Public Water System Chlorination and Pre-treatment Project

Environmental Assessment

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PRUDENCE ISLAND WATER DISTRICT
PO Box 93
Prudence Island, RI 02872
(401) 683-0011

H2Olson Engineering, Inc.
DRINKING WATER PROFESSIONALS

10 Riverside Dr., Suite 103
Lakeville, MA 02347
508-375-7007
www.h2olsonengineering.com

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1. Introduction

1.1 Background and Overview

The Prudence Island Water District (PIWD) is located on the southeastern side of Prudence Island, Rhode Island, and generally serves the residents between Warnerville and Bristol Colony. Prudence Island is a 3,444-acre island located in Narragansett Bay and is located within the political boundaries of the Town of Portsmouth, Rhode Island. The Town of Portsmouth is approximately 2.3 miles from Prudence Island and access to Prudence Island can only be achieved by seacraft. Historically, the water system was operated as a private water company, by an entity known as the Prudence Island Utility Corporation (PIUC). In 2004, the water system and all the assets were transferred to the PIWD, and the PIWD assumed all the responsibilities of the PIUC, including full operational control of the water system.

The PIWD water system was designed to only provide domestic water service to its customers and does not provide water for fire protection. The PIWD water system includes three supply wells, a 100,000-gallon storage tank, and distribution system piping. The piping consists of approximately 9 miles of pipe, varying in size from 1-inch to 6-inch in diameter. Two of the active wells are located at the Indian Springs site and were installed in 1994. The other active well is located at the Army Camp site, which has been in service since the 1940's, on land owned by the Prudence Conservancy. The PIWD Water System serves a year-round population of approximately 150 people and a seasonal population in excess of 1,800 people. There are approximately 350 customer service accounts within the distribution system.

1.2 Purpose and Need

The Prudence Island Water District (PIWD) is under an Administrative Consent Order (ACO) with the Rhode Island Department of Health (RIDOH) to install permanent disinfection facilities at their two water supply sites, including pre-treatment for the removal of iron and manganese at the Indian Springs well site (see Attachment A). PIWD retained the services of H2Olson Engineering, Inc. (H2Olson) to complete the design and permitting of these facilities in accordance the RIDOH ACO requirements.

Two treatment systems are being proposed:

1. Disinfection and iron and manganese facilities at the Indian Springs well site.
2. Disinfection facilities at the Army Camp well site.

The design drawings for the proposed facilities are included as Attachment B. The design technical memorandum is included as Attachment C.

Indian Springs Well Site

The Indian Springs well site consists of two supply wells and two wood-framed sheds. One shed contains the well flow meter and emergency chlorine injection, and the other contains the electrical equipment. A backup generator is located outside for use in the case of electric power failure.

The primary need of the PIWD is to improve the water quality supplied from the Indian Springs wells. This will be accomplished through the installation of a treatment facility for the removal of source water iron and manganese and disinfection to achieve 4-log inactivation of viruses. The Indian Springs wells have demonstrated elevated levels of iron and manganese, beyond the regulatory water quality limits. A viable treatment system would be one in which the iron and manganese is removed to acceptable levels without utilizing a significant amount of potable water to maintain the system or generate a significant amount of treatment residuals that would be costly to dispose of and could potentially have an adverse impact on the environment of the island. The treatment system will have to be purchased, installed, and operated at a cost that would not be an undue burden upon the relatively small number of service customers of the PIWD.

The proposed treatment system includes converting the existing pump station to a chlorine addition facility which will be used for storing and dosing chlorine. The use of commercial strength sodium hypochlorite (12.5% strength) is proposed. This product can be purchased in 5-gallon pails. The proposed chlorination facilities consist of two (2) chlorine pumps, a 1-gallon day tank, and a containment pallet suitable to store up to six (6) 5-gallon pails. The chlorine will be injected downstream of the existing flow meter. Several hundred feet of the existing 4-inch water main will need to be replaced with 8-inch diameter ductile iron water main in order to provide enough contact time (CT) for 4-log inactivation of viruses.

A 2-filter greensand filtration system is proposed for iron and manganese treatment. The system is completely pre-engineered and assembled on a skid. A previously completed hydraulic evaluation indicated that the existing well pumps have sufficient head to pump through the filters with sufficient head to pump into the 100,000-gallon storage tank. The system will operate with 1 filter online, with an anticipated run-time between 24 and 72 hours. When the on-line filter requires cleaning, it will be taken offline, and the 2nd filter that is on stand-by will be placed in service. The offline filter will then be backwashed and placed on stand-by until needed. A dedicated 1,500-gallon wash water supply tank and backwash pump will provide the means for backwashing each filter. Residuals from backwashing the filters will be directed to a 2,000-gallon holding tank and infiltration system. Settled solids from filter

backwashing will be removed via a vacuum pump every 6 to 12 months, or as needed, to remove the accumulated solids in the holding tank.

Army Camp Well Site

The Army Camp well will be equipped with a new chlorination disinfection system to meet the requirements of the ACO with RIDOH. There are no other viable alternatives for this action. The proposed disinfection treatment system includes converting the existing pump station to a chlorine addition facility which will be used for storing and dosing chlorine. The use of commercial strength sodium hypochlorite (12.5% strength) is proposed. The proposed chlorination facilities consist of two chlorine pumps, a carboy scale, and a containment pallet suitable to store up to six 5-gallon pails. The chlorine will be injected downstream of the existing flow meter. Seventy feet of the existing 2-inch water main will be replaced with 16-inch diameter ductile iron water main to provide enough contact time (CT) for 4-log inactivation of viruses. The finished water will then be discharged to the high service zone and Broadway Booster station. A sample line of the treated water will run through a chlorine analyzer and then discharge the sample water into a dry well system for disposal. See Attachment B for further design details and calculations.

2. Proposed Actions and Alternatives

2.1 Alternative 1 - Do Nothing

Based on the ACO with RIDOH, doing nothing is not a viable option. The two Indian Springs wells have elevated levels of iron and manganese above the Secondary Drinking Water Guidelines (0.3 mg/L for iron and 0.05 mg/L for manganese). Iron levels in these two wells generally range from 0.17 to 1.0 mg/L with spikes as high as 4.0 mg/L and manganese levels ranging from 0.12 to 0.23 mg/L. In addition, disinfection is required at both the Indian Springs and Army Camp well sites for microbiological safety.

2.2 Alternative 2 – Connect to another Public Water System

The closest public water supply is the Portsmouth Water and Fire District. Connection to this system would require over 1.3 miles of transmission water main across (under) Narragansett Bay, which is economically not feasible for a system the size of the PIWD.

2.3 Alternative 3 – Installation of Point of Use (POU) Devices at All Customer Services

RIDOH regulations do not allow for the use of POU devices to achieve compliance with a Maximum Contaminant Limit (MCL).

2.4 Alternative 4 – Installation of Individual Private Wells for All District Customers

This alternative is not technologically viable in that many of these homes are on small lots with on-site septic disposal systems that would preclude the proper separation between wells and individual sewage disposal systems. In addition, most of these service customers are along the eastern shoreline and well installation would be very difficult due to the potential for saltwater intrusion.

2.5 Alternative 5 – Provide Treatment for the Wells

This alternative consists of addressing the problem directly through treatment of the affected raw water supply before it enters the distribution system. Treatment includes disinfection at both well sites (Army Camp and Indian Springs), and removal of source water iron and manganese at the Indian Springs site.

2.6 Recommended Alternative

The only feasible alternative that will address the concerns of the aforementioned ACO (included in Attachment A) is Alternative 5 – providing treatment at the existing well sites. The proposed method of treatment includes greensand filtration for the removal of source water iron and manganese at the Indian

Springs wells, and disinfection by chlorination at both the Indian Springs wells and Army Camp well. This Environmental Assessment (EA) will discuss the potential for environmental impacts resulting from this proposed action.

3. Environmental Impacts, Consequences, and Mitigation

The sections below provide a discussion of the environmental conditions at the project site, the potential for environmental impacts, and any mitigation measures that are determined to be necessary. Environmental impacts assessed include both short-term and long-term impacts. The direct impacts for this project are primarily short-term construction impacts and can be successfully mitigated during the construction period. No substantive environmental impacts are anticipated as a result of this project. The benefits of these water treatment updates greatly outweigh any negative impact of project implementation, providing necessary improvements in water quality for the residents of Prudence Island.

3.1 Soils

a) Affected Environment

Indian Springs Well Site

The area surrounding the Indian Springs well site consists of three soil units, as determined via the NRCS Web Soil Survey: Quonset gravelly sandy loam, rolling (QoC); Scarboro mucky fine sandy loam (Sb), 0 to 3 percent slopes; and Windsor loamy sand, 0 to 3 percent slopes (WgA). QoC makes up 24.8% of the area of interest (AOI) and has a hydrologic rating of A, Sb makes up 26.5% of the AOI and has a hydrologic rating of A/D, and WgA makes up 48.7% of the area of interest and has a hydrologic rating of A. Hydrologic group A soils have a high infiltration rate and consist mainly of deep, well drained to excessively drained sands or gravelly sands. Soils in a dual hydrologic group match the first letter for drained areas and the second letter for undrained areas. Group D soils have a very slow infiltration rate. The soil survey results can be seen in Attachment D.

Subsurface exploration of the site was performed on November 11, 2021 by means of test pitting, performed west of the proposed building. A summary of soil conditions encountered are as follows:

TABLE 1 TEST PIT FINDINGS

Depth	Soil Description
0.0'-1.0'	Moist, black topsoil with root matter from vegetated (grassed) ground surface During excavation from 1.0' to 9.5' depth soil density was observed to be firm. Estimate range of soil bearing capacity in this zone is between 2.5 to 3.0 ton/sf. Soil density observed below 9.5' is estimated to range between 3.0 & 4.0 tons/sf.
1.0'-7.0'	Dry, tan, fine sand, trace silt
7.0'-9.5'	Dry, gray, fine sand, trace silt
9.5'-10.5'	Dry, gray, fine sand, trace silt, and occasional cobble
10.5'	Bottom of excavation. No groundwater was observed.

Army Camp Well Site

The area surrounding the Army Camp well site consists of two soil units, as determined via the NRCS Web Soil Survey: Newport silt loam, 0 to 3 percent slopes (NeA) and Newport silt loam, 3 to 8 percent slopes (NeB). NeA makes up 36.5% of the AOI and NeB makes up 63.5% of the AOI. Both soil units are in hydrologic group C, classified as having a slow infiltration rate when thoroughly wet and consisting chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. The soil survey results can be seen in Attachment D.

b) Environmental Consequences

There are no indications of any conditions that would adversely impact soil conditions permanently. Increased erosion is a possible consequence of soil disturbance during construction, so appropriate controls will be implemented to prevent a negative impact. Any disturbed areas will be restored after construction is complete.

c) Mitigation

The contractor shall loam, seed, and fertilize all disturbed vegetative areas within the limit of work. All new and disturbed vegetative surface areas called out within the limits of work and as shown on the plans shall be comprised of 4-inch loam, seed, and fertilizer.

3.2 Land Use and Planning

Indian Springs Well Site

The proposed site is identified as Portsmouth Assessor's Plat 76 Lot 5A, which is a 5.14-acre parcel which was transferred from the PIUC to the PIWD as part of the transfer of the capital assets of the water system, with the address 024 Homestead Ave. The latitude and longitude coordinates of the specific site location within the parcel are 41° 37' 13" N and 71° 18' 40" W. The treatment building and related infrastructure will comprise approximately a ½ acre portion of this existing parcel and will be situated so that it is upland and out of the protective well head radius of the existing Indian Springs wells.

Army Camp Well Site

The Army Camp well site is located on the Town of Portsmouth Assessors Plat 80, Lot 4, which is a 166-acre parcel, with the address 0 Broadway. The latitude and longitude coordinates of the specific site location within the parcel are 41° 36' 30" N and 71° 18' 45" W.

3.2.1 Zoning

a) Affected Environment

The project sites and surrounding areas are located within a residential zoning area (R-60). An R-60 district is a residential zone with minimum lot size of sixty thousand square feet (60,000 $ft.^2$). The zoning map of Prudence Island is included in Attachment E. The proposed project will be contained entirely within the existing well sites.

b) Environmental Consequences

The zoning of the site is not a concern since the wells are already located in this area and serve the island's residential water needs. To confirm that there are no zoning conflicts, a request for review comments was made to the Rhode Island Division of Statewide Planning and the Portsmouth Town Planner. The Portsmouth Town Planner, Lea Hitchen, has confirmed that the proposed project is in compliance with the Portsmouth Zoning Ordinance and has found the project to be consistent with the Comprehensive Community Plan. The Division of Statewide Planning has reviewed the proposed project and had no comments. Copies of all correspondence can be found in Attachment J.

c) Mitigation

There are no mitigation needs related to zoning for this project.

3.2.2 *Farmlands and Agricultural Uses*

a) Affected Environment

Based upon observation of the project site, there are no farmlands or agricultural uses in the project site or surrounding area and therefore will not be impacted by the project. To confirm these findings, information requests have been sent to the Rhode Island Division of Statewide Planning describing the project and requesting information on potential land use impacts of the proposed project. The Division of Statewide Planning has reviewed the proposed project and has no comments. Copies of all correspondence are included in Attachment J.

b) Environmental Consequences

Based upon the findings above, there are no perceived environmental consequences associated with the project and farmlands or agricultural uses.

c) Mitigation

Based upon the lack of environmental consequences, no mitigation associated with farmlands and agricultural uses is recommended.

3.2.3 Floodplain

a) Affected Environment

In review of the National Flood Insurance Program Flood Insurance Rate Maps (FIRM) for the site locations, numbered 44005C0081J, effective September 4, 2013, the project sites are located in Zone X (unshaded), which is the Area of Minimal Flood Hazard and has less than 0.2% annual chance of flood hazard. These maps can be seen in Attachment F.

b) Environmental Consequences

Based upon the findings above, there are no perceived environmental consequences associated with the project and floodplain.

c) Mitigation

Based upon the lack of environmental consequences, no mitigation associated with the floodplain is recommended.

3.3 Biological Resources

3.3.1 Wetlands

a) Affected Environment

The RIDEM Rules and Regulations Governing the Administration and Enforcement of The Freshwater Wetlands Act define a freshwater wetland as:

A. A bog, flood plain, pond, marsh, riverbank, swamp, river, area of land within fifty feet (50'), area(s) subject to flooding, area(s) subject to storm flowage, floodway, flowing body of water, stream, intermittent stream, perimeter wetland, submergent and emergent plant communities, special aquatic sites, shrub and forested wetland or any combination thereof;

B. Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions; or

C. Any or all wetlands created as part of, or the result of, any activity permitted or directed by the Department after July 16, 1971 including, but not limited to: restored wetlands; value replacement wetlands created to compensate for wetland loss such as flood plain excavations; biofiltration areas; and any wetlands created, altered or modified after July 16, 1971.

Indian Springs Well Site

Based upon the review of RIGIS mapping of the project area, showing National Wetlands Inventory sites, and a preliminary review of the identified project site, there are no RIDEM regulated wetlands within or surrounding the proposed project area.

Army Camp Well Site

Based upon the review of RIGIS mapping of the project area, showing National Wetlands Inventory sites, and a preliminary review of the identified project site, there are no RIDEM regulated wetlands within or surrounding the proposed project area.

There is a wetland area surrounding Schoolhouse Swamp, but this is approximately 1,300 feet away from the project site, therefore no impact is anticipated.

A map of the wetland areas delineated by the National Wetlands Inventory is attached as Attachment G. Communication with RIDOH has confirmed that there are no regulated wetlands within or impacted by the project area.

b) Environmental Consequences

Based upon the findings above, there are no perceived environmental consequences associated with the project and wetlands.

c) Mitigation

Based upon the lack of environmental consequences, no mitigation associated with wetlands is recommended.

3.3.2 Vegetation and Wildlife

a) Affected Environment

Based upon review of the RIGIS database, the Indian Springs site is located within a RI Natural Heritage Area. Natural Heritage Areas are locations where rare species carry out important life-cycle activities. A map of these areas and the site locations is attached in Attachment H. Through contact with Paul Jordan, a data analyst and GIS specialist at RIDEM, RI Natural Heritage records were obtained showing no rare species observations near the Army Camp site and three rare species observations within 2,500 feet of the parcel containing the Indian Springs proposed facility. These records are all state-listed threatened species and include the Pine Barrens Tiger Beetle (*Cicindela formosa generosa*), the Oblique-lined Tiger Beetle (*Cicindela tranquebarica*), and Arrow-feather Three-awn Grass (*Aristida purpurascens var. purpurascens*) as listed in Table 2. The two beetle species observations were located about 1,200 feet west of the parcel boundary that contains the Indian Springs proposed facility. The parcel covers a land area of 5.14 acres, of which the Indian Springs project site occupies an approximately ½ acre portion on the eastern side of the parcel. The habitat is similar across the surrounding area, so the presence of these threatened species at the site is possible. *Cicindela formosa generosa* occurs exclusively in inland sand flats and barrens. The proposed project will not disturb or modify any existing sand patches.

TABLE 2
RI NATURAL HERITAGE RECORDS LOCATED WITHIN 2,500 FEET OF THE INDIAN SPRINGS SITE

#	Family	Genus	Species	Common Name	Survey Year	Last Seen	Status	Count
1	Insect	*Cicindela*	*formosa generosa*	Pine Barrens Tiger Beetle	1996	1996	State Threatened	1
2	Insect	*Cicindela*	*tranquebarica*	Oblique-lined Tiger Beetle	1995	1995	State Threatened	1
3	Poaceae	*Aristida*	*purpurascens var. purpurascens*	Arrow-feather Three-awn Grass	2021	2021	State Threatened	1

Project review comments from the RIDEM Office of Customer & Technical Assistance have drawn attention to the likely presence of wildlife in roads and within the Limit of Work – particularly eastern box turtles and spotted turtles. These turtles are active and can be found crossing roads from approximately April 1 through November 1. Additionally, the island is sensitive to the introduction of wildlife pathogens and invasive species.

The proposed project will be located downhill and adjacent from the existing well house, on land that is already cleared, regularly mowed, and used for vehicle parking and storage. The project is not anticipated to significantly alter the suitability of this small, already disturbed area as habitat for these threatened species or remove any additional habitat area. Species profiles for the identified threatened animal species are included in Attachment I. Requests for review of the proposed project and identification of any potential issues related to vegetation and wildlife have been sent to the RIDEM Division of Fish and Wildlife and the NOAA Fisheries Greater Atlantic Regional Fisheries Office. The RIDEM Division of Fish and Wildlife directed our request to the Office of Customer & Technical Assistance for review. Copies of these letters are included in Attachment J.

b) Environmental Consequences

Any impact of this project to the surrounding habitat is anticipated to be minimal. With proper precautions, it is not expected that the project will have significant consequences to vegetation and wildlife in the area. Review comments from the NOAA Fisheries Office indicate that construction related to the project has the possibility to impact Essential Fish Habitat, but the minimization procedures outlined in the project, such as sedimentation controls, are adequate to minimize adverse effects. This response is included in Attachment J.

c) Mitigation

To prevent harm to animals that may be present on island roads, project vehicles will exercise caution and follow local speed limits at all times. In the event that a turtle is found in the road, the vehicle will be stopped, and the turtle carefully moved to safety. Before beginning construction each day, a visual sweep of the Limit of Work will be performed to identify the presence of box turtles. If a turtle is found in the Limit of Work, it will be moved to a forested, upland area at least 200 feet away before construction begins. Further information on Best Management Practices to limit impacts to box turtles can be found with RIDEM correspondence in Attachment J.

To prevent the introduction of wildlife pathogens to the island, all equipment will be cleaned and decontaminated before loading onto the ferry to Prudence Island. Complete disinfection protocols can be found with RIDEM correspondence in Attachment J. To prevent the introduction of invasive species, loaming and seeding within construction areas will not involve imported soil from off-island and will only use native species seed mixes.

If any of the listed species are observed in the project area during construction, appropriate measures will be taken to protect the species and its habitat. Any vegetation disturbed during construction will be restored to the greatest extent possible.

3.4 Coastal Zones/Coastal Barrier Resources

a) Affected Environment

The Coastal Zone Management Act (CZMA) of 1972, as amended, applies to all lands on the boundary of any ocean or arm thereof, and the Great Lakes. The Coastal Barrier Resources Act (CBRA) and the Coastal Barrier Improvement Act only apply to selected geographic areas designated as "Coastal Barrier Resources System (CBRS) Units." These units have been established along the coasts of the Atlantic Ocean, Gulf of Mexico, and the Great Lakes. Based upon its upland location, this project does not impact any of the areas defined by CZMA or CBRA. The project site is not located in areas under the jurisdiction of the Rhode Island Coastal Resources Management Council – tidal and coastal pond waters, shoreline features, and areas of historic and archaeological significance in the coastal zone – and the project does not present a reasonable potential to damage the coastal environment.

b) Environmental Consequences

Based upon the findings above, there are no perceived environmental consequences associated with the project and coastal resource issues.

c) Mitigation

Based upon the lack of environmental consequences, no mitigation associated with coastal resource issues is recommended.

3.5 Cultural Resources

3.5.1 Historic Properties

a) Affected Environment

The National Historic Preservation Act (NHPA) of 1966, as amended (16 U.S.C. § 470 et seq.), and the Advisory Council on Historic Preservation's (ACHP) implementing regulations, 36 CFR Part 800 (Section 106 regulations), requires the identification of historic properties that are within the proposed project area to determine potential effects. Historic property means any prehistoric or historic district, site, building, structure, or object included in or eligible for inclusion in the National Register of Historic Places. This term includes, for the purposes of the Section 106 regulations, artifacts, records, and remains that are related to and located within such properties. The term "eligible for inclusion in the National Register" includes both properties formally determined as such by the Secretary of the Interior and all other properties that meet National Register of Historic Properties listing criteria. Under the Rhode Island Historic Preservation Act (R.I. Gen. Laws § 42-45-5), the Rhode Island Historic Preservation and Heritage Commission (RIHPHC) shall advise on any activity that will encroach upon, damage, or destroy any site, building, place, landmark, or area included in the state register. Based upon the review of the project site and the national and state registers, there appears to be no historic properties within the project area or affected by the project activities. However, the project may still require review by RIHPHC since it will be seeking other state permits. The NHPA also requires consultation with federally recognized tribes when a project might affect a historic site. Upon review of the project area, it does not appear to impact any tribal sites or cultural resources. To confirm these findings, a request for review comments has been sent to the RIHPHC and the Narragansett Tribal Historic Preservation Office. Upon review of the project information, RIHPHC has confirmed that no historic properties will be affected by the project. No response has yet been received from the Narragansett Tribal Historic Preservation Office. Copies of all correspondence can be found in Attachment J.

b) Environmental Consequences

Based upon the findings above, there are no perceived environmental consequences associated with the project and historical properties.

c) Mitigation

Based upon the lack of environmental consequences, no mitigation associated with historical properties is recommended. In the event that any historical artifacts are unearthed during project construction, RIHPHC will be notified, and construction will be delayed or modified to ensure that these resources are properly managed.

3.5.2 Archaeological Resources

a) Affected Environment

The Archaeological Resources Protection Act of 1979 (ARPA) focuses on regulation of legitimate archaeological investigation on public lands and the enforcement of penalties against those who loot or vandalize archaeological resources, as well as providing authority to Federal officials to better manage archaeological sites on public land. Section 9 of ARPA requires that information about the location and nature of these archaeological resources is held confidential unless providing the information would further the purpose of ARPA and not create harm for the resources. There are no known archaeological resources on or affected by the project sites. To confirm the absence of archaeological resources in the project site area, a request for further review has been sent to the RIHPHC. Upon review of the project information, the RIHPHC has concluded that no historic properties will be affected by the project. A copy of this correspondence can be found in Attachment J.

b) Environmental Consequences

There are no expected environmental consequences related to archaeological resources based on the above information.

c) Mitigation

Based on the above information, no mitigation is recommended.

3.6 Water Quality

a) Affected Environment

The proposed greensand filtration system will generate filter backwash waste from the periodic backwash to flush accumulated solids from the media bed. The filter will be backwashed from a 1,500-gallon wash water supply tank every 1 to 3 days. The backwash water supernatant will be discharged through a settling tank and infiltration galley system to filter out the insoluble ferric and manganic oxides and return the spent backwash water to the watershed. There will also be a minor discharge at the Army Camp site from an analyzer discharge line that will pull treated water for sampling, with a flow of approximately 0.5-1 gpm, and direct it to a dry well system. An application for approval of the groundwater discharge systems - including settling tank, infiltration galley, and dry well – has been submitted to RIDEM. This course of approval, and other potential design options, has been discussed with Neal Personeus, Senior Environmental Scientist/Project Manager for the Office of Water Resources at RIDEM. This correspondence is included in Attachment J.

b) Environmental Consequences

The groundwater discharge systems related to this project are not anticipated to have any negative impact on water quality but will be monitored to detect any changes that could possibly occur. Based upon the findings above, there are no perceived environmental consequences associated with water quality issues and the project.

c) Mitigation

Based upon the lack of environmental consequences, no mitigation associated with water quality issues is recommended. If any issues are detected during the use of the proposed groundwater discharge system, the system operators will follow the protocol laid out in the groundwater discharge approval application.

3.7 Air Quality

a) Affected Environment

One possible air quality impact associated with the project is exhaust from the propane-driven portable emergency generator that will be used during electric power failure. The generator will be relatively small and only run for short periods of time when needed.

Construction activities may involve short-term air quality impacts such as dust generation and emissions from vehicles. With proper controls and the small scale of this project, these impacts are anticipated to be negligible.

b) Environmental Consequences

There are negligible environmental consequences associated with the project and air quality.

c) Mitigation

Precautions shall be taken in accordance with good industrial practice to limit airborne particulate matter from construction activities and material transport. Construction vehicles will be in compliance with the most recent Rhode Island Department of Transportation (RIDOT) emissions standards.

3.8 Noise

a) Affected Environment

The facilities proposed for this project are not expected to generate adverse noise impacts. There will inevitably be some noise associated with construction, but this will be confined to normal weekday work hours. During normal operation, all mechanical equipment will be housed in an enclosed structure and their sound of operation will not be heard outside the confines of the treatment building. The only potential noise resulting from the operation of these facilities will be the use of a propane-driven portable emergency generator in the case of electric power failure.

b) Environmental Consequences

The environmental consequences related to noise will be minimal. Those temporary impacts associated with construction will be of a short duration. Any noise associated with long-term operation of the facility would be well below residential threshold levels and is not expected to have any environmental consequences.

c) Mitigation

Short-term noise impacts will be mitigated by provisions in the construction contract documents to control noise to the extent possible during construction. This will also require that activities that have the potential to generate noise issues be carried out on weekdays, during daytime hours, when noise will be less disruptive.

No long-term noise mitigation is necessary for this project.

3.9 Traffic Circulation and Parking Access

a) Affected Environment

Short-term transportation issues may arise during project construction due to limited access to the island by ferry. The transportation of construction materials to the island may take up vehicle space on the ferry that is generally used by residents and visitors to the island. Operation will only generate, at most, a few additional trips per day over island roads leading to the facility. There will be some minor disruptions of local traffic during the construction of utilities within existing roadways, but this will be limited and minimized with good traffic control practices. Traffic on Prudence Island is extremely minimal, and the project is of a small scale, so no significant disruptions are expected. The project will not impact any public parking access.

b) Environmental Consequences

Based upon the findings above, there are minor consequences associated with the project and transportation issues related to the use of limited ferry space and disrupting roadways during construction.

c) Mitigation

To mitigate the minor consequences associated with the project and transportation issues related to the use of limited ferry space, transportation of equipment and building materials will be avoided during peak ferry usage times. Construction personnel will be instructed to carpool to the jobsite to limit the number of vehicles on the ferry and on island roads. Good traffic control practices will be used to minimize the impact of disrupted roadways during construction.

3.10 Public Services and Utilities

3.10.1 Water Supply/Use

a) Affected Environment

This project will improve the quality of the water supply by removing iron and manganese to within regulatory standards and provide disinfection. The greensand filtration system at the Indian Springs site will be backwashed from a 1,500-gallon wash water supply tank every 1 to 3 days. This system is not anticipated to have any adverse effect on water supply.

Water required during construction is expected to be minimal to none and is not a concern to the water supply.

b) Environmental Consequences

Based on the information above, there are no perceived environmental consequences associated with water supply from this project.

c) Mitigation

Based upon the lack of perceived environmental consequences, no mitigation efforts related to water supply are recommended.

3.10.2 Sanitation

a) Affected Environment

There are no sanitation changes or additions associated with the implementation of this project.

b) Environmental Consequences

Since there are no sanitation aspects of this project, no environmental consequences related to sanitation are anticipated.

c) Mitigation

Based on the above information, there is no mitigation recommended for sanitation.

3.10.3 Solid Waste Disposal

a) Affected Environment

Some solid waste generation is to be expected during the construction of this project, mainly consisting of construction debris. All construction debris and other solid waste generated will be properly contained and disposed of in compliance with Federal, State, and local regulations.

The Indian Springs site includes a backwash settling tank that will generate sludge resulting from backwash of the greensand filter. The sludge in the settling tank will be monitored and measured monthly by operating staff. When the sludge depth reaches 18 inches, the sludge

will be vacuumed out of the settling tank. Once removed, the sludge will be disposed of through a sludge hauler.

b) Environmental Consequences

There are no expected environmental consequences related to solid waste disposal for this project.

c) Mitigation

To ensure there are no consequences related to solid waste disposal, any waste generated will be properly contained and disposed of.

3.10.4 Stormwater Drainage

a) Affected Environment

This project will not create significant long-term changes to stormwater drainage in the surrounding environment. There are no storm drains in the project vicinity.

b) Environmental Consequences

During the construction phase of the project, soil erosion has the potential to enter stormwater flows and impact local water bodies if proper control methods are not put in place.

No long-term environmental consequences related to stormwater drainage are anticipated for this project.

c) Mitigation

To mitigate the effects of land disturbance during construction on stormwater quality, standard soil erosion and sedimentation control measures will be implemented. As small sites of less than 1 acre, the project construction will comply with Minimum Standard 10 of the *RI Stormwater Design and Installation Standards Manual* (RISDISM). The construction operator will develop a Soil Erosion and Sediment Control Plan, in accordance with the measures laid out in Section 3.3.7 of the RISDISM, prior to beginning construction.

Communication with RIDEM confirmed that the project does not fall under any stormwater regulations. No long-term mitigation for stormwater drainage is recommended.

3.10.5 Electric Power

a) Affected Environment

The project is expected to require only minimal amounts of electric power that will not be a burden on the power provided to Prudence Island. The site will have a propane-driven portable emergency generator that will be used during electric power failure.

b) Environmental Consequences

There are no anticipated environmental consequences associated with electric power for this project.

c) Mitigation

Based on the above information, no mitigation related to electric power is recommended.

3.10.6 Law Enforcement

a) Affected Environment

Prudence Island is part of the municipality of Portsmouth, RI and all law enforcement service calls are taken by the Portsmouth Police Dispatch Center. Any law enforcement emergencies during project implementation will be directed there.

b) Environmental Consequences

There is no anticipated interference with law enforcement associated with this project.

c) Mitigation

Based on the above information, no mitigation is recommended regarding law enforcement.

3.10.7 Fire Protection

a) Affected Environment

The PIWD water system is designed only to provide domestic water service and does not provide fire protection. The wells and hydrants impacted by this project are not involved in fire protection. Fire emergencies are responded to by the Prudence Island Volunteer Fire Department. Prudence Island has a separate water storage tank, known as Greer tank, and a number of underground cisterns, which are used to supply water for fire trucks in

emergencies. These supplemental fire water storage tanks are filled manually as water supply resources permit, and will not be affected by this project.

b) Environmental Consequences

Based upon the above findings, there are no perceived environmental consequences associated with fire protection on Prudence Island.

c) Mitigation

Based upon the lack of consequences associated with fire protection, no mitigation is recommended.

3.11 Aesthetics

a) Affected Environment

Aesthetics are not anticipated to be a concern for this project. The proposed treatment building will be a single low-profile structure and the building and related infrastructure will be occupying only a small area of the parcel. The design will complement and blend into the surrounding area. Observation of the sites show that they are positioned away from other developments and hidden by the tree cover in the area.

b) Environmental Consequences

Based upon the findings above, there are no perceived environmental consequences associated with the project and local aesthetics.

c) Mitigation

Based upon the lack of consequences associated with aesthetics, no mitigation is recommended.

3.12 Climate Change

a) Affected Environment

Climate change has serious potential impacts, especially for coastal areas like Rhode Island. This project will not contribute significantly to greenhouse gas emissions that advance climate change. The project site is in an upland location that is not imminently threatened by potential sea level rise.

b) Environmental Consequences

There are no significant anticipated environmental consequences associated with the advancement of climate change due to the implementation of this project.

c) Mitigation

Based on the above information, no mitigation due to climate change impacts is recommended.

3.13 Socioeconomic Issues and Environmental Justice

a) Affected Environment

RIDEM defines Environmental Justice (EJ) as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, English language proficiency, or income with respect to access to the state's natural resources and the development, implementation, and enforcement of environmental laws, regulations, and policies." EJ efforts seek to prevent disproportionate impacts of environmental and public health risks on any particular communities.

A substantial portion of the PIWD service area is comprised of low-income residents. According to EPA's EJScreen tool, there is a high elderly population on Prudence Island as well. Overall, Prudence Island is sparsely populated, and the project sites are fairly isolated. Prudence Island is not located within any of RIDEM's identified EJ Focus Areas.

There will be some noise associated with construction of the project for a temporary period during working hours. This will most affect those living closest to the project sites, but the impact is expected to be minimal and short-term. Traffic impacts will be extremely minimal. There will be no displacement due to this project. There are no expected economic losses to the residents of Prudence Island due to implementation of this project.

The water treatment updates in this project are necessary for the residents of Prudence Island and no significant adverse human health or environmental effects are anticipated for any group or community. This project would be benefiting the residents of Prudence Island through much-needed water quality improvements at a reasonable cost.

b) Environmental Consequences

Based upon the findings above, there are no perceived environmental consequences associated with the project and socioeconomic issues or EJ.

c) Mitigation

Based upon the lack of environmental consequences, no mitigation associated with socioeconomic issues or EJ is recommended.

4. Summary of Mitigation

The mitigation measures proposed for this project are as follows:

- **Soils**: All new and disturbed vegetative surface areas called out within the limits of work and on the plans shall be comprised of 4-inch loam, seed, fertilizer.

  Vegetation and Wildlife: To prevent harm to animals that may be present on island roads, project vehicles will exercise caution and follow local speed limits at all times. In the event that a turtle is found in the road, the vehicle will be stopped, and the turtle carefully moved to safety. Before beginning construction each day, a visual sweep of the Limit of Work will be performed to identify the presence of box turtles. If a turtle is found in the Limit of Work, it will be moved to a forested, upland area at least 200 feet away before construction begins. Further information on Best Management Practices to limit impacts to box turtles can be found with RIDEM correspondence in Attachment J.

  To prevent the introduction of wildlife pathogens to the island, all equipment will be cleaned and decontaminated before loading onto the ferry to Prudence Island. Complete disinfection protocols can be found with RIDEM correspondence in Attachment J. To prevent the introduction of invasive species, loaming and seeding within construction areas will not involve imported soil from off-island and will only use native species seed mixes.

  If any of the listed species are observed in the project area during construction, appropriate measures will be taken to protect the species and its habitat. Any vegetation disturbed during construction will be restored to the greatest extent possible.

- **Historic Properties:** The project is not anticipated to have any adverse impact on historic properties or items. In the event that any historical artifacts are unearthed during project construction, RIHPHC will be notified and construction will be delayed or modified to ensure that these resources are properly managed.

- **Water Quality:** No adverse impact on water quality is expected as a result of this project. If any issues are detected during the use of the proposed groundwater discharge system, the system operators will follow the protocol laid out in the groundwater discharge approval application.

- **Air Quality:** Precautions shall be taken in accordance with good industrial practice to limit airborne particulate matter from construction activities and material transport. Construction vehicles will be in compliance with the most recent RIDOT emissions standards.

- **Noise:** Short-term noise impacts will be mitigated by provisions in the construction contract documents to control noise to the extent possible during construction. This will also require that activities that have the potential to generate noise issues be carried out on weekdays, during daytime hours, when noise will be less disruptive.

- **Traffic Circulation:** To mitigate the minor consequences associated with the project and transportation issues related to the use of limited ferry space, transportation of equipment and building materials will be avoided during peak ferry usage times. Construction personnel will be instructed to carpool to the jobsite to limit the number of vehicles on the ferry and on island roads. Good traffic control practices will be used to minimize the impact of disrupted roadways during construction.

- **Solid Waste Disposal:** To ensure there are no consequences related to solid waste disposal, any waste generated will be properly contained and disposed of.

- **Stormwater Drainage:** To mitigate the effects of land disturbance during construction on stormwater quality, standard soil erosion and sedimentation control measures will be implemented. As small sites of less than 1 acre, the project construction will comply with Minimum Standard 10 of the *RI Stormwater Design and Installation Standards Manual* (RISDISM). The construction operator will develop a Soil Erosion and Sediment Control Plan, in accordance with the measures laid out in Section 3.3.7 of the RISDISM, prior to beginning construction.

5. Public Participation

5.1 Public Meeting

A public meeting or workshop to discuss the project and the environmental impacts of the project shall be coordinated by the Prudence Island Water District in accordance with 216-RICR-50-05-6.11. The meeting is required to discuss with the public the project scope, alternatives, and the preferred additions of disinfection and iron and manganese treatment, and to solicit public opinions and concerns. This meeting is required to be documented including the preparation of meeting notes, sign-in sheet, presentation materials, and methods of advertisement (including media). The meeting documentation will be included as an Attachment of the final EA.

5.2 Regulatory Review and Public Hearing

RIDOH and RIDEM will review the final EA and make a determination. Following the decision, RIDOH will invite public comments for thirty (30) days, or as required by R.I. Gen. Laws Chapter 42-35, by publishing a notice of the determination made in a paper of statewide circulation, on RIDOH's website and/or any other acceptable means in accordance with R.I. Gen. Laws Chapter 42-35. In addition, notification of such determination will be sent to all persons and associations who have advised RIDOH that they wish to be notified. During the public comment period, any interested party may submit written comments. Requests for a public hearing shall be made in accordance with R.I. Gen. Laws § 42-35-2.8. Following the public notice or public hearing, the final determination will be made by the Director of RIDOH.

6. Agency Coordination and Review

Several agencies were contacted in the development of this EA. Each agency was provided a proposed scope of work generally describing the project components, a copy of the project overview plan showing the project limits, and the proposed site location. The following agencies were contacted:

- RIDEM Office of Technical and Customer Assistance
- RIDEM Division of Fish and Wildlife
- RIDEM Office of Water Resources
- RIDEM Supervising GIS Specialist
- Rhode Island Division of Statewide Planning
- Portsmouth Town Planner
- Rhode Island Historic Preservation and Heritage Commission (RIHPHC)
- Narragansett Tribal Historic Preservation Office (NTHPO)
- NOAA Fisheries Greater Atlantic Regional Fisheries Office

Letters requesting project review were sent out on July 20, 2022 by mail and email. The NTHPO was only contacted by mail. The RIDEM Supervising GIS Specialist was contacted by email on July 21, 2022 after direction from the RI Natural History Survey. Discussion with the RIDEM Office of Water Resources regarding the groundwater discharge approval application began on June 27, 2022. Any review comments that were received have been incorporated into the EA. No response has yet been received from the NTHPO. Copies of all correspondence are included in Attachment J.

Attachment A

RIDOH Administrative Consent Order

Department of Health
Room 209
Three Capitol Hill
Providence, RI 02908-5097

TTY: 711
www.health.ri.gov

September 2, 2021

CERTIFIED MAIL

7020 2450 0001 5704 5167

PWS #RI1592023
Robin Weber, Moderator, Administrative Contact
Prudence Island Water District
PO Box 100
Prudence Island, RI 02872

Dear Ms. Weber:

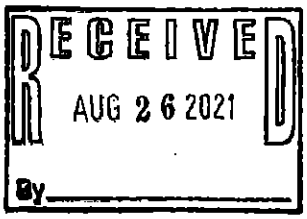
Enclosed is the Second Amended Consent Order signed by both Rhode Island Department of Health and Prudence Island Water District.

Sincerely,

Seema Dixit
Director
Environmental Health Division

Enclosures

Cc: William Capron, Designated Operator (by email)
Prudence Island Water District, Owner (0412 Narragansett Ave, Prudence Island, RI 02872)
Ralph Kinder, Prudence Island Water District Legal Counsel (Gilstein, Kinder & Levin, LLP, 300 Metro Center Blvd., Suite 150A, Warwick, RI 02886)
Anita Flax, RIDOH
Carlene Newman, RIDOH
Colin Millar, RIDOH
Hui Chen, RIDOH
Garth Hoxsie-Quinn, RIDOH
Christina Millar, RIDOH
Zhengkai Li, RIDOH



IN THE MATTER OF:
PRUDENCE ISLAND WATER DISTRICT PUBLIC WATER SYSTEM # RI 1592023

SECOND AMENDED CONSENT ORDER

The Prudence Island Water District (PIWD) is licensed as a Public Water System pursuant to R.I. Gen. Laws § 46-13-1 *et seq.* (Public Drinking Water Supply) and 216-RICR-50-05-1 (Public Drinking Water). The Rhode Island Department of Health, Division of Environmental Health, Center for Drinking Water Quality, in connection with the matter described below, herein makes the following:

FINDINGS OF FACT AND CONCLUSIONS OF LAW

1. PIWD is licensed by RIDOH as Public Water System #RI 1592023.

2. During the period July 1, 2018 to July 31, 2018, PIWD violated Section 17.1 of R4613-DWQ[1] in that it exceeded the microbiological Maximum Contaminant Level for the Total Coliform Rule.

3. During the period September 1, 2018 to September 30, 2018, PIWD violated Section 16.4(c)(6)(B) of R46-13-DWQ in that it exceeded the microbiological Maximum Contaminant Level for the Total Coliform Rule.

4. During the period September 1, 2018 to September 30, 2018, PIWD violated Section 16.4(c) of R46-13-DWQ and 40 CFR § 141.860(a) of the National Primary Drinking Water Regulations in that it exceeded the microbiological Maximum Contaminant Level for the Total Coliform Rule and the Revised Total Coliform Rule.

5. By email dated October 4, 2018 RIDOH notified PIWD that PIWD was required to provide public notice of a boil water advisory because *E. coli* bacteria was found in the water supply.

6. From June, 2017 to June, 2021, PIWD had 49 sample results out of 210 samples that were present for total coliform, triggering ten Level 1 or Level 2 Assessments.

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[1] R46-13-DWQ was superseded by 216-RICR-50-05-1 on 10/31/2018.

7. By letter dated October 19, 2018, RIDOH notified PIWD that RIDOH had concluded that despite the implementation of several corrective actions to attempt to remedy recurring coliform presence in the distribution system, the coliform issue still remained, had been assessed as a sanitary defect and significant deficiency that was expected to continue, and required PIWD to install permanent chlorination at all wells in order to maintain a disinfect residual of at least 0.2 mg/L throughout the distribution system pursuant to Sections 13.4, 16.4 (c) and 10.1 of R46-13-DWQ. RIDOH stated that this permanent chlorination system must reliably achieve 4-log (99.99%) inactivation of viruses before the first customer for each groundwater source in accordance with Section 13.4. RIDOH stated that the permanent chlorination system must be installed and approved by May 17, 2019.

8. By letter dated October 29, 2018, PIWD filed a timely request for a hearing on the issue of whether RIDOH was justified in ordering plans for permanent chlorination at all PIWD wells.

9. During the period October 1, 2018 to October 31, 2018, the PIWD violated Section 16.4(c) of R46-13-DWQ in that it exceeded the microbiological Maximum Contaminant Level for the Total Coliform Rule.

10. On or about February 28, 2019, RIDOH and PIWD entered into a Consent Order under which PIWD agreed to attain compliance through the implementation of a cross-connection plan by August 1, 2020. PIWD also agreed to apply for approval of a permanent chlorination system by September 13, 2020 and to install a permanent chlorination system by July 1, 2021 if compliance through the implementation of a cross-connection plan was not attained by August 1, 2020.

11. On or about June 15, 2020, RIDOH and PIWD entered into a First Amendment and Restatement of the Consent Order under which PIWD agreed to attain compliance through the implementation of a cross-connection plan by December 1, 2020. PIWD also agreed to apply for approval of a permanent chlorination system by January 13, 2021 and install the permanent chlorination system by November 1, 2021 if compliance through the implementation of a cross-connection plan was not attained by December 1, 2020.

12. PIWD did not attain compliance through the implementation of a cross-connection plan by December 1, 2020.

13. PIWD did not apply for approval of a permanent chlorination system by January 13, 2021. PIWD requested an extension by email on January 13, 2021 and RIDOH approved the extension by email on January 14, 2021.

14. Upon information and belief, the permanent chlorination system will not be installed by November 1, 2021.

15. PIWD admits to the jurisdiction of RIDOH.

16. PIWD hereby acknowledges and waives:

a. The right to an administrative hearing on whether RIDOH was justified in ordering plans for permanent chlorination at all PIWD wells;
b. The right to legal representation at said hearing;
c. The right to produce testimony, witnesses, and evidence on its behalf at said hearing; and
d. Any and all rights of appeal.

ACCORDINGLY, AND BASED ON THE FOREGOING,

RIDOH and PIWD hereby agree:

1. PIWD must have all cross-connection control surveys performed by an individual holding a current certification from a cross-connection control program recognized by RIDOH (216-RICR-50-05-1.9.4(E)(1)).

2. PIWD has until May 31, 2025 to attain compliance through implementation of a cross connection control plan, including the inspection of existing backflow preventers and installation and inspection of backflow preventers at locations where a proper backflow preventer is not present, at each service connection.

3. On or before October 31, 2021, PIWD shall submit an application to the Rhode Island Infrastructure Bank for a loan from the State Revolving Fund for the purpose of obtaining funding, or otherwise apply for funding by October 31, 2021 from a different financial institution, for a permanent chlorination system at all wells (and an iron-manganese pre-treatment system at the Indian Spring wells) in order to maintain a disinfect residual of at least 0.2 mg/L throughout the distribution system pursuant to 216-RICR-50-05-1.13.4, 216-RICR-50-05-1.16.4(A)(6)(j) and 216RICR-50-05-1.10(A) of R46-13-DWQ. This permanent chlorination system must reliably achieve 4-log (99.99%) inactivation of viruses before the first customer for each groundwater source in accordance with 216-RICR-50-05-1.13.4. PIWD shall comply with all state and federal statutes and regulations in submitting this application (see https://www.riib.org/sites/default/files/Drinking-Water.pdf). PIWD shall provide to RIIB or another financial institution all information necessary to ensure financing is secured in order to meet the requirements of Items 4 through 7 below.

4. PIWD shall submit an application to RIDOH for approval of a permanent chlorination system as described in the RIDOH letters dated October 19, 2018 and June 10, 2021, attached hereto as Exhibit A, by December 31, 2021. The application must include:

a. Plans, specifications, and calculations for iron and manganese pre-treatment of the Indian Spring wells. These plans, specifications, and calculations shall be signed and stamped by a Rhode Island-registered Professional Engineer and include manufacturer cut sheets and NSF 60 and 61 certifications for all components that come into contact with the water. PIWD shall comply with all state and federal statutes and regulations in submitting this application (see https://health.ri.gov/publications/specifications/Relevant-Federal-and-StateLaws.pdf).

b. A corrosion control study performed, stamped, and signed by a Rhode Island registered Professional Engineer to ensure any alteration of water chemistry due to the addition of chlorine will not cause a destabilization to the existing pipe scale. This study is required under 216-RICR-50-05-1.7.2(B)(3)(c) and shall include results of:

   i. A materials survey or re-evaluate the most recent survey completed for the Lead and Copper Rule. The objective is to determine the existing structure of the water distribution system and the potential sources/tiers of lead and copper (216-RICR-50-05-1.7.7(A)).

   ii. A water characteristics evaluation or re-evaluate the most recent studies that measures for lead, copper, pH, alkalinity, calcium hardness, conductivity, water temperature, dissolved oxygen, chlorides, sulfates, the oxidation-reduction potential and corrosion inhibitor, if used. Depending on the model of evaluation that is utilized, there are other analytes that should be considered. These include but are not limited to natural organic matter, total dissolved solids, ammonia, and buffer intensity.

   iii. A desktop study, which includes evaluations of literature, pre-engineering work, prior PIWD system investigations, water quality data and information, theory, and similar system information in order to demonstrate if an alteration in the water chemistry can cause a destabilization of existing scale. All references must be cited.

c. A plan created, stamped, and signed by a Rhode Island-registered Professional Engineer for reducing the potential for Disinfection Byproducts formation. This plan must include test results of the wells for total organic carbon and other water quality parameters the Professional Engineer deems necessary to make this determination.

5. Within 90 days of preliminary approval by RIDOH of the permanent chlorination system engineering design, PIWD shall submit to RIDOH its final Environmental Assessment as required by Section 6.11 of the *Rhode Island Drinking Water State Revolving Fund* regulations, 216-RICR-50-05-6.

6. PIWD shall respond to comments and questions in RIDOH's engineering plan review letter(s) related to the treatment system within 31 days or by the date included in the letter(s), whichever is later.

7. Within 120 days of receiving financing or the final RIDOH engineering approval letter, whichever is later, PIWD shall install the permanent chlorination system treatment system and notify the RIDOH project engineer of the completion of the installation so that a conformance inspection can be performed by RIDOH.

8. PIWD will submit progress reports to RIDOH, which will be due January 15, 2022, January 15, 2023, January 15, 2024 and October 31, 2024 in accordance with 216-RICR50-05-1.9.4. These reports shall include progress on Items 4(a) through 4(c) above.

9. PIWD customers will remain on a boil water advisory until the treatment system is installed and approved by RIDOH, 4-log chlorination is shown to be maintained in two consecutive months of Groundwater Rule Compliance Monitoring monthly operating reports, and a minimum concentration of 0.2 mg/L chlorine residual is maintained throughout the distribution system as shown in two consecutive months of chlorine monitoring with Revised Total Coliform Rule coliform samples. PIWD will provide boil water advisory Public Notice Distribution and Posting to consumers, a copy to RIDOH, and Public Notice Certification to RIDOH on or before September 3, 2021 and every three months thereafter until the boil water advisory is lifted by RIDOH.

10. All previous Notices of Violation issued to date, including without limitation those dated October 19 and October 31, 2018, and any and all appeals thereof, are hereby dismissed/null and void with no assessments.

11. Should PIWD remain out of compliance with 216-RICR-50-05-1 following the expiration of all deadlines stated herein, PIWD will be subject to all fines and administrative penalties allowable by law, including, but not limited to, R.I. Gen. Laws § 46-13-16 and 216-RICR50-05-1.20.

12. This Second Amended Consent Order supersedes the First Amendment and Restatement of the Consent Order dated June 15, 2020 and is binding on the PIWD, its successors, and assigns, and cannot be terminated or modified unless a written agreement is executed between the parties.

Signed this 23 day of August, 2021.

Robin R. Weber

ROBIN WEBER
PWS # RI1592023

PRUDENCE ISLAND WATER DISTRICT

Ratified by the RI Department of Health on the 1st day of September 2021.

Seema Dixit

AMY B. PARMENTER, CHIEF
CENTER FOR DRINKING WATER QUALITY
RHODE ISLAND DEPARTMENT OF HEALTH

Attachment B

Design Drawings

WATER SYSTEM CHLORINATION & PRETREATMENT

Prepared For:

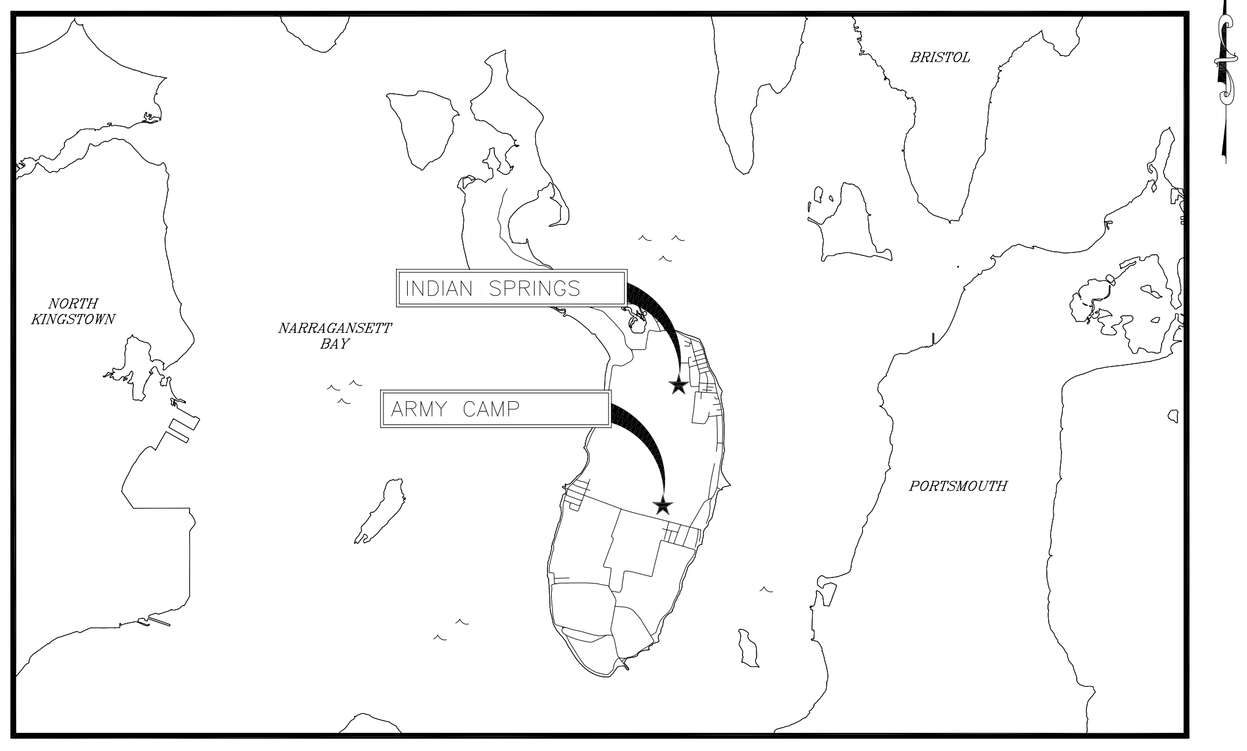
PRUDENCE ISLAND WATER DISTRICT

024 HOMESTEAD AVE
PRUDENCE ISLAND, RHODE ISLAND

LISA GOYER
No. 11536
REGISTERED PROFESSIONAL ENGINEER
CIVIL
12/30/21

Index of Drawings

Sheet No.	Dwg. No.	Description
		COVER SHEET
1	G-1	PROCESS FLOW DIAGRAM
		CIVIL SHEETS
2	C-1	LEGEND AND GENERAL NOTES
3	C-2	INDIAN SPRINGS EXISTING CONDITIONS PLAN
4	C-3	ARMY CAMP EXISTING CONDITIONS PLAN
5	C-4	INDIAN SPRINGS PROPOSED CONDITIONS PLAN
6	C-5	INDIAN SPRINGS PROPOSED GRADING PLAN
7	C-6	ARMY CAMP PROPOSED CONDITIONS
8	C-7	CIVIL CONSTRUCTION DETAILS
9	C-8	CIVIL CONSTRUCTION DETAILS
		BUILDING SHEETS
10	B-1	INDIAN SPRINGS PRECAST CONCRETE BUILDING ELEVATIONS
11	B-2	INDIAN SPRINGS BUILDING FLOOR PLANS
		STRUCTURAL SHEETS
12	S-1	GENERAL NOTES AND TYPICAL DETAILS
13	S-2	FOUNDATION PLAN, SECTIONS AND DETAILS



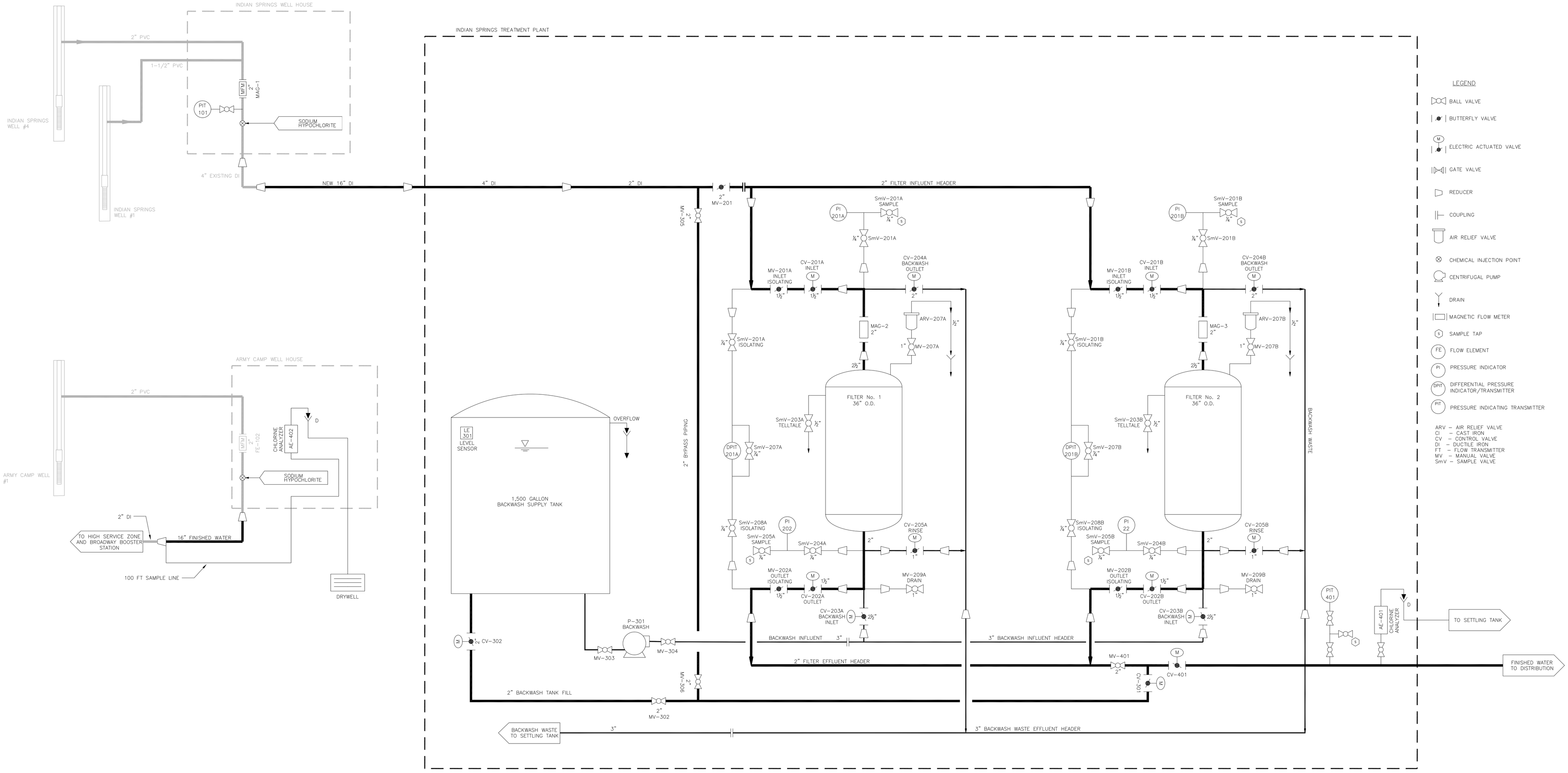
Locus Plan
SCALE: 1"=6,000'

Index of Drawings

Sheet No.	Dwg. No.	Description
		MECHANICAL SHEETS
14	M-1	PLANT MECHANICAL NOTES AND LEGEND
15	M-2	MECHANICAL SCHEDULES
16	M-3	MECHANICAL PROCESS PIPING PLAN
17	M-4	MECHANICAL PROCESS PIPING SECTIONS
18	M-5	WELL HOUSE CHEMICAL FEED SYSTEMS
19	M-6	MECHANICAL DETAILS
		HVAC SHEETS
20	H-1	MECHANICAL HVAC NOTES, SYMBOLS, AND ABBREVIATIONS
		ELECTRICAL SHEETS
21	E-1	ELECTRICAL NOTES, SYMBOLS, AND ABBREVIATIONS
22	E-2	ELECTRICAL POWER DETAILS AND SCHEDULE
		INSTRUMENTATION SHEETS
23	I-1	SCADA SYSTEM SCHEMATIC
24	I-2	INDIAN SPRINGS CHLORINATION
25	I-3	FILTER SKID INSTRUMENTATION
26	I-4	ARMY CAMP CHLORINATION

PROJECT No. 19.21.01
FOR PERMITTING
DECEMBER 2021

H2Olson Engineering, Inc.
DRINKING WATER PROFESSIONALS



FOR PERMITTING

H2Olson Engineering, Inc.
DRINKING WATER PROFESSIONALS
www.h2olsonengineering.com
(508) 375-7007

SCALE ADJUSTMENT GUIDE
0" 1"
BAR IS ONE INCH ON ORIGINAL DRAWING

REVISIONS

NO.	DATE	DESCRIPTION

LISA GOYER
No. 11536
REGISTERED PROFESSIONAL ENGINEER (CIVIL)

PROJECT NO.:	119.21.01
DATE:	DECEMBER 2021
SCALE:	AS NOTED
DESIGNED BY:	SCO
CHECKED BY:	SCO
DRAWN BY:	RAT
APPROVED BY:	LMG

WATER SYSTEM CHLORINATION & PRETREATMENT

PRUDENCE ISLAND WATER DISTRICT
PRUDENCE ISLAND, RHODE ISLAND

DRAWING TITLE:
PROCESS FLOW DIAGRAM

DRAWING NO.:
G-1

SHEET NO. 1 OF 26

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A. GENERAL NOTES

1. CONTRACTOR'S WORK SHALL NOT INTERFERE WITH NORMAL ON-GOING OPERATIONS OF THE EXISTING WATER TREATMENT PLANT. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING WITH THE ENGINEER, OWNER, AND OTHER CONTRACTORS ON SITE, ALL WORK, ESPECIALLY SEQUENCING, LOCATION, AND ACTIVITY OF HIS FORCES OR HIS SUBCONTRACTORS. ANY AND ALL WORK ACTIVITIES WHICH REQUIRE A DISRUPTION OF NORMAL OPERATIONS OF THE EXISTING FACILITIES MUST BE APPROVED BY THE ENGINEER, AND ALL REQUESTS FOR CHANGES TO NORMAL OPERATIONS TO PERFORM WORK MUST BE MADE IN WRITING TO THE ENGINEER AT LEAST 7-DAYS IN ADVANCE, AND ARE SUBJECT TO THE REVIEW AND APPROVAL OF THE ENGINEER.
2. THE CONTRACTOR IS ADVISED THAT IT MAY BE NECESSARY TO WORK DURING PERIODS OUTSIDE NORMAL WORKING HOURS FOR THE PURPOSE OF OBTAINING SHUT DOWNS AND/OR TO FACILITATE THE INSTALLATION OF NEW WORK. ALL PROPOSED WORK TO BE PERFORMED OUTSIDE NORMAL WORKING HOURS WILL BE SUBMITTED TO THE ENGINEER IN WRITING AT LEAST 7-DAYS IN ADVANCE FOR REVIEW AND APPROVAL, AND SHALL BE COORDINATED WITH THE TOWN OF WEYMOUTH.
3. NOTICE TO CONTRACTOR: THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AND STRUCTURES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF VARIOUS UTILITY COMPANIES AND WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THIS INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE LOCATION OF ALL UNDERGROUND UTILITIES AND STRUCTURES SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION. THE CONTRACTOR MUST CONTACT THE APPROPRIATE UTILITY COMPANY, ANY GOVERNING PERMITTING AUTHORITY, AND "DIGSAFE" 1-888-344-7233 AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION WORK TO REQUEST EXACT FIELD LOCATION OF UTILITIES. THE ENGINEER SHALL BE NOTIFIED IN WRITING OF ANY UTILITIES INTERFERING WITH THE PROPOSED CONSTRUCTION AND APPROPRIATE REMEDIAL ACTION SHALL BE TAKEN BEFORE PROCEEDING WITH THE WORK. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLAN.
4. DATUM: THE PROJECT VERTICAL DATUM IS A LOCAL DATUM. SEE PROJECT BENCHMARKS SHOWN ON THE PLANS.
5. COORDINATE SYSTEM: HORIZONTAL PROJECT CONTROL IS LOCAL SYSTEM AND IS PROVIDED THROUGH CONSTRUCTION BASELINE.
6. CONSTRUCTION STAKING CONTROL: THE CONTRACTOR SHALL BE RESPONSIBLE FOR ESTABLISHING AND MAINTAINING ALL CONTROL POINTS AND BENCH MARKS NECESSARY TO PERFORM THE WORK.
7. IT SHOULD BE NOTED THAT ADDITIONAL UTILITY STRUCTURES MAY EXIST. THE LOCATION AND SIZES OF EXISTING PIPES, DUCTS, CONDUITS AND ANOTHER UNDERGROUND STRUCTURES SHOWN ON THE DRAWINGS ARE NOT WARRANTED TO BE EXACT NOR IS IT WARRANTED THAT ALL UNDERGROUND STRUCTURES ARE SHOWN. THE CONTRACTOR SHALL BEAR FULL RESPONSIBILITY FOR OBTAINING ALL LOCATIONS OF UNDERGROUND STRUCTURES BEFORE BEGINNING CONSTRUCTION.
8. IT IS THE GENERAL CONTRACTOR'S RESPONSIBILITY TO REVIEW THE SITE CONDITIONS BEFORE THE PREPARATION AND SUBMITTAL OF HIS BID. CONCRETE, BOULDERS, ROCK AND STOCK PILES OF SOIL, EXISTING EQUIPMENT LAYDOWN AREAS, AND ORGANIC MATERIALS ARE PRESENT. THE CONTRACTOR SHALL HANDLE THESE MATERIALS AS NECESSARY TO COMPLETE THE WORK OF THIS PROJECT, AND ASSUMES ALL COSTS (REFLECTED IN HIS BID) FOR THE EXECUTION OF THIS WORK.
9. DO NOT SCALE DRAWINGS UNLESS OTHERWISE NOTED. WRITTEN DIMENSIONING AND STATIONING SHALL PREVAIL. REPORT ANY DISCREPANCIES TO THE ENGINEER IMMEDIATELY.
10. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE REGULATIONS OF THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA.)
11. THE CONTRACTOR SHALL OBTAIN AND PAY THE FEES FOR ANY AND ALL ADDITIONAL PERMITS REQUIRED FOR THE PROPER EXECUTION OF ALL PHASES OF THE PROJECT.
12. REFER TO EARTHWORK SPECIFICATION SECTION AND/OR CONSTRUCTION DETAIL SHEETS FOR BEDDING AND BACKFILL REQUIREMENTS.
13. THE CONTRACTOR SHALL BE REQUIRED TO FURNISH AND MAINTAIN A TELEPHONE NUMBER WHERE THE CONTRACTOR CAN BE REACHED 24 HOURS A DAY, 7 DAYS A WEEK, UNTIL THE PROJECT HAS REACHED SUBSTANTIAL COMPLETION.
14. THE LOCATION AND LIMITS OF ALL ON-SITE WORK AREAS SHALL BE REVIEWED/COORDINATED WITH, AND ACCEPTABLE TO PRUDENCE ISLAND WATER DISTRICT AND THE ENGINEER. THE CONTRACTOR SHALL LIMIT HIS ACTIVITIES TO THESE AREAS.
15. ALL UTILITY SIZES, LOCATIONS, AND APPURTENANCES ARE SUBJECT TO THE APPROVAL AND/OR REVISION OF THE RESPECTIVE UTILITY HAVING JURISDICTION.
16. ALL MATERIALS TO BE REMOVED MUST BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
17. ALL TEMPORARY SEDIMENTATION BASINS AND DEWATERING EQUIPMENT TO BE INSTALLED PRIOR TO ANY DEWATERING ACTIVITIES ON THE SITE AS REQUIRED.
18. ANY ALTERATIONS REQUIRED ON THESE DRAWINGS DURING CONSTRUCTION SHALL BE APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION AND RECORDED BY THE CONTRACTOR ON THE AS-BUILT DRAWINGS.
19. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PREPARATION, SUBMITTAL AND APPROVAL OF ALL REQUIRED STORMWATER, DRAINAGE AND GROUNDWATER DISCHARGE OR CONSTRUCTION PERMITS AND PLANS, SUCH AS NPDES CONSTRUCTION PERMIT AND THE DEVELOPMENT OF SITE SPECIFIC SWPPP. SUGGESTED SWPPP NOTES ARE INCLUDED IN SECTION D OF THIS SHEET FOR CONSTRUCTOR'S USE.
20. THE CONTRACTOR SHALL NOT OPEN OR CLOSE ANY VALVES WHICH HOLD WATER IN THE SYSTEM, UNLESS GRANTED APPROVAL TO DO SO BY THE PRUDENCE ISLAND WATER DISTRICT
21. ALL EQUIPMENT SHALL BE DE-ENERGIZED AND MADE SAFE BEFORE DEMOLITION.
22. THE CONTRACTOR IS ADVISED THAT HAZARDOUS CHEMICALS MAY BE PRESENT IN PROPOSED AREAS OF WORK. CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO ENSURE THE SAFETY OF PERSONNEL WORKING IN AND AROUND THE AREAS.

B. DIMENSIONS AND QUANTITIES

1. ALL DIMENSIONS AND QUANTITIES SHALL BE DETERMINED OR VERIFIED BY THE CONTRACTOR.
2. THE CONTRACTOR IS ADVISED TO TAKE ALL PRECAUTIONS AND MAKE ALL INVESTIGATIONS NECESSARY TO PERFORM THE WORK. THE OWNER WILL NOT CONSIDER CONTRACTOR'S UNFAMILIARITY WITH THE PROJECT OR SITE CONDITIONS AT THE TIME OF BID AS A BASIS FOR ADDITIONAL COMPENSATION.

