

PROJECT MANUAL

SPECIFICATIONS



**PETSMART STORE NO. XXXX
SHOPPING CENTRE NAME
STREET ADDRESS, CITY, PROVINCE**

DATE

ISSUED FOR XXX

DESIGNER NOTES:

- 1. THE PETSMART PROTOTYPE INSTRUCTIONAL SET IS BASED ON A STAND ALONE BUILDING WITH STEEL BEAMS, STEEL JOISTS AND METAL ROOF DECK.**
- 2. DEVIATIONS FROM THE INSTRUCTIONAL SET ARE PERMITTED ONLY WHEN SPECIFIC APPROVAL IS GRANTED IN WRITING FROM PETSMART. DEVIATIONS FROM NATIONAL ACCOUNT ITEMS WILL NOT BE CONSIDERED.**
- 3. THE DESIGN OF ANY INDIVIDUAL PROJECT MUST CONFORM TO THE REQUIREMENTS OF THE INSTRUCTIONAL SET AS MODIFIED BY SITE SPECIFIC CONDITION AND SPECIFIC BUILDING CODES AND OTHER JURISDICTIONAL REQUIREMENTS.**
- 4. PROJECT SPECIFICATION SHALL BE WRITTEN IN ADDENDUM FORMAT AS A LIST OF MODIFICATIONS FROM THE INSTRUCTIONAL SET. ALL MODIFICATIONS SHALL BE IDENTIFIED IN THE MODIFICATION LIST. MODIFICATION PAGES SHALL BE PRINTED ON COLOURED PAPER.**
- 5. DELETE THESE DESIGNER NOTES FOR INDIVIDUAL PROJECTS AND FILL IN ALL REQUIRED PROJECT SPECIFIC INFORMATION ON THIS PAGE AND ON THE FOLLOWING MODIFICATION PAGE.**

**INSTRUCTIONAL SET
CANADIAN 2025 PETSMART 14K PROTOTYPE
INCLUDING UPDATES UP TO: XXXX**

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PROJECT MANUAL

S P E C I F I C A T I O N S

PETSMART STORE NO. XXXX ▪ SHOPPING CENTRE NAME **CITY, PROVINCE**

THE SPECIFICATION FOR THIS PROJECT SHALL CONFORM TO THE ATTACHED 2024 CANADIAN PETSMART 14K PROTOTYPE INSTRUCTIONAL SETS PROJECT MANUAL/SPECIFICATIONS:

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END OF SECTION

DESIGNER NOTE:

This invitation to bid section is for Petsmart issued bids (Petsmart capital projects)

The General Contractor (Invited Bidder):

(CONTRACTOR NAME AND ADDRESS)

ATTN:

Proposals are invited for the construction of the PETsMART _____
_____.

The project work consists of:

NEW CONSTRUCTION

A one-story retail store of approximately _____ square feet in area.

Site development work of the project is limited per construction drawings. All off-site work is excluded unless otherwise noted in the Construction Drawings.

All proposals must be submitted on a total lump sum basis to include all material, labor, taxes, bonds, etc. Segregated proposals will not be accepted. **Proposal will be presented with breakout for building and site construction per the included breakout of Bid Schedule of Values (Part IV).**

Proposals shall be faxed by bid due date time and delivered, within 24 hours, to the office of PETsMART:

PETsMART
19601 North 27th Avenue
Phoenix, Arizona 85027
(623) 580-6100 • (623) 580-6509 fax
ATTN: Director of Construction

on **(DATE)** at **(TIME)** P.M. (Time Zone as Applicable) Proposals received after this specified time or date will not be accepted. Announcement of AWARD OF CONTRACT shall be made to all BIDDERS.

Invited Bidders may obtain **1 electronic copy of the drawings and 1 copy of the PROJECT MANUAL (Bid Documents)** from the Architect. Additional copies can be purchased through the Architect's office (no partial copies will be issued); shipping costs shall be provided by the receiver using their shipping account number.

- The OWNER AND/OR PETsMART reserves the right to reject any and all Proposals and to waive formalities and irregularities.
- No telephone questions by the General Contractor or the Subcontractors shall be accepted by the Owner, PETsMART and/or the Architect.
- All questions regarding building Construction Documents shall be written and addressed to the Architect, from the General Contractors invited to bid.

END OF SECTION

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DESIGNER NOTE:

This Supplemental Instructions to Invited Bidders section is for Petsmart issued bids (Petsmart capital projects)

EXAMINATION

Before submitting a Proposal, the Invited Bidder shall carefully examine the Drawings and Specification Manual (Bid Documents), visit the site of the work, and fully inform themselves as to all existing conditions and limitations, and shall include in the Proposal, the cost of all items necessary in the construction of the project. The Invited Bidder shall not be allowed any extra compensation by reason of any matter or thing, concerning that which such the Invited Bidder might have fully informed himself prior to the bidding.

INTERPRETATIONS, ADDENDA

Should an Invited Bidder find any ambiguity, inconsistency or error in the Drawings or Project Manual, or be in doubt as to their meaning, the Invited Bidder shall at once notify the Professional of Record, in writing via EMAIL, who will issue a written addendum response to all Invited Bidders. Any exclusions by the General Contractor found to be in error will be added to the bid for comparison.

Any addenda issued by the Professional of Record during the time of bidding are to be included in the proposal from the Invited Bidder, and shall become a part of the Bid Documents. The Invited Bidder shall acknowledge receipt of addenda on the proposal form in the space provided.

Addenda will be emailed to each Invited Bidder, person or firm recorded by the Professional of Record as having received the Construction Documents for bidding.

SUBSTITUTION OF MATERIALS

Absolutely no substitutions for materials and products will be allowed for National Account Items as listed in this Project Manual. All bids will be automatically construed to include National Account Items which will be furnished by the Awarded Invited Bidder for construction (the General Contractor). Any deviation from National Account Items in the construction of the project will be cause to require the General Contractor to replace the material or product to the National Accounts specification at the General Contractor's cost.

All other substitution requests must be submitted in writing, prior to bid date, to the Professional of Record per the requirements of Section 01600 of this Project Manual. Approved substitution requests will be distributed as addenda to all Invited Bidders in writing by the Professional of Record.

PROPOSALS

Proposal, by the Invited Bidders to be submitted for consideration, must be made upon the **Proposal Form**, provided herewith, all blank spaces must

be filled, the signature shall be in longhand, and the completed form shall be without alterations or erasures. The included **Bid Schedule of Values** must be fully executed and submitted simultaneously with the *Proposal Form*.

The *Proposal Form* shall bear the name of the Invited Bidder. Where an Invited Bidder is a corporation, a corporate proposal must be signed in the legal name(s) of the corporation followed by the name of province of incorporation and the legal signature of a corporate officer authorized to bind the corporation to a contract.

Proposals shall be addressed to the Owner and/or PETSMART and delivered in an enclosed sealed envelope in addition to faxed copies.

Time is of the essence and consideration of such shall be made in the awareness of this on the bid proposal form. The project shall be completed to the point of "**substantial completion**" as defined in **The General Conditions of the Contract for Construction** and the Certificate of Occupancy shall be issued within 120 calendar days (including weekdays and weekend days) from 5 days following the Notice of Authorization to Proceed. (There will be no additional days allowed.)

All bids shall remain firm for a period of 60 calendar days after the date of bid opening and the Invited Bidder shall be prepared to enter into a contract for construction and begin construction within 5 calendar days after date of Notice of Authorization to Proceed.

Proposals may not be modified after submittal. Invited Bidders may withdraw proposals any time prior to bid opening, but may not resubmit them. No proposal may be modified or withdrawn after the bid opening except where the Award of the Contract for Construction has been delayed for more than 60 days.

The building permit(s) cost or development fees assessed by all governmental authorities shall be excluded from the base bid. These additional costs may be added to the contract sum by Change Order. Any taxes assessed by the issuer will be included in the permit cost. The General Contractor shall provide the Owner and/or PETSMART with 2 copies of the permit(s) within one week of receipt.

**GENERAL CONTRACTOR PROPOSED
SUBCONTRACTORS**

The Invited Bidder (General Contractor) shall submit to PETSMART, within 48 hours (2 working days) of bid opening, if requested by the Owner and/or PETSMART, the enclosed **Subcontractor List**, listing single name only for each branch of the work.

The Owner and/or PETSMART reserve the right to reject any proposed subcontractor(s). Subcontractors proposed by the bidder must be used on the work for which they are proposed and shall not be changed without the written approval by the Owner and/or PETSMART. Rejection of proposed subcontractors shall be pre-emptory and the Owner and/or PETSMART will not be expected or required to state cause.

BID SCHEDULE OF VALUES

At the time of bid proposal submittal, the Invited Bidder shall submit a complete ***Bid Schedule of Values***. This schedule is included herewith and its format must be adhered to strictly.

COPIES FURNISHED

The successful Invited Bidder (General Contractor) will use the previously issued sets of Bid Documents for Construction Drawings. No other previously issued drawings or project manuals shall be allowed for use in construction of the project.

CONTRACTORS LICENSE LAW

The General Contractor shall comply with and require all subcontractors to comply with all Federal, Provincial and Municipal Contractor License Laws and be duly Registered and Licensed thereunder as required.

PERFORMANCE BOND

The General Contractor is required to provide and pay for a performance and payment bond. This bond shall cover the faithful performance (100%) of the Contract for Construction and the payment of all obligations (100%) arising thereunder, in such form as the Owner and/or PETSMART may prescribe and with such sureties as they may approve. The General Contractor shall deliver the required bonds to the Owner and/or PETSMART not later than the date of execution of the Contract for Construction. The General Contractor shall require the attorney of fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of his Power of Attorney indicating the monetary limit of such power.

The General Contractor shall furnish the name, address and rating of the bonding company on the proposal form. PETSMART and/or Owner reserve the right to reject any proposed bonding company without stating cause. In this event the General Contractor shall provide an alternate bonding company selection acceptable to PETSMART and/or the Owner.

Bonds shall conform with provincial/federal statutes regarding performance bond and labor and material payment bond with amount shown on each part equal to 100% of the total amount payable by terms of the Contract for Construction. The Surety Company shall be licensed to do business in the province in which construction project is located and shall be acceptable to Owner and/or PETSMART. Bond amount shall be increased to include any Change Order(s) added to the contract to 100% total value amount of each Change Order. Bonds will be recorded along with a copy of the construction contract in the County Recorder Records by the General Contractor with written proof submitted to the Owner and PETSMART.

SALES AND USE TAX

The General Contractor agrees to comply with and to require all of his subcontractors to comply with all the provisions of applicable federal and provincial tax law and compensation use tax law and all amendments to same. The contractor further agrees to indemnify and save harmless the Owner and/or PETSMART, of and from any and all claims and demand made against it by virtue of the failure of the General Contractor or any Subcontractor to comply with the provisions of any or all said laws and amendments.

WAIVER OF LIENS

The General Contractor is responsible for the payment of all bills for labor and materials furnished by the subcontractors, the suppliers, and the General Contractor on this project. The General Contractor shall deliver to the Owner and/or PETSMART, as outlined in the Supplementary General Conditions, unconditional Lien Waivers and/or Releases from himself and from each of his subcontractors and suppliers, and at such time he shall certify that he is submitting such lien waivers for all subcontractor and suppliers involved.

Where "substantial completion" is achieved final payment requests will be considered for approval (not including retention funds) and the Professional of Record shall prepare a "Punch List". (Punch List does not indicate "Substantial Completion" is achieved). The General Contractor shall complete all items noted on the "Punch List" to the satisfaction of the Owner and/or PETSMART within 20 calendar days. If the Punch List is not completed within the 20 days, the General Contractor acknowledges that PETSMART has the right to complete the work with other forces and reduce the Contract amount owed to the General Contractor by that amount plus 25% management fee.

Upon the satisfactory completion of the "Punch List", with "Substantial Completion achieved, a "Certificate of Occupancy" issued and all "close-out package" items completed to the satisfaction of the Owner and/or PETSMART, construction retention funds shall be approved for payment.

END OF SECTION

DESIGNER NOTE:

This Proposal Form section is for Petsmart issued bids (Petsmart capital projects)

To: OWNER/DEVELOPER:**Name**

Address

City, Province, Postal Code

Attn.:

TENANT:**PETsMART**

19601 North 27th Avenue

Phoenix, AZ 85027

Attn: Director of Construction

Submitted by:

(General Contractor's Name and Address)

I / WE, the undersigned, propose to do all the work, and furnish all the labor, physical plant and materials necessary for the construction of subject project as set forth in the Drawings and Specification Manual (BID DOCUMENTS) titled:

PETSMART Store No. XXXX

(Address)

As prepared by Professional of Record.

We further declare that we have carefully read and examined the BID DOCUMENTS INCLUDING THE PROJECT MANUAL, the Bidding Requirements, Contract Forms, General Conditions, Supplementary General Conditions, all other Sections, all sheets of the Drawings, that we have made a personal examination of the site and that we understand the exact scope of the Project WITHOUT QUESTION.

We acknowledge receipt of the following Addenda and have included their provisions in this Proposal:

Addendum No. _____ Dated _____

Addendum No. _____ Dated _____

Addendum No. _____ Dated _____

Addendum No. _____ Dated _____

In submitting this Proposal, I / WE agree:

1. To hold the Proposal open until 60 days after date for receipt of bids.
2. Within 5 calendar days after the Notice of Authorization to Proceed to enter into and execute a contract for construction awarded on the basis of this proposal and start construction and to furnish guaranty bonds and insurance certificates in accordance with the Bid Documents.
3. To accomplish the work in accordance with the Bid Documents.
4. To provide substantial completion of the project, within 120 calendar days from date of 5 calendar days following the Notice of Authorization to proceed and understand that failure to complete within this time will result in deduction of liquidated damages as specified in the Instructions to Bidders.
5. To provide all materials, products, etc. as specified in the Bid Documents without any deviation whatsoever.
6. To provide all necessary 'small tool' costs under the base bid of project with a fixed charge which will not be increased due to changes in scope of work.

The undersigned agrees that the site work bid portion as defined by the Bid Documents, including: all building pad construction excavation/fill and compaction, all related concrete work (not part of the building), asphalt paving, striping, extruded curbs, site lighting, landscape, irrigation and relocation of or extension of utilities to within 5' of the building wall will be stated as a separate lump sum price of:

_____ CAD Dollars (\$ _____)

(Including GST or HST)

The undersigned agrees that the building bid portion as defined by the bid documents, including: the building, all interiors, pallet storage, the truck well and wall(s), the trash enclosure, the rear concrete service slab(s), concrete utility pad(s), storefront sidewalk(s) and ramps(s), fencing, concrete stoops at the exit(s), pipe guards, excavation and re-compaction at the truck well, utilities from within 5' outside the building and their connection will be stated as a separate lump-sum price of:

_____ CAD Dollars (\$ _____)

(Including GST or HST)

The undersigned agrees to construct this Project for a total lump sum price of:

_____ CAD Dollars (\$ _____)

(Including GST or HST)

The base bid may be increased or decreased in accordance with the following alternate bids as may be selected by the Owner and PETSMART for the added or deducted costs listed. (See Section 01010.3)

The maximum amount for profit and overhead (excluding sales tax) to be charged the OWNER AND PETSMART on Contract Sum and Change Orders shall be as follows:

For the GENERAL CONTRACTOR; for any work performed by his own forces:

10% of the cost of labor and materials.

For the GENERAL CONTRACTOR; for any work performed by his subcontractor:

5% of the amount due the Contractor.

For each subcontractor involved; for any work performed by that subcontractor's own forces:

10% of the cost of labor and materials.

The allowed mark up percentage shall be figured on one line, one time.

The Bonding Company proposed for use on this construction project is:

NAME: _____

ADDRESS: _____

RATING: _____

I / WE will submit Subcontractor listing within 48 (2 working days) hours of Bid Opening.

The above noted pricing and terms are hereby agreed to for the construction of this project as defined by the Bid Documents.

DATE: _____

CONTRACTOR: _____

BY: _____

TITLE: _____

SEAL, IF CORPORATION: _____

ADDRESS: _____

TELEPHONE NO.: _____

LICENSE NO.: _____

SURETY: _____

NOTICE: Bidders shall indicate all items of cost in the *Bid Proposal Form* and *Schedule of Values* or the proposal will be subject to disqualification.

NAME OF CONTRACTOR:

TO:

GENTLEMEN:

Having carefully examined the Invitation to Bid, the Instructions to Bidders, the Contract, the Geotechnical Report (if provided) prepared by _____, dated _____, the Plans and Project Manual prepared by _____, any special provisions, the Bid Proposal Form, and any Addenda issued prior to submittal of the proposal for the construction of the above referenced project and having ascertained all of the conditions affecting the proposed work, and having inspected the site, we do hereby propose to furnish all supervision, labor and materials, transportation, services and equipment necessary for and/or reasonably incidental to the construction and proper completion of the entire scope of work called for by the above-named documents hereinafter referred to as the “Base Bid”.

Name of Person Who Inspected the Site

Date of Inspection

A. BASE BID AMOUNT (includes allowances and premium cost of bond)

_____ CAD Dollars (\$_____) (Including GST or HST)

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PART IV:

BID SCHEDULE OF VALUES: BUILDING COST

PETSMART Store No. XXXX

PETSMART STORE NO. & CITY:

GENERAL CONTRACTOR:

BID DATE:

PART IV: BID SCHEDULE OF VALUES - BUILDING COST

CAN - Form Version 5 Updated 2.22.22

PetSmart Store Number & City:			General Contractor:
Bid Date:			
Section	Description	Required Vendor (must show cost for each required vendor)	Cost CAD
	DEMOLITION		\$0.00
	SECURITY GUARD		\$0.00
	TESTING / SPECIAL INSPECTIONS		\$0.00
	GENERAL CONDITIONS BREAKDOWN		See Below
	PROJECT MANAGER		\$0.00
	SITE SUPERINTENDENT		\$0.00
	EQUIPMENT RENTALS		\$0.00
	PORT-A-JOHN RENTAL		\$0.00
	SITE SUPER SUPPLIES / CELL PHONE		\$0.00
	DUMPSTERS		\$0.00
	GENERAL AND FINAL CLEANING		\$0.00
	BARRICADES / PORT-A-JOHN FENCE		\$0.00
	TEMPORARY UTILITIES, GAS, WATER, ELECTRIC		\$0.00
	CONTRACTOR'S FEE		\$0.00
	PERMITS		\$0.00
	BOUND FEES		\$0.00
	LIABILITY INSURANCE		\$0.00
	BUILDERS WORKMANSHIP		\$0.00
3300	JOINTING CONCRETE - CAST IN PLACE		\$0.00
3300	CONCRETE FLOORING SYSTEM	See Drawing F2.0 For List	\$0.00
3930	JOINT FILLING		\$0.00
4810	REINFORCED CONCRETE MASONRY		\$0.00
5120	STRUCTURAL STEEL	Canam Steel	\$0.00
5210	STEEL JOIST & JOIST GIRDERS	Canam Steel	\$0.00
5310	METAL ROOF DECK	Canam Steel	\$0.00
5400	COLD FORMED STEEL FRAMING		\$0.00
5500	METAL FABRICATION		\$0.00
5520	STEEL RAILINGS AND HANDRAILS		\$0.00
6100	CARPENTRY (ROUGH & FINISH)		\$0.00
6100	INTERIOR CART BUMPER STORAGE	Alvarado	\$0.00
6100	EXTERIOR CART CORRALS	National Cart	\$0.00
6402	INTERIOR ARCHITECTURAL WOODWORK	AFI	\$0.00
7190	WATER REPELLENTS		\$0.00
7210	BUILDING INSULATION		\$0.00
7240	EXTERIOR INSULATION AND FINISH SYSTEM		\$0.00
7540	MEMBRANE ROOFING SYSTEM		\$0.00
7620	SHEET METAL FLASHING AND TRIM		\$0.00
7720	ROOF ACCESSORIES		\$0.00
7842	FIRE-RESISTIVE JOINT SYSTEMS		\$0.00
7920	JOINT SEALANTS		\$0.00
8110	HOLLOW METAL DOORS AND FRAMES	Cook & Boardman	\$0.00
8111	PRE-FINISHED FRAMES	Cook & Boardman	\$0.00
8210	WOOD DOORS	Cook & Boardman	\$0.00
8310	IMPACT DOORS	Senneca	\$0.00
8311	ACCESS DOORS AND FRAMES		\$0.00
8363	SECTIONAL OVERHEAD DOOR	Blue Giant	\$0.00
8411	ALUMINUM FRAMED ENTRANCES AND STOREFRONTS	American Direct	\$0.00

8450	ALL GLASS STOREFRONT (PETSHOTEL ONLY)		\$0.00
8461	SLIDING AUTOMATIC ENTRANCE DOORS	Assa Abloy	\$0.00
8710	FINISH HARDWARE	Cook & Boardman	\$0.00
8800	GLAZING		\$0.00
9260	GYPSUM BOARD ASSEMBLIES		\$0.00
9310	CERAMIC WALL / FLOOR TILE AND BASE		\$0.00
9511	ACOUSTICAL PANEL CEILINGS		\$0.00
9651	WALLBASE		\$0.00
XXXX	RESILIENT FLOOR TILE & LVT (IF APPLICABLE)		\$0.00
XXXX	RESINOUS FLOORING (IF APPLICABLE)		\$0.00
9721	WALL PANEL COVERING		\$0.00
9910	PAINTING		\$0.00
10200	LOUVERS AND VENTS		\$0.00
10285	IMPACT RESILIENT WALL PROTECTION	Contract Specialties	\$0.00
10800	TOILET AND BATH ACCESSORIES	HJC	\$0.00
11160	LOADING DOCK EQUIPMENT	W. H. Smith	\$0.00
15100	PLUMBING		\$0.00
XXXX	WASHER & DRYER - HOTEL/DAYCAMP (IF APPLICABLE)	W. H. Smith	\$0.00
15100	UNDER COUNTER SANITIZER - (IF APPLICABLE)	HJC	\$0.00
15100	PLUMBING FIXTURES, FLOOR MOUNTED	HJC	\$0.00
15200	HVAC		\$0.00
15204	HVAC EQUIPMENT	Lennox	\$0.00
15204	HVAC THERMOSTAT AND BALANCE	Dynamic Flow	\$0.00
15300	CHILLER/COIL SYSTEM		\$0.00
16000	BUILDING AUTOMATION - ZONE TEMPERATURE CONTROL	Nexrev	\$0.00
16010	ELECTRICAL		\$0.00
16010	ELECTRICAL SWITCHGEAR	Villa or Hill Phoenix	\$0.00
16500	WIRING	Graybar	\$0.00
16720	INTRUSION ALARM SYSTEM	ADT	\$0.00
16720	INTRUSION ALARM SYSTEM	ADT	\$0.00
Total Building Cost			\$0.00

Add bid alternates and/or itemized scope items in this section		
	USGN LICENSE FEE \$1,600.00 USD (WHEN APPLICABLE)	\$0.00
	FIRE PLAN	\$0.00
	ROLLER SHADES	\$0.00
	EXCLUDER DOOR SWEEPS	\$0.00
	COMING SOON BANNER	\$0.00
		\$0.00
		\$0.00
Total Extra Cost		\$0.00

TOTAL BUILDING COST	\$0.00
TOTAL EXTRA COST	\$0.00
GRAND TOTAL	\$0.00

END OF SECTION

This attachment to the *Proposal Form* shall be submitted to THE OWNER AND PETSMART.

Each envelope shall bear the name of the GENERAL CONTRACTOR making submittal with identification of contents contained therein. The GENERAL CONTRACTOR must list below the names of all qualified Subcontractors or suppliers he will employ for the various portions of the work indicated. Failure on the part of the GENERAL CONTRACTOR to complete or properly complete this list will constitute sufficient grounds to reject his bid. The GENERAL CONTRACTOR may list ITS OWN FORCES to perform one or more of the listed categories of work for which THE GENERAL CONTRACTOR has any requisite provincial licenses when required. In this case, all personnel performing such work at the site shall be carried on his THE GENERAL CONTRACTOR'S payroll, except AT THE GENERAL CONTRACTOR'S OPTION those portions of the work which are traditionally and commonly sublet by the representative Subcontractor in the community. If equipment is leased with operators, the operators need not be carried on the GENERAL CONTRACTOR'S payroll.

List only a single name and phone number for each listing. List names only for Base Bid as per your Proposal.

DESCRIPTION	WARRANTY	SUBCONTRACTOR'S NAME	TELEPHONE NO.
Asphalt Paving	1 Year		
Concrete	1 Year		
Masonry	1 Year		
Structural Metal	1 Year		
Carpentry	1 Year		
Steel Erector	1 Year		
Building Insulation	1 Year		
Roofing	5 Years		
Caulking & Sealant	5 Years		
Hollow Metal Doors & Frames	1 Year		
Aluminum Doors & Frames	2 Years		
Wood Doors	Life of Install.		
Overhead Doors	1 Year		
Finish Hardware	2 Years		
Glass & Glazing	1 Year		
Gypsum Wallboard/Framing	1 Year		
E.I.F.S.	10 Years		
Acoustical Treatment	1 Year		
Resilient Flooring	1 Year		
Painting	1 Year		
Dock Facilities	1 Year		
Mechanical/Sheet Metal	2 Years 5 Yrs Compressor		
Plumbing	2 Years		
Fire Sprinkler System	2 Years		
Electrical	2 Years		

Signed _____ (Contractor)

END OF SECTION

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The General Conditions for this project shall be based on AIA Document A201, 1997 edition.

The following supplementary general conditions have been based on AIA Document A201, 1997 edition.

END OF SECTION

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DESIGNER NOTE:

This Supplemental General Conditions section is for Petsmart issued bids (Petsmart capital projects)

The following supplements, modifies, deletes and/or adds to the PETsMART Contract documents. Where any article, paragraph or subparagraph in the General Conditions is supplemented by one of the following paragraphs, the provisions of such article, paragraph or subparagraph shall remain in effect and the supplementary provisions shall be considered as added thereto. Where any Article, paragraph or subparagraph in the General Conditions is amended, voided or superseded by any of the following paragraphs, the provisions of such Article, paragraph or subparagraph not so amended or voided or superseded shall remain in effect. In the event of any conflict with such General Conditions, the provision of these Supplemental General Conditions will prevail.

1.1.1. Change first sentence to read as follows:

"1.1.1 The Contract Documents consist of the Project Manual including Advertisement or Invitation to Bid, the Instructions to Bidders, THE SUPPLEMENTARY INSTRUCTIONS TO BIDDERS (IB), the Proposal form, the Subcontractor List Form, the Construction Contract, the Conditions of the Contract (General and Supplementary), the Technical Specifications, the Drawings, all pre-bid Addenda issued and all Change Orders issued after execution of the Contract."

1.2 Add the following:

"1.2.6 Execute work as per Contract Documents. Make no changes therefrom without having first received written permission FROM THE PROFESSIONAL OF RECORD. Where detailed information is lacking, before proceeding with work, refer matter to the Professional of Record for information."

"1.2.7 If the Contractor observes any errors, discrepancies or omissions in the Contract Documents, he shall promptly notify the Professional of Record, requesting clarification. If the Contractor proceeds with work affected by such errors, discrepancies or omissions without receiving such clarification, he does so at his own risk, but not limited to coordination to fixture plan (F1), MEP and Architectural. Any adjustments involving such circumstances made by the Contractor, prior to approval by the Professional of Record, shall be at the Contractor's risk and the settlement of any complications or disputes arising therefrom shall be at the Contractor's sole expense."

"1.2.8 In general, the Drawings indicate dimensions, positions and details of construction; the PROJECT MANUAL describes

qualities of material and methods of workmanship. All work described in the PROJECT MANUAL shown on the drawings and all work dependent upon or necessary, shall be executed in a quality workmanlike manner and shall be of the materials best adapted to the purpose where such work or materials are not specifically mentioned."

"1.2.9 Should conflicts occur in or between Drawings and PROJECT MANUAL the Contractor is deemed to have estimated on the more expensive way unless he has asked for and obtained additional written instructions from the Professional of Record before submission of the contractor's proposal as to which method or materials will be required."

"1.2.10 All work and materials shall be the best of the respective kinds specified and indicated. Should any workmanship or materials be required which are not directly or indirectly called for in the PROJECT MANUAL and/or shown on the drawings, but which are necessary for proper fulfillment of the obvious intent thereof, said workmanship or materials shall be the same as similar parts that are detailed, indicated or specified, and the Contractor shall understand the same to be implied and provide for it in his proposal as fully as if it were particularly described or delineated."

1.3 Delete in its entirety and insert the following:

"The use of the Contract Documents shall be restricted to the original site for which they were prepared and publication thereof is expressly limited to such use. Reuse, reproduction or publication by any method, in whole or in part, is prohibited. Title to the Contract Documents remains with the Professional of Record and PETsMART without prejudice. Visual contact with the Contract Documents shall constitute prima facie evidence of the acceptance of these restrictions."

2.2.1 Delete in its entirety.

2.2.2 Delete in its entirety.

2.2.3 Delete in its entirety.

2.2.5 Delete in its entirety.

2.3.1 Delete "persistently" from paragraph.

2.4.1 Delete "after such seven-day period give the Contractor ... If the Contractor... deficiencies the Owner may," Delete fourth sentence in its entirety.

3.2 Add the following:

"The Contractors shall notify the Professional of Record or Owner, in writing, at or before the time of submitting his proposal, of any discrepancies between the Contract Documents and the existing Conditions at the site, and he shall make his proposal conform to the intent of the Contract Documents, without additional cost to the Owner."

"3.2.4 Neither the Owner nor the Professional of Record assume any responsibility for an understanding or representation made by any of their agents or representatives prior to the execution of the Agreement unless (1) such understandings or representation are made by any of their agents or representatives in written form prior to the execution of the agreement unless and such understandings or representations are expressly stated in the Agreement, and (2) the Agreement expressly provides that responsibility therefore is assumed by the Owner."

"3.2.5 Maps, soil investigation reports and similar reference data made available to the Contractor are given for the Contractor's information only, and neither the Owner nor the Professional of Record assume any responsibility for conclusions the Contractor may draw therefrom."

"3.2.6 Failure of the Contractor to acquaint himself with all available information concerning these Conditions will not relieve him from responsibility for estimating properly the difficulty or cost of successfully performing the work."

3.3.3 Add the following:

"Neither the presence or absence of the Owner or the Professional of Record, nor their authorized representatives, shall relieve the Contractor from any requirements herein."

3.4 Add the following:

"3.4.3 When requested by the Professional of Record, the Contractor shall deliver to the Professional of Record, (prior to final acceptance of the work as a whole) signed certificates from suppliers of materials and manufactured items stating that such items conform to the Contract Documents."

"3.4.4 The Contractor, immediately upon award of the Contract (or where Shop drawings, Product data or samples, etc., are required, immediately upon receipt of reviewed submittals thereof) shall place orders for all materials, work, fabrication and/or equipment to be incorporated in the work. The Contractor shall keep the Professional of Record informed as to the availability of all materials, work, fabrications and/or equipment specified and to advise the Professional of Record promptly, in writing, of all orders placed and of such material, work, fabrication and/or equipment which may not be available for the purposes of completing the Contract."

"3.4.5 Labor shall be performed in best quality and most workmanlike manner, by mechanics skilled in their respective trades. Standards for work required throughout shall be of such grade as will result in first-class work."

"3.4.6 Mechanics whose work is unsatisfactory to the Owner or the Professional of Record or is considered by the Owner or Professional of Record to be careless, incompetent, unskilled or otherwise objectionable shall be dismissed from work under the Contract upon written notice from Owner or Professional of Record."

3.5.1 Change fourth sentence to read as follows:

"If required by the Professional of Record or by the Owner, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment."

3.7.4 Delete "Knowing it to be" from paragraph. Add the following:

"3.7.5 The Contractor shall, before commencing work, verify all grades, lines, levels and dimensions shown on the drawings and shall report any errors or inconsistencies to the Professional of Record. The Contractor shall not proceed until such errors or inconsistencies are corrected."

"3.7.6 The Contractor shall establish and maintain all buildings and construction grades, lines, levels and benchmarks and shall be responsible for accuracy and protection of same. This work shall be performed by a licensed civil engineer or surveyor."

"3.7.7 The Contractor shall protect all temporary benchmarks and maintain them in place for duration of the Contract or until such time as their removal does not affect completion of the Project."

"3.7.8 The Contractor shall not remove any property line markers or monuments or data established by the Owner. If such are damaged or removed, the Contractor shall bear cost of replacement."

3.9.1 Delete first sentence and insert the following:

"The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project Site on a full-time basis during the progress of the work. The superintendent shall not divide his duties or responsibilities among any other projects that are not a specific portion of this agreement."

3.10.1 Change "information" to read "approval".

3.13.1 Add the following:

	"The Contractor shall be liable for any and all damage caused by him to the Owner's premises. The Contractor shall hold and save the Owner, his agents and representatives, free and harmless from liability of any nature or any kind arising from any use, trespass or damage occasioned by his operations on premises or third persons."		Requests and Article 7. Professional of Record may authorize minor changes in the work as provided in Paragraph 7.4."
3.14	Add the following: "3.14.3 In all cases exercise extreme care in cutting operations, and perform such operations under adequate supervision by competent mechanics skilled in the applicable trade. Openings shall be neatly cut and shall be kept as small as possible to avoid unnecessary damage. Careless and/or avoidable cutting, damage, etc., will not be tolerated, and the Contractor shall be held responsible for such avoidable or willful damage." "3.14.4 All replacing, patching and repairing of all materials and surfaces cut or damaged in the execution of the work shall be performed by experienced mechanics of the several trades involved. Such replacing, repairing and/or patching shall be done with the applicable materials, in such a manner that all surfaces so replaced, etc., will, upon completion of the work, match the surrounding similar surfaces."	4.2.12	Add the following: "If work is required in a manner to make it impossible to produce first class work, or should discrepancies appear among Contract Documents, the Contractor shall request interpretation before proceeding with work."
		4.2.13	Delete in its entirety.
		4.5	Delete in its entirety.
		5.2.1	Delete second and third sentence.
		5.2.2	Delete "or the Professional of Record" and "reasonable and timely" from first sentence.
		5.2.3	Delete "or the Professional of Record" and "reasonable" from paragraph. Add the following: "The provisions of this subparagraph providing for adjustment of price shall not apply if the Contractor has proposed a subcontractor unqualified under any applicable provincial law."
3.16.1	Add the following: "The Contractor shall provide facilities for such access without charge to the Owner so the Professional of Record may perform his functions under the Contract Documents."	6.1.3	Delete in its entirety and insert the following: "The Contractor shall provide for the coordination of the work of the Owner's forces and of each separate contractor with the work of the Contractor."
4.1.1	Add the following: "In the Contract Documents, the term Professional of Record refers to PROFESSIONAL OF RECORD and it shall be understood to their acting through any of their personnel or consultants duly authorized to act for them."	6.2.2	Add "and the Owner" after "Professional of Record".
4.1.2	Delete in its entirety.	Article 7	Change all references to "Construction Change Directive" to "PETSMART fieldwork order" throughout Article 7.* *All references to "Owner" shall be deemed to mean "PETSMART" throughout Article 7 whether or not PETSMART is the contracting party.
4.1.3	Delete in its entirety.		
4.1.4	Delete in its entirety.		
4.2.1	Change third sentence to read as follows: "The Owner's instructions to the Contractor shall be forwarded through the Professional of Record or as the Owner otherwise elects, in which case the Owner accepts full responsibility with the Contractor for the instructions given."	7.1.2	Delete in its entirety.
4.2.8	Delete in its entirety and insert the following: "The Professional of Record will prepare proposal requests. Contractor to prepare Change Orders based on Proposal	7.2.1	Substitute "the Contractor" for "the Professional of Record".** ** Add "on the enclosed form" after the word "prepared" in the first sentence.
		7.3.1	Change first reference to "Professional of Record" to "Owner" and delete second reference.***

*** Add “and shall be prepared on the enclosed sample” to the end of the first sentence.

7.3.4 Change “Professional of Record” to “Owner”.

7.3.3.5 Add the following:

"All change order directives shall be referenced to account numbers as shown on Schedule of Values."

7.3.6 Change “Professional of Record” to “Owner”.

7.3.7 Change “Professional of Record” to “Owner”.

7.3.9 Delete the words “made by the Professional of Record”.

7.4 Delete in its entirety.

8.1.3 Add "and certificate of occupancy or equivalent has been issued by the applicable governmental agency." to end of paragraph.

8.3.1.2 Adverse weather conditions shall be defined as weather extremes (precipitation, temperature and/or winds) which prohibit any type of construction activity scheduled during the time of adverse weather that exceeds the ten year average.

8.3.2.1 Requests for extensions of construction time due to adverse weather conditions shall include U.S. Weather Bureau Climatological Reports, for the time involved, from the nearest reporting station. Extensions of time may be requested for any month of construction for days lost due to adverse weather that exceeds the ten year average.

9.2.1 Add "and the Owner" after "Professional of Record" to paragraph.

9.3 Add the following:

"9.3.1 Application for Payment shall be made on PETsMART Contract "Application and certificate for Payment", (2 copies) utilizing complete provisions provided by the form. Provide signature space for Owner's approval."

"9.3.2.1 The Contractor agrees to accompany all payment requests, except the first, with unconditional lien waivers from all subcontractors and material men pertaining to all the work performed and all materials provided with respect to previous payments received by Contractor. The Contractor further agrees that each subcontract (which, for the purpose of this paragraph, includes both contracts with subcontractors and material men) shall contain an express provision, satisfactory in form and content to the Owner, whereby such subcontractor or material

men expressly agrees that, for the benefits of the Owner, it waives all rights to file mechanics liens with respect to any unpaid services or materials provided by it, as specified by current Provincial statutes. Such subcontractor or material men shall give written notice to the Owner of such non-payment for such materials and services, which notice shall include a specific detail listing of the services and materials with respect to which payment has not been made. The Contractor further agrees that the Owner shall have the right to issue checks made jointly payable to the Contractor and any subcontractor or material men claiming not to have been paid for services or materials provided for which Contractor has been paid. If any liens are filed against the Owner's property, the Owner and/or PETsMART may, at their option, require the Contractor to immediately provide a bond in accordance with Provincial requirements. Final lien waivers, stating "Unconditional Upon Final Payment", from all subcontractors and material men shall accompany the final payment request prior to approval for release of construction retention funds.

9.5.1 Subparagraph .1 - Change to read:

".1 Defective work not remedied, or failure to begin remedial action within 5 days following written notification."

Subparagraph .7 - Delete "persistent" from sentence.

9.7.1 Add "and if such failure has not been corrected within seven (7) calendar days after notice there of is given to the Owner and Professional of Record," after "payment" third line of paragraph.

9.8.2 Add "and the Owner" after "Professional of Record" to the first sentence.

9.8.3 Delete in its entirety.

PARAGRAPH 9.8 - SUBSTANTIAL COMPLETION: Add the following new subparagraph 9.8.4:

"9.8.4 The Contractor shall reimburse the Owner by deductive Change Order, for the Professional of Record's additional services made necessary by the Contractor's failure to finally complete the work within twenty (20) days from substantial completion".

9.10.1 Add "or Owner" following: ". . . Payment, the Professional of Record" and " when the Professional of Record".

9.10.2 Revise to the following: ". . . to indemnify the Owner against such lien" to read ". . . to indemnify the Owner against such

lien as a condition precedent to receiving any further payment on account of the work of such contractor."

"9.10.2.1 Neither the final payment nor the remaining retained percentage shall become due, until after all requirements, listed in Section 01700 Contract Closeout, have been 100% completed."

- 9.10.3 Add the following: "Except those arising from:
1. Unsettled liens,
 2. Faulty or defective Work appearing after Substantial Completion,
 3. Failure of the Work to comply with the requirements of the Contract Documents, or
 4. Terms of any special warranties required by the Contract Documents."

- 10.1.3 Add the following: ". . . except as otherwise provided in the Contract Documents."

- 10.2 Add the following:
- "10.2.8 The Contractor shall be responsible for all existing structure and/or improvements, both above and underground, including the finishes thereof (both exterior and interior) within the adjoining working areas, and shall provide adequate protection therefore, either by barricades, covering or by temporary removal. Any existing structures and/or improvements damaged during construction shall be repaired and/or improvements damaged during construction shall be repaired and/or replaced with materials, workmanship, fixtures or equipment of the same kind, quality and size as required by the Contract Documents. Any materials or equipment temporarily removed and damaged shall be re-erected or installed in an approved manner."

ARTICLE II - INSURANCE & BONDS:

Paragraph 11.1 - CONTRACTOR'S LIABILITY INSURANCE: Delete subparagraph 11.1.1 in its entirety and insert the following:

"11.1.1 Do not commence work until required insurance has been obtained and paid for, nor until insurance policies have been approved by Owner as to a company or companies licensed to do business in the province in which the project is located, amount and coverage form (contractor's insurance carrier must be an "A" A.M. Best rated carrier.) Do not permit any subcontractor to commence work on

subcontract until such insurance has been so obtained and has been approved by the Owner.

The Contractor shall furnish the Owner certificate evidencing such insurance, list PETsMART, Inc. and its subsidiaries as an additional insured on all policies required and shall arrange with each insurance company to give PETsMART thirty days notice of all renewals, cancellations and major changes in the policies.

Furnish one copy of Certificates herein required for each copy of the Agreements' specifically set forth and evidence of all coverage required by Subparagraph 11.1 and 11.2. The form of the Certificates shall be in conformance with the enclosed sample. Furnish to Owner's agent as shown below copies of any endorsements that are subsequently issued amending coverage or limits:

Acordia of Arizona
3020 E. Camelback Road, #200
Phoenix, AZ 85016

Attn: PETsMART Rick Management

"11.1.2.1 The insurance required by Subparagraph 11.1.1 shall be written for not less than the following, or greater if required by law:

1. Worker's Compensation:

Provincial Statutory		
Applicable Federal		Statutory
Employer's Liability	\$ 500,000 / \$500,000 / \$500,000	
2. Comprehensive general Liability (including Premises-Operation; (Contingent Liability, Contractual Liability, Independent Contractor's Protection; and Products and Completed Operation)"

Bodily Injury	\$1,000,000	Each Occurrence
	\$2,000,000	Annual Aggregate
Property Damage	\$1,000,000	Each Occurrence
	\$2,000,000	Annual Aggregate

Products and completed operations to be maintained insured for two years after final completion.

Property Damage Liability Insurance will provide X, C, or U coverage as applicable.
3. Contractual Liability:

Bodily Injury	\$1,000,000	Each Occurrence
	\$2,000,000	Annual Aggregate
Property Damage	\$1,000,000	Each Occurrence
	\$2,000,000	Annual Aggregate

4.	Personal Injury, with Employment exclusion deleted: \$1,000,000 Annual Aggregate		
5.	Comprehensive Automobile Liability: \$1,000,000 Combined Single Limit		
6.	The Contractor shall provide the limits of liability by a combination of the above described policy forms and an Umbrella Excess Liability policy. Contractor's excess liability, umbrella form, bodily injury and property damage combined: \$1,000,000 Each Occurrence \$1,000,000 Aggregate		installed fixtures and equipment, less cost of site preparation and excavation. A policy deductible clause not exceeding two hundred fifty dollars (\$250.00) shall be permissible and such deductible shall be borne by the Contractor. Policy shall specifically permit beneficial occupancy, by PETSMART prior to completion or acceptance of the work.” “11.3.1.1 The form of policy for this coverage shall be "Completed Value". “11.3.1.2 If by terms of this insurance any mandatory deductibles are required, or if the Contractor should elect, with the concurrence of the Owner, to increase the mandatory deductible amounts or purchase this insurance with voluntary deductible amounts, the Contractor shall be responsible for payment of the amount of the deductible in the event of a paid claim.”
11.1.3.1	The Contractor shall, prior to starting work, furnish one copy of Certificates herein required for each copy of the Agreement which shall specifically set forth evidence of all coverage required by Subparagraph 11.1.1, 11.1.2 and 11.1.3. The form of the Certificate shall be in conformance with the enclosed sample. The Contractor shall furnish to the Owner copies of any endorsements that are subsequently issued amending coverage or limits.		
	Delete existing 11.2.1 and substitute the following: “11.2.1 The Contractor shall be responsible for purchasing and maintaining Owner's Liability insurance with the same limits as Contractor's Comprehensive General Liability. Including; Bodily Injury, Property Damage and Personal Injury. (Broad Form Property Damage Endorsements).”	11.3.4	Delete subparagraph in its entirety and substitute the following: “The contractor shall file two certified copies of all policies with the Owner before exposure to loss can occur. If the Owner is damaged by the failure of the Contractor to maintain such insurance and to so notify the Owner, then the Contractor shall bear all reasonable costs properly attributable thereto. The Contractor shall not commence work until he has received a copy of such policies.”
		11.3.6	Delete in its entirety.
		11.3.9	Delete in its entirety.
	PARAGRAPH 11.3 - PROPERTY INSURANCE: Delete subparagraph 11.3.1, 11.3.1.1, 11.3.1.2, 11.3.1.3 in its entirety and insert the following: “11.3.1 The Contractor shall purchase and maintain Builders Risk Policy issued to contractor and Owner and shall include interest of subcontractors and such insurance shall cover all work in the course of construction including temporary structures and materials used in construction at the job site and while awaiting installation, including storage and transit to the site of materials, paid for by the Owner including the Owner's installed fixtures and equipment. The Policy shall insure all risks of direct physical loss or damage from any external cause subject to policy terms conditions and exclusions and the policy will not cover vehicles, property, while waterborne, trees, shrubs, plants or grass, plans, specifications, blueprints, or contractor's tools or equipment of any kind. (Fixtures and Equipment insured value \$300,000.00.) The amount of insurance provided shall not be less than the final completed value of the project, including the Owner's	11.4	Performance Bond and Labor and Material Payment Bond: Add the following subparagraphs to this article: "11.4.3 The Contractor is required, as a condition precedent of the execution of the Contract, to furnish bond in a penal sum of one hundred percent (100%) of the total amount payable by the terms of the Contract and pay all premiums for such bonds." "11.4.4. Bonds shall be in accordance with Provincial Requirements with amount shown equal to 100% of the total amount payable by terms of the Contract. Surety shall be company licensed to do business in province in which work is located and shall be acceptable to Owner. Bond amount shall be increased to include any Change Order added to the Contract to 100% total value amount of each Change Order. Bond limitations shall be one year except where provincial laws and statutes require additional time limitations."
		12.1.1	Add "or the Owner's" after "Professional of Record's" to paragraph.
		12.1.2	Add "or the Owner" after "Professional of Record" to paragraph.

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| <p>12.3.1 Add the following: "Nonconforming work shall be deemed accepted only if the Owner does so expressly and in writing." to paragraph.</p> <p>13.1 Add the following:</p> <p style="padding-left: 40px;">"13.1.2 Nothing contained in the Contract Documents shall be construed as authority for violation by the Contractor of any applicable codes or ordinances which shall take full and complete precedence of anything herein contained to the contrary."</p> <p style="padding-left: 40px;">"13.1.3 In the event that the building inspector or other public official requires that additional work be done or that the work under the Contract Documents be modified in any way, the Contractor shall notify the Professional of Record and the Owner in writing of the requested change. The Professional of Record will review the requested change with the Owner and advise the Contractor in writing. Any such work performed without written permission shall be at the expense of the Contractor performing such work."</p> <p>13.2.2.1 Repair all defects and/or damage resulting from faults in workmanship or materials that develop during specified guarantee periods. Disruption of store business shall not be permitted. Contractor shall complete repair work entirely at his own expense within five days of receipt of written notice. General Contractor must coordinate work schedules with PETsMART prior to commencement of any repair and/or warranty work.</p> <p>13.2.2.2 <u>Emergency / Warranty repairs</u> - Note: Telephone communication will constitute official notification. This will be followed up by written notification. Failure to respond within one hour gives the Owner and/or PETsMART the right to have repair work performed. Charges for that work shall be billed to the General Contractor upon completion of any warranty and/or repair work. The General Contractor shall notify PETsMART in writing when the work is completed.</p> <p>13.5.1 Add "and the Owner" after "Professional of Record" to paragraph.</p> <p>13.5.2 Add "and the Owner" after "Professional of Record" to paragraph.</p> | <p>14.1.1.5 Add ". . . and such condition is not corrected promptly after written notice there of is given to Owner and Professional of Record", after "contractor" to paragraph.</p> <p>14.1.2 Delete the words "and damages" at the end of this paragraph.</p> <p>14.2.1.1 Delete "persistently or repeatedly".</p> <p>14.2.1.3 Delete "persistently".</p> <p>14.2.1.4 Delete "substantial".</p> <p>14.2.2 Delete "upon certification by the Professional of Record that sufficient cause exists to justify such action".</p> |
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END OF SECTION

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DESIGNER NOTE:

This Section and onwards is to be used regardless of build to suit (Landlord Bid) or Capital projects (Petsmart Bid)

PART I – GENERAL**WORK INCLUDED**

The work under the Base Bid of the Contract/Proposal shall include all work indicated or specified within the construction limit lines unless the work is specifically indicated as "Not In Contract", "By PETSMART", "By Others". Also, included is all work which may be necessary to provide and connect all water & fire lines, gas, sewer, telephone, and electrical service to the building site, including replacement of paving to meet the requirements of governmental authorities. All utilities are to be extended to a minimum 5 feet outside of building and connected to site utilities.

Work of this project to meet the seismic requirements of the local jurisdiction. This includes, but is not limited to interior walls, ceilings and supports.

SPECIFICATIONS

- In the preparation of the Project Manual an effort has been made to segregate the various branches of the work under headings, by trades. This is done only for convenience and shall not relieve the General Contractor of the responsibility of furnishing every item indicated or specified whether properly segregated or not.
- No responsibility will be assumed by the Owner/PETSMART or the Professional of Record for omissions or duplications by the General Contractor in the completion of the Contract due to any alleged error in the arrangement of the material in the Project Manual nor shall any such segregation of work and materials operate to make the Professional of Record an arbiter in defining limits to the Agreements between the General Contractor and his Subcontractors or Suppliers.
- The misplacement, addition or omission of any letter, word or punctuation, or lack of capitalization of a word, shall in no way damage the true spirit, intent, or meaning of these Specifications.
- The word "shown", "indicated", "noted", "scheduled", or words of like effect shall be understood to mean that reference is made to the Drawings accompanying these Specifications.
- Where reference herein is made to colors or finishes "as selected" the reference is to the Professional of Record.
- Reference to known standards within the Project Manual shall mean and intend the latest edition or amendment published prior to the date of this Project Manual, unless specifically specified otherwise, and to such portions of it that relate and apply directly to the material or installation called for on the Project.

DISPOSITION OF UTILITIES

Observe rules and regulations governing the respective utilities in executing all work under this heading.

Adequately protect active utilities from damage, and remove or relocate only as indicated or specified.

Remove, plug or cap inactive and abandoned utilities encountered during the work.

ARCHITECTURAL AND ENGINEERING SERVICES

It is understood that normal architectural and engineering liaison for the purpose of interpretation of the Construction Documents is provided for by the Owner and PETSMART. Should any services of the Professional of Record be required to assist in the corrections of errors or omissions in construction by the General Contractor, or services of the Professional of Record be required because of changes in structure or equipment where the General Contractor has requested approval of substitute methods or materials, these services will be provided by the Professional of Record at his standard hourly rates, and shall be paid for by the General Contractor in advance.

SAFETY REQUIREMENTS

These Construction Documents, and the joint and several phases of construction hereby contemplated are to be governed, at all times, by applicable provisions of the federal laws, including but not limited to, the latest amendments of the following:

- Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations. (SOR/86-304) – Latest Edition
- Health Canada/Workplace Hazardous Materials Information System (WHMIS), Material Safety Data Sheets (MSDS).
- Province of Alberta, Occupational Health and Safety Act, R.S.A. 2000 - Latest Edition
- Province of British Columbia, Workers Compensation Act, RSBC 1996 - Latest Edition
- Province of Manitoba, The Workers Compensation Act RSM 1987/C.S.S.M. c.W-200 - Latest Edition
- Province of New Brunswick, Occupational Health and Safety Act, S.N.B. 1983. - Latest Edition
- Province of Newfoundland and Labrador, Occupational Health and Safety Act, R.S.N.C. 1990 - Latest Edition
- Northwest Territories and Nunavut, Safety Act, R.S.N.W.T. 1988 - Latest Edition
- Province of Nova Scotia, Occupational Health and Safety Act, S.N.S. 1996 - Latest Edition
- Province of Ontario, Occupational Health and Safety Act, R.S.O. 1990 Latest Edition
- Province of Prince Edward Island, Occupational Health and Safety Act, R.S.P.E.I. 1988 - Latest Edition

- Province of Quebec, An Act Respecting Occupational Health and Safety, R.S.Q. 1997 -Latest Edition.
- Province of Saskatchewan, Occupational Health and Safety Act, 1993, S.S. Latest Edition.
- Yukon Territory, Occupational Health and Safety Act, R.S.Y. 2002, c159.

CONTRACTORS LICENSE LAW

General Contractor shall comply with, and require all Subcontractors to comply with, Provincial and Municipal Contractor's license laws and be duly registered and licensed thereunder.

APPROVED APPLICATORS

Where specific instructions in these specifications require that a particular product and/or material(s) be installed and/or applied by an approved applicator of the manufacturer, it shall be the General Contractor's responsibility to ensure that any Subcontractors used for such work be approved applicators.

WATERTIGHT-WEATHERTIGHT

Anything in the Construction Documents not withstanding, the General Contractor accepts the responsibility of constructing a watertight, weathertight project.

EXTRA WORK

1. In accordance with the General Conditions and when authorized in writing by the PETSMART Representative, extra work may be ordered. Claims for additional compensation, on account of extra work done, will not be recognized unless such extra work has been authorized in advance and writing by the PETSMART Representative. Costs must be submitted to PETSMART within two weeks of change request.
2. The Contractor shall perform such extra work and charge the Owner and/or PETSMART at actual cost of labor and materials on the approval of Owner and/or PETSMART or at an approved fixed cost

fee of not more than 5% OH&P figured one time. The General Contractor shall have the right to add not more than the amounts indicated on the Proposal Form.
3. *For work omitted from Contract:* If Contract Agreement has been previously increased by Change Order for additional work, then overhead and profit will be deducted for omitted work; if revised Contract Sum will be less than original Contract amount, then overhead expenses and profit will also be decreased as part of the deductive Change Order for work omitted.
4. Where extra work involves both added and omitted work, the overhead and profit figures specified above shall be added only to the increased amount over the original Contract sum.

CONTRACTOR COORDINATION

The General Contractor is responsible for providing a separate and fully qualified and competent Superintendent, Project Manager and

Subcontractors for this project. PETSMART reserves the right to replace, or have replaced, the Superintendent, Project Manager or any General Contractor or Subcontractor personnel if deemed necessary by Owner and/or PETSMART.

The General Contractor is responsible for coordination of the project with work by others where PETSMART building abuts adjacent property(s) or buildings, but not limited to, finish grades, asphalt, utility connections, landscape, site lighting, parking, paint striping.

PROJECT DESCRIPTION

Project Site: The Project Site for PETSMART Store consists of the area indicated on the Construction Documents.

Off-site work is not a part of this contract. See plans for Scope of Work. Site paving is part of this contract if and as defined within Civil Drawings.

WORK BY OTHERS:

Certain items of equipment and/or elements of the construction may be excluded from the Contract for Construction, and if so, are indicated on the Drawings and identified herein. Installation thereof may be performed while the General Contractor's work progresses. The General Contractor shall cooperate with the Owner and PETSMART to facilitate the expeditious installation of such items.

Other construction activities, under direct supervision by the Owner and/or PETSMART, are contemplated in the same area of work during the construction period established for this Agreement. All Contractors on the work which may begin progress during the same period of time shall have equal rights to use the roads, grounds, areas, etc., and shall coordinate activities which come into conflict so as to determine the effect of his work on the additional activity, which is not part of this Agreement; and shall adequately adjust his price accordingly. No request for additional compensation for any reason, in this connection, will be considered.

PETSMART'S CABINETRY, FRP WALL COVERING, & EQUIPMENT DELIVERY SCHEDULE

General Contractor will coordinate PETSMART's equipment and cabinetry delivery date with the General Contractor's construction schedule dates. Should, during the course of construction, the General

Contractor need to revise the scheduled delivery dates of any PETSMART furnished equipment, PETSMART will try to accommodate the General Contractor's wishes. If PETSMART is unable to revise their delivery dates, the General Contractor will be held responsible for all additional costs related to storage, extra shipping, re-advertising, additional insurance protection from theft and/or damage, etc., that may be necessary. The request for PETSMART to modify the delivery dates must be in writing. PETSMART will determine who handles the equipment and where it shall be stored.

OCCUPANCY PRIOR TO COMPLETION

The Owner and PETSMART shall have the right to occupy portions of the building that are completed on or before the specified completion date (even though the General Contractor may not have completed the entire

Project). Such occupancy by the Owner and PETSMART will not release the General Contractor or his bonding agency from completing punchlist work, any warranties or guarantees and final completion of work in accordance with the Contract Documents.

CONTRACTOR USE OF PREMISES

- The General Contractor shall send proper notices, make all necessary arrangements, and perform all services required in the care and maintenance of all public utilities. The General Contractor shall, during the construction period and until final acceptance of the work as a whole by the Owner and PETSMART, assume all responsibility concerning the same for which the Owner and PETSMART may be liable.
- Prior to beginning work of the Contract, the General Contractor shall meet with the Landlord/Landlord's Architect (where applicable) and PETSMART to determine procedures regarding access to and use of the site, exterior staging and storage areas, special site conditions, and any other restrictions regarding the use of the site areas surrounding the construction.
- The General Contractor shall keep all public and private access roads and walks clear of debris caused by this work during the entire term of the Contract for construction. He shall repair all public and private streets, drives, curbs, walks, and other improvements where disturbed by work of, or related to, building operations, leaving them in as good condition after completion of the work as before operations started, in accordance with rules, regulations, and specifications of the public agencies having jurisdiction.
- Access roads and fire-lanes on and about the site shall be kept open and free at all times, except moving traffic, for passage of emergency vehicles.
- The General Contractor shall endeavor at all times to maintain as low a level of construction noise as possible in order not to create a disturbance in the neighborhood.
- Confine operations at site to areas permitted by Law, Ordinances, Permits and Construction Documents.
- Do not unreasonably encumber site with materials or equipment.
- Schedule work to minimize disruption of the Owner and adjoining tenants use of adjacent facilities.
- Assume full responsibility for protection and safekeeping of products stored on premises and persons on premises.
- Move any stored products which interfere with existing operations of the Owner and/or adjacent tenants.
- Obtain and pay for use of additional storage or work areas needed for operations.
- Do not load structure with weight that will endanger structure.

PARTIAL OCCUPANCY

General Contractor shall establish priority scheduling for partial occupancy without appreciably affecting the completion time for the entire project. Coordinate completion times with PETSMART.

Schedule early completion of designated areas for PETSMART's usage prior to substantial completion of entire project in accordance with schedule or as designated during construction.

PETSMART will occupy designated areas (determined at later date for purpose of moving material and fixtures and preparing for the installation).

General Contractor provides access for PETSMART personnel.

Preference in Authority of Documents

In case of a discrepancy between Contract Documents, the Professional of Record is to be notified so he may issue a written clarification. If Professional of Record is not notified prior to bid date, refer to General Conditions, Article 1, Subparagraph 1.2.3.

ENERGY MANAGEMENT SCOPE OF WORK

All EM components are to be purchased from the National EM vendor as listed on page F2.0 and installed as noted on EM1 and EM2 drawings.

Commissioning contract to be purchased by the GC/EC.

ENERGY MANAGEMENT CHECKLIST

The following checklist is to be fully executed by the Electrical, Mechanical and General Contractor prior to requesting NexRev to perform checkout/start-up of the Energy Management System.

Shop drawing will be provided with EMS equipment. If any questions or additional information is required.

ENERGY MANAGEMENT SYSTEM CHECK-OFF SHEET

PETSMART STORE NO. XXXX

Address, City, Province



Ready for Freedom Checklist

TO: Phillip Caffey _____

E-mail: phillipcaffey@nexrev.com

FROM: _____

DATE: _____

JOB NAME: _____

ADDRESS: _____

Scheduled Date(s) For Freedom Commissioning:

1. Freedom Commissioning (3 week prior to Substantial Completion): _____

Freedom Checklist - To ensure that the building is ready for prewire prior to racking installation, please verify that the following items are complete:

- | | |
|---|--|
| 1. RTUs set? And started up. | ☐ YES ☐ NO When? _____ |
| 2. Raceways/sleeves in place to pull wire into RTUs from inside the building? | ☐ YES ☐ NO When? _____ |
| 3. Are the provided relays and Normally Closed contactors installed in LCP? | ☐ YES ☐ NO When? _____ |
| Wired up | ☐ YES ☐ NO When? _____ |
| 4. Sensor conduit and boxes for sensors installed? | ☐ YES ☐ NO When? _____ |
| 5. All low voltage conduit installed? | ☐ YES ☐ NO When? _____ |
| 6. Is permanent power to the building. | ☐ YES ☐ NO When? _____ |
| 7. Is meter and CT's installed. | ☐ YES ☐ NO When? _____ |

THE GENERAL CONTRACTOR MUST SIGN AND RETURN THIS COMPLETED CHECKLIST TO NEXREV AFTER CONFIRMING THAT THE BUILDING IS READY FOR THE FREEDOM INSTALL PER THE CHECKLIST ABOVE.

General Contractor Printed Name: _____ Date: _____

General Contractor Signature: _____ Phone #: _____

NOTES:

- This form must be returned to NexRev at least fourteen (14) days prior to the scheduled Freedom date(s) to prevent delays or additional charges for insufficient notice.
- One trip is expected for NexRev to complete our SOW based on other trades being complete with their work
- If steps noted in checkout list are not complete and NexRev was either advised to arrive on site early or checklist appeared to be inaccurate, then any extra time that NexRev occurs will result in a change order to company responsible for payment of services. Change order will be for extra time of NexRev waiting for other trades to complete and/or a return trip charge of \$2,200.00 p/return trip if applicable.

601 Development Drive, Plano, TX 75074

(972) 578-0505

Fax (972) 578-0175

Rev. 3/8/23

SAMPLE CERTIFICATE OF INSURANCE

ACORD		CERTIFICATE OF INSURANCE			ISSUE DATE (MM/DD/YY)	
PRODUCER		THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.				
		COMPANIES AFFORDING COVERAGE				
		COMPANY LETTER A ALL INSURANCE CARRIERS MUST				
INSURED		COMPANY LETTER B HAVE AN A.M. BEST RATING OF				
		COMPANY LETTER C A OR BETTER				
		COMPANY LETTER D				
		COMPANY LETTER E				
COVERAGES						
THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED, NOT WITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS, AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.						
CO LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS	
	GENERAL LIABILITY				GENERAL AGGREGATE	\$ 2,000,000
	☒ COMMERCIAL GENERAL LIABILITY				PRODUCTS-COMP/OP AGG	\$ 2,000,000
	☐ CLAIMS MADE ☒ OCCUR				PERSONAL & ADV. INJURY	\$ 1,000,000
	OWNER'S & CONTRACTOR'S PROT.				EACH OCCURRENCE	\$ 1,000,000
					FIRE DAMAGE (Any one fire)	\$ 50,000
					MED EXPENSE (Any one person)	\$ 5,000
	AUTOMOBILE LIABILITY				COMBINED SINGLE LIMIT	\$ 1,000,000
	☒ ANY AUTO				BODILY INJURY (Per Person)	\$
	☐ ALL OWNED AUTOS				BODILY INJURY (Per Accident)	\$
	☐ SCHEDULED AUTOS				PROPERTY DAMAGE	\$
	☐ HIRED AUTOS					
	☐ NON-OWNED AUTOS					
	GARAGE LIABILITY					
	EXCESS LIABILITY				EACH OCCURRENCE	\$ 1,000,000
	☒ UMBRELLA FORM				AGGREGATE	\$ 1,000,000
	☐ OTHER THAN UMBRELLA FORM					
	WORKER'S COMPENSATION				☒ STATUTORY LIMITS	
	EMPLOYERS' LIABILITY				EACH ACCIDENT	\$ 100,000
					DISEASE - POLICY LIMIT	\$ 500,000
					DISEASE - EACH EMPLOYEE	\$ 100,000
	OTHER PROFESSIONAL LIABILITY				\$ 1,000,000 EACH CLAIM \$ 1,000,000 ANNUAL AGGREGATE	
DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/SPECIAL ITEMS						
Certificate holder, PETsMART, Inc., and its subsidiaries, is hereby named additional insured as respects any and all jobs performed by the named insured for the certificate holder.						
CERTIFICATE HOLDER			CANCELLATION			
PETsMART, Inc. c/o Acordia of Arizona Attn: CMS Department 3020 E. Camelback Rd., Suite 220 Phoenix, AZ 85016-4400			SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING COMPANY WILL MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT,			

SAMPLE FORM – ONLINE FIELD WORK ORDER

FIELD WORK ORDER



PETSMART Corporation 19601 North 27th Avenue Phoenix, Arizona 85027 Ph. 623.580.6100



Online Project Management

FIELD WORK ORDER

FIELD WORK ORDER (Log) - Forms -	
Post New Search	
Date	mm/dd/yyyy
Field work order number	3
To:	Select a Contact
Store Number	
Location	
You are hereby authorized to proceed with the work in accordance with the instructions below. All work shall conform to the General Conditions, Specification, Addenda and drawings prepared for this job, unless specifically noted herein.	
Description of Work 1	
Costs 1	\$0.00
Description of Work 2	
Costs 2	\$0.00
Total	\$0.00 =
Contract adjustment for the above - described work to be based on one of the following:	☐ A. Fixed Lump Sum ☐ B. Actual Costs with estimated total ☐ C. Unit prices
Authorized by: PETSMART	
Accepted by: Contractor	
Distribution List	Contacts must be highlighted. Hold Control key to select multiple contacts.
This form will automatically be sent to	
Field Work Order	☐ Approved ☐ Denied
Date	mm/dd/yyyy
Approved By	
Last Updated by	
Submit Cancel	

Change Order No: _____

Due within two weeks of Change Request

Total of All Extras to this Contract: _____

Total of All Extras (% of Contract): _____

Work to be Performed at:

[illegible]

Contractor:

By: _____

By: _____

Date: _____

Date: _____

UNCONDITIONAL FINAL WAIVER OF MECHANIC'S AND MATERIALMENS' LIEN CLAIMS

THE PROVINCE OF _____)
) ss.
 THE CITY OF _____)

The undersigned is an original contractor or subcontractor who has furnished labor and/or material ("Work") in the construction of improvements upon real property located at _____, PETSMART No. _____, in the City of _____, Province of _____, which deed is incorporated herein by reference (the "Property").

Description of Work/Materials: _____

For Work in connection with the Property, the undersigned:

1. received \$ _____ through _____, 20 ____ ("Completion Date"),
2. is not owed any amounts, and no amounts have been retained.

Therefore, the undersigned:

1. Has been paid in full for all sums owed for Work concerning the Property;
2. Acknowledges complete satisfaction of, and forever waives and releases, all claims of every kind against the Owner or the Property, including but not limited to all liens and claims of liens, which the undersigned may have as a result of or in connection with the Work;
3. Has represented and warranted and does hereby represent and warrant that all persons or entities who have furnished labor and/or material to the undersigned in connection with the Work have been paid all amounts they are owed;
4. Agrees unconditionally to indemnify the Owner and hold the Owner harmless against all liability, loss, cost or expense (including but not limited to attorneys' fees) now or hereafter incurred, paid or suffered by or asserted against the Owner or the Property because of any claim or action by the undersigned, or by any person or entity claiming by, through or under the undersigned, with respect to the claims, liens and rights herein waived and released or arising out of any breach or untruth of any representation herein made.

The person signing this document represents that he or she is duly authorized to do so on behalf of the undersigned original contractor or subcontractor.

All of the provisions of this document shall bind the undersigned original contractor or subcontractor and the undersigned's heirs, legal representatives, successors and assigns and shall inure to the benefit of the Owner and the Owner's heirs, legal representatives, successors, assigns and sureties.

EXECUTED this _____ day of _____, 20____.

Firm Name: _____

By: _____

Name: _____

Title: _____

THE CITY OF _____)
) ss.
 PROVINCE OF _____)

This Instrument was acknowledged before me on _____, 20__, by _____, _____ of and on behalf of _____, a _____.

(SEAL)

 Notary Public, Province of _____

CONDITIONAL PROGRESS WAIVER OF LIEN

THE CITY OF _____)
) ss.
 PROVINCE OF _____)

The undersigned is an original contractor or subcontractor who has furnished labor and/or material ("Work") in the construction of improvements upon real property located at _____, PETSMART No. _____, in the City of _____, Province of _____, which deed is incorporated herein by reference (the "Property").

Description of Work/Materials: _____

TOTAL COMPLETE TO DATE: \$ _____
 LESS RETENTION: \$ _____
 LESS PREVIOUS PAYMENTS: \$ _____
 THIS PAYMENT: \$ _____
 BALANCE DUE: \$ _____

For and in consideration of \$ _____ and other good and valuable consideration, does hereby waive, release and quitclaim all right to a lien upon the land and improvements above-described, as a result of work done and/or materials furnished by the undersigned and employees, materialmen and subcontractors under the statutes of the province of _____ relating to mechanic's liens on the aforementioned property and improvements thereon through billing period _____ for which this payment was made.

The undersigned warrants that no laborers and subcontractors employed in the performance of the work and no materialmen who have furnished materials and services have asserted a claim against or lien upon the premises herein above-described, that no chattel mortgage, conditional bill of sale, or retention of title agreement has been executed or given with respect to any item of property used in conjunction with or incorporated into the improvements on the premises herein above-described, that no claim has been assigned for payment or right to perfect a lien against said land and improvements, and that the undersigned is fully authorized and empowered to execute this Waiver of Lien.

The undersigned understands and agrees that the Owner and any Lender and any Title Insurance Company are entitled to rely upon this Waiver.

EXECUTED this _____ day of _____, 20____.

Firm Name: _____
 By: _____
 Name: _____
 Title: _____

THE CITY OF _____)
) ss.
 PROVINCE OF _____)

This Instrument was acknowledged before me on _____, 20__, by _____ of and on behalf of _____, a _____.

(SEAL)

 Notary Public, Province of _____

CONSTRUCTION CONTRACT

RE: **PetSmart** Store #
Location:

Dear:

Attached you will find the construction contract for the project referenced above. Please sign and return a copy to my attention via email at crapacz@petsmart.com, once fully executed, a copy will be returned to you.

Please include following items as required per the contract documents:

Payment and Performance Bonds

Forward one **recorded** original of each bond for the full amount of the contract.

Insurance Certificates

Mail Direct to: PetSmart Inc.

Attn: Benjamin Lawrence, Safety & Loss Control Manager

Attn: Charese Rapacz, Real Estate Administrator

Certificate Requirements:

General Liability - \$2 million Gen. Agg.; \$2 million Prod/Comp; \$1 million Occ; \$50,000 Fire Damage; \$5,000 Med. Exp. Automobile Liability - \$1 million Each Accident; Worker's Compensation - \$100,000/500,000/100,000

ADDITIONAL INSURED: PetSmart, Inc. and its subsidiaries

Taxes

Proof of State/Province/local sales tax license/permits for the state and city for performing work in separate line item on all invoices/pay applications that breaks out all sales tax paid by GC.

Subcontractor List

A Subcontractor list must be submitted with **the first pay Application for Payment**. An updated and **final** Subcontractor list must be posted on PetSmart construction web-site before final payment is released.

AIA Form G703

An AIA Continuation Sheet must be submitted for approval prior to submission of first Application for Payment. Breakdown must be no less detailed than the Contract **Exhibit "B"** Schedule of Values. Once approved, this Breakdown may not be changed.

Shop Drawings

All shop drawings and/or submittals should be forwarded directly to the Architect, _____, and attention: _____ and transmittals posted on the website.

Lien Waivers

Lien Waivers are to be executed, General Contractor may use a comparable document to the forms located in the bid specifications. And, all lien waivers submitted must be originals, signed, stamped, notarized and must accompany the appropriate payment application.

First Payment Application

- A *conditional progress* lien waiver from General Contractor **and all Subs** must accompany the first Payment Application
- Along with the **Sworn Statement spreadsheet**.

All Payment Applications (except the first and last)

- Unconditional progress and a conditional progress lien waiver from General Contractor.
- Conditional progress from all subcontractors, suppliers and materialmen who will receive payment with the accompanying pay application.
- **Sworn Statement spreadsheet**
- Unconditional progress lien waivers from all subcontractors, suppliers and materialmen having received payment in the prior application.

Last Payment Application

- Final unconditional lien waiver from General Contractor
- Final unconditional lien waivers from all subcontractors, suppliers and materialmen must accompany the last draw.
- **Sworn Statement spreadsheet**

Payment Applications

All payment applications must be signed, dated and properly notarized.

In an effort to minimize approval delays and/or payment delays, please ensure all change orders have been approved by the Construction Manager and posted to the web site prior to including them on any pay application.

Please note that your draw will not be processed for approval and/or payment until all required documents and waivers are received. If any errors are found on the Pay Application or attachments, it may be sent back with a rejection and a request for a corrected reissue. Corrected reissued Pay Applications will delay your payment.

Should you have any questions, or if I can be of assistance, anytime during this project, please do not hesitate to call me at (623) 587-2156.

Sincerely,
PetSmart LLC

Charese Rapacz
Real Estate Administrator
Enclosures: Contract

EXHIBIT "D" TO CONSTRUCTION CONTRACT – SUBCONTRACTOR LIST

EXHIBIT "D" TO CONSTRUCTION CONTRACT

PETSMART No. xxxx

ADDRESS, CITY, PROVINCE

This document must be completely filled out in accordance with construction contract requirements and specifications herein.

Line No.	A SUBCONTRACTOR NAME & ADDRESS <i>(Must be completed in its entirety)</i>	B KIND OF WORK <i>(Division Code & Title)</i>	C ORIGINAL SCHEDULE OF VALUES <i>(Can not change from original submittal)</i>
1.		Temporary Facilities	\$
2.		Security	\$
3.		Testing/Inspections - Bldg	\$
4.		Staking - Site	\$
5.		Miscellaneous	\$
6.		General Conditions	\$
7.		Contractor's Fee	\$
8.		Taxes	\$
9.		Bond Fees	\$
10.		Liability Insurance	\$
11.		Building Risk Insurance	\$
12.		2200 Structure Excavation & Backfilling	\$
13.		3300 Cast-In-Place Concrete	\$
14.		4810 Reinforced Concrete Masonry	\$

(continues on next page)

EXHIBIT "D" TO CONSTRUCTION CONTRACT
PETSMART No. xxxx
ADDRESS, CITY, PROVINCE

This document must be completely filled out in accordance with construction contract requirements and specifications herein.

Line No.	A SUBCONTRACTOR NAME & ADDRESS <i>(Must be completed in its entirety)</i>	B KIND OF WORK <i>(Division Code & Title)</i>	C ORIGINAL SCHEDULE OF VALUES <i>(Can not change from original submittal)</i>
15.		5120 Structural Steel	\$
16.		5210 Steel Joists & Joists Girders	\$
17.		5310 Metal Roof Deck	\$
18.		5400 Cold Formed Steel Framing	
19.		5500 Metal Fabrications	
20.		5520 Steel Railings and Handrails	
21.		6100 Rough Carpentry	\$
22.		6200 Finish Carpentry	\$
23.	National Vendor See Drawing F2.0	6402 Interior Architectural Woodwork <i>(Required vendor)</i>	\$
24.		7190 Water Repellents	\$
25.		7210 Building Insulation	\$
26.		7240 Exterior Insulation and Finish System	\$
27.	National Vendor See Drawing F2.0	7540 Membrane Roofing System <i>(Required vendor)</i>	\$

(continues on next page)

EXHIBIT "D" TO CONSTRUCTION CONTRACT**PETSMART No. xxxx****ADDRESS, CITY, PROVINCE***This document must be completely filled out in accordance with construction contract requirements and specifications herein.*

Line No.	A SUBCONTRACTOR NAME & ADDRESS (Must be completed in its entirety)	B KIND OF WORK (Division Code & Title)	C ORIGINAL SCHEDULE OF VALUES (Can not change from original submittal)
28.		7620 Sheet Metal Flashing and Trim	
29.		7720 Roof Accessories	
30.		7842 Fire-Resistive Joint Systems	
31.		7920 Joint Sealants	\$
32.	National Vendor See Drawing F2.0	8110 Hollow Metal Doors and Frames (Required vendor)	\$
33.	National Vendor See Drawing F2.0	8111 Pre-Finished Frames (Required vendor)	\$
34.	National Vendor See Drawing F2.0	8210 Wood Doors (Required vendor)	\$
35.		8311 Access Doors and Frames	\$
36.	National Vendor See Drawing F2.0	8310 Hollow Metal Doors and Frames (Required Vendor)	\$
37.	National Vendor See Drawing F2.0	8325 Interior Stainless Steel Gates (Required vendor)	
38.	National Vendor See Drawing F2.0	8363 Sectional Overhead Door (Required vendor)	\$
39.	National Vendor See Drawing F2.0	8411 Aluminum Framed Entrances and Storefront	\$
40.		8450 All Glass Entrances and Storefronts.	\$
41.	National Vendor See Drawing F2.0	8461 Sliding Automatic Entrance Doors (Required vendor)	\$

(continues on next page)

EXHIBIT "D" TO CONSTRUCTION CONTRACT**PETSMART No. xxxx****ADDRESS, CITY, PROVINCE***This document must be completely filled out in accordance with construction contract requirements and specifications herein.*

Line No.	A SUBCONTRACTOR NAME & ADDRESS (Must be completed in its entirety)	B KIND OF WORK (Division Code & Title)	C ORIGINAL SCHEDULE OF VALUES (Can not change from original submittal)
42.	National Vendor See Drawing F2.0	8710 Finish Hardware (Required vendor)	
43.		8800 Glazing	
44.		9260 Gypsum Board Assemblies	
45.	National Vendor See Drawing F2.0	9310 Ceramic Tile	
46.		9511 Acoustical Panel Ceilings	
47.		9651 Resilient Floor Tile and Base	\$
48.		9690 Recycled Rubber Flooring	\$
49.	National Vendor See Drawing F2.0	9721 Plastic Panel Wall Covering (Required vendor)	\$
50.		9910 Painting (Required vendor)	\$
51.		10155 Toilet Compartments	\$
52.		10200 Louvers and Vents	\$
53.		10285 Impact Resistant Wall Protection (Required vendor)	\$
54.		10800 Toilet and Bath Accessories (Required vendor)	\$
55.		11160 Loading Dock Equipment (Required vendor)	\$

EXHIBIT "D" TO CONSTRUCTION CONTRACT

PETSMART No. xxxx

ADDRESS, CITY, PROVINCE

This document must be completely filled out in accordance with construction contract requirements and specifications herein.

Line No.	A SUBCONTRACTOR NAME & ADDRESS (Must be completed in its entirety)	B KIND OF WORK (Division Code & Title)	C ORIGINAL SCHEDULE OF VALUES (Can not change from original submittal)
56.		15100 Plumbing	\$
57.	National Vendor See Drawing F2.0	15200 HVAC (Required vendor)	\$
58.		15300 Fire Sprinkler System	\$
59.	National Vendor See Drawing F2.0	16000 Building Automation & Automatic Temperature Control Systems (Required vendor)	\$
60.		16010 Electrical	\$
61.	National Vendor See Drawing F2.0	16010 Electrical Switchgear (Required vendor)	\$
62.	National Vendor See Drawing F2.0	16500 Lighting (Required vendor)	\$
63.		16720 Fire Sprinkler Alarm System (Required vendor)	\$
Total must match Construction Contract Schedule of Values. TOTAL			\$

Total must match Bid Alternate Schedule of Values. TOTAL	\$
---	----

PART I – GENERAL

WORK SPECIFIED HEREIN

This Section describes abbreviations used throughout these Specifications.

ABBREVIATIONS

Throughout these Specifications reference to a technical society, organization or body is by abbreviations and shall refer as follows:

AA	Aluminum Association
AAMA	American Architectural Manufacturers Association
AASHTO	American Association of State Highway and Transportation Officials
AMA	Acoustical Materials Association
ABPA	Acoustical and Board Products Association
ACI	American Concrete Institute
ACR	Air Conditioning and Refrigeration Institute
AGA	American Gas Association
AGC	Associated General Contractors
AHC	Architectural Hardware Consultant
AI	Asphalt Institute
AIA	American Institute of Architects
AIEE	American Institute of Electrical Engineers
AISC	American Institute of Steel Construction
ISI	American Iron and Steel Institute
AMCA	Air Movement & Control Association
ANSI	American National Standards Institute
APA	American Plywood Association
ARI	Air Conditioning and Refrigeration Institute
ARMA	Asphalt Roofing Manufacturers Association
ASA	American Standards Association
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers

ASTM	American Society for Testing and Materials
AWI	Architectural Woodwork Institute
AWMAC	Architectural Woodwork Manufacturers Association of Canada
AWPI	American Wood Preservers Institute
AWS	American Welding Society
CAN1	National Standard of Canada (published by CGA)
CAN2	National Standard of Canada (published by CGSB)
CAN3	National Standard of Canada (published by CSA)
CAN4	National Standard of Canada (published by ULC)
CCA	Canadian Construction Association
CEC	Canadian Electrical Code
CGA	Canadian Gas Association
CGSB	Canadian General Standards Board
CISC	Canadian Institute of Steel Construction
CLFMI	Chain Link Fence Manufacturer's Institute
CRC	Canadian Roofing Contractors Association
CSA	Canadian Standards Association
CRSI	Concrete Reinforcing Steel Institute
CSC	Construction Specifications Canada
CWB	Canadian Welding Bureau
EMAC	Electrical and Electronic Manufacturers Association of Canada
ESA	Electrical Safety Authority
FGMA	Flat Glass Marketing Association
FM	Factory Mutual

[illegible]

PART I – GENERAL**WORK SPECIFIED HEREIN**

This Section describes criteria for Project meetings to be held both before and during construction. This Section is complementary to the General Conditions and Supplementary General Conditions and nothing herein shall be considered to waive any requirements of the General Conditions or Supplementary General Conditions.

PRE-BID CONFERENCE

A pre-bid conference will be scheduled by PETSMART Construction Manager. Said meeting will be held at the proposed jobsite or by telephone. A representative from each bidding General Contractor shall attend. This meeting is mandatory, any G.C. not represented will be assumed to fully understand all aspects of this bid. A PETSMART representative will contact each G.C. to verify time, location and attendance at meeting/ conference call.

PRE-CONSTRUCTION CONFERENCE

A Construction Conference to discuss the Project work will be held at a time no more than four (4) weeks from start of construction and at a location designated by PETSMART. The General Contractor, together with representatives of his major Subcontractors, shall attend, as will the Owner/PETSMART. The purpose of this conference is to discuss the Project in detail, including scheduling of work, bi-weekly construction meetings and to answer any questions that may arise. Unless followed up in writing, verbal authorizations or acknowledgment by any one present shall not be binding. **The General Contractor shall prepare detailed written “minutes” of each meeting and distribute to all attendees and all associated subcontractors.**

END OF SECTION

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PART I – GENERAL**WORK SPECIFIED HEREIN**

This Section outlines, in general, as a convenience to the General Contractor, submittals required before commencing construction or during the course of construction of the Project. This Section is complementary to the General Conditions and Supplementary General Conditions and nothing herein shall be considered to waive any requirements of the General Conditions or Supplementary General Conditions.

Submit all documents/data required by this Project Manual within ten (10) calendar days after signing contract for construction, issuance of a work order, or Letter of Intent.

CONSTRUCTION SCHEDULE AND COST BREAKDOWN

Within 10 working days of execution and delivery of the contract for construction and before the first partial payment is made, the general contractor shall deliver to the owner and PetsMart a construction progress schedule via online posting, showing, at minimum, the proposed dates of commencement and completion of each of the various subdivisions of the work required under the construction documents as well as certain milestone dates including 50%, millwork and aquarium installation, punch list and turnover (setup), which are described below.

PHONE LINE / SYSTEM INSTALLATION REQUIREMENTS.

Landlord with general contractor's assistance shall complete the following:

- Landlord to confirm building address at the outset of building work.
- Landlord to order / reserve broadband cable service for PetsMart in site specific utility package. Order is to be placed no later than the outset of building work.
- Landlord / contractor to install 3" conduit to PetsMart phone backboard with pull string to d-mark / phone pedestal / pull box for routing of cable two weeks prior to millwork date.
- Landlord / contractor shall install and paint phone backboard (match adjacent wall color) and install ground wire / power outlet for phone cable installation two weeks prior to millwork date.
- Landlord / contractor shall identify and relay location to PetsMart of phone d-mark for space (exterior of building / shared utility room). Additionally, they shall provide approximate distance of cable run to PetsMart interior phone backboard two weeks prior to millwork.
- Landlord / contractor are to ensure permanent power is in place no later than one week prior to millwork installation (week of phone line cabling). **Note:** permanent power will be required prior to this to complete interior finish work.
- Landlord / contractor are to ensure cable is pulled in and punched down (dial tone is operational) one week prior to millwork installation.
- Landlord / contractor to ensure all electrical outlets are working and misc. Phone j-boxes are installed at millwork installation date.
- Landlord / contractor to install power poles immediately after register locations are set during millwork installation...for completion of follow on work.

50% OBSERVATION (NINE WEEKS PRIOR TO BUILDING TURNOVER /SET-UP)

Architect of record and PetsMart representative must conduct a courtesy "50% observation" to verify project is on schedule and is being constructed in accordance with plans and specifications. Time and date shall be coordinated with PetsMart construction manager a minimum of three weeks prior to requested observation date.

At minimum, general contractor must cause all trades to meet the following requirements.

- Roofing must be complete and building "dried in."
- All HVAC units and exhaust fans to be set on roof curbs.
- The electrical service equipment must be set in place.
- All interior metal stud wall framing must be completed.
- All "in wall" mechanical / plumbing / electrical rough-ins must be completed.
- All stud walls must have drywall installed on one side.
- All blocking for wall mounted fixtures, equipment, etc. Must be installed inside walls per the blocking schedules.
- All wall insulation must be installed per specifications.
- All in-wall water lines must be insulated per specifications.
- The underside of the metal deck and roof framing must be painted.
- Sales area and receiving area light fixtures must be installed.
- All exterior doors must be installed and the building must be secured.
- The exterior canopy must be started.
- The 'coming soon' banner must be installed on the exterior of the building.
- A 4'x8' drywall finish sample must be prepared and ready for submittal on site.
- Interior building temperature must be held to a heating temperature of not less than 65 degrees f and a cooling temperature of not more than 75 degrees f.
- Temporary lighting must be installed in all areas of space sufficient to conduct the observation.

MILLWORK AND AQUARIUM DELIVERY (FOUR WEEKS PRIOR TO BUILDING TURNOVER)

General contractor must cause subcontractors to be approximately 95% complete prior to millwork and aquarium delivery. Millwork package is contracted and coordinated by general contractor through PetSmart's required vendor. Millwork package will arrive on a Monday. Aquarium package is coordinated by general contractor through PetSmart's vendor. Aquarium equipment will arrive on Tuesday 2 weeks after millwork. Coordinate vendor with PetsMart construction manager. General contractor must cause the following items to occur prior to millwork and aquarium delivery.

