

Planning Board Meeting  
Belfast, Maine

Nordic Aquafarms Inc  
June 26<sup>th</sup>, 2019



Our Fredrikstad Seafoods Facility

Why is this project relevant in the US?

The US is the largest western seafood consumption market.

**High growth:**

**7.4 % seafood  
consumption increase  
in 2017 in the US**

Intrafish

**High trade deficit:**

**The US has a  
94 % and growing  
seafood deficit**

FDA

**Low traceability:**

**Less than 1 percent  
of imported seafood  
to the US is inspected**

FDA

# What is the Belfast proposal really all about?

- A project that takes leaps in defining a new generation of food systems and ocean protection standards in the US and internationally – with tried and proven technologies.
- A project that ultimately will produce approx. 7 percent of US salmon consumption on a 30-acre footprint.
- A project that connects Maine and Europe’s seafood industries with many more opportunities to come.
- A project that has spent considerable resources on achieving local low-impact solutions.
- Many economic development benefits for Belfast and Maine.
- A production approach supported by major environmental organizations in the US.

THE  
CONSERVATION FUND

The Nature  
Conservancy 

clf | Conservation  
Law Foundation

  
Gulf of Maine  
Research Institute  
Science. Education. Community.

 NORDIC  
AQUAFARMS  
SUSTAINABLE AQUACULTURE

# Benefits to Belfast and Maine

- A multi-phased development that the community can follow step-by-step
- Approx. 100 direct jobs + many indirect jobs
- Workforce development initiatives
- Good paying full-time jobs, good benefits, and career opportunities
- Tax revenue from a 500 Mill USD investment
- Upgrade of the Water District infrastructure
- Various community support initiatives
- Attraction of additional investment projects to Maine, and possibly Belfast

## Types of jobs

**Engineers**  
**Biologists**  
**Quality managers**  
**Production staff**  
**Processing staff**  
**Maintenance staff**  
**Administrative staff**  
**Vocational jobs**  
**Internships**

# A short history of our journey in Belfast

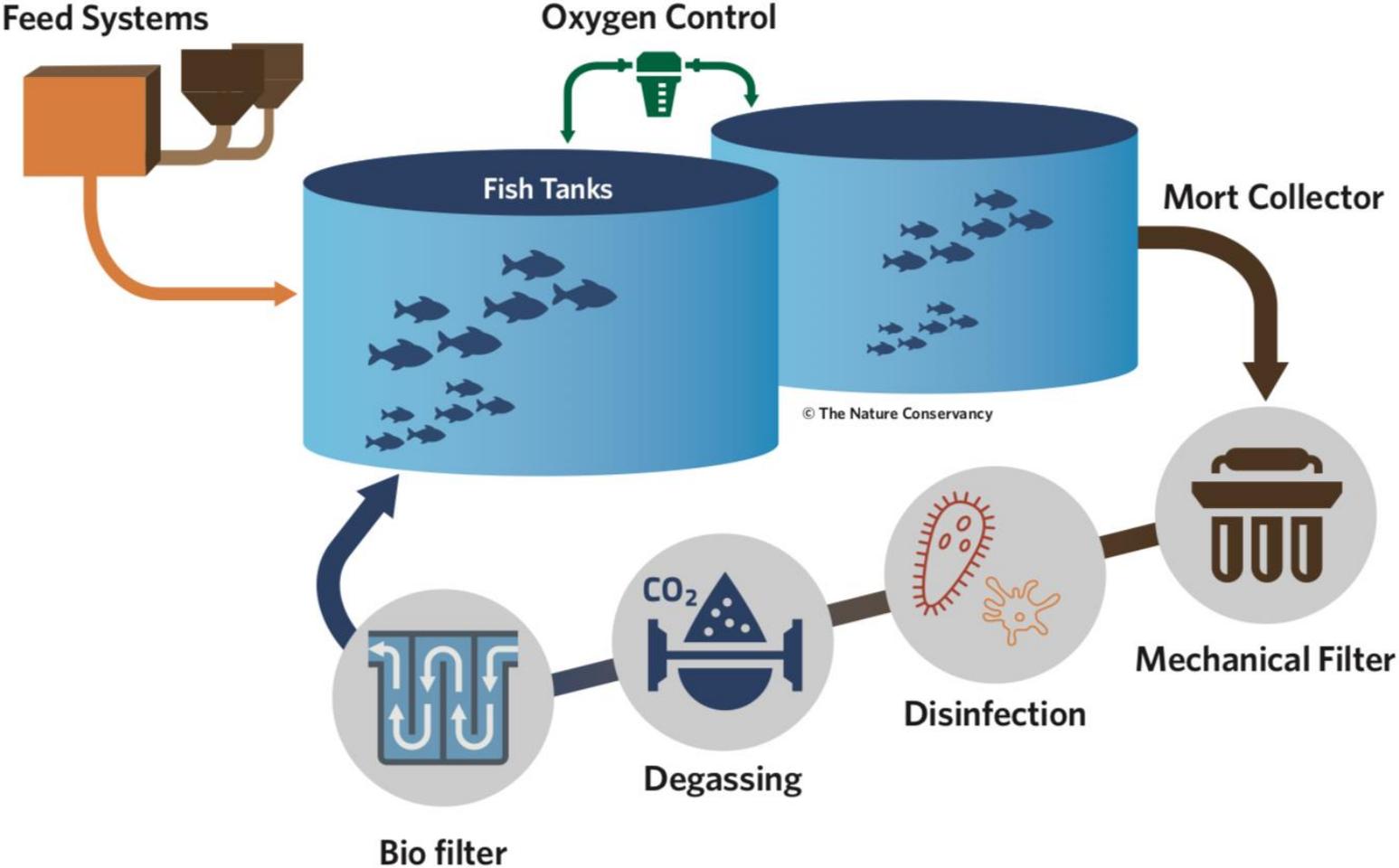
## The process

- Project initiated after meetings with stakeholders in Belfast
- Due diligence February through June 2018
- Permitting started in June 2018
- 7 public meetings, half of which were voluntary + regular newsletters through the permitting phase
- Permitting and engineering work completed May 2019
- Applications are for a multi-phase development project

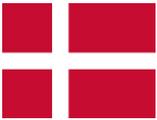
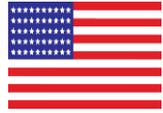
## Why Belfast?

- Search along the Eastern coastline
- Suitable construction site
- Clean fresh- and seawater
- Central location
- Good community for staff
- Appropriate grid access
- Local political support

# What are recirculating aquaculture systems (RAS)?



Nordic Aquafarms is recognized as one of the leading land-based developers internationally with three facilities in operation



# We are an international leader in “clean” production designs

Escape prevention

0 Escapes

Sustainable feed ingredients

0 Growth hormones  
Antibiotics  
Pesticides  
GMO

Nutrient removal & recycling

85%/99%  
Nitrogen All other

CO2 compared to imports

30-40%

Parasites and disease

0 Parasites  
Disease?

Use of fish

100%

# Our US team – first stage of hiring complete



**John Hessler**  
Maine



**Carter Cyr**  
Maine



**David Noyes**  
Maine



**Margaret Kneeland**  
Maine



**Brenda Chandler**  
Maine



**Ed Cotter**  
Connecticut



**Cathal Dinneen**  
Ireland

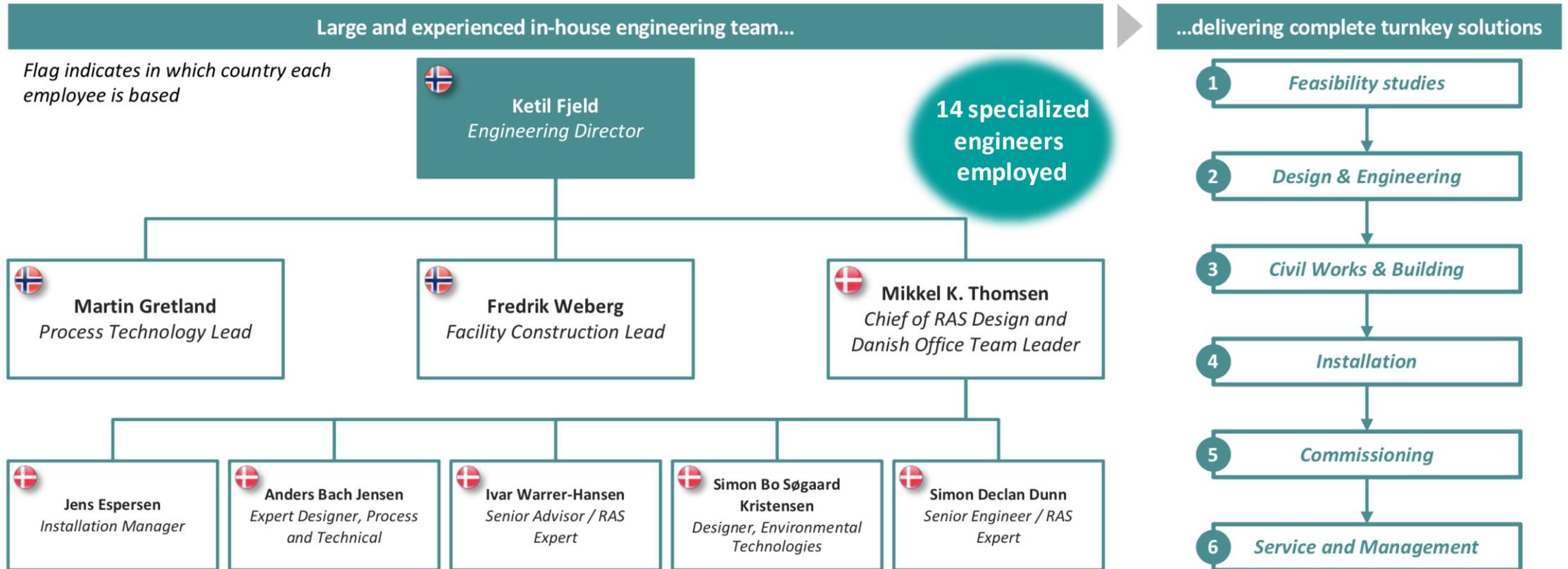


**Marianne Naess**  
Norway



**Erik Heim**  
US/Norway

# Our in-house design team is one of the most experienced in the industry – experience from many projects in the past decade



Over 50 expert resources have been involved in the permitting work

Nordic Center  
of excellence



**Ed Cotter**  
Project Director



**John Hessler**  
Project Engineer



**David Noyes**  
CTO

Development partners in Maine



ATTORNEYS AT LAW

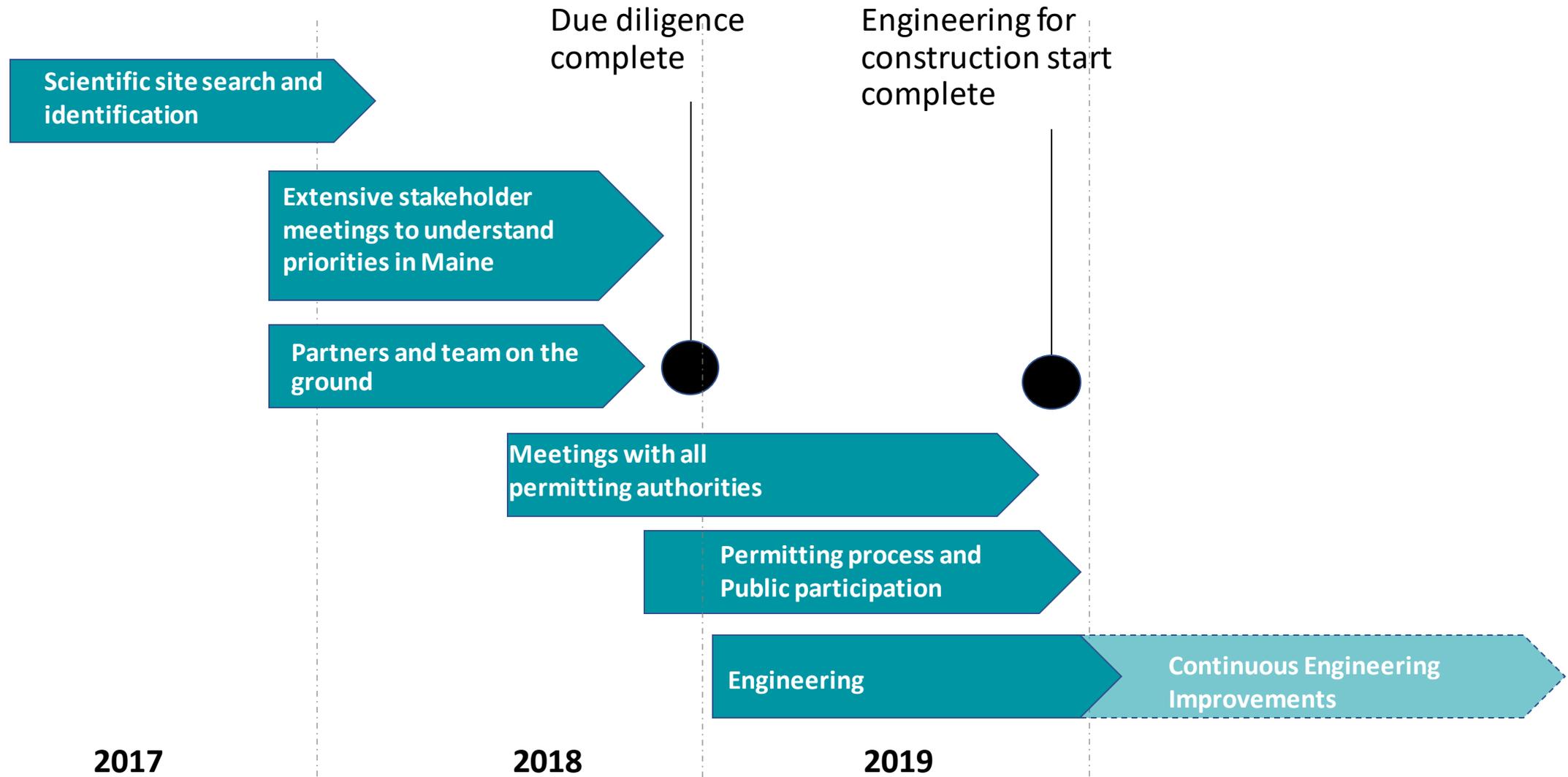
Undertaking engineering for a 30-acre footprint is a large effort

Today we are presenting a summary of our proposal  
for a facility that sets new environmental standards in  
the land-based farming industry

# Agenda

- ♻️ **Permitting Update**
- ♻️ City of Belfast Site Plan Permit Application
- ♻️ Proposed Development Overview
- ♻️ Visual Impact Assessment
- ♻️ Construction Overview
- ♻️ Soil Erosion and Sediment Control Plan
- ♻️ Noise, Odor, and Air Pollution Mitigation
- ♻️ Traffic Study
- ♻️ Proposed Stormwater Management Plan
- ♻️ Water Supply and Proposed Monitoring Plan
- ♻️ Waste Discharge

# Timetable for Belfast



# Project Status

## State and Federal Permitting:

### **Department of Environmental Protection- Submitted May 17th, 2019**

-  Site Law of Development Act (SLODA)
-  Minor New Source Air Emissions License
-  Natural Resource Protection Act (NRPA)
-  Maine Pollutant Discharge Elimination System (MEPDES)- Amended, originally submitted October 2018

### **Department of Agriculture, Conservation and Forestry- Permit received in January 2019**

-  Land Based Aquaculture License

### **Army Corps of Engineers- Submitted May 31st, 2019**

-  Sections 404/10 of the Clean Water Act

## Planning:

### **Optimizing systems to reduce impacts**

-  Maximize use of waste heat
-  Reduce electrical loads
-  Incorporate proven technological advancements

### **Construction Planning**

-  Onboarding Construction Manager Team
-  Develop contracting plan to find qualified subcontractor pool, maximizing local contractor and labor utilization
-  Optimize schedule to deliver operational facilities as soon as possible
-  Analyze estimates to find cost efficiencies/ best value design

# Agenda

- ♻️ Permitting Update
- ♻️ City of Belfast Site Plan Permit Application
- ♻️ Proposed Development Overview
- ♻️ Visual Impact Assessment
- ♻️ Construction Overview
- ♻️ Soil Erosion and Sediment Control Plan
- ♻️ Noise, Odor, and Air Pollution Mitigation
- ♻️ Traffic Study
- ♻️ Proposed Stormwater Management Plan
- ♻️ Water Supply and Proposed Monitoring Plan
- ♻️ Waste Discharge

# Planning Board Application

## Proposed Permits

- ♻️ Site Plan Permit
- ♻️ Zoning Use Permit
- ♻️ Shoreland Permit
- ♻️ Significant Groundwater Well Permit
- ♻️ Significant Water Intake/Discharge Pipe Permit

## Five volumes Divided by “Attachments”

- ♻️ 36 Attachments listed in Table of Contents
- ♻️ Attachments provided to address requirements of City Ordinances
- ♻️ Provide back-up and details to narrative responses
- ♻️ Project Drawings provided both 11x17 and “full size”

**NORDIC  
AQUAFARMS**  
SUSTAINABLE AQUACULTURE

City of Belfast  
Permit Application

Submitted to:  
City of Belfast Planning Board  
131 Church Street  
Belfast, ME 04915

Prepared by:  
Nordic Aquafarms Inc  
159 High Street  
Belfast, Maine 04915

June 11, 2019  
Volume 1, Attachments 1-14

Prepared with our Partners:

**RANSOM** Consulting Engineers and Scientists **SMRT** **CIANBRO**

# Planning Board Application (con't)

## Application posted to City of Belfast website

NAF Applications

**Belfast Maine**

City Government | Our Community | Doing Business | Just Visiting | How Do I ?...

You are here: Home > City Government > Planning & Codes

### Code & Planning Department

**Services**  
The Planning and Codes Department performs a variety of services intended to protect, maintain, and develop an attractive, safe, and healthy environment. Primary functions address property development and land use activities occurring in the City.

**Responsibilities**  
The Planning and Codes Department provides direction and leadership in implementing the goals, objectives, and policies of the Master Plan as adopted by the City Council.

The Department is also responsible for the orderly development of the City and the administration of various land use regulations, including the zoning code, design review ordinances, and sign ordinance.

