SECTION 15500 –HEATING, VENTILATION, AND AIR CONDITIONING

PART 2 – PRODUCTS (CONTINUED)

J. HYDRONIC SYSTEMS PIPING

1) HYDRONIC PIPING FOR CHILLED WATER, CONDENSER WATER AND HEATING WATER SHALL BE AS FOLLOWS:

a. MATERIALS:

i. 1 INCH AND SMALLER: TYPE "L" HARD DRAWN COPPER

ii. 1–1/4 INCHES AND LARGER: SCHEDULE 40 BLACK STEEL

b. FITTINGS:

i. 1 INCH AND SMALLER: WROUGHT COPPER FITTINGS WITH 95/5 SOLDER OR SIL–FOS FOR PRESSURES GREATER THAN 50 PSI.

ii. 1–1/4 INCHES THROUGH 2 INCHES: 300# MALLEABLE IRON FITTINGS.

iii. 2–1/2 INCHES AND LARGER: BLACK STEEL WELDED FITTINGS.

c. PROVIDE DIELECTRIC UNIONS BETWEEN DISSIMILAR METALS.

d. ALL PIPING SHALL BE IN STRICT CONFORMANCE WITH ASTM, ASA, AND LANDLORD'S REQUIREMENTS, WHICHEVER IS MOST STRINGENT.

e. UNIONS OR FLANGES MUST BE USED AT EQUIPMENT CONNECTIONS WHERE SERVICE OR REMOVAL MAY BE REQUIRED.

2) ALL ELBOWS SHALL BE LONG RADIUS TYPE.

K. HYDRONIC SYSTEMS VALVES

1) VALVES FOR CHILLED WATER, CONDENSER WATER AND HEATING WATER SHALL BE AS FOLLOWS:

a. BALL VALVES, 2– INCHES AND SMALLER:

i. CAST BRASS BODY, FULL PORT CHROME PLATED BRASS BALL, TEFLON SEATS AND LEVER HANDLE, 600 PSI COLD WORKING PRESSURE.

ii. NIBCO OR APPROVED EQUAL.

b. BUTTERFLY VALVES, 2–1/2 INCHES AND LARGER:

i. CAST IRON BODY, 200 PSI PRESSURE RATING, EPDM SEAT, STAINLESS STEEL STEM WITH COPPER BUSHINGS, LEVER LOCK.

ii. NIBCO OR APPROVED EQUAL.

c. SWING CHECK VALVES, 2– INCHES AND SMALLER:

i. CLASS 150, CAST BRONZE BODY AND CAP CONFORMING TO ASTM B62 WITH HORIZONTAL SWING, Y–PATTERN, RENEWABLE BRONZE DISC, AND HAVING THREADED OR SOLDERED ENDS.

ii. NIBCO OR APPROVED EQUAL.

d. SWING CHECK VALVES, 2–1/2 INCHES AND LARGER:

i. CLASS 125, CAST IRON BODY AND BOLTED CAP, HORIZONTAL SWING, RENEWABLE BRONZE DISC, FLANGED ENDS AND CAPABLE OF BEING REFITTED WHILE THE VALVE REMAINS IN THE LINE.

ii. NIBCO OR APPROVED EQUAL.

e. CALIBRATED BALANCE VALVES:

i. BELL & GOSSETT CIRCUIT SETTER OR APPROVED EQUAL. TACO OR HOMESTEAD ARE CONSIDERED AS EQUAL.

ii. CIRCUIT SETTER SHALL BE PROVIDED WITH LOCKING SET POINT.

iii. A CIRCUIT SETTER BALANCE WHEEL MUST BE INCLUDED WITH O&M MANUAL.

L. HYDRONIC SYSTEMS SPECIALTIES

1) PRESSURE/TEMPERATURE TEST PLUGS

a. PETE'S PLUG WITH NORDEL CORE AND BRASS BODY.

b. RATED AT 400 PSIG AT 0 DEGREES F TO 200 DEGREES F.

