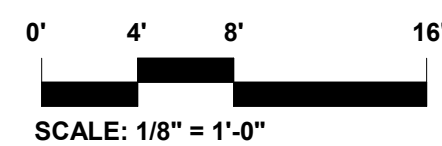
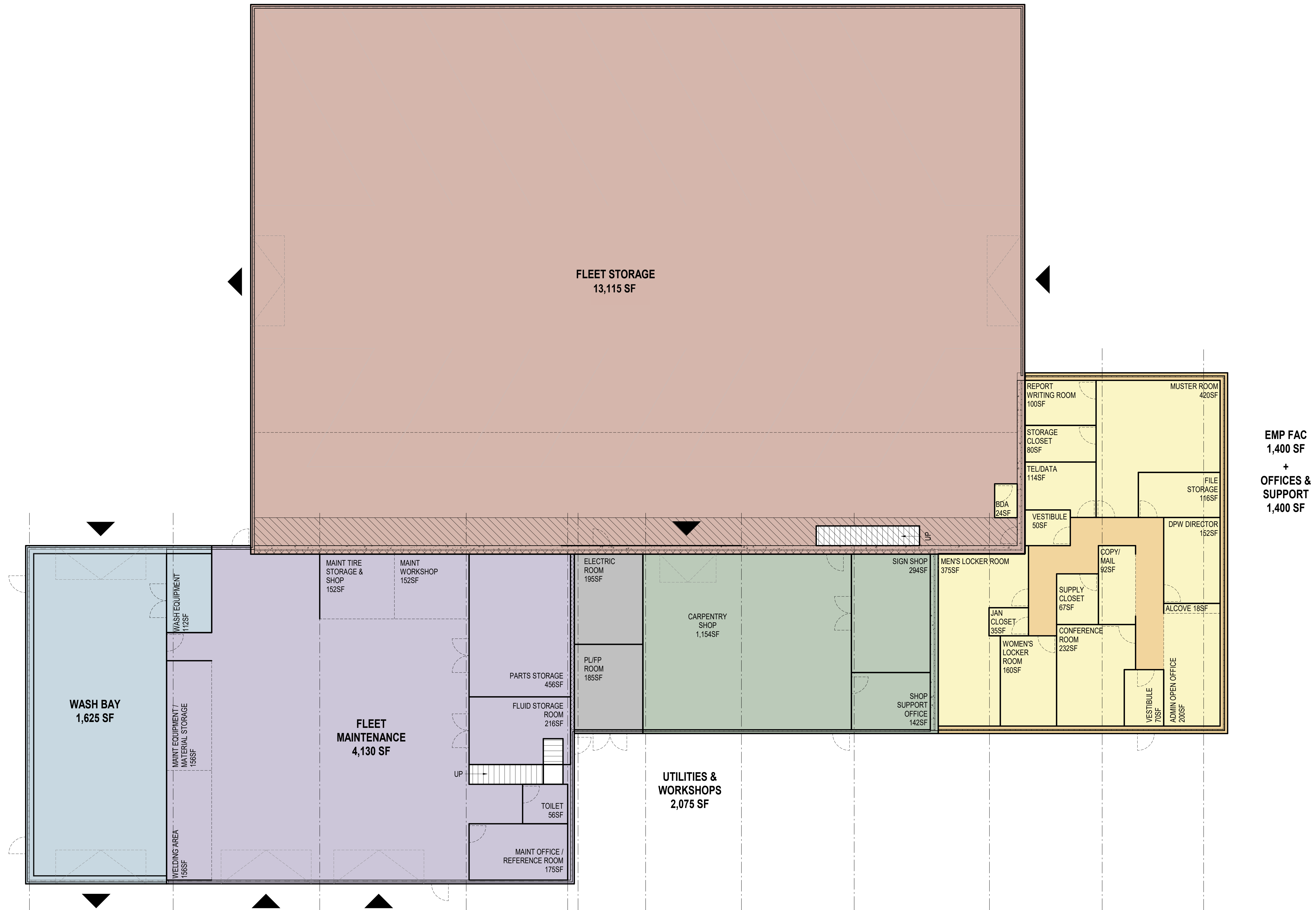