C. PROTECTION NOTES

1. ADEQUATE PROTECTION OF PERSONS AND PROPERTY SHALL BE PROVIDED AT ALL TIMES. THE WORK SHALL BE EXECUTED IN SUCH A WAY AS TO AVOID HAZARD TO PERSONS AND PROPERTY. WORK SHALL BE ACCOMPLISHED IN ACCORDANCE WITH THE REQUIREMENTS OF LOCAL, STATE AND FEDERAL AUTHORITIES HAVING JURISDICTION OVER THE WORK.
2. PROVIDE ALL NECESSARY TEMPORARY PROTECTION AND BARRIERS TO SEGREGATE THE WORK AREA AND TO PREVENT DAMAGE TO ADJACENT AREAS, AS REQUIRED BY ALL JURISDICTION REGULATIONS.
3. PROVIDE PROPER PROTECTION AND BARRIERS BETWEEN THE WORK OF THIS CONTRACT AND EXISTING STRUCTURES TO REMAIN.
4. THE CONTRACTOR SHALL RESTORE ALL DAMAGED PRIVATE AND PUBLIC PROPERTY DURING CONSTRUCTION TO ITS PRE-CONSTRUCTION CONDITION, AT NO COST TO THE OWNER.
5. THE CONTRACTOR IS TO TAKE SPECIAL CARE NOT TO DAMAGE TREES, BUSHES, PLANTS, FLOWERS, STONEWALLS, FENCES, BUILDING ETC. WITHIN THE CONSTRUCTION AREA UNLESS THEY ARE NOTED TO BE REMOVED.
6. CONTRACTOR SHALL REMOVE AND REPLACE, OR REPAIR, ALL CURBS, SIDEWALKS, STONE WALLS, PAVEMENT, GRAVEL ACCESS ROAD, LANDSCAPING, TREES AND OTHER ITEMS INTENDED TO REMAIN IN PLACE THAT ARE DAMAGED BY HIS CONSTRUCTION ACTIVITIES TO AT LEAST THEIR ORIGINAL CONDITION, AND TO THE SATISFACTION OF THE PRUDENCE ISLAND WATER DISTRICT AND THE ENGINEER AT NO ADDITIONAL COST TO THE OWNER.
7. THE CONTRACTOR, AT NO ADDITIONAL COST TO THE OWNER, SHALL REPAIR ANY EXISTING UTILITIES TO REMAIN, WHICH ARE DAMAGED DURING CONSTRUCTION.
8. IN THOSE INSTANCES WHERE POWER OR TELEPHONE POLE SUPPORT IS REQUIRED, THE CONTRACTOR SHALL PROVIDE A MINIMUM 48-HOUR NOTIFICATION TO THE RESPECTIVE UTILITY COMPANY. NO ADDITIONAL PAYMENT WILL BE PROVIDED FOR TEMPORARY BRACING OF UTILITIES.
9. ALL STRUCTURES AND PIPELINES LOCATED ADJACENT TO THE TRENCH EXCAVATION SHALL BE PROTECTED AND FIRMLY SUPPORTED BY THE CONTRACTOR UNTIL THE TRENCH IS BACKFILLED. INJURY TO ANY SUCH STRUCTURE CAUSED BY, OR RESULTING FROM, THE CONTRACTORS OPERATIONS SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. ALL UTILITIES REQUIRING REPAIR, RELOCATION OR ADJUSTMENT AS A RESULT OF THE PROJECT SHALL BE COORDINATED THROUGH THE RESPECTIVE UTILITY AND THE TOWN.
10. OPEN TRENCHES MUST BE BACKFILLED AT THE END OF THE WORKDAY OR COVERED WITH STEEL PLATES.

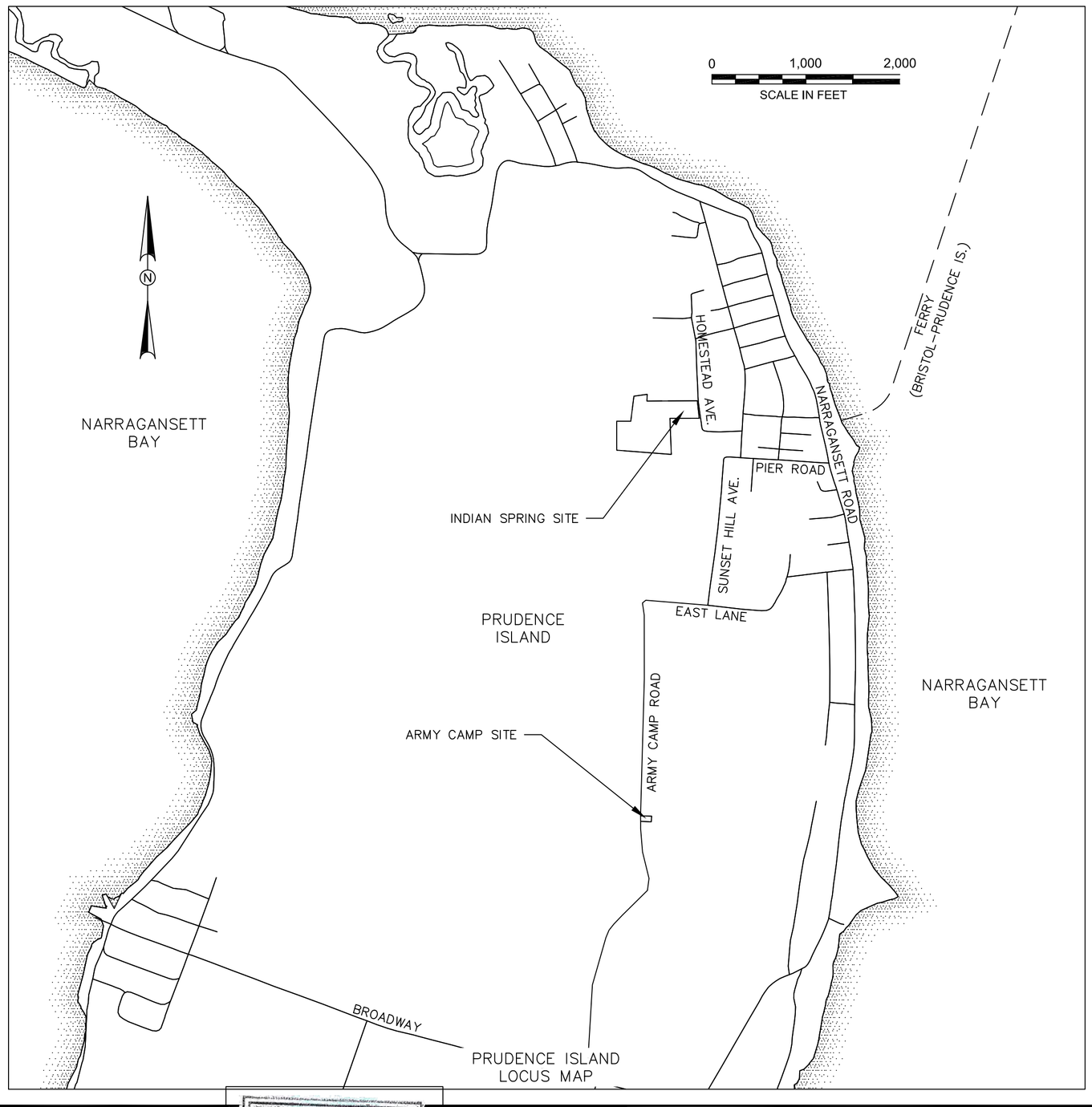
D. STORMWATER POLLUTION PREVENTION PLAN

1. DEMOLITION, SEDIMENTATION, AND EROSION CONTROL (STORMWATER POLLUTION PREVENTION PLAN):
2. THE FIRST STAGE INVOLVES ACTIVITIES NEEDED TO ADDRESS STORMWATER MANAGEMENT, EXCAVATING MATERIAL DESIGNATED FOR OFF-SITE DISPOSAL OR ON-SITE RELOCATION AND FENCING SELECTED AREAS. STAGE ONE WILL PREPARE SITE FOR CONSTRUCTION.

D. STORMWATER POLLUTION PREVENTION PLAN (CONT.)

4. TYPICAL PRACTICES TO BE APPLIED TO THE SITE INCLUDE THE FOLLOWING:
   - A. PRIOR TO EARTH DISTURBANCE IN ANY WORK AREA, CHECK PREVIOUSLY INSTALLED SILTATION BARRIERS (STRAW WATTLE) BETWEEN THE WORK AREA AND ANY WETLAND AREAS OR OTHER RECOGNIZED SENSITIVE AREA WHERE CONSTRUCTION AREA RUNOFF MAY DRAIN TOO, AND IN FULL ACCORD WITH THE DEMOLITION AND EROSION CONTROL PLANS. EROSION CONTROL MEASURES WILL BE INSPECTED AND REPAIRED AS NEEDED WEEKLY OR FOLLOWING EACH MAJOR RAINFALL EVENT (GREATER THAN 0.5") WHICHEVER IS SOONER.
   - B. DISCHARGE WATER FROM DEWATERING OPERATIONS TO A TEMPORARY SILTATION TRAP OR SEDIMENTATION BASIN. ALL EXISTING STOCKPILES OF MATERIAL AS SHOWN ON THE DRAWINGS SHALL BE STABILIZED AND SURROUNDED BY EROSION CONTROLS.
   - C. PROVIDE TEMPORARY BERMS AND SWALES TO DIVERT SURFACE WATER AWAY FROM THE AREAS THAT WILL BE EXPOSED BY CONSTRUCTION ACTIVITY TO MINIMIZE THE AMOUNT OF SURFACE WATER COMING INTO CONTACT WITH EXPOSED SOILS. PROVIDE STABLE OUTLETS FOR THESE DEVICES, AND LINE OR VEGETATE THESE DIVERSIONS TO PROVIDE FOR THEIR STABILITY DURING CONSTRUCTION.
   - D. LIMIT THE EXTENT OF EXPOSED SOILS TO AREAS THAT CAN BE WORKED AND RESTABILIZED WITHIN THE CONSTRUCTION SEASON AND DURING THE SPECIFIC CONSTRUCTION PHASE.
   - E. WHEN EARTHWORK CONSTRUCTION ACTIVITY IN AN AREA IS COMPLETE, STABILIZE THE AREA WITH A SUITABLE SURFACE AS DESCRIBED BELOW.
   - F. ALL CONSTRUCTION VEHICLES EXITING THE SITE WILL BE HOSED DOWN (AS NEEDED) TO REMOVE ALL SOIL. REFER TO CIVIL CONSTRUCTION DETAILS FOR ENTRANCE PAD CONSTRUCTION DETAIL, WHICH SHALL BE MAINTAINED DURING CONSTRUCTION.
   - G. THE CONTRACTOR WILL BE RESPONSIBLE FOR THE CONTROL OF DUST AND IMPLEMENT CONSTRUCTION MEASURES WITH THE INTENT TO PRECLUDE THE GENERATION OF EXCESS DUST, AND AS DIRECTED BY THE OWNER'S REPRESENTATIVE.
   - H. EXISTING HAUL ROADS AND PARKING LOTS AND ROADWAYS ADJACENT TO THE SITE WILL BE SWEPT BY A MOTORIZED STREET SWEEPER WEEKLY OR AS NEEDED TO REMOVE LOSE SOIL MATERIALS ACCUMULATED ON PAVED SURFACES. IN ADDITION TO THESE PRACTICES, THE CONTRACTOR SHALL FOLLOW THE SPECIAL PRACTICES DESCRIBED BELOW. COMPLY WITH THE DIRECTIONS OF THE APPLICANT'S REPRESENTATIVE TO ADDRESS EROSION AND SEDIMENTATION CONDITIONS THAT MAY ARISE ON A CASE BY CASE BASIS DURING CONSTRUCTION.
5. THE FOLLOWING IS A DESCRIPTION OF MINIMUM CONSTRUCTION REQUIREMENTS AND DOES NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITIES WITH REGARD TO DETERMINING THE ADEQUACY OF MEANS AND METHODS OF CONSTRUCTION.
6. THE ANTICIPATED CONSTRUCTION SEQUENCING IS DESCRIBED IN SECTION 01010 OF THE SPECIFICATIONS. THE CONTRACTOR SHALL SUBMIT A HIS SEQUENCE OF WORK FOR THE OVERALL PROJECT FOR THE ENGINEER'S REVIEW AND APPROVAL.
7. MAINTENANCE:

   DURING THE PERIOD OF CONSTRUCTION:
   - A. TEMPORARY DEWATERING SEDIMENTATION BASINS, IF REQUIRED, WILL BE CHECKED AFTER EACH SIGNIFICANT RAINFALL AND CLEANED AS NEEDED TO RETAIN STORAGE CAPACITY.
   - B. TEMPORARY DRAINAGE SWALES WILL BE CHECKED WEEKLY AND REPAIRED WHEN NECESSARY.
   - C. THE HAYBALE AND SILTATION FENCING BARRIERS AND OTHER EROSION AND SEDIMENT CONTROL MEASURES/DEVICES SHALL BE INSPECTED, CLEANED, REPLACED AND/OR REPAIRED AS NECESSARY, WEEKLY AND AFTER EACH SIGNIFICANT RAINFALL.



PRUDENCE ISLAND LOCUS MAP

EXISTING LEGEND

- 100 — CONTOUR LINE
- CHAIN LINK FENCE
- OHW — OVERHEAD WIRES
- E — UNDERGROUND ELECTRIC
- BRUSH/SHRUB LINE
- D — DRAINAGE PIPE
- W — WATER PIPE
- PROPERTY LINE (APPROXIMATE)
- 50-FT PROPERTY LINE SET BACK
- EDGE OF GRAVEL ROAD
- EDGE OF SOIL STOCKPILE
- EDGE OF LAYDOWN AREA (EQUIPMENT OR PIPE)
- GRAVEL ROAD
- STONE WALL
- TREE (DECIDIOUS) WITH CALIPER SIZE
- TREE (EVERGREEN) WITH CALIPER SIZE
- W — DRINKING WATER WELL
- TEST PIT
- SIGN
- IRON ROD
- MAIL BOX
- BENCH MARK
- HUB & TACK
- WV — GATE VALVE (WATER)
- UTILITY POLE
- MW — MONITORING WELL
- TEST PIT

PROPOSED LEGEND

- 100 — CONTOUR LINE
- OHW — OVERHEAD WIRES
- E — UNDERGROUND ELECTRIC
- E — UNDERGROUND ELECTRIC DUCT BANK
- BRUSH/SHRUB LINE
- D — DRAINAGE PIPE
- W — WATER PIPE
- LIMIT OF WORK
- EROSION CONTROL BARRIER
- DENSE GRADED CRUSHED STONE
- WV — GATE VALVE (WATER)
- REDUCER FITTING (WATER)
- YARD HYDRANT
- 176.23 — SPOT ELEVATION

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REVISIONS		
NO.	DATE	DESCRIPTION

LISA GOYER — RHODE ISLAND — No. 11536 — REGISTERED PROFESSIONAL ENGINEER — CIVIL — 12/30/21

PROJECT NO.:	119.21.01
DATE:	DECEMBER 2021
SCALE:	AS NOTED
DESIGNED BY:	RJK
CHECKED BY:	SCO
DRAWN BY:	RJK
APPROVED BY:	LMG

WATER SYSTEM CHLORINATION & PRETREATMENT

PRUDENCE ISLAND WATER DISTRICT
PRUDENCE ISLAND, RHODE ISLAND

DRAWING TITLE: LEGEND & GENERAL NOTES

DRAWING NO.: C-1

SHEET NO. 2 OF 26

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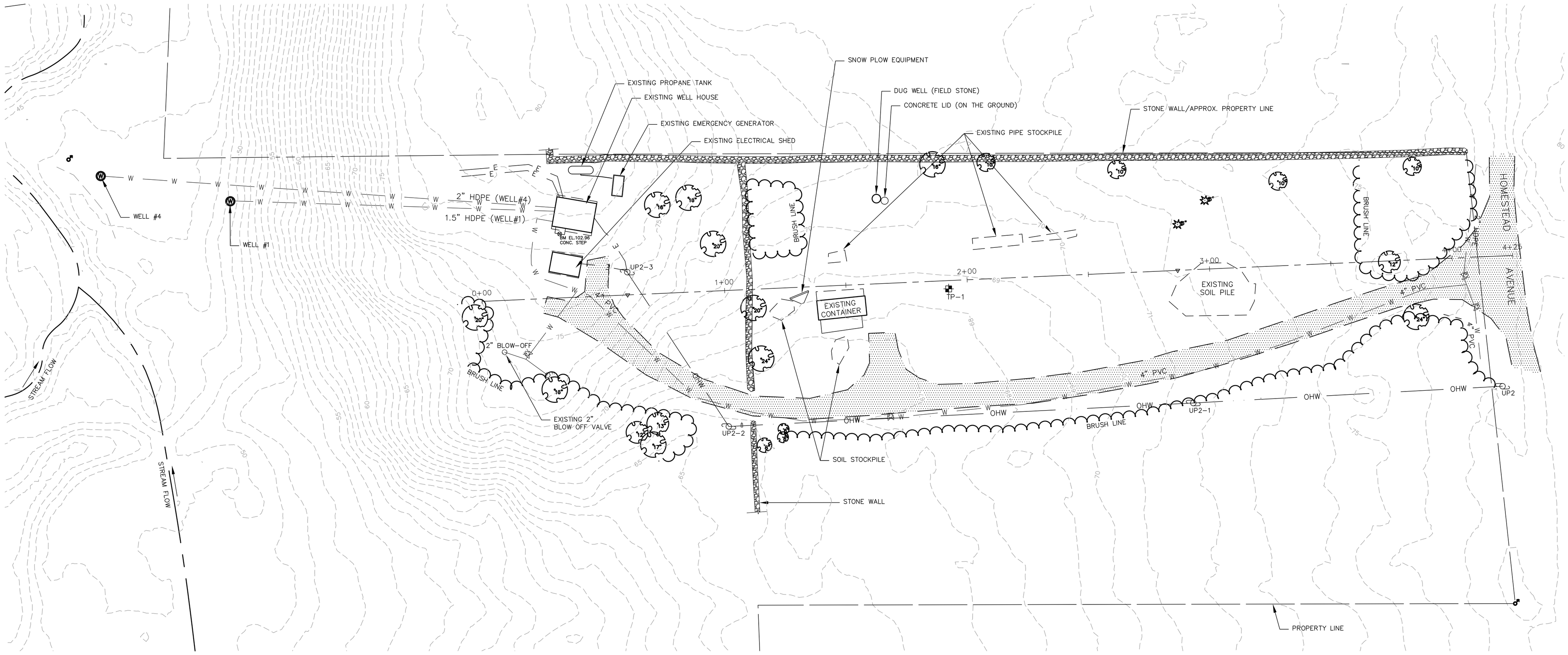

GENERAL NOTES

1. HORIZONTAL AND VERTICAL DATUM IS BASED ON LOCAL DATUM.
2. PROJECT BENCH MARK ESTABLISH IN THE MIDDLE OF THE CONCRETE STEP TO THE PUMP HOUSE. BENCH MARK ELEVATION IS 102.96.
3. CONSTRUCTION BASELINE HUB & TACK ESTABLISHED AT STA.0+60.00 AND STA.2+86.86.

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WATER SYSTEM CHLORINATION & PRETREATMENT

PRUDENCE ISLAND WATER DISTRICT
PRUDENCE ISLAND, RHODE ISLAND

DRAWING TITLE:
INDIAN SPRING
EXISTING CONDITIONS
PLAN

DRAWING NO.:
C-2

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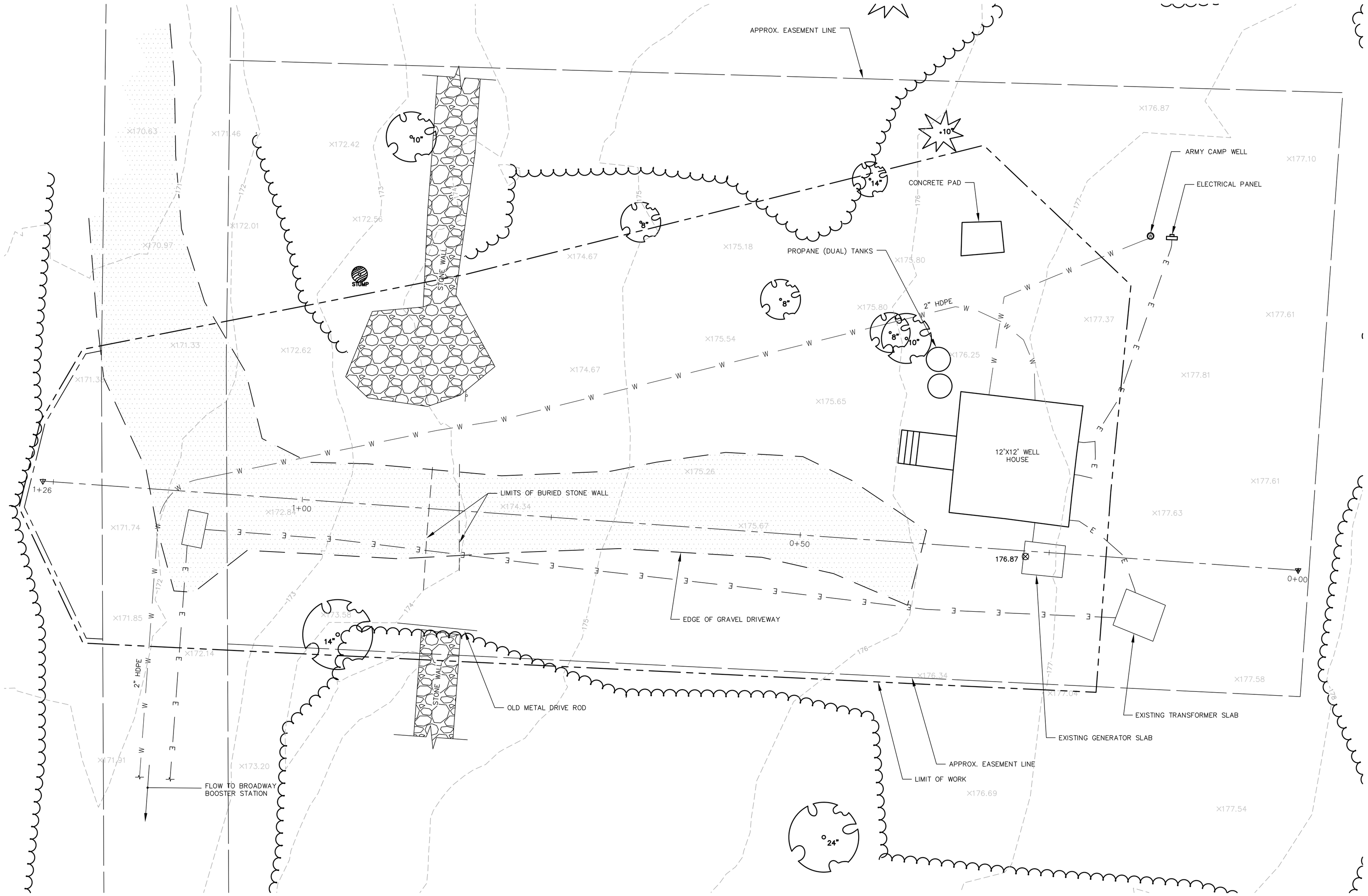

GENERAL NOTES

1. HORIZONTAL AND VERTICAL DATUM IS BASED ON LOCAL DATUM.
2. PROJECT BENCH MARK ESTABLISH ON THE MIDDLE EDGE OF THE CONCRETE SLAB FOR THE BACKUP GENERATOR. BENCH MARK ELEVATION IS 176.87.
3. CONSTRUCTION BASELINE HUB & TACK ESTABLISHED AT STA.0+00.00 AND STA.1+26.06.

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WATER SYSTEM CHLORINATION & PRETREATMENT

PRUDENCE ISLAND WATER DISTRICT
PRUDENCE ISLAND, RHODE ISLAND

DRAWING TITLE:
ARMY CAMP
EXISTING CONDITIONS PLAN

DRAWING NO.:
C-3

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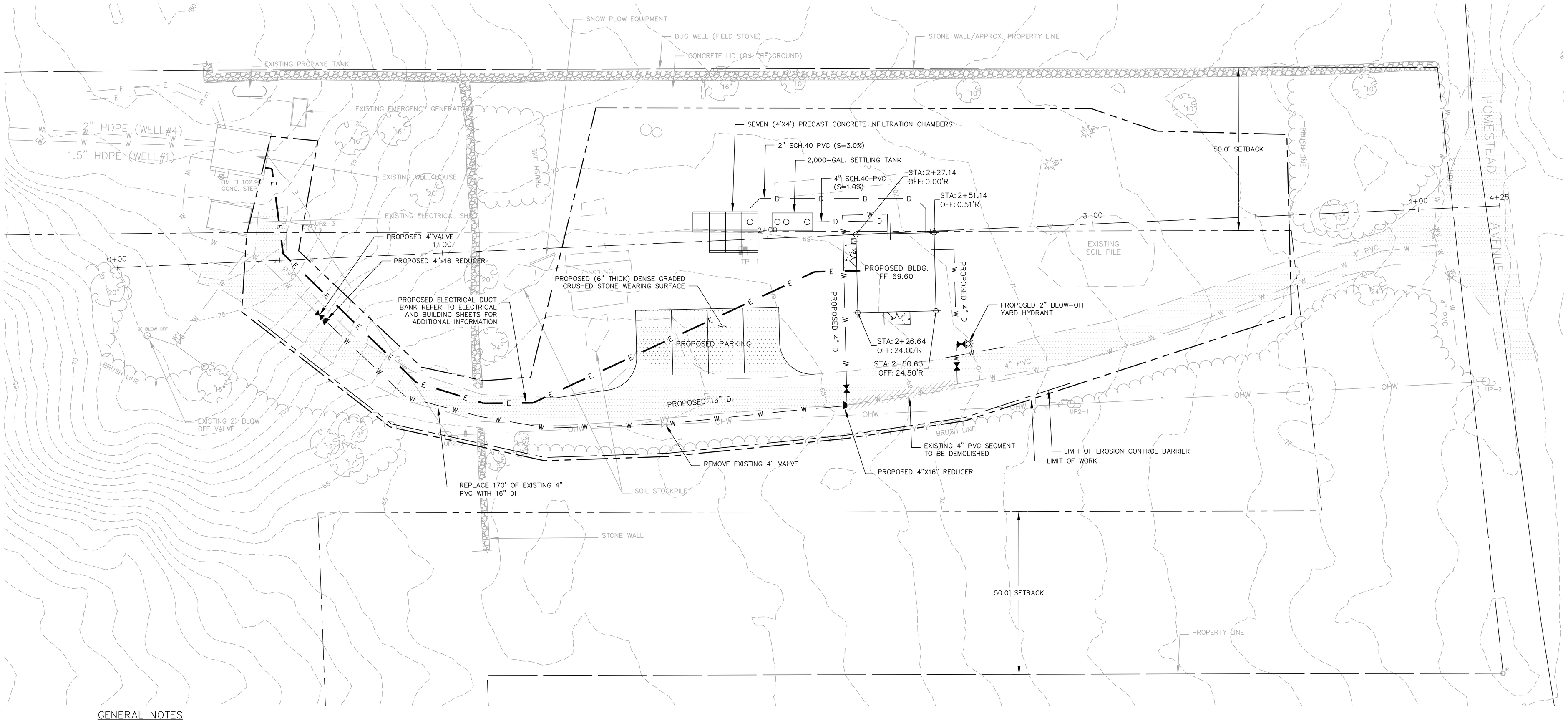

GENERAL NOTES

1. THE STATION AND OFFSET FROM THE CONSTRUCTION BASELINE FOR THE PROPOSED BUILDING CORNERS ARE AS FOLLOWS:

   NE CORNER – STA.2+27.14, 0.00'R
   NW CORNER – STA.2+51.14, 0.51'R
   SW CORNER – STA.2+50.64, 24.50'R
   SE CORNER – STA.2+26.64, 24.00'R

2. SUBSURFACE EXPLORATION WAS PERFORMED NOVEMBER 1, 2021 BY MEANS OF TEST PITTING. AS SHOWN ON THIS SHEET, TEST PIT #1 (TP-1) WAS PERFORMED WEST OF THE PROPOSED BUILDING. A SUMMARY OF SOIL CONDITIONS ARE ENCOUNTERED ARE AS FOLLOWS:

DEPTH	SOIL DESCRIPTION
0.0'–1.0'	MOIST, BLACK, TOPSOIL, WITH ROOT MATTER FROM VEGETATED (GRASSED) GROUND SURFACE.
1.0'–7.0'	DRY, TAN, FINE SAND, TRACE SILT.
7.0'–9.5'	DRY, GRAY, FINE SAND, TRACE SILT.
9.5'–10.5'	DRY, GRAY, FINE SAND, TRACE SILT AND OCCASIONAL COBBLE.
10.5'	BOTTOM OF EXCAVATION

3. REFER APPENDIX IN CONTRACT DOCUMENTS FOR TEST PIT LOG INFORMATION.

N

0 15' 30'
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WATER SYSTEM CHLORINATION & PRETREATMENT

PRUDENCE ISLAND WATER DISTRICT
PRUDENCE ISLAND, RHODE ISLAND

DRAWING TITLE:
INDIAN SPRING
PROPOSED CONDITIONS
PLAN

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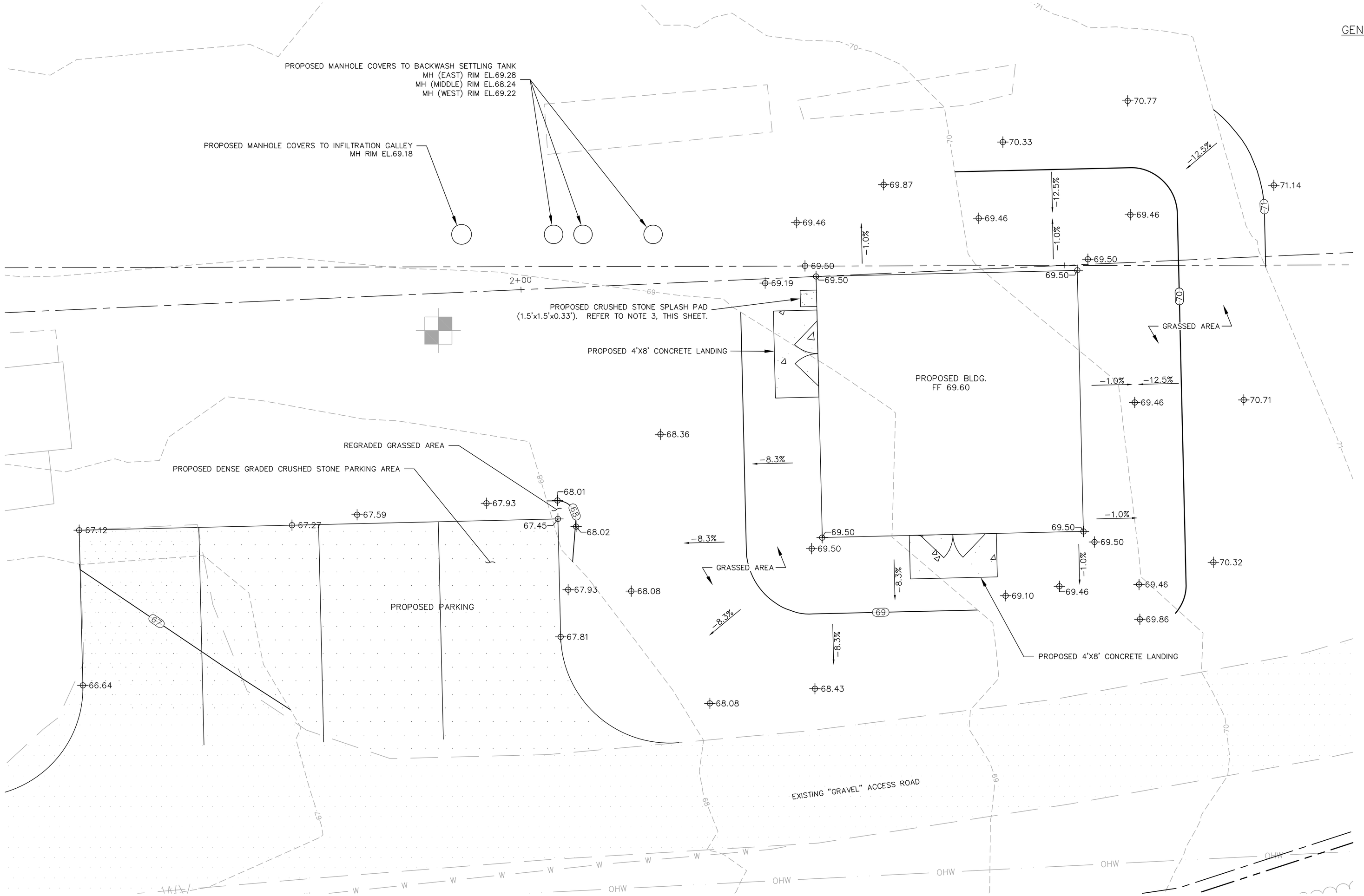

GENERAL NOTES

1. CONTRACTOR SHALL LOAM, SEED AND FERTILIZE ALL DISTURBED VEGETATIVE AREAS OUTSIDE THE LIMIT OF WORK, AT NO COST TO THE OWNER. LOAM THICKNESS SHALL BE 4–INCH MINIMUM.
2. UNDER THE LUMP SUM BID ITEM, ALL NEW VEGETATIVE SURFACE AREAS CALLED OUT WITHIN THE LIMITS OF WORK AND ON THE PLANS SHALL BE COMPRISED OF 4–INCH LOAM, SEED, FERTILIZER AND WHERE APPLICABLE SHALL INCLUDE EROSION CONTROL BLANKET. IN ADDITION, THE CONTRACTOR SHALL ALSO BE PREPARED TO LOAM, SEED AND FERTILIZE ANY ANY AREA DISTURBED AS PART OF CONSTRUCTION ACTIVITY, AT NO ADDITIONAL COST TO THE OWNER.
3. PROPOSED CRUSHED STONE SPLASH PAD, LOCATED NEAR THE NORTHWEST CORNER OF THE PROPOSED BUILDING, SHALL BE CONSTRUCTED OF 4–INCH THICK LAYER OF 3/4–INCH CRUSHED STONE, IN A 1.5–FT BY 1.5–FT FOOTPRINT. MIDDLE OF CRUSHED STONE PAD IS TO BE CENTERED BELOW THE PROPOSED PROCESS PIPING IN THIS LOCATION. CRUSHED STONE PAD SHALL BE INSTALLED OVER A 4–OZ, NONWOVEN GEOTEXTILE. GEOTEXTILE IS TO BE PLACED ACROSS THE BOTTOM OF THE PAD AND EXTEND UP THE CRUSHED STONE SIDEWALL TO THE SURFACE.

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WATER SYSTEM CHLORINATION & PRETREATMENT

PRUDENCE ISLAND WATER DISTRICT
PRUDENCE ISLAND, RHODE ISLAND

DRAWING TITLE:
INDIAN SPRING
PROPOSED GRADING
PLAN

DRAWING NO.:
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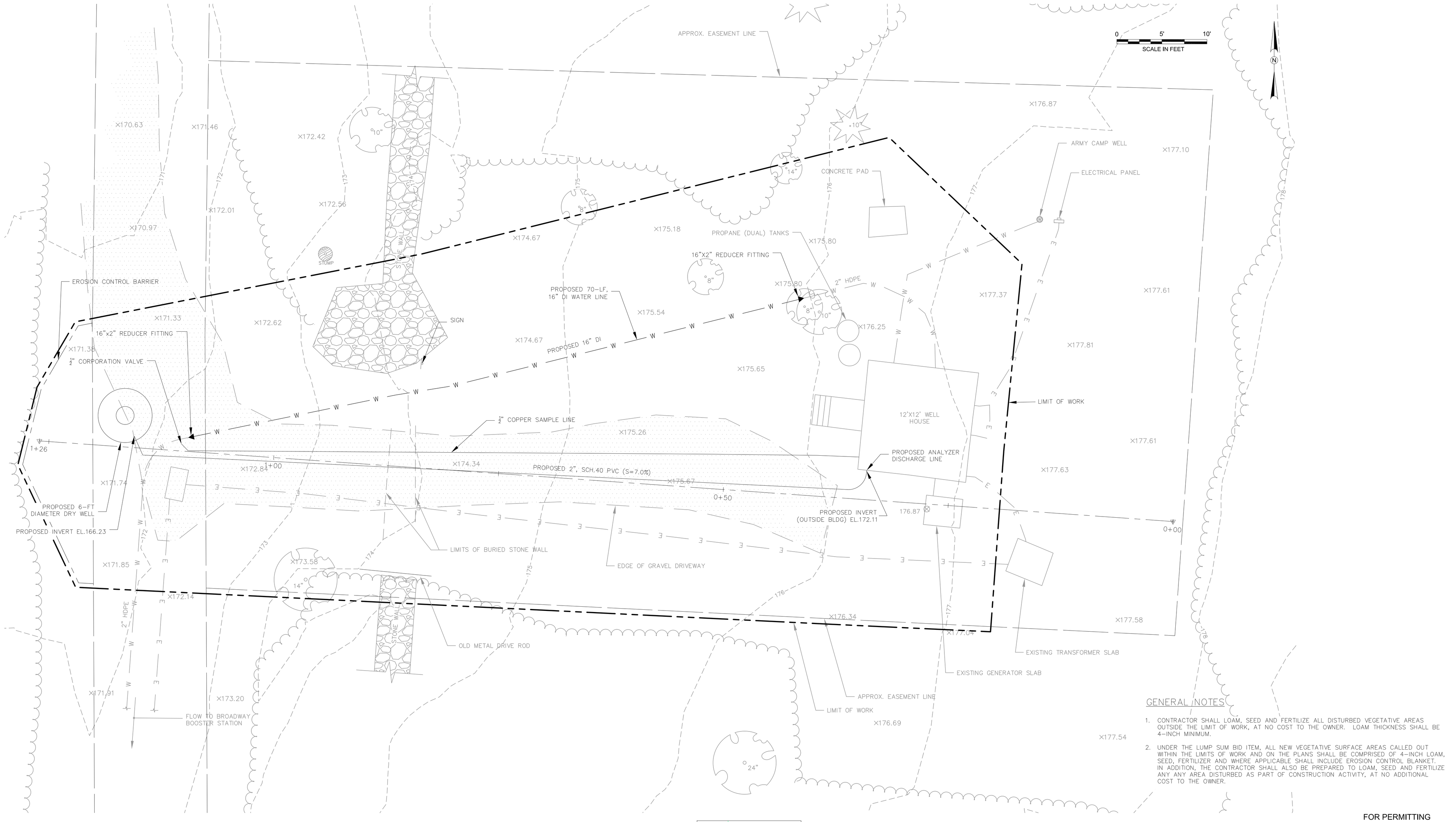

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LISA GOYER — No. 11536 — REGISTERED PROFESSIONAL ENGINEER — CIVIL — 12/30/21

PROJECT NO.:	119.21.01
DATE:	DECEMBER 2021
SCALE:	AS NOTED
DESIGNED BY:	RJK
CHECKED BY:	SCO
DRAWN BY:	RJK
APPROVED BY:	LMG

WATER SYSTEM CHLORINATION & PRETREATMENT

PRUDENCE ISLAND WATER DISTRICT
PRUDENCE ISLAND, RHODE ISLAND

DRAWING TITLE:
ARMY CAMP
PROPOSED CONDITIONS
PLAN

DRAWING NO.:
C-6

SHEET NO. 7 OF 26

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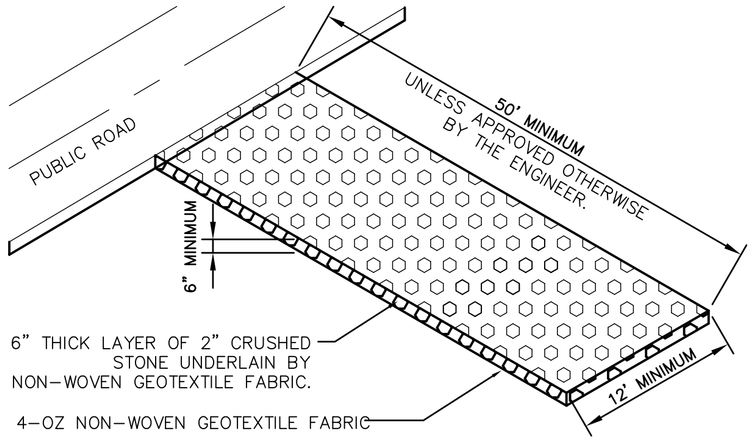
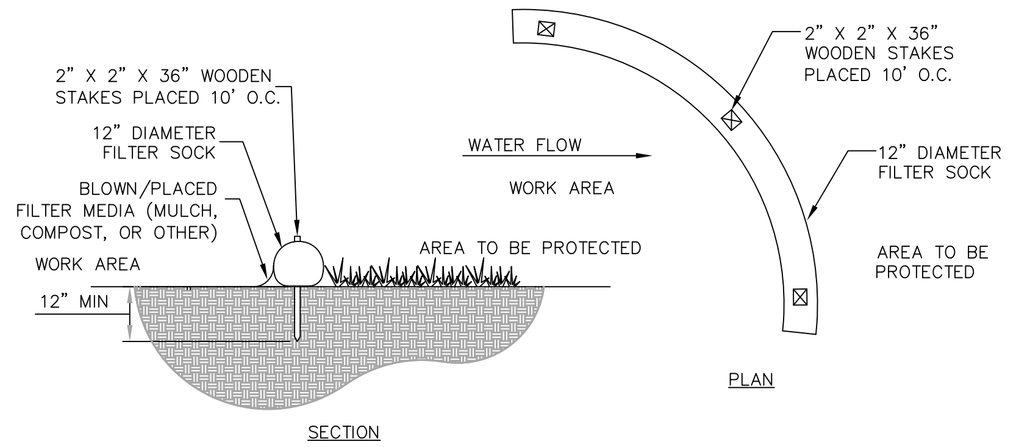


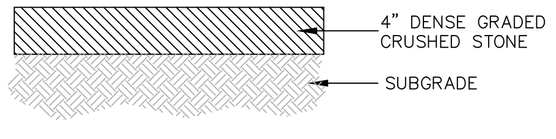
ENTRANCE PAD NOTES:

1. NON-WOVEN GEOTEXTILE FABRIC SHALL BE PLACED OVER THE ENTIRE AREA OF THE CONSTRUCTION ENTRANCE PRIOR TO PLACING STONE.
2. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING SEDIMENT ONTO PUBLIC RIGHT-OF WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, WASHED, OR TRACKED ONTO PUBLIC RIGHT-OF-WAY MUST BE REMOVED PROMPTLY.
3. AT THE COMPLETION OF CONSTRUCTION THE CONTRACTOR SHALL REMOVE THE CONSTRUCTION ENTRANCE PAD AND RESTORE THE SURFACE TO ORIGINAL CONDITION.

CONSTRUCTION ENTANCE PAD
SCALE: NOT TO SCALE

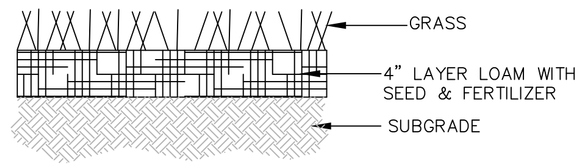


SEDIMENTATION CONTROL BARRIER
SCALE: NOT TO SCALE



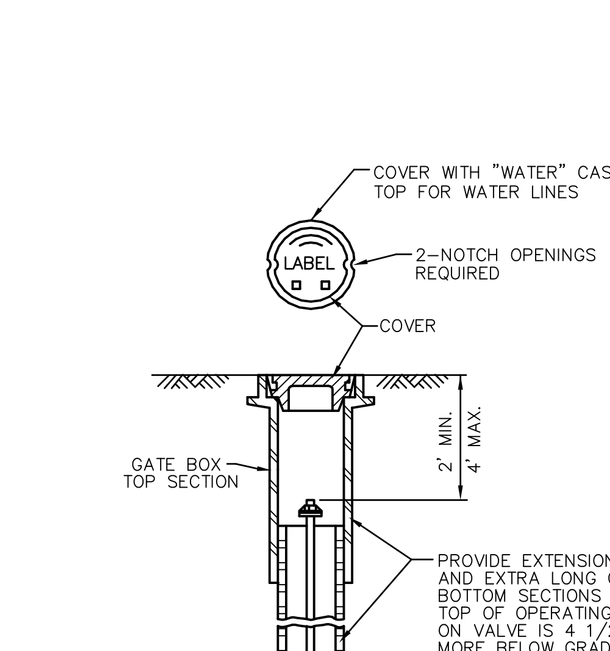
NOTE:
1. DENSE GRADED CRUSHED STONE SHALL MEET MASSDOT M2.01.7 SPECIFICATION AND GRADATION REQUIREMENTS.
2. MATERIAL SHALL BE COMPACTED TO 95% OF THE MAX. DRY DENSITY OF THE MATERIAL, AS DETERMINED BY LABORATORY TESTING.
3. CONTRACTOR SHALL PREPARE LEVEL SUBGRADE TO RECEIVE THE DENSE GRADE CRUSHED STONE AND SHALL PERFORM AT A MINIMUM PROOF ROLLS THE SUBGRADE FOUR TIMES WITH A 10-TON SMOOTH DRUM ROLLER. BEFOR PLACING DENSE GRADE CRUSHED STONE.

DENSE GRADED CRUSHED STONE ACCESS ROAD DETAIL
SCALE: N.T.S.



NOTES
1. ALL GRASSED SURFACE SLOPES STEEPER THAN 7H:1V SLOPE SHALL INCLUDE THE INSTALLATION OF EROSION CONTROL BLANKET AFTER THE LOAM, SEED AND FERTILIZER HAVE BEEN PLACE.
2. MATERIAL SPECIFICATIONS FOR THE EROSION CONTROL BLANKET SHALL MEET CURLEX II EROSION CONTROL BLANKET AS MANUFACTURED BY AMERICAN EXCELSIOR COMPANY, OR EQUAL.

GRASSED VEGETATED SURFACE
SCALE: NOT TO SCALE

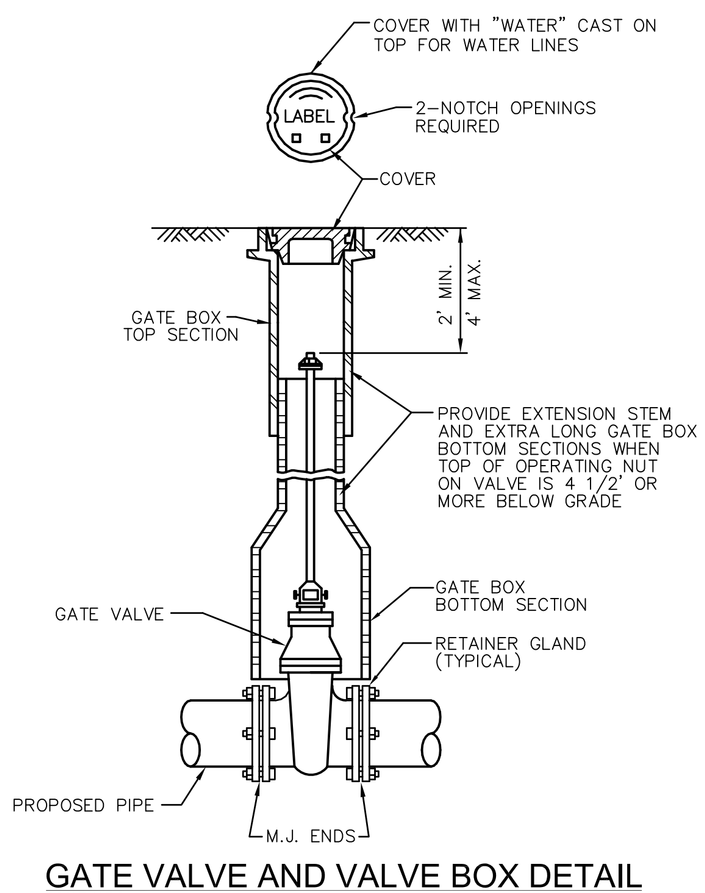


1) MINIMUM SURFACE AREA OF CONCRETE THRUST BLOCK AGAINST UNDISTURBED EARTH – SF (SQUARE FEET)
2) MINIMUM RESTRAINED LENGTH OF PIPE ON EITHER SIDE OF FITTING – LF (LINEAR FEET)

PIPE SIZE	PLUG SF	PLUG LF	TEE SF	TEE LF	90° BEND SF	90° BEND LF	45° BEND SF	45° BEND LF	22 1/2° BEND SF	22 1/2° BEND LF	11 1/4° BEND SF	11 1/4° BEND LF
6"	2.8	37	2.8	32	4.0	18	2.1	7	1.1	4	1.0	2
8"	4.8	48	4.8	43	6.8	23	3.7	10	1.9	5	1.0	2
10"	7.3	58	7.3	53	10.3	28	5.6	12	2.8	6	1.4	3
12"	10.3	69	10.3	63	14.5	33	7.9	14	4.0	6	2.0	3
16"	17.8	89	17.8	83	25.2	42	13.6	17	7.0	8	3.5	4
20"	27.5	108	27.5	102	38.9	51	21.0	21	10.7	10	5.4	5
24"	39.2	127	39.2	121	55.4	59	30.0	25	15.3	12	7.7	6

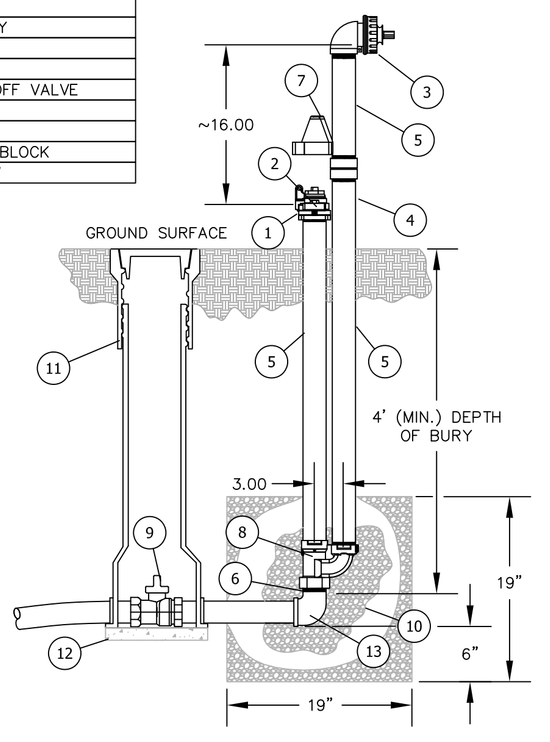
NOTES:
1. THE "SF" VALUES IN THE ABOVE TABLE ARE BASED ON 3,000 P.S.F. SOIL BEARING CAPACITY, 150 P.S.I. TEST PRESSURE AND A 1.5 FACTOR OF SAFETY.
2. THE "LF" VALUES IN THE ABOVE TABLE ARE BASED ON A TYPE 3 LAYING CONDITION, A SAND SILT SOIL DESIGNATION, A 5 FOOT RUN LENGTH, 150 P.S.I. TEST PRESSURE AND A 1.5 FACTOR OF SAFETY.

RESTRAINT AT FITTINGS
SCALE: NOT TO SCALE



GATE VALVE AND VALVE BOX DETAIL
SCALE: N.T.S.

ITEM	ITEM / DESCRIPTION
1	TOP CAP
2	SLOTTED OPERATING NUT
3	2-1/2" NST OUTLET
4	2" COUPLING
5	2" STEEL PIPE
6	INLET VALVE BODY
7	LOCKING COVER
8	DRAIN HOLE
9	HYDRANT SHUT-OFF VALVE
10	CRUSHED ROCK
11	VALVE BOX
12	SOLID CONCRETE BLOCK
13	2" STREET ELBOW



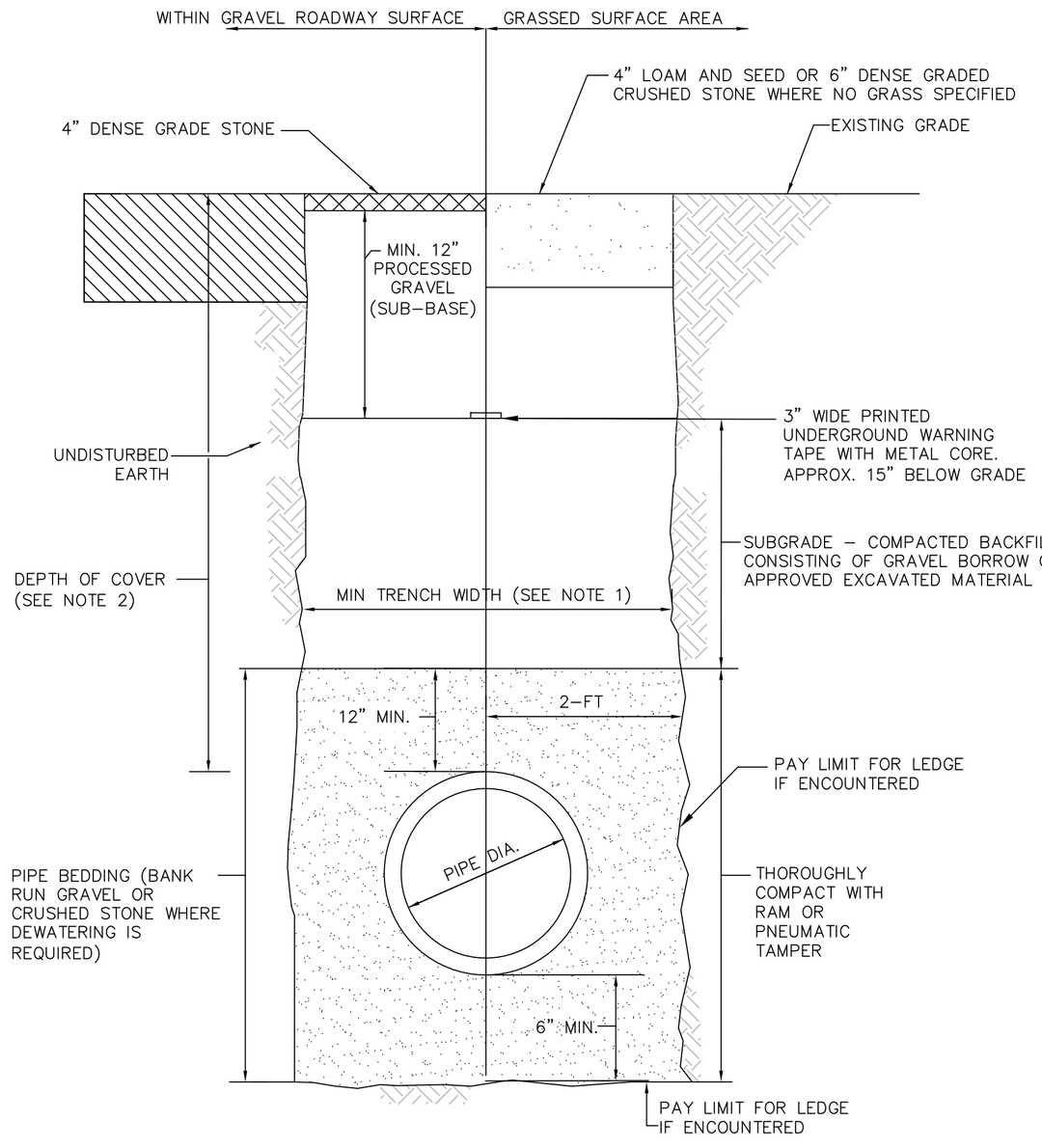
HYDRANT NOTES:
BLOW-OFF HYDRANT SHALL BE SELF-DRAINING, NON-FREEZING TYPE WITH A 4' DEPTH OF BURY. HYDRANT SHALL BE FURNISHED WITH A 2" FIP VERTICAL INLET CONNECTION, A NON-TURNING OPERATING ROD AND SHALL OPEN TO THE LEFT. OUTLET SHALL BE 2-1/2" NST OR SMALLER (MUST SPECIFY ON ORDER WITH CAP AND EXTEND A MINIMUM OF 12" ABOVE THE GROUND.

ALL WATER FLOW SHALL PASS THRU A 2" STEEL PIPE AND WATERWAY. THE OPERATING DRIVE MECHANISM SHALL RAISE AND LOWER A PLUNGER TO CONTROL THE FLOW OF WATER AND SHALL BE SERVICEABLE FROM ABOVE GROUND WITH NO DIGGING, WITH ALL WORKING PARTS BEING BRASS, GALVANIZED STEEL, OR PVC. SAID OPERATING DRIVE SHALL OPERATE WITH A STANDARD UNIVERSAL SLOTTED VALVE WRENCH. WHEN OPEN THE FLOW OF WATER SHALL BE UNOBSTRUCTED AND THE DRAIN HOLE SHALL BE COVERED.

HYDRANT SHALL BE SET IN 4 CUBIC FEET OF CRUSHED STONE TO ALLOW FOR PROPER DRAINAGE OF HYDRANT. CRUSHED STONE SHALL BE WRAPPED WITH 4-OZ. NONWOVEN GEOTEXTILE. ALL GEOTEXTILE SEAMS SHALL HAVE MINIMUM 12" LAP. RECOMMENDATION OF THE AWWA SHOULD BE FOLLOWED WHEN INSTALLING THE HYDRANT.

THE MAINGUARD MODEL #77 BLOW-OFF HYDRANT AS MANUFACTURED BY THE KUPFERLE FOUNDRY, ST. LOUIS MO. 63102 OR APPROVED EQUAL.

2-INCH BLOW-OFF HYDRANT
SCALE: NOT TO SCALE



TYP. TRENCH NOTES:

1. MIN. COVER 5' COVER FOR WATER MAIN
2. MIN. 3' COVER FOR STORM DRAIN

TYPICAL TRENCH DETAIL
SCALE: N.T.S.

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SCALE ADJUSTMENT GUIDE
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PRUDENCE ISLAND, RHODE ISLAND

DRAWING TITLE:
CIVIL CONSTRUCTION DETAILS

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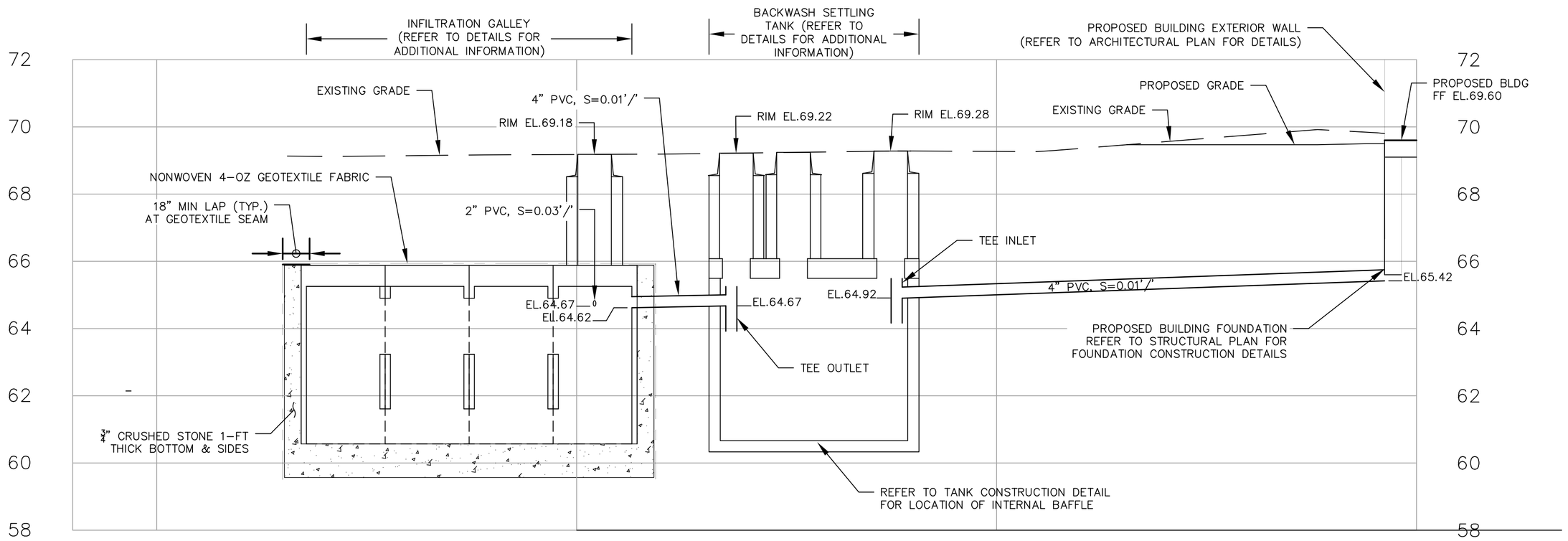
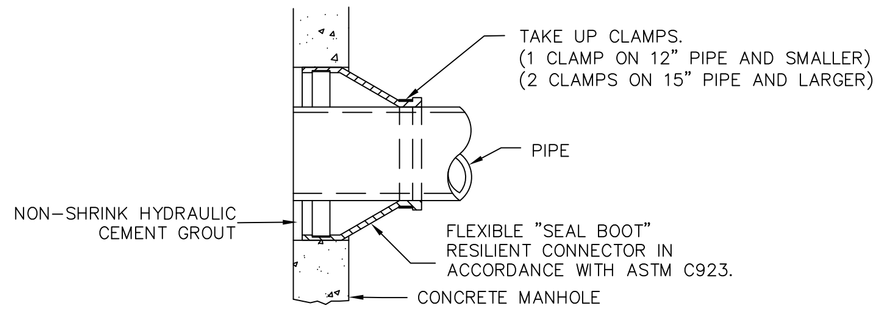


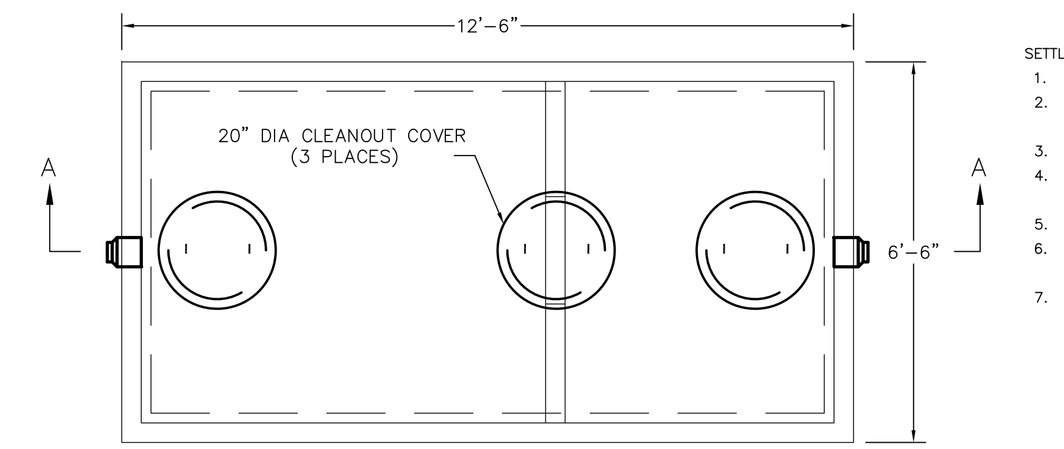
FILTER BACKWASH INFILTRATION SYSTEM - SECTION

SCALE: N.T.S.



TYPICAL PIPE BOOT SEAL

SCALE: N.T.S.

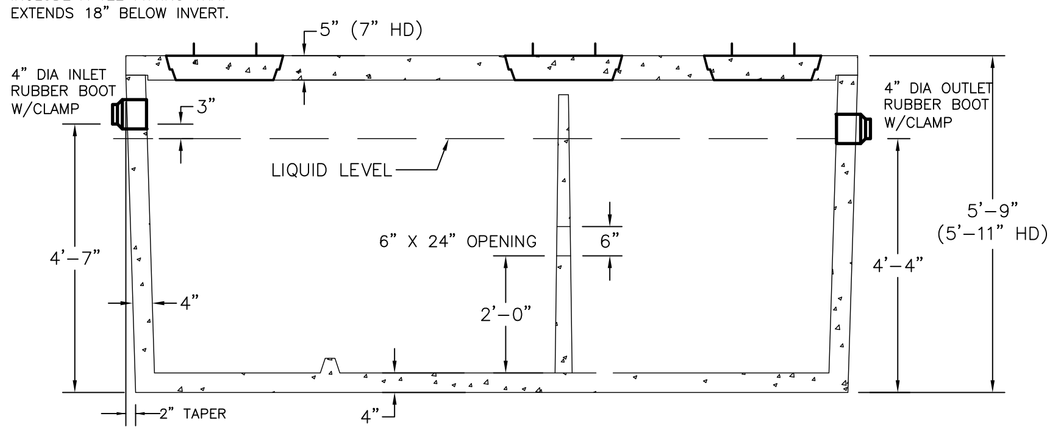


PLAN VIEW

SETTLING TANK NOTES:

1. CONCRETE: 4,000 PSI MINIMUM AFTER 28 DAYS.
2. DESIGN CONFORMS WITH 310 CMR, SECTION 15.00 DEP TITLE 5 REGS FOR SEPTIC TANKS
3. ALL REINFORCEMENT PER ASTM C1227.
4. BAFFLE WALL OPTIONAL FOR TWO COMPARTMENT TANKS.
5. TEES AND GAS BAFFLE SOLD SEPARATELY.
6. TONGUE & GROOVE JOINT SEALED WITH BUTYL RESIN.
7. IF COVER EXCEEDS 4 FEET, HEAVY DUTY TANK REQUIRED. ALSO AVAILABLE IN AASHTO HS-20 LOADING.

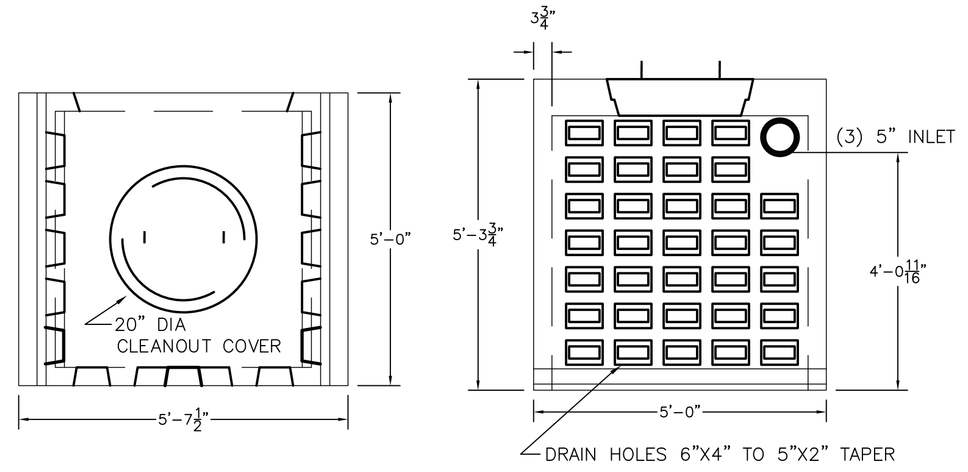
NOTE:
TANK INLET & OUTLET PIPING TO INCLUDE A TEE FITTING THAT EXTENDS 18" BELOW INVERT.



SECTION VIEW A-A

BACKWASH (2,000 GALLON) SETTLING TANK DETAIL

SCALE: N.T.S

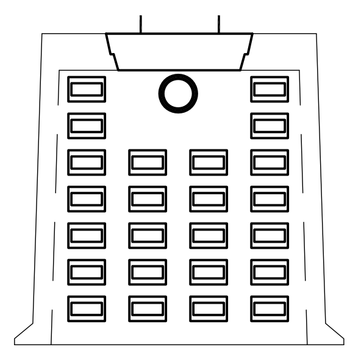


PLAN VIEW

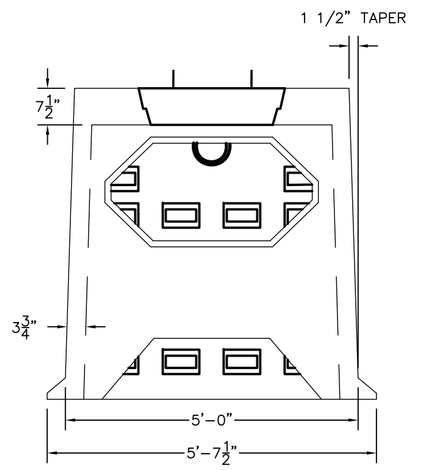
SIDE VIEW

GALLEY NOTES:

1. CONCRETE: 4,000 PSI MINIMUM AFTER 28 DAYS.
2. DESIGNED FOR AASHTO HS-20 LOADING, 1 TO 3 FEET COVER.
3. GALLEY AVAILABLE IN BOTH END AND CENTER SECTIONS. CENTER SECTIONS HAVE LARGE OPENING IN BOTH THE BACK AND FRONT SIDES.



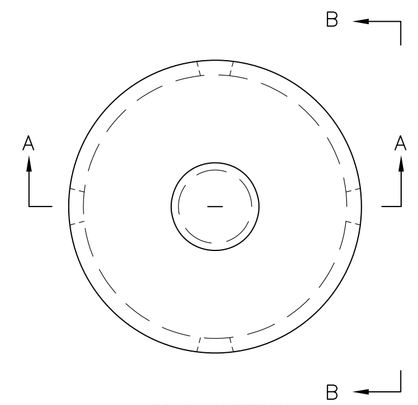
FRONT VIEW



SIDE VIEW

BACKWASH INFILTRATION (4'X4') GALLEY DETAIL

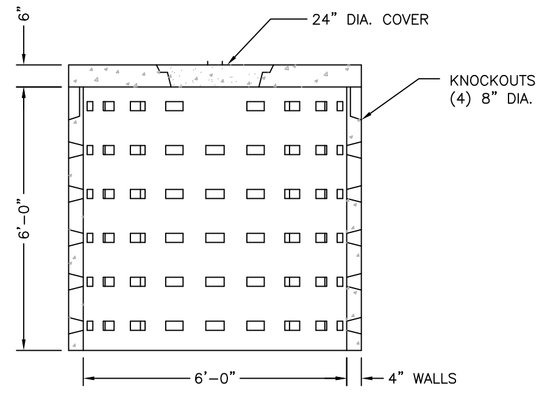
SCALE: N.T.S.



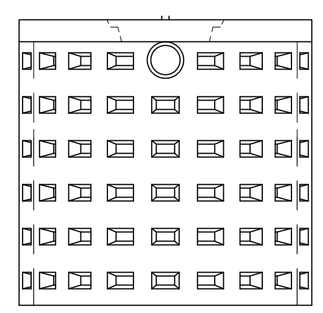
PLAN VIEW

DRY WELL NOTES:

1. CONCRETE: 28 DAY COMPRESSIVE STRENGTH f'e = 4,000 PSI
2. STEEL REINFORCEMENT: ASTM A-615, GRADE 60
3. COVER TO STEEL-1" MINIMUM
4. DESIGN LOADING-AASHTO HS-20
5. EARTH COVER-0 to 5 Feet MAX.
6. CONSTRUCTION JOINT-LAPPED



SECTION VIEW A-A



SECTION VIEW B-B

6-FT DIAMETER DRY WELL

SCALE: N.T.S.

