

**FEDERAL CONSISTENCY REPORT FOR THE RELOCATION OF
LABORATORY, ANCILLARY SUPPORT FACILITIES, AND CRITICAL
STORAGE CONTAINERS.**

**PORTION OF REM. PLOT 11, ESTATE PENITENTIARY LAND
CHRISTIANSTED, ST. CROIX, U.S.V.I.**



Prepared for:

**THE OFFICE OF COASTAL ZONE MANAGEMENT
DEPARTMENT OF PLANNING AND NATURAL RESOURCES,
AND THE GOVERNMENT OF THE VIRGIN ISLANDS**

Project Owner:

**VIRGIN ISLANDS DEPARTMENT OF HEALTH – GVI
3500 Estate Richmond, Christiansted, VI 00820**

**Project Address: Portion of Remainder, Plot 11, Estate Penitentiary Land
Project Coordinates: 17 44'49.30" N, 64 42'47.92" W Property ID: 2-04900-0103-00**

**Submitting Entity – Department of Health Prime Contractor:
GERMFREE LABORATORIES
4 Sunshine Blvd., Ormond Beach, FL 32174**

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OCTOBER 27, 2022

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INTRODUCTION

On September 7, 2017, and September 16, 2017, Hurricanes Irma and Maria significantly damaged Department of Health (DOH) facilities throughout the three islands of the USVI. These back-to-back Category 5 hurricanes caused catastrophic structural damage and flooding to the Charles Harwood Medical Center (CHMC) and its six (6) outbuildings on the St. Croix campus. Resulting damages to the CHMC were so severe, a replacement for the Charles Harwood Medical Center was authorized by FEMA. As an interim measure to restore the critical functions of the VIDOH Laboratory, a new BSL-3 Temporary Laboratory was required. Public Health Laboratories (PHL) focus on diseases and the health status of population groups. They perform limited diagnostic testing, reference testing, and disease surveillance. They also provide emergency response support, perform applied research, and provide training for laboratory personnel.

The Laboratory and its auxiliary equipment are a “permanent self-contained secure high containment Lab that will complement future clinical laboratories in the new proposed DOH building”. It is a highly complex multi-million-dollar facility approved and funded by the Center for Disease Control (CDC). By itself, the space allotted to new lab functions in the proposed Charles Harwood Hospital will not be sufficient for a long-term public health lab. However, the provision of the GermFree Lab, along with allotted clinical lab space in the new hospital, will be adequate to perform the requisite testing, in a secure, non-public facility.

The decision to relocate the Labs and its storage facilities to this specific new location was based on its proximity to the Charles Harwood Hospital complex, which is one block away. This will allow for efficient and swift provision of services for the hospital and precludes the need to hire additional staff for another offsite location. This new location will keep it within proximity of the newly built hospital complex and allow for ease of services between the Lab, the hospital, and its onsite clinics. In addition to relocating existing modular laboratory facilities, VIDOH has contracted with Germfree Labs Inc. (GLI) to construct an adjacent new modular high containment facility on this plot of land. An existing Emergency Medical Services modular office building, supporting regulatory functions, will also be relocated to a portion of this site as part of this project.

The importance of the smooth and continued operation of these facilities in service of the public health of the island’s residents cannot be overstated. The Department of Health Lab is the only public health lab facility in the Territory. The Lab and its staff have been highly instrumental in the success of the USVI Department of Health’s response to the COVID-19 pandemic, by providing professional expertise, guidance, technical support, and testing, at a critical time in the Territory’s history. Currently and in the future, it stands equipped and ready to meet the future testing response needs of the Territory.

LOCATION OF PROJECT

The project location is located within the north side, central area on the island of St. Croix, to the west of the heart of Christiansted, the main urban area on the island.



Figure 1 – Overall Island Location Map.



Figure 2 – Greater Christiansted Location Map.

LOCATION DESCRIPTION

The project location is a portion of Remainder Plot 11, Estate Penitentiary Land, to the North of the Charles Harwood Hospital Complex. This land was previously developed for the Ralph de Chabert housing project, which was demolished in 2015. The overall acreage of the site in question is 2.6 acres (less than 1 acre of this area will be disturbed). This 2.6 acres does not include acreage to the south of the site that was recently utilized for a new parking area in support of the Department of Health temporary facilities. The decimal degrees GPS coordinates for the site can be found at Latitude 17.74694693828904, Longitude -64.70966831804833. The site is within the R-3 zone, and a fuller description of the zoning parameters can be found within Section 13.0 of this report.

The area surrounding the project is a quiet, formerly residential area, comprised of unoccupied land where the now-demolished residential structures once were. A block immediately to the east of the site is a well-established neighborhood of modest, single-family residences, as well as the offices for the VI Government's Property and Procurement. To the south of the site sits much of the Department of Health's facilities, including its current temporary offices, associated parking, and the Charles Harwood Medical Center itself. There are no other active facilities – public, retail, commercial, etc. – immediately nearby. The condition of the surrounding streets are passable but marginal, with the street at the north end of the site requiring additional repair upgrades in order for it to be serviceable. The nature of these repairs are currently a matter of discussion with the Department of Public Works. Regardless, the improvements via the relocation and construction of the new GermFree Labs, will unquestionably serve to reinvigorate and enhance security within this neighborhood.

PROJECT DESCRIPTION

The project's area measures approximately 230 feet by 210 feet, or just over one acre of land. The area of actual disturbance within this overall project footprint is approximately 41,000 square feet (0.94 acres). While this land is currently covered with scrub vegetation, this site was previously built upon, most recently as a housing development that was demolished in 2015 (see below). The land in question is currently being leased from the VI Housing Authority for the purposes of this project.

The proposed layout for buildings and improvements on the site is shown in the figure on the next page (Figure 3). All buildings – new and relocated - are modular construction, and new foundations will be provided to support them above grade. The majority of the disturbed area on the site will be impervious coverage, and a new underground stormwater retention system has been designed as part of the site improvements to handle this run-off. Gravel surfaces have been provided in support of utilitarian areas.

The buildings that are denoted on the plan as laboratories will provide essential services for the Virgin Islands Department of Health (VIDOH) related to public health testing. These buildings will require emergency power during utility outages and onsite generators have been included in the layout. The building designated as the EMS Regulatory office building will house Emergency Medical Service Regulatory employees performing office functions. There will not be any treatment of individuals or repair of vehicles at this location. Off-street parking has been provided for each set of buildings, and the entire site will be protected with a new security fence. Primary vehicular access onto both the Germfree and EMS portions of the site will be via gated, secured entrances at the north side of the site. Secondary access onto the site is provided via a gated entry to the west. Enhanced site lighting will be provided along the north side of the site.

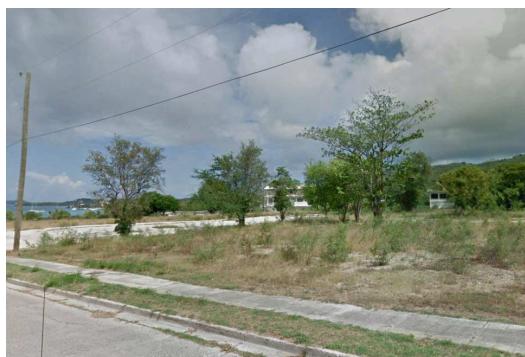


Figure 3 – Existing Site Conditions Photos.

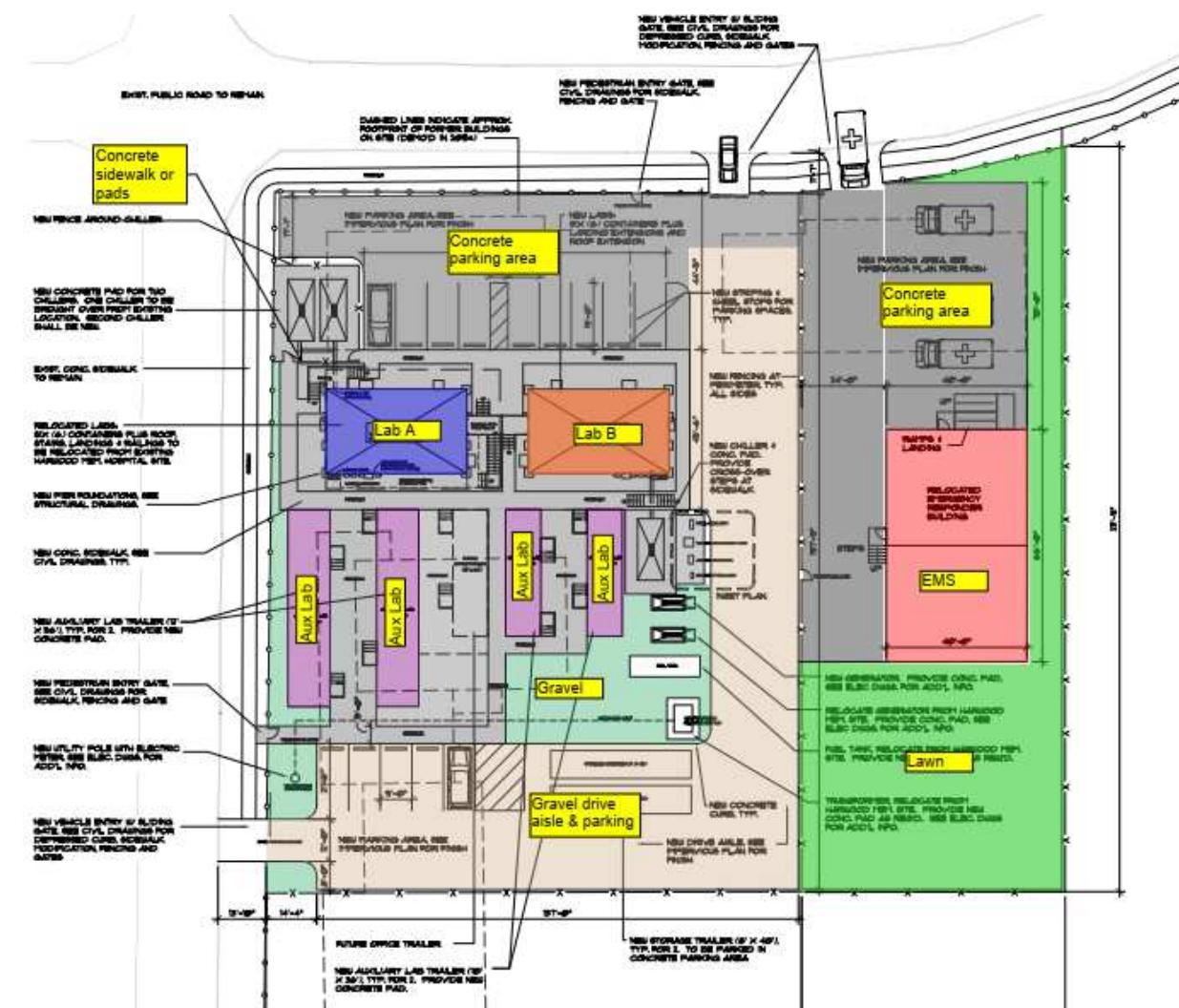


Figure 4 – Layout Plan.