**Contact**  
Wayne E. Marshall  
Director of Code & Planning  
[Email](#)

Bub Fournier  
Code Enforcement Officer  
[Email](#)

Sadie Lloyd Mudge  
Planner  
[Email](#)

Erica Nealley  
Administrative Assistant

131 Church Street  
Belfast, ME 04915  
(207) 338-1417 ext. 125  
(207) 338-1605 (Fax)

**Related Links**

- Notice of Position Vacancy - Planner
- Nordic Aquafarms Permit Applications
- Tractor Supply - April 10
- VOANNE Project - 80 High S
- Office Park Amendments 4-2-19
- Groundwater Permit Amendments, Feb/March 2019
- Bahre Property Project - Route 3
- Peiroe School Use Permit App. and Review
- Goose River Hydro DEP Water Quality App. Jan 15, 2019 - Ord. Amend. (including Peiroe)
- December 13, 2018 - Planning Board Hearings
- September 19, 2018 Housing Hearing
- Council Hearings - NORDIC - 10/9/2018
- Council Hearings - NORDIC - 9/25 + 10/9/2018
- Proposed Wastewater Treatment Plant Upgrades
- Aerial Maps & Property Data

City Government | Our Community | Doing Business | Just Visiting | How Do I ?...

You are here: Home > City Government > Planning & Codes > Nordic Aquafarms Permit Applications

### Nordic Aquafarms Permit Applications

(Please note, some of these files are exceptionally large, and will take more time to open or to download.)

[Agenda for City of Belfast 6/26/2019 Planning Board Meeting \(to be held at the University of Maine Hutchinson Center, 80 Belmont Avenue\)](#)

[Agenda for City of Belfast 7/10/2019 Planning Board Meeting \(site visit, to be held at the project site, 285 Northport Avenue\)](#)

[Cover Letter and Table of Contents](#)

ATTACHMENT 1 - LOCATION MAP:  
[Site Location Map](#)

ATTACHMENT 2 - PROJECT DESCRIPTION:  
[Attachment 2 - Project Description](#)

[Appendix 2A - Construction Schedule](#)  
[Appendix 2B - Intake Discharge Construction Schedule](#)  
[Appendix 2C - Pipeline Photos](#)

ATTACHMENT 3 - WAIVER NARRATIVE:  
[Attachment 3 - Waiver Requests](#)

ATTACHMENT 4 - CHAPTER 102, ZONING STANDARDS:  
[Attachment 4 - Chapter 102, Zoning Standards](#)

ATTACHMENT 5 - CHAPTER 90, SITE PLAN STANDARDS:  
[Attachment 5 - Chapter 90, Site Plan Standards](#)

ATTACHMENT 6 - CHAPTER 82, SHORELAND ZONE STANDARDS:  
[Attachment 6 - Chapter 82, Shoreland Zone Standards Wetland and Stream Survey](#)

ATTACHMENT 7 - CHAPTER 98, TECHNICAL STANDARDS:  
[Attachment 7 - Chapter 98, Technical Standards](#)

ATTACHMENT 8 - TITLE, RIGHT, AND INTEREST:  
[Attachment 8 - Title, Right, or Interest Deed into Eckrole \(Map 29, Lot 36\), \(Book 3697, Pages 5-7\) Perkins Road Permit to Open Street Title, Right, and Interest Supplemental Information to Maine Department of Environmental Protection US Route 1 Permit to Open Street](#)

ATTACHMENT 9 - FINANCIAL CAPACITY:  
[Attachment 9 - Financial Capacity \(with appendices\)](#)

ATTACHMENT 10 - CAPACITY TO SERVE:  
[Belfast Water District Capacity to Serve Letter](#)  
[Belfast Water District Letter to Public October 2018](#)  
[Capacity Evaluation for the Belfast Water District](#)  
[Casella Organics Letter of Intent](#)  
[City of Belfast Wastewater Treatment Facility Capacity to Serve Letter](#)  
[Coast of Maine Organic Products Letter of Intent](#)  
[Compost Maine LLC Letter of Intent](#)  
[Comprehensive Land Technologies Letter of Intent](#)  
[Comprehensive Land Technologies Timber Inventory](#)  
[Maine Public Utilities Commission Examiners' Report](#)

# Planning Board Application (con't)

## Table of Contents

### (1) Site Location Map

(2) Project Description

(3) Waiver Narrative

(4) Chapter 102- Zoning Standards

(5) Chapter 90- Site Plan Standards

(6) Chapter 82- Shoreland Zone Standards

(7) Chapter 98- Technical Standards

(8) Title, Right, and Interest

(9) Financial Capacity

(10) Capacity to Serve

(11) Natural Resource Report

(12) Soils Report

(13) Geotechnical Report

(14) Soil Erosion Sediment Control

(15) Stormwater Management Plan

(16) Stormwater Maintenance Plan

(17) Traffic Study

(18) Exterior Lighting Narr

(19) Flooding

## City ordinance narrative

(20) Project Drawings

(21) Solid Waste

(22) Other Permit Applications

(23) Hydrogeologic Study and Proposed Monitoring Plan

(24) Belfast Water District Capacity Evaluation

(25) Statement from Public Works Director and School Superintendent

(26) Construction Schedule

(27) Visual Assessment Report

(28) Buffers

(29) Technical Ability

(30) Noise Study

(31) Air Emissions

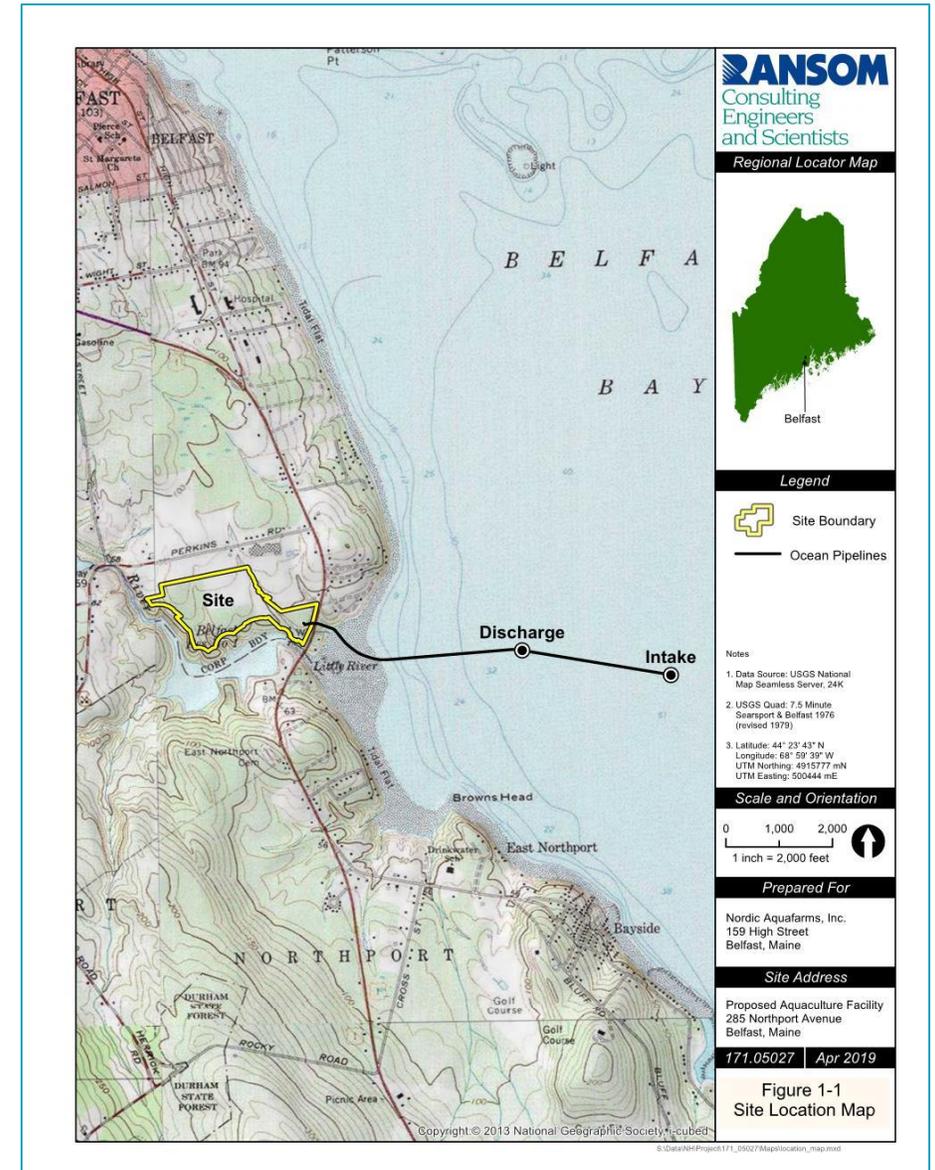
(32) MHPC Archeological Study and Notice

(33) Sunlight Study

(34) Wetland and Stream Survey

(35) Odor Control

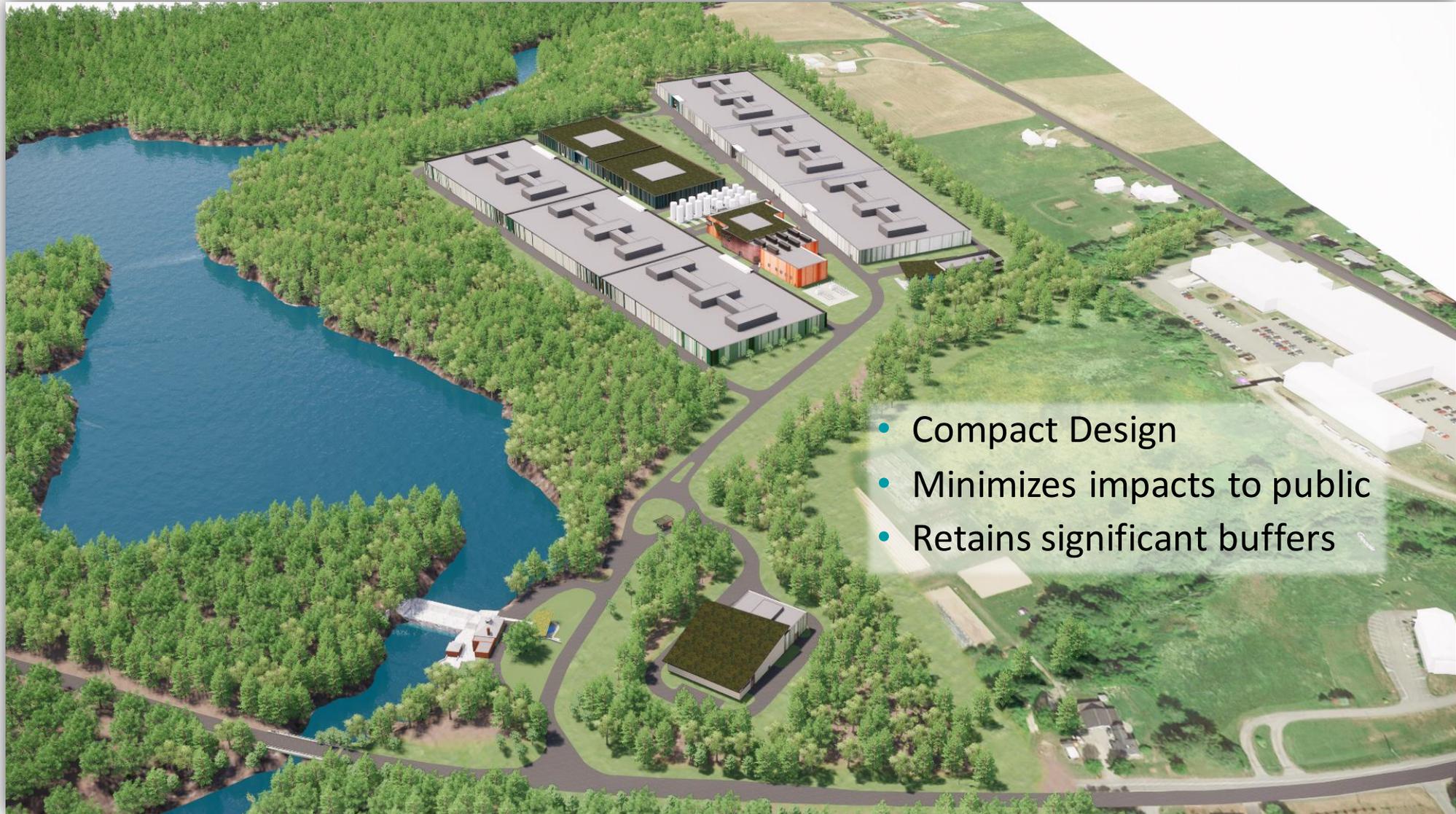
(36) NRPA Conditions Report



# Agenda

- ♻️ Permitting Update
- ♻️ City of Belfast Site Plan Permit Application
- ♻️ Proposed Development Overview
- ♻️ Visual Impact Assessment
- ♻️ Construction Overview
- ♻️ Soil Erosion and Sediment Control Plan
- ♻️ Noise, Odor, and Air Pollution Mitigation
- ♻️ Traffic Study
- ♻️ Proposed Stormwater Management Plan
- ♻️ Water Supply and Proposed Monitoring Plan
- ♻️ Waste Discharge

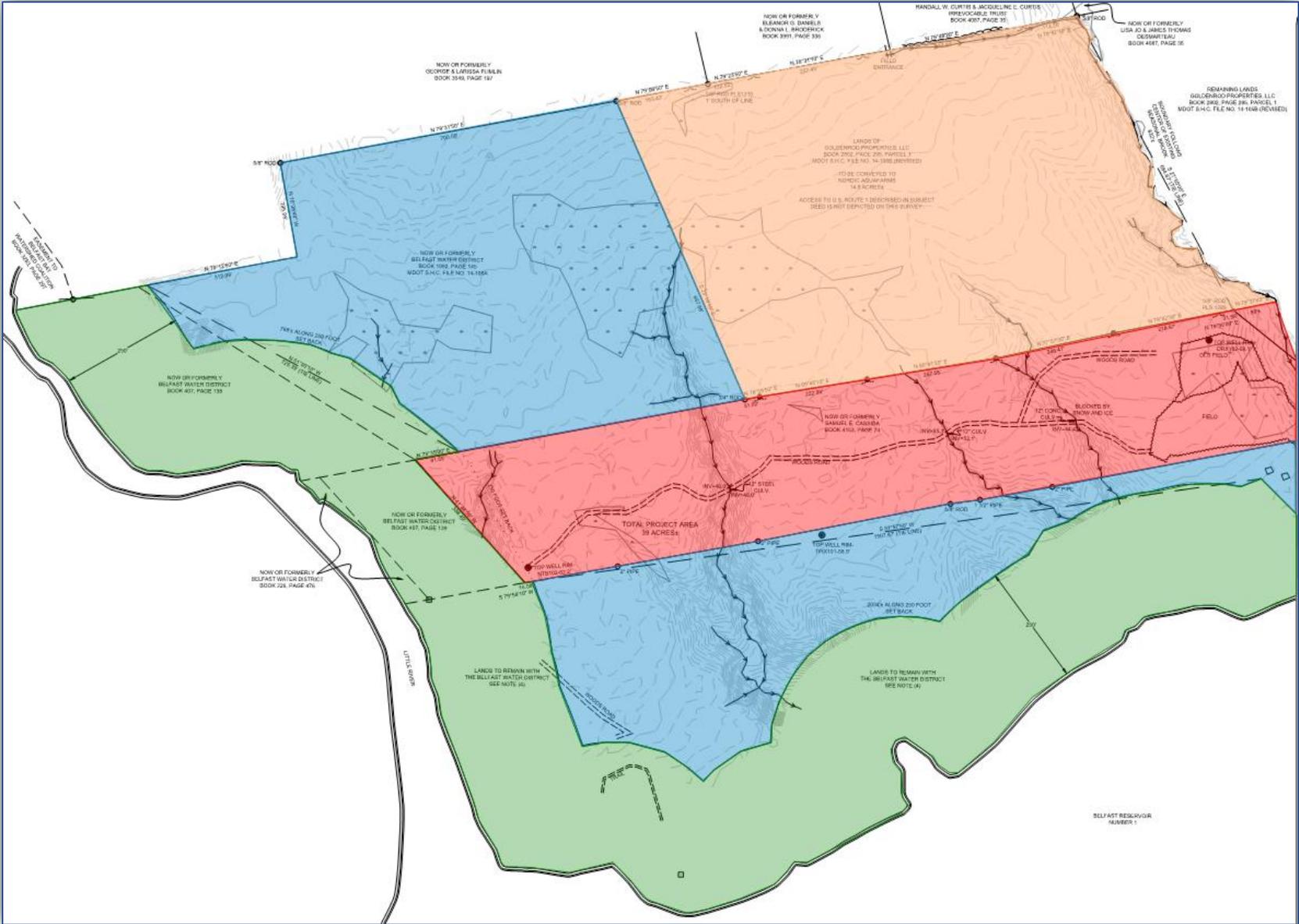
# Project Layout



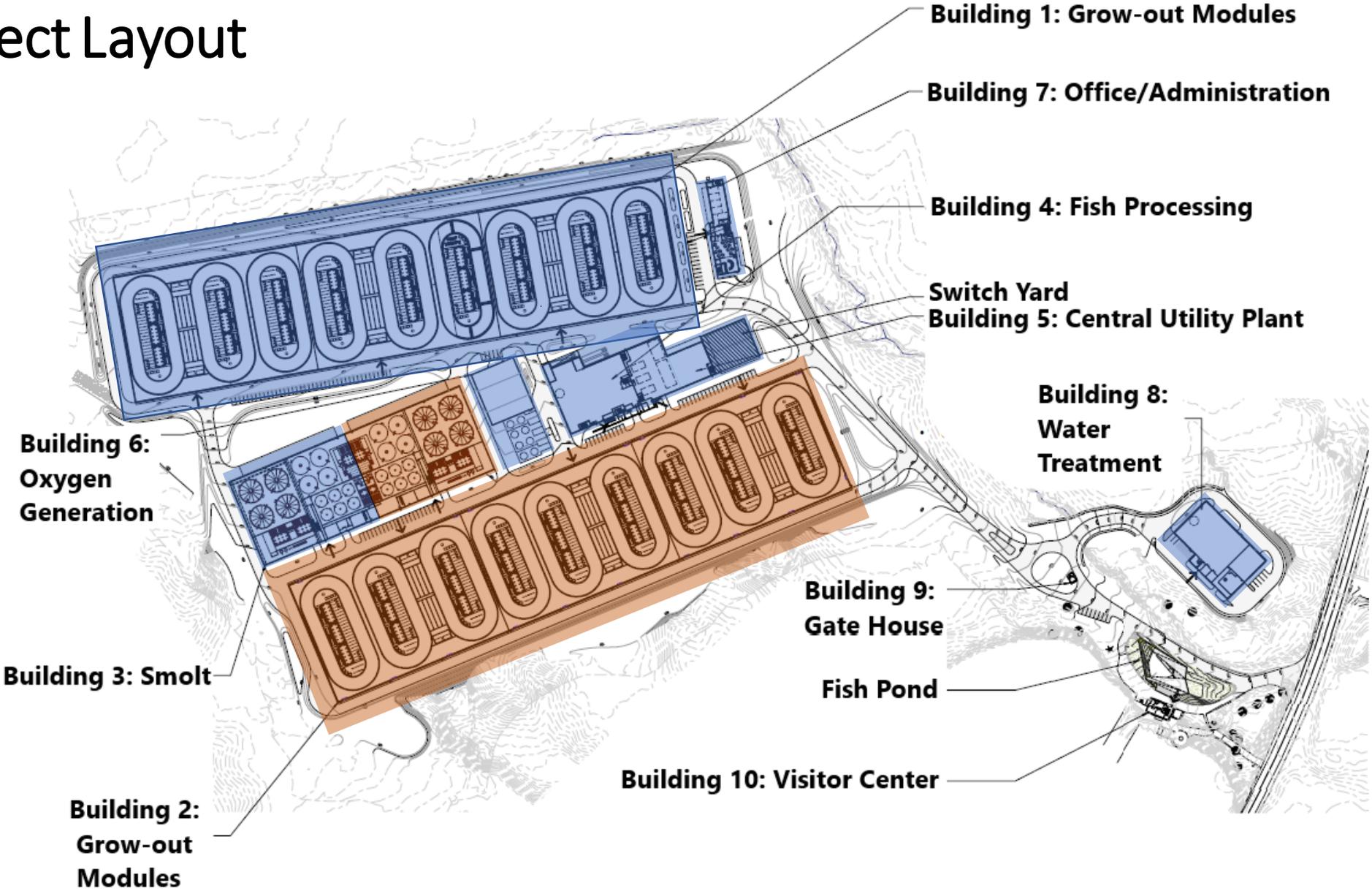
# Project Layout

## Property Composition

- ♻️ Belfast Water District
- ♻️ Goldenrod Properties, LLC
- ♻️ Private Land Owner
- ♻️ Shoreland Zone retained by City of Belfast



