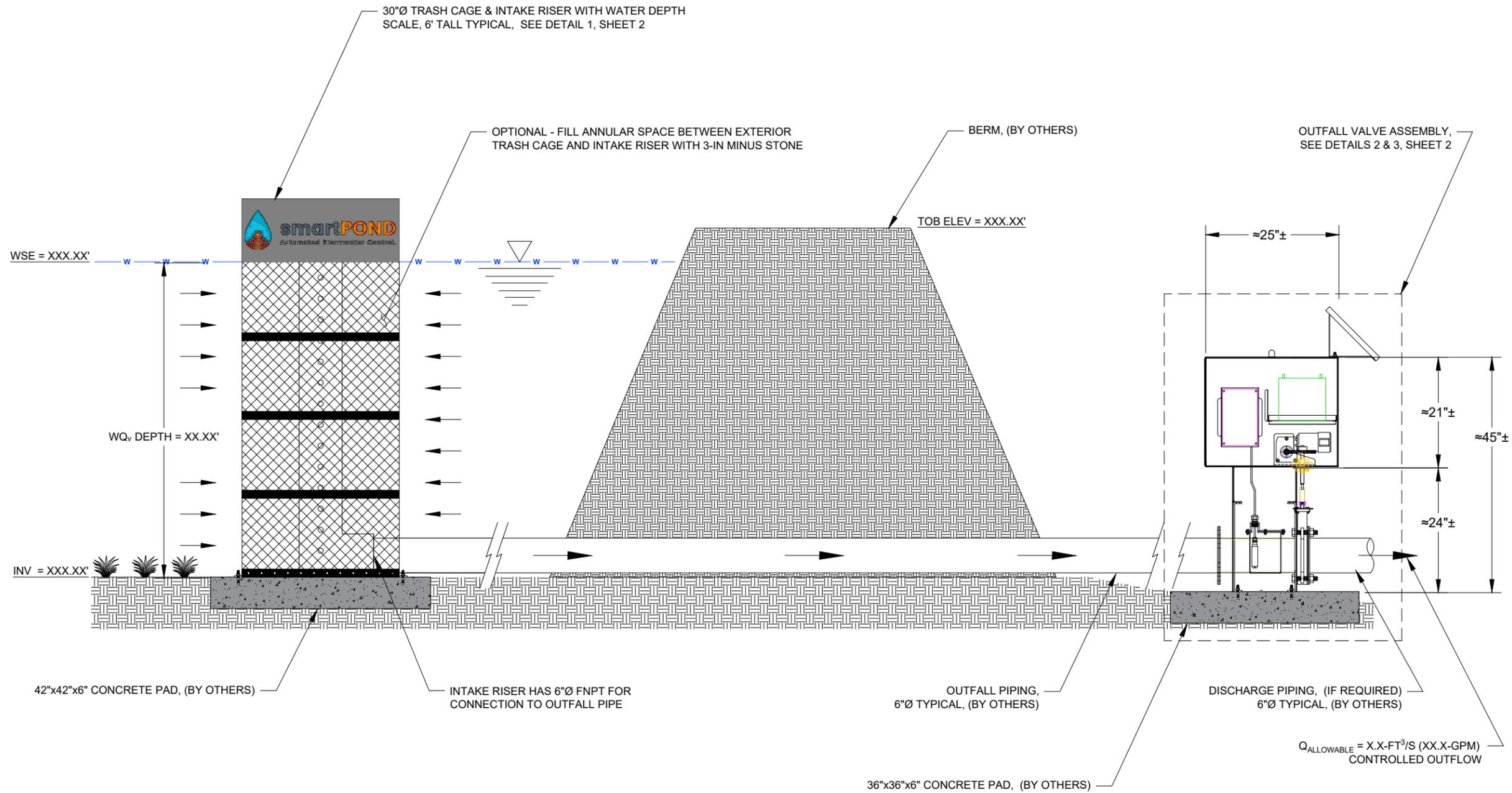


smartPOND OUTFALL VALVE CONFIGURED DOWNSTREAM OF BERM

OUTFALL VALVE DISCHARGE RATE AND DETENTION SETTING	
ALLOWABLE DISCHARGE RATE ($Q_{ALLOWABLE}$)	X.XX-FT ³ /S (XX.X-GPM)
REQUIRED DETENTION VOLUME	X.XX-FT ³
DETENTION VOLUME PROVIDED	X.XX-FT ³ /S
REQUIRED DETENTION TIME	XX-HOURS



NOTE: ENGINEER OF RECORD TO REVIEW, APPROVE AND ENDORSE FINAL SITE SPECIFIC DESIGN.

smartPOND
Automated Stormwater Control.