- all floor finishes 100% completed.
- all painting (finish coat) 100% completed.
- minimum 75% of the sales floor must be clear including the area surrounding the checkstands and the area around the fish equipment. This is where the millwork and aquarium installers will work from during the install.
- all exterior doors and locks must be installed and functioning.
- entire building must have clear access into and out of the building and into and out of all rooms.
- all exterior elevations receiving signage must be ready for install.
- forklift, battery charger, and pallet jacks will be delivered to store the thursday (confirmed by gc) before delivery of millwork and aquariums. **Charger to be hooked up AND PLUGGED INTO FORKLIFT IMMEDIATELY SO IT IS FULLY CHARGED WHEN THE MILLWORK AND AQUARIUMS ARRIVE MONDAY MORNING.**

- Must have all stainless steel sinks on site so millwork installer can cut in.
- utility information must be posted on web page under project info area.
- all permanent utilities must be completed, connected, and servicing the building.
- the entire space must have conditioned air. The HVAC system must have been started up and should be functioning. (does not need to be running through the energy management system at this time.)
- the lighting system must be installed 100% complete and functioning.
- all ceiling grid and tile must be installed with functioning light fixtures and HVAC drops installed.
- phone lines from the local exchange carrier must have been pulled into the building and landed at the telephone demarc on the telephone backboard near the electrical power wall service equipment.
- the entire building must be broom clean.
- certain additional items will be required by the general contractor during the millwork and aquarium installation phase. At minimum, the following items must be provided by the general contractor.
- The final electrical and plumbing connections for the aquarium system should be made immediately following the systems installation but no later than Thursday of the installation week.

The architect of record will perform the final punch list along with the PetsMart construction manager approximately 15 business days after general contractor's receipt of the millwork package. General contractor shall coordinate exact date and time with PetsMart construction manager.

At minimum, the following criteria must be met prior to building punch.

- All lighting, HVAC, EMS, plumbing and life safety systems must be 100% functional.
- Superintendent will have completed their own "pre-punch" and reported results to PetsMart construction manager.
- All paint touch ups must be complete.
- Building final cleaning must be complete.
- Parking lot must be 100% complete including all striping, signage and cart corrals.
- Any landscaping must be completed per plans.
- All construction tools, equipment and materials must be removed.
- Attic stock must be ready for verification by PetsMart construction manager. See section 1700 for full list of required parts.

BUILDING TURNOVER (SETUP)

Building turnover (also known as the "Setup Date") will occur four weeks after receipt of the millwork package. General contractor will be substantially complete with the "punch items" prior to this date. PetSmart's fixture vendor will arrive on Monday at 8:00 am, local time. General contractor will meet the fixture vendor on site to turn the keys over to the fixture installation foreman. At minimum, the following criteria must be met prior to the setup date.

- Governmental permission to fixture must be obtained.
- Governmental permission to interview potential employees must be granted one week prior to the "Setup Date."
- General contract will coordinate floor cleaning with PetSmart's floor care specialist. This must be scheduled the weekend prior to the "Setup Date."
- Any cleaning required by punch list repairs must be completed.
- General contractor will coordinate with the fixture installer and the electrician for fixtures requiring power drops approximately 4 days after fixtures start.

REQUEST FOR INFORMATION:

The General Contractor must submit all Request For Information (RFI) through the PETSMART On-Line Project Management Web Site. RFIs submitted in any other manner will not be processed.

SHOP DRAWINGS:

General Contractor shall keep copies of all Shop Drawings and an updated Shop Drawing Log on site at all times (see attached sample form).

The Professional of Record will only review Shop Drawings that are specifically requested in the Contract Documents. Any Shop Drawings submitted that are not requested by the Contract Documents will be returned without action. Required Shop Drawings are generally limited to life safety related items. Required Vendor items generally do not require submittal.

Shop Drawings may not be used for approval of alternate products or substitutions. Contractor is responsible for providing all items as specified whether Shop Drawings are submitted or not.

Shop Drawings shall be reviewed by the General Contractor for conformance with the Contract Documents, completeness and for coordination with other trades prior to submittal to Professional of Record. Shop Drawings shall bear the General Contractor's stamp of approval indicating that the General Contractor has reviewed the Shop Drawings.

General Contractor shall submit Shop Drawings to Professional of Record and PetSmart CM for review. Professional of Record shall review Shop Drawings within 5 working days and shall return Shop Drawings to General Contractor.

SHOP DRAWINGS AND SAMPLE RECORD – SHEET 1 OF 2

Project: _____

Project No.: _____

PETSMART Store No.: _____

Construction Manager – PETSMART: _____

Project Manager – Professional of Record: _____

General Contractor: _____

DATE RECEIVED	SPECIFICATION SECTION SHOP DRAWING / TITLE SAMPLE NO.	CONTRACTOR SUBCONTRACTOR TRADE	COPIES RECEIVED	SUBMITTAL:				ACTION:			DATE RETURNED	COPIES TO:			
				SUBMITTED TO	DATE SUBMITTED	COPIES SUBMITTED	SUBMITTAL RETURN DATE	FURNISH AS SUBMITTED	FURNISH AS CORRECTED	REVISE & RESUBMIT		CONTRACTOR	OWNER	FIELD	FILE
	Section 03300 Concrete														
	Section 03300 Concrete Mix Designs														
	Section 03331 Polished Concrete Floor System														
	Section 04810 Reinforced Concrete Masonry														
	Section 05120 Structural Steel														
	Section 05210 Steel Joists & Joists Girders														

SHOP DRAWINGS AND SAMPLE RECORD – SHEET 2 OF 2

DATE RECEIVED	SPECIFICATION SECTION SHOP DRAWING / TITLE SAMPLE NO.	CONTRACTOR SUBCONTRACTOR TRADE	COPIES RECEIVED	SUBMITTAL:				ACTION:			DATE RETURNED	COPIES TO:			
				SUBMITTED TO	DATE SUBMITTED	COPIES SUBMITTED	SUBMITTAL RETURN DATE	FURNISH AS SUBMITTED	FURNISH AS CORRECTED	REVISE & RESUBMIT		CONTRACTOR	OWNER	FIELD	FILE
	Section 05310 Metal Roof Deck														
	Section 07240 Exterior Insulation and Finish System (If required, see section)														
	Section 08411 Aluminum Framed Entrance & Storefronts														
	Section 08800 Glazing														
	Section 09260 Gypsum Board Assemblies (Steel studs)														
	Section 15300 Fire Sprinklers System														

PART I – GENERAL**WORK SPECIFIED HEREIN**

This Section outlines requirements covering special inspections, testing laboratory services and inspection required during the course of construction of the Project. This Section is complementary to the General Conditions and Supplementary General Conditions and nothing herein shall be considered to waive any requirements of the General Conditions or Supplementary General Conditions.

TESTING LABORATORY SERVICES AND INSPECTIONS

- The Owner and/or PETSMART shall employ the services of an Independent Testing Agency to provide testing and inspection of the work as outlined below. The testing agency shall be licensed in the province where the structure is located and shall meet the requirements of “Recommended Practices for Inspection and Testing Agencies for Concrete, Steel and Bituminous Materials as Used in Construction” (ASTM E329). All testing and inspections shall be performed under the supervision of a Professional of Record registered in the province where the structure is located.
- The Owner and PETSMART reserve the right to perform tests in addition to the testing specified herein.
- Materials and operations shall be tested and inspected as the work progresses. Failure to detect any defective work or material shall not in any way prevent later rejection when such defect is discovered nor shall it obligate the Owner’s Representative for final acceptance.
- The testing agency shall report all test and inspection results to the General Contractor, the Professional of Record and PETSMART’s Construction Manager immediately after they are performed. All test and inspection reports shall be signed and sealed by a Professional of Record registered in the province where the structure is located and shall include the exact location in the work represented by the test.
- At the completion of each portion of the work the testing agency shall submit a letter of certification, signed and sealed by an Professional of Record registered in the province where the structure is located, stating that all work has been constructed in accordance with the contract documents and all other applicable code requirements.
- The testing agency and its representatives are not authorized to revoke, alter, relax, enlarge or release any requirement of the contract documents, approve or accept any portion of the work, perform any duties of the Contractor, or be a party to scheduling of work.
- The Contractor shall notify the testing agency and the Owner’s Representative a minimum of 24 hours in advance of all work requiring testing and inspection work and all reasonable facilities shall be made available for technicians.
- Records of inspections shall be kept available to the Building Official during progress of work and for two years after completion of the project. Records shall be preserved by the testing agency.

PAYMENT FOR SERVICES

- Payment for basic quality assurance services will be by the Owner/PETSMART, directly to the Independent Testing Agency.
- When the results show that the work does not meet the full requirements of the Contract Documents, the General Contractor shall pay for retesting corrected materials or workmanship until satisfactory test results are obtained.
- The costs of any additional tests or analysis, including additional architectural or engineering services, performed to prove the adequacy of non-conforming work, shall be borne by the contractor without any increase to the Contract Sum.

PART II – EXECUTION**REINFORCED CONCRETE MASONRY**

- Provide Special Inspections as called for on the Structural Drawings and as required by the Building Official.
- Unless specifically noted on the drawings or otherwise required by the Building Official, prism tests and compression tests of mortar and grout are not required.

STRUCTURAL STEEL

- Provide Special Inspections as called for on the Structural Drawings and as required by the Building Official.

STRUCTURAL CONCRETE

- Provide Special Inspections as called for on the Structural Drawings and as required by the Building Official.
- Conduct strength tests of the concrete during construction in accordance with the following procedures:
 1. Secure composite samples in accordance with “Method of Sampling Fresh Concrete” (ASTM C172). Each sample shall be obtained from a different batch of concrete on a random basis, avoiding any selection of the test batch other than by a number selected at random before commencement of concrete placement.
 2. Mold and cure three specimens from each sample in accordance with “Method of Making and Curing Concrete Test Specimens in the Field” (ASTM C31). Any deviations from the requirements of this Standard shall be recorded in the test report.
 3. Test specimens in accordance with “Method of Test for Compressive Strength of Cylinder Concrete Specimens” (ASTM C39). Two specimens shall be tested at 28 days and one shall be tested at 7 days. The acceptance test results shall be the average of the strengths of the two specimens tested at 28 days. If one specimen in a test manifests evidence of improper sampling, molding or testing, it shall be discarded and the strength of the

remaining cylinder shall be considered the test result. Should both specimens in a test show any of the above defects, the entire test shall be discarded.

4. Make at least one strength test (3 cylinders) for each 38 m³ (50 cu. yd.), or fraction thereof, of each mix design of concrete placed in any 1 day.
5. Determine slump of the concrete sample for each strength test and whenever consistency of concrete appears to vary using "Method of Test for Slump of Portland Cement Concrete (ASTM C143).
6. Determine air content of normal weight concrete sample for each strength test in accordance with either "Method of Test for Air Content of Freshly Mixed Concrete by the Pressure Method" (ASTM C231), "Method of Test for Air Content of Freshly Mixed Concrete by the Volumetric Method" (ASTM C173), or "Method of Test for Unit Weight, Yield, and Air Content of Concrete" (ASTM C138).
7. Determine temperature of concrete sample for each strength test.
8. Determine static coefficient of friction, specular gloss/reflectance, floor flatness number and floor levelness number for interior exposed slabs.

FOUNDATIONS

- Inspect all excavations prior to installation of foundations for correct depth for frost penetration, bearing strata and bearing capacity.

END OF SECTION

PART I – GENERAL

WORK SPECIFIED HEREIN

All labor, materials, equipment and services necessary to furnish, erect and maintain construction facilities and temporary controls and perform temporary work required in the performance of the Contract for Construction, including those indicated and specified. This Section is complementary to the General Conditions and Supplementary General Conditions and nothing herein shall be considered to waive any requirements of the General Conditions or Supplementary General Conditions.

The General Contractor shall verify with the Owner and PETSMART the storage areas allocated to the General Contractor for the work, and he shall limit his storage and office operations to the defined areas.

MAINTENANCE AND REMOVAL

Maintain construction facilities and temporary controls in a proper, safe operating and sanitary condition for the duration of the Contract for Construction. Upon completion of the Construction Contract work, the General Contractor shall remove all construction facilities and temporary controls from the premises.

UTILITIES

- Provide temporary adequate light and power supply for construction, making all necessary arrangements with serving utility and paying all expenses in connection therewith. Temporary lighting illumination level shall be adequate to permit workmen to properly perform their work.
- Provide temporary adequate water supply for construction, making all necessary arrangements with serving utility and paying all expenses in conjunction therewith.
- All utilities, temporary and permanent, shall be paid for by the General Contractor until 10 days prior to store opening or upon receipt of Certificate of Substantial Completion (or equivalent), whichever occurs first. Receipted bills setting forth that charges have been paid in full shall accompany Application for Final Payment.
- Supply adequate cool, pure drinking water with individual drinking cups or sanitary bubbler fountain for the use of employees on the project. The quality of the drinking water shall meet the standards for public water supplies of the County Health Department.

OFFICE TRAILER EQUIPMENT

Contractor shall provide and maintain the following office equipment in the jobsite office for the duration of the project:

1. The job superintendent shall have a cell phone on at all times and carried after hours in case of emergency. This number shall be provided to the PETSMART representative at the beginning of the project.

A digital camera or Cell Phone camera is required to remain on site throughout the project. Weekly pictures of the project will be taken by the job superintendent and posted to the PETSMART Web. A map of the locations showing where the pictures are to be taken is located on the project home page of the web site. Failure to post jobsite pictures in this manner will be subject to a penalty of \$500 per occurrence.

It is understood that the Owner's/Tenant's representatives, Architect, etc. will have full use of the above described office equipment for purposes related to the project at no additional cost to any representative or PETSMART.

WEB SITE

The General Contractor is required to purchase a limited-time license (for the duration of the project) from US Global Network Communications, Inc. A certified/cashier check, payable to US Global. Network Communications, Inc., in the amount of \$1,600.00, and the PETSMART Web Site License Form (Section 01550), shall be sent to US Global Network Communications. Upon the receipt of the fee and application, an instructional compact disc will be sent to the General Contractor.

The PETSMART Construction Manager will provide on-site follow-up tutorial of the web site during the pre-construction meeting.

The web site will enable the contractors to access construction documents electronically, including bulletins, plans, addendum, etc. Additionally, the web site will be used for all communications relating to the project including RFI's. (No Exceptions)

TOILET FACILITIES

Provide proper sanitary and adequate toilet facilities for the use of all workmen employed on the Project, located where directed, and enforce their use by all personnel on the project. Enclose and weatherproof toilets and keep in a sanitary condition at all times.

HEATING

Should it become necessary to do any work in the building, such as plastering, cement work, painting, etc., at times when the temperature is below 40o F. (painting 60o F.), the General Contractor shall provide temporary heat (non-storage type) for such length of time as deemed necessary by the Professional of Record and PetSmart CM for the protection of the work. Pay all expenses for temporary apparatus, its installation, proper maintenance and operation and for fuel. Damage or deterioration caused by insufficient heat or ventilation shall be repaired or replaced by the General Contractor.

Should temporary heat be required after permanent-heating system is installed and operating, this unit may be used, however, the General Contractor shall pay all fuel costs and be responsible for proper operation of unit.

FIRE PROTECTION

Provide adequate fire extinguishers on the premises during the course of construction, of the type and sizes recommended by the NFPA to control fires resulting from the particular work being performed. Instruct employees in their use. Place extinguishers in the immediate vicinity of the work being performed, ready for instant use. In the use of especially hazardous type of equipment, such as acetylene torches, welding equipment, tar pots, kettles, etc., no work shall be commenced or equipment used unless fire extinguishers of an approved type and capacity are placed in the working area and available for immediate use by the workmen using the above-mentioned equipment.

Fire extinguishers shall be maintained throughout all accessible areas. Provide one approved foam type extinguisher in the construction shed and also in the space where paint or oil, etc., is stored. Other special features of hazard shall be provided with special extinguisher protection as may be warranted.

TEMPORARY ENCLOSURES, BARRIERS AND FENCES

Provide and maintain all fences, barricades, lights, shoring and other protective structures or devices necessary for the safety of workmen, equipment, the public and property as required by province or municipal laws and regulations, and local ordinances, laws and other requirements of authorities having jurisdiction with regard to safety precautions, operation and fire hazards.

Provide and maintain pumping facilities including power for keeping the site, excavations and structure free from accumulations of water at all times, whether from underground seepage, rainfall, drainage or broken lines.

Maintain provisions for closing and locking the building at such time as possible to do so.

Protect all door openings when so required with temporary batten doors, and cover windows and openings with suitable materials when weather or job conditions require.

Protect all elements of construction including certified building pad from any danger of damage from wind, rain, dust, frost, freezing temperatures, or other infiltration of weather.

Protect all openings from debris (drains, pipes, etc.).

SCAFFOLD, STAGING, ETC.

The work under each Section of these specifications shall include providing, installing, and maintaining all scaffold, staging, trestles, and planking necessary for the work under each Section in strict conformity with applicable laws and ordinances, and maintenance of same so as not to interfere with or obstruct the work of other trades. Additionally, the work under each Section of these Specifications shall include providing all forms of protection necessary to preserve the work of other trades free from damage. These provisions shall be considered as though repeated under each separate Section of these Specifications.

TREE AND PLANT PROTECTION

Existing or newly planted vegetation, shrubs, trees, sidewalks, paving, etc., on the site, shall, unless directly affected by the work of this Contract, be protected against damage of any kind. No diesel or gasoline engine shall be allowed to pass over the feeder root system within the drip line unless approved by the Owner/PETSMART. Work, storage and traffic areas shall be restricted to those areas immediately adjacent to the building.

Damage of any kind caused by the work of this contract shall be made good before final acceptance of the Project. The General Contractor shall provide water and protection barricades as required to maintain all trees, plants, shrubs, existing site improvements, etc., designated to remain.

SECURITY

Provide such watchmen's service as necessary to protect Owner's and/or PETSMART's interest during the progress of construction of the building.

The Professional of Record, the Owner and PETSMART do not assume any responsibility, at any time, for the protection of the building and premises or for loss of materials, from the time that the Contract operations have commenced until the final acceptance of the work by the Professional of Record, Owner and PETSMART. If watchman service is deemed necessary by the General Contractor, such protection shall be provided and paid for by the General Contractor.

NOISE AND DUST CONTROL

Exercise all possible care to control excessive noise and dust during the construction to keep these problems to a minimum. Traffic or construction areas shall be sprinkled with water or chemicals as required and in accordance with applicable governmental requirements.

PROJECT IDENTIFICATION

The General Contractor shall provide a project sign as defined herewith.

No sign will be permitted on this project except the project sign, identifying captions over offices, certain directional signs and warning signs required for safety and protection. The General Contractor shall take all necessary steps to prevent installation of unauthorized signs, and should any appear, the General Contractor shall cause them to be removed immediately and repair and repaint all damage caused thereby without additional cost to the Owner and PETSMART.

Coming soon Banner shall be ordered by GC and have delivered to the site around the 50% milestone.

GC is to hang banner on the building eyebolts that are provided by the GC.

Banner to remain up until store opening. Grand opening team will replace the banner after store opening.

Any applicable permits for banner to be applied for by PetSmart.

PARKING

Limit parking by construction personnel to the area designated by the Owner.



BANNER ORDER FORM



THIS BANNER PACKAGE CONSISTS of (1) BANNER REQUIRED by PETSMA RT.
THE BANNER IS SINGLE SIDED



Part #: PETS-BA096x0144.000A



PMS 307C BLUE



PMS 2035C RED



BLACK

JOB SITE:

PETSMA RT STORE # _____
NAME _____
STREET _____
CITY _____
PROV _____ POS _____

CONTRACTOR: (PAID BY)

COMPANY _____
STREET _____
CITY _____
PROV _____ POS _____
PHONE _____

SHIP TO:

CONTACT PERSON _____
NAME _____
STREET _____
CITY _____
PROV _____ POS _____
PHONE _____

PAYMENT METHOD ☐ CHEQUE
☐ ELECTRONIC TRANSFER

PURCHASERS NAME _____
(EXACTLY AS IT APPEARS ON CARD, IF APPLICABLE)
SIGNATURE _____
DATE _____

COST \$ _____ 1 BANNER (PLUS
SHIPPING AND HANDLING).

LOCAL SALES TAX \$ _____ (PLEASE CALCULATE TAX)

**TOTAL
ENCLOSED \$** _____

THE BANNER PACKAGE WILL BE SHIPPED
GROUND SHIPPING WITHIN 3-5 BUSINESS DAYS.
(REQUIRED FOR PROCESSING AND PRODUCTION)
ALL BANNER ORDERS MUST BE PRE-PAID.

COMPLETE THIS FORM FOR EACH SEPARATE PACKAGE ATTACH A CHEQUE
FOR FULL PRICE



4130, Highway 440 west
South service road
Laval (Québec) H7T 0H3

Diane Lamer
Phone : 450.668.4888 ext. 272

Phone : 450.668.4888 Phone : 514.757.0336 Fax : 450.668.8822 www.montrealneon.com



BANNER ORDER FORM



THIS BANNER PACKAGE CONSISTS of (1) BANNER REQUIRED by PETSMART.
THE BANNER IS SINGLE SIDED



Part #: PETS-BA060x0058.000A



PMS 307C BLUE



PMS 2035C RED



BLACK

JOB SITE:

PETSMART STORE # _____
NAME _____
STREET _____
CITY _____
PROV _____ POS _____

CONTRACTOR: (PAID BY)

COMPANY _____
STREET _____
CITY _____
PROV _____ POS _____
PHONE _____

SHIP TO:

CONTACT PERSON _____
NAME _____
STREET _____
CITY _____
PROV _____ POS _____
PHONE _____

PAYMENT METHOD ☐ CHEQUE
☐ ELECTRONIC TRANSFER

PURCHASERS NAME _____
(EXACTLY AS IT APPEARS ON CARD, IF APPLICABLE)
SIGNATURE _____
DATE _____

COST \$ _____ 1 BANNER (PLUS SHIPPING AND HANDLING).

LOCAL SALES TAX \$ _____ (PLEASE CALCULATE TAX)

TOTAL ENCLOSED \$ _____

THE BANNER PACKAGE WILL BE SHIPPED GROUND SHIPPING WITHIN 3-5 BUSINESS DAYS. (REQUIRED FOR PROCESSING AND PRODUCTION) ALL BANNER ORDERS MUST BE PRE-PAID.

COMPLETE THIS FORM FOR EACH SEPARATE PACKAGE ATTACH A CHEQUE FOR FULL PRICE



4130, Highway 440 west
South service road
Laval (Québec) H7T 0H3

Diane Lamer

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19601 North 27th Avenue • Phoenix, Arizona 85027 • (623) 580-6100

WEB SITE

The General Contractor *[or project landlord, owner or developer]* is required to purchase a limited-time license (for the duration of the project) from USGN, Inc. A check, payable to USGN, Inc., in the amount of \$1,600, and the *PetSmart Web Site License Form* (on pages 2 -3 following), shall be sent to USGN. The PetSmart Construction Manager will provide on-site follow-up tutorial of the web site during the pre-construction meeting.

The web site will enable all the project team members to access construction documents electronically, including bulletins, plans, addendum, etc. Additionally, the web site will be used for all communications relating to the project including RFI's. **Please be sure that you have included all information and all parties that will require access to the website, if necessary, please use additional pages.**

Thank you for doing business with USGN. Please fill out this form completely and mail to the address listed below along with the license fee. Upon the receipt of this form and the fee, we'll e-mail confirmation of your account and process the order within 24 hours. If you have any questions, please contact support @ (602) 745-2497.

PROJECT INFORMATION:

PROJECT NAME:		PETSMART STORE NO.	
PROJECT ADDRESS:			
CITY, STATE ZIP CODE:			
JOB-SITE TELEPHONE NO.:		JOB-SITE FAX NO.	

DEVELOPER:

CONTACT PERSON:			
CONTACT TELEPHONE NO.:		FAX NO. Mobile No.	
CONTACT E-MAIL:			
COMPANY NAME:			
ADDRESS:			
CITY, STATE ZIP CODE:			
TELEPHONE NO.:		FAX NO.	

CONTACT PERSON:			
CONTACT TELEPHONE NO.:		FAX NO. Mobile No.	
CONTACT E-MAIL:			
COMPANY NAME:			
ADDRESS:			
CITY, STATE ZIP CODE:			
TELEPHONE NO.:		FAX NO.	

**ARCHITECT:**

CONTACT PERSON:			
CONTACT TELEPHONE NO.:		FAX NO.	
		Mobile No.	
CONTACT E-MAIL:			
COMPANY NAME:			
ADDRESS:			
CITY, STATE ZIP CODE:			
TELEPHONE NO.:		FAX NO.	

GENERAL CONTRACTOR:

CONTACT PERSON:			
CONTACT TELEPHONE NO.:		FAX NO.	
		Mobile No.	
CONTACT E-MAIL:			
COMPANY NAME:			
ADDRESS:			
CITY, STATE ZIP CODE:			
TELEPHONE NO.:		FAX NO.	

PAYMENT TYPE (PLEASE CHECK ONE)		LIMITED PERIOD LICENSE FEE: \$1,600 US PLEASE MAKE CHECKS PAYABLE TO: USGN, INC. 7465 E. OSBORN RD. SCOTTSDALE, AZ 85251 Email: mgibson@usgn.net

Fax copy of Web Site License Form to PetSmart @ (623) 580-6509.

MARKET-LEADING PETSMART PARTNER WITH USGLOBAL.NET

USGN has created this Privacy Statement to demonstrate our commitment to privacy. This Privacy Statement discloses the information gathering and dissemination practices we use on PetSmart's Construction Management web sites.

INFORMATION COLLECTED

Registration forms on our web sites require you to provide contact and profile information. We will not share profile and site use information with advertisers without receiving prior approval from all parties and PetSmart.

PUBLIC FORUMS

Information may not be disclosed on our site in forums, message boards or news groups that may be available to other users and becomes public information. Accordingly, you should exercise caution when deciding to disclose project information in this manner as it is expressly forbid.

SECURITY

To help prevent unauthorized access, maintain data accuracy and ensure the appropriate use of information, we have put in place customary physical, electronic and managerial procedures to assist in safeguarding and securing the information we collect online.

ACCURACY AND CHOICE

We work hard to keep your contact and profile information accurate. The registration information you provide on license form can be updated by sending revised information to webmaster@usglobal.net.

CONTACTING USGLOBAL.NET

If you have any questions about our Privacy Statement or the practices of our site please contact support@usglobal.net

END OF SECTION

WORK SPECIFIED HEREIN

All requirements and procedures covering material and equipment to be utilized in the Project work. This Section is complementary to the General Conditions and Supplementary General Conditions and nothing herein shall be considered to waive any requirements of the General Conditions or Supplementary General Conditions.

FACILITY AND EQUIPMENT

The General Contractor shall provide, install, maintain and operate a complete and adequate facility for the handling, execution, disposal and distribution of all material and equipment required for the proper and timely performance of all work connected with the Contract for Construction.

DELIVERY AND STORAGE OF MATERIALS

- Deliver all manufactured materials in the original packages, containers or bundles (with the seals unbroken) bearing the name or identification mark of the manufacturer.
- Deliver fabrications in as large assemblies as practicable, and where specified to be shop primed or shop finished, such assemblies shall be packaged or crated as required to preserve such priming or finish intact and free from abrasion.
- Store all materials in such manner as necessary to properly protect same from damage. Materials or equipment damaged by handling, weather, dirt or from any other cause will not be acceptable.
- Store material so as to cause no obstructions. Material is to be stored off sidewalks, roadways and underground services. The General Contractor shall be responsible for protecting all material and equipment furnished under the Contract.
- When any room in the project is used as a shop or store room, the General Contractor shall be responsible for any repairs, patching or cleaning necessary due to such use. Location of such storage space shall be subject to approval of the Professional of Record.

WORKMANSHIP

Where not more specifically described in any of the various Sections of these Specifications, workmanship shall conform to all of the methods and operations of best standards and accepted practices of the trade or trades involved, and shall include all items of fabrication, construction or installation regularly furnished or required for completion (including any finish, and for successful operation as intended).

All work shall be executed by mechanics skilled in their respective lines of work.

When completed, all parts shall have been durably and substantially built and shall present a neat, workmanlike appearance.

SUBSTITUTIONS OF MATERIALS

SEE SECTION 01630 for "Required Vendor" materials for which no substitutions will be accepted.)

Substitutions are not permitted unless approved during bid process by addendum. If a substitution is required (Contractor to provide justification statement), it must be of equal or greater quality than the product it replaces. At no time will PETSMART pay additional costs associated with the aforementioned substitution.

When a specific manufacturer, trade name or material is specified, or indicated, it is to establish a standard of quality and shall not be construed as limiting competition. If the General Contractor desires to use a manufacturer, trade name or material other than that specified, he shall request approval of such substitution, in writing to the Professional of Record. Requests for substitutions shall be in the hands of the Professional of Record no later than 7 days prior to the stated date of bidding as identified in the Contract Documents. Items found acceptable for bidding will be approved by a duly authorized Addendum issued by the Professional of Record. Substitutions will only be considered if they are prepared on a copy of the "Substitution Request Form" attached and submitted completely executed 7 days prior to bid.

Submittals for approval of substitute manufacturer, trade name or materials shall contain sufficient information, descriptive brochures, drawings, samples or other data as is necessary to provide direct comparison to the specified products. Each submittal shall be well marked and identified as to the type and kind of items being submitted for approval. It is the sole responsibility of the Bidder to submit complete descriptive and technical information so that the Professional of Record can make proper appraisal. Lack of proper information will be sufficient cause for rejection. References to catalogs that the Professional of Record may or may not have, will not be accepted.

Interferences: Substitutions shall not be offered unless a thorough check is made of all related items and interferences, revised arrangements and other changes that may result. Prepare drawings of revised equipment and piping arrangements caused by substitutions. Such drawings shall be equal in quality to Contract Drawings. The cost of supplying drawings shall be included by the General Contractor in his estimate of proposed substituted materials.

Responsibility: A General Contractor offering a substitution shall accept responsibility for its effect on the work of all trades, including any possible delays in completion time of Project. All costs of changes in the work of other trades and Drawings, etc., affected by inclusion of General Contractor requested substitutions shall be paid by the General Contractor requesting approval of such substitution.

If alternate manufacturers, trade names or materials are not so approved for the Base Bid the General Contractor may, at his option, offer alternate manufacturers, trade names or materials at the time of bidding. This offer shall be on the General Contractor's letterhead and shall state the type of substitution in detail together with net addition to or deduction from the Base Bid.

Award of the Contract in accordance with Contract Documents requires that the specified manufacturers, trade names or materials and equipment shall be furnished and installed.

Unless specifically submitted and approved in accordance with above, substitutions will not be allowed.

MATERIAL REFERENCE STANDARDS

Where material is specified solely by reference to Standard Specifications the General Contractor shall, if requested by the Professional of Record, submit to the Professional of Record, for his approval, data on all such material proposed to be incorporated into the work of the Contract listing the name and address of vendor, the manufacturer or producer, and the trade or brand names of such materials.

PRE-BID SUBSTITUTION REQUEST FORM

TO:

PROJECT:

We hereby submit for your consideration for the above project the following product instead of the specified item described as:

The explanation for this substitution is because:

Refer to Section _____ Section Title _____ Paragraph _____ Page _____

Proposed Substitution:

Attach complete product description, drawings, photographs, performance and test data, and other information necessary for evaluation. Identify specific model numbers, finishes, options, etc. Note: For substitutions of Items in Divisions 1 through 14, send additional copy of request with attachments to the Professional of Record.

Will changes be required to building design in order to properly install proposed substitution? Yes ☐ No ☐

If yes, explain:

Will the undersigned pay for changes to the building design, including engineering and drawing costs, caused by requested substitution? Yes ☐ No ☐

List differences between proposed substitution and specified item.

Specified Item:

Proposed Substitution:

Does substitution affect drawing dimension? Yes ☐ No ☐

If yes, explain:

What affect does substitution have on other trades?

Does manufacturer's warrant of proposed substitution differ from that specified? ? Yes ☐ No ☐

If yes, explain:

Will substitution affect progress schedule? Yes ☐ No ☐

If yes, explain:

Will substitution require more license fees or royalties than specified product? Yes ☐ No ☐

If yes, explain:

Will maintenance and service parts be locally available for substitution? Yes ☐ No ☐

If yes, explain:

Does the substitution contain asbestos in any form? Yes ☐ No ☐

SUBMITTED BY:

(SIGNATURE)

FIRM:

ADDRESS:

DATE:

TELEPHONE:

FOR PROFESSIONAL OF RECORD'S USE ONLY:

☐ **ACCEPTED:**

☐ **ACCEPTED AS NOTED:**

☐ **NOT ACCEPTED:**

☐ **RECEIVED TOO LATE:**

REVIEWED BY:

DATE:

REMARKS

END OF SECTION

WORK SPECIFIED HEREIN

All requirements and procedures covering "Required Vendor" materials to be utilized in the Project work. This Section is complementary to the General Conditions and Supplementary General Conditions and nothing herein shall be considered to waive any requirements of the General Conditions or Supplementary General Conditions.

See Section 01600 for provisions covering substitutions of materials OTHER than those identified herein as "Required Vendor" materials. There shall be no substitutions for the products identified herein as "Required Vendor" materials.

DESCRIPTION

PETSMART has negotiated favorable purchase agreements with various national manufacturers for the exclusive use of their products in PETSMART facilities. The General Contractor and his subcontractors for applicable trades, as a condition on the award of the Contract for Construction, are obligated to purchase these materials from these required vendor product manufacturers and to identify their purchase for the PETSMART store under contract.

PETSMART REQUIRED VENDOR LIST (NO SUBSTITUTIONS)

See Part V for listing of Required Vendor information.

COORDINATION OF REQUIRED VENDOR MATERIALS

The General Contractor shall provide, install, maintain and operate a complete and adequate facility for the receipt of, handling, execution, disposal and distribution of all "Required Vendor" materials required for the proper and timely performance of all work connected with the Contract for Construction.

All Required Vendor materials shall be purchased immediately of General Contractor's Contract Execution.

DELIVERY AND STORAGE OF MATERIALS

Provisions as specified under Section 01600 are applicable to the work under this Section.

END OF SECTION

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Work Specified Herein

All requirements and procedures for submittal of pertinent data relating to closing out the Project upon completion of the project work are as follows. This Section is complementary to the General Conditions and Supplementary General Conditions and nothing herein shall be considered to waive any requirements.

FINAL PAYMENT

Receipt/review and acceptance of all items specified in this Section is a prerequisite for final payment.

RECORD DRAWINGS

Professional of Record will have uploaded the Bid Set Construction Documents including specifications (a Microsoft Word binder document) and addenda, on the PETSMART web site.

General Contractor shall maintain a set of Record Drawings at the job site. These shall be kept legible and current and shall be available for inspection at all times by the Professional of Record. Show all changes in the Contract work, or work added, on these Record Drawings in a contrasting color, including work changed by Addendum or Bulletin. General Contractor to notify the Professional of Record, in a posting form of any changes in the Contract Work for work added. At time of Substantial Completion or final punch, whichever is earlier (Substantial Completion should occur at punch) the on-site redlines shall be placed in a storage tube and marked "AS BUILTS". Leave at a location near the electrical wall as noted on drawing A2.2.

CLOSEOUT MANUAL

At substantial completion or final punch of the project, the General Contractor shall upload the final close out scanned documents or files on the PETSMART On-line project management Web site in project under the Close Out tab on the top toolbar, Project Closeout From/View Log. As this is a condition of delivery, a scanned copy will be the only accepted means. If hard copies are sent they will be returned at Landlord/General Contractor's expense. The Closeout Package shall include all information in accordance with the following outline:

- **CERTIFICATE OF OCCUPANCY** - Document issued by local governmental authority certifying that the building complies with the provisions of applicable statutes and regulations, and permitting occupancy for the designated use.
- **CERTIFICATE OF SUBSTANTIAL COMPLETION** - issued by Professional of Record, signed by all parties.
- **GENERAL CONTRACTOR'S SUBCONTRACTORS LIST** with subcontractor name, contacts, telephone number and 24-hour employee contact telephone numbers.
- **SIGNED PUNCH LIST** - 100% Punch List showing items completed and signed by the Construction Manager and General Contractor. These items shall include Architectural, Mechanical, Electrical, Plumbing, Test and Balance company, Lennox, and Novar. 100%

punchlist shall also include the completed and signed "Confirmation Checklist". This checklist is located at end of section.

- **GENERAL CONTRACTOR'S WARRANTY** - The General Contractor shall warranty all work (including all subcontractor work) to the Owner and PETSMART for a period of one year from date of Certificate of Substantial Completion unless specified for a longer period. Any warranty repair work that proves to be defective in workmanship and/or materials shall be repaired/replaced without delay or expense whatsoever to PETSMART.
- **COMPILED SPECIFIC WARRANTIES/PLANS INCLUDING BUT NOT LIMITED TO THE FOLLOWING:**

All subcontractors warranties;

Asphalt Paving	1 Year
Concrete	1 Year
Masonry	1 Year
Structural Metal	1 Year
Carpentry	1 Year
Steel Erector	1 Year
Building Insulation	1 Year
Roofing	<u>5 Years</u>
Caulking & Sealant	<u>5 Years</u>
Hollow Metal Doors & Frames	1 Year
Aluminum Doors & Frames	<u>2 Years</u>
Wood Doors	<u>Life of Install.</u>
Overhead Doors	1 Year
Finish Hardware	<u>2 Years</u>
Glass & Glazing	1 Year
Gypsum Wallboard/Framing,	1 Year
E.I.F.S.	<u>10 Years</u>
Acoustical Treatment	1 Year
Polished Concrete	3 Years
Painting	1 Year
Dock Facilities	1 Year
Mechanical/Sheet Metal	<u>2 Years</u>
	<u>5 Yrs Compressor</u>
	<u>10Yrs (Heat Exchanger)</u>
Plumbing	<u>2 Years</u>
Fire Sprinkler System	<u>2 Years</u>

Electrical

2 Years

Roofing – 5 years by manufacturer (15 year available if Landlord wants to purchase – not included in original pricing).

Each of the warranty sections shall contain the following information;

1. Product or Work Item
 2. Subcontractor or Vendor firm name and address, with name of responsible principal, and telephone number for that individual (including 24 hour emergency telephone numbers)
 3. Scope of the Warranty, Bond or Service Contract
 4. Date of the beginning of the Warranty, Bond or Service Contract
 5. Duration of the Warranty, Bond or Service Contract
 6. Proper procedures for tenant's personnel in case of failure.
- *FIRE SPRINKLER PLAN/INFORMATION* - Appropriate shop drawings and warranty
 - *SPARE PARTS AND MAINTENANCE MATERIALS CHECKLIST (INCLUDED IN THIS SECTION)*
 - *HEALTH DEPARTMENT APPROVAL* - where necessary
 - *FORMAL TEST & BALANCE REPORT* - completed by HVAC Subcontractor*.
 - *HVAC EOC LIST*

*It is the General Contractor's responsibility to ensure the HVAC Subcontractor has completed the two above requirements.

- *NEXREV Energy Management Commissioning Report.*

SEMI-FINAL AND FINAL INSPECTIONS

Closeout is hereby defined to include general requirements near end of contract time, in preparation for final acceptance, final payment, normal termination of contract, occupancy by PETSMART and similar actions evidencing completion of the work. Specific requirements for individual units of work are specific throughout this specification. Time of closeout is directly related to "Substantial Completion".

When General Contractor is of the opinion that the Project is Substantially Complete, (each and all departments are ready for their intended use) he shall request a final inspection by the Professional of Record/Project Manager to create a punch list. Such notice shall be given at least 20 days before the requested inspection date.

PREREQUISITES TO SUBSTANTIAL COMPLETION

General: This will happen after General Contractor and subcontractors have completed their punch list.

Prior to requesting Professional of Record's/Project Manager's inspection for Certification of Substantial Completion, complete the following:

- General Contractor is responsible to provide routo-router service for all plumbing lines after installation. A video camera scope is required; video is to be provided to the PETSMART construction manager at building turn over.
- A. Obtain and submit releases enabling Tenant's full and unrestricted use of the work and access to services and utilities, including (where required) occupancy permits, operating certificates, and similar releases.
 - B. Complete start-up testing of systems, and instructions of Tenant's operating/maintenance personnel. Discontinue (or changeover) and remove from project site temporary facilities and services, along with construction tools and facilities, mock-ups, and similar events.
 - C. "Prior to Substantial completion the General Contractor shall schedule and execute a phone conference with the PETSMART Construction Manager, Mechanical Contractor, Electrical Contractor, Fire Alarm vendor/contractor, LENNOX & NEXREV to discuss and resolve issues listed within the Testing and Balancing report, Energy Management Checklist, and the Equipment Operational Check Report (EOC). These discussions shall bring to resolution any problems indicated within the above referenced reports with action noted by the appropriate party(s) to the satisfaction of PETSMART"
 - D. Complete final cleaning up requirements, including touch-up painting of marred surfaces.

If the Construction Manager finds that the Project is substantially complete, he will instruct the Professional of Record to prepare a Certificate of Substantial Completion, and Letters of Conformance attaching thereto a list or "Punch List" of items to be completed or corrected.

ISSUANCE OF SUBSTANTIAL COMPLETION

After the Professional of Record's inspection and the issuance of Certification of Substantial Completion has been completed, the following items shall be completed:

- A. In progress payment request, coincident with or first following date claimed, show either 100% completion for portion of work claimed as "substantially complete", or list incomplete items, value of incompleteness, and reasons for being incomplete.
- B. Include supporting documentation for completion as indicated in these contract documents.

- C. Submit specific warranties, workmanship/maintenance agreements and final certifications for review of each required manual, and similar documents.
- D. Deliver tools, spare parts, extra stocks of materials, and similar physical items to Owner/PETSMART.
- E. Touch-up and otherwise repair and restore marred exposed finishes.
- F. Replace filters in the domestic water post filter system.

RE-INSPECTION PROCEDURE

Upon receipt of General Contractor's request for final inspection and that the work has been completed, including punch-list items resulting from earlier inspections, and excepting incomplete items delayed because of acceptable circumstances, (subject to Owner and PETSMART approval), PETSMART will re-inspect work once.

After completion of the procedures outlined above the General Contractor shall submit his final application for payment in accordance with the Agreement, the General Conditions and Supplementary General Conditions.

If, because of acts or omissions of the General Contractor, PETSMART is required to conduct more than one final inspection of the Project to review the "Punch List", he will charge the Contractor for the additional services required and such costs will be pre-paid to PETSMART by the General Contractor. The Contractor must complete the "Punch List" within 15 days from its assembly.

The HVAC contractor is responsible to change the filters and clean the smoke detectors during re-inspection. This responsibility must be followed by a confirmation in writing as part of the "Punch List."

Subcontractor is to label each unit with a 3" size reflective number for easy visibility from the side ladder, and should use this number in the "HVAC Equipment List" (see below).

STORE MANAGER WALK-THROUGH

PETSMART's Construction Manager will arrange for each installer of work requiring continuing maintenance or operation and General Contractor, to meet with PETSMART personnel, at the project site, to provide basic instructions by manufacturer's representatives where installers are not expert in the required procedures. Review maintenance manuals, record documentation, tools, spare parts, and materials, lubricants, fuels, identification system, control sequences, hazards, cleaning and similar procedures and facilities. For operational equipment, demonstrate start-up, shutdown, emergency operations, noise and vibration adjustments, safety, economy/efficiency adjustments, energy effectiveness, and similar operations. Review maintenance and operations in relations with applicable warranties, agreements to maintain bonds, and similar continuing commitments.

SPARE PARTS AND MAINTENANCE MATERIALS

The General Contractor shall deliver to PETSMART the spare parts, extra stock, and maintenance materials listed below at time of punch list. Materials shall be neatly packaged and identified. The General Contractor shall complete the sign-off checklist below and provide the completed and signed checklist to the Petsmart CM.

SECTION	ITEM	RECEIVED BY
07920 – Joint Sealants	2 tubes of grey Sikaflex 1A polyurethane sealant	
09310 – Ceramic Tile	1 box new unopened ceramic tile for each type used. (There are two types used)	
09511 – Acoustical Panel Ceilings	1 box new unopened ceiling tile for each type used. (There are 3 types used)	
09651 - Wall Base	20 feet continuous roll of 4" rubber cove base to match installed	
09910 – Painting	1 full new unopened gallon of each type of paint used, see building plan, sheet A7	
15202 – Air Distribution Filters	1 box of new unopened filters for Salon return air grill	
15300 – Fire Protection	1 head wrench 1 cabinet (capacity sized to house all heads) 2 each of type head a) recessed, interior b) recessed, exterior c) upward pendant warehouse, interior d) upward pendant main sales, interior e) upward pendant, exterior f) other as indicated	
16000 – Electrical	- one (1) new unopened box of plug outlet covers, supplied by Electrical Subcontractor - one (1) new unopened box of switch plate covers, supplied by Electrical Subcontractor	

The General Contractor has delivered all spare parts, extra stock, and maintenance materials as defined above in a satisfactory condition.

The Petsmart CM is to upload the document to USGN under the Closeout tab on the top toolbar, under Internal Closeout Documents.

Petsmart Construction Manager

Date

General Contractor

Date

Form Revised 5.28.19

PROJECT CLOSEOUT STATUS CHECKLIST

LOCATION: _____

DATE: _____

JOB NO.: _____

UPLOADED TO CONSTRUCTION WEBSITE*: _____

*IN PROJECT UNDER THE CLOSE OUT TAB ON TOP TOOLBAR, PROJECT CLOSEOUT FROM/VIEW LOG

PROJECT MANUAL

ITEM DESCRIPTION	NOT COMPLETE	NOT APPROVED	COMPLETED
CERTIFICATE OF OCCUPANCY			
COMPLETELY SIGNED CERTIFICATE OF SUBSTANTIAL COMPLETION			
1 YEAR WARRANTY DOCUMENTATION BY GENERAL CONTRACTOR (INCLUDING ALL SUBCONTRACTOR WARRANTIES)			
SUBCONTRACTOR INFORMATION LIST WITH NAME, ADDRESS, & TELEPHONES			
Asphalt Paving 1 Year			
Concrete 1 Year			
Masonry 1 Year			
Structural Metal 1 Year			
Carpentry 1 Year			
Steel Erector 1 Year			
Building Insulation 1 Year			
Roofing <u>5 Years</u>			
Caulking & Sealant <u>5 Years</u>			
Hollow Metal Doors & Frames 1 Year			
Aluminum Doors & Frames <u>2 Years</u>			
Wood Doors <u>Life of Install.</u>			
Overhead Doors 1 Year			
Finish Hardware <u>2 Years</u>			
Glass & Glazing 1 Year			
Gypsum Wallboard/Framing 1 Year			
Ceramic Tile 1 Year			
Plastic Panel Wall Covering 2 Years			
E.I.F.S. <u>10 Years</u>			
Acoustical Treatment 1 Year			
Painting 1 Year			
Dock Facilities 1 Year			

Mechanical/Sheet Metal	<u>2 Years, 5 Yrs Compressor, 10Yrs Heat Exchanger</u>			
Plumbing	<u>2 Years</u>			
Fire Sprinkler System	<u>2 Years</u>			
Electrical	<u>2 Years</u>			
SUBCONTRACTOR INFORMATION LIST WITH NAME, ADDRESS, & TELEPHONES				
HVAC TEST & BALANCE REPORT				
SUBCONTRACTOR 5 YEAR WARRANTY FOR ROOFING				
FIRE SPRINKLER SYSTEMS AND HYDRAULIC PLACARD POSTED ON THE STANDPIPE				
O&M MANUALS				
SEWER VIDEO				
RPZ CERTIFICATION				
SPARE PARTS & MAINTENANCE MATERIAL – CHECKLIST SIGNED				
PUNCH LIST ITEMS COMPLETED & SIGNED BY GENERAL CONTRACTOR, PROFESSIONAL OF RECORD AND CONSTRUCTION MANAGER (20 DAYS MAXIMUM)				

RECORD DRAWINGS

ITEM DESCRIPTION	NOT COMPLETE	NOT APPROVED	COMPLETED
ONE (1) SET OF AS-BUILTS DOCUMENTS IN A STORAGE TUBE, MARKED "AS BUILTS" & LEFT AT LOCATION NEAR STORE'S ELECTRICAL WALL AS SHOWN ON DRAWING A2.2			

END OF SECTION

Confirmation Checklist HVAC Test & Balance Confirmation

TO: _____ EMAIL: _____
 FROM: _____ DATE: _____
 JOB NAME: PetSmart ADDRESS: _____

SCHEDULED DATE FOR T&B: _____ (Ideally 1-2 weeks before turnover)

To ensure the HVAC system is ready for the test and air balance on the above scheduled date, please verify that the following (applicable) items are completed:

PETSMART PREPARATION CHECKLIST

PETSMART - STORE # _____

PLEASE CHECK THESE KEY ITEMS TO ENSURE BALANCING CAN PROCEED SMOOTHLY

	RTU-1	RTU-2	RTU-3	RTU-4	RTU-5	RTU-6	RTU-7	RTU-8	EF-1	EF-2	EF-3	EF-4
Ductwork is 100% Completed/All terminals installed												
All inlets/outlets have balancing dampers												
All balancing dampers are accessible												
Ductwork and diffusers are insulated as per spec												
Wet area diffusers are insulated (blanket on top)												
Plenum Boxes for linears are insulated												
Filters are installed												
HVAC units are installed in proper locations												
Exhaust fans are installed in proper locations												
HVAC Systems and exhaust fans are wired												
HVAC Systems have been started up												
Overload protection is properly sized												
Outside air damper controls are operational												

PLEASE CHECK OFF EACH ITEM AS IT IS VERIFIED COMPLETED AND RETURN CHECKLIST ONCE COMPLETED

PLEASE ENSURE THE MOTORIZED DAMPERS ARE INSTALLED AND OPERATIONAL ON RTU-5 (HOLDING ROOM)

THESE ARE THE MOST OVERLOOKED ITEM - PLEASE DOUBLE CHECK

THE SUPERINTENDENT MUST SIGN AND RETURN THIS CHECKLIST. THE CHECKLIST MUST INDICATE THE HVAC SYSTEM IS 100% READY.

Superintendent Signature: _____ Date: _____

NOTE: This checklist must be returned no later than Wednesday (3:00pm, EST/EDT) of the week prior to the date requested to prevent a \$450 surcharge for insufficient notice. There will be a \$1250 surcharge if the HVAC system is not ready and a second visit must be made. This request for work will only be scheduled upon receipt of a completed checklist indicating the site is ready.

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PART I – GENERAL**WORK SPECIFIED HEREIN**

This section outlines requirements for cleaning of the project work. This section is complementary to the General Conditions and Supplementary General Conditions and nothing herein shall be considered to waive any requirements of the General Conditions or Supplementary General Conditions, or additional requirements within this specification.

REQUIREMENTS OF REGULATORY AGENCIES

Safety and Insurance Standards: Maintain project in accordance with the following safety and insurance standards:

1. State Industrial Commission
2. OSHA

Fire Protection: Store volatile waste in covered metal containers and remove from premises daily.

PART II – PRODUCTS**CLEANING MATERIAL**

Use only cleaning materials recommended by manufacturer of surface to be cleaned. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART III – EXECUTION**DURING CONSTRUCTION**

- During the construction period, the material to be used in the work shall be kept in an orderly manner, neatly stacked or piled.
- Clean up frequently (at least daily) all refuse, rubbish, scrap materials, and debris caused by operations, to the end that at all times the site of the work shall present a neat, orderly and workmanlike appearance. Sprinkle dusty debris with water.
- Provide for the disposal of all waste products, trash, debris, etc., and make necessary arrangement for legal disposal of same off the site.
- Remove all surplus material, false-work, temporary structures, including foundations thereof, plant of any description and debris of every nature resulting from operations, and put the site in a neat, orderly condition.
- Vacuum clean interior building areas when ready to receive finish painting and continue vacuum cleaning on an as-needed basis until building is ready for acceptance.
- Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.
- General Contractor shall provide trash gondolas or containers for use by all trades.
- General Contractor may bill trades proportionately for trash gondola use at no additional cost to the Owner/ PETSMART or his vendors.

FINAL CLEANING

- Use experienced workmen or professional cleaners for final cleaning.
- Besides general broom cleaning, do following special cleaning for all trades at completion of work:
- Remove putty stains from glass and mirrors; wash, polish same, inside and outside. Exercise care not to scratch glass.
- Remove marks, stains, fingerprints, other soil, dirt from painted, decorated, or stained work.
- Clean, polish and wax woodwork. (Where applicable)
- Clean and polish hardware for removal of stains, dust, dirt, paint and the like.
- Remove spots, soil, paint from tile and similar work; wash same.
- Clean fixtures, equipment; remove stains, paint, dirt, and dust.
- Remove temporary floor protections.
- Clean and damp mop all tile floors.
- Remove all temporary protections at the site.
- Remove labels which are not required as permanent labels.
- Clean exposed exterior and interior hard-surfaced finishes, to a dirt-free condition, free of dust, stains, films and similar noticeable distracting substances. Except as otherwise indicated, avoid disturbance of natural weathering of exterior surfaces. Restore reflective surfaces to original reflective condition.
- Wipe surfaces of mechanical and electrical equipment clean, including elevator equipment and similar equipment: remove excess lubrication and other substances.
- Remove debris and surface dust from limited-access spaces including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics and similar spaces.
- Make buildings ready for occupancy in all respects. Lay heavy building paper in main circulation areas to protect the floors until final inspection and acceptance.
- All existing improvements, inside or outside the property which are disturbed, damaged or destroyed by the work under the Contract shall be restored to the condition in which they originally were or to the satisfaction of the Professional of Record.
- Clean project site yard and grounds), including landscape development areas, of litter and foreign substances. Sweep paved areas to a broom-clean condition; remove stains, petrochemical spills and other foreign deposits. Rake grounds which are neither planted nor paved, to a smooth, even-textured surface.
- Pest Control: The General Contractor shall engage an experienced exterminator to make a final inspection of project, and to rid project of rodents, insects and other pests and to pay all costs for same.

- Removal of Protection: Except as otherwise indicated or requested by Architect, remove temporary protection devices and facilities which were installed during course of the work to protect previously completed work during remainder of construction period.
- Where extra materials of value as determined by PETSMART remain after completion of associated work, they shall become the property of PETSMART.
- Between substantial completion and final acceptance General Contractor shall maintain the store in a state of cleanliness.

END OF SECTION

PART I – GENERAL**RELATED DOCUMENTS**

- Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section. Requirements of this section DO NOT release the Contractor from compliance with requirements of individual specification sections.
- OPR and BoD documentation prepared by Owner and Architect contains requirements that apply to this Section.

SUMMARY

- This Section includes general requirements that apply to implementation of commissioning for ALL systems to be commissioned. Contractor should refer all disciplines to this section.
- Related work includes the following:
 1. Division 15 Mechanical.
 2. Division 16 Electrical.

DEFINITIONS

- BoD: Basis of Design, also referred to as the Design Intent Document.
- CxA: Commissioning Authority.
- OPR: Owner's Project Requirements.
- Systems, Subsystems, and Equipment: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, and equipment.
- TAB: Testing, Adjusting, and Balancing.

COMMISSIONING TEAM

- Members Appointed by Contractor(s): Individuals, each having authority to act on behalf of the entity he or she represents, explicitly organized to implement the commissioning process through coordinated actions. The commissioning team shall consist of, but not be limited to, representatives of sub-Contractors associated with each of the applicable divisions, including Project superintendent and subcontractors, installers, suppliers, and specialists deemed appropriate by the CxA.
- Members Appointed by Owner:
 1. CxA: The designated person, company, or entity that plans, schedules, and coordinates the commissioning team to implement the commissioning process. Owner will engage the CxA under a separate contract.
 2. Representatives of the facility user and operation and maintenance personnel.
 3. Architect and engineering design professionals.

OWNER'S RESPONSIBILITIES

- Provide the OPR documentation to the CxA and Contractor for use in developing the commissioning plan and testing plans and checklists.
- Assign operation and maintenance personnel and schedule them to participate in commissioning team activities including, but not limited to, the following:
 1. Coordination meetings.
 2. Testing meetings.
 3. Demonstration of operation of systems, subsystems, and equipment.
 4. Training in operation and maintenance of systems, subsystems, and equipment.
- Provide utility services required for the commissioning process.
- Provide the BoD documents, prepared by Architect/Engineer and approved by Owner, to the CxA and Contractor for use in developing the commissioning plan, and testing plans and checklists.

CONTRACTOR'S RESPONSIBILITIES

- Provide utility services required for the commissioning process.
- Contractor shall assign representatives with expertise and authority to act on behalf of the Contractor and schedule them to participate in and perform commissioning team activities including, but not limited to, the following:
 1. Participate in design- and construction-phase coordination meetings.
 2. Distribute (CxA provided) pre-functional checklists to appropriate subcontractors.
 3. Ensure completion of, and collect, completed Pre-functional checklists and return to CxA.
 4. Participate in Pre-Functional and Functional Testing meetings.
 5. Participate in maintenance orientation and inspection.
 6. Participate in operation and maintenance training sessions.
 7. Participate in final review at acceptance meeting.
 8. Certify that Work is complete and systems are operational according to the Contract Documents, including calibration of instrumentation and controls.
 9. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend and coordinate corrective action.
 10. Review and approve final commissioning documentation.

- Subcontractors shall assign representatives with expertise and authority to act on behalf of subcontractors and schedule them to participate in and perform commissioning team activities including, but not limited to, the following:
- Related work includes the following:
 1. Participate in design and construction phase coordination meetings.
 2. Participate in procedures meeting for testing.
 3. Provide information to the CxA for developing construction phase commissioning plan.
 4. Provide schedule for operation and maintenance data submittals, equipment startup, and testing to CxA for incorporation into the commissioning plan. Update schedule on a weekly basis throughout the construction period.
 5. Provide updated Project Record Documents to the CxA on a weekly basis.
 6. Provide technicians who are familiar with the construction and operation of installed systems and who shall develop specific test procedures and participate in testing of installed systems, subsystems, and equipment. Ensure participation of equipment/system vendors as required.
 7. Gather and submit operation and maintenance data for systems, subsystems, and equipment to the CxA, as specified in Division 01 Section "Operation and Maintenance Data."
 8. Complete Pre-functional Checklists Provided by CxA as distributed by the Contractor, and return *prior* to functional performance testing.
 9. Participate in maintenance orientation and inspection.
 10. Prepare Training Manuals and participate in training sessions for Owner's operation and maintenance personnel.
 11. Participate in final review at acceptance meeting.

C X A ' S R E S P O N S I B I L I T I E S

- Organize and lead the commissioning team.
- Prepare a construction-phase commissioning plan. Collaborate with Contractor and with subcontractors to develop commissioning checklists that will be used by (sub) Contractors to prepare detailed test and inspection procedures. Include design changes and scheduled

commissioning activities coordinated with overall Project schedule. Identify commissioning team member responsibilities, by name, firm, and trade specialty, for performance of each commissioning task.

- Review and comment on submittals from Contractor and sub-Contractor for compliance with the OPR, BoD, Contract Documents, and construction-phase commissioning plan. Review and comment on performance expectations of systems and equipment and interfaces between systems relating to the OPR and BoD.
- Convene commissioning team meetings for the purpose of coordination, communication, and conflict resolution; discuss progress of the commissioning processes. Responsibilities include arranging for facilities, preparing agenda and attendance lists, and notifying participants. The CxA shall prepare and distribute minutes to commissioning team members and attendees within five workdays of the commissioning meeting.
- At the beginning of the construction phase, conduct an initial construction-phase coordination meeting for the purpose of reviewing the commissioning activities and establishing preliminary schedules for pre-functional testing, functional testing, operation and maintenance submittals; operation and maintenance training sessions; TAB Work; and Project completion.
- Prepare Project-specific pre-functional checklists to be used by Contractor and sub-Contractors.
- Schedule, direct, witness, and document functional performance testing.
- Compile test data, inspection reports, and certificates and include them in the systems manual and commissioning report.
- Provide blank functional performance testing forms for inclusion in operations and maintenance manuals to facilitate future recommissioning efforts.
- Certify date of acceptance and startup for each item of equipment for start of warranty periods.
- Review Project Record Documents for accuracy. Request revisions from Contractor to achieve accuracy. Project Record Documents requirements are specified in Division 01 Section "Project Record Documents."
- Review and comment on operation and maintenance documentation and systems manual outline for compliance with the OPR, BoD, and Contract Documents. Operation and maintenance documentation requirements are specified in Division 01 Section "Operation and Maintenance Data."
- Review operation and maintenance training program outline and coordinate participation by sub-Contractors and equipment vendors to provide qualified instructors to conduct operation and maintenance training.
- Prepare commissioning reports.

- Assemble the final commissioning documentation, including the commissioning report and Project Record Documents.
- Participate in a 10 month review of building's operations and maintenance and develop a plan for resolving outstanding commissioning related issues.

COMMISSIONING DOCUMENTATION

- Index of Commissioning Documents: CxA shall prepare an index to include storage location of each document.
- OPR: A written document, prepared by Owner, that details the functional requirements of Project and expectations of how it will be used and operated. This document includes Project and design goals, measurable performance criteria, budgets, schedules, success criteria, and supporting information.
- BoD Document: A document, prepared by Architect and MEP Engineer, that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.
- Commissioning Plan: A document, prepared by CxA, that outlines the documentation requirements of the commissioning process, and shall include, but is not limited to the following:
 1. Plan for delivery and review of submittals, systems manuals, and other documents and reports. Identification of the relationship of these documents to other functions and a detailed description of submittals that are required to support the commissioning processes. Submittal dates shall include the latest date approved submittals must be received without adversely affecting commissioning plan.
 2. Identification of systems and equipment to be commissioned.
 3. Description of schedules for testing procedures along with identification of parties involved in performing and verifying tests.
 4. Identification of items that must be completed before the next operation can proceed.
 5. Description of responsibilities of commissioning team members.
 6. Description of observations to be made.
 7. Description of requirements for operation and maintenance training, including required training materials.
 8. Description of expected performance for systems, subsystems, equipment, and controls.
 9. Schedule for commissioning activities with specific dates coordinated with overall construction schedule.

10. Identification of installed systems, subsystems, and equipment, including design changes that occurred during the construction phase.
 11. Process and schedule for documenting changes on a continuous basis to appear in Project Record Documents.
 12. Process and schedule for completing pre-functional checklists and functional performance tests for systems, subsystems, and equipment to be verified and tested.
 13. Step-by-step procedures for testing systems, subsystems, and equipment with descriptions for methods of verifying relevant data, recording the results obtained, and listing parties involved in performing and verifying tests.
- Pre-functional Checklists: CxA, with assistance of project manager, mechanical engineer, and controls contractor shall develop pre-functional checklists for each system, subsystem, or equipment including interfaces and interlocks, and include a separate entry, with space for comments, for each item to be tested. Prepare separate functional performance tests for each mode of operation and provide space to indicate whether the mode under test responded as required. Provide space for testing personnel to sign off on each checklist. Each checklist, regardless of system, subsystem, or equipment being tested, shall include, but not be limited to, the following:
 1. Name and identification code of tested item.
 2. Test number.
 3. Time and date of test.
 4. Indication of whether the record is for a first test or retest following correction of a problem or issue.
 5. Dated signatures of the person performing test and of the witness, if applicable.
 6. Individuals present for test.
 7. Deficiencies.
 8. Issue number, if any, generated as the result of test.
 - Test and Inspection Reports: CxA shall record test data, observations, and measurements on test checklists. Photographs, forms, and other means appropriate for the application shall be included with data. CxA shall compile test and inspection reports and test and inspection certificates and include them in systems manual and commissioning report.
 - Corrective Action Documents: CxA shall document corrective action taken for systems and equipment that fail tests. Include required modifications to systems and equipment and revisions to test procedures, if any. Retest systems and equipment requiring corrective action and document retest results.
 - Issues Log: CxA shall prepare and maintain an issues log that describes design, installation, and performance issues that are at

variance with the OPR, BoD, and Contract Documents. Identify and track issues as they are encountered, documenting the status of unresolved and resolved issues.

1. Creating an Issues Log Entry:
 - a. Identify the issue with unique numeric or alphanumeric identifier by which the issue may be tracked.
 - b. Assign a descriptive title of the issue.
 - c. Identify date and time of the issue.
 - d. Identify test number of test being performed at the time of the observation, if applicable, for cross-reference.
 - e. Identify system, subsystem, and equipment to which the issue applies.
 - f. Identify location of system, subsystem, and equipment.
 - g. Include information that may be helpful in diagnosing or evaluating the issue.
 - h. Note recommended corrective action.
 - i. Identify commissioning team member responsible for corrective action.
 - j. Identify expected date of correction.
 - k. Identify person documenting the issue.
2. Documenting Issue Resolution:
 - a. Log date correction is completed or the issue is resolved.
 - b. Describe corrective action or resolution taken. Include description of diagnostic steps taken to determine root cause of the issue, if any.
 - c. Identify changes to the OPR, BoD, or Contract Documents that may require action.
 - d. State that correction was completed and system, subsystem, and equipment are ready for retest, if applicable.
 - e. Identify person(s) who corrected or resolved the issue.
 - f. Identify person(s) documenting the issue resolution.
3. Issues Log Report: On a periodic basis, but not less than for each commissioning team meeting, CxA shall prepare a written narrative for review of outstanding issues and a status update of the issues log. As a minimum, CxA shall include the following information in the issues log and expand it in the narrative:
 - a. Issue number and title.
 - b. Date of the identification of the issue.
 - c. Name of the commissioning team member assigned responsibility for resolution.
 - d. Expected date of correction.

- Commissioning Report: CxA shall document results of the commissioning process including unresolved issues and performance of systems, subsystems, and equipment. The commissioning report shall indicate whether systems, subsystems, and equipment have been completed and are performing according to the OPR, BoD, and Contract Documents. The commissioning report shall include, but is not limited to, the following:

1. Lists and explanations of substitutions; compromises; variances in the OPR, BoD, and Contract Documents; record of conditions; and, if appropriate, recommendations for resolution. This report shall be used to evaluate systems, subsystems, and equipment and shall serve as a future reference document during Owner occupancy and operation. It shall describe components and performance that exceed requirements of the OPR, BoD, and Contract Documents and those that do not meet requirements of the OPR, BoD, and Contract Documents. It may also include a recommendation for accepting or rejecting systems, subsystems, and equipment.
2. OPR and BoD documentation.
3. Commissioning plan.
4. Testing plans and reports.
5. Corrective modification documentation.
6. Issues log.
7. Completed test checklists.
8. Listing of off-season test(s) not performed and a schedule for their completion.

SUBMITTALS

- Commissioning Plan Prefinal Submittal: CxA shall submit hard copies of prefinal commissioning plan. Deliver one copy to Contractor, Owner, Engineer and Architect. Present submittal in sufficient detail to evaluate data collection and arrangement process. One copy, with review comments, will be returned to the CxA for preparation of the final construction-phase commissioning plan.
- Commissioning Plan Final Submittal: CxA shall submit hard and digital copies of final commissioning plan. The final submittal must address previous review comments. The final submittal shall include a copy of the prefinal submittal review comments along with a response to each item.
- Pre-functional Checklists: CxA shall submit pre-functional checklists to Contractor to distribute to sub-contractors for completion. These checklists shall be completed by the installing sub-contractors.
- Test and Inspection "Trip" Reports: CxA shall submit test and inspection reports.

- Corrective Action Documents: CxA shall submit corrective action documents.
- Prefinal Commissioning Report Submittal: CxA shall submit hard copies of the prefinal commissioning report. Include a copy of the preliminary submittal review comments along with CxA's response to each item. CxA shall deliver one copy to Owner and one copy to Architect. One copy, with review comments, will be returned to the CxA for preparation of final submittal.
- Final Commissioning Report Submittal: CxA shall submit hard copies and electronically formatted information of the final commissioning report. CxA shall deliver one hard copy and one set of discs to Owner, and one copy to Architect. The final submittal must address previous review comments and shall include a copy of the prefinal submittal review comments along with a response to each item.

QUALITY ASSURANCE

- Instructor Qualifications: Factory-authorized service representatives, experienced in training, operation, and maintenance procedures for installed systems, subsystems, and equipment.
- Test Equipment Calibration: Comply with test equipment manufacturer's calibration procedures and intervals. Recalibrate test instruments immediately whenever instruments have been repaired following damage or dropping. Affix calibration tags to test instruments. Instruments shall have been calibrated within six months prior to use.

COORDINATION

- Coordination Meetings: CxA shall conduct coordination meetings of the commissioning team to review progress on the commissioning plan, to discuss scheduling conflicts, and to discuss upcoming commissioning process activities. Frequency of meetings shall vary depending on phase of construction, but at least once monthly and not more than once weekly.
- Pretesting Meetings: CxA shall conduct pretest meetings of the commissioning team to review startup reports, pre-functional checklist results, testing procedures, testing personnel and instrumentation requirements, and manufacturers' authorized service representative services for each system, subsystem, equipment, and component to be tested. Separate Pretesting meetings shall be held with each subcontractor responsible for each subsystem to be tested. Pretesting meetings shall take place prior to Functional Performance Testing and can occur via conference call.
- Testing Coordination: CxA shall coordinate sequence of testing activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
 1. Schedule times for tests, inspections, obtaining samples, and similar activities.

- Manufacturers' Field Services: CxA shall coordinate through Contractor and sub-Contractors for manufacturers' field services.

PART II – PRODUCTS

(NOT USED)

Part III – Execution

GENERAL

- A commissioning team scoping meeting shall be held at a time and place designated by CxA within 14 days of issuance of Notice to Proceed. Owner, Commissioning Authority, General Contractor, and all major sub-Contractors (Mechanical, Electrical, and Controls) shall be present at this meeting. The purpose of the meeting is to review the preliminary Construction Phase Commissioning Plan, familiarize all parties with the requirements of the commissioning process, and to ensure that the responsibilities of each party are clearly understood.
- Separate meetings including individual equipment suppliers and subcontractors shall be held prior to commissioning of their systems as outlined in Part-1 of this Section.
- CxA shall update and modify the Commissioning Plan as needed after meeting with Contractor and sub-Contractors to reflect updated scope and schedule.
- Contractor shall include in proposal the time required to attend and have suppliers and subcontractors attend Commissioning Meetings associated with each item scheduled to be commissioned under Part 4 of this specification.

SUBMITTAL REVIEW

- CxA shall review submittals for systems listed in Part-4 of this specification to obtain information needed to fine-tune Pre-Functional and Functional Checklists based on actual equipment and systems to be installed.
- Should CxA discover discrepancies between submitted data and design requirements, he shall issue submittal review comments to Architect, Engineer, and Owner.
- Upon approval of submittals, Contractor and sub-Contractors shall submit preliminary Operations and Maintenance manuals for systems listed in Part-4 of this specification for review by Owner, Architect and CxA.
- Upon review of comments issued on preliminary O&M Manuals, Contractor and sub-Contractors shall issue final O&M Manuals for use by CxA in preparing testing checklists and training manuals.

INSPECTION AND TESTING

- CxA shall prepare pre-functional checklists and functional performance tests for all systems to be commissioned as listed in Part 4 of this specification.
- Contractor and sub-Contractors shall complete and sign all pre-functional checklists prior to system startup of the equipment/system they have installed. Completed pre-functional checklists shall then be submitted to the CxA via the General Contractor.
- Upon completion and CxA approval of pre-functional checklists, functional performance testing shall begin. CxA shall coordinate with Contractor and individual sub-Contractors to schedule execution of functional performance testing. Contractor and sub-Contractors shall perform functional performance tests in the presence of CxA. There are two distinct types of tests for which the Contractor is responsible:
 1. Pre-Functional Checklists: These tests ensure that all equipment and systems are installed in accordance with specifications, drawings, manufacturer's requirements, and all applicable codes, and are started-up according to manufacturer's instructions. The CxA need not witness these tests.
 2. Functional Performance Tests: These tests ensure that all the equipment and systems can operate in accordance with design intent in all modes of operation. Functional performance tests shall be developed by the CxA for each system individually and for the system as a whole once all controls are implemented. Tests not witnessed by CxA shall not be considered complete
- Contractor and sub-Contractor shall make all test readings available to CxA and shall initial checklists prepared by CxA noting whether or not test requirements have been met.
- CxA shall issue test reports with readings and checklists and a listing of any deficiencies that must be addressed by Contractor or sub-Contractors.
- Contractor and sub-Contractors shall in proposal include all costs associated with preparation and execution of Testing Procedures for all items listed in Part 4 of this specification.

OPERATION AND MAINTENANCE TRAINING REQUIREMENTS

- Training Manuals: Operations and Maintenance (O&M) manuals for each piece of equipment will be prepared by the installing sub-contractors. The CxA will collaborate with the Start-up and Testing Contractor (Entek, Inc.) to develop a systems manual that provides future operating staff the information needed to understand and optimally operate the integrated commissioned systems listed in Part-4 of this Section.

- Training Materials: Contractor and sub-Contractors shall provide documentation and materials required for training for each specific system or subsystem. CxA shall assemble into comprehensive training manual for each system or subsystem.
- Training: The CxA will verify that the requirements for training operating personnel and building occupants have been completed.
- Instructors: The Contractor shall act as coordinator of training activities. Contractor and sub-Contractors shall make available competent technicians and/or equipment representatives to conduct specialized aspects of systems and subsystems training under the direction of CxA.
- Training Sessions: The Contractor shall schedule Training Sessions after successful completion of Functional Performance Testing for individual systems, as listed in Part-4 of this specification. Contractor shall set aside no less than four (4) hours of training for each item to be commissioned.

COMMISSIONING REPORT

- Upon successful completion of testing procedures, and operation and maintenance training requirements, CxA shall prepare preliminary and final Commissioning Reports as detailed elsewhere in this specification.
- Contractor and sub-Contractors shall provide the following documentation for inclusion as part of the Commissioning Report:
 1. Record/As-built drawings and documentation.
 2. Final Operations and Maintenance Manuals.

Part IV – Systems to be Commissioned**GENERAL**

- The following outline of commissioning requirements by Division is provided as a guideline for Contractor, sub-Contractors, and CxA to understand the nature and extent of commissioning work, so that resources may be properly allocated.
- Commissioning specifications supplement requirements of individual specifications sections, but shall not be interpreted to replace or diminish the specified scope of any individual section.
- Additional Commissioning requirements are included in Section 15995, and Section 16995.
- Contractor shall coordinate with sub-Contractors and equipment vendors/representatives to set aside adequate time to address Pre-Functional Checklists, Functional Performance Testing, Operations and Maintenance Training, and associated coordination meetings.
- CxA shall also conduct site inspections at critical times (generally only for functional performance testing) and issue Cx Field Reports with observations on installation deficiencies so that they may be issued by Architect as deemed appropriate.

- For all systems listed below, Contractor and sub-Contractors shall comply with all commissioning requirements specified, including:
 1. Full set of Submittals to CxA for preparation of checklists and training manuals. Provide drawings approved by Authority having jurisdiction.
 2. Submit Operations and Maintenance Data to CxA for preparation of checklists and training manuals.
 3. Complete Pre-functional (installation) Checklists, Functional Performance Testing Procedures and conduct inspections and testing. Ensure participation by certified installer during inspection and testing.
 4. Conduct Operations and Maintenance training with participation by certified installer.
 5. As-built drawings and documentation.
 6. Additional requirements specified in Commissioning Sections 15995 and 16995.
 7. Requirements of individual specification sections.
- The following systems (with the corresponding specifications section in parenthesis) shall further comply with the commissioning requirements for Training:
 1. Rooftop Units
 2. Energy Management Systems
 3. Energy Management Systems (Section 16210)
 4. Lighting (Section 16500)

END OF SECTION**APPLICABLE SYSTEMS TO COMMISSION**

- The following systems (with the corresponding specifications section in parenthesis) shall comply with the commissioning requirements for Submittals and Pre-Functional Testing:
 1. Piping Insulation (Section 15090)
 2. Plumbing – Dom. HW only (Section 15400)
 3. Rooftop Units
 4. Air Distribution Systems and Accessories – Submittals required; Pre-Functional testing by field observation only (Section 15810)
 5. Energy Management Systems
 6. Testing, Adjusting, and Balancing (Section 15990)
 7. Energy Management Systems (Section 16210)
 8. Lighting (Section 16500)
- The following systems (with the corresponding specifications section in parenthesis) shall also comply with the commissioning requirements for Functional Testing:
 1. Plumbing – Dom. HW only (Section 15400)
 2. Rooftop Units
 3. Energy Management Systems
 4. Testing, Adjusting, and Balancing (Section 15990)
 5. Energy Management Systems (Section 16210)
 6. Lighting (Section 16500)

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SEE ATTACHED REPORT.

END OF SECTION

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PART I – GENERAL

WORK SPECIFIED HEREIN

All labor, materials, equipment and services necessary to complete the structure excavation, backfilling, compacting and related items as indicated or specified.

SUBSTITUTIONS

In accordance with Section 01600.

QUALITY ASSURANCE

Provide testing as specified herein (unless previously documented in geotechnical report by site developer).

Provide 5 field density tests of under-slab fill at locations directed.

Provide 5 field density tests of backfill at locations and elevations directed.

See Section 01400 for provisions covering payment for testing.

PART II – PRODUCTS

UNDER-SLAB FILL

As per geotechnical report (see Section 02150).

BACKFILL MATERIAL

Backfill material shall consist of the material excavated from the site (provided it is free of debris or vegetation) or shall be selected material as specified herein for under-slab fill per the geotechnical report criteria.

Backfill around pipes and conduits shall be clean sand (100% passing a #8 sieve) unless the local utility companies specify a different backfill. The utility company backfill shall govern if there are differences in backfill materials.

PART III – EXECUTION

PREPARATION

Identify all lines, elevations, and grades necessary to construct building subgrades as shown in the plans and specifications.

Protect benchmarks, property corners, monuments or other reference points.

Locate and identify all site utilities that have previously been installed and may be in danger of damage by grading operations.

Locate and identify all existing utilities that are to remain and protect them from damage.

EXCAVATION

Excavate building areas to line and grade as shown in the plans and specifications being careful not to overexcavate beyond the elevation needed for building subgrades.

Perform excavation using capable, well maintained equipment and methods acceptable to the Owner and the project document requirements.

Excavations for foundations and footings shall have clean vertical walls, all corners squared up. Keep entire excavation free from any loose material. Excavation shall conform to dimensions and elevations indicated with allowances for erection of forms, shoring, waterproofing, and inspection of footings.

Material to be excavated shall be non-classified and shall include all earth or other materials encountered in excavating. The Contract Sum is understood to cover the removal of all such materials to the depth and extent indicated or specified. The use of explosives will not be permitted.

The Drawings show predetermined elevations or depths for bottoms of footings. If additional depth of excavation should be necessary, the Contractor will be paid for the work in accordance with the provisions of the General Conditions.

Shore and brace excavations if necessary to prevent cave-ins. Remove shoring before backfilling is completed, but not until permanent supports are in place.

If excavation, through error or carelessness, is carried beyond depth indicated, backfilling will not be permitted except under floor slabs. Increase foundation depth as required and place backfill below floor slabs (material as herein specified) without extra compensation.

Remove all excess excavated material from the grounds and legally dispose of same.

UNDER-SLAB FILL PLACEMENT

Place under-slab fill to the thickness and grade indicated, smooth and even, free of voids. Compact to specified density. Grade to a tolerance of 1/4" in 10 feet.

BACKFILL

After completion of the foundations, walls and other construction, and removal of forms, clean the excavations of trash and debris.

Place the backfill symmetrically against each side of the walls to prevent eccentric loading. Place backfill in horizontal 6" layers with the proper moisture content for the required degree of compaction.

Backfill pipe and conduit trenches in a manner to prevent disturbance to the pipes or conduits. Fill under and around pipes thoroughly to a point approximately 12" above the top of the pipe and compact. Backfill remainder of trench in 6" layers and compact.

Building area subgrade pad shall be that portion of site directly beneath and 10 feet beyond the building and appurtenances.

The building area subgrade pad shall be prepared in strict accordance with the geotechnical report criteria.

Backfill materials used in preparation of the building pad shall be place in lifts or layers not to exceed 6 inches loose and compacted per the geotechnical report criteria.

COMPACTION

Compaction of under-slab fill and backfill shall be in horizontal lifts not exceeding 6" in thickness. Compact in accordance with requirements of geotechnical report.

Maintain optimum moisture content of fill materials to attain required compaction density.

MAINTENANCE OF SUBGRADE

Finished subgrades shall be verified to ensure proper elevation and conditions for construction above subgrade.

Protect subgrade from excessive wheel loading during construction, including concrete trucks and dump trucks.

Remove areas of finished subgrade found to have insufficient compaction density to depth necessary and replace in a manner that will comply with compaction requirements by use of material equal to or better than best subgrade material on site. Surface of subgrade after compaction shall be hard, uniform, smooth, stable and true to grade and cross sections.

END OF SECTION

PART I – GENERAL**GENERAL REQUIREMENTS**

Comply with requirements with Division 1.

RELATED WORK

- Section 02200: Structure Excavation and Backfilling
- Section 03200: Concrete Reinforcing
- Section 03300: Cast-in-Place Concrete
- Section 03320: Interior Concrete Slabs on Grade
- Section 06100: Rough Carpentry

WORK INSTALLED BUT SUPPLIED BY OTHERS

- Inserts, anchor bolts, miscellaneous frames, flashing reglets, holes, sleeves and other items that are supplied under the work of other Sections.

WORK SUPPLIED BUT NOT INSTALLED

- Supply recessed tie plugs to Section 03300 for installation.

REFERENCE STANDARDS

- Do concrete formwork in conformance with CSA A23.1/A23.2-2019 and CSA S269.1-1975 (R2003) unless specified otherwise.

QUALITY ASSURANCE

- Design criteria: be responsible for the structural design of formwork and its construction, including shoring and bracing, to ensure its stability and to support safely and resist loads imposed by weight of forms and wet concrete, wind, fluid pressure of concrete, equipment and workers.
- Allowable tolerances: construct formwork to maintain tolerances in conformance with requirements of CSA A23.1/A23.2-2019.

UNIT PRICES

- Unit prices for concrete work requested as a part of the Bid, shall include materials, erection, bracing, shoring, stripping and removing of formwork.

PART II – PRODUCTS**MATERIALS**

- Forms:
 - Generally: to CSA A23.1/A23.2-2019;
 - Falsework materials: to CSA S269.1-1975 (R2003)
 - Form panels for concrete exposed to view: smooth and free of defects which would be reproduced as concrete blemishes; use one of following materials;
 - Plywood panels: Douglas Fir minimum 17.5 mm (11/16") thick, to CSA 0121, coated or faced one side, specifically produced for formwork use, edges sealed;
 - Plywood or lumber form with plastic liner, designed for formwork use;
 - Metal forms, designed for formwork use.

- Chamfers: wood, 45°, cut from 25 mm x 25 mm (1"x1") nominal material or plastic type;
- Tubular forms: seamless type where concrete is exposed: Sonotubes.
- Form ties: snap-off type with plugs or approved equal to ensure that ties break off at approximately 20 mm (3/4") below face of concrete.
- Form release agent: chemically active type containing compounds that react with free lime present in concrete to provide water insoluble soaps, preventing concrete from sticking to forms; non-staining, non-grain raising; suitable for type of formwork on which used; having no adverse affect on paint, adhesives or other treatments which are specified for application to concrete and containing no non-drying ingredients such as mineral oil.
- Waterstops: extruded flexible PVC with centre bulb and corrugated wings.
- Joint filler: bituminous type to ASTM 994; asphalt impregnated fiber; "Sealtight – Asphalt Expansion Joint Filler" by W.R. Meadows of Canada Limited or as approved by Consultant.
- Dovetail anchor slots: 0.46 mm (26 ga) galvanized steel, glass fiber filled.

PART III – EXECUTION**EARTH FORMS**

- Where soil conditions are suitable, earth forms for wall footings may be used when approved by Consultant.

FORMWORK CONSTRUCTION

- Design, construct and remove formwork, framing, supports and bracing to conform to requirements of CSA A23.1/A23.2-2019 and CSA S269.1-1975 (R2003) and to provide finished poured concrete surfaces within specified tolerances.
- Do not eliminate or displace reinforcement to accommodate built-in work. Where inserts or openings cannot be located as indicated, obtain Consultant's review and approval of any modifications prior to placing concrete.
- Do not place concrete in forms without Consultant's prior review.
- Form construction joints expansion and waterstop joints where required, as indicated on drawings and as approved by Consultant. Locate and construct construction joints at architectural concrete surfaces as approved by Consultant.

5. Install waterstops where indicated; tie waterstops rigidly in place; install and field splice in accordance with manufacturer's recommendations to ensure effective water seal.
6. Build into formwork dovetail anchor slots for masonry anchors in locations as directed in Section 04200 and/or as required on Drawings.
7. Build into formwork inserts, anchor bolts, miscellaneous frames, flashing reglets, weather bars, holes, sleeves and items otherwise specified as supplied and located under the work of other Sections. Imbed no wood in concrete for purposes of anchorage.
8. Coat formwork with form release agent before reinforcement, anchors or other accessories are placed.
9. Before placing concrete, clean out forms to remove foreign matter, ice and snow in accordance with CSA A23.1/A23.2-2019.
10. Holes through concrete: install only at locations approved by Consultant.
11. Provide drainage and weep holes where indicated on Drawings.
12. Provide pre-moulded joint filler, in single piece for depth and thickness, where indicated. Secure filler to prevent displacement during placing of concrete. Unless otherwise detailed, provide 12.5 mm (1/2") thick joint filler to separate slabs on grade from vertical surfaces; extend joint filler from bottom of slab to within 12.5 mm (1/2") of finished slab surface.

REMOVAL OF FORMWORK AND RESHORING

1. Be responsible for the safety of structure, both before and after removal of forms, until concrete has reached its specified twenty-eight (28) day strength.
2. Strip side forms of vertical elements when 50% of specified concrete strength is reached. Strip soffit of suspended structural concrete when 67% of specified concrete strength is reached. Support concrete with adequate vertical struts until concrete has reached 28 days strength. Take particular care in cold weather.
3. Re-use formwork and falsework subject to requirements of CSA A23.1/A23.2-2019.
4. Immediately after the removal of forms all bolts, ties, nails and other metal not specifically required for construction purposes shall be removed or cut back to a depth of minimum 15 mm (5/8") from the surface of the concrete.
5. Fins, ridges and other imperfections shall be neatly chipped off and rubbed flush with adjacent surface areas at all concrete surfaces exposed and at all concrete surfaces scheduled to received finishes by Division 9.

6. No later than five to six (5 to 6) hours after removal of forms, provide a smooth rubbed finish on all formed concrete surfaces, exposed in finished wood, either unfinished or painted, except for underside of slabs. Thoroughly wet surfaces and rub with carborundum brick, or other acceptable abrasive, until uniform colour and texture are produced, and all ridges and projections are removed. No cement grout shall be used other than that produced from the concrete by the rubbing process.

FIELD QUALITY CONTROL

- a. The Owner may engage an inspection and testing company to inspect and report on compliance with the Specification for the fabrication and installation of work of this Section in accordance with Section 01410 and as directed by Consultant.
- b. Set special inserts for non- destructive strength testing of concrete where required by inspection and testing agency.

ADJUSTMENT

1. Replacement of defective work:
 - a. Movement and displacement of formwork during construction, variations in excess of specified tolerances, marked and disfigured surfaces that cannot be repaired by specified methods will be considered defective work.
 - b. Reconstruct defective formwork and replace concrete and reinforcement placed in defective formwork at no additional cost to the Owner.

