Lake Chelan National Recreation Area

National Park Service
U.S. Department of the Interior

# Environmental Assessment

## Stehekin Winter Ferry Landing Improvement Project

February 2010

# How to Comment on this Environmental Assessment

You may submit your comments by any of the following methods:

*By mail or hand delivery to:*
Superintendent
North Cascades NPS Complex
ATTN: Ferry Landing EA
810 State Route 20
Sedro-Woolley, WA 98284

*By fax to:* (360) 856-1934

*Via the internet*
www.nps.gov/noca/parkmgmt/ferry.htm

Comments on this Environmental Assessment must be postmarked (surface mail) or sent (e-mail or fax) *no later than April 2, 2010*.

*Freedom of Information*
Our practice is to make comments, including names and home addresses of respondents, available for public review during regular business hours. Individual respondents may request that we withhold their home address from the rulemaking record, which we will honor to the extent allowable by law. There also may be circumstances in which we would withhold from the rule-making record a respondent's identity, as allowable by law. If you wish us to withhold your name and/or address, you must state this prominently at the beginning of your comment. However, we will not consider anonymous comments. We will make all submissions from organizations, or businesses, and from individuals identifying themselves as representatives of officials of organizations or businesses, available for public inspection in their entirety.

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*Cover Photo:* This photo shows the Lady Express, one of two public ferries serving Lake Chelan including the community of Stehekin. The vessel is moored alongside the winter barge landing and public boat ramp. The ferries dock in this area in winter during low lake levels. These wintertime mooring conditions do not enable universal access for mobility-impaired persons.

# Contents

# Chapter I. Purpose of and Need for Action

## Purpose and Need

The purpose of this proposed action is to improve passenger safety and experience by providing year-round ADAAG-compliant universal access at the Stehekin Ferry Landing for all passengers traveling via the commercial ferry system. An important but secondary purpose is to improve passenger circulation and freight handling.

This action is needed because for at least eight months out of the year the current docking facilities at the Stehekin Ferry Landing do not meet guidelines provided by the Architectural Barriers Act Accessibility Standards (ABAAS) or Americans with Disabilities Act (ADA). Once the lake level drops more than two feet below full elevation, the angle of the passenger gangway from the ferry to the shoreline exceeds the ADA-mandated maximum 1:12 slope and can reach angles of 4:12 before ferry docking is shifted to the boat launch. Docking along the boat launch forces passengers to navigate an expanse of uneven terrain, precluding any "accessible route" between primary transportation to or from Stehekin and additional transportation or facilities within Stehekin. The lack of accessibility is a notable problem since approximately 25% of commercial ferry passengers are over the age of 60 and/or have limited mobility.

## Background

Lake Chelan National Recreation Area receives approximately 55,000 visitors annually and is only accessible via boat, floatplane, and hiking trail. Boat access via commercial passenger ferry on Lake Chelan is the most common means of travel to and from the area. The commercial ferry system conveys as many as 81% of visitors to the area.

The commercial ferry system arrives and departs at the Stehekin Landing near the head of Lake Chelan (Figure 1), a natural lake that has been raised approximately 21 feet for hydropower production. On average, the level of Lake Chelan fluctuates approximately 16 feet throughout the year. No permanent or accessible facilities currently exist to support transfer of passengers and freight during lower lake levels occurring six months each year (October-April) so the commercial ferries must use various ramp configurations to transfer passengers and freight. To board or disembark the ferries, passengers must traverse up to 150 feet of rough terrain, through an area that is often congested with vehicles, freight, residents and visitors. Conditions are often quite hectic, because passenger and freight transfers must take place in less than 90 minutes. While no accidents have yet occurred, this makeshift configuration of ramps and congested terrain poses various hazards for on-loading and off-loading of passengers and freight.

## Objectives

- Fully comply with National Park Service Director's Order #42, which states that park facilities, including transportation systems, will be "universally designed" to exceed ADA standards where possible in order to provide the highest levels of accessibility

consistent with protecting park resources, preserving visitor safety, and providing a high-quality visitor experience.
- Maximize flexibility to accommodate the full range of current vessels serving Stehekin.
- Maximize operational and maintenance efficiency, especially for snow removal and debris removal
- Minimize adjustments required by changes in lake level.
- Improve freight and baggage handling capabilities.
- Ensure the design harmonizes with the rustic architectural aesthetic of Stehekin, and is compatible with the Golden West Historic District.

# Decision to be Made

The General Management Plan for Lake Chelan NRA provides for improving the Ferry Landing to ensure safe and adequate docking for commercial boats, including handicapped accessibility (NPS, 1995). Therefore, this decision focuses on selecting an alternative that best achieves the intent of the General Management Plan and the specific Purpose, Need and Objectives of this proposed action.

# Project Area

The Project Area is located near the head of Lake Chelan within Lake Chelan National Recreation Area (Figure 1). Along with North Cascades National Park, and Ross Lake National the National Park Service collectively administers these units as part of the North Cascade National Park Service Complex.

Land ownership within the immediate vicinity of the Project Area includes a mixture of terrestrial and submerged aquatic lands including National Park Service lands, private lands, and municipal public lands owned and managed by the Chelan Public Utility District No. 1 of Chelan County. The closest parcel of private land (NPS Tract No. 03-108; Chelan County Parcel No. 331831340150) is approximately 475' NNW of the Project Area. Otherwise, the National Park Service has fee title to the surface lands above the full pool level (approx. 1100') in the immediate vicinity of the Ferry Landing, including that portion of the Project area that would be physically occupied by the facilities proposed in Alternatives II and III.

Land ownership below the full pool level involves several different entities. The United States (National Park Service) has easement ownership to an approximately 0.2 acre tract of land that extends from the full pool level (1100') to the low water elevation (1085'). This easement was originally granted in 1963 by Chelan PUD to the Chelan Port Authority for constructing and maintaining a dock and dock facilities. The Chelan Port Authority conveyed this easement interest to the NPS by quit claim deed on February 17, 1970 (Neely, 1989). The dock-related easement is a permanent conveyance to "construct, erect, alter, improve, repair, operate and maintain a dock and docking facilities over, across, through and on lands of the grantor…" (May 14, 1963 Easement Deed from Public Utility District No. 1 Chelan County Washington to Port of Chelan County).

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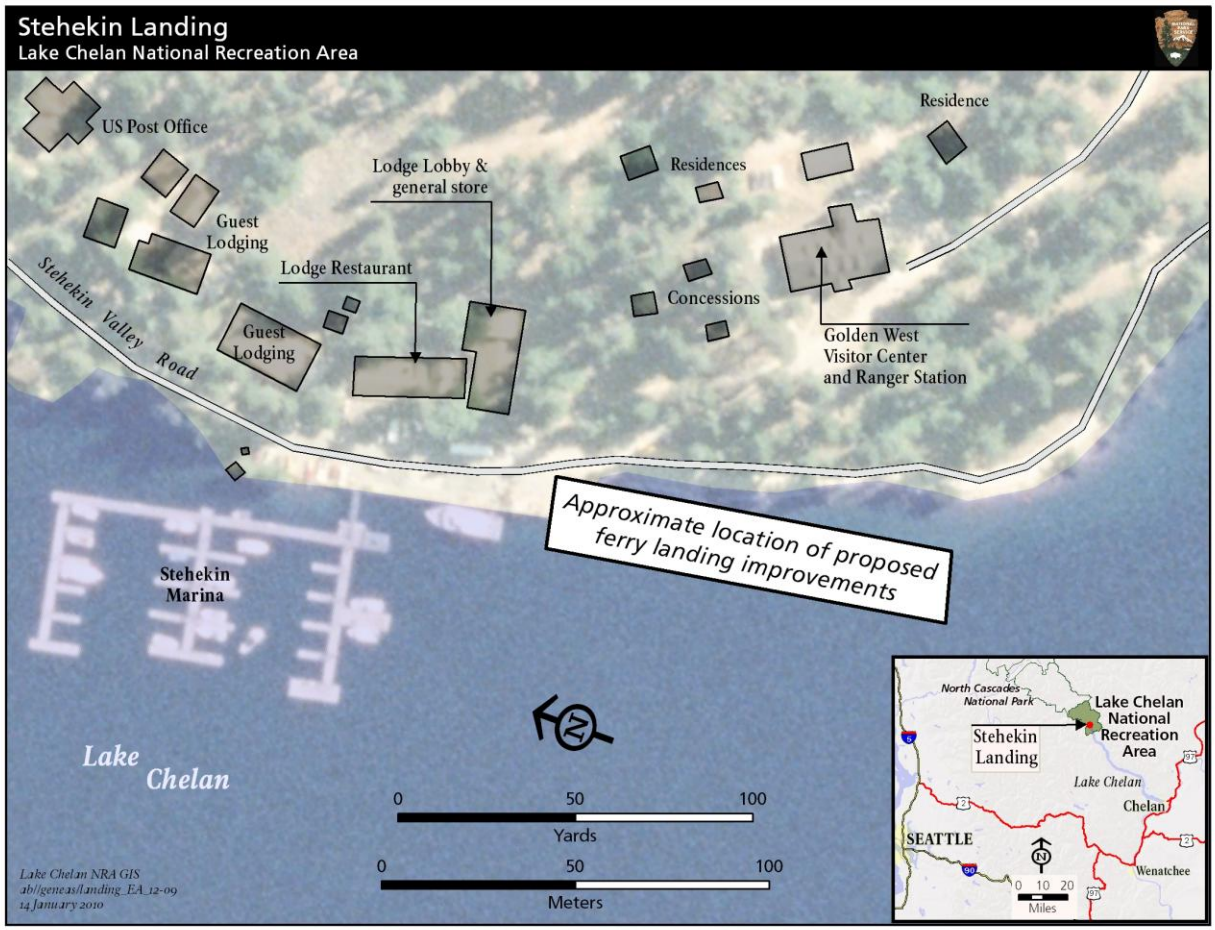


**Figure 1 Project Area Map depicting the Stehekin Ferry Landing and adjacent facilities. The area depicted as "Approximate location of proposed ferry landing improvement" would be the specific area for construction.**

Beyond this easement area, a portion of the "footprint" of the facilities proposed in Alternatives II and III would also extend southward and below the 1085' low water level and to include second class submerged aquatic lands owned by the State of Washington and administered by the Department of Natural Resources.

# History of Public Involvement

This proposed action first originated in the 1995 General Management Plan for Lake Chelan NRA, specifically in the section entitled "Stehekin Landing Development Concept Plan." Review of the public comments received on the 1995 General Management Plan indicates few (if any) comments were received specific to this proposal. Instead, most comments regarding the

Landing area focused on transportation-related issues once passengers and residents disembarked the ferries.

The National Park Service in 2003 received funding for further planning and design of the conceptual plan presented in the 1995 GMP for the Stehekin Landing. This funding initiated a "*Stehekin Transportation Study and Landing Design*" process that included a series of meetings with park staff, local residents, and various business owners to consider transportation options and conceptual design alternatives for the Stehekin Landing area. This planning process included public meetings in Chelan on October 20, 2003 and in Stehekin December 1, 2003.

The NPS used the public input received following those meetings to formulate conceptual design alternatives for transportation in the valley, including the dock and landing area. Those design alternatives were presented at a public meeting in Stehekin in May 2004 to obtain additional input. The majority of comments recorded during that meeting focused on parking issues and traffic congestion during boat time. A few commented on the need for covered storage of freight and baggage at the Ferry Landing. No comments were specifically provided in regard to the concept of a floating dock and wheelchair accessibility.

The public scoping and involvement process concluded in May 2004, and the planning process shifted focus into the complex technical and engineering details and design constraints of the potential design options. A summary of this planning phase provided in Chapter II, "Alternatives Considered but Rejected". A complete, timeline-based account of the Design History is provided in Appendix I.

# Issues and Concerns

The following section describes issues and concerns that will be considered in detail in this EA. The issues were derived from public and agency comments received during public scoping in November 2003 and May 2004. They are also based upon input received from marine engineers, architects, NPS staff and key stakeholders including staff from the Lake Chelan Boat Company.

## Issues to be Considered in Detail

1. *Improved safety and accessibility*. Commercial ferries convey the approximately 81% of visitors and residents to and from the community of Stehekin (NPS unpublished data). The current Ferry Landing area is not designed to accommodate passengers with impaired mobility. Measures need to be taken to improve safety and to accommodate an increase in the number of "baby boomers" and persons with impaired mobility. This issue will be evaluated in the *Recreation and Visitor Use* impact topic.
2. *Operational and maintenance efficiency*. Stehekin is a remote and isolated area that is expensive for the National Park Service to administer and maintain. The design for the Ferry Landing must be cost-effective to construct, environmentally benign, durable and relatively easy to maintain—especially in regard to snow removal, woody debris management and cyclic maintenance and repairs. This issue will be evaluated in the *National Park Service Management and Operations* impact topic.
3. *Historic Compatibility*. The rustic charm of the Stehekin Landing, and the historic character of the Golden West Historic District (a National Register-listed historic area) is

important to the community of Stehekin, to visitors, and to the character of Lake Chelan National Recreation Area. The Ferry Landing is not listed as historic, and the Project Area is not located within a historic district. However, the Ferry Landing is readily visible from the historic district. Improvements to the Ferry Landing must harmonize and complement the historic character of the area. This issue will be addressed under the *Historic Cultural Resources* impact topic.

4. *Prehistoric Cultural Resources*. The nearest known prehistoric cultural resource is an ancient pictograph site across the lake from the Ferry Landing. This site is within the viewshed and soundscape of the Ferry Landing, and is eligible for listing on the National Register of Historic Places. It is also of great significance to native peoples. The issue of potential visual and auditory effects of this proposal is addressed under the "Prehistoric Cultural Resources" impact topic.
5. *Construction-related effects*. The two design options presented in this Environmental Assessment would require work along the shoreline of Lake Chelan and in water. Construction could temporarily inconvenience visitors and residents. Disturbance from construction and use of the facility could also cause temporary adverse impacts to water quality and aquatic habitats within the immediate vicinity of the Project Area. These construction-related concerns will be addressed in the following impact topics: *Water Resources, Fish and Wildlife, Recreation and Visitor Use, National Park Service Operations*.

## Issues and Concerns Considered but Dismissed

1. *Impacts to Air Quality*. Construction equipment would temporarily create dusty conditions and release various pollutants such as particulate matter, carbon monoxide and carbon dioxide (a greenhouse gas). The adverse impacts to air quality from construction would be temporary and barely detectable beyond the immediate vicinity of the area.
2. *Impacts to Riparian Vegetation*. The area that would experience biological and physical disturbance from this project is essentially devoid of native vegetation given the high degree of disturbance the area experiences on a daily basis. None of the alternatives considered in this Environmental Assessment would adversely affect vegetation, so this topic as dismissed from further analysis.
3. *Socioeconomic Effects*. Broadly speaking, socioeconomic effects include such things as patterns of consumption, the distribution of incomes and wealth, the way in which people behave (both in terms of purchase decisions and the way in which they choose to spend their time), and the overall quality of life. This proposed action may have beneficial socioeconomic consequences, but there are no data or studies to conduct a reasonably objective and scholarly analysis. Given this uncertainty, socioeconomic effects was considered but dismissed as an impact topic. Indirect considerations of socioeconomic effects are included instead under the "Recreation and Visitor Use" impact topic.

# Laws, Regulations and Policies and Administrative Procedures Relevant this Decision

## Introduction

The following section highlights the most relevant regulatory, policy and administrative procedures guiding this decision.

## Enabling Legislation, Lake Chelan National Recreation Area

The Enabling Legislation for Lake Chelan National Recreation Area states:

> "In order to provide for the public outdoor recreation use and enjoyment of portions of the Stehekin River and Lake Chelan, together with surrounding lands, and for the conservation of the scenic, scientific, historic, and other values contributing to public enjoyment of such lands and waters…(Sec. 202, Public Law 90-544, October 2, 1968).

Title IV, Administrative Provisions, provides:

> "…the Secretary [of the Interior] shall administer the [Lake Chelan National Recreation Area] in a manner which in his judgment will best provide for (1) public outdoor recreation benefits; (2) conservation of scenic, scientific, historic and other values contributing to public enjoyment; and (3) such management use and disposal of renewable natural resources and the continuation of such existing uses and developments as will promote, or are compatible with, or do not significantly impair public recreation and conservation of the scenic, scientific, historic or other values contributing to public enjoyment."

## General Management Plan, Lake Chelan National Recreation Area (NPS, 1995)

The General Management Plan (GMP) specifies that recreational access for visitors with disabilities would be enhanced. The GMP includes a Development Concept Plan for the Ferry Landing that stipulates adequate and safe commercial boat docking must be ensured to meet safety requirements. The Development Concept Plan depicts a floating dock for ferry landing accessible to visitors in wheelchairs.

## The Architectural Barriers Act of 1968 (P.L. 90-480)

This law requires all buildings and facilities built or renovated in whole or in part with Federal funds to be accessible to, and usable by people with disabilities. Since 1968, official standards for making buildings accessible have been developed and the U.S. Architectural and Transportation Barriers Compliance Board has been created to monitor and enforce compliance with the law.

## Americans with Disabilities Act Accessibility Guidelines (ADAAG) 2004

Summary

This document sets guidelines for accessibility to places of public accommodation and commercial facilities by individuals with disabilities. These guidelines are to be applied during the design, construction, and alteration of all buildings and facilities. The manner by which the National Park Service complies with these 2004 guidelines is described in the section

Implementation Strategy

To achieve the goals and objectives of this Director's Order, the NPS will implement the following strategies: (1) NPS will increase employee awareness and technical understanding of accessibility requirements; (2) All new and renovated buildings and facilities, and all new services and programs--including those offered by concessioners and by interpreters, will be "universally designed" and implemented in conformance with applicable regulations and standards.

## National Park Service Director's Order #42: Accessibility

This Order issued by the Director of the NPS, further clarifies NPS responsibilities in providing accessible facilities and services for visitors as follows:

> "It is the goal of the NPS to ensure that all people, including the estimated 54 million citizens with disabilities, have the highest level of accessibility that is reasonable to our programs, facilities and services in conformance with applicable regulations and standards. Accordingly, the NPS will seek to provide that level in the planning, construction, and renovation of buildings and facilities and in the provision of programs and services to the public and to our employees."

## National Park Service Management Policies 2006 Regarding Accessibility

Overview

NPS Management Policies provide the management directives for making decisions in the National Park System. These policies cover the following topics: park foundation, park system planning, land protection, natural resource management, cultural resource management, wilderness preservation and management, interpretation and education, use of parks, park facilities, and commercial visitor services.

1.9.3 Accessibility for Persons with Disabilities (Park Foundation, Chapter 1)

"All practicable efforts will be made to make NPS facilities, programs, services, employment, and meaningful work opportunities accessible and usable by all people, including those with disabilities. This policy reflects the commitment to provide access to the widest cross section of the public and ensure compliance with the Architectural Barriers Act of 1968, Section 504 of the Rehabilitation Act of 1973, the Equal Employment Opportunity Act of 1972, and [the Americans with Disabilities Act Accessibility Guidelines (ADAAG) July 2004]."

8.2.4 Accessibility for Persons with Disabilities (Use of the Parks, Chapter 8)

"All reasonable efforts will be made to make NPS facilities, programs, and services accessible to and usable by all people, including those with disabilities. This policy reflects the commitment to provide access to the widest cross section of the public, and to ensure compliance with the intent of the Architectural Barriers Act and the Rehabilitation Act. The Service will also comply with section 507 of the ADA (42 USC 12207) which states that wheelchairs will be permitted in federal wilderness areas. Specific guidance for implementing these laws is found in the Secretary of the Interior's regulations regarding enforcement of non-discrimination on the basis of disability in Department of the Interior Programs." (43 CFR Part 17, Subpart E).

"One primary tenet of disability rights requirements is that, to the highest degree reasonable, people with disabilities should be able to participate in the same programs and activities available to everyone else. In choosing among methods for providing accessibility, higher priority will be given to those methods that offer programs and activities in the most integrated setting appropriate. Special, separate, or alternative facilities, programs, or services will be provided only when existing ones cannot reasonably be made accessible. The determination of what is reasonable will be made only after careful consultation with persons with disabilities, or their representatives. Any decision that would result in "less than equal opportunity" is subject to the filing of an [official complaint under Section 504 of the Rehabilitation Act as amended in 1978]."

9.1.2 Accessibility for Persons with Disabilities (Park Facilities, Chapter 9)

"The NPS will design, construct, and operate all buildings and facilities so they are accessible to, and usable by, persons with disabilities to the greatest extent reasonable, in compliance with all applicable laws, regulations and standards. This means that all new and altered buildings and facilities will be in conformance with the appropriate design standards. It also means that a sufficient number of existing buildings and facilities will be modified to ensure that programs can be provided in an accessible location."

"Transportation systems in parks, including water transportation will have a sufficient percentage of fully accessible vehicles or watercraft to provide effective services to persons with disabilities. In the case of existing systems, the necessary vehicles will be provided on a replacement or retrofit basis. Until the transportation system has been made fully accessible, a separate accessible vehicle will be provided, or disabled persons will be allowed to drive their personal vehicles on otherwise restricted roadways."

"In meeting the goal of accessibility, emphasis will be placed on ensuring persons with disabilities are afforded experiences and opportunities along with other visitors, to the greatest extent reasonable. Separate facilities for people with disabilities are not a substitute for full accessibility to other park facilities, but they may be allowed where the need for specialized services is clearly demonstrated."

### Clean Water Act

The Clean Water Act is a national policy to restore and maintain the chemical, physical, and biological integrity of waters of the United States; to enhance the quality of water resources; and to prevent, control, and abate water pollution. Sections 404 and 401 of the Clean Water Act apply to new construction that would involve the discharge of fill material and placement of a structure into waters of the United States. This project must comply with the Act because it would involve placement of pilings and a structure into the navigable waters of Lake Chelan.

### Endangered Species Act

Section 7 of the Endangered Species Act precludes all federal agencies, including the National Park Service, from authorizing, funding, or carrying out any activity that may jeopardize the continued existence of a listed species. The NPS must consult with the U.S. Fish and Wildlife Service regarding any action associated with this project that may affect a listed species.

### Washington State Hydraulic Code

The enabling legislation for Lake Chelan NRA mandates the National Park Service to consult with the State of Washington regarding management activities that may affect fish and wildlife habitat. The NPS typically fulfills this consultation requirement by obtaining a Hydraulic Project Authorization (HPA) from the Department of Fish and Wildlife (WDFW) if a project will "use, divert, obstruct, or change the natural flow or bed of any fresh or salt water of the state" (75.20 RCW). This project will involve some in-water work, including pile driving, so the NPS will consult with WDFW and obtain an HPA to document the consultation process.

## Required Permits and Approvals

### Individual Permit, U.S. Army Corps of Engineers

In accordance with section 404 of the Clean Water Act, this project would require an Individual Permit the U.S. Army Corps of Engineers (Deborah Knaub, ACOE pers. comm.).

### Informal Consultation, U.S. Fish and Wildlife Service

This project will have No effect on federally listed species as per informal consultation with the U.S. Fish and Wildlife Service (refer to Chapter III for further details). The National Park Service would not normally seek written concurrence from the U.S. Fish and Wildlife Service for a "No Effect" determination, but the U.S. Army Corps of Engineers (ACOE) requires written documentation in order to initiate the Section 404 Individual Permit process. Therefore, the NPS will set aside its authority and procedures and obtain written concurrence from the U.S. Fish and Wildlife Service for this "No Effect" determination to fulfill ACOE requirements.

### Hydraulic Project Authorization from the Washington Department of Fish and Wildlife

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## Chelan County Public Utilities District

The surface estate in the vicinity of the marina and the Ferry Landing (above 1079' natural lake elevation) is owned by Chelan County PUD. The PUD granted an easement in 1963 to Chelan Port Authority for constructing and maintaining the dock and related facilities at the Ferry Landing. In 1970, the NPS acquired this easement from the Chelan Port Authority, including the right to operate and maintain the Ferry Landing. However, any additional structures below 1100 ft "full pool" elevation of the Lake Chelan would need to be registered in the PUD inventory of structures within the PUD flowage easement. Chelan PUD would also need issue a License (used to be called a permit) to Occupy Project Waters. Typically the PUD License would be issued once the NPS obtains all other necessary permits from all agencies involved (Steve Vaughn, Chelan PUD, pers. comm. 12/7/2009).

## Washington State Department of Natural Resources

Washington State holds title to land under navigable waters. Washington Department of Natural Resources (DNR) owns the land under the natural lakebed beginning at the 1079 ft elevation. DNR issues Aquatic Land Leases for any structures above or below the water line of this elevation. For example, the NPS leases the aquatic lands from DNR for the Stehekin Marina, immediately adjacent to the Project Area. Any additional aquatic land occupied as part of this project will be appended to the existing DNR lease.

# Chapter II. Alternatives

## Introduction

This Chapter begins with a description of the "No Action" alternative, as required by the National Environmental Policy Act. The "No Action" alternative provides a common baseline from which to evaluate the environmental impacts of each "action" alternative.

After describing the "No Action" alternative, this Chapter describes two reasonable management options, or alternatives, the National Park Service has identified to enable year-round universal access to and from Stehekin for all passengers traveling via the commercial ferry system. These alternatives have been developed through a multi-year process that has included an existing condition and needs assessment, public scoping, conceptual site layout designs, and engineering feasibility analyses of the conceptual designs.

The impetus behind each action alternative originates from the need to provide barrier-free access between the existing commercial ferry boats, which provide the primary form of transportation into and out of Stehekin, and the Stehekin Landing, which acts as a hub for nearly all sources of transportation within Stehekin. Both action alternatives meet Americans with Disabilities Act Accessibility Guidelines (ADAAG) by providing an accessible route to connect ferry boat transportation with facilities and services within Stehekin regardless of Lake Chelan's water level.

Additional design considerations included minimizing maintenance and operational requirements, improving freight handling efficiency, and maintaining a compatible aesthetic character with the Stehekin Landing (objectives described at the beginning of this EA). Many alternatives were originally considered but dismissed because of failure to meet accessibility requirements or inability to meet design criteria. A more detailed history of the design process and evolution is provided in Appendix I.

## Alternative I. No Action—Continue Current Management

The No Action alternative would involve no further changes in the current configuration of the Ferry Landing. The existing facilities, including the boat launch and bulkheads, would continue to be managed and maintained in their present configuration with routine maintenance. Use of the Ferry Landing would continue at current levels and barriers that currently limit access from the passenger ferry to the Stehekin Landing during low-water periods would remain in place. Ferry landing and passenger disembarkation would remain out of compliance with ADAAG requirements for approximately eight months each year.

This alternative assumes that there would be no substantial changes to operations regarding the Ferry Landing. The congestion of ferry passengers, freight, and residential vehicles that occurs on the boat launch when passenger ferries are moored at low water would continue to generate a confusing and potentially unsafe circulation system with no separation between pedestrian and vehicular transportation routes. Inefficiencies associated with freight handling and transport would remain.

# Alternative II. Fixed Walkway with Portable Wedge Landings and Freight Platform (Preferred Alternative)

Alternative II would involve installing a fixed walkway located atop the western bulkhead of the existing boat launch. The fixed walkway would have either a series of flat landings at approximately 25-foot intervals, or a portable wedge type structure that would provide a flat landing depending upon lake level. In either case the flat landing or portable wedge would enable level placement of a gangway from the ferry to the slightly inclined walkway.