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**smartPOND OUTFALL VALVE
DOWNSTREAM OF BERM
CONFIGURATION**

REVISION NO.

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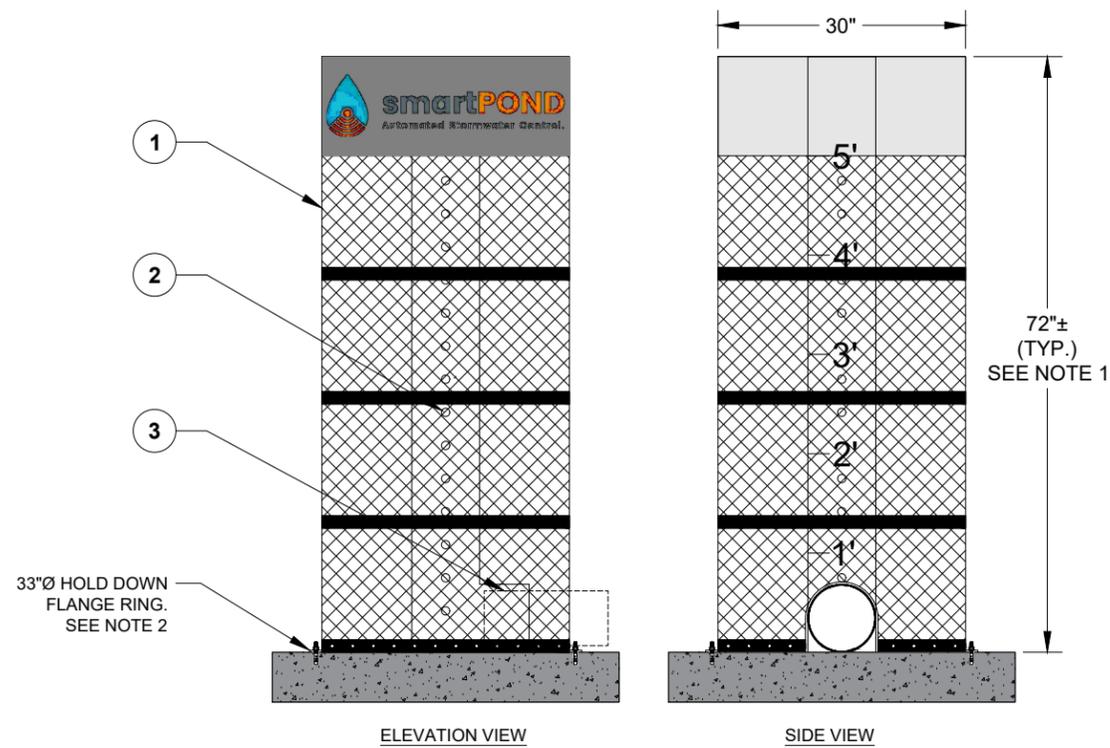
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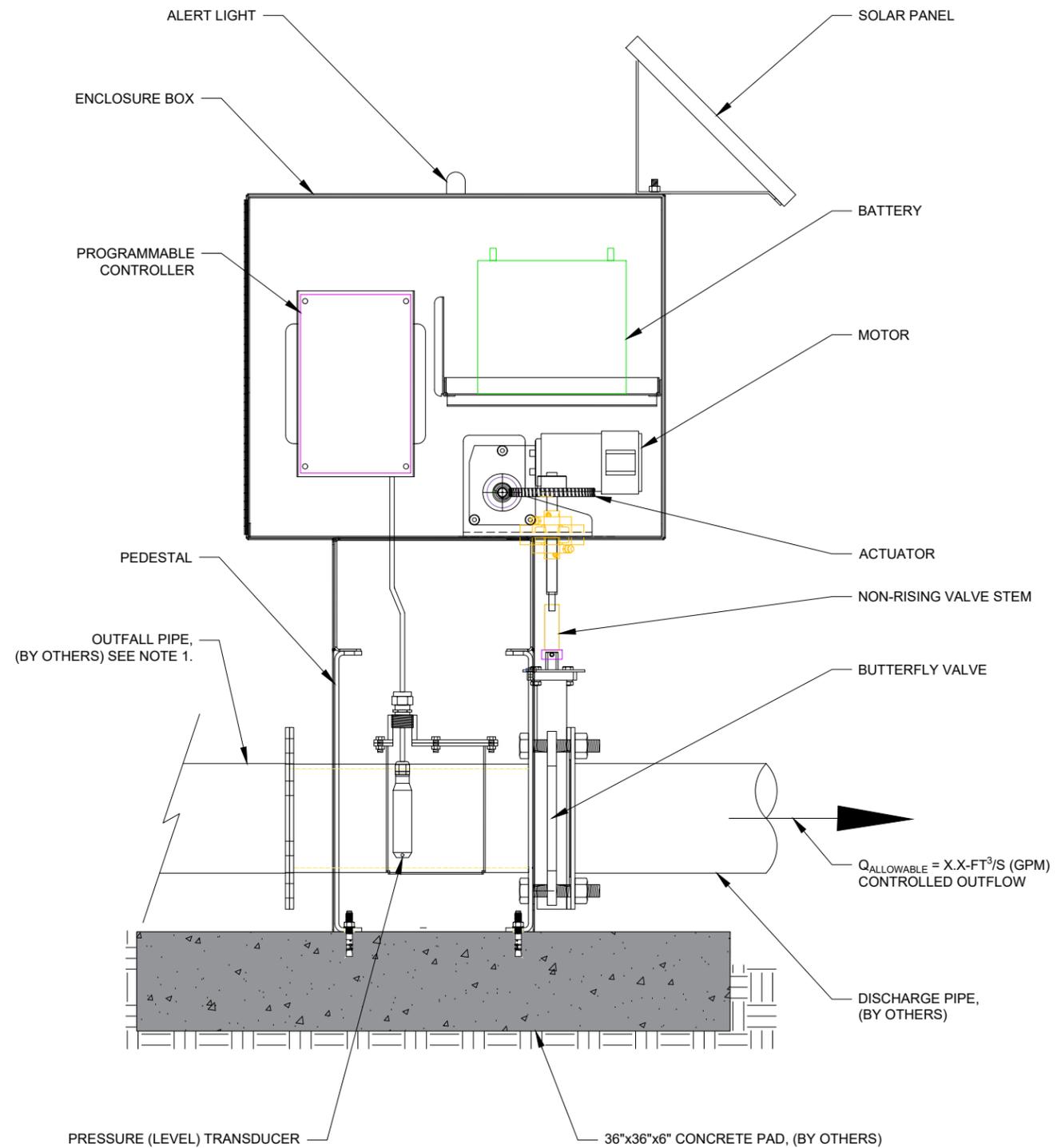
DETAIL 1 - TRASH CAGE & INTAKE RISER



