Department of Marine Resources
Site Review

Keith Butterfield
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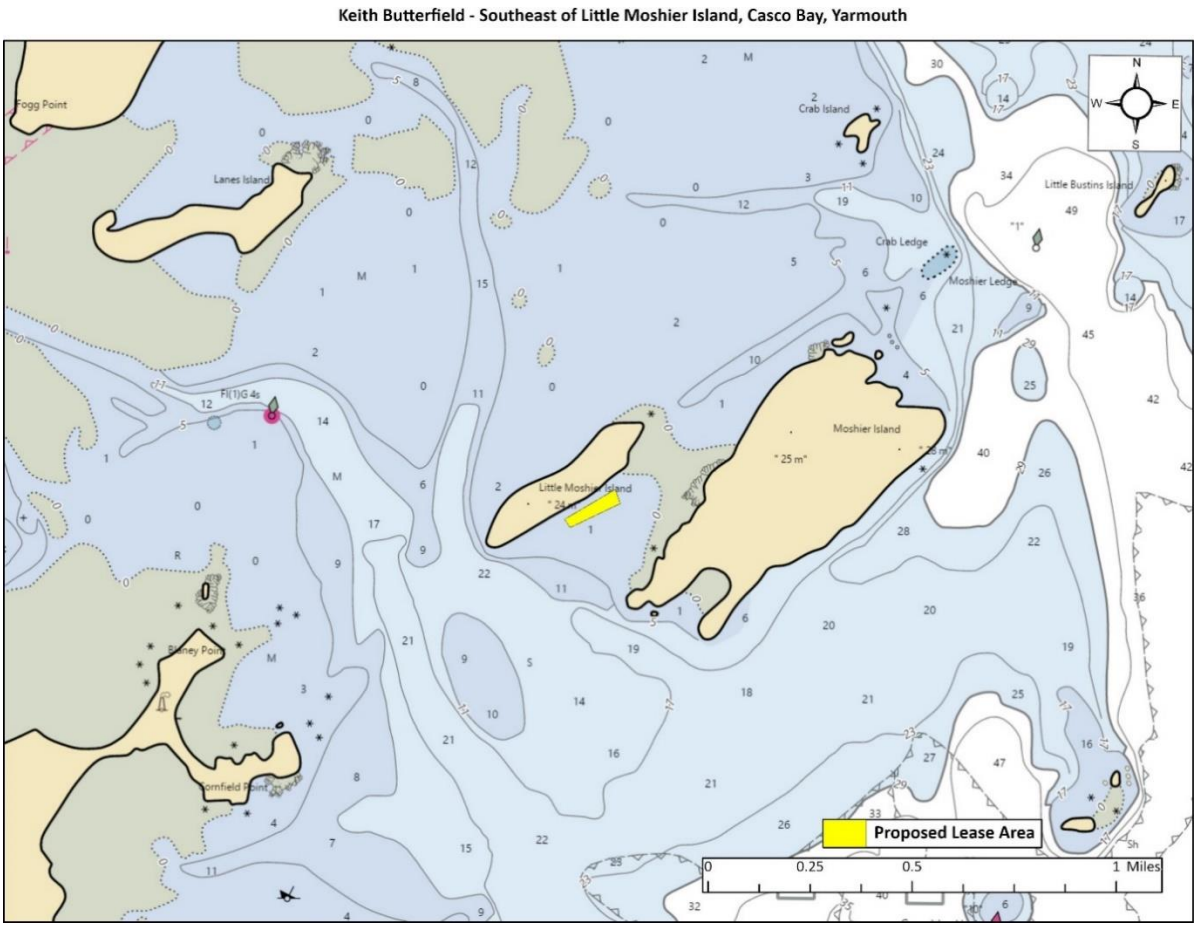

Figure 1. Vicinity map[1]

Location: Southeast of Little Moshier Island, Casco Bay, Yarmouth, Cumberland County, Maine

Purpose: Standard lease for suspended and bottom culture of American/eastern oysters (*Crassostrea virginica),* Arctic surf clams *(Mactromeris polynyma),* Atlantic surf clams *(Spisula solidissima),* Atlantic sea cucumbers *(Cucumaria frondosa),* waved whelks *(Buccinum undatum),* dog whelk *(Nucella lapillus),* sea urchins (*Strongylocentrotus droebachiensis),* northern quahogs *(Mercenaria mercenaria),* sugar kelp *(Saccharina latissima*), and Atlantic sea scallops *(Placopecten magellanicus).*

Site Review: Cheyenne Adams and Flora Drury
Report Preparation: Geoffrey Shook, Meryl Grady, and Amanda Ellis

[1] Unless otherwise noted, all figures in this report were created in ArcGIS Pro version 2.9 using digitized NOAA Nautical Charts or geo-referenced aerial photographs provided by The Maine Office of GIS.

Application Overview

The applicant, Keith Butterfield, is requesting a 2.72 acre standard lease southeast of Little Moshier Island in Casco Bay for both bottom and suspended culture of shellfish, marine algae, and echinoderm species. Shellfish are intended to be cultivated in a combination of surface and seafloor cages and may also be bottom planted. Echinoderms are proposed to be cultured in seafloor cages and hexcyl baskets. Marine algae is intended to be grown on lines at the perimeter of the lease. Gear is intended to be deployed and in operation year-round.[2]

The proposed standard lease footprint is identical to tract one of the applicant's experimental lease site, CAS MIx, southeast of Little Moshier Island. The proposal does not include the second tract of the experimental lease, CAS MIx, that is located southeast of Moshier Island (Figure 2). The standard lease proposal also includes the addition of gear types and species not currently authorized on the experimental lease, so the operations vary between what is currently authorized and what is proposed.

