineer.

END OF SECTION - 02940

SECTION 02950 – LANDSCAPE MATERIALS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Plant materials and installation.
- B. Accessories - planting mix, fertilizer, herbicide, pesticide, woven geo-textile fabric, mulch, guying, staking.
- C. Maintenance.

1.02 RELATED DOCUMENTS

- A. City of Ann Arbor Standard Specifications for Construction
- B. American Association of Agriculture, Agricultural Research Services - Plant Hardiness Zone Map.
- C. American Association of Nurserymen, Inc. (AAN) - American Standards of Nursery Stock, latest Edition.
- D. U.S. Department of Agriculture, Agricultural Research Services - Plant Hardiness Zone Map.
- E. American Joint Committee on Horticultural Nomenclature - Standard Sized Plant Names.
- F. Hortus Third, Cornell University, 1976.

1.03 BASIS OF PAYMENT

- A. Includes all labor, material and equipment costs associated with:
 - (i) Tree, shrub, perennial, vine, or ground cover unit, including supply and installation - excavation, planting, backfill, fertilizing, guying, staking, wrapping, pruning, etc. Does not include maintenance, but does include guarantee as specified.
 - (ii) Shredded bark or stone mulch, provided, and installed.
 - (iii) Woven geo-textile fabric, provided, and installed.
 - (iv) Maintenance during the warranty period for all plantings as a single item. Contractor is to submit evidence of maintenance operations as specified with billings.

1.04 QUALITY ASSURANCE

- A. Perform work with personnel experienced in the work required in this Section under direction of a skilled foreman.
- B. Source Quality Control
 - (i) Sources: Plant material shall be nursery grown in the same or higher hardiness zone as determined by the latest edition of the "Plant Hardiness Zone Map", Agricultural Research Service, U.S. Department of Agriculture.
 - (ii) Certification: All landscape materials shall be from stock inspected and certified by authorized governmental agencies. The stock shall comply with governmental regulations prevailing at the supply source and the job site.
 - (iii) Analysis and Standards: Products packaged in sealed containers shall be labeled with manufacturer's certified analysis. The composition of bulk materials shall be tested by an approved laboratory in accordance with procedures established by the Association of Official Agricultural Chemists, wherever applicable, or as specified by product specifications referenced herein.
 - (iv) Plant Material Selection: The Owner's representative reserves the right to tag and inspect any and all plant materials prior to digging and shipment by the nursery. Notify the Owner's representative of tagged material locations at least four (4) weeks prior to digging. For remote sources, photographs of the materials may be required for preliminary inspection of materials.
- C. Substitutions
 - (i) If specified landscape material is not obtainable, notify the Owner's representative, who will identify alternate sources or substitutes. Adjustments will be made at no additional cost to the Owner. If replacements are downsized, credits to the Owner will be based on comparable cost differentials customary for materials and sizes involved.
 - (ii) Plants shall be supplied at the sizes specified. Plants of larger size may be used if acceptable to Owner's representative and if root and/or ball size are increased proportionally.
 - (iii) Container plants may be substituted for those designed "BB", if approved by the Owner's representative.

1.05 TESTS

- A. Analyze topsoil to ascertain percentage of nitrogen, phosphorus, potash, soluble salts, organic matter, and pH value.

1.06 SUBMITTALS

- A. Samples: Representative samples of the following materials shall be provided to the Owner's representative from the supply source being used:
 - (i) Plant material: Samples or photos may be requested in lieu of inspection.
 - (ii) Mulches: 5 lb sample.
 - (iii) Woven geo-textile fabric: 1 sq. ft. sample
 - (iv) Staking and guying material.
- B. Test Reports: Submit to the Owner's representative certified test reports for topsoil, for onsite stockpiles and offsite services if additional topsoil is required.
- C. Certification:
 - (i) Phytosanitary Certification: All plant material inspection certificates required by federal, state, or other governing authorities will accompany each shipment and be turned over to the Owner's representative upon delivery.
 - (ii) Invoice: Vendor or owner's invoice for each shipment of plants shall show size, quantity, and root treatment of plants (container, BB, or BR).
- D. Construction Schedule: Submit construction schedule indicating dates for proposed landscaping work items and compliance with planting season limitations indicated on the drawings.
- E. Maintenance Instructions: Submit typewritten instructions recommending procedures to be established by the Owner for the maintenance of landscape work throughout the year. Submit prior to end of maintenance period.
- F. Toxic Chemicals: Submit products, rates of application, and anticipated uses of pesticides, herbicides, and fumigants.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Plant Materials
 - (i) Deliver plant materials to site in closed vehicles, or in open vehicles with the entire load properly covered in transit for protection from drying winds.
 - (ii) Move plant materials with solid balls wrapped in burlap.
 - (iii) Deliver plant materials immediately prior to placement. Keep plant materials moist. If delays beyond the Contractor's control occur after delivery, plants shall be kept watered and protected from sun, wind, and mechanical

damage; root balls shall be covered with topsoil or mulch. Do not remove container-grown stock from containers until planting time. "Heel in" bare root plants in moist soil immediately upon delivery. Open bundles of plants and separate the plants before the roots are covered. Take care to prevent air pockets among roots when heeling in. Keep the roots constantly moist until planted. The heeling-in grounds shall be a well-protected, shaded area.

(iv) Handle plants at all times in accordance with the best horticultural practices. Lift B&B materials from the bottom of the ball only. Plants handled otherwise will be subject to rejection. Balled and burlapped plants which have cracked or broken balls are not acceptable and shall not be planted.

(v) All plants will be rejected when burlap, staves, and ropes required in connection with transplanting have been displaced prior to acceptance.

(vi) Labels: Shipment of plants shall be clearly identified with legible labels stating name and size of plants, securely attached to individual plants or bundles of like variety and size.

1.08 GUARANTEE

- A. Warrant all plant material to be true to botanical name, specified size.
- B. After receiving Notice of Provisional Acceptance, all plant materials shall be maintained in a vigorous condition and be warranted against defects, including death, improper maintenance, and unsatisfactory growth for the following time periods.
 - (i) 15 October, one year after fall plantings.
 - (ii) 15 June, one year after spring plantings.
- C. The Contractor shall not assume responsibility for damages or loss of plants caused by fire, flood, lightning storms, freezing rains, winds over 60 mph, or vandalism.
- D. Replacements
 - (i) During the warranty period, replace, at no additional expense to the Owner, plant materials that are dead or that are, in the opinion of the Owner's representative, in an unhealthy or unsightly condition, or that have lost their natural shape due to dead branches, excessive pruning, inadequate or improper maintenance. Rejected plant materials shall be removed from the site and legally disposed of at Contractor's expense.
 - (ii) Only one replacement of any plant is required after Provisional Acceptance, except for losses or replacements needed due to failure to comply with specified requirements.

(iii) Replacement plants and planting operations shall be in accordance with the original specifications. Replacements shall be made no later than the next succeeding planting season. Fully restore areas damaged by replacement operations to their original and specified condition.

1.09 MAINTENANCE

- A. Begin maintenance of plant materials immediately after planting and continue until termination of guarantee period. During this period, the Contractor shall make a minimum of one (1) maintenance trip every four (4) weeks during the growing season, and as many more as necessary to keep the plantings in a thriving condition.
- B. Maintenance shall include measures necessary to establish and maintain plants in a vigorous and healthy growing condition, including the following:
- (i) Water trees and shrubs at least twice each month from May 15 to September 25th, or as directed by the Owner.
 - (ii) Keep planting beds and tree saucers free from weeds to the satisfaction of the Owner. Grass and weeds shall not be allowed to reach a height of 3 inches before being completely removed, including root growth. Note that treatment of mulch with pre-emergent weed killer is required in this specification.
 - (iii) Spraying shall encompass:
 - a) dormant oil with ethion for scale insects,
 - b) malathion for leaf eating insects, and
 - c) bordeaux mixture for fireblight control.
 - (iv) These shall be applied in accordance with the manufacturer's recommendations and in proper strength and number of applications for the particular insect or disease. The Contractor must provide the Owner's representative a written record of applications and dates.
 - (v) Fertilization shall be as specified on the plans. Provide the Owner and Owner's representative a written record of applications and dates.
 - (vi) Keep trees erect. Raise trees that settle below grade to the established elevation. Keep tree wrap and wire in neat condition. Remove at completion of guarantee period.
 - (vii) Prune dead or broken branches from all deciduous trees and shrubs.
 - (viii) Fill to the original grade level areas that have settled around trees and shrubs.

- (ix) Winter protection shall include late fall spraying of all evergreen trees and evergreen shrubs with Foliagard, Wilt-Pruf, or approved equal, at the manufacturer's recommended rate to prevent winter desiccation and late fall watering if required by a dry season.
- C. Notify the Owner's representative at least two (2) work days prior to each maintenance trip and send a written record of what maintenance was performed within two (2) days after each maintenance trip.

PART 2 - PRODUCTS

2.01 PLANT MATERIALS

A. Quality and Size:

- (i) Plant material shall be true to name and variety in accordance with the American Joint Committee on Horticultural Nomenclature - Standardized Plant Names.
- (ii) Plant material shall conform to sizes given in the plant list. All measurements, such as spread, ball size, number of canes, quality designations, etc., shall be in accordance with ANN - "American Standards for Nursery Stock".
- (iii) Plant materials shall be typical of their species or variety and shall be sound, healthy, vigorous, and free from plant diseases and insect pests or their eggs. They shall have healthy, well developed root systems.
- (iv) Materials planted in rows shall be uniform in size and shape.

B. Root Protection:

- (i) Plants designated "B&B" in the plant list shall be balled and burlapped. They shall be dug with firm, natural balls of earth of sufficient diameter and depth to encompass the fibrous and feeding root systems necessary for full recovery of the plant. Balls shall be securely wrapped with burlap and bound with cord. No balled and burlapped plant shall be planted if the ball is cracked or broken. No planting with rot-proof burlap or ties shall be permitted.
- (ii) Plants designated "Cont." in the plant list shall be container grown. They shall be plants that have been transplanted into a container and grown long enough for the new fibrous root system to retain its shape when removed from the container. The container shall be rigid enough to hold the ball shape during shipping.
- (iii) Bare root plants shall have a root spread sufficient to insure full recovery and development of the plant. Take care to avoid injury to or removal of fibrous

roots. Protect roots with wet straw, moss, or other materials to keep them moist and healthy. Remove broken and injured roots prior to planting.

- C. Plant materials shall be subject to final approved by the Owner's representative at the site prior to installation.

2.02 SOIL MIXES

A. Soil Amendments

- (i) Peat shall be granulated raw peat moss or baled peat moss, containing not more than 9% mineral on a dry basis, Canadian peat.

- (ii) Sand shall be clean, ungraded, coarse sand which meets the ASTM C33 requirements for fine aggregates.

- (iii) Superphosphate shall be finely ground phosphate rock, as used for agricultural purposes, and containing not less than 15 percent available phosphoric acid and potash.

- (iv) Granular fertilizers shall contain a minimum percentage of 10-10-10 by weight of nitrogen (50% organic), available phosphoric acid, and potash.

- (v) pH adjusters

- a) Lime shall be ground dolomite limestone, with not less than 85 percent calcium and magnesium carbonates; 50 percent to pass through 100 mesh screen, 98 percent to pass through 20 mesh screen.

- b) Elemental sulphur shall be finely ground horticultural grade material of at least 95 percent purity. Material shall be delivered in unopened containers which display manufacturer's guaranteed analysis.

- B. Standard planting backfill shall be native soil excavated from planting pits and mixed with 2 lbs 10-10-10 fertilizer per cubic yard. The method of mixing shall be approved by the Owner's representative.

- C. Ericaceous planting mix will be used to backfill planting areas containing ericaceous materials identified on the plant list. The mix shall contain one (1) part peat, one (1) part sand, two (2) parts topsoil, 2.5 lbs elemental sulphur per cubic yard, and 3 lbs superphosphate per cubic yard. Mechanically mix to uniform blend, with no lumps or pockets of individual components.

2.03 SHREDDED BARK MULCH

- A. Shredded bark mulch shall be processed shredded hardwood bark, free of leaves, twigs or other extraneous materials.

2.04 STONE MULCH

- A. Stone mulch shall be as identified on the plans, free of leaves, twigs or other extraneous materials.

2.05 WOVEN GEO-TEXTILE FABRIC

- A. Woven geo-textile fabric shall be DeWitt Pro-5 Weed Barrier, or approved equal.

2.06 GUYING, STAKING AND WRAPPING MATERIAL

- A. Guying stakes shall be sound wood, 2" x 2" x 30" long, minimum size.
- B. Tree stakes shall be sound, 2" x 2" wood stakes, or 3-inch diameter debarked cedar, 8 feet long, or steel posts of equal length.
- C. Staking wire shall be pliable, No. 12 to 14 gauge, galvanized steel.
- D. Hose for covering wire shall be new or used, two-ply fiber reinforced garden hose, not less than 1/2-inch inside diameter. Seconds rejected by factory are acceptable. Use one (1) color throughout job.
- E. Tree wrap shall be 2-inch wide treated waterproof crepe paper as manufactured by Kraft, or approved equal. Twine used to secure tree wrap shall be a minimum 2-ply jute material.

2.07 ACCESSORIES

- A. Anti-Desiccant: Emulsion type, film-forming agent similar to Dowax by Dow Chemical Co., or Wilt-Pruf by Nursery Specialty Products, Inc., designed to permit transpiration but retard excessive loss of moisture from plants. Deliver in manufacturer's fully identified containers and mix in accordance with manufacturer's instructions.
- B. Tree Wound Dressing: Waterproof, asphalt base paint with antiseptic properties which will not harm the cambium of the plants, such as Sherwin Williams Pruning Compound, or approved equal.
- C. Herbicides: A pre-emergent weed killer such as "Banlon", or approved equal, shall be used on all mulched areas as directed by the manufacturer. Herbicide products and rates of application shall conform to registered uses.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify site conditions and note irregularities affecting work of the section.
- B. Beginning work of this Section means acceptance of existing conditions.

3.02

- A. Field stake individual locations of all trees for Owner's representative's approval prior to planting. The Contractor shall schedule his work and arrange to stake enough planting work for two (2) weeks. He shall arrange periodic site meetings with the Owner's representative for the purpose of reviewing the work that has taken place in the prior two (2) weeks and the staking for the next two (2) weeks. The Contractor shall notify the Owner's representative at least three (3) working days prior to the desired date for inspection of staking.
- B. Minor Changes: It is understood and agreed that should minor changes and deviations from the plans or staking be required by the Owner's representative, this shall be done by the Contractor at no additional cost, providing such instructions are given to the Contractor before work other than location staking is started.
- C. Method of Staking: The Contractor shall accurately stake plant material locations according to the plans. Stakes shall be 1 foot high above grade and painted a bright color to be clearly visible for inspection. Distinguish by color between types of materials, i.e., evergreen trees, shade trees, flowering trees.

3.03 VEGETATION REMOVAL

- A. Strip existing grass and weeds, including roots, from all bed areas, leaving soil surface 1-inch below finish grade.
- B. Herbicides: Apply specific herbicide to eradicate vegetation within bed areas.

3.04 PLANTING METHOD

- A. Excavation
 - (i) Tree pits shall be excavated as shown on the drawings. Subsoil dug from pits, trenches and beds shall be used in soil mixes as specified in Paragraph 2.02 of this Section. Rocks or other obstructions shall be removed to the necessary planting depth.
 - (ii) Plant pits shall be round, with vertical sides and flat bottoms, and sized per drawings. Holes dug with augers or other mechanical diggers shall have vertical sides scarified to eliminate impervious surfaces.

(iii) Loosen bottom of all plant pits as detailed to minimum 4-inch depth.

B. Planting

(i) The Contractor is responsible for planting to correct grades and alignment and all plants shall be set so that, when settled, they will bear the same relation to finish grade as they did before being transplanted. No filling will be permitted around trunks or stems.

(ii) Balled and burlapped plants shall be placed on a minimum 4 inches compacted planting mix.

(iii) Burlap shall be cut away from top 1/3 of the root ball and all ropes, wires, etc., securing the ball shall be removed.

(iv) All plastic tape and/or plastic fabric shall be completely removed from the root ball during the planting operation. "Rot proof" or treated burlap shall also be totally removed.

(v) When the plant has been properly set, the pit shall be backfilled with planting mixture, gradually filling, tamping and settling with water. No soil in a frozen or muddy condition shall be used for backfilling. A ring of soil shall be formed around the edge of each plant to hold water.

(vi) Bare root stock shall be planted so that the roots are arranged in a natural position. Remove damaged roots with a clean cut. Carefully work planting mix between roots. Fill, tamp, and water remainder of hole and form saucer as in Item (v) above.

(vii) Plant container-grown stock as specified for balled and burlapped materials, except remove containers before planting, and sever root ball sides in several places to loosen roots and prevent girding of the root mass.

(viii) Ground cover plantings shall have 2 inches peat moss mulch. Mulch these area first, rototill the peat into the top 6 inches, fertilize, and then plant ground cover.

(ix) Install woven geo-textile fabric per Manufacturer's specifications in all planting beds, and under stone mulch as shown on the plans. Individual tree plantings shall not receive fabric under the mulch.

(x) All planting shall be mulched with a 3-inch cover of shredded bark mulch as shown on the drawings and details, including all tree pits, unless otherwise indicated on the drawings. Mulch depths shall be 3 inches at time of inspection.

(xi) All plants shall be thoroughly soaked after planting. After each watering, all beds shall be raked and left in a complete and finished manner.

(xii) Upon completion of planting, all trees and shrubs shall have been pruned and injuries repaired. The amount of pruning shall be limited to the minimum necessary to remove dead or injured twigs and branches and to compensate for the loss of roots and from transplanting. Pruning shall be done in such a manner as not to change the natural habit or shape of the plant, as directed by the Owner's representative. Do not use hedge shears. All cuts shall be made flush, leaving no stubs. Paint all cuts over 3/4-inch diameter with tree paint. Notify the Owner's representative at least one (1) week prior to pruning operations.

(xiii) Guying and staking shall be completed immediately after planting. The trunks of all deciduous trees larger than the 6 to 8 ft grade shall be wrapped in a spiral manner with standard tree wrap, with an overlap of one-half-the-width from the first branch down to the ground and secured at top and bottom, and at maximum 18-inch intervals with twine. Stake all shade trees 2-inch cal. or smaller; guy all trees 3-inch cal. or larger. Guy all coniferous trees as detailed.

(xiv) If deciduous trees or shrubs are moved in full-leaf, spray with anti-desiccant at nursery before moving and again two (2) weeks after planting. Use power spray to provide an adequate film over trunks, branches, stumps, twigs and foliage.

3.05 REMOVALS OF GUYS, STAKING AND WRAPPING

- A. At the end of the guarantee period, the Contractor shall remove all guying, staking and wrapping. Saucers are to remain and will be maintained by Owner.

3.06 CLEANUP AND PROTECTION

- A. All excess and waste material shall be disposed of legally off-site, at Contractor's expense.
- B. Upon completion of work, leave site in clean condition.
- C. Protect landscape work and materials from damage due to landscape operations, operations by other Contractors and trades, and by trespassers. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged work as directed.

3.07 ACCEPTANCE

- A. Inspections for Acceptance of Work.
 - (i) Provisional Acceptance Inspection
 - a) Notify the Owner's representative in writing of the completion of planting.
 - b) The Owner's representative will inspect the work within ten (10) days of receipt of the completion notice, and will prepare a Notice of

Provisional Acceptance and a list of items to be completed or corrected.

c) Issuance of Notice of Provisional Acceptance shall constitute the start of the warranty period for the accepted portion of the work.

(ii) Final Acceptance Inspection

a) Final inspection of the work will be made by the Contractor, Owner and/or Owner's representative.

b) Before final acceptance, the terms of the guarantee shall be met and the site shall be in the condition stipulated under "Cleanup and Protection".

c) Final Acceptance Inspection of plantings or material planted during recognized planting seasons will be made during the following September for fall planting and by the following June for spring plantings.

END OF SECTION 02950

SECTION 02951 - EDGING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Provide and install edging.

1.02 BASIS OF PAYMENT

- A. Includes all labor, material and equipment costs associated with edging provided finished, and installed as specified herein, including cleanup and removal/disposal of all scrap materials.

PART 2 - PRODUCTS

2.01 STEEL EDGING

- A. Shall be 1/8-inch thick by 4 inches high, with 18-inch length coated steel stakes at maximum 30-inch intervals.
- B. Weight (including stakes) per 16-foot section shall be 36 lbs.
- C. Edging shall be manufactured by Ryerson Steel, or approved equal.
- D. All steel edging shall be painted with two (2) coats flat black or dark green rust inhibitive paint, "Rustoleum" or approved equal prior to installation.

2.02 POLYETHYLENE/VINYL EDGING

- A. Polyethylene/vinyl edging shall be black, 1/4-inch thick at the top 2 inches, and 95/1000-inch thick in the lower ground portion of the edging with steel stakes at maximum 48-inch intervals.
- B. Weight (including stakes) per 20-foot section shall be six (6) lbs.
- C. Edging and stakes shall be "Slim Edg" as manufactured by Oly-Ola Sales, Inc., or approved equal.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify site conditions and note only irregularities affecting work of this Section.
- B. Beginning work of this Section means acceptance of existing conditions.

3.02 EDGING INSTALLATION

- A. Obtain approval of the bed line layout from Owner's Representative prior to installation of edging.
- B. Install edging per manufacturer's instructions and as detailed on the plans.
- C. All edgings shall be installed in straight lines and smooth curves.
- D. Stakes shall be placed on the inside of the beds at regular intervals per manufacturer's recommendations.

END OF SECTION

SECTION 03300 - CONCRETE WORK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. All Drawings and general provisions of Contract, including General Conditions, Supplementary Conditions, Division 0, and Division 1 Specification sections apply to the Work of this Section.

1.02 DESCRIPTION OF WORK:

- A. Extent of typical concrete work shown on Drawings and specified herein, including but limited to the following:
 - 1. Foundations and footings
 - 2. Slabs on grade
 - a. **Provide vapor barriers under all concrete slabs that come into direct contact with soil.**
 - 3. Frost-blocks and entry flatwork not shown on Civil Documents, or as supplements to Civil Documents
 - 4. Cast-in-place walls, floors, risers, and stairs
- B. Accessories for concrete formwork, installation and reinforcement
- C. Reinforcing steel bars, wire fabric and accessories for cast-in-place concrete
- D. Field finishing of concrete surfaces
- E. Formwork for cast-in-place concrete, with shoring, bracing and anchorage
- F. Form accessories
- G. Form stripping

1.03 RELATED SECTIONS:

- A. Section 05500 - Metal Fabrications: Supply of metal fabrications for placement by this section
- B. Section 07200 – Insulation: for foundation and perimeter Insulation
- C. Section 07900 – Joint Sealants
- D. Division 15 - Mechanical: Supply of mechanical items for placement by this section
- E. Division 16 - Electrical: Supply of electrical items for placement by this section.

1.04 QUALITY ASSURANCE:

- A. Codes and Standards -- Comply with the provisions of latest editions of the following:
 - 1. ACI 301 "Specifications for Structural Concrete for Buildings"
 - 2. ACI 302 "Recommended Practice for Concrete Floor and Slab Construction"
 - 3. ACI 304 "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete"
 - 4. ACI 308 - Standard Practice for Curing Concrete
 - 5. ACI 311 "Recommended Practice for Concrete Inspection"
 - 6. ACI 318 "Building Code Requirements for Reinforced Concrete"
 - 7. ACI 347 "Recommended Practice for Concrete Formwork"
 - 8. ASTM C171 - Sheet Materials for Curing Concrete.
 - 9. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.
 - 10. ACI 303R-91 "Guide to Cast-In-Place Architectural Concrete Practice"
 - 11. ASTM A615 - Deformed and Plain Billet Steel Bars for Concrete Reinforcement
 - 12. Concrete Reinforcing Steel Institute, "Manual of Standard Practice", except where more stringent requirements are shown or specified.
 - 13. CRSI - Concrete Reinforcing Steel Institute - Manual of Practice.
 - 14. CRSI 63 - Recommended Practice For Placing Reinforcing Bars

- B. Concrete Testing Service: The Owner will employ and Contractor will coordinate with a testing laboratory to perform materials evaluation and testing, and to design and test concrete mixes in accord with requirements of ACI 301, and to evaluate and inspect concrete delivered to, and placed at, the site. The Contractor shall have no involvement with the Owner's testing laboratory. The testing laboratory will be entirely responsible for taking, storing, curing, etc., of all concrete samples.
- C. Installers: Installation of concrete paving, including any special architectural concrete work, shall be carried out by contractors and their employees who are thoroughly experienced and skilled in the necessary crafts and who are completely familiar with the specified requirements and methods needed for proper performance of the work of this section.
 - 1. Design, engineer and construct formwork, shoring and bracing to conform to design and code requirements; resultant concrete to conform to required shape, line and dimension.
 - 2. Design formwork under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of Michigan.
 - 3. Installation Company and crew shall have a minimum of five (5) years of documented experience in projects comparable to the work described on the Drawings and specified herein.
- D. Preinstallation Conference - Conduct conference at Project site to comply with requirements of Division 1 and the following:
 - 1. At least 30 days prior to submitting design mixes. Conduct a meeting to review detailed requirements for preparing concrete design mixes.
 - 2. Establish preliminary work progress schedule and procedures for materials inspection, testing and certifications.
- E. Single Materials Source: Obtain each material from same source throughout to ensure consistency of finished work. Provide "system" products from a single manufacturer to ensure compatibility.

1.05 SUBMITTALS:

- A. Concrete Mix Designs
- B. Reinforcing Placing Drawings
- C. Laboratory Test Reports: The testing agency shall submit 3 copies of laboratory test reports for concrete materials, for mix design tests and for results of field quality control testing to the Architect, the Owner, Contractor and concrete producer on same day tests are made.
 - 1. Submit proposed mix design to Architect for review prior to commencement of work.
- D. Shop Drawings: Indicate pertinent dimensions, materials, bracing, and arrangement of joints and ties.
- E. Product Data: Submit manufacturer's product data for all products and materials certifying compliance with specified requirements.

1.06 INCONSISTENCIES:

- A. In the case that a discrepancy exists between two or more stated or implied characteristics of any product, assembly, technique, and application, etc., between any one or more Sections of this Project Manual, any one or more Paragraphs of this Specification, or between the Drawings and Specifications, the Contractor's Bid amount shall reflect the most costly version or combination of the requirement(s).

PART 2 – PRODUCTS

2.01 CONCRETE MATERIALS:

- A. Portland Cement: ASTM C 150,
 - 1. **Type I** for normal interior construction and sub-surface installations
 - 2. **Type IA** – air-entrained, for exterior flat-work and other exposed-to-the-elements applications

3. Use one brand of cement throughout Project.
- B. Normal-weight aggregates: ASTM C33.
 1. Provide aggregates from a single source for exposed concrete.
 2. For exposed exterior surfaces, do not use fine or coarse aggregates that contain substances that may cause spalling.
- C. Light-weight aggregates (where noted or required) ASTM C330
- D. Fly Ash:
 1. ASTM C 618, Type C
 2. Allowed based on the design properties of the concrete mixture submitted.
- E. Water:
 1. Clean, potable and free of substances detrimental to concrete and reinforcing.
- F. Admixtures, General: Provide concrete admixtures that contain not more than 0.1 percent chloride ions.
- G. Air-Entraining Admixture: ASTM C 260 certified compatible with other required admixtures by the manufacturer.
 1. **Air-entraining is required for all exterior concrete – unless otherwise noted.** 6% +/- 1% content
 2. Products: Subject to requirements, provide one of the following:
 - a. Air-mix or Perma-Air, Euclid Chemical Co
 - b. Darex AEA or Daravair, W.R. Grace
 - c. Sealtight AEA, W.R. Meadows
- H. Water Reducing Admixture, and other Retarders/Accelerators:
 1. Where required, shall comply with ASTM C 494, Type A. Use only admixtures which have been tested and accepted in mix designs, unless otherwise acceptable. Submit all admixes for review.
 2. Products: Subject to compliance with requirements, provide one of the following:
 - a. Eucon WR-91, Euclid Chemical Co.
 - b. Pozzolith, Normal or Polyheed, Master Builders, Inc
- I. Calcium Chloride:
 1. Calcium chloride will not be permitted in concrete mix. Use cold weather non-chloride, non-corrosive set accelerators only with written approval of Architect. Provide Product Data for Architect approval prior to use in accordance with 1.04 "Submittals".

2.02 CONCRETE MIX DESIGN:

- A. Proportion normal weight mixes by either laboratory trial batch or field experience method, complying with ACI 211.1.
 1. Submit written reports of each proposed mix for each class of concrete to Architect at least 15 days prior to start of work. Do not begin concrete production until mixes have been reviewed by the Architect.
 2. Mix designs may be adjusted when material characteristics, job conditions, weather, test results or other circumstances warrant. Do not use revised concrete mixes until submitted to and reviewed by the Architect.
- B. Use air-entraining admixture in all concrete which will be exposed to freezing and thawing, providing not less than 5% or more than 7% entrained air and in compliance with ACI 301, Table 3.4.1.
- C. Use set-retarding admixtures during hot weather only when approved by Testing Laboratory.
- D. Limit the use of fly ash to not exceed 20 percent of cement content by weight.
- E. Design the mix to produce standard weight concrete consisting of Portland cement, aggregate, water, and specified admixtures to produce the following properties:
 1. Compressive Strength: If greater compressive strength values are indicated on Structural Drawings, they shall take precedence over the following.
 - a. Exterior flat work, low walls: 3,500 psi minimum at 28 days
 - b. Foundations and footings: 3,000 psi minimum at 28 days
 - c. Interior Slabs: 3,000 psi minimum at 28 days

- d. Air-Entrained for stairs: 4000 psi minimum, water/cement ratio 0.44
2. Slump Range:
 - a. Ramps, slabs, and sloping surfaces - Not more than 3"
 - b. Reinforced foundation systems - Not less than 2" and not more than 4"
 - c. Concrete containing high-range water reducing admixture after attaining a site-verified 2-4" slump concrete - Not more than 8"
 - d. Other concrete - Not more than 4"
3. Water Cement Ratio:
 - a. The maximum water-cement ratio shall be in accordance with ACI 301 except as follows:
 - 1) **For thin sections (railings, curbs, sills, ledges, ornamental work) and sections with less than 1" cover over steel, maximum water-cement ratio for severe weathering area shall not exceed 0.45.**
 - 2) **For all other structures in severe weathering area, maximum water-cement ratio shall not exceed 0.50.**
4. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, as accepted by Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect before using in Work.

2.03 ADMIXTURES:

- A. Use water-reducing admixture or high-range water-reducing admixture in concrete, as required for placement and workability.
- B. Use air-entraining admixture in exterior exposed concrete unless otherwise indicated, Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus or minus 1-1/2 percent with the following limits:
 1. Concrete structures and slabs exposed to freezing and thawing, de-icer chemicals, or hydraulic pressure:
 - a. 5.5 percent of 1-1/2" maximum aggregate
 - b. 6 percent for 1" maximum aggregate
 - c. 6 percent for 3/4" maximum aggregate
 - d. 7 percent for 1/2" maximum aggregate
 2. Other concrete not exposed to freezing, thawing, or hydraulic pressure, or to receive a surface hardener: 2 to 4 percent air.
 3. Use admixtures for water reduction and set accelerating or retarding in strict compliance with manufacturer's directions.

2.04 FORM MATERIALS:

- A. General:
 1. Provide form materials with sufficient stability to withstand pressure of placed concrete without bow or deflection.
- B. **Exposed Concrete Surfaces.** See Documents for requirements of formwork, and choose from the following:
 1. Wood/Non-Specific Form Materials:
 - a. Exposed surface form materials: Clear surface MDO plywood, metal, metal-framed plywood or other acceptable panel-type materials with strength and stiffness to leave straight surface with less than 1/8" deflection between studs. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings.
 - b. This formwork shall be used as needed for all smooth surface requirements at the choice of the contractor and as reviewed/approved by the Architect.

2. Acceptable panel-type to provide continuous, straight, smooth, as-cast surfaces. Use largest practical sizes to minimize form joints.
 3. Cylinder forms for columns and bollards providing clear surface **without spirals** and forming a continuous, straight, plumb surface.
- C. **Unexposed Concrete Surfaces:**
1. Suitable material for project conditions
 2. Hand trim sides and bottom of earth forms. Maintain a clean bottom. Remove loose soil prior to placing concrete.
 3. Earth sides are not allowed for grade beams and footings. Form grade beams and footings with wood materials.
- D. Erection of Formwork:
1. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.
 2. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.
 3. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.
 4. Align joints and make watertight. Keep form joints to a minimum.
 5. Obtain approval before framing openings in structural members that are not indicated on Drawings.
 6. Provide fillet or chamfer strips on external corners of walls.
 7. Install void forms in accordance with manufacturer's recommendations. Protect forms from moisture or crushing.
 8. Coordinate this section with other sections of work that require attachment of components to formwork.
 9. If formwork is placed after reinforcement resulting in insufficient concrete cover over reinforcement before proceeding, request instructions from Architect/Engineer.
- E. Formwork Accessories as required:
1. Form Ties: Snap off type, factory-lubricated, galvanized metal, fixed length, cone type, 1 1/2 inch back break dimension, free of defects that could leave holes larger than 1 inch in concrete surface.
 2. Form Release Agent: Colorless releasing agent with a maximum of 350 mg/l volatile organic compounds (VOCs) which will not stain concrete, or absorb moisture, or impair natural bonding or color characteristics of coating intended for use on concrete.
 3. Corners: Chamfered, rigid plastic or wood strip type; 3/4 x 3/4 inch size; maximum possible lengths.
 4. Dovetail Anchor Slot: Galvanized steel, 22-gage thick, foam filled, release tape sealed slots, anchors for securing to concrete formwork.
 5. Flashing Reglets: Rigid PVC, 22 gage thick, longest possible lengths, with alignment splines for joints, release tape sealed slots, anchors for securing to concrete formwork.
 6. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.
 7. Waterstops: Rubber or Polyvinyl chloride, minimum 1,750 psi tensile strength, minimum 50 degrees F to plus 175 degrees F working temperature range, maximum possible lengths, ribbed profile, preformed corner sections, heat welded jointing.

2.05 REINFORCING MATERIALS:

A. Steel Reinforcement:

1. Reinforcing Steel: ASTM A 615, Grade 60, 60 ksi yield grade; deformed billet steel bars, unfinished.
 - a. All footings/foundations shall have reinforcing as indicated in the Documents, or at a minimum - as referenced below. Refer to Structural Documents first and default to Architectural Documents if no Structural occurs.

- 1). All footings shall have a min. of two (2) #4 reinforcement bars, cont. with min. 3" of concrete cover to bottom of footing. See Documents for additional information.
- 2). All steps and foundation walls shall have a min. of two (2) #4 reinforcement bars, cont. with min. 3" of concrete cover to top & sides of foundation @ approx. 24" O/C. See Documents for additional information.
2. Welded Steel Wire Fabric: ASTM A 185 Welded Steel Wire Fabric, in flat sheets - unfinished.
3. **All re-bar in Stairs shall be Epoxy-coated Reinforcing Bars: ASTM A 775.**
4. Steel Wire: ASTM A 82, plain, cold-drawn steel. Sizes noted on Documents shall be as related to the Table below:

Table 34-2. Rectangular welded wire fabric.		
Style designation ^{1/}		
Weight		
by steel wire gauge	by W-number	(lb/100 ft ²)
6 x 6 - 10 x 10	6 x 6 - W1.4 x W1.4	21
6 x 6 - 8 x 8	6 x 6 - W2.1 x W2.1	30
6 x 6 - 6 x 6	6 x 6 - W2.9 x W2.9	42
6 x 6 - 4 x 4	6 x 6 - W4.0 x W4.0	58
4 x 4 - 10 x 10	4 x 4 - W1.4 x W1.4	31
4 x 4 - 8 x 8	4 x 4 - W2.1 x W2.1	44
4 x 4 - 6 x 6	4 x 4 - W2.9 x W2.9	62
4 x 4 - 4 x 4	4 x 4 - W4.0 x W4.0	85
4 x 12 - 8 x 12	4 x 12 - W2.1 x W0.9 ^{2/}	25
4 x 12 - 7 x 11	4 x 12 - W2.5 x W1.1 ^{2/}	31
^{1/} Style designation is defined in ACI Standard 315 of the American Concrete Institute.		

- B. Accessories:
1. Tie Wire: Minimum 16 gage annealed type.
 2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions including load bearing pad on bottom to prevent vapor barrier puncture. Use wire bar-type supports complying with CRSI specifications.
 - b. Slab-on-grade - use supports with sand plates or horizontal runners where base material will not support chair legs.

2.06 RELATED MATERIALS:

- A. Vapor Retarding:
1. All interior Slabs-on-grade shall have a moisture/vapor barrier installed below the slab. Refer to Documents to determine whether the barrier is applied above or within the granular bed supporting the slab.
 2. All moisture/vapor barriers, used in contact with soil or granular fill, shall meet ASTM E-1745-97. Tape all joints to create a single, continuous membrane.
 - a. 10 mil vapor retarder, polyolefin geo-membrane with WVTR of 0.03 Perms as tested by ASTM E-96.
 2. Follow manufacturer's recommendations and ASTM E-1745-97/ASTM E 1643-98 for all installation procedures.
- B. Moisture-Retain Cover: the following shall comply with the ASTM C 171:

1. Waterproof paper
2. Polyethylene film
3. Polyethylene-coated burlap
- C. Concrete Sealers: **Seal all interior, exposed concrete slabs.** Prior to application of sealer, cure concrete according to manufacturer's recommendations. Provide one of the following:
 1. Day-Chem Sure Hard (J17), Dayton Superior
 2. Intraseal, Conspec Marketing and Mfg. Co.
 3. or similar
- D. Bonding Agent: Polyvinyl acetate or acrylic base. Subject to compliance with field conditions, and as required - provide one of the following:
 1. Polyvinyl Acetate (Interior only)
 - a. Superior Concrete Bonder, (J-41) Dayton Superior Corp.
 - b. Euco Weld, Euclid Chemical Co.
 - c. Everweld, L&M Construction Chemical, Inc.
 2. Acrylic or Styrene Butadiene:
 - a. Day-Chem Ad Bond, Dayton Superior Corp.
 - b. SBR Latex, Euclid Chemical Co.
 - c. Daraweld C, W.R. Grace & Co.
- E. Epoxy Adhesive: Per ASTM C881, two-component material suitable for use on dry or damp surfaces. Provide material type, grade, and class to suit Project requirements. Subject to compliance with field conditions, provide one of the following:
 1. Resi-Bond (J-58), Dayton Superior
 2. Euco Epoxy System #452 or #620, Euclid Chemical Co.
 3. Rexi-Weld 1000, W.R. Grace & Co.
- F. Joint Fillers and Sealants:
 1. Install a joint sealant to interior slabs not scheduled to receive an additional finish.
 2. See Section 07900.

PART 3 - EXECUTION

3.01 FORMING AND PLACING CONCRETE:

- A. Placing Concrete: Place concrete continuously between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur. Place concrete to scoring pattern indicated on drawings. All joints to be straight lines, or smooth curves at the direction of the Architect.
 1. Place concrete in accordance with ACI 301.
 2. Ready-Mixed Concrete: ASTM C 94.
 3. Hot Weather Placement: ACI 301.
 4. Ensure reinforcement, inserts, embedded parts and formed joints are not disturbed during concrete placement.
- B. Preparation:
 1. Place moisture barrier over between layers of compacted fill, just prior to placement of reinforcement. Keep foot traffic over moisture barrier to a minimum. Lap all joints a minimum of 6".
 2. Tape all moisture barrier joints with approved material/system as recommended by the manufacturer.
- C. Formwork:
 1. Construct so that concrete members and structures are of correct size, shape, alignment, elevation and position, complying with ACI 347.
 - a. Provide Class A tolerances for concrete surfaces exposed to view.
 - b. Provide Class C tolerances for other concrete surfaces.
 2. Provide openings in framework to accommodate work of other trades, accurately place, and securely support items built into forms.

3. Align staples or other fasteners holding form liners in place with seams to conceal in finished work.
 4. Clean and adjust forms and form liners prior to concrete placement. Apply form release agents or wet forms, as required. Retighten forms during and after concrete placement, if required, to eliminate mortar leaks.
 5. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.
 6. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.
- D. Steel Reinforcement:
1. Reinforcement shall meet ACI 301 and 318 requirements. Position, support and secure reinforcement against displacement. Locate and support with metal chairs, runners, bolsters, spacers and hangers, as required. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
 - a. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.
 - b. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that may reduce or destroy bond with concrete.
 2. Unless otherwise noted, reinforcing shall have a Class B splice.
 - a. Min. lap splice for all bars shall be 12".
 3. Interrupt reinforcement at expansion joints.
- E. Joints:
1. **All Joints shall meet ACI 301 requirements.** Provide expansion, control (contraction), construction and any other decorative or required joints as required of ACI 301 and/or as indicated on Drawings. If none shown, Contractor shall install joints conforming to ACI 301 requirements and best industry standards and practices.
 - a. Typical "**contraction joints**" or control joints should be at approx. 2x the slab thickness in feet (ie. - 4" slab thickness = 8 foot control intervals). Contractor shall provide joint layout for Architect's approval for all Decorative concrete construction.
 - b. Typical "**expansion joints**" for slab movement shall be at a min. of 30 feet on center and shall have a full joint with a flexible filler and a joint sealant typically, or as required by these Documents. Install a dowel bars and support assemblies at joints if indicated in Documents.
 - c. Typical "**isolation joints**" shall be installed where concrete abuts another, fixed wall, structural member or other structure - typical. Construction shall be similar to expansion joints.
 2. Locate construction joints so as to not impair the strength and appearance of the structure. Place isolation and control joints in slabs-on-ground to stabilize differential settlement and random cracking.
 3. All joints to be neatly made straight lines or smooth curves if shown to complete an Architectural pattern.
 4. **All interior control and construction joints in floor slabs not scheduled to receive an additional finish shall have a joint sealant installed.** Coordinate with Section 07900 - Joint Sealants - for additional information.
 5. Apply sealants as required to all joint installations.
- F. Installation of Embedded Items:
1. Embedded items shall meet ACI 301 requirements. Set and build into the work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting diagrams, templates and instructions provided by others for locating and setting.
- G. Vapor Retarder/Barrier Installation
1. General: Place vapor retarder/barrier sheeting in position with longest dimension parallel with direction of pour.

2. Lap joints 6 inches and seal with manufacturer's recommended mastic or pressure-sensitive tape.
- H. Concrete Placement:
 1. Comply with ACI 304, placing concrete in a continuous operation within planned joints or sections. Do not begin placement until work of other trades affecting concrete is completed.
 2. Consolidate placed concrete using mechanical vibrating equipment with hand rodding and tamping, so that concrete is worked around reinforcement and other embedded items and into all part of forms.
 3. Protect concrete from physical damage or reduced strength due to weather extremes during mixing, placement, and curing – for the entire length of time required to achieve design strengths.
 - d. In cold weather, comply with ACI 306.
 - 1) Do not use calcium chloride, salt or other materials containing anti-freeze agents. Use non-chloride or non-anti-freeze containing cold weather agents only with Architect's approval.
 - 2) Use chemical accelerators only as accepted in mix designs.
 - e. In hot weather, comply with ACI 305.
 - 1) Cool ingredients before mixing to maintain concrete temperature at time of placement to below 90°F (32°C). Mixing water may be chilled or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 - 2) Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedding in concrete.
 - 3) Fog spray forms, reinforcing steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without puddles or dry areas.
 - 4) Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, as acceptable to Architect.
 - f. Maintain future, ambient temperatures during curing to minimize 'temperature contraction'. Any slabs with 4" – 6" slab thicknesses shall have contraction joints per ACI 304 and in strict accordance with contraction joint frequencies.
 - 1) Per ACI 360 – Design of Slabs-on-Ground, follow recommendations to minimize shrinkage and curling of slabs.

3.02 CONCRETE FINISHES:

A. Finishing Formed Surfaces:

1. Direct-Application Surfaces:

- a. Provide a smooth trowelled finish for concrete surfaces that are to receive a finish coating or where the concrete will serve as a subfloor for finish material directly applied. Remove fins and projections, patch defective areas with cement grout, and finish smooth. **The following tolerances shall be met for all conditions:**
 - i. Where concrete is to receive a thin set tile floor finish, maximum surface variation shall not exceed 1/8" in 10'-0". New slabs to receive floor tile shall not be treated with curing or acceleration compounds, form-release agents or other additives that will interfere with tile bonding.
 - ii. Where concrete is to receive resilient flooring finish or carpeting, maximum surface variation shall not exceed 1/8" in 10'-0". Provide slab trowel finish.
 - iii. Correct defects by removal and replacement of the defective work.
- b. Where concrete is to receive a thin set tile floor finish, maximum surface variation shall not exceed 1/8" in 10'-0". New slabs to receive floor tile shall not be treated with curing or acceleration compounds, form-release agents or other additives that will interfere with tile bonding.