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SCALE ADJUSTMENT GUIDE
0" 1"
BAR IS ONE INCH ON ORIGINAL DRAWING

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PRUDENCE ISLAND, RHODE ISLAND

DRAWING TITLE:
CIVIL CONSTRUCTION DETAILS

DRAWING NO.:
C-8

SHEET NO. 9 OF 26

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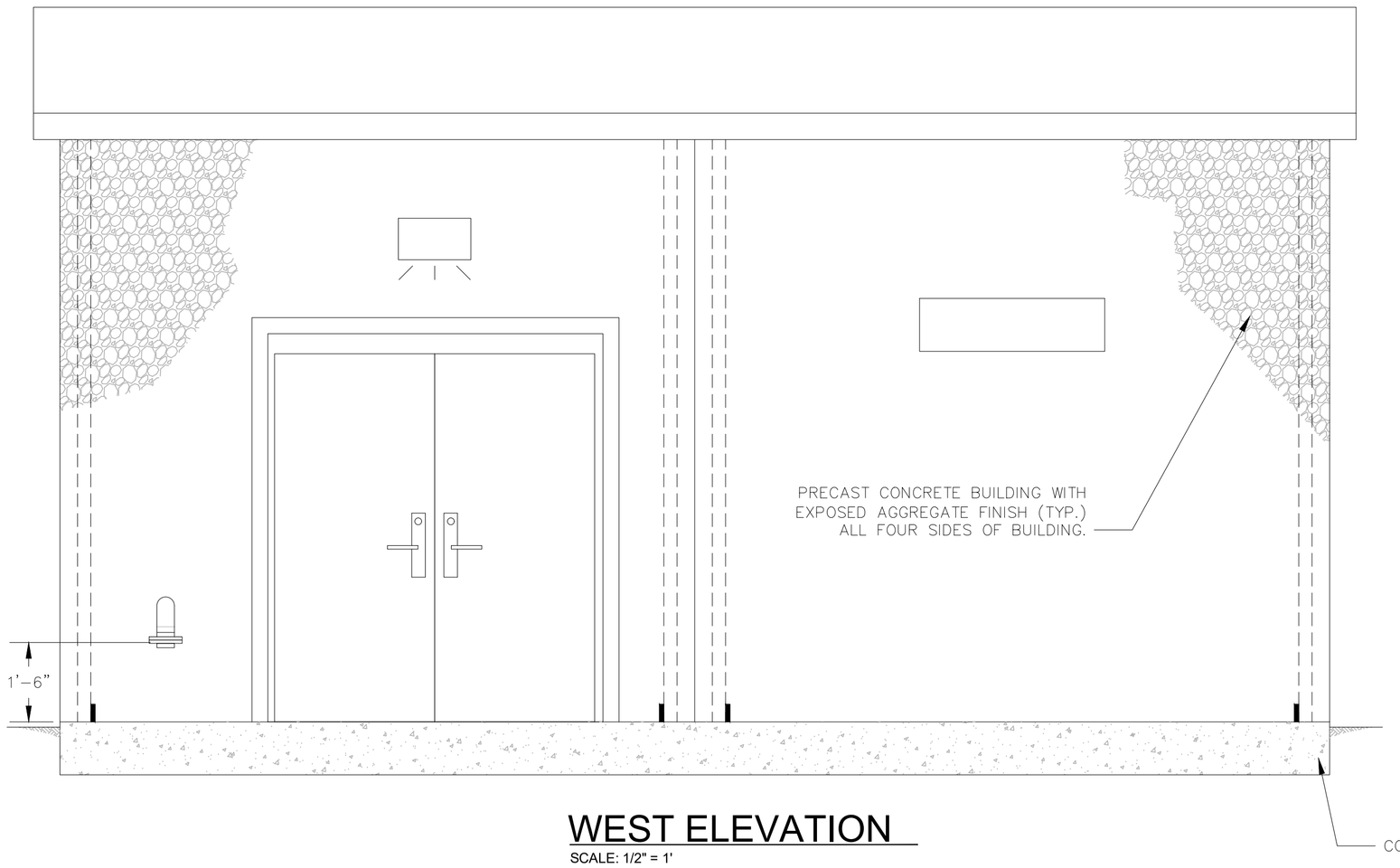
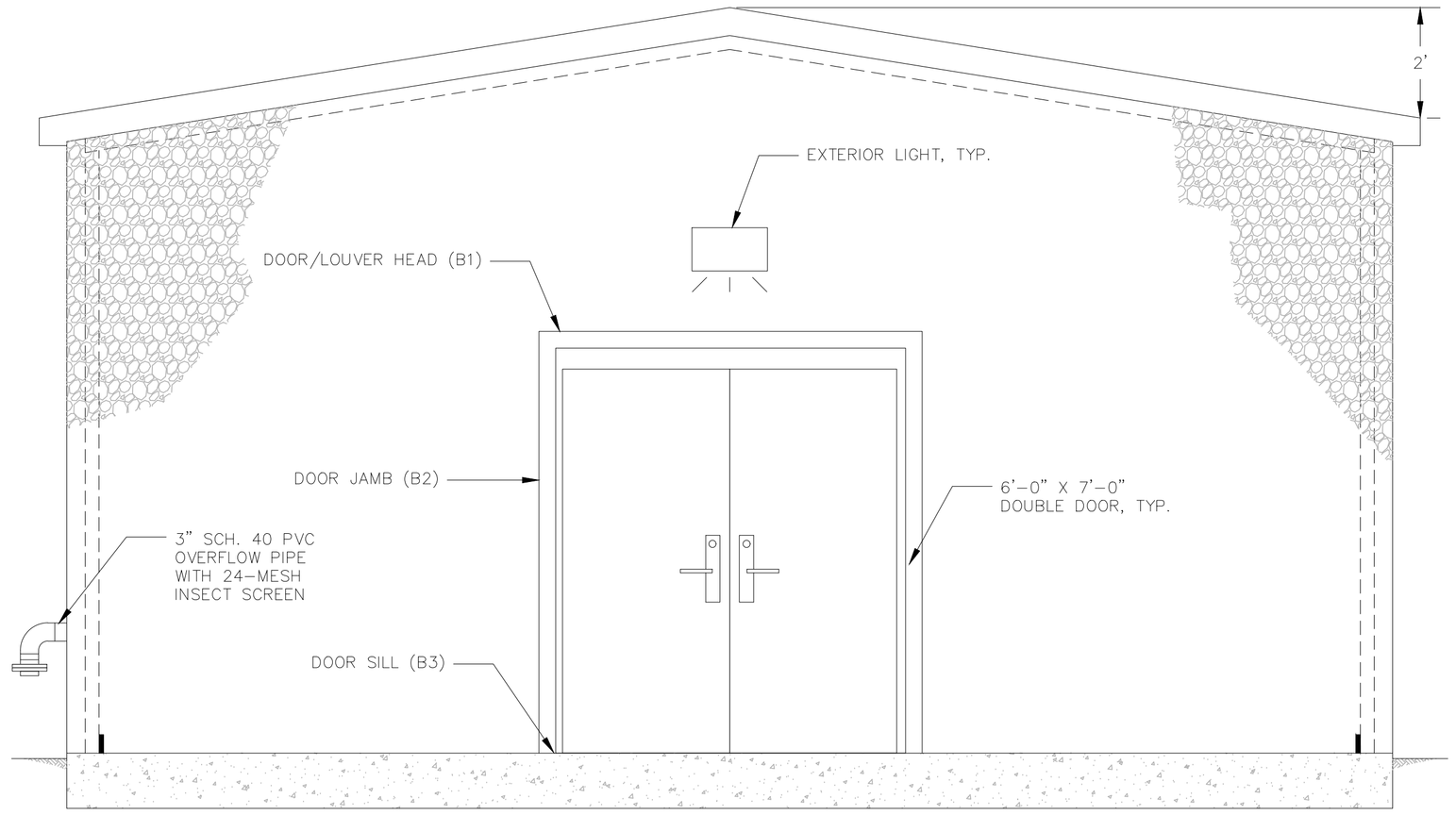


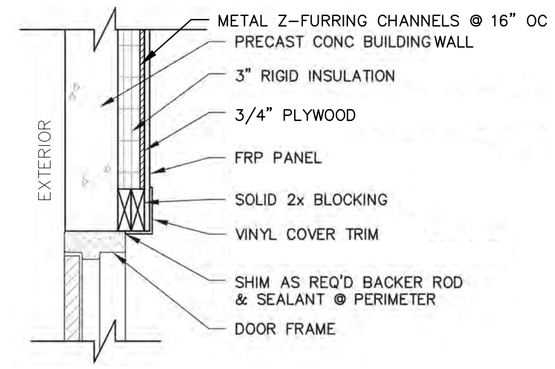
WEST ELEVATION

SCALE: 1/2" = 1'



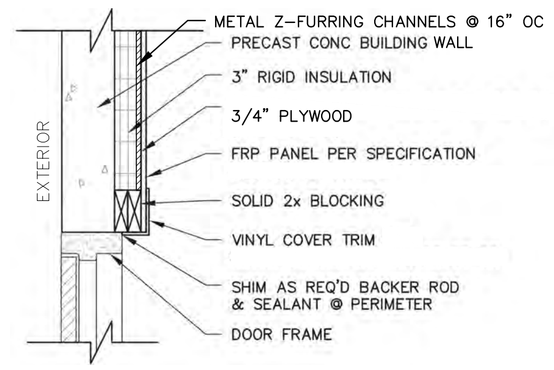
SOUTH ELEVATION

SCALE: 1/2" = 1'



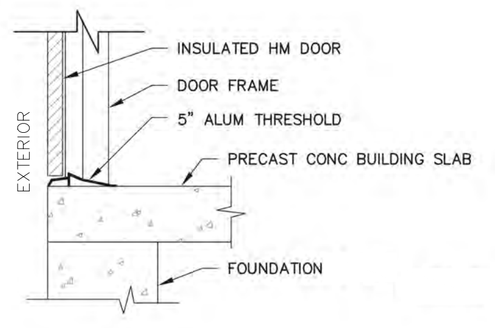
B1 - DOOR AND LOUVER HEAD DETAIL

SCALE: N.T.S.



B2 - DOOR JAMB DETAIL

SCALE: N.T.S.



B3 - DOOR SILL DETAIL

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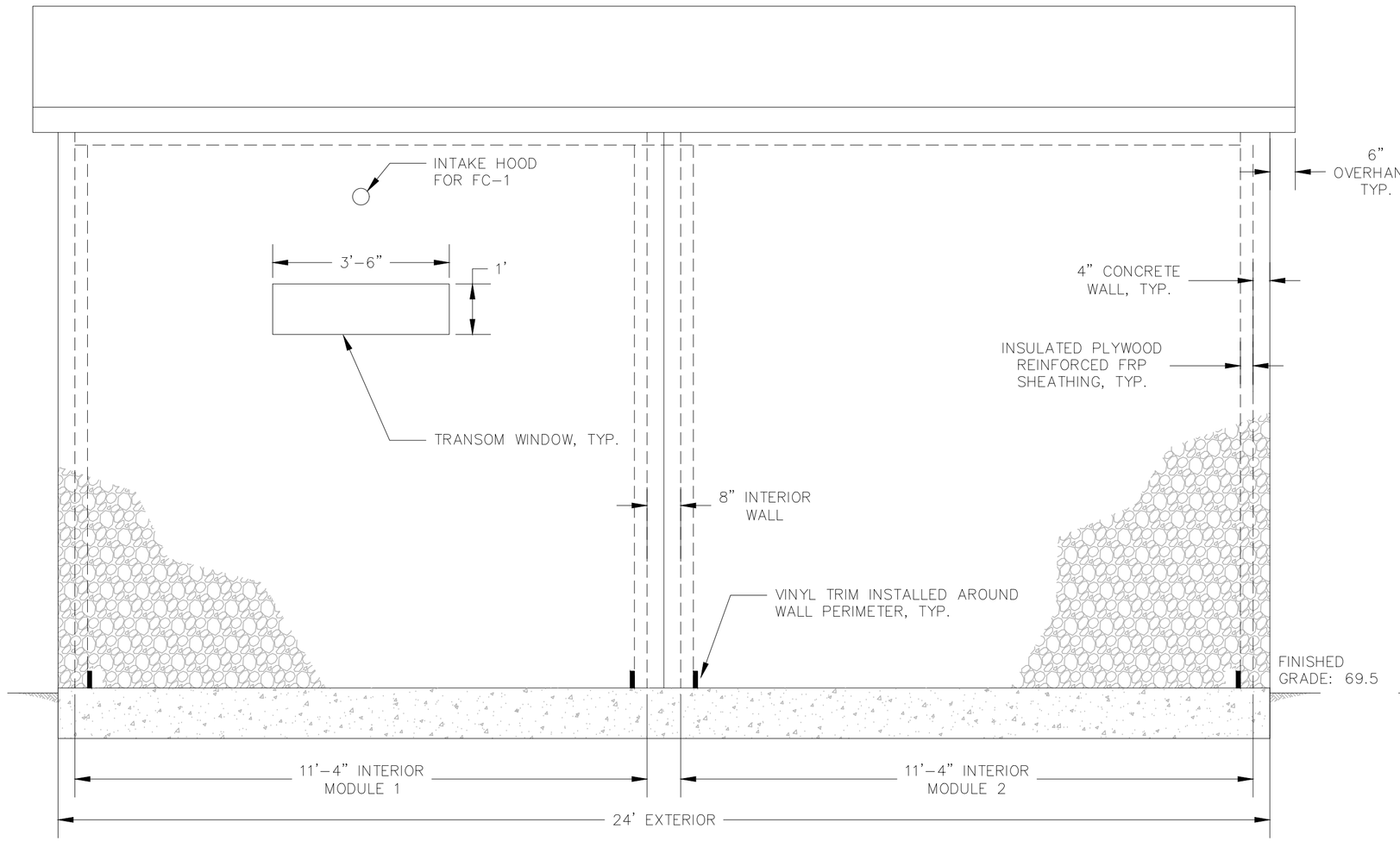
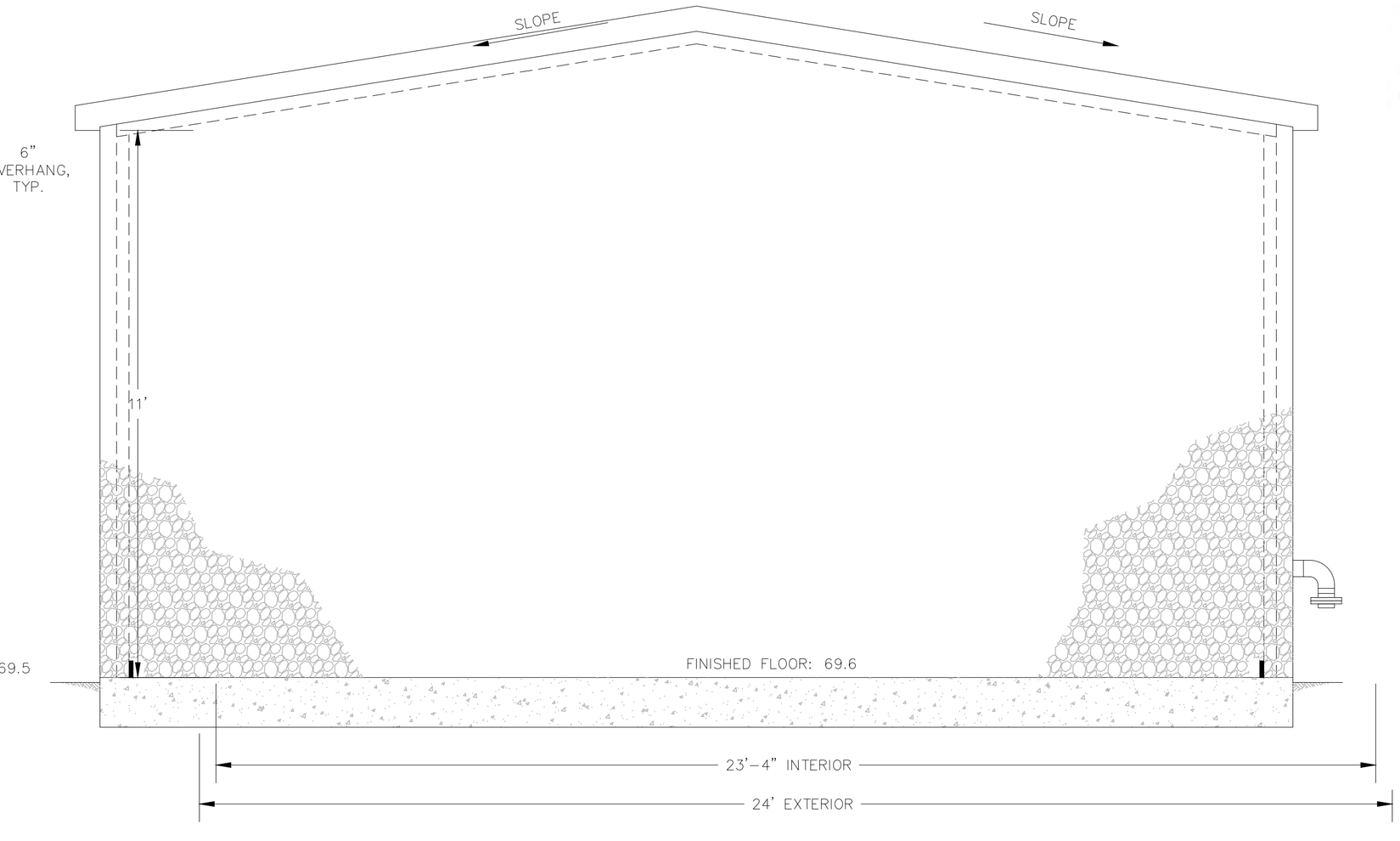


EAST ELEVATION

SCALE: 1/2" = 1'



NORTH ELEVATION

SCALE: 1/2" = 1'

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PRUDENCE ISLAND, RHODE ISLAND

DRAWING TITLE:

INDIAN SPRINGS
PRECAST CONCRETE
BUILDING ELEVATIONS

DRAWING NO.:

B-1

SHEET NO. 10 OF 26

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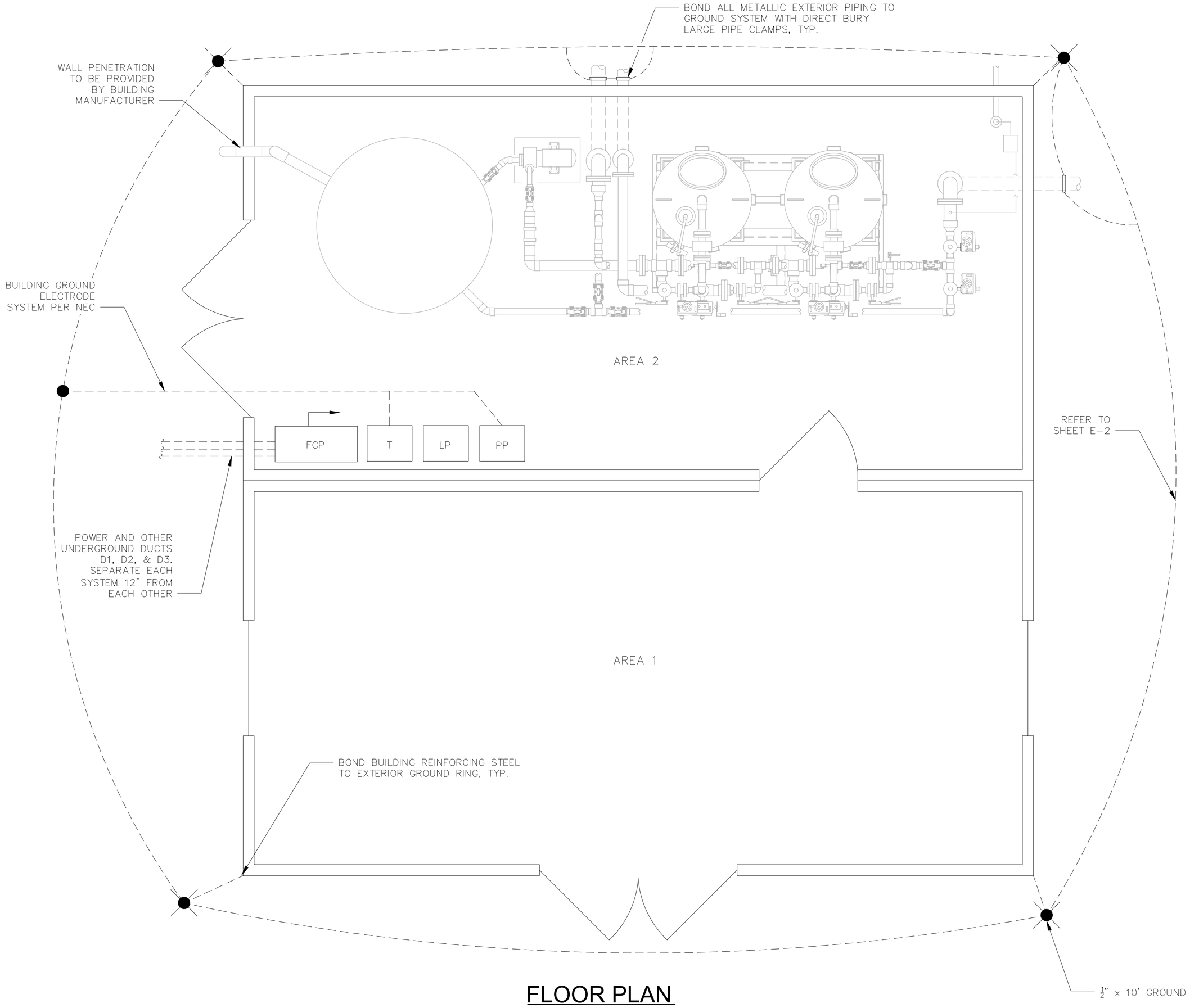
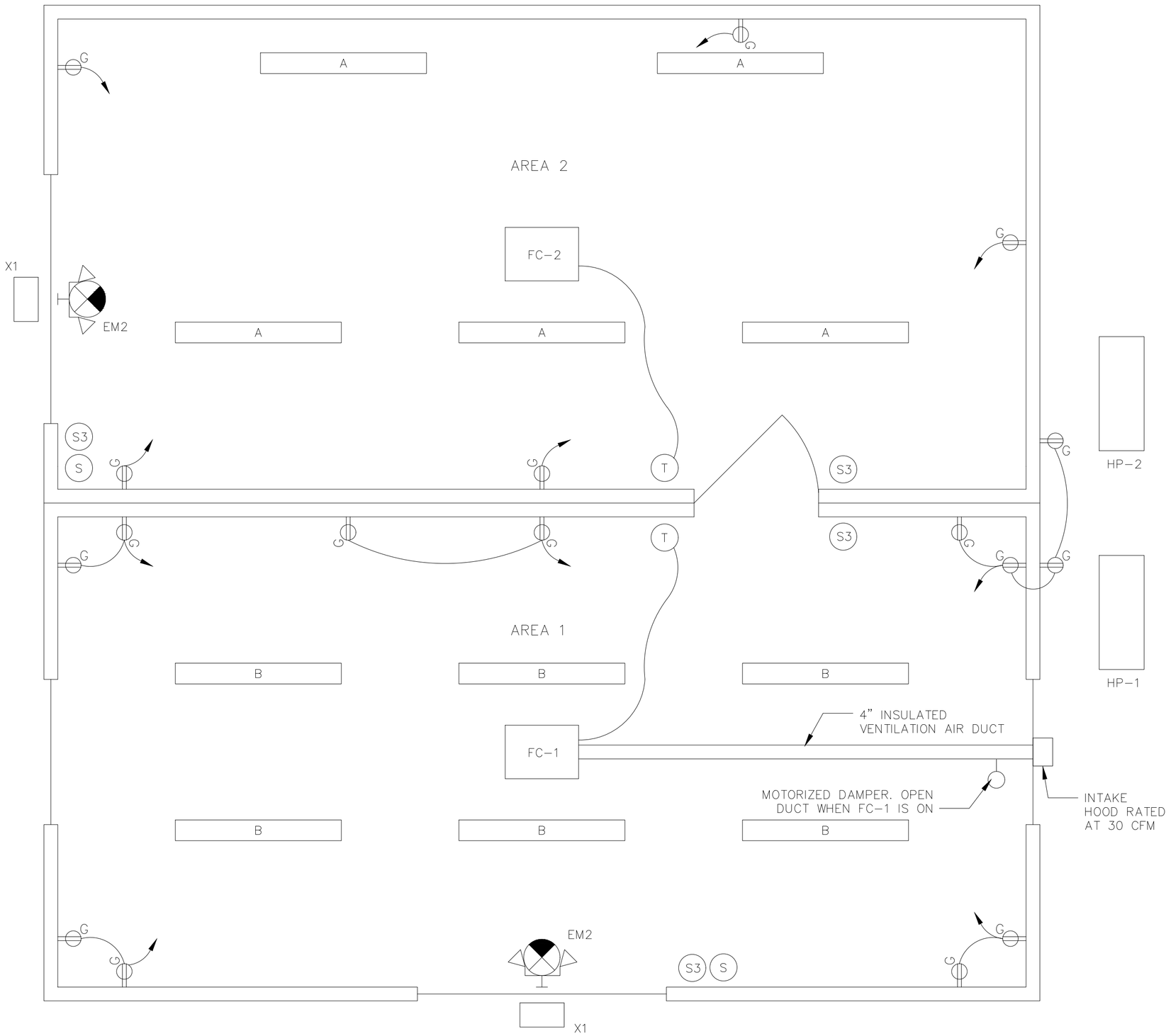


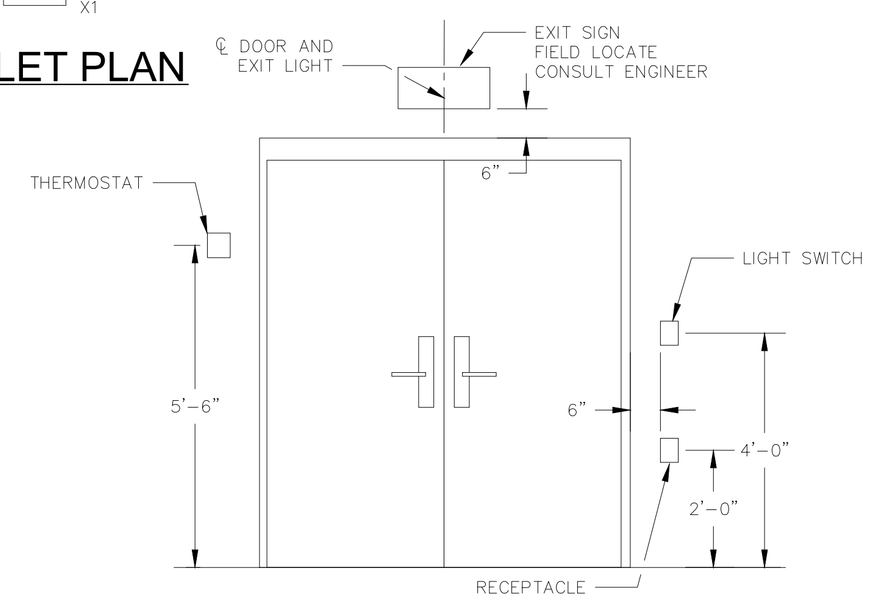
FLOOR PLAN

SCALE: 1/2" = 1'



HVAC, LIGHTING, AND OUTLET PLAN

SCALE: 1/2" = 1'



TYPICAL MOUNTING PLAN

FOR PERMITTING

SCALE: 1/2" = 1'

NOTES:
1. REFER TO ELECTRICAL PLANS FOR NOMENCLATURE.
2. REFER TO ELECTRICAL SHEETS FOR ALL ELECTRICAL DETAILS AND HOMERUNS.
3. PENETRATIONS/EQUIPMENT PADS:
   - CONTRACTOR TO VERIFY THE NUMBER, SIZE, AND LOCATIONS OF ALL PENETRATIONS AND EQUIPEMNT PADS PRIOR TO CONSTRUCTION – ALL PENETRATIONS AND PADS MAY NOT BE SHOWN ON THE DRAWINGS.
   - PROVIDE WATERTIGHT SEAL FOR ALL PIPE PENETRATIONS IN WALLS AND FLOORS.
4. PROVIDE WEATHER STRIPPING FOR ALL EXTERIOR DOORS.
5. REFER TO MECHANICAL HVAC DRAWINGS FOR ALL HVAC DETAILS.

LIGHTING AND SWITCH LEGEND	
S3	3-WAY SWITCH (INTERIOR LIGHTS)
S	SWITCH (EXTERIOR LIGHTS)
	6"x48" LED CEILING LIGHTING FIXTURE • A – INTERIOR LIGHT A • B – INTERIOR LIGHT B
	COMBO EXIT SIGN EM LIGHT (EM2)
	LED EXTERIOR LIGHT (X1)

POWER LEGEND	
G	DUPLEX GFCI RECEPTACLE
	GROUND ROD
	HOMERUN
FCP	FILTER CONTROL PANEL
T	TRANSFORMER
LP	LIGHTING PANEL
PP	POWER PANEL

HVAC LEGEND	
T	THERMOSTAT
FC	FAN COIL
HP	HEAT PUMP

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REGISTERED PROFESSIONAL ENGINEER
CIVIL

PROJECT NO.:	119.21.01
DATE:	DECEMBER 2021
SCALE:	AS NOTED
DESIGNED BY:	SCO
CHECKED BY:	SCO
DRAWN BY:	LMG
APPROVED BY:	LMG

WATER SYSTEM CHLORINATION & PRETREATMENT

PRUDENCE ISLAND WATER DISTRICT
PRUDENCE ISLAND, RHODE ISLAND

DRAWING TITLE:
INDIAN SPRINGS BUILDING FLOOR PLANS

DRAWING NO.:
B-2

SHEET NO. 11 OF 26

A GENERAL

A1 STRUCTURAL WORK SHALL CONFORM TO THE RHODE ISLAND STATE BUILDING CODE (SBC-1-2019).

A2 ALL STRUCTURAL DRAWINGS SHALL BE USED IN CONJUNCTION WITH THE CIVIL, BUILDING, MECHANICAL, ELECTRICAL, HEATING AND VENTILATING DRAWINGS AND SPECIFICATIONS.

A3 THE CONTRACTOR SHALL REVIEW, COORDINATE AND VERIFY DIMENSIONS SHOWN IN ALL PLANS AND REVIEW ALL FIELD CONDITIONS THAT MAY AFFECT THE INSTALLATION OF THE FOUNDATION. SHOULD DISCREPANCIES APPEAR, THE CONTRACTOR SHALL NOTIFY THE ENGINEER, OBTAIN ENGINEER'S CLARIFICATION BEFORE COMMENCING THE WORK.

A4 THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE STRUCTURAL STABILITY DURING CONSTRUCTION. THE STRUCTURE SHOWN ON THE DRAWINGS HAS BEEN DESIGNED FOR STABILITY UNDER THE FINAL CONFIGURATION ONLY.

A5 TYPICAL DETAILS AND NOTES SHOWN ON STRUCTURAL DRAWINGS SHALL BE APPLICABLE TO ALL PARTS OF THE STRUCTURAL WORK EXCEPT WHERE SPECIFICALLY REQUIRED OTHERWISE BY CONTRACT DOCUMENTS.

A6 DETAILS NOT SPECIFICALLY SHOWN SHALL BE SIMILAR TO THOSE SHOWN FOR THE MOST NEARLY SIMILAR CONDITION AS DETERMINED BY THE ENGINEER.

A7 GENERAL CONTRACTOR TO COORDINATE CONCRETE FOUNDATION WITH APPROVED PRECAST CONCRETE BUILDING FOR DETAILS AND DIMENSIONS.

B FOUNDATION

B1 FOUNDATIONS FOR THIS PROJECT CONSISTS OF SPREAD FOOTINGS AND FOUNDATION WALLS.

B2 SPREAD FOOTING SHALL REST ON UNDISTURBED SOIL OR COMPACTED STRUCTURAL FILL WITH MIN. BEARING CAPACITY OF 5 KIPS PER SQUARE FOOT AS SPECIFIED IN THE "TEST PIT SOIL DESCRIPTION" MEMORANDUM BY H2OLSON ENGINEERING, INC. DATED NOVEMBER 17, 2021.

B3 ALL STRUCTURAL FILL SHALL BE COMPACTED TO 95% DRY DENSITY TO ACHIEVE BEARING CAPACITY SHOWN UNLESS OTHERWISE NOTED.

B4 FOUNDATION UNITS SHALL BE CENTERED UNDER SUPPORTED STRUCTURAL MEMBERS, UNLESS NOTED OTHERWISE ON THE DRAWINGS.

B5 SLAB OUTSIDE THE BUILDING FOOTPRINT SHALL BE SUPPORTED ON COMPACTED FILL, SELECTED AND COMPACTED AS REQUIRED BY THE SPECIFICATIONS.

B6 EXTERIOR CONSTRUCTION SHALL BE CARRIED DOWN BELOW FINISHED EXTERIOR GRADE TO MINIMUM DEPTH OF 4'-0", UNLESS NOTED OTHERWISE.

B7 CARRY OUT CONTINUOUS CONTROL OF SURFACE AND SUBSURFACE WATER DURING CONSTRUCTION SUCH THAT FOUNDATION WORK IS DONE IN DRY AND ON UNDISTURBED SUBGRADE MATERIAL, AS APPLICABLE.

B8 NO FOUNDATION CONCRETE SHALL BE PLACED IN WATER OR ON FROZEN SUBGRADE MATERIAL.

B9 BACKFILL TYPICAL FOUNDATION WALLS WITH MAXIMUM ONE FOOT DIFFERENTIAL IN ELEVATION OF BACKFILL BETWEEN EACH SIDE OF THE WALL.

C CONCRETE

C1 CONCRETE WORK SHALL CONFORM TO "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (ACI CODE 318; 318R)" AND "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS (ACI SPEC 301)".

C2 CONCRETE SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF:
FOUNDATION WALL AND FOOTING ..... 4000 PSI (NORMAL WEIGHT)
PRECAST CONCRETE BUILDING ..... 5000 PSI (NORMAL WEIGHT)

C3 SIZE OF CONCRETE PLACEMENT UNLESS NOTED OTHERWISE SHALL BE AS FOLLOWS:

	MAX LENGTH (FEET)	MAX AREA (SQ. FEET)
(A) FOOTINGS AND WALLS	30*	–

* EXCEED ONLY IF INTERMEDIATE CONTROL JOINTS ARE PERMITTED AND PROVIDED.

C4 MINIMUM OF 72 HOURS SHALL ELAPSE BETWEEN ADJACENT CONCRETE PLACEMENTS.

C5 CONSTRUCTION, EXPANSION AND CONTROL JOINTS SHOWN ON DRAWINGS ARE MANDATORY; ANY OMISSIONS, ADDITIONS, OR CHANGES SHALL BE SUBMITTED FOR REVIEW IN THE FORM OF A WRITTEN REQUEST TOGETHER WITH DRAWINGS OF THE PROPOSED JOINT LOCATIONS.

C6 CONCRETE SHALL BE PLACED WITHOUT HORIZONTAL CONSTRUCTION JOINTS EXCEPT WHERE SHOWN OR NOTED; VERTICAL CONSTRUCTION JOINTS AND STOPS IN CONCRETE WORK SHALL BE MADE AT MIDSPAN OR AT POINTS OF MINIMUM SHEAR.

C7 ALL EDGE OF CONCRETE EXPOSED TO VIEW SHALL HAVE 3/4" CHAMFER.

C8 CONCRETE MIX DESIGN SHALL BE:
NORMAL WEIGHT, 4000 PSI 28-DAY COMPRESSIVE STRENGTH
WATER/CEMENT RATIO = 0.40
1% TO 3% AIR ENTRAINED
CEMENT TO BE TYPE II PORTLAND CEMENT PER ASTM C150
CONCRETE MIX TO CONTAIN 25% FLY ASH BY WEIGHT PER ASTM C618, CLASS F
COURSE AND FINE 3/4" AGGREGATES TO CONFORM TO ASTM C33
DESIGN SLUMP OF 4" CONFIRMING TO ASTM C94, EXTEND SLUMP WITH MID-RANGE WATER REDUCER/SUPERPLASTICER ADMIXTURE UP TO 8" MAX. FOR WORKABILITY

D REINFORCING

D1 REINFORCEMENT WORK, INCLUDING DETAILING, FABRICATION, AND ERECTION SHALL CONFORM TO "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (ACI CODE 318; 318R)", "DETAILS AND DETAILING OF CONCRETE REINFORCEMENT (ACI PRC 315) (SP-66 FIRST PART)", "MANUAL OF ENGINEERING AND PLACING DRAWINGS FOR REINFORCED CONCRETE STRUCTURES (AC1 PRC 315R) (SP-66 SECOND PART)", "CRSI MANUAL OF STANDARD PRACTICE (DA4)."

D2 STEEL REINFORCEMENT, UNLESS NOTED OTHERWISE, SHALL CONFORM TO THE FOLLOWING:
(A) BARS, TIES, AND STIRRUPS ..... ASTM A615 GRADE 60 (Fy=60,000 PSI)
(B) WELDED WIRE FABRIC ..... ASTM A185, FLAT SHEETS
(C) BARS TO BE WELDED ..... ASTM A706, GRADE 60 (Fy=60,000 PSI)

D3 PROVIDE SCHEDULE ON SHOP DRAWINGS INDICATING NECESSARY ACCESSORIES TO HOLD REINFORCEMENT SECURELY IN POSITION, MINIMUM REQUIREMENTS SHALL BE: HIGH CHAIRS, 4'-0" O.C. WITH CONTINUOUS #5 SUPPORT BAR; SLAB BOLSTERS, 3'-6" OC; BEAM BOLSTERS, 5'-0" OC.

D4 REINFORCING STEEL SHALL HAVE THE FOLLOWING MINIMUM CLEAR CONCRETE COVER, UNLESS OTHERWISE NOTED:
(A) CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH---- 3 INCHES
(B) CONCRETE SURFACE IN CONTACT WITH SOIL, WATER OR EXPOSED TO WEATHER (INCLUDING BOTTOM COVER OVER LIQUID CONTAINING STRUCTURES)--- 2 INCHES
(C) CONCRETE SURFACES NOT IN CONTACT WITH SOIL, WATER OR EXPOSED TO WEATHER
(1) BEAMS AND COLUMNS:
STIRRUPS AND TIES-------- 1 1/2 INCHES
PRINCIPAL REINFORCEMENT---- 2 INCHES
(2) WALLS AND SLABS---------- 1 INCHES

D5 SPLICES SHALL BE LAPPED IN ACCORDANCE WITH CONTRACT DRAWINGS.

D6 UNLESS SPECIFICALLY SHOWN OR NOTED, PROVIDE CONTINUOUS REINFORCEMENT, IT WILL BE EXTENDED CONTINUOUSLY AROUND CORNERS, LAPPED AT SPLICES AND HOOKED AT DISCONTINUOUS ENDS.

D7 WHERE REINFORCEMENT IS NOT SHOWN ON DRAWINGS, PROVIDE REINFORCEMENT IN ACCORDANCE WITH APPLICABLE DETAILS AS DETERMINED BY THE ENGINEER; IN NO CASE SHALL REINFORCEMENT BE LESS THAN THE MINIMUM REINFORCEMENT PERMITTED BY THE APPLICABLE CODES.

E DESIGN LOADS

E1 STRUCTURAL DESIGN LOAD: CONFORMING TO THE RHODE ISLAND STATE BUILDING CODE (SBC-1-2019).

E2 DEAD LOADS
(A) WEIGHT OF BUILDING COMPONENTS ..... ACTUAL WEIGHT
(B) ROOF: ..... 20 PSF

E3 LIVE LOADS
(A) PROCESS FLOOR ..... 300 PSF

E4 SNOW LOAD
(A) GROUND SNOW LOAD, Pg..... 30 PSF
(B) FLAT ROOF SNOW LOAD, Pf..... 30 PSF (Pf MIN.)
(C) SNOW EXPOSURE FACTOR Ce = 0.9
(D) SNOW LOAD IMPORTANCE FACTOR Is =1.1 WITH RISK CATEGORY III
(E) THERMAL FACTOR Ct = 1.0
(F) UNBALANCED, DRIFTING, AND SLIDING SNOW PER SBC-1-2019.

E5 WIND LOAD
(A) ULTIMATE DESIGN WIND SPEED, Vult = 149 MPH
(B) NOMINAL DESIGN WIND SPEED, Vasd = 115 MPH
(C) RISK CATEGORY III
(D) WIND EXPOSURE D
(E) INTERNAL PRESSURE COEFFICIENT GCpi = +/- 0.18
(F) DESIGN WIND PRESSURE FOR EXTERIOR COMPONENTS AND CLADDING:

WIND PRESSURE (PSF)			
BLDG. SURFACE	EFFECTIVE WIND AREA (SF)		
	0-10	10^2-1000	500^2-1000
1	+23.9,-58.7	+18.9,-53.7	–
2	+23.9,-98.5	+18.9,-63.7	–
3	+23.9,-148.3	+18.9,-63.7	–
4	+58.7,-63.7	–	+43.8,-48.8
5	+58.7,-78.6	–	+43.8,-48.8

NOTES:
1. FOR BUILDING SURFACE SEE FIGS 30.4-1 AND 30.4-2A ASCE 7-10
2. INTERPOLATE BETWEEN 10 SF AND 100 SF
3. INTERPOLATE BETWEEN 10 SF AND 500 SF

E6 SEISMIC LOAD
(A) EARTHQUAKE DESIGN FACTORS Ss..... 0.170
S1..... 0.059
(B) SITE CLASS "D", Fa..... 1.6
Fv..... 2.4
(C) SEISMIC IMPORTANCE FACTOR, Ie = 1.25 WITH RISK CATEGORY III
(D) MCE SPECTRAL RESPONSE ACCELERATION, SMs..... 0.272
SM1..... 0.142
(E) SEISMIC DESIGN CATEGORY = "B"
(F) DESIGN SPECTRAL RESPONSE ACCELERATION SDs..... 0.181
SD1..... 0.094

E7 ALLOWABLE SOIL BEARING PRESSURE..... 5.0 KSF

F PRECAST CONCRETE BUILDING

F1 PRECAST CONCRETE BUILDING MANUFACTURER SHALL BE RESPONSIBLE FOR THE DESIGN, FABRICATION AND ERECTION OF ALL PRECAST CONCRETE STRUCTURE.

F2 COORDINATE ALL DETAILING WITH ALL PROJECT REQUIREMENTS OF THE CONTRACT DRAWINGS.

F3 ALL PRECAST CONCRETE FLOOR AND ROOF SHALL BE DESIGNED TO ACT AS DIAPHRAGM FOR LATERAL LOAD TRANSFER OF THE BUILDING, INCLUDING THOSE FROM ROOF TO THE SUPPORTING PRECAST WALLS AND FOUNDATIONS.

F4 ALL ATTACHMENTS, LOOSE REINFORCING REQUIRED FOR ERECTION OF THE BUILDING SHALL BE FURNISHED AND INSTALLED BY THE PRECAST CONCRETE BUILDING MANUFACTURER.

F5 THE PRECAST CONCRETE BUILDING MANUFACTURER SHALL BE FULLY RESPONSIBLE FOR THE ROOF, WALL AND FLOOR SYSTEM AND IT'S DESIGN, INCLUDING ANCHORING TO THE FOUNDATION, AND OTHER NECESSARY FRAMING REQUIRED BY THE PROJECT. THE SYSTEM SHALL BE FULLY SELF-SUFFICIENT, TRANSFERRING ALL VERTICAL AND LATERAL LOADS TO THE FOUNDATION. PRECAST CONCRETE BUILDING MANUFACTURER'S ENGINEER REGISTERED IN RHODE ISLAND TO COORDINATE AND DESIGN ALL FRAMING AND LOADING REQUIREMENT INCLUDING EQUIPMENT SUPPORTED BY THE PRECAST CONCRETE BUILDING.

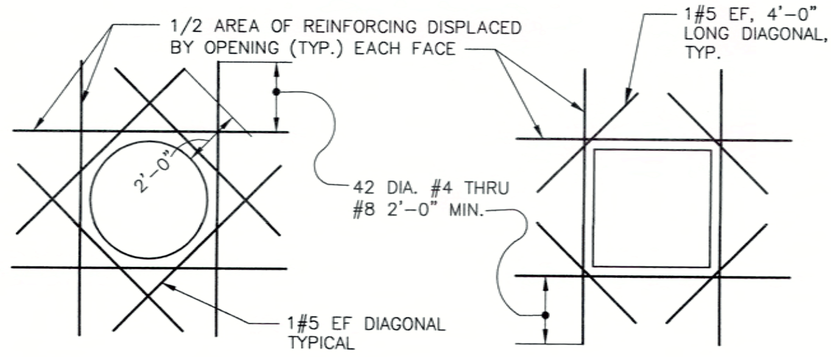
F6 PROVIDE TEMPORARY BRACING AS REQUIRED DURING CONSTRUCTION TO PREVENT DAMAGE TO FOUNDATION.

F7 THE PRECAST CONCRETE BUILDING SYSTEM CONTRACTOR SHALL FIELD VERIFY THAT ALL FOUNDATION AND ANCHORING REQUIREMENT ARE COORDINATED AGAINST APPROVED PRECAST CONCRETE BUILDING SHOP DRAWINGS PRIOR TO THE START OF PRECAST CONCRETE BUILDING ERECTION. NOTIFY THE ENGINEER OF ANY DISCREPANCIES OR DEVIATIONS.

F8 SUBMITTALS SHALL CONFORM TO REQUIREMENTS SET FORTH IN THE TECHNICAL SPECIFICATIONS.

F9 MAXIMUM BUILDING DRIFT = HEIGHT/240.

F10 PRECAST CONCRETE BUILDING SHALL HAVE THE FOLLOWING MINIMUM STRENGTHS:
COMPRESSIVE STRENGTH @ 28 DAYS f'c = 5,000 psi.
COMPRESSIVE STRENGTH @ TRANSFER fc' = 3,500 psi.



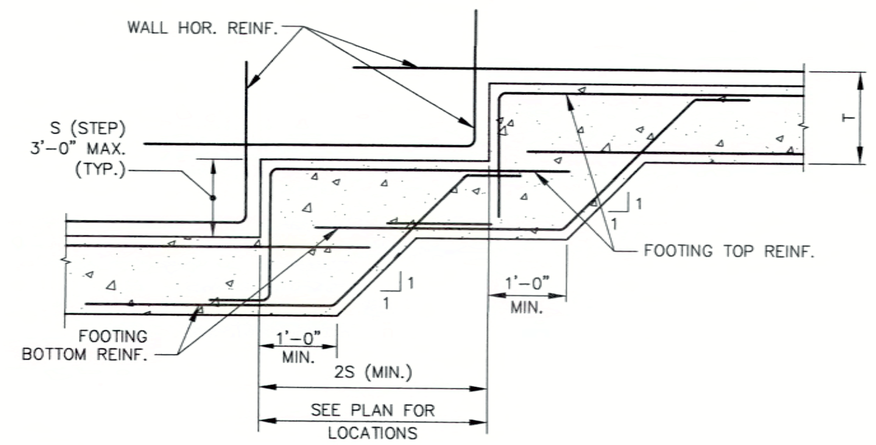
NOTES:
1. DETAILS ARE TYPICAL FOR ALL OPENINGS 8" AND GREATER IN CONCRETE WALLS AND SLABS, UNLESS OTHERWISE NOTED. SPREAD REINFORCING AT SMALLER OPENINGS.
2. HOOK ALL HORIZONTAL AND VERTICAL RE-BARS WHICH ARE INTERRUPTED AT OPENINGS.
3. REINFORCING STEEL IS TO BE CARRIED ACROSS ALL CONSTRUCTION JOINTS.

TYPICAL ADDITIONAL REINF. AT OPENINGS

SCALE: N.T.S.

SPLICE SCHEDULE

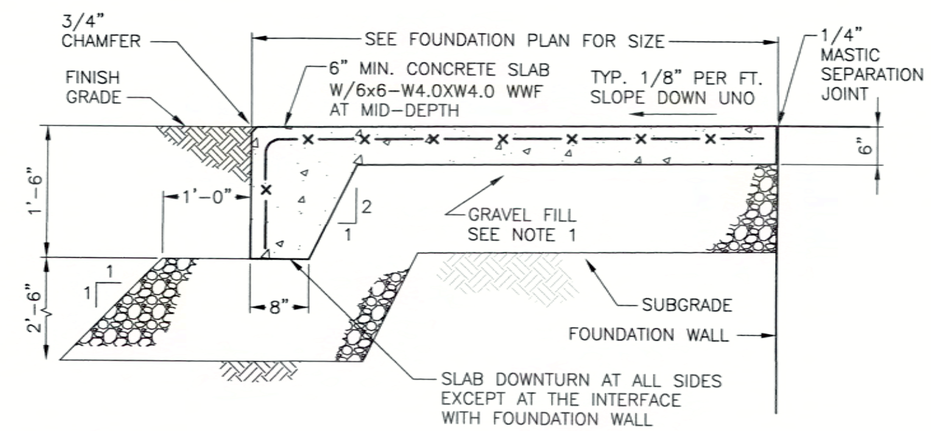
REINFORCING BAR DEVELOPMENT AND LAP SPLICE LENGTHS FOR f'c = 4000 PSI AND Fy = 60 KSI							
BAR SIZE	TENSION DEVELOPMENT		TENSION SPLICE (CLASS B)		STANDARD 90° HOOK	COMPRESSION BARS	
	TOP BARS	OTHER BARS	TOP BARS	OTHER BARS	EMBEDMENT Ldh	DEVELOPMENT Ldb	SPLICE LENGTH
#4	25"	20"	33"	25"	10"	10"	15"
#5	32"	24"	41"	32"	12"	12"	19"
#6	38"	30"	49"	38"	15"	15"	24"



NOTE:
1. REFER TO PLANS, SECTIONS, AND OTHER DETAILS FOR WALL REINFORCING, DOWELS, ADDITIONAL FOOTING REINFORCING AND OTHER INFORMATION AND REQUIREMENTS.

STEPPED FOOTING DETAIL

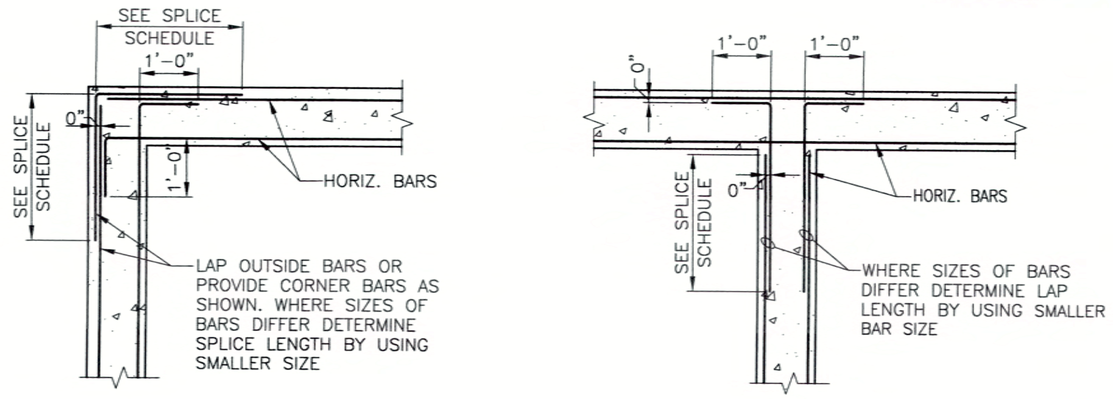
SCALE: N.T.S.



NOTES:
1. BELOW THE CONCRETE APRON PROVIDE A MINIMUM 12 INCHES OF GRAVEL FILL EXTEND LATERALLY BEYOND THE LIMITS OF THE FOUNDATION CONCRETE A DISTANCE EQUAL TO THE DEPTH OF THE FILL PLUS 1 FEET IN ALL PLAN DIRECTIONS. THE GRAVEL FILL SHALL BE PLACED IN 6-INCH LIFTS, AND EACH LIFT SHALL BE COMPACTED TO 95 PERCENT OF THE MAXIMUM MODIFIED PROCTOR DENSITY. PRIOR TO PLACING THE GRAVEL FILL, THE SUBGRADE SHALL BE PROOF COMPACTED WITH AT LEAST 6 PASSES OF A 5-TON VIBRATORY ROLLER.
2. FOR THE EXTEND AND ELEVATION OF THE CONCRETE APRON SEE ARCH. DWGS.

CONCRETE ENTRANCE PAD DETAIL

SCALE: N.T.S.



HORIZONTAL WALL REINF. PLAN AT CORNER

SCALE: N.T.S.

HORIZONTAL WALL REINF. PLAN AT INTERSECTIONS

SCALE: N.T.S.

WALL CONSTRUCTION JOINT

SCALE: N.T.S.

FOR PERMITTING

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(508) 375-7007

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(617)566-4216 FAX: (617)566-4626
BOSTON MARLBOROUGH

SCALE ADJUSTMENT GUIDE
0" 1"
BAR IS ONE INCH ON ORIGINAL DRAWING

REVISIONS

NO.	DATE	DESCRIPTION

LISA GOVER
No. 11536
REGISTERED PROFESSIONAL ENGINEER
12/17/21

PROJECT NO.:	1119.21.01.01
DATE:	DECEMBER 2021
SCALE:	AS NOTED
DESIGNED BY:	GK
CHECKED BY:	GK
DRAWN BY:	RWL
APPROVED BY:	GK

WATER SYSTEM CHLORINATION & PRETREATMENT
PRUDENCE ISLAND WATER DISTRICT
PRUDENCE ISLAND, RHODE ISLAND

DRAWING TITLE: GENERAL NOTES AND TYPICAL DETAILS

DRAWING NO.: S-1

SHEET NO. 12 OF 26

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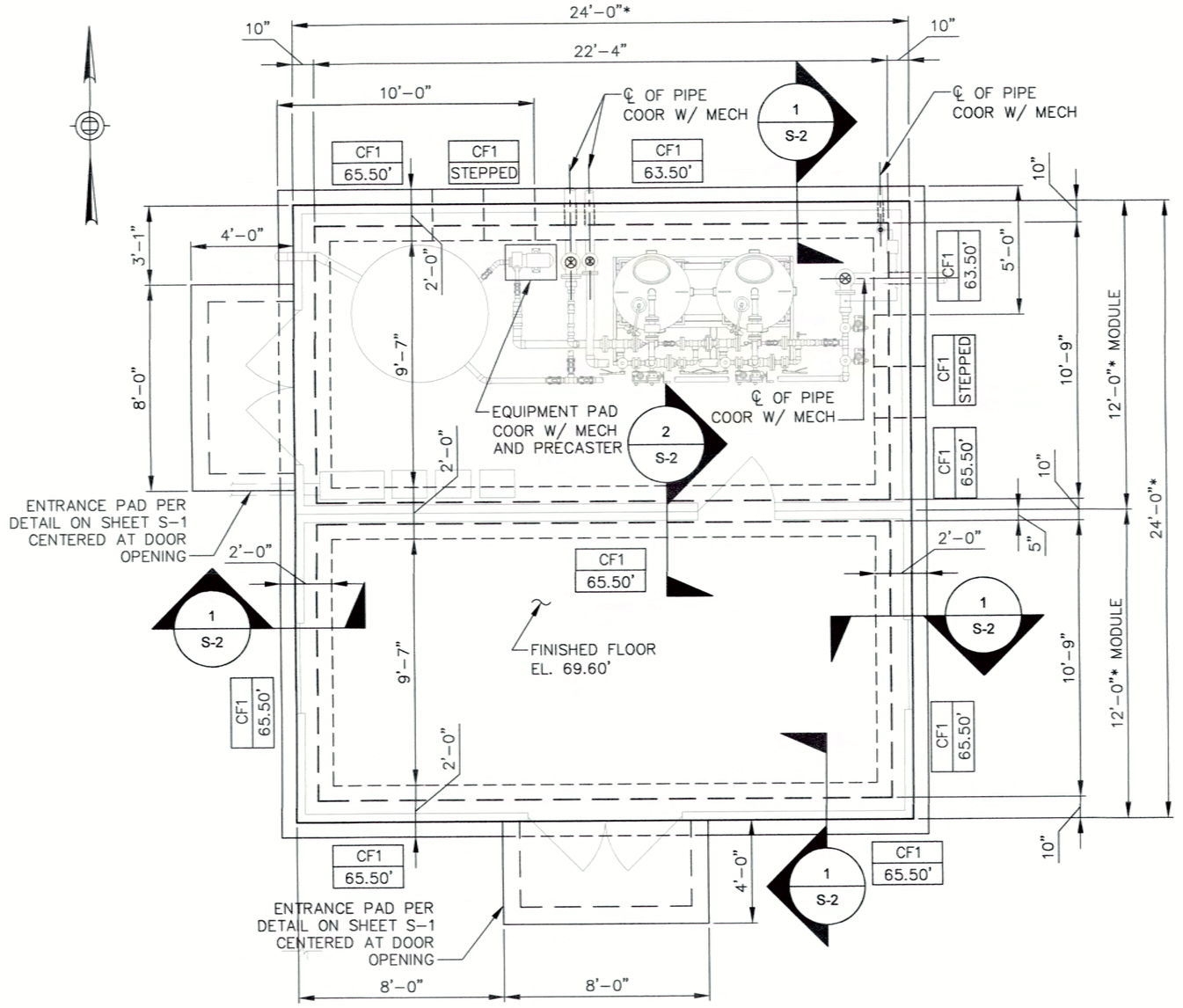
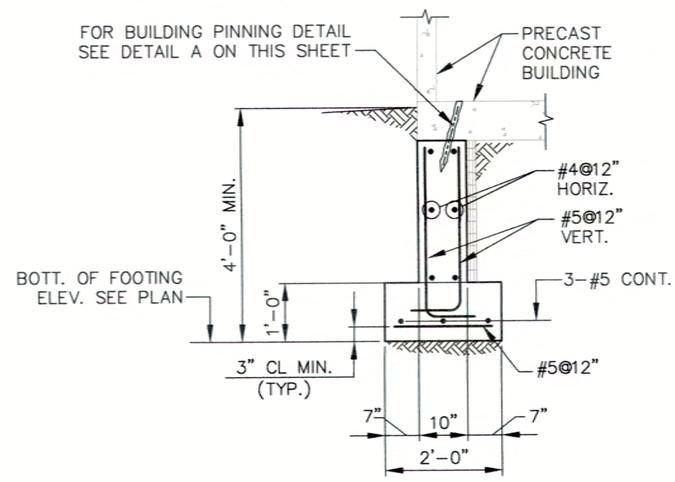


FOUNDATION PLAN

SCALE: 1/4" = 1'-0"

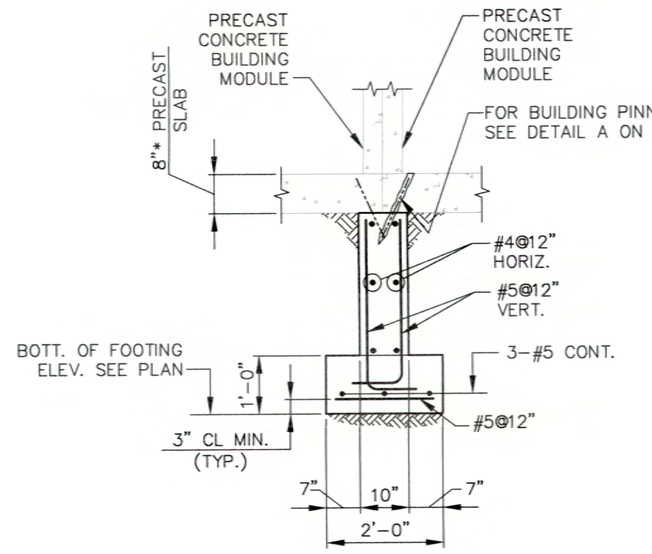
NOTES:

1. REFER TO BUILDING AND MECHANICAL DRAWINGS FOR BUILDING LAYOUT.
2. CF1 / 65.50' — CF1 INDICATES FOOTING TYPE. SEE FOOTING SCHEDULE. 65.50' INDICATES BOTTOM FOOTING ELEVATION.
3. (*) ASTERISKS INDICATES DIMENSIONS TO BE COORDINATED WITH PRECAST CONCRETE WITH APPROVED PRECAST CONCRETE BUILDING SHOP DRAWINGS PRIOR TO FABRICATIONS.
4. COORDINATE PRECAST CONCRETE BUILDING PINNING LAYOUT AND REQUIREMENT BETWEEN THE FOUNDATION PLAN AND DETAIL A ON THIS SHEET AND THE PINNING REQUIREMENT ON THE APPROVED PRECAST CONCRETE BUILDING SHOP DRAWINGS PRIOR TO INSTALLATION.



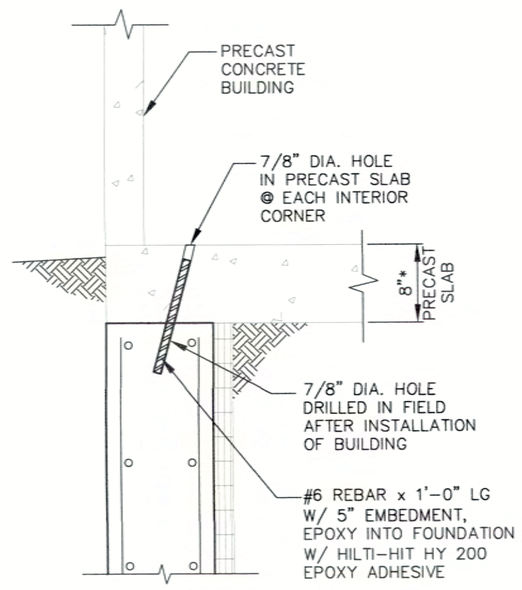
SECTION 1/S-2

SCALE: 1/2"=1'-0"



SECTION 2/S-2

SCALE: 1/2"=1'-0"



TYP. BUILDING PINNING DETAIL A/S-2

SCALE: 1"=1'-0"

NOTES:

1. BUILDING PINNING DETAIL, ITS LAYOUT AND REQUIREMENTS TO BE COORDINATED, VERIFIED AND APPROVED BY PRECAST CONCRETE BUILDING'S PROFESSIONAL ENGINEER PRIOR TO FABRICATION AND INSTALLATION. REVISE AS REQUIRED.

FOOTING SCHEDULE

TYPE	SIZE	REINFORCING
CF1	2'-0" X 1'-0" DEEP X CONT.	3-#4 LONG. & #5@12" TRANS. BOTT.

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SCALE ADJUSTMENT GUIDE
0" 1"
BAR IS ONE INCH ON ORIGINAL DRAWING

REVISIONS		
NO.	DATE	DESCRIPTION

LISA GOYETTE No. 11536 REGISTERED PROFESSIONAL ENGINEER (CIVIL)

PROJECT NO.:	1119.21.01.01
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WATER SYSTEM CHLORINATION & PRETREATMENT

PRUDENCE ISLAND WATER DISTRICT
PRUDENCE ISLAND, RHODE ISLAND

DRAWING TITLE: FOUNDATION PLAN, SECTIONS AND DETAILS

DRAWING NO.: S-2

SHEET NO. 13 OF 26

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NOTES

1. THE REQUIREMENTS INCLUDED IN THESE NOTES ARE SUPPLEMENTARY TO THE CONTRACT, GENERAL CONDITIONS, TECHNICAL REQUIREMENTS, AND OTHER REQUIREMENTS SPECIFIED HEREIN.
2. MOUNTING DETAILS PROVIDED ARE GENERIC FOR EQUIPMENT AND DEVICES OF VARIOUS MANUFACTURERS. THE INSTALLING CONTRACTOR MUST STRICTLY COMPLY WITH MANUFACTURER'S INSTRUCTION IN THE INSTALLATION OF THESE DEVICES. IF THERE ARE ANY ENGINEERING ISSUES THEY MUST BE REFERRED TO THE ENGINEER PRIOR TO INSTALLATION.
3. IT IS NOT THE INTENT OF THESE DRAWINGS TO PORTRAY EVERY DETAIL OF THE REQUIRED WORK. THE CONTRACTOR SHALL PROVIDE THE EQUIPMENT AND SYSTEMS COMPLETE SO THAT WHEN ASSEMBLED AND INSTALLED IN THE WORK, THEY SHALL OPERATE AND PERFORM AS DESCRIBED HEREIN.
4. COORDINATE THE WORK REQUIRED BY THESE DRAWINGS ("M" SERIES) WITH THE WORK REQUIRED BY OTHER DRAWINGS.
5. PROVIDE FILLER FLANGES (OR OTHER ENGINEER APPROVED METHOD) TO LIMIT INTERFERENCE BETWEEN WAFER BUTTERFLY VALVES AND DUCTILE IRON PIPE LINING OR CAST IRON FITTINGS.
6. THE CONTRACTOR SHALL NOT OPEN OR CLOSE ANY VALVES WHICH HOLD WATER IN THE SYSTEM, UNLESS GRANTED APPROVAL TO DO SO BY THE PRUDENCE ISLAND WATER DISTRICT.
7. ALL WALL AND FLOOR SLEEVES SHALL BE LARGE ENOUGH TO ACCOMMODATE FLANGES AS REQUIRED. FLOOR SLEEVES SHALL PROJECT AT LEAST 4-IN ABOVE FINISH FLOOR UNLESS OTHERWISE SHOWN. IF SLEEVES ARE TO BE SEALED, PROVIDE GROOVED COUPLING PIPING CONNECTION TO FACILITATE INSTALLATION AND REMOVAL OF PIPING.
8. ALL PIPE PENETRATIONS THROUGH INTERIOR AND EXTERIOR WALLS AND FLOORS SHALL BE SEALED WATERTIGHT.
9. SMALL PIPING (SAMPLE, SERVICE WATER, ETC.) IS SHOWN DIAGRAMMATICALLY: FIELD-ROUTING SUBJECT TO APPROVAL OF THE ENGINEER. SMALL PIPE ROUTING MUST NOT INTERFERE WITH ACCESS TO OR OPERATION OF ANY OTHER PIPE, VALVE, EQUIPMENT, OR BUILDING SYSTEM.
10. ALL PROCESS EQUIPMENT, INCLUDING PUMPS, SHALL BE ISOLATED FROM PIPING LOADS AND DYNAMICS BY FLEXIBLE CONNECTORS IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS AND SPECIFICATIONS.
11. ALL PIPING, VALVES, EQUIPMENT, ETC. SHALL BE LABELED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.
12. CONRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE LOCATION FOR ALL WALL PENETRATIONS WITH THE VARIOUS TRADES. WALL PIPES AND WALL SLEEVES SHALL BE REQUIRED FOR ALL PIPE PENETRATIONS THROUGH CONCRETE WALLS WHETHER SHOWN ON THE DRAWINGS OR NOT. ALL WALL AND FLOOR SLEEVES SHALL BE LARGE ENOUGH TO ACCOMMODATE FLANGES, IF REQUIRED.
13. WHEN MAKING NEW CONNECTIONS TO EXISTING PIPING, THE CONTRACTOR MAY, AT ITS OPTION:
    A. REPLACE PIPING BACK TO NEAREST FITTING.
    B. USE SLEEVE COUPLING OR FLANGE ADAPTERS (RESTRAINED ON PRESSURE LINES).
14. PROVIDE EXPANSION JOINTS WITH CONTROL RODS FOR ALL EXPOSED PIPING CROSSING STRUCTURAL EXPANSION JOINTS.
15. ALL SLEEVE TYPE COUPLINGS ON PRESSURE PIPING SHALL BE HARNESSED UNLESS OTHERWISE INDICATED. WHERE COUPLINGS ARE PROVIDED TO PROVIDE AXIAL FLEXIBILITY, PIPING MUST BE SECURELY RESTRAINED.
16. MATERIALS AND WORKMANSHIP FURNISHED UNDER THIS CONTRACT SHALL BE A STANDARD, HIGH-GRADE QUALITY, AND OF THE BEST WORKMANSHIP AND DESIGN. ALL LIKE PARTS OF EQUIPMENT OF THE SAME SIZE OR CAPACITY SHALL BE INTERCHANGEABLE. SUITABLE PROVISION SHALL BE MADE FOR EASY ADJUSTMENT OR REPLACEMENT OF ALL PARTS REQUIRING ADJUSTMENT OR REPLACEMENT.
17. ALL MECHANICAL LAYOUTS ARE GENERALLY DIAGRAMMATIC AS SHOWN ON THESE DRAWINGS. THE WORK OF THE VARIOUS TRADES SHALL BE COORDINATED TO AVOID INTERFERENCE AND TO SECURE MAXIMUM HEAD ROOM. PARTICULAR ATTENTION IS DRAWN TO CONGESTED SPACES INSIDE AND OUTSIDE OF THE STRUCTURES. IF, IN THE INTEREST OF COORDINATION AND EXPEDIENCY, IT BECOMES NECESSARY TO DEVELOP "INTERFERENCE DRAWINGS" (DEFINED AS DRAWINGS EMBODYING THE WORK OF TRADES INVOLVED, ILLUSTRATING DETAILS OR CONSTRUCTION PROPOSED BY THE CONTRACTOR AND ARRANGEMENT OF ACTUAL EQUIPMENT AND APPARATUS PURCHASED), SUCH DRAWINGS SHALL BE PREPARED BY THE CONTRACTOR AND SHALL BE COORDINATED WITH OTHER TRADES AT NO ADDITIONAL EXPENSE TO THE OWNER.
18. THE INSTALLATION OF FACILITIES AND APPURTENANT WORK SHALL BE PROVIDED IN ACCORDANCE WITH THE REQUIREMENTS OF ALL FEDERAL, STATE, AND MUNICIPAL CODES AND REGULATIONS GOVERNING THE WORK. IN INSTANCES WHERE THE REQUIREMENT OF DRAWINGS AND SPECIFICATIONS ARE IN EXCESS OF THE REQUIREMENTS OF THE APPLICABLE CODES AND REGULATIONS, AND ARE PERMITTED THEREUNDER, THEN, IN SUCH INSTANCES, THE REQUIREMENTS OF THE CONTRACT DOCUMENTS SHALL GOVERN, UNLESS DIRECTED OTHERWISE IN WRITING BY THE ENGINEER.
19. UNLESS OTHERWISE SPECIFIED, NEAT BRASS PLATE, OR OTHERWISE SUITABLE MATERIAL, HAVING THE SERIAL NUMBER, THE MAKE, HORSEPOWER, CAPACITY, SPEED, AND OTHER PERTINENT DATA, AND ANY IMPORTANT OPERATING OR MAINTENANCE INSTRUCTIONS PERMANENTLY AND CLEARLY MARKED ON THE PLATE, SHALL BE MOUNTED ON EACH ITEM OF EQUIPMENT. ALL IMPORTANT PARTS OF EQUIPMENT,AS DIRECTED BY ENGINEER/OWNER SHALL BE STAMPED FOR IDENTIFICATION AND LOCATION.
20. ALL NECESSARY ANCHOR BOLTS, NUTS, WASHERS, SETTING TEMPLATES, AND SUCH OTHER PARTS SHALL BE PROVIDED AS REQUIRED FOR THE PROPER INSTALLATION OF THE WORK, AND WHEREVER PRACTICABLE, THEY SHALL BE BUILT IN AS THE WORK PROGRESSES. THE PARTS SHALL BE OF THE MATERIALS SPECIFIED, AND WHERE NOT SPECIFIED OR INDICATED, THEY SHALL BE OF APPROVED TYPES AND MATERIALS FOR EACH APPLICATION. THE SETTING OF ANCHOR BOLTS BY DRILLING AND GROUTING WILL NOT BE PERMITTED.
21. ALL EQUIPMENT SHALL BE INSTALLED IN STRICT CONFORMANCE WITH THE RECOMMENDATIONS OF THE MANUFACTURER, AS APPROVED, TRULY LEVEL AND PLUMB, AND SHALL BE PROVIDED COMPLETE WITH ALL NECESSARY PIPING, FITTINGS, VALVES, CONTROLS, WIRING, AND APPURTENANCES AND ACCESSORIES SO THE EQUIPMENT WILL BE LEFT COMPLETE AND IN SATISFACTORY OPERATION. PARTICULAR CARE SHALL BE TAKEN IN THE INSTALLATION OF PUMPS IN ORDER TO PREVENT A STRAIN ON THE PIPING OR PUMP FLANGES AND THE CONTRACTOR SHALL INSURE THE CORRECT ALIGNMENT OF SHAFTS, COUPLINGS, AND BEARINGS.
22. ALL WEDGES, SHIMS, FILLING PIECES, KEYS, PACKING, GROUT, OR OTHER MATERIALS NECESSARY TO PROPERLY ALIGN, LEVEL, AND SECURE APPARATUS IN PLACE SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR. ALL PARTS INTENDED TO BE PLUMB OR LEVEL MUST BE PROVEN EXACTLY SO. ANY GRINDING NECESSARY TO BRING PARTS TO PROPER BEARING AFTER INSTALLATION SHALL BE DONE AT THE EXPENSE OF THE CONTRACTOR.
23. THE CONTRACTOR SHALL PROVIDE ALL OPENINGS, CHANNELS, CHASES, ETC. AS REQUIRED TO COMPLETE THE WORK UNDER THIS CONTRACT, TOGETHER WITH THOSE REQUIRED BY OTHER CONTRACTORS.
24. EXISTING PROCESS SYSTEMS, PIPELINES, EQUIPMENT, AND APPURTENANCES ARE SHOWN ON THESE DRAWINGS FOR REFERENCE ONLY AND WERE OBTAINED FROM THE BEST AVAILABLE SOURCES. THE EXACT LOCATION AND ELEVATION OF THESE ITEMS SHALL BE INVESTIGATED AND FIELD VERIFIED BY THE CONTRACTOR. ANY DISCREPANCIES SHALL BE IMMEDIATELY REPORTED TO THE ENGINEER.
25. CONTRACTOR SHALL PROVIDE RESTRAINT OF ALL EXPANSION JOINTS/FLEX CONNECTORS WITH TIE-RODS.
26. WHERE CONNECTION OF NEW PIPING SYSTEMS TO EXISTING PIPING SYSTEMS IS REQUIRED, CONTRACTOR SHALL PROVIDE MISCELLANEOUS FITTINGS, FILLER FLANGES, COUPLINGS, ETC. AS MAY BE REQUIRED TO COMPLETE THE WORK, WHETHER SHOWN ON THE DRAWINGS OR NOT. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING PIPING DIMENSIONS.
27. CONTRACTOR SHALL SUBMIT PIPING LAYOUT DIAGRAMS TO THE ENGINEER FOR APPROVAL PRIOR TO ANY PIPING INSTALLATION. PIPING LAYOUT DIAGRAMS SHALL SHOW DIMENSIONS OF ALL VALVES, FITTINGS, PIPE RUNS, AND SUPPORTS.
28. ALL PIPING SYSTEMS AND EQUIPMENT SHALL BE ADEQUATELY AND SAFELY SUPPORTED. CONTRACTOR SHALL DESIGN, PROVIDE, AND INSTALL ALL SUPPORTS AS REQUIRED BY THE PIPING AND EQUIPMENT PROVIDED. AT A MINIMUM, ALL PIPING SYSTEMS SHALL BE SUPPORTED PER THE REQUIREMENTS OF MANUFACTURER'S STANDARDIZATION SOCIETY (MSS) SP-58 AND MSS SP-69. SUPPORT DESIGN SHALL ACCOMMODATE ALL STATIC AND OPERATIONAL CONDITIONS TO WHICH THE PIPING AND EQUIPMENT MAY BE SUBJECTED. SUPPORTS SHALL BE IN ADDITION TO THOSE SHOWN ON THE CONTRACT DRAWINGS.

