

# Specifications

---

## 00 31 46 - PERMITS

### PART 1 – GENERAL

- 1.1. SCOPE
- 1.2. REFERENCES
- 1.3. GENERAL CONTRACTORS REQUIREMENTS

## 01 25 00 - SUBSTITUTION PROCEDURES

### PART 1 – GENERAL

- 1.1. SCOPE

### PART 2 – EXECUTION

- 2.1. REQUESTING A SUBSTITUTION DURING BIDDING
- 2.2. REQUESTING A SUBSTITUTION AFTER AWARD OF CONTRACT
- 2.3. UNAUTHORIZED SUBSTITUTIONS

## 01 26 00 - CONTRACT MODIFICATION PROCEDURES

### PART 1 – GENERAL

- 1.1. SCOPE
- 1.2. REFERENCES
- 1.3. DEFINITIONS AND STANDARDS

### PART 2 – EXECUTION

- 2.1. CONTRACTOR INITIATED REQUESTS FOR INTERPRETATION (RFI)
- 2.2. CONSTRUCTION BULLETINS (CB)
- 2.3. CHANGE ORDER REQUESTS (COR)
- 2.3. CHANGE ORDERS (CO)

## 01 29 00 - PAYMENT PROCEDURES

### PART 1 – GENERAL

- 1.1. SCOPE
- 1.2. REFERENCES
- 1.3. SCHEDULE OF VALUES
- 1.4. PROGRESS PAYMENT MILESTONES

### PART 2 – EXECUTION

- 2.1. AIA DOCUMENT G702 – APPLICATION AND CERTIFICATE FOR PAYMENT
- 2.2. AIA DOCUMENT G703 – CONTINUATION SHEET
- 2.3. PROGRESS PAYMENT SUBMITTAL

## 01 31 00 - PROJECT MANAGEMENT AND COORDINATION

### PART 1 – GENERAL

- 1.1. SCOPE
- 1.2. CONTRACTOR REQUIREMENTS
- 1.3. COORDINATION DRAWING

1.4. OVERALL PROJECT SCHEDULE (OPS)

PART 2 – EXECUTION

- 2.1. PRECONSTRUCTION MEETING
- 2.2. CONSTRUCTION PROGRESS MEETINGS
- 2.3. PRE-INSTALLATION MEETINGS
- 2.4 OTHER SPECIAL MEETINGS

01 33 00 - SUBMITTAL PROCEDURES

PART 1 – GENERAL

- 1.1. SCOPE
- 1.2. SUBMITTAL REQUIREMENTS
- 1.3. ADMINITRATIVE SUBMITTALS
- 1.4. GENERAL PROCEDURES

01 35 29 - HEALTH SAFETY AND EMERGENCY RESPONSE PROCEDURES

PART 1 – GENERAL

- 1.1. SCOPE
- 1.2. REFERENCES
- 1.3. SUBMITTALS
- 1.4. GENERAL PROCEDURES

01 40 00 - QUALITY REQUIREMENTS

PART 1 – GENERAL

- 1.1. SCOPE
- 1.2. DEFINITIONS
- 1.3. STANDARD SPECIFICATIONS
- 1.4. REFERENCE STANDARDS
- 1.5. SUBMITTALS
- 1.6. QUALITY ASSURANCE
- 1.7. DRAWINGS, SPECIFICATIONS AND OTHER DESIGN DOCUMENTS
- 1.8. CONTRACTOR'S RESPONSIBILITES
- 1.9. REGULATORY REQUIREMENTS

PART 2 - PRODUCTS

- 2.1. VOLATILE ORGANIC COMPOUND (VOC) CONTENT LIMITATIONS
- 2.2. OWNER PROVIDED, CONTRACTOR INSTALLED EQUIPMENT

PART 3 -EXECUTION

- 3.1. DELIVERY AND STORAGE
- 3.2. INSTALLATION
- 3.3. QUALITY MANAGEMENT OBESERVATIONS (QMO)
- 3.4. MOCKUPS
- 3.5. PHOTOGRAPHIC DOCUMENTATION
- 3.6. As-BUILT DOCUMENTS

01 73 00 - EXECUTION

PART 1 – GENERAL

- 1.1. SCOPE
- 1.2. EXAMINATION
- 1.3. CONSTRUCTION LAYOUT
- 1.4. CONTINUITY OF SERVICES AND TRAFFIC

PART 2 – PRODUCTS

- 2.1. FENCING MATERIALS AND BARRICADES

PART 3 – EXECUTION

- 3.1. PROTECT WORK
- 3.2. WORK INTERRUPTION
- 3.3. CUTTING AND PATCHING

01 74 00 - CLEANING AND WASTE MANAGEMENT

PART 1 – GENERAL

- 1.1. SCOPE
- 1.2. REFERENCES
- 1.3. DEFINITIONS
- 1.4. WASTE MANAGEMENT
- 1.5. WASTE MANAGEMENT PLAN

PART 2 – EXECUTION

- 2.1. PROJECT SITE CLEANING
- 2.2. FINAL CLEANING AND CALL BACK WORK
- 2.3. HAZARDOUS AND TOXIC WASTE
- 2.4. RECYCLABLE, RE-USABLE, AND SALVAGEABLE WASTE

01 77 00 - CLOSEOUT PROCEDURES

PART 1 – GENERAL

- 1.1. SCOPE
- 1.2. DEFINITIONS

PART 2 – EXECUTION

- 2.1. CONSTRUCTION CLOSEOUT REQUIREMENTS
- 2.3. CONTRACT CLOSEOUT REQUIREMENTS

01 78 00 - CLOSEOUT SUBMITTALS

PART 1 – GENERAL

- 1.1. SCOPE
- 1.2. DEFINITIONS
- 1.3. O&M DATA REQUIREMENTS
- 1.4. SPARE PARTS

01 78 36 - WARRANTIES

PART 1 – GENERAL

- 1.1. SCOPE
- 1.2. DEFINITIONS
- 1.3. CONTRACTOR RESPONSIBILITIES AND OWNER RIGHTS
- 1.4. WARRANTY NOTIFICATION, RESPONSE, EXECUTION AND FOLLOW-UP
- 1.5. LETTERS OF WARRANTY

02 41 00 - DEMOLITION

PART 1 – GENERAL

- 1.1. SCOPE
- 1.2. REFERENCES
- 1.3. SUBMITTALS
- 1.4. QUALITY ASSURANCE

PART 2 - PRODUCTS

- 2.1. REPAIR MATERIALS

PART 3 – EXECUTION

- 3.1. EXAMINATION
- 3.2. DEMOLITION
- 3.3. GENERAL BUILDING DEMOLITION
- 3.4. UTILITY SERVICES AND BUILDING SERVICES SYSTEMS
- 3.5. PROTECTION

26 05 00 - COMMON WORK RESULTS FOR ELECTRICAL

PART 1 – GENERAL

- 1.1. SCOPE
- 1.2. REFERENCES
- 1.3. SUBMITTALS
- 1.4. QUALITY ASSURANCE

PART 2 - PRODUCTS

- 2.1. ELECTRICAL IDENTIFICATION PRODUCTS
- 2.2. HANGERS AND SUPPORT
- 2.3. LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLE
- 2.4. RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS
- 2.5. GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS
- 2.6. CONTROL SWITCHES AND STATIONS
- 2.7. GENERAL PURPOSE CONTACTORS

PART 3 – EXECUTION

- 3.1. INSTALLATION
- 3.2. FIELD QUALITY CONTROL
- 3.3. IDENTIFICATION
- 3.4. RACEWAY AND BOXES
- 3.5. WIRING CONNECTIONS

26 50 00 - LIGHTING

PART 1 – GENERAL

- 1.1. SCOPE
- 1.2. REFERENCES
- 1.3. SPARE PARTS

PART 2 - PRODUCTS

- 2.1. INTERIOR LUMINAIRES AND ACCESSORIES
- 2.2. AC-POWERED EXIT SIGNS
- 2.3. FIRE ALARM RELAY
- 2.4. EMERGENCY LIGHTING INVERTERS
- 2.5. EXTERIOR LUMINAIRES AND ACCESSOIRES
- 2.6. POLES
- 2.7. INTERIOR MOTION AND PHOTO SENSORS
- 2.8. ANALOG DIMMERS 0-10V
- 2.9. DIMMERS LINE-VOLTAGE (TRACK LIGHTING)
- 2.10. REWIND TIMER
- 2.11. PROGRAMMABLE TIMERS
- 2.12. SWITCHES
- 2.13. LOCKABLE COVERS
- 2.14. LOW VOLTAGE CONTROL
- 2.15. PILOT LIGHTS

**SECTION 00 31 46**

**PERMITS**

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54

PART 1 – GENERAL .....1

    1.1. SCOPE .....1

    1.2. REFERENCES .....1

    1.3. GENERAL CONTRACTORS REQUIREMENTS .....1

**PART 1 – GENERAL**

**1.1. SCOPE**

- A. Each project has varying requirements for permits, inspections, and fees based on the scope, size, and location of the project. Contractor shall be knowledgeable of all applicable requirements.
- B. The City of Madison (Owner) is subject to all permits, inspections and associated fees for construction, demolition, utility connection, storm water management, and other similar requirements that may be required to complete the scope of work associated with these contract documents.

**1.2. REFERENCES**

- A. The following references are not intended to be all inclusive. It shall be the contractor’s responsibility to determine all requirements based on the scope of work in the contract documents.
- B. City of Madison Ordinances: Review all ordinances that may require a permit or fee that may be connected with a required permit. Contact the following City Agencies to determine the exact requirements during bidding:
  - 1. Building Inspection
  - 2. Zoning
  - 3. Engineering
  - 4. Water Utility
  - 5. Traffic Engineering
  - 6. Utilities
  - 7. Others as may be specified by the contract documents.
- C. State Statutes
- D. Other Regulatory Regulations
- E. Other Agencies or companies that may have related requirements
  - 1. Madison Metropolitan Sewerage District
  - 2. Local gas and electric utility companies
  - 3. Other utility companies

**1.3. GENERAL CONTRACTORS REQUIREMENTS**

- A. Contractor shall be responsible for all of the following:
  - 1. Execute application for all required permits as may be required by the scope of work described within the contract documents.
  - 2. Scheduling and pay for all required inspections that may be conditions of any required permits.
  - 3. Paying for other permits not explicitly stated as excluded in this section.
  - 4. Obtain all permits and pay all fees required by local utilities for permanent electric and gas service.
  - 5. Contractor shall obtain copies of all required permits and certificates of inspection applicable to the work. Provide high quality scanned images of all required permits and inspections and upload them to the Contract Documents-Regulatory Documents Library on the Project Management Web Site.
- B. GC is not responsible for paying for the City of Madison Building, HVAC, Electrical, Plumbing, Fire Department Sprinkler and Fire Department Fire Alarm permits.
  - 1. Contractor is responsible for applying for the permit. COM will provide the contractor with a City-internal cashier code to use when paying for the permit.
  - 2. Contractor will be responsible for permit cost from all non-City of Madison agencies.
- C. COM will provide plans approved by Wisconsin Department of Safety and Professional Services and/or City of Madison Building Inspection.

**END OF SECTION**

SECTION 01 25 00  
SUBSTITUTION PROCEDURES

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57

PART 1 – GENERAL .....1

    1.1. SCOPE .....1

PART 2 – EXECUTION.....1

    2.1. REQUESTING A SUBSTITUTION DURING BIDDING .....1

    2.2. REQUESTING A SUBSTITUTION AFTER AWARD OF CONTRACT .....1

    2.3. UNAUTHORIZED SUBSTITUTIONS.....1

**PART 1 – GENERAL**

**1.1. SCOPE**

- A. A specific list of preferred products is used to establish standards of quality, utility, and appearance required. For Products specified by naming only one Product and manufacturer, no substitute product will be considered.
- B. The Owner may reject any substitution request without providing specific reasons.
- C. Requestor shall provide comparison of significant data showing how the product is equal or better than the specified product.
- D. The City of Madison will not allow substitutions for specified Products except as follows:
  - 1. The Product is no longer produced or the product manufacturer is no longer in business.
  - 2. The manufacturer has significantly changed performance data, product dimensions, or other such design criteria for the specified Product(s).
  - 3. Products specified by naming one or more Products or manufacturer’s and “or approved equal” or “approved equivalent.”
  - 4. The substitute would enhance the design.

**PART 2 – EXECUTION**

**2.1. REQUESTING A SUBSTITUTION DURING BIDDING**

- A. In the event that a substitution is requested during the bidding phase, no substitution request will be considered less than a week before bid submittal deadline. Complex substitution requests may require a longer time and submitters are encouraged to submit as soon as possible. In general, this procedure shall be as follows:
  - 1. Submit the Substitution Request including all required supporting documentation to the City Project Manager.
  - 2. Submit a Substitution Request for each product, supported with complete data, drawings and samples including:
    - a. Comparison of qualities of the proposed substitutions with that specified.
    - b. Changes required in other elements of the Work because of the substitution.
    - c. Effect on the construction schedule.
    - d. Cost data comparing the proposed substitution with the Product specified.
    - e. Any required license fees or royalties.
    - f. Availability of maintenance service and source of replacement materials.
    - g. All information shall be complete and sufficient assuming the reviewer is not familiar with the proposed manufacturer and product. It is not the reviewer’s responsibility to research missing information.
  - 3. The Owner will review the Substitution Request Form and if approved the City of Madison will publish a bidding addendum authorizing the replacement.
  - 4. Documents provided shall be officially manufacturer-published documents. Statements regarding properties created solely by representatives or other 3<sup>rd</sup> parties will be rejected. Those documents provided shall be available for download from manufacturer’s website.
- B. A requestor shall evaluate the substitution request before submitting and shall only submit products that are “equal or better” than the specified products.

**2.2. REQUESTING A SUBSTITUTION AFTER AWARD OF CONTRACT**

- A. A substitution request will only be considered if it meets the qualifying provisions as described above.
- B. The GC shall submit a substitution request using the form provided by City Project Manager (CPM). Request for substitutions from any party other than the General Contractor (GC) will not be accepted.

**2.3. UNAUTHORIZED SUBSTITUTIONS**

- A. Any Contractor who substitutes products without proper authorization by the CPM will be required to immediately remove and replace the product at no cost to owner.

**END OF SECTION**

**SECTION 01 26 00**  
**CONTRACT MODIFICATION PROCEDURES**

1		
2		
3		
4	PART 1 – GENERAL .....	1
5	1.1. SCOPE .....	1
6	1.2. REFERENCES .....	1
7	1.3. DEFINITIONS AND STANDARDS .....	1
8	PART 2 – EXECUTION.....	2
9	2.1. CONTRACTOR INITIATED REQUESTS FOR INTERPRETATION (RFI).....	2
10	2.2. CONSTRUCTION BULLETINS (CB).....	2
11	2.3. CHANGE ORDER REQUESTS (COR).....	2
12	2.3. CHANGE ORDERS (CO).....	4
13		
14	<b><u>PART 1 – GENERAL</u></b>	
15	<b>1.1. SCOPE</b>	
16	A. This section defines contract modifications and includes Requests for Interpretation (RFI), Construction Bulleting (CB),	
17	Change Order Requests (COR) and Change Orders (CO).	
18		
19	<b>1.2. REFERENCES</b>	
20	A. Parts of this specification will reference articles within “The City of Madison Standard Specifications for Public Works	
21	Construction”.	
22	1. Use the following link to access the Standard Specifications web page:	
23	<a href="http://www.cityofmadison.com/business/pw/specs.cfm">http://www.cityofmadison.com/business/pw/specs.cfm</a>	
24	2. Navigate by clicking on the appropriate links on the website and the PDF.	
25		
26	<b>1.3. DEFINITIONS AND STANDARDS</b>	
27	A. LABOR: The amount of time and cost associated with the performance of human effort for a defined scope of Work. Labor	
28	is further defined as follows:	
29	1. Labor rate is the total rate which includes the base rate, taxes, insurance and fringe benefits required by agreement or	
30	custom.	
31	2. Unit labor is the labor hours anticipated to install the corresponding unit of material.	
32	3. Labor cost is the labor hours multiplied by the hourly labor rates.	
33	B. MATERIAL: Actual material cost is the amount paid, or to be paid, by the GC for materials, supplies and equipment entering	
34	permanently into the Work, including cost of transportation and applicable taxes. The cost shall not exceed the usual and	
35	customary cost for such items available in the geographical area of the project	
36	C. LARGE TOOLS AND MAJOR EQUIPMENT: Large tools and major equipment are those with an initial cost greater than	
37	\$1,500, whether from the GC or other sources.	
38	1. Tool and equipment use and time allowed is only for extra work associated with change orders.	
39	a. Rental Rate is the machine cost associated with operating a piece of equipment for a defined length of time (hour,	
40	day, week, or month) and shall not exceed the usual and customary amount for such items available in the	
41	geographical area of the project.	
42	b. Rental cost is the rental rate multiplied by the anticipated duration the equipment shall be required.	
43	2. The GC shall provide a breakdown of all rental rates to indicate what items and costs are associated with the rate.	
44	Examples of items to include in the breakdown would be fuel consumption, lubrication, maintenance and other similar	
45	expenses but not including profit and overhead.	
46	3. When large tools and equipment needed for Change Order work are not already at the job site, the actual cost to get	
47	the item there is also reimbursable.	
48	D. BOND COST: The cost shall be calculated at 1% of the total proposed change order.	
49	E. SUB-CONTRACTOR COSTS: Sub-contractor costs are for those labor, material, and equipment costs required by	
50	subcontracted specialties to complete the Change Order work including allowable markups as outlined within this	
51	specification.	
52	F. OVERHEAD AND PROFIT Markup: The allowable markup percentage to a COR by the GC and Sub-contractors for overhead	
53	and profit. All of the following are expenses associated with overhead and profit and shall not be reimbursable as individual	
54	items on any COR:	
55	1. CHANGE ORDER PREPARATION: All costs associated with the preparing and processing of the change order.	
56	2. DESIGN, ESTIMATING, AND SUPERVISION: All such efforts, unless specifically requested by Owner as additional Work to	
57	be documented as a COR or portion thereof.	
58	3. INSTALLATION LAYOUT: The layout required for the installation of material and equipment, and the installation design,	
59	is the responsibility of the GC.	
60	4. SMALL TOOLS AND SUPPLIES: The cost of small hand tools with an initial cost of \$1,500 or less, along with consumable	
61	supplies and expendable items such as drill bits, saw blades, gasoline, lubricating or cutting oil, and similar items.	
62	5. GENERAL EXPENSE: The general expense, which is those items that are a specific job cost not associated with direct	
63	labor and material such as job trailers, foreman truck, and similar items.	
64	6. RECORD DRAWINGS: The preparation of record or as-built drawings.	



- 1 7. OTHER COSTS: Any miscellaneous cost not directly assessable to the execution of the Change Order including but not  
2 limited to the following:  
3 a. All association dues, assessments, and similar items.  
4 b. All education, training, and similar items.  
5 c. All drafting and/or engineering, unless specifically requested by Owner as additional Work to be documented as a  
6 Change Order proposal or portion thereof.  
7 d. All other items including but not limited to review, coordination, estimating and expediting, field and office  
8 supervision, administrative work, etc.  
9 G. CONTRACT EXTENSION: The necessary amount of time to be added to the contract deadlines for the completion of a  
10 change order.

## 11 **PART 2 – EXECUTION**

### 12 **2.1. CONTRACTOR INITIATED REQUESTS FOR INTERPRETATION (RFI)**

- 13 A. Immediately on discovery of the need for additional information or interpretation of the Contract Documents any  
14 contractor may initiate an RFI for additional information or clarification through the GC.  
15 B. Submit a new RFI for each issue. Multiple questions that are of a similar nature may be combined into one RFI.  
16 C. Thoroughly explain the issue at hand, provide backup information (photographs, sketches, drawings, data, etc) as  
17 necessary, and clearly state the question or problem that requires a resolution. GC shall ensure:  
18 1. RFI is valid and the information being requested is not addressed in the construction documents.  
19 2. All requests are clearly stated and the RFI form is completely filled out.  
20 D. Responses to simple RFI issues shall use the response section of the RFI form.  
21 E. Responses to more complex issues may require additional time or may require a Construction Bulletin to be published. The  
22 following GC generated RFIs will be returned without action:  
23 1. Requests for approval of submittals  
24 2. Requests for approval of substitutions  
25 3. Requests for approval of Contractor's means and methods.  
26 4. Requests for coordination information already indicated in the Contract Documents.  
27 5. Requests for adjustments in the Contract Time or the Contract Sum.  
28 6. Requests for interpretation of A/E's actions on submittals.  
29 7. Incomplete RFI or inaccurately prepared RFI.  
30 F. COMMENCEMENT OF WORK RELATED TO AN RFI:  
31 1. The GC shall only proceed with the Work of an RFI where, additional information is not required.  
32 2. The GC shall not proceed with any Work associated with an RFI while it is under review.  
33 3. The GC shall not proceed with any Work associated with an RFI that clearly states a CB will be issued in response to the  
34 RFI.  
35 4. The GC will be required to immediately remove and replace unauthorized Work and all costs required to conform to the  
36 Contract Documents shall be borne by the GC.  
37 5. Ensure that all work associated with an RFI response is carried out as intended.  
38  
39

### 40 **2.2. CONSTRUCTION BULLETINS (CB)**

- 41 A. CB are formal published construction documents that modify the original contract documents after construction has  
42 commenced. CBs may be published for many reasons, including but not limited to the following:  
43 1. Clarification of existing construction documents including specifications, plans, and details  
44 2. Change in product or equipment  
45 3. A response to a Request for Information  
46 4. Change in scope of the contract as either an add or a deduct of work  
47 B. CBs provide a higher degree of detail in response to an RFI through directives, revised plans/details, and specifications.  
48 C. The CB may change the original contract documents through additions or deletions to the Work.  
49 D. Where the directives of a CB are significant enough to warrant a COR, the GC shall use all information provided in the CB to  
50 assemble all required back-up documentation for additions and deletions of materials, labor and other related contract  
51 costs for the COR.  
52 E. GENERAL CONTRACTOR: The GC shall be responsible for the following as needed:  
53 1. Acknowledge receipt of the CB on the Project Management Web Site.  
54 2. Notify all Sub-contractors of the CB and publish the CB to all field sets of drawings and specifications as appropriate.  
55 3. The GC shall execute the directives of the CB or submit Change order Request (COR) documentation as necessary during  
56 the execution and implementation of the CB.  
57

### 58 **2.3. CHANGE ORDER REQUESTS (COR)**

- 59 A. Except in cases of emergency no changes in the Work required by the Contract Documents may be made by the General  
60 Contractor (GC) without having prior approval of the City Engineer or his representative.  
61 B. The City may at any time, without invalidating the Contract and without Notice to Sureties, order changes in the Work by  
62 written Change Order (CO). Such changes may include additions and/or deletions.  
63 C. Upon receipt of a Construction Bulletin (CB) where the GC believes a significant change in contract scope warrants the  
64 submittal of a COR the GC shall do all of the following within 10 working days after receipt of the CB:

1. Review the CB with all necessary trades and sub-contractors required by the change in scope.
  - a. Additions or deletions to the contract scope shall be as directed within the CB.
  - b. Additions or deletions of labor and materials shall be determined by the GC based on the directives of the CB.
2. Assemble all required back-up documentation for additions and deletions of materials, labor and other related contract costs as previously outlined in this specification.
3. Submit a COR request form on the Project Management Web Site.
- D. Submitting a COR does not obligate the GC to complete the work associated with the COR nor does it obligate the Owner to approve the COR as a change to the contract.
- E. Where the City desires to make changes in the Work through use of written Change Order Request (COR), the following procedures apply:
  1. If requested by the City, the GC shall prepare and submit a detailed proposal, including all cost and time adjustments to which the GC believes it will be entitled if the change proposed is incorporated into the Contract. The City shall be under no legal obligation to issue a Change Order for such proposal.
  2. The parties shall attempt in good faith to reach agreement on the adjustments needed to the Contract to properly incorporate the proposed change(s) into the Work. In the event that the parties agree on such adjustments, the City may issue a Change Order and incorporate such changes and agreed to adjustments, if any.
  3. In some instances it is necessary for the City to authorize Work or direct changes in Work for which no final and binding agreement has been reached and for which unit prices are not applicable. In such cases the following shall apply.
    - a. Upon written request by the City, the GC shall perform proposed Work
    - b. The cost of such change may be determined in accordance with this specification.
    - c. In the event agreement cannot be accomplished as contemplated herein, the City may authorize the Work to be performed by City forces or to hire others to complete the Work. Such action on the part of the City shall not be the basis of a claim by the GC for failure to allow it to perform the changed Work.
- F. Where changes in the Work are made by the City through use of a force account basis, the GC shall as soon as practicable, and in no case later than 10 working days from the receipt of such order, unless another time period has been agreed to by both parties, give the City written Notice, stating:
  1. The date, circumstances and source of the extra work; and,
  2. The cost of performing extra work described by such Order, if any; and,
  3. Effect of the order on the required completion date of the Project, if any.
- G. The giving of each Notice by the GC as prescribed by this specification shall be a requirement to liability of the City for payment of any additional costs incurred by the GC in implementing changes in the Work. Under this specification, no order or statement of the City shall be treated as a Change Order, or shall entitle the GC to an equitable adjustment of the terms of this Contract or damages for costs incurred by the GC on any activity for which the Notice was not given.
- H. In the event Work is required due to an emergency as described in this specification the GC must request an equitable adjustment as soon as practicable, and in no case later than 10 working days of the commencement of such emergency.
- I. All GC requests for equitable adjustment shall be submitted to the CPM per the specifications below. Such requests shall set forth with specificity the amount of and reason(s) for the proposed adjustment and shall be accompanied by supporting information and documents.
- J. No adjustment of any kind shall be made to this Contract, if asserted by the GC for the first time, after the date of final payment.
- K. The GC shall be responsible for all of the following:
  1. Carefully reviewing the CB that is associated with the COR.
  2. Collect required supporting documentation from all contractors that quantify the need for a COR.
    - a. Labor hours and wage rates
    - b. Material costs
    - c. Equipment costs
- L. The following shall apply to establishing prices for labor, materials, and equipment costs:
  1. Where Work to be completed has previously been established by individual bid items in the contract bid proposal the GC shall use the unit bid prices previously established.
  2. Where Work to be completed was bid as a Lump Sum without individual bid items the GC shall provide a breakdown of all labor, materials, equipment including unit rates and quantities required.
- M. CONTRACT EXTENSION:
  1. If the GC feels a contract extension is warranted he/she shall provide sufficient scheduling information that shows how the COR being requested impacts the critical path of the project.
  2. Time extensions for extra Work will be considered when a schedule analysis of the critical path shows that the Change Order Request places the Work beyond the completion date stated in the Contract.
- N. OVERHEAD AND PROFIT MARKUP:
  1. Pursuant to the City of Madison Standard Specifications for Public Works Construction, Section 104.7, Extra Work, the following maximum allowable markups shall be strictly enforced on all change orders associated with the execution of this contract. The total maximum overhead and profit shall not exceed fifteen percent (15%) of the total costs.
  2. The total maximum overhead and profit shall be distributed as follows:
    - a. For work performed and materials provided solely by the General Contractor, fifteen percent (15%) of the total costs.
    - b. For work performed and materials provided solely by Sub-contractors and supervised by the General Contractor:

- 1 i. Supervision of the GC, five percent (5%) of the total Sub-contractor cost.
- 2 ii. Sub-contractors work and materials ten percent (10%) of the total Sub-contractor cost.
- 3 O. The GC shall be responsible for ensuring that all COR supporting documentation meets the following requirements prior to
- 4 completing the COR form on the Project Management Web Site:
- 5 1. Sufficiently indicates labor, material, and other expenses related to completing the intent of the CB.
- 6 2. No costs exceed the usual and customary amount for such items available in the geographical area of the project, and
- 7 no costs exceed those established under the contract.
- 8 P. EMERGENCY CHANGE ORDER REQUEST:
- 9 1. In the event Work is required due to an emergency as described in the Contract Documents, the GC must request an
- 10 equitable adjustment as soon as practicable, and in no case later than ten (10) working days of the commencement of
- 11 such emergency.
- 12 2. The GC shall provide full documentation of all labor, materials and equipment used during the period of emergency as
- 13 part of the COR submittal.
- 14 Q. The GC shall not act upon any accepted COR until it has received final approval through the Public Works process as an
- 15 official CO to the Work unless instructed to do so by the CPM. Proceeding without the final approval of a fully authorized
- 16 Change Order is at the GC's own risk.

### 17 18 **2.3. CHANGE ORDERS (CO)**

- 19 A. Except in cases of emergency, no changes in the Work required by the Contract Documents may be made by the GC
- 20 without having prior approval of the City Project Manager (CPM).
- 21 B. The Change Order (CO) is a Board of Public Works (BPW) form that is reviewed and approved by a specific process.
- 22 C. The CO form is typically made up of multiple Change Order Requests (CORs) and/or Bid Items as appropriate depending on
- 23 the type of project and how the contract was bid.
- 24 D. The procedure for the review and approval of all change orders associated with any Public Works Contract as follows:
- 25 1. The Supervisory Chain of the CPM shall review and approve any CO under \$20,000 provided it does not include either of
- 26 the following:
- 27 a. The CO does not request a time extension to the contract.
- 28 b. The CO does not cause the contract contingency sum to be exceeded.
- 29 2. The Board of Public Works shall review and approve any CO that requires any of the following:
- 30 a. Any CO over \$20,000.
- 31 b. Any CO requesting a time extension to the contract regardless of the monetary value of the CO.
- 32 c. Any CO that that causes the contract contingency sum to be exceeded.
- 33 E. The Board of Public Works generally meets every other week and only once in August and December. The GC is cautioned
- 34 that, under normal scheduling, a CO requiring a BPW review will take a minimum of 2 weeks to achieve final approval. The
- 35 City shall not be responsible for additional delays to the Work caused by the scheduling constraints of the Board of Public
- 36 Works.
- 37 F. The GC is cautioned to never proceed unless told to do so by the CPM. Only in rare instances may the CPM give a written
- 38 notice to proceed on a COR without an approved CO. Proceeding without the written notice of the CPM or an approved CO
- 39 is at the GC's own risk.
- 40 G. The GC and/or CPM may be required to attend the BPW meeting to address specific information as it relates to the Work
- 41 and/or materials associated with the CO.
- 42 H. EXECUTION OF CO:
- 43 1. CPM will provide a CO form
- 44 2. GC shall do the following:
- 45 a. Review all items on the form. The GC shall notify the CPM immediately of any errors or discrepancies on the form
- 46 and shall not sign or save it.
- 47 b. If/when the GC concurs with the CO form as drafted the GC shall digitally sign the form.
- 48 3. After the GC digitally signs/saves the CO it shall be routed Site for additional review and/or approvals.
- 49 4. Upon final approval of the CO the GC may proceed with executing the Work associated with the CO.

50  
51 **END OF SECTION**

**SECTION 01 29 00  
PAYMENT PROCEDURES**

1  
2  
3  
4 PART 1 – GENERAL .....1  
5 1.1. SCOPE .....1  
6 1.2. REFERENCES .....1  
7 1.3. SCHEDULE OF VALUES .....1  
8 1.4. PROGRESS PAYMENT MILESTONES .....1  
9 PART 2 – EXECUTION.....3  
10 2.1. AIA DOCUMENT G702 – APPLICATION AND CERTIFICATE FOR PAYMENT .....3  
11 2.2. AIA DOCUMENT G703 – CONTINUATION SHEET.....3  
12 2.3. PROGRESS PAYMENT SUBMITTAL .....3  
13

**PART 1 – GENERAL**

**1.1. SCOPE**

A. This section includes payment procedures required by the contractor

**1.2. REFERENCES**

A. Parts of this specification will reference articles within “The City of Madison Standard Specifications for Public Works Construction”.

1. Use the following link to access the Standard Specifications web page:  
<http://www.cityofmadison.com/business/pw/specs.cfm>
2. Navigate by clicking on the appropriate links on the website and the PDF.