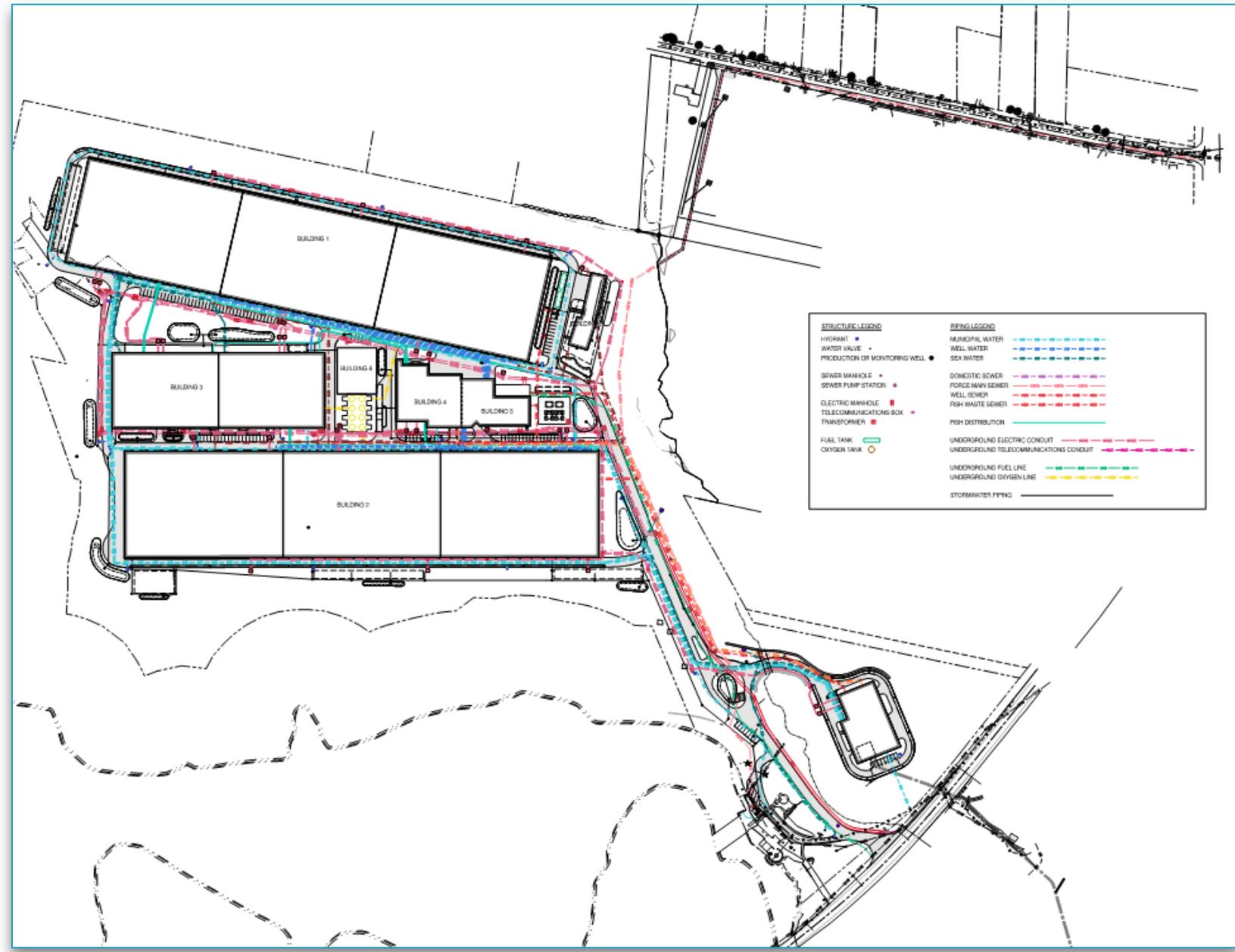
# Project Layout



# Project Layout

## Site Utilities

- ♻️ Domestic Water Connection
- ♻️ Electrical Grid Connection
- ♻️ Domestic Sewer Connection
- ♻️ Intake/Discharge Pipes



# Agenda

- ♻️ Permitting Update
- ♻️ City of Belfast Site Plan Permit Application
- ♻️ Proposed Development Overview
- ♻️ **Visual Impact Assessment**
- ♻️ Construction Overview
- ♻️ Soil Erosion and Sediment Control Plan
- ♻️ Noise, Odor, and Air Pollution Mitigation
- ♻️ Traffic Study
- ♻️ Proposed Stormwater Management Plan
- ♻️ Water Supply and Proposed Monitoring Plan
- ♻️ Waste Discharge

# Proposed Development Overview and Visual Impacts

- Visual Assessment
- Existing and Enhanced Buffers
- Architectural Narrative

# Visual Assessment

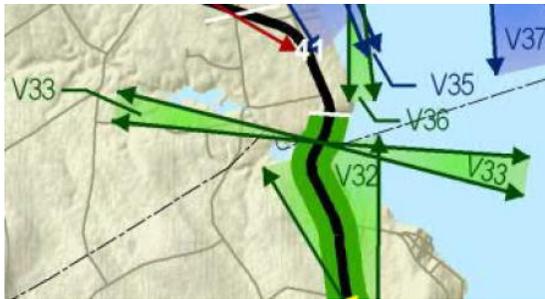
- Purpose
- Methodology



# Visual Assessment

## View From US1

Southern Gateway to Belfast



# Visual Assessment

## View From US1

Entry to Project Site



# Visual Assessment

View from US1

Little River Church



# Visual Assessment

## View from Perkins Road

Between 34 and 38 Perkins



# Visual Assessment

## View from Perkins Road

Between 38 and 52 Perkins



# Existing and Enhanced Buffers

Vegetation Retained

Added Plantings



# Architectural Narrative

## Project Goals

Successful business

Member of the Community

## Architectural Ideals and Inspiration

Create Safe Functional Spaces to Serve the Enterprise and address Public Interests

Blend with, and Enhance, the Surrounding Environment

# Architectural Narrative

## Over View

- Arrangement of spaces
- Selection of Materials
- Use of Color and Pattern



# Architectural Narrative

Entry to Site



# Architectural Narrative and Treatment

Building 8



# Architectural Narrative and Treatment

Salmon Pond  
and Building 10



# Architectural Narrative and Treatment

Building 9



# Architectural Narrative and Treatment

Trail Parking

towards

Building 8



# Architectural Narrative and Treatment

Trail Parking  
towards  
Salmon Pond and  
Building 10



# Architectural Narrative and Treatment

Building 7

View from Stream



# Agenda

- ♻️ Permitting Update
- ♻️ City of Belfast Site Plan Permit Application
- ♻️ Proposed Development Overview
- ♻️ Visual Impact Assessment
- ♻️ Construction Overview
- ♻️ Soil Erosion and Sediment Control Plan
- ♻️ Noise, Odor, and Air Pollution Mitigation
- ♻️ Traffic Study
- ♻️ Proposed Stormwater Management Plan
- ♻️ Water Supply and Proposed Monitoring Plan
- ♻️ Waste Discharge

# Construction Planning and Management

## CIANBRO

- ♻️ Intake/Discharge pipe installation
- ♻️ Saltwater pump station
- ♻️ History of successful heavy civil & marine projects
- ♻️ Local Maine General Contractor

## Gilbane

- ♻️ Upland site Construction Manager
- ♻️ Procurement of local trade contracts
- ♻️ Industry leader in Safety and Sustainability
- ♻️ Landry/French local Maine partner



# Construction Schedule

Proposed Project Development Timeline -- Exact dates are shown for illustrative purposes and will be subject to permit approval timeline

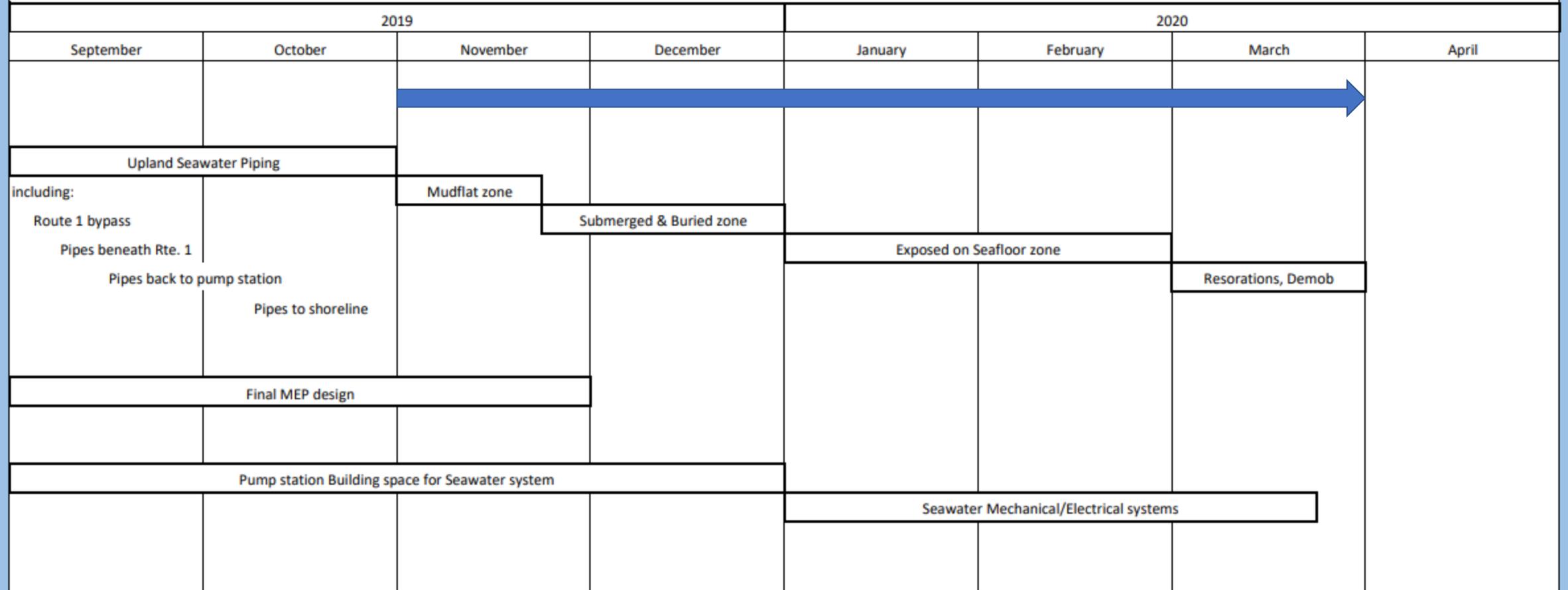
	2019												2020												2021												2022											
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec						
<b>Phase 1</b>																																																
Phase 1 Site Prep																																																
Underground Pipe Installation																																																
Smolt 1																																																
Water Treatment																																																
Sea Water Intake & Discharge																																																
Switchyard																																																
Backup Facility 1																																																
Central Cooling 1																																																
Oxygen 1																																																
Grow Out Module 1 (of 6)																																																
Grow Out Module 2 (of 6)																																																
Grow Out Module 3 (of 6)																																																
Fish Processing																																																
Office																																																
Gate/Site finishes																																																
	2023												2024												2025																							
<b>Phase 2</b>	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec												
Phase 2 Site Prep																																																
Smolt 2																																																
Grow Out Module 4 (of 6)																																																
Grow Out Module 5 (of 6)																																																
Grow Out Module 6 (of 6)																																																
Backup Facility 2																																																
Central Cooling 2																																																
Oxygen 2																																																
Visitor Centre																																																

This period is allocated for Phase 1 operational startup, assessment of operations, and incorporation of Phase 1 learnings into Phase 2 preconstruction. The duration shown is subject to change based on these factors.

# Construction Schedule

Proposed Project Development Timeline– Exact dates are shown for illustrative purposes and will be subject to permit approval timelines

## SEAWATER ACCESS PIPING INSTALLATION TIMELINE



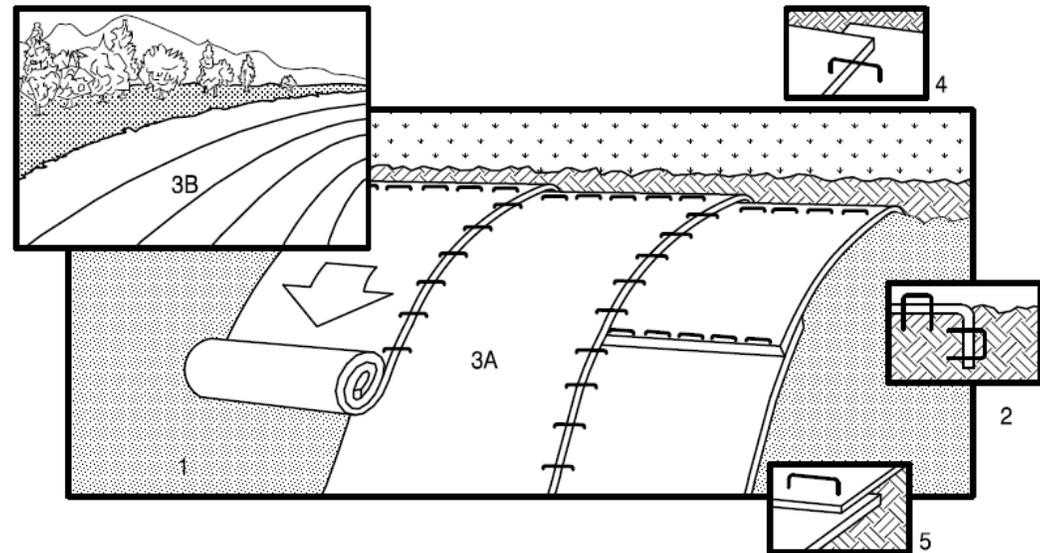
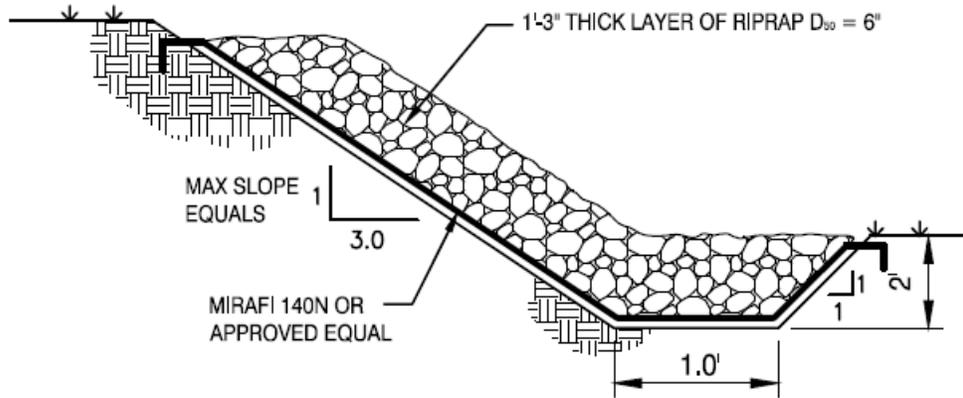
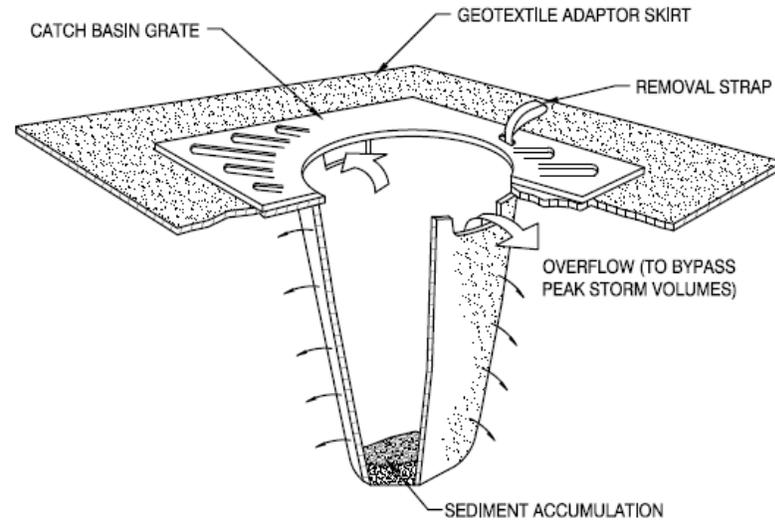
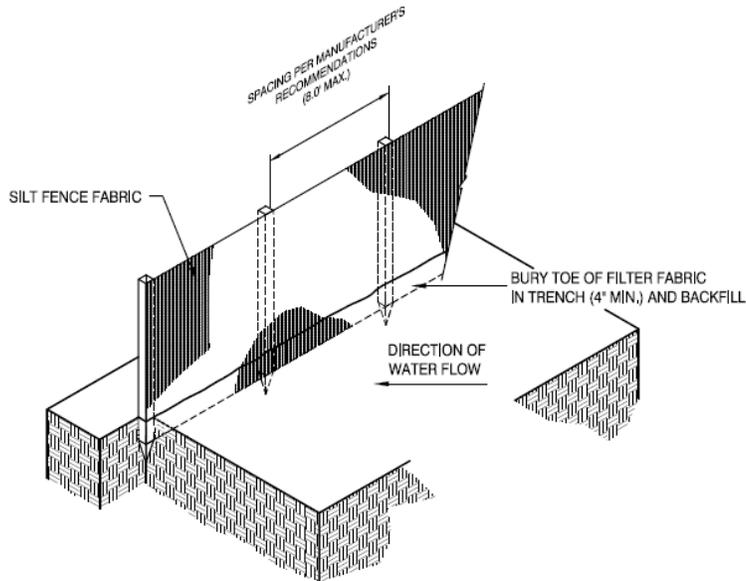
# Agenda