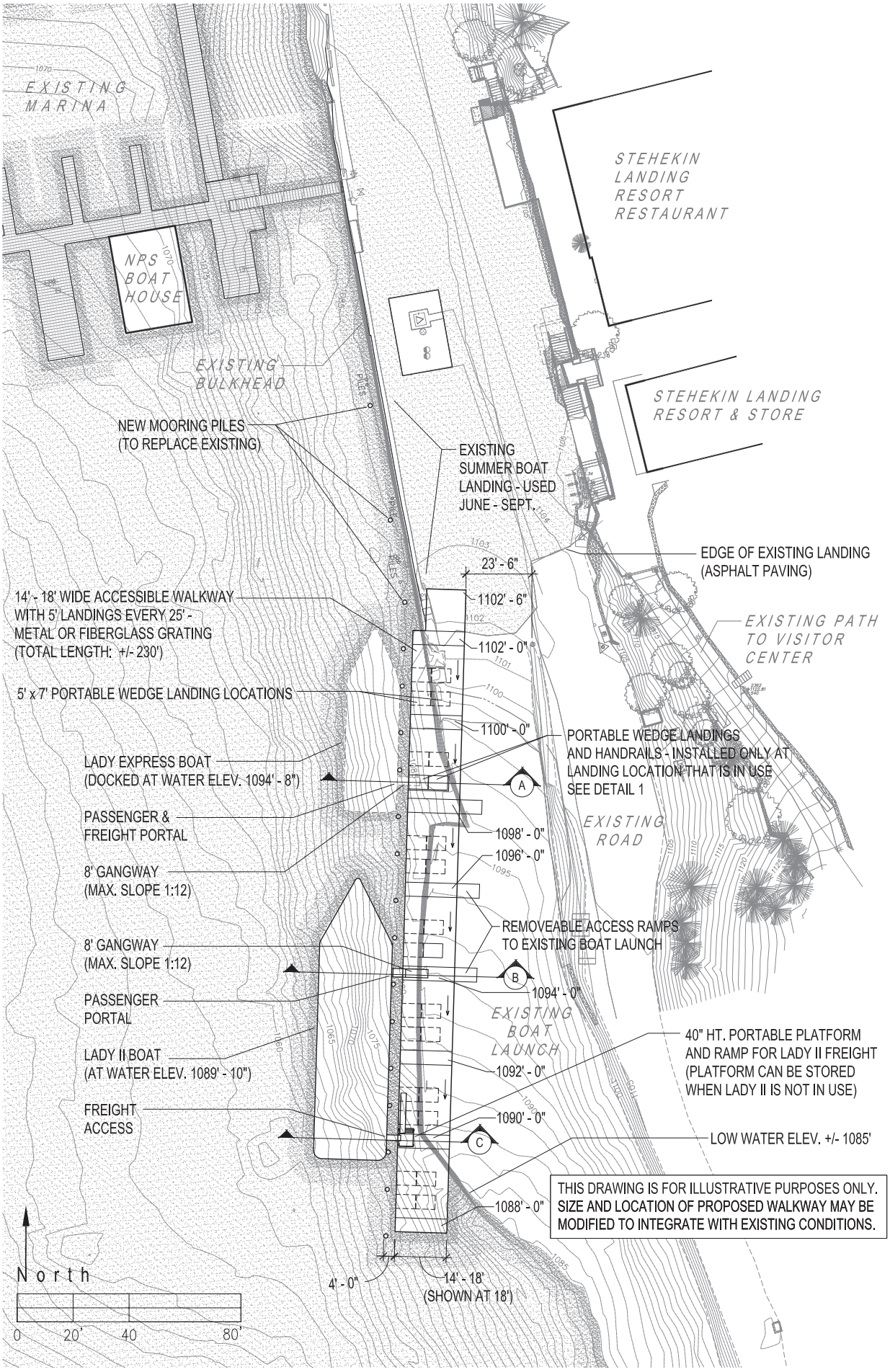
Passenger ferries would moor alongside the fixed walkway, tying off in one of three potential configurations determined by lake level. Passengers would disembark the ferry via a gangway onto a flat landing on the fixed walkway. The flat landings would be either part of the fixed structure every 25 feet or created by positioning a portable wedge at intermediate locations. Transitioning onto the fixed walkway would provide passengers with an ADA-accessible route between passenger ferries and the Stehekin Landing.

This design would enable all visitors to disembark independently from the commercial ferry boats throughout the entire range of annual lake level fluctuations. Further engineering analyses would be performed to delineate the minimum width required for the fixed walkway, based on gangway length requirements to meet ADA slope restrictions between the ferry boat passenger deck and the fixed walkway. The design objective would be to minimize the overall width of footprint of the fixed walkway to optimize the size of the structure. Similarly, the exact number of mooring piles would be determined based on a more detailed evaluation of ferry docking requirements and may be reduced from the current depiction. The following illustrations depict the maximum potential impact of an 18'-wide walkway with 16 mooring piles, although a 14'-wide walkway with fewer mooring piles would be preferred provided universal access can be maintained.

## Description of Infrastructure

The fixed walkway would extend approximately 215 feet from the Stehekin Landing at a width ranging from 14' – 18', depending on gangway design. At its northern end, the walkway elevation would intersect with the existing Stehekin Landing between elevations 1102' and 1103'. The walkway would angle downward at slopes meeting ADA standards (less than or equal to 1:12 slope) until reaching an elevation of 1088' at its southern end. The fixed walkway would have flat 5'-wide landings at intervals of 25 feet as well as intermediate locations for anchoring a portable wedge, which would enable docking of current vessels throughout the full range of water levels and provide a level transition between the gangway and the fixed walkway to meet ADA requirements.

During summer high water (approximately June through September), most of the walkway would be submerged and ferry boat operations would deviate little from the current practice of docking at the existing summer boat landing. At lower lake levels (October through May), varying portions of the fixed walkway would be exposed above the water line for docking purposes. The following pages (pp. 13-16) depict plan views, section views and perspectives of this alternative.




# ALT. 2 - FIXED WALKWAY WITH PORTABLE WEDGE LANDINGS AND FREIGHT PLATFORM - PLAN

STEHEKIN LANDING - STEHEKIN, WA

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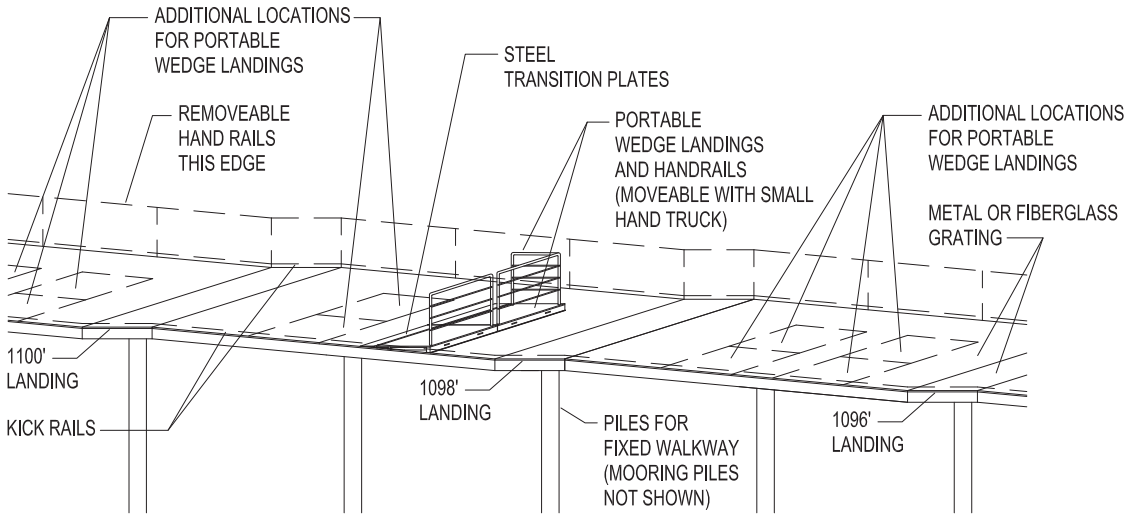
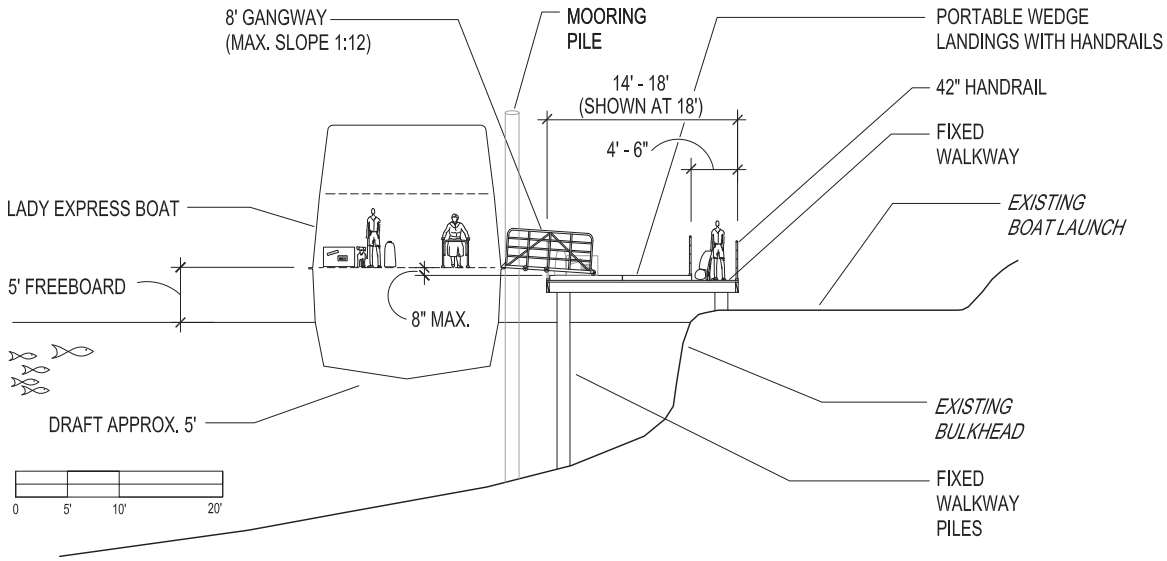
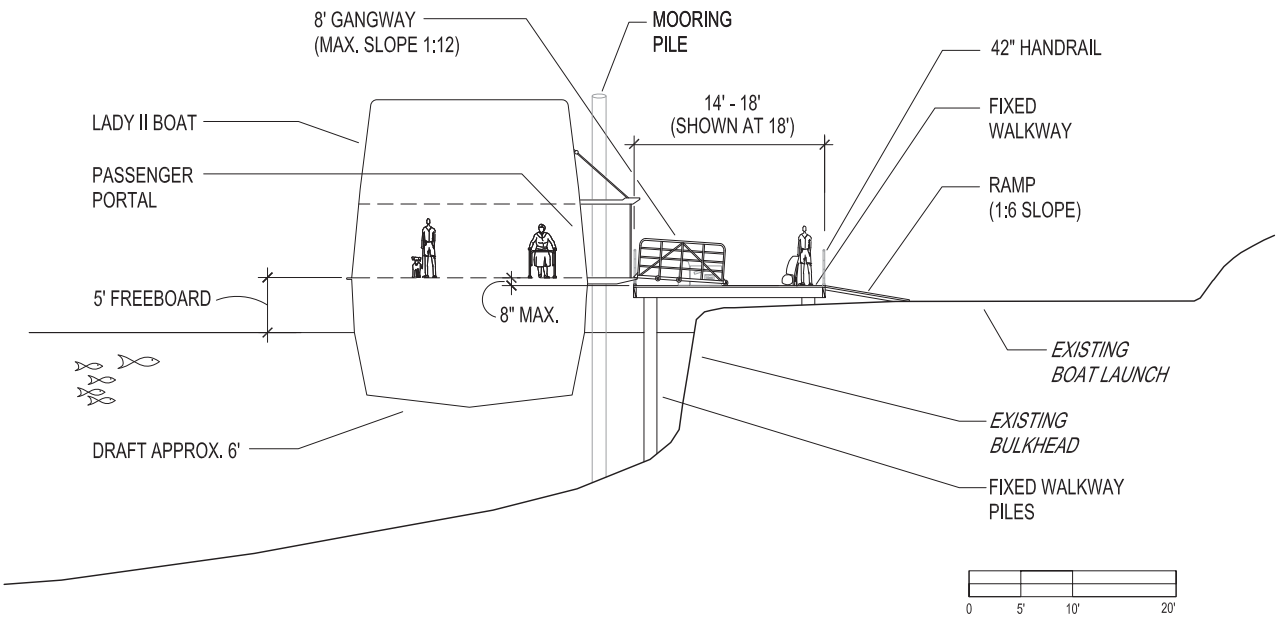



1 FIXED WALKWAY WITH PORTABLE WEDGE LANDINGS AND HANDRAILS

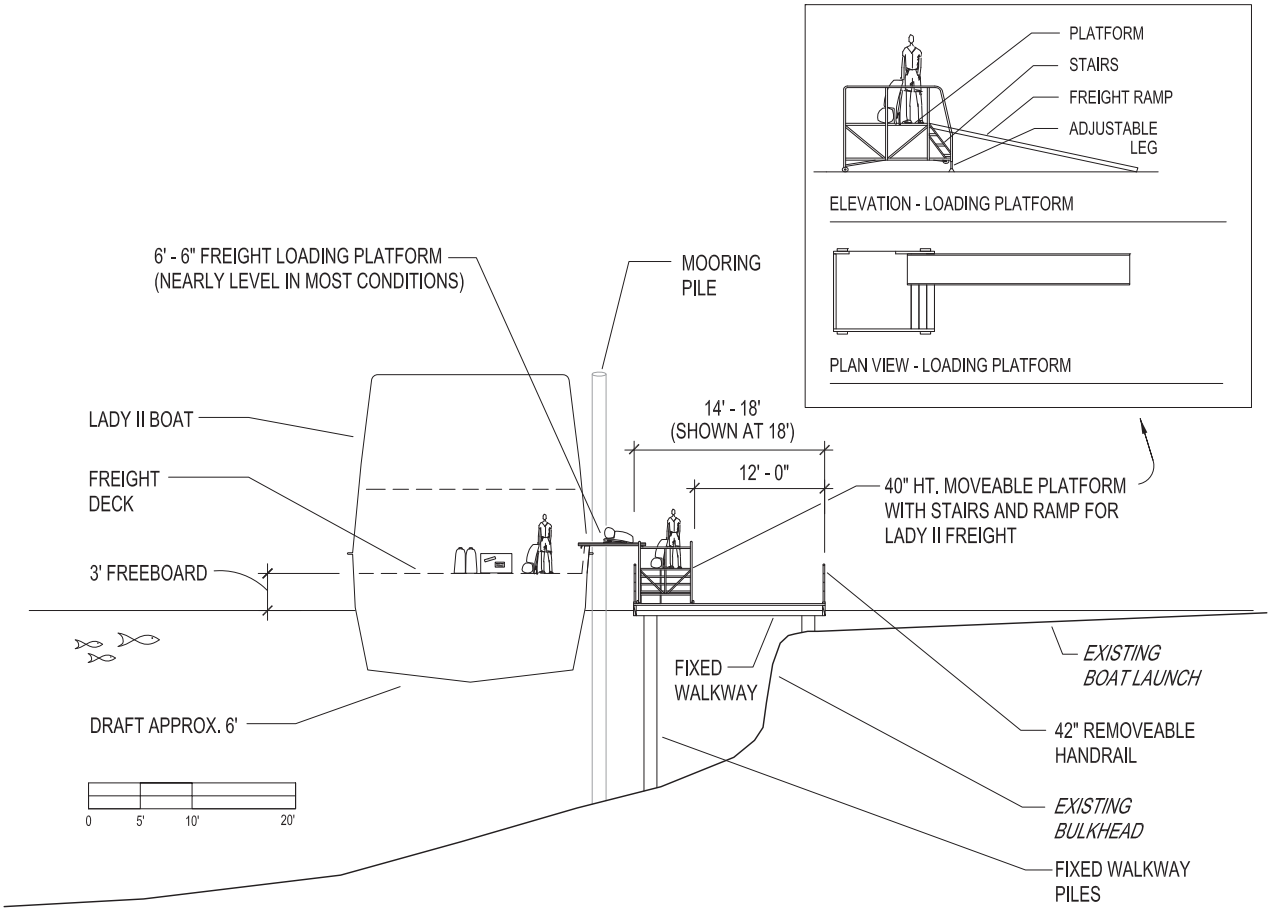



A CROSS-SECTION SHOWING LADY EXPRESS BOAT AND GANGWAY

# ALT. 2 - FIXED WALKWAY WITH PORTABLE WEDGE LANDINGS AND FREIGHT PLATFORM - DETAIL & SECTION

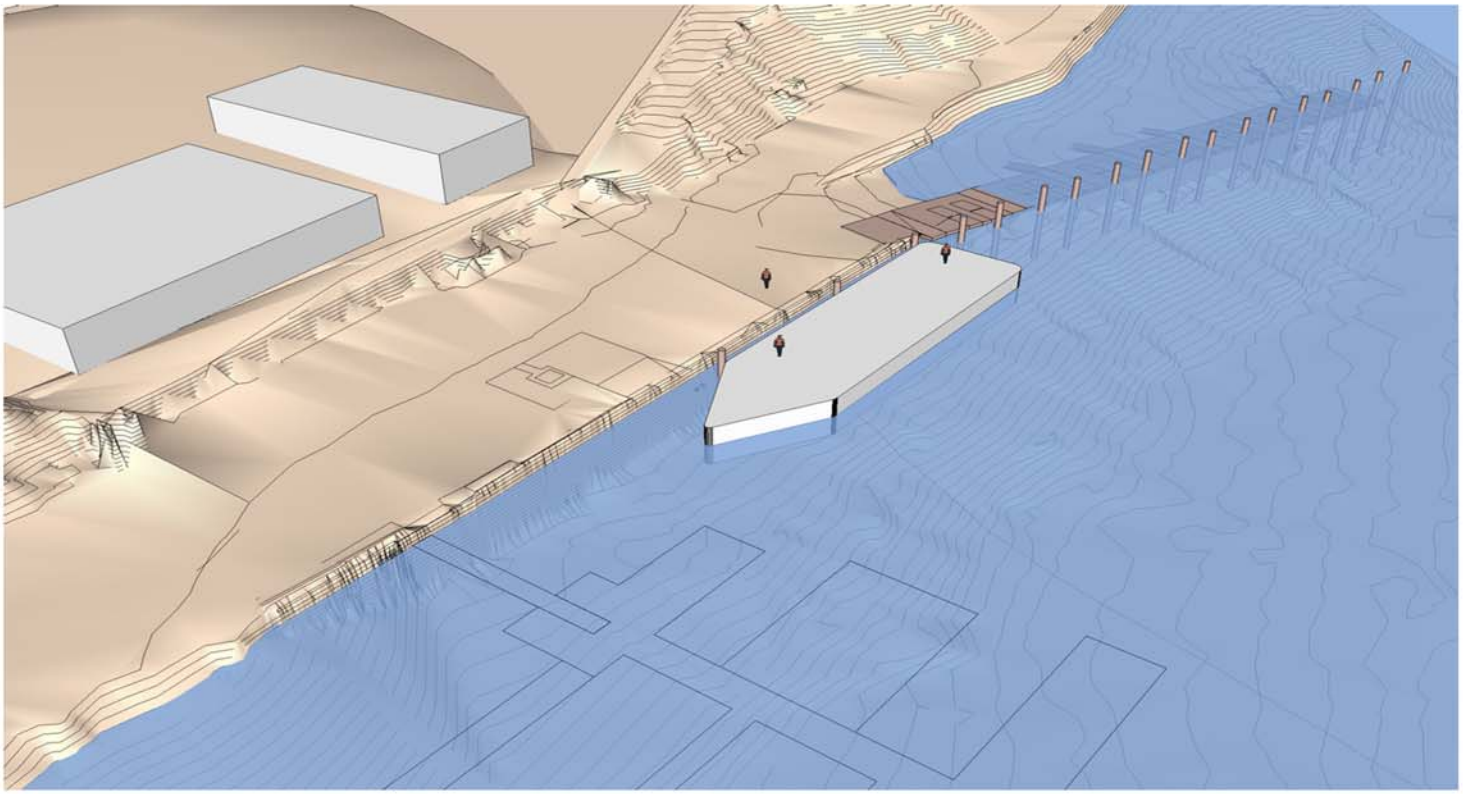



B CROSS-SECTION SHOWING LADY II BOAT AND GANGWAY

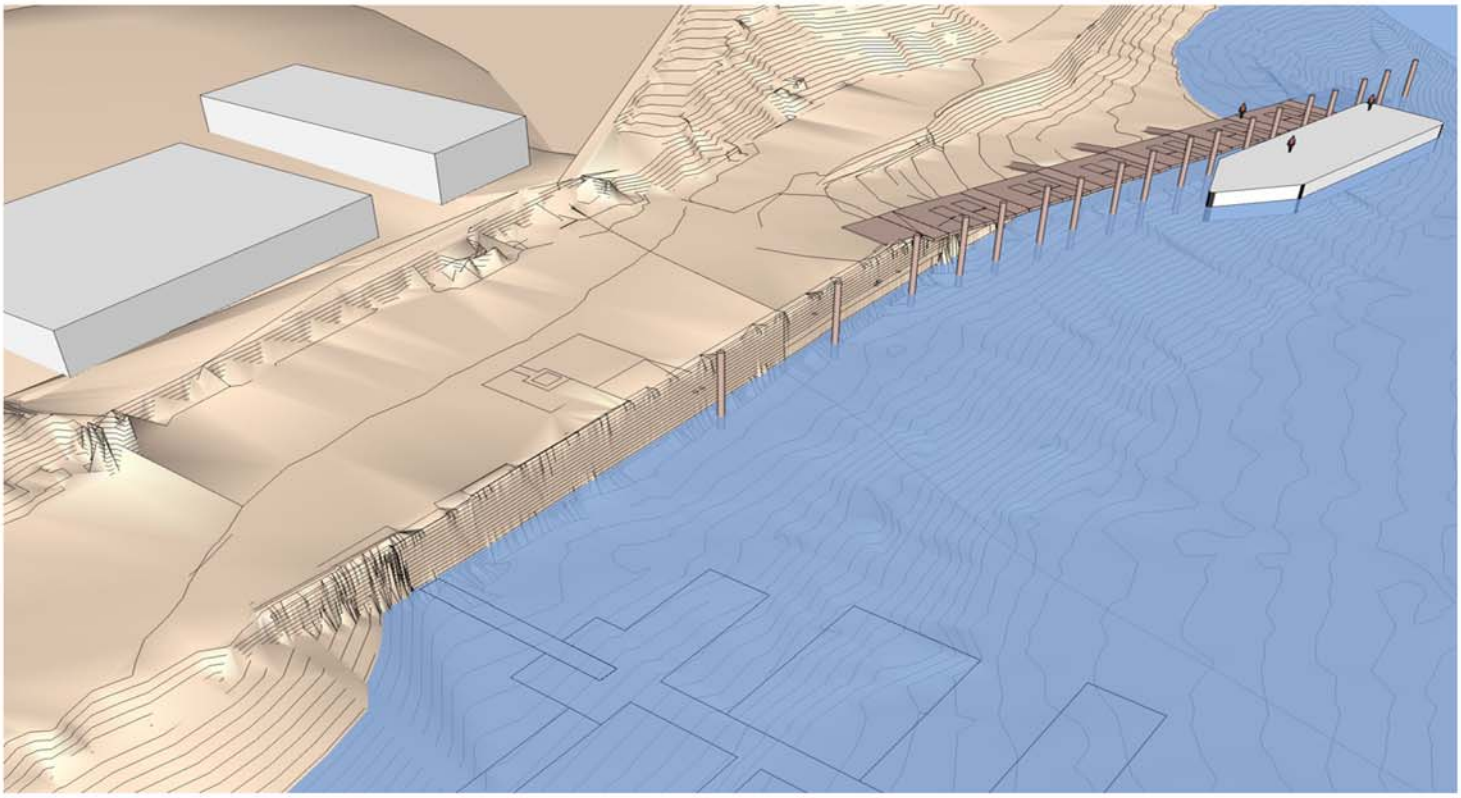



C CROSS-SECTION SHOWING LADY II BOAT AND MOVEABLE PLATFORM FOR FREIGHT

# ALT. 2 - FIXED WALKWAY WITH PORTABLE WEDGE LANDINGS AND FREIGHT PLATFORM - SECTIONS



ALT. 2 - FIXED WALKWAY WITH PORTABLE WEDGE LANDINGS
AND FREIGHT PLATFORM - SHOWN AT HIGH WATER - ELEVATION 1100'



ALT. 2 - FIXED WALKWAY WITH PORTABLE WEDGE LANDINGS
AND FREIGHT PLATFORM - SHOWN AT LOWER WATER - ELEVATION 1090'

The walkway would rest atop a combination of bent and hammerhead pier types. The western edge would be supported by a series of vertical steel piles, while the eastern edge would rest on a continuous curb supported by hammerhead-style footings; both support systems would be connected by weathering steel to provide the fixed walkway substructure. A total of nine piles would be needed to support the fixed walkway. A maximum of sixteen additional steel piles would be needed for ferry boat mooring, although this number may be reduced following further analysis of ferry docking requirements.

Passenger ferries would dock alongside the fixed walkway in one of 21 possible locations, depending upon water level. Ferries would be tied off to the separate set of mooring piles placed approximately four feet from the fixed walkway; boat operators would have three different docking configurations to master depending upon the water level.

One detachable handrail (with kick rail) would line the eastern edge of the fixed walkway for safety and accessibility purposes; a fixed kick rail would line the western edge of the walkway for permanent edge protection. Handrail sections would be placed or removed as dictated by the water level. At each flat landing along the fixed walkway, handrail sections could be removed and temporary access ramps would lead from the walkway down onto the existing boat launch to enable more direct transfer of freight between boats and vehicles. Access ramps would be moved into place manually depending upon water level. A portable freight platform and ramp would also be used between the Lady II boat and the fixed walkway to enable efficient loading/unloading of freight. This platform and ramp would be manually positioned depending upon lake level and use of the Lady II.

## Construction Details

The fixed walkway would be constructed onsite with prefabricated components during the lowest lake level period (mid-winter and early spring) to reduce the need for in-water work. Structural components of the substructure would consist of bolted steel to allow for future access or repairs to the boat launch bulkhead. Decking material would be fiberglass grating with non-slip tread designed to minimize in-water shading.

The first phase of construction would be to (a) repair and stabilize the existing sheet metal bulkhead along the lake side of the boat ramp, if necessary, and (b) remove several existing wooden pilings on the lake-side of the ramp. Hammerhead-style precast footings would be placed in trenches along the boat ramp and connected with a continuous curb, which would provide part of the structural support for the fixed walkway. Open-end steel pipe piles (approximately nine for the fixed walkway and 16 for ferry mooring) would be driven approximately 35 feet into the lakebed during high water using a barge-mounted hammer driver. The substructure piles would be cross-connected to the hammerhead-style footings and curb with horizontal steel beams to form eight bents spaced approximately 30 feet apart. The bent closest to the Stehekin Landing would be tallest, with each successive bent being progressively lower in height to slope the walkway downward. The decking platform and handrails for the fixed walkway would be assembled on top of the bents. Mooring piles would be spaced approximately 13’-17’ apart and would protrude from the lake approximately eight feet above the surface of the lake at full pool. Other than pile driving, the majority of construction would take place during low water.