ENVIRONMENTAL IMPACTS

1.0 Climate and Weather

Best Management Practices (BMPs) implementing sediment and erosion control measures will be utilized to ensure that rainfall runoff does not adversely impact the surrounding areas. These measures will include a combination of silt fences, gravel construction entrance and egress points, and hay bales. All structures will meet current building code requirements with respect to the region's high velocity hurricane force wind load requirements and earthquake zone seismic requirements.

2.0 Landform, Geology, Soils & Historic Land Use

According to the Soil Survey of the United States Virgin Islands report, the primary soils associated with this site is UgC, Urban land-Glynn complex. UgC is composed of 80% UgC and 15% Glynn complex, with 0 to 12 percent slopes, and are rarely flooded. This map unit consists of Urban land and very deep, well drained alluvial soils. The Urban land soils typically exist in airports, shopping centers, parking lots, large buildings, streets, sidewalks, or other impervious surfaces. The landform position is on alluvial fans and terraces. The project area has been developed multiple times in the past, most recently as a housing development. The structures from that development were demolished in 2015 and the land has been left vacant up until now.

3.0 Drainage, Flooding & Erosion Control

The project site is located in Zone X of the FEMA Flood Map for this area, indicating that it is outside of Flood Hazard areas. Drainage for stormwater is currently overland flow into the streets to the North and West of the property. As part of the improvements for this property, we are proposing an underground stormwater retention system to mitigate the increased impervious areas that will be created.

During construction, erosion control measures will be undertaken, consisting primarily of hay bales or silt fencing at the North and West property borders.

4.0 Drainage Patterns

Onsite drainage flows roughly parallel to the street at the West property line with an overall elevation change of approximately 8 feet over the 220' length of the property. The low point of the property is at the intersection of the two paved streets that border the property. While the site will require some regrading, the overall drainage pattern for the site will be maintained. A new underground stormwater retention structure will be installed near the lowest point of the site to collect water that flows off of the impervious areas onsite. This retention structure will have an overflow that will allow excess stormwater to flow into the paved streets much in the same way that happens currently. The stormwater retention system has been sized to meet the needs of both the Germfree and EMS sites as per current DPNR stormwater management best practices.

A Hydrological Report for the site can be found within Appendix A.

5.0 Coastal Floodplain

The project site is located at approximately 29 to 37 feet above mean sea level. The relevant FEMA Flood Map for this area shows the project site within the Area of Minimal Flood Hazard or Flood Zone X (outside of the 500-year flood hazard area)

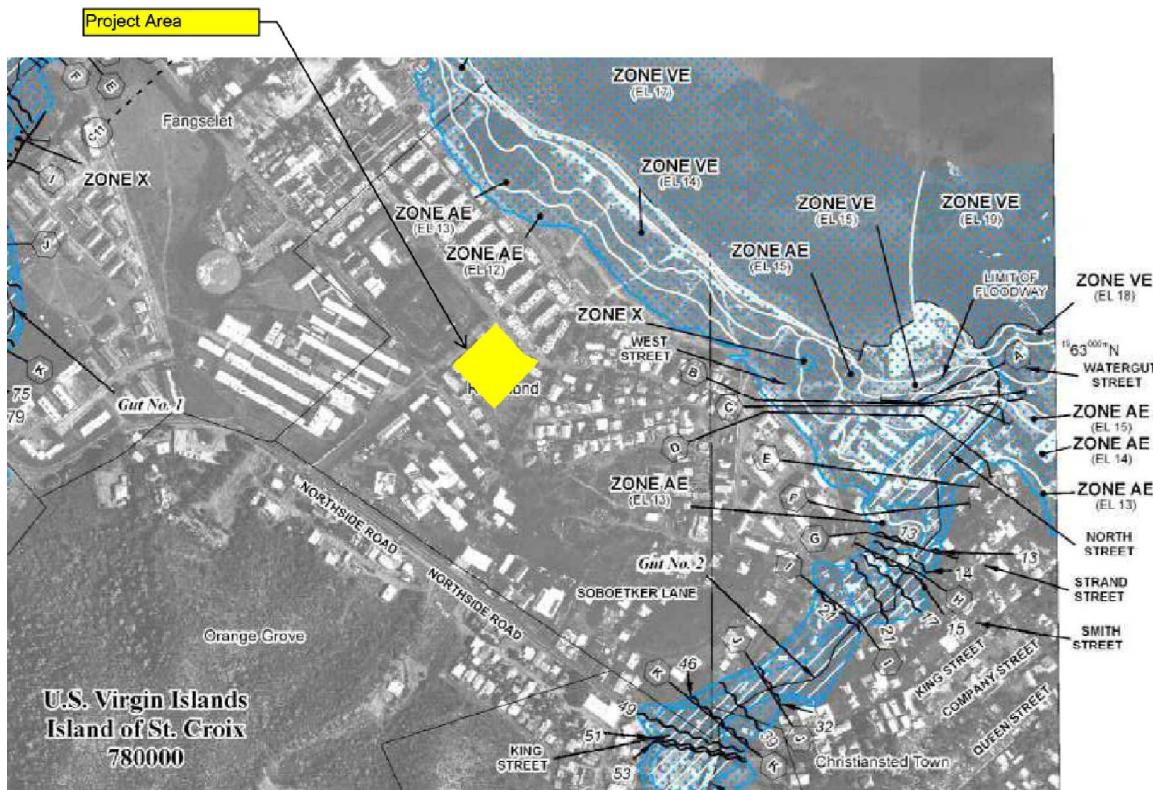


Figure 5 – FEMA Flood Map (detail).

6.0 Freshwater Resources

Water supply for this site is primarily from the WAPA Municipal water service. This project proposes to connect to that system with a new valve box to be located at the nearest possible location, approximately 100 feet to the East of the property border. Best Management Practices will be undertaken during construction to limit any impacts to the local freshwater resources.

7.0 Oceanography

The project site is outside of CZM Tier 1 and will not be affected by marine tides nor have any effect on marine resources.

8.0 Marine Resources

The project site is outside of CZM Tier 1 and will not be affected by marine tides nor have any effect on marine resources.

9.0 Terrestrial Resources

The project is on an urban site that has been extensively developed in the past. This new development is in keeping with the previous land disturbances and will not have any adverse effect on existing terrestrial resources.

10.0 Wetlands

There are no wetlands included within the project area. No wetlands will be affected by this project.

11.0 Rare and Endangered Species

As an urban site, there are no rare or endangered species within the developed property, and the site is not critical habitat for any endangered species. There will be no impact on terrestrial rare or endangered species.

12.0 Air Quality

All of St. Croix is designated Class II by the Environmental Protection Agency (EPA) in compliance with the National Ambient Air Quality Standards. In Class II air quality regions, the following air pollutants are regulated: open burning, visible air contaminants, particulate matter emissions, volatile petroleum products, sulfur compounds, and internal combustion engine exhaust (Virgin Islands Code Rules and Regulations).

Heavy equipment such as excavators, backhoes, dump trucks etc. will be used during construction that will create engine exhaust fumes that will go away upon completion of construction when air quality will be returned to ambient pre-construction conditions.

As part of this project, stand-by generators will be installed onsite. These generators will serve as a backup power supply in the event of a utility power failure. This development includes medical laboratories that store materials that are sensitive to environmental changes and a long power outage would be deleterious to them. Additionally, the function of the laboratories needs to be maintained during and after the extreme weather events that are likely to cause power failures. This project will apply to DPNR for the proper construction and operation permits related to air pollution emission sources.

The laboratory buildings that are part of this project will have self-contained Air Handling units with HEPA filters. The BSL2 and BSL3 modular laboratory systems are designed for the staff to handle any hazardous or potentially hazardous materials within the interior spaces (secondary containment) or the Class II equipment (primary containment). These spaces offer HEPA filtration exhaust units to protect the environment during normal operating procedures as well as any potential accidents which may occur.

IMPACT ON MAN'S ENVIRONMENT

13.0 Land and Water Use plans

The project site is zoned R-3 – Residential – Medium Density. While the proposed uses of the site are unique – medical laboratories and emergency services offices, the R3 zone does acknowledge and accommodate the general intent of these uses – via “hospitals and medical clinics” (i.e. medical), and “fire and police stations” (i.e. community-based emergency services). These uses are subject to further conditions as set forth within the Virgin Islands zoning code, within sections 231 and 232.