MECHANICAL PROCESS LEGEND

VALVES, COUPLING, & APPURTENANCES

- BURIED GATE VALVE
- BURIED PLUG VALVE
- BALL VALVE
- BUTTERFLY VALVE
- ELECTRIC ACTUATED BUTTERFLY VALVE (M)
- BALL CHECK VALVE
- SWING CHECK VALVE
- WAFER CHECK VALVE
- GATE VALVE
- DIAPHRAGM VALVE
- PINCH VALVE
- PLUG VALVE
- MUD VALVE
- NEEDLE VALVE
- SOLENOID VALVE (S)
- SLEEVE TYPE COUPLING
- SPLIT SLEEVE ADAPTER
- FLANGED COUPLING ADAPTER
- EXPANSION JOINT (METAL)
- FLEX CONNECTOR/EXPANSION JOINT (RUBBER)
- EXPANSION JOINT (REDUCING)
- QUICK CONNECT
- MAGMETER
- TURBINE FLOWMETER
- PRESSURE REDUCING VALVE
- BACK PRESSURE/ANTISIPHON VALVE (AS)
- VACUUM BREAKER
- RELIEF VALVE
- COMBINATION VALVE
- PRESSURE INDICATOR (LIQUID SERVICE) (PI)
- PRESSURE INDICATING TRANSMITTER (LIQUID SERVICE) (PIT)
- PRESSURE INDICATOR (AIR SERVICE) (PI)
- FLOW SWITCH (FS)
- PRESSURE SWITCH (PS)
- ANTI-SIPHON VALVE (AS)
- TEMPERATURE INDICATOR (TI)
- SAMPLE TAP (S)
- PRESSURE DIFFERENTIAL SWITCH (PDS)
- QUICK DISCONNECT FEMALE COUPLER
- REDUCER/INCREASER
- STRAINER
- UNION
- FLEXIBLE HOSE
- CENTRIFUGAL PUMP
- DIAPHRAGM METERING PUMP
- ROTAMETER
- DIAPHRAGM ISOLATOR (GAUGE GUARD)
- CALIBRATION COLUMN
- VENT
- VENT
- 4 FUNCTION VALVE
- EJECTOR
- DRAIN (D)
- FLEX COUPLING (CHEMICAL SERVICE)
- FLOAT SWITCH
- ULTRASONIC LEVEL SENSOR
- SUBMERSIBLE CENTRIFUGAL PUMP
- AIR FILTER/INSECT SCREEN
- NHMP-2 — ELECTRIC DIAPHRAGM METERING PUMP
- BASKET STRAINER
- QUICK DISCONNECT MALE ADAPTER
- HOSE COUPLING
- EXPANSION JOINT
- CAST-IN-PLACF WALL PIPE

PROCESS STREAM ABBREVIATIONS

BW	BACKWASH
FE	FILTER EFFLUENT
FI	FILTER INFLUENT
NaOCl	SODIUM HYPOCHLORITE

PIPING AND TUBING MATERIALS

CI	CAST IRON PIPE
CPVC	CHLORINATED POLYVINYL CHLORIDE PIPE
CS	CARBON STEEL
CU	COPPER
DI	DUCTILE IRON PIPE
FRP	FIBERGLASS REINFORCED PLASTIC PIPE
GALV	GALVANIZED STEEL
HDPE	HIGH DENSITY POLYETHYLENE
HOSE	FLEXIBLE HOSE
PE	POLYETHYLENE
PVC	POLYVINYL CHLORIDE
RCP	REINFORCED CONCRETE PIPE
SS	STAINLESS STEEL PIPE OR TUBING
STL	STEEL

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REVISIONS

NO.	DATE	DESCRIPTION

LISA GOYER — No. 11536 — REGISTERED PROFESSIONAL ENGINEER (CIVIL) — 12/30/21

PROJECT NO.:	119.21.01
DATE:	DECEMBER 2021
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DESIGNED BY:	SCO
DRAWN BY:	SCO
CHECKED BY:	LMG
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WATER SYSTEM CHLORINATION & PRETREATMENT

PRUDENCE ISLAND WATER DISTRICT
PRUDENCE ISLAND, RHODE ISLAND

DRAWING TITLE:
PLANT MECHANICAL NOTES AND LEGEND

DRAWING NO.:
M-1

SHEET NO. 14 OF 26

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PROCESS VALVE SCHEDULE

Mechanical Tag No.	Size	Type	Description	Location	Application	Service	Valve Position	Valve Operator
CV-201A	1-1/2"	BUTTERFLY VALVE	FILTER #1 INFLUENT	FILTER VALVE SKID	WATER	OPEN/CLOSE	OPEN FOR ONLINE, CLOSED FOR OFFLINE	MOTOR
MV-201A	1-1/2"	BUTTERFLY VALVE	FILTER #1 INFLUENT	FILTER VALVE SKID	WATER	OPEN/CLOSE	NORMALLY OPEN	HANDLE
CV-201B	1-1/2"	BUTTERFLY VALVE	FILTER #2 INFLUENT	FILTER VALVE SKID	WATER	OPEN/CLOSE	OPEN FOR ONLINE, CLOSED FOR OFFLINE	MOTOR
MV-201B	1-1/2"	BUTTERFLY VALVE	FILTER #2 INFLUENT	FILTER VALVE SKID	WATER	OPEN/CLOSE	NORMALLY OPEN	HANDLE
CV-202A	1-1/2"	BUTTERFLY VALVE	FILTER #1 EFFLUENT	FILTER VALVE SKID	WATER	OPEN/CLOSE	OPEN FOR ONLINE, CLOSED FOR OFFLINE	MOTOR
MV-202A	1-1/2"	BALL VALVE	FILTER #1 EFFLUENT	FILTER VALVE SKID	WATER	OPEN/CLOSE	NORMALLY OPEN	HANDLE
CV-202B	1-1/2"	BUTTERFLY VALVE	FILTER #2 EFFLUENT	FILTER VALVE SKID	WATER	OPEN/CLOSE	OPEN FOR ONLINE, CLOSED FOR OFFLINE	MOTOR
MV-202B	1-1/2"	BALL VALVE	FILTER #2 EFFLUENT	FILTER VALVE SKID	WATER	OPEN/CLOSE	NORMALLY OPEN	HANDLE
CV-203A	2-1/2"	BUTTERFLY VALVE	FILTER #1 BACKWASH INLET	FILTER VALVE SKID	WATER	OPEN/CLOSE	NORMALLY CLOSED	MOTOR
CV-203B	2-1/2"	BUTTERFLY VALVE	FILTER #2 BACKWASH INLET	FILTER VALVE SKID	WATER	OPEN/CLOSE	NORMALLY CLOSED	MOTOR
CV-204A	1"	BUTTERFLY VALVE	FILTER #1 BACKWASH OUTLET	FILTER VALVE SKID	WATER	OPEN/CLOSE	NORMALLY CLOSED	MOTOR
CV-204B	1"	BUTTERFLY VALVE	FILTER #2 BACKWASH OUTLET	FILTER VALVE SKID	WATER	OPEN/CLOSE	NORMALLY CLOSED	MOTOR
CV-205A	1"	BUTTERFLY VALVE	FILTER #1 RINSE VALVE	FILTER VALVE SKID	WATER	OPEN/CLOSE	NORMALLY CLOSED	MOTOR
CV-205B	1"	BUTTERFLY VALVE	FILTER #2 RINSE VALVE	FILTER VALVE SKID	WATER	OPEN/CLOSE	NORMALLY CLOSED	MOTOR
ARV-207A	1"	AIR RELEASE	FILTER #1	FILTER VALVE SKID	WATER	OPEN/CLOSE	NORMALLY CLOSED	-
ARV-207B	1"	AIR RELEASE	FILTER #2	FILTER VALVE SKID	WATER	OPEN/CLOSE	NORMALLY CLOSED	-
MV-207A	1"	BALL VALVE	ARV ISOLATION FILTER #1	FILTER VESSEL	WATER	OPEN/CLOSE	NORMALLY OPEN	HANDLE
MV-207B	1"	BALL VALVE	ARV ISOLATION FILTER #2	FILTER VESSEL	WATER	OPEN/CLOSE	NORMALLY OPEN	HANDLE
MV-209A	1"	BALL VALVE	WASTE/DRAIN FILTER #1	FILTER VALVE SKID	DRAIN	OPEN/CLOSE	NORMALLY CLOSED	HANDLE
MV-209B	1"	BALL VALVE	WASTE/DRAIN FILTER #2	FILTER VALVE SKID	DRAIN	OPEN/CLOSE	NORMALLY CLOSED	HANDLE
CV-301	2"	BUTTERFLY VALVE	BACKWASH TANK FILL	FILTER VALVE SKID	WATER	OPEN/CLOSE	NORMALLY CLOSED	MOTOR
CV-302	2"	BUTTERFLY VALVE	BACKWASH TANK FILL	FILTER VALVE SKID	WATER	OPEN/CLOSE	NORMALLY CLOSED	MOTOR
MV-302	2"	BALL VALVE	BACKWASH TANK FILL	FILTER VALVE SKID	WATER	OPEN/CLOSE	NORMALLY OPEN	HANDLE
MV-303	1-1/2"	BALL VALVE	BACKWASH PUMP SUCTION	BACKWASH SUPPLY	WATER	OPEN/CLOSE	NORMALLY OPEN	HANDLE
MV-304	1-1/4"	BALL VALVE	BACKWASH PUMP DISCHARGE	BACKWASH SUPPLY	WATER	OPEN/CLOSE	NORMALLY OPEN	HANDLE
MV-305	2"	BALL VALVE	TREATMENT SKID BYPASS	BYPASS	WATER	OPEN/CLOSE	NORMALLY CLOSED	HANDLE
MV-306	2"	BALL VALVE	TREATMENT SKID BYPASS	BYPASS	WATER	OPEN/CLOSE	NORMALLY CLOSED	HANDLE
CV-401	2"	BUTTERFLY VALVE	FILTER EFFLUENT HEADER	FILTER VALVE SKID	WATER	OPEN/CLOSE	NORMALLY OPEN	MOTOR
MV-401	2"	BALL VALVE	FILTER EFFLUENT HEADER	FILTER VALVE SKID	WATER	OPEN/CLOSE	NORMALLY OPEN	HANDLE
SmV-201A	1/4"	BALL VALVE	FILTER #1 INFLUENT	FILTER VALVE SKID	WATER	OPEN/CLOSE	NORMALLY OPEN	HANDLE
SmV-201B	1/4"	BALL VALVE	FILTER #2 INFLUENT	FILTER VALVE SKID	WATER	OPEN/CLOSE	NORMALLY OPEN	HANDLE
SmV-202A	1-1/2"	BALL VALVE	FILTER #1 EFFLUENT	FILTER VALVE SKID	WATER	OPEN/CLOSE	NORALLY CLOSED	HANDLE
SmV-202B	1-1/2"	BALL VALVE	FILTER #2 EFFLUENT	FILTER VALVE SKID	WATER	OPEN/CLOSE	NORALLY CLOSED	HANDLE
SmV-203A	1/2"	BALL VALVE	FILTER #1	FILTER VALVE SKID	WATER	OPEN/CLOSE	NORMALLY CLOSED	HANDLE
SmV-203B	1/2"	BALL VALVE	FILTER #2	FILTER VALVE SKID	WATER	OPEN/CLOSE	NORMALLY CLOSED	HANDLE
SmV-204A	1/4"	BALL VALVE	FILTER #1	FILTER VALVE SKID	WATER	OPEN/CLOSE	NORMALLY OPEN	HANDLE
SmV-204B	1/4"	BALL VALVE	FILTER #2	FILTER VALVE SKID	WATER	OPEN/CLOSE	NORMALLY OPEN	HANDLE
SmV-205A	1/4"	BALL VALVE	FILTER #1	FILTER VALVE SKID	WATER	OPEN/CLOSE	NORMALLY CLOSED	HANDLE
SmV-205B	1/4"	BALL VALVE	FILTER #2	FILTER VALVE SKID	WATER	OPEN/CLOSE	NORMALLY CLOSED	HANDLE
SmV-206A	1/4"	BALL VALVE	FILTER #1	FILTER VALVE SKID	WATER	OPEN/CLOSE	NORMALLY OPEN	HANDLE
SmV-206B	1/4"	BALL VALVE	FILTER #2	FILTER VALVE SKID	WATER	OPEN/CLOSE	NORMALLY OPEN	HANDLE
SmV-207A	1/4"	BALL VALVE	FILTER #1	FILTER VALVE SKID	WATER	OPEN/CLOSE	NORMALLY CLOSED	HANDLE
SmV-207B	1/4"	BALL VALVE	FILTER #2	FILTER VALVE SKID	WATER	OPEN/CLOSE	NORMALLY CLOSED	HANDLE
SmV-208A	1/4"	BALL VALVE	FILTER #1	FILTER VALVE SKID	WATER	OPEN/CLOSE	NORMALLY OPEN	HANDLE
SmV-208B	1/4"	BALL VALVE	FILTER #2	FILTER VALVE SKID	WATER	OPEN/CLOSE	NORMALLY OPEN	HANDLE

PUMP SCHEDULE

EQUIPMENT ID	P&ID TAG NO.	EQUIPMENT DESCRIPTION	LOCATION	TYPE	RATING POINTS	DRIVE	MOTOR			VOLTAGE			REMARKS
							HP	RPM	ENCL	VAC	Hz	PH	
P-301	BWP-301	BACKWASH SUPPLY PUMP	INDIAN SPRINGS TREATMENT PLANT	CENTRIFUGAL	85 GPM @ 40 FT TDH	CONSTANT	1.5	1200	ODP	460	60	3	
P-302	ISMP-501	METERING PUMP	INDIAN SPRINGS WELL HOUSE	PERISTALTIC	0.0002 - 33.3 GPH @ 125 PSI	VARIABLE	3.5 AMPS (MAX)			120	60	1	ELECTRICAL 3-PRONG TWIST-LOCK PLUG CONNECTION
P-303	ISMP-502	METERING PUMP	INDIAN SPRINGS WELL HOUSE	PERISTALTIC	0.0002 - 33.3 GPH @ 125 PSI	VARIABLE	3.5 AMPS (MAX)			120	60	1	ELECTRICAL 3-PRONG TWIST-LOCK PLUG CONNECTION
P-304	ACMP-503	METERING PUMP	ARMY CAMP WELL HOUSE	PERISTALTIC	0.0002 - 33.3 GPH @ 125 PSI	VARIABLE	3.5 AMPS (MAX)			120	60	1	ELECTRICAL 3-PRONG TWIST-LOCK PLUG CONNECTION
P-305	ACMP-504	METERING PUMP	ARMY CAMP WELL HOUSE	PERISTALTIC	0.0002 - 33.3 GPH @ 125 PSI	VARIABLE	3.5 AMPS (MAX)			120	60	1	ELECTRICAL 3-PRONG TWIST-LOCK PLUG CONNECTION

FLOW ELEMENT SCHEDULE

EQUIPMENT ID	P&ID TAG NO.	EQUIPMENT DESCRIPTION	LOCATION	TYPE	Size	Flow Range	VOLTAGE			REMARKS
							VAC	Hz	PH	
MAG-1	FE-101	RAW WATER FLOW METER	INDIAN SPRINGS WELL HOUSE	MAG	2"	5 - 100 GPM	110	6	1	
MAG-2	FE-201A	FILTER NO. 1 INFLUENT	INDIAN SPRINGS TREATMENT PLANT	MAG	2"	5 - 100 GPM	110	6	1	
MAG-3	FE-201B	FILTER NO. 2 INFLUENT	INDIAN SPRINGS TREATMENT PLANT	MAG	2"	5 - 100 GPM	110	6	1	

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REVISIONS

NO.	DATE	DESCRIPTION

LISA GOYER No. 11536 REGISTERED PROFESSIONAL ENGINEER CIVIL

PROJECT NO.:	119.21.01
DATE:	DECEMBER 2021
SCALE:	AS NOTED
DESIGNED BY:	SCO
CHECKED BY:	SCO
DRAWN BY:	LMG
APPROVED BY:	LMG

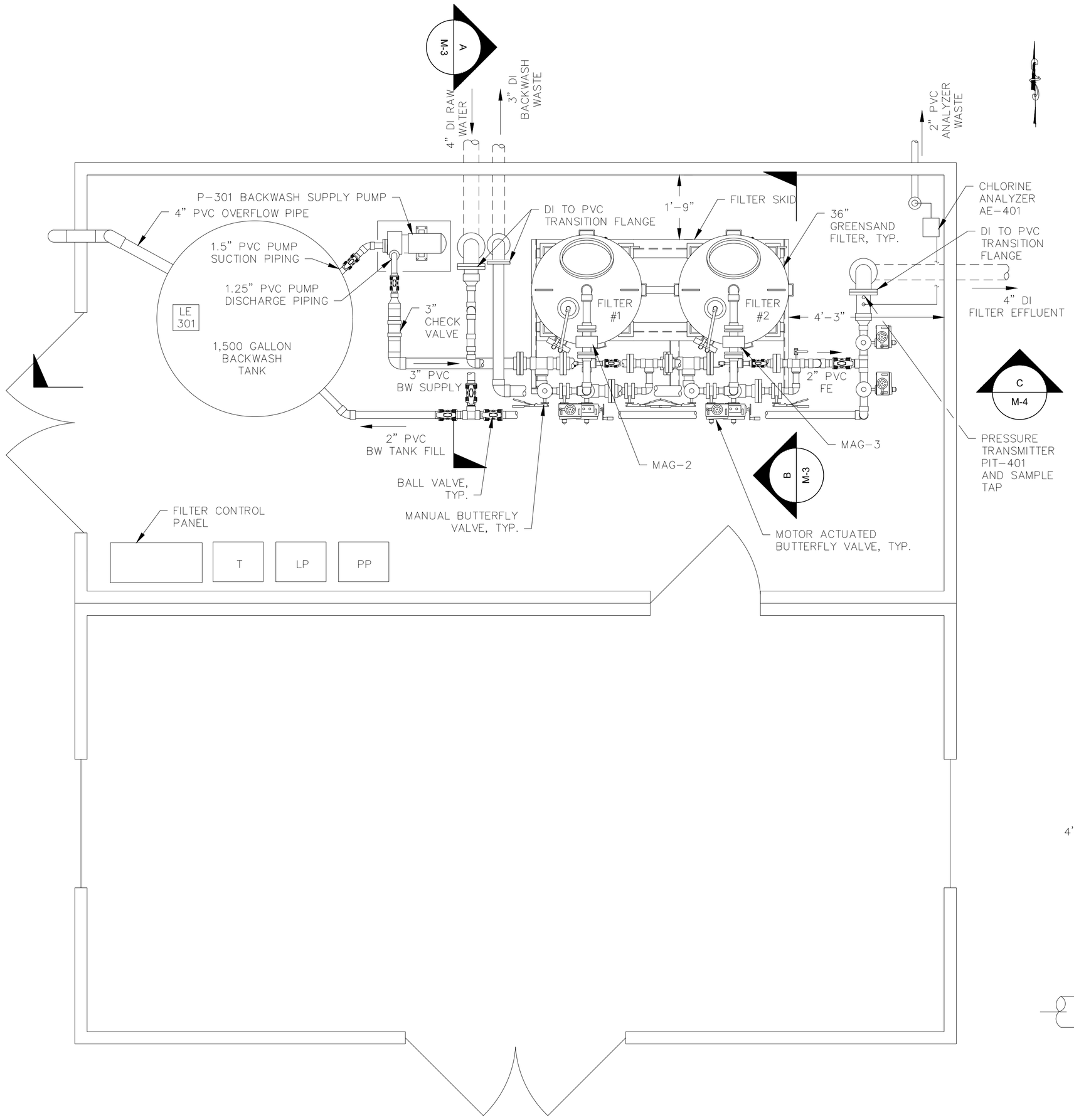
WATER SYSTEM CHLORINATION & PRETREATMENT

PRUDENCE ISLAND WATER DISTRICT
PRUDENCE ISLAND, RHODE ISLAND

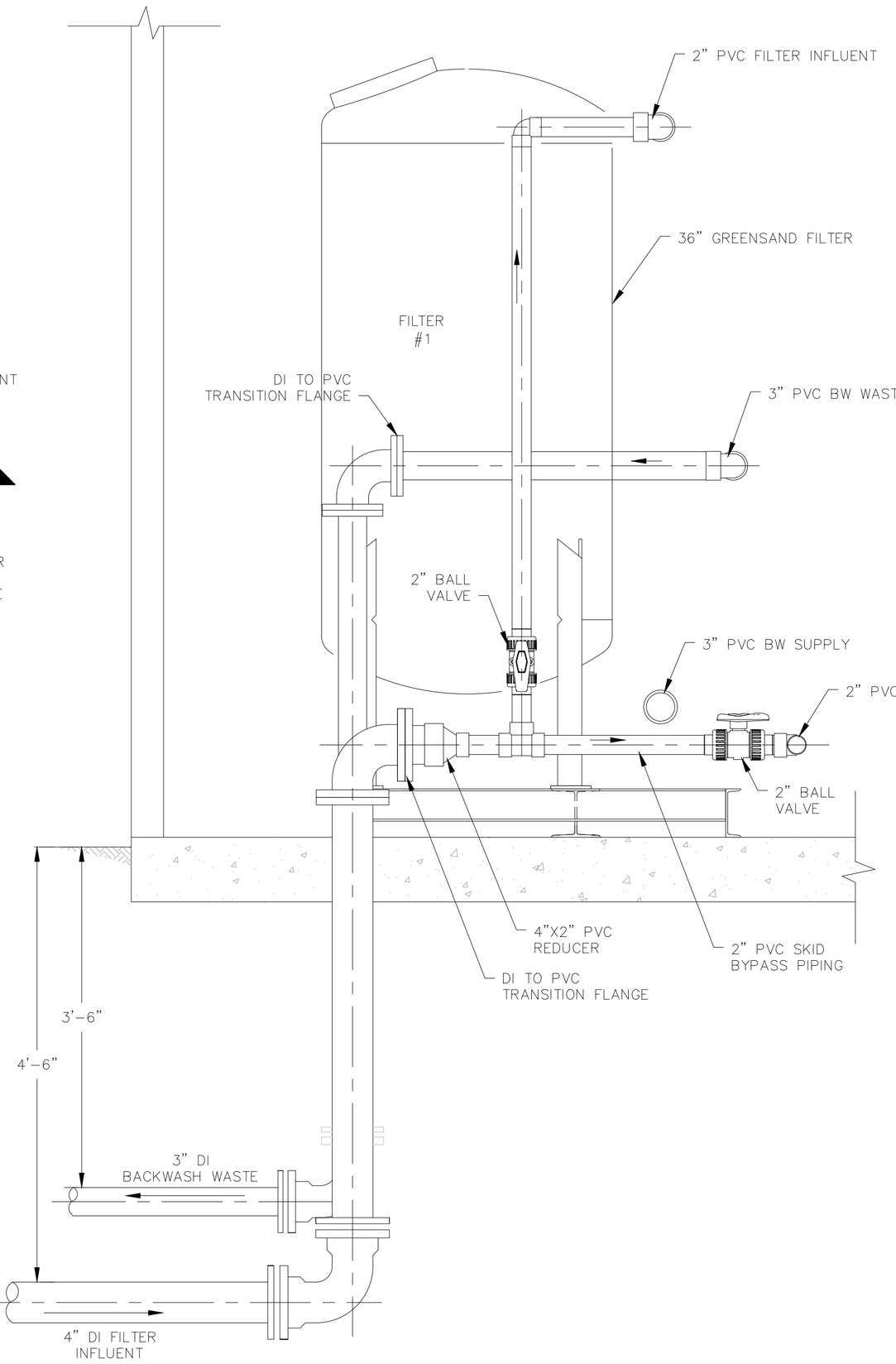
DRAWING TITLE:
MECHANICAL SHEDULES

DRAWING NO.:
M-2

SHEET NO. 15 OF 26

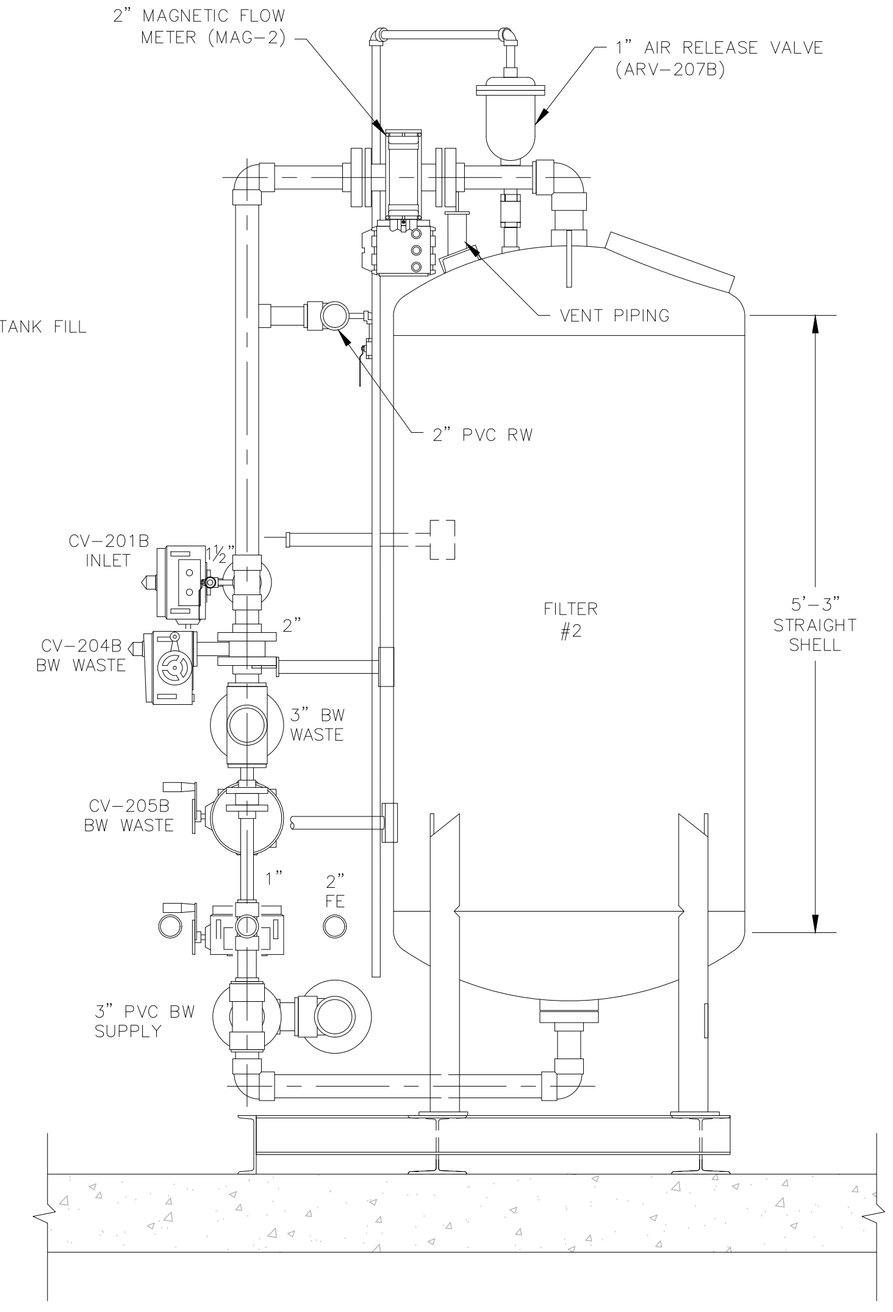


FLOOR PLAN
SCALE: 1/2" = 1'



SECTION
SCALE: 1" = 1'

A / M-3



SECTION
SCALE: 1" = 1'

B / M-3

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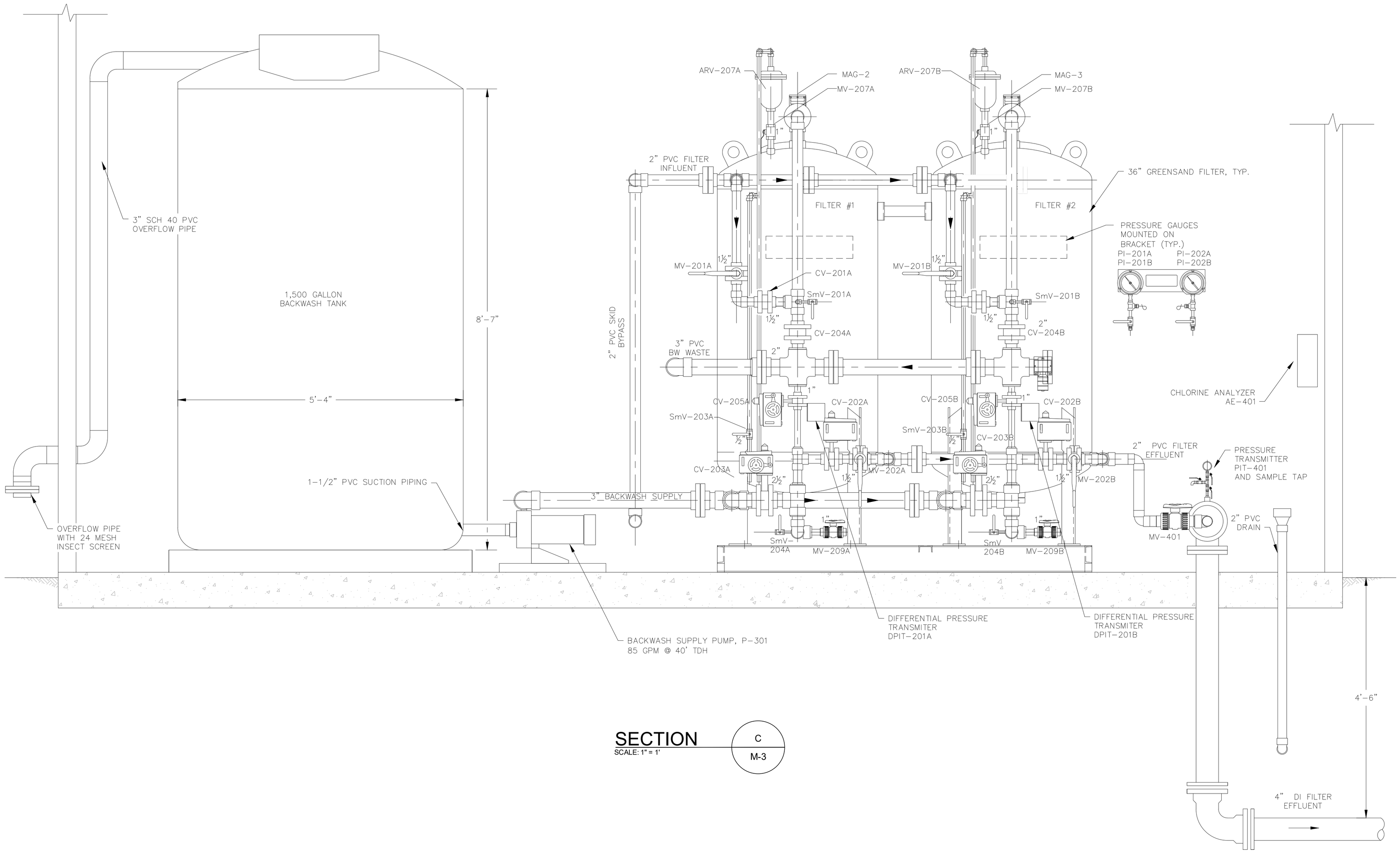
APPROVED BY:	LMG

WATER SYSTEM CHLORINATION & PRETREATMENT
PRUDENCE ISLAND WATER DISTRICT
PRUDENCE ISLAND, RHODE ISLAND

DRAWING TITLE:
MECHNICAL PROCESS PIPING PLAN

DRAWING NO.:
M-3

SHEET NO. 16 OF 26



SECTION C
SCALE: 1" = 1'

M-3

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WATER SYSTEM CHLORINATION & PRETREATMENT
PRUDENCE ISLAND WATER DISTRICT
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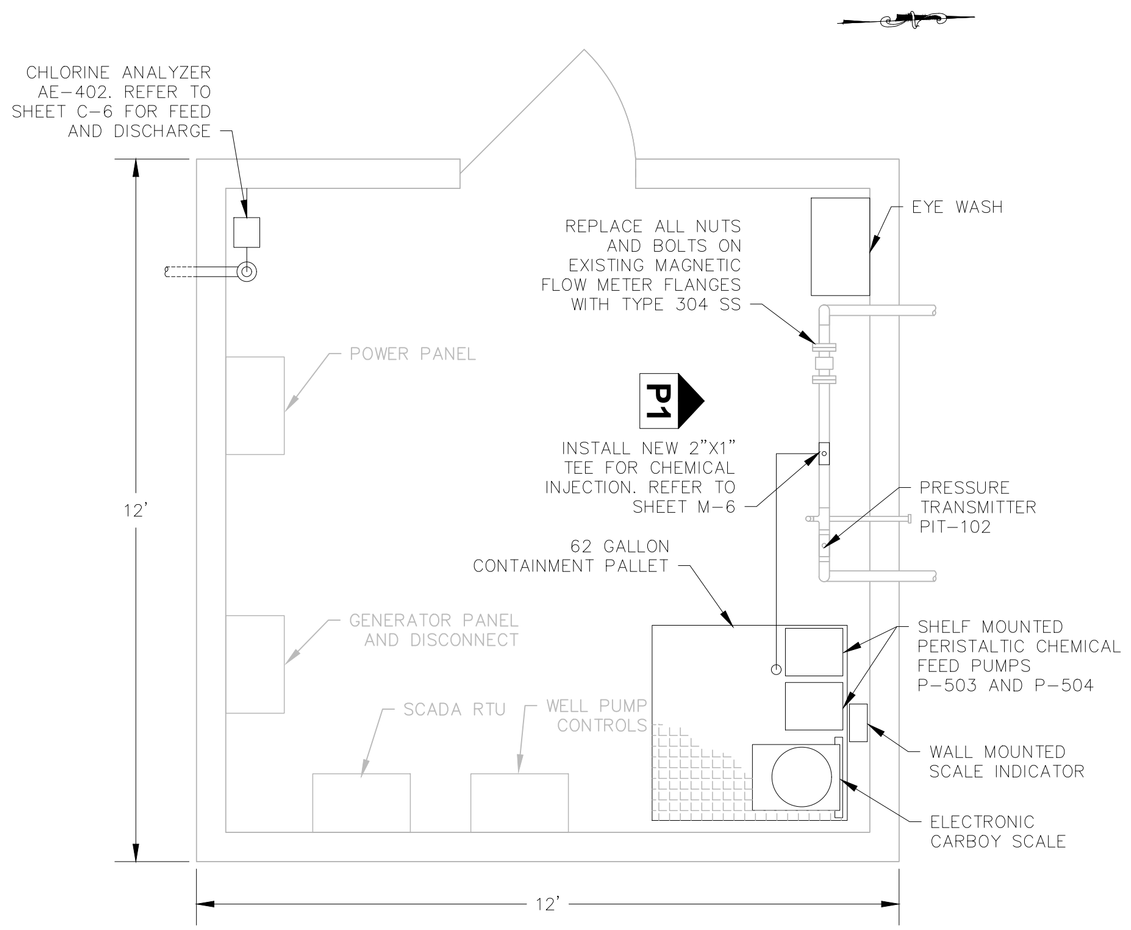
DRAWING TITLE:
MECHNICAL PROCESS PIPING SECTIONS

DRAWING NO.:
M-4

SHEET NO. 17 OF 26



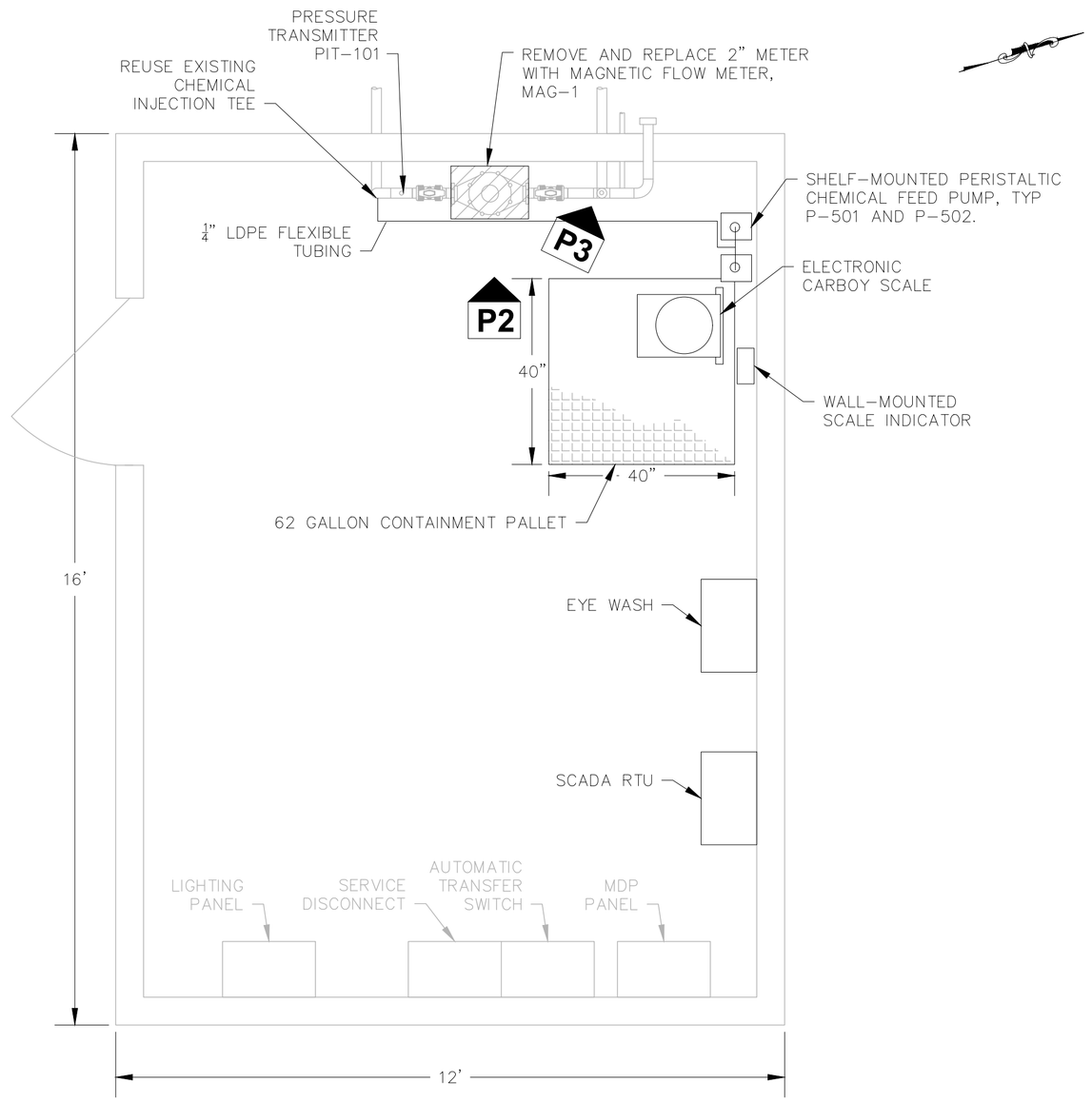
ARMY CAMP WELL HOUSE
FLOOR PLAN

SCALE: 1/2" = 1'

PHOTO 1

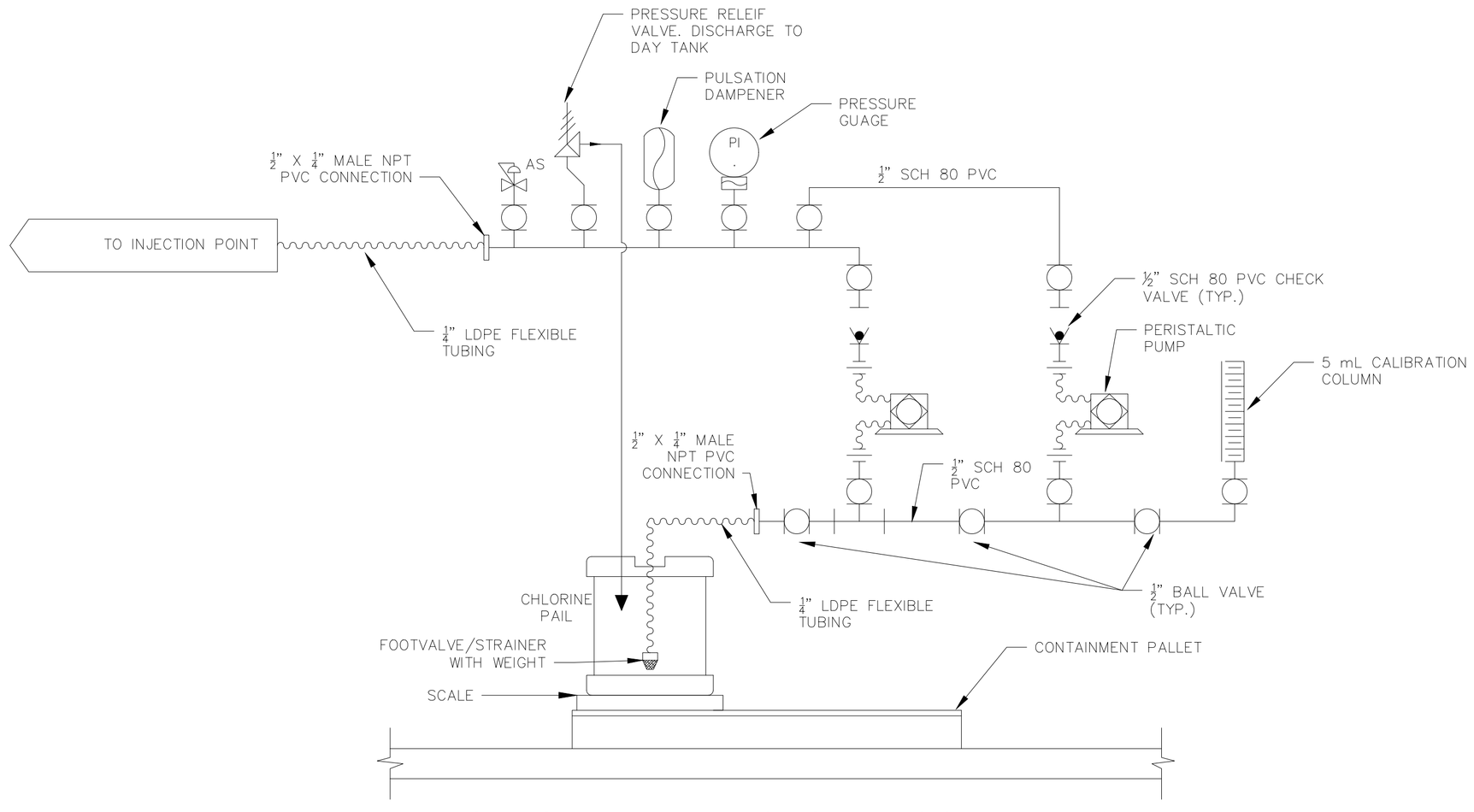
PHOTO 2

PHOTO 3



INDIAN SPRINGS WELL HOUSE
FLOOR PLAN

SCALE: 1/2" = 1'



CHLORINE FEED SYSTEM SCHEMATIC

SCALE: nts

NOTE:
1. CHLORINE SYSTEM SCHEMATIC IS FOR BOTH INDIAN SPRINGS AND ARMY CAMP.

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No. 11536
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CIVIL
12/30/21

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WATER SYSTEM CHLORINATION & PRETREATMENT

PRUDENCE ISLAND WATER DISTRICT
PRUDENCE ISLAND, RHODE ISLAND

DRAWING TITLE:
WELL HOUSE
CHEMICAL FEED SYSTEMS

DRAWING NO.:
M-5

SHEET NO. 18 OF 26

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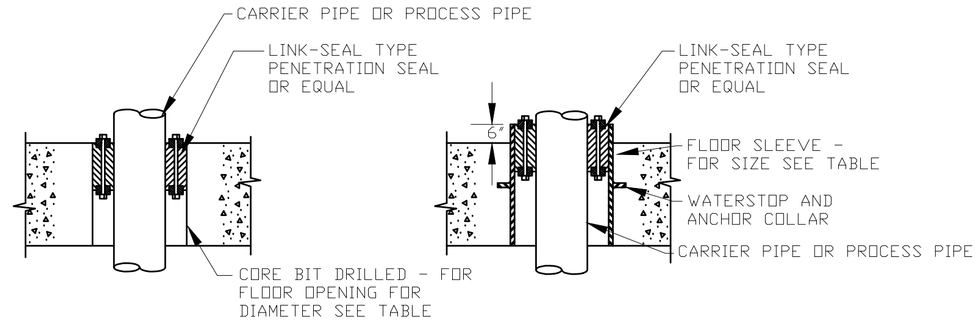


EXISTING CONCRETE FLOOR
SCALE: NTS

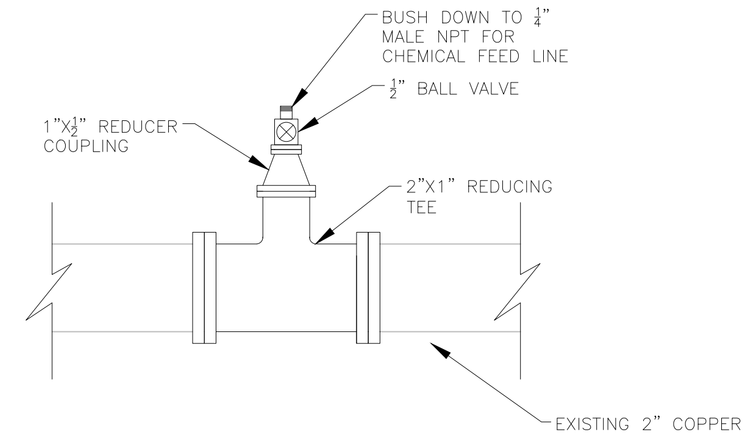
NEW CONCRETE FLOOR
SCALE: NTS

CARRIER PIPE NOMINAL SIZE	CARRIER PIPE O.D.	FLOOR SLEEVE SIZE	CORE DRILLED I.D.
1 1/2''	1.625''	3''	3''
2''	2.50''	4''	4''
4''	4.80''	8''	8''
6''	6.90''	10''	10''
8''	9.05''	12''	12''
16''	17.40''	20''	20''
18''	19.50''	24''	24''
24''	25.80''	30''	29''

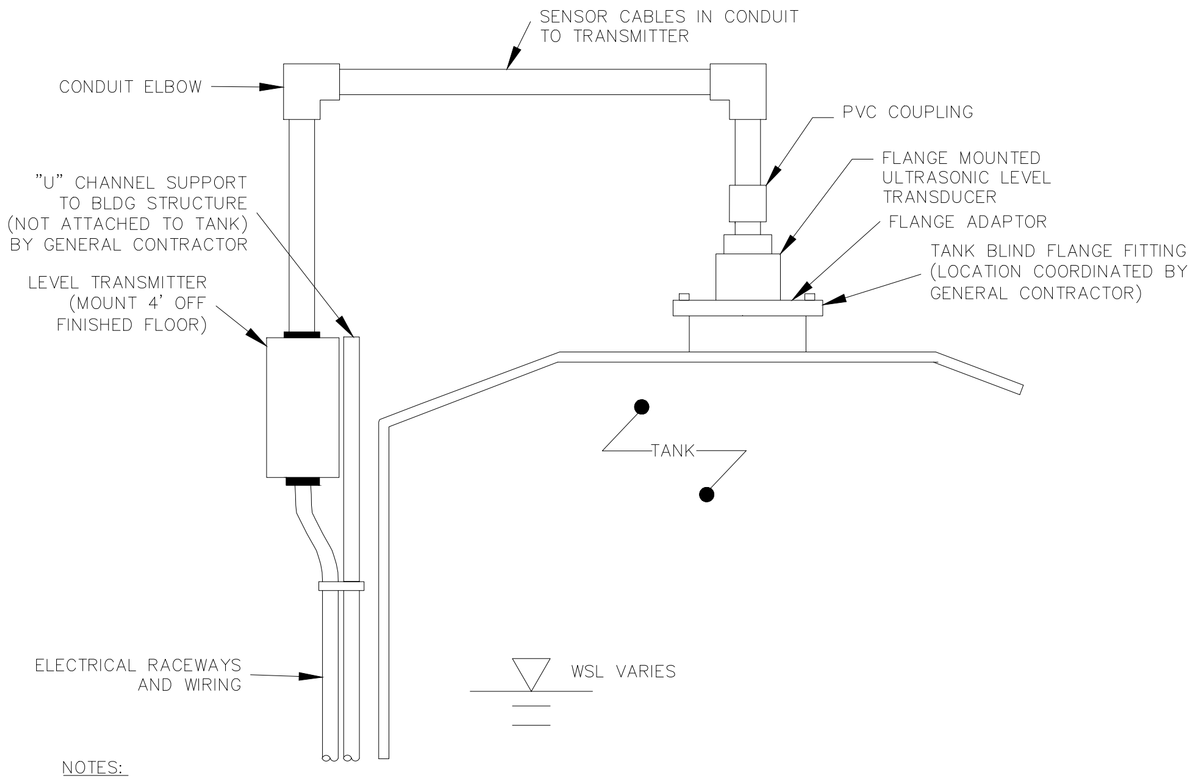
NOTES:

1. SIZES SHOWN ARE FOR DUCTILE IRON PIPE, FOR OTHER MATERIALS AND PIPE SIZES CONSULT MANUFACTURER'S SPECIFICATIONS.
2. FILL ANNULAR SPACE WITH GROUT.

TYPICAL PIPE SLAB PENETRATION DETAIL
SCALE: N.T.S.



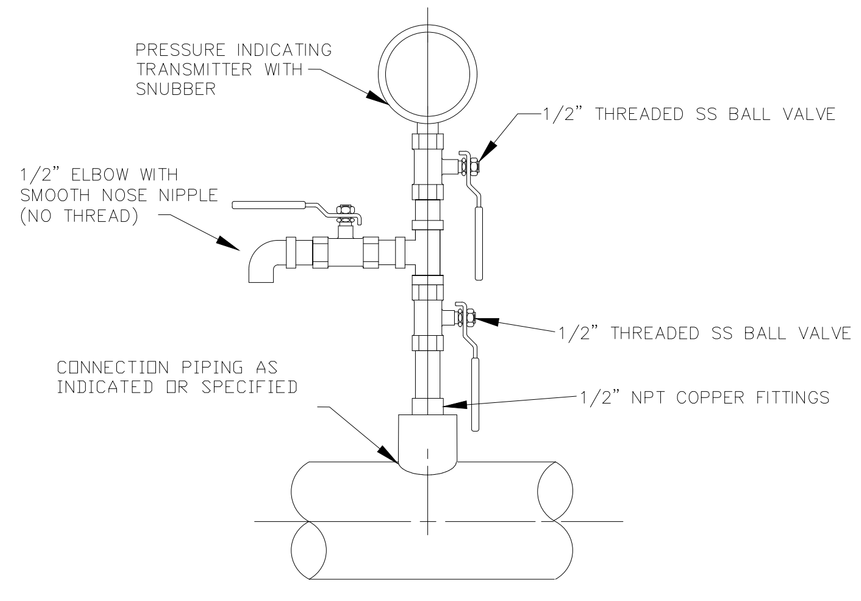
CHEMICAL FEED TEE DETAIL
SCALE: N.T.S.



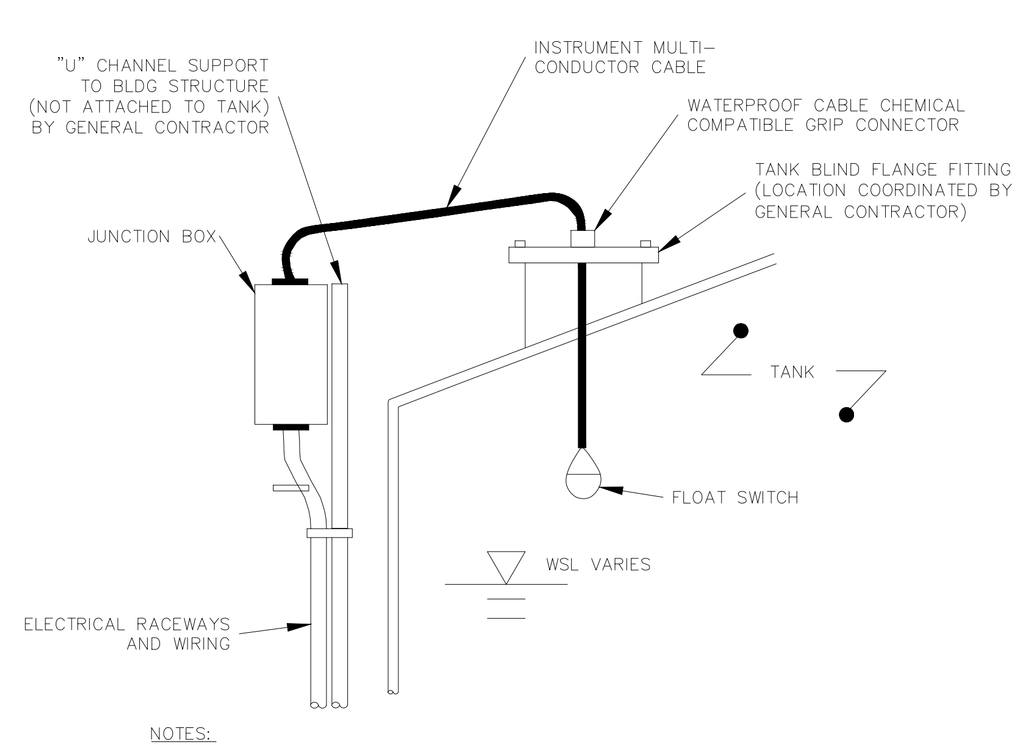
NOTES:

1. ELECTRICAL CONTRACTOR TO SUPPLY AND INSTALL ALL DIVISION 16 DEVICES, EQUIPMENT, COMPONENTS, AND ANCILLARY ITEMS ASSOCIATED WITH POWER AND SIGNAL WIRING FOR I&C DEVICES.
2. THE MOUNTING DETAILS PROVIDED ARE GENERIC FOR ULTRASONIC DEVICES OF VARIOUS MANUFACTURERS. THE INSTALLING CONTRACTOR MUST STRICTLY COMPLY WITH MANUFACTURER'S INSTRUCTION IN THE INSTALLATION OF THESE DEVICES. IF THERE ARE ANY ENGINEERING ISSUES THEY MUST BE REFERRED TO THE ENGINEER PRIOR TO INSTALLATION.

BACKWASH TANK ULTRASONIC LEVEL DETAIL
SCALE: N.T.S.



PRESSURE TRANSMITTER MOUNTING DETAIL TRANSMITTER AND SAMPLE TAP
SCALE: N.T.S.



NOTES:

1. ELECTRICAL CONTRACTOR TO SUPPLY AND INSTALL ALL DIVISION 16 DEVICES, EQUIPMENT, COMPONENTS, AND ANCILLARY ITEMS ASSOCIATED WITH POWER AND SIGNAL WIRING FOR I&C DEVICES.
2. THE MOUNTING DETAILS PROVIDED ARE GENERIC FOR LEVEL SWITCH DEVICES OF VARIOUS MANUFACTURERS. THE INSTALLING CONTRACTOR MUST STRICTLY COMPLY WITH MANUFACTURER'S INSTRUCTION IN THE INSTALLATION OF THESE DEVICES. IF THERE ARE ANY ENGINEERING ISSUES THEY MUST BE REFERRED TO THE ENGINEER PRIOR TO INSTALLATION.

BACKWASH TANK FLOAT SWITCH DETAIL
SCALE: N.T.S.

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SCALE ADJUSTMENT GUIDE
0" 1"
BAR IS ONE INCH ON ORIGINAL DRAWING

REVISIONS

NO.	DATE	DESCRIPTION

LISA GOYER
No. 11536
REGISTERED PROFESSIONAL ENGINEER
CIVIL
12/30/21

PROJECT NO.:	119.21.01
DATE:	DECEMBER 2021
SCALE:	AS NOTED
DESIGNED BY:	SCO
CHECKED BY:	SCO
DRAWN BY:	RAT
APPROVED BY:	LMG

WATER SYSTEM CHLORINATION & PRETREATMENT
PRUDENCE ISLAND WATER DISTRICT
PRUDENCE ISLAND, RHODE ISLAND

DRAWING TITLE:
MECHANICAL DETAILS

DRAWING NO.:
M-6

SHEET NO. 19 OF 26

C:\Users\Ryan\H2Olson Engineering, Inc\H2Olson Engineering, Inc. - Documents\03 Projects\119 - Prudence Island, RI\01 Design\Drawings\M-Drawings.dwg

GENERAL SYMBOLS

1 / E001 — PLAN TITLES

SCALE: 1/4" = 1'-0" (0, 2', 4', 8')

NORTH ARROW

HVAC DUCTWORK LEGEND

12ø — DOUBLE LINE ROUND DUCT (DIMENSIONS IN INCHES)

24X12 — DOUBLE LINE RECTANGULAR DUCT, FIRST NUMBER IS VIEW SIZE, SECOND NUMBER IS DEPTH SIZE (DIMENSIONS IN INCHES)

SUPPLY AIR FLOW

RETURN / EXHAUST AIR FLOW

HVAC CONTROL LEGEND

T1 T — TEMPERATURE \ THERMOSTAT

HVAC ABBREVIATIONS

% – PERCENT
° or DEG – DEGREE
ø or DIA – DIAMETER
A – AREA
AC – ALTERNATING CURRENT
AFF – ABOVE FINISHED FLOOR
ANG – ANGLE
ANSI – AMERICAN NATIONAL STANDARDS INSTITUTE
AWG – AMERICAN WIRE GAUGE
BHP – BRAKE HORSEPOWER
CC – CEILING CONCEALED UNIT (DUCTLESS SPLIT SYSTEM)
CFM – CUBIC FEET PER MINUTE
CUH – CABINET UNIT HEATER
DB – DECIBEL
DC – DIRECT CURRENT
DENS – DENSITY
DIFF – DIFFERENCE or DELTA
DN – DOWN
DP – DEPTH
DWG – DRAWING
EF – EXHAUST FAN
EL – ELEVATION
ENT – ENTERING
EXG – EXISTING
F – FARENHEIT
FP – FIRE PROTECTION
FPM – FEET PER MINUTE
FPS – FEET PER SECOND
FS – FLOW SWITCH
FT – FEET
FTLB – FOOT POUND
GA – GAUGE
GAL – GALLON(S)
GHU – GAS UNIT HEATER
GPM – GALLONS PER MINUTE
HD – HEAD
HGT – HEIGHT
HOR – HORIZONTAL
HP – HORSEPOWER
HR – HOUR(S)
HZ – HERTZ FREQUENCY
ID – INSIDE DIAMETER
IPS – INTERNATIONAL PIPE STANDARD
IPS – IRON PIPE SIZE
KW – KILOWATT(S)
KWH – KILOWATT HOUR
LBS – POUNDS
LG – LENGTH
LVE – LOUVER (EXHAUST)
LVI – LOUVER (INTAKE)
MAX – MAXIMUM
MIN – MINIMUM
N/A – NOT APPLICABLE
NC – NOISE CRITERIA
NC – NORMALLY CLOSED
NO – NORMALLY OPEN
NO – NUMBER
NTS – NOT TO SCALE
OD – OUTSIDE DIAMETER
OS&Y – OUTSIDE STEM & YOKE
OZ – OUNCE
PD – PRESSURE DROP oR DIFFERENCE
PH – PHASE
PIV – POST INDICATING VALVE
PSI – POUNDS PER SQUARE INCH
PSIA – PSI ABSOLUTE
PSIG – PSI GAUGE
QTY – QUANTITY
RPDA – REDUCE PRESSURE PRINCIPLE DETECTOR ASSEMBLY
RPM – REVOLUTIONS PER MINUTE
RS – RISING STEM
SF – SAFETY FACTOR
SF – SQUARE FEET
SP – SPRINKLER PIPE
SPEC – SPECIFICATIONS
SPLY – SUPPLY
STD – STANDARD
TC – TEST CONNECTION
TEMP – TEMPERATURE
TYP – TYPICAL
U.O.N. – UNLESS OTHERWISE NOTED
V – VOLT
VA – VOLT AMPERE
VEL – VELOCITY
VERT – VERTICAL
VOL – VOLUME
VP – VELOCITY PRESSURE
W – WATT(S)

HVAC GENERAL NOTES & REQUIRMENTS

1. CONSTRUCTION\CONTRACT DOCUMENTS: CONTRACT DOCUMENTS INCLUDING PLANS, DETAILS, AND ONE–LINE DIAGRAMS SHOW THE GENERAL LOCATION AND ARRANGEMENT OF THE WORK.

2. COORDINATION:
   A) BEFORE SELECTING MATERIAL, EQUIPMENT AND PROCEEDING WITH WORK, INSPECT AREAS WHERE MATERIAL AND EQUIPMENT ARE TO BE INSTALLED TO INSURE SUITABILITY, AND CHECK NEEDED SPACE FOR PLACEMENT, CLEARANCES AND INTERCONNECTIONS.
   B) PLANS AND DETAILS DO NOT SHOW ALL INTERFERENCE'S AND CONDITIONS, VISIBLE AND/OR HIDDEN THAT MAY EXIST; THUS, REQUIRING THE CONTRACTOR TO INSPECT AND SURVEY THE SPACE BEFORE PERFORMING THE WORK.
   C) BEFORE CUTTING OR DRILLING INTO BUILDING ELEMENTS INSPECT AND LAYOUT WORK TO AVOID DAMAGING STRUCTURAL ELEMENTS AND BUILDING UTILITIES.

3. CODES AND STANDARDS: FOLLOW ALL FEDERAL, STATE AND LOCAL CODES THAT HAVE JURISDICTION WHERE THE WORK IS BEING PERFORMED.

4. PERMITS: THE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL REQUIRED PERMITS AND ARRANGE FOR ALL REQUIRED INSPECTIONS IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL GOVERNING AUTHORITIES.

5. WORKMAN: ALL WORK SHALL BE DONE WITH LICENSED WORKMEN IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL GOVERNING AUTHORITIES CODES AND REGULATIONS.

6. EQUIPMENT AND MATERIAL INSTALLATIONS:
   A) ALL EQUIPMENT AND MATERIALS SHALL BE LABELED AND LISTED, AND INSTALLED IN ACCORDANCE WITH THEIR LISTING AND MANUFACTURER'S REQUIREMENTS.
   B) WHEN A MANUFACTURER RECOMMENDS AN OPTION OR ACCESSORY ITEM FOR THE INSTALLED CONDITION, OPERATION, OR ENVIRONMENT THAT IS TO BE EXPERIENCED, SUCH ITEM SHALL BE SUPPLIED AT NO ADDITIONAL COST TO THE OWNER.
   C) IF AN EQUIPMENT MANUFACTURER REQUIRES LARGER CAPACITY, CIRCUITRY AND/OR EQUIPMENT, THE CONTRACTOR SHALL PROVIDE SUCH CAPACITY AND/OR EQUIPMENT UNDER HIS CONTRACT AT NO ADDITIONAL COST TO THE OWNER.
   D) LOCATE ALL EQUIPMENT, WHICH REQUIRES SERVICING IN FULLY ACCESSIBLE POSITIONS. IF REQUIRED FOR BETTER ACCESSIBILITY, FURNISH ACCESS DOORS FOR THAT PURPOSE.
   E) INSTALL EQUIPMENT TO FACILITATE SERVICING, MAINTENANCE, AND REPAIR OR REPLACEMENT OF EQUIPMENT COMPONENTS. AS MUCH AS PRACTICAL, CONNECT EQUIPMENT FOR EASE OF DISCONNECTING, WITH MINIMUM OF INTERFERENCE WITH OTHER INSTALLATIONS.
   F) BEFORE TRENCHING OR DIGGING, CONTACT THE UTILITY COMPANIES BY CALLING THE "CALL BEFORE YOU DIG" SERVICE AT 1–800–922–4455 FOR CONNECTICUT OR "DIG SAFE" AT 1–800–322–4844 FOR MASSACHUSETTS FOR INFORMATION REGARDING THE LOCATION OF UNDERGROUND UTILITIES. DO NOT RELY ON CONTRACT SITE AND BUILDING DRAWINGS FOR UTILITY INFORMATION AS THEY ARE SCHEMATIC IN NATURE AND DO NOT SHOW EXACT INFORMATION OR ALL UTILITY LINES THAT MAY BE PRESENT.
   G) FURNISH AND INSTALL CONCRETE LAGBOLT SYSTEM OR THREADED ROD WITH ALL HARDWARE TO FC–1 AND FC–2 TO GABLED CEILING.
   H) FURNISH AND INSTALL CONCRETE PRECAST PADS FOR GROUND MOUNTED EQUIPMENT.