- TRASH CAGE & INTAKE RISER NOTES:**
- DESIGN HEIGHT OF INTAKE TRASH CAGE AND INTAKE RISER TO MATCH REQUIRED DETENTION DEPTHS.
 - USE 4X, 1/2" X 3.5" SS WEDGE ANCHOR BOLTS TO CONNECT OUTFALL ASSEMBLY TO CONCRETE PAD, 2.5" MINIMUM EMBEDMENT.

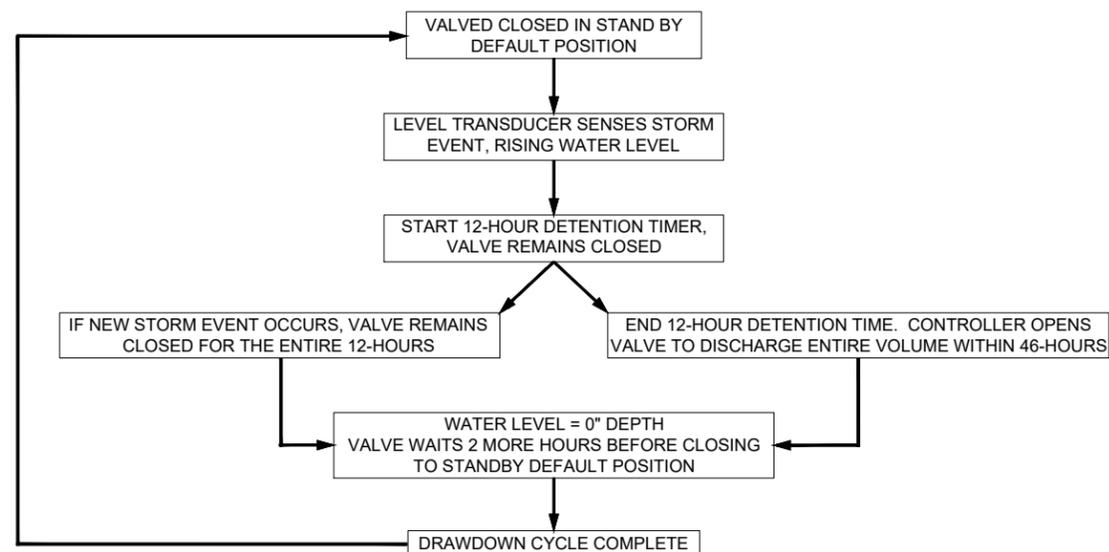
TRASH CAGE WITH INTAKE RISER - PARTS LIST	
ITEM	COMPONENT DESCRIPTION
1	30"Ø CAGE WITH 1.5" GALVANIZED MESH SCREEN
2	8" SQUARE PERFORATED TUBING WITH 1"Ø PERFORATIONS, SPACED 4" ON CENTERS WITH WATER DEPTH SCALE
3	6"Ø FNPTS PROVIDED AT BOTTOM DISCHARGE OF INTAKE RISER

DETAIL 3 - OUTFALL VALVE ASSEMBLY



- OUTFALL VALVE ASSEMBLY NOTES:**
- USE ANSI 16.5B CLASS 150 FLANGES TO CONNECT OUTFALL AND DISCHARGER PIPES.
 - USE 4X, 1/2" X 3.5" SS WEDGE ANCHOR BOLTS TO CONNECT OUTFALL ASSEMBLY TO CONCRETE PAD, 2.5" MINIMUM EMBEDMENT.

DETAIL 2 - PROGRAMMABLE LOGIC FLOW CHART, OUTFALL VALVE OPERATION FOR DETENTION AND/OR WATER QUALITY



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smartPOND™ OUTFALL VALVE SPECIFICATIONS

CONTINUOUSLY MONITORED AUTOMATED STORMWATER SYSTEM (C-MASS), WITH PROGRAM CONTROLLED OUTFALL VALVE

1. CONTINUOUSLY MONITORED AUTOMATED STORMWATER SYSTEM (C-MASS) DEVICE: THE CONTINUOUSLY MONITORED AUTOMATED STORMWATER SYSTEM (C-MASS), SHOWN ON THE PLANS AS THE OUTFALL ASSEMBLY SHALL BE A smartPOND™ OUTFALL VALVE PROVIDED BY:

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THE smartPOND™ OUTFALL VALVE SHALL PROVIDE FOR ACTIVE MANAGEMENT OF DETAINED STORMWATER VOLUME AND / OR ITS ALLOWABLE DISCHARGE RATE. THE smartPOND™ OUTFALL VALVE SHALL BE PROGRAMMABLE TO DETAIN A SPECIFIED VOLUME OF STORMWATER FOR A SPECIFIED REQUIRED PERIOD OF TIME AND / OR PROGRAMMED TO CONTROL THE OUTFLOW RATE TO MATCH THE MAXIMUM ALLOWABLE DISCHARGE RATE OR BOTH OF THIS OPERATIONS SIMULTANEOUSLY. THE smartPOND™ VAULT VALVE MAXIMIZES THE DETENTION TO PROMOTE THE SETTLEMENT OF SOLIDS BEFORE AUTOMATICALLY DEWATERING THE DETENTION POND COMPLETELY. FOR STORMWATER RETENTION SYSTEMS, THE SYSTEM SHALL BE PROGRAMMED TO MANAGE THE REQUIRED RETENTION VOLUME WHILE MAINTAINING A SPECIFIED AMOUNT OF CAPACITY FOR FLOOD STORAGE OR OTHER USE.