If the labs were treated to the same standards as a medical clinic (Section 231 (Subsection 20), items A-D), all conditions would be met. Similarly, if the EMS facility was treated to the same standards as a police or fire station (Section 231 (Subsection 14), items A-F), all conditions would be met. Section 232 (Planned area development) would not be applicable in this case. The site sits outside of CZM boundaries, as well as outside of other specific regulated coastal environments.

14.0 Visual Impacts

The project site has been left as a vacant, undeveloped area for the past seven years, following the demolition of the Ralph de Chabert housing project. Development of the project site with modular structures that are performing a vital function for the island of St. Croix will have a positive impact for this underutilized location. The utilitarian modular buildings that will house the laboratories and accessory functions are one or two story which will fit in with the current low-rise character of the neighborhood. A new decorative metal picket fence will be constructed along the main street to the West of the property. Chain-link security fencing will be installed on the remaining sides of the property.

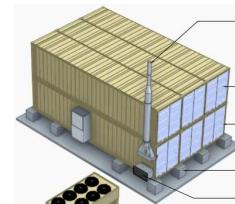


Figure 6 – (a) Existing Lab Bldg. (b) Existing EMS Bldg. (c) Proposed Lab Bldg. Expansion

15.0 Social and Economic Impacts

The Germfree Laboratories perform an integral service for the Department of Health. The continuing operation of these laboratories in proximity to the Harwood hospital complex will provide a valuable service towards supporting the health and wellbeing of the entire community. The good-functioning of the Emergency Medical Service is also a critical component for maintaining community well-being and healthcare standards in Christiansted and beyond.

As part of this project, Germfree will be constructing an additional laboratory building to increase the amount of laboratory capacity available. This will allow for additional testing to be performed, and is projected to lead to timely testing results for the community (especially when critical), and a modest, but increased employment opportunity at this facility. This facility currently employs 9 full time people. An eventual increase of roughly three additional employees is anticipated once the new, expanded facility is in operation.

16.0 Historical and Archeological Resources

All of the project site has been extensively disturbed by past developments and has no known historical or archeological resources. A significant area of lab footprint sits in the same location as the previous, demolished housing structures. In response to a request for determination on the need for an archeological resources investigation, VISHPO Senior Archeologist David Brewer has noted that the site will not require a Phase 1 Archaeological Survey “due to the highly disturbed nature of the property due to previous land development”.

17.0 Waste Disposal and Accidental Spills

The contractor-of-record has extensive experience and understanding of meeting all applicable on-island local and federal regulations related to solid waste disposal and accidental spills during construction. Although the site is vacant, intermingling of wastes will be avoided and any substances that exhibit hazardous waste characteristics will be managed to prevent a release to the environment. A copy of the construction firm’s Best Practices handbook and standards related to these subjects can be made available for inspection prior to the start of construction.

Solid waste disposal for the completed project will be coordinated by the Department of Health in accordance with local regulations. In essence this will be a continuation of the solid waste disposal practices that have been ongoing for the current facility locations on the grounds of the Harwood hospital complex, one block to the South. Any potentially hazardous solid waste leaving the laboratories within the lab buildings will be sterilized using a steam sterilization process inside of an autoclave unit within the laboratory. After the sterilization process is complete, the products are safe to dispose of as common waste.

Regarding liquid wastes, a portion of the laboratory facility will contain Biological Safety Level 3 (BSL3) labs. Plumbing systems within these labs are connected to an Effluent Decontamination System (EDS) for decontamination. The EDS mixes Sodium Hypochlorite (bleach) with waste water from the BSL3 spaces within the laboratory for a predetermined amount of time during operation. The unit uses 6% bleach at a mixture of 600-800 ppm at the discharge to sanitary drain and is automatically controlled by a float switch located in a HEPA filter ventilated holding tank supplied with the system. This tank collects all of the liquid waste from the BSL3 space drains before treatment and safe disposal in the municipal sewer system. The Auxiliary Labs and the BSL2 labs do not require effluent decontamination as they do not handle potentially hazardous materials, and the liquid waste from these labs will be connected to the municipal sewer system directly.

In summary, all potentially hazardous solid waste will be sterilized before leaving the laboratories and all potentially hazardous liquid waste will be decontaminated by the EDS before entering the municipal sewer system.

COASTAL CONSISTENCY

The proposed Modular High Containment Facility / EMS project, as proposed, will be undertaken in a manner consistent to the maximum extent practicable with the enforceable policies of the U.S. Virgin Islands' Coastal Zone Management (CZM) program. This federal consistency determination request demonstrates the project's compliance with the U.S. Virgin Islands' CZM program. This project meets the basic goals set forth in the U.S. Virgin Islands Code Title 12, Conservation Chapter 21, Virgin Islands Coastal Zone Management [V.I. Code tit. 12, § 903(b)].

Additional details are as follows:

1. Protect, maintain, preserve and, where feasible, enhance and restore, the overall quality of the environment in the coastal zone, the natural and man-made resources therein, and the scenic and historic resources for the coastal zone for the benefit of residents of and visitors of the United States Virgin Islands.

The development of the project site for use as a healthcare-oriented property and supporting EMS services is consistent with the character of the neighbor and will enhance the ability of the adjacent Harwood facility to meet its healthcare goals. The reinvigoration of activity on the site will help enhance a currently marginal neighborhood area. Furthermore, the improvement of this property, especially the installation of a stormwater detention system on the site, will have a net positive impact on the local environment. Best management practices will be undertaken during construction to manage erosion control and stormwater runoff as well as to limit disturbances within the local community.

2. Promote economic development and growth in the coastal zone and consider the need for development of greater than territorial concern by managing: (1) the impacts of human activity and (2) the use and development of renewable and nonrenewable resources so as to maintain and enhance the long-term productivity of the coastal environment.

The use of modular containers to construct the laboratories and other buildings onsite allows for an increased efficiency for construction activities. The majority of construction is performed on a factory floor and in a manner whereby materials can be efficiently recycled or used to the maximum possible extent. Construction waste is kept to a minimum and is recycled where feasible. Completed modular containers are shipped to the project site where they are installed and connected to utility systems onsite.

3. Assure priority for coastal-dependent development over other development in the coastal zone by reserving areas suitable for commercial uses including hotels and related facilities, industrial uses including port and marine facilities, and recreation uses.

The project location is outside of the CZM Tier 1 zone and will not impact development of the coastal zone for the benefit of the community.

4. Assure the orderly, balanced utilization and conservation of the resources of the coastal zone, taking into account the social and economic needs of the residents of the United States Virgin Islands.

Locating this facility in proximity to the local Harwood health facility makes the best use of available resources. Travel between the Harwood facility and this facility can be easily accomplished without recourse to private or public transportation.

5. Preserve, protect and maintain the trust lands and other submerged and filled lands of the United States Virgin Islands so as to promote the general welfare of the people of the United States Virgin Islands.

There are no trust lands or submerged and filled lands on the project site. This project will have no impact on such lands in the coastal zone.

6. Preserve what has been a tradition and protect what has become a right of the public by insuring the public, individually and collectively, has and shall continue to have the right to use and enjoy the shorelines and to maximize public access to and along the shorelines consistent with the constitutionally-protected rights of private property owners.

The project site is contained by existing roadways and will not impede in any way the access for the public to the existing shorelines.

7. Promote and provide affordable and diverse public recreational opportunities in the coastal zone for all residents of the United States Virgin Islands through acquisition, development and restoration of areas consistent with sound resource conservation principles.

Coastal zone recreational activities will not be affected by this project.

8. Conserve ecologically significant resource areas for their contribution to marine productivity and value as wildlife habitats, and preserve the function and integrity of reefs, marine meadows, salt ponds, mangroves and other significant natural areas.

Locating this project away from the coastal environment will help to maintain the integrity of the natural area. Reutilization of a previously developed site helps to preserve and maintain existing wildlife habitats elsewhere.

9. Maintain or increase coastal water quality through control of erosion, sedimentation, runoff, siltation and sewage discharge.

Best management practices will be undertaken during construction to manage erosion control and stormwater runoff. The completed facility will be connected to the existing sanitary sewer system. Installation of a new underground stormwater detention structure onsite will help to mitigate stormwater runoff.

End, Federal Consistency Report

Hydrology Study Report



Duane R. Ferguson
10/4/22

Project Site:
Germfree Labs
Portion of Rem Plot 11
Estate Penitentiary Land
Christiansted, St. Croix, VI



Introduction

The site was previously developed and had VI Housing Authority buildings on the property. These buildings were demolished several years ago and now the site is currently overgrown with weeds with some bare soil areas. The proposed Germfree Labs site is approximately 0.85 acres and will consist of two 2-story lab buildings, four auxiliary lab buildings, a future trailer, storage containers, miscellaneous structures for the labs use and associated parking. Some of the site will be covered with gravel and paved parking areas.

This study as with typical hydraulic studies for stormwater management will analyze the pre and post stormwater conditions and provide a storage volume. This site will utilize underground chambers for the retention of stormwater to address the increase in run-off generated by the proposed development of the site.

Hydraulic Analysis

The site slopes south to north and the stormwater will be collected with onsite storm drain inlets and trench drains which be directed into the underground chamber system for storage and release. Minimal off-site runoff intrudes onto the site. An ADS Storm Tech MC-3500 chamber system will be utilized as the type of underground chamber system. The one year 24-hour rain event was used for the determination of the storage volume required for the site.





Topography

TR-55 was used for determination of the pre and post condition values. First the soil name/type and hydrologic group was determined which the USVI Mapgeo database was used. The existing soil type of the site was found to be UgC which is Urban land-Glynn complex. In accordance with the Soil Survey of the USVI, UgC soils:

consists of Urban land and very deep, well drained alluvial soils that are so intermingled that it was not practical to map them separately. The Urban land is composed of airports, shopping centers, parking lots, large buildings, streets, sidewalks, or other impervious surfaces. Closely associated areas, such as lawns, parks, vacant lots, and playgrounds, contain natural soils, but these areas were too small to be mapped separately.