2) STRAINERS

a. FOR CHILLED WATER AND HEATING HOT WATER SYSTEMS

i. "Y" PATTERN STRAINER, NIBCO OR APPROVED EQUAL.

ii. STRAINER SHALL HAVE A CAST IRON BODY, AND RATED TO 125 PSIG.

iii. STRAINER SHALL HAVE THREADED CONNECTIONS FOR 2 INCHES AND SMALLER.

iv. STRAINER SHALL HAVE FLANGED CONNECTIONS FOR 2–1/2 INCHES AND LARGER.

v. PERFORATED STAINLESS STEEL SCREEN:

a. HEATING HOT WATER: 0.033 INCHES

b. CHILLED WATER: 1/8 INCH

vi. PROVIDE WITH BLOWDOWN VALVE AND HOSE END FITTING.

b. FOR CONDENSER WATER SYSTEMS

i. FABROTECH BASKET MODEL 125 BASKET STRAINER.

ii. CAST IRON BODY AND COVER.

iii. QUICK RELEASE KNOBS.

iv. PERFORATED 304 STAINLESS STEEL SCREEN: 0.062 INCH

3) THERMOFLO INDICATOR

a. BELL & GOSSETT MODEL "TFI".

M. REFRIGERANT PIPING

1) REFRIGERANT PIPING SHALL BE TYPE "L" HARD DRAWN COPPER TUBING IN ACCORDANCE WITH ASTM B88.

2) ALL FITTINGS AND JOINTS SHALL BE WROUGHT COPPER OR CAST BRONZE IN ACCORDANCE WITH ANSI B16.22.

3) COPPER TO COPPER JOINTS SHALL BE BRAZED WITH A COPPER–PHOSPHORUS ALLOY.

4) COPPER TO BRONZE JOINTS SHALL BE BRAZED WITH SIL–FOS 5 ALLOY.

5) ALL ELBOWS SHALL BE LONG RADIUS TYPE.

N. CONDENSATE PIPING

1) INDOOR INSTALLATIONS:

a. TYPE "L" DRAWN COPPER TUBE WITH 95/5 TIN–ANTIMONY SOLDERED JOINTS AND WROUGHT COPPER FITTINGS.

b. PROVIDE DIELECTRIC SEPARATION BETWEEN DISSIMILAR METALS.

2) OUTDOOR INSTALLATIONS:

a. SCHEDULE 40 UV RESISTANT PVC PIPING.

b. PVC JOINTS SHALL BE SLIP FIT.

O. DUCTWORK INSULATION

1) INSULATE THE FOLLOWING DUCTWORK:

a. CONCEALED SUPPLY DUCTWORK: 1 ½ INCHES

b. UNTREATED OUTSIDE AIR DUCTWORK LOCATED WITHIN THE INTERIOR: 2 INCHES

c. ALL EXTERIOR SUPPLY AND RETURN AIR DUCTWORK: 2 INCHES

2) THERMAL RESISTANCE SHALL BE AT LEAST R–5.2 FOR INTERIOR DUCTWORK AND R–8.0 FOR EXTERIOR DUCTWORK, OR AS REQUIRED BY LOCAL CODE, WHICHEVER IS MORE STRINGENT.

3) INSULATION SHALL HAVE A FLAME SPREAD RATING OF NO MORE THAN 25 AND A SMOKE DEVELOPED RATING NO HIGHER THAN 50.

4) INSULATION SHALL BE JOHNS MANVILLE MICROLITE XG OR APPROVED EQUAL.

5) PROVIDE EXTERIOR DUCTWORK INSULATION WITH PVC WEATHERPROOF JACKETING.

6) INSULATION IS NOT REQUIRED ON SUPPLY DUCTWORK INSTALLED WITH INTERNAL DUCT LINING.

P. DUCT LINING

1) ALL RECTANGULAR SUPPLY DUCTWORK WITHIN 15 FEET AND RETURN DUCTWORK WITHIN 10 FEET OF THE HVAC UNIT SHALL BE INTERNALLY LINED.

2) INTERNAL LINING SHALL BE 1 INCH THICK FIBERGLASS LINER, JOHNS MANVILLE LINACOUSTIC RC OR APPROVED EQUAL.

3) LINER SHALL HAVE A COATED SURFACE EXPOSED TO AIRSTREAM TO PREVENT EROSION. APPLY ADHESIVES AND MECHANICAL FASTENERS AS RECOMMENDED BY SMACNA AND THE MANUFACTURER TO PREVENT LINER SEPARATION FROM THE DUCT. ALL TRANSVERSE EDGES SHALL BE COATED WITH ADHESIVE.