**1.3. SCHEDULE OF VALUES**

- A. Schedule of Values (SOV) is a Contractor provided statement that allocates portions of the total contract sum to various portions of the contracted work and shall be the basis for reviewing the Contractors Progress Payment Requests.
- B. The breakdown detail may require a labor and material breakdown for each division of work or trade or as directed by the CPM. The total sum of all items shall equal the Contract Sum.
- C. The Contractor shall submit the initial SOV no later than 5 working days after the Pre-construction Meeting.
  1. The initial SOV shall provide information in Column A (Item No.), Column B (Description of Work), and Column C (Scheduled Value) only.
- D. The Project City Project Manager (CPM) may require modifications to reflect additional detail as necessary. Progress Payment Application 1 will not be processed until such time as the Contractor has met this requirement regardless of the amount of work completed per the application.
- E. The following documents shall be the basis for initiating and maintaining the SOV throughout the execution of this contract.
  1. Drawing documents and specifications (including general provisions) as provided with the bid set documents and any published addendums.
  2. Construction Bulletins
  3. Request for Information
  4. Approved Change Orders
  5. The latest daily/weekly Construction Progress Report
- F. The Contractor shall update the initial SOV with each Progress Payment Application as follows:
  1. Initial items and values listed above will not be adjusted once the original SOV has been approved.
  2. Change orders shall be added as additional items and values at the bottom of the SOV as they become approved and posted to the City’s contract worksheet. The value for each change order shall be the value indicated on the SOV and shall stand alone.
  3. Fill out Columns D, E, F and G to properly reflect the work completed and materials received since the last Progress Payment Application.
  4. Only materials delivered and stored on the project site may be reflected on SOV progress updates.
- G. Provide updated G702 and G703 sheets with each Progress Payment application.

**1.4. PROGRESS PAYMENT MILESTONES**

- A. The Progress Payment Milestone Schedule is not an all-inclusive list. Multiple agencies review progress payment requests and contract closeout requests. Missing, incomplete, or incorrect documentation for any agency may be a cause for not processing progress payments. It shall be the sole responsibility of the Contractor for providing documentation as required or requested to the appropriate agencies.
- B. The milestone schedule is based on the contract total sum. Milestone submittals will be required with whatever progress payment hits the percentage of contract total indicated in the schedule.
- C. It shall be the General Contractors responsibility to comply with all BPW Contract Administration requirements and related deadlines as outlined in the Award Letter, Award Checklist, and Start Work Letter.

<b>Progress Payment (PP) Milestone Schedule</b>		
<i>Milestone Description</i>	<i>Due Before</i>	<i>Remarks</i>

<b>Progress Payment (PP) Milestone Schedule</b>		
<b>Milestone Description</b>	<b>Due Before</b>	<b>Remarks</b>
Workforce profiles Best Value Contracting Documentation Sub-contractors prequalification approval & Affirmative Action plans as may be required	PP-1, or start work as applicable	For GC and Sub-contractors before PP-1 regardless of scheduling Sub-contractors (if applicable), due 10 days before they may start work Sub-contractors (if applicable), due 10 days before they may start work
Contractors Project Directory Schedule of Values Submittals Schedule Waste Management Plan Closeout Requirement Checklist Warranty Checklist Early submittals, per submittal schedule Detailed Contract Schedules	PP-1	
Progress Schedules Submittals/Re-submittals (ongoing) Schedule of Values Progress Reporting LEED Documentation Waste Management documentation QMOs are being addressed and closed Progress Cleaning As-Built Drawings	Each future PP	
<b>* All of the above are being updated as required</b>		
Weekly payroll reports Best Value Contracting Reports SBE Reports	25% CT or PP 2	
Construction/Contract Closeout Meeting #1 Submittals/Re-submittals complete	50% CT	
Operation and Maintenance (O & M) drafts	60% CT	
Construction/Contract Closeout Meeting #2 Construction closeout checklist	70% CT	
BPW Contract Administration Documentation Request Finalization Review from BPW Construction Progress Milestones Operation and Maintenance (O & M) finals, accepted All major QMO issues resolved As-Built Drawings, Division Trades ready for GC review	80% CT	This is a recommendation to the GC and is not a requirement of this PP.
All of the following shall be completed for this PP: Regulatory Inspections completed All QMO reports closed Demonstration and Training completed Attic Stock completed Final Cleaning	90% CT	Contractor to determine the proper order of completion:
Construction Closeout Procedures: Letter of Substantial Compliance sent to BI and DHS as needed Certificate of Occupancy issued As-Built Drawings, finals, accepted City Letter of Substantial Completion Warranty letters dated and issued	100% CT Completion of this begins the one year warranty.	Generated/Signed by the Architect Building Inspection Signed by the City Engineer
BPW Contract Administration Documentation Contract Closeout Procedures Construction Closeout has been completed Contractor requests final payment of retainage All BPW contractual requirements are verified	Final	Contractor must provide any missing BPW Contractual Documentation

<b>Progress Payment (PP) Milestone Schedule</b>		
<b>Milestone Description</b>	<b>Due Before</b>	<b>Remarks</b>
<b>NOTE: CT = Contract Total less held retainage</b>		

1

2

**PART 2 – EXECUTION**

3

**2.1. AIA DOCUMENT G702 – APPLICATION AND CERTIFICATE FOR PAYMENT**

4

A. GC shall use AIA Document G-702 Application and Certificate for Payment with each Progress Payment Request.

5

B. Completely fill out the Project Information section as follows:

6

1. TO OWNER: provide all owner related information as provided in the contract documents.

7

2. PROJECT: provide all contract information including contract number, title and address.

8

3. FROM CONTRACTOR: provide all contractor related information.

9

4. VIA ARCHITECT: provide all the architect's related information including the architect's project reference number if different from the owners.

10

5. Indicate the current APPLICATION NO., PERIOD TO date, and CONTRACT DATE.

11

C. Completely fill out the Contractors Application for Payment section.

12

1. Fill out lines 1 through 9 to reflect the current status of the contract through the payment date being requested.

13

2. The City of Madison calculates retainage on as described in City of Madison Standard Specification 110.2.

14

D. Completely fill out the Change Order Summary section. Only change orders that have been finalized and posted to the City of Madison's Application for Partial Payment worksheet may be itemized into the SOV documents.

15

E. The Contractor shall sign and date the application and it shall be properly notarized.

16

F. The Contractor shall not fill in any information in the Architects Certificate for Payment section.

17

18

19

20

**2.2. AIA DOCUMENT G703 – CONTINUATION SHEET**

21

A. GC shall use AIA Document G-703 Continuation Sheet to itemize SOV for this contract. Provide additional sheets as necessary.

22

B. Provide information in Column A (Item No.), Column B (Description of Work), and Column C (Scheduled Value). Possible methods include combinations of the following:

23

1. By division of work

24

2. By contractor, sub-contractor, sub sub-contractor

25

3. By specialty item or group

26

4. Other methods of breakdown as may be requested by the CPM at the pre-construction meeting.

27

C. Provide total cost of the item of work including proportionate shares of profit and overhead related to the item.

28

29

30

31

**2.3. PROGRESS PAYMENT SUBMITTAL**

32

A. Each progress payment submittal shall be Digital in colored PDF format

33

B. In general the following shall apply to all PP requests:

34

1. Materials or products:

35

a. On order, being shipped, etc. may not be invoiced.

36

b. Received and stored on the project site may be invoiced.

37

c. Being manufactured off site at any location may not be invoiced (example: cabinetry, ductwork, etc.)

38

d. Only completed installations may be invoiced to 100% based on the Schedule of Values.

39

e. DO NOT submit BPW Contract Administration Documentation with Progress Payment Requests, submit them directly to the correct agency and in the correct format as instructed.

40

f. GC shall provide below documents in a single PDF file for each PP request.

41

g. City cover sheet – Application and Certificate for Payment

42

h. City tabulation sheet(s)

43

2. AIA G702 - Application and Certificate for Payment

44

3. AIA G703 - Continuation Sheet(s)

45

4. Daily and weekly construction progress reports filed since the last payment request.

46

5. Contractors Schedule of Values as updated from the last payment request.

47

6. Any miscellaneous documents that may be requested as backup documentation for the pay request.

48

7. Lien waivers are not required and shall not be submitted.

49

C. Do not provide contractual administrative documents such as pay reports with pay requests.

50

D. Do not supply progress deliverables with pay requests.

51

52

53

**END OF SECTION**

**SECTION 01 31 00  
PROJECT MANAGEMENT AND COORDINATION**

1  
2  
3  
4 PART 1 – GENERAL .....1  
5 1.1. SCOPE .....1  
6 1.2. CONTRACTOR REQUIREMENTS .....1  
7 1.3. COORDINATION DRAWING .....1  
8 PART 2 – EXECUTION.....2  
9 2.1. PRECONSTRUCTION MEETING .....2  
10 2.2. CONSTRUCTION PROGRESS MEETINGS.....2  
11 2.3. PRE-INSTALLATION MEETINGS.....2  
12 2.4 OTHER SPECIAL MEETINGS.....2  
13

**PART 1 – GENERAL**

**1.1. SCOPE**

- A. This specification provides general information regarding project coordination for the General Contractor and all Sub-contractors.
- B. This specification is not intended to cover planning and execution meetings between the General Contractor (GC) and sub-contractors.
- C. Representatives of Contractors, Subcontractors, and suppliers attending meetings shall be qualified and authorized to act on behalf of the entity each represents.
- D. The General Contractor shall at all times be responsible for the project, project site, and execution of the Contract Documents.

**1.2. CONTRACTOR REQUIREMENTS**

- A. Cooperate with the Owner, all authorized Owner Representatives, Project Engineer and all consultants of the Owner.
- B. Assume the responsibility for all Work specified in the Contract Documents except where specifically identified to be performed by the Owner or other contractor separately hired by the Owner.
- C. Coordinate work with owner-provided work or equipment. Adjust project schedule accordingly.
- D. Be familiar with all of the contract documents as they pertain to specific and adjacent work and the overall project.
- E. CLEARANCE COORDINATION: Each device requiring clearance shall have a label attached outlining clearance requirements. This shall include but not be limited to manufacturer’s clearance drawings, indication of distances and other information helpful for other trades to not interfere with the clearance requirements. Label shall be clearly visible and durable for construction site conditions.
- F. Coordinate work with all adjacent work and existing conditions.
  - 1. Perform work in proper sequence according to the GC’s project schedule and in relation to the work of other trades.
  - 2. Notify other sub-contractors and trades whose work may be connected to, combined with, or influenced by your work and allow them reasonable time and access to complete their work.
  - 3. Join your work to the work of others in accordance with the intent of the Contract Documents.
- G. Cooperate with all other trades to facilitate the general progress of the work. This shall include providing every reasonable opportunity for the installation of work by others and the storage of their materials and equipment.
- H. Arrange work, equipment, and materials and dispose of construction waste so as to not interfere with the work or storage of materials of others.
- I. Coordinate all work as indicated during pre-installation meetings with Owner, the GC and other trades. Any work improperly coordinated shall be relocated as designated by the Owner Representative at no additional cost to the City.
- J. General Contractor (GC) shall provide all construction management responsibilities including but not limited to:
  - 1. Scheduling of work
  - 2. Coordination of work between other Trades and Sub-contractors
  - 3. Construction administration and management
  - 4. Site layout, cleanliness, and protection of completed work/stored materials
  - 5. Waste Management
  - 6. Quality Assurance and Quality Control
- K. GC shall be responsible for assigning work and related responsibilities where the Contract Documents may not clearly state who is responsible for providing the work, material, or product.

**1.3. COORDINATION DRAWING**

- A. Prior construction, GC shall schedule a meeting with the Subcontractors. The meeting shall introduce the coordination program and determine its implementation in relation to the project schedule.
- B. Using the Construction Documents as a reference, contractors shall draw, to scale, the proposed installation showing duct sizes, equipment layouts, piping, conduit runs, and other equipment and installations. In congested areas, the contractor will, in addition, prepare drawings in section and 3D view. Provide detail on sloped installations.
- C. Right-of-way: Lines with pitch shall have right-of-way over those which do not pitch. For example, plumbing drains shall normally have right-of-way over lines whose elevations can be changed.
- D. The major components to be indicated include (but are not limited to):

- 1 1. Roof drain leaders
- 2 2. Waste piping
- 3 3. Sprinkler mains
- 4 4. Heating mains
- 5 5. Cooling mains
- 6 6. Lighting
- 7 7. Conveying systems
- 8 8. Significant conduit runs
- 9 9. Duct mains and branches
- 10 E. GC will distribute the electronic drawings to the participating Trade Subcontractors and CPM. Within 1 week , GC shall
- 11 schedule a meeting with the participating Trade Subcontractors at which time, the drawing will be overlaid to identify areas
- 12 of conflict. All parties shall cooperate in resolving any identified conflicts. The above drawing, review and coordination
- 13 process will be repeated until all areas on the project have been coordinated as determined by the GC.
- 14 F. If a Change Order request is issued, the affected Trade Subcontractors shall review the coordination drawings and bring to
- 15 the attention of the GC any revisions necessary to the work of others not directly affected by the Change Order.

#### 1.4. OVERALL PROJECT SCHEDULE (OPS)

- 18 A. The GC shall prepare an Overall Project Schedule (OPS) that covers the duration of the contract from the pre-construction
- 19 meeting through the end of construction to final contract closeout. Indicate critical path and start and end dates of each
- 20 task associated with the project.
- 21 B. The GC shall prepare a 6-week Look Out Schedule (LOS) to include detail of daily tasks for the first 6 weeks of construction
- 22 in depth for the Pre-construction meeting. The LOS shall be compatible and complimentary to the OPS. The LOS shall also
- 23 include identifying and scheduling such events as:
  - 24 1. Pre-installation meetings and mock-up review meetings.
  - 25 2. Quality management reviews of installations before they are covered.
  - 26 3. Owner provided equipment as designated by the contract documents.
  - 27 4. Work by others as designated by the contract documents.
  - 28 5. Critical submittal dates.

## **PART 2 – EXECUTION**

### **2.1. PRECONSTRUCTION MEETING**

- 32 A. After execution of the Contract the City Project Manager (CPM) shall schedule and conduct the pre-construction meeting at
- 33 the Owner's facilities. The CPM shall be responsible for the final agenda and meeting minutes.
- 34 B. Attendance shall be required by all of the following:
  - 35 1. General Contractor and applicable subcontractors and suppliers
  - 36 2. City Quality Management Staff
  - 37 3. Others, as may be invited for particular agenda items.
- 38 C. Topics of the Preconstruction Meeting shall include but not be limited to the following:
  - 39 1. Staff and contractor introductions
  - 40 2. Completion Date
  - 41 3. BPW Administrative requirements and due outs
    - 42 a. Small Business Enterprise (SBE) (if applicable)
    - 43 b. Certified payroll forms
    - 44 c. Workforce profiles
    - 45 d. Best Value Contracting (BVC)
  - 46 4. Construction Schedule

### **2.2. CONSTRUCTION PROGRESS MEETINGS**

- 49 A. The General Contractor Project Manager (GCPM) shall:
  - 50 1. Schedule and conduct all construction progress meetings biweekly or more frequently as required.
  - 51 2. Prepare agenda for meetings including, but not limited to the following:
    - 52 a. Safety
    - 53 b. Current Overall Project Schedule, including review of the critical path and 6-week look ahead schedule
    - 54 c. Status of project related documentation (Submittals, RFIs, CBs, etc.)
    - 55 d. Quality Observation Log and status of correction of deficient items
    - 56 e. Project questions and issues from meeting attendees
    - 57 f. BPW Administration Check
    - 58 g. Other as needed
    - 59 h. Status of CORs and COs to be reviewed outside the standard progress meeting time.
  - 60 3. Make physical arrangements for meetings.
  - 61 4. Preside at meetings.
  - 62 5. Route a meeting attendance roster for attendees to sign-in on.
  - 63 6. GCPM to record the minutes of the meeting; include significant proceedings and decisions. Post meeting minutes to
  - 64 the PMWS no more than two (2) working days after the completed meeting. Meeting minutes shall include a scanned



1 copy of the attendance sign-in sheet. Notify all required meeting attendees, applicable parties to the contract, and  
2 others affected by decisions made at the meetings.

3 7. The above requirements do not apply to GC/sub-contractor meetings.  
4

5 **2.3. PRE-INSTALLATION MEETINGS**

6 A. The GCPM shall schedule and conduct all pre-installation meetings before each construction activity.

7 B. Required attendance shall be personnel having a stake in the outcome of the installation or knowledge of the system being  
8 installed. Owner and designers shall always be invited.

9 C. In the event the Contractor installs equipment or materials without a pre-installation meeting the Contractor shall be solely  
10 responsible for removing, replacing, repositioning materials and equipment as instructed by owner at no additional cost to  
11 the City.  
12

13 **2.4 OTHER SPECIAL MEETINGS**

14 A. The Contractor shall schedule special meetings per the requirements of the specification, the Project Quality Management  
15 Plan, the Commissioning Plan and as indicated by other specifications.

16 B. Special meetings include but are not limited to the following:

17 1. Waste Management Conference

18 2. Equipment start up meetings

19 3. Testing and balancing meetings

20 4. Commissioning meetings

21 5. Other meetings as necessitated by the contract documents  
22

23

**END OF SECTION**

**SECTION 01 33 00**  
**SUBMITTAL PROCEDURES**

1		
2		
3		
4	PART 1 – GENERAL .....	1
5	1.1. SCOPE .....	1
6	1.2. SUBMITTAL REQUIREMENTS .....	1
7	1.3. ADMINITRATIVE SUBMITTALS .....	1
8	1.4. GENERAL PROCEDURES .....	2
9		

**PART 1 – GENERAL****1.1. SCOPE**

- A. General Contractor (GC) shall be responsible for providing submittals for review of all contractors and sub-contractors as designated in the construction documents. Submittals shall include but not be limited to all of the following:
1. Equipment specified and pre-approved in the specification; to ensure quality, construction, and performance specifications have not changed since final design.
  2. Equipment specified by performance in the specification; to ensure that the intended quality, construction, and performance specified is met by the selected material or product.
  3. Shop, piece, erection, and other such drawings as indicated in the specifications to ensure all structural, dimensional, and assembly requirements are being met.
  4. Submittals indicating installation sequencing
  5. Submittals indicating control sequencing
  6. Contractor licensing, certification, and other such regulatory documentation when required by a specification.
  7. Other submittals as may be required by individual specifications.
- B. The submittal process shall not be used to determine alternates to specified products or equipment.
- C. In the event that a manufacturer has significantly changed a product (discontinued a model, changed dimension or performance data changed available colors, etc.) since bid opening the GC shall submit a Request for Information (RFI) requesting other approved alternates prior to uploading a digital submittal.
- D. The Owner reserves the right to request documentation on any materials, equipment, or product being installed where a submittal is not on file. If the material, equipment, or product installed is determined not to meet the intent of the specification the contractor/sub-contractor shall be required to remove and replace the items involved. The GC shall be solely responsible for all costs associated with the removal and replacement.
- E. Contractor is responsible for meeting contract requirements. Reviewed submittals don't relieve contractor from responsibility to meet all requirements. It is not the responsibility of the owner or designer to verify submitted items meet the contract requirements.

**1.2. SUBMITTAL REQUIREMENTS**

- A. Submittals shall be based on but not limited to all contract documents, any published addenda, Requests for Interpretation (RFI) and Construction Bulletins (CB).
- B. Digital submittal shall be original PDF of manufacturer's data sheets or high quality color scan if no original available.
- C. Submittals shall not include sales fliers or other similar documents that typically do not provide technical data.
- D. Identify the plan reference (WC-1, EF-3, etc.) in RED block letters that the submittal is for. Where multiple model numbers appear in a table identify the specific model being submitted by using a RED square, box, or other designation.
- E. Information shall include but not be limited to the following:
1. Dimensional data
  2. Performance data
  3. Resource requirements, power, water, waste, etc
  4. Clearance and maintenance requirements
  5. Finish information, colors, textures, etc.
  6. Installation Documentation
  7. Warranty information
- F. Where a submittal includes material samples (carpet, tile, paint draw downs, etc.) the contractor shall do the following:
1. The Contractor shall submit the sample(s) as indicated in the specification.
  2. The Contractor shall include a quality photograph(s) meeting photographic documentation requirements of the product
- G. Provide one Submittal per specification section.
- H. Delete any blank pages, foreign language documents and any other irrelevant pages.
- I. Mark what option is part of the project.
- J. Highlight any changes to original requirements and explain advantages and disadvantages of the deviation.
- K. If a pre-approved, but not basis-of-design, product or product from a pre-approved manufacturer is submitted, highlight how this product meets all design intent.

**1.3. ADMINITRATIVE SUBMITTALS**

- A. The GC shall upload the following submittals within 15 working days of receipt of the City of Madison Start Work Letter. All Administrative Submittals shall be approved prior to requesting Progress Payment Number 1.
1. Contractors Project Directory

- 1        2. Schedule of Values
- 2        3. Submittals Schedule
- 3        4. Waste Management Plan
- 4        5. Closeout Requirement Checklist

5

6        **1.4. GENERAL PROCEDURES**

7

A. All required submittals will be submitted as required by the CPM.

8

1. The GC shall prepare a new Submittal Form for each required submittal from the Submittals schedule.

9

2. Fill in required information on the form that will be used for routing the review and comments.

10

B. The GC and sub-contractors shall provide re-submittals as required.

11

C. Contractors shall be aware that the goals for submittal review by the City Project Manager staff and City staff will be as follows:

12

13

1. For items on the Critical Path as identified by the GC, five (5) working days

14

2. For most other submittals ten (10) working days

15

3. Additional time may be needed for complex submittals or if re-submittals are required.

16

D. If submittals are not correct, one of the following will happen:

17

1. Revise and Re-submit: a new complete and corrected submittal is required.

18

2. Reviewed with Comment: no new submittal is required the comments shall be implemented. Any direction of change or modification shall have the same effect as a construction bulletin.

19

20

21

**END OF SECTION**

**SECTION 01 35 29  
HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES**

1

2

3

4 PART 1 – GENERAL .....1

5 1.1. SCOPE .....1

6 1.2. REFERENCES .....1

7 1.3. SUBMITTALS .....1

8 1.4. GENERAL PROCEDURES .....2

9

**PART 1 – GENERAL**

**1.1. SCOPE**

- 12 A. This section includes information common to health, safety and emergency responses and applies to the entire contract.
- 13 B. Contractor shall provide all labor, materials, PPE, equipment, services and supervision required to maintain work sites that
- 14 meet the safety and health (S&H) requirements and protect the safety and health of all visitors and staff on site and the
- 15 general public. Owner can request additional safety protection measures at any time.
- 16 C. Contractor shall provide a qualified onsite S&H Representative with the authority to enforce all of the safety requirements
- 17 and implement the contractor’s Injury and Illness Prevention Program and Hazard Abatement Plan. The representative shall
- 18 conduct safety inspections of the project operations, materials, and equipment frequently throughout the day to ensure
- 19 that all safety deficiencies are identified and corrected.

**1.2. REFERENCES**

- 22 A. Work under this section depends on applicable provisions from other sections and the plan set in this contract.
- 23 B. OSHA – Occupational Safety and Health Administration
- 24 C. All applicable municipal, state and federal guidelines
- 25 D. All industry-specific guidelines

**1.3. SUBMITTALS**

- 28 A. REPORTING: regardless of perceived severity, all unsafe acts, conditions, damage, spills, leaks, accidents, injuries and near-
- 29 misses must be immediately reported to the owner. For OSHA recordable injuries, furnish a copy of the OSHA Form 301.
- 30 B. Safety, Health and Emergency Response Plan that includes but is not limited to all the below items:
- 31 1. All applicable aspects that are part of this specification
- 32 2. Construction contractor responsibilities.
- 33 3. Contractor’s disciplinary procedures.
- 34 4. Confined Space Entry
- 35 5. Hazard Communication Program.
- 36 6. Site specific Emergency Response, First Aid, & Medical Services. Identify employees with CPR/First Aid certification.
- 37 7. Fire Protection and Prevention
- 38 8. Inspection, Maintenance, and Certification of Heavy Equipment, Cranes, and Motor Vehicles
- 39 9. Construction Safety Training
- 40 10. Refer to the Manual of Accident Prevention in Construction, published by the Associated General Contractors of
- 41 America.
- 42 A. Activity Hazard Analysis and Hazard Abatement Plan including but not be limited to:
- 43 1. Description of work phase or activity
- 44 2. Identification of potential hazards associated with the activity
- 45 3. A list of the contractor’s planned controls to mitigate the identified hazards
- 46 4. Designate meeting/rally points for evacuation and designate severe weather shelters.
- 47 5. Roofing
- 48 6. Hoisting and handling of materials
- 49 7. Excavations
- 50 8. Trenching and drilling
- 51 9. Concrete placement and false work
- 52 10. Welding
- 53 11. Steel erection
- 54 12. Work performed six feet or higher above ground
- 55 13. Electrical work
- 56 14. Demolition
- 57 15. Work in confined spaces
- 58 16. Work that causes the release of silica (i.e. demolition or drilling of concrete or work with materials that contain silica)
- 59 17. Work with epoxy coatings
- 60 18. Work with or around hazardous materials
- 61 19. Work on hilly terrain
- 62 20. Use and handling of flammable materials
- 63

**1.4. GENERAL PROCEDURES**

- B. **WORK SITE ORIENTATION:** Each employee shall receive initial orientation prior entering site. Contractor shall maintain on the work site a detailed outline of the orientation and a roster of all employees who have completed the project EHS indoctrination. The orientation for visitors shall, at a minimum, cover the following points:
1. First aid and medical facilities.
  2. Site and project specific hazards.
  3. Hazard recognition and procedures for reporting or correcting unsafe conditions or practices.
  4. Procedures for reporting accidents and incidents.
- C. **ALCOHOL AND DRUG ABUSE POLICY:** No person on construction site shall be under the influence of any alcohol or drugs. Persons in violation will be banned from construction site for the duration of the project.
- D. The plans and programs shall be updated to reflect new knowledge and uncovered deficiencies.
- E. **DUST CONTROL:** Provide all necessary control measures at the work site to keep worker exposure to crystalline silica dust within the OSHA Established Permissible Exposure Limits (PEL's). Dust control measures may require spraying of water or engineering controls at the dust generating points. It also may include the use of respirators, industrial grade HEPA vacuums, and HEPA filtered locally exhausted tools. Operations causing the release of silica dusts include, but are not limited to:
1. Chipping, sawing, grinding, hammering, and drilling of concrete, rock, or brick.
  2. Work with cementitious materials such as grout, mortar, stucco, gunnite, etc.
  3. Dry sweeping of dust originating from concrete or rock
- F. **ELECTRICAL WORK:**
1. Energized electrical work within panels and equipment is not allowed.
  2. Workers shall be qualified to perform electrical tasks in accordance with OSHA 29 CFR 1910 and 1926 requirements.
  3. Work practices must be compliant with NFPA 70E, newest edition – Standard for Electrical Safety in the Workplace.
  4. Lock Out/Tag Out (LOTO)
- G. **INDOOR AIR QUALITY (IAQ):**
1. During construction the recommended control measures of the Sheet Metal and Air Conditioning Contractors National Association (SMACNA) IAQ guidelines for occupied buildings under construction must be met or exceeded.
  2. In case permanent air handlers are used, filtration media with a Minimum Efficiency Reporting Value (MERV) of 13 shall be used at each return air grille. Contractor shall replace all filtration media immediately prior occupancy.
  3. All to be installed ductwork, air handlers and other equipment later connected to the indoor air path are to be protected from dirt and debris.
- H. **FALL PROTECTION:**
1. Fall Protection needs to be used for any work 6' or higher above ground:
  2. Lifts: full body harness must be worn 100% of time
  3. Extension ladders must extend 3 feet past the landing point. Step Ladders must be used in open position. The two top steps of any ladder shall not be used to stand or sit at any time.
  4. Scaffolding systems need to be inspected and documented before use. No riding or surfing on rolling scaffolds is allowed.
- I. **PERSONAL PROTECTIVE EQUIPMENT (PPE)**
1. PPE shall be provided in sufficient number to site visitors (owner staff, shippers, etc.) near the main entrances to the jobsite. This shall include but not be limited to hard hats, eye protection and reflective vests
  2. High visibility vests or other clothing shall be worn 100% of the time.
  3. Hard hats must be worn 100% of time. Employee hard hats shall display name in front.
  4. Eye protection must be worn 100% of time. Dark glasses are not allowed indoors.
  5. Face Protection shall be worn during all cutting or grinding operations.
  6. Hearing protection must be worn when sound levels are at or above 85 dB(A)
  7. Long pants and sturdy footwear shall be worn at all times.
  8. Respirators shall be used when dry-cutting or other dusty activities occur. This is in addition to all other dust-control measures.
- J. **FIRE PROTECTION AND PREVENTION:**
1. Smoking is prohibited everywhere on the job site – no exceptions. Signs shall be posted. In visible locations.
  2. Combustible waste shall be removed immediately or stored in fire resistive containers until disposed.
  3. Contractor shall provide during the entire construction period, a minimum of 3 fire extinguishers on each floor level, including basement of the building, and 1 in temporary office. Extinguishers shall be nonfreezing type such as A-B-C rated dry chemical, of not less than 10-pound capacity each. Any enclosed shed shall have similar fire extinguisher. This is not required where the building already has sufficient fire protection. Examples include remodels where the existing fire suppression and alarm system is functioning.
  4. Fire watch personnel in sufficient number shall monitor all locations where fire is used. The fire watch personnel shall remain on the job at least thirty minutes after such operations are completed. Fire safety personnel may be installers.
  5. Noncombustible shields or covers shall be provided to protect building structures, equipment and personnel from sparks and fragments of hot metal. Also take these precautions for grinding, drilling or sawing operations.

**END OF SECTION**

**SECTION 01 40 00**  
**QUALITY REQUIREMENTS**

1		
2		
3		
4	PART 1 – GENERAL .....	1
5	1.1. SCOPE .....	1
6	1.2. DEFINITIONS .....	1
7	1.3. STANDARD SPECIFICATIONS .....	2
8	1.4. REFERENCE STANDARDS .....	2
9	1.5. SUBMITTALS .....	5
10	1.6. QUALITY ASSURANCE .....	6
11	1.7. DRAWINGS, SPECIFICATIONS AND OTHER DESIGN DOCUMENTS .....	7
12	1.8. CONTRACTOR’S RESPONSIBILITIES .....	8
13	1.9. REGULATORY REQUIREMENTS .....	8
14	PART 2 - PRODUCTS .....	9
15	2.1. VOLATILE ORGANIC COMPOUND (VOC) CONTENT LIMITATIONS .....	9
16	2.2. OWNER PROVIDED, CONTRACTOR INSTALLED EQUIPMENT .....	10
17	PART 3 -EXECUTION .....	10
18	3.1. DELIVERY AND STORAGE .....	10
19	3.2. INSTALLATION .....	12
20	3.3. QUALITY MANAGEMENT OBSERVATIONS (QMO) .....	12
21	3.4. MOCKUPS .....	12
22	3.5. PHOTOGRAPHIC DOCUMENTATION .....	13
23	3.6. AS-BUILT DOCUMENTS .....	13

**PART 1 – GENERAL****1.1. SCOPE**

- A. This Section includes administrative and procedural requirements for quality assurance and quality control and applies to the entire contract.
- B. This specification does not relieve the GC from any requirements associated with regulatory inspections performed by JHA.
- C. Any testing performed by an Owner’s Representative does not relieve the GC from performing any testing that may be required by the construction documents. These services do not relieve Contractor of responsibility for testing and compliance with the Contract Document requirements.
- D. This section establishes minimum qualification levels required. Individual Specifications specify additional requirements.
- E. If a conflict exists within the Specifications or within the Drawings, the Contractor shall furnish the item, system, or workmanship, which is the highest quality, largest, largest quantity or most closely fits the owner’s intent. Refer uncertainties to City Project Manager for a decision before proceeding.
- F. Portions of these specifications are of the abbreviated, simplified type and may include incomplete sentences. Omitted words or phrases shall be supplied by inference in the same manner, as they are when a note occurs on the drawings.
- G. Work in all sections depends on applicable provisions from other sections and the plan set. Any trade, contractor and sub-contractor shall know the entire specification and plan set and meet all applicable requirements. Some specifications cross-reference other sections and standards. This is for convenience only and not considered all inclusive.
- H. Unless stated differently, all products shall be new and free of defects.