Soil Map

The soil type along with the hydraulic condition and hydraulic soil group is used to determine the Runoff Curve numbers. For the pre-developed condition, the hydraulic condition used was good and the hydraulic group is B. Using these criteria, the Runoff Curve number for the existing condition was determined to be 48 (see **Figure 1**).



| Cover type | Cover description | Hydrologic condition | Curve numbers for hydrologic soil group | | | |
|--|-------------------|----------------------|---|----|----|----|
| | | | A | B | C | D |
| Pasture, grassland, or range—continuous forage for grazing. ^{2/} | Poor | 68 | 79 | 86 | 89 | |
| | Fair | 49 | 69 | 79 | 84 | |
| | Good | 39 | 61 | 74 | 80 | |
| Meadow—continuous grass, protected from grazing and generally mowed for hay. | — | — | 30 | 58 | 71 | 78 |
| Brush—brush-weed-grass mixture with brush the major element. ^{3/} | Poor | 48 | 67 | 77 | 83 | |
| | Fair | 35 | 56 | 70 | 77 | |
| | Good | 30 ^{4/} | 48 | 65 | 73 | |
| Woods—grass combination (orchard or tree farm). ^{5/} | Poor | 57 | 73 | 82 | 86 | |
| | Fair | 43 | 65 | 76 | 82 | |
| | Good | 32 | 58 | 72 | 79 | |

Figure 1

The post development conditions for the site were assumed to be 100% impervious which results in a Runoff Curve number of 98.

The next item used to determine the site runoff is the time of concentration (Tc). The predeveloped condition Tc was calculated as **0.08 hours** and the post development as **0.01 hours**.

Worksheet 2 from TR-55 determines the runoff in inches for the pre and post development and are as follows:

Pre development **0.09 inches** **Figure 2**

Post development **2.97 inches** **Figure 3**

The 24-hour rainfall depth in inches for the subject site for the one-year storm is 3.2 inches. Using worksheet 4 from TR-55 the peak discharge rates for the pre and post conditions are as follows:

Pre development peak discharge **0.005 cfs** (cubic feet per second) **Figure 4**

Post development peak discharge **1.9 cfs** **Figure 5**

The storage volume required to retain the increase in runoff for the proposed site for the one year 24-hour rain event is **6400 cubic feet**. The Storm Tech MC-3500 sized for the property will provide **6570 cubic feet** of storage, which exceeds the requires 6400 cubic feet.



TR 55 Worksheet 2: Runoff Curve Number and Runoff

Project: Germfree Designed By: DRF Date: 9/19/14

Location: Checked: Date:

Check one: Present Developed

1. Runoff curve number (CN)

** Note: Calculations may run a step behind. --
Type in a text field and press "Tab" to update.

| Soil name and hydrologic group (Appendix A) | Cover description (Cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN ¹⁾ | | | Area ■ acres □ mi ² □ % | Product of CN x area |
|--|---|------------------|-------------|-------------|---|----------------------------|
| | | Table 2-2 | Fig. 2-3 | Fig. 2-4 | | |
| Ugc | Cleared Lot with brush growth | 48 | | | 0.9 | 40.8 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

¹⁾ Use only one CN source per line.

Totals = 0.9 40.8

$$\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{40.8}{0.9} = 48 \quad \text{Use CN} = \boxed{48}$$

(If CN is less than 30, further calculations will not be made.)

2. Runoff

| | Storm #1 | Storm #2 | Storm #3 |
|---------------------------------|----------|----------|----------|
| Frequency years | 1 | | |
| Rainfall, P (24 hour) in. | 3.2 | | |
| Runoff, Q in. | 0.09 | | |

(Use P and CN with Table 2-1, Figure 2-1,
or equations 2-3 and 2-4.)

Figure 2



TR 55 Worksheet 2: Runoff Curve Number and Runoff

Project: Germfree Designed By: DRF Date: 9/29/07

Location: Checked: Date:

Check one: Present Developed

1. Runoff curve number (CN)

** Note: Calculations may run a step behind.
Type in a text field and press "Tab" to update.

| Soil name and hydrologic group (Appendix A) | Cover description (Cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio) | CN ^{1/} | | | Area <input type="checkbox"/> acres <input type="checkbox"/> mi ² <input type="checkbox"/> % | Product of CN x area |
|---|--|------------------|----------|----------|--|----------------------|
| | | Table 2-2 | Fig. 2-3 | Fig. 2-4 | | |
| UgC | Developed - Impervious | 98 | | | 0.9 | 83.3 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

^{1/} Use only one CN source per line.

Totals = 0.9 83.3

CN (weighted) = total product = $\frac{83.3}{0.9} = 92$ Use CN = 98

(If CN is less than 20, further calculations will not be made.)

2. Runoff

Frequency years

| Storm #1 | Storm #2 | Storm #3 |
|----------|----------|----------|
| 1 | | |

Rainfall, P (24 hour) in.

| Storm #1 | Storm #2 | Storm #3 |
|----------|----------|----------|
| 3.2 | | |

Runoff, Q in.

| Storm #1 | Storm #2 | Storm #3 |
|----------|----------|----------|
| 2.97 | | |

(Use P and CN with Table 2-1, Figure 2-1, or equations 2-3 and 2-4.)

Figure 3



Tr 55 Worksheet 4: Graphical Peak Discharge Method

Project: Germfree Designed By: DRF Date: 9-19-22

Location: Checked By: Date:

Check one: Present Developed

1. Data:

Drainage area A_m = 0.00 mi² (acres/640)

Runoff curve number CN = 48 (From Worksheet 2)

Time of concentration T_c = 0.08 hr (From Worksheet 3)

Rainfall distribution type = II (II, III, DMVIII)

Pond and swamp areas spread throughout watershed = 0 percent of A_m (0 acres or mi² covered)

| | Storm #1 | Storm #2 | Storm #3 |
|----------------------|----------|----------|----------|
| 2. Frequency..... yr | 1 | | |

3. Rainfall, P (24-hour)..... in 3.2

4. Initial abstraction, I_a in 2.167
(Use CN with Table 4-1.)

5. Compute I_a/P 0.68

6. Unit peak discharge, q_u csm/in 45
(Use T_c and I_a/P with exhibit 4- 10)

7. Runoff, Q in 0.09
(From Worksheet 2)

8. Pond and swamp adjustment factor, F_p in 1.0
(Use percent pond and swamp area with Table 4-2. Factor is 1.0 for zero percent pond and swamp area.)

9. Peak discharge, q_p cfs 0
(Where $q_p = q_u A_m Q F_p$) .005

Figure 4



Tr 55 Worksheet 4: Graphical Peak Discharge Method

Project: Germfree Designed By: DRF Date: 9-19-22

Location: Checked By: Date:

 Check one: Present Developed

1. Data:

 Drainage area $A_m = 0.00 \text{ mi}^2$ (acres/640)

Runoff curve number CN = 98 (From Worksheet 2)

 Time of concentration $T_c = 0.01 \text{ hr}$ (From Worksheet 3)

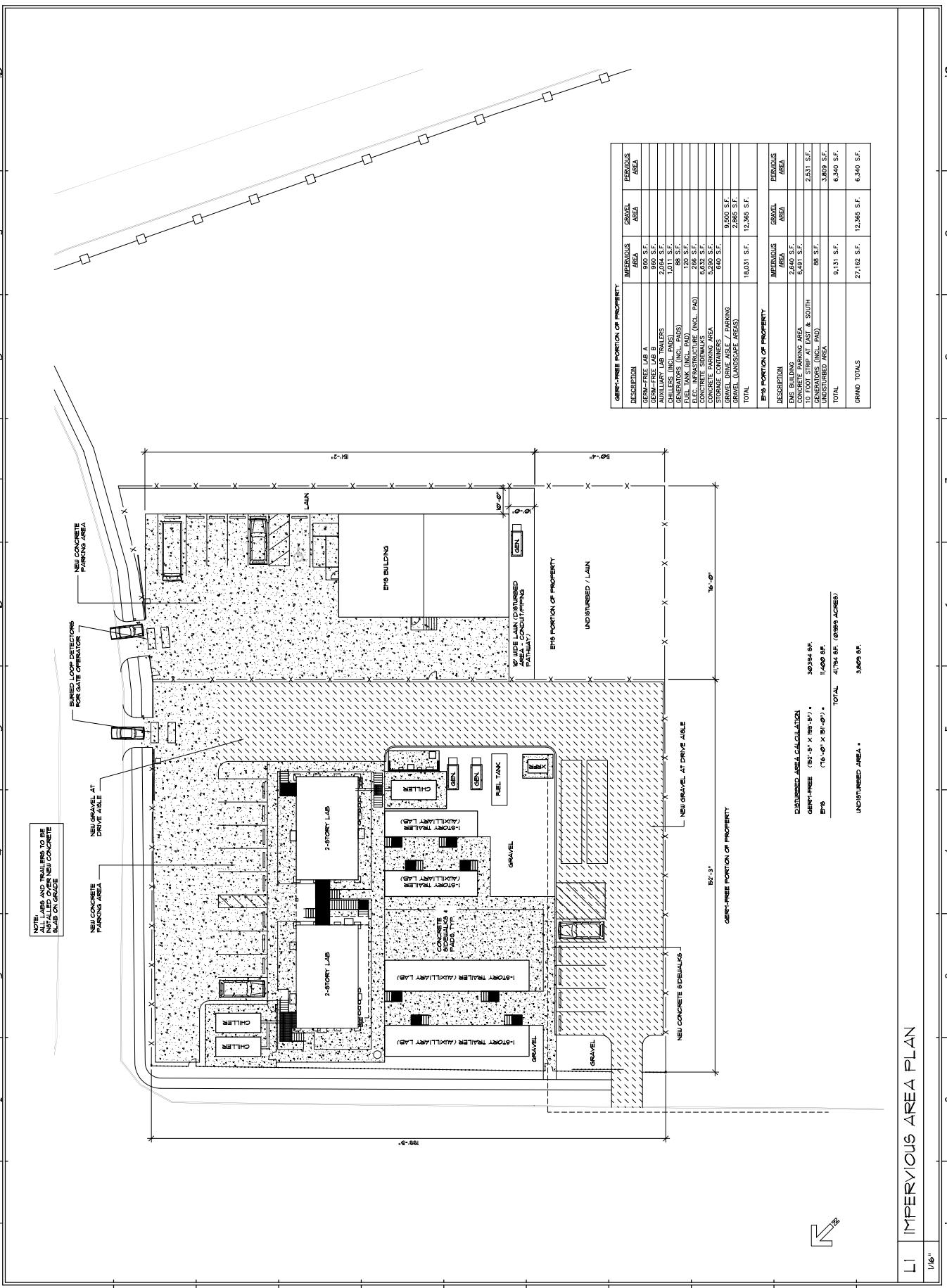
Rainfall distribution type = II (II, III, DMVIII)