Q. PIPING INSULATION

1) INSULATION THICKNESS SHALL BE PER THE FOLLOWING:

a. REFRIGERANT SUCTION LINES: 1 ½ INCH

b. CONDENSATE LINES : 1 INCH

c. HEATING HOT WATER SUPPLY AND RETURN: 1 ½ INCHES

d. CHILLED WATER SUPPLY AND RETURN: 1 ½ INCHES

2) INSTALLED THERMAL RESISTANCE SHALL BE AT LEAST R–6.0 AT 1 ½ INCH THICKNESS.

3) INSULATION SHALL HAVE A FLAME SPREAD RATING OF NO MORE THAN 25 AND A SMOKE DEVELOPED RATING NO HIGHER THAN 50.

4) INSULATION SHALL BE ARMACELL ARMAFLEX AP OR APPROVED EQUAL.

5) DO NOT INSULATE HOT GAS LIQUID LINES, HOT GAS BYPASS LINES, OR CONDENSER WATER SYSTEMS, WHERE APPLICABLE.

6) PROVIDE EXTERIOR PIPING INSULATION WITH PVC WEATHERPROOF JACKETING.

7) INSULATION AT ALL HANGERS FOR PIPING 2–1/2 INCHES AND LARGER SHALL BE HARD AND NON–COMPRESSIBLE.

8) PROVIDE JOHNS MANVILLE ZESTON 300 INSULATION OR APPROVED EQUAL FOR ALL TEES, ELLS OR SPECIALTY FITTINGS.

PART 3 – EXECUTION

3.1 – INSTALLATION

A. REFRIGERANT SYSTEMS:

1) SUCTION LINES SHALL HAVE ADEQUATE LIFT TRAPS AND/OR DOUBLE SUCTION RISERS TO MEET THE REQUIREMENTS OF FIELD CONDITIONS AND EQUIPMENT MANUFACTURER'S RECOMMENDATIONS.

2) BRAZE ALL JOINTS WITH SILFOS–5 STARTING AT THE INDOOR UNIT AND WORKING TOWARD THE OUTDOOR UNIT. THE SEALS ON THE OUTDOOR UNIT SHALL BE BROKEN LAST. A NITROGEN BLEED SHALL BE USED DURING ALL BRAZING AND ANY TIME THE SYSTEM IS OPEN. ALL OPEN LINES SHALL BE CAPPED AND SEALED BEFORE LEAVING THE SITE DURING CONSTRUCTION. PRESSURE TEST FOR LEAKS WITH AN INERT GAS UP TO 245 PSIG. REDO LEAKING JOINTS AND RETEST UNIT SYSTEM IS TIGHT. EVACUATE ENTIRE SYSTEM TO 200 MICRONS OF MERCURY. CHARGE SYSTEM WITH 25 PSI OF SPECIFIED REFRIGERANT AND AN INERT GAS TO 245 PSI AND RETEST SYSTEM WITH HALIDE LEAK DETECTOR. ALL LEAKING JOINTS MUST BE COMPLETELY RESEALED UNTIL NO LEAKS EXIST. TURN ON CRANK CASE HEATERS 24 HOURS PRIOR TO STARTING COMPRESSOR. MAKE SURE ALL REFRIGERANT LIQUID IS OUT OF THE COMPRESSOR.

3) THE CONTRACTOR SHALL FURNISH AND INSTALL A COMPLETE REFRIGERANT PIPING SYSTEM BETWEEN THE INDOOR FAN UNITS AND OUTDOOR FAN UNITS.

B. EQUIPMENT SHALL BE INSTALLED AND START–UP PERFORMED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. ALL AIR CONDITIONING EQUIPMENT MUST BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS DATA.

C. FURNISH AND INSTALL INSULATION PRODUCTS IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS, AND IN ACCORDANCE WITH RECOGNIZED INDUSTRY PRACTICES.

D. INSTALL WATER MAINS WITHOUT PITCH. USE ECCENTRIC REDUCING COUPLINGS AT CHANGES IN SIZE WITH THE TOP OF PIPES AT SAME ELEVATION.