- c. Where concrete is to receive resilient flooring finish, maximum surface variation shall not exceed 1/8" in 10'-0". Provide slab trowel finish.
 2. Exposed-to-View Surfaces – Float Finish:
 - a. Apply float finish to monolithic slab surfaces that are exposed-to-view. After screeding, consolidate and level concrete surface. Do not work surface until ready for floating. Float using float blades or float shoes only when surface water has disappeared, or when concrete has stiffened sufficiently to permit operation of power-driven floats. Level uniformly tolerance of F(F) (floor flatness) and F(L) (floor levelness) according to ASTM E 1155.
 - 1) F (F) 20, local F (F) 15
 - 2) F (L) 15, local F (L) 10
 3. Non-Slip Broom Finish:
 - a. Apply non-slip broom finish to exterior concrete walks and elsewhere as shown on the Drawings. Immediately after trowel finishing, slightly roughen surface by drawing a fiber bristle broom across surface, perpendicular to main traffic route.
 4. **Vertical Surfaces:**
 - a. **Exposed-to-View Formed Finish: Lightly work surfaces of formed concrete work to remove minor surface imperfections and variations with a burlap bag filled with concrete slurry to roughen surface and fill voids.**
 - b. Not-Exposed-to-View - Rough-Formed Finish: Imperfections allowed.
 - B. Monolithic Slab Finishes
 1. Trowel Finish: Apply a trowel finish to monolithic slab surfaces exposed to view and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or another thin film-finish coating system.
 - a. After floating, begin first trowel-finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and finish surfaces to the following tolerances of F(F) (floor flatness) and F(L) (floor levelness) measured according to ASTM E 1155. Grind smooth any surface defects that would telegraph through applied floor covering system.
 - 1) Floor slabs to receive wood flooring:
F (F) 50, local F (F) 25
F (L) 30, local F (L) 15
 - 2) Typical Floor Slabs:
F (F) 30, local F (F) 15
F (L) 20, local F (L) 10
 2. Nonslip Broom Finish: Apply a nonslip broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
 - a. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.03 CURING:

- A. Curing of concrete shall meet ACI 301, and 305 or 306 (as appropriate), beginning as soon as free water has disappeared from exposed surfaces. Where possible, keep continuously moist for not less than 72 hours. Continue curing by use of moisture-retaining cover, or (unless otherwise prohibited) membrane-forming curing compound. Cure formed surfaces by moist curing until forms are removed. Provide protection as required to prevent damage to exposed concrete surfaces.
- B. Concrete Protection in winter for ice and snow conditions:
 1. Use 'safe', non-toxic de-icers when required to melt snow and ice on newly placed concrete. Use the 'safest' product available at the time of use. Recommendations are:
 - a. Use magnesium chloride as required to temperature to 5 degrees Fahrenheit.

- b. Use calcium chloride as required when temperatures are below 5 degrees Fahrenheit.

3.04 QUALITY CONTROL TESTING DURING CONSTRUCTION:

- A. Testing laboratory employed by the Owner will perform sampling and testing during concrete placement in accord with requirements of ACI 301, which may include the following:
 - 1. Sampling:
 - a. ASTM C 172
 - 2. Slump:
 - a. ASTM C 143, one for each set of compressive strength specimens or whenever concrete consistency appears to vary, but not fewer than one for each load at point of discharge.
 - 3. Air Content:
 - a. ASTM C 173, one for each set of compressive strength specimens.
 - 4. Compression Test Specimen:
 - a. ASTM C 31, one set of 6 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.
 - 5. Compressive Strength:
 - a. ASTM C 39, one set for each 50 cubic yards or fraction thereof of each class of concrete; 2 specimens tested at 7 days, 3 specimens tested at 28 days, and one retained for later testing if required.
 - b. When the total quantity of a given class of concrete is less than 50 cubic yards, the strength tests may be waived by the Architect or testing agency if field experience indicates evidence of satisfactory strength.
- B. The testing laboratory employed by the Owner shall report test results, in writing, to the Architect, the Owner, Contractor and concrete producer on same day tests are made.
- C. The Contractor shall give 48 hours prior notice to the testing laboratory employed by the Owner of his intention to place concrete.
- D. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.

3.05 CONCRETE SURFACE REPAIRS

- A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removing forms, when acceptable to Architect.
- B. Mix dry-pack mortar, consisting of one part Portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing.
 - 1. Cut out honeycombs, rock pockets, voids over 1/4 inch in any dimension, and holes left by tie rods and bolts down to solid concrete but in no case to a depth less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with bonding agent. Place patching mortar before bonding agent has dried.
 - 2. For surfaces exposed to view, blend white Portland cement and standard Portland cement so that, when dry, patching mortar will match surrounding color. Provide test areas at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.
- C. Repairing Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes and fill with dry-pack mortar or precast cement cone plugs secured in place with bonding agent.
 - 1. Repair concealed formed surfaces, where possible, containing defects that affect the concrete's durability. If defects cannot be repaired, remove and replace the concrete.

- D. Repairing Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface tolerances specified for each surface and finish. Correct low and high areas as specified. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having the required slope.
 - 1. Repair finished unformed surfaces containing defects that affect the concrete's durability. Surface defects include crazing and cracks in excess of 0.01 inch wide or that penetrate to the reinforcement or completely through nonreinforced sections regardless of width, spalling, popouts, honeycombs, rock pockets, and other objectionable conditions.
 - 2. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.
 - 3. Correct low areas in unformed surfaces during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete. Proprietary underlayment compounds may be used when acceptable to Architect.
 - 4. Repair defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose reinforcing steel with at least 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
- E. Repair isolated random cracks and single holes 1 inch or less in diameter by dry-pack method. Groove top of cracks and cut out holes to sound concrete and clean of dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Place dry-pack before bonding agent has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- F. Perform structural repairs with prior approval of Architect for method and procedure, using specified epoxy adhesive and mortar.
- G. Repair methods not specified above may be used, subject to acceptance of Architect.

END OF SECTION 03300

SECTION 05040 - HOT DIP GALVANIZING

PART I - GENERAL

1.01 WORK INCLUDED

- A. This specification covers iron and steel materials to be hot dip galvanized after manufacture or fabrication including, but not limited to:
 - 1 General Steel Articles.
 - 2 Structural Steel Members.
 - 3 Fabricated Steel Assemblies.
 - 4 Wire Work Fabricated from uncoated wire.
 - 5 Steel Forgings.
 - 6 Iron Castings.
 - 7 Iron and Steel Pipe.
 - 8 Fasteners and Miscellaneous Hardware.
 - 9 Fencing Materials.
 - 10 Ornamental Iron.
 - 11 Any Ferrous item exposed to the weather.

1.02 RELATED WORK SPECIFIED ELSEWHERE:

- A. Steel materials, fabrications, and assemblies are specified to be furnished installed in various other sections.
- B. Section 05500 – Metal Fabrications
- C. Section 05520 – Handrails and Railings

1.03 REFERENCES

- A. Publications:
 - 1. American Galvanizers Association (AGA):
 - a. Inspection of Products Hot Dip Galvanized After Fabrication
 - b. The Design of Products to be Hot Dip Galvanized After Fabrication
 - c. Recommended Details of Galvanized Structures
 - 2. Research Council on Structural Connections of the Engineering Foundation:
 - a. Specification for Structural Joints Using ASTM-A325 or A490 bolts
- B. Reference Standards:
 - 1. American Society for Testing and Materials (ASTM):
 - b. A123 Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
 - c. A143 Safeguarding Against Embrittlement of Hot-Dip Galvanized
 - d. Structural Steel Products and Procedure for Detecting Embrittlement
 - e. A153 Zinc Coating (Hot-Dip) on Iron and Steel Hardware
 - f. A384 Safeguarding Against Warpage and Distortion During Hot-Dip Galvanizing of Steel Articles
 - g. Galvanizing of Steel Articles
 - h. A385 Providing High-Quality Zinc Coatings (Hot-Dip)
 - i. A767 Specification for Zinc-Coated (Hot-Dip Galvanized)
 - j. Steel Bars for Concrete Reinforcement
 - k. A780 Repair of Damaged Hot-Dip Galvanized Coatings
- C. Federal Specifications:
 - a. DOD-P-21035, Paint, High Zinc Dust Content, Galvanizing Repair
 - b. MIL-P-26915, Primer Coating, Zinc Dust Pigmented

1.04 QUALITY ASSURANCE

- A. Coating Applicator: Company specializing in hot dip galvanizing after fabrication and following the procedures of the Quality Assurance Manual of the American Galvanizers Association.
- B. Company specializing in DUROZINQ® to assure quality and on time guaranteed delivery.
- C. ISO 9002 Certified within the last five years and audited yearly.

1.05 SUBMITTALS

- A. In accordance with provisions of Section 01300, submit an original and two copies of the coating applicator's Certificate of Compliance that the hot dip galvanized coating meets or exceeds the specified requirements of ASTM-A 123 A767 or A153 (as applicable).
- B. Applicator must submit quality assurance certification and ISO 9002 certification, and auditor's yearly report for the past 3 years.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Store and protect products under the provisions of Section 01610.
- B. Load and store galvanized articles in accordance with accepted industry standards.

PART 2 - PRODUCTS

2.01 ACCEPTABLE COATING APPLICATORS

- A. Applicator must be ISO 9002 certified to assure premier quality standards
- B. American Galvanizing Association members available upon request from the American Galvanizing Association.

2.02 GALVANIZING MATERIALS

- A. Material for galvanizing to be geometrically suitable for galvanizing as described in ASTM-A 384 and A385. Steel materials suitable for galvanizing include structural shapes, pipe, sheet, fabrications and assemblies.
- B. Material to be chemically suitable for galvanizing Steels containing carbon below 0.25 percent, phosphorus below 0.04 percent and manganese below 1.35 percent, either individually or in combination, and providing the silicon content is .04 percent or less or a range of 0.15-0.23%, will normally develop a typical coating when conventional galvanizing techniques are applied. In cases where a steel is selected for considerations other than galvanizing and the chemistry of the elements (C, Mn, P, and Si) exceeds the limits indicated above, the steel may be galvanizable. The galvanizer must be advised of the variation in advance so that he can determine if the material is galvanizable and whether or not special processing techniques will be required or different appearance and bonding is acceptable. Experience has shown that silicon in the ranges of 0.02 to 0.04% and 0.15 to 0.23% produce coatings of normal integrity and performance. Steels with silicon contents significantly below 0.04% may not achieve the desired minimum coating thicknesses. Steel with silicon above 0.23% can have less bonding and adhesion, as well as, a higher milage and dull appearance. Recommended steel materials for hot dip galvanizing include, but are not limited to:

- 1. Structural shapes and plates: ASTM-A 36, A242 type 2, A283, A441, A500, A501, A529, A572 and A588.
- 2. Steel for fasteners:

<u>General Category</u>	<u>Bolt Material</u>	<u>Nut Material</u>
Carbon Steel	A307 GR A or B	A563 GR A
High Strength	A325 Type I	A563 GR DHor
Tower Bolts	A394	A563 GR A
Quenched & Tempered Carbon Steel Bolts	A449	A563 GR C
Quenched & Tempered Alloy Steel Bolts	A354 GR BC	A563 GR DH

CAUTION. Avoid use of steel with an ultimate tensile strength greater than 150 ksi.

2.03 FABRICATION REQUIREMENTS

- A. Fabricate structural steel in accordance with Class (I), (II), (III) guidelines as described in AGA's; Recommended Details for Galvanized Structures.

- B. Fabrication practices for products to be in accordance with the applicable portions of ASTM-A 143, A384, and A385, except as specified herein. Avoid fabrication techniques, which could cause distortion or embrittlement of the steel.
- C. The Fabricator shall consult with Architect/Engineer and Hot Dip Galvanizer regarding potential problems or potential handling problems during the galvanizing process, which may require modification of design before fabrication proceeds.
- D. Remove all welding slag, splatter, anti-splatter compounds and burrs prior to delivery for galvanizing. When weldments are to be galvanized, avoid the use of a high silicon welding rod. (An AGA member can advise on welding rod best suited for architecturally exposed material).
- E. Provide holes and/or lifting lug to facilitate handling during the galvanizing.
- F. Avoid unsuitable marking paints. Use only water-soluble markers. Consult with the galvanizer about removal of grease, oil paint and other deleterious material prior to fabrication.
- G. Remove by blast cleaning or other methods surface contaminants and coatings which would not be removable by the normal chemical cleaning process in the galvanizing operation.
- H. Whenever possible, slip joints should be used to minimize field welding of materials.
- I. To minimize handling damage, trucking to and from the galvanizer must be the responsibility of the galvanizer utilizing galvanizer's company owned truck or by prior written agreement between steel fabricator and galvanizer.

2.04 MATERIALS FOR REPAIRS:

- J. Use a product that meets or exceeds ASTM A-780 (Standard Practice for Repair of Damaged Hot-Dip Galvanized Coatings), with a 95% pure zinc metal as a liquid coating - similar to:
 - 1 Galvilite – Galvanizing Repair Compound By ZRC
 - 2 or equal
- K. Comply with manufacturer's requirements per the application process.
- L. The application may be sprayed, rolled or brushed – at the contractor's option – unless determined otherwise by the Architect.

PART 3 - EXECUTION

3.01 SURFACE PREPARATION

- A. Pre-clean steel works in accordance with accepted methods to produce an acceptable surface for quality hot dip galvanizing.

3.02 APPLICATION OF COATING

- A. Galvanize steel members, fabrications, and assemblies after fabrication by the hot dip process in accordance with ASTM-A 123.
- B. Galvanize bolts, nuts, washers, iron and steel hardware components in accordance with ASTM-A 153. For best results this material will be galvanized in a kettle capable of reaching 1000 degrees Fahrenheit.
- C. Safeguard products against steel embrittlement in conformance with ASTM-A 143.
- D. Galvanize reinforcing steel in accordance with ASTM-A 767.
- E. Handle all articles to be galvanized in such a manner as to avoid any mechanical damage and to minimize distortion.
- F. To minimize surface imperfections use of the galvanizing process involving a flux blanket on the kettle (wet method) is prohibited.
- G. To minimize potential distortion, any steel item less than 45 FT in length and 9 FT in depth shall be coated in a single dip.

3.03 COATING REQUIREMENTS

- A. Coating Weight: conform to paragraph 5.1 of ASTM-A 123, table I of A767, or table I of ASTM-A 153, as appropriate. Special thickness requirements should refer to ASTM-A 123 paragraph 3.1 section 7 and be specified as the minimum average mils of thickness. Extra thick coatings are not always obtainable.

- B. Surface Finish: Continuous, adherent, as smooth and evenly distributed as possible and free from any defect detrimental to the stated end use of the coated article.
- C. Adhesion: Withstand normal handling consistent with the nature and thickness of the coating and normal use of the article.

3.04 TESTS

- A. Inspection and testing of hot dip galvanized coatings shall be done under the guidelines provided in the AGA publication, "Inspection of Products Hot Dip Galvanized after Fabrication".
- B. Include visual examination and tests in accordance with ASTM-A 123, A 767 or A 153 as applicable to determine the thickness of the zinc coating on the metal surface.
- C. Furnish Certificate of Compliance with ASTM Standards and Specifications herein listed. The Certificate must be signed by the galvanizer and contain a detailed description of the material processed. The Certificate shall include information as to the ASTM standard used for the coating.
- D. Furnish a detail description as outlined in the Galvanizer ISO 9002 Quality Compliance certification.

3.05 REPAIR FOR DAMAGED COATING

- A. The maximum area to be repaired is defined in accordance with ASTM-A 123 Section 4.6 current edition.
 - I. The maximum area to be repaired in the field shall be determined in advance and prior to the start of fabrication by mutual agreement between parties. (galvanizer, fabricator, architect/owner)
- B. Repair areas damaged by welding, flame cutting or during handling, transport or erection by one of the approved methods in accordance with ASTM-A 780 whenever damage exceeds 3/16" in width. Minimum thickness requirements for the repair are those described in ASTM-A 123 section 4. 6 current edition.
- C. **When using the zinc-rich paint method of repair in accordance to ASTM-A 780, the use of aerosol (spray) cans is prohibited. Using a brush applied paint product for touch up of the galvanized surface is the only paint repair acceptable.**

END OF SECTION 05040

SECTION 05400 – COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. Load bearing, formed steel stud interior and exterior wall and floor framing systems.
- B. Formed steel framing and bridging as required.

1.02 RELATED SECTIONS:

- A. Section 05040 - Galvanizing
- B. Section 05120: Structural and Miscellaneous Steel.
- C. Section 06114 - Wood Blocking and Curbing: Rough wood blocking.
- D. Section 07200 - Insulation: Insulation within framing members.
- E. Section 07900 - Joint Sealers.
- F. Section 09250 – Gypsum Drywall System

1.03 REFERENCES:

- A. AISI - American Iron and Steel Institute - Cold-Formed Steel Design Manual.
- B. ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- C. ASTM A446 - Steel Sheet, Zinc Coated (Galvanized) by Hot Dip Process, Physical (Structural) Quality.
- D. ASTM A525 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
- E. ASTM A570 - Hot Rolled Carbon Steel Sheet and Strip. Structural Quality.
- F. ASTM A611 - Steel, Cold Rolled Sheet, Carbon, Structural.
- G. ASTM A645 - Steel Sheet, Pressure Vessel Plates, Five Percent Nickel Alloy Steel, Specially Heat Treated.
- H. ASTM C955 - Load-Bearing (Transverse and Axial) Steel Studs, Runners (Track), and Bracing or Bridging, for Screw Application of Gypsum Board and Metal Plaster Bases.
- I. AWCI (Association of Wall and Ceiling Industries) -Specifications Guide for Cold Formed Steel Structural Members.
- J. AWS D1.1 - Structural Welding Code.
- K. AWS D1.3 - Light Steel Welding Code.
- L. SSPC (Steel Structures Painting Council) - Steel Structures Painting Manual.
- M. MFMA (Metal Framing Manufacturers Association) - Guidelines for the Use of Metal Framing.
- N. BOCA requirements for Components and Cladding.
- O. ASCE 7 Minimum Design Loads for Buildings and Other Structures.

1.04 SYSTEM DESCRIPTION:

- A. Size components to withstand design loads per requirements of ASCE 7 per minimum design loads listed on contract drawings.
- B. Maximum Allowable Deflection: 1/600 span typical, 1/750 span for masonry backup.
- C. Design wall system to provide for thermal movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.
- D. Design system to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.
- E. Design wind loads shall be in accordance with applicable building codes of the appropriate jurisdiction, or as shown on the Documents.

1.05 SUBMITTALS:

- A. Submit under provisions of Section 01300.
- B. Shop Drawings: Indicate component details, framed openings, bearing, anchorage, loading, welds, type and location of fasteners, and accessories or items required of related work. Michigan Professional Engineers shall seal shop drawings and calculations.
- C. Indicate stud, floor joist, and ceiling joist layout.

- D. Describe method for securing studs to tracks and for bolted or welded framing connections.
- E. Provide calculations for loadings and stresses of specially fabricated framing and connections under the Professional Structural Engineer's seal.
- F. Product Data: Provide data on standard framing members; describe materials and finish, product criteria, limitations and manufacturer's requirements.
- G. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and connections.

1.06 QUALITY ASSURANCE:

- A. Calculate structural properties of framing members in accordance with AISI – “Specifications for the Design of Cold-Formed Steel Structural Members”, AWCI, MFMA and AWS D1.3 requirements. Welding shall conform to welding procedures and each welder in accordance with American Welding society (AWS) D1.3, “Structural Welding Code – Sheet Steel”.
- B. All Shop Drawings shall bear the seal of an engineer/Architect registered in the State of Michigan. Submit calculations for loadings and stresses of system members and connections.
- C. Maintain one copy of each document on site.

1.07 QUALIFICATIONS:

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum five years documented experience.
- B. Installer: Company specializing in performing the work of this section with minimum five years documented experience.
- C. Design structural elements under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State of Michigan.

1.08 FIELD MEASUREMENTS:

- A. Verify that field measurements are as indicated on shop drawings.

1.09 COORDINATION:

- A. Coordinate work under provisions of Section 01039.

PART 2 - PRODUCTS

2.01 MANUFACTURERS:

- A. Dale/Incor.
- B. Dietrich.
- C. Unimast.
- D. Substitutions: Under provisions of Section 01600 meeting latest requirements of AISI.

2.02 FRAMING MATERIALS:

- A. Studs and “CEE” Sections: ASTM C955 for Load-Bearing Steel Studs, Runners and Bracing, formed to channel shape, solid or punched web, knurled faces; 18 gage minimum thick, 1.625 inch face and depth as indicated on contract drawings.
 - 1. Finish to ASTM A525 – galvanized to G60 minimum.
 - 2. Yield Strength: As required to meet structural design criteria, but not less than 33,000 psi.
- B. Track: Formed steel; channel shaped; same width as studs, tight fit, 18-gage minimum thickness, and solid web.
- C. Slip-track for head conditions to allow deflection of material above partition.
- D. Galvanized Joists and Purlins: ASTM A 653/A 653M.
 - 1. Base Metal: As required to meet specified performance levels within maximum depths indicated.
 - 2. Gage and Depth: As required to meet specific performance levels.

- E. Painted Joists and Purlins: Provide components fabricated from either ASTM A 611 or ASTM A 570/A570M steel.
 - 1. Gage and depth: As required to meet specific performance levels.
 - 2. Finish: Manufacturer's standard, rust-inhibitive paint.
 - 3. Primer and finishes provided as part of the work of this Section are to comply with the requirements of Section 0110 – Project Environmental and Health Goals with respect to compliance with low-VOC standards.

2.03 ACCESSORIES:

- A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered.
- B. Plates, Gussets, Clips: Formed sheet steel, thickness determined for conditions encountered.
- C. Touch-Up Primer for Galvanized Surfaces: SSPC - Paint 20 Type I Inorganic zinc rich.
- D. Shop and Touch-Up Primer: SSPC-Paint 15, Type I – Red Oxide.
- E. Sheathing: Moisture-resistant inorganic, glass fiber reinforced boards or exterior gypsum board sheathing.
 - 1. "Dens-Glass Gold"; Georgia-Pacific Corporation, or equal.
- F. Joint treatment as required of sheathing manufacturer.
 - 1. Dow Corning 795 – Building Sealant, or equal.

2.04 FASTENERS:

- A. Self drilling, Self-tapping Screws, Bolts, Nuts and Washers: ASTM A123, hot dip galvanized to 1.25 oz/sq ft.
- B. Anchorage Devices: Power actuated, drilled expansion bolts, screws with sleeves.
- C. Welding: In conformance with AWS D1.1 and AWS D1.3.

2.05 FABRICATION:

- A. Fabricate assemblies of framed sections of sizes and profiles required; with framing members fitted, reinforced, and braced to suit design requirements.
- B. Fit and assemble in largest practical sections for delivery to site, ready for installation.

2.06 FINISH - TYPICAL:

- A. Studs: Galvanize to G60 coating class per ASTM A525.
- B. Tracks and Headers: Galvanize to G60 coating class.
- C. Joists and Purlins: Galvanize to G60 coating class.
- D. Bracing, Furring, Bridging: Same finish as framing members.
- E. Plates, Gussets, Clips: Same finish as framing members.

PART 3 - EXECUTION

3.01 EXAMINATION:

- A. Verify site conditions under provisions of Section 01039.
- B. Verify that substrate surfaces building framing components are ready to receive work.

3.02 ERECTION OF STUDDING:

- A. Install components in accordance with manufacturer's instructions.
- B. Align floor and ceiling tracks; locate to wall partition layout. Secure in place with fasteners or by welding at maximum 24 inches oc. Coordinate installation of sealant with floor and ceiling tracks.
- C. Place studs at maximum of 16 inches OC; not more than 2 inches from abutting walls and at each side of openings. Connect studs to tracks using clip and tie fastener or welding method.
- D. Construct corners using minimum three studs. Double stud wall openings at door and window jambs.

- E. Erect load bearing studs one-piece full length. Splicing of studs is not permitted.
- F. Erect load-bearing studs, brace, and reinforce to develop full strength, to achieve design requirements.
- G. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.
- H. Install intermediate studs above and below openings to align with wall stud spacing.
- I. Provide deflection allowance in stud track, directly below horizontal building framing at non-load bearing framing.
- J. Attach cross studs and furring channels to studs for attachment of fixtures anchored to walls.
- K. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.
- L. Touch up field welds and damaged galvanized surfaces with primer.
- M. Complete framing ready to receive finish material.

3.03 WALL SHEATHING INSTALLATION

- A. Coordinate installation of flashings, anchors, and similar items necessary to construct and weatherproof system.
- B. Provide required blocking (wood may be allowed and shall be treated, but not allowed in fire-rated assemblies) to attach windows systems, sheathing, and horizontal edges not bearing on horizontal framing members.
- C. Tape and seal all joints in wall sheathing with approved materials. Apply a bead of building sealant to the joint and trowel flat.
- D. Install sheathing so that long edges are parallel to studs. Center edges over studs.

3.04 ERECTION TOLERANCES:

- A. Maximum Variation from True Position: 1/4 inch.
- B. Maximum Variation of any Member from Plane: 1/8 inch.

END OF SECTION 05400

SECTION 05500 - METAL FABRICATIONS

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK:

- A. Section Includes:
 - 1. Steel pipe handrails, brackets and fittings.
 - 2. Pipe bollards
 - 3. Loose Bearing and leveling plates – if required.
 - 4. Loose steel lintels– if required.
 - 5. Miscellaneous framing and supports for the following:
 - a. Applications where framing and supports are not specified in other sections.
 - 6. Miscellaneous steel trim – if required.
 - 7. Shelf and relieving angles

1.02 RELATED SECTIONS:

- A. Section 05040 - Galvanizing
- B. Section 05120 – Structural and Miscellaneous Steel
- C. Section 05520 - Handrails and Railings

1.03 DEFINITIONS:

- A. Definitions in ASTM E 985 for railing-related terms apply to this section.

1.04 QUALITY ASSURANCE:

- A. Fabricator Qualifications: Firms experienced in successfully producing metal fabrications similar to that indicated for this Project, with sufficient production capacity to produce required units without causing delay in the Work.
- B. Installer Qualifications: Arrange for installation of metal fabrications specified in this section by same firm that fabricated them.
- C. Qualify welding processes and welding operators in accordance with AWS D1.1 "Structural Welding Code - Steel," D1.3 "Structural Welding Code - Sheet Steel", and D1.2 "Structural Welding Code - Aluminum."
- D. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.
- E. Engineer Qualifications: Professional engineer licensed to practice in jurisdiction where project is located and experienced in providing engineering services of the kind indicated that have resulted in the successful installation of metal fabrications similar in material, design, and extent to that indicated for this Project.

1.05 SUBMITTALS:

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data for products used in miscellaneous metal fabrications, including paint products and grout.
- C. Shop drawings detailing fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide templates for anchors and bolts specified for installation under other sections.
 - 1. Where installed metal fabrications are indicated to comply with certain design loadings, include structural computations, material properties, and other information needed for structural analysis that has been signed and sealed by the qualified professional engineer who was responsible for their preparation.
- D. Samples representative of materials and finished products as may be requested by Architect.
- E. Welder certificates signed by Contractor certifying that welders comply with requirements specified under "Quality Assurance" article.

- F. Qualification data for firms and persons specified in "Quality Assurance" article to demonstrate their capabilities and experience. Include list of completed projects with project name, addresses, names of Architects and Owners, and other information specified.

1.06 PROJECT CONDITIONS:

- A. Field Measurements: Check actual locations of walls and other construction to which metal fabrications must fit, by accurate field measurements before fabrication; show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay of Work.
 - 1. Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with fabrication of products without field measurements. Coordinate construction to ensure that actual opening dimensions correspond to guaranteed dimensions. Allow for trimming and fitting.

1.07 INCONSISTENCIES:

- A. Refer to Section 00100 – Instructions to Bidders for General Contractor, Construction Manager, and/or sub contractor responsibilities pertaining to Specification inconsistencies.

PART 2 - PRODUCTS

2.01 MATERIALS AND COMPONENTS:

- A. Metal Surfaces, General: For metal fabrications exposed to view upon completion of the Work, provide materials selected for their surface flatness, smoothness, and freedom from surface blemishes. Do not use materials whose exposed surfaces exhibit pitting, seam marks, roller marks, rolled trade names, roughness, and, for steel sheet, variations in flatness exceeding those permitted by reference standards for stretcher-leveled sheet.
- B. Steel Plates, Shapes, and Bars: ASTM A 36.
- C. Rolled Steel Floor Plates: ASTM A 786.
- D. Uncoated Structural Steel Sheet: Product type (manufacturing method), quality, and grade, as follows:
 - 1. Cold-Rolled Structural Steel Sheet: ASTM A 611, grade as follows:
 - a. Grade A, unless otherwise indicated or required by design loading.
 - 2. Hot-Rolled Structural Steel Sheet: ASTM A 570, grade as follows:
 - a. Grade 30, unless otherwise indicated or required by design loading.
- E. Steel Pipe: ASTM A 53; finish, type, and weight class as follows:
 - 1. Black finish, unless otherwise indicated.
 - 2. Galvanized finish for exterior installations and where indicated.
 - 3. Type S, Grade A, standard weight (schedule 40), unless otherwise indicated, or another grade or weight or both required by structural loads.
 - 4. Schedule 80 Weight for railings and handrails, unless otherwise indicated or another weight is required by structural loads.
- F. Gray Iron Castings: ASTM A 48, Class 30.
- G. Malleable Iron Castings: ASTM A 47, grade 32510.
- H. Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.
- I. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A 47, or cast steel, ASTM A 27. Provide bolts, washers, and shims as required, hot-dip galvanized per ASTM A 153.
- J. Welding Rods and Bare Electrodes: Select in accordance with AWS

2.02 GROUT AND ANCHORING CEMENT:

- A. Non-shrink Nonmetallic Grout: Premixed, factory-packaged, non-staining, non-corrosive, nongaseous grout complying with CE CRD-C 621. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this section.

- B. Interior Anchoring Cement: Factory-prepackaged, non-shrink, non-staining, hydraulic controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound. Use for interior applications only.
- C. Erosion-Resistant Anchoring Cement: Factory-prepackaged, non-shrink, non-staining, hydraulic controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without need for protection by a sealer or waterproof coating and is recommended for exterior use by manufacturer.
- D. Products: Subject to compliance with requirements, provide one of the following:
 - 1. Non-shrink Nonmetallic Grouts:
 - a. "Bonsai Construction Grout," W.R. Bonsai Co.
 - b. "Diamond-Crete Grout, Concrete Service Materials Co.
 - c. "Euco N-S Grout, Euclid Chemical Co.
 - d. "Kemset," Chern-Masters Corp.
 - e. "Crystex," L & M Construction Chemicals, Inc.
 - f. "Masterflow 713," Master Builders.
 - g. "Sealtight 588 Grout," W.R. Meadows, Inc.
 - h. "Sonogrout," Sonneborn Building Products Div., Rexnord Chemical Products, Inc.
 - "Stoncrete NM1,"
 - i. Stonhard, Inc.
 - j. "Five Star Grout," U.S. Grout Corp.
 - k. "Vibropruf #11," Lambert Corp.
 - 2. Interior Anchoring Cement:
 - a. "Bonsai Anchor Cement," W.R. Bonsai Co.
 - b. "Por-Rok," Minwax Construction Products Division.
 - 3. Erosion-Resistant Anchoring Cement:
 - a. "Super Por-Rok"; Minwax Construction Products Division.

2.03 FASTENERS:

- A. General: Provide zinc-coated fasteners for exterior use or where built into exterior walls. Select fasteners for the type, grade, and class required.
- B. Bolts and Nuts: Regular hexagon head type, ASTM A 307, Grade A.
- C. Lag Bolts: Square head type, FS FF-B-561.
- D. Machine Screws: Cadmium plated steel, FS FF-S-92.
- E. Wood Screws: Flat head carbon steel, FS FF-S-111.
- F. Plain Washers: Round, carbon steel, FS FF-W-92.
- G. Drilled-In Expansion Anchors: Expansion anchors complying with FS FF-S-325, Group VIII (anchors, expansion. [non-drilling]). Type I (internally threaded tubular expansion anchor); and machine bolts complying with FS FF-B-575, Grade 5.
- H. Toggle Bolts: Tumble-wing type, FS FF-B-588, type, class, and style as required.
- I. Lock Washers: Helical spring type carbon steel, FS FF-W-84.

2.04 PAINT:

- A. Shop Primer for Ferrous Metal: Manufacturer's or fabricator's standard, fast-curing, lead-free, universal modified alkyd primer selected for good resistance to normal atmospheric corrosion, for compatibility with finish paint systems indicated, and for capability to provide a sound foundation for field-applied topcoats despite prolonged exposure complying with performance requirements of FS TT-P-664D.
- B. Galvanizing Repair Paint: High zinc dust content paint for re-galvanizing welds in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD-P-21 035 or SSPC-Paint-20.
- C. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12 except containing no asbestos fibers.
- D. Zinc Chromate Primer: FS TT -P-645.

2.05 CONCRETE FILL AND REINFORCING MATERIALS:

- A. Concrete Materials and Properties: Comply with requirements of Division 3 section "Concrete Work" for normal weight, ready-mix concrete with minimum 28-day compressive strength of 2,500 psi, 440 lb. cement per cu. ft. minimum, and W/C ratio of 0.65 maximum, unless higher strengths indicated.
- B. Non-slip Aggregate Finish: Factory-graded, packaged material containing fused aluminum oxide grits or crushed emery as abrasive aggregate; rust-proof and non-glazing; unaffected by freezing, moisture, or cleaning materials.
- C. Reinforcing Bars: ASTM A 615. Grade 60, unless otherwise indicated.

2.06 FABRICATION, GENERAL:

- A. Form metal fabrications from materials of size, thickness, and shapes indicated but not less than that needed to comply with performance requirements indicated. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of each metal fabrication. Weld corners and seams continuously, grind exposed welds smooth and flush. Comply with AWS recommendations.
- B. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.
- C. Allow for thermal movement resulting from the following maximum change (range) in ambient temperature in the design, fabrication, and installation of installed metal assemblies to prevent buckling, opening up of joints, and overstressing of welds and fasteners. Base design calculations on actual surface temperatures of metals due to both solar heat gain and nighttime sky heat loss.
- D. Temperature Change (Range): 100 deg F (55.5 deg C).
- E. Shear and punch metals cleanly and accurately. Remove burrs.
- F. Ease exposed edges to a radius of approximately 1/32 inch, unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- G. Remove sharp or rough areas on exposed traffic surfaces.
- H. Weld corners and seams continuously to comply with AWS recommendations and the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surface matches those adjacent.
- I. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.
- J. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.
- K. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- L. Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware, screws, and similar items.
- M. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.

2.07 ROUGH HARDWARE:

- A. Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels, and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in Division 6 sections.
- B. Fabricate items to sizes, shapes, and dimensions required. Furnish malleable-iron washers for heads and nuts that bear on wood structural connections; elsewhere, furnish steel washers.

2.08 LOOSE BEARING AND LEVELING PLATES:

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction, made flat, free from warps or twists, and of required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required.

2.09 LOOSE STEEL LINTELS:

- A. Fabricate loose structural steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated.
- B. Weld adjoining members together to form a single unit where indicated.
- C. Size loose lintels for equal bearing of one inch per foot of clear span but not less than 8 inches bearing at each side of openings, unless otherwise indicated.
 - 1. Loose lintels where indicated or required, and not included with structural steel, shall be as follows: (Galvanize loose steel lintels located in exterior walls.)
 - a. Openings up to 4'-0" - one angle 3-1/2" x 3-1/2" x 5/16" for each 4" width of masonry.
 - b. Openings 4'-0" to 7'-0" - one angle 5" x 3-1/2" x 5/16" for each 4" width of masonry .
 - c. Openings 7'-0" to 10'-0"- one beam W8 x 10 plus 5/16" thick plate 1/2" narrow than up to 12" thick wall.
 - d. Openings 10'-0" to 12'-0" - one beam W8 x 18 plus 5/16" thick plate 1/2" narrow than up to 12" thick wall.

2.10 MISCELLANEOUS FRAMING AND SUPPORTS:

- A. General: Provide steel framing and supports for applications indicated or which are not a part of structural steel framework, as required to complete work.
 - 1. Metal shapes, and assemblies indicated on the Architectural Drawings and not specified in other sections of the specifications or not indicated on the Structural Drawings, and framing supporting other components of the construction shall be provided in accordance with the provisions of this section and STRUCTURAL STEEL Section.
- B. Fabricate units to sizes, shapes, and profiles indicated and required to receive adjacent other construction retained by framing and supports. Fabricate from structural steel shapes, plates, and steel bars of welded construction using mitered joints for field connection. Cut, drill, and tap units to receive hardware, hangers, and similar items.
 - 1. Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is placed.
 - 2. Except as otherwise indicated, space anchors 24 inches o.c. and provide minimum anchor units in the form of steel straps 1-1/4 inches wide x 1/4 inch x 8 inches long.
- C. Frames fabricated from structural steel shapes
 - 1. Provide structural steel frames for door openings, exterior wall supports, ceiling hung toilet partition supports, frames around curbs, pits and other openings in floors and walls and at slab edges as indicated.
 - 2. Construction frames to sizes indicated, of steel channels, bent plates, steel angles, steel plate or combinations of shapes as detailed. Frames shall be accurately squared, mitered, butted or coped as necessary and shall be full welded with all welds on exposed surfaces ground smooth. Concealed clip angles shall be welded or flush-riveted to the bottom of steel jamb members and provided with two (2) 1/2" diameter floor bolts for each clip angle. Provide sill members and slab edge angles where indicated.
 - 3. Provide steel strap anchors of sizes and spacing indicated, welded to back of frames for anchoring into masonry, concrete or to steel as necessary. Where size and spacing of

anchors are not shown, use 1/4" x 2" x 8" straps turned 2". Space anchors not more than 16" apart.

4. Provide spreaders between the bottom of steel jamb members and elsewhere as necessary. Remove spreaders after frames are properly set and securely anchored.
- D. Galvanize miscellaneous framing and supports in the following locations:
 1. Exterior locations.

2.11 MISCELLANEOUS STEEL TRIM:

- A. Provide shapes and sizes indicated for profiles shown. Unless otherwise indicated, fabricate units from structural steel shapes, plates, and steel bars, with continuously welded joints and smooth exposed edges. Use concealed field splices wherever possible. Provide cutouts, fittings, and anchorages as required for coordination of assembly and installation with other work.
- B. Galvanize miscellaneous framing and supports in the following locations:
 1. Exterior locations.

2.12 STEEL PIPE RAILINGS AND HANDRAILS:

- A. General: Fabricate pipe railings and handrails to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of pipe, post spacings, and anchorage, but not less than that required to support structural loads.
- B. Interconnect railing and handrail members by butt-welding or welding with internal connectors, at fabricator's option, unless otherwise indicated.
 1. At tee and cross intersections, notch ends of intersecting members to fit contour of pipe to which end is joined and weld all around.
- C. Form changes in direction of railing members as follows:
 2. By radius bends of radius indicated.
- D. Form simple and compound curves by bending pipe in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross-section of pipe throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of pipe.
- E. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated.
- F. Close exposed ends of pipe by welding 3/16-inch thick steel plate in place or by use of prefabricated fittings, except where clearance of end of pipe and adjoining wall surface is 1/4 inch or less.
- G. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings, and anchors for interconnections of pipe and attachment of railings and handrails to other work. Furnish inserts and other anchorage devices for connecting handrails to other work.
- H. Fillers: Provide steel sheet or plate fillers of thickness and size indicated or required to support structural loads of handrails where needed to transfer wall bracket loads through wall finishes to structural supports. Size fillers to suit wall finish thicknesses. Size fillers to produce adequate bearing to prevent bracket rotation and overstressing of substrate.
- I. **For exterior steel railings and handrails formed from steel pipe with galvanized finish, galvanize fittings, brackets, fasteners, sleeves, and other ferrous components.**

2.13 PIPE BOLLARDS:

- A. Fabricate pipe bollards from Schedule 80 steel pipe. Cap bollards with 1/4-inch minimum thickness steel base plate.
- B. Fabricate sleeves for bollard anchorage from steel pipe with 1/4-inch thick steel plate welded to bottom of sleeve.

2.14 FINISHES, GENERAL:

- A. Comply with NAAMM "Metal Finishes Manual" for recommendations relative to application and designations of finishes.
- B. Finish metal fabrications after assembly.

- C. Primer selected must be compatible with finish coats of paint specified, coordinate with requirements of Section 09900.
- D. Shop Painting:
 - 1. Prepare surfaces in accordance with the Steel Structure Painting Council's specifications.
 - 2. Shop paint miscellaneous metal work, except members or portions of members to be embedded in concrete or masonry. Apply primer at a rate to provide uniform dry film thickness of 2.0 mils.

2.15 STEEL AND IRON FINISHES:

- A. Galvanizing: For those items indicated for galvanizing, apply zinc-coating by the hot-dip process compliance with the following requirements:
 - 1. ASTM A 153 for galvanizing iron and steel hardware.
 - 2. ASTM A 123 for galvanizing both fabricated and unfabricated iron and steel products made of uncoated rolled, pressed, and forged shapes, plates, bars, and strip 0.0299 inch thick and heavier.
- B. Preparation for Shop Priming: Prepare uncoated ferrous metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:
 - 1. Exteriors (SSPC Zone 1 B): SSPC-SP6 "Commercial Blast Cleaning."
 - 2. Interiors (SSPC Zone 1A): SSPC-SP3 "Power Tool Cleaning."
- C. Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finish or to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with requirements of SSPC-PA1 "Paint Application Specification No. 1" for shop painting.
 - 1. Stripe paint all edges, corners, crevices, bolts, welds, and sharp edges.

PART 3- EXECUTION

3.01 PREPARATION:

- A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, including concrete inserts, sleeves, anchor bolts, and miscellaneous items having integral anchors that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.
- B. Center nosings on tread widths with noses flush with riser faces and tread surfaces.
- C. Set sleeves in concrete with tops flush with finish surface elevations; protect sleeves from water and concrete entry.

3.02 INSTALLATION, GENERAL:

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installation of miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete masonry or similar construction.
- D. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.

- E. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, methods used in correcting welding work, and the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surface matches those adjacent.
- F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint or zinc chromate primer.

3.03 INSTALLATION OF STEEL PIPE HANDRAILS:

- A. Secure handrails to wood posts with wall brackets and required fittings. Provide bracket with not less than 1-1/2 inch clearance from inside face of handrail and support surface. Locate brackets, at spacing required to support structural loads. Secure wall brackets and wall return fittings to building construction as follows:
 - 2. Use type of bracket with pre-drilled hole for exposed anchorage.
 - 3. For concrete and solid masonry anchorage, use drilled-in expansion shield and either concealed hanger bolt or exposed lag bolt, as applicable.
- B. Expansion Joints: Provide expansion joints at locations indicated, or if not indicated, at intervals not to exceed 40 feet. Provide slip joint with internal sleeve extending 2 inches beyond joint on either side; fasten internal sleeve securely to one side; locate joint within 6 inches of post.

3.04 INSTALLATION OF BOLLARDS:

- A. Anchor bollards in concrete by means of pipe sleeves preset and anchored into concrete. After bollards have been inserted into sleeves, fill annular space between bollard and sleeve solid with non-shrink, nonmetallic grout, mixed and placed to comply with grout manufacturer's directions.

3.05 ADJUSTING AND CLEANING:

- A. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 requirements for touch-up of field painted surfaces.
 - 1. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.
- B. Touch-Up Painting: Cleaning and touch-up painting of field welds, bolted connections, and abraded areas of the shop paint on miscellaneous metal is specified in Division 9 Section "Painting" of these specifications.
- C. For galvanized surfaces clean welds, bolted connections and abraded areas and apply galvanizing repair paint to comply with ASTM A780.

END OF SECTION - 05500

SECTION 06070 - PRESSURE-TREATED WOOD PRODUCTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Preservative treatment of lumber and plywood by a pressure-treatment
- B. Fire-retardant treatment of lumber and plywood by a pressure-treatment
- C. **Selective/Stabilizing repair of Wood Pilings.**
- D. Wood that shall be pressure-treated for fire-retardants as noted in the Documents and/or required by Code and typically for:
 - 1. wood as part of a fire-rated assembly
 - 2. wood that shall be specifically treated to resistant fire as required for a Class A rating assembly
 - 3. wood that shall be resistant to fire as part of an assembly in a particular Construction Type
- E. Wood that shall be pressure-treated for preservation and/or fire-retardants as noted in the Documents and/or required by Code and typically for:
 - 1. wood in contact with concrete
 - 2. wood exposed to the weather
 - 3. wood in roof coping and flashing installations
- F. As required in an assembly as noted in the Documents

1.02 RELATED SECTIONS

- A. Section 06100 - Rough Carpentry
- B. Section 06200 - Finish Carpentry
- C. Section 06401 – Exterior Woodworking

1.03 REFERENCES

- A. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 1998.
- B. AWPA C20 - Structural Lumber -- Fire-Retardant Treatment by Pressure Processes; American Wood-Preservers' Association; 1999
- C. AWPA C27 - Plywood -- Fire-Retardant Treatment by Pressure Processes; American Wood-Preservers' Association; 1999
- D. ASTM E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials; 1998
- E. UL 723 – Standard for Test for Surface Burning Characteristics of Building Materials; Underwriters Laboratories Inc.; 1996.

1.04 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Preservative Treatment Certification: Treating plant's certification of compliance with specified standards, process employed, and preservative retention values
- C. Fire-Retardant Treatment Certification: Treating plant's certification of compliance with specified requirements

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Protect wood products against moisture and dimensional changes, in accordance with instructions from treating plant.