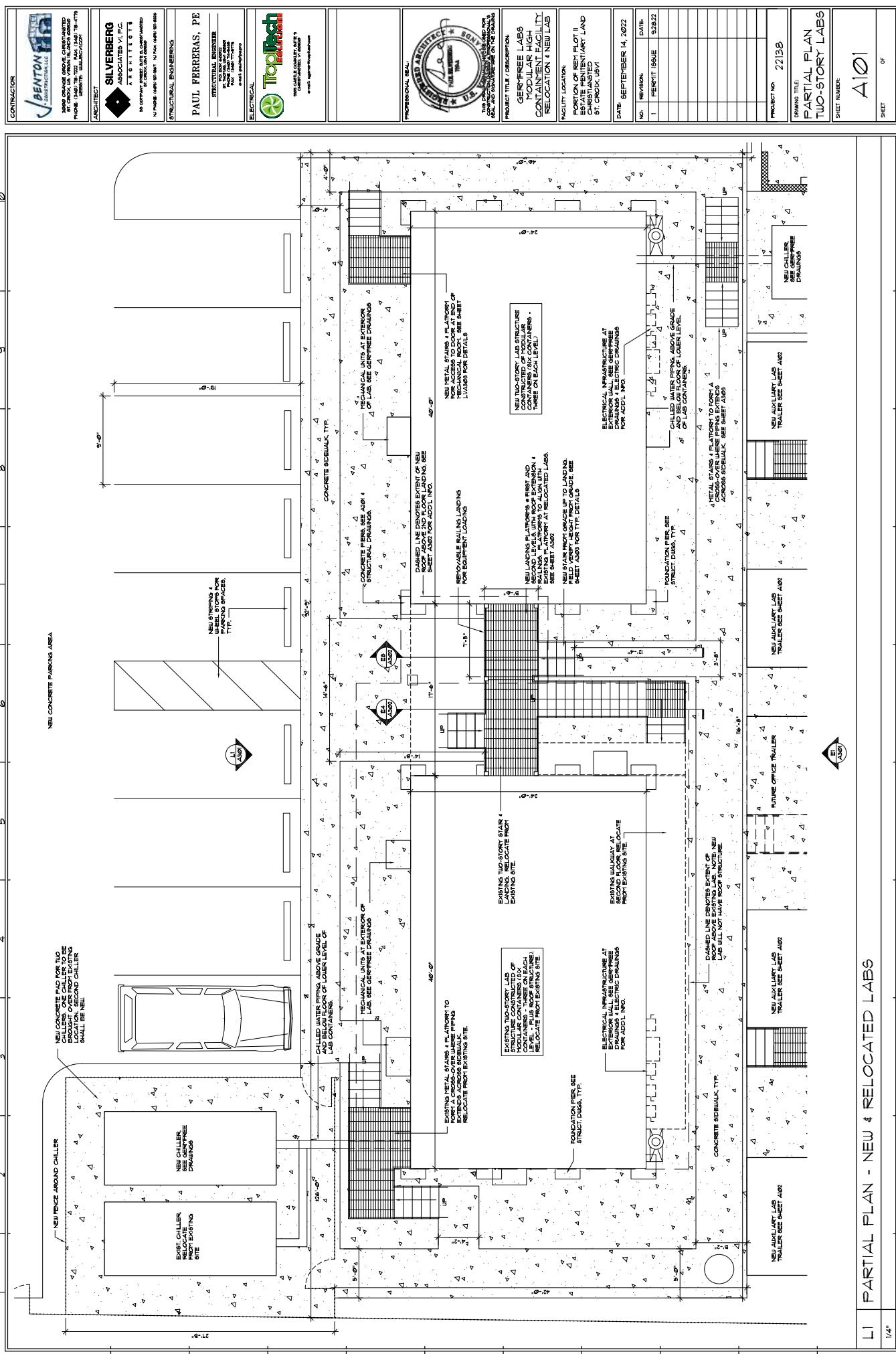
 Pond and swamp areas spread throughout watershed = 0 percent of A_m (0 acres or mi^2 covered)

| | Storm #1 | Storm #2 | Storm #3 |
|--|----------|----------|----------|
| 2. Frequency..... yr | 1 | | |
| 3. Rainfall, P (24-hour)..... in | 3.2 | | |
| 4. Initial abstraction, I_a in (Use CN with Table 4-1.) | 0.041 | | |
| 5. Compute I_a/P | 0.01 | | |
| 6. Unit peak discharge, q_u csm/in (Use T_c and I_a/P with exhibit 4- 10) | 500 | | |
| 7. Runoff, Q in (From Worksheet 2) | 2.97 | | |
| 8. Pond and swamp adjustment factor, F_p in (Use percent pond and swamp area with Table 4-2. Factor is 1.0 for zero percent pond and swamp area.) | 1.0 | | |
| 9. Peak discharge, q_p cfs (Where $q_p = q_u A_m F_p$) | 2 | | 1.93 |

Figure 5


| | | | |
|---|--|---|--|
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| STRUCTURAL ENGINEERING | | PAUL FERRERAS, PE STRUCTURAL ENGINEER TOOLTECH ENGINEERING 1000 N. BROADWAY, SUITE 1000 PHOENIX, AZ 85004 PHONE: (602) 261-1000 | |
| ELECTRICAL | | ToolTech Electrical www.ToolTech.com 1000 N. BROADWAY, SUITE 1000 PHOENIX, AZ 85004 PHONE: (602) 261-1000 | |
| <p style="text-align: center;">PROFESSIONAL SEAL OF THE STATE OF ARKANSAS</p> <p>The seal of the state of Arkansas, featuring a central shield with a plow, a sheaf of wheat, and a cotton plant, surrounded by the words "THE GREAT SEAL OF THE STATE OF ARKANSAS" and the date "1865".</p> | | | |





L1 PARTIAL PLAN - NEW & RELOCATED LABS

1/4"

A101

OF

SHEET

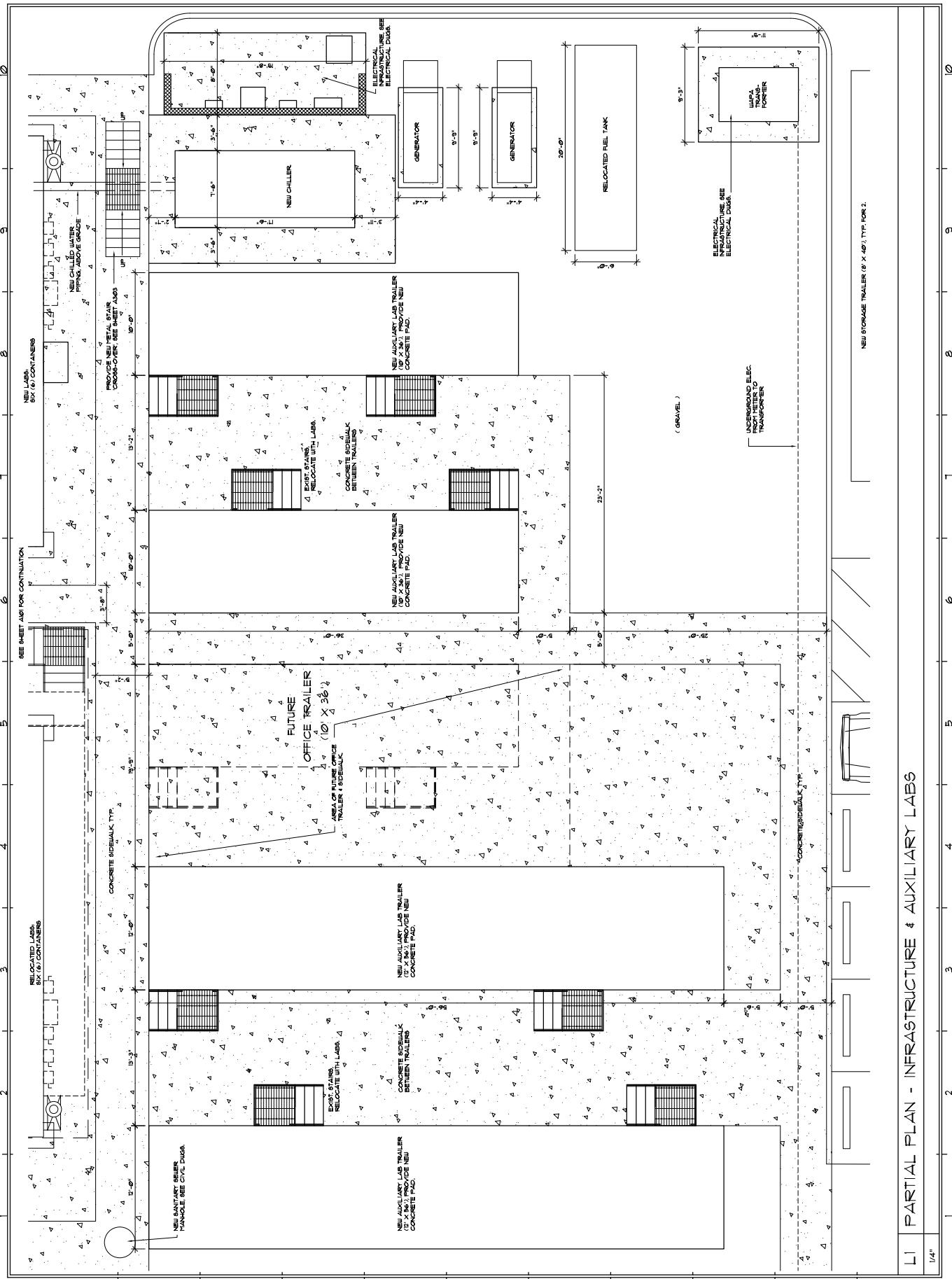
22138

DRAWING NO.