**1.2. DEFINITIONS**

- A. ADHESIVES: All gunnable, trowelable, liquid-applied, and aerosol adhesives, whether specified or not; including flooring adhesives, resilient base adhesives, and pipe jointing adhesives.
- B. APPROVED / REVIEWED / EQUAL / AS DIRECTED / AS PERMITTED / ACCEPTABLE / SATISFACTORY: shall mean the same as it is implied the owner (or its designee) will decide.
- C. CITY / OWNER / CITY / CITY OF MADISON / CITY ENGINEER / PROJECT MANAGER / CITY ENGINEER: shall mean the same in a sense that different individuals may be granted authority to make decisions.
- D. CONTRACTOR / SUBCONTRACTOR / GENERAL CONTRACTOR / INSTALLER / APPLICATOR / ERECTOR: shall mean the same in a sense that the owner has a contract with the general contractor (GC) only. GC ultimately will be held responsible for any items listed as to be done. All directions given in this contract shall mean “by contractor” unless noted otherwise.
- E. EXPERIENCED: When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- F. FIELD QUALITY-CONTROL TESTING: Tests and inspections that are performed on-site.
- G. FURNISH / INSTALL / AS REQUIRED / PROVIDE: shall mean the same in a sense that the Contractor shall provide and install all the necessary materials, apparatus, and devices to complete the equipment and systems installation. This also includes that the contractor demolishes and disposes an existing item if demolition is required to install the new item, even if demolition drawings or specification don’t mention demolition of the specific item. If an item is either called for in the specifications or shown on the plans, it shall be considered sufficient for the inclusion of said item in this contract.
- H. INTERIOR OF BUILDING: Anywhere inside the exterior weather barrier.

- 1 I. PRECONSTRUCTION TESTING: Tests and inspections that are performed specifically for the Project before products and  
 2 materials are incorporated into the Work to verify performance or compliance with specified criteria.
- 3 J. PROJECT SITE / SITE: Space available for performing construction activities. The extent of Project site is shown on Drawings  
 4 and may or may not be identical with the description of the land on which Project is to be built.
- 5 K. QUALITY-ASSURANCE SERVICES: Activities, actions, and procedures performed before and during execution of the Work to  
 6 guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- 7 L. QUALITY-CONTROL SERVICES: Tests, inspections, procedures, and related actions during and after execution of the Work to  
 8 evaluate that actual products incorporated into the Work and completed construction comply with requirements.
- 9 M. SEALANTS: All gunnable, trowelable, and liquid-applied joint sealants and sealant primers, whether specified or not;  
 10 including firestopping sealants and duct joint sealers.
- 11 N. SOURCE QUALITY-CONTROL TESTING: Tests and inspections that are performed at the source, i.e., mill, factory, or shop.
- 12 O. TESTING AGENCY: Entity engaged in specific tests, inspections, or both. Testing laboratory shall mean the same. Cooperate  
 13 with City Project Manager and Contractor in performance of duties. Provide qualified personnel to perform required tests  
 14 and inspections. Determine the location from which test samples will be taken and in which in-situ tests are conducted.  
 15 Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or  
 16 deviates from requirements.

### 17 1.3. STANDARD SPECIFICATIONS

- 19 A. The City of Madison Standard Specification for Public Works Construction (Edition at publication date of this bid) forms a  
 20 part of these contract documents as if attached hereto. These Standard Specifications are available from the City Engineer,  
 21 City Engineering Division, Room 115, City County Building, 210 Martin Luther King Jr. Blvd., Madison, WI 53710 or  
 22 electronically from the City Website <http://www.cityofmadison.com/business/pw/specs.cfm>. The Contractor shall review  
 23 these standard specifications prior to preparation of proposal for the work to be done under this contract. Failure to do so  
 24 does not relieve the Contractor from meeting all requirements. All provisions, including provisions indicating they would  
 25 apply to Public Right Away only, apply to this contract unless superseded by provisions giving owner an advantage.  
 26

### 27 1.4. REFERENCE STANDARDS

- 28 A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction  
 29 industry standards have the same force and effect as if bound or copied directly into the Contract Documents. Such  
 30 standards are made a part of the Contract Documents by reference.
- 31 B. The newest version of a code or standard shall apply unless an older version is adopted by the Jurisdiction Having Authority.
- 32 C. Standard References incorporated in the requirements by reference shall be those of the latest edition at time of receiving  
 33 bids, unless otherwise specified. The contractors, manufacturers, producers and their agents shall have such specifications  
 34 available for reference and shall be fully familiar with their requirements as they pertain to their product or material.
- 35 D. Applicable standards include, but are not limited to:
- 36 1. AA - Aluminum Association
  - 37 2. AABC - Associated Air Balance Council -www.aabc.com
  - 38 3. AATCC - American Association of Textile Chemists and Colorists
  - 39 4. AAMA – American Architectural Manufacturers Association
  - 40 5. AASHTO - American Association of State Highway and Transportation Officials [www.transportation.org](http://www.transportation.org).
  - 41 6. ABMA - American Bearing Manufacturers Association - [www.americanbearings.org](http://www.americanbearings.org)
  - 42 7. ABMA - American Boiler Manufacturers Association - [www.abma.com](http://www.abma.com)
  - 43 8. ACGIH -American Conference of Governmental Industrial Hygienists
  - 44 9. ACPA - American Concrete Pipe Association [www.concrete-pipe.org](http://www.concrete-pipe.org)
  - 45 10. ACI – American Concrete Institute
  - 46 11. ADC - Air Diffusion Council
  - 47 12. AGA – American Gas Association - [www.aga.org](http://www.aga.org)
  - 48 13. AHAM - Association of Home Appliance Manufacturers - [www.aham.org](http://www.aham.org)
  - 49 14. AHRI – Air Conditioning, Heating and Refrigeration Institute - [www.ahrinet.org](http://www.ahrinet.org)
  - 50 15. AIHA - American Industrial Hygiene Association
  - 51 16. AISC - American Institute of Steel Construction - [www.aisc.org](http://www.aisc.org)
  - 52 17. AISI – American Iron and Steel Institute - [www.steel.org](http://www.steel.org)
  - 53 18. AITC - American Institute of Timber Construction - [www.aitc-glulam.org](http://www.aitc-glulam.org)
  - 54 19. ALSC – American Lumber Standard Committee
  - 55 20. ABMA – American Bearing Manufacturer Association
  - 56 21. AMCA - Air Movement and Control Association
  - 57 22. AMMA - American Architectural Manufacturers Association
  - 58 23. ANSI – American National Standards Institute - [www.ansi.org](http://www.ansi.org)
  - 59 24. APA – American Plywood Association
  - 60 25. APA - Architectural Precast Association - [www.archprecast.org](http://www.archprecast.org)
  - 61 26. API - American Petroleum Institute - [www.api.org](http://www.api.org)
  - 62 27. ARI - Air Conditioning and Refrigeration Institute
  - 63 28. ARMA - Asphalt Roofing Manufacturers Association - [www.asphaltroofing.org](http://www.asphaltroofing.org)
  - 64 29. ASCE - American Society of Civil Engineers - [www.asce.org](http://www.asce.org)

- 1 30. ASME – American Society of Mechanical Engineers
- 2 31. ASPE - American society of Plumbing Engineers
- 3 32. ASHRAE – American Society of Heating, Refrigeration and Air Conditioning Engineers - [www.ashrae.org](http://www.ashrae.org)
- 4 33. ASSE – American Society of Safety Engineers - [www.asse.org](http://www.asse.org)
- 5 34. ASSE - American Society of Sanitary Engineering - [www.asse-plumbing.org](http://www.asse-plumbing.org)
- 6 35. ASTM - American Society for Testing and Materials - [www.astm.org](http://www.astm.org)
- 7 36. ATIS - Alliance for Telecommunications Industry Solutions - [www.atis.org](http://www.atis.org)
- 8 37. AWI - Architectural Woodwork Institute - [www.awinet.org](http://www.awinet.org)
- 9 38. AWPA - American Wood Protection Association - [www.awpa.com](http://www.awpa.com)
- 10 39. AWS – American Welding Society - [www.aws.org](http://www.aws.org)
- 11 40. AWWA - American Water Works Association - [www.awwa.org](http://www.awwa.org)
- 12 41. BHMA - Builders Hardware Manufacturers Association - [www.buildershardware.com](http://www.buildershardware.com)
- 13 42. BIA - Brick Industry Association - [www.gobrick.com](http://www.gobrick.com)
- 14 43. CDA - Copper Development Association - [www.copper.org](http://www.copper.org)
- 15 44. CEA - Consumer Electronics Association - [www.ce.org](http://www.ce.org)
- 16 45. CFSEI - Cold-Formed Steel Engineers Institute - [www.cfsei.org](http://www.cfsei.org)
- 17 46. CGA - Compressed Gas Association - [www.cganet.com](http://www.cganet.com)
- 18 47. CICC - Ceiling and Interior Systems Construction Association
- 19 48. CIMA - Cellulose Insulation Manufacturers Association - [www.cellulose.org](http://www.cellulose.org)
- 20 49. CISCA - Ceilings & Interior Systems Construction Association - [www.cisca.org](http://www.cisca.org)
- 21 50. CISPI - Cast Iron Soil Pipe Institute - [www.cispi.org](http://www.cispi.org)
- 22 51. CLFMI - Chain Link Fence Manufacturers Institute - [www.chainlinkinfo.org](http://www.chainlinkinfo.org)
- 23 52. CMAA – Crane Manufacturers Association of America
- 24 53. CPA - Composite Panel Association; [www.pbmdf.com](http://www.pbmdf.com).
- 25 54. CPAA – Concrete Polishing Association of America
- 26 55. CRI - Carpet and Rug Institute - [www.carpet-rug.org](http://www.carpet-rug.org).
- 27 56. CRRRC - Cool Roof Rating Council - [www.coolroofs.org](http://www.coolroofs.org).
- 28 57. CRSI – Steel Reinforced Concrete Institute - [www.crsi.org](http://www.crsi.org)
- 29 58. CS - Commercial Standards, Products Standards Sections
- 30 59. CSSB - Cedar Shake & Shingle Bureau - [www.cedarbureau.org](http://www.cedarbureau.org)
- 31 60. CTI - Cooling Tower Institute - [www.cti.org](http://www.cti.org)
- 32 61. DASMA - Door and Access Systems Manufacturers Association - [www.dasma.com](http://www.dasma.com)
- 33 62. DHI – Door and Hardware Institute - [www.dhi.org](http://www.dhi.org)
- 34 63. DHS – Department of Health Services State of Wisconsin - [www.dhs.wisconsin.gov](http://www.dhs.wisconsin.gov)
- 35 64. DNR – Department of Natural Resources State of Wisconsin - [dnr.wisconsin.gov](http://dnr.wisconsin.gov)
- 36 65. ECIA - Electronic Components Industry Association - [www.eciaonline.org](http://www.eciaonline.org).
- 37 66. EIMA - EIFS Industry Members Association - [www.eima.com](http://www.eima.com).
- 38 67. EJMA - Expansion Joint Manufacturers Association, Inc. - [www.ejma.org](http://www.ejma.org)
- 39 68. EN – European Norm
- 40 69. EPA - Environmental Protection Agency
- 41 70. ESD - Electrostatic Discharge Association - [www.esda.org](http://www.esda.org)
- 42 71. ETL - Electrical Testing Laboratories, Inc.
- 43 72. FCI - Fluid Controls Institute - [www.fluidcontrolsinstitute.org](http://www.fluidcontrolsinstitute.org)
- 44 73. FGMA - Flat Glass Manufacturers Association
- 45 74. FM – Factory Mutual
- 46 75. FM Approvals - FM Approvals LLC - [www.fmglobal.com](http://www.fmglobal.com)
- 47 76. FS – Federal Specifications
- 48 77. FSA - Fluid Sealing Association - [www.fluidsealing.com](http://www.fluidsealing.com)
- 49 78. GA – Gypsum Association - [www.gypsum.org](http://www.gypsum.org)
- 50 79. GANA - Glass Association Of North America - [www.glasswebsite.com](http://www.glasswebsite.com)
- 51 80. HI - Hydraulic Institute - [www.pumps.org](http://www.pumps.org).
- 52 81. HPVA - Hardwood Plywood & Veneer Association - [www.hpva.org](http://www.hpva.org).
- 53 82. IAPMO - International Association of Plumbing & Mechanical Officials - [www.iapmo.org](http://www.iapmo.org)
- 54 83. IBC – International Building Code
- 55 84. ICC - International Code Council - [www.iccsafe.org](http://www.iccsafe.org)
- 56 85. ICC-ES – International Code Council Evaluation Services - [www.icc-es.org](http://www.icc-es.org)
- 57 86. ICEA - Insulated Cable Engineers Association, Inc.; [www.icea.net](http://www.icea.net).
- 58 87. ICPA - International Cast Polymer Alliance - [www.icpa-hq.org](http://www.icpa-hq.org).
- 59 88. ICRI - International Concrete Repair Institute, Inc. - [www.icri.org](http://www.icri.org).
- 60 89. IEC - International Electrotechnical Commission - [www.iec.ch](http://www.iec.ch)
- 61 90. ICS – International Classification of Standards
- 62 91. IEEE - Institute of Electrical and Electronics Engineers - [www.ieee.org](http://www.ieee.org)
- 63 92. IES - Illuminating Engineering Society - [www.ies.org](http://www.ies.org)
- 64 93. IEST - Institute of Environmental Sciences and Technology; [www.iest.org](http://www.iest.org)



- 1 94. IGMA - Insulating Glass Manufacturers Alliance - [www.igmaonline.org](http://www.igmaonline.org)
- 2 95. IGSHPA - International Ground Source Heat Pump Association - [www.igshpa.okstate.edu](http://www.igshpa.okstate.edu)
- 3 96. ILI - Indiana Limestone Institute of America, Inc. - [www.iliai.com](http://www.iliai.com)
- 4 97. IFC - International Fire Code
- 5 98. IGMA - Insulating Glass Manufacturers Alliance
- 6 99. ISA - International Society of Automation - [www.isa.org](http://www.isa.org)
- 7 100. ISFA - International Surface Fabricators Association - [www.isfanow.org](http://www.isfanow.org)
- 8 101. ISO – International Organization for Standardization - [www.iso.org](http://www.iso.org)
- 9 102. JCI – Japanese Concrete Institute
- 10 103. JHA – Jurisdiction Having Authority
- 11 104. KCMA - Kitchen Cabinet Manufacturers Association - [www.kcma.org](http://www.kcma.org)
- 12 105. LGSEA - Light Gauge Steel Engineers Association
- 13 106. LPI - Lightning Protection Institute - [www.lightning.org](http://www.lightning.org)
- 14 107. LSGA - Laminators Safety Glass Association
- 15 108. MBMA - Metal Building Manufacturers Association - [www.mbma.com](http://www.mbma.com)
- 16 109. MFMA - Maple Flooring Manufacturers Association, Inc. - [www.maplefloor.org](http://www.maplefloor.org).
- 17 110. MFMA - Metal Framing Manufacturers Association, Inc. - [www.metalframingmfg.org](http://www.metalframingmfg.org)
- 18 111. MCA - Mechanical Contractors Association - [www.metalconstruction.org](http://www.metalconstruction.org)
- 19 112. MHIA - Material Handling Industry of America - [www.mhia.org](http://www.mhia.org)
- 20 113. MIA - Marble Institute of America - [www.mhia.org](http://www.mhia.org)
- 21 114. MICA - Midwest Insulation Contractors Association
- 22 115. MMPA - Moulding & Millwork Producers Association - [www.wmmpa.com](http://www.wmmpa.com).
- 23 116. MPI - Master Painters Institute - [www.paintinfo.com](http://www.paintinfo.com).
- 24 117. MSS - Manufacturer's Standardization Society of the Valve & Fitting Industry, Inc. - [www.mss-hq.org](http://www.mss-hq.org)
- 25 118. NAAMM - National Association Of Architectural Metal Manufacturers - [www.naamm.org](http://www.naamm.org)
- 26 119. NACE - National Association of Corrosion Engineers International - [www.nace.org](http://www.nace.org)
- 27 120. NADCA Mechanical Cleaning of Non-Porous Air Conveyance System Components National Air Duct Cleaners  
28 Association - [www.nadca.com](http://www.nadca.com)
- 29 121. NAIMA – North American Insulation Manufacturers Association - [www.naima.org](http://www.naima.org)
- 30 122. NARA - National Archives And Records Administration
- 31 123. NBGQA - National Building Granite Quarries Association, Inc. - [www.nbgqa.com](http://www.nbgqa.com).
- 32 124. NBI - New Buildings Institute - [www.newbuildings.org](http://www.newbuildings.org).
- 33 125. NBS - National Bureau of Standards
- 34 126. NCAA - National Collegiate Athletic Association - [www.ncaa.org](http://www.ncaa.org).
- 35 127. NCMA - National Concrete Masonry Association - [www.ncma.org](http://www.ncma.org)
- 36 128. NEBB - National Environmental Balancing Bureau - [www.nebb.org](http://www.nebb.org)
- 37 129. NEC - National Electric Code
- 38 130. NECA - National Electrical Contractors Association - [www.necanet.org](http://www.necanet.org)
- 39 131. NEIS - National Electrical Installation Standards
- 40 132. NEMA - National Electrical Manufacturers Association - [www.nema.org](http://www.nema.org)
- 41 133. NESC - National Electrical Safety Code
- 42 134. NESHAPS - National Emission Standards for Hazardous Air Pollutants
- 43 135. NETA - InterNational Electrical Testing Association - [www.netaworld.org](http://www.netaworld.org)
- 44 136. NFPA - National Fire Protection Association - [www.nfpa.org](http://www.nfpa.org)
- 45 137. NFRC – National Fenestration Rating Council - [www.nfrc.org](http://www.nfrc.org)
- 46 138. NHLA - National Hardwood Lumber Association - [www.nhla.com](http://www.nhla.com).
- 47 139. NIOSH - National Institute for Occupational Safety and Health
- 48 140. NLGA - National Lumber Grades Authority - [www.nlga.org](http://www.nlga.org)
- 49 141. NOMMA - National Ornamental & Miscellaneous Metals Association - [www.nomma.org](http://www.nomma.org)
- 50 142. NRCA – National Roofing Contractor Association - [www.nrca.net](http://www.nrca.net)
- 51 143. NRMCA - National Ready Mixed Concrete Association - [www.nrmca.org](http://www.nrmca.org).
- 52 144. NSF - NSF International - [www.nsf.org](http://www.nsf.org).
- 53 145. NSPE - National Society of Professional Engineers - [www.nspe.org](http://www.nspe.org).
- 54 146. NSSGA - National Stone, Sand & Gravel Association - [www.nssga.org](http://www.nssga.org).
- 55 147. NTMA - National Terrazzo & Mosaic Association, Inc. - [www.ntma.com](http://www.ntma.com).
- 56 148. NWFA - National Wood Flooring Association - [www.nwfa.org](http://www.nwfa.org)
- 57 149. OSHA – Occupational Safety and Health Administration
- 58 150. PCI - Precast/Prestressed Concrete Institute - [www.pci.org](http://www.pci.org).
- 59 151. PDI - Plumbing & Drainage Institute - [www.pdionline.org](http://www.pdionline.org).
- 60 152. PLASA – PLASA - [www.plasa.org](http://www.plasa.org)
- 61 153. RCSC - Research Council on Structural Connections
- 62 154. RFCI - Resilient Floor Covering Institute - [www.rfci.com](http://www.rfci.com).
- 63 155. RIS - Redwood Inspection Service - [www.redwoodinspection.com](http://www.redwoodinspection.com)

- 1 156. SAE - SAE International - [www.sae.org](http://www.sae.org).
- 2 157. SCTE - Society of Cable Telecommunications Engineers - [www.scte.org](http://www.scte.org)
- 3 158. SDI – Steel Deck Institute - [www.sdi.org](http://www.sdi.org)
- 4 159. SDI – Steel Door Institute - [www.steeldoor.org](http://www.steeldoor.org)
- 5 160. SEFA - Scientific Equipment and Furniture Association - [www.sefalabs.com](http://www.sefalabs.com)
- 6 161. SFBC – South Florida Building Code
- 7 162. SFIA - Steel Framing Industry Association
- 8 163. SIA - Security Industry Association - [www.siaonline.org](http://www.siaonline.org)
- 9 164. SJI - Steel Joist Institute - [www.steeljoist.org](http://www.steeljoist.org)
- 10 165. STI - Steel Tank Institute
- 11 166. SMA - Screen Manufacturers Association - [www.smainfo.org](http://www.smainfo.org)
- 12 167. SMACNA - Sheet Metal and Air Conditioning Contractors National Association - [www.smacna.org](http://www.smacna.org)
- 13 168. SPC - Society of Protective Coatings (Formerly Steel Structures Painting Council)
- 14 169. SPFA - Spray Polyurethane Foam Alliance - [www.sprayfoam.org](http://www.sprayfoam.org).
- 15 170. SPIB - Southern Pine Inspection Bureau - [www.spib.org](http://www.spib.org)
- 16 171. SPRI - Single Ply Roofing Institute - [www.spri.org](http://www.spri.org)
- 17 172. SPS - State of Wisconsin Dept. of Safety and Professional Services
- 18 173. SRCC - Solar Rating & Certification Corporation - [www.solar-rating.org](http://www.solar-rating.org)
- 19 174. SSINA - Specialty Steel Industry of North America - [www.ssina.com](http://www.ssina.com).
- 20 175. SSPC - SSPC: The Society for Protective Coatings - [www.sspc.org](http://www.sspc.org)
- 21 176. SSMA - Steel Stud Manufacturer’s Association
- 22 177. SSPC - Steel Structures Painting Council
- 23 178. STI - Steel Tank Institute - [www.steel tank.com](http://www.steel tank.com).
- 24 179. SWI - Steel Window Institute - [www.steelwindows.com](http://www.steelwindows.com).
- 25 180. SWPA - Submersible Wastewater Pump Association - [www.swpa.org](http://www.swpa.org)
- 26 181. TABB – Testing Adjusting and Balancing Bureau
- 27 182. TCA - Tilt-Up Concrete Association - [www.tilt-up.org](http://www.tilt-up.org)
- 28 183. TCNA – Tile Council of North America - [www.tileusa.com](http://www.tileusa.com)
- 29 184. TEMA - Tubular Exchanger Manufacturers Association, Inc. - [www.tema.org](http://www.tema.org).
- 30 185. TIA - Telecommunications Industry Association - [www.tiaonline.org](http://www.tiaonline.org).
- 31 186. TMS- The Masonry Society - [www.masonrysociety.org](http://www.masonrysociety.org)
- 32 187. TPI - Truss Plate Institute; [www.tpinst.org](http://www.tpinst.org).
- 33 188. TPI - Turfgrass Producers International - [www.turfgrasssod.org](http://www.turfgrasssod.org).
- 34 189. TRI - Tile Roofing Institute - [www.tilerroofing.org](http://www.tilerroofing.org)
- 35 190. UL - Underwriters Laboratory - [www.ul.com](http://www.ul.com)
- 36 191. UNI - Uni-Bell PVC Pipe Association - [www.uni-bell.org](http://www.uni-bell.org)
- 37 192. WASTEC - Waste Equipment Technology Association - [www.wastec.org](http://www.wastec.org)
- 38 193. WCMA - Window Covering Manufacturers Association - [www.wcmanet.org](http://www.wcmanet.org)
- 39 194. WDMA Window and Door Manufacturers Association - [www.wdma.com](http://www.wdma.com)
- 40 195. WH- Warnock Hersey
- 41 196. WI - Woodwork Institute - [www.wicnet.org](http://www.wicnet.org)

42

43

**1.5. SUBMITTALS**

44

A. TESTING AGENCY QUALIFICATION DATA: Submit proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

45

46

B. For all tests and quality verifications prepare and submit certified written reports that include the following:

47

1. Date of issue.

48

2. Project title and number.

49

3. Name, address, and telephone number of testing agency.

50

4. Dates and locations of samples and tests or inspections.

51

5. Names of individuals making tests and inspections.

52

6. Description of the Work and test and inspection method.

53

7. Identification of product and Specification Section.

54

8. Complete test or inspection data.

55

9. Test and inspection results and an interpretation of test results.

56

10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.

57

11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.

58

12. Name and signature of laboratory inspector.

59

13. Recommendations on re-testing and re-inspecting.

60

61

C. DUST- AND HVAC-CONTROL PLAN: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:

62

63

1. Locations of dust-control partitions at each phase of work.

64

- 1 2. HVAC system isolation schematic drawing.
- 2 3. Location of proposed air-filtration system discharge.
- 3 4. Waste handling procedures.
- 4 5. Other dust-control measures.

#### 6 **1.6. QUALITY ASSURANCE**

- 7 A. BIDDER QUALIFICATIONS: By submitting the bid, the bidder and each subcontractor certify meeting the following
- 8 requirements:
  - 9 1. Has completed one projects of at least 50% of the size or value of the division of work being bid and the type of work
  - 10 completed is similar to that being bid. Additional requirements will be described in the appropriate technical section of
  - 11 these specifications.
  - 12 2. Has access to all necessary equipment and has organizational capacity and technical competence necessary to do the
  - 13 work properly and expeditiously.
  - 14 3. Maintains a permanent place of business.
  - 15 4. Bidder shall check all bid documents for possible interferences, inadequacies, errors, conflicts and omissions and bring
  - 16 such to owner's attention by the time substitution requests are due. Failure to do so will not relieve the successful
  - 17 Bidder of responsibility. Signing of the contract will be considered as implicitly denoting that the Contractor has
  - 18 thorough understanding of the scope of work, existing conditions, and comprehension of the contract documents.
  - 19 Owner is not responsible for verbal instructions.
  - 20 5. During bidding owner will allow contractors to visit the site to familiarize themselves with the existing conditions and to
  - 21 ask questions for clarification. Failure to attend the scheduled walkthrough implies that the contractor accepts all
  - 22 existing conditions and includes all work to handle existing conditions in this contract.
  - 23 6. Prior bidding, bidder must obtain information on payment conditions, discounts, shipping charges, and other cost from
  - 24 vendors or manufacturers of the products specified. Any changes to prices or unknown cost are bidder's responsibility.
- 25 B. INSTALLER QUALIFICATIONS: A firm or individual experienced in installing, erecting, or assembling work similar in material,
- 26 design, and extent to that indicated for this Project with a record of successful in-service performance.
- 27 C. MANUFACTURER OR FABRICATOR QUALIFICATIONS: A firm experienced in manufacturing products or systems similar to
- 28 those indicated for this project and with a record of successful in-service performance, as well as sufficient capacity.
- 29 A. FACTORY-AUTHORIZED SERVICE REPRESENTATIVE QUALIFICATIONS: An authorized representative of manufacturer who is
- 30 trained and approved by manufacturer to inspect installation of manufacturer's products indicated for this Project. Where
- 31 indicated, engage a factory-authorized service representative to startup, inspect field-assembled components and
- 32 equipment installation, including service connections. Report results in submittal.
- 33 B. LAND SURVEYOR QUALIFICATIONS: A professional land surveyor who is legally qualified to practice in jurisdiction where
- 34 Project is located and who is experienced in providing land-surveying services of the kind indicated.
- 35 D. TESTING AGENCY QUALIFICATIONS: An NRTL (nationally recognized testing laboratory according to 29 CFR 1910.7.), an
- 36 NVLAP (testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program), or an
- 37 independent agency with the experience and capability to conduct testing and inspecting indicated according to ASTM E
- 38 548. Must be acceptable to JHA.
- 39 E. All contractors shall be responsible for a proper quality assurance/quality control (QA/QC) program throughout the
- 40 execution of the Work defined within the construction documents, including all recognized construction industry standards
- 41 and all applicable regulatory codes.
- 42 F. The GC shall be responsible for all of the following:
  - 43 1. Monitor the quality of all workmanship, supplies, materials, and products being installed by all contractors and
  - 44 installers to ensure they meet or exceed the minimum requirements set forth by the construction documents.
  - 45 2. Submit a Request for Information (RFI) whenever manufacturers' instructions or referenced standards conflict with the
  - 46 construction documents before proceeding with the Work.
  - 47 3. Ensure that work requiring special, training, qualification, certifications or licensing is being and supervised by
  - 48 personnel that meet the appropriate requirements. Ensure that all certificates and licenses are current throughout the
  - 49 execution of the project.
  - 50 4. All materials, equipment, and products shall be new, clean, undamaged, and meet the performance specifications
  - 51 defined within the construction documents including favorably reviewed submittals. Any material, equipment, or
  - 52 product that does not meet the requirements of the construction documents shall be removed and replaced, including
  - 53 any adjacent and related work, at the GCs expense.
  - 54 5. Include owner's QM team and invite to pre-installation meetings, allow delivery review, and invite to startups, testing
  - 55 and installation.
- 56 G. Tests and inspections not explicitly assigned to owner are contractor's responsibility. Unless otherwise indicated, provide
- 57 quality-control services specified and those required by authorities having jurisdiction.
  - 58 1. Engage a qualified testing agency to perform these quality-control services.
  - 59 2. Notify testing agencies at least 48 hours in advance of time when Work requiring testing or inspecting will be
  - 60 performed.
  - 61 3. Notify City Project Manager and Contractor promptly of irregularities or deficiencies observed in the work.
- 62 H. RETESTING/REINSPECTING: Regardless of whether original tests or inspections were Contractor's responsibility, provide
- 63 quality-control services, including retesting and re-inspecting, for construction that replaced Work that failed to comply
- 64 with the Contract Documents.

- 1 I. ASSOCIATED SERVICES: Cooperate with agencies performing required tests, inspections, and similar quality-control services,  
2 and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit  
3 assignment of personnel. Provide the following:
  - 4 1. Access to the Work.
  - 5 2. Incidental labor and facilities necessary to facilitate tests and inspections.
  - 6 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in  
7 obtaining samples.
  - 8 4. Facilities for storage and field curing of test samples.
  - 9 5. Delivery of samples to testing agencies.
  - 10 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
  - 11 7. Security and protection for samples and for testing and inspecting equipment at Project site.
- 12 J. COORDINATION: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a  
13 minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.  
14 Schedule times for tests, inspections, obtaining samples, and similar activities.
- 15 K. If a conflict exists within the Specifications or within the Drawings, the Contractor shall furnish the item, system, or  
16 workmanship, which is the highest quality, largest, largest quantity or most closely fits the owner's intent.
- 17 L. STARTING AND ADJUSTING:
  - 18 1. Start and test equipment, controls and operating components to confirm proper operation. Remove malfunctioning  
19 units, replace with new units, and retest.
  - 20 2. Once the equipment has been run, maintain lubrication in accordance with the manufacturer's instructions until the  
21 work is accepted by owner. Maintain a log of all lubricants used and frequency of lubrication.
  - 22 3. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.

#### 23 **1.7. DRAWINGS, SPECIFICATIONS AND OTHER DESIGN DOCUMENTS**

- 24 A. All specifications and drawings are intended to include everything necessary to perform the entire work properly. Every  
25 item required may not be specifically mentioned, shown, or detailed.
- 26 B. Unless expressly stated, all systems and equipment shall be complete and operable. All devices and installation methods  
27 necessary for a functioning system are considered included in this contract even if a detail is missing or unclear. Contractor  
28 shall furnish all labor, material, equipment and software not specifically referred to herein or on the plans, that is required  
29 to meet the functional intent of this specification.
- 30 C. Details and drawings are diagrammatic and may not be all inclusive. In case of a discrepancy within and between the  
31 drawings that would cause an awkward or improper installation the owner has to be notified for clarification prior to  
32 installation.
- 33 D. If items are too large to fit into existing space Contractor shall provide smaller model of same type upon approval by owner  
34 at no cost to owner.
- 35 E. Items are shown approximately to scale and attempt to show how these items should be integrated with building  
36 construction. All dimensions have to be field-verified by contractor. Before locating items, confer with the owner as to  
37 desired location in the various areas. Make any minor changes in locations of equipment, piping, and ductwork from that  
38 shown on drawings and for all physical details required for installation at no cost to owner. Items shall not be located by  
39 scaling drawings. Contractor must relocate items and bear cost of redoing work or other trades' work necessitated by  
40 failure to comply with this requirement.
- 41 F. Elevation of piping and ductwork indicated on these drawings are to be used as guidelines to assist with installations. Minor  
42 changes to these elevations may be necessary to eliminate unforeseen interferences. Any change in elevation shall be  
43 approved prior to change.
- 44 G. Information pertaining to existing conditions that are described in this contract is based on available records. There is no  
45 expressed or implied guarantee that conditions indicated are entirely representative of actual condition. Starting of work by  
46 the Contractor shall imply acceptance of existing conditions.
- 47 H. Where site observation or documents indicate existing underground or covered utilities/services in close proximity (within  
48 4' horizontally and/or vertically) to necessary new construction work, the Contractor shall be responsible to test, probe or  
49 otherwise determine exact locations so as to prevent damage to such utilities/services. Verify all existing conditions,  
50 dimensions, sizes and locations, of structural, equipment, mechanical and utility components.
- 51 I. If the Contractor encounters conditions at the site that differ materially from those indicated in the Contract Documents or  
52 unknown physical conditions of an unusual nature, that differ materially from those ordinarily found to exist and generally  
53 recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor  
54 shall provide notice to the Owner before conditions are disturbed and in no event later than 5 days after first observance.  
55 Annotate any inconsistencies, errors, omissions on the GC As-Built record drawings immediately for future reference.
- 56 J. Electronic design files may be provided by the owner at its discretion as they are needed for the contractor to perform the  
57 work. Contractor shall use electronic design files on their own risk and assume all liability. Electronic documents are not  
58 contract documents and significant discrepancies may exist between these electronic files and contract documents and  
59 actual site conditions. Signing of a liability waiver may be required.
- 60 K. Using datum, the lot lines and present levels have been established as shown on the drawings. Other grades, lines, levels  
61 and benchmarks, shall be established and maintained by the Contractor, who shall be responsible for them. The Contractor  
62 shall make provision to preserve property line stakes, benchmarks, or datum point. Information delineated will be distance  
63 from column center lines, pipe/equipment size and distance from finished floor to bottom of pipe/equipment.  
64

- 1 L. No Contractor shall take any advantage of any apparent error or omission in the construction documents. Owner shall be  
2 permitted to make corrections and interpretations as may be deemed necessary for the fulfillment of the intent of the  
3 construction documents. Contractor shall report any inconsistencies, errors, omissions, or code violations in writing to the  
4 owner immediately. Failure to report inconsistencies prior to beginning work shall indicate that the GC accepted all existing  
5 conditions. If a conflict exists within the contract documents the contractor shall furnish the item, system, or workmanship  
6 of the highest quality, largest, largest quantity, or most closely fits the intent of the contract documents.
- 7 M. Report any inconsistencies, errors, omissions, or code violations in writing to the City Project Manager immediately. Failure  
8 to report inconsistencies prior to beginning work shall indicate that the GC accepted all existing conditions.
- 9 N. Manufacturers recommended installation details shall be verified and used prior to installation of products and equipment.