Public ferries would be able to continue docking at the current winter ferry landing site during construction, although additional measures (to be determined) would most likely be needed to enable continued access to and use of the Stehekin Landing area during construction. Construction specifications would ensure minimal inconvenience to ferry passengers during construction.

### Operation and Maintenance

The portable wedge landing and gangway would need to be shifted up or down the fixed walkway periodically in response to changing water levels so as to maintain embarkation and disembarkation paths that meet ADA standards (<1:12 slope). When the Lady II boat is used, a platform or ramp mechanism would need to be positioned near the rear of the boat for unloading freight.

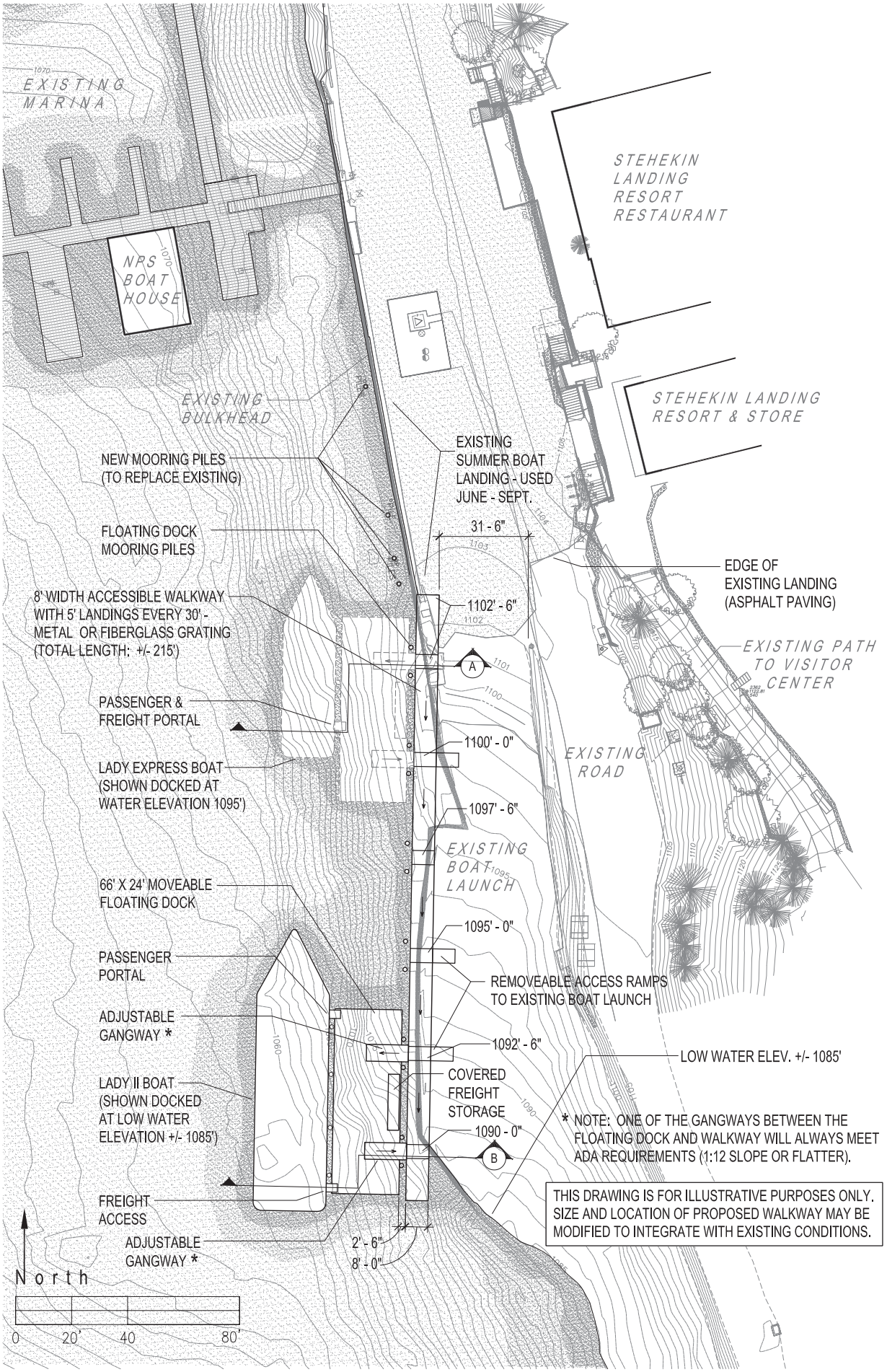
There would be little maintenance of the fixed walkway following construction. Removable handrails and boat launch access ramps would be placed and secured as the water level dropped, then removed and stored as the water level rose to full elevation. Periodic removal of flotsam and woody debris would also be needed following lake level fluctuation. The most common form of routine maintenance would be snow removal. This would be done using both mechanized equipment and shoveling by hand. In heavy snow years, snow removal could occur as often as 3-4 times per week.

## Alternative III. Fixed Walkway with Moveable Floating Dock

Alternative III would involve installing a moveable floating dock that would connect to a fixed walkway located atop the bulkhead of the existing boat launch. Passenger ferry operators would pull up to the floating dock and tie off in the same configuration every time. Passengers would disembark the ferry via gangway onto the floating dock. The floating dock and fixed walkway together provide an universally accessible route between passenger ferries and the Stehekin Landing. All visitors would be able to independently disembark from the commercial ferry boats throughout the entire range of annual lake level fluctuations.

### Description of Infrastructure

Dock dimensions would be approximately 24 feet wide by 66 feet long, with a freeboard of five feet to match the passenger ferry disembarkation elevation. Passengers would disembark from the ferries onto the dock via a 5’-long aluminum gangway. Daily freight would be staged or unloaded at designated areas on the dock, while a small covered area would provide short-term, animal-proof storage for freight left overnight. Two gangways would be adjusted for daily lake level fluctuations to provide a smooth transition from the dock onto the fixed walkway landings. Plan and section views and a perspective view are provided on the following pages (pp. 19-21).



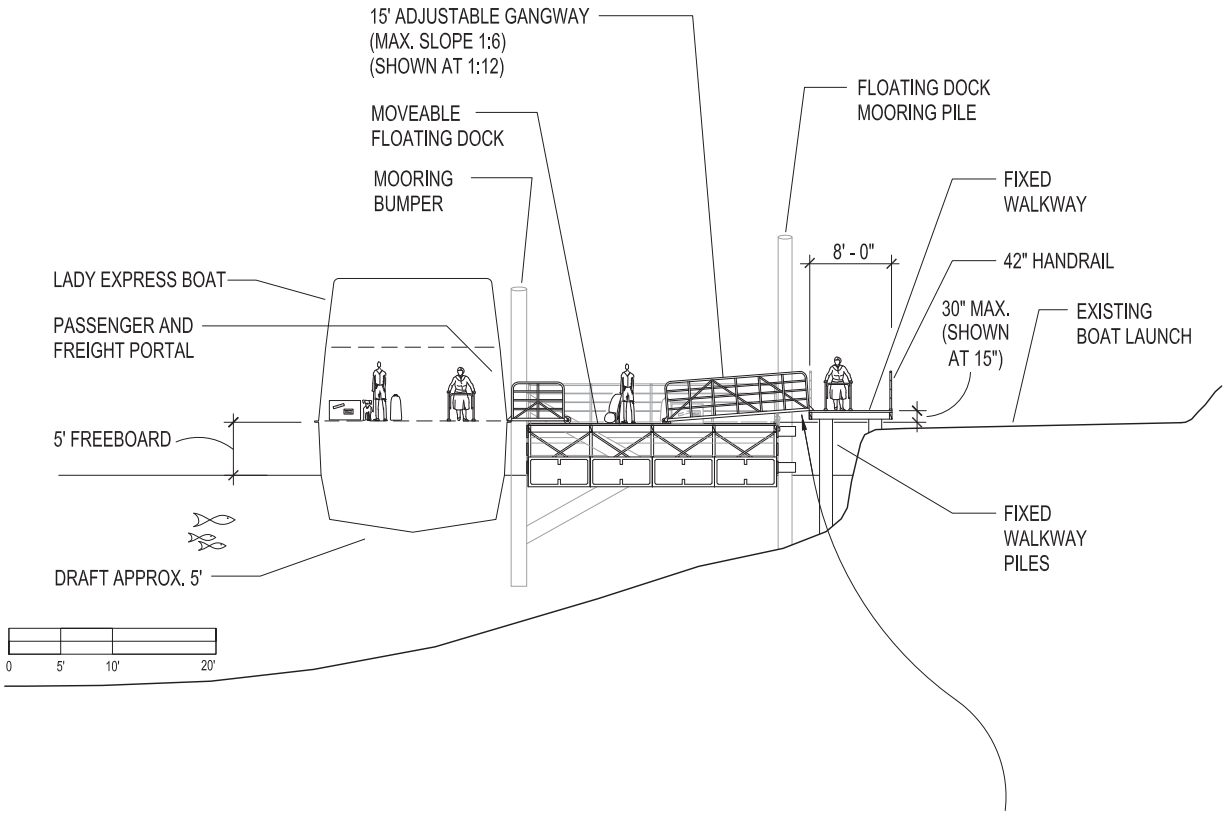

* NOTE: ONE OF THE GANGWAYS BETWEEN THE FLOATING DOCK AND WALKWAY WILL ALWAYS MEET ADA REQUIREMENTS (1:12 SLOPE OR FLATTER).

THIS DRAWING IS FOR ILLUSTRATIVE PURPOSES ONLY. SIZE AND LOCATION OF PROPOSED WALKWAY MAY BE MODIFIED TO INTEGRATE WITH EXISTING CONDITIONS.

# ALT. 3 - FIXED WALKWAY WITH MOVEABLE FLOATING DOCK - PLAN

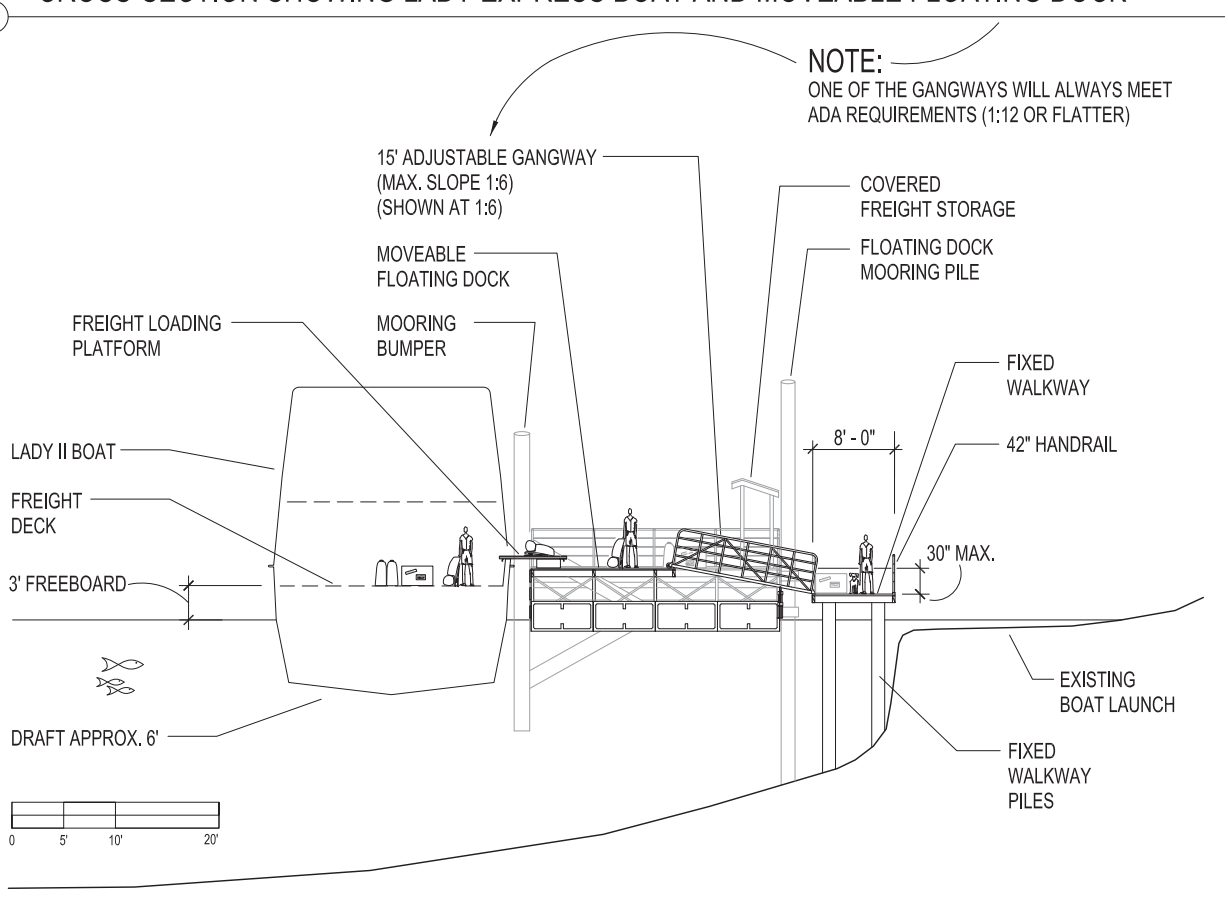
STEHEKIN LANDING - STEHEKIN, WA

8 FEB 2010




## CROSS-SECTION SHOWING LADY EXPRESS BOAT AND MOVEABLE FLOATING DOCK

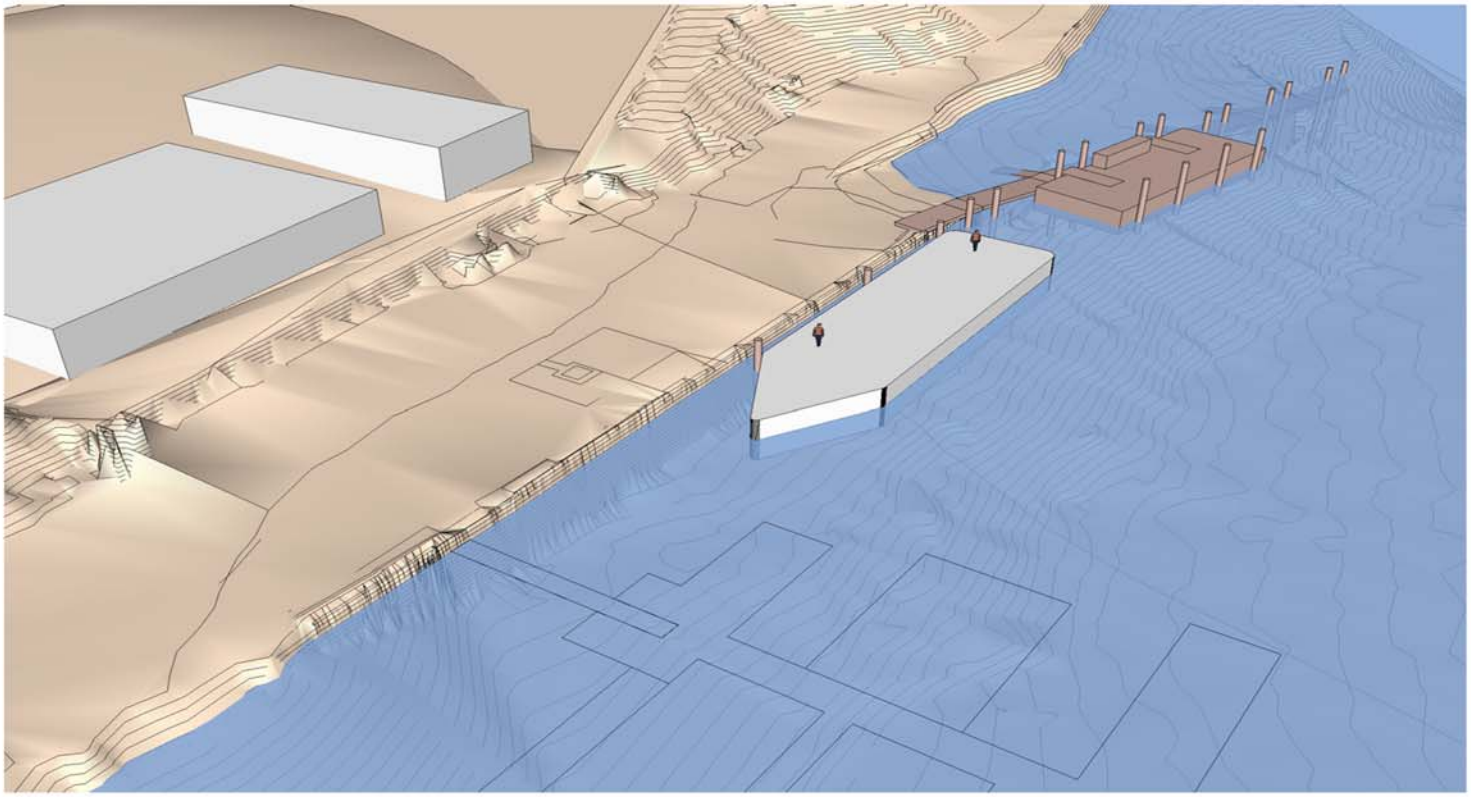
A



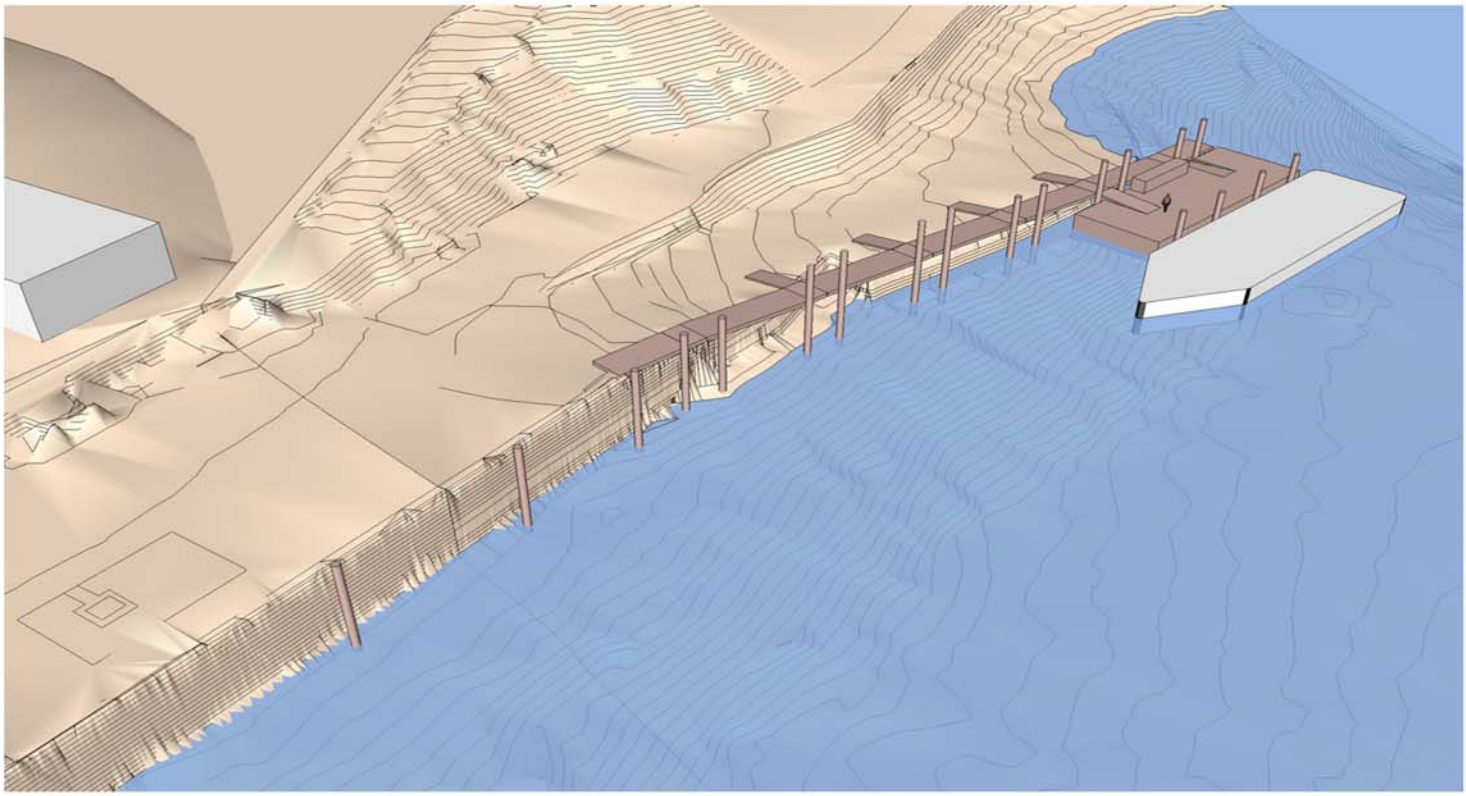

## CROSS-SECTION SHOWING LADY II BOAT AND MOVEABLE FLOATING DOCK

B

# ALT. 3 - FIXED WALKWAY WITH MOVEABLE FLOATING DOCK - SECTIONS



ALT. 3 - FIXED WALKWAY WITH
MOVEABLE FLOATING DOCK - SHOWN AT HIGH WATER - ELEVATION 1100'



ALT. 3 - FIXED WALKWAY WITH
MOVEABLE FLOATING DOCK - SHOWN AT LOWER WATER - ELEVATION 1087'

The fixed walkway would extend approximately 210 feet from the Stehekin Landing at a width of eight feet. At its northern end, the walkway elevation would intersect with the existing Stehekin Landing between elevations 1102' and 1103'. The walkway would angle down at slopes meeting ADA standards (1:12 minimum) until reaching an elevation of 1090' at its southern end. Flat landings at 30-foot intervals would meet ADA requirements and provide a point of transition between the fixed walkway and floating dock. During high water periods in summer (approximately June through September), most of the walkway would be submerged, the floating dock would be moved away from the site, and ferry boat operations would deviate little from the current practice of docking at the existing summer boat landing. At lower lake levels (October through May), varying portions of the fixed walkway would be exposed above the water line and connected to the floating dock.

The walkway would rest atop a combination of bent and hammerhead pier types. The western edge would be supported by a series of vertical steel piles, while the eastern edge would rest primarily on a continuous curb supported by hammerhead-style footings; both support systems would be connected by weathering steel to provide the fixed walkway substructure. A total of 10 piles would be needed to support the fixed walkway. Sixteen additional steel piles would be needed for anchoring the floating dock.

Passenger ferries would dock alongside of the floating dock and tie off to mooring bumpers affixed to the dock. The dock would attach via a locking mechanism to mooring piles (approximately 16) adjacent to the fixed walkway. Periodic movement of the dock would be required to ensure ferry deck elevations match the fixed walkway landing elevations as the lake level fluctuates.

Detachable handrails would line both sides of the fixed walkway for safety and accessibility purposes. Handrail sections would be placed or removed as dictated by the water level. At each flat landing along the fixed walkway, handrail sections would be removed to provide access either onto the floating dock (western side) or onto the boat launch (eastern side). Temporary access ramps would lead from the walkway down onto the existing boat launch to enable more direct transfer of freight between boats and vehicles. Access ramps would be moved into place manually depending upon water level and would not necessarily meet Universal accessibility guidelines.

## Construction Details

The floating dock would be constructed of concrete with a foam core. Dock construction would occur off-site to minimize cost and reduce construction impacts. The dock would be launched near Chelan and pushed up lake to Stehekin via boat or tug before attachment to mooring piles adjacent to the fixed walkway.

The fixed walkway would be constructed onsite with prefabricated components during the lowest lake level period (mid-winter and early spring) to reduce the need for in-water work. Structural components of the substructure would consist of bolted steel to allow for future access or repairs to the boat launch bulkhead. Decking material would be fiberglass grating with non-slip tread designed to minimize in-water shading.

The first phase of construction would be to (a) repair and stabilize the existing sheet metal bulkhead along the lake side of the boat ramp, if necessary, and (b) remove several existing wooden pilings on the lake-side of the ramp. Hammerhead-style precast footings would be placed in trenches along the boat ramp and connected with a continuous curb, which would provide part of the structural support for the fixed walkway. Open-end steel pipe piles (approximately 10 for the fixed walkway and 16 for ferry mooring) would be driven approximately 35 feet into the lakebed during high water using a barge-mounted hammer driver.

The substructure piles would be cross-connected to the hammerhead-style footings and curb with horizontal steel beams to form eight bents spaced approximately 35 feet apart. The bent closest to the Stehekin Landing would be tallest, with each successive bent being progressively lower in height to slope the walkway downward. The decking platform and handrails for the fixed walkway would be assembled on top of the bents. Mooring piles would be spaced on either side of each fixed landing and would protrude approximately eight feet above the surface of the lake at full pool. Other than pile driving, the majority of fixed walkway construction would take place during low water.

Public ferries would be able to continue docking at the current winter ferry landing site during construction, although additional measures (to be determined) would most likely be needed to enable continued access to and use of the landing area during construction. Construction specifications would ensure minimal inconvenience to ferry passengers during construction.

## Operation and Maintenance

The floating dock would need to be repositioned periodically in response to changing water levels so that the difference in elevation between the floating dock and the fixed walkway would remain fairly constant throughout the year. Dock repositioning would be required each time the lake level fluctuated beyond the 30-inch range of each position so as to maintain embarkation and disembarkation paths that meet ADA standards (1:12 maximum slope).

Analyses of water levels on Lake Chelan over a three year period from 12/1/2006 to 12/1/2009 indicate the dock would need to be moved roughly 10 times per year. This analysis indicates the most severe water level fluctuations typically occur during May and June, as the water level rises in response to spring snowmelt. During these months, the dock may need to be repositioned up to three times in any given two week period. The NPS would use a park boat to shift the dock's position and secure it to the next set of mooring piles.

In summer, the floating dock would be relocated away from the landing area at the far end of the boat launch. The high freeboard of the dock would create safety concerns for public use, so the dock would be closed to the public during the summer season.

There would be little maintenance of the dock and walkway following construction. Removable handrails would be placed and secured as the water level dropped, then removed and stored as the water level rose to full elevation. Periodic removal of flotsam and woody debris would also be needed following lake level fluctuation. The most common form of routine maintenance

would be snow removal. This would be done using both mechanized equipment and shoveling by hand. In heavy snow years, snow removal could occur as often as 3-4 times per week.

# Mitigation Measures Common to Both Action Alternatives

The term "mitigation measures" refers to various actions that would be taken to lessen the adverse impacts of a proposal. For each of the action alternatives presented in this Environmental Assessment, the following mitigation measures would be implemented. These measures could be expanded or modified as required by the various permitting agencies that would need to authorize work in or near water (refer to Chapter I for a description of required permits and approvals).

## Timing of Construction

Both action alternatives would involve work below the full pool elevation of the Lake Chelan. To the greatest extent possible, construction work would need to be done during low water levels in winter and early spring 2011 to avoid impacts to water quality, and to ensure equipment access to portion of the area that are flooded at higher lake levels. This timing would also coincide with generally lower levels of activity in the vicinity of the Stehekin Landing area, and cause less disruption.