MARCH 24, 2025

SITE CONCEPT

TRURO NEW DEPARTMENT OF PUBLIC WORKS
17 TOWN HALL RD, TRURO, MA 02666



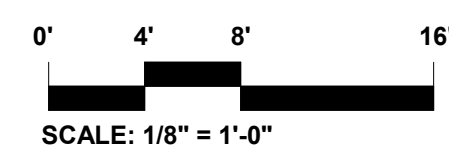
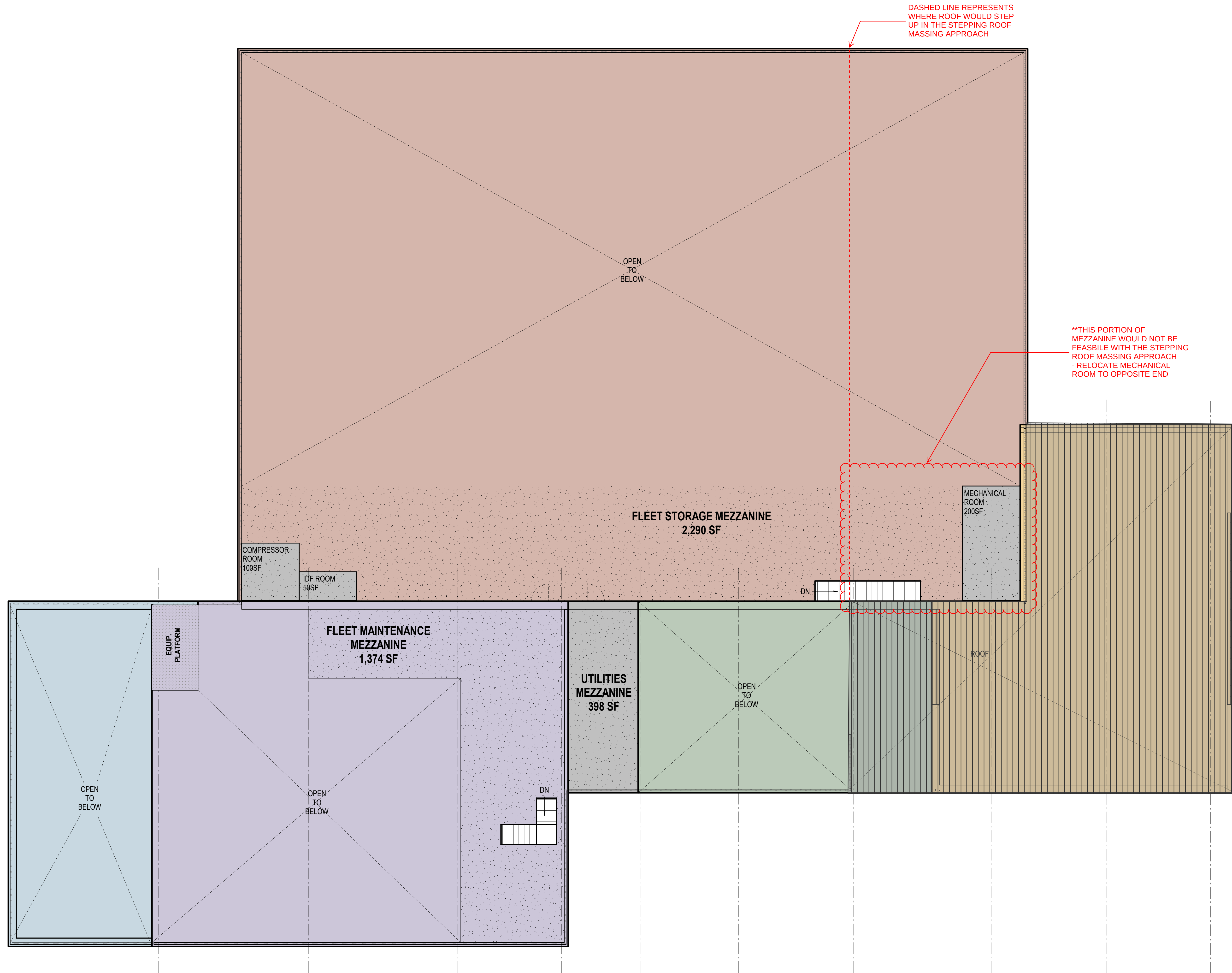


