

## 5. Visit Site - Apply Matrix

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Select potential sites by using existing design references and communicating with the local community. Evaluate the suitability of a site through an on-site visit, field investigation, and preliminary analysis. Apply the *Site Visit Matrix*, located in Appendix A, to compare proposed sites. Use the site visit to verify preliminary assumptions and establish a closer working relationship with the local community.

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## 5.10 Alternative Sites

Compare the natural ability of each site to accommodate the design fleet in a functional harbor facility. The selection matrix identifies physical characteristics of the basin and uplands, including engineering, environmental, and economic features. You must consider geographic features, navigable water, safe harbor protection, good vehicular and pedestrian access, and sensitivities to environmental issues.

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**SITE INVESTIGATION is a part of every design. Don't postpone the visit until later in the study.**

- 1) To save development time and expense, identify all potential harbor sites and unsatisfactory conditions early in the design process.
- 2) You must perform on-the-ground confirmation of actual conditions to produce good aerial photographic documentation.
- 3) Encourage strong participation by members of the community during an initial site visit. This may provide valuable insight and local perspective toward each potential site.

**We recommend you observe the following during the site visit:**

1. Are uplands suitable for road access, utilities, parking, buildings, and boat storage, etc?
  2. Does the area have environmental, historical, or archeological concerns?
  3. Are there natural or man-made structures for protection from wind and waves that you can enhance or modify? Are there structures that will interfere with navigation or construction?
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**Note 1.** A **site** may encompass several acceptable **alternative** locations for the harbor. **Alternatives** within a site encompass only the basin area required to accommodate the design fleet.

**Note 2.** During these initial stages of site selection and investigation, you should be concerned with a broader scope, not specific harbor alternatives. As the investigation progresses and more information is known, narrow the scope of study. Often, sites are dropped after the site selection comparison is completed. Several alternatives, even within one site, may be carried forward.

**Note 3.** Smaller Alaskan communities may only need all terrain vehicle (e.g. four-wheelers) and pedestrian access.

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### REFERENCES:

1. ASCE Manual No. 50. Task Committee on Marinas 2000, 1982. *Planning and Design Guidelines for Small Craft Harbors*. New York. Pg. 3-9.

## 5.20 Interviews

Informal interviews are a valuable source of information. Local residents have observations not found elsewhere. Interviews are a good public relations tool and allow residents to feel as though they are a part of the design process. Interviews can reveal a community's perceptions, wants, and needs.

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<b>Perform INTERVIEWS during the on-site visit when:</b>
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- 1) The site is near a community with a variety of weather conditions.
- 2) The site is in an area for vessels seeking refuge from storms.
- 3) An existing facility has exposure similar to the proposed project.
- 4) Determining socioeconomic concerns regarding proposed sites.

### Recommendations for interview topics:

#### Design Wave:

1. What is the direction of the **largest waves**? How large were the waves you observed? What are the relative wave heights from **other directions**? [This may be difficult to estimate for untrained observers. Use this information cautiously in design.]
2. What are the most frequent **wind** directions?
3. From what direction are the **strongest winds**?
4. Can you recall the dates (or approximate dates) of major storms? [Correlate these dates with wind records or synoptic weather maps.]

#### Water Levels:

1. What is the highest observed **water level** relative to a landmark that can be surveyed? [This can be either with or without waves. In some areas, such as along the Bering Sea coast, also consider storm surge.]

#### Property Boundaries:

1. Where are the **survey markers** located?

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- Note 1.** It is best to interview individuals separately, as there is often a consensus in group interviews that may be influenced by leaders and elders. Determine the individual's time of residency.
- Note2.** **Interviews ought to be part of a normal conversation without formality and pomp. Serious and respectful consideration of the local experience will improve project quality and the public's satisfaction.** Even if you feel an idea has little merit, consider it, then explain why it may or may not be acceptable.
- Note 3.** Identify previous uses of an area: for example, cannery, log storage, or saltery. These uses suggest there is reasonable protection from winds and waves, and constructability may not be an issue. However, they may also identify potential environmental issues.