## Construction Staging Area

The primary staging area for supplies and equipment would be at the summer barge landing, several hundred feet north of the project site.

## Pile Driving

Both action alternatives would require driving a series of 16" diameter hollow-core steel piles approximately 35 feet into the bed of Lake Chelan for structural support and vessel moorage. Geotechnical survey data indicate the pilings would need to be driven with an impact hammer given the force required for embedment (GeoEngineers, 2009). An impact hammer would generate very loud noise above water, and percussive forces below water that could potentially harm fish (WSDOT, 2006). To reduce noise and potential harm to fish, a wooden wedge would be placed between the pile and impact hammer when driving the piles.

## Shade Reduction

Overwater structures in shallow areas can inhibit light transmission, alter fish behavior, and provide cover for fish predators (Bolton and Shelberg, 2001). To mitigate these effects, and to ensure durability, both alternatives would use fiberglass or metal grating as decking material along the fixed walkways to minimize shading and enhance light transmission.

## Sediment Control

Both action alternatives would require work near and in water. The sediment in the project area includes finer grain silts (GeoEngineers, 2009) that could be stirred up during construction. To minimize impacts to water quality, a silt curtain would be would be placed in water around the

construction area to contain turbid water. Additional measures such as erosion control fencing would also be used above water as needed to contain exposed soils.

### Unanticipated Discoveries of Cultural Resources

The project area has been substantially disturbed from previous development at the Stehekin Landing, so the potential for affecting historic or prehistoric archeological resources is low. Nonetheless, should construction unearth potential cultural resources, work would immediately cease and the site would be evaluated by an archeologist. No further work would commence until tribal and state consultations are fulfilled.

## Alternatives Considered but Rejected

The two management alternatives presented in this Environmental Assessment (EA) have evolved over several years through an interactive design process that included input from Stehekin residents, the Lady of the Lake Boat Company, National Park Service staff, and several planning and engineering firms. As this design process unfolded, preliminary concepts were modified in such a way that it is difficult to identify discreet alternatives that have been "considered but rejected" in the traditional sense of the concept. A chronology of design work, including concept drawings, is presented in Appendix I. Therefore, this section focuses on the key steps, concepts, and constraints encountered in the design process that have contributed to the alternatives presented in this EA.

### Transportation Study Concept Designs

In March 2004, the draft transportation study included four conceptual design alternatives for the improved ferry dock landing. Please see Appendix I for detailed drawings of the following four alternatives:

1. Pier and Floating Dock
2. New Boat Ramp/Launch and Landings
3. Floating Dock with Ramp Rider
4. Floating Dock with Switchback Gangway

### Value Analysis Preferred Concept Designs

In July 2004, NPS Denver Service Center facilitated a Value Analysis (VA) workshop to rate the four conceptual design alternatives. The VA study made recommendations to improve the function and reduce costs of the alternative designs and recommended the development of Alternative #2 "Ramp at boat launch with vehicle access". This recommendation was based on it being the lowest cost alternative with the highest score of weighted advantages. However, there was concern raised by regional NPS representatives that none of the alternatives fully met the accessibility requirements.

To obtain feedback and to improve the accessibility of the designs, a meeting was held in Seattle with accessibility specialists from NPS regional and local offices and the State of Washington Interagency Committee for Outdoor Recreation. The outcome of this meeting was a clear

understanding of how the alternatives would need to be modified to meet Federal accessibility requirements. Drawings of the various preliminary alternatives (Appendix I) included:

1. Floating Dock with 60 ft gangway (SD5)
2. Modified Boat Ramp (SD1)
3. Rail Mounted Floating Dock and Fixed Ramp (SD3)
4. Scissor Gangway and Floating Dock (SD2)

## Additional Concept Designs

The "Stehekin Transportation Study and Landing and Dock Conceptual Design" report was completed in 2007. Following its completion, an engineering study was initiated to determine the feasibility and cost of the alternatives. In addition, three new designs were created by the engineering firm (one with input from the ferry operators). Please see Appendix I for detailed drawings of the three additional alternatives.

5. Towable Floating Dock and Fixed Ramp (SD4)
6. Adjustable Gangways and 1:12 Ramps (SD6)
7. Multi Ramp and Fixed Dock (SD7)

Alternative Selection: The seven design alternatives were discussed with NPS staff at an April 24, 2007 meeting where four of the designs were recommended for further study. The four designs included:

1. Modification to the existing boat ramp (SD1)
2. Towable floating dock and fixed walkway (SD4)
3. Adjustable gangways and fixed walkway (SD6)
4. Multi ramp and fixed dock and walkway (SD7)

Once the additional information was gathered and analyzed, the planning team recommended the "Towable Floating Dock and Walkway" as the preferred design based on ADA access and efficiency of loading and unloading freight from the ferry.

The preferred design was presented to local NPS staff representing all divisions in spring 2009. Comments from this meeting included concerns regarding the small size of the freight area on the floating dock, the difficulty of transporting freight from the dock to vehicles, the need for snow removal on the structures prior to boat arrival, maintenance of the attachment system for the movable dock, storage of the dock and the removable hand rails of the walkway when not in use (June – Sept), and aesthetics of the Stehekin Landing.

These comments were shared with the planning team along with a new design, which was very similar to the "modified boat ramp" alternative. In Sept 2009, the planning team adapted the new alternative to meet ADA requirements, resulting in a modified fixed walkway design. Both the "Towable Floating Dock and Walkway" design and the "Fixed Walkway" design were recommended as alternatives to be analyzed in this Environmental Assessment.

# Environmentally Preferred Alternative

NPS policies regarding implementation of the National Environmental Policy Act require the identification of the Environmentally Preferred Alternative. The Council of Environmental Quality recommends the following criteria for determining the Environmentally Preferred Alternative :

1. Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.
2. Ensure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings.
3. Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences.
4. Preserve important historic, cultural, and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice.
5. Achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities.
6. Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

Alternative II. Fixed Walkway with Portable Wedge Landings and Freight Platform would be the Environmentally Preferred Alternative for the following reasons:

- Providing universal access would improve the human environment by promoting the health, safety and quality of the visitor experience, including the overall quality of life for those who live in the valley and/or own property in the area.
- Universal access would help to improve the diversity and variety of human choices with only negligible to minor and generally short-term impacts to the biological and physical environment.
- Universal access would also help to permit a higher standard of living for residents who routinely rely upon the public ferry for transportation. It would also the visitor service amenities provide at the Ferry Landing area.

Alternative I. No Action—Continue Current Management would perpetuate the substandard conditions that constrain the availability of universal access. However, it would avoid the generally short-term and negligible to minor adverse impacts to the biological and physical environment. The area around the Ferry Landing has been substantially disturbed by previous management actions and by ongoing use as the focal point for water-based transportation of people goods and services, so the area lacks ecological integrity. These conditions would continue for the reasonably foreseeable future. Given the compromised ecological integrity of the area, and the lack of universal access that would remain, Alternative I. would not be the environmentally preferred alternative.

Alternative III. Fixed Walkway with Moveable Floating Dock also would not be the Environmentally Preferred Alternative because the floating dock would result in longer-term impacts to the biological and physical environment.

# Chapter III. Environmental Consequences

## Introduction

This Chapter describes the affected environment, or environmental baseline, within the project area that would be affected the various management alternatives presented in Chapter II. The resources and values that could be affected were derived from the issues briefly described in Chapter I. These impact topics include: Water Resources; Fish, Wildlife, Prehistoric and Historic Cultural Resources, Recreation and Visitor Use, and National Park Service Management and Operations.

## Definitions and Methods for Evaluating Impacts

For each impact topic, this chapter analyzes the direct, indirect and cumulative impacts, both adverse and beneficial, that would be anticipated for each of the management alternatives considered. The nature, duration and intensity of impacts according to the following definitions and criteria:

### Nature of Impact

*Adverse Impact:* Moves the system away from the desired condition .
*Beneficial Impact:* Moves the system toward the desired condition

### Duration of Impact

*Short-term:* During construction or up to one year.
*Long-term:* Longer than one year.

### Intensity of Impact

*Negligible:* Imperceptible, not measurable, or undetectable.

*Minor:* Slightly perceptible or measurable and limited in extent. Without further actions, impacts would reverse and the resource would return to the previous condition.

*Moderate:* Readily apparent and measurable but limited in extent. Without further actions, impacts would eventually reverse and the resource would return to the previous condition. Individuals of a species would be harmed or killed, with slightly measurable impacts to the population or surrounding community.

*Major:* Substantial and measurable, highly noticeable, and affecting a large area. Changes would not reverse without active management. Entire communities of species would be measurably affected.

## Terminology for Federally Listed Species

This EA uses the following terminology to describe potential effects to federally listed species of wildlife:

*No effect:* when a proposed action would not affect a listed species or designated critical habitat.

*May affect / not likely to adversely affect:* effects on federally listed species are discountable (i.e., extremely unlikely to occur and not able to be meaningfully measured, detected, or evaluated) or are completely beneficial.

*May affect / likely to adversely affect:* when an adverse impact to a federally listed species may occur as a direct or indirect result of proposed actions and the effect is not discountable or beneficial.

*Is likely to jeopardize a species and/or adversely modify critical habitat:* the appropriate conclusion when the NPS or the U.S. Fish and Wildlife Service identifies situations in which the proposal would jeopardize the continued existence of a proposed species or adversely modify critical habitat to a species within or outside the North Cascades Complex boundaries.

## Cumulative Impacts

The analysis also includes a discussion of cumulative impacts for each proposal. Cumulative effects are the "additive" impacts from past, present or reasonably foreseeable management actions.

## Impairment

NPS Management Policies 2006 define impairment as "…an impact that, in the professional judgment of a responsible NPS manager, would harm the integrity of park resources or values and violate the Organic Act's mandate that park resources and values remain unimpaired. Whether an impact constitutes impairment depends on the particular resources and values that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts." (NPS, 2007). NPS policies require an impairment analysis in environmental documentation, so an impairment discussion for all resource-related impact topics included in the "Conclusions" section for each impact topic evaluated in this EA.

# Impact Summary

| Resources & Values | Alternative I. No Action--Continued Current Management | Alternative II. Fixed Walkway with Portable Wedge Landings and Freight Platform | Alternative III. Fixed Walkway with Moveable Floating Dock |
|---|---|---|---|
| **Water Quality** | Negligible to minor long-term adverse impacts to near shore water quality from wave erosion, prop wash and non-point source pollutants.<br><br>Beneficial cumulative impacts to water quality in the coming years due to increased protection of lake and river shoreline environment | Similar to Alternative I PLUS:<br><br>Negligible to minor, short-term adverse impacts to water quality caused by agitating the bottom sediments during pile driving<br><br>Negligible risk to water quality from equipment leaks/breakdowns. | Same as Alternative II. |
| **Fish** | Negligible adverse direct and indirect impacts to native and non-native fish<br><br>Negligible to minor beneficial impacts to native fish by improving near shore habitats. | Negligible to minor, short term, adverse impacts to native fish from pile driving.<br><br>Negligible adverse cumulative impacts to fish and fish habitat.<br><br>No Effect to bull trout (federally threatened) because they are extirpated from Lake Chelan.<br><br>Negligible to minor beneficial impacts to native fish by improving near shore habitat as offsite mitigation. | Similar to Alternative II, except slightly more long-term impacts to fish and fish habitat from the added negligible adverse impact of dock shading and its effects on fish behavior and fish habitat. |
| **Wildlife** | Negligible impacts from continued current management activities. | Similar to Alternative I, except negligible short-term impacts (disturbance) to some wildlife during construction.<br><br>No Effect to federally listed wildlife species. | Same as Alternative II. |

| Resources & Values | Alternative I. No Action--Continued Current Management | Alternative II. Fixed Walkway with Portable Wedge Landings and Freight Platform | Alternative III. Fixed Walkway with Moveable Floating Dock |
|---|---|---|---|
| **Prehistoric Cultural Resources** | No effect | No effect to physical integrity of the prehistoric pictograph site. Indirect adverse effects from noise and modification to viewshed | Similar to Alternative II except the floating dock would be slightly more obtrusive within the viewshed. |
| **Historic Cultural Resources** | No effect | No effect to physical integrity of the Golden West Historic District. Cumulative minor adverse effect to the rustic vernacular style of the District. | Similar to Alternative II although the dock would add a slightly more perceptible adverse cumulative impact to the rustic vernacular style of the District. |
| **Recreation and Visitor Use** | Moderate long-term adverse impacts to mobility-impaired persons due to continued lack of ADAAG-compliant facility | Moderate beneficial impact to mobility impaired persons by providing universal access.<br><br>Some residents and visitors might be adversely impacted by change from current conditions, including aesthetics; impact would vary among individuals. | Similar to Alternative II except: (a) the floating dock would create longer distances for transfer of freight from the ferries to the Landing; and (b) the floating dock would become an attractive nuisance in summer when not in use. |
| **NPS Management and Operations** | Negligible long-term adverse impact on NPS management and operations from continued maintenance of Ferry Landing area. | Negligible to minor adverse impact to operations from additional snow removal and facility maintenance requirements. | Similar to Alternative II except moving the floating dock would increase the burden on park staff and snow removal from the dock would be more difficult. |

# Water Resources

## Issues and Concerns

The various design options presented in this Environmental Assessment would require construction along the shoreline of Lake Chelan and pile driving in water. Construction, use and maintenance of the proposed Ferry Landing facility could adversely affect water quality, aquatic organisms such as fish, and aquatic habitats within the immediate vicinity of the Project Area.

## Affected Environment

Hydrology and Hydraulics

Lake Chelan is the largest (55-miles long) and deepest (1,486') lake in Washington State. The upper four miles of the lake lie within Lake Chelan National Recreation Area. The Stehekin River, located north of the Project Area, provides approximately 65% of the total inflow to Lake Chelan.

Lake Chelan is a natural lake that has been dammed and raised approximately 21-feet for hydroelectric power production. The water levels in Lake Chelan are managed in accordance with the terms of the hydroelectric license issued by the Federal Energy Regulatory Commission in November 2006 to Chelan Public Utility District No. 1.

The full pool level of Lake Chelan is approximately 1,099 feet, and lake levels typically fluctuate around 16 feet on an annual basis for hydroelectric power generation (Figure 2). The annual drawdown of the lake generally begins in October and ends in April. Proceeding from fall through the winter, lake levels decline gradually with the lowest levels typically reached in April. From May through June, rainfall and warmer weather melts the accumulated winter snowpack and refills the lake (http://www.chelanpud.org/relicense/process/facts.htm). These predictable seasonal fluctuations can be strongly affected over shorter timeframes by extreme wet precipitation events when these events coincide with filling the reservoir in spring.

Analyses of daily lake level fluctuations over a three year period from December 1, 2006 to December 1, 2009 depict occasional rapid fluctuations in water level (Table I). These rapid fluctuations are an important design consideration, because they would directly affect operation of the proposed facilities (Gieger Engineers, 2009). In general, the most rapid changes in lake levels occur during snowmelt in May and June, when high inflows coupled with hydroelectric operations enable the lake to fill rapidly and remain at or near for pool for the summer season.

Wind driven waves are common on Lake Chelan. The most common prevailing winds on Lake Chelan are northerly or down lake. At times these winds can generate severe waves up to 10 feet in height. However, the shoreline area in the vicinity of the Ferry Landing is normally buffered by northerly wind-driven waves due to the limited fetch (area of open water) at the head of the lake. The marina facilities along the shoreline along the Ferry Landing also blunt the northerly wind-driven waves.

Strong southerly (up lake) winds are less common, but they too can create large waves given the long southerly fetch and lack of buffer between the open water and the shoreline. Wind-driven waves have substantially eroded the shoreline on Lake Chelan including the vicinity of the Landing area. The NPS, with funding from Chelan PUD, is currently implementing erosion control measures at 16 of 36 sites identified within Lake Chelan NRA, including two sites in the vicinity of the Stehekin Ferry Landing (NPS, 2006).

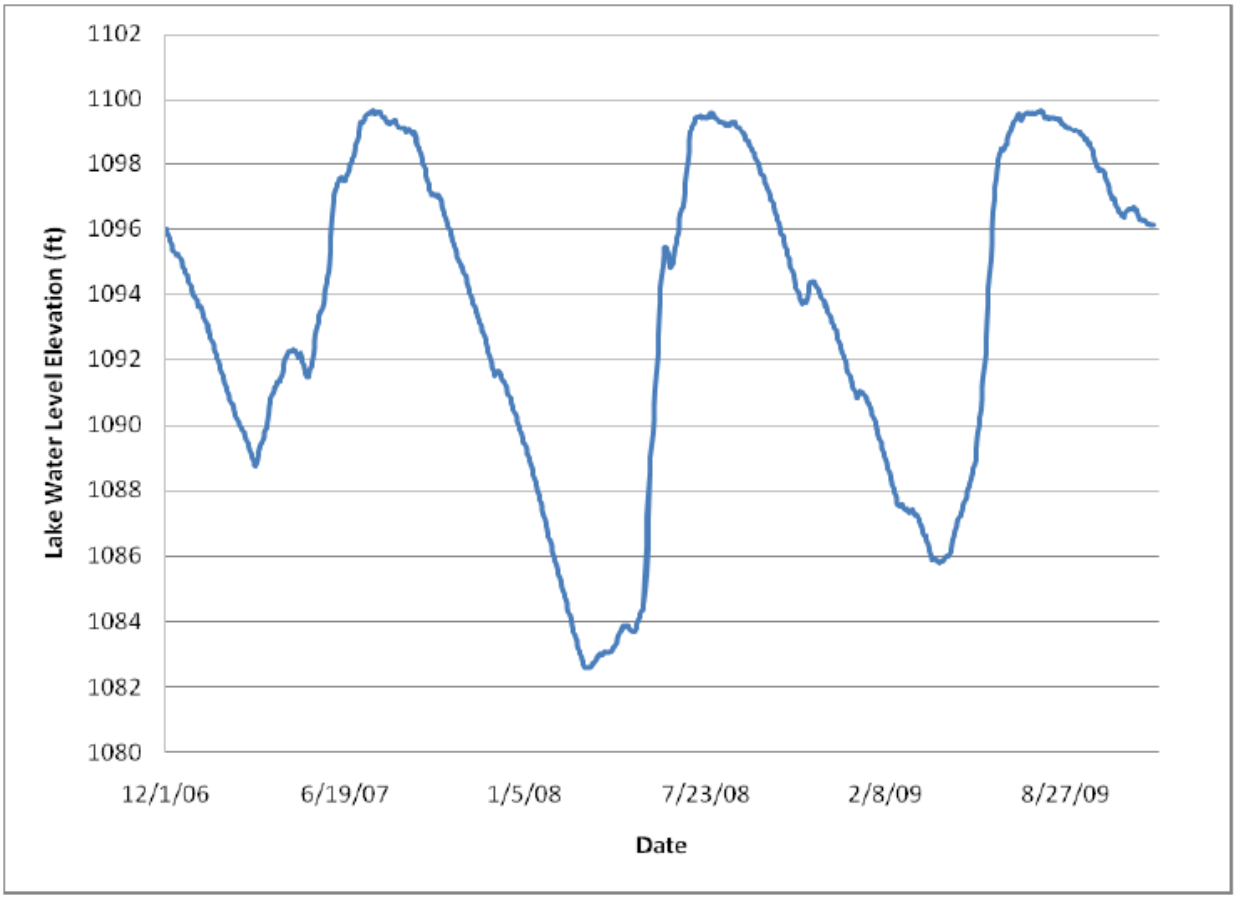



**Figure 2. Daily water level fluctuations on Lake Chelan (Purple Point Gauging Station #12451200) from December 1, 2006 to December 1, 2009 (Source: Geiger, 2009).**

**Table I. Daily Lake Level Changes from 12/1/06 to 12/1/2009 (Geiger, 2009).**

| **Number of Days** | **1Day** | **5 Days** | **7 Days** | **10 Days** | **14 Days** |
|---|---|---|---|---|---|
| **Maximum change (in.)** | 10.6 | 44.2 | 54.4 | 69.0 | 94.6 |
| **Average Change (in.)** | 1.0 | 4.8 | 6.7 | 9.3 | 12.8 |
| *Lake Levels EXCLUDING May and June, from December 1, 2006 to December 1, 2009* | | | | | |
| **Number of Days** | **1Day** | **5 Days** | **7 Days** | **10 Days** | **14 Days** |
| **Maximum change (in.)** | 4.3 | 19.6 | 24.6 | 29.3 | 37.0 |

Water Quality

Lake Chelan is a cold, clear and ultraoligotrophic (very nutrient deficient) lake with generally exceptional water quality (Patmont et al, 1989). Factors such as low levels of phosphorus (an essential and limited nutrient for plant and algal growth in fresh water), 10-year long residence times lake waters, and limited development in the Lake Chelan basin enable exceptional water quality, including exceptional clarity. National Park Service water quality monitoring data from the head of Lake Chelan in the vicinity of the Project Area indicate the depth of visibility (as measured by secchi disk) can range from 21-45 feet (Wasem, 1984-1990 unpublished NPS data). this notable clarity is a fundamental human value for visitors to the area.

In spite of the generally exceptional water quality, there are some threats to Lake Chelan's water quality. These threats include elevated levels of fecal coliform and phosphorus from substandard septic systems, agricultural inputs such as elevated levels of phosphorus, nitrates and arsenic, storm water runoff, metals such as zinc (especially from tailing piles at the Holden mine); and pesticide residuals such as DDT (Patmont et al., 1989).

There are no recent water quality data specific to the Project Area, however, professional observations of NPS staff indicate the water quality is generally consistent with the water quality of the lake as a whole. There are times when near-shore water quality is most likely adversely affected for short timeframes by non-point source runoff from the road network (e.g. oils, greases, metals) and other impermeable surfaces in the vicinity of the Ferry Landing. Heavy rainfall on saturated soils may also cause near shore septic systems to leach nutrients (phosphorus) bacteria into the lake (Patmont et al, 1989). In addition, when the large ferries arrive and depart, their powerful engines disturb the lighter, saltier fractions in the sediment and temporarily reduce water quality, including clarity. Other inputs such as oils, greases, and volatile aromatic hydrocarbons from boat engine exhausts may also temporarily degrade water quality in the immediate area of the Ferry Landing, especially along the boat ramp.

## Impacts of Alternative I. No Action

Direct and Indirect Impacts

Nonpoint or diffuse sources of pollutants would continue to be released in varying degrees from the various impermeable surfaces around the Ferry Landing including paved and unpaved roads and pathways, parking lots and various structures. Diffuse pollution from these impermeable sources would continue to include petroleum byproducts; metals such as lead, copper and zinc; various organic toxins and sediment (Novotny and Olem, 1994).

Non-point source pollutants tend to accumulate on impermeable surfaces (e.g. roads, parking lots) during long periods of dry weather, so non-point source impacts to water quality would be greater during a rainfall event following long periods of dry weather. In addition, locally adverse impacts to water quality would be expected to be higher in areas with large contiguous tracts of impermeable surfaces, such as from the parking lot adjacent to the Ferry Landing.

The lake bottom sediments in the vicinity of the Ferry Landing consist of boulders, gravel, sand, silt, and clay deposited over the millennia primarily by periodic debris flows, slides, avalanches

following heavy precipitation events, and locally modified by alluvial processes (Geiger Engineers, 2009). The finer fractions of these sediments (silts and clays) would continue to be stirred up by wave action, especially during lower water, and from the prop wash of the ferries. The adverse impacts to water quality caused by waves, prop wash, and non-point source pollutants would remain adverse, minor, long-term and localized to the near shore.

Cumulative Impacts

The ambient lake water quality in the vicinity of the Ferry Landing is generally excellent. There are no data to suggest that near shore water quality is incrementally or cumulatively deteriorating from the various point and non-point sources of pollution at the head of the lake, or from the mixing waters from the Stehekin River. To the contrary, ongoing trends including (a) tighter county and state regulations governing development near shorelines; (b) recent upgrades to the NPS' sewage treatment system; and (c) the NPS' ongoing efforts to mitigate impacts to the Stehekin River and its channel migration zone suggest the potential for beneficial cumulative impacts to water quality in the coming years.

Conclusions

Continued current conditions, management actions and activities in the vicinity of the Ferry Landing would cause negligible to minor long-term adverse impacts to near-shore water quality from wave erosion of unstable shorelines, agitation of sediments from prop wash and inputs of non-point source pollutants from impermeable surfaces at the Ferry Landing. There would also be beneficial cumulative impacts to water quality in the coming years due to increased protection of lake and river shoreline environment. There is no indication that continued current management would cause more than negligible to minor, short term and localized impacts to water quality or clarity, therefore, there would be no impairment to water resources.

## Impacts of Alternative II. Fixed Walkway with Portable Wedge Landings and Freight Platform

Direct and Indirect Impacts

In addition to the negligible to minor impacts to water quality described for Alternative I. No Action, this alternative would also cause various short term impacts from construction of the fixed walkway. These impacts would primarily result from construction-related activities within water and on the shoreline.

Alternative II would require rehabilitation of portion of the sheet metal bulkhead along the boat launch, including removal of approximately 10 old, treated wood mooring piles (depicted on the cover photo of this EA). Depending upon the treatment formulation, treated wood can be very toxic in aquatic environments. Leaching from wood into water and sediment rates vary widely, also according to treatment type. The type of wood treatment is not known in this instance. Disturbance to sediments could occur when removing the pilings, and when driving the new steel pilings, but the adverse impact to water quality would most likely be negligible because the pilings are old and compounds capable of leaching into water typically do so shortly following installation (Lebow, 1993).

Shoring up the sheet metal bulkhead adjacent to the area proposed for the fixed walkway would take place "in the dry" during low water, so there would be no direct impacts to water quality from this action.

The steel pilings for the fixed walkway would need to be driven "in the wet". Driving pilings in water (below the 1084' lake level) would agitate the lighter fractions (clays and silts) of the bottom sediments. Geotechnical data collected on the bottom sediments indicate fine grained particles (silt and clay) are very limited (GeoEngineers, 2009). Therefore, driving the pilings would cause negligible to minor, short-term adverse impacts to water quality (increased turbidity) in the immediate vicinity of the Ferry Landing.

Heavy mechanized equipment would be needed for construction. Whenever heavy machinery equipped with hydraulic systems is operated near water, there are always risks to water quality from hydraulic leaks, fuel spills and related accidents. The NPS would require the contractor to identify these risks and mitigate them to a negligible level by preparing and implementing a spill response plan. This plan would include daily inspections and emergency procedures to be implemented immediately to contain any spills

Cumulative Impacts

Same as Alternative I.

Conclusions

There would be negligible to minor, short-term adverse impacts to water quality caused by agitating the bottom sediments during pile driving. Temporary reductions in water clarity would be limited to the immediate vicinity of the Project Area. Construction equipment and activities present a negligible risk to water quality from equipment leaks/breakdowns provided proper plans and procedures are followed, including daily equipment inspections. This alternative would not cause impairment of water resources because adverse impacts would be short-term and negligible to minor. While water clarity is fundamental resource to Lake Chelan NRA, impacts would be localized and short term; therefore, impairment to water resources, including water clarity, would not occur. Cumulative impacts would be minor to moderate and beneficial over the long term.

