

HILLSIDE DEVELOPMENT LANGUAGE

A. Timber Harvesting on Hillsides in Development Areas

Timber harvesting on hillsides within the viewshed of any lake within Development Area is limited to selective harvesting only. This provision applies in such areas regardless of the provisions of Sub-Chapter IV, Section 10.30.

B. Development on Hillsides

Development on hillsides visible from a public viewpoint or waterbody will meet the following standards to minimize unreasonable visual impacts on public viewpoints and waterbodies within the Plan area.

1. Developments must be designed to fit harmoniously into the visual environment when viewed by the public from public viewpoints. Site clearing must be minimized and vegetation must be retained or provided to minimize the visual intrusion of the development.
2. As part of an application for a new residential subdivision that may be visible from a lake or other public viewpoint, the developer shall submit design standards for new construction to ensure that new housing units, garages, roads, lighting, and other components of the development will not have an unreasonable potential visual impact on scenic resources within and adjacent to the Plan area.
3. Subdivisions planning shall include professionals who are trained and have experience in the application of principles of visual quality management and hillside development. As part of the planning process, the developer shall identify areas with high and moderate visual sensitivity (both on and off the site) and take appropriate measures to avoid unreasonable potential visual impacts wherever necessary.
4. Alterations to existing contours for roads, driveways, utilities, homes, and non-residential structures shall be kept to a minimum by using design and construction techniques that are appropriate to the natural topography of the site.
5. Vegetated ridgelines shall be preserved to the extent practical by establishing limits to clearing and construction in certain areas (e.g., requiring existing vegetation and natural contours to remain intact; establishing minimum horizontal or vertical setbacks from ridgelines; and incorporating ridgelines into the required open space).
6. The design standards to be provided by the developer shall include measures to address visual impacts from color, form, line and texture. This may include provisions that require (examples shown in parentheses in B.6 are provided as potentially suitable techniques to minimize adverse visual impacts, and that the applicant should explore a range of options to determine what is most effective and appropriate for each particular situation):
 - a. The use of colors and materials that minimize color contrasts with surrounding forestland;
 - b. Lighting used for roadways and residential use must be shielded to prevent glare and off-site visibility (e.g., the use of shields may effectively block visibility of light sources);

- c. Consideration of limits on the amount of windows and other reflective surfaces that may be visible from lakes or other public viewpoints;
- d. Cleared openings for building sites, septic systems, roads, driveways, or community uses must have a minimal visual impact if seen from public vantage points (e.g., maintaining a vegetative buffer of a sufficient height, density and composition to make the cleared opening visually indistinct);
- e. Clearing for views may be allowed, but should be limited to minimize potential visual impacts, as seen from public viewpoints (e.g., narrow view openings between trees and beneath tree canopies downslope from development sites may be more effective than removal of mature trees);
- f. Buildings shall be designed to complement the site and topography (e.g., avoiding long unbroken roof lines; orienting buildings in the same direction of the slope; stepping the building down the slope rather than creating building pads requiring extensive excavation and slope filling);
- g. Existing vegetation shall be preserved / maintained where practicable in areas necessary to help screen hillside development from public view points;
- h. Slopes greater than 20% should be avoided (e.g., wherever possible, development should be located in areas where sustained slopes are less than 15%; development may not be allowed on slopes in excess of 25%); and
- i. Homes shall be sited to avoid extensive areas of steep slopes immediately below the homesite where clearing may expose significant portions of the building.

SUSTAINABLE FORESTRY PRINCIPLES

1. Water Quality, Wetlands, and Riparian Zones

The Plan area has a diverse range of aquatic habitats, including bogs, fens, thoroughfares, wetlands, streams, lakes, and ponds, that are recognized for their water quality and the quality of their fisheries, their undeveloped shorelines and riparian areas, and their ecological values. Forestry activities in the Plan area will meet and or exceed the current LUPC or MEDEP standards for setbacks and buffering through adoption of the Addendum.

To minimize siltation and associated water quality degradation, new forestry roads shall be sited to minimize the number of stream crossings and will use current LiDAR or comparable data to make road layout and water crossing siting decisions. Design of required crossings and for replacement culverts or bridges shall incorporate a 15% increase in flow calculations over the standard design requirements to anticipate the effects of potential climatic changes in the Plan area.

2. Soil Productivity

Soil productivity is important for regrowth of the forest resource. Forestry activities within the Plan area will be conducted pursuant to policies to maintain or improve site productivity. This will include setting specific policies for limiting the total amount of roads and landings within the Plan area and establishing site disturbance procedures for rutting. No more than 5% of the land base will be in forestry roads or landings within the areas that are zoned as M-FRL-GN. Rutting, which can cause erosion and soil compaction, is not allowed within watercourse buffers. If rutting begins to occur during the operation, the operation shall cease until the problem can be resolved. Outside of a water course buffer, no more than 30% of trails shall contain a rut (ruts are 12 inches deep and 60 feet long) in any given harvest area.

3. Timber Supply and Quality

The timber supply within the Plan area is diverse and of high quality. To help sustain the timber supply and quality silviculture, activities will focus on stand tending and planting programs that optimize growth and long term forest health. Clearcut areas with good site productivity will be replanted to a variety of spruce species, depending on soil types. Tolerant hardwood stands will be managed using selective harvesting to create uneven aged stands.

Planting and tending levels shall be determined as part of a forest management plan that is updated on a rolling basis.

4. Aesthetic Impacts of Timber Harvesting

The Plan area has scenic qualities and aesthetic values that are intrinsic to the recreational resources and overall enjoyment by visitors. As part of the development of a Forest Management Plan, planners shall identify, with input from stakeholders, areas that may have scenic or aesthetic value in the areas that are targeted for forestry activity. Within these areas, harvest operations will use methods that minimize the visual impacts. In addition, all forestry and planning staff will be trained in methods to minimize visual impact.

Forest management activities within development areas shall use aesthetic management practices, which will include at least the following:

- a. Areas that are considered of moderate or high scenic value will be identified prior to any harvesting activity;
- b. Within the areas identified as having moderate or high scenic value, only selective harvesting techniques will be permitted, which will limit tree removal to approximately 30% of the standing timber on an individual tree basis and retain the majority of the forest cove;
- c. Screening or buffering, as necessary, along road corridors or along trails to minimize visual impact based on harvesting activities and traffic volumes; and
- d. Highly visible locations (such as hillsides) with moderate or high scenic value will be modeled to identify potential visual impacts before operations begin and management planning will be adjusted to minimize impacts.