THE FOLLOWING SPECIFICATIONS DESCRIBE THE COMPONENTS, GENERAL FUNCTIONS, AND APPLICATIONS OF A CONTINUOUSLY MONITORED AUTOMATED STORMWATER SYSTEM (C-MASS), USING THE PROGRAMMED smartPOND™ OUTFALL VALVE.

THIS smartPOND™ OUTFALL VALVE SHALL FUNCTION AS AN ELECTRONICALLY CONTROLLED, SOLAR POWERED STORMWATER MANAGEMENT DEVICE, PROVIDING PRECISION STORMWATER VOLUME MANAGEMENT CAPABILITIES AND REAL-TIME DATA. USING SENSORS, SOLAR POWER, AN ELECTRONIC ACTUATOR, AND AN INTERNET-BASED CONTROL INTERFACE. THE smartPOND™ OUTFALL VALVE CONNECTS TO A SPECIALIZED PERFORATED INTAKE RISER INSIDE THE STORMWATER IMPOUNDMENT AREA TO ENABLE PRECISE CONTROL OF REQUIRED DETAINED OR RETAINED STORMWATER CONTROL VOLUMES AND ALLOWABLE DISCHARGE RATES AUTOMATICALLY OR IN REAL TIME. THE smartPOND™ ASSEMBLY CAN BE CONFIGURED ABOVE GROUND OR BELOW IN SMALL MANHOLE OR VAULT STRUCTURE.

1.1 PRE-PROGRAMMED OUTFALL VALVE CONTROL: THE OUTFALL VALVE SHALL BE PRE-PROGRAMMED TO EXECUTE COMMANDS BASED ON STORM EVENTS, REQUIRED CONTROL VOLUMES AND ALLOWABLE DISCHARGE RATES.

1.1.1 DETENTION POND OPTIMIZATION: THE smartPOND™ OUTFALL VALVE SHALL BE PROGRAMMED TO DISCHARGE FLOWS FROM THE DETENTION SYSTEM AT THE MAXIMUM ALLOWABLE RELEASE, WHICH IS TYPICALLY A PREDEVELOPMENT VALUE. OTHER PROGRAM CONSIDERATIONS MAY INCLUDE PREVENTION OF OVERTOPPING OR BYPASS.

1.1.2 BATCH DETENTION FUNCTION FOR STORMWATER QUALITY: THE smartPOND™ OUTFALL VALVE MAY BE PROGRAMMED TO PROVIDE BATCH DETENTION TO ACHIEVE STORMWATER QUALITY EFFLUENT GOAL OF 80% OR MORE REMOVAL OF TOTAL SUSPENDED SOLID (TSS) REMOVAL BY HOLDING THE WATER QUALITY VOLUME (WQ_v) FOR SETTLEMENT TREATMENT, FOR A REQUIRED PERIOD OF TIME. HOLDING TIMES ARE TYPICALLY SET FORTH IN STORMWATER MANAGEMENT REGULATIONS AS 2, 24 OR 48-HOURS.

1.1.3 SPILL CONTROL OF HAZARDOUS MATERIAL (HAZMAT): smartPOND™ WHEN SPECIFIED FOR HAZMAT SPILL CONTROL SHALL BE EQUIPPED WITH POLLUTANT SPECIFIC SENSORS THAT WHEN TRIGGERED AUTOMATICALLY CLOSE THE OUTFALL VALVE UNTIL THE COMMAND IS OVERRIDDEN.