## Impacts of Alternative III. Fixed Walkway with Moveable Floating Dock

Direct and Indirect Impacts

Direct impacts would be similar to Alternative II, however, the dock would cause additional shading the of the lakebed and adversely affect the primary productivity of the benthic (bottom) environment. The adverse effects of dock shading would be negligible given the minimal amount of lakebed that would be shaded, the lack of plant material or algae on the lakebed in this area, and the previous disturbance to the aquatic environment in the area.

Cumulative Impacts

Cumulative impacts would be similar to Alternative II, however, the dock would cause a cumulative increase in the shading of the nearshore environment. This additional cumulative

impact would be negligible given the very small "shadeprint" of the dock relative the very large area of undisturbed nearshore aquatic habitats in the general vicinity of the project area.

Conclusions

The impacts to water resources would generally be similar to Alternative II, except for the additional adverse impacts from the dock shading the nearshore aquatic environment. These additional adverse impacts would be long-term but negligible. There would be no impairment of water resources under this alternative given the negligible to minor and localized adverse impacts to water resources.

# Fish and Fish Habitat

## Issues and Concerns

- Disturbance from construction, maintenance and continued use of the Ferry Landing could adversely affect fish in the vicinity of the Project Area.
- Management alternatives II and III would both require use of a barge-mounted impact hammer to drive approximately twenty five, 16" diameter steel mooring and structural support pilings. Some of the pilings would need to be driven "in the wet". Research indicates that the extreme noise of percussive pile driving can harass, harm or kill fish. Chronic noise from percussive pile driving over longer timeframes can also substantially alter fish behavior (Popper, 2006).
- Boat moorage structures such as docks and piers can adversely impact aquatic habitats by shading the littoral (near shore) zone and inhibiting the primary productivity (photosynthesis) of submerged aquatic vegetation and benthic algae.
- Docks and piers can create artificial structure and habitat for fish in areas where such habitat would not be found naturally. for example, larger fish can use the cover created by piers and docks to hide and prey upon smaller fish migrating along shore to avoid pelagic (deepwater) habitats where larger fish species typically reside (NOAA, 2007; WDFW, 2001).
- Bull trout (federally Threatened) are believed to be extirpated from the Lake Chelan Basin (U.S. Fish and Wildlife Service, 1998; Archibald, 2002), but sufficient high quality habitat exists to repatriate this species to the Stehekin River. Management actions must preserve this opportunity to help recover this threatened species.

## Affected Environment

Description of Aquatic Habitats

The aquatic habitat in the vicinity of the Ferry Landing includes the seasonally submerged portions of Lake Chelan between lake elevations 1099' and 1082' that are exposed to varying degrees during low water in winter and early spring. These areas were historically upland (as opposed to aquatic) environments that became seasonally flooded when the level of Lake Chelan was artificially raised in 1921 for hydropower production. The Project Area also includes deeper waters that were part of the original "footprint" of Lake Chelan prior to raising the lake for hydropower production.

The aquatic habitat in the vicinity of the Ferry Landing includes a mix of natural and artificial environments. The ecological integrity of naturally submerged areas (below the low water level of 1082 feet) in the vicinity of the Ferry Landing has been compromised to some degree by various forms of development and use of the area. For example, the near shore aquatic and seasonally submerged areas of the lake drawdown around the Project Area generally lack submerged aquatic vegetation, woody debris, or other natural structures that are typically found in lakes with shorelines not modified (seasonally inundated) for hydropower production. The riparian zone in the Project Area also lacks vegetation, as the area has been substantially modified by development. Riparian vegetation is also inhibited by the wide amplitude of lake levels (approximately 16 feet annually), including high lake levels during the growing season.

Notable changes to the natural integrity of the Project Area have included construction of various bulkheads for docking, construction of a large boat ramp and barge landing for wintertime access and freight transport, removal of vegetation and extensive logging prior to reservoir inundation, and installation of various facilities including a marina and various docks. All of these developments have substantially altered the natural aquatic conditions and the artificial habitats created by raising the lake level.

Fish species, populations and current status

Fish native to Lake Chelan currently include an adfluvial population cutthroat trout (*Oncorhynchus clarki*), burbot (*Lota lota*) pygmy whitefish (*Prosopium coulteri*), northern pike minnow (*Ptychocheilus oregonensis*), bridge lip sucker (*Catostomus columbianus*), three-spine stickleback (*Gasterosteus aculeatus*), peamouth chub (*Mylocheilus caurinus*) and chiselmouth (*Acrocheilus alutaceus*) (WDFW, 2002). The historically abundant bull trout (*Salvelinus confluentus*; federally threatened) is now considered extirpated (WDFW, 2002; Federal Register, 1998; FERC, 2003; Archibald, 2002). No anadromous fish have ever inhabited the lake (Hillman and Giorgi, 2000).

Over the past 100 or so years, the Lake Chelan fishery has been substantially manipulated to enhance sport fishing opportunities. A wide variety of non-native sport fish have been introduced including land-locked chinook salmon, kokanee, lake trout, rainbow trout, Twin Lakes cutthroat trout and brook trout (Brown, 1984; Hillman and Giorgi, 2000). Some of these non-native species of fish are most likely present in the general vicinity of the Project Area. However, the low-quality habitat in the vicinity of the Ferry Landing most likely limits sport fish abundance and species diversity (Ashley Rawhouser, NPS Aquatic Ecologist, pers. comm.).

## Impacts of Alternative I. No Action

Direct and Indirect Impacts

Continued current management and uses of the area would have negligible adverse impacts to native and non-native fish. These impacts would remain negligible because there would be little substantive changes to fish habitat from ongoing projects and management activities, and the nearshore habitat quality in the vicinity of the Ferry Landing is of poor quality due to previous and ongoing forms of disturbance.

This alternative would have *No Effect* on bull trout because they are believed to be extirpated from Lake Chelan.

Cumulative Impacts

Under this alternative, there would be little substantive changes to the quality of fish habitat in the immediate vicinity of the Ferry Landing. Further afield, however, continued installation of erosion control measures, including logjams and "bioengineering" (planting of native vegetation along the shoreline) along the shoreline at Weaver Point would have negligible to minor beneficial impacts to native fish by improving near shore habitats. These benefits would largely offset the existing adverse impacts to fish and fish habitat in the vicinity of the Ferry Landing.

Conclusions

Continued current management would result in negligible adverse direct and indirect impacts to native and non-native fish from routine but limited disturbance to habitat. There would be negligible to minor beneficial impacts to native fish from offsite mitigation that would involve improving near shore habitats across the lake at Weaver Point. There would be no impairment to native fish because adverse impacts would be limited in magnitude, and the Lake Chelan fishery has already been irretrievably impacted by previous actions intended to improve sport fishing.

## Impacts of Alternative II. Fixed Walkway with Portable Wedge Landings and Freight Platform

Direct and Indirect Impacts

Installation of steel pilings in the wet could temporarily displace, harm or kill some native and non-native fish in the immediate vicinity of the Project Area. Measures to mitigate the impacts of underwater noise would include (a) working during low winter water in late winter and early spring, and (b) reducing some of the noise energy by slipping a hard wooden wedge between the impact hammer and the steel piling.

The actual impacts to fish from pile driving would vary according to the sound exposure level experienced by fish. The sound exposure level would decrease with distance, and it is assumed that fish would most likely flee the area and avoid harm. The overall magnitude of impact to native fish would be adverse but minor, meaning that individual members of a population could be affected, but there would be no impact to the overall population. The magnitude of impact for non-native fish would be similar to native fish, but beneficial for the health of the native fishery within Lake Chelan NRA because (a) any reduction in numbers of non-native fish (especially species such as lake trout) would be beneficial to native fish in Lake Chelan, and (b) as a longstanding matter of policy, the National Park Service supports native species in their native habitats (NPS, 2006).

Other construction-related activities such as assembling the fixed walkway, repairing the sheet metal bulkhead, and removing wooden mooring piles would likely have negligible adverse impacts to fish and fish habitats because these actions would occur "in the dry" (to the greatest extent possible) during low water in late winter and early spring, 2011.

Following construction, the fixed walkway could affect fish by creating artificial near shore habitat and structure, and modifying existing natural conditions below the 1082' lake elevation. The impact of the fixed walkway would most likely be adverse but negligible because the grated decking materials would create minimal cover or shading.

This alternative would have No Effect on bull trout (federally threatened) because the species is extirpated from Lake Chelan.

Cumulative Impacts

This project would further modify the near shore aquatic and semi-aquatic environment in the vicinity of the Ferry Landing. This area has been substantially modified over the past century by a wide variety of human activities, most notably logging prior to raising the lake, the wide fluctuation in lake levels caused by hydropower production, construction of several large docks and lengthy bulkheads, and installation of other artificial shoreline structures.

Other human uses of the area that have cumulatively and adversely affected fish and fish habitat include the widespread introduction of non-native fish to enhance sport fishing, increases in unnatural sources of nutrients, metals, pesticides, and various organic and inorganic toxins, and bacterial contamination from septic tanks.

Fish stocking in particular may have caused the extirpation of bull trout (federal Threatened species) from Lake Chelan and its tributaries, possibly by creating competition and introducing disease (Archibald, 2002; Reed Glesne, Aquatic Ecologist, pers. comm.). Stocking of non-native rainbow trout has also reduced the population and distribution of the native, genetically "pure" strain of west slope cutthroat trout present in the cooler headwaters of the Stehekin River (Ostberg and Rodriguez, 2006).

In the reasonably foreseeable future, notable beneficial impacts to fish and fish habitats in the vicinity of the Project Area may include improved near shore conditions for fish created by installation of erosion control structures, enhancement of lakeshore vegetation through direct planting and installation of artificial logjams, and various proposed measures to reduce impacts to the ecological integrity of the Stehekin River as per the pending Stehekin River Corridor Implementation Plan (http://www.nps.gov/noca/parkmgmt/srcip.htm).

The National Park Service and other agencies also plan to repatriate bull trout into the headwaters of the Stehekin River, although this plan is conceptual and there are no specific proposals or funding available at this time. There are no reasonably foreseeable plans, however, to establish a population of bull trout into Lake Chelan due to risk of failure from lake trout predation (WDFW, 2002).

On balance, the adverse cumulative impacts of past activities that have harmed fish and fish habitat may be offset to some degree by various proposed management actions with potentially beneficial impacts to the Stehekin River and the head of Lake Chelan. For example, increased scrutiny of shoreline-related activities at the local and state level is leading to improved protection of the shoreline environment. The proposed repatriation of bull trout in the Stehekin River may help to establish a resident population for this fish, but this project would have no

adverse affect on bull trout in the river. Taken together, this project would likely result in negligible adverse cumulative impacts to fish and fish habitat because the area of potential effect is small, the area is not presently favorable for fish, and the mechanisms that could harm fish are relatively benign in spatial scope and temporal extent.

Conclusions

There would be negligible to minor, short term, adverse impacts to native fish from pile driving during construction. Once constructed, the fixed walkway would have negligible long-term impacts to native fish and fish habitat in the immediate vicinity of the Ferry Landing. There would also be negligible long-term adverse cumulative impacts to the shoreline environment because the area is already substantially disturbed. There would be no impairment of fish or fish habitat because the adverse impacts would be negligible to minor and constrained to the immediate vicinity of the Ferry Landing.

## Impacts of Alternative III. Fixed Walkway with Moveable Floating Dock

Direct and Indirect Impacts

The impacts of pile driving and construction of the fixed walkway would be same as Alternative II.

In contrast to Alternative II, this alternative also proposes installation of a floating dock. The floating dock would partially shade an approximately 2000 square foot portion of the near-shore aquatic environment at any given time. Periodically shifting dock along the 210' fixed walkway (to match ferry docking with lake levels) would cyclically distribute the effects of shading across an approximately 5000 square foot area of the lake bed. This shading effect could enable larger predator fish to prey upon smaller fish utilizing the near shore environment for forage and cover. (WDFW, 2001).

Shading from the dock could also disrupt near shore migration of native and non-native fish, including juvenile salmonids. There are no data regarding use of the near shore environment by juvenile fish in the vicinity of the Ferry Landing. However, the routine presence of diving ducks and other piscivorous waterfowl (e.g. common loons and western grebes) suggest that juvenile fish are present in the area. However, the near shore aquatic habitat at the Ferry Landing is generally unfavorable compared to other locations in the general vicinity at the head of the lake, most notably the western lakeshore at the mouth of the Stehekin River (across the lake from the Ferry Landing). Near shore aquatic habitat quality is generally correlated with abundance of near shore juvenile salmonids, so it is reasonable to assume that impacts to juvenile salmonids, including migration, predation, and disruption of foraging behavior would be adverse but negligible to minor over the long term.

Aside from affecting fish behavior, shading from the dock could also affect the benthic (lake bottom) environment by reducing primary production (WDFW, 2001; Nightingale and Simenstad, 2001). Given the relatively small area of the near shore environment that would be affected, and the generally unfavorable habitat conditions in this area, the impacts to fish and fish habitat would be adverse, long-term and negligible to minor.

This alternative would have *No Effect* on bull trout (federally threatened) because bull trout are extirpated from Lake Chelan.

Cumulative Impacts

Similar to Alternative II, except the adverse cumulative impacts from the dock would be slightly greater due to the added long-term effects of the floating dock. The additional adverse cumulative impacts from the dock would still be negligible given the very small surface area of the dock compared to the vast undisturbed area of the lakeshore.

Conclusions

There would be negligible to minor, short term, adverse impacts to native fish from construction activities such as pile driving. Dock shading would cause negligible long-term adverse impacts to fish and fish habitat given the small scale of the shading effect. There would be negligible adverse cumulative impacts to fish and fish habitat because the area has been substantially disturbed by previous management activities. This action would have No Effect on bull trout because they are extirpated from Lake Chelan and plans to repatriate the species to the Stehekin River would not be compromised by this proposal. There would be no impairment to native fish populations because adverse impacts would be negligible to minor.

# Wildlife

## Issues and Concerns

The noise and disturbance from construction could temporarily displace various common species of wildlife in the vicinity of the Ferry Landing. There would be no effect to federally listed wildlife species because these species are not present in the vicinity of the Ferry Landing due to lack of habitat and chronic human use and disturbance in the area.

## Affected Environment

Habitat Overview

The immediate vicinity of the Ferry Landing is the focal point of arrival and departure for visitors to Lake Chelan NRA, and the transportation hub for residents of the Stehekin Valley. As a result, the natural habitat surrounding this area has been substantially developed and modified from its original forested condition.

The lakeshore in the vicinity of the Ferry Landing has also been substantially modified with various docking facilities, a road, boat launch, marina, bulkheads and other improvements. There is little vegetation, woody debris, or other natural forms of cover along the shoreline due to the wide amplitude of lake levels and the wide ranging human uses of the shoreline.

Northward of the Ferry Landing the lake becomes shallower and somewhat less intensively developed along the shoreline. Southeastward of the mouth of the Stehekin River lies a large flat expanse of land commonly referred to as “Stehekin Flats” because it seasonally exposed in late winter and spring. Within this reservoir drawdown zone there are four to seven acres of deltas and islands have become partially vegetated with a mix of native riparian species and non-native

reed canary grass. Reed canary grass has become the dominate plant cover in these areas and has spread into wetlands at the head of the lake, across the Stehekin Road, into the little Boulder Creek floodplain, and into inland riparian areas. This grass can displace native grasses, sedges, willows and other riparian species. The Park Service estimates that 10 acres of private lands and 12 acres of public lands along the reservoir shoreline are infested with reed canary grass (FERC, 2003). This area also has extensive deposits of large woody debris. This area becomes flooded at higher lake levels, providing marsh-like habitat for a wide variety of waterfowl and various semi-aquatic wildlife such as beavers and otters.

Birds

A wide variety of waterfowl congregate and forage in the general vicinity of the Project Area, especially in the Stehekin Flats area at the head of the lake. Waterfowl appear to be drawn to the area, especially in winter and spring when lake levels are low. Notable species include diving ducks such as western grebes, golden-eyes, mergansers and buffleheads. Common loons are also frequently present. The shallower areas attract various dabbling ducks, geese, and swans.

Ospreys and eagles are also present at times in the vicinity of the Project Area. Ospreys frequently hunt for fish in the greater project area, but the nearest known nesting site is at least one mile away on the western shore of the lake. In the recent past, eagles have nested in the vicinity of Weaver Point at the mouth of the Stehekin River, approximately 0.5 miles from the Ferry Landing. No nesting eagles, however, have been documented in the last few years in spite of attempts to locate aeries. however, eagles may be nesting further up the Stehekin River (Robert Kuntz, Wildlife Biologist, pers. comm.).

Semi-aquatic and Terrestrial Species

River otters and beavers frequent the general vicinity of the Ferry Landing, although they tend to favor the shallower waters and vegetated shorelines along the head of the lake.

An isolated population of western gray squirrels (Washington State Threatened Species) inhabits the Lower Stehekin Valley. Western gray squirrels can be seen frequently in the vicinity of the Ferry Landing.

Several species of bats (genus *Myotis*) nest and forage for insects in the immediate vicinity of the Ferry Landing.

There are few larger mammals in the immediate vicinity of the Ferry Landing, presumably due to the lack of favorable habitat and chronic human disturbance in the area. However, mule deer are fairly common, and black bears occasionally traverse the area. Bear-human conflicts created by untended food are a notable concern throughout the lower Stehekin Valley.

Federally Listed Wildlife Species

Lake Chelan NRA and the surrounding wilderness areas provide documented habitat for several federally listed species including gray wolves, wolverines, Canada lynx, and northern spotted owls. However, no federally listed species have been documented in the Project Area. Their

presence is very unlikely given the lack of suitable habitat, including the high degree of human activity at the Ferry Landing.

## Impacts of Alternative I. No Action

Continued current management actions in the vicinity of the Ferry Landing would have negligible to minor adverse impacts on terrestrial and semi-aquatic wildlife, primarily due to disturbance from human use of the area. These impacts would remain negligible to minor because most wildlife are presumably habituated to human disturbance, and when necessary would simply move elsewhere to forage, nest or den. Continued current management of the Ferry Landing would have *No Effect* on federally listed wildlife species in Lake Chelan NRA because these species would not be present in the Project Area.

## Impacts of Alternative II. Fixed Walkway with Portable Wedge Landings and Freight Platform

Direct and Indirect Impacts

Construction-related activities, especially noise from pile driving, would temporarily displace some wildlife such as waterfowl that would otherwise be present in the immediate vicinity of the Ferry Landing. This adverse impact would be short term and negligible because most waterfowl congregate closer to the head of the lake, generally more than a quarter mile away from the Ferry Landing Area. Construction-related noise would substantially dissipate across this distance.

Other more habituated wildlife would probably not be affected. It is unlikely that construction would adversely affect wildlife such as waterfowl at the head of the lake because the most favorable areas for waterfowl are more than a quarter mile away from the Ferry Landing, and waterfowl would most likely move into this area if disturbed.

There are no nesting eagles in the general vicinity of the Ferry Landing, although circumstances do change each year. However, if eagles returned to nest in the vicinity of Weaver Point, as has occurred in previous years, their nesting activities would most likely not be affected because construction would occur in late winter and early spring prior to nesting, and the distance from disturbance would be more than the 660-foot buffer commonly recommended to protect eagles from construction-related activities (U.S. Fish and Wildlife Service, 2007). Ospreys would similarly not be affected because their nearest nesting sites are at least 0.5 mi or more away, on the opposite side of the lake.

This alternative would have *No Effect* on federally listed wildlife species because these species would not be present in the vicinity of the Ferry Landing.

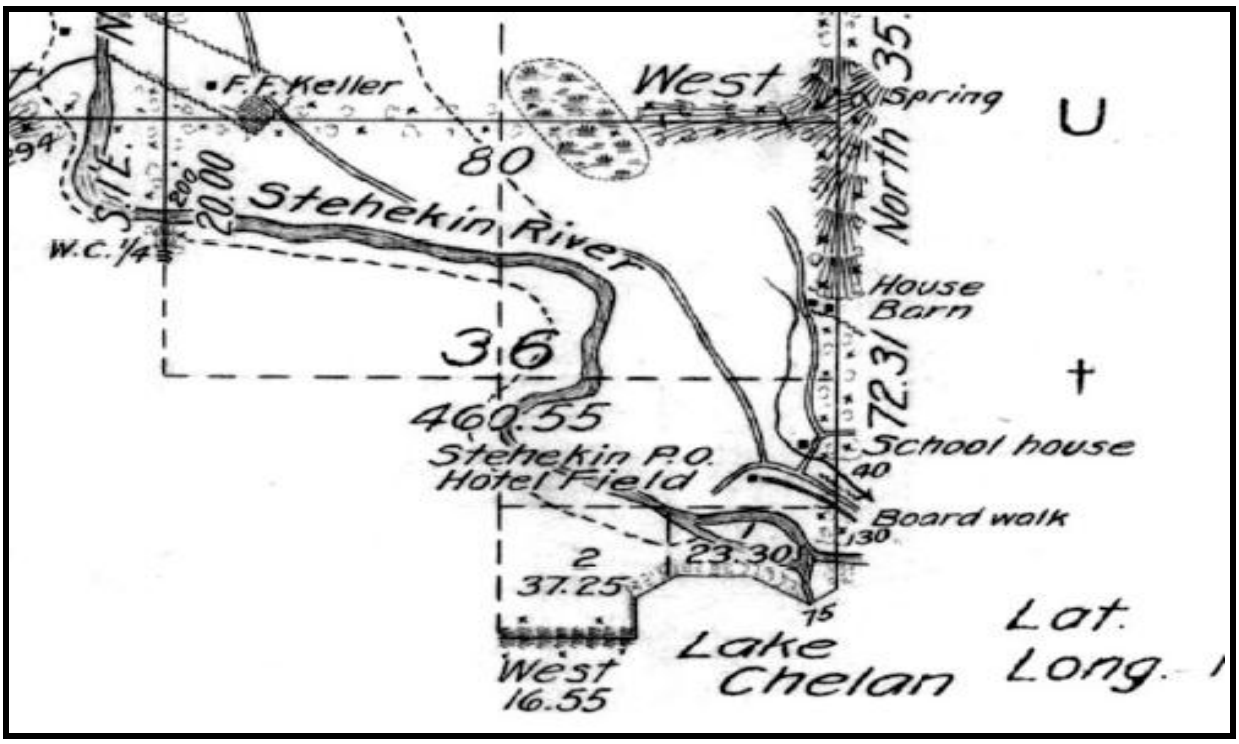



**Figure 3. General Land Office map from 1902 depicting the head of Lake Chelan prior to raising the lake 21 feet in 1921 for hydropower production. Today a good portion of the area depicted by this historic map is now seasonally or permanently submerged.**

Cumulative Impacts

Little is known about the wildlife or habitat conditions prior to homesteading in the mid- to late 1800's, however the record indicates the area was used for thousands of years by native peoples for activities such as hunting game, foraging for berries, and procurement of resources such as yew (Robertson, 1987). While these activities may have affected wildlife and wildlife habitat in the area, but conditions changed far more dramatically when the area was homesteaded in the late 1800's.

Homesteading and settlement at the head of Lake Chelan brought about extensive changes to the landscape in the vicinity of what is now the project area, including extensive logging of the forests and tourism-related development including construction of the popular Field Hotel (Figure 3). When the lake level was raised in 1921, the site of the Field Hotel and other developments at the head of the lake were abandoned as the waters rapidly rose. After the lake was raised, development was relocated along the new shoreline, and the area around the Ferry Landing became the new focal point for tourism and commerce on Lake Chelan (Robertson, 1987).

Over the last century widespread and cumulative changes to wildlife habitat have occurred at the head of the Lake. Most notably, a large segment of the former Stehekin River delta and shoreline of Lake Chelan has become either seasonally or permanently flooded for hydropower production. There has also been widespread development along the new lakeshore. In light of these substantial cumulative changes to original the original landscape, the additional cumulative impacts to wildlife and wildlife habitat from Alternative II would be adverse but negligible given

the substantial development that has taken place to date, and the very limited impact to wildlife anticipated by this proposal.

Conclusions

This alternative would have adverse but negligible short-term impacts on wildlife in the vicinity of the Ferry Landing during construction, and long-term, negligible cumulative impacts. There would be *No Effect* to federally listed wildlife species. There would be no impairment to wildlife given the negligible and generally short-term adverse impacts.

### Impacts of Alternative III. Fixed Walkway with Moveable Floating Dock

Same as Alternative II.

Conclusions

Same as Alternative II.

## Prehistoric Cultural Resources

### Issues and Concerns

The nearest known prehistoric cultural resource is an ancient pictograph site across the lake from the Ferry Landing. This site is within the viewshed and soundscape of the Ferry Landing, and is eligible for listing on the National Register of Historic Places. It is also of great significance to native peoples.

### Impacts of Alternative I. No Action

Continued current management actions and activities in the vicinity of the Project Area would be audible and visible from the prehistoric pictograph site across the lake. These activities would not harm the physical integrity of the resource, but they would indirectly detract from the feeling and association one would experience at the site itself. Noise levels experienced at the site would continue to vary widely given the many types of uses and activities that commonly occur in the general area. There would be no substantives change to viewshed, although boat traffic and other temporary activities would constantly change. Human activities in the vicinity of the Ferry Landing would continue to cause chronic adverse effects on the feelings and associations at the pictograph site, but these impacts would be negligible for most persons. These continued indirect impacts would not adversely affect the integrity of the pictographs, or their eligibility for inclusion on the National Register of Historic Places.

### Impacts of Alternative II. Fixed Walkway with Portable Wedge Landings and Freight Platform

Similar to Alternative I, this alternative would not harm the physical integrity of the pictograph site. However, noise from construction of the walkway would temporarily and indirectly affect the site feeling and associations experienced there. The impacts of noise would be negligible to minor given the large distance between the pictograph site and the Ferry Landing. Following construction, there would be distant but nonetheless visible differences in the character of the

Ferry Landing created by the additional infrastructure. These visual changes would be negligible amidst the wide variety of other developments presently in the area. Taken together, these indirect effects would not harm the physical integrity of the site, nor affect its eligibility for inclusion on the National Register of Historic Places.

### Impacts of Alternative III. Fixed Walkway with Moveable Floating Dock

Impacts would be similar to Alternative II, although the floating dock would be negligibly more obtrusive as an additional artificial feature.

## Historic Cultural Resources

### Issues and Concerns

The rustic vernacular architectural of the Golden West Historic District (a National Register-listed historic area) is important to the cultural integrity of Stehekin, Lake Chelan National Recreation Area, and the historic cultural legacy of the National Park Service as an institution Good, 1938). The Ferry Landing is not listed as historic, and the Project Area is not located within a historic district. However, the Ferry Landing is readily visible from the historic district. Improvements to the Ferry Landing should harmonize with the historic character of the area, and meet the Secretary of the Interior's Standards for Historic Preservation (???if so need to cite these in law and policy section).

### Affected Environment

The Golden West Lodge Historic District includes the Golden West Lodge and its approximately 4-acre surroundings. Built in 1926, the lodge was partly constructed with salvaged portions of the former Field Hotel, demolished when the level of Lake Chelan was raised for hydropower production (Robertson, 1987).

The Golden West Historic District represents the only extant example of a large-scale wilderness resort development in the North Cascades. Its historic period of significance is from 1926 to World War II. Extensively rehabilitated in 2002, it now serves as the visitor center and administrative headquarters for National Park Service operations in Stehekin.

The immediate vicinity of the Ferry Landing has been extensively altered. Today the area bears little resemblance to the historic period of significance (Figure 4). However, various historic elements including dry-laid rock walls, wooden cribbing and paths still remain against the backdrop of more recent development.