PARTIAL PLAN
TWO-STORY LABS

Project No. 92-B22
Revision No. 1
Date 14 SEP 2012

| | |
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| CONTRACTOR |  BENTON ASSOCIATES VPC INC. / ARCHITECTS 700 CROX. LN. VINYL, ST. CROIX, U.S.V.I. PHONE: (343) 732-1344 FAX: (343) 732-1378 |
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L1 PARTIAL PLAN - INFRASTRUCTURE & AUXILIARY LABS

A102

OF

1 SHEET

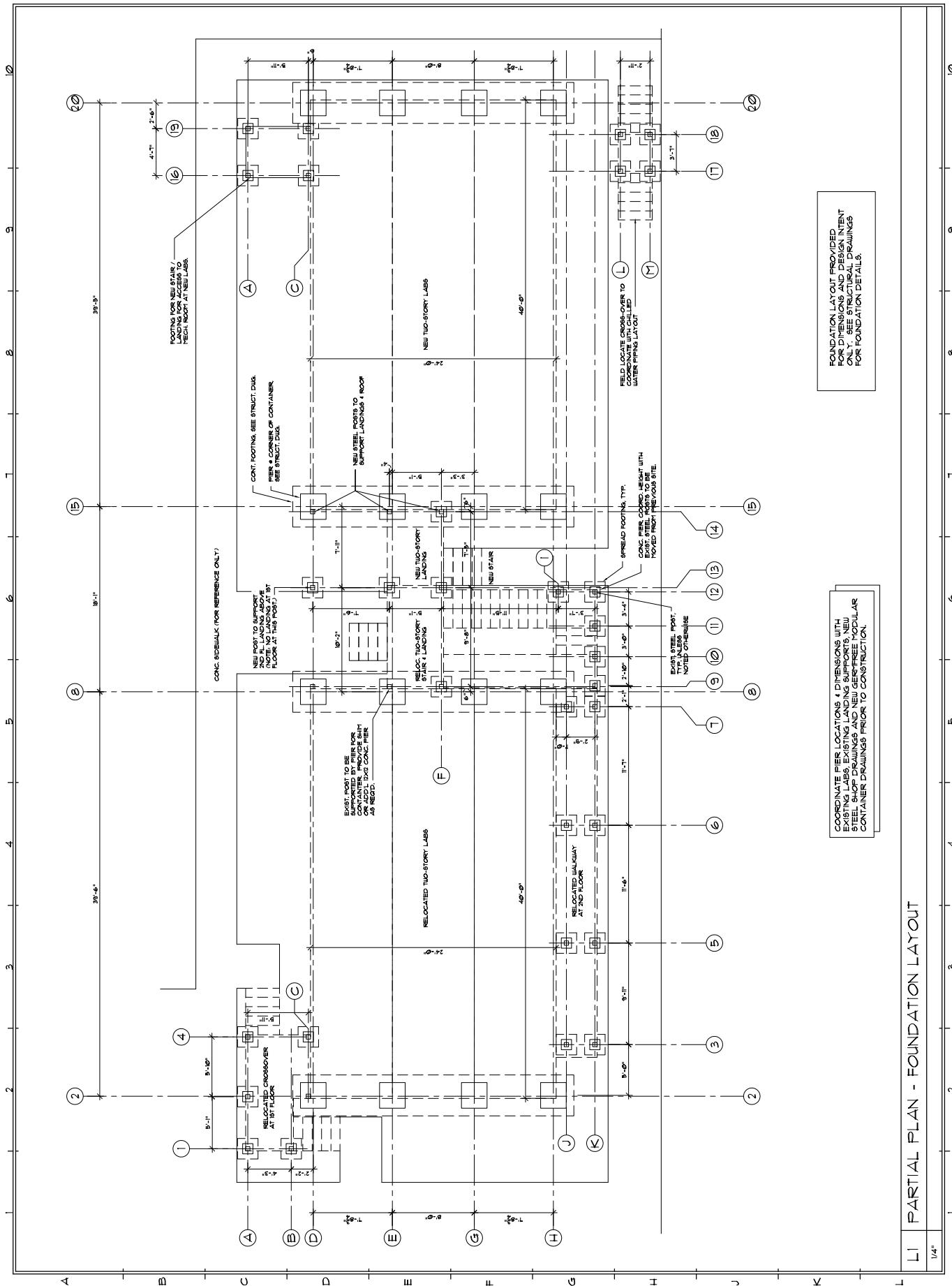
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PARTIAL PLAN
INFRASTRUCTURE

DATE:

22/3/08

DATE:

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| CONTRACTOR | BENTON 1000 CHINAHAN DR., SUITE 100 671 CROX. RD., VENICE, FLA. 34285 PHONE: (800) 251-2880 FAX: (800) 251-2881 |
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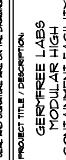
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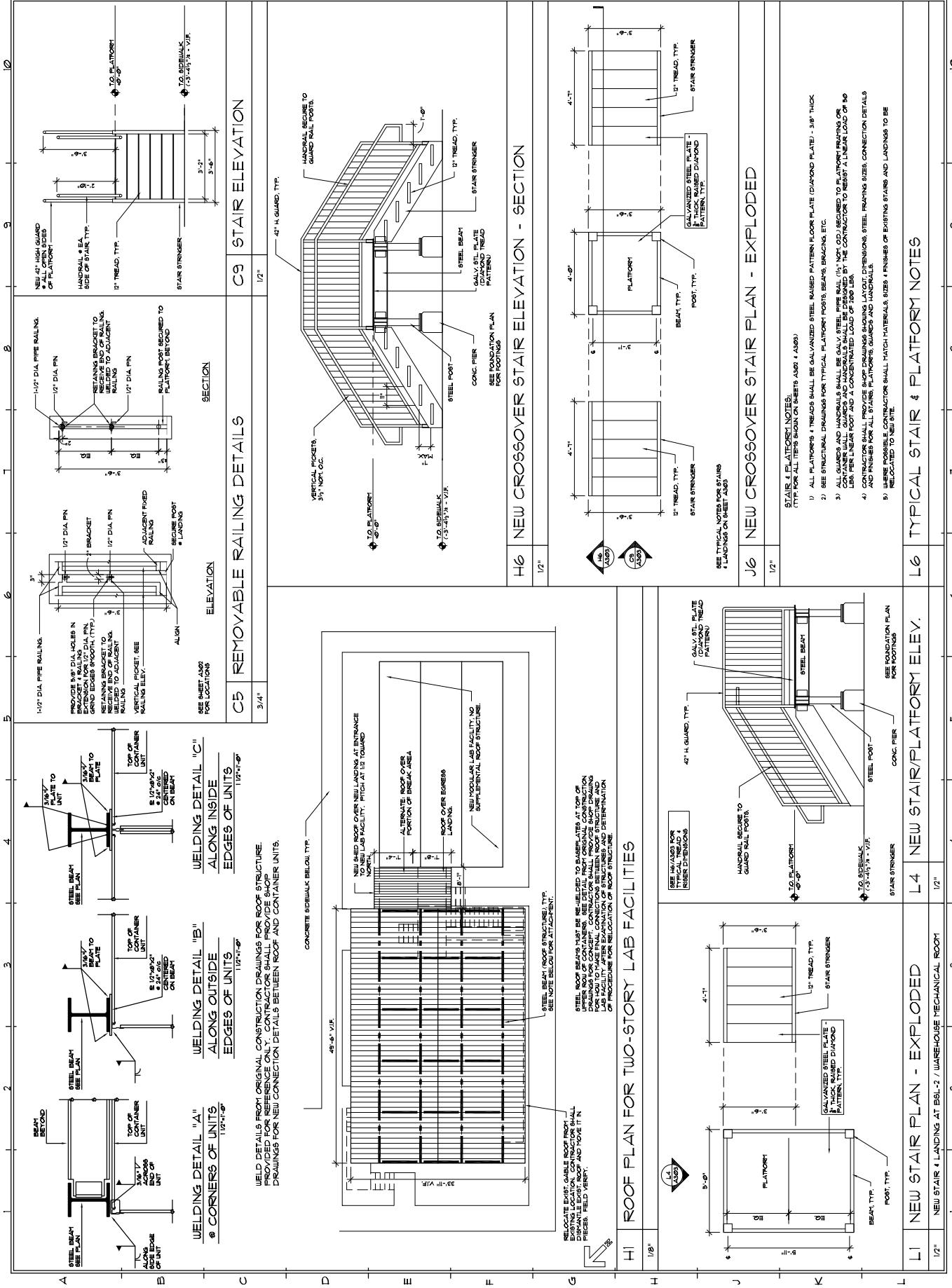
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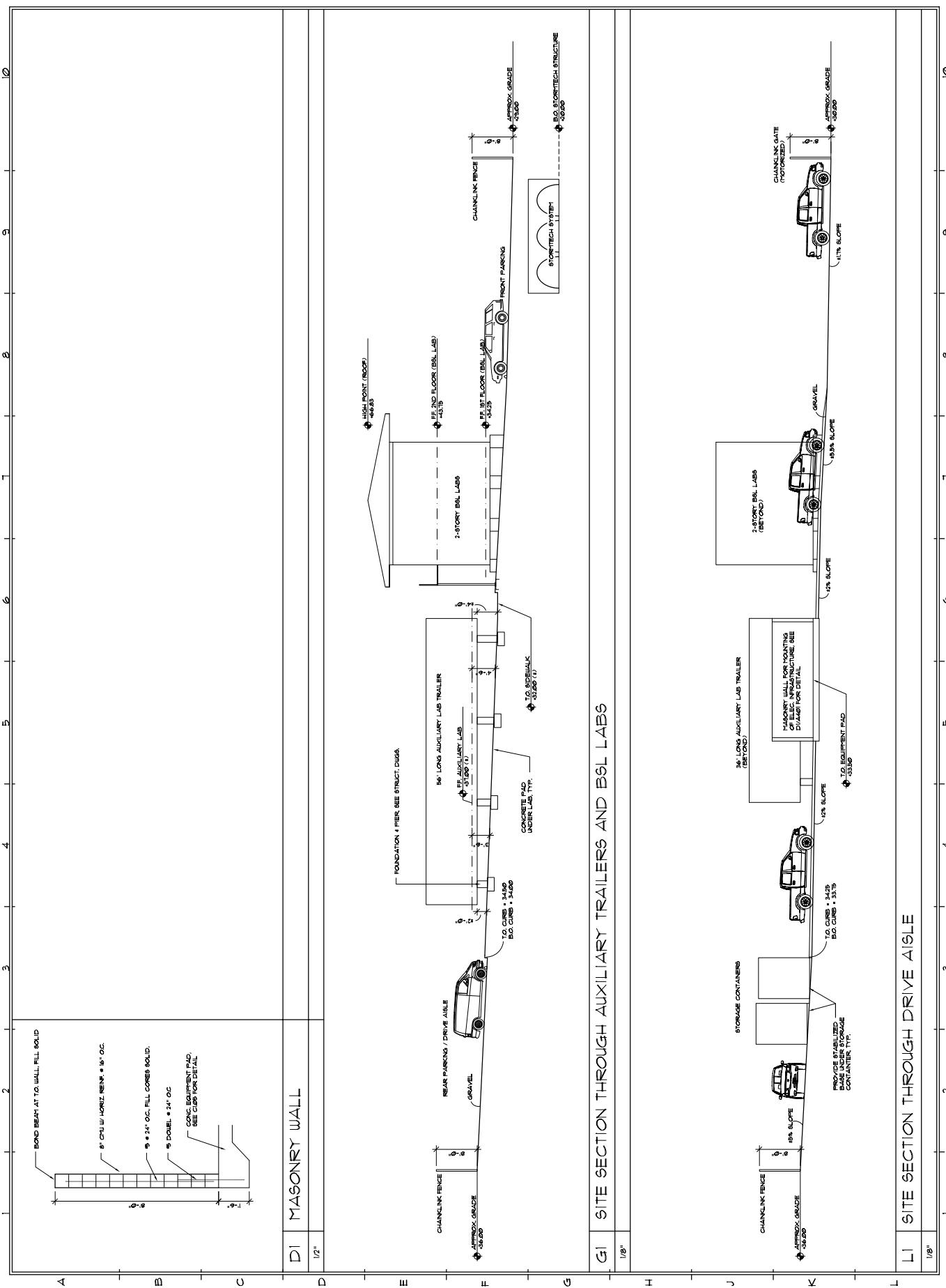
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DRAWING NO: ROOF PLAN &
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SHEET NUMBER: A303
DATE: SEPTEMBER 14, 2002
NO. REVISED: 1
PATENT ISSUE: 9/26/22