7. SERVICE LABELING: LABEL EQUIPMENT, PIPING, CONDUITS, INCLUDING FANS, AIR HANDLERS, TERMINAL UNITS, PANELBOARDS, ETC. WITH LABELS MADE OF SELF–STICKING, PLASTIC FILM DESIGNED FOR PERMANENT INSTALLATION. LABELS SHALL MATCH DESIGNATIONS AS INDICATED ON CONTRACT DRAWINGS. IDENTIFY PIPING AND CONDUITS IN ACCORDANCE WITH OSHA 29 CFR 1910.144, EXCEPT THAT LABELS OR TAPES MAY BE USED IN LIEU OF PAINTING OR STENCILING. SPACING OF IDENTIFICATION MARKING ON RUNS SHALL NOT EXCEED 50 FEET. MATERIALS FOR LABELS AND TAPES SHALL CONFORM TO CID A–A–1689, AND SHALL BE GENERAL PURPOSE TYPE AND COLOR CLASS.
   A) IN ADDITION IDENTIFY SERVICES AS INDICATED BELOW:
   B) EACH POINT OF ENTRY AND EXIT OF PIPE OR CONDUITS PASSING THROUGH WALLS.
   C) EACH CHANGE IN DIRECTION, I.E., ELBOWS, TEES.
   D) IN CONGESTED OR HIDDEN AREAS AND AT ALL ACCESS PANELS AT EACH POINT REQUIRED TO CLARIFY SERVICE OR INDICATED HAZARD.
   E) IN LONG STRAIGHT RUNS, LOCATE LABELS AT DISTANCES WITHIN EYESIGHT OF EACH OTHER NOT TO EXCEED 50 FEET. ALL LABELS SHALL BE VISIBLE AND LEGIBLE FROM THE PRIMARY SERVICE AND OPERATING AREA.

8. MANUFACTURER'S NAMEPLATES: EACH ITEM OF EQUIPMENT SHALL HAVE A NAMEPLATE BEARING THE MANUFACTURER'S NAME, ADDRESS, MODEL NUMBER, AND SERIAL NUMBER SECURELY AFFIXED IN A CONSPICUOUS PLACE; THE NAMEPLATE OF THE DISTRIBUTING AGENT WILL NOT BE ACCEPTABLE.

9. POSTED OPERATING INSTRUCTIONS: PROVIDE FOR EACH SYSTEM AND PRINCIPAL ITEM OF EQUIPMENT AS SPECIFIED FOR USE BY OPERATION AND MAINTENANCE PERSONNEL. PRINT OR ENGRAVE OPERATING INSTRUCTIONS AND FRAME UNDER GLASS OR IN APPROVED LAMINATED PLASTIC. POST INSTRUCTIONS WHERE DIRECTED. FOR OPERATING INSTRUCTIONS EXPOSED TO THE WEATHER, PROVIDE WEATHER–RESISTANT MATERIALS OR WEATHERPROOF ENCLOSURES. OPERATING INSTRUCTIONS SHALL NOT FADE WHEN EXPOSED TO SUNLIGHT AND SHALL BE SECURED TO PREVENT EASY REMOVAL OR PEELING. THE OPERATING INSTRUCTIONS SHALL INCLUDE THE FOLLOWING:
   A) WIRING DIAGRAMS, CONTROL DIAGRAMS, AND CONTROL SEQUENCE FOR EACH PRINCIPAL SYSTEM AND ITEM OF EQUIPMENT.
   B) START UP, PROPER ADJUSTMENT, OPERATING, LUBRICATION, AND SHUTDOWN PROCEDURES.
   C) SAFETY PRECAUTIONS.
   D) THE PROCEDURE IN THE EVENT OF EQUIPMENT FAILURE.
   E) OTHER ITEMS OF INSTRUCTION AS RECOMMENDED BY THE MANUFACTURER OF EACH SYSTEM OR ITEM OF EQUIPMENT.

10. WARNING SIGNS: PROVIDE WARNING SIGNS FOR THE ENCLOSURES OF ELECTRICAL EQUIPMENT INCLUDING SUBSTATIONS, PAD–MOUNTED TRANSFORMERS, PAD–MOUNTED SWITCHES, GENERATORS, AND SWITCHGEAR HAVING A NOMINAL RATING EXCEEDING 600 VOLTS.

11. EXTERIOR FERROUS MATERIALS: ALL EXTERIOR FERROUS MATERIALS SHALL BE PROTECTED FROM CORROSION BY ONE OF THE FOLLOWING METHODS:
   A) COVERED WITH A NON–FERROUS OR NON–CORRODING MATERIAL.
   B) MATERIALS THAT ARE INSULATED ON THE EXTERIOR.
   C) MATERIALS THAT ARE GALVANIZED.
   D) MATERIALS THAT ARE PAINTED. EXTERIOR PAINTING SHALL CONSIST OF A BASE COAT OF AN APPROPRIATE PRIMER AND TWO COATS OF FINAL PAINT. FINAL PAINT COLOR SHALL BE SELECTED BY THE OWNER'S REPRESENTATIVE.

DUCTLESS SPLIT SYSTEM SCHEDULE		
INDOOR UNIT		
DESIGNATION	FC-1	FC-2
SERVICE	AREA 1	AREA 2
DESCRIPTION	CEILING CASSETT	CEILING CASSETT
SUPPLY AIR FLOW (CFM)	265	265
VENTILATION AIR FLOW (CFM)	30	N/A
TOTAL COOLING (BTU/HR)	12,000	12,000
TOTAL HEATING (BTU/HR), NOTE 3	13,800	13,800
LIQUID LINED SIZE (IN), NOTE 4	1/4	1/4
VAPOR LINE SIZE, NOTE 4	3/8	3/8
CONDENSATE CONNECTION SIZE (IN), NOTE 5	1-1/4	1-1/4
THERMOSTAT	PROVIDE DELUX WIRED THERMOSTAT	PROVIDE DELUX WIRED THERMOSTAT, NOTE 1
ACCESSORIES	CONDENSATE PUMP	CONDENSATE PUMP
LOCAL ELECTRICAL DISCONNECT	PROVIDE	PROVIDE
ELECTRICAL (V/PH/HZ)	INDDOR UNIT IS POWERED BY OUTDOOR UNIT	INDDOR UNIT IS POWERED BY OUTDOOR UNIT
MODEL	SLZ-KF12NA	SLZ-KF12NA
OUTDOOR UNIT		
DESIGNATION	HP-1	HP-1
LOCATION	EXTERIOR GRADE	EXTERIOR GRADE
SERVICE	FC-1	FC-1
DESCRIPTION	VARIBLE SPEED HEAT PUMP WITH HYPER-HEATING	VARIBLE SPEED HEAT PUMP WITH HYPER-HEATING
TOTAL COOLING (BTU/HR)	12,000	12,000
TOTAL HEATING (BTU/HR)	13,800	13,800
ACCESSORIES	STAND, BLUE FIN ANTI-CORROSION COIL TREATMENT	STAND, BLUE FIN ANTI-CORROSION COIL TREATMENT
CONCRETE PAD	PROVIDE	PROVIDE
LOCAL ELECTRICAL DISCONNECT	PROVIDE	PROVIDE
ELECTRICAL (V/PH/HZ)	208/1/60	208/1/60
ELECTRICAL MCA (AMPS)	14	14
ELECTRICAL MOCP (AMPS)	20, NOTE 2	20, NOTE 2
MODEL	SUZ-KA12NAHZ	SUZ-KA12NAHZ
MANUFACTURER	MISUBISHI ELECTRIC	MISUBISHI ELECTRIC

NOTES:
1. SET THERMOSTAT TO PROVIDE DEHUMIDIFICATION MODE FOR 10 MINUTES FOR EVERY HOUR.
2. VERIFY WITH MANUFACTURER.
3. BASED ON AN OUTDOOR AIT TEMPERATURE OF 5°F.
4. PROVIDE PIPING BETWEEN FC AND HP.
5. RUN CONDENSATE PIPING FROM FC TO THE EXTERIOR.

DUCTWORK INSULATION SCHEDULE										
DUCT SYSTEM	LOCATION	DUCT TEMP. (°F)	INSULATION MATERIAL, NOTE 3	INSULATION DENSITY (LB/CF)	INSULATION THICKNESS (IN), NOTE 1	K-FACTOR AT A 75°F MEAN TEMP. (BTU*IN/HR*ST*F)	MIN. INSTALLED R-VALUE (H*FT^2/BTU)	JACKET TYPE, NOTE 3	PRODUCT, NOTE 2	MANUFACTURER, NOTE 2
VENTILATION	CONDITIONED SPACE	0 TO 95	INORGANIC GLASS MINERAL WOOL BLANKET	0.75	2	0.29	6	FSK	FRIENDLY FEEL DUCT WRAP WITH ECOSE TECHNOLOGY	KNAUF

NOTES:
1. THICKNESS IS BASED ON LABEL.
2. OR EQUAL MANUFACTURERS ARE ACCEPTABLE.
3. INSULATION AND JACKET SHALL HAVE A MAXIMUM FLAME SPREAD OF 25 & SMOKE DEVELOPMENT OF 50 PER ASTM E 84.

DUCTWORK CONSTRUCTION SCHEDULE, NOTE 1			
DUCTWORK SYSTEM	DUCTWORK MATERIAL	PRESSURE CLASS (IWG), NOTE 2	SEAL CLASS, NOTE 3
VENTILATION NEGATIVE PRESSURE	GALVANIZED STEEL	-1	B

NOTES:
1. ALL DUCTWORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SMACNA 2005 "HVAC DUCT CONSTRUCTION STANDARDS".
2. PRESSURE CLASSIFICATIONS ARE BASED ON SMACNA 2005 "HVAC DUCT CONSTRUCTION STANDARDS".
3. SEAL CLASS A: SEAL ALL TRANSVERSE JOINTS, LONGITUDINAL SEAMS & DUCT WALL PENETRATIONS. SEAL CLASS B: SEAL ALL TRANSVERSE JOINTS & LONGITUDINAL SEAMS .

MECHANICAL PIPING & EQUIPMENT INSULATION SCHEDULE													
PIPING SYSTEM, NOTE 1	LOCATION	PIPING TEMP. (°F)	INSULATION THICKNESS BASED ON PIPE DIAMETER (IN), NOTE 2						INSULATION MATERIAL, NOTE 3	K-FACTOR AT A 75°F MEAN TEMP.	JACKET TYPE, NOTE 3	FITTING COVER TYPE	PRODUCT, NOTE 4	MANUFACT-URER, NOTE 4
			RUNOUTS <2	<=1	1.0 - 1.25	1.5 - 3.5	4 - 6	>=8						
REFRIGERANT VAPOR	INTERIOR	45	0.5	0.5	1.0	1.0	1.0	1.0	CLOSED CELL ELASTOMERIC FOAM	0.25	N/A	N/A	AP ARMAFLEX	ARMACELL
REFRIGERANT VAPOR	EXTERIOR	45	1.0	1.0	1.5	1.5	1.5	1.5	CLOSED CELL ELASTOMERIC FOAM	0.25	N/A	N/A	AP ARMAFLEX	ARMACELL

NOTES:
1. SEE PIPING SCHEDULE FOR PIPING TYPES.
2. RUNOUTS ARE AREAS WERE PIPING IS RUN IN PARTITIONS WITHIN CONDITIONED SPACES.
3. INSULATION AND JACKET SHALL HAVE A MAXIMUM FLAME SPREAD OF 25 & SMOKE DEVELOPMENT OF 50 PER ASTM E 84.
4. OR EQUAL MANUFACTURERS ARE ACCEPTABLE.

MECHANICAL PIPING MATERIAL SCHEDULE						
PIPING SYSTEM	ABBREVIATION	OPERATING TEMPERATURE (°F) OR PRESSURE (PSI)	SERVICE PRESSURE (PSI)	PIPE DIAMETER, NPS (INCH)	PIPE MATERIAL \ SCHEDULE OR TYPE \ SPECIFICATION	JOINT MATERIAL \ TYPE \ SPECIFICATION
COOLING COIL CONDENSATE	C	55°F	N/A	0.5 - 4.0	PVC\ 40 \ ASTM D 2665	PVC \ SOCKET SOLVENT CEMENT \ ASTM F 891
REFRIGERANT	LL & VL	45°F - 150°F	150	0.5 - 2.0	CPR-ACR \ \ ASTM B280	WC \ SOCKET BRAZED \ ASME B16.22

NOTES:
1. VALVE JOINT TYPE INCLUDES OTHER VALVES AND ITEMS NOT SHOWN IN SCHEDULE (I.E. STRAINERS, BALANCING VALVES)
2. DRAWINGS MAY INDICATE DIFFERENT VALVE TYPE. VALVE TYPE SHALL BE AS SHOWN ON DRAWINGS UNLESS OTHERWISE INDICATED.
3. MXIMUM WORKING PRESSURE OF 62 PSI AT 180°F.

PIPE MATERIAL SCHEDULE	
CPR-ACR	COPPER AIR-CONDITIONING REFRIGERATION
PVC	POLYVINYLCHLORIDE

JOINT MATERIAL SCHEDULE	
PVC	POLYVINYLCHLORIDE
WC	WROUGHT COPPER

FOR PERMITTING

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Kurt Kuegler, P.E.
198 Cutler Street
Watertown, CT
06795
203–233–1583

SCALE ADJUSTMENT GUIDE
0" 1"
BAR IS ONE INCH ON ORIGINAL DRAWING

REVISIONS		
NO.	DATE	DESCRIPTION

KURT W. KUEGLER No. 8156 REGISTERED PROFESSIONAL ENGINEER MECHANICAL

PROJECT NO.:	1119.21.01.01
DATE:	DECEMBER 2021
SCALE:	AS INDICATED
DESIGNED BY:	ERK
CHECKED BY:	ERK
DRAWN BY:	GJG
APPROVED BY:	SCO

WATER SYSTEM CHLORINATION & PRETREATMENT
PRUDENCE ISLAND WATER DISTRICT
PRUDENCE ISLAND, RHODE ISLAND

DRAWING TITLE:
MECHANICAL
HVAC
NOTES, SYMBOLS, & ABBREVIATIONS

DRAWING NO.: H-1

SHEET NO. 20 OF 26

M:\C27-03 Prudance Island\20 Dwg\C27-03 Prudance Island H1.dwg

ELECTRICAL ABBREVIATIONS

CNTL – CONTROL
DH – DOOR HOLDER
EF – EXHAUST FAN
EGC – EQUIPMENT GROUNDING CONDUCTOR
EMT – ELECTRICAL METALLIC TUBING
EOLD – END OF LINE DEVICE
EQPM – EQUIPMENT
EWH – ELECTRIC WATER HEATER
EXG – EXISTING
FA – FIRE ALARM
FAAP – FIRE ALARM ANNUNCIATION PANEL
FACP – FIRE ALARM CONTROL PANEL
FMP – FIRE MANUAL PULL STATION
FT – FEET
FU – FUSED
GEC – GROUNDING ELECTRODE CONDUCTOR
GFCI – GROUND FAULT CIRCUIT INTERRUPTER
GFI – GROUND FAULT INTERRUPTER
GFP – GROUND FAULT PROTECTION
HOA – HAND OFF AUTO
HP – HORSEPOWER
IEGC – INSULATED EQUIPMENT GROUNDING CONDUCTOR
IMC – INTERMEDIATE METAL CONDUIT
KA.I.C. – KILO–AMPERES INTERRUPTING CURRENT
KVA – KILO VOLT–AMPERES
KW – KILOWATT
LTG – LIGHTING
MCCB – MOLDED CASE CIRCUIT BREAKER
MDP – MAIN DISTRIBUTION PANEL
MOCP – MAXIMUM OVERCURRENT PROTECTION
MLO – MAIN LUG ONLY
N/A – NOT APPLICABLE
N.C. – NORMALLY CLOSED
NEC – NATIONAL ELECTRIC CODE
NF – NON–FUSED
N.O. – NORMALLY OPEN
P – POLE
PC – PHOTOCELL
PNL – PANEL
PWR – POWER
QTY – QUANTITY
RECPT – RECEPTACLE
REQ'D – REQUIRED
RM – ROOM
RSC – RIGID STEEL CONDUIT
SQ – SQUARE
SWBD – SWITCHBOARD
T–STAT – THERMOSTAT
TC – TIME CLOCK
(TYP.) – TYPICAL FOR OTHER LOCATIONS
VA – VOLTS–AMPERES
VAC – VOLTS–ALTERNATING CURRENT
VAV – VARIABLE AIR VOLUME
W – WIRE
WP – WEATHERPROOF

INDIAN SPRINGS POWER AND CONTROL WIRING WORK ITEMS AND INTERCONNECTION SCHEDULE

WORK ITEM	USE	WORK ITEM	CONDUIT / WIRING	ADDITIONAL REQUIREMENT
W1	PROVIDE POWER TO WATER TREATMENT PLANT BUILDING FROM MAIN BUILDING	PROVIDE 3 PHASE 100AMP 408Y/277 FEEDER FROM EXISTING MDP PANEL, PROVIDE 100AMP BREAKER TO FIT EXISITNG PANEL,, PROVIDE AND INSTALL TREATMENT MAIN PANEL, TRANSFORMER AS SHOWN	SEE D1	SEE ONE LINE DIAGRAM AND PANEL SCHEDULES AND SIZES OF EQUIPMENT AND CONDUCTORS
W2	PROVIDE SCADA BACKBONE BETWEEN WELL HOUSE AND TREATMENT BUILDING	PROVIDE AND INSTALL WIRING FOR SCADA SYSTEM, PROVIDE BACK BONE CONNECTION FROM SCADA RTU IN THE PUWELL HOUSE TO THE FCP IN TREATMENT BUILDING, ALSO PROVIDE WIRING TO DEVICES SEE W4	SEE D2	CONTRACTOR SHALL COORDINATE WITH CONTROLS INSTALLER FOR INSTALLATION AND FINAL PUNCH DOWN LOCATION OF ALL CONTROLS AND WIRING.
W3	SPARE DUCTS AND CONDUITS FOR BUILDING INTERCONNECTIONS	SPARE: CONDUITS AND DUCTS FOR FUTURE COMMUNICATIONS AND CONTROL CONNECTION BETWEEN BUILDINGS	SEE D3	
W4	CONTROLS WIRING GENERAL	PROVIDE WIRING AND CONNECTIONS OF CONTROLS/RTUS TO EQUIPMENT PER THE PROCESS DRAWINGS, PROVIDE BACK BONE CONECTION AND DEVICE CONNECTION TO PID DRAWINGS	3/4"PVC	SEE PROCESS AND INSTRUMENTATION DRAWINGS. FOR EVERY DO OR DI PROVIDE (1) UTP CABLE. FOR EVERY AO OR AI PROVIDE (1) STP CABLE, SEE SPECIFICATIONS FOR BINARY AND ANALOG SIGNALS.
W5	CHEMICAL FEED PUMP CONTROLLED OUTLETS ON WHEN WELL PUMPS ARE ON (INDIAN SPRINGS WELL HOUSE)	PROVIDE DUPLEX OUTLET FED FROM EXISITNG PANEL AND CONTROLED BY WELL PUMP STARTER VIA A CONTACTOR PANEL, TO BE PROVIDED. CONTRACTOR TO VERIFY AND UTILIZE EXISITNG "OVER LOAD/OUTPUT CONTACT" OF THE EXISING STARTER. CONTACTOR PANEL SHALL HAVE TRANSFORMER AND CONTACTOR COIL SUITIBLE FOR THE REMOTE CONTACTS ON THE EXISITNG STARTER . THE EXISITNG STARTER SHALL ENERGIZE AND CLOSE THE OUT PUT CONTACT ON THE CONTACTOR POWERING THE DUPLEX OULET WHEN MOTOR IS RUNNING. IF SUITABLE CONTACTS ARE NOT AVAIALBE THEN ALTERNATE CONTROL METHOD IS AS FOLLOWS: PROVIDE CONTACTOR WITH COIL ENTERGIZED BY DIRECTLY POWER BY POWER TO PUMP BY TAPPING POWER TO WELL PUMP AT ITS STARTER OUTPUT. INTERCEPT TWO LEADS LINE TO LINE (480V)PROVIDE (2) POLE 20AMP BREAKER WITH LEADS AS SHORT AS POSSIBLE FOR THE TAP, TAP SHALL FOLOW TAP RULES FOR WIRE SIZE ACROSS LINE TO LINE . THE CONTACTOR COILD VOLTAGE IN THIS INSTANCE IS 480V.	3/4"PVC	PROVIDE (2) 120V 20AMP CIRCUIT FROM EXISITNG 120V PANEL FOR RECEPTICAL POWER AND CONTACTOR POWER, PROVIDE 1 POLE 20AMP BREAKER FOR THE OUTLET AND A 1 POLE 15 AMP BREAKER FOR THE CONTACTOR CONTROL POWER. THESE BREAKERS SHALL MATCH EXISITNG TYPE. IF THE ALTERNATE METHOD IS USED CONTROL POWER IS NOT NEEDED SINCE CONTROL POWER IS THE PUMP POWER. IF ALTERNATE METHOD IS USED (2) RELAYS/COILS ARE REQUIRED FOR EACH PUMP AND THEIR OUTPUTS ARE WIRED IN PARALLEL (OR FUNCTION, EITHER PUMP ON , THEN OUTLET IS ON.
W6	RTU / CONTOL SYSTEM (SCADA) POWER (INDIAN SPRINGS WELL HOUSE)	PROVIDE POWER TO RTU/PANEL VIA A HARDWIRE CONNECTION ON A DEDICATED CIRCUIT FED FROM 120V EXISITNG PANEL	3/4"PVC	FOR EACH CIRCUIT, PROVIDE (1) 120V 20AMP CIRCUIT FROM EXISITNG 120V PANEL FOR RECEPTICAL POWER, PROVIDE 1 POLE 20AMP BREAKER FOR THE EXITING PANEL, THESE BREAKERS SHALL MATCH EXISITNG TYPE.

DUCTS (D#)	USE	WORK ITEM	CONDUIT	(QTY) X (QTY) WIRE/CABLE
D1	UNDERGROUND DUCT FOR POWER FEED TO WATER TREATMENT PLANT P FROM EXISTING WELL HOUSE	PROVIDE 3 PHASE UNDERGROUND POWER FEEDER SEE WORK ITEM 1	(2) 2-1/2"	(1) ACTIVE (1) SPARE, ACTIVE WITH (4) 3/0 AND & (1) #4 EGC,
D2	CONTROL/T BACKBONE TO WATER TREATMENT BUILDING FROM EXISTING WELL HOUSE	PROVIDE UNDERGROUND CONDUIT FOR SCADA BACK BONE	(2) 2-1/2"	(1) ACTIVE (1) SPARE CONDUIT, ACTIVE WITH CAT 6 CABLE, SEE WORK ITEM W2
D3	SPARE: FUTURE TELECOMM / SECURITY BETWEEN BUILDINGS	PROVIDE (2) CONDUITS IN DUCT BANK	(2) 2-1/2"	(2) SPARE

BRANCH CIRCUITS	USE	WORK ITEM	CONDUIT	(QTY) X (QTY) WIRE/CABLE
B1	BACK WASH PUMP POWER AND CONTROL, GRUNDFOS 1.5HP, VIA STARTER	PROVIDE COMBINATION STARTER WITH DISCONNECT SIZED TO MOTOR WITH HOMERUN TO PANEL HV1. STARTER SHALL BE ELECTRONIC SOFT START WITH ACROSS THE LINE CONTACTOR IN A NEMA 1 ENCLOSURE. PROVIDE HOA SWITCH, PROVIDE START WIRING TO CONTROL PANEL	3/4"	SEE PANEL SCHEDULE FOR WIRE SIZE AND CIRCUIT INFO
B2	VARIOUS BRANCH CIRCUITS FOR LIGHTING AND POWER	PROVIDE DEVICES AND HOMERUNS TO CIRCUIT BREAKER PANEL WITH ITEMS SHOWING HOME RUNS ON THE B2 DRAWINGS	3/4"	SEE PANEL SCHEDULE FOR CIRCUITS AND WIRE SIZE INFO
B3	HVAC POWER	PROVIDE POWER FOR OUT DOOR UNITS AND WIRING FROM OUT DOOR TO INDOOR UNIT PER MANUFACTURES INSTRUCTION	3/4"	SEE PANEL SCHEDULE FOR WIRING AND CIRCUIT SIZE FOR OUT DOOR UNIT HOME RUN.

ARMY CAMP POWER AND CONTROL WIRING WORK ITEMS AND INTERCONNECTION SCHEDULE

WORK ITEM	USE	WORK ITEM	CONDUIT / WIRING	ADDITIONAL REQUIREMENT
W7	CHEMICAL FEED PUMP CONTROLLED OUTLETS ON WHEN WELL PUMPS IS ON (ARMY CAMP)	PROVIDE DUPLEX OUTLET FED FROM EXISITNG PANEL AND CONTROLED BY WELL PUMP STARTER VIA A CONTACTOR PANEL, TO BE PROVIDED. CONTRACTOR TO VERIFY AND UTILIZE EXISITNG "OVER LOAD/OUTPUT CONTACT" OF THE EXISING STARTER. CONTACTOR PANEL SHALL HAVE TRANSFORMER AND CONTACTOR COIL SUITIBLE FOR THE REMOTE CONTACTS ON THE EXISITNG STARTER . THE EXISITNG STARTER SHALL ENERGIZE AND CLOSE THE OUT PUT CONTACT ON THE CONTACTOR POWERING THE DUPLEX OULET WHEN MOTOR IS RUNNING. IF SUITABLE CONTACTS ARE NOT AVAIALBE THEN ALTERNATE CONTROL METHOD IS AS FOLLOWS: PROVIDE CONTACTOR WITH COIL ENTERGIZED BY DIRECTLY POWER BY POWER TO PUMP BY TAPPING POWER TO WELL PUMP AT ITS STARTER OUTPUT. INTERCEPT TWO LEADS LINE TO LINE (480V)PROVIDE (2) POLE 20AMP BREAKER WITH LEADS AS SHORT AS POSSIBLE FOR THE TAP, TAP SHALL FOLOW TAP RULES FOR WIRE SIZE ACROSS LINE TO LINE . THE CONTACTOR COILD VOLTAGE IN THIS INSTANCE IS 480V.	3/4"PVC	PROVIDE (2) 120V 20AMP CIRCUIT FROM EXISITNG 120V PANEL FOR RECEPTICAL POWER AND CONTACTOR POWER, PROVIDE 1 POLE 20AMP BREAKER FOR THE OUTLET AND A 1 POLE 15 AMP BREAKER FOR THE CONTACTOR CONTROL POWER. THESE BREAKERS SHALL MATCH EXISITNG TYPE. IF THE ALTERNATE METHOD IS USED CONTROL POWER IS NOT NEEDED SINCE CONTROL POWER IS THE PUMP POWER.
W8	CLHORINE ANALYZER POWER	HARDWIRE ON A DEDICATED CIRCUIT FOR EACH HOME RUN SHOWN	3/4"PVC	FOR EACH CIRCUIT, PROVIDE (1) 120V 20AMP CIRCUIT FROM EXISITNG 120V PANEL FOR RECEPTICAL POWER, PROVIDE 1 POLE 20AMP BREAKER FOR THE EXITING PANEL, THESE BREAKERS SHALL MATCH EXISITNG TYPE.
W9	CONTROLS WIRING GENERAL	PROVIDE POWER TO RTU/PANEL VIA A HARDWIRE CONNECTION ON A DEDICATED CIRCUIT FED FROM 120V EXISITNG PANEL	3/4"PVC	SEE PROCESS AND INSTRUMENTATION DRAWING. FOR EVERY DO OR DI PROVIDE (1) UTP CABLE AND FOR AO OR AI PROVIDE (1) Stp CABLE, SEE SPECIFICATIONS FOR BINARY AND ANALOG SIGNALS

GENERAL ELECTRICAL NOTES & REQUIRMENTS

ELECTRICAL NOTES & SPECIFICATIONS:

PART 1 GENERAL:

1. SEE SPECIFICATIONS, DIVISION 16 ELECTRICAL AND THE OTHER SPECIFICATIONS REFERENCED IN DIVISION 16 SPECIFICATIONS.
2. PROVIDE A COMPLETE AND OPERATIONAL ELECTRICAL SYSTEM INCLUDING ALL NECESSARY MATERIAL, LABOR, EQUIPMENT AND TESTING REQUIRED.
3. ELECTRICAL PLANS, DETAILS, AND ONE–LINE DIAGRAMS SHOW THE GENERAL LOCATION AND ARRANGEMENT OF THE ELECTRICAL SYSTEM. THEY ARE DIAGRAMMATIC AND DO NOT SHOW ALL CONDUIT BODIES, CONNECTORS, BENDS, FITTINGS, HANGERS, AND ADDITIONAL PULL AND JUNCTION BOXES WHICH THE CONTRACTOR MUST PROVIDE TO COMPLETE THE ELECTRICAL SYSTEM. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS BY FIELD MEASUREMENTS.
4. ELECTRICAL PLANS AND DETAILS DO NOT SHOW ALL INTERFERENCES AND CONDITIONS, VISIBLE AND/OR HIDDEN, THAT MAY EXIST, THUS REQUIRING THE CONTRACTOR TO INSPECT AND SURVEY THE SPACE BEFORE PERFORMING THE WORK.
5. ALL EQUIPMENT AND MATERIAL SHALL BE LABELED AND LISTED AND INSTALLED IN ACCORDANCE WITH THEIR LISTING.
6. THE CONTRACTOR SHALL OBTAIN ALL REQUIRED PERMITS AND ARRANGE FOR ALL REQUIRED INSPECTIONS IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL GOVERNING AUTHORITIES.
7. ALL WORK SHALL BE DONE BY LICENSED WORKMEN IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL GOVERNING AUTHORITIES AND CODES.
8. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE RHODE ISLAND STATE BUILDING CODE, RHODE ISLAND ELECTRIC CODE AND ITS ADOPTION AND ITS MODIFICATIONS TO THE NATIONAL ELECTRIC CODE (NEC) ANSI/NFPA 70.
9. THE DEFINITION OF ELECTRICAL TERMS USED SHALL BE AS DEFINED IN THE 2017 EDITION OF THE NATIONAL ELECTRICAL CODE (NEC).
10. THE TERM "INDICATED" SHALL MEAN, "AS SHOWN ON CONTRACT DOCUMENTS (SPECIFICATIONS, DRAWINGS, AND RELATED ATTACHMENTS)".
11. THE TERM "PROVIDE" SHALL MEAN, "TO FURNISH, INSTALL, AND CONNECT COMPLETELY".
12. THE TERM "SIZE" SHALL MEAN ONE OR MORE OF THE FOLLOWING: "LENGTH, CURRENT AND VOLTAGE RATING, NUMBER OF POLES, NEMA SIZE, AND OTHER SIMILAR ELECTRICAL CHARACTERISTICS".
13. THE TERM "SPACE" ON PANELBOARD AND SWITCHBOARD SCHEDULES SHALL MEAN, "PROVIDE SPACE TO INSTALL THE NUMBER OF POLES AND SIZE OF THE PROTECTIVE DEVICE INDICATED WITH ALL THE NECESSARY SPACE ON THE BUSBAR AND FITTINGS TO INSTALL THE DEVICE AT SOME FUTURE DATE".
14. THE TERM "COORDINATE" SHALL MEAN ONE OR MORE OF THE FOLLOWING: "TO MANAGE, INTERFACE, COMMUNICATE, MAKE ARRANGEMENT, BRING INTO ORDER, ADMINISTER AND HANDLE COMPLETELY".
15. WRITTEN REQUESTS FOR APPROVAL FOR PLANNED SHUTDOWNS OR INTERRUPTION OF OWNER'S ELECTRIC SERVICE AND EQUIPMENT SHALL BE MADE 72 HOURS PRIOR TO THE START OF THE REQUESTED SHUTDOWN PERIODS.
16. COORDINATE ELECTRICAL WORK WITH OWNER.
17. COORDINATE ELECTRICAL WORK WITH OTHER DIVISIONS OF THIS PROJECT.
18. PROVIDE SHOP DRAWINGS, CATALOG CUTS FOR ALL EQUIPMENT USED ON THE PROJECT.
19. PROVIDE AS–BUILTS, AND OPERATIONAL AND MAINTENANCE (O&M) DOCUMENTATION TO OWNER..

PART 2 PRODUCTS AND EXECUTION

20. THE CONTRACTOR SHALL VISIT THE SITE OF WORK AND FAMILIARIZE HIMSELF WITH ALL AVAILABLE INFORMATION CONCERNING THE NATURE OF THE INSTALLATION AND CONDITIONS. FAILURE OF THE CONTRACTOR TO ACQUAINT HIMSELF WITH ALL AVAILABLE INFORMATION CONCERNING THE ABOVE CONDITIONS WILL NOT RELIEVE THE CONTRACTOR FROM THE RESPONSIBILITY FOR ESTIMATING THE DIFFICULTIES AND COSTS FOR SUCCESSFULLY PERFORMING THE COMPLETE WORK UNDER THIS PROJECT.
21. THE RIGHT IS RESERVED BY THE ENGINEER OR OWNER TO MAKE REASONABLE CHANGES IN LOCATIONS OF EQUIPMENT, OUTLETS, OR WIRING PRIOR TO THE INSTALLATION WITHOUT INVOLVING ADDITIONAL COST OR EXPENSE TO THE OWNER.
22. TURN OVER TO THE OWNER ALL MANUFACTURER'S WARRANTIES FOR EQUIPMENT AND MATERIALS PROVIDED.
23. UNLESS OTHERWISE INDICATED, ALL ELECTRICAL EQUIPMENT HAS BEEN BASED ON GENERAL ELECTRIC PRODUCTS. THE CONTRACTOR MAY SUBSTITUTE PRODUCTS OF ANOTHER MANUFACTURER IF IT IS OF EQUAL QUALITY AND RATING, SUBJECT TO ENGINEER'S REVIEW AND OWNER'S ACCEPTANCE.
24. WHEN A MANUFACTURER RECOMMENDS AN OPTION OR ACCESSORY ITEM FOR THE INSTALLED CONDITION, OPERATION, OR ENVIRONMENT THAT IS TO BE EXPERIENCED, SUCH ITEM SHALL BE SUPPLIED AT NO ADDITIONAL COST TO THE OWNER.
25. BEFORE SELECTING MATERIAL, EQUIPMENT AND PROCEEDING WITH WORK, INSPECT AREAS WHERE MATERIAL AND EQUIPMENT ARE TO BE INSTALLED TO ENSURE SUITABILITY, AND CHECK NEEDED SPACE FOR PLACEMENT, CLEARANCES AND INTERCONNECTIONS.
26. PROVIDE TRENCHING, SAND, BACKFILL, WARNING TAPES AND PATCHING OF SURFACES FOR ALL UNDERGROUND UTILITY LINES SUCH AS ELECTRICAL, POWER DISTRIBUTION AND COMMUNICATIONS UNDERGROUND DUCTS.
27. PROVIDE GROUNDING AND BONDING OF WATER TREATMENT EQUIPMENT.
28. PROVIDE GROUND ELECTRODE SYSTEM FOR THE BUILDING INCLUDING A 2/0 GROUND RING AROUND THE BUILDING, WITH (4) GROUND RODS (1 EACH CORNER) BONDED TO THE FOUNDATION REBAR, SHELTER STEEL. BOND ELECTRIC DISTRIBUTION EQUIPMENT AND PROCESS EQUIPMENT TO THE GROUND RING AND GROUND ELECTRODE SYSTEM.

FOR PERMITTING

H2Olson Engineering, Inc.
DRINKING WATER PROFESSIONALS
www.h2olsonengineering.com
(508) 375-7007

Kurt Kuegler, P.E.
198 Cutler Street
Watertown, CT
06795
203–233–1583

SCALE ADJUSTMENT GUIDE
0" 1"
BAR IS ONE INCH ON ORIGINAL DRAWING

REVISIONS

NO.	DATE	DESCRIPTION

KURT W. KUEGLER
No. 8156
REGISTERED PROFESSIONAL ENGINEER
MECHANICAL

PROJECT NO.:	1119.21.01.01
DATE:	DECEMBER 2021
SCALE:	AS INDICATED
DESIGNED BY:	ERK
CHECKED BY:	ERK
DRAWN BY:	GJG
APPROVED BY:	SCO

WATER SYSTEM CHLORINATION & PRETREATMENT
PRUDENCE ISLAND WATER DISTRICT
PRUDENCE ISLAND, RHODE ISLAND

DRAWING TITLE:
ELECTRICAL NOTES, SYMBOLS, & ABBREVIATIONS

DRAWING NO.:
E-1

SHEET NO. 21 OF 26

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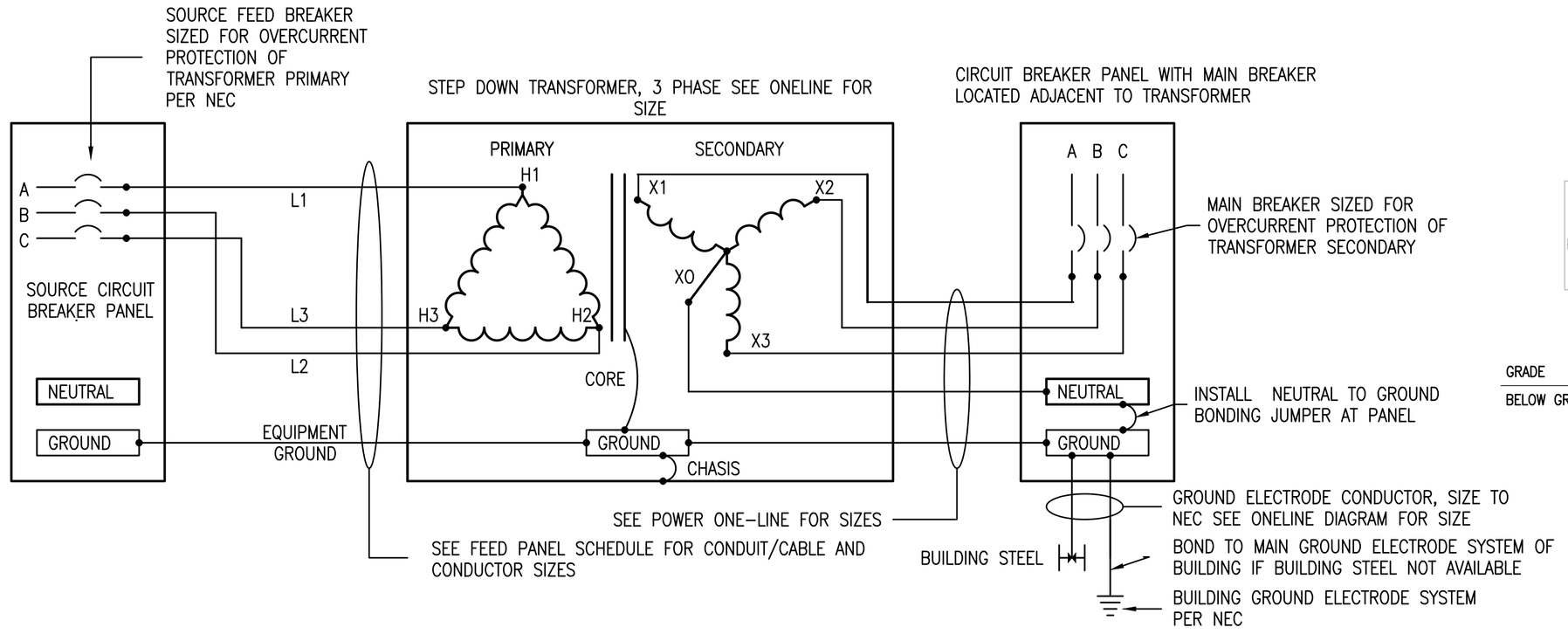
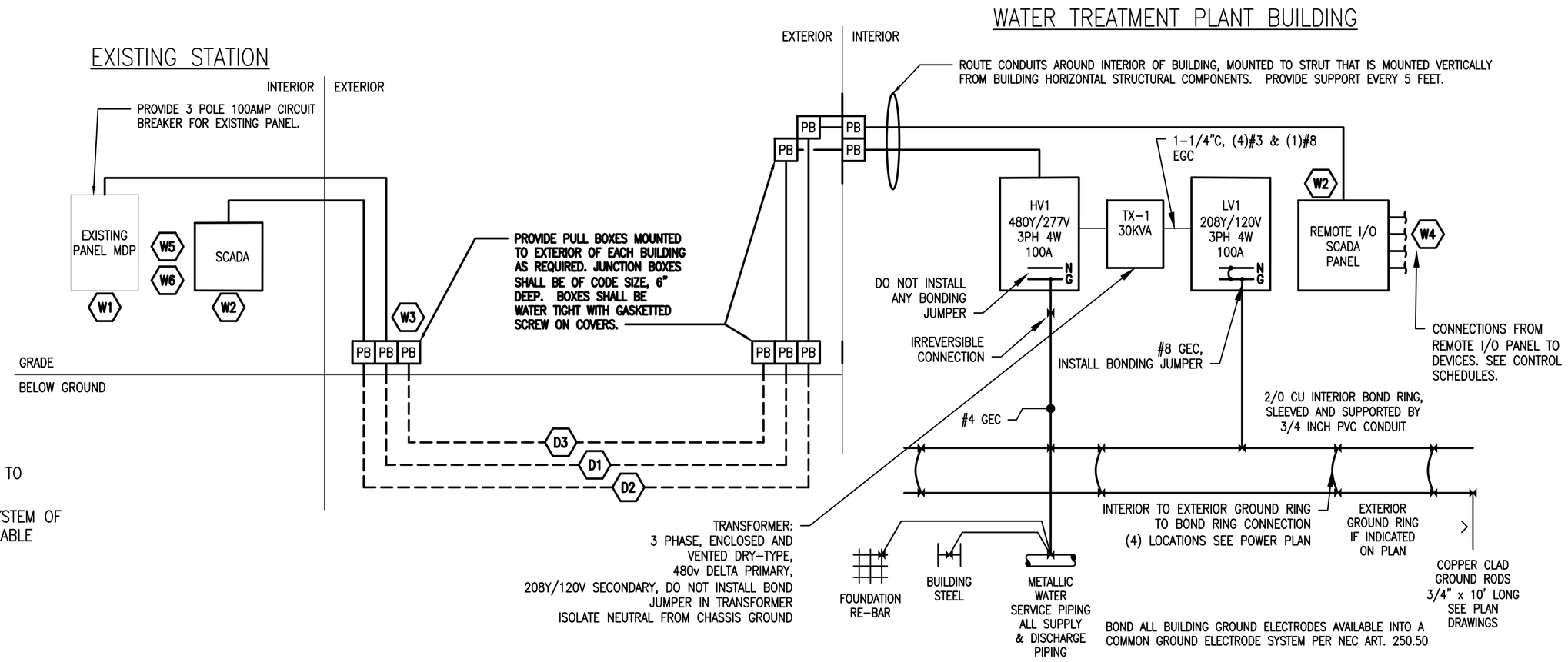


STEP DOWN TRANSFORMER CONNECTION DIAGRAM

NO SCALE



ELECTRICAL ONE-LINE

SCALE: NTS

ONE-LINE NOTES:
1) SEE POWER AND CONTROL INTERCONNECTION SCHEDULES AND WORK ITEMS ALONG WITH DUCT SCHEDULE FOR WIRING INFORMATION
2) NOT ALL REQUIRED JUNCTION OR PULL BOXES AND OR HAND HOLES ARE SHOWN WHICH ARE REQUIRED TO COMPLETE THE INSTALLATION, PULL BOXES SHOWN MUST BE INSTALLED AS NOTED.
3) SEE OTHER DRAWINGS FOR LOCATIONS AND SCHEDULE INFORMATION FOR ALL EQUIPMENT, WIRING AND INFORMATION REQUIRED TO COMPLETE THE INSTALLATION

PANELBOARD	Class: LIGHTING	Circuit Short Rating (Min.): 22 KA.I.C.
HV1	Type: G.E. TYPE AE	Remark:
SERVICE	480Y/277V Volts, 3 Phase, 4 Wire	S/E Label: NO, **** DO NOT IS STALL BONDING JUMPER**
PANELBOARD	200 AMPERE TIN PLATED COPPER MAIN BUS	Entrance: TOP
CONFIGURATION	Trim: SURFACE, , Neutral bus ISOLATED FROM GND	Equipment Ground Bus: YES, SEPARATE THAN NEUTRAL
MAIN	Type: 100A 3P MOLDED CASE CIRCUIT BREAKER , LABEL "MAIN DISCONNECT" Wire Size: #3 - 3/0 NUMBER PER PHASE: 1 Wire Material: CU	
BRANCH CIRCUITS	Branch Protective Devices: MOLDED CASE CIRCUIT BREAKERS, BOLT-ON TYPE	

Ckt. No.	Circuit Designation	KVA Load	Num. Pole	Trip Amps	Frame Amps	Wire (min.), PANEL SCHED NOTE #
1	PANEL LV1 VIA TX-1	12.3	3	50	100	1" C, (4) #8 & (1) #10 EGC,
2	BACH WASH PUMP	2.0	3	20	100	3/4" C, (4) #12 & (1) #12 EGC,
3	---		-	-	100	
4	---		-	-	100	
5	---		-	-	100	
6	---		-	-	100	
7	SPARE		3	30	100	
8	SPARE		3	15	100	
9	---		-	-	100	
10	---		-	-	100	
11	---		-	-	100	
12	---		-	-	100	
13	SPARE		1	20	100	
14	SPARE		1	20	100	
15	SPACE		1		100	
16	SPACE		1		100	
17	SPACE		1		100	
18	SPACE		1		100	
19	SPACE		1		100	
20	SPACE		1		100	
21	SPACE		1		100	
22	SPACE		1		100	
23	SPACE		1		100	
24	SPACE		1		100	
25	SPACE		1		100	
26	SPACE		1		100	
27	SPACE		1		100	
28	SPACE		1		100	
29	SPACE		1		100	
30	SPACE		1		100	
	TOTAL CONNECTED	14.3				

PANELBOARD	Class: LIGHTING	Circuit Short Rating (Min.): 10 KA.I.C.
LV1	Type: G.E. TYPE AQ	Remark:
SERVICE	208Y/120V Volts, 3 Phase, 4 Wire	S/E Label: NO
PANELBOARD	125 AMPERE TIN PLATED COPPER MAIN BUS	Entrance: BOTTOM
CONFIGURATION	Trim: SURFACE	Equipment Ground Bus: YES
MAIN	Type: 100AMP 3P MOLDED CASE CIRCUIT BREAKER Wire Size: #6 THROUGH #3 NUMBER PER PHASE: 1 Wire Material: CU	
BRANCH CIRCUITS	Branch Protective Devices: MOLDED CASE CIRCUIT BREAKERS, BOLT-ON TYPE	

Ckt. No.	Circuit Designation	KVA Load	Num. Pole	Trip Amps	Frame Amps	Wire (min.), PANEL SCHED NOTE #
1	RECEPTACLES OFFICE	0.4	1	20	100	3/4" C, (2) #12 & (1) #12 EGC,
2	LIGHT OFFICE	0.5	1	20	100	3/4" C, (2) #12 & (1) #12 EGC,
3	RECEPTACLES OFFICE	0.4	1	20	100	3/4" C, (2) #12 & (1) #12 EGC,
4	CONTROL PANEL POWER	1.0	1	20	100	3/4" C, (2) #12 & (1) #12 EGC,
5	RECEPTACLES OFFICE	0.4	1	20	100	3/4" C, (2) #12 & (1) #12 EGC,
6	FILTER SYSTEM POWER	1.0	1	20	100	3/4" C, (2) #12 & (1) #12 EGC,
7	RECEPTACLES OFFICE	0.4	1	20	100	3/4" C, (2) #12 & (1) #12 EGC,
8	SPARE		1		100	
9	RECEPTACLES OFFICE	0.5	1	20	100	3/4" C, (2) #12 & (1) #12 EGC,
10	LIGHT TREATMENT	0.5	1	20	100	3/4" C, (2) #12 & (1) #12 EGC, NOTE A, GFCI
11	RECEPTICAL GP TREATMENT	0.2	1	20	100	3/4" C, (2) #12 & (1) #12 EGC, NOTE A, GFCI
12	SPARE		1	20	100	
13	RECEPTICAL GP TREATMENT	0.2	1	20	100	3/4" C, (2) #12 & (1) #12 EGC, NOTE A, GFCI
14	SPACE		1		100	
15	RECEPTICAL GP TREATMENT	0.2	1	20	100	3/4" C, (2) #12 & (1) #12 EGC, NOTE A, GFCI
16	SPACE		1		100	
17	RECEPTICAL GP TREATMENT	0.2	1	20	100	3/4" C, (2) #12 & (1) #12 EGC, NOTE A, GFCI
18	SPACE		1		100	
19	RECEPTICAL GP TREATMENT	0.2	1	20	100	3/4" C, (2) #12 & (1) #12 EGC, NOTE A, GFCI
20	SPACE		1		100	
21	SPACE		1		100	
22	EXTERIOR LIGHTING	0.1	1	20	100	3/4" C, (2) #12 & (1) #12 EGC,
23	RECEPTACLE EL BACK BOARD	0.1	1	20	100	3/4" C, (2) #12 & (1) #12 EGC, NOTE A, GFCI
24	SPACE		1		100	
25	SPACE		1		100	
26	EXTERIOR RECEPTICAL, HVAC MAINT.	0.2	1	20	100	3/4" C, (2) #12 & (1) #12 EGC, NOTE A, GFCI
27	HVAC HP-1	2.9	2	20	100	3/4" C, (2) #12 & (1) #12 EGC,
28	HVAC HP-2	2.9	2	20	100	3/4" C, (2) #12 & (1) #12 EGC,
29	-	-	-	-	100	
30	-	-	-	-	100	
	KVA CONNECTED TOTAL	12.3				

NOTE A PROVIDE GFCI GROUND FAULT CIRCUIT BREAKER, MARK OUTLET TO INDICATE GFCI PROTECTED.

LIGHTING FIXTURE AND CONTROL DEVICE SCHEDULE

TYPE	DESCRIPTION	MANUFACTURER / CATALOG NO	LUMENS NOMINAL	WATTS	TYPE	COLOR TEMP DEGREES K	CRI	OPERATING VOLTS	INSTALLATION & MOUNTING
A	4FT LED ENCLOSED AND SILICON GASKETED. POLYCARBONATE HOUSING. WHITE FINISH , VAPOR TIGHT	LITHONIA CSVT OR EQUAL	5,000		LED	4000 K	>=80	120-277V	CEILING OR STRUCTURE SURFACE. PROVIDE JUNCTION BOX WITH SHORT FLEXIBLE WHIPTO FIXTURE.
B	4FT LED SURFACE VOLUMETRIC, SURFACE CONDUIT END CAPS BOTH ENDS WHITE FINISH	LITHONIA STL 4L OR EQUAL	4800	45	LED	3500K	>=80	120-277V	CEILING OR STRUCTURE SURFACE. DIRECT
EM2	2-HEAD EMERGENCY LIGHT EXIT SIGN COMBO UNIT WITH A 2 HEAD WEATHER PROOF REMOTE WHITE HIGH-IMPACT THERMOPLASTIC HOUSING WET LOCATION RATED PROVIDES A MINIMUM 90 MINUTES , 12 VOLT SEALED MAINTENANCE-FREE BATTERY WITH TEST SWITCH AND STATUS INDICATOR FOR VISUAL AND MANUAL MEANS OF MONITORING SYSTEM OPERATION, OPTIONAL HIGH OUTPUT LEDS, 12 WATT CAPACITY, WHITE FINISH	LITHONIA WLTC, OR EQUAL WITH REMOTE WEATHERPROOF HEADS	>546	6	LED HI LUM	NA	>=80	120-277V	WALL SURFACE, 6 FT EGRESS WITDTH MH OF 20' SPACING LT EQ TO 40 FT.AIM FIXTURES AT 45 DEGRESS OUT AND CENTERED ON EGRESS PATH OR EXIT WAY
X1	EXTERIOR ARCHITECTURAL WALL, WITH PHOTOCELL AND MOTION PROVIDE SURFACE MOUNT BACK BOX, DARK BRONZE	LIHONIA WDGE1 LED P1 40K 80CRI VW MVOLT, OR EQUAL	1,100	10	LED	4000K	>=80	120-277V	EXTERIOR WALL

LIGHT FIXTURE SCHEDULE NOTES

#	DESCRIPTION
1	GENERAL NOTE - CATALOG NUMBER MAY NOT SPECIFY ALL OPTIONS, ACCESSORIES, ADAPTERS THAT MUST BE PROVIDED FOR A COMPLETE INSTALLATION, OR SPARE ITEMS, SEE OTHER COLUMNS IN THIS SCHEDULE, CONTRACT DOCUMENTS AND ACTUAL CONDITIONS ENCOUNTERED.
2	GENERAL NOTE - MOUNTING INDICATED SHOWS BASIC FIXTURE MOUNTING ARRANGEMENT. SEE ARCHITECTURAL AND OTHER DOCUMENTS FOR ADDITIONAL INFORMATION WHICH AMY EFFECT FIXTURE PLACEMENT AND MOUNTING STRUCTURES (CEILING AND WALL CONSTRUCTION, ETC). PROVIDE MOUNTING ADAPTERS AS REQUIRED.
3	GENERAL NOTE - CONTRACTOR MUST PROVIDE ADJUSTMENTS (ALIGNMENTS AND FOCUSING) FOR FIXTURES WHICH ARE ADJUSTABLE. ADJUSTMENTS SHALL PROVIDE OPTIMAL ILLUMINATION OF AREA TO BE ILLUMINATED. ADJUSTMENTS SHALL BE MADE TO PROVIDE EVEN ILLUMINATION.
4	GENERAL NOTE - ALL LED FIXTURES SHALL HAVE A SINGLE BALLAST OR POWER SUPPLY POWERING ALL LIGHT ENGINES, UNLESS OTHERWISE INDICATED.

FOR PERMITTING

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(508) 375-7007

Kurt Kuegler, P.E.
198 Cutler Street
Watertown, CT
06795
203-233-1583

SCALE ADJUSTMENT GUIDE
0" 1"
BAR IS ONE INCH ON ORIGINAL DRAWING

REVISIONS		
NO.	DATE	DESCRIPTION

KURT W. KUEGLER
No. 8156
REGISTERED PROFESSIONAL ENGINEER
MECHANICAL

PROJECT NO.:	1119.21.01.01
DATE:	DECEMBER 2021
SCALE:	AS INDICATED
DESIGNED BY:	ERK
CHECKED BY:	ERK
DRAWN BY:	GJG
APPROVED BY:	SCO

WATER SYSTEM CHLORINATION & PRETREATMENT

PRUDENCE ISLAND WATER DISTRICT
PRUDENCE ISLAND, RHODE ISLAND

DRAWING TITLE:
ELECTRICAL POWER DETAILS & SCHEDULES

DRAWING NO.:
E-2

SHEET NO. 22 OF 26

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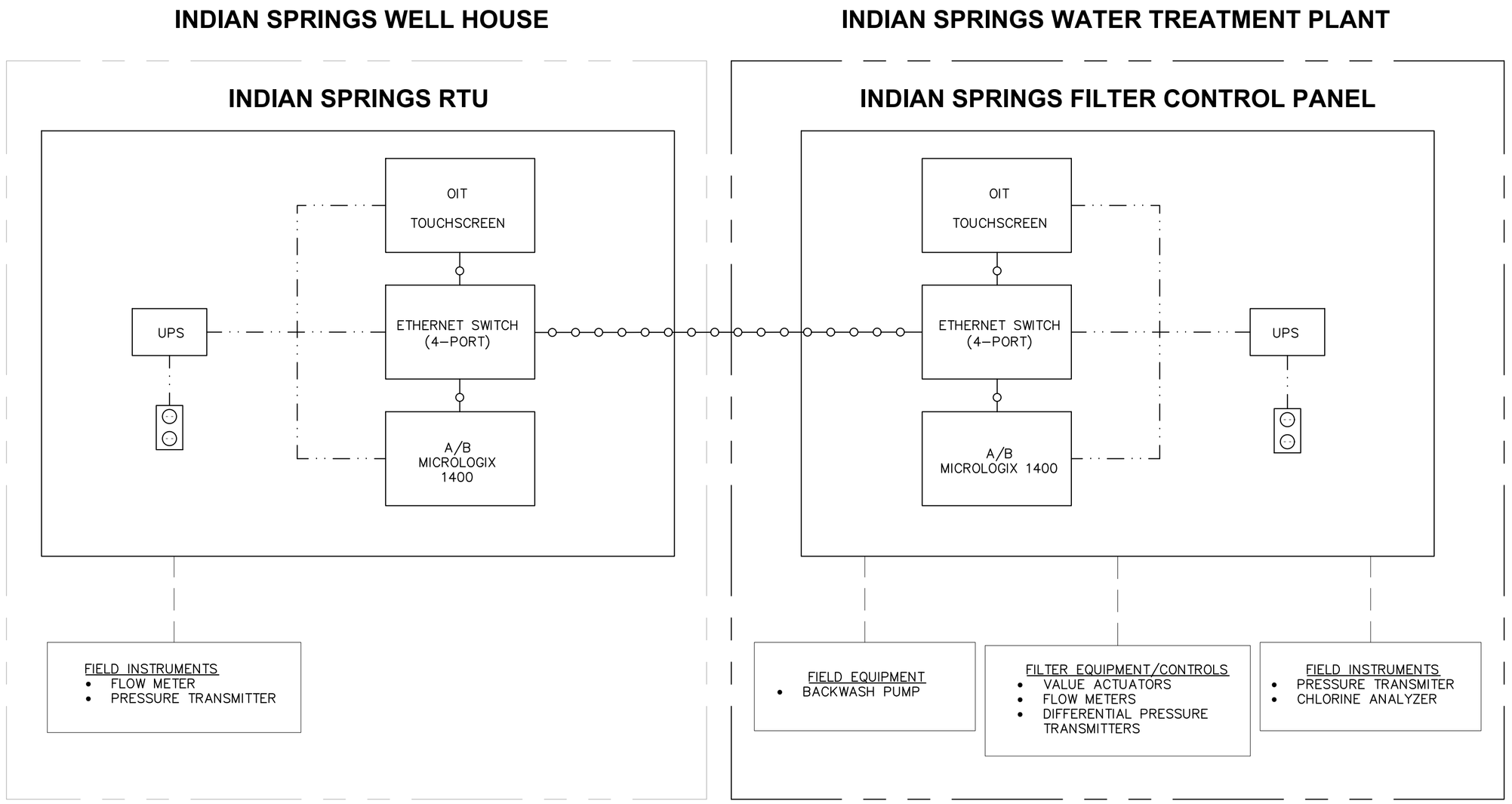

ISA INSTRUMENT IDENTIFICATION TABLE

MEASURED OR INITIATING VARIABLE	FIRST LETTER MEAS. VARI.	SUCCEEDING LETTERS: SWITCH (HI, LO, OPEN, CLOSE)	PRIM. ELEM. (SENSOR)	INDICATOR	INDICATING CONTROLLER	CONTROL OR CONTR. (BLIND)	RECORDER	INTEGRATOR (TOTALIZER)	TRANSMITTER (INDICTING)	TRANSMITTER	VALVE OR ACTUATOR	RELAY	SOURCE
ANALYSIS	A	ASL	AE	AI			AR		AIT	AT		AY	
BURNER, COMBUSTION	B		BE			BC						BY	
CONDUCTIVITY	C	CSH	CE	CI	CIC	CC	CR		CIT	CT		CY	
DENSITY	D	DSH	DE	DI	DIC	DC	DR		DIT	DT		DY	DX
VOLTAGE	E		EE	EI					EIT	ET		EY	
FLOW RATE	F	FSHL	FE	FI	FIC	FC	FR	FQ	FIT	FT	FV	FY	
USER'S CHOICE	G												
HAND	H	HS											
CURRENT (ELECTRICAL)	I	IS	IE	II	IIC	IC				IT		IY	
POWER	J	JSH	JE	JI	JIC	JC	JR	JQ				JY	
TIME, TIME SCHEDULE	K			KI	KIC	KC		KQ				KY	KS
LEVEL	L	LSH	LE	LI	LIC	LC	LR		LIT	LT	LV	LY	
HUMIDITY	M		ME	MI	MIC	MC	MR		MIT	MT		MY	
USER'S CHOICE	N												
USER'S CHOICE	O												
PRESSURE, VACUUM	P	PSH	PE	PI	PIC	PC	PR		PIT	PT	PV	PY	
QUANTITY	Q						QR						
RADIATION	R												
SPEED, FREQUENCY	S	SSL	SE	SI		SC			SIT	ST		SY	
TEMPERATURE	T	TSL	TE	TI	TIC	TC	TR		TIT	TT	TV	TY	
MULTIVARIABLE	U			UI			UR					UY	
MECHANICAL ANALYSIS	V												
WEIGHT, FORCE	W	WS	WE	WI	WIC		WR		WIT	WT			
VIBRATION	X		XE	XI								XY	
EVENT	Y	YS		YI			YR		YIT	YT		YY	
POSITION, DIMENSION	Z	ZSO	ZE	ZI			ZR		ZIT	ZT		ZY	

ALARM AND INTERLOCK SCHEDULE

DEVICE	EVENT	INTERLOCK #	ALARM	SET POINT	RANGE	DELAY	ACTION
AIT-401 & AIT-402	HI-HI CHLORINE	1	YES	2	0 TO 4.0	0 - 300 S	STOP CHLORINE FEED PUMPS; STOP WELL PUMPS
AIT-401 & AIT-402	HI CHLORINE	N/A	YES	1.5	0 TO 4.0	0 - 300 S	ANNUNCIATE ON APPLICABLE OIT
AIT-401 & AIT-402	LO CHLORINE	N/A	YES	0.5	0 TO 4.0	0 - 300 S	ANNUNCIATE ON APPLICABLE OIT
AIT-401 & AIT-402	LO-LO CHLORINE	2	YES	0.25	0 TO 4.0	0 - 300 S	STOP CHLORINE FEED PUMPS; STOP WELL PUMPS
PIT-101	HI PRESSURE, IS	N/A	YES	85	0 TO 150	0 - 300 S	ANNUNCIATE ON APPLICABLE OIT
PIT-101	LO PRESSURE, IS	N/A	YES	55	0 TO 150	0 - 300 S	ANNUNCIATE ON APPLICABLE OIT
PIT-401	HI PRESSURE, IS	N/A	YES	75	0 TO 150	0 - 300 S	ANNUNCIATE ON APPLICABLE OIT
PIT-401	LO PRESSURE, IS	N/A	YES	50	0 TO 150	0 - 300 S	ANNUNCIATE ON APPLICABLE OIT
FIT-101	HI FLOW, IS	N/A	YES	50	0 TO 100	0 - 300 S	ANNUNCIATE ON APPLICABLE OIT
IS-P1, IS-P4, AC-P1	WELL PUMP OFF/ON	3	NO	N/A	N/A	N/A	WELL PUMPS ON/OFF = POWER TO CHLORINE PUMPS ON/OFF
LIT-301	HI-HI Level	4	YES	7	0 TO 10	0 - 300 S	CLOSE CV-301; CLOSE CV-202
LSH-301	HI-HI Level	5	YES	7	N/A	N/A	CLOSE CV-301; CLOSE CV-202
LIT-301	HI Level	N/A	YES	6	0 TO 10	0 - 300 S	ANNUNCIATE ON APPLICABLE OIT
LIT-301	LO Level	N/A	YES	2	0 TO 10	0 - 300 S	ANNUNCIATE ON APPLICABLE OIT
LSL-301	LO-LO Level	6	YES	1	N/A	N/A	STOP BACKWASH PUMP P-301
LIT-301	LO-LO Level	7	YES	1	0 TO 10	0 - 300 S	STOP BACKWASH PUMP P-301
DPIT-201A	HI DIFFERENTIAL PRESSURE	N/A	YES	7	0 TO 20	0 - 300 S	ANNUNCIATE ON APPLICABLE OIT
DPIT-201B	HI DIFFERENTIAL PRESSURE	N/A	YES	7	0 TO 20	0 - 300 S	ANNUNCIATE ON APPLICABLE OIT
WIT-501	LO Weight	N/A	YES	20	1 TO 100	0 - 300 S	ANNUNCIATE ON APPLICABLE OIT
WIT-502	LO Weight	N/A	YES	20	0 TO 100	0 - 300 S	ANNUNCIATE ON APPLICABLE OIT

LEGEND

- FIELD MOUNTED INSTRUMENT TAG
- PANEL MOUNTED INSTRUMENT TAG (EQUIPMENT MANUFACTURERS PANEL)
- PANEL MOUNTED INSTRUMENT TAG (INSTRUMENTATION CONTRACTORS PANEL)
- SCADA SYSTEM SIGNAL TAG – A=ANALOG, D=DISCRETE I=INPUT, O=OUTPUT
- SCADA ALARM: L = LOW, H = HIGH NF = NO FLOW
- INTERLOCK
- HYDROPNEUMATIC ACTUATION
- DUPLEX TWISTLOCK RECEPTACLE
- PROCESS STREAM TO/FROM LOCATION REFER TO SHEET X

REFER TO SHEET M–1 FOR ADDITIONAL SYMBOLS

- ROOM LINE
- CONTROL PANEL
- LOCATIONAL DIVIDE / BUILDING LINE
- FIELD/SIGNAL WIRING
- DATA / COMMUNICATION
- ELECTRICAL WIRING
- EXISTING

SCADA SYSTEM ARCHITECTURE NOTES

1. COMMUNICATIONS: ETHERNET/IP
2. PLC SYSTEM: ALLEN BRADLEY MICROLOGIX 1400
3. OIT: AUTOMATION DIRECT EA9–T10CL

PROCESS AND INSTRUMENTATION

A/L/L	AUTO/LEAD/LAG	N/A	NORMAL/ALARM
DPIT	DIFFERENTIAL PRESSURE INDICATOR TRANSMITTER	O/C	OPEN/CLOSE OR OPEN/CLOSED
EFF	EFFLUENT	O/C/A	OPEN/CLOSE/AUTOMATIC
F	FAULT	O/O	ON/OFF
FCP	FIELD CONTROL PANEL	O/O/R	ON/OFF/RESET
FCV	FLOW CONTROL VALVE	O/S/C	OPEN/STOP/CLOSE
F/R	FORWARD/REVERSE	O/S/C/A	OPEN/STOP/CLOSE/AUTOMATIC
FS	FLOW SWITCH	PIC	PANEL INTERFACE CONNECTOR
H/A	HAND/AUTOMATIC	PLC	PROGRAMABLE LOGIC CONTROLER
H/O/A	HAND/OFF/AUTOMATIC	POS	POSITION
INF	INFLUENT	RS	RUN STATUS
L/R	LOCAL/REMOTE	RSL	REMOTE/STOP/LOCAL
L/R/O	LOCAL/REMOTE/OFF	(S)	SAMPLE PORT
MCP	MAIN CONTROL PANEL	SA	SPEED ADJUST

SP	SET POSITION
S/S	START/STOP
YL	EVENT ALARM LOW
YLL	EVENT ALARM LOW LOW
YH	EVENT ALARM HIGH
YHH	EVENT ALARM HIGH HIGH
YNF	EVENT NO FLOW
YF	EVENT FAIL
YM	EVENT IN MANUAL
YS	EVENT STATUS

FOR PERMITTING

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DRINKING WATER PROFESSIONALS
www.h2olsonengineering.com
(508) 375-7007

SCALE ADJUSTMENT GUIDE
0" 1"
BAR IS ONE INCH ON ORIGINAL DRAWING

REVISIONS

NO.	DATE	DESCRIPTION

LISA GOYER
No. 11536
REGISTERED PROFESSIONAL ENGINEER
CIVIL
12/30/21

PROJECT NO.:	119.21.01
DATE:	DECEMBER 2021
SCALE:	AS NOTED
DESIGNED BY:	SCO
CHECKED BY:	SCO
DRAWN BY:	RAT
APPROVED BY:	LMG

WATER SYSTEM CHLORINATION & PRETREATMENT

PRUDENCE ISLAND WATER DISTRICT
PRUDENCE ISLAND, RHODE ISLAND

DRAWING TITLE:
SCADA SYSTEM SCHEMATIC

DRAWING NO.:
I-1

SHEET NO. 23 OF 26

INDIAN SPRINGS WELL HOUSE

EXISTING INDIAN SPRINGS WELL HOUSE

INDIAN SPRINGS RTU

YNF
YM
DI
FAULT
NO FLOW
HAND
AUTO
AO
SP
DO
S/S
YL
AI
TO IS FILTER CONTROL PANEL. REFER TO SHEET 1-3

HS 101
HS 104
O/O

WELL #4
IS-P4

WELL #1
IS-P4

1
2
3

FIT 101
PIT 101
FE 101
MFM 101

HS 501C
HS 501B
HS 501A
HS 502C
HS 502B
HS 502A
L/R
SPEED 0-100%

TO INDIAN SPRINGS WTP
REFER TO SHEET 1-3

PI

WIT 501

ELECTRICAL WIRE

ISMP-1

ISMP-2

CHLORINE PAIL

SCALE

NOTES:

1) POWER SUPPLY FOR THE CHEMICAL FEED PUMPS SHALL BE NEW DUPLEX OUTLET. OUTLET IS TO BE ELECTRICALLY INTERLOCKED WITH THE WELL PUMPS. REFER TO ELECTRICAL SHEETS FOR DETAILS AND SHEET I-1 FOR OTHER INTERLOCKS.