5. Biodiversity

The Plan area has a diverse and extensive range of wildlife, forest, meadow, and other terrestrial habitats, including habitats of rare, threatened and endangered flora and fauna, natural communities, and places of significant ecological value. The maintenance of biological diversity with healthy populations of flora and fauna will be assured through a variety of practices including:

- a. **Deer Wintering Areas (DWAs).** Using current scientific and biological data, DWAs will be identified and managed to maintain or improve the quality of their habitat. Management of DWAs outside of State regulated areas will continue to be coordinated with Maine IF&W or its successor through cooperative agreements and partnerships.
- b. **Late Successional Forest Policy.** Currently there are 2,500 acres of late successional forests within the Plan area. These are important habitats for plant and animal species that rely on a mixture of dead and fallen trees and multiple canopy layers. Ten percent of each of the 5 major stand types of concern (old tolerant hardwood stands, old tolerant mixed wood stands, old cedar stands, old pine/hemlock stands, old softwood stands) will be maintained by acreage in late successional stage(s).
- c. **Snag Policy.** As part of the forest management and harvesting operations, portions of standing dead and coarse woody debris across the harvest areas will be maintained. Where practicable, trees containing active stick or cavity nesting birds, large hollow trees that are providing wildlife dens or nests, and trees with decay exhibiting heavy use by cavity excavating birds should be left standing. In even aged harvesting prescriptions, these trees could form the nucleus of an island. If these trees are located near the edge of a block or an adjacent riparian zone, small adjustments to the block boundary should be made.
- d. **High Conservation Value Forests.** At locations within the Plan area that are identified as High Conservation Value Forests, harvesting operations will be managed so as to minimize impacts to them or to avoid those areas altogether. High Conservation Value Forests are those that possess one or more of the following attributes: (1) forest areas containing globally, regionally, or nationally significant concentrations of biodiversity values; (2) forest areas that are in or contain rare, threatened, or endangered ecosystems; (3) forest areas that provide basic services of nature in critical situations (e.g., watershed protection or erosion control); or (4) forest areas fundamental to meeting the basic needs of local communities (e.g., subsistence or health) or are critical to local communities' traditional cultural identity (e.g., areas of cultural, ecological, economic, or religious significance identified in cooperation with such local communities).

- e. **Important, Rare, Threatened, and Endangered Habitats.** Within the Plan area, there are areas that provide important habitat for rare, threatened, and endangered species. These include stick nests, rare plant sites, and smelt streams. These areas will be managed using techniques such as, but not limited to, timing of activities, maintaining buffers, and/or avoiding the area altogether.
- f. **Riparian Zones.** Within the Plan area riparian zones will be maintained to provide shade and protection for lakes and streams. Riparian zones shall be a minimum width of 100' on either side of permanent streams and 25' in width on either side of intermittent streams. This large area of interconnected riparian zones also creates corridors for many different species to utilize for travel and foraging.

6. Public Accountability

Forest management activities in the Plan area will be subject to third-party verification by a recognized forestry certification program for sustainability (for example, Forest Stewardship Council or Sustainable Forestry Initiative). A Forest Management Plan must be developed and approved by a licensed forester. Contractors must employ at least one Certified Logging Professional. As part of the third party certification an annual audit and site inspection will be required and the results will be made available to the public.

7. Economic Considerations

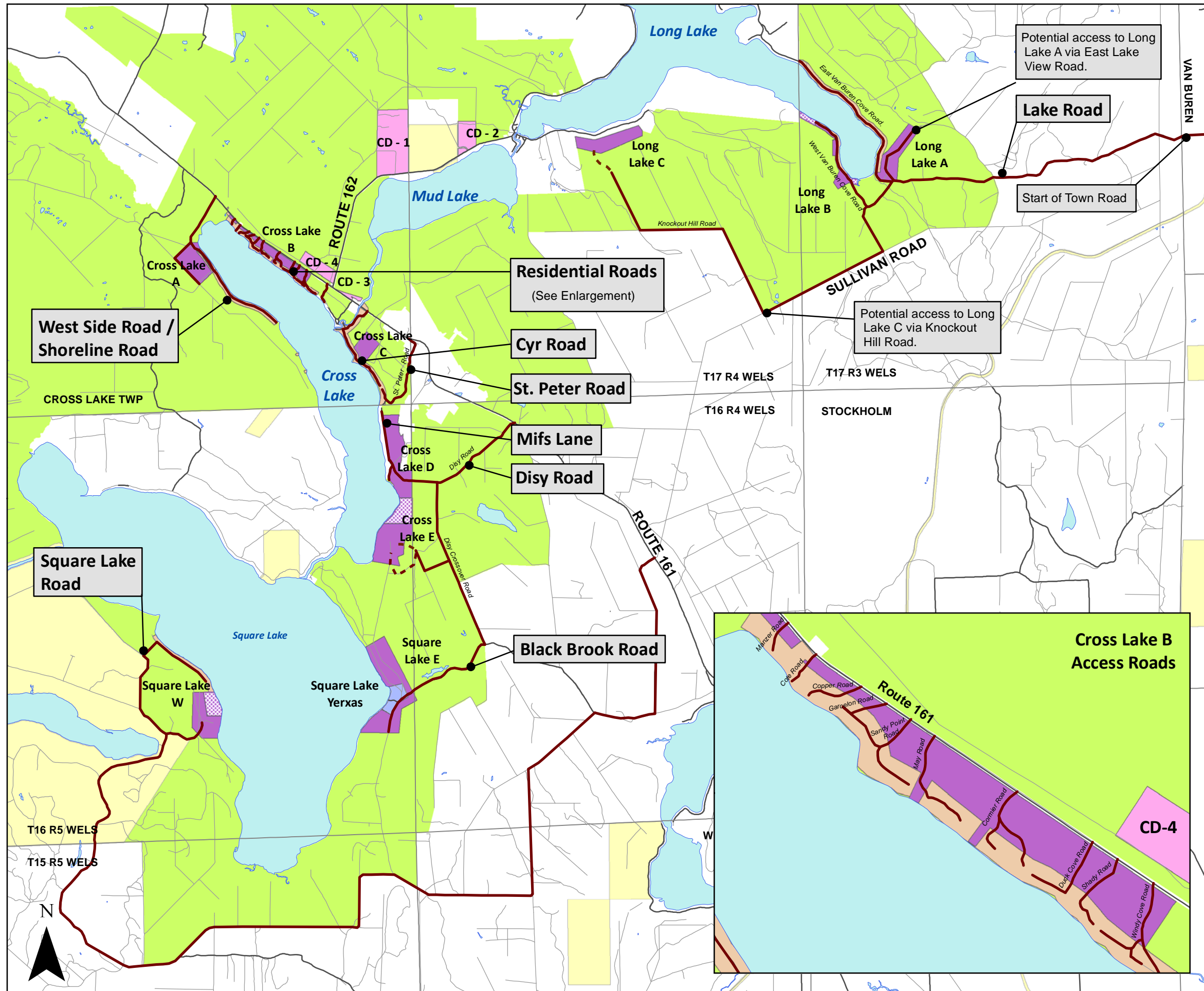
The working forest is an important part of the local and regional economy. The majority of the Plan area will remain available as “working forest” that contributes to the overall local economy, including businesses like pulp and paper mills, saw mills, harvesters, and many more.

8. Social Considerations

Access to private timberlands for hunting, fishing, boating, snowmobiling, ATV riding, and other low-intensity recreational activities is an intrinsic aspect of the culture of Northern Maine. Traditionally managed access for recreational purposes will continue as long as such uses do not conflict with forest management operations or landowner values. This includes adopting the appropriate management policies for recreational users (for example, ATV and snowmobile use) and committing to allowing managed access to the Plan area.

9. Forest Health

Overall forest health is critical to the sustainability of the ecological and economic success of a working forest. Within the Plan area, ongoing actions to maintain forest health will continue, such as insect and disease monitoring/management, fire suppression activities, and other forest health actions.