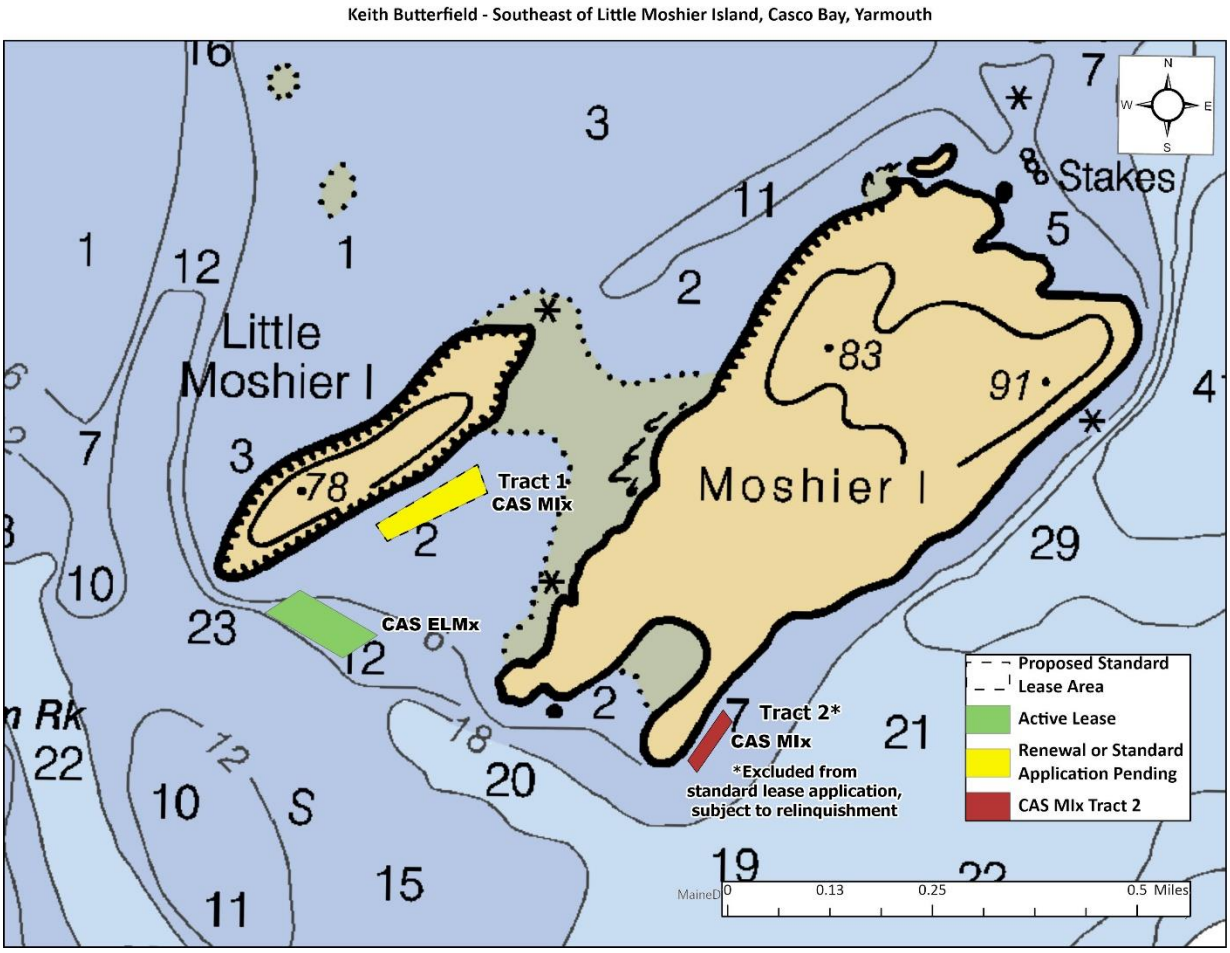

Figure 2. The applicant's standard lease proposal in comparison to current experimental operations.

[2] Application pages 1-2

General Characteristics

On June 29, 2021, Maine Department of Marine Resources (MDMR) scientists assessed the proposed lease site. MDMR staff arrived at the site at approximately 9:40 AM. Due to shallow water at the site at the time of the visit, a walkover was conducted utilizing an underwater video camera to get footage of the bottom at the site. The proposal is in an inlet between Moshier Island and Little Moshier Island about 130 feet southeast of the shore of Little Moshier Island. There is an intertidal sandbar located north of the proposal between Moshier and Little Moshier Islands. The shoreline of both islands are rocky, low-lying ledges covered in seaweed with forested uplands. There is one house on Little Moshier Island. On Moshier Island, there are approximately five houses on the western side, and approximately seven houses on the eastern side. There are no docks on the eastern shore of Little Moshier Island and no docks south of the tidal sandbar on the western shore of Moshier Island. There is a pier with a tidal dock on the western shore of Moshier Island approximately 900 feet to the northeast that is located on the tidal sandbar. There is a work float located outside of the proposed lease boundaries to the southwest (Image 1).

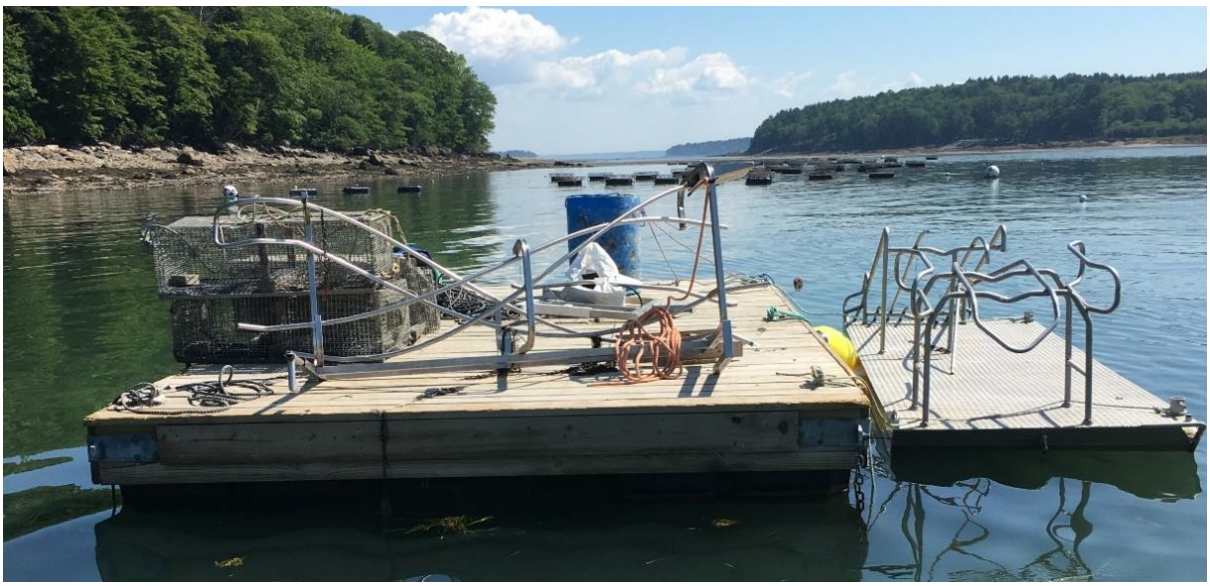

Image 1 . Workfloat near the proposed lease site (June 29, 2021).

