Supplement to Notice of Intent
DEP No. 082-0379

Department of Conservation & Recreation

Winthrop Beach Nourishment

Winthrop Shore Drive
Winthrop, Massachusetts

June 20, 2012

OVERVIEW:

This document includes additional and revised information as requested by the Winthrop Conservation Commission and its consultant, pursuant to the initial Public Hearing on this Notice of Intent (NOI) held on June 13, 2012.

INDEX:

OVERVIEW: 1

INDEX: 1

1. Miscellaneous Information 2

1.A Minor Clarifications and Errata 2

1.B Truck Route Enforcement 2

2. Construction Schedule 3

3. Construction Logistics, Staging and Equipment 3

3.A Overview of Construction for Each Contract 4

3.B Equipment Storage, Refueling & Spill Management 6

3.C Truck Dumping Area 6

4. Winthrop Beach Monitoring and Mitigation Plan 8

4.A. Physical Monitoring at Winthrop Beach 8

4.B Biological Monitoring at Winthrop Beach 10

4.C Mitigation at Winthrop Beach 11

4.D Minimization at Winthrop Beach 12

5. Effect of Nourishment on Wave and Sediment Transport Patterns Relative to Surfing Concerns 13

6. Public Information 15

7. Response to Written Comments 16

Attachment A – Power Point of Hearing Presentation, June 13, 2012 A-1
Attachment B – Grain Size Distribution, Saugus Borrow Site B-1
Attachment C – Groin Construction Details, Sheet C-7 C-1
Attachment D – Shellfish Survey Write-up from FEIR D-1

1. Miscellaneous Information

1.A Minor Clarifications and Errata

Page 14 of 43, Section 8.1 of NOI Attachments
DELETE reference to the removal of the Coral Avenue groin.
Note: The removal was originally proposed to compensate for construction of the new terminal groin. However, under the "Pilot Project," removal would not be required. It will remain in place and will be included in the repair work being done in the first construction contract (C1A).

Page 35 of 43, Section 10.3.3 Coastal Beach, Item (5) NOI Attachments
DELETE in its entirety and **REPLACE** with the following:

> "(5) Beach nourishment with clean sediment of a grain size compatible with that on the existing beach may be permitted size
> A topographic survey, borings, test pits and grain size analyses were conducted to confirm the material at the Saugus borrow site would be of a grain size compatible with that on the existing Winthrop Beach. The comparison of grain size is presented in Attachment 1 of the NOI."

Page 35 of 43, Section 10.3.3 Coastal Beach, Item (7) NOI Attachments
DELETE in its entirety and **REPLACE** with the following:

> "(7) Notwithstanding the provisions of 310 CMR 10.27(3) through 10.27(6), no project may be permitted which will have any adverse effect on specified habitat sites or rare vertebrate or invertebrate species, as identified by procedures established under 310 CMR 10.37.
> Only the "Pilot Project" will perform work in known habitat sites. The Pilot Project will reduce impact to the maximum extent practicable for the potential impacts to know habitats, which represents the threshold allowable under the legislation. See Section 4 of Supplement #1 to the NOI."

Page 36 of 43, Section 10.4.3, Item (4)(d) NOI Attachments
DELETE in its entirety and **REPLACE** with the following:

> "(d) Distribution of sediment grain size
> A topographic survey, borings, test pits and grain size analyses were conducted to confirm the material at the Saugus borrow site would be of a grain size compatible with that on the existing Winthrop Beach. The comparison of grain size is presented in Attachment 1 of the NOI."

Pages 39 and 40 of 43, Section 11.2.3 of NOI Attachments
Clarification: Mention is made of Winthrop Beach being a barrier beach. It should be noted that Winthrop Beach is not a state designated barrier beach. Nevertheless, geologically it was formed as a typical barrier beach, as a tombolo spanning between the drumlins at Winthrop Highlands and Cottage Hill. This is also indicated in the topography, which was originally (before the seawall) a dune gently sloping west to the salt marsh which is now the area now known as Crystal Lake and the golf course.

1.B Truck Route Enforcement

A comment was made concerning the truck route and if there was any way to enforce the route with the contractor. The General Conditions will include a provision for a $500 fine for each and every instance of trucks deviating from the approved route to and from the Beach. Additionally, Contractors will be

required to equip all trucks with a GPS monitoring system and compliance will be monitored in real time by the DCR, Planning Bureau GIS Unit.

2. Construction Schedule

At the June 13th Hearing, we provided a preliminary construction schedule. A construction schedule was not included in the NOI. The actual schedule may vary, depending on permit conditions, construction logistics, and availability of funding in each Fiscal Year.

3. Construction Logistics, Staging and Equipment

We provided an overview of the construction for each of the three packages during the June 13th Hearing. This overview included equipment on the beach, as well as logistics and approximate duration. We've provided this information on the following pages.

3.A Overview of Construction for Each Contract

C1A – Groin Repairs
Overview of Construction:

Equipment on beach:

- Crane on groin:
  - Walk in from Cutler St.
  - Temp. ramps up/over groins
- Bobcat or small loader

On Shore Dr.:

- Trucks to deliver stone and remove debris
- 200 ft. work area (8 – 9 parking spaces)

Schedule: 3 to 4 weeks/groin

C2A – "Pilot Project" & South Nourishment Area
Overview of Construction:

Equipment on beach:

- Excavators for dredging (2-3)
- Off-Road Dump Trucks (3-5)
- Bulldozers (2-3)
- Backhoe/loader (1-2)
- Access from Cutler & Tewksbury
- Possible off-hours equipment storage on beach in a contained area

On Shore Drive:

- 400 ft. staging area (loss of 16 – 18 parking spaces)
- equipment parking during non-work hours

Schedule: 3 to 5 months

C3A – North Nourishment Area & New Terminal Groin Overview of Construction:

Equipment for Beach Nourishment:

- Trucks from Saugus dumping on Beach north of Cutler: 9 am – 3 pm (6 hrs./workday)
- Loaders (1 to 3)
- Off-Road Dump Trucks (3-5)
- Bulldozers (2-3)
- Pile Driver (temp. groins)
- Off-road jeep (1 to 2)

Schedule: 8 months (trucking)

Stockpiling of sand on the Figure Eight Island Beach north (updrift) of Mason Inlet, NC. The material was later graded.

C3A – North Nourishment Area & New Terminal Groin Overview of Construction:

Equipment for New Terminal Groin:

- Large crane on Groin or Barge
- Loader or Bobcat on Groin
- Stone delivery by barge and/or truck

On Shore Drive:

- 400 ft. staging area
  (loss of 16 – 18 parking spaces)
- Equipment parking during non-work hours

3.B Equipment Storage, Refueling & Spill Management

Equipment Storage Area

We mentioned, at the June 13th hearing, the potential need for storing equipment on the beach during non-work hours. For the C2A and C3A Contracts (Pilot Project/South Nourishment Area & North Nourishment Area), based on the amount of equipment anticipated to perform the work, the maximum size of the storage area would be approximately 400 feet long by 70 feet wide. This area will have poly wrap (impervious liner) and 12 inches of crushed stone laid down to prevent any spilled material from mixing with the sand. It will be fenced off to protect the public, as well as to prevent vandalism and theft. The fencing will include a polypropylene fabric.

The area would be graded so that it is lower than the surrounding beach area, yet above the elevation of extreme high water (EHW), approximately Elev. 13 Boston City Base.

Except at the entry areas into and out of the storage area, the area would be surrounded by concrete barriers with hay bales, to confine the area. Once the gates to the area are closed, the gated ends would also be protected by hay bales for containment.

The stone, fabric and fencing will all be removed prior to the completion of the completion of the work. The area will be filled and graded to the beach nourishment template. Once the Equipment Storage Area is removed, no equipment will be permitted to be stored on the beach.

Refueling, Servicing and Repairing Equipment

Except within the equipment containment area, all equipment shall be refueled, serviced and repaired outside of the resources areas. All major repairs to equipments shall be performed outside the resource areas.

Storage of Machinery, Equipment, Vehicles, Tools and Construction Materials

Except within the equipment containment area, no storage of machinery, vehicles or equipment on Winthrop Beach will be permitted

No storage of tools or construction materials on Winthrop Beach will be permitted.

Spill Management

The Contractor shall develop a spill management plan for any hazardous materials that may be employed during work over the water or within one hundred (100) feet of the resource area. Specifically, the Contractor shall prepare to effectively deal with spillage of fuel or hydraulic fluids from equipment. A quick absorbent material, such as “Speedy Dry” or equivalent shall be stored in a dry readily available area at the work site for use in the event petroleum-based fluids are spilled or leaked. The spent material is then to be containerized and disposed of properly. An absorbent-floating boom shall be stored in a readily available area for use in case of a spill in the water.

The Contractor shall submit the Spill Prevention Plan to the Winthrop Conservation Commission for approval.

3.C Truck Dumping Area

As part of the C3A project, trucks will pull onto the beach to dump the sand. This dumping area would be opposite Cutler Street, at the wide opening in the seawall cap. To accommodate the turning motion of the trucks, the seawall cap would have to be cut back approximately 50 feet to the north of the existing beach opening and 20 feet to the south of the existing opening.

The dumping area will need to be approximately 125 by 300 feet, and would accommodate up to 3 tractor-trailer dump truck simultaneously. Below is a detail of the proposed dumping area, including the trucks turning movements.

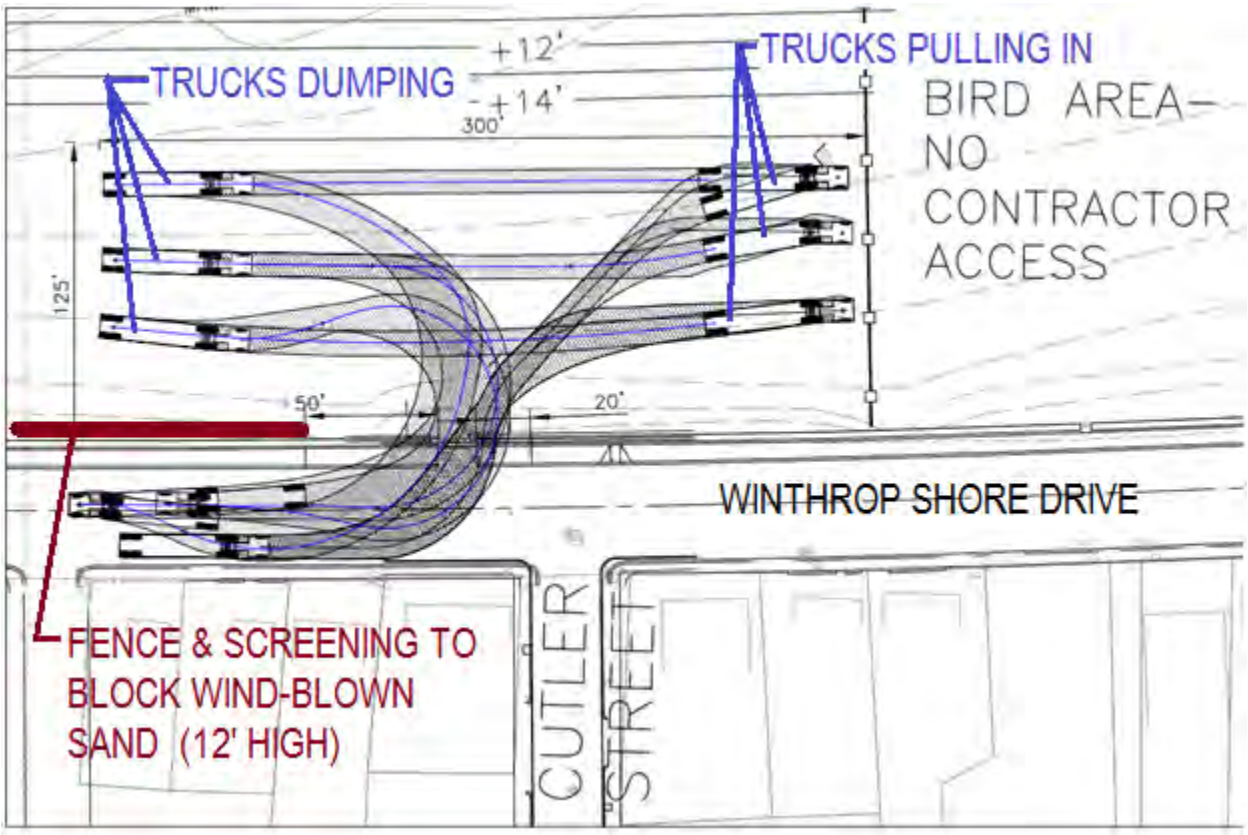


Figure 3-1 Truck Dumping Area

The dumping area would be separated by a temporary construction fence from any bird habitat zone that may be adjacent and to the south of this location. For dust control measures, see Section 4.D of this Supplement.

Once the delivery of sand is completed, the opening in the seawall cap will be restored to its original size. The stone, fabric and fencing will all be removed. The area will be filled and graded to the beach nourishment template.

4. Winthrop Beach Monitoring and Mitigation Plan

This Section describes the monitoring and mitigation proposed to eliminate, offset, or reduce the potential impacts associated with the project within the Town of Winthrop. Beach nourishment monitoring generally consists of two major components: physical monitoring of sand movement and biological monitoring and/or mitigation to ensure recovery of the nearshore resources following nourishment.

4.A. Physical Monitoring at Winthrop Beach

Since the purpose of the beach nourishment program is to reestablish the local sediment supply and provide storm protection for the shoreline, an evaluation of long-term nourishment needs will be required to assist the DCR with future nourishment maintenance. An essential aspect to this project will be the monitoring of fill performance. This monitoring information will aid the DCR by determining:

- The percent fill remaining within the design template
- Accretion or erosion along adjacent beaches (either to the north or south of the project)
- The longshore variability in beach width indicative of potential "hot spot" erosion
- Future nourishment need required to maintain the Winthrop Shore Drive shore protection and the Winthrop Beach sediment supply

The rapid introduction of such a large volume of sediment to the nearshore area will result in the material moving both alongshore and cross-shore to reach equilibrium with the waves and currents in the area. Monitoring will provide a means to measure the shoreline change and shifting of the nourishment fill. This can be determined by measuring the elevation along a series of shore perpendicular control transects (or cross-sections) along the length of the fill, as well as performing a differential GPS survey of the observed high water mark.

Approximately 30 to 35 transect locations, every 200 feet along the beach, are proposed for the monitoring effort. Surveys will be conducted from the seawall and extend offshore. Figure 4-1 shows roughly the location of the two fill areas, the new terminal groin, and typical spacing of the monitoring transects. The actual distance that each transect runs offshore will be determined by *in situ* water depth. In the first year post-construction, surveys will be performed quarterly. The post-construction survey will be performed as soon as is practical after the completion of the fill and will extend offshore to the -15 ft (NGVD) contour or the landward edge of the 5 sisters breakwaters, whichever is reached first. The remaining surveys in the first year will be wading surveys out to the -5 ft contour. The second year post-construction will see two surveys performed. The first survey (12 months post construction) will again be to the -15 ft contour and the second survey (18 months post construction) will be a wading survey to -5 ft. Starting in the third year post-construction, surveys will be conducted once annually out to -15 feet.

To ensure consistency between surveys, permanent benchmarks and/or markers will be installed along the seawall for the purpose of future beach measurements. The elevations along the transects will be plotted to determine changes in the fill volume. The cross-sections can also be used to determine performance of the nourishment within the original design template, as well as within approximately 800 feet north of the new groin and 800 feet south of the southern fill. In addition, differential-GPS surveys will be performed using a backpack unit along the observed high water line. These surveys of the high water line will be performed immediately following construction, and will take place on the same schedule as the cross-shore transects discussed above. Shorelines plotted from this data set will help identify potential "hot spots" of increased erosion along the nourishment project.

Figure 4-1 – Proposed monitoring transects along Winthrop Beach that extend approximately 800 feet north and south of the nourishment design template.
Source: Applied Coastal Research & Engineering, Inc.

Monitoring reports will be prepared one (1), three (3), five (5), seven (7), and ten (10) years after completion of the nourishment project. These reports will include a summary of all data collected, information regarding the wave climate and storm activity, volume change over time, and an evaluation of shoreline change. In this manner, the performance of the beach fill can be evaluated relative to design predictions. The monitoring information will provide useful data needed to assess future re-nourishment requirements of the Winthrop Beach shoreline. In addition, monitoring of any potential impact associated with terminal structure is included as part of the data collection and analysis effort.

4.B Biological Monitoring at Winthrop Beach

4.B.1 Beach Placement Area

It is understood that placement of the Winthrop Beach nourishment will cover approximately 36.7 acres of intertidal and sub-tidal habitat. This direct impact, primarily to shellfish resources, is expected to recover relatively rapidly following nourishment. Once equilibrated, the proposed beach nourishment project will significantly increase the width of the intertidal beach, providing a long-term enhancement of shellfish habitat. As shown in the attached shellfish survey from 2005, the existing shellfish resources at Winthrop Beach are limited. In the southern nourishment area it does not appear that any impact to shellfish resources will occur. The northern area has some shellfish located 200-ft and farther out from the sea wall; however, this resource is not extensive due to the high energy wave conditions. Since surf clams are most common at water depths from 8 to 66 meters in areas beyond the breaker zone there may be a large population beyond the nourishment area. Storms are known to displace adults a considerable distance from their burrows (Fay et al. 1983). This may serve as a means to repopulate the area after nourishment is completed. The area of intertidal beach will increase as a result of the nourishment project. Since the beach nourishment project represents a long-term enhancement of the shellfish habitat, as the nourishment will provide a larger expanse of intertidal and sub-tidal habitat with appropriate grain size for shellfish resources, there is no plan to monitor recovery of this resource at Winthrop Beach.

4.B.2 Tombolo Dredging Area

In addition, the tombolo excavation/dredging (the 'Pilot' project) will have a footprint of approximately 12.8 acres below the Mean High Water (MHW) line. All shellfish resources within this dredging template will be removed from the beach system as part of the dredging effort; however, the excavation does not extend to the Mean Low Water (MLW) line. Therefore, the more productive shellfish area located within the lower intertidal beach, as well as the land under the ocean is not affected by the proposed tombolo excavation.

4.B.3 Piping Plover and Least Tern Nesting Area

The DCR presently contracts monitoring of the Piping Plovers and Least Terns on Winthrop Beach to an outside vendor. As part of the "Pilot Project," both the Massachusetts Natural Heritage and Endangered Species Program (NHESP) and the U.S. Fish and Wildlife Service (FWS) have indicated that both bird species will require ongoing monitoring as part of the overall beach management plan. DCR is committed to meeting the monitoring requirements needed to obtain the appropriate MESA permit from the NHESP, as well as federal guidelines from FWS that will be required to obtain the U.S. Army Corps of Engineers permit for the project. Similar to previous years, Piping Plover and Least Tern monitoring efforts will require proactive monitoring of nesting activities throughout the season, including state and federal requirements to close certain portions of the beach, as needed, to protect the threatened and listed bird species.

4.C Mitigation at Winthrop Beach

The large-scale beach nourishment program can be considered self-mitigating, since it will enhance the quality and quantity of intertidal shellfish habitat in the long-term. Temporary loss of shellfish resources will occur as a result of initial burial; however, these likely will recover rapidly through natural seeding from adjacent beaches (e.g. Yirrell Beach) or from areas further offshore. In addition, beach nourishment provides additional material to reestablish the depleted littoral sediment supply, allowing the beach system to act as a natural system where waves do not interact with the seawall. Although the beach nourishment project will consist primarily of sand with some gravel and cobble, natural wave sorting of the sediments will provide a significant recreational resource in the form of a generally sandy lower beach during the more quiescent summer months

The DCR is committed to maintaining the nourishment for the primary purpose of shore protection to Winthrop Shore Drive. Predictive shoreline change modeling indicated a design life of at least 10 years. With the observed performance of nearby Revere Beach, as well as the additional incorporation of sand trapping structures (groins), the initial estimate of a 10-year design life likely is an under-prediction of the Winthrop Beach design performance. Regardless, DCR has planned a comprehensive monitoring plan of nourishment performance (described above), to assess beach nourishment performance and future nourishment needs.