MARCH 24, 2025

PRELIMINARY SCHEMATIC LAYOUT -
OVERALL FLOOR PLAN

TRURO NEW DEPARTMENT OF PUBLIC WORKS
17 TOWN HALL RD, TRURO, MA 02666



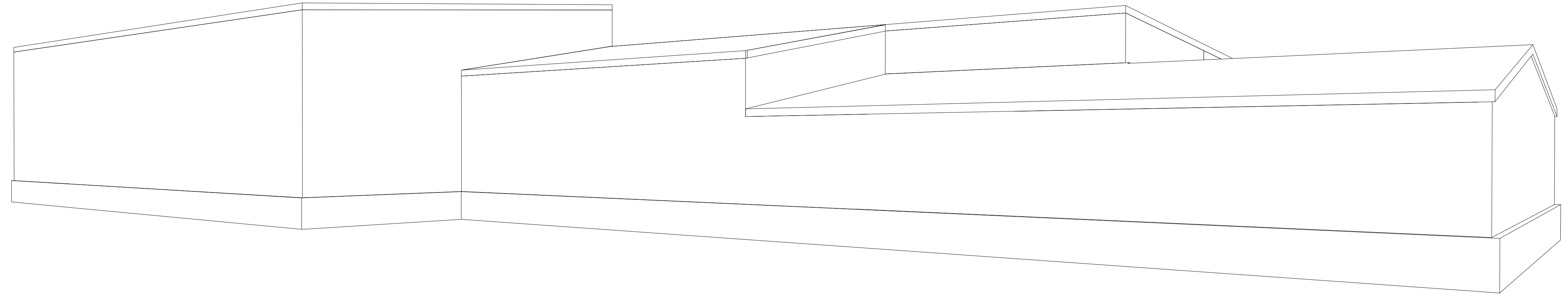


MARCH 24, 2025

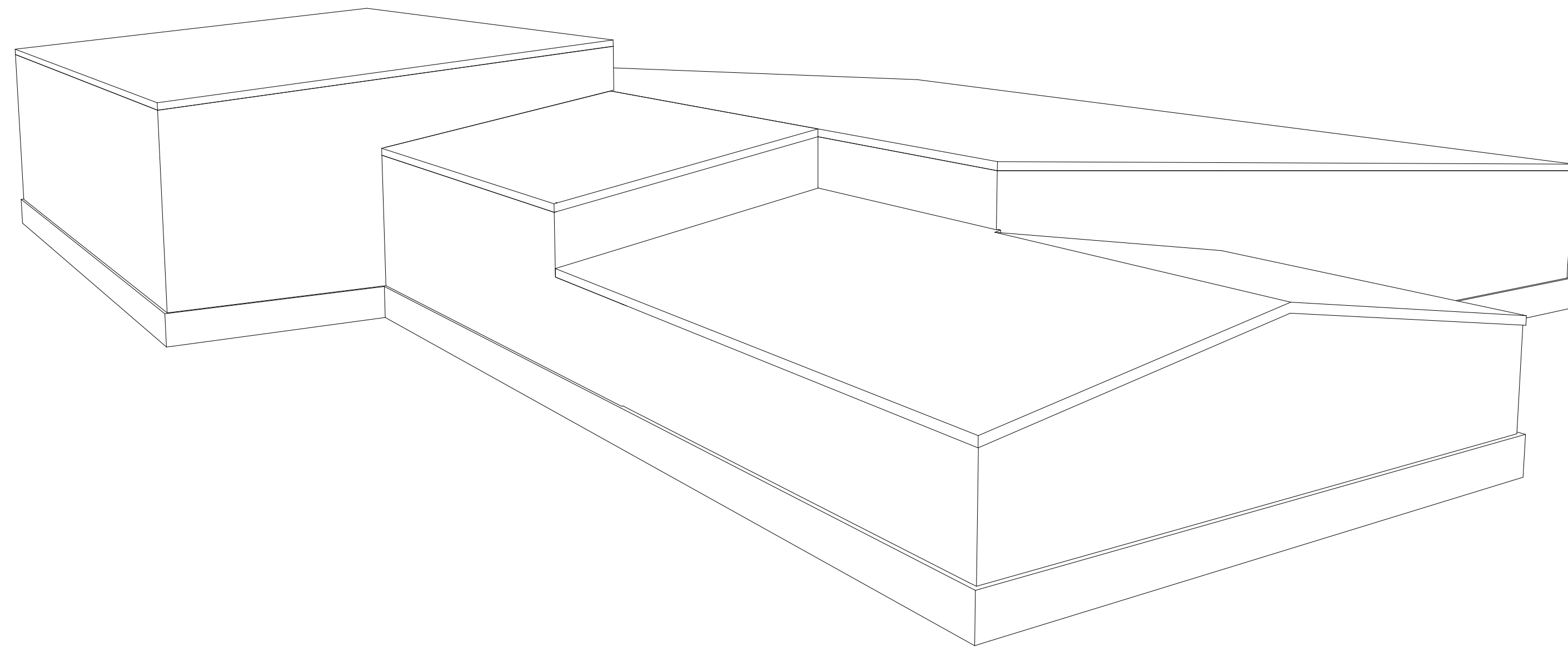
PRELIMINARY SCHEMATIC LAYOUT -
OVERALL MEZZANINE PLAN

TRURO NEW DEPARTMENT OF PUBLIC WORKS
17 TOWN HALL RD, TRURO, MA 02666

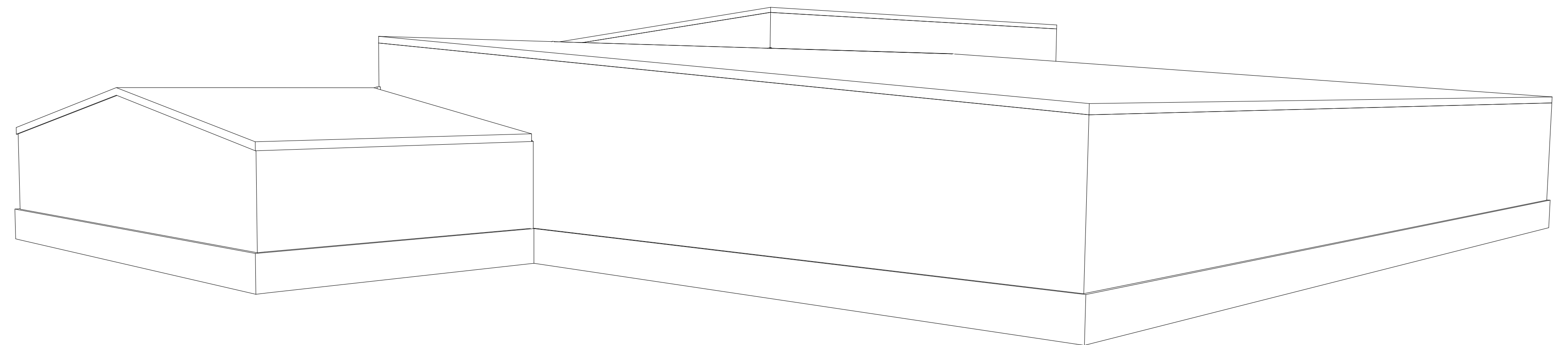




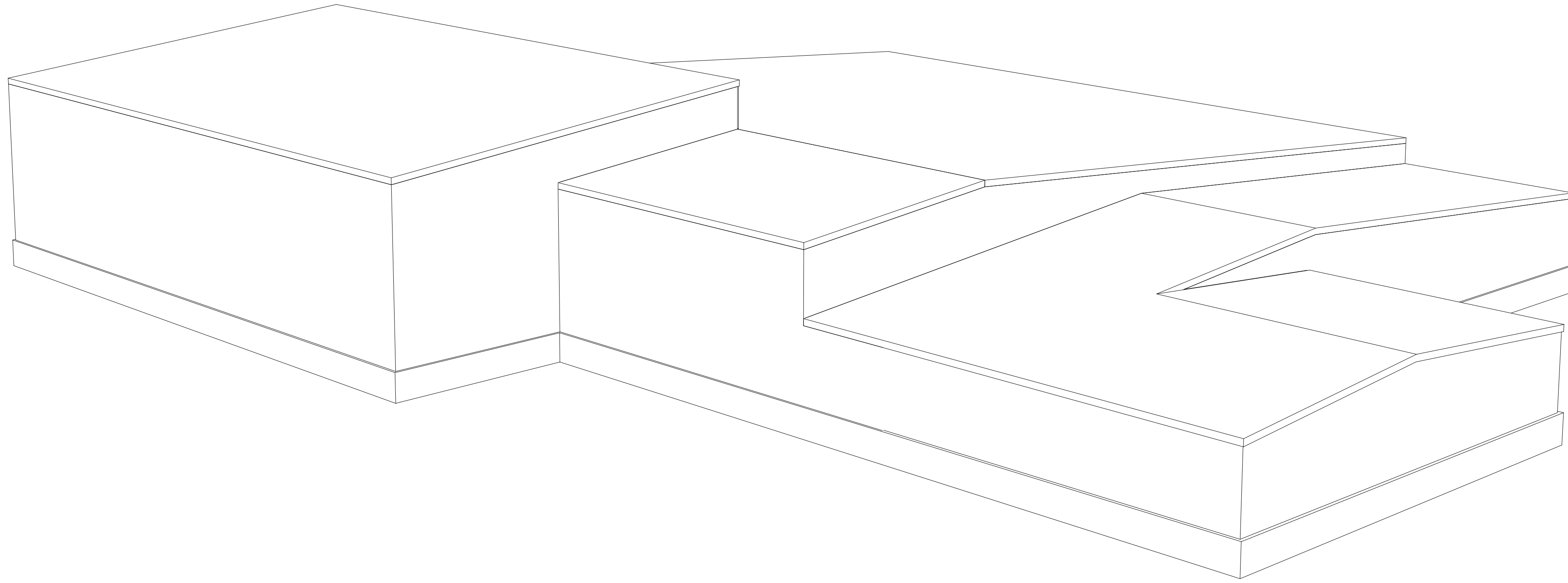
③ 3D VIEW 3



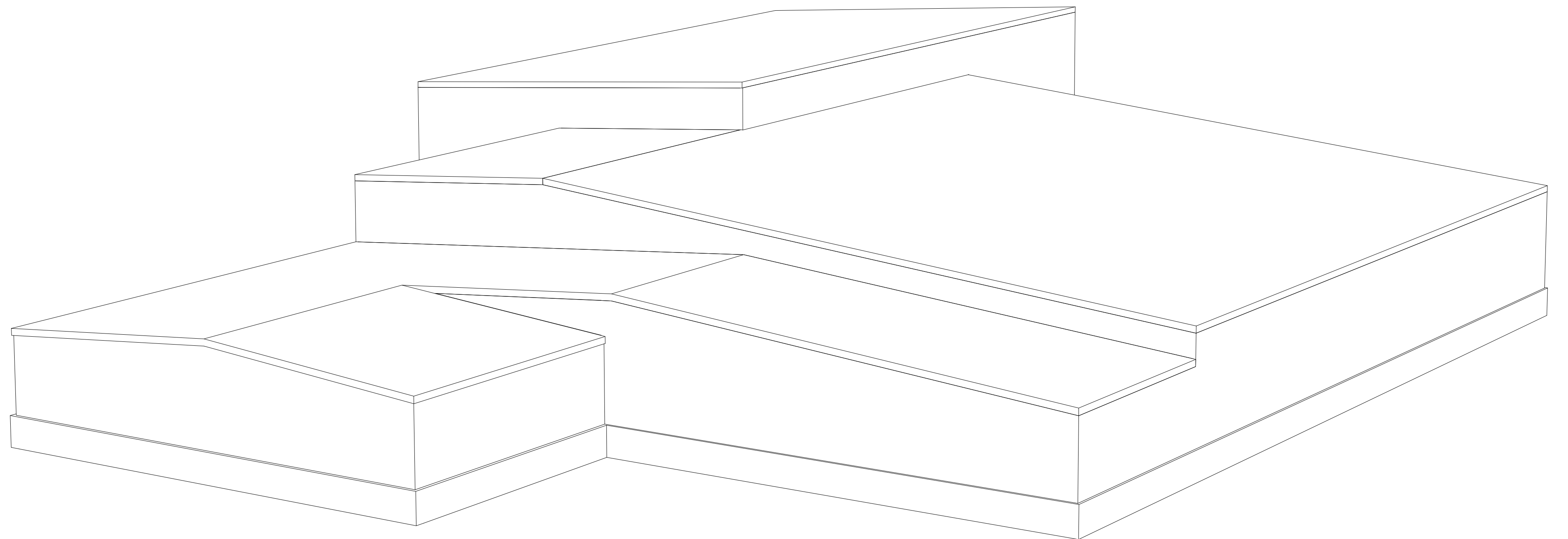
② 3D VIEW 2



① 3D VIEW 1



② 3D VIEW 2 - OPTION 2



① 3D VIEW 1 - OPTION 2

MEMORANDUM

TO: Jarrod Cabral; Ad Hoc Building Committee; Town of Truro

FROM: Della Donahue

MEETING DATE: March 13, 2025

DATE ISSUED: March 24, 2025

SUBJECT: Truro Public Works Facility; Sustainable Design Goals

The following document includes project background and information gathered at the March 13th Sustainable Design Workshop for the Truro Public Works Facility project, held in-person and virtually via the Ad Hoc Building Committee zoom link. The meeting was conducted to review sustainable design principles and identify potential project goals.

General Project Background Information:

- The project is in the early stages of schematic design. A draft pricing package is currently scheduled to be submitted to an independent cost estimator by May 2nd and a final schematic design package is anticipated to be submitted to Truro by May 30th.
- The project will work in conjunction with PFAS capping efforts in the northeast corner of the parcel as well as a new water main connection to a new potable water source on a remote site adjacent to Snow's Field. The PFAS capping, water main and well projects are all required regardless of the new Public Works Facility project.
- The approved conceptual site plan features a single, consolidated facility with a supplementary storage canopy and salt shed.
- At this time, the new facility will be about 23,800 square feet, consisting of administrative office space, Public Works employee facilities (i.e. locker rooms), workshop space, fleet maintenance, a wash bay, and fleet storage garage.
- The current facility has reported issues/concerns with ventilation in the vehicle service areas, heating/cooling inefficiencies, insufficient storage provisions for fleet assets, and inadequate sleeping arrangements for extreme events (some staff are on-call 24/7 during snowstorms).