- ♻️ Permitting Update
- ♻️ City of Belfast Site Plan Permit Application
- ♻️ Proposed Development Overview
- ♻️ Visual Impact Assessment
- ♻️ Construction Overview
- ♻️ **Soil Erosion and Sediment Control Plan**
- ♻️ Noise, Odor, and Air Pollution Mitigation
- ♻️ Traffic Study
- ♻️ Proposed Stormwater Management Plan
- ♻️ Water Supply and Proposed Monitoring Plan
- ♻️ Waste Discharge

# Erosion Control Strategies

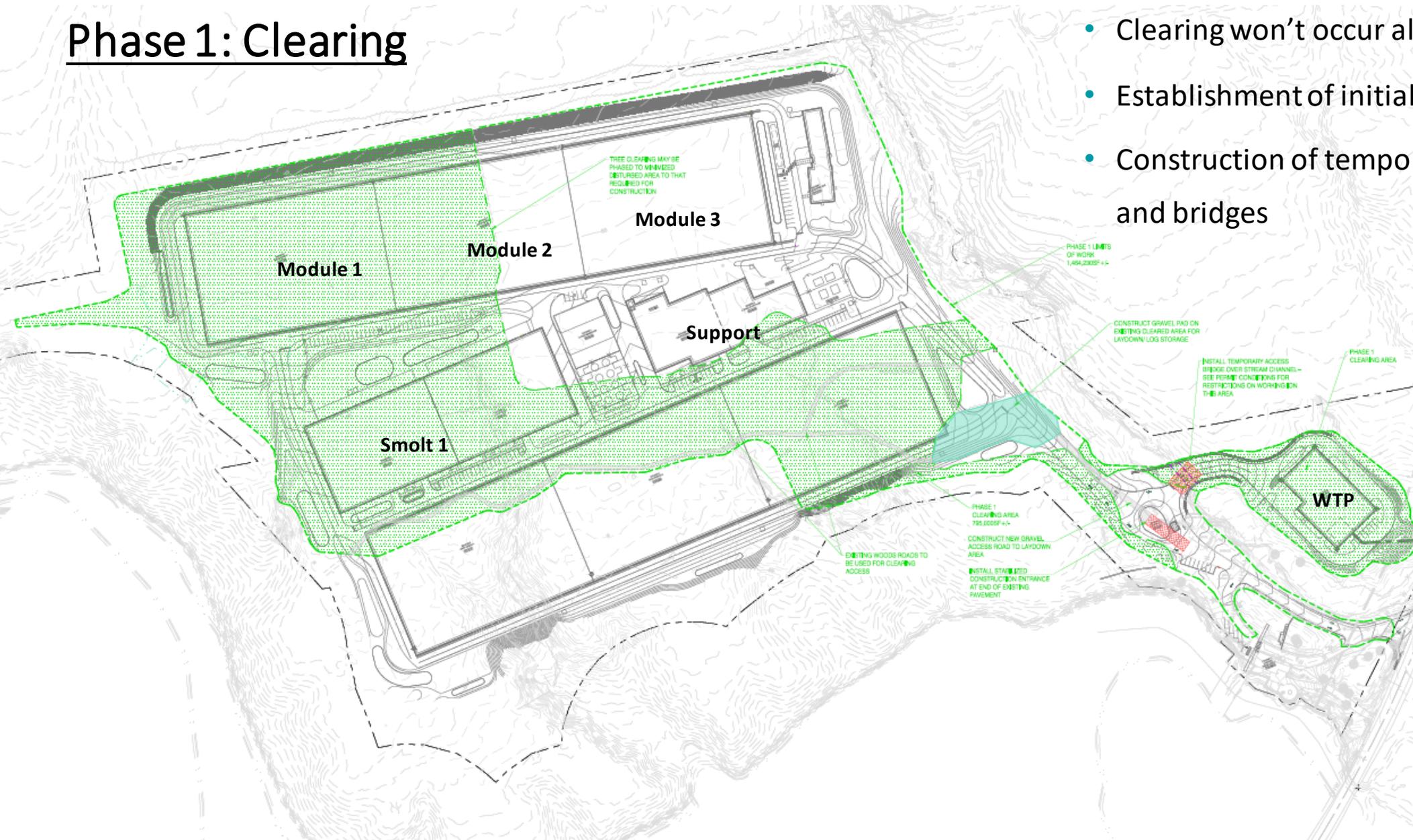
- Phased construction approach
  - Limits area of disturbance at one time
  - Well defined perimeter around construction area
- Regular inspection protocol
  - Weekly and after significant weather events
- Temporary and permanent mitigation strategies
- Establishment of sediment collection and stormwater systems
  - Management of site runoff – phased with construction
  - Diversion trenches, sediment sumps and basins, bypass culverts
- Adherence to BMP's to minimize impact

# Erosion Control Measures

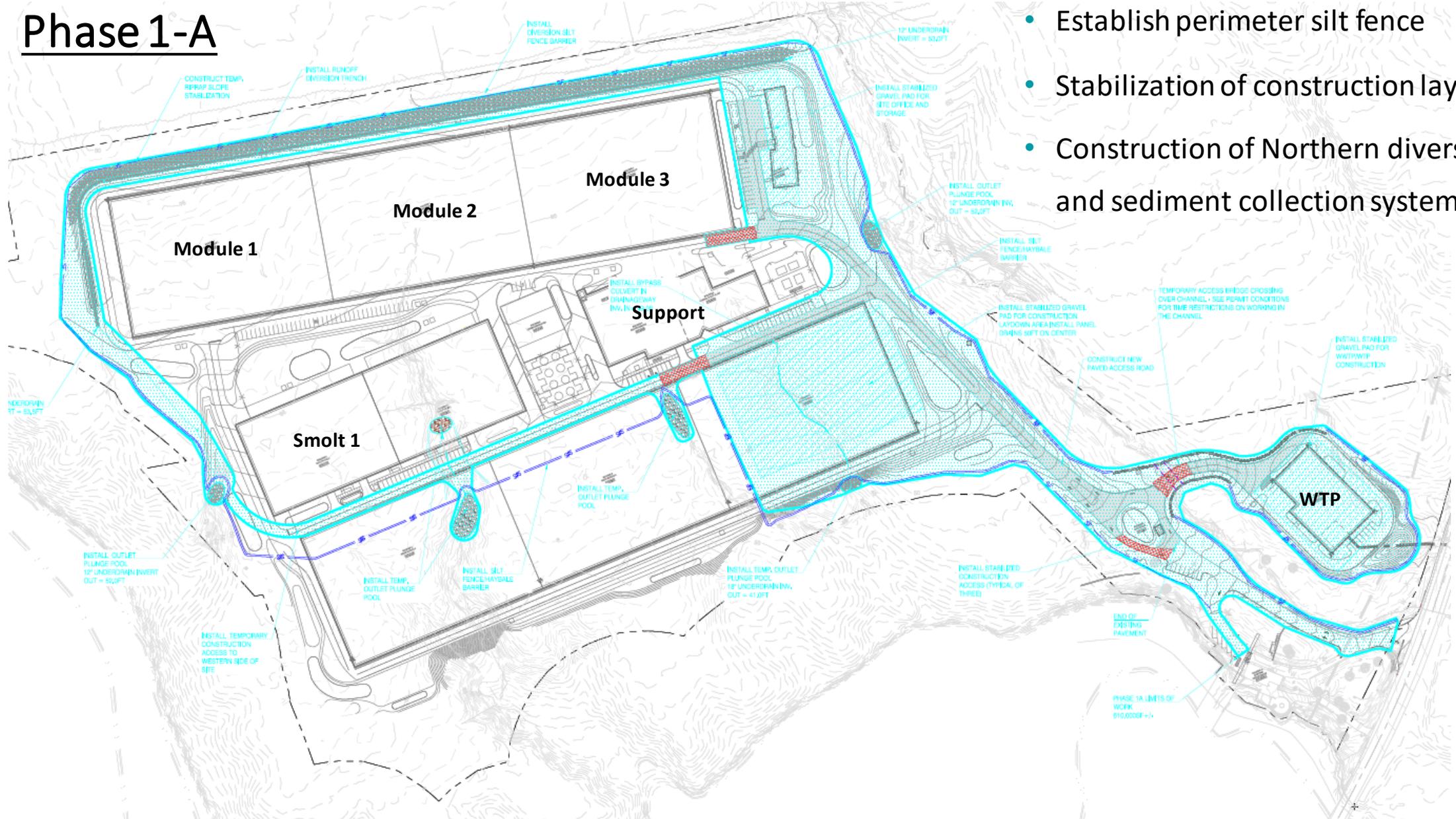


# Phase 1: Clearing

- Clearing won't occur all at once
- Establishment of initial laydown area
- Construction of temporary access roads and bridges

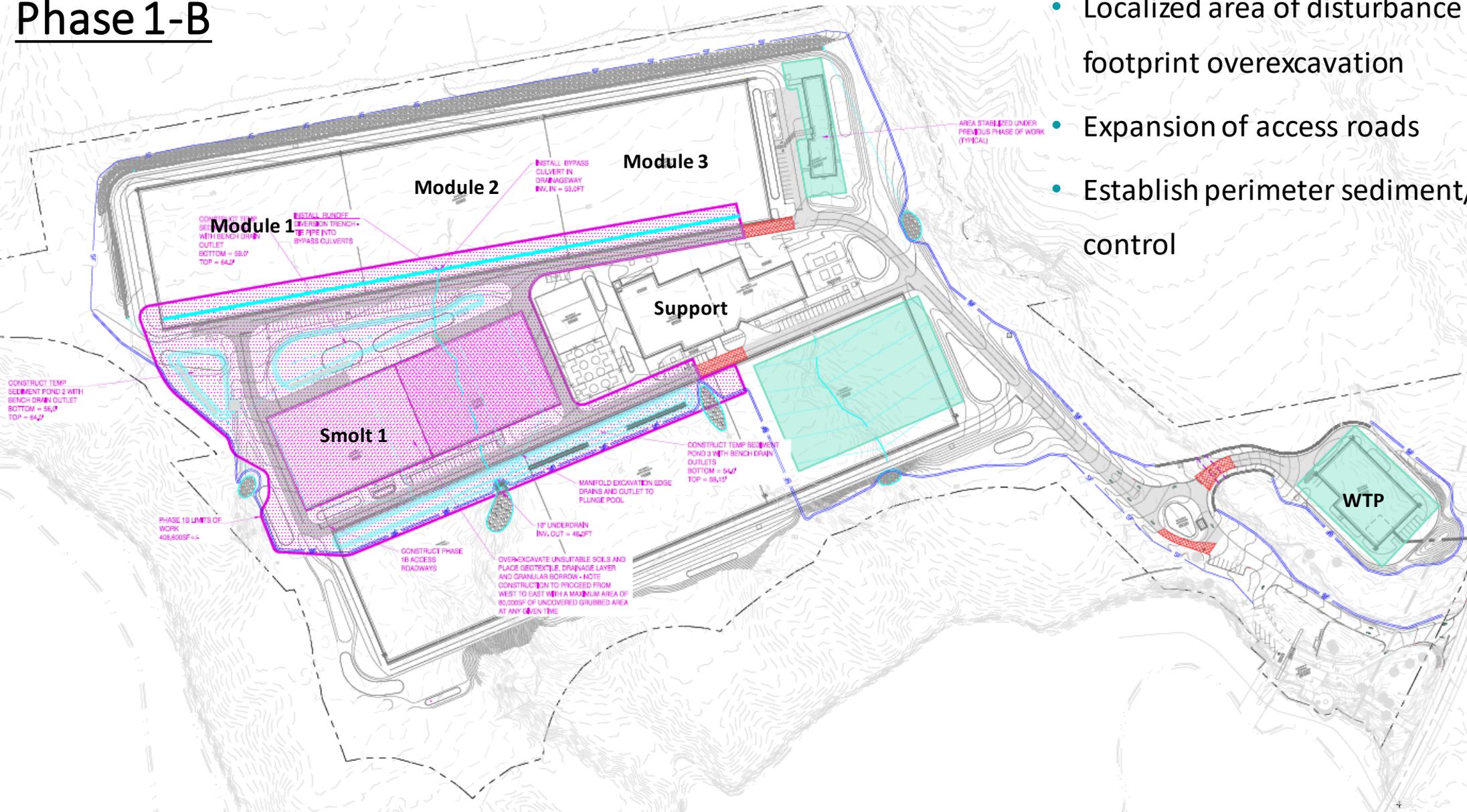


# Phase 1-A



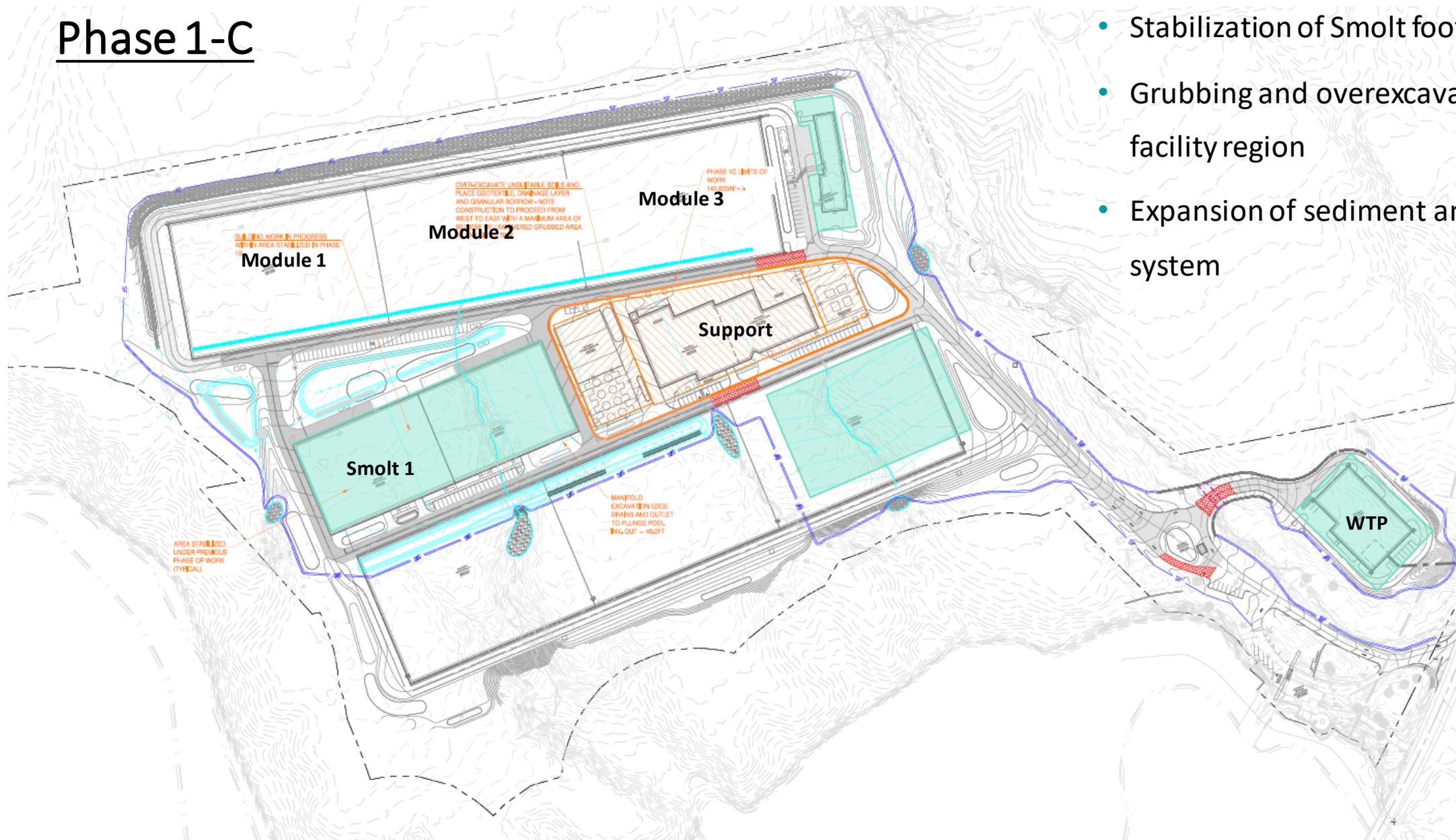
- Establish perimeter silt fence
- Stabilization of construction laydown area
- Construction of Northern diversion trench and sediment collection system

# Phase 1-B



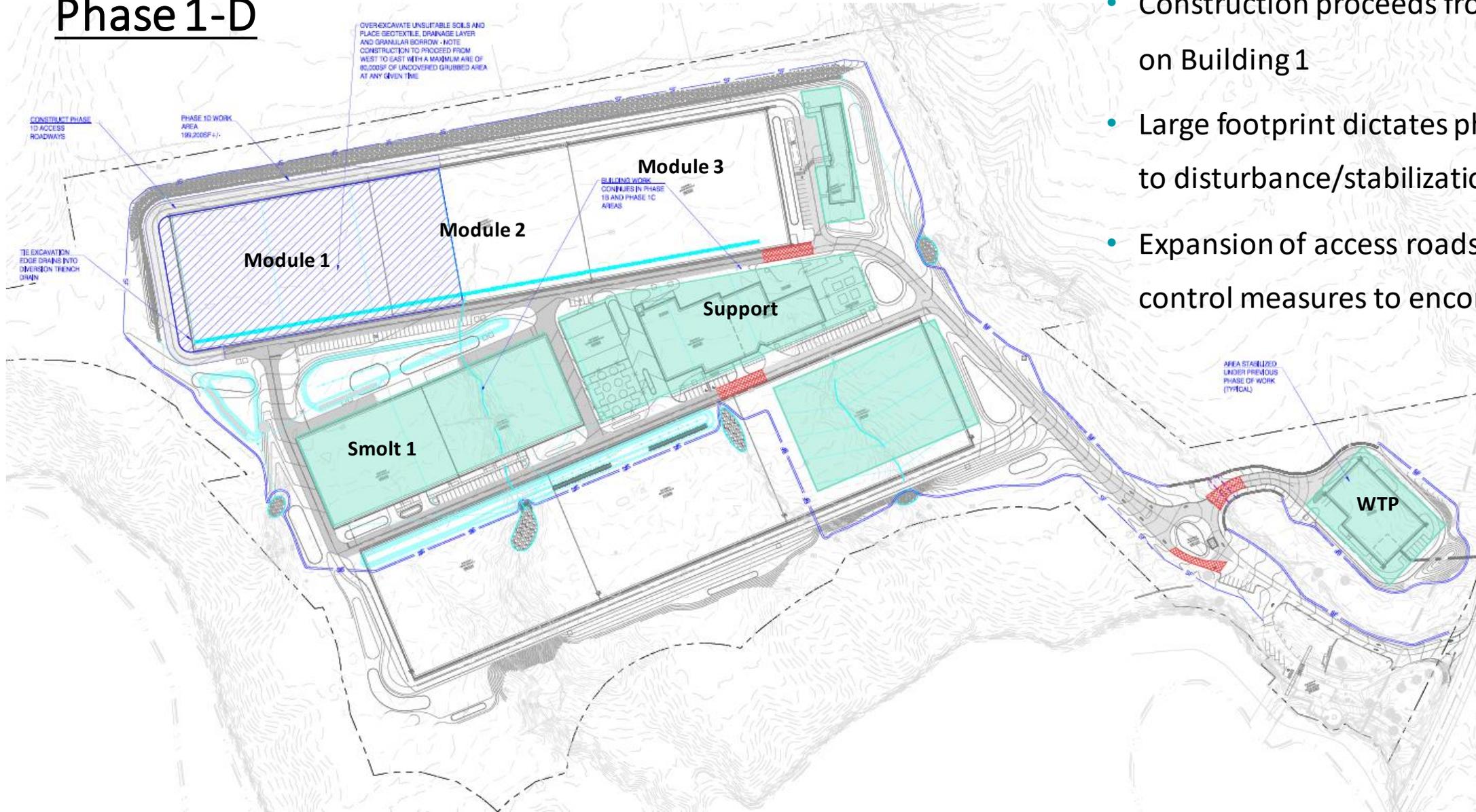
- Localized area of disturbance – Smolt footprint overexcavation
- Expansion of access roads
- Establish perimeter sediment/runoff control