4.C.1 Mitigation for Impacted Shellfish Resources

Due to the direct construction impacts associated with excavating (dredging) the tombolo landward of the "Five Sisters" and burial of existing shellfish resources in the proposed beach nourishment template, re-seeding of shellfish along Winthrop Beach may be warranted to ensure rapid recovery of the resource. Based on the extensive shellfish survey performed in 2005 (see Attachment D of this Supplement), as well as discussions with the Winthrop Shellfish Constable, it appears that existing shellfish resources are limited within the nourishment 'footprint'. Regardless, DCR is committed to working with the Winthrop Shellfish Constable to develop an appropriate shellfish re-seeding program following beach placement to appropriately mitigate for construction activities.

4.C.2 Mitigation for Piping Plover and Least Tern Habitat

The existing tombolo serves as nesting habitat for both Piping Plovers and Least Terns. While the 'Pilot' project to excavate and redistribute sediment from the tombolo minimizes potential impacts to shorebird habitat to the maximum extent practicable, discussions with NHESP, FWS, and Massachusetts Audubon staff have indicated that proactive mitigation activities to preserve and enhance shorebird habitat will be required to ensure that the project meets environmental regulatory guidelines. DCR has committed to development of a Beach Management Plan that addresses the various concerns related to Piping Plovers and Least Terns. The Beach Management Plan will contain required monitoring and mitigation efforts needed to meet MESA permitting standards. The following components will be included in the Plan:

- Increased level of staffing for monitoring the Piping Plover and Least Tern populations on Winthrop Beach
- Dedicated law enforcement on the beach to ensure that nesting birds are not harassed. It is anticipated that the "maximum presence" of law enforcement activities on the beach will run from late May to late August, depending on bird activity.
- Development of fencing guidelines to restrict beach access to nesting areas. DCR will assist with placement and maintenance of symbolic fencing. In addition, other fencing (e.g. sand fencing) may be utilized to delineate a travel corridor along the upper portion of the beach or to direct pedestrians from access ways to the water.

- Follow the existing vegetation management plan for the tombolo to maximize habitat quality. Specifically, limit vegetated areas to approximately 30% plant coverage to enhance nesting habitat for Piping Plovers.
- Develop a proactive predator control program that addresses recent issues with mammalian predators of the Piping Plover and Least Tern nests on Winthrop Beach. This activity will primarily involve a trapping program for rats, with the overall goal of removing this threat to the nesting shorebirds. In addition, evidence exists that cats also have caused mortality of Least Terns on the beach. Therefore, predator control also will include both a public outreach program to educate residents about the issue and live trapping of cats on the beach during the nesting season. Animal Control will take any cats removed from the beach to a nearby animal shelter.

4.D Minimization at Winthrop Beach

In addition to development of the overall Beach Management Plan, construction activities also have been developed in a manner that minimizes long-term impacts to shorebird habitat. First, portions of the surficial tombolo sediments consist of gravel and cobble ridges that do not provide ideal habitat. Initial tombolo excavation activities will screen and stockpile this material using a single 2-inch screen. The coarse-grained material derived from the screening process will be placed along the base of the seawall south of the tombolo. In this manner, the amount of cobble and gravel in the surface sediments within the nourishment area south of the tombolo will be minimized to enhance bird nesting habitat quality. During a March 2012 site visit with NHESP and FWS personnel, a 'low' area in the southern portion of the tombolo was identified as an area where habitat value could be improved. This area is presently fronted by a gravel/cobble ridge. As part of the sediment redistribution from the tombolo, this area will be re-graded to remove the depression and allow this area to serve as potential Piping Plover habitat.

Dust Control

The NOI describes a number of mitigation measures as part of the project. At the hearing on June 13th, a number of residents were concerned about dust from the dumping sand and demolition of the concrete cap on the groins.

Dust Control during Groin Repairs:

The groin repair contract will have dust control measures in place to reduce the amount of airborne concrete dust. The groins will be naturally wet from tidal action, but the contractor will also be responsible for keeping them hosed down during low tide.

The following provisions are added to the Special Provisions in Addendum No. 1 of the Groin Repair Contract Documents (Contract C1A):

- Keep all debris thoroughly wetted to prevent dust while breaking up and handling the concrete from the cap on the groins. Use methods that avoid any visible dust that may become wind-driven.
- Submit a Dust Control Mitigation Plan for approval to the Engineer and the Winthrop Conservation Commission. Obtain approvals prior to commencing any construction activities.

Dust Control during Nourishment Material Handling and Placement:

A mitigation measure that was not mentioned as part of the NOI would be to install a temporary construction fence (minimum 12 foot high) along the beach side of the seawall in the Truck Dumping Area. See also Section 3.C of this Supplement. The fence would be wrapped in a fabric (tightly woven polypropylene fabric) to alleviate the amount of sand blowing towards the neighborhood.

Dust control measures will include the wetting of sand to minimize blown sand during the dumping, stockpiling and spreading operations.

The Contractor will be required to submit a dust control plan to the DCR and Winthrop Conservation Commission for review and approval, prior to the start of construction activities.

5. Effect of Nourishment on Wave and Sediment Transport Patterns Relative to Surfing Concerns

The proposed beach nourishment of the Winthrop Beach area is designed to re-establish a beach system primarily for shore protection. In addition, the volume of material placed will provide a wider beach area that will enhance recreational beach use. Similar to other large-scale nourishment projects, the beach template is anticipated to spread (or diffuse) laterally along the shoreline over time. In general, significant offshore movement of sediment is limited.

Based on the wave climate and geology of the Winthrop Beach region, the project will not significantly change the wave climate in the region offshore of the beach. Specifically, a concern has been raised regarding potential modifications to the wave climate created by the project relative to the influence on the recreational surfing area at the south end of Winthrop Beach. Based on the numerical wave and sediment transport analysis performed for the beach, there is no evidence that the project will impact the surf break offshore of Cottage Hill. Beach nourishment will take place starting at the southernmost groin, east of Beacon Street, extending north from there. While some sand will be placed in the northern limits of the surfing area presented in the comment letter, this will have a minimal impact on the surf break as most of the surf area extends a southwest of this groin. Furthermore, after beach nourishment, the sand migration patterns will likely not significantly alter the surfing area because there is no evidence that accumulation of sand in the surfing location will occur. Figure 5-1 below indicates the existing sediment transport directions and magnitudes along Winthrop Beach. As shown, the dominant direction of sediment transport for the proposed beach nourishment project is towards the “Five Sisters”; therefore, material transported to the surfing area will be negligible over the life of the nourishment project. As designed, the proposed beach nourishment will both provide necessary protection to the community from storm waves and not be a significant detriment to the local surfing community.

Using established engineering standards, the sand from the I-95 embankment has been tested and its compatibility with Winthrop beach has been confirmed. Using these tests, extensive coastal engineering experience, and accounting for past sediment behavior in the area; beach behavior may be predicted following placement. In the Winthrop Beach area, a general trend of lateral spreading of sediment southward is present. However, the wave field and subsequent sand movement local to the surf area is strongly dependent on both the “Five Sisters” breakwaters and the glacial geology of the area, as shown in Figure 5-1.

At the Winthrop beach surfing area, the dominant feature that creates a surf able wave is the remnants of a glacial drumlin that is an extension of Cottage Hill. This boulder-strewn feature extends outward as the foundation of the surfing point that swells propagate along, resulting in a surf able wave. The nourishment of Winthrop Beach will not change this geologic feature. Additionally the volume of sand deposited on the southern side of the Beacon Street groin is small relative to the size of the surfing area. Sand placed immediately south of this groin will cause a short-term alteration of the surfing area, but will not have a

detrimental impact on the surf break because the overall bathymetry of the surf area will not drastically change. As normal erosion patterns occur in the area this small amount of sand will likely spread south beyond the surf break. Furthermore sand migration patterns resulting from the Five Sisters breakwaters will likely preserve this valuable surfing resource.

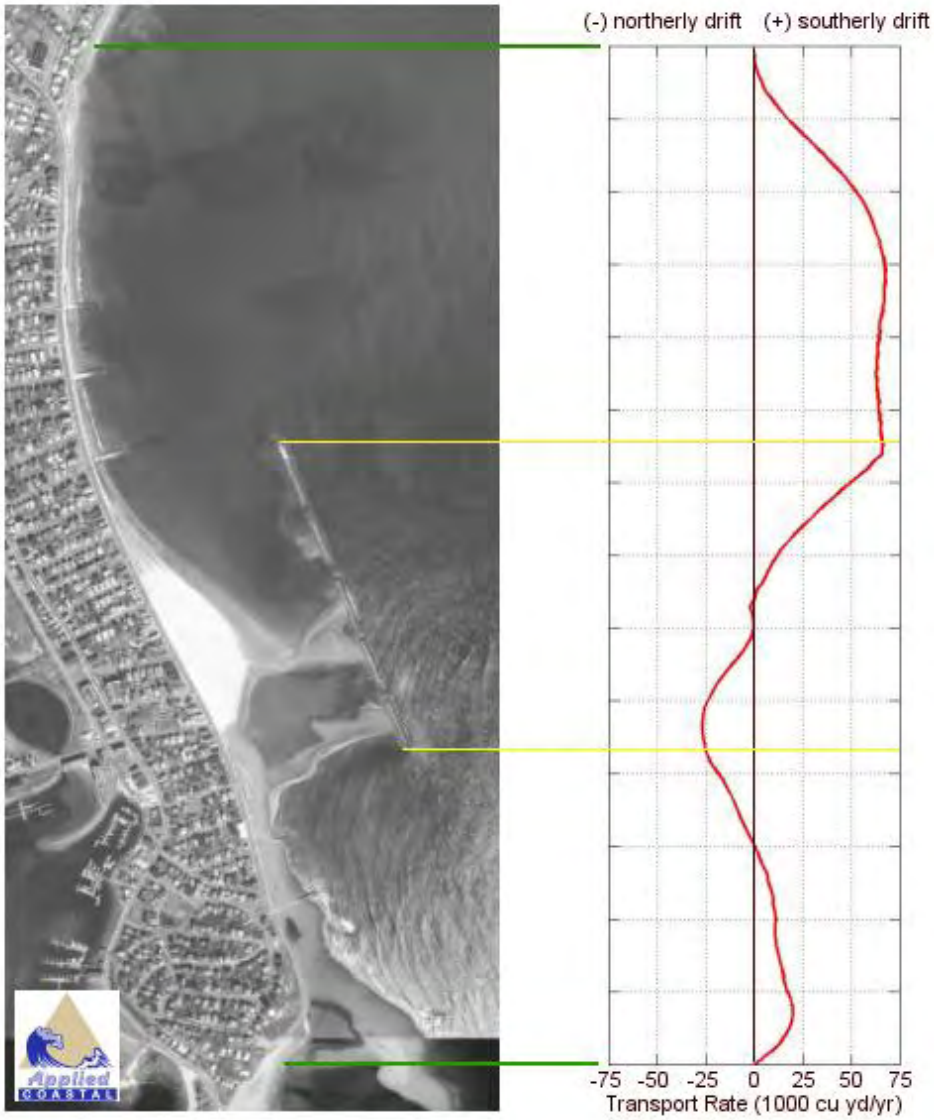


Figure 5-1. Portions of 1994 aerial photographs showing Winthrop Beach and the "Five Sisters" offshore breakwater. Limits of the shoreline modeled are designated by green lines. Also shown is computed distribution of sediment transport rates along the modeled shoreline. Values represent average rates for first two years of the 10-year simulation, beginning with the 1959 nourishment.

The sand movement in the nourishment area directly north of the surf spot is primarily controlled by how the "Five Sisters" disperse wave energy. Coastal breakwaters like these are used to impede shore erosion because beach sediment accumulates on the leeward shore behind them. On Winthrop Beach this is

evident because of the tombolo currently existing behind the breakwaters. The dominant waves approach Winthrop Beach from the east and move beach sediment behind the breakwaters from both the north and the south (see Figure 5-1). Evidence of sediment movement from the south away from the surf break along the beach may be seen at the groins extending out from Tewksbury Street and Charles Street. Sand has accreted on the south sides of the groins and eroded on the north sides. This indicates a northward movement of sediment in this area. It is likely that this sediment migration trend, along with the southern movement of sand at the surf break is the mechanism that maintains a bottom that is well suited to surfing. After beach nourishment, there is no evidence that would indicate that this trend would be altered in a demonstrable manner.

It is important to consider that proposed beach nourishment will create a larger beach recreational area and endangered species habitat. More importantly this beach nourishment will protect the community, specifically shielding in the area neighboring the northern part of Winthrop Beach from large storm waves. In these ways, the proposed nourishment of Winthrop Beach is a reasonable and essential long-term improvement to the community. Failure to protect this area may result in significant damage to public infrastructure and the Winthrop Community.

6. Public Information

DCR will post regular project updates, including upcoming work elements, in the Winthrop Shores Reservation web page on the DCR Internet web site. DCR will also maintain a listserv during the duration through which notices will be delivered. Interested parties will be able to sign up for the list at: DCR.Updates@State.ma.us. Please put Winthrop Beach in the subject line.

7. Response to Written Comments

Topic	Comment Received	Reference in NOI Supplement #1	Additional Response
General	1) Construction phasing, schedule and methodology needs to be described.	Sections 2 and 3	
C1A Groin Repair	2) During removal of concrete capping via jackhammer (typ), describe "means and methods" of concrete removal so that it does not enter the coastal environment	***To be provided in Supplement #2***	
	3) Provide cross section for groin repair	Attachment C, Sheet C-7, Rev. 2	
	4) Scope needs to include Coral Avenue groin	See Section 1A	
C2A "Pilot Project" and South Nourishment Area	5) In the PPT presentation, there's mention of "separation of cobble and placement of this material under the sand surface of the nourishment area to improve habitat quality"—Need clarification on proposed depths and separation.	Section 1B	Only surficial cobble/ gravel ridges will be screened, as there is not space available to separate and stockpile all material.
	6) Provide proposed location of fenced buffer between excavation activities and upper beach/dune area.	See response at right:	The fence will generally run about 100 to 150 feet from the landward limit of the excavation along the tombolo feature.
	7) Written clarification on why the southern portion of tombolo / area west of southernmost breakwater was not included within the proposed dredge area.	See response at right:	The amount of material available in this small intertidal feature is negligible if excavated to the proposed excavation elevation.
	8) At Tewkesbury Boat Ramp, contouring and slope of ramp may channel wave energy/runup to the top of the ramp. What are provisions for flood protection at top and scour protection at sides and toe of ramp? Will sand movement prevent use of ramp?	See response at right:	Ramp will be buried in the nourishment. Ramp will only function should the beach in this area erode to the point of exposing the ramp.
C3A North Nourishment Area and New Terminal Groin	9) Equipment delivery/staging via barge for the new terminal groin was discussed as the preferred alternative at the 6/13 Public Hearing—Provide information on equipment and material staging/storage areas.	***To be provided in Supplement #2***	
	10) Confirm no scour protection required for terminal groin beyond structure footprint as shown.	See response at right:	The marine mattresses proposed are not for scour protection, but rather to limit differential settlement. No additional scour protection beyond the footprint is planned.

Topic	Comment Received	Reference in NOI Supplement #1	Additional Response
	11)Has the NHESP commented on the relative proximity of the proposed construction entry point (opposite of Cutler St) and potential staging/equipment storage area to the roped-off bird habitat? (e.g., considering that the proposed work will take place during the bird nesting season). Confirmation that no timing restrictions will be required by NHESP. Fenced buffer locations?	See response at right:	NHESP has requested a detailed Beach Management Plan (as described in Project Monitoring and Mitigation) that will include fencing plans for various project phases. During the onsite meeting (March 2012) the Cutler Ave. access was discussed and it was understood that no seasonal restrictions would be required, as long as it was only for getting the construction equipment onto the beach. Stone for groin work and removal of material will need to be transported across the seawall at the location of each groin.
	12) Include description or removal and reconstruction of temporary stone revetment at Pearl.	***To be provided in Supplement #2***	
	13) Temporary groin details and extents should be indicated with description of installation	See response at right:	Details of this feature are dependent on the contractor. It is anticipated that temporary groins will consist of sheet pile installed using a vibratory hammer. They will not extend beyond the length of the existing groins and they will only be constructed perpendicular to the shoreline.
	14)As discussed, information on the pre and post-monitoring will be provided.	Section 4	
	15)Definitive detail needed on equipment storage on beach, containment area design, stormwater management, spill prevention plans, proposed plans for storm events, etc.	Section 3	***Stormwater and Storm Event details to follow in Supplement #2***
	16)a--WPA Performance Standards review should be updated based on the current proposal. There are a number of references to the NOMES I site within the NOI. b--Additionally, there should be a description addressing 310 CMR 10.27(7)-short or long-term adverse effects on rare bird habitat?	a—Section 1A b--Sections 1A and 4.	

Topic	Comment Received	Reference in NOI Supplement #1	Additional Response
	17) Need clarification on sand fencing and/or dune vegetation to be proposed and/or maintained—Post-construction management plan?	See response at right:	NHESP has requested a detailed Beach Management Plan (as described in Project Monitoring and Mitigation) that will include fencing and/or vegetation plans that are consistent with the existing DCR Order of Conditions for Vegetation Management
	18) Input from Winthrop Shellfish Warden and proposed mitigation?	Section 4	
	19) NHESP-approved Formal Management Plan for Piping Plover and Least Tern habitat should become part of record upon completion		DCR believes that this can be described in the Order of Conditions, as a MESA permit is required for the project.
General	During the sinkhole repair of 2006, my neighbors and I (Pearl/Shore Dr) suffered a catastrophe when our houses were filled with wind-blown cement dust and were shaking from vibrations. Serious medical problems developed among us (hospitalization, pneumonia, serious asthma). The vibrations caused cracks in foundations, ceilings, and walls, and broke window seals. At the time we were told that the work was done on an emergency permit and no protective conditions were in place. I did find out, from the main cement worker, though, that he had a water spray attachment he could have used to prevent the cement dust from escaping. If only he had been directed to use it right from the beginning. We are now facing a DCR repair project that, while essential, will cause these same problems if no protections are mandated. Containment techniques do exist and are known to construction companies and engineers. We are requesting in the strongest possible terms, in desperation, really, that the Conservation Commission specify conditions which will protect the many beach area residents so we are not overcome by cement dust, sand, and sand dust, and our homes are not damaged by vibrations.	***See response below to specific comments***	

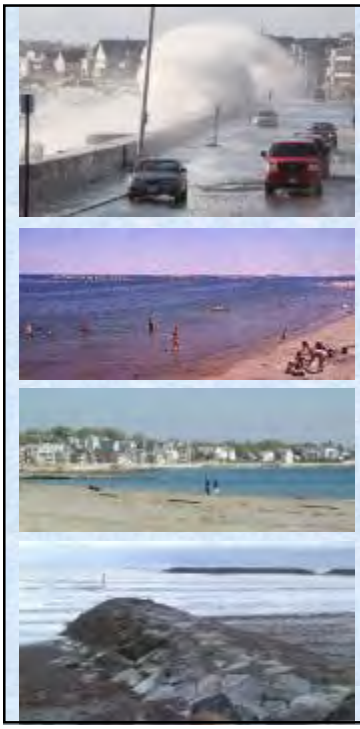
Topic	Comment Received	Reference in NOI Supplement #1	Additional Response
Groin Repairs	20) Cement dust. The use of a jackhammer on cement (jetty repair) produces copious amounts of cement dust. It is toxic, exceedingly so for those with respiratory problems, and will blow right into our houses. It needs to be contained. The contractor must be mandated to use effective dust containment procedures, whether water sprays, screens, or other. At the recent meeting, DCR offered no plans to contain the dust, other than to say that the sidewalk work would be much worse than the jetty work.	Section 4D; see also response at right:	We are researching additional methods, but our air quality expert does not return until 6/25. We will report at the Hearing on 6/27.
North Nourishment Area	21) Sand and Sand Dust. Dumping enormous amounts of sand, truckload by truckload, on the northern area beach is going to produce wind-blown sand and sand dust. DCR's comment that the grain size is too large to affect the lungs is beside the point. Grains are broken in an offloading environment and produce a fine silicon dioxide dust, easily carried by wind. Eyes and respiratory systems are at risk. Full dust containment is required. A single screen as mentioned by DCR is not adequate.	Section 4D; see also response at right:	We are researching this matter, but our air quality expert does not return until 6/25. We will report at the Hearing on 6/27.
	22) Vibrations. DCR advised that they do not plan to drop boulders during jetty restoration. A pile driver may be necessary, though, and this will undoubtedly cause damaging vibrations It would help to specify that a pile driver should only be used as a last resort, and that a review of some kind be required at the time to be sure it is needed. If needed, its use should be minimized. Any procedures available for damping vibrations should of course be used. Vibrations need to be monitored with appropriate instruments. Finally, if the pile driver is required there should be a fund of some kind to repair damage to houses. DCR is planning to repave the roads damaged by heavy trucking. They should also be required to repair residential structural damage caused by their work.	See response at right:	The use of temporary groins installed as driven sheet piles will be a contingency if needed due to the schedule of delivery of material. If the drive sheet piling is used, pre- and post-construction surveys will be conducted of houses within a radius where vibrations could cause damage. In addition, vibration monitoring will be performed in the vicinity of the structures most likely to be damaged. If damage to structures is indicated to be due to this operation, then DCR's contractor will be responsible for repairs.