Depth

On June 29, 2021, MDMR staff assessed the site at low tide beginning at approximately 9:40 AM. Depths at 10:00 AM, about 20 minutes after low tide, along the proposed site were determined to be 1.2-1.5 feet. Correcting for tidal variations derives water depths at the next high tide to be a range from 11.6 to 11.9 feet. Water depths at mean low water (MLW, 0.0 feet) range from 1.6 to 1.9 feet (Table 1).

Table 1. Tide observations at Portland Station 8418150, Casco Bay, Maine (43° 39.5 N, 70° 14.7 W).[3]

Date	Time	Height (ft)
6/29/2021	3:18 AM	10.37 H
6/29/2021	9:36 AM	-.43 L
6/29/2021	3:54 PM	9.44 H
6/29/2021	9:54 PM	.81 L

Bottom Characteristics

MDMR staff observed the bottom characteristics within the proposed site via an underwater camera transect on June 29, 2021. Due to shallow water depths at the time of the visit, scientists walked the site with the camera. Observed bottom characteristics were categorized using the Coastal and Marine Ecological Classification Standard (CMECS), a national standard for describing features of the marine environment (Table 2). The observed sea floor was composed of soft mud (Images 2 and 3).

Table 2. Bottom characteristics of the proposed site.

Substrate Origin	Substrate Class	Substrate Subclass	Substrate Group
Geologic Substrate	Unconsolidated Mineral Substrate	Fine Unconsolidated Mineral Substrate	Mud
Biogenic Substrate	Shell Substrate	Shell Rubble	Clam/Oyster Rubble

Image 2. Soft mud observed during drop camera transect (June 29,2021).

[3] https://tidesandcurrents.noaa.gov/stationhome.html?id=8418150

Image 3. Shell rubble observed during drop camera transect (June 29,2021).

Position and Distances to Shore

The measuring tool in ArcGIS Pro 2.9 was used to verify the distances and bearings between proposed lease corners. Distances to shore were determined using the measuring tool in ArcGIS Pro 2.9, digital orthophotography provided by the Maine Office of GIS, and the application coordinates (Table 3, Figure 3).

Application Coordinates (WGS84) – 2.72 Acres (Figure 3)

Corner	Latitude	Longitude	
1	43.78151° N	-70.10899° W	then 761.4 feet at 60° True to
2	43.78260° N	-70.10653° W	then 195.0 feet at 163° True to
3	43.78210° N	-70.10628° W	then 716.6 feet at 245° True to
4	43.78122° N	-70.10871° W	then 129.2 feet at 325° True to 1

Table 3. Approximate distances from proposed lease to surrounding features (Figures 1-3).

Feature	Distance
Corner 1 to Little Moshier Island shoreline, nearest point (~MLW)	~115 feet to the southwest
Corner 2 to Little Moshier Island shoreline, nearest point (~MLW)	~160 feet to the northwest
Corner 3 to Moshier Island, nearest point (~MLW)	~480 feet to the southeast
Corner 4 to Moshier Island, nearest point (~MLW)	~980 feet to the southeast
Corner 3 to tidal dock on Moshier Island	~880 feet to the east

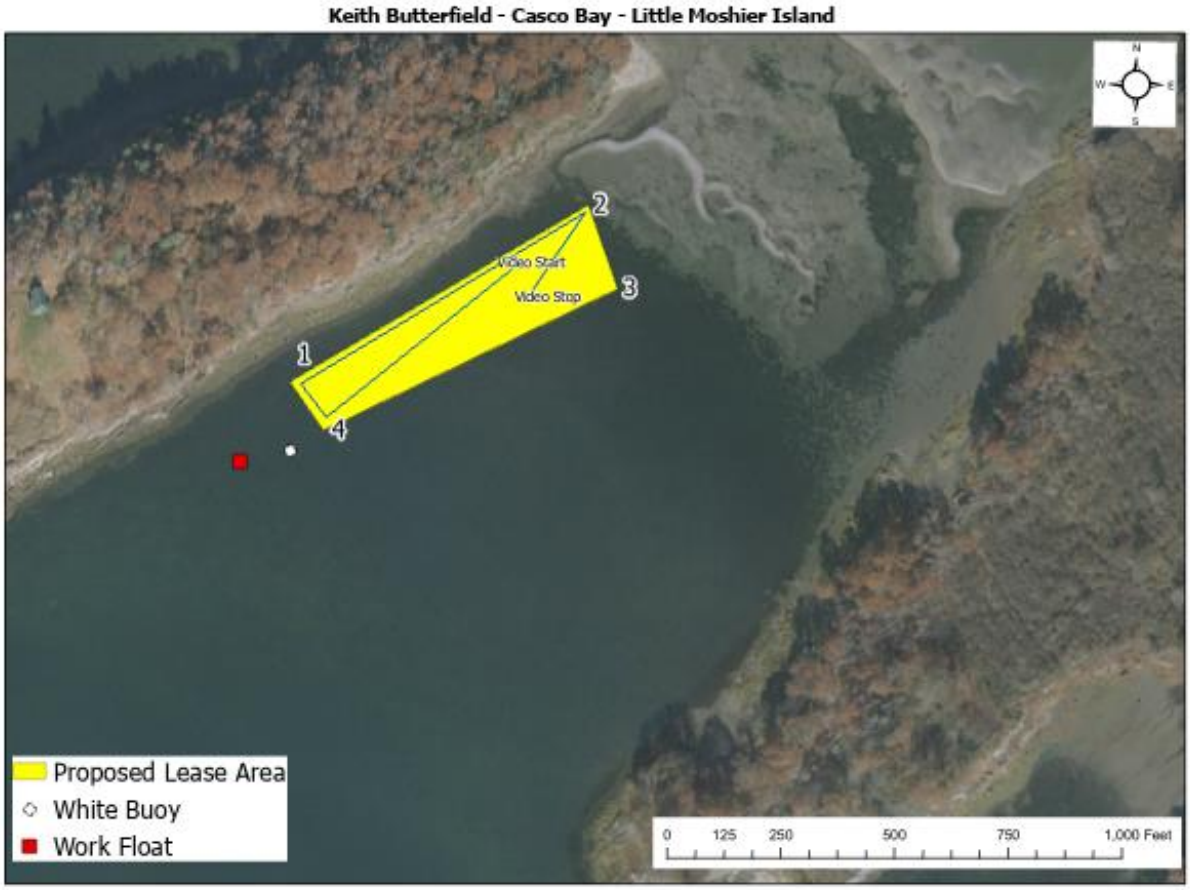

Figure 3. Approximate camera transect, buoys, and work float observed nearest to the proposal (June 29, 2021).