# Phase 1-C



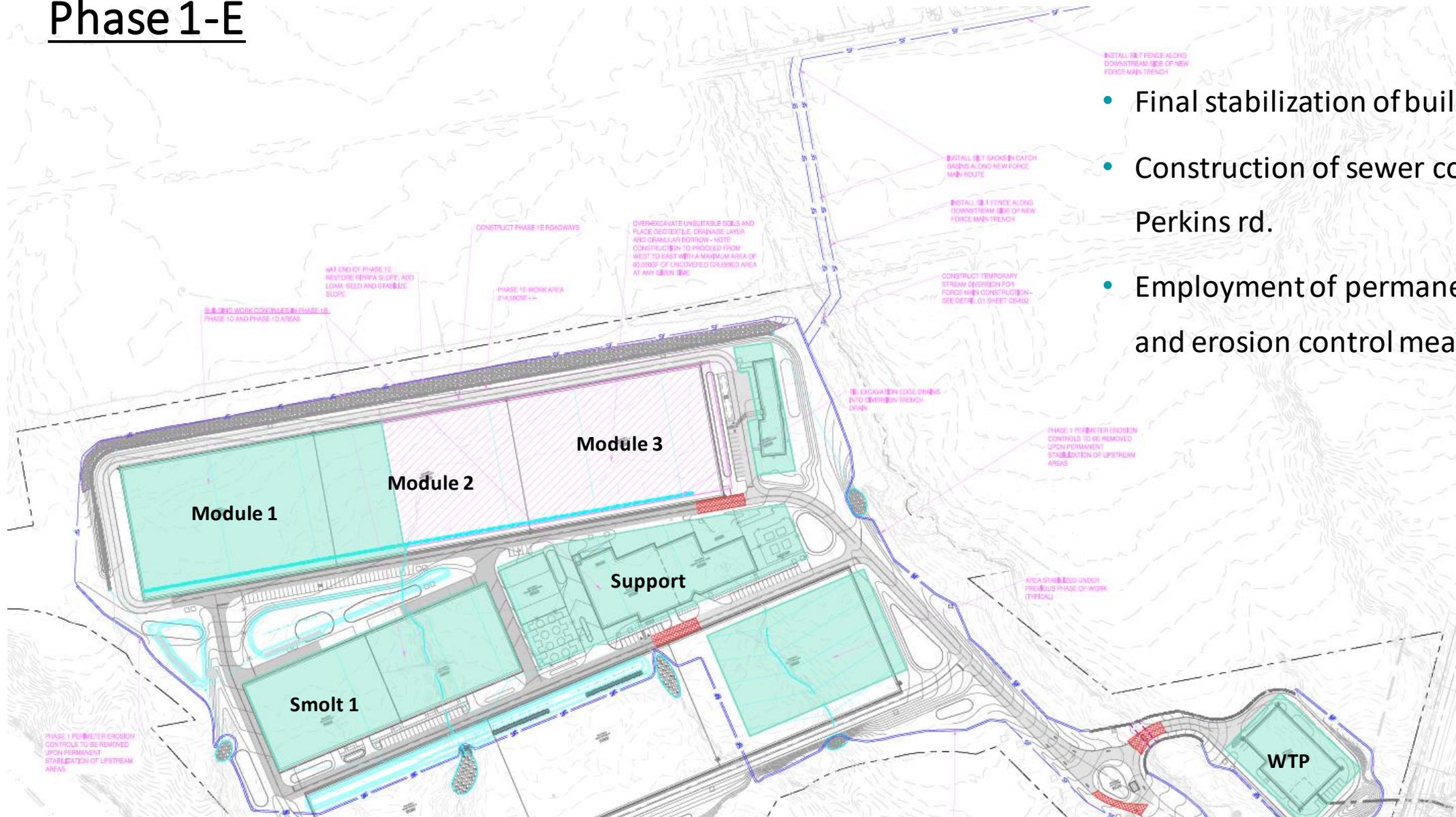
- Stabilization of Smolt footprint
- Grubbing and overexcavation of support facility region
- Expansion of sediment and runoff control system

# Phase 1-D



- Construction proceeds from West to East on Building 1
- Large footprint dictates phased approach to disturbance/stabilization
- Expansion of access roads and sediment control measures to encompass region

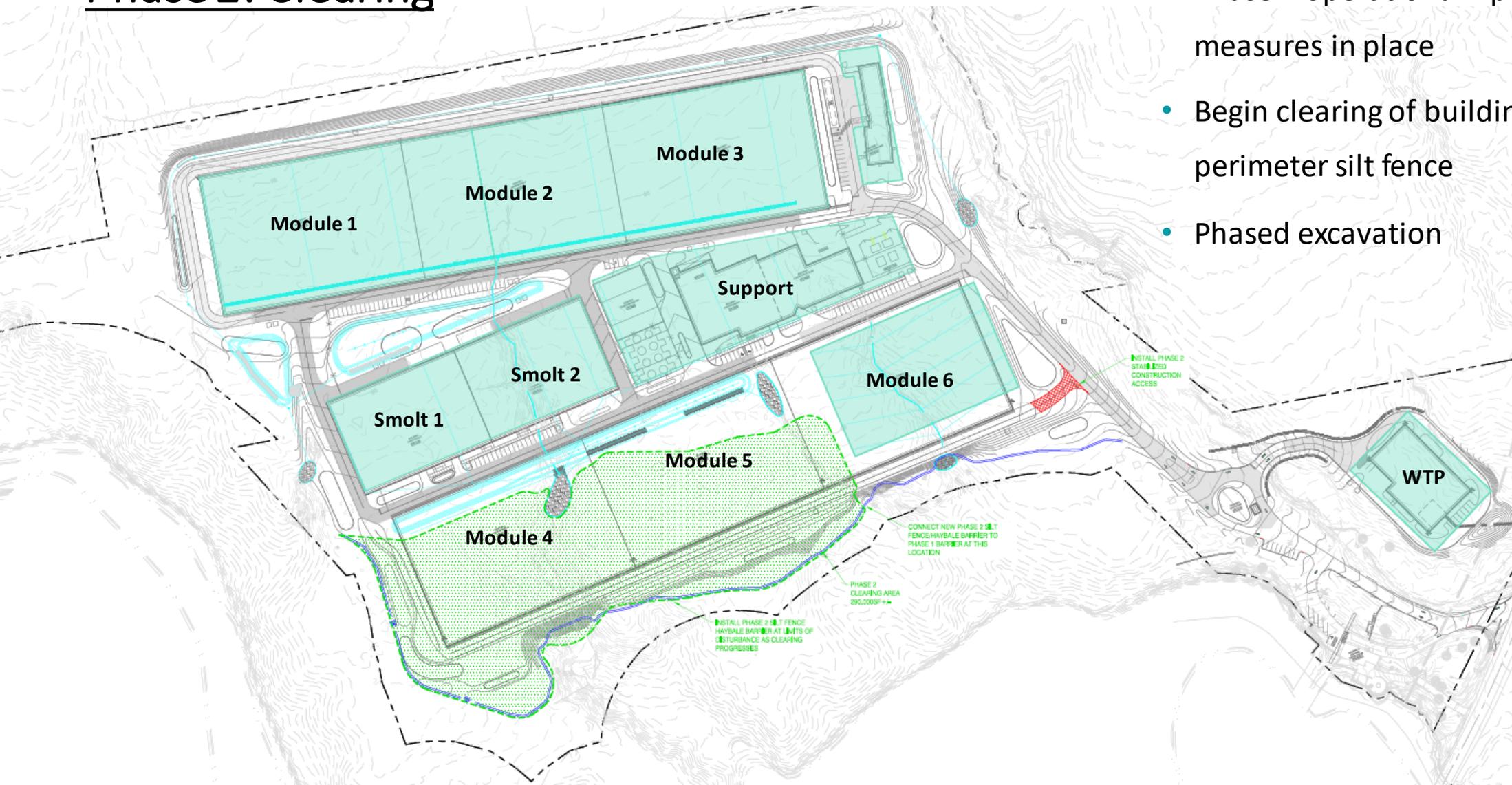
# Phase 1-E



- Final stabilization of building 1 footprint
- Construction of sewer connection to Perkins rd.
- Employment of permanent stabilization and erosion control measures.

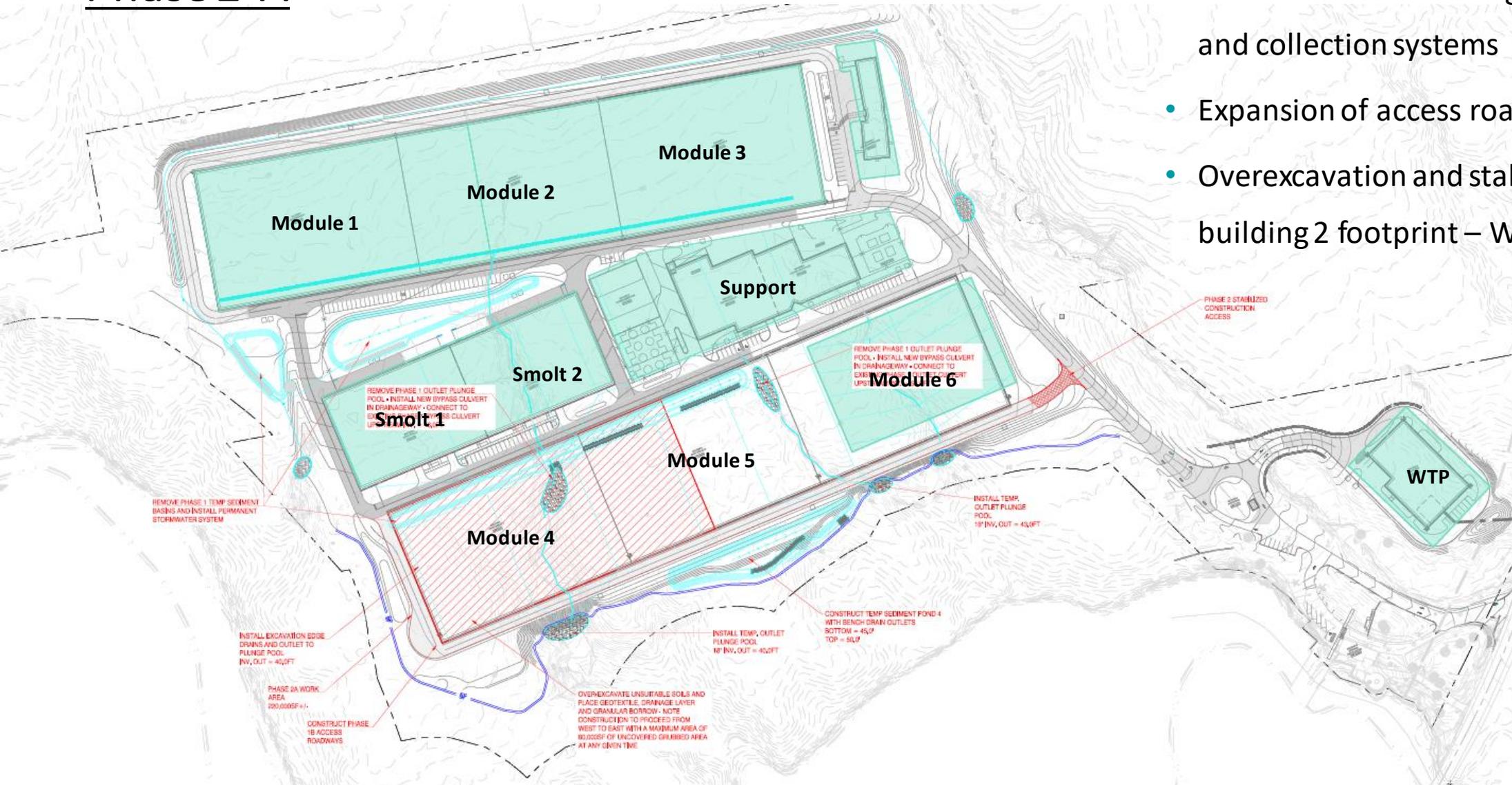
# Phase 2: Clearing

- Phase 1 operational – permanent measures in place
- Begin clearing of building 2 region – perimeter silt fence
- Phased excavation



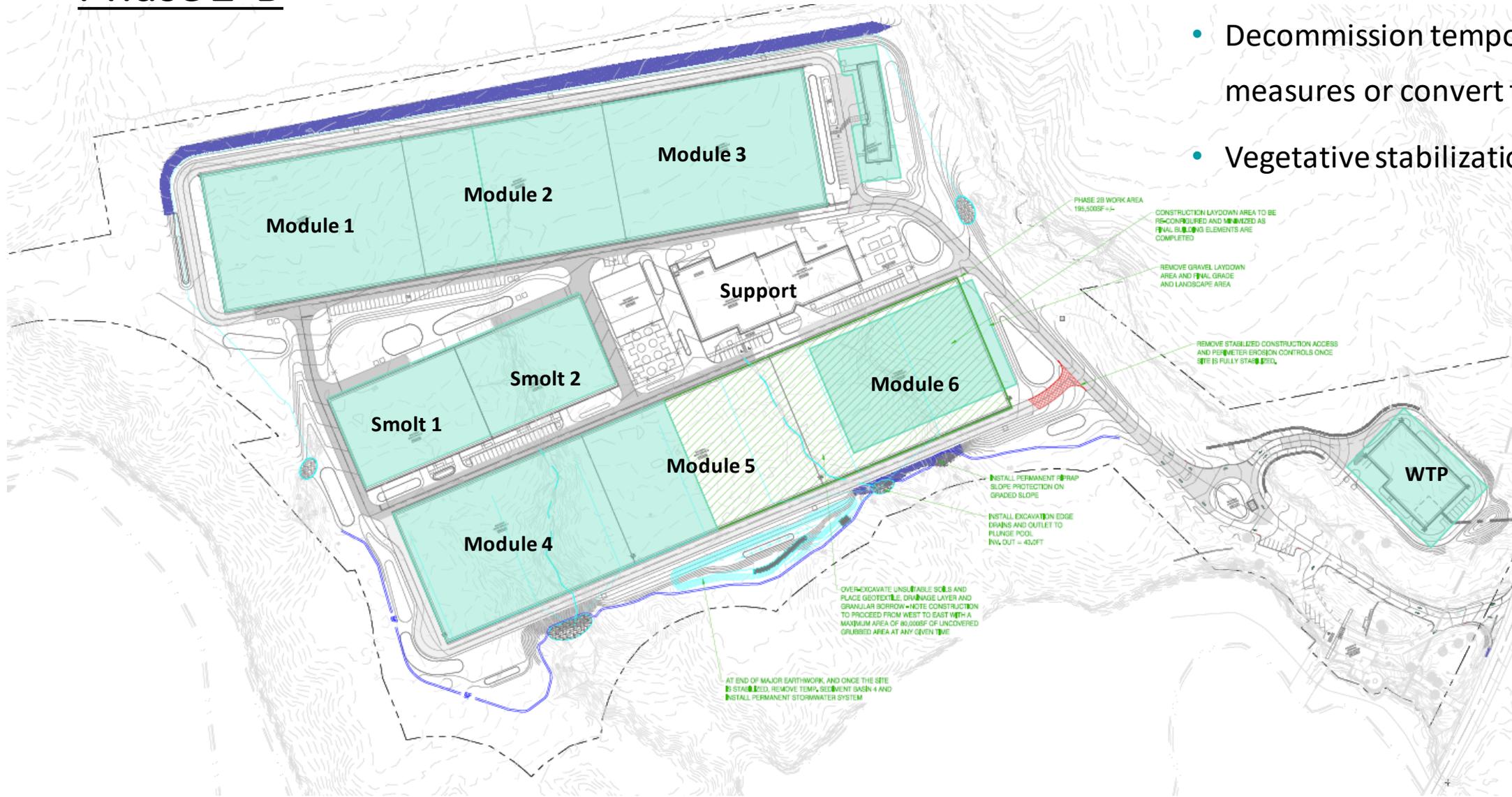
# Phase 2-A

- Establishment of downgrade drainage and collection systems
- Expansion of access roads
- Overexcavation and stabilization of building 2 footprint – West to East