**Figure 4. Stehekin Ferry Landing, ca. 1930. The area proposed for installation of Alternatives II and III is just to the right (southeast) of the area depicted in this photo.**

## Impacts of Alternative I. No Action

There would be no material changes to the physical integrity of historic or prehistoric cultural resources in the vicinity of the Ferry Landing, nor would there be any changes to feeling and associations derived from these resources. Therefore, there would be no impact to these resources from continued current management activities and uses of the area.

## Impacts of Alternative II. Fixed Walkway with Portable Wedge Landings and Freight Platform

Direct and Indirect Impacts

This proposal would not directly affect the Golden West Historic District because the site of the fixed walkway is located outside the historic district. However, installation of fixed walkway would introduce additional development within sight of the district. The non-historic architectural elements of the walkway, the vertical elements of the steel pilings and the non-indigenous materials such as exposed metal fiberglass would detract to some degree from rustic vernacular character of the historic scene (NPS, 1986).

These non-historic features would have a minor indirect adverse impact to the visual character, feeling and association of the Golden West Historic District. This adverse impacts would be

partially mitigated (i.e. made less obtrusive) by using non-reflective, weathering steel and muted fiberglass tones for construction materials.

Cumulative Effects

The character of area in the vicinity of the Golden West Historic District has changed substantially over the years as buildings have been replaced, developments have expanded, and modern materials have replaced the rustic craftsmanship and native materials such as wood and stone that were historically used. This alternative would further detract from the rustic character of the area. This cumulative impact would be long-term, adverse and minor to moderate given the clear views of the area from the Golden West Historic District and the relatively large scale of the walkway.

Conclusions

There would be no effect to the physical integrity of the Golden West Historic District. However, this alternative would result in minor to moderate cumulative adverse effects to the viewshed by adding a non-historic, feature constructed of modern materials that would detract from the rustic vernacular style of the Historic District. There would be no impairment to historic cultural resources given the other modern, non-conforming architectural features in the vicinity of the area, and the lack of direct impact to the integrity of the Golden West Historic District.

### Impacts of Alternative III. Fixed Walkway with Moveable Floating Dock

Direct and Indirect Effects

Adverse impacts would be similar to Alternative II, although slightly more noticeable because this alternative would include the added visual intrusion of a concrete floating dock.

Cumulative Effects

Similar to Alternative II, with the additional long-term presence of the visually obtrusive floating concrete dock.

Conclusions

Similar to Alternative II.

## Recreation and Visitor Use

### Issues and Concerns

- *Accessibility*. Persons with impaired mobility deserve to be treated with dignity and self-respect. The lack of accessible facilities at the Stehekin Landing requires haphazard measures to enable mobility impaired persons to board and disembark the public ferries. These measures inadvertently highlight the physical limitations of mobility impaired persons in an undignified manner. To comply with federal law and National Park Service policies, and to help provide a superlative visitor experience for all, measures need to be taken to accommodate persons with impaired mobility.
- *Public safety*. Accommodating persons with impaired mobility within the constraints of the current ferry transportation system is difficult because the public ferries and docking

facilities on Lake Chelan were not designed for this purpose. The various stop-gap measures that are currently used at the Stehekin Ferry Landing present safety risks to those who have impaired mobility, and to those that provide assistance.

- *Freight handling*. The ferries transport tons of supplies each year for visitors and residents of Stehekin. Improved accessibility should not come at the expense of reduced freight handling.
- *Aesthetic concerns*. The rustic architectural style of Stehekin is key feature of its character. The incremental encroachment of modern materials and craftsmanship in the Ferry Landing area could detract from the rustic visual character of the area.

## Affected Environment

The community of Stehekin within Lake Chelan NRA can only be accessed by foot, private boat, airplane or the public ferries that ply the waters of Lake Chelan. The public ferries are the most common form of transportation: on average approximately 42,000 people visit Stehekin and as many as 81% of them arrive by public ferry (Otak, 2007; NPS unpublished data). The highest use of the public ferry system occurs in July and August, and the lowest use occurs in December and January (Figure 5).

The following baseline information is qualitative and anecdotal because there are no verifiable data on the number of mobility-impaired persons who rely upon the public ferry system to visit Stehekin. However, NPS observations indicate that mobility impaired persons routinely use the public ferries to access Stehekin. These observations also indicate that more retired and elderly people are riding the public ferry to visit Lake Chelan NRA, including an increasing population of people with impaired mobility (Otak, 2007).

The difficulty of boarding and disembarking the public ferries increases with the degree of the mobility impairment. For example, those who are confined to wheelchairs often need to be lifted and carried because the boats and facilities are not universally accessible. The ferry crews watch out for and provide assistance to mobility impaired persons if needed, but they recognize this approach is not an optimal solution (Otak, 2007).

Currently there is no facility at the Ferry Landing to accommodate mobility impaired persons during lower water levels in winter and early spring. Instead, the ferries dock along the sheet metal bulkhead of boat launch/winter barge landing. Low water in winter coupled with wintery conditions such as snow and ice increase the difficulty of boarding and disembarking for all visitors at this location, especially those who have mobility impairment (Otak, 2007).

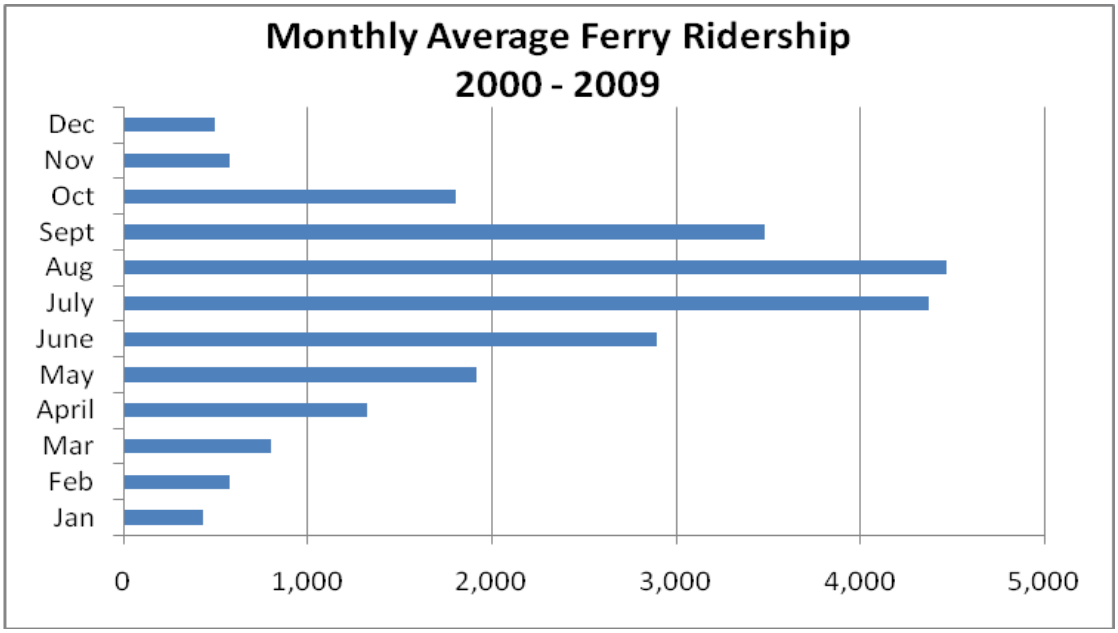



**Figure 5. Monthly average use (#of people/month) of the public ferry system serving Stehekin from 2000-2009. Data derived from the NPS files and the Lake Chelan Boat Company.**

## Impacts of Alternative I. No Action

Current conditions at the Stehekin Ferry Landing would remain the same. Mobility impaired persons would continue to visit Lake Chelan NRA as they do now, but facilities for boarding and disembarking at the Ferry Landing would continue present challenges due to lack of universal accessibility. These challenges would generally be worse in the winter and early spring at lower lake levels. Impacts to mobility-impaired visitors would continue to be adverse, although minor given that the whole ferry system is not ADA-compliant.

## Impacts of Alternative II. Fixed Walkway with Portable Wedge Landings and Freight Platform

Direct and Indirect Impacts

This alternative would provide year-round, ADAAG-compliant access to all mobility impaired persons. Compared to Alternative I. No Action, this alternative would beneficially affect all mobility impaired persons, but the degree of impact would vary among individuals.

This alternative would affect other visitors in several ways compared with existing conditions. Currently the timeframes around the arrival and departure of the ferry, known as "boat time" is a somewhat hectic experience because large groups of people are often gathered in fairly tight quarters. The area is shared with vehicles, cyclists, and pedestrians and these different uses are concentrated. Providing a fixed walkway with a small staging area could help to create additional space in the immediate vicinity of the Ferry Landing, and perhaps provide a subtle benefit to some visitors who feel current conditions are a bit too hectic and confusing. In winter, the benefit would be negligible given the reduced visitation and the added space available.

This alternative would have a negligible effect on movement of freight because distances would remain the same and motor vehicle access would still be available.

Analyses of the visual character surrounding the Stehekin Ferry Landing caution against use of concrete and metal because these modern, finished materials detract from the indigenous materials such as rock, gravel and wood (fir cedar, maple) that were historically used for construction (National Park Service, 1986). The materials for the dock (concrete) and walkway (weathering steel pilings, metal, fiberglass) would detract from the rustic visual character of the area. Some visitors and residents would find the visual quality of the dock and walkway aesthetically displeasing. Other visitors or residents might not appreciate the visual change from current conditions. As with all matters of aesthetics, the degree of adverse impact would vary among individuals, but would most likely be negligible to minor for most people.

Cumulative Impacts

Upgrading the Stehekin Ferry Landing for universal accessibility would only partly solve the probably of accessibility for visitors using the public ferries because other links in the ferry transportation chain including Fields Point Landing, Chelan and Lucerne would remain ADAAG-noncompliant, as would the ferries themselves. Therefore, the cumulative benefit to mobility impaired persons would be moderate because universal access would not be complete across the ferry transportation system.

Over the years, various facilities have been added to the Stehekin Ferry landing to accommodate changes in visitor and residential use. Installation of the dock and fixed walkway would add another non-historic element, causing a cumulative adverse impact to the visual character of the area. Some visitors and residents would find this added change to be a negligible to minor cumulative adverse impact compared to current conditions.

Conclusions

This alternative would have moderate beneficial impacts to mobility impaired persons by providing universal access at the Ferry Landing for all residents and visitors. However, the beneficial impact would be limited because other links in the transportation chain between Stehekin and points down lake would not be universally accessible. This alternative would have negligible to minor adverse cumulative impacts to the rustic visual character of the Ferry Landing area.

## Impacts of Alternative III. Fixed Walkway with Moveable Floating Dock

Direct and Indirect Impacts

This alternative would be similar to Alternative II in regard to the beneficial impacts of universal accessibility. However, there would be a negligible to minor adverse impact to freight handling capacity and efficiency because this design would increase the distances compared to existing conditions and Alternative II.

This alternative would require relocating the dock away from the fixed walkway in summer during high lake levels. During these times the dock would sit idle and not be available for

public use. This could create an attractive nuisance for visitors and present a minor adverse public safety concern.

This design would be more visually obtrusive compared to Alternative II because the large concrete dock would further impinge upon the rustic character of the Ferry Landing. However, the fixed walkway would slightly narrower compared to alternative II, so it might appear slightly less obtrusive. Some visitors might find the added feature of a concrete dock to be an adverse minor aesthetic impact, although the degree of impact would vary among individuals.

Cumulative Impacts

Similar to Alternative II, although there would also be minor adverse impacts to public safety from the idle floating dock in summer. The floating dock would also contribute a negligible to minor adverse additional adverse impact to the visual character of the area.

Conclusions

Direct, indirect and cumulative impacts would be similar to Alternative II. However, there would be additional negligible to minor adverse impacts in terms of freight handling and public safety concerns compared to existing conditions and Alternative II.

# National Park Service Management and Operations

## Issues and Concerns

Each of the "action" alternatives would require more snow removal, and some areas around the Ferry Landing would have to be shoveled by hand. Alternative III would also require NPS staff to move the dock periodically with a motorized vessel to enable ADAAG-accessible pathways with changing lake levels (<1:12 slope). Complications could arise from having to rely upon a motorized vessel to move the dock, especially if lake levels rise or fall suddenly.

## Impacts of Alternative I. No Action

NPS staff based in Stehekin currently maintain the Ferry Landing area. Maintenance-related activities primarily include plowing snow maintaining the gravel road. Snow plowing is generally straightforward, because heavy equipment (grader, front end loader) can be used and little if any hand shoveling is required.

NPS staff also occasionally need to respond to incidents such as deer getting into edible materials left unprotected at the landing. Over longer timeframes, the infrastructure that enables docking needs to be maintained and replaced, but this occurs very infrequently. For example, the current sheetmetal bulkhead and boat launch was installed in 1982 and has functioned with virtually no structural maintenance for more than 25 years.

Taken together, the current circumstances associated with operation and maintenance of the Ferry Landing would continue to have a negligible to minor long-term impact on NPS management and operations.

## Impacts of Alternative II. Fixed Walkway with Portable Wedge Landings and Freight Platform

Adding a new, substantial infrastructure would increase the operational and maintenance burden on NPS staff. The workload would be greater in winter on those days when boats are running, because snow would need to be removed. This design would also require more staff time compared to existing conditions because hand shoveling would be necessary in certain places that mechanized equipment could not access. Compared to current conditions, snow removal would impose a minor additional long-term maintenance burden on NPS staff in winter.

The fixed walkway would also require periodic repairs and servicing, although this would most likely be a negligible adverse impact to park operations because repairs would presumably be very infrequent.

## Impacts of Alternative III. Fixed Walkway with Moveable Floating Dock

Impacts would be similar to Alternative II, except the approximately 150-ton floating dock would impose additional operational and management burdens. Changing water levels would require NPS staff to periodically reposition the dock to maintain ADAAG-compliant pathways (i.e. slight slopes not exceeding 1:12). It is estimated that moving the floating dock would take a three people approximately 1 hour. The need for repositioning would be somewhat unpredictable, because at certain times lake levels could fluctuate rapidly, especially during extreme rain on snow events. These extreme events could simultaneously require the limited pool of NPS staff in Stehekin to attend to other operational issues, such as responding to flooding.

Lake level analyses indicate that the dock would need to be repositioned as often as every three days, with four movements occurring at seven day time intervals and seven movements occurring at 14 day time intervals (Geiger, 2009). This would have a periodic, long-term minor adverse impact on NPS staff during boat time. Moreover, the possibility would also exist for the dock to get stick or otherwise remain unavailable given the added complexity involved.

## Conclusions

Alternative I. No action would continue to have a negligible to minor long-term impact on NPS management and operations. Alternative II would impose a minor additional long-term maintenance burden on NPS staff in winter, primarily with respect to snow removal. Alternative III would impose the most burden on NPS operations compared to Alternatives I and II because snow removal would be more complicated, and the dock would need to be moved periodically.

# Chapter IV. Consultation and Coordination

## Agency Consultation

### U.S. Army Corps of Engineers

Preliminary conversations began Sept 2009 with agency representative to discuss potential designs and Section 404 permit requirements, including work window constraints that could affect the feasibility of the project. In January 2010, Ms. Deborah Knaub clarified the proposed action would require a Standard Individual Permit as opposed to a Nationwide Permit. Ms. Knaub also clarified that there would be no work window constraints regarding wintering bald eagles because BPS biological determinations indicated no wintering eagles would be affected by the proposed action.

### Chelan Public Utility District

Consultations with Mr. Steve Vaughn from Chelan PUD began in December 2009. Mr. Vaughn indicated via e-mail correspondence on 12/7/2009 that the PUD did not own the land in the immediate vicinity of the Ferry Landing identified for this proposal. Nonetheless, Mr. Vaughn indicated the NPS would need to obtain a License from the PUD to occupy project waters. Mr. Vaughn also clarified the PUD license would be issued once all other necessary permits and approvals from all other agencies were obtained.

### U.S. Fish and Wildlife Service

Preliminary discussions with a representative of U.S. Fish and Wildlife Service began in December 2009. At that time, discussions focused on the initial designs and potential concerns regarding bull trout (federally Threatened). USFWS encouraged adherence to the US Army Corp of Engineer standards for light penetration when choosing materials to be used in the design of the over water structures. Further informal consultation on February 3, 2010 with Mr. David Morgan indicated concurrence with the NPS' determination that there would be "No Effect" to bull trout (federally Threatened) from this proposal because multiple lines of scientific evidence and the regulatory record indicates that bull trout are extirpated from Lake Chelan.

### Washington Department of Natural Resources

Preliminary discussions with a representative of WDNR began in December 2009. WDNR regulates any portion of the project impacting waters beginning at the 1079 ft elevation. Discussions regarding permit requirements and fees were initiated at that time. Those discussion confirmed the NPS would need to obtain approval, in the form of a lease, from DNR to occupy the bed of Lake Chelan with pilings and related structures.

# Preparers and Contributors

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# Appendix I – Design History

## Introduction

The Appendix provides a detailed description of the history of the proposed action, including the evolution of the design concept from its inception in 1995 to the present alternatives evaluated in this Environmental Assessment. This history is provided in a yearly timeline format so the reviewer can see how the design has evolved since it was first formally proposed in the Development Concept Plan section of the 1995 General Management Plan for Lake Chelan NRA.

**1995**

The Final General Management Plan (GMP) for Lake Chelan National Recreation Area was completed in June of 1995 and helped provide a framework for future development and use of the Stehekin area. Enhancing recreational access for visitors with disabilities was specifically identified as a goal for improving the visitor experience. Ensuring adequate and safe commercial boat docking was also recommended as development necessary to meet safety requirements associated with transportation services.

The Stehekin Landing and Valley Development Concept Plans (DCP) and Transportation Plan was also completed in June of 1995, identifying improvements to the Stehekin Landing dock and moorage facilities as a priority action. The illustrations published in both the GMP and the DCP identify a floating dock for the ferry landing adjacent to the public boat launch that's accessible to visitors in wheelchairs (Figure 1).

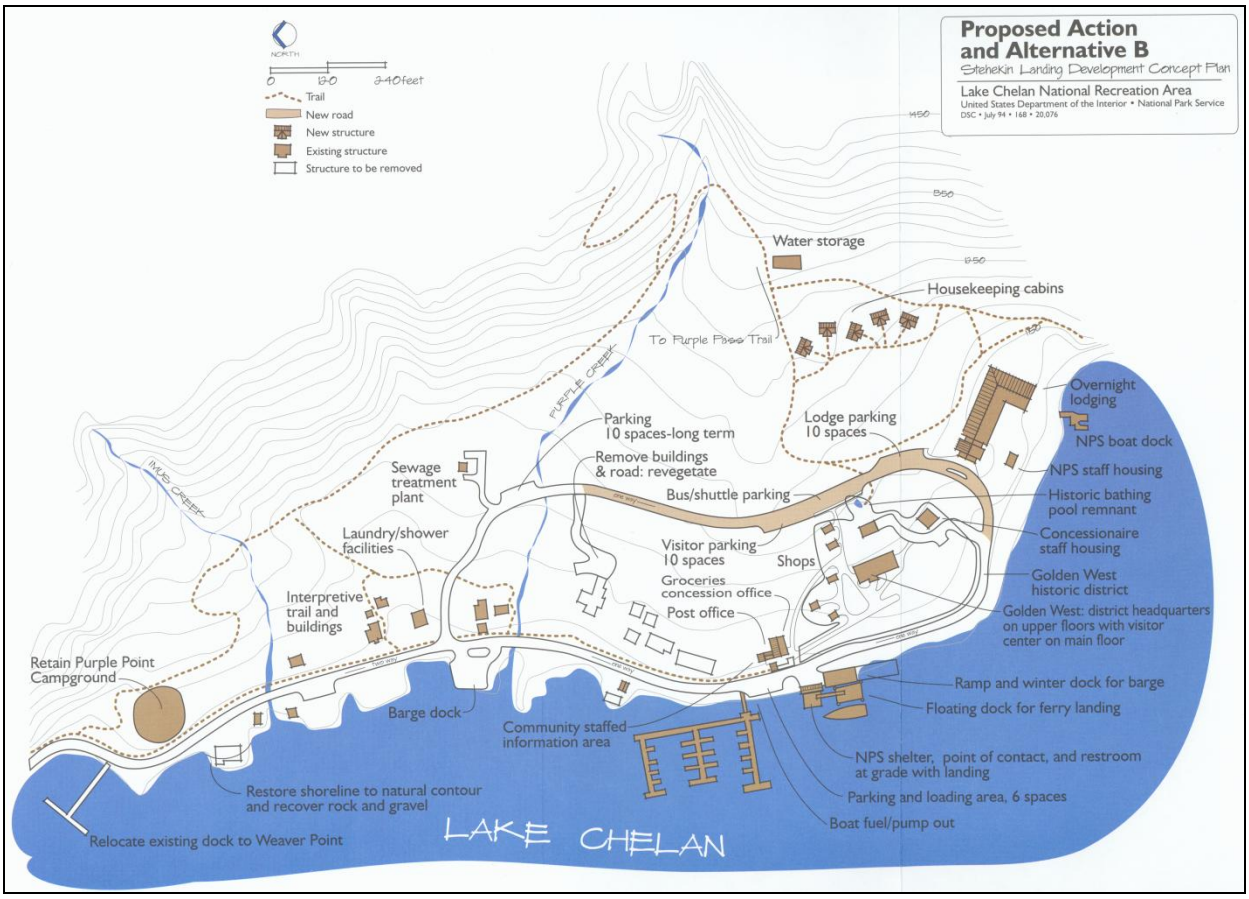


Figure 1. Development Concept Plan from 1995 General Management Plan.

**2003**

The Stehekin transportation study and planning project was awarded to Seattle-based Otak Incorporated, a planning and design firm specializing in transportation and site design. The project commenced with a site visit by the multidisciplinary Otak team in August, followed by field work and data collection. Workshop sessions and a public scoping meeting in Chelan were held on October 20th, while workshops and public meetings in Stehekin were held during the first week of December. Written and oral comments, concerns, and improvement ideas were collected over the course of ten different sessions or meetings from residents, business owners, and National Park Service (NPS) staff during this process. Examples of comments pertinent to the Stehekin Landing and dock design development are included below.

*"Holding areas for people and freight would be nice to have – as long as they don't take up too much space."*

*"Baggage storage – don't know if it's much of an issue (other stated it was a problem)."*

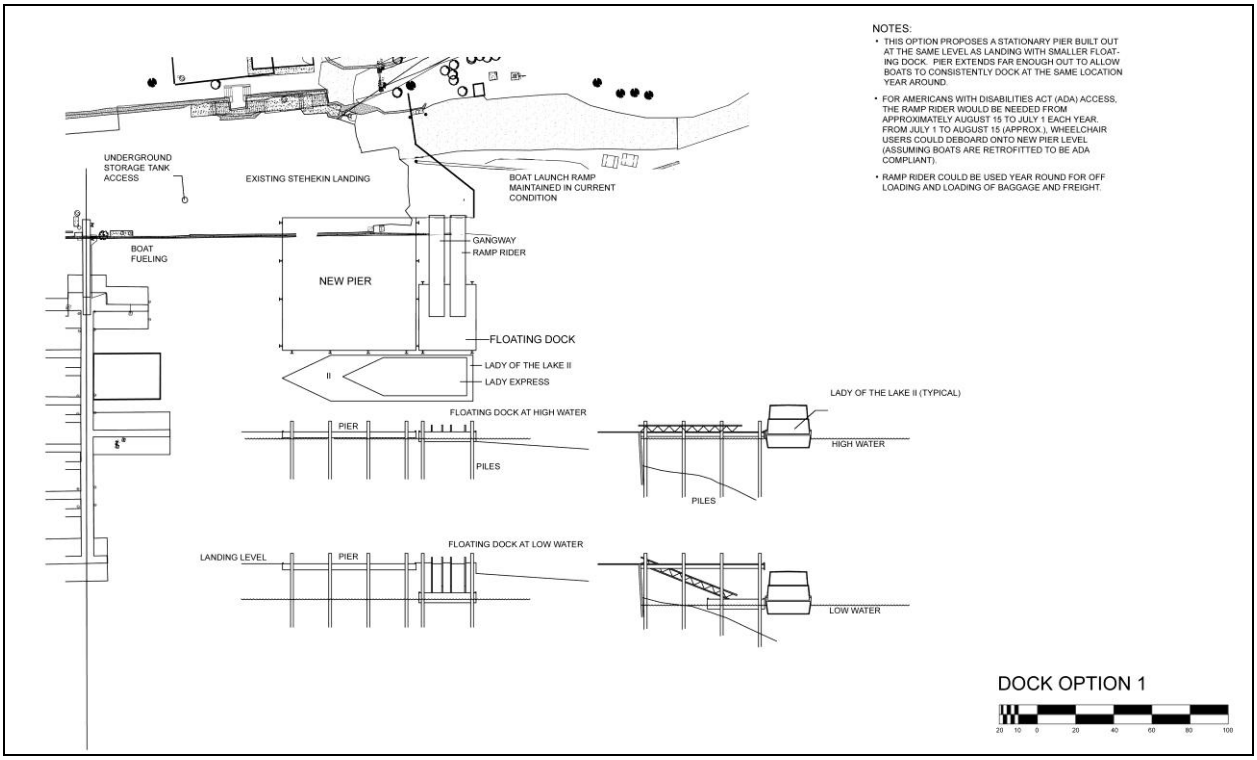
*"Stehekin residents now shop over the Internet, creating more freight at The Landing. Boxes sit at The Landing in rain and shine. A covered storage area may alleviate the need for residents to be at The Landing at the same time the boat arrives."*

*"The Stehekin community feels like they have a right to the dock. Community doesn't feel like they are represented as a whole at The Landing."*

*"We (Stehekin community) want people to get off the boat and see a 'home spun' community."*

**2004**

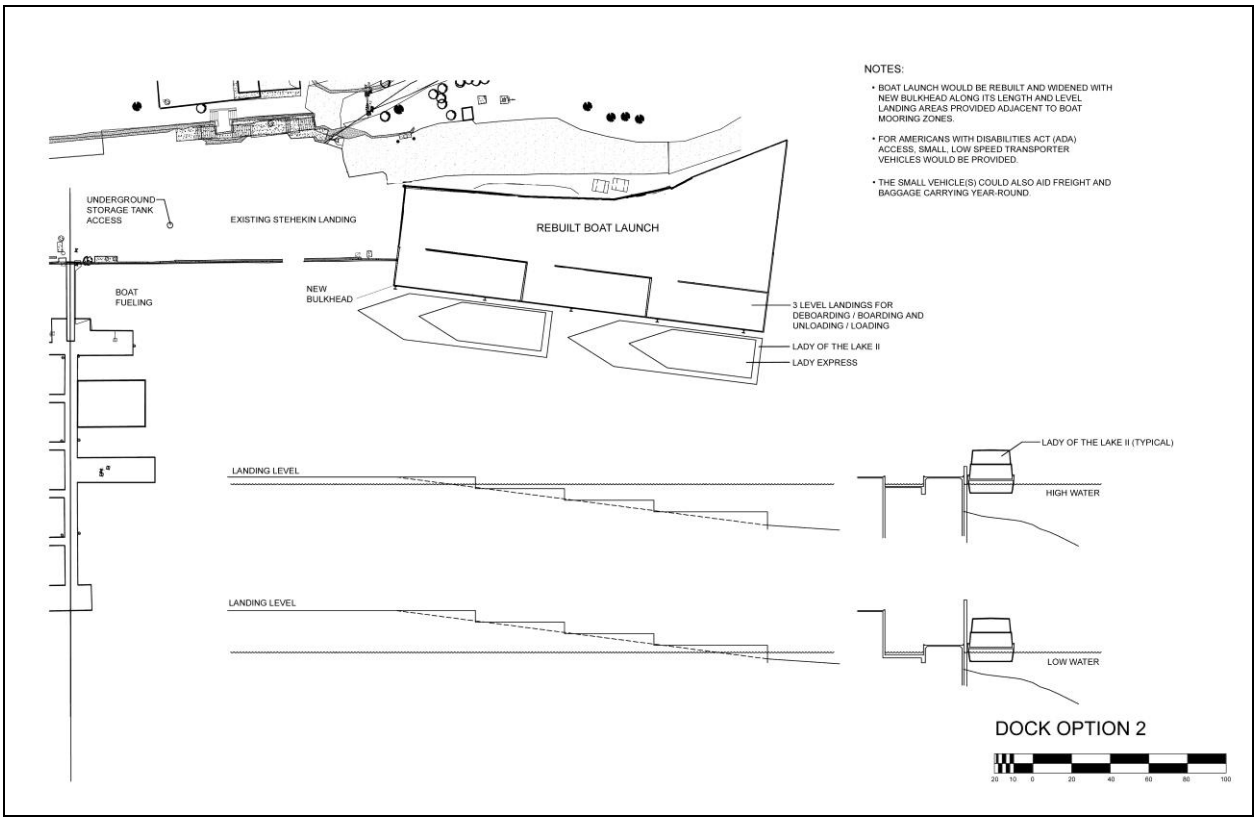
The Otak team formulated conceptual design alternatives for the dock and landing, as well as recommendations for transportation and parking management based on public comments, and submitted a draft study to the park in March. Park staff provided comments on conceptual alternatives over the next six weeks. Additional public meetings were held in Stehekin and Chelan the week of May 12th to present and obtain input on Otak's design alternatives and plan recommendations. During these meetings, the following three preliminary dock options were presented:




Dock Option 1 – Pier and Floating Dock
Develop a new stationary pier extending from the bulkhead built at the same elevation as the Landing. A smaller floating dock would rise and fall with water levels and serve as the primary freight loading/unloading surface. The pier would extend far enough out into the lake to allow the boat to consistently dock at the same location year-round. A ramp rider/conveyer system would be used year-round to offload freight and baggage. The ramp rider would be needed to provide ADAAG-compliantaccess between the floating dock and the Landing most of the year.