ACCESS TO DEVELOPMENT AREAS

Fish River Chain of Lakes Concept Plan

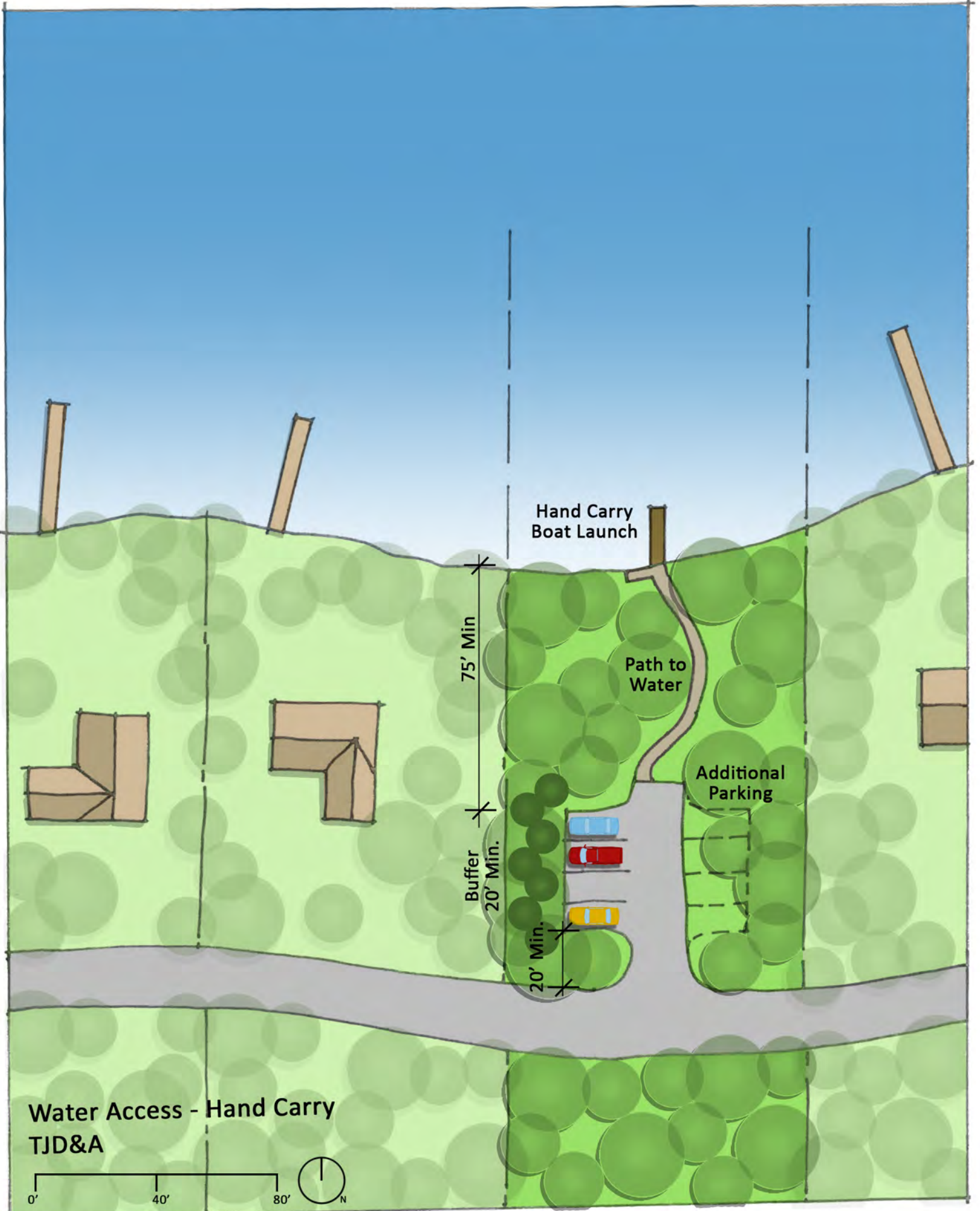
Legend

- Potential Access to Development Areas
- Existing Woods Road
- Proposed D-FRL-RF (Yexas)
- Proposed Comm/Econ Development Areas
- Proposed Residential Development Areas
- Proposed Residential Open Space
- Existing/Expanded D-FRL-RS
- Maine Public Reserve Land
- Concept Plan Area

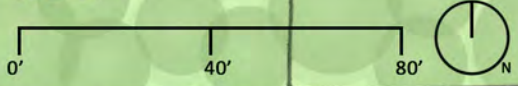
- Notes**
1. Access to CD-1, 2, 3, and 4 to be off off State Roads or other existing roads.
 2. Petitioners can not grant access over the Maine Public Reserve Land.
 3. Development of Square Lake West may require a dedicated parking area for possible boat access for Square Lake West residents in Square Lake East.

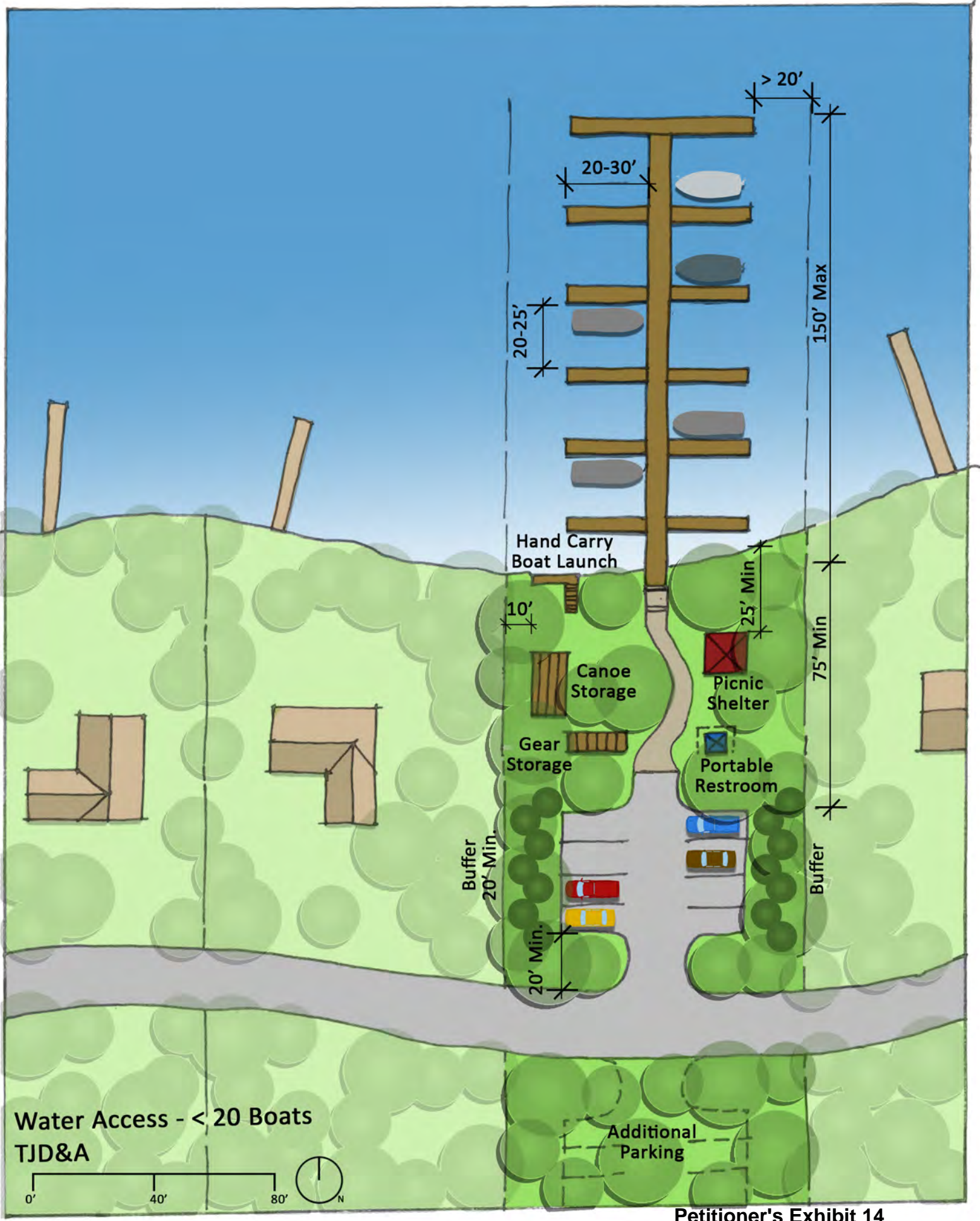
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IRVING WOODLANDS, LLC