### 10 **1.8. CONTRACTOR'S RESPONSIBILITIES**

- 11 A. Provide installer with appropriate checklists, plans, specifications and submittals.
- 12 B. Provide on-site staff with appropriate electronic devices (tablets and smartphones with data connection) to read and mark  
13 up electronic documents as required.
- 14 C. Provide all material, labor, equipment, tools and transportation as needed to complete the project according to contract  
15 documents.
- 16 D. Use Diggers Hotline and private utility locating companies to accurately locate all public and private utilities on the property  
17 as needed. The GC is responsible for any repair or replacement to any public or private utility damaged during the  
18 execution of the Work
- 19 E. DESIGN BY CONTRACTOR:
- 20 1. Contractor shall provide design of elements to meet performance requirements. This includes, but is not limited to,  
21 Structural design of structural steel elements, pre-cast concrete elements, rebar, and attachment systems.
- 22 2. Contractor shall be responsible for meeting code, permit, and other approval required. Design shall be certified by  
23 Person legally authorized to practice in the jurisdiction where the project is located and who is experienced in providing  
24 design services similar to the kind required.
- 25 3. Contractor alone shall be responsible for all errors of detailing, fabrication, and for the correct fitting.
- 26 F. On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore  
27 substrates and finishes. Provide materials and comply with installation requirements specified in other Specification  
28 Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as  
29 possible. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-  
30 control.
- 31 G. All items and apparatuses necessary, reasonably incidental or customarily included, even though each and every item is not  
32 specifically called out for or shown.
- 33 H. Demo work as required. Relocate existing items as required. See drawings and notes.
- 34 I. REPLACEMENTS: In the event of damage, immediately make all repairs and replacements necessary to the approval of the  
35 Architect and at no additional cost to the Owner.
- 36 1. Repair or remove and replace defective construction. Restore damaged substrates and finishes.
- 37 2. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and  
38 properly adjusting operating equipment.
- 39 3. Restore permanent facilities used during construction to their specified condition.
- 40 4. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without evidence of  
41 repair.
- 42 5. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- 43 6. Remove and replace chipped, scratched, and broken glass or reflective surfaces.
- 44 J. Prior to all work, carefully inspect the installed work of all other trades and verify that all such work is complete and free of  
45 errors to the point where installation may properly commence.
- 46 K. The contractor shall support work and equipment plumb, rigid and true to line. The contractor shall study the general,  
47 structural, mechanical and electrical drawings, shop drawings and catalog data to determine how equipment, fixtures,  
48 conduit, etc. are to be installed and shall provide foundations, bolts, inserts, stands, hangers, brackets and accessories for  
49 proper support whether or not shown on the drawings.
- 50 L. All materials and equipment shall be installed in accord with the approved recommendations of the manufacturer, the best  
51 practices of the trade, and in conformance with contract documents. Should the contractor perform any work that does not  
52 comply with the manufacturer's directions, the contractor shall bear all costs arising in correcting deficiencies.
- 53 M. Notify owner of any tests (required by authorities or not) and allow owner to witness complete test. Arrange with owner to  
54 have tests done at reasonable times and during adequate conditions. Discuss with owner any failed tests and verifications.
- 55

### 56 **1.9. REGULATORY REQUIREMENTS**

- 57 A. Comply with and give notices required by applicable laws, statutes, ordinances, codes, rules, and regulations, and lawful  
58 orders of public authorities having jurisdiction. Comply with and give notices required by Owner's insurance companies,  
59 local utilities and labor regulations relating to the performance of the Work, the protection of adjacent property, and the  
60 maintenance of passage ways, guard fences and other protective facilities.
- 61 B. Contractor shall acquire all permits, licenses, certificates of inspection, and occupancy, and approvals necessary for the  
62 execution of this Contract and performance of the Work and provide evidence of such before start of the Work. Where  
63 Contract Documents require abatement of asbestos containing materials, prior written Notice to the State of Wisconsin,  
64

- 1 Department of Natural Resources is required. If necessary, file and maintain Notification of Demolition and/or Renovation  
 2 and Application for Permit Exemption with DNR. All costs shall be included within the Base Bid.
- 3 C. It is not Contractor's responsibility to ascertain that the Contract Documents are in accordance with applicable laws,  
 4 statutes, ordinances, codes, and rules and regulations. However, if Contractor observes that portions of the Contract  
 5 Documents are at variance therewith, Contractor shall promptly notify Owner in writing, and necessary changes shall be  
 6 accomplished by appropriate modification.
- 7 D. Applicable provisions of Public Law, Laws and Statutes of the State of Wisconsin, municipal ordinances and the codes and  
 8 regulations of governmental departments are hereby referred to and made a part of this contract. This includes  
 9 requirements by all Jurisdictions Having Authority (JHA). Contractor is expected to know or to ascertain, in general and in  
 10 detail, the requirements of all codes and ordinances, and all rulings and interpretations of code requirements being made  
 11 by all authorities having jurisdiction over the work performed by them.
- 12 E. The Contractor must maintain all licenses required for the work performed and required by authorities. The Contractor  
 13 must submit proof of holding the license or certificate upon request. If a Contractor loses a license for whatever reason he  
 14 must inform the owner immediately and provide properly licensed substitute (i.e. new sub-contractor).
- 15 F. Where ADA equipment is indicated, install equipment to meet applicable sections of IBC and ICC A117.1. Specifications and  
 16 plans may indicate how accessibility is achieved, but contractor is responsible for meeting JHA's requirements and  
 17 interpretations of the code. Consult with JHA before installation.
- 18 G. If contractor encounters human remains or recognizes the existence of burial markers, archaeological sites, or wetlands not  
 19 indicated in the Contract Documents, contractor shall immediately suspend any operations that would affect them and  
 20 shall notify the Owner and authorities. Contractor shall suspend operations until otherwise instructed by the Owner or  
 21 authorities. Continue with all other operations that do not affect those remains or features.

## 22 **PART 2 - PRODUCTS**

### 23 **2.1. VOLATILE ORGANIC COMPOUND (VOC) CONTENT LIMITATIONS**

- 24 A. Provide only products having volatile organic compound (VOC) content not greater than required.
- 25 B. References:
- 26 1. CAL (CHPS LEM) - Low-Emitting Materials Product List; California Collaborative for High Performance Schools (CHPS);  
 27 current edition at [www.chps.net/](http://www.chps.net/).
- 28 2. CAL (VOC) - Standard Practice for the Testing of Volatile Organic Emissions From Various Sources Using Small-Scale  
 29 Environmental Chambers (including Addendum 2004-01); State of California Department of Health Services; 2004
- 30 3. CRI (GLCC) - Green Label Testing Program - Approved Product Categories for Carpet Cushion; Carpet and Rug Institute;  
 31 Current Edition.
- 32 4. CRI (GLP) - Green Label Plus Carpet Testing Program - Approved Products; Carpet and Rug Institute; Current Edition.
- 33 5. Green Seal GS-36 - Commercial Adhesives; Green Seal, Inc.; 2000; [www.greenseal.org](http://www.greenseal.org).
- 34 6. Green Seal GS-11 - Paints and Coatings; Green Seal, Inc.; 1993; [www.greenseal.org](http://www.greenseal.org).
- 35 7. Green Seal GC-03 - Anticorrosive Paints, 2nd Edition, 1997; [www.greenseal.org](http://www.greenseal.org).
- 36 8. SCAQMD 1113 - South Coast Air Quality Management District Rule No.1113; 2004; [www.aqmd.gov](http://www.aqmd.gov).
- 37 9. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition; [www.aqmd.gov](http://www.aqmd.gov).
- 38 10. SCS (CPD) - SCS Certified Products; Scientific Certification Systems; current listings at [www.scs-certified.com](http://www.scs-certified.com).
- 39 C. Provide the following data to proof compliance:
- 40 1. Report of laboratory testing performed in accordance with requirements.
- 41 2. Published product data showing compliance with requirements.
- 42 3. Current GreenSeal Certification.
- 43 4. Current Green Label Plus Certification.
- 44 D. MAXIMUM VOC CONTENT OF ADHESIVES AND SEALANTS:
- 45 1. Wood Glues: 30 g/L.
- 46 2. Metal-to-Metal Adhesives: 30 g/L.
- 47 3. Adhesives for Porous Materials (Except Wood): 50 g/L.
- 48 4. Subfloor Adhesives: 50 g/L.
- 49 5. Plastic Foam Adhesives: 50 g/L.
- 50 6. Carpet Adhesives: 50 g/L.
- 51 7. Carpet Pad Adhesives: 50 g/L.
- 52 8. VCT and Asphalt Tile Adhesives: 50 g/L.
- 53 9. Cove Base Adhesives: 50 g/L.
- 54 10. Gypsum Board and Panel Adhesives: 50 g/L.
- 55 11. Rubber Floor Adhesives: 60 g/L.
- 56 12. Ceramic Tile Adhesives: 65 g/L.
- 57 13. Multipurpose Construction Adhesives: 70 g/L.
- 58 14. Fiberglass Adhesives: 80 g/L.
- 59 15. Contact Adhesive: 80 g/L.
- 60 16. Structural Glazing Adhesives: 100 g/L.
- 61 17. Wood Flooring Adhesive: 100 g/L.
- 62 18. Structural Wood Member Adhesive: 140 g/L.
- 63 19. Single-Ply Roof Membrane Adhesive: 250 g/L.
- 64

- 1 20. Special Purpose Contact Adhesive (contact adhesive that is used to bond melamine covered board, metal, unsupported
- 2 vinyl, rubber, or wood veneer 1/16 inch or less in thickness to any surface): 250 g/L.
- 3 21. Top and Trim Adhesive: 250 g/L.
- 4 22. Plastic Cement Welding Compounds: 250 g/L.
- 5 23. ABS Welding Compounds: 325 g/L.
- 6 24. CPVC Welding Compounds: 490 g/L.
- 7 25. PVC Welding Compounds: 510 g/L.
- 8 26. Adhesive Primer for Plastic: 550 g/L.
- 9 27. Sheet Applied Rubber Lining Adhesive: 850 g/L.
- 10 28. Aerosol Adhesive, General Purpose Mist Spray: 65 percent by weight.
- 11 29. Aerosol Adhesive, General Purpose Web Spray: 55 percent by weight.
- 12 30. Special Purpose Aerosol Adhesive (All Types): 70 percent by weight.
- 13 31. Other Adhesives: 250 g/L.
- 14 32. Architectural Sealants: 250 g/L.
- 15 33. Non-membrane Roof Sealants: 300 g/L.
- 16 34. Single-Ply Roof Membrane Sealants: 450 g/L.
- 17 35. Other Sealants: 420 g/L.
- 18 36. Sealant Primers for Nonporous Substrates: 250 g/L.
- 19 37. Sealant Primers for Porous Substrates: 775 g/L.
- 20 38. Modified Bituminous Sealant Primers: 500 g/L.
- 21 39. Other Sealant Primers: 750 g/L.
- 22 E. MAXIMUM VOC CONTENT OF INSIDE PAINTS AND COATINGS:
- 23 1. Flat Paints, Coatings, and Primers: VOC not more than 50 g/L.
- 24 2. Nonflat Paints and Coatings: VOC not more than 150 g/L.
- 25 3. Dry-Fog Coatings: VOC not more than 400 g/L.
- 26 4. Primers, Sealers, and Undercoaters: VOC not more than 200 g/L.
- 27 5. Anticorrosive and Antirust Paints applied to Ferrous Metals: VOC not more than 250 g/L.
- 28 6. Zinc-Rich Industrial Maintenance Primers: VOC not more than 340 g/L.
- 29 7. Pretreatment Wash Primers: VOC not more than 420 g/L.
- 30 8. Clear Wood Finishes, Varnishes: VOC not 1 more than 350 g/L.
- 31 9. Clear Wood Finishes, Lacquers: VOC not more than 550 g/L.
- 32 10. Floor Coatings: VOC not more than 100 g/L.
- 33 11. Shellacs, Clear: VOC not more than 730 g/L.
- 34 12. Shellacs, Pigmented: VOC not more than 550 g/L.
- 35 13. Stains: VOC not more than 250 g/L.

## 37 2.2. OWNER PROVIDED, CONTRACTOR INSTALLED EQUIPMENT

- 38 A. The Owners Representative shall do the following:
- 39 1. Inspect all deliveries upon receipt and notify manufacturer of any issues directly.
- 40 2. Review the received shipment with the contractor.
- 41 3. Only provide products or materials to the contractor that were not damaged through shipping or handling.
- 42 4. Confirm missing products or materials and anticipated delivery schedule if known.
- 43 B. The Contractor responsible for the installation of Work associated with Owner provided materials or products shall "take
- 44 ownership" and provide safe and secure storage and handling as previously described within this specification. The
- 45 Contractor shall be liable for the repair or replacement of any material or product damaged after taking ownership of the
- 46 product from receipt through final acceptance.
- 47 C. Equipment being provided by the Owner but shipped directly to any sub-contractor or the project site for installation under
- 48 the contract:
- 49 1. The GC and/or Contractor responsible for the Work associated with the Owner provided materials or products shall do
- 50 the following:
- 51 a. Inspect all deliveries upon receipt and notify the Owner or Owners Representative of any issues directly.
- 52 b. Review the received shipment with the Owner or Owners Representative
- 53 2. The Contractor shall "take ownership" and provide safe and secure storage and handling as previously described within
- 54 this specification. The Contractor shall be liable for the repair or replacement of any material or product damaged after
- 55 taking ownership of the product from receipt through final acceptance.

## 57 PART 3 - EXECUTION

### 58 3.1. DELIVERY AND STORAGE

- 59 A. Notify owner of expected delivery of material to allow for inspection before installation.
- 60 B. Designate specific areas of the site for delivery and storage of materials. Designated areas not interfere with the installation
- 61 of any work including installation of utilities or the maintenance of existing utilities.
- 62 C. Arrange for openings in the building as needed to allow delivery and installation of large items. Openings shall be
- 63 appropriately sized to include the use of booms, slings, and other such lifting devices that may be larger than the item being
- 64 in

- 1 stalled. When openings are required in completed Work (new or existing) the GC shall be responsible for providing an  
2 appropriate opening and for restoring the opening to the original or better condition upon completion.
- 3 D. The GC shall be responsible for ensuring that these minimum storage and handling requirements are met by all contractors  
4 on the project site. GC shall be responsible for any damage and replacement because of mishandling or excessive handling.
- 5 E. Receiving deliveries of materials, products, and equipment:
- 6 1. Inspect all deliveries upon arrival for damage, completeness, and compliance with the construction documents.  
7 Deliveries shall remain in original packaging or crates, shipping manifest shall be kept with the delivery and the  
8 packaging shall have visible identification of the items within the packaging.
- 9 2. Immediately report any damaged products or equipment to owner. Start arrangements for immediate replacement.  
10 Materials or equipment that have been damaged, are incomplete, or do not comply with the construction documents  
11 shall not be permitted to be installed.
- 12 F. Any offsite storage shall be at the expense of the contractor storing the material or product. All offsite storage  
13 requirements shall comply with this specification.
- 14 G. LIFTING: Equipment rating shall be greater than the loading requirements of the item being lifted. Comply with:
- 15 1. Only designated and/or designed lift points shall be used.  
16 2. Large items shall have tag lines and handlers at all times during lifting operations.  
17 3. Lift at multiple points as needed to prevent bending.
- 18 H. Storage shall not be allowed to impede the flow of work in progress.
- 19 I. Storage shall not be allowed to hide completed work from review and inspections.
- 20 J. Storage shall not exceed the design loads of the structural components it is being stored upon.
- 21 K. All materials and products shall be stored according the manufacturers minimum recommended requirements. At minimum  
22 protect from dust and dirt, moisture and humidity, including rain and snow, excessive temperatures, direct sun, and  
23 product incompatibility with other products such as corrosiveness, chemical reactions, flammability, etc.
- 24 L. Provide fully functional tarps or plastic wrap, to protect materials and products from the weather. All coverings shall be  
25 free of holes and tears, and shall be tied, strapped, or weighted down to resist blowing. Manufacturer's wrapping may not  
26 be sufficient for extended on-site storage.
- 27 M. Minimize on-site storage time by sequencing delivery in accordance to actual installation.
- 28 N. Contractor shall provide any temporary heating, cooling, or other utility requirement that may be associated with the  
29 storage of a material or product.
- 30 O. The GC shall inspect the job site daily to ensure that all products and materials stay weather tight and are secured against  
31 vandalism or theft as required by this specification.
- 32 P. Owner may require improved storage and protection for any items stored on site for more than 1 week or if the used  
33 methods are not satisfactory to owner. Such protection may include but is not limited to sheds, ports or other structures to  
34 be erected weather tight at no expense to owner.
- 35 Q. BULK MATERIAL: such as sand, gravel, top soil and other types of fill shall be stock piled as follows:
- 36 1. All bulk material shall be piled safely and efficiently in as small an area as practical.  
37 2. All stock piles shall have silt fence/sock properly installed around the perimeter to prevent erosion and loss of material.  
38 3. Fine grained material shall be protected with tarps to prevent blowing. Tarps shall be weighted or staked to stay in  
39 place.  
40 4. Brick, concrete block, stone, and other palletized materials shall be stored on original shipping pallets until use.
- 41 R. DRY PACKAGED MATERIAL: such as cement, mortar, etc shall be stored on pallets, on slightly elevated ground or clear stone  
42 pad to keep water away from the base of the material being stored. Protect from moisture.
- 43 S. STRUCTURAL MATERIAL:
- 44 1. All structural and framing material shall be stored in an organized manner arranged by type, size and dimension.  
45 Materials shall be stored on pallets or timbers as necessary and shall not be allowed to lie directly on the ground.  
46 2. Long and heavy items shall be supported at several points to prevent bending and warping.
- 47 T. EQUIPMENT: Store on slightly elevated ground or clear stone pad to keep water away from the base of the equipment.
- 48 U. FINISH PRODUCT:
- 49 1. Finish products such as flooring, tile, counters, lockers, toilets, partitions, lighting, and other similar items should not be  
50 delivered and stored until the structure has been enclosed, is weather tight, temperature controlled and the contractor  
51 is ready for such items to be installed. Storage of finished products outside for any length of time shall not be allowed.  
52 2. Products that cannot be stored inside the structure shall be stored in secured containers or job trailers until such time  
53 as they are ready to be installed.  
54 3. Products with a high potential for breakage such as glass, mirrors, tiles, toilet fixtures, etc. shall be stored with  
55 additional protection as necessary. Store in original shipping containers until ready for installation. Do not store in high  
56 traffic areas. Shield with other materials such as cardboard, plywood, or similar products.
- 57 V. All piping and conduit shall be stored horizontally unless otherwise specified elsewhere.
- 58 1. Do not store directly on grade.  
59 2. Cover metal pipes and tubes to prevent rust and corrosion, allow ventilation to prevent condensation.  
60 3. Whenever possible use pipe stands for storing pipe and conduit to prevent tripping and rolling hazards.
- 61 W. All ductwork shall be stored horizontally or vertically as necessary unless otherwise specified elsewhere.
- 62 1. During storage, both ends of each duct shall be protected with plastic sheathing to prevent dust and dirt from getting  
63 inside the duct. Sheathing shall be sufficiently taped to the duct.



- 1 2. After installation, free/open ends shall remain protected with taped plastic sheathing and or temporary filters as  
2 specified by division or Trade specifications.  
3

### 4 3.2. INSTALLATION

- 5 A. Install in accordance with recognized industry practices, code requirements and manufacturer's latest recommendations.  
6 B. Notify owner of installation time to allow discussion prior installation.  
7 C. Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated. Make vertical  
8 work plumb and make horizontal work level. Where space is limited, install components to maximize space available for  
9 maintenance and ease of removal for replacement.  
10 D. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for  
11 product performance until Substantial Completion.  
12 E. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that  
13 expected during normal conditions of occupancy.  
14 F. ANCHORS AND FASTENERS: Provide anchors and fasteners as required to anchor each component securely in place,  
15 accurately located and aligned with other portions of the Work.  
16 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.  
17 2. Allow for building movement, including thermal expansion and contraction.  
18 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages,  
19 including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete  
20 or masonry.  
21 G. CONSTRUCTION LOADS: During the construction period, the Contractor shall provide means for the adequate distribution of  
22 concentrated loads so that the carrying capacity of any member is not exceeded. Review plans and consult with engineer or  
23 manufacturer to determine allowable loads. Contractor shall hire a Professional Engineer to determine the adequacy of  
24 concentrated loads (e.g. construction equipment and material) point or wheel loads. The Contractor assumes full  
25 responsibility for damage.  
26

### 27 3.3. QUALITY MANAGEMENT OBSERVATIONS (QMO)

- 28 A. The Quality Management Observation (QMO) is an ongoing observation of the construction process as it progresses. The  
29 QMO process acts as an "in progress punch list".  
30 B. If a contract non-conformance appears, a QMO report is initiated to begin the documentation process. The observer will  
31 attempt to discuss the issue with the applicable trade and the superintendent.  
32 C. The GC shall be responsible for determining the course of action required to remedy the non-conforming issue and shall  
33 coordinate and direct the contractor(s) responsible for any work related to the observation. Discuss remedy with owner.  
34 D. All contractors assigned to remedy the observation by the GC shall provide follow-up responses on the QMO report as the  
35 problem is remedied. Contractors shall acknowledge the issue, provide solution, timeline and update.  
36 E. The GC shall inspect the work to ensure that all assigned contractors have remedied the observation to the intent of the  
37 construction documents. CPM will close item once satisfactory resolution is confirmed.  
38

### 39 3.4. MOCKUPS

- 40 A. DEFINITION: Mockups are field samples constructed, applied, or assembled at the project site for review by the Owners  
41 Representative. Mockups are three dimensional, true scale models that illustrate materials and methods, equipment,  
42 workmanship, or location; based on plans and specifications and any contract amendments (RFI, CB, CO, submittals etc.).  
43 B. Approved mockups establish the standard of quality by which the final work will be judged.  
44 C. All Contractors shall be responsible for providing and constructing mockups per the respective specifications. Owner may  
45 request additional mockups at any time.  
46 D. Mockups shall be of sufficient size to show various material adjacencies, connectivity, patterns, and other features.  
47 E. GC shall be responsible for coordinating mockups, designating the location, coordinating the work of all contractors and  
48 materials required, and ensuring that the mockup meets the intent of the construction documents.  
49 F. Mockups shall be done and completed in a timely fashion for review and approval so as to not impact the project schedule.  
50 G. All materials associated with a particular detail, construction method, manufacturer's installation instructions shall be  
51 properly represented and visible in the mockup. This includes but is not limited to finished mortar joints, sealants, backer  
52 rods, tie bars, rebar, etc.  
53 H. Mockups shall be constructed in a layered fashion so that all products being used can be seen and evaluated.  
54 I. Mockups that will not be built in place or will not remain will be constructed in a space on the project site protected from  
55 weather, construction traffic, and other such disturbances until such time as the associated work has been completed.  
56 J. The General Contractor and all associated Sub-contractors shall meet with the Owner, City Project Manager and Design  
57 Team as necessary to review the mock-up. Contractors shall be prepared to answer questions on materials and methods as  
58 necessary. Improvements or adjustments shall be discussed as needed. If the mockup is incomplete or does not show  
59 sufficient detail, GCs shall resubmit a new mockup. Contractor is responsible for cost or re-submittal.  
60 K. The field approved mockup shall be submitted by the General Contractor as any other submittal for project documentation  
61 purposes. The mockup submittal shall consist of the following:  
62 1. As many detailed photos as necessary to capture the complexity of the mockup.  
63 2. Provide a written summary of the approved mockup. Include all recommended adjustments, level of expected  
64 workmanship, and other such detail as discussed during the mockup review.

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54

### 3.5. PHOTOGRAPHIC DOCUMENTATION

- A. GC shall take weekly digital photographs of construction progress.
- B. Owner may direct contractors to take additional pictures to document work progress and verify proper installation.
- C. All digital photographs shall be taken with a good quality device and be properly zoomed in/out to capture a specific level of detail as necessary.
- D. All digital photographs shall be saved in a JPEG (.jpg) format and uploaded directly to the PMWS.
- E. The GC shall take exterior photographs from at least 2 different angles.
  - 1. This requirement shall end when the exterior work has been substantially completed.
  - 2. This requirement may be suspended due to weather conditions or substantial delays in exterior progress.
- F. The GC shall take interior photographs of interior construction, equipment installation, rough-ins and other such progress that helps document weekly progress reporting. Interior photographs should focus on specific significant installations as well as general progress throughout the progress of the contract.

### 3.6. AS-BUILT DOCUMENTS

- A. All documents shall be electronic and marked up electronically in the field. Field staff shall have access to electronic devices and software to mark-up and use the documents. Unless noted differently, the deliverable shall be in PDF.
- B. The Plan Set shall be kept up to date with new revisions within 2 working days of supplemental drawings being issued.
  - 1. Void old sheets but do not remove them from the plan set. Indicate date received and what document (RFI, CB, CO, etc) caused the change.
  - 2. Add new details in appropriate white space on relevant sheets. If no space is available use the back side of the previous sheet or insert a new sheet. Indicate date received and what document (RFI, CB, CO, etc) caused the change.
  - 3. Depending on software used, the above process shall be a guideline detailing the desired outcome.
- C. The GC shall be responsible for all of the following:
  - 1. Spot checking all sub-contractors field documents to insure daily information is being recorded as work progresses.
  - 2. Discuss as-built recording to the plan set at weekly job meetings with all sub-contractors on site.
  - 3. Insure that all sub-contractors are providing clear and accurate information to the plan set in a neat and organized manner.
  - 4. Insure sub-contractors who have completed work have finalized recording all as-built information to the plan set before releasing them from the project site.
- D. The City Project Manager, and other design team staff will perform random checks of the As-Built Document Set. An updated and current Master As-Built Document Set is a stipulation for approval of the progress payment.
- E. No Work shall be buried, covered, or hidden, by any additional Work, regardless of Contractor or Trade, until locations of all materials and equipment has been properly documented as described below.
- F. All contractors shall be required to record the following as-built information:
  - 1. Sketches, corrections, and markups indicating final location, positioning, and arrangement of materials and equipment such as pipes, conduits, valves, cleanouts, pull boxes and other such items. Note all final locations on plan sheets, indicate dimension off identifiable building features. Riser diagrams need only be corrected for significant changes in locations, routing or configuration. Final as-built document shall be electronic (jpg, PDF)
  - 2. Note whether horizontal runs are below slab or above ceiling, include dimensions above or below finished floor elevation.
- G. Accurately locate items on the plan set as follows:
  - 1. For items that are located as dimensioned provide a check mark or circle indicating the dimension was verified.
  - 2. For items that are within 5 feet of the location indicated on the plans leave as shown provide correct dimensions to existing dimension strings or, accurately locate with new dimension strings.
  - 3. Accurately draw the items in the new location as installed and,
  - 4. Accurately locate with new dimension strings and,
  - 5. Note that the existing location is void.
  - 6. Include dimensioned locations for items that will be buried, concealed, or hidden in the ground, under floors, in walls or above ceilings.
  - 7. Dimensions shall be pulled from identifiable building features, not from centers of columns or other buried features.
  - 8. When necessary pull more dimensions as needed from opposing directions to properly locate single items.

**END OF SECTION**

**SECTION 01 73 00  
EXECUTION**

1  
2  
3  
4 PART 1 – GENERAL .....1  
5 1.1. SCOPE .....1  
6 1.2. EXAMINATION .....1  
7 1.3. CONSTRUCTION LAYOUT .....2  
8 1.4. CONTINUITY OF SERVICES AND TRAFFIC .....2  
9 PART 2 – PRODUCTS .....2  
10 2.1. FENCING MATERIALS AND BARRICADES .....2  
11 PART 3 – EXECUTION .....3  
12 3.1. PROTECT WORK .....3  
13 3.2. WORK INTERRUPTION .....5  
14 3.3. CUTTING AND PATCHING .....5  
15

**PART 1 – GENERAL**

**1.1. SCOPE**

- 18 A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the  
19 following:  
20 1. Protection of installed construction including but not be limited to the following:  
21 a. Any existing site feature such as pavement, curbs, drainage features, utilities, landscaping features (trees, shrubbery,  
22 plantings, flagpoles, etc) and other such exterior items not associated with the building whether on or adjacent to  
23 the project site.  
24 b. Any existing structure on or adjacent to the project site.  
25 c. Any existing interior work that may be adjacent to the new work including all paths of ingress/egress to areas  
26 associated with accessing the Work.  
27 d. Any existing feature of any kind within the public right-of-way that may be on the project site property, adjacent to  
28 the project site or across the street from the project site.  
29 2. The Contractor shall provide and pay for field engineering services required for the Project:  
30 a. Land surveying services required to execute the Work, to include building addition location and layout, and location  
31 and layout of pavements and all proposed site improvements.  
32 b. Verification of existing building dimensions, elevations, and relationship to proposed additions.  
33 c. Professional Engineering services to execute Contractor's construction methods.  
34 d. Registered Professional Engineer in the State of Wisconsin to determine the load capacity of the existing structure  
35 for use of Contractors temporary facilities, equipment, lifts, machinery, material storage, etc.  
36 B. The contractor shall be responsible for cleaning, repairing, or replacing any completed work or work in progress under this  
37 specification as deemed necessary by the CPM without additional cost to the contract.  
38

**1.2. EXAMINATION**

- 40 A. FIELD MEASUREMENTS: Take field measurements as required to fit the Work properly. Recheck measurements before  
41 installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other  
42 construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid  
43 delaying the Work.  
44 B. Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with  
45 requirements for installation tolerances and other conditions affecting performance. Record observations.  
46 1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.  
47 2. Examine roughing-in for systems to verify actual locations of connections before equipment and fixture installation.  
48 3. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.  
49 4. Proceed with installation only after unsatisfactory conditions have been corrected.  
50 5. Proceeding with the Work indicates acceptance of surfaces and conditions.  
51 C. EXISTING CONDITIONS:  
52 1. Verify all existing conditions noted in the contract documents with actual field locations. Verify dimensions, sizes and  
53 locations, of structural, equipment, mechanical and utility components.  
54 2. Report any inconsistencies, errors, omissions, or code violations in writing to owner immediately and annotate on as-  
55 built record drawings.  
56 3. If the Contractor encounters conditions at the site subsurface or otherwise concealed physical conditions that differ  
57 materially from those indicated in the Contract Documents or unknown physical conditions of an unusual nature, that  
58 differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the  
59 character provided for in the Contract Documents, the Contractor shall promptly provide notice to the City Project  
60 Manager before conditions are disturbed. The City will promptly investigate such conditions and recommend possible  
61 adjustment in contract time and sum.  
62

**1.3. CONSTRUCTION LAYOUT**

- A. VERIFICATION: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify City Project Manager promptly.
- B. SITE IMPROVEMENTS: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.
- C. BUILDING LINES AND LEVELS: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- D. RECORD LOG: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.
- E. REFERENCE POINTS: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to City Project Manager before proceeding. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- F. BENCHMARKS: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark. Record benchmark locations, with horizontal and vertical data, on Project Record Documents. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

**1.4. CONTINUITY OF SERVICES AND TRAFFIC**

- A. BUILDING ACCESS: Maintain existing access and egress throughout construction period. Maintain ANSI A117 compliant access, delivery access, emergency vehicle access, and emergency egress. Do not interrupt access and egress without approval by owner.
- B. TRAFFIC: Do not interrupt or change existing traffic, delivery, or parking without prior written approval from owner. When interruption is required, coordinate schedule with the owner agency to minimize disruptions. When working in public right-of-way, obtain all necessary approvals and permits from applicable municipalities and WISDOT. When Contractor's activities impede or obstruct traffic flow, Contractor shall provide traffic control devices, signs and flaggers in accordance with other Contract Documents and the current version of the MUTCD, or as shown on the Drawings.
- C. UTILITIES: Verify the locations of any water, drainage, gas, sewer, electric, drainage, gas, sewer, electric, telephone/communication, fuel, steam lines or other utilities and site features which may be encountered in any excavations or other sitework. All these shall be protected, properly underpinned and supported to avoid disruption of service.
- D. HVAC: If the building is occupied and continues operation during construction, retrofit or demolition, Contractor must maintain ventilation, heating and air conditioning for as large parts of the building as technically feasible. Where maintaining space conditioning is not feasible with the existing system, the Contractor shall provide temporary sufficient air conditioning, heating and ventilation in coordination with the owner. The regular on-site energy provided by owner can be used (i.e. local natural gas) with all connections provided by contractor. Space temperatures in occupied spaces shall be equal to typical design temperatures and contractor has to provide more capacity upon request by owner.
- E. For occupied buildings contractor shall provide and maintain continuous service (power, controls, fire alarm, fire suppression, alarms, communication, elevators, HVAC, roads etc.) during the entire construction period. Shutdowns need to be conform to the following:
1. Any outage must be scheduled 72 hours in advance and when the interruption causes the least interference with owner's operation and might be scheduled during after-hours if regular business hours are not acceptable to the owner. No extra costs will be paid to the Contractor for such work outside of regular weekly working hours. Postponement of scheduled shutdowns by the owner shall not constitute a basis for additional charges to the owner. Overtime cost to the utility is paid by Owner.
  2. Prior to the shutdown the Contractor shall provide the following:
    - a. Proof of receipt of all materials required for the shutdown or a written commitment from the responsible.
    - b. A list of the qualified Contractor personnel assigned to perform the work.
    - c. Analysis of any effect on the utility or building energy system(s) and the estimated duration of the shutdown.
    - d. A 24-hour emergency callback phone number for any problems or concerns after the Contractor has left the site.
  3. Services shall be restored as fast as possible. Building shall not be left without services when contractor leaves for the day.
  4. Limit outages to the area or system being worked on.