1.06 WARRANTY

- A. See Section 01740 - Closeout Submittals, for additional warranty requirements.
- B. Fire-Retardant Treated Wood: Provide manufacturer's standard 20-year limited warranty.
- C. Preservative-Treated Wood: Provide manufacturer's standard lifetime warranty.

PART 2 - PRODUCTS

2.01 REQUIREMENTS:

- A. Provide preservative wood treatment that does not contain arsenic, chromium or other preservatives classified as hazardous by the Environmental Protection Agency.
 - 1. Preserve Pressure Treated Lumber: Arsenic and Chromium free pressure treated wood produced in accordance with ACQ Preserve Standard ACQ - 94 and the appropriate AWPA Standards (AWPA C1, AWPA C2, AWPA C4, AWPA C5, AWPA C9, AWPA C14, AWPA C15, AWPA C16, AWPA C17, AWPA C22, AWPA P5).
 - 2. Wood or wood products that are treated with CCA (Copper Chromium Arsenide) or other pressure treatments that are toxic or hazardous are prohibited.
 - 3. Substitutions: See Section 01600 - Product Requirements.
- B. Provide fire-retardant treated wood, where required, as pressure impregnated lumber and plywood with chemicals complying with AWPA C20 and C27, respectively. Identify with appropriate classification marking of UL, US Testing, Timber Products Inspection, Inc., or other testing and inspection agency acceptable to authorities having jurisdiction.

2.02 MANUFACTURERS:

- A. Provide wood treatment from the following sources:
 - 1. Chemical Specialties, Inc., One Woodlawn Green, Suite 250, 200 E. Woodlawn Road, Charlotte, NC 28217. ASD. Tel: (800) 421-8661.
 - 2. Hoover Treated Wood Products, Inc., 1-800-TEC-WOOD - www.FRTW.com

2.03 MATERIALS

- A. Dimension Lumber: As specified in Section 06100.
- B. Structural Plywood: As specified in Section 06100.
- C. Fasteners: For treated wood and where wood is in ground contact, subject to high relative humidity, or exposed to weather, provide steel fasteners with hot-dip zinc coating per ASTM A 153/A 153M.
- D. Hot dipped galvanized or stainless steel fasteners and fittings are recommended. Anti-corrosion coatings applied to fasteners and fittings in contact with treated wood will enhance long term performance. Direct contact of Preserve treated wood with aluminum fasteners is not recommended. A list of approved fastener systems is available from your Preserve supplier.

2.04 PRESSURE TREATMENT OF WOOD

- A. **Selective/Stabilizing** – Stabilize the existing wood Pilings where deteriorated at/near grade elevations:
 - 1. Apply multiple coatings/treatment applications of a penetrating, epoxy-resin wood hardener.
 - 2. Apply product per manufacturer's recommendations
 - 3. Product shall be similar to:
 - a. "Clear Penetration Epoxy Sealer" (CPES) by The Rot Doctor, Inc. drrot@rotdoctor.com
 - b. or equal
- B. Preservative Treatment:
 - 1. Treatment: ACQ(R) Preserve(R)
 - a. Use 0.25 lb/cu ft retention for above ground use.
 - b. Use 0.40 lb/cu ft retention for ground contact use.
 - c. Use 0.60 lb/cu ft retention for in-ground use – typical for exterior use.**
 - 2. Kiln dry after treatment to 19 percent maximum moisture content for lumber and 15 percent for plywood.
 - 3. **Treat wood to 'above ground use' in the following locations only – all others shall be for "in-ground use":**
 - a. **In contact with roofing, flashing, or waterproofing.**
 - b. **In contact with masonry or concrete in interior spaces.**

- c. **Within 18 inches (450 mm) of grade.**
 - d. **Exposed to weather**
- C. Fire-Retardant Treatment:
 - 1. Lumber: Comply with AWPA C20.
 - 2. Plywood: Comply with AWPA C27, Type A.
 - 3. Product:
 - a. Pyro-Guard by Hoover Treated Wood Products, Inc.
 - b. Or equal
 - 4. Surface Burning Characteristics: UL FRS rating; flame spread and smoke developed ratings of 25 or less in a test of 30 minutes' duration in accordance with ASTM E 84 (Standard Test Method for Surface Burning Characteristics of Building Materials), NFPA 255, or UL 723. This shall meet a Class A rating.
 - 5. Treatment: No halogens, sulfates, chlorides, ammonium phosphate, oils, or solvents.
 - 6. Smoke Toxicity: no more than that of untreated wood.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Framing and Sheathing: Comply with installation requirements in Section 06100.
- B. Millwork and Trim: Comply with installation requirements in Section 06200.
 - 1. Interior Type A: For interior locations use fire-retardant chemical formulation that produces treated lumber and plywood with the following properties under conditions present after installation: No reductions in bending strength, stiffness, and fastener holding capacities.
 - 2. Exterior Type: Use for exterior locations and where indicated.
 - 3. All exposed pressure-treatment shall be compatible with additional finish applications that may be a part of Section 09900 – Painting. **Pressure-treatment shall be transparent and not impaired the finish quality of the end product.**
- C. Fire-Retardant Treated Wood: End cuts and drilling are permitted. Do not rip or mill lumber or plywood after fire-retardant treatment.
- D. Apply field treatment complying with AWPA M4 to cut surfaces of preservative treated lumber and plywood.

3.02 SCHEDULE:

- A. All wood in exterior applications used as blocking or furring shall be pressure-treated with a preservative – typically as “in-ground use”.
- B. All wood in contact with exterior concrete shall be pressure-treated with a preservative – typically as “in-ground use”.
- C. All wood in contact with the earth or below grade shall be pressure-treated with a preservative – typically as “in-ground use”.
- D. All wood or blocking within a fire-rated assembly shall be pressure-treated with a fire-retardant – typically.

END OF SECTION 06070

SECTION 06100 - ROUGH CARPENTRY

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK:

- A. Framing with dimensional lumber
- B. Carpentry or installation for:
 - 1. blocking in walls
 - 2. misc. lumber and blocking for attachment and support of other work
 - 3. sill gaskets and flashings
 - 4. construction and mounting panels
- C. Carpentry work not specified as part of other Sections and which is:
 - 1. framing for other material or systems
 - 2. not considered Finished Carpentry or Casework - which is specified elsewhere
 - 3. may be a part of misc. framing or trim

1.02 RELATED SECTIONS

- A. Section 03300 – Concrete Work
- B. Section 06070 – Pressure-treated Products
- C. Section 06114 – Wood Curbs and Blocking
- D. Section 06200 - Finish Carpentry
- E. Section 06405 – Architectural Casework
- F. Section 06401 – Exterior Architectural Woodwork

1.03 REFERENCES:

- A. AHA (American Hardboard Association) A135.4 - Basic Hardboard
- B. ALSC (American Lumber Standards Committee) - Softwood Lumber Standards.
- C. ANSI A208.1 Mat-Formed Wood Particleboard
- D. APA (American Plywood Association)
- E. AWPA (American Wood Preservers Association) C1 - All Timber Products - Preservative Treatment by Pressure Process
- F. AWPA (American Wood Preservers Association) C20 - Structural Lumber Fire Retardant Treatment by Pressure Process
- G. NFPA (National Forest Products Association)
- H. RIS (Redwood Inspection Service)
- I. SPIB (Southern Pine Inspection Bureau)
- J. WCLIB (West Coast Lumber Inspection Bureau)
- K. WWPA (Western Wood Products Association)

1.04 QUALITY ASSURANCE:

- A. Lumber Standard: Comply with PS 20.
- B. Plywood Standard: Comply with PS 1.
- C. Identification: Factory-mark each piece of lumber and plywood with type, grade, mill and grading agency.

1.05 SUBMITTALS FOR REVIEW:

- A. Section 01300 - Submittals: Procedures for submittals
- B. Product Data: Provide technical data on insulated sheathing, wood preservative materials, fire-retardant materials and application instructions.
- C. Perform Work in accordance with the following agencies:
 - 1. Lumber Grading Agency: Certified by ALSC.
 - 2. Plywood Grading Agency: Certified by APA.
- D. In lieu of grade stamping exposed to view lumber and plywood, submit manufacturer's certificate certifying that products meet or exceed specified requirements.

1.06 INCONSISTENCIES:

- A. Refer to Section 00100 – Instructions to Bidders for General Contractor, Construction Manager, and/or sub contractor responsibilities pertaining to Specification inconsistencies.

PART 2 – PRODUCTS

2.01 LUMBER MATERIALS:

- A. Lumber, General:
1. Nominal sizes are indicated, except as shown be detail dimensions. Provide dressed lumber, S4S, with 19% maximum moisture content and time of dressing.
 2. Comply with PS 20 “American Lumber Standard” and with applicable grading rules; factory-mark with grade, species, moisture content at time of surfacing, and mill; dressed lumber, S4S, unless otherwise indicated.
- B. Framing Lumber (2" through 4" thick):
1. Concealed Dimension Lumber: As follows:
 - a. Species: Any wood species listed by PS 20.
 - b. Moisture Content: S-DRY, KD 19 or MC 19 (19 percent maximum moisture content).
 - c. Grade: No. 2 or standard grade
 2. For light framing (less than 6" wide), provide Construction Grade, any species, 19 percent maximum moisture content.
- C. Concealed blocking and framing in exterior wall and roof assemblies:
1. SPF species, No. 2 and Btr. grade, 19 percent maximum moisture content.
 2. .40#/ cu. ft. pressure-preservative treated
 3. Fire-resistant treatment as required to match assembly ratings and as required

2.02 SHEATHING MATERIALS:

- A. General Plywood:
1. Comply with PS1 “U.S. Product standard for Construction and Industrial Plywood” for plywood construction panels and, for products not manufactured under PS1 provision with APA PRP-108
 2. See drawings for thickness and type. If not noted otherwise conform to the following minimum dimensions and requirements.
 - a. Exterior type, CDX plywood sheathing, ¾" thick, association stamped.
 - b. Interior type, A-D grades, one side exposed. A-A grades, two sides exposed. ¾" thick for all mounting applications, otherwise refer to Documents.
 - c. Subflooring: waferboard, ANSI A 208.1, Grade 2-M-W, or ¾" nominal plywood
 - d. For backing panels for electrical equipment, provide ¾" thick, fire-retardant treated, Interior Type A/C.
- B. Plywood/sheathing materials:
1. Plywood Wall Sheathing: APA Rated Structural II, Span Rating 24; Exposure Durability 2; unsanded
 2. Plywood Floor Sheathing: APA Rated Sheathing Structural II, Span Rating 24; Exposure Durability [2]; unsanded.
 3. Particleboard Roof Sheathing: ANSI A208.1; APA Oriented Strand Board; wood flakes set with waterproof resin binder; unsanded faces.
- C. Identify each plywood panel with appropriate APA trademark.

2.03 MISCELLANEOUS MATERIALS:

- A. Fasteners and Anchorages:
1. Provide size and type recommended by applicable standards, complying with applicable Federal Specifications for nails, staples, screws, bolts, nuts, washers and anchoring devices.
 2. Provide fasteners with a hot-dip zinc coating (ASTM A153) for treated lumber and where wood is in ground contact, subjected to high relative humidity, or exposed to weather.

3. Toggle bolt type for anchorage to hollow masonry
4. Expansion shield and lag bolt type for anchorage to solid masonry or concrete.
5. Bolt or ballistic fastener for anchorages to steel
- B. Die Stamped Connectors: 16 ga. thick, hot dipped galvanized steel.
- C. Sill Gasket on Top of Foundation Wall: 1/4 inch thick, plate width, closed cell foam from continuous rolls.
- D. Termite Shield: Galvanized sheet steel, 1/16 inch
- E. Building Paper:
 1. Asphalt saturated felt, non-perforated, ASTM D 226.

2.04 PRESSURE-TREATMENT:

- A. Coordinate all pressure-treatment with Section 06070 – Pressure-treated Product for additional requirements. In general:
- B. Preservative Treatment: Obtain preservative-treated lumber complying with AWPA Standard C2. Mark each treated item with AWPB or SPIB Quality Mark Requirements. Coat surfaces cut after treatment to comply with AWPA M4.
 1. Above-Ground Wood Treatment: Pressure-treat with waterborne preservatives to a minimum retention of 0.25 pcf. Treat wood items indicated and in contact with roofing, flashing, waterproofing, masonry, concrete, and within 18 inches of grade. Kiln-dry interior dimension lumber and construction panels after treatment to 19 and 15 percent maximum moisture content, respectively.
 2. Ground-Contact Wood Treatment or where exposed to weather with no surface protection: Pressure treat with waterborne preservatives to a minimum retention of 0.40 pcf.
- C. Fire-Retardant Treatment: Comply with AWPA C20 for lumber, AWPA C27 for plywood; Interior Type A for protected items, Exterior Type for items exposed to weather.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. General:
 1. Set carpentry work accurately to required levels and lines, with members plumb and true and accurately cut and fitted.
 2. Securely attach carpentry work to substrate by anchoring and fastening as required by recognized standards. Countersink nail heads on exposed carpentry work and fill holes. Use finishing nails for finish work. Make tight connections between members. Install fasteners without splitting of wood; predrill as required.
 3. Place full width continuous sill flashings under framed walls on cementitious foundations. Lap flashing joint 4 inches
 4. Place sill gasket directly on sill flashing, cementitious foundation. Puncture gasket clean and fit tight to protruding foundation anchor bolts.
- B. Wood Framing, General:
 1. Provide framing members of sizes and on spacings shown on the drawings, and frame openings to comply with recommendations of "Manual for House Framing" of National Forest Products Association. Do not splice structural members between supports.
 2. Anchor and nail to comply with "Recommended Nailing Schedule" of "Manual for House Framing" and other recommendations of N.F.P.A. and other recommendations of N.F.P.A.
 3. Double members at openings over 24 inches wide. Space short studs over and under opening to stud spacing.
 4. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists. Frame rigidly into joists.
- C. Installation of Plywood:
 1. Comply with recommendations of the American Plywood Association (APA).

2. Install sheathing as recommended by APA for spacing of supports or types of substrates involved in the work. Provide thickness shown or verify as required for spans and load applications.

3.02 WOOD BLOCKING, NAILERS AND GROUNDS:

- A. Provide wherever shown and where required for screeding or attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached.
- B. Attach to substrates as required to support applied loading.
- C. Countersink bolts and nuts flush with surfaces, unless otherwise indicated.
- D. Build into masonry during installation of masonry and anchor to form work before concrete placement.
- E. Provide permanent grounds of dressed, preservative treated lumber not less than 1-1/2" wide and of thickness required to bring face of ground to exact thickness of finish material mounting. Shim as required to bring to perfect plumb or level.

3.03 SHEATHING:

- A. Secure roof sheathing with longer edge perpendicular to framing members and with ends staggered and sheet ends over bearing.
- B. Use sheathing clips between sheets between roof framing members. Provide solid edge blocking between sheets. Fully engage tongue and groove edges.
- C. Secure wall sheathing with long dimension perpendicular to wall studs, with ends over firm bearing and staggered.
- D. Place plywood or structural-use panel sheathing at building corners for a horizontal distance of 96 inches, or provide sheet steel corner bracing.
- E. Place building paper horizontally over wall sheathing; weather lap edges and ends.
- F. Secure subfloor sheathing with longer edge perpendicular to floor framing and with end joints staggered and sheet ends over bearing. Attach with subfloor glue and drywall screws.
- G. Install plywood to two-span continuous.
- H. Place building paper between floor underlayment and subflooring.
- I. Install flooring underlayment after dust and dirt generating activities have ceased and prior to application of finished flooring. Apply perpendicular to subflooring, stagger joints of underlayment. Secure with screw fasteners.
- J. Install telephone and electrical panel back boards with plywood sheathing material where required. Size the back board by 12 inches beyond size of electrical panel.

3.04 SITE APPLIED WOOD TREATMENT:

- A. Apply preservative treatment in accordance with manufacturer's instructions.
- B. Brush apply two coats of preservative treatment on wood in contact with cementitious materials, roofing and related metal flashings and other locations where moisture exposure is possible. Treat site sawn cuts.
- C. Allow preservative to dry prior to erecting members.

3.05 COORDINATION:

- A. For all materials noted herein – coordinate with the Documents for system requirements for widths, thicknesses, material characteristic and pressure-treated properties.
- B. Documents and Drawing Details shall override all specifications noted herein for specific material requirements.

END OF SECTION - 06100

SECTION 06200 - FINISH CARPENTRY

PART 1 - GENERAL

1.01 **DESCRIPTION OF WORK:**

- A. Finish Carpentry items, other than items Specified in Section 06400 - Architectural Woodwork or more specially details wood assemblies noted in Section 0610 – Custom Casework
- B. Installation of doors etc.
- C. Installation of door, window and base trims, etc.
- D. Installation of countertops – Plastic laminate
- E. Installation of shelving systems
- F. Installation of misc. hardware, casework, shelving and attachment accessories

1.02 **RELATED DOCUMENTS:**

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to the work of this section.
- B. **See Section 06500 – Carpentry Materials and Accessories where material and accessories associated with this Specification Section are detailed.**

1.03 **PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION:**

- A. Section 06500 – Carpentry Material and Accessories: Material specified elsewhere that is a part of the scope of Work herein described.
- B. Section 08710 - Door Hardware: Supply of hardware attachment devices and related accessories to this section
- C. Section 10800 - Toilet and Bath Accessories: Boxes and trim for recessed components and accessories

1.04 **RELATED SECTIONS:**

- A. Section 06070 – Pressure-Treated Wood Products
- B. Section 06100 – Rough Carpentry
- C. Section 06400 – Interior Architectural Woodwork
- D. Section 06405 – Architectural Casework
- E. Section 06500 – Carpentry Materials and Accessories
- F. Section 08211 - Flush Wood Doors
- G. Section 09900 - Painting: Painting and finishing of finish Carpentry items.

1.05 **REFERENCES:**

- A. ADA - Americans with Disabilities Act (ADA) - Cabinet Hardware
- B. ANSI A135.4 - Basic Hardboard
- C. ANSI A208.1 - Mat Formed Wood Particleboard
- D. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials
- E. AWI - Quality Standards, Custom Grade, unless otherwise noted
- F. AWPA (American Wood Preservers Association) C2 - Lumber, Timbers, Bridge Ties and Mine Ties - Preservative Treatment by Pressure Processes.
- G. AWPA (American Wood Preservers Association) C20 - Structural Lumber Fire Retardant Treatment by Pressure Process
- H. BHMA A156.9 - Cabinet Hardware
- I. FS MMM A 130 - Adhesive, Contact
- J. HPM (Hardwood Plywood Manufacturer's Association) HP American Standard for Hardwood and Decorative Plywood
- K. NEMA (National Electric Manufacturers Association) LD3 High Pressure Decorative Laminates.
- L. NHLA (National Hardwood Lumber Association)
- M. NWWDA (National Wood Window and Door Association) I.S.4 - Water Repellant Preservative Treatment for Millwork

- N. PS 1 - Construction and Industrial Plywood
- O. PS 20 - American Softwood Lumber Standard

1.06 SUBMITTALS FOR REVIEW:

- A. Submit under provisions of Section 01300.
- B. Shop Drawings
 - 1. On original hard-line drawings drawn to ¼"=1'-0" for composite plans; 1"=1'-0" for enlarged plans, elevations, and sections; and 3"=1'-0" for details, indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location and schedule of finishes/colors.
 - 2. Clearly show proposed joinery and installation details. For structurally critical connections, indicate design loading criteria and other pertinent information.
 - 3. Identify core material wherever used.
 - 4. Indicate Products specified in Related Sections and account for coordination of all Mechanical and Electrical devices and accessories (where applicable).
 - 5. Reference applicable Construction Document Details and/or Interior Elevations for each submitted unit.
 - 6. See Quality Assurance, below.
 - 7. Shop Drawings copied directly from the Contract Documents shall be returned with "No Action Taken".
- C. Product Data: Submit manufacturer's product data for each product and process specified as work of this Section and incorporated into items of Finish Carpentry during fabrication, finishing and installation.
- D. Provide instructions for attachment hardware and finish hardware.
- E. Samples: Install two (2) samples of finish plywood, in the area of final installation, with adjacent substrates in place, illustrating wood grain and specified finish.
- F. Submit two samples of wood trim in the area of final installation, with adjacent substrates in place, illustrating wood grain and specified finish.

1.07 QUALITY ASSURANCE:

- A. Single Source Manufacturing and Installation Responsibility: It is required that the Fabricator/Installer assume undivided responsibility for architectural woodwork including fabrication, finishing and installation.
 - 1. Factory prime architectural woodwork with transparent finish at same shop facility where fabricated.
- B. Fabricator/Installer Qualifications: Firm with minimum of five (5) years experience in successfully producing architectural woodwork similar to that indicated for this Project, with sufficient production capacity to produce required units and materials without causing delay in the Work.
 - 1. Submit written information to document Manufacturer/Installer qualifications, capabilities and experience. Include list of completed projects with Owner and Architect reference contacts and other information as required.
- C. Quality Standards: Comply with applicable requirements of "Architectural Woodwork Quality Standards" (latest edition) for **Custom Grade**, by the Architectural Woodwork Institute (AWI) for each type of architectural woodwork, except as otherwise indicated.
- D. Factory-mark each piece of lumber and plywood with type, grade, mill and grading agency identification. Omit marking from surfaces to receive transparent finish and submit mill certificate that material has been inspected and graded in accordance with requirements if it cannot be marked on a concealed surface.

1.08 REGULATORY REQUIREMENTS:

- A. Conform to applicable code for fire retardant, flame spread and smoke developed requirements.

1.09 FIELD MEASUREMENTS:

- A. Verify that field measurements are as indicated on reviewed shop drawings and as instructed by the manufacturer.
- B. Provide templates for all countertops prior to fabrication.
- C. Coordinate the work with plumbing and electrical rough-in and installation of associated and adjacent components.

1.10 CORRELATION AND INTENT:

- A. Should a conflict occur in or between elements of the Contract Documents, the Contractor shall be deemed to have based his bid on the more expensive way of doing the work or of material supplied unless he shall have asked for and obtained a decision in writing from the Architect before submission of bids as to which method or materials will be required.

PART 2 – GENERAL LUMBER PRODUCTS:

2.01. GENERAL MATERIALS:

- A. **See Section 06500 – Carpentry Material and Accessories** for typical sheet material and accessories required for installation in this Section.
- B. General: Provide materials for each type of architectural woodwork that comply with requirements of the AWI “Architectural Woodwork Quality Standards” for **Custom Grade**. All materials are subject to the Architect's review. Finish work and materials shall conform in all respects to approved samples
- C. **Exposed Solid Hardwood:** Graded in accordance with AWI Custom; plain-sliced, maximum moisture content of 11 percent; with mixed grain, of quality suitable for transparent finish.
 - 1. Species: Any one of the following, or as noted in the Documents:
 - a. **Hickory**
 - b. For Painted Finish: Birch or Poplar
- D. Softwood Lumber: PS 20; Graded in accordance with AWI Custom; maximum moisture content of 12 percent; with consistent color and grain of quality suitable for transparent finish.
 - 1. smooth-4-sides (S4S) unless noted otherwise
 - 2. Species: Any one of the following, or as noted in the Documents:
 - a. Douglas fir-larch
 - b. Southern yellow pine
 - c. Longleaf yellow pine
 - d. Mountain hemlock
- E. Concealed Solid Wood: Comply with PS 20 - American Softwood Lumber Standard; clear, dry, sound and free of defects.
- F. Cabinet Hardware: Comply with ANSI/BHMA A156.9 “American National Standard for Cabinet Hardware.” Hardware finishes to comply with BHMA 1301.

2.02. PAINT GRADE LUMBER MATERIALS:

- A. For lumber products which are not Hardwood but are exposed to view (concealed non-Hardwood materials are covered in the Rough Carpentry Section).
- B. Softwood Lumber:
 - 1. Caps and Casings: Poplar, Select grade absent of visible knots or other surface irregularities

2.03. STANDING AND RUNNING TRIM:

- A. Quality Standard: Comply with AWI Section 300.
- B. Backout or groove backs of flat trim members and kerf backs of other wide flat members, except for members with ends exposed in finished work.
- C. Interior Standing and Running Trim for Top Coat Finish: Comply with the following requirements:
 - 1. Species: pine - painted

2. Profiles: As shown on Drawings and approved shop drawings. Note all conditions where trim is to match existing.
- 2.04. SHELVING:
- A. Wood shelving material:
 1. ¾" plywood with ½" - round applied wood trim
 2. Provide continuous wall cleat at back and sides of shelving.
 3. Provide brackets and standards to support shelving.
 4. Providing supports, anchors and brackets as needed to support 25#/SF loading.
- 2.05. ACCESSORY MATERIALS:
- A. Lumber for Shimming and Blocking: Softwood lumber of SPF species.
 - B. Edgebands for panel edging – may be on tops and/or shelving
 1. ¼" hardwood veneer attached to panel
 - a. 1/8" eased edges
- 2.06. ACCESSORY PRODUCTS:
- A. Joint Adhesive: Manufacturer's standard two-part adhesive kit to create inconspicuous, non-porous joints by chemical bond.
 - B. Panel Adhesive: Manufacturer's standard neoprene-based panel adhesive complying with ANSI A136.1-1967, Sealant: Manufacturer's standard mildew-resistant, FDA, UL listed silicone sealant in colors matching components.
 - C. Fasteners: Of size and type to suit application; mill finish in concealed locations and chrome plated finish in exposed locations.
 - D. Concealed Joint Fasteners: Threaded steel.
- 2.07. WOOD TREATMENT PROCESSES:
- A. All exposed wood shall be Pressure-Treated as required to maintain Flame-Spread requirements and/or Fire-Rating requirements of assemblies as indicated or required.
 - B. Coordinate with Section 06070-Pressure-Treated Lumber.
 - C. Fire retardant (FR S Type): Chemically treated and pressure impregnated; capable of providing a maximum flame spread/smoke development as required by applicable regulatory agencies, in accordance with ASTM E84.
 - D. Wood Preservative by Pressure Treatment (PT Type): AWPA Treatment C2 using water borne preservative with 0.25 percent retainage.
 - E. Wood Repellent Preservative Treatment by Dipping Method: NWWDA I.S.4, with 0.25 percent retainage
- 2.08. TREATMENT OF WOOD MATERIALS:
- A. Pressure treat wood materials requiring UL fire ratings as required or noted.
 - B. Provide UL approved identification on fire retardant treated material.
 - C. Deliver fire retardant treated materials cut to required sizes. Minimize field cutting.
 - D. Kiln dry wood after pressure treatment to maximum 11 percent moisture content.

PART 3 -EXECUTION

- 3.01 EXAMINATION:
- A. Examine conditions of substrates, supports and other conditions under which this work is to be performed and notify Contractor, in writing, of circumstances detrimental to the proper completion of the work. Do not proceed with work until unsatisfactory conditions are corrected.
 - B. Verify adequacy of backing and support framing.
 - C. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

3.02 PREPARATION:

- A. Condition woodwork to average prevailing humidity conditions in installation areas prior to installing.
- B. Preinstallation Requirements: Visit project site prior to delivery of architectural woodwork and review coordination and environmental controls required for proper installation and ambient conditioning in areas to receive work. Proceed with woodwork installation only where involved parties agree that required ambient conditions can be maintained.
- C. Prior to installation of architectural woodwork, examine shop-fabricated work for completion, and complete work as required, including back priming and removal of packing.
 - 1. Verify that all factory cut-outs are present. Coordinate with other trades as necessary for field cut-outs. Seal field cut edges as factory cut edges

3.03 LAMINATE FABRICATION:

- A. Fabricate to AWI Custom Grade standards.
- B. Shop assemble work for delivery to site, permitting passage through building openings.
- C. Cap exposed plastic laminate finish edges with material of same finish and pattern.
- D. Shop prepare and identify components for book match grain matching during site erection.
- E. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.
- F. Apply plastic laminate finish in full, uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut outs.
- G. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.

3.04 INSTALLATION:

- A. Install work in accordance with AWI Quality Standard - **Custom Grade**.
- B. Set and secure materials and components in place, plumb and level.
- C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.
- D. Install components and trim with fasteners appropriate for intended finish. All fasteners shall be concealed unless approved by Architect.
- E. Install prefinished paneling with fasteners appropriate for intended finish. All fasteners shall be concealed unless approved by Architect.
- F. Install hardware supplied by Section 08710 in accordance with manufacturer's instructions.

3.05 FINISHING OF CARPENTRY:

- A. Sand work smooth and set exposed nails and screws.
- B. Apply wood filler in exposed nail and screw indentations.
- C. On items to receive transparent finishes, use wood filler which matches surrounding surfaces and of types recommended for applied finishes.
- D. Seal, stain and varnish exposed to view surfaces. Brush apply only.
- E. Seal, stain and varnish semi-exposed to view surfaces. Brush apply only.
- F. Prime paint and seal surfaces in contact with cementitious materials.

3.06 SITE APPLIED WOOD TREATMENT:

- A. Apply preservative treatment in accordance with manufacturer's instructions.
- B. Brush apply two coats of preservative treatment on wood in contact with cementitious materials and roofing and related metal flashings. Treat all site sawn cuts with appropriate treatment.
- C. Before installation, prime paint surfaces of all painted items or assemblies to be in contact with cementitious materials
- D. Allow preservative to dry prior to erecting members.

3.07 ERECTION TOLERANCES:

- A. Maximum Variation from True Position: 1/16 inch.
- B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

3.08 ADA REQUIRMENTS:

- A. See "Typical Mounting Heights and Locations" Drawings in the Documents for Barrier-Free clearances and mounting information – which shall control.
- B. The following special requirements shall be met, where indicated on Documents or as required by Statute, for Barrier-Free Accessibility:
 - 1. Countertop height: with or without cabinet below, shall not exceed a height of 34 inches AFF, at a minimum surface depth of 24 inches.
 - 2. Kneespace Clearance: to be minimum 27 inches AFF and 30 inches clear span width.
 - 3. Sink cabinet clearances: in addition to Notes Above – upper kneespace front depth to be no less than 8 inches, lower toe front depth to be no less than 8 inches, and lower toe front depth to be no less than 11 inches at a point 9 inches AFF.
 - 4. Lavatory piping scald-guard. Protective pipe covers by TrueBro, or equal, to cover all exposed undersink piping, where noted or required by ADA.

END OF SECTION 06200

SECTION 06401 - EXTERIOR ARCHITECTURAL WOODWORK

PART 1- GENERAL

1.01 DESCRIPTION OF WORK:

- A. Carpentry work not specified as part of other Sections and as required for special details and trim, and generally for “architectural woodwork” part of exterior construction.
- B. Carpentry for:
 - 1. **Framing for Architectural woodwork and construction associated with the pergola.**
 - 2. Trim/casing/detailing, etc. required for exterior finishing is specified herein.
 - 3. Misc. lumber for attachment and support of other work.
- C. Fabrications and Fittings for misc. exterior construction
- D. Carpentry which is generally exposed to the environment.
 - 1. This material shall also be vinyl or PVC material being used with wood – See Details for additional information.

1.02 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to the work of this section.
- B. **See Section 06500 – Carpentry Materials and Accessories where material and accessories associated with this Specification Section are detailed.**

1.03 RELATED SECTIONS

- A. Section 06070 – Pressure-Treated Wood Products.
- B. Section 06100 – Rough Carpentry
- C. Section 06200 - Finish Carpentry.
- D. Section 06500 – Carpentry Materials and Accessories

1.04 REFERENCES

- A. Western Lumber Grades and Quality Control
- B. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 1998.
- C. AWPA C20 - Structural Lumber -- Fire-Retardant Treatment by Pressure Processes; American Wood-Preservers' Association; 1999.
- D. AWPA C27 - Plywood -- Fire-Retardant Treatment by Pressure Processes; American Wood-Preservers' Association; 1999.
- E. ASTM E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials; 1998.
- F. UL 723 – Standard for Test for Surface Burning Characteristics of Building Materials; Underwriters Laboratories Inc.; 1996

1.05 SUBMITTALS:

- A. Product Data: Submit manufacturer's product data for each product and process specified as work of this Section and incorporated into items of architectural woodwork during fabrication, finishing and installation.
- B. **Shop Drawings:**
 - 1. Submit shop drawings for all job or shop assembled architectural woodwork to the Architect for review and approval before fabrication. Show location of each item, plans and elevations with field verified dimensions, large-scale details, attachment devices and other components.
 - 2. Where dimensions are critical, include layout of architectural woodwork items with relation to surrounding walls, doors, windows and other building components.
 - 3. Prepare shop drawings at scale not less than 1/4" = 1'-0" for composite plans, 3/4" = 1'-0" for enlarged plans, 3/4" = 1'-0" for elevations, 3/4" = 1'-0" for sections, and 3" = 1'-0" for details. Show all trim, moldings and shaped elements at full scale.

4. **Clearly show proposed joinery and installation details.** For structurally critical connections, indicate design loading criteria and other pertinent information.
 5. Identify where composite or PVC material is being used.
 6. **Identify core material wherever used**, and species and cut of all solid lumber.
- C. **Samples for Verification Purposes:** Submit samples as follows, coordinating shop priming with field finish to provide samples illustrating final field finish:
1. Lumber with or for transparent finish; 50 square inches, for each species and cut, finished on one side and one edge.
 2. Trim, molding or shaped element samples in lengths not less than 12 inches for each type.
 - a. Where new wood trim, molding or shaped elements shall match existing in species and finish, work of this section shall **not** commence without Architect's approval of verification sample. Sample evaluation may take place at project site for best comparison with existing installation.
 3. Synthetic (vinyl, other): a single sample of each type for review.
 4. Exposed hardware items, one unit for type and finish.
- D. Shop Drawings copied directly from the Contract Documents shall be returned with "No Action Taken".

1.06 QUALITY ASSURANCE:

- A. Identification: Factory-mark each piece of lumber and plywood with type, grade, mill and grading agency.
- B. WIC Quality Standard: Comply with applicable requirements of "Manual of Millwork" by WIC.
- C. Shop Drawings: Submit shop drawings for each item of architectural woodwork.
- D. Samples: Submit samples of each wood species and cut indicated for transparent finish; of each material indicated for opaque finish.
- E. Refer to Section 00100 – Instructions to Bidders for General Contractor, Construction Manager, and/or sub contractor responsibilities pertaining to Specification inconsistencies.

1.07 FIELD MEASUREMENTS:

- A. Verify that field measurements are as indicated on reviewed shop drawings and as instructed by the manufacturer.
- B. Provide templates for all countertops prior to fabrication.
- C. Coordinate the work with plumbing and electrical rough-in and installation of associated and adjacent components.

PART 2 - PRODUCTS

2.01 GENERAL MATERIAL REQUIREMENTS:

- A. Lumber, General:
 1. Nominal sizes are indicated, except as shown on detail dimensions. Provide dressed lumber, S4S, with 19% maximum moisture content and time of dressing – typical for most applications.
 2. For cedar – left natural or receiving a clear or semi-transparent finish – all lumber shall be **'Select 1 or A'** or better.
 3. For treated lumber and lumber that shall be allowed as a part of architectural work and/or painted – it shall be **No. 1** or better.
- B. General Framing Lumber – **not a part of the Pergola or critical to appearance** (2" through 4" thick):
 1. For light framing (less than 6" wide), provide #1 or better, any species.
 2. For structural framing – not architectural framing (6" and wider and from 2" to 4" thick), provide #1 Hem-Fir or Southern Pine or any other species and grade which meets or exceeds the following values:

- a. F_b (minimum extreme fiber stress in bending); 2x4 thru 2x8 1,200 F_b and 2x10 and larger 1,000 F_b min.
- C. Architectural Framing Lumber **for the Pergola** (2" through 4" thick stock):
 1. Provide 'Select' or 'Select Structural' grade 1 or A, or better – **Western-red cedar**.
- D. Sheet Material:
 1. See drawings for thickness and type. If not noted otherwise conform to the following minimum dimensions.
 2. Wood Panels may be:
 - a. Exterior Exposure rating only, $\frac{3}{4}$ " thick (nominal) plywood, APA association stamped.
 - b. Pressure-treated preservative as required for installation.
 - c. Identify each plywood panel with appropriate APA trademark.
 3. Synthetic Panels (if noted on the Documents) may be:
 - a. $\frac{1}{4}$ " nominal cement board
 - b. $\frac{1}{4}$ " nom. perforated soffit material

2.02 EXTERIOR GRADE SOFTWOOD – WHERE REQUIRED

- A. Exterior Wood: Materials as follows:
 1. Grading requirements **as above** for lumber.
 2. Lumber Species allowed for Transparent Finish: **Western-red cedar**.
 3. Lumber Species allowed for Opaque Finish: Eastern white pine, sugar pine, and Idaho white pine.
- B. Wood Requirements – Comply with grading rules of grading agency for species of timber used:
 1. RIS--Redwood Inspection Service.
 2. SPIB--Southern Pine Inspection Bureau.
 3. WCLIB--West Coast Lumber Inspection Bureau.
 4. WWPA--Western Wood Products Association.
 5. Timber Species: Any soft wood, at Fabricator's option, as required to comply with other requirements.
- C. Dressing: Provide timber that has been dressed on four sides (S4S) at mill, prior to grading. Comply with grade sizes.
- D. End Sealer: Manufacturer's standard, transparent, colorless wood sealer, which is effective in retarding transmission of moisture at cross-grain cuts for all wood not receiving a finish coat of other sealer.
- E. Penetrating Sealer: Manufacturer's standard, translucent, penetrating wood sealer, which will not interfere when applying wood stain and transparent finish, or paint finish.

2.03 EXTERIOR BOARD MATERIALS:

- A. **Refer to the Documents to where PVC and/or wood trim boards are required.**
- B. Exposed-to-weather, exterior wood boards – clear, smooth surface. As follows:
 1. Natural wood species: Any one of the following:
 - a. Western cedar
 2. Grading:
 - a. Select A or better for clear finish
- C. Exterior, composite trim:
 1. PVC, solid boards with smooth finish. Sizes and thicknesses to meet Details.
 2. As manufactured by:
 - a. Certainteed
 - b. Azek
 - c. or equal

2.04 MISCELLANEOUS MATERIALS:

- A. Fasteners and Anchorages:

1. **Provide size and type recommended by applicable standards, complying with applicable Federal Specifications for nails, staples, screws, bolts, nuts, washers and anchoring devices.**
2. Provide all fasteners with a hot-dip zinc coating (ASTM A153) for treated lumber at a minimum and unless noted otherwise, and where wood is in ground contact, subjected to high relative humidity, or exposed to weather. .
- B. Post anchors:
 1. Provide a 'stand-off base and anchor' similar to Simpson CBSQ series
- C. Swinging Gate Hardware:
 1. Provide a latch similar to: heavy-duty, zinc chromate plated, drop-latch with padlock eye.
 2. Provide a pair of strap hinges similar to: plated steel, 3" +/- x 12" Min. long strap.
- D. Building Paper:
 1. Asphalt saturated felt, non-perforated, ASTM D 226.

PART 3- EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS:

- A. Install exterior woodwork to comply with requirements of AWI Section 1700 "Installation of Woodwork (Interior)" that refer to types of woodwork specified in this section and that apply to the same grade specified in Part 2 of this section.
- B. Fabrication, Timber Framing: Comply with the following.
 1. Fabricate members by cutting and restoring exposed surfaces to match specified surfacing. Pre-drill for fasteners and assembly of units wherever feasible.
 - a. Machine sand exposed surfaces to remove planing or surfacing marks, finishing with No. 80 grit sand paper.
 2. Shop Fabrication: Where treatment of timber work is indicated, fabricate members (cutting, drilling, surfacing and sanding) prior to treatment to the greatest extent possible.
 3. Preservative Treatment: Pressure treat fabricated members with waterborne solution for above-ground use, complying with AWPA C2.
 - a. Provide preservative treatment solution free of water repellents and other substances that might interfere when applying finishes as indicated for timber work.
 4. End-Cut Sealing: Immediately after end-cutting each member to final length, and after wood treatment (if any), apply a saturation coat of end sealer to ends and other cross-cut surfaces, keeping surfaces flood-coated for not less than 10 minutes.
- C. Seal Coat for all pre-treated woods: After fabricating and surfacing each unit and end-cut sealing, apply a saturation coat of penetrating sealer on surfaces of each unit, except for treated wood where the treatment included a water repellent.

3.02 ERECTION REQUIREMENTS:

- A. Set carpentry work accurately to required levels and lines, with members plumb and true and accurately cut and fitted.
- B. Securely attach carpentry work to substrate by anchoring and fastening as required by recognized standards. Countersink nail heads on exposed carpentry work and fill holes. Use finishing nails for finish work. Make tight connections between members. Install fasteners without splitting of wood; pre-drill as required.
- C. Wood Framing, General:
 1. Provide framing members of sizes and on spacings shown on the drawings, and frame openings to comply with recommendations of "Manual for House Framing" of National Forest Products Association. Do not splice structural members between supports.
 2. Anchor and nail to comply with "Recommended Nailing Schedule" of "Manual for House Framing" and other recommendations of N.F.P.A. and other recommendations of N.F.P.A.

END OF SECTION 06401

SECTION 06500 – CARPENTRY MATERIAL AND ACCESSORIES

PART 1 - GENERAL

1.01 **DESCRIPTION OF SCOPE**

- A. Furnishing material and accessories that will be used in other Specification Sections of these Documents.

1.02 **RELATED SECTIONS:**

- A. Section 06070 – Pressure-Treated Products
- B. Section 06100 – Rough Carpentry
- C. Section 06200 - Finish Carpentry
- D. Section 06401 – Exterior Architectural Woodwork
- E. Section 06405 – Architectural Casework
- F. Section 08800 - Glazing: Glass for casework.
- G. Section 09900 - Painting: Site finishing of cabinet exterior and interior.

1.03 **REFERENCES:**

- A. ADA - Americans with Disabilities Act (ADA) - Cabinet Hardware.
- B. ANSI A135.4 Basic Hardboard.
- C. ANSI A208.1 - Mat Formed Wood Particleboard.
- D. AWI (Architectural Woodwork Institute) - Quality Standards.
- E. BHMA A156.9 - Cabinet Hardware.
- F. FS MMM A 130 - Adhesive, Contact.
- G. HPM (Hardwood Plywood Manufacturer's Association) HP - American Standard for Hardwood and Decorative Plywood.
- H. NEMA (National Electric Manufacturers Association) LD3 - High Pressure Decorative Laminates & LD-3 – 1995 for GP 28.
- I. NHLA (National Hardwood Lumber Association).
- J. PS 1 - Construction and Industrial Plywood.
- K. PS 20 - American Softwood Lumber Standard.
- L. WIC (Woodwork Institute of California) - Manual of Millwork.

1.04 **SUBMITTALS FOR REVIEW:**

- A. General: Submit per Section 01300 – Submittals.
- B. **Shop Drawings**
 - 1. Indicate **all** of the following:
 - a. materials, finishes and colors
 - b. component profiles and elevations
 - c. assembly methods, joint details, fastening methods and support considerations
 - d. accessory listings, hardware and locations
 - e. schedule of finishes/colors, whether or not shown on the Contract Drawings.
- C. Product Data: Submit manufacturer's product data for each product and process specified as work of this Section and incorporated into items of Custom Casework during fabrication, finishing and installation.
- D. Samples:
 - 1. Submit two 6 x 9 inch size samples, illustrating color, texture, finish and edge details, etc. for each material required.

1.05 **QUALITY ASSURANCE:**

- A. Provide materials and perform work in accordance with AWI quality standards for Custom Grade, unless otherwise noted.
- B. Manufacturer Qualifications: Company specializing in fabricating and installing the Products specified in this section, and any Related Section, with minimum three years documented experience.
- C. Single-source responsibility:

1. The contractor shall be responsible for all Products covered in this Section.
2. Where assemblies are shown to be constructed using Products covered in Related Sections, such as light gauge metal framing, miscellaneous steel shapes, etc., the contractor shall also be responsible for the Related Section Products which are part of each assembly.
3. All components of any assembly shall be furnished and installed by the contractor and shown on the shop drawings as such.

1.06 DELIVERY, STORAGE, AND PROTECTION:

- A. Section 01600 - Material and Equipment: Transport, handle, store, and protect products.
- B. Protect units from moisture damage.

1.07 ENVIRONMENTAL REQUIREMENTS:

- A. Section 01600 - Material and Equipment: Environmental conditions affecting products on site.
- B. During and after installation of work of this section, maintain the same temperature and humidity conditions in building spaces as will occur after occupancy.

PART 2 – MATERIAL/PRODUCTS:

2.01. GENERAL:

- A. Proprietary names and/or model numbers used to designate products or materials are not intended to imply that products of named manufacturers are required to the exclusion of equivalent products of other accepted manufacturers. Pre-bid requests for approval of other products may be accepted in accordance with Section 00100 – Instructions to Bidders. Post-Bid substitutions may be accepted in accordance with Section 01600 – Product Substitutions.

2.02. HIGH PRESSURE LAMINATE MATERIALS:

- A. Provide High-Pressure laminate materials for all plastic laminate countertops, doors, drawers, face-frames, and carcasses (UON), as typical materials unless specifically noted otherwise on the Drawings.
- B. Plastic Laminate: shall meet NEMA LD3-1995 standards;
 1. Provide 0.028+/- inch thickness (VGP) for exterior cabinet surfaces and vertical surfaces, meeting NEMA PF 30
 2. Provide 0.050+/- inch thickness (HGS) for General Purpose surfaces and all horizontal surfaces, meeting NEMA GP 50
 3. Provide 0.039+/- inch thickness (HGL) for postforming, meeting NEMA PF 42.
- C. Plastic laminate balancing sheets: shall meet NEMA LD23 – 1991 CL20 standard; .020 inch thickness for backing of all high-pressure applications where this surface is unseen.
- D. Color and pattern as selected by Architect; from all standard colors and patterns.
- E. Manufacturer of Plastic Laminates:
 1. Wilsonart
 2. Nevamar.
 3. Formica.
 4. Pionite
 5. Substitutions: Refer to Section 01600.