Pursuant to statute and regulation, aquaculture leases are evaluated in consideration of applicable decision criteria. The site report documents DMR's observations of the area and other information, in consideration of those criteria, as noted below:

(1) Riparian Ingress and Egress

There is a house on Little Moshier Island that is set back approximately 300 feet from the southeastern shore and the pier and dock for the property is located on the southwestern side of the island. There are no houses along the subtidal western shoreline of Moshier Island adjacent to the proposed lease site. There is a tidal dock located on the intertidal sandbar at MLW approximately 880 feet to the east of the proposed site on the western shore of Moshier Island. There are two docks to the north of the intertidal sandbar on the western shore of Moshier Island. There were moorings observed to the north of the tidal sandbar. The harbormaster for the town of Yarmouth indicated that this proposal may affect riparian ingress and egress as there is a nearby beach that is accessed by boat occasionally by a riparian landowner.[4]

[4] Harbormaster Questionnaire submitted on 9/22/2022 by Yarmouth Harbormaster, Will Owen

(2) Navigation

The proposal is located approximately 115-160 feet off the southern shore of Little Moshier Island in an inlet between Little Moshier and Moshier islands. There is approximately 700-1,000 feet of navigable water at MLW between the proposed site and the immediate southwestern shore of Moshier Island. A tidal sandbar prevents transiting the inlet between Little Moshier and Moshier Island at all tidal stages (Figure 4). At the time of MDMR's site assessment on June 29, 2021, no vessels were observed operating in the area. The Yarmouth Harbormaster also stated this proposal would not cause navigational issues.[5]

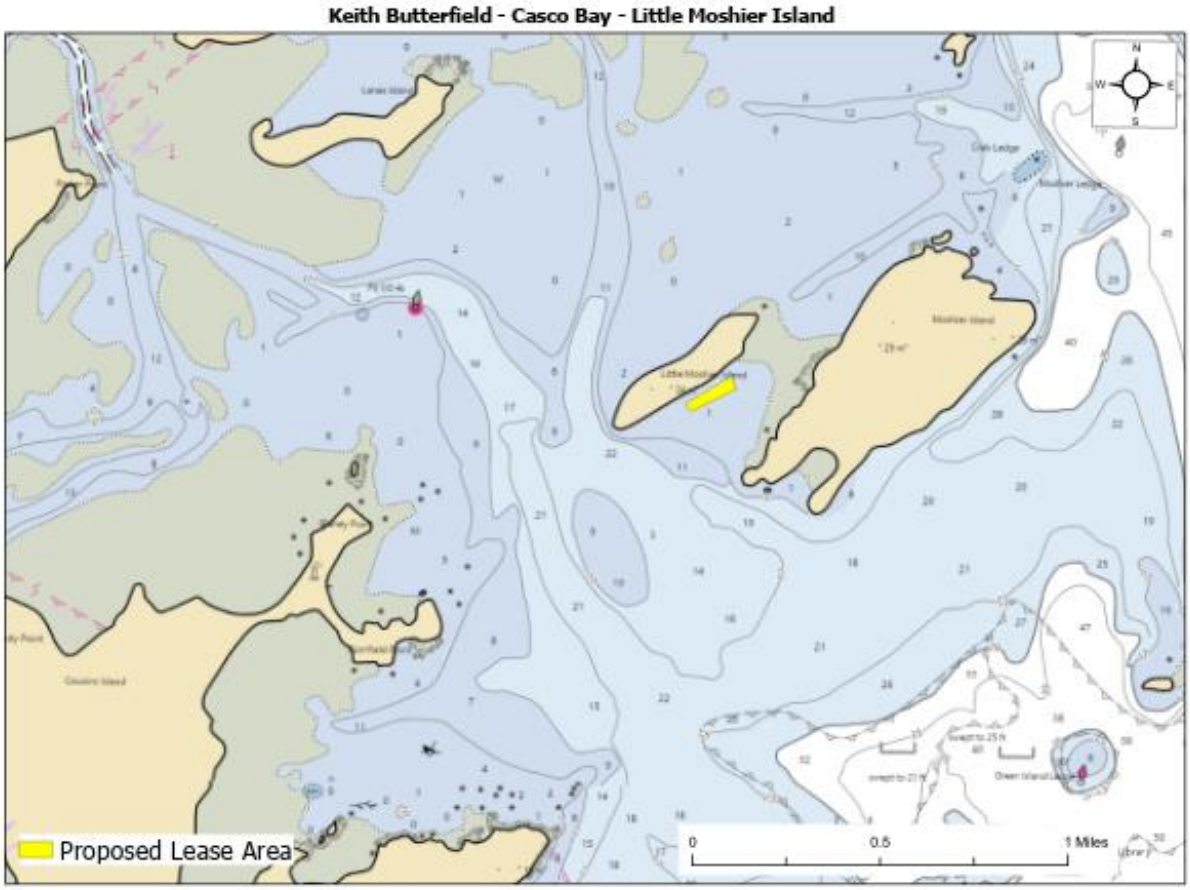

Figure 4. Proposed lease area, navigation channels, and channel markers.

(3) Fishing and Other Uses

During MDMR's site assessment on June 29, 2021, staff observed approximately two lobster buoys in the immediate vicinity. However, staff did not observe lobster (*Homarus americanus)* within the boundaries of the proposed site. Some European Oysters *(Ostrea edulis)* were visible on the

[5] Harbormaster Questionnaire submitted on 9/22/2022 by Yarmouth Harbormaster, Will Owen

underwater camera footage, though MDMR did not observe any shellfish harvesting during the site assessment.