*Opportunities*
Functions year-round
Compact area with consistent boat positioning
Loading and unloading operations can adapt to water levels
Short distance to existing landing

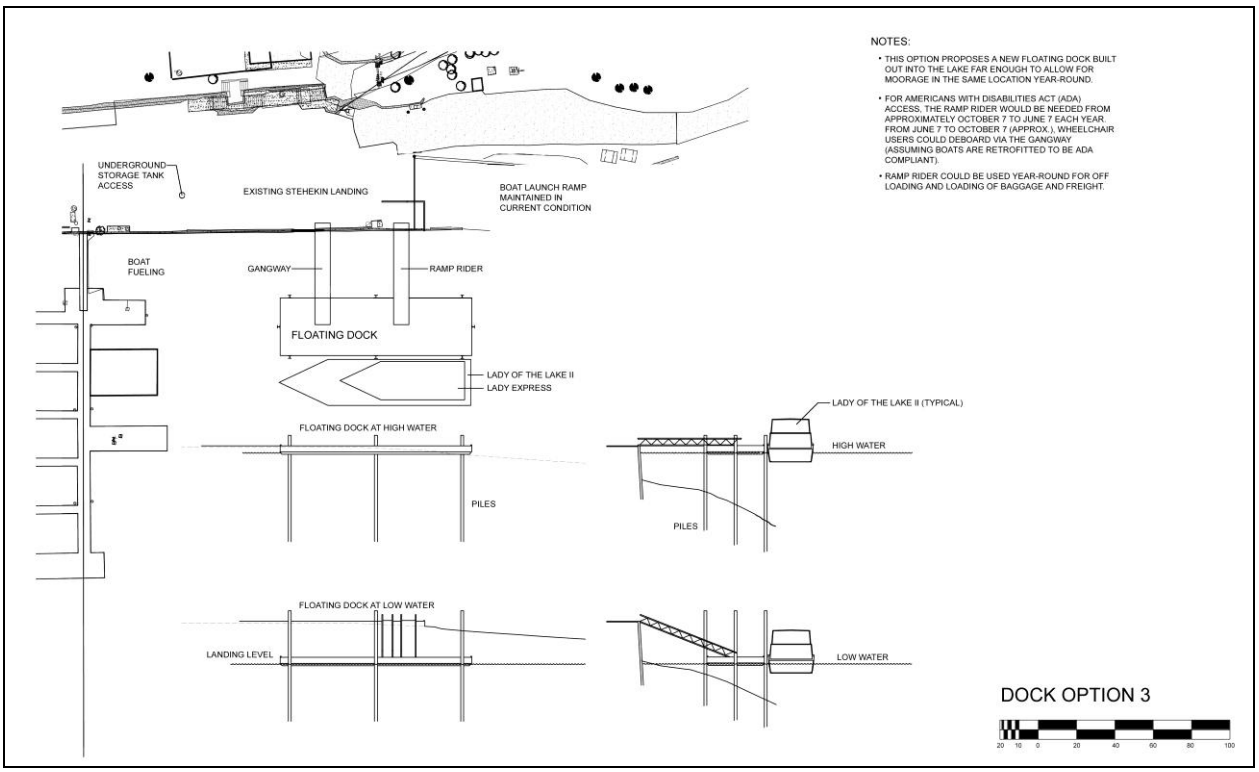
*Challenges*
ADA access and loading/unloading rely on mechanical means during low water periods
ADA access for passengers provided through ramp rider or switchback gangway design
Can only dock one vessel at a time, making timing of loading and unloading more critical
Summer landing at the existing Landing location is no longer possible




Dock Option 2 – New Boat Ramp/Launch and Landings
Reconstruct the existing boat ramp and construct a series of floating docks alongside the rebuilt ramp area. Widen the boat ramp/launch with a new bulkhead constructed along its length. Passengers board and de-board between the boat and one of three level landing areas adjacent to boat mooring zones. Freight and baggage would be offloaded at the other end of the landing area from the passenger loading. Accommodation for passengers in wheelchairs or with physical mobility challenges would be via a small transport vehicle parked in the boat launch area.

*Opportunities*
Functions year-round
Loading and unloading operations can easily adapt to various water levels
ADA access handled through low speed transporter vehicle
Rebuilds portion of bulkhead and boat ramp
Could dock multiple vessels at one time

Challenges
ADA access and loading/unloading rely on mechanical means during low water periods
Longer distance of travel for passengers and freight/baggage hauling, particularly during low water periods (but similar to current conditions)




Dock Option 3 – Floating Dock with Ramp Rider
Build a new floating dock far enough out into the lake to allow moorage in the same location year-round. For ADA access, a ramp rider system would be needed from Oct 7th to June 7th each year. The ramp rider system could be used year-round for loading/offloading freight and baggage.

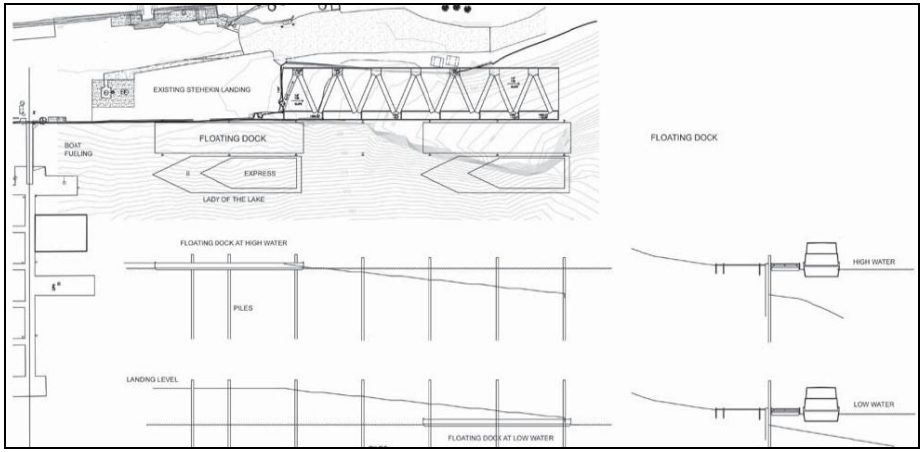
*Opportunities*
Functions year-round
Floating dock stays in one location for consistent operations
Loading and unloading operations can adapt to water levels

*Challenges*
ADA access and loading/unloading rely on mechanical means during low water periods
ADA access for passengers provided through ramp rider or switchback gangway design
Longer distance to landing via gangway
Can only dock one vessel at a time, making timing of loading and unloading more critical

Along with these three recommended dock options were four additional options, which were developed and considered during the planning process but dismissed for reasons described below.

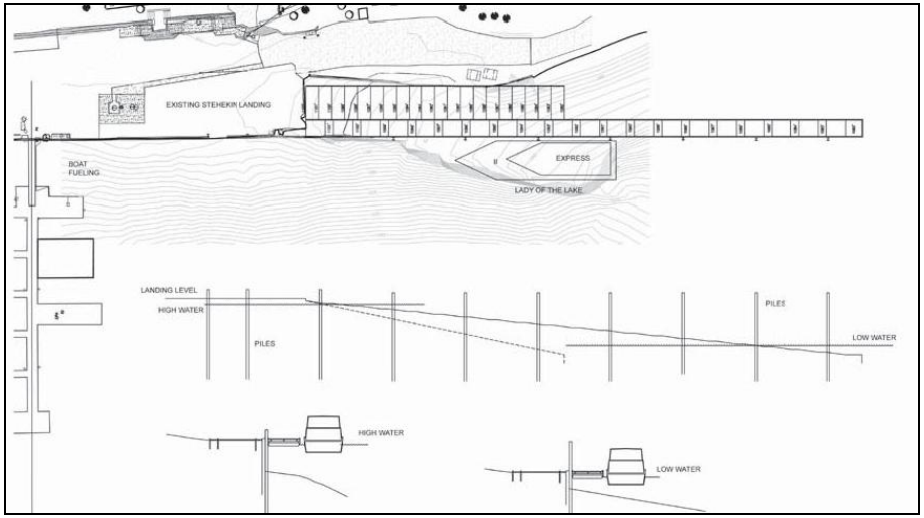
# Other Options Considered but Dismissed in 2004

New Boat Launch / Switchback Access Ramp



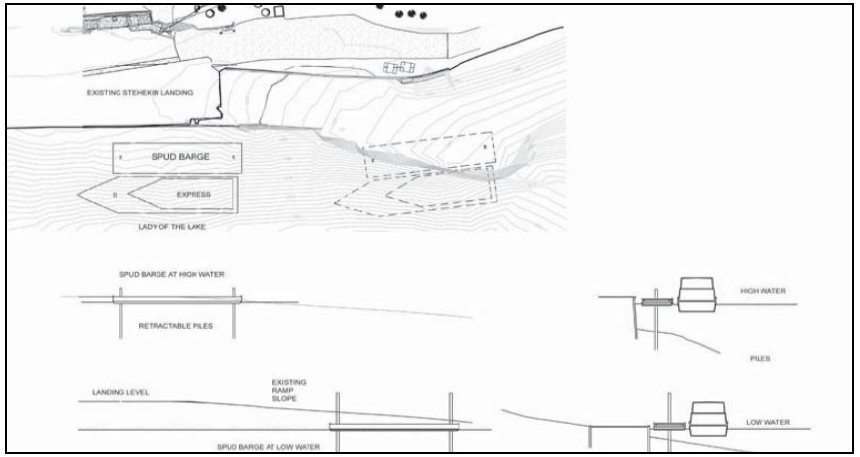

Accommodate accessibility standards with a 20’ x 80’ floating dock. Dismissed due to permitting restrictions/costs for adding excess fill to lake, inability to launch boats, and negative effect on winter barge operations.

New Boat Launch with Parallel Access Ramp



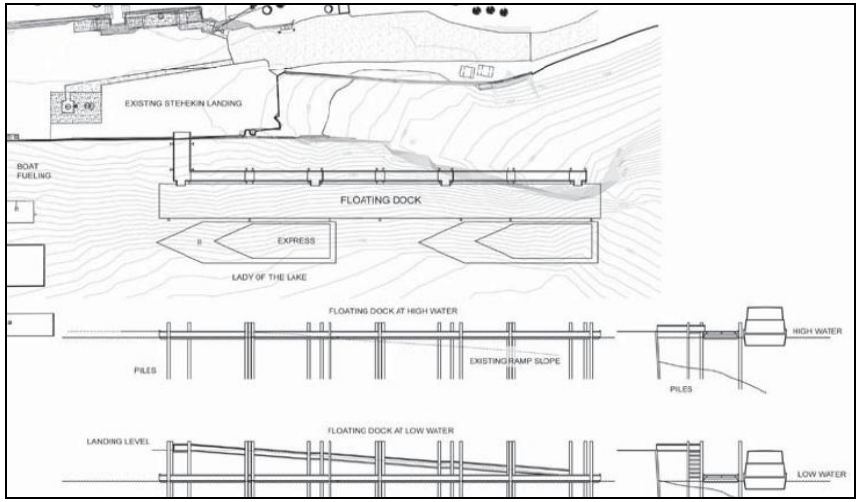

Rebuild existing boat launch and construct parallel access ramp adjacent to launch for passenger boarding/de-boarding. Dismissed due to concern of adding fill to lake, limited maneuverability to dock and unload at proper level, and negative effect on winter barge operations.

Spud Barge




The 20’ x 80’ floating barge would include spuds or piles at each end that could be raised/lowered from the lake bed, eliminating stationary piles. Dismissed due to operational challenges and repeated lake bed disturbance.

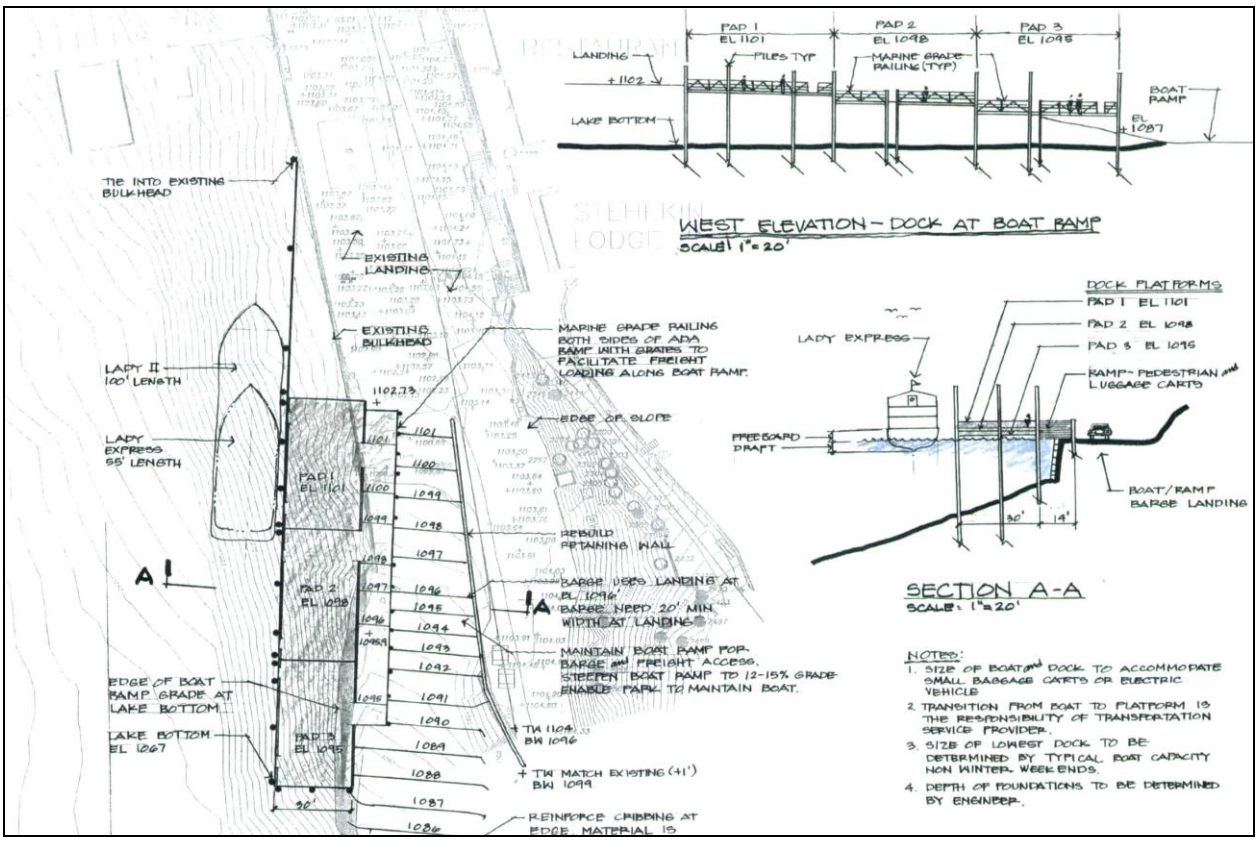
Floating Dock with Linear Access Ramp




Construct a 20’ x 245’ floating dock and fixed ramp to meet accessibility standards. Dismissed due to extensive amount of piling and potential for permitting restrictions/costs.

**2004 Continued:**
The NPS Denver Service Center (DSC) facilitated a Value Analysis (VA) with Choosing By Advantages (CBA) workshop in the park the week of July 12th to evaluate the three alternatives and select a preferred alternative for the dock and landing design. The VA and CBA session narrowed the range of dock alternatives down to two potentially viable options, however, there was concern raised by the NPS that neither alternative actually met ADA universal access requirements. It was determined that further analysis (from accessibility experts) and subsequent design modifications were required.

**2005**
A meeting was held in Seattle with NPS accessibility specialists from the Region and Denver Service Center, and recreation accessibility specialists from the State of Washington to evaluate the dock alternatives under consideration. This was a brainstorming session to develop new solutions and/or modify the three alternatives to actually provide improved access and freight handling. This meeting helped identify how the proposed alternatives would need to be modified to meet Federal accessibility requirements. Conceptual alternatives defined during this February meeting with accessibility specialists were further refined during a follow-up meeting in October, resulting in the development of three modified options that were potentially viable. All three were schematic in nature and needed engineering and structural analysis to determine feasibility and probable construction costs. These three options follow below:

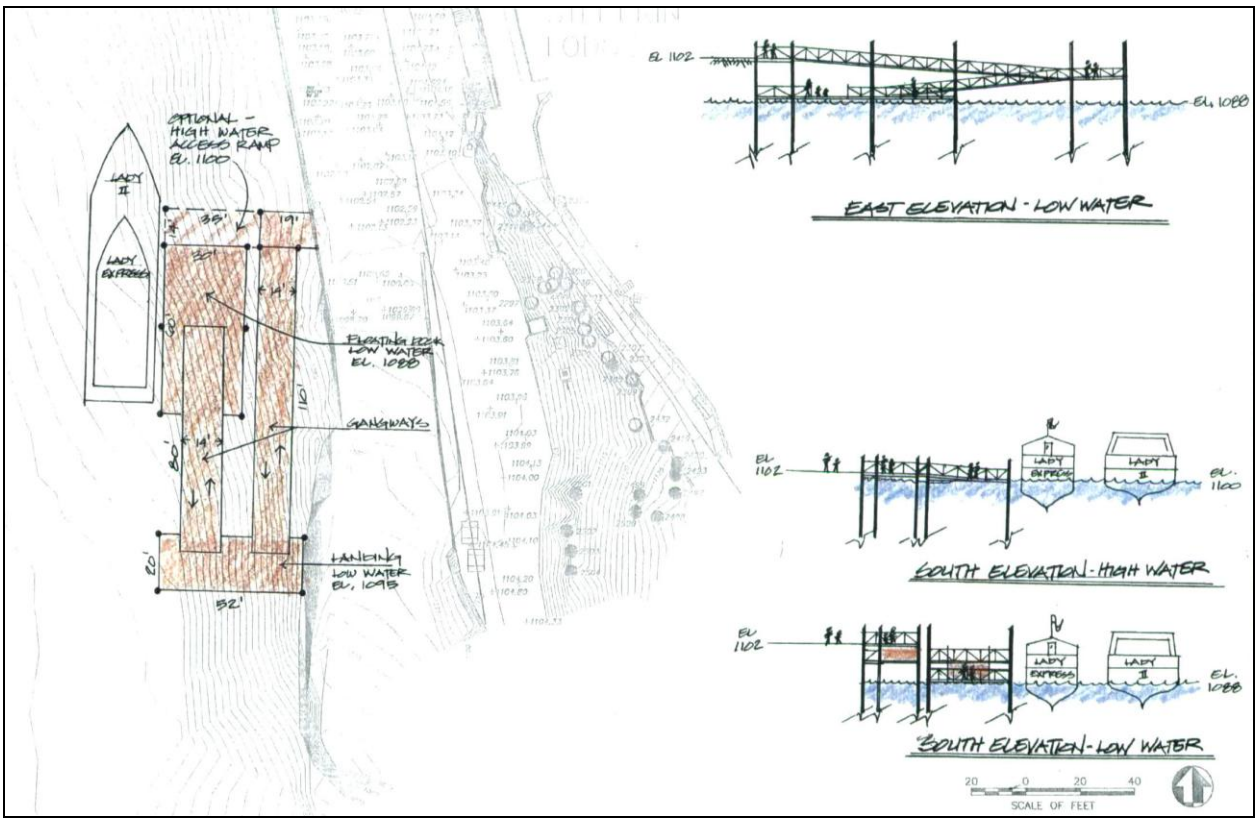


Option 1: Three Dock Pads at the Boat Ramp

Modify the boat ramp by dividing the existing ramp into two sections: one to serve as the barge landing area, and another to serve as an accessible route for transporting ferry passengers and freight to the landing. Stationary dock pads would be situated at the edge of a shallow underwater shelf so boats could pull up to each pad without running aground. Piles would be required along the structure's edge that extend above high water level to increase visibility of the submerged structure and provide a location where boats can tie up. An accessible ramp wide enough to accommodate pedestrians with luggage carts or a small vehicle would link dock pads to the landing. Platforms would be required to have edge protection and marine grade railings and handrails on both sides where ramp slope exceeds 5%. Edge protection would also be required where vertical drops exceed 18" on level platforms or 6" on sloped gangways. This alternative requires the service provider to make up differences in elevation between the platform level and the boat access point by using temporary movable ramps.

The position of the boats with respect to the fixed platform would vary with lake level. When the lake level is drawn down to low pool (1085'), the Lady Express could dock at the 1095' platform and offload from the upper deck. Freight would be offloaded at the low end of the boat ramp. The platforms would be accessible from the boats as the water level descended from full pool (1100') to 1089.5', or from approximately May 10th through December 27th. These dates cover 85% of passengers arriving to Stehekin via the ferry service.

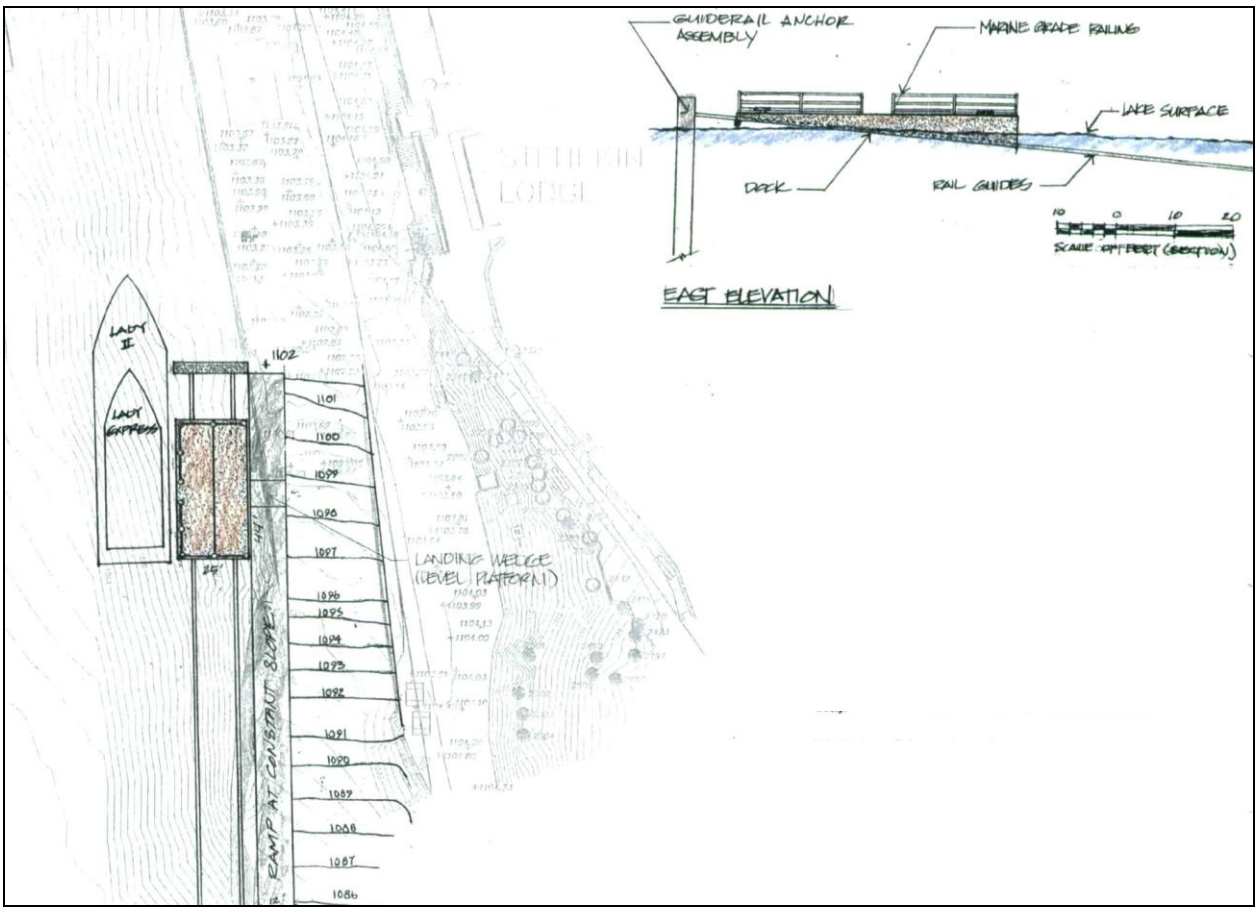
Maintenance considerations would include the need to continually monitor for debris beneath the platforms and remove and store marine grade handrail when the platforms and ramps become submerged. This option would bring about the least amount of visual impact to the landing area.




Option 2: Scissor Gangway and Floating Dock
This alternative has been tried and tested in Washington and Alaska under considerable tidal fluctuation. Unloading would occur at a constant level as the boats relationship to the floating dock is the same year round. Access from the dock to the landing would be via a 14-foot wide double ramped gangway that would be considered accessible year round, as gangways are exempt from ADA requirements for accessible routes. Motorized tractors or hand powered push carts could be used to facilitate freight and luggage transfer from the boat to the landing.