2.03. WOOD PANEL MATERIALS:

- A. Wood Particleboard: ANSI A208.1; AWI standard, composed of wood chips, medium density, made with high waterproof resin binders; of grade and thickness to suit application; sanded faces. See Section 2.08 Certification for additional requirements if Applicable.
- B. Paint Grade Wood Shelving: Wood Particleboard: ANSI A208.1; AWI standard, composed of wood chips, high density, made with high waterproof resin binders; of grade and thickness to suit application; sanded faces.

1. Paint grade wood shelving shall be comprised of 1" particle board, sanded, with edges eased to a 1/8" radius.

2.04. ACCESSORIES:

- A. Adhesive: Type recommended by AWI and laminate manufacturer to suit application.
- B. Glass: Type as detailed and as specified in Section 08800.
- C. Fasteners: Size and type to suit application.
- D. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; mill finish in concealed locations and chrome plated finish in exposed locations.
- E. Concealed Joint Fasteners: Threaded steel.
- F. Lavatory piping scald-guard. Protective pipe covers by TrueBro, or equal, to cover all exposed undersink piping, where noted or required by ADA.

2.05. HARDWARE:

A. **General:**

- 1 **The hardware items noted below are available from the following manufacturers and all manufacturers listed will be considered equal:**

- a. Engineered Products Company (EPCO 810-767-2050)
- b. Rockford Process Control
- c. National Lock
- d. Knape & Vogt (K&V)
- e. Blum
- f. Grass
- g. Accuride

B. Casework Door/Shelf

- 1 Hafele, or equal
 - a. Hinged spring bracket
 - b. Style: 287.54.730

C. Catches manufactured by:

- 1 Engineered Products Company
- 2 Rockford Process Control
- 3 Knape & Vogt
- 4 or equal
 - a. roller barrel-ball and catch

D. Hinges – continuous as manufactured by

- 1 Engineered Products Company (EPCO 810-767-2050)
- 2 Rockford Process Control
- 3 National Lock
- 4 Knape & Vogt (K&V)
- 5 Blum
- 6 Grass
- 7 Accuride
- 8 or equal
- 9 Similar to Soss #218 invisible hinge

E. Magnetic Catch:

- 1 Engineering Product Co.
- 2 Knape & Vogt
- 3 or equal
 - a. heavy-duty magnet and plate

F. Shelf Rests and Standards manufactured by:

- 1 Engineering Product Co.
- 2 Knape & Vogt
- 3 or equal
 - a. No. 255ZC Pilaster Standard by K&V, Flush Mounted, with No. 256 support, 4 per shelf.
 - b. or equal

c. Architect.

PART 3 - EXECUTION

3.01. EXAMINATION/COORDINATION:

- A. Section 01039 - Coordination and Meetings: Verification of existing conditions before starting work.
- B. Coordinate various Specification Sections for how Materials and Accessories herein noted are to be used, combines and integrated into various woodworking responsibilities.

3.02. WORKMANSHIP:

- A. Shall be as required by Related Specification Sections requiring the Material and Accessories herein noted.

3.03. WOOD TREATMENT PROCESSES:

- A. Provide Fire-retardant applications where noted and/or required by code.
 - 1. Fire Retardant (FR S Type): Chemically treated and pressure impregnated; capable of providing a maximum flame spread/smoke development rating as required by applicable regulatory agencies, in accordance with ASTM E84.
 - 2. If fire-retarding inhibits the application of finishes specified – notify the Architect.

3.04. SHOP TREATMENT OF WOOD MATERIALS:

- A. Shop brush-apply wood materials requiring UL fire rating to concealed wood blocking.
- B. Provide UL approved identification on fire retardant treated material.
- C. Deliver fire retardant treated materials cut to required sizes. Minimize field cutting.
- D. Kiln dry wood after pressure treatment to maximum 11 percent moisture content.

3.05. FINISHING MATERIALS:

- A. See requirements of Related Specification for Finishing Requirements and coordinate between ‘Shop Finishing’ and ‘Field Finishing’ which is also covered in Section 09900 – Painting and Section 09920 - Finishing.

3.06. FINISHING OF WOOD CASEWORK:

- A. Sand work smooth and set exposed nails and screws.
- B. Apply wood filler in exposed nail and screw indentations that matches surrounding surfaces and of types recommended for applied finishes.
- C. Seal, stain and apply polyurethane to exposed to view surfaces and where there occur the possibility of moisture accumulation.
- D. Seal, stain and apply polyurethane to internal, but exposed to view and semi concealed surfaces.
- E. Seal surfaces in contact with cementitious materials.

END OF SECTION 06500

SECTION 07120 - FLUID-APPLIED WATERPROOFING

PART 1- GENERAL

1.01 SECTION INCLUDES:

- A. Fluid-applied membrane waterproofing for foundation walls, exterior building shell and elsewhere as indicated or required to waterproof construction.
- B. Cant strips and membrane flashings.

1.02 RELATED SECTIONS:

- A. Section 02223 - Backfilling.
- B. Section 03300 - Cast-in-place: Concrete substrate.
- C. Section 07900 - Joint Sealers.

1.03 REFERENCES:

- A. ASTM D412 - Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension.
- B. ASTM C-836: Standard Specification for High Solids Content, Cold Liquid-applied elastomeric waterproofing membrane.
- C. ASTM D-3767: Standard Practice for rubber-measurement of dimensions
- D. ASTM D-5295: Standard Guide for preparation of concrete surfaces for adhered membrane waterproofing systems.

1.04 SUBMITTALS FOR INFORMATION:

- A. Section 01300 - Submittals: Procedures for submittals.
- B. Certificate: Certify that Products meet or exceed specified requirements.
- C. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.05 SUBMITTALS AT PROJECT CLOSEOUT:

- A. Section 01700 - Contract Closeout: & 01740 - Warranties: Procedures for submittals.
- B. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE:

- A. Perform Work in accordance with NRCA Waterproofing Manual.
- B. Test material samples in accordance with ASTM D449. Maintain one copy of each document on site.
- C. Applicator: Company specializing in performing the work of this section with minimum 5 years experience or as approved by manufacturer. Membrane Manufacturer: Company specializing in waterproofing sheet membranes with three years experience.

1.07 MOCKUP:

- A. Section 01400 - Quality Control: Requirements for mockup.
- B. Construct mockup 10 sq ft vertical waterproofed panel; to represent finished work including internal and external corners, seam jointing, attachment method, counter flashing cover, drainage panel, control joints.
- C. Locate where directed by Construction Manager.
- D. Mockup may remain as part of the Work.

1.08 ENVIRONMENTAL REQUIREMENTS:

- A. Section 01600 - Material and Equipment: Environmental conditions affecting products on site.

- B. Maintain ambient temperatures above 40 degrees F for 24 hours before and during application and until liquid or mastic accessories have cured.

1.09 WARRANTY:

- A. Section 01700 - Contract Closeout and 01740 - Warranties.
- B. Correct defective Work within a 10-year period after Date of Substantial Completion.
- C. Provide 10-year manufacturer's warranty for waterproofing failing to resist penetration of water, except where such failures are the result of structural failures of building. Hairline cracking of concrete due to temperature change or shrinkage is not considered a structural failure.

1.10 INCONSISTENCIES:

- A. Refer to Section 00100 – Instructions to Bidders for General Contractor, Construction Manager, and/or sub contractor responsibilities pertaining to Specification inconsistencies.

PART 2 - PRODUCTS

2.01 MEMBRANE SYSTEMS:

- A. Polyurethane-Based, 1-Component Waterproofing: Single-component, bitumen-modified, polyurethane-based liquid membrane material, self-bonding to substrates, and compounded specifically for application and slope of substrate indicated. Provide membrane with not less than 90 percent solids, minimum 6-month shelf life in uncured state, and tested by manufacturer to comply with requirements of ASTM C 836.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. "A-H Seamless Membrane 1-R"; Anti Hydro Company.
 - b. "One-Kote System W-1"; Karnak Corporation.
 - c. "Vulkem 201"; Mameco International, Inc.
 - d. "Perma-Guard (No. 7410 Series)"; The Neogard Corporation.
 - e. "Duramem H-500/V-500"; Pecora Corporation.
 - f. "HLM 5000"; Sonneborn Building Products.
 - g. "Tremproof 60"; Tremco, Inc.
- B. Hot, Rubberized-Asphalt, 1-Component Waterproofing: Single-component, rubberized-asphalt membrane system formulated for minimum 150-mil thick-coat application to substrate type and slope indicated, and complying with the following requirements:
 - 1. Solids Content: 100 percent.
 - 2. Low-Temperature Flexibility: No cracking, delamination, or adhesion loss when 1/8-inch thick membrane applied to aluminum substrate is subjected to 90-degree bend over 1/4-inch mandrel in one-second time period at minus 15 deg F.
 - 3. Water Resistance: No delamination, blistering, emulsion, or deterioration after 24 hrs. at 77 deg F; ASTM D 2939.
 - 4. Water Vapor Permeability: 0.03 perms maximum for 1/8-inch-thick membrane at 100 deg F; ASTM E 96, Procedure E.
 - 5. Water Absorption: Maximum 0.18 percent weight gain for 1/8-inch-thick membrane after 72 hrs. total immersion.
 - 6. Service Temperature Range: 0 deg F to 120 deg F.
 - 7. Products: Subject to compliance with requirements, provide one of the following:
 - a. "Liquid Membrane 6125"; American Hydrotech, Inc.
 - b. "Bakelite 790-11"; Bakelite Thermosets Limited.
 - c. "Ram-Tough, W.I. 250"; The Barrett Company.
 - d. "Tremproof 150"; Tremco, Inc.

2.02 MISCELLANEOUS MATERIALS:

- A. Primer/Filler/Sealer: As recommended by manufacturer of fluid-applied waterproofing compound.

- B. Flashings, Cant Strips, and Accessories: As recommended by manufacturer of waterproofing compound.
- C. Protection Course: Premolded, 1/8-inch-thick, semi-rigid board consisting of mineral-stabilized asphalt core sandwiched between layers of asphalt-saturated felt, surface-coated with asphalt and sealed to core under heat and pressure, and provided with polyethylene film facings.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. "Ram-Tough Protection Board"; The Barrett Company.
 - b. "PC-2 Protection Course"; W.R. Meadows, Inc.
 - c. "Protection Sheet"; Pecora Corp.
 - d. "Protection Course II"; Sonneborn Bldg. Products.
 - e. "Tremboard"; Tremco, Inc.

PART 3- EXECUTION

3.01 EXAMINATION:

- A. Section 01039 - Coordination and Meetings: Verification of existing conditions before starting work.
- B. Verify substrate surfaces are durable; free of matter detrimental to adhesion or application of waterproofing system.
- C. Verify items that penetrate surfaces to receive waterproofing are securely installed.

3.02 PREPARATION:

- A. Protect adjacent surfaces not designated to receive waterproofing.
- B. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions.
- C. Do not apply waterproofing to surfaces unacceptable to manufacturer or applicator.
- D. Seal cracks and joints with sealant materials using depth to width ratio as recommended by sealant manufacturer and in accordance with Section 07900.
- E. Apply surface conditioner at a rate recommended by manufacturer. Protect conditioner from rain or frost until dry.

3.03 MEMBRANE APPLICATION:

- A. General: Comply with manufacturer's written application recommendations, including preparation of substrate surfaces, detail coatings of joints and planar changes in substrate, and priming of substrates.
 - 1. Mix separately packaged components in accordance with manufacturer's written recommendations.
 - 2. Apply waterproofing membrane material to substrates and adjoining surfaces indicated to receive membrane. Apply in accordance with manufacturer's recommendations to obtain thicknesses specified and using applicators and techniques best suited for slope and type of substrate to which applied.
 - 3. If two-coat application is required to obtain membrane thickness specified below, apply second coat only after initial coat has cured as recommended by manufacturer.
 - 4. Provide 60-mil (average) membrane thickness, with minimum 50-mil thickness.
- B. Install sheet-type flashings and joint covers where indicated and as recommended by prime materials manufacturer. Extend flashings onto perpendicular surfaces and other work penetrating substrate to not less than 6 inches beyond finished surface to be applied over waterproofing.
- C. Permit membrane to cure under conditions that will not contaminate or deteriorate waterproofing material. Block off traffic and protect membrane from physical damage.
- D. Install protection course on cured membrane (after testing, if required) without delay to minimize period of membrane exposure.

1. On vertical surfaces, comply with waterproofing manufacturer's recommendations for adhesion of protection course to membrane.
- E. In-Place Testing: Before completed membranes on horizontal surfaces are covered by protection course or other work, test for leaks with 2-inch depth of water maintained for 24 hours. Repair any leaks revealed by examination of substructure, and repeat test until no leakage is observed.

END OF SECTION 07120

SECTION 07200 - INSULATION

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. Board-type insulation at perimeter of concrete construction.
- B. Batt insulation (Type II – paper-faced, perm of < 1) with vapor retarder, in exterior wall - typical.
- C. Batt insulation – Type I, to be used as sound insulation
- D. Batt insulation – Type I, without vapor retarder, where noted, or as supplement to a system of batts with vapor retarder already in place
- E. Fire-safing and fire-stopping – as required.

1.02 RELATED DOCUMENTS:

- A. All Drawings and general provisions of Contract, including General Conditions, Supplementary Conditions, Division 0, and Division 1 Specification sections apply to the Work of this Section.

1.03 RELATED SECTIONS:

- A. Section 03300 – Concrete Work
- B. Section 09250 - Gypsum Drywall Systems

1.04 REFERENCES:

- A. ASTM E84 - Surface Burning Characteristics of Building Materials.
- B. ASTM C208 - Insulating Board (Cellulosic Fiber), Structural and Decorative.
- C. ASTM C516 - Vermiculite Loose Fill Insulation.
- D. ASTM C520 - Test Methods for Density of Granular Loose Fill Insulations.
- E. ASTM C578 - Preformed, Cellular Polystyrene Thermal Insulation.
- F. ASTM C612 - Mineral Fiber Block and Board Thermal Insulation Board.
- G. ASTM C1013 - Membrane Faced Rigid Cellular Polyurethane Roof Insulation.
- H. ASTM D2842 - Water Absorption of Rigid Cellular Plastics.
- I. ASTM E96 - Test Methods for Water Vapor Transmission of Materials.
- J. NFPA 255 - Test of Surface Burning Characteristics of Building Materials.
- K. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

1.05 QUALITY ASSURANCE:

- A. Thermal Conductivity: Thicknesses shown are for thermal conductivity (k-value at 75 degrees F. (or 24 degrees C.) specified for each material. Provide adjusted thicknesses as directed for equivalent use of material having a different thermal conductivity. Where insulation is identified by an "R" value, provide appropriate thickness.
- B. Fire Performance Characteristics: Provide insulation materials identical to those whose indicated fire performance characteristics have been determined per ASTM E 119, ASTM E 84, and ASTM E 136, as applicable, by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing and inspecting organization.
- C. Fire and Insurance Ratings: Comply with fire-resistance, flammability and insurance ratings indicated, and comply with government regulations as interpreted by authorities.
- D. Insulation shall be manufactured with a blowing agent that provides at least a 90% reduction in ozone depletion potential compared to standard CFC blowing agents.

1.06 SUBMITTALS:

- A. General: Submit per Section 01300 – Submittals.
- B. Product Data: Submit manufacturer's product information, confirming compliance with specified requirements.
- C. Submit manufacturer's CFC compliance certification.

- D. Submit samples of specified insulation.

1.07 DELIVERY, STORAGE & HANDLING:

- A. All insulation to be delivered to the site dry and stored dry, flat and uncompacted.
B. Store and handle plastic insulation in strict compliance with manufacturer's recommendations.
1. Do not expose to direct Sunlight, except as needed for period of installation and concealment.
2. Protect all insulation from open flames and high heat sources.
3. Avoid putting rigid insulation in contact with petroleum-based solvents or with molten asphalt or tar.

1.08 SEQUENCING AND SCHEDULING:

- A. Coordinate insulation installation with work of other trades.
B. Do not begin work of this section until work that will be concealed by insulation has been completed and accepted.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS:

Subject to compliance with requirements, provide products of one of the following as appropriate for the various applications encountered, **or as noted under the individual material information:**

- A. Dow Chemical Co.
B. Owens-Corning Fiberglas Corp.
C. Celotex Corporation
D. Certainteed
E. Johns Manville Corp.
F. Rockwool Industries Inc.
G. or Architect approved substitution under provisions of Section 01600.

2.02 MANUFACTURERS - GENERAL:

- A. Proprietary names and/or model numbers used to designate products or materials are not intended to imply that products of named manufacturers are required to exclusion of equivalent products of other accepted manufacturers. Pre-bid requests for approval of other products may be accepted in accordance with Section 00100 – Instructions to Bidders. Post-Bid substitutions may be accepted in accordance with Section 01600 – Product Substitutions.

2.03 GENERAL REQUIREMENTS:

- A. All insulation installations shall meet Code requirements for each application at a minimum.
B. Refer to Documents for additional information, thicknesses or assembly requirements.

2.04 RIGID INSULATION

- A. Provide preformed units in sizes to fit applications required, selected from manufacturer's standard thicknesses, widths, and lengths from materials noted below. If multiple choices are allowed the contractor has the option of material selection as long as it meets the application criteria.
B. **For use in Forming Concrete Stair and:** under Concrete Slabs on Grade, at Foundation Wall Perimeters as required:
1. **Extruded Polystyrene Board Insulation:** Rigid, square edged, closed-cell, extruded polystyrene insulation board with integral high-density skin; complying with ASTM C578, Type IV.
a. Compressive Resistance: 18 lb./sq. in. minimum at yield, or 10% deformation (ASTM D1621). [Use 25 lb./sq. in for special load conditions.]
b. Water Absorption: 0.1% by volume, maximum (ASTM C272)

- c. Water Vapor Permeance: 1.0 perm maximum (ASTM E96)
- d. Thickness: As indicated on Drawings.
- e. Widths to coordinate with masonry wall ties when applicable.
- f. Available Products: Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to the following:
 - 1) "Styrofoam Cavitymate Plus", DOW Chemical USA
 - 2) "Foamular 250", UC Industries
 - 3) "Certifoam", Minnesota Diversified Products, Inc.
 - 4) "Tuff-RC", Celotex

2.05 THERMAL BATT INSULATION:

- A. For use in Light Gauge Metal or Wood Framed Walls, Ceilings and where required:
Mineral/Glass Fiber Blanket/Batt Insulation: Inorganic glass fibers formed with binders into resilient flexible blankets or semi-rigid batts; FS HH-I-521, Type as indicated, densities of not less than 0.5 lb. per cu. ft. for glass fiber units and not less than 2.5 lb. per cu. ft. for mineral wool units k-value of 0.27; manufacturer's standard lengths and widths as required to coordinate with spaces to be insulated; types as follows:
 - 1. Type I: Unfaced glass fiber thermal insulation complying with ASTM C 665.
 - 2. Type II: Kraft-faced glass fiber insulation complying with ASTM C 665, **Class C**.
 - 3. Flame Spread 25 - Type III: Foil-faced glass fiber thermal insulation complying with ASTM C 665, **Class A with flame spread of 25 or less.**
- B. R-Value 13, when tested in accordance with ASTM C 518.
 - 1. Provide Type I unfaced units where indicated, semi-rigid in vertical spaces and where self-support is required.
 - 2. Provide Type II, typically
 - 3. Provide batts in thicknesses as required to achieve stated "R-value" or as noted on the documents.
- C. Vapor Retarder Perm Rating:
 - 1. Kraft-facing Perms Maximum 1.00
 - 2. When tested in accordance with ASTM E 96.
- D. Surface Burning Characteristics:
 - 1. Unfaced Insulation: Maximum flame spread: 10; Maximum smoke developed: 10
 - 2. Kraft Faced Insulation: Maximum flame spread - Not Rated. Maximum smoke developed - Not Rated. When tested in accordance with ASTM E 84.
 - 3. Kraft facings on this insulation will burn and must not be left exposed. The facing must be installed in substantial contact with the unexposed surface of the ceiling finish material. Protect facing from any open flame or heat source.
- E. Combustion Characteristics: Unfaced insulation passes ASTM E 136.

2.06 SPRAY-ON INSULATION:

- A. Spray-on Polyisocyanurate Foam is allowed in lieu of batts if coordinated with Architect or as chosen by Contractor for tight-fill spaces:
 - 1. R-Value: Five-year aged R-value of 6.8 deg. F • sq. ft • h/Btu per inch minimum at 75 degrees F (ASTM C518).

2.07 ACOUSTIC BATT INSULATION:

- A. Type II: Kraft faced glass fiber acoustical insulation complying with ASTM C 665, Class C.
- B. Sizes:
 - 1. Thickness 2" in typical wall cavities.
 - 2. In thicknesses as required for other applications to meet STC/NRC ratings required.
- C. Surface Burning Characteristics:
 - 1. Maximum flame spread: Not Rated
 - 2. Maximum smoke developed: Not Rated when tested in accordance with ASTM E 84.
- D. Dimensional Stability:
 - 1. Linear Shrinkage less than 0.1%

2.08 ACCESSORIES:

- A. Sheet Vapor Retarder: Specified in Section 07260
- B. Polyethylene Vapor Retarder: ASTM D 4397, 6.0 mils thick, with a maximum permeance rating of 0.13 perms.
- C. Tape: Polyethylene self-adhering type, mesh reinforced, 2 inches wide.
- D. Insulation Fasteners: Steel impale spindle and clip on flat metal base, self adhering backing, length to suit insulation thickness, capable of securely and rigidly fastening insulation in place.
- E. Staples: Steel wire; electroplated; type and size to suit application.
- F. Wire Mesh: Galvanized steel, hexagonal wire mesh.
- G. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation or mechanical anchors securely to substrates indicated without damaging or corroding insulation, anchors, or substrates.
- H. Adhesives - General: Type recommended by insulation manufacturer for application indicated.

PART 3 - EXECUTION

3.01 INSPECTION AND PREPARATION:

- A. Examine the areas and conditions under which work of this section will be installed. Verify that adjacent materials are dry and ready to receive insulation. Verify mechanical and electrical services within the above ceiling space have been tested and inspected.

3.02 BOARD INSTALLATION:

- A. Installation of concrete stairs:
 - 1. Place insulation against cast stone walls and/or under slabs on grade after base for slab has been compacted. Refer to details for locations.
 - 2. Cut and fit insulation tight to protrusions or interruptions to the insulation plane.
 - 3. Prevent insulation from being displaced or damaged while placing granular fill, vapor retarder and concrete slab.

3.03 INSTALLATION OF THERMAL BATTS:

- A. Comply with manufacturer's instructions for particular conditions of installation in each case.
- B. Provide a thermal batt with a vapor retardant membrane in all applications involving an exterior envelope. The vapor membrane shall always be to the interior side of the insulation (warm side) unless specifically noted otherwise.
- C. Under Roof Decks:
 - 1. Apply insulation directly to the interior surface of the underside of roof deck with appropriate spindle or prong-type anchors.
 - a. Fasten anchors to deck by welding the pin to metal and then impale the insulation, or by using pre-attached heads and welding them through the insulation.
 - b. Fasten anchors to deck with adhesive. Follow manufacturer's recommendations for surface preparation and adhesive pattern.
 - c. Impale insulation on anchor and secure with washer. Select pin lengths to ensure tight fit. Protect pin tips where subject to human contact. See manufacturer's diagram for impaling pin pattern.
- D. Mechanical Fasteners – where required to support insulation:
 - 1. Apply insulation directly to the interior surface of the exterior wall with appropriate spindle or prong-type anchors.
 - a. Fasten anchors to wall by welding the pin to metal and then impale the insulation, or by using pre-attached heads and welding them through the insulation.
 - b. Fasten anchors to wall with adhesive. Follow manufacturer's recommendations for surface preparation and adhesive pattern.

- c. Impale insulation on anchor and secure with washer. Select pin lengths to ensure tight fit. Protect pin tips where subject to human contact. See manufacturer's diagram for impaling pin pattern.
 - E. Between Wood Studs:
 - 1. Friction-fit unfaced insulation between studs after cover material has been installed on one side of the cavity. When unfaced insulation is used, and in applications without a cover material, use wire or metal straps to hold insulation in place. When faced insulation is used staple attachment flanges to face or side of stud every 8 to 12 inches to prevent gaps along the edge of the vapor retarding facing
 - F. Installation - Vapor Retarders:
 - 1. Maintain vapor retarder integrity by tightly abutting adjacent insulation. Repair punctures or tears in vapor retarder facing by taping. Follow tape manufacturer's application recommendations.
- 3.04 INSTALLATION OF SOUND BATTS:
- A. Place insulation above ceilings and in partitions/interstitial space as required forming a sound damping barrier. Do not compress insulation.
 - B. Extend vapor retarder tight to full perimeter of adjacent door frames and other items interrupting the plane of membrane where required.
 - C. Cut and fit insulation tight to protrusions or interruptions to the insulation plane.
- 3.05 INSPECTION:
- A. Installer must examine conditions under which insulation work is to be performed and must notify Contractor in writing of unsatisfactory conditions. Do not proceed with insulation work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.
 - B. Beginning work implies that Installer accepts existing conditions.
- 3.06 INSTALLATION:
- A. Install insulation in strict accordance with manufacturer's instructions and recommendations and with best industry practices.
 - B. Coordinate installation with work of other sections and other trades as required.
 - C. Protect installed insulation and vapor retarders from harmful weather exposures and from possible physical abuses.
 - D. Provide temporary coverings or enclosures where protections are needed.

END OF SECTION 07200

SECTION 07900 - JOINT SEALANTS

PART 1 – GENERAL

1.01 **DESCRIPTION OF WORK:**

- A. Providing and installing a material to close joints between dissimilar materials.
- B. A 'soft joint' material such as caulk or sealant shall be installed between dissimilar materials wherever expansion/contraction or movements in adjacent materials may occur. Coordinate these joint materials with the Architect for colors.**
- C. The Contractor shall be responsible for coordinating appropriate joint material with substrates and movement characteristics.**
- D. Providing and installing a material to close joints required because of construction techniques and/or expansion/contraction requirements.
- E. Providing and installing all required back-up rods and accessories for caulking/sealant materials.
- F. This Section may include joint sealants as noted on the Documents and for the following locations that may occur:**
 - 1. Exterior Joints in vertical and non-traffic horizontal surfaces:
 - a. Control and expansion joints in masonry, cast-in-place concrete or stone
 - b. Joints in stonework not set with mortar, or as noted
 - c. Perimeters of all windows and door frames
 - d. Other locations as noted or required
 - 2. Exterior joints in horizontal traffic surfaces:
 - a. Horizontal joint whenever concrete sidewalks or steps abut the building structure at or near grade
 - b. Control and/or expansion joints in brick pavers and cast-in-place concrete. Coordinate with Civil Documents for information that may be required in lieu of information herein noted.
 - c. Control and expansion joints in other exterior material as noted herein and/or required
 - 3. Interior joints at surfaces as noted:
 - a. Control and/or expansion joints in gypsum board, tile, masonry, concrete and/or other wall construction material or interface between wall and floor
 - b. Control and/or expansion joints of concrete slabs not scheduled to receive additional floor finishes.
 - c. Joints/connections of all dissimilar materials
 - d. Acoustical sealant application for gypsum board system. See Section 09250 for additional information and/or requirements
 - e. Perimeter joint of all plumbing accessories and toilet fixtures to fixed construction
 - f. Perimeter joint of all thresholds, countertops, door and window frames
 - g. Other locations as noted or required

1.02 **PERFORMANCE REQUIREMENTS:**

- A. Provide exterior joint sealants that have been produced and installed to create and maintain a watertight, continuous seal without staining or deteriorating the substrates adhered to.
- B. Provide interior joint sealants (typically called as caulk) that have been produced and installed to maintain a continuous, water resistant seal and cause no staining of the substrates adhered to. Under most situations, caulks shall be paintable unless noted otherwise or matching the particular substrate in color.

1.03 **RELATED WORK SPECIFIED ELSEWHERE:**

- A. Section 07200 - Insulation
- B. Section 09250 - Gypsum Board Systems
- C. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to the work of this section.

- D. Refer to Division 6 for architectural woodwork requirements; for work coordinated with this section.
- E. Refer to Divisions 15 and 16 for joint sealers in mechanical and electrical work; for work coordinated with this section.
- F. Sealants used in manufacture of insulating glass units, glazing materials, and all other products manufactured and sealed off site are not part of this section.

1.04 QUALITY ASSURANCE:

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum ten (10) years documented experience.
- B. Installer Qualifications: Firm with not less than five (5) years documented experience in successful installation of the work of this section and on projects similar in scope and type. Installer must be capable of tooling joints per the "Typical Caulk/Sealant Joints" detail found in the Drawings.

1.05 SUBMITTALS:

- A. Product Data: Submit manufacturer's product indicating sealant specifications, handling/installation/curing instructions and performance test data sheets, limitations and color charts.
 - 1. Submit descriptive data listing back-up material, bond-preventative material, primer for each type of surface, solvents, cleaning agents, and wetting agents as recommended by sealing compound Manufacturer.
 - 2. Manufacturer's printed instructions for each type of sealing compound to be used in the work covering surface preparation, mixing, recommended joint dimensions and sealing compound application.
- B. The contractor shall be responsible for coordinating the choice of manufacturer, with available colors choices, to meet the color requirements of the Project. **Therefore, the Architect shall be allowed to choose a manufacturer whose color is compatible for the particular Project and installation requirements.**
- C. Samples: **Provide accurate, material samples to the Architect for choice of sampling colors. Paper sample are not allowed.**
- D. Field Mock-up: Submit two (2) samples 6" long, minimum, illustrating a sample of the material (cured) in each color selected and specified tooling requirements. **Have at least two (2) samples prepared for each sealant color and condition** for approval by the Architect prior to installation. Provide a textured finish of sealant when specified.
- E. For exterior conditions: Install a sampling (mock-up) of at least two sealant colors for each application requirement as part of the Project.

1.06 PROJECT CONDITIONS:

- A. Weather Conditions: Do not proceed with installation of liquid sealants under unfavorable weather conditions. Install elastomeric sealants when temperature is in lower third of temperature range recommended by manufacturer for installation.
- B. Where possible, maintain temperature and humidity levels recommended by manufacturer during and after installation.
- C. Do not install solvent curing sealants in enclosed building spaces.

1.07 GUARANTY-WARRANTY:

- A. This Contractor shall and hereby does warrant, shall and hereby does guarantee all caulking work in this division against defective materials and workmanship for a specified period:
 - 1. Warranty period: **(2) years** from date of Substantial Completion.
- B. Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those failing in performance within warranty period.
 - 1. Warranty period: **20 years from date of Substantial Completion.**

- C. Issuance of final certificate of payment is contingent upon delivery to architect of said written Guaranty-Warranty.

1.08 INCONSISTENCIES:

- A. Refer to Section 00100 – Instructions to Bidders for General Contractor, Construction Manager, and/or sub contractor responsibilities pertaining to Specification inconsistencies.

PART 2 - PRODUCTS

2.01 MANUFACTURER:

- B. Acceptable Manufacturers - Subject to compliance with the following requirements, provide products by one of the following Manufacturers:
 - 1. Tremco, Inc.
 - 2. Dow Chemical
 - 3. Sika Corporation
 - 4. Polymeric Systems, Inc.
 - 5. Sonneborn Building Products Div., ChemRex, Inc.
 - 6. Pecora Corp.
 - 7. Or Architect approved substitution.
- C. Provide joint sealants, fillers and related materials that are compatible with one another and with the particular substrates, conditions of service and applications – as specified by sealant manufacturer based on testing and field experience.
- D. Proprietary names used below are not intended to imply that products of named manufacturers are required to exclusion of equivalent products of other accepted manufacturers.

2.02 INTERIOR CAULKING/SEALANT - TYPICAL:

- A. **Typical Acrylic Latex Caulk:** All caulking compounds for interior use, except as otherwise stated in this Division or related referenced sections, shall be one-part, acrylic latex conforming to ASTM C-834, type OP.
 - 1. Caulking compound shall be acid resistant, waterproof, and paintable; shall not stain or injure materials in contact with same; shall not disintegrate at low temperature or liquefy at temperature of 140 degrees F.; shall not be affected by vibration.
 - 2. Compound shall form a thin, tough, elastic film on surface but remain permanently plastic underneath.
 - 3. This material shall be used at interior areas for joints/interfaces of window/door frames, countertops, wall mounted accessories, precast concrete slabs, masonry walls and other, similar materials
 - 4. Manufacturer's products approved for use are:
 - a. Sonolac®, Sonneborn
 - b. AC-20 + Silicone, Pecora Corp.
 - c. Tremco Acrylic™ Latex, Tremco, Inc.
 - d. Or Architect approved substitution.
- B. **Acoustic sealants** shall conform to ASTM-D-217 and be a synthetic rubber as manufactured by Tremco or equal.
 - 1. Apply wherever interior partitions butt against exterior walls or drywall ceilings.
- C. Provide and install all backer-rods and release tapes necessary for a complete installation of all types of caulk/sealants noted above.

2.03 EXTERIOR SEALANTS - TYPICAL:

- A. General: Provide manufacturer's standard, chemically curing elastomeric sealants as required for the particular type of installation and environmental conditions, and that comply with ASTM C 920 and other requirements indicated on each Joint Sealant Data Sheet for application use.

- 1 Coordinate with the Manufacturer for the most appropriate material for the type of installation noted below.
 - 2 **The contractor shall be responsible for providing Data Sheets for each sealant choice for the various material/condition/environment conditions applicable.**
- B. **Typical sealant conditions are noted below and shall use the materials following unless additional requirements are specified in the Documents:**
1. **Masonry, mortar or glazing sealant or in contact with structural elements** (requiring the maximum elasticity) shall be a silicone Type S, Grade – NS (non-sag), Class 50 min. (medium modulus of elasticity allowing 50% + movement) **silicone sealant** similar to:
 - a. Tremco 'Spectrem 2' medium-modulus, Type S, Grade-NS, Class 50
 - b. Tremco 'Spectrem 3' Type S, Grade-NS, Class 50, or equal
 - c. Provide primers for particular substrates as required by manufacturer
 2. **General Construction** sealants shall be similar to:
 - a. Tremco 'Spectrem 3' Type S (single component), Grade-NS (non-sagging) or equal
 - b. Similar products of Dow Corning, Sika or DAP
 3. **On-Grade Joint** sealant associated with the building systems shall be one or two-part, self-leveling, pouring grade polyurethane appropriate for the particular material in contact to the sealant.
 - a. Typical of building to concrete-at-grade joints and other cast-concrete installations.
 - b. **All joints shall be tooled to force the sealant into contact with the substrate material.**
 - c. Coordinate with Architect for color matching to substrate.
 - d. Provide required backer-rod allowing sealant to comply with the manufacturer's thickness requirements for sealant application (typically ¼" – ½" depth) and compression/elongation limitations of the particular installation.
 - e. An appropriate sealant as manufactured by:
 1. Tremco – THC 900/901
 2. Sika – Sikaflex 1c SL
 3. Pecora – NR-200
 4. Sonneborn – SL-2
 5. or equal
 4. **Sitework Sealants** – Traffic ready and flat-work paving, sidewalks:
 - a. Coordinate with any requirements set forth in the Civil Divisions of these Specifications which shall take precedence.
 - b. Cold-applied joint sealants in concrete and asphalt paving shall be:
 1. Type NS Silicone Sealant for concrete: Single-component, low-modulus, neutral-curing, 'gunnable' silicone sealant complying with ASTM D 5893.
 2. Type SL Silicone Sealant for concrete and asphalt: Single-component, low-modulus, neutral-curing, self-leveling silicone sealant complying with ASTM D 5893 for Type SL (self-leveling).
- 2.04 JOINT FILLERS, PAVEMENT TYPES:
- A. Joint fillers for typical concrete slab construction/control joints applications.
 - B. Bituminous and Fiber Joint Filler: Provide resilient and non-extruding type pre-molded bituminous impregnated fiberboard units complying with ASTM D1751; FS HH-F-341, Type I; or AASHTO M213.
- 2.05 CELLULAR/FOAM JOINT FILLERS AND SEALANT BACKERS:
- A. Provide sealant backing of material and type that are non-staining; are compatible with joint substrates, sealants, primers and other joint fillers.
 - B. **Provide a cellular/foam, rigid board for expansion and placement of cast-in-place concrete against cast-stone walls. Use a ½" board for expansion during placement and cut back to allow sealant to be placed after concrete has set.**
 - C. Typical materials are as follows. The contractor is responsible to coordinate with particular sealants and installation conditions:

1. Closed-Cell Synthetic Rubber Joint Filler: Expanded synthetic rubber complying with ASTM D1056, Class SC-E (oil-resistant and medium swell), of 2 to 5 psi compression deflection (Grade SCE 41); except provide 13 to 17 psi compression deflection (Grade SCE 44) where filler is applied under sealant exposed to traffic. Provide as needed.
2. Closed-Cell PVC Joint Filler: Flexible expanded polyvinyl chloride complying with ASTM D1667, Grade VE 41 BL (3.0 psi compression deflection); except provide higher compression deflection grades as may be necessary to withstand installation forces and provide proper support for sealants, if any. Provide as needed.
3. Closed-Cell Semi-Rigid Plastic Joint Filler: Semi-rigid, compressible non-staining, closed-cell plastic joint filler, recommended by manufacturer where low modulus of elasticity is required, but suitable for retaining poured concrete. Provide as needed.
4. Closed-cell polyethylene foam

2.06 ACCESSORIES:

- A. Joint Primer/Sealer: Non-staining type primer/sealer shall be as recommended by the sealant manufacturer for use on the type of substrate material encountered, and shall have been tested for staining, durability, and dirt pick-up on the surfaces to be primed or sealed.
- B. Joint Cleaner: Non-corrosive and non-staining type as recommended by sealant manufacturer; shall be compatible with joint forming materials.
- C. Bond Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer to suit application. To be applied to sealant-contact surfaces where bond to substrate or joint filler must be avoided for proper performance of sealant. Provide self-adhesive tape where applicable.
- D. Compression Seals: Manufacturer's standard, preformed, pre-compressed, open-cell foam sealant. It shall be a high-density urethane foam impregnated with a non-drying, water repellent agent in a factory produced pre-compressed size to fit joint widths required.
 1. Density: 9-10 lb./cu. ft
 2. Backing: pressure sensitive adhesive, factory applied to one side, with protective wrapping.
 3. Color: Manufacturer's standard gray at building expansion joint, unless otherwise noted.
 4. Acceptable manufacturers:
 - a. Will-Seal Expanding Foam Sealant Tapes
 - b. Thermal Products, Inc.
 - c. or equal

2.07 COLOR SELECTION:

- A. Unless otherwise noted, color of sealant/caulk shall be selected by the Architect from each manufacturer's full range of available colors.
- B. Provide accurate, material samples to the Architect for choice of sampling colors. Paper sample are not allowed.**
- C. **Have at least two (2) samples prepared for each sealant color and condition** for approval by the Architect prior to installation. Sealant shall be applied to sample panel/wall when requested by Architect.

PART 3 - EXECUTION

3.01 INSPECTION:

- A. Installer shall verify that surfaces, substrates, joint openings and conditions under which joint sealer work is to be performed are satisfactory and ready to receive work. Installer shall notify Contractor in writing of unsatisfactory conditions. Do not proceed with joint sealer work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.
- B. Beginning of installation means Installer accepts existing surfaces and conditions.

3.02 PREPARATION:

- A. The surface of joints to be sealed with gaskets, sealants or caulking compound shall be cleaned free of loose particles, oil, grease, water, frost, surface dust, coatings, and other foreign matter which might impair performance of joint sealing materials.
 - 1. Porous materials such as masonry and concrete shall be cleaned by sandblasting, mechanical abrading, acid washing, or a combination of these methods, as required to provide a clean, sound surface free of laitance, coatings and loose particles. When acid washing method is used, all traces of acid shall be removed from the surface of porous materials by immediately washing with fresh water and all metal and glass in adjacent construction shall be protected from the acid. Methods used shall be compatible with sealant materials and comply with manufacturer's recommendations.
- B. Prime or seal joint surfaces where required and where recommended by sealant manufacturer. Confine primer/sealant to areas of sealant bond. Do not allow spillage or migration onto adjoining surfaces.
- C. Verify that joint backing and release tapes are compatible with sealants.
- D. Measure joint dimensions and verify that joint filler and backer materials are sized to achieve joint width/depth ratios required by sealant manufacturer.

3.03 PROJECT CONDITIONS:

- A. Do not proceed with installation of joint sealants where joint widths are less than allowed by joint sealant manufacturer for application indicated.
- B. Do not proceed with installation of joint sealants until contaminants capable of interfering with their adhesion are removed from joint substrates.
- C. Comply with manufacturer's printed instructions for sealant and sealant accessory preparation and installation, except where more stringent requirements are shown or specified or where appearance of joints is governed by the "Typical Caulk/Sealant Joints" detail found in the Drawings.
- D. Apply sealant within manufacturer's recommended temperature and humidity ranges. Exterior sealing compounds shall not be applied in damp or rainy weather nor until the surfaces of joints to be sealed have thoroughly dried from the effects of such weather. Condensation shall not be allowed to form on the joint surfaces to receive sealing compounds. Ventilation shall be provided as required to prevent the formation of condensation on such surfaces.

3.04 INSTALLATION:

- A. All interior joints shall be caulked with acrylic latex, except control joints and expansion joints in masonry wall; such joints shall be caulked with exterior type sealant. All exterior joints shall be sealed with exterior type sealant.
- B. Install bond breaker where joint backing is not used.
- C. Employ only proven installation techniques which will ensure that sealants are: deposited in uniform, continuous ribbons forced solidly into joint cavities so that full adhesion is achieved against contact faces of joint backing and joint faces; free from gaps, cracks, air pockets and foreign matter. For gun applications, select nozzle size to match joint width. **Except as otherwise indicated, finished sealant surfaces shall be struck flat no less than 1/8" below adjoining surfaces.** Where horizontal joints are between a horizontal and vertical surface, install joint to form a slight cove, so that joint will not trap moisture and dirt.
- D. Do not overheat or reheat hot-applied sealants. Discard overheated material.
- E. Install liquid-applied sealant to depths as shown, or, if not shown, as recommended by sealant manufacturer but within the following general limitations, measured at center (thin) section of beads (not applicable to sealants in lapped joints):
 - 2. For sidewalks, pavements and similar joints sealed with elastomeric sealants and subject to traffic and other abrasion and indentation exposures: fill joints to a depth equal to 75% of joint width, but neither more than 5/8" deep nor less than 3/8" deep.
 - 3. For normal moving joints sealed with elastomeric sealants but not subject to traffic, fill joints to a depth equal to 50% of joint width, but neither more than 1/2" deep nor less than 1/4" deep.

4. For joints sealed with non-elastomeric sealants and caulking compounds, fill joints to a depth in the range of 75% to 125% of joint width.
 - F. Do not allow sealants/caulks to overflow from confines of joints, to spill onto adjoining work, or to migrate into voids of exposed finishes. Clean adjoining surfaces by appropriate means necessary to eliminate evidence of spillage.
 1. Paper pressure-sensitive masking tape shall be placed on the finish surface on one or both sides of a joint cavity to protect adjacent finish surfaces from primer and sealing compound smears. Masking tape shall be removed within ten (10) minutes after the joint has been filled.
 - G. All materials that have been over-applied in exposed-to-view locations or in locations being further treated by other trades shall be neatly trimmed with a knife edge or other trimming tool.
- 3.05 JOINT SHAPE:
- A. Tooling:
 1. Provide concave joint configuration per Figure 5A in ASTM C 962, unless otherwise noted.
 - B. Tolerances:
 1. Set joint filler units at depth or position in joint as required coordinating with other work, including installation of bond breakers, backer rods and sealants. Do not leave voids or gaps between ends of joint filler units.
 2. As measured from any adjacent material face, edge, or line, tooled sealant/caulk joints shall not vary in depth by more than 1/16" in 1'-0".
 3. Exposed face of sealant/caulk shall be smooth and free of irregularities.
- 3.06 CLEANING AND ADJUSTMENT:
- C. At conclusion of caulking and when directed, clean off all excess material from adjoining surfaces and materials. Repair or replace all defaced or disfigured finishes caused by work of this section. Leave entire installation in perfect condition.
- 3.07 CURING AND PROTECTION:
- A. Cure sealants and caulking compounds in compliance with manufacturer's instructions and recommendations, to obtain high early bond strength, internal cohesive strength and surface durability.
 - B. Implement procedures required for cure and protection of joint sealers during construction period, so that they will be without deterioration or damage (other than normal wear and weathering) at time of substantial completion. Cure and protect sealants in a manner that will minimize increases in modulus of elasticity and other accelerated aging effects. Replace or restore sealants that are damaged or deteriorated during construction period.