E. BRANCHES TO UNITS BELOW PIPING MAINS SHALL BE TAKEN FROM BOTTOM OF MAINS AT A 45 DEGREE ANGLE, PITCH DOWNWARD TOWARD UNITS. BRANCHES TO UNITS ABOVE MAINS SHALL BE TAKEN FROM TOP OF MAINS AT A 45 DEGREE ANGLE, PITCHED UPWARD TOWARDS UNITS. PITCH NOT LESS THAN 1 INCH PER 10 FEET.

F. INSTALL ALL NECESSARY PIPE HANGERS, AND SADDLES TO PROPERLY SUPPORT ALL CONDENSATE PIPING. HANGERS SHALL SUIT TYPE OF PIPING PROVIDED AND BE SPACED AT A MAXIMUM SPAN OF 5 FEET. PROVIDE SWAY AND SEISMIC BRACING AS REQUIRED BY CODES.

G. DUCTWORK SIZES SHOWN ON DRAWINGS ARE INSIDE CLEAR DIMENSIONS. INCREASE DUCTWORK SIZES AS REQUIRED FOR INTERNALLY LINED DUCT TO MAINTAIN INSIDE CLEAR DIMENSIONS.

H. CONDENSATE DRAINS SHALL TERMINATE AT A CODE APPROVED LOCATION.

I. CURBS AND STEEL FRAMING FOR SUPPORT

1) THE CONTRACTOR WILL FURNISH AND INSTALL ALL NECESSARY CURBS AND BLOCKING REQUIRED TO INSTALL ALL HVAC EQUIPMENT AS DESCRIBED OR IMPLIED ON THE DRAWINGS. CURBS SHALL BE A MINIMUM OF 14 INCHES HIGH OF THE SAME MANUFACTURER OF THE EQUIPMENT SUPPORTED, UNLESS NOTED OTHERWISE. INSULATE UNDER THE COMPRESSOR SECTION. ALL CURBS MUST BE INSTALLED SO THAT TOP OF CURBS ARE "DEAD" LEVEL. ALL PENETRATIONS OF EXISTING STRUCTURE SHALL BE DONE IN ACCORDANCE TO THE LANDLORD'S GUIDELINES AT THE CONTRACTOR'S EXPENSE. COORDINATE STEEL FRAMING REQUIREMENTS, ROOF PENETRATIONS, AND ROOF FLASHING WITH G.C. TO DETERMINE SCOPE OF WORK PRIOR TO BID. CONTRACTOR MUST RECEIVE WRITTEN APPROVAL BEFORE ANY ADDITIONAL WORK TAKES PLACE.

3.2 – FIELD QUALITY CONTROL

A. UPON COMPLETION OF TESTING, BUT BEFORE THE REFRIGERANT PIPING INSULATION IS APPLIED, THE PIPING MUST BE INSPECTED BY A REPRESENTATIVE OF THE LOCAL GOVERNING AUTHORITY AS NECESSARY.

B. ALL PIPING AND EQUIPMENT SHALL BE PRESSURE TESTED WITHOUT LEAKAGE AT A MINIMUM PRESSURE OF 125 PSI.

3.3 – CLEANING

A. ALL HYDRONIC PIPING AND EQUIPMENT CONNECTED TO THE HVAC PIPING SYSTEM SHALL BE CLEANED AND FLUSHED. REMOVE, CLEAN, AND REPLACE STRAINER SCREENS. FILL TENANT'S SYSTEM WITH DOMESTIC WATER, VENT ALL PIPING AND EQUIPMENT PRIOR TO CONNECTION TO THE LANDLORD'S SYSTEM. CONTRACTOR SHALL NOT FILL TENANT'S SYSTEM WITH WATER FROM THE LANDLORD'S SYSTEM UNLESS SPECIFICALLY INSTRUCTED TO DO SO FROM THE LANDLORD'S FIELD REPRESENTATIVE.