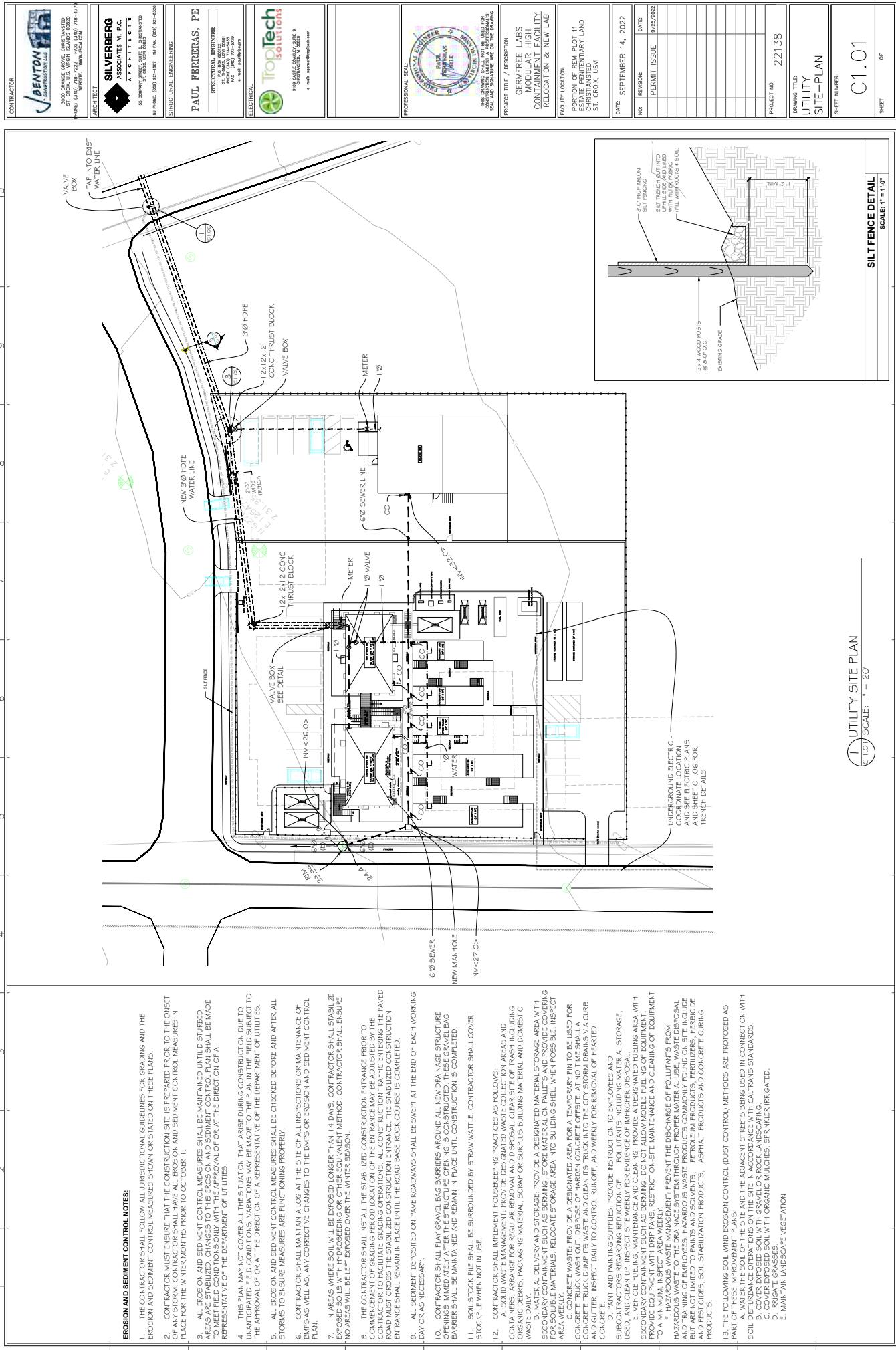
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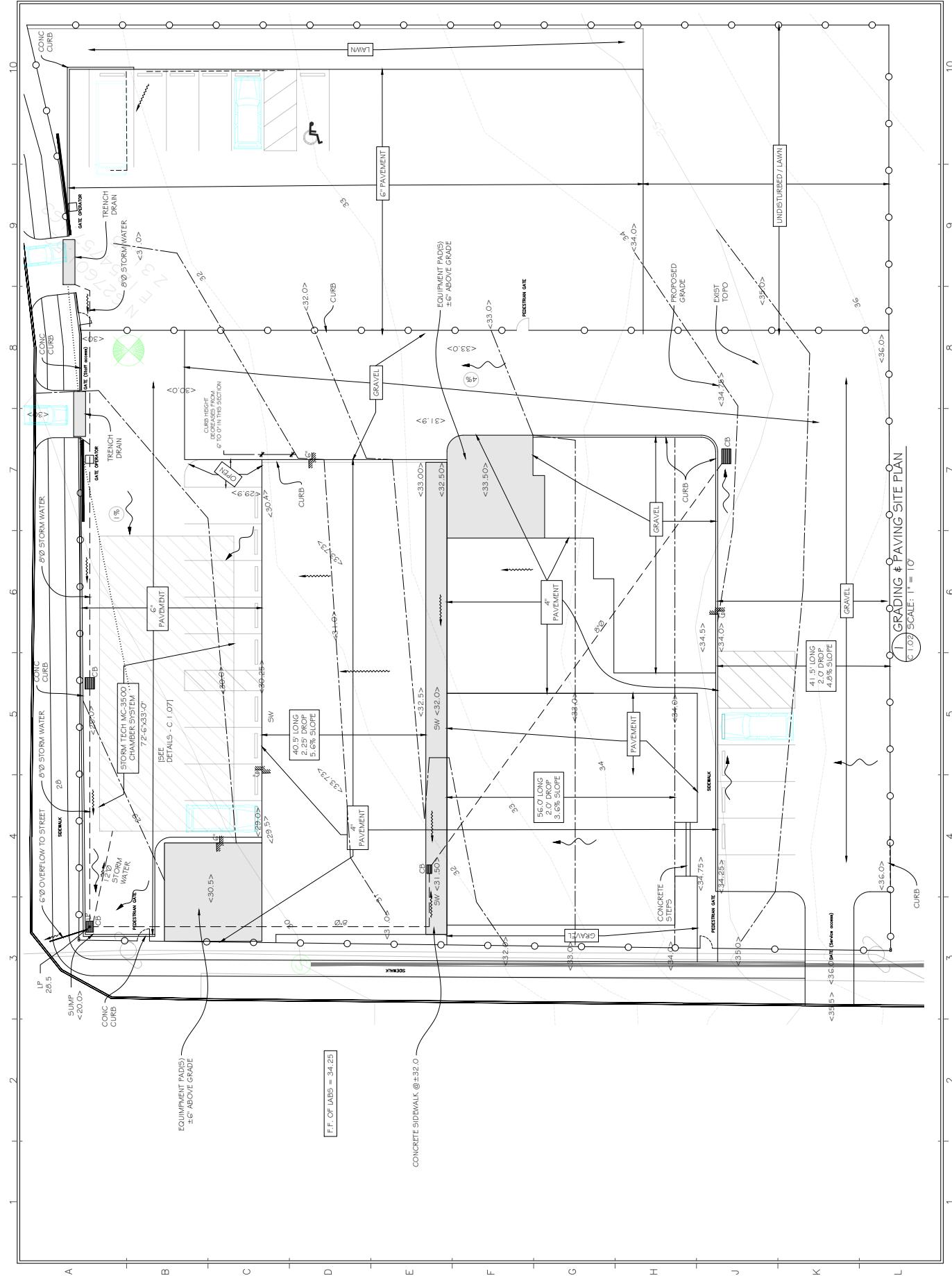