1.2 REAL TIME MONITORING: smartPOND™ SHALL COME WITH TELEMETRY AND THE "AUTOFLOW APP" USER APPLICATION SOFTWARE AT NO ADDITIONAL COST FOR 1-YEAR. THIS AUTOFLOW APP ENABLES REAL TIME MONITORING OF THE DETENTION POND'S STORAGE-STAGE AND DISCHARGE RATE. THE AUTOFLOW APP SHALL ENABLE A USER TO:

- CONTROL THE OUTFALL VALVE, EITHER OPEN OR CLOSE.
- DETERMINE THE WATER SURFACE ELEVATION (WSE) OR POND DEPTH.
- DETERMINE IF TRASH OR DEBRIS IS SURROUNDING THE TRASH CAGE AND INTAKE RISER.
- RECEIVE MAINTENANCE ALERTS SUCH AS: LOW BATTERY, OUTFALL VALVE FAILURE, ETC.
- MAINTAIN SPECIFIED WATER SURFACE LEVEL.

2. COMPONENTS: THE smartPOND™ OUTFALL VALVE MAY BE IMPLEMENTED EITHER ABOVE OR BELOW GROUND, AND IS COMPRISED OF THE FOLLOWING COMPONENTS:

2.1 HARDWARE AND CONFIGURATION:

THE STANDARD smartPOND™ OUTFALL VALVE ASSEMBLY CONSISTS OF A LOWER AND UPPER COMPONENT: THE LOWER COMPONENT IS THE PEDESTAL WITH 6"Ø PIPE SPOOL AND 6"Ø ACTUATED OUTFALL VALVE AND PRESSURE TRANSDUCER HOUSING. THIS LOWER PEDESTAL SHALL HAVE FLANGES ON EACH SIDE OF THE ASSEMBLY CONFORMING WITH AN ANSI 16.5B CLASS 150 FLANGE FOR CONNECTION OF THE OUTFALL PIPE FROM THE DETENTION SYSTEM AND TO A DOWNSTREAM DISCHARGE PIPE IF CALLED FOR ON THE PLANS. THE SECOND, UPPER COMPONENT IS THE LOCKABLE STEEL WEATHERPROOF ENCLOSURE BOX WITH A SOLAR PANEL AND ALERT LIGHT MOUNTED ON ITS TOP. THIS ENCLOSURE BOX HOUSES THE PROGRAMMABLE CONTROLLER INSIDE A NEMA-3R BOX, BATTERY, ELECTRIC MOTOR, ACTUATOR GEARING AND AN EXTENDABLE NON-RISING VALVE STEM BETWEEN THE ACTUATOR AND THE 6"Ø OUTFALL VALVE.

FOR ABOVE GROUND APPLICATIONS, THE COMPLETE "OUTFALL VALVE ASSEMBLY" SHALL BE BOLTED TO A 36"X36, 6" THICK OR LARGER CONCRETE PAD USING ½"Ø, 3.5 LONG STAINLESS STEEL (SS) WEDGE ANCHORS. THE OUTFALL PIPE FROM THE DETENTION SYSTEM CONNECTS TO THE INLET OF THE OUTFALL VALVE ASSEMBLY WITH EIGHT (8X) ¾"Ø BOLTS AND NUTS THAT CONFORM TO ANSI 16.5B CLASS 150 FLANGE GRADE SPECIFICATIONS. THE DISCHARGE PIPE, IF ANY, CONNECTS WITH ONLY FOUR (4X) BOLTS TO PROPERLY FLANGE UP TO THE DISCHARGE SIDE OF THE ACTUATED VALVE.

2.2 OTHER ELECTRONICS SPECIFICATIONS:

- **MOTOR** - OPERATES ON 12-VOLTS AND HAS TWO WIRES CONNECTING TO THE MOTOR CONTROLLER BOARD.
- **BATTERY** - THIS IS A GEL BATTERY THAT PROVIDES 12-VOLTS, 30 AMP/HOUR OF POWER TO THE OUTFALL VALVE ASSEMBLY.
- **SOLAR PANEL** - PROVIDES 15-WATT CHARGING TO THE 12-VOLT GEL BATTERY.
- **SOLAR CHARGE CONTROLLER** - REGULATES THE VOLTAGE AND CURRENT DELIVERED TO THE GEL BATTERY.