From low water elevation at 1088' (approximately February to March), Gangway A (110 feet in length from landing to intermediate platform) will slope at 6% to 7%. Gangway B (80 feet in length from the intermediate platform to the dock) will slope at 8% to 9%. From July through September, when the lake level is essentially at or near full pool (1100'), Gangway A will slope from 2% to 3% and Gangway B will be level to 1% in slope. A high water optional ramp could bypass the gangway during periods when the lake level is above 1096.

With this type of dock system, flotsam and debris removal would be less of a problem than in Options 1 and 3. Passenger and freight transfer to the dock platform would be at a constant level year round. It would not be necessary to remove edge protection as railings would not be submerged. One disadvantage is that freight transfer can be cumbersome for much of the year when gangways need to be used. However, the double gangway makes it possible to provide unassisted access most of the year (although not year-round) as ramps are kept at or below 9% slope.



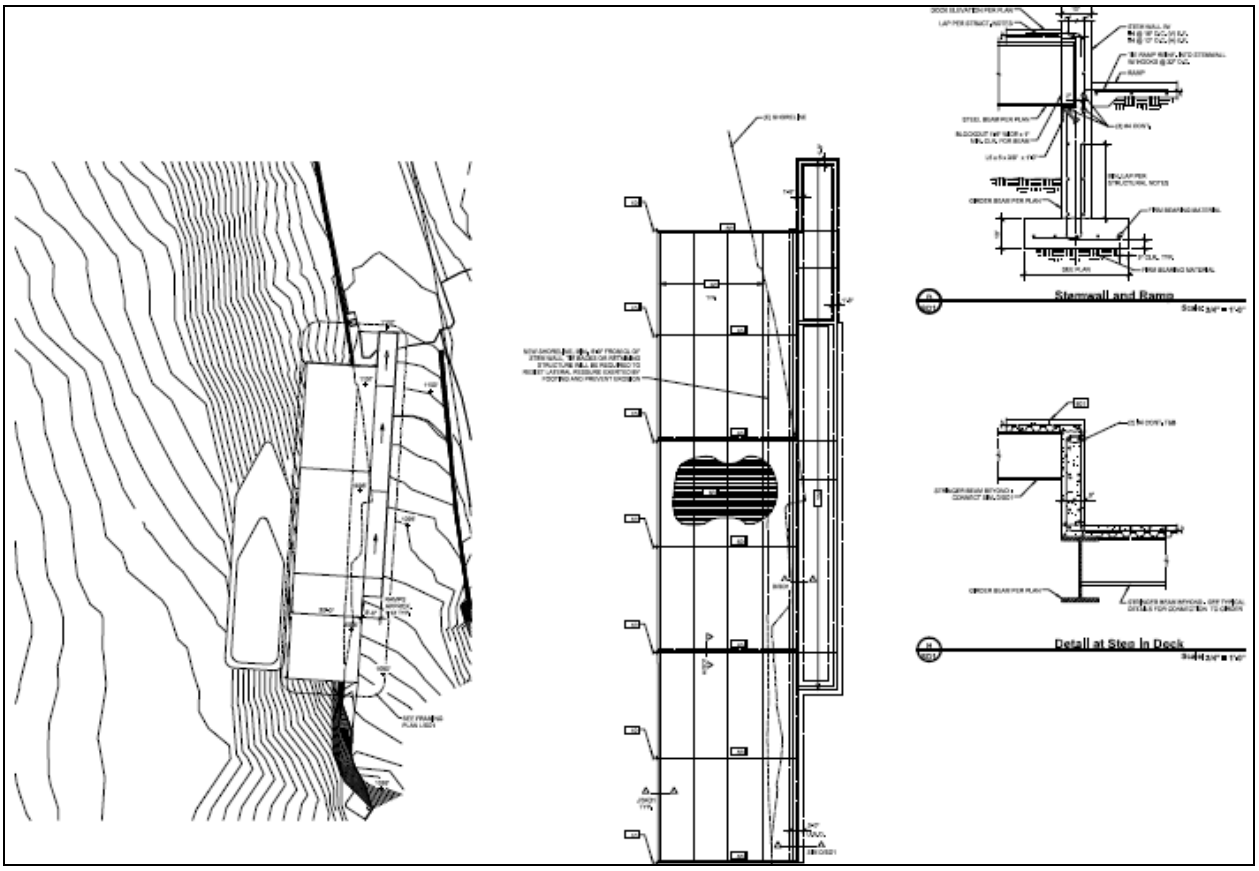

Option 3: Rail Wedge Adjacent to the Boat Ramp
This option provides a docking platform that moves along a stationary guide rail system. The dock is designed to move with the fluctuating lake level. A "wedge" flips out to accommodate transfer of passengers and freight to a stationary concrete ramp installed at a constant grade along the existing boat ramp. The wedge would be flat on top and constitute a "level landing." Design details need to be worked out by dock design engineers. Passenger and freight transfer would occur at a constant level year round, making shore side loading easier by using the existing boat ramp for transfer of freight. It would also not be necessary to move edge protection, as railings would not be submerged. One disadvantage of this type of dock is that the dock can get stuck and a mechanized means of winching the dock up the rail system may be necessary. Flotsam and debris would be a maintenance concern, as the guide rail system would need to be kept clear so the dock platform can move freely.

**2006**
The Value Analysis Study for North Cascades National Park Complex Stehekin Dock and Landing Improvements was published by the NPS Denver Service Center Transportation Division. This incorporated the work from 2004 and 2005. No additional design work occurred during this period.

**2007**
Otak Inc. prepared the Stehekin Transportation Study & Landing and Dock Conceptual Design for publication that was finalized in March 2007.

The three schematic dock alternatives developed with the accessibility specialists were taken to Geiger Engineers for further development in order to perform a detailed feasibility analysis. In April, Geiger Engineers generated three more concepts (towable floating dock with fixed ramp, adjustable gangways with fixed onshore ramps, and multi-ramp fixed dock) for comparison and evaluated all seven alternatives based on the following factors:
Accessibility: Must meet Federal accessibility requirements
Freight Handling: Prefer low slope and short distance to move freight, room to place freight out of the path of passengers, and room for covered freight storage
Water Level Variation Tolerance: Accessibility and freight handling requirements must be met over the entire range of lake level fluctuation
Maintenance and Operations: Simple and inexpensive to operate and maintain
Visual Impact: System should fit into the landscape, not detract from it
Compatibility with Landing: Existing high-water docking situation work well; prefer to maintain the option of using the existing landing during high water conditions
Compatibility with Boats: Different ferries have different lengths, disembarkation points occur at different freeboards; needs compatibility with all possible boats

Based on the evaluation factors four alternatives were deemed to merit further study and went on to be developed, then evaluated along with the No Action alternative via a mini Value Analysis by Geiger Engineers:

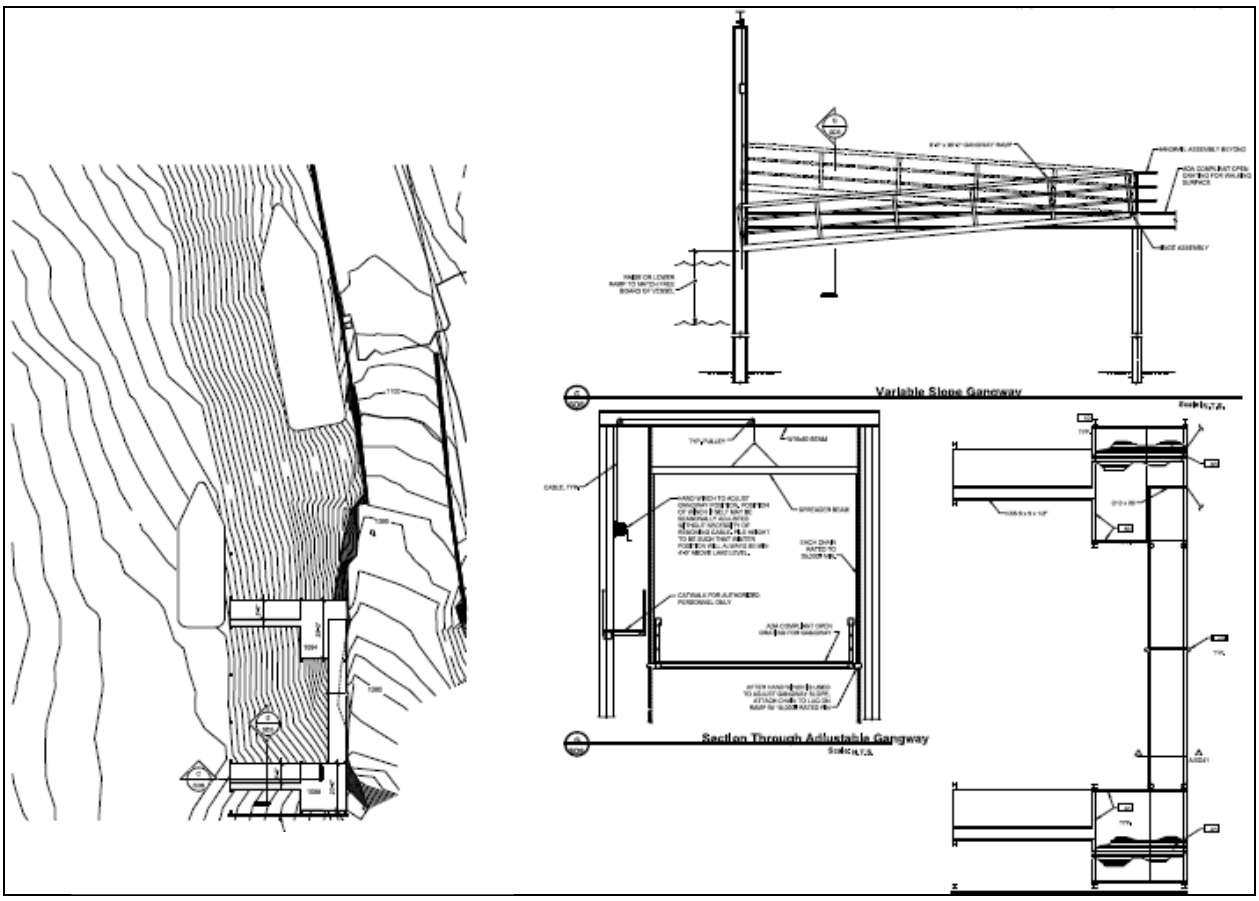


SD1 Modified Boat Ramp with 3 – Level Fixed Dock
This design concept consists of a single fixed dock with three different levels. A fixed ramp that meets Federal accessibility standards connects the three levels to each other and to the shore.

*Advantages*
Straightforward, no moving parts
Good Universal accessibility once on dock

*Disadvantages*
Poor accessibility from boat to dock when lake level is at awkward relationships to the 3’ stages of the dock
Requires disembarkation from upper boat deck at times
Essentially the same as current conditions
Would require fill behind sheet piling, could be complicated permitting
Does not greatly improve freight handling
Narrows access to the existing boat launch

No matter how different dock levels are adjusted, there will be times when gangway ramps from the boat to the dock would need to be very steep, resulting in poor ADA access and difficult freight handling. The result is essentially the same as current conditions. It adds two 3’ stages to the present dock elevation, but the lake fluctuates 15’; there is little to be gained from this approach. The disadvantages of this design were found to outweigh the advantages; accordingly, this concept was eliminated.

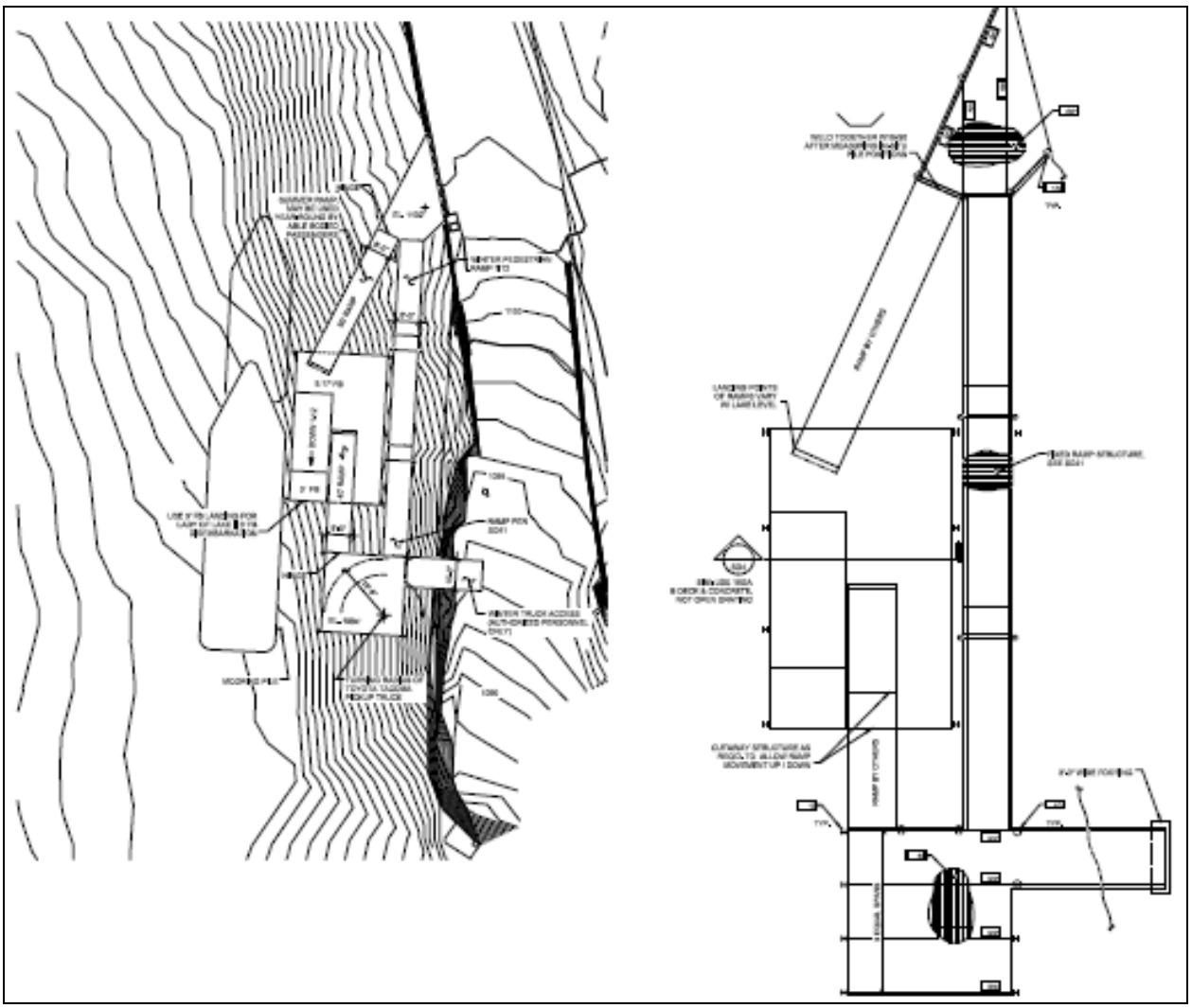



SD6 Adjustable Gangways with Fixed Onshore Ramps
This concept consists of two landing locations at different elevations, each of which is accessed by a gangway that can be adjusted to match the freeboard of the ferry. The two landings are connected to each other and the shore by an ADA compliant ramp.

*Advantages*
Good Universal accessibility
Improved winter freight handling, with wide ramps the entire way from low water level

*Disadvantages*
Cannot use both fore and aft gangways on Lady II at the same time
Requires more mechanical maintenance than other alternatives

This design concept would still allow summer operations to occur at the current location. The ferry operator indicated that the Lady II currently disembarks from both a three-foot and five-foot freeboard on the lower deck simultaneously. This design concept would work well for the Lady Express, for which there is only one lower deck disembarkation point. However, it would not work well for the Lady II, as both lower deck ramps could not be used at the same time. Frequent operation and maintenance labor requirements lead to high life cycle costs. The disadvantages of this design were found to outweigh the advantages; accordingly, this concept was eliminated.



SD7 Multi Ramp Fixed Dock

This concept consists of several ramps connecting to a floating dock in a fixed location. The dock would have both three-foot and five-foot freeboard sections for disembarkation. One ramp would extend directly from the dock to the shore. During low water, this ramp could be very steep. The other ramp from the dock would extend to an intermediate level landing. From there an additional ramp would run to the shore; both ramps would meet ADA standards year round.

*Advantages*

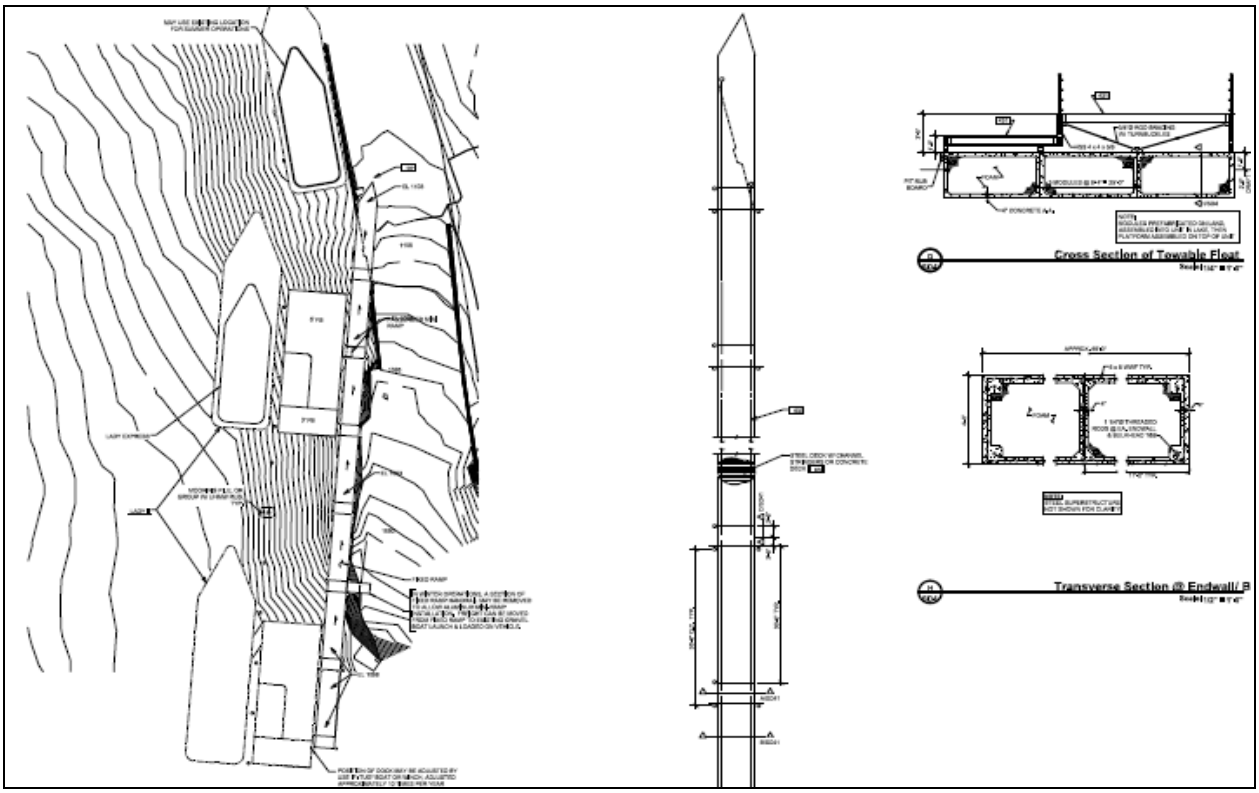
Versatile, good Universal accessibility

*Disadvantages*

Complex, highest projected cost, requires the most maintenance

Freight handling only marginally improved over existing conditions in winter

This design concept would be the highest cost alternative, with relatively few advantages to commend it given its costs. Additionally, the complexity of the concept means that unforeseen problems in design or construction could further add to costs or diminish utility. The disadvantages of this concept were found to outweigh the advantages and it was eliminated.




SD4 Movable Floating Dock with Fixed Ramp

This concept consists of a single movable floating dock and a single fixed ramp extending to the shore. The fixed ramp would slope down at inclines meeting ADA standards. At several different elevations, flat landings on the ramp would provide access to the floating dock. During high water periods, the lower portion of the ramp would be below the water surface. As lake levels change, the floating dock would be periodically moved so that the ramp would remain fairly constant throughout the year. The floating dock would have both three-foot and five-foot freeboard areas to allow for ease of disembarkation from the different ferry boats.

*Advantages*

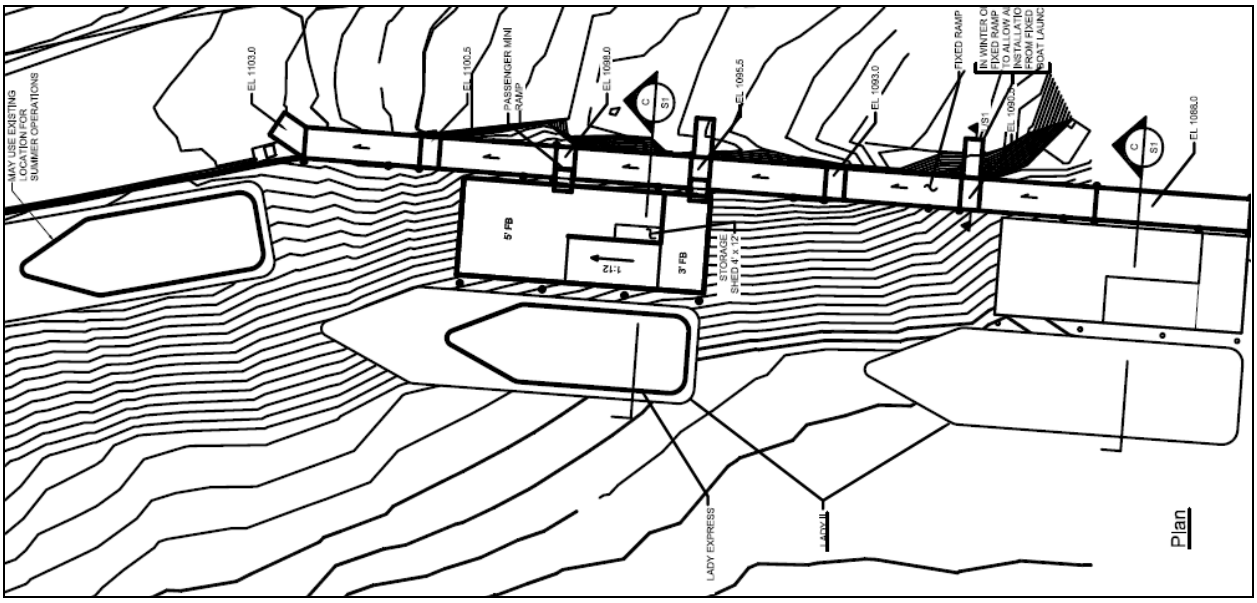
Straightforward, good Universal accessibility
Very little maintenance required
Enough room for freight handling with small freight shed
Recommended by the ferry boat pilots

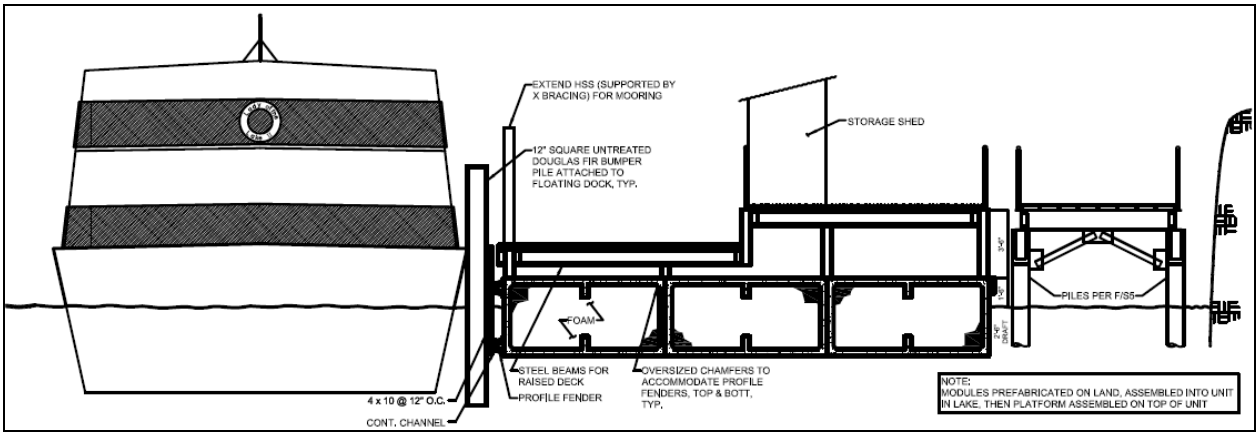
*Disadvantages*

Requires dock movement several times annually
Mooring piles could make access to the existing boat launch difficult

This design concept would meet accessibility requirements for movement between the ferry boats, the dock, and the fixed ramp at all times. The size of the floating dock would allow for ease of freight loading and unloading without significantly interfering with passenger circulation. Probable construction cost was found to be the lowest of the concepts given second-level study. As a result of the accessibility advantages, ease of freight handling, simplicity of everyday operations, and low relative construction cost, this concept was selected for further development.

**2008**
In February, Geiger Engineers presented NPS staff with a detailed design evaluation and preliminary drawings of the preferred alternative – the towable floating dock with fixed ramp walkway.




During the summer season, the process by which freight and passengers are moved from the ferryboat to the landing would change little from what occurs at present. Throughout the rest of the year, the improvements to disembarkation and freight handling processes due to the new floating dock and fixed ramp would be apparent.

When a ferryboat arrives and docks at the new floating dock, personnel would tie the boat up to the steel mooring posts. Once the ferryboat is secured, mini ramps would be put in place to allow movement from the boat to the dock for disembarkation and freight movement.

Passengers would disembark from the floating dock to the fixed ramp via mini ramps and up the fixed ramp to the Stehekin landing. Freight handling is expected to occur separate from passenger circulation. Off-season freight would be moved into a covered storage area provided

on the floating dock. During low water conditions, personnel may elect to remove a portion of the fixed ramp handrail and install a mini ramp extending from the fixed ramp to the boat launch. This would be especially useful to residents receiving heavy supplies, as it would substantially reduce the distance freight must be carried to their vehicles.

The selected design concept is based on the premise that the dock would be moved periodically so that its deck elevations always closely match the lower deck elevations of the Lady Express and Lady II ferries, as well as a landing area on the fixed ramp. Operations are described in detail in Geiger Engineers' February 14, 2008 report.

**2009**

In August, Jones & Jones Architects and Landscape Architects and Geiger Engineers were tasked with performing a geotechnical evaluation and further developing the design alternatives. A design workshop was held in Stehekin on September 9, 2009 to work through some of the problems and engineering challenges identified by NPS staff in Stehekin regarding the floating dock and fixed ramp walkway concept. During that process, an additional alternative, the widened fixed walkway with adjustable landings, was identified and the group concurred that this alternative warranted further consideration. This alternative was developed to a level of detail commensurate with the fixed walkway and floating dock alternative for comparison. It is now the preferred alternative in this EA.