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APPROVED BY:	LMG

WATER SYSTEM CHLORINATION & PRETREATMENT

PRUDENCE ISLAND WATER DISTRICT
PRUDENCE ISLAND, RHODE ISLAND

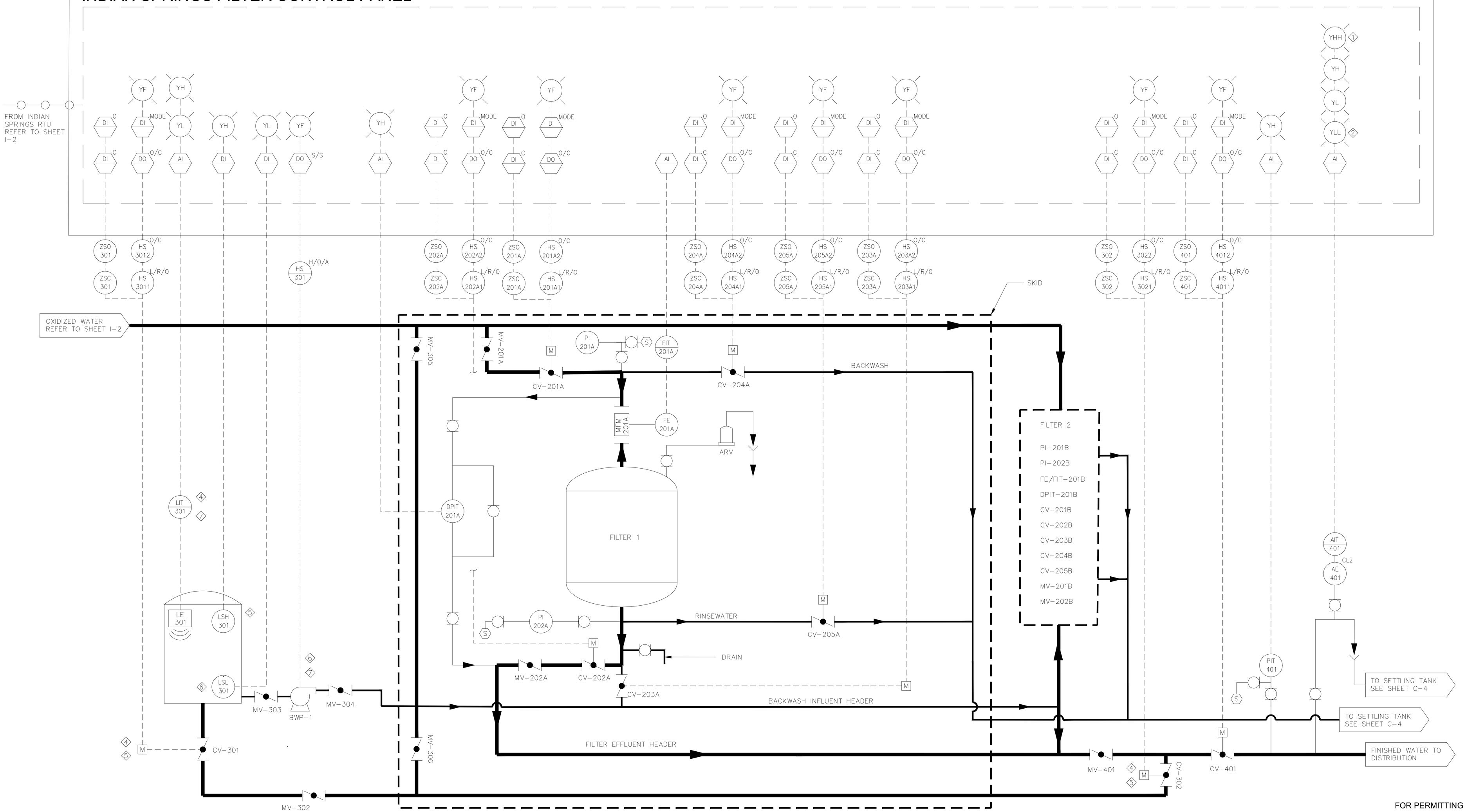
DRAWING TITLE:
INDIAN SPRINGS CHLORINATION

DRAWING NO.:
I-2

SHEET NO. 24 OF 26

INDIAN SPRINGS WATER TREATMENT PLANT

INDIAN SPRINGS FILTER CONTROL PANEL



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LISA GOYER
REGISTERED PROFESSIONAL ENGINEER
No. 11536
CIVIL
12/30/21

PROJECT NO.:	119.21.01
DATE:	DECEMBER 2021
SCALE:	AS NOTED
DESIGNED BY:	SCO
CHECKED BY:	SCO
DRAWN BY:	RAT
APPROVED BY:	LMG

WATER SYSTEM CHLORINATION & PRETREATMENT

PRUDENCE ISLAND WATER DISTRICT
PRUDENCE ISLAND, RHODE ISLAND

DRAWING TITLE:
TREATMENT PLANT INSTRUMENTATION

DRAWING NO.:
I-3

SHEET NO. 25 OF 26

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ARMY CAMP WELL HOUSE

ARMY CAMP RTU

YH
YL
AI
HS 102 O/O
LIT 102
LE 102
WELL #1 AC-P1
1
2
3
YL
AI
PIT 102
YNF
AI
FIT 102
FE 102
MFM 102
YL
AI
YNF
YM
DI
FAULT
NO FLOW
HAND
AUTO
AO
SP
DO
S/S
HS 503C
L/R
HS 503B
S/S
HS 503A
SPEED 0-100%
FAULT
NO FLOW
HAND
AUTO
HS 504C
HS 504B
HS 504A
PI
WIT 502
ACMP-1
ACMP-2
ELECTRICAL WIRE
CHLORINE PAIL
SCALE
YHH
YH
YL
YLL
AIT 402
CL2
AE 402
TO HIGH SERVICE ZONE AND BROADWAY BOOSTER STATION
100 FT SAMPLE LINE
D
TO DRYWELL REFER TO SHEET C-6

NOTES:

1) POWER SUPPLY FOR THE CHEMICAL FEED PUMPS SHALL BE NEW DUPLEX OUTLET. OUTLET IS TO BE ELECTRICALLY INTERLOCKED WITH THE WELL PUMP. REFER TO ELECTRICAL SHEETS FOR DETAILS AND SHEET I-1 FOR OTHER INTERLOCKS

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www.h2olsonengineering.com
(508) 375-7007

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No. 11536
REGISTERED PROFESSIONAL ENGINEER (CIVIL)

PROJECT NO.:	119.21.01
DATE:	DECEMBER 2021
SCALE:	AS NOTED
DESIGNED BY:	SCO
CHECKED BY:	SCO
DRAWN BY:	RAT
APPROVED BY:	LMG

WATER SYSTEM CHLORINATION & PRETREATMENT

PRUDENCE ISLAND WATER DISTRICT
PRUDENCE ISLAND, RHODE ISLAND

DRAWING TITLE:
ARMY CAMP CHLORINATION

DRAWING NO.:
I-4

SHEET NO. 26 OF 26

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Attachment C

Treatment Design Technical Memorandum

H2Olson Engineering, Inc.
DRINKING WATER PROFESSIONALS

Technical Memorandum

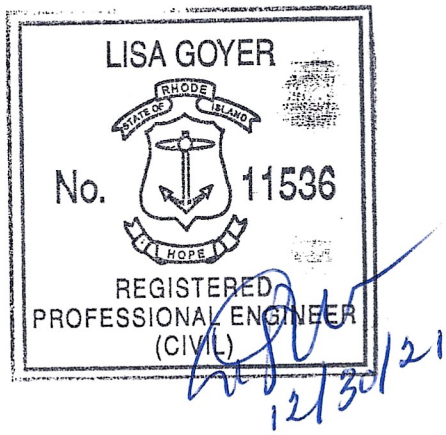
To: Robin Weber, Board Moderator
Prudence Island Water District

From: Lisa M. Goyer, P.E.
Stephen C. Olson, P.E.

Cc:

Date: December 30, 2021

Subject: Prudence Island Water District
Public Water System Chlorination and Pre-treatment Design



INTRODUCTION AND BACKGROUND

The Prudence Island Water District (PIWD) is under an Administrative Consent Order (ACO) with the Rhode Island Department of Health (RIDOH) to install permanent disinfection facilities for their two water supply sources, including pre-treatment for the removal of iron and manganese at the Indian Springs well site. PIWD retained the services of H2Olson Engineering, Inc. (H2Olson) to complete the design and permitting of these facilities in accordance the RIDOH ACO requirements. As such, H2Olson has completed the design and prepared plans and specifications suitable for bidding and construction of the proposed disinfection and pre-treatment facilities.

Presented herein are engineering design calculations and studies required by the ACO including the following:

1. Facility description and design capacity of the proposed disinfection facilities and iron and manganese treatment facilities for the Indian Springs water supply sources.
2. CT calculations for the proposed PIWD disinfection facilities to achieve 4-log inactivation of viruses under the Groundwater Rule.
3. A Disinfection By-Product formation study based on the proposed use of chlorine for disinfection at the PIWD water supply sites.
4. A Corrosion Control Study to assess the proposed use of chlorine for disinfection while maintaining simultaneous compliance with the Lead and Copper Rule (and recent revisions).

10 Riverside Drive, Suite 103
Lakeville, MA 02347

Tel: 508-375-7007
www.h2olsonengineering.com

FACILITY DESCRIPTION

The PIWD water supply system currently consists of two active groundwater well sites: Army Camp and Indian Springs. The Army Camp site consists of one groundwater supply well while the Indian Springs site consists of two groundwater supply wells: Well # 1 and Well #2.
As previously noted, two treatment systems are being proposed:

1. Disinfection and iron and manganese facilities at the Indian Springs well site.
2. Disinfection facilities at the Army Camp well site.

H2Olson has reviewed numerous existing available engineering reports including, but not limited to: Prudence Island Utility Corporation Water System Master Plan, 1998; Preliminary Engineering Report, Prudence Island Water District, Treatment Facility, 2006; Engineering Evaluation and Facility Capital Improvement Plan, Prudence Island Water District, 2012; and Draft Preliminary Engineering Report, Prudence Island Water District, Various Water System Projects, 2013. The following treatment technologies for the removal of iron and manganese at the Indian Springs well site were reviewed and discussed to varying degrees within the above noted reports: water softening (ion exchange); greensand media filtration; granular activated carbon (GAC) media filtration; membrane filtration; and, vacuum diatomaceous earth filtration. Based on a review and evaluation of the previously completed alternative treatment assessments, the use and application of greensand media filtration for the Indian Springs well site is recommended. This technology will only require the application of chlorine for oxidation and effective treatment performance. This is an efficient and effective approach since the addition of chlorine is already required for disinfection to achieve 4-log inactivation of viruses to meet the requirements of the Groundwater Rule.

A summary of proposed engineering design parameters, including target chemical dosages, for the Indian Springs treatment facilities are presented in Table 1. The proposed treatment system includes converting the existing well house to a chlorine addition facility which will be used for storing and dosing chlorine. The use of commercial strength sodium hypochlorite (12.5% strength) is proposed. This product can be purchased in 5-gallon pails (carboys). The proposed chlorination facility consists of two (2) chlorine pumps, a carboy scale, and a containment pallet suitable to store up to six (6) 5-gallon pails. Chlorine will be pumped directly out of a 5-gallon pail and injected downstream of the existing flow meter. Several hundred feet of the existing 4-inch water main will need to be replaced with 8-inch diameter ductile iron water main in order to provide sufficient contact time (CT) for 4-log inactivation of viruses.

A 2-filter greensand filtration system is proposed for iron and manganese treatment. The system is completely pre-engineered and assembled on a skid. A previously completed hydraulic evaluation indicated that the existing well pumps have sufficient head to pump through the filters with sufficient head to pump into the system's 100,000 gallon storage tank (Big Blue). The system will operate with 1 filter online (the second on stand-by), with an anticipated run-time between 24 and 72 hours. When the on-line filter requires cleaning, it will be taken off-line and the 2nd filter that is on stand-by will be placed in service. The off-line filter will then be backwashed and placed on stand-by until needed. A dedicated 1,500 gallon washwater supply tank and backwash pump

will provide the means for backwashing each filter. The backwash sequence will also include a rinsing sequence. Residuals from backwashing the filters will be directed to a 2,000 gallon holding tank and infiltration system. Settled solids from filter backwashing will be removed via a vacuum pump every 6 to 12 months, or as needed, to remove the accumulated solids in the holding tank.

Table 1
Indian Spring Treatment Facility
Conceptual Design Summary

Hydraulic Design Capacity	35 gpm
Disinfection Facilities	
Chlorine Dose	3.2 mg/L Target POE Residual: 0.5 mg/L Minimum Residual for CT: 0.2 mg/L
Chlorine Pumps	2
Feed Capacity	0.04 gph (2.6 mL/min)
Day Use/Storage	1 gallon
Bulk Storage	Five (5) 5-gallon pails
Pipe for 4-log CT	170 ft of 16-inch DI (@ 60 gpm)
Iron and Manganese Pretreatment	
Building Size	24 ft x 24 ft
Number of Filters	2
Filter Size	3 ft diameter, 6.5 ft height
Filter Skid Dimensions (L x W x H)	8.3 ft x 5 ft x 9 ft
Filter Loading Rate (per filter)	5 gpm/sf
Filter Run Time	24 – 72 hours
Backwash Loading Rate	12 gpm/sf
Backwash Flow Rate	85 gpm
Washwater Supply Tank Volume	1,500 gallons
Rinse to Waste Flow Rate	35 gpm
Rinse to Waste Volume	500 gallons
Backwash Waste Tank Volume	2,000 gallons

A summary of proposed engineering design parameters, including target chemical dosages, for the proposed Army Camp disinfection facilities are presented in Table 2. The proposed disinfection treatment system includes converting the existing well house to a chlorine addition facility which will be used for storing and dosing chlorine. The use of commercial strength sodium hypochlorite (12.5% strength) is proposed. This product can be purchased in 5-gallon pails. The proposed chlorination facilities consist of two (2) chlorine pumps, a carboy scale, and a containment pallet suitable to store up to six (6) 5-gallon pails. Chlorine will be pumped directly out of a 5-gallon pail (carboy) and injected downstream of the existing flow meter. Seventy feet of the existing 2-inch water main will need to be replaced with 16-inch diameter ductile iron water main in order to provide enough contact time (CT) for 4-log inactivation of viruses.

Table 2
Amy Camp Disinfection Facility
Conceptual Design Summary

Hydraulic Design Capacity	26 gpm
Disinfection Facilities	
Chlorine Dose	1.0 mg/L Target POE Residual: 0.5 mg/L Minimum Residual for CT: 0.2 mg/L
Chlorine Pumps	2
Feed Capacity	0.01 gph (0.6 mL/min)
Day Use/Storage	0.25 gallon
Bulk Storage	Two (2) 5-gallon pails
Pipe for 4-log CT	70 ft of 16-inch DI

4-LOG INACTIVATION CT CALCULATIONS

The PIWD disinfection facilities were designed to achieve 4-log inactivation of viruses using sufficient contact time with free chlorine. The CT values required for 4-log inactivation were based on the inactivation tables found in the USEPA Guidance Manual for Disinfection Profiling and Benchmarking, source water temperature, and treated water pH. The calculated CT achieved was based on a minimum free chlorine residual of 0.2 mg/L and the contact time achieved for the various pipe sections at the site design flow. The design flow for the Army Camp well site was 26 gallons per minute (gpm), based on a review of historical pumping records. The design flow for the Indian Springs well site was 60 gpm, based on the directive to build in addition CT capacity for future growth. The CT calculations determined that 70 feet of new 16-inch diameter pipe was required to achieve 4-log inactivation at Army Camp and 170 feet of new 16-inch diameter pipe at Indian Springs. In addition to the 16-inch main, CT credits were also calculated for the existing 50 feet of 2-inch pipe, 20 feet of new 2-inch pipe, and the volume of one (1) greensand filter. The CT calculations for each site are provided in Attachment A.

DISINFECTION BY-PRODUCT FORMATION STUDY

In order to examine the future potential impacts of chlorine disinfection at the PIWD well sites on the future potential formation of disinfection by-products, H2Olson Engineering, Inc. completed a bench-top simulated distribution system (SDS) disinfection by-product (DBP) formation potential study. The intent of the SDS-DBP study was to chlorinate PIWD source water with chlorine and allow the samples to incubate in the dark at a constant temperature to simulate typical distribution system conditions (temperature, time, pH). Monthly PIWD production numbers were reviewed from 2017 through July 2021 and theoretical seasonal water ages were estimated based on the total water volume of the distribution system (capacity of the Big Blue Storage Tank and the total pipe length and diameter) and the average winter and summer production. Using a total distribution system volume of 129,000 gallons, an average monthly winter flow of 10,381 gallons

per day (gpd) and an average monthly summer flow of 42,072 gpd, an estimated water age of 12.4 days was calculated for typical winter conditions and 3.1 days for typical summer conditions.

Source water from each water supply site was collected and tested for temperature, pH, alkalinity, UV absorbance to 254 nanometers (UV-254), total organic carbon (TOC), iron, and manganese. Source water iron and manganese from the Indian Springs site was removed by completing a bench scale jar test consisting of the addition of potassium permanganate (at the stoichiometric requirement for iron and manganese oxidation), flocculating for 20 minutes, settling for 30 minutes, then filtering through a 1 micron glass fiber filter followed by a 0.45 micron membrane filter. The resulting source water quality used for the SDS-DBP study is presented below in Table 3.

Table 3
SDS-DBP Study
Summary of Source Water Quality

Water Quality Parameter	Indian Springs	Army Camp
Temperature (°F)	50	51
pH (SU)	7.3	7.5
Alkalinity (mg/L as $CaCO_3$)	40.8	53.4
Iron (mg/L)	0	0.01
Manganese (mg/L)	0.19	0
UV-254 (1/cm)	0.023	0.005
TOC (mg/L)	< 0.5	0.585

A chlorine titration was then completed on the filtered water from the Indian Springs jar test and Army Camp source water to determine the chlorine demand and required dose to achieve a free chlorine residual between 1.1 and 1.5 mg/L. Water from each site was dosed with chlorine to achieve a free chlorine residual of 1.5 mg/L at Indian Springs and 1.1 mg/L at Army Camp. A slightly higher chlorine residual was targeted for Indian Springs due to the higher manganese level in this water (assuming that it would consume the stoichiometric chlorine demand of 0.4 mg/L over time). The water samples were not adjusted for pH and sealed in 1,000 mL brown glass jars with PTFE septa, and stored in the dark at a temperature of approximately 50 °F, for a period of 3 days and 12 days. An initial SDS-DBP sample (representative of Day 0), was also prepared and tested within 30 minutes after chlorine addition. After the representative holding times (Day 0, Day 3, Day 12), samples were collected and tested for pH, free chlorine residual, alkalinity, ORP, total trihalomethanes (TTHMs) and a group of five haloacetic acids (HAA5s). All samples were collected and sent to an independent laboratory for analysis. In addition, free chlorine residual was tested in the field as soon as the SDS incubation jars were opened in order to get a more accurate chlorine measurement (in case of decay during sample transport and holding at the independent laboratory).

All of the laboratory analysis sampling results are provided in Attachment B. A summary of the SDS-DBP sampling results are provided in Table 4.

Table 4
SDS-DBP Study
Summary of Water Quality Results

PIWD Supply:	Indian Springs			Army Camp		
Water Quality Parameter	Day 0	Day 3	Day 12	Day 0	Day 3	Day 12
Free Chlorine Residual (mg/L)	1.54	1.24	1.11	1.12	0.94	0.87
pH (SU)	7.7	7.5	6.9	7.7	7.4	6.8
ORP (mV)	570	540	410	590	570	360
TTHMs (µg/L)	0	2.53	4.4	0	3.7	7.2
HAA5s (µg/L)	1.8	2.1	1.1	0	0	1.7

A review and analysis of the SDS-DBP results provided above and in Attachment B indicated that the PIWD source water has very low levels of natural organic matter and very low levels of disinfection by-products are anticipated after the implementation of chlorine disinfection. TTHMs levels were less than 10 (µg/L) after 12 days of reaction time and HAA5 levels were all less than 3 (µg/L). Based on the current DBP maximum contaminant levels of 80 (µg/L) for TTHMs and 60 (µg/L) for HAA5s, based on locational running annual averages of quarterly sampling results, PIWD should have no problems maintaining compliance with the Disinfection/Disinfection By-Product Rule.

CORROSION CONTROL STUDY

The purpose of the corrosion control study is to examine whether there is expected to be any alteration in water chemistry due to the addition of chlorine which could destabilize existing pipe scales leading to elevated levels of lead or copper in customer's taps. The corrosion control study consisted of a limited materials survey of customer water service lines, and an examination of water quality and desk-top study.

Materials Survey

H2Olson completed a detailed and comprehensive review of PIWD files and interviewed operations staff. The PIWD does not currently maintain a set of water service cards that provide details of the customers water service. However, PIWD recently completed a comprehensive backflow and cross connection survey of their customers and did not observe any lead water service materials. In addition, in over 20 years of working on the distribution system, making water service repairs and replacements, current operations staff have never observed a lead service pipe or lead gooseneck. The vast majority of customer water service lines are plastic. However, there are also some copper and iron pipe material services. However, there are no written records of customer water service materials.

Water Characteristics and Desk-Top Study

H2Olson examined numerous engineering studies during the design phase of this project as referenced on page 2 of this Technical Memorandum. In addition to these engineering studies, and experience with numerous public water systems for corrosion control, a careful review of the USEPA Report "Optimal Corrosion Control Treatment Evaluation Technical Recommendations for Primacy Agencies and Public Water Systems (March 2016)" was completed. Based on the aforementioned study, there are several treatment changes to public water systems which could negatively affect lead and copper corrosion control, in particular for systems with lead service lines. The treatment changes identified which can affect lead and copper corrosivity include:

- Corrosion Control Treatment – changes in pH, alkalinity, dissolved inorganic carbon (DIC), and inhibitor types/concentrations (e.g. lowering the target pH or alkalinity).
- Disinfection – changing secondary disinfection from free chlorine to combined chlorine (chloramines) or changing the type of chlorine used (gaseous chlorine can decrease pH while sodium hypochlorite can increase pH).
- Coagulation – changes in the type of coagulant, in particular if it results in changes to the chloride to sulfate mass ratio (CSMR).
- Water Softening – adding softening can increase alkalinity and pH while eliminating softening can lower pH and alkalinity.
- Membrane Filtration – nanofiltration and reverse osmosis can remove alkalinity, hardness, and other dissolved compounds which can lower pH

With respect to the above noted potential water quality changes that can affect lead and copper corrosion control, only the first three bullet points are relevant. To assess potential chemistry changes PIWD source water and SDS-DBP study water was sampled and tested for several common corrosion control parameters. The SDS-DBP samples represent the future potential water quality within the PIWD distribution system after implementing chlorine disinfection. A summary of the sampling results is presented in Table 5.

Table 5
Corrosion Control Study
Summary of Water Quality

Water Quality Parameter	Indian Springs		Army Camp	
	Source Water Existing	Treated Future	Source Water Existing	Treated Future
Temperature (°F)	50	50	51	51
pH (SU)	7.3	7.4	7.5	7.3
ORP (mV)	41	507	53	507
Alkalinity (mg/L as $CaCO_3$)	41	37	53	52
DIC (mg/L - calculated)	11	10	14	14
Chloride (mg/L)	10.0	13.6	7.5	14.8
Sulfate (mg/L)	22.5	23.8	7.3	7.3
CSMR	0.4	0.6	1.0	2.0

A review of the water quality information presented in Table 5 strongly suggests that the proposed PIWD disinfection facilities and Indian Springs treatment facility for the removal of source water iron and manganese will not independently negatively impact the District's compliance with the Lead and Copper Rule since the target point of entry pH and alkalinity will not change. Although the ORP is anticipated to increase, the dissolved inorganic carbon (DIC) levels will remain constant, and as a result there should be no destabilization of premise plumbing scales. In addition, the minor increases in CSMR are not indicative of problematic water chemistry changes. A review and comparison of PIWD source water quality information and SDS-DBP results from bench top study with USEPA Optimal Corrosion Control Treatment guidelines indicate that there should be no negative impacts on lead and copper corrosion control from either the application of chlorine for disinfection or the removal of source water iron and manganese, provided that the target finished water (point of entry) pH and alkalinity levels do not change significantly.

A review of existing available PIWD lead and copper sampling information indicates that customer tap water sampling results are always below the Action Levels for both lead and copper. The most recent round of customer tap water lead and copper sampling was conducted in July 2021. The results indicated a 90^{th} percentile lead level of 0.0046 mg/L with 8 of 10 samples non-detect for lead and a 90th percentile copper level of 0.13 mg/L. All of the information reviewed herein suggests that the implementation of disinfection for the PIWD will not negatively impact the water chemistry resulting in increased levels of tap water lead or copper.

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DRINKING WATER PROFESSIONALS

Attachment A – 4-Log CT Calculations

Prudence Island Water District
Groundwater Rule CT Evaluation
Army Camp Well Site

Existing

Pipe Diam ": 2 **Pipe Length Ft:** 260 **Baffling Factor:** 1

1	2	3	4	5	6	7	8	9
Cl Conc	**pH**	**Temp**	**Peak Flow**	**Storage**	**Total Detention**	**Contact time**	**CT calc**	**CT req**
mg/L		°C	GPM	**Volume**	**Time (TDT)**	min	Cl Conc x	Table 2
				Gallons	Vol/Peak Flow	TDT x Baffling Factor	Contact Time	
0.2	7	10	23	42	1.84	1.84	0.37	6
						Total CT	**0.37**	
						CT Calc/CT Req	**0.06**	Needs to be > 1

Proposed

Pipe Diam ": 16 **Pipe Length Ft:** 70 **Baffling Factor:** 1

1	2	3	4	5	6	7	8	9
Cl Conc	**pH**	**Temp**	**Peak Flow**	**Storage**	**Total Detention**	**Contact time**	**CT calc**	**CT req**
mg/L		°C	GPM	**Volume**	**Time (TDT)**	min	Cl Conc x	Table 2
				Gallons	Vol/Peak Flow	TDT x Baffling Factor	Contact Time	
0.2	7	10	23	731	31.77	31.77	6.35	6
						Total CT	**6.35**	
						CT Calc/CT Req	**1.06**	Needs to be > 1

Table 1
Baffling Factors

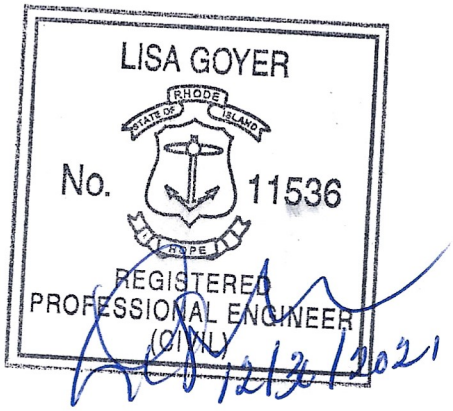
Factor	Description
0.1	None, agitated basin, very low length to width ratio, high inlet/outlet velocities
0.3	Single or multiple unbaffled inlets or outlets, no intra-basin baffles
0.5	Baffled inlet/outlet with some intra-basin baffling
0.7	Perforated inlet baffle, serpentine or perforated intra-basin baffles, outlet weir or perforated launders
1	Very high length to width ratio (pipeline flow) perforated inlet, outlet and intra-basin baffles

TABLE 2
CT VALUES* FOR
4- LOG INACTIVATION OF VIRUSES BY FREE CHLORINE

Temperature(°C)	pH	
	6-9	10
0.5	12	90
5	8	60
10	6	45
15	4	30
20	3	22
25	2	15

USEPA Guidance Manual for Disinfection Profiling and Benchmarking

Temperature: 50 degrees F is 10 degrees C



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Prudence Island Water District
Groundwater Rule CT Evaluation
Indian Springs Well Site

1. From chlorine injection to filters

Pipe Diam ": 2 Pipe Length Ft: 50 Baffling Factor: 1

1	2	3	4	5	6	7	8	9
Cl Conc	pH	Temp	Peak Flow	Storage	Total Detention	Contact time	CT calc	CT req
mg/L		°C	Raw Water Q	Volume	Time (TDT)	min	Cl Conc x	Table 2
			GPM	Gallons	Vol/Peak Flow	TDT x Baffling Factor	Contact Time	
0.2	7	10	60	8	0.14	0.14	0.03	6

2. From chlorine injection to filters

Pipe Diam ": 16 Pipe Length Ft: 170 Baffling Factor: 1

1	2	3	4	5	6	7	8	9
Cl Conc	pH	Temp	Peak Flow	Storage	Total Detention	Contact time	CT calc	CT req
mg/L		°C	Raw Water Q	Volume	Time (TDT)	min	Cl Conc x	Table 2
			GPM	Gallons	Vol/Peak Flow	TDT x Baffling Factor	Contact Time	
0.2	7	10	60	1,775	29.58	29.58	5.92	6

3. Filter Rack & Building Piping

Pipe Diam ": 2 Pipe Length Ft: 20 Baffling Factor: 1

1	2	3	4	5	6	7	8	9
Cl Conc	pH	Temp	Peak Flow	Storage	Total Detention	Contact time	CT calc	CT req
mg/L		°C	Raw Water Q	Volume	Time (TDT)	min	Cl Conc x	Table 2
			GPM	Gallons	Vol/Peak Flow	TDT x Baffling Factor	Contact Time	
0.2	7	10	60	3	0.05	0.05	0.01	6

4. Greensand Filter Baffling Factor: 0.5

1	2	3	4	5	6	7	8	9
Cl Conc	pH	Temp	Peak Flow	Storage	Total Detention	Contact time	CT calc	CT req
mg/L		°C	Raw Water Q	Volume	Time (TDT)	min	Cl Conc x	Table 2
			GPM	1 Filter	Vol/Peak Flow	TDT x Baffling Factor	Contact Time	
				Gallons				
0.2	8.3	10	60	185	3.08	3.08	0.62	6
						Total CT	6.56	
						CT Calc/CT Req	1.09	Needs to be > 1

Table 1
Baffling Factors

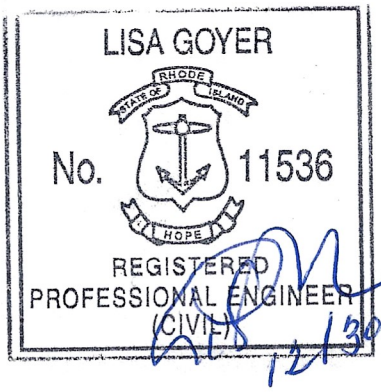
Factor	Description
0.1	None, agitated basin, very low length to width ratio, high inlet/outlet velocities
0.3	Single or multiple unbaffled inlets or outlets, no intra-basin baffles
0.5	Baffled inlet/outlet with some intra-basin baffling
0.7	Perforated inlet baffle, serpentine or perforated intra-basin baffles, outlet weir or perforated launders
1	Very high length to width ratio (pipeline flow) perforated inlet, outlet and intra-basin baffles

Temperature: 50 degrees F is 10 degrees C

TABLE 2
CT VALUES* FOR
4- LOG INACTIVATION OF VIRUSES BY FREE CHLORIN

Temperature(°C)	pH	
	6-9	10
0.5	12	90
5	8	60
10	6	45
15	4	30
20	3	22
25	2	15

Filter Vessel Volume for CT
3' diameter X 6' height
0.5' underdrain structure
1' gravel @ 50% porosity = 0.5' height
3' media @ 50% porosity = 1.5' height
1.5' water depth on top of media = 1.5' height
Total water height, ft = 3.5



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Attachment B – Independent Laboratory Sampling Results

ANALYTICAL REPORT

Lab Number:	L2162231
Client:	H2Olson Engineering, Inc. 10 Riverside Drive, Suite 103 Lakeville, MA 02347
ATTN:	Stephen Olson
Phone:	(508) 375-7007
Project Name:	PRUDENCE ISLAND
Project Number:	119-21-01
Report Date:	11/29/21

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01

Lab Number: L2162231
Report Date: 11/29/21

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2162231-01	IS-RAW	DW	PRUDENCE ISLAND	11/11/21 13:00	11/11/21
L2162231-02	AC-RAW	DW	PRUDENCE ISLAND	11/11/21 13:15	11/11/21
L2162231-03	IS-DAYO	DW	PRUDENCE ISLAND	11/11/21 15:00	11/11/21
L2162231-04	AC-DAYO	DW	PRUDENCE ISLAND	11/11/21 15:30	11/11/21

Project Name:	PRUDENCE ISLAND	**Lab Number:**	L2162231
Project Number:	119-21-01	**Report Date:**	11/29/21

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name:	PRUDENCE ISLAND	**Lab Number:**	L2162231
Project Number:	119-21-01	**Report Date:**	11/29/21

Case Narrative (continued)

Report Submission

The analysis of HAA was subcontracted. A copy of the laboratory report is included as an addendum. Please note: This data is only available in PDF format and is not available on Data Merger.

Chlorine, Total Residual

L2162231-03 and -04: The sample was analyzed with the method required holding time exceeded.

Oxidation/Reduction Potential

The WG1570624-2 Laboratory Duplicate RPD for oxidation/reduction potential (23%), performed on L2162231-01, is outside the acceptance criteria. The elevated RPD has been attributed to the non-homogeneous nature of the native sample.

Chlorine, Total Residual

WG1572235-1: A Matrix Spike and Laboratory Duplicate could not be performed due to insufficient sample volume available for analysis.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:  Sebastian Corbin

Title: Technical Director/Representative Date: 11/29/21

ORGANICS

VOLATILES

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01
Lab Number: L2162231
Report Date: 11/29/21

SAMPLE RESULTS

Lab ID: L2162231-03
Client ID: IS-DAYO
Sample Location: PRUDENCE ISLAND
Date Collected: 11/11/21 15:00
Date Received: 11/11/21
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 16,524.2
Analytical Date: 11/15/21 12:26
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Chloroform	ND		ug/l	0.50	--	1
Bromodichloromethane	ND		ug/l	0.50	--	1
Dibromochloromethane	ND		ug/l	0.50	--	1
Bromoform	ND		ug/l	0.50	--	1
THMs, Total	ND		ug/l	0.50	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichlorobenzene-d4	101		80-120
4-Bromofluorobenzene	97		80-120

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01
Lab Number: L2162231
Report Date: 11/29/21

SAMPLE RESULTS

Lab ID: L2162231-04
Client ID: AC-DAYO
Sample Location: PRUDENCE ISLAND
Date Collected: 11/11/21 15:30
Date Received: 11/11/21
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 16,524.2
Analytical Date: 11/17/21 14:17
Analyst: GT

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Chloroform	ND		ug/l	0.50	--	1
Bromodichloromethane	ND		ug/l	0.50	--	1
Dibromochloromethane	ND		ug/l	0.50	--	1
Bromoform	ND		ug/l	0.50	--	1
THMs, Total	ND		ug/l	0.50	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichlorobenzene-d4	101		80-120
4-Bromofluorobenzene	94		80-120

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01
Lab Number: L2162231
Report Date: 11/29/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 16,524.2
Analytical Date: 11/15/21 10:24
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 03 Batch: WG1571987-4					
Chloroform	ND		ug/l	0.50	--
Bromodichloromethane	ND		ug/l	0.50	--
Dibromochloromethane	ND		ug/l	0.50	--
Bromoform	ND		ug/l	0.50	--
THMs, Total	ND		ug/l	0.50	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichlorobenzene-d4	102		80-120
4-Bromofluorobenzene	97		80-120

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01
Lab Number: L2162231
Report Date: 11/29/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 16,524.2
Analytical Date: 11/17/21 12:44
Analyst: GT

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 04 Batch: WG1573778-4					
Chloroform	ND		ug/l	0.50	--
Bromodichloromethane	ND		ug/l	0.50	--
Dibromochloromethane	ND		ug/l	0.50	--
Bromoform	ND		ug/l	0.50	--
THMs, Total	ND		ug/l	0.50	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichlorobenzene-d4	104		80-120
4-Bromofluorobenzene	98		80-120

Lab Control Sample Analysis
Batch Quality Control

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01

Lab Number: L2162231
Report Date: 11/29/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 03 Batch: WG1571987-3								
Chloroform	95		-		70-130	-		20
Bromodichloromethane	90		-		70-130	-		20
Dibromochloromethane	85		-		70-130	-		20
Bromoform	100		-		70-130	-		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichlorobenzene-d4	98				80-120
4-Bromofluorobenzene	97				80-120

Lab Control Sample Analysis
Batch Quality Control

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01

Lab Number: L2162231
Report Date: 11/29/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 04 Batch: WG1573778-3								
Chloroform	98		-		70-130	-		20
Bromodichloromethane	92		-		70-130	-		20
Dibromochloromethane	85		-		70-130	-		20
Bromoform	98		-		70-130	-		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichlorobenzene-d4	97				80-120
4-Bromofluorobenzene	100				80-120

Matrix Spike Analysis
Batch Quality Control

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01
Lab Number: L2162231
Report Date: 11/29/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 03 QC Batch ID: WG1571987-5 WG1571987-6 QC Sample: L2102617-62 Client ID: MS Sample												
Dichlorodifluoromethane	ND	4	5.0	125		5.6	**140**	Q	70-130	11		20
Chloromethane	ND	4	5.6	**140**	Q	6.0	**150**	Q	70-130	7		20
Vinyl chloride	ND	4	6.3	**158**	Q	6.4	**160**	Q	70-130	2		20
Bromomethane	ND	4	3.8	95		4.2	105		70-130	10		20
Chloroethane	ND	4	4.8	120		5.6	**140**	Q	70-130	15		20
Trichlorofluoromethane	ND	4	4.7	118		4.9	123		70-130	4		20
Acetone	ND	8	9.0	113		9.4	118		70-130	4		20
1,1-Dichloroethene	ND	4	4.8	120		5.1	128		70-130	6		20
tert-Butyl Alcohol	ND	20	20	100		19	95		70-130	5		20
Methylene chloride	ND	4	4.7	118		5.0	125		70-130	6		20
Methyl tert butyl ether	ND	4	4.0	100		4.1	103		70-130	2		20
trans-1,2-Dichloroethene	ND	4	4.7	118		5.0	125		70-130	6		20
1,1-Dichloroethane	ND	4	4.8	120		5.0	125		70-130	4		20
2,2-Dichloropropane	ND	4	4.0	100		4.0	100		70-130	0		20
cis-1,2-Dichloroethene	ND	4	4.4	110		4.4	110		70-130	0		20
Chloroform	ND	4	4.4	110		4.6	115		70-130	4		20
Bromochloromethane	ND	4	4.2	105		5.2	130		70-130	**21**	Q	20
Tetrahydrofuran[1]	ND	8	7.1	89		9.3	116		70-130	**27**	Q	20
1,1,1-Trichloroethane	ND	4	4.1	103		4.0	100		70-130	2		20
1,1-Dichloropropene	ND	4	4.5	113		4.2	105		70-130	7		20
Carbon tetrachloride	ND	4	4.0	100		3.8	95		70-130	5		20
1,2-Dichloroethane	ND	4	4.6	115		4.4	110		70-130	4		20
Benzene	ND	4	4.4	110		4.2	105		70-130	5		20

Matrix Spike Analysis

Batch Quality Control

Project Name: PRUDENCE ISLAND

Project Number: 119-21-01

Lab Number: L2162231

Report Date: 11/29/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 03 QC Batch ID: WG1571987-5 WG1571987-6 QC Sample: L2102617-62 Client ID: MS Sample												
Trichloroethene	ND	4	3.8	95		3.7	92		70-130	3		20
1,2-Dichloropropane	ND	4	4.3	108		4.3	108		70-130	0		20
Bromodichloromethane	ND	4	3.9	98		3.8	95		70-130	3		20
Dibromomethane	ND	4	4.1	103		4.0	100		70-130	2		20
cis-1,3-Dichloropropene	ND	4	3.7	92		3.7	92		70-130	0		20
Toluene	ND	4	3.9	98		3.9	98		70-130	0		20
trans-1,3-Dichloropropene	ND	4	3.7	92		3.5	88		70-130	6		20
1,1,2-Trichloroethane	ND	4	3.8	95		4.1	103		70-130	8		20
1,3-Dichloropropane	ND	4	4.0	100		3.9	98		70-130	3		20
Tetrachloroethene	ND	4	3.4	85		3.6	90		70-130	6		20
Dibromochloromethane	ND	4	3.3	82		3.5	88		70-130	6		20
1,2-Dibromoethane	ND	4	3.6	90		3.8	95		70-130	5		20
Chlorobenzene	ND	4	4.4	110		4.1	103		70-130	7		20
1,1,1,2-Tetrachloroethane	ND	4	4.0	100		4.0	100		70-130	0		20
Ethylbenzene	ND	4	4.4	110		4.3	108		70-130	2		20
p/m-Xylene	ND	8	9.0	113		8.8	110		70-130	2		20
o-Xylene	ND	4	4.2	105		4.2	105		70-130	0		20
Styrene	ND	4	4.3	108		4.3	108		70-130	0		20
Isopropylbenzene	ND	4	4.2	105		4.2	105		70-130	0		20
Bromoform	ND	4	3.5	88		3.4	85		70-130	3		20
1,1,2,2-Tetrachloroethane	ND	4	4.8	120		4.4	110		70-130	9		20
1,2,3-Trichloropropane	ND	4	4.4	110		4.2	105		70-130	5		20
n-Propylbenzene	ND	4	4.6	115		4.5	113		70-130	2		20

Matrix Spike Analysis

Batch Quality Control

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01
Lab Number: L2162231
Report Date: 11/29/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 03 QC Batch ID: WG1571987-5 WG1571987-6 QC Sample: L2102617-62 Client ID: MS Sample												
Bromobenzene	ND	4	4.7	118		4.7	118		70-130	0		20
1,3,5-Trimethylbenzene	ND	4	4.4	110		4.3	108		70-130	2		20
o-Chlorotoluene	ND	4	4.7	118		4.6	115		70-130	2		20
p-Chlorotoluene	ND	4	4.7	118		4.6	115		70-130	2		20
tert-Butylbenzene	ND	4	4.4	110		4.4	110		70-130	0		20
1,2,4-Trimethylbenzene	ND	4	4.4	110		4.4	110		70-130	0		20
sec-Butylbenzene	ND	4	4.6	115		4.4	110		70-130	4		20
p-Isopropyltoluene	ND	4	4.3	108		4.3	108		70-130	0		20
1,3-Dichlorobenzene	ND	4	4.3	108		4.4	110		70-130	2		20
1,4-Dichlorobenzene	ND	4	4.3	108		4.3	108		70-130	0		20
n-Butylbenzene	ND	4	4.4	110		4.5	113		70-130	2		20
1,2-Dichlorobenzene	ND	4	4.4	110		4.2	105		70-130	5		20
1,2-Dibromo-3-chloropropane	ND	4	4.1	103		3.5	88		70-130	16		20
1,2,4-Trichlorobenzene	ND	4	3.6	90		3.5	88		70-130	3		20
Hexachlorobutadiene	ND	4	3.7	92		3.7	92		70-130	0		20
Naphthalene	ND	4	3.6	90		3.5	88		70-130	3		20
1,2,3-Trichlorobenzene	ND	4	3.7	92		3.7	92		70-130	0		20

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
1,2-Dichlorobenzene-d4	101		101		80-120
4-Bromofluorobenzene	103		103		80-120

Matrix Spike Analysis
Batch Quality Control

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01
Lab Number: L2162231
Report Date: 11/29/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 04 QC Batch ID: WG1573778-6 QC Sample: L2163057-02 Client ID: MS Sample												
Dichlorodifluoromethane	ND	4	7.8	**195**	Q	-	-		70-130	-		20
Chloromethane	ND	4	7.0	**175**	Q	-	-		70-130	-		20
Vinyl chloride	ND	4	7.9	**198**	Q	-	-		70-130	-		20
Bromomethane	ND	4	4.6	115		-	-		70-130	-		20
Chloroethane	ND	4	5.9	**148**	Q	-	-		70-130	-		20
Trichlorofluoromethane	ND	4	5.4	**135**	Q	-	-		70-130	-		20
1,1-Dichloroethene	ND	4	5.6	**140**	Q	-	-		70-130	-		20
Methylene chloride	ND	4	5.3	**133**	Q	-	-		70-130	-		20
Methyl tert butyl ether	ND	4	4.5	113		-	-		70-130	-		20
trans-1,2-Dichloroethene	ND	4	5.2	130		-	-		70-130	-		20
1,1-Dichloroethane	ND	4	5.3	**133**	Q	-	-		70-130	-		20
2,2-Dichloropropane	ND	4	4.5	113		-	-		70-130	-		20
cis-1,2-Dichloroethene	ND	4	5.1	128		-	-		70-130	-		20
Chloroform	1.4	4	6.4	125		-	-		70-130	-		20
Bromochloromethane	ND	4	6.0	**150**	Q	-	-		70-130	-		20
1,1,1-Trichloroethane	ND	4	5.4	**135**	Q	-	-		70-130	-		20
1,1-Dichloropropene	ND	4	5.1	128		-	-		70-130	-		20
Carbon tetrachloride	ND	4	4.3	108		-	-		70-130	-		20
1,2-Dichloroethane	ND	4	5.0	125		-	-		70-130	-		20
Benzene	ND	4	4.6	115		-	-		70-130	-		20
Trichloroethene	ND	4	4.0	100		-	-		70-130	-		20
1,2-Dichloropropane	ND	4	4.8	120		-	-		70-130	-		20
Bromodichloromethane	ND	4	4.2	105		-	-		70-130	-		20
Dibromomethane	ND	4	4.6	115		-	-		70-130	-		20

Matrix Spike Analysis

Batch Quality Control

Project Name: PRUDENCE ISLAND

Project Number: 119-21-01

Lab Number: L2162231

Report Date: 11/29/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab	Associated sample(s): 04	QC Batch ID: WG1573778-6	QC Sample: L2163057-02	Client ID: MS Sample								
cis-1,3-Dichloropropene	ND	4	4.0	100		-	-		70-130	-		20
Toluene	ND	4	4.1	103		-	-		70-130	-		20
trans-1,3-Dichloropropene	ND	4	3.8	95		-	-		70-130	-		20
1,1,2-Trichloroethane	ND	4	4.1	103		-	-		70-130	-		20
1,3-Dichloropropane	ND	4	4.2	105		-	-		70-130	-		20
Tetrachloroethene	ND	4	4.0	100		-	-		70-130	-		20
Dibromochloromethane	ND	4	3.7	92		-	-		70-130	-		20
1,2-Dibromoethane	ND	4	4.0	100		-	-		70-130	-		20
Chlorobenzene	ND	4	4.8	120		-	-		70-130	-		20
1,1,1,2-Tetrachloroethane	ND	4	4.6	115		-	-		70-130	-		20
Ethylbenzene	ND	4	4.9	123		-	-		70-130	-		20
p/m-Xylene	ND	8	10	125		-	-		70-130	-		20
o-Xylene	ND	4	4.7	118		-	-		70-130	-		20
Styrene	ND	4	4.9	123		-	-		70-130	-		20
Isopropylbenzene	ND	4	4.8	120		-	-		70-130	-		20
Bromoform	ND	4	4.0	100		-	-		70-130	-		20
1,1,2,2-Tetrachloroethane	ND	4	5.1	128		-	-		70-130	-		20
1,2,3-Trichloropropane	ND	4	4.7	118		-	-		70-130	-		20
n-Propylbenzene	ND	4	5.2	130		-	-		70-130	-		20
Bromobenzene	ND	4	5.1	128		-	-		70-130	-		20
1,3,5-Trimethylbenzene	ND	4	5.0	125		-	-		70-130	-		20
o-Chlorotoluene	ND	4	5.1	128		-	-		70-130	-		20
p-Chlorotoluene	ND	4	5.2	130		-	-		70-130	-		20
tert-Butylbenzene	ND	4	4.8	120		-	-		70-130	-		20

Matrix Spike Analysis

Batch Quality Control

Project Name: PRUDENCE ISLAND

Project Number: 119-21-01

Lab Number: L2162231

Report Date: 11/29/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 04 QC Batch ID: WG1573778-6 QC Sample: L2163057-02 Client ID: MS Sample												
1,2,4-Trimethylbenzene	ND	4	5.2	130		-	-		70-130	-		20
sec-Butylbenzene	ND	4	5.2	130		-	-		70-130	-		20
p-Isopropyltoluene	ND	4	4.9	123		-	-		70-130	-		20
1,3-Dichlorobenzene	ND	4	5.1	128		-	-		70-130	-		20
1,4-Dichlorobenzene	ND	4	4.5	113		-	-		70-130	-		20
n-Butylbenzene	ND	4	4.6	115		-	-		70-130	-		20
1,2-Dichlorobenzene	ND	4	4.6	115		-	-		70-130	-		20
1,2-Dibromo-3-chloropropane	ND	4	3.7	92		-	-		70-130	-		20
1,2,4-Trichlorobenzene	ND	4	4.0	100		-	-		70-130	-		20
Hexachlorobutadiene	ND	4	4.4	110		-	-		70-130	-		20
Naphthalene	ND	4	3.6	90		-	-		70-130	-		20
1,2,3-Trichlorobenzene	ND	4	4.0	100		-	-		70-130	-		20

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
1,2-Dichlorobenzene-d4	98				80-120
4-Bromofluorobenzene	105				80-120

Lab Duplicate Analysis
Batch Quality Control

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01

Lab Number: L2162231
Report Date: 11/29/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 04 QC Batch ID: WG1573778-5 QC Sample: L2163054-02 Client ID: DUP Sample						
Dichlorodifluoromethane	ND	ND	ug/l	NC		20
Chloromethane	ND	ND	ug/l	NC		20
Vinyl chloride	ND	ND	ug/l	NC		20
Bromomethane	ND	ND	ug/l	NC		20
Chloroethane	ND	ND	ug/l	NC		20
Trichlorofluoromethane	ND	ND	ug/l	NC		20
1,1-Dichloroethene	ND	ND	ug/l	NC		20
Methylene chloride	ND	ND	ug/l	NC		20
Methyl tert butyl ether	ND	ND	ug/l	NC		20
trans-1,2-Dichloroethene	ND	ND	ug/l	NC		20
1,1-Dichloroethane	ND	ND	ug/l	NC		20
2,2-Dichloropropane	ND	ND	ug/l	NC		20
cis-1,2-Dichloroethene	ND	ND	ug/l	NC		20
Chloroform	2.2	2.0	ug/l	10		20
Bromochloromethane	ND	ND	ug/l	NC		20
1,1,1-Trichloroethane	ND	ND	ug/l	NC		20
1,1-Dichloropropene	ND	ND	ug/l	NC		20
Carbon tetrachloride	ND	ND	ug/l	NC		20
1,2-Dichloroethane	ND	ND	ug/l	NC		20
Benzene	ND	ND	ug/l	NC		20
Trichloroethene	ND	ND	ug/l	NC		20

Lab Duplicate Analysis
Batch Quality Control

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01

Lab Number: L2162231
Report Date: 11/29/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 04 QC Batch ID: WG1573778-5 QC Sample: L2163054-02 Client ID: DUP Sample						
1,2-Dichloropropane	ND	ND	ug/l	NC		20
Bromodichloromethane	ND	ND	ug/l	NC		20
Dibromomethane	ND	ND	ug/l	NC		20
cis-1,3-Dichloropropene	ND	ND	ug/l	NC		20
Toluene	ND	ND	ug/l	NC		20
trans-1,3-Dichloropropene	ND	ND	ug/l	NC		20
1,1,2-Trichloroethane	ND	ND	ug/l	NC		20
1,3-Dichloropropane	ND	ND	ug/l	NC		20
Tetrachloroethene	ND	ND	ug/l	NC		20
Dibromochloromethane	ND	ND	ug/l	NC		20
1,2-Dibromoethane	ND	ND	ug/l	NC		20
Chlorobenzene	ND	ND	ug/l	NC		20
1,1,1,2-Tetrachloroethane	ND	ND	ug/l	NC		20
Ethylbenzene	ND	ND	ug/l	NC		20
p/m-Xylene	ND	ND	ug/l	NC		20
o-Xylene	ND	ND	ug/l	NC		20
Styrene	ND	ND	ug/l	NC		20
Isopropylbenzene	ND	ND	ug/l	NC		20
Bromoform	ND	ND	ug/l	NC		20
1,1,2,2-Tetrachloroethane	ND	ND	ug/l	NC		20
1,2,3-Trichloropropane	ND	ND	ug/l	NC		20

Lab Duplicate Analysis
Batch Quality Control

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01

Lab Number: L2162231
Report Date: 11/29/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 04 QC Batch ID: WG1573778-5 QC Sample: L2163054-02 Client ID: DUP Sample						
n-Propylbenzene	ND	ND	ug/l	NC		20
Xylene (Total)[1]	ND	ND	ug/l	NC		20
Bromobenzene	ND	ND	ug/l	NC		20
Trihalomethanes, Total	2.2	2.0	ug/l	10		20
1,3,5-Trimethylbenzene	ND	ND	ug/l	NC		20
o-Chlorotoluene	ND	ND	ug/l	NC		20
p-Chlorotoluene	ND	ND	ug/l	NC		20
tert-Butylbenzene	ND	ND	ug/l	NC		20
1,2,4-Trimethylbenzene	ND	ND	ug/l	NC		20
sec-Butylbenzene	ND	ND	ug/l	NC		20
p-Isopropyltoluene	ND	ND	ug/l	NC		20
1,3-Dichlorobenzene	ND	ND	ug/l	NC		20
1,4-Dichlorobenzene	ND	ND	ug/l	NC		20
n-Butylbenzene	ND	ND	ug/l	NC		20
1,2-Dichlorobenzene	ND	ND	ug/l	NC		20
1,2-Dibromo-3-chloropropane	ND	ND	ug/l	NC		20
1,2,4-Trichlorobenzene	ND	ND	ug/l	NC		20
Hexachlorobutadiene	ND	ND	ug/l	NC		20
Naphthalene	ND	ND	ug/l	NC		20
1,2,3-Trichlorobenzene	ND	ND	ug/l	NC		20

Lab Duplicate Analysis
Batch Quality Control

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01

Lab Number: L2162231
Report Date: 11/29/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits

Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 04 QC Batch ID: WG1573778-5 QC Sample: L2163054-02 Client ID: DUP Sample

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichlorobenzene-d4	103		105		80-120
4-Bromofluorobenzene	96		91		80-120

INORGANICS
&
MISCELLANEOUS

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01

Lab Number: L2162231
Report Date: 11/29/21

SAMPLE RESULTS

Lab ID: L2162231-01
Client ID: IS-RAW
Sample Location: PRUDENCE ISLAND

Date Collected: 11/11/21 13:00
Date Received: 11/11/21
Field Prep: Not Specified

Sample Depth:
Matrix: Dw

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Alkalinity, Total	40.8		mg CaCO3/L	2.00	NA	1	-	11/23/21 10:12	121,2320B	JB
pH (H)	7.3		SU	-	NA	1	-	11/12/21 22:08	121,4500H+-B	AS
Total Organic Carbon	ND		mg/l	0.500	--	1	-	11/17/21 16:28	121,5310C	DW
Oxidation/Reduction Potential	27		mv	-	NA	1	-	11/12/21 10:28	12,1498	KP

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01

Lab Number: L2162231
Report Date: 11/29/21

SAMPLE RESULTS

Lab ID: L2162231-02
Client ID: AC-RAW
Sample Location: PRUDENCE ISLAND

Date Collected: 11/11/21 13:15
Date Received: 11/11/21
Field Prep: Not Specified

Sample Depth:
Matrix: Dw

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Alkalinity, Total	53.4		mg CaCO3/L	2.00	NA	1	-	11/23/21 10:12	121,2320B	JB
pH (H)	7.5		SU	-	NA	1	-	11/12/21 22:08	121,4500H+-B	AS
Total Organic Carbon	0.585		mg/l	0.500	--	1	-	11/17/21 16:44	121,5310C	DW
Oxidation/Reduction Potential	130		mv	-	NA	1	-	11/12/21 10:28	12,1498	KP

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01

Lab Number: L2162231
Report Date: 11/29/21

SAMPLE RESULTS

Lab ID: L2162231-03
Client ID: IS-DAYO
Sample Location: PRUDENCE ISLAND

Date Collected: 11/11/21 15:00
Date Received: 11/11/21
Field Prep: Not Specified

Sample Depth:
Matrix: Dw

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Alkalinity, Total	36.7		mg CaCO3/L	2.00	NA	1	-	11/23/21 10:12	121,2320B	JB
Chlorine, Total Residual	0.34		mg/l	0.02	--	1	-	11/16/21 23:09	121,4500CL-D	AS
pH (H)	7.7		SU	-	NA	1	-	11/12/21 22:08	121,4500H+-B	AS
Oxidation/Reduction Potential	570		mv	-	NA	1	-	11/12/21 10:28	12,1498	KP

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01

Lab Number: L2162231
Report Date: 11/29/21

SAMPLE RESULTS

Lab ID: L2162231-04
Client ID: AC-DAYO
Sample Location: PRUDENCE ISLAND

Date Collected: 11/11/21 15:30
Date Received: 11/11/21
Field Prep: Not Specified

Sample Depth:
Matrix: Dw

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Alkalinity, Total	52.2		mg CaCO3/L	2.00	NA	1	-	11/23/21 10:12	121,2320B	JB
Chlorine, Total Residual	0.17		mg/l	0.02	--	1	-	11/16/21 23:09	121,4500CL-D	AS
pH (H)	7.7		SU	-	NA	1	-	11/12/21 22:08	121,4500H+-B	AS
Oxidation/Reduction Potential	590		mv	-	NA	1	-	11/12/21 10:28	12,1498	KP

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01
Lab Number: L2162231
Report Date: 11/29/21

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 03-04 Batch: WG1572235-1										
Chlorine, Total Residual	ND		mg/l	0.02	--	1	-	11/16/21 23:09	121,4500CL-D	AS
General Chemistry - Westborough Lab for sample(s): 01-02 Batch: WG1572347-1										
Total Organic Carbon	ND		mg/l	0.500	--	1	-	11/17/21 08:44	121,5310C	DW
General Chemistry - Westborough Lab for sample(s): 01-02 Batch: WG1574988-1										
Alkalinity, Total	ND		mg CaCO3/L	2.00	NA	1	-	11/23/21 10:12	121,2320B	JB
General Chemistry - Westborough Lab for sample(s): 03-04 Batch: WG1574989-1										
Alkalinity, Total	ND		mg CaCO3/L	2.00	NA	1	-	11/23/21 10:12	121,2320B	JB

Lab Control Sample Analysis

Batch Quality Control

Project Name: PRUDENCE ISLAND

Project Number: 119-21-01

Lab Number: L2162231

Report Date: 11/29/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-04 Batch: WG1570624-1								
Oxidation/Reduction Potential	103		-		90-110	-		20
General Chemistry - Westborough Lab Associated sample(s): 01-04 Batch: WG1570882-1								
pH	101		-		99-101	-		5
General Chemistry - Westborough Lab Associated sample(s): 03-04 Batch: WG1572235-2								
Chlorine, Total Residual	104		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 01-02 Batch: WG1572347-2								
Total Organic Carbon	100		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 01-02 Batch: WG1574988-2								
Alkalinity, Total	104		-		90-110	-		10
General Chemistry - Westborough Lab Associated sample(s): 03-04 Batch: WG1574989-2								
Alkalinity, Total	102		-		90-110	-		10

Matrix Spike Analysis
Batch Quality Control

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01

Lab Number: L2162231
Report Date: 11/29/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1572347-4 QC Sample: L2162966-01 Client ID: MS Sample												
Total Organic Carbon	3.87	16	20.0	101		-	-		80-120	-		20
General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1574988-4 QC Sample: L2163203-03 Client ID: MS Sample												
Alkalinity, Total	282	100	385	103		-	-		86-116	-		10
General Chemistry - Westborough Lab Associated sample(s): 03-04 QC Batch ID: WG1574989-4 QC Sample: L2162696-03 Client ID: MS Sample												
Alkalinity, Total	55.2	100	158	103		-	-		86-116	-		10

Lab Duplicate Analysis

Batch Quality Control

Project Name: PRUDENCE ISLAND

Project Number: 119-21-01

Lab Number: L2162231

Report Date: 11/29/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-04 QC Batch ID: WG1570624-2 QC Sample: L2162231-01 Client ID: IS-RAW						
Oxidation/Reduction Potential	27	34	mv	**23**	Q	20
General Chemistry - Westborough Lab Associated sample(s): 01-04 QC Batch ID: WG1570882-2 QC Sample: L2162077-01 Client ID: DUP Sample						
pH	6.0	6.0	SU	0		5
General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1572347-3 QC Sample: L2162966-01 Client ID: DUP Sample						
Total Organic Carbon	3.87	3.80	mg/l	2		20
General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1574988-3 QC Sample: L2163203-03 Client ID: DUP Sample						
Alkalinity, Total	282	282	mg CaCO3/L	0		10
General Chemistry - Westborough Lab Associated sample(s): 03-04 QC Batch ID: WG1574989-3 QC Sample: L2162696-03 Client ID: DUP Sample						
Alkalinity, Total	55.2	55.3	mg CaCO3/L	0		10

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01

Lab Number: L2162231
Report Date: 11/29/21

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2162231-01A	Vial H2SO4 preserved	A	NA		4.5	Y	Absent		TOC-5310(28)
L2162231-01B	Vial H2SO4 preserved	A	NA		4.5	Y	Absent		TOC-5310(28)
L2162231-01C	Plastic 120ml unpreserved	A	7	7	4.5	Y	Absent		ORP(1),PH-4500(.01)
L2162231-01D	Plastic 250ml unpreserved/No Headspace	A	NA		4.5	Y	Absent		ALK-T-2320(14)
L2162231-02A	Vial H2SO4 preserved	A	NA		4.5	Y	Absent		TOC-5310(28)
L2162231-02B	Vial H2SO4 preserved	A	NA		4.5	Y	Absent		TOC-5310(28)
L2162231-02C	Plastic 120ml unpreserved	A	7	7	4.5	Y	Absent		ORP(1),PH-4500(.01)
L2162231-02D	Plastic 250ml unpreserved/No Headspace	A	NA		4.5	Y	Absent		ALK-T-2320(14)
L2162231-03A	Vial Ascorbic Acid/HCl preserved	A	NA		4.5	Y	Absent		524-THM(14)
L2162231-03B	Vial Ascorbic Acid/HCl preserved	A	NA		4.5	Y	Absent		524-THM(14)
L2162231-03C	Vial NH4Cl preserved	A	NA		4.5	Y	Absent		SUB-HAA(9)
L2162231-03D	Vial NH4Cl preserved	A	NA		4.5	Y	Absent		SUB-HAA(9)
L2162231-03E	Vial NH4Cl preserved	A	NA		4.5	Y	Absent		SUB-HAA(9)
L2162231-03F	Vial NH4Cl preserved	A	NA		4.5	Y	Absent		SUB-HAA(9)
L2162231-03G	Plastic 120ml unpreserved	A	7	7	4.5	Y	Absent		ORP(1),TRC-4500(1)
L2162231-03H	Plastic 60ml unpreserved	A	7	7	4.5	Y	Absent		PH-4500(.01)
L2162231-03I	Plastic 250ml unpreserved/No Headspace	A	NA		4.5	Y	Absent		ALK-T-2320(14)
L2162231-04A	Vial Ascorbic Acid/HCl preserved	A	NA		4.5	Y	Absent		524-THM(14)
L2162231-04B	Vial Ascorbic Acid/HCl preserved	A	NA		4.5	Y	Absent		524-THM(14)
L2162231-04C	Vial NH4Cl preserved	A	NA		4.5	Y	Absent		SUB-HAA(9)
L2162231-04D	Vial NH4Cl preserved	A	NA		4.5	Y	Absent		SUB-HAA(9)
L2162231-04E	Vial NH4Cl preserved	A	NA		4.5	Y	Absent		SUB-HAA(9)
L2162231-04F	Vial NH4Cl preserved	A	NA		4.5	Y	Absent		SUB-HAA(9)

*Values in parentheses indicate holding time in days

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01

Lab Number: L2162231
Report Date: 11/29/21

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2162231-04G	Plastic 120ml unpreserved	A	7	7	4.5	Y	Absent		ORP(1),TRC-4500(1)
L2162231-04H	Plastic 60ml unpreserved	A	7	7	4.5	Y	Absent		PH-4500(.01)
L2162231-04I	Plastic 250ml unpreserved/No Headspace	A	NA		4.5	Y	Absent		ALK-T-2320(14)

*Values in parentheses indicate holding time in days

Project Name:	PRUDENCE ISLAND	**Lab Number:**	L2162231
Project Number:	119-21-01	**Report Date:**	11/29/21

GLOSSARY

Acronyms

DL - Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

EDL - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).

EMPC - Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.

EPA - Environmental Protection Agency.

LCS - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

LFB - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LOD - Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

LOQ - Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

MDL - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

MS - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

NC - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.

NDPA/DPA - N-Nitrosodiphenylamine/Diphenylamine.

NI - Not Ignitable.

NP - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.

NR - No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.

RL - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

RPD - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.

SRM - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

STLP - Semi-dynamic Tank Leaching Procedure per EPA Method 1315.

TEF - Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.

TEQ - Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.

TIC - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: Data Usability Report

Project Name:	PRUDENCE ISLAND	**Lab Number:**	L2162231
Project Number:	119-21-01	**Report Date:**	11/29/21

Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA,this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND - Not detected at the reporting limit (RL) for the sample.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where

Report Format: Data Usability Report

Project Name:	PRUDENCE ISLAND	**Lab Number:**	L2162231
Project Number:	119-21-01	**Report Date:**	11/29/21

Data Qualifiers

the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

V - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Z - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Report Format: Data Usability Report

Project Name:	PRUDENCE ISLAND	**Lab Number:**	L2162231
Project Number:	119-21-01	**Report Date:**	11/29/21

REFERENCES

12 Annual Book of ASTM Standards. (American Society for Testing and Materials) ASTM International.

16 Methods for the Determination of Organic Compounds in Drinking Water - Supplement II. EPA/600/R-92/129, August 1992.

121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene
EPA 625/625.1: alpha-Terpineol
EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D/8270E: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522, EPA 537.1.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

CHAIN OF CUSTODY

PAGE 1 OF 1

ALPHA ANALYTICAL — Mass Clean Chemistry
6 Walkup Drive, Westboro, MA 01581, Tel: 508-898-9220
320 Forbes Blvd, Mansfield, MA 02048, Tel: 508-822-9300

Date Rec'd in Lab: 11/11/21

ALPHA Job #: L2162231

Client Information

Client: H2O Olson Engineering
Address: 10 Riverside Drive Suite 103
Lakeville, MA 02043
Phone: 508-375-7007
Email: scott@h2olsonengineering

Additional Project Information:

Project Information

Project Name: Prudence Island
Project Location: Prudence Island
Project #: 119-21-01
Project Manager: Steve Olson
ALPHA Quote #:

Turn-Around Time

☒ Standard ☐ RUSH (only confirmed if pre-approved!)
Date Due:

Report Information - Data Deliverables

☐ ADEx ☐ EMAIL

Billing Information

☐ Same as Client info PO #:

Regulatory Requirements & Project Information Requirements

☐ Yes ☐ No MA MCP Analytical Methods
☐ Yes ☐ No CT RCP Analytical Methods
☐ Yes ☐ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)
☐ Yes ☐ No GW1 Standards (Info Required for Metals & EPH with Targets)
☐ Yes ☐ No NPDES RGP
☐ Other State /Fed Program _____ Criteria _____

ANALYSIS

VOC: ☐ 8260 ☐ 624 ☐ 524.2
SVOC: ☐ ABN ☐ PAH
METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15
METALS: ☐ RCRA5 ☐ RCRA8 ☐ PP13
EPH: ☐ Ranges & Targets ☐ Ranges Only
VPH: ☐ Ranges & Targets ☐ Ranges Only
TPH: ☐ Quant Only ☐ Fingerprint
Chlorine
pH
ORP
Alkalinity
TOC
TTHMs
HAA5s

SAMPLE INFO
Filtration
☐ Field
☐ Lab to do
Preservation
☐ Lab to do

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	Sample Comments	TOTAL # BOTTLES
6223l-01	IS - Raw	11/11	1PM	DW	SO	1:00 PM	4
-02	AC - Raw	11/11	1:15PM	DW	SO	1:15PM	4
-03	IS - DAYO	11/11	3PM	DW	SO	3:00 PM	11
-04	AC - DAYO	11/11	3:30PM	DW	SO	3:30 PM	11

Sample Times Not on Labels

Container Type							P		P	P	P	V	V	V
Preservative							-		-	-	-	D	HCl	J

Container Type
P= Plastic
A= Amber glass
V= Vial
G= Glass
B= Bacteria cup
C= Cube
O= Other
E= Encore
D= BOD Bottle

Preservative
A= None
B= HCl
C= HNO_3
D= H_2SO_4
E= NaOH
F= MeOH
G= $NaHSO_4$
H = $Na_2S_2O_3$
I= Ascorbic Acid
J = NH_4Cl
K= Zn Acetate
O= Other

Relinquished By:	Date/Time	Received By:	Date/Time
	11/11 4PM	Rob Macedo ATL	11/11/21 1600
	11/12 1800		11/12 800

All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 12-Mar-2012)

GRANITE STATE
ANALYTICAL SERVICES, LLC.

22 Manchester Road, Unit 2, Derry, NH 03038
Phone (800) 699-9920 | (603) 432-3044 website www.granitestateanalytical.com

Laboratory Report

Alpha Analytical-Westborough
8 Walkup Dr.
Westborough, MA 01581

Date Printed:	**11/24/2021**
Work Order #:	**2111-02054**
Client Job #:	
Date Received:	**11/12/2021**
Sample collected in:	**Massachusetts**

Attached please find results for the analysis of the samples received on the date referenced above.

Unless otherwise noted in the attached report, the analyses performed met the requirements of the analyzing laboratory's Quality Assurance Plan, Standard Operating Procedures and State Accreditation. This certificate shall not be reproduced, except in full, without the written approval of the analyzing laboratory. The results presented in this report relate to the samples listed on the following pages in the condition in which they were received. Accreditation for each analyte is identified by the * symbol following the analyte name. Location of our analyzing laboratory is identified by the code in the Analyst Column.

A & L Laboratory:
Identified by ME in Analyst Column
155 Center Street, Auburn, Maine 04210
www.allaboratory.com

Granite State Analytical Services LLC:
Identified by NH in Analyst Column
22 Manchester Road, Derry, NH 03038
www.granitestateanalytical.com

ANALYSIS RELATED NOTES:

- RL: "Reporting limit" means the lowest level of an analyte that can be accurately recovered from the matrix of interest.
- A & L Laboratory / Granite State Analytical Services LLC. accreditation lists can be found on our websites listed above.
- Subcontracted samples will be identified by the Accreditation number of the subcontract laboratory in the analyst field for each analyte and the appropriate laboratory will be listed here. None
- Data Qualifiers (DQ) Flags provide additional information in regards to the receipt, analysis or quality control of a sample. These are indicated under the DQ Flags Column on your report and listed here if necessary: Data Qualifier (DQ) Flags: None

SAMPLE STATE SPECIFIC NOTES:

Additional Narrative or Comments: None

We appreciate the opportunity to provide you with laboratory services. If you have any questions regarding the enclosed report, please contact the laboratory and we will be happy to assist you.