**PART 2 – PRODUCTS****2.1. FENCING MATERIALS AND BARRICADES**

- A. Provide and maintain any of the following that sufficiently provide a sturdy physical barrier and/or visual barrier as necessary for the intended application.
1. 4'0" high standard orange construction fence
  2. Type A, Jersey Barriers, used as permanent blocking devices to deny access to alternate project site entrances or exits.

- 1 3. Type B, Traffic Barricades, used as temporary blocking devices to deny access to alternate project site entrances / exits.
- 2 4. Type C, Construction Barrels without construction fencing shall be used for lane closures, temporary blocking devices to
- 3 deny access and the protection of single locations (I.E. identify the location of an access structure) that do not require
- 4 fencing.
- 5 5. Type D, Standard orange construction barrels each with a standard rubber base ring and reflective tape. Provide flashing
- 6 amber lights as needed to increase night time visibility. Replace batteries pro-actively.
- 7 6. with construction fencing where it becomes necessary to surround an object with a complete visual barricade and it is
- 8 impractical or unacceptable to install fence posts. The surround shall be constructed in such a manner as to provide a
- 9 buffer zone around and access to the item being protected.
- 10 7. Type E, Steel "T" Fence Posts with construction fencing to surround an object with a complete visual barricade and it is
- 11 practical to install fence posts. The surround shall be constructed in such a manner as to provide a buffer zone around
- 12 and access to the item being protected.
- 13 8. Type X, Other fencing or barricade types that may be designated and detailed within the construction documents shall
- 14 use additional alpha numeric designations.
- 15 9. Other types of fencing or barricades typically used in the construction industry

### 16 **PART 3 – EXECUTION**

#### 17 **3.1. PROTECT WORK**

- 19 A. Contractor shall be responsible to provide all reasonable protection methods, materials, or precautionary measures required
- 20 to protect new or existing construction of this project as a whole. The GC shall be responsible that any damaged new or
- 21 existing construction is repaired or replaced at no additional cost to owner.
- 22 B. Ensure that all materials being used to protect installed construction are compatible with, and/or adjacent to, the materials
- 23 being protected. This shall include but not be limited to the material used as covering, tapes used to fasten protective
- 24 materials, etc.
- 25 C. The GC shall do all of the following:
  - 26 1. Provide all temporary services that may be required to protect the installed material from heat, cold, humidity, etc, while
  - 27 materials such as concrete, mortar, sealants, paints, etc, are drying and/or curing.
  - 28 2. Provide adequate visual and/or physical protection as needed to protect newly completed interior work such as paint,
  - 29 flooring material, sealants, grouts, etc. that may be drying and/or curing.
  - 30 3. Provide adequate space and materials for cleaning boots, tool boxes, supplies, and other items coming into the project
  - 31 site once finish work has begun.
  - 32 4. Clean dirtied areas and repair/replace damaged areas immediately.
- 33 D. Prior to installing protective measures, the responsible contractor shall propose to City Project Manager (CPM) the proposed
- 34 plan for protection, materials to be used and samples as necessary. CPM reserves the right to disapprove any proposed
- 35 method and/or material and/or make alternate proposals.
- 36 E. Report any incident of damage to existing property, right-of-way, or utility to the CPM immediately upon rendering the
- 37 incident safe, and notifying emergency response teams, and emergency utility crews as needed.
- 38 F. Conduct a site walk through prior to leaving at the end of each day to assess protection measures are properly in place,
- 39 provide correction actions as necessary. Report any damage to CPM and repair/replace as needed.
- 40 G. EXTERIOR:
  - 41 1. Open trenches, pits, and other such excavations shall be properly covered, lined, or shored as needed during periods of
  - 42 inclement weather to prevent the caving of soils onto existing work in progress. Refer to the appropriate specifications
  - 43 and/or regulatory requirements governing this type of work as necessary.
  - 44 2. Provide adequate protection at all openings with heavy duty tarps, plastic sheathing, or wood framing and sheathing as
  - 45 needed to protect interior work in progress from inclement weather as needed.
  - 46 3. Protect exterior finishes of all kinds with heavy duty tarps or plastic sheathing as needed while landscaping is being
  - 47 installed through full germination of seeded areas or installation of filter fabric and mulches to keep dust, dirt, and mud
  - 48 off of finished exterior surfaces.
  - 49 4. Designate specific curb mounting points and provide wood blocking where small vehicles, skid loaders and other such
  - 50 equipment may need access to areas being landscaped.
  - 51 5. Provide plywood turning pads for skid loaders to turn on to prevent tire marking on new pavement.
  - 52 6. Do not permit the parking of vehicles with any kind of fluid leaks to park on new pavement.
- 53 H. ADJACENT PROPERTIES:
  - 54 1. Whenever possible the Owner shall have previously provided notice to adjacent property owners and shall have
  - 55 obtained any permanent or temporary easements that may be necessary to complete any Work on adjacent properties.
  - 56 2. It shall be the responsibility of the GC to do the following for all Work on or adjacent to the property line:
    - 57 a. Contact the adjacent property owner and provide them with information on the work to be done, equipment to be
    - 58 used, and estimated duration of the work. Information to be updated and communicated to property owner(s) as
    - 59 construction progresses and site conditions change. For rented or leased space the GC shall provide the same
    - 60 information to the tenants.
    - 61 b. Determine from the owner and/or tenants if there are any concerns for children, pets, special plantings, etc.
    - 62 c. Ensure all protective measures are placed and maintained during the execution of Work on or adjacent to the
    - 63 property line. Interact with the adjacent property owners/tenants as needed. Enforce rules with all subs.

- 1 d. Restoration shall include but not be limited to repair or replacement using like materials and finishes to its original
- 2 condition or better.
- 3 e. Restoration of landscaping materials shall include watering of any seed, sod, or other planting of any kind for a
- 4 reasonable period of time to encourage germination and root development.
- 5 3. The GC shall keep the CPM informed directly to any issues pertaining to adjacent property owners and tenants.
- 6 I. LANDSCAPING FEATURES:
- 7 1. Whenever possible do not install new landscape features until exterior building construction has been completed,
- 8 equipment such as scaffolding and lifts have been removed, and heavy equipment operation is no longer required.
- 9 2. Whenever possible remove and temporarily store all existing landscape features such as benches, waste receptacles,
- 10 signage, and other such features that will be within the area of Work that can be removed.
- 11 3. Landscape features that cannot be removed such as flag poles, light poles, light bollards, etc. shall be protected with
- 12 Type D fencing for areas on pavement or Type E fencing for areas on soil.
- 13 4. Planting beds shall be protected using Type E fencing around the exposed perimeter of the planting bed as needed.
- 14 J. UTILITIES:
- 15 1. Contractor shall be responsible for notifying all utilities to determine emergency response procedures and protection
- 16 requirements prior to installing any construction protection. This includes requesting utility marking through Diggers
- 17 Hotline. <http://www.diggershotline.com/> Contact the Owner and CPM for any available private utility information on
- 18 the property that may be available prior to calling a private utility locating company.
- 19 2. Hydrants, lamp posts, electrical transformers, and other utility pedestals shall be protected with Type D fencing for areas
- 20 on pavement or Type E fencing for areas on soil. Fence posts shall be located so as to not be directly over the utility
- 21 main.
- 22 3. Storm sewer structures shall have proper inlet protection according to City of Madison Standard Specification and Type C
- 23 Construction Barrels when necessary.
- 24 4. Stormwater management features such as greenways, retention/detention ponds, bio-filtration ponds and other such
- 25 features shall be properly protected according to the appropriate erosion control measure specified on the Erosion
- 26 Control Plan. See multiple sections of City of Madison Standard Specification.
- 27 a. For the protection of hard to see items such as structures, castings, inlets, etc. in grassy areas provide Type E fencing
- 28 for areas on soil.
- 29 b. For the protection of storm water management features having special soils and plants such as bio-filtration ponds
- 30 provide Type E fencing for areas on soil.
- 31 5. Other structures and covers including but not limited to cleanouts, wiring hand holes, valve boxes, access structures,
- 32 grease trap structures, etc shall be protected as follows:
- 33 a. Provide Type E fencing for areas on soil.
- 34 b. When paving operations are complete provide a construction barrel or cone near structures as necessary depending
- 35 on required heavy construction traffic.
- 36 K. PUBLIC RIGHT OF WAY:
- 37 1. All public right-of-way shall remain open and accessible except during periods of active work. At such times the public
- 38 right of way shall be properly closed and signed as referenced in City of Madison Standard Specification 107.9.
- 39 2. Bus stops and bus stop structures shall remain accessible at all times.
- 40 3. Traffic signage and traffic signals, traffic control boxes shall be protected with Type D fencing for areas on pavement or
- 41 Type E fencing for areas on soil. Protection at traffic signage/signals shall not obstruct the viewing of the sign/signal for
- 42 its intended purpose at any time.
- 43 L. INTERIOR:
- 44 1. Protect vinyl composite, rubber composite, painted/stained concrete, and tiled flooring as follows:
- 45 2. Define foot traffic areas and protect with Ramboard Temporary Floor Protection products as a minimum basis of design
- 46 or other protection product(s) compatible with installed flooring product if Ramboard is not compatible. Products to be
- 47 used shall be new.
- 48 3. Tape all edges, seams, etc with a good quality tape that does not leave sticky residue. Do not allow any debris or other
- 49 material between the installed flooring and the protection material.
- 50 4. Repair tears immediately, replace worn areas with like material as necessary.
- 51 5. Protect carpeted areas as follows:
- 52 6. Define foot traffic areas and protect with a minimum of 6mil, clear, polyethylene sheeting 3 feet wide. Products to be
- 53 used shall be new.
- 54 7. Tape all edges, seams, etc with a good quality tape that does not leave sticky residue. Do not allow any debris or other
- 55 material between the installed flooring and the protection material.
- 56 8. Repair tears immediately, replace worn areas with like materials as necessary.
- 57 9. Protect all finished walls in high traffic areas with Ramboard Temporary Wall protection products or approved equal.
- 58 10. Tape all edges, seams, etc with a good quality tape that does not leave sticky residue. Do not allow any debris or other
- 59 material between the installed flooring and the protection material.
- 60 11. Repair tears immediately, replace worn areas with like materials as necessary.
- 61 12. Protect counter tops, cabinets, and other finished surfaces with large sheets of thick cardboard or Ramboard products.
- 62 Do not allow toolboxes, finish materials, parts and other such items to be placed on finished materials.
- 63 13. All protection shall stay in place until the CPM and GC mutually deem the project is ready for Final Cleaning. The
- 64 contractors responsible for protecting the work shall be responsible for removing the protection and removing any adhe

- 1           sive residue at that time. Contractors shall only use manufacturer authorized cleaning materials for removing adhesives,  
2           etc.
- 3           14. Finished areas shall be sufficiently covered to accommodate all equipment, and materials being used to complete the  
4           work being done.
- 5           15. Finished areas shall be sufficiently covered to prevent splatters, over spray, etc when doing touch-up work.
- 6           16. Contractors who do not provide sufficient protection under this sub-section shall be responsible for any costs associated  
7           with cleaning, repairing or replacing already finished construction at no additional cost to the contract.

### 9           **3.2. WORK INTERRUPTION**

- 10          A. Once contractor starts work, work shall proceed without interruption. Work site shall not be left temporarily abandoned  
11          without approval by City.
- 12          B. Upon approval by City, work on site may pause for one of the following reasons
- 13                1. Contractor-provided material is not available even when contractor made all effort to receive material in time. Note that  
14                the contractor is required to provide adequate submittals immediately after contract award. All material shall be ordered  
15                immediately after review of submittal. Documentation of speedy processing shall be provided. Lack of adequate and  
16                timely submittals and late ordering are not valid reasons to allow a pause of work.
- 17                2. A City-provided work or equipment is delayed
- 18          C. If work interruption is approved by City, contractor shall:
- 19                1. Ensure work will be completed before contract end date. Provide updated schedules and notify city of any changes in  
20                required pause.
- 21                2. The site or facility is left in orderly condition and is no unsafe nuisance. Facilities that are in use during construction shall  
22                be brought into representable condition. Areas open to the public shall be especially representable. The City will  
23                determine specific conditions depending on the use of the site.

### 24          **3.3. CUTTING AND PATCHING**

- 25          A. CUTTING: Remove in-place construction necessary to permit installation of other Work. Cut in-place construction by sawing,  
26          drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage  
27          elements retained or adjoining construction. Cut holes and slots as small as possible, neatly to size required, and with  
28          minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
- 29                1. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
- 30                2. Concrete or Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
- 31                3. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and  
32                seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
- 33          B. PATCHING: Fit and repair work required to restore surfaces to original conditions after installation of other Work. Patch  
34          construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch  
35          with durable seams that are as invisible as possible. Before patching, verify compatibility with and suitability of substrates,  
36          including compatibility with in-place finishes or primers. Use materials identical to existing in-place materials. If identical  
37          materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional  
38          performance of in-place materials. Restore exposed finishes of patched areas and extend finish restoration into retained  
39          adjoining construction in a manner that will eliminate evidence of patching and refinishing.
- 40                1. Clean piping, conduit, and similar features before applying paint or other finishing materials.
- 41                2. Restore damaged pipe covering to its original condition.
- 42                3. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final  
43                paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends in.
- 44                4. Ceilings: Patch, repair, or re-hang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
- 45                5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weather tight condition.
- 46          A. STRUCTURAL ELEMENTS: Do not cut and patch structural elements in a manner that could change their load-carrying  
47          capacity. Contractor shall notify the owner of structural members, piping, conduit, or equipment not indicated for removal  
48          that may cause interference with the work. Work shall not proceed in the affected area until instructions have been issued.  
49          Do not drill or penetrate existing structures without prior permission. The removal of existing work shall be by methods that  
50          will not jeopardize the integrity of structures or systems that are to remain.
- 51          C. MISCELLANEOUS ELEMENTS: Do not cut and patch miscellaneous elements or related components in a manner that could  
52          change their load-carrying capacity, their capacity to perform as intended, or that may result in increased maintenance or  
53          decreased operational life or safety. This includes but is not limited to water, moisture, or vapor barriers, membranes and  
54          flashings, exterior curtain-wall construction, equipment supports, piping, ductwork, vessels, and equipment, noise and  
55          vibration control elements and systems
- 56          D. VISUAL REQUIREMENTS: Do not cut and patch construction in a manner that results in visual evidence of cutting and  
57          patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in  
58          Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and  
59          patched in a visually unsatisfactory manner.
- 60          E. WARRANTIES: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching  
61          operations, by methods and with materials so as not to void existing warranties. All cutting and patching work performed  
62          under this contract shall be warranted like new work as defined by the Specification governing the work.
- 63

- 1 F. Before any drilling, cutting or other type of opening the contractor shall verify that no conduits, wires, pipes or other items  
2 are in or near opening area. X-ray or ground-penetrating radar technology shall be employed to survey ceilings, slabs or walls  
3 when potentially damaging opening techniques are employed. Existing available data and records may not be accurate  
4 regarding exact location of structural steel, pipes or conduit. This work shall be performed at least a week prior to give owner  
5 the opportunity to resolve any issues by rebar or other obstacles in unexpected locations.
- 6 G. PROTECTION: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse  
7 weather conditions for portions of Project that might be exposed during cutting and patching operations. Provide temporary  
8 support of Work to be cut.

9  
10

**END OF SECTION**



**SECTION 01 74 00  
CLEANING AND WASTE MANAGEMENT**

1  
2  
3  
4 PART 1 – GENERAL .....1  
5 1.1. SCOPE .....1  
6 1.2. REFERENCES .....1  
7 1.3. DEFINITIONS .....1  
8 1.4. WASTE MANAGEMENT .....1  
9 1.5. WASTE MANAGEMENT PLAN .....2  
10 PART 2 – EXECUTION .....3  
11 2.1. PROJECT SITE CLEANING .....3  
12 2.2. FINAL CLEANING AND CALL BACK WORK .....4  
13 2.3. HAZARDOUS AND TOXIC WASTE .....4  
14 2.4. RECYCLABLE, RE-USABLE, AND SALVAGEABLE WASTE .....5  
15

**PART 1 – GENERAL**

**1.1. SCOPE**

- A. This specification includes administrative and procedural requirements for the recycling, re-use, salvaging, and disposal of non-hazardous construction and demolition waste. GC shall be fully responsible for complying with all applicable ordinances and other such regulatory requirements during the execution of this contract.
- B. Throughout the execution of this contract all contractors shall be responsible for maintaining the project site in a standard of cleanliness as described in this specification.
- C. Minimize dust, noise and other nuisances to greatest extent possible.

**1.2. REFERENCES**

- A. Work under this section depends on applicable provisions from other sections and the plan set in this contract.
- B. There are 2 Madison General Ordinances (MGO) that the City of Madison has regarding construction and demolition waste.
  - 1. MGO 10.185, Recycling and Reuse of Construction and Demolition Debris, describes the requirements associated with this ordinance including definitions, documentation requirements, and penalties.
  - 2. MGO 28.185, Approval of Demolition (Razing, Wrecking) and Removal, describes the requirements associated with applying for and receiving a demolition permit.

**1.3. DEFINITIONS**

- A. CLEAN: Untreated and unpainted material, free of contamination caused by oils, solvents, caulks, and other chemicals.
- B. CONSTRUCTION AND DEMOLITION DEBRIS: Materials resulting from the construction, remodeling, repair, and demolition of utilities, structures, buildings, and roads.
- C. DISPOSAL: Off-site removal of construction and demolition debris and the subsequent sale, recycling, reuse, or deposit in authorized landfill or incinerator.
- D. HAZARDOUS: Exhibiting the characteristics of hazardous substance, i.e. ignitability, corrosiveness, toxicity, or reactivity and including but not limited to asbestos containing materials, lead, mercury and PCBs.
- E. RECYCLABLE: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product.
- F. RECYCLER: Any recycling facility, transfer station, or other waste handling facility which accepts construction and demolition debris for recycling, or for other transferring to a recycling facility.
- G. RECYCLING: Process of sorting, cleaning, treating, or reconstituting solid waste and other discarded materials for the purpose of preparing the material to be recyclable. Recycling does not include burning, incinerating or thermally destroying waste.
- H. RETURN: To give back reusable items or unused products to vendors for credit.
- I. REUSE: Shall mean any of the following:
  - 1. The on-site use of reprocessed construction and demolitions debris.
  - 2. The off-site redistribution of a material, for use in the same manner or similar manner at another location.
  - 3. The use of non-toxic, clean wood as an alternative fuel source.
- J. SALVAGE: To remove a waste material from the project site for resale or reuse by the Owner or others.
- K. TOXIC: Poisonous to humans either immediately or after a long period of exposure.
- L. TRASH: Any product or material unable to be re-used, returned, recycled, or salvaged.
- M. WASTE: Extra materials or products that have reached the end of its useful life or its intended use. Waste includes salvageable, returnable, recyclable and re-useable construction and demolition materials, and trash.

**1.4. WASTE MANAGEMENT**

- A. GC salvage/recycling/reuse 75% (minimum) by weight of the total waste generated by the Work.
- B. The GC shall salvage or recycle 100% of all uncontaminated packaging materials including but not limited to the following:
  - 1. Paper
  - 2. Cardboard
  - 3. Beverage containers

- 1 4. Boxes
- 2 5. Plastic Sheet and film
- 3 6. Polystyrene packaging
- 4 7. Wood crates and pallets
- 5 8. Plastic pails and buckets
- 6 C. Use all reasonable means to divert construction waste from landfills and incinerators through recycling, reuse, or salvage as
- 7 appropriate.
- 8 D. WASTE MANAGEMENT COORDINATOR: The GC shall designate a Waste Management Coordinator. Coordinator may be any
- 9 member of the GC staff having knowledge of proper waste management procedures and all applicable regulations.
- 10 E. REFRIGERANT RECOVERY TECHNICIAN QUALIFICATIONS: Certified by EPA-approved certification program.
- 11 F. All revenues, savings, rebates, tax credits, and other such incentives received from recycling, reusing, or salvaging waste
- 12 materials shall accrue to the GC unless specified otherwise in the contract documents.
- 13 G. Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways
- 14 will not be permitted.
- 15 H. Provide adequate containers, storage space, signage, transportation and other items required to manage waste.
- 16 I. Train all workers, sub-contractors, and suppliers on proper waste management procedures. Conduct additional training as
- 17 needed during the execution of the contract to keep a positive focus on the waste management plan.
- 18 J. Distribute the waste management plan to everyone concerned including new workers, sub-contractors, and suppliers when
- 19 they first appear on the project site.
- 20 K. Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other
- 21 adjacent and used facilities. Designate and label specific areas on the project site necessary for separating materials to be
- 22 salvaged, recycled, reused, donated, and sold.
- 23 L. The GC and Waste Management Coordinator shall be responsible for monitoring and reporting the status of the Waste
- 24 Management Plan and shall monitor the waste management practices on site as frequently as needed.
- 25 M. Any waste that is contaminated, organic, or cannot be recycled, re-used, or salvaged shall be legally disposed of in an
- 26 authorized landfill or incinerator. Disposal methods shall follow all applicable regulatory requirements.
- 27 N. No burning of any kind of waste material shall be permitted on this project site at any time.
- 28 O. PAINT AND STAIN: Paints, stains, and their containers shall be disposed of as follows:
- 29 1. Whenever possible containers should be thoroughly cleaned immediately after emptying and sorted with as
- 30 appropriate (metal or plastic) for recycling
- 31 2. Latex paint may be placed with general garbage if properly solidified as follows:
- 32 a. 1" or less in can: Remove lids and allow paint to dry out in the can and harden. Protect cans from rain and freezing.
- 33 b. 1" or more: Mix paint with equal amounts of cat litter or paint hardener, stir and allow to completely dry.
- 34 3. Oil-based or combustible paints and stains, regardless of liquid or solid, shall be transported to an approved facility that
- 35 takes such items such as Dane County Clean Sweep Sites.
- 36 P. TREATED WOOD MATERIALS: Treated wood materials including but not limited to wood that has been painted, stained, or
- 37 chemically treated shall not be recycled or incinerated.
- 38 Q. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
- 39 R. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80°F.

#### 40 41 **1.5. WASTE MANAGEMENT PLAN**

- 42 A. Develop and submit a plan consisting of waste identification, a waste reduction work plan, and cost/revenue analysis.
- 43 Indicate quantities by weight or volume. Use the same units of measure throughout the waste management plan.
- 44 1. Waste Identification: Indicate anticipated types and quantities of site clearing, demolition waste, and construction
- 45 waste that will be generated during the execution of this contract. Include assumptions for the estimates.
- 46 2. Waste Reduction Work Plan: The work plan shall consist of but not be limited to all of the following:
- 47 a. Identify methods for reducing construction waste. Re-using, framing and forming materials, re-planning material
- 48 cuts to minimize waste, etc.
- 49 b. Identify what types of materials will be recycled. Provide lists of local companies that receive and/or process the
- 50 materials. Include names, addresses, and phone numbers.
- 51 c. Identify what types of materials will be disposed of and whether it will be disposed of in a landfill facility or by
- 52 incineration facility. Provide lists of local companies that receive and/or process the materials. Include names,
- 53 addresses, and phone numbers.
- 54 d. Identify methods to be used on site for separating waste including all of the following:
- 55 i. Sizes of containers to be used.
- 56 ii. Labels to be used on the containers to identify the type of waste allowed in the container.
- 57 iii. Designated locations on the project site for waste material containers.
- 58 3. If a Waste Management Disposal Company that allows comingled and unsorted waste materials is used, include with
- 59 Waste Management Plan the following:
- 60 a. Name, address, phone number, state permitting information, and other pertinent information about the disposal
- 61 company.
- 62 b. Documentation from the disposal company indicating company policies and procedures regarding comingled and
- 63 unsorted waste materials to include:

- 1 c. Disposal company procedures for receiving, sorting, recycling, and disposing of comingled and unsorted waste  
2 material.
- 3 B. If project requires demolition incorporate the ordinance required (MGO 28.185) Recycling and Reuse Plan into the Waste  
4 Management Plan.
- 5 C. MANAGEMENT SUMMARY LOG:
- 6 1. Indicate receipt and acceptance by individuals or organizations and if the organization is tax exempt.  
7 2. Records of Donations  
8 3. Records of Sales  
9 4. Recycling and Processing Facility Records: Include manifests, weight tickets, receipts and invoices.  
10 5. Landfill and Incinerator Disposal Records: Include manifests, weight tickets, receipts and invoices.  
11 6. Statement of Refrigerant Recovery: indicate all of the following:  
12 a. All recovery was performed according to EPA Regulations.  
13 b. All refrigerant present was recovered; indicate the total quantity recovered by unit.  
14 c. Date of Recovery.  
15 d. Name, address, company name, and phone number of technician performing the recovery.  
16 e. Technician shall sign and date the statement.

## 17 **PART 2 – EXECUTION**

### 18 **2.1. PROJECT SITE CLEANING**

- 19 A. The Contractor shall provide all required personnel, equipment, and materials necessary to maintain the required level of  
20 cleanliness as described in this specification. Employ experienced personnel or professional cleaners for final cleaning as  
21 necessary for the areas or equipment being cleaned.
- 22 B. Use only cleaning materials, equipment, and methods as recommended in the manufacturers care and use guide of the  
23 material, finish or equipment being cleaned. Contractor shall be responsible for replacing any finished work, finishes,  
24 fixtures, and trim damaged or disfigured because of inadequate or improper cleaning.
- 25 C. The overall appearance of the project site shall neat and orderly. Defined areas for material storage, material waste, and  
26 project area are clean and well maintained.
- 27 D. Safety Cleaning shall include but not be limited to the following:  
28 1. All work areas, passageways, ramps, and stairs shall be kept free of debris, scrap materials, pallets, and other large  
29 items that would obstruct exiting routes. Small items such as tools, electrical cords, etc are picked up when not in use.  
30 2. Form and scrap lumber shall have nails/screws removed or bent over. Lumber shall be neatly stacked in an area  
31 designated by the GC.  
32 3. Spills of oil, grease, and other such liquids shall be cleaned immediately or sprinkled with sand/oil-dry first, then  
33 cleaned.  
34 4. Oily, flammable, or hazardous items shall be stored in appropriate covered containers and storage devices unless  
35 actively being used.  
36 5. Oily, or flammable rags, and other such waste shall only be disposed of in authorized covered containers.
- 37 E. EXTERIOR PROJECT SITE AREAS:  
38 1. All erosion control measures are properly maintained, cleaned, and repaired as necessary.  
39 2. All loose materials (construction or waste) are properly tied or weighted down to resist blowing.  
40 3. All construction materials are properly covered with fully functional tarps or plastic wrap, protected from the weather,  
41 coverings are tied, strapped, or weighted down to resist blowing.  
42 4. Dust control is applied as necessary or as required by any regulatory requirement.
- 43 F. INTERIOR PROJECT SITE AREAS:  
44 1. Stored materials are kept in original shipping containers whenever possible. Stored materials not in shipping containers  
45 are properly stored and protected according to other applicable specifications.  
46 2. All scraps and debris shall be properly disposed of as often as necessary to keep work areas, passageways, stairs, and  
47 ramps free of debris and clear for emergency exiting.  
48 3. Boxes, pallets, and other such shipping containers, are broken down, stored in a consolidated area or, disposed of as  
49 often as is necessary.  
50 4. Hand tools, supplies, materials, electrical cords not being used are picked up and stored in gang boxes.
- 51 G. JOB TRAILER: The interior of the job trailer shall be kept clean and available as a work space at all times.
- 52 H. CONCEALED SPACES: Remove debris from concealed spaces before enclosing the space.
- 53 I. Daily cleanings shall be conducted by all contractors at the end of the work day as follows:  
54 1. Debris in excavated areas shall be removed prior to backfill and compaction.  
55 2. Debris in wall cavities, chase spaces, etc shall be removed prior to enclosing the spaces.  
56 3. Large items shall be properly stored, returned to designated areas, or disposed of as necessary.  
57 4. Loose materials shall be properly secured.  
58 5. Flammable or hazardous materials are properly stored or disposed of.
- 59 J. Surfaces receiving finishes shall be thoroughly cleaned prior to contractors applying finish materials. GC shall be responsible  
60 for inspecting the area and surfaces being cleaned for finish prior to the sub-contractor applying the finish. This shall  
61 include but not be limited to the following:  
62 1. Wall surfaces shall be wiped clean of dirt and oily residues, vacuumed free of dust, and shall be free of surface  
63 imperfections prior to painting or installing wall coverings.  
64

- 1 2. Metal surfaces shall be wiped clean of dirt and oily residues, and be free of surface imperfections prior to painting.
- 2 3. Flooring shall be broom swept of large and loose items then vacuumed clean of dust and small particles, and damp
- 3 mopped clean and dried prior to installing any flooring finish. Additional cleaning may be required depending on the
- 4 preparation requirements recommended by the flooring material manufacturer.
- 5

## 6 **2.2. FINAL CLEANING AND CALL BACK WORK**

- 7 A. For the purposes of this section "clean" shall be defined as a level of cleanliness generally provided by skilled cleaners using
- 8 commercial quality building maintenance equipment and materials.
- 9 B. Cleaning equipment used shall be commercial grade equipment commonly used by professional cleaners.
- 10 C. Cleaning equipment and materials shall be cleaned, rinsed, or replaced to ensure a uniform level of cleanliness is being
- 11 maintained during the final cleaning.
- 12 D. Exterior Cleaning shall include but not be limited to the following:
  - 13 1. All exterior glazing surfaces have been professionally cleaned and are free of dust and streaking.
  - 14 2. Metal roofs, siding, and other surfaces shall be clean of dirt and free of splashed or excess materials such as sealants,
  - 15 mortar, paint, etc.
  - 16 3. All exterior furnishings shall be clean; waste receptacles shall be empty.
  - 17 4. Paved areas shall be clean, free of dirt, oily stains and other such blemishes
  - 18 5. Exterior lights and diffusers are clean and free of dust.
- 19 E. Interior Cleaning shall include but not be limited to the following:
  - 20 1. Remove all labels, stickers, tags, and other such items which are not required by code as permanent labels.
  - 21 2. All interior glazing surfaces, including mirrors, have been professionally cleaned and are free of dust and streaking.
  - 22 3. All interior surfaces have been cleaned of excess materials such as paint, sealants, etc and are free of dust.
  - 23 4. Interior metals, fixtures, and trim have been cleaned free of dust and oily residues
  - 24 5. Carpet flooring has been thoroughly cleaned; vacuumed free of dust, excess glues and other stains removed per
  - 25 manufacturers use and care instructions.
  - 26 6. Resilient flooring has been thoroughly cleaned; vacuumed free of dust, excess glues and other stains removed, mopped
  - 27 and buffed per manufacturers use and care instructions.
  - 28 7. Interior non-occupied concrete floors shall be broom cleaned, vacuumed free of dust, excess glues and other stains
  - 29 removed per manufacturers use and care instructions.
  - 30 8. Light fixtures, lamps, diffusers and other such items have been dusted and cleaned as necessary.
- 31 F. The GC shall be responsible for ensuring that any contractor returning to the project site for completion or correction work
- 32 has re-cleaned and restored the area to the levels described above upon completion of the work. This shall include but not
- 33 be limited to the following:
  - 34 1. The immediate area(s) where work was completed.
  - 35 2. Adjacent areas where dust or debris may have traveled.
  - 36 3. Other areas occupied during the completion of the call back work.
  - 37 4. Path of entrance/exit, to/from the area(s) of work.
- 38

## 39 **2.3. HAZARDOUS AND TOXIC WASTE**

- 40 A. All hazardous and toxic waste shall be separated, stored, and disposed of according to all applicable regulations.
- 41 B. All hazardous and toxic materials on site shall have a Material Safety and Data Sheet (MSDS) available that indicates storage
- 42 requirements, emergency information, and disposal requirements as necessary.
- 43 C. Contractor removes, collects and stores, and disposes of hazardous substances on site if those substances were known to
- 44 be present and mentioned in bid documents. If hazardous substances are found during construction, the owner assumes
- 45 responsibility for additional cost due to removal, collection and storage on site.
- 46 D. Contractor will assume that all electronic components, machinery, refrigeration devices, appliances and other common
- 47 devices to be removed under this contract contain hazardous substances and include disposal of such in bid price even if
- 48 those substances are not mentioned separately.
- 49 E. ASBESTOS: Contractor's shall follow guidelines in WAC NR 447, WAC HSS 159 and the Occupational Safety and Health Act in
- 50 general, part 1926.1101--ASBESTOS in particular. Contractor is responsible for compliance with all applicable regulations
- 51 when the work includes fastening to or coring through Asbestos Containing Materials and disturbance of asbestos
- 52 containing caulking and mastics.
- 53 F. LEAD BASED PAINT: Conform with OSHA and EPA recommended worker safety requirements when removing lead based
- 54 paint or material bearing lead based paint or material contaminated with lead by the demolition process. Follow
- 55 Occupational Safety and Health Act (OSHA) in general and particularly to 29 CFR 1910 (LEAD STANDARD) and to CFR 1926
- 56 (LEAD EXPOSURE IN THE CONSTRUCTION INDUSTRY). Dispose of refuse containing lead based paint or paint contaminated
- 57 with lead by the demolition process in conformance with State of Wisconsin Hazardous Waste Regulations set forth by the
- 58 Department of Natural Resources and in conformance with OSHA and EPA recommended worker safety requirements.
- 59 G. PCB: Contractor shall assume all ballasts and transformers not specifically labeled as "no PCB" to contain PCB.
- 60 H. MERCURY-CONTAINING DEVICES: Contractor shall assume typically mercury containing devices including but not
- 61 limited to building controls and switches, thermometers, and lamps are on site and shall have those recycled by certified
- 62 contractor. Lamps are stored in accordance with EPA universal waste regulation 40 CFR part 273 including storing them in
- 63 containers with labels describing the contents and the start date of accumulation.