The Yarmouth Harbormaster indicated that recreational fishing occurs in the area of the lease proposal.[6] The Harbormaster also noted that the gear being proposed for the site may preclude other uses within or near the site.[7]

(4) Other Aquaculture Uses

The proposed standard lease boundaries are located on the same footprint as Tract 1 of the applicant's experimental lease site, CAS MIx. If the proposal were granted, the standard lease would replace the experimental lease. Tract 2 of experimental lease site, CAS MIx, is not included in this standard lease proposal. In addition, the applicant also operates experimental lease site CAS ELMx at the mouth of the inlet between Little Moshier and Moshier Islands. CAS ELMx is the only other lease site within 1,000 feet of the standard lease proposal. At the time of this report, there were no active LPAs within 1,000 feet of the proposal (Figure 5).

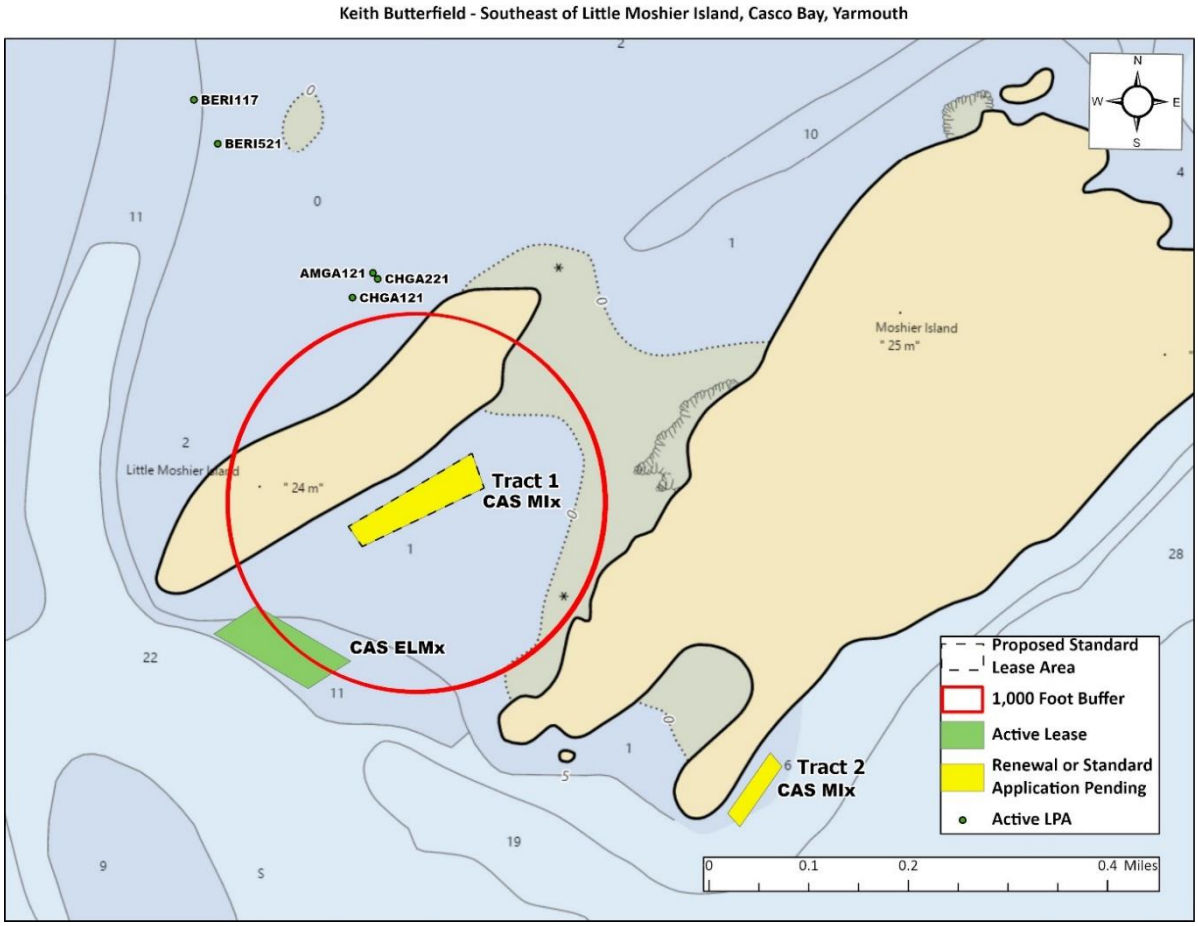

Figure 5. Aquaculture leases and Limited Purpose Aquaculture (LPA) licenses in the general area of the proposal.

[6] Harbormaster Questionnaire submitted on 9/22/2022 by Yarmouth Harbormaster, Will Owen
[7] Ibid.

(5) Existing System Support

Epibenthic Flora and Fauna

On June 29, 2021, MDMR staff conducted underwater camera transects to assess the epibenthic ecology of the area (Figure 3). The observed bottom was primarily soft mud sediment with shell rubble (Images 2 and 3). A few European oysters *(Ostrea edulis)*, as well as patches of drift rockweed (*Ascophyllum nodosum*), and a variety of tunicate species were observed on the underwater footage (Images 4 and 5). In at least one location, an unattached blade of eelgrass was observed.

Table 4. Species observed during MDMR camera transect on June 29, 2021.

Species Observed	Abundance
Drift rockweed (*Ascophyllum nodosum*)	Abundant
European oysters *(Ostrea edulis)*	Occasional
Tunicate species (not classified)	Occasional
Eelgrass (*Zostera marina*)	Rare