END OF SECTION

PART I – GENERAL**WORK SPECIFIED HEREIN**

All labor, materials, equipment and services necessary to provide the Cast-In-Place Concrete work as indicated or specified including:

- Concrete, reinforcement and formwork for foundations, pilasters, slabs, sidewalks, stairs, etc.
- Installation of anchor bolts for steel columns, posts and other anchored work as may be required.
- Grouting of column bases.
- All embedded anchors, anchor slots, sleeves and other inserts as required.
- Vapor barrier and granular subbase beneath slabs on grade.
- All dowels from concrete into masonry walls or pilasters.
- All other items required to make the work of this Section.

RELATED WORK

- Section 03100: Concrete Formwork
- Section 03300: Cast-In-Place Concrete
- Section 03320: Interior Concrete Slabs on Grade
- Section 08363: Sectional Overhead Doors

REFERENCE STANDARDS

- Supply and install concrete reinforcement in conformance with CAN/CSA-A23.1-04 unless specified otherwise.
- CAN/CSA G30.18-M1992 (R2007) Billet Steel Bars for Concrete Reinforcement.
- Reinforcing Steel Institute of Ontario manual of standard practice.

QUALITY ASSURANCE

- Source quality control: Upon Consultant's request, submit mill test reports to verify that reinforcement supplied to project by Canadian mills conforms to specified requirements.
- Conduct and pay for tests of non-Canadian and unidentified products as instructed by Consultant.

SUBMITTALS

- Submit bar lists and placing drawings.
- Prepare shop drawings in accordance with "Reinforcing Steel Manual of Standard Practice" by the Reinforcing Steel Institute of Ontario.
- Design and detail lap lengths and bar development lengths to CSA A23.3-04, unless otherwise indicated.
- Detail placement of reinforcing where special conditions occur.

UNIT PRICES

- Unit prices for concrete work, requested as part of the Bid, shall include detailing, listing, materials, bending, placing and cleaning

PART II – PRODUCTS**MATERIALS**

- Reinforcing steel: to CAN/CSA-G30.18-M1992 (R2007) with grade identification by permanent rolled indentations in bars; Canadian produced; of types indicated on Drawings; billet steel; deformed.
- Tie wires: 1.6 mm (16 ga SWG) or heavier, cold-drawn annealed wire to CSA G30.3-M1983 (R1998) or proprietary system as approved by Consultant.
- Chairs: to CSA A23.1/A23.2-94; plastic or concrete where concrete surfaces at base of chairs are exposed to view; plastic or concrete for slabs on grade and steel or concrete in other locations.
- Welded steel wire fabric: to CSA G30.5-M1983 (R1998) ; supply in flat mats only.
- Weld bars: use of weld bars must be approved by Consultant.
- Epoxy coated reinforcing steel where indicated on the Drawings to meet Ontario Provincial Specification 1442.
- Plastic ties and/or plastic coated wires shall be used for epoxy coated reinforcement.

FABRICATION

- Shop fabricate reinforcing steel to CSA A23.1/A23.2-04.
- Ship bundles of bar reinforcement, clearly identified in accordance with bar list.

PART III – EXECUTION**EXAMINATION**

Examine supporting formwork to ensure that it has been completed and adequately braced in place before commencing to place reinforcement.

PLACING

Place reinforcement in accordance with CSA A23.1/A23.2-04 and of sizes, at spacing and in locations as shown on approved placing drawings.

Install spacers and chairs as required.

Weld bars to CSA G30.5-M1983 (R1998) using bars to CAN/CSA-G30.18-M1992 (R2007).

Do not field bend reinforcement except where indicated or authorized by Consultant.

When field bending is authorized, bend without heat, applying a slow and steady pressure.

Replace bars which develop cracks or splits.

Paint portion of dowel intended to move within set concrete with one coat of lead or asphalt paint. When paint is dry, apply a thick even film of mineral lubricating grease.

Use plastic coated tire wire for epoxy coated reinforcing steel.

Provide minimum concrete cover over reinforcing steel to CSA A23.1/A23.2-04 and as indicated on drawings.

Coordinate location of reinforcing bars with location of vehicle loop detector, at service centre.

FIELD QUALITY CONTROL

The Owner may engage an inspection and testing company to inspect work of this Section as directed by Consultant.

ADJUSTMENT AND CLEANING

Adjust reinforcement immediately before concrete is poured to ensure that bars are in correct position and are securely tied to maintain position.

Remove loose rust, scale and any other materials from surfaces of reinforcement and accessories that would reduce their bond.

END OF SECTION

PART I – GENERAL**WORK SPECIFIED HEREIN**

All labor, materials, equipment and services necessary to provide the Cast-In-Place Concrete work as indicated or specified including:

- Concrete, reinforcement and formwork for foundations, pilasters, slabs, sidewalks, stairs, etc.
- Installation of anchor bolts for steel columns, posts and other anchored work as may be required.
- Grouting of column bases.
- All embedded anchors, anchor slots, sleeves and other inserts as required.
- Vapor barrier and granular subbase beneath slabs on grade.
- All dowels from concrete into masonry walls or pilasters.
- All other items required to make the work of this Section.

SUBSTITUTIONS

In accordance with Section 01600.

SUBMITTALS

- Submit five copies of shop drawings showing fabrication dimensions and locations for placing reinforcing steel and accessories and details of steel reinforcement.
- Submit concrete mix design for each class of concrete for review well in advance of concrete placement. Concrete mix design shall include all strength data necessary to show compliance with the project specifications for either the trial batch or field experience method.
- Submit in accordance with Section 01340.

QUALITY ASSURANCE

- Provide Special Inspections for concrete as shown on the drawings and as required by Building Official.
- See Section 01400 for required testing.
- See Section 01400 for payment provisions for testing.

RELATED DOCUMENTS

- Unless otherwise shown or specified, the work shall conform to the following standards:
 1. CSA A23.1-04 Concrete Materials and Method of Concrete Construction.
 2. CSA A23.1/A23.2 Standard Specification for Cold Weather Concreting.
 3. CSA A23.3-04 Design of Concrete Structures
 4. RSIO Manual of Standard Practice (Latest Edition)

- Unless otherwise shown or specified, the work shall conform to the following standards of the Concrete Reinforcing Steel Institute:

1. Manual of Standard Practice, 2009

FIELD ACCEPTANCE OF CONCRETE

- Air-entrained concrete not within the specified limits of air-entrainment shall not be used in the work.
- Concrete not within the specified slump limits at the point of placement shall not be used in the work.
- Concrete not within the specified temperature limits shall not be used in the work.

ACCEPTANCE OF CONCRETE STRENGTH

- Test results for standard molded and cured test cylinders shall be evaluated separately for each specified concrete design mixture. Evaluation will be valid only if tests have been conducted in accordance with procedures specified. For evaluation, each specified design mixture shall be represented by at least five tests.
- The strength level of concrete shall be considered satisfactory when the average of all sets of three consecutive compressive strength test results equal or exceed the specified compressive strength, f'_c , and no individual strength test result falls below the specified compressive strength, f'_c , by more than 500 psi.
- The costs of any additional tests or analysis, including additional architectural or engineering services, performed to prove the adequacy of concrete strength, shall be borne by the contractor.

ACCEPTANCE OF STRUCTURE

- Completed concrete work shall conform to all applicable requirements of the Construction Documents.
- Concrete work that fails to meet one or more requirements of the Construction Documents but subsequently is repaired to bring the concrete into compliance may be accepted.
- Concrete work that does not meet the tolerances of ACI 117 will be rejected.
- Concrete with defects that adversely affect the appearance of the specified finish will be rejected.
- Concrete work that fails to meet one or more requirements of the Construction Documents and cannot be brought into compliance will be rejected.
- Repair rejected work by removing and replacing or by reinforcing with additional construction as required by the Owner.
- Contractor shall pay all costs to bring concrete work into compliance with requirements of the Construction Documents.

- The costs of any additional tests or analysis, including additional architectural or engineering services, performed to prove the adequacy of the structure, shall be borne by the contractor.

ACCEPTANCE OF FLOORS

- The slab shall be checked with a straight edge by the General Contractor (2) weeks after the slab is poured. Maximum tolerance of 1/4" over 10'-0" will be permitted and a total maximum of 3/8" over the entire slab.
- All exposed floors which are not within the specified tolerance shall be corrected by the removal and replacement of the defective slab. Removal shall be score to score, joint to joint. No other solution will be permitted.
- There will be no grinding any portion of the exposed slab.
- The exposed slab must be acceptable to PetSmart and in compliance with, but not limited to, the specifications contained within in regards to stains, abrasions, gouging, marring, etc. Any slab portion that is determined by PetSmart as unacceptable or defective shall be removed and replaced immediately.

MATERIALS DELIVERY STORAGE AND HANDLING

- Handle and store all reinforcement materials to prevent bending, coating with earth, oil or other material.
- Store cementitious materials in dry weathertight buildings, bins or silos, which will exclude contaminants.
- Store and handle aggregate in a manner that will avoid segregation and prevent contamination with other materials or other sizes of aggregates. Store aggregates to drain freely. Do not use aggregates that contain frozen lumps.
- Protect mixing water and ice from contamination during storage and delivery.

PROTECTION OF IN-PLACE CONCRETE

- Do not allow construction loads to exceed the capacity that the structure can safely support without damage.
- Protect all finished concrete surfaces from damage caused by construction equipment, materials or methods.
- During the curing period, protect concrete from damaging mechanical disturbances including load stresses, shock, and harmful vibration.
- Protect concrete surfaces from mechanical injury, damage by construction traffic, equipment, materials, rain or running water, and other adverse weather conditions.
- Protect all finished surfaces from stains, abrasions, etching, discoloration, gouging, scratches and marring. General Contractor will be responsible for any concrete replacement. Protect surfaces or edges by leaving forms in place, by providing temporary covers,

diapers, etc. to avoid marring, gouging, etc. Protect all concrete from rain, flowing water or mechanical injury. Areas that are to be replaced are at PetSmart's discretion. General Contractor is responsible for providing adequate protection of the exposed slab areas.

- Protect all exposed interior slabs at all times from the dropping of plaster, paint, dirt, etc.
- Equipment diapering shall be provided to protect exposed floor slabs from the dripping of oils, acid, rust marks, etc.

PART II – PRODUCTS

CONCRETE MATERIALS

- Portland Cement: Normal Type GU to CSA A3000-08.
- Coarse Aggregate: CSA A23.1/A23.2 and non-reactive.
- Fine Aggregate: CSA A23.1/A23.2 and non-reactive.
- Water and Ice: Mixing water for concrete and water used to make ice shall meet the requirements of CSA A23.1/A23.2.
- Admixtures: Water reducing, retarding, and accelerating admixtures: CSA A23.1-04.
- Air-entraining admixtures: CSA CAN3-A266.1, for all air-entrained concrete.
- Maximum chloride ion due to admixtures shall not exceed 0.1% by weight.
- The addition of calcium chloride is not permitted.
- All admixtures shall be used in accordance with the manufacturer's recommendations.

Reinforcement Materials

- Reinforcing Steel Bars: CSA G30.18-M1992 (R2007), Grade 400.
- Welded Wire Fabric: CSA G30.5-M1983 (R1998)
- Metal Accessories: Include all spacers, ties, chairs and other devices required to properly support and fasten reinforcing steel in place.

Form Materials

- Form-facing Materials: To CSA O121-08 COFI exterior grade, Douglas Fir plywood. Form facing material shall be plywood, tempered concrete-form-grade hardboard, metal, plastic, paper capable of producing a smooth, uniform texture on the concrete. Do not use form-facing material with raised grain, torn surfaces, worn edges, patches, dents, or other defects that will impair the texture of concrete surfaces.

Formwork Accessories: Use commercially manufactured accessories for formwork. Provide all necessary bracing, ties and accessories as necessary to support formwork.

Formwork Release Agent: Use commercially manufactured form release agents that will prevent formwork absorption of moisture, prevent bond with concrete, and not stain the concrete surfaces. Form release agent shall be compatible with finishes to be used on concrete surfaces.

RELATED MATERIALS

Curing Compound: Use L&M Cure as manufactured by L & M Construction Chemicals, Inc.

Sealer/Hardener: As manufactured by L&M Construction Chemicals, Inc. See drawings for types.

Non-Shrink Grout: N-S grout as manufactured by Euclid, or equal. 40 MPa minimum 28-day compressive strength

Vapor Barrier: See Drawings.

Granular Subbase: Granular subbase beneath slabs on grade shall conform to the requirements of the geotechnical report. Where no requirements are specified in the geotechnical report, granular subbase shall be fine graded granular material conforming to the following requirements:

- Maximum size: 1-1/4 "
- Passing No. 200 Sieve: 15% maximum
- Plasticity Index: 6 maximum
- Liquid Limit: 25 maximum

PART III – EXECUTION

CONCRETE PROPORTIONS

- The specified strength of concrete, f'_c , for each portion of the structure shall be as designated on the drawings. Strength requirements shall be based on 28-day compressive strength.
- The maximum size of coarse aggregate shall be not more than $\frac{3}{4}$ " crushed stone or gravel.
- Maximum water/cement ratio, by mass, shall be 0.40
- Cement content shall not be less than 320 kg/m³
- Concrete shall have a slump of 3" +/- 1"
- See Drawings for Concrete Proportions.

FORMWORK

- Forms shall be used, wherever necessary, to confine the concrete and shape it to the required dimensions. Forms shall have sufficient strength to withstand the pressure resulting from placement and vibration of the concrete, and shall have sufficient rigidity to maintain specified tolerances.
- The design and engineering of the formwork, as well as its construction, shall be the responsibility of the contractor.
- Forms shall be sufficiently tight to prevent loss of mortar from the concrete.
- Place required sleeves, inserts, anchors, and embedded items prior to concrete placement.
- Clean surfaces of formwork and embedded materials of mortar, grout, and foreign material before concrete is placed.
- Cover surfaces of formwork with formwork release agent before placing reinforcing steel and concrete. Do not allow formwork release agent to puddle in the forms or to contact reinforcing steel or hardened concrete against which fresh concrete is to be placed.
- Forms shall not be disturbed until the concrete has adequately hardened. Forms for walls shall remain in place for a minimum of 3 days after placement of concrete. Care shall be taken in removing forms to prevent any damage to the concrete.
- Unless noted otherwise, earth cuts may be used for forms for footings not exposed to view if soil conditions permit.

REINFORCEMENT

- Fabricate reinforcement in accordance with fabricating tolerances of A23.3-04. Bend all reinforcement cold.
- When concrete is placed, all reinforcement shall be free of materials deleterious to bond.
- Place, support, and fasten reinforcement as shown on the Drawings. Do not exceed the placing tolerances in ACI 117.
- Place reinforcement supported from the ground on precast concrete reinforcement supports. Place reinforcement supported from concrete or formwork on reinforcement supports made of metal or plastic. Secure reinforcement as necessary to prevent displacement during placement of concrete.
- Extend welded wire fabric for slabs on grade to within 2 inches of concrete edge. Lap edges and ends of fabric sheets a minimum of one mesh spacing. Support welded wire fabric during placing of concrete to assure required positioning in the slab.

MIXING AND DELIVERY OF CONCRETE

- All concrete shall be measured, batched and mixed in accordance with CSA A23.1/A32.2. Job site mixed concrete not permitted.

- Transport and deliver concrete in equipment conforming to CSA A23.1/A32.2. Batch tickets shall be provided indicating the batch weight of all materials, and indicating the amount of additional water that may be added without exceeding mixture proportions.
- Time for completion of discharge shall be as specified in CSA A23.1/A32.2, except discharge must be completed within 90 minutes of elapsed time since batching and before the drum has revolved 300 revolutions.

PLACEMENT OF CONCRETE

- Remove snow, ice, frost, water and other foreign material from surfaces, including reinforcement and embedded items, against which concrete will be placed.
- Do not begin to place concrete while rain, sleet, or snow is falling unless adequate protection is provided. Do not allow rain water to increase mixing water or to damage the surface of the concrete.
- In cold weather, when the average of the highest and lowest temperature during the period from midnight to midnight is expected to drop below 40 F for more than three successive days, concrete shall be delivered at a minimum temperature of 55 F.
- In hot weather, the temperature of concrete as placed shall not exceed 90 F. When temperature of steel reinforcement, embedments, or forms is greater than 120 F, fog steel reinforcement, embedments and forms with water immediately prior to placing concrete. Remove standing water prior to placing concrete.
- Convey concrete from mixer to the place of final deposit rapidly by methods that will prevent segregation or loss of ingredients and will assure the required quality of concrete. Do not use aluminum pipes or chutes. Colored concrete for interior slabs may not be pumped.
- Deposit concrete continuously in one layer or in layers to have fresh concrete deposited on in-place concrete that is still plastic. Do not deposit fresh concrete on concrete that has hardened sufficiently to cause formation of seams or planes of weakness within the section.
- Do not use concrete that has surface dried, partially hardened, or contains foreign material.
- Do not subject concrete to any procedure that will cause segregation. Deposit concrete as near as practicable to the final position to avoid segregation.
- Consolidate concrete by vibration. Concrete shall be thoroughly worked around reinforcement and embedded items and into corners of forms, eliminating all air and stone pockets that may cause honeycombing, pitting, or planes of weakness. Do not use vibrators to move concrete within the forms.
- Use ready mix concrete to give a 28-day compressive strength of:
 - 27.6 MPa for interior slab-on-grade

- 25 MPa (N Exposure) for footings and interior foundation walls
- 25 MPa (F-2 Exposure) for exterior foundation walls.
- 32 MPa (C-2 Exposure) for sidewalks and curbs.
- 35 MPa (C-1 Exposure) for exterior slabs-on-grade (i.e. loading docks)

- Use an air-entraining admixture for all concretes exposed to the exterior to give a total air content conforming to CSA A23.1/A23.2.

- The minimum concrete cover for steel reinforcement shall conform to CSA A23.1/A23.2

FINISHING FORMED SURFACES

- After forms are removed, patch tie holes and defects. Remove all fins completely.
- Finish formed surfaces no later than the day following form removal by wetting the surface of the concrete and rubbing carborundum brick or other abrasive until uniform color and texture are produced. Use no cement grout other than cement paste drawn from the concrete itself by the rubbing process.

FINISHING (FLATWORK)

- Move the concrete into place with square tipped shovels. Place concrete at a rate that allows spreading, straight edging, and darbying or bullfloating before bleed water disappears. Finish slab surfaces in accordance with one of the following finishes.
 - Floated finish: Place, consolidate, strike off, and level concrete, eliminating high spots and low spots. Do not work concrete further until it is ready for floating. Begin floating with a hand float, a bladed power float equipped with float shoes, or a powered disk float when the bleed water sheen has disappeared and the surface has stiffened sufficiently to permit the operation. Produce a finish that will meet conventional straightedge tolerance of 3/8 inch in 10 feet, then refloat the slab immediately to a uniform texture.
 - Troweled finish: Float concrete surface, then power trowel the surface. Hand trowel the surface smooth and free of trowel marks. Continue hand troweling until a ringing sound is produced as the floor is troweled. Produce a finish that will meet conventional straightedge tolerance of 1/4 inch in 10 feet.
 - Light/light brown finish (Interior): Immediately after concrete has received a troweled finish, give the concrete surface a light transverse texture (in the direction indicated on the drawings) by drawing a soft bristle broom across the surface.
 - Broom finish (Exterior): Immediately after concrete has received a floated finish, give the concrete surface a coarse transverse scored texture by drawing a broom across the surface.

- Interior flatwork to receive a troweled finish.
- Exterior flatwork to receive a broom finish.
- Sawcutting for joints at flatwork shall be coordinated with locations shown within the documents and shall be made as soft cuts. Joints are to be cut with the use of "soft-cut" blades as soon as finishing is complete. Joints shall be 1/8" wide and 1/3 depth of slab.

CURING

- Cure all concrete surfaces with the specified curing compound applied per manufacturer's instructions & as specified in CSA A23.1/A23.2.
- All interior slabs shall receive a cure coat of L&M Cure applied full strength in accordance with manufacturer's recommendations.

SEALING/HARDENER

- Apply sealer/hardener to all interior exposed concrete slabs.
- Prepare the surface in strict conformance with the manufacturer's printed recommendations.
- Apply in strict accordance with the manufacturer's printed application procedures. All installation of L&M materials shall be performed by an L&M approved applicator.
- Application rate shall be a maximum of 200 s.f. per gallon. Do not puddle.

INDEPENDENT INSPECTION AND TESTING

- The architect will appoint an independent inspection and testing agency to undertake concrete strength tests. Laboratory curing and testing of the samples will be carried out in accordance with CSA A23.1/A23.2.
- Strength tests will include air entrainment and slump tests will be required for each 40 cubic meters of concrete, but not less than one test for each class of concrete placed each day.
- Provide a group of three cylinders for each standard strength test. One specimen will be tested at 7 days and two at 28 days. Provide one additional field cured cylinder for testing at 7 days when concrete is placed under cold weather conditions. Results will be on form conforming to CSA A23.1/A23.2, stating the location of concrete to which tests relate and with comments on abnormal results and conditions, and will be reported to the architect, engineer and contractor.

END OF SECTION

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PART I – GENERAL

WORK SPECIFIED HEREIN

All labor, materials, equipment and services necessary to provide the Cast-In-Place Concrete work as indicated or specified including:

- Integrally colored concrete slabs.
- Vapor retarder and granular subbase beneath slabs on grade.
- All other items required to make the work of this Section complete.
- Related sections:
 1. Section 03300: Cast-in-Place Concrete
 2. Section 03331: Polished Concrete Floor System

SUBSTITUTIONS

In accordance with Section 01600.

SUBMITTALS

Submit manufacturer's product data, performance criteria and other documentation for each material specified in this Section that is proposed for use including:

- Submit shop drawings showing fabrication dimensions and locations for placing reinforcing steel and accessories and details of steel reinforcement.
- Submit concrete mix design for each class of concrete for review well in advance of concrete placement. Concrete mix design shall include all strength data necessary to show compliance with the project specifications for either the trial batch or field experience method.
- Admixtures
- Curing compound
- Sealing compound
- Proposed placement equipment
- Schedule of events and casting plan regarding placement operations, and records of concrete pours.

QUALITY ASSURANCE

- Provide Special Inspections for concrete as shown on the drawings and as required by Building Official.
- It is the intent of this Section to establish a single component source to be responsible for providing complete, durable concrete floors as specified herein. Including provisions of formwork, reinforcing, concrete and finishing complete as specified herein.
- Concrete Slab Installer qualifications for placing of concrete slab: Slab placing and finishing shall be done by an established Subcontractor with at least five (5) years proven, accredited and satisfactory experience in this trade, employing only skilled personnel. Submit proof on this requirement to the Consultant. Consultant reserves the right to reject installers who do not meet these requirements.

RELATED DOCUMENTS

- Unless otherwise shown or specified, the work shall conform to the following standards:
- Cast-in-place concrete work shall conform to, Section 03300, Cast-in-Place Concrete, (unless specified otherwise), and the applicable requirements of the latest edition of:
 1. CAN/CSA-A23.1
 2. CAN/CSA-A23.2
 3. CSA-A283

FIELD ACCEPTANCE OF CONCRETE

INSPECTION AND TESTING

- Materials and concrete work will be inspected and tested for conformance to CAN/CSA-A23.1, CSA-A283, Section 01410; Inspection and Testing, to these Specifications and as directed by the Consultant. An independent inspection company selected and paid for by the Owner may perform inspection services.
- Test will be executed in accordance with CAN/CSA-A23.2.
- Inspection companies' reports of tests will be forwarded to the Consultant and to the Contractor with an opinion or reason for any abnormalities noted thereon.
- Cooperate with, and assist Inspection Company's personnel during inspections and tests.
- Remove defective materials and completed work, which fail tests and replace as directed by Consultant, at no cost to the Owner. Further inspection and testing required as a result of materials and work that failed original tests, shall be paid for by the Contractor.
- Air-entrained concrete not within the specified limits of air-entrainment shall not be used in the work.
- Concrete not within the specified slump limits at the point of placement shall not be used in the work.
- Concrete not within the specified temperature limits shall not be used in the work.

TOLERANCES

- Place concrete level and true to linear building lines.
- Maximum variation of concrete slab on grade only shall not exceed 6 mm in 6m x 6m (1/4" in 20'-0" x 20'-0") area and shall be sufficiently even to make contact with a 3000 mm (10'-0") long straightedge with a tolerance of 3 mm (1/8").
- A permitted variation in any part of the construction or in any Section of the Specification shall not be construed as permitting violation of more stringent requirements for any other part of construction or in any Specification Section.
- The interior slab shall be checked by the General Contractor (2) weeks after the slab is poured. Maximum tolerance of FF = 50 for flatness and FL = 45 for levelness, shall be required.

- All slabs without floor coverings that are not within the specified tolerance shall be corrected by the removal and replacement of the defective slab. Removal shall be score to score, joint to joint. No other solution will be permitted.
- Slabs without floor coverings must be acceptable to PETSMART and in compliance with, but not limited to, the specifications contained within in regards to stains, abrasions, gouging, marring, etc. Any slab portion that is determined by PETSMART as unacceptable or defective shall be removed and replaced immediately, at no additional cost to PetSmart and with no change in schedule.

JOB CONDITIONS

- Environmental requirements: The minimum temperature of the subgrade at the time of placement of the concrete shall be 12°C when measured by a thermometer embedded 25 mm (1") into the granular material. The minimum ambient air temperature shall be 10°C when measured 305mm (12") above finished floor level.
- During cold weather, provide temporary heating equipped with exhaust vents, pipes or chimneys and enclosures as required. Mix, place and protect concrete in accordance with CAN/CSA-A23.1.

PROTECTION OF IN-PLACE CONCRETE

- Do not allow construction loads to exceed the capacity that the structure can safely support without damage.
- Protect all finished concrete surfaces from damage caused by construction equipment, materials or methods.
- During the curing period, protect concrete from damaging mechanical disturbances including load stresses, shock, and harmful vibration.
- Protect concrete surfaces from mechanical injury, damage by construction traffic, equipment, materials, rain or running water, and other adverse weather conditions.
- Protect all finished surfaces from stains, abrasions, etching, discoloration, gouging, scratches and marring. General Contractor will be responsible for any concrete replacement. Protect surfaces or edges by leaving forms in place, by providing temporary covers, diapers, etc. to avoid marring, gouging, etc. Protect all concrete from rain, flowing water or mechanical injury. Areas that are to be replaced are at PETSMART's discretion. General Contractor is responsible for providing adequate protection of the exposed slab areas.
- Protect all exposed interior slabs at all times from the dropping of plaster, paint, dirt, etc.
- Equipment diapering shall be provided to protect exposed floor slabs from the dripping of oils, acid, rust marks, etc.

DELIVERY, STORAGE AND HANDLING

- Store materials on Site in a manner to prevent damage thereto. Protect materials from inclement weather. Comply with CAN/CSA-A23.1.
- Protect materials and work of this Section from damage. Protect other work from damage resulting from work of this Section. Replace damaged work, which cannot be satisfactorily repaired at no cost to the Owner.

UNIT PRICES

- Unit prices, requested as part of the Bid, shall include addition of super plasticizer where specified, reinforcing, placing, curing and finishing and providing control joints.

PART II – PRODUCTS

CONCRETE MATERIALS

Concrete materials are to meet the requirements of CAN/CSA-A23.1 and Section 03300 Cast-in-Place Concrete, unless otherwise specified herein.

Reinforcing:	Bars and mesh as specified in Section 03200 Concrete Reinforcement.
Welded steel wire fabric:	to CSA G30.5-M1983 (R1998), supply in flat mats only.
Vapour Barrier:	See Drawings
Floor Sealer:	Not to be used where cementitious adhesives are used for porcelain floor tile application: "Florseal WB" by Sika, "Masterkure-N-Seal VOC" by Maser Builders or approved equivalent.
Curing Compound:	The curing compound shall meet the moisture retention requirements of ASTM C309, and be compatible with scheduled finishing materials.
Granular Subbase:	Granular subbase beneath slabs on grade shall conform to the requirements of the geotechnical report. Where no requirements are specified in the geotechnical report, granular subbase shall be fine graded granular material conforming to the following requirements: • Maximum size: 1-1/4" • Passing No. 200 Sieve: 15% maximum • Plasticity Index: 6 maximum • Liquid Limit: 25 maximum

CONCRETE MIXES

GENERAL

- Minimum twenty-eight (28) day compressive strength of laboratory cured test specimens shall be 27.6 MPa (4000 psi), unless otherwise indicated.
- Maximum slump of 80 mm (3 1/4") +/- 20mm (3/4") before addition of plasticizer. Add plasticizer to achieve workability as required by the steel fibre supplier and concrete placer.
- Slag cement or flyash content shall not be used without prior approval by the Consultant.
- Coarse aggregates not less than 56% of total aggregate. Maximum size of coarse aggregate shall be 25 mm (1").
- Super-plasticizing admixture shall only be used with prior authorization by the Consultant.

- Air entraining admixture shall not be used.
- Total air content of the hardened concrete shall not exceed 3% when the top size coarse aggregate is 25mm.

PART III – EXECUTION

PRE-CONCRETE CONFERENCE

- At least fifteen (15) days prior to the start of the concrete construction schedule, a pre-concrete conference MUST be held. The mix designs shall be reviewed, and the required methods and procedures to achieve the required concrete shall be discussed. The Contractor shall send a pre-concrete conference agenda to all the attendees' ten (10) days prior to the scheduled date of the conference.
- The Contractor shall require responsible representatives of every part who is concerned with the concrete work to attend the conference, including but not limited to the following: the Contractor's super, a representative from the laboratory responsible for the concrete mix design, the laboratory responsible for field quality control, the concrete sub-contractor, the ready mix concrete producer, the admixture manufacturer(s), and the concrete pumping contractor.
- Minutes of the meeting shall be recorded, typed and printed by the Contractor and distributed by him to all parties concerned within five (5) days of the meeting. One (1) copy of the minutes shall also be transmitted to the following for information purposes: the Owner's representative, the resident engineer, and the Consultant engineer.
- The minutes shall include a statement by the admixture manufacturer(s) indicating that the proposed mix design and placing techniques can produce the concrete quality required by these Specifications.
- The Consultant engineer will be present at the conference. The Contractor shall notify the Consultant engineer at least ten (10) days prior to the scheduled date of the conference.

SLABS ON COMPACTED FILL

- Ensure that compacted fill has been placed and compacted to meet specified requirements in the Soil Report and that under-slab services have been installed, inspected, tested and approved, prior to placing of concrete.
- Pour slabs in one (1) monolithic thickness, screed and strike off to required levels; slope to drain in areas with floor drains; slope exterior slabs to drain.
- If rapid evaporation conditions are present, moisten granular fill, prior to placing of concrete where no dampproof membrane is provided below slab. Allow no standing water on fill.
- Rapid evaporation conditions include relative humidity below 50%, wind in excess of 29 KM per hour, direct sunlight or any combination of these.
- Ensure that screeds do not puncture dampproof membrane. Membrane to have minimum thickness of 10 mil. (0.25 mm) and comply with ASTM E1745-97. Unless otherwise indicated on Drawings, provide 25MPa (3600 psi) concrete.
- Pour floor slabs in sections of maximum 1000 m2 (10,000 sq. ft.), scheduled and completed on alternate days.

- Incorporate construction joints into the floor slab at locations detailed on the floor slab drawings. Ensure that construction joints are not located in the aisles.

SAWCUT CONTROL JOINTS

- The use of an early-entry, dry-cut saw ("Soff-Cut") is the preferred method. Sawcut immediately after final finishing and as soon as the slab will support the weight of the saw and operator without damaging the final finish (0-2 hours). Sawcut to a depth of 32 mm (1-1/4") following the manufacturer's recommended procedures.
- Concrete residue MUST be removed by dry method, i.e. dry vac, dry broom. No water must be used on the floor to remove any of the cement residue.
- Ensure that reinforcements and work of other Sections are located below cutting line.
- Chalk used for chalk lining sawcuts shall not be red, blue or any colour with a dye that would stain the floor. Use white or light grey chalk only.

FLOOR SLAB FINISHES

- Curing (Wet Cure, when and where possible):
- The concrete shall be cured for a minimum of seven days by means of polyethylene sheets.
- Apply approved curing/sealing compound after seven (7) days.
- No construction personnel or traffic shall be allowed on the slab during the curing period or after curing, and until eight (8) hours after the first application of the floor sealer material.
- Placement of the polyethylene joints shall allow temporary exposure of the concrete to complete the sawcutting procedure and clean up of associated slurry from this work. The concrete shall be completely re-covered immediately upon completion of this work to maintain proper curing.
- Where the above curing method is not possible in retail areas receiving porcelain tile flooring, spray or 'mist' floor slab entirely, twenty-four to forty-eight (24-48) hours after pouring slab, and every forty-eight (48) hours thereafter for a minimum of two (2) weeks. Maintain floor slab at room temperature during this period and while slab is curing, use propane heaters if required.

FIELD QUALITY CONTROL

- Comply with field quality control requirements specified in Section 03300.

CONCRETE SLAB REPAIR

- After slab has set and cured for fourteen (14) days, and prior to turn over of the slab to the floor finish applicators, (i.e. porcelain tile installer), a thorough floor inspection MUST be carried out. This inspection is for the purpose of ensuring that the slab tolerances set out in this Section have been met. The use of an engineering company MAY be used and paid for, at the request of the Project Manager. Any parts of the slab that show evidence of curling, un-level areas or any other abnormalities that do not meet the quality and

tolerance criteria set out herein and that would be a detriment to a first class floor finish installation, will be repaired to the satisfaction of the floor finish applicator. THE COST FOR THIS REPAIR WILL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR. The process used to repair these areas may include, but not be limited to mechanical or hand grinding, shot blasting or scarifying. The Project Manager must approve the repair method.

- Sufficient time has to be accounted for, to allow the entire slab repair process to be satisfactorily completed and to allow the floor finish installers to commence with their work, on schedule.
- The final, repaired, concrete slab must be to the satisfaction of the floor finish installer, in order that the tile installation meets quality and tolerance requirements set out in Section 09300. THE COST FOR ANY ADDITIONAL SURVEYS OR FLOOR INSPECTIONS REQUIRED, WILL BE THE SOLE RESPONSIBILITY OF THE GENERAL CONTRACTOR.
- For floors receiving porcelain tile finish, Blastrac or grind curling that occurs at sawcuts.
- For floors receiving porcelain tile finish, Blastrac or grind peaking that occurs at cold pour joints.
- For floors receiving porcelain tile finish, where crooked or inaccurate sawcuts are made in the slab, prior to the first frost clean out and vacuum the joint and then fill with epoxy to leave no voids in slabs. Re-cut accurate joints as per Drawings.

REINFORCEMENT

- Extend welded wire fabric for slabs on grade to within 2 inches of concrete edge. Lap edges and ends of fabric sheets a minimum of one mesh spacing. Support welded wire fabric during placing of concrete to assure required positioning in the slab.
- Place reinforcement supported from the ground on precast concrete reinforcement supports. Place reinforcement supported from concrete or formwork on reinforcement supports made of metal or plastic. Secure reinforcement as necessary to prevent displacement during placement of concrete.

CONCRETE FINISH SCHEDULE

FLOOR SLABS

- Broom finish: provide broom finish in direction of waterflow at exterior formed slabs.
- Steel trowel finish: provide steel trowel finish at floors exposed to view, at floors to receive resilient flooring or thin set tile and at floors where no specific finish is indicated. Finish shall be hard, smooth, dense, free of laitance, excessive water, trowel marks, blemishes, ridges and discolouration.
- Wood float finish: provide a wood float finish at the stair landings and treads, which are exposed to view. The finish shall provide a "non-slip" texture across the full width of the treads and landings.
- In areas receiving porcelain tile, finish concrete floor surface to ANSI 108.5.

CURING

- Cure all concrete surfaces with the specified curing compound applied per manufacturer's instructions.
- All interior slabs shall receive a cure coat of FGS Hardener Plus applied full strength in accordance with manufacturer's recommendations.

SEALING/HARDENER

- Apply sealer/hardener to all interior exposed concrete slabs.
- Prepare the surface in strict conformance with the manufacturer's printed recommendations.
- Apply in strict accordance with the manufacturer's printed application procedures. All installation of L&M materials shall be performed by an L&M approved applicator.
- Application rate shall be a maximum of 250 s.f. per gallon for the first coat and 350 s.f. per gallon for the second coat. Do not puddle.

END OF SECTION

PART I— GENERAL**WORK SPECIFIED HEREIN**

- All labor, materials, equipment and services to install polished concrete floor systems for interior concrete slab surfaces as identified on the drawings. **This is a Required Vendor.**
- Densifier and stain guard application, as specified.
- Progressive polishing and burnishing of slab surface to achieve required gloss values, prior to and after application of stain guard.

RELATED WORK SPECIFIED ELSEWHERE

- Section 03300: Cast-in-Place Concrete.
- Section 03930: Joint Filling

SUBSTITUTIONS

- In accordance with Section 01600

SUBMITTALS

- The contractor shall prepare all shop drawings, product literature, etc. as required to properly coordinate and construct the project, and as per the requirements of the Project Manual.
- Submit the following items for review by PETSMART's Construction Manager.
- Submit all data items required within this section in a single submittal via e-mail (maximum document size 3Mb, scanned black and white, 150 dpi). Do not submit required information for this section combined with data from other sections.
 - Maintenance Manual: Submit installer's maintenance manual, including maintenance and cleaning instructions for polished concrete floor system.
 - Product data and cut sheets, including MSDS sheets:
 1. Manufacturer and model of all equipment to be used (as specified):
 - a. All grinding and polishing machines.
 - b. Manufacturer and model of diamond polishing heads. Product data and procedure of polishing must be submitted for verification of compatibility, prior to beginning slab enhancement work.
 - c. Dust extraction system.
 - d. High speed burnishing equipment, including burnishing pads. Product data for pads must be submitted for verification of pad texture prior to beginning burnishing work.
 - e. Scrubber machines.
 - f. Densifier applicators/sprayers.

2. Chemical Stripper: Brand name, chemical composition, dilution rate, installation directions and certificates of compliance with required standards, if applicable.
3. Reactive Surface Densifier, Colorant, and Stain Guard: Brand name, chemical composition, installation directions and certificates of compliance with required standards.

QUALITY ASSURANCE

- See Section 01400 for required testing and for payment provisions for testing.
- Installers Qualifications:
 1. Equipment certified installer with at least 5 years of experience in diamond concrete grinding, honing and polishing.
- Environmental Requirements:
 1. Comply with current federal and local toxicity and air quality regulations and with federal requirements on content of lead, mercury, and other heavy metals. Do not use solvents in floor polish products that contribute to air pollution.
 - a. All propane powered equipment must have catalytic converters on mufflers and certification of emission testing conducted within 6 months of operation that confirms compliance with all air quality regulation.
 2. Limit and control all noise, dust and moisture created by concrete surface enhancement work to meet all local, provincial, and federal ordinances, codes and laws.
 - a. Limit and control damage from dust or slurry caused by surface preparation and polishing.
- Pre-installation Meeting:
 1. Convene pre-installation meeting before start of all polished concrete work.
 2. Require attendance of parties directly affecting work of this section, including Contractor and installer.
 3. Review acceptance of test panel, surface preparation, installation, field quality control, protection and coordination with other work.

RELATED DOCUMENTS

- ASTM D 523-08 – Standard Test Method for Specular Gloss.
- ASTM D1455-87 (Reapproved 2008) - Standard Test Method for 60°

MATERIALS DELIVERY, STORAGE AND HANDLING

- Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging with labels clearly identifying product name and manufacturer.
- Storage

2. Store materials in clean, dry area indoors in accordance with manufacturer's instructions.
 3. Keep materials from freezing.
- Handling: Protect materials during handling and application to prevent contamination or damage.

WARRANTY

- Installer shall warrant compliance with the Performance Requirements herein for a period of three years.

PART II – PRODUCTS

MANUFACTURERS

- Subject to compliance with project requirements, provide products and equipment by the following:
 1. 3M, www.3m.com
 2. American Decorative Concrete, www.adcsc.com
 3. Concrete Polishing Solutions, www.go2cps.com
 4. Convergent Concrete Technologies, www.convergentconcrete.com
 5. Diamond Tool Supply, Inc., <http://www.diamondtoolsupply.com/>
 6. Eagle Solutions, www.eaglefloorsolutions.com
 7. ETC of Henderson, Inc., www.etcps.com
 8. HTC, www.htc-america.com
 9. Innovatech, www.innovatechproducts.com
 10. Norton Abrasives, www.nortonprocleaning.com
 11. Pioneer Eclipse, www.pioneer-eclipse.com
 12. Prosoco, www.prosoco.com
 13. Pullman-Ermator, www.pullman-ermator.com
 14. Rubbermaid Commercial Products.
 15. SASE Company, Inc., www.sasecompany.com
 16. Substrate Technology, Inc., www.substratetechnology.com
 17. Superabrasive, Inc., <http://www.superabrasive.com/>
 18. VIC International Corporation, www.vicintl.com
 19. VMC Technical Assistance Corp, www.vmctac.com

EQUIPMENT

- Three-phase 600-volt electrical supply to be provided by the Contractor.
 1. If generators are required due to site constraints, coordinate security at all access points for cables.

- a. Location of Cables throughout sales floor must be coordinated with the Owner.
- b. It is the responsibility of the Contractor to communicate safety hazards with all store personnel and provide adequate protection and marking for power cord(s) associated with all equipment.

- Dust extraction system and pre-separator for grinding and polishing.
 1. Heavy-duty industrial HEPA filtration vacuum system, suitable for extracting and containing large quantities of fine concrete dust (minimum 350CFM air flow) in conjunction with manufacturer recommended pre-separator.
 2. Provide one of the following:
 - a. 86D, by HTC.
 - b. T8600, by Pullman-Ermator.
 - c. Bull 1250, by SASE Company, Inc.
- Furnish minimum three grinding/polishing machines in full operating condition during the duration of the night's work.
 1. Planetary, counter rotating variable speed floor grinder.
 2. Minimum 600 pounds of downward pressure.
- Hand grinder or stand-up edger with dust extraction attachment and pads for edge grinding/polishing.
- Diamond Grinding Heads:
 1. Provide diamond grinding heads from one of the following manufacturers. Use heads from same manufacturer throughout entirety of project.
 - a. HTC
 - b. SASE, Inc.
 - c. Substrate Technology, Inc.
 - d. Superabrasive, Inc.
 - e. VMC Technical Assistance Corp
 2. Grinding Diamonds
 - a. Metal Bonded Diamond Grit Sizes: 40, 80, and 150.
 - b. Hybrid Style Diamond: 30, 50, 100.
 - c. Resin Bonded, Phenolic Diamond Grit Sizes: 100, 200, 400, 800 and 1,500 as needed to achieve specified gloss, prior to stain guard application.
 - d. Grinding/Polishing Pads for Edges: Provide grit sizes matching grinding/polishing diamonds above.
 3. Progression of all polishing steps shall include sequential grit sizes that are not greater than twice the previous grit used.
- High speed propane burnisher:

1. Equipment shall meet the specified minimum performance requirements.
 - a. 27 inch head.
 - b. 585 cc engine size, generating 1,500 RPM or higher (as verified with tachometer).
 - c. 22 pound head weight (40 pound maximum).
 - d. Dust skirt assembly.
 - e. The weight and speed of the burnisher shall generate adequate heat and friction at the concrete floor surface to transform the lithium stain guard application to the specified gloss level.
2. Provide burnisher as manufactured by one of the following:
 - a. Eagle Solutions.
 - b. Minuteman.
 - c. Pioneer Eclipse.
 - d. Onyx.

• Burnishing Pads:

1. Diamond Impregnated Pads (1500 grit)
 - a. Scotch-Brite Diamond Floor Pads Plus, by 3M.
 - b. SpinFlex Diamond Polishing Pads, by Concrete Polishing Solutions.
 - c. Vortex Heavy Duty Diamond Impregnated Pads-Buff X, by Diamond Tool Supply, Inc.
 - d. Twister Diamond Cleaning System Pads, by HTC.
 - e. Diamond Polishing Pads, by Norton.
2. Natural Hair Pads:
 - a. Niagra Super Hogs Hair Floor Pad 3700N by 3M.
 - b. Ultra Grizzly Bear by Norton.
 - c. Consolideck Heat Pad by Prosoco.

• Sprayer for Reactive Surface Stain Guard:

1. CO₂ sprayer.
 - a. SpraySafe System, by Patriot Sprayer Systems.

• Applicator pad:

1. Minimum 24" Microfiber Wet Room Pad, by Rubbermaid.

MATERIALS

- Reactive Surface Densifier: Clear lithium based chemical densifier specifically for concrete surface treatment which reacts chemically to the concrete surface forming a clear, dense, durable, hard, abrasion-resistant surface. Product shall be a colorless, odorless, water-based solution that is less than 50 VOC.
 1. Provide one of the following:
 - a. Consolideck LS, by Prosoco.
 - b. Pentra-Sil (NL), by Convergent Concrete Technologies.
 - c. SureLock Densifier, by American Decorative Concrete.
 - d. Sase D2 Densifier, by SASE.

- Stain Guard (Protective Surface Treatment): Water-based, low odor, non-flammable, VOC compliant penetrating treatment.

1. Provide product of same manufacturer as densifier.

- a. Consolideck LS Guard, by Prosoco.
- b. Pentra-Guard (HP), by Convergent Concrete Technologies.
- c. SureLock Stain Protector, by American Decorative Concrete.
- d. SASE Select Protect, by SASE.

2. Oil and Water Repellent Sealer – 1 application of SASE SPR3 or Ameripolish SR2.

PART III – EXECUTION

SYSTEM DESCRIPTION

- Installation of polished concrete floor system for interior concrete floors by grinding, honing and polishing with various size grit metal- and resin-bonded diamonds, including application of concrete dye, densifier and stain guard for concrete slabs on grade.
- Chemical Resistance: System shall resist staining or deterioration from exposure to animal waste and the cleaning products normally used by PetSmart including, but not limited to, “Lemon Quat”, “Green Light”, “Buckeye Blue” and “Crossbow” as manufactured by Buckeye International, Inc.

EXAMINATION

- Examine floor to receive polished concrete floor system.
 1. Verify Floor Finish: smooth, flat surface free of rough areas.
 2. No stains or other defects exist in the slab that would affect the final floor finish.
- Floor and Joints:
 1. Free of debris, dirt, dust, clay and mud.
 2. Dry.
- Notify PETSMART of conditions that would adversely affect installation or subsequent use.
- Do not begin surface preparation or installation until unacceptable conditions are corrected.
- Surface Preparation: Prepare surfaces in accordance with all specified product manufacturer’s requirements.
 1. Clean Surfaces: Remove dirt, dust, debris, oil, grease, curing agents, bond breakers, paint, coatings and other surface

contaminants which could adversely affect installation of polished concrete floor system.

- a. Remove all curing or sealing compounds, coatings (including epoxy resins), and wax by mechanical means that will not expose concrete slab coarse aggregate.
- b. Thoroughly rinse floor surface with clean water to remove soap residue and contaminants. Vacuum with auto scrubber.
- c. Squeegee dry.

SURFACE POLISHING, COLORANT AND DENSIFIER APPLICATION

- Install polished concrete floor system, as described below, at locations indicated on the Drawings.
 1. Aggregate Exposure: Salt and pepper look from exposed sand, with minimal coarse aggregate exposure to achieve a consistent appearance throughout the store.
- Ensure surfaces are clean and dry.
- Complete any joint replacement and slab repair work minimum 12 hours prior to commencement of any grinding or polishing.
- Dispose of all polishing waste. Disposal shall be in compliance with all local, provincial and federal guidelines and regulations for disposal.
- Open slab surface by progressively grinding with 40, 80, or 150-grit metal-bonded diamond heads. Use Mohs Pencil scratch test to determine initial grinding grit necessary to produce required gloss values and clarity (surface free of pits, inclusions and scratches).
 1. Do not expose coarse aggregate, unless unavoidable due to existing conditions and approved by Owner from observation of test sample.
 2. Sequential progression of diamond grinding shall be required and limited to no more than double the grit value of the previous diamonds used.
 3. Each polishing pass must overlap previous polishing pass by 25%.
 4. Between grinding passes, thoroughly scrub and rinse slab surface with clean water and vacuum up with auto scrubber.
- Progressively hone and polish slab surface with 100, 200, 400, 800 and 1,500-grit resin-bonded, phenolic diamond heads. Use of 100/200 combination diamond heads will be acceptable if required to produce less scratching in the slab surface.
 1. Progressively diamond polish edges along and around all vertical abutments, including walls, columns, cases, and racking systems as shown on Drawings. Use same progression of polishing diamonds as specified above.
 2. Sequential progression shall be required and shall be limited to no more than double the grit value of the previous diamonds used.

3. Between grinding/honing/polishing passes, thoroughly scrub and rinse slab surface with clean water and vacuum up with auto scrubber.

4. Burnish slab to remove swirls from resin-bonded, phenolic diamond heads.

- Apply reactive surface densifier at 500 sq. ft. per gallon, one time after 400-grit resin and before subsequent 800-grit resin diamond pass, according to manufacturer's instructions.
 1. Thoroughly clean slab surface pores with auto scrubber prior to application of densifier.
 2. Ensure slab surface is dry at time of application of lithium densifier.
- Apply Stain Guard and oil and water repellent sealer as specified herein.

STAIN GUARD APPLICATION

- Subsequent to densifier and final colorant application, apply stain guard over surfaces to which densifier has been applied and has dried.
- Use proper Personal Protective Equipment (PPE) when applying lithium stain guard and/or burnishing.
- Application:
 1. Apply in accordance with manufacturer's published instructions, unless otherwise noted.
 - a. Apply using specified sprayer with red #6 spray tip.
 - b. Use new sprayer tip for each night's work.
 - c. Application of stain guard in excess of manufacturer's published instructions may result in additional cost to Contractor without an increase in Contract time.
 2. Use applicator pad, pre-wetted with stain guard, to pull material out to create a thin film prior to drying.
 3. Remove product completely from areas of over application, as evidenced by surface streaking, and replace with unused stain guard.
- High speed burnish:
 1. After each application of stain guard is dry, burnish surface per manufacturer's instructions.
 2. Burnish at a slow movement pace using high speed machine with 1500 grit diamond impregnated or natural hair burnishing pads.
 3. Burnishing, pad type, and pace of forward movement shall combine to develop a minimum floor surface temperature of 91-degrees F directly below the burnishing pad as continuously measured by the operator during installation.
- Continue periodic burnishing operations to retain specified gloss until Substantial Completion.

- Provide final burnishing prior to Substantial Completion as required to eliminate damage from subsequent work.

FINISH REQUIREMENTS

- Appearance: Polished interior slabs shall comply with the following:
 1. Failure to comply with specifications to produce finish requirements may result in additional cost to Contractor without an increase in Contract time or additional disruption to Store operations.
 2. Slab surface must have a consistent look and exhibit a hard polish that is “mirror-like” in appearance with no evidence of scratching from polishing process.
 3. White residue or hazy appearance in the finished surface will not be accepted.
- Gloss: Final surface gloss shall be a Specified Overall Gloss Value (SOGV) of not less than 40 and Minimum Local Gloss Value (MLGV) of 30 as measured using a Horiba IG-320 Gloss Checker.
- Slip Resistance: Measured static coefficient of friction (SCOF) shall be not less than 0.50 (0.60 wet) at time of Substantial Completion as measured using an American Slip Meter ASM 825 Digital Meter, Regan Scientific Instruments BOT-3000 Tribometer.
- Leave work complete and ready for final inspection.

FIELD QUALITY CONTROL

- Completed polished concrete floor system to meet satisfaction of Owner, PETSMART, Contractor and Professional of Record.
- Review procedures with Owner’s Representative to correct unacceptable areas of completed polished concrete floor system. Repairs to include re-polishing or removal of portions of slab as necessary to satisfy Owner’s Representative.
- Take gloss measurements a minimum of once each five working days. Gloss shall be considered as a quantitative value that expresses the degree of reflection when light hits the concrete floor surface. Gloss measurements will be taken independent of ambient lighting and within a sealed measurement window located beneath the testing equipment.
- Measurement and reporting of SOGV and MLGV shall be as follows:
 1. Collect a minimum of five samples in random locations in the center of each aisle for each night work area. Record measurement locations on copy of Floor Polishing Plan. Discard the high and low values measured in each area.
 2. The average of all samples collected in each area shall meet SOGV.
 - a. If the average of samples collected do not meet the SOGV, collect an additional three samples in each bay for each deficient result unless the individual samples fail to meet the MLGV or the average of all collected samples in each bay fail to meet the SOGV.

- b. If samples fail to meet the SOGV, Contractor shall continue sweeping, scrubbing and polishing until the SOGV is achieved.

3. No single measured value shall be less than MLGV.
 - a. If one or more samples fall below the MLGV, Contractor shall continue sweeping, scrubbing and polishing until all samples comply with Specified MLGV and SOGV.
4. Collect and certify final gloss measurements.
5. Within 24 hours of testing, submit all measurements to Owner for review.
- Slip Resistance Measurements:
 1. Take slip resistance measurements 2 weeks prior to Substantial Completion. Contractor shall notify the testing agency when floors are ready for testing.
 2. Four slip resistance measurements will be required within the areas of the two highest and two lowest SOGV measurements.
 3. Correlate single re-measured gloss value at each location in floor slab where slip resistance is measured.
 4. Within 24 hours of testing, submit all measurements to Owner for review.
- Testing: Test the following from completed polished concrete floor system.
 1. Static Coefficient of Friction, ASTM C 1028: both wet and dry surfaces.

PROTECTION OF POLISHED CONCRETE

- Protect slab surface from moisture for 72 hours to prevent re-emulsification of surface treatment prior to cure. Verify that all wood pallets are dry prior to placing on finished slab.
- Protect completed polished concrete floor system from damage until 12 hours prior to Substantial Completion.
 1. Do not allow vehicle and pedestrian traffic on unprotected floor.
 2. Do not allow construction materials, equipment and tools on unprotected floor.
- Immediately remove mortar splatter, spilled liquids, oil, grease, paint, coatings and other surface contaminants which could adversely affect completed polished concrete floor system.
- Repair damaged areas of completed polished concrete floor system to satisfaction of Owner’s Representative.

END OF SECTION

PART I – GENERAL**DESCRIPTION OF WORK**

- Provide all labor, products and equipment required to properly install joint filler in all construction and control joints in all interior concrete floor slabs.
- Scope of Work
 1. Filling of all contraction and construction joints in the interior concrete floor slab.
 2. Repair of spalled joints (less than 1”).
 3. Repair of non-moving narrow (1/32” – 1/4”) cracks.
 4. Repair of minor surface defects including pop-outs, chips, and surface pitting.

RELATED WORK

- Section 03300: Cast-In-Place Concrete
- Section 03331: Polished Concrete Floor System

SUBSTITUTIONS

- In accordance with Section 01600.

SUBMITTALS

- The contractor shall prepare all shop drawings, product literature, etc. as required to properly coordinate and construct the project, and as per the requirements of the Project Manual.
- Submit all data items required within this section in a single submittal via e-mail (maximum document size 3Mb, scanned black and white, 150 dpi). Do not submit required information for this section combined with data from other sections.
- Submit the following items for review by PETSMART’s Construction Manager.
 1. Submit Manufacturer’s data describing all materials proposed for use on the project.
 2. Submit Manufacturer’s Approved Applicator Certificate.

QUALITY ASSURANCE

- Contractor Qualifications
 1. Installer shall have a minimum of three (3) years experience in performing the types of work covered by this Section and shall be an Approved Applicator of the material manufacturer.
 2. Use only Manufacturer Approved Applicators for work covered by this section.
 3. Approved Applicator shall use tools and equipment specifically designed for the preparation and placement of industrial joint fillers.

ENVIRONMENTAL REQUIREMENTS

- Limit and control damage from excessive dust caused by demolition, preparation, and installation of all Work.
- Limit and control damage from moisture.
- All concrete shall be cured a minimum of 28 days prior to joint filler installation.

PART II – PRODUCTS**MATERIALS**

- Subject to compliance with project requirements, provide products as manufactured by the following:
 1. Ardex Engineered Cements
 2. CSS Polymers, Inc.
 3. Metzger/McGuire.
 4. Sika Corporation.
 5. SpecChem.
 6. VersaFlex, Inc.
- Joint Filler (for all interior slabs except colored concrete in Pets-Hotel): Rapid setting, two-component polyurea polymer liquid of 100% solids content, Shore hardness 85-90, compatible with construction materials in contact. Match color of adjacent exposed concrete slab surface.
 1. EdgePro 80 by Metzger McGuire
 2. Flex Joint 85 by Sase
 3. Quick Joint 85, by CSS Polymers
 4. Spal-Pro RS 88, by Metzger/McGuire.
 5. VersaFlex SL/85, by VersaFlex.
- Joint Filler (including all interior slabs in PetsHotel): One part polyurethane elastomeric sealant/adhesive. Match color of adjacent exposed concrete slab surface.
 1. Sikaflex-1A, by Sika
 2. Sikalex 2cSL, by Sika
- Joint Filler Stain Preventing Film: (Where pre-installation test proves necessary)
 3. SPF by Metzger/McGuire.
- Polymerized Portland Cement Compound
 1. Rapid Set TRU PC or SP, Colour Grey.
 2. Divots / Spall repair Metzger McGuire Rapid reffloor or SASE All-spall.
 3. RepCon 928, by SpecChem.
- Polymer Modified Topping
 1. RepCon 928 /Acrylic Bonder / SpecFilm RTU, by SpecChem.

EQUIPMENT

- Subject to compliance with project requirements, provide equipment manufactured by the following:
 1. HTC
 2. Husqavarna Soft-Cut 150
 3. Joe Due Blades and Equipment, Mauston, WI.
 4. Pulman-Ermator,
 5. SASE Company, Inc, Kent, WA
 6. U.S. Saws, Santa Ana, CA.
- Dust extraction system for grinding/sawing:
 1. HEPA filtration vacuum, designed for use with all hand tools when grinding or sawing concrete (minimum 125CFM air flow).
 2. Provide one of the following:
 - a. 26D, by HTC.
 - b. S2400, by Pullman-Ermator.
 - c. Bull 50, by SASE Company, Inc.
- Joint Filler Removal and Preparation
 1. Husqavarna Soft-Cut 150
 2. Humpback Cutter Complete, by Joe Due.
 3. Dust Buggy, by U.S. Saws.
- Crack Repair:
 1. 5" Dustmizer 007, by Joe Due.
 2. 5" Crack Attacker, by Joe Due.
 3. 7" Handheld Crack Chaser, by Joe Due.
 4. SawTec 5" Tile Vac, by U.S. Saws.
 5. SawTec 7" Crac-Vac, by U.S.Saws.
- Surface Grinder: Handheld 5"-7" electric surface grinder with dustless shroud/housing.
 1. Dust Avenger 5, by Joe Due.
 2. Dust Avenger 7, by Joe Due.
 3. SawTec 5" Grinder Vac, by U.S. Saws.
 4. SawTec 7" Grinder Vac, by U.S. Saws.

PART III – EXECUTION**EXAMINATION**

- An evaluation of the existing floor slab shall be conducted, identifying all defects. Scope of repairs shall be confirmed by the Owner's Representative prior to commencement of work.
- Repairs are not acceptable unless specifically approved on a case-by-case basis by the Owner's Representative.

PREPARATION

- Protect surface of slab immediately adjacent to defect under repair.

JOINT FILLER PLACEMENT)

- Fill all contraction and construction joints in all interior concrete floor slabs.
- Where potential staining from joint filler application may be objectionable, utilize stain preventing film, following manufacturer installation instructions. Place SPF prior to joint cleanout process commences.
- Clean joints full depth with a dry-cut, vacuum-equipped saw using a slightly oversized concrete diamond blade.
- Fill with joint filler per manufacturer's installation guidelines. Fill joints from the bottom up taking care not to entrap large air bubbles. Slightly overfill and shave flush to the slab surface after cure, approximately 1hr – 4 hrs after placement

SPALLED JOINT REPAIR - LESS THAN 1" (See Figure 2)

- Where potential staining from joint filler application may be objectionable, utilize stain preventing film following manufacturer installation instructions.
- Re-saw the joint edge to a minimum depth of 3/4" with a dry-cut, vacuum-equipped saw allowing removal of the widest spall along a given joint segment to produce a sharp corner on each side of the joint with a minimum of two passes through joint.
- Clean joint of loose concrete, joint filler, laitance, dirt, debris, backer rod, etc.
- Joints must be free of all visible moisture.
- Fill joint cavity per manufacturer's instructions, taking care not to entrap large air bubbles. Overfill joint slightly and shave flush to slab surface prior to grinding process. It may be necessary to place a trace layer (1/8"-1/4") of clean dry silica sand at the joint base to prevent material seepage down through the shrinkage crack.

CRACK REPAIR – LESS THAN ¼" IN WIDTH

- Clean crack cavity.
 1. Remove loose concrete, dirt and debris from crack with a wire brush or hand grinder with twisted wire wheel attachment.
 2. Remove any loose segments, including islands formed by crack, with sharp tool.
 3. Use methods that will not widen existing crack.
 4. Vacuum crack to remove all dirt, debris and other laitance.
- Mask slab surface along crack as necessary to minimize overfill.
- Choose material color that closely matches the adjacent floor.
- Install low viscosity rigid urethane repair material in accordance with manufacturer's instructions.

- Repeat until all voids are filled and material crowns slab surface.
 1. Watch for bubble formation and off gassing as that would indicate that moisture is present in crack cavity and steps will need to be taken to dry area prior to further repairs.
 2. Do not allow material to gel before adding additional material.
- Grind material flush to surface upon full cure, approximately 15-30min.

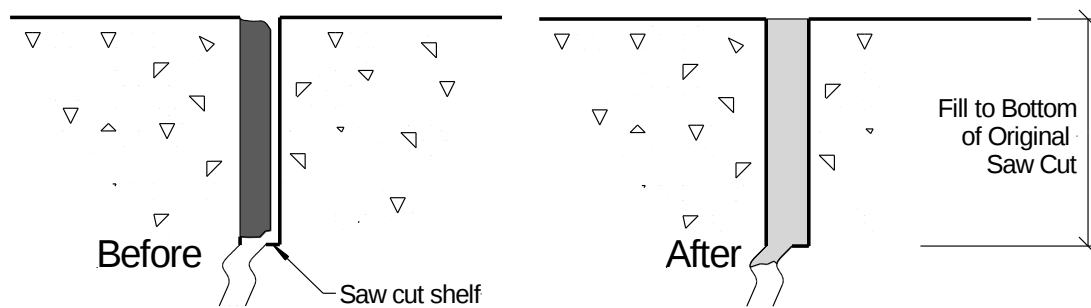
BOLT HOLE/POP-OUT SPALL REPAIR

- Recess steel bolt a minimum of 1/2" below finish floor by either punching or cutting.
- For spall fracture edge less than 30 degrees, square edge to a minimum 3/8" depth with either a drill bit or chisel.

- Clean cavity of all debris and laitance with drill activated, brass wire wheel. Vacuum hole to remove all dirt, debris and other laitance.
- Dispense low viscosity rigid urethane at moderate pace using steady pressure. Dispense material into void, refilling as necessary to produce slight crown.
- Grind material flush to slab surface per manufacturer's instructions approximately 15 – 30 min after placement.

PROTECTION

- Protect surfaces of finished floor.
- Prohibit traffic until floor repairs have received final approval by Owner's Representative.



Note: if shelf width at base of saw cut is less than 1/4" on either side of joint, minimum required filler depth is 2" placed over compressible backer rod or bagged silica sand.

FIGURE 1: JOINT FILLER PLACEMENT

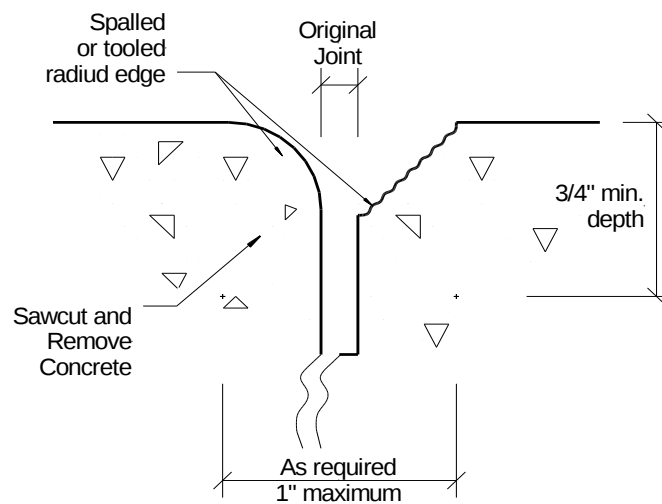


FIGURE 2: SPALLED JOINT REPAIR (LESS THAN 1")

END OF SECTION

PART 1 - GENERAL

SUMMARY

This Section includes requirements for provision of all labour, materials, equipment and incidental services necessary to *Provide* brick/block masonry veneer units.

Masonry veneer forms a part of the exterior rain screen and protective veneer facing. Design to allow for ventilation, drainage and pressure equalization of the voids between the stone veneer and the insulation with the exterior atmospheric pressures.

Structural steel support angles and brackets shall be supplied and installed as required over any openings.

RELATED REQUIREMENTS

- Section 04060 – Masonry Mortar.
- Section 07210 – Building Insulation.
- Section 07920 – Joint Sealants:
- Section 08110 – Hollow Metal Doors and Frames.
- Section 08411 – Aluminum-Framed Entrances and Storefronts.

REFERENCE STANDARDS

- i. American Society for Testing and Materials (ASTM):
 - a. ASTM C216-17, Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale)
 - b. ASTM E84-15b, Standard Test Method for Surface Burning Characteristics of Building Materials.
 - c. ASTM E119-16, Standard Test Methods for Fire Tests of Building Construction and Materials.
- ii. Canadian Standards Association (CSA):
 1. CSA A82-14, Fired Masonry Brick Made from Clay or Shale.
 2. CAN/CSA-A371-14; Masonry Construction for Buildings.
 3. CSA S304-14; Design of Masonry Structures.
 4. CSA A165 Series-14; CSA Standards on Concrete Masonry Units (Consists of A165.1, A165.2 and A165.3).

SUBMITTALS

- i. Make *Submittals* in accordance with Section 01300 – Submittals.
- ii. *Actions Submittals*: Submit the following *Submittals* before starting any work of this Section:
 1. *Product* Data Sheets: Submit *Product* Data Sheets indicating physical characteristics, test results confirming performance characteristics, finishes and compliance with referenced standards.
 2. Samples for Verification: Submit duplicate full-size samples for verification for each type, finish and colour (full range of possible colours):

QUALITY ASSURANCE

- i. Manufacturer Qualifications:

Minimum five (5) years documented continuous experience prior to award of subcontract, for projects of similar size and scope, producing *Products* specified in this Section; has

personnel, plant equipment capable of fabricating *Products* of the types specified and has a written quality control and system in place. If requested by *Owner* or *Consultant*, submit proof of experience to *Consultant* prior to commencement of the *Work* of this Section.

PART 2 - PRODUCTS

MANUFACTURERS

Basis-of-Design *Products*:

1. *Products* named in this Section were used as the basis-of-design for the *Project*; additional manufacturers offering similar *Products* may be incorporated into the work of this Section provided they meet the performance and aesthetic requirements established by the named *Products*.
2. Unsolicited Substitutions Limitations: *Consultant* may consider additional manufacturers having similar *Products* to Basis-of-Design *Product* Manufacturer listed below during the construction period, provided they meet the performance and aesthetic requirements.

BRICK/BLOCK MASONRY UNITS

1. Final selection of Masonry Units is pending site plan approval and from the PetSmart Design Team.
2. Manufactured in accordance with CAN/CSA A82, and as follows:
 3. Grade: Exterior Grade (EG).
 4. Type: X.
 5. Size: to suit.
 6. Colour and Texture: to be approved by Petsmart design team.
 7. Basis-of-Design *Product*: Brampton Brick.

SOURCE QUALITY CONTROL

1. Aesthetic Tolerances: *Consultant* will limit use of defective units in exposed work for the following reasons; referenced CSA A82 masonry unit standards allow for a certain percentage of units to exceed tolerances and to contain chips, cracks, or other defects exceeding limits stated in the standard, notwithstanding the requirements of these standards:
 - i. Masonry units with chipped edges or corners, or units having cracks on the face will not be permitted in exposed masonry construction within
 - a. 4 meters viewing distance, at corners or other edges.
 - ii. Mix defective units that comply with CSA A82 with remaining units and use where aesthetic tolerances are not required.
 - iii. Do not use units where dimensions vary from specified dimensions by more than stated tolerances for units exposed in the completed *Work* or where use of these units will impair the quality of completed masonry.

PART 3 - EXECUTION

EXAMINATION

- i. Verification of Conditions: Prior to commencing the work of this Section, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence. Provide *Notice in Writing* to the *Consultant* and *Construction Manager* of conditions detrimental to the proper and timely completion of the work of

- this Section.
- 1. Ensure the following items are installed before starting installation of Masonry veneer:
 - a. Shelf angles.
 - b. Though-wall flashings.
 - c. Veneer ties.
 - d. Cavity insulation.
 - ii. Do not begin installation until all unsatisfactory conditions are resolved. Beginning work of this Section constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

INSTALLATION – GENERAL

- i. Use full size units without cutting except as follows:
 - 1. Cut units with motor driven saws if cutting is required to provide a continuous pattern or to fit adjoining construction
 - 2. Provide clean, sharp, un-chipped edges.
 - 3. Allow units to dry before laying unless wetting of units is specified.
 - 4. Install cut units with cut surfaces and cut edges concealed where possible; obtain Consultant’s acceptance where cut edges must be exposed.
- ii. Select and arrange units for exposed unit masonry to produce a uniform blend of colours and textures; mix units by drawing units diagonally down multiple rows from at least three different pallets as masonry units are placed.
- iii. Wet brick before laying when recommended by brick manufacturer; allow units to absorb water so they are damp but not wet at time of laying.
- iv. Use mortar as specified in Section 04060.
- v. Install mortar control devices as required.
- vi. Install wire install wire ties into previously installed tie supports of veneer ties as per manufacturers recommended installation instructions.
- vii. Leave 10 mm (3/8”) minimum clear space below shelf angles, or more as indicated.
- viii. Construct control joints in accordance with manufacturers recommended installation instructions.
- ix. Jointing:
 - 1. Concave: all joints exposed to view.
 - 2. Flush: all joints within wall cavities.
- x. Installation Tolerances: Install masonry to tolerances listed in CSA A371, except as modified by this Section as follows:
 - 1. Conspicuous Vertical Lines:
 - a. Includes, but is not limited to, external corners, door jambs, reveals, and expansion and control joints.
 - 1. Do not vary from plumb by more than 3 mm in 3000 mm, 6 mm in 6000 mm with total variation not exceeding 13 mm over entire height of masonry.
 - 2. Vertical Alignment of Exposed Head Joints: Do not vary

- from plumb by more than 6 mm in 3000 mm or 13 mm over entire height of masonry.
- 3. Conspicuous Horizontal Lines:
 - a. Includes, but is not limited to, lintels, sills, parapets, and reveals.
 - b. Do not vary from level by more than 3 mm in 3000 mm, 6 mm in 6000 mm or 13 mm over entire length of masonry.
- 4. Exposed Bed Joints:
 - a. Do not vary from thickness indicated by more than
 - 1. ±3mm,withamaximumthickness limitedto13mm.
 - b. Do not vary from bed joint thickness of adjacent courses by more than 3 mm.
- 5. Exposed Head Joints:
 - a. Do not vary from thickness indicated by more than
 - 1. ±3mm.
 - b. Do not vary from adjacent bed joint and head joint thicknesses by more than 3 mm.
- 6. Faces of Adjacent Exposed Masonry Units: Do not vary from flush alignment by more than 1.5 mm except as allowed for warpage of masonry units within tolerances listed in referenced standards.
- 7. Exposed Bed Joints and Head Joints of Stacked Bond Units: Do not vary from a straight line by more than 1.5 mm from one masonry unit to the next.

LAYING MASONRY UNITS

- i. Bond: Set brick masonry units in running bond.
- ii. Stopping and Resuming Work:
 - 1. Stop work by racking back units in each course from those in course below; do not tooth.
 - 2. Clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry when resuming work.

MORTAR BEDDING AND JOINTING

- iii. Lay hollow brick as follows:
 - 1. Face shells fully bedded in mortar and with head joints of depth equal to bed joints.
 - 2. Webs fully bedded in mortar in all courses of piers, columns, and pilasters.
- iv. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place; do not deeply furrow bed joints or slush head joints.

CLEANING

Clean brick masonry in accordance upon completion of work.

END OF SECTION

PART 1 - GENERAL**SUMMARY**

This Section includes requirements for provision of all labour, materials, equipment and incidental services necessary to Provide mortar and grout for masonry.

RELATED REQUIREMENTS

Section 04050 – Basic Masonry Materials & Methods.

REFERENCE STANDARDS

1. American Concrete Institute: (ACI):
 - a. ACI 530.1-99/ASCE 6-99/TMS 602-99, Commentary on Specification for Masonry Structures
2. American Society for Testing and Materials (ASTM):
 - a. ASTM C207-18; Standard Specification for Hydrated Lime for Masonry Purposes
 - b. ASTM C494/C494M-19, Standard Specification for Chemical Admixtures for Concrete.
 - c. ASTM E119-20, Standard Test Methods for Fire Tests of Building Construction and Materials.
3. Canadian Standards Association (CSA):
 - a. CAN/CSA-A179-14 (R2019); Mortar and Grout for Unit Masonry.
 - b. CAN/CSA-A371-14 (R2019); Masonry Construction for Buildings.
 - c. CSA S304-14 (R2019); Design of Masonry Structures.
 - d. CSA-A3000-18; Cementitious materials compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

SUBMITTALS

1. Make Submittals in accordance with Section 01300 – Submittal Procedures.
2. Actions Submittals: Submit the following Submittals before starting any work of this Section:
 - a. Product Data Sheets: Submit Product Data Sheets indicating physical characteristics, test results confirming performance characteristics, finishes and compliance with referenced standards.

DELIVERY, STORAGE AND HANDLING

1. Deliver, store and handle masonry mortar and grout materials as follows:
 - a. Deliver prepackaged, dry-blended mortar mix to the Place of the Work in labelled plastic-lined bags each bearing name and address of manufacturer, production codes or batch numbers, and colour or formula numbers.
 - b. Maintain mortar, grout and packaged materials clean, dry, and protected against dampness, freezing, traffic and contamination by foreign materials.

PART 2 - PRODUCTS**MATERIALS**

1. Use same brands of materials and source of aggregate for entire Project.
2. Portland Cement: Type GU - General Use Hydraulic Portland Cement (formerly Type 10) in accordance with CAN/CSA-A3000, gray colour.
3. Blended Cement: Type GUB in accordance with CSA-A3002.

4. Hydrated Lime: Type S or SA in accordance with ASTM C207.
5. Supplementary Cementing Materials: In accordance with CAN/CSA-A3001.
6. Water: clean and potable in accordance with CAN/CSA-A179.

AGGREGATES

1. Mortar Aggregates: In accordance with CSA A179, and as follows:
 - a. Use same brands of Products and source of aggregate for entire Project.
 - b. Use washed aggregate consisting of natural sand or crushed stone for mortar that is exposed to view.
 - c. Use aggregate graded with 100% passing the 1.18 mm (No. 16) sieve for joints less than 6 mm (1/4") thick.
2. Grout Aggregates: In accordance with CSA A179.

ADMIXTURES

1. Cold Weather Admixture: Non-chloride, non-corrosive, accelerating admixture in accordance with CSA A179 and ASTM C494/C494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
2. Acceptable Products:
 - a. Morset by gcp Construction Products (formerly Grace Construction Products).
 - b. Trimix-NCA by Degussa ChemRex.

MORTAR AND GROUT MIXES

1. Do not use admixtures, including air entraining agents, accelerators, retarders, water repellent agents, antifreeze compounds, or other admixtures; unless approved in writing by the Consultant, and as follows:
 - a. Do not use calcium chloride in mortar or grout.
 - b. Limit cementitious materials in mortar to portland cement, mortar cement, and lime.
 - c. Limit cementitious materials in mortar for reinforced masonry to portland cement, mortar cement, and lime.
 - d. Add cold weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar colour is consistent.
2. Mix mortar ingredients in accordance with CAN/CSA A179 in quantities needed for immediate use.
 - a. Add admixtures in accordance with manufacturer's instructions.
3. Maintain sand uniformly damp immediately before mixing process.
4. Do not use anti-freeze compounds including calcium chloride or chloride-based compounds.
5. Do not add air entraining admixture to mortar mix.
6. Use a batch type mixer in accordance with CAN/CSA A179.
7. Re-temper mortar only within two hours of mixing, when water is lost by evaporation.
8. Use mortar within 2 hours after mixing at temperatures of 32°C (90°F), or 2-1/2 hours at temperatures under 10°C (50°F).
9. Pre-blended, Dry Mortar Mix: Provide dry mortar ingredients in form of a preblended mix; measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to the Place of the Work.
 - a. Use pre-blended mortar pre-packaged under controlled factory conditions. Ingredients batching limitations to be within 1% accuracy.
10. Mortar Colour: Natural.
11. Provide the following types of mortar for applications stated unless another type is specifically indicated on Drawings or needed to provide required compressive strength of masonry:
 - a. Parging Mortar: Type S.
 - b. Mortar for exterior masonry above grade, as follows:
 - c. Non-loadbearing: Type N.
 - d. Parapet Walls: Type N.

- e. Calcium Silicate Manufactured Stone Masonry: Type N 1:1:6.

- b. Products or work which fail to meet specified requirements may be rejected by the Consultant whenever found at any time prior to final acceptance of the Work regardless of previous site review or testing and inspection. If rejected, defective Products or work shall be promptly removed and replaced or repaired to the requirements of the Construction Documents as accepted by the Consultant, at no expense to the Owner.

PART 3 - EXECUTION

CONSTRUCTION

1. Do masonry mortar and grout work in accordance with CAN/CSA A179 except where specified otherwise.
2. Apply parging in uniform coating not less than 10mm (3/8") thick, where indicated on Drawings.

-END OF SECTION -

MIXING

1. Only electric motor mixers are permissible. Mixers run on hydrocarbons are not permitted, due to fumes.
2. Mixing by hand must be pre-approved by the Consultant.
3. Clean all mixing boards and mechanical mixing machine between batches.
4. Mortar must be weaker than the units it is binding.
5. Appoint one individual to mix mortar for duration of Project. In the event that this individual must be changed, mortar mixing must cease until the new individual is trained, and mortar mix is tested.

MORTAR PLACEMENT

1. Install mortar to requirements of:
 - a. Brick Masonry: Section 04 21 00.
 - b. Calcium Silicate Manufactured Stone Masonry: Section 04 73 13.
2. Remove excess mortar from grout spaces.

SITE QUALITY CONTROL

1. Testing and Inspection Agency:
 - a. The Owner will appoint the Testing and Inspection Agency to make inspections or perform tests as the Consultant directs.
 - b. Prior to commencing significant segments of the Work, give the Consultant and Testing and Inspection Agency appropriate notification so as to afford reasonable opportunity to review the Work. Failure to meet this requirement may be cause for the Consultant to classify the Work as defective.
 - c. Prior to commencement of construction, the masonry Subcontractor shall prepare and mix on-site, under supervision of the Consultant and the Testing and Inspection Agency, mortar samples to determine compliance with the Specifications.
 - d. Tests of such samples shall determine a ratio-by-mass value or "control value" for mortar mixes.
 - e. Subsequent sample ratio tests taken during the course of construction shall not vary from the control value by more than 15%.
 - f. Testing Frequency: One set of tests for each 450 m² (4500 ft²) of wall area or portion remaining.
2. Non-Conforming Work:
 - a. Where evidence exists that defective work has occurred or that work has been carried out incorporating defective Products, the Consultant may have additional tests, inspections or surveys performed, in order to determine if work is defective. Tests, inspections or surveys carried out under these circumstances will be made at the Subcontractor's expense in the event of defective Work or at the Owner's expense where Work is in conformance.

PART I – GENERAL**WORK SPECIFIED HEREIN**

All labor, materials, equipment, labor and services necessary to provide all concrete masonry units, reinforcing, mortar, grout, anchors and accessories, and insulating fill for unit masonry work as indicated or specified. Scope of Work includes the furnishing and installation of masonry including the following:

1. Furnishing and placing masonry units, grout, mortar, masonry lintels, sills, copings, through-wall flashing, and connectors.
2. Furnishing, erecting and maintaining of bracing, forming, scaffolding, rigging and shoring.
3. Furnishing and installing insulating fill for unit masonry.
4. Furnishing and installing other equipment for constructing masonry.
5. Cleaning masonry and removing surplus material and waste.
6. Installing lintels, nailing blocks, inserts, window and door frames, connectors and construction items to be built into the masonry, and building in vent pipes, conduits and other items furnished and located by other trades.

SUBSTITUTIONS

In accordance with Section 01600.

QUALITY ASSURANCE

- Provided Special Inspections for masonry as shown on the drawings and as required by the Building Official.
- Unless otherwise required by the Building Official, field testing of the compressive strength of masonry units, mortar and grout is not required.
- See Section 01400 for required testing.
- See Section 01400 for payment provisions for testing.

PRODUCT DELIVERY, STORAGE AND HANDLING

- Do not accept damaged or contaminated masonry units, damaged components or structure, or damaged packaged material.
- Protect concrete masonry units and cementitious materials from precipitation and ground water. Store off the ground and under cover.
- Store different aggregates separately.
- Protect masonry units, reinforcement, ties, and metal accessories from permanent distortions and store them off the ground.

PROJECT CONDITIONS

- Do not apply construction loads that exceed the safe superimposed load-carrying capacity of the masonry and shores, if used.
- Cover top of unfinished masonry work at all times when work is not in progress to protect it from the weather.

COLD WEATHER CONSTRUCTION

- Implement the following when the ambient temperature falls below 40° F., or the temperature of masonry units is below 40° F.
- Do not lay masonry units having a temperature below 20° F. Remove visible ice on masonry units before the unit is laid in the mortar.
- Heat mortar sand or mixing water to produce mortar temperatures between 40° F and 120° F at the time of mixing. Maintain mortar above freezing until used in the masonry.
- When ambient temperature is between 25° F and 20° F use heat sources on both sides of the masonry under construction and install wind breaks when wind velocity is in excess of 15 mph.
- When ambient temperature is below 20° F provide an enclosure for the masonry under construction and use heat sources to maintain temperatures above 32° F within the enclosure.
- When mean daily temperature is between 40° F and 25° F, completely cover completed masonry with a weather-resistive membrane for 24 hours after construction.
- When mean daily temperature is 25° F or below, completely cover completed masonry, maintain masonry temperature above 32° F for 24 hours after construction by enclosure with supplementary heat, by electric heating blankets, by infrared heat lamps, or by other acceptable methods.

HOT WEATHER CONSTRUCTION

- When the ambient air temperature exceeds 100° F, or exceeds 90° F with a wind velocity greater than 8 mph implement the following:
 1. Maintain sand piles in a damp, loose condition.
 2. Provide necessary conditions and equipment to produce a mortar having a temperature below 120° F.
 3. Maintain temperature of mortar and grout below 120° F.
 4. Flush mixer, mortar transport container, and mortar boards with cool water before they come in contact with mortar ingredients or mortar.
 5. Maintain mortar consistency by retempering with cool water.
 6. Use mortar within 2 hours of initial mixing.
 7. Fog spray all newly constructed masonry until damp, at least three times a day until the masonry is three days old.
- When the ambient air temperature exceeds 115° F, or exceeds 105° F with a wind velocity greater than 8 mph implement the following in addition to the requirements above:
 1. Shade materials and mixing equipment from direct sunlight.
 2. Use cool mixing water for mortar and grout. Ice is permitted in the mixing water prior to use. Do not permit ice in the mixing water when added to the other mortar or grout materials.

PART II – PRODUCTS

GENERAL

- Conform to CSA A304.1-04, Design of Masonry Structures
- Conform to CSA A371-04, Masonry Construction for Buildings

MORTAR MATERIALS

- Provide mortar of the color specified on the drawings.
- All mortar shall conform to CSA/A179-04, Type S

GROUT MATERIALS

- All grout shall conform to CSA/A179-04.
- Use 20 MPa ready-mix concrete with 3/8" coarse aggregate or mix 1:3:2 cement:sand:pea gravel by volume with maximum 8" slump.

MASONRY UNIT MATERIALS

- Load bearing concrete block to be 50% solid, normal weight, modular units to CSA/A165.1-04. Use type H/15/A/M for hollow units and type S/15/A/M for solid units.
- Load bearing brick to CSA/A82.1-M87 (R1999) burned clay brick (solid masonry units made from clay or shale)
- Provide sizes, shapes and finishes of units as indicated on the drawings.

REINFORCING MATERIALS

- Horizontal joint reinforcement to be 9 gauge, truss type galvanized wire block reinforcement. Use 9 gauge, ladder type for reinforced masonry walls or grouted walls.
- Reinforcing steel to CSA G30.18-M (R2007), billet steel bars for concrete reinforcement, grade 400.

INTEGRAL WATER REPELLANT ADMIXTURE (CMU):

- Description: An integral liquid polymeric admixture mixed with concrete during production of CMU which cross links and becomes permanently locked into the CMU, at the rate prescribed by manufacturer. To provide resistance to water penetration to achieve a Class E rating when tested in accordance with ASTM E514-90.
- Product: See Material/Product Schedule on Drawings.

INTEGRAL WATER REPELLANT ADMIXTURE (MORTAR):

- Description: An integral liquid polymeric admixture designed specifically for use in a mortar mix at the rate prescribed by manufacturer which cross links and becomes permanently locked into mortar to provide resistance to water penetrations, achieving a Class E rating when tested in a wall section in accordance with ASTM 514-90.
- Product: See Material/Product Schedule on Drawings.

METAL ANCHORS, TIES AND ACCESSORIES

1. Provide anchors, ties and connectors that conform to CSA A370-04 Connectors for Masonry
2. Anchor bolts.....ASTM A 307, Grade A

MIXING

- For mortar, mix all cementitious materials and aggregates between 3 and 10 minutes in a mechanical batch mixer with a sufficient amount of water to produce a workable consistency. Do not hand mix mortar. Maintain workability of mortar by remixing and retempering. Discard all mortar which has begun to stiffen or is not used within 2 hours after initial mixing. Do not use admixtures containing more than 0.2 percent chloride ions.
- Mix grout to a consistency that has a maximum slump of 8".

FABRICATION

- Fabricate bars used in masonry reinforcement in accordance with the fabricating tolerances of CSA A371-04ACI 315.
- Bend bars cold and do not heat bars. The minimum inside bend diameter shall be 6 bar diameters.
- Fabricate bars used in masonry reinforcement in accordance with the fabricating tolerances of CSA A371-04ACI 315.
- Provide standard 90 degree hooks with a 90 degree bend plus a minimum extension of 12 bar diameters beyond the bend.

PART III – EXECUTION

INSPECTION

- Prior to the start of construction, the Contractor shall verify that the foundations are constructed to the proper tolerances and that the reinforcing dowels are positioned in accordance with the contract documents.

PREPARATION

- Clean all reinforcement by removing mud, oil, or other materials that will adversely affect or reduce bond at the time the mortar or grout is placed.
- Prior to placing masonry, remove laitance, loose aggregate, and anything else that would prevent mortar from bonding to the foundation.

PLACING MORTAR AND UNITS

- Do not use masonry materials that are damaged or contaminated.
- Unless otherwise noted on the drawings, construct masonry in running bond.
- Unless otherwise required, construct 3/8" thick bed and head joints except at foundation. Construct bed joint of the starting course of foundation with a thickness not less than 1/4 inch and not more than 3/4" inch.
- Face shells of bed joints shall be fully mortared. Head joints shall be fully mortared, a minimum distance from each face equal to the face

shell thickness of the unit. Webs shall be fully mortared in all courses of pilasters, in the starting course on foundations, when necessary to confine grout or loose-fill insulation, and when otherwise required.