(This page is intentionally blank)

Attachment A

Power Point Slides of Hearing Presentation

June 13, 2012



Winthrop Beach Nourishment

Conservation Commission Hearing

June 13, 2012

Winthrop 101

- Project history
- Offshore borrow site at NOMES Site 1
- Permits: obtained & denied
- Redirection
- Minimization of Impacts

Winthrop Beach Program

Current Filing:

Beach Nourishment

- Groin Repairs
- "Pilot Project" – South Nourishment Area
- New Terminal Groin
- North Nourishment Area

Future Filing:

Upland Improvements:

- Reconstruct Shore Dr.
- New Sidewalks
- New Drainage
- Improved crosswalks
- Amenities (drinking fountains, shower/foot washes, benches, etc.)

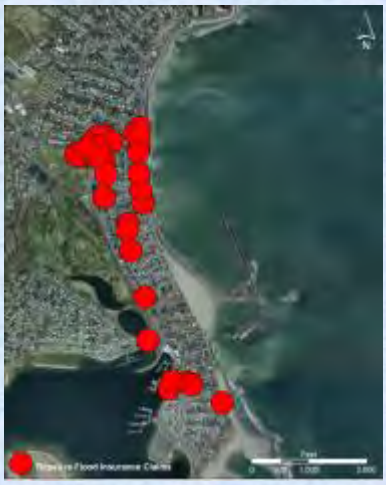
Winthrop Beach Schedule

Construction in Four Projects:

C1A	Groin Repairs:	Summer 2012
C2A	"Pilot Project"/ South Nourishment Area:	Fall 2012
C3A	North Nourishment Area:	2013 – 2014
C4A	Shore Drive Improvements:	2014 - 2015

Need for Shore Protection

Need for Shore Protection



FEMA repetitive flood insurance claims for properties along and near Winthrop Beach

Brief History of Shore Protection

Over 100 years of providing shore protection:

1899: Commonwealth constructs seawall after Portland Gale of '98

1933: Construction of 3 Breakwaters ("Sisters")

1935: Construction of 2 more Breakwaters

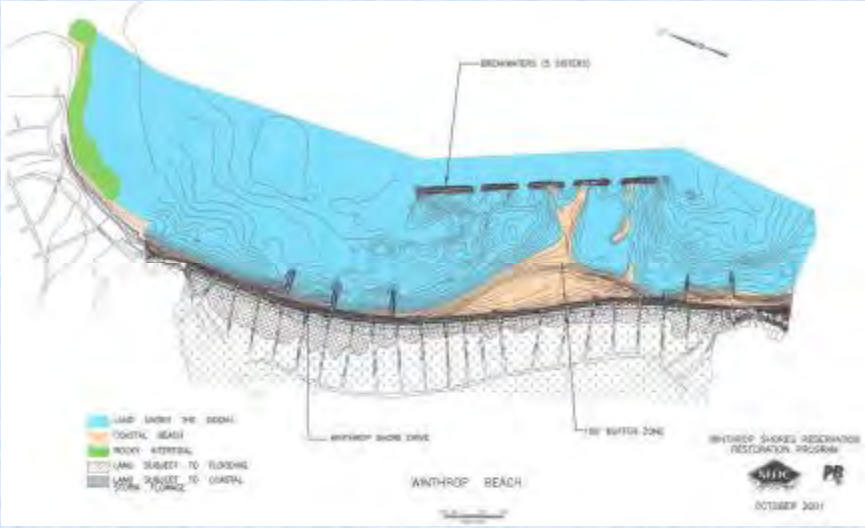
1955: Construction of 5 Groins

Today: Beach Nourishment Plan

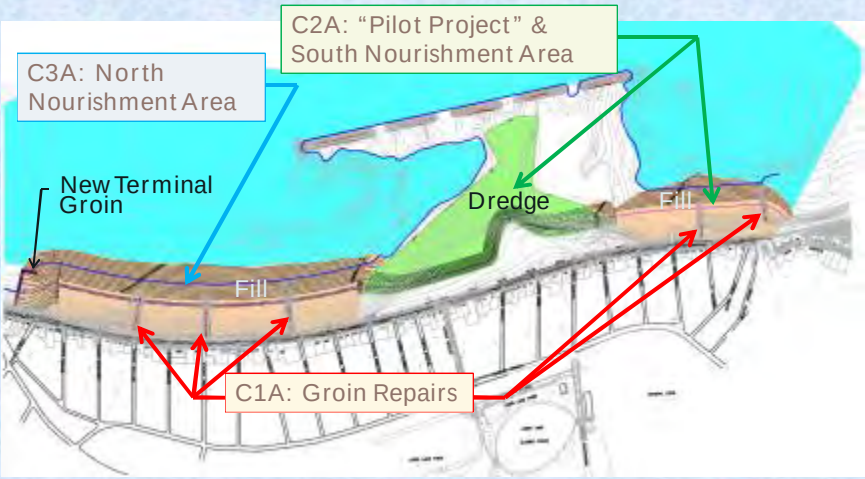
Topics for Tonight

- Overview of Wetland Resource Areas
- Presentation of 3 Construction Packages:
  - C1A – Groin Repair
  - C2A – "Pilot Project" and South Nourishment Area
  - C3A – North Nourishment Area, including New Terminal Groin

Wetland Resource Areas



Presentation of Construction Packages



Presentation of the 3 Construction Packages

- Scope of Work
- Resource Areas Impacted
- Overview of Construction:
  - Logistics
  - Equipment
  - Other issues
- Compliance with Performance Standards

C1A – Groin Repairs

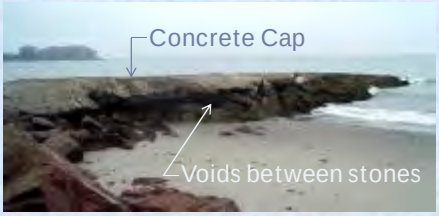
C1A – Groin Repairs

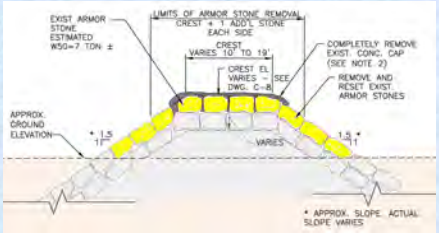
Scope of Work:

- Removal of Concrete Cap
- Removal of Upper Layer of Armor Stone
- Resetting of Armor Stone
- Chinking of Crest

Resource Areas:

- *Coastal Beach*: Seawall to MLW
- *Land Under the Ocean*: Below MLW





C1A – Groin Repairs
Overview of Construction:

Equipment on beach:

- Crane on groin:
  - Walk in from Cutler St.
  - Temp. ramps up/over groins
- Bobcat or small loader

On Shore Dr.:

- Trucks to deliver stone and remove debris
- 200 ft. work area (8 – 9 parking spaces)

Schedule: 3 to 4 weeks/groin

C1A – Groin Repairs

Compliance with Performance Standards:

- Land Under the Ocean (310 CMR 10.25):
  - (5): No change in bottom topography
  - (6): Minimize adverse effects on marine habitat
- Coastal Beach (310 CMR 10.27):
  - (4): Groin construction: N/A
  - Material & debris will be removed from beach on a daily basis
  - Crane(s) may remain on groin during non-working hours

C2A – "Pilot Project" & South Nourishment Area

Legislation:

- Shore Protection Pilot Project under the Section 191 "Pilot" program (Chapter 68,Acts of 2011)
  - Allows for innovate concepts
  - Minimize impacts
  - Monitor results

C2A – "Pilot Project" & South Nourishment Area

Concept for Pilot Project:

- 1959 Army Corps Nourishment Project
  - 200,000 cy dredged from behind 5 Sisters
  - Project failed – material drifted lee of 5 Sisters
- Today:
  - Dredge 90,000 - 100,000 cy behind the 5 Sisters
  - Place south of tombolo
  - Will not compromise shore protection lee of the 5 Sisters

C2A – "Pilot Project" & South Nourishment Area

Resource Areas:

- *Coastal Beach*: Seawall to MLW
- *Land Under the Ocean*: Below MLW

Habitats on Coastal Beach:

- Least tern (threatened)
- Piping plover (endangered)

C2A – "Pilot Project" & South Nourishment Area

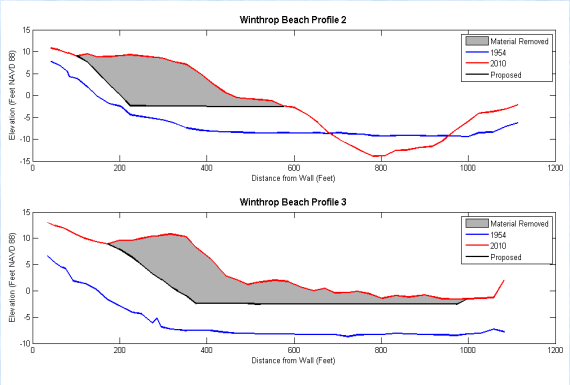
C2A – "Pilot Project" & South Nourishment Area

Scope of Work:

- Dredge Sediments behind 5 Sisters (90,000 – 100,000 cy)
- Place as Beach Nourishment between Underhill and Beacon Circle
- Replace Ramp at Tewksbury St.
- Interim storm drainage outlets

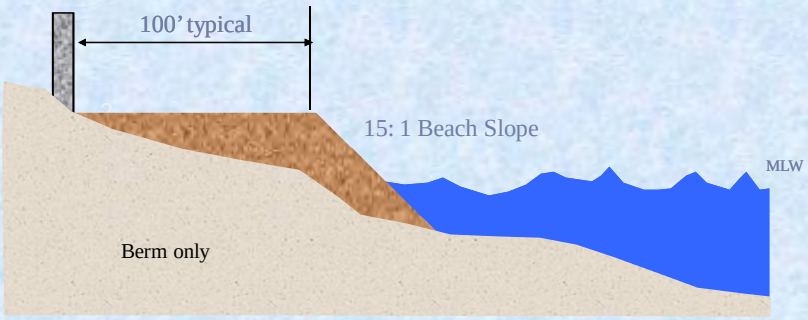
C2A – "Pilot Project" & South Nourishment Area

Dredge Profile



C2A – "Pilot Project" & South Nourishment Area

Nourishment Profile



C2A – "Pilot Project" & South Nourishment Area Overview of Construction:

Equipment on beach:

- Excavators for dredging (2-3)
- Off-Road Dump Trucks (3-5)
- Bulldozers (2-3)
- Backhoe/loader (1-2)
- Access from Cutler & Tewksbury
- Possible off-hours equipment storage on beach in a contained area

On Shore Drive:

- 400 ft. staging area (loss of 16 – 18 parking spaces)
- equipment parking during non-work hours

Schedule: 3 to 5 months

C2A – "Pilot Project" & South Nourishment Area

Compliance with Performance Standards:

- Land Under the Ocean (310 CMR 10.25):
  - (5): Project will change alter bottom topography, but will reduce storm damage and erosion.
  - (6): Minimize adverse effects on marine habitat:
    - (a) no significant alteration of water circulation
    - (b) no known eel grass or widgeon grass
    - (c) no alteration in grain size – reusing existing sediments
    - (d) no anticipated change in water quality
    - (e) will cover intertidal and subtidal habitats: anticipate repopulation of shellfish by storm currents

C2A – "Pilot Project" & South Nourishment Area

Compliance with Performance Standards:

- Coastal Beach (310 CMR 10.27):
  - (3): Project will decrease erosion
  - (4): Groin construction: N/A
  - (5): Reuse of existing sediments ensures compatibility of beach nourishment material
  - Material & debris will be removed from beach on a daily basis
  - Large equipment may remain on beach if in containment area (stone over poly and surrounded by hay bales or equivalent)

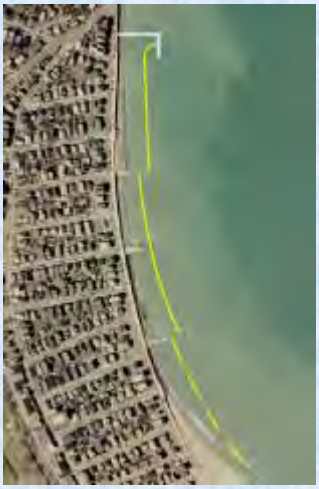
C3A – North Nourishment Area & New Terminal Groin

Scope of Work:

- New Terminal Groin
- Place as Beach Nourishment between Locust and Dolphin Av.
  - Truck in from Saugus
- Temp. Sheet Pile Groins
- Interim Drainage Outlets

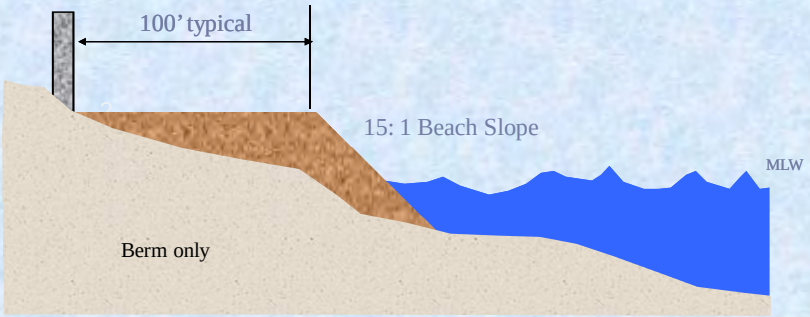
Resource Areas:

- *Coastal Beach*: Seawall to MLW
- *Land Under the Ocean*: Below MLW
- *Land Containing Shellfish*

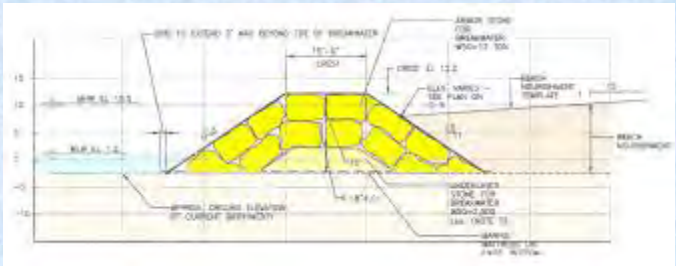


C3A – North Nourishment Area & New Terminal Groin

Nourishment Profile



New Terminal Groin



C3A – North Nourishment Area & New Terminal Groin Overview of Construction:

Equipment for Beach Nourishment:

- Trucks from Saugus dumping on Beach north of Cutler: 9 am – 3 pm (6 hrs./workday)
- Loaders (1 to 3)
- Off-Road Dump Trucks (3-5)
- Bulldozers (2-3)
- Pile Driver (temp. groins)
- Off-road jeep (1 to 2)

Schedule: 8 months (trucking)

Stockpiling of sand on the Figure Eight Island Beach north (updrift) of Mason Inlet, NC. The material was later graded.

C3A – North Nourishment Area & New Terminal Groin Overview of Construction:

Equipment for New Terminal Groin:

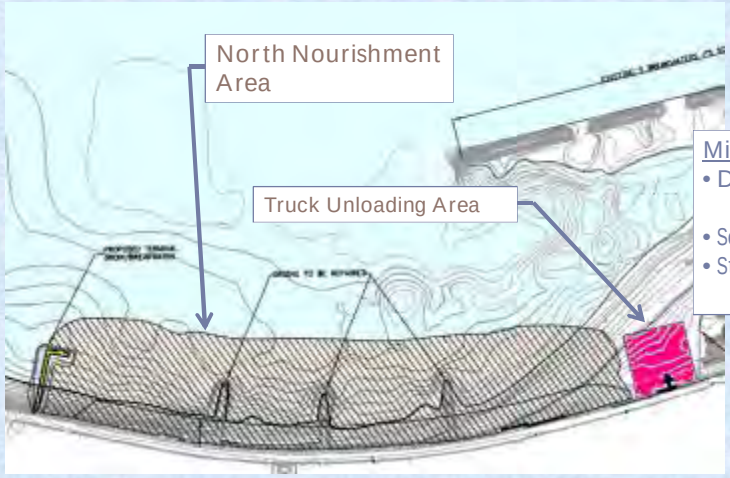
- Large crane on Groin or Barge
- Loader or Bobcat on Groin
- Stone delivery by barge and/or truck

On Shore Drive:

- 400 ft. staging area
  (loss of 16 – 18 parking spaces)
- Equipment parking during non-work hours

C3A – North Nourishment Area & New Terminal Groin

Construction Access:



Mitigation:
- Dust control (seawater)
- Screening Fence
- Stone & poly at Unloading Area

C3A – North Nourishment Area & New Terminal Groin

Compliance with Performance Standards:

- Land Under the Ocean (310 CMR 10.25):
  - (5): Project will change alter bottom topography, but will reduce storm damage and erosion.
  - (6): Minimize adverse effects on marine habitat:
    - (a) no significant alteration of water circulation
    - (b) no known eel grass or widgeon grass
    - (c) no alteration in grain size – reusing existing sediments
    - (d) no anticipated change in water quality
    - (e) will cover intertidal and subtidal habitats: anticipate repopulation of shellfish by storm currents

C3A – North Nourishment Area & New Terminal Groin

Compliance with Performance Standards:

- Coastal Beach (310 CMR 10.27):
  - (3): Project will decrease erosion
  - (4): Groin construction:
    - (a) sized per ACOE
    - (b) nourishment fill will be placed after construction
    - (c) sediment transport around tip and during storms, over outer end
  - (5): Sediment sampling and grain size analyses indicates compatibility of beach nourishment material
  - Material & debris will be removed from beach on a daily basis
  - Large equipment may remain on beach if in containment area (stone over poly and surrounded by hay bales or equivalent)

C3A – North Nourishment Area & New Terminal Groin

Compliance with Performance Standards:

- Land Containing Shellfish (310 CMR 10.34):
  - (4): No adverse effects:
    - (a) water circulation: N/A
    - (b) relief elevation:
      - initial covering of intertidal and subtidal areas;
      - long-term enhancement of shellfish habitat
    - (c) compacting of sediments by vehicle traffic: N/A
    - (d) sediment size: analysis indicated compatibility
    - (e) natural drainage from adjacent land: N/A
    - (f) water quality: no long range impacts
  - (5): Temporary Impacts: Small existing habitat in the subtidal zone will be temporarily impacted.