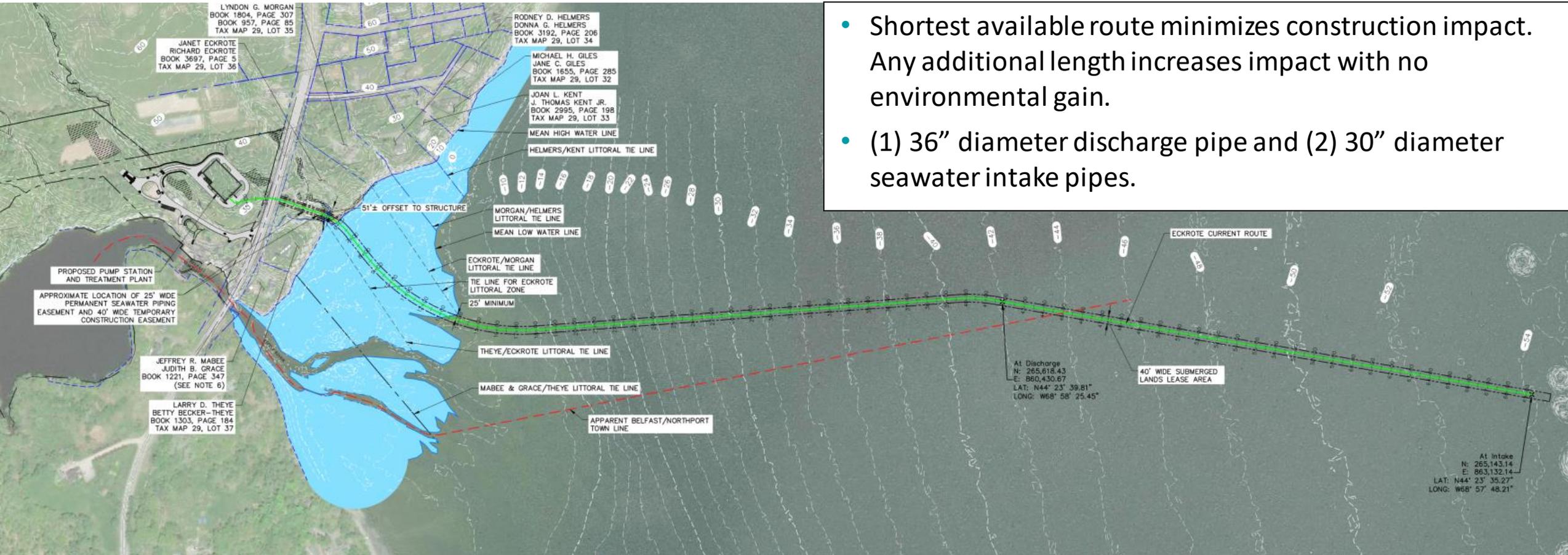
# Phase 2-B

- Completion of Phase 2 construction
- Decommission temporary erosion measures or convert to permanent
- Vegetative stabilization and buffers



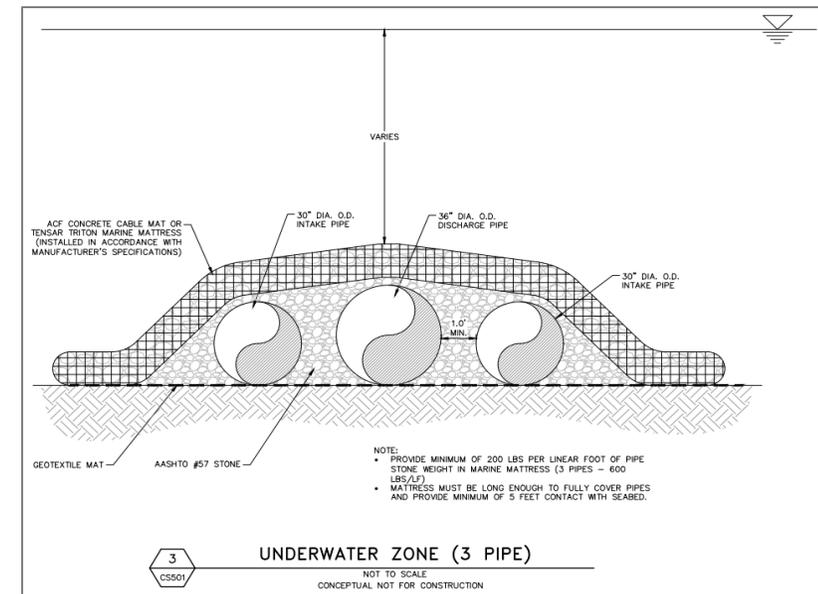
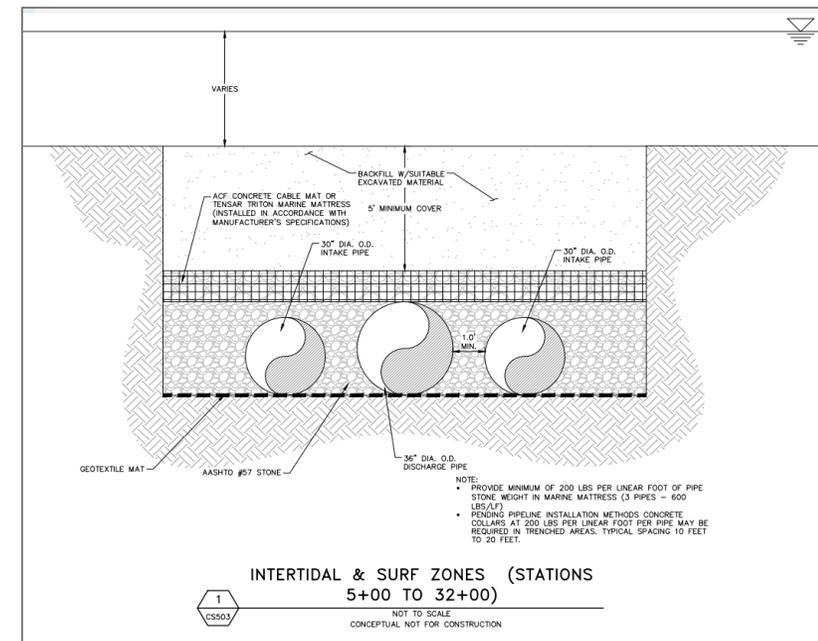
# Seawater Intake/ Discharge Pipes

- Shortest available route minimizes construction impact. Any additional length increases impact with no environmental gain.
- (1) 36" diameter discharge pipe and (2) 30" diameter seawater intake pipes.



# Pipe Installation

- All components are buried in upland, intertidal, and ~2,150 feet into the subtidal region
- All excavated material not used for backfill to be disposed of at licensed upland disposal sites
- Pipe emerges from subsurface in approximately 35' of water, remainder of pipe placed on seafloor
- Structural protection to be installed to prevent displacement or damage due to currents and storm waves
- Use of cofferdams and turbidity curtains to minimize sedimentation in intertidal region

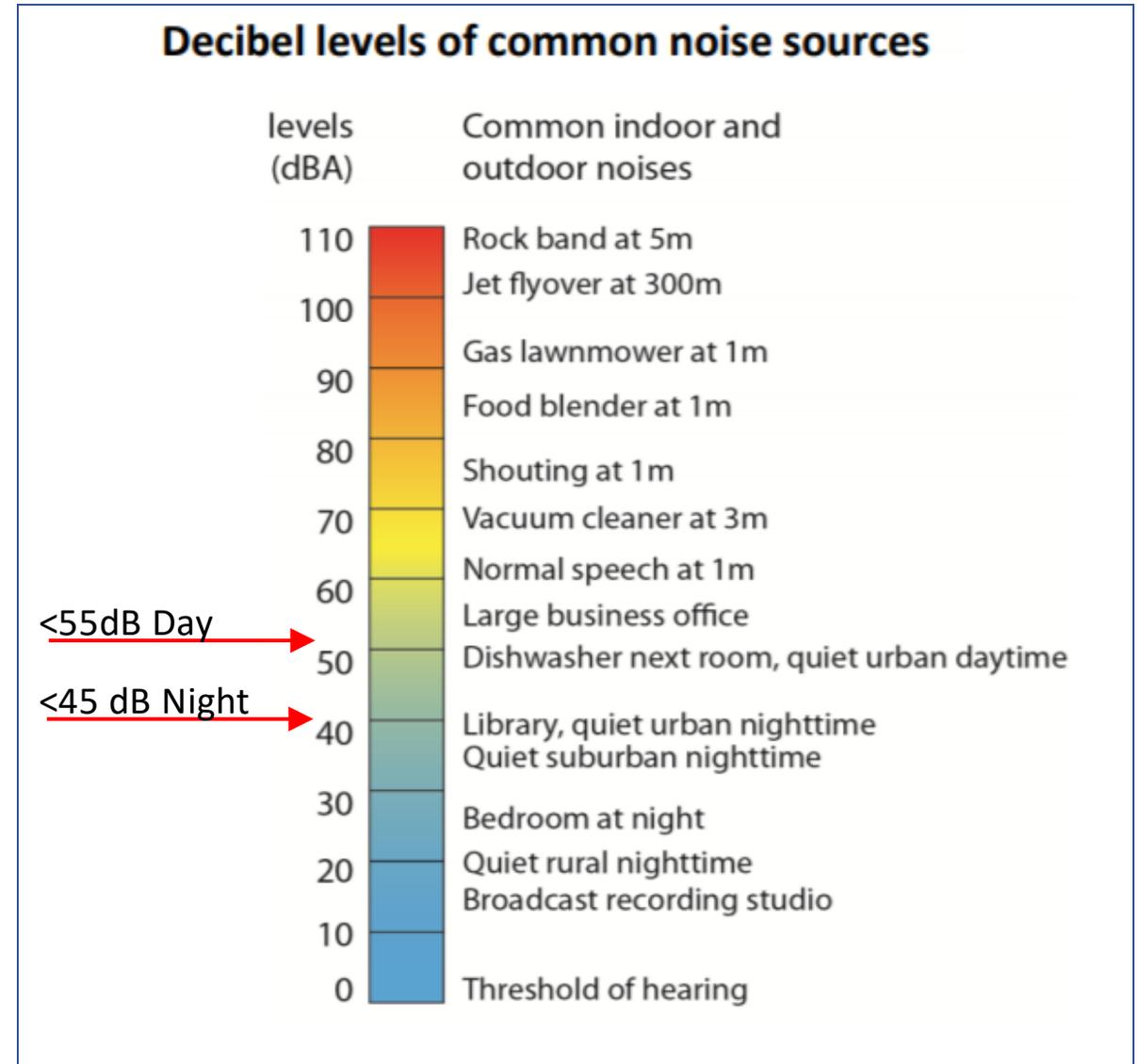


# Agenda

- ♻️ Permitting Update
- ♻️ City of Belfast Site Plan Permit Application
- ♻️ Proposed Development Overview
- ♻️ Visual Impact Assessment
- ♻️ Construction Overview
- ♻️ Soil Erosion and Sediment Control Plan
- ♻️ Noise, Odor, and Air Pollution Mitigation
- ♻️ Traffic Study
- ♻️ Proposed Stormwater Management Plan
- ♻️ Water Supply and Proposed Monitoring Plan
- ♻️ Waste Discharge

# Noise

- Chapter 375.10 of Maine's SLODA regulations govern sound levels
- < 55 dBA during daytime, <45 dBA at night, or lower at certain protected quiet areas
- State regulations more stringent than local
- Nordic's project will meet state and local regulations for permissible noise thresholds.



# Odors

*Processing byproducts have value, they will be immediately frozen / chilled and stored in insulated containers for shipping and recycling*

- **Potential Sources**

- Wastewater Treatment Plant
- Feed
- Fish Processing
- Mortalities

- **Operational Control Measures**

- Everything is indoors
- WWTP filtrate is dewatered and sealed in tanks until transport
- Feed storage is indoors in enclosed silos
- Mortalities removed from tanks, preserved, and shipped offsite.

- Best Management Practices
- Employee Training
- Staff with decades of industry experience
- Trusted local partners to efficiently remove and recycle potential sources of odor

# Air Emissions

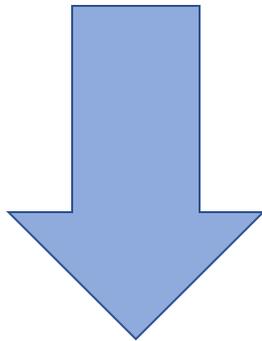
- Submitted Chapter 115 Minor Source Air Emissions Application
  - Application covers
    - back-up power generation by seven 2MW diesel generators (+1 redundancy)
  - Each piece of equipment will meet best available control technologies as specified by state of Maine regulations including particulate control measures.

Pollutant	Control Technology
NOx	<ul style="list-style-type: none"><li>• Add-On Controls (i.e., Selective Catalytic Reduction)</li><li>• Combustion Control Technologies</li></ul>
PM/PM <sub>10</sub> /PM <sub>2.5</sub>	<ul style="list-style-type: none"><li>• Add-On Controls (i.e., particulate filter)</li><li>• Combustion Control Technologies</li></ul>
CO	<ul style="list-style-type: none"><li>• Oxidation Catalyst</li><li>• Combustion Control Technologies</li></ul>
VOCs	<ul style="list-style-type: none"><li>• Oxidation Catalyst</li><li>• Combustion Control Technologies</li></ul>
SO <sub>2</sub>	<ul style="list-style-type: none"><li>• Low Sulfur Fuel</li></ul>

# Development Waste Streams

## Construction Waste

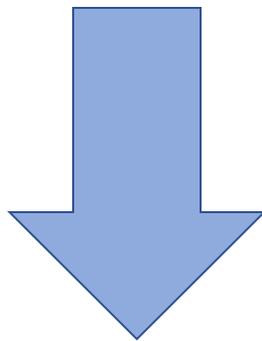
- Construction Debris
- Excess soils/dredge spoils
- Cleared timber



- Offsite contracted disposal
- Further processing/reuse
- Firewood

## Operational Solid Waste

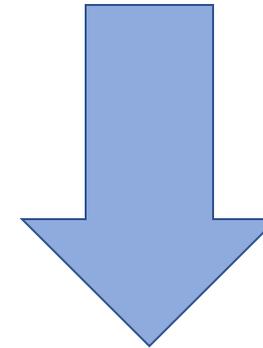
- Fish ensilage
- Processing waste
- Process filtrate



- Offsite contracted disposal
- Value-added use
  - Biogas
  - Animal feed
  - Bait

## Wastewater

- Filtrate dewatering
- Facility drainage
- Personnel use



- Facility wastewater treatment plant
- Municipal sewer line



# What regulates sea water discharge?

In Maine, the state administers the discharge permits, and the Maine DEP reviews the permit applications. Nordic has applied for a MEPDES permit.

- Proven wastewater treatment technologies.
- Discharge meets or exceeds all applicable water quality standards.
- Discharge will be monitored to ensure compliance.
- Submitted for 3<sup>rd</sup> party peer reviews.

# Agenda

- ♻️ Permitting Update
- ♻️ City of Belfast Site Plan Permit Application
- ♻️ Proposed Development Overview
- ♻️ Visual Impact Assessment
- ♻️ Construction Overview
- ♻️ Soil Erosion and Sediment Control Plan
- ♻️ Noise, Odor, and Air Pollution Mitigation
- ♻️ **Traffic Study**
- ♻️ Proposed Stormwater Management Plan
- ♻️ Water Supply and Proposed Monitoring Plan
- ♻️ Waste Discharge



**Figure 1**

<b>Site Location Map</b>
<b>Nordic Aquafarms</b>
<b>Belfast, Maine</b>

<b>Maine Traffic Resources</b>		40 Forest Falls Drive, Suite 2
		Yarmouth, ME 04096 tel: (207) 207-817-5440

ITE Trip Generation – Newest 10<sup>th</sup> Edition

<u>Time Period</u>	<u>Phase 1</u>			<u>Phase 2</u>		
	<u>Man.</u>	<u>Office</u>	<u>Avg.</u>	<u>Man.</u>	<u>Office</u>	<u>Avg.</u>
Weekday	148	196	172	248	328	288
AM Peak Hour	26	28	27	43	47	45
Entering	21	25	23	35	41	38
Exiting	5	3	4	8	6	7
PM Peak Hour	27	27	27	45	45	45
Entering	12	5	8	20	8	14
Exiting	15	22	19	25	37	31

# Traffic Impact Study

- 27 one-way trips generated during peak hours at completion of Phase 1 and 45 at completion of Phase 2
- Includes employees and delivery vehicles
- TMP not required from MaineDOT
- Facility will generate similar traffic levels during AM and PM peak hours

# Traffic Impact Study

			Route 1 and Perkins Road		
			AM Peak Hour Level of Service		
			2019	2024	2024
			<u>Existing</u>	<u>No-Build</u>	<u>Build</u>
<u>Approach/Movement</u>					
Eastbound Perkins Road			A (7.4)	A (8.8)	A (8.8)
Northbound Route 1			A (0.7)	A (0.8)	A (0.9)
Southbound Route 1			A (0.8)	A (0.9)	A (0.8)
Unsignalized Intersection Level of Service			PM Peak Hour Level of Service		
<u>LOS</u>	<u>Delay Range</u>		2019	2024	2024
			<u>Existing</u>	<u>No-Build</u>	<u>Build</u>
A	<= 10.0 seconds				
B	> 10.0 and <= 15.0				
C	> 15.0 and <= 25.0		B (11.8)	C (15.7)	C (16.9)
D	> 25.0 and <= 35.0		A (0.8)	A (1.1)	A (1.2)
E	> 35.0 and <= 50.0				
F	> 50.0		A (1.1)	A (1.2)	A (1.1)

- Facility will generate similar traffic levels during AM and PM peak hours
- AM peak hour 8:00-9:00 AM
- PM peak hour 3:45-4:45 PM
- No capacity concerns identified. Route 1 has capacity to accommodate additional trips

# Traffic Impact Study

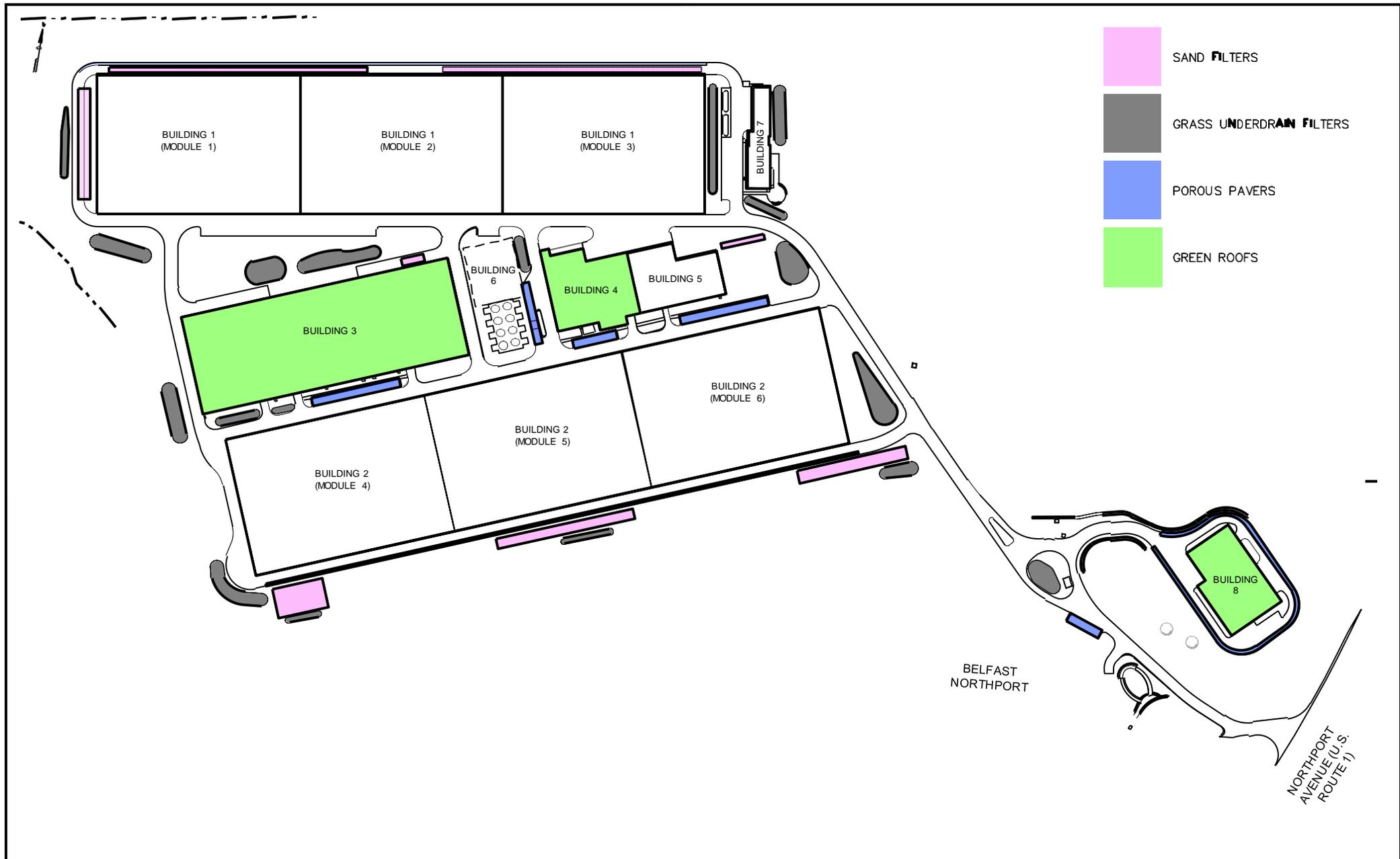
- Auxiliary left and right turn lane not warranted under projected 2024 full build volumes
- Two high crash locations on Route 1 within vicinity of site, data obtained from MaineDOT 2016-2018 analysis period
  - Collision diagrams evaluated for each for accident patterns.
- Field review conducted and no contributing safety deficiencies identified.