B. ALL DUCTWORK REQUIRING PAINTING AND EXPOSED IN SALES AREAS AND FITTING ROOMS SHALL BE PHOSPHATIZED OR "PAINTGRIP" SPIRAL GALVANIZED UNINSULATED SHEET METAL EXCEPT FOR SPIRAL DUCTWORK BY LINDAB PRODUCTS WHICH SHALL BE PREPARED ACCORDING TO THE PAINT MANUFACTURES RECOMMENDATIONS FOR THE ADHERENCE OF PAINT. SURFACES SHALL BE CLEAN, DRY AND FREE FROM SPIRAL MANUFACTURER'S LUBRICANTS THAT WILL ADVERSELY AFFECT ADHESION OR APPEARANCE OF APPLIED PAINT COATING. REMOVE ALL DIRT AND GREASE FROM GALVANIZED SPIRAL DUCTWORK WITH A WATER BASED COMMERCIAL DETERGENT AND WIPE DRY WITH DRY CLEAN CLOTHS. SURFACE SHALL BE FREE OF ALL FOREIGN MATERIALS.

C. REFRIGERANT PIPING SHALL BE CLEAN, CAPPED AND NITROGEN CHARGED.

END OF SECTION 15500

SECTION 15950 – TESTING, ADJUSTING, AND BALANCING

PART 1 – GENERAL

1.1 – SUMMARY

A. SECTION INCLUDES TESTING, ADJUSTING, AND BALANCING OF AIR, WATER AND REFRIGERATION SYSTEMS AND MEASUREMENT OF FINAL OPERATING CONDITION OF HVAC SYSTEMS.

1.2 – RELEVANT CODES AND CRITERIA

A. AABC (ASSOCIATED AIR BALANCE COUNCIL)

B. NEBB (NATIONAL ENVIRONMENTAL BALANCING BUREAU)

1.3 – SUBMITTALS

A. TAB REPORT SHALL BE SUBMITTED ELECTRONICALLY TO THE ARCHITECT/ENGINEERING CONSULTANT AND TO GAP ENGINEERING FOR REVIEW.

B. TEST REPORTS: THE TAB REPORT SHALL BE IN THE FORMAT OF THE AABC NATIONAL STANDARD REPORT OR THE NEBB CERTIFIED REPORT FORMS AS PUBLISHED IN THEIR MOST CURRENT EDITIONS.

C. THE COMPLETE TAB REPORTS SHALL BE PROVIDED TO THE OWNER NO LATER THAN ONE (1) WEEK PRIOR TO CONSTRUCTION END DATE.

D. TAB CONTRACTOR IS REQUIRED TO COMPLETE THE PROVIDED GAP INC SUMMARY COVER SHEET IN ADDITION TO THEIR COMPANY AABC OR NEBB FORMAT REPORT FOR ALL EQUIPMENT IDENTIFIED IN THE PROJECT.

1.4 – QUALITY ASSURANCE

A. PERFORM WORK IN ACCORDANCE WITH AABC NATIONAL STANDARDS FOR FIELD MEASUREMENT AND INSTRUMENTATION, TOTAL SYSTEM BALANCE OR NEBB PROCEDURAL STANDARDS FOR TESTING, BALANCING AND ADJUSTING OF ENVIRONMENTAL SYSTEMS.

B. QUALIFICATIONS

1) THE TESTING, ADJUSTING AND BALANCING (TAB) OF ALL WORK SHALL BE PERFORMED BY AN INDEPENDENT CONTRACTOR THAT IS CURRENTLY LICENSED BY AABC OR NEBB. THE COMPANY SHALL SPECIALIZE IN TAB OF SYSTEMS SPECIFIED IN THIS SECTION AND SHALL HAVE A MINIMUM THREE YEARS DOCUMENTED EXPERIENCE CERTIFIED BY AABC OR NEBB.

3.2 – FIELD QUALITY CONTROL

A. ALL AIR AND WATER SYSTEMS MUST BE BALANCED WITHIN PLUS OR MINUS 10% OF DESIGN.

2.3 – ENERGY MANAGEMENT SYSTEM

A. FIELD TRAINING (WHERE APPLICABLE)

1) COMPREHENSIVE ON SITE TECHNICAL TRAINING AGENDA FOR GAP MAINTENANCE AND ENGINEERING PERSONNEL (APPROXIMATELY 4–8 HOURS)

a. OVERVIEW OF THE ENERGY MANAGEMENT SYSTEM (EMS)