Minimization and Mitigation

Part 1

- Reuse of tombolo sediments to reduce trucking from Saugus
- Compatible grain size of sediments from Saugus
- Low fine % (generally under 10%): minimize turbidity
- Time of year restriction: no work on tombolo during nesting times
- Tombolo dredging in pattern to preserve a portion of habitat distant (400 ft. or more) from the seawall
- Dredging and South Nourishment Area work to be coordinated with Mass. NHESP and US F&WS so as to provide habitat in post-construction beach configuration
- Burying cobble mounds in base of nourishment fill
- Mitigation for shellfish habitat impacts per recommendations of Winthrop Shellfish Warden

Minimization and Mitigation

Part 2 – Beach Habitat Protection

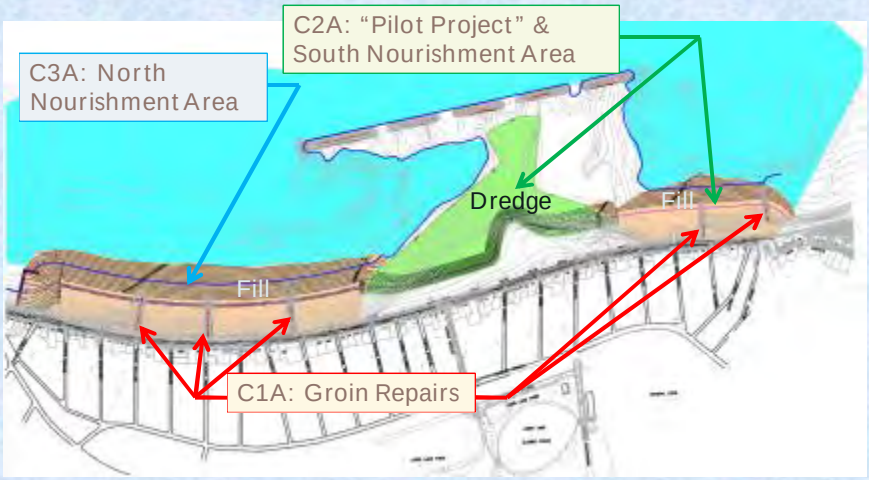
1. Fenced buffer between excavation activities and upper beach/dune area
2. Use of back-up alarms that are sensitive to ambient noise levels
3. Development of formal management plan for Piping Plover and Least Tern habitat:
   - Staffing for monitoring
   - Enforcement requirements
   - Maintenance/management of sand fencing and dune vegetation
   - Fencing to cordon off Least Tern habitat
   - Live trapping and removal of mammalian predators
4. Excavation Methods:
   - Maintaining existing dune/beach system in all areas not under active excavation
   - Separation of cobble and placement of this material under the sand surface of the nourishment area to improve habitat quality
   - Re-grading of existing tombolo to enhance habitat (Figure 10) to improve habitat quality
   - Ensure that the final grading of the beach slope is not steeper than 1:10 (v:h)
   - Ensure that the truck route only affects those portions of the tombolo that will be excavated
   - No excavation below -3 feet NAVD to prevent impacts to low tide foraging habitat

Minimization and Mitigation

Part 3 – Beach Nourishment

- Repaving of haul route streets:
  - Winthrop Parkway
  - Revere Street
  - Crest Avenue
  - Winthrop Shore Drive (as 4th part of project)
- Dust Control:
  - Wetting of sand
  - Barrier fence with screening
  - Dump truck on area of stone & poly fabric

Questions & Comments



Attachment B

Grain Size Distribution

Saugus Borrow Site

LABORATORY TESTING DATA SHEET

Project Name Winthrop Shores Reservation
Project No. 08.0170939.00
Project Manager M. Polsky

Project Location Saugus, MA
Assigned By D. D'Angelo
Date 5/18/2011

Reviewed By Matthew Polsky
Date Reviewed 5/18/11

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests								Strength Tests					Consol.	
				Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Torvane or Type Test	$\bar{\sigma}_c$ psf	Failure Criteria	$\sigma_1 - \sigma_3$ or τ psf	Strain %	$\frac{C_c}{1 + e_0}$	Laboratory Log and Soil Description
T-1	Bulk	0.0-10.5	1				4											Brown Poorly-graded Sand with Silt & Gravel (SP-SM)
T-2	Bulk	0.3-10.5	2				6											Brown Poorly-graded Sand with Silt & Gravel (SP-SM)
T-3	Bulk	0.3-10.0	3				5											Brown Poorly-graded Sand with Silt & Gravel (SP-SM)
T-4	Bulk	0.3-10.5	4				7											Brown Poorly-graded Sand with Silt & Gravel (SP-SM)
T-5	Bulk	0.3-10.5	5				7											Brown Poorly-graded Sand with Silt & Gravel (SP-SM)
T-6	Bulk	0.3-11.0	6				7											Brown Poorly-graded Sand with Silt & Gravel (SP-SM)
T-7	Bulk	0.5-11.0	7				6											Brown Poorly-graded Sand with Silt & Gravel (SP-SM)
T-8	Bulk	0.5-11.0	8				13											Brown Silty Sand (SM)
T-9	Bulk	0.3-10.5	9				8											Brown Poorly-graded Sand with Silt (SP-SM)
T-10	Bulk	0.5-10.0	10				9											Brown Poorly-graded Sand with Silt & Gravel (SP-SM)

GZA GeoEnvironmental, Inc.
Engineers and Scientists

LABORATORY TESTING DATA SHEET

Project Name Winthrop Shores Reservation
Project No. 08.0170939.00
Project Manager M. Polsky

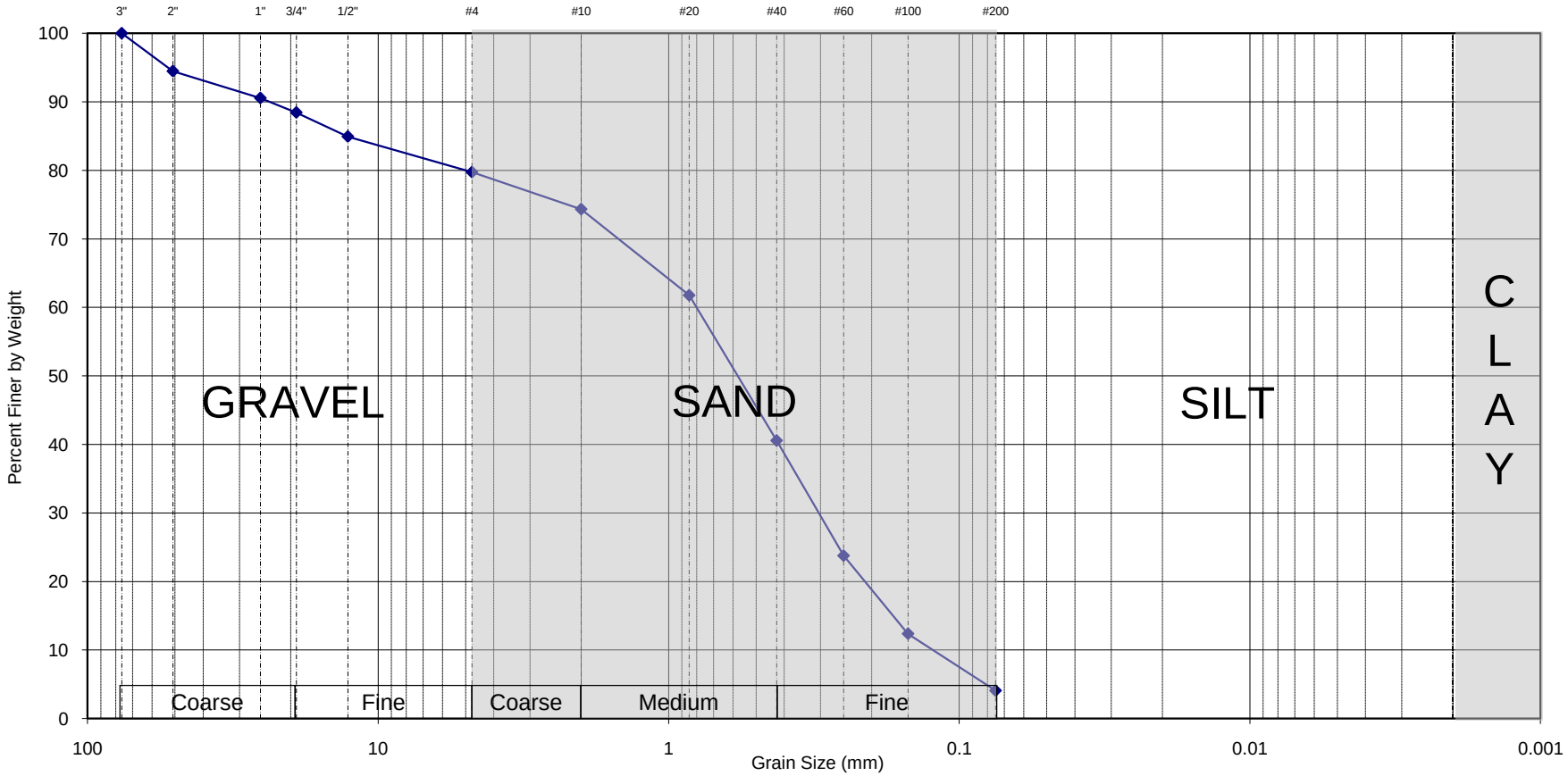
Project Location Saugus, MA
Assigned By D. D'Angelo
Date 5/19/2011

Reviewed By
Date Reviewed *5/19/11*

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests								Strength Tests					Consol.	
				Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Torvane or Type Test	$\bar{\sigma}_c$ psf	Failure Criteria	$\sigma_1 - \sigma_3$ or τ psf	Strain %	$\frac{C_c}{1 + e_0}$	Laboratory Log and Soil Description
T-11	Bulk	0.3-11.0	11				7											Brown Poorly-graded Sand with Silt & Gravel (SP-SM)
T-12	Bulk	0.0-10.5	12				8											Brown Poorly-graded Sand with Silt & Gravel (SP-SM)
T-13	Bulk	0.0-10.0	13				9											Brown Poorly-graded Sand with Silt & Gravel (SP-SM)
T-14	Bulk	0.3-10.5	14				8											Brown Poorly-graded Sand with Silt & Gravel (SP-SM)
T-15	Bulk	0.0-10.0	15				10											Brown Poorly-graded Sand with Silt & Gravel (SP-SM)
T-16	Bulk	0.5-11.0	16				8											Brown Poorly-graded Sand with Silt & Gravel (SP-SM)
T-17	Bulk	0.3-10.5	17				6											Brown Poorly-graded Sand with Silt & Gravel (SP-SM)
T-18	Bulk	0.5-10.0	18				8											Brown Poorly-graded Sand with Silt & Gravel (SP-SM)
T-19	Bulk	0.5-10.5	19				8											Brown Poorly-graded Sand with Silt & Gravel (SP-SM)
T-20	Bulk	0.5-11.0	20				8											Brown Poorly-graded Sand with Silt & Gravel (SP-SM)

GZA GeoEnvironmental, Inc.
Engineers and Scientists

U.S. STANDARD SIEVE AND HYDROMETER



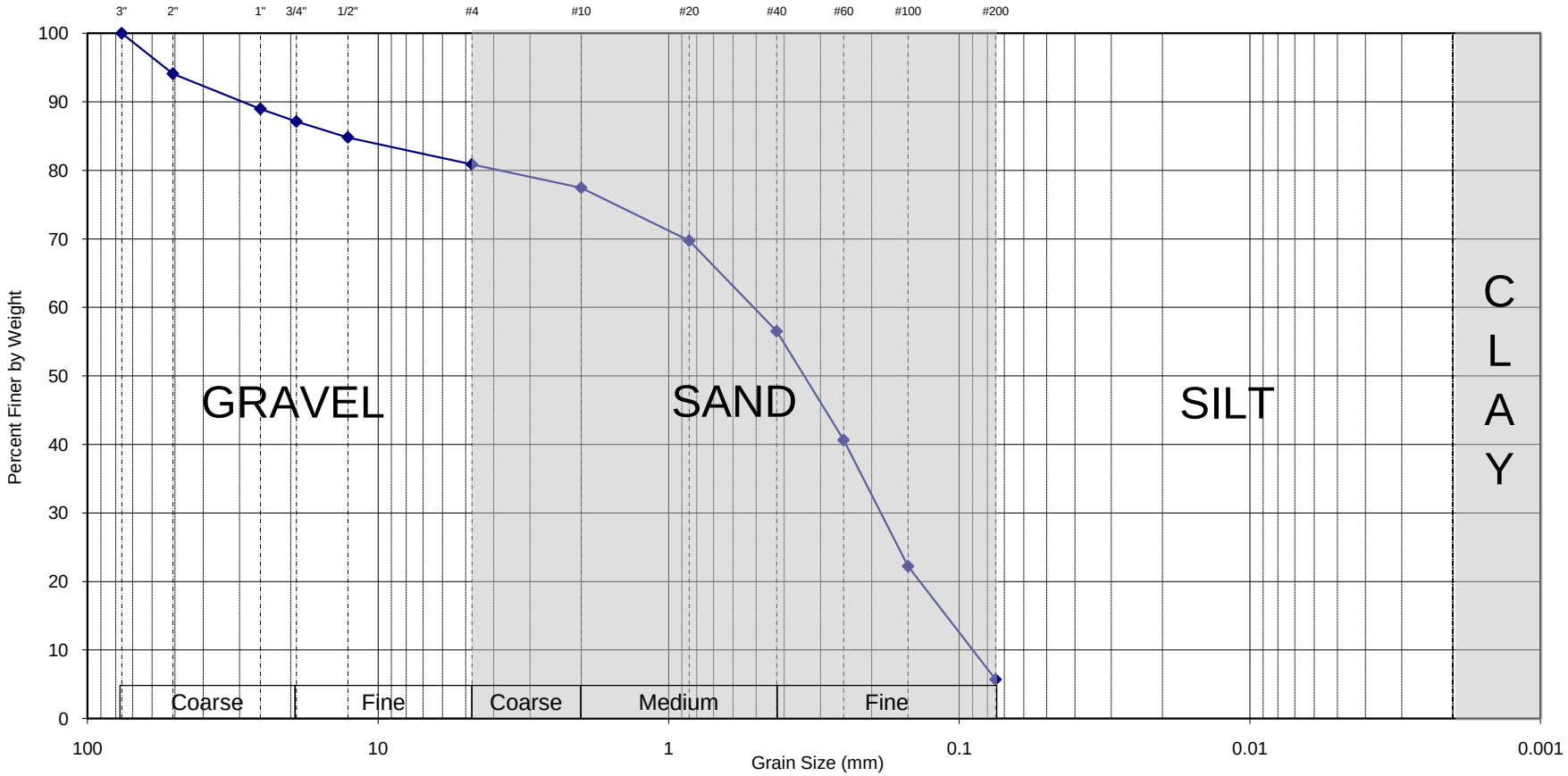
Gravel	Sand	Fines
20.3%	75.7%	4.1%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
1	T-1	Bulk	0.0-10.5'	Brown Poorly-graded Sand with Silt & Gravel (SP-SM)				

Winthrop Shores Reservation
Saugus, MA
GZA File # 08.0170939.00

Tested by: PEC/TAJ Date: 5/12/11
Reviewed by: MBP Date: 5/16/11

U.S. STANDARD SIEVE AND HYDROMETER



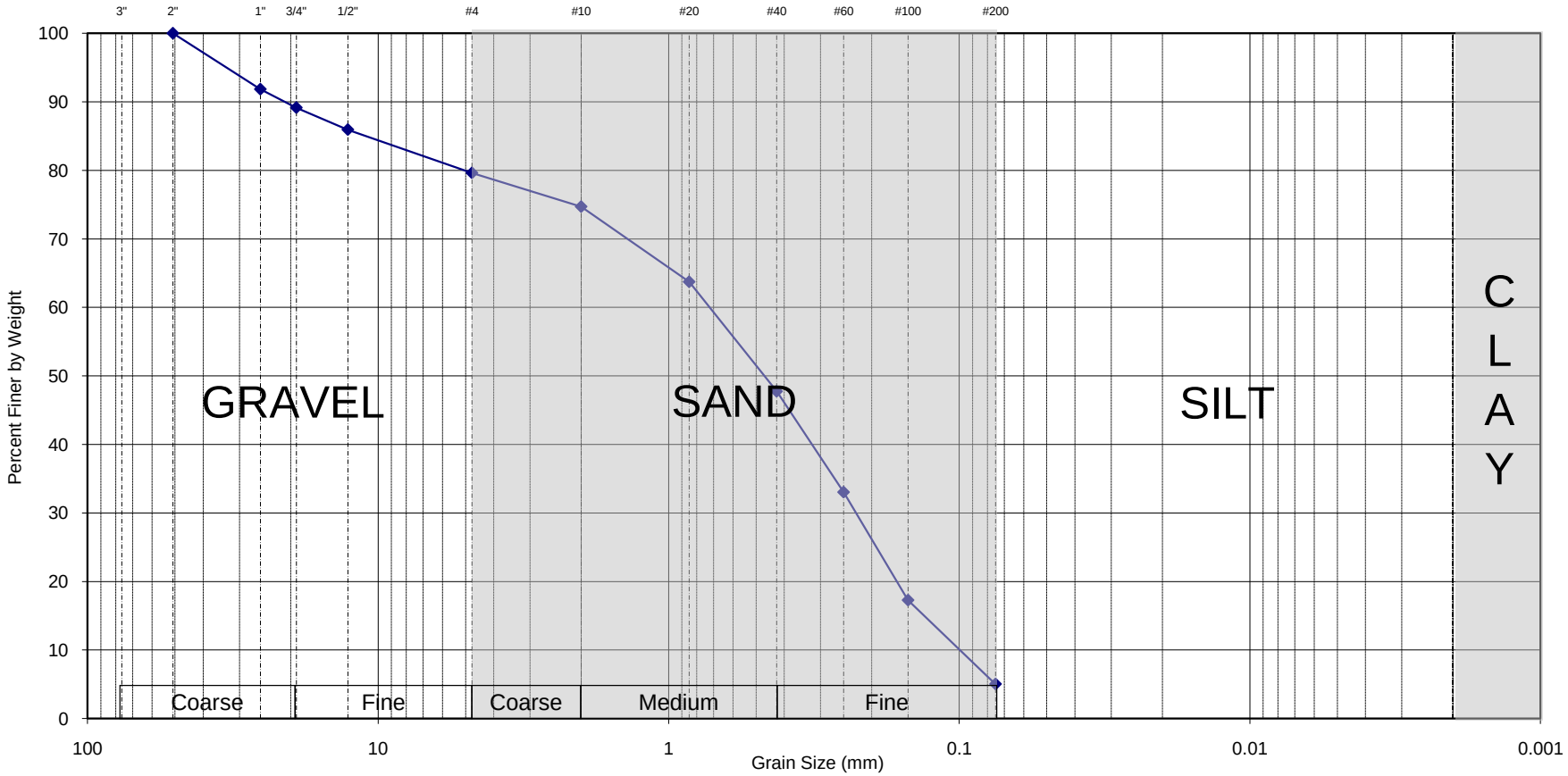
Gravel	Sand	Fines
19.1%	75.1%	5.7%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
2	T-2	Bulk	0.3-10.5'	Brown Poorly-graded Sand with Silt & Gravel (SP-SM)				