Donald A. D'Anjou, Ph. D.
Laboratory Director

GRANITE STATE
ANALYTICAL SERVICES, LLC.
22 Manchester Road, Unit 2, Derry, NH 03038
Phone (800) 699-9920 | (603) 432-3044 website www.granitestateanalytical.com

CERTIFICATE OF ANALYSIS FOR DRINKING WATER

DATE PRINTED: 11/24/2021
CLIENT NAME: Alpha Analytical-Westborough
CLIENT ADDRESS: 8 Walkup Dr.
Westborough, MA 01581

SAMPLE ID #: 2111-02054-001
SAMPLED BY: Alpha Analytical-Westborough
SAMPLE ADDRESS: L2162231
IS-DAYO
MA

MORE LOC INFO:

Legend	
Passes	✓
Fails EPA Primary	⊗
Fails EPA Secondary	▼
Fails State Guideline	✕
Attention	⚠

DATE AND TIME COLLECTED: 11/11/2021 03:00PM
DATE AND TIME RECEIVED: 11/12/2021 01:51PM
ANALYSIS PACKAGE: HAA GSA
RECEIPT TEMPERATURE: ON ICE .5° CELSIUS
CLIENT JOB #:

Test Description	Result	Test Units	Pass /Fail	DQ Flag	RL	Limit	Method	Analyst	Date - Time Analyzed
Date Extracted	-					No Limit	EPA 552.2	GQ-NH	11/18/2021 04:11PM
Dibromoacetic Acid*	<1	ug/L			1	No Limit	EPA 552.2	KV-NH	11/20/2021 02:08AM
Dichloroacetic Acid*	1.8	ug/L			1	No Limit	EPA 552.2	KV-NH	11/20/2021 02:08AM
Monobromoacetic Acid*	<1	ug/L			1	No Limit	EPA 552.2	KV-NH	11/20/2021 02:08AM
Monochloroacetic Acid*	<2	ug/L			2	No Limit	EPA 552.2	KV-NH	11/20/2021 02:08AM
Total Haloacetic Acids*	1.8	ug/L	✓		1	60 ug/L	EPA 552.2	KV-NH	11/20/2021 02:08AM
Trichloroacetic Acid*	<1	ug/L			1	No Limit	EPA 552.2	KV-NH	11/20/2021 02:08AM
2,3-Dibromopropionic Acid	74	%	✓			70-130%	EPA 552.2 - SS	KV-NH	11/20/2021 02:08AM

Donald A. D'Anjou, Ph. D.
Laboratory Director

GRANITE STATE
ANALYTICAL SERVICES, LLC.

22 Manchester Road, Unit 2, Derry, NH 03038
Phone (800) 699-9920 | (603) 432-3044 website www.granitestateanalytical.com

CERTIFICATE OF ANALYSIS FOR DRINKING WATER

DATE PRINTED: 11/24/2021
CLIENT NAME: Alpha Analytical-Westborough
CLIENT ADDRESS: 8 Walkup Dr.
Westborough, MA 01581

SAMPLE ID #: 2111-02054-002
SAMPLED BY: Alpha Analytical-Westborough
SAMPLE ADDRESS: L2162231
AC-DAYO
MA

MORE LOC INFO:

Legend	
Passes	✓
Fails EPA Primary	⊗
Fails EPA Secondary	▽
Fails State Guideline	✕
Attention	⚠

DATE AND TIME COLLECTED: 11/11/2021 03:30PM
DATE AND TIME RECEIVED: 11/12/2021 01:51PM
ANALYSIS PACKAGE: HAA GSA
RECEIPT TEMPERATURE: ON ICE .5° CELSIUS
CLIENT JOB #:

Test Description	Result	Test Units	Pass /Fail	DQ Flag	RL	Limit	Method	Analyst	Date - Time Analyzed
Date Extracted	-					No Limit	EPA 552.2	GQ-NH	11/18/2021 04:11PM
Dibromoacetic Acid*	<1	ug/L			1	No Limit	EPA 552.2	KV-NH	11/20/2021 02:48AM
Dichloroacetic Acid*	<1	ug/L			1	No Limit	EPA 552.2	KV-NH	11/20/2021 02:48AM
Monobromoacetic Acid*	<1	ug/L			1	No Limit	EPA 552.2	KV-NH	11/20/2021 02:48AM
Monochloroacetic Acid*	<2	ug/L			2	No Limit	EPA 552.2	KV-NH	11/20/2021 02:48AM
Total Haloacetic Acids*	<1	ug/L	✓		1	60 ug/L	EPA 552.2	KV-NH	11/20/2021 02:48AM
Trichloroacetic Acid*	<1	ug/L			1	No Limit	EPA 552.2	KV-NH	11/20/2021 02:48AM
2,3-Dibromopropionic Acid	87	%	✓			70-130%	EPA 552.2 - SS	KV-NH	11/20/2021 02:48AM

Donald A. D'Anjou, Ph. D.
Laboratory Director

ANALYTICAL REPORT

Lab Number:	L2162696
Client:	H2Olson Engineering, Inc. 10 Riverside Drive, Suite 103 Lakeville, MA 02347
ATTN:	Stephen Olson
Phone:	(508) 375-7007
Project Name:	PRUDENCE ISLAND
Project Number:	119-21-01
Report Date:	12/01/21

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01

Lab Number: L2162696
Report Date: 12/01/21

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2162696-01	IS-DAY3	DW	PRUDENCE	11/14/21 15:30	11/15/21
L2162696-02	AC-DAY3	DW	PRUDENCE	11/14/21 15:30	11/15/21
L2162696-03	IS #2 RAW	DW	PRUDENCE	11/14/21 16:00	11/15/21

Project Name:	PRUDENCE ISLAND	**Lab Number:**	L2162696
Project Number:	119-21-01	**Report Date:**	12/01/21

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name:	PRUDENCE ISLAND	**Lab Number:**	L2162696
Project Number:	119-21-01	**Report Date:**	12/01/21

Case Narrative (continued)

Report Submission

The analysis of HAAs was subcontracted. A copy of the laboratory report is included as an addendum. Please note: This data is only available in PDF format and is not available on Data Merger.

Sample Receipt

L2162696-03: The collection date and time on the chain of custody was 14-NOV-21 16:00; however, the collection date/time on the container label was 14-NOV-21 15:30. At the client's request, the collection date/time is reported as 14-NOV-21 16:00.

Chlorine, Total Residual

L2162696-01 and -02: The sample was analyzed with the method required holding time exceeded.

WG1572235: A Matrix Spike and Laboratory Duplicate could not be performed due to insufficient sample volume available for analysis.

Oxidation/Reduction Potential

L2162696-01, -02, and -03: The sample was analyzed with the method required holding time exceeded.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Kelly Stenstrom

Title: Technical Director/Representative Date: 12/01/21

ORGANICS

VOLATILES

Project Name: PRUDENCE ISLAND
Lab Number: L2162696
Project Number: 119-21-01
Report Date: 12/01/21

SAMPLE RESULTS

Lab ID: L2162696-01
Client ID: IS-DAY3
Sample Location: PRUDENCE
Date Collected: 11/14/21 15:30
Date Received: 11/15/21
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 16,524.2
Analytical Date: 11/16/21 14:27
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Chloroform	0.62		ug/l	0.50	--	1
Bromodichloromethane	0.96		ug/l	0.50	--	1
Dibromochloromethane	0.95		ug/l	0.50	--	1
Bromoform	ND		ug/l	0.50	--	1
THMs, Total	2.5		ug/l	0.50	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichlorobenzene-d4	103		80-120
4-Bromofluorobenzene	97		80-120

Project Name: PRUDENCE ISLAND
Lab Number: L2162696
Project Number: 119-21-01
Report Date: 12/01/21

SAMPLE RESULTS

Lab ID: L2162696-02
Client ID: AC-DAY3
Sample Location: PRUDENCE
Date Collected: 11/14/21 15:30
Date Received: 11/15/21
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 16,524.2
Analytical Date: 11/16/21 14:55
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Chloroform	1.3		ug/l	0.50	--	1
Bromodichloromethane	1.4		ug/l	0.50	--	1
Dibromochloromethane	1.0		ug/l	0.50	--	1
Bromoform	ND		ug/l	0.50	--	1
THMs, Total	3.7		ug/l	0.50	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichlorobenzene-d4	104		80-120
4-Bromofluorobenzene	96		80-120

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01
Lab Number: L2162696
Report Date: 12/01/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 16,524.2
Analytical Date: 11/16/21 13:32
Analyst: GT

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01-02 Batch: WG1572447-4					
Chloroform	ND		ug/l	0.50	--
Bromodichloromethane	ND		ug/l	0.50	--
Dibromochloromethane	ND		ug/l	0.50	--
Bromoform	ND		ug/l	0.50	--
THMs, Total	ND		ug/l	0.50	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichlorobenzene-d4	102		80-120
4-Bromofluorobenzene	95		80-120

Lab Control Sample Analysis

Batch Quality Control

Project Name: PRUDENCE ISLAND

Project Number: 119-21-01

Lab Number: L2162696

Report Date: 12/01/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-02 Batch: WG1572447-3								
Chloroform	88		-		70-130	-		20
Bromodichloromethane	78		-		70-130	-		20
Dibromochloromethane	75		-		70-130	-		20
Bromoform	100		-		70-130	-		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichlorobenzene-d4	100				80-120
4-Bromofluorobenzene	101				80-120

Matrix Spike Analysis
Batch Quality Control

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01

Lab Number: L2162696
Report Date: 12/01/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab	Associated sample(s): 01-02	QC Batch ID: WG1572447-6	QC Sample: L2161603-03	Client ID: MS Sample								
Dichlorodifluoromethane	ND	4	7.2	**180**	Q	-	-		70-130	-		20
Chloromethane	ND	4	6.4	**160**	Q	-	-		70-130	-		20
Vinyl chloride	ND	4	7.1	**178**	Q	-	-		70-130	-		20
Bromomethane	ND	4	4.2	105		-	-		70-130	-		20
Chloroethane	ND	4	5.4	**135**	Q	-	-		70-130	-		20
Trichlorofluoromethane	ND	4	5.0	125		-	-		70-130	-		20
1,1-Dichloroethene	ND	4	5.1	128		-	-		70-130	-		20
Methylene chloride	ND	4	4.9	123		-	-		70-130	-		20
Methyl tert butyl ether	ND	4	4.0	100		-	-		70-130	-		20
trans-1,2-Dichloroethene	ND	4	4.8	120		-	-		70-130	-		20
1,1-Dichloroethane	ND	4	4.8	120		-	-		70-130	-		20
2,2-Dichloropropane	ND	4	4.4	110		-	-		70-130	-		20
cis-1,2-Dichloroethene	ND	4	4.7	118		-	-		70-130	-		20
Chloroform	ND	4	4.5	113		-	-		70-130	-		20
Bromochloromethane	ND	4	5.3	**133**	Q	-	-		70-130	-		20
1,1,1-Trichloroethane	ND	4	4.4	110		-	-		70-130	-		20
1,1-Dichloropropene	ND	4	4.7	118		-	-		70-130	-		20
Carbon tetrachloride	ND	4	4.2	105		-	-		70-130	-		20
1,2-Dichloroethane	ND	4	4.8	120		-	-		70-130	-		20
Benzene	ND	4	4.5	113		-	-		70-130	-		20
Trichloroethene	ND	4	3.9	98		-	-		70-130	-		20
1,2-Dichloropropane	ND	4	4.5	113		-	-		70-130	-		20
Bromodichloromethane	ND	4	4.1	103		-	-		70-130	-		20
Dibromomethane	ND	4	4.1	103		-	-		70-130	-		20

Matrix Spike Analysis

Batch Quality Control

Project Name: PRUDENCE ISLAND

Project Number: 119-21-01

Lab Number: L2162696

Report Date: 12/01/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab	Associated sample(s): 01-02			QC Batch ID: WG1572447-6			QC Sample: L2161603-03		Client ID: MS Sample			
cis-1,3-Dichloropropene	ND	4	3.9	98		-	-		70-130	-		20
Toluene	ND	4	3.9	98		-	-		70-130	-		20
trans-1,3-Dichloropropene	ND	4	3.8	95		-	-		70-130	-		20
1,1,2-Trichloroethane	ND	4	4.0	100		-	-		70-130	-		20
1,3-Dichloropropane	ND	4	4.0	100		-	-		70-130	-		20
Tetrachloroethene	ND	4	3.8	95		-	-		70-130	-		20
Dibromochloromethane	ND	4	3.6	90		-	-		70-130	-		20
1,2-Dibromoethane	ND	4	3.8	95		-	-		70-130	-		20
Chlorobenzene	ND	4	4.5	113		-	-		70-130	-		20
1,1,1,2-Tetrachloroethane	ND	4	4.6	115		-	-		70-130	-		20
Ethylbenzene	ND	4	4.7	118		-	-		70-130	-		20
p/m-Xylene	ND	8	9.5	119		-	-		70-130	-		20
o-Xylene	ND	4	4.4	110		-	-		70-130	-		20
Styrene	ND	4	3.9	98		-	-		70-130	-		20
Isopropylbenzene	ND	4	4.4	110		-	-		70-130	-		20
Bromoform	ND	4	4.0	100		-	-		70-130	-		20
1,1,2,2-Tetrachloroethane	ND	4	4.8	120		-	-		70-130	-		20
1,2,3-Trichloropropane	ND	4	4.4	110		-	-		70-130	-		20
n-Propylbenzene	ND	4	4.7	118		-	-		70-130	-		20
Bromobenzene	ND	4	4.8	120		-	-		70-130	-		20
1,3,5-Trimethylbenzene	ND	4	4.4	110		-	-		70-130	-		20
o-Chlorotoluene	ND	4	4.9	123		-	-		70-130	-		20
p-Chlorotoluene	ND	4	4.6	115		-	-		70-130	-		20
tert-Butylbenzene	ND	4	4.5	113		-	-		70-130	-		20

Matrix Spike Analysis

Batch Quality Control

Project Name: PRUDENCE ISLAND

Project Number: 119-21-01

Lab Number: L2162696

Report Date: 12/01/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab	Associated sample(s): 01-02	QC Batch ID: WG1572447-6	QC Sample: L2161603-03	Client ID: MS Sample								
1,2,4-Trimethylbenzene	ND	4	4.7	118		-	-		70-130	-		20
sec-Butylbenzene	ND	4	4.7	118		-	-		70-130	-		20
p-Isopropyltoluene	ND	4	4.5	113		-	-		70-130	-		20
1,3-Dichlorobenzene	ND	4	4.6	115		-	-		70-130	-		20
1,4-Dichlorobenzene	ND	4	4.3	108		-	-		70-130	-		20
n-Butylbenzene	ND	4	4.5	113		-	-		70-130	-		20
1,2-Dichlorobenzene	ND	4	4.3	108		-	-		70-130	-		20
1,2-Dibromo-3-chloropropane	ND	4	3.8	95		-	-		70-130	-		20
1,2,4-Trichlorobenzene	ND	4	3.8	95		-	-		70-130	-		20
Hexachlorobutadiene	ND	4	4.2	105		-	-		70-130	-		20
Naphthalene	ND	4	3.2	80		-	-		70-130	-		20
1,2,3-Trichlorobenzene	ND	4	3.7	92		-	-		70-130	-		20

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
1,2-Dichlorobenzene-d4	99				80-120
4-Bromofluorobenzene	102				80-120

Lab Duplicate Analysis
Batch Quality Control

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01

Lab Number: L2162696
Report Date: 12/01/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1572447-5 QC Sample: L2161603-01 Client ID: DUP Sample						
Dichlorodifluoromethane	ND	ND	ug/l	NC		20
Chloromethane	ND	ND	ug/l	NC		20
Vinyl chloride	ND	ND	ug/l	NC		20
Bromomethane	ND	ND	ug/l	NC		20
Chloroethane	ND	ND	ug/l	NC		20
Trichlorofluoromethane	ND	ND	ug/l	NC		20
1,1-Dichloroethene	ND	ND	ug/l	NC		20
Methylene chloride	ND	ND	ug/l	NC		20
Methyl tert butyl ether	ND	ND	ug/l	NC		20
trans-1,2-Dichloroethene	ND	ND	ug/l	NC		20
1,1-Dichloroethane	ND	ND	ug/l	NC		20
2,2-Dichloropropane	ND	ND	ug/l	NC		20
cis-1,2-Dichloroethene	ND	ND	ug/l	NC		20
Chloroform	ND	ND	ug/l	NC		20
Bromochloromethane	ND	ND	ug/l	NC		20
1,1,1-Trichloroethane	ND	ND	ug/l	NC		20
1,1-Dichloropropene	ND	ND	ug/l	NC		20
Carbon tetrachloride	ND	ND	ug/l	NC		20
1,2-Dichloroethane	ND	ND	ug/l	NC		20
Benzene	ND	ND	ug/l	NC		20
Trichloroethene	ND	ND	ug/l	NC		20

Lab Duplicate Analysis
Batch Quality Control

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01

Lab Number: L2162696
Report Date: 12/01/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1572447-5 QC Sample: L2161603-01 Client ID: DUP Sample						
1,2-Dichloropropane	ND	ND	ug/l	NC		20
Bromodichloromethane	ND	ND	ug/l	NC		20
Dibromomethane	ND	ND	ug/l	NC		20
cis-1,3-Dichloropropene	ND	ND	ug/l	NC		20
Toluene	ND	ND	ug/l	NC		20
trans-1,3-Dichloropropene	ND	ND	ug/l	NC		20
1,1,2-Trichloroethane	ND	ND	ug/l	NC		20
1,3-Dichloropropane	ND	ND	ug/l	NC		20
Tetrachloroethene	ND	ND	ug/l	NC		20
Dibromochloromethane	ND	ND	ug/l	NC		20
1,2-Dibromoethane	ND	ND	ug/l	NC		20
Chlorobenzene	ND	ND	ug/l	NC		20
1,1,1,2-Tetrachloroethane	ND	ND	ug/l	NC		20
Ethylbenzene	ND	ND	ug/l	NC		20
p/m-Xylene	ND	ND	ug/l	NC		20
o-Xylene	ND	ND	ug/l	NC		20
Styrene	ND	ND	ug/l	NC		20
Isopropylbenzene	ND	ND	ug/l	NC		20
Bromoform	ND	ND	ug/l	NC		20
1,1,2,2-Tetrachloroethane	ND	ND	ug/l	NC		20
1,2,3-Trichloropropane	ND	ND	ug/l	NC		20

Lab Duplicate Analysis
Batch Quality Control

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01

Lab Number: L2162696
Report Date: 12/01/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1572447-5 QC Sample: L2161603-01 Client ID: DUP Sample						
Xylene (Total)[1]	ND	ND	ug/l	NC		20
n-Propylbenzene	ND	ND	ug/l	NC		20
Bromobenzene	ND	ND	ug/l	NC		20
Trihalomethanes, Total	ND	ND	ug/l	NC		20
1,3,5-Trimethylbenzene	ND	ND	ug/l	NC		20
o-Chlorotoluene	ND	ND	ug/l	NC		20
p-Chlorotoluene	ND	ND	ug/l	NC		20
tert-Butylbenzene	ND	ND	ug/l	NC		20
1,2,4-Trimethylbenzene	ND	ND	ug/l	NC		20
sec-Butylbenzene	ND	ND	ug/l	NC		20
p-Isopropyltoluene	ND	ND	ug/l	NC		20
1,3-Dichlorobenzene	ND	ND	ug/l	NC		20
1,4-Dichlorobenzene	ND	ND	ug/l	NC		20
n-Butylbenzene	ND	ND	ug/l	NC		20
1,2-Dichlorobenzene	ND	ND	ug/l	NC		20
1,2-Dibromo-3-chloropropane	ND	ND	ug/l	NC		20
1,2,4-Trichlorobenzene	ND	ND	ug/l	NC		20
Hexachlorobutadiene	ND	ND	ug/l	NC		20
Naphthalene	ND	ND	ug/l	NC		20
1,2,3-Trichlorobenzene	ND	ND	ug/l	NC		20

Lab Duplicate Analysis
Batch Quality Control

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01

Lab Number: L2162696
Report Date: 12/01/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits

Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1572447-5 QC Sample: L2161603-01 Client ID: DUP Sample

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichlorobenzene-d4	102		104		80-120
4-Bromofluorobenzene	96		95		80-120

INORGANICS
&
MISCELLANEOUS

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01

Lab Number: L2162696
Report Date: 12/01/21

SAMPLE RESULTS

Lab ID: L2162696-01
Client ID: IS-DAY3
Sample Location: PRUDENCE

Date Collected: 11/14/21 15:30
Date Received: 11/15/21
Field Prep: Not Specified

Sample Depth:
Matrix: Dw

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chlorine, Total Residual	0.30		mg/l	0.02	--	1	-	11/16/21 23:09	121,4500CL-D	AS
pH (H)	7.5		SU	-	NA	1	-	11/16/21 03:49	121,4500H+-B	KA
Oxidation/Reduction Potential	540		mv	-	NA	1	-	11/15/21 23:17	12,1498	AS

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01

Lab Number: L2162696
Report Date: 12/01/21

SAMPLE RESULTS

Lab ID: L2162696-02
Client ID: AC-DAY3
Sample Location: PRUDENCE

Date Collected: 11/14/21 15:30
Date Received: 11/15/21
Field Prep: Not Specified

Sample Depth:
Matrix: Dw

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chlorine, Total Residual	0.25		mg/l	0.02	--	1	-	11/16/21 23:09	121,4500CL-D	AS
pH (H)	7.4		SU	-	NA	1	-	11/16/21 03:49	121,4500H+-B	KA
Oxidation/Reduction Potential	570		mv	-	NA	1	-	11/15/21 23:17	12,1498	AS

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01

Lab Number: L2162696
Report Date: 12/01/21

SAMPLE RESULTS

Lab ID: L2162696-03
Client ID: IS #2 RAW
Sample Location: PRUDENCE

Date Collected: 11/14/21 16:00
Date Received: 11/15/21
Field Prep: Not Specified

Sample Depth:
Matrix: Dw

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Alkalinity, Total	55.2		mg CaCO3/L	2.00	NA	1	-	11/23/21 10:12	121,2320B	JB
pH (H)	7.4		SU	-	NA	1	-	11/16/21 03:49	121,4500H+-B	KA
Total Organic Carbon	ND		mg/l	0.500	--	1	-	11/30/21 12:27	121,5310C	DW
Oxidation/Reduction Potential	490		mv	-	NA	1	-	11/15/21 23:17	12,1498	AS

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01
Lab Number: L2162696
Report Date: 12/01/21

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01-02 Batch: WG1572235-1										
Chlorine, Total Residual	ND		mg/l	0.02	--	1	-	11/16/21 23:09	121,4500CL-D	AS
General Chemistry - Westborough Lab for sample(s): 03 Batch: WG1574989-1										
Alkalinity, Total	ND		mg CaCO3/L	2.00	NA	1	-	11/23/21 10:12	121,2320B	JB
General Chemistry - Westborough Lab for sample(s): 03 Batch: WG1576924-1										
Total Organic Carbon	ND		mg/l	0.500	--	1	-	11/30/21 06:53	121,5310C	DW

Lab Control Sample Analysis

Batch Quality Control

Project Name: PRUDENCE ISLAND

Project Number: 119-21-01

Lab Number: L2162696

Report Date: 12/01/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-03 Batch: WG1571768-1								
Oxidation/Reduction Potential	102		-		90-110	-		20
General Chemistry - Westborough Lab Associated sample(s): 01-03 Batch: WG1571795-1								
pH	100		-		99-101	-		5
General Chemistry - Westborough Lab Associated sample(s): 01-02 Batch: WG1572235-2								
Chlorine, Total Residual	104		-		90-110	-		
General Chemistry - Westborough Lab Associated sample(s): 03 Batch: WG1574989-2								
Alkalinity, Total	102		-		90-110	-		10
General Chemistry - Westborough Lab Associated sample(s): 03 Batch: WG1576924-2								
Total Organic Carbon	96		-		90-110	-		

Matrix Spike Analysis
Batch Quality Control

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01

Lab Number: L2162696
Report Date: 12/01/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 03 QC Batch ID: WG1574989-4 QC Sample: L2162696-03 Client ID: IS #2 RAW												
Alkalinity, Total	55.2	100	158	103		-	-		86-116	-		10
General Chemistry - Westborough Lab Associated sample(s): 03 QC Batch ID: WG1576924-4 QC Sample: L2161355-03 Client ID: MS Sample												
Total Organic Carbon	1.13	4	4.94	95		-	-		80-120	-		20

Lab Duplicate Analysis
Batch Quality Control

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01

Lab Number: L2162696
Report Date: 12/01/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1571768-2 QC Sample: L2162696-01 Client ID: IS-DAY3						
Oxidation/Reduction Potential	540	560	mv	4		20
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1571795-2 QC Sample: L2162696-01 Client ID: IS-DAY3						
pH (H)	7.5	7.4	SU	1		5
General Chemistry - Westborough Lab Associated sample(s): 03 QC Batch ID: WG1574989-3 QC Sample: L2162696-03 Client ID: IS #2 RAW						
Alkalinity, Total	55.2	55.3	mg CaCO3/L	0		10
General Chemistry - Westborough Lab Associated sample(s): 03 QC Batch ID: WG1576924-3 QC Sample: L2161355-02 Client ID: DUP Sample						
Total Organic Carbon	1.12	1.14	mg/l	2		20

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01

Lab Number: L2162696
Report Date: 12/01/21

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2162696-01A	Vial NH4Cl preserved	A	NA		5.8	Y	Absent		SUB-HAA(9)
L2162696-01B	Vial NH4Cl preserved	A	NA		5.8	Y	Absent		SUB-HAA(9)
L2162696-01C	Vial NH4Cl preserved	A	NA		5.8	Y	Absent		SUB-HAA(9)
L2162696-01D	Vial NH4Cl preserved	A	NA		5.8	Y	Absent		SUB-HAA(9)
L2162696-01E	Vial Ascorbic Acid/HCl preserved	A	NA		5.8	Y	Absent		524-THM(14)
L2162696-01F	Vial Ascorbic Acid/HCl preserved	A	NA		5.8	Y	Absent		524-THM(14)
L2162696-01G	Plastic 60ml unpreserved	A	7	7	5.8	Y	Absent		PH-4500(.01)
L2162696-01H	Plastic 120ml unpreserved	A	7	7	5.8	Y	Absent		ORP(1),TRC-4500(1)
L2162696-02A	Vial NH4Cl preserved	A	NA		5.8	Y	Absent		SUB-HAA(9)
L2162696-02B	Vial NH4Cl preserved	A	NA		5.8	Y	Absent		SUB-HAA(9)
L2162696-02C	Vial NH4Cl preserved	A	NA		5.8	Y	Absent		SUB-HAA(9)
L2162696-02D	Vial NH4Cl preserved	A	NA		5.8	Y	Absent		SUB-HAA(9)
L2162696-02E	Vial Ascorbic Acid/HCl preserved	A	NA		5.8	Y	Absent		524-THM(14)
L2162696-02F	Vial Ascorbic Acid/HCl preserved	A	NA		5.8	Y	Absent		524-THM(14)
L2162696-02G	Plastic 60ml unpreserved	A	7	7	5.8	Y	Absent		PH-4500(.01)
L2162696-02H	Plastic 120ml unpreserved	A	7	7	5.8	Y	Absent		ORP(1),TRC-4500(1)
L2162696-03A	Vial H2SO4 preserved	A	NA		5.8	Y	Absent		TOC-5310(28)
L2162696-03B	Vial H2SO4 preserved	A	NA		5.8	Y	Absent		TOC-5310(28)
L2162696-03C	Plastic 120ml unpreserved	A	7	7	5.8	Y	Absent		ORP(1),PH-4500(.01)
L2162696-03D	Plastic 250ml unpreserved/No Headspace	A	NA		5.8	Y	Absent		ALK-T-2320(14)

*Values in parentheses indicate holding time in days

Project Name:	PRUDENCE ISLAND	**Lab Number:**	L2162696
Project Number:	119-21-01	**Report Date:**	12/01/21

GLOSSARY

Acronyms

DL - Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

EDL - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).

EMPC - Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.

EPA - Environmental Protection Agency.

LCS - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

LFB - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LOD - Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

LOQ - Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

MDL - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

MS - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

NC - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.

NDPA/DPA - N-Nitrosodiphenylamine/Diphenylamine.

NI - Not Ignitable.

NP - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.

NR - No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.

RL - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

RPD - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.

SRM - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

STLP - Semi-dynamic Tank Leaching Procedure per EPA Method 1315.

TEF - Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.

TEQ - Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.

TIC - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: Data Usability Report

Project Name:	PRUDENCE ISLAND	**Lab Number:**	L2162696
Project Number:	119-21-01	**Report Date:**	12/01/21

Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA,this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND - Not detected at the reporting limit (RL) for the sample.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where

Report Format: Data Usability Report

Project Name:	PRUDENCE ISLAND	**Lab Number:**	L2162696
Project Number:	119-21-01	**Report Date:**	12/01/21

Data Qualifiers

the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

V - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Z - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Report Format: Data Usability Report

Project Name:	PRUDENCE ISLAND	**Lab Number:**	L2162696
Project Number:	119-21-01	**Report Date:**	12/01/21

REFERENCES

12 Annual Book of ASTM Standards. (American Society for Testing and Materials) ASTM International.

16 Methods for the Determination of Organic Compounds in Drinking Water - Supplement II. EPA/600/R-92/129, August 1992.

121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene
EPA 625/625.1: alpha-Terpineol
EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D/8270E: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522, EPA 537.1.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

CHAIN OF CUSTODY

PAGE 1 OF 1

Date Rec'd in Lab: 11/15/21

ALPHA Job #: L2162696

ALPHA ANALYTICAL
8 Walkup Drive, Westboro, MA 01581, Tel: 508-898-9220
320 Forbes Blvd, Mansfield, MA 02048, Tel: 508-822-9300

Client Information

Client: H2O Olson Engineering
Address: 10 Riverside
Phone: 508 375 7007
Email: sco@h2olsonengineering.com

Additional Project Information:

Project Information

Project Name: Prudence Island
Project Location: Prudence
Project #: 119.21.01
Project Manager: Steve Olson
ALPHA Quote #:

Turn-Around Time

☒ Standard ☐ RUSH (only confirmed if pre-approved!)
Date Due:

Report Information - Data Deliverables

☐ ADEx ☒ EMAIL

Billing Information

☐ Same as Client info PO #:

Regulatory Requirements & Project Information Requirements

☐ Yes ☐ No MA MCP Analytical Methods ☐ Yes ☐ No CT RCP Analytical Methods
☐ Yes ☐ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)
☐ Yes ☐ No GW1 Standards (Info Required for Metals & EPH with Targets)
☐ Yes ☐ No NPDES RGP
☐ Other State /Fed Program _____ Criteria _____

ANALYSIS

VOC: ☐ 8260 ☐ 624 ☐ 524.2
SVOC: ☐ ABN ☐ PAH
METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15
METALS: ☐ RCRA5 ☐ RCRA8 ☐ PP13
EPH: ☐ Ranges & Targets ☐ Ranges Only
VPH: ☐ Ranges & Targets ☐ Ranges Only
☐ PCB ☐ PEST
TPH: ☐ Quant Only ☐ Fingerprint
THMs
HAAs
Chlorine - ORP
Alkalinity - ORP-PH
TOC

SAMPLE INFO

Filtration
☐ Field
☐ Lab to do
Preservation
☐ Lab to do

Sample Comments

TOTAL # BOTTLES

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	TOTAL # BOTTLES
62616-01	IS - Day 3	11/14	3:30p	DW	SO	8
-02	AC - Day 3	11/14	3:50p	DW	SO	8
-03	IS #2 Raw	11/14	4:00p	DW	SO	4

Container Type
P= Plastic
A= Amber glass
V= Vial
G= Glass
B= Bacteria cup
C= Cube
O= Other
E= Encore
D= BOD Bottle

Preservative
A= None
B= HCl
C= HNO_3
D= H_2SO_4
E= NaOH
F= MeOH
G= $NaHSO_4$
H = $Na_2S_2O_3$
I= Ascorbic Acid
J = NH_4Cl
K= Zn Acetate
O= Other

Container Type																			
Preservative																			

Relinquished By:	Date/Time	Received By:	Date/Time
Rob Mento	11/15 12:45	Rob Mento AR	11/15/21 1235
Rob Mento	11/15/21 1930		11/15 1950

All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 12-Mar-2012)

GRANITE STATE
ANALYTICAL SERVICES, LLC.

22 Manchester Road, Unit 2, Derry, NH 03038
Phone (800) 699-9920 | (603) 432-3044 website www.granitestateanalytical.com

Laboratory Report

Alpha Analytical-Westborough
8 Walkup Dr.
Westborough, MA 01581

Date Printed:	**11/24/2021**
Work Order #:	**2111-02494**
Client Job #:	
Date Received:	**11/16/2021**
Sample collected in:	**Rhode Island**

Attached please find results for the analysis of the samples received on the date referenced above.

Unless otherwise noted in the attached report, the analyses performed met the requirements of the analyzing laboratory's Quality Assurance Plan, Standard Operating Procedures and State Accreditation. This certificate shall not be reproduced, except in full, without the written approval of the analyzing laboratory. The results presented in this report relate to the samples listed on the following pages in the condition in which they were received. Accreditation for each analyte is identified by the * symbol following the analyte name. Location of our analyzing laboratory is identified by the code in the Analyst Column.

A & L Laboratory:
Identified by ME in Analyst Column
155 Center Street, Auburn, Maine 04210
www.allaboratory.com

Granite State Analytical Services LLC:
Identified by NH in Analyst Column
22 Manchester Road, Derry, NH 03038
www.granitestateanalytical.com

ANALYSIS RELATED NOTES:

- RL: "Reporting limit" means the lowest level of an analyte that can be accurately recovered from the matrix of interest.
- A & L Laboratory / Granite State Analytical Services LLC. accreditation lists can be found on our websites listed above.
- Subcontracted samples will be identified by the Accreditation number of the subcontract laboratory in the analyst field for each analyte and the appropriate laboratory will be listed here. None
- Data Qualifiers (DQ) Flags provide additional information in regards to the receipt, analysis or quality control of a sample. These are indicated under the DQ Flags Column on your report and listed here if necessary: Data Qualifier (DQ) Flags: None

SAMPLE STATE SPECIFIC NOTES:

Additional Narrative or Comments: None

We appreciate the opportunity to provide you with laboratory services. If you have any questions regarding the enclosed report, please contact the laboratory and we will be happy to assist you.

Donald A. D'Anjou, Ph. D.
Laboratory Director

GRANITE STATE
ANALYTICAL SERVICES, LLC.
22 Manchester Road, Unit 2, Derry, NH 03038
Phone (800) 699-9920 | (603) 432-3044 website www.granitestateanalytical.com

CERTIFICATE OF ANALYSIS FOR DRINKING WATER

DATE PRINTED: 11/24/2021
CLIENT NAME: Alpha Analytical-Westborough
CLIENT ADDRESS: 8 Walkup Dr.
Westborough, MA 01581

SAMPLE ID #: 2111-02494-001
SAMPLED BY: Alpha Analytical-Westborough
SAMPLE ADDRESS: L2162696
IS-DAY3
RI

MORE LOC INFO:

Legend	
Passes	✓
Fails EPA Primary	⊗
Fails EPA Secondary	▼
Fails State Guideline	✕
Attention	⚠

DATE AND TIME COLLECTED: 11/14/2021 03:30PM
DATE AND TIME RECEIVED: 11/16/2021 04:46PM
ANALYSIS PACKAGE: HAA GSA
RECEIPT TEMPERATURE: ON ICE 0.9° CELSIUS
CLIENT JOB #:

Test Description	Result	Test Units	Pass /Fail	DQ Flag	RL	Limit	Method	Analyst	Date - Time Analyzed
Date Extracted	-					No Limit	EPA 552.2	GQ-NH	11/18/2021 04:11PM
Dibromoacetic Acid*	<1	ug/L			1	No Limit	EPA 552.2	KV-NH	11/20/2021 03:29PM
Dichloroacetic Acid*	2.1	ug/L			1	No Limit	EPA 552.2	KV-NH	11/20/2021 03:29PM
Monobromoacetic Acid*	<1	ug/L			1	No Limit	EPA 552.2	KV-NH	11/20/2021 03:29PM
Monochloroacetic Acid*	<2	ug/L			2	No Limit	EPA 552.2	KV-NH	11/20/2021 03:29PM
Total Haloacetic Acids*	2.1	ug/L	✓		1	60 ug/L	EPA 552.2	KV-NH	11/20/2021 03:29PM
Trichloroacetic Acid*	<1	ug/L			1	No Limit	EPA 552.2	KV-NH	11/20/2021 03:29PM
2,3-Dibromopropionic Acid	78	%	✓			70-130%	EPA 552.2 - SS	KV-NH	11/20/2021 03:29PM

Donald A. D'Anjou, Ph. D.
Laboratory Director

GRANITE STATE
ANALYTICAL SERVICES, LLC.

22 Manchester Road, Unit 2, Derry, NH 03038
Phone (800) 699-9920 | (603) 432-3044 website www.granitestateanalytical.com

CERTIFICATE OF ANALYSIS FOR DRINKING WATER

DATE PRINTED: 11/24/2021
CLIENT NAME: Alpha Analytical-Westborough
CLIENT ADDRESS: 8 Walkup Dr.
Westborough, MA 01581

SAMPLE ID #: 2111-02494-002
SAMPLED BY: Alpha Analytical-Westborough
SAMPLE ADDRESS: L2162696
AC-DAY3
RI

MORE LOC INFO:

Legend	
Passes	✓
Fails EPA Primary	⊗
Fails EPA Secondary	▽
Fails State Guideline	✕
Attention	⚠

DATE AND TIME COLLECTED: 11/14/2021 03:30PM
DATE AND TIME RECEIVED: 11/16/2021 04:46PM
ANALYSIS PACKAGE: HAA GSA
RECEIPT TEMPERATURE: ON ICE 0.9° CELSIUS
CLIENT JOB #:

Test Description	Result	Test Units	Pass /Fail	DQ Flag	RL	Limit	Method	Analyst	Date - Time Analyzed
Date Extracted	-					No Limit	EPA 552.2	GQ-NH	11/18/2021 04:11PM
Dibromoacetic Acid*	<1	ug/L			1	No Limit	EPA 552.2	KV-NH	11/20/2021 04:09PM
Dichloroacetic Acid*	<1	ug/L			1	No Limit	EPA 552.2	KV-NH	11/20/2021 04:09PM
Monobromoacetic Acid*	<1	ug/L			1	No Limit	EPA 552.2	KV-NH	11/20/2021 04:09PM
Monochloroacetic Acid*	<2	ug/L			2	No Limit	EPA 552.2	KV-NH	11/20/2021 04:09PM
Total Haloacetic Acids*	<1	ug/L	✓		1	60 ug/L	EPA 552.2	KV-NH	11/20/2021 04:09PM
Trichloroacetic Acid*	<1	ug/L			1	No Limit	EPA 552.2	KV-NH	11/20/2021 04:09PM
2,3-Dibromopropionic Acid	98	%	✓			70-130%	EPA 552.2 - SS	KV-NH	11/20/2021 04:09PM

Donald A. D'Anjou, Ph. D.
Laboratory Director

ANALYTICAL REPORT

Lab Number:	L2164713
Client:	H2Olson Engineering, Inc. 10 Riverside Drive, Suite 103 Lakeville, MA 02347
ATTN:	Stephen Olson
Phone:	(508) 375-7007
Project Name:	PRUDENCE ISLAND
Project Number:	119-21-01
Report Date:	12/10/21

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01

Lab Number: L2164713
Report Date: 12/10/21

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2164713-01	AC-DAY 12	DW	PRUDENCE	11/23/21 10:00	11/23/21
L2164713-02	IS-DAY 12	DW	PRUDENCE	11/23/21 10:00	11/23/21
L2164713-03	AC-RAW	DW	PRUDENCE	11/23/21 10:00	11/23/21
L2164713-04	IS-RAW	DW	PRUDENCE	11/23/21 10:00	11/23/21

Project Name:	PRUDENCE ISLAND	**Lab Number:**	L2164713
Project Number:	119-21-01	**Report Date:**	12/10/21

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name:	PRUDENCE ISLAND	**Lab Number:**	L2164713
Project Number:	119-21-01	**Report Date:**	12/10/21

Case Narrative (continued)

Report Submission

The HAA analysis was subcontracted. A copy of the laboratory report is included as an addendum. Please note: This data is only available in PDF format and is not available on Data Merger.

Volatile Organics by Method 524.2

The WG1576530-5 Laboratory Duplicate RPD for bromodichloromethane (24%), performed on L2164713-01, is outside the acceptance criteria. The elevated RPD has been attributed to vial discrepancy.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:  Cristin Walker

Title: Technical Director/Representative Date: 12/10/21

ORGANICS

VOLATILES

Project Name: PRUDENCE ISLAND
Lab Number: L2164713
Project Number: 119-21-01
Report Date: 12/10/21

SAMPLE RESULTS

Lab ID: L2164713-01
Client ID: AC-DAY 12
Sample Location: PRUDENCE
Date Collected: 11/23/21 10:00
Date Received: 11/23/21
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 16,524.2
Analytical Date: 11/28/21 14:34
Analyst: KJD

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Chloroform	2.7		ug/l	0.50	--	1
Bromodichloromethane	2.8		ug/l	0.50	--	1
Dibromochloromethane	1.7		ug/l	0.50	--	1
Bromoform	ND		ug/l	0.50	--	1
THMs, Total	7.2		ug/l	0.50	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichlorobenzene-d4	103		80-120
4-Bromofluorobenzene	98		80-120

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01
Lab Number: L2164713
Report Date: 12/10/21

SAMPLE RESULTS

Lab ID: L2164713-02
Client ID: IS-DAY 12
Sample Location: PRUDENCE
Date Collected: 11/23/21 10:00
Date Received: 11/23/21
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 16,524.2
Analytical Date: 11/28/21 15:02
Analyst: KJD

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Chloroform	1.1		ug/l	0.50	--	1
Bromodichloromethane	1.8		ug/l	0.50	--	1
Dibromochloromethane	1.5		ug/l	0.50	--	1
Bromoform	ND		ug/l	0.50	--	1
THMs, Total	4.4		ug/l	0.50	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichlorobenzene-d4	105		80-120
4-Bromofluorobenzene	93		80-120

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01
Lab Number: L2164713
Report Date: 12/10/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 16,524.2
Analytical Date: 11/28/21 13:39
Analyst: KJD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01-02 Batch: WG1576530-4					
Chloroform	ND		ug/l	0.50	--
Bromodichloromethane	ND		ug/l	0.50	--
Dibromochloromethane	ND		ug/l	0.50	--
Bromoform	ND		ug/l	0.50	--
THMs, Total	ND		ug/l	0.50	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichlorobenzene-d4	104		80-120
4-Bromofluorobenzene	96		80-120

Lab Control Sample Analysis
Batch Quality Control

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01

Lab Number: L2164713
Report Date: 12/10/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-02 Batch: WG1576530-3								
Chloroform	90		-		70-130	-		20
Bromodichloromethane	90		-		70-130	-		20
Dibromochloromethane	75		-		70-130	-		20
Bromoform	102		-		70-130	-		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichlorobenzene-d4	98				80-120
4-Bromofluorobenzene	97				80-120

Matrix Spike Analysis

Batch Quality Control

Project Name: PRUDENCE ISLAND

Project Number: 119-21-01

Lab Number: L2164713

Report Date: 12/10/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab	Associated sample(s): 01-02		QC Batch ID: WG1576530-6			QC Sample: L2164713-02			Client ID: IS-DAY 12			
Chloroform	1.1	4	5.6	113		-	-		70-130	-		20
Bromodichloromethane	1.8	4	5.8	100		-	-		70-130	-		20
Dibromochloromethane	1.5	4	4.9	85		-	-		70-130	-		20
Bromoform	ND	4	4.1	103		-	-		70-130	-		20

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
1,2-Dichlorobenzene-d4	100				80-120
4-Bromofluorobenzene	105				80-120

Lab Duplicate Analysis
Batch Quality Control

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01

Lab Number: L2164713
Report Date: 12/10/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1576530-5 QC Sample: L2164713-01 Client ID: AC-DAY 12						
Chloroform	2.7	2.2	ug/l	20		20
Bromodichloromethane	2.8	2.2	ug/l	**24**	Q	20
Dibromochloromethane	1.7	1.4	ug/l	19		20
Bromoform	ND	ND	ug/l	NC		20
THMs, Total	7.2	5.8	ug/l	**22**	Q	20

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichlorobenzene-d4	103		108		80-120
4-Bromofluorobenzene	98		95		80-120

INORGANICS
&
MISCELLANEOUS

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01

Lab Number: L2164713
Report Date: 12/10/21

SAMPLE RESULTS

Lab ID: L2164713-01
Client ID: AC-DAY 12
Sample Location: PRUDENCE

Date Collected: 11/23/21 10:00
Date Received: 11/23/21
Field Prep: Not Specified

Sample Depth:
Matrix: Dw

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chlorine, Total Residual	0.98		mg/l	0.04	--	2	-	11/24/21 00:27	121,4500CL-D	KA
pH (H)	6.8		SU	-	NA	1	-	11/24/21 00:01	121,4500H+-B	AS
Oxidation/Reduction Potential	360		mv	-	NA	1	-	11/23/21 23:40	12,1498	AS
Anions by Ion Chromatography - Westborough Lab										
Chloride	14.8		mg/l	0.500	--	1	-	12/09/21 03:50	44,300.0	AT
Sulfate	7.31		mg/l	1.00	--	1	-	12/09/21 03:50	44,300.0	AT

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01

Lab Number: L2164713
Report Date: 12/10/21

SAMPLE RESULTS

Lab ID: L2164713-02
Client ID: IS-DAY 12
Sample Location: PRUDENCE

Date Collected: 11/23/21 10:00
Date Received: 11/23/21
Field Prep: Not Specified

Sample Depth:
Matrix: Dw

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chlorine, Total Residual	0.65		mg/l	0.04	--	2	-	11/24/21 00:27	121,4500CL-D	KA
pH (H)	6.9		SU	-	NA	1	-	11/24/21 00:01	121,4500H+-B	AS
Oxidation/Reduction Potential	410		mv	-	NA	1	-	11/23/21 23:40	12,1498	AS
Anions by Ion Chromatography - Westborough Lab										
Chloride	13.6		mg/l	0.500	--	1	-	12/09/21 04:01	44,300.0	AT
Sulfate	23.8		mg/l	1.00	--	1	-	12/09/21 04:01	44,300.0	AT

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01

Lab Number: L2164713
Report Date: 12/10/21

SAMPLE RESULTS

Lab ID: L2164713-03
Client ID: AC-RAW
Sample Location: PRUDENCE

Date Collected: 11/23/21 10:00
Date Received: 11/23/21
Field Prep: Not Specified

Sample Depth:
Matrix: Dw

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Anions by Ion Chromatography - Westborough Lab										
Chloride	9.96		mg/l	0.500	--	1	-	12/08/21 21:38	44,300.0	AT
Sulfate	22.5		mg/l	1.00	--	1	-	12/08/21 21:38	44,300.0	AT

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01

Lab Number: L2164713
Report Date: 12/10/21

SAMPLE RESULTS

Lab ID: L2164713-04
Client ID: IS-RAW
Sample Location: PRUDENCE

Date Collected: 11/23/21 10:00
Date Received: 11/23/21
Field Prep: Not Specified

Sample Depth:
Matrix: Dw

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Anions by Ion Chromatography - Westborough Lab										
Chloride	7.45		mg/l	0.500	--	1	-	12/08/21 21:49	44,300.0	AT
Sulfate	7.33		mg/l	1.00	--	1	-	12/08/21 21:49	44,300.0	AT

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01
Lab Number: L2164713
Report Date: 12/10/21

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01-02 Batch: WG1575339-1										
Chlorine, Total Residual	ND		mg/l	0.02	--	1	-	11/24/21 00:27	121,4500CL-D	KA
Anions by Ion Chromatography - Westborough Lab for sample(s): 01-04 Batch: WG1580925-1										
Sulfate	ND		mg/l	1.00	--	1	-	12/08/21 17:15	44,300.0	AT
Anions by Ion Chromatography - Westborough Lab for sample(s): 01-04 Batch: WG1580925-1										
Chloride	ND		mg/l	0.500	--	1	-	12/08/21 17:15	44,300.0	AT

Lab Control Sample Analysis

Batch Quality Control

Project Name: PRUDENCE ISLAND

Project Number: 119-21-01

Lab Number: L2164713

Report Date: 12/10/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-02 Batch: WG1575324-1								
Oxidation/Reduction Potential	103		-		90-110	-		20
General Chemistry - Westborough Lab Associated sample(s): 01-02 Batch: WG1575326-1								
pH	100		-		99-101	-		5
General Chemistry - Westborough Lab Associated sample(s): 01-02 Batch: WG1575339-2								
Chlorine, Total Residual	96		-		90-110	-		
Anions by Ion Chromatography - Westborough Lab Associated sample(s): 01-04 Batch: WG1580925-2								
Chloride	101		-		90-110	-		
Sulfate	96		-		90-110	-		

Matrix Spike Analysis
Batch Quality Control

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01

Lab Number: L2164713
Report Date: 12/10/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1575339-4 QC Sample: L2164681-01 Client ID: MS Sample												
Chlorine, Total Residual	2.3	2.5	4.5	86		-	-		80-120	-		20
Anions by Ion Chromatography - Westborough Lab Associated sample(s): 01-04 QC Batch ID: WG1580925-3 QC Sample: L2164713-04 Client ID: IS-RAW												
Chloride	7.45	4	11.3	96		-	-		90-110	-		18
Sulfate	7.33	8	15.2	98		-	-		90-110	-		20

Lab Duplicate Analysis
Batch Quality Control

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01

Lab Number: L2164713
Report Date: 12/10/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1575324-2 QC Sample: L2164713-01 Client ID: AC-DAY 12						
Oxidation/Reduction Potential	360	360	mv	0		20
General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1575326-2 QC Sample: L2164713-01 Client ID: AC-DAY 12						
pH (H)	6.8	6.7	SU	1		5
General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1575339-3 QC Sample: L2164664-01 Client ID: DUP Sample						
Chlorine, Total Residual	3.2	3.1	mg/l	3		20
Anions by Ion Chromatography - Westborough Lab Associated sample(s): 01-04 QC Batch ID: WG1580925-4 QC Sample: L2164713-04 Client ID: IS-RAW						
Chloride	7.45	7.58	mg/l	2		18
Sulfate	7.33	7.51	mg/l	2		20

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01

Lab Number: L2164713
Report Date: 12/10/21

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2164713-01A	Vial NH4Cl preserved	A	NA	NA	2.3	Y	Absent		SUB-HAA(9)
L2164713-01B	Vial NH4Cl preserved	A	NA	NA	2.3	Y	Absent		SUB-HAA(9)
L2164713-01C	Vial NH4Cl preserved	A	NA	NA	2.3	Y	Absent		SUB-HAA(9)
L2164713-01D	Vial NH4Cl preserved	A	NA	NA	2.3	Y	Absent		SUB-HAA(9)
L2164713-01E	Vial Ascorbic Acid/HCl preserved	A	NA		2.3	Y	Absent		524-THM(14)
L2164713-01F	Vial Ascorbic Acid/HCl preserved	A	NA		2.3	Y	Absent		524-THM(14)
L2164713-01G	Plastic 120ml unpreserved	A	7	7	2.3	Y	Absent		SO4-300(28)
L2164713-01H	Plastic 250ml unpreserved	A	7	7	2.3	Y	Absent		ORP(1),TRC-4500(1),PH-4500(.01)
L2164713-01I	Plastic 500ml unpreserved	A	7	7	2.3	Y	Absent		CL-300(28)
L2164713-02A	Vial NH4Cl preserved	A	NA	NA	2.3	Y	Absent		SUB-HAA(9)
L2164713-02B	Vial NH4Cl preserved	A	NA	NA	2.3	Y	Absent		SUB-HAA(9)
L2164713-02C	Vial NH4Cl preserved	A	NA	NA	2.3	Y	Absent		SUB-HAA(9)
L2164713-02D	Vial NH4Cl preserved	A	NA	NA	2.3	Y	Absent		SUB-HAA(9)
L2164713-02E	Vial Ascorbic Acid/HCl preserved	A	NA		2.3	Y	Absent		524-THM(14)
L2164713-02F	Vial Ascorbic Acid/HCl preserved	A	NA		2.3	Y	Absent		524-THM(14)
L2164713-02G	Plastic 120ml unpreserved	A	7	7	2.3	Y	Absent		SO4-300(28)
L2164713-02H	Plastic 250ml unpreserved	A	7	7	2.3	Y	Absent		ORP(1),TRC-4500(1),PH-4500(.01)
L2164713-02I	Plastic 500ml unpreserved	A	7	7	2.3	Y	Absent		CL-300(28)
L2164713-03A	Plastic 120ml unpreserved	A	7	7	2.3	Y	Absent		SO4-300(28)
L2164713-03B	Plastic 250ml unpreserved	A	7	7	2.3	Y	Absent		CL-300(28)
L2164713-04A	Plastic 60ml unpreserved	A	7	7	2.3	Y	Absent		CL-300(28)
L2164713-04B	Plastic 120ml unpreserved	A	7	7	2.3	Y	Absent		CL-300(28)
L2164713-04C	Plastic 120ml unpreserved	A	7	7	2.3	Y	Absent		SO4-300(28)

*Values in parentheses indicate holding time in days

Project Name: PRUDENCE ISLAND
Project Number: 119-21-01

Lab Number: L2164713
Report Date: 12/10/21

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)

*Values in parentheses indicate holding time in days

Project Name:	PRUDENCE ISLAND	**Lab Number:**	L2164713
Project Number:	119-21-01	**Report Date:**	12/10/21

GLOSSARY

Acronyms

DL - Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

EDL - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).

EMPC - Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.

EPA - Environmental Protection Agency.

LCS - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

LFB - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LOD - Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

LOQ - Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

MDL - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

MS - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

NC - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.

NDPA/DPA - N-Nitrosodiphenylamine/Diphenylamine.

NI - Not Ignitable.

NP - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.

NR - No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.

RL - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

RPD - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.

SRM - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

STLP - Semi-dynamic Tank Leaching Procedure per EPA Method 1315.

TEF - Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.

TEQ - Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.

TIC - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: Data Usability Report

Project Name:	PRUDENCE ISLAND	**Lab Number:**	L2164713
Project Number:	119-21-01	**Report Date:**	12/10/21

Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA,this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND - Not detected at the reporting limit (RL) for the sample.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where

Report Format: Data Usability Report

Project Name:	PRUDENCE ISLAND	**Lab Number:**	L2164713
Project Number:	119-21-01	**Report Date:**	12/10/21

Data Qualifiers

the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

V - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Z - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Project Name:	PRUDENCE ISLAND	**Lab Number:**	L2164713
Project Number:	119-21-01	**Report Date:**	12/10/21

REFERENCES

12 Annual Book of ASTM Standards. (American Society for Testing and Materials) ASTM International.

16 Methods for the Determination of Organic Compounds in Drinking Water - Supplement II. EPA/600/R-92/129, August 1992.

44 Methods for the Determination of Inorganic Substances in Environmental Samples, EPA/600/R-93/100, August 1993.

121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene
EPA 625/625.1: alpha-Terpineol
EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D/8270E: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522, EPA 537.1.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

CHAIN OF CUSTODY

PAGE 1 OF 1

Date Rec'd in Lab: 11-23-21

ALPHA Job #: L2164713

ALPHA ANALYTICAL
8 Walkup Drive, Westboro, MA 01581, Tel: 508-898-9220
320 Forbes Blvd, Mansfield, MA 02048, Tel: 508-822-9300

Client Information

Client: H2 Olson Engineering, Inc.
Address: 10 Riverside Dr, Suite 103
Lakeville, MA 02347
Phone: 781 588 6800
Email: scu@h2olsonengineering.com

Project Information

Project Name: Prudence
Project Location: Prudence Island
Project #: 119.21.01
Project Manager: Steve Olson
ALPHA Quote #:

Turn-Around Time

☑ Standard ☐ RUSH (only confirmed if pre-approved!)
Date Due:

Additional Project Information:

Report Information - Data Deliverables

☐ ADEx ☑ EMAIL

Billing Information

☐ Same as Client info PO #:

Regulatory Requirements & Project Information Requirements

☐ Yes ☑ No MA MCP Analytical Methods ☐ Yes ☑ No CT RCP Analytical Methods
☐ Yes ☒ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)
☐ Yes ☐ No GW1 Standards (Info Required for Metals & EPH with Targets)
☐ Yes ☑ No NPDES RGP
☐ Other State /Fed Program _____ Criteria _____

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	VOC: ☐ 8260 ☐ 624 ☐ 524.2	SVOC: ☐ ABN ☐ PAH	METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15	METALS: ☐ RCRA5 ☐ RCRA8 ☐ PP13	EPH: ☐ Ranges & Targets ☐ Ranges Only	VPH: ☐ Ranges & Targets ☐ Ranges Only	☐ PCB ☐ PEST	TPH: ☐ Quant Only ☐ Fingerprint	pH - ORP - Chloride	Sulfate	TTHMs	HAA5s	Sample Comments	TOTAL # BOTTLES
64713-01	AC - DAY 12	11/23	10	DW	SO								✓	✓	✓	✓	✓		9
-02	IS - DAY 12	↓	↓	↓	↓								✓	✓	✓	✓	✓		9
-03	AC - Raw													✓	✓				3
-04	IS - Raw													✓	✓				2

SAMPLE INFO
Filtration
☐ Field
☐ Lab to do
Preservation
☐ Lab to do

Container Type																			
Preservative																			

Container Type
P= Plastic
A= Amber glass
V= Vial
G= Glass
B= Bacteria cup
C= Cube
O= Other
E= Encore
D= BOD Bottle

Preservative
A= None
B= HCl
C= HNO_3
D= H_2SO_4
E= NaOH
F= MeOH
G= $NaHSO_4$
H = $Na_2S_2O_3$
I= Ascorbic Acid
J = NH_4Cl
K= Zn Acetate
O= Other

Relinquished By:	Date/Time	Received By:	Date/Time
	11/23/21 1257		11/23/21 1257
	11/23/21 1940		11/23/21 1940

All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 12-Mar-2012)

GRANITE STATE
ANALYTICAL SERVICES, LLC.

22 Manchester Road, Unit 2, Derry, NH 03038
Phone (800) 699-9920 | (603) 432-3044 website www.granitestateanalytical.com

Laboratory Report

Alpha Analytical-Westborough
8 Walkup Dr.
Westborough, MA 01581

Date Printed:	**12/03/2021**
Work Order #:	**2111-03708**
Client Job #:	**L2164713**
Date Received:	**11/24/2021**
Sample collected in:	**Rhode Island**

Attached please find results for the analysis of the samples received on the date referenced above.

Unless otherwise noted in the attached report, the analyses performed met the requirements of the analyzing laboratory's Quality Assurance Plan, Standard Operating Procedures and State Accreditation. This certificate shall not be reproduced, except in full, without the written approval of the analyzing laboratory. The results presented in this report relate to the samples listed on the following pages in the condition in which they were received. Accreditation for each analyte is identified by the * symbol following the analyte name. Location of our analyzing laboratory is identified by the code in the Analyst Column.

A & L Laboratory:
Identified by ME in Analyst Column
155 Center Street, Auburn, Maine 04210
www.allaboratory.com

Granite State Analytical Services LLC:
Identified by NH in Analyst Column
22 Manchester Road, Derry, NH 03038
www.granitestateanalytical.com

ANALYSIS RELATED NOTES:

- RL: "Reporting limit" means the lowest level of an analyte that can be accurately recovered from the matrix of interest.
- A & L Laboratory / Granite State Analytical Services LLC. accreditation lists can be found on our websites listed above.
- Subcontracted samples will be identified by the Accreditation number of the subcontract laboratory in the analyst field for each analyte and the appropriate laboratory will be listed here. None
- Data Qualifiers (DQ) Flags provide additional information in regards to the receipt, analysis or quality control of a sample. These are indicated under the DQ Flags Column on your report and listed here if necessary: Data Qualifier (DQ) Flags: None

SAMPLE STATE SPECIFIC NOTES:

Additional Narrative or Comments: None

We appreciate the opportunity to provide you with laboratory services. If you have any questions regarding the enclosed report, please contact the laboratory and we will be happy to assist you.

Donald A. D'Anjou, Ph. D.
Laboratory Director

GRANITE STATE
ANALYTICAL SERVICES, LLC.
22 Manchester Road, Unit 2, Derry, NH 03038
Phone (800) 699-9920 | (603) 432-3044 website www.granitestateanalytical.com

CERTIFICATE OF ANALYSIS FOR DRINKING WATER

DATE PRINTED: 12/03/2021
CLIENT NAME: Alpha Analytical-Westborough
CLIENT ADDRESS: 8 Walkup Dr.
Westborough, MA 01581

SAMPLE ID #: 2111-03708-001
SAMPLED BY: Alpha Analytical-Westborough
SAMPLE ADDRESS: L2164713
AC-Day 12
RI
MORE LOC INFO:

Legend	
Passes	✓
Fails EPA Primary	⊗
Fails EPA Secondary	▼
Fails State Guideline	✕
Attention	⚠

DATE AND TIME COLLECTED: 11/23/2021 10:00AM
DATE AND TIME RECEIVED: 11/24/2021 01:20PM
ANALYSIS PACKAGE: HAA GSA
RECEIPT TEMPERATURE: ON ICE .5° CELSIUS
CLIENT JOB #: L2164713

Test Description	Result	Test Units	Pass /Fail	DQ Flag	RL	Limit	Method	Analyst	Date - Time Analyzed
Date Extracted	-					No Limit	EPA 552.2	GQ-NH	11/30/2021 08:45AM
Dibromoacetic Acid*	<1	ug/L			1	No Limit	EPA 552.2	KV-NH	12/01/2021 09:52AM
Dichloroacetic Acid*	1.1	ug/L			1	No Limit	EPA 552.2	KV-NH	12/01/2021 09:52AM
Monobromoacetic Acid*	<1	ug/L			1	No Limit	EPA 552.2	KV-NH	12/01/2021 09:52AM
Monochloroacetic Acid*	<2	ug/L			2	No Limit	EPA 552.2	KV-NH	12/01/2021 09:52AM
Total Haloacetic Acids*	1.1	ug/L	✓		1	60 ug/L	EPA 552.2	KV-NH	12/01/2021 09:52AM
Trichloroacetic Acid*	<1	ug/L			1	No Limit	EPA 552.2	KV-NH	12/01/2021 09:52AM
2,3-Dibromopropionic Acid	97	%	✓			70-130%	EPA 552.2 - SS	KV-NH	12/01/2021 09:52AM

Donald A. D'Anjou, Ph. D.
Laboratory Director

GRANITE STATE
ANALYTICAL SERVICES, LLC.