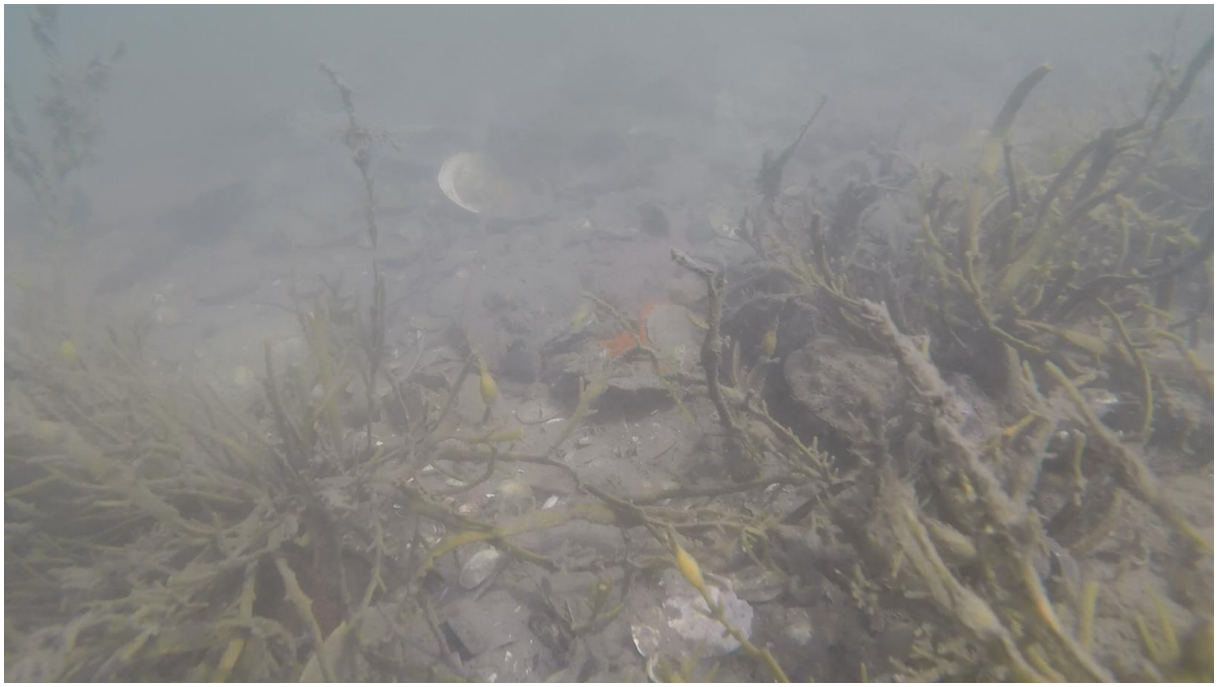

Image 4. Drift rockweed (*Ascophyllum nodosum*) observed during the camera transect (June 29, 2021).

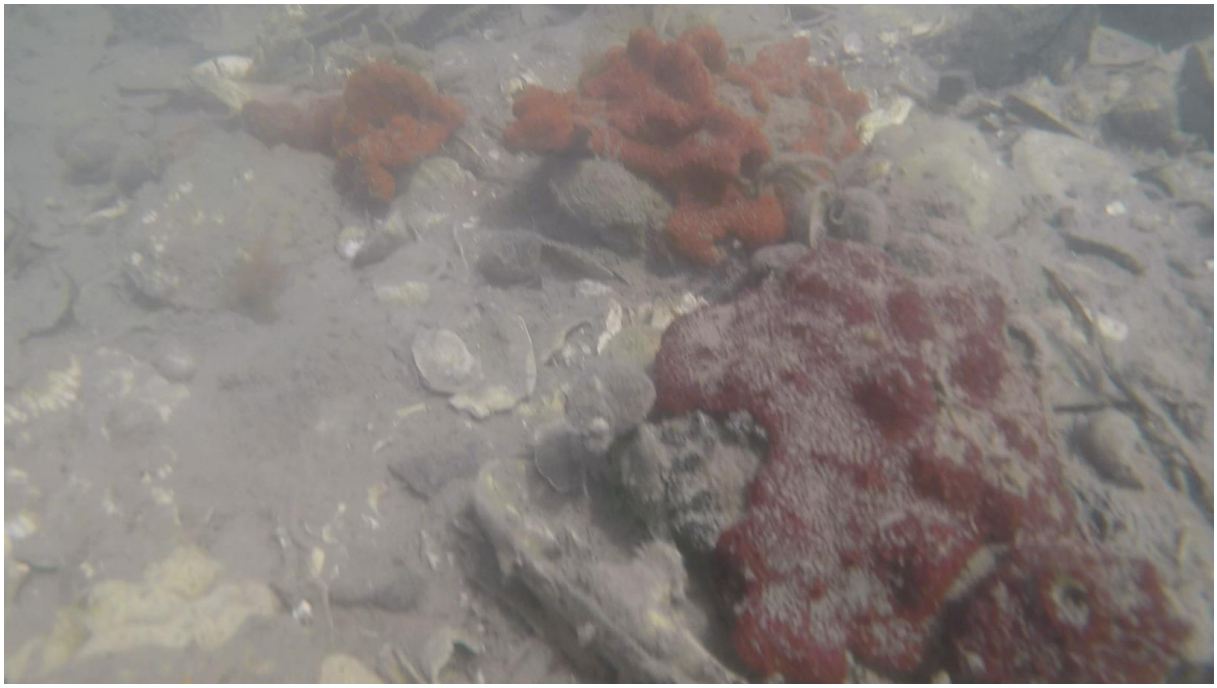

Image 5. Tunicate species observed during the camera transect (June 29, 2021).

Eelgrass (*Zostera marina*)

According to data collected in 1997 and 2018, there has been a historical presence of *Z. marina* in the southern portion of the proposal. According to data from 1997, the proposal extends approximately 270 feet into historical eelgrass beds. In 2018, eelgrass was reported 85 feet into the proposal (Figure 6). Underwater camera footage collected by MDMR staff on June 29, 2021 saw only rare, unattached blades of eelgrass.