- The design is currently targeting a pre-engineered metal building (PEMB) with insulated metal panels and a masonry knee-wall for durability.
- Truro is a Specialized Opt-In Code community regarding the Project's energy code requirements
- The project will be put to Town vote for construction funding approval next Spring 2026

Workshop Discussion Items:

1. Meeting Purpose:

- a. Discuss potential sustainable design goals for Truro's new Public Works Facility.
- b. Align the various values/visions for this project and agree upon a set of goals to implement into design going forward.
 - i. Solving specific issues was not the focus for the meeting, but rather clarifying the various stakeholders' values and interests.
- c. Introduce third-party incentives, potential tax credits, and grant funding opportunities
- d. Introduce potential certification program opportunities to gauge interest
 - i. International Living Future Institute:
 - 1. Zero Carbon Certification: focused on carbon emissions (embodied and operational)
 - 2. Zero Energy Certification: providing 100% of the building's energy needs with on-site renewable energy
- e. Address how the strategies vary in terms of cost-benefit analysis
 - i. Who / what experiences the benefits / co-benefits
 - ii. Immediate vs. long-term cost savings
 - iii. Within scope vs. additional design fee requirements
 - iv. Negligible vs. high up-front cost implications

2. What will make this project successful regarding sustainability?

- a. Balancing the various visions/values of taxpayers
 - i. Being mindful of goals for both capital cost reductions and long-term cost savings through operational efficiencies. These goals occasionally compete with each other, but a balance must be struck for the project to be supported and approved at town meeting
 - ii. Given budget constraints, implementing "low-hanging fruit" sustainable design strategies (little-to-negligible capital cost increases)
- b. Referencing recent Decarbonization Roadmap Reports prepared by RISE Engineering and Cape Light Compact, completed November 2024 (document links included on page "iii" of the Sustainable Design Catalog; Section 04 of the Pre-Meeting Package).
- c. Referencing the Truro Municipal Decarbonization Roadmap prepared by the Town, the Department of Energy Resources (DOER), RISE Engineering, and ICF (document link included on page "iii" of the Sustainable Design Catalog; Section 04 of the Pre-Meeting Package).