# Traffic Impact Study

- Sight distance from existing site drive exceeds recommended minimum to both north and south
- Additional mowing of roadside edge is recommended to north of site drive
- City of Belfast may consider asking MaineDOT to extend 40 mph zone 400' further to south to encompass site drive

# Agenda

- ♻️ Permitting Update
- ♻️ City of Belfast Site Plan Permit Application
- ♻️ Proposed Development Overview
- ♻️ Visual Impact Assessment
- ♻️ Construction Overview
- ♻️ Soil Erosion and Sediment Control Plan
- ♻️ Noise, Odor, and Air Pollution Mitigation
- ♻️ Traffic Study
- ♻️ **Proposed Stormwater Management Plan**
- ♻️ Water Supply and Proposed Monitoring Plan
- ♻️ Waste Discharge





- Sand Filters
- Grass Underdrain Filters
- Green Roofs
- Pervious Pavers

# Stormwater

- 95.5% (95% is requirement) treatment of runoff from new impervious surfaces
- 86% (80% is requirement) treatment of all developed areas
- Proposed treatment of stormwater meets Maine DEP's Stormwater Management Design Manual and Chapter 500 of Maine Regulations for stormwater.

# Agenda

- ♻️ Permitting Update
- ♻️ City of Belfast Site Plan Permit Application
- ♻️ Proposed Development Overview
- ♻️ Visual Impact Assessment
- ♻️ Construction Overview
- ♻️ Soil Erosion and Sediment Control Plan
- ♻️ Noise, Odor, and Air Pollution Mitigation
- ♻️ Traffic Study
- ♻️ Proposed Stormwater Management Plan
- ♻️ Water Supply and Proposed Monitoring Plan
- ♻️ Waste Discharge

# Water will come from four sources

**Belfast Bay**

➤ 3,925 gpm

**Belfast Water District**

➤ 500 gpm



**Wells on Property**

➤ 455 gpm



**Surface water**

➤ 250gpm



## Understanding the Aquifer

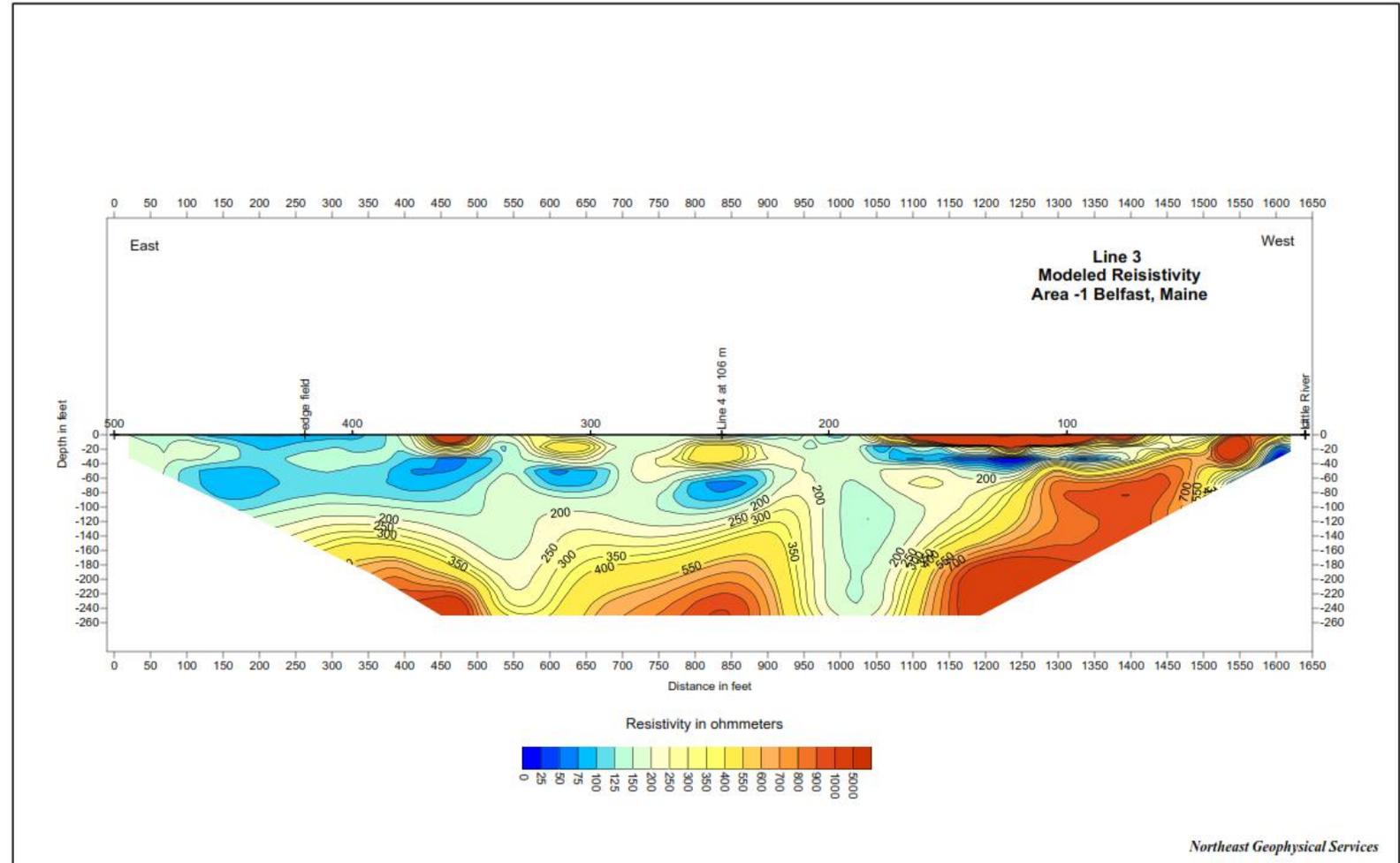
- A comprehensive investigation was completed, including:
  - Exploration
    - Geophysical Survey
    - Drilling
  - Characterization
    - Four Pumping Tests
    - Over 20 Monitoring Points

All of this information was used to form the Conceptual Site Model and the set up the Groundwater Model

# Understanding the Aquifer

A comprehensive investigation was completed, including:

1. Exploration
  1. Geophysical Survey



# Understanding the Aquifer

A comprehensive investigation was completed, including:

1. Exploration
  1. Geophysical Survey
  2. Drilling



# Understanding the Aquifer

A comprehensive investigation was completed, including:

1. Exploration
  1. Geophysical Survey
  2. Drilling
2. Characterization
  1. Four Pumping Tests



# Understanding the Aquifer

A comprehensive investigation was completed, including:

1. Exploration
  1. Geophysical Survey
  2. Drilling
2. Characterization
  1. Four Pumping Tests
  2. Over 20 Monitoring Points

All of this information was used to make the Groundwater Model



# Executive Summary

---

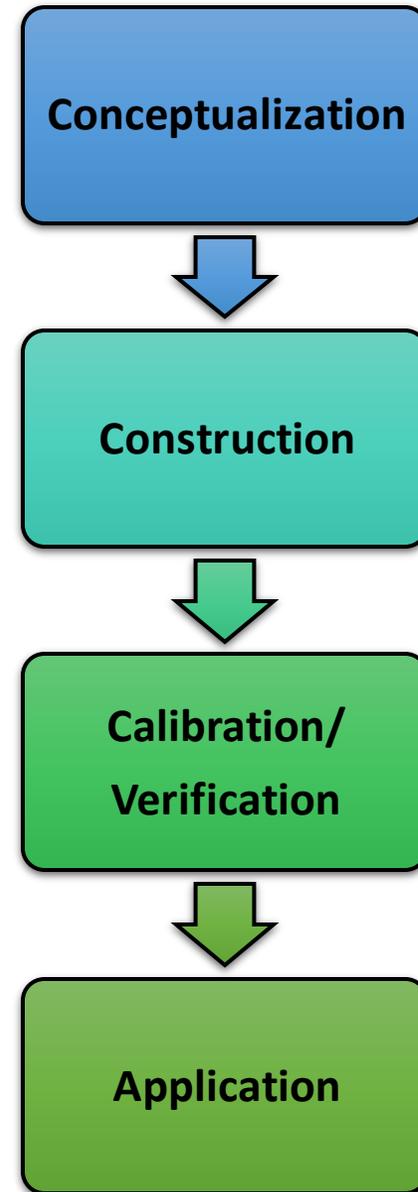
- Significant volume of information and data gathered during hydrogeologic investigation
- Mathematical model developed to support estimates of aquifer responses to proposed withdrawals
- Model results indicate proposed withdrawals not anticipated to influence current use of domestic wells in neighboring areas
- Going forward – data gathering to establish baselines and monitor private supply well conditions

# Modeling Objectives & Approach

1. Construct a groundwater flow model for the bedrock aquifer occurring in the Site vicinity based on available data and information; and
2. With support from the model, assess potential long-term viability of proposed withdrawal rates based on drawdown effects occurring away from the proposed well network.

**Common modeling code applied  
(MODFLOW-USG)**

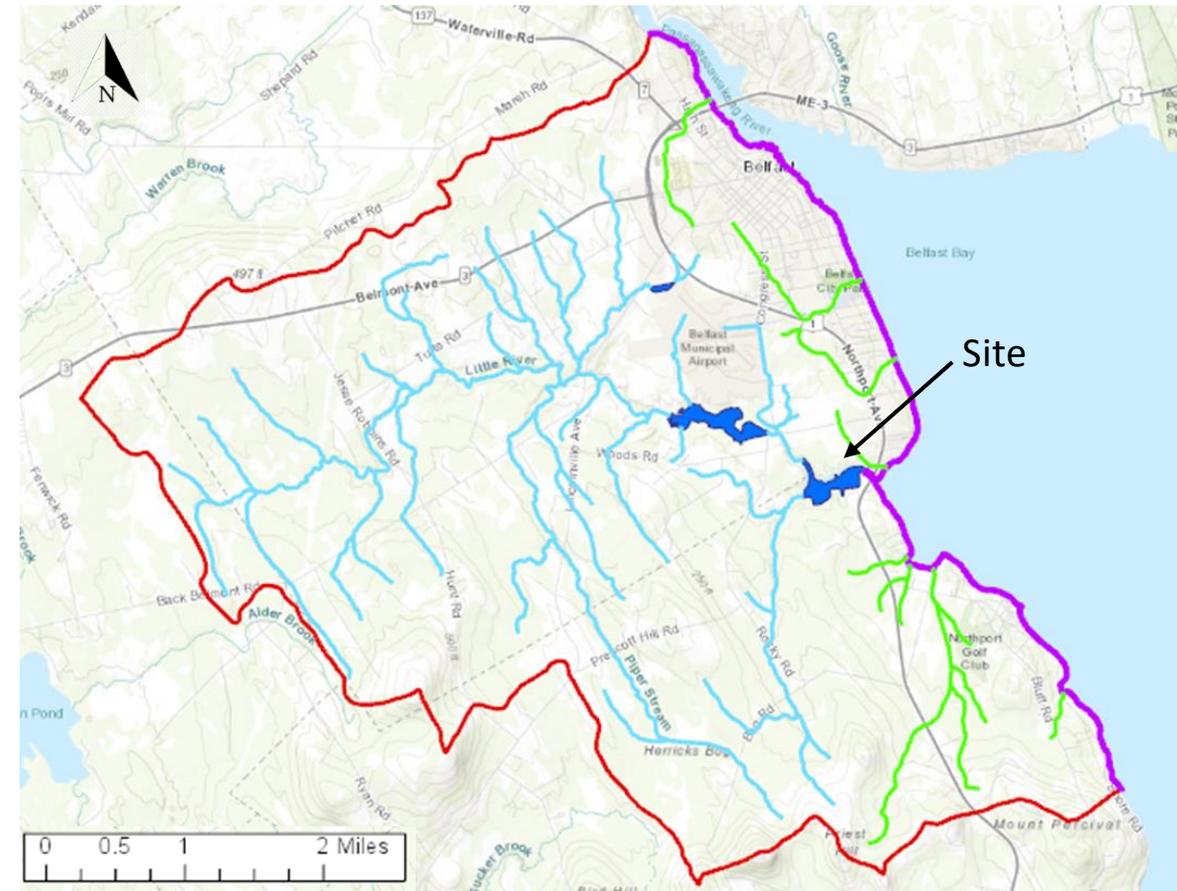
**Common modeling approach applied  
to address these objectives**



# Conceptual Model

## Key Components

- Perimeter boundaries
- Interior “sources and sinks”
- Recharge
- Proposed withdrawals
- Aquifer properties (e.g., storage)

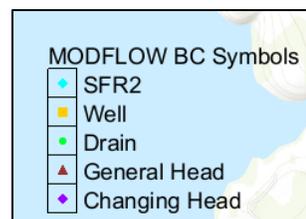
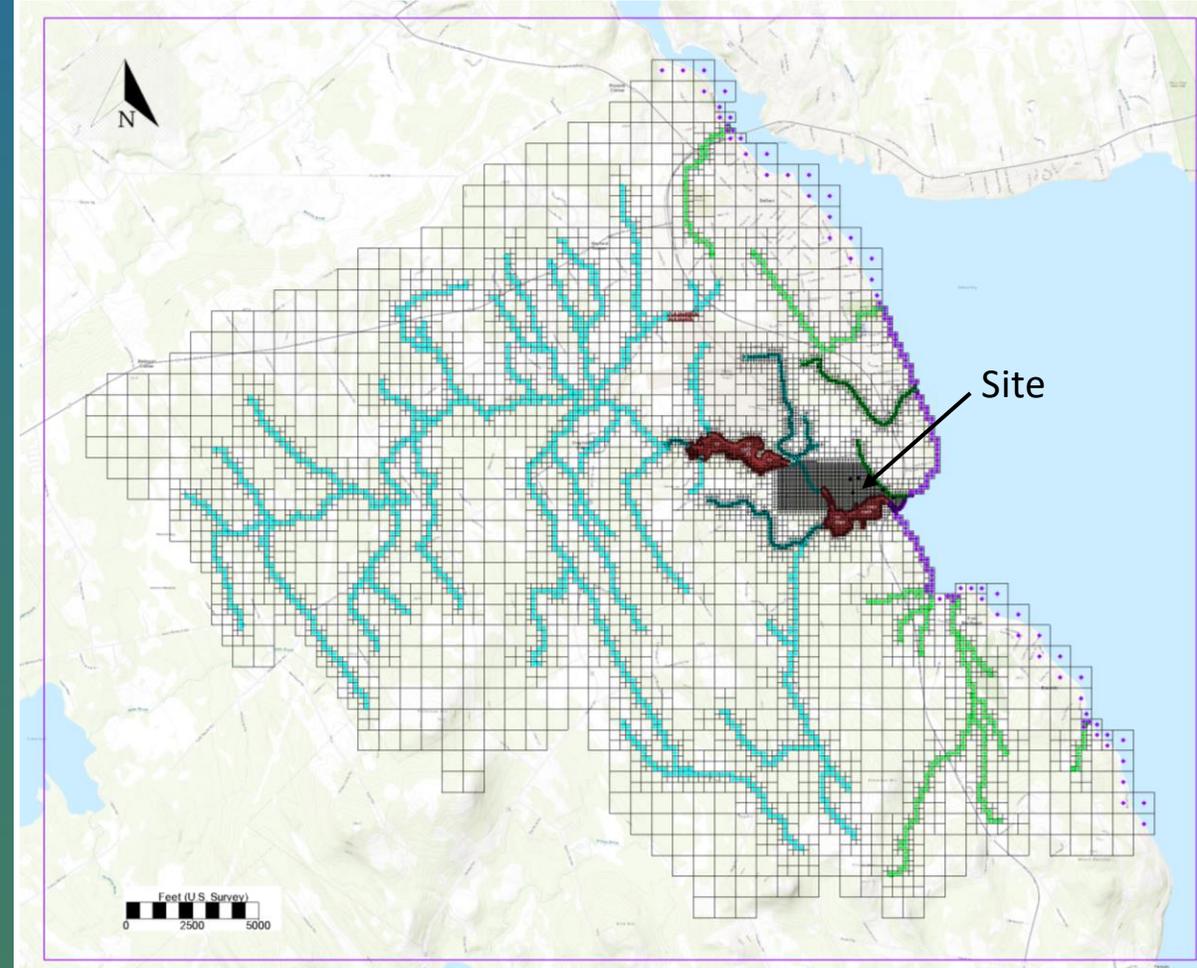