SENSORS:

- **PRESSURE TRANSDUCER** - A SENSOR CAPABLE OF STAYING SUBMERSED IN WATER INDEFINITELY AND IS MOUNTED IN CENTER PIPE SPOOL OF THE LOWER PEDESTAL COMPONENT.
- **OUTFALL VALVE POSITION SENSOR** - DETERMINES THE POSITION OF THE OUTFALL VALVE.

OPTIONAL SENSORS:

- **CELL DATA MODEM** - REQUIRED FOR REAL TIME CONTROL AND ALERTS.
- **HYDROCARBON SENSOR** - THIS OPTIONAL SENSOR MAY BE FITTED TO THE smartPOND™ OUTFALL VALVE TO PERFORM SPECIFIC FUNCTIONS BASED ON THE PRESENCE OF HYDROCARBON CONTAMINATION.

3. ADDITIONAL COMPONENTS LIST:

3.1 **INTAKE RISER:** THIS SHALL BE A PERFORATED STEEL RISER CONNECTED TO THE 6"Ø OUTFALL PIPE WITHIN THE POND AREA. THIS INTAKE RISER SHALL BE AN 8" SQUARE STEEL WITH FOUR (4X) 1"Ø HOLES AT 90-DEGREES EACH, EVERY 4 VERTICAL INCHES. THE DISCHARGE OF THIS INTAKE TUBING SHALL HAVE FEMALE NATIONAL PIPE THREADS (FNPT) TO MATCH THE 6"Ø SCHEDULE 40 PVC OUTFALL PIPE.

3.2 **TRASH CAGE:** THE TRASH CAGE ATTACHES TO THE PERFORATED RISER WITH A COUPLING AND CALDER PIN PROVIDED WITH THE THE SYSTEM. THE TRASH CAGE SHALL BE COMPRISED OF STEEL BANDING AND A 1.5" X 1.5" MESH TO PREVENT FLOATABLE'S AND OTHER CONTAMINANTS FROM ENTERING AND CLOGGING THE PERFORATED RISER. THE TRASH CAGE WILL SIT 0.5" ABOVE THE BOTTOM OF THE IMPOUNDMENT TO ALLOW THE LAST 0.5" OUT OF THE IMPOUNDMENT.

4. **REAL TIME MONITORING INTERFACE (OPTIONAL):** THE AUTOFLOW APP SHALL BE THE SOFTWARE USED IF THE REAL TIME MONITORING OPTION IS SPECIFIED FOR LONG-TERM POND OPERATIONS. A COMPLETE SET OF USER INSTRUCTIONS SHALL BE PROVIDED IN THE CONSTRUCTION SUBMITTALS AND COPY OF THESE INSTRUCTIONS SHALL BE PLACED IN THE ENCLOSURE BOX.

THIS AUTOFLOW APP SHALL PROVIDE LIVE AND HISTORICAL DATA AND PROVIDE THE ALERTS LISTED IN SECTION 6. IT WILL ALSO ENABLE COMMANDS TO BE SENT TO THE OUTFALL VALVE TO CHANGE THE VALVES POSITION TO CONTROL DISCHARGE RATE AND POND DEPTH.

5. **ALERTS:** THE smartPOND™ OUTFALL VALVE WILL INDICATE THE FOLLOWING ALERTS BY ILLUMINATING AN EXTERIORLY VISIBLE RED LED LIGHT ON TOP OF THE ENCLOSURE BOX:

- LOW BATTERY
- LOSS OF FUNCTION
- OUTFALL VALVE MALFUNCTION
- HYDROCARBON CONTAMINATION (OPTIONAL)

IF THE TELEMETRY OPTION IS SELECTED, THE UNIT WILL UPLOAD THE ABOVE ALERTS TO THE AUTOFLOW APP AND NOTIFY THE OPERATOR VIA TEXT OR EMAIL.