- Place units so that vertical cells to be grouted are aligned and unobstructed openings for grout are provided. Construct grout spaces free of mortar dropping, debris, loose aggregates, and any material deleterious to masonry grout. Remove masonry protrusions extending ½ inch or more into cells or cavities to be grouted.
- Provide control joints in masonry at 25'-0" centers maximum.
- Install embedded items and accessories as required.
- Masonry walls have been designed to span vertically as simple span beams from floor to roof and are dependent upon the completed roof structure, metal roof deck, and completion of all masonry walls for stability and for resistance to wind and seismic forces. The contractor is solely responsible for providing all necessary bracing as required for construction loads, for stability, and for resistance to wind and seismic forces until the entire structure is complete. The shoring shall not rely on any moment resistance capacity of the footings.
- Erect masonry within the following tolerances:
 1. Variation Of Plumb: For vertical lines and surfaces of columns, walls, and arises, do not exceed ¼ inch in 10 feet, nor 3/8 inch over the height of the wall. For external corners, control joints, and other conspicuous lines do not exceed ¼ inch in 20 feet, nor ¼ inch over the height of the wall. For vertical alignment of head joints, do not exceed plus or minus ¼ inch in 10 feet, nor ½ inch over the height of the wall.
 2. Variation From Level: For bed joints and lines of exposed sills, parapets, horizontal grooves, and other conspicuous lines, do not exceed ¼ inch in 20 feet, nor ½ inch in 40 feet or more. For top surface of bearing walls, do not exceed 1/8 inch in 10 feet, nor 1/16 inch within width of a single unit.
 3. Variation In Linear Building Line: For position shown in plan and related portions of columns, walls and partitions, do not exceed ½ inch in 20 feet, nor ¾ inch in 40 feet or more.
 4. Variation In Cross-Sectional Dimensions: For columns and thickness of walls, from dimensions shown, do not exceed minus ¼ inch nor plus ½ inch.
 5. Variation In Mortar Joint Thickness: Do not vary from joint thickness indicated by more than plus or minus 1/8 inch with a maximum thickness limited to ½ inch. Do not vary bed joint thickness from bed joint thickness of adjacent course by more than 1/8 inch. Do not vary head joint thickness from adjacent head joint thickness by more than 1/8 inch.

REINFORCEMENT INSTALLATION

- Place reinforcement and accessories in accordance with the sizes, types, and locations specified in the Contract Documents. Do not place dissimilar metals in contact with each other.

- Reinforcement shall be secured in place prior to grouting by wire positioners or other suitable devices at intervals not exceeding 200 bar diameters.
- Tolerances for the placement of reinforcement shall be as follows:
 1. Tolerances for the placement of steel in walls and flexural elements shall be ± ½ inch.
 2. Place vertical bars within 2 inches of the required location along the length of the wall.
- Completely embed reinforcing bars in grout. Maintain a minimum clear distance between reinforcing bars and any face of masonry unit or formed surface of 1/2".
- Lap splice reinforcement as required. The minimum length of lap splice of reinforcement shall be 48 times the bar diameter, but not less than 24 inches.
- Provide horizontal joint reinforcement in every third course unless noted otherwise in drawings.
- Do not bend reinforcement after it is embedded in grout or mortar.
- Place joint reinforcement so that longitudinal wires are embedded in mortar with a minimum cover of 5/8 inch.

GROUT PLACEMENT

- Prior to grouting, the grout space shall be clean so that all spaces to be filled with grout do not contain mortar projections greater than ½ inch, mortar droppings or other foreign material.
- Place grout within 1½ hour from introduction of water in the mixture and prior to initial set.
- All cells containing reinforcement shall be filled with grout. Confine grout to the areas indicated on the drawings. Use materials to confine grout that permits bond between masonry units and mortar.
- Units may be laid to the full height of the grout pour and grout shall be placed in a continuous pour in grout lifts not exceeding 5 feet. Do not exceed the maximum grout pour heights as follows:

Maximum grout pour height (ft)	Minimum grout space dimensions (in x in)
1	1½ x 2
5	2 x 3
12	3 x 3
24	3 x 4

- Cleanouts shall be provided for all grout pours over 5 feet in height. Where required, cleanouts shall be provided in the bottom course at every vertical bar but shall not be spaced more than 32 inches on center for solidly grouted masonry. Cleanouts shall be sealed after inspection and before grouting.
- Consolidate grout at the time of placement by mechanical vibration and reconsolidate by mechanical vibration after initial water loss and settlement has occurred.
- Insulating Fill Placement

Plug all holes in the walls through which insulation can escape with permanent materials. Tightly caulk or otherwise permanently seal electrical outlets, and other apertures for conduits, pipes and all other wall openings prior to the installation of the insulation.

- Before any insulation is poured, place a temporary statement in each room, and no more than 20 feet o.c. on the interior face of all walls to be insulated, warning all trades who might subsequently cut into the wall to use caution to prevent the loss of insulation. Note: Gummed labels are available from one processor for this purpose.
- At all exterior building unit masonry walls completely fill ungrouted cells solid with insulating fill materials. Pour insulation directly into

the wall from the bag or from a hopper placed on the top of the wall. Pours may be made at any convenient level. The height of any pour shall not exceed 20 feet or one-story height, whichever is less.

CLEANING

- Clean exposed masonry surfaces of all stains, efflorescence, mortar or grout droppings, and debris.

END OF SECTION

PART I – GENERAL**WORK SPECIFIED HEREIN**

All labor, materials, equipment and services necessary to fabricate and erect all structural steel as indicated or specified including, but not limited to:

- All structural steel including columns, beams, girders, column base and cap plates, joist and beam bearing plates, angles and channels.
- Framing for all openings in metal deck.
- Connection angles, bolts and electrodes for welding work.
- Framing and support for roof top units.
- Shop painting.
- Shop drawings.
- Furnishing of anchor bolts and anchor plates to be embedded in concrete or masonry.
- Connections for steel joist girders and steel joists to each other and to structural steel.
- All other items required to make the work of this section complete.

SUBSTITUTIONS

In accordance with Section 01600.

QUALITY ASSURANCE

- Provide Special Inspections for structural steel as shown on the drawings and as required by the Building Official. See Section 01400 for payment provisions for testing.
 - Welders shall be duly qualified (test passed in the preceding 12 months) in the position in which they are to weld and the qualifications and specifications for workmanship shall comply with the AWS requirements & Canadian Welding Bureau – CSA W47.1 &/or W55.3.
- Unless otherwise shown or specified, structural steel work shall conform to the following standards:
 - American Institute of Steel Construction
 1. Specifications for Structural Steel Buildings, 2005
 2. Code of Standard Practice, 2005
 - American Welding Society: Structural Welding Code – Steel, AWS D1.1-08 & Canadian Welding Bureau – CSA W47.1 &/or W 55.3.

SUBMITTALS

Submit shop drawings in accordance with Section 01300 and CAN/CSA S16-01 for all work under this Section. Include complete details and schedules for fabrication and assembly of structural steel members, procedures and diagrams. Include details of cuts, connections, camber, holes and other pertinent data. Indicate welds by standard AWS and CSA W59 symbols, and show size length and type of each weld. Furnish erection drawings referencing erection marks to shop detail drawing numbers. Provide setting drawings, templates and directions for installation of anchor bolts, embedded plates and other anchorages to be installed by others.

PRODUCT DELIVERY, STORAGE AND HANDLING

Exercise care during unloading, storage and erection to avoid damage. Dumping on the ground is not permitted. Material stored at the site shall be supported completely free of the ground and covered to avoid damage from the elements.

PART II – PRODUCTS**MATERIALS**

- Cold formed Steel Structural members CSA S136.
- Structural steel: Shall conform to CSA Standard G40.20/G40.21M, latest edition.
 - (a) Rolled shapes WF, WWF grade M350W.
 - (b) Channels angles, grade M300W.
 - (c) HSS shall have minimum yield of 350 MPa (class H).
- Hollow structural sections: CSA-G40.20/G40.21M
- Anchor bolts: CSA-G40.20/G40.21 M
- Leveling and bearing plates: CSA-G40.20/G40.21 M
- Bolts nuts and washers: ASTM A325.
- Welding materials and shear connectors: CSA W59.
- Shop primer:
 1. Interior steel to CISC/CPMA 1-73a.
 2. Exterior steel to CISC/CPMA 1-73a
 3. Color: gray
- Hot dip galvanizing: CAN/CSA G164-M, minimum zinc coating of 600g/m2 (2oz./sq.ft.)

PART III – EXECUTION**FABRICATION**

- Provide all structural steel components indicated on Drawings, in accordance with the requirements specified herein and meeting applicable requirements of CAN/CSA S16-01.
- Beam splices are acceptable only if approved by Consultants.
- Prepare steel work for attachments of other work.
- Provide structural work bearing on concrete or masonry with base or bearing plates and wall anchors unless noted otherwise on Drawings.
- Cut required holes in steel members and reinforce openings only as detailed on Drawings or as approved by Consultants.
- Attach retainers for adjustable masonry anchors required for tying masonry to structural steel.
- If indicated on Drawings, weld masonry strap anchors to structural steel.

- Supply steel Lintels installed by Section 04200. Provide 150mm (6") bearing at each end for angle lintels, 200mm (8") for beam or channel sections and with packing as may be required to ensure level seating. Fabricate multiple member lintels to suit masonry dimensions with spacers and weld or bolt them together. Provide lintels for all openings and as indicated on Drawings.
- Supply all necessary angles, channels and anchors for overhead door and other steel jambs, and framing, installed under Section 03300 and 04200.
- See approved overhead sectional door shop drawings for location of jamb extensions and spring pads.
- Connections:
 1. Shop and field connections shall be welded or bolted with high tensile bolts.
 2. Beam connections: Provide beam connections adequate to resist the reactions produced by the framing or load connections. Provide beam to column connections that apply vertical reaction with negligible eccentricity at the connecting face of the column, such as double angle beam web connections, end plate connections or unstiffened seats, unless otherwise shown on Drawings. Submit for review, in advance of the preparation of shop drawings, connections which do not meet these requirements. Provide connections complying with the requirements of CISC handbook of steel construction, except that the length of beam web angles shall not be less than half the depth of the beam and single angles shall not be used for beams deeper than 500 mm (1'-8"). Provide direct connections to flanges of spandrel beams to restrain twisting and torsion. Do not use fish plate or shear plate connections.
- Painting:
 1. All structural steel work except where specified otherwise herein, shall be one coat of shop primer or shop paint applied thoroughly and evenly to dry surfaces only;
 2. Surfaces scheduled to be top coated in the field shall receive shop primer prior to shipment; all other surfaces shall receive one coat of shop paint;
 3. Where shop coat of paint is applied, clean and prepare surfaces to meet requirements of CISC/CPMA Standard 1-73a.
 4. Paint steel members under cover and keep them under cover and protected until paint/primer has dried;
 5. Remove paint for at least 50 mm (2") beyond surfaces which are to be welded after painting;
 6. Do not paint surfaces to be field welded, that are in contact at bolted friction type connections or that are encased in or in contact with concrete;

7. Cleaning and preparation of special surfaces shall be in conformance to CAN/CSA-S16.1;
8. Structural steel exposed in finished areas and scheduled to receive finish coats of paint, must be smooth, even and free of shop paint drip marks.

- Marking:

1. Mark materials in accordance with CSA-G40.20/G40.21 M. Do not use die stamping. If steel is to be left in unpainted condition, place marking at locations not visible from exterior after erection.
2. Match marking: shop mark bearing assemblies and splices for fit and match.

SITE INSPECTION

Verify all anchor bolt locations, grouting and elevation of base and setting plates and other material set by other trades, etc., before commencing work. Notify the Professional of Record of any work set by others if out of tolerances specified, and do not erect any material upon such work until it has been corrected satisfactorily. Starting work implies acceptance of the work of other trades affecting erection of the structural frame. Final results are the entire responsibility of the Contractor.

ERECTION

- Erect the work of this Section in accordance with CAN/CSA-S16.1 and in accordance with reviewed shop drawings.
- Work shall include necessary erection equipment and temporary shoring and bracing as required for erection and in manner meeting safety regulations. Brace and support structure during erection to ensure that it is maintained in alignment under construction and other loading and until all other construction elements contributing to stability are in place.
- Obtain written permission from Consultant prior to field cutting or altering structural steel members.
- Set column base plates and loose bearing plates with steel leveling nuts, shims to proper elevation, true and level, ready for grouting in, as specified under the work of other Sections.
- Set beams cambered within allowable tolerances with cambers on top sides.
- Splice members only with Consultant's approval.
- Ensure that joints between exposed exterior members are provided with seal welds or that they are sealed with another method approved by Consultant.
- Provide structural framing at perimeter of holes through metal decking where required and in accordance with Section 05310 and as indicated on Drawings.
- Touch up with prime paint, field connections and burnt or scratched surfaces when erection is completed.

END OF SECTION

PART I – GENERAL**WORK SPECIFIED HEREIN**

All labor, materials, equipment and design services necessary to furnish, transport and install all steel joists and joist girders as indicated or specified.

This Specification is based on the design and fabrication of joists and joist girders by XYZ Joist Company.

- Contractor shall purchase all joists and joist girders under a National Account agreement with XYZ Joist Company
- General Contractor is to use standard purchase agreement as shown in Section 01010.

SUBSTITUTIONS

No substitutions.

SUBMITTALS

- Submit five white prints of the shop drawings in accordance with Section 01340 for all work under this Section. Shop drawings shall clearly show all chord and web member sizes, panel point spacing, bearing plate sizes and details, extended end sizes and details and bridging angle connections and length and size of weld at all panel points. Show type of paint and all accessories and details as may be required for proper installation of joists and joist girders. Include the mark, number, type, location and spacing of all joists and bridging.
- Submit five prints of the design calculations for steel joists bearing the seal and signature of a Professional Engineer licensed in the province of Ontario. Total load deflection shall not exceed 1/240th of the span and live load deflection 1/360th of the span. Centre reaction point of joists on centroid of supporting beam or wall. Joist shop drawings shall carry the seal of a Professional Engineer licensed in the province of Ontario who shall be responsible for design, fabrication and erection of all joists.

PART II – PRODUCTS**MATERIALS**

- Steel for joists and joist girders shall comply with CSA-G40.20/G.40.21M & CSA-S136.
- Unless otherwise shown or specified, structural steel work shall conform to the following standards:
 - CSA Standards CAN/CSA-S16-01, CAN/CSA-S136-01, W47.1-03, W48-01, W55.3-1965(R2003), W59-03 & CAN/CSA G40.20-04.
 - Work shall be carried out by a member of the Canadian Institute of Steel Construction.
 - Welding shall be performed by firms fully approved by the Canadian Welding Bureau under the requirements of CSA Standard W47.1-03, certification of companies for fusion welding.

- Structural steel shall conform to CSA Standard G40.20/G40.21M, latest edition.
 - (a) Channels, plates, angles, and rolled shapes grade M350W.
 - (b) HSS shall have minimum yield of 350 MPa (class H).
- Shop paint shall comply with CISC/CPMA 1-73a specifications except asphalt type paint will not be permitted. Colour to be gray.

DESIGN

- Steel joists and joist girders shall be designed by the manufacturer. The manufacturer's engineer shall be responsible for the design, adequacy and safety of all steel joists and joist girders. The design shall be in accordance with CAN/CSA-S16.1.
- Joists/Joist Girders: See Drawings for Design Information.

FABRICATION

- Steel joists and joist girders shall be fabricated in accordance with SJI Specifications, except as otherwise indicated.
- Joists
 - Provide extended ends, special depth ends, etc. where indicated on the drawings and as job conditions require.
 - Camber all steel joists in accordance with SJI specifications.
- Joist Girders
 - Provide strutted ends of the bottom chord of sufficient strength and rigidity to restrain the lateral movement of the bottom chord.
 - Camber all steel joist girders in accordance with SJI specifications.
- Shop paint all joists and joist girders. Remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories before application of shop paint in accordance with SSPC SP-2, SP-3, or SP-7. Remove oil, grease, and similar contaminants in accordance with SSPC SP-1. Apply shop coat by spray, dipping or other method to provide a continuous dry paint film not less than 0.75 mil thick.

PART III – EXECUTION**APPLICATION, HANDLING AND ERECTION**

- Steel joists and joist girders shall be erected in strict accordance with the "Standard Specifications for Open-Web Steel Joists and Joist Girders".
- The contractor shall provide means for the adequate distribution of all loads during the construction period so that the carrying capacity of any joists or joist girders is not exceeded.
- No other loads shall be placed on the joist girders until the steel joists bearing on the girder are in place and attached thereto.

- All bridging and bridging anchors shall be placed and joist ends fixed prior to the application of any loads.
- Repair or replace all damaged joists or joist girders.
- After installation, paint all field bolt heads and nuts, and abraded or rusty surfaces on joists and joist girders using the same paint as used for shop coat.
- Install bridging so that it will not interfere with mechanical, electrical or other installations.

END OF SECTION

PART I – GENERAL**WORK SPECIFIED HEREIN**

All labor, materials, equipment and services necessary to furnish and install all metal roof deck as indicated or specified.

This Specification is based on the metal roof deck being provided by XYZ Company.

- Contractor shall purchase all metal roof deck under a National Account agreement with XYZ Company
- General Contractor is to use standard purchase agreement as shown in Section 01010.

SUBSTITUTIONS

No substitutions.

SUBMITTALS

Submit shop drawings in accordance with Section 01340 for all work under this section. Furnish detailed drawings and lists showing the mark, number, type, and location of all metal roof deck. Show method of attachment to the supporting structure. Show all openings for hatches, mechanical equipment, etc. Show type of paint and all accessories and details as may be required for proper installation of metal roof deck.

PRODUCT DELIVERY, STORAGE AND HANDLING

Deliver, store and handle all metal roof deck in such a manner that it will not be damaged or deformed. Stack decking stored at the site before erection on platforms or pallets, and suitably protect from the weather.

PART II – PRODUCTS**MATERIALS**

- Steel deck shall be formed from sheet steel conforming to CSSBI 10M-08 zinc-coated structural quality sheet steel for steel deck with a minimum nominal thickness not less than noted on the drawings and a minimum zinc coating designation of ZFO75 (wiped coat).
- Conform to CAN CSA-S136-01 and S136S1-04, North American Specifications for the design of cold formed steel structural members (using the Appendix B provisions applicable to Canada)
- Conform to CSA W47.1-03, Certification of Companies for Fusion Welding of Steel.
- Conform to W55.3-1965 (R2003) Resistance Welding Qualification Code for Fabrication of Structural Members used in Buildings, W59-03 Welded Steel Construction (metal arc welding), CSSBI 10M-8, Standard for Steel Roof Deck.
- Steel deck specified as galvanized to have a zinc coating as per designation Z275.
- Zinc Rich paint to CAN CGSB 1.181-99 ready-mixed organic zinc-rich coating.
- Steel for Painted Deck: Comply with SDI Specifications
- Accessories: Manufacturer's standard

- Shop paint: Manufacturer's standard

FABRICATION

- Metal roof deck shall be fabricated in accordance with SDI Specifications and CSA S136-94.
- Welding shall be performed by firms fully approved by the Canadian Welding Bureau under the requirements of CSA Standard W47.1-03, certification of companies for fusion welding.
- Design deck profiles for indicated loads. Minimum thickness and section depths are shown on the drawings. Limit roof deflection under total specified load to 1/240TH of span and under total specified live/snow loads to 1/360TH of span. Make sections continuous over three spans or increase thickness of material to give the equivalent stiffness and strength of a three span deck. Design anchorage to resist a gross uplift of 30 psf and 45 psf for cantilevers. Steel deck shop drawings shall carry the seal of a registered Professional Engineer licensed to practice in the province of Ontario, who shall be responsible for the design, fabrication and erection of the metal deck.
- Submit five white prints of erection diagrams and shop details for review prior to fabrication. Review of shop drawings is a precaution against oversight and error. It is not a detailed check and shall not be construed as relieving the contractor of responsibility for making the work accurate and in conformity with the contract documents. Maintain a set of reviewed drawings on site.

PART III – EXECUTION**INSTALLATION**

Install deck units and accessories in accordance with CAN CSA-S136-01 North American Specifications for the design of cold formed steel structural members, the specifications, manufacturer's recommendations, and final shop drawings, and as specified herein.

Placing:

- Do not start placement of deck units before all supporting members are installed. Place deck units on supporting steel framework and adjust to final position with ends bearing on supporting members and accurately aligned end to end before being permanently fastened. Lap ends not less than 2". Do not stretch or contract the side-lap interlocks.
- Metal roof deck shall be continuous over at least three spans.
- Provide all required closures, reinforcing sheet steel plates and reinforcements at edges of free spanning deck and at all other locations indicated in the drawings.
- Coordinate and cooperate with structural steel erector in locating decking bundles to prevent overloading of structural members.
- Do not use deck units for storage or working platforms until permanently secured in position.

- Do not hang or support any loads from metal roof deck.

Fastening:

- Weld deck to supports at all bearing points with 3/4" diameter puddle welds as per fastening schedule. Stagger welds along flanges of supporting members. Place one weld in each flute where side lap is made. Make end laps over supports not less than 2". Connect side laps with #10 screws as per fastening schedule. Paint welds with zinc-rich paint. Weld deck to perimeter angles with 3/4" diameter puddle welds at 6" on center where angles are parallel to the valleys in the deck.

Cutting and Fitting:

- Cut and fit deck units and accessories around other work projecting through or adjacent to the decking. Provide neat, square, and trim cuts.

Reinforcement at Openings:

- Reinforce openings over 6" up to 12" wide across the flutes with L 2" x 2" x 1/4" angles under flutes on each side. Weld angles to at least two flutes on each side of the opening. Design and provide reinforcing for opening over 12" to 17" wide to support the loads indicated.

Touch-Up Painting:

- After decking installation, wire brush, clean and paint scarred areas, welds and rust spots on the top and bottom surfaces of decking units and supporting steel members.
- In areas where touch-up painted surfaces are to be exposed, apply the paint to blend into the adjacent surfaces in a manner that will minimize visual discontinuity in the coatings.

Independent Inspection and Testing:

- The Architect will appoint an Independent Inspection and testing Agency. Work will be inspected when deck is erected to determine conformance to the drawings and specifications.

END OF SECTION

PART I – GENERAL**WORK SPECIFIED HEREIN**

All labor, materials, equipment and services necessary to furnish and install all cold-formed steel framing as indicated or specified.

SUBSTITUTIONS

In accordance with Section 01600.

PART II – PRODUCTS**MATERIALS**

- Steel studs shall conform to CAN CSA-S136-07, Design of Cold Formed Steel Structural Members and CAN CGSB-7.1-98, Light weight steel wall.
- Provide shop drawings for all metal studs, with all stud connections and details to be designed by a suitable qualified registered Professional Engineer licensed to practice in the province of Ontario, who's stamp and signature shall be on the shop drawings.
- Bolts and fasteners are to conform to the requirements of A307 or ASTM A325.
- Structural steel studs shall be sizes indicated.

FABRICATION

- Option: Provide prefab metal stud truss framing for the front canopy when requested.

PART III – EXECUTION**INSTALLATION**

- Installation of studs shall be as per CSA Standards CAN/CSA-S16-01 Limit States Design of Steel Structures, CAN/CSA-S136-07, Design of Cold Formed Steel Structural Members, CSA A370 Connectors for Masonry.
- Securely anchor track to floor with 1/2" diameter bolts at 48" o.c. maximum, or with 0.145" Ø powder driven fasteners at 8" o.c. maximum with 2 bolts or fasteners per any track sections.
- Provide top track to accommodate vertical deflection gap to account for movement of the structure. The gap is to be as indicated in the drawings.
- All track butt joints, abutting pieces of track shall be securely anchored to a common structural element, or they shall be butt-welded or spliced together.
- All stud bridging shall be attached in a manner to prevent stud rotation. Bridging rows shall be spaced according to Dietrich Indus. recommendations.
- Temporary bracing shall be provided until erection is completed.
- Joists shall be located directly over bearings studs or a load distribution member shall be provided at the top track.

- Provide web stiffeners at reaction points where indicated by plans.
- Stud ends must be squarely seated against the track web. Both stud flanges must be attached to track members at top and bottom by welding flanges to track or with (4) #10 TEK screws, (2) top and (2) bottom. Space studs as indicate don drawings but not greater than 24" o.c. triple up studs with 2 studs full height at all jambs.
- Stud bridging shall be provided by 1-1/2" cold rolled u-channel. The u-channel must be attached to each stud by welding or attaching with clip angles and screws. Horizontal strapping and solid bridging with track members can also be used for bridging. Bridging shall be spaced at 4'-0" o.c. max.
- Brick ties shall consist of "Dur-O-Wal" D/A 210 and D/A 807 screws with D/A 700 series triangle ties at 16" o.c. horizontally and vertically.
- The following minimum cold formed steel attachments shall be provided U.N.O.:

Track to Structural Steel	(1) - .145 Ø powder driven fastener @ 2'-8" o.c.
Track to Metal Deck	(1) - #10 TEK screw @ 1'-4" o.c.
Track to Masonry	(1) - .145" Ø powder driven fastener @ 2'-8" o.c.
Stud to Structural Steel	(1) - L2x2x - 14 ga. clip angle connection w/(2) - #10 TEK screws into metal stud and (2) - .145" Ø powder driven. Fasteners into structural steel.
- Touch-up field abrasions and welds in the field after erection using the same materials as shop coat paint.

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PART I – GENERAL**WORK SPECIFIED HEREIN**

All labor, materials, equipment and services necessary to provide the miscellaneous metals and related items as indicated or specified.

SUBSTITUTIONS

In accordance with Section 01600.

DESCRIPTION OF WORK

The extent of miscellaneous metal work is shown on the drawings and includes items fabricated from iron and steel shapes, plates, bars, strips, tubes, pipe and castings which are not a part of the structural steel or other metal systems in other sections of these specifications.

The types of miscellaneous metal items include, but are not limited to the following:

- Carpenter's iron work
- Steel gratings and frames
- Steel pipe bollards and guard posts
- Ladders
- Interior steel stairs
- Loose bearing plates
- Miscellaneous framing and supports
- Miscellaneous steel trim
- Steel angle corner guards
- Steel channel door frames
- Steel dock angles
- Steel angle jambs
- Steel O.H. door supports

STRUCTURAL PERFORMANCE

Design, engineer, fabricate and install the following metal fabrications to withstand the following structural loads without exceeding the allowable design working stress of the materials involved, including anchors and connections. Apply each load to produce the maximum stress in each respective component of each metal fabrication.

- Comply with the requirements of the authorities having jurisdiction at site location if those requirements are more stringent than those indicated herein.
- Treads and Platforms of Metal Stairs: Capable of withstanding a uniform load of 100 lbf/sq. ft. or a concentrated load of 300 lbf on an area of 4 sq. in., whichever produces the greater stress.
- Stair Framing: Capable of withstanding stresses resulting from loads specified above in addition to stresses resulting from railing system loads.
- Limit deflection of treads, platforms, and framing members to L/360 or 1/4 inch (6.4 mm), whichever is less.

QUALITY ASSURANCE

Comply with the provisions of the following codes, standards and specifications, except as otherwise shown and specified.

- AISC "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings," including "Commentary of the AISC Specifications".
- AISI "Specifications for the Design of Cold-Formed Steel Structural Members".
- AWS "Structural Welding Code - Steel".
- ASTM A6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piping and Bars for Structural Use".

Professional of Record Qualifications

A Professional who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of metal stairs (including handrails and railing systems) that are similar to those indicated for this Project in material, design and extent.

Qualification for welding work

Qualify welding processes and welding operators in accordance with AWS "Standard Qualifications Procedure".

Field Measurement

Take field measurements prior to preparation of shop drawings and fabrication, where possible, to ensure proper fitting of the work. However, do not delay job progress; allow for trimming and fitting wherever the taking of field measurements before fabrication might delay the work.

Inserts and Anchorages

Furnish inserts and anchoring devices which must be set in concrete or built into masonry for the installation of miscellaneous metal work. Provide setting drawings, templates, instructions and directions for installation of anchorage devices. Coordinate delivery with other work to avoid delay.

Shop Assembly

Pre-assemble items in the shop to the greatest extent possible, so as to minimize field splicing and assembly of units at the project site. Disassembly units only to the extent necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinate installation.

PART II – PRODUCTS**MATERIALS**

Metal Surfaces - General: For the fabrication of miscellaneous metal work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness. Remove such blemishes by grinding or by welding and grinding, prior to cleaning, treating and application of surface finishes including zinc coatings.

- Steel Plates, Shapes and Bars: *ASTM A36*
- Steel Bars and Bar-size Shapes: *ASTM A36*
- Steel Tubing: (Hot formed, welded or seamless): *ASTM A501*
- Hot-rolled Carbon Steel Bars: *ASTM A108, Grade as selected by fabricator.*

- Hot-rolled Carbon Steel Sheets and Strips: *ASTM A568 and ASTM A569; pickled and oiled.*
- Cold-rolled Carbon Steel Sheets: *ASTM A336.*
- Galvanized Carbon Steel Sheets: *ASTM A526, with ASTM A525, G90 zinc coating.*
- Cold-drawn Steel Tubing: *ASTM A512, sunk drawn, butt welded, cold-finished and stress-relieved.*
- Steel Pipe: *ASTM A53, type as selected; Grade A. Black finish unless galvanizing is required. Standard weight, Schedule 40, unless otherwise shown or specified.*

ANCHORS

Thread-type Concrete Inserts

Galvanized ferrous castings internally threaded to receive 3/4" diameter machine bolts; either malleable iron complying with ASTM A47 or cast steel complying with ASTM A27; hot-dip galvanized in compliance with ASTM A153.

Wedge-type Concrete Inserts:

Galvanized box-type ferrous castings, designed to accept 3/4" diameter bolts having special wedge-shaped heads, either malleable iron complying with ASTM A47 or cast steel complying with ASTM A27; hot-dipped galvanized in compliance with ASTM A153. Provide carbon steel bolts having special wedge-shaped heads, nuts, washers and shims; all galvanized in compliance with ASTM A153.

Slotted-type Concrete Inserts:

Galvanized 1/8" thick pressed steel plate complying with ASTM A283. Box-type welded construction with slot designed to receive 3/4" diameter square head bolt and with knockout cover. Hot-dip galvanized in compliance with ASTM A123.

Masonry Anchorage Devices

Expansion shield; FS FF-S-325.

Toggle Bolts

Tumble-wing type; FS FF-B-588, type, class and style as required.

FASTENERS

General: Provide zinc-coated fasteners with galvanized complying with ASTM A153 for exterior use or where built into exterior walls. Select fasteners for the type, grade and class required for the installation of miscellaneous metal items.

- Bolts and Nuts: *ASTM A307, Grade A, regular hexagon head.*
- Bolts, Hexagon and Square: *ANSI B-18.2.1.*
- Bolts, Round Head: *ANSI B-18.5.*
- Lag Bolts: *FS FF-B-561, square head type.*
- Wood Screws: *ANSI B-18.6.1, flat head carbon steel.*
- Plain Washers: *FS FF-W-84, helical spring type carbon steel.*

PAINT

- Metal Primer Paint: *FS TT-P-636.*
- Galvanizing Repair Paint: *High zinc dust content paint for regalvanizing welds in galvanized steel, complying with military specifications MIL-P-21035 (Ships).*

FABRICATION, GENERAL

Workmanship:

- Use materials of the size and thickness shown, or if not shown, of the required sized and thickness to produce adequate strength and durability of the finished product for the intended use. Work to the dimensions of fabrication and support. Use the type of materials shown or specified for the various components of work.
- Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32" unless otherwise shown. Form bent-metal corners to the smallest radius possible without causing grain separation or otherwise impairing the work.
- Weld corners and seam continuously and in accordance with the recommendations of AWS. Grind exposed welds smooth and flush, to match and blend with adjoining surfaces.
- Form exposed connections with hairline joints which are flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of the type shown, or if not shown, use Phillips flat-head (countersunk) screws or bolts.
- Cut, reinforce, drill and tap miscellaneous metal work as may be required to receive finish hardware and similar items of work. Use hot-rolled steel bars for work fabricated from bar stock, unless work is indicated to be fabricated from cold-rolled or cold-finished stock.

Galvanizing:

Provide zinc coating for those items shown or specified to be galvanized, using the hot-dip process after fabrications. ASTM A153 for galvanizing of iron and steel hardware. ASTM A123 for galvanizing of rolled, pressed and forged steel shapes, plates, bars, and strip 1/8" thick and heavier and for galvanizing of assembly projects.

Shop Painting:

- Shop paint miscellaneous metal work, except those members or positions of members to be embedded in concrete or masonry, surfaces and edges to be field welded, and galvanized surfaces, unless otherwise indicated.

- Remove scale, rust and other deleterious materials before the shop coat of paint is applied. Clean off heavy rust and loose mill scale in accordance with SSPC SP-2 "Hand Tool Cleaning", or SSPC SP-3 "Power Tool Cleaning, or SSPC SP-7 "Brush-off Blast Cleaning". Remove oil, grease and similar contaminants in accordance with SSPC SP-1 "Solvent Cleaning".
- Apply one shop coat of metal primer paint to fabricated metal items, except apply 2 coats of paint to surfaces which are inaccessible after assembly or erection.
- Immediately after surface preparation, brush or spray on metal primer paint, applied in accordance with the manufacturer's instructions, and at a rate to provide a uniform dry film thickness of 2 mils for each coat. Use painting methods which will result in full coverage of joints, corners, edges and all exposed surfaces.

PART III – EXECUTION

MISCELLANEOUS METAL ITEMS:

Carpentry's Iron Work:

Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware are specified in Division 6 Sections.

Ladders:

Fabricate ladders for the locations shown, with dimensions, spacing, details and anchorages as required. Comply with the requirements of ANSI A14.3, except as otherwise shown. Provide 3" x 3" x 1/4" steel angle bracket at max. 6'-0" o.c., 3/8" x 3" continuous structural steel plate stringer with eased edges, spaced 18" apart. Provide 3/4" diameter, No. 6 deformed steel rebar rungs (for slip resistance), spaced 12" o.c.

Fit rungs into punched holes in centerline of side rails, plug weld and grind smooth on outer rail faces.

Support each ladder at top and bottom and at intermediate points spaced not more than 5 feet o.c. Use welded or bolted steel brackets, designed for adequate support and anchorage, and to hold the ladder 6" clear of the wall surface and other obstructing construction. Extend rails 42" above top rung, and return rails to wall or structure unless other secure handholds are provided. If the adjacent structures does not extend above the top rung, gooseneck the extended rails back to the structure to provide secure ladder access.

Provide non-slip surfaces on the top of each rung, either by coating the rung with aluminum oxide granules set in epoxy resin adhesive, or deformed steel reinforced bars.

Loose Bearing Plates:

Provide loose bearing plates for steel items bearing on masonry or concrete construction, made flat, free from warps or twists, and of required thickness

and bearing area. Drill plates to receive anchor bolts and for grouting as required.

Loose Steel Lintels:

Provide loose structural steel shape lintels for openings and recesses in masonry walls and partitions as shown. Weld adjoining members together to form a single unit. Provide not less than 4" bearing at each side of openings, unless otherwise shown.

Miscellaneous Framing and Supports:

Provide miscellaneous steel framing and supports which are not a part of the structural steel framework as required to complete the work.

Miscellaneous Steel Trim:

Provide shapes and sizes as required for the profiles shown. Except as otherwise noted, fabricate units from structural steel shapes and plates and steel bars, with continuously welded joints and smooth exposed edges. Use concealed field splices wherever possible. Provide cutouts, fittings and anchorages as required for coordination of assembly and installation with other work.

Shelf Angles:

- Provide structural steel shelf angles of sizes shown for attachment to concrete framing. Provide slotted holes to receive 3/4" bolts, spaced not more than 6" from ends and not more than 24" o.c., unless otherwise shown.
- Furnish wedge-type concrete inserts, complete with fasteners, for attachment of shelf angles to cast-in-place concrete.
- Security bars (provide if smoke/heat vents are required):
- Provide security bars where indicated and at all openings through the roof 12" or greater in any direction. Fabricate of 5/8" diameter steel bar 6" on center each way. All joints and intersections shall be welded. Provide steel angle frame to suit opening and bolt securely to opening with 3/4" diameter bolts at 24" centers. Deform or weld threads to prevent removal of bolts.

Gratings:

Grating in utility trench shall be McNichols Co. (or equal) electro-pressure welded construction type with 1" x 1/4" bearing bars spaced at 1-3/16" centers and 1/2" x 3/16" cross bars spaced at 2" centers. Wearing surface of bearing bars and of cross bars shall be serrated. Grating shall be hot-dipped galvanized after fabrication. Furnish perimeter support angles with welded anchors as detailed.

STAIRS - INTERIOR:

Stair Framing:

Fabricate stringers of structural - steel channels, plates, or a combination of both, as indicated. Provide closures for exposed ends of stringers. Construct platforms of structural-steel channel headers and miscellaneous framing members as indicated. Bolt or weld headers to stringers; bolt or weld framing members to stringers and headers. If using bolts, fabricate and join so bolts are not exposed on finished surfaces.

Steel Floor Plate Treads, Risers, and Platforms:

Form to configurations shown from raised-pattern steel floor plate of thickness necessary to support indicated loads, but not less than 1/4 inch (6.4 mm).

END OF SECTION

PART I – GENERAL**WORK SPECIFIED HEREIN**

All labor, materials, equipment and services necessary to fabricate, furnish and erect all steel railings and handrails including anchors, brackets, etc., as indicated or specified.

SUBSTITUTIONS

In accordance with Section 01600.

PART II – PRODUCTS**MATERIALS**

- Structural steel shapes and plates shall conform to *ASTM A-36*.
- Steel Bars and bar-size shapes shall conform to *ASTM A-36*.
- Steel butting shall conform to *ASTM A-500, Grade B*.
- Gray iron casting shall conform to *ASTM A-48, Class 30*.
- Malleable iron castings shall conform to *ASTM A-47, Grade as selected*.
- Steel pipe shall conform to *ASTM A-53, type as selected, Grade A, standard weight (Schedule 40)*.
- Primer shall *FS TT-P-386*.
- Chain Link Railing Infill: No. 9 gage, Class 2 galvanized, ASTM A392 (202.21NC per sq. ft.) Core SRE Steel Wires, 2" mesh, with top and bottom selvages knuckled.

FABRICATION

Work shall conform with the standard specifications, rules and practice of the AISC as described in the "Steel Construction Manual". Form and fabricate the work to meet installation conditions. Include accessories to adequately secure the work in place. Verify dimensions, conditions and existing limitations, upon which the work of this section might be contingent. Make provisions to connect with or to receive the work specified in other sections. Install items anchored in concrete in the formwork, where practicable. Set items to be built into masonry so that masonry can be built up to them, anchoring in position.

PRIME COAT

Clean all metal work of grease, rust, mill scale, and other foreign matter and give a coat of primer.

PART III – EXECUTION**WORKMANSHIP**

Fabricate and erect all work using only skilled workmen. Make all connections between members, unless otherwise indicated, by the use of welds or bolts. Conceal connections in finished work where possible. Exposed screw fastenings, where required, shall be Phillips oval head screws to match material in which they are used. Accurately member or miter exposed joints with hairline joints. Grind all welds in finished

surfaces smooth. Welding shall be done by the shielded arc method. No identifying marks shall remain exposed.

STEEL RAILINGS

- Furnish and install all steel railing at locations indicated. Include all plates, angles brackets, sleeves, etc., required.
- Railings shall be smooth, with all projections and corners ground smooth. Welds shall be flush type, neatly and substantially done, with fillets dressed to uniform radius, with all excess metal removed and welds ground smooth. Return all rail ends to walls.
- Install all posts and vertical members plumb within 1/8" of vertical. Install longitudinal members parallel with each other and with floor surfaces or slope of stairs to within 1/8" per 10 running feet. Center lines of all members within each run shall lie in the same vertical plane.
- All railings located in the Sales Area/Cart Vestibule, Cart Storage areas shall be polished chrome (Alvarado Manufacturing Co). All anchoring to the floor shall be concealed with chrome base plate covers.

END OF SECTION

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PART I – GENERAL**WORK SPECIFIED HEREIN**

- All labor, materials, equipment and services necessary to furnish and install the rough carpentry and related items as indicated or specified.

PRODUCT DELIVERY, STORAGE AND HANDLING

- Carefully store all lumber delivered to the site off the ground in a manner to assure proper drainage, ventilation and protection from the weather.

SUBMITTALS

- Unless otherwise notes, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.
- Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

GENERAL**Grades:**

- Use CLS grade-marked lumber conforming to Standard Grading Rules for Canadian Lumber published by National Lumber Grades Authority.

Lumber:

- For each use, comply with CAN/CSA O41, kiln dried to maximum moisture content of 8%, dressed 4 sides.

Plywood:

- Softwood plywood meeting CSA O121 or CSA O151, cross-banded, sanded G2S, thickness as indicated.

Medium Density Fibreboard (MDF):

- Meeting ASTM D1037 and ANSI A208.2, Premium Grade for interior use, minimum 750 kg/m³ (47 lbs/ft³) density; formaldehyde emissions 0.30 ppm or less per 0.424 m²/m³ (0.13ft²/ft³) of room volume.

COORDINATION

- Keep carpentry materials dry during delivery. Store lumber and plywood in stacks. Protect bottom of stacks against contact with damp or wet surfaces. Protect exposed materials against weather. Do not store dressed or treated lumber or plywood outdoors.
- Do not store dressed or treated lumber or plywood outdoors.
- Store materials for which a maximum moisture content is specified only in areas where relative humidity has been reduced to a level where specified moisture content can be maintained.

PART II – PRODUCTS**MATERIALS****Framing Lumber:**

All framing lumber shall be Group D (SPF), No. 2 grade or better.

Plywood:

13 mm Douglas Fir or Western Softwood panels to CSA O325, 1220 mm x 2440 mm (48" X 96") (or as indicated).

Miscellaneous Lumber:

Provide wood for support or attachment of other work such as cant strips, bucks, nailers, blocking, furring, grounds, stripping and similar members. Provide lumber of the sizes shown or specified, worked to shapes shown, and as follows:

- Moisture Content: 8% maximum for all lumber items not specified to receive wood preservatives treatment.
- Grade: Construction grade light framing size lumber of D (SPF) species or board size lumber, as required. Provide Construction Grade boards to CAN/CSA O141.
- Concealed plywood interior standard grade, interior type.
- Backing panels for electrical or telephone equipment standard grade interior type plywood with exterior glue.

Anchorage and Fastening Materials:

Select proper type, size, material and finish for each application. Comply with the following:

- Nails and Staples: *CSA B111*
- Wood Screws: *ASTM C 954*
- Bolts, hexagon and square: *Hot dipped galvanized to CSA G164 or Grade A to ASTM A307.*
- Bolts, round head: *Hot dipped galvanized to CSA G164*
- Nuts: *Hot dipped galvanized to CSA G164*
- Washers: *Hot dipped galvanized to CSA G164*
- Lag Screws or Lag Bolts: *Hot dipped galvanized to CSA G164*
- Expansion Shields, Expansion Nails and Drive Screw Devices: *Hot dipped galvanized to CSA G164*
- Toggle Bolts: *Hot dipped galvanized to CSA G164*
- Bar or strap Anchors: *ASTM A525 size coated steel, 1.2 mm (18 gauge) minimum.*
- Metal Framing Connectors: *MGA Connectors, Simpson Strong-Tie, USP Lumber Connectors.*

Wood Preservative Treatment:

Treat wood, including lumber and plywood, as specified herein to be treated, to comply with the applicable requirements of CAN/CSA O80.

Pressure treat the following items with water borne preservatives for above-ground use, complying with CAN/CSA O80.20M:

- Wood cants, nailers, blocking, stripping and similar members in connection with roofing, flashing, vapor barriers and waterproofing (except plywood sheathing).
- Wood sills, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete or below grade. Foundation Grade redwood, grade marked, is acceptable for wood sills in lieu of treated lumber.

FIRE RETARDANT TREATMENT

- For all wood members and plywood required by code as fire retardant treated provide pressure impregnation with Dricon fire retardant chemicals in accordance with the recommendations and quality control of CAN/CSA O80.9M, CAN/CSA O80.20M and CAN/CSA O80.27M to provide classification for flame spread of not more than 25, smoke developed of not more than 75 in accordance with CAN4 S102. Each piece or bundle of fire-retardant treated material or panel to bear ULC inspection label or stamp attesting to FRS rating indicating flame spread, smoke developed, and fuel contributed classification meeting AWPA standard C20 and C27 for Type A Use.

PART III – EXECUTION

INSTALLATION

- Use only sound, thoroughly seasoned, well manufactured materials of the longest practical lengths and sizes to minimize jointing.
- Use materials free from warp, which cannot be easily corrected by anchoring and attachment. Sort out and discard warped material and material with other defects, which would impair the quality of the work.
- Securely attached carpentry work to substrates by anchoring and fastening as shown and as required by recognized standards. Provide washers under bolt heads and nuts in contact with wood.
- Nail plywood to comply with CSA recommendations.
- Set carpentry work accurately to required levels and lines with members plumb and true and accurately cut and fitted.
- Shim with metal or slate for full bearing on concrete or masonry substrates.
- Attachment and Anchorage:
- Use common wire nails, except as otherwise shown or specified herein. Do not wax or lubricate fasteners that depend on friction for holding power. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; predrill as required. Do not drive threaded friction type fasteners; turn into place. Tighten bolts and lag screws at installation and retighten as required for tight connections prior to closing in or at completion of work. Counter

sink nail heads on exposed carpentry work and fill holes, use finishing nails for finish work.

WOOD FRAMING INSTALLATION

- Nail or spike members in accordance with code requirements. All framing 406 mm (16") o.c. unless otherwise noted.
- Cut framing square on bearings, closely fit, accurately set to required lines and levels. Secure rigidly in place at bearings and connections. Do not use shims for leveling on wood or metal bearings. Use steel shims with full bearing on masonry or concrete substrates.
- Frame members for passage of pipes and ducts to avoid cutting structural members. Do not cut, notch or bore framing members for passage of pipes or conduits without Consultant's permission. Reinforce framing members as directed where damaged by cutting. Provide Simpson NS nail stoppers over utilities that penetrate framing members, nailing with 8d nails.

WOOD GROUNDS, NAILERS AND BLOCKING

- Provide wherever shown and where required for screeding or attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached.
- Provide solid wood backing and wood blocking inside stud wall construction for all wall mounted equipment, accessories, and toilet rooms.
- Coordinate location with other work involved; refer to shop drawings of such work.
- Attach to substrates securely with anchor bolts and other attachment devices as shown and as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise shown.
- Set true to line and level, plumb, with intersections true to required angle. Build into masonry as work progresses, cutting to fit masonry unit size involved. Anchor to form work before concrete placement.
- Provide grounds of dressed, preservative treated, key-beveled lumber not less than 38 mm (1-1/2") wide and of the thickness required to bring fact of ground to exact thickness of finish material involved. Remove temporary grounds when no longer required.

WOOD FURRING

Install plumb and level with closure strips at all edges and openings. Shim with wood as required.

END OF SECTION

PART I – GENERAL**WORK SPECIFIED HEREIN**

All labor, materials, equipment and services necessary to furnish and install the finish carpentry and related items as indicated or specified. Installation of architectural woodwork is specified in this section.

SUBSTITUTIONS

In accordance with section 01600.

SUBMITTALS

- Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.
- Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

GENERAL REQUIREMENTS

- Employ only mechanics skilled in finish carpentry.
- Handle and store architectural woodwork and trim carefully, accepting delivery only after storage area temperature is being permanently maintained above 17° C, and area is sufficiently dry so woodwork will not be damaged by excessive change in moisture content. At delivery, average moisture content of woodwork shall not exceed 6% with maximum permitted of 10%.
- Arrange for back priming of all concealed surfaces for materials scheduled to be painted under Section 09900 as soon after delivery as possible.
- In general, woodwork shall be fabricated and assembled at the mill, and be ready for installation when delivered. Erect no woodwork until moisture content of grounds, furring, etc., is below 19% verified by moisture meter.
- Install all work plumb, level, true to line and firmly secured to grounds or backing. Scribe and fit accurately to adjacent work, taking care not to injure finished surfaces.
- Distribute defects allowed in the quality grades specified to minimize their affect on the finished work. Fit joints tight, flush and even. Ease all sharp edges.
- Protect all work after erection, repairing or replacing damaged work as directed, at Contractor's expense.

PART II – PRODUCTS

Not applicable.

PART III – EXECUTION**FASTENINGS**

Attach all work to assure firm, secure support, with all fastenings concealed. Blind nail where possible; where not possible, locate, drive and

set surface nails for putty stopping so as not to be conspicuous in the finish. Surface nail plain casings, base, etc., in pairs at 610 mm (24") centers. Drill lead holes for all screws. Apply adhesives in strict accordance with manufacturer's directions, supplementing adhesives with nailing as required.

DOORS

Hand and fit all doors plumb and accurately aligned with frames and stops.

Provide uniform 1.5 mm to 3 mm (1/16" to 1/8") edge clearance at jambs and heads and 3 mm (1/8") bottom clearance above finish flooring except at undercut doors. Bevel lock stiles a standard 3 mm in 50 mm (1/8" in 2"), or as required to match hardware. Ease all edges. Install specified hardware to provide free swinging or sliding doors that close easily and latch securely, free from rattling.

Make lock cutouts with proper templates or jigs, using manufacturer's recommended methods. Cut mortises accurately to size and depth, with minimum clearance. Patching will not be permitted, and doors and frames incorrectly prepared for hardware shall be replaced.

TRIM, ETC.

Install standing trim in single lengths without splices, running trim in lengths as long as possible, joined only where solid fastenings can be made. End joints in built-up members shall be well distributed. Miter external comers, cope internal comers.

FINISH HARDWARE INSTALLATION

Forward complete information as to details, sizes, shapes, levels, thickness, etc., of all items requiring hardware to the hardware supplier and review his schedules to verify the inclusion of this information. Notify hardware supplier immediately regarding changes and revisions, obtain confirmation through revised hardware schedules and expedite shipment to subcontractors, manufacturers and the job site.

Store hardware at the site in a room designated for this purpose, and inspect immediately upon delivery, reordering missing items. Protect installed hardware until building is complete, replacing all damaged material. At completion deliver keys to Owner, properly labeled, sorted and arranged for easy filing.

The finish hardware shall be accurately fitted and installed on properly prepared surfaces in conformity with the manufacturer's instructions and templates. Upon completion, the finish hardware shall be in perfect condition and in perfect working order.

END OF SECTION

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PART I – GENERAL

WORK SPECIFIED HEREIN

All labor, materials, equipment and services necessary to furnish all architectural woodwork and casework and related items as indicated or specified. **This is a Required Vendor with Advanced Fixtures, Inc. and is supplied in a complete package, which includes installation. For Contact Information See Required Vendor List.**

SUBSTITUTIONS

No substitutions.

SUBMITTALS

Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.

Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

QUALITY ASSURANCE

The "Quality Standards" of the Architectural Woodwork Manufacturing Association of Canada (AWMAC) shall apply and by reference are hereby made a part of this specification. Any reference to custom in this specification shall be as defined in the latest edition of the AWMAC Architectural Woodwork Quality Standards Illustrated, 8th Edition, Version 1.0, 2003.

Any item not given a specified quality grade shall be Custom grade as defined in the AWMAC Architectural Woodwork Quality Standards.

FIELD DIMENSIONS

The architectural woodwork manufacturer is responsible for actual field measurements prior to manufacture. The General Contractor and the woodwork manufacturer shall cooperate to establish and maintain these field dimensions.

PRODUCT DELIVERY, STORAGE AND HANDLING

The architectural woodwork manufacturer and the contractor shall be jointly responsible to make certain that woodwork is not delivered until the building and storage areas are conditioned so that the woodwork will not be damaged by excessive changes in moisture content.

PART II – PRODUCTS

MATERIALS

1. Exposed woodwork shall have a smooth finish free from machine and tool marks, abrasions, raised grain or exposed surfaces, and all joints shall be tight.
2. Scribe and cope cabinets shelving trim and partitions to fit abutting walls and other building surfaces.

3. All frames and trim shall have kerfed or hollow backs and shall be in single lengths, except that running trim shall be in commercial long lengths, and with no splicing pieces shorter than 915 mm (3 feet). At internal corners square members shall be butt jointed and the molding coped; at external corners, members shall be cut at a 45-degree angle to conceal shrinkage. Brace frames at mill with cross and diagonal strips before shipping to job.
4. Set wood finish straight, plumb and level, in true alignment and rigidly fastened in place. Nailing and fastening shall be concealed where possible, and exposed nail heads shall be set for puttying. Provide stops where detailed and required.
5. Doors and other movable wood parts shall be set for puttying. Provide stops where detailed and required.
6. Doors and other movable wood parts shall be accurately fitted with proper clearances and left in perfect working order. All refitting necessary due to swelling, shrinking, faulty assembly, or installation shall be done by the contractor, without cost to the Owner, for a period of one year after completion and acceptance of the building. When dressing or cutting has been done, these surfaces shall be repainted or varnished. The work shall be left clean and free from warp, twist, open joints, or other defects.

PLASTIC LAMINATE INSTALLATION

- Core material to be thermofused melamine with particleboard core. Application of plastic shall be by pressure gluing using water-resistant glue. Backing sheets shall be used to prevent bowing.
- Shop joints shall be allowed only when the required length of plastic regularly available. Field joints shall be shop prepared and pre-fitted with bolt-type fasteners.
- Counter tops, intermediate supports and splash backs shall be self-edged and plastic edges shall return across all open ends. Joints between tops and sides shall be square.
- **Protection:** All finished millwork to be covered and protected from damage and discoloration prior to final cleanup. Any damaged material to be completely replaced.
- **Cleanup:** Remove all scrap and unused material from jobsite. Leave in finished condition per general conditions.
- Any/all required blocking/backing for installation of millwork shall be coordinated, furnished and installed by General Contractor.

END OF SECTION

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PART I – GENERAL**WORK SPECIFIED HEREIN**

All labor, materials, equipment and services necessary to furnish and install the water repellent masonry stain on masonry units as indicated or specified.

SUBSTITUTIONS

In accordance with Section 01600.

SUBMITTALS

Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.

Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

QUALITY ASSURANCE

Application of water repellent masonry stain shall be by an approved applicator of the manufacturer. The application shall leave the finished surfaces uniform in color, and water repellent, and shall not alter the natural texture of the materials.

PRELIMINARY TEST:

Sealer manufacturer shall seal samples of masonry units and submit to the Professional of Record for his review both the aesthetics and effectiveness, accompanied with a letter stating the actual application rates required to meet the guarantee requirements.

RECOMMENDED METHOD-OF-INSTALLATION

Submit 3 copies of the current Method-of-Installation recommendations of the manufacturer of the waterproofing system. These recommendations shall become the basis for acceptance or rejection of actual installation methods used on the work. See Section 01340.

SAMPLES

The applicator shall apply clear waterproofing and stain to the masonry sample wall located at the job site. The purpose of this sample will be to observe color uniformity and intensity, the method of application, including workmanship techniques, and to water test surface after a 30-day period. Equipment to be used for actual application to building walls shall be used to apply materials to sample wall.

This sample, when accepted by the PETSMART Representative, will function as reference base for acceptance or rejection of color.

NOTIFICATIONS

A representative of the manufacturer shall be notified 48 hours in advance, and be present during job application. He shall also approve the wall and the suitability of the weather for application.

WARRANTIES

Upon completion of the installation, and as a condition of its acceptance, deliver in Closeout Documents a written warranty that the waterproofing installed will remain effective for a period of 5 years.

The applicator shall guarantee the installation against poor workmanship for a period of 2 years from the date of acceptance of the building by the Owner. He shall make all necessary repairs without charge to Owner during that period. Manufacturer shall guarantee material against moisture penetration for 5 years.

JOB CONDITIONS

Temperature and relative humidity conditions for a period before, during and after application shall be as recommended by the manufacturer. If rain occurs, allow surfaces to dry a minimum of 5 days.

PRODUCT DELIVERY, STORAGE AND HANDLING

Delivery shall be made to the job site in manufacturer's original containers with seals unbroken and labeled with manufacturer's batch number.

Store materials in original, unopened containers in compliance with manufacturer's printed instructions.

Use all means necessary to protect masonry stain before, during and after installation and to protect the installed work of other trades. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Professional of Record and at no additional cost to the Owner.

PART II – PRODUCTS**CLEAR WATERPROOFING AND/OR STAIN**

All exposed exterior and interior masonry walls shall be sealed with RAINGUARD'S BLOK-LOK and stained with RAINGUARD'S COLOR-LOK or OKON PLUS COLOR Stain/Water Repellent System:

Rainguard Products Company	or	OKON Incorporation
3334 East Coast Highway #201		4725 Leyden St., Unit A
Corona Del Mar, CA 92625		Denver, CO 80216
(888) 765-7070		(303) 377-7800

COVERAGE

Bids will be based on manufacturer's minimum coverage rates based on permeability and surface area as determined in Preliminary Tests. At no time shall rate of coverage be less than detailed in manufacturer's technical data sheets.

Surface area to be increased by 1/4 to 1/2 or more when fluted block or other textured block is used.

EQUIPMENT

The Stain/Water Repellent System shall be applied by a low pressure or airless sprayer and shall be applied in accordance with manufacturer's recommendations.

PART III – EXECUTION**SURFACE CONDITIONS**

Prior to all work of this Section, carefully inspect the installed work of other trades, and verify that all such work is complete to the point where this installation may commence, including all exterior caulking. The waterproofing manufacturer's representative shall verify to the Contractor that the waterproofing may be installed in accordance with the manufacturer's recommended methods and the original design. In the event of discrepancy, immediately notify the PETSMART Representative and proceed as he directs.

Concrete masonry walls shall be allowed to cure at least 30 days before clear waterproofing is applied, and the walls shall be free of excess mortar. Cracks, other than hair-line cracks, shall be pointed up. Defective mortar joints shall be routed out, pointed with mortar and tooled.

INSPECTION AND TESTING

The surfaces shall be inspected prior to the application of any waterproofing materials. The masonry surfaces shall be tested for moisture content using the "Electronic Moisture Register - Model B" (calibrated for concrete block). A minimum of one reading shall be taken for each 18 m² (200 square feet) of wall area and the results tabulated. The moisture content shall not exceed 15% on any surface prior to the waterproofing application.

WATERPROOFING

The waterproofing shall be applied with a light coat to break surface tension followed by a flood coat. Flood coat passes shall be made starting at base of the wall followed by overlapping passes going up the wall. The spray head should be held so that the fan will be vertical, with the head about 204 mm to 250 mm (8" to 10") from the surface so that the flood coat runs freely down the surface 152 mm to 204 mm (6" to 8") below the point of application. In all instances, spray by traveling horizontally to ensure uniform coverage. Overlap each following pass by approximately 50% (start each new section by holding the spray head centered on the bottom line of the previous pass). The surface should remain wet for a few minutes and damp for over one hour. Repeat the procedure on spots which absorb too quickly. When a second coat of sealer is required, allow to dry a minimum of 24 hours and apply material to saturation.

MASONRY STAIN

Application rates and method shall comply with manufacturer's recommendations.

WATER TEST

Twenty days after completion of this portion of the work, and as a condition of its acceptance, demonstrate by running water test that the work of this Section will successfully repel water.

PROCEDURE

- Notify manufacturer at least 72 hours in advance and conduct the test in the manufacturer's presence.

- By means of an outrigger or similar acceptable equipment, place 3/4" garden hose with garden type spray nozzle, at a point designated by the PETSMART Representative, if required, 8 to 10 feet away from the wall, aiming the nozzle so that water will strike the wall at a 45° downward angle.
- Run the water onto the wall at full available force for not less than 4 hours.
- Upon completion of the 4 hour period, inspect the interior surface of the wall for evidence of moisture penetration.
- If evidence of moisture penetration is discovered, apply an additional coat of the approved sealer material to the areas where leakage occurred, an additional area or areas shall be designated by PETSMART and tested and corrected for leakage if they occur, at no cost to the Owner.

END OF SECTION

PART I – GENERAL**SUMMARY**

Extent of insulation work is shown on drawings and indicated by provisions of this section.

Applications of insulation specified in this section include the following:

- Perimeter insulation
- Blanket insulation
- Safing insulation
- Sound attenuation insulation
- Roof insulation is specified in Single Ply Membrane Roofing Section.

SUBMITTALS

Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.

Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

PRODUCT HANDLING

Delivery and Storage: Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces.

PART II – PRODUCTS**INSULATING MATERIALS**

General: Provide insulating materials, which comply with requirements indicated for materials, compliance with referenced standards, and other characteristics.

Preformed Units: Sizes to fit applications indicated, selected from manufacturer's standard thicknesses, widths and lengths.

Perimeter insulation shall be extruded polystyrene foam insulation. Thicknesses as shown on the drawings.

The thickness shown on the drawings (6") is for Foil-Faced Batt Insulation with an RSI 3.34 (R value of 19 (R-19)). Verify with manufacturer that (6") thickness is adequate to achieve RSI 3.34 (R-value of 19).

Safing Insulation: Provide mineral fiber safing insulation, regular color, unfaced, thickness indicated or required. See drawings for locations.

Sound attenuation blankets shall be Noise barrier batts, Type 1, Unfaced 89 mm (3-1/2") thick.

Refer to Material and Product List on Drawings for additional information.

AUXILIARY INSULATING MATERIALS

Mechanical Anchors: Type and size indicated or, if not indicated as recommended by insulation manufacturer for type of application and condition of substrate.

Insulation Mastic: As recommended by insulation manufacturer for securing batts to surfaces shown on drawings.

Acoustical Sealant: Acoustical Sealant Type as recommended by manufacturer for condition.

PART III – EXECUTION**INSPECTION AND PREPARATION**

Required Installer to examine substrates and conditions under which insulation work is to be performed. As satisfactory substrate is one that complies with requirements of the section in which substrate and related work is specified. Obtain Installer's written report listing conditions detrimental to performance of work in this section. Do not proceed with installation of insulation until unsatisfactory conditions have been corrected.

Clean substrates of substances harmful to insulation or vapor retarders, including removal of projections which might puncture facings.

INSTALLATION, GENERAL

- Comply with manufacturer's instructions for particular conditions of installation in each case. If printed instructions are not available or do not apply to project conditions, consult manufacturer's technical representative for specific recommendations before proceeding with work.
- Extend insulation full thickness as shown over entire area to be insulated. Cut and fit tightly around obstructions, and fill voids with insulation. Remove projections, which interfere with placement.
- Apply a single layer of insulation of required thickness, unless otherwise shown or required to make up total thickness.

INSTALLATION OF GENERAL BUILDING INSULATION

Apply insulation units to substrate by method indicated, complying with manufacturer's recommendations. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

INSTALLATION OF SOUND ATTENUATION INSULATION

- Place sealant under track. Install acoustical insulation in between studs. Stagger wallboard joints.
- Sound blankets shall be pressed firmly in place against back of gypsum board and secured with mastic. Mastic and method of installation shall be in accordance with manufacturer's instructions. An air space shall be maintained between blankets and back surface of one partition face.
- Continuity of blankets shall be maintained. Use full-length strips where possible.
- This contractor shall consult and cooperate with tradesmen whose work precedes and follows sound blanket installation to permit the orderly and expeditious procedure in executing work of this Section.

- Upon completion, and at times when other contractors are covering work, correct loose, sagged or damaged work.

PROTECTION

General: Protect installed insulation from possible physical abuses, where possible by non-delayed installation of concealing work or, where that is not possible, by temporary covering or enclosure.

END OF SECTION

PART I – GENERAL

WORK SPECIFIED HEREIN

All labor, materials, equipment and services necessary to furnish and install foam cornices and drainable E.I.F.S. with related accessories and finishes as indicated or specified.

SUBSTITUTIONS

In accordance with Section 01600.

QUALITY ASSURANCE

All products shall be of the highest quality and workmanship. All products utilized as part of the E.I.F.S. System must be those recommended by manufacturer of system.

System Description: A polymer modified stucco cladding system, intended for direct application over monolithic concrete, masonry walls, cementitious panels, glass mat-surfaced gypsum panels and/or plywood or oriented strand board (OSB) sheathing.

The stucco system is intended for use on buildings where the applicable Building Code allows the use of combustible and noncombustible claddings.

MANUFACTURERS' INSTRUCTIONS

Furnish manufacturers' printed instructions for installation of products specified.

MATERIAL - GENERAL

Manufacturers: Dryvit Systems of Canada Outsulation Plus Exterior Insulation Finish System(s) Class PB or acceptable alternative DuROCK PUCCS Exterior Insulation Finish System.

Refer to Materials and Products Schedule for additional information.

WARNING

The EFIS System(s) are designed as drainage wall systems and are detailed to discharge incidental moisture from within the System(s). Specifications should be followed and proper details adhered to, in order to prevent water intrusion, resulting in possible damage to the System(s) or other building elements. Care should be taken to ensure that all building envelope elements, including without limitations, roof designs, windows, flashings, sealants, etc., are compatible with the system(s).

DISCLAIMER

Information contained in this specification conforms to standard detail and product recommendations for the installation of the EFIS System. To ensure that you are using the latest, most complete information, refer to manufactures installation instructions.

RELATED SECTIONS

- | | | |
|-----|------------------|-------------------------------|
| .1 | Section 03300 | Cast-in-Place Concrete |
| .2 | Section 04 20 00 | Unit Masonry |
| .3 | Section 06100 | Rough Carpentry |
| .7 | Section 07620 | Sheet Metal Flashing and Trim |
| .8 | Section 07920 | Joint Protection (Sealants) |
| .10 | Section 08411 | Aluminum Framed Entrances |

**PART II – DRYVIT EXTERIOR INSULATION
AND FINISH SYSTEM (S)**

INTRODUCTION

This document contains the Manufacturer's Standard Specification for the EFIS System(s).

DESIGN CRITERIA

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| .1 | Structural Design |
| .1 | Design professional shall design the back-up wall in full compliance with the requirements of the National Building Code (NBC) of Canada and/or applicable provincial or territorial building codes. Sufficient details on architectural plans and drawings shall demonstrate compliance to the NBC. |
| .2 | Supporting Substrate |
| .1 | All substrates shall be flat and plumb within 2 mm/m (1/4" per 10'), as per ASTM C 1397. |
| .2 | All substrates shall be free of surface contamination, including (but not limited to): dirt, form release agents, efflorescence, oil and chalkiness. |
| .3 | All substrates shall be free of any loose materials and cracks greater than 1 mm (1/24") in width. |
| .3 | Mass Wall Substrates |
| .1 | Mass wall substrates shall be cast-in-place concrete, concrete masonry units or brick. |
| .2 | Cast-in-place, concrete masonry units or brick shall be at least 28 days old. |
| .3 | Unit masonry and brick veneer shall have mortar joints struck flush or recessed. |
| .4 | Sheathing Substrates |
| .1 | Apply the system to one of the following recommended substrate sheathings or substrate system or approved equivalent: |
| .1 | Cementitious backer Board as per ASTM C1325. |
| .2 | Glass-mat gypsum sheathing conforming to ASTM C1177/C1177M. |
| .3 | OSB and/or plywood sheathing conforming to CSA O86. OSB conforming to CSA O325. Douglas fir Plywood conforming to CSA O121, Canadian Soft Plywood conforming to CSA O151 and Poplar Plywood conforming to CSA O153. |
| .2 | Sheathing shall be designed with framing to resist applicable wind loads, with a maximum design deflection of substrate not to exceed L/240. |
| .3 | Sheathing substrates shall be installed in accordance with the sheathing manufacturer's latest installation instructions and in general conformance with ASTM C1280. Sheathing joints shall be properly staggered. Vertical joints shall be offset by at least one framing member. Sheathing shall be: |

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| <p>.1 Minimum 11.1mm (7/16") and 12.7 mm (1/2") thick for OSB and plywood sheathing respectively.</p> <p>.2 Minimum 12.7 mm (1/2") thick for glass-mat gypsum, cementitious and fibre cement boards.</p> <p>.3 Continuously supported by framing.</p> <p>.4 The sheathing shall be installed horizontally across framing when using wood sheathing.</p> <p>.5 Having sheathing joints not exceeding 3.0 mm (1/8").</p> <p>.6 Installed with corrosion resistance fasteners tight and flush to the sheathing surface. (Not to be countersunk.)</p> <p>.7 Replaced where damaged or weathered.</p> <p>.5 Air/Vapour/Moisture Controls</p> <p>.1 The air/moisture control shall be designed using the specified, designated control membrane. Continuity of these membranes shall be maintained at all wall interfaces.</p> <p>.2 The use, location and performance of the air barrier shall be determined by the design professional.</p> <p>.3 The use and location of the vapour retarder within the wall assembly shall comply with the requirements of Part 5 of the National Building Code (NBC) of Canada and/or the applicable provincial or territorial building codes.</p> <p>.4 Sheathing Membrane</p> <p>.1 At least one layer of sheathing membrane shall be applied beneath Stucco Wall.</p> <p>.2 The sheathing membrane shall conform to Article 9.27.3.3. of Division B of the National building Code (NBC) Canada, and/or to the related article in provincial and territorial codes that are based on the national code.</p> <p>.3 The continuity of the sheathing membrane shall be maintained across windows, openings, joints and all other wall interfaces.</p> <p>.4 The second plane of protection for moisture management shall be made using the code-compliant, stucco system's sheathing membrane and self-furring that could provide a minimum 6 mm from the sheathing membrane and he sheathing.</p> <p>.6 Air/Moisture Transition Membrane</p> <p>.1 The continuity of the air/moisture control elements shall be maintained across joints, windows, openings and all other wall interfaces using the specified transition membranes.</p> <p>.2 Through wall penetrations and openings shall be sealed to the sheathing membrane with transition membranes.</p> <p>.3 Transition membranes shall be installed at all movement joints, roof junctions and window and door interfaces.</p> <p>.4 Transition membranes shall be installed in conformance with manufacturers' instructions.</p> | <p>.5 Transition membranes shall be as listed in Part 2, "Products" of this specification. No other generic transition membranes should be permitted.</p> <p>.7 Inclusion of drainage mediums or capillary break</p> <p>.1 Where required to have a drained and vented airspace between the stucco and the backing assembly, the drainage medium and/or the capillary break shall be specified by the designer who shall determine the spacing and amount of drainage and/or venting required for the stucco system.</p> <p>.2 Drainage medium or a capillary break between the stucco system and the backing assembly shall be vented.</p> <p>.8 Code-related Fire Protection</p> <p>.1 The stucco system is intended to be used in combustible and/or non-combustible constructions. When used in non-combustible construction, the scratch coat and the base coat shall be in conformance with CAN/ULC S114, "Test for Determination of Non-Combustibility in Building Materials".</p> <p>.2 Where required to meet the requirements of CAN/ULC S114, the compliant stucco system shall be listed with an accredited 3rd party certification organization for validating such performance.</p> <p>.9 Design Details at Terminations</p> <p>.1 The stucco system shall extend a minimum of 25 mm (1") below the sill plate onto the foundation wall. The system shall terminate at least 200 mm (8") above finished grade and 50 mm above the roofing system.</p> <p>.2 The stucco system shall not be used on wall surfaces subject to continuous or intermittent water immersion or hydrostatic pressure.</p> <p>.3 The stucco system shall be terminated a minimum of 12.7 mm (1/2") from adjoining materials at interfaces for sealant applications.</p> <p>.10 Projections and Decorative Elements</p> <p>.1 Ensure termination of the stucco system at roof parapet is covered with continuous waterproofing membrane and sheet metal cap that is coordinated with the roofing contractor.</p> <p>.2 Conform with the following guidelines for length and slope of inclined surfaces:</p> <p>.1 Minimum slope (6:12), for projection greater than 102 mm (4").</p> <p>.2 Minimum slope (3:12), for projection less than 102 mm (4").</p> <p>.3 The stucco system shall not be used for areas defined by codes as roofs.</p> <p>.11 Sealant System</p> <p>.1 Joints in the stucco system shall be sealed using an elastomeric sealant with a closed-cell foam backer rod or bond breaker tape, as specified in Section 07 90 00 and as tested to ASTM C1382.</p> <p>.2 Minimum joint width shall be four times greater than the anticipated range of movement. Sealant shall be applied in a</p> |
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	width to depth ration of (4:1), (3:1), (2:1) as recommended by the Sealant manufacturer.	.13	Flashing
	.3 Sealant installation shall conform with the requirements of ASTM C1481.		.1 The stucco system shall be used in conjunction with flashing conforming to Subsection 9.27.3 of Division B of the National Building Code (NBC) of Canada and/or the equivalent requirements of the related applicable provincial or territorial codes.
.12	Expansion and Termination Joints		.2 Provide corrosion-resistant flashing at all roof-wall intersections, windows and door heads and sills, decks, balconies, chimneys, parapet walls, projecting features and other areas as necessary to direct water to the exterior and to prevent water entry behind the cladding.
	.1 Provide two stage sealant joints at all expansion and termination joint locations. The inner joint seal is not required if the water resistive barrier system is continuous behind the outer joint seal and /or penetrations.		.3 Flashing must be installed in accordance with section 07 60 00 and the applicable building codes.
	.2 Sealant Joint Venting		.4 Flashing shall have a slope of not less than 6% towards the exterior, lap not less than 10 mm (3/8") vertically over the building element below, terminate in a drip offset not less than 5 mm (3/16") outward from the outer face of the building and terminate at each end with an end-dam.
	All two stage sealant joints shall be vented:	.14	Finish
	.1 Horizontal joints shall be vented at not greater than 1.2 m (4'-0") on center.		.1 The design professional shall assess the design of the building façade to the desired finish textures and colours that could be expected at various sections of the façade.
	.2 Vertical joints shall be vented at not greater than 3 m (10'-0") on center and/or at not greater than 50 mm (2") below the intersection of vertical and horizontal joints.		.2 Where the type of texture and the intensity of the selected colours include vibrant, accent and / or mass tone colours that are more susceptible to UV degradation, the designer shall specify the use of Durex Kolor Gard Architectural Coatings to augment and heighten the colour fastness.
.3	Expansion joints are required at the following locations:		.3 Sufficient details / notifications on architectural plans and drawings shall demonstrate the required specialized finish texture and colour of the exterior insulation and finish system.
	.1 At through wall penetrations		
	.2 At movement joint locations within the substrate.		
	.3 At building movement joint locations.		
	.4 At floor lines of all wood frame structures and as required by the structural design of other framing types.		
	.5 At junctions with different cladding materials and components.		
	.6 At changes in roof line, building shape or structural system.		
	.7 At changes in substrate materials.		
	.8 At all other locations specified or indicated on drawings		
.4	Control Joints		
	.1 Provide control joints every 13 m2 (144 ft2) of finished surface area on vertical applications and at 9.3 m2 (100 ft2) of finished surface area on horizontal and/or sloped applications.		
	.2 The distance between control joints shall not exceed 5.5 m (18') in either direction or a length-to-width ratio of 2 ½ to 1.		
.5	Termination joints are required at the following locations:		
	.1 At windows, doors and through-wall penetrations interfaces.		
	.2 200 mm (8") above finished grade.		
	.3 50 mm (2") above roofing system.		
			SUBMITTALS
			Product Data
			1. Submit stucco system's specifications and individual component data sheets to show compliance to the intent of the design specifications, and installation instructions.
			2. Submit approvals and/or evaluations applicable to the system and/or components to be installed.
			Shop Drawings
			1. Submit shop drawings in accordance with requirements specified in Division 1.
			2. Clearly indicate dimensions, tolerances and materials in large-scale details for terminations, drainage/venting, description of related and abutting components and elevations of units with locations of expansion joints, control joints, and reveals.
			Samples
			1. Prior to application of mock-up, submit duplicate 150mm x 200mm (6" x 8") representative colour samples of each colour and finish coat texture.
			2. Maintain an approved sample at the project site.

Closeout Submittals

1. Provide stucco system's maintenance, repair and cleaning procedures.
2. Provide stucco system's material warranty as per section 1.10.
3. Provide workmanship warranty by stucco applicator as per section 1.10.
4. Provide identification labels of colour batch numbers, water resistive barriers, base coat, finish coats and reinforcing mesh used.

QUALITY ASSURANCE

.1 Qualifications

.1 System Manufacturer: All system components shall be manufactured or sold by the stucco system's manufacturer and purchased from the system's manufacturer and/or its authorized distributors.

.2 Contractor: Shall be knowledgeable in the proper installation of the stucco system and shall be in possession of the system's current Certificate of Installer. Work of this this specification shall be executed in conformance with good trade practices and manufacturer's installation manual.

.2 Mock-Up

.1 The contractor shall, before installation works, provide the owner/consultant with a mock-up demonstrating the stucco system's components and application.

.2 The Mock-up shall be constructed to dimensions and in location specified by the Designer.

.3 The mock-up system's component shall include the water resistive barrier, reinforcing mesh, base coat and finish coats that would include each colour and texture to be used.

.4 The mock-up shall demonstrate methods of application as well as typical details at opening (windows, doors etc.) and roofing assemblies.

.5 The Mock-up shall serve for initial review purposes by the Consultant and when accepted shall represent the minimum standard for work and the basis for acceptance for the rest of the project.

.6 The mock-up shall be prepared with the same products, components, tools and techniques required for the actual project.

.7 The approved mock-up shall be available at all time at the jobsite and shall form the basis for acceptance for the remainder of the project.

.8 Accepted mock-up may remain as part of the work.

**DELIVERY, STORAGE, HANDLING &
PROTECTION**

.1 All required materials and components shall be supplied by the manufacturer of the stucco system and shall be delivered to job site in original, unopened packaging with all identifying labels and markers clearly visible and intact. Upon delivery, materials shall be inspected for any damages and the system's manufacturer shall be advised, in writing of any damaged and/or unacceptable materials. Any defective materials and/or components shall not be used.

.2 Materials shall be stored in a dry, vented, weatherproof enclosures, stacked off the ground, out of direct sunlight and other detrimental conditions. Pail products and liquid materials shall be stored at ambient temperatures above 5°C and below 35°C. All materials shall be protected from freezing or overheating.

.3 Protective coverings shall be provided to all freshly-applied coatings to protect them from damages due to rain, inclement weather and/or any other damages until the coatings have fully set and cured.

.4 All capping and flashing shall be immediately and properly installed in co-ordination with the application of the stucco system, unless temporary protection has been provided. If capping and flashing or temporary protection have not been provided, the Architect and General Contractor shall be advised accordingly in writing.

.5 All insulation boards shall be protected from direct sunlight.

PROJECT/SITE CONDITIONS

.1 Prior to installation of the exterior insulation and finish system, the substrate shall be examined with respect to the following:

.1 The substrate shall be type-approved by system's manufacturer.

.2 The substrate surface shall be free of any deleterious materials such as oil, dust, direct form-release agents, paint, wax glazing, water, moisture, efflorescence, frost, etc.

.3 The substrate shall be examined for soundness, such as tightness of connections, crumbling, spalling, delamination, voids, loose joints and projections.

.4 The substrate shall be examined for compliance with Contract Documents.

.2 Ambient Conditions

.1 Application shall take place when ambient and substrate temperature are within the specified limits by manufacturer and when the substrate is free from any moisture arising from condensation, frost, and/or rainfall.

.2 Do not proceed with application of materials immediately prior to, during, or immediately after inclement weather conditions, nor if adverse weather is anticipated within 24 hours after application.

.3 Do not apply materials to wet, frozen or frosted surfaces.

.4 Application of water resistive barrier, base coat and finish coat shall not proceed during rainy conditions or weather conditions with ambient air and/or wall surface temperatures below 5°C, or above 38°C. Wet applied coatings shall be protected from rain until they are completely dry.

.5 Avoid coating surfaces that are directly exposed to direct sunlight or windy conditions.

.6 When necessary, provide temporary enclosures for exterior work and ensure that temporary climatized enclosure is provided in the area of work to maintain the required ambient air temperature prior to, during application and for a minimum of 24 hours after application of coating.

.7 Do not apply finish coat in areas where dust is being generated.

- .8 Proceed with work only when surfaces and conditions are satisfactory for the production of perfect application.
- .9 Protect applied coating from rapid evaporation during dry and hot weather.
- .10 Consult system's manufacturer for recommendations should adverse conditions exist.

WARRANTY

- .1 The warranty period stipulated in the General Conditions of the Contractor shall be extended as follows:
 - .1 The system is eligible for a manufacturer's warranty from the date of substantial completion, upon written request, against defective material. For full applicable warranty details contact the system manufacturer.
 - .2 The manufacturer warranty is effective only when materials and workmanship comply with this specification.
 - .3 The system manufacturer does not warrant workmanship.
 - .4 The system applicator shall warrant workmanship separately against faulty workmanship.

PART III – PRODUCTS

MANUFACTURER

All components of the EFIS Stucco Wall system shall be manufactured and/or distributed by same supplier or one of its authorized distributors. No substitutes of materials shall be allowed without prior written notice of the manufacturer.

SHEATHING MEMBRANE

- .1 Sheathing membranes conforming to the performance requirements of CAN/CGSB-51.32M, Sheathing, Membrane, Breather Type.
- .2 Perforated, #15 asphalt-saturated felt, weighing not less than 0.195 kg/m², in rolls 1 m wide.
- .3 Spun-bonded Polyolefin membranes, Micro-perforated, woven, coated, high-density polyethylene fabrics, or Polypropylene fabrics that hold a Standard Council of Canada (SCC) accredited, 3rd party certification on the capacity of the membrane in achieving at least the minim level of performance required by Division B of the National Building Code (NBC), in the area defined by the objectives and functional statements attributed to Article 9.27.3.2. "Sheathing Membrane and Material Standard".

TRANSITION MEMBRANE

- .1 Durex® EIFS Tape, a 30 mil thick, self-adhering, Styrene Butadiene Styrene (SBS) modified rubberized asphalt membrane with a polyester top surface. Available in rolls 914 mm (36"), 457 mm (18"), 225 mm (9"), 152 mm (6") and 102 mm (4") wide. Durex® EIFS Tape requires the use of Durex® Flex-Seal Primer for proper adhesion.
- .2 Durex® EIFS Tape Super Stick TM, a 17 mil, self-adhering, high performance tape with a polyester fabric top layer. Available in rolls 914 mm (36"), 457 mm (18"), 225 mm (9"), 152 mm (6") and 102 mm (4") wide. Durex® Super Stick TM requires the use of Durex® Flex-Seal primer for proper adhesion.

- .3 Durex® Flex-Seal Membrane, a 40 mil thick, self-adhering, rubberized asphalt membrane with high density cross-laminated polyethylene reinforcement. Available in rolls 914 mm (36"), 457 mm (18"), 225 mm (9"), 152 mm (6") and 102 mm (4") wide. Durex® Flex-Seal Membrane requires the use of Durex® Flex-Seal Primer.

METAL LATH

- .1 Expanded, self-furring diamond mesh metal lath that are copper-alloy coated or galvanized, meeting the physical characteristics of Sentence 9.28.4.3. of Division B of the National Building Code (NBC) Canada and/or provincial and territorial building codes.
- .2 Self-furring, woven or welded wire lath, meeting the physical characteristics of Sentence 9.28.4.3. of Division B of the National Building Code (NBC) Canada.
- .3 Self-Furring Paperback lath having a D60 grade asphalt-saturated felt.
- .4 Austenitic Stainless steel lath
- .5 10 mm (3/8") Rib lath (for horizontal surfaces)
- .6 The corrosion protection of the metal lath shall conform to ASTM A 641, or ASTM A847.

FASTENERS FOR METAL LATH

- .1 Mechanical fasteners and Tie Wire for metal lath shall be non-corroding in compliance with CSA B 111 and/or ASTM C 1513. Fasteners shall be compatible with other metals. Aluminum fasteners shall not be used.
- .2 Fasteners shall be applied tight against the lath and shall penetrate into the framing members through the sheathing.
- .3 Attachment to Wood Framing:
 - .1 Nails for stucco lath shall be not less than 11gauge, 3.2 mm diam., minimum 25 mm (1") long, and with a head diameter of not less than 11.1 mm (7/16").
- .4 Attachment to Steel Framing:
 - .1 Screws for stucco lath shall be corrosion resistance, self-tapping, minimum #8, fully threaded type ATek-Wafer Head, minimum 19 mm (3/4") long, with a minimum 8 mm (5/16"), three thread penetration into studs. Meeting ASTM C646
- .5 Nails and screws for stucco lath of applications over wood or steel framing shall have metal retainer plates "Lath-Lock plates."
- .6 Attachment to Concrete Wall and Masonry
 - .1 Fasteners for concrete and masonry shall be minimum # 8 wafer head, fully threaded, Zamac Pin bolts, minimum 25 mm (1") length.
- .7 Tie Wire
 - .1 Tie wire shall be 18 gauge, galvanized and annealed low-carbon steel in compliance with ASTM A 641 with a minimum Class I Coating.

TRIM & ACCESSORIES

- .1 All metal trims and accessories, expansion and control joints, casing beads/stops, corner beads, weep and drip screeds shall be minimum 26-gauge, hot-dipped galvanized steel G60 coating, zinc alloy and shall be

compatible with other metallic surfaces. Trim and accessories shall have a minimum ground of 10 mm (3/8").

.2 PVC trims and accessories shall conform to ASTM D 1784, cell classification 13244C.

.3 Provide all trims and accessories as detailed in shop drawings and/or as required to complete the work in accordance with good trade practices and reference standards.

.4 PVC trims and accessories shall conform to ASTM D 1784, cell classification 13244C.

.5 Fasteners for trims accessories shall be placed in the crotch of the trim flanges.

STUCCO MATERIALS

.1 Water

.1 Water, if needed to be used within the stucco mix shall be potable, clean and free from any deleterious substances.

.2 Scratch Coat and Based Coat

.1 Durex® Dryplast Coarse and Durex® Dryplast Medium, pre-blended, fibre reinforced Portland cement and graded sand stucco mix, mixed on site in a ratio of 1 bag Durex® Dryplast Coarse or Medium to 5 liters of potable water.

.2 Durex® Uniplast Coarse and Durex® Uniplast Medium, a two-component polymer-modified cementitious base coat mixed with Acrybond S, a water-based 100% acrylic polymer additive in a ratio of 1 bag Durex® Uniplast to 5 liters of Durex® Acrybond S.

.3 Primer

.1 Durex® Brush Coat Primer, a water-based, 100% acrylic coating, colour-tinted to suit the colour of the final finish coat.

.4 Finish Coat

.1 Durex® Architectural Coatings, Classic Series, a 100% acrylic, water-based, multi-coloured, textured, protective coating. (Colour and texture to be selected)

.2 Durex® Architectural Coatings, Premium Series, high build, multi-coloured, protective and decorative coating consisting of coloured quartz aggregates and oversized mica flakes embedded in a clear 100% acrylic resin, textured, protective coating. (Colour and texture to be selected)

.3 Durex® Architectural Series, Artisan Series, a 100% acrylic, water-based, high-build, multi-coloured, textured with special patterns and artistic reliefs, protective coating. (Colour, texture and finish pattern to be selected)

.4 Durex® Architectural Series, Kolor Gard Series, a 100% acrylic, Fade Resistant Decorative High Build Protective Textured Coating for Accent & Bright Colours. (Colour, texture and finish pattern to be selected)

.5 Durex® Architectural Coatings, Elastomeric FX Series, a 100% acrylic, water-based, high-build, high flexibility, multi-coloured, textured, protective coating. (Colour and texture to be selected)

MIXING

.1 Perform all mixing under the conditions set forth in Article 1.9 "PROJECT/SITE CONDITIONS".