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56

#### **2.4. RECYCLABLE, RE-USABLE, AND SALVAGEABLE WASTE**

- A. ASPHALT PAVING: Break-up into transportable pieces or grind, transport to an authorized recycling facility.
- B. CARPET AND PAD: Separate carpet and pad scraps, containerize and transport to an authorized recycling facility.
- C. CEILING SYSTEM COMPONENTS: Suspended ceiling system components shall be sorted by material type as follows:
  - 1. Broken, cut, or damaged tiles shall be containerized, transport to an authorized recycling facility.
  - 2. Damaged, or cut tracks, trim and other metal grid system components shall be sorted with other metals of similar types, palletize, transport to an authorized recycling facility.
- D. CLEAN FILL: When allowed by Division 31 Specifications; concrete, masonry, stone, asphalt pavement, sand and other such materials may be used as clean fill on this project site. The GC shall verify with owner representative as necessary prior to using any materials as clean fill. Materials shall be processed, placed, and compacted as specified. If not being re-used on site, transport to an authorized recycling facility.
- E. CLEAN WOOD MATERIALS: Including but not limited framing cutoffs, wood sheathing or paneling materials, structural or engineered wood products, and pallets or crates. Clean Wood shall be free of paints, stains, oils, preservatives and other such contaminants.
  - 1. Useable pieces shall be sorted by type and dimension, bundled reused by the GC or returned to the supplier.
  - 2. Non-useable pieces shall be palletized or containerized, transport to an authorized recycling facility.
  - 3. Clean, uncontaminated sawdust and wood shavings shall be bagged, transport to an authorized recycling facility.
- F. CONCRETE: Break-up into transportable pieces, remove all metals, transport to an authorized recycling facility.
- G. GLASS PRODUCTS: Sort by types, do not include light fixture lamps and bulbs. Products broken in shipment shall be returned to the supplier. Broken or cracked items still in frames shall be taped to prevent further breakage and injury to workers. Transport to an authorized recycling facility.
- H. GYPSUM BOARD: Stack large clean pieces on wooden pallets or container, store in a dry location, transport to an authorized recycling facility.
- I. MASONRY AND CMU: Remove all metal reinforcing, anchors, and ties, clean undamaged pieces and neatly stack on pallets, transport damaged pieces to an authorized recycling facility.
- J. METALS: Sort metals by type as follows, this does not include piping:
  - 1. Architectural metals including but not limited to siding, soffit, and roofing panels shall be sorted by material, palletize or bundle as needed and transport to an authorized recycling facility.
  - 2. Structural steel, sort by size and type; palletize and transport to an authorized recycling facility.
  - 3. Miscellaneous metals such as aluminum, brass, bronze, etc. shall be sorted by type, containerized or palletized as necessary, transport to an authorized recycling facility.
- K. PACKAGING AND SHIPPING MATERIALS:
  - 1. Cardboard boxes and containers: Breakdown all cardboard boxes and containers into flat sheets. Bundle and store in a dry location until transported for recycling.
  - 2. Pallets:
    - a. Whenever possible require deliveries using pallets to remove them from the project site.
    - b. Neatly stack pallets in preparation for reusing them or providing them to other companies for salvage or re-use.
    - c. Break down pallets into component wood pieces that comply with the requirements for recycling clean wood materials. Neatly stack or palletize pieces in preparation for transportation.
  - 3. Crates: Break down crates into component wood pieces that comply with the requirements for recycling clean wood materials. Neatly stack or palletize pieces in preparation for transportation.
  - 4. Polystyrene Packaging: Separate and bag materials.
- L. PIPING AND CONDUIT: Reduce all piping and conduit to straight lengths, sort and store by size, material and type. Remove supports, hangers, valves, boxes, sprinkler heads, and other such components, sort and store by size, material and type. Transport to authorized recycling facilities according to material types.
- M. ROOFING: Roofing materials shall be sorted and containerized by type, transport to authorized recycling facilities according to material types.
- N. SITE-CLEARING WASTE: Sort all site waste by type.
  - 1. Only stockpile soils types and quantities required for re-use on the project site. All remaining quantities shall be transported off site to an authorized facility that receives such materials.
  - 2. Brush, branches, and trees with no marketable re-use shall be transported to facilities for chipping into mulch.
  - 3. Trees with a marketable re-use shall be salvaged and transported to facilities that specialize in processing trees for future use as wood products.

**END OF SECTION**

SECTION 01 77 00  
CLOSEOUT PROCEDURES

1  
2  
3  
4 PART 1 – GENERAL .....1  
5 1.1. SCOPE .....1  
6 1.2. DEFINITIONS .....1  
7 PART 2 – EXECUTION.....1  
8 2.1. CONSTRUCTION CLOSEOUT REQUIREMENTS .....1  
9 2.3. CONTRACT CLOSEOUT REQUIREMENTS .....2

10  
11 **PART 1 – GENERAL**

12 **1.1. SCOPE**

- 13 A. The purpose of this specification is to clearly define and quantify the requirements associated with closing a City of Madison  
14 Public Works Contract.  
15 B. All contracts have two distinct but related paths. Each path needs to be properly closed independently in order to close the  
16 contract as a whole.  
17 1. Construction closeout is related to closing out all of the Work associated with the construction documents.  
18 Construction Closeout must be completed before Contract Closeout can begin.  
19 2. Contract closeout is related to closing out all of the administrative aspects of the contract in general.  
20

21 **1.2. DEFINITIONS**

- 22 A. SUBSTANTIAL COMPLIANCE: A letter provided to the City of Madison Building Inspection and signed by the designing  
23 professional indicating that all Work has been completed to a level that would allow Owner Occupancy and that all  
24 construction is in compliance with the construction documents. This letter does not represent construction closeout.  
25 B. CERTIFICATE OF OCCUPANCY: The Regulatory letter from the City of Madison Building Inspection Department indicating  
26 that all regulatory requirements and inspections have been completed and the building may now be occupied for its  
27 intended use. This letter does not represent construction closeout.  
28 C. CERTIFICATE OF SUBSTANTIAL COMPLETION: A letter provided by the Department of Public Works, signed by the City  
29 Engineer indicating that Construction activities are substantially complete. This letter does represent construction closeout  
30 and the date of this letter begins the date of the Warranty Period.  
31 D. CONSTRUCTION CLOSEOUT: The point in the contract where all contractual requirements associated the execution of the  
32 Work as described in the plans, specifications, and other documents have been successfully met.  
33 E. FINAL PROGRESS PAYMENT: The progress payment associated with achieving Construction closeout as described above. At  
34 this point the contractor may request all monies associated with the contract be paid with the exception of held retainage.  
35 F. CONTRACT CLOSEOUT: The point in the contract where all contractual requirements associated with the City of Madison,  
36 Board of Public Works contract has been successfully met.  
37 G. FINAL PAYMENT: The final contract payment submittal that may be approved by the City of Madison after all contractual  
38 requirements of the Public Works Contract have been met and any remaining monies (retainage) due to the contractor may  
39 be released for the Final Payment.  
40

41 **PART 2 – EXECUTION**

42 **2.1. CONSTRUCTION CLOSEOUT REQUIREMENTS**

- 43 A. The GC shall be responsible for all of the following:  
44 1. Ensuring that all contractors have met the construction closeout requirements associated with their Work.  
45 2. Coordinate the collection of all construction closeout deliverables from all contractors, provide the deliverables to the  
46 City Project Manager for review as necessary, and ensure all contractors correct deficiencies of deliverables and  
47 resubmit as needed for final acceptance.  
48 3. Ensure all closeout requirements identified in the Construction Closeout Checklist below have been completed as  
49 intended by the construction documents.  
50 B. All contractors shall be responsible for reviewing the drawings and specifications and provide any of the following (and  
51 examples) prior to moving into Contract Closeout Procedures:  
52 1. Test reports of all types  
53 2. Startup reports  
54 3. As-builts and record drawings  
55 4. Operation and maintenance data  
56 5. Attic stock  
57 6. Keys  
58 7. Ducts cleaned  
59 8. Filters replaced  
60 9. Commissioning and LEED related items and submittals  
61 10. Owner and Maintenance Training  
62 C. Upon successful completion and final acceptance of all Construction Closeout Requirements the GC may submit to the CPM  
63 the request for Final Progress Payment (100% contract total, less retainage).

- 1 D. The GC and all subcontractors shall finalize all warranty letters associated with their Work using the date noted on the City  
2 Letter of Substantial Completion, and provide the CPM with all warranties. Upon receipt and final approval of the  
3 Warranties the CPM may initiate final processing of the Final Progress Payment (100% contract total, less retainage).

4  
5 **2.3. CONTRACT CLOSEOUT REQUIREMENTS**

- 6 A. The City of Madison, Department of Civil Rights (DCR) monitors contract compliance for construction and procurement  
7 contracts to ensure that local, state and federal regulations are followed by contractors working on City of Madison Public  
8 Works (PW) projects. Contractors will be required to submit reporting paperwork throughout the PW project process. Visit  
9 <http://www.cityofmadison.com/Business/PW/contractCompliance.cfm> Questions regarding the process should be directed  
10 to parties and offices as identified on the various forms, documents, and instructions or contact:  
11 B. The documents required for submittal to the City of Madison for Contract Closeout may include any/all of the items listed  
12 below depending on contract type. It is the sole responsibility of all contractors to know and submit the required and  
13 complete documentation in a timely fashion.  
14 1. Weekly Payroll Reports  
15 2. Employee Utilization Reports  
16 3. Agent or Subcontractor Affidavit of Compliance with Prevailing Wage Rate Determination  
17 4. Prime Contractor Affidavit of Compliance with Prevailing Wage Rate Determination  
18 5. Documentation required for Small Business Enterprise (SBE) goals  
19 6. Other documents as maybe required or requested through the Finalization Review Process  
20 C. The GC and all sub-contractors shall follow all requirements associated with documenting contract compliance and provide  
21 documentation as required or requested by DCR or PW staff. All contractors are encouraged to stay current with  
22 submissions of the following documentation:  
23 1. Weekly Payroll Reports no later than the Progress Payment equal to 50% of the contract total.  
24 2. Employee Utilization Reports  
25 3. Agent or Subcontractor Affidavit of Compliance with Prevailing Wage Rate Determination  
26 4. Prime Contractor Affidavit of Compliance with Prevailing Wage Rate Determination  
27 5. Documentation required for Small Business Enterprise (SBE) goals  
28 6. Other documents as maybe required or requested through the Finalization Review Process  
29 D. Near the Progress Payment equal to 80% of the contract total the GC shall request in writing a Finalization Review. At that  
30 time DCR or PW staff shall prepare a report of all contract documentation submitted to date. A list of missing items or  
31 outstanding issues will be emailed to the GC. No additional follow-up will be generated by DCR or PW Staff.  
32 E. The Contract Closeout Procedure will not begin until the Construction Closeout Procedure has been completed.  
33 F. When the GC feels he/she has successfully met all of the Contract Closeout Requirements described above, the GC may  
34 submit to the request for Final Payment to the CPM.  
35 G. The CPM shall sign and submit the Final Payment request for processing.  
36 H. DCR or PW Staff will notify GC of any documentation that may still be missing, have incomplete information, or other  
37 outstanding issues. It shall be the responsibility of the GC to continue follow-up with DCR and PW staff until all  
38 documentation has been successfully submitted and accepted.  
39 I. When all required documentation associated with Contract Closeout has been successfully submitted and accepted by DCR  
40 and PW Staff the City of Madison shall process the Final Payment of any remaining monies including retainage.

41  
42 **END OF SECTION**

**SECTION 01 78 00  
CLOSEOUT SUBMITTALS**

1		
2		
3		
4	PART 1 – GENERAL .....	1
5	1.1. SCOPE .....	1
6	1.2. DEFINITIONS .....	1
7	1.3. O&M DATA REQUIREMENTS .....	1
8	1.4. SPARE PARTS .....	2
9		

**PART 1 – GENERAL****1.1. SCOPE**

A. The purpose of this specification is to provide clear responsibilities and guide lines related to material, documents and parts submitted prior contract closeout:

1. Operation and Maintenance (O&M) Data related to general facility use, equipment, systems, finishes, and materials to City of Madison Staff (Owner, Owner Representatives, Maintenance, and Custodial Personnel). Include special care instructions for such things as flooring, tile, partitions, and other such finishes and trim related items.
2. Spare parts, special tools, special materials, and extra materials.
3. Accurate recording of work.
4. Warranty documents.

**1.2. DEFINITIONS**

- A. SPARE PARTS: Any component of a product or assembly that comes pre-packaged or was specially ordered for the explicit use of the product or assembly. This shall include but not be limited to fastening devices, mounting brackets, replacement parts, wheels, pulleys, wiring, alternate assembly pieces, etc.
- A. SPECIAL TOOLS: Any tool of any kind that was pre-packaged or specially ordered, and is required to be used for the installation or maintenance of an installed product or assembly as part of this contract. This shall include but not be limited to fastening devices, mounting brackets, replacement parts, wheels, pulleys, wiring, alternate assembly pieces, etc.
- B. SPECIAL MATERIALS: Any oil, lubricant, glue, touch-up paint, or other such material that comes pre-packaged or was specially ordered and is required to be used for the installation or maintenance of an installed product or assembly as part of this contract.
- C. EXTRA MATERIALS (ATTIC STOCK): Any surplus materials in new and useable condition that was installed a part of this contract. Included not be limited to the following: ceiling tiles, paint, stain, floor coverings, ceramic tiles, light bulbs/lamps, filters, strainers, etc. This shall include partially opened bulk items and additional unopened quantities.

**1.3. O&M DATA REQUIREMENTS**

- A. All contractors shall provide O&M Data for each piece of equipment, system, or finish installed in this contract.
- B. Provide one document per specification section. Format: "Specification number\_Equipment name\_What"
- C. PDF files shall be complete original consumer useable PDF documents as provided by Product manufacturer and/or Supplier of product. PDF files shall be word-searchable. Scanned printed material is not acceptable and will be rejected without further review. No hardcopy will be required.
- D. O&M Data shall include but not be limited to the following manufacturers' published information as appropriate for the equipment, system, material, or finish:
  1. Installation instructions
  2. Parts lists, assembly diagrams, explosion diagrams
  3. Wiring diagrams
  4. Start-up, shut-down, troubleshooting and other related operation procedures
  5. Lubrication, testing, parts replacement, and other such maintenance procedures
  6. General use, care, and cleaning instructions
  7. Special precautions and safety requirements
  8. A list of certified equipment vendors, service companies, parts suppliers including company name, address, and phone number
  9. A list of the recommended spare parts to have on hand at all times
  10. A list by type of all recommended lubes, oils, packing material, and other maintenance supplies
  11. Copies of final test reports, balance reports, and other related documentation
  12. Warranty information for equipment and systems
- E. Delete any blank or foreign language pages.
- F. Provide one overall project document listing all contractors, contacts and emergency contacts.
- G. The GC shall review all contractors' samples and checklists for compliance with this specification and shall return any to the originating contractor that are insufficient for re-submittal. When acceptable to the GC, he/she shall upload each O&M Data draft submittal file to the O&M Draft library on the Project Management Web Site.
- H. O&M Data Draft submittals will be reviewed for content, procedure, and compliance only. A general critique with recommendations for improvement will be made but re-submittals will not be required.
- I. O&M Data Final submittals will be reviewed for content, procedure, and compliance. Re-submittals will be required until such time as each submittal is accepted.



- 1 J. Acceptance of O&M Data Final submittals is required to be complete prior to scheduling and conducting owner related  
2 training and construction closeout.  
3
- 4 **1.4. SPARE PARTS**
- 5 A. All contractors shall be responsible for consolidating spare parts, special tools, special materials, and attic stock as it  
6 pertains to the specific Work within their Division or Trade.
- 7 B. The General Contractor (GC) shall be responsible for all of the following:
- 8 1. Coordinate the location for and the delivery of all spare parts, special tools, special materials, and attic stock being  
9 provided by all contractors under this contract to one centralized location as designated by the Owner.
- 10 2. Verify that all items being delivered are:
- 11 a. Clean, new, and in a usable condition.
- 12 b. Properly sealed, protected, and labeled
- 13 c. Properly documented
- 14 3. Like items are stored together by material, product, or trade as necessary.
- 15 4. Liquids are stored in sealable containers and the lids have been properly installed to prevent drying out, spillage, etc.
- 16 5. All labels are clearly visible and provide the required information.
- 17 C. PACKAGING:
- 18 1. Whenever possible all surplus items should remain in their original packaging such as parts envelopes.
- 19 2. Package small parts in re-sealable plastic bags (Ziploc) or envelopes with clasp fasteners. Do not use envelopes that  
20 seal with glue or tape envelopes closed. Do not leave packaging unsealed.
- 21 3. Package like parts together for products or assemblies. I.E. keep all spare parts for flushometers together.
- 22 4. Many small packages may be grouped together into a larger container by trade.
- 23 5. Do not use unrelated boxes or containers for packaging spare items. I.E. do not use a light fixture box for spare  
24 breakers, or flushometers parts.
- 25 6. Whenever possible the original labeling indicating part numbers and other pertinent information shall remain. If original  
26 labeling is not available, contractor shall label all parts and packages using tape or labels and permanent black markers.
- 27 7. Labels shall include the name of the product or equipment the item belongs to, part number and/or name, and any  
28 other information that would assist maintenance personnel in identifying the piece and related product. Include plan or  
29 specification designations (WC-1, LAV-3, DF-2, CPT-1, etc.) that identify the particular product or finish material it  
30 represents.
- 31 8. Labels for parts stored in clear re-sealable plastic bags may be placed inside the bag. Label shall face out and be able to  
32 be read from one side. Multiple bags shall be numbered individually for identification.
- 33 9. Label the outside of large containers with the trade name (Plumbing, Electrical, etc.).
- 34 D. Provide an inventory in a tabular format of all items being provided under this and other specifications. The minimum  
35 information to be provided for each item on the inventory shall be as follows:
- 36 1. Bag or container number, all items of one bag or container shall be grouped together on the inventory
- 37 2. Item description
- 38 3. Item size (if applicable)
- 39 4. Total quantity provided
- 40 5. Identify if item is a spare part, tool, special material, or attic stock
- 41 E. Prior to the 90% Progress Payment milestone the GC shall review all attic stock already stored by the contractors to ensure  
42 the following:
- 43 1. Materials are stored in the proper location(s).
- 44 2. All boxes, containers and items are properly labeled according to the submitted/approved inventory.
- 45 3. Quantities are correct according to the submitted/approved inventory.
- 46 4. Provide Special Tools and Material.
- 47 F. Discrepancies associated with Attic Stock shall be resolved and verified prior to the CPM releasing the 90% CT progress  
48 payment.  
49  
50

51 **END OF SECTION**

SECTION 01 78 36  
WARRANTIES

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60  
61  
62  
63

PART 1 – GENERAL .....1

1.1. SCOPE .....1

1.2. DEFINITIONS .....1

1.3. CONTRACTOR RESPONSIBILITIES AND OWNER RIGHTS .....1

1.4. WARRANTY NOTIFICATION, RESPONSE, EXECUTION AND FOLLOW-UP .....2

1.5. LETTERS OF WARRANTY .....2

**PART 1 – GENERAL**

**1.1. SCOPE**

- A. Responsibilities and guide lines related to providing all Warranties and Guarantees related to the Work, workmanship, materials, equipment, and other such items required by Construction Documents.
- B. Manufacturers’ disclaimers and limitations on product warranties do not relieve any contractor, supplier or manufacturer of the warranty on the Work that includes the product.
- C. Warranty periods of specific equipment and materials shall not start before the appropriate equipment start-up or project close-out. Manufacturer warranties that base start of warranty period on date of production, or have other limitation to the disadvantage of the owner, shall be accompanied by a letter by the manufacturer stating that warranty period will start after project reached level of substantial completion.

**1.2. DEFINITIONS**

- A. **INSTALLER:** The company or contractor hired to install a finished product that was manufactured and supplied specifically for the Work within this contract. The Installer may or may not be the same company that supplied the product
- B. **SUPPLIER:** Any company that makes a specific finished product for the Work from information within the Contract Documents. Examples of suppliers would include custom cabinets, steel stairs and railings, etc. A supplier would not be a company that distributes items manufactured by others such as an electrical or plumbing supplier.
- C. **WARRANTY:** A written guarantee from the manufacturer to the owner on the integrity of a product and its installation, and the manufacturers’ responsibility to repair or replace the defective product or components within a specified time from the date of ownership. Warranty may also be used interchangeably with Guarantee.
- D. **WARRANTY DATE:** The effective date that begins all warranty periods required for products, installations, and workmanship associated with the execution of the Work for this contract. The Warranty Date shall be the date the Certificate of Substantial Completion was signed by the City Engineer. This is different from Substantial Completion as defined by Building Permit and Certificate of Occupancy.

**1.3. CONTRACTOR RESPONSIBILITIES AND OWNER RIGHTS**

- A. For 1-year from the warranty date the General Contractor (GC) shall be responsible to remedy, at his/her expense, any defect in the Work and any damage to City owned or controlled real or personal property when the damage is a result of:
  - 1. Contractor’s failure to conform to Contract Document requirements. Any substitutions not properly approved and authorized may be considered defective.
  - 2. Any defect in workmanship, materials, equipment, or design furnished by the GC or Sub-contractors.
- B. The GC’s warranty with respect to Work repaired or replaced, including restored or replaced Work due to damage, will run for 1 year from the date of Owner Acceptance of said repair or replacement. This shall be regardless of any benefit the Owner may have had from the Work through any portion of its anticipated useful service life.
- C. **EMERGENCY REPAIR:** The Owner reserves the right to make emergency repairs as required to keep equipment or materials in operation or to prevent damage to property and injury to persons without voiding the contractors warranty or bond or relieving the contractor of his/her responsibilities during the warranty period.
- D. **REINSTATEMENT OF WARRANTY:** When Work covered by a warranty has failed and been corrected contractor shall reinstate the warranty by a new written endorsement. The reinstated warranty shall be equal to the original warranty.
- E. **REPLACEMENT COST:** Contractor is responsible for all costs that may be associated with Work being replaced under warranty including but not limited to the following:
  - 1. Related damages and losses
  - 2. Labor, material and equipment
  - 3. Removal and replacement of construction to access the warranted work.
  - 4. Repair or replacement of any construction damaged due to the failure of warranted work.
  - 5. Permits and inspection fees
  - 6. This shall be regardless of any benefit the Owner may have had from the Work through any portion of its anticipated useful service life.
- F. **OWNERS RECOURSE:** Expressed warranties made to the Owner are in addition to implied warranties and shall not limit the duties, obligations, rights, and remedies otherwise available under the law. Expressed warranty periods shall not be interpreted as limitations on the time in which the Owner can enforce such other duties, obligations, rights, and remedies.
  - 1. **Rejection of Warranties:** The Owner reserves the right to reject any warranty and to limit the selection of products with warranties not in conflict with the requirements of the contract documents.

- 1           2. Where the Contract Documents require a Special Warranty or similar commitment on the Work or product, the Owner  
2 reserves the right to refuse acceptance of the Work until the Contractor presents evidence the entities required to  
3 countersign such required commitments have done so.
- 4 G. ON SITE ISNPECTION AND REPALCEMENT: Under no circumstances shall the owner be responsible for sending damaged  
5 equipment or material back for inspection. Manufacturer, vendor or contractor shall provide an on-site person to inpsct  
6 and discuss warranty items. Any shipment of a replacement shall be at no cost to owner.

7

8 **1.4. WARRANTY NOTIFICATION, RESPONSE, EXECUTION AND FOLLOW-UP**

9 A. WARRANTY NOTIFICATION:

- 10 1. The Project Management Web Site, uses an email notification system for all warranty related issues. The GC will be  
11 required to provide, and keep current during the warranty period, a minimum of 2 email addresses and phone numbers  
12 of current employees to receive email notifications and provide response regarding Work associated with these  
13 construction documents.
- 14 2. The GC shall notify any other sub-contractor, supplier, or installer that may be required to review the warranty issue.
- 15 B. WARRANTY RESPONSE: The GC shall upon notification by Owner provide warranty response as follows:
- 16 1. Critical Systems or equipment: Owner will decide on criticality of the system or equipment. Where damage to  
17 equipment and other building components, or injury to personnel is probable provide immediate on-site response. In  
18 no case shall on-site response exceed 24 hours. Contractor shall pay for expedited delivery and work during off-hours if  
19 required by owner.
- 20 2. For non-critical responses where damage or injury is unlikely provide on-site response no later than next business day.  
21 Correction shall be completed no later than what is possible with regular delivery times.
- 22 3. Where Technical Assistance support is part of the written warranty provide all assistance necessary as indicated by the  
23 warranty. If issues cannot be resolved provide on-site response no later than the next business day.
- 24 4. If the request cannot be supported in sufficient time as outlined above, the Owner reserves the right to contract other  
25 contractors or staff having similar capability to expedite the repair or replacement and GC shall pay all associated costs  
26 to the Owner.

27 C. WARRANTY EXECUTION:

- 28 1. The GC shall provide all repairs or replacements as necessary to restore broken or damaged Work to the original level of  
29 acceptance as intended by the Contract Documents.
- 30 2. Provide all cleaning services as may be required before, during, and after the repair or replacement as Specified.
- 31 3. Provide any protection necessary for existing construction as specified.
- 32 4. Provide new letters of warranty when required.

33 D. WARRANTY FOLLOW-UP:

- 34 1. The GC shall provide complete documented responses of all logged Warranty Issues. Responses shall provide a  
35 description of work completed including dates, and photos of completed or repaired work. Provide call back response if  
36 work is not acceptable.

37

38 **1.5. LETTERS OF WARRANTY**

- 39 A. Provide letter of warranty for items and systems with more than 1-year warranty. This includes warranties required by  
40 special mentioning in specifications and warranties by specifying a product or material with a specific warranty.
- 41 B. Letter of Warranty shall enable the owner to claim all warranty services without future assistance of contractors, vendors  
42 and without requiring additional documentation. If the manufacture requires invoices, shipment data, or any other  
43 documentation, this documentation shall be included in the letter of warranty. Format shall be:
- 44 1. The letter shall be on official company stationary including company name, address, and phone number.
- 45 2. Indicate project name, contract number, and contract address the warranty is for on the reference line.
- 46 3. Provide the manufacturer name and model number of the product if not specified within the warranty. Provide the plan  
47 identifier (LAV-1, WC-2, etc) when applicable.
- 48 4. Provide a description of the warranty(ies) being provided.
- 49 5. Indicate the effective Warranty Date.
- 50 6. Contractor or supplier letters of Warranty shall be signed by a principal officer of the company scanned to color PDF.