Winthrop Shores Reservation
Saugus, MA
GZA File # 08.0170939.00

Tested by: PEC/TAJ Date: 5/12/11
Reviewed by: MBP Date: 5/16/11

U.S. STANDARD SIEVE AND HYDROMETER



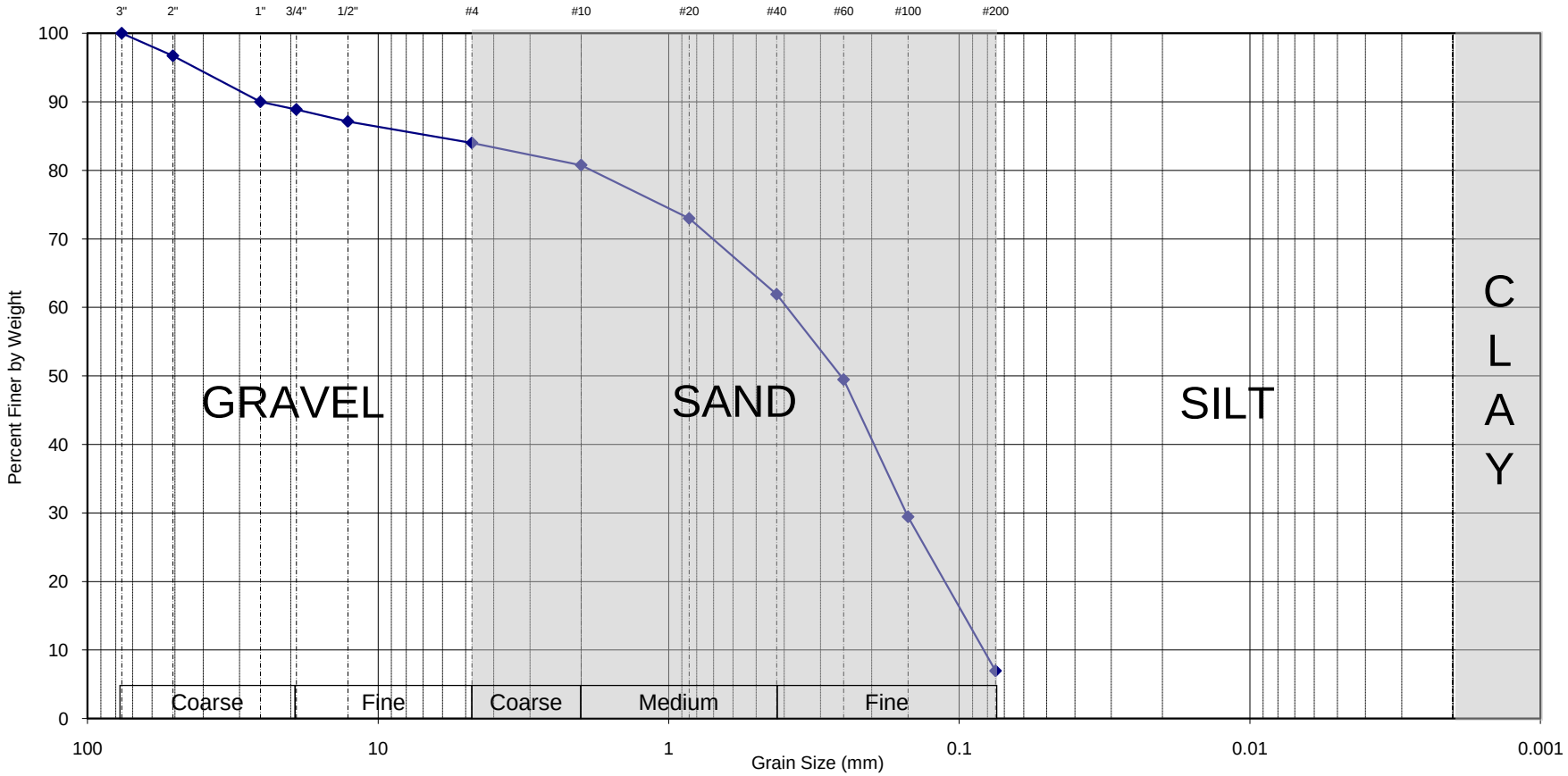
Gravel	Sand	Fines
20.4%	74.6%	5.0%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
3	T-3	Bulk	0.3-10.0'	Brown Poorly-graded Sand with Silt & Gravel (SP-SM)				

Winthrop Shores Reservation
Saugus, MA
GZA File # 08.0170939.00

Tested by: PEC/TAJ Date: 5/12/11
Reviewed by: MBP Date: 5/16/11

U.S. STANDARD SIEVE AND HYDROMETER



Gravel	Sand	Fines
16.0%	77.0%	7.0%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
4	T-4	Bulk	0.3-10.5'	Brown Poorly-graded Sand with Silt & Gravel (SP-SM)				

Winthrop Shores Reservation
Saugus, MA
GZA File # 08.0170939.00

Tested by: PEC/TAJ Date: 5/12/11
Reviewed by: MBP Date: 5/16/11

U.S. STANDARD SIEVE AND HYDROMETER

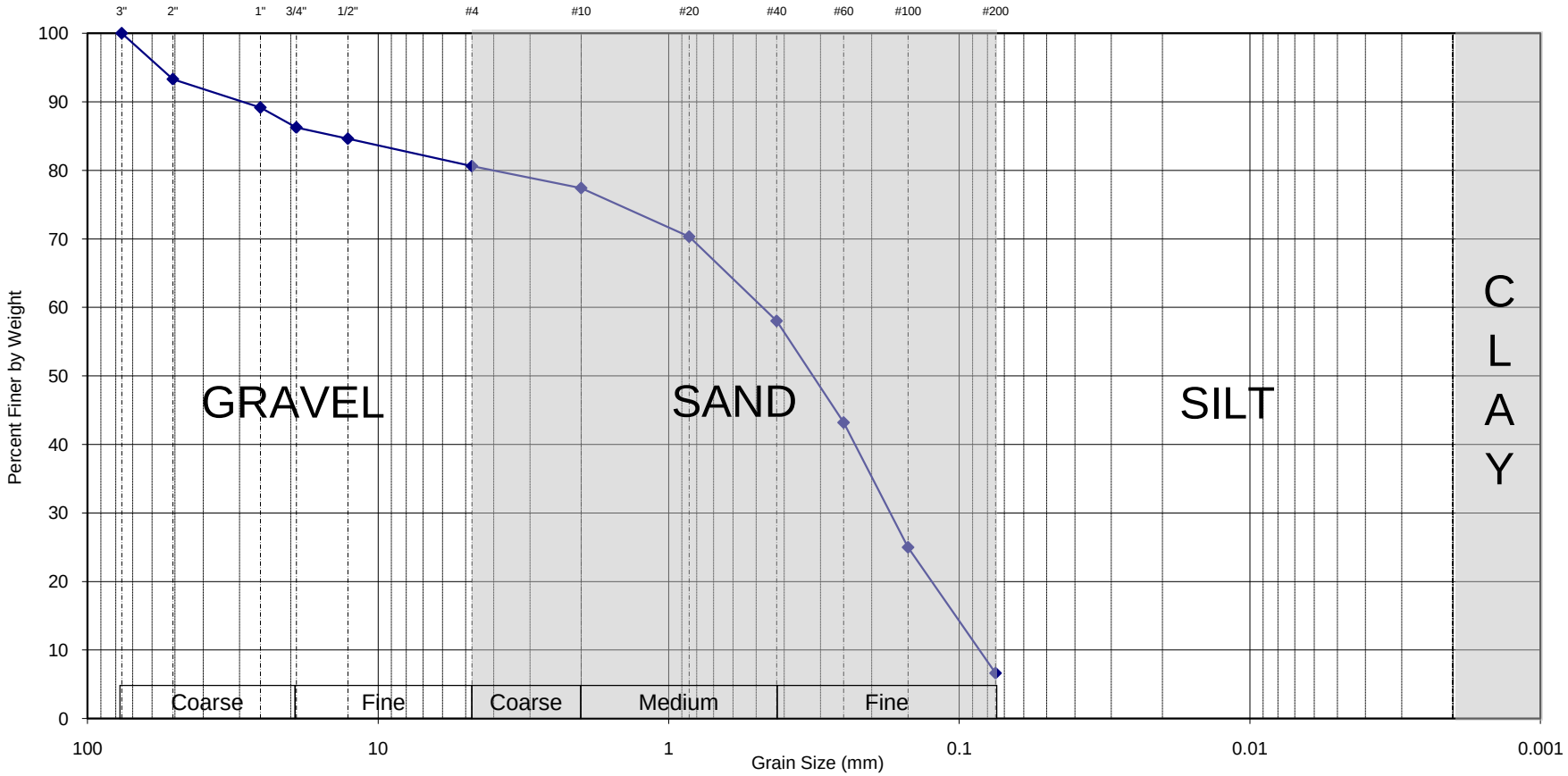
Gravel	Sand	Fines
24.6%	68.8%	6.6%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
5	T-5	Bulk	0.3-10.5'	Brown Poorly-graded Sand with Silt & Gravel (SP-SM)				

Winthrop Shores Reservation
Saugus, MA
GZA File # 08.0170939.00

Tested by: PEC/TAJ Date: 5/12/11
Reviewed by: MBP Date: 5/16/11

U.S. STANDARD SIEVE AND HYDROMETER



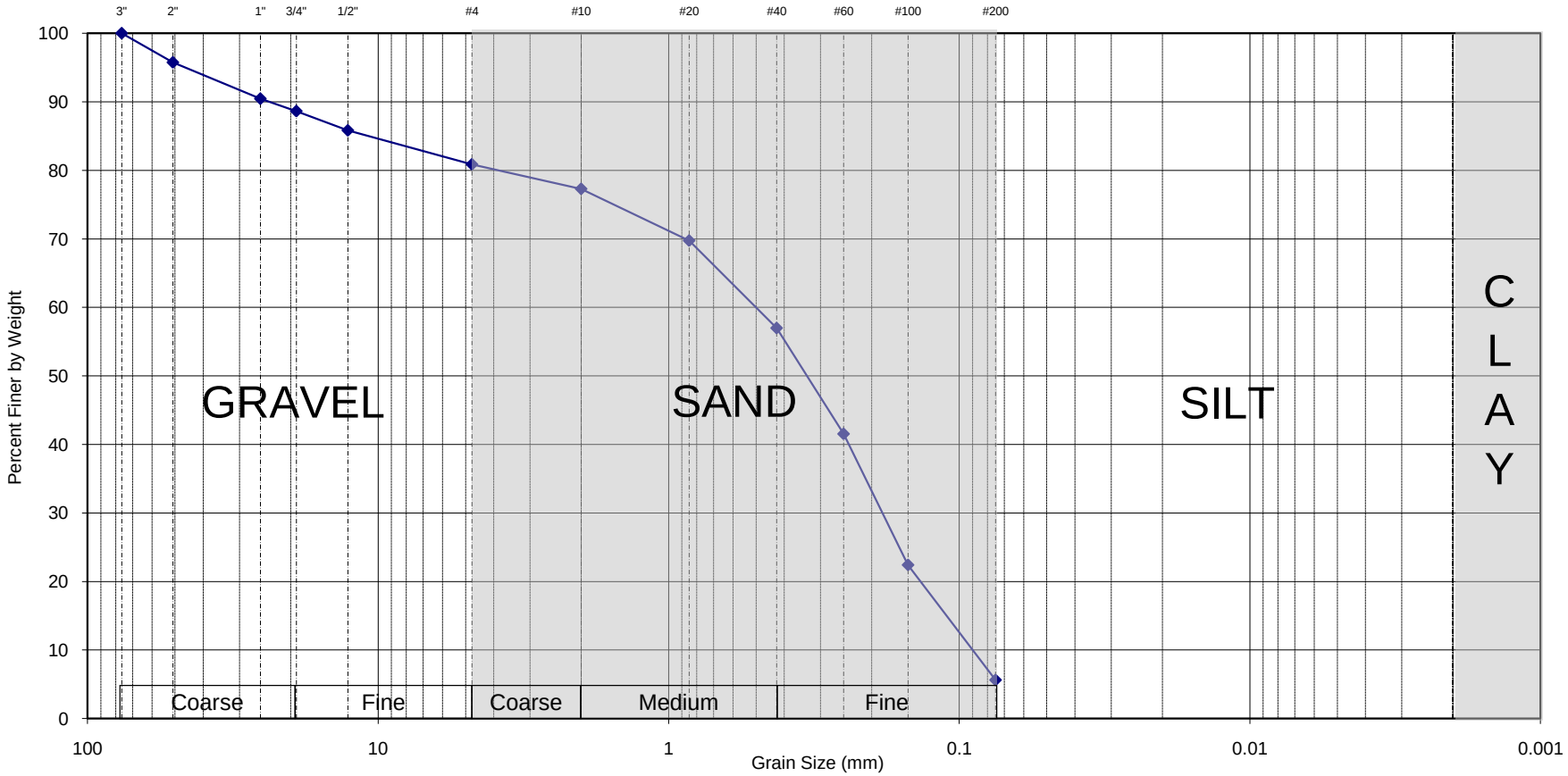
Gravel	Sand	Fines
19.4%	74.0%	6.6%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
6	T-6	Bulk	0.3-10.0'	Brown Poorly-graded Sand with Silt & Gravel (SP-SM)				

Winthrop Shores Reservation
Saugus, MA
GZA File # 08.0170939.00

Tested by: PEC/TAJ Date: 5/12/11
Reviewed by: MBP Date: 5/16/11

U.S. STANDARD SIEVE AND HYDROMETER



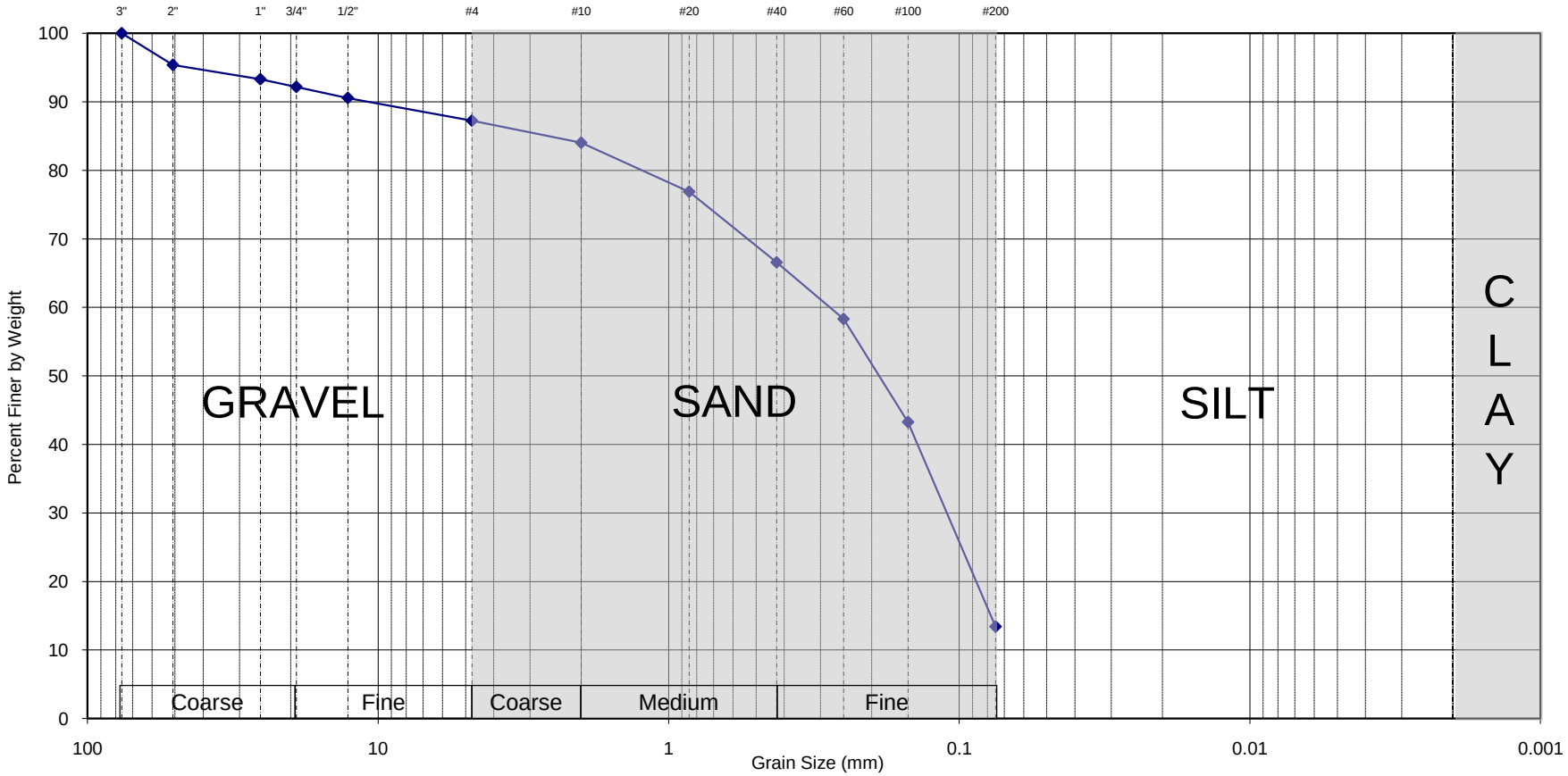
Gravel	Sand	Fines
19.1%	75.3%	5.6%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
7	T-7	Bulk	0.5-11.0'	Brown Poorly-graded Sand with Silt & Gravel (SP-SM)				

Winthrop Shores Reservation
Saugus, MA
GZA File # 08.0170939.00

Tested by: PEC/TAJ Date: 5/12/11
Reviewed by: MBP Date: 5/16/11

U.S. STANDARD SIEVE AND HYDROMETER



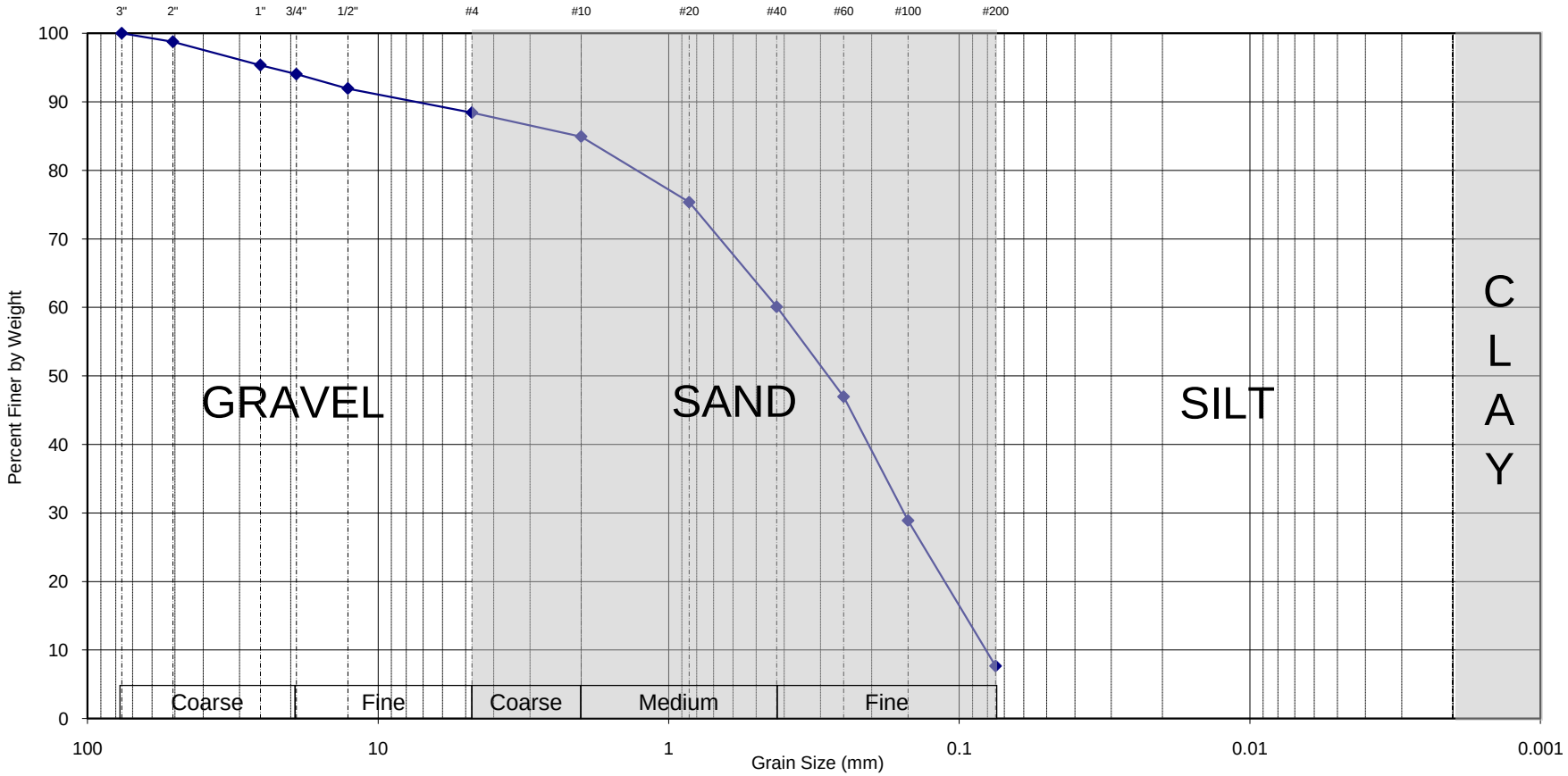
Gravel	Sand	Fines
12.8%	73.8%	13.4%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
8	T-8	Bulk	0.5-11.0'	Brown Silty Sand (SM)				