.2 Ensure materials, mixing and application equipment are clean and free of any contamination.

.3 Prepare and mix scratch coat, base coat, finish coat and primer in strict accordance with Durabond's written instructions to obtain a homogeneous consistency of mixture.

.4 Do not add any other additives, rapid binders, antifreeze, accelerators, fillers, surfactants to the mixture except those permitted by Durabond Products Limited.

.5 Do not use frozen, baked or lumpy materials.

.6 Size batches for complete use within 45 – 60 minutes of its mixing.

.7 Do not over-mix or use excessive mixing speed. Let mixed materials stand for a few minutes until they begin initial stiffening.

EQUIPMENT

.1 All mixing shall be carried out with a clean, rust-free paddle mixer that shall minimize air entrainment, powered by a power-drill at 400-500 rpm maximum speed.

.2 Metal trowels, hawks, utility knives, corner trowels and plastic floats

SEALANTS

.1 Sealant: a low modulus sealant, as recommended and approved by Durabond Products Ltd. Standard colour shall be selected by consultant.

PART IV – EXECUTION

EXAMINATION

.1 Examine framing, and surfaces to have lath and to receive the stucco system for defects that could adversely affect execution and quality of work.

.2 Report in writing to Contractor or Consultant any conditions and/or deviations that might adversely affect proper the stucco system installation.

.3 Ensure substrate tolerances are within 3.2 mm in 2,430 m (1/8" in 8'-0")

.4 Commencement of work shall indicate acceptance of substrate conditions.

.5 Ensure lath, furring, trims and accessories are securely and tightly fixed in place. and securely Ensure substrate surfaces, including each applied base coat, are dry, solid and sound, free of weak and powdery surfaces, free from ice, snow and frost, oil, grease, releasing agents and other deleterious materials detrimental to a positive bond.

.6 Ensure that flashing at all openings, roof-wall intersections, terminations and other areas as required, have been installed to divert water away from the stucco system.

PREPARATION

- .1 Prepare substrates to receive the stucco system as recommended in manufacturer's instructions.
- .2 Thoroughly clean and wash (existing) surfaces, including each applied base coat, (and including existing coated surfaces) by wire brushing or other approved methods to remove all dirt, dust, grease, oil, latent, efflorescence, loose coatings and any other deleterious materials.
- .3 Where necessary, mask all surrounding surfaces to provide neat, clean, true juncture lines with no over-spray of the coatings on surrounding surfaces.
- .4 Co-operate and co-ordinate with other trades penetrating or abutting to the work of this Trade. Ensure that components by other trades are in position before the application of the exterior insulation and finish system.

INSTALLATION OF SHEATHING PAPER

- .1 Code prescribed sheathing membrane shall be installed with all the joints lapped in such a way as to provide positive drainage and where all the joints occur over the framing.
- .2 Code-prescribed sheathing membrane shall be fastened to the framing with roofing nails or staples spaced not more than 150 mm (6") along the edges of the outer layer of the sheathing membrane.
- .3 Sheathing membrane based on paper-backed metal lath shall be installed in such a way as to provide continuous positive drainage.

INSTALLATION OF TRIM ACCESSORIES

- .1 Trim and accessories shall be installed in accordance with related reference standards, trim manufacturer, stucco system's Installation Manual requirements and good trade practices.
- .2 Casing beads/stops shall be installed prior to the installation of the lath while Corner beads shall be installed subsequent to the installation of the lath.
- .3 Trims shall be mechanically fastened to the substrate with fasteners placed within 50 mm (2") from the ends and spaced at no more than 300 mm (12") o.c.
- .4 Plaster stop trims shall be installed at all terminations and around all openings.
- .5 Weep screed shall be installed at the base of all walls situated above roofing and at grade level.

INSTALLATION OF EXPANSION AND CONTROL JOINTS

- .1 Provide and install expansion joints in alignment with building expansion joints.
- .2 Install expansion joints at all locations where dissimilar substrates meet.
- .3 Install expansion joints at all locations of maximum stress, in the direction as shown on drawings.
- .4 Install expansion joints at through wall penetrations. Expansion joints are to be installed so as to divide the wall surface into panels of not more than 13 m² (144 ft²) and not more than 3.0 m (10'-00") o.c. vertically. Neither dimension within the panel area should be greater than 2.5 times the other.
- .5 All horizontal joints shall be vented and located and spaced at intervals not greater than three stories.

- .6 Unless otherwise noted, provide all joints 12.7 mm (1/2") wide.

INSTALLATION OF LATH

- .1 Diamond Metal Lath
 - .1 Install and mechanically fasten the metal lath to the substrate, with the lath long dimension oriented horizontally at right angles to the structural framing. All metal lath vertical laps shall be staggered.
 - .2 Terminate the metal lath at expansion joints making sure the metal lath does not run continuously through joints.
 - .3 Fasten the metal lath to the framing members at a spacing not exceeding 178 mm (7") o.c vertically apart, and 406 mm (16") o.c. horizontally apart.
 - .4 Metal Lath shall be nested not less than 25 mm (1").
 - .5 Metal lath side laps, accessory side laps and/or end laps occurring between support shall be wire-tied at not more than 229 mm (9") o.c.
 - .6 Metal Lath overlaps shall not be places within 300 mm (12") of openings, corners, control joints or termination joints.
- .2 Self-furring Paper-backed wire lath
 - .1 Self-furring Paper-backed wire lath shall be installed in the same way as Diamond Metal Lath.
 - .2 Self-furring Paper-backed metal lath side laps shall lap lath over lath, and not paper to lath. Horizontal overlaps shall have the paper backing lapped in shingle style behind the lath to lath overlap.

APPLICATION

- .1 General:
 - .1 Supply experienced and qualified installers and applicators to carry out the work.
 - .2 Mix materials in accordance with manufacturer's instructions.
 - .3 Install the stucco system in strict accordance with the approved mock-up and manufacturer's printed instructions (and reviewed shop drawings).
- .2 Application of Scratch Coat
 - .1 Apply a scratch coat on trims and accessories that have been securely fastened in place.
 - .2 Apply the scratch coat firmly over the lath. The scratch coat shall not be less than 6 mm (1/4") thick. Apply uniformly and forcefully to fill all voids to ensure full bond with the substrate and to sufficiently cover and key the reinforcing lath.
 - .3 Rake the surface of the newly applied scratch coat with a plaster rake to form fairly uniform indentations which will act as a key surface for the base coat.
 - .4 Allow a minimum of 3 days for curing and drying.
- .3 Application of Base Coat

.1 Ensure that the surface of the scratch coat is dry and free of loose materials, and dirt and that detail work has been completed.

.2 In hot, dry weather, if the scratch coat surface is exceptionally dry, lightly dampen the surface with a fog mist of clean potable water. Do not over-saturate with water, as it will impair the bonding of the base coat.

.3 Trowel apply a layer of base coat over the scratch coat surface, not less than 3 mm, applying sufficient pressure in the trowelling process to ensure full contact with the scratch coat surface.

.4 Use a straight edge tool to darby the surface and bring it to a straight, even and true surface.

.5 Total thickness of both the scratch coats shall not be less than 7 mm (1/8").

.6 When the base coat has taken initial set, use a wood or sponge float and work the surface with light circular motion to remove all high points and to fill low points.

.7 Final surface shall be smooth, straight and true to a tolerance of not more than 3.2 mm in 3 m (1/8" in 10'-0"). Surface shall be free of trowel marks, irregularities and visible mesh pattern.

.8 Allow a minimum of 3 days for curing and drying.

.4 Application of Finish Coat Primer

.1 Evenly apply the primer throughout with a high pile roller at a rate of 2.8 m²/l (600 ft²/pail). The substrate shall not be visible through the applied primer.

.2 Avoid excessive build-up in any one area.

.3 If required, re-coat when the first coat is dry to the touch, but in any event not earlier than 2 hours after initial setting.

.4 Allow minimum 4 hours for curing prior to application of finish coat.

.5 Application of Finish Coat

.1 Apply the stucco system's selected finish coat, within 3 days after application of the system's selected primer. Longer periods may be scheduled between operations provided that the primed surface is kept clean and in good condition.

.2 Apply the selected finish coat in strict accordance with manufacturer's printed instructions for the Selected finish.

.3 Apply the finish coat in such a way as to match the colour and texture of the approved site mock-up.

.4 Do not apply the finish coat onto surfaces that are intended to be caulked.

SEALANTS

.1 Seal and caulk all joints in the stucco system with the system's specified elastomeric sealant that shall be applied over a compatible closed-cell foam backer rod or bond breaker tape.

.2 Seal and caulk all expansion joints between the stucco system and dissimilar abutting building components.

.3 Apply sealant and/or sealant primer in strict accordance with the sealant manufacturers printed instructions.

SPECIAL CLEANING

.1 Clean off all surfaces and work area of foreign materials resulting from material installation and leave work in clean condition.

.2 Entirely reinstate at this Trade's own expense, any surface not to be coated, but soiled and attributable to this Trade due to spillage, mixing of material or any other cause.

PROTECTION

.1 Protect the installed Stucco Lite system from damage during construction.

.2 Provide protection of installed materials from precipitation, freezing, excessive heat, dust, and dirt during installation and curing of the system.

.3 Provide protection to adjacent materials that could be damaged by the system's installation.

.4 Post appropriate warning signs while work is in progress and during curing period.

.5 Clean off all surfaces and work area of foreign materials resulting from material installation and leave work in clean condition.

REFERENCES

.1 American Society for Testing Materials

.1 ASTM A641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire

.2 ASTM A653 Specification for Sheet Steel Zinc Coated (Galvanized) by the Hot-dip Process, Commercial Quality.

.3 ASTM B117 Standard Practice for Operating Salt Spray (Fog) Apparatus

.4 ASTM A580/A580M Specification for Stainless Steel Wire

.5 ASTM C847 Standard Specification for Metal Lath

.6 ASTM C926 Standard Specification for Application of Portland Cement- Based Plaster

.7 ASTM C933 Standard Specification for Welded Wire Lath

.8 ASTM C954 Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.84 mm ((0.033")) to 2.84 mm (0.112")) in thickness

.9 ASTM C1002 Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.

.10 ASTM C1032 Standard Specification for Woven Wire Plaster Base

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.11	ASTM C1063	Standard Specification for Installation of Lathing and Plaster	Standard Specification for Furring for Portland Cement	.29	ASTM G154	Standard Practice for Operating Fluorescent Ultraviolet Exposure of Nonmetallic	Standard Practice for Operating (UV) Lamp Apparatus for Materials.
.12	ASTM C1177/C1177M	Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.		.30	ASTM G155-05a	Standard Practice for Operating Xenon Arc Light Apparatus	Standard Practice for Operating for Exposure of Non-Metallic Materials.
.13	ASTM C1185	Standard Specification for Flat Fiber-Cement Sheets		.2	Canadian Standards Organization (CSA)		
.14	ASTM C1280	Standard Specification for Application of Exterior as Sheathing	Standard Specification for Gypsum Panel Products for Use	.1	CSA A3000	Cementitious materials compendium	
.15	ASTM C1325	Standard Specification for Fiber-Mat Reinforced Cementitious Backer Units		.2	CSA B111	Wire Nails, Spikes and Staples	
.16	ASTM C1338	Standard Test Method for Determining the Fungi Resistance of Insulation Materials and Facings.	Standard Test Method for Resistance of	.3	CSA O86	Engineering Design in Wood.	
.17	ASTM C1382	Standard Test Method for Determining Tensile Adhesion Used in Exterior Insulation and Finish Systems (EIFS) Joints.	Standard Test Method for Properties of Sealants When and Finish Systems (EIFS)	.4	CSA O325	Construction Sheathing.	
.18	ASTM C1481	Standard Guide for Use of Joint Sealants with Exterior Systems (EIFS).	Standard Guide for Use of Joint Insulation and Finish	.5	CSA O121	Douglas Fir Plywood.	
.19	ASTM C1513	Standard Specification for Tapping Screws for Cold-Connections	Standard Specification for Steel formed Steel Framing	.6	CSA O151	Canadian Softwood Plywood.	
.20	ASTM C1861	Standard Specification for Lathing and Furring Accessories, Interior and Exterior Portland Cement-	Standard Specification for and Fasteners, for Based Plaster.	.7	CSA O153	Poplar Plywood.	
.21	ASTM D226	Standard Specification for Asphalt-Saturated Organiz Felt Waterproofing	Standard Specification for Used in Roofing and	.3	Canadian General Standard Board (CGSB)		
.22	ASTM D5420	Standard Test Method for Impact Resistance of Flat, Rigid Striker Impacted by Falling	Standard Test Method for Impact Plastic Specimen by Means of Weight (Gardner Impact).	.1	CAN2-51.32	Sheathing Membrane, Breather Type	
.23	ASTM E84	Standard Test Method for Surface Burning Characteristics	Standard Test Method for of Building Materials.	.4	International Organization for Standardization (ISO)		
.24	ASTM E96/E96M	Standard Test Methods for Vapor Transmission of	Standard Test Methods for Water Materials.	.1	ISO 7892	Vertical Building Elements – Impact Resistance Tests – Impact Bodies and General Test Procedures	
.25	ASTM E330	Standard Test Method for Structural Performance of Skylights and Curtain Walls by Difference.	Standard Test Method for Exterior Windows, Doors, Uniform Static Air Pressure	.2	ISO 15148	Hygrothermal performance of building materials and products - Determination of water absorption coefficient by partial immersion.	
.26	ASTM E331	Standard Test Method for Penetration of Exterior Curtain Walls by Uniform	Standard Test Method for Water Windows, Skylights, Doors, and Static Air Pressure Difference.	.5	ULC (Underwriters Laboratories of Canada)		
.27	ASTM E1131	Standard Test Method for Compositional Analysis by	Standard Test Method for Thermogravimetry.	.1	CAN/ULC-S114	Standard Method of Test for Determination of Non-Combustibility in Building Materials.	
.28	ASTM E1252	Standard Practice for Obtaining Infrared Spectra for Qualitative Analysis.	Standard Practice for General Infrared Spectra for Qualitative				

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PART I – GENERAL

This GUIDE-SPEC is a brief outline of Carlisle's Sure-Seal Mechanically-Fastened Roofing System requirements and is intended for use as a submittal with a bid package. Specifiers and the Carlisle Authorized Roofing Applicator must comply with the "Design Criteria" and "Application" Sections of Carlisle's technical manual prior to design or bid. The "Products" Section included in the Carlisle technical manual and Carlisle's Technical Data Bulletins contain information on proper usage of Carlisle products as well as applicable cautions and warnings. Prior to the installation of this roofing system, this information must be thoroughly reviewed.

PART I GENERAL

1.01 DESCRIPTION

The Mechanically-Fastened Roofing System incorporates Sure-Seal (black) 60 -mil thick **reinforced Sure-Tough™ Reinforced** EPDM membrane. An acceptable insulation is mechanically fastened to the roof deck and the membrane is mechanically fastened with Fastening Plates or Metal Fastening Bars and the appropriate Carlisle Fastener spaced 6" minimum to 12" maximum on center, depending on project criteria, within the center of the membrane splice.

Adjoining sheets of EPDM membrane are spliced together a minimum of 6" using Factory Applied Splice Tape and Primer. Field sheets are either 8' or 10' wide, depending on wind load requirements, building height and type of roof deck. At the roof perimeter, a heavier fastening density is required using 4' or 5' wide sheets or RUSS™ (Reinforced Universal Securement Strip) under a full – width sheet.

As an option, this roofing system can be specified over an existing standing seam, flat seam or corrugated metal roof with the membrane secured to the structural purlins. Refer to the Sure-Seal Metal Retrofit Roofing System Specification for requirements.

1.02 QUALITY ASSURANCE

- A. This roofing system must be installed by a Carlisle Authorized Roofing Applicator in compliance with shop drawings as approved by Carlisle. There must be no deviations made without **PRIOR WRITTEN APPROVAL** of Carlisle.
- B. Upon completion of the installation, an inspection will be conducted by a Technical Representative of Carlisle to ascertain the roofing system has been installed according to Carlisle's specifications and details.
- C. This roofing system meets **Underwriters Laboratories** (UL) and **Factory Mutual** (FM) requirements. For specific code approvals achieved with this system, refer to Carlisle's EPDM Code Approval Guide, Factory Mutual Approval Guide or Underwriters Laboratories Fire Resistance and Roofing Materials and Systems Directories.

1.03 SUBMITTALS

- A. To ensure compliance with Carlisle's warranty requirements, projects should be forwarded to Steven Benjamin (steven.benjamin@syntec.carlisle.com) Technical Manager of Carlisle's Strategic Accounts Group for review prior to bid.

- B. Pay special attention to project circumstances in the following cases and make Carlisle aware of such situations as:
 1. Projects where building height exceeds 75' or is in a coastal wind zone.
 2. Air pressurized buildings, canopies and buildings with large openings where the total wall openings exceed 10% of the total wall area on which the openings are located (such as airport hangars, warehouses and large maintenance facilities).
 3. Projects where EPDM is expected to come in direct contact with petroleum-based products or other chemicals.
 4. Projects where fire – retardant treated plywood will come in contact with the EPDM membrane.
- C. The roofing contractor must include pullout tests when fasteners are used into a steel deck lighter than 22 gauge or into plywood decks less than 5/8" thick. Pullout tests are also required when Sure-Seal HP-NTB Fasteners are used with cementitious wood fiber or gypsum decks or HP Woodie Fasteners are used with OSB decks.
- D. For all projects (prior to project inspection by Carlisle) a final shop drawing must be approved by Carlisle.
- E. Submit a Notice of Award to Carlisle and receive approval prior to work commencing.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to job site in original, unopened containers labeled with the manufacturer's name, brand name and installation instructions.
- B. Job site storage temperatures in excess of 90°F may affect shelf life of curable materials (i.e., uncured flashing, adhesives, sealants, primers, SecurTape, Pourable Sealer and Pressure-Sensitive Flashings).
- C. When liquid adhesives and sealants are exposed to lower temperatures, restore to a minimum of 60°F before use. Do not store adhesive containers with opened lids due to loss of solvent, which will occur from flash off.
- D. Insulation and underlayment must be stored so it is kept dry and is protected from the elements. Store insulation on a skid and completely cover with a breathable material such as tarp or canvas. If the insulation is lightweight, it should be weighted to prevent possible wind damage.

1.05 JOB CONDITIONS

- A. In order to achieve the specified UL ratings, special underlayment materials may be required on portions of a project where **slope exceeds 1/2"** in one horizontal foot.
- B. On retrofit-recover projects, existing roofing material must be investigated and wet material must be removed. Existing sprayed-in-place urethane roofs and Phenolic insulation must be removed.

- C. The use of a vapor retarder to protect insulation and reduce moisture accumulation within an insulated roofing assembly should be investigated by the specifier. Consult the latest publications by ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.) and NRCA (National Roofing Contractors Association) for specific information.
- D. If this roofing system is installed during windy conditions or on projects that are not encapsulated, precautionary measures must be taken to utilize temporary ballast during installation.
- E. Coordination between trades is essential to avoid unnecessary rooftop traffic over sections of the roof and to prevent damage to the membrane.

1.06 WARRANTY

- A. 5 year (72 mph) by manufacture (15 year available if Landlord wants to purchase – not included in original pricing). A 15 year Golden Seal Total System Warranty which utilize all components manufactured or marketed by Manufacturer., with a wind speed coverage up to 72 mph is available for a charge.

Note: Projects must be reviewed by Carlisle prior to bid, preferably in the design phase, to determine system enhancements that may be applicable.

PART II – PRODUCTS

2.01 GENERAL

- A The components of this roofing system are to be products of Carlisle or accepted by Carlisle as being compatible. The installation, performance or integrity of products by others, when selected by the specifier and accepted by Carlisle is not the responsibility of Carlisle and is expressly disclaimed by the Carlisle Warranty.

2.02 MEMBRANE

- A. Sure-Seal (black) 60-mil thick reinforced Sure-Tough Reinforced EPDM (Ethylene, Propylene, Diene Terpolymer). For physical properties of membrane, refer to the "Products" Section of the Carlisle Technical Manual.

Membrane is available in widths of 4' and 5' to be used as perimeter membrane sheets, and 8' or 10', used as field membrane sheets.

2.03 INSULATION/UNDERLAYMENT

- A. Insulation shall be HP – H as supplied by Carlisle SynTec.
 - 1. **Carlisle HP-H Polyiso** – A foam core insulation board covered on both sides with a medium weight fiber-reinforced felt facer meeting ASTM C 1289-06, Type II, Class 1, Grade 2 (20 psi). The product is available in 4' x 8' standard size with a thickness from 1 to 4 inches. 4' x 4' tapered panels are also available.

2.04 RELATED MATERIALS

- A Carlisle Bonding Adhesive, Splice Cleaner, Lap Sealant, Primer, SecurTAPE, Cured EPDM Flashing, Pressure-Sensitive Flashing, uncured Elastoform Flashing, Carlisle

Fasteners and Fastening Plates or Bars and RUSS, (with the corresponding fasteners), metal Fastening Bars, Carlisle Walkway Pads, Pre-Molded Pipe Flashings, Pressure-Sensitive Inside/Outside Corners, Pipe Flashings and Pourable Sealer Pockets are required for use with this roofing system. Other Carlisle products, such as, insulation, insulation fasteners, edgings and Termination Bars are also required when a Total System Warranty is specified.

PART III – EXECUTION

3.01 PROTECTION

- A. Cover walls and adjacent work where materials hoisted or used.
- B. Use warning signs and barriers. Maintain in good order until completion of work.
- C. Dispose of rainwater off roof and away from face of building until roof drains or hoppers installed and connected.
- D. Prevent traffic over completed roofing except where required by work above roof level. Comply with precautions deemed necessary by Consultant. Repair damage cause by non-compliance with Consultant's requirements.
- E. At end of each day's work or when stoppage occurs due to inclement weather provide protection for completed work and materials out of storage.

3.02 EXAMINATION OF ROOF DECKS

- A. **Examine roof decks and immediately inform Architect in writing of any defects.**
- B. Prior to commencement of work ensure:
 - 1. Decks are firm, straight, smooth, dry, free of snow, ice or frost, and swept clean of dust and debris.
 - 2. Curbs have been built.
 - 3. Roof drains have been installed at proper elevations relative to finished roof surface.
 - 4. Plywood and lumber nailer plates have been installed to walls and parapets as indicated.

3.03 VAPOUR BARRIER

- A. Apply vapour barrier to manufacturer's recommendations
- B. Seal vapour barrier on roof into the air/vapour barrier of the wall construction to provide continuity of the building air/vapour envelope.
- C. Do not apply to larger area than can be covered the same day.

3.04 INSULATION

- A. Install insulation in two layers with staggered joints for total thickness as specified.
- B. Butt boards together without gaps greater than ¼ inch.
- C. Fill gaps greater than ¼ inch with spray - applied foam.
- D. Fasten insulation to roof deck with Carlisle InsulFast insulation fasteners and metal or plastic insulation plates.
- E. Fastening density for insulation is 5 fasteners and plates for each 4 by 8 foot board of insulation for 15 year warranties.

3.05 MEMBRANE PLACEMENT AND ATTACHMENT

- A. Unroll and position membrane without stretching. Allow the membrane to relax for approximately 1/2 hour prior to attachment. Provide and secure both perimeter and field membrane sheets in accordance with the manufacturer's most current specifications and details.
- B. Secure the 8 or 10 foot wide membrane (along the pre-printed blue line approximately 3 inches from the edge of the membrane sheet) with the required Sure-Seal Fastener and 2 inch Polymer Seam Plate (required for steel decks) spaced 9 inches on center for 10 foot width sheet or 12 inches on center for the 8 foot width sheet. The minimum distance between the edge of the fastening plate and the edge of the membrane must be 2 inches. A minimum of two perimeter half – sheets are required.
- C. Consult Carlisle requirements for the number perimeter sheets are required for this installation.
- D. Install adjoining membrane sheets in the same manner in accordance with the manufacturer's specifications.

3.06 MEMBRANE SPLICING WITH SecurTAPE

- A. Tape splices where fastening plates are located (along the length of the membrane) must utilize 6 inch wide Factory Applied SecurTAPE. Tape splices at end roll sections (along the width of the membrane without fastening plates) shall utilize 3 inch wide SecurTAPE.
- B. Overlap adjacent sheets and mark a line approximately ¼ inch to ½ inch from the top sheet edge.
- C. Apply Sure-Seal HP-250 Primer to the splice area.
- D. Immediately roll the splice using positive pressure when using a 2 inch wide steel roller. Roll across the splice edge, not parallel to it. When using Factory Applied Splice Tape, Carlisle's Stand-Up Seam Roller can be used to roll parallel to the splice edge.
- E. At all **field splice intersections**, apply Lap Sealant along the edge of the membrane splice to cover the exposed SecurTAPE 2 inch in each direction from the splice intersection. Install Carlisle's Pressure-Sensitive "T" Joint Covers or a 6 inch wide section (with rounded corners) of Sure-Seal Pressure-Sensitive Flashing over the field splice intersection.

3.07 EPDM FLASHING

- A. Wall and curb flashing shall be cured EPDM membrane. Adhere .060 non – reinforced EPDM membrane onto walls and terminate according to Carlisle specifications and details.
- B. Follow Carlisle's typical flashing procedures for wall, curb, and penetration flashing including metal edging/coping and roof drain applications.

3.08 WALKWAYS

- A. Install walkways at the roof hatches and access doors at all serviceable units.
- B. All walkways are to be colour contrasted from the roof membrane.
- C. Adhere walkways to the EPDM membrane in accordance with the manufacturer's specifications.

3.09 DAILY SEAL

- A. On phased roofing, when the completion of flashings and terminations is not achieved by the end of the work day, a daily seal must be performed to temporarily close the membrane to prevent water infiltration.
- B. Complete an acceptable membrane seal in accordance with the manufacturer's requirements.

3.10 CLEAN UP

- A. Perform daily clean-up to collect all wrappings, empty containers, paper, and other debris from the project site. Upon completion, all debris must be disposed of in a legally acceptable manner.
- B. Prior to the manufacturer's inspection for warranty, the applicator must perform a pre-inspection to review all work and to verify all flashing has been completed as well as the application of all caulking.

END OF SECTION

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PART I – GENERAL**WORK SPECIFIED HEREIN**

All labor, materials, equipment and services necessary to provide the flashing and sheet metal work and related items as indicated or specified.

SUBSTITUTIONS

In accordance with Section 01600.

SUBMITTALS

- Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.
- Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

QUALITY ASSURANCE

- Standards: Quality, procedures and methods recommended by *SMACNA Architectural Sheet Metal Manual, 5th Edition*.
- Coordinate trade jurisdiction with respect to installing sheet metal items.
- Provide the sheet metal items in sufficient time to avoid delays to the construction progress.

PART II – PRODUCTS**MATERIALS**

- Galvanized Sheet Metal: *ASTM A-653 lock-forming, gauges as indicated (0.58 mm (24 gauge) minimum) (0.72 mm (22 gauge) @ copings)*.
- Solder: *ASTM B-32, Grade Sn50, 50% tin and 50% lead, used with rosin flux.*
- Mastic Sealant: *CAN/CGSB 37.29 polyisobutylene; non-hardening, non-skinning, non-drying, non-migrating sealant*
- Caulking: *ASTM C-920, Type M, Grade NS, Class 25, use NT, M, A, O.*
- Reglets and counterflashing: *As manufactured by Fry Reglet Corporation, Type MA, ST.*
- Nails, Screws, Rivets: *Same material as flashing sheet, or other as recommended by manufacturer of flashing sheet.*
- Cleats: *Metal and gauge as sheets being anchored, 50 mm (2") wide, punched for 2 anchors.*
- Roofing Felt: *ASTM D-226, 7 kg (15 pound) type or 14 kg (30 pound) type.*
- Bituminous Coating: *FS TT-C-494 or SSPC paint - 12, dry film 15 mils per coat.*

PART III – EXECUTION**WORKMANSHIP**

Surfaces to receive sheet metal shall be clean, dry, and free from projections or other defects that would affect the application. Report any unsatisfactory surfaces to the Professional of Record.

Where dissimilar materials abut, provide proper separation or protection to minimize the possibility of galvanic action.

Provide for thermal expansion of running trim, flashing, expansion joints, and other items exposed for more than 4 500 mm (15 feet) continuous length. Maintain a watertight installation at expansion seams. Locate expansion seams as shown, or if not shown, at the following maximum spacing for each general flashing use:

- Flashing, expansion joints, and trim - at 3 048 mm (10 foot) intervals, and 610 mm (24") on each side of corners and intersections.
- Sealant-type expansion joints - where sealant-filled expansion joints are used, embed and hooked flanges of the joint members not less than 25 mm (1.0") into the sealant. Form joints to completely conceal the sealant. When ambient temperature is moderate at the time of installation (4°C to 21°C, set joint members for 50% movement either way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant type joints at temperatures below 4°C. Installation of sealant is specified in Section 07900.

Fabricate and install sheet metal with lines, arrows, and angles sharp and true, and plane surfaces free from objectional wave, warp or buckle. Hem exposed edges to form a 13 mm (1/2") wide hem on the side concealed from view.

Forming, anchoring, expansion and contraction details shall conform to the current edition of the *SMACNA Architectural Sheet Metal Manual*.

SOLDERING

- Except where other methods of joining are indicated or specified, solder all joints, and connections of sheet metal work.
- Remove grease and dirt from metal surfaces to be joined.
- Remove all flux residue by scrubbing, neutralizing with ammonia or a 5-10% solution of washing soda and followed by a clear water rinse.
- Assemble parts and solder using regular non-corrosive rosin flux. Heat metal thoroughly to completely sweat solder through full contact area.

SCUPPER, LEADER BOXES AND DOWNSPOUTS

- Provide galvanized metal scuppers, leader boxes and downspouts as indicated.
- Construct scuppers in accordance with Figure 1-26 of *SMACNA Architectural Sheet Metal Manual* and as detailed (0.58 mm (24 ga.) min.)

- Construct downspouts in accordance with Figure 1-32B and Figure 1-34 of *SMACNA Architectural Sheet Metal Manual* and as detailed (0.72 mm (22 ga.) min.), gutter straps 18 ga. min.

GUTTERS AND DOWNSPOUTS

- Provide gutters and downspouts as indicated (0.72 mm (22 ga.) min. unless noted otherwise).
- Construct gutters in accordance with Figure 1-2, Style A of *SMACNA Architectural Sheet Metal Manual* and as detailed.

END OF SECTION

PART I – GENERAL**WORK SPECIFIED HEREIN**

All labor, materials, equipment and services necessary to furnish and install all roof hatches as indicated or specified.

SUBMITTALS

Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.

Review of submittals by the Professional of Record is limited to specific shop drawings as called for in this Project Manual.

SUBSTITUTIONS

In accordance with Section 01600.

PART II – PRODUCTS**MATERIALS**

This specification is based on roof hatches as manufactured by those listed within the Material and Product Schedule shown on the Drawings.

Covers shall be galvanized steel, prime painted, 1.9 mm (14 gauge) with 75 mm (3") beaded flange neatly welded. Insulation shall be glass fiber, 25 mm (1") in thickness, fully covered and protected by a galvanized steel, prime painted, 0.72 mm (22 gauge) metal liner. Curb shall be 400 mm (16") high of galvanized steel, prime painted, 1.9 mm (14 gauge), formed with a 89 mm (3-1/2") flange with holes provided for securing to roof deck. Equip curb with an integral metal cap flashing of the same gauge and material as the curb, full welded at the corners for absolute weather tightness. Insulation on exterior of the curb shall be 25 mm (1") thick rigid fiberboard.

PART III – EXECUTION**INSTALLATION**

Install roof hatches at location indicated, fastening securely to deck through curb flange.

END OF SECTION

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PART I – GENERAL**WORK SPECIFIED HEREIN**

All labor, materials, equipment and services necessary to furnish all fire-rated sealants and related materials and perform all sealing of fire rated joints as indicated or specified.

See Section 07900 for conventional sealants.

SUBSTITUTIONS

In accordance with Section 01600.

SUBMITTALS

Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.

Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

PRODUCT DELIVERY, STORAGE AND HANDLING

Deliver sealant to the job site in sealed containers, each bearing manufacturer's name and product designation.

JOB CONDITIONS

Do not apply sealants in temperatures or to material below 4°C.

Seal penetrations before final coat of paint or before application of any clear or stain waterproofing compounds.

Do not apply sealants to surfaces that are wet.

QUALITY ASSURANCE

All sealants and related materials shall conform to the following applicable standards:

- ASTM E119 Fire Tests of Building Construction and Materials.
- ASTM E814/E814M Fire Tests of through penetration fire stops.
- ANSI/UL 1479 Firestops, fire tests of through penetrations.
- CAN/ULC S101-04, Fire Endurance Tests of Building Construction and Materials.
- CAN4 S114-05, Test for Determination of Non-Combustibility in Building Materials.
- ULC S115-05, Fire Tests of Firestop Systems.
- CAN/ULC S702-97, Mineral Fibre Thermal Building Insulation
- ULC Guide No. 40 U19-2004, Firestop Systems.
- Underwriters Laboratories of Canada (ULC)
- Underwriters Laboratories of Canada (ULC), List of Equipment and Materials

All products shall have been tested and classified by ULC. Refer to CAN/ULC S101-04, "Fire Endurance Tests of Building Construction and Materials."

PART II – PRODUCTS**MATERIALS**

Products shall be one-part compositions, synthetic elastomeric organic/inorganic intumescent material, as follows:

Caulk

Putty

Wrap/strip

Composite sheet

Refer to Material and Product List on Drawings for additional information.

PART III – EXECUTION**GENERAL**

Qualified applicators shall apply sealants in conformance with manufacturer's written directions.

Examine all surfaces and report all conditions not acceptable.

Remove loose dirt and oil from penetration surfaces. Install hangers or damming material if necessary. Place the required amount of firestopping material in the penetration to obtain the desired rating (1, 2, or 3 hour rating). If required, install top cap and smoke seal.

METHODS

All depth requirements are the installed or "wet" depth.

Precaution: During application of Caulk and Putty, keep away from heat, open flame, sparks or other sources of ignition until product cures. Use only with adequate ventilation.

All joints to receive sealant shall be as indicated on Shop or Project Drawings. Do not seal joints until they are in compliance with Drawings; or meet with the approval of the Architect.

Clean adjacent surfaces of sealant as work progresses. Use solvent or cleaning agent as recommended by sealant manufacturer. All finished work shall be left in a neat, clean condition.

PART IV - SCHEDULE

Provide fire-rated sealants at the following locations. This schedule is not to be construed to be complete. Provide fire-rated sealant at other areas as indicated.

Fire seal all penetrations made by:

- Ducts
- Cable, power and/or telephone
- Conduit
- Pipe, steel, plastic, insulated or uninsulated

Thickness of sealant shall be appropriate to provide same fire-rating as the fire wall/floor assembly it penetrates.

END OF SECTION

PART I – GENERAL

WORK SPECIFIED HEREIN

All labor, materials, equipment and services necessary to furnish all sealants, rodent control mesh, and related materials and perform all work as indicated or specified.

See Section 07952 for fire retardant sealants.

SUBSTITUTIONS

In accordance with Section 01600.

SUBMITTALS

Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.

Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

WARRANTY

The manufacturer and applicator shall warrant all materials and their installation for a period of five (5) full years.

Warranty shall be issued jointly by the manufacturer and applicators from the date of Substantial Completion. The manufacturer and/or applicator shall replace all defective materials at no cost to the Owner for this five (5) year warranty period.

PRODUCT DELIVERY, STORAGE AND HANDLING

Deliver sealant to the job site in sealed containers, each bearing manufacturer's name and product designation.

JOB CONDITIONS

Do not apply sealants or expanding foam in temperatures or to material below 40° F.

Caulk joints before final coat of paint or before application of any clear or stain waterproofing compounds.

Do not apply sealants or expanding foam to surfaces that are wet.

PART II – PRODUCTS

MATERIALS – JOINT SEALANTS

- All sealants used on exterior of project, except those in contact with E.I.F.S., are to be 2-component polyurethane base, including inside surface of exterior joints.
- All sealants in contact with E.I.F.S. to be silicone or as approved by E.I.F.S. manufacturer and color shall match adjacent E.I.F.S. surface.

- Floor Joint Filler:
Sealant shall be 2-component base of liquid (or paste equal) polyurethane polymer. Sealant shall be in colors selected. Sealants shall conform to the following:

ASTM

Traffic Joints	C-920, Type M, Grade P, Class 25, Use T (Fast Drying)
Horizontal Joints	Same as Traffic Joints
Other Joints	C-920, Type M, Grade NM, Class 25, Use NT, M, A, O

- All sealant used on interior of project are to be acrylic latex base, unless noted otherwise.
Sealant shall be acrylic latex base conforming to CAN/CGSB-19.17M; and ASTM C-834. Colors shall be as selected.

All sealants in restrooms mould and mildew resistant silicone, conforming to ASTM C920, Type S, grade NS, Class 25, use NT, G, and A. Color shall be as selected.

All sealants in wet areas, such as bathing, drying, dog runs, etc. shall be polyurethane base conforming to CAN/CGSB-19.13M Type 2, Class MCG-2-25-A-N; and ASTM C920, Type S, grade GNS, Class 25, use NT, M, and A.

Non-elastomeric Sealants:

- At roof flashings and scuppers: Per Roofing Manufacturer's Recommendations
- Primer: Where required, shall be used as recommended, in wiring, by the manufacturer. The primer shall have been tested for non-staining characteristics and durability on samples of actual surfaces to be sealed.
- Back-up materials and preformed joint fillers shall be non-staining, compatible with sealant and primer, and of a resilient nature, such as closed cell polyethylene rod, closed cell urethane or Neoprene rod, or elastomeric tubing or rod (Neoprene, butyl, or EPDM). Materials impregnated with oil, bitumen or similar materials shall not be used. Size and shape shall be as indicated by joint details on drawings and shall be as recommended by sealant manufacturer in writing. Sealant shall not adhere to back-up material.
- Bond Breakers: Where required, shall be polyethylene tape (or approved alternate) as recommended by manufacturer of sealant, in writing.
- Solvents, cleaning agents and other accessory materials shall be as recommended by sealant manufacturer in writing.

MATERIALS – RODENT CONTROL MESH

- Rodent control mesh shall be a woven copper mesh secured in place (both sides) by an expanding foam.

- Rodent control mesh shall be “Stuf-Fit”.
- Expanding foam shall be “off white” in color.

PART III – EXECUTION

WORKMANSHIP

General:

- Qualified applicators (5 year minimum successful experience in application of joint sealers specified) shall apply sealants in conformance with manufacturer's written directions.
- Examine all surfaces and report all conditions not acceptable.
- Apply sealant under pressure with hand or power actuated gun or other appropriate means. Gun shall have nozzle of proper size and provide sufficient pressure to completely fill joints as designed. All joint surfaces shall be tooled to provide the contour as indicated.

Preparation:

- Thoroughly clean all joints, removing all foreign matter such as dust, oil, grease, water, surface dirt and frost. Sealant must be applied to the base surface. Previously applied paint or primer must be entirely removed.
- Porous materials such as concrete or masonry shall be cleaned where necessary by grinding, blast-cleaning, mechanical abrading, acid washing to combination of these methods to provide a clean, sound base surface for sealant adhesion.
- Laitance shall be removed by acid washing, grinding or mechanical abrading.
- Form oils shall be removed by blast-cleaning.
- Loose articles present or resulting from grinding, abrading or blast-cleaning shall be removed by blowing out joints with oil-free compressed air (or vacuuming) prior to application of primer or sealant.
- Non-porous surface, such as metal and glass, shall be cleaned either mechanically or chemically. Protective coatings on metallic surfaces shall be removed by a solvent that leaves no residue. Solvent shall be used with clean cloths or lintless paper towels. Do not allow solvent to air dry without wiping. Wipe dry with clean, dry cloth or lintless paper towels.
- Joint areas to be protected with masking tape or strippable films shall be cleaned before application of tape or film.
- All joints to receive sealant shall be as indicated on Shop or Project Drawings. Do not seal joints until they are in compliance with Drawings or meet with the approval of the Architect.
- For joints in concrete or masonry: depth of the sealant may be equal to the width in joints up to 6 mm (1/4") wide. For joints 13 mm to 25 mm (1/2" to 1") wide: depth shall be 13 mm (1/2"). For expansion and other joints 25 mm to 50 mm (1" to 2") wide: depth

shall not be greater than 1/2 the applied sealant width. For joints exceeding 50 mm (2") in width: depth shall be as directed by sealant manufacturer.

- For joints in metal, glass and other non-porous surfaces: sealant depth shall be a minimum of 1/2 the applied sealant width, and shall in no case exceed the applied sealant width.
- Joints to receive sealant, back-up material or pre-formed joint filler shall be cleaned out, raked to full width and depth as required.
- Joints shall be of sufficient width and depth to accommodate specified back-up material or preformed joint filler and sealant.

Application:

- Install back-up material or joint filler, of type and size specified, at proper depth to provide sealant dimensions as detailed. Back-up material shall be of suitable size and shape; and compressed 25-50% to fit joints as required. Sealant shall not be applied without back-up material and/or bond breaker strip. When using back-up tube, avoid lengthwise stretching. Tube or rod shall not be twisted or braided.
- Apply masking tape, where required, in continuous strips in alignment with joint edge.
- Prime surfaces, where required, with primer as recommended by sealant manufacturer.
- Follow sealant manufacturer's instructions regarding mixing (if required), surface preparation, priming, application life, and application procedure.
- Apply, tool and finish sealant as required. When tooling sealants, use tooling solution recommended by sealant manufacturer. Remove masking tape immediately after joints have been tooled.
- Clean adjacent surfaces of sealant as work progresses. Use solvent or cleaning agent as recommended by sealant manufacturer. All finished work shall be left in a neat, clean condition.

RODENT CONTROL MESH

General:

- Install Rodent Control Mesh in a workmanlike manner and at a rate as recommended by manufacturer.
- Prior to installation of expanding foam, insure all surfaces are clean and free of loose particles or oils.
- After foam is expanded and cured, cut flush with face of penetration opening.

PART IV - SCHEDULE

Provide caulking at the following locations. This schedule is not to be construed to be complete. Provide caulking at other areas to provide a watertight building.

- Control joints in masonry surfaces, interior and exterior (New and Existing).
- Control joints and expansion in concrete surfaces, interior and exterior.
- Perimeter of door frames, interior and exterior. (No caulking at pre-finished door frames)
- Perimeter of window frames, interior and exterior.
- Perimeter of louvers and grilles, interior and exterior. (No caulking at louvers in pre-finished doors)
- Perimeter of aluminum sections, interior and exterior.
- Top edge of all reglet/counterflashing assemblies.
- All piping, duct, conduits at wall penetrations.

Note: At interior partitions caulking is required at all joints between dissimilar materials.

SANITARY CAULKING

Caulk all joints, seams, cracks, etc., in the groomer area/ bath, mech., janitor and toilets. Typical joints to be caulked are as follows:

- Juncture of all wall panels with floor or base; juncture of door jambs (other than pre-finished frames) or jamb covers with walls; juncture of fixture with floor and wall; around plumbing fixtures; all transitions of dissimilar materials; all other similar locations.

Bottom of prefinished frames at floor tile: Color to be black.

RODENT CONTROL MESH

Provide Rodent Control Mesh in all wall and floor penetrations or openings or space around penetrations for pipes conduits, ducts, etc. and secure both sides with expanding foam.

END OF SECTION

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PART I – GENERAL

WORK SPECIFIED HEREIN

- All labor, materials, equipment and services necessary to furnish and install all exterior hollow metal frames as indicated or specified. **This is a Required Vendor.**

SUBMITTALS

- Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.
- Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

QUALITY ASSURANCE

All frames to meet specified requirements and SDI-100 for unit welded frames and the CSDMA “Canadian Steel Door Manufacturers Association”.

PRODUCT DELIVERY, STORAGE AND HANDLING

Upon delivery to the job, store frames in vertical positions covered on 100 mm (4”) wood sills in a manner to prevent rust and damage. Provide wood slats between doors to avoid any metal-to-metal contact. Leave doors in stored position until ready to hang. Identify each door and frame per shop drawings.

SUPPLIER

Per a Required Vendor Agreement, all material in this Section shall be purchased by the General Contractor from National Vendor, see drawing A0.1.

PART II – PRODUCTS

HOLLOW METAL FRAMES

- Frames to be pressed steel to profile indicated, 1.5 mm (16 gauge) (unless otherwise noted) cold rolled, pickled, annealed steel, unity type welded construction, with angles, modes, returns and miters neatly welded and weld beads ground smooth.
- Prepare frames to receive mortised type hardware. Spot weld reinforcing plates to inner surface of jambs at hinge, lock, latch, and other hardware locations. Hinge reinforcements shall be 3.4 mm (10 gauge) steel for lightweight core doors, 4.2 mm (7 gauge) steel for others. All other hardware reinforcements shall conform to Table IV, SDI-100. Spot weld 0.58 mm (24 gauge) galvanized steel plaster guards over hardware from templates furnished to frame manufacturer by hardware supplier. Provide suitable reinforcements for surface applied hardware. Punch door stops to receive rubber silencers as required.
- Provide frames with fixed insert anchors welded to face and flange returns 300 mm (12”) down from top, then 610 mm (24”) on center.

Provide frames with minimum 1.9 mm (14 gauge) floor clips welded to each jamb, face and flanges punched for anchoring to floor. All anchors to be suitable for wall conditions. All door openings wider than 1070 mm (42”) and at multiple openings, reinforce head members full length with 2.7 mm (12-gauge) steel channel. Brace door frames with temporary wood or metal spreaders to insure maintaining square and true shapes in shipping. Any frames damaged in any way shall not be installed.

- Provide frames with ULC labels as required or as indicated.

PRIMING

Frames are to receive one shop coat of rust inhibitive primer. Primer shall be smooth surface, ready to receive finish coats at time of delivery and when installed. No runs, over spray, dust or other defects will be allowed. Primer shall be bonded to metal sufficiently that upon again it will not chip or flake when scraped through.

HOLLOW METAL DOORS

- Construct hollow metal doors, flush type, 45 mm (1-3/4”) thick, of 2 sheets of finest grade 1.5 mm (16-gauge) cold rolled steel. Reinforce top and bottom of doors horizontally by steel channels, full width spot welded to each face of door at least 100 mm (4”) o.c. Manufacturer’s mechanical interlocking edge on hinge and lock edge.
- Doors shall have polystyrene core for insulation.
- Provide double doors with one-piece astragals of 2.7 mm (12-gauge) steel. Provide solid drip cap at top of all exterior out-swinging doors.
- Accurately mortise doors for locks and hinges. Provide adequate reinforcement in accordance with Table IV SDI-100 and CSDMA.
- Provide louver doors as scheduled. Provide sight proof louvers either pierced into the panels of the doors or inserted into the panels. Form louver frames of minimum 0.84 mm (20-gauge) steel. Weld or tenon minimum 0.58 mm (24 gauge) blades to frame and fasten the entire assembly to the door with moldings. The moldings, when used, shall be an integral part of the louver.

PRIMING

- Doors to be thoroughly cleaned, bonderized and primed with shop coat of light gray zinc chromate rust inhibitive primer, baked on.
- Primer shall be smooth surface, ready to receive finish coats at time of delivery and when installed. No runs, overspray, dust or other defects will be allowed. Primer shall be bonded to the metal sufficiently that upon aging it will not chip or flake when scraped through.

PART III – EXECUTION

FRAME INSTALLATION

- In concrete walls: Provide adjustable T-strap type anchors, of not less than 1.5 mm (16 gauge) steel or 0.396 mm (0.156") diameter steel wire. Provide a minimum of four anchors per jamb for frames up to 2440 mm (8'-0") in height. For frames over 2440 mm (8'-0"), provide one additional anchor for each 610 mm (2'-0") or fraction thereof in height.
- At each jamb of frames in masonry walls, provide at least 3 "T" type loose masonry anchors fabricated from 1.2 mm (18 ga.) steel up to 2440 mm (8'-0") high.
- Floor anchor clips shall be fabricated from 1.9 mm (14 ga.) steel and shall be welded between the door frame flanges. Anchor clips to floor with at least two power driven anchors or equivalent per clip to prevent twist.

DOOR INSTALLATION

Fit hollow metal doors accurately in frames with clearances as follows:

- Between door and frame at head and jamb: 3 mm (1/8")
- At doorsill without threshold: 10 mm (3/8") max.
- At doorsill with threshold: 6 mm (1/4") max.
- Between meet edges of pairs of doors: 3 mm (1/8")

Note: No hardware to be visible on hollow metal doors at building exterior.

Place fire-rated doors with clearance as specified in NFPA Std. No. 80.

Install doors completely and accurately, complete with all finish hardware. Install finish hardware in a neat workmanlike manner in accordance with the hardware schedule using only mechanics skilled in this type of work. Do not install hardware until painting is completed. Keep all hardware free from scratches, dents or other defacements.

Adjust and Clean - Prime Coat Touch-Up:

Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.

Final Adjustments:

Check and re-adjust operating finish hardware items, leaving metal doors and frames undamaged and in complete and proper operating condition.

INSPECTION

Installer must examine substrates and conditions under which metal door and frames are to be installed and must notify Contractor in writing of any conditions detrimental to proper and timely completion of work.

Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to installer.

General:

Install metal doors, frames, and accessories in accordance with approved shop drawings and manufacturer's data, and as herein specified.

Placing Frames:

Except for frames located at in-place concrete or masonry and at drywall installations, place frames prior to construction of enclosing walls and ceilings.

Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set.

Remove temporary spreaders before setting frames (spreader bars are for shipping only).

Use temporary braces to set frames as per SDI-100.

END OF SECTION

PART I – GENERAL**WORK SPECIFIED HEREIN**

- All labor, materials, equipment and services necessary to furnish and install all interior prefinished hollow metal door frames as indicated or specified. **This is a Required Vendor.**

SUBMITTAL

- Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.
- Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

QUALITY ASSURANCE

All frames are to be in compliance with ASTM A568 and ASTM A366.

PRODUCT DELIVERY, STORAGE AND HANDLING

Upon delivery to the job, store frames in manufacturer prepared packaging and in a vertical position - covered to prevent moisture damage and damage from ongoing construction activities.

SUPPLIER

Per a Required Vendor Agreement, all material in this section shall be purchased by the General Contractor from National Vendor, see drawing A0.1.

PART II – PRODUCTS

- Provide (KD) knock down frames.
- Frames to be roll-form or break frames to standard profiles as shown or indicated and shall be constructed from 1.2 mm (18 gauge) cold rolled steel for all door installation conditions.
- Frames shall be provided at all gypsum board door openings and at window openings as indicated on documents or otherwise shown.
- Frames shall be prefinished factory applied polyester paint - color to be black.
- Prepare frames for die formed, heat treated clips to assure tight casing fit. Clips to be mechanically fastened to assure a secure and proper aligned installation.
- Provide oval alignment slots to allow visual alignment of the frame in the rough opening. Slots to allow for insertion of tool to move frame on the wall to avoid damage to wall finish.
- All frames to have 1.9 mm (14 gauge) hinge reinforcement plates applied to the frame and strikes for 70 mm (2-3/4") 'T' strike, or as required, see hardware schedule section 08700. Provide standard field applied reinforcement (i.e. TA-10 and/or TA-12 as applicable reinforcement bracket for door closers) for all surface mounted hardware as required. Verify locations where reinforcement must be applied prior to installation of frame over the wall.

- Provide frames with UL labels as required or as indicated.
- Provide 0.72 mm (22 gauge) prefinished steel at all window installation conditions. Frames shall be full bound and sized to match as indicated on documents or otherwise shown.
- Provide three door silencers per door.

PART III – EXECUTION**INSTALLATION**

- Prior to installation, examine all openings to verify proper rough opening dimensions, **wall thickness**, blocking or other requirements to assure proper performance. Frames to be installed **over finished walls** and anchored through the faces into the structure in compliance with manufacturer's requirements.
- Use a pre-fit template door or actual door for the opening to assure alignment and clearance. Doors and glass is to be pre-fit according to frame manufacturer's requirements.
- Anchor with drywall screws for frames at all locations. The recommended fastener is 32 mm (1-1/4") bugle head drywall screws.
- Verify all hardware requirements for each opening to provide proper reinforcement, preparation and anchorage for adequate performance and long life.
- Align all parts with proper clearance to assure proper fit, tight miters and desired performance.

INSPECTION

- Installer must examine substrates and conditions under which prefinished steel frames are to be installed and notify the contractor in writing of any conditions detrimental to proper and timely completion of work.
- Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to installer.
- Inspect each opening for proper operation, correct hardware, general appearance upon completion.

WARRANTY

Provide a minimum of one-year warranty from date of installation.

END OF SECTION

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PART I – GENERAL**WORK SPECIFIED HEREIN**

All labor, material, equipment and services necessary to furnish the wood doors and related items as indicated or specified. **This is a Required Vendor.**

SUPPLIER

Per a Required Vendor Agreement, all material in this section shall be purchased by the General Contractor from National Vendor, see drawing A0.1.

SUBMITTALS

Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.

Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

QUALITY ASSURANCES

Standards: Architectural Woodwork Manufacturer's Association of Canada, 2003 Edition (AWMAC) and AWI Quality Standards, 3rd Edition, Section 1300 as modified below, and ANSI A-208.1, govern all work hereunder.

PRODUCT DELIVERY, STORAGE AND HANDLING

Do not deliver wood doors to the job site until a suitable storage room is provided to protect the doors from either excessive moisture or excessive dryness. Store doors flat prior to hanging. Do not install doors until plaster and wallboard operations are completed and buildings are protected from excessive temperature changes. Apply painter's finish as soon as practicable after the doors are hung with particular attention to sealing all edges.

Carefully stack doors laid flat and level on three (3) 2 X 4's, one at center and one 300 mm (12") from each end, in a dry, clean, well-ventilated space. Place corrugated cardboard or plywood under bottom doors and over doors.

GUARANTEE - SOLID CORE DOORS

Furnish manufacturer's standard "Life of the Installation" guarantee for all interior doors. Repair or replacement shall include reasonable cost for rehanging and refinishing.

Obtain detailed instructions on the limitations imposed on this guarantee by the door manufacturer and his recommendations with respect to storage, installation and maintenance, including sealing finishing, and shall notify all subcontractors of these requirements before any doors are delivered.

PART II – PRODUCTS**MANUFACTURER**

Refer to Materials and Product List on Drawings.

No field staining/shop staining will be accepted

MATERIALS

Solid Core Wood Doors:

Flush, AWI/AWMAC Spec. Symbol PC-7 (7-Ply).

Face Veneers:

Standard thickness rotary cut, natural birch, prefinished (Color: As indicated on drawings).

Thoroughly dried hardwood, 1.5 mm (1/16") minimum thickness extending the full width of the door and laid with the grain at right angles to the face veneers.

Core:

Particleboard Grade I-L-1.

Side Stile Edges:

Double thickness, minimum 35 mm (1-3/8") optional stiles (must be requested when ordering) of same species of wood as face veneers. Outer edge band shall be one piece, no finger joints. Top and bottom rail edges of double thickness, minimum 28 mm (1-1/8") minimum wood one piece or laminated (SCL) thoroughly kiln-dried hardwood.

Note: For pivot hinges, concealed closers or holders, or other hardware mortised into top and bottom edges, edges shall be a minimum 114 mm (4-1/2"), as above. Laminate all edges to the core, prior to the application of cross bands and faces with Type II face bond interior adhesive.

Pre-fitting:

Pre-fit doors at factory in accordance with tolerance requirements of the NWMA Standards with allowances for specific undercuts as indicated on the door schedule. Provide standard bevel or radius to edge of door as required for the installation.

Labeled Wood Doors:

Flush. AWI/AWMAC type FD mineral core, faces and finished as specified above the UL label as listed. Edges shall be fire treated birch and shall be compatibly finished to match door faces. Schedule hardware in accordance with the manufacturer's comparative data or Underwriter's Laboratories, Inc. listings. Pre-fit doors to 3 mm (1/8") under net opening width and 11 mm (7/16") under net height. Where transoms are indicated at labeled doors, construct transom panels to meet UL requirements.

DOOR MODIFICATION

Door cutouts: Door manufacturer shall make necessary provisions in the mill for all door cut-outs as indicated on the drawings.

Hardware preparation: Doors to be factory machined for hardware, beveled and exactly fitted for hanging.

Provide prefinished snap-in aluminum (Clear anodized) frames at all vision lites.

PART III – EXECUTION**INSTALLATION**

- Place frames prior to construction of enclosed walls and ceilings. Set frames accurately in position plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders leaving surfaces smooth and undamaged.
- Doors shall be accurately fitted with proper clearances and left in perfect working order. All re-fitting necessary due to swelling, shrinking, faulty assembly or installation shall be done by the contractor, without cost to the Owner, for a period of two-year after completion and acceptance of the building. When dressing or cutting has been done, these surfaces shall be repainted or varnished.
- Provide standard pre-fit clearances of 3 mm (1/8") at top 3 mm (1/8") each side and minimum 10 mm (3/8") at bottom; increase bottom clearances over carpet and saddles.

ADJUST AND CLEAN

- Final Adjustments: Check and re-adjust operating finish hardware items in hollow metal. Work just prior to final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including doors or frames, which are warped, bowed or otherwise damaged.
- Touch Up: Immediately after erection, sand smooth any rough or damaged or damaged areas and apply touch-up so that there is no visual evidence of touch up.

END OF SECTION

PART I – GENERAL**WORK SPECIFIED HEREIN**

All labor, material, equipment and services necessary to furnish the impact doors and related items as indicated or specified. **This is a Required Vendor.**

SUBSTITUTIONS

No substitutions.

SUBMITTALS

Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.

Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

QUALITY ASSURANCES

Standards: AWI Quality Standards, 3rd Edition, Section 1300 as modified below, and ANSI A-208.1, govern all work hereunder.

PRODUCT DELIVERY, STORAGE AND HANDLING

Do not deliver impact doors to the job site until a suitable storage room is provided to protect the doors from elements. Store doors flat prior to hanging. Do not install doors until plaster and wallboard operations are completed and buildings are protected from excessive temperature changes.

GUARANTEE

Furnish manufacturer's standard one year guarantee for all impact doors. Repair or replacement shall include reasonable cost for rehanging and refinishing.

Obtain detailed instructions on the limitations imposed on this guarantee by the door manufacturer and his recommendations with respect to storage, installation and maintenance and shall notify all subcontractors of these requirements before any doors are delivered.

PART II – PRODUCTS**MANUFACTURER**

The following door manufacturer is approved for use on this project, subject to all the detailed requirements of the specifications and drawings:

Refer to Required National Vendor List on Drawing A0.1 for additional contact information.

MATERIALS

Door to be constructed of 45 mm (1-3/4") thick solid core with 090ABS plastic with each door having a window, size as indicated on drawings. Provide gravity-hinged EZ-Hang system and all necessary hardware and door frame work.

The impact doors are as follows:

- Location – Salon
Door, Purchased by General Contractor

- Backroom Entrance (Receiving Hall)
Door, Purchased by General Contractor
- Fish Aquarium (Equipment room)
Purchased by General Contractor.
- Hall (PETSHOTEL)
Door purchased by General Contractor.
- See Drawings for additional information.

PART III – EXECUTION**INSTALLATION**

- Place frames prior to construction of enclosed walls and ceilings. Set frames accurately in position plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders leaving surfaces smooth and undamaged.
- Doors shall be accurately fitted with proper clearances and left in perfect working order. All re-fitting necessary due to swelling, shrinking, faulty assembly or installation shall be done by the contractor, without cost to the Owner, for a period of two-years after completion and acceptance of the building. When dressing or cutting has been done, these surfaces shall be repainted or varnished.
- Provide standard pre-fit clearances of 3 mm (1/8") at top 3 mm (1/8") each side and minimum 10 mm (3/8") at bottom; increase bottom clearances over carpet and saddles.

ADJUST AND CLEAN

Final Adjustments: Check and re-adjust operating finish hardware items. Work just prior to final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including doors or frames which are warped, bowed or otherwise damaged.

Touch Up: Immediately after erection, sand smooth any rough or damaged or damaged areas and apply touch-up so that there is no visual evidence of touch up.

END OF SECTION

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PART I – GENERAL**WORK SPECIFIED HEREIN**

All labor, materials, equipment and services necessary to furnish and install access doors and related items as indicated or specified.

SUBSTITUTIONS

In accordance with Section 01600.

SUBMITTALS

- Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.
- Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

QUALITY ASSURANCE

Specification is based on access doors as manufactured by those listed within the Material and Product List shown on the drawings.

PART II – PRODUCTS**METAL ACCESS DOORS**

Refer to drawings and mechanical/electrical sections of the specifications for locations and sizes.

- Access doors in plaster or E.I.F.S. surfaces shall be 762 mm x 51 mm (30" x 20") Model DSC-214 PL or sized as per plan.
- Access doors in masonry or tile surfaces shall be recessed KRVB.
- Access doors in wallboard surfaces shall be 356 mm x 356 mm (14" x 14") Model KDW unless noted otherwise.
- Access doors in masonry exterior walls shall be Type DSC-214 M.
- Access doors in suspended fire-rated wallboard surfaces shall be Type KRP-150FR.
- Fire rated access doors shall be Karp fire rated access doors. Frame and panel assembly shall be manufactured under factory inspection service of UL and shall bear a label reading "Frame and Fire Door Assembly, Rating 1-1/2 hours (B), temperature rise 30 minutes, 121°C maximum."

DESIGN**Fire Rated Access Doors:**

- Frames shall be 1.5 mm (16 gauge) steel; panels shall be 0.84 mm (20 gauge) steel, sandwich type.

- Panel shall be equipped with an automatic closing mechanism on doors over 929 sq. cm. (144 square inches) in size.
- Lock assembly shall be cylinder type, self-latching with key operated cylinder lock and shall have a mechanism to release the latch bolt from the inside.
- Hinges shall be continuous, steel with stainless steel pin.
- Prime coat shall be factory-applied baked enamel over a protective phosphate coating on the steel.
- Where designated in masonry walls, attach masonry anchors to frame assemblies in the factory.
- Styles KRVB, KDW, DSC-214PL and DSC-214M.
- Frame shall be 1.5 mm (16 gauge); panel 1.9 mm (14 gauge) steel.
- At Style KDW galvanized steel wallboard bead shall surround frame.
- At Style DSC-214PL casing bead of 0.22 mm (22 gauge) steel shall surround the frame.
- At Style KRVB flange shall be 1.5 mm (16 gauge) steel, 25 mm (1") wide.
- Prime coat shall be factory applied, baked-on enamel, chemically bonded to the steel.
- Hinges shall be concealed, spring type, opening to 175°.
- Locks shall be flush, key operated cylinder locks.
- Style KRP-150FR.
- Frames shall be 1.5 mm (16 gauge) steel; panel 1.2 mm (18 gauge).
- Prime coat shall be factory applied rust-inhibitive white paint.
- Hinge shall be continuous; steel with stainless steel pin.
- Locks shall be flush, key operated cylinder lock. Provide grommet for access to cam lock control.
- Panel shall be equipped with an automatic closing mechanism on doors over 929 sq. cm. (144 square inches) in size.

END OF SECTION

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PART I – GENERAL**WORK SPECIFIED HEREIN**

All labor, materials, equipment and services necessary to furnish and install all stainless steel interior gates as indicated or specified, including hardware. **This is a National Account Vendor.**

PRODUCT DELIVERY, STORAGE AND HANDLING

Upon delivery to the job site, store stainless steel gates in a vertical position. Raise bottom of gates at least 4" above the floor. Provide wood slats between gates to avoid any metal-to-metal contact. Leave gates in stored position until ready to hang.

Supplier

Per a National Account Agreement, all material in this section shall be purchased by the General Contractor from Shor-Line. See National Account List for addition contact information.

PART II – PRODUCTS**STAINLESS STEEL GATES**

- Construct stainless steel gates of type 304 stainless steel.
- Gate framing shall be constructed of 1 1/4" square tube with 18 ga. wall thickness.
- Gate grille shall be constructed of 1/4" diameter stainless steel rods, spot welded at all intersections and tack welded to frame.

HARDWARE

- Latch is of type 305, 11 ga. stainless steel, self locking with dual latch points. Latch shall have nylon bushings for quiet operation.
- Hinge system shall be manufacturer's standard stainless steel.

FINISH

- All stainless steel shall receive a 180 grit finish.

PART III – EXECUTION**INSTALLATION**

- Fit stainless steel gates accurately in openings.
- Install gates completely and accurately, complete with all hardware. Install gates and hardware in a neat workmanlike manner using only mechanics skilled in this type of work. Keep all hardware free from scratches, dents or other defacements.

Final Adjustments:

Check and re-adjust operating hardware items, leaving gates undamaged and in complete and proper operating condition.

END OF SECTION

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PART I – GENERAL**WORK SPECIFIED HEREIN**

- This section includes insulated, high-impact sectional overhead doors and accessories for complete installation. **This is a Required Vendor.**

SUBMITTALS

- Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.
- Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

Operating and Maintenance Data: For door, optional operator and accessories.

QUALITY ASSURANCE

- Manufacturer Qualifications: Provide each sectional overhead door as a complete unit produced by a single manufacturer, including frames, sections, brackets, guides, tracks, counterbalance mechanisms, and hardware.
- Inserts and Anchorages: Furnish inserts and anchoring devices that must be set, anchored or built into concrete or masonry; or drilled and tapped or welded to structural steel.
- Installer Qualification: Door manufacturer or trained, approved and licensed door installer.

WARRANTIES

- One-year performance warranty on door panel and side weatherseals.
- One-year warranty on entire door system against defects in material or workmanship.

PART II – PRODUCTS**MANUFACTURERS**

- Refer to Materials and Product Schedule on Drawings for Additional Information.

DOOR SECTIONS

- Sectional Door Assembly: Insulated steel door assembly with rabbeted meeting rails to form weathertight joints and provide full-width interlocking structural rigidity. Units shall have the following characteristics:
 - Panel thickness: 2"
 - Exterior Surface: Ribbed
 - Steel: Minimum 24 gauge galvanized exterior, back cover 26 gauge steel.
 - Center and End Stiles: 16 gauge.
 - Standard Springs: 25,000 cycles.
 - Insulation: HCFC-free Polystyrene, R-Value 7.35.
- Finish and Color: Factory-applied baked-on white polyester.
- Windload Design: ANSI/ASMA 102 standards and as required by code.
- Door Viewer: Provide one (1) 180° door viewer mounted in center of door at 60" A. F. F.

TRACKS, SUPPORTS AND ACCESSORIES

- Tracks: Provide track as recommended by manufacturer to suit loading required. Door hardware to ride in channel. Tracks to be securely mounted flush with door jamb to maintain full opening width. Tracks systems that reduce door opening width will not be accepted.

- Weather Seal: Provide of continuous extruded loop of low-friction urethane coated PVC weatherseal along both vertical edges of the door panel. Provided one extruded loop of PVC weatherseal extending the full width of the door opening as a bottom seal. Loop weatherseals to be attached to panel edge capping for installation and removal and shall be rated for low temperature exposure. Provide 2" horizontal lintel brush seal securely attached to door lintel to seal tightly against uppermost door section when door is in a closed position. Side weatherseals to be removed from potential impact when door is in full open position. Weatherseals attached to the door track or frame will not be accepted.

HARDWARE

- General: Provide heavy-duty, rust-resistant hardware with galvanized steel hinges and fixtures.
- Hinges: High strength flat panel hinges constructed from 12-gauge steel attached to door panels with four bolts per hinge. Hinges to be connected with removable pin and clip for quick installation and removal of door panels. High tensile strength to allow cable attachment to upper door panels removing cables from impact zone.
- Locking: Manufacturer's standard slide lock with padlock provision

COUNTERBALANCE

- Torsion Spring: Operation by torsion-spring counterbalance consisting of adjustable-tension, tempered-steel torsion springs mounted on a cross header steel shaft. Connect to top of upper door sections on straight vertical and hi-lift doors with galvanized aircraft-type lift cables. Provide springs calibrated for 15,000 cycle minimum.
- Provide cast-aluminum or gray-iron casting cable drums, grooved to receive cable. Mount counterbalance mechanism with manufacturer's standard ball-bearing brackets at each end of shaft. Provide one additional midpoint bracket to support shafts unless alternate brackets and spacing are recommended by door manufacturer.

PART III – EXECUTION**EXAMINATION**

Verify installation conditions as satisfactory to receive work of this section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

- Verify precise opening size, dimensions, tolerances and obstructions.

PREPARATION

- Protect surrounding areas and surfaces to prevent damage during work of this section.

INSTALLATION

- General: Install door, track and operating equipment complete with necessary hardware, anchors, inserts, hangers and equipment supports according to manufacturer's recommendations and instructions and as specified.
- Fasten track assembly to framing as specified in manufacturer's installation manual. Provide sway bracing, diagonal bracing, and reinforcing as required for rigid installation of track and door opening equipment.
- After completing installation, including work by other trades, test and adjust doors to operate easily, free from warp, twist or distortion,

fitting weather-tight and knockout as detailed in manufacturer's standard performance specifications.

CLEANING

Leave the premises clean and free of residue of work of this section.

END OF SECTION

PART I – GENERAL

WORK SPECIFIED HEREIN

- All labor, materials, equipment and services necessary to furnish and install all exterior/interior aluminum storefront, interior aluminum doors and frames, aluminum framing for interior window units and other related materials as indicated or specified.

SUBSTITUTIONS

- In accordance with Section 01600.

SUBMITTALS

- Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.
- Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

QUALITY ASSURANCE

Standards:

- Except as otherwise indicated, the requirements for aluminum doors and frames, and the terminology used in this Section, are those of NAAMM, AAMA and AA and in particular, those of the "Entrance Manual" by NAAMM.

Manufacturer:

- For vestibule door and window frames, refer to Materials and Product Schedule on Drawings.
- For the Salon (and PetsHotel if applicable), Western Integrated Materials is a **required vendor** for the window and door frames. Refer to Materials and Product Schedule on Drawings for additional information.

Sizes and Profiles:

- The required sizes for exterior/interior storefronts, door and frame units, interior window units and profile requirements are as shown on the drawings.

JOB CONDITIONS

Coordination of Fabrication:

- Check the actual openings in the construction work by accurate field measurement before fabrication, and show recorded measurements on final shop drawings. However, coordinate fabrication schedule with construction progress as directed and avoid delays of the work.

ENVIRONMENTAL REQUIREMENTS

- Do not begin installation of aluminum frames until area of work has been completely enclosed and interior is protected from the elements.

- Maintain temperature and humidity in areas of installation within reasonable limits, as close as possible to final occupancy standards. If necessary, provide artificial heating, cooling and ventilation to maintain required environmental conditions.

WARRANTY

- Contractor guarantees that the manufacturer, installer and contractor will replace aluminum window wall units which fail in materials or workmanship within 2 years of the date of acceptance. Failure of materials or workmanship shall include (but not be limited to) excessive leakage or air infiltration, excessive deflections, deterioration of finish or metal in excess of normal weathering and defects in accessories, weatherstripping, and other components of the work.

SYSTEM PERFORMANCE

Provide manufacturer's stock system, adapted to application indicated, which has been tested in accordance with ASTM E 330 to withstand at least the following loading:

- Uniform pressure of 1.44 kPa (30 psf) inward and 1.20 kPa (25 psf) outward. Or as required by Building Code (whichever is greater).
- Maximum deflection of window wall shall be 1/175 of span.

Manufacturer entrances and storefronts shall have been in accordance with ASTM E 283, not to leak air more than 0.305 litre per second per metre (.06 cm per sq. ft.) wall area and in accordance with ASTM E 331 for water leakage.

PART II – PRODUCTS

MATERIALS AND ACCESSORIES

- Type: Provide front glazed system for exterior storefront system and center glazed system for interior framing systems with medium stile doors.
- Main storefront system: Provide anodized frame members prepared to receive 25 mm (1") thick tempered glass units as indicated on drawings.
- Tempered glass – 6 mm glass at all interior locations.
- Materials: Frames - Extruded 6063-T5 Aluminum alloy not less than 0.80" thick.
- Aluminum Members: allow and temper recommended by manufacturer for strength, corrosion resistance, and application of required finish; ASTM B 221 for extrusions, ASTM B209 for sheet/plate.
- Finish for aluminum: Cleaned caustic-etched anodized finish – **Clear Anodized**, unless noted otherwise.

- Factory finish extruded frame and door components so that any part exposed to view upon completion of installation will be uniform in finish and color.
- Fasteners: Aluminum, non-magnetic stainless steel, or other materials warranted by manufacturer to be non-corrosive and compatible with aluminum components.
- Use concealed fasteners except where unavoidable, for application of hardware. Match finish of adjoining metal.
- Provide Phillips flat-head machine screws for exposed fasteners.
- Sill Flashing: Extruded aluminum.
- Brackets and Reinforcements: Manufacturer's high-strength aluminum units where feasible; otherwise, non-magnetic stainless steel or hot-dip galvanized steel complying with ASTM A 386.
- Concrete/Masonry Inserts: Cast iron, malleable iron, or hot-dip galvanized steel complying with ASTM A 153.
- Bituminous Coatings: Cold-applied asphalt mastic complying with SSPC-PS 12, compounded for 0.762 mm (30-mil) thickness per coat.
- Clear Protective Coatings: AAMA 602.2, compounded specifically for protection of aluminum finish during construction.
- Compression weatherstripping: Manufacturer's standard replacement stripping of molded neoprene gaskets complying with ASTM D 200.
- Glass and glazing materials: Provide glass and glazing materials which comply with requirements of "Glass and Glazing" section of these specifications.

FABRICATION

General

- Sizes and Profiles: Required sizes for storefront, door and frame units, including profile requirements, are shown on drawings. Any variable dimensions are indicated together with maximum and minimum dimensions required to achieve design requirements and coordination with other work.
- Prefabrication: To the greatest extent possible, complete fabrication, assembly, finishing hardware application, and other work before shipment to project site. Disassemble components only as necessary for shipment and installation.
- Do not drill and tap for surface-mounted hardware items until time of installation at project site.
- Sequence: Complete cutting, fitting, forming, drilling and grinding of metal work prior to cleaning, finishing, surface treatment, and application of finishes. Remove arises from cut edges and ease edges and corners to radius of approximately 0.396 mm (1/64").

- Welding: Comply with AWS recommendations to avoid discoloration; grind exposed welds smooth and restore mechanical finish.
- Reinforcing: Install reinforcing as necessary for performance requirements; separate dissimilar metals with bituminous paint or other separator which will prevent corrosion.
- Continuity: Maintain accurate relation of planes and angles, with hairline fit of contacting members.
- Fasteners: Concealed wherever possible.

Professional of Record reserves the right to require samples of typical fabricated sections, showing joints, exposed fastening (if any) quality of workmanship, hardware and accessory items, before fabrication of the work proceeds.

STILE-AND-RAIL TYPE ALUMINUM DOORS

Frame: Provide tubular frame members, fabricated with mechanical joint using heavy inserted reinforcing plates and concealed tie-rods or j-bolts, or fabricate with structurally welded joints, at manufacturer's option.

Style: Except as otherwise shown or scheduled, provide doors of medium style, as described in AAMA publications., prepared to receive 6 mm (1/4") thick safety glass.

Glazing: Fabricate doors to facilitate replacement of glass or panels, without disassembly of door stiles and rails. Provide snap-on extruded aluminum glazing stops, with exterior stops anchored for non-removal.

Note: All doors shall include gaskets and sweep, cylinder (where hardware supplier cylinders are not provided - See Section 08710), pull/push handles, and cart guards as indicated on drawings (Threshold at exterior aluminum doors only.) Provide a closer at all locations.

FINISHES

- Clear anodized (min. thickness 0.01 mm (0.4 mil.)) unless noted otherwise (see interior elevations).
- Clear anodized in Pet Hotels

PART III – EXECUTION

INSPECTION

The storefront contractor must examine the supporting structure and for the conditions under which the work is to be erected, and notify the contractor in writing of conditions detrimental to proper and timely completion of the

work. Do not proceed with erection until unsatisfactory conditions have been corrected in a manner acceptable to the storefront contractor.

INSTALLATION

Do not install component parts which are observed to be defective in any way, including warped, bowed, dented, abraded and broken members and including glass with glass damage. Remove and replace members which have been damaged during installation or thereafter before the time of final acceptance.

Do not cut, trim, weld or braze component parts during erection, in any manner which would damage the finish, decrease the strength, or result in a visual imperfection or a failure in performance of the storefront. Return component parts which require alteration to the shop for refabrication, if possible, or for replacement by new parts.

Install component parts level, plumb, true to line and with uniform joints and reveals. Secure to structure with non-staining and non-corrosive shims, anchors, fasteners, spacers and fillers. Use erection equipment which will not mar or stain finished surfaces and will not damage the component parts in any way.

CLEANING AND PROTECTION

The storefront contractor shall advise the general contractor of proper and adequate means for protection of portions of the work which are exposed to likely sources of damage during the remainder of the construction period, including the probable areas of glass breakage or deterioration.

Immediately before the time of final acceptance the storefront contractor shall clean all aluminum framing, glass, etc., thoroughly, inside and out, demonstrate proper cleaning methods to the Owner's maintenance personnel during this final cleaning. Prepare a "Cleaning and Maintenance Manual" listing the types of cleaning compounds, cleaning methods, and types of sealants and glazing materials to be used for cleaning, repair and maintenance of the work.

END OF SECTION

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PART I – GENERAL

WORK SPECIFIED HEREIN

- All labor, materials, equipment and services necessary to furnish and install new automatic sliding entrance packages and controls as indicated or specified including final electrical connections and tune in.

SUBSTITUTIONS

- No substitutions.

SUBMITTALS

- Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.
- Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

QUALITY ASSURANCE

- Manufacturer: ASSA ABLOY Entrance Systems, Besam SL500 Fixed Sidelite, Bi-Parting Automatic Sliding Door Entrance. Refer to Required Vendor List in Specification and Material and Product Schedule on Drawings for Additional Information.
- Manufacturer must have a minimum of ten (10) years experience in the fabrication of aluminum-and-glass door assembly similar to those specified.
- Compliance with both ANSI/BHMA A156.10 American National Standard for Power Operated Pedestrian Doors. (current version) and UL 325 Standard for Safety for Door, Drapery, Gate, Louver and Window Operators and Systems.
- Installation shall be approved by an AAADM certified inspector.

COORDINATION AND TESTS

- Coordinate accurately and fully with other trades affected by this work.
- Thoroughly test and check all items and equipment. Make corrections and adjustments to produce a completely satisfactory and operative automatic door installation.

WARRANTY

- The manufacturer shall warrant all equipment, including operators, controls, etc.; and the installation of the equipment for a period of three (3) full years from date of acceptance. The manufacturer and/or the manufacturer's distributor shall replace all defective equipment at no cost to the Owner or Tenant during this three (3) year warranty period. The manufacturer shall have available on a local area level any parts and services required throughout the life of this equipment.

PART II – PRODUCTS

MANUFACTURER

ASSA ABLOY Entrance Systems Inc
4020B Sladeview Crescent, Units 3&4
Mississauga, Ontario, L5L 6B1
(905) 569-5221

SLIDING AUTOMATIC ENTRANCES

- **Sliding Door Package:** Sliding door packages shall be complete including operator, sliding door(s), sidelite(s), header(s), jambs, threshold(s), bottom door guide(s) and activation/safety sensors.
- **Sliding Panels and Sidelites:** Structural aluminum sections, 0.125 inch (3.2 mm) wall thickness, shall be 6063-T5 alloy with exposed surfaces anodized (painted) to matching architectural finish.

Stile and rail sliding panels and sidelites shall have 1-3/4" (44 mm) x 2-1/8" (54 mm) narrow stiles, 10" (254 mm) bottom rail, 1-3/4 inch (45 mm) intermediate muntin.

Slide-in type, replaceable pile mohair seals retained by the aluminum extrusions. The following types of weather-stripping are required: complementing weather-stripping on the joining vertical stiles of the sidelite and sliding door panels, complementing weather-stripping on the lead edge of the lock stiles of bi-parting doors, single pile weather-stripping on the lead edge stile of single slide door panels, dual pile weather-stripping on the pivot stile of breakout sidelite panels, and single pile weather-stripping between the carrier and the header. Bottom rails shall be provided with an adjustable nylon sweep.

Each active door leaf shall have dual door carrier assemblies with tandem 1-7/16" diameter, sealed ball bearing roller assemblies and two heavy duty self-aligning anti-risers. Concealed bottom door guides shall provide stable movement of sliding panels.

- **Frames:** All structural aluminum sections shall be 6063-T5 alloy with exposed surfaces anodized (painted) to matching architectural finish.

4-1/2" wide extruded aluminum header with hinged access panel shall conceal replaceable roller track, door operators, and carrier assemblies.

Vertical jambs and transom framing shall be 1-3/4" (44 mm) x 4-1/2" (114 mm).

- **Glass and Glazing:** Glazing in compliance with ANSI Z97.1.

Glazing Sliding Panels, Sidelite Panels and Transom: 1/4" (6 mm) clear tempered glass.

- **Hardware:** Provide manufacturer's standard hardware as required for operation indicated.

Breakaway arms and bottom pivot assemblies shall be supplied, adjustable to comply with applicable codes.

Magnetic catch(s) to retain breakout door and sidelite panels in the closed position.

Door Security Alarm Contact Switch: Manufacturer’s standard alarm contact switches.

Cart Protection Bars: Flat bar, 2-inch high by 1/2-inch thick, 6063-T5 aluminum. Two (2) cart protection bars on the exterior side of each sliding panel and two (2) cart protection bars on the interior side of each sidelite panel.

Two point locking system with throw rod into carrier arm and mortise hookbolt. Locking required at both interior and exterior entrances.

Interior Side of Entrance: Thumbturn with lock indicators.

Exterior Side of Entrance: Keyed cylinder, replaceable core.

Guide Track/Threshold:

Exterior Entrance Threshold: 1/2 inch (12.7 mm) high, surface mounted aluminum threshold with integral track shall span the width of the sliding door header and fit between the vertical framing members. Threshold shall include extruded aluminum ramps that securely interlock to the flat section to meet ADA requirements.

Interior Entrance Guide Track: Surface mounted aluminum guide track(s) adjacent to the sidelite portion of the sliding automatic door assembly.

- Operator:** Door movement shall be driven by an energy efficient, DC motor and nylon reinforced drive belt. The supplied system shall have the capability to operate at full performance well beyond a brown out and high line voltage conditions (85V – 265V) sensing changes and adjusting automatically. The operator shall allow an adjustable hold open time delay of 0 to 60 seconds and have internal software to incorporate a self-diagnostic system.
- Microprocessor Control:** Control unit shall be a factory-adjusted configuration with opening and closing speeds set to comply with ANSI/BHMA A156.10 requirements. Electronic dampening shall be included to reduce wear on drive train. Should the drive train operations deviate from design criteria ranges, Watchdog Control Circuit Monitoring will assume command of the system and shut down the automatic function allowing a secondary supervisory circuit to perform as a backup. Control unit shall allow diagnostics with the ability to produce application data.

Mode Selector Control: Multi-position rotary knob mode selector control, jamb mounted, shall allow selection of the indicated functions to be engaged when switch is turned to the appropriate setting. Mode selector control to allow the following functions: “Off”, “Exit Only” for one way traffic with automatic operation from

the interior, “Two Way Traffic” allowing automatic operation from exterior and interior, “Partial Opening” energy saving door position allows door to automatically adjust opening width based on amount of usage, that is, full open during high use and partial open during low use (the control for this setting is programmable allowing adjustment to both the usage setting and the opening width), “Hold Open” doors held in the full open position.

- Emergency Egress:** Fixed sidelite entrances with sliding door(s) capable of being swung out to 90° from any position of slide movement and require no more than 50 lbf. (222 N) of force applied at the lock stile to open. Units with this emergency egress feature comply with ANSI/BHMA A156.10.
- Finish:** Aluminum entrances shall be clear anodized complying with AAMA 611, Clear, AA- M12C22A41, Class I, 0.018 mm.
- Activation and Safety Control Devices:** Combination activation motion sensor/safety presence sensor unit shall utilize K-band microwave technology to detect motion and focused active infrared technology to detect presence, combined in a single housing. Sensor housing shall be mounted on each side of the header.

Presence sensor shall remain active at all times.

The sensor shall communicate with the automatic door operator through a self-monitoring connection that allows the door to go into a fail-safe mode preventing the door from closing in the event of a sensor failure.

OPERATING CONDITIONS

- Climatic Conditions:** All automatic sliding door system components shall operate between -31 degrees F and +130 degrees F (-35° C to 54.44° C) in all climatic conditions.

ELECTRICAL

- Power Requirements:** Self-detecting line voltage capable control. 120 VAC through 240 VAC, 50/60 Hz, 3amp minimum incoming power with solid earth ground connection for each door system.

REQUIREMENTS FOR WORK SPECIFIED IN OTHER SECTIONS

- Electrical:** The Electrical Contractor shall furnish and install all wiring to the operator. Provide 120VAC, 60 HZ, 1 phase, 15amp service to each operator header on a separate dedicated circuit routed into the header.

PART III – EXECUTION

INSTALLATION

- Comply with manufacturer's specifications and recommendations for the installation of doors and frames and operators, using only factory trained personnel.
- The automatic door installer must examine the areas and conditions under which the automatic entrances are to be installed and notify the General Contractor in writing of conditions detrimental to the proper functioning of the entrance and the timely completion of the work. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to the installer.
- Set units plumb, level and true in line, without warp or rack of frames or doors. Anchor securely in place. Separate aluminum and other corrodible metal surfaces from sources of corrosion or electrolytic action at points of contact with other materials with a bituminous coating of approximately 30-mil dry film thickness or other suitable permanent separator.
- The installer shall work with the General Contractor to coordinate all details pertinent to the installation. Complete manufacturer's drawings and details shall be furnished for the installation of the equipment. Final connections and tune in shall be made by the installer and the automatic entrances shall be left in a satisfactory operating condition.
- Set sill members and other members in a bed of sealant, with joint fillers or gaskets to provide weathertight construction. Comply with requirements specified in division 7 Section "Joint Sealants" to provide a weather tight installation.
- Apply signage on both sides of each door and sidelite as required by ANSI/BHMA A156.10 and manufacturers installation instructions.

ADJUSTING

- Adjust door operators, controls and hardware for smooth and safe operation and for weather tight closure. Adjust doors in compliance with ANSI/BHMA A156.10.

FIELD QUALITY CONTROL

- Before placing doors into operation, AAADM certified technician shall inspect and approve doors for compliance with ANSI/BHMA A156.10. Certified technician shall be approved by the manufacturer.

INSTRUCTION

- Following the installation and final adjustments, the installer shall fully instruct the facility manager as to correct operating procedure and safety requirements of the sliding door package.

FINAL CLEANUP

- After installation and adjustment for smooth, reliable operation, clean the door package and remove all surplus material, equipment and debris incidental to this work.

END OF SECTION

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PART I – GENERAL**WORK SPECIFIED HEREIN**

- All labor, materials, equipment, services and transportation required to furnish hardware as indicated or specified, and in compliance with Barrier Free Accessibility Guidelines. **This is a Required Account.**

SUBMITTALS

- Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.
- Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

GENERAL REQUIREMENTS

- The Contractors shall be responsible for arranging his work and issuing his purchase order to facilitate securing delivery of all hardware, etc., so all work shall progress without delay or interruption.
- Upon delivery of the finish hardware to the job site, check in and sign for all material delivered and thereafter be responsible for same.
- Provide a room with sufficient space and shelving in which to lock and arrange the finish hardware. This room shall be locked with a lock furnished for this project. Protect hardware from damage at all times, both prior to and after installation.
- Tab and turn all keys over to the Owner upon completion of the work.