END OF SECTION 07900

SECTION 08211 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. Provide and install interior flush wood doors and accessories as noted in the Documents, including:
 - 1. Flush wood door panels
 - 2. Door Lites
 - 3. Solid Core Wood (SC) (WD) Flush Wood Interior and Exterior Door Panels

1.02 RELATED SECTIONS:

- A. Section 06200 - Finish Carpentry: Wood door frames.
- B. Section 08710 - Door Hardware.
- C. Section 08800 - Glazing.
- D. Section 09900 - Painting: Site finishing of doors.

1.03 REFERENCES:

- A. ANSI A135.4 - Basic Hardboard.
- B. ASTM E152 - Methods of Fire Tests of Door Assemblies.
- C. ASTM E413 - Classification for Determination of Sound Transmission Class.
- D. AWI -Quality Standards of the Architectural Woodwork Institute.
- E. HPMA HP - Hardwood and Decorative Plywood.
- F. NEMA (National Electric Manufacturers Association) LD3 - High Pressure Decorative Laminates.
- G. NFPA 80 - Fire Doors and Windows.
- H. NFPA 252 - Standard Method of Fire Tests for Door Assemblies.
- I. UL 10B - Fire Tests of Door Assemblies.
- J. Warnock Hersey - Certification Listings for Fire Doors.
- K. Quality Standards:
 - 1. WDMA Industry Standard I.S. 1-A-04 (Window and Door Manufacturers Association)
 - 2. AWI Quality Standards 8th Edition, Version 2.0 2005.[OR] select AWI QCP program
 - 3. WI Manual of Millwork, 11th Edition, 2003
 - 4. ANSI A115. W Series, Wood Door Hardware Standards. (American National Standard Institute)
- L. Labeling Agencies
 - 1. Underwriters Laboratories, Inc. (UL) (Neutral pressure and positive pressure rated doors)
 - 2. Intertek Testing Services-Warnock Hersey (ITS-WH) (Ratings for both neutral and Positive pressure rated doors)

1.04 SUBMITTALS FOR REVIEW:

- A. Section 01300 - Submittals: Procedures for submittals.
- B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- C. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, special beveling, special blocking for hardware, factory machining and finishing criteria, identify cutouts for glazing louvers and other accessories. Use same reference numbers for openings as scheduled on Drawings. Submit concurrently with frame and hardware submittal.
- D. Samples: Submit two samples of door construction, 6 x 9 inches in size, cut from top corner of door. Submit two samples of door veneer, 6 x 9 inches in size illustrating wood grain, stain color, and sheen.

- E. For Renovation projects where new doors and/or hardware are required to be installed in existing frames and/or doors, verify the fit of new doors and hardware in or on the existing frames and/or doors prior to submitting Shop Drawings.
- 1.05 SUBMITTALS FOR INFORMATION:
- A. Section 01300 - Submittals: Procedures for submittals.
 - B. Manufacturer's Installation Instructions: Indicate special installation instructions.
- 1.06 QUALITY ASSURANCE:
- A. Perform work in accordance with AWI Quality Standard Section 1300, Custom Grade. Maintain one copy on site.
 - B. Finish doors in accordance with AWI Quality Standard Section 1500, grades identified in schedule.
 - C. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- 1.07 REGULATORY REQUIREMENTS:
- A. Fire Door and Panel Construction: Conform to ASTM E152 NFPA 252 UL 10B.
 - B. Installed Fire Rated Door and Transom Panel Assembly: Conform to NFPA 80 for fire rated class as scheduled.
- 1.08 DELIVERY, STORAGE, AND PROTECTION:
- A. Section 01600 - Material and Equipment: Transport, handle, store, and protect products.
 - B. Package, deliver and store doors in accordance with AWI Section 1300.
 - C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.
- 1.09 PROJECT CONDITIONS:
- A. Section 01039 - Coordination and Meetings.
 - B. Coordinate the work with door opening construction, door frame and door hardware installation.
- 1.10 WARRANTY:
- A. Section 01700 - Contract Closeout. 01740 - Warranties and Bonds.
 - B. Provide warranty to the following term:
 - 1. Life of Installation: Interior and exterior doors.
 - C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.
- 1.11 INCONSISTENCIES:
- A. In the case that a discrepancy exists between two or more stated or implied characteristics of any product, assembly, technique, and application, etc., between any one or more Sections of this Project Manual, any one or more Paragraphs of this Specification, or between the Drawings and Specifications, the Contractor's Bid amount shall reflect the most costly version or combination of the requirement(s).

PART 2 - PRODUCTS

- 2.01 MANUFACTURERS:
- A. Weyerhaeuser.
 - B. Eggers.
 - C. Poncraft.

- E. Proprietary names and/or model numbers used to designate products or materials are not intended to imply that products of named manufacturers are required to the exclusion of equivalent products of other accepted manufacturers.
 - 1. Pre-bid requests for approval of other products may be accepted in accordance with Section 00100 – Instructions to Bidders.
 - 2. Post-Bid substitutions may be accepted in accordance with Section 01600 – Product Substitutions.

2.02 DOOR PANEL TYPES:

A. Interior Doors:

- 1. Paint-grade, particleboard core door with MDO veneer, both faces.
- 2. Performance Standards: WDMA IS.1.A-2011 & AWS-09.
- 3. Core: Particleboard complying with ANSI A208.1 grade 1- LD-2 (32lb.), with supplemental blocking.
- 4. Core Assembly: Stiles and Rails bonded to core.
- 5. Top and Bottom Rails: Oversize Structural Composite Lumber (SCL).
- 6. Face Assembly / Adhesive: Face and crossbands hot-pressed to core with Type 1 adhesive.
- 7. Faces: Medium Density Overlay (MDO).
- 8. Weight: Approximately 165 lbs.

B. Exterior (Entry) Doors: Performance Standards: WDMA IS.1.A-2011 & AWS-09.

- 2. Core: Structural Composite Lumber (SCL) (38 pcf density). Core contains no added formaldehyde.
- 3. Core Assembly: Stiles and Rails bonded to core.
- 4. Top and Bottom Rails: Structural Composite Lumber (SCL).
- 5. Crossband: Engineered Wood Product.
- 6. Face Assembly / Adhesive: Face and crossbands hot-pressed to core with Type 1 adhesive.
- 7. Faces: Medium Density Overlay (MDO).
 - a. Grade: AWI, Grade A
 - b. Paint Grade
 - c. Finishing: Field Finishing by Others.

2.03 DOOR PANEL CONSTRUCTION - TYPICAL:

- A. Solid Core – (SC) (Solid, Non Rated): AWI Section 1300, Particleboard or Staved Lumber Core as typical. Other construction shall be acceptable if equal to Standards.
- B. Hollow core (HC) – non-rated construction, where noted.
- C. Vertical stiles:
 - 1. Hardwood outer stile edge, matching the face veneer.
 - 2. Min. 1-1/8" thick
 - 3. laminated for improved screw holding and split resistance.
- D. Rail edges:
 - 1. Top rail 1-1/4" min.
 - 2. Bottom rail 1-1/2" min.
 - 3. Laminated top and bottom rail.

2.04 ADHESIVE:

- A. Facing Adhesive: Type I - waterproof.

2.05 ACCESSORIES:

A. Door Lites:

- 1. Provide wood frames for glazing openings as indicated in Door Elevations.
- 2. Provide and install glazing as required by the Door Schedule and Code for particular applications.

- B. Provide removable hardwood stops to match the door specie.

2.06 FABRICATION:

- A. Fabricate non-rated doors in accordance with AWI Quality Standards requirements.
- B. Astragals for Fire Rated Double Doors: Steel, T shaped, overlapping and recessed at face edge at mid-door thickness, specifically for double doors.
- C. Sound Rating For Single Door Leaf and Frame Assembly: ASTM E413, minimum STC 35.
- D. Provide lock blocks at lock edge and top of door for closer for hardware reinforcement.
- E. Vertical Exposed Edge of Stiles: Of same species as veneer facing, for transparent finish.
- F. Fit door edge trim to edge of stiles after applying veneer facing.
- G. Bond edge banding to cores.
- H. Factory machine doors for finish hardware in accordance with hardware requirements and dimensions. Do not machine for surface hardware. Provide solid blocking for through bolted hardware.
- I. Factory fit doors for frame opening dimensions identified on shop drawings.
- J. Cut and configure exterior door edge to receive recessed weather stripping devices.
- K. Provide edge clearances in accordance with AWI 1600.

2.07 FINISH:

- A. Site finish doors in accordance with approved sample.
- B. Double-seal door top edge with color sealer to match door facing.

PART 3 - EXECUTION

3.01 EXAMINATION:

- A. Section 01039 - Coordination: Verification of existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.02 INSTALLATION:

- A. Install doors in accordance with manufacturer's instructions.
- B. Install fire rated and non rated doors in accordance with AWI Quality Standard, NFPA 80 and to Warnock Hersey requirements.
- C. Trim non-rated door width by cutting equally on both jamb edges.
- D. Trim door height by cutting bottom edges to a maximum of 3/4 inch. Trim fire door height at bottom edge only, in accordance with fire rating requirements.
- D. Machine cut for hardware.
- E. Coordinate installation of doors with installation of frames specified in Section 08112 and hardware specified in Section 08710.
- F. Coordinate installation of glass and glazing.
- G. Install door louvers plumb and level.

3.03 INSTALLATION TOLERANCES:

- A. Conform to AWI requirements for fit and clearance tolerances.
- B. Maximum Diagonal Distortion (Warp): 1/8 inch measured with straight edge or taut string, corner to corner, over an imaginary 36 x 84 inches surface area.
- B. Maximum Vertical Distortion (Bow): 1/8 inch measured with straight edge or taut string, top to bottom, over an imaginary 36 x 84 inches surface area.
- C. Maximum Width Distortion (Cup): 1/8 inch measured with straight edge or taut string, edge to edge, over an imaginary 36 x 84 inches surface area.

3.04 ADJUSTING:

- A. Section 01700 - Contract Closeout: Adjusting installed work.
- B. Adjust door for smooth and balanced door movement.

Adjust closer for full closure.

END OF SECTION 08211

SECTION 08213 – IN-SWING FRENCH DOORS

PART 1 - GENERAL

1.01 WORK/SECTION INCLUDES:

- A. Factory-primed Wood French hinged doors – In-Swing.
 - 1. Paintable
- B. This application shall have a sill/threshold that meets ADA/Barrier-Free requirements per ANSI A117.1.**

1.02 GENERAL CONDITIONS:

- A. All Drawings and general provisions of Contract, including General Conditions, Supplementary Conditions, Division 0, and Division 1 Specification sections apply to the Work of this Section.

1.03 RELATED SECTIONS:

- A. Section 07265 - Air Barriers.
- B. Section 07900 - Joint Sealants
- C. Section 08710 – Hardware Schedule

1.04 REFERENCES:

- A. American Architectural Manufacturers Association (AAMA):
 - 1. AAMA 502 - Voluntary Specification for Field Testing of Windows and Sliding Doors.
- B. American Society for Testing and Materials (ASTM):
 - 1. ASTM B 117 - Operating Salt Spray (Fog) Apparatus.
 - 2. ASTM C 1036 - Flat Glass.
 - 3. ASTM C 1048 - Heat-Treated Flat Glass – Kind HS, Kind FT Coated and Uncoated Glass.
 - 4. ASTM D 1149 - Rubber Deterioration – Surface Ozone Cracking in a Chamber.
 - 5. ASTM D 2803 - Filiform Corrosion Resistance of Organic Coatings on Metal.
 - 6. ASTM D 3656 - Insect Screening and Louver Cloth Woven from Vinyl-Coated Glass Yarns.
 - 7. ASTM D 4060 - Abrasion Resistance of Organic Coatings by the Taber Abraser.
 - 8. ASTM E 283 - Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Difference Across the Specimen.
 - 9. ASTM E 330 - Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.
 - 10. ASTM E 547 - Water Penetration of Exterior Windows, Curtain Walls and Doors by Cyclic Static Air Pressure Differential.
 - 11. ASTM G 85 - Modified Salt Spray (Fog) Testing.
- C. Window and Door Manufacturers Association (WDMA):
 - 1. ANSI/AAMA/NWWDA 101/I.S.2 - Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors.
 - 2. ANSI/AAMA/NWWDA 101/I.S.2/NAFS-02 - Voluntary Performance Specification for Windows, Skylights and Glass Doors.
 - 3. WDMA I.S.4 - Industry Standard for Water-Repellent Preservative Non-Pressure Treatment for Millwork.

1.05 SUBMITTALS:

- A. Submit under provisions of Section 01300.
- B. Comply with Division 1 requirements.
- C. Product Data: Submit manufacturer's product data, including installation instructions.
- D. Shop Drawings: Submit manufacturer's shop drawings, indicating dimensions, construction, component connections and locations, anchorage methods and locations, hardware locations, and installation details.

- E. Samples: Submit full-size or partial full-size sample of door illustrating glazing system, quality of construction, and color of finish.
- F. Warranty: Submit manufacturer's standard warranty.

1.06 PERFORMANCE REQUIREMENTS:

- A. Doors shall be Hallmark certified to a rating of LC55 specifications in accordance with ANSI/AAMA/NWDA I.S.2.
- B. Door Unit Air Leakage, ASTM E 283, 25 mph: 0.15 cfm per square foot of frame or less.
- C. Door Unit Water Penetration: No water penetration through door unit when tested in accordance with ASTM E 547, under static pressure of 30 mph after 4 cycles of 5 minutes each, with water being applied at a rate of 5 gallons per hour per square foot

1.07 QUALIFICATIONS:

- A. Applicator: Company specializing in performing the work of this Section with minimum 5 years documented experience.

1.08 DELIVERY, STORAGE, AND HANDLING:

- A. Delivery: Deliver materials to site undamaged in manufacturer's or sales branch's original, unopened containers and packaging, with labels clearly identifying manufacturer and product name. Include installation instructions.
- B. Storage: Store materials in an upright position, off ground, under cover, and protected from weather, direct sunlight, and construction activities.
- C. Handling: Protect materials and finish during handling and installation to prevent damage.

1.09 MOCKUP:

- A. Provide mockup of door system and related work under provisions of Section 01400.
- B. Mockup:
 - 1. Provide sample installation for field testing door performance requirements and to determine acceptability of door installation methods.

1.10 FIELD MEASUREMENTS:

- A. Verify that field measurements are as shown on Drawings and coordinate with shop drawings.
- B. Any modifications of dimensions, blocking or integration with surroundings required of a particular manufacturer are the responsibilities of this Contractor.
- C. Coordinate Work under provisions of Section 01039

1.11 INCONSISTENCIES:

- A. Refer to Section 00100 – Instructions to Bidders for General Contractor, Construction Manager, and/or sub contractor responsibilities pertaining to Specification inconsistencies.

PART 2 - PRODUCTS

2.01 MANUFACTURERS:

- A. Proprietary names and/or model numbers used to designate products or materials are not intended to imply that products of named manufacturers are required to exclusion of equivalent products of other accepted manufacturers. Pre-bid requests for approval of other products may be accepted in accordance with Section 00100 – Instructions to Bidders. Post-Bid substitutions may be accepted in accordance with Section 01600 – Product Substitutions.
- B. The following Material Descriptions and Qualifications are as specified by the Pella Corp. for their In-Swing, Wood French Door System.
- C. **This application shall have a sill/threshold that meets ADA/Barrier-Free requirements per ANSI A117.1.**
- D. Acceptable Manufacturers:

1. Pella Corporation, 102 Main Street, Pella, Iowa 50219. Toll Free (800) 54-PELLA. Phone (641) 621-1000. Website www.pella.com.
2. Andersen Windows
3. Marvin Windows
4. or equal

2.02 WOOD FRENCH HINGED DOORS

- A. Factory-Primed Wood In-swing French Doors: Architect Series factory-assembled wood French doors with inward swing door panels installed in frame.
- B. Frame:
 1. Select wood, water-repellent, preservative-treated with EnduraGuard® in accordance with WDMA I.S.-4. EnduraGuard includes water-repellency, three active fungicides and an insecticide applied to the frame.
 2. Exposed Surfaces: [Pine] [Mahogany] veneered and edge-banded. Curved members may have visible finger joints.
 3. Finish: [Factory-Primed] [Unfinished].
 4. Sill: [Solid-extruded aluminum with brown EnduraClad finish at sill with oak insert at threshold.] [1/2-inch low-profile extruded aluminum with [mill] [bronze anodized] [brass anodized] finish.]
 5. Overall Frame Depth: 5-7/8 inches to 8-5/16 inches.
- C. Door Panel:
 1. Select wood, water-repellent, preservative-treated with EnduraGuard™ in accordance with WDMA I.S.-4. EnduraGuard includes water-repellency, three active fungicides and an insecticide applied to the frame.
 2. Rails and Stiles: Three-ply construction. Randomly finger-jointed blocks laminated with water-resistant glue and veneered both sides.
 3. Exposed Surfaces: Pine veneered.
 4. Exterior Finish: Factory-Primed.
 5. Interior Finish: Unfinished.
 6. Corners: Urethane-sealed and secured with metal fasteners and structural adhesive.
 7. Panel Thickness: 2-1/16 inches.
- D. Weather Strip:
 1. Panel-mounted, dual-durometer extruded polymer one-piece design with welded corner.

2.03 GLAZING:

- A. Glazing:
 1. Float Glass: ASTM C 1036, Quality 1.
 - a. Tempered Glass: ASTM C 1048.
 2. Type: Urethane-glazed 13/16-inch, dual-seal, fully tempered, insulating glass, multi-layer Low-E coated with argon.

2.04 HARDWARE

- A. Handles:
 1. Solid brass on interior and exterior.
 2. Interior thumb-turn.
 3. Schlage configured "C-K" keyway pinlock cylinder on exterior.
 4. Finish: Oil-rubbed bronze. Submit for approval.
- B. Locking System:
 1. Mortised and keyed multi-point locking system.
 2. 7/8-inch center dead bolt and shoot-bolts at head and sill shall engage simultaneously.
- C. Hinges:
 1. Corrosion-resistant leaves with wear-resistant hinge bushings, stainless steel pin and decorative cap.
 2. Doors with frame heights 6' 10" and under: 3 hinges.
- D. Finish:
 1. In-Swing Doors: Match handle finish.

2.05 TOLERANCES

- A. Doors shall accommodate the following opening tolerances:
 - 1. Vertical Dimensions Between High and Low Points: Plus 1/8 inch, minus 0 inch.
 - 2. Width Dimensions: Plus 1/8 inch, minus 0 inch.
 - 3. Building Columns or Masonry Openings: Plus or minus 1/8 inch from plumb.
- B. **Door Thresholds shall meet ADA/Barrier-Free requirements.**

2.06 INSTALLATION ACCESSORIES

- A. Flashing/Sealant Tape: Pella SmartFlash.
 - 1. Aluminum-foil-backed butyl window and door flashing tape.
 - 2. Maximum Total Thickness: 0.013 inch.
 - 3. UV resistant.
 - 4. Verify sealant compatibility with sealant manufacturer.
- B. Insulating-Foam Sealant: Dow Great Stuff Window & Door.
 - 1. Low-pressure, polyurethane window and door insulating-foam sealant.

PART 3 - EXECUTION

3.01 EXAMINATION:

- A. Verify substrate conditions under provisions of Section 01039.
- B. Verify that conditions are acceptable and are ready to receive work.
- C. Examine areas to receive doors. Notify Architect of conditions that would adversely affect installation or subsequent use. Do not proceed with installation until unsatisfactory conditions are corrected. Verify:
 - 1. True to line and dimension.

3.02 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions and approved shop drawings.
- B. Install doors to be weather-tight and freely operating.
- C. Maintain alignment with adjacent work.
- D. Secure assembly to framed openings, plumb and square, without distortion.
- E. Integrate door system installation with exterior water-resistant barrier using flashing/sealant tape. Apply and integrate flashing/sealant tape with water-resistant barrier using watershed principles in accordance with door manufacturer's instructions.
- F. Place interior seal around door perimeter to maintain continuity of building thermal and air barrier using insulating-foam sealant.
- G. Seal door to exterior wall cladding with sealant and related backing materials at perimeter of assembly.
- H. Leave doors closed.

3.03 CLEANING

- A. Clean door frames and glass in accordance with Division 1 requirements.
- B. Do not use harsh cleaning materials or methods that would damage finish.
- C. Remove labels and visible markings.

3.04 PROTECTION

- A. Protect installed doors to ensure that, except for normal weathering, doors will be without damage or deterioration at time of substantial completion.
- B. Protect finished Work under provisions of Section 01500.
- A. Do not permit applied work to damage adjacent surfaces.

END OF SECTION 08213

008710 HARDWARE SCHEDULE

<u>SET NUMBER</u>	<u>HARDWARE</u>
<u>SET #1</u>	
Closer Balance – Existing Hardware	DORMA 8600
<u>SET #2</u>	
Hinges Cylinder Lock Kickplates Wall Stop	IVES 1020 S40D Both sides
<u>SET #3</u>	
Hinges Cylinder Lock Wall Stop	IVES 1020 S80PD
<u>SET #4</u>	
As Supplied by Manufacturer – Coordinate all hardware supplied with Architect Threshold	Meets ADA/BF
<u>SET #5</u>	
Latch Passage Flush Bolts & Catch Balance – Existing Hardware	S170 S10D @ Top Frame w/ catch
<u>SET #6</u>	
Hinges Passage Closer Kickplates	IVES 1020 S10D DORMA 8600 Both sides
<u>SET #7</u>	
Hinges Cylinder Lock Closer Kickplates Threshold	IVES 1020 S51PD DORMA 8600 Both sides Pemko 2005_T - Meets ADA/BF
<u>SET #8</u>	
Threshold Weatherstripping Balance – Existing Hardware	Pemko 2005_T - Meets ADA/BF Coordinate with Existing Door/Frame

END OF SECTION 08710

SECTION 08712 - DOOR HARDWARE

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. All Drawings and general provisions of Contract, including General Conditions, Supplementary Conditions, Division 0, and Division 1 Specification sections apply to the Work of this Section.
- B. Hardware for wood doors.
- C. Metal thresholds.
- D. Gasketing
- E. Accessory equipment and hardware

1.02 WORK FURNISHED BUT INSTALLED UNDER OTHER SECTIONS:

- A. Furnish templates to Sections 08110 and 08210 for door and frame preparation.
- B. Furnish cylinders and other hardware noted to Sections 08410 for factory installation on aluminum doors.
- C. Furnish all items of Finish Hardware specified, scheduled, shown or required herein except those items specifically excluded from this section of the specification.

1.03 RELATED SECTIONS:

- A. Drawings and general provisions of the contract, including general, supplementary and special conditions and division 1 specification sections apply to the work of this section.
- B. Section 06100 – Rough Carpentry.
- C. Section 06200 – Finish Carpentry: Installation of finish hardware.
- D. Section 08210 – Wood doors.
- E. Section 08111 - Steel Door and Frames.
- F. Section 08210 - Wood Doors.
- G. Section 08410 - Aluminum Entrances and Storefronts: Hardware for same, except cylinders.
- H. Division 16 - Electrical: Electrical connection from fire alarm and smoke detection system to activate door closers.

1.04 REFERENCES:

- A. ANSI A117.1 - Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.
- B. ANSI/NFPA 80 - Fire Doors and Windows.
- C. AWI - Architectural Woodwork Institute.
- D. BHMA - Builder's Hardware Manufacturers Association.
- E. DHI - Door and Hardware Institute.
- F. NAAMM - National Association of Architectural Metal Manufacturer.
- G. NFPA 101 - Life Safety Code.
- H. SDI - Steel Door Institute.
- I. UL - Underwriter's Laboratories Product Listings.

1.05 COORDINATION:

- A. Coordinate work of this section with other directly affected sections involving manufacturer and installer of any internal reinforcement for door hardware.
- B. Before hardware installation, general contractor/construction manager shall request a hardware installation seminar be conducted on the installation of hardware; specifically of locksets, closers, exit devices, overhead stops and coordinators. Manufacturer's representatives of the above products to present seminar. Seminar to be held at job site and attended by installers of hardware for aluminum, hollow metal and wood doors. Seminar to address proper coordination and installation of hardware, per finish hardware schedule for

this specific project by using installation manuals, hardware schedule, templates, physical product samples and installation video's.

1. Convene one week prior to commencing work of this Section.
2. Coordinate with section 01039

1.06 QUALITY ASSURANCE:

- A. Manufacturers: Companies specializing in manufacturing door hardware with minimum five years documented experience.
- B. Hardware Supplier: Company specializing in supplying commercial door hardware with three years documented experience on projects of similar scope.
- C. Hardware Supplier Personnel: Employ a qualified person to assist in the work of this section.
- D. Furnish finish hardware to comply with the requirements of laws, codes, ordinances, and regulations of the governmental authorities having jurisdiction where such requirements exceed the requirements of the Specifications.
- E. Provide textured surface on the exterior door lever, pull or other operating hardware of doors that lead to hazardous areas (areas that might be dangerous to a blind person) Ex. Loading platforms, boiler rooms, stages and the like.

1.07 REGULATORY REQUIREMENTS:

- A. Conform to applicable codes for requirements applicable to fire rated doors and frames. Furnish finish hardware to comply with the requirements of laws, codes, ordinances, and regulations of applicable regulatory agencies, where such requirements exceed the requirements of this section.
- B. Conform to applicable barrier free codes.
- C. Conform to the applicable sections of Chapter 5 of NFPA 101.
- D. Furnish finish hardware to comply with the requirements of the regulations for public building accommodations for physically handicapped persons of the governmental authority having jurisdiction and to comply with Americans with Disabilities Act.
- E. Provide hardware for fire-rated openings in compliance with NFPA 80 and local building code requirements. Provide only hardware which has been tested and listed by UL for types and sizes of doors required and complies with requirements of door and door frame labels.
- F. Where emergency exit devices are required on fire-rated doors that carry supplementary marking on the doors UL labels indicating "fire door to be equipped with fire exit hardware," provide UL label on exit devices indicating "Fire Exit Hardware".
- G. Inform architect of any conflict between regulatory agency requirements and specified hardware.

1.08 CERTIFICATIONS:

- A. Architectural hardware consultant shall inspect complete installation and certify that hardware and installation has been furnished and installed in accordance with manufacturer's instructions and as specified herein.
- B. Provide two copies of certifications to architect.

1.09 SUBMITTALS:

- A. General: Submit per Section 01300 – Submittals.
- B. Shop Drawings: Submit shop drawings that indicate locations, handing, mounting heights, reinforcement locations, and fastener locations of each type of hardware and accessory. Provide schedule of door hardware using same reference numbers for openings as those as shown on drawings.
- C. Product Data: Provide product data on specified hardware.
- D. Samples: Submit samples of hinges, latchsets, and other hardware items as requested by architect, illustrating style, color and finish.
- E. Samples: Accepted samples may be incorporated into the work.
- F. Manufacturer's Maintenance and Installation Data: Submit manufacturer's parts lists, templates, and installation instructions, including preparatory work and sequencing.

- G. Certificates: Submit manufacturer's certificate under provisions of Section 01400 that hardware meets or exceeds specified requirements.
- H. Include the Following:
 - 1. Preface sheet listing category only and manufacturer's names of items being furnished as follows:

CATEGORY	SPECIFIED	SCHEDULED
Hinges	Manufacturer A	Manufacturer B
Lock sets	Manufacturer X	Manufacturer X
Kick Plates	Open	Manufacturer Z

- 2. Hardware Locations: Refer to Article 3.1 B.2 Locations.
 - 3. Opening Description: Single or pair, number, room locations, hand, active leaf, degree of swing, size, door material, frame material, and UL listing.
 - 4. Hardware Description: Quantity, category, product number, fasteners, and finish.
 - 5. Headings that refer to the specified Hardware Set Numbers.
 - 6. Scheduling Sequence shown in Hardware Sets.
 - 7. Product data of each hardware item, and shop drawings where required, for special conditions and specialty hardware.
 - 8. Riser drawings, wiring drawings and system operation description.
 - 9. "Vertical" scheduling format only. "Horizontal" schedules will be returned "Not Approved."
 - 10. Typed Copy.
 - 11. Double Spacing.
 - 12. 8-1/2 x 11 inch sheets
 - 13. U.S. Standard finish symbols or BHMA Finish symbols.
 - I. Key Schedule:
 - 1. Submit detailed schedule indicating clearly how the Owner's final keying instructions have been followed.
 - 2. Submit as an integral part of finish hardware schedule or as a separate keying schedule.
- 1.10 OPERATION AND MAINTENANCE DATA:
- A. Submit operation and maintenance data under provisions of Section 01700.
 - B. Include data on operating hardware, lubrication requirements and inspection procedures related to preventative maintenance.
- 1.11 DELIVERY, STORAGE, AND HANDLING:
- A. Deliver products to site under provisions of Section 01600.
 - B. Store and protect products under provisions of Section 01600.
 - C. Package hardware items individually, label and identify package with door opening code to match hardware schedule.
 - D. Deliver keys to owner by security shipment direct from hardware supplier.
 - E. Protect hardware from theft by cataloging and storing in secure area.
- 1.12 WARRANTY:
- A. Provide ten-year warranty on general door hardware under provisions of Section 01700.
 - B. Provide ten-year warranty on door closers under provisions of Section 01700.
 - C. Warranty: Include coverage of general and miscellaneous hardware items.
- 1.13 EXTRA STOCK:
- A. Provide ten extra key lock cylinders for each master keyed group under provisions of Section 01700.
- 1.14 MAINTENANCE MATERIALS:

- A. Provide special wrenches and tools applicable to each different or special hardware component.
- B. Provide maintenance tools and accessories supplied by hardware component manufacturer.

1.15 INCONSISTENCIES:

- A. Refer to Section 00100 – Instructions to Bidders for General Contractor, Construction Manager, and/or sub contractor responsibilities pertaining to Specification inconsistencies.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS:

- A. Hinges: Hager, Lawrence, McKinney, Soss, Stanley.
- B. Latch Sets: Schlage, Corbin, Russwin.
- C. Flush Bolts: Glynn-Johnson.
- D. Push/Pulls: Any member of B.H.M.A.
- E. Cylinder Locks: Best, or to match existing.
- F. Closers ('Swing Free' arm type): LCN, Russwin.
- G. Gasketing: National Guard, Reese, Pemko.
- H. Protection Plates: Any member of B.H.M.A.
- I. Floor and Wall Stops: Any member of B.H.M.A.
- J. Thresholds, Sweeps and Astragals: Reese, National Guard Pemko.
- K. Substitutions: Under provisions of section 01600.

2.02 PRODUCTS:

- A. Furnish each category with the products of only one manufacturer unless specified otherwise; this requirement is mandatory whether various manufacturers are listed or not.
- B. Provide the products of manufacturer designated or if more than one manufacturer is listed, the comparable product of one of the other manufacturers listed. Where only one manufacturer or product is listed, it is understood that this is the owner's Building Standard and "no substitution" is allowed.

2.03 SELECTIONS:

- A. Hinges:
 - 1. Unless specified otherwise in sets furnish hinges of class and size as follows:
 - 2. Furnish 3-1/2 x 3-1/2 inches (residential)
 - 3. 1-1/2 pair per panel
 - 4. Numbers used are Ives 1020-square cornered
 - 5. Equal products of Stanley, McKinney and Hager are acceptable.
- B. Locksets and Passage Sets – Series 4000, Grade 2 Cylindrical Type:
 - 1. Locks are to have a standard 2-3/8" - 2-3/4" backset.
 - 2. Interchangeable core: 6-pin, C keyway
 - 3. Function numbers are Schlage S series with Neptune lever trim.
- C. Flush Bolts:
 - 1. Manual – wood and metal doors:
 - a. IR-Ives 265 Series
 - b. Equal product of any B.H.M.A. member.
 - 2. Dust Proof Strikes - furnish with all flush bolts, except at openings having thresholds:
 - a. IR-Ives DP2
 - b. Equal product of any B.H.M.A. member.
- D. Closers:
 - 1. Spring power shall be continuously adjustable over the full range of closer sizes, and allow for reduced opening force for the physically handicapped. Hydraulic regulation shall be by tamper-proof, non-critical valves. Closers shall have separate adjustment for latch speed, general speed, and backcheck.

2. Closers will have Powder coating finish certified to exceed 100 hours salt spray testing by ETL, an independent testing laboratory used by BHMA for ANSI certification.
3. Refer to door and frame details and furnish accessories such as drop plates, panel adapters, spacers and supports as required to correctly install door closers. State degree of door swing in the hardware schedule.
4. **Similar in function and performance (surface mounted) to:**
 - a. Dorma 8600 series or equal
- E. Kickplates:
 1. Furnish .050 inches thick 12" high x door width less 1-1/2" at single doors, and less 1" at pairs. Where glass or louvers prevent this height, supply with height equal to height of bottom rail less 2". Length 7 5/16" LDW at rod/latch guards.
 2. Kickplates shall be drilled and counter sunk for oval head, counter sunk screws. Pan head not acceptable.
 - a. Any B.H.M.A. manufacturing product meeting above is acceptable.
- F. Wall Stops:
 1. Length to exceed projection of all other hardware. Provide with anchors as required of wall construction.
 - a. Products specified in sets are Ives - WS33.
 - b. B.H.M.A. L12011 or L12021. Length to exceed projection of all other hardware.
- G. Wall Bumpers:
 1. Products specified in sets are Ives WS407CCV
 - a. Equal products of any BHMA manufacturer
- H. Thresholds:
 1. 1/2" (max) high - 5" +/- wide. Cope at jambs.
 2. **Thresholds shall meet ADA/Barrier-Free requirements – ANSI A117.1.**
 3. Furnish full wall opening width when frames are recessed.
 4. Cope in front of mullions if thresholds project beyond door faces.
 5. Furnish with non-ferrous Stainless Steel Screws.
 - a. Pemko 2005_T
 - b. National Guard
 - c. or equal
- I. Weather-stripping
 1. Apply to head and jamb stops.
 2. Solid Bar stock all sides
 - a. National Guard as listed in sets
 - b. Equal by Pemko or Reese
- J. Fasteners:
 1. Furnish fasteners of the proper type, size, quantity, and finish. Use machine screws and expansion shields for attaching hardware to concrete or masonry, and wall grip inserts at hollow wall construction. Supply sex bolts for closers at lead-lined or UL listed wood doors only. Supply sex bolts when U.L. listing of wood doors requires them. Furnish machine screws for attachment to reinforced hollow metal doors and frames and reinforced aluminum doors and frames. Furnish full thread wood screws for attachment to solid wood doors and frames. "TEK" type screws are not acceptable.

2.04 FINISHES:

- A. Finishes: Generally, Oiled Bronze US10B, unless otherwise identified in schedule at end of this section.

2.05 TEMPLATES AND HARDWARE LOCATION:

- A. Furnish hardware made to template. Supply required templates and hardware locations to the door and frame manufacturers.
- B. Furnish metal template to frame/door supplier for continuous hinge.
- C. Refer to Article 3.1 B.2, Locations, and coordinate with templates.

2.06 KEYING:

- A. All cylinders for this project will be supplied by one supplier regardless of door type and location.
- B. The Finish Hardware supplier will meet with Architect and/or Owner to finalize keying requirements and obtain keying instructions in writing.
 - 1. Supplier shall include the cost of this service in his proposal.
- C. Provide a cylinder for all hardware components capable of being locked.

PART 3 - EXECUTION

1.01 INSPECTION:

- A. Verify that doors and frames are ready to receive work and dimensions are as indicated on shop drawings.
- B. Beginning of installation means acceptance of existing conditions.

1.02 INSTALLATION:

- A. Install hardware in accordance with manufacturer's instructions and to template dimensions.
- B. Use the templates provided by hardware item manufacturer.
- C. Mounting heights for hardware from finished floor to center line of hardware item:
 - 1. Hinges: Door manufacturer's standard
 - 2. Flush Bolt Levers: 72" and 12".
 - 3. Surface Bolt Knobs: 72" and 12".
 - 4. Deadlatch Cylinders: 43".
 - 5. Pull Units: 42" pull portion
 - 6. Push Units: 52".
 - 7. Locksets and Latchsets: Door manufacturer's standard.
 - 8. Panic Devices: Manufacturer's templates.
- D. Conform to ANSI A117.1 and applicable local or state barrier free codes for hardware positioning requirements for the handicapped.
- E. Final Adjustment:
 - 1. Provide the services of a representative to inspect material furnished and its installation and adjustment, to make final hardware adjustment, and to instruct the Owner's personnel in adjustment, care and maintenance of hardware.
 - 2. Locksets, closers and exit devices shall be inspected by the factory representative and adjusted after installation and after the HVAC system is in operation, to insure correct installation and proper adjustment in operation. The manufacturer's representative shall prepare a written report stating compliance, and also recording locations and kinds of noncompliance. The original report shall be forwarded to the Architect with copies to the Contractor, hardware distributor, hardware installer and building owner.

1.03 SCHEDULE:

See Section 08710 for Hardware Schedule.

END OF SECTION 08712

SECTION 08800 - GLASS AND GLAZING

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK:

- A. Furnishing all materials, labor and equipment to provide and install glass and glazing as shown on the Drawings, Schedules and specified herein.
 - 1. Definitions: "Glass" includes both primary and fabricated glass products as described in FMGA "Glazing Manual" and, for this project, extend to opaque infill panels to be glazed into window frames. "Glazing" includes glass installation and materials used to install glass.
- B. Types of work in this section include glass and glazing for:
 - 1. Entrances and other doors not indicated as preglazed.
 - 2. Other windows not indicated as preglazed.
- C. This section provides requirements for glass and glazing for factory preglazed doors and windows.

1.02 RELATED DOCUMENTS:

- A. All Drawings and general provisions of Contract, including General Conditions, Supplementary Conditions, Division 0, and Division 1 Specification sections apply to the Work of this Section.
- B. Coordinate with Drawings and Code requirements for locations of glass/glazing required to be fire-rated.

1.03 RELATED WORK SPECIFIED ELSEWHERE:

- A. Section 09900 - Painting

1.04 SYSTEM PERFORMANCE:

- A. Provide glass and glazing that has been produced, fabricated and installed to withstand normal temperature changes, wind loading, impact loading (where applicable), without failure including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glass and glazing materials, and other defects in the work.
- B. Glass Design: thickness designations are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites in the thickness designations indicated for various size openings, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:
 - 1. Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:
 - a. Specified Design Wind Loads: not less than wind loads applicable to Project as required by ASCE 7 "Minimum Design Loads for Building and Other Structures": Section 6.0 'wind loads'.
 - b. Maximum Lateral Deflection: for the following types of glass supported on all 4 edges, provide thickness required that limits center deflection at design wind pressure to 1/50 times the short side length or 1 inch, whichever is less.
 - 1) For monolithic-glass lites heat treated to resist wind loads.
 - 2) For insulating glass.
 - 3) For laminated-glass lites.
- C. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change in ambient and surface temperatures acting on glass framing members and glazing components.

1.05 REFERENCE STANDARDS:

- A. Products and materials shall comply with the following standards:

1. FS DD-G-1403B - Glass, Plate, Sheet, Figured and Spandrel (Heat Strengthened and Fully Tempered).
2. FS DD-M-411 - Mirror Glass.
3. SIGMA No. 65-7-2 - Specification for Sealed Insulating Glass Units.
4. ANSI Z97.1 - for Safety Glazing Material.
5. ASTM E-546 - Test for Frost Point of Sealed Insulating Glass Units.
6. ASTM D-576 - Test for Dew/Frost Point of Sealed Insulating Glass Units.
7. UL Building Materials Directory Classification (KCMZ) for Glazing of Fire Rated Doors and Windows.
8. **Safety Glass:** Product must comply with CPSC16 CFR1201 Cat. I or II, as required, and ANSI Z97.1. Most Fire-rated glazing is also required to conform to Safety Glass requirements.

1.06 QUALITY ASSURANCE:

- A. Glazing Standards: Comply with recommendations of Flat Glass Marketing Association (FMGA) "Glazing Manual" and "Sealant Manual" except where more stringent requirements are indicated. Refer to those publications for definitions of glass and glazing terms not otherwise defined in this section or other referenced standards.
- B. Safety Glazing Standard: Where safety glass is indicated or required by authorities having jurisdiction, provide type of products indicated which comply with ANSI Z97.1 and testing requirements of 16 CFR Part 1201 for category II materials.
- C. All materials and glazing shall comply with Federal, State and Local Regulations, Codes, and Ordinances; the more stringent requirements shall govern.
- D. Fire-Resistance-Rated Wire Glass: Where indicated and allowed by Code, provide wire glass products that are identical to those tested per ASTM E 163 (UL 9) are and listed by UL or other testing and inspecting agency acceptable to authorities having jurisdiction.
- E. Insulating Glass Certification Program: Subject to compliance with requirements, provide insulating glazing units permanently marked either on spacers or on at least one component pane of units with appropriate certification label of inspecting and testing organization indicated below.
 1. Insulating Glass Certification Council (IGCC).
 2. Associated Laboratories, Inc. (ALI).
- F. Opaque Infill Panels: Laminating to be done by a manufacturer with not less than twenty-five (25) years experience.
- G. Single Source Responsibility: Provide materials obtained from one source for each type of glass and glazing product indicated.

1.07 SUBMITTALS:

- A. General: Submit per Section 01300 – Submittals.
- B. Product Data: Submit manufacturer's technical data for each glazing material and fabricated glass product required, including installation and maintenance instructions.
- C. Samples: Submit, for verification purposes, two 12" square samples of each type of glass and panel product indicated except for clear single pane units, and 12" long samples of each color required (except black) for each type of sealant or gasket exposed to view.
- D. Certification: Submit certificates from respective manufacturers attesting that glass and glazing materials furnished for project comply with requirements.
 1. Separate certification will not be required for glazing materials bearing manufacturer's permanent labels designating type and thickness of glass, provided labels represent a quality control program involving a recognized certification agency or independent testing laboratory acceptable to authorities having jurisdiction.
- E. Test Reports: Submit sealant-substrate adhesion and sealant compatibility test reports, including glazing sealant manufacturer's findings and recommendations.

1.08 PRODUCT DELIVERY, STORAGE AND HANDLING:

- A. Deliver glass materials in perfect condition. Glazing compounds and sealants shall be in manufacturer's unopened, labeled containers.
- B. All glass materials and glass products shall be stored in the dry, under cover, and on wood blocking. Store and handle materials to comply with manufacturer's directions and as required to prevent edge damage to glass, and damage to glass and glazing materials from effects of moisture including condensation, of temperature changes, of direct exposure to sun, and from other causes.
- C. Store opaque infill panels horizontally in a flat dry area and protect against exposure to rain and other forms of moisture.

1.09 PROJECT CONDITIONS:

- A. Environmental Conditions: Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing material manufacturer or when joint substrates are wet due to rain, frost, condensation or other causes. Install glazing sealants only when temperatures are in middle third of manufacturer's recommended installation temperature range.

1.10 INCONSISTENCIES:

- A. In the case that a discrepancy exists between two or more stated or implied characteristics of any product, assembly, technique, and application, etc., between any one or more Sections of this Project Manual, any one or more Paragraphs of this Specification, or between the Drawings and Specifications, the Contractor's Bid amount shall reflect the most costly version or combination of the requirement(s).

PART 2 - PRODUCTS

2.01 MANUFACTURERS, GENERAL:

- A. Proprietary names and/or model numbers used to designate products or materials are not intended to imply that products of named manufacturers are required to exclusion of equivalent products of other accepted manufacturers.
- B. Pre-bid requests for approval of other products may be accepted in accordance with Section 00100 – Instructions to Bidders.
- C. Post-Bid substitutions may be accepted in accordance with Section 01600 – Product Substitutions.

2.02 GLASS PRODUCTS, GENERAL:

- A. All primary glass, fabricated glass products and opaque infill panels shall be new, up to grade requirements and free of bubbles and other imperfections. Each piece of glass shall bear the manufacturer's label, indicating quality and grade. Labels shall remain intact until final acceptance and cleaning, unless otherwise recommended by manufacturer. All glass must comply with all regulating codes.
- B. Sizes: Fabricate glass, fabricated glass products and opaque infill panels to sizes required for glazing openings indicated, with edge clearances and tolerances complying with recommendations of glass manufacturer. Perform field measurements to determine sizes for existing openings. Provide thicknesses indicated or, if not otherwise indicated, as recommended by glass manufacturer for application indicated.

2.03 PRIMARY GLASS MATERIALS:

A. GENERAL GLASS MATERIAL:

- 1. Typical Float Glass (transparent flat glass): Shall be clear, 1/4" thick; and shall meet or exceed ASTM C1036, Quality-Q3.
- 2. Acceptable Manufacturers: Subject to compliance with requirements, provide products from one of the following manufacturers for each type of glass required by the Project.
 - a. PPG Industries Inc.