- d. Implementing design strategies that reflect and support the risk areas as identified in the RMAT Climate Assessment (Section 01 in the Pre-Meeting Package) and maximizing the longevity of building/site materials and systems to reduce repair and replacement costs.
 - i. The project site is at high risk for extreme precipitation/stormwater flooding and extreme heat

- e. Ensuring employees have safe and comfortable working conditions
- f. Achieving energy efficiency through building envelope thermal performance, passive design strategies, and mechanical systems selection.
- g. Leveraging various sources of funding whether it be from utility incentives, IRA tax credits, grants, etc.

3. Sustainable design considerations at Site Scale:

- a. Nature-based solutions for stormwater management and heat island mitigation desirable
 - i. Rain gardens and green space to manage stormwater
 - ii. Vegetative shading
 - 1. May be more effective than roof overhangs/shading devices for managing solar heat gain during sunrise/sunset given the building's orientation during; coordinate with glazing design
 - 2. Tree selection important with consideration for maintenance needs
 - a. Native species; USDA Hardiness Zone 6b
- b. It is worth noting that new stormwater drainage, a contained vehicle wash area, and fleet storage provisions will also improve stormwater management and water quality
- c. Rainwater collection is not a priority
 - i. Use for fire suppression unrealistic; wouldn't be commissioned
 - ii. Maintenance issues (microbial)
 - iii. Could be used to support some vehicle wash operations, but given project budget constraints, the initiative is not desirable due to associated capital cost and design fee increases
- d. Light-colored pavement options to be explored and applied where appropriate
- e. Parking Provisions; EV-ready parking for 20% of spaces provided per energy code
- f. Potential interest in standalone solar canopy depending on energy goals, feasibility on site, and costs
- g. Potential interest in designing and installing an educational kiosk at the Town Hall site to describe sustainable design efforts as an educational initiative
 - i. Could be an effort pursued at a later date, not necessarily as part of this project
 - ii. Could be spearheaded by municipal committees, students, etc.