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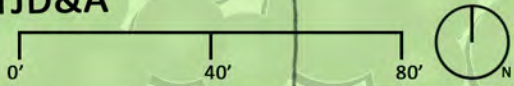


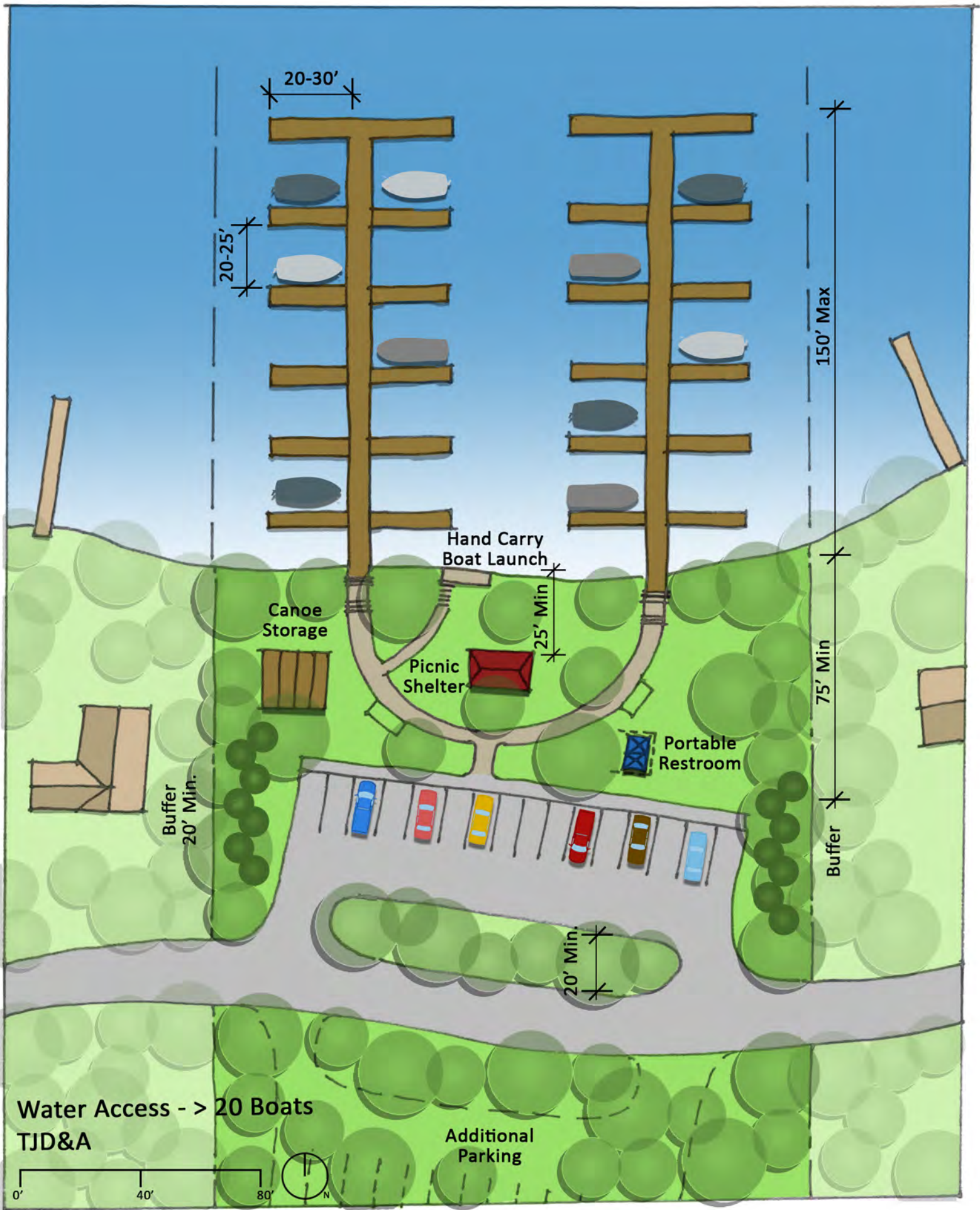
Water Access - Hand Carry
TJD&A

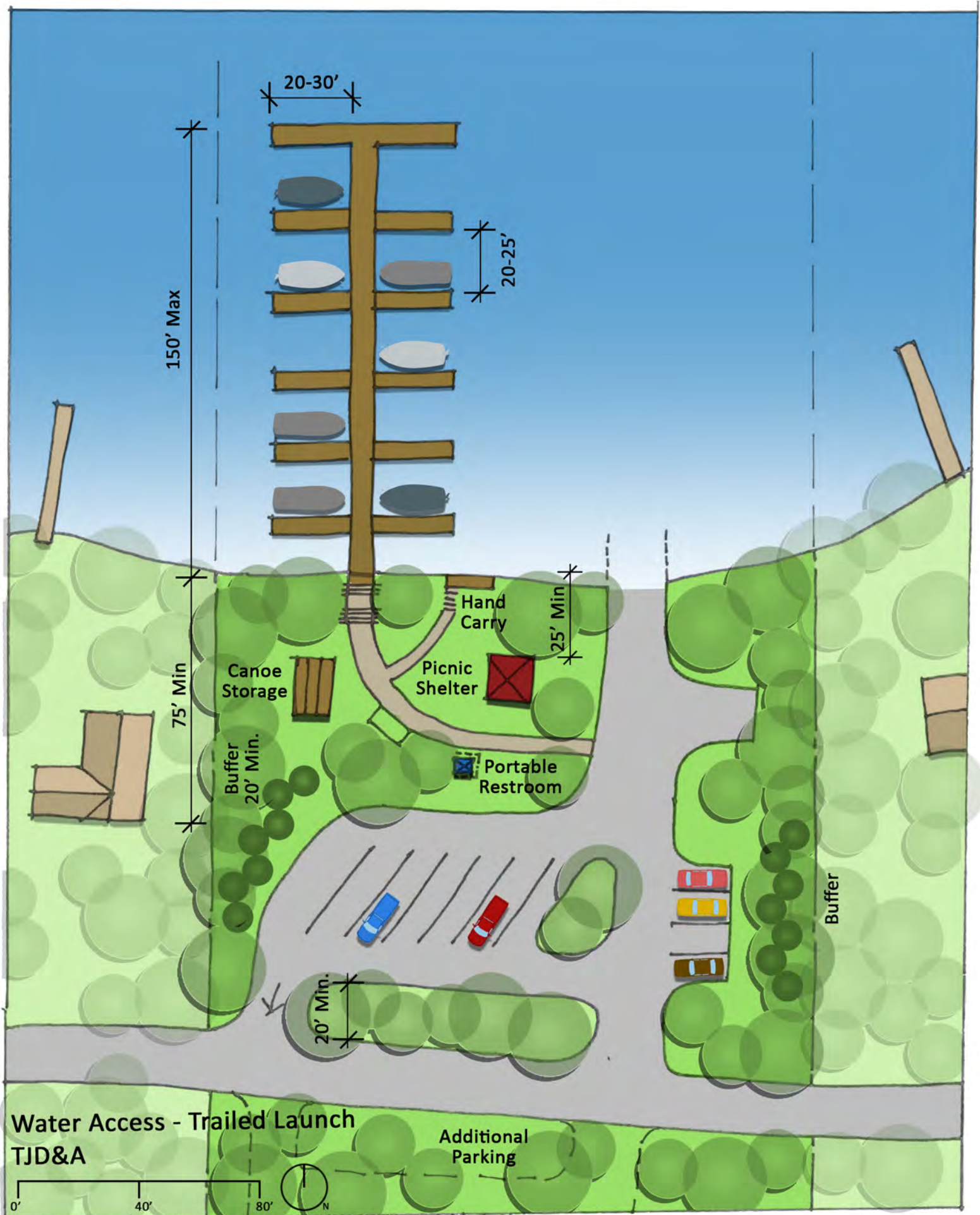




Water Access - < 20 Boats
TJD&A

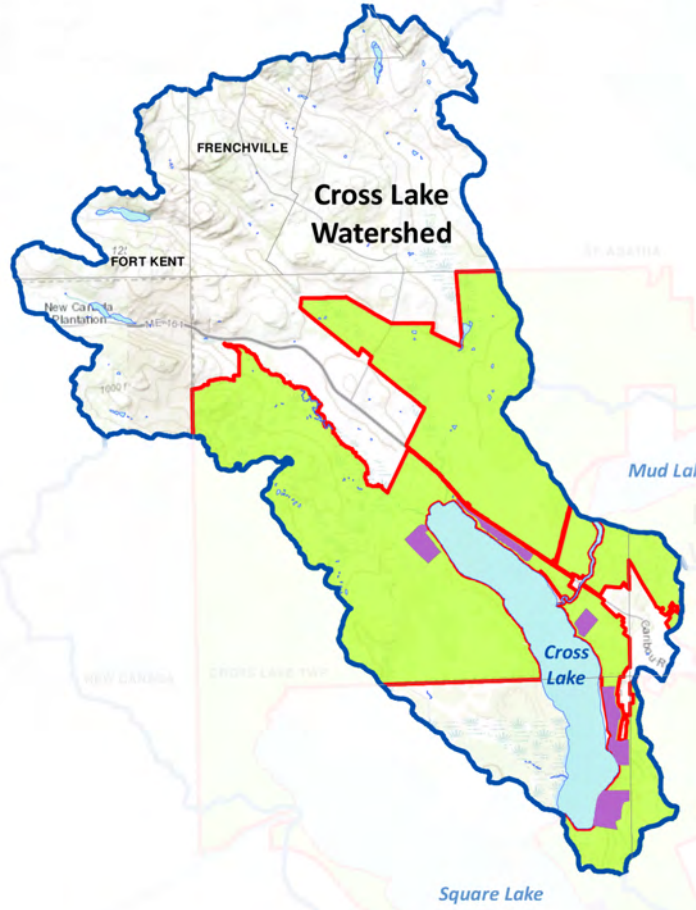




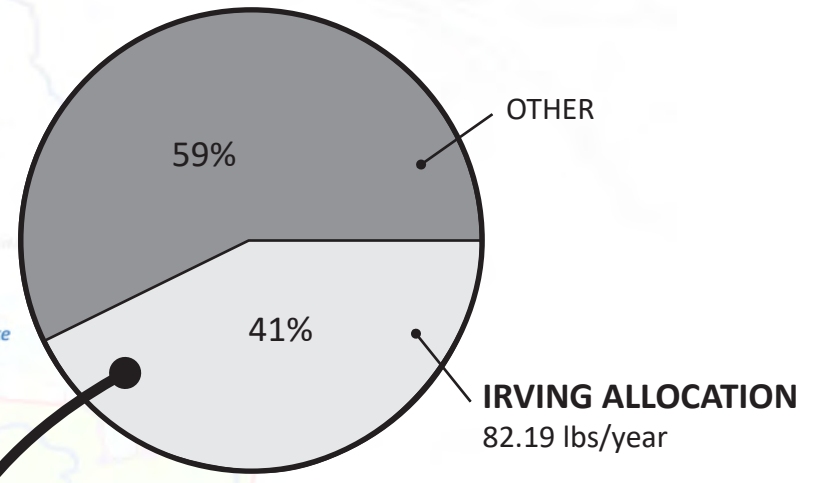


Typical D-FRL-RS Zone

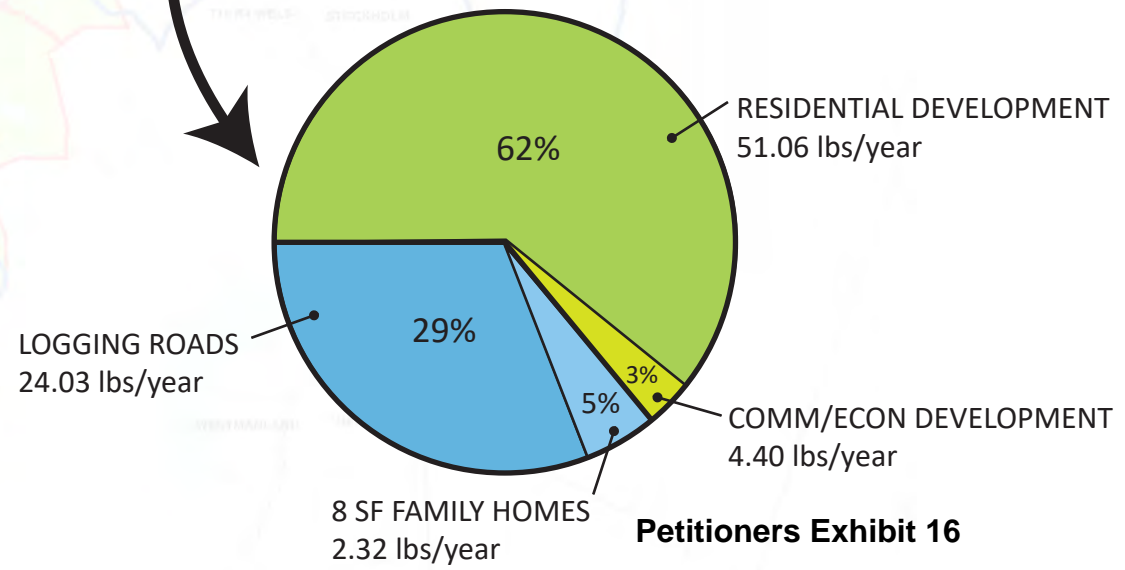




**ANNUAL INCREASE
IN P LOAD (lbs/year): 199**



**IRVING ALLOCATION
IN P LOAD (lbs/year): 82.19**



STATISTICAL SUMMARY BY WATER BODY: May 2017 Submittal

1. Long Lake

Lake area: 6,000± acres
Total shoreline: 33.1± miles
Shoreline owned by Petitioners: 4.0± miles
Shoreline occupied by Petitioners' camp lots: 3.0± miles
Potential new residential development: Infill: 0.1± mile
Proposed permanent conservation easement: none
Percent of Petitioners' shoreline currently developed: 75.0±% (does not include beach (0.26± mile) or unoccupied land (0.25± mile))
Percent of Petitioners' shoreline allocated for development: 77.5±% (an increase of 2.5%)
Percent of Petitioners' shoreline allocated for permanent conservation: none

2. Long Lake / Mud Lake thoroughfare

Length: 0.5± mile
Shoreline owned by Petitioners: none
Shoreline occupied by Petitioners' camp lots: none
Potential new residential development: N/A
Proposed permanent conservation easement: N/A
Percent of Petitioners' shoreline currently developed: N/A
Percent of Petitioners' shoreline allocated for development: N/A
Percent of Petitioners' shoreline allocated for permanent conservation: N/A