SPECIFIC REQUIREMENTS

- While the following hardware schedule (list) is intended to cover all doors and establish a type and standard of quality, where the size and shape of members to be equipped with hardware prevents or makes unsuitable the use of exact types specified, furnish suitable types having as nearly as practicable the same operation, function, style, and quality as that specified. Sizes shall in all instances be adequate for the service to which the individual items of hardware will be subjected in the course of normal usage. It shall be the specific duty and responsibility of the finish hardware supplier to examine the Specifications, Drawings, and details, and furnish the proper hardware for all openings, whether listed or not. **If there are any omissions in the hardware groups in regard to regular doors, they shall be called to the attention of the Professional of Record for instructions, prior to bid opening; otherwise, the list will be considered complete. No extras will be allowed.**

WORK SPECIFIED ELSEWHERE

- *Installation of Hardware.*
- *Hardware for the following items will be furnished under other Sections of these Specifications.*
- *Casework.*

- *Thresholds not listed in the hardware list.*
- *Hardware for aluminum doors, except as listed in the hardware list.*
- *Toilet compartments.*

SUPPLIER

- Per a National Account Agreement, all material in this section shall be purchased by the General Contractor from National Vendor, see drawing A0.1.

DELIVERY

- Package each item of hardware in original and individual containers, complete with all necessary fastenings, keys, instructions, and templates for spotting mortising tools. Mark each container with its item number corresponding to the item number on the finish hardware schedule. **Containers holding keyed locks and cylinders shall show the following: heading number, door number, hand of door (when required) and keying symbol; all corresponding to that shown on the finish hardware schedule.**

TEMPLATES

- The finish hardware supplier, upon receipt of reviewed finish hardware schedule, shall send an approved schedule along with a complete template list for all items requiring template information to the hollow metal manufacturer, aluminum door and frame supplier, or any other supplier requiring this information.
- When hardware must be installed at the factory, the hardware supplier shall send all such needed items to the respective supplier for their use in installation. The cost of this shipping requirement shall be borne by the hardware supplier.

TEMPLATE HARDWARE

- All hardware supplied to metal doors or jambs shall be made to template and secured by machine screws. Where cylindrical locks are used in hollow metal doors, the door manufacturer shall furnish lock reinforcing in the door at the time of manufacture.

FASTENINGS

- Furnish finish hardware with all necessary screws, bolts, or other fastenings of suitable size and type to anchor the hardware in position for heavy use and long life, and to harmonize with the hardware as to material and finish. Furnish fastenings where necessary with expansion shields, sex bolts, toggle bolts, and other approved anchors according to the material to which it is applied, and as recommended by the manufacturer. Furnish hardware fastened to concrete with machine screws and tap-ins. Fasteners for closers on wood or mineral core doors shall be sex bolts.

PART II – PRODUCTS**BUTTS**

All exterior out-swinging doors shall have butts with non-removable pin when the door is closed. Doors with closers shall have ball bearing butts.

- Doors 45 mm (1-3/4") thick and up to 1016 mm (40") wide to have 114 mm (4-1/2") butts.
- Doors 45 mm (1-3/4") thick; 1041 to 1220 mm (41" to 48") wide to have 125 mm (5") butts.
- All butts shall be sized in width to clear all trim.
- Manufacturer: All butts shall be type, size and manufacturer as listed on drawings.

LOCKS AND LATCHES

- Manufacturer: All locks shall be type and function as listed on drawings.
- All locks shall have 7-pin removable core cylinders. All lock and latchsets to have 70 mm (2-3/4") backset unless otherwise noted.
- Strikes shall be extended lips where required to protect trim from being marred by latch bolt. Wrought boxes shall be furnished with all strikes.

KEYS AND KEYING CORES

- All cylinders for this project to set to a new master key system.
- All cylinders to be constructed master keyed with **GREEN** temporary construction cores prior to delivery to job site; any others will be removed and replaced immediately.
- Master key sets and individual keying of locks will be determined by PETSMART.
- Furnish: 4 each construction master keys to be delivered with locksets to contractor.
- All grand master, master and change keys shall be properly tagged for easy identification and delivered to an authorized recipient as directed by PETSMART.

PUSH PLATES, PULL PLATES, KICK PLATES, CLOSERS, STOPS, THRESHOLDS, SWEEPS, WEATHERSTRIPPING, FLUSH BOLTS, ASTRAGALS AND DOOR VIEWERS

All shall be type, size and manufacturer as listed on drawings.

SIGNS

- All signs shall conform to Federal ADA Requirements. Mount all signs per ADA Requirements on wall adjacent to door servicing room. Base manufacturer: Hager (HA). No metal - plastic only. ("Employees Only" and "Emergency Exit Only" signs shall be mounted on doors at 1524 mm (60") A.F.F. centerline.) Characters

and symbols shall contrast with their background, white characters on a black background.

EXIT DEVICES

- All exit devices shall be type, size and manufacturer as listed on drawings.

INSPECTION

- The General Contractor shall visually inspect the installation of all hardware at completion of all such installations. He shall note all discrepancies or errors in installation and operation to the Professional of Record. Upon completion and before final inspection, the General Contractor shall certify to the Professional of Record that all hardware is properly installed according to the manufacturer's printed instructions, and is working properly. Forward letter of certification in duplicate to the Professional of Record as soon as possible after installation of all hardware.

WARRANTY

- Materials are to have a two (2) year manufacturer's warranty.
- Installation contractor shall not do anything to void the manufacturer's warranty.
- The installation contractor shall warranty the installation of finish hardware to be properly operational for a period of two (2) years.

END OF SECTION

PART I – GENERAL**WORK SPECIFIED HEREIN**

- All labor, materials, equipment and services necessary to provide the glass and glazing and related items as indicated or specified.

SUBMITTALS

- Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.
- Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

QUALITY ASSURANCE

- All work under this section shall conform to National Building Code; and to local code requirements. In case of conflict the more stringent requirements shall apply.
- Specification is based on products as manufactured by PPG Industries, Pittsburgh, PA. Glass products by other manufacturers may be submitted for approval by the Professional of Record subject to their meeting specification performance requirements.

PERFORMANCE REQUIREMENTS

- Insure that all materials comply with the requirements and is intended for the applications shown.
- Water tight and airtight installation of each piece of glass is required. Each installation must withstand normal temperature changes, wind loading, impact loading (for operating doors) without failure of any kind including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glazing materials and other defects in the work.
- Protect glass from edge damage at all times during handling, installation and operation of the building. Glass breakage during the guarantee period will be considered a form of faulty material or workmanship (resulting from edge damage) unless known to result from vandalism or other causes not related to materials and workmanship.
- Glazing channel dimensions as shown are intended to provide for necessary minimum bite on the glass, minimum edge clearance and adequate sealant thicknesses, with reasonable tolerance. The glazer is responsible for correct glass size for each opening, within the tolerances and necessary dimensions established.
- Examine the framing or glazing channel surfaces, backing, removable stop design, and the conditions under which the glazing is to be performed, and notify the Contractor in writing of any conditions detrimental to the proper and timely completion of the work. Do not proceed with glazing until unsatisfactory conditions have been corrected in a manner acceptable.

PART II – PRODUCTS**MATERIALS**

- *Glass Types:* All glass types are as scheduled on drawings. Exterior storefront performance glass shall be tempered glass units complying with CAN/CGSB-12.8. Performance glass units shall be manufactured with low-E performance coating, complying with CAN/CGSB-12.10, applied to Surface #2. Refer to Material and Products Schedule on Drawings for additional information.
- *Interior Glass:* 6 mm and 13 mm thick fully tempered glass complying with CAN/CGSB-12.1, Type 2, Class B, Category II, and ASTM C-1048. Permanently etch each light with manufacturer's name and his compliance with ANSI Z-97.1. Clear or as indicated. Provide one-way view, glass conforming with CAN/CGSB-12.6-M91, as indicated on plans.
- *Interior Glazing Compound:* complying with CAN/CGSB-19.2, Polymerized Butyl Rubber and inert Fillers (pigments), solvent based with minimum 75% solids, non-sag consistency, tack-free time of 24 hours or less, paintable non-staining.
- *Setting Blocks:* Neoprene, EPDM, or other resilient blocks of 85 shore A durometer hardness, minimum length 100 mm (4").
- *Exterior Glazing Compound:* Conforming to ASTM C290, Type S, Grade NS, Use G.
- *Butt Glazing Sealant:* GE SCS1200 Silicone Sealant, complying with CAN/CGSB-13-M, and ASTM C90.

PART III – EXECUTION**INSTALLATION**

- Comply with combined recommendations of glass manufacturer and manufacturer of sealants and other materials used in glazing, except where more stringent requirements are shown or specified, and except where manufacturer's technical representatives direct otherwise.
- Clean the glazing, channel, or other framing members to receive glass, immediately before glazing. Remove coatings, which are not firmly bonded to the substrate.
- Do not attempt to cut, seam, nip or abrade glass, which is tempered or heat strengthened.
- Comply with "Glazing Manual" by FGMA, except as shown, and specified otherwise by the manufacturers of the glass and glazing material.
- Inspect each piece of glass immediately before installation, and eliminate pieces having observable edge damage or face imperfections.
- Install setting blocks of proper size at quarter points of sill rabbet. Set blocks in this course of the heel-head compound, if any.
- Provide spacers inside and out, and of proper size and spacing, for all glaze sizes larger than 127 mm (50 united inches). Provide 3 mm

(1/8") minimum bite of spacers on glass, and use thickness equal to sealant width.

- At butt glazing; ground edges, provide 3 mm (1/8"), $\pm$ 1.5 mm (1/16") space and fill with clear silicone sealant.
- Unify appearance of each series of lights by setting each piece to match others as nearly as possible. Inspect each piece and set with pattern, draw and bow oriented in the same direction as other piece.
- Miter cut and bond ends together at corners where gaskets are used for channel glazing, so that gaskets will not pull away from corners and result in voids or leaks in the glazing system.
- Protect exterior glass from breakage immediately upon installation, by attachment of crossed streamers to framing held away from glass. Do not apply markers of any type to surfaces of glass.
- Remove and replace glass which is broken, chipped, cracked, abraded or damaged in any other way during the construction period, including natural causes, accidents and vandalism.
- Final installation must be completely weather tight and clean both inside and out.

END OF SECTION

PART I – GENERAL**WORK SPECIFIED HEREIN**

- All labor, material, equipment and services necessary to furnish and install all the gypsum wallboard finish complete with related metal components and accessories and finish surfaces as indicated or specified.

SUBMITTALS

- Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.
- Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

QUALITY ASSURANCE

- Manufacturers: Wallboard components shall be furnished as a part of a single system, whether it be supplied by one or several manufacturers.
- Refer to Materials and Product Schedule for additional information.
- Samples: Provide sample of texture finishes for PETSMART's approval.

PRODUCT DELIVERY, STORAGE AND HANDLING

Deliver wallboard materials in manufacturer's unopened containers, packages or bundles identified with manufacturer's name, brand, type and grade. Store inside in dry areas and protect from dampness and deterioration. Protect redi-mixed products from freezing and protect metal accessories from rusting. Remove damaged or deteriorated materials from the premises.

Deliver fire-rated materials bearing testing agency label and required fire classification number.

JOB CONDITIONS

- *Temperature and Humidity Conditions:* Do not install wallboard unless installation areas comply with the minimum temperature and ventilation requirements recommended by the manufacturer.
- *Protection:* Protect work installed by other trades previous to work under this section. Replace any work damaged without added cost to the Owner.
- Provide closures for exterior openings, where required. Room temperature during installation of wallboard shall not be less than 50° F., with adequate ventilation maintained to eliminate excessive moisture until joint compound is completely dry. Protect wallboard from wetting, and replace any damaged material.
- Provide ventilation during the following adhesives and joint treatment applications. Use temporary air circulators in enclosed areas lacking natural ventilation. Under slow drying conditions, allow additional

drying time between coats of joint treatment. Protect installed materials from drafts during hot, dry weather.

PART II – PRODUCTS**GYPSUM WALLBOARD**

- *Regular Wallboard:* ASTM C-36; 15.9 mm (5/8") thickness, tapered edge.
- *Fire Rated Wallboard:* ASTM C-36, Type X; 12.7 mm (1/2") & 16 mm (5/8") thickness, tapered edge.
- *Water-Resistant Wallboard:* ASTM C-1396, Grade Type X, 15.9 mm (5/8") thickness, tapered edge.
- *Exterior Wallboard as E.I.F.S. substrate:* ASTM C1177, Type II, Grade W, Class 2, ASTM C-79, exterior grade gypsum sheathing 15.9 mm (5/8") thick, Type 'X', moisture resistant (M.R.).
- *Exterior Ceiling:* Canadian Gypsum Company (CGC) exterior gypsum ceiling board, 15.9 mm (5/8") thickness, or conforming to ASTM C-931.

WALLBOARD ACCESSORIES

Corner Bead Reinforcement: ANS CB 114 X 114.

Metal Edge Reinforcement: ANS L 12 or L 58; or ANS U 12 or U 58.

Control Joint: Canadian Gypsum Company (CGC), No. 093

FASTENERS

Nails: Annular ring shank nail, GWB-54, ASTM C-514, 32 mm (1-1/4") for 12.7 mm (1/2") wallboard, 35 mm (1-3/8") for 15.9 mm (5/8") wallboard; or smooth shank nail, 35 mm (1-3/8") for wallboard, 38 mm (1-1/2") for 15.9 mm (5/8") wallboard.

Screws: Self-drilling, self tapping, bugle head, for use with power driven tool. Type S for application to light gauge metal framing, minimum 25 mm (1"), Type 12 for application to heavy gauge metal framing (ASTM C-646); Type W for application to wood framing, minimum 38 mm (1-1/2") (single layer) 41 mm (1-5/8") (double layer); (ASTM C-894); Type G for wallboard to wallboard application, minimum 38 mm (1-1/2") (ASTM C-893) at lead lined wallboard provide lead tabs at screws.

LAMINATING ADHESIVES

- *Wallboard to Wood or Metal Framing:* Canadian Gypsum Company (CGC) Durabond 200 or 300; or conforming to ASTM C-557 for wood framing.
- *Wallboard-to-Wallboard:* Canadian Gypsum Company (CGC) SHEETROCK All Purpose Joint Compound Ready-Mixed.
- *Wallboard to Coreboard or Sound Deadening Boards:* Canadian Gypsum Company (CGC) SHEETROCK All Purpose Joint Compound Ready-Mixed.
- *Wallboard to Concrete or Masonry:* Canadian Gypsum Company (CGC) SHEETROCK All Purpose Joint Compound Ready-Mixed.

SUSPENDED CEILING COMPONENTS

- *Furring Channels:* Type DWC as manufactured by Canadian Gypsum Company (CGC), or rigid furring channels conforming to ASTM C-645.
- *Main Runner Channels:* Cold rolled sections, 38 mm (1-1/2"), formed of 1.5 mm (16 gauge) metal core thickness steel, painted with rust-inhibiting paint.
- *Hanger Wires:* Sizes specified, double annealed and galvanized, conforming to ASTM A641 Class1.
- *Steel Stud Framing:* Per ASTM C645, galvanized, 0.84 mm (0.0329 inch) minimum metal core thickness, depth as indicated on the drawings.

WALLS AND PARTITION FRAMING

- *General:* Comply with ASTM C754 and the following:
- *Steel Studs and Runners:* Per ASTM C645, 0.84 mm (16 gauge) metal core thickness, unless otherwise indicated, hot dipped galvanized, depth as indicated on drawings.
- *Steel Rigid Furring Channels:* Per ASTM C645, 0.84 mm (16 gauge, 7/8 inch) depth, hot dipped galvanized.
- *Slotted Ceiling Tracks:* 1.5 mm (16 gauge) metal core thickness, galvanized with slotted holes in the flanges and pop-up tabs in the web.

FINISHING MATERIALS

Joint treatment system shall be Perf-A-Tape joint system consisting of:

- Perf-A-Tape reinforcement tape.
- Perf-A-Tape all purpose ready mixed compound for embedding, fill and finishing.

SEALANTS

Sealant (non-acoustical) shall be as specified under Section 07900 of these Specifications.

Acoustical Sealant: Refer to Materials and Product Schedule for additional information.

SOUND ATTENUATION INSULATION

Sound Attenuation Blankets shall be noise barrier batts, Type 1, foil faced or unfaced 89 mm (3-1/2") thick. Refer to Materials and Product Schedule for additional information.

PART III – EXECUTION**INSTALLATION - SUSPENDED CEILINGS**

- Except where otherwise indicated, provide 38 mm (1-1/2") main runner channels spaced on 1220 mm (4 foot) centers and metal furring channels spaced on not over 406 mm (16") centers. Neither main runners nor cross furring shall be let into nor come in contact

with abutting masonry walls or partitions. Locate a main runner within 150 mm (6") of the wall to support the ends of the furring channels, and located hangers to support the ends of the main runners.

- Where main runners or furring channels are spliced, overlap the ends not less than 204 mm (8") and securely tie near each end of the splice with 2 loops of 1.5 mm (16 gauge) galvanized wire.
- Suspend main runners from structure above with one No. 9 hanger wire for each 1.1 m² (12 square feet) of ceiling area. All wire hangers shall be of such length so that the lower ends may be saddletied or wrapped around the main runners so as to prevent turning or twisting of the runners.
- At steel beams, joists or other steel construction wrap hangers around, inset through, or clip or bolt to the supports, so as to develop the full strength of the hangers.
- For wood construction inset wire hangers in holes drilled a minimum of 75 mm (3") above bottom of joists and with the upper end of the hangers to 3-12d nails, driven on a downward slant into sides of joists allowing minimum 32 mm (1-1/4") penetration into the wood, driving nails at least 125 (5") from bottom edges and not over 915 mm (36") o.c. with the upper end of the hanger in each case twisted 3 times around itself, or use 114 mm (4 1-1/2") No. 9 gauge wire staples to secure hangers to the sides of the joists, driving staples horizontally or on a downward slant, 3 near the upper edge of the loop and the fourth to fasten the loose end.
- Securely clip metal furring channels to main runners using furring channel clips or saddletie with 2 strands of 1.5 mm (16 gauge) tie wire. Install furring channel clips on alternate sides of the main runner channel.
- At lights or other openings that interrupt the main runner or furring channels reinforce grillage with 19 mm (3/4") cold rolled channels, wire tied atop and paralleled to the main runner channels.
- Apply wallboard with long dimension at right angles to the furring channels, with all abutting ends and edges occurring over the web surface of the furring channel. Use wallboard of maximum possible length to minimize end joints. Neatly fit and stagger end joints. Install wallboard with 41 mm (1-5/8") screws spaced 204 mm (8") o.c. in the field of the board, at all bearings, and along abutting edges. Install control joints as specified below for walls.

INSTALLATION - WALLS

- **Apply wallboard with long dimension at right angles to framing or furring members** with all abutting ends and edges occurring over stud flanges. Use wallboard of the maximum practical length to minimize end joints. Neatly fit and stagger end joints. Arrange joints on opposite sides of the partition as to occur on different studs. Cut wallboard neatly to fit around all openings. Wallboard to extend to within 6 mm (1/4") off the floor. (No Exceptions)

- Whenever wallboard terminates against dissimilar materials or where edges of wallboard are exposed, provide continuous caulking and install metal edge reinforcement as specified. At all outside corners install metal corner bead reinforcement as specified.
- At metal studs apply wallboard using screws spaced a maximum of 300 mm (12") o.c. in the field of the board and 300 mm (12") on center along the abutting end joints; 204 mm (8") o.c. at rated walls.
- At wood framing apply wallboard with double nailing method. Apply first nails spaced 300 mm (12") o.c. with the second nail in close proximity (2") installed after first nails are in place. Nails shall not be staggered on adjoining edges or ends. While the nails are being driven, hold the wallboard in firm contact with the underlying support. Nail from central portion of the wallboard toward ends and edges. Nails shall be driven home with the heads slightly below the surface of the wallboard, in a dimple form by the driving tool stubbing the last blow. A nail set shall not be used and care shall be taken to avoid breaking the paper face.
- At double stud partitions, such as at chases, install strips of wallboard 300 mm (12") wide and of length to span the partition depth by screwing to the webs of opposing studs. Space strips approximately 1 070 mm (42") o.c.
- Provide perimeter relief where non-load-bearing wallboard partitions abut structural decks or ceilings of vertical structural elements. Allow 50 mm (2") gap between wallboard and structure. Finish edges of wallboard face layer with square-nose metal casing head and caulk space between casing bead and structure with continuous sealant bead. Attach wallboard to studs not less than 13 mm (1/2") below bottom edge of ceiling track flanges and to first stud adjacent to vertical tracks. Do not attach wallboard directly to tracks.
- Where wallboard partitions intersect masonry walls, provide control joint no less than 6 mm (1/4"); nor more than 10 mm (3/8") wide between wallboard and masonry. Finish exposed edges of wallboard with square-nose metal casing bead and caulk space between casing bead and masonry with continuous sealant bead.
- Install exterior ceiling board allowing 105 mm (1/16") to 3 mm (1/8") space between butt ends of board. Fasten to supports with screws spaced 300 mm (12") o.c. or nails spaced 8" o.c. For metal framing use 1" Type S screws. For wood framing use 6 mm (1/4") Type W Screws or 38 mm (1-1/2") galvanized box or aluminum nails. Conceal panel joints by installing panels with ends installed into aluminum H moldings. Fasten H moldings to support with screws spaced 300 mm (12") o.c. or nails spaced 204 mm (8") o.c.
- At areas of lead lined wallboard, provide minimum 0.75 mm (1/32") sheeting at all recess to fully enclose recessed equipment.
- Sound blankets shall be pressed firmly in place against back of gypsum board and stapled. Staples and method of installation shall be in accordance with manufacturer's instructions. An air space shall be maintained between blankets and back surface of one partition face.
- Continuity of blankets shall be maintained. Use full-length strips where possible.
- This contractor shall consult and cooperate with tradesmen whose w/o precedes and follows sound blanket installation to permit the orderly and expeditious procedure in executing work of this Section.
- Upon completion, and at times when other contractors are covering work, correct loose, sagged or damaged work.

FINISHING

- Reinforce wall and ceiling angles and inside vertical corner angles with tape folded to conform to the adjoining surface and to form a straight, true angle.
- Apply a thin uniform layer of compound, approximately 75 mm (3") wide, under and over the tape in the angle joint to be reinforced. Center tape over all joints to be reinforced and seal into the compound, leaving sufficient compound under the tape to provide proper bond. Apply a skim coat of compound immediately after embedding tape. Clean excess compound from the wallboard surface. After drying, cover embedding compounds with an additional coat of compound.
- Allow joints to dry thoroughly (minimum of 24 hours) between each application of compound.
- All joints shall have tape embedded, filled and finished using specified compound.
- Cover fill coat with compound spread evenly over and slightly beyond the tapered edge of the board, feathered at the edges, with a smooth uniform slight crown over the joint. All dimples at fastener heads shall receive 3 coats of compound in succession as used in joints.
- Conceal flanges of all metal corner and edge reinforcing by at least 2 coats of compound. When completed, the compound shall extend approximately 204 mm (8") to 250 mm (10") on either side of the exposed metal nosing.
- Sand all coats as necessary after each application of compound has dried. The final coat and subsequent sanding shall leave all wallboard and treated areas uniformly smooth and ready to receive decoration, to the extent that after painting of wallboard there shall be no distinguishable difference in appearance between taped and untapped surface.

INSTALLATION - SOUND ATTENUATION BLANKETS

- Place sealant under track. Install acoustical insulation in between studs. Stagger wallboard joints.

END OF SECTION

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PART I – GENERAL**WORK SPECIFIED HEREIN**

- Furnish all labor, materials, tools and equipment required for completing ceramic tile work and related items indicated on the drawings and herein specified. **This is a Required Vendor.**

SUPPLIER

- Per a Required Vendor Agreement, all material in this section shall be purchased by the General Contractor. See Required Vendor List on Drawing A0.1 for additional account information.

SUBMITTALS

- Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.
- Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

QUALITY ASSURANCE

- Source of materials: Provide materials obtained from one source for each type and color of tile, grout and setting materials.
- All ceramic tile shall be installed by a trained installer and approved by the product manufacturer.
- Work shall be executed and tested in accordance with current editions of ANSI A108 ("Installation of Ceramic Tile"), ANSI A118.4 ("Specifications for Latex-Portland Cement Mortar") and Terrazzo, Tile and Marble Association of Canada (TTMAC), "09300, Tile Specification Guide", and "Installation Manual"

PRODUCT HANDLING

- Deliver to job site and store packaged material in original containers with labels intact. Prevent damage to materials by water, freezing or other causes.

PROJECT CONDITIONS

- Maintain temperatures at not less than 10°C in tiled areas during installation and for 7 days after completion unless higher temperatures are required by manufacturer's instructions.
- Store all materials off the ground under watertight cover and away from sweating walls and other damp surfaces until ready for use. All rooms, subfloors, tiles and adhesives shall be maintained at a minimum temperature of 21°C for at least 48 hours before commencing work. Temperature shall be maintained during installation and for at least 48 hours after completion.
- Protect finished work installed by other trades prior to work under this section. Any work damaged by workmen of this trade shall be replaced without cost to the Owner.

- Vent temporary heaters (if required) to exterior to avoid carbon dioxide damage to new tilework.

EXTRA MATERIAL

- Provide one (1) unopened case of each type and color used.

PART II – PRODUCTS**MATERIALS**

- Glazed Wall Tile (CT-1): Furnished in a 152 mm (6") x 610 mm (24") size. Refer to materials and product schedule for additional information.
- Glazed Wall Tile (CT-3):): Furnished in a 305 mm (12") x 305 mm (12") size. Refer to materials and product schedule for additional information.

SETTING MATERIALS

- Sanded Acrylic Portland Cement Mortar: Premium Blend thin-set mortar consisting of portland cement, sand and acrylic mortar admixture. Refer to materials and product schedule for additional information.

GROUTING MATERIAL

- Sanded Portland Cement Grout: Standard epoxy grout. Refer to materials and product schedule for additional information.

SEALANT

- Floor to Base Sealant: Sikaflex acrylic sealant in a color to match grout color.
- Tile to Wall: Sikaflex

CLEANER

- Tile and Grout Cleaner: Tile & Grout Cleaner as recommended by tile manufacturer.
- Acid based cleaning products are prohibited.

SEALER

- Grout Sealer: Penetrating Grout Release Sealer, water based, as recommended by grout manufacturer.

PART III – EXECUTION**PREPARATION**

- Before tile installation begins, substrate surfaces shall not show variations in excess of 3 mm (1/8") in 2 440 mm (8 ft).
- Substrate shall be free of oils, waxes, sealers and other substances that will adversely affect tile work. Etch or roughen as necessary.
- Substrate shall be wet-mop clean and completely dry before installation of tile begins.

- Do not proceed in areas of discrepancy until substrates are properly repaired.

INSTALLATION OF TILE

- Concrete Base: All floor tile to be installed over a base material consisting of concrete shall be installed by the thin-set mortar bed method. Thin-set mortar shall be mixed thoroughly and applied in strict accordance with manufacturer's printed instruction. Minimum thickness of setting bed shall be 3 mm (1/8"). Install with best practice of the trade in accordance with the procedure set forth in the Installation Manual current edition, published by Terrazzo, Tile and Marble Association of Canada (TTMAC), "Installation Manual"
- Water proofing and anti-fracture membrane products shall be applied on concrete slab under the thin-set mortar.
- Lay tile with smooth transition to floor drains with no raised edges.
- Ceramic wall tile and base shall be installed per Terrazzo, Tile and Marble Association of Canada (TTMAC), "Installation Manual" for Dry Set Mortar.
- Grout: Force grout into joints, avoiding air traps or voids, strike or tool joints of tile to depth of cushion. Remove excess grout, check for gaps or air holes.

WORKMANSHIP

- Work: Performed by qualified workmen in a manner conforming to best current practice of the trade.
- Cut and drill where necessary, without marring tile. Grind and carefully joint any cut edges against other work.
- Remove loose mortar, laitance or materials detrimental to bond before applying setting beds.
- Carefully lay out work to ensure straight joints of uniform width. Avoid tile cut less than half size, unless specifically approved by Owner's Representative.

CLEANING AND PROTECTION

- At completion of installation, thoroughly clean all surfaces. Use of acid will not be permitted. Use clean water in initial cleaning. Remove all stains, mortar, etc.
- Before traffic is permitted over finished tile floors, cover with waterproof building paper with all joints taped.
- Remove crooked, broken or damaged tile; replace with new before completion of building.

END OF SECTION

PART I – GENERAL**WORK SPECIFIED HEREIN**

- All labor, materials, equipment and services necessary to furnish and install the acoustical treatment and related items as indicated or specified.

SUBMITTALS

- Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.
- Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

COORDINATION

- Coordinate work with mechanical and electrical trades to incorporate ceiling light fixtures and air outlets into the ceiling layout.

PRODUCT DELIVERY, STORAGE AND HANDLING

- Store materials off the ground under watertight cover and away from sweating walls and other damp surfaces until ready for use. Remove damaged or deteriorated materials from the premises.

Provide the Owner with one (1) unopened case each of extra stock of each panel.

PROTECTIONS

- Protect finished work installed by other trades previous to acoustical treatment.

PART II – PRODUCTS**ACOUSTICAL MATERIALS**

- All units shall conform to ASTM E1264.
- Surface burning properties, all types: Flame spread of 25 or less and smoke developed of 50 or less when tested in accordance with CAN/ULC S102, substantiated by ULC labels on materials supplied.

LAY-IN UNITS

- Pattern: Refer to Materials and Product Schedule for additional information
- Finish: *Factory white paint.*
- Size: 610mm(24")x610mm(48") x16mm(5/8")
- Light Reflectance: *LR-1 (over 75%) (White Only)*
- NRC: .50 - .60
- STC: 35 - 39

SPECIAL LAY-IN UNITS

- Type: Refer to Materials and Product Schedule for additional information
- Finish: *0.0508 mm (2 mil) thick, white vinyl facing in stipple pattern.*

- Size: 610mm(24")x610mm(48") x13mm(1/2")
- STC: 45-49

SUSPENSION SYSTEMS (GENERAL)

- All main runners shall conform to the Intermediate Duty classification of ASTM C-635.

Exposed Grid Systems: Refer to Materials and Product Schedule for additional information

Finish: White factory applied paint finish.

Materials: Steel

EXPOSED GRID

- 610 mm (2') X 1220 mm (4') square grid pattern where indicated - See *Plans.*
- All locking cross tees supporting other cross tees shall conform to the same classification as the main runners.
- Main runners and cross tees shall be of cold rolled painted steel with finish as specified.
- Angles:* Wall angle moldings shall be of cold rolled painted steel with finish as specified.

LIGHT FIXTURE INTEGRATION

- Lighting fixture types and locations require the normal grid spacing to be interrupted. Light fixtures are specified in the electrical section of the specifications. Provide all necessary materials, special fabrication, etc., necessary to proper spacing and installation of lighting fixtures.

PART III – EXECUTION**INSTALLATION**

- General:* Furnish and install acoustical materials and suspension systems of the types, sizes and designs as specified herein and noted. Install ceiling suspension systems requiring seismic restraint in accordance with ASTM E580 and applicable Building Code requirements.
- Preparation of Work:* Building shall be examined before beginning work to determine that it is properly enclosed and the structure is in proper condition to receive acoustical materials as specified. Installation of acoustical material shall not be made when the building is excessively cold and damp or hot and dry.
- Temperature and Humidity:* Conditions closely approximating the interior conditions, which will exist, when the building is occupied shall be maintained before, during and after installation of ceiling materials. Area shall be broom cleaned and uninterrupted for free movement of scaffolding. Scaffolding shall be a type that will not scar or mar floor surfaces and will not damage other construction. Work not to proceed until satisfactory conditions described above preside.

- *Inspection:* Inspection locations to receive work and check existing dimensions. Ascertain before proceeding with work, that all required inspections have been made. Commencement of work constitutes acceptance of responsibility related to guarantee requirements.
- *Coordination:* Be responsible for coordination and compatibility of the acoustical ceiling treatment, suspension system, and air distribution as specified in this section and indicated. Coordinate work with mechanical and electrical trades to ensure proper compatibility and interfacing of their related spheres of responsibility.

EXPOSED GRID

- Install the ceiling suspension system per the recommendations of ASTM C-636 and UBC Standard 47-18. Loading of any component may not cause deflection of more than 1/360 of the span.
- Where ductwork prevents proper hanger wire spacing, provide uni-strut trapeze supports as required. Hanger wires shall not penetrate or be suspended from ductwork or roof deck.
- Provide additional hanger wires at applied beam ceilings as required by support for additional weight.
- Install main runners 1220 mm (48") o.c., and directly suspend by not less than 12 gauge galvanized steel wire (pre-stretched) spaced 1220 mm (48") o.c. along the main runners.
- Interconnect main runners by locking cross tees 1220 mm (48") long to form 610 mm (24") x 1220 mm (48") modules. Install proper length locking cross tees adjacent to all side of recessed light fixtures not supported by a main runner.
- Hanger wires shall be wrapped tightly at least 3 full turns.
- Fully lock all grid members together including stabilizers bars and structural attachments capable of support required loads.
- Trapeze around obstructions and level accurately.
- No vertical hanger wire shall be more than 25 mm (1") in 150 mm (6") out of plum without a counter-splayed wire. Splay wires to be taut, not causing ceiling uplift (note: do not penetrate ducts) or roof deck.
- Install vertical hanger wire 204 mm (8") from wall to support each runner end at all terminal ends of main and cross runners. At maximum of two adjacent walls, runners may be attached for alignment purposes to wall or wall angle, but not elsewhere.
- Hanger wire shall not be suspended from main roof deck (to avoid deck penetrations) but shall be suspended from the bottom of joists with clip ties as required.
- All splays shall be four No. 12 gauge wire, in line with main runners and cross runners at 45° angle maximum from horizontal plane of ceiling, connected with 50 mm (2 inches) of cross runner or stabilizer bar intersection on main. Locate first splay locations within 1220

mm (4'-0") maximum of all walls. Interior splays shall be maximum of 3 658 mm (12'-0") square feet in both directions.

- Install wall molding wherever suspension components meet vertical surfaces.
- Attach all fixtures positively to grid system.
- Attach hanger wires to grid within 75 mm (3 inches) of all fixture corners at intermediate duty suspension system. Tandem fixtures may utilize common wires.
- Heavy duty suspension systems do not require additional hanger wire attachment to the grid.
- All fixtures over 9 kg (20 pounds), but less than 25 kg(56 pounds) require two slack No. 12 gauge wires at opposite corners directly to the structure with approved hangers.
- Install lay-in units in a clean, neat manner.

CLEANING

- Upon completion of installation of acoustical material and suspension systems, clean dirty or discolored surface of acoustical units and suspension components in accordance with manufacturer's recommendations and leave free from defects. Components that are damaged or improperly installed shall be removed and replaced without additional cost to the Owner.

END OF SECTION

PART I – GENERAL**WORK SPECIFIED HEREIN**

- All labor, materials, equipment and services necessary to provide prefinished wall panel covering and related items as indicated or specified.
- Supplied and installed with millwork package.

DELIVERY, STORAGE AND HANDLING

- Deliver materials in the original package, containers and bundles bearing the name of the manufacturer and the brand. Store all prefinished panels off the ground under watertight cover and away from any damp surfaces until ready for use. Remove any damaged or deteriorated materials from the site.

SUBMITTALS

- The contractor shall prepare all shop drawings, as required to properly coordinate and construct the project.
- The Contractor shall provide shop drawings with the actual field measured dimensions of all walls to be covered by wall panel covering and trim to the Required Vendor at the time an order is placed. The Contractor assumes all responsibility for the dimensions provided in the shop drawings.
- Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

JOB CONDITIONS

- All work herein requires coordination with trades whose work connects with, is affected or concealed by gypsum board. Before proceeding with the work, make certain all required inspections have been made.
- Inspect surfaces to receive the pre-finished panels before starting work and do not start until surfaces are acceptable. Starting work under this Section implies acceptance of surfaces.

PART II – PRODUCTS**MATERIALS:**

- Wall panel covering and accessories shall be rigid vinyl acrylic 1.02mm (.040 inch) nominal thickness, factory finished smooth, color, as indicated on drawings.
- Trim and closure pieces shall be one piece continuous (edges), joint strips, inside and outside corners as required to provide a finished appearance and a water proof installation. All wall panel covering and trim shall be matched for color and texture.
- The wall panel covering and trim accessories shall be purchased from the Required Vendor; and shall be furnished as a complete package system containing all primers and adhesive.

- Primer and adhesive materials shall be water based and non-hazardous.
- The Required Vendor will fabricate the wall panel covering and trim pieces to comply with the requirements of the design, and the dimensions furnished in the shop drawing submittal.
- Refer to Materials and Product Schedule for additional information.

PART III – EXECUTION**INSTALLATION**

- Make preparation to substrate surfaces as required to install panels per the manufacturer's recommendation.
- Apply the adhesive and install the panels and trim per the manufacturer's installation instructions.
- Caulk all seams, edges at walls, curb junctures, penetrations, and corners. Panel installer responsible for all caulking. No button fasteners. Install panels with adhesive as per manufacturer directions.
- Erection techniques shall result in plumb and straight surfaces without waves or buckles, free of unevenness at joints.
- If backing materials are out of alignment, bowed or warped, correct to make true surfaces before application of wall panel covering covers. Use method of correction approved by the Manufacturer. Finished walls shall be made straight, plumb and level without ridges, bows or warps.

WARRANTY

- Materials are to have a 5 year manufacturer's warranty.
- Installation contractor shall not do anything to void the manufacturer's warranty.
- Installation Contractor shall warranty the installation of the system to be water tight for 2 years.

CLEAN - UP

Clean up shall be as per the manufacturer's standards.

DEFECTIVE WORK

All work deemed defective by the Professional of Record shall be corrected as direct by the Professional of Record at no additional cost to the Owner. The following partial list constitutes possible defective work items:

- Non-adhered panels.
- Improperly installed trim.
- Out of plumb and uneven surfaces.
- Damaged panels.

END OF SECTION

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PART I – GENERAL**WORK SPECIFIED HEREIN**

All labor, materials, equipment and services necessary to complete all painting and finishing required for surfaces as indicated or specified. **This is a Required Vendor.**

SUBSTITUTIONS

No substitutions.

SUBMITTALS

Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.

Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

PRODUCT DELIVERY, STORAGE AND HANDLING

It is necessary to contact painters to bid. Painters are then to contact their servicing PPG Dulux to set up a job account. Provide Account Number 9387 to receive special account pricing on the products specified by PETSMART.

Delivery charges are included in the cost of the paint.

Deliver all paint to site in manufacturer's labeled and sealed containers. Labels shall give manufacturer's name, brand, type, batch number, color of paint and instructions for reducing. Thin only in accordance with printed directions of manufacturer.

Store all material used on the job in a single designated space. Such storage place shall be kept clean. Make good any damage to it or to its surroundings. Remove any oily rags, waste, etc., from the building every night and take every precaution to avoid any danger of fire. In no case shall amount of materials stored exceed that permitted by local ordinances, provincial laws, or fire underwriter regulations.

ENVIRONMENTAL CONDITIONS

Do not apply exterior paint in damp, rainy weather or until the surface has dried thoroughly from the effects of such weather. Do not apply varnish or paint when temperature is below 7°C. Avoid painting surfaces when exposed to hot sunlight. All products must comply with local and provincial E.P.A restrictions.

PROTECTION

Before painting, remove hardware, accessories, plates, lighting fixtures and similar items or provide ample protection of such items. On completion of each space, replace above items. Protect adjacent surfaces as required or directed. Any damage done shall be repaired by the painting contractor at his expense. A sufficient supply of clean drop cloths and other protective covering shall be properly distributed and maintained.

Finishing of the following listed items and materials will not be required and shall be protected:

- Stainless steel, brass, bronze, copper, monel, chromium, anodized aluminum; specially finished articles such as porcelain enamel, plastic coated fabrics, and baked enamel.
- Finished products such as ceramic tile, windows, glass, brick, resilient flooring, acoustical tiles (except @ fish sales area) board and metal tees; other architectural features, such as "finish" hardware, furnished in aluminum, bronze or plated ferrous metal, prefinished panels, or other items that are installed prefinished.

COLOR SCHEDULE

Final confirmation of all colors by subcontractor with PETSMART is required prior to installation or application. 1830 mm x 1830 mm (6'x6') on site test samples will be required and must be approved by PETSMART prior to commencing work.

PART II – PRODUCTS**PAINT MATERIALS**

Manufacturer: Refer to Required Vendor List and Materials and Product Schedule for Additional Information.

Basic painting materials such as linseed oil, shellac, turpentine, thinners, driers, etc., shall be highest quality, made by reputable manufacturers as specified, having identifying labels on containers. All paint materials shall be factory fresh.

As part of the list of proposed subcontractors, the painting subcontractor shall indicate the name of the manufacturer whose materials he purposes to use.

PART III – EXECUTION**PREPARATION OF SURFACES****Inspection of surfaces:**

Do not begin painting on any surface until it has been inspected and is in proper condition to receive the paint as specified. Should any surface be found unsuitable to produce a proper paint finish, notify the General Contractor in writing. Apply no material until the unsuitable surfaces have been made satisfactory. After acceptance of surface, by application of first coat of paint, assume responsibility for the rectify any unsatisfactory finish resulting.

If, after treatment, the completed finish (or any portion thereof) blisters, checks, peels, or otherwise shows indication of dampness or other irregular condition of surface the painting contractor shall, at his own expense, remove the applied treatment and refinish the part affected to the satisfaction of PETSMART and/or the Professional of Record. (The painting contractor should determine dryness of all moisture-holding materials by use of a reliable electronic moisture meter.)

Wood:

Sandpaper to smooth and even surface and then dust off. After priming or stain coat has been applied, thoroughly fill all nail holes and other surface imperfections with putty tinted with primer or stain to match wood color. Stand all woodwork between coats to a smooth surface. Cover knots and sap streaks with a thin coat of shellac.

Steel and Iron:

Remove grease, rust and rust scale and touch-up any chipped abraded places on items that have been shop coated. Where steel or iron have a heavy coating of scale, remove descaling, or wire brushing, as necessary, to produce a satisfactory surface for painting. When area will be exposed to view, sandpaper the entire treated area smooth, feather the edge of surrounding undamaged prime coat and spot prime in a manner to eliminate evidence of repair.

Galvanized Metal:

Thoroughly clean by wiping surfaces with surface conditioner and prime with galvanized iron primer as recommended by paint manufacturer.

Concrete and Concrete Masonry:

Prepare surfaces to be painted or stained by removing all concrete spatter, dirt, dust, oil and grease stains and efflorescence. The method of surface preparation shall be left to the discretion of the painter provided the results are satisfactory to the Professional of Record. Before first paint coat or stained coat is applied, spot prime any nails and other exposed metal occurring in the surfaces with an oil-base masonry primer as recommended by paint manufacturer.

Stucco Surfaces:

Fill cracks, holes or imperfections in plaster with patching plaster and smooth off to match adjoining surfaces. Before painting any plaster, surfaces shall be first tested for dryness with moisture testing device. Apply no paint or sealer on plaster when the moisture content exceeds 12% as determined by the testing device. Test sufficient areas in each space and as often as necessary to determine the proper moisture content for painting. If the moisture content is between 8% and 12%, prime with alkali resistance primer. If 8% or less, prime with specified primer. Remove the dry sand deposit from all plaster surfaces by brushing with stiff brush before painting. Test pH of stucco surface prior to painting. If pH level is not in compliance with paint manufacturer's requirement, the entire stuccoed surface is to be primed with alkali resistance primer.

WORKMANSHIP

- Perform all work using only experienced, competent painters in accordance with the best standards of practice in the trade. Hand brush or roll work except where otherwise permitted or directed. When completed, the painting shall represent a first-class workmanlike appearance. Apply all paint materials under adequate illumination.
- Tint all primers and undercoats to approximately the color of the finish coat with each coat being sufficiently different from the work in place to permit easy identification.

- Finish edges, tops and bottoms of all doors the same as door faces. Both sides and all edges of doors to be finished simultaneously.
- Prime coats specified herein will not be required on items delivered with prime or shop coats already applied, unless otherwise specified.
- All exposed water, gas, waste piping, exposed conduits, fire sprinkler piping, lighting panels, telephone terminal boxes and galvanized or insulated ducts, shall be painted in all areas, unless otherwise scheduled.
- Grilles and registers shall be prefinished as called out on Plans.
- Duct throats behind all grilles, registers, louvers, baffles, etc., shall be given one coat of flat black oil paint, wherever visibility of the interior of the ducts allowed.
- Carefully examine the Mechanical and Electrical Drawings and Specifications to determine the amount of exposed work to be painted.

APPLICATION

- Stain or paint only when surfaces are clean, dry, smooth and adequately protected from dampness. Each coat of paint shall be well brushed on, or sprayed and backrolled, worked out evenly and allowed to dry at least 24 hours before the subsequent coat is applied.
- Finished work shall be uniform, of approved color, smooth and free from runs, sags, clogging or excessive flooding. Make edges of a paint adjoining other materials or colors sharp and clean, without overlapping. Where high gloss enamel is used, lightly sand undercoats to obtain a smooth finish coat.
- Each coat of material applied must be inspected and approved by the Professional of Record before the application of the succeeding specified coat; otherwise no credit for the concealed coat will be given, and the contractor shall assume the responsibility to recoat the work in question.
- At completion, touch-up and restore finish where damaged and leave finish surfaces in good condition.

MATERIAL NOT SPECIFIED

Painting Subcontractor shall designate type of paint to be used on each portion of the work not itemized on drawings. Semi-gloss paint finish shall be verified with the PETSMART representative prior to painting on the job if there is a question of intent.

All graphic lines to be applied using "easy-mask" masking tape. All cut lines to be true without overlaps or voids.

Coordinate layout of graphics.

END OF SECTION

PART I – GENERAL**WORK SPECIFIED HEREIN**

- All labor, materials, equipment and services necessary to furnish and install toilet compartments and urinal screens as indicated or specified. **This is a required vendor.**

SUBMITTALS

- Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.
- Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

QUALITY ASSURANCE

- Take field measurements prior to preparation of shop drawings and fabrication to assure proper fitting.
- Provide setting drawings, templates, instructions and directions for installation of anchorage devices.

PRODUCT DELIVERY, STORAGE AND HANDLING

Deliver items in manufacturer's original unopened protective packaging. Store materials in original packaging to prevent soiling, physical damage or wetting. Handle so as to prevent damage to finished surface.

PART II – PRODUCTS**MATERIALS**

- Acceptable manufacturer: Refer to Materials and Product Schedule on drawings for additional information.
- Doors and partition panels shall be 1" thick, sound insulated. Panel plates shall consist of 2 sheets of galvanized/bonderized steel not less than 0.72 mm (22 gauge) for doors, or 0.84 mm (20 gauge) for partitions, and shall have formed edges sealed with a continuous oval crown locking strip. Door edges shall be electrically welded with welds spaced not over 450 mm (18") apart around the entire perimeter. Locking strips on doors and partitions, shall be mitered, welded and finished at the corners; 610 mm (24") wide doors unless noted otherwise.
- Pilasters shall be 32 mm (1-1/4") thick, made of 2 sheets of 1.2 mm (18 gauge) galvanized/bonderized steel welded and finished as specified above. Bottom of pilasters shall have a jack-leveling screw to carry and weight of the compartment and to provide a secure mechanical anchorage to floor with adjustable floor fittings.
- Pilaster connection to the floor shall be concealed with a one piece 75 mm (3") polished type 302 stainless steel shoe.
- Pilasters when set in place shall be securely braced with continuous 25 mm x 38 mm (1" x 1-1/2") lock seam tubular steel overhead bracing attached through the top of the pilaster with metal screws applied through the pilaster into the headrail on the inside of the stall.

Headrail shall extend full length of installation and over end compartments and be fastened into wall brackets. Exposed ends of headrail to be capped. Headrail to be of "anti-grip" type.

- Dividing partitions and pilasters shall be attached to one another and to the walls with stirrup brackets. Trim shall be theft-proof one-way screws or bolts, held in place with concealed anchor clips without the use of exposed fasteners.

HARDWARE AND FITTINGS:

- Top hinge pin shall be secured at 3 points with all door hinge fittings fully flush with face plates of the door.
- Each door shall be equipped with chrome plated cast alloy coat hook and bumper, concealed latch with bolt of stainless steel permitting exterior access, a one-piece chrome plated stop and keeper and concealed controlled power bearing gravity hinge.
- The door shall be adjustable to permit rest position at any angle with 270° arc and the weight at all times shall be carried by a thrust bearing with all moving parts concealed within the door thickness.
- Pilaster hinge brackets shall be factory mounted flush to the pilaster and of zamac alloy.
- *Hardware:* Provide manufacturer's standard design heavy duty operating hardware and accessories, in stainless steel No. 4 bright polish finish.
- *Reinforcing:* Internally reinforce compartment panels where specified toilet accessories are installed through compartment panels.
- *Cutouts:* Provide reinforced cutouts in compartment panels where specified toilet accessories are installed through compartment panels.
- Urinal screens shall be 610 mm (2'-0") long, wall hung and floor supported 25 mm (1") thick made of 2 sheets of 0.84 mm (20 gauge) galvanized/bonderized steel constructed as specified above for partitions. Additionally, both vertical edges are to be supplied with additional reinforcement consisting of a wood core 102 mm (4") wide.
- Provide all necessary blocking as per manufacturer's recommendations.
- Provide stirrup brackets, 2 for each screen, made of heat treated, polished and anodized extruded aluminum alloy. Each stirrup bracket shall be 75 mm (3") long and provided with 4 holes for attachment of screws to the wall and 2 thru-bolts through the screen.
- Use theft-proof or one-way screws or bolts throughout all construction.

FINISH

- Colors are as indicated on drawings.

PART III – EXECUTION**INSTALLATION**

- Install toilet compartments and urinal screens in strict accordance with manufacturer's instructions, of size, and at locations indicated. Erect in a rigid, substantial manner, straight and plumb, and with all horizontal lines level. Clearance at the wall shall be approximately 25 mm (1") for panels and 25 mm (1") for pilasters; not more than 13 mm (1/2") between pilasters and panels. All evidence of drilling cutting and fitting to room finish shall be concealed in the finish work. Clearance at vertical edges of doors shall be uniform from top to bottom and shall not exceed 10 mm (3/16"). Adjust hardware and leave in perfect working order. Adjust door hinges to hold door open at approximately 30°.

CLEANING

- Clean partitions and hardware; touch up as required and provide minimum 1 litre (2.11 pt) touch-up enamel paint to match finish surface.

END OF SECTION

PART I – GENERAL**WORK SPECIFIED HEREIN**

- All labor, materials, equipment and services to furnish and install wall louvers as indicated or specified.

SUBMITTALS

- Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.
- Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

SUBSTITUTIONS

- In accordance with Section 01600.

PART II – PRODUCTS**LOUVERS**

- Refer to Materials and Product Schedule for Additional Information.
- Stationary extruded aluminum louvers. Blades and frames shall be 2.057 mm (12 gauge) extruded aluminum, alloy 6063-T5. Louvers shall be completely assembled into sections by factory welding. Furnish 50 mm (2") flat flange all around exterior face with holes for attachment to wall by expansion bolts. Louver blades are to be placed in a horizontal direction.
- Additional louvers as required and specified in other areas of this specification shall be by manufacturers listed above.

PART III – EXECUTION**INSTALLATION**

- Install louvers at locations indicated, straight and plumb, in accordance with manufacturer's printed instructions.

END OF SECTION

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PART I – GENERAL

WORK SPECIFIED HEREIN

- All labor, material, equipment and services necessary to provide wall and corner guards as indicated or specified. **This is a Required Vendor.**

SUBMITTALS

- Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.
- Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

SUBSTITUTIONS

- In accordance with Section 01600.

COORDINATION

- Coordinate with all other trades whose work relates to items specified herein for placing of all required backing and furring, to ensure proper locations.
- Verify all dimensions shown on drawings by taking field measurement; proper fit and attachment of all parts is required.

DELIVERY, STORAGE AND HANDLING

- Deliver and store all items specified herein in dry, protected areas. Keep free of corrosion or other damage. Replace any damaged items at no cost to the Owner.

PART II – PRODUCTS

MATERIALS

- Corner guard shall be: 50 mm x 50 mm (2"x2") Surface Mounted with top cap and bottom caps.
- G.C to provide 20ga strapping as required at all wall bumpers.
- Crash rail shall be surface mounted with end caps
- Refer to Materials and Product Schedule for Additional Information.

PART III – EXECUTION

INSTALLATION

- Install all items per manufacturer's published instructions and approved installation drawings.

END OF SECTION

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PART I – GENERAL**WORK SPECIFIED HEREIN**

- All labor, materials, equipment and services necessary to furnish and install all toilet accessories as indicated or specified. **This is a Required Vendor.**

QUALITY ASSURANCE

- This Specification is based on products as listed within the Materials and Product Schedule shown on the drawings, unless otherwise noted.

SUBMITTALS

- Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.
- Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

GENERAL REQUIREMENTS

- Review Drawings for locations of toilet accessories and verify dimensional requirements for recessed units. Coordinate location of blocking and built-in anchorage devices.
- Notify PETSMART Representative of any conflicts with accessory locations and partition dimensions or piping interference.
- Use concealed fastening wherever possible.
- Provide anchors, bolts and other necessary fasteners, and attach accessories securely to walls and partitions in locations as shown or directed.
- Provide products of the same manufacturer for each type of accessory unit and for units exposed in the same areas, wherever possible.
- Stamped names or labels on exposed faces of units will not be permitted, except where otherwise specified.
- All dispensers are supplied to PETSMART at no cost. The contractor is only charged for delivery.

PART II – PRODUCTS**TOILET ACCESSORIES**

- Provide shipping, coordination, storage, blocking, fasteners/anchors and installation of all toilet accessories shown and those listed on the Materials and Product Schedule shown on the Drawings.

PART III – EXECUTION**EXAMINATION**

- Verification of Conditions: Examine the areas and conditions under which the work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

INSTALLATION

- *General:* Install the work of this Section in accordance with the manufacturer's written instructions and recommendations, anchoring components firmly into position for long life under hard use.
- *Coordination:* Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section. Coordinate schedules for installation of the orderly progress of the total construction sequence.
- Deviation of site conditions contrary to approved shop drawings shall be called to the attention of the PETSMART Representative.
- Install all toilet accessories at locations indicated in strict accordance with manufacturer's printed instructions.
- Install concealed mounting devices and fasteners fabricated of the same material as the accessories or of galvanized steel.
- Install exposed mounting devices and fasteners finished to match the accessories.
- Provide theft-resistant fasteners for all accessory mountings.
- Secure toilet room accessories to adjacent walls and partitions in accordance with the manufacturer's instructions for each item and each type of substrate construction.
- Install grab bars in accordance with manufacturer's printed instructions at locations indicated. Install connectors or support angles between studs. Attachment of support angles to studs must be sufficient to withstand a horizontal pull of 11 kN (300 pound force). Accurately position connector assemblies and tighten to the support angles before wall finish is applied. After wall surface is finished, secure concealed mounting plate to connector assembly using stainless steel machine screws furnished by the manufacturer. Where grab bars installed on toilet compartments make through-bolted connection with specified anchors.
- Provide full perimeter caulking at mirror, lavatory, w/c to wall and floor, baby changing station, and all paper towel dispensers.

CLEANING

- Upon completion of this portion of the work, promptly clean exposed portions and remove traces of dirt, grease and foreign materials.

PROTECTION

- Upon completion of the installation, visually check exposed surfaces of the work of this Section, and touch up scratches and abrasives to be completely invisible.

END OF SECTION

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PART I – GENERAL**SECTION INCLUDES**

- Loading dock equipment of the following types:
 1. Dock bumpers.
 2. Vertical dock leveler.
 3. Control stations.
 4. Dock shelters.

RELATED SECTIONS

- Section 03100 - Concrete Forms and Accessories: Placement of anchors into concrete.
- Section 03300 - Cast-In-Place Concrete: Docks and pits.
- Section 05500 - Metal Fabrications: Metal angles for edge of dock.

REFERENCES

- American National Standards Institute (ANSI):
 1. ANSI MH30.1 - Industrial Loading Dock Boards (Ramps).

SUBMITTALS

- Section 01330 - Submittals Procedures: Procedures for submittals.
- Product Data: For each product specified.
 1. Bumpers: Indicate unit dimensions, method of anchorage, and details of construction.
 2. Levelers: Indicate materials and finish, installation details, roughing-in measurements, and operation of unit.
- Shop Drawings:
 1. Indicate required opening dimensions, tolerances of opening dimensions, placement dimensions, and perimeter conditions of construction.
 2. Wiring diagrams including location of control stations and disconnect switches.
- Assurance/Control Submittals:
 1. Certificates: Manufacturer's certificate that Products meet or exceed specified requirements.
 2. Qualification Documentation: Submit documentation of experience indicating compliance with specified qualification requirements.

QUALITY ASSURANCE

- Dock Levelers: Conform to requirements of ANSI MH30.1.
- Manufacturer Qualifications:
 1. Manufacturer specializing in manufacturing Products specified with minimum 30 years of experience.
 2. Manufacturer to have quality assurance improvement programs.
 3. Manufacturer shall be associated with Loading Dock Equipment Manufacturers (LODEM) setting ANSI standards.
 4. Manufacturers welding procedure compliant with A.W.S.D1.1 specifications.
- Installer Qualifications: Company specializing in performing the Work of this Section with minimum 5 years of experience.

DELIVERY, STORAGE, AND HANDLING

- Deliver, store and handle materials and products in strict compliance with manufacturer's instructions and recommendations and industry standards. Store materials within absolute limits for temperature and humidity recommended by manufacturer. Protect from damage.
- Store products in manufacturer's labeled packaging until ready for installation.

WARRANTY

- Warranty: Provide manufacturer's standard warranty.
- Dock Leveler: The manufacturer warrants to the original purchaser its loading dock equipment to be free from defective material and workmanship under normal use for a period of 1 year (365 days). Structural is covered for an additional (4) years and include deck, frame, support beams, lip and hinge. Hydraulics is covered for an additional (1) year and includes power pack motor, hydraulic pump, hydraulic hoses and hydraulic fittings.
- Dock Shelter: The manufacturer warrants to the original purchaser its dock seals and shelters to be free from defective material and workmanship under normal use for a period of 1 year (365 days).

PART II – PRODUCTS**MANUFACTURERS**

- Blue Giant Equipment Corporation, which is located at: 410 Admiral Blvd., ON, Canada L5T 2N6; Toll Free Tel: 1-800-668-7078; Tel: 905-457-3900; Fax: 905-457-2313. Contact Steve Ross Trimble, National Accounts, rtrimble@bluegiant.com; Secondary Contact: Chris Wang, 416-989-6294, cwang@bluegiant.com
- Substitutions: Not permitted.

DOCK BUMPERS

Dock Bumpers: Two per dock leveler as manufactured by Blue Giant.

- Type: Laminated and shall be made of nylon impregnated heavy-duty industrial rubber and punched to receive 5/8 inch (16 mm) supporting rod. Bumper material shall be assembled with two 3 inches by 3 inches by 1/4 inch (76 by 76 by 6 mm) thick steel angles, factory painted and fastened with threaded rod and nut. Dimensions include angle iron for laminated bumpers.
 1. Model DB512: 5-1/2 inches D by 14 inches W by 20 inches H (140 mm D by 356 mm W by 508 mm H).

VERTICAL DOCK LEVELERS

Hydraulic Dock Levelers: "V" Series Hydraulic Dock Levelers, Model 'V7006H' as manufactured by BLUE GIANT.

- Type: Recessed, pit installed hinged dock leveler. Electro-hydraulically operated with independent control of deck and lip

complete with hydraulic lip and deck cylinders and rear fixed hinge with 4 inches (102 mm) lateral ramp flex. Pit Depth: Front 12.5 inches (318 mm) and Rear 12 inches (305 mm). Deck length includes 10 inches (254 mm) lip.

1. Model VH7006H: Deck Size - 86 inches (2134 mm) W by 57.5 inches (1461 mm) L.
- Function:
 1. Vertical Travel: Working range of 12 inches (305 mm) above and 12 inches (305 mm) below dock level.
 2. Automatic Vertical Compensation: Unit provides float of 12 inches (305 mm) above and 12 inches (305 mm) below dock level.
 3. Automatic Lateral Compensation: Leveler shall have deck flex up to 4 inches (102 mm) to compensate for non-level trailer beds. Rear hinge fixed and does not come up above floor level.
- Operation:
 1. Hydraulic Operating System: Easy to operate, quiet and smooth cycling. Electro-hydraulic raising and hydraulic lowering of the dock leveler controlled from a remote control station. Includes means of lowering the dock leveler below platform level with lip retracted behind dock bumpers. The loaded ramp's free fall is limited to not over 3 inches (76 mm) by a hydraulic velocity fuse. Unit shall come complete with a 1HP TENV motor. Power pack mounted underneath the deck.
 2. Control Station: Model SP1. Remote push-button control station. Provide a single push button control station with constant pressure "I" (UP) button. Control station is NEMA4X / IP65 rated, 3-1/4 inch W x 6-1/2 inch W x 5-1/8 inch D (83 mm x 165 mm x 130 mm) in size (standard).
- Rated Capacity:
 1. Welding procedure compliant with ANSI AWS D1.1 specifications. All units rated in compliance with ANSI MH30.1. ANSI/NFPA70 approved electrical components. Structural deck support to include minimum six each high-tensile solid steel U-beam members.
 2. Capacity: 40,000 lb (18,144 kg).
- Power: 575V, 3Phase, 60HZ.
- Safety Devices:

1. Toe Guard: Full operating range metal toe guard protection.
2. Cross traffic support - lip engaged in saddles (standard).
3. Corner below level stops (standard).
4. Telescopic v-grooved maintenance strut, integral to unit (standard).
5. Beveled lip (standard).

- Finish and Color:
 1. Toe guards painted safety yellow as specified by ANSI Z535.1. High visibility OSHA safety striping on stationary side toe guards.
 2. Remainder of unit painted blue, standard.
- Warranty: Warranties are subject to standard limitations on liability. Consult manufacturer for full details on warranty information and product registration.
- Locking Devices: Standard night locks.
- Dock Bumpers: Standard, two model DB512 laminated bumpers
- Lip Extensions: 18 inch (457 mm) long lip.
- Accessories: Provide the following standard accessories.
 1. Side weather seals, nylon brush style.
 2. Rear weather seals, nylon brush style.
- Features/Accessories: Provide the following optional features/accessories:
 1. Pour-in pan (dock leveler welded to a 3 sided steel pan, allowing it to be "poured in place" after concrete slab is poured).
 2. Assured motion float: 4 inch / 101 mm maintained deck tilt
 3. Standard oil (temperature range of -41 to 200 degrees C).
 4. 48" high (2) door track guards, painted yellow
 5. Dock leveler wedge (2), to be fitted to bottom of door panel
 6. Wheel chock kit, c/w laminated wheel chock, 15' (4,572mm) chain, wall mounting bracket and sign, to be fitted on exterior driveway wall

CONTROL STATIONS

Single Push Button Control Stations: SP1 as manufactured by BLUE GIANT.

- Type: Model SP1; single push button control station.

- Standard Features:
 1. NEMA4X/IP65 plastic enclosure- resistant to both corrosion and wet conditions.
 2. UL/CSA/CE approved.
- Operation: Operating System: The single push button control station raises an independent hydraulic dock leveler via a constant pressure "I" (UP) button.
- Power: 575V, 3Phase, 60HZ
- Construction and Finish: NEMA4X/IP65 (wet and corrosion resistant) rated plastic enclosure. Overall dimensions 6-1/2 inch L x 3 -1/4 inch W x 5-1/8 inch D (165 x 83 x 130 mm).
- Warranty: Warranties are subject to standard limitations on liability. Consult manufacturer for full details on warranty information and product registration.

DOCK SHELTERS

Foam Frame Shelter: Model 'BG100V-22' as manufactured by BLUE GIANT

- Manufactured to fit door size of 8' x 10', overall shelter size 119" wide x 120" high x 10" deep (3023mm x 3048mm x 254mm)
- Galvanized steel frames covered with polyethylene sheeting
- All exterior front frame edges shall have a minimum 1.5" x 2.5" (40mm x 65mm) aluminum trim angle to provide a neat clean finish
- Projection is 10" (254mm) inclusive of wood build out box
- Polyurethane foam core with 98% memory unaffected by moisture heat or cold, maintaining flexibility at -40 degrees C. The foam core shall be continuously bonded to the kiln dried lumber backing with a high quality adhesive
- Base cover material shall be a polyester base using Hi-Tear Vinyl fabric with a finished weight of 22oz
- Head bumper shall be 12" high (305mm). Curtain bumper shall be a polyester base with a 40oz Hi-Tear Vinyl finished weight. Material shall have an unbalanced distribution coating of 90/10 to allow for superior abrasion on contact surface.
- Side seals shall be 12" wide (305mm) wide with a 4" (102mm) wide x full length yellow aiming stripe. Seal material shall be a polyester base with a 40oz Hi-Tear Vinyl finished weight. Material shall have an unbalanced distribution coating of 90/10 to allow for superior abrasion on contact surface.
- Side pads shall be 12" wide x 10" projection (305mm x 254mm) inclusive of build out box. Material shall be 22oz Hi-Tear Vinyl.
- All mounting hardware included shall be galvanized (manufacturer's standard).

PART III – EXECUTION

EXAMINATION

- Do not proceed with installation until substrates have been properly prepared and deviations from manufacturer's recommended tolerances are corrected. Commencement of installation constitutes acceptance of conditions.
- Prepare substrates using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- If preparation is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions.
- Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.

INSTALLATION

- Follow manufacturer's directions for pour-in-place method of installation for leveler. Install leveler with pour in place box onto a prepared depression and shim level and lag in required locations to ensure unit is level with floor.
- Install/secure box spacers at top of side angles to prevent caving in of side panels.
- After first concrete base pour has set, shim level and lag and place second pour to curb angles and puddle between box sides and wall recess.
- Place pour to fill under base of leveler. Pour concrete base under/surrounding pit box to ensure that the inside rear frame will be fully supported. Cylinder base to be shimmed and fully supported.
- Remove box spacers and lip plate securement fastener. Open leveler and commission unit. Touch-up welds with matching paint.
- Install dock bumpers in accordance with manufacturer's instructions.
- Install shelter in accordance with manufacturer's instructions

ADJUSTING

- Adjust installed leveler for smooth and balanced operation.

STANDARD SECTIONAL OVERHEAD DOOR SPECIFICATIONS

OUTLINE SPECIFICATIONS

PART I – GENERAL

SECTION INCLUDES

- Insulated Sectional Overhead Doors.
- Electric Operators and Controls.
- Operating Hardware, tracks, and support.

DESIGN / PERFORMANCE REQUIREMENTS

Wind Loads: Design and size components to withstand loads caused by pressure and suction of wind acting normal to plane of wall as calculated in accordance with applicable code.

Single-Source Responsibility: Provide doors, tracks, motors, and accessories from one manufacturer for each type of door. Provide secondary components from source acceptable to manufacturer of primary components.

SUBMITTALS

- Submit under provisions of Section 01300.
- Product Data: Manufacturer's data sheets on each product to be used, including:
 1. Preparation instructions and recommendations.
 2. Storage and handling requirements and recommendations.
 3. Installation methods.
- Shop Drawings: Indicate plans and elevations including opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations, and installation details.
- Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- Operation and Maintenance Data.

QUALITY ASSURANCE

- Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum five years documented experience.
- Installer Qualifications: Authorized representative of the manufacturer with minimum five years documented experience.
- Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories, Inc. acceptable to authority having jurisdiction as suitable for purpose specified.

DELIVERY, STORAGE, AND HANDLING

- Store products in manufacturer's unopened labeled packaging until ready for installation.
- Protect materials from exposure to moisture until ready for installation.
- Store materials in a dry, ventilated weather tight location.

PROJECT CONDITIONS

Pre-Installation Conference: Convene a pre-installation conference just prior to commencement of field operations, to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.

WARRANTY:

Warranty: Manufacturer's limited door and operators System warranty for 10 year against delamination of polyurethane foam from steel face and all other components for 3 years or 20,000 cycles, whichever comes first.

PART II – PRODUCTS

MANUFACTURERS

- Acceptable Manufacturer: Overhead Door Corporation as supplied by Blue Giant Equipment Corporation, Brampton, ON Canada, L6W 3K2
- Contact Steve Greco, Director, National Accounts, sgreco@BlueGiant.com; Secondary Contact: Chris Wang, 416-989-6294, cwang@bluegiant.com
- Substitutions: Not permitted.

INSULATED SECTIONAL OVERHEAD DOORS

- Insulated Steel Sectional Overhead Doors: 592 Series Thermacore Insulated Steel Doors by Overhead Door Corporation as supplied by Blue Giant Equipment Corporation
- Units shall have the following characteristics:
 1. Door Assembly: Metal/foam/metal sandwich panel construction, with PVC thermal break and weather-tight ship-lap design meeting joints
 - a. Panel Thickness: 2 inches (51 mm)
 - b. Exterior Surface: Ribbed, textured
 - c. Exterior Steel: .015 inch (.38 mm), hot-dipped galvanized
 - d. End Stiles: 16 gauge with thermal break
 - e. Spring Counterbalance: Sized to weight of the door, with a helically wound, oil tempered torsion spring mounted on a steel shaft; cable drum of diecast aluminum with high strength galvanized aircraft cable. Sized with a minimum 7 to 1 safety factor. Rated for 25,000 life cycle minimum. 1" solid keyed shaft to accept sprocket and chain connection from Door operator

- f. Insulation: CFC-free and HCFC-free polyurethane, fully encapsulated
 - g. Thermal Values: R-value of 17.50; U-value of 0.057
 - h. Air Infiltration: 0.08 cfm at 15 mph; 0.08 cfm at 25 mph
 - i. 1- 24" x 8" Insulated DSB lite in center of 3rd section (eye level) per door
 - j. Two coat baked-on polyester: Interior color, white. Exterior color, white.
 - k. Windload Design: Provide to meet the Design/Performance requirements specified
 - l. Hardware: Galvanized steel hinges and fixtures. Ball bearing rollers with hardened steel races
 - m. Locking: Interior mounted slide lock at each door jamb suitable for padlocks by owner
 - n. Weather stripping:
 - EPDM bulb-type strip at bottom section
 - Flexible Jamb seals
 - Flexible Header seal
2. Track: Provide track as recommended by manufacturer to suit loading required and clearances available.
- a. Size: 2 inch (51 mm). Full vertical/ high lift track to suit interior ceiling site checked and verified by Overhead Door Installation technician or Distributor or as verified by signed shop drawings as submitted.
- Anchor assembly to wall construction and building framing without distortion or stress.
 - Securely brace door tracks suspended from structure. Secure tracks to structural members only.
 - Fit and align door assembly including hardware.
 - Coordinate installation of electrical service. Complete power and control wiring from disconnect to unit components.

CLEANING AND ADJUSTING

- Adjust door assembly to smooth operation and in full contact with weather stripping.
- Clean doors, frames and glass.
- Remove temporary labels and visible markings.

PROTECTION

- Do not permit construction traffic through overhead door openings after adjustment and cleaning. 08360-592 Series - 7
- Protect installed products until completion of project.
- Touch-up, damaged coatings and finishes and repair minor damage before Substantial Completion.

END OF SECTION.**OPERATION**

Manual pull rope operation complete with lift handle and step plate

- Do not begin installation until opening properly prepared.
- Verify wall openings are ready to receive work and opening dimensions and tolerances are within specified limits.
- Verify electric power is available and of correct characteristics.
- If preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

PART III – EXECUTION**PREPARATION**

- Clean surfaces thoroughly prior to installation.
- Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

INSTALLATION

- Install overhead doors and track in accordance with approved shop drawings and the manufacturer's printed instructions.
- Coordinate installation with adjacent work to ensure proper clearances and allow for maintenance.

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PART I – GENERAL

GENERAL

"General Conditions of the Contract for the Construction" with supplements thereto, special conditions, and Division 1 are hereby made a part of this division of the specifications and shall apply to the contractor, subcontractors, and all others furnishing labor, equipment, materials, or work under this division of the specifications and the drawings and must comply with current Canadian equivalent standards.

Other sections of Division 15 valid only when considered in conjunction with these General Provisions. These shall apply to all work specified in all sections 15100 through 15999. In addition, work in these sections is governed by all provisions of the Contract Documents.

Division of Contractors shall be as follows:

- Division 15000 - Work required for All contractor's below
- Division 15100 - Plumbing Work - Plumbing Contractor
- Division 15200 - Mechanical Work - Mechanical Contractor
- Division 15300 - Fire Protection Work - Sprinkler Contractor
- Division 07952 - Fire Retardant Sealant

The above contractors shall have the responsibility of incorporating Section 15000 along with each other's work and include any additional work required as reading through the other sections to provide a complete and operational system as described here-in and include in his bid an amount to do such work. Each contractor is responsible to read the other sections here-in for additional work. Submission of bid indicates such.

DEFINITIONS

1. "Provide" means to supply, erect, install and connect up complete, in readiness for regular operation, the particular work referred to.
2. "Furnish" means to supply and deliver to the job and install.
3. "Piping" includes, in addition to pipe, all fittings, flanges, valves, hangers, and other accessories related to such piping.
4. "Concealed" means hidden from sight in chases, furred spaces, shafts, hung ceilings, or embedded in construction.
5. "Exposed" means not installed underground or "concealed" as defined above.
6. "Regulating Authorities" means all Governmental Utility and Fire Protection Authorities having jurisdiction.

SINGULAR NUMBERS

Where any device or part of equipment is herein referred to in the singular number, such reference shall be deemed to apply to as many such devices as are required to complete the installation on as shown.

INTENT

It is the intention of the drawings and specifications to provide finished work, tested and ready for operation.

Any apparatus, appliance, material, or work not shown on the drawings, but mentioned in the specifications or visa versa, or any incidental accessories necessary to make the work complete and ready for operation, even if not particularly specified, shall be provided without additional expense to the Owner/PETSMART. Should there appear to be discrepancies or questions of intent in the Contract Documents, refer the matter to the Professional of Record or his authorized representative for his decisions, before ordering any materials or equipment or before the start of any related work. The decision of the Professional of Record, or his authorized representative, shall be final, conclusive and binding.

DRAWING AND DATA

- Drawings are generally diagrammatic and are intended to convey the scope of work and to indicate the general arrangement of equipment, ductwork, piping, and fixtures. The locations of all items not definitely fixed by dimensions are approximations only. The exact locations necessary to secure the best condition and results must be determined at the project and shall have the approval of the Professional of Record, or his authorized representative, before being installed. Do not scale drawings.
- Make reasonable modifications in the layout as needed to prevent conflict with work of other trades or for proper execution of the work without additional cost. Document all modifications and secure all approvals prior to implementing modifications.
- Minor details not usually shown or specified, but necessary for proper installation and operation of a system or piece of equipment, shall be included in the work and in the bid price, the same as if specified or shown.
- Should the particular equipment proposed to be installed require other space conditions than those shown on the drawings, the contractor must arrange for such space before submitting his bid. Such changes becoming necessary on account of failure to comply with this paragraph, the contractor shall make such changes at this (Contractor's) expense. Should conditions require any rearrangement to suit the design of equipment or piping furnished, submit working drawings showing in detail and schematic all changes and receive approved return copies before proceeding with work.

PART II – PRODUCTS

MATERIALS AND EQUIPMENT

- All materials and equipment shall be the standard product of a reputable manufacturer engaged in the manufacture of the items, they shall all be furnished by the same manufacturer, except where specified otherwise.
- All manufactured articles, material, and equipment shall be applied, installed, erected, connected, adjusted, tested, used, operated, cleaned, and conditioned according to the best practice as recommended by the manufacturer. Instructions from manufacturers shall be as published by the various manufacturers. Where published instructions are not

available for the manufacturer, the Contractor shall obtain new instructions in writing from the manufacturer.

- The contractor's attention is directed to the fact that the drawings and design of the system are based on definite makes or materials or equipment, which shall be considered the "specified standard".
- Where manufacturers are listed in the specification or scheduled on the drawings with model numbers, they are the "specified standard" for this project. Any other manufacturers listed without model numbers are acceptable manufacturers to provide the equipment only when they supply equipment, which meets or exceeds the quality of the "specified standard".
- Any material or equipment other than the "specified standard" shall be equivalent in such features as noise level, power requirements, metal gauges, vibration attenuation, finish, appearance, certification of recognized testing agencies and standards bureaus, allowable working pressure, physical size and arrangement so far as affects installation in the available space, factory-applied insulation, electrical devices, controls, access to internal parts, water and air-pressure drops, operating speeds, coil face areas, fan diameters, operating efficiencies, and all other features and capacities specified herein. The Professional of Record shall be the sole judge of the ability of any equipment and material other than the "specified standard" to meet the requirements of the specification and the burden of proof shall be the responsibility of the contractor.
- Applications for substitution in "prior approval" process during the bid period shall be done in accordance with the Professional of Record specifications.
- No substitute material or equipment shall be used or delivered to the job site without the prior written approval of the Professional of Record and PETSMART.

PART III – EXECUTION

INVESTIGATION OF CONDITIONS

Examine the contract drawings and all available information concerning existing installations, structure, excavations, and local conditions bearing on labor, transportation, handling and storage of materials, etc. Bidders on work under this section shall visit the site to satisfy themselves as to the nature and scope of all work to be done. The submission of bid will be taken as evidence that such an examination has been made and difficulties, if any, noted. Later claims for labor, work, materials, and equipment required for any difficulties encountered which could have been foreseen will be recognized and all such difficulties shall be properly taken care of by this contractor at no additional expense to the Owner. In no event will the Professional of Record assume any responsibility for any interpretation, deduction, or conclusion drawn from the examination of the site.

EXISTING INSTALLATION AND CONFLICTS

- Existing active services including water, rain, sewer, electric, other piping systems, when encountered, shall be protected against damage due to construction work. Do not prevent or disturb operation of active services, which are to remain. If work makes temporary shutdowns of services unavoidable, consult with Owner as to dates, procedures and estimated duration of shut-down period in advance of date work is to be performed. See Professional of Record's Specifications for Additional Information.
- Work shall be arranged for continuous performance to assure that any existing operating services will be shut down only during the time required to make necessary connections. If a system cannot be shut down, temporary bypass or jumpers shall be installed until connections are complete.
- Be responsible for all costs incurred by the above shutdowns including bypass or jumper installations for work performed under this Division.
- If existing active utility services are encountered which require relocation, make request to proper authorities for determination of procedures. Where existing services are to be abandoned, they shall properly terminate in conformance with requirements of the utility or municipal service involved.

CODE, ORDINANCES, PERMITS, AND FEES

See Instructions to Bidders for status of permits and fees. Permits and fees: All permits fees, meters, etc. shall be included in bid price.

Include in the work, without extra costs to the Owner, all labor, materials, services, apparatus, drawings (in addition to contract drawings and documents) required to comply with all applicable laws, ordinances, rules and regulations.

The drawings and specifications take precedence when they are more stringent than codes, ordinances, standards and statutes. Codes, ordinances, standards and statutes take precedence when they are more stringent or conflict with the drawings or specifications. The following industry standards, specifications and codes are minimum requirements:

- Owner's Insurance Underwriters Requirements
- Underwriters Laboratories Canada, Inc. Standards (ULC)
- Canadian Standards Association (CSA)
- American Society for Testing Materials Standards (ASTM)
- National Fire Protection Association Pamphlets (NFPA)
- Canadian Electrical Code (CEC)
- National Electrical Code (NEC)
- American Society of Mechanical Engineers Boiler and Pressure Vessel Codes (ASME)
- National Plumbing Code
- National Building Code
- Applicable Municipal, Provincial and Federal Sanitary Codes, Laws and Ordinances.

- Standards and Requirements of Local Utility Company Concerned.
- Fire Department Regulations.
- Sheet Metal and Air Conditioning Contractors/National Association Standards (SMACNA)
- Model Energy Code of Canada
- Occupational Safety and Health Act
- American Society of Heating, Refrigerating, and Air Conditioning Engineers Standards (ASHRAE)
- Air Movement and Control Association (AMCA.)
- Air Conditioning and Refrigeration Institute Standards (ARI)

LAYING OUT THE WORK

The contractor shall carefully lay out his work on the premises and make proper provision for the other work. The exact location of each item shall be measured at the building and in cooperation with other contractors. The contractor shall be responsible for accurately locating all openings for ducts, pipes, etc. and all access doors required.

The mechanical drawings do not give exact details as to elevations of lines, exact locations, etc., and do not show all the offsets, control lines, pilot lines and other installation details. The contractor shall carefully layout his work at the site to conform to the Professional of Record and structural conditions, to provide proper grading lines, to avoid all obstructions, to conform to details of installation supplied by the manufacturers of the equipment to be installed and, thereby, to provide an integrated, satisfactorily operating installation.

COORDINATION OF TRADES

- Schedule and coordinate work so as to execute expeditiously the contract and to avoid unnecessary delays.
- Examine fully the specifications and drawings for other trades to become familiar with all conditions affecting work, and consult and cooperate with other trades for determining space requirements and adequate clearances with respect to other equipment in the building. The Professional of Record reserves the right to determine space priority of the trades in the event of interference between piping, ductwork, conduit and equipment of the various trades.
- If the work is installed without coordinating with other trades, and the installation interferes with their installation, make any changes necessary in this work to correct the conditions without extra charges.
- If so directed by the Professional of Record, provide fabrication drawings of critical areas.

PROTECTION OF WORK AND PROPERTY

- Be responsible for the maintenance and protection of all equipment, materials, and tools supplied or installed on the job site, from loss or damage of all causes, until final acceptance by the Owner.

- Be responsible for the protection of any work of any trades from damage or defacement by these operations and remedy any such injury at his expense.
- At all times take such precautions as are necessary to protect the apparatus from damage caused by theft, the weather, and all building operations. Failure to protect the material and apparatus adequately to the entire satisfaction of the Professional of Record shall be sufficient cause for the rejection of any damaged material or equipment. All pipe and equipment openings shall be closed to prevent obstruction and damage.

TEMPORARY OPENINGS

Ascertain, from examination of the contract drawings and conditions to the sites whether any special temporary openings in the buildings will be required for the admission of apparatus furnished or provided and assume all costs of providing such openings.

SCAFFOLDING, RIGGING AND HOISTING

Provide all scaffolding, rigging, hoisting and services necessary for erection and delivery into the premises for all equipment and materials provided under these Sections and remove the same from premises when no longer required.

EXCAVATION AND BACKFILL

The contractor shall do all excavating, filling, and backfilling necessary for the installation of his work including shoring, bailing, and pumping as required to maintain his trenches and keep in dry condition until the work required has been installed, tested, and approved.

Excavation and backfill shall be in accordance with all requirements of Division 2 in the Professional of Record Specifications.

CUTTING AND PATCHING

- All necessary cutting and patching of wall, floors, partitions, ceiling, etc., required for the proper installation of the work under this contract, shall be done at the expense of the contractor in a neat and workmanlike manner, and as approved by the Professional of Record. No hoists, beams, girders, columns, or other structural members shall be cut by any contractor without first obtaining written permission from the Professional of Record and the contractor shall exercise due diligence to avoid cutting openings larger than necessary or in wrong locations.
- Labor and materials required to replace or rebuild parts cut or damaged shall be furnished at the expense of this contractor, subject to the satisfaction of the Professional of Record.
- Patched areas shall be finished the same as adjacent areas whether new or existing.

SLEEVES

- Be responsible for the location and maintaining in proper position of all sleeves, inserts, and anchor bolts supplied or set in place. In the event that failure to do so required cutting and patching of finished work, it shall be done at no additional expense.
- All pipe passing through floors, walls, or partitions shall be provided with sleeves having an internal diameter 1" larger than the outside diameter of the pipe, or insulation on covered lines. Concrete slabs on grade and concrete floors may be formed with an opening 1" larger than the outside diameter of the pipe and grouted solid and sealed after installing the pipe.
- Sleeves passing through walls, floors, and partitions and through firewalls shall be packed between sleeve and pipe using approved caulking material.
- Sleeves through masonry or concrete floors or interior masonry or concrete walls shall be Schedule 40 black steel pipe, set flush with finished wall or ceiling surfaces but extending 1" above finished floors. See detail on drawings for installation.
- Sleeves through interior walls other than masonry or concrete shall be 22 gauge galvanized sheet steel, set flush with finished surfaces for the partitions.

ESCUTCHEONS

Where exposed pipes or conduit pass through floors, walls, or ceilings, they shall be fitted with chrome brass plates with round head set screws. Spring clips will not be acceptable. Plates shall be secured to the pipe or conduit.

Escutcheons shall be of sufficient outside diameter to cover the sleeve opening and shall fit snugly around the pipe. Where necessary to cover heads of fittings or sleeves extending through floors, special deep escutcheons shall be provided.

PIPE EXPANSION

All pipe connections shall be installed to allow for freedom of movement of the piping during expansion and contraction. Expansion loops and expansion joints with proper anchor and guides shall be provided as required. Anchors and guides shall be subject to the review of the Professional of Record. All supports shall be installed to permit the materials to contract and expand freely without putting a strain or stress on any part of the system. Provide anchors as necessary.

SEISMIC RESTRAINT

All mechanical equipment including diffusers and grilles, ductwork, piping, roof top fans and air conditioning systems, etcetera shall be supported from the building structure with appropriate supports, anchorages, and restraints to meet governing Building Code where applicable.

The Contractor shall arrange and pay for the services of a seismic engineer registered in province to review the design and installation of seismic

supports and anchorage. Prior to substantial performance a letter from the seismic engineer shall be forwarded to the consultant certifying that all mechanical equipment has been seismically restrained and the installation has been reviewed in accordance with the governing Building Code.

HANGERS, INSERTS, SUPPORTS

- Furnish required structural members, hangers, supports, and inserts to keep piping in proper alignment and prevent transmission of injurious thrusts and vibrations. In cases where supported from concrete or penetrating waterproofed decks or slabs, care shall be taken not to weaken concrete or penetrate waterproofing. All hangers and supports shall be capable of screw adjustment after piping or conduit is erected. All such hangers shall be finally adjusted, both in the vertical and horizontal direction under operating conditions.
- Professional of Record shall review, in writing, method of supporting pipes from the building structure prior to starting any work.
- All piping shall be braced and sway braced for LOCAL SEISMIC ZONE REQUIREMENTS in accordance with Uniform Building Code and Uniform Mechanical Code.

BASES AND SUPPORTS

- Provide all bases and supports, not part of the building structure, for all materials and equipment furnished or provided under this Division.
- Concrete bases (reinforced as required) will be provided by the general contractor specified in Division 3.
- Furnish general contractor all required anchor bolts, templates, complete dimensional drawings, and instructions for all equipment requiring concrete foundations.
- All equipment and accessories shall be braced and sway braced for LOCAL SEISMIC ZONE REQUIREMENTS in accordance with Uniform Building Code and Uniform Mechanical Code.

NOISE REQUIREMENTS

All power-driven equipment shall be quiet in operation and free from vibration. All metal partitions, ducts, sheet metal housing, etc., shall be so constructed and braced that there will be no vibration or rattling when the system is in operation. Connections to equipment shall be so designed and constructed that noise and vibration will not reach the conditioned area through ducts, piping, sheet metal construction or building construction.