4. Sustainable design considerations at Building Scale:

- a. Roof solar for renewable energy production
 - i. Prioritize the main building for potential extents of PV; the standalone canopy in the north may not be a great candidate
 - ii. TBD to what extent on-site renewable energy is desired; offset a percentage of the facility's energy use? Net-zero?
 - 1. Preliminary PV Analysis of roof solar will be conducted as part of the schematic design phase to help inform the Town's decision
 - iii. If pursued, the Town would have to decide whether they'd like to own or lease the system

- iv. Interest in a roof PV system's ability to be retrofitted if battery storage was added later; yes, this is possible
- b. Cool roof; application suggested where spaces receive air conditioning
 - i. The offices & employee facilities block is a good candidate
 - ii. The cost is encumbered within the base design already estimated; just a color selection initiative to meet a Solar Reflectance Index (SRI) metric
- c. Building orientation, massing and façade design to strike a balance between operational efficiencies, project costs, and passive design strategies
 - i. Optimizing daylighting and solar heat gain
- d. Building envelope thermal performance for energy efficiency
 - i. Exterior wall assemblies to meet maximum code-required U-Values or better
 - ii. Triple-glazed windows and curtain walls to meet maximum code-required U-Values or better
 - iii. If radiant floor heating is requested, slab insulation to meet maximum code-required F-factors or better

5. Sustainable design considerations at Occupant/Interior Scale:

- a. Daylighting a priority; design implementation through clerestories, translucent panels, and windows
- b. Occupant health, safety & comfort; achievable through material selection and application as well as adequate employee facilities (i.e. both male and female locker rooms for social equity).
 - i. Can help to attract and retain employment
 - ii. Good for productivity and morale
- c. Low embodied carbon framing systems and building materials
 - i. Specifying materials must follow Massachusetts' public project bidding & procurement requirements (specify performance criteria and provide three examples that meet the criteria > General Contractor to choose from one of the three or equal)
 - 1. There is an option for the town to request a proprietary product by holding an open meeting and taking a Select Board and/or committee vote
 - ii. Timber framing is of interest where large clear spans are not a priority (i.e. the administrative office space and employee facilities block)
 - 1. Clarification needed to better understand if the Town envisions this design approach in terms of conventional wood framing (instead of metal studs) or a more intensive framing system like Cross-Laminated Timber (CLT) or Glulam
 - a. Depending on the direction, it may come with increased design fee and capital costs compared to a PEMB
 - iii. Life cycle assessment may be of interest
 - 1. Clarification needed to better understand to what extent this is desired

- a. Weston & Sampson to provide a scope and fee write-up for what that process looks like and associated fees
- d. Building mechanical systems to optimize energy efficiency
 - i. Natural gas is not available in this area of Cape Cod.
 - ii. Geothermal Wells are of interest, but also met with cost concerns
 - 1. Subsurface environmental investigations / a test well would be recommended to best understand the feasibility of a geothermal system, informing well quantity (i.e. soil quality and conductivity)
 - a. The sizing of this system is based on the proposed building's energy usage portfolio from energy modeling efforts
 - 2. If pursued, the Town would like to see this system coupled with radiant floor heating as they tend to operate efficiently together
 - iii. A Life Cycle Cost Analysis (LCCA) is of interest to help inform the Town what energy source and building systems they may like to implement in the project. The LCCA looks at first (capital) costs, operating costs, maintenance costs, and replacement costs of building system options. It can also include analysis for associated on-site carbon emissions
 - 1. The project team will need current utility rate information, confirmation if they're stable rates or not, and any interest rates on borrowed money associated with the project. Information to be requested from Finance Committee.
 - 2. The Town and Weston & Sampson will work together to identify 2-3 building systems to analyze.
 - 3. Based on the resulting LCCA, the Town must decide on their preferred mechanical system by mid-April so the Engineers can correctly capture the basis of design in their Narratives for cost estimating and to stay on schedule.
- e. Building Management System to manage intensive plug loads associated with industrial equipment use for fleet maintenance
 - i. Question: Can equipment use/maintenance tasks be staggered/scheduled to balance the peak load?
 - ii. Answer: Perhaps a portion of typical operations, though some operations may be beyond DPW's control as an emergency responder
 - 1. Routine maintenance optimization would be a workforce/administrative initiative to tackle operationally

6. Additional notes relating to third-party funding:

- a. Take into consideration the potential utility incentives discussed at the Energy Incentives Introduction Meeting with Cape Light on Wednesday, 3/13
 - i. Energy modeling will be a requirement of utility incentives; already captured within the contract

- b. Take into consideration the potential IRA tax credits that renewable energy and energy efficiency projects are eligible to receive.
- c. Take into consideration the potential grant funding opportunities that renewable energy and energy efficiency projects are eligible to receive.
 - i. This project may also be eligible for Environmental Justice (EJ) grant programs due to the identified EJ community within the Town

7. Additional considerations relating to Construction & Facility Operations

- a. Commissioning per energy code
- b. Commissioning requirements for the Mass Save incentive program, as well.
- c. Energy metering requirements per energy code and Mass Save incentives, too

Next Steps?