1. DESCRIPTION OF THE ARCHITECTURAL DESIGN OF THE EMS.

2. LOCATION OF CONTROL PANELS, SENSORS AND OTHER EMS COMPONENTS.

3. TOPOLOGY OF THE COMMUNICATION NETWORK AND CHARACTERISTICS.

4. BRIEF DESCRIPTION OF THE SEQUENCE OF OPERATION OF THE DIFFERENT EMS CONTROL PANELS.

5. DESCRIPTION AND LOCATION OF LOCAL OVERRIDE DEVICES (I.E. LIGHTING OVERRIDE SWITCHES, ETC).

6. BRIEF INTRODUCTION TO THE USE OF THE TOUCH SCREEN FOR TROUBLESHOOTING OF HVAC EQUIPMENT.

b. WALK THROUGH OF THE EMS SYSTEM

1. PHYSICAL LOCATION AND IDENTIFICATION OF EMS COMPONENTS.

2. BRIEF DESCRIPTION ON THE INTERNAL COMPONENTS OF SOME OF THE EMS CONTROL PANELS THAT COULD HAVE SOME INTEREST FOR THE CONTRACTORS WHILE TROUBLESHOOTING EMS RELATED ISSUES (I.E. CIRCUIT BREAKERS BUILT INSIDE THE CONTROL PANELS, HOA SWITCHES, ETC.).

3. DEMONSTRATION ON THE USE OF THE LIGHTING OVERRIDE PUSH BUTTONS AND TOUCH SCREEN PANEL.

4. IDENTIFICATION OF OTHER EMS RELATED EQUIPMENT THAT COULD PROVIDE VALUABLE INFORMATION WHILE TROUBLESHOOTING EMS RELATED ISSUES (I.E. FLOW METERS, VARIABLE FREQUENCY DRIVES, ETC.)

5. TIPS FOR TROUBLESHOOTING OF EMS AND HVAC EQUIPMENT USING INFORMATION AVAILABLE ONSITE.

A. ON SITE TRAINING AGENDA FOR GAP STORE EMPLOYEES (APPROXIMATELY 30 MINUTES)

1. TOUCHSCREEN TRAINING

1) HANDOVER PACKAGE

1) AS–BUILT EMS DRAWINGS WITH POINT TO POINT WIRING DIAGRAMS

2) ROSTER OF TRAINING PARTICIPANTS

3) SIGNED CERTIFICATION FROM EMS VENDOR THAT SYSTEM OPERATES AS PER THE CONTRACT DOCUMENTS.

C. EMS FRONT END GRAPHIC USER INTERFACE

1) PROVIDE GRAPHIC OF EACH PIECE OF HVAC EQUIPMENT

a. ALL SENSORS, DEVICES, AND OVERRIDES TIED TO EACH EQUIPMENT SHALL BE ORGANIZED IN A SYSTEM ARCHITECTURE DIAGRAM

2) ALL MEASUREMENTS SHALL BE TRENDED AND HISTORICAL DATA SHALL BE KEPT FOR ONE CALENDAR YEAR.

3) ALL SYSTEM ALARMS SHALL BE ACCESSIBLE FROM MAIN PAGE.

4) ALL SYSTEM ALARMS AND NOTIFICATIONS SHALL BE CAPABLE OF BEING EMAILED TO GAP MAINTENANCE.

5) EMS FRONT END SHALL BE PROVIDED WITH A MINIMUM OF 30 DAYS FROM STORE OPENING DATE OF EMS VENDOR MODIFICATIONS PER GAP ENGINEERING AND GAP MAINTENANCE REQUESTS.

6) LOCALLY INSTALLED LAPTOP WORKSTATION CAPABLE OF ALL EMS SYSTEM MODIFICATIONS

7) GRAPHICAL INTERPRETATION OF THE FLOOR PLAN WITH LOCATION OF EQUIPMENT, SENSORS, AND ASSOCIATED ALARMS

END OF SECTION 15950

REMODEL STORE

OLD NAVY

GAP INC.
STORE DEVELOPMENT
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SAN FRANCISCO, CA 94105

REPS. I.D.: 0000013184

STORE NUMBER: 5724

STORE LOCATION: BUCKHEAD STATION
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ATLANTA, GA 30326

DESIGN TYPE: P3
GENERATION: 18Q12
PROTOTYPE DATE: 08/31/17
OPENING: 2018

CONSULTANT INFO.

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MPF13-2