ROOF CURBS

Roof curbs are a Required Vendor item by Lennox. All roof curbs shall have the bottom-bearing flange following the roof slope. Maximum shim tolerance is 1/16" per linear foot in any direction. The above mentioned shall include all mechanical and plumbing equipment. Refer to individual specifications and ratings for locations of roof curbs required.

All roof curbs 24" sq. and below shall be fabricated of 18 Ga. galv. steel with cant. All roof curbs 26" sq. and above shall be fabricated of 16 Ga. (min.) gal. steel with cant. All curbs shall be insulated. Curbs shall be engineered by the manufacturer to support the intended loads. Manufacturer shall have the responsibility of coordinating and obtaining the intended weight from the appropriate subcontractor and design the curbs to support such loads. If required, curb manufacturer shall submit engineering calculations for review by the Professional of Record. Roof curbs for exhaust fans shall be provided by fan manufacturer thru Lennox Required Vendor.

ACCESS DOORS

Furnish to the general contractor access doors in all locations where necessary to provide access to concealed valves, dampers, controls, cleanouts, and other equipment requiring service or inspection. General contractor shall install such access doors and frames in locations designated after such locations are reviewed by the Professional of Record.

Access doors shall be provided per section 08305.

MANUFACTURER'S IDENTIFICATION

Manufacturer's nameplate, name or trademark shall be permanently affixed to all equipment and material furnished under this specification. The nameplate of a subcontractor or distributor will not be acceptable.

VALVE TAG, DIRECTORIES, AND CODING

- All items of mechanical equipment, including but not limited to RTU's, exhaust fans, air cleaners and electric unit heaters, shall be identified by approved nameplates. Nameplates shall be securely fastened to each individual piece of equipment. Nameplates shall bear notations corresponding to the notations on the operating instruction. Nameplates shall be 1/16" thick black bakelite with engraved white core letters and 4 edge bevel, 2-1/2 by 3/4" or aluminum with black enameled background and etched or engraved natural aluminum lettering 2-1/4" x 3/4".
- All valves, except fixture stops, shall be tagged with brass tags not less than 1-1/2" diameter with depressed black filled letters and numbers. Numbers not less than 1/2" high, letters not less than 1/4" high. Plumbing valve tags to be labeled "Plbg" plus valve identification number. Mechanical valve tags to be labeled "Mech" plus valve identification number.
- Tags shall be securely fastened to valves with approved brass "S" hooks or nickel-plated bead chain viewable from floor.
- At the end of the construction phase, the Contractor shall supply PetSmart with a full set of as-built drawings indicating numbers and locations of all control valves. A half size set of such as-built drawings and Control Valves Schedule for each division in clear laminate cover is to be placed on the wall in the Maintenance Room. Control Valves Schedule shall include valve numbers per plans and

what area is controlled by each valve and is to be placed next to the laminated drawings.

PAINTING AND IDENTIFICATION

- Finish painting is included in the general contract under SECTION 09900.1 except when specifically called for under this section.
- Certain shop and/or prime painting specified as part of the mechanical trades work is included herein.
- Work installed under this section shall be left free from dirt, grease and foreign matter, ready for painting.
- After finish painting is complete, stencil identification labels on all pipe and duct. Labels shall be placed at sufficient intervals throughout the systems, preferably adjacent to valves and fittings, to ensure ready recognition. Maximum spacing shall be 20 foot on center. In concealed areas provide identification at all access panels including access in removable tile ceilings. In finished areas exposed pipe or ducts shall be labeled only as directed by the Professional of Record. Size of stencil letters shall conform to ANSI A13.1 except that identification tags may be used when outside diameter of pipe or covering is less than 1". Stencils placed to be legible from floor level. Provide stencil flow arrows in addition to labels.

LINE	PIPE OR BAND COLOR	STENCIL
Drains, Waste & Vent	Black	None
Cold Water – Domestic	Yellow	CW
Hot Water – Domestic	Yellow	HW
Fire Line (by fire sprinkler contractor)	Red	F

Note: Painting of pipelines is not required where concealed.

MOTORS AND STARTERS

- All electric motors and starters shall conform to requirements of NEMA, ULC, CEC, CSA and be suitable for required load, voltage, duty, phase, frequency, service and location.
- Motors shall have permanently lubricated and sealed ball or fuller bearing except where otherwise specified and shall be limited at 1750 RPM maximum unless specified otherwise. Furnish all single-phase motors with internal overload protection.
- All belt drives shall be designed for 150% of motor rated drive, Assemblies up to two belts shall have adjustable motor shaft with midpoint of the adjustment range at rpm required for submitted performance. All multiple belt drives shall be factory marked match sets. Unless otherwise specified all two speed motors shall be two winding motors.

- All starters will be provided by the electrical contractor, except when starters are furnished as an integral part of the mechanical equipment or as noted.
- The contractors shall acquaint themselves with those portions of the electrical drawings and specifications which establish characteristics of electrical service and shall furnish equipment to operate on the service.

INTERFERENCE

Arrange the work schedule to prevent interference with the work of other trades and cooperate with other trades.

ACCESSIBILITY

Unions, valves, controls, etc., shall not be placed in any pipeline at a location that will be inaccessible after the system is complete.

All valves, damper quadrants, motors, bearings, controls, and other apparatus which must be located in an inaccessible location shall be provided with suitable hinged access doors for operation and servicing of the apparatus.

TEST AND ADJUSTMENTS

- Labor, materials, instruments and power required for testing shall be provided for work under this Division.
- Tests shall be performed to the satisfaction of the Professional of Record and the regulating authority having jurisdiction. Submit to the Professional of Record, a written certificate that all tests have been performed in accordance with the specifications requirements.
- Pressure tests shall be applied to piping only before connections of equipment. In no case shall piping, equipment, or accessories be subject to pressure exceeding their rating.
- All defective work shall be promptly repaired or replaced and the test repeated until the particular system and component parts thereof receive the approval of the PETSMART Representative and the regulating authority. Any damages resulting from tests shall be repaired and damaged materials replaced, all to the satisfaction of the PETSMART Representative and at no cost to the Owner.
- Equipment and systems which normally operate during certain seasons of the year shall be tested during the appropriate season. Tests shall be performed on individual equipment or system, under test is interrelated which depends upon the operation of other equipment, functioning and performance, the latter to be operated simultaneously with the equipment or system being tested.
- No piping in any locations shall be closed up, furred in or covered before testing.
- Notify the regulating authorities and the PETSMART representative 3 working days before tests are to be conducted.

- All systems shall be tested as specified under the various applicable divisions of the specifications. The duration of all tests shall be as determined by the authority having jurisdiction but in no case less than the time prescribed in the specifications.
- Water used for testing shall be drained from the system after tests are complete. Any damages caused by freezing or water left in a system shall be repaired and replaced.
- Schedule of Testing: A schedule of testing shall be drawn up by each contractor in such a manner that it will show areas tested, test pressure, length of test, date, time and signature of testing personnel. All testing must be performed in the presence of the general contractor. His signature for verification of test must appear on schedule. All testing must be performed in accordance with the procedures set forth in the plumbing, fire protection, and HVAC sections of these specifications. At completion of testing, the schedule shall then be submitted in triplicate to the Professional of Record.

CLEANING

- At all times keep the job site free from accumulations of waste materials or rubbish caused by these operations. At the completion of the work, remove all rubbish, tools, construction equipment, and surplus materials from the job site and leave the premises in a clean condition.
- During the course of construction, all ducts and piping shall be capped in an approved manner to insure adequate protection against the entrance of foreign substances.
- Thoroughly clean all items of work under this contract including piping, ducts, and equipment of all foreign substances inside and out before operation of any related system.
- If any part of the respective system should be stopped by any foreign matter after being placed in operation, the system shall be disconnected, cleaned, and reconnected wherever necessary to locate and remove obstructions and shall be repaired or replaced when the respective system is reconnected at no additional cost to the Owner.

ELECTRIC WIRING

Mechanical equipment having electrical motors shall be furnished with all necessary control equipment for the protection of each motor and for automatic and/or manual control. All motor starters that are an integral part of the HVAC equipment shall be furnished under this division.

All control wiring, controls, and relays are furnished and installed this division. Room thermostat and control switches shall be located as shown or directed and all controls, relays, starters, and wiring shall conform to the Canadian Electrical Code and applicable local codes. All controls shall be furnished and properly identified with instruction for proper electrical connections. The responsibility for proper connections and operation is

included under this division. All power wiring, all conduit, and raceways shall be furnished and installed under Division 16, Electrical.

QUALIFICATIONS OF WORKMEN

Use sufficient journeyman craftsman and competent supervisors in the execution of this portion of the work to insure prompt and adequate installation of the work throughout. In the acceptance or rejection of installed plumbing or mechanical no allowance will be made for lack of skill on the part of workmen.

LEAK DAMAGE

The contractor shall be responsible for damage to the work of other contractors or to the building, or to its contents, people, etc., caused by leaks in any of the equipment or material installed by him through equipment or material failures or disconnect pipes or fittings and shall make at his own expense, all repairs or replacement required as a result of damage.

SAFETY GUARDS

Provide safety guards of reinforced sheet metal around all motor drives, fan belts, flexible couplings, etc. as required in order to obtain certificates of inspection and approval from any authorities having lawful jurisdiction, and which are considered satisfactory by the manufacturer of the equipment and the Professional of Record.

LUBRICATION

Lubricate as required, all motor, bearings, fans, etc., before operation of any equipment during construction.

Also, provide a final lubrication to all equipment requiring same before turning over the system to the Owner.

EMERGENCY REPAIRS

The Owner reserves the right to make emergency repairs as required to keep systems in operation without relieving the contractor, of his responsibilities during the guarantee or bonding periods.

OPERATION BY OWNER

The Owner may require operation of all of the respective installations prior to final completion. Cost of utilities for such operation shall be paid for by the Contractor, unless the Owner has occupancy of the project. Operation of the installation shall not be construed as acceptance of the work.

INSTRUCTION OF OWNER'S PERSONNEL

Prior to the acceptance of the work during a time to be designated by the PETSMART Representative, provide the necessary qualified personnel to operate each system in the entire installation for a period of two consecutive, full working days.

During the operating period, fully instruct the Owner's representative in the complete operation, adjustment and maintenance of each respective installation.

INSTALLATION MANUAL

Thirty calendar days prior to the completion of the installation and final inspection of the work, furnish the Professional of Record for approval, one copy of complete instruction manual, bound in booklet form and indexed for each representative trade specified under mechanical division, including such other divisions as directed which customarily would require an instruction manual.

Each manual shall contain the following items:

1. List of all equipment with manufacturer's name, model number, and local representative, service facilities, and normal channel or supply for each item.
 2. Manufacturer's literature describing each item of equipment, with detailed parts list. For fans and pumps provide operation data including fan curves and pump curves.
 3. Detailed step by step instructions for starting, summer operation, winter operation, and shutdown of each system.
 4. Detailed maintenance instructions for each system and piece of equipment.
 5. Copy of valve chart.
 6. Individual equipment guarantees.
 7. Certificates of Inspection.
 8. Blueprints of as-built construction and related shop drawings.
- See paragraph below for instructions.

After approval of manual and corrections have been made, resubmit four (2) copies to PETSMART representatives.

All written material contained in the manual shall be typewritten.

RECORD DRAWINGS: AS-BUILT DRAWINGS FOR EACH PHASE OF THE WORK

- Mechanical and plumbing contractors shall provide as-built drawings which shall clearly show all differences between the contract work as drawn and installed for all concealed work, as well as work added to the contract drawings. All addenda and change order work shall be shown and drawn on as-builts.
- Concealed shall mean work installed underground or in the area which cannot be readily inspected by use of access panels, inspection plates or other removable features.
- Contractor shall maintain a set of record drawings at the job site. These shall be kept legible and current and shall be available for inspection at all times by the Professional of Record.
- Upon completion of the work, transfer the information from the record prints to the as-built sepia drawings.
- Prepare as-built drawings on reproducible sepia prints or original drawings. The contractor shall pay the cost of printing sepias.
- Prepare separate sets of as-built drawings for the heating, air conditioning, refrigeration and plumbing work.

- In showing the installed changes in the work, work indicated on the drawings, or added work, use the same legends as were used on the contract drawings. Indicate exact locations by dimensions and exact elevations, given in job datum, by depth. Give dimensions from a permanent point. Give elevations to sewer and storm drainage lines to the invert elevation. All changes in elevation, location, size, or material, and all offsets and valves shall be clearly indicated and dimensioned. All underground, concealed or buried piping shall be located by two or more dimensions per run of pipe between each direct change. All elevations (invert or center line) shall be shown with the point of elevation change clearly located. All valves shall be numbered and lettered to correspond with the numbers and letter of the valve charts.
- Mechanical and plumbing as-built drawings shall indicate routing of all major piping, ductwork, plumbing and control wiring, etc., location and function of all controls and whether manual or automatic.
- As-built drawings shall contain the names, addresses, and phone numbers of the subcontractors and shall be signed by the contractor on the front cover.
- Upon completion of the project work, submit one printed copy of the as-built sepia drawings to the general contractor and then through the Professional of Record for approval. Upon receipt of notice of approval of the as-built drawings deliver the as-built sepia drawings, together with two sets of prints to the Professional of Record.
- Professional of Record shall approve the as-built drawings and he shall be the sole judge of the acceptability of these drawings. Receipt and approval of as-built drawings is a pre-requisite for final acceptance (refer to Section 01700).

GUARANTEE

- Guarantee that all work installed will be free from any and all defects and that all apparatus will develop capacities and characteristics specified under the respective divisions covering the specific work, and that if during a period of two (2) years from date of completion and acceptance of work, except as specified for a longer period elsewhere; any such defects in workmanship, material, or performance appear, they will be immediately replaced, repaired, or otherwise corrected subject to approval by the Owner without cost to the Owner within a reasonable time, to be stated in the Notice to the Professional of Record.
- All heat exchangers are to be guaranteed for a period of ten (10) years from the date of manufacture.
- "Purchase and supply an additional four (4) year warranty on all motor compressors from the manufacturer (total of 5 years). Warranty certificates to show model number, serial number date of installation of motor compressor. Warranty certificates shall be

included in the manual under the warranty section. Warranties must be directly exercisable by PETSMART."

- Replace or repair to the satisfaction of the Owner any and all damage due to the building or its contents or to work of other trades on consequence of work performed in fulfilling the guarantee periods of two years. Coordinate with Professional of Record specifications.

ENERGY MANAGEMENT CHECKLIST

- The following checklist is to be fully executed by the Electrical, Mechanical and General Contractor prior to requesting Nexrev to perform checkout/start-up of the Energy Management System.
- At the time the attached checklist has been completed it shall be sent to: Nexrev.
- After receipt of a completed checklist and acceptance by Nexrev, a start-up will be scheduled within 7 to 10 working days. This start-up is only for Energy Management Controls not mechanical unit start-up.
- Immediately after Mechanical Units are powered up, the "Testing & Balancing" (T & B) Report to the PETSMART Project Website (Prior to millwork). The "Equipment Operation Check" (EOC) and Nexrev's deficiency report shall be performed, and all items must be repaired or completed prior to start of Building Punchlist. The "Correction Report" shall be attached to the "Punchlist Report".
- Coordinate scheduling of air balancing with unit start-up.
- Shop drawing will be provided with EMS equipment. If any questions or additional information is required, contact: Nexrev, Keith Svonovec (972) 303-8517, keithsvonovec@nexrev.com

ENERGY MANAGEMENT SYSTEM CHECK-OFF SHEET

PETSMART STORE NO. XXXX

LOCATION

ACTIVITY DESCRIPTION	CHECK WHEN COMPLETED
1. All transformers, sensors, and wiring are installed and terminated as shown on Novar installation drawings and EM sheets.	
2. Permanent power to the building by Electrical Contractor.	
3. Power installed to all roof top units by Electrical Contractor.	
4. All lighting installed and wired. Contractors include those as noted on EM Sheet.	
5. All conduit, cabling, and installation of Novar backplates in accordance with Novar installation drawings and EM Sheets.	
6. Two (2) dedicated 120-volt circuits installed at the location of the OPUS Controller.	
7. A dedicated working voice grade phone line with T1 outlet installed at the Novar OPUS Controller location, tagged with phone number provided by General Contractor and PETSMART. A dedicated working Data Jack installed at the Novar OPUS Controller	
8. Zone temperature sensors mounted and wired to each rooftop unit by Electrical Contractor	
9. HVAC units labeled/numbered per plans and in working order. All heating and cooling stages functional by Mechanical Contractor.	
10. HVAC start-up and equipment performance check completed by Mechanical Contractor (EOC) and Novar's Deficiency Report.	
11. Discharge Temperature Sensors and Electronic Thermostat Modules mounted and wired to each rooftop unit. Verify Rooftop unit manufacturer factory installed ETM-2051's.	
12. Economizers wired to interface relays for control by Electronic Thermostat Module (if applicable) by Mechanical Contractor. Humiditrol units in all sensors.	
13. Outdoor sensor assembly mounted and wires installed back to Novar OPUS Controller by Electrical Contractor.	
14. Verify kW demand meter with pulse contacts is provided and installed by Hill Phoenix. Wires to be installed and run back to Novar OPUS Controller.	

General Contractor Sign-off Signature

Completion Date

Mechanical Contractor Sign-off Signature

Completion Date

Electrical Contractor Sign-off Signature

Completion Date

END OF SECTION

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PART I – GENERAL**NOTE**

Refer to Section 15000, General Provisions, Mechanical, which sets forth specific requirements for Mechanical and Plumbing Contractors.

Cross references where noted are for convenience and their inclusion or omission from any particular section in no way limits scope of particular section or intent of any contract documents.

SUBMITTALS

Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.

Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

WORK INCLUDED

The work required under this section shall consist of all labor, materials, tools, equipment, power, transportation, hoisting implements, services, etc., of every description necessary for the entire completion of the plumbing work of the contract all as specified herein and shown on the drawings complete in every respect.

The work in general consists of but is not necessarily limited to the installation test and guarantee of the following work:

1. A complete system of building soil, waste, and vent piping.
2. Connection to waterline outside the building provided by others. Final connection by the plumbing contractor. (Verify with documents.)
3. A complete gas piping system from gas meter and regulator.
4. A complete system of hot and cold water piping.
5. Water heaters (elect).
6. Plumbing fixtures.
7. Valved outlets and connections to all heating, air conditioning, or electrical equipment with location if required.
8. Plumbing specialties, including clean-outs, drains, fixture supports, interceptors, etc.
9. Equipment condensate drains.
10. Sterilization of potable water system.
11. Connection to equipment (equipment furnished by others).
12. All rough-in requirements for owner furnished equipment and final connection.
13. All valves, fittings, hangers, insulation, etc. required for installing the aforementioned piping.

14. All other miscellaneous items of equipment, materials, piping, etc. as hereinafter specified as shown on drawings or as required for the proper operation and installation of plumbing work.

GUARANTEE

- Guarantee that all work installed will be free from any and all defects and that all apparatus will develop capacities and characteristics specified under the respective divisions covering the specific work, and that if during a period of two (2) years from date of substantial completion and acceptance of work; any such defects in workmanship, material, or performance appear, they will be immediately replaced, repaired, or otherwise corrected subject to approval by the Owner without cost to the Owner within a reasonable time. Warranty certificates to show model number, serial number date of installation of motor compressor. Warranty certificates shall be included in the manual under the warranty section. Warranties must be directly exercisable by PETSMART."

END OF SECTION

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PART I – GENERAL

WORK SPECIFIED HEREIN

- Pipe, fittings, valves, piping specialties, and mechanical supporting devices.

SUBMITTALS

- Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.
- Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

SUBSTITUTIONS

- In accordance with Section 01600.

ALTERNATE EQUIPMENT

- Below is a list of alternate equipment. Refer to Section 15000 for all instructions.
 Valves: Nibco/Scott, Milwaukee, Red & White
 Shock Absorbers: Zum, Smith, Wade.
 Pipe Hangers & Supports: Grinnell, Kin-Line, B-line, Michigan, Toyo.

PART II – PRODUCTS

MATERIALS

Pipe and Fittings:

- Pipe furnished under this Contract shall be new; practically circular in cross sections with inner and outer surfaces concentric, free from cracks, blisters, and defects. All piping shall be subjected to standard mill tests before being shipped and each length of pipe shall give maker's name or trademark legibly rolled on outside or shall be marked in an approved manner.
- All pipe shall conform to Federal Government and/or A.S.T.M., A.S.M.E. Specifications for all types specified.
- Fittings furnished under this Contract shall be new and free from cracks, sponginess, shrinkage, sand and gas holes, and all other defects. All fittings shall be 125 lb. steam working pressure.

Schedule of Piping and Fittings:

SERVICE	PIPE	FITTINGS
Soil, waste, & vent piping inside building to 5' outside building walls – 2" and larger	Preferred – ABS Schedule 40 ASTM D2661-87a Alternate – DWV Rated PVC	Solvent Weld Joints & Fitting

Storm piping in building above and below grade	Schedule 40 DWV Rated PVC with DMV filling	Joints – Solvent Cemented Fittings – Drainage Pattern Schedule 40 PVC
Soil, waste, piping inside building to 5' outside building walls – 1.5" and smaller	Preferred – ABS Schedule 40 ASTM D2661-87a Alternate – DWV Rated PVC	Solvent Weld Joints & Fitting
Vent piping inside building to 5' outside building walls – 1.5" and smaller	ABS Schedule 40 ASTM D2661-87a or PVC	Solvent Weld Joints & Fitting
Water piping underground	Type "K" – Soft Copper (wrapped as per specification)	Wrought Copper Solder Type
All cold & hot water piping above ground	PEX; Non-Barrier Tubing cross Linked polyethylene tubing If PEX is not acceptable by code, alternate - Type "L" – Hard Copper	PEX only Wrought Copper Solder Type
Compressed Air	Type "L" – Hard Copper	Wrought Copper Solder Type
Fire Line	See Section 15300 herein for all requirement.	
Condensate Piping from A/C Coils	Type "M" – Hard Copper	Wrought Copper Solder Type
Gas Piping up to 2-1/2"	Schedule 40 Black Steel	Screwed Malleable Iron
Gas Piping 3" and larger	Schedule 40 Black Steel	Welded Forged Steel

PIPING MATERIALS

- General: Provide pipe and tube of the type, joint type, grade, size and weight (wall thickness or class) indicated for each service and as required by local code requirements. Where type, grade, or class is not indicated, provide proper selection as determined by installer for installation requirements and comply with governing regulations and industry standards. See schedule above. Where allowed by local code the use of ABS piping is allowed at underslab locations.

STEEL PIPE

- ASTM A53, A106 or A120 except as called for (I.E. natural gas piping shall be A53) with ASTM A53 or A106 where close coiling or bending is required.

COPPER PIPING

- ASTM B88; type (wall thickness) as indicated for each service: hard-drawn temper, except as otherwise indicated.

PEX NON-BARRIER TUBING

- ASTM F-876/F-877, CSA B137.5 and ANSI/NSF 61 as suitable for potable water.

PIPE AND TUBE FITTINGS

- *General:* Provide factory-fabricated fittings of the type, materials, grade class and pressure rating as indicated for each service and pipe size. Provide sizes and types matching pipe, tube, valve, or equipment connection in each case. Where not otherwise indicated, comply with governing regulations and industry standards for selections, and with pipe manufacturer's recommendations where applicable.

FITTINGS FOR STEEL PIPE

- Malleable iron threaded unions shall be Class 150 MSS SP-76; selected by installer or as indicated herein, for proper piping fabrication and service requirements, including style, end connections, and metal-to-metal seats, (iron, bronze or brass); plain or galvanized as indicated.
- Threaded pipe plugs shall conform to ANSI B16, 14.
- Steel flanges and fittings shall conform to ANSI 16.5, including bolting and gasketing of the following group, end connection and facing, except as otherwise indicated; material group; Group 1.1.
- End connections shall be butt-welded.
- Facings shall be raised faced.
- Wrought-steel butt-welding fittings shall conform to ANSI B16.9 except use ANSI B16.28 for short-radius elbows and returns with ratings to match pipe.
- Pipe nipples shall be fabricated from same pipe as used for connected pipe, except do not use less than Schedule 80 pipe when length remaining unthreaded is less than 1-1/2", and where pipe size is less than 1-1/4", and do not thread nipples full length (no close-nipples).
- Fittings for copper piping shall be cast/bronze solder type conforming to ANSI B16.18 or wrought Copper/bronze solder type conforming to ANSI B16.22.
- Fitting for PEX tubing shall be PEX only.

Copper Unions:

- Provide standard products recommended by the manufacturer for use in the service indicated.

Valves:

- Ball valves, 2 Wilkins Model 850 Full Port Ball Valve.
- Swing check valves, screwed ends, 2 inches and smaller, bronze, 125 psi WSP, 200 psi WOG, Hammond #IB-940, Milwaukee #509.
- Swing check valves, solder ends, 2 inches and smaller bronze 125 psi WSP, 200 psi WOG, Hammond #IB-912, Milwaukee #1509.
- Provide valves in underground piping with square operating nut and extension wrench.
- PEX Valves, see Section 15106 Cross-Lined Polyethylene Tubing and Fittings.

Piping Specialties:

- Unions - Malleable iron ground joint type crane #1280 brass to iron seat for ferrous pipe. For copper pipe Nibco #633.
- Escutcheons - Chrome plated brass (with set screws) for all pipes passing through walls, floors, or ceiling.
- Roof flashing assemblies – To match single-ply roof by roofing contractor.
- Dielectric Insulating Fittings - Dielectric fittings, unions, or couplings, for all connections between ferrous and copper piping.
- Water hammer arrestors: J.R. Smith Hydrotrol, sized and submitted as per manufacturer's requirements.

Cleanouts:

Plastic cleanouts will not be accepted. Cleanouts shall be installed at location as shown on the drawings. Any deviation from the Contract Documents without the written approval of the Professional of Record will not be allowed. Submitted as-built drawings shall indicate such. Cleanouts shall be as follows:

- | | |
|---|----------------------|
| • Grade (outside building): | Zurn Z-1400-HD-BP-VP |
| • Finish Floors: | Zurn ZN-1400-T-VP |
| • Concrete Slabs and Unfinished Floors: | Zurn Z-1400-HD |
| • Dry Walls: | Zurn Z-1447 |
| • Tile Walls: | Zurn Z-1443 |

NOTE: Cleanouts shall be installed flush with the finish floor. The Contractor has the responsibility to referring to the Architectural Room Schedule and determine the exact height the top of the cleanout must be to be installed perfectly flush with the FINAL finish floor. Cleanouts installed higher or lower than the FINAL finish floor will be rejected and removed and installed flush at no additional expense to the Owner. ALL floor and surface cleanouts shall have nickel bronze tops, with bronze

plugs; ALL wall cleanouts shall have Stainless steel cover plates; NO EXCEPTIONS!

PART III – EXECUTION

PIPE HANGERS AND SUPPORTS

Hangers shall adequately support the piping system. They shall be located near or at changes in piping direction and concentrated loads. They shall provide vertical adjustment to maintain pitch required for proper drainage. They shall allow expansion and contraction of the piping. Hangers shall be fastened to building structural members wherever practicable. Provide "Stoneman" "Trisolators" at each pipe hanger, support bracket or strap, on all uninsulated water piping.

Plastic pipe shall be supported with clevis type hangers per pipe section located close to the hub, changes in direction and branch connection. Rod and spacing sizes as follows:

DWV PIPING	SPACING	ROD SIZE
Up to 6"	10'-0"	3/8" dia.

HORIZONTAL STEEL PIPING	SPACING	ROD SIZE
Up to 1-1/4"	8'-0" (maximum)	3/8" dia.
1-1/2 to 2"	10'-0" (maximum)	3/8" dia.
2-1/2" to 3"	10'-0" (maximum)	1/2" dia.
4"	10'-0" (maximum)	5/8" dia.

HORIZONTAL COPPER TUBING	SPACING	ROD SIZE
1/2"	3'-6" (maximum)	3/8" dia.
3/4"	4'-3" (maximum)	3/8" dia.
1"	5'-0" (maximum)	3/8" dia.
1-1/4" to 1-1/2"	6'-0" (maximum)	3/8" dia.

HORIZONTAL PEX TUBING	SPACING	ROD SIZE
Up to 2"	2'-8" (maximum)	3/8" dia.

INSTALLATION: VERTICAL PIPING

When support locations are not indicated on the drawings, support steel and copper pipe at every floor and roof penetration.

Structural Attachments:

- To concrete: Use Grinnell Fig. 281 wedge type concrete inset for loads up to 1200 lbs. or Grinnell Fig. 282, Universal concrete insert for loads up to 1430 lbs.
- To steel: Use Grinnell Fig. 87 C-clamp with retaining clip for pipe 2" and smaller.
- Intermediate attachments: Continuous threaded rod may be used wherever possible. No chain, wire, or perforated strap shall be used.
- Pipe Attachments: Grinnell, Elcen, or Kin-Line.
- All pipe attachments shall be clevis type with vertical turnbuckle adjustment, or Grinnell, Fig. 260 clevis hanger.
- When thermal expansion on excess of 1/2" axially is anticipated, use Grinnell Fig. 174 adjustable swivel pipe roll or Grinnell Fig. 271 pipe roll stand, or equal. Where pipe is insulated, use a pipe covering protection saddle in conjunction with the roll device.
- For copper tubing, use Grinnell Fig. CT-65 clevis hanger, copper hanger or plastic-coated hanger.
- For vertical pipe, use Grinnell Fig. 261.

HANGER SIZING:

- Hangers shall be pipe size installed inside insulation for all lines regularly operating at 70°F and above.
- Hangers shall be insulation O.D. size for all covered lines operating at 69°F and below. Install protection saddles between insulation and hanger.
- Trapeze hangers may be used to support three or more parallel pipes. Trapeze design and application shall be subject to approval by the Professional of Record and shall incorporate adjustment features specified for ring or clevis hangers.
- Piping near the floor shall be supported from side wall or floor by approved upright iron pipe brackets, stanchions or hangers, in such manner as to maintain its alignment while making suitable provisions for necessary expansion. In stud walls and pipe chases mechanically attach water piping to structure with "Trisolators".
- Where pipes or conduits of different contractors may possibly be racked on the same supporting structure, each Contractor shall cooperate with the others involved to properly locate the supporting members and shall furnish a proportionate share of the labor and materials involved in the installation.

WORKMANSHIP

- Pipe fitting and installation.
- Cleaning: All piping materials shall be installed free of dirt, scale, rust, excess oil, grease or other compounds. Steel and copper piping sections before installation shall be stood on end and rapped sharply

to loosen cutting and other foreign materials from the interior. After installation, open ends of piping systems shall be temporarily plugged. Foreign matter accumulating in or on the piping as a result of fabrication and erection work shall be removed as the work progresses.

- Openings in pipes, drains, fittings and equipment shall be kept covered or plugged to prevent accumulation or debris in systems.
- Piping shall be free of traps, sags and bends. Piping shall be drainable at low points in the systems. Where obstacles are encountered the piping shall drop below to allow drainage. Minimum slope on water lines shall be 1/8" per foot toward drain.
- Install piping to maintain head room and keep passageways clear. Offset to maintain the required clearances and conform to architectural and structural features of the building. Run parallel and straight with adjacent walls or ceilings to present a uniform appearance. Maintain spacing to accommodate insulation.
- All rough-in shall be set to dimensions furnished by manufacturers.
- Street elbows, bushings and long screw fittings shall not be used.
- Mains and risers: All piping shall be continuous between fittings wherever possible, as short lengths and couplings will not be permitted.
- Unions and Flanges: Provide unions or flanges at all connections to equipment for dismantling of piping. Provide unions at connections to all screwed body and solder end valves.
- Copper, brass pipe and chromed, polished, or painted connections from fixtures shall not show tool marks.

JOINTS AND CONNECTIONS

- Screwed piping shall be fabricated using sharp cutting, threading and reaming tools which maintain proper thread dimensions and produce standard thread engagement. Pipe shall be properly reamed after cutting. Joints shall be made with graphite and oil lubricant, or teflon tape. Sealing or adhesive type compounds will be rejected. Exposed threads at joints shall be coated with red lead not later than the end of the day's work.
- Solder joint piping shall be cut square using roller type tube cutter; ends shall be de-burred, resized and polished to "bright" metal; fitting sockets shall be cleaned; heat indicating flux shall be applied to tube end; joint shall be assembled and uniformly heated to proper temperature; solder or brazing alloy shall be melted by contact with tube and fitting, not by exposure to flame; solder application shall stop as soon as joint flows full.
- Solder joints on all copper piping shall be made with approved non-lead 95-5 solder, for all piping above grade and silver solder for all piping below grade.

- Joints in mechanical joint piping shall be installed in strict compliance with manufacturer's instructions. Provide thrust blocking for all cast iron pipe below grade as directed by manufacturer, at all changes of directions and all branch takeoffs. Thrust blocks shall have a minimum of one yard of concrete.
- All underground copper piping shall be wrapped spirally with three layers of 20 mil. polyethylene tape with 50% overlap.
- PEX shall be installed using PEX crimping system and in strict compliance with manufacturer's instructions. Do not use polyethylene crimp fitting and rings.

VALVES

All shut-off and drain valves in water piping shall be ball valves.

TESTING

Furnish all test pumps, gauges, equipment and personnel required and test as necessary to demonstrate the integrity of the finished plumbing installation to the approval of pertinent authorities, as called for herein. Test all valve bonnets for tightness. Test operate all valves at least once from closed-to-open-to-closed position while valve is under test pressure. Test all automatic valves for proper operation at the settings indicated. Test pressure relief valves at least three times.

Piping Specialties: Test all piping specialties for proper operation.

END OF SECTION

PART I – GENERAL**WORK SPECIFIED HEREIN**

- Complete waste, drain, and vent system for domestic plumbing within the building, to a minimum of 5'-0" outside the building as shown and provide final connection.
- Drain connections to all fixtures, devices and equipment requiring drain connections, including connections to air conditioning equipment, and equipment specified under other Sections.
- Excavation, trenching, backfill, and disposal of excess earth in connection with above system, in accordance with the requirements of Division 2, Site Work.

SUBMITTALS

- Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.
- Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

PART II – PRODUCTS**MATERIALS**

- Basic materials, as specified in Section 15101 Basic Materials and Methods Plumbing.
- Plumbing fixtures, equipment, and trim as specified in Section 15105 Plumbing Fixtures, Equipment and Trim.

PART III – EXECUTION**WORKMANSHIP**

- Verify fall measurements before starting work; be responsible for their correctness. Make variations only with Architect's permission.
- Do all cutting and patching of new and existing work necessary to accommodate plumbing. Cut structural members only where permitted by Architect. Perform all excavation and backfill required.
- Coordinate with others to provide necessary holes, slots, chases, etc., to accommodate plumbing as work progresses. Obtain Architect's approval for sizes of all openings.
- Pipe rough-in work shall proceed as rapidly as general construction of building will permit. Complete and test pipe rough-in before insulation of any other finish work is applied.
- Run pipe parallel to building elements and conceal all piping in walls, floors, ceilings, chases, unless otherwise noted on drawings. Install pipe work accurately to fit rough-in drawings of plumbing fixtures, heating equipment, cooling equipment, etc., in which it connects. Install pipes so that contraction and expansion will not damage the work.
- Drain vent lines back to waste lines. Collect vents together into one vent, where possible, to minimize number of vents terminating

through roof. Verify location of fresh air intakes indicated. Offset vents through roof to maintain distance of 10 feet away from said items. Install vent piping with each bend 45 degree minimum from the horizontal wherever structural conditions will permit.

- Vent piping penetrating the roof structure shall be rigidly anchored with angle iron frame work below the roof, bolted to roof structure.
- Locate all pipes out of the way of all doors, windows, service area, access holes, etc. Run no piping in or interfere with, bond beams or other structural elements.
- Test all pipe systems in presence of PETSMART and prove to be tight as per test prescribed by the latest edition - "Uniform Plumbing Code" and/or any other governing provincial or local code. Covering of work before acceptance is prohibited.
- Locate cleanouts as indicated on drawings or at a maximum 50 feet intervals. Fittings shall be long sweep bends, cleanout tees or combination Y and 1/8th bends. Plugs shall be heavy cast brass set with graphite and oil compound. Covers shall be flush with walls or floors and brass plugs shall be located and installed that they are readily accessible for removal. Where cleanouts are installed at fixtures or in plumbing chases, they shall be located above the floor rim of the fixture having the highest flood rim. Bring exterior cleanouts up to grade and set flush in concrete pad with top of pad set flush with grade.
- Slope all waste lines inside building 3" and smaller 1/4" per foot, 4" and larger 1/8" per foot minimum.
- Establish grade lines with surveyor's level. Verify location of all sewer connections before start of work and make necessary grade adjustments.
- Cushion all traps and bearings to minimize transfer of sound.
- Flush piping clean with water after installation.
- Install all plumbing to operate without objectionable noise or vibration.
- Install cleanouts on all waste stacks serving sinks, as indicated on the drawings and on waste lines at all change of directions, 100 foot maximum on center on straight runs and/or as required by local plumbing codes. Cleanouts to be the same size as the piping which they serve. Make all cleanouts accessible by either locating in wall within 6" of ceiling access panel, extending to floor or grade, or locating in wall with removable plate. Where surfacing materials, such as resilient floor covering or ceramic tile is used, install the cleanout with top so that finished surface is smooth and flush.

Where installed in waterproofed slabs, provide cleanouts with a non-puncturing flashing device and anchoring flange. See Section 15101 Basic Materials and Methods for all cleanout information. Insure cleanout plugs are hand tight.

TESTS

After completion inspect all systems and proper flow and make necessary adjustments. Cooperate with other trades in testing work under this section. Soil, waste and vent system shall be filled with water to highest point, not less than 5 psi static head, maintaining pressure without leaks or pressure for eight hours, without any leakage.

END OF SECTION

PART I – GENERAL**WORK SPECIFIED HEREIN**

- Furnishing and installing a complete domestic hot and cold water system within the building and outside of the building as shown, including water meters in meter boxes.
- Final hot and cold water connections to all fixtures, devices and equipment requiring water connections, including connections to air conditioning equipment, and equipment specified under other sections. Refer to the Equipment Coordination Schedule on the architectural drawings for all requirements. Provide ball valves on all water connections to all fixtures, devices equipment, and etc.
- Excavation, trenching, backfill, and disposal of excess earth in connection with above system, in accordance with above system, in accordance with the requirements of Division 2, Sitework.

SUBMITTALS

- Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.
- Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

PART II – PRODUCTS**MATERIALS**

Basic materials as specified in Section 15101, Basic Material and Methods.

Plumbing fixtures, equipment and trim as specified in Section 15105 Plumbing Fixtures, Equipment and Trim.

PART III – EXECUTION**WORKMANSHIP**

- Verify all measurements before starting work; be responsible for their correctness. Make variations only with the written permission of the Architect.
- Do all cutting and patching of new and existing work necessary to accommodate plumbing. Cut structural members only where permitted by architect. Perform all excavation and backfill required.
- Coordinate with others to provide necessary holes, slots, chases, etc., to accommodate plumbing as work progresses. Obtain architect's approval for sizes of all openings.
- Tube/Pipe rough-in work shall proceed as rapidly as general construction of building will permit. Complete and test tube/pipe rough-in before insulation or any other finish work is applied.
- Run tube/pipe parallel to building elements and conceal all piping and ducts in walls, floors, ceilings, chases, unless otherwise specifically noted on drawings. Install tube/pipe work accurately to fit rough-in drawings of plumbing fixtures, heating equipment, cooling

equipment, etc., into which it connects. Install tubes/pipes so that contraction and expansion will not damage any work. Provide necessary concrete thrust blocks for all underground piping.

- Locate all tubes/pipes out of the way of all doors, windows, service areas, access holes, etc. Run no tubing/piping in nor interfere with bond beams or other structural elements.
- Provide manufactured water hammer arresters, for all isolated fixtures and each fixture battery on both hot and cold water lines that contain any device, equipment, or flush valve containing a solenoid or quick opening valve, i.e., laundry, washing machine, urinal, etc. Install per manufacturer's recommendations.
- Test all tube/pipe systems and prove to be tight as per test prescribed by the latest city adopted edition - "Uniform Plumbing Code" and/or any other governing provincial or local code. Covering of work before acceptance is prohibited.
- Install drain valves at all low points of each system to enable complete drainage, and air vents at all high points in the piping system to enable complete air venting.
- Water piping installed in an exterior wall shall be electrically traced.

DISINFECTING DOMESTIC WATER LINES:

- Disinfect all lines with fluid chlorine or hypochlorite. Introduce sufficient chlorine to provide an initial concentration of 50 ppm. Disinfect for 24-hour period, opening and closing valves in system at various points during disinfection, per health department requirements.

PREPARATION**Service Cock:**

- Provide service cock or valve within three feet of supply main for introducing disinfecting agent into lines.

Flushing:

- Leave each fixture or outlet wide open after final pressure test until flow shows only clear water.

Domestic Hot Water Temperature:

- Reduce to that of cold water system during disinfecting procedure.

PROCEDURE

1. **Flushing:** With system full of water and under main pressure, open all outlets.
2. Inject disinfectant through service cock at slow, even continuous rates until orthotolidine test at each outlet shows chlorine residual concentration of more than 50 parts per million (ppm).
3. At ends of all waste lines more than five feet in length.

4. **Test:** Orthotolidine test, after 24-hour period, shall indicate minimum chlorine residual concentration of 50 ppm. If not, repeat disinfection procedure until the standard is attained.
5. **Final Flushing:** After satisfactory completion of above test, flush out system until orthotolidine tests show maximum chlorine residual of 0.5 ppm.
6. **Bacteriological Analysis of Water:** After final flushing, analyze water samples to test negative for coli-aerogene organisms. Analysis to indicate total plate count less than 100 bacteria per cc or equal to control sample.
7. **Final Approval:** If analysis results are not satisfactory, repeat disinfection procedure until specified standards are met.
8. **Certification:** Submit a certificate stating (1) system capacity, (2) disinfectant used, (3) time and rate applied, and (4) resultant residuals in parts per million at completion of work.
9. Provide a pre-cast concrete valve box with cast iron cover over each underground valve. Set valve a minimum of 24 inches below grade, or below frost line, whichever is greater, with stem extended to maximum of 6" below cast iron cover.
10. Install all tubing/piping to operate without objectionable noise or vibration.
11. Water tubing/piping below grade shall be buried a minimum of 18", or below frost line, whichever is greater.
12. Provide a water shut-off valve and hose bibb drain on all water supply lines where they enter buildings.
13. Shut-off valves above suspended ceiling no more than 1 foot above ceiling elevation or readily accessible.

PROTECTION OF MATERIALS

- Protect all fixtures and material against damage or use during construction.

TESTING

- After completion, inspect and test all fixtures for adequate water pressure and flow and for proper flushing action, and make necessary adjustments. Cooperate with other trades in testing fixtures and equipment involving work under this section. Test system hydrostatically 1-1/2 times operating pressure and maintain without leaks or pressure loss for eight hours.

END OF SECTION

PART I – GENERAL**WORK SPECIFIED HEREIN**

- All pipe insulation, for new domestic hot water, cold water supply piping and condensate piping.

SUBMITTALS

- Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.
- Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

PART II – PRODUCTS**ALTERNATE EQUIPMENT**

- Below is list of alternate equipment. Refer to Section 15000 for instructions.
- Pipe insulation: Owens-Corning, Certain-Teed, Johns-Manville, Armstrong.
- Pipe insulation fittings: Zeston, Manville, or equal.

MATERIALS

- All domestic cold and hot water piping exposed above finished floor, and within partition walls including ALL PEX piping, shall be insulated to conform to ASHRAE standards.
- All condensate piping shall be insulated.
- Insulation Schedule: 1/2" insulation for pipes up to 3/4" diameter.
1" insulation for pipes 1" - 2" in diameter
1-1/2" insulation for pipes greater than 2" in diameter
1/2" insulation for all PEX tubing
- All insulation shall be fiberglass 25 ASJ/SSL with 4" wide longitudinal lap joints and end strips.
- All insulation, vapor barriers, jackets, and adhesives used for applying them shall have a U.L.C. flame spread classification of not more than 25 and a smoke developed rating not more than 50.
- Valves and fittings shall be insulated to same thickness as pipe insulation with only wheel and adjusting nut visible. Provide pre-molded plastic fittings at all valves and fittings (Fiberglass).
- Hangers - 180° rigid insulation section at all hangers. Eight inches long, 90°, 20 gauge, galvanized steel insulation guard and rigid insulation on lines 2-1/2" and larger.
- All piping at hot water tanks is to receive PVC jacket
- All rain water leaders are to be insulated with minimum 1" insulation. Rain water leaders are to receive PVC jacket.

PART III – EXECUTION**WORKMANSHIP**

- Tightly butt all end joints together.
- Valve bonnets and flanges will be completely insulated. All miters and raw ends of piping covering are to be fully sealed neatly in place with butt strip and fire retardant sealing adhesive. Use NO staples.
- Fittings or fabricated mitered segments of pipe insulation securely wired in place. Cover mitered segments with a 1/4" coat of hard setting finishing cement. Insulate flanges with sectional pipe insulation extending a minimum of 1" beyond the ends of the bolts. Fill both areas with mineral wool cement. Insulate fittings with insulation cement to the thickness on adjacent piping. Apply insulation in 2 layers. Allow the first layer to dry before applying a second layer. Trowel the final coat to a smooth, even finish. The cover the fittings with a ounce canvas and "Arabol Lagging Adhesive" to a smooth finished surface. Finish all exposed canvas jacketing with two coats of "Arabol Lagging Adhesive".
- Contractor shall be responsible for the replacement of all insulation installed as a part of his work that is damaged by water, etc., during the construction period.
- All hanger rods must be perpendicular before piping covering is applied.

END OF SECTION

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PART I – GENERAL

WORK SPECIFIED HEREIN

- All plumbing fixtures, equipment, plumbing specialties, traps, drains, etc., required.
- All carriers, hangers, bases and supports for plumbing fixtures, equipment, and trim.
- Installation of plumbing fixtures, equipment, and trim.

SUBSTITUTIONS

In accordance with Section 01600.

SUBMITTALS

- Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.
- Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

PART II – PRODUCTS

GENERAL

- *Plumbing Trim:* All exposed faucets, traps, connecting piping, stops, flush valves, and other fixtures trim shall be chromium plated, polished brass unless otherwise specified.
- Accessories, in general, are listed for each fixture. The Plumbing Contractor shall however, supply all stops, traps, escutcheons, connections, etc., as necessary to complete the installation of each fixture, whether such items are listed or not.
- Vacuum breakers shall be furnished and installed as a part of the fixture trim wherever there is a possibility of back siphoning. All water faucets, hose bibbs, etc., with threaded hose ends shall have vacuum breakers.
- Check valves shall be furnished and installed in connection with all mixing fixtures, which normally might allow cross-circulation of hot and cold water when the fixture would not be in actual use.
- Fixture Stops: Shut-off for urinal flush valves shall be an integral part of the fixture or fitting. Shut-off for all other fixtures shall be angle or straight type adapted for each particular location and shall be located immediately adjacent to the fixture. All fixture stops in public areas shall be keyless.
- After all fixtures have been set and are ready for use and before the Contractor leaves the job, he shall thoroughly clean all fixtures furnished and set by him, no discoloration on fixtures, leaving every part in good condition.

- All special equipment indicated on the Drawings and listed in the Equipment Specification Division will be furnished in place under the General Contract.
- Plumbing Contractor shall rough in all services (waste, vent, water etc.) indicated for the equipment and after same is set in place, he shall make all service connections required for each item of equipment (under the direction of the supplier of the equipment) including the installation of service fixtures and all piping required to make equipment operable. SECURE APPROVED SHOP DRAWINGS FROM PROFESSIONAL OF RECORD PRIOR TO ROUGH IN.
- Plumbing Contractor shall furnish and install shut-off valves on lines to equipment as shown on the plans and all direct waste lines shall be provided with "P" traps of proper sizes by this Contractor.
- All carriers for plumbing fixtures shall be securely bolted to the floor. Drinking fountains shall be mounted as indicated on the Architectural Drawings.
- Fixture Backing: Provide backing for wall hung fixtures other than for those with carriers.
- Stud Walls: Install 1/4" x 6" wide steel flat backing plate to the inside web of the studs and secured to at least three studs by welding or bolting.
- Concrete Walls: Securely fasten steel brackets with heavy expansion shields and bolts of proper length.
- Trap Primers: Shall be installed on cold water supply at nearest fixture and run supply to trap being protected. Trap primers shall be installed above ceiling or in plumbing wall with access door, and shall not be exposed in toilet rooms. All floor drains in toilet rooms shall be protected by trap primers. Provide trap primers on all floor sinks in mechanical, janitor, storage and utility rooms where required by code.
- All toilet seats shall be fireproof and be provided with concealed spring check hinges, self-sustaining.
- All indirect waste shall be piped to nearest floor sink as required by code.
- Refer to the Equipment Connection Schedule on the Architectural Drawings for all requirements of this Contractor. Include in his bid an amount to do such work.
- The plumber is to furnish and install silicone sealant around the perimeter of all service sink edges touching an adjacent wall.

END OF SECTION

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PART I – GENERAL

WORK INCLUDED

- Cross-linked polyethylene (PEX) tubing and fittings.
- Submit product data in accordance with General Conditions and Division 1.

INDEMNIFICATION

In consideration for allowing the use of the specifically manufactured PEX systems and products, the Plumbing Contractor and the PEX manufacturer both hereby agree, jointly and severally, to indemnify, defend, and hold harmless Architect and/or Engineer of Record and related entities, as well as their principals, shareholders, employees and all heirs and assigns from any and all related consequences and claims arising from the use of a PEX piping system for all water services.

REFERENCES

- ASTM International
 1. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials
 2. ASTM F876 Standard Specification for Cross-linked Polyethylene (PEX) Tubing
 3. ASTM F877 Standard Specification for Cross-linked Polyethylene (PEX) Plastic Hot- and Cold-Water Distribution Systems
 4. ASTM F1807 Standard Specification for Metal Insert Fittings Utilizing a Copper Crimp Ring for SDR9 Cross-linked Polyethylene (PEX) Tubing
 5. ASTM F2159 Standard Specification for Plastic Insert Fittings Utilizing a Copper Crimp Ring for SDR9 Cross-linked Polyethylene (PEX) Tubing
- Canadian Standards Association (CSA)
 1. CAN/CSA B137.5 Cross-Linked Polyethylene (PEX) Tubing Systems for Pressure Applications
- International Code Council (ICC)
 1. International Mechanical Code
 2. International Plumbing Code
- Plastics Pipe Institute (PPI)
 1. Technical Report TR-3 Policies and Procedures for Developing Recommended Hydrostatic Design Stresses for Thermoplastic Pipe Materials
 2. Technical Report TR-4 Recommended Hydrostatic Strengths and Design Stresses for Thermoplastic Piping and Fitting Compounds

WARRANTY

- Manufacturer's warranty covers the repair or replacement of any properly installed tubing or fittings proven defective and incidental damages.

1. NSF61 Drinking water system component health affects.

- Warranty period for PEX tubing: 25-year non-prorated warranty against failure due to defect in material or workmanship, beginning with date of substantial completion.

PART II – PRODUCTS

GENERAL

- All products, components, etc., specified herein shall be supplied by the PEX tubing manufacturer.

TUBING

Material: Cross-linked polyethylene (PEX) manufactured by PEX-b or Silane method.

- PEX tubing shall have a smoke developed rating of less than 50 and a flame spread rating of less than 25 in general accordance with ASTM E-84.
- Material Standard: Manufactured in accordance with ASTM F876 and ASTM F877 and tested for compliance by an independent third-party agency.
- Material Standard: Tested and listed for chlorine resistance according to the requirements of ASTM F876.
- Pressure Ratings: Standard Grade hydrostatic design and pressure ratings as issued by the Plastics Pipe Institute (PPI).
- Minimum Bend Radius (Cold Bending): No less than six times the outside diameter. Use PEX tubing manufacturer bend supports if radius is less than stated.
- Non-Barrier Tubing Type: PEX Non-Barrier Tubing
 1. Shall have a Pressure and Temperature rating of 160 PSI at 73°F, 100 PSI at 180°F and 80 PSI at 200°F.
 2. Provide tubing with nominal tube size in accordance with ASTM F876, size as required by manufacturer's recommended design to meet criteria on Plans.
 3. Tubing shall have a minimum of 6 months' UV protection.

FITTINGS

For system compatibility, use fittings offered by the PEX tubing manufacturer.

- The fitting assembly must comply with ASTM F877 and CAN/CSA B137.5 requirements.
- Poly Alloy Polymer Fittings (Quick/Sert CR) ½" – 1" diameter.
 1. Fittings manufactured in accordance with ASTM F2159.
 2. Poly Alloy Polymer Fittings are identified by the letters "Q" and "PEX" molded on the outside of the fitting.
 3. The fitting assembly consists of a barbed adapter and an applicable sized stainless steel QuickClamp.

- Brass (Qick/Sert 1), 1 1/4" – 2" diameter
 1. Fitting manufactured in accordance with ASTM F877.
 2. The fitting assembly consists of a brass barbed adapter and an applicable sized copper crimp ring.

VALVES

- Branch lines 1/2" – 1" diameter.
 1. Qest Pex Qick Sert inlet ball valves.
 2. Main lines – 1-1/4 - 2" diameter.
 3. 2" and larger Wilkins Model 850 full port ball valve.
 4. Provide Zurn thread to barb fitting in applicable size.
 5. The valve assembly consists of a DZR brass MPT x PEX adapter and applicable sized copper crimp ring.
- Annealed Copper Crimp Rings
 1. Crimp ring manufactured per copper material specification in ASTM F1807.
 2. Annealed Copper Crimp rings are black and identified by the letters "Q" and "PEX" stamped on the outside of the ring.
- QickClamp
 1. Made of stainless steel, listed to the requirements of ASTM F877 when used with PEX tube and Qick/Sert 1 fittings.
 2. QickClamp rings are identified by the letters "QickClamp" stamped on the outside of the ring.
 3. QickClamp rings shall have the following features:
 - a. Crimping Ear that allows one tool for multiple sizes
 - b. Bridge feature providing uniform crimping forces
 - c. Locating shoulder to properly position critical components
 - d. Gripping ribs
 - e. Position indicator

MANUFACTURER'S INSTRUCTIONS

Comply with manufacturer's product data, including product technical bulletins, installation instructions and design drawings.

SITE VERIFICATION OF CONDITIONS

- Verify that site conditions are acceptable for installation of the PEX plumbing system.
- Do not proceed with installation of the PEX plumbing system until unacceptable conditions are corrected.

FIELD QUALITY CONTROL

- Site tests.
 1. To ensure system integrity, pressure test the system before covering tubing in concrete or when other trades are working in the vicinity of the tubing.

END OF SECTION

PART III – EXECUTION

DELIVERY, STORAGE, AND HANDLING

- Materials shall remain in manufacturer's original, unopened, undamaged containers with identification labels intact, until ready for installation.
- Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.
 1. Store PEX tubing in cartons or under cover to avoid dirt or foreign material from entering the tubing.
- Do not expose PEX tubing to direct sunlight for more than 30 days. If construction delays are encountered, cover the tubing that is exposed to direct sunlight.

PART I – GENERAL

NOTE

- Refer to Section 15000, General Provisions, Mechanical, which sets forth specific requirements for the mechanical contractors.

SUBMITTALS

- Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.
- Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

WORK INCLUDED

The work required under this division shall consist of all labor, materials, tools, equipment, power, transportation, hoisting implements, services, etc., of every description necessary for the entire completion of the heating, ventilating, and air conditioning work of the contract, all as specified herein and shown on the drawings complete in every respect.

The work in general consists of, but is not necessarily limited to the installation, test, and guarantee of the following work:

- Installation of ductwork according to SMACNA requirements. Connection to the package air-handling units, as manufactured by Lennox.
- Toilet room and miscellaneous exhaust systems.
- Weather seals at A/C unit curbs.
- Smoke Detectors at ductwork.
- Grilles, registers, ceiling outlets, louvers, dampers, and access doors.
- Insulation (Internal and External)
- Tests, balances, and adjustment.
- All special supports, other than concrete, required for HVAC equipment, furnished by the mechanical contractor.
- All other miscellaneous items of equipment, materials and ductwork, as hereinafter specified, as shown on the drawings, or as required for the proper completion and operation of the heating, ventilating, and air conditioning system.

REGULATIONS, PERMITS AND INSPECTIONS

- Regulations: All materials, equipment, and installation shall comply with all applicable codes, rules and regulations, all of which shall be considered a part of these specifications.
- Inspections: When required by code, all work shall be inspected and approved by local authorities. Prior to final review by architect, furnish Professional of Record with certificates of inspections and approvals by the local authorities, as per Section 01700.

END OF SECTION

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PART I – GENERAL**WORK SPECIFIED HEREIN**

- Ductwork, air devices, and associated equipment and materials.

SUBSTITUTIONS

In accordance with Section 01600.

SUBMITTALS

- Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.
- Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

PART II – PRODUCTS**DUCTWORK:**

- All exposed supply and return ductwork and all exhaust ductwork shall be fabricated of galvanized steel of lock forming quality with uniform galvanized coating of not less than 1-1/4 oz./sq. ft. Duct joining system shall comply with SMACNA standards.
- Antimicrobial duct board, manufactured by Johns Mansville, MatFaced Micro-Aire, Fiberglass Duct Board Type 475 and Type 800.

FLEXIBLE DUCTWORK:

- All concealed supply and return ductwork shall be wiremold type WG insulated flexible air duct. (United Sheet Metal, Thermoflex). Use ONLY where allowed by local code, if not approved use galvanized sheet metal spiral ductwork as specified for exposed ductwork.

TURNING VANES:

- Single thickness vanes per Figure 2.3 with runners screwed to the ductwork per SMACNA Duct Standards.

VOLUME DAMPERS:

- Manual opposed blade type with damper lock and indicating quadrant (Airstream, Ruskin, Louvers & Dampers, Inc.).

FIRE DAMPER:

- Provide suitable access panels. Construct in accordance with Code requirements. Air Balance Model 119 AL Type B or approved equal, sized with open damper out of air stream. Install per manufacturers directions and SMACNA manual on fire dampers.

GRILLES, REGISTERS, DIFFUSERS (KRUEGER):

- Grilles, diffusers, and registers shall be as indicated on the schedule on the Drawings, and shall be furnished with frame style suitable for the type of ceiling in which installed. Refer to drawing for finish

color. Provide Neoprene gasketing around the inside of the frame of all units.

ACOUSTICAL DUCT LINER:

- The inside of the supply return ducts from the air conditioner to a distance of 10'-0" from the unit, all transfer ductwork and return air plenums shall be lined with Owens-Corning QuietR AcoustiTex Duct Liner Type 200, 1" thick or other approved duct liner acoustical board (Certainteed, Schuller).

SPIN-IN BRANCH DUCT CONNECTOR:

- Flexmaster West Model FLDE or approved equal, including adjustable locking type quadrant damper.

BIRD GRILLES:

- At all exhaust fan openings and other miscellaneous mechanical openings, provide maximum 1/4" square bird grilles.

FILTERS:

- Unit filters shall be CAM-FARR 30/30 (2") or Equal.

PART III – EXECUTION**WORKMANSHIP**

- All ductwork installation shall conform to latest edition of the applicable SMACNA Duct Construction Standards, except where more stringent requirements are called for herein. At all times keep available at the Project Site for reference purposes, a minimum of one SMACNA manual pertaining to the specific duct system used.
- Do all cutting and patching necessary to accommodate air conditioning. Cut structural members only where permitted, attain written permission from the Structural Professional of Record before the cutting of any structural member.
- Coordinate with others to provide necessary holes, slots, chases, etc., to accommodate ductwork as work progresses. Obtain Professional of Record's approval for sizes of all openings. If structural difficulties prevent installation of work as shown, make variations thereon, only as directed by the Professional of Record, with no change in Contract amount.
- Rough-in work shall proceed, as rapidly as general construction of building will permit.

- Run all ductwork parallel to building elements. Conceal all ductwork in walls, floors, ceiling, chases, unless otherwise shown or noted on drawings. Install work accurately to fit the rough-in drawings of heating equipment, cooling equipment, etc., into which it connects.
 - Locate duct out of the way of all doors, windows, service areas, access holes, access spaces, etc.
 - Care must be taken to keep the inside of all ducts clean during and after erection.
 - No pipes or other obstructions shall pass through air ducts.
 - Poorly made joints, splits, visible holes, etc., shall be reworked or new pieces of ductwork installed as directed by the Professional of Record. Where excessive pulsating of ductwork or plenum housing is found, additional stiffeners shall be added as directed.
 - All changes in the cross section of ducts shall be made by transformations without contracting the area of the ducts. Necessary changes in cross section, offsets, etc., shall be made throughout the system whether or not specifically shown on the Drawings.
 - Centerline radius of curves, bends, offset, branch connections, etc., equal to 1-1/2 times the width of duct or larger.
 - Install single thick turning vanes in all square elbows and tees (and elsewhere when shown), on both supply and return ductwork.
 - The angle for transformation at connections to equipment of plenums must not exceed 20 degrees from a line parallel to the air flow. The angle of approach may be increased to meet space conditions when the transformation is within reasonable limits and the angle of approach must be approved by the Professional of Record prior to fabrication of the ductwork.
 - All grilles, registers, and diffusers shall set flush and true to the wall or ceilings to prevent air leakage around the edges. Provide plaster frames for all outlets in plaster or gypsum board.
 - Provide barometric dampers in the neck of all exhaust air fans and elsewhere as indicated on the drawings.
 - Provide volume dampers where shown or specified.
 - Exhaust fan discharge shall be a minimum of 10'-0" removed from any fresh air inlets.
 - Construct duct openings at outlets so that plaster will not crack, chip, or peel beyond flange.
 - Acoustical Duct Liner: Secure 1" thick duct liner to duct interior with 3-M, EC-K-4, coated side facing air stream. Form longitudinal joints in one corner of duct with all joints tightly butted and heavily sized. Where duct liner leading edge is exposed to air stream, (protect with sheet metal closure per SMACNA) size heavily same as joints. Duct sizes shown on Drawings are clear inside dimensions. Increase duct size to allow for liner.
 - Apply insulation over surfaces which have been wiped clean and dry. Impale insulation over weld pin fasteners on 12" x 18" centers with a minimum of 2 rows of fasteners per duct side and not less than 2 fasteners per section of insulation. Use no remnant less than 12" x 12" by duct side if the duct side is less than 12". Secure insulation with a speed washer (round beveled) or clip on each weld pin, applied flush to the face of the insulation without depressing the surface. Cut off weld pins as close to the washer as possible. Apply corner angle of not lighter than 28 gauge galvanized sheet metal or 26 gauge aluminum with 1/2" lag to all corners and secure to the insulation. But all joints firmly together and seal all joints, breaks, cracks and perforations in the vapor barrier to insure a continuous vapor barrier surface. Seal with 4" wide embossed aluminum foil vapor barrier type embedded in a coat of mastic. Seal all self pin penetrations of vapor barrier with a 4" x 4" patch of aluminum foil tape.
 - All ductwork above roof or outside building walls, as indicated, to be weatherproofed.
 - Where ducts pass through walls or floors the opening between the duct and wall or floor shall be packed firm with fiberglass insulating material. Where ducts pass through fire partitions, the packing shall conform to all provincial and local codes. Furnish and install galvanized steel angles on all sides of the duct on both sides of floor or wall. Angles to be sufficient size to cover the openings between the wall or floor and the duct. Angles to be securely fastened to the duct with sheet metal screws.
 - Manual dampers above inaccessible ceilings shall be provided with Young Regulator #315A adjustable cover regulator complete with rods and damper operator. Provide access doors in place of Young regulators when building elements, ducts, or lights make it impossible to install regulators.
 - Inlet and outlet connections to all air handling equipment shall be made with glass fiber flexible connection not less than 4" full length with 1" slack, installed as per Figure 3-5 of the SMACNA Duct Standards.
- SHEET METAL DUCT FABRICATION
 - Use the following gauges:

<u>Largest Duct Dimension</u>	<u>Galvanized Steel Gauge</u>
Up to 12"	26
13" to 30"	24
31" to 48"	22
49" to 60"	20
61" to 84"	18
84" and above	16
 - Cross-break all sides of ducts over 18" maximum dimension, except exhaust ducts which shall be reinforced with standing seam locking.
 - Cross-joints and bracing shall be in accordance with Table 1 or the SMACNA Duct Standards. Longitudinal seams shall be Pittsburgh

lock or button punch snap lock. Longitudinal seam shall be heavily sealed with Arabol.

- Protect all exposed couplings for rotating machinery and belt drives with a substantial belt or coupling guard.
- Paint the inside of all supply, return and exhaust ducts and dampers one coat of flat black paint wherever the duct is visible through the opening. Where the duct insulation is visible from the room below, the insulation must have a black finish.

HANGING OF DUCTWORK

- All ducts shall have hangers or supports at joints and every six feet or less.
- Hangers for rectangular and square ductwork smaller than 35" shall be with strap hangers screwed to the ductwork as indicated at Figure 5-4. If strap length from top of duct to support exceeds 36" trapeze duct hangers shall be utilized. Hanger strap shall be sized and supported in accordance with Table 5-1.
- Hangers for rectangular and square ductwork larger than 36" in size shall be with trapeze hangers. Trapeze hangers shall incorporate threaded rod and steel angle iron support as shown at Figure 5-5. Design of the trapeze hangers shall as per Figure 5-5 for load diagram, Table 5-1 for rod sizes and Table 5-3 for trapeze loading at angles.
- Hangers for round ductwork smaller than 23" diameter shall be with strap hangers as shown at Figure 5-4. Straps shall be screwed or bolted to a band which will be the same size as the strap hanger.
- Sizes for the strap hanger shall be in accordance with Table 5-1.
- Hangers for round ductwork larger than 24" shall be with trapeze hangers as called for at paragraph above.
- Refer to the Structural Drawings for structural attachment requirements. At precast tee construction use manufactured concrete inserts provided. At beams and purlins use beam clamps. At open web joists use required angles and straps. Metal decking shall not be penetrated.
- Where ductwork risers are supported from the floor, install as per Figures 5-6 and 5-7.
- All figures and tables referred to above shall be from the edition of the SMACNA low pressure duct standards, 5th Edition.

END OF SECTION

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PART I – GENERAL

WORK SPECIFIED HEREIN

- Supply and return duct insulation.

RELATED WORK

- Specified under other Section.
- Acoustical duct liner (in Section 15202 - Basic Materials and Methods - Air Distribution Systems).

SUBMITTALS

- Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.
- Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

PART II – PRODUCTS

MATERIALS

- Insulation shall be Owens-Corning, Armstrong, Schuller or CertainTeed.
- All insulation, vapor barriers, jackets, and the adhesives used for applying them shall have a U.L.C. flame spread classification of not more than 25 and a smoke developed rating not more than 50.
- Duct Sealant: McGill Uni-Mastic 181 Duct Sealer or equal. Polymeric Rubber Duct Sealant shall be used for sealing of joints. Sealant shall be high in solid content and have high bonding strength. Any/all tape adhesives are NOT acceptable. All ductwork shall be sealed in accordance with SMACNA Seal Class "C".
- Duct Wrap: Owens-Corning SoftR Fiberglass Duct Wrap Type 75 – 0.75 pcf, 1-1/2" thick with vapor barrier or other approved duct wrap. Delete where acoustical liner is used.
- Duct Liner: Owens-Corning QuietR AcoustiTex Duct Liner Type 200, 1" thick or other approved duct liner. Duct liner shall have anti-microbial agents in the coating and shall have a durable cleanable surface.
- Ductwork located in the store exposed to the room, will not be insulated. Ductwork located above the suspended ceilings shall be insulated as indicated on construction documents and called for at the above paragraphs.
- Exhaust ductwork shall be insulated with duct wrap for a minimum of 10ft. from exterior penetration.

PART III – EXECUTION

WORKMANSHIP

- Contractor shall be responsible for the replacement of all insulation installed as a part of this work, that is damaged by water, etc., during the construction period.
- All hanger rods must be perpendicular before duct covering is applied.
- Adhere insulation to duct with fire retardant adhesive in sufficient quantities to prevent sagging. Insulation shall be butted with facing overlapping all joints at least 3" and sealed with fire retardant vapor barrier adhesive. Seal all breaks and punctures with vapor tape and same type of fire retardant adhesive.
- Blanket insulation shall be wrapped with 3" overlap at all joints and tied with #18 G.I. wire at 12" on center (3" o.c. at fittings, elbows, etc.).

END OF SECTION

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PART I – GENERAL

WORK SPECIFIED HEREIN

- All heating, ventilating and air conditioning equipment, specialties, etc., required.
- Supply, and exhaust equipment, etc. as required.
- All hangers, supports, and based (not concrete) required for the installation of specified equipment herein.
- Tests, balance, and adjustments.
- All equipment requiring electrical power shall be U.L.C. Listed and be provided with U.L.C. Label.

SUBSTITUTIONS

- This is a Required Vendor. No substitutions allowed.

SUBMITTALS

- Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.
- Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

PART II – PRODUCTS

EXHAUST FANS

- *General:* Provide roof caps, wall caps, flashings, bases, speed switches integral inlet grilles, backdraft dampers and duct connections as indicated or specified.
- Provide internal disconnecting means and overload protection on all units 1/2 HP and smaller and/or 120 volt single phase.
- Provide Captive Air exhaust fans with approved internal vibration isolators as indicated or specified.
- All belt driven exhaust fans shall have adjustable motor pulleys for fan speed control. Rate belts for 150% of motor rates HP.
- All fans shall be AMCA certified and approved.
- Sound levels shall not exceed those indicated.

AIR CONDITIONING UNITS (ROOF TOP-GAS)

Contractor to contact: Lennox Industries, Inc.

For Pricing: Jane Gunter (905) 497-6869

(This is a Required Vendor)

For Delivery: Jane Gunter (905) 497-6869

For Start-Up Support: Jane Gunter (905) 497-6869

Unit shall be combination heating and cooling units complete including:

- Units shall be a one-piece air-cooled electric cooling, gas-heating unit.
- Heating capacity of units shall be as shown on the drawings.
- Multiple hermetic/scroll compressors shall be resiliently mounted, have overload protection, internal pressure relief, compressor monitor, and crankcase heater. Compressors shall be protected with 5 minute time delay.
- Compressor warranty shall be five (5) year parts only.
- Indoor and outdoor coils shall be of nonferrous construction with aluminum fins bonded to seamless copper tubes with all joints brazed.
- Indoor Centrifugal supply blowers shall have permanently lubricated ball bearings and adjustable belt drive. Motor mount base shall be slide out design (ENERGENCE series) to permit ease of motor changeover and belt tension adjustment.
- Outdoor direct drive fan motors shall be totally enclosed, permanently lubricated and inherently protected. Fans shall have safety guards with rain shield.
- The cooling system shall be protected with expansion valves, high capacity drier, high pressure switches, and loss of charge switches. Factory installed freezestat to prevent evaporator coil freeze up during low ambient operation. Independent refrigerant circuits provide staging control to fit varying cooling needs.
- Heat exchanger shall be tubular in design and constructed of corrosion resistant aluminized steel. Heat exchangers shall carry a full 10 year parts warranty.
- Heating controls shall consist of direct spark ignition with a redundant dual gas valve for two stage operation. Flame roll out switch shall be provided.
- Bottom power entry for electrical wiring shall be provided through unit roof mounting curb and unit bottom.
- Roof mounting curb shall be provided by unit manufacturer. Curb shall be minimum height of 14 inches.
- Economizers with barometric relief shall be on each unit.
- Electrical convenience package: Unit mounted disconnect (factory wired), Electrical Contractor is to bring power to disconnect, dual 120V GFI Service outlet (field wired), and hinged box cover.
- Smoke detectors will be factory installed by manufacturer where required. See Mechanical Drawings for locations and units.
- The installing contractor shall be responsible for coordinating release of units for delivery with Lennox. Contractor shall coordinate with Lennox and the General Contractor so that the HVAC units may be hoisted directly from the truck to the roof.

- Packaged rooftop units shall include factory installed Lennox Logic controls. Lennox ETM-2051.

Controls shall include:

- Wall Temperature Sensor shall be provided for field mounting below unit. (Required Vendor) Lennox.
- Prodigy M2 Unit Controller:
 1. Provides control function for Emergence roof-top unit.
 2. Includes a user interface consisting of a dot matrix display, navigation arrow buttons, as select button and a USB port.
 3. Provides status and diagnostic information for troubleshooting.
 4. Allows adjustment of time delays and setpoints that enable advanced features.
 5. Is controlled by a standard room thermostat, direct digital controller (DDC) or a zone sensor.
 6. Can be configured as a device on the network when daisy-chained to the L Connection Network.
 7. May be connected to a PC which has been loaded with Unit Controller software.
 8. Accepts add-on boards to build variations according to application or equipment type.
 9. USB verification.
- Lennox/RSI series 570 Duct and Diffuser package consisting of supply duct, return duct, return duct grill and four-way supply stepdown diffuser. All components to be field installed by mechanical contractor.

EQUIPMENT OPERATIONAL CHECK

- After the Mechanical Contractor completes the HVAC installation and start-up, as per the manufacturer’s instructions, Lennox authorized personnel shall inspect the equipment and its operation. The Equipment Operational Check (EOC) shall provide for a check to ensure system operation and proper unit installation by Mechanical Contractor.
- The Mechanical Contractor shall schedule the EOC with Lennox at least three (3) weeks prior to desired date. Contact: Jane Gunter (905) 497-6869.
- Weather seals shall be provided at all units.

ELECTRICAL WIRING

- Mechanical equipment having electrical motors shall be furnished with all necessary control devices for the protection of each motor and for automatic and manual control, under this Section of these Specifications.

- All control and low voltage wiring for automatic controls and labor for installation shall be included in this Section of these Specifications.
- All electrical temperature control devices, thermostats, relays, switches, pushbuttons, hand-off-auto switches, pilot lights, etc., will be furnished under this Section of Specifications.
- All motor starters and controllers which are integral with the equipment must be furnished under this Section of these Specifications and installed under the Electrical Section.
- Mechanical contractor shall verify site/system voltage prior to ordering HVAC equipment.
- All starters, controls, relays, and wiring must conform to the NEC.

BALANCING OF AIR SYSTEMS

- The General Contractor shall be responsible for scheduling the testing, adjusting, and balancing directly with National Vendor, see drawing F2.0 at least 4 weeks in advance.
- This work shall be performed after the HVAC system start-up and 1 week before turnover to Operations. Gas and electric power must be turned on, all doors and windows installed, and ceiling tiles in place.
- Testing, adjusting, and balancing the HVAC system shall ensure optimal performance, comfort, and energy efficiency.
- This service covers the testing, adjusting, and balancing of all heating and air-conditioning and exhaust ventilation systems. A certified report shall be submitted to the Owner within 1-2 weeks of completion.
- The Testing, adjusting, and balancing work shall be completed in accordance with the following checklist:
 1. Inquire about any design, equipment, and installation problems or deviations and/ or changes from “Bid Set/Construction Set” of Mechanical Drawings.
 2. Compare installed system to mechanical plans.
 3. Document design specifications for report.
 4. Ensure all fans are running for balance.
 5. Measure initial building pressure.
 6. Inspect units and document any deficiencies.
 7. Record unit nameplate data.

8. Check thermostats for proper wiring and settings.
9. Check for correct fan rotation (include condenser fans).
10. Check conditions of filters and coils.
11. Check position of outside air dampers.
12. Check gas lines and condensate lines.
13. Check belt tension and pulley alignment.
14. Check disconnect switches and covers.
15. Check any fan noise and vibration.
16. Check heating/cooling modes of RTU's.
17. Measure RTU supply and return airflows.
18. Adjust RPM as necessary to achieve design.
 - a. Check actual amps versus motor FLA.
 - b. Note adjustments made on pulleys.
 - c. Measure final RPM's.
19. Damper at branch takeoffs first and at diffusers second.
20. Check for drafts and hot/cold spots.
21. Ensure slightly positive building pressure.
 - a. Fine tune position of OA dampers.
 - b. Measure final building pressure.
22. Review report and data for completeness.
23. Discuss findings and results with superintendent and PETSMART Construction Manager
24. Submit certified report along with recommendations to Owner. This document is to also be uploaded to the "PETSMART Construction Website"
 - Air quantities shall be balanced to within +/-10% of design as a general rule. However, in some cases, the air quantities may need to be adjusted differently in order to ensure acceptable comfort levels, proper hood capture, positive building pressure, etc.
 - Balancer shall notify the superintendent and PETSMART Construction Manager of any deficiencies needing immediate attention, and the G.C. shall have the mechanical and electrical contractors available on call to promptly correct any such problems (i.e. replace burned out motors, failed thermostats, incorrect wiring, bad circuit breakers and starters, dirty filters, missing dampers, undersized RTU outside air intakes).
 - In the event Balancer needs to reschedule a follow up visit to test and balance any equipment not ready on the originally

scheduled T & B date, the G.C. shall be responsible for the additional cost involved, including travel.

CLEANING AND REPAIRS

At the completion of the Work, all exposed equipment, piping, apparatus, and material shall be thoroughly cleaned of oil, grease, dirt, rust, cement, plaster, etc. All cracks and corners shall be scraped out clean; finished surfaces shall be cleaned and polished; confirm all fins are combed and straight.

All damage to glass or the finish or structure of adjacent work shall be properly repaired or replaced. All unused construction material in or about the building construction and all dirt and rubbish caused by the work under this section shall be removed. The premises shall be left in a neat, clean, unblemished condition to the complete satisfaction of the Professional of Record.

NOTE: After completion of all final cleaning, all filters must be changed and all grilles must be cleaned throughout the building at time of punchlist/turnover of the store.

INSPECTION AND TESTS

Test shall be made before the rough work is covered. The system may be tested in parts, if approved by Professional of Record.

When the tests of inspections show the work is in any way defective, material or equipment shall be removed from the premises, and replace with acceptable new material.

TESTING OUT

- It shall be the responsibility of the contractor to check out and test operate all equipment installed under this Section of these specifications, including a check of all work performed under the electrical, and plumbing sections in conjunction with the equipment installed under this Section.
- The Contractor shall check the electrical work to see that the power is properly supplied to all electrical motors and that all electrical controls are properly hooked up in the control circuits.
- The Contractor shall make sure that each unit is ran for at least one hour, in order to properly burn off the oil from units. It is recommended that the blower fan is disconnected and the unit runs until the high temperature switch shuts unit off.
- The Contractor shall check all of his own work and see that all controls are in good working order and properly adjusted. After the equipment has been properly checked and adjusted, the Contractor shall start up and run all equipment enough to determine that the installation is complete.
- When the tests or inspections show that the Work is in any way defective or at a variance with these specification requirements, the contractor shall immediately make all changes necessary to correct the work and remedy the defects to the satisfaction of the Professional of Record. Any defective material or equipment shall be removed

from the premises. In the event the contractor does not remedy all defects and make all the changes required by the Professional of Record within a reasonable time, the right is reserved to have the defects remedied or changes made and to charge the cost of the work against the account of the contractor.

- The contractor shall furnish all appliances, equipment, and labor for the tests and shall meet all the expense of the tests.

FINAL TESTS

Before acceptance and final payment and at a time designated, a complete test shall be made to demonstrate that the air qualities are balanced for even temperatures throughout, that all controls are adjusted and that, in general, the system is placed into proper operation. A skilled operation engineer shall be furnished for a period of at least four days, at a time or times required designated by the Owner, to instruct the Owner's representative in the operation and maintenance of the system.

INSTALLATION MANUAL

See section 15000.

FORMS FOR CLOSEOUT MANUAL

Subcontractor is to arrange to have a formal Test & Balance report completed and incorporated/included in the closeout documents.

Subcontractor is to label each unit with a 3" size reflective number for easy visibility from the side ladder, and should use this number in the "HVAC Equipment List" (see below).

The form titled "HVAC Equipment List," located in "HVAC" of the drop-down list in the "PM Files" tab at the top of each project on the construction website, must be filled out by the General Contractor after compiling the needed information from the HVAC subcontractor after installation. It must then be posted under the appointed store project for appropriate parties' general information.

NOTE: Retainage will not be paid until all this HVAC form is completed and posted on the website.

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END OF SECTION

PART I – GENERAL**NOTE**

- Refer to Section 15000, General Provisions, Mechanical, which sets forth specific requirements for the Mechanical Contractors, with additions and modifications specified herein.

SCOPE OF WORK

- A complete wet pipe automatic fire sprinkler system for the entire project. The Fire Protection Professional of Record (Licensed Engineer) shall be retained and paid for by the Fire Sprinkler Contractor.

SUBSTITUTIONS

- In accordance with Section 01600.

SUBMITTALS

- The contractor shall prepare all shop drawings, product literature, etc. as required to properly coordinate and construct the project, and as per the requirements of the Project Manual.
- Submit the following items for review by the Architect/Engineer Professional of Record in accordance with Section 01300, Submittals.
- Base submittals on the Contract Documents and show, in detail, all structural and metal work included in the contract. Concurrently and in addition to the standard submittal requirements, submit two (2) sets of hydraulic calculations and shop drawings to PETSMART representative for approval. All submittals shall be signed and sealed by the Fire Protection Professional of Record.

NO APPROVAL WILL BE RELEASED ON THIS SUBMITTAL UNTIL REVIEWED BY PETSMART CONSTRUCTION MANAGER.

- Manufacturer's Data: Within 30 days after award of Contract, and before commencing any work, eight copies of data, in one completely marked and coordinated brochure sufficient to assure full compliance with the contract requirements, shall be submitted for review. All manufactured equipment and material which the contractor proposed to furnish shall be submitted at one time. Partial submittals will not be acceptable. Data shall be submitted as required under each section of the specifications.
- Each copy of the brochure shall be enclosed in a hard-back binder with proper project identification on the cover, shall have individual index tabs for each item listed in the submittal, and an index page listing each item by its paragraph number in the specifications.
- Data shall include a complete equipment and material list. The list shall be on the Contractor's letterhead, shall include the data, general contractor's name and address, Fire Protection Professional of Record's name and address, proper name and location of the project, followed by a complete list of all items of equipment and material being submitted for review. List shall include appropriate make and model numbers, optional accessories, special features and other data as required. In addition to the equipment and material list, "back-up"

data submitted shall include catalog sheets, dimensions and all other appurtenant data as required.

- Shop drawings and samples: Within 30 days after award of contract and before commencing any related work, eight copies of drawings shall be submitted for review. All of the drawings for the project shall be submitted at one time. Partial submittals will not be acceptable. Drawings and samples shall be submitted as required under each section of the specification.
- Prior to submittal, check the shop drawings thoroughly to ascertain that they comply in detail with the drawings and specifications. Any deviations from the drawings and specifications shall be clearly noted on the certified shop drawings. Drawings shall include a reference to the appropriate section, page and paragraph number of the specifications. Stamp the drawings with firm name, date, and review indicating that the above has been complied with. Shop drawings received without this stamp will be returned rejected without further explanation.
- Also submit to the Architect/Engineer Professional of Record at least 30 days prior to installation for review; with such promptness as to cause no delay in work, all samples requested. All samples shall have been checked and stamped with the review and identified clearly as to material, manufacturer, any pertinent catalog numbers and the use for which intended.

No work requiring a shop drawing or sample submission shall be commenced until the submission has been reviewed by the Architect/Engineer Professional of Record.

GUARANTEE

- Guarantee that all work installed will be free from any and all defects and that all apparatus will develop capacities and characteristics specified under the respective divisions covering the specific work, and that if during a period of two (2) years from date of substantial completion and acceptance of work; any such defects in workmanship, material, or performance appear, they will be immediately replaced, repaired, or otherwise corrected subject to approval by the Owner without cost to the Owner within a reasonable time. Warranty certificates to show model number, serial number and date of installation. Warranty certificates shall be included in the manual under the warranty section. Warranties must be directly exercisable by PETSMART."

PART II – PRODUCTS**GENERAL**

The Sprinkler Contractor is directed to the fact that these specifications are performance: Meaning that at the time of submission of bid the contractor has contacted all governing agencies as to the scope of the work to be done for the entire project as outlined here-in. This shall include contacting all authorities having jurisdiction, water departments (private and public) etc. and including in the bid an amount to do such work required by them.

Submission of bid shall so indicate that all agencies have been contacted. In the bid, include all required work such as backflow preventers, fire department connections, fire hose cabinets, booster pumps, etc. to provide a complete and working system ready to use when the building is occupied by the Owner. Determine in advance of the bid the street pressure and incorporate the required devices, piping, pipe sizes etc. to meet all of the requirements of NFPA and authority having jurisdiction requirements.

The work in the section includes, but is not necessarily limited to, the following principal items:

- Design and installation of a complete automatic fire sprinkler system for the areas specified above in accordance with all insurance carriers and authorities having jurisdiction.
- Securing all necessary permits and inspections. Fees by governing agencies shall be paid AS DIRECTED IN DIVISION 1.
- Field verification of all dimensions, existing equipment, valves, and sprinklers. No extra charges or compensation will be allowed for any differences between actual dimensions and measurements indicated.
- Providing a letter of acceptance from the appropriate agency having jurisdiction and completed printed instructions on operation of system to the Owner.
- Eight complete sets of shop drawings submitted to Architect/Engineer Professional of Record for review prior to fabrication or installation of sprinkler system.
- All excavation and backfill for piping work in strict accordance with these specifications, cutting and patching of work to accommodate piping, and protection of work and materials. Excavation, backfilling, and compaction shall be as specified in Division 2.
- All underground piping (which pertains to the fire protection system) to 5 feet outside of building as indicated on the drawings and/or as necessitated by the design, including all required pipe, valves, etc. Final connection to the main provided by others.
- A hydraulically calculated system shall be used.
- Provide automatic sprinkler protection in all areas per NFPA-13 and all authorities having jurisdiction.
- Furnishing miscellaneous materials such as brackets, hangers, steel supports for equipment, concrete thrust-blocks, expansion joints, inspector's test connection, etc. All piping shall be braced for seismic requirements as determined by authorities having jurisdiction.
- Electrical connections to fire alarm system shall be provided by electrical/fire alarm contractor.
- The following shall be considered minimum requirements acceptable to the Insurance Underwriters and to Petsmart. The design, equipment, materials, installation, and workmanship shall be in strict accordance with the required and advisory provision of NFPA 13 for 18'-0" high piled rack storage at Receiving Area (typically, density of

0.41 gpm/sf over the most remote 2000 sf shall be required). Commodity Class IV-non-encapsulated in single row racks with 8'-0" minimum aisles. 500 GPM hose allowance must be included. Sales area shall Contain Class IV Commodity shelf storage up to 8'-0" high, density will be based on ordinary hazard Group II occupancy, which corresponds to a density of 0.2 gpm/sf. over the most remote 1500 sf. Each system shall include all materials, accessories, and equipment inside and outside the buildings necessary to provide each system complete and ready for use.

- Water flow test must have been completed within 3 months.
- Each system shall be designed and installed to give full consideration to built-in spaces, piping, electrical equipment, ductwork, and all other construction and equipment to afford complete coverage and be free from operating and maintenance difficulties, all in accordance with detailed drawings to be submitted by the contractor for approval. Devices and equipment shall be of a make and type listed by the Underwriters' Laboratories Canada (ULC) or Underwriters' Laboratories, Inc. for use in Canada.
- The work for the building shall begin at connection to the underground main, 5 feet outside the building. Underground system shall be flushed and approved prior to final connection to overhead sprinkler system.
- *Instruction Manuals:* Contractor shall furnish instruction manuals, containing complete instructions for the specific make and model of the alarm valve furnished. One copy of each instruction manual shall be placed in a flexible oil resistant, protective binder and mounted in an accessible location in the vicinity of each alarm valve. Four additional copies of instruction manual shall be furnished to the General Contractor for incorporation into installation manual.