- 1. Truro: Confirm if and to what extent an embodied carbon LCA is desired
- 2. Truro / WSE: confirm to what extent the Town would like to offset the building's energy use through photovoltaic systems at the roof level. Also, confirm how this initiative will be integrated into the project – if added scope & fee during the Design Development phase, or if pursued later and delegated post-construction
- 3. Truro / WSE: confirm what building systems to compare in the LCCA
- 4. Truro: confirm preferred building system to capture in basis of design narratives (by mid-April)

END OF DOCUMENT

The meeting notes from the Sustainable Design Workshop are recorded as understood by Della Donahue, WSE, who should be notified of any omissions or corrections. Unless notified otherwise, this document is presumed correct.

Truro DPW Project
Scope of Services
Embodied Carbon Life Cycle Assessment

DESIGNER SERVICES

The following scope of services for a, embodied carbon Life Cycle Assessment (LCA) is based on on-going discussions with the Town regarding sustainability goals for the new Public Works Facility. LCAs calculate the embodied carbon associated with building materials during various stages of their lifespan including manufacturing, construction, use, demolition, and disposal (cradle-to-grave).

The scope of services and corresponding fees are intended to clarify the process and cost implications that are beyond the current contract. If the Town chooses to proceed with the additional service, the consultant will submit a formal proposal based on the preferred assessment scoping.

Embodied Carbon Life Cycle Assessment (LCA)

- 1.1 LCAs can include some or all of the following building materials and systems: foundation systems, framing systems, mechanical systems, products / appliances, and interior finishes.
- 1.2 LCAs include four major stages (Based on EN 15978:2011 and ISO 21930:2017):
 - a. Product Stage (A1-A3)
 - b. Construction Stage (A5-A6)
 - c. Use Stage (B1-B7)
 - i. Operational carbon stages are sometimes excluded from LCAs focused on embodied carbon (*B6: Operational Energy Use and *B7: Operational Water Use)
 - d. End of Life State (C1-C4)

Product Stage			Construction Stage		Use Stage					End-of-Life Stage			
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4
Raw Material Supply	Transport to Factory	Manufacturing	Transport to Site	Construction / Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Deconstruction / Demolition	Transport to Waste Processing/Disposal	Waste Processing	Disposal of Waste

1.3 LCAs are typically performed at two different levels: building-level or product/material-level.

a. Building-level LCAs (referred to as whole building LCAs (WBLCA)):

- i. Scoping: The consultant will define the LCA's functional description (project use type, technical requirement such as building and energy code, occupancy, etc.), the reference unit, the study period, and the system boundary. Scoping also defines the physical scope - some WBLCAs include structure only, or structure and envelope, while others may include a more complete assessment with structure, envelope, interiors, and mechanical, electrical, and plumbing (MEP) systems. The Town will identify their preferred physical scope for the assessment.
- ii. Inventory & Data Collection: The consultant will identify the types and quantities of material that are defined during the scoping phase. Detailed data is also gathered at this time including transportation travel distance. If MEP systems are defined in the scoping phase, energy use will also be modeled and inventoried. (Note: if an LCA is conducted during Design Development once a schematic cost estimate has been completed and MEP Narratives have been established, there could be efficiencies in using the bill of materials generated by and consistent with the estimator's quantities.)
- iii. Impact Assessment: the consultant will calculate the inventory by the environmental impact factors (associated with extraction, manufacturing, transportation, construction, end-of-life demolition/disposal) for each respective material. The analysis will also include operational carbon if MEP systems are included in the scope. This phase typically requires software tools to generate the total estimated embodied carbon.
- iv. Interpretation and Results: The consultant will review the analysis and summarize the results into an Embodied Carbon Report.

b. Product- or material-level LCAs:

- i. Scoping: The consultant will define the LCA's functional description, the reference unit, the study period, and the system boundary. The Town will identify the preferred physical scope for the assessment in terms of what material(s)/product(s) to assess.
- ii. Environmental Product Declarations (EPDs) Collection & Assessment: The consultant will focus on a specific material(s) or product(s) used in the construction of the facility and evaluate the embodied carbon across its entire life cycle. The assessment is primarily driven by looking at EPDs created by LCA practitioners and product manufacturers. EPDs are based on product LCAs covering the impacts of product extraction, transportation and

manufacturing (A1-A3). EPDs capture manufacturing and supply chain strategies that prioritize material and energy efficiency, and low-carbon energy sources. Comparing EPDs for multiple products is only accurate if the products are functionally equivalent, include the same life cycle stages, the use of one product versus another does not change other aspects of the design or assembly, and both use the same product category rule (PCR). (Note: not all manufacturers provide EPDs for their materials / products).

- iii. Interpretation and Results: The consultant will review the analysis and summarize the result. The review process will include providing insight into potential material substitutions to reduce embodied carbon (e.g., low-carbon concrete alternatives or recycled steel).