3. Mud Lake

Lake area: 972± acres
Total shoreline: 6.0± miles
Shoreline owned by Petitioners: 3.6± miles
Shoreline occupied by Petitioners' camp lots: none
Potential new residential development: none
Proposed permanent conservation easement: 1.7± miles of shoreline
Percent of Petitioners' shoreline currently developed: none
Percent of Petitioners' shoreline allocated for development: none
Percent of Petitioners' shoreline allocated for permanent conservation: 47.2±%

4. Mud Lake / Cross Lake thoroughfare

Length: 1.9± miles
Shoreline owned by Petitioners (both sides): 3.4± miles
Shoreline occupied by Petitioners' camp lots: 0.5± mile
Potential new residential development: none
Proposed permanent conservation easement: 2.0± miles of shoreline
Percent of Petitioners' shoreline currently developed: 14.7±%
Percent of Petitioners' shoreline allocated for development: 14.7±% (no increase)
Percent of Petitioners' shoreline allocated for permanent conservation: 58.8±%

5. Cross Lake

Lake area: 2,515± acres
Total shoreline: 13.1± miles
Shoreline owned by Petitioners: 9.0± miles
Shoreline occupied by Petitioners' camp lots: 4.8± miles
Potential new residential development at Cross Lake D/E: 0.8± miles
Proposed permanent conservation easement: 2.0± miles of shoreline
Percent of Petitioners' shoreline currently developed: 53.3±% (does not include north shoreline (0.71± mile or Cross Lake boat launch (0.08 mile))
Percent of Petitioners' shoreline allocated for development: 62.2±% (an increase of 8.9%) (does not include Cross Lake boat launch or Cross Lake A water access)
Percent of Petitioners' shoreline allocated for permanent conservation: 22.2%

6. Cross Lake/Square Lake thoroughfare

Length: 0.8± miles
Shoreline owned by Petitioners (east side only): 0.6± mile
Shoreline occupied by Petitioners' camp lots: none
Potential new residential development: none
Proposed permanent conservation easement: 0.6± mile of shoreline
Percent of Petitioners' shoreline currently developed: N/A
Percent of Petitioners' shoreline allocated for development: N/A
Percent of Petitioners' shoreline allocated for permanent conservation: 100%

7. Square Lake

Lake area: 8,150± acres
Total shoreline: 19.4± miles
Shoreline owned by Petitioners: 13.9± miles
Shoreline occupied by Petitioners' camp lots: 1.0± mile (west side of Square Lake; w/o Yexas)
Potential new residential development: 1.9± miles (Square Lake W, Square Lake E, Yexas)
Proposed permanent conservation easement: 10.6± miles of shoreline
Percent of Petitioners' shoreline currently developed: 7.2±%
Percent of Petitioners' shoreline allocated for existing and potential) development (2.9 miles): 20.9±% (an increase of 13.7%)
Percent of Petitioners' shoreline allocated for permanent conservation: 76.3±%

SUMMARY

Development Allocation

- 34.5± miles of shoreline owned by Petitioners
- 9.3± miles of shoreline currently occupied (27.0±%) (Yexas not included)
- 2.8± miles of shoreline allocated for new development (an increase of 8.1±%)
- 12.1 miles allocated for ex. and potential development (35.1±%) (an increase of 8.1±%)

Permanent Conservation

- 34.5± miles of shoreline owned by Petitioners
- 25.2 miles of undeveloped shoreline
- 16.9 miles of shoreline in Conservation Easement (49.0±%)

STATISTICAL SUMMARY BY WATER BODY: April 2018 Update

8. Long Lake

Lake area: 6,000± acres
Total shoreline: 33.1± miles
Shoreline owned by Petitioners: 4.0± miles
Shoreline occupied by Petitioners' camp lots: 3.0± miles
Potential residential development: Infill: 0.1 miles
Proposed permanent conservation easement: none
Proposed permanent open space: 0.4 miles
Percent of Petitioners' shoreline currently developed: 75.0±% (does not include beach (0.26± mile) or unoccupied land (0.25± mile))
Percent of Petitioners' shoreline allocated for development: 77.5±% (an increase of 2.5%)
Percent of Petitioners' shoreline allocated for conservation easement: none
Percent of Petitioners' shoreline allocated for permanent open space: 10% (beach not incl.)

9. Long Lake / Mud Lake thoroughfare

Length: 0.5± mile
Shoreline owned by Petitioners: none
Shoreline occupied by Petitioners' camp lots: none
Potential residential development: N/A
Proposed permanent conservation easement: N/A
Percent of Petitioners' shoreline currently developed: N/A
Percent of Petitioners' shoreline allocated for development: N/A
Percent of Petitioners' shoreline allocated for conservation easement: none

10. Mud Lake

Lake area: 972± acres
Total shoreline: 6.0± miles
Shoreline owned by Petitioners: 3.6± miles
Shoreline occupied by Petitioners' camp lots: none
Potential residential development: none
Proposed permanent conservation easement: 1.7± miles of shoreline
Percent of Petitioners' shoreline currently developed: none
Percent of Petitioners' shoreline allocated for development: none
Percent of Petitioners' shoreline allocated for conservation easement: 47.2±%

11. Mud Lake / Cross Lake thoroughfare

Length: 1.9± miles
Shoreline owned by Petitioners (both sides): 3.4± miles
Shoreline occupied by Petitioners' camp lots: 0.5± mile
Potential residential development: none
Proposed permanent conservation easement: 2.0± miles of shoreline
Percent of Petitioners' shoreline currently developed: 14.7±%
Percent of Petitioners' shoreline allocated for development: 14.7±% (no increase)
Percent of Petitioners' shoreline allocated for conservation easement: 58.8%

12. Cross Lake

Lake area: 2,515± acres
Total shoreline: 13.1± miles
Shoreline owned by Petitioners: 9.0± miles
Shoreline occupied by Petitioners' camp lots: 4.8± miles
Potential residential development at Cross Lake D/E: 0.8± miles
Proposed permanent conservation easement: 2.0± miles of shoreline
Proposed permanent open space: 0.5 miles
Percent of Petitioners' shoreline currently developed: 53.3±% (does not include north shoreline (0.71± mile or Cross Lake boat launch (0.08 mile))
Percent of Petitioners' shoreline allocated for development: 62.2±% (an increase of 8.9%) (does not include Cross Lake boat launch or Cross Lake A water access)
Percent of Petitioners' shoreline allocated for conservation easement: 22.2±%
Percent of Petitioners' shoreline allocated for permanent open space: 5.6±%
Total: Percent of Petitioners' shoreline protected: 27.8±%

13. Cross Lake/Square Lake thoroughfare

Length: 0.8± miles
Shoreline owned by Petitioners (east side only): 0.6± mile
Shoreline occupied by Petitioners' camp lots: none
Potential residential development: none
Proposed permanent conservation easement: 0.6± mile of shoreline
Percent of Petitioners' shoreline currently developed: N/A
Percent of Petitioners' shoreline allocated for development: N/A
Percent of Petitioners' shoreline allocated for conservation easement: 100%

14. Square Lake

Lake area: 8,150± acres
Total shoreline: 19.4± miles
Shoreline owned by Petitioners: 13.9± miles
Shoreline occupied by Petitioners camp lots: 1.0± mile (west side of Square Lake, w/o Yexas)
Potential new residential development: 1.9± miles (Square Lake W, Square Lake E, Yexas)
Proposed permanent conservation easement: 10.6± miles of shoreline
Proposed permanent open space: 0.4 miles
Percent of Petitioners' shoreline currently developed: 7.2±%
Percent of Petitioners' shoreline allocated for existing and potential) development (2.9 miles): 20.9±% (an increase of 13.7%)
Percent of Petitioners' shoreline allocated for conservation easement: 76.3±%
Percent of Petitioners' shoreline allocated for permanent open space: 2.9±%
Total: Percent of Petitioners' shoreline protected: 79.2±%