- b. LOF, Libbey-Owens-Ford Co.
- c. Guardian Industries Corp.
- d. Viracon

B. SAFETY GLASS MATERIALS:

1. **Safety Glazing Standard** - Where safety glass is indicated or required by authorities having jurisdiction, provide type of products indicated which comply with material testing requirements of 16 CFR Part 1201 for Category I or II – as required, and ANSI Z97.1. Category I shall be allowed for glazing of less than 9 SF (1,296 SI) per lite - as allowed by CPSC 16 CFR 1201 chart. All other Safety Glazing shall meet Category II. **Wired glass will only be allowed if specifically noted in the Schedule or elsewhere in these Documents.**
2. Tempered Glass: Clear, 1/4" tempered; shall meet or exceed ASTM C1048. Acceptable Manufacturers: Subject to compliance with requirements, provide products from one of the following for each type:
 - 1) Guardian Industries Corp.
 - 2) Temp Glass, 1-800-537-4064
 - 3) Viracon

2.04 GLAZING SEALANTS:

- A. General: Comply with recommendations of sealant and glass manufacturers for selection of glazing sealants which have performance characteristics suitable for applications indicated and conditions at time of installation.
- B. Compatibility: Select sealants with proven compatibility with surfaces contacted in the installation and under service conditions indicated, as demonstrated by testing and field experience.
- C. Colors: Provide color of exposed sealants indicated or, if not otherwise indicated, as selected by Architect from manufacturer's standard colors.
- D. Silicone Glazing Sealant: Single component elastomeric silicone sealant complying with FS TT-S 001543, Class A, nonsag; and with ASTM C 920, Type S, Grade NS, Class 25, Use G and, as applicable to use indicated, Uses A and O; and with the following requirements:
 1. Low-Modulus Glazing Sealant: Manufacturer's standard low-modulus non-acid curing sealant that can withstand an increase and decrease of 50% of joint width as measured at time of application when tested per ASTM C 719.
 2. High-Modulus Silicone Glazing Sealant: Manufacturer's standard high-modulus acid-curing sealant.
- E. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following.
 1. Low-Modulus Silicon Glazing Sealants:
 - a. Dow Corning Corp.
 - b. General Electric.
 - c. Perrenator.
 - d. Woodmont Products, Inc.
 2. Acrylic Glazing Sealants:
 - a. Tremco.
 5. Preformed Butyl-Polyisobutylene Glazing Tape:
 - a. Tremco.

2.05 MISCELLANEOUS GLAZING MATERIALS:

- A. Compatibility: Provide materials with proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Type recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Neoprene, EPDM or silicone blocks as required for compatibility with glazing sealants, 80 to 90 Shore A durometer hardness.

- D. Spacers: Neoprene, EPDM or silicone blocks, or continuous extrusions, as required for compatibility with glazing sealant, of size, shape and hardness recommended by glass and sealant manufacturers for application indicated.
- E. Edge Blocks: Neoprene, EPDM or silicone blocks as required for compatibility with glazing sealant, of size and hardness required to limit lateral movement (side-walking) of glass.
- F. Compressible Filler Rods: Closed-cell or waterproof jacketed rod stock of synthetic rubber or plastic foam, flexible and resilient, with 5-10 psi compression strength for 25% deflection.

PART 3 - EXECUTION

3.01 INSPECTION:

- A. Require Glazier to inspect work of glass framing erector for compliance with manufacturing and installation tolerances, including those for size, squareness, offsets at corners; for presence and functioning of weep system; for existence of minimum required face or edge clearances; and for effective sealing of joinery. Obtain Glazier's written report listing conditions detrimental to performance of glazing work. Do not allow glazing work to proceed until unsatisfactory conditions have been corrected.

3.02 PREPARATION:

- A. Clean glazing channels and other framing members to receive glass, immediately before glazing. Remove coatings that are not firmly bonded to substrates. Remove lacquer from metal surfaces where elastomeric sealants are indicated for use.

3.03 GLAZING, GENERAL:

- A. Comply with combined printed recommendations of glass manufacturers, of manufacturers of sealants, gaskets and other glazing materials, except where more stringent requirements are indicated, including those of referenced glazing standards. Glazing performed at temperatures below 40 degrees F. shall be done in accordance with manufacturer's recommendations.
- B. Glazing channel dimensions as indicated in details are intended to provide for necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by job conditions at time of installation.
- C. Protect glass from edge damage during handling and installation; use a rolling block in rotating glass units to prevent damage to glass corners. Do not impact glass with metal framing. Use suction cups to shift glass units within openings; do not raise or drift glass with a pry bar. Rotate glass with flares or bevels along one horizontal edge that would occur in vicinity of setting blocks so that these are located at top of opening. Remove from project and dispose of glass units with edge damage or other imperfections of kind that, when installed, weakens glass and impairs performance and appearance.
- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by pre-construction sealant-substrate testing.

3.04 GLAZING:

- A. Install setting blocks of proper size in sill rabbet, located one quarter of glass width from each corner, but no closer than 6", unless otherwise required. Set blocks in thin course of sealant that is acceptable for heel bead use.
- B. Provide spacers inside and out, of correct size and spacing to preserve required face clearances, for glass sizes larger than 50 united inches, except where gaskets or glazing tapes with continuous spacer rods are used for glazing. Provide 1/8" minimum bite of spacers on glass and use thickness equal to sealant width, except with sealant tape use thickness slightly less than final compressed thickness of tape.
- C. Provide edge blocking to comply with requirements of referenced glazing standard, except where otherwise required by glass unit manufacturer.

- D. Set units of glass in each series with uniformity of pattern, draw, bow and similar characteristics.
- E. Provide compressible filler rods or equivalent back-up material, as recommended by sealant and glass manufacturers, to prevent sealant from extruding into glass channel weep systems and from adhering to joints back- surface as well as to control depth of sealant for optimum performance, unless otherwise indicated.
- F. Force sealants into glazing channels to eliminate voids and to ensure complete "wetting" or bond of sealant to glass and channel surfaces.
- G. Tool exposed surfaces of sealants to provide a substantial "wash" way from glass. Install pressurized tapes and gaskets to protrude slightly out of channel, so as to eliminate dirt and moisture pockets.

3.05 PROTECTION AND CLEANING:

- A. Protect exterior glass from breakage immediately upon installation by use of crossed streamers attached to framing and held away from glass. Do not apply markers to surfaces of glass. Remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove immediately by method recommended by glass manufacturer.
- C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less often than once a month, for build-up of dirt, scum, alkali deposits or staining. When examination reveals presence of these forms of residue, remove by method recommended by glass manufacturer.
- D. Remove and replace glass which is broken, chipped, cracked, abraded or damaged in other ways during construction period, including damage by natural causes, accident and vandalism.
- E. Wash glass on both faces not more than four days prior to date scheduled for inspections intended to establish date of substantial completion in each area of project. Wash glass by method recommended by glass manufacturer.
- F. Replace any insulated glass that shows fogging in the first two years.

END OF SECTION - 08800

SECTION 09250 - GYPSUM DRYWALL SYSTEM

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK:

- A.** Furnishing and installing all labor, materials and equipment necessary for a complete installation of each type of gypsum board assembly with accessories as shown on the Drawings and/or Finish Schedules, and specified herein.
- B. Work includes but is not limited to:**
 - 1. Rated walls and/or ceilings at demising walls as indicated on Documents.
 - 2. Ceiling suspension and/or framing systems.
 - 3. Selective demolition, reworking, and/or provision of new light gage metal framing, plaster, and gypsum board materials wherever the installation of new hollow metal frames is scheduled in existing light gage metal-framed walls with drywall or plaster finish. At a minimum, this work shall include removal of existing framing and gypsum board (or plaster), a new light gage metal header, new light gage metal jamb framing, and new wall finish to match existing, for a seamless installation. Refer to Drawings for locations.
 - 4. Patching of gaps in gypsum board finishes and feathering-in drywall compounds where new work abuts existing and/or when drawings require partial demo of existing.
 - 5. Plaster patching as required.
 - 6. Blocking for wall-hung components by others, including but not limited to wall cabinets, and for the upper support of floor-mount components by others, including but not limited to full-height cabinets.
- C. Design system to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.**

1.02 RELATED WORK SPECIFIED ELSEWHERE:

- A. Section 05400 – Cold-formed Metal Framing
- B. Section 06100 – Rough Framing
- C. Section 07200 - Insulation.
- D. Section 07900 – Joint Sealers
- E. Section 09900 - Painting.
- F. Divisions 15 & 16

1.03 QUALITY ASSURANCE:

- A. Where work is indicated for fire resistance ratings, including those required to comply with governing regulations, provide materials and installations identical with applicable assemblies that have been tested and listed by recognized authorities, including UL.
- B. Comply with applicable requirements of GA 203 - Installation of Screw-Type Steel Framing Members to Receive Gypsum Board.
- C. Comply with applicable requirements of GA-216 "Application and Finishing of Gypsum Board" by the Gypsum Association, except where more stringent requirements are recommended by the manufacturer.
- D. Steel studs, runners and furring channels shall comply with the requirements of ASTM Specification C-645-08, C-channel, roll-formed from hot-dipped galvanized steel; complying with ASTM A1003 and ASTM A653 G40 or equivalent corrosion resistant coating.
- E. Installation of steel framing members for gypsum wallboard shall comply with the requirements of ASTM Specification C-754.
- F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanize) or zinc-iron alloy-coated (galvanized) by the Hot-Dip Process.
- G. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members.
- H. ASTM C754 - Installation of Steel Framing Members to Receive Screw-Attached Gypsum Wallboard, Backing Board, or Water-Resistant Backing Board.
- I. ASTM C847 - Standard Specification for Metal Lath.

- J. ASTM C1002- Standard Specification Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
- K. ASTM A1003/A1003M –Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members.
- L. ASTM C1047 – Standard Specification for Accessories for Gypsum Wallboard and Gypsum veneer Base (Drywall and Veneer Trims).
- M. ASTM C1063- Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster.
- N. ASTM C1396 - Standard Specification for Gypsum Board
- O. Apply acoustical sealant in accordance with requirements of ASTM C919.

1.04 SUBMITTALS:

- A. Submit under provisions of Section 01300
- B. Product Data: Submit product data describing standard framing member materials and finish, product criteria, load charts, limitations, and other pertinent information as requested by architect.
- C. Shop Drawings: Indicate component details, framed openings, bearing/hanging conditions, anchorage, loading, welds, type and location of fasteners, and accessories or items required of related work. Include layout drawings where unusual conditions occur. A Michigan Professional Engineer shall seal shop drawings and calculations.
- D. Provide calculations for loadings and stresses of specially fabricated framing and connections under the Professional Structural Engineer's seal. All sizes shall be assessed per the deflection criteria per Section 2.02 – System Description above and coordinated to the Construction Documents.
- E. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and connections.

1.05 DELIVERY, STORAGE AND HANDLING:

- A. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover, off the ground or in a manner to keep them dry, protected from weather, direct sunlight, surface contamination, corrosion and damage from construction traffic and other causes. Neatly stack gypsum boards flat to prevent sagging. Disperse stacks of gypsum board to prevent overloading of structural system.
- C. Handle gypsum boards to prevent damage to edges, ends or surfaces. Protect metal corner beads and trim from being bent or damaged.
- D. Damages or deteriorated materials shall be removed from the site and replaced with items of acceptable quality, without cost to the Owner.
- E. Steel framing and related accessories shall be stored and handled in accordance with the A.I.S.I. "Code of Standard Practice."

1.06 PROJECT CONDITIONS:

- A. Environmental Requirements, General: Comply with requirements of referenced gypsum board application standards and recommendations of gypsum board manufacturer for environmental conditions before, during, and after application of gypsum board.
- B. Cold Weather Protection: When ambient outdoor temperatures are below 55 degrees F., maintain continuous, uniform, comfortable building working temperatures of not less than 55 degrees F. for a minimum period of 48 hours prior to during, and following application of gypsum board and joint treatment materials or bonding of adhesives.
- C. Ventilation: Ventilate building spaces as required to remove water in excess of that required for drying of joint treatment material immediately after its application. Avoid drafts during dry, hot weather to prevent too rapid drying.

1.07 INCONSISTENCIES:

- A. In the case that a discrepancy exists between two or more stated or implied characteristics of any product, assembly, technique, and application, etc., between any one or more Sections of this Project Manual, any one or more Paragraphs of this Specification, or between the Drawings and Specifications, the Contractor's Bid amount shall reflect the most costly version or combination of the requirement(s).

1.08 SYSTEM REQUIREMENTS:

- A. Design system to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.
- B. Provide gypsum board shaft-wall assemblies capable of withstanding the full air-pressure loads indicated for maximum heights of partitions without failing and while maintaining an airtight and smoke-tight seal.
- C. Refer to Section 3.06 for final appearance performance required of specific locations.
- D. Performance Requirements:
 - 1. Gypsum Board Partitions: Standard partitions – maximum deflection of 1/240 of partition height. Partitions to receive water resistant gypsum board or backer board – maximum deflection of 1/360 of partition height.
 - 2. Cavity shaftwall systems – withstand minimum positive and negative pressure of 5 psf.
 - 3. Interior suspended ceiling and soffits – maximum deflection of 1/360 of distance between supports.
- E. Acoustical Ratings: Where sound ratings are indicate, provide materials and application procedures identical to those tested by manufacturer to achieve Sound Transmission Class (STC) scheduled or indicated in accordance with ASTM E90.

PART 2 - PRODUCTS

2.01 GYPSUM BOARD SYSTEM PRODUCTS:

- A. Available Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Metal Stud and Related Materials
 - a. Dale Industries, Inc.
 - b. Deitrich Metal Framing
 - c. Gold Bond Building Products Division
 - d. Milcor Division
 - e. Clark Steel Framing Systems.
 - f. United States Gypsum Company
 - g. Unimast, Inc.
 - h. National Gypsum Co.
 - i. Or Architect approved substitution.
 - 2. Gypsum Board and Related Products
 - a. Georgia Pacific Corp.
 - b. National Gypsum Co.,
 - c. Gold Bond Building Products
 - d. United States Gypsum Company, USG Corp.
 - e. Or Architect approved substitution.

2.02 METAL PARTITION MATERIALS:

- A. General: Sizes and gage of framing members shall comply with requirements of ASTM C754 unless otherwise indicated.
 - 1. Maximum deflections shall be L/240 at 5 psf. loading.
 - 3. Water resistant gypsum board or cement backer board partitions shall have a maximum deflection of 1/360.

4. Metal components shall comply with ASTM C645 roll-formed from hot-dipped galvanized steel; complying with ASTM A1003 and ASTM A653 G40 or equivalent corrosion resistant coating.
- B. Framing System Components – steel studs and runners: ASTM C645. Studs: Non-load bearing rolled steel, channel shaped, punched for utility access, 25 gage minimum thickness - unless otherwise indicated or required.
 1. Standard depth shall be 3-1/2" or 3-5/8". Other depths shall be provided as required by assemblies and details.
 2. All shapes shall be galvanized.
 3. Provide 20 gage studs for applications receiving cement backer boards.
 4. Runners: Of same material and finish as studs, bent leg retainer notched to receive studs with provision for crimp locking to stud. Provide ceiling runners with extended legs for ceiling deflection conditions.
- C. Headers and Jambs: Manufacturer's proprietary shape used to form header beams and jambs, columns or posts, of web depths indicated, unpunched, with stiffened flanges and as follows:
 1. [Heavy Duty Studs – HDS] and [Header Bracket – HDSC]
 2. or equal from approved manufacturer.
- D. Furring and Bracing Members: Hat shaped, 'ZEE' – for insulation applications, and other shapes, of same material and finish as studs, thickness to suit purpose. Conform to ASTM C645, GA-216 and GA-600.
- E. Channel Bridging and Bracing: U-Channel Assembly; Base metal thickness of .0538 inch and minimum 1/2 inch wide flanges. Subject to compliance with requirements, provide one of the following:
 1. Dietrich Metal Framing: Spazzer® 9200 Bridging and Bracing Bar
 2. or equal
- F. U-Channel Assembly: [3/4 inches] [1-1/2 inches] [2 inches]
- G. Deflection Track Slotted: Manufacturer's single, deep-leg, U-shaped steel track: punched with vertical slots in both legs. Steel Sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
- H. Fasteners: GA 203, Self-drilling, self-tapping screws of type recommended by stud manufacturer.
- I. Metal Backing: 20 gauge thick steel for reinforcement of studs at installation of wall-mounted accessories. **Coordinate with Interior Elevations or Furniture layouts for misc. equipment to be mounted on partitions.**
 1. Minimum width of backing shall be 8".
 2. Coordinate exact width requirements with other Documents.
- J. Acoustic Sealant: As specified in Section 07900 – Joint Sealant.
- K. Primer: FSTT-P-645, for touch-up of galvanized surfaces.

2.03 GYPSUM BOARD PRODUCTS:

- A. General: Gypsum board shall conform to Federal Specification SS-L-30D; ASTM C1393/C1396M-06 of type as specified hereinafter for each type of board. Wallboard shall be in maximum practicable length to minimize end joints (with no horizontal joints permitted in vertically installed boards, unless wall height exceeds 14'-0"), as follows:
 1. Gypsum Board shall be 1/2" and 5/8" thick, unless otherwise indicated.
 2. Long edges: tapered.
- B. Gypsum core wall panel surfaced with face paper on front and a liner paper on back.
 1. Provide fire rated type "FIRECODE C" or "type 'x'", 1/2" or 5/8" thick (as required by UL system), by USG, or approved equal, and where indicated on Drawings and Schedules.
- B. Regular gypsum board:
 1. **Acceptable Uses: Regular Drywall products shall be used only in concealed applications, such as above ceilings and as the first layer of drywall in a multi-layer**

application. See Drawings for conditions where more than one payer of gypsum board is required.

2. Long edges: tapered.
3. Gypsum core wall panel surfaced with face paper on front and a liner paper on back.
4. Provide fire rated type "FIRECODE C" or "type 'x'", 1/2" or 5/8" thick (as required by UL system), by USG, or approved equal, and where indicated on Drawings and Schedules.
5. Flexible gypsum panels 3/8" thick, shall be used to fit curves without wetting provided the total thickness of the gypsum board components complies with Details found in the Drawings.

2.04 TRIM ACCESSORIES:

- A. General: Manufacturer's standard galvanized steel beaded units with flanges for concealment in joint compound, including corner beads, edge trim and control joints. Exposed visible flanges will not be acceptable. Non-corrosive fasteners shall be used for exterior and wet-interior applications.
- B. Installations shall follow manufacturer's recommendations of spacing and application for the material used.
- C. The following materials are as referenced to USG and should be the basis for approval of equals.
 1. External Corner Bead shall be all metal type, equal to a USG DUR-A-BEAD Corner Bead #103 with 1-1/4" wide flanges punched for nailing; designed for concealment of wings by finishing treatment.
 2. Trim shall be all metal type, equal to US Gypsum's #200A 'J-trim' and/or #200B 'L-trim', punched for nailing, designed for concealment of wings by finishing treatment. Install at locations of terminus of gypsum board surfaces.
 3. Use US Gypsum's 400 series trim for gypsum board terminations to dissimilar materials that may have differential movement or expansion. This material should also be used for exterior installations of soffits and fascia applications.
 4. Use US Gypsum's control joint #093 for typical expansion/control joints (max. spacing – 30 feet on center). Refer to US Gypsum Co.'s handbook for installations in rated assemblies.
 5. Backer-supports: 6" wide x 20" (or as required) x 20 gauge minimum; fastened to studs.
 6. For installations where partition terminates to dissimilar material or to existing construction use a P-1 vinyl trim (with fins) or #200 J-trim with sealant.

2.05 JOINT TREATMENT MATERIALS

- A. General: ASTM C-475, type recommended by the manufacturer for the application indicated, except as otherwise indicated.
- B. Joint Tape: Provide Perf-A-Tape Reinforcing Tape by USG or equal, centered over all joints and internal corners.
- C. Joint Compound: ready-mixed vinyl type for interior use. Provide 2 separate grades; one specifically for bedding tapes and filling depressions, and one for topping and sanding as recommended and distributed by gypsum panel manufacturer.
- D. Joint compound for tile: cementitious compound per manufacturer.

2.06 MISCELLANEOUS MATERIALS

- A. General: Provide auxiliary materials for gypsum drywall work of the type and grade recommended by the manufacturer of the gypsum board.
- B. Gypsum Board Fasteners:
 1. Comply with GA-216 for screw type installation. Screws shall be Type "S" bugle-head in length as required, power driven. Provide fasteners of appropriate material for cement board installation in wet areas.
- C. Metal Framing Fasteners:
 1. Power driven screws - ASTM C 954, for fastening panels to metal framing.
 2. Pre-drilled expansion bolts – size as required for loads and base material.

3. Beam clamps or other mechanical type of attachment – as required of the specific condition.
- D. Acoustical Sealant shall be one of the following:
 1. Tremco Manufacturing Company, "Tremco Acoustical Sealant."
 2. United States Gypsum Company, "USG Acoustical Sealant."
 3. Or Architect approved substitution.

PART 3 - EXECUTION

3.01 GENERAL:

- A. Refer to Architectural, Mechanical, and Electrical Drawings for components located in ceilings. Account for labor, materials, and coordination for all such components.

3.02 INSPECTION:

- A. Installer must examine conditions under which the work of this section shall be performed prior to installation and shall notify Contractor immediately in writing of conditions detrimental to proper and timely execution of gypsum drywall work.
- B. Installer shall not proceed with installation until unsatisfactory conditions have been corrected.
- C. Beginning of installation means Installer accepts existing conditions.

3.03 INSTALLATION OF METAL STUDS AND ACCESSORIES:

- A. Install stud framing per ASTM C754 for partition height and for thickness of assemblies, except where exceeded by other requirements.
- B. Provide cross-bracing at all doors/windows/openings to adjacent walls or to underside of floor above.
- C. Partitions: Extend studs to 6" min. above suspended ceiling height or to underside of floor or roof construction above, as indicated on the Documents.
 1. Anchor all studs adjacent to door frames, partition intersections, and corners to deck runner flanges with a special fastener tool. Securely anchor studs to jamb and head anchor clips of door or borrowed light frames by bolt or screw attachment. Over hollow metal doors and borrowed-light frames by bolt or screw attachment. Over hollow metal doors and borrowed-light frames, place a section of runner track horizontally with a web-flange bent at each end. Fasten with one positive attachment per flange. At the location of vertical joints over the door-frame header, position a cut-to-length stud extending to the upper runner.
 2. Install studs vertically at spacing as detailed on drawings, or at 16" o.c. minimum if not otherwise indicated. Place two beads of acoustic sealant between studs and adjacent vertical surfaces. **Provide fire-rated sealant where fire-rated walls are indicated.** Achieve air seal between studs and adjacent vertical surfaces to provide specified wall sound transmission coefficient (STC) rating.
 3. Stud splicing is not permitted.
 4. Maximum Variation from True Position: 1/8 inch. Maximum Variation of any Member from Plane: 1/16 inch.
 5. Coordinate with installation of sound batts for all sound attenuation partitions. This may occur in the stud space or above the partition in the ceiling space. Coordinate with Details.
 6. Blocking: Install blocking for support of plumbing fixtures, toilet partitions, architectural casework, toilet accessories, finish hardware, and all other miscellaneous wall mounted accessories.
 7. Refer to drawings for details of partitions extending to ceiling only and for partitions extending through ceiling to structure above. Provide slip type joint under structural building members to avoid deflection transfer to studs, while maintaining specified wall fire or sound rating. Provide extended leg ceiling runners where detailed or required.

8. Do not bridge building control and expansion joints with steel framing. Frame both sides of joints independently.
 9. Install steel framing and furring members so fastening surfaces vary not more than 1/8" from the plane formed by the faces of adjacent framing.
- D. Blocking and bracing: Install blocking and bracing as recommended by manufacturer of particular equipment.
1. Coordinate required framing/blocking for all overhead braced equipment and installations – in particular, toilet partitions.

3.04 INSTALLATION OF GYPSUM BOARD:

- A. In addition to compliance with ASTM C840 and GA-216, comply with manufacturer's instructions and requirements of fire resistance ratings whichever is most stringent. Comply with requirements of ANSI A108.11 and manufacturer's recommendations for cement board installation.
- B. Install ceiling boards prior to wall/partition boards and in the direction and manner that will minimize the number of end-butt joints and which will avoid end joints in the central area of each ceiling. Stagger end joints at least 1'-0". Butt panels with not more than 1/16" of open space between panels.
- C. Where indicated or required, install acoustical insulation prior to installation of gypsum board.
- D. Install wall/partition boards horizontally using maximum length sheets available so as to minimize end-butt joints. Install boards with end joints staggered over studs. Form control and expansion joints with space between edges of adjoining gypsum panels.
- E. Where recommended by manufacturer, install gypsum board with "floating" internal corner construction.
- F. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members using resilient channels, or provide control joints to counteract wood shrinkage.
- G. Space fasteners in gypsum boards in accordance with GA-216 and manufacturer's recommendations. Fasten with screws. Space fasteners for cement board in wet locations in accordance with manufacturer's recommendations.
- H. Where partitions intersect mechanical equipment, joists or other structural members, cut gypsum panels to fit profile of interference; allow 1/4" to 3/8" wide joints and install sealant/firecaulk where required.
- I. Isolate perimeter of non-load-bearing gypsum board partitions at structural abutments, except floors. Provide 1/4" to 1/2" wide spaces at these locations, and trim edges with appropriate trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- J. Partitions, soffits or other assemblies within occupant reach or with painted or vinyl finishes shall be constructed to meet L/240 deflection criteria.
- K. Partitions, or assemblies where the final finish is a rigid veneer, such as plaster, skim coat, tile or stone shall be constructed to meet L/360 deflection criteria.
- L. Partitions, unexposed to the occupant, shall meet L/120 deflection criteria.
- M. Provide gypsum board 'control joints' as required by GA-216, best practices and at:
 1. a maximum of 30' o/c for walls.
 2. a maximum of 50' o/c for ceiling planes.
 3. at transitions with large, 'open areas' in wall construction. Coordinate with the Architect in the field for exact locations.
 4. at less than 30' o/c where required by complicated details or large areas of gypsum construction.
 5. where indicated in the Contract Documents

3.05 INSTALLATION OF DRYWALL TRIM ACCESSORIES:

- A. Use same fasteners to anchor trim accessory flanges as required to fasten gypsum board to supports or fasten flanges by nailing or stapling in accordance with manufacturer's instructions and recommendations.

- B. Install metal corner beads at external corners of drywall work.
- C. Install metal edge trim whenever edge of gypsum board would otherwise be exposed. Provide type with face flange to receive joint compound. Install 'L-type' trim where work is tightly abutted to other work. Install 'J-type' trim where edge is exposed.

3.06 INSTALLATION OF DRYWALL FINISHING

- A. Apply joint treatment at gypsum board joints, both directions, internal angles, flanges of trim accessories, penetrations, fastener heads, surface defects and elsewhere as required to prepare work for decoration. Pre-fill open joints using type of compound recommended by manufacturer.
- B. Apply joint compound in 3 coats (not including pre-fill of openings in base), and feather out onto panel faces. Sand between all coats and after last coat.
- C. Prior to field-applied painting, gypsum drywall surfaces shall be smooth, dense, free of surface defects including (but not limited to) gouges, scrapes, nail or screw "pops". Joints shall be fully treated as to be invisible
- D. Finish wallboard to "Levels of Drywall Finish" as noted in GA-214-90 Level of Gypsum Board Finish and as follows for typical applications:

Level 0

Level 0 is used only in temporary construction or if final decoration is undetermined. No taping or finishing is required.

Level 1

Level 1 finish is recommended in areas that would generally be concealed from view. All joints and interior angles shall have tape set in joint compound. Tape need not be covered with joint compound to fulfill the requirements of Level 1. In Level 1, the surface is left free of excess joint compound. Ridges and tool marks are acceptable for a Level 1 finish. This level is often specified in the plenum area above ceilings, in attics, or in service corridors.

Level 2

Level 2 shall be used where surfaces are concealed to view or where specifically permitted by name in the Drawings. As an example, Level 2 is allowed where moisture-resistant gypsum board is used as a tile substrate. All joints and interior angles shall have tape embedded in joint compound and wiped with a joint knife leaving a thin coating of joint compound over all joints and interior angles. Joint compound is applied over all fastener heads and beads. Joint compound applied over the body of the tape at the time of tape embedment shall be considered a separate coat of joint compound and shall satisfy the conditions of this level. The surface is left free of excess joint compound. Ridges and tool marks are acceptable for a Level 2 finish.

Level 3

In areas to be decorated with a medium or heavy texture or where heavy-grade wall coverings will become the final decoration, a Level 3 finish is allowed. All joints and interior angles have tape embedded in joint compound and one additional coat of joint compound applied over all joints and interior angles. Fastener heads and accessories shall be covered with two separate coats of joint compound. All joint compounds shall be smooth and free from tool marks and ridges. Before final decoration it is recommended that the prepared surface be coated with a drywall primer prior to the application of final finishes. Level 3 is not recommended where smooth painted surfaces or light- to medium-weight wall coverings become the final decoration. Coordinate all finishes of Level 3 with the Architect.

Level 4

Level 4 is the typical "standard" for most construction. All joints and interior angles have tape embedded in joint compound and two separate coats of joint compound applied over all flat joints and one separate coat of joint compound applied over interior angles. Fastener heads and accessories shall be covered with three separate coats of joint compound. All joint compounds shall be smooth and free from tool marks and ridges. Before final decoration it is recommended that the prepared surface be coated

with a drywall primer prior to the application of final finishes. Gloss, semi-gloss and enamel paints are not recommended over a Level 4 finish.

3.07 'REFINISHING' EXISTING GYPSUM BOARD SURFACES

- A. 'Refinished' Gypsum Board (existing walls to receive new finish to meet new construction):
1. Thoroughly remove existing level 1 finish, including tape, from existing gypsum board and other adjacent surfaces / materials, including all adjacent structural steel elements.
 2. Carefully trim and remove any and all existing gypsum board which does not neatly follow the contours of the existing structure at the roof and/or columns (any perimeter condition).
 3. Carefully trim and remove any and all existing gypsum board whose surface protrudes more than 1/8" from the generally accepted wall plane it is part of.
 4. Carefully trim and remove any and all existing gypsum board which will not permit the installation of new tear-away trim noted below.
 5. Provide new gypsum board patching (materials to match existing) in order to provide complete coverage on wall up to and against existing perimeter conditions.
 6. Provide new flat tear-away PVC gypsum board trim against all non-gypsum board perimeter conditions.
 7. Apply new level 4 finish.

END OF SECTION 09250

SECTION 09650 - RESILIENT FLOORING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to the work of this section.

1.02 DESCRIPTION OF WORK:

- A. Furnishing and installing all labor, materials and equipment necessary for a complete installation of each type of resilient flooring material and accessories as shown on the Drawings and Finish Schedules and specified herein.
- B. Work of this section includes welded seams. See Drawings.
- C. Work of this section includes integral or flash coving of sheet vinyl tile. See Drawings.

1.03 RELATED WORK SPECIFIED ELSEWHERE:

- A. Section 03300 - Concrete Work. All new slabs to receive resilient floor finish shall have a vapor barrier installed directly under the concrete.
- B. Section 12350 – Premanufactured Casework

1.04 EXISTING CONDITIONS:

- A. The Contractor and Installer for the work of this Section shall be responsible for becoming intimately familiar with existing conditions and substrates in areas to receive new resilient floor finishes.
- B. The Contractor and Installer for the work of this Section shall be responsible for making a thorough evaluation of worn and otherwise compromised substrates in order to implement proper stabilization and preparation measures, and to ensure sound a sound substrate, full bonding of new materials to existing and overall satisfactory installation of resilient flooring finishes.

1.05 QUALITY ASSURANCE:

- A. All resilient flooring and finish materials shall contain no asbestos.
- B. Manufacturer: Provide each type of resilient flooring and accessories as produced by a single manufacturer, including recommended primers, adhesives, sealants, and leveling compounds.
- C. Flooring Contractor Qualifications: Firm with not less than five (5) years of experience in projects comparable to work of this section.
- D. Flooring Installer Qualifications: Firm and crew with not less than five (5) years of experience in installation of flooring materials of type, quantity and installation methods comparable to work of this section.
 - 1. Installer firm and installation crew shall have documented experience with sheet vinyl integral or flash coving technique. Installer firm shall provide documentation of successful integral or flash coving work and project references at Architect's request.
- E. If required, provide resilient flooring material to meet the following fire test performance criteria as tested by a recognized independent testing laboratory:
 - 1. ASTM E 648 Critical Radiant Flux of 0.45 watts per sq. cm. or greater, Class I.
 - 2. ASTM E 662 (Smoke Generation) Maximum Specific Optical Density of 450 or less.

1.06 SUBMITTALS:

- A. Product Data: Submit manufacturer's technical data for each type of resilient flooring and accessory.
 - 1. Submit material safety data sheets on all materials and guarantee in writing that all materials used to not contain asbestos.
- B. Submit 3 sets of samples of each type, color and pattern of resilient flooring and accessories required. Include full range of flooring color and pattern variation.

- C. Maintenance Data: Submit 2 copies of manufacturer's recommended maintenance practices for each type of resilient flooring and accessory required.

1.07 EXTRA STOCK:

- A. Deliver stock of maintenance material to Owner in quantity not less than one box for each 50 boxes or fraction thereof, for each type, color, pattern and size of tile installed. Maintenance materials to be from same manufactured lot as materials installed, and enclosed in protective packaging with appropriate identifying label.

1.08 PROJECT CONDITIONS:

- A. Installation of resilient flooring should not begin until the work of all other trades has been completed, especially overhead trades. Areas to receive flooring shall be clean, fully enclosed and weathertight.
- B. Continuously heat areas to receive resilient flooring to a minimum of 68 degrees F. for at least 72 hours prior to installation. Room temperature will be maintained at a minimum of 68 degrees F. and a maximum of 100 degrees F. continuously during and after installation as recommended by flooring manufacturer, but for not less than 72 hours. Maintain minimum temperature as recommended by flooring manufacturer thereafter.
- C. Protect all materials from direct flow of heat from hot-air registers, radiators or other heating fixtures and appliances.
- D. Areas to receive flooring shall be adequately lighted to allow for proper inspection of the substrate, installation and seaming of the flooring for final inspection.

1.09 DELIVERY, STORAGE AND HANDLING:

- A. Deliver materials to job site in original unopened packaging with all labels intact.
- B. Store all rolled sheet materials vertically, labels up and ensure that the color, roll and batch numbers can be easily read.
- C. Boxed tile materials shall be stacked no more than five (5) boxes high.
- D. Store materials in a fully enclosed, weathertight area, and maintain at a uniform temperature of at least 68 degrees F. for 72 hours before, during and after installation.
- E. Sheet materials must always be stored and transported rolled face out on a heavy tube.

1.10 WARRANTY:

- A. Provide special product "installation" warranty signed by Contractor, installer and flooring manufacturer, agreeing to repair or replace defective materials and workmanship of all resilient flooring work during a 1-year warranty period following substantial completion. Attach copies of product warranties.

1.11 INCONSISTENCIES:

- A. In the case that a discrepancy exists between two or more stated or implied characteristics of any product, assembly, technique, and application, etc., between any one or more Sections of this Project Manual, any one or more Paragraphs of this Specification, or between the Drawings and Specifications, the Contractor's Bid amount shall reflect the most costly version or combination of the requirement(s).

PART 2 - PRODUCTS

2.01 GENERAL:

- A. Proprietary names and/or model numbers used to designate products or materials are not intended to imply that products of named manufacturers are required to exclusion of equivalent products of other accepted manufacturers.
- B. Pre-bid requests for approval of other products may be accepted in accordance with Section 00100 – Instructions to Bidders.

- C. Post-Bid substitutions may be accepted in accordance with Section 01600 – Product Substitutions.

2.02 VINYL COMPOSITION FLOOR TILE:

- A. Vinyl Composition Floor Tile: Products complying with ASTM F1066, Class 2.
- B. Standard Excelon Imperial Texture (Armstrong).
 - 1. Size: 12" x 12"
 - 2. Gauge: 1/8"
 - 3. Fire Test Data:
 - a. ASTM E 648 - Critical Radiant Flux: 0.45 watts/cm² or more, Class I
 - b. ASTM E 662 - Smoke Density: 450 or less.
 - d. ASTM F 970 - Static Load Limit: 75 psi.
- C. Acceptable Manufacturers: Subject to compliance with requirements, provide products of one of the following:
 - 1. Armstrong World Industries, Commercial Flooring, "Standard Excelon," Imperial Texture.
 - 2. Kentile
 - 3. or Architect approved substitution.
- D. Colors: To be selected by Architect from manufacturer's full range.

2.03 VINYL WALL BASE:

- A. Vinyl Wall Base: Products complying with Federal Specification SS-W-40a, Type II, Class 1, Styles B (cove). Provide matching end stops and preformed or molded corner units.
 - 1. Height: 4", see Finish Schedule for locations
 - 2. Thickness: 1/8" gauge
 - 3. Style: Standard bottom cove, unless otherwise indicated on Drawings
 - 4. Finish: Matte.
 - 5. Fire Test Data:
 - a. ASTM E 648 - Critical Radiant Flux: 0.45 watts/cm² or more, Class I
 - b. ASTM E 662 - Smoke Density: 450 or less.
- B. Acceptable Manufacturer: Subject to compliance with requirements, provide products of one of the following:
 - 1. Armstrong World Industries, Inc.
 - 2. Johnsonite, Division of Duramax, Inc.
 - 3. Roppe Corp.
 - 4. or Architect approved substitution.
- C. Colors: To be selected by Architect from manufacturer's full range.

2.04 ACCESSORIES:

- A. Metal Transition Strips: Extruded aluminum with mill finish, butt type for concealed anchorage. Of width shown and of required thickness to protect exposed edge of resilient flooring. **Provide a transition strip at each door way.** Provide units of maximum available length, to minimize number of joints. Shall have a minimum of 2-inch wide anchorage flange.
 - 1. Acceptable Manufacturers:
 - a. Schlüter-SCHIENE-E by Schlüter Systems, 800-472-4588.
 - b. or equal
 - 2. Select size according to floor tile thickness.
 - 3. Install in strict accordance with manufacturer's recommendations.
- C. Concrete Slab Primer: Non-staining type only as recommended by flooring manufacturer for each type of flooring.
- D. Adhesives: For each type of resilient flooring material, installer must provide flooring manufacturer's recommended adhesive ONLY. No substitutions will be allowed.
- E. Epoxy Stair Nose Filler: For each type of resilient stair nosing or stair tread with integral nosing, install must provide manufacturer's recommended filler ONLY. No substitutions will be allowed.

- F. Patching/Leveling Compounds: As approved by each flooring manufacturer for each flooring type for each substrate type.
 - 1. Calcium sulfate, plaster or gypsum patching/leveling compounds will not be accepted.
 - 2. Provide self-leveling epoxy patching compound for repair of worn terrazzo stair treads, or alternative patching material to achieve a level, smooth, hard and permanent patch.

PART 3 - EXECUTION

3.01 INSPECTION:

- A. Inspect all flooring materials under provisions of Division 1 to ensure they are free from defects that would preclude their use on this Project.
- B. Installer shall inspect subfloor/substrate surfaces to determine that they are satisfactory. A satisfactory subfloor is one that is smooth, rigid, cured, permanently dry, without surface blemishes and free from foreign matter. Foreign matter includes, but is not limited to, dust, paint, grease, oils, solvents, curing and hardening compounds, sealers, asphalt, old adhesive residue and other substances preventing adhesive bond and impairing performance or appearance.
- C. Perform adhesive bond, moisture and pH tests on concrete subfloors prior to installation to determine if surfaces are sufficiently cured and dry as well as to ascertain the presence of curing compounds.
- D. Do not allow resilient flooring work to proceed until subfloor surfaces are satisfactory.
- E. Beginning of installation means Installer accepts existing surfaces and conditions.

3.02 PREPARATION

- A. Concrete Subfloors:
 - 1. Use a portland cement patching/leveling compound with a liquid latex binder compatible with flooring adhesive to repair any cracks, holes, trowel marks or other substrate defects.
 - a. If patching/leveling compound is found not to be bonding tightly to the subfloor or if resilient flooring is found not to be bonding tightly to the patching/leveling compound during the guarantee period, the Contractor shall remove such loose patching/leveling compound and resilient flooring, and prepare the surfaces in whatever way necessary and reinstall patching/leveling compound and resilient flooring. Contractor shall guarantee such patched areas for a time period equal to original guarantee period. This work shall be done at no additional cost to the Owner.
 - 2. Grind smooth and flush any ridges or high spots in concrete subfloors.
 - 3. Remove any coatings or foreign substances from subfloor surfaces that would prevent adhesive bond and impair resilient flooring performance.
 - 4. If subfloor surface is dusty or chalky, sweep the surface and seal with one coat of primer as recommended by the flooring and adhesive manufacturers.
 - 5. Broom clean or vacuum surfaces to be covered and inspect subfloor.
- B. General provisions for preparing concrete subfloors apply to preparation of any subfloor.
- C. Where flooring/finish materials of different thicknesses meet in a seam (no transition trim), subfloor/substrate preparation shall include modifications to achieve a smooth and flush joint between dissimilar materials.
- D. Where installations are located over existing floor substrates, Installer shall evaluate and prepare substrates in strict accordance with resilient flooring manufacturer's recommendations. Resilient flooring Contractor shall be responsible for ensuring proper preparation and satisfactory installation of new flooring materials over existing subfloors and substrates.
- E. For areas to receive new resilient floor finishes and requiring new subfloor construction, the resilient flooring Contractor and Installer shall coordinate with the trades responsible for those subfloors to ensure that their work meets all flooring manufacturer's requirements.

3.03 INSTALLATION:

A. General:

1. Install resilient flooring and accessories in strict accordance with flooring manufacturer's recommendations for types of materials, project conditions and direct glue down installation. Installer shall confirm compatibility of all specified adhesives with flooring and base materials.
2. Butt tightly to vertical surfaces, thresholds, nosings and edgings. Scribe around obstructions. Extend flooring into closets, toe spaces, door reveals and similar openings.
3. Tightly cement to subbase/subfloor without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface imperfections. Hand roll resilient flooring at perimeter of each covered area to assure adhesion.
4. Fit and apply all material in a neat and workmanlike manner, cut and scribed to adjoining work with joints as inconspicuous as practicable. Cut neat openings for items penetrating the flooring. Leave all surfaces smooth, straight and free from buckles and waves.
 - a. Broken, cracked, chipped, or deformed materials are not acceptable.
 - b. Place a bead of caulk tinted to match wall, along edges of flooring if no cove base is used. Caulk type and grade shall be appropriate for use at specific location. Bead shall be neat, continuous and unobtrusive.
5. Maintain reference markers, holes or openings that are in place or plainly marked for future cutting by repeating on finish flooring as marked on subfloor. Use chalk or other non-permanent and non-injurious marking device.

B. Resilient Tile Installation:

1. Unless otherwise indicated, lay tile following chalk lines based on center marks established on principal walls, discounting minor offsets, so that tile at opposite edges of a room are of equal width. Adjust as necessary to avoid use of cut widths less than 1/2 tile at room perimeter. Lay tiles square to room axis, unless otherwise indicated on Drawings.
 - a. After adhesive is properly set, install the tile along chalk lines, laying field tile first and then fitting in border tile.
 - b. Lay tile in "checkerboard" fashion with grain reversed in adjacent tiles, unless otherwise indicated.
2. When using tile from two or more cartons, check to be sure all pattern and lot numbers are the same to ensure proper color match.
3. Remove adhesive on the face of tiles using methods recommended by the adhesive and flooring manufacturers.

C. Vinyl Base:

1. Apply wall base to all walls, curbs and built-in fixtures around columns, pilasters and piers, and into all recesses and returns of the rooms or parts in which it occurs, unless otherwise shown. Tightly bond base to substrate over full length of each piece.
2. Install base in lengths as long as practicable. Neatly form base to follow all curved surfaces and shapes of the finished wall or other construction. Install preformed one-piece exterior corners at all exterior corners. Miter or cope interior corners if preformed pieces are not available.
3. On masonry surfaces or other similar irregular substrates, fill voids along top edge of wall base with manufacturer's recommended adhesive filler material.
4. Verify that gypsum board and plaster walls have been finished to within 1/4" of the floor and that a smooth surface is provided for application of wall base.

D. Accessories:

1. Install metal edge strips and other transition devices where indicated, and properly sequence installation with installation of resilient flooring. Use countersunk stainless steel screws.
2. Install vinyl edge strips at all locations indicated in the Drawings and Schedules, or if not indicated, at all doorways and locations where a change in flooring type occurs. Butt tight to flooring and secure with adhesive. Provide at all exposed edges of flooring.

3.04 CLEAN-UP -- GENERAL:

- A. Upon completion of the installation, the Installer shall remove all waste and excess material, all tools and equipment and shall carefully and thoroughly sweep the entire floor surface with a dust mop to the Owner's satisfaction.
- B. All usable pieces of tile not necessary to complete the work shall be left on the job site in an orderly manner in an area designated by the Owner.

3.05 CLEANING AND PROTECTION:

- A. Immediately upon completion of resilient flooring installation clean flooring in strict accordance with manufacturer's recommendations.
 - 1. Do not wash floor until time period recommended by resilient flooring manufacturer has elapsed to allow resilient flooring to become well sealed in adhesive.
 - 2. Remove all excess adhesive or other surface blemishes, using neutral type cleaners as recommended by flooring manufacturer. Cover to protect installed flooring from damage.
- B. Protect flooring against damage during construction period and comply with resilient flooring manufacturer's directions.
 - 1. After cleaning, apply protective polish or other coating as recommended by flooring manufacturer for each type of flooring.
 - 2. Protect resilient flooring against damage from rolling loads for initial period following installation by covering with plywood or hardboard. Use dollies to move stationary equipment or furnishings across floors.
 - 3. Cover resilient flooring with undyed, untreated building paper until inspection for substantial completion.
- C. Clean resilient flooring not more than four (4) days prior to date scheduled for inspections intended to establish date of substantial completion in each area of project using flooring manufacturer's recommended method for each type of flooring.
 - 1. Strip protective floor polish (applied immediately after installation) prior to cleaning; work in strict compliance with flooring manufacturer's instructions for each type of flooring
 - 2. Reapply polish or coating and buff, with type of polish or coating, number of coats and buffing procedures in strict compliance with flooring manufacturer's instructions for each type of flooring.