22 Manchester Road, Unit 2, Derry, NH 03038
Phone (800) 699-9920 | (603) 432-3044 website www.granitestateanalytical.com

CERTIFICATE OF ANALYSIS FOR DRINKING WATER

DATE PRINTED: 12/03/2021
CLIENT NAME: Alpha Analytical-Westborough
CLIENT ADDRESS: 8 Walkup Dr.
Westborough, MA 01581

SAMPLE ID #: 2111-03708-002
SAMPLED BY: Alpha Analytical-Westborough
SAMPLE ADDRESS: L2164713
IS-Day 12
RI

MORE LOC INFO:

Legend	
Passes	✓
Fails EPA Primary	⊗
Fails EPA Secondary	▽
Fails State Guideline	✕
Attention	⚠

DATE AND TIME COLLECTED: 11/23/2021 10:00AM
DATE AND TIME RECEIVED: 11/24/2021 01:20PM
ANALYSIS PACKAGE: HAA GSA
RECEIPT TEMPERATURE: ON ICE .5° CELSIUS
CLIENT JOB #: L2164713

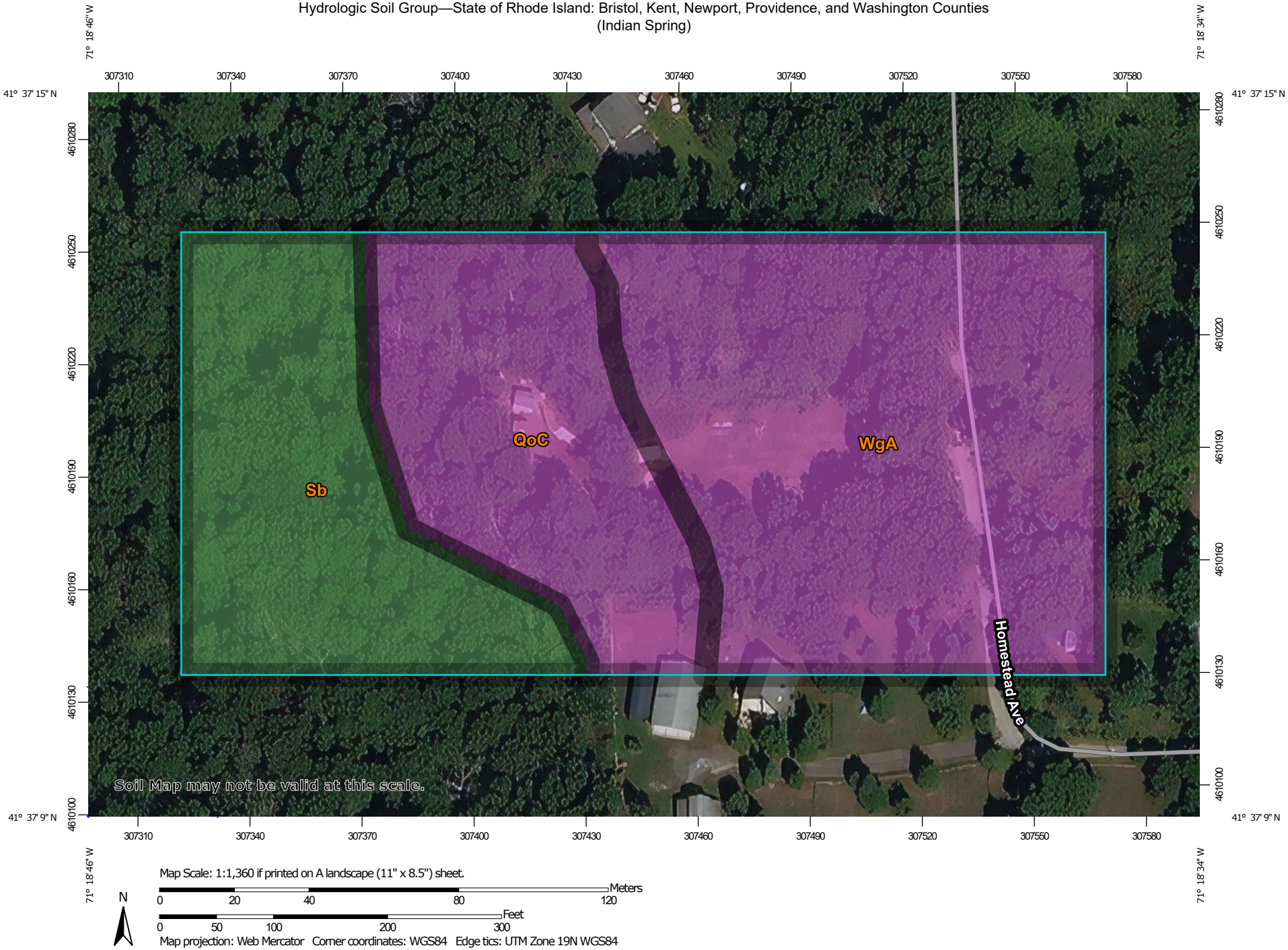
Test Description	Result	Test Units	Pass /Fail	DQ Flag	RL	Limit	Method	Analyst	Date - Time Analyzed
Date Extracted	-					No Limit	EPA 552.2	GQ-NH	11/30/2021 08:45AM
Dibromoacetic Acid*	<1	ug/L			1	No Limit	EPA 552.2	KV-NH	12/01/2021 10:32AM
Dichloroacetic Acid*	1.7	ug/L			1	No Limit	EPA 552.2	KV-NH	12/01/2021 10:32AM
Monobromoacetic Acid*	<1	ug/L			1	No Limit	EPA 552.2	KV-NH	12/01/2021 10:32AM
Monochloroacetic Acid*	<2	ug/L			2	No Limit	EPA 552.2	KV-NH	12/01/2021 10:32AM
Total Haloacetic Acids*	1.7	ug/L	✓		1	60 ug/L	EPA 552.2	KV-NH	12/01/2021 10:32AM
Trichloroacetic Acid*	<1	ug/L			1	No Limit	EPA 552.2	KV-NH	12/01/2021 10:32AM
2,3-Dibromopropionic Acid	108	%	✓			70-130%	EPA 552.2 - SS	KV-NH	12/01/2021 10:32AM

Donald A. D'Anjou, Ph. D.
Laboratory Director

Attachment D

NRCS Web Soil Surveys

Hydrologic Soil Group—State of Rhode Island: Bristol, Kent, Newport, Providence, and Washington Counties
(Indian Spring)



Map Scale: 1:1,360 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 20 40 80 120

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Rhode Island: Bristol, Kent, Newport, Providence, and Washington Counties
Survey Area Data: Version 21, Sep 3, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 14, 2010—Apr 1, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
QoC	Quonset gravelly sandy loam, rolling	A	1.8	24.8%
Sb	Scarboro mucky fine sandy loam, 0 to 3 percent slopes	A/D	1.9	26.5%
WgA	Windsor loamy sand, 0 to 3 percent slopes	A	3.5	48.7%
Totals for Area of Interest			**7.2**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

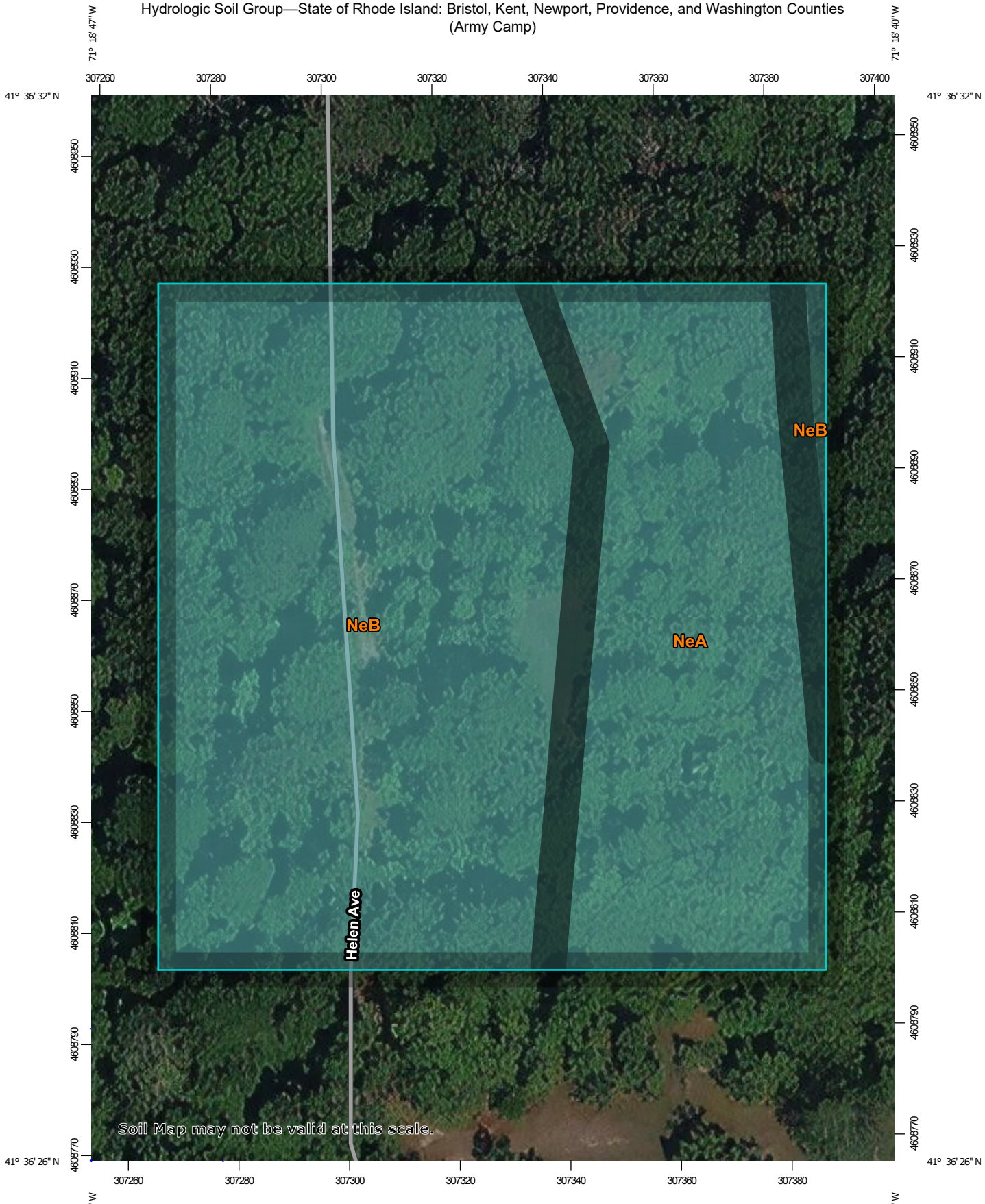
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Hydrologic Soil Group—State of Rhode Island: Bristol, Kent, Newport, Providence, and Washington Counties (Army Camp)



Map Scale: 1:935 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 10 20 40 60

Feet: 0 45 90 180 270

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Rhode Island: Bristol, Kent, Newport, Providence, and Washington Counties
Survey Area Data: Version 21, Sep 3, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 14, 2010—Apr 1, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
NeA	Newport silt loam, 0 to 3 percent slopes	C	1.4	36.5%
NeB	Newport silt loam, 3 to 8 percent slopes	C	2.3	63.5%
Totals for Area of Interest			**3.7**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

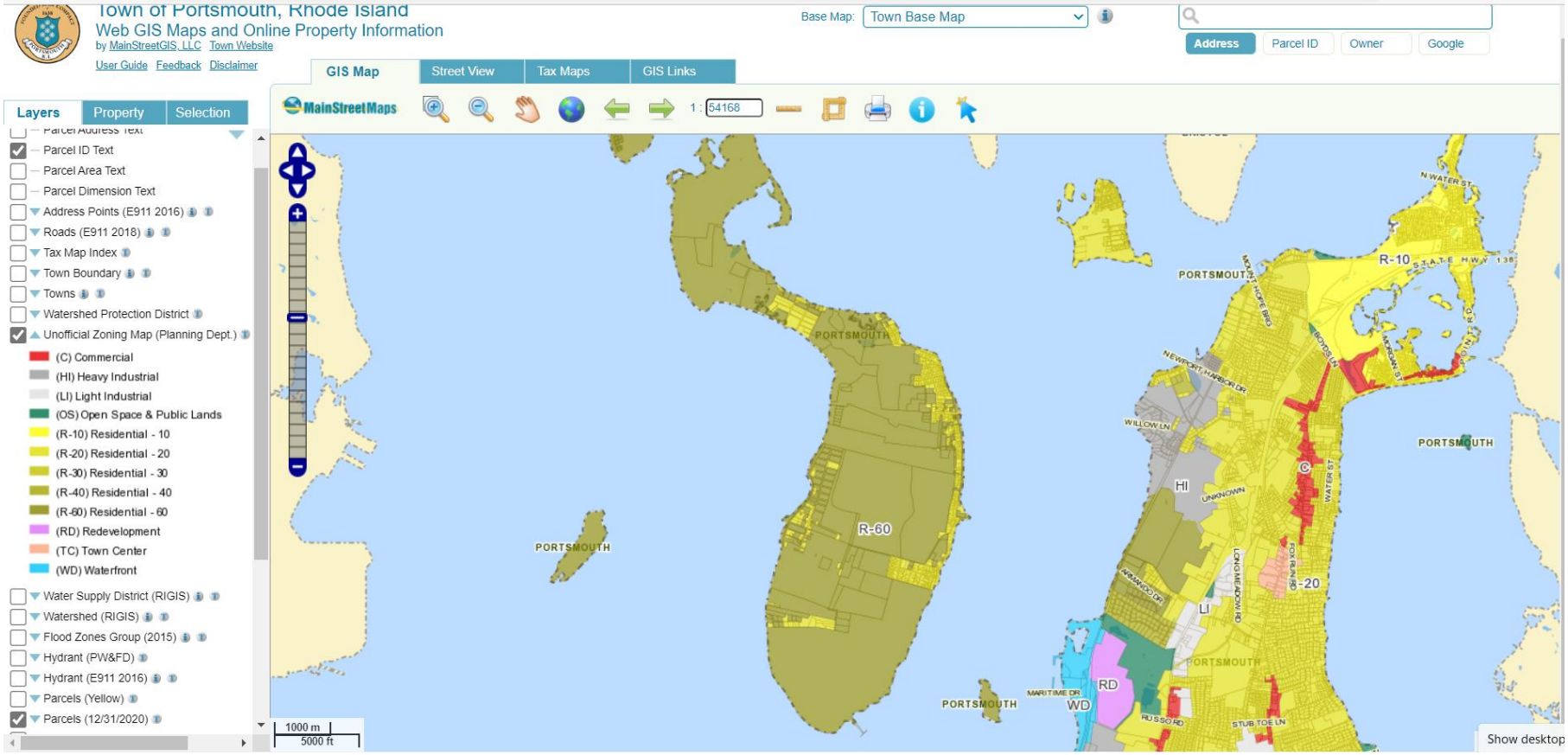
Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Attachment E

Zoning Map


Town of Portsmouth, Rhode Island
Web GIS Maps and Online Property Information
by MainStreetGIS, LLC Town Website
User Guide Feedback Disclaimer
Base Map: Town Base Map
Address Parcel ID Owner Google
GIS Map Street View Tax Maps GIS Links
MainStreetMaps
1 : 54168
Layers Property Selection
Parcel ID Text
Parcel Area Text
Parcel Dimension Text
Address Points (E911 2016)
Roads (E911 2018)
Tax Map Index
Town Boundary
Towns
Watershed Protection District
Unofficial Zoning Map (Planning Dept.)
(C) Commercial
(HI) Heavy Industrial
(LI) Light Industrial
(OS) Open Space & Public Lands
(R-10) Residential - 10
(R-20) Residential - 20
(R-30) Residential - 30
(R-40) Residential - 40
(R-60) Residential - 60
(RD) Redevelopment
(TC) Town Center
(WD) Waterfront
Water Supply District (RIGIS)
Watershed (RIGIS)
Flood Zones Group (2015)
Hydrant (PW&FD)
Hydrant (E911 2016)
Parcels (Yellow)
Parcels (12/31/2020)
PORTSMOUTH
R-60
R-10
R-20
HI
LI
RD
WD
1000 m
5000 ft
Show desktop

Attachment F

FEMA FIRM Maps

National Flood Hazard Layer FIRMette

FEMA

71°18'59"W 41°37'27"N

71°18'21"W 41°37'N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

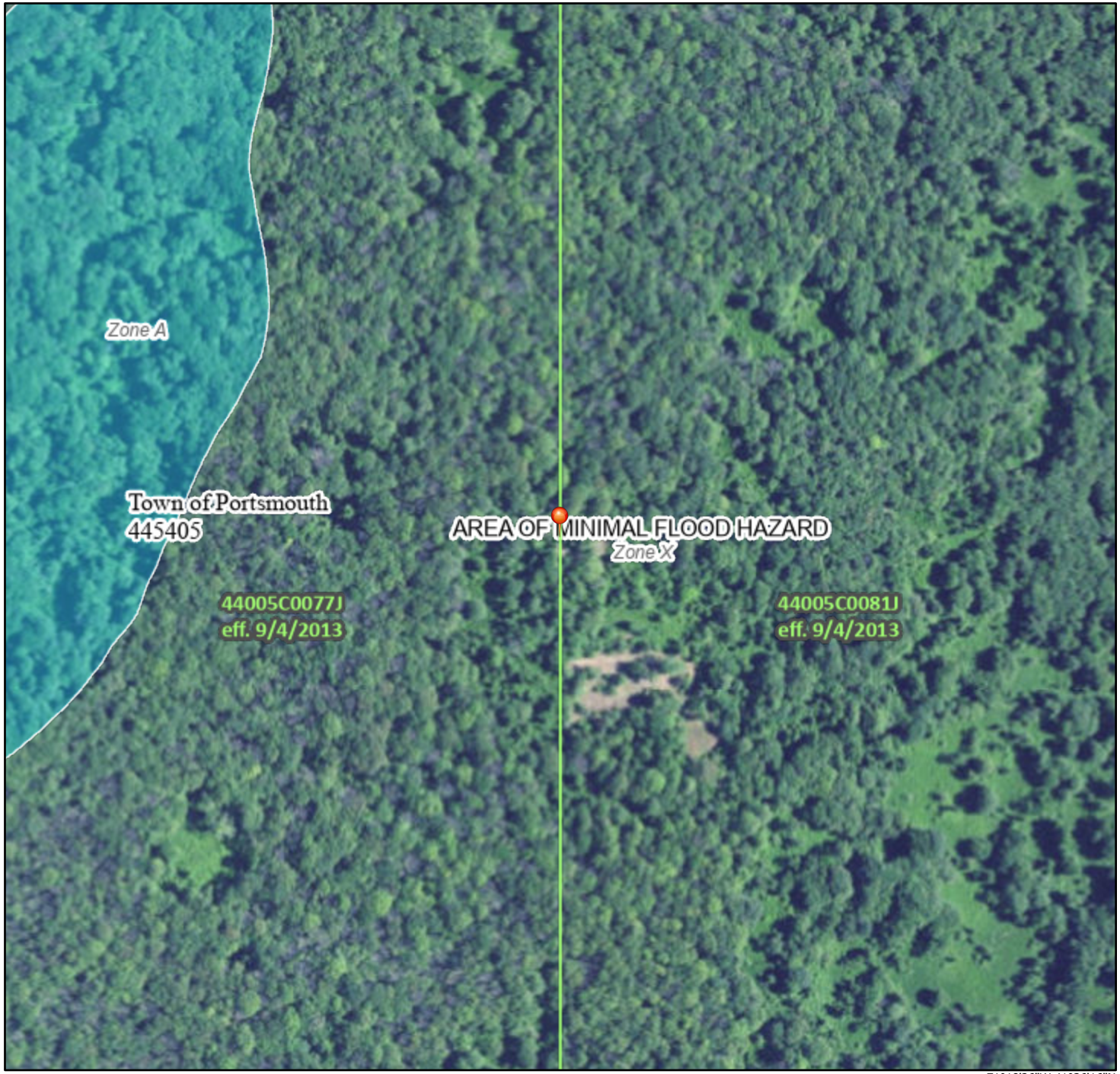
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 8/1/2022 at 9:52 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

National Flood Hazard Layer FIRMette

FEMA

71°19'4"W 41°36'43"N



71°18'26"W 41°36'16"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 8/1/2022 at 9:48 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Attachment G

National Wetlands Inventory Map

0 0.05 0.1 0.2 0.3 0.4 Miles

National Wetlands Inventory

source: www.rigis.org

Legend

- Site Locations
- Wetlands

H2Olson Engineering, Inc.
DRINKING WATER PROFESSIONALS

Attachment H

Natural Heritage Areas Map

0 0.050.1 0.2 0.3 0.4 Miles

Rhode Island Natural Heritage Areas

source: www.rigis.org

N

Legend

☆ Site Locations

Natural Heritage Areas

H2Olson Engineering, Inc.
DRINKING WATER PROFESSIONALS

Attachment I

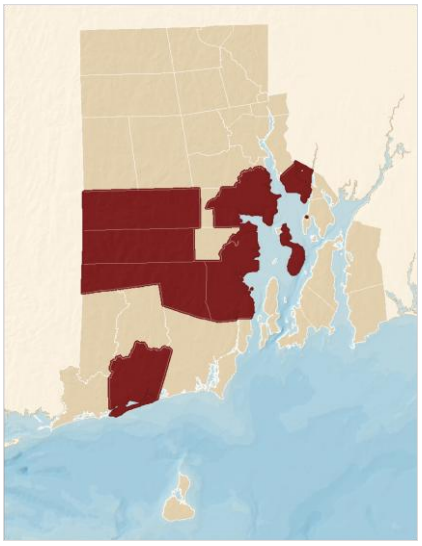
Species Profiles

Big Sand Tiger Beetle

INVERTEBRATES
Tiger Beetles

Cicindela formosa generosa

Image: Chris Raithel



~See map disclaimer in profiles introduction

Distribution & Abundance

Cicindela formosa generosa occurs exclusively in inland sand flats and barrens. Although this species has been known from about 10 recent sites in Rhode Island, some populations have disappeared or are extremely threatened. Except for one large population in the Big River Management Area, sites tend to contain only a few individuals. Most of the recent localities for this species occur on state managed lands and other preserves. However, many of these sites have been degraded or lost because of trampling by illegal ORV usage or revegetation of the habitat. There are very few places where this species could be considered secure. One is the Nockum Hill area of Barrington, where the habitat is maintained for the benefit of nesting turtles and vehicular traffic is prohibited. A TNC preserve in North Kingstown has an intact inland sand flat that is not often visited by vehicles or pedestrians.

Habitat Community: Pitch Pine Woodland/Barren, Type: Barren

Status

STSTAT: C. SRANK: S1. GRANK: G5T5. Res/B: 1. FORM: 1. GRP: 17. PRIOR: 1. Climate Change Vulnerability: Low=2100

Threats and Actions

Threat 1 - Natural system modifications; Succession of sand patches, anything that fills sand patch (grass, trees, asphalt)

Actions:
- *Site/area management. Rank: 2*
- *Manage for sand patches. Rank: 2*

Threat 2 - Residential and commercial development; Development of sand patches

Actions:
- *Land/water protection. Rank: 2*
- *Protect sand patches. Rank: 2*

Threat 3 - Recreational activities; Impacts from human disturbance of habitats

Actions:
- *Land/water protection. Rank: 2*
- *Protect habitats. Rank: 2*

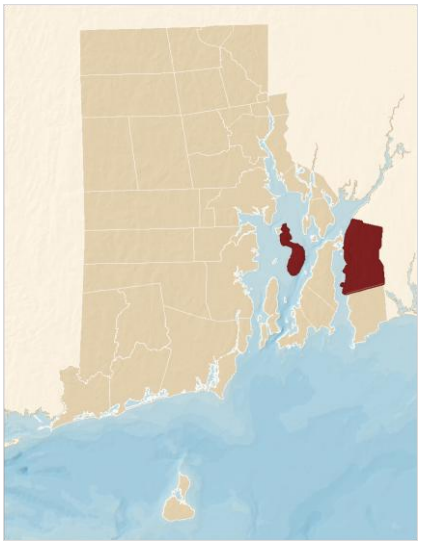
Refer to the Community: Pitch Pine Woodland/Barren, Type: Barren - Habitat Profile for additional threats to this species.

Oblique-lined Tiger Beetle

INVERTEBRATES
Tiger Beetles

Cicindela tranquebarica tranquebarica

Image: Chris Raithel



~See map disclaimer in profiles introduction

Distribution & Abundance

Cicindela tranquebarica mirrors the status of C. purpurea except that it is still extant at a few mainland sites in southern New England. In Rhode Island, remaining populations are known only from Prudence Island and Tiverton, where the species resides on protected managed lands. As with Cicindela purpurea, trampling and over-collection do not seem to be affecting populations at this time. However, active habitat management, including the reintroduction of fire, must occur to retain populations.

Habitat Community: Pitch Pine Woodland/Barren, Type: Barren

Status

SRANK: S1. GRANK: G5. Res/B: 1. GRP: 28. PRIOR: 1. Climate Change Vulnerability: Low=2100

Threats and Actions

Threat 1 - Human intrusions and disturbance; Disturbance from recreation

Actions:
- *Land/water protection. Rank: 2*
- *Protect habitats. Rank: 2*

Refer to the Community: Pitch Pine Woodland/Barren, Type: Barren - Habitat Profile for additional threats to this species.

Attachment J

Agency Correspondence

H2Olson Engineering, Inc.
DRINKING WATER PROFESSIONALS

July 18, 2022

Ron Gagnon, PE
Administrator
Rhode Island Department of Environmental Management
Office of Technical and Customer Assistance
235 Promenade St.
Providence, RI 02908
401-222-4700 ext. 2777500
ron.gagnon@dem.ri.gov

SUBJECT: Intergovernmental Review Comments

PROJECT: Prudence Island Water District, Proposed Water Treatment Facilities

Dear Ron Gagnon:

The Prudence Island Water District (PIWD) is under an Administrative Consent Order (ACO) with the Rhode Island Department of Health (RIDOH) to install permanent disinfection facilities for their two water supply sources, including the pre-treatment for the removal of iron and manganese at the Indian Springs well site. PIWD retained the services of H2Olson Engineering, Inc. (10 Riverside Drive, Lakeville, MA 02347) to complete the design and permitting of these facilities in accordance with RIDOH ACO requirements.

One of the requirements of the State Environmental Review Process is to have the RIDEM Office of Technical and Customer Assistance review the proposed project and comment on the potential impact that the project might have, as well as its compliance with rules, regulations, environmental standards, and the permitting process. As such, I am attaching the following documents for your use and information:

- A proposed scope of work generally describing the project components.
- A copy of the project overview plan showing the project limits.
- Proposed site location.

Can you please review the attached information and let me know if you have any comments or concerns with the proposed water treatment project on Prudence Island? The project is being propped to improve the water quality and protect the public health for PIWD customers.

Review comments are requested within 30 days of receipt of this letter.
If you have any questions, please feel free to contact us at 508-375-7007 at your convenience.

Very Truly Yours,
H2Olson Engineering, Inc.

Stephen C. Olson, P.E.
President

10 Riverside Drive, Suite 103
Lakeville, MA 02347

Tel: 508-375-7007
www.h2olsonengineering.com

H2Olson Engineering, Inc.
DRINKING WATER PROFESSIONALS

July 18, 2022

Jenny Kilburn
Principal Biologist
Rhode Island Department of Environmental Management
Division of Fish and Wildlife
Great Swamp Field Headquarters
277 Great Neck Road
West Kingston, RI 02892
401-789-0281
jennifer.kilburn@dem.ri.gov

SUBJECT: Identification of Threats to Wildlife

PROJECT: Prudence Island Water District, Proposed Water Treatment Facilities

Dear Jenny Kilburn:

The Prudence Island Water District (PIWD) is under an Administrative Consent Order (ACO) with the Rhode Island Department of Health (RIDOH) to install permanent disinfection facilities for their two water supply sources, including the pre-treatment for the removal of iron and manganese at the Indian Springs well site. PIWD retained the services of H2Olson Engineering, Inc. (10 Riverside Drive, Lakeville, MA 02347) to complete the design and permitting of these facilities in accordance with RIDOH ACO requirements.

One of the requirements of the State Environmental Review Process is to have the Division of Fish and Wildlife review the proposed project and comment on the potential impact that the project might have on any local wildlife. As such, I am attaching the following documents for your use and information:

- A proposed scope of work generally describing the project components.
- A copy of the project overview plan showing the project limits.
- Proposed site location.

Can you please review the attached information and let me know if you have any comments or concerns with the proposed water treatment project on Prudence Island? The project is being propped to improve the water quality and protect the public health for PIWD customers.

Review comments are requested within 30 days of receipt of this letter.
If you have any questions, please feel free to contact us at 508-375-7007 at your convenience.

Very Truly Yours,
H2Olson Engineering, Inc.

Stephen C. Olson, P.E.
President

From:	Lisa Goyer
To:	Lauren Blair
Subject:	FW: Request for Project Review
Date:	Tuesday, August 2, 2022 2:31:51 PM
Attachments:	image006.png image007.png NEPARC2022-02_construction_decon-4.pdf easternbox-turtle-cmp.pdf NEPARC_Pub_2014-02_Disinfection_Protocol.pdf
Importance:	High

From: Stephen Olson <sco@h2olsonengineering.com>
Sent: Tuesday, August 2, 2022 2:23 PM
To: Lisa Goyer <lmg@h2olsonengineering.com>
Subject: Fw: Request for Project Review
Importance: High

~ Steve O

Stephen C. Olson, P.E. | President

H_2Olson Engineering, Inc.
10 Riverside Drive | Lakeville, MA 02347
O: 508.375.7007 | F: 508.748.5960 | C: 781.588.6800
www.h2olsonengineering.com
LinkedIn

H_2Olson Engineering, Inc.
DRINKING WATER PROFESSIONALS

From: McIntyre, Jenna (DEM) <jenna.mcintyre@dem.ri.gov>
Sent: Tuesday, August 2, 2022 12:07 PM
To: Stephen Olson <sco@h2olsonengineering.com>
Cc: DEM.Filereview <DEM.Filereview@dem.ri.gov>
Subject: FW: Request for Project Review

Good afternoon,

Please the 4 comments below and attachments. This should complete your records request.

1. Expect wildlife in the roads. Prudence Island is home to a host of sensitive wildlife, including eastern box turtles and spotted turtles. Turtles are particularly vulnerable to being hit by vehicles and caution should be used at all times when travelling in vehicles. Spotted turtles and eastern box turtles are active and could be found crossing roads from approximately April 1 through November 1. Do not exceed local speed limits and use caution *at all times* when driving on all paved and dirt roads. If a turtle is found in the road, stop the vehicle, approach the turtle when conditions are safe, and move the turtle at least 15 feet off the road in natural vegetation in the direction it was headed. Do not proceed until the turtle is out of harm's way.
2. Expect turtles within the Limit of Work. Eastern box turtles are likely to be present within the Limit of Work at both the Indian Springs and Army Camps sites. Eastern box turtles are active on the surface from approximately April 1 through November 1. Prior to any construction activity, use daily visual sweeps within the Limit of Work

to look for box turtles. If a box turtle is located, move outside the Limit of Work at least 200 feet and place in a forested, upland area. See attached BMPs for more information on how to limit impacts to box turtles.

3. Islands are extremely sensitive to introduction of wildlife pathogens. Clean and decontaminate all construction equipment, footwear, and hand-held equipment before loading on the ferry to bring to Prudence Island. Follow the instructions in the attached protocols.
4. Islands are extremely sensitive to introduction of invasive species. The current plans call for loaming and seeding within construction areas. No soil should be imported from off-island. Only native species seed mixes should be used.

Thank You,

Jenna
Rhode Island Department of Environmental Management
235 Promenade Street | Room 260 | Providence, RI 02908

RIDEM

Jenna McIntyre
Chief Program Development
Permit Application Center, Supervisor
Office of Customer & Technical Assistance
Tel: (401) 222-4700 ext. 2777049

Email: Jenna.McIntyre@dem.ri.gov
Permit Application Center: DEM.PAC@dem.ri.gov
File Reviews: DEM.filereview@dem.ri.gov

From: Stephen Olson <sco@h2olsonengineering.com>
Sent: Thursday, July 21, 2022 10:40 AM
To: DEM.Filereview <DEM.Filereview@dem.ri.gov>
Cc: Lauren Blair <lab@h2olsonengineering.com>
Subject: [EXTERNAL] : FW: Request for Project Review

Good Morning,

We were instructed to forward this request to you (see below).

Can you please review the attached and provide us with a response?

Thank you for your time and cooperation.

~ Steve O

Stephen C. Olson, P.E. | President

H_2Olson Engineering, Inc.
10 Riverside Drive, Suite 103 | Lakeville, MA 02347
O: 508.375.7007 | F: 508.748.5960 | C: 781.588.6800
www.h2olsonengineering.com [h2olsonengineering.com]
LinkedIn [linkedin.com]

H_2Olson Engineering, Inc.
DRINKING WATER PROFESSIONALS

From: Lauren Blair lab@h2olsonengineering.com
Sent: Thursday, July 21, 2022 10:33 AM
To: Stephen Olson sco@h2olsonengineering.com
Subject: FW: [EXTERNAL] : Request for Project Review

Lauren Blair | Engineering Intern
H_2Olson Engineering, Inc.
10 Riverside Drive, Suite 103
Lakeville, MA 02347
O: 508.375.7007 | C: 941.348.8209
www.h2olsonengineering.com [h2olsonengineering.com]

From: Kilburn, Jennifer (DEM) <Jennifer.Kilburn@dem.ri.gov>
Sent: Wednesday, July 20, 2022 2:14 PM
To: Lauren Blair <lab@h2olsonengineering.com>
Subject: RE: [EXTERNAL] : Request for Project Review

Hi,

Please submit this project review request through this email dem.filereview@dem.ri.gov

Thanks

Jennifer Kilburn AWB®
Principal Biologist-Waterfowl Program
Rhode Island Department of Environmental Management
Division of Fish and Wildlife
277 Great Neck Road
West Kingston, RI 02892
Office: (401)-284-2245

From: Lauren Blair
Sent: Wednesday, July 20, 2022 1:49 PM
To: jennifer.kilburn@dem.ri.gov
Subject: Request for Project Review

Dear Jenny Kilburn,

I hope this email finds you well. H2Olson Engineering is seeking review comments from the RIDEM Division of Fish and Wildlife regarding a proposed water treatment project on Prudence Island, in accordance with the State Environmental Review Process. The attached documents provide further information on this request and the proposed project. A copy of these items will be sent by mail as well. Please let us know if you have any questions or concerns. We look forward to hearing from you.

Best regards,

Lauren Blair | Engineering Intern
H_2Olson Engineering, Inc.
10 Riverside Drive, Suite 103

Lakeville, MA 02347
O: 508.375.7007 | C: 941.348.8209
www.h2olsonengineering.com [h2olsonengineering.com]

Disinfection of Field Equipment to Minimize Risk of Spread of Chytridiomycosis and Ranavirus[1]

Importance of Disinfection

The spread of pathogens is a major threat to amphibians and reptiles worldwide.[2-5] This is particularly true for Ranavirus (RV) and *Batrachochytrium dendrobatidis* (Bd) responsible for chytridiomycosis. Humans can transmit diseases from one place to another and from one organism to another in a short amount of time and over distances the organisms cannot traverse. With the increasing spread of pathogens and reports of die-offs among amphibians and select reptiles worldwide, it is imperative that field biologists, researchers, hobbyists, and anyone interested in recreational herpetology-related field activities employ basic disinfecting procedures to prevent the spread of pathogens.

BEFORE LEAVING FOR THE FIELD

Although other chemicals are effective (see table), NEPARC recommends a 3% bleach solution to inactivate Bd and most RV's.[3-7] Concentrated bleach is inexpensive and readily available. However, diluted bleach solutions lose their potency if exposed to air, sunlight, or organic material, and should be discarded after 5 days if exposed.[8] To ensure maximum efficacy, prepare only as much solution as you will need for the sampling event.

Suggested equipment:

- Brushes for scrubbing and/or removing mud and vegetation from equipment.
- Hand sanitizers and antiseptic alcohol wipes.
- Handheld bottles and/or pump sprayers for applying bleach and water. Bring clean rinse water.

- Gloves for handling animals. These should be disinfected or discarded between animals.
- Plastic bags of different sizes: examining animals in bag minimizes contact.
- Prepare additional sets of equipment if sampling at multiple locations.
- Trash bags.

INSTRUCTIONS FOR LARGE EQUIPMENT

Brush off mud, wash with biodegradable soap, disinfect with bleach and rinse all exterior surfaces of boats, canoes, vehicles or trailers and their tires that may have come in contact with potentially affected water (e.g. stream or wetland).

AFTER EACH SAMPLING EVENT AND BEFORE MOVING TO THE NEXT SITE

1. Brush off mud and vegetation from field equipment (e.g., nets, buckets, boots). Soil or mud can reduce the effectiveness of the disinfection process.
2. Generously spray or immerse all items in bleach solution.
   - Bleach is highly toxic to aquatic organisms; stand at least 50 m from any natural water source.
   - Lab studies indicate 1 minute contact time to be sufficient to inactivate pathogens but NEPARC recommends 5 minutes in field situations.
3. Rinse bleached items with water to minimize damage to the equipment and to prevent exposing the next wetland to residual bleach.
4. Use alcohol wipes to disinfect calipers, measuring boards, and other sensitive equipment.

END OF THE DAY

After returning from the field, all equipment should be washed and thoroughly disinfected. If available, set up 2 buckets or large tubs: one with soapy water and one with 3% bleach solution.

Brush or scrub off any soil or vegetation. Immerse into soap, wash then rinse.

- Immerse in bleach and leave for 5 minutes. Rinse thoroughly with water.
- Hang equipment and gear, and allow them to air dry completely.

DISINFECTION OPTIONS FOR RANAVIRUS (RV) AND *BATRACHOCHYTRIUM DENDROBATIDIS* (*Bd*)

Although these chemicals were not developed specifically for RV or Bd, these recommendations represent the minimum concentration and contact time demonstrated as effective

	Clorox Bleach®	Nolvasan®	Virkon S®	Ethanol
Active Ingredient (AI)	Sodium hypochlorite	Chlorhexidine	Potassium peroxymonosulfate	Ethyl alcohol
Concentration of AI	6.0%	2.0%	20.4%	70.0%
Relative cost	$4.99/gal	$65.95/gal	$76.50/10 lb or $1.60/gal	$23.45/L or $88.83/gal
Min. Contact Time RV[9]/Bd[10]	1 min / 30 sec	1 min / not determined	1 min / 20 sec	1 min[11] / 20 sec
Min. Concentration RV[9]/Bd[10]	3.0% / 1.0%	0.75% / not determined	1.0% / 1.0%	70% / 70%
Effective dilution ratio for both RV and Bd	1:32 dilution (bleach:water) for 3% solution using 6% concentration of household bleach.	1:127 (Nolvasan®: water) for 0.75% solution (RV only)	1 scoop (1.3 oz) or 1 tablet per gal of water	Effective when applied undiluted (70%)
Toxicity to Humans	• Vapor may cause severe irritation or damage to eyes and skin • Harmful if swallowed	• May be fatal if inhaled • Avoid breathing spray mist • Causes irreversible eye damage • Harmful if swallowed	• Harmful if swallowed • Irritating to respiratory system and skin • May cause serious eye damage	• May be fatal if swallowed or inhaled • Can damage liver, kidneys and nervous system by repeated or prolonged exposure • May be absorbed through skin. Repeated or prolonged contact can cause eye irritation or dermatitis[12]
Toxicity to Amphibians	• Fatal at high concentrations	• Safe for short durations [13]	• Non-toxic [14]	• May destroy mucus and wax resulting in dehydration and microbial infection[11]
Effects on Equipment	• Corrodes metals • Will fade colors and break down cloth fibers	• None reported	• Safe on fabric • May cause pitting on galvanized or soft metal if not rinsed with water	• May damage rubber and plastics • May cause deterioration of glues[12]

Special Instructions:

• Remove debris from equipment prior to treatment.[15] • Wear safety glasses and gloves when handling chemicals. • Water pH can affect chemicals; all information in this table assumes the use of tap or municipal water. • Keep out of lakes, streams, or ponds; stand at least 50 m from any natural water source. • Do not clean equipment or dispose of waste solutions at field sites. • For disposal, follow local, state, and federal guidelines.

Bleach: Inactivated by organic material. • Inactivated by sunlight. • If in an opaque container, diluted bleach will last 1 month[16]. If exposed to sunlight or air, it will only last 5 days.

Nolvasan: Can be inactivated by organic material.[15] • Store at room temperature in sealed container.[17] • Dilute concentrate with water of pH 5-7.[18] • Remains stable for 1 week if dilute with tap water, and for up to 6 weeks if diluted with deionized water.[17] • Use concentrate within 36 months.[17] • Toxic to fish.[18]

Virkon-S: Store at room temperature.[19] • Keep solution away from extreme cold or heat. • Shelf life for tablets is 2 years and for powder is 3 years. • Remains stable for 1 week if diluted with tap water.

Ethanol: Highly flammable. • Use and store in a well ventilated area. • Evaporation may diminish effective concentration.[12,18]

Citations for Disinfection of Field Equipment to Minimize Risk of Spread of Chytridiomycosis and Ranavirus

1. This information has been compiled in part from Miller, D. L., and M. J. Gray. 2009. Southeastern Partners in Amphibian and Reptile Conservation, Disease, Pathogens and Parasites Task Team, Information Sheet #10.

2. Converse K.A. and D.E. Green. 2005. Diseases of tadpoles. p 72-88. In: Wildlife Diseases: Landscape Epidemiology, Spatial Distribution and Utilization of Remote Sensing Technology. S.K. Majumdar, J.E. Huffman, F.J. Brenner and A.I. Panah (eds.). Pennsylvania Academy of Science, Easton, PA.

3. Picco, A.M., J.L. Brunner, and J.P. Collins. 2007. Susceptibility of the endangered California tiger salamander, *Ambystoma californiense*, to *Ranavirus* infection. Journal of Wildlife Diseases 43:286-290.

4. Picco, A.M. and J.P. Collins. 2008. Amphibian commerce as a likely source of pathogen pollution. Conservation Biology 22:1582-1589.

5. St-Amour,V., W.M. Wong, T.W.J. Garner, and D. Lesbarreres. 2008. Anthropogenic influence on prevalence of two amphibian pathogens. Emerging Infectious Diseases 14:1175-1176.

6. Bryan L., C.A. Baldwin, M.J. Gray, and D.L. Miller. 2009. Efficacy of select disinfectants at inactivating *Ranavirus*. Diseases of Aquatic Organisms 84:89-94.

7a. Johnson, M. and R. Speare. 2003. Survival of *Batrachochytrium dendrobatidis* in water: quarantine and control implications. Emerging Infectious Diseases 9:922-925.

7b. Brem F., J.R. Mendelson III, and K.R. Lips. 2007. Field-Sampling Protocol for *Batrachochytrium dendrobatidis* from Living Amphibians, Using Alcohol Preserved Swabs. Version 1.0. http://www.amphibianark.org/pdf/, Accessed 19 March 2014.

8. Green, D.E., M.J. Gray and D.L. Miller. 2009. Disease monitoring and biosecurity. p 481-506. *In*: Amphibian Ecology and Conservation: A Handbook of Techniques. C.K. Dodd (ed.). Oxford University Press, Oxford, United Kingdom.

9. Bryan, L. K., Baldwin, C. A., Gray, M. J., & Miller, D. L. (2009). Efficacy of select disinfectants at inactivating Ranavirus. Diseases of Aquatic Organisms 84:89-94.

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11. Phillott A.D., R. Spear, H.B. Hines, E. Meyer, L.F. Skerratt, K.R. McDonald, S.D. Cashins, D.Mendez, and L. Berger. 2010. Minimising exposure of amphibians to pathogens during field studies. Diseases of Aquatic Organisms 92:175-185.

12. Simmons, B., M. Trusler, J. Roccaforte, P. Smith, and R. Scott. 1990. Infection control for home health. Infection Control and Hospital Epidemiology 11:362-70.

13. Hadfield, C.A. and B.R. Whitaker.2005. Amphibian emergency medicine and care. Seminars in Avian and Exotic Pet Medicine 14:79-89.

14. Schmidt, B. R., C. Geiser, N. Peyer, N. Keller, and M. von Rutte. 2009. Assessing whether disinfectants against the fungus *Batrachochytrium dendrobatidis* have negative effects on tadpoles and zooplankton. Amphibia-Reptilia 30: 313-319.

15. Kennedy, J., J. Bek, and D. Griffin. 2000. Selection and Use of Disinfectants. University of Nebraska Cooperative Extension, G00-1410-A.

16. Rutala, W.A. and J.W. Weber. 1997. Uses of inorganic hypochlorite (bleach) in health care facilities. Clinical Microbiology Reviews 10:597-610.

Citations for Disinfection of Field Equipment to Minimize Risk of Spread of Chytridiomycosis and Ranavirus (Continued)

17. Zoetis Veterinary Medical Information and Product Support, inquiry 2014-US-03903, 18 March, 2014.

18. Dvorak, G. 2008. Disinfection 101. Center for Food Security and Public Health. http://www.cfsph.iastate.edu/Disinfection/Assets/Disinfection101.pdf, Accessed 19 March 2014.

19. Pharmacal Research Laboratories Inc. http://www.pharmacal.com/MSDS/US/MSDSVIRKON-S%20Tablet.pdf, Accessed 19 March 2014.

Three Steps to Minimize Wildlife Disease Transmission Via Construction Equipment

STEP 1: CLEAN STEP 2: DISINFECT STEP 3: DRY

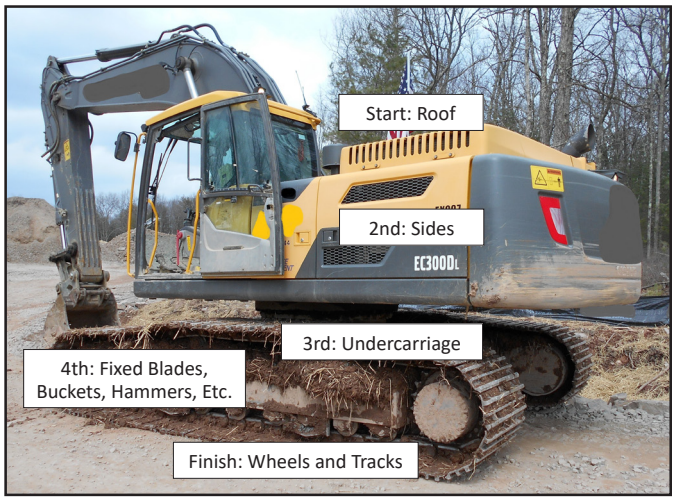
Aquatic wildlife can be harmed by viruses, bacteria, fungi, and parasites introduced into wetlands. These infectious pathogens can survive in mud, soil, vegetation, and other debris that collect on the bodies and crevices of drivable equipment. Construction and habitat restoration projects can accidentally transport pathogens from a contaminated aquatic habitat into a healthy one. These three steps can help minimize the spread of pathogens to amphibians, reptiles, and fishes.

Step 1 CLEAN before entering a worksite or relocating to a worksite near wetlands or waterways.

- Clean on site or at a predetermined wash station.
- Detach parts and accessories (buckets, augers, trailers, chains) as needed to access all surfaces.
- Remove all caked-on mud and foreign materials with shovels, pry bars, or stiff brooms.
- Clean equipment in the following sequence:

  Exterior surfaces (from top to bottom): roof → sides → undercarriage → fixed attachments → wheels

  Interior area: remove seat covers and floor mats to clean separately
- Clean equipment top-to-bottom and exterior-then-interior.
- Power-wash exterior with ≥90 pounds per square inch water for sediment removal.



Step 2 DISINFECT using chemical agents when your current worksite may have water or soil with pathogens OR when you move equipment between sites more than a half-mile away.

- Disinfect equipment at a dry location more than 165 feet from any wetland or aquatic habitat.
- Apply one of the following reagents* with a sprayer, then allow it to sit for at least 5 minutes:
  - ▶ 1% potassium peroxymonosulfate solution per manufacturer's instructions (such as 1.3 ounces of Virkon® Aquatic granulated powder per 1 gallon of water).
  - ▶ An effective bleach mixture. Bleach is sold at different concentrations (see graph on the next page for appropriate ratios of water to bleach).
- Prepare solutions as needed to minimize storage time; solutions weaken within 10 days.
- Rinse chemical disinfectants off equipment with liberal amounts of water.
- Follow the manufacturers' Safety Data Sheets to ensure proper handling and disposal.

**Any use of trade, product, or firm names is for descriptive purposes only and does not imply endorsement by the U.S. Government.*

Step 3 DRY outdoors, ideally in direct sunlight, for at least:

- 5 days if the equipment was cleaned but NOT disinfected, or
- 24 hours if the equipment was cleaned AND disinfected.

NORTHEAST PARC PARTNERS IN AMPHIBIAN AND REPTILE CONSERVATION

CONTINUED ON BACK

ILLLUSTRATION BY M. NOWIK (INSTAGRAM @THE_PROCASTINATING_ARTIST)

CREATING AN EFFECTIVE BLEACH MIXTURE

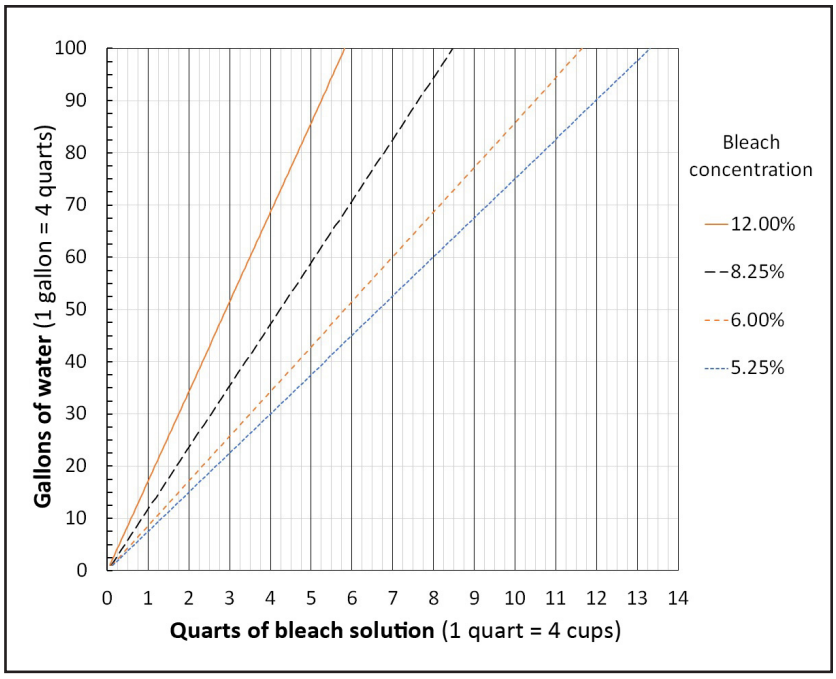
The appropriate water-to-bleach mixture will depend on the bleach concentration as measured by its %active ingredient (AI) of sodium hypochlorite (NaClO).
To make an appropriate mixture (~3% bleach solution):

1. Use the vertical axis to to locate the **gallons of water** you're using.

2. Follow that horizontal line to the right until you intersect the diagonal line for the **bleach concentration** being used.

3. Follow the vertical line at this intersection downward to determine the **quarts of bleach solution** to add to your **gallons of water.** If the intersection is between two vertical lines, use the vertical line to the right of the intersection.

Example: *For 50 gallons of water, use either:*
3 quarts of a 12.00% bleach concentration OR
4 quarts + 1 cup of a 8.25% bleach OR
6 quarts of a 6.00% bleach OR
6 quarts + 3 cups of a 5.25% bleach



ADDITIONAL SUGGESTIONS FOR MINIMIZING THE SPREAD OF PATHOGENS

Alternatives for difficult-to-clean materials: Traditional wooden mats that are used to protect wetland substrates from vehicular traffic are not recommended because they are very difficult to clean before relocating them to a different worksite. As an alternative, a composite matting system is nonporous and is easier to clean, dry, and reuse. Although initially more expensive than wooden mats, its durability, extended life, and ease of cleaning may offset costs.

Materials with low risk of introducing pathogens: Native materials obtained *on site*, such as topsoil, logs, wood-chipped vegetation, and streambed rocks, can be used with little risk of introducing new pathogens. The following materials brought into a worksite also have a low risk of containing pathogens:

- Crushed stone for activities requiring roadbeds or temporary stream crossings
- Manufactured sand and rock dust for padding underground pipes and filling sandbags
- Kiln-dried hay or straw bales instead of untreated hay for sediment filtration

Avoid reusing materials between sites with a higher risk of introducing pathogens, such as wooden mats, plywood, and silt fencing.

Decontaminating hand-held equipment, outerwear, and tools: If exposed to wetland debris, these items should be cleaned and disinfected daily and, if possible, at the worksite. Porous items that retain water should be cleaned, disinfected, and allowed to air dry. Written instructions on disinfecting these items are found at http://northeastparc.org/disinfection-protocol/ and a video is available at https://www.youtube.com/watch?v=_SZZiSlWycc

These steps are explained in detail in the article
Minimizing the Spread of Herpetofaunal Pathogens in Aquatic Habitats by Decontaminating Construction Equipment
http://northeastparc.org/wp-content/uploads/2021/01/Julian-2020-Decontamination-for-Herps-for-large-equipment.pdf

NEPARC PUBLICATION 2022-01

From: Personeus, Neal (DEM)
To: Lauren Blair
Cc: Stephen Olson
Subject: RE: [EXTERNAL] : RE: Prudence Island groundwater discharge permit question
Date: Monday, July 25, 2022 10:29:43 AM
Attachments: image001.png

Hi Lauren,

I'm back in the office this week. I did have a chance to meet with someone in the office before I left to discuss this. We can go along with processing a UIC permit application for this discharge provided the RI Department of Health gives it their blessing for the discharge within the well radius. On another note, it may also be worth your looking into designing a surficial sand filter for the discharge rather than going with the UIC. Provided your flow rates and volumes are acceptable, you could design a system based upon the requirements of the RI Stormwater Installation Standards Manual and just make sure it is dedicated for this use only and does not mix with any other flow including stormwater. There would need to be signage indicating such. If this concept is of interest to you let me know and we can discuss it further. This option may provide a way to avoid any permitting and/or registration with the EPA, which would come with a UIC permit.

Neal

From: Lauren Blair <lab@h2olsonengineering.com>
Sent: Wednesday, July 13, 2022 11:43 AM
To: Personeus, Neal (DEM) <neal.personeus@dem.ri.gov>
Cc: Stephen Olson <sco@h2olsonengineering.com>
Subject: [EXTERNAL] : RE: Prudence Island groundwater discharge permit question

Hello Neal,

I hope you are doing well. I wanted to follow up on these questions again and see if you were able to look over the plans for the site. We would be happy to know any comments or suggestions that you have. We are hoping to get these permit applications finished up this week.

Thank you,

Lauren Blair | Engineering Intern
H_2Olson Engineering, Inc.
10 Riverside Drive, Suite 103
Lakeville, MA 02347
O: 508.375.7007 | C: 941.348.8209
www.h2olsonengineering.com [h2olsonengineering.com]

From: Lauren Blair
Sent: Thursday, June 30, 2022 11:15 AM
To: 'Personeus, Neal (DEM)' <neal.personeus@dem.ri.gov>
Cc: Stephen Olson <sco@h2olsonengineering.com>
Subject: RE: Prudence Island groundwater discharge permit question

Hi Neal,

Thank you for getting back with me. I am attaching the full set of design plans for this project. There are two sites involved – Indian Springs well and Army Camp well. The Army Camp well site has the analyzer line and the plans for the dry well. Sheet C-6 shows the proposed conditions plan for the Army Camp well site and sheet C-8 shows the details of the discharge systems, including the dry well for Army Camp. I am also cc'ing Steve Olson, President of H2Olson Engineering, onto this email. We would be happy to hear your input. I hope you have a great holiday weekend!

All the best,

Lauren Blair | Engineering Intern
H_2Olson Engineering, Inc.
10 Riverside Drive, Suite 103
Lakeville, MA 02347
O: 508.375.7007 | C: 941.348.8209
www.h2olsonengineering.com [h2olsonengineering.com]

From: Personeus, Neal (DEM) <neal.personeus@dem.ri.gov>
Sent: Wednesday, June 29, 2022 2:40 PM
To: Lauren Blair <lab@h2olsonengineering.com>
Cc: Pena, Traci (DEM) <traci.pena@dem.ri.gov>; Beck, Eric (DEM) <eric.beck@dem.ri.gov>
Subject: Prudence Island groundwater discharge permit question

Hi Lauren,

I was forwarded a request from you regarding a proposed subsurface discharge permit. It sounds as though you are on the right permit track. I would like to see the overall site design, but if what I'm thinking is correct, there may be an easier and less expensive way to deal with the disinfected analyzer line water. I am out of the office until next Tuesday but will be available then if you want to go over it.

Neal Personeus
Sen. Env. Scientist/Project Mgr.

H2Olson Engineering, Inc.
DRINKING WATER PROFESSIONALS

July 21, 2022

Paul Jordan
Rhode Island Department of Environmental Management
235 Promenade Street
Providence, RI 02908
401-222-4700 ext. 2774316
paul.jordan@dem.ri.gov

SUBJECT: Identification of Disturbance to Threatened or Endangered species

PROJECT: Prudence Island Water District, Proposed Water Treatment Facilities

Dear Paul Jordan:

The Prudence Island Water District (PIWD) is under an Administrative Consent Order (ACO) with the Rhode Island Department of Health (RIDOH) to install permanent disinfection facilities for their two water supply sources, including the pre-treatment for the removal of iron and manganese at the Indian Springs well site. PIWD retained the services of H2Olson Engineering, Inc. (10 Riverside Drive, Lakeville, MA 02347) to complete the design and permitting of these facilities in accordance with RIDOH ACO requirements.

One of the requirements of the State Environmental Review Process is to have the relevant agencies review the proposed project and comment on any potential environmental impacts. We are requesting the review of the Rhode Island Department of Environmental Management to determine any impacts of the project to threatened or endangered species. As such, I am attaching the following documents for your use and information:

- A proposed scope of work generally describing the project components.
- A copy of the project overview plan showing the project limits.
- Proposed site location.

Can you please review the attached information and let me know if you have any comments or concerns with the proposed water treatment project on Prudence Island? The project is being propped to improve the water quality and protect the public health for PIWD customers.

Review comments are requested within 30 days of receipt of this letter.
If you have any questions, please feel free to contact us at 508-375-7007 at your convenience.

Very Truly Yours,
H2Olson Engineering, Inc.

Stephen C. Olson, P.E.
President

From: Jordan, Paul (DEM) <paul.jordan@dem.ri.gov>
Sent: Thursday, July 21, 2022 2:16 PM
To: Stephen Olson; Lauren Blair
Subject: RE: [EXTERNAL] : Request for Project Review

The two species observations are about 1200 feet west of the parcel boundary. The habitat is essentially the same across the entire area.

From: Stephen Olson <sco@h2olsonengineering.com>
Sent: Thursday, July 21, 2022 2:11 PM
To: Jordan, Paul (DEM) <paul.jordan@dem.ri.gov>; Lauren Blair <lab@h2olsonengineering.com>
Subject: RE: [EXTERNAL] : Request for Project Review

Thank you.

Would it be possible to prepare a map of the Indian Springs site with the habit overlaid?

From your below e-mail my assumption is that our project site does not include any habitat, and the buffer to the closet habitat for endangered species is 2,500 feet. Do I have that correct?

Thank you for your assistance.

~ Steve O

H2Olson Engineering, Inc.
DRINKING WATER PROFESSIONALS

From: Jordan, Paul (DEM) <paul.jordan@dem.ri.gov>
Sent: Thursday, July 21, 2022 1:48 PM
To: Stephen Olson <sco@h2olsonengineering.com>; Lauren Blair <lab@h2olsonengineering.com>
Subject: RE: [EXTERNAL] : Request for Project Review

No, the data points are not shared publicly.
Paul

From: Stephen Olson <sco@h2olsonengineering.com>
Sent: Thursday, July 21, 2022 1:45 PM
To: Jordan, Paul (DEM) <paul.jordan@dem.ri.gov>; Lauren Blair <lab@h2olsonengineering.com>
Subject: RE: [EXTERNAL] : Request for Project Review

Thanks Paul.

Are the RI Natural Heritage maps located on-line or in a GIS database?

~ Steve O

H2Olson Engineering, Inc.
DRINKING WATER PROFESSIONALS

From: Jordan, Paul (DEM) <paul.jordan@dem.ri.gov>
Sent: Thursday, July 21, 2022 1:36 PM
To: Lauren Blair <lab@h2olsonengineering.com>; Stephen Olson <sco@h2olsonengineering.com>
Subject: RE: [EXTERNAL] : Request for Project Review

Hi Lauren,

These are the RI Natural Heritage records located within 2,500 feet of the Indian Springs site.

#	Family	Genus	Species	COMNAME	SurveyYear	LastSeen	St
1	Insect	Cicindela	formosa generosa	Pine Barrens Tiger Beetle	1996	1996	State Threat
2	Insect	Cicindela	tranquebarica	A Tiger Beetle	1995	1995	State Threat
3	Poaceae	Aristida	purpurascens var. purpurascens	Purple or Arrowfeather Three-awn, Triple-awned Grass	2021	2021	State Threat

There are no records associated with the Army Camp site.

All the best,
Paul

Paul Jordan
Data Analyst II / Geographic Information System
RI Dept. Of Environmental Management
235 Promenade Street
Providence, RI 02908
(401) 222-2776 x277-4315
paul.jordan@dem.ri.gov
http://www.dem.ri.gov/maps/

From: Lauren Blair <lab@h2olsonengineering.com>
Sent: Thursday, July 21, 2022 1:03 PM

To: Jordan, Paul (DEM) <paul.jordan@dem.ri.gov>; Stephen Olson <sco@h2olsonengineering.com>
Subject: [EXTERNAL] : Request for Project Review

Dear Paul Jordan,

I hope this email finds you well. H2Olson Engineering is seeking review comments from the Rhode Island Department of Environmental Management regarding a proposed water treatment project on Prudence Island, in accordance with the State Environmental Review Process. We were directed to your contact information by David Gregg of the Rhode Island Natural History Survey. The attached documents provide further information on this request and the proposed project. Please let us know if you have any questions or concerns. We look forward to hearing from you.

Best regards,

Lauren Blair | Engineering Intern
H_2Olson Engineering, Inc.
10 Riverside Drive, Suite 103
Lakeville, MA 02347
O: 508.375.7007 | C: 941.348.8209
www.h2olsonengineering.com [h2olsonengineering.com]

H2Olson Engineering, Inc.
DRINKING WATER PROFESSIONALS

July 18, 2022

Meredith Brady
Associate Director for Planning
Rhode Island Statewide Planning Program
235 Promenade Street, Suite #230
Providence, RI 02908
401-222-6496
meredith.brady@doa.ri.gov

SUBJECT: Intergovernmental Review Comments

PROJECT: Prudence Island Water District, Proposed Water Treatment Facilities

Dear Meredith Brady:

The Prudence Island Water District (PIWD) is under an Administrative Consent Order (ACO) with the Rhode Island Department of Health (RIDOH) to install permanent disinfection facilities for their two water supply sources, including the pre-treatment for the removal of iron and manganese at the Indian Springs well site. PIWD retained the services of H_2Olson Engineering, Inc. (10 Riverside Drive, Lakeville, MA 02347) to complete the design and permitting of these facilities in accordance with RIDOH ACO requirements.

One of the requirements of the State Environmental Review Process is to have the Division of Planning review the proposed project and comment on the potential impact that the project might have on any Federal or State Programs, including zoning or land use issues. As such, I am attaching the following documents for your use and information:

- A proposed scope of work generally describing the project components.
- A copy of the project overview plan showing the project limits.
- Proposed site location.

Can you please review the attached information and let me know if you have any comments or concerns with the proposed water treatment project on Prudence Island? The project is being propped to improve the water quality and protect the public health for PIWD customers.

Review comments are requested within 30 days of receipt of this letter.
If you have any questions, please feel free to contact us at 508-375-7007 at your convenience.

Very truly yours,
H2Olson Engineering, Inc.

Stephen C. Olson, P.E
President

Lauren Blair

From: Hess, Nancy (DOA) <Nancy.Hess@doa.ri.gov>
Sent: Monday, August 22, 2022 8:03 AM
To: RIDWQ, DOH (RIDOH)
Cc: Lauren Blair
Subject: Environmental Review - water treatment project on Prudence Island
Attachments: Review Request RI Statewide Planning.pdf; PIWD - Drawings for Permit Letters.pdf; PIWD - Technical Memorandum for Permit Letters.pdf

Good afternoon.

We received a direct request for comments on the environmental review from Lauren Blair, an engineering intern at H_2Olson Engineering, Inc. on behalf of Prudence Island water system. We did not see the number of expected people served, although it does give GPD estimates. This project seems to be quite specific in the removal of metals (iron and manganese) from the wells. **We have no comments on the limited scope of this proposal**.

For speedier replies in the future, would you please advise consultants snail mail is no longer necessary as scanned materials can be sent direct to me by email.

Thank you.

Nancy Hess
Interdepartmental Project Manager
Division of Statewide Planning
235 Promenade Street, Suite 230
Providence, RI 02908
401-222-6480
www,planning.ri.gov

H2Olson Engineering, Inc.
DRINKING WATER PROFESSIONALS

July 20, 2022

Lea Hitchen
Portsmouth Town Planner
2200 E. Main Road
Portsmouth, RI 0287
401-643-0332
lhitchen@portsmouthri.gov

SUBJECT: Identification of Zoning Issues

PROJECT: Prudence Island Water District, Proposed Water Treatment Facilities

Dear Lea Hitchen:

The Prudence Island Water District (PIWD) is under an Administrative Consent Order (ACO) with the Rhode Island Department of Health (RIDOH) to install permanent disinfection facilities for their two water supply sources, including the pre-treatment for the removal of iron and manganese at the Indian Springs well site. PIWD retained the services of H2Olson Engineering, Inc. (10 Riverside Drive, Lakeville, MA 02347) to complete the design and permitting of these facilities in accordance with RIDOH ACO requirements.

One of the requirements of the State Environmental Review Process is to have the Planning Department review the proposed project and comment on any potential zoning conflicts. As such, I am attaching the following documents for your use and information:

- A proposed scope of work generally describing the project components.
- A copy of the project overview plan showing the project limits.
- Proposed site location.

Can you please review the attached information and let me know if you have any comments or concerns with the proposed water treatment project on Prudence Island? The project is being propped to improve the water quality and protect the public health for PIWD customers.

Review comments are requested within 30 days of receipt of this letter.
If you have any questions, please feel free to contact us at 508-375-7007 at your convenience.

Very Truly Yours,
H2Olson Engineering, Inc.

Stephen C. Olson, P.E.
President

TOWN OF PORTSMOUTH

2200 East Main Road / Portsmouth, Rhode Island 02871

(401) 643-0332 / www.portsmouthri.gov

Lea Hitchen
Town Planner

www.portsmouthri.gov
lhitchen@portsmouthri.gov

August 2, 2022

Mr. Stephen C. Olson, P.E.
H2Olson Engineering, Inc.
10 Riverside Drive, Suite 103
Lakeville, MA 02347

RE: Prudence Island Water District, Proposed Water Treatment Facilities (Project No. 19.21.01)

Dear Mr. Olson,

Thank you for providing me the opportunity to review the designs and plans for the proposed water pre-treatment systems at the "Army Camp" and "Indian Springs" well sites on Prudence Island that have been prepared by your office. I have reviewed the scope of work, project plans and proposed site locations and find there to be no evidence of zoning conflicts with either site.

The "Indian Springs" well site is owned by the Prudence Island Water District (PIWD), being located at 024 Homestead Avenue, Map 76 Plat 5A, consisting of 5.14 acres, and is zoned "Residential-60." The Indian Springs site calls for the construction of a proposed 23'x23' well house building along with four (4) new crushed stone parking spaces which will be located within the building envelope and meet all dimensional requirements per the Zoning Ordinance.

The "Army Camp" well site, being located at on property owned by The Prudence Conservancy, being Map 80 Lot 4, already has an existing 12' x 12' well house on the parcel. Upon review of this site, it does not appear there are any applicable sections of the Zoning Ordinance that are relevant to this portion of the project. The proposed limit of work appears to extend beyond the approximate PIWD easement line; I suggest legal counsel of all parties involved properly evaluate the issue.

In summary I find the project to be consistent with the Comprehensive Community Plan, specifically Element 9, Water Supply, as the plan specifically identifies the drinking water for Prudence Island residents as a critical natural resource as it is sourced from groundwater wells which are threatened. The installation of permanent disinfection facilities for Prudence Island's two water supply sources will satisfactorily address the goals and policies set forth for distributing safe drinking water. Secondly, the proposal is in compliance with the purpose and intent of the Portsmouth Zoning Ordinance, particularly Chapter 405, Article IV, District Intensity Regulations, Section B, Land Space Requirements Table.

Please accept this letter as notice of said zoning concerns. Should you have any questions, please do not hesitate to contact me.

Sincerely,

Lea Hitchen

Lea Hitchen
Town Planner

cc: Richard Rainer, Town Manager
Kevin Gavin, Town Solicitor
Gareth Eames, Building Official
Robin Weber, PIWD Moderator

H2Olson Engineering, Inc.
DRINKING WATER PROFESSIONALS

July 18, 2022

Elizabeth Totten
Project Review
Rhode Island Historic Preservation and Heritage Commission
150 Benefit Street
Providence, RI 02903
401-222-2671
elizabeth.totten@preservation.ri.gov

SUBJECT: Identification of Historic and/or Archaeological Resources

PROJECT: Prudence Island Water District, Proposed Water Treatment Facilities

Dear Elizabeth Totten:

The Prudence Island Water District (PIWD) is under an Administrative Consent Order (ACO) with the Rhode Island Department of Health (RIDOH) to install permanent disinfection facilities for their two water supply sources, including the pre-treatment for the removal of iron and manganese at the Indian Springs well site. PIWD retained the services of H2Olson Engineering, Inc. (10 Riverside Drive, Lakeville, MA 02347) to complete the design and permitting of these facilities in accordance with RIDOH ACO requirements.

One of the requirements of the State Environmental Review Process is to have the Historic Preservation and Heritage Commission review the proposed project and comment on the potential impact that the project might have on any historic and/or archaeological resources. As such, I am attaching the following documents for your use and information:

- A proposed scope of work generally describing the project components.
- A copy of the project overview plan showing the project limits.
- Proposed site location.

Can you please review the attached information and let me know if you have any comments or concerns with the proposed water treatment project on Prudence Island? The project is being propped to improve the water quality and protect the public health for PIWD customers.

Review comments are requested within 30 days of receipt of this letter.
If you have any questions, please feel free to contact us at 508-375-7007 at your convenience.

Very Truly Yours,
H2Olson Engineering, Inc.

Stephen C. Olson, P.E.
President

10 Riverside Drive, Suite 103
Lakeville, MA 02347

Tel: 508-375-7007
www.h2olsonengineering.com

STATE OF RHODE ISLAND

HISTORICAL PRESERVATION & HERITAGE COMMISSION

Old State House 150 Benefit Street Providence, RI 02903

Telephone 401-222-2678 Fax 401-222-2968
TTY 401-222-3700 www.preservation.ri.gov

August 19, 2022

Via email: sco@h2olsonengineering.com

Stephen C. Olson, P.E.
President
H2Olson Engineering, Inc.
10 Riverside Drive
Lakeville, MA 02347

Re: RIHPHC Project No. 16772
Prudence Island Water District
Portsmouth, Rhode Island

Dear Mr. Olson:

The Rhode Island Historical Preservation and Heritage Commission (RIHPHC) staff has reviewed the information that you provided for the above-referenced project. The Prudence Island Water District is proposing to install permanent disinfection facilities for two water supply sources on Prudence Island at Indians Springs and the Army Camp.

Based on our review of available information, it is the conclusion of the RIHPHC that no historic properties will be affected by the project.

These comments are provided in accordance with the Rhode Island Historic Preservation Act and Rhode Island General Laws. If you have any questions, please contact RIHPHC Project Review Coordinator Elizabeth Totten at 401-222-2671 or elizabeth.totten@preservation.ri.gov.

Sincerely,

Elizabeth Totten
FOR

Jeffrey Emidy
Interim Executive Director
Interim State Historic Preservation Officer

220819.03est

H2Olson Engineering, Inc.
DRINKING WATER PROFESSIONALS

July 18, 2022

John Brown
Narragansett Tribal Historic Preservation Office
4425 South County Trail
Charlestown, RI 02813

SUBJECT: Identification of Historic/Archaeological Resources and Land Use Impacts

PROJECT: Prudence Island Water District, Proposed Water Treatment Facilities

Dear John Brown:

The Prudence Island Water District (PIWD) is under an Administrative Consent Order (ACO) with the Rhode Island Department of Health (RIDOH) to install permanent disinfection facilities for their two water supply sources, including the pre-treatment for the removal of iron and manganese at the Indian Springs well site. PIWD retained the services of H2Olson Engineering, Inc. (10 Riverside Drive, Lakeville, MA 02347) to complete the design and permitting of these facilities in accordance with RIDOH ACO requirements.

One of the requirements of the State Environmental Review Process is to have the Narragansett Tribal Historic Preservation Office review the proposed project and comment on the potential impact that the project might have on any historical/archaeological resources or lands related to the Narragansett Tribe. As such, I am attaching the following documents for your use and information:

- A proposed scope of work generally describing the project components.
- A copy of the project overview plan showing the project limits.
- Proposed site location.

Can you please review the attached information and let me know if you have any comments or concerns with the proposed water treatment project on Prudence Island? The project is being propped to improve the water quality and protect the public health for PIWD customers.

Review comments are requested within 30 days of receipt of this letter.
If you have any questions, please feel free to contact us at 508-375-7007 at your convenience.

Very Truly Yours,
H2Olson Engineering, Inc.

Stephen C. Olson, P.E.
President

10 Riverside Drive, Suite 103
Lakeville, MA 02347

Tel: 508-375-7007
www.h2olsonengineering.com

H2Olson Engineering, Inc.
DRINKING WATER PROFESSIONALS

July 18, 2022

Aja Szumylo
Acting Deputy Regional Administrator
NOAA Fisheries Greater Atlantic Regional Fisheries Office
55 Great Republic Drive
Gloucester, MA 01930
206-526-4746
aja.szumylo@noaa.gov

SUBJECT: Identification of Fisheries Impacts

PROJECT: Prudence Island Water District, Proposed Water Treatment Facilities

Dear Aja Szumylo:

The Prudence Island Water District (PIWD) is under an Administrative Consent Order (ACO) with the Rhode Island Department of Health (RIDOH) to install permanent disinfection facilities for their two water supply sources, including the pre-treatment for the removal of iron and manganese at the Indian Springs well site. PIWD retained the services of H2Olson Engineering, Inc. (10 Riverside Drive, Lakeville, MA 02347) to complete the design and permitting of these facilities in accordance with RIDOH ACO requirements.

One of the requirements of the State Environmental Review Process is to have the NOAA Fisheries Greater Atlantic Regional Fisheries Office review the proposed project and comment on the potential impact that the project might have on fisheries in the area. As such, I am attaching the following documents for your use and information:

- A proposed scope of work generally describing the project components.
- A copy of the project overview plan showing the project limits.
- Proposed site location.

Can you please review the attached information and let me know if you have any comments or concerns with the proposed water treatment project on Prudence Island? The project is being propped to improve the water quality and protect the public health for PIWD customers.

Review comments are requested within 30 days of receipt of this letter.
If you have any questions, please feel free to contact us at 508-375-7007 at your convenience.

Very Truly Yours,
H2Olson Engineering, Inc.

Stephen C. Olson, P.E.
President

10 Riverside Drive, Suite 103
Lakeville, MA 02347

Tel: 508-375-7007
www.h2olsonengineering.com

From: Sabrina Pereira - NOAA Federal
To: Lauren Blair
Subject: Re: Request for Project Review
Date: Thursday, August 11, 2022 11:44:20 AM
Attachments: image001.png

Hi Lauren,

Thank you for reaching out and sending these materials. We agree that some of the construction activities associated with the installation of water disinfection facilities for the Prudence Island water district may adversely affect Essential Fish Habitat. However the avoidance and minimization measures, like sedimentation controls outlined in the project drawings, adequately minimize adverse effects, and we have no conservation recommendations to provide.

Thank you, and please let me know if you have any questions.

Best regards,
Sabrina Pereira
Marine Resources Management Specialist
Habitat and Ecosystem Services Division
NOAA/ National Marine Fisheries Service
Gloucester, MA
Pronouns: she/her/hers
(978)-675-2178
Sabrina.pereira@noaa.gov

On Fri, Jul 22, 2022 at 11:38 AM Christopher Boelke - NOAA Federal <christopher.boelke@noaa.gov> wrote:

> At this point, I do not think we have any action to take under the state process, so just FYI
>
> ---------- Forwarded message ---------
> From: **Lou Chiarella - NOAA Federal** <lou.chiarella@noaa.gov>
> Date: Fri, Jul 22, 2022 at 10:52 AM
> Subject: Fwd: Request for Project Review
> To: Chris Boelke <Christopher.Boelke@noaa.gov>
>
> Chris,
> I don't know how you want to handle this.
>
> Lou Chiarella
> Assistant Regional Administrator
> for Habitat and Ecosystem Services
> NOAA/National Marine Fisheries Service
> Greater Atlantic Regional Fisheries Office
> 55 Great Republic Drive
> Gloucester, MA 01930

978-281-9277

---------- Forwarded message ---------
From: **Aja Szumylo - NOAA Federal** <aja.szumylo@noaa.gov>
Date: Fri, Jul 22, 2022 at 5:04 AM
Subject: Fwd: Request for Project Review
To: Lou Chiarella - NOAA Federal <lou.chiarella@noaa.gov>, Jennifer Anderson - NOAA Federal <jennifer.anderson@noaa.gov>, Julie Crocker - NOAA Federal <julie.crocker@noaa.gov>

Hi Lou and Julie-

Forwarding to your groups for review. How do these typically come in to you?

Aja

---------- Forwarded message ---------
From: **Lauren Blair** <lab@h2olsonengineering.com>
Date: Wed, Jul 20, 2022 at 10:59 AM
Subject: Request for Project Review
To: aja.szumylo@noaa.gov <aja.szumylo@noaa.gov>

Dear Aja Szumylo,

I hope this email finds you well. H2Olson Engineering is seeking review comments from the NOAA Greater Atlantic Regional Fisheries Office regarding a proposed water treatment project on Prudence Island, in accordance with the Rhode Island State Environmental Review Process. The attached documents provide further information on this request and the proposed project. A copy of these items will be sent by mail as well. Please let us know if you have any questions or concerns. We look forward to hearing from you.

Best regards,

Lauren Blair | Engineering Intern

H_2Olson Engineering, Inc.

10 Riverside Drive, Suite 103