DESIGN OF SPRINKLER SYSTEMS

Design of wet pipe sprinkler systems shall be by hydraulic calculations and shall conform to NFPA 13, insurance carrier requirements, all other authorities having jurisdiction, and to the requirements as specified hereinafter.

Sprinklers:

Sprinklers shall vary in size based on NFPA 13 requirements. Release element of each sprinkler shall be of ordinary temperature rating or higher as suitable for the individual location where it is installed. Finish of ceiling plates and pendent sprinklers in suspended ceilings shall be white plated concealed. Sprinklers in all ceilings shall be white plated concealed. Deflector distance to top of storage shall be a minimum of 18". The use of sprinklers equipped with "O" ring seals shall be prohibited on all PETSMART projects.

When sprinklers are installed in acoustical ceiling tiles, sprinklers shall be located along the center line and in the center of the ceiling where possible, otherwise, locate 12" from either side of the tile along the center line.

Cabinet:

Sprinklers and sprinkler wrenches shall be provided in a cabinet at an accessible location adjacent to the alarm valve within each building. The number and types of extra sprinklers shall be as specified in NFPA 13. The cabinet shall be manufactured 10 gauge metal cabinet with hinged, lock type door, with wrenches necessary to change sprinklers. Cabinet shall be of ample size to contain the sprinklers and wrenches.

Alarm Valve:

Valve shall be of the variable pressure type complete with all accessories and appurtenances necessary for the proper operation of each system and to prevent false alarms due to surges or other conditions in the supply to each system.

ALARMS

If building is not provided with a monitored fire alarm system, provide either:

Water Motor Alarm:

Alarm of the approved weatherproofed and guarded type, to sound locally on the flow of water in each sprinkler system to which it is connected, and shall be mounted on the outside of the outer walls of each building or at a location indicated on the Drawings.

Electric Alarm:

The audio notification device shall be provided as indicated on the drawings. The bell notification assembly shall consist of a weatherproof box, coverplate and alarm bell which shall exceed 90 dBA at 10 feet with a red grille. The audio notification device shall operate on 120 vac power from the building electrical system and shall be controlled by a relay activated by contacts in the water flow switch. The device shall be mounted in a semi-flush, box. Provided by sprinkler contractor.

Pressure Switch:

Provide switches with circuit opener or closer for the automatic transmittal of an alarm over the facility fire alarm system connected into the fire alarm system. Alarm actuating devices shall be of the mechanical diaphragm controlled water flow type without retard feature, which instantly recycles when pressure is released on the diaphragm. Coordinate the required voltage of switch with the electrical contractor and assume the switch will be 24V wiring.

ABOVE GROUND PIPING SYSTEMS

Piping shall be run concealed in areas with suspended ceilings and shall be inspected, tested, and approved before being concealed. Fittings shall be provided for changes in direction of piping for all connections. Changes in piping sizes shall be made through standard reducing pipe fittings; the use of bushings will not be permitted.

Piping in areas having ceilings, other than the underside of the roof deck, shall be concealed. Piping above stock and service areas may be exposed but shall be kept as high as possible with respect to proper deflector distances per NFPA. All piping shall be clean and free of dirt.

Valves:

Valves shall be provided as required by NFPA 13 and of types approved for fire service. Gate valves shall be flanged clear opening swing check type with flanged inspection and access cover plate. Provide an indicating valve in each riser, located beneath each wet pipe alarm valve. Supervise against tampering via fire alarm system; if no fire alarm system exists, lock in appropriate position.

Identification Signs:

Properly lettered, code approved metal signs conforming to NFPA 13 shall be attached to each valve and alarm device.

Test Connection:

Test connections shall be provided 6' above the floor for each sprinkler system or portion of each sprinkler system equipped with an alarm device and shall be located 3' downstream of the alarm device. Test connection shall be piped to a location where the discharge will be readily visible and where water may be discharged without damage. **(Location shall be approved by PETSMART.)**

Main Drains:

Drains shall be piped to discharge at safe points outside each building or to sight cones attached to drains of adequate size to readily care for the full flow from each sprinkler drain under maximum pressure. Auxiliary drains shall be provided as required by NFPA 13.

Sleeves:

Standard weight zinc coated steel pipe sleeves shall be provided for all pipes passing through masonry walls, floors, and ceilings. Sleeves shall extend completely through construction shall be firmly packed with oakum and caulked at both ends with insulating cement.

Escutcheon Plates:

Sprinkler piping passing through floors, walls, and ceilings shall be provided with approved type, one piece or split type plates. Plates where pipe passes through finished ceilings shall be chromium plated. Other plates shall be of steel or cast iron, with aluminum finish. Plates shall be securely anchored in place with set screws or other approved positive means.

FIRE DEPARTMENT CONNECTIONS AND VALVES

Fire Department Inlet Connections: Connections shall be provided 3' above grade, of the approved 2-way type with local Fire Department hose threads with plug and chain. Connection shall be wall mounted as indicated on the architectural drawings with approved check valve and automatic drip. Connect to sprinkler riser in an approved manner. Connections must match threads of fire department having jurisdiction at job site.

Outside connections shall be labeled "AUTO SPRINKLER" for wet sprinkler system.

ELECTRICAL WORK***Wiring:***

Control and fire alarm wiring including connections to fire alarm systems, shall be provided under this Section and shall conform to ULC S524. The conduit shall be rigid zinc coated steel.

Controllers:

Controllers shall be furnished with their respective pieces of equipment; and shall have all electrical connections provided under this Section. Coordinate the required voltage of control with the electrical contractor and assume the switch will be 24V wiring.

UNDERGROUND PIPING SYSTEM***Pipe and Fittings:***

Piping under the building and less than 5' outside of the building walls shall be outside coated cement lined case iron pipe and fittings conforming to NFPA 24, with the joints anchored in accordance with NFPA 24.

Valves:

Valves shall be provided as required by NFPA 13 and of types approved for fire service.

CONTRACTOR QUALIFICATIONS

Contractor performing work is to be a licensed fire protection contractor and is to be regularly engaged in the installation of fire sprinkler systems. He may be required to furnish satisfactory evidence that he has the labor and equipment available to maintain a satisfactory schedule in doing the work.

TESTS

Prior to connecting to overhead sprinkler piping, the underground main shall be flushed. After completion of the installation, the entire system shall be tested. Contractor to provide certificate for both flushing and testing of system and include in project closeout manual.

CAUTION

Sprinklers and piping shall be installed without conflict with plumbing, mechanical or electrical work.

Install additional sprinklers as required per NFPA-13 to account for interferences.

END OF SECTION

PART I – GENERAL

WORK SPECIFIED HEREIN

- All components required for a complete Building Automation System (BAS) and temperature control system, shall be provided under this section of the specifications. The system is to be provided by a National Account Vendor, refer to Required Vendor List on drawing A0.1 for specific contacts.

SUBMITTALS

- Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.
- Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

PART II – PRODUCTS

SYSTEM REQUIREMENT

The Building Automation System will perform the following:

1. Interface with the factory mounted, microprocessor based control systems in each of the rooftop units to provide complete monitoring and control capabilities.
2. Lighting control with individual outputs for the stocking area, employee area and exterior lights.
3. Exhaust fan control.
4. Monitor building electrical consumption and minimize usage as much as possible through energy management routines.
5. The Hotel Area shall have the same type of National Account Vendor automation system as the PETSMART Store area.

All electrical work required for the installation of the building automation system will be provided under Division 16 including the following:

1. All line and low voltage control wiring and conduit, as shown on the electrical drawings and control wiring diagrams, and as required by the sequence of operation for a complete control system installation.
2. Mounting of all required control components (i.e., room temperature sensors, phase loss monitor, outdoor sensor assembly, control panels, lighting contactors and control relays), that are not factory mounted.
3. Wiring of lighting circuits to Main electrical power wall furnished contactors where required for lighting control.
4. Mounting and wiring of control relays for start/stop control of exhaust fans.

5. Mounting and wiring of all control and sensors for zone dampers.

Items required but not furnished under this section:

Section 16000 - Service Entrance

1. Demand pulse generator for KW input to Nexrev EMS.
2. T1 communications at the Nexrev controller.
3. Data jack for PETSMART communications at the Nexrev controller.

- Electronic Thermostat Modules (ETM) and related internal sensors to be furnished and factory installed by rooftop air conditioning unit manufacturer.
- Direct digital microprocessor based Control Panel (Freedom Controller) and related sensors, labor, materials, and equipment shown on drawings and specified to make a complete Temperature Control and Energy Management System.
- Provide a complete system of conduits and wiring as shown on the drawings.
- Wiring shall be continuous between devices and equipment with **no splices**.
- Furnish and install all devices and equipment associated with the Energy Management System as shown on the drawings.
- Electrical Contractor shall make all 600, 120 and 24 volt terminations.
- Nexrev shall install one inch high permanent black numbers on temperature sensors to correspond to the associated RTU.
- General Contractor shall coordinate with Owner telephone installer for installation of dedicated T1 line.
- Mechanical Contractor and Electrical Contractor shall coordinate for terminations of wiring within roof top units.
- Mechanical Contractor and Electrical Contractor shall coordinate with Nexrev Controls for system download (start up) and checkout.
- Energy Management System components will be as manufactured by National Account Vendor Controls Corporation. No exceptions.
- Nexrev Controls Corporation to provide equipment as specified herein and on the drawings as well as complete system design installation documents programming, start-up and checkout for a complete and operable Energy Management System. The following completed forms shall be filled out and turned over to Owner:
 1. Module Address Verification
 2. Load Title Verification
 3. Energy Management System Test Report
 4. Results of Phone Test performed by National Account Vendor Controls.

5. Warranty contact personnel, with 24 hour telephone list, and service personnel's home/office telephone numbers.
- Provide hardware and software warranty at no charge for a period of one year from date of system start-up.

PART III – EXECUTION

INSTALLATION

General Contractor, Mechanical Contractor, and Electrical Contractor shall verify all equipment and devices are installed to National Account Vendor Controls printed installation and hardware mounting instructions.

NEXREV QUALITY CONTROL

The following noted trades shall verify specified quality and proper operation of system components. Perform required system testing as required by National Account Vendor Controls. This testing and check out shall include but not be limited to:

- Verify analog light sensor location and placement. (Electrical Contractor)
- Verify area light switching pattern (Light Splits). (Electrical Contractor)
- Verify contactor operation. (Electrical Contractor)
- Verify operation of RTU's and HVAC equipment in both first and second stage operation, and heat and cool modes. (Mechanical Contractor)

- Verify sprinkler alarm interlock with National Account Vendor Controls (if applicable). (Electrical Contractor)
- Establish remote communications with Owner maintenance. (General Contractor)

TESTING AND START-UP

1. The Energy Management System shall be complete and fully operational on or before the substantial completion date. Verify this date with Owner Representatives.
2. Contractor shall arrange to have a National Account Vendor Factory Technician on-site to perform, but not limited to, the following:
 - System testing of all rooftop units.
 - System testing of all lighting contactors.
 - System testing of outdoor temperature sensor.
 - System testing of outdoor light sensor.
 - Download system.
 - Transfer system program to Owner monitoring computer.
 - System start-up

END OF SECTION

PART I – GENERAL

RELATED DOCUMENTS

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

SUBMITTALS

- Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.
- Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

DESCRIPTION OF WORK

- All work covered in Division 16, as described in the following sections, is subject to "General Conditions" and "Division 1 - General Requirements", as hereinbefore included. Furnish all materials, equipment, labor including supervision, permits, plan check fees, insurance and services required for the installation of all electrical work and as required to provide a complete and operable electrical system as indicated by drawings and/or specified herein. For a listing of all required contact information, refer to the "Required Vendor List" located on the drawings.
- Any items not mentioned in these specifications or not indicated on drawings, but are necessary for successful and efficient operation of the work shall be held to be implied and shall be furnished and installed as part of the contract at no additional cost.
- Incidental items not indicated on drawings, nor mentioned in specifications that can legitimately and reasonably be inferred to belong to the work described or be necessary in good practice.
- Drawings showing electrical work are wholly diagrammatic and are not intended to show in detail all features of the work. No extra payment will be allowed where obstructions in work of other trades or work under this section require offsets, etc. Take measurements and do fitting on job. Check location of electrical work to determine in advance that it clears all openings and that equipment clears all other cabinets, fixed equipment, windows, door openings, etc.
- Do not scale for dimensions.
- Take all dimensions and measurements from Architectural Drawings and actual equipment to be furnished. All dimensions and measurements must be verified in the field since actual locations, distances, and elevations will be governed by actual field conditions. Contractor shall be responsible for all measurements taken in the field and coordinate with other trades.
- Study and review all contract documents, including drawings and specifications for architectural, structural, mechanical and other portions of the work to avert possible installation conflicts. Adjust

electrical work to conform to all conditions indicated thereon. Should conflicts arise which require changes in the contract documents, notify the Professional of Record. Secure written approval and agreement on necessary adjustments before the installation is started, or be held responsible to correct work at no extra charge.

ELECTRIC AND TELEPHONE UTILITIES

Consult with the utility company and Owner to verify all conditions affecting the service, type of terminations required, etc., and coordinate work with the utility company and Owner.

The electrical service for this project shall be as shown on the Electrical drawings.

MATERIALS

All materials shall be new and in good condition, the product of substantially established and recognized manufacturers. All materials shall comply with applicable codes and standard provisions as stated in each particular section, and where applicable, shall comply with utility company specifications and local codes.

WORKMANSHIP - CODES

The complete installation and all materials for all the systems shall comply with the requirements of all local building and electrical codes; with the Electrical Safety Authority and the local fire department; with the latest edition of the Canadian Electrical Code (CEC) and with the requirements of the utility companies furnishing service to the project.

The Drawings and Specifications take precedence when they are more stringent than codes, ordinances, or statutes in effect. The following standards, codes, and specifications are minimum requirements: (Date of issue subject to City requirements)

- National Electrical Manufacturers Association Standards (NEMA)
- Provincial Building Code
- Underwriters Laboratories Canada (ULC)
- American National Standards Institute (ANSI)
- NFPA 101, 72 (Life Safety Code)
- Canadian Electrical Code (CEC)
- Canadian Standards Association (CSA)
- Provincial Fire Code
- Institute of Electrical and Electronics Engineers Standards (IEEE)
- Illuminating Engineers Society of North America (IESNA)

The Contractor shall maintain at the Project at all times during the construction a superintendent capable of coordinating the Work, and to receive instructions from the Owner's representative.

Make available to Professional of Record and maintain, in good condition, on the jobsite the following:

- Two sets of contract documents (keep one set current, neatly corrected and up to date with "As-Built" data and revisions for all electrical changes from the original set). At completion of all work, furnish to Professional of Record a set of sepias with dimensions from columns and walls of all electrical underground conduit and feeder runs.
- One copy of all applicable local, county, provincial, federal, serving utility companies' codes, rules and regulations, e.g. current Canadian Electrical Code.
- All elements of the construction are to be performed by workmen skilled in the particular craft involved and regularly employed in that particular craft. All work is to be performed in a neat workmanlike manner in keeping with the highest standards of the craft.

COORDINATION OF WORK

- All items of work by other trades which is necessary for completion of work under this division of the specifications shall be the responsibility of the General Contractor. The General Contractor shall thoroughly understand the scope of work required of each trade and shall appropriately coordinate subcontractors, suppliers, etc., and arrange for such work to be performed in an orderly course of the project. Where work of this trade joins that of other trades, there shall be no discrepancies.
- Special attention shall be given to coordination between Electrical and Mechanical subcontractors. Comply with Section 15000, General Mechanical Provisions, Electrical Coordination.
- Plan and install work in such manner as to conform to the structure, avoid obstructions, preserve headroom, and keep openings and passageways clear. Consult general contract drawings for conditions affecting this work and verify spaces in which work will be installed. Notify Professional of Record immediately of possible conflicts. Where interferences with structural, mechanical, or other features exist, or where job conditions require reasonable changes in locations and arrangement of indicated equipment, conduit, outlets, or wiring. Contractor shall make such changes without extra cost to Owner.
- Study the suppliers' detailed shop drawings and wiring diagrams, sleeves, anchor bolts, supports, hangers, openings, conduits, and outlets, and provide such items as necessary to make the installation complete and functional. In particular, verify all motor and control outlet locations and conduit sizes with the supplier of motor driven equipment. Secure rough-in dimensions and electrical characteristics of all equipment before installation or work.

STORAGE AND HANDLING

Receive, accept and provide protection and be completely responsible for all electrical equipment materials, including same, that may be furnished by others (F.B.O.) and is to be installed, electrically connected, etc., under this section of work prior to and after installation of same until completion of all work and final acceptance of same by Professional of Record, e.g. provide a dry storage area for lighting fixtures; store conduit a minimum of six inches above grade and slope to drain. Cover service and distribution equipment with approved plastic or equal cover (secure tightly to prevent weather and other elements from damaging factory finishes), etc. Arrange for introduction into the building for equipment too large to pass through finished openings.

All materials, equipment, devices, etc., when installed either partial or complete, shall be properly protected throughout the remainder of the project construction. Failure to do so shall be sufficient cause of rejection of any items.

The Electric Prefabricated power center is to be unloaded and placed by the contractor - see documents for other items of coordination for proper installation and obligations.

AS-BUILT DRAWINGS

Maintain at the Project, a set of prints, on which a daily record of changes and deviations from Contract drawings and Specifications are recorded. All buried or concealed conduit, size 1" and larger, both inside and outside of the building, shall be located by dimensions from grid lines and elevation of these prints. Include all other pertinent information necessary for maintenance and possible future renovations. Comply with Division 1 - Project Closeout (Section 01700).

CUTTING, PATCHING, AND SLEEVES

- Cutting and patching shall be done by mechanics skilled in the various trades.
- No cutting or patching shall impair the strength, function, or aesthetics of Work being cut, i.e., holes through exterior walls and ground floor shall be waterproofed. Patches in finished surfaces shall be invisible.
- Escutcheon plates shall be provided for all exposed pipes passing through walls, floors, and ceilings. Plates shall be nickelpated, (chrome plated in exposed locations) split ring type. Where plates are provided for pipes passing through sleeves which extend above surface, provide deep recessed plates to conceal the pipe sleeves.
- Roof flashing assemblies shall be provided for all pipes passing through roof.

HANGERS AND SUPPORTS

Furnish and install necessary hangers, supports, fasteners, frames and other similar construction necessary for the proper and safe support of conduit and equipment furnished under this Division. Support conduits from building structure, not from ceiling supports. Supports for lighting fixtures, panelboards, exposed feeders, and similar items shall be CSA approved type.

TEMPORARY CONSTRUCTION POWER

Furnish and install temporary construction power as required to provide sufficient power and lighting for construction needs. Temporary receptacles shall be grounded type Ground Fault Interrupters per CEC. Provide temporary lighting as required for adequate illumination for construction for safety purposes. If at all possible the electric prefabricated power center is to be set and is to be used for temporary power.

Minimum of 200 amp service.

PAINTING

Provide a prime coat of paint for unprotected supports, hangers, frames, and similar items furnished and installed under this Division of the Specifications. Panels and cabinets in unfinished areas shall have a standard factory finish grey in color.

IDENTIFICATION

All distribution equipment (service entrance, switchboards, cabinets, transformer, motor and equipment controls, starters, disconnect switches, etc.) shall be identified with engraved white letters 3/16" high on 1/2" high black micarte nameplates and screwed on the front of the equipment, e.g., "Panel HA".. Provide letters to identify each A/C, heating, and ventilating unit to include corresponding panel and circuit breaker identification number per panel schedules. Screw on each name plate nearest the electrical connection.

PROTECTION OF WORK

Protect work at all times from damage and replace damaged work. Use every precaution to protect the work of others and be responsible for damage to other work caused by work accomplished under this Division. Provide space for storage of materials and apparatus and assume complete responsibility for losses due to any cause whatsoever. In no case shall storage interfere with traffic conditions in any public thoroughfare or constitute a hazard to persons in the vicinity.

EXCAVATION AND BACKFILL

Perform all necessary excavations, shoring, and backfilling required for the proper laying of all pipes and conduits inside the building and premises, and outside as may be necessary. Conform to Section 2 - Site Work requirements. Remove all excess excavation materials from the site, except as otherwise directed.

Electrical System:

The bank of trenches for electrical cables, conduits and duct lines need not be kept vertical, but may be sloped or widened to such general limits, as to allow for a gradual cushioning toward the point of abrupt dropoff due to rock to levels being considerably below the grade of the duct.

Provide for backfilling and compaction in accordance with the requirements of Section 2 - Site Work requirements to required density. Make the first two feet of fill in six-inch layers, each thoroughly compacted as directed, and free from rocks, large clods, leaves, branches, and debris. Compact the rest of the backfill as directed, using in the backfill rocks not larger than two inches in diameter, and using no rocks at all in the top twelve inches.

Provide a minimum of two inches of sand cushioning between all ducts and conduits.

CONCRETE WORK

Where used for structures provided under this Section, such as bases, manholes, cable trenches, pull pits, and isolated vaults, setting pads, concrete and concrete work with associated reinforcing shall be as specified in Section 3 - Concrete. However, if the Contractor fails to provide sleeves, inserts, and templates, or to notify other trades well in advance of requirements, the Contractor shall then be held responsible to pay for all cutting and patching required. See drawings for details.

Concrete used for conduit envelopes, backfill at footings, and miscellaneous shall be 3000 psi at 28 day compressive strength concrete. Slump test per Section 3.

Furnish and set all mounting bolts, conduit, and accessories for equipment located on concrete bases.

SEISMIC RESTRAINT

Where required by local Code, all electrical equipment including light fixtures, transformers, distribution equipment, etcetera, shall be supported from the building structure with appropriate supports, anchorages, and restraints to meet the requirements of the Code.

The Contractor shall arrange and pay for the services of a seismic engineer registered in the project province to design and review the installation of seismic supports and anchorage. Prior to substantial performance, a letter from the seismic engineer shall be forwarded to the Consultant certifying that all electrical equipment has been seismically restrained and the installation has been reviewed in accordance with the local authorities having jurisdiction.

TESTS AND ADJUSTMENTS

- *Before energizing any circuits:* Test circuits with a "megger" tester to determine that insulation values conform to applicable NEMA Standards. Check motor controllers to determine that properly sized overload devices are installed. Check motors for proper rotations. Test other electrical equipment for proper operation. Provide complete list of findings.

- Test auxiliary systems for proper operation. Thoroughly familiarize maintenance personnel with the proper operating procedures of each system.
- Tests and adjustments shall be made prior to energization and final acceptance. Provide certificate of inspection and acceptance of the electrical installation by local inspection authorities. Equipment or wiring which proves by testing, to be defective or operating improperly, shall be corrected or replaced promptly at no additional cost to the Owner. Electrical Contractor shall pay the cost of testing for failed tests, including replacement of damaged equipment resulting from testing within designed loads.
- Adjust voltage taps on transformers for optimum operating level.
- Measure load balance on panelboards and reconnect loads as may be necessary to obtain a balanced load on all phases. There shall be no more than a 10% difference between the high and low phases. Provide complete list of findings and final corrected loads measured.
- Demonstrations and instructions - Contractor shall demonstrate to the Owner and operation personnel, all essential features of all systems and instruct them in the proper operation and maintenance of such systems. Systems to be demonstrated are as follows: Lighting System and Controls. Electrical service and power distribution systems. Sequence and controls for A/C, heating, and ventilating systems. Emergency Power System - in the presence of the Owner.
- Contractor shall arrange for manufacturer's representative of all special systems to be present during the demonstrations.
- Upon completion of all tests, demonstrations, and instructions, the Contractor shall submit to the Owner, a signed, written statement certifying that all demonstrations and instructions have been completed. The statement shall be countersigned by the Owner. Contractor shall include copies of all tests and readings taken.
- Contractor shall submit all certificates of inspections and approvals as directed by the Professional of Record. At completion of installation, submit a letter to the Professional of Record stating that project was installed in accordance with all contract documents and if not, where and how work was accomplished. The entire installation shall be subject to the Professional of Record's approval.

CLEANING UP PREMISES:

At all times keep the premises free from accumulation of waste materials or rubbish caused by employees. Metal floor pans shall be provided for pipe threading machines and benches, being used at all times to prevent concrete floors from becoming oil soaked. Upon completion of the job remove all debris, clean all switch plates, fixtures, panel trims and, in general, leave the premises in a clean and tidy condition.

FINAL INSPECTION

At the time of final inspection, the Project Foreman shall remove cover plates, panel covers, and other access panels for the inspecting personnel, to allow complete inspection of the entire electrical system.

Submit a list of spare parts (the fuses, lamps, etc.) to Owner with a copy to the Professional of Record.

GUARANTEE:

Fully guarantee all Work under this section, for a period of two years minimum stated in these specifications from the date of substantial completion, against imperfect workmanship or failure or malfunction of materials and/or equipment due to faulty or imperfect workmanship. Give this guarantee in writing to the Owner at the time of issuing finals certificate. Work found to be defective within this period shall be replaced without cost to the Owner.

PART II – PRODUCTS

(Not applicable)

PART III – EXECUTION

(Not applicable)

END OF SECTION

PART I – GENERAL

- This section is valid only when considered in total with all other Contract Documents. Cross references, where noted, are for convenience only. Their inclusion or omission from any particular section in no way limits the scope of particular sections or the intent of any Contract Documents.
- Furnish and install approved raceway systems for all electrical conductors, including conductors for telephone, signal, special systems, control and other systems required by applicable codes, rules, and regulations. Raceways shall be sized according to Canadian Electric Code unless shown larger than required by the CEC. All raceways shall contain code sized copper bond wire.
- It shall be the responsibility of the Electrical Contractor to determine from the architectural and engineering drawings and by actual determination at the site, the exact location of each and every outlet. The outlet locations shall be modified from those shown on the plans to accommodate changes in door swings or to clear other interferences that may arise from job construction details, as well as modifications to center within specific spaces. These modifications shall be made without change in contract price. The Owner reserves the right to relocate lighting fixtures and power convenience outlets to a point within eight feet of that shown, without any change in contract price, providing the contractor is advised of the new location prior to installation of the conduit and boxes affected. The contractor shall check such conditions throughout the entire job and shall notify the Professional of Record of discrepancies that may occur before proceeding with the installation of the work. Wall boxes shall be set in advance of wall construction. They shall be blocked in place and secured. All wall boxes shall be set flush with the finished building construction and the contractor shall furnish and install extension sleeves as required to extend boxes to the finished surfaces of special furring or wall finishes.
- Other Sections of this Division are valid only when considered in conjunction with these General Provisions.

SUBMITTALS

- Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.
- Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

PART II – PRODUCTS**CONDUIT, FITTINGS, AND BOXES**

- **Conduit:** Conduit shall be manufactured by National, Triangle, LTV. All conduit shall be furnished by one manufacturer with the exception of non-metallic, PVC coated and flexible conduit, and shall be Underwriter Laboratory listed and approved for the installation in which it is to be used.

- **Rigid Conduit:** Rigid steel, hot dipped, galvanized, or sherardized with baked enamel coating, zinc coated threads and protective caps.
- **Thinwall conduit:** Electro galvanized "Electrical metallic Tubing" of cold rolled steel, electrically welded. Baked clear plastic enamel coating.
- **Armored Cable:** Shall be of one manufacturer. It will have an adequate path for ground per.
- **Flexible Conduit:** National "Flexsteel", Allflex flexible steel conduit, formed of one continuous length of electro galvanized spirally wound steel strip.
- **Liquid-Tight Flexible Conduit:** Anaconda "Sealtite" liquid-tight flexible steel conduit, formed of one continuous length of electro galvanized spirally wound steel strip with neoprene jacket.
- **Non-Metallic Type 40 PVC Plastic Duct:** Carlon PV-Duct Plus, as manufactured per NEMA TC-2 and UL-651 Standards and CSA/ULC listed for underground uses.
- **Intermediate Metal Conduit:** Conduit shall be hot-dipped galvanized intermediate metal conduit manufactured in accordance with ULC or CSA standards.

CONDUIT FITTINGS

- Conduit fittings manufactured by Thomas and Betts, Raco, O.R. Gedney, or Appleton. All fittings shall be by one manufacturer and shall be CSA or ULC approved.
- **Rigid Conduit fittings:** Threaded type, galvanized steel, or malleable iron, water and concrete tight. All connectors at cabinets, boxes, outlets, gutters, panelboards, etc., shall be nylon insulated, metallic bushings with double locknuts.
- **Thinwall Conduit Fittings:** Compression type, galvanized steel, rain and concrete tight. All connectors shall be nylon insulated. Indentor or set screw type fittings will be allowed as per local code.
- **Flexible Conduit Fittings:** Squeeze or screw type, galvanized malleable iron or steel, with nylon insulated throats.
- **Liquid-tight Flexible conduit Fittings:** Galvanized steel or malleable iron liquid-tight with neoprene gaskets, "O" ring and retainer, nylon insulated throats.
- **Non-Metallic Type 40 PVC Duct:** Joints of the ducts assembled together with approved couplings to make a watertight joint. Furnish and install expansion fittings on all non-metallic duct per manufacturer's recommendations.
- **IMC Fittings:** All rigid fittings shall be CAS or ULC approved compression IMC fittings.
- **PVC-Coated Rigid Fittings:** Roblroy Plasti-Bond 2 as required for all PVC-coated rigid conduit installation.

- *Condulets:* Crouse-Hinds, R & S, Appleton, Efcor, Gedney or Killark cast ferloy types with sheet steel covers. Provide neoprene gaskets for all locations.

CONDUIT SIZE AND TYPE

All raceways shall be GRC for entire installation, except as noted or shown. Rigid steel conduit, elbows, standard couplings shall be hot dipped galvanized rigid steel. If partitions or walls are solid concrete or are grouted solid with concrete or mortar, rigid steel conduit shall be used, also where subject to injury or damage: e.g., consider area up to 4 feet above floor level subject to injury. Verify these areas prior to installation.

Conduit size and type to be used for various applications are as follows (unless shown otherwise on Contract Drawings):

- *Rigid Conduit:* All conduit, regardless of size, installed under poured concrete floor slabs and in walls unless otherwise noted. Rigid conduit in earth shall be PVC coated rigid conduit, or concrete encased.
- *Thinwall Conduit:* Connections to suspended unit heaters, fans, ceiling and where exposed in dry interior locations where not subject to mechanical stress. EMT larger than 2" diameter shall not be used.
- *Flexible Conduit:* Connections to suspended unit heaters, fans, and similar small equipment subject to vibration not exposed to rain or water drip. Connections from junction box to lighting fixtures in accessible ceilings. Connection from junction boxes to switch for narrow switches in hollow metal jamb posts (mullions). Flex conduits shall not be used in exposed areas unless noted otherwise.
- *Liquid-tight Flexible Conduit:* Final connections to all motor operated equipment. Provide stranded green ground wire except as otherwise permitted by CEC.
- PVC bends up to 45 degrees per manufacturer's recommendation. All larger bends shall be rigid galvanized conduit, wrapped with plastic tape half lapped. Make transition to rigid conduit with approved fittings.
- Intermediate metal conduit: Installed in all corrosive locations, or in earth unless otherwise noted as permitted by CEC. All risers and elbows from all underground conduit installations and as shown on Contract Documents.

General Note: Unless excluded by city code and manufacturers recommendation or previously stated requirement, EMT conduit is acceptable for use above slab.

WIREWAYS

- Wireways and fittings with screw and/or hinged cover as shown shall be constructed of code gauge enameled sheet steel.
- Wireways and fittings installed on exterior and where subject to water or similar conditions shall be raintight type construction without knockouts, constructed from galvanized sheet steel.

- Approved manufacturers are Square-D Company, Alwalt or Gibbons.
- Outlet boxes and accessories used in the conduit systems as manufactured by Appleton, Raco, Steel City, or Bowers. All boxes shall be electro-galvanized or zinc plated steel.
- *Location:* Approximate location of outlets is shown on Plans, but each outlet location shall be checked before installation. Refer to electrical notes on Drawings and Specification Sections covering systems and equipment types of boxes required and mounting instructions. Coordinate installation of boxes and conduit stubs with equipment supplier and Professional of Record.

TYPE OF BOXES

- *Flush masonry wall outlets:* Masonry box 2-1/2", 3-1/2" deep, with concentric K.O.'s (single or multi-gauged as required).
- *Wood or Metal Stud Wall Outlets:* 4" square box - 1-1/2" or 2-1/8" deep with conduit K.O.'s (plastic rings) and required square extension rings and/or device corners.
- *Wood or Metal Stud Wall Outlets (Multi-Gang):* Same as masonry outlets with required supports (no single gang boxes allowed).
- *Outlets in Plastic or Gyp. board Ceiling:* 4" octagon box, 2-1/8" deep, with conduit K.O.'s and required extension rings and/or covers. Fixtures not provided with prewired junctions shall have 4" octagon boxes above accessible ceiling with flexible conduit connection to fixture box of wiring channel.
- Where surface wall outlet boxes are allowed, they shall be the following types:
 - 2 gang 4" square box 2-1/8" deep, multi-gang solid masonry box 2-1/2" deep.
 - All boxes shall have a 1/2" raised steel cover and approved mounting accessories.
- Where outlet boxes are mounted on conduit stubs on roof or at other areas as indicated, boxes shall be Type FS or FD malleable iron, cadmium finish.
- *Floor boxes and fittings:* Russel-Stoll, Fullman, Steel City and comparable to as follows: Power (LEW #632SE-DFB and with #DCF-1 carpet flange in carpeted areas), telephone and low voltage signal (LEW #532SE with 2" #538 brass kick ring and DF-1 carpet flange in carpeted areas). Use deep boxes for all floor boxes where feasible.
- *Outlets in concrete:* Concrete boxes - depth as required with conduit K.O.'s and mounting logs designed to mount on forms without rocking.
- *Outlets for W.P. receptacles:* Boxes shall be type FS or FD case steel.
- For exposed wiring on the exterior of building and on interior of building where subject to water, use cast ferloy type boxes with

weatherproof covers, and neoprene gaskets. For other exposed wiring on the interior of building, use code gauge 4" square or larger galvanized boxes and 1/2" raised steel cover plate.

PULL BOXES AND JUNCTION BOXES AND WIREWAYS

- Install pull boxes, junction boxes, and auxiliary wiring gutters where indicated and where required to facilitate installation of the wiring. Such boxes and gutters shall meet all requirements of CEC.
- For concealed conduit, install flush with ceiling or wall with covers accessible and easily removable. Where flush boxes are installed in finish ceiling and walls, provide cover to match material and finish specified for devices (Paragraph 7.7) which shall exceed the box face dimensions by a sufficient amount to allow no gap between box and finished material.
- Pull and junction boxes not specifically described in other sections or on the drawings, shall be fabricated of code gauge galvanized steel with screw covers, brass hardware, and baked enamel finish, equal to Circle AW.
- Pull and junction boxes installed in poured concrete floors: Flush type cast iron with watertight gasketed covers, gray metallic finish. Where boxes are installed in floors with tile or carpet floor covering, covers shall be of the recessed type to accommodate the floor covering. Cast iron boxes as manufactured by Lew Electric Fittings Company.
- *Boxes:* Not to be located in finished, occupied rooms without prior approval of the Professional of Record.

WIRE AND CABLE

General:

- Materials listed in this section are products of Anaconda Wire, General Cable, Southwestern and General Electric. All wire required for this project shall be furnished by one manufacturer, unless otherwise noted or specifically approved. Submit for review, prior to placing orders, a complete schedule of wire, cable, and connectors to be installed.
- In no case shall a conductor of size less than No. 12 AWG be used for lighting, receptacle circuits, or any other power. Where home-run conductors are specifically indicated to be larger than #12 (i.e.; three #10-3/4" C.), it shall be understood that the increase in conductor size shall extend the entire length of the circuit. Conductors for bus voltage control shall be minimum #14 AWG.

- All wire and cable is to be new and unused, 98% conductivity copper only, manufactured within a six month period preceding the delivery to the job site. Submit UL label with date (for all wire coils). All branch circuit wire to be delivered to the job in unbroken cartons or spools.
- Wire and Cable: CEC grades insulated to 600 volts by ASTM Standards unless otherwise indicated.

WIRE AND CABLE TYPES

Type THHN or THWN shall be used for branch circuit conductors. Type XHHW or THWN (90° C) shall be used for panel and equipment feeders, and where exterior exposure of raceways is encountered. All wiring to motors, or equipment and cases subject to vibration, shall be stranded.

Type AF (150° C); Minimum size No. 14 stranded, use for filed tap-off connections to incandescent fixture sockets, and other high operating temperature equipment where operating temperature exceeds 90° C.

CONNECTORS

1. Splices for Conductors No. 10 and Smaller: Made with Ideal, Wing-nut insulated, solderless, screw-on connectors (size as recommended by manufacturer).
2. Connectors for Conductors No. 8 and Larger: Of compression of split bolt types T & B, OZ, Blackburn, or Burndy mechanical connector. Fill connector voids with electrical insulation putty and follow with 3M Scotch Tape #50, so insulation is equivalent to or greater than insulation of conductor.
3. Control wiring and all other stranded wiring to screw connections shall be provided with T & B "STA-KON" terminals, or as noted on control drawings.
4. Install approved expansion joint type fittings in raceway systems crossing building expansion joints and as recommended by raceway manufacturer where expansion is caused by temperature changes or similar type conditions. Expansion fittings to maintain approved raceway system (provide bonding jumpers as required.)

IDENTIFICATION AND TAGGING

Wire and Cable for feeders, sub-feeders, control and branch conductors shall be identified as follows:

- Switch legs for local wall switches to be a distinctive color such as purple.
- Colors: Assigned to each conductor as described and carried throughout all main and branch circuit distribution.
- Electrical system color codes, main and branch conductors identified as follows:

DESCRIPTION	120/208 VOLT	347/600 VOLT
A Phase	Black	Brown
B Phase	Red	Orange
C Phase	Blue	Yellow
Neutral	White	Gray
Ground	Green	Green with Yellow Stripe

- *Conductor Insulation:* Colored in sizes up through No. 8: conductors No. 6 and larger: May have black insulation but phase color coded with 1/2" band or colored tape at all junction and terminations.
- All conductors shall be tagged in all pull boxes, wireways, terminations, splices, or connections of any type. Tags to be of fireproof material as manufactured by "Brady" or approved equal.
- Mark underground stubouts with concrete monuments (8" x 8" x 8") installed 1" below finish grade, over but not in contact with capped ends. Identify capped empty raceway with linen tags located inside of raceway ends. Pitch all conduits uniformly to manholes to eliminate pockets. All joints shall be watertight.
- Numbered bands to identify each wire or cable at panelboards and/or piece of equipment served, or connection point.

ACCESS PANELS

Provide access panels in building construction where required for access to concealed junction boxes, pull boxes, etc.

Access panels shall be of the flush steel panel type of ample size to permit inspection and servicing of the concealed item. Panels shall be verified with Section 08305 Metal Access Doors.

WIRING DEVICES

- All wiring devices shall be as manufactured by Hubbel, G.E., Woodhead, or Leviton unless otherwise noted or shown. Numbers shown are for Hubbell. All devices to be of one manufacturer.
- All devices heavy-duty specification grade.
- For additional devices refer to notes on drawings.
- Cover plates for each and every device including telephone outlets shall be furnished and installed under this contract. All plates shall be one piece. No sectional plates will be allowed. In all finished areas, furnish and install cover WHITE plates with matching screws. In mechanical equipment room, and other similar areas with exposed conduit, furnish galvanized steel plates.

COVER PLATES (WHITE IN COLOR)

- Products specified herein shall be specification grade, as manufactured by Hubbell.

- Provide gang cover plates for grouped switches.
- Engraving device Plates: All device plates installed on devices other than 120-volt, 1-phase, 20A shall be engraved and filled with black filler stating the characteristics (i.e., voltage, phases, and capacity).

PART III – EXECUTION

CONDUIT INSTALLATION

- Conduit Systems: Installed for all wiring, lighting, power, signal, control communications, etc. Install conduit below or above concrete floors or roof.
- Minimum size conduit 3/4" trade size underground, or under slab, 1/2" trade size above grade for 12 AWG. or less only. Where specified size is not called for on drawings or in the specifications select size required CEC. Where specified sizes required by drawings or specifications are larger than Code required, the larger size shall be installed. All conduits shall be furnished with 200 lb. nylon pull cord for pulling wire by electrical contractor or others, provide labels for all computer and register conduit.
- All conduit shall be concealed, except in crawl spaces, unfinished equipment and storage rooms, equipment bays, mechanical equipment rooms and free-standing equipment or as shown on plans.
- Where exposed raceways are permitted by the Professional of Record in finished areas, paint as directed by Professional of Record and use approved escutcheons where entering or leaving finished areas.
- All conduit shall be routed parallel or perpendicular to building construction. No conduit shall be installed less than 6" from any piping installed by other trades. Exposed conduit fittings (conduit type) for all sharp corners, tees, etc.
- Conduit system shall be mechanically and electrically continuous from panel and to all cabinets, junction, or pull boxes. Conduit shall enter and be secured to all cabinets and boxes in such a manner that all parts of the system will have electrical continuity.

CONDUIT

- Securely fasten at intervals as follows: 8 foot spacing up through 1" with CEC scheduled spacing for sizes over 1". Fasteners. Two-hole malleable straps, minerlac hangers, or split pipe hangers. Multiple runs of conduit shall be uniformly spaced and supported on unistrut channels independently from building structure. Standard anchorage by Phillips self-drilling anchors and bolts, or concrete inserts. Any form of strap iron or wire hangers will not be allowed. Do not support raceways from other crafts, pipe, pipe supports, ducts, or other related equipment. Wire or perforated strapping shall not be used for hanging conduit. Unistrut channel hangers shall be supported by 3/8" minimum "all-thread".
- Vertical runs of raceways shall be supported on heavy steel clamps. Clamps shall be bolted tightly around the conduit and shall rest

securely on the building structure without blocking. Clamps shall be placed below couplings.

- Non-Metallic Conduits: Conduit banks not under building slabs shall be encased in concrete 4" minimum all sides. Separation between conduits of 3 inches shall be maintained by installing high impact styrene spacers with horizontal and vertical locking at intervals of 10 feet.
- Underground Conduits: All risers and elbows from underground conduit installations shall be PVC-coated, galvanized rigid steel long radius elbows with steel up to connection above floor.
- Apply thoroughly, Permacel 412 Ribbon Dope Thread Sealant or comparable material to male threaded ends of metallic raceways installed, below grade, in concrete or mortar or in wet type locations. Running threads shall not be used.
- Ground Wire: A separate copper grounding conductor shall be provided for the entire length of all raceways.
- Conduit runs from outlet to outlet and from outlets and junction points shall contain not more than three 90° bends, and shall not exceed 150 feet in length. Accessible pull or junction boxes in conduit shall be installed when more than three bends are required. Each junction box shall be supported independent of the conduit.
- When installing conduit, all cuts shall be smooth and square with the run. Inside and outside burrs shall be removed. Conduit joints in concrete or in the earth shall be made watertight with compound seal.
- Unless otherwise indicated where conduit raceways enter or leave the top of a concrete slab, it shall be accomplished with an approved hot dipped galvanized rigid steel (heavy wall) coupling, installed flush to 1/4" below finish floor level. Extend conduit raceways from flush coupling as required to complete run.
- Raceways installed below grade shall be installed a minimum of 24" below finish grade, or a minimum of 3" from surface of raceway to bottom side of 4" thick or greater, concrete slabs poured on grade.
- Conduit raceways shall not be installed where they will be subject to injury or damage, e.g. sharp rocks, in bottom of trench or backfill. Provide approved materials for backfill and install without damaging the raceways.
- Install with select backfill and a 4" thick protective concrete cap under driveways, alleys, streets, or similar areas. Where metallic raceways are in contact with earth, backfill, ABC type fill or similar type surroundings, they shall be encased in concrete with 3" minimum coverage on all sides or wrapped with #50 Scotch-Wrap, or similar plastic covering half lapped, or approved equal.
- Concrete for encasement shall be 2,500 lb. test concrete of maximum 3/4" aggregate.
- Underground conduit runs or banks shall be supported on preformed, non-metallic separators. Spacing between exterior surfaces of

conduits generally shall be not less than the following: two (2) inches between telephone conduit, two (2) inches between conduits containing cable operating at not over 600 volts, six (6) inches between a telephone conduit and any power circuit in the same envelope. Spacing in separators shall not exceed five (5) feet and be close enough to prevent sagging of conduits and breaking of coupling and watertight seals.

- Raceways shall not be covered until approved by Professional of Record and/or PETSMART Representative.
- Where an underground conduit, without a concrete envelope, enters the building through a non-waterproofed wall or floor a sleeve made of Schedule 40 galvanized pipe shall be provided. The space between the conduit and the sleeve shall be filled with a suitable plastic expandable compound or an oakum and lead joint on each side of the wall or floor in such a manner as to prevent entrance of moisture. Detailed drawings of proposed installation shall be approved by Professional of Record.
- The open ends of conduit shall be capped to keep out debris.
- Raceways extending through roof and similar areas shall be flashed in an approved manner (extend flashing 6" above and 4" below roofing, and provide rain collar). Verify flashing requirements with Professional of Record and comply as directed. Coordinate and schedule installation for a proper and approved installation. Pitch pockets are specifically not acceptable.
- Pull a mandril and swab through all conduits before installing conductors. Cleaning conduits with compressed air alone is not acceptable.

CONDUCTOR INSTALLATION

- Where applicable, or as directed, cover all exposed taps, joints and splices with approved insulating material, equal to original insulation of conductor; e.g. for 600 volt or less use sufficient self vulcanizing Okonite or approved equal, electrical rubber tape covered with manson, or approved equal, electrical friction tape of highest quality, or approved equal.
- Make splices and taps only when required and as directed in approved location, such as junction boxes, wireways, etc.
- Wiring, including fish tapes, pull wires, etc., to be installed in raceways shall not be installed until raceway system is complete, clean, dry and free of all foreign materials.
- Conductors sizes #8 and larger or conductors serving motors and where subject to vibration shall be stranded. #8 and smaller sized stranded conductors that terminate to a screw or similar type connection shall be provided with approved crimping type terminals.
- Lubricant to facilitate the installation of wire through raceway systems shall be "Polywater P."

- Armored cable is permitted in concealed areas and shall be installed per Article 333.

WALL BOX INSTALLATION

Wall boxes mounted flush in wall shall not be back-to-back. Boxes shall have conduit openings plugged with duct seal. Install boxes plumb and square with all face and with front of box or cover located within 1/8" of face of finish wall. Boxes in masonry set with the bottom of the box tight to the masonry unit. Handy boxes and sectional switch boxes are not allowed.

DEVICE INSTALLATION

- In masonry walls, switch heights shall be adjusted as required, so they are at nearest mortar joint but no higher than 48" A.F.F.

- Receptacles heights shall be adjusted as required so they are at nearest mortar joint but no lower than 18" A.F.F.
- Where walls have wainscot finish, switch height shall be adjusted as required, so switch is either all in wainscot or all in wall above wainscot.
- Where light switches are located adjacent to doors, they shall be installed on "knob" side of door, not less than 2" and no further than 6" from door jamb.
- Prior to roughing-in outlet boxes, verify from general construction drawings, door swings, type of wall finishes, and locations for counters and work benches.

END OF SECTION

PART I – GENERAL

- Furnish and install magnetic and manual starters as indicated on plans. Starters shall be as specified herein.

SUBMITTALS

- Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.
- Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

MANUAL STARTERS

- Across-the-line manual starters shall be provided where indicated on plans, for single phase, fractional HP motors, unless provided with the equipment.
- Starter shall consist of a manually operated toggle switch with thermal overload protection.
- Manual starters shall have: NEMA I enclosure (or NEMA 3R when mounted outside) with switch positions indicating ON, OFF, and TRIPPED positions, positive, quick-make, quick-break mechanisms. A red pilot light to indicate whether the motor is running shall be provided for each starter.

MAGNETIC STARTERS

- Magnetic starters shall be provided for all motors unless otherwise specified.
- Starters shall be full voltage across-the-line type, unless otherwise specified.
- Overload protective relays shall be furnished for all phases.
- All starters for motor shall be furnished with a 24 volt control transformer, with its control circuit fused.
- Provide four reversible auxiliary contacts for each starter.
- Combination units shall be comprised of magnetic motor starters and fused disconnects.

PART II – PRODUCTS

Not applicable.

PART III – EXECUTION

Furnish and install motor starters (coordinate with mechanical contractor) for all motors as shown on the drawings and as herein specified. Motor horsepower rating shown on the drawings and controls required shall be in accordance with the mechanical specifications and verified with the Mechanical Contractor. Overload elements shall be sized per Canadian Electric Code. Voltage ratings and internal connections of all motors shall be verified to assure that they are suitable for the voltage to be applied. The motors shall be connected for the direction of rotation specified by the Contractor supplying same.

END OF SECTION

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PART I – GENERAL

- The work specified in this section includes, but is not limited to, the electrical service, grounding, panel boards, disconnect switches, transformers, and other distribution equipment as specified.
- Installation of the miscellaneous electrical wiring required for all plumbing, A/C, and heating equipment, complete as shown on the mechanical and/or electrical drawings, and specified herein, including all labor, materials, equipment, accessories, services, and tests of all systems.
- Electrical contractor to offload, set, and install the Main Electrical Power Wall equipment (This is a Required Vendor). Approximate weight of prefabricated wall unit is 2,500 pounds.
- All motor and motor driven equipment such as pumps, etc., will be furnished and set in place by the mechanical, refrigeration and plumbing contractors.
- Equipment indicated as N.I.C. (Not in Contract).

SUBMITTALS

- Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.
- Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

PART II – PRODUCTS**GROUNDING**

- Provide main ground connections between all apparatus and conduits and the water and/or gas piping, as required by the latest approved edition of the CEC, and according to the requirements of the local utility company. Grounding conductors so routed as to permit as far as practicable, the shortest and most direct path to the grounding electrode system. Install all ground conductors in conduit and make connections readily accessible for inspection.
- Equipment grounding consists of connecting all noncurrent-carrying metal parts of the wiring system to a ground source. This includes the conduit or other steel raceway itself, boxes, and similar components, as well as the metal enclosures of panels and equipment.
- Ground source to be the ground terminal of the system grounding at the main service equipment.
- Branch circuit and distribution panelboards and switchboards shall be grounded as shown on Contract drawings.
- Motors shall be grounded by connecting a bare conductor from each motor frame to the grounding terminal on the rigid-to-flexible conduit adapter. Ground conductor for motor equipment shall be at least 50 percent of the total copper per phase of the largest feeder to the equipment grounded. Minimum size ground conductor in conduit

shall be No. 12 AWG. Minimum exposed ground conductor shall be No. 6 AWG.

- Connect all step-down transformers and switchgear to the main ground with copper ground wire.

SERVICE ENTRANCE SECTION

- Install the service entrance distribution panelboard as herein specified and shown on the Electrical Drawings. Panelboard shall be designed, built, and tested in accordance with the applicable portion of the latest editions to NEMA PB-2 and CSA/ULC.
- Provide embossed steel identification nameplates with 1/4" high letters for each circuit (screwed on cover of each switch), properly marked to indicate equipment served and circuit number. Nameplates shall be furnished and installed by equipment manufacturer for every switch or circuit breaker in the service entrance and distribution line-up.
- All equipment shall be rated to comply with NEMA standards for construction, capacity and quiet operation.
- All equipment compartments with hinged access doors shall be provided with friction catches to facilitate inspection and adjustment, live compartments secured with captive bolts.
- Provide "pulse type" equipment for the energy management system as described on Drawing EM2.

METERING (EXTERIOR)

Provide in the metering section facilities for mounting power company furnished and installed CT's and PT's and metering per P.U.E.S.R. and utility company requirements.

DISTRIBUTION SECTION

- The distribution section (NEMA-3R construction where installed outside the building) shall consist of completely enclosed, self-supporting metal clad structures containing distribution circuit breakers, bus bars, supports, etc.
- Enclosed construction: The panelboard framework shall be fabricated on a die-formed steel base or base assembly consisting of the formed steel and commercial channel welded or bolted together to rigidly support the entire shipping unit for moving on rollers and floor mounting. The framework is to be formed code gauge steel, rigidly welded and bolted together to support all cover plates, bussing, and component devices during shipment and installation. Top and bottom conduit areas are to be clearly shown and dimensioned on the shop drawings. All closure plates shall be screw removable and small enough for easy handling by one man. The paint finish shall be gray enamel over a rust-inhibiting phosphate primer.
- Bus bars shall be high strength, 55% conductivity, pure aluminum and suitably plated. Unless otherwise indicated, bus bar bracing shall be 50,000 RMS amperes symmetrical. The panelboard bussing shall be plated and sufficient cross-sectional areas to continuously conduct

rated full load current with a maximum temperature rise of 50°C, above an ambient temperature of 40°C. Provide equipment ground bus.

- The circuit breaker shall be suitable for use on the service as described and the sizes as shown on the associated drawings. The units shall be listed and approved by CSA/ULC for general service entrance use. The circuit breakers shall be group mounted in panel-type construction.

BRANCH CIRCUIT PANELBOARDS

- 120/208 volt, 3-phase, 4-wire Circuit Breaker Type: Install circuit breaker panelboard as indicated in the panelboard schedules, and where shown on the plans. Panelboards shall be of the dead-front safety type, equipped with thermal-magnetic molded case circuit breakers with frame and trip ratings as shown on the schedule. The unit shall be listed, approved by CSA/ULC for service entrance use and labeled at each unit.
- All circuit breakers shall be bolt-on type, quick-break, quick-make, thermal-magnetic, trip indicating, have a common trip on all multipole breakers and shall be CSA/ULC approved for switching duty. Tandem, twin duplex, or thin types are not acceptable. All breakers shall have large permanent individual circuit numbers affixed to each breaker in a uniform position. All breakers having a 225 amp frame and larger shall be equipped with adjustable trips.
- Bus bar connections to the branch circuit breakers shall be the "distributed phase" or "phase sequence" type. All current-carrying parts of the bus assembly shall be plated. Mains rating shall be as shown in the panelboard schedule on the plans. Provide an equipment ground bus and an insulated, isolated ground bus. Bus bars shall be high strength 55% conductivity pure aluminum and suitably plated.
- Wiring Terminals: Terminals for feeder conductors to the panelboard mains and neutral shall be CSA/ULC listed as suitable for the type of conductor specified. Terminals for branch circuit wiring, both breaker and neutral, shall be CSA/ULC listed as suitable for the type of conductor specified.
- The panelboard bus assembly shall be enclosed in a steel cabinet. Fronts shall include doors and have flush-brushed, stainless steel, cylinder tumbler-type locks with catches and spring-loaded door pulls. The flush lock shall not protrude beyond the front of the door. All panelboard locks shall be keyed alike. Fronts shall not be removable with door in the locked position. A circuit directory frame and card with a clear plastic covering shall be provided on the inside of the door. The directory shall be typed to identify the load fed by each circuit.
- Provide one spare 3/4" conduit for each three unused poles and one spare 1" conduit in all flush mounted panelboards. Extend conduits from panelboard to an accessible point beyond the area of finished wall or ceiling construction.

- 347/600 Volt, 3-Phase, 4-Wire, Circuit Breaker Type: Install circuit breaker lighting panelboards as indicated in the panelboard schedule and where shown on the plans. Panelboards shall be dead front safety type equipped with thermal magnetic molded case circuit breakers of frame and trip ratings as shown on the schedule. The units shall be listed, approved by CSA/ULC and labeled at each unit.
- Panelboard bus structure and main lugs or main breaker shall have current ratings as shown on the panelboard schedule. Such ratings shall be established by heat rise test with maximum hot spot temperature on any connector or bus bar not to exceed 50° rise above ambient. Heat rise test shall be conducted in accordance with CSA/ULC.
- Provide an equipment ground bus. Bus bars shall be high strength 55% conductivity pure aluminum and suitably plated. Bus bar shall be adequately braced and supported to withstand the mechanical forces exerted when connected directly to a power source having the indicated short circuit. Unless otherwise indicated, bus bar bracing shall be 42,000 RMS amperes symmetrical.
- Circuit breakers shall be bolt-on circuit breakers equipped with individually insulated, braced, and protected connectors. Large permanent individual circuit numbers shall be affixed to each breaker in a uniform position (or equip each breaker with a circuit card holder and neatly printed card identifying the circuit). Provisions for additional breakers shall be such that no additional connectors will be required to add breakers.
- Each panelboard, as a complete unit, shall have a rating equal to or greater than the integrated equipment rating shown on the panelboard schedule on the plans. Such rating shall be established by test with the circuit breakers mounted on the panelboard.
- Doors shall be fastened to trim with concealed hinges and provided with flush type combination latch and lock with three keys each (all keyed alike).
- Panelboards, with circuit breakers installed, to be provided by Required National Vender. See drawing A0.1.

BRANCH CIRCUITS

- A general layout of branch circuit wiring and routing is indicated. Generally, receptacles and appliances are on separate circuits from lighting.
- No. 14 wires will be permitted only on control circuits of relays, contractors, starters, etc. No. 12 wire will be a minimum size for any lighting, motor or general branch circuits unless specifically noted otherwise.

- In general, conductor sizes for major branch circuits such as large motor and equipment branch circuits are noted. Where conductor sizes for circuits are not noted, produce branch circuits with conductors sized as follows:
 - Conductor for individual motor branch circuits shall have ampere capacity of not less than 125% of the running current of the motor.
 - Conductors for multiple motor branch circuits: Have ampere capacity of not less than 125% of the running current of the largest motor plus 100% of the running current for each additional motor connected to the circuit.
 - Conductor sizes for lighting, receptacles, and small motor branch circuits, with less than 20 ampere connected load, are not shown. Conductors for such circuits are sized as follows:
- Conductor size for branch circuits (120/208V) 75 feet in length from branch circuit panel to center of load, not smaller than No. 12, up to 150 feet not smaller than No. 10, up to 200 feet not smaller than No. 8. Conductor size for branch circuits (277/480V) not smaller than No.12, up to 300 feet not smaller than No. 10, 400 feet not smaller than No. 8.
- Where specific conductor sizes required by the drawings and specifications are larger than Code requires, the largest sizes are installed.

DISCONNECT SWITCHES AND PROTECTIVE DEVICES

- Disconnecting devices, when not included, with electrically-operated equipment furnished under other sections of the specifications, shall be furnished and installed under this section.
- Safety disconnect switches shall be quick-make, quick-break, heavy-duty, horsepower rated, with voltage rating as required by the system and current rating as scheduled or as required by the motor manufacturer. All switches shall be furnished with a defeatable cover interlock. All disconnect switches shall be fusible except where otherwise noted.
- All fused switches shall accept only Class "R" type current-limiting fuses and reject all other class and type.
- Disconnect switches for fractional horsepower (1/4 or less), 120 volt, single-phase motors shall be Fusetron box cover units with a toggle switch, pilot light and a fustat dual-element fuse of a size nearest to ampere rating of motor.
- Disconnect switches for 1/3 and 1/2 horse power 120 volt motors and fractional horsepower motors (3/4 or less) single phase motors may be a manual motor starter with pilot light. Provide thermal overload protection when not integral with motor.

- Disconnect switches for fractional horsepower motors and for equipment of similar capacity shall be a heavy duty industrial type fused disconnect, with solid neutral where required.
- Disconnects installed indoors to have NEMA 1R enclosures. Disconnects installed outdoors or in outdoor locations to have NEMA 3R enclosures.

FUSES (WHERE OCCUR)

- All fuses shall be non-renewable type R, current limiting, 250 or 600 volt, with interrupting rating of 200,000 amperes RMS, as manufactured by Bussman Division of McGraw Edison Company with current rating and type as scheduled.
- Fuses protecting distribution and branch circuit panels shall be Buss RK-1 low-peak dual element type or as noted on Drawings.
- Fuses protecting motor branch circuits shall be Buss Fusetron dual-element type, sized for motor nameplate data per manufacturer's recommendation. All other fuses shall be typed as noted on the contract drawings. Fuses furnished by contractor and approved by Professional of Record different from those specified shall be coordinated with each other and with circuit breakers which they are protecting. The contractor shall provide a written statement certifying that coordination verification has been performed. Provide a fuse in each fuseholder and a label inside each switch cover indicating specific type of fuse required for replacement in all fused switches including panels. S.E.S. distribution switchboards, and disconnects.
- Provide three spare fuses for each type and current rating used on this project. Fuses shall be mounted in fuse clips in a panel with a hinged, lockable door and installed in the mechanical rooms(s) as directed. Mount fuses by current rating in a manner to make sizes evident and fuses readily available. Cabinets shall be as manufactured by Bussman, a Division of McGraw Edison. Provide only where fuses are required on site.

STARTERS

- Furnish and install starters and control devices shown and required by code.
- Starters (manual and magnetic) shall be Square-D. Furnish complete with green light pilot lights to indicate equipment energized, auxiliary contacts as required, push buttons, hand-off-on-switches, etc., control devices and overload relays in each line to motors except neutral, all as required to complete installation.
- Control devices (push button stations, hand-off-auto, on-off, limit switches, etc.) Square-D.

DRY TYPE TRANSFORMER

- Transformers shall have KVA ratings, primary and secondary voltages, phases, and electrical characteristics as scheduled on drawings.

- All transformers, 30 KVA and larger, shall incorporate a CSA/ULC class 220°C insulation system in accordance with National Electrical Manufacturer's Association ST-20 and the latest revision. The electrical insulation shall have been examined and listed by CSA or ULC.
- The temperature rise shall not exceed 115° above a 24-hour 40°C ambient when loaded at the nameplate KVA. The 115°C rise transformers shall be capable of providing a 30% continuous overload without exceeding a 150°C rise.
- All coils shall be of the continuous wire wound construction and shall be vacuum impregnated with non-hydroscopic, thermosetting varnish, each layer having end fillers or tie downs to provide maximum mechanical strength. Tap terminations to be brazed to magnet wire. Primary and secondary magnet wire brazed directly to bus stubs or lugs firmly mounted. Windings continuous from start to finish. No splicing acceptable. Materials incorporated must have a minimum of

one year of proven field usage. Accelerated laboratory test are not acceptable.

- Tap arrangements shall either meet or exceed the requirements of NEMA ST-20. Those requirements are 2, 2-1/2 % full capacity taps below the normal primary voltage.
- Sound levels shall not exceed the following limits; 10 to 50 KVA - 45 D.B.; 51 to 150 KVA - 50 D.B.; 151 to 300 KVA - 55 D.B.; 301 to 500 KVA - 60 D.B.
- Dry-type transformers are provided by Required National Vendor. See drawing A0.1 for approved vendor.

PART III – EXECUTION

All equipment shall be installed in accordance with manufacturer's recommendations and applicable codes as specified elsewhere.

END OF SECTION

PART I – GENERAL

GENERAL

Furnish and install circuits, feeders, and outlets, as shown on the drawings completely connect and leave store fixtures, checkout stands and equipment as indicated on the drawings, in proper operating condition. A general description of such work follows; however, any omission of details will not relieve the contractor of the responsibility of completely connecting the various items. It shall be the duty of the contractor to familiarize himself with details involved by actual examination of equipment and fixtures. Cases and checkout standard are subject to some relocations; all dimensions and locations indicated shall be verified with representative of PETSMART and fixtures or equipment supplier before actual installation. Type of junction box outlet to be provided for each piece of equipment and case shall be determined by the type of fixtures or cases to be installed. Verify location of all electrical requirements with PETSMART immediately prior to rough-in. Connect wiring between adjacent cases, store fixtures, equipment of all items in each line-up, etc., for complete wiring.

SUBMITTALS

- Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.
- Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

PART II – PRODUCTS

CHECKOUT STANDS

- Furnish and install the following wiring, outlets, circuitry, and connections for each checkout stand. Provide facilities as specified herein for NCR Cash Register Terminal System. Completely connect checkout stands that are to be installed and provide blanked outlets.

MISCELLANEOUS EQUIPMENT

- The contractor shall rough-in for and make final connection to all miscellaneous equipment requiring electrical connections as shown and called for on the drawings. All work shall be done in accordance with approved shop drawings furnished by the equipment supplier. Where rough-in only is called for, sufficient pigtails shall be left in the outlet boxes to facilitate extension to the equipment. Ends of conductors shall be properly taped and boxes furnished with suitable covers.

PART III – EXECUTION

Not applicable.

END OF SECTION

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PART I – GENERAL**WORK SPECIFIED HEREIN**

- The contractor shall furnish and install a lighting fixture as scheduled on each and every outlet in accordance with the type designation shown on the drawings. If a type designation is omitted the fixture shall be of the same type as is shown for rooms of similar usage. Verify before purchase and installation.
- Fixtures are specified in the schedule by manufacturer's name and catalog number. No substitutions on **Required Vendor** items.
- It shall be the contractor's responsibility to check the architectural drawings and, regardless of the catalog number prefixes and suffixes shown, furnish fixtures with the proper trim, frames, supports and hangers and other miscellaneous appurtenances to properly coordinate with finish ceilings, etc.
- Where ceiling construction requires reinforcing to support the weight of the fixtures, it shall be furnished by the contractor.
- Where multiple voltages are used, it shall be the contractor's responsibility to verify the voltage shown connected with the voltage shown in the light fixture schedule. If there is any difference, it is the contractor's responsibility to verify the voltage with the engineer before placing an order for the fixtures.
- Furnish and install all lighting fixtures as indicated and scheduled on the drawings.

SUBMITTALS

- Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.
- Review of submittals by the Professional of Record is limited to specific shop drawings as called for in the Project Manual.

PART II – PRODUCTS**GENERAL**

- Provide lighting fixtures of sizes, types, and ratings indicated; complete with, but not necessarily limited to housing, lamps, lamp holders, reflectors, ballasts, starters and wiring.
- All recessed LED fixtures shall have thermal protection.
- All LED fixtures having flat lenses shall have a .125 (min.) thickness.
- All fixtures exposed to direct weather condition (rain) shall be wet labeled. All exterior fixtures not exposed to direct weather shall be damp labeled.

PART III – EXECUTION**FIXTURE INSTALLATION**

- Fixtures shall be recessed in furred ceiling and installed so that they can be removed from below the ceiling, unless indicated otherwise.
- Recessed fixtures installed with metal bar hangers for attaching to ceiling supports. Fixtures not supported directly from ceiling, provide galvanized steel wire as required for supporting fixtures from structure. No wood or other combustible material shall be used for supporting fixture.
- As certain the type of ceiling construction for each fixture and provide suitable frame and fixture accessories to suit. Furnish substantial mounting frames or plaster rings for all recessed and semi-recessed lighting fixtures where indicated or required. All frames made of galvanized steel shall be provided with extra cross members where required to insure maintenance of proper opening dimensions during installation.
- Direct connected recessed fixtures in removable ceilings shall be connected to the branch circuit with flexible conduit and branch circuit wire from an accessible junction box. Where LED fixture housings are connected together, use 90°C wire for branch circuit feed through fixture channels.
- Fixtures shall be grounded to the grounding system.
- Prior to placing orders for recessed LED fixtures, contractor shall verify the types of ceilings and suspension systems that have been approved for the project and shall order fixtures with flanges as required to fit in the approved ceilings.

INSTALLATION OF LIGHTING FIXTURES

- Installation of all lighting fixtures shall be done by experienced mechanics. Lighting fixtures should not be installed where finished coat of paint has been applied to ceiling and walls until paint is thoroughly dry.
- Lighting fixtures in equipment rooms shall not be installed until after all piping and ductwork is in place. Lighting fixture layout shown on the drawings is typical layout for bid purposes but shall be modified to provide adequate lighting of the equipment space according to final construction conditions. Any relocation of fixtures due to duct or piping interference shall be as directed by the Engineer at no expense to the Owner.
- Contractor shall be responsible for proper coordination of all lighting fixture locations. Provide support for all fixtures mounted on or recessed in hung ceiling. Confer with ceiling contractors and other trades to coordinate lighting system.
- Fixtures shall be rigidly mounted to fixture stud in outlet boxes. Provide Malleable iron hickies or extension pieces where required.
- Provide suitable coverplate or canopy for each fixture outlet box where the fixture does not provide a suitable cover.

- Fixtures located on exterior of building shall be installed with cadmium-plated brass screws and gasketed.
- All pendant type fixtures in the same room shall be installed at a uniform height from the floor and hung plumb.
- Verify all ceiling heights and clearances. Before proceeding with fixture installation, a schedule of mounting heights for all fixtures shall be submitted for approval.
- Recessed lay-in fixtures furnished with 7 feet No. 14 AF wire (minimum) and 6 feet Greenfield.
- Circuit wiring running through the fixtures shall be No. 12 AWG with Type XHHW or THWN/THHN insulation. No joints in the wires other than those absolutely required. Provide fixture wires of sufficient length for making approved connections at the fixture outlets and at the lamp holders.
- Joints and splices within fixtures to be secured by wire nuts or indent type lug fasteners.
- Protect the lighting fixtures from damage during their unloading or removal, storage and installation. Any broken fixtures, glassware, etc., must be replaced with new parts, without any additional expense to the Owner, unless undue delay or inconvenience.
- Upon completion of the installation of the lighting fixtures and lighting equipment, they must be in first class operating order and in perfect condition as to finish, etc. Check for proper operation and appearance, alignment of fixtures, and proper placement of lenses, louvers, lamps, and other light-controlling or modifying appurtenances. Where special lighting effects, flood or spotlighting is involved, perform final adjustment under the direct supervision of the Professional of Record and PETSMART.
- *Cleaning:* Immediately prior to occupancy, damp clean all glass ware, fixture trims, reflectors, and clean lamps or install new lamps as directed, with glass and fixtures free of labels.
- *Use of Lighting Fixtures:* As soon as any portion of the lighting fixture work is ready for operation, the Owner shall have the right to operate the same under the supervision of the contractor. This shall in no way be interpreted to mean the acceptance of such part of the installation or relieve the contractor of his responsibility for the complete work or any part thereof.
- All fixtures used on this project shall be new, delivered to the job site in the original packing cases and sleeves and shall be of the same manufacturer. Unless otherwise scheduled all lamps fixtures be as shown in light fixture schedule on drawing E1.0 and energy efficient.
- *Approved manufacturers:* General Electric

END OF SECTION

PART I – GENERAL**SUMMARY**

Related Documents: Drawings, General Conditions and Division 1 Specification Sections apply to this section.

Related Work Specified Elsewhere: 15204 Heating and Ventilation Systems

- 15300 Automatic Sprinkler Systems
- 16010 General Provisions - Electrical
- 16100 Basic Materials & Methods

This section is valid only when considered in total with other Contract Documents. Cross references are for convenience of reader and their inclusion in or omission from any section in no way limits its scope or intent of any Contract Document.

DESCRIPTION OF WORK

- Furnish and install all labor, material and equipment necessary for the fire alarm and water flow notification system, as herein specified. System shall be tested and left in first class operating condition. Furnish and install all miscellaneous control wiring complete as specified herein, including all labor, materials, equipment, accessories, services and tests of all systems. The system shall perform the sequence of operation herein specified and shall provide all devices shown on the drawings, called for in the specifications and as required by the applicable codes and standards.
- This Contractor shall, under this contract, obtain the services of an authorized representative of the sprinkler control communicator system manufacturer to assure that the system is in proper operating condition and compliance with all applicable regulations. The authorized representative of the sprinkler communicator system manufacturer shall provide all certification, inspection, testing and other services required by the testing and certification provisions of this specification.
- Water flow switch and sprinkler supervisory tie-ins: Contractor shall provide connection to water flow switches and sprinkler supervisory switches. Switches to be supplied by sprinkler contractor in accordance with NFPA 72.
- Contractor shall provide necessary openings in floors, walls, ceilings, provide sleeves, inserts and templates required for installation compliant with applicable sections of this specification.

REFERENCES

Codes and Standards: Installation methods and system performance shall be in compliance with the most currently recognized building code and:

NFPA 70, National Electrical Code,

NFPA 72, National Fire Alarm Code,

Applicable CSA/ULC Listing

All equipment and wiring shall be installed in accordance with the requirements of the manufacturer, these specifications, the codes and standards listed above, and with all applicable regulations.

SUBMITTALS

- Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.
- Upon completion, copies of all inspection/certification reports required by, issued to, or issued by the Local Authority Having Jurisdiction.
- Upon completion, record drawings of the custom wiring schematic, riser diagram, and point-to-point wiring diagrams specified above but modified to include any changes incorporated in construction.
- A letter from the manufacturer's representative certifying that the installation is compliant with all requirements of the manufacturer.
- A copy of the manufacturer's warrantee, modified if necessary to comply with the requirements of the warrantee sections of this specification.

PART II – PRODUCTS**ACCEPTABLE MANUFACTURERS**

"Alarm Package" (Fire and Burglar) shall be provided and installed by a Required Vendor as noted in "Bidding Requirements" Section 5 for approved vendor.

SEQUENCE OF OPERATION

1. The system shall operate as a low voltage water flow reporting system and shall be a complete non-coded, zoned, electrically supervised fire communicator system as herein specified. Initiation circuits shall be NFPA 72 Class B, Style B. Supervisory circuits shall be NFPA 72 Class B, Style B. Notification circuits shall be NFPA 72 Class B, Style X. Circuits for relay coil operation shall be 24 volt maximum and be derived from the fire communicator panel.
2. Power supply shall be 120 volts, 60 Hz. The 24 volts, DC power for all system supervisory and control functions shall be provided by the main fire communicator power supply.
3. Upon loss of building power, the entire system shall operate on battery power for 24 hours.
4. System Operation shall be:
 - Any abnormal circuit conditions as specified for the Class and Style designated for the system shall initiate a "trouble" condition at the panel and indicate a "trouble" condition at a ULC listed central station.
 - Any abnormal condition of the position of a sprinkler system control valve shall indicate a distinct "supervisory" alarm condition at the panel, illuminate a "supervisory" indication on

the remote annunciator, and indicate a "supervisory" alarm condition at a ULC listed central station.

- Activation of any device monitoring water flow in the sprinkler system shall initiate a "General Alarm" condition as hereinafter described at the panel and a ULC listed central station.
 - Malfunction of the battery circuits, low battery levels or any charger malfunctions shall initiate a "trouble" condition at the panel, and indicate a "trouble" condition at a ULC listed central station.
5. Initiation of a "General Alarm" condition shall result in the following functions to be performed by the system:
- Initiate an alarm indication on the panel remote annunciator by tone and illuminate the corresponding English zone description. Manually activating the "Alarm Silence" shall silence the tone at the remote annunciator silence the building audio device controlled by this fire alarm system. The alarm condition displayed on the panel and at the remote annunciator will remain on until the condition causing the alarm has been cleared and reset.
 - Illuminate the water flow alarm English display and activate sounding device on the remote annunciator located at the store as shown on the drawings.
 - Panel will automatically notify the ULC listed central station of the alarm condition.

COMMUNICATOR PANEL

The communicator panel shall be as supplied by the Required Vendor and shall provide power, annunciation, supervision and control for the water flow alarm, annunciation and supervisory system. All external circuits shall be listed as power limited circuits per article 760 of The Canadian Electrical Code. The control panel shall operate according with this section, the sequence of operation and applicable drawings. All zones shall be capable of alarming up to the total number connected to the system. The panel shall have the ability to by-pass a zone or an output through programming.

RELAYS

Relays provided for the control of external auxiliary devices shall have energizing coils of a low voltage (24 volts). Contacts shall consist of a minimum one each of normally open and normally closed contacts. Contacts shall be rated at a minimum of 5 amps and 120 volts. The enclosure for the relay shall be NEMA 1 rating unless the relay is mounted where subject to weather, moisture, hazardous or other extreme classified conditions in which case the relay shall be provided with an enclosure of the appropriate rating.

REMOTE ANNUNCIATOR

The remote annunciator shall be located as shown on the drawings. The assembly shall consist of a coverplate with English readout of "alarm",

"supervisory" and "trouble" conditions. The unit shall be surface mounted and operate in compliance with the "Sequence of Operation" described herein. The "water flow" indication and "water flow" sounding device shall derive power from the sprinkler alarm communicator. The "supervisory" indication shall derive its power from the sprinkler alarm communicator.

PART III – EXECUTION

INSTALLATION/APPLICATION

- This contractor shall furnish and install all control wiring and outlet boxes required for a complete system as described herein and as detailed on the drawings. All back boxes shall be furnished by the electrical contractor. Any required conduit shown in the submittals referenced by this section shall be furnished and installed by the licensed electrical contractor.
- All wiring to be installed exposed at 8' or less above the finished floor or, where subject to physical damage, shall be in conduit. All cables shall be type FPL or FPLP and shall meet the requirements of all national, provincial, and local electrical codes. The sizes of the different wires shall be those specified by the manufacturer or as indicated on the drawing whichever is the larger wire or more stringent requirement. All wires shall be tagged at all junction points and shall test free from grounds or crosses between conductors. Only low voltage, current limited, burglar and fire alarm wiring may be installed in conduits with conductors for the fire communicator system.
- Circuits installed at more than 8' above finished floor, concealed above lay-in ceilings or concealed within partitions shall be installed without conduits and supported using plastic supports in a manner and at intervals compliant with CEC requirements. In addition, conductors installed above lay-in ceilings shall be supported from the building structure and shall not be permitted less than 9" above the removable ceiling tiles or panels. Conductors shall be concealed from public view at all locations by routing conductors on the inside of joists, over girders, within partitions or in any other manner acceptable to the owner. All conductors shall be installed at right angles to the building walls, floors and ceilings.
- All circuits required for operation of the relays, initiation devices, supervisory devices and panel in accordance with these specifications will be provided by this contractor whether or not expressly shown on the drawings. The fire communicator equipment manufacturer shall have final responsibility for exact definition of the circuits.
- Final connections between equipment and the wiring system shall be made under direct supervision of a representative of the manufacturer.

TESTS AND CERTIFICATIONS

All certifications specified in this section shall be in writing and submitted as part of the certification requested in the paragraph specifying submittals.

The system shall meet all the requirements of the listed applicable codes and the requirements of the Local Authority Having Jurisdiction. The system test certification documents, including those required for and of the central station shall meet the requirements of the Local Authority Having Jurisdiction.

Any and all testing and retesting required for certification and for or after warrantee replacement shall be compliant with all the requirements of the listed applicable codes and the requirements of the Local Authority Having Jurisdiction and shall be completed at no additional cost to the Owner.

Contractor shall notify the Owner in writing a minimum of two weeks prior to testing so that the Owner may, at the Owner's option, have a representative present for testing.

If testing and/or inspection agreements are required by the Local Authority Having Jurisdiction for building occupancy, a compliant agreement shall be offered to the owner in writing a minimum of two weeks prior to sprinkler communicator system testing. The cost of the Test and Inspection Agreement shall not be included in this section and will be paid by the Owner separately unless the Owner is bound to either the manufacturer or installer for inspection and testing as terms of the manufacturer's or installer's warrantee. If testing or inspection of the system by organizations other than the installer or manufacturer would void any warranties, a testing and inspection agreement satisfactory to the Local Authority Having Jurisdiction and valid for the length of time of the warrantee will be provided under this section at no additional cost to the Owner.

The systems in their entirety shall be warranted for a period of 1 year from the date of final acceptance or beneficial use of the systems by the Owner. Warranty shall be documented by the issuance of a written service agreement in the name of the Owner.

END OF SECTION

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PART I – GENERAL**SUMMARY**

Related Documents: Drawings, General Conditions and Division 1 Specification Sections apply to this section. **This is a Required Vendor.**

Related Work Specified Elsewhere: 15204 Heating and Ventilation Systems

16010 General Provisions - Electrical

16100 Basic Materials & Methods

This section is valid only when considered in total with other Contract Documents. Cross references are for convenience of reader and their inclusion in or omission from any section in no way limits its scope or intent of any Contract Document.

DESCRIPTION OF WORK

- Furnish and install all labor, material and equipment necessary for the intrusion alarm system, as herein specified. System shall be tested and left in first class operating condition. Furnish and install all miscellaneous control wiring complete as specified herein, including all labor, materials, equipment, accessories, services and tests of all systems. The system shall perform the sequence of operation herein specified and shall provide all devices shown on the drawings, called for in the specifications and as required by the applicable codes and standards.
- This Contractor shall, under this contract, obtain the services of an authorized representative of the intrusion alarm system manufacturer to assure that the system is in proper operating condition and compliance with all applicable regulations. The authorized representative of the intrusion alarm system manufacturer shall provide all certification, inspection, testing and other services required by the testing and certification provisions of this specification.
- Contractor shall provide necessary openings in floors, walls, ceilings, provide sleeves, inserts and templates required for installation compliant with applicable sections of this specification.

REFERENCES

Codes and Standards: Installation methods and system performance shall be in compliance with the most currently recognized building code and:

NFPA 70, National Electrical Code,

Applicable CSA/ULC Listing

All equipment and wiring shall be installed in accordance with the requirements of the manufacturer, these specifications, the codes and standards listed above, and with all applicable regulations.

SUBMITTALS

- Unless otherwise noted, the contractor shall prepare all shop drawings, product literature, etc. only as required to properly coordinate and construct the project.

- Upon completion, copies of all inspection/certification reports required by, issued to, or issued by the Local Authority Having Jurisdiction.
- Upon completion, record drawings of the custom wiring schematic, riser diagram, and point-to-point wiring diagrams specified above but modified to include any changes incorporated in construction.
- A letter from the manufacturer's representative certifying that the installation is compliant with all requirements of the manufacturer.
- A copy of the manufacturer's warrantee, modified if necessary to comply with the requirements of the warrantee sections of this specification.

PART II – PRODUCTS**ACCEPTABLE MANUFACTURERS**

"Intrusion Alarm Package" shall be provided and installed by a Required Vendor as noted on drawing A0.1.

SEQUENCE OF OPERATION

- The system shall operate as a low voltage intrusion reporting system and shall be a complete non-coded, zoned, electrically supervised communicator system as herein specified. Initiation circuits shall be NFPA 72 Class B, Style B. Supervisory circuits shall be NFPA 72 Class B, Style B. Notification circuits shall be NFPA 72 Class B, Style X. Circuits for relay coil operation shall be 24 volt maximum and be derived from the communicator panel.
- Power supply shall be 120 volts, 60 Hz. The 24 volts, DC power for all system supervisory and control functions shall be provided by the main fire communicator power supply.
- Upon loss of building power, the entire system shall operate on battery power for 24 hours.
- System Operation shall be:
 - Any abnormal circuit conditions as specified for the Class and Style designated for the system shall initiate a "trouble" condition at the panel and indicate a "trouble" condition at a ULC listed central station.
 - Activation of any device monitoring intrusion in the system shall initiate a "General Alarm" condition as hereinafter described at the panel and a ULC listed central station.
 - Malfunction of the battery circuits, low battery levels or any charger malfunctions shall initiate a "trouble" condition at the panel, and indicate a "trouble" condition at a ULC listed central station.
- Initiation of a "General Alarm" condition shall result in the following functions to be performed by the system:
 - Initiate an alarm indication on the panel remote annunciator by tone and illuminate the corresponding English zone description.

Manually activating the "Alarm Silence" shall silence the tone at the remote annunciator silence the building audio device controlled by this alarm system. The alarm condition displayed on the panel and at the remote annunciator will remain on until the condition causing the alarm has been cleared and reset.

- Panel will automatically notify the ULC listed central station of the alarm condition.

COMMUNICATOR PANEL

The communicator panel shall be as supplied by the Required Vendor and shall provide power, annunciation, supervision and control for the alarm, annunciation and supervisory system. All external circuits shall be listed as power limited circuits per article 760 of The Canadian Electrical Code. The control panel shall operate according with this section, the sequence of operation and applicable drawings. All zones shall be capable of alarming up to the total number connected to the system. The panel shall have the ability to by-pass a zone or an output through programming.

RELAYS

Relays provided for the control of external auxiliary devices shall have energizing coils of a low voltage (24 volts). Contacts shall consist of a minimum one each of normally open and normally closed contacts. Contacts shall be rated at a minimum of 5 amps and 120 volts. The enclosure for the relay shall be NEMA 1 rating unless the relay is mounted where subject to weather, moisture, hazardous or other extreme classified conditions in which case the relay shall be provided with an enclosure of the appropriate rating.

REMOTE ANNUNCIATOR

The remote annunciator shall be located as shown on the drawings. The assembly shall consist of a coverplate with English readout of "alarm", "supervisory" and "trouble" conditions. The unit shall be surface mounted and operate in compliance with the "Sequence of Operation" described herein. The unit shall derive power from the intrusion alarm system.

PART III – EXECUTION

INSTALLATION/APPLICATION

- This contractor shall furnish and install all control wiring and outlet boxes required for a complete system as described herein and as detailed on the drawings. All back boxes shall be furnished by the electrical contractor. Any required conduit shown in the submittals referenced by this section shall be furnished and installed by the licensed electrical contractor.
- All wiring to be installed exposed at 8' or less above the finished floor or, where subject to physical damage, shall be in conduit. All cables shall be type FPL or FPLP and shall meet the requirements of all national, provincial, and local electrical codes. The sizes of the different wires shall be those specified by the manufacturer or as indicated on the drawing whichever is the larger wire or more stringent requirement. All wires shall be tagged at all junction points and shall test free from grounds or crosses between conductors.

Only low voltage, current limited, burglar intrusion alarm wiring may be installed in conduits with conductors for the intrusion alarm system.

- Circuits installed at more than 8' above finished floor, concealed above lay-in ceilings or concealed within partitions shall be installed without conduits and supported using plastic supports in a manner and at intervals compliant with CEC requirements. In addition, conductors installed above lay-in ceilings shall be supported from the building structure and shall not be permitted less than 9" above the removable ceiling tiles or panels. Conductors shall be concealed from public view at all locations by routing conductors on the inside of joists, over girders, within partitions or in any other manner acceptable to the owner. All conductors shall be installed at right angles to the building walls, floors and ceilings.
- All circuits required for operation of the relays, initiation devices, supervisory devices and panel in accordance with these specifications will be provided by this contractor whether or not expressly shown on the drawings. The equipment manufacturer shall have final responsibility for exact definition of the circuits.
- Final connections between equipment and the wiring system shall be made under direct supervision of a representative of the manufacturer.

TESTS AND CERTIFICATIONS

All certifications specified in this section shall be in writing and submitted as part of the certification requested in the paragraph specifying submittals.

The system shall meet all the requirements of the listed applicable codes and the requirements of the Local Authority Having Jurisdiction. The system test certification documents, including those required for and of the central station shall meet the requirements of the Local Authority Having Jurisdiction.

Any and all testing and retesting required for certification and for or after warrantee replacement shall be compliant with all the requirements of the listed applicable codes and the requirements of the Local Authority Having Jurisdiction and shall be completed at no additional cost to the Owner.

Contractor shall notify the Owner in writing a minimum of two weeks prior to testing so that the Owner may, at the Owner's option, have a representative present for testing.

If testing and/or inspection agreements are required by the Local Authority Having Jurisdiction for building occupancy, a compliant agreement shall be offered to the owner in writing a minimum of two weeks prior to sprinkler communicator system testing. The cost of the Test and Inspection Agreement shall not be included in this section and will be paid by the Owner separately unless the Owner is bound to either the manufacturer or installer for inspection and testing as terms of the manufacturer's or installer's warrantee. If testing or inspection of the system by organizations other than the installer or manufacturer would void any warranties, a testing and inspection agreement satisfactory to the Local Authority Having Jurisdiction and valid for the length of time of the warrantee will be provided under this section at no additional cost to the Owner.

The systems in their entirety shall be warranted for a period of 1 year from the date of final acceptance or beneficial use of the systems by the Owner. Warranty shall be documented by the issuance of a written service agreement in the name of the Owner.

END OF SECTION

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