3.06 REPLACEMENT OF IMPROPER WORK:

- A. Readjust and/or replace any and all improper work and materials within twelve (12) months after final acceptance and project sign off at no additional cost to the Owner.

END OF SECTION 09650

SECTION 09900 - PAINTING

PART 1 - GENERAL

1.01 **WORK INCLUDED:**

- A. General: The terms "finishing", "paint" or "painting" as used in the Drawings and this Section are general terms which shall, by definition, include surface preparations required of all finishes, and the application of fillers, sealers, primers, stains, paints, and/or finishes and varnishes.
- B. Preparation of all surfaces and materials to receive finish.
- C. Painting and/or staining and finishing of all surfaces indicated on the Room Finish Schedule, Door Schedule and/or as noted on the Documents.
- D. All interior and exterior exposed and/or unfinished items (not pre-finished by the manufacturer) and surfaces throughout the project, including, but not limited to the following:
 - 1. All gypsum board surfaces - typical
 - 2. All hollow metal frames and doors - typical
 - 3. Finishing of all exposed woodwork not factory pre-finished
 - 4. Painting of all unfinished (i.e. no factory final finish) interior and exterior metal, including:
 - a. All mechanical panels, access panels, cover plates, louvers, grilles, and metal expansion plates not factory-finished.
 - b. All exposed portions of all shop-primed steel embedded in masonry or other construction.

1.02 **RELATED DOCUMENTS:**

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to the work of this section.

1.03 **RELATED WORK SPECIFIED ELSEWHERE:**

- Painting of recessed electrical cabinets and panels
- B. Shop priming
- C. Concealed surfaces
- D. Installation of finish hardware

1.04 **COLOR SCHEDULES AND SAMPLE FINISHES:**

- A. See Color Coordination, below.
- B. After the beginning of construction (see 'Color Coordination' paragraph, below), the architect will prepare a color schedule for color and finish requirements for each painted or finished surface for this project. **The schedule may include color chips for matching.**
- C. Notify the Architect prior to mobilizing for painting so samples of colors and/or finishes may be requested.
- D. When requested by the architect, before paint materials are delivered to the jobsite, furnish 12" x 12" samples of colors and/or **finishes** applied on materials similar to those to which paint will be applied on the project. After 12"x12" samples have been approved by the Architect/Owner and -
 - 1. Before beginning work, the painting contractor shall apply a sample area of each of the types of finish on each type of wall surface for the architect's review. Sample area shall be approximately 6' x 6', with each successive coat covering an area 12" smaller than the coat before it, allowing the architect to inspect a minimum 12" strip of successive coats.
- E. The Architect reserves the right to select colors from Manufacturer's standard or premium price groups, including deep tone colors for both interior and exterior products.
- F. Tinted primer shall be used whenever deep tone colors are specified.

1.05 **ATTIC STOCK:**

- A. Leave on premises, one unopened gallon of each color of each type of paint or finish used.

- B. Containers to be unopened after preparation at the factory, tightly sealed, bearing manufacturer's name, type of paint, brand name, color designation, and instructions for mixing and/or reducing.
- 1.06 **DELIVERY, STORAGE AND HANDLING:**
- A. Deliver paint materials in sealed original labeled containers, bearing manufacturer's name, type of paint, brand name, color designation and instructions for mixing and/or reducing.
 - B. Provide adequate storage facilities. Store paint materials at minimum ambient temperature of 45 degrees F. in a well-ventilated area.
 - C. Take precautionary measures to prevent fire hazards and spontaneous combustion.
- 1.07 **SUBMITTALS:**
- A. Within thirty (30) days after an award of bid, the painting contractor shall submit a statement to the architect indicating both the manufacturer of paint of finish products to be used on the job, and the specific brand name for each usage specified.
 - B. The architect reserves the right to request and receive copies of invoices for material purchased for this project from the various manufacturers and/or dealers.
 - C. The painting contractor shall provide the architect with (2) complete and current color decks from the select manufacturer to select colors from. One color deck will be retained by the Architect.
- 1.08 **COLOR COORDINATION:**
- A. After receipt of all project submittals containing color selection criteria, the architect shall prepare an overall color presentation to the Owner, for approval.**
 - B. The overall color presentation to the Owner will not be scheduled until all submittals containing color selection criteria have been approved by the Contractor and delivered to the architect for review.**
- 1.09 **MANUFACTURER CERTIFICATION:**
- A. Manufacturer shall certify that tests have been performed on semi-gloss wall finish and others selected by Architect. Testing shall include the following (or equivalent) tests:
 - 1. Scrub resistance ASTM D2486-79: Value as specified in approved schedule, but not less than 1,200.
 - 2. Washability ASTM D3450-80: Value as specified in approved schedule but not less than 80% for sponge and 90% for brush.
- 1.10 **MIXING, THINNING, AND STORAGE:**
- A. Store and mix paints only in areas designated and provided with proper protection for floors and walls.
 - B. Mix and thin paints in strict accordance with Manufacturer's recommendations.
 - C. Deliver and store paints and related flammable materials in the Manufacturer's original unopened containers, as far as practicable. Keep partially used materials in tightly closed containers.
 - D. Do not store oil or paint soaked rags inside the building. Do not store materials in any room containing a direct fired heating unit.
- 1.11 **ENVIRONMENTAL CONDITIONS:**
- A. A minimum interior temperature of 65 degree F shall be maintained during the actual application and drying of the paint and until occupancy of the building occurs. Adequate ventilation shall be maintained at all times to control excessive humidity that will adversely affect the curing of coatings. The general contractor is solely responsible for maintaining suitable temperatures and ventilation.
 - B. No exterior painting shall be undertaken if air or surface temperatures are below 50 degree F, or if the temperature is expected to drop below that mark before the coating has dried. Do not paint during or immediately after foggy, rainy, or frosty weather, or until frost, dew or

condensation has evaporated. Ambient air temperature and surface temperature must be minimum 5 degree F above dew point.

- C. Surfaces shall be dry before any coating is applied. New plaster, masonry and concrete work shall not be primed until it has been determined these substrates have dried sufficiently and are of suitable Ph to safely accept paint. A reliable electronic moisture meter shall be used to make the determination pertaining to moisture.
- D. Adequate lighting shall be provided in work areas to assure adequate illumination. See Division 1, for temporary electric requirements.
- E. Do not commence work in spaces until all other trades other than finish work trades have completed their work within the space.

1.12 PROTECTION:

- A. Close off the various spaces while painting and exclude dust until finish is dry.
- B. Adequately protect adjacent surfaces from paint and damage. Repair damage as a result of inadequate or unsuitable protection.
- C. Furnish sufficient drop cloths, shields, and protective equipment to prevent spray or droppings from fouling surfaces not being painted and in particular, surfaces within storage and preparation area.
- D. Place cotton waste, cloths and materials that may constitute a fire hazard in closed metal containers and remove daily from site.
- E. Remove electrical plates, surface hardware, fittings and fastenings, prior to painting operations. These items are to be carefully stored, cleaned and replaced on completion of work in each area. When cleaning hardware, do not use solvent that may remove permanent lacquer finish.

1.13 QUALITY ASSURANCE:

- A. General: Work shall be performed by tradesmen with at least (5) five years experience with similar types of preparation and application as required by this Project.
- B. Refinishing and/or refurbishing woodwork: Work shall be performed by tradesmen with at least (5) five years experience, and who are capable of evaluating wood surfaces, stripping, fine sanding, and refinishing hardwood and softwood surfaces.

1.14 INCONSISTENCIES:

- A. Refer to Section 00100 – Instructions to Bidders for General Contractor, Construction Manager, and/or sub contractor responsibilities pertaining to Specification inconsistencies.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS:

- A. All **paint** (opaque coatings) materials shall be products of:
 - 1. Benjamin Moore
 - 2. Sherwin-Williams
 - 3. Pratt & Lambert
 - 4. ICI Dulux
 - 5. Devoe Paint
 - 6. Pittsburgh Paint Company
 - 7. Substitutions shall not be made without the architect's prior approval.
- B. All **stains** (pigmented coatings) materials shall be products of:
 - 1. Flood Products
 - 2. Valspar Co. - Cabot stains
 - 3. PPG Architectural Finishes – Olympic stains
 - 4. Wolman Wood Care Products
 - 5. Minwax Co.
 - 6. Old Masters Craftsman Stains

7. or approved equal
- C. All **sealers/transparent top-coats** (translucent coatings) shall be products of:
 1. Flood Products
 2. Valspar Co. - Cabot stains
 3. Wolman Wood Care Products
 4. or approved equal
- D. All materials used on the job shall be the manufacturer's highest quality product for each usage specified. **The contractor shall provide the most current product for the application noted, and/or the product replacement when products noted have been discontinued.**

2.02 MATERIAL COORDINATION:

- A. Furnish specified Manufacturer's top quality, first line material, delivered to the job-site in original, unopened, labeled containers.
- B. Acceptance of materials is conditional upon demonstration of washability and abrasion resistance of specified test patch.
- C. Tinted primer shall be used whenever deep tone colors are specified.
- D. All primers/first-coats shall be compatible with final top-coats.
 1. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

2.03 PRODUCTS:

- A. The following requirements are for material and specific applications noted below. **Should one or more of the specified products no longer be produced by the manufacturer (due to a change in product line, for example), the Contractor shall use another similar product from the same manufacturer(s) providing the product and warrant is substantively similar to the specified product and intended for the application noted.**
- B. **Exterior Finishes:**
 1. Ferrous Metals (doors, railings, lintels (not spec'd to be galvanized), fences, gates, etc.):
 - a. First Coat: (if flash rusting occurs, use two coats)
 - 1) Benjamin Moore MO4 Acrylic Metal Primer
 - 2) PPG Industries 90-708 Series, Pitt-Tech One-Pack Interior/Exterior Industrial Primer.
 - 3) Pratt & Lambert Latex Suprime 3
 - 4) Sherwin-Williams DTM Acrylic Primer Finish B66W1
 - b. Second and Third Coats:
 - 1) Benjamin Moore Moorcraft Latex House and Trim Paint 170 except railings, which shall be Impervex Enamel 309
 - 2) PPG Industries 6-2000 Series, Speedhide Exterior Satin Latex except railings, which shall receive 90-474 Series, Pitt-Tech One-Pack Interior/Exterior Satin High Performance Industrial Enamel
 - 3) Pratt & Lambert Pro Hide + Satin Latex H.P.
 - 4) Sherwin-Williams DTM Acrylic Gloss Coating (Water Reducible), B66 Series
 2. Painted Wood:
 - a. First Coat:
 - 1) Benjamin Moore Moorcraft Latex Exterior Primer 169r
 - 2) Pittsburgh Paints 6-609 Speedhide Exterior Latex Primer
 - 3) Pratt & Lambert Latex Suprime 2
 - 4) Sherwin-Williams A-100 Latex Exterior Wood Primer B42W41
 - b. Second and Third Coats – as specified:
 - 1) Benjamin Moore Moorcraft Latex House and Trim Paint 170
 - 2) Pittsburgh Paints 6-2000 Series, Speedhide Exterior Satin Latex
 - 3) Pratt & Lambert Pro Hide + Satin Latex H.P.
 - 4) Sherwin-Williams Duration exterior acrylic latex Paint (one-coat is possible) or 'SuperPaint' acrylic latex.

3. Natural (stained and preserved) Finish Woodwork – Semi-transparent or solid color, stain coating for pressure-treated lumber finishing:
 - a. First Step:
 - 1) Apply a “mill finish remover” similar to WOLMAN Deck & Fence Brightener
 - 2) Use steady, hard stream of water or wide-angled power wash to remove brightener.
 - b. Second Step:
 - 1) Flood’s SWF Semi-Transparent **or solid color** wood finish.
 - 2) Wolman DuraStain® Semi-Transparent **or solid color** stain
 - 3) Cabot’s solid color decking stain. Oil-based stain and sealer
 - 4) Olympic Maximum Semi-Transparent **or solid color** stain/sealer.
 4. Natural (stain/clear) Finish Wood (not previously finished) for soft and hard woods:
 - a. First Step (Stain as needed to achieve color selected by Architect. Apply per manufacturer’s instructions)
 - 1) Benjamin Moore Exterior Wood Penetrating Stain
 - 2) Pittsburgh Paints 77-560 Rez Semi Transparent Alkyd Stain
 - b. Second and Third Steps (two finish coats)
 - 1) Benjamin Moore Exterior Spar Urethane
 - 2) Pittsburgh Paints Exterior Spar Urethane
 - 3) Pratt & Lambert Exterior Spar Urethane
 5. Natural (stain/natural) Finish Woodwork – **clear coat for Cedar or pressure-treated wood finishing**:
 - a. First Step
 - 1) Apply a “mill finish remover” similar to WOLMAN Deck & Fence Brightener
 - 2) Use steady, hard stream of water or wide-angled power wash to remove brightener.
 - b. Second Steps
 - 1) Flood’s CWF UV5 Oil Clear Wood Finish.
 - 2) Cabot’s SPF – Deck and Fence Stain and Seal
 - 3) Olympic Maximum waterproofing sealer
 6. Exterior Structural Steel (exposed to view):
 - 1) Prime Coat – Refer to Division 5
 - 2) Intermediate Coat:
 - 3) TNEMEC Series 161 Fascure @ 4.0 to 6.0 mils DFT
 - 4) PPG Industries 95-240 Series, Pitt-Guard Rapid Coat D-T-R Epoxy Mastic, @ 5.0 to 7.0 mils DFT
 - b. Finish Coat:
 - 1) TNEMEC Series 74 Endure-Shield @ 2.0 to 5.0 mils DFT
 - 2) PPG Industries 95-812 Series, Pitthane Ultra Gloss Urethane Enamel @ 2.0 to 3.0 mils DFT
- C. Interior Finishes:**
1. Gypsum Board Soffit, Fascia and Ceiling Drops: First Coat:
 - 1) Benjamin Moore Moorcraft Vinyl Latex Primer-Sealer 273
 - 2) Pittsburgh Paints 6-603 Speedhide Acrylic Alkali Resistant Primer for plaster; 6-2 Speedhide Latex Primer-Sealer for gypsum board
 - 3) Pratt & Lambert Pro-Hide + PVA Wall Primer Z-96
 - 4) Sherwin-Williams Wall and Wood Primer B49W22 for plaster; Pro Mar Latex Wall Primer B28W200 for gypsum board
 - b. Second & Third Coat:
 - 1) Benjamin Moore Moorcraft Vinyl Latex Flat 275
 - 2) Pittsburgh Paints Speedhide Latex Flat 6-70 (for deep tone colors use Wall Hide 80-587)
 - 3) Pratt & Lambert Pro Hide + Latex Flat
 - 4) Sherwin-Williams Pro-Mar 200 Latex Flat Wall Paint, B30W200
 2. **Gypsum Board Walls:**

- a. First Coat:
 - 1) Benjamin Moore Moorcraft Vinyl Latex Primer-Sealer 273
 - 2) Pittsburgh Paints 6-603 Speedhide Acrylic Alkali Resistant Primer for plaster; 6-2 Speedhide Latex Primer-Sealer for gypsum board
 - 3) Pratt & Lambert Pro-Hide + PVA Wall Primer Z-96
 - 4) Sherwin-Williams Wall and Wood Primer B49W22 for plaster; Pro Mar Latex Wall Primer B28W200 for gypsum board.
- b. Second & Third Coats:
 - 1) BENJAMIN MOORE® Aura Waterborne Interior Paint – Satin Finish 526
 - 2) Graham Aqua Borne Ceramic interior **flat** wall paint – when flat required.
 - 3) Sherwin-Williams Duration interior acrylic latex – 1200 series
3. Concrete floor – exposed:
 - a. Clear Coat:
 - 1) Waterproofing Sealer 072 by Benjamin Moore
 - b. Opaque Finish – First & Second Coat:
 - 1) Benjamin Moore Moorcraft Latex Semi Gloss Enamel 276
 - 2) Pittsburgh Paints 6-512 Series Speedhide Semi Glass Latex Enamel
 - 3) Graham – Aqua Borne Ceramic, 100% acrylic resin floor paint
 - 4) Sherwin-Williams Pro Mar 200 Latex Semi Gloss Enamel B31W200 Series
4. Painted Woodwork including any interior window sash and trim: First Coat:
 - 1) Benjamin Moore Moorcraft Alkyd Enamel Underbody 269
 - 2) Pittsburgh Paints 6-6 Speedhide Alkyd Enamel Undercoater
 - 3) Pratt & Lambert Alkyd Suprime 11
 - 4) Sherwin-Williams Wood and Wall Primer, B49W2
 - b. Second and Third Coats:
 - 1) Benjamin Moore Dulamel Alkyd Eggshell Enamel 305
 - 2) Pittsburgh Paints 6-90 Series Speedhide Lo-Sheen Alkyd Enamel (for deep tone colors use 20-554)
 - 3) Pratt & Lambert Pro-Hide + Alkyd Eggshell Enamel
 - 4) Sherwin-Williams Pro Mar 200 Alkyd Eg-Shell Enamel
5. Natural Finish Woodwork (**not previously finished**):
 - a. First Step (Wood Filler, applied as per manufacturer's instructions) when specified:
 - 1) Benjamin Moore Benwood Paste Wood Filler 238
 - 2) Pratt & Lambert Filler-Sealer
 - b. Second Step (Stain as needed to achieve color selected by Architect. Apply per manufacturer's instructions)
 - 1) Benjamin Moore Interior Wood Penetrating Stain 241
 - 2) Old Masters penetrating stain
 - 3) Pratt & Lambert Interior Latex Wood Stain
 - c. Third and Fourth Steps (two finish coats required) with knock-down sanding between coats.
 - 1) Benjamin Moore Interior Benwood 'Stays Clear' acrylic 423/Low Lustre
 - 2) Pittsburgh Paints – Olympic water-based polyurethane satin
 - 3) Minwax Poly-acrylic Satin – acrylic finish – satin.
 - 4) Old Master water-based Clear finish satin
 - 5) or equal

PART 3 - EXECUTION

3.01 GENERAL:

- A. The painting contractor shall be wholly responsible for the quality of the work and is not to commence any part of it until each surface is in proper condition. All surfaces are to be clean. If for any reason the surface cannot be cleaned, this condition shall be promptly reported to the General Contractor and the Architect prior to commencing with the work.

1. Surfaces shall be properly prepared, dry, and free of any foreign materials such as dirt, dust, oil, grease, rust, scale, mildew, algae, mold, effervescence, release agents, etc., which will adversely affect adhesion or appearance of applied coating.
- B. Examine each surface scheduled to be painted or finished prior to commencing with the work. Report any condition that may potentially affect proper application. **Application of first coat constitutes acceptance of surface as being in fit condition to receive paint.**
- C. To prevent contamination of the substrate, apply the prime coat to each surface as soon as possible after surface preparation has been completed.
- D. Test shop applied primer for compatibility with subsequent cover materials. Report adverse conditions, if any, to the Architect prior to continuing with the work.
- E. The Architect may take samples of materials used on the project for testing purposes. Shall samples not match manufacturer's product specifications, no credit will be given for work covered with the questionable material and any cost of test shall be borne by the painting contractor.
- F. Test moisture content of each surface using a properly calibrated electronic moisture meter. Do not apply finishes unless moisture content of surfaces is below the following maximums:
 1. Plaster and Gypsum Wallboard: 12 percent.
 2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
 3. Interior Wood: 15 percent, measured in accordance with ASTM D2016.
 4. Exterior Wood: 15 percent, measured in accordance with ASTM D2016.
 5. Concrete Floors: 8 percent.
- G. Do not apply paints when the temperature of or on the substrate or the temperature of the air in the vicinity of the painting work is below 45 degrees or above 95 degrees Fahrenheit. Application shall proceed only when relative humidity is between 20 and 80 percent. Exterior and interior latex paints shall not be applied below 50 degrees Fahrenheit unless so authorized in writing by the manufacturer. Epoxy paints and other sophisticated coating shall not be applied below 50 degrees Fahrenheit unless otherwise noted on the manufacturer's printed instructions.
- H. Test Ph of plaster, masonry, and concrete surfaces. Neutralize where required.
- I. Remove electrical plates, hardware, light fixture trim, escutcheons, and other miscellaneous fittings prior to preparing surfaces for painting or finishing. Masking will not be accepted.
- J. Correct surface defects and clean surfaces which affect work of this section. Remove existing coatings that exhibit loose surface defects.
- K. Seal all marks that may bleed through surface finishes with appropriate stain-stopping coating.
- L. Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry. Follow manufacturer's recommendations for final preparation.

3.02 PREPARATION OF VARIOUS NEW SURFACES (NOT PREVIOUSLY FINISHED):

- A. For all surfaces and conditions:
 1. Remove all cover plates, hardware and fixtures prior finishing
 2. Clean all substrates of nubs, dust and oils that could affect finish
 3. Refer to Section 09250 for additional information as to the requirements of gypsum board surface prep prior to finishing.
- B. New interior wood:
 1. Sand all imperfections from the wood to receive a clear or transparent finish.
 2. All surfaces must be free of sanding dust, and shall be thoroughly dry.
 3. Staining and sealing preparation:
 - a. Apply the stain/sealer according to manufacturer's instructions. Coordinate with the Architect for exact color or density of stain application with appropriate samples.
 - b. Finish with finish coat(s) as required by the Documents.
 4. Opaque finish preparation:
 - a. Spot prime defects if the final coating is opaque.
 - b. Apply a primer coat to all surfaces.

- c. Apply finish coat(s) as directed by these Documents or Schedules.
 - d. Sand between coats if directed.
- C. New exterior wood where a painted finish is to be applied:
 1. Scrape any sap drippings from (exterior) wood.
 2. Sand or otherwise remove any trade stamps, burn labels or other markings from the wood to receive a clear or transparent finish.
 3. All surfaces must be free of sanding dust, and shall be thoroughly dry.
 4. Staining and sealing preparation:
 - a. Apply a "mill finish remover" to allow the wood to receive the finish coat.
 - b. Let the wood completely dry prior to any final finishing.
 - c. Apply the stain/sealer according to manufacturer's instructions. Coordinate with the Architect for exact color or density of stain application with appropriate samples.
 - d. Finish with finish coat(s) as required by the Documents.
 5. Opaque finish preparation:
 - a. Spot prime defects, knots or sap wells if the final coating is opaque.
 - b. Apply a primer coat to all surfaces. **Siding or other woods forming an exterior surface exposed to the weather shall be thoroughly back-primed prior to initial installation.**
 - c. Apply finish coat(s) as directed by these Documents or Schedules.
 - d. Sand between coats if directed.
 6. Priming and backpainting of wood:
 - a. All wood which is to be painted, factory finished or otherwise, must be backprimed immediately upon delivery with an appropriate primer specified for wood; or with manufacturer's recommended protective pre-treatment for wood which is to have a natural finish.
 - b. Apply first coat to all wood scheduled to receive natural finish as soon as possible.
 - c. Furnish sealer to other trades for touching up any bare wood caused by mortising or butting of surfaces, or any kind of assembly or installation.
 - d. Avoid painting or otherwise staining edges of wood where natural finish is scheduled.
- D. New Gypsum Board:
 1. Fill minor defects with filler compound. Spot-prime and patched defects after repair.
 2. All surfaces must be free of sanding dust, and joint treatment shall be thoroughly dry.
 3. **Verify condition of gypsum board surfaces prior to finishing – Refer to USG standards:**
 - a. **Level 4 Drywall Finish for typical paints: All joints and interior angles shall have tape embedded in joint compound and at least two separate coats of joint compound applied over all joints, angles, fastener heads, and accessories. The surface shall be smooth and free of tool marks and ridges.**
 - b. **Level 5 Drywall Finish typical for Impact-Resistant gypsum board and for Semi or Gloss paints: All joints and interior angles shall have tape embedded in joint compound and three separate coats of joint compound applied over all joints, angles, fastener heads, and accessories. A thin skim coat of Imperial Plaster for Impact-Resistant board or joint compound, or a material manufactured especially for this purpose, shall be applied to the entire surface.** The surface shall be smooth and free of tool marks and ridges.
 - c. If gypsum wallboard surfaces have not been finished to Level required above, notify the Architect prior to commencing with work.
- E. Doors – metal and wood:
 1. Sand all edges of wood door smooth. Remove any burrs or welding droppings from metal door panels prior to finishing.
 2. Finish all edges, including tops and bottoms of wood and metal doors same as faces.
 3. Seal top and bottom edges with two coats of zinc-rich primer for all metal doors scheduled to be painted.
- F. Ferrous Metal Surfaces:
 1. Wash all surfaces with a solvent to remove dirt, grease and oil.

2. Touch up all bare metal welded areas around screws and damaged shop coats with specified shop coat primer. Primer on welded areas shall be applied after grinding and after welding flux is removed.

3.03 PREPARATION OF SURFACES (PREVIOUSLY PAINTED)

A. **Comply with requirements as specified for preparation of new construction surfaces as well as the following:**

1. Scrub clean existing surfaces with a stiff brush and a solution of clean water and mild detergent.
2. Scuff –sand surface to allow new finish to hold.
3. De-gloss painted surfaces in a manner appropriate to the substrate.
4. Fill cracks, holes, voids, and defects, and leave a smooth surface ready for application of primer.
5. Remove loose paint and feather edges or patch as required to provide a smooth, seamless finish.
6. **Verify with manufacturer of new finish and prime existing surfaces as required for complete adhesion between existing surfaces and new finishes.**
7. Prepare a 36" x 36" minimum test area to see if a reaction occurs between existing and new finishes prior to proceeding with the specified work. If a reaction occurs, alert the Architect with a proposed solution prior to proceeding with work.

3.04 APPLICATION AND FINISHING REQUIREMENTS

- A. All specified products shall be applied at the minimum wet film thickness rate as recommended by the manufacturer.
- B. The number of coats scheduled are minimums. Provide paint finishes free from cloudy or mottled surfaces and with complete coverage of even, uniform color. Spot prime or undercoat as necessary for complete coverage.
- C. Apply paints and finishes in the order scheduled, unless otherwise directed. Where more than one coat of paint is scheduled, tint undercoats to approximately the same color as the finish coat, but vary the shade of succeeding coats for identification.
- D. Do not apply succeeding coats until undercoats are thoroughly dry.
- E. After completion of work, do all necessary touching up of all the Painting and Finishing and leave the work in perfect condition.
- F. Additional coats will be required where finished work is not in complete compliance with all requirements of these specifications, or if complete coverage is not accomplished in the specified number of coats.
- G. All coats specified under this division are in addition to shop priming coats specified under other divisions. A completely finished job is required, regardless of whether every individual item is mentioned herein or not.
- H. All painting materials and installation procedures shall comply with all Federal Regulations.
- I. Coverage and hide shall be complete. When color, stain, dirt or undercoats show through final coat of paint, the surface shall be covered by additional coats until the paint film is of uniform finish, color, appearance and coverage, at no additional cost to the owner.

3.05 WORKMANSHIP

- A. All painting and finishing work shall be done by thoroughly experienced, skilled, competent mechanics and smoothly flowed on without runs, sags, streaks, wrinkles, shiners, or bush marks. Apply proprietary paint products in strict accordance with manufacturer's instructions.
- B. **Except where specifically authorized by the Architect, apply flat or eggshell wall paint by brush or roller; apply gloss or semi-gloss with brush only.**
- C. Sanding: In addition to preparatory sanding, fins sand between succeeding coats of all varnish enamel or flat enamel, using sandpaper appropriate to the finish. Use fine production paper between coats.

- D. Painting Contrasting Colors: Cut to meet true lines against contrasting colors. Holidays and restrikes in painted surfaces shall be considered sufficient cause to require recoating of entire surface.
- E. Execute all painting and finishing work strictly as per approved color and finish samples. Commencing work before obtaining said approvals is at the contractor's risk.
- F. Comply with manufacturer's printed directions on labels of all product containers. Primer and finish coats shall be products of the same manufacturer.
- G. All suction spots or "hot spots" in plaster and/or cement after the application of the first coat shall be touched up before applying the second coat.
- H. Remove electrical panel box covers and doors before painting walls. Paint separately and reinstall after all paint is dry. Remove all finish hardware from walls, doors and cabinets before painting.
- I. **Enamel finish applied to metal shall be sanded with fine sandpaper and then cleaned between coats to produce an even surface. All undercoats of paint or enamel to be off shade from other coats such that one coat can be clearly identified from the next.**
- J. Do all necessary puttying of nail holes, cracks and similar conditions, after first coat, with putty of color matching finish. Bring putty flush with adjoining surfaces.
- K. The architect reserves the right to inspect each coat of paint or other finish before application of succeeding coat or else no credit for said coat will be given and the painting contractor automatically assumes responsibility for recoating work in question. Notify architect when each coat is ready for inspection.
- L. Paint all walls and/or framing members behind grilles and at reveals, which will be visible from occupied areas. Paint shall be flat black.
- M. Replace hardware after completion as originally installed.

3.06 CLEANING:

- A. At conclusion of work and/or when directed, examine all painting and finishing work. Clean paint spots off glass, plaster, metal, fabric wall coverings, wood and other surfaces. Clean and repair paint finish where dark spots, fingerprints, and similar imperfections appear. Said retouching shall exactly match surrounding surfaces. Refinish entire surface in question in order to attain this result if necessary. Leave all painting and finishing in perfect condition.
- B. During progress of the work keep premises free from accumulations of tools, equipment, surplus materials and debris. At completion of work leave premises neat and clean.

3.07 SCHEDULE - EXTERIOR SURFACES

- A. Wood for the Pergola (architectural grade) – Nature to Weather (unfinished):
- B. Wood – Semi-Transparent Finish as part of the Building:
 - 1. Two coats of semi-transparent, exterior stain to match existing finishes
- C. Wood (decking, handrails/guardrails etc.) – Clear Preservative Finish:
 - 1. Apply "mill-finish" remover to entire surface
 - 2. Heavy coat of clear-coat for Pressure-Treated wood as specified above
- D. Steel: Unfinished
 - 1. One coat of zinc chromate primer
 - 2. Two coats of semi-gloss paint
- E. Steel - Shop Primed:
 - 1. Touch-up with zinc chromate primer.
 - 2. Two coats of semi-gloss paint
- F. Steel-Galvanized – (unfinished):
 - 1. Repair any nicks/scratches and repaint areas of welding
 - 2. Accessories and handrails are to be left in the exposed galvanized state.

3.08 SCHEDULE - INTERIOR SURFACES

- A. Wood - Painted:
 - 1. One coat of latex prime sealer
 - 2. Two coats of latex enamel, semi-gloss paint

- B. Wood - Transparent:
 - 1. Filler coat (for open grained wood only)
 - 2. Two coats of poly-acrylic, satin finish.
- C. Gypsum Board wall surfaces:
 - 1. One coat of latex-based PVC primer sealer
 - 2. Sealer shall be tinted for all dark colors.
 - 3. Two coats of latex eggshell/satin paint
- D. Gypsum Board ceiling/soffit surfaces:
 - 1. One coat of latex-based PVC primer sealer
 - 2. Two coats of latex flat paint

END OF SECTION 09900

SECTION 10440 - INTERIOR SIGNAGE

PART 1 - GENERAL

- 1.01 **DESCRIPTION OF WORK:**
A. Section Includes: Interior signage, including interior identifying devices for Toilet Room – meeting all ANSI A117.1 requirements.
- 1.02 **SYSTEM DESCRIPTION**
A. Performance Requirements: Provide interior signage which has been manufactured, fabricated and installed to maintain performance criteria stated by manufacturer without defects, damage or failure.
- 1.03 **SUBMITTALS**
A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedures Section.
B. Product Data: Submit product data, including manufacturer's SPEC-DATA product sheet, for specified products.
C. Shop Drawings: Submit shop drawings showing layout, profiles and product components, including anchorage, accessories, finish colors, patterns and textures.
D. Samples: Submit selection and verification samples for finishes, colors and textures.
- 1.04 **QUALITY ASSURANCE**
A. Installer Qualifications: Installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project.
B. Regulatory Requirements:
1. ADA Requirement: ANSI A117.1
- 1.06 **WARRANTY**
A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.
B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.
1. Warranty Period: 2 years commencing on Date of Substantial Completion.

PART 2 - PRODUCTS

- 2.01 **INTERIOR SIGNAGE**
A. Manufacturers:
1. American Graphics, Inc. Contact: 2827 West Edgemont Avenue, Montgomery, AL 36108; Telephone: (800) 653-7982, (334) 288-8882; Fax: (334) 281-9496.
2. ASI Sign Systems
3. SuperSine Co.
4. The Southwell Company
5. Substitutions: Under the provisions of Section 01600.
B. Proprietary Product(s)/System(s): nomenclature below is per American Graphics Signage which shall not preclude other manufacturers, and is used for informational purposes only.
1. Type: Type ADA - Raised letter and braille signs.
2. Type: ADA conforming, single-ply adhesive signs.
a. Interior ADA raised letter signage.
C. Manufacturer's Specification Forms: Provide signage per manufacturer's specification form as follows:
1. Material and Thickness: 1/8" thick.

2. Corners: **Square**.
3. Background Color: Coordinate with Owner during Shop Drawing Process.
4. Letter Color: Coordinate with Owner during Shop Drawing Process.
5. Letter Size and Style: Coordinate with Owner during Shop Drawing Process.
6. Letter Type: Caps and Lower Case.
10. Mounting Method: mechanically attached
11. Number of Signs: one per door.
12. Sizes to: meet ADA
13. Copy: "**Toilet Room**", "**Unisex**" with BF and "woman/man" logo included.

PART 3 - EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

- A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions and product carton instructions for installation.

3.02 EXAMINATION

- A. Site Verification of Conditions: Verify substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions.

3.04 INSTALLATION

- A. Interior Signage Installation:
 1. ADA Installation Requirements: install as noted in Typical Mounting Height and Clearances drawing noting Barrier-Free heights and locations

3.06 CLEANING

- A. Cleaning: Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance. Remove construction debris from project site and legally dispose of debris.

3.07 PROTECTION

- A. Protection: Protect installed product and finish surfaces from damage during construction.

3.08 SCHEDULE:

- A. Provide a sign at the following locations/conditions:
 1. Toilet Room

END OF SECTION 10440

SECTION 10800 - TOILET ROOM ACCESSORIES

PART 1 - GENERAL

1.01 **RELATED DOCUMENTS:**

- A. Drawings and general provisions of the Contract, including General, Supplementary and Special Conditions and Division 1 Specification sections, apply to work in this section.

1.02 **DESCRIPTION OF WORK:**

- A. Furnishing all labor, materials and equipment to completely install all items of this section shown on Drawings or specified herein.
- B. Coordinate with others for correct locations of and appropriate clearance for Toiletroom equipment. Inform Architect of any discrepancies prior to installation of equipment or other associated wall finishes.
- C. **Providing and installing specialty fixtures associated with Toilet Rooms and utility areas.**

1.03 **RELATED WORK SPECIFIED ELSEWHERE:**

- A. Section 06100 - Rough Framing.
- B. Section 09100 - Metal Stud Framing System.
- C. Section 09250 - Gypsum Drywall System.

1.04 **QUALITY ASSURANCE:**

- A. Inserts and Anchorage: Furnish inserts and anchoring devices which must be set into concrete or built into masonry; coordinate delivery with other work to avoid delay.
- B. Accessory Locations: Coordinate accessory locations with other work to avoid interference and to assure proper operation and servicing of accessory units.
- C. Single Source Manufacturer: Provide products of same manufacturer for each type of accessory unit, unless otherwise indicated.

1.05 **REFERENCES:**

- A. ANSI A117.1 - Specifications for Making Buildings and Facilities Accessible To and Usable by Physically Handicapped People.
- B. ANSI/ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars and Strips.
- C. ANSI/ASTM A366 - Steel, Carbon, Cold-Rolled Sheet, Commercial Quality.
- D. ANSI/ASTM A386 - Zinc Coating (Hot-Dip) on Assembled Steel Products.
- E. ANSI/ASTM B456 - Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
- F. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
- G. ASTM A269 - Seamless and Welded Austenitic Stainless Steel Tubing for General Service.

1.06 **SUBMITTALS:**

- A. Product Data: Provide product data describing size, finish, details of function, installation details for each accessory.
- B. Manufacturer's Installation Instructions: Submit manufacturer's installation instructions, including setting drawings, templates, directions for preparatory work, installation of anchorage devices in other work and sequencing.

1.07 **KEYING:**

- A. Supply four keys for each lockable accessory to Owner.
- B. Master key all accessories as directed by Owner.

1.08 **REGULATORY REQUIREMENTS:**

- A. Conform to ANSI A117.1 and applicable State Barrier Free codes for provisions for the physically handicapped.

1.10 INCONSISTENCIES:

- A. Refer to Section 00100 – Instructions to Bidders for General Contractor, Construction Manager, and/or sub contractor responsibilities pertaining to Specification inconsistencies.

PART 2 - PRODUCTS

2.01 MANUFACTURERS:

- A. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Bobrick Washroom Equipment, Inc.
 - 2. Bradley Corporation, Washroom Accessories Division
 - 3. Or Architect approved substitution.
- B. Proprietary names and/or model numbers used to designate products or materials are not intended to imply that products of named manufacturers are required to exclusion of equivalent products of other accepted manufacturers.

2.02 COMPONENTS - TOILET ROOM ACCESSORIES:

- A. Coat Hook:
 - 1. Wall mounted hook; stainless steel – satin, with vandal-resistant screws. Bobrick B-233, or Architect approved equal.
- B. Handicapped Grab Bars:
 - 1. At Toilet Room locations as shown on Drawings or required by ADA. Peened non-slip gripping surface approved for barrier free use, with satin finish at ends of bars and on flange. Bobrick B-6806.99 Series, or Architect approved equal.
- C. Provide a single, vertical grab bar at each B.F. and ambulatory toilet, and shower stall as required by ADA. Peened, 1-1/2" x 18" non-slip gripping surface approved for barrier free use, with satin finish, 18-gauge type 304 stainless steel with snap cover over concealed mounting flange. Bobrick B-6806.99 Series, or Architect approved equal
- D. Toilet Paper Dispenser – existing to be re-installed:
- E. Mirror:
 - 1. Mirror 24" x 30" with No. 1 quality 1/4" mirror glass, type 304 stainless steel frame with satin finish. Bobrick B-165 Series, or Architect approved equal.
- F. Soap Dispenser – existing to be re-installed:
- G. Paper towel dispenser – existing to be re-installed.
- H. Sanitary napkin/Tampon Vendor –:
 - 1. Stainless steel finish, surface mounted vendor. Bobrick B-47069-Contura Series or Architect approved equal.
- I. Undersink Pipe Insulation - when not enclosed by base cabinet:
 - 1. Fully molded closed cell vinyl insulating pipe wrap, coordinate model number with specific plumbing pipe configuration at each required location (coordinate as necessary with Division 15 Mechanical):
 - a. Truebro, Inc., "Handi Lav-Guard" Kit - Color: White.
 - b. or approved equal.

2.03 MATERIALS:

- A. Sheet Steel: ANSI/ASTM A366.
- B. Stainless Steel Sheet: ASTM A167, Type 304.
- C. Tubing: ASTM A269, stainless steel.
- D. Fasteners, Screws, and Bolts: Hot-dip galvanized, tamper proof.

- E. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.
- F. Primer: As recommended by accessory manufacturer.
- G. Individually box or wrap each item suitably to prevent damage, with label identifying item and location for same.
- H. Provide each item complete with fasteners, anchorages, trim, back-up plates and other incidental items required for fastening to intended substrate.

2.04 FABRICATION:

- A. Weld and grind smooth joints of fabricated components.
- B. Form exposed surfaces from single sheet of stock, free of joints.
- C. Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.
- D. Back-paint components where contact is made with building finishes to prevent electrolysis.
- E. Shop-assemble components and package complete with anchors and fittings.
- F. Provide steel anchor plates, adapters, and anchor components for installation.
- G. Hot dip galvanized exposed and painted ferrous metal and fastening devices.

2.05 FACTORY FINISHING:

- A. Galvanizing: ANSI/ASTM A386 to 1.25 oz/sq. yd.
- B. Shop Primed Ferrous Metals: Pretreat and clean, spray-apply one coat primer and bake.
- C. Enamel: Where indicated, pretreat to clean condition, apply one coat primer and minimum two coats baked enamel.
- D. Chrome/Nickel Plating: Where indicated, comply with ANSI/ASTM B456, Type SC 2 satin (polished) finish.
- E. Stainless Steel: No. 4 satin luster finish typical for items specified herein.

PART 3 - EXECUTION

3.01 EXAMINATION:

- A. Installer must examine the conditions under which the Work of this section is to be performed and notify Contractor in writing of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions have been corrected in manner acceptable to the Installer.
- B. Beginning of installation means acceptance of existing conditions and substrates.

3.02 PREPARATION:

- A. Deliver inserts and rough-in frames to site at appropriate time for building-in.
- B. Provide templates and rough-in measurements as required.
- C. Verify exact location of accessories for installation. Comply with all applicable barrier free code requirements for mounting heights.

3.03 INSTALLATION:

- A. Install fixtures, accessories and items in accordance with manufacturer's instructions.
- B. Install plumb and level, securely and rigidly anchored to in-wall blocking or structure and in locations and at mounting heights indicated.
- C. Coordinate with framing contractor for required blocking.
- D. This contractor shall be responsible to establish the location for all accessories allowing full access to toilet stalls and maintaining required clearances for Barrier Free requirements. Refer to Michigan Barrier Free Requirements for heights and locations of all equipment.

END OF SECTION 10800

SECTION 13340 - PRE-MANUFACTURED FLOATING DOCK SYSTEM

PART 1 - GENERAL

1.01 WORK INCLUDES:

- A. Design, fabricate, install and furnish all parts, labor, equipment, supplies and materials and perform all operations required for installation of a complete, fully functional and operational floating dock system, including but not necessarily limited to dock assembly, bridges, anchorage, all utilities, and other work all as indicated on the drawings and as specified herein.
- B. The Contract Drawings are general in nature and show basic floating dock layout with required dimensions, required cleat locations, and certain required materials and details of construction. It is the requirement of this Contractor to provide all of the details, material, means and methods to make the required elements functional and meet the Code requirements.
- C. Providing and installing a Barrier-Free Kayak/Canoe Launch attached to the Barrier-Free floating dock.
- D. The docks shown on the drawings and the specifications herein are patterned after the type manufactured by Flotation Docking Systems, of Cedarville, Michigan. However, the intent is not to preclude other floating dock systems of different manufacture as long as they meet the required design loads, are within the range of required dimensions, are constructed with the specified materials, and are of a quality equal to or better than that specified in this Section.
- E. **The floating docks shall be designed and constructed to be Barrier-Free accessible where noted on the Documents.**

1.02 GENERAL CONDITIONS:

- A. All Drawings and general provisions of Contract, including General Conditions, Supplementary Conditions, Division 0, and Division 1 Specification sections apply to the Work of this Section.

1.03 DESIGN CRITERIA

- A. The top of the floating docks shall be maintained at approximately 11" above the level of the river. The river level is 747.5 with a .3 foot variation from this water level. The Boardwalk is approximately 748.4 at areas of attachment to the floating docks.
- B. Docks noted as Barrier-Free Accessible shall comply with "Accessible Fishing Piers & Platforms" and "Accessible Boating Facilities" per the United States Access Board criteria – current recommendations.
- C. Floating docks, anchorages and connections shall be designed in accordance with ASCE Report No. 50 "Small Craft Harbors" dated 1969 or current edition, and the revised edition "Planning and Design Guidelines for Small Craft Harbors" dated 1994. Except for docks noted as Barrier-Free those are to be designed to be fully accessible.
- D. The framework shall be a hybrid composite of southern yellow pine, structural steel fabricated components (galvanized where applicable), and galvanized sheet steel. The assembly format shall be similar to: monocoque design utilizing 2" thick exterior framing lumber, 2" thick interior bulkheading on maximum 4'-0" transverse span and 5'-0" longitudinal span, and 20 gauge sheet steel upper and lower skin on body work. Structural steel fabricated corner and finger connectors shall have a minimum 6" legs and a sectional depth equal to that of the dock frame. Bulkheads shall be of the same material as the timber sidewall. Framing shall act as a bulkhead member to withstand compression and shall be the full width of the unit @ 48" spacing along the length of each unit. This support framing/bulkhead shall be incorporated with a continuous flotation encasement to provide rigidly constructed monocoque units.
- E. All structural members shall be designed and appropriately sized to carry and accept all design loads without failure or excessive deformation. Members shall be so sized to compensate for reductions in cross section resulting from the drilling of bolt holes and cutting of openings needed for utilities. Only single width dock modules shall be allowed for piers up

to 5 feet in width. Where the required width of main, tee and service piers requires fabrication from narrower pier modules, the individual pier modules shall not be less than four feet in width. Overlapping adjacent modules by staggering transverse joints to insure maximum strength is encouraged. However, overlapping is not required as long as sufficient longitudinal joint strength is otherwise provided.