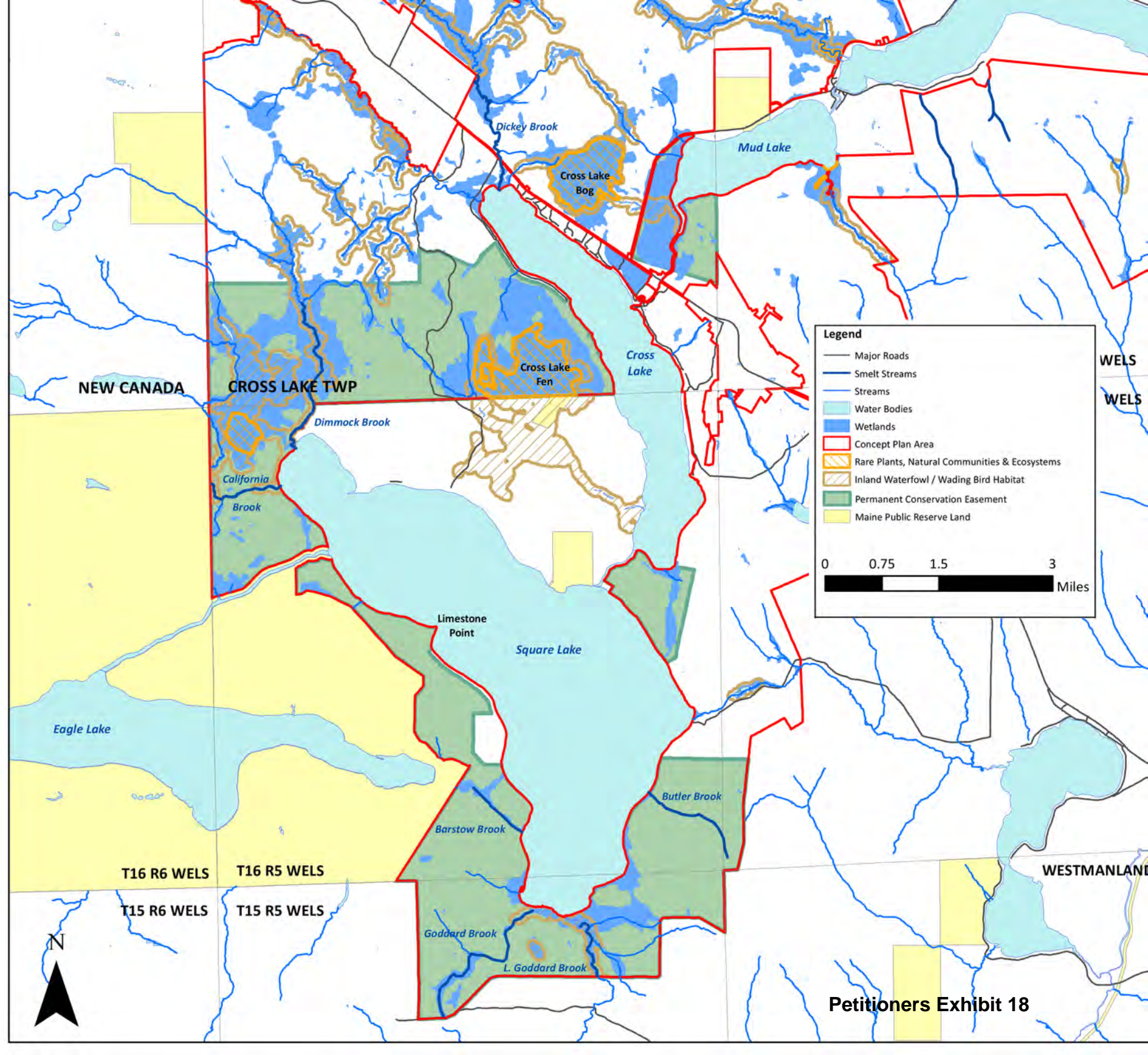
SUMMARY

Development Allocation

- 34.5± miles of shoreline owned by Petitioners
- 9.3± miles of shoreline currently occupied (27.0±%) (Yexas not included)
- 2.8± miles of shoreline allocated for new development
- 12.1 miles allocated for ex. and potential development (35.1±%) (an increase of 8.1±%)

Permanent Protection

- 34.5± miles of shoreline owned by Petitioners
- 25.2 miles of undeveloped shoreline
- 16.9 miles of shoreline in Conservation Easement: 49.0±%
- 1.2 miles of Protected Shoreline: 3.5±%
- Total Percentage of Petitioners' shoreline protected: 52.5±%



NEW CANADA

CROSS LAKE TWP

WELS

WELS

Legend

- Major Roads
- Smelt Streams
- Streams
- Water Bodies
- Wetlands
- Concept Plan Area
- Rare Plants, Natural Communities & Ecosystems
- Inland Waterfowl / Wading Bird Habitat
- Permanent Conservation Easement
- Maine Public Reserve Land

0 0.75 1.5 3 Miles

Dickey Brook

Mud Lake

Cross Lake Bog

Cross Lake

Cross Lake Fen

Dimmock Brook

California Brook

Limestone Point

Square Lake

Eagle Lake

Butler Brook

Barstow Brook

T16 R6 WELS

T16 R5 WELS

WESTMANLAND

T15 R6 WELS

T15 R5 WELS

Goddard Brook

L. Goddard Brook

Petitioners Exhibit 18



APPENDIX C: EVALUATION OF RECREATIONAL RESOURCES, SUPPLEMENT

Outline

In response to our discussion with LUPC Staff on the topic of recreational boating numbers, this supplement to Appendix C, Evaluation of Recreational Resources, has been provided to clarify the methodology used to predict potential recreational impacts on the lakes within the Concept Plan area.

Overview. Appendix C, an Evaluation of Recreation Resources (Evaluation), was prepared to provide LUPC with a) an indication of the relative number of boats that are anticipated on each of the four lakes in the Fish River Chain of Lakes in the Concept Plan (i.e., Long Lake, Mud Lake, Cross Lake, and Square Lake) and the connecting thoroughfares, if the Concept Plan were fully implemented, and b) the effect that the additional boating use is expected to have on the recreational experience of those using these resources.

The analysis in the Evaluation is based upon the Recreation Opportunity Spectrum (ROS), a recreation inventory and management tool that was developed by the USDA Forest Service in the late 1970s for use on public lands in the western United States. In 2003, a team of Vermont researchers developed a revision of ROS aimed at recreational land holdings in the Northeastern United States. This program, called the ROS Northeast Guide (the Guide), was aimed at lands similar to the Petitioner's holdings in Aroostook County, i.e., smaller land holdings (smaller than those found in the Western US), and greater number of roads. In 2004, the Forest Service issued a refinement to the original ROS for water-based recreation planning called the Water Recreation Opportunity Spectrum (WALROS). The Evaluation used both the Guide and WALROS to evaluate impacts to the recreation experience.

Summary. This Amendment re-examines the assumptions that were used in the evaluation for both Cross Lake and Square Lake, based upon comments received by LUPC staff. The Amendment takes a more conservative approach in establishing a WALROS Class for the lakes and refines the number of boats that are anticipated to be on the lakes during peak times. While the estimated number of boats for both lakes changed slightly, the increase is in line with the Evaluation, which determined that the possible development allowed under the Concept Plan will not have an unreasonable effect on the experience characterizations for either lake.