Winthrop Shores Reservation
Saugus, MA
GZA File # 08.0170939.00

Tested by: PEC/TAJ Date: 5/12/11
Reviewed by: MBP Date: 5/16/11

U.S. STANDARD SIEVE AND HYDROMETER



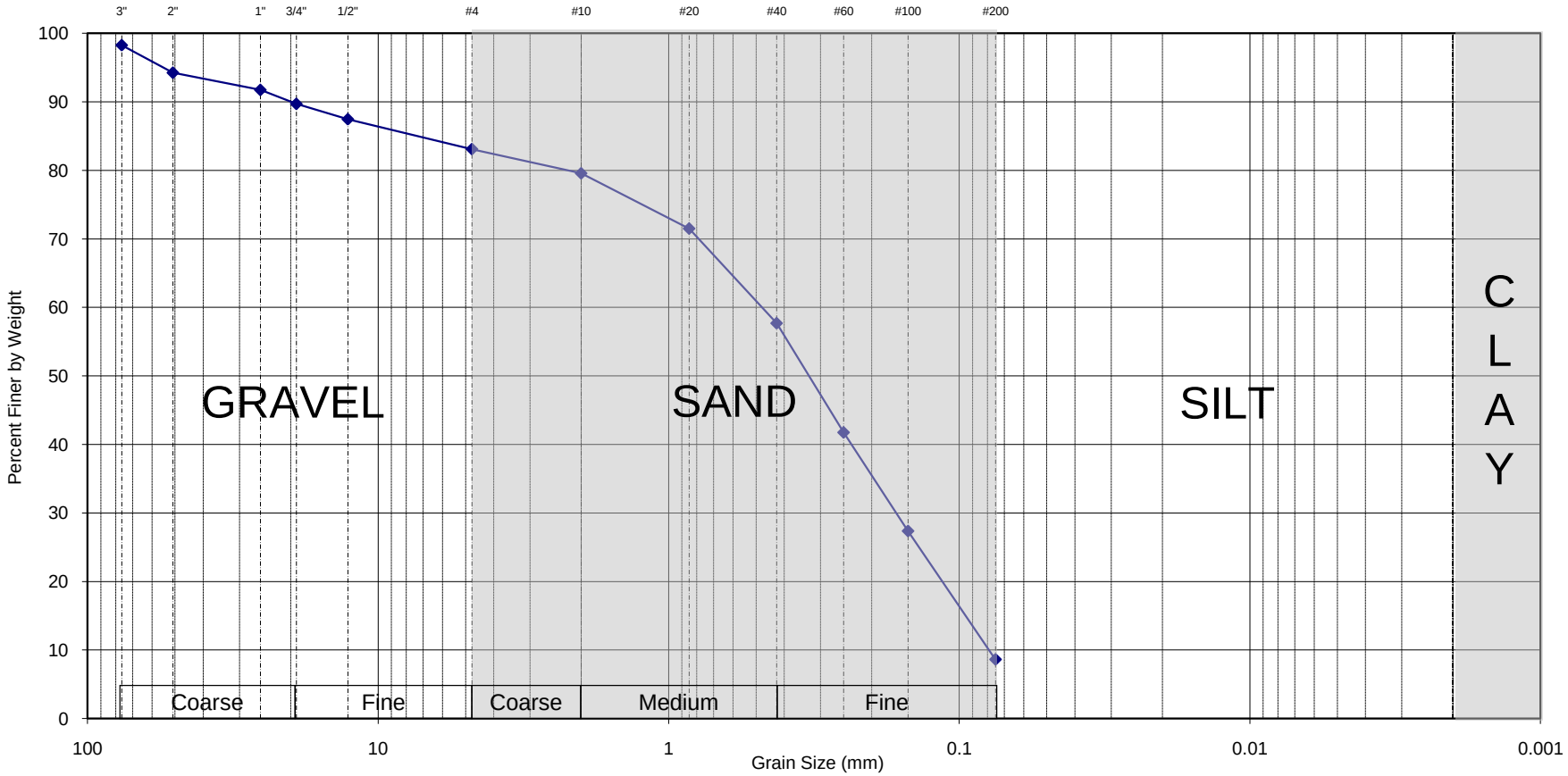
Gravel	Sand	Fines
11.6%	80.8%	7.7%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
9	T-9	Bulk	0.3-10.0'	Brown Poorly-graded Sand with Silt (SP-SM)				

Winthrop Shores Reservation
Saugus, MA
GZA File # 08.0170939.00

Tested by: PEC/TAJ Date: 5/12/11
Reviewed by: MBP Date: 5/16/11

U.S. STANDARD SIEVE AND HYDROMETER



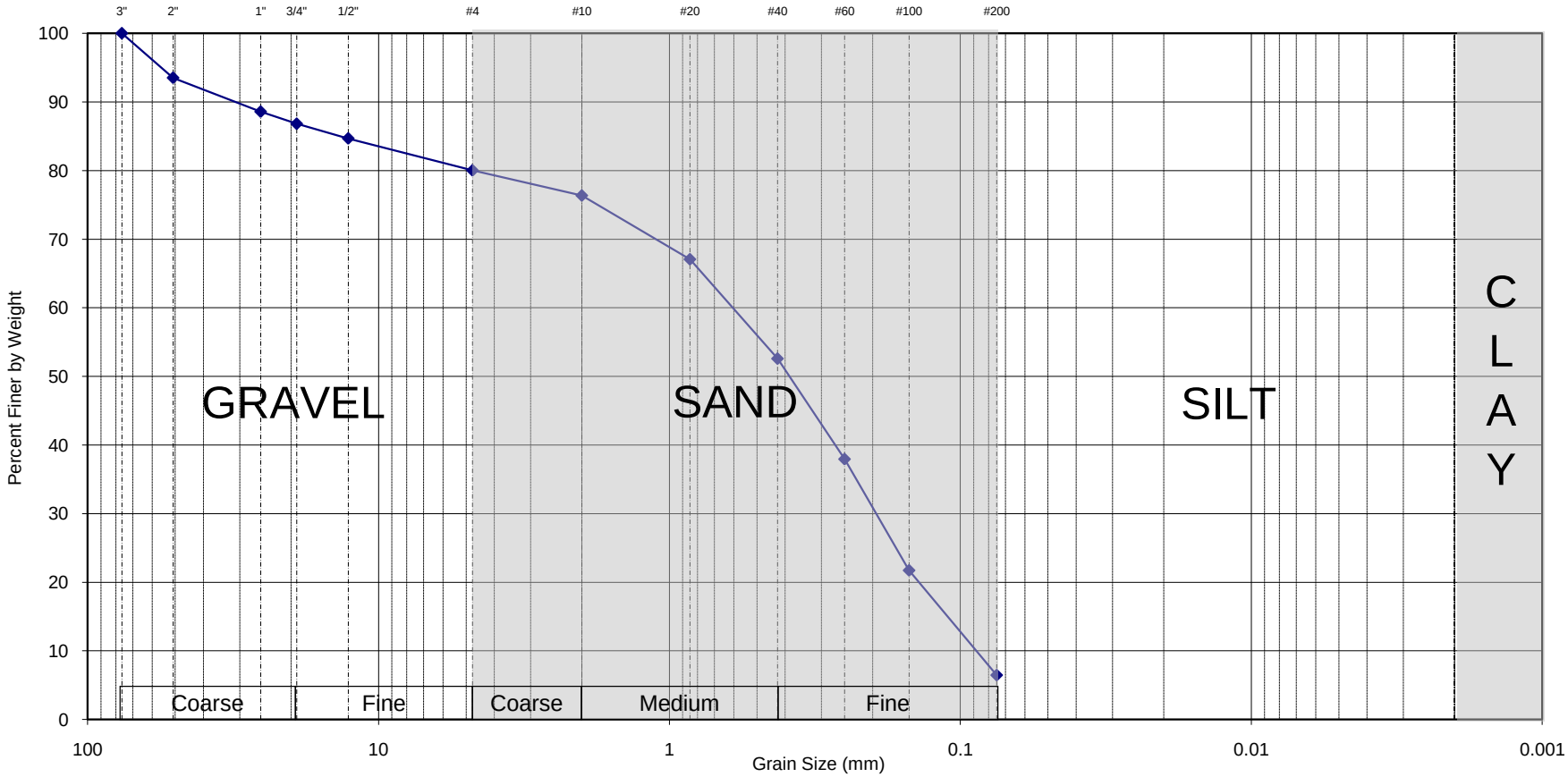
Gravel	Sand	Fines
16.9%	74.5%	8.6%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
10	T-10	Bulk	0.5-10.0'	Brown Poorly-graded Sand with Silt & Gravel (SP-SM)				

Winthrop Shores Reservation
Saugus, MA
GZA File # 08.0170939.00

Tested by: PEC/TAJ Date: 5/12/11
Reviewed by: MBP Date: 5/16/11

U.S. STANDARD SIEVE AND HYDROMETER



Gravel	Sand	Fines
20.0%	73.6%	6.5%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
11	T-11	Bulk	0.3-11.0'	Brown Poorly-graded Sand with Silt & Gravel (SP-SM)				

Winthrop Shores Reservation
Saugus, MA
GZA File # 08.0170939.00

Tested by: PEC/TAJ Date: 5/16/11
Reviewed by: MBP Date: 5/18/11

U.S. STANDARD SIEVE AND HYDROMETER

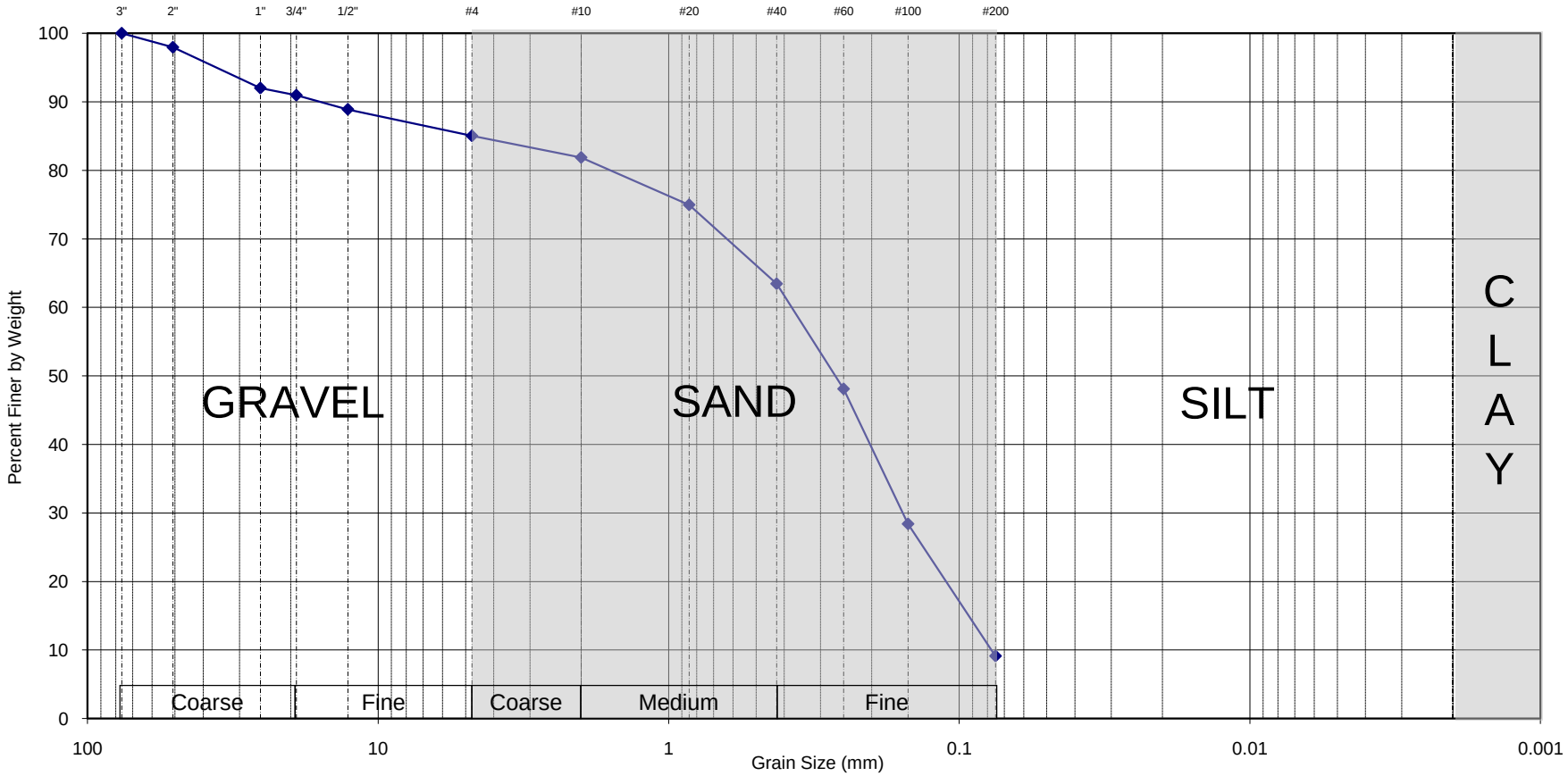
Gravel	Sand	Fines
20.9%	70.8%	8.2%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
12	T-12	Bulk	0.0-10.5'	Brown Poorly-graded Sand with Silt & Gravel (SP-SM)				

Winthrop Shores Reservation
Saugus, MA
GZA File # 08.0170939.00

Tested by: PEC/TAJ Date: 5/16/11
Reviewed by: MBP Date: 5/18/11

U.S. STANDARD SIEVE AND HYDROMETER



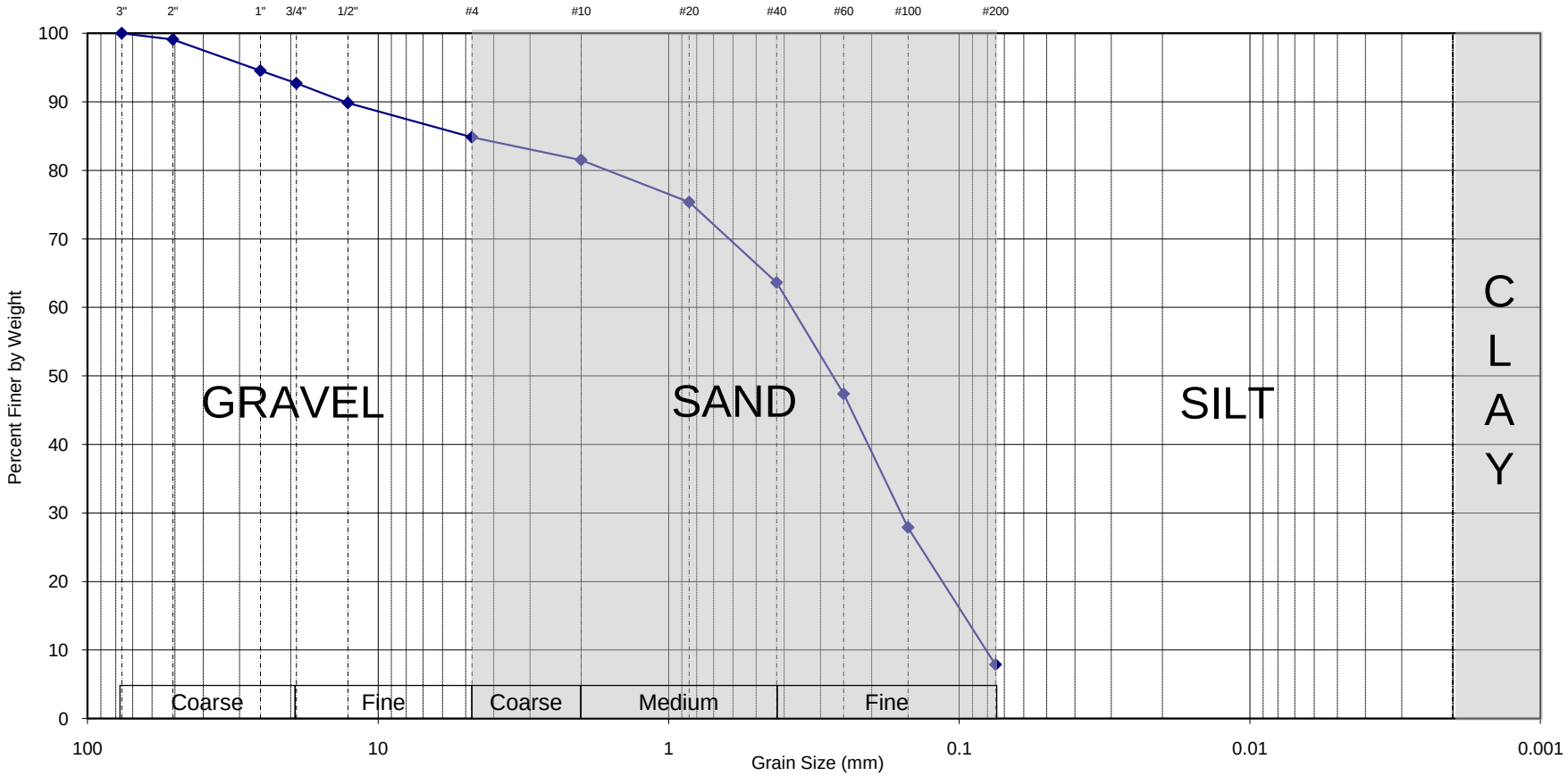
Gravel	Sand	Fines
15.0%	75.9%	9.1%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
13	T-13	Bulk	0.0-10.0'	Brown Poorly-graded Sand with Silt & Gravel (SP-SM)				