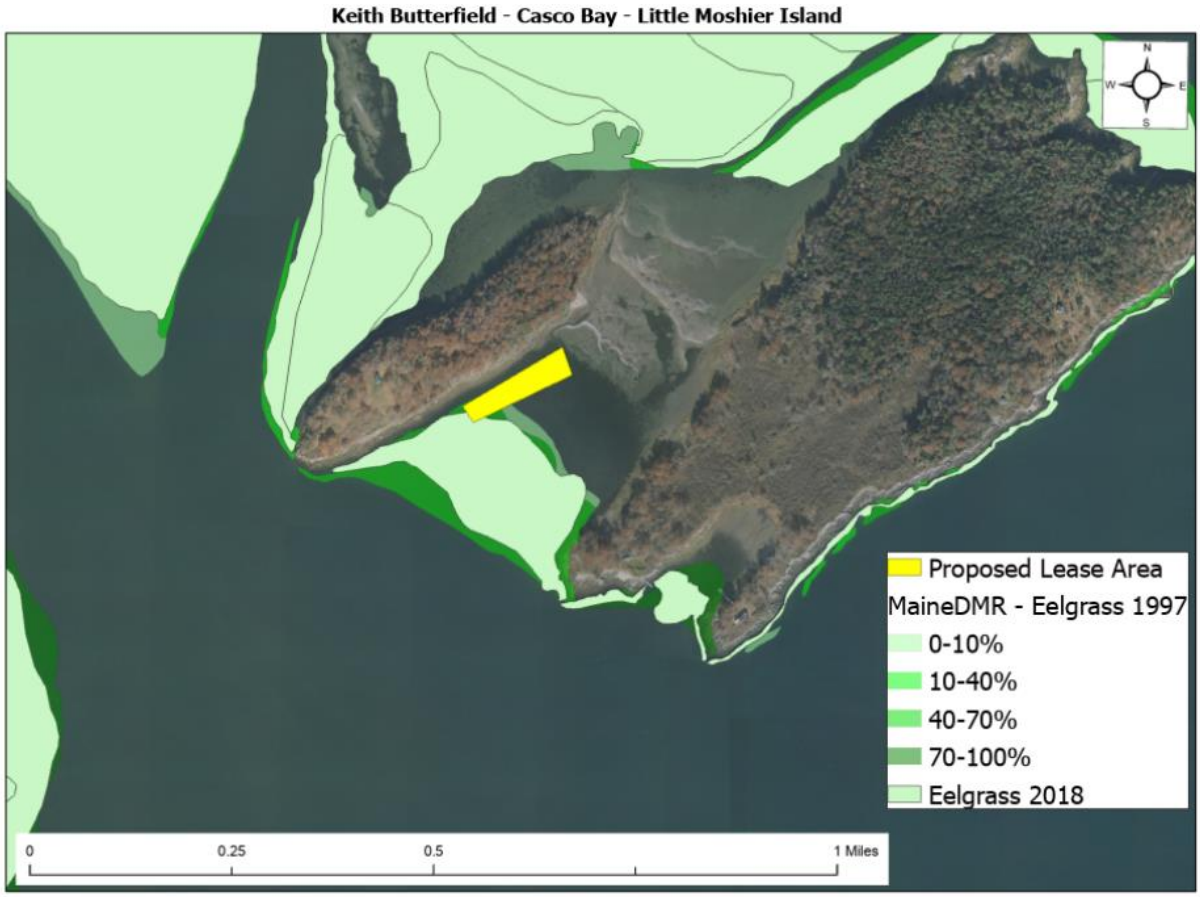

Figure 6. Historical eelgrass (*Z. marina*) near the proposed lease site from historical data.[8]

Wildlife

During MDMR's site assessment on June 29, 2021, staff observed Terns (*Sterninae sp.)* feeding at the mouth of the cove (*Phalacrocorax auritus*) and Canada geese (*Branta canadensis*) in the general vicinity of the proposal.

According to Geographic Information System (GIS) data maintained by the Maine Department of Inland Fisheries and Wildlife (MDIFW) and available through the Maine Office of GIS, the proposed lease is located about 100 feet to the southwest of tidal waterfowl and wading bird habitat (Figure 7).

On June 1, 2021, a Wildlife Biologist with MDIFW responded by email to a "Request for Agency Review and Comment", stating minimal impacts to wildlife are anticipated for this project.[9]

[8] Data obtained from The Maine Office of GIS (Eelgrass 2018 and 1997).
[9] Email correspondence between MDIFW and MDMR

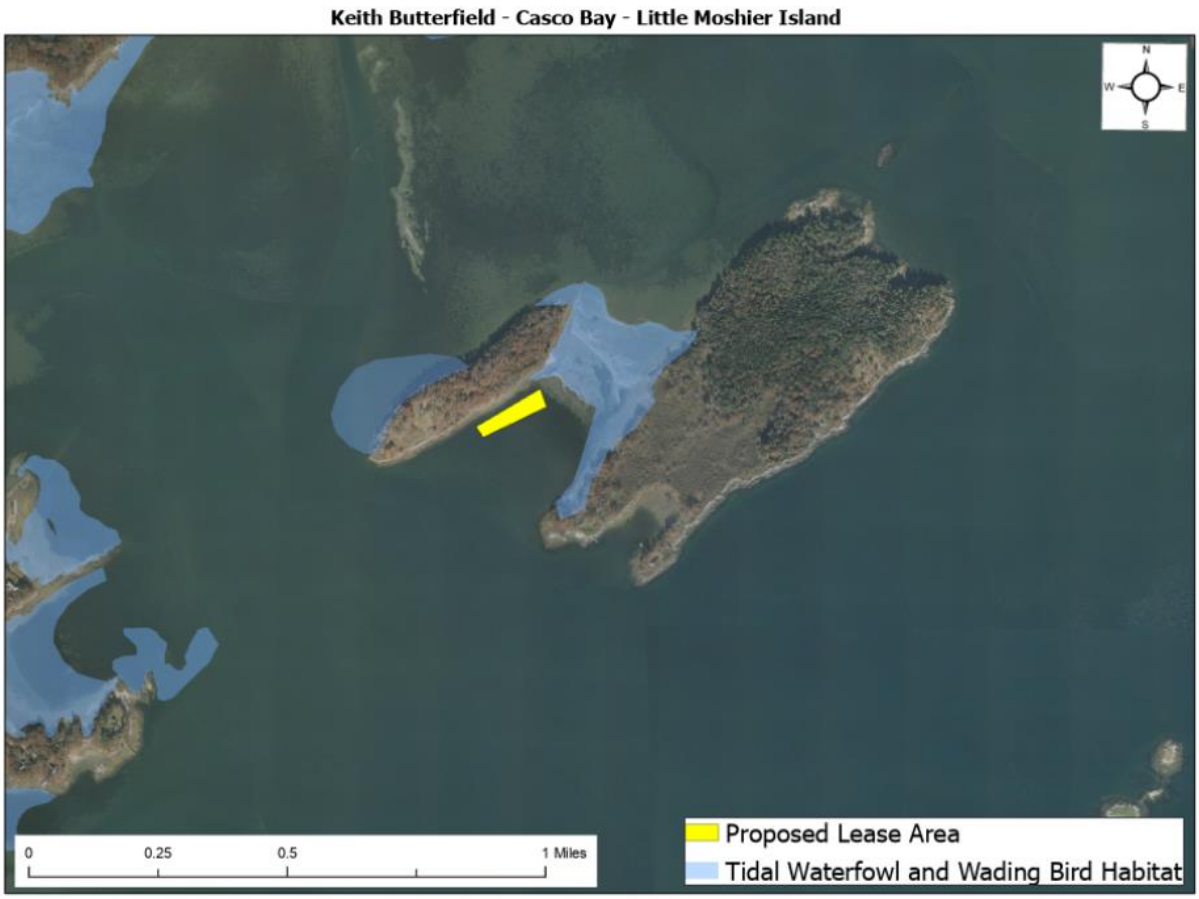

Figure 7. Tidal waterfowl and wading bird habitat.[10]

(6) Interference with Public Facilities

The proposed lease is not within 1,000 feet of any beach, park, docking facility, or conserved lands owned by the federal, state, or municipal governments (Figure 8).