51

52 **END OF SECTION**

**SECTION 02 41 00  
DEMOLITION**

1  
2  
3  
4 PART 1 – GENERAL .....1  
5 1.1. SCOPE .....1  
6 1.2. REFERENCES .....1  
7 1.3. SUBMITTALS .....1  
8 1.4. QUALITY ASSURANCE .....1  
9 PART 2 - PRODUCTS .....2  
10 2.1. REPAIR MATERIALS.....2  
11 PART 3 – EXECUTION.....2  
12 3.1. EXAMINATION .....2  
13 3.2. DEMOLITION .....2  
14 3.3. GENERAL BUILDING DEMOLITION.....2  
15 3.4. UTILITY SERVICES AND BUILDING SERVICES SYSTEMS .....3  
16 3.5. PROTECTION.....3  
17

**PART 1 – GENERAL**

**1.1. SCOPE**

- 20 A. This section includes information common to demolition and applies to the entire contract.  
21 B. Remove items indicated, for salvage, relocation, recycling, and removal from premises. Plans show items to be demolished  
22 in dashed lines.  
23 C. Unless noted otherwise, contractor is responsible for proper disposal of all removed and/or demolished material and  
24 equipment.  
25 D. Obtain required permits.  
26 E. Take precautions to prevent collapse of structures to be removed; do not allow worker or public access within range of  
27 potential collapse of unstable structures.  
28 F. Perform all demolition as indicated on the drawings and as required to accomplish new work. Demolition Drawings are  
29 based on casual field observation and/or existing record documents. Verify field measurements and circuiting  
30 arrangements as shown on Drawings. Verify that abandoned wiring, piping, ducting and equipment serve only abandoned  
31 facilities. Report discrepancies to owner before disturbing existing installation. Beginning of demolition means contractor  
32 accepts existing conditions.  
33 G. Demolition all abandoned services and devices in areas affected by this contract, even if not shown on plans. This includes  
34 but is not limited to wiring, conduits, ductwork, piping, and equipment. Disconnect all services in a manner which allows for  
35 future connection to that service. Disconnect services to equipment at unions, flanges, valves, or fittings wherever possible.  
36 Abandon gas, electric and communication utilities in accordance with local utility company requirement.  
37 H. Patch holes and openings caused by removal of material and equipment, or formerly covered by such, with like material  
38 and texture of surrounding surface. Paint to match surroundings.  
39 I. Arrange selective demolition schedule so as not to interfere with Owner's operations.  
40

**1.2. REFERENCES**

- 41 A. OSHA – Occupational Safety and Health Administration  
42 1. CFR 1926 - U.S. Occupational Safety and Health Standards.  
43 B. NFPA - National Fire Protection Association  
44 1. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations  
45  
46

**1.3. SUBMITTALS**

- 47 A. PRE-DEMOLITION PHOTOGRAPHS: Record existing conditions by use of preconstruction photographs. Show existing  
48 conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as  
49 damage cause d by selective demolition operations.  
50 B. PROJECT RECORD DOCUMENTS: Accurately record actual locations of capped and active utilities and subsurface  
51 construction.  
52 C. PROPOSED PROTECTION MEASURES: Submit report, including Drawings, that indicates the measures proposed for  
53 protecting individuals and property, for environmental protection, for dust control and for noise control. Indicate proposed  
54 locations and construction of barriers.  
55 D. Schedule of demolition activities with starting and ending dates for each activity.  
56  
57

**1.4. QUALITY ASSURANCE**

- 58 A. Coordinate work with owner to minimize disruption to the existing building occupants.  
59 B. Dismantle each structure in an orderly manner to provide complete stability of the structure at all times. Provide bracing  
60 and shoring where necessary to avoid premature collapse of structure. Where necessary to prevent collapse of any  
61 construction, install temporary shores, underpinning, struts or bracing. Do not commence demolition work until all  
62 temporary construction is complete.  
63

- 1 C. Verify the locations of, and protect, any buildings, structures, utilities, paved surfaces, signs, streetlights, utilities,  
2 landscaping and all other such facilities that are intended to remain or be salvaged. Make such explorations and probes as  
3 necessary to ascertain any required protection measures that shall be used before proceeding with demolition.
- 4 D. Explosives shall not be used for demolition.
- 5 E. Do not demolish or damage equipment and material that is to stay in place. The Contractor shall restore all disturbed areas  
6 in accordance with the drawings and specifications. If plans and specifications do not address restoration of specific areas,  
7 these areas will be restored to pre-construction conditions as approved by owner.
- 8 F. EXISTING WARRANTIES: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective  
9 demolition, by methods and with materials and using approved contractors so as not to void existing warranties.
- 10 G. Comply with ASSE A10.6 and NFPA 241.

## 11 **PART 2 - PRODUCTS**

### 12 **2.1. REPAIR MATERIALS**

- 13 A. Use repair materials identical to existing materials.
  - 14 1. If identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing  
15 adjacent surfaces to the fullest extent possible.
  - 16 2. Use materials whose installed performance equals or surpasses that of existing materials.
- 17 B. Comply with material and installation requirements specified in individual Specification Sections.

## 18 **PART 3 – EXECUTION**

### 19 **3.1. EXAMINATION**

- 20 A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- 21 B. Perform an engineering survey of condition of building to determine whether removing any element might result in  
22 structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building  
23 demolition operations.
- 24 C. Inventory and record the condition of items to be removed and salvaged.

### 25 **3.2. DEMOLITION**

- 26 A. Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods  
27 required to complete the Work within limitations of governing regulations and as follows:
  - 28 B. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage  
29 construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not  
30 hammering and chopping. Temporarily cover openings to remain.
  - 31 C. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
  - 32 D. Don't use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe  
33 interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-  
34 suppression devices during flame-cutting operations. Maintain fire watch during and for at least 2 hours after flame-  
35 cutting operations.
  - 36 E. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting  
37 walls, floors, or framing.
  - 38 F. Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks,  
39 walkways, and other adjacent occupied and used facilities.
  - 40 G. Removed and Salvaged Items:
    - 41 1. Clean salvaged items.
    - 42 2. Pack or crate items after cleaning. Identify contents of containers.
    - 43 3. Store items in a secure area until delivery to Owner.
    - 44 4. Transport items to Owner's storage area off-site designated by Owner.
    - 45 5. Protect items from damage during transport and storage.
  - 46 H. Removed and Reinstalled Items:
    - 47 1. Clean and repair items to functional condition adequate for intended reuse.
    - 48 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
    - 49 3. Protect items from damage during transport and storage.
  - 50 I. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition.
  - 51 J. Do not allow demolished materials to accumulate on-site.
  - 52 K. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
  - 53 L. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a  
54 controlled descent.
  - 55 M. Clean adjacent structures and improvements of dust, dirt, and debris caused by demolition operations. Return adjacent  
56 areas to condition existing before selective demolition operations began.

### 57 **3.3. GENERAL BUILDING DEMOLITION**

- 58 A. Proceed with demolition in a systematic manner, from top of structure to ground. Complete demolition work above each  
59 floor or tier before disturbing supporting members on lower levels.
- 60 B. Remove structural framing members and lower to ground by hoists, derricks or other suitable means.

- 1 C. Locate demolition equipment and remove structure so as to not impose excessive loads to supporting walls, floors or
- 2 framing.
- 3 D. Break up and remove concrete slabs-on-grade, unless otherwise shown to remain.
- 4 E. Masonry and concrete shall be demolished in small sections. Use braces and shores as necessary to support the structure of
- 5 the building or structure and protect it from damage. Where limits of demolition are exposed in the finished work, cutting
- 6 shall be made with saws, providing an absolutely straight line, plumb, true and square. Operate equipment so as to cause a
- 7 minimum of damage to plaster which is to remain, and so as to keep dust and dirt to a minimum.
- 8 F. Demolish foundation walls and other below grade features in accordance with the plans. Unless otherwise noted, remove
- 9 all below grade features to a point 4' below adjoining existing grade, or proposed grade, whichever is lower. Basement
- 10 and/or lowest level floors more than 4' below existing grade need not be removed, but must be broken up to permit
- 11 drainage.
- 12 G. Backfill and compact below grade areas and voids resulting from demolition of structures and other abandonment and
- 13 demolition. Backfilling shall not begin until demolition and abandonment has been approved and documented by owner.
- 14 Prior to placement of fill materials, ensure that areas to be filled are free of standing water, frost, frozen materials, trash
- 15 and debris.
- 16 H. Carefully protect and/or replace drain tiles encountered during demolition which are necessary to maintain site drainage
- 17 conditions. Immediately repair or replace any drain tiles not scheduled for demolition, but damaged. Report damage to
- 18 owner.
- 19 I. Repairs to drain tile or replacement drain tile shall be comparable or better than the existing drain tile system.
- 20 J. Test drain lines with water to assure free flow before covering. Remove all obstructions, retest until satisfactory.

### 21 **3.4. UTILITY SERVICES AND BUILDING SERVICES SYSTEMS**

- 23 A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- 24 B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility
- 25 services and mechanical/electrical systems serving areas to be selectively demolished.
  - 26 1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
  - 27 2. Arrange to shut off utilities with utility companies.
  - 28 3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that
  - 29 bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
  - 30 4. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and
  - 31 components indicated on Drawings to be removed.
    - 32 a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with
    - 33 same or compatible piping material.
    - 34 b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material
    - 35 and leave in place.
    - 36 c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
    - 37 d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store
    - 38 equipment; when appropriate, reinstall, reconnect, and make equipment operational.
    - 39 e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to
    - 40 Owner.
    - 41 f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or
    - 42 compatible ductwork material.
    - 43 g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in
    - 44 place.
- 45 C. All disconnected wiring shall be removed from all raceway systems, panels, enclosures pull boxes, junction boxes etc.
- 46 irrespective of whether the removal is specified in the construction documents or not. The empty raceway systems shall be
- 47 tagged spare on both ends of each termination.

### 48 **3.5. PROTECTION**

- 50 A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and
- 51 damage to adjacent buildings and facilities to remain.
- 52 B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve
- 53 stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent
- 54 unexpected or uncontrolled movement or collapse of construction being demolished.
- 55 C. Remove temporary barricades and protections where hazards no longer exist.

56 **END OF SECTION**

57

**SECTION 26 05 00  
COMMON WORK RESULTS FOR ELECTRICAL**

1  
2  
3  
4 PART 1 – GENERAL .....1  
5 1.1. SCOPE .....1  
6 1.2. REFERENCES .....1  
7 1.3. SUBMITTALS .....1  
8 1.4. QUALITY ASSURANCE .....1  
9 PART 2 - PRODUCTS .....2  
10 2.1. ELECTRICAL IDENTIFICATION PRODUCTS .....2  
11 2.2. HANGERS AND SUPPORT .....3  
12 2.3. LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLE .....3  
13 2.4. RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS .....3  
14 2.5. GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS .....5  
15 PART 3 – EXECUTION.....5  
16 3.1. INSTALLATION .....5  
17 3.2. FIELD QUALITY CONTROL .....6  
18 3.3. IDENTIFICATION .....6  
19 3.4. RACEWAY AND BOXES.....8  
20 3.5. WIRING CONNECTIONS .....9

**PART 1 – GENERAL**

**1.1. SCOPE**

- A. This section includes information common to electrical work and applies to all sections in this contract. Provide all electrical work required for all trades in this contract. This work includes but is not limited to:
1. Temporary power and lighting.
  2. Controls power included in equipment listed elsewhere. This includes but is not limited to HVAC controls.
  3. Power for motors and other electricity-requiring devices in equipment furnished and/or installed by contractor
  4. De- and re-energizing of areas to be demolished, cleaned or abated.

**1.2. REFERENCES**

- A. Work under this section depends on applicable provisions from other sections and the plan set in this contract.
- B. ANSI – American National Standards Institute - [www.ansi.org](http://www.ansi.org)
1. ANSI A13.1 – Standard for Pipe Identification
  2. ANSI C2 – National Electrical Safety Code
    - a. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.
      - i. ANSI C80.3 - Electrical Metallic Tubing, Zinc Coated.
      - ii. ANSI/NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
      - iii. ANSI/NFPA 70 National Electrical Code.
    3. ANSI Z535.4 – Standard for Product Safety Signs and Labels
- C. NFPA – National Fire Protection Agency
1. NFPA 70 National Electrical Code.
- D. NECA - National Electrical Contractors Association
1. NECA "Standard of Installation."
  2. NEMA - National Electrical Manufacturers Association
    - a. NEMA FB 1 Fittings and Supports for Conduit and Cable Assemblies.
    - b. NEMA OS 1 Sheet steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
    - c. NEMA OS 2 Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports.
    - d. NEMA 250 Enclosures for Electrical Equipment (1000 Volts Maximum).
    - e. NEMA ICS 1 General Standards for Industrial Control Systems.
    - f. NEMA ICS 2 Standards for Industrial Control Devices, Controllers and Assemblies.
    - g. NEMA ICS 6 Enclosures for Industrial Controls and Systems.
    - h. NEMA ST 1 Standard for Specialty Transformers (Except General Purpose Type.)
    - i. NEMA TC 2 Electrical Plastic Tubing (EPT) and Conduit (EPC 40 and EPC 80).
    - j. NEMA TC 3 PVC Fittings for Use with Rigid PVC Conduit and Tubing.
    - k. NEMA WD 1 General Purpose Wiring Devices.
    - l. NEMA WD 6 Wiring Device Configurations

**1.3. SUBMITTALS**

- A. AFFIDAVITS: The contractor shall execute the standard State Electrical Affidavit of Compliance with the Electrical Code and safe practices. Notarize and file with the appropriate utility. Provide owner with copy.

**1.4. QUALITY ASSURANCE**

- A. Furnish products listed and classified by Underwriters Laboratories, inc. as suitable for purpose specified and shown.

- 1 B. INSTALLERS: Electrical contractor with at least 5 years of experience performing similar work. This contractor shall employ a
- 2 Master Electrician to oversee work and obtain permits.
- 3 C. Manufacturer: Company specializing in manufacturing Products specified in this Section with minimum 3 years' experience.
- 4 D. The following restrictions detail methods and material that are not acceptable even if allowed under NEC:
- 5 1. Aluminum or aluminum-clad conductors are not acceptable.
- 6 2. Shared Neutrals between different branch circuits or other wiring are not acceptable.
- 7 3. Field-marking of cables is not acceptable. All wires need to be in manufactured color.
- 8 4. Combining lighting and other loads in one branch circuit is not acceptable.
- 9 5. Use of grounded circuit conductors metal conduit, raceway or cable trays as sole grounding conductor is not
- 10 acceptable. A separate grounding wire is required.
- 11 6. Omission of bonding jumpers in boxes, and omission of grounding/bonding wires in metal raceways and conduit is not
- 12 acceptable.
- 13 7. Underground wiring without conduit or raceway is not acceptable.
- 14 8. Underground wiring less than 24" deep regardless of concrete pads is not acceptable.
- 15 9. Exposed insulation is not acceptable.
- 16 10. Electric Nonmetallic Tubing (ENT) is not acceptable.
- 17 11. Overhead wiring without messenger support is not acceptable.
- 18 12. Use of circuit breaker as device disconnect is not acceptable. Devices need separate disconnects.
- 19 13. Cast metal, split or gland type fittings are not acceptable.
- 20 14. Combining lighting and other loads in one branch circuit is not acceptable.
- 21 15. Underground wiring without conduit or raceway is not acceptable.
- 22 16. Underground wiring less than 24" deep regardless of concrete pads is not acceptable.
- 23 17. Overhead wiring without messenger support is not acceptable.
- 24 E. Install in accordance with NECA "Standard of Installation."
- 25 F. Size wire for a voltage drop <= 2%.

**PART 2 - PRODUCTS**

**2.1. ELECTRICAL IDENTIFICATION PRODUCTS**

- 29 A. Colored Adhesive Marking Tape for banding Raceways, Wires, and Cables: Self-adhesive vinyl tape not less than 3 mils
- 30 thick by 1 inch to 2 inches in width.
- 31 B. Pre-tensioned Flexible Wraparound Colored Plastic Sleeves for Cable Identification: flexible acrylic bands sized to suit the
- 32 cable diameter and arranged to stay in place by pre-tensioned gripping action when coiled around the cable.
- 33 C. Wire/Cable Designation Tape Markers: Vinyl or vinyl-cloth, self-adhesive, wraparound, cable/conductor markers with
- 34 preprinted numbers and letter.
- 35 D. Cable Ties: Fungus-inert, self-extinguishing, one-piece, self-locking nylon cable ties, 0.18-inch minimum width, 50-lb
- 36 minimum tensile strength, and suitable for a temperature range from minus 50°F to 350°F. Provide ties in specified colors
- 37 when used for color coding.
- 38 E. Underground Plastic Markers: Bright colored continuously printed plastic ribbon tape of not less than 6 inches wide by 4
- 39 mil thick, printed legend indicating type of underground line, manufactured for direct burial service. Tape shall contain a
- 40 continuous metallic wire to allow location with a metal detector.
- 41 F. Aluminum, Wraparound Marker Bands: 1" in width, .014 inch thick aluminum bands with stamped or embossed legend,
- 42 and fitted with slots or ears for permanently securing around wire or cable jacket or around groups of conductors.
- 43 G. Brass or aluminum Tags: 2" by 2" by .05-inch metal tags with stamped legend, punched for fastener.
- 44 H. Indoor/Outdoor Number and Letters: Outdoor grade vinyl label, minimum of 3/4" high x 9/16" wide, with acrylic adhesive
- 45 designed for permanent application in severe indoor and outdoor environments.
- 46 I. NAMEPLATES AND SIGNS:
- 47 1. Engraved, Plastic-Laminated Labels, Signs and Instruction Plates: Engraving stock melamine plastic laminate, 1/16-
- 48 inch minimum thick for signs up to 20 square inches, or 8 inches in length; 1/8 inch thick for larger sizes. Labels shall
- 49 be punched for mechanical fasteners. Engraving legend shall be as follows:
- 50 a. Black letters on white face for normal power.
- 51 b. White letters on red face for emergency power.
- 52 c. White letters on green face for grounding.
- 53 d. Black letter on yellow face for Caution or UPS.
- 54 2. Baked-Enamel Signs for interior Use: Preprinted aluminum signs, punched, or drilled for fasteners, with colors,
- 55 legend, and size required for application. Mounting 1/4" grommets in corners.
- 56 3. Exterior, Metal-Backed, Butyrate Signs: Weather-resistant, non-fading, preprinted, cellulose-acetate butyrate signs
- 57 with .0396 inch galvanized-steel backing: and with colors, legend, and size required for application. Mounting 1/4"
- 58 grommets in corners.
- 59 4. Safety Signs: Comply with 29 CFR, Chapter XVII, Part 1910.145.
- 60 5. Fasteners for Plastic-Laminated Signs; Self-tapping stainless steel screws or number 10/32 stainless steel machine
- 61 screws with nuts and flat and lock washers.
- 62 J. Conduit shall be factory color coded as follows:

Normal Power 277V/480V	Clear. Labeled as "277/480Y"
Normal Power 120V/208V	Clear. Labeled as "120/208Y"



Emergency Power	Green, Labeled per Voltage used
Optional Standby	Blue, Labeled per Voltage used
Fire Alarm	Red
DC Voltage (Solar etc.)	Orange. Labeled as "600VDC" or per system rating
Building Automation System	White. Labeled as "BAS"
Communication (CAT6, Fiber, Access System, Radio, etc.)	Purple. Labeled "COM", "FIBER" or as directed by owner
Security System	Yellow

1

2

**2.2. HANGERS AND SUPPORT**

A. Provide materials, sizes, and types of anchors, fasteners and supports to carry the loads of equipment and conduit.

4

**B. ANCHORS AND FASTENERS:**

5

1. Provide anchors, fasteners, and supports in accordance with NECA "Standard of Installation".

6

2. Concrete Structural Elements: Use precast insert system, expansion anchors and preset inserts.

7

3. Steel Structural Elements: Use beam clamps. Do not use spring steel clips and clamps.

8

4. Concrete Surfaces: Use self drilling anchors and expansion anchors. Do not use powder actuated anchors.

9

5. Hollow Masonry, Plaster, and Gypsum Board Partitions: Use toggle bolts and hollow wall fasteners.

10

6. Solid Masonry Walls: Use expansion anchors and preset inserts.

11

7. Sheet Metal: Use sheet metal screws.

12

8. Wood Elements: Use wood screws.

13

**C. STEEL CHANNEL**

14

1. Manufacturer: Allied, B-Line, Kindorf, UniStrut,

15

2. Galvanized

16

17

**2.3. LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLE**

18

**A. BUILDING WIRE:**

19

1. MANUFACTURERS: Carol, Triangle, Southwire.

20

2. Conductor: Copper only (aluminum or aluminum-clad conductors are not allowed).

21

3. Insulation Voltage Rating: 600 volts.

22

4. Insulation:

23

a. ANSI/NFPA 70, Type THW,RHW, TW, THHN/THWN, XHHW.

24

b. Material rated 75 degrees C minimum for branch circuits or feeders in wet and damp locations. Material rated 90 degrees C for feeders in dry locations.

25

5. CONCEALED DRY INTERIOR LOCATIONS: Use only building wire Type THHN/THWN.

26

6. EXPOSED DRY INTERIOR LOCATIONS: Use only building wire Type THHN/THWN, XHHW insulation, in raceway.

27

7. ABOVE ACCESSIBLE CEILINGS: Use only building wire Type THHN/THWN, XHHW insulation, in raceway as allowed by code.

28

8. WET OR DAMP INTERIOR LOCATIONS: Use only building wire Type THHN/THWN, XHHW insulation, in raceway.

29

9. EXTERIOR LOCATIONS: Use only building wire Type THHN/THWN, XHHW insulation, in raceway.

30

10. UNDERGROUND INSTALLATIONS: Use only building wire Type THW, THHN/THWN, XHHW insulation, in raceway.

31

11. Use solid or stranded conductors for feeders and branch circuits 10 AWG and smaller.

32

12. WIRING CONNECTORS: manufacturers: Burndy, T&B, Blackburn, Panduit.

33

34

**B. METAL CLAD CABLE**

35

1. BASIS OF DESIGN: Atkore AFC Cable Systems

36

a. Install neatly and per NEC 330.10 and NEC 330.30.

37

b. Only use for lighting retrofit projects in inaccessible locations if code allows and where not exposed to damage.

38

Locations include grid ceilings and drywall ceilings.

39

C. Pull all conductors into raceway at same time.

40

D. Use suitable wire pulling lubricant for building wire 4 AWG and larger.

41

E. Protect exposed cable from damage.

42

F. Support cables above accessible ceiling, using spring metal clips. Do not rest cable on ceiling panels.

43

G. Neatly train and lace wiring inside boxes, equipment, and panelboards.

44

H. Clean conductor surfaces before installing lugs and connectors.

45

I. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.

46

J. Use split bolt connectors for copper conductor splices and taps, 6 AWG and larger. Tape uninsulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.

47

K. Use solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.

48

L. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.

49

50

51

52

**2.4. RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS**

53

**A. CONDUIT:**

54

1. Underground Installations: Use PVC conduit per local code. Site conduits shall be at least 30" below grade. Utility

55

conduit depth shall be per utility requirements.

56

2. Outdoor Locations, Above Grade: Use rigid steel conduit.

57

3. In Slab Above Grade:

- 1 a. Use rigid steel conduit, intermediate metal conduit, or electrical metallic tubing conduit.
- 2 b. Maximum Size Conduit in Slab: 1 inch. Maintain a minimum of 2" concrete covering. Run conduits within concrete
- 3 parallel to each other and spaced on center at least three times the conduit trade size. Conduits over 1 inch may not
- 4 be installed in slabs without approval.
- 5 c. Route conduit in and under slab from point to point.
- 6 d. Do not cross conduits in slab.
- 7 4. Dry Interior Locations: Use rigid steel, intermediate metal conduit or electrical metallic tubing.
- 8 5. FITTINGS AND CONDUIT BODIES: ANSI/NEMA FB 1; material to match body.
- 9 6. METAL CONDUIT:
- 10 a. MANUFACTURERS: Allied, Republic Steel
- 11 b. Rigid Steel Conduit: ANSI C80.1.
- 12 c. Intermediate Metal Conduit (IMC): Rigid steel.
- 13 7. FLEXIBLE METAL CONDUIT:
- 14 a. MANUFACTURERS: Alfex Corp., Electri-Flex.
- 15 b. Description: Interlocked steel construction.
- 16 8. LIQUIDTIGHT FLEXIBLE METAL CONDUIT:
- 17 a. MANUFACTURERS: Alfex Corp, Electri-Flex
- 18 b. Description: Interlocked steel construction with PVC jacket.
- 19 9. ELECTRICAL METALLIC TUBING (EMT):
- 20 a. MANUFACTURERS: Allied, Republic Steel
- 21 b. Description: ANSI C80.3; galvanized tubing.
- 22 c. Fittings and Conduit Bodies: steel set screw connectors and couplings may be used on interior EMT conduit. Cast
- 23 metal, split or gland type fittings are not acceptable.
- 24 B. WET AND DAMP LOCATION CONDUIT
- 25 1. MANUFACTURERS: KorKap.
- 26 2. PVC Coated schedule 40 Rigid Steel Conduit: ANSI C80.1, UL 6, ETL PVC-001 3072346-004, CSA Certified C22.2 No. 45.
- 27 3. The PVC-coated, threaded conduit system is specifically designed to prevent corrosive conditions from causing early
- 28 replacement of the conduit. All the conduit, fittings, and supporting products shall be provided by the same
- 29 manufacturer.
- 30 4. PVC and Zinc coating must be UL-listed as providing primary corrosion protection for the rigid metal conduit.
- 31 5. Conduit must be hot dipped galvanized inside and out including threads.
- 32 6. Fittings and Conduit Bodies: Threaded type, material to match conduit. PVC coated fittings and couplings shall have
- 33 specially formed sleeves to tightly seal to conduit PVC coating. The sleeves shall extend beyond the fitting or coupling a
- 34 distance equal to the pipe outside steel diameter or two inches (50 mm) whichever is greater.
- 35 7. A PVC sleeve extending one pipe diameter or two inches, whichever is less, shall be formed at every female fitting
- 36 opening except unions. The inside sleeve diameter shall be matched to the outside diameter of the conduit. The PVC
- 37 coating on the outside of conduit couplings shall have a series of longitudinal ribs 40 mils in thickness to protect the
- 38 coating from tool damage during installation.
- 39 8. Form 8 Condulets shall have a V-Seal tongue-in-groove gasket to effectively seal against the elements. The design shall
- 40 be equipped with a positive placement feature to ease and assure proper installation. Certified results confirming seal
- 41 performance at 15 psig (positive) and 25 in. of mercury (vacuum) for 72 hours shall be available. Form 8 Condulets shall
- 42 be supplied with plastic encapsulated stainless steel cover screws.
- 43 9. Urethane coating of nominal 2 mil thickness shall be uniformly and consistently applied to the interior of all conduit and
- 44 fittings. Conduit or fittings with thin or no coating shall be unacceptable.
- 45 10. The PVC exterior and urethane interior coatings applied to the conduit shall afford sufficient flexibility to permit field
- 46 bending without cracking or flaking at temperatures above 30°F (-1°C). The PVC coating bond to the galvanized steel
- 47 conduit shall be stronger than the tensile strength of the coating itself.
- 48 11. All female threads on fittings and couplings shall be protected by urethane coating.
- 49 12. Right angle beam clamps and U bolts shall be specially formed and sized to snugly fit the outside diameter of the coated
- 50 conduit. All U-bolts will be supplied with plastic encapsulated nuts that cover the exposed portions of the threads.
- 51 13. All clamping, cutting, threading, bending, and assembly instructions from the manufacturer shall be rigorously followed.
- 52 C. OUTLET BOXES:
- 53 1. SHEET METAL OUTLET BOXES: NEMA OS 1, welded, galvanized steel, 4" square minimum. Drawn boxes will not be
- 54 accepted.
- 55 a. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; include 1/2 inch male
- 56 fixture studs where required.
- 57 b. Concrete Ceiling Boxes: Concrete type.
- 58 2. CAST BOXES: NEMA FB 1, Type FD, aluminum. Provide gasketed cover by box manufacturer. Provide threaded hubs.
- 59 3. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.
- 60 4. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.
- 61 5. Use flush mounting outlet box in finished areas.
- 62 6. Use cast outlet box in exterior locations exposed to the weather and wet locations.
- 63 7. FLOOR BOXES:
- 64 a. NEMA OS 1, fully adjustable, 1 1/2 inches deep or as shown on drawings.

- 1 b. MATERIAL: Cast metal, Formed steel or PVC per drawing.
- 2 c. SHAPE: Round, or rectangular as shown on drawings.
- 3 d. Use cast floor boxes for installations in slab on grade; formed steel boxes are acceptable for other installations.
- 4 e. Set floor boxes level.
- 5 f. Adjust floor box flush with finish flooring material.
- 6 D. PULL AND JUNCTION BOXES
- 7 1. SHEET METAL BOXES: NEMA OS 1, galvanized steel.
- 8 2. SURFACE MOUNTED CAST METAL BOX: NEMA 250, Type 4; flat flanged, surface mounted junction box:
- 9 a. Material: Galvanized cast iron, Cast aluminum.
- 10 b. Cover: Furnish with ground flange, neoprene gasket, and stainless steel cover screws.
- 11 3. Large Pull Boxes: Use hinged enclosure in interior dry locations, surface mounted cast metal box in other locations.
- 12 E. SURFACE METAL RACEWAY
- 13 1. MANUFACTURERS: Hubbell, Wiremold V200, V500, V700, 4000
- 14 2. Sheet metal channel with fitted cover, suitable for use as surface metal raceway.
- 15 3. Finish: White or Ivory scuffcoat.
- 16 4. Fittings, Boxes, and Extension Rings: Furnish manufacturer's standard accessories.
- 17 5. Run surface raceway in a neat and workman like manner. Surface raceway will only be allowed on existing or non-
- 18 accessible walls where recessed devices can not be cut in.
- 19 F. WIREWAY
- 20 1. MANUFACTURERS: Hoffmann, Square D, Wiegmann
- 21 2. General purpose type wireway.
- 22 3. Knockouts: Manufacturer's standard or none.
- 23 4. Fittings: Lay in type with removable top, bottom, and side; captive screws, drip shield for wet locations.
- 24 5. Finish: Rust inhibiting primer coating with gray enamel finish.
- 25 G. POWER/DATA POLE
- 26 1. MANUFACTURERS: Wiremold 30TP-4.
- 27 2. Sheet metal channel with fitted cover, suitable for use as metal raceway.
- 28 3. Finish: Standard finish.
- 29 4. Fittings, Boxes, and Extension Rings: Furnish manufacturer's standard accessories.
- 30
- 31 **2.5. GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS**
- 32 A. ROD ELECTRODE
- 33 1. Manufacturers: Appleton, Crouse-Hinds, Burndy.
- 34 2. Material: Copper clad steel.
- 35 3. Diameter: 3/4 inch .
- 36 4. Length: 10 feet.
- 37 B. MECHANICAL CONNECTORS: Material: Bronze.
- 38 C. EXOTHERMIC CONNECTIONS: Cad-Weld.
- 39 D. WIRE: Stranded copper.
- 40 E. Grounding System Resistance: 25 ohms or less.
- 41 F. Grounding Electrode Conductor: Size to meet NFPA 70 or local requirements.
- 42 G. Connect ground to:
- 43 1. Metal underground water pipe.
- 44 2. Metal frame of the building.
- 45 3. Reinforcing steel in foundation footing where indicated. Bond steel together.
- 46 H. Provide grounding electrode conductor and connect to Bond together metal siding not attached to grounded structure;
- 47 bond to ground.
- 48 I. Bond together reinforcing steel and metal accessories in pool and fountain structures.
- 49 J. Provide isolated grounding conductor for circuits supplying electronic equipment.
- 50 K. Equipment Grounding Conductor: Provide separate, insulated conductor within each raceway. Terminate each end on
- 51 suitable lug, bus, or bushing. Use of grounded metal conduit, raceway or cable trays as the sole grounding conductor is not
- 52 acceptable.
- 53 L. Use 4 AWG minimum copper conductor to ground communications service.
- 54 M. Inspect grounding and bonding system conductors and connections for tightness and proper installation.
- 55 N. Use suitable test instrument to measure resistance to ground of system. Perform testing in accordance with test
- 56 instrument manufacturer's recommendations using the fall of potential method. Record overall resistance to ground.
- 57 O. Accurately record actual locations of grounding electrodes.
- 58 P. Install rod electrodes at locations indicated. Install additional rod electrodes as required to achieve specified resistance to
- 59 ground. Verify that final backfill and compaction has been completed before driving rod electrodes.
- 60
- 61 **2.6. CONTROL SWITCHES AND STATIONS**
- 62 A. MANUFACTURERS: Square D 30mm.
- 63 B. Contacts: NEMA ICS 2, Form C.
- 64 C. Contact Ratings: NEMA ICS 2, A150.

- 1 D. Selector Switches Operators: Two, Three position rotary selector switch.
- 2 E. Pushbutton Operator: Unguarded, Recessed, Shrouded, Shielded, Covered or lockable type per drawings.
- 3 F. Control Stations: Heavy duty oiltight type pushbutton station.
- 4 G. MAGNETIC CONTROL RELAYS:
  - 5 1. MANUFACTURERS: Square D 30mm.
  - 6 2. Magnetic Control Relays: NEMA ICS 2, Class A300.
  - 7 3. Contacts: NEMA ICS 2, Form C, per drawing.
  - 8 4. Contact Ratings: NEMA ICS 2, Class A150, per drawing.
  - 9 5. Coil Voltage: per drawing

## 10 2.7. GENERAL PURPOSE CONTACTORS

- 11 A. MANUFACTURERS: Square D.
- 12 B. NEMA ICS 2, AC general purpose magnetic contactor.
- 13 C. Coil Voltage: 120 volts, 60 Hertz or As indicated.
- 14 D. Poles: As indicated.
- 15 E. Size: NEMA or IEC as indicated on drawings.
- 16 F. Accessories as indicated on drawings.
- 17 G. Pushbuttons and Selector Switches: NEMA ICS 2, general duty type.
- 18 H. Indicating Lights: NEMA ICS 2, transformer push to test type.
- 19 I. Auxiliary Contacts: NEMA ICS 2, as required.
- 20 J. Accessories as indicated on drawings.