1.04 DEFLECTION CRITERIA

- A. Docks, bridges, connections and anchorages shall be designed for the following loads and conditions. All drawings and calculations submitted must be sealed by a registered Professional Engineer in the State of Michigan.
- B. Vertical:
 - 1. Vertical Dead Load: Dead loads shall be the entire weight of the floating docks and attachments including anchorages. The ends of all docks shall be as level as practical but in no case shall a cross slope of more than $\frac{1}{2}$ " for each 3' of width be tolerated, nor no more than $\frac{3}{4}$ " at the end of 5 years. Adjacent dock units shall have a maximum deck surface elevation difference of 1/8 inch. All Barrier-Free accessible docks shall meet ADA cross-slope requirements.
 - 2. Vertical Live Load: A uniform live load of not less than 30 pounds per square foot on the floating docks shall be used. Minimum live load for flotation shall be 30 pounds per square foot. Floating docks must be designed to withstand a 400 pound concentrated live load 1' from the end without a loss in freeboard of more than 4" at the time of acceptance, nor more than 6" at the end of 5 years.
 - 3. Combined Vertical Dead Load and Live Load: Combined dead load plus live load for piers, and bridges shall be the actual dead load including utilities plus 30 psf live load. However, for purposes of calculation, the combined dead load plus required 30 psf live load shall never be calculated as being less than 50 psf. Bridges shall be so designed that maximum live load deflection of the bridge is limited to 1/180 of the span. Extra flotation of the same general type and design used for the floating piers shall be installed at end sections as required to compensate for end reactions of bridges due to combined loading. In no case shall the supporting pier module at the bridge connection be less than the designated freeboard under combined loading nor more than 2" above the freeboard shown on the approved shop drawings under the full deadload including utilities.
 - 4. Dead Load Freeboard: Pier manufacturer shall provide piers with dead load freeboards of not less than 11" or more than 15". However, actual dead load freeboard shall not vary appreciably from the freeboard above with piers presenting a reasonably level, flat, even surface to the eye under dead load conditions. As indicated, main piers shall be reasonably level, but in no case shall a cross slope exceeding 1" in 6' of length or width be tolerated under dead load conditions when accepted, nor more than $1\frac{1}{2}$ " in 6 feet at the end of 5 years. At the design load of dead load plus 30 psf live load a freeboard of not less than 10 inches shall be maintained. Freeboard loss shall not be more than 2.5" at the end of 5 years.
- C. Torsion: Positively prevent torsion, racking and twisting by providing sufficient built-in torsional resistance to prevent no more than 3" variation from normal deadload freeboard at the free end of all dock units of whatever length (30' or longer) due to design impact loading transferred through the fender system.
- D. Piers and flotation shall sustain the loads imposed by ice without damage, fracture or puncture. The pier system including ramps and anchorage shall be capable of sustaining waves of up to 1.5 feet without damage.

1.05 REFERENCES:

- A. "Accessible Fishing Piers & Platforms" and "Accessible Boating Facilities" per the United States Access Board criteria – current recommendations..

1.06 MAINTENANCE DATA:

- A. Submit under provisions of Section 01700.
- B. Maintenance Data: Provide data on maintenance renewal of applied coatings.

1.07 SUBMITTALS:

- A. Submit under provisions of Section 01300.
- B. Shop Drawings: Indicate formwork, shaped earthwork, dimensions and thickness, tolerances, and contours, reinforcement and accessories required for a complete installation.
- C. The Contract Drawings are not intended to be used for fabrication, nor suggest all material, connections or details required to complete the floating dock system.
- D. The Contractor shall prepare and submit at least three (3) sets of drawings to the Architect, plus the number the Contractor wants back for approval prior to fabricating and installing the required floating dock system.
 - 1. The shop drawings shall show all dimensions, clearances, and anchorage locations.
 - 2. The shop drawings shall account for all height fluctuations as required by the low-high-mean average water levels noted.
 - 3. All Accessible docks and/or piers shall comply with ADA requirements for 'sloped walking surfaces' and coordinate between floating dock elevations and fixed grades at existing Boardwalk.
- E. Product Data: Provide data on admixtures, reinforcing and aggregate.

1.08 QUALITY ASSURANCE:

- A. A minimum of five (5) years of proven experience in floating pier system fabrication and installation is required.
- B. Use of an alternative product not meeting the criteria herein must be approved prior to bidding. Failure to pre-approve an alternative product assumes (mandates) that bidder has reflected an intended use of the above-named manufacturer
- C. Other materials and equipment shall be as indicated on the Drawings, however, all other materials not specifically described but required for a complete and proper installation of the work under this Section, shall be new, first quality, and if selected by the Contractor, subject to the approval of the Engineer

1.09 QUALIFICATIONS:

- A. **Applicator:** Company specializing in performing the work of this Section with minimum 5 years documented experience.
- B. **Qualification of the Bidder:** A minimum of ten (10) years of proven experience in floating pier system fabrication and installation is required.
- C. **Pre-qualification:** In order to obtain pre-qualification status for this project, the following list of submittals must be presented within one week of bid date in order to provide the owner's representative with sufficient time to review said alternative request.
 - 1. Applicable specifications and typical fabrication drawings showing cross sections, details, attachments, connections, anchorage details and all other necessary information for adequate product analysis.
 - 2. A list of existing installations placed during the required ten (10) year performance period where floating dock systems similar to that to be qualified have been installed at locations with similar climatic and ice conditions. Such listing shall also include the number of slips at each location, date installed and the name, address and telephone number of the installation's owner, or the owner's local contact.
 - 3. Catalog information on all commercial equipment being installed as part of the system, whether specified or offered as a substitution.
 - 4. General literature covering floating dock manufacturer and his product.
 - 5. Design calculations for piers, connectors, bracing, flotation, bridges, anchorages and related pier system components based upon specified loading conditions. Decking shall not be considered as part of the load carrying structure. All drawings and calculations submitted must be sealed by a Professional Engineer registered in the State of Michigan experienced in the design of floating piers and anchorages. If the Engineer is not a full-time employee of the pier manufacturer, proof must be provided of satisfactory experience in floating pier system design including anchorages for conditions similar to

those which will be experienced on this project. The burden of proof of the merit of the proposed floating pier system including anchorages is upon the manufacturer.

- D. Prospective bidders are cautioned that qualification of any floating dock system is not to be considered as a determination of complete product acceptability and that a pre-qualified system may be determined by the Architect as being in need of modification on the basis of subsequently introduced information on shop drawings or in the final submitted structural calculations as reviewed by the Architect. In any case, the system furnished must comply with the design criteria specified herein.
 - E. Design work of this section under direct supervision of a Professional Engineer experienced in design of this work and licensed in the State of Michigan.
- 1.10 DELIVERY, STORAGE, AND HANDLING:
- A. Deliver, store, protect, and handle products to site under provisions of Section 01600.
 - B. Deliver materials in manufacturer's packaging including application instructions.
- 1.11 PRE INSTALLATION CONFERENCE:
- A. Convene one week prior to commencing work of this section, under provisions of Section 01039.
- 1.12 FIELD MEASUREMENTS:
- A. Verify that field measurements and datum are as shown on Drawings and shop drawings.
 - B. Dock layout shall be to the configuration shown on the drawings. Widths of piers are to the edge of the piers and do not include rub-rails and fenders.
 - C. Docks may be up to 3 inches less than the specified widths to allow some tolerance in the manufacturing process. However, the pier width shall be uniform and the 3-inch tolerance does not imply that variations in width over the length of the pier(s) will be tolerated.
- 1.13 COORDINATION:
- A. Coordinate Work under provisions of Section 01039.
- 1.14 INCONSISTENCIES:
- A. Refer to Section 00100 – Instructions to Bidders for General Contractor, Construction Manager, and/or sub contractor responsibilities pertaining to Specification inconsistencies.

PART 2 - PRODUCTS

- 2.01 LUMBER:
- A. Decking lumber shall be No. 1 select structural Southern Yellow Pine or better and shall conform to the rules of the SPIB as applicable. Framing lumber shall be No. 1 Southern Yellow Pine or better, and shall conform to the rules of the SPIB. Timber and lumber shall be pressure treated with CA-B or ACQ preservative in accordance with AWPB Standard LP-22 and each piece shall bear the AWPB Quality Mark.
 - B. Deck boards shall not have any holes, loose knots, or wane and shall not have sap or free flowing preservative on the walking surface. All four upper edges of each deck board shall have a ½" radius eased edge
 - C. All lumber shall have a minimum of 0.2 pounds per cubic foot of preservative retained after treatment except lumber, which is in continuous contact with ground or water. Such lumber shall have a minimum of 0.31 pcf of preservative retained after treatment.
 - D. The Engineer, at his/her discretion, may assay the treated lumber and have the AWPB laboratory test the pressure treatment retention of all lumber prior to acceptance at the Contractor's expense.
- 2.02 STRUCTURAL AND MISCELLANEOUS STEEL:
- A. Structural and miscellaneous steel shall conform to the requirements of the Standard Specification for Structural Steel, ASTM Designation A36 or stronger. All steel shall be zinc

- coated (hot-dipped) in accordance with the requirements of ASTM Designation A123 except where structural steel remains out of sight as per State of Michigan exemption. Note: galvanizing of steel components reduces their structural integrity.
- B. Structural aluminum shapes and/or extrusions shall be made from 6061-T6 aluminum, conforming to the requirements of ASTM Designation B221.
 - C. Fasteners: Bolts, lag bolts, screws, nails, flat washers and lock washers shall be of the type and size best suited for the intended use. Low-carbon bolts shall conform to the requirements for Grade "A" bolts, ASTM Designation A307. High strength bolts shall conform to the requirements of ASTM Designation A325 or A490.
 - 1. All nailing and screw fasteners shall be hot dipped galvanized. All other bolts and washers (1/2" diameter and above) may be galvanized by electroplating process.
 - 2. The coating thickness shall be of a minimum that corrosion of nonwear surfaces does not appear during the warranty period. Stainless steel fasteners may be substituted for protected Steel.
 - D. Cleats shall be heavy duty 10 inch bullhorn design made of cast aluminum alloy 319 (27,000 psi tensile, 18,000 psi yield) with countersunk hex bolt head lock features. Cleats shall be of the size indicated and shall be installed at the locations shown on the drawings.
 - 1. Cleats shall be securely bolted directly to the pier's structural framing or fastened securely to the structural framing through appropriate intermediate members as approved by the Engineer.
 - 2. Bolts, nuts, and washers (both standard and lock) shall be of adequate size and strength for tying up boats normally using the slip adjacent to the cleats and shall be hot dipped or mechanically galvanized
 - E. Arc welding electrodes shall conform to American Welding Society "Iron and Steel Arc Welding Electrodes".
 - F. Galvanized steel sheet metal shall be at least 20 gauge, conforming to the requirements of either the Standard Specifications for zinc-coated (Galvanized Carbon Steel Sheets of a Commercial Quality, ASTM Designation A526) or zinc-coated (Galvanized) Steel sheets of structural quality, coils and cut lengths, ASTM Designation A446.
 - 1. The steel base metal, its formability and zinc coating shall be in accordance with ASTM Designation A525.
 - 2. The zinc coating shall be a minimum of 2.0 ounces per square foot.
 - G. Aluminum alloy plate shall be equivalent in strength to 20 gauge steel and be 0.124 inch thick, alloy 5052, H36 Marine Aluminum conforming to the requirements of the Standard Specification for Aluminum-Alloy Sheet and Plate ASTM Designation: B209.

2.03 FLOTATION MATERIAL

- A. The flotation material shall be closed cell polystyrene with an average density of 1.0 pounds per cubic foot and a buoyancy factor of 59.0 pounds per cubic foot to allow for moisture absorption.
- B. Flotation shall be provided by closed-cell polystyrene cellular materials, either pre-formed or expanded in place.
 - 1. The flotation material shall be fully encased in at least 20 gauge galvanized steel sheet metal, marine aluminum at least 0.124 inches thick, and wood having a nominal thickness of 2 inches.

2.04 ACCESSORIES:

- A. Provide a Barrier-Free Kayak/Canoe Launch for the Barrier-Free floating dock:
 - 1. Provide a single BF Kayak/Canoe Launch as provided by EZ Dock OIM.
www.GreatLakesLift.com or www.ez-dock.com
- B. Fendering shall be non-marring white extruded vinyl or flexible polyvinyl chloride, resistant to sunlight, water, gasoline, oil or other agents common to marinas.
- C. Dock Cleats:
 - 1. Provide 4 cleats per dock: 6" aluminum, safety cleats that fold flat when not in use. Similar to www.kfsboatdocks.com

- D. Lifting rings, where used in lieu of lifting straps or other acceptable methods of removal, shall be of galvanized cast steel of a size sufficient to safely handle the anticipated loads.
- E. All cable hardware shall be galvanized and capable of carrying all loads transmitted.

PART 3 - EXECUTION

3.01 APPLICATORS:

- A. Installers and Applicators with 5 years of documented experience in the State of Michigan, with all design by an engineer registered in the State of Michigan.

3.02 EXAMINATION:

- A. Verify on-site conditions under provisions of Section 01039.
- B. Verify that conditions are acceptable and are ready to receive work.

3.03 INSTALLATION

- A. The pier manufacturer shall provide a full time superintendent at the job site to supervise and coordinate the unloading, assembly and installation of the floating pier system including anchorages, bridges and utilities as well as to coordinate pier related activities with those activities that are the responsibility of other trades and/or contractors.
- B. A maximum amount of fabrication and assembly shall be done at the pier manufacturer's plant rather than on the job site.

3.04 DOCKS

- A. Docks shall be pre-fabricated within practical limits in the plant by the manufacturer and delivered ready for flotation.
 - 1. All workmanship shall be first class in all respects as determined by the Engineer and any units not representing a finished and acceptable appearance will be rejected.
 - 2. If utilities are part of the work, all utility conduits, pipes, cables, boxes, etc. shall be located inside the structural frame and not outside of the frame where they are exposed to ice and boat damage.
- B. All connector plates, including those in-line, at the corners and at knee braces which receive loads from impact and anchorage forces shall be of a height, width and thickness sufficient to dissipate the required loads to the framework without distortion or damage.
 - 1. Connections may be either of the single or double shear type with hinge pin (bolt) holes parallel and along the hinge pin axis.
 - 2. Hinge pin holes shall be as tight as possible to eliminate excessive "slop" and unnecessary movement in the joints.
 - 3. Calculations may be required to demonstrate the frame's ability to accept such loads imposed through the connectors as well as the ability of the connections (single or double shear) to resist the loads without distortion or damage.
- C. All steel galvanized members must be hot dip galvanized after fabrication, including welding, and after the drilling of bolt holes for the attachment of anchorages, utilities and deck mounted components.
 - 1. Exception is given only to the above referenced exemption and those field welds that must be performed, as determined by the Engineer, at a custom connection and done so in the interest of quality control. Where applicable, enough coats of an acceptable cold galvanizing compound must be applied to the field weld to give a thickness equal to the adjoining original hot dip galvanizing.
- D. Where heavy plates are used in lieu of standard SAE washers (only on frame interior) hot dip galvanizing will not be required. Structural knee braces boxed in by wood and not visible are painted in lieu of galvanizing. Only the portion of intermediate spud that is visible above water is to be galvanized.
- E. All finished steel members shall be free from twists, bends, distortions, and open joints. All steel construction shall be free of sharp edges and burrs. Ends of exposed steel members shall be rounded or beveled. All coping and mitering shall be done with care. Projecting

- materials and burrs, which would prevent bearing of the various members on each other, shall be removed.
- F. All welding shall conform to the requirements of the American Welding Society. Welds shall be a solid and homogenous part of the metals joined and shall be free from pits or scale, and shall be of full area and length required to develop the required strength for the intended use. All shop welders, welding operators, welding equipment and welding procedures used in production of steel structures shall have been qualified in accordance with the qualification procedures of AWS D1.1. Welders shall be certified to perform the welds that are shown on the fabrication drawings. Proof of qualifications shall be required.
 - G. All bolts, nuts and washers shall be of a size and strength adequate for the loads imposed and shall be set square with connecting structural members with the nuts drawn up tight. Lock washers or other devices or techniques shall be used to prevent nuts from loosening after being properly tightened.
 - 1. No bolt threads shall be allowed within the structural components in hinge type connections.
 - 2. Hinge pins or bolts shall be of a positive locking type, which will not allow loosening or loss of the pin or bolt from movement of the joint.
 - 3. High strength bolts shall be used where required in accordance with the American Institute of Steel Construction's specifications for "Structural Joints using ASTM A325 or A490 Bolts".
 - H. Lumber shall be counterbored wherever projecting boltheads or nuts may damage boats or provide a hazard to pier users. Counterboring shall be sufficiently deep to permit installation of the bolts and nuts with washers well below the surface of the wood.
 - 1. All counterboring shall receive additional application of preservative prior to setting anchors.

3.05 DECKING

- A. Deck boards may be fastened either by nailing or screwing.
 - 1. If nailed, nails shall be driven to set the heads flush with or slightly below the surface of the wood. Number of nails used per connection, type and size shall be sufficient to fasten the deck boards firmly to the nailing surface (timber framing or nailers) and provide a flat, even walking surface free from warp of any kind.
 - 2. Decking shall be screwed down for easy removal in those locations where electrical boxes, valves, drains, etc. must be accessed.
 - 3. Deck screws shall be stainless steel and small and have heads flush with the deck surface or slightly depressed to provide a flat, even walking surface. Deck screws shall be installed so as not to fracture the wood and cause splintering at the hole.
 - 4. Number of screws used per connection shall be adequate to firmly attach the deck boards and provide a flat, even walking surface. Fasteners of whatever type shall be located in symmetrical patterns throughout with fasteners in straight lines.
- B. Deck boards shall be installed with no space between adjacent deck boards. Decking shall be installed perpendicular to the longitudinal axis of the pier.
- C. Deck boards shall be supported at a maximum of 3 feet on center with the boards laid heart side down.
- D. Openings between adjacent floating pier modules shall not exceed 1-1/2 inches, however, the opening between adjacent pier module end deck boards shall not exceed 1/8 inch. All connections between floating pier modules shall not protrude above the level of the pier surface.

3.06 BRIDGES

- A. A bridge shall be required between every dock and shore Boardwalk. Bridges shall have timber decks constructed of 2" x 6" lumber, adequately supported, installed parallel to the longitudinal axis of the bridge and meeting the material requirements of Article 2.1.
- B. Hinged connections at both ends may be used if the anchorage system used allows for the horizontal movement of the pier(s). In all cases, the bridge connections shall be so designed as not to present any excessive openings or significant differences in elevation between the

- bridge and point of connection at the shore and pier under a range of lake levels from +3" above to -3' below LWD.
- C. Handrails shall be required on both sides of Barrier-Free accessible bridges and may be part of the structural support or separate units. Top rail is to be 42 inches above the deck surface with intermediate railings as required by ADA.
1. **Bridges shall have an edge-guard associated with all handrail/guardrail systems required by ADA.**
 2. All rails shall be smooth with no sharp corners, burrs, etc., so as to make a smooth member for hand contact.
 3. Handrail and handrail brackets shall be designed to withstand a minimum concentrated load of 200 pounds applied from any direction at any point on the handrail.
 4. Sharp corners on handrails or trusses used as handrails shall be avoided by the use of short 45° miters, short curved sections, or other approved methods.
 5. Protrusions on the railing or on the bridges themselves shall not have sharp corners.
- 3.07 SKIRTING AND RUBRAILS
- A. Skirting (to the waterline) is required. Required structural framework and flotation devices shall be skirted from decking to no less than 2" above the waterline. In the case where skirting is the prime side wall member (timber box type floating docks) extend sidewall to the bottom of the unit with nominal 2" thick wood meeting the lumber requirements as specified under Section 2.1.
1. The skirting must be adequately secured full depth to the frame members at maximum 4'-0" spacing along unit with bolts or other acceptable fasteners as dictated by sound engineering practices to prevent skirting and frame damage by ice, wave and impact design forces.
 2. Fendering shall be non-marring white extruded vinyl or flexible polyvinyl chloride, resistant to sunlight, water, gasoline, oil or other agents common to marinas.
- 3.08 MAINTENANCE AND OPERATIONS MANUAL
- A. Upon completion of the project, the Contractor shall furnish the Owner three (3) copies of a "Maintenance and Operations Manual", which shall include instructions and related information for maintaining and operating the floating pier system and anchorages including utilities, if applicable. Utilities include, but are not necessarily limited to electrical, lighting systems.
- B. The Contractor shall include in the manual a detailed procedure for systematically maintaining and winterizing the floating pier system and its anchorages and utilities in an effort to minimize ice damage to the system during the winter.
- 3.09 WARRANTY
- A. The Contractor shall warrant to the original purchaser that the product shall be free from defects in materials, workmanship, and/or design under normal use for a period of five (5) years.
- B. All dockage components, connectors, and appurtenances have been designed and are constructed to the performance standards identified within the preceding general specifications. Conditions exceeding these standards (patterned after Michigan Department of Natural Resources design criteria for small craft harbors) may precipitate damage not covered under this warranty.
- C. Anchorage systems and any related damage to the anchorage system, if specified by others, may not be covered as a part of this warranty.
- D. At any time within the warranty period the Contractor will replace and/or repair any part, assembly or portion thereof, which our examination shall disclose to our satisfaction to be defective, without expense to the Owner.
- E. This warranty specifically excludes misuse, alteration, or damage resulting from transportation after initial installation as well as from flood, windstorm, moving ice (thermal expansion, current, or wind-driven), fire, or an act of God exceeding the design criteria set

forth in these specifications. Docks located immediately adjacent to vertical walls will require either de-icing or winter removal.

- 3.10 PROTECTION OF FINISHED WORK:
- A. Protect finished Work under provisions of Section 01500
 - B. Do not permit applied work to damage adjacent surfaces.

END OF SECTION 13340

SECTION 15400 PLUMBING

PART 1 - GENERAL

1.01 **SECTION INCLUDES**

- A. Plumbing piping, valves, equipment, piping supports, piping specialties, fixtures, trim, hangers and related items for plumbing.

1.02 **SUBMITTALS**

- A. Submit under provision of SECTION 15010 - MECHANICAL GENERAL PROVISIONS.
- B. Submit product data information on:
 - 1. Domestic water systems.
 - 2. Sanitary waste and vent systems.
 - 3. Plumbing fixtures, trim, traps and supplies.
 - 4. Valves
 - 5. Cleanouts
 - 6. Back Flow Preventers
 - 7. Hangers and Supports
 - 8. Sleeves

1.03 **APPLICABLE CODES AND REGULATIONS**

- A. Plumbing system installation and testing shall be per the latest accepted edition to International Plumbing, Michigan State Plumbing Code and all other authorities having jurisdiction.
- B. In addition to ASME/ANSI standards, flammable and combustible liquids and liquid and gas fuel piping installation and testing should be per applicable factory mutual guidelines, local, state and national fire protection codes:
 - 1. Weld design and welder qualification shall be per ASME-Boiler and Pressure Vessel Code, Section IX - "Welding and Brazing Qualifications".

PART 2 - PRODUCTS

2.01 **PLUMBING PIPING AND FITTINGS**

- A. Provide plumbing piping and fittings as required of the proposed connections.
- B. Cleanouts:
 - 1. Locations: At each 90 degree bend in suspended and underground waste and drain pipes, at 50 foot intervals in straight runs, at base of each downspout and riser, above P-traps and elsewhere as shown.
 - 2. Exposed concrete floor areas: Sectional cast iron with serrated cut-off section, brass head plug with cover.
 - 3. Finish floor areas: Same as exposed concrete floors except head plug raised brass and brass scored cover plate.
 - 4. Finish wall areas: Cast brass countersunk plug, polished brass cover plate secured to plug with counter sunk screws.
 - 5. Concealed suspended pipe: Wye branch with raised brass plug.
 - 6. Acceptable manufacturers: Josam, Zurn, Wade or Smith.

2.02 **BACKFLOW PREVENTERS**

- A. Reduced pressure principle on the water service size.
- B. Acceptable manufacturers: Febco, Watts, Zurn, Becco, or Conbraco.

2.03 **WATER HAMMER ARRESTERS**

- A. Size and locate according to the fixture unit method as determined by the Plumbing and Drainage Institute.
- B. Acceptable Manufacturers: Smith or Zurn.

2.04 UNIONS AND COUPLINGS

- A. Size 2 inch and under: 300 psi malleable iron, bronze to iron ground joint unions for threaded ferrous piping. Air test required for gas service. Provide wrought copper or brass couplings for copper piping. Provide brass unions for all ferrous to copper piping connections.
- B. Size 2-1/2 inch and over: 150 psi forged steel slip-on flanges for ferrous piping and 150 psi bronze flanges for copper piping. Gaskets: 1/8 inch thick, preformed synthetic rubber with impregnate cloth suitable for service intended, high temperature type, 286 degrees F.

2.05 BOLTS, STUDS AND NUTS

- A. Steel bolts, studs, and nuts: Comply with the current ASTM A-307, Grade B, or equal.
- B. Threads: American National form right hand machine cut threads complying with the current American Standard for Screw Threads ANSI B1-1, Coarse Thread Series, Class 2 fit.
- C. Bolt heads and nuts: Semi-finished, hexagonal, complying with the dimensions for the current American Standard for Wrench Head Bolts and Nuts and Wrench Openings, ANSI B18.2, Heavy Series.

2.06 PIPE SLEEVE

- A. Material: Seamless pipe, galvanized, ASTM A120 for penetrations through outside walls, floors and roofs. Provide seamless, black steel ASTM A53 elsewhere.
- B. Sleeve Size: Large enough to accommodate the pipe and its covering, wall sleeves to be flush on both sides, and floor sleeves to be extended 1 inch above floor level. Where escutcheon plates are required, extend the sleeves 1/4 inch above the floor.
- C. Modular mechanical type seal: Use for the annular space between pipes and sleeves to seal against water or earth, consisting of interlocking synthetic rubber links compressed to positive seal by through bolts bearing on delrin plastic pressure plates. Provide 316 stainless steel bolts.

2.07 DOMESTIC WATER BALL VALVES

- A. Provide 2-piece; full port, bronze body, stainless steel ball, and PTFE seats. GATE VALVES WILL NOT BE USED.

2.08 PLUMBING EQUIPMENT, FIXTURES AND TRIM

- A. Provide as specified on as required of the proposed Document.
- B. Lavatory and trim assembly:
 - 1. Kohler – K-2849 lavatory with Speakman Model S-3561, single-lever faucet, deck mount, 3 hole, 2" centers.
 - 2. Or equal if approved by Architect

2.09 ACCEPTABLE MANUFACTURERS

- A. Faucets:
 - 1. Cambridge Brass
 - 2. Chicago Faucet
 - 3. Delta
 - 4. Eljer
 - 5. Elkay
 - 6. Kohler
- B. Clean-Outs:
 - 1. Josam
 - 2. J.R. Smith
 - 3. Zurn
- C. Plumbing Fixtures (Water Closets & Lavatories):
 - 1. Crane
 - 2. Eljer
 - 3. Elkay
 - 4. Just
 - 5. Kohler

- D. Supplies with Valves:
 - 1. Brasscraft
 - 2. Cambridge Brass
 - 3. Crane
 - 4. Kohler
- E. Valves - Domestic Water Ball Valves
 - 1. Jomar S-100-SS
 - 2. NIBCO 5-585-70-66
 - 3. Watts B-6081-SS (2-inch & smaller)

PART 3 - EXECUTION

3.01 INSTALLATION

- A. For soldered joints, use non-acidic and lead-free flux on cleaned pipe and fittings. Cut pipe square and ream ends before assembly. Fill joints with solder by capillary actions, with solder covering joint periphery. Wipe joints clean. Apply heat carefully to prevent overheating and damage to pipe, fittings, and valves. Strict adherence to manufacturer's installation recommendations when heating and soldering valves is mandatory.
- B. Changes in direction shall be made by use of fittings. No pipe bending allowed. Pipe size reductions shall be by use of reducing fittings, no bushings allowed.
- C. Terminal units shall be properly supported to wall studs by use of backing plate spanning stud-to-stud.
- D. Cut copper tube square and ream before assembly. Keep piping capped during construction to prevent intrusion of construction debris.
- E. Support piping drops through finished ceiling from structure above to prevent any lateral or up/down movement. Other outlet drops shall be supported from walls, columns, or work benches using appropriate hangers, anchors, or unistrut.
- F. Provide plugs or caps for openings during construction phase. Temporary plug shall be plastic cap or equivalent.
- G. CONTRACTOR shall provide his own survey to locate pipes, elevations, ducts, conduits, etc. and prepare his own shop drawings. Variations to suit existing conditions, structural features or mechanical equipment shall be his responsibility.
- H. Piping shall be run parallel with building lines and shall be as direct as possible. Piping shall be concealed as far as possible in the finished portions of the building.
- I. Downfeed runouts for water piping shall be taken at 45 degrees or from bottom of main and upfeed runouts from the top of the main.
- J. Cut pipe accurately and install without springing or forcing. All burrs shall be removed after cutting.
- K. Install plumbing to applicable code requirements.
- L. Install ball valves on all domestic branches serving two or more outlets close to the point where the branches leave the main.
- M. Provide ball valves and access doors for all domestic piping installed in chases.
- N. Install all domestic supply piping for fixtures through the sidewalls unless otherwise noted on the Plans.
- O. Install shock absorbers on the water supply at flush valves or self-closing valves and at equipment with solenoid valves.
- P. Install above ground water piping so as to be completely drainable with stop and drain valves installed accessibly at the low points of the system.
- Q. Lubricate domestic cleanout plugs with mixture of graphite and linseed oil.
- R. Install ball valves for all domestic equipment.
- S. Install chrome-plated compression stops for all fixtures.
- T. Sanitary lines 4" and larger in diameter, shall be graded 1/8" per foot minimum unless otherwise indicated. All sanitary waste lines 3" and smaller in diameter shall be graded 1/4" per foot minimum unless otherwise indicated.

3.02 FLASHING

- A. Flash and counterflash where mechanical equipment passes through weather or waterproofed walls, floors, and roofs.
- B. Flash vent and soil pipes projecting 12 inch minimum above finished roof surface with galvanized steel flashing and neoprene boots. For pipes through outside walls turn flange back into wall and caulk.

3.03 SLEEVES

- A. Set sleeves in position in advance of concrete work. Provide suitable reinforcing around sleeves. Core drilling is allowed up to 8" openings, with permission of ENGINEER.
- B. Install seals and provide floor plate.
- C. Sleeve Size: Large enough to accommodate the pipe and its covering, wall sleeves to be flush on both sides, and floor sleeves to be extended 1 inch above floor level. Where escutcheon plates are required, extend sleeves 1/4 inch above floor.
- D. Where piping passes through floor, ceiling or wall where no potential moisture exists, close off space between pipe and construction with non-combustible insulation. Provide tight fitting metal caps on both sides and caulk.
- E. Use modular mechanical type seal for the annular space between pipes and sleeves to seal against water or earth.
- F. Install chrome plated escutcheons where piping passes through finished surface.

3.04 VALVES

- A. General:
 - 1. Provide valves of same manufacturer throughout where possible. Provide valves with manufacturer's name and pressure rating clearly marked on outside of body.
 - 2. Installation:
 - a. Install valves with stems upright or horizontal, not inverted.
 - b. Install ball valves for shut-off and isolating service, to isolate equipment, part of systems or vertical risers. Use AGA rated plug cocks or ball valves.

3.05 INSTALLATION OF FIXTURES

- A. Install each fixture with its own trap, easily removable for servicing and cleaning. At completion thoroughly clean plumbing fixtures and equipment.
- B. Provide chrome plated rigid or flexible supplies to fixtures with screw driver stops, reducers and escutcheons.
- C. Install wall mounted lavatories with approved wall carriers, model to suit installation.
- D. Mount fixtures according to architectural Drawings and heights meeting State of Michigan Plumbing Code and ANSI A117.1.
- E. Solidly attach floor mounted water closets to floor with lag screws. Lead flashing shall not hold closet in place.
- F. Install hose and faucets and hose connections with vacuum breakers.
- G. Provide rough-in piping connections in accordance with the plumbing fixture schedule on Contract Document P1.0.

3.06 DOMESTIC WATER SYSTEMS TESTING

- A. General:
 - 1. Each system of piping and control tubing tested by installer under superintendence of CONTRACTOR.
 - 2. Provide pumps, gauges, instruments, test equipment personnel and clean auxiliary water. After tests have been made, remove all test equipment and drain all pipes.
 - 3. Submit a complete test report to the ENGINEER.
 - 4. Operate pumps which have mechanical seal only with water in the system.
 - 5. Test prior to painting, installation and insulation, or concealment.
 - 6. Tests may be made on sections of piping as installed.
 - 7. Re-test repaired or revised piping.
- B. Pressure Systems:

System	Test Media	Test Pressure	Permissible Pressure Drop
Underground potable water	water	150 psig	0 psig in 4 hours
Above ground water	air/water	100 psig	1 psig in 2 hours

C. Gravity Systems:

1. Sanitary drain and vent systems, as well as stormwater systems.
2. Entire System: Close all openings except the highest and fill system with water to point of overflow.
3. Sections: Close all openings except highest, and provide a head of 10 feet. In testing successive sections, at least the upper 10 feet of next preceding section shall be included so that every joint and pipe in the whole system (except the uppermost 10 feet) shall have been subjected to a head of ten feet of water.
4. After system or section under test has been filled with water, wait at least 15 minutes before starting inspection.
5. After 2 hours (minimum) there shall be no evidence of leakage.
6. Test waste, drain and vent pipe system before fixtures are installed and retest after fixtures have been installed.

3.07 CLEANING OF DOMESTIC PIPING SYSTEMS

- A. Domestic Water: Flush with chlorine solution - AWWA C6-1-68 "Disinfecting Water Mains".
- B. Natural Gas: Blow clear of chips and scale with 100 psig air.

3.08 PIPE AND EQUIPMENT IDENTIFICATION

- A. Pipe and equipment identification is specified in as required of the proposed systems.

END OF SECTION 15400

APPENDIX A FAIR EMPLOYMENT PRACTICE

The consultant, its agents or sub-contractors, shall comply with all requirements of Chapter 112 of Title IX of the Code of the City of Ann Arbor and in particular the following excerpts there from:

9:161 NONDISCRIMINATION BY CITY CONTRACTORS

- (1) All contractors proposing to do business with the City of Ann Arbor shall satisfy the nondiscrimination administrative policy adopted by the City Administrator in accordance with the guidelines of this section. All contractors shall receive approval from the Director prior to entering into a contract with the City, unless specifically exempted by administrative policy. All City contractors shall take affirmative action to insure that applicants are employed and that employees are treated during employment in a manner which provides equal employment opportunity and tends to eliminate inequality based upon race, national origin or sex.
- (2) Each prospective contractor shall submit to the City data showing current total employment by occupational category, sex and minority group. If, after verifying this data, the Director concludes that it indicates total minority and female employment commensurate with their availability within the contractor's labor recruitment area, i.e., the area from which the contractor can reasonably be expected to recruit, said contractor shall be accepted by the Director as having fulfilled affirmative action requirements for a period of one year at which time the Director shall conduct another review. Other contractors shall develop an affirmative action program in conjunction with the Director. Said program shall include specific goals and timetables for the hiring and promotion of minorities and females. Said goals shall reflect the availability of minorities and females within the contractor's labor recruitment area. In the case of construction contractors, the Director shall use for employment verification the labor recruitment area of the Ann Arbor-Ypsilanti standard metropolitan statistical area. Construction contractors determined to be in compliance shall be accepted by the Director as having fulfilled affirmative action requirements for a period of six (6) months at which time the Director shall conduct another review.
- (3) In hiring for construction projects, contractors shall make good faith efforts to employ local persons, so as to enhance the local economy.
- (4) All contracts shall include provisions through which the contractor agrees, in addition to any other applicable Federal or State labor laws:
 - (a) To set goals, in conference with the Human Resources Director, for each job category or division of the work force used in the completion of the City work;
 - (b) To provide periodic reports concerning the progress the contractor has made in meeting the affirmative action goals it has agreed to;
 - (c) To permit the Director access to all books, records and accounts pertaining to its employment practices for the purpose of determining compliance with the affirmative action requirements.

- (5) The Director shall monitor the compliance of each contractor with the nondiscrimination provisions of each contract. The Director shall develop procedures and regulations consistent with the administrative policy adopted by the City Administrator for notice and enforcement of non-compliance. Such procedures and regulations shall include a provision for the posting of contractors not in compliance.
- (6) All City contracts shall provide further that breach of the obligation not to discriminate shall be a material breach of the contract for which the City shall be entitled, at its option, to do any or all of the following:
 - (a) To cancel, terminate, or suspend the contract in whole or part and/or refuse to make any required periodic payments under the contract;
 - (b) Declare the contractor ineligible for the award of any future contracts with the City for a specified length of time;
 - (c) To recover liquidated damages of a specified sum, said sum to be that percentage of the labor expenditure for the time period involved which would have accrued to minority group members had the affirmative action not been breached;
 - (d) Impose for each day of non-compliance, liquidated damages of a specified sum, based upon the following schedule:

Contract Amount	Assessed Damages Per Day of Non-Compliance
\$ 10,000 - 24,999	\$ 25.00
25,000 - 99,999	50.00
100,000 - 199,999	100.00
200,000 - 499,999	150.00
500,000 - 1,499,999	200.00
1,500,000 - 2,999,999	250.00
3,000,000 - 4,999,999	300.00
5,000,000 - and above	500.00

- (e) In addition the contractor shall be liable for any costs or expenses incurred by the City of Ann Arbor in obtaining from other sources the work and services to be rendered or performed or the goods or properties to be furnished or delivered to the City under this contract.

**CITY OF ANN ARBOR
LIVING WAGE ORDINANCE**

RATE EFFECTIVE MAY 1, 2012-ENDING APRIL 30, 2013

\$12.17 per hour

If the employer provides health care benefits*

\$13.57 per hour

If the employer does **NOT** provide health care benefits*

Employers providing services to or for the City of Ann Arbor or recipients of grants or financial assistance from the City of Ann Arbor for a value of more than \$10,000 in a twelve-month period of time must pay those employees performing work on a City of Ann Arbor contract or grant, the above living wage.

ENFORCEMENT

The City of Ann Arbor may recover back wages either administratively or through court action for the employees that have been underpaid in violation of the law. Persons denied payment of the living wage have the right to bring a civil action for damages in addition to any action taken by the City.

Violation of this Ordinance is punishable by fines of not more than \$500/violation plus costs, with each day being considered a separate violation. Additionally, the City of Ann Arbor has the right to modify, terminate, cancel or suspend a contract in the event of a violation of the Ordinance.

* Health Care benefits include those paid for by the employer or making an employer contribution toward the purchase of health care. The employee contribution must not exceed \$.50 an hour for an average work week; and the employer cost or contribution must equal no less than \$1/hr for the average work week.

The Law Requires Employers to Display This Poster Where Employees Can Readily See It.

For Additional Information or to File a Complaint Contact:

**Linda Newton, Procurement Officer
734/794-6576 or Lnewton@a2gov.org**

**CITY OF ANN ARBOR
LIVING WAGE ORDINANCE
DECLARATION OF COMPLIANCE**

The Ann Arbor Living Wage Ordinance (Section 1:811-1:821 of Chapter 23 of Title I of the Code) requires that employers providing services to the City or recipients of grants for financial assistance (in amounts greater than \$10,000 in a twelve-month period of time) pay their employees who are working on the City project or grant, a minimum level of compensation known as the **Living Wage**. This wage must be paid to the employees for the length of the contract/project.

Companies employing fewer than 5 persons and non-profits employing fewer than 10 persons are exempt from the Ordinance. If this exemption applies to your firm, please check below:

- _____ This **company** is exempt due to the fact that we employ or contract with fewer than 5 individuals.
_____ This **non-profit agency** is exempt due to the fact that we employ or contract with fewer than 10 employees.

The Ordinance requires that all contractors/vendors and/or grantees agree to the following terms:

- a) To pay each of its employees performing work on any covered contract or grant with the City, no less than the living wage, which is defined as \$12.17/hour when health care is provided, or no less than \$13.57/hour for those employers that do *not* provide health care. It is understood that the Living Wage will be adjusted each year on April 30, and covered employers will be required to pay the adjusted amount thereafter. The rates stated above include any adjustment for 2012.
- b) Please check the boxes below which apply to your workforce:
 - Employees who are assigned to *any covered* City project or grant will be paid at or above the applicable living wage without health benefits Yes _____ No _____
- OR**
- Employees who are assigned to *any covered* City project or grant will be paid at or above the applicable living wage with health benefits Yes _____ No _____
- c) To post a notice approved by the City regarding the Living Wage Ordinance in every work place or other location in which employees or other persons contracting for employment are working.
- d) To provide the City payroll records or other documentation as requested; and,
- e) To permit access to work sites to City representatives for the purposes of monitoring compliance, investigating complaints or non-compliance.

The undersigned authorized representative hereby obligates the contractor/vendor or grantee to the above stated conditions under penalty of perjury and violation of the Ordinance.

Company Name	Address, City, State, Zip
Signature of Authorized Representative	Phone (area code)
Type or Print Name and Title	Email address
Date signed	

Questions about this form? Please contact:
Procurement Office City of Ann Arbor
Phone: 734/794-6576

City of Ann Arbor Procurement Office

INSTRUCTIONS FOR CONTRACTORS

For Completing CONTRACT COMPLIANCE FORM

City Policy

The “non discrimination in contracts” provision of the City Code, (Chapter 112, Section 9:161) requires contractors/vendors/grantees doing business with the City not to discriminate on the basis of actual or perceived race, color, religion, national origin, sex, age, condition of pregnancy, marital status, physical or mental limitations, source of income, family responsibilities, educational association, sexual orientation, gender identity or HIV status against any of their employees, any City employee working with them, or any applicant for employment. It also requires that the contractors/vendors/grantees include a similar provision in all subcontracts that they execute for City work or programs.

This Ordinance further requires that each prospective contractor/vendor submit employment data to the City showing current total employee breakdown by occupation, race and gender. This allows the Human Rights Office to determine whether or not the contractor/vendor has a workforce that is reflective of the availability of women and under-represented minorities within the contractor’s labor recruitment area (the area where they can reasonably be expected to recruit employees). ***This data is provided to the City on the Human Rights Contract Compliance Forms (attached).***

To complete the form:

- 1) **If a company has more than one location, then that company must complete 2 versions of the form.**
 - **Form #1** should contain the employment data for the **entire corporation**.
 - **Form #2** should contain the employment data for those employees:
 - who will be working on-site;
 - in the office responsible for completing the contract; or,
 - in the case of non-profit grantees, those employees working on the project funded by the City grant(s).
- 2) If the company has only one location, fill out Form #1 only.
- 3) Complete all data in the upper section of the form including the name of the person who completes the form and the name of the company/organization’s president.
- 4) Complete the Employment Data in the remainder of the form. Please be sure to complete all columns including the Total Columns on the far right side of the form, and the Total row and Previous Year Total row at the bottom of the form.
- 5) Return the completed form(s) to your contact in the City Department for whom you will be conducting the work.

For assistance in completing the form, contact:

City of Ann Arbor Procurement Office at
734-794-6576

If a contractor is determined to be out of compliance, the Procurement Office will work with them to assist them in coming into compliance.

**CITY OF ANN ARBOR PROCUREMENT OFFICE
HUMAN RIGHTS CONTRACT COMPLIANCE FORM**
Entire Organization (Totals for All Locations where applicable)

Form #1

Name of Company/Organization _____ Date Form Completed _____

Name and Title of Person Completing this Form _____ Name of President _____

Address _____ County _____ Phone # _____
(Street address) (City) (State) (Zip) (Area Code)

Fax# _____ Email Address _____
(Area Code)

EMPLOYMENT DATA

Job Categories	Number of Employees (Report employees in only one category)												TOTAL COLUMNS A-L
	Male						Female						
	White	Black or African American	Asian	Hispanic or Latino	Native Hawaiian or Other Pacific Islander	American Indian or Alaska Native	White	Black or African American	Asian	Hispanic or Latino	Native Hawaiian or Other Pacific Islander	American Indian or Alaskan Native	
A	B	C	D	E	F	G	H	I	J	K	L		
Exec/Sr. Level Officials													
Supervisors													
Professionals													
Technicians													
Sales													
Admin. Support													
Craftspeople													
Operatives													
Service Workers													
Laborers/Helper													
Apprentices													
Other													
TOTAL													
PREVIOUS YEAR TOTAL													

**CITY OF ANN ARBOR PROCUREMENT OFFICE
HUMAN RIGHTS CONTRACT COMPLIANCE FORM**
Local Office (Only those employees that will do local or on-site work, if applicable)

Form #2

Name of Company/Organization _____ Date Form Completed _____

Name and Title of Person Completing this Form _____ Name of President _____

Address _____ County _____ Phone # _____
(Street address) (City) (State) (Zip) (Area Code)

Fax# _____ Email Address _____
(Area Code)

EMPLOYMENT DATA

Job Categories	Number of Employees (Report employees in only one category)												
	Male						Female						TOTAL COLUMNS A-L
	White	Black or African American	Asian	Hispanic or Latino	Native Hawaiian or Other Pacific Islander	American Indian or Alaska Native	White	Black or African American	Asian	Hispanic or Latino	Native Hawaiian or Other Pacific Islander	American Indian or Alaska Native	
	A	B	C	D	E	F	G	H	I	J	K	L	
Exec/Sr. Level Officials													
Supervisors													
Professionals													
Technicians													
Sales													
Admin. Support													
Craftspeople													
Operatives													
Service Workers													
Laborers/Helper													
Apprentices													
Other													
TOTAL													
PREVIOUS YEAR TOTAL													