[10] Data obtained from MDIWF maintained SDE Feature Class "GISVIEW.MEIFW.Twwh"

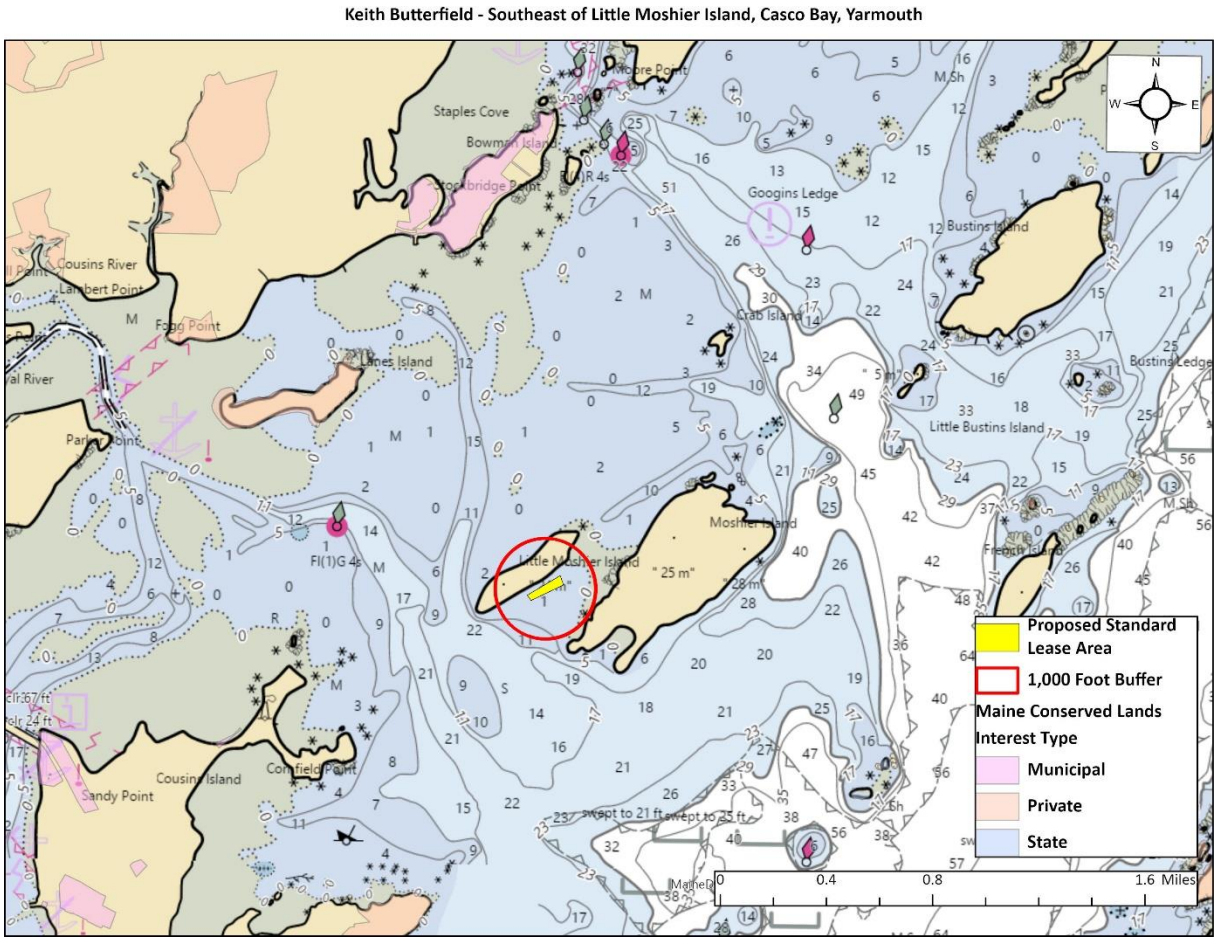

Figure 8. Public facilities near the proposed lease site.[11]

(7) Water Quality

The proposed lease area is currently classified as "Open/Approved" by the MDMR Bureau of Public Health for the harvest of shellfish. On April 14, 2020, a staff member from the Bureau of Public Health responded by email to a "Request for Agency Review and Comment", stating that the applicant is proposing to grow high-risk species, including whole or roe on scallops, and will need memorandum of understandings and self-funding for testing. Harmful algal blooms can be common in this area.[12]

(8) Lighting

Lighting is not proposed to be used at the site. The applicant does not intend to work on the farm beyond daylight hours.[13]

[11] Data obtained from SDE Feature Class sourced from The Maine Office of GIS "GISVIEW.MECONSLANDS.Conserved_Lands"
[12] Email correspondence MDMR, Bureau of Public Health
[13] Application, page 9

(9) Noise

Routine maintenance, work, and harvesting on the proposed site would be accomplished with a 24' and 19' foot skiff utilizing a 115 horsepower 4-stroke and 75 horsepower 2-stroke, respectively. The applicant intends to visit the site daily and oyster harvesting is intended to be done by hand once per week. A grader/ tumbler/sorter would be used for approximately 1 week per year in June, July, or August and a pressure washer would be used two times during the year for one to two days each time. The applicant intends to replace the 24' skiff with a 26' deck boat and may use electric propulsion or a 115 horsepower 4-stroke engine.[14]

(10) Visual Impact

The applicant is currently using a 30'x12' work raft as part of current operations on CAS MIx (Image 1). Based on the standard lease application and MDMR's site assessment, the work float is moored outside the boundaries of the proposed site (Figure 3). All grow-out gear is proposed to be black. The corner markers are proposed to be large, yellow buoys and string lines would be marked with smaller yellow buoys.[15] In consideration of MDMR's Chapter 2.80 requirement that aquaculture lease boundaries be marked with yellow marking devices that are readily distinguishable from interior buoys, a different color for the string line buoys may be required, should the lease be granted.

[14] Application, page 8 and 9
[15] Application, page 6