6. **MAINTENANCE & OPERATION SUBMITTAL:** AN OPERATION AND MAINTENANCE MANUAL SHALL BE PROVIDED, REVIEWED AND APPROVED DURING THE CONSTRUCTION SUBMITTAL PROCESS AND SHALL INCLUDE AT A MINIMUM: GREASING AND LUBRICATION ITEMS AND CYCLE FOR THE ACTUATOR, MOTOR AND VALVE; INSPECTION AND MAINTENANCE OF THE SOLAR PANEL, GEL BATTERY TRASH CAGE AND INTAKE RISER; AND PROCEDURES FOR VALVE OPERATION IN CASE OF TOTAL ELECTRONIC OR MOTOR FAILURE.

7. **SHIPPING AND HANDLING STORAGE:** THE smartPOND™ OUTFALL VALVE IS SHIPPED IN A NEAR-FULLY ASSEMBLED CONFIGURATION AND SHOULD BE STORED LIKEWISE. THE SYSTEMS ARE TRANSPORTED AND STORED ON PALLETS AND MUST REMAIN SECURED VIA STRAPS OR STEEL BANDS TO SAID PALLET AT ALL TIMES. THE SOLAR PANEL IS NOT INSTALLED AT TIMES OF TRANSPORT OR STORAGE AND SHOULD NOT BE INSTALLED UNTIL THE UNIT IS READY TO BEGIN OPERATION. THE BATTERY MAY BE STORED INSIDE THE ELECTRONICS BOX AND IF REMOVED, SHOULD NEVER BE STORED ON A CONCRETE SURFACE.

8. **INSTALLATION:** INSTALL THE smartPOND™ OUTFALL ASSEMBLY FIRST WITHOUT THE SOLAR PANEL. MOUNT SOLAR PANEL WITH THE CONNECTION BOLTS PROVIDED AFTER THE ASSEMBLY IS ANCHORED TO THE CONCRETE PAD USING THE ANCHOR BOLTS CALLED OUT ON THE PLANS. AS . BOLTS SHOULD BE REMOVED DURING THE INSTALLATION PROCESS. THERE ARE SEVERAL WAYS TO INSTALL THE smartPOND™ OUTFALL VALVE WITH THE KEY BEING STRUCTURED SUPPORT.

8.1 **BELOW GROUND INSTALLATIONS:** THE UPPER COMPONENT CONSISTING OF THE ENCLOSURE BOX AND ALL ITS INTERNALS SHOULD BE FASTENED TO THE SURFACE OF THE CONCRETE VAULT. FOR VAULT INSTALLATIONS, SEE DESIGN DETAILS FOR STANDARD VAULT DESIGN.

9. SAFETY INFORMATION AND WARNINGS:

- ALWAYS KEEP HANDS CLEAR OF THE OUTFALL VALVE AND MOTOR WHEN UNIT IS IN OPERATION.
- TURN THE POWER SWITCH OFF WHEN DOING ANY ELECTRICAL WORK.
- DO NOT ENTER THE WATER WHEN THE DEVICE IS ACTIVELY DRAINING WATER.
- ALWAYS USE PROPER PERSONAL PROTECTION EQUIPMENT (PPE), AND CONFINED SPACE PROTOCOL WHEN SERVICING A OUTFALL VALVE BENEATH GROUND.

10. **PRODUCTS:** THE MANUFACTURER SHALL BE AN ESTABLISHED STORMWATER COMPANY THAT HAS AT LEAST FIVE (5X) INSTALLATIONS OF C-MASS DEVICES THAT HAVE BEEN IN USE AND FUNCTIONAL FOR FIVE (5X) OR MORE YEARS.

11. **QUALITY ASSURANCE AND PERFORMANCE SPECIFICATIONS:** THE QUALITY OF ALL SYSTEM COMPONENTS AND ALL OTHER APPURTENANCES AND THEIR ASSEMBLY PROCESS SHALL BE SUBJECT TO INSPECTION UPON DELIVERY OF THE SYSTEM TO THE WORK SITE. INSTALLATION IS TO BE PERFORMED ONLY BY SKILLED WORK PEOPLE WITH SATISFACTORY RECORD OF PERFORMANCE ON EARTHWORKS, PIPE, WELDING, CHAMBER, OR POND/LANDFILL CONSTRUCTION PROJECTS OF COMPARABLE SIZE AND QUALITY.

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smartPOND™ OUTFALL VALVE

SPECIFICATIONS

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