Winthrop Shores Reservation
Saugus, MA
GZA File # 08.0170939.00

Tested by: PEC/TAJ Date: 5/16/11
Reviewed by: MBP Date: 5/18/11

U.S. STANDARD SIEVE AND HYDROMETER



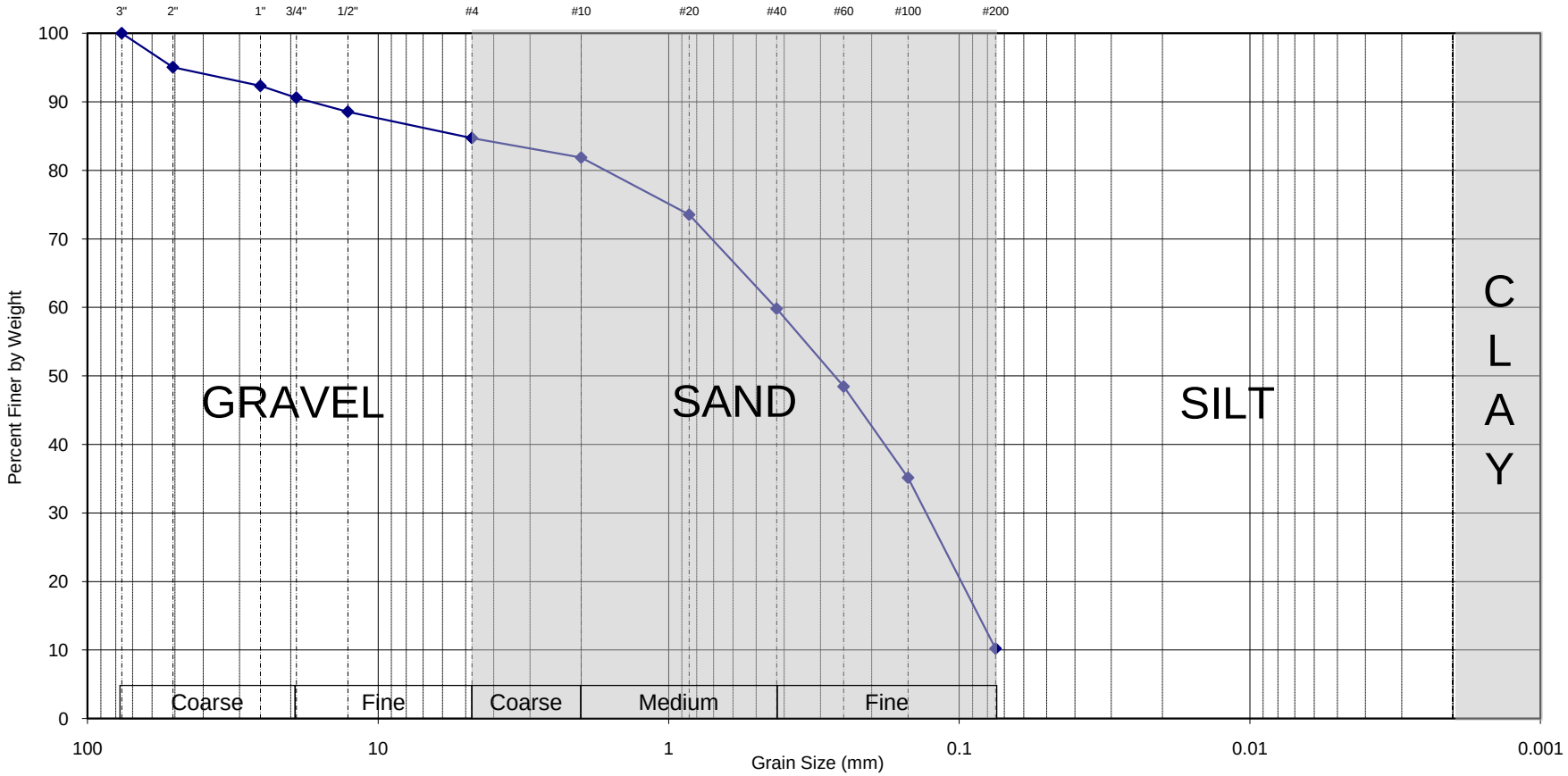
Gravel	Sand	Fines
15.2%	77.0%	7.9%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
14	T-14	Bulk	0.3-10.5'	Brown Poorly-graded Sand with Silt & Gravel (SP-SM)				

Winthrop Shores Reservation
Saugus, MA
GZA File # 08.0170939.00

Tested by: PEC/TAJ Date: 5/16/11
Reviewed by: MBP Date: 5/18/11

U.S. STANDARD SIEVE AND HYDROMETER



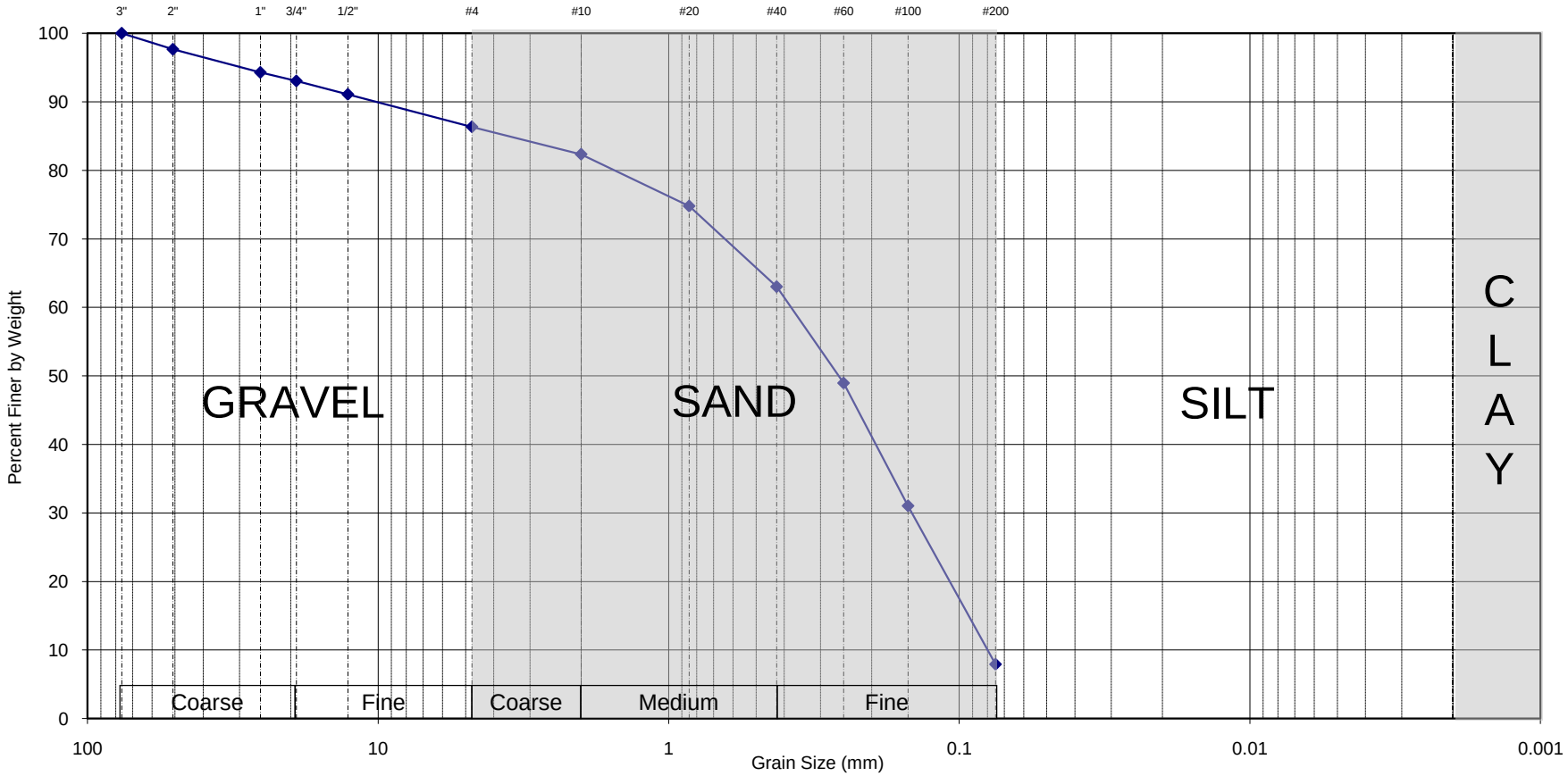
Gravel	Sand	Fines
15.3%	74.5%	10.2%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
15	T-15	Bulk	0.0-10.0'	Brown Poorly-graded Sand with Silt & Gravel (SP-SM)				

Winthrop Shores Reservation
Saugus, MA
GZA File # 08.0170939.00

Tested by: PEC/TAJ Date: 5/16/11
Reviewed by: MBP Date: 5/18/11

U.S. STANDARD SIEVE AND HYDROMETER



Gravel	Sand	Fines
13.7%	78.4%	7.9%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
16	T-16	Bulk	0.5-11.0'	Brown Poorly-graded Sand with Silt & Gravel (SP-SM)				

Winthrop Shores Reservation
Saugus, MA
GZA File # 08.0170939.00

Tested by: PEC/TAJ Date: 5/16/11
Reviewed by: MBP Date: 5/18/11

U.S. STANDARD SIEVE AND HYDROMETER

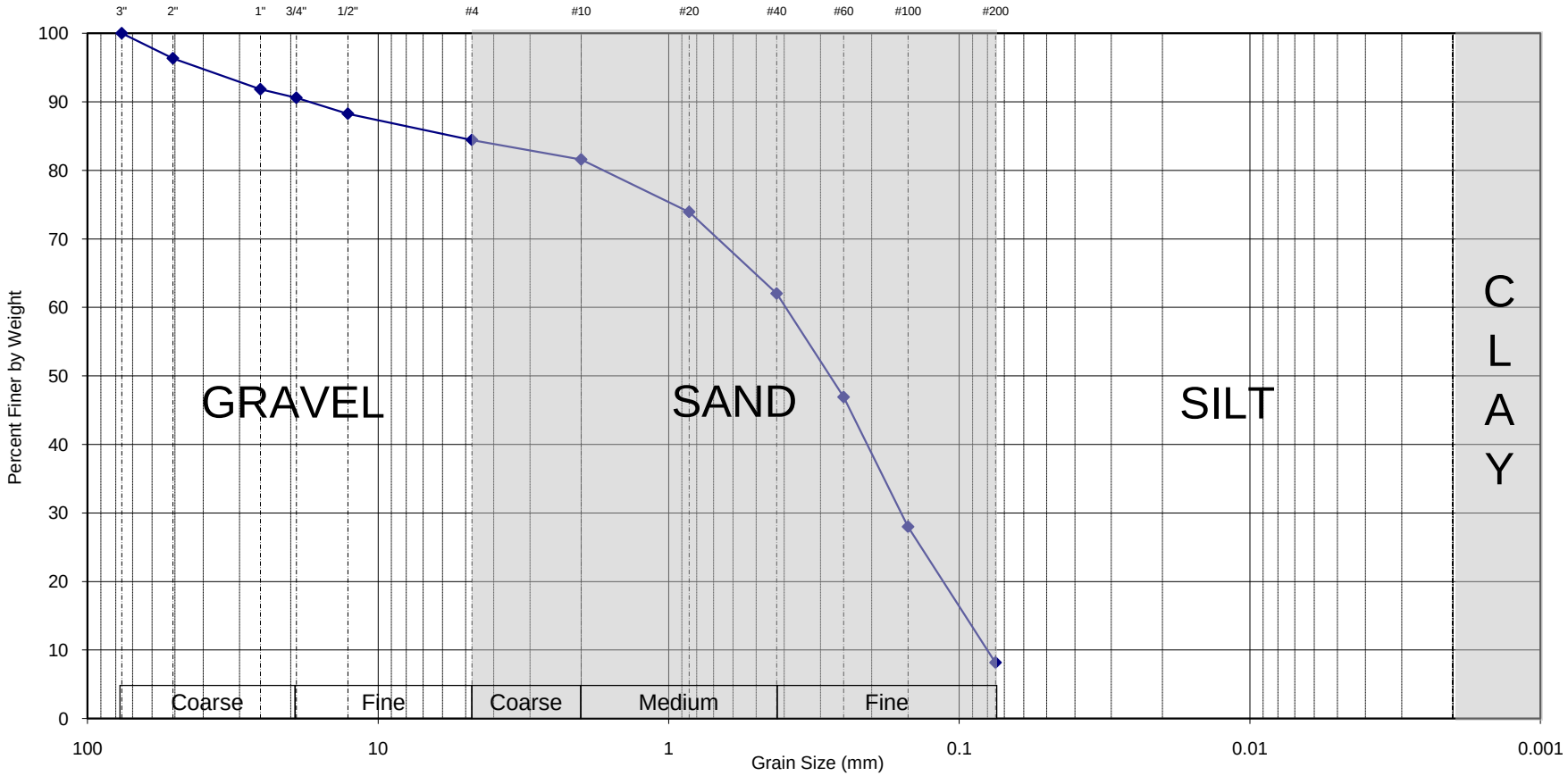
Gravel	Sand	Fines
18.5%	75.5%	6.0%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
17	T-17	Bulk	0.3-10.5'	Brown Poorly-graded Sand with Silt & Gravel (SP-SM)				

Winthrop Shores Reservation
Saugus, MA
GZA File # 08.0170939.00

Tested by: PEC/TAJ Date: 5/16/11
Reviewed by: MBP Date: 5/18/11

U.S. STANDARD SIEVE AND HYDROMETER



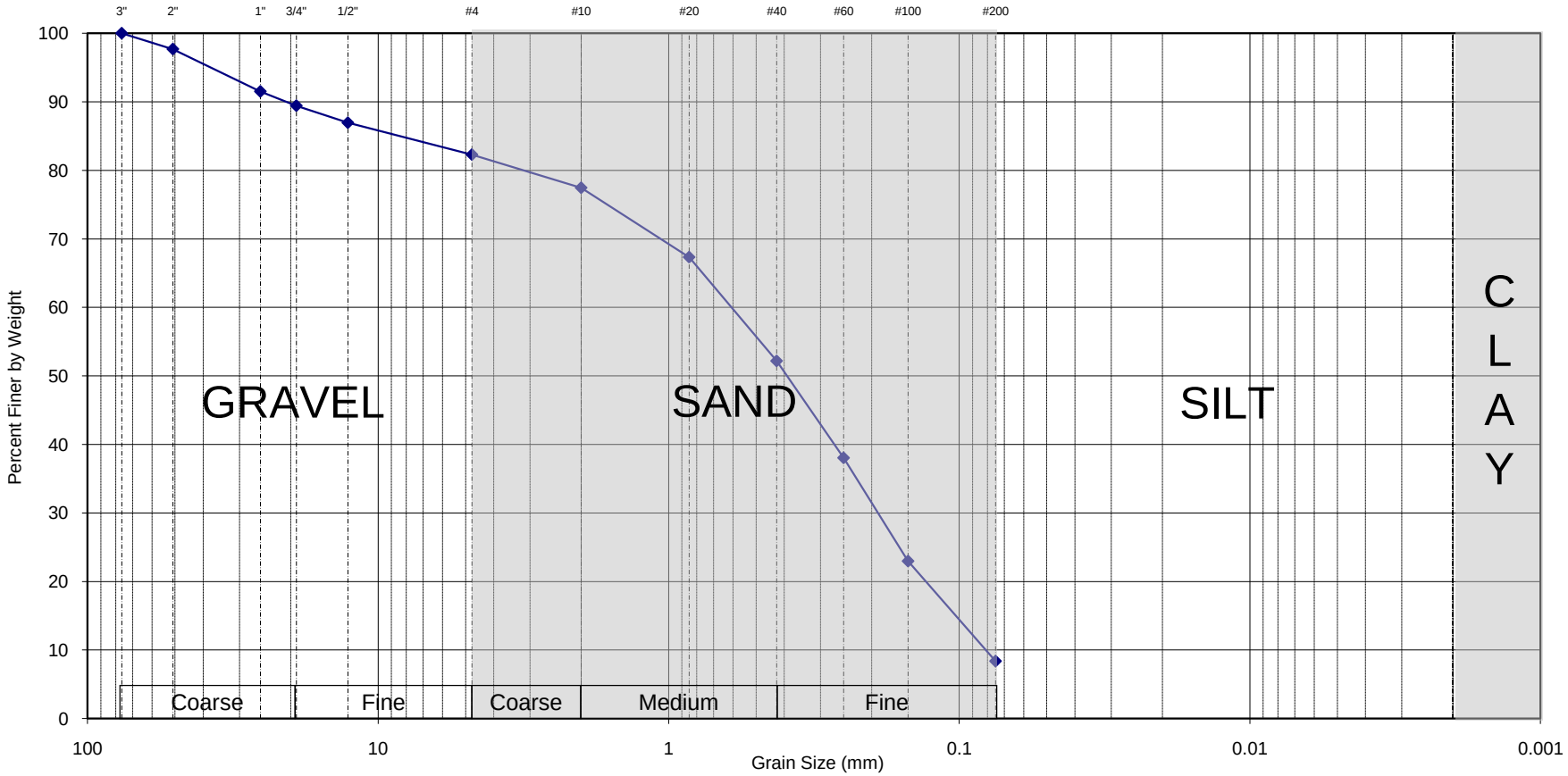
Gravel	Sand	Fines
15.6%	76.3%	8.1%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
18	T-18	Bulk	0.5-10.0'	Brown Poorly-graded Sand with Silt & Gravel (SP-SM)				

Winthrop Shores Reservation
Saugus, MA
GZA File # 08.0170939.00

Tested by: PEC/TAJ Date: 5/18/11
Reviewed by: MBP Date: 5/19/11

U.S. STANDARD SIEVE AND HYDROMETER



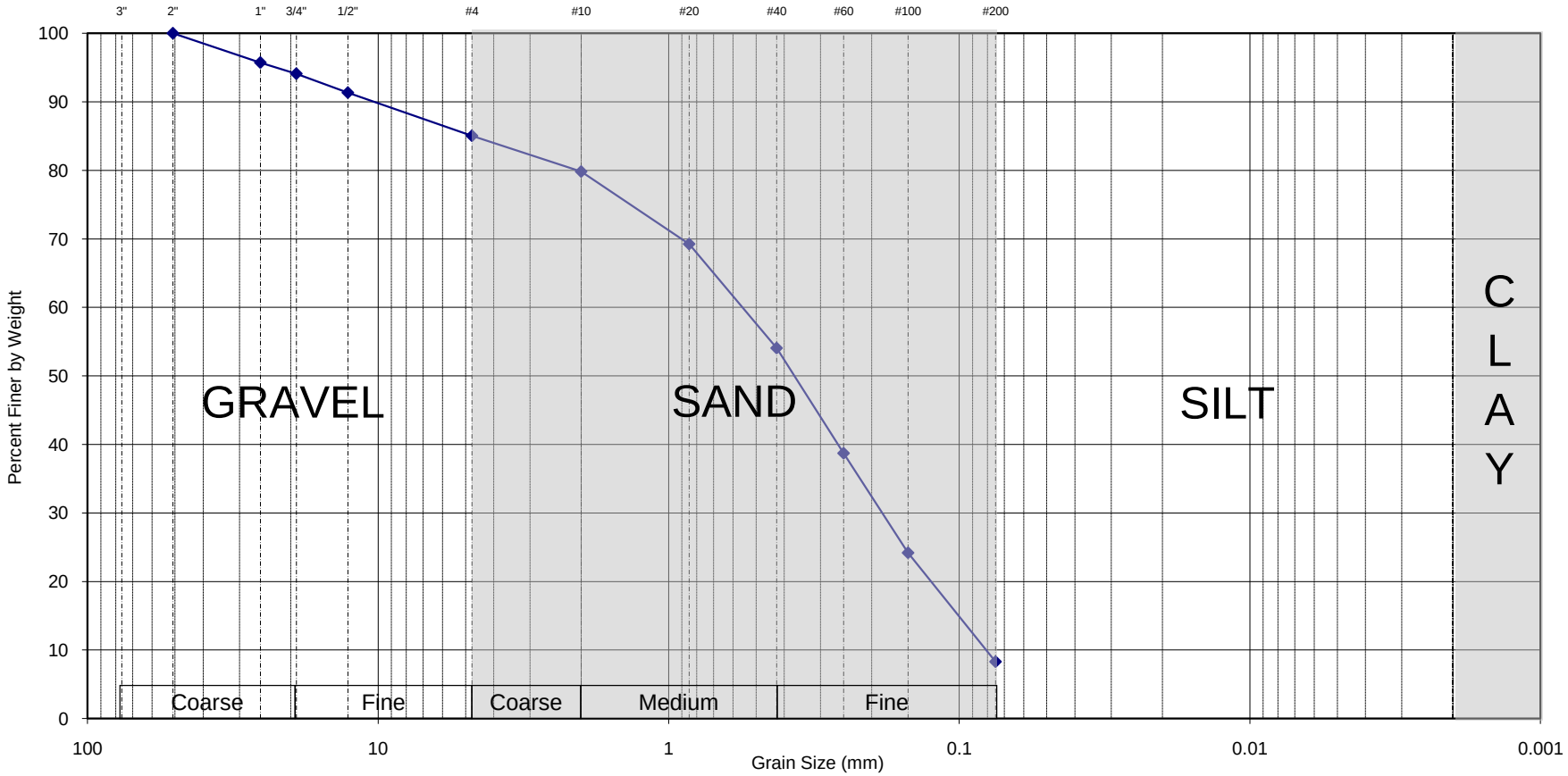
Gravel	Sand	Fines
17.7%	73.9%	8.4%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
19	T-19	Bulk	0.5-10.5'	Brown Poorly-graded Sand with Silt & Gravel (SP-SM)				