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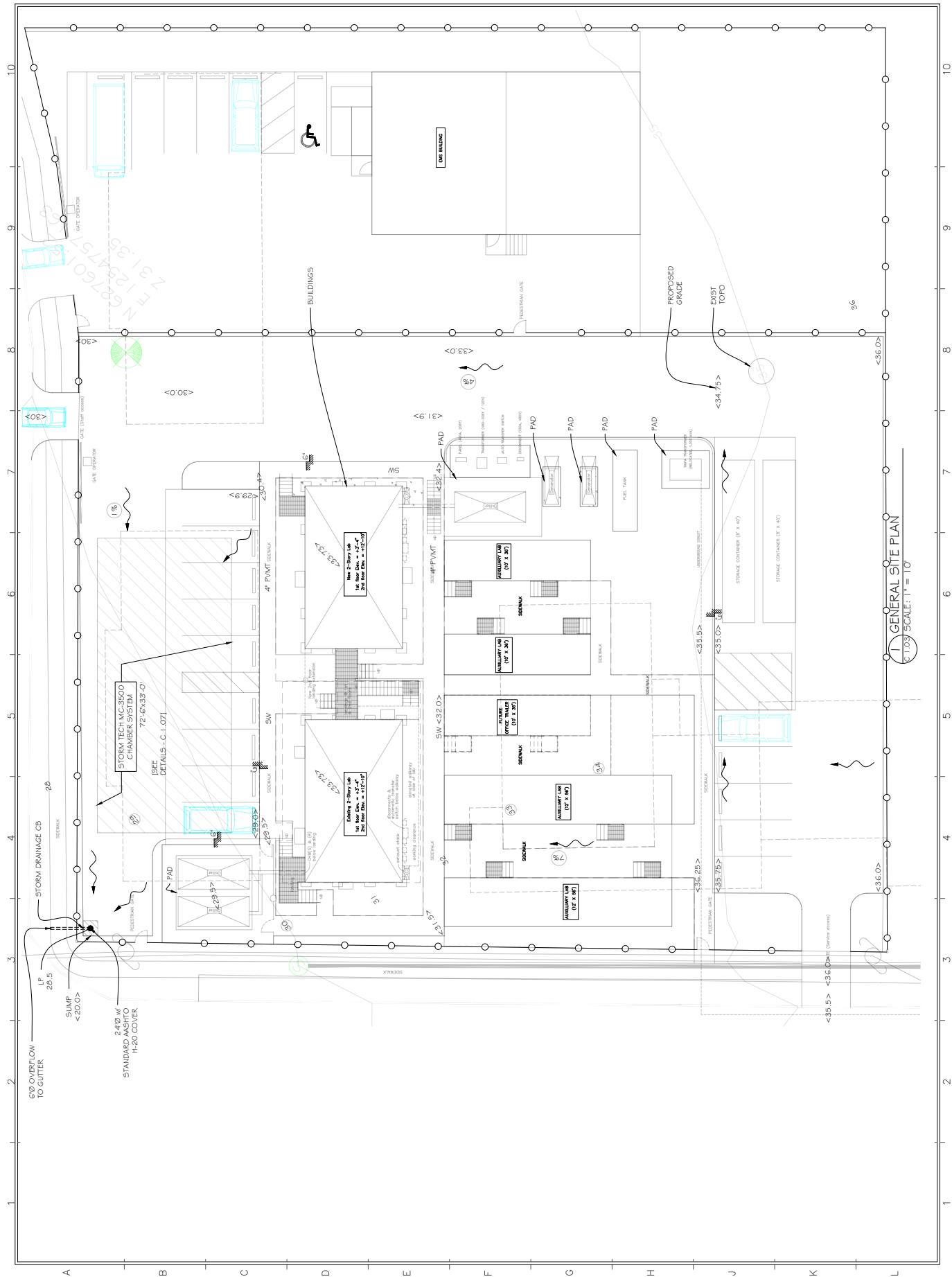


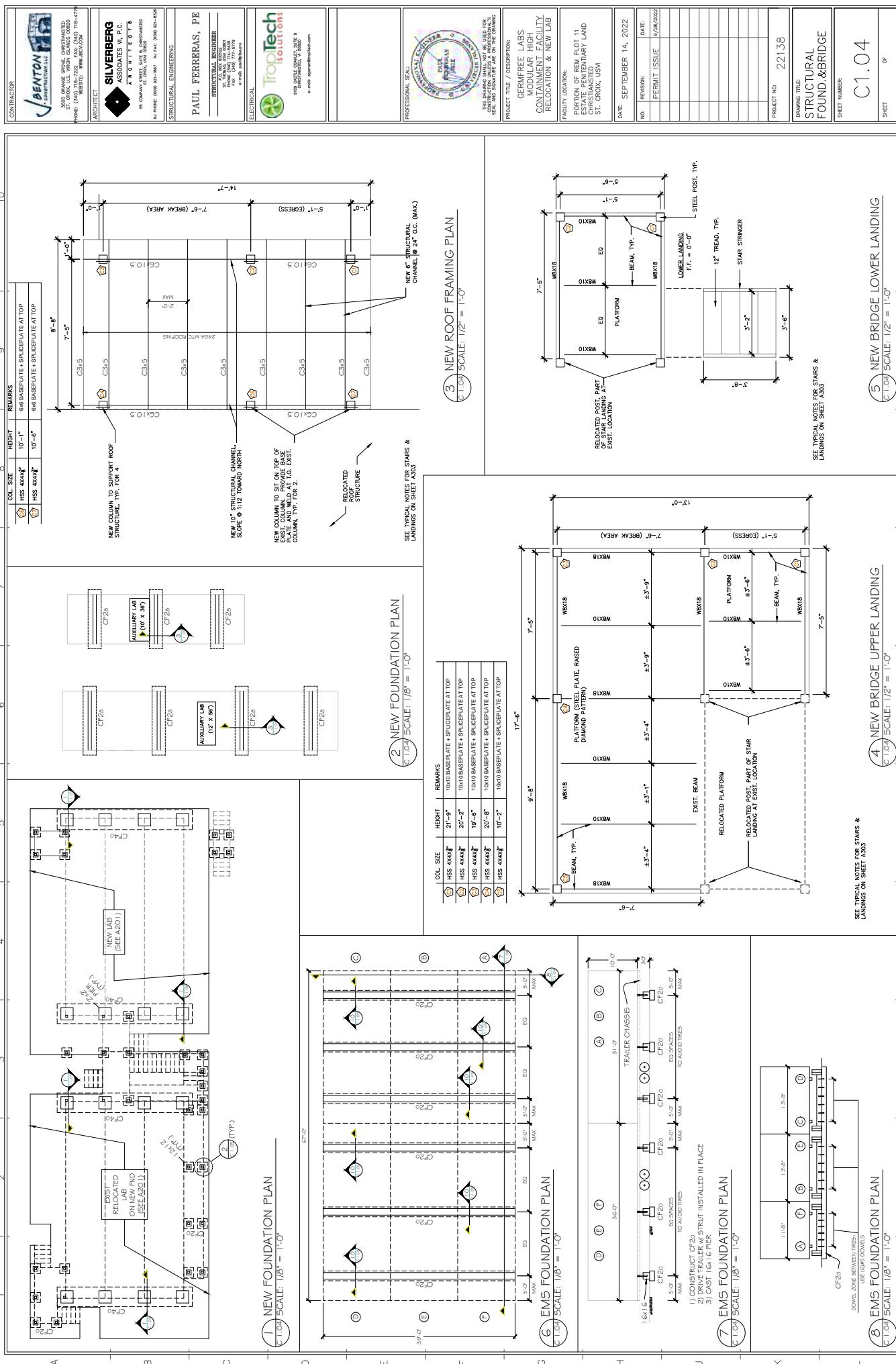


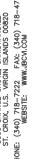
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| DATE: SEPTEMBER 14, 2022 | REVISION: DATE: 9/28/2022 | PERMIT ISSUE DATE: 9/28/2022 | PROJECT NO: 22138 | DRAWING TITLE: GENERAL SITE-PLAN SHEET NUMBER: C1.03 SHEET OF |





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