## 21 **PART 3 – EXECUTION**

### 22 **3.1. INSTALLATION**

- 23 A. The contractor shall be responsible for the proper location of roughing in and connections by other trades.
- 24 B. INTERFERENCES:
  - 25 1. Locations: Locations of conduit, equipment, fixtures, etc., shall be adjusted to accommodate the work to interferences
  - 26 anticipated or encountered. Devices specifically dimensioned on the drawings are critical dimensions and shall installed
  - 27 as shown. The contractor shall determine the exact route and locations of each conduit prior to installation.
  - 28 2. Offsets: Offsets and changes in direction in conduit shall be made as required to maintain proper head room and not
  - 29 interfere with pitch of sloping lines whether or not indicated on the drawings.
  - 30
- 31 C. Location of lighting switches, outlets and equipment as shown on drawings is approximate and exact locations will be
- 32 verified. Minor modifications in location of switches, outlets and equipment is considered incidental up to a distance of 10
- 33 feet with no additional compensation.
- 34 D. Existing Conditions:
  - 35 1. Move or remove electrical connections, devices or equipment necessary for completion of project and reconnect
  - 36 reused existing equipment or wiring removed to accommodate new work.
  - 37 2. Existing electrical equipment indicated on the drawings as being reworked or relocated shall be wired the same way
  - 38 new equipment would be wired.
  - 39 3. Work involving shutdown of present service and equipment now functioning in present area shall be done at such time
  - 40 as to provide the least amount of inconvenience to the owner at times established by the owner.
  - 41 4. Locations and elevations of utilities have been obtained from utility maps or other sources and are offered as a general
  - 42 guide only without guarantee as to accuracy. The Contractor shall verify the location and elevation of utilities and their
  - 43 relation to the work before beginning work.
- 44 E. The electrical contractor shall restore damaged painted surfaces of electrical equipment to its original condition.
- 45 F. HANGERS AND SUPPORT:
  - 46 1. Do not fasten supports to pipes, ducts, mechanical equipment, and conduit.
  - 47 2. Fabricate supports from structural steel or steel channel. Rigidly weld members or use hexagon head bolts to present
  - 48 neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.
  - 49 3. In wet and damp locations use steel channel supports to stand cabinets and panelboards one inch off wall.
  - 50 4. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.
- 51 G. ACCESS: Install and paint to match access doors required for installation and maintenance.

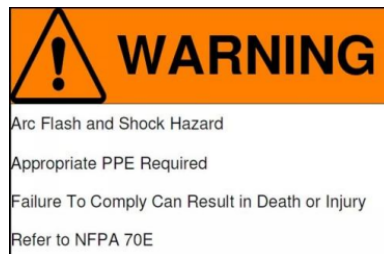
### 52 **3.2. FIELD QUALITY CONTROL**

- 53 A. Control circuits, branch circuits, feeders, motor circuits and transformers:
  - 54 1. Megger check of phase-to-phase and phase-to-ground insulation levels. Do not megger check solid state equipment.
  - 55 2. Continuity.
  - 56 3. Short circuit.
  - 57 4. Operational check.
  - 58 5. Inspect wire and cable for physical damage and proper connection.
  - 59 6. Measure tightness of bolted connections and compare torque measurements with manufacturer's recommended
  - 60 values.
  - 61 7. Verify continuity of all conductors.

- 1 B. Wiring devices: Test receptacles with Hubbell 5200, Woodhead 1750 or equal tester for correct polarity, proper ground  
2 connection and wiring faults.  
3

4 **3.3. IDENTIFICATION**

- 5 A. Coordinate names, abbreviations, colors, and other designations used in electrical identification work with corresponding  
6 designations specified or indicated. Install numbers, lettering, and colors as required by code.  
7 B. Install identification devices in accordance with manufacturer's written instruction and requirements of NEC.  
8 C. Sequence of Work: Where identification is to be applied to surfaces that require finish, install identification after  
9 completion of finish work. All mounting surfaces shall be cleaned and degreased prior to identification installation.  
10 D. Identify Junction, Pull and Connection Boxes: Labeling shall be 3/8-inch Kroy tape or Brother self-laminating vinyl label, or  
11 permanent magic marker (color coded), neatly hand printed. In rooms that are painted out, provide labeling on inside of  
12 cover.  
13 E. Circuit Identification: Tag or label conductors as follows:  
14 1. Multiple Power or Lighting Circuits in Same Enclosure: Where multiple branch circuits are terminated or spliced in a  
15 box or enclosure, label each conductor with source and circuit number.  
16 2. Multiple Control Wiring and Communication/Signal Circuits in Same Enclosure: For control and  
17 communications/signal wiring, use wire/cable marking tape at terminations in wiring boxes, troughs, and control  
18 cabinets. Use consistent letter/number conductor designations throughout on wire/cable marking tape.  
19 3. Match identification markings with designations used in panelboards shop drawings, Contract Documents, and similar  
20 previously established identification schemes for the facility's electrical installations.  
21 F. Apply warning, caution and instruction signs as follows:  
22 1. Install warning, caution or instruction signs where required by NEC, where indicated, or where reasonably required to  
23 assure safe operation and maintenance of electrical systems and of the items to which they connect. Install engraved  
24 plastic-laminated instruction signs with approved legend where instructions or explanations are needed for system or  
25 equipment operation. Install metal-backed butyrate signs for outdoor items.  
26 2. Emergency Operating Signs: Install, where required by NEC, where indicated, or where reasonably required to assure  
27 safe operation and maintenance of electrical systems and of the items to which they connect, engraved laminate  
28 signs with white legend on red background with minimum 3/8inch high lettering for emergency instructions on power  
29 transfer, load shedding, or other emergency operations.  
30 G. Apply circuit/control/item designation labels of engraved plastic laminate for pushbuttons, pilot lights, alarm/signal  
31 components, and similar items, except where labeling is specified elsewhere.  
32 H. Install labels parallel to equipment lines at locations as required and at locations for best convenience of viewing without  
33 interference with operation and maintenance of equipment.  
34 I. Install ARC FLASH WARNING signs on all switchboards, panelboards, industrial control panels, and motor control centers.  
35 Sign at a minimum shall contain:



- 36 J. Circuits with more than 600V: Identify raceway and cable with "DANGER—HIGH VOLTAGE" in black letters 2" high on  
37 orange background at 10'-0 foot intervals.  
38 1. Entire floor area directly above conduits running beneath and within 12 inches of a basement or ground floor that is  
39 in contact with earth or is framed above unexcavated space.  
40 2. Wall surfaces directly external to conduits concealed within wall.  
41 3. All accessible surfaces of concrete envelope around conduits in vertical shafts, exposed in building, or concealed  
42 above suspended ceilings.  
43 K. Underground Electrical Lines: For exterior underground power, control, signal, and communication lines, install continuous  
44 underground plastic line marker located directly above line at 6 to 8" below grade. Where width of multiple lines installed  
45 in a common trench or concrete envelope does not exceed 16" overall, use a single marker. Install line marker for  
46 underground wiring, both direct-buried cables and cables in raceway.  
47 L. Secure nameplate to inside surface of door on panelboard that is recessed in finished locations.  
48 M. Identify underground conduits using underground warning tape. Install one tape per trench at 12 inches above conduit.  
49 N. SWITCH AND RECEPTACLES:  
50 1. Provide identification on all switch and receptacle cover plates. Identification shall indicate source and circuit number  
51 serving the device (i.e. "C1A #24").  
52 2. Identification material to be a clear, 3/8-inch Kroy tape or Brother self-laminating vinyl label with black letters in  
53 normal size "Swiss 721 Bold" font. Letter and number size to 3/16-inch high. Embossed Dymo-Tape labels are not  
54 acceptable. Permanently affix identification label to cover plates, centered above the receptacle openings.  
55 O. BOX LABELING:  
56

1. All junction, pull, and connection boxes shall be identified as follows:
    - a. For power and lighting circuits, indicate system voltage and identity of contained circuits ("120V, 1LA1-3,5,7").
    - b. For other wiring, indicate system type and description of wiring ("FIRE ALARM NAC #1").
  2. Box covers shall be painted same color as associated conduit.
- P. CONDUCTOR COLOR CODING:
1. Color coding shall be applied at all panels, switches, junction boxes, pull boxes, vaults, manholes etc., where the wires and cables are visible and terminations are made. The same color coding shall be used throughout the entire electrical system, therefore maintaining proper phasing throughout the entire project.
  2. Where more than one nominal voltage system exists in a building or facility, the identification of color coding used in the panelboard or equipment shall be permanently posted on the interior of the door or cover.
  3. All Wire and cables smaller shall be color coded along the entire length by the manufacturer.
  4. Colored cable ties shall be applied in groups of three ties of specified color to each conductor at each terminal or splice point starting 3 inches from the termination and spaced at 3- inches centers. Tighten to a snug fit, and cut off excess length.
  5. Switch leg shall have same color as their associated circuit.
  6. Conductors shall be color coded as follows:

	<u>480Y/277 System</u>	<u>208Y/120V System</u>
Phase A	Brown	Black
Phase B	Yellow	Red
Phase C	Orange	Blue
Neutral	Gray	White
Travelers		Yellow
Equipment Ground	Green	Green

- Q. ELECTRICAL GEAR
  1. Exterior electrical gear shall be identified with vinyl label names and numbers to be visible on the exterior of the gear. The labels shall correspond to the 1-line nomenclature and identify each cubicle of multi-section gear.
- R. CONTROL EQUIPMENT IDENTIFICATION
  1. Provide identification on the front of all control equipment, such as disconnect switches, starters, VFDs, contactors, motor control centers, etc. Nameplate text shall be a minimum of 1/4" high.
  2. Labeling shall include:
    - a. Equipment type and contract documents designation of equipment being served.
    - b. Location of equipment being served if it is not located within sight.
    - c. Voltage and phase of circuit(s).
    - d. Panel and circuit number(s) serving the equipment.
    - e. Method of automatic control, if included ("AUTO CONTROL BY BAS").

EXHAUST FAN EF-1 (Located on roof)  
 480V 3-PHASE  
 FED FROM H02

- S. POWER DISTRIBUTION EQUIPMENT IDENTIFICATION:
  1. Provide identification on the front of all power distribution equipment, such as panelboards, switchboards, etc. The identification material shall be engraved plastic-laminated labels. Text shall be a minimum of 1/4" high, Swiss 721 Bold.
  2. Labeling shall include:
    - a. Equipment type and contract documents designation of equipment.
    - b. Voltage of the equipment.
    - c. Name of the upstream equipment and location of the upstream equipment if it is not located within sight.
    - d. Rating and type of the overcurrent protection device serving the equipment if it is not located within sight ("FED BY 400A/3P BREAKER").

DISTRIBUTION PANEL H-2  
 480V 3-PHASE  
 FED FROM SWITCHBOARD SB-1

3. A separate nameplate for the service entrance equipment shall be labeled with the MAXIMUM AVAILABLE FAULT CURRENT and DATE of calculation given on the one-line diagram.
4. Distribution panelboards and switchboards shall have each overcurrent protection device identified with name and location of the load being served ("AHU-1 LOCATED IN PENTHOUSE 1").
5. Branch panelboards shall be provided with typed panel schedules upon completion of the project. Existing panelboards shall have their existing panel schedules typed, with all circuit changes, additions or deletions also typed on the panel schedules. A copy of all panel schedules for the project shall be turned over as part of the O&M Manuals.

T. TRANSFORMER EQUIPMENT IDENTIFICATION

- 1 1. Provide identification on the front of all transformers. The identification nameplate shall be an engraved plastic-laminated label. Text shall be a minimum of 1/4" high.
- 2
- 3 2. Labeling shall include:
- 4 a. Equipment type and contract documents designation of equipment
- 5 b. Name of the upstream equipment.
- 6 c. Voltage and rating of the equipment.
- 7 d. Location of the upstream equipment if it is not located within sight.

<p>TRANSFORMER TR-2 480V: 208Y/120 20 kVA FED FROM SWITCHBOARD SB-1 (located in Rm 100)</p>
---

8

## 9 U. EXTERIOR LIGHTING IDENTIFICATION:

- 10 1. Lighting poles, bollards and overhead distribution poles shall be individually identified with a unique number, for
- 11 maintenance purposes. Apply the vinyl label number above the hand hole cover or 24" above grade. Bollards may be
- 12 identified with a number applied inside the luminaire that is visible from the exterior.

13

14 **3.4. RACEWAY AND BOXES**

- 15 A. Support conduit using coated steel or malleable iron straps, lay in adjustable hangers, clevis hangers, and split hangers.
- 16 B. Group related conduits; support using conduit rack. Construct rack using steel channel; provide space on each for 25
- 17 percent additional conduits.
- 18 C. Do not attach conduit to ceiling support wires.
- 19 D. Route conduit parallel and perpendicular to walls.
- 20 E. Maintain 12 inch clearance between conduit and surfaces with temperatures exceeding 104° F.
- 21 F. Cut conduit square using saw or pipe cutter; de burr cut ends. Bring conduit to shoulder of fittings; fasten securely.
- 22 G. Join nonmetallic conduit using cement as recommended by manufacturer.
- 23 H. Use conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.
- 24 I. Install no more than equivalent of three 90 degree bends between boxes. Use conduit bodies to make sharp changes in
- 25 direction, as around beams. Use hydraulic one shot bender to fabricate factory elbows for bends in metal conduit larger
- 26 than 2 inch size.
- 27 J. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.
- 28 K. Provide suitable fittings to accommodate expansion and deflection where conduit crosses control and expansion joints.
- 29 L. Provide suitable pull string in each empty conduit except sleeves and nipples.
- 30 M. Use suitable caps to protect installed conduit against entrance of dirt and moisture.
- 31 N. All conduit to be concealed, except in mechanical rooms. Surface wiring to be used only where absolutely necessary.
- 32 1. In existing buildings with exposed masonry walls or exposed structural ceilings, surface installation is allowed.

## 33 O. BOXES:

- 34 1. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.
- 35 2. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling access panel or from
- 36 removable recessed luminaire.
- 37 3. Do not install flush mounting box back to back in walls; provide minimum 6" separation. Provide minimum 24"
- 38 separation in acoustic rated walls.
- 39 4. Use stamped steel bridges to fasten flush mounting outlet box between studs.
- 40 5. Install flush mounting box without damaging wall insulation or reducing its effectiveness.
- 41 6. Use adjustable steel channel fasteners for hung ceiling outlet box.
- 42 7. Do not fasten boxes to ceiling support wires.
- 43 8. Support boxes independently of conduit.
- 44 9. Use gang box where more than one device is mounted together. Do not use sectional box.
- 45 10. Use gang box with plaster ring for single device outlets.
- 46 11. Adjust flush mounting outlets to make front flush with finished wall material.
- 47 12. Install knockout closures in unused box openings.
- 48 13. Clean interior of boxes to remove dust, debris, and other material.

## 49 P. RACEWAY:

- 50 1. Use flat head screws, clips, and straps to fasten raceway channel to surfaces. Mount plumb and level.
- 51 2. Use suitable insulating bushings and inserts at connections to outlets and corner fittings.
- 52 3. Verify surface raceway routing in field. All surface raceway routing shall be approved by the owner. Installation shall
- 53 follow molding or floor wherever possible. Vertical runs to be located at corners of walls or sides of columns wherever
- 54 possible. Coordinate location with other trades.

55

56 **3.5. WIRING CONNECTIONS**

- 57 A. Verify that equipment is ready for electrical connection, wiring, and energization.
- 58 B. Make electrical connections in accordance with equipment manufacturer's instructions.
- 59 C. Make conduit connections to equipment using flexible conduit. Use liquidtight flexible conduit with watertight connectors
- 60 in damp or wet locations.

- 1 D. Make wiring connections using wire and cable with insulation suitable for temperatures encountered in heat producing
- 2 equipment.
- 3 E. Provide receptacle outlet where connection with attachment plug is indicated. Provide cord and cap where field supplied
- 4 attachment plug is indicated.
- 5 F. Provide suitable strain relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.
- 6 G. Install disconnect switches, controllers, control stations, and control devices as indicated.
- 7 H. Modify equipment control wiring with terminal block jumpers as indicated.
- 8 I. Provide interconnecting conduit and wiring between devices and equipment where indicated.
- 9 J. Coolers and Freezers: Cut and seal conduit openings in freezer and cooler walls, floor, and ceilings.

10  
11

**END OF SECTION**



**SECTION 26 50 00  
LIGHTING**

1		
2		
3		
4	<b>PART 1 – GENERAL</b> .....	<b>1</b>
5	1.1. SCOPE .....	<b>1</b>
6	1.2. REFERENCES .....	<b>1</b>
7	1.3. SPARE PARTS .....	<b>1</b>
8	<b>PART 2 - PRODUCTS</b> .....	<b>1</b>
9	2.1. INTERIOR LUMINAIRES AND ACCESSORIES .....	<b>1</b>
10	2.2. AC-POWERED EXIT SIGNS .....	<b>2</b>
11	2.3. FIRE ALARM RELAY .....	<b>2</b>
12	2.4. EMERGENCY LIGHTING INVERTERS .....	<b>2</b>
13	2.5. EXTERIOR LUMINAIRES AND ACCESSOIRES .....	<b>3</b>
14	2.6. POLES .....	<b>3</b>
15	2.7. INTERIOR MOTION AND PHOTO SENSORS .....	<b>3</b>
16	2.8. ANALOG DIMMERS 0-10V .....	<b>3</b>
17	2.9. DIMMERS LINE-VOLTAGE (TRACK LIGHTING) .....	<b>3</b>
18	2.10. REWIND TIMER .....	<b>4</b>
19	2.11. PROGRAMMABLE TIMERS .....	<b>4</b>
20	2.12. SWITCHES .....	<b>4</b>
21	2.13. LOCKABLE COVERS .....	<b>4</b>
22	2.14. LOW VOLTAGE CONTROL .....	<b>4</b>
23	2.15. PILOT LIGHTS .....	<b>5</b>

**PART 1 – GENERAL****1.1. SCOPE**

- A. This section includes information common to lighting and lighting controls and applies to all sections in this Division.
- B. All light fixtures marked as emergency light fixtures (black dot on plans) and EXIT signs shall be powered by the emergency lighting source. Refer to plans whether that source is a central battery inverter or a generator.
- C. Egress light fixtures shall be equipped with fire alarm relay. Upon activation of fire alarm and/or power outage the following shall happen:
1. Turn light on regardless of local lighting control (sensor or switch)
  2. Turn light to 100% light output regardless of local dimming signal (dimmer or sensor)

**1.2. REFERENCES**

- A. Work under this section depends on applicable provisions from other sections and the plan set in this contract.
- B. IFC - International Fire Code
- C. NFPA - National Fire Protection Association - [www.nfpa.org](http://www.nfpa.org)
- D. UL – Underwriters Laboratory - [www.ul.com](http://www.ul.com)
1. UL 924 - Standard for Emergency Lighting and Power Equipment

**1.3. SPARE PARTS**

- A. Provide the following devices as a spare parts. Provide one per specific model used in this project:
1. Sensor
  2. Analog dimmer
  3. Rewind timer
  4. Light fixtures: none unless schedule indicates a number of spare fixtures to be provided

**PART 2 - PRODUCTS****2.1. INTERIOR LUMINAIRES AND ACCESSORIES**

- A. Provide schedule fixtures.
- B. If the manufacturer offers a higher, or lower efficiency option, the higher efficiency option is to be used.
- C. Driver shall operate with 120-277V and 0-10V dimming signal.
- D. Include all accessories required for proper installation compatible with the wall, ceiling and other mounting surfaces. This includes, but is not limited to, suspension cables, mounting clips, and other items. Linear fixtures shown to be installed in a row shall include all required connector, and end pieces. Schedules don't necessarily show those accessories.
- E. PANEL FIXTURES: provide required surface- or drywall kit required for specific installation location.
- F. TRACK LIGHTS:
1. Provide complete track system from fixture manufacturer. Include all required adapters, connectors, end pieces, pendant kits etc. Track shall match fixture color.
  2. Plans will show location and approximate length of track systems. Contractor shall derive required track material needs.

- 1 3. Install current-limiting feed for each dimmer. Select current based on down-rated dimmer (typically 75% of dimmer
- 2 rating). Example: 400 VA dimmer requires  $\leq 2.5A$  current limiting device. Use mini end-feed. Unless noted otherwise,
- 3 select largest possible (based on de-rating) current limiter to allow future addition of track heads.
- 4 4. Corner connectors shall be solid (not accordion style) where installation angles allow use of pre-fabricated corners.
- 5 G. FIXTURES DESIGNED TO BE PENDANT-MOUNT:
- 6 1. Use fixture manufacturer provided cables, connectors, end pieces and other accessories required for a stable and neat
- 7 looking installation.
- 8 H. WALL WASH FIXTURES: Alternate model allowed is "Axis Beam 2 TB2WDLED" series

## 2.2. AC-POWERED EXIT SIGNS

- 11 A. Approved Manufacturer: Lithonia or approved equal
- 12 1. Approved Substitute: Chloride VERW
- 13 B. UL-damp location listed 50°F – 104°F.
- 14 C. MOUNTING:
- 15 1. Wall, ceiling, back, or end mounting as required by location.
- 16 2. Provide required number of face plates
- 17 D. FINISH: White face for both with clear baked enamel protective coating.
- 18 E. LAMPS: Light-emitting diode (LED), red color for EXIT signs.
- 19 F. MOUNTING HEIGHT: 90" above floor or 1" above door casing where mounted over doors.
- 20 G. Power from emergency lighting power source.
- 21 H. Enable directional arrows as shown on plans or to direct occupants towards exits. Confer with designer on egress paths.

## 2.3. FIRE ALARM RELAY

- 24 A. BASIS OF DESIGN: Functional Devices ESRN
- 25 B. Multiple relays wire in parallel. 0.016 mA for each relay.
- 26 C. UL 924 rated as "Emergency Lighting Equipment"
- 27 D. UL 2043 plenum rated
- 28 E. LED indicators for normal voltage, emergency voltage and load status
- 29 F. When fire alarm is triggered or if regular power is out, the relay shall force emergency lights on at 100% brightness level
- 30 (override any dimming signals).
- 31 G. When fixture is outdoors, install relay in adjacent indoor space at accessible location.
- 32 H. For fixture-mounted sensors re-fit fixture to use appropriate relay inside or external to the fixture.
- 33 I. Install one relay per emergency lighting zone. Wire to emergency power source (inverter or generator).
- 34 J. Wire to local fire alarm panel. Contractor shall coordinate with fire alarm contractor and manufacturer the relay
- 35 requirements. Provide additional relays as required to work with the different alarm panel types. Re-program or re-
- 36 configure fire alarm panel as required to enable required functionality.

## 2.4. EMERGENCY LIGHTING INVERTERS

- 39 A. BASIS OF DESIGN MANUFACTURERS: Myers
- 40 B. Ambient operating temperature minimum 32°F and maximum 100°F. Forced fan cooling during emergency mode.
- 41 C. Performance:
- 42 1. Rated power output for 90 minutes
- 43 2. Rated for fluorescent and LED lighting
- 44 3. Under normal operation, bypass inverter. Transfer time 2ms or less
- 45 4. Harmonic distortion < 10%
- 46 5. Operating efficiency at full load >97%
- 47 6. Output frequency 60Hz +/- 0.5Hz
- 48 7. Overload Rating: 115% momentarily
- 49 8. Audible noise less than 50 dB(A) at 3ft
- 50 D. Protection:
- 51 1. Input circuit breaker and output circuit breaker sized based on unit output rating
- 52 2. Unless plans show a specific layout, contractor can choose wiring path from inverter to the emergency fixtures. Balance
- 53 loads evenly over the circuits.
- 54 E. Battery and charger:
- 55 1. Maintenance-free sealed lead-calcium
- 56 2. micro-processor controlled charger with 24 hour re-charge time
- 57 F. Diagnosis:
- 58 1. Displaying input voltage, output voltage, battery voltage, battery current, output current, output VA, temperature,
- 59 date, time and inverter wattage with controls and logging data
- 60 2. Audible alarm will indicate high/low battery charger fault, near low battery, low battery, load reduction fault, output
- 61 overload, high/low AC input volts, high ambient temperature, inverter fault, output fault.
- 62 3. Program unit to meet all operation and self-testing requirements of IFC and NFPA 101. At minimum automatically test
- 63 monthly for 5 minutes and annually for 90 minutes and provide log.

- 1 G. Provide factory-startup and perform all required tests and adjustments.  
 2 H. Test lighting on battery operation for 90 minutes  
 3 I. Provide wall or floor-bracket required for installation. Wall installation requires anchoring and bracketing suitable for the  
 4 weight of the unit including batteries.  
 5

## 6 **2.5. EXTERIOR LUMINAIRES AND ACCESSOIRES**

- 7 A. Driver shall operate with 120-277V and 0-10V dimming signal.  
 8 B. Fixture must be water- and dust tight and corrosion resistant and UL listed for location.  
 9 C. Provide with built-in sensor and controls where schedule indicates fixture-control.  
 10

## 11 **2.6. POLES**

- 12 A. Furnish poles as specified in schedule on Drawings. Poles shall be galvanized. Handhole in pole shall have removable  
 13 weatherproof cover. Anchor bolts as recommended by pole manufacturer. Provide template, flat washers, lock washers,  
 14 and hex nuts for each pole.  
 15 B. No precast bases for poles are permitted. Construct from reinforced concrete in sizes as shown on drawings and to meet  
 16 the minimum structural requirements of AASHTO (American Association of State Highway and Transportation Officials) or  
 17 as designed by a licensed structural engineer. The exposed surface area of the foundation shall have the forms removed  
 18 and the concrete rubbed out to a smooth finish.  
 19 C. Provide 3/4" X 10'0" ground rods in the pole foundation so that the ground rod projects 3" up into center of pole base.  
 20 D. Install lighting poles at locations indicated. Install poles plumb. Provide shims or double nuts to adjust plumb. Use belt slings  
 21 or non-chafing ropes to raise and set pre-finished luminaire poles.  
 22 E. Provide double nuts to adjust plumb. Grout around each base.  
 23 F. Minimum underground conduit size is 1 inch.  
 24 G. Underground and exterior wire shall be type XHHW-2 or USE.  
 25 H. Project anchor bolts 2 inches (50 mm) minimum above base. Install all anchor bolts and handhole fasteners with anti-seize  
 26 compound.  
 27

## 28 **2.7. INTERIOR MOTION AND PHOTO SENSORS**

- 29 A. BASIS OF DESIGN MANUFACTURER: Sensorswitch  
 30 B. Operate with 120-277V and 0-10V dimming signal  
 31 1. Low voltage sensors will not be acceptable except:  
 32 a. Retrofit installations where line-voltage conduit installation would not be possible. This include installation behind  
 33 existing drywall  
 34 b. Where plans indicate use of low-voltage control is acceptable  
 35 c. Where low-voltage control is allowed, use the low-voltage sensor and power pack version of the scheduled line-  
 36 voltage sensors. Include same features. Schedules will show the line-voltage device regardless. No cost shall be  
 37 added to contract due to use of low-voltage controls.  
 38 C. Occupancy Detection based on Combination of (IR) Technology and passive microphonic (PM) based on scheduled sensor.  
 39 D. Where daylight is present, photosensor shall control dim-level of associated fixtures. After sufficient daylight is detected,  
 40 lights shall be completely turned off. Sensors shall be able to auto calibrate and to differentiate between artificial and  
 41 natural light. Adaptive delay must prevent system from cycling on cloudy days.  
 42 E. Where fixtures operate on 2-poles (e.g. 208V) a 2-pole sensor shall be used and included in bid price.  
 43 F. Plans will show sensor locations. Sensors shall be located to enable early detection when person enters the zone but shall  
 44 also avoid detection bypassing persons in adjacent zones. Locations on plans may have to be adjusted to enable proper  
 45 function. Coordinate final sensor location with engineer prior installation.  
 46 G. Sensors shall receive permanent label indicating the model number. Label shall be placed under removable sensor cover.  
 47 H. Flexible conduit behind suspended ceiling (i.e. acoustic, drywall) shall enable relocation of sensor by 5 feet in any direction.  
 48 I. Sensors mounted to fixtures may be the scheduled sensor or an equal fixture-mounted type with appropriate bracket.  
 49

## 50 **2.8. ANALOG DIMMERS 0-10V**

- 51 A. BASIS OF DESIGN: Wattstopper RH4BL3PW  
 52 B. Color: Match face plate color in same space  
 53 C. 3-way installation where indicated on plans  
 54 D. Manual Switch shall switch line voltage to downstream controls and fixtures  
 55 E. 0-10V sliding dimmer shall control dimming level. Flicker-free from 1-100%  
 56

## 57 **2.9. DIMMERS LINE-VOLTAGE (TRACK LIGHTING)**

- 58 A. BASIS OF DESIGN:  
 59 1. Use scheduled dimmer approved by track fixture manufacturer.  
 60 2. Use 400VA model or higher.  
 61 3. If the listed model is not available, an equal model (same functionality and same model, but re-branded) will be  
 62 accepted. The originally listed manufacturer has to confirm the model is functionally and electrically the same.  
 63 B. Install in separate single-gang box to avoid de-rating.

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60  
61  
62  
63

## **2.10. REWIND TIMER**

- A. BASIS OF DESIGN: Intermatic FD/FF series
- B. No hold function shall be implemented
- C. Electromechanical spring wound timer
- F. Color: Match face plate color to surrounding in finished spaces. Brushed metal in unfinished spaces.
- D. Select Model based on length of time indicated on plans
- E. Switch shall be rated for 120/277V, 800W load.

## **2.11. PROGRAMMABLE TIMERS**

- A. BASIS OF DESIGN: Intermatic ET 2800 Series
- B. Minimum Features:
  - 1. 120-277V wide range input
  - 2. Astronomic time and dusk-dawn scheduling
  - 3. Holiday programming
  - 4. 100-hour superconductor
  - 5. Non-volatile EEPROM
  - 6. LED compatible
  - 7. Relays with zero-crossing technology
- C. Models:
  - 1. 1-circuit: ET2805C
  - 2. 2-circuit: ET2825C
  - 3. 4-Circuit: ET2845C
  - 4. For exterior or wet-rated installation use NEMA 3R-rated version

## **2.12. SWITCHES**

- A. 20 Amp commercial specification grade series unless noted otherwise
- B. SINGLE POLE SWITCH: P&S CSB20AC1, Hubbell: CBS120 or Leviton: CSB1-20
- C. 3- AND 4-WAY SWITCHES: Same series and quality as single-pole
- D. When water is near switch, use code-approved type of switch for the location.
- E. Color: typically white or per architect and owner.
- F. Install switches with OFF position down.
- G. Install multi-switches close together. Scaled plans may show switches further apart for better readability.

## **2.13. LOCKABLE COVERS**

- A. BASIS OF DESIGN: Honeywell CG512A, CG511A, CG510A
  - 1. Use similar types if required to fit all controls.
  - 2. Owner approval required for differing type.
- B. Where indicated on plans, provide lockable cover for all switches, timers and dimmers in the vicinity.
  - 1. Tags might indicate "COVER" or similar.
  - 2. If multiple switches in publicly accessible areas are labelled to be have a cover, it is to be assumed that all switches and dimmers in those public areas are to receive a cover even if not every single instance is labelled.
- C. All locks shall be keyed the same unless owner provides keying scheme.

## **2.14. LOW VOLTAGE CONTROL**

- A. Use equipment equivalent to and compatible with the scheduled line-voltage devices. Where available, use same manufacturer and adjust model number to reflect low-voltage version.
- B. Use Powerpack with integrated power supply and relay to switch the line voltage and provide low-voltage
- C. Low voltage control is only allowed in these applications:
  - 1. REMOTE MANUAL SWITCH:
    - a. Where plans show manual lighting control (i.e. switches) located far outside the controlled zone. Typical applications include:
      - i. Switches located in a staff area to control lights in public areas
  - 2. TIMER OVERRIDE:
    - a. Where plans show timer override the local zone is forced on by programmable timer.
    - b. Local line voltage sensor can be overridden ON (parallel to sensor) with a power pack relay. Wiring from programmable timer to local powerpack can be low-voltage
  - 3. INACCESSIBLE LOCATIONS:
    - a. Where plans show inaccessible locations. This typically includes existing drywall ceiling.
    - b. Areas outside the inaccessible location shall be controlled by line voltage as scheduled. This typically includes a lay-in ceiling adjacent to an inaccessible drywall ceiling.
- D. For multiple zones controlled by a single contact in "remote manual switch" and "timer override mode" use Wattstopper BZ-50 powerpacks in parallel (maximum 10 parallel devices).

1  
2  
3  
4  
5  
6  
7

**2.15. PILOT LIGHTS**

- A. BASIS OF DESIGN: Line voltage indicator-LED in color specified
- B. Visibility from a 180° angle
- C. In finished areas only expose the tip of the pilot light. Conceal box.

**END OF SECTION**