Winthrop Shores Reservation
Saugus, MA
GZA File # 08.0170939.00

Tested by: PEC/TAJ Date: 5/18/11
Reviewed by: MBP Date: 5/19/11

U.S. STANDARD SIEVE AND HYDROMETER



Gravel	Sand	Fines
15.0%	76.7%	8.3%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
20	T-20	Bulk	0.5-11.0'	Brown Poorly-graded Sand with Silt & Gravel (SP-SM)				

Winthrop Shores Reservation
Saugus, MA
GZA File # 08.0170939.00

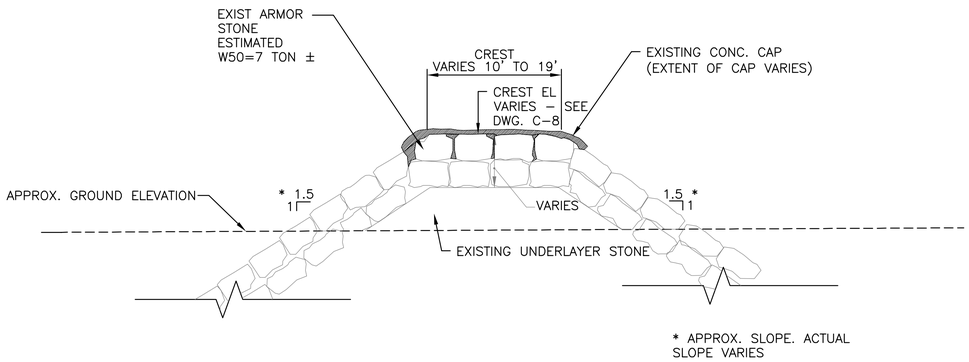
Tested by: PEC/TAJ Date: 5/18/11
Reviewed by: MBP Date: 5/19/11

This page is intentionally blank

Attachment C

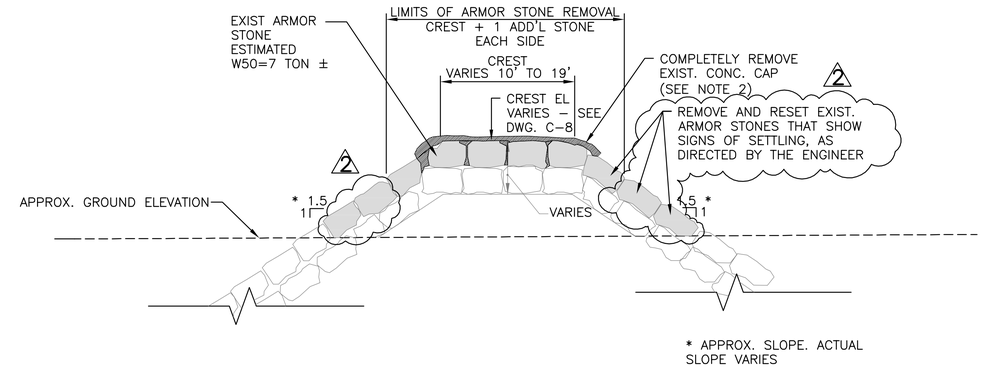
Groin Construction Details

Sheet C-7



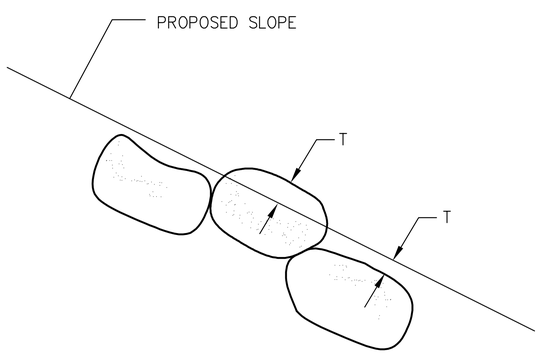
EXISTING SECTION AT GROIN

SCALE = 1"=8'



DEMOLITION SECTION AT GROIN

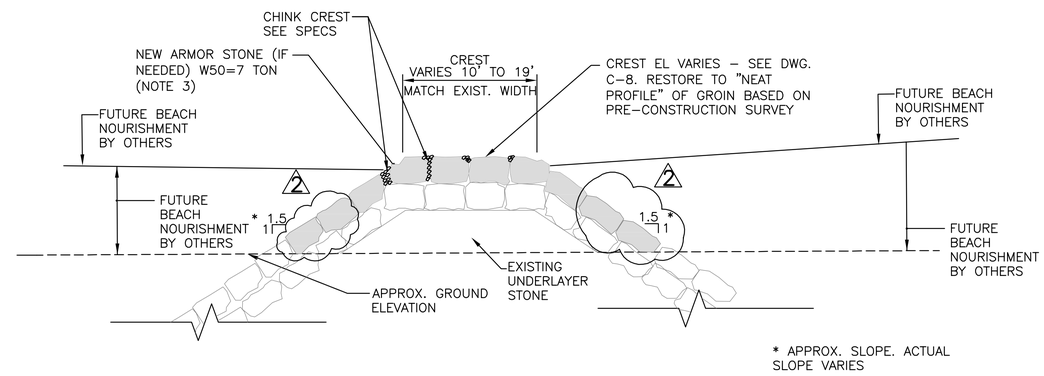
SCALE = 1"=8'



SETTING TOLERANCE FOR ARMOR STONE

N.T.S

STONE SIZE	T (MAX.)
7.0 TON	12"



DETAILED SECTION AT GROIN

SCALE = 1"=8'

NOTES:

1. PRIOR TO CONSTRUCTION, SURVEY THE PROFILE OF THE CREST ELEV. OF EACH GROIN, FROM THE FACE OF SEAWALL AT LEAST 250' SEAWARD.

2. BREAK UP AND COMPLETELY REMOVE THE CONC. CAP. DO NOT LEAVE CONC. DEBRIS ON THE BEACH OR IN THE WATER.

3. NEW ARMOR STONE SHALL BE W50=7 TON

4. ALL GROINS SHALL BE REBUILT TO BE A SAFE STABLE STRUCTURE. ALL GAPS BETWEEN LAYERS WILL BE REMOVED. ARMOR STONES SHALL BE ARRANGED SO THAT EACH ARMOR STONE HAS AT LEAST THREE POINTS OF BEARING ON UNDERLYING AND ADJACENT ARMOR STONES, PRIOR TO PLACEMENT OF CHINKING. NO DISCERNABLE ROCKING MOTION SHALL BE PERMITTED. ALL CONCRETE AND SHARP STONE FRAGMENTS SHALL BE REMOVED PRIOR TO BEING SUBJECT TO TIDAL ACTION. ALL ARMOR STONE SHALL BE REUSED UNLESS DIRECTED BY THE ENGINEER. 2

NO.	DATE	REVISIONS	BY
2	6/20/12	MISCELLANEOUS REVISIONS	LAC
1	6/11/12	REISSUE SHEET	LAC

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF CONSERVATION & RECREATION

WINTHROP BEACH GROIN REPAIRS

GROIN SECTION AND DETAILS

DESIGNED: RJB
CHECKED:
DRAWN LAV
CHECKED: RJB

PARSONS BRINCKERHOFF
Parsons Brinckerhoff, Inc.
75 Arlington St. Boston, MA 02116
PH. (617)426-7330 FAX (617)482-8487

REF. | CONT. P11-2686-C1A
ACC.
SCALE: AS NOTED
DATE: MAY 2012

SHEET C-7

dcr
DEPARTMENT OF CONSERVATION & RECREATION
251 CAUSEWAY STREET
BOSTON, MA. 02114

T:\52533CP - DCR Wintrop Nourishment\P11-2686-C1A - Winthrop Beach Groin Repairs\C-7 REV 1.dwg, 6/19/2012 11:59:48 AM, chandler1

Attachment D

Shellfish Survey Write-up

From Final Environmental Impact Report

4.2.2 Shellfish Survey

4.2.2.1 Methods

A shellfish survey was conducted on June 23, 24, 27 and 28, 2005 along Winthrop Beach in the area of the proposed nourishment project. The survey was divided into two separate areas (Figure 4-68). The northern survey area started approximately 800 feet south of the Wave Way groin and extended northward ending approximately 900 feet north of the Neptune Avenue Groin. The southern area started 200 feet south of the Beacon Street groin extending northward for 1,300 feet. Transects were established every 100 feet in each area and sampling locations were established every fifty feet along each transect starting from the sea wall. The northern area, due to the location of the groins, was divided into four sections:

North of the Neptune Avenue groin contained 9 transects.

1. Between the Neptune Avenue and Canal Avenue groins contained 4 transects.
2. Between the Canal Avenue and Wave Way groins contained 5 transects and
3. South of the Wave Way groin 8 transects were established.

Each sample was obtained by pressing a one cubic foot aluminum frame into the sediment. All material within the frame was removed to a depth of 1 foot and sieved in baskets lined with 2 mm mesh.

All shellfish were identified and measured to the nearest millimeter. Upon inspection of the beach and after some sampling in the area between the seawall and 150 feet seaward along several of the transects, it was decided not to dig samples above the 150-ft mark since that area was above the low tide mark and clearly did not contain shellfish habitat. The effort saved from the elimination of these samples was used for additional sampling in areas containing shellfish and shellfish habitat. Once transects reached the low tide mark, typically 200 feet from the seawall and where surf clam (*Spisula solidissima*) habitat typically begins, the sampling interval was reduced to every 25 feet.

4.2.2.2 Results

The southern nourishment area did not yield shellfish of any kind in 28 samples (Table 4-25). This area consists predominantly of cobble and rock with very little sand. The steep contour of the beach in this area exposes much of the nourishment area at low tide so it is largely intertidal and therefore unsuitable for most species of shellfish.

In the northern nourishment area the four survey areas were treated separately since the wave energy imparted upon the beach is different in each primarily due to the offshore breakwaters. Densities were calculated based on samples taken at the 200-ft line or seaward of that point.

Transects in the area north of the Neptune Avenue groin were typically composed of small cobbles above 150 feet. The slope was relatively steep in that area. At 200 feet along each transect the slope diminished and the mean low water mark was established. From 200 to 500 feet out the bottom was usually sandy. At the northern edge of the nourishment area starting approximately 800 feet from the Neptune Street groin there is an area of rocky bottom. In this area the first 100 feet from the seawall was primarily pebbles and cobbles (sediment size of ~10 to 25 mm). From 100 to 200 feet the sediment transitions from the cobble/pebble substrate to

Figure 4-68 Area covered by a shellfish survey conducted on Winthrop Beach, June 2005. Four sections made up the north nourishment area and one the south.

coarse sand farther down the steep slope of the beach in this first 200 feet. At 200 feet the sediment is more sandy and the slope declines. Beginning at ~ 250 feet from the seawall, the sublittoral zone became very rocky being comprised of cobbles and boulders (approximately ranging from 50 to 1,000 mm) with algae covered rocks and little sand among the rocks ending at 450 feet where the bottom transitions to a medium to fine sand similar to the 200 to 500-ft area on the other transects completed during the shellfish survey. There were several species of algae observed attached to the rocks, most notably Irish moss (*Chondrus crispus*), dulse (*Rhodymenia palmata*) and kelp (*Laminaria spp*.), these species are readily associated with rocky habitats. In this area there were some blue mussels (*Mytilus edulis*) both live individuals and shell litter interspersed among the rocks. Rock crabs (*Cancer irroratus*) and hermit crabs (*Pagurus spp*.) were seen around and on the rocks. Young cunner (*Tautoglabrus adspersus*) were observed in close proximity to the rocks, as these are not very strong swimmers this habitat offers refuge from rough seas and protection from predators. Winter flounder (*Pseudopleuronectes americanus*) was

also seen on the flatter sections where there was some sand amongst the rocks. Little skate (*Leucoraja erenacea*) were noticed on the outlying sandy areas and may venture into this habitat occasionally. Over the 9 transects in this area 117 samples were taken at or below 200 feet from the seawall producing 26 surf clams and yielding a density of 0.22 clams per ft^2 (= 0.021 per m^2; Table 4-26).

The transects situated between the Neptune and Canal Avenue groins had littoral and sublittoral zones similar to the area north of Neptune Avenue. Along the four transects in this section 52 samples were taken below the low tide mark producing a total of nine surf clams with a mean density of 0.17 clams per ft^2 or 0.016 per m^2 (Table 4-27).

Beach material between the Coral Avenue and Wave Way groins gradually changes from coarse sediments at the north end to finer material southward. This is probably due to the reduction in wave energy resulting from the offshore five sisters breakwaters. Subtidal sediment consisting of medium to fine sand was similar to the northern two sections. There were 25 surf clams in 65 samples yielding a density of 0.38 clams per ft^2 or 0.036 per m^2 (Table 4-28)

The fourth north beach section south of the Wave Way groin was primarily composed of coarse and fine sand. This area resides in a section that is well protected by the offshore breakwaters which greatly reduce any wave energy that hits the beach. The area had a surf clam density of 0.18 clams per ft^2 (or 0.017 clams per m^2; Table 4-29)

The northern area provided more suitable habitat for surf clams compared with the rocky southern section yielding an overall density of 0.2 clams per square foot or 0.0186 per square meter (77 clams in 384 samples) over the entire area. Eliminating the samples taken above the 200-foot mark on each transect produced a density of 0.23 clams per square foot (0.02 per square meter; 77 clams in 330 samples). Surf clams ranged from 56 to 203 mm, averaging 108 mm (s.e. = 2.87). Harvestable size for surf clams is a minimum of 127 mm or 5 inches; 25% of the clams collected had reached that size. Additional information on surf clams may be found in the essential fish habitat section (Appendix A).

There were also ten razor clams (*Ensis directus*) located in the north survey area producing a density of 0.03 razor clams per square foot for the area seaward of 200 ft. Razor clams are harvested recreationally in some areas and used in clam chowders. Razor clams are fast diggers with fragile shells and as a result only four were sampled intact; those ranged from 47 to 116 mm. There is no minimum size for harvesting.

No other shellfish such as quahog (*Mercenaria mercenaria)* or softshell clams (*Mya arenaria*), were noted in either the southern or northern sites. Both of these species were not expected to be found in the area since they are generally found in protected locations within bays, estuaries and inlets.

4.2.2.3 Conclusions

In the southern nourishment area it does not appear that any impact to shellfish resources will occur. The northern area has some shellfish located 200-ft and farther out from the sea wall. Since surf clams are most common at water depths from 8 to 66 meters in areas beyond the breaker zone there may be a large population beyond the nourishment area. Storms are known to displace adults a considerable distance from their burrows (Fay et al. 1983). This may serve as a means to repopulate the area after nourishment is completed.

Table 4-25
Location of Samples Taken on the Transects in the Southern Nourishment Area of Winthrop Beach.

		Transect												
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
Distance from seawall	**0**													
	50													
	100													
	150													
	200				0							0		0
	250											0		0
	300								0			0		0
	350								0			0		0
	400					0	0		0	0		0		0
	450						0	0	0	0				
	500						0	0	0					
	525							0						
	550							0						
	575							0						
	600							0						

Notes:
Total Samples = 28
Number of clams = 0
Density per sq. foot = 0

Hatching designates areas that were not sampled.
Shading indicates areas that were inspected but not systematically sampled.
Areas above the low tide line were very rocky.

Table 4-26
Location of Surf Clams Along the Transects North of the Neptune Street Groin, Winthrop Beach.

		Transect								
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Distance from seawall	**0**									
	50	0		0		0		0		0
	75	0								
	100				0	0	0	0	0	0
	125	0	0	0	0	0	0	0	0	0
	150	0	0	0	0	0	0	0	0	0
	200	0	2	1	2	1	0	0	0	0
	225	0	0	0	0	0	0	0	0	0
	250	1	2	1	0	1	1	0	0	0
	275	0	0	0	1	1	0	0	0	0
	300	0	0	1	0	0	1	0	0	0
	325	0	1	1	0	0	0	0	0	0
	350	0	0	0	0	0	1	0	0	0
	375	0	1	1	0	0	1	0	0	0
	400	0	0	0	0	0	0	0	0	0
	425	0	0	0	0	0	1	0	0	0
	450	0	0	1	1	0	0	0	0	0
	475	0	0	0	0	1	0	0	0	0
	500	0	0	0	0	0	0	0	0	0

Notes:

Hatching designates areas that were not sampled.

Total Samples =	147
Samples 200 ft and beyond =	117
Number of clams =	26
Density per sq. foot =	0.222

Table 4-27
Location of Surf Clams Along the Transects Between the Neptune and Canal Street Groins, Winthrop Beach.

Distance from seawall	Transect A	Transect B	Transect C	Transect D
0				
50				
100				
150	0	0	0	0
200	1	1	0	0
225	1	0	0	2
250	0	0	0	1
275	1	0	0	0
300	0	0	0	0
325	0	0	0	0
350	0	0	0	0
375	0	0	0	0
400	0	0	0	0
425	0	0	0	0
450	0	0	0	0
475	0	0	0	1
500	0	0	0	1

Total Samples =	56
Samples 200 ft and beyond =	52
Number of clams =	9
Density per sq. foot =	0.173

Hatching designates areas that were not sampled.

Table 4-28
Location of Surf Clams on the Transects between the Canal Street and Wave Street Groins, Winthrop Beach.

		Transect				
		1	**2**	**3**	**4**	**5**
Distance from seawall	**0**					
	50					
	100	0	0	0	0	0
	150	0	0	0	0	0
	200	0	0	0	0	1
	225	0	0	1	1	0
	250	0	0	1	0	1
	275	0	0	0	1	0
	300	0	0	1	0	1
	325	0	0	0	1	1
	350	0	0	0	0	0
	375	0	0	0	1	2
	400	2	1	0	0	0
	425	0	1	1	1	0
	450	1	1	0	0	0
	475	1	0	1	0	0
	500	1	0	1	0	0

Total Samples =	75
Samples 200 ft and beyond =	65
Number of clams =	25
Density per sq. foot =	0.38

Hatching designates areas that were not sampled.

Table 4-29
Location of Surf clams Along the Transects South of the Wave Street Groin, Winthrop Beach.

		Transect							
		A	**B**	**C**	**D**	**E**	**F**	**G**	**H**
Distance from seawall	**0**								
	50								
	100					0			
	150	0	0	0	0	0	0		
	200	1	0	0	0	0	0	0	0
	225								
	250	0	0	1	0	1	0	0	0
	275	0	0	0	1	0	0	0	0
	300	0	0	0	0	1	3	0	0
	325	0	0	0	0	0	0	0	0
	350	0	0	0	0	0	1	1	2
	375	0	0	0	0	0	0	0	0
	400	0	0	0	0	1	0	0	2
	425	0	0	0	0	0	0	0	1
	450	0	0	0	0	1	0	0	0
	475	0	0	0	0	0	0	0	0
	500	0	0	0	0	0	0	0	0

Total Samples =	103
Samples 200 ft and beyond =	96
Number of clams =	17
Density per sq. foot =	0.18

Hatching designates areas that were not sampled.