Cross Lake

Cross Lake has a surface area of 2,515 acres. The area north of the boat launch (approximately 80% of the lake, or approximately 2,000 acres) is heavily developed, with approximately 275 camps along the shoreline. The Evaluation characterized this part of the lake as Suburban (according to WALROS). Many, if not most, of these existing camps have docks, and it is assumed that they have some type of watercraft.

If all five of the residential development areas on Cross Lake were built, there would be an additional 125 units within easy walking distance of the lake. While very few of these new units would have water frontage, a limited number of water access sites and docking facilities would be available.

For purposes of determining the maximum number of boats to be expected on the lake during peak times (i.e., occurring on a warm, sunny day during a weekend or holiday) the Evaluation assumed that a) all residences had a boat and b) 15% of those households were using their boat on the water. This number is in line with a 2005 literature review of boating carrying capacity¹ in seven selected studies throughout the United States and Canada that found that the proportion of moored boats on a lake at any given time ranged from 3.6% to 25%.

Likewise, the Evaluation assumed that all new units would have boats, and that 15% of these boats would be on the water during this peak time. The following projection of boating activity (which is revised from the original Evaluation in Appendix C) also accounts for day-use boats that would gain access from the Cross Lake boat launch.

15% of 275 existing residences on lake	41 boats
15% of the 125 new units	19 boats
<u>50% of boats from boat launch</u>	<u>10 boats</u>
Total anticipated boats on Cross Lake	70 boats

These estimates are very conservative. It is unlikely that all residences in the new development areas would have boats, since there are so few water access sites. Likewise, the boat launch at Cross Lake typically has a small number of boats using the facility. And, as noted in the Evaluation, year-round residents report that on a busy July 4th there may be as many as 30 motorized boats (including jet skis) on the lake, plus another 5 canoes/kayaks. On a “typical” day during the summer, there may be as many as a dozen motorized boats on the lake. (Cheryl St. Peter, Cross Lake Resident. Personal Communication.)

Table 3, Range of Boating Coefficients, from WALROS (from the Evaluation and presented below) presents a range of “reasonable boating capacity coefficients,” which are defined as the number of water surface acres adequate for each recreational boat in a particular WALROS class. Lake users in each of the WALROS classes have an expectation of the number of boats that might be on the lake; once that number is exceeded, the perception of the lake may change. (For example, if a boater was on a lake in a Rural Natural area and the number of boats exceeded 50 acres/boat on a

¹ Hosley, Holly E., Techniques for Estimating Boating Carrying Capacity: A Literature Review, North Carolina State University, Department of Parks, Recreation & Tourism Management. For Catawba-Wateree Relicensing Coalition. August, 2005.

regular basis, it would start to take on the characteristics of a Rural Developed lake.)

The Evaluation assumed that the northern end of Cross Lake was in the Suburban WALROS Class, due to the density of the waterfront development. For lakes in the Suburban class, the coefficients range from 10 to 20 acres per boat, which translates into a coefficient range of 100 to 200 boats over the 2,000 acres in the northern portion of Cross Lake. At 70 boats (from chart on previous page), based upon the assumptions for boat ownership and use, this is well below the acceptable range for the Suburban class.

LUPC staff has suggested, however, that northern portion of Cross Lake may be considered a Rural Developed ROS class, which has a coefficients range from 20 to 50 acres per boat. This translates into a coefficient range of 40 to 100 boats over the 2,000 acres. At 70 boats, this is well within the acceptable range for the Rural Developed class.

TABLE 3 RANGE OF BOATING COEFFICIENTS		
WALROS CLASS	Range of Boating Coefficients	
	Low End (more boats)	High End (fewer boats)
Primitive	480 acres/boat	3,200 acres/boat (5 sq. miles)
Semiprimitive	110 acres/boat	480 acres/boat
Rural Natural	50 acres/boat	110 acres/boat
Rural Developed	20 acres/boat	50 acres/boat
Suburban	10 acres/boat	20 acres/boat

Square Lake

Square Lake has a surface area of 8,150 acres. Its north half is considered Rural Developed, due to the number of camps along the western shoreline (19 Irving leased/licensed lots) and the northern shoreline (approximately 36 non-Irving properties). One additional camp is located at the point where the Cross Lake thoroughfare enters the lake. The southern half is almost completely undeveloped and was considered Rural Natural in the Evaluation.

The Evaluation estimated that there currently may be as many as 18 boats on the lake during peak times. However, this number is undoubtedly high, due to lack of convenient public access, lack of deep water access, limited number of residents, distance from the Cross Lake boat launch, obstructions in the Cross Lake thoroughfare, wind and wave conditions on the lake, and lack of service facilities.

The Concept Plan anticipates a maximum of 130 new units on the lake, divided between Square Lake W, Square Lake E, and Square Lake Yexas. In addition, the Concept Plan calls for a public or commercial trailered ramp to be constructed on the east side of the

lake in conjunction with development at Square Lake E or Yexas. The Concept Plan also allows a commercial marina at Yexas, which may have slips for up to 50 boats.

The assumptions used for Cross Lake (i.e., 15% of moored boats would be on the water at peak times) were also applied to Square Lake, even though it would likely result in higher use numbers than would actually occur.

The Evaluation's projection of boating activity on Square Lake has been revised to account for a) a decrease in the number of boats coming from the Cross Lake boat launch, partially due to b) boats that would use the new Square Lake boat launch, and c) boats launched from the existing Muscovic facility (private) at the northern end of the lake.

15% of 56 existing camps on lake	8 boats
Boats from Cross Lake boat launch	5 boats
Boats from Muscovic boat launch	5 boats
Boats from new trailered facility	15 boats
15% of 130 new units (total on lake)	19 boats
<u>Boats for lease (estimate)</u>	<u>15 boats</u>
Total anticipated boats on Square Lake 67 boats	

For purpose of this assessment, Square Lake is divided into the northern and southern half, due to their different ROS characteristics. The northern portion is considered Rural Developed. Table 3 (above) indicates that for lakes in this class, boating coefficients are expected to range from 20 to 50 acres per boat, which translates into a capacity of 80 to 200 boats for the roughly 4,000 acres in the north half of the lake. The southern half of the lake is classified as Rural Natural, which has a boating coefficient range from 50 to 110 acres per boat, or 36–80 boats for the 4,000 acres at the south half of the lake. Combined totals for the entire lake are 116 to 280 boats.

At 67 boats, based upon the assumptions for boat ownership and use, this is well within or below the acceptable range for both the Rural Developed and Rural Natural classes. As noted, it is highly unlikely that this number would ever be achieved, or that the boats would concentrate in either the northern or southern end.

LUPC staff suggested that the lake may have characteristics of less intense ROS classes, i.e., portions of the northern half could be considered Rural Natural, while portions of the southern half could be considered Semi-Primitive. The coefficients for these classes range from 36 to 80 boats for the northern half, and 8 to 36 for the southern half. Combined totals under this scenario range from 44 to 116 boats. At 67 boats, assuming they were split evenly between the north and southern halves of the lake, this is still within or below the acceptable range for Square Lake.

Conclusion

Based on this supplemental analysis for the Evaluation, additional boating pressure from the Concept Plan is not expected to have an unreasonable effect on the recreational experience on the Fish River Chain of Lakes in the Plan area.

HILLSIDE DEVELOPMENT EXAMPLES



SELECTIVE HARVESTING EXAMPLES