ASSUMPTIONS

- This scope of work does not include consideration for third-party funding or third-party certification. If the Town wishes to pursue related incentives or certification programs, the scope and fee may need amending to match the verification criteria/requirements of those programs.
- Material quantities will be conducted in-house and may differ from those collected by the independent cost estimator for the schematic design cost estimate. This effort could be conducted during Design Development once a schematic cost estimate has been completed to ensure consistent quantities are being referred to.

SCHEDULE

This scope of work identified above will be completed within one to two months once the preferred schematic floor plan is approved and depending on the level of analysis (whole building vs. product/material level).

FEE OF SERVICES

The following is a summary of the proposed fees associated with the scope of services identified above. The total fee will not exceed the fee schedule below unless written authorization is granted by the Town.

TASK	FEE
Product- or Material-Level Life Cycle Assessment	\$9,000 per material/product
Whole Building Level Life Cycle Assessment *depending on the physical scope	\$25,000 - \$40,000*

Revised 3/24/2025

Revised 3/24/2025

[illegible]

Truro DPW

Schematic Narrative 3-24-25

Administration, Employee Support and Maintenance/Sign shop :

- One story with clear height of 10'
- Exposed Stained Concrete slab
- Either a Prefab wood structure, (almost like a house), Timber frame with SIPS
- Building Envelope to meet stretch code. Use CI sheathing or SIPS
- Building to have Full HVAC, consider Ground Source heat pump as an option
- Building to be Ventilated. Provide air moment in the Summer; use "Destrat" fans, and create a "thermal chimney" in the middle with either Cupola or large vents/skylights
- Install Solar Array on roof
- Provide Multi-purpose/Muster Room
- Optional basement/attic for overflow storage
- 400 AMP Electric service, (size to be verified)
- Include Vampire switch to turn off all electric upon leaving
- Programmed spaces to match W & S program
- NO Fire Sprinklers

Vehicle Fleet Maintenance/Service Bay & Wash Bay:

- One story with clear height of 25' at the middle of split Gable to allow for truck lift
- Exposed Polished Concrete slab with densifier and clear seal except below lift. Install hi build epoxy, (approx. 600 sq. ft.). Slope the slab at a minimum pitch to:
 - Create positive drainage to trench drain
 - Provide adequate containment at exterior doors
- PEB with a clear span over this portion. Wash bay to be integrated into this structure
- Building Envelope to meet stretch code. Use polystyrene CI at interior face of wall with Class A fire rated scrim, Dupont makes a product which we have used as does amazon on their warehouses to meet Energy codes
- Building to be heated by infrared heat using the slab as a heat exchanger or H & V unit connected to CO detectors
- Building to be Ventilated to exhaust CO AND provide air moment in the Summer; use Big ass "Destrat" fans in Service area
- Building to be protected by Frie Sprinklers
- Create small Rooms, (Separate Control areas with fire barriers) for storage of Flammable/Combustible Materials; keep the volumes under the Code thresholds so it remains and S-1 Occupancy
- Install Solar Array on roof
- Provide Connection to Fleet Storage Area
- Install trench drain in the bay and pipe to Oil water separator
- 400 AMP Electric service, (size to be verified)
- Include Vampire switch

Fleet Storage

- One story with clear height of 15'
- Exposed Polished Concrete slab with densifier and clear seal. Slope the slab at a minimum pitch to:
 - Create positive drainage to trench drain
 - Provide adequate containment at exterior doors
- PEB with minimal columns
- Building Envelope to meet stretch code. Use polystyrene CI at interior face of wall with Class A fire rated scrim, Dupont makes a product which we have used as does amazon on their warehouses to meet Energy codes
- Building to be heated by infrared heat using the slab as a heat exchanger heat to 45°F. Can this be considered Semi Heated per ASHRAE 90.1? Would this alleviate compliance with specialty code?
- Building to be Ventilated to exhaust CO.
- Building to be protected by Fire Sprinklers
- Install Solar Array on roof
- Install trench drain in the bays and pipe to Oil water separator
- Fire Pump room, (could also be in the Fleet Maintenance area)
- Provide a 3 hour fire wall against Knuckle structure
- 200 amp electrical service

Knuckle

- One story with cupola to match Town Hall and act as a thermal chimney
- Provide 3 Hour Fire Wall against the Fleet storage building
- House centralized Toilet facilities accessible to all DPWE structures
- Create a sense of Entry
- Include Barreira-free ramp to interconnect the separate structures

Lean-to:

- Unheated PEB connected to the large Building

Salt Shed:

- Tensile structure with large modular concrete restraints
- Concrete slab with protection for corrosive material
- Minimal electric for lighting 100 amp

Solar Canopy

- Storage of small gasoline vehicles
- Harvest Solar power

Site:

- Slight regrade south to north; set FFE of the Fleet Storage and Vehicle Fleet Maintenance facilities +/- 2'-0" lower than admin/Workshop to follow general grade. This would also include lowering the Salt barn to be set closer to existing grade
- Modular retaining wall at NWC
- We anticipate either a Water tank or below grade cistern for non-potable fire sprinkler supply will be required.
- New septic system, (assume I/A)
- Stormwater management for NEW impervious only, (keep below threshold for water quality, < ¼ acre of new impervious, < 1 acre disturbance). Can stormwater run-off to north end, (low topo and be infiltrated into ground?)
- Mill and repave previously paved areas, (3" top over 4" milling sub-base at truck areas
- New asphalt see above