**Total area = 23.2 square miles**

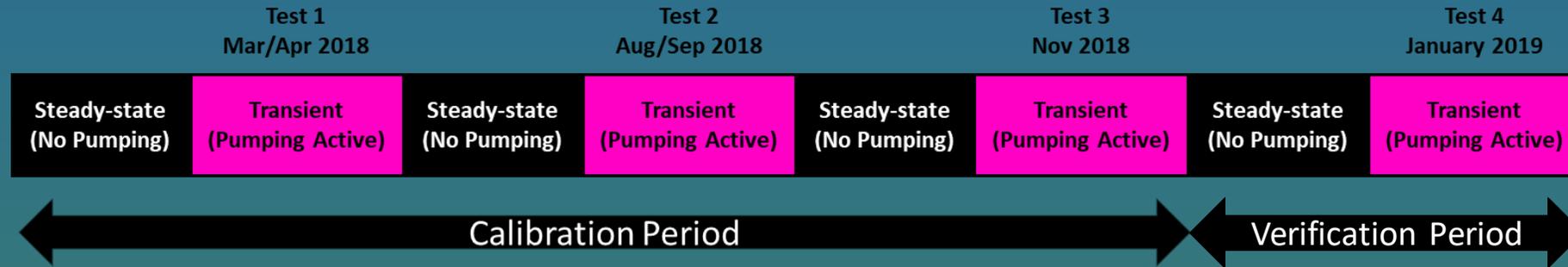
# Model Construction

## Model Representation

- Drainage area limits;
- Belfast Bay;
- Little River and streams;
- Reservoirs/ponds;
- Recharge; and
- Proposed withdrawals (pumping)



# Model Calibration and Verification



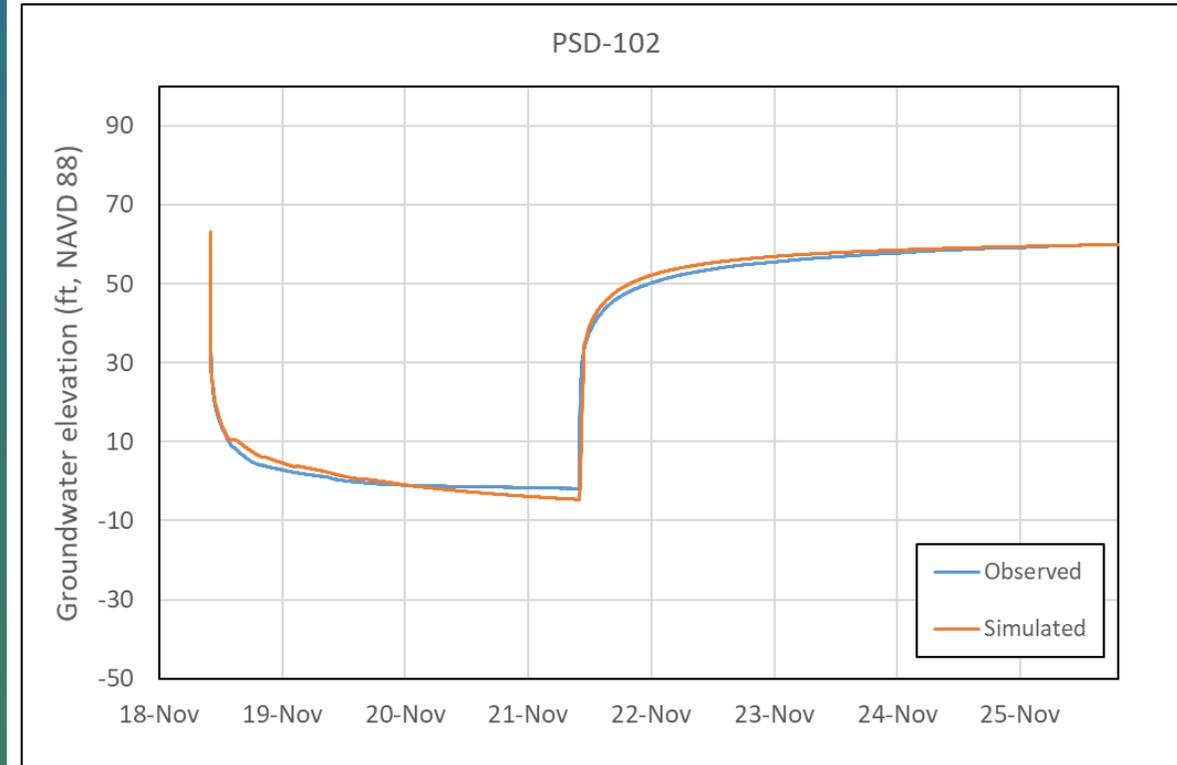
## Approach Overview:

- Manual approach supplemented by automated parameter estimation
- Several hydraulic parameters considered during calibration
- Robust “target” data sets (~200,000 individual data points)

# Model Calibration and Verification

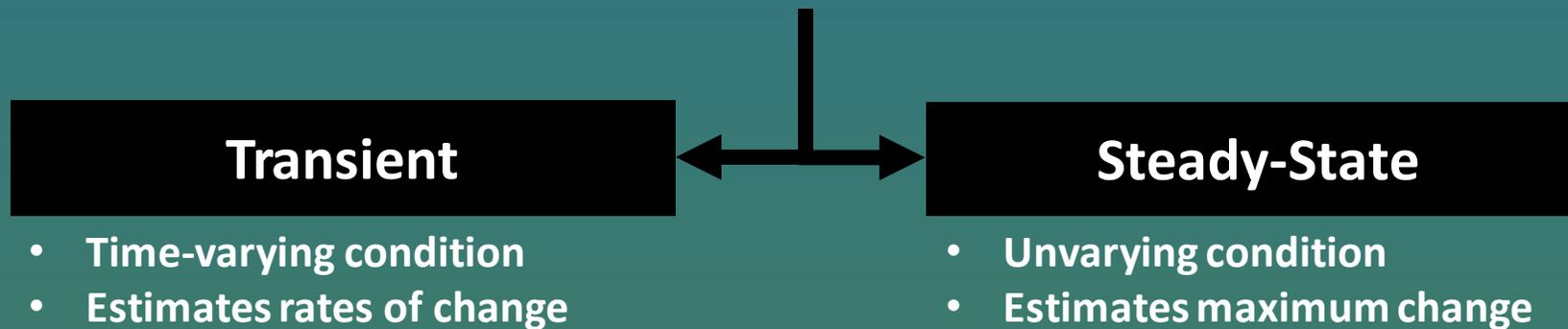
## Summary of Results

1. Hydraulic heads (water levels)
2. Flow rates
3. Verification – similar consistency

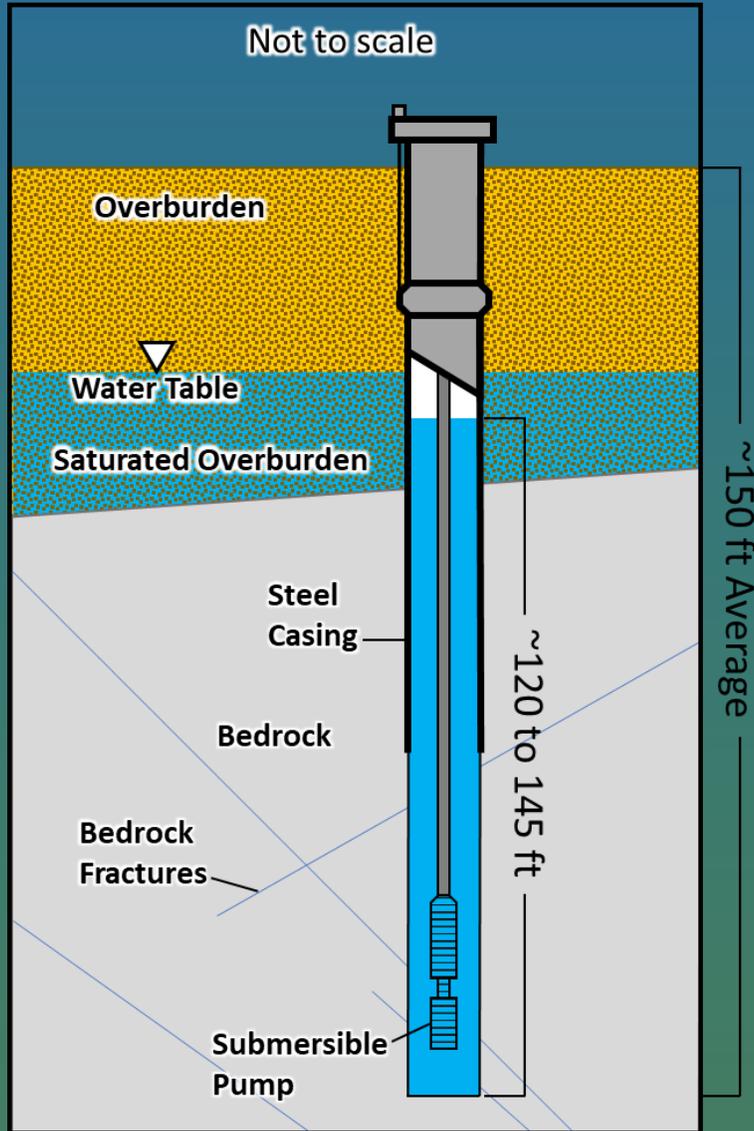


# Model Application Approach

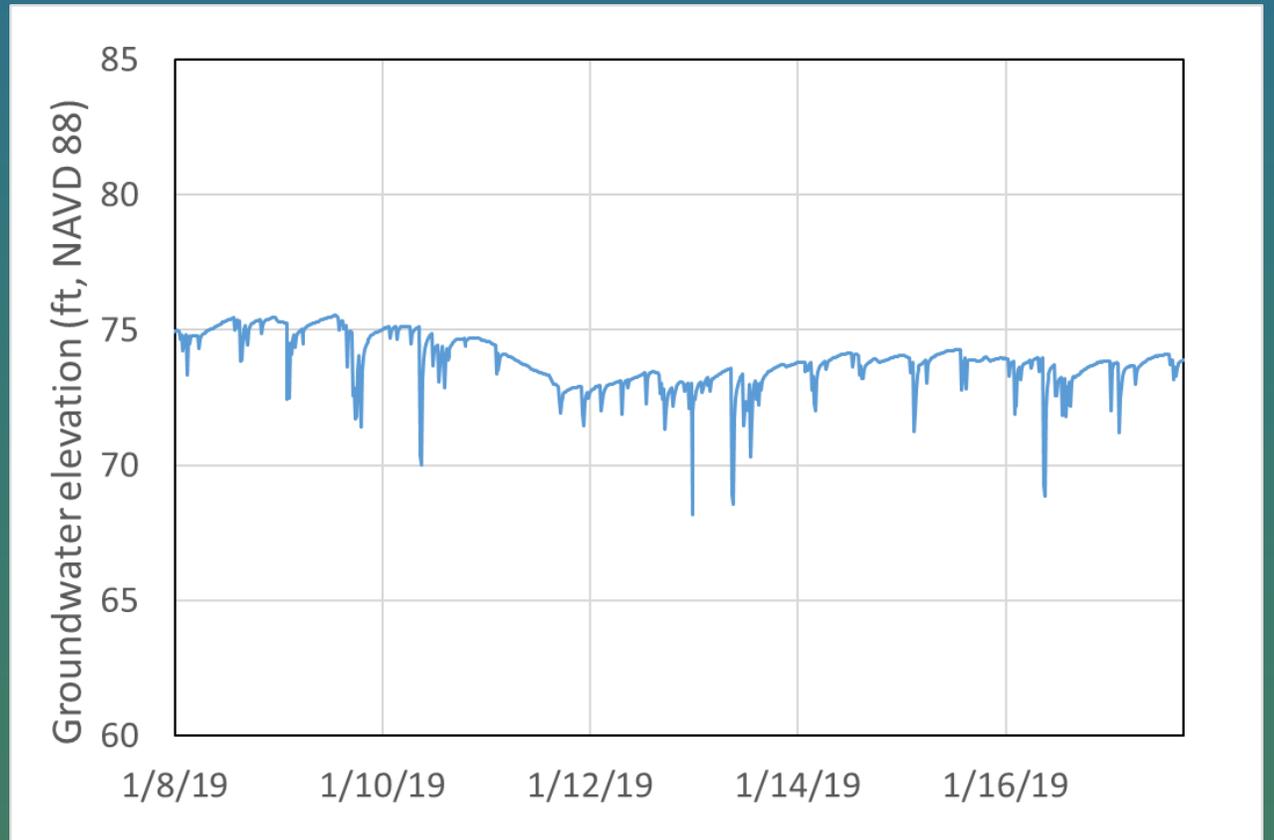
Pumping “Scenario” of 455 gallons per minute (gpm)



# Model Results



## Typical Domestic Supply Well Fluctuations



# Summary

---

- A mathematical model of groundwater flow in the Site vicinity was created using common techniques and a significant amount of field data.
- Calibration and verification results suggest the model is a reasonable representation of hydraulic responses to Site withdrawals.
- Model results indicate a proposed withdrawal scenario of 455 gpm is not anticipated to influence current use of domestic wells.
- Data gathering to establish thresholds and monitor private supply well conditions

# Monitoring Methodology

- Data Evaluation
- Performance Criteria
- Threshold Levels
  - Action Plan

# Monitoring Points

- Production Wells
- Bedrock Monitoring Wells
- Private Water Supply Wells
- Piezometers
- Overburden Monitoring Wells
- Surface Water Stages
- Biomonitoring
- Precipitation



# Private Groundwater Wells: Quantity

The transducers will collect data every 15 minutes

Downloaded for evaluation on a quarterly basis

Following significant changes in groundwater extraction rates, such as the start of Phase 1 and Phase 2 operations, water level data will be downloaded from transducers on a monthly basis for evaluation

# Private Groundwater Wells : Quality

Water quality monitoring will be conducted on a quarterly basis

Sampling will be conducted in accordance with MEDEP SOP

Continuous chain of custody for all samples

Samples will be analyzed by a certified environmental laboratory

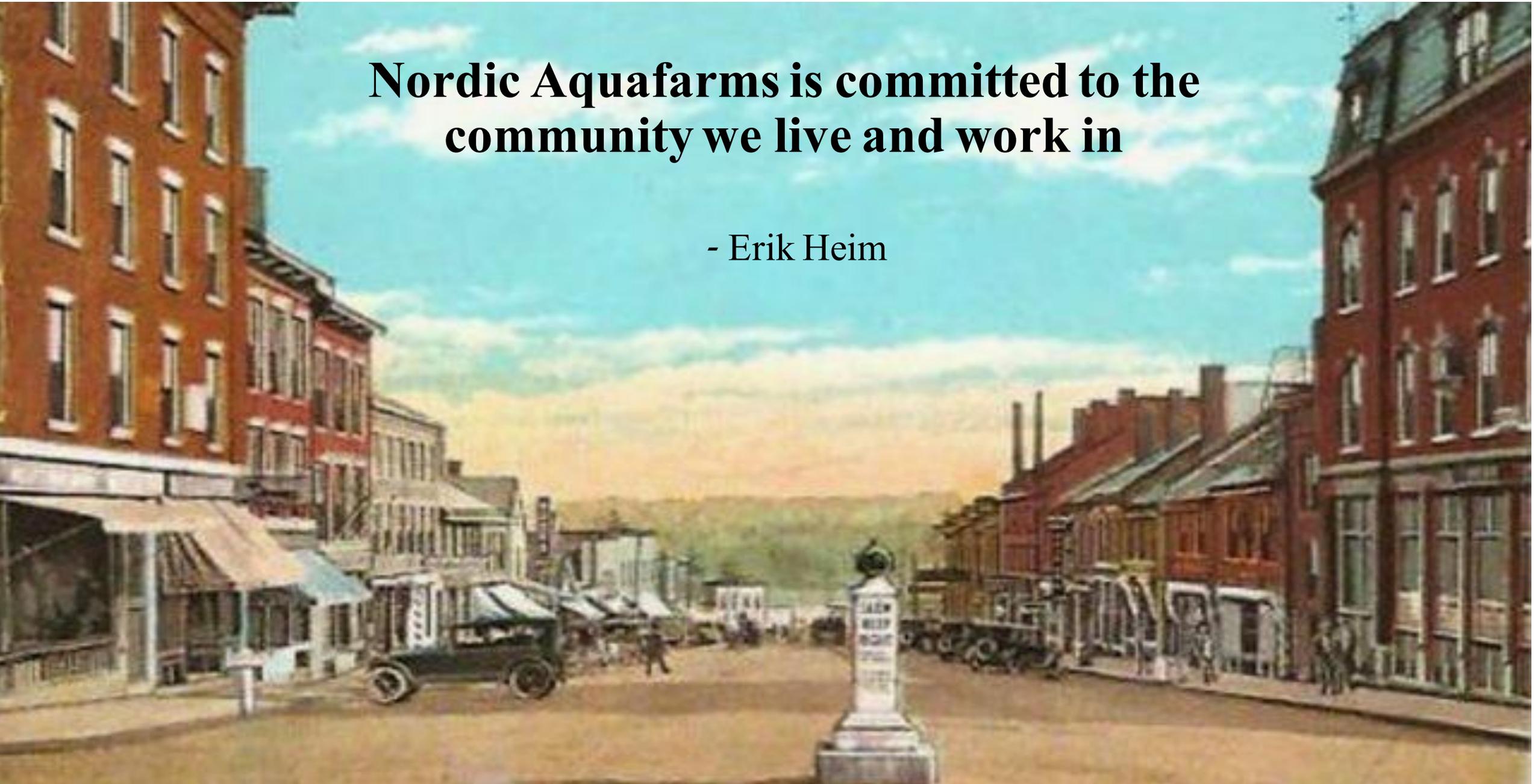
# Monitoring Parameters

- Water Levels
- Conductivity (salinity indicator)
- Nitrogen & Phosphorus
- Drinking Water Quality
  - Bacteria, nitrate, nitrite, fluoride, copper, iron, manganese, arsenic, hardness, pH, total dissolved solids
- Vegetation
- Aquatic Macroinvertebrates
- Precipitation



**Nordic Aquafarms is committed to the  
community we live and work in**

- Erik Heim



# Agenda

- ♻️ Permitting Update
- ♻️ City of Belfast Site Plan Permit Application
- ♻️ Proposed Development Overview
- ♻️ Visual Impact Assessment
- ♻️ Construction Overview
- ♻️ Soil Erosion and Sediment Control Plan
- ♻️ Noise, Odor, and Air Pollution Mitigation
- ♻️ Traffic Study
- ♻️ Proposed Stormwater Management Plan
- ♻️ Water Supply and Proposed Monitoring Plan
- ♻️ Waste Discharge

# Next Steps:

- ♻️ Planning Board Site Walk- July 10<sup>th</sup>, 2019
- ♻️ Planning Board Organizational Meeting- July 11<sup>th</sup>, 2019
- ♻️ Planning Board Plan Review meetings- Start August, 2019
  - ♻️ Meetings to cover particular aspects in detail