### 5.30 Photographic Documentation

Good photographic documentation will become an invaluable tool as the design progresses. You can digitize photographs and enhance the graphic rendering with proposed harbor features for public presentation. Remember that film is cheap, while field trips are not.

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#### PHOTOGRAPHIC DOCUMENTATION:

- 1) **ALWAYS** take photographs when doing a site visit.

#### Purpose and suggested uses:

1. Document material sites (insitu, quarry, etc.).
  2. Take a panoramic view (360° if necessary) from a critical location such as potential land access to float systems.
  3. Take photos from waterside approaches when possible.
  4. Photograph the beach during low tide, giving detail on material composition, slopes, or obstructions. In addition, identify environmental concerns, such as plants or animals.
  5. Document the relationship of structures that may affect the project, such as docks or upland buildings.
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**Note 1.** Always **document time** of photos that show relationship of tide to identifiable features.

**Note 2.** Include an appropriate **scale** on all photographs of beach material, armor rock, or any other feature where size is a design consideration. Make certain that the scale has high visibility.

## 5.40 Geotechnical Investigations

Identify bottom conditions, presence of bedrock or boulders, and potential for local quarry development during the harbor site selection. While professional geologists will identify and describe specific materials and conditions later, your observations during this initial site visit are critical in comparing alternative sites.

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**Perform these GEOTECHNICAL investigations during your site visit:**

- 1) Determine the type of material that may need to be dredged. Do this at low tide. You may use a shovel, backhoe, or other excavating tool to obtain samples of the exposed beach. Can the material be used for upland fill?
- 2) Evaluate quarry potential, including stone quality, size, and yield.
- 3) Investigate foundation materials for breakwater structures, upland fills, pile driving, etc.
- 4) Evaluate the feasibility of upland development and adequate access.
- 5) Assess the scope for geophysical studies.

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**Note 1.** Choice between **stone or concrete armor units** may depend on availability of local materials as well as wave conditions.

**Note 2.** When taking samples, knowledge of **minimum sample size** requirements are critical.

**Note 3.** Always provide good **photographic documentation** with an appropriate scale.

**Note 4.** Use local materials for constructing rubble breakwaters, as well as requirements for dredging and/or excavation, to greatly reduce the cost of building the harbor.

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### REFERENCES:

1. ASCE Manual No. 50. Task Committee on Marinas 2000. 1982. *Planning and Design Guidelines for Small Craft Harbors*. New York. Pg. 83-84, 139.
2. Construction Industry Research and Information Association, Special Publication 83, 1991. *Manual on the Use of Rock in Coastal and Shoreline Engineering*. Vermont, A.A. Balkema Publishers.

## 5.50 Beach Composition

The composition of beach materials will sometimes leave clues as to the general wave and wind action, currents, and tides. Be aware of these conditions to better understand the level of energy at the proposed site, which will aid in developing the best design.

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**Observe BEACH COMPOSITION during the site visit:**

- 1) Clean, uniform, well-rounded sand, pebbles, or cobbles are consistent with high wave action.
- 2) Angular cobbles and boulders with barnacles or other marine organisms suggest a lower wave climate.
- 3) An area of deposition that appears to be a trap for fine materials (sediment sink) is one of relatively low energy.
- 4) Well defined storm berms with crest elevations extending some distance above extreme high tides, or debris strewn inland, can give clues to the level of storm activity. Since tide elevations cannot be easily linked to historical storm berms, use this information with caution.
- 5) Investigate shoals or discontinuities in a natural beach. If not associated with sediment sources or sinks, they may indicate bedrock or large boulders. The presence of rock or boulders on adjacent uplands may also indicate similar sub-bottom materials in the beach.

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**Note 1.** The **material size** on a beach is mainly associated with the **slope** of the beach. The relationship between material size and wave height is not well understood.

**Note 2.** If you take samples, you should know the **sample size requirements** for analysis.

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**REFERENCES:**

1. ASCE Manual No. 50. Task Committee on Marinas 2000. 1982. *Planning and Design Guidelines for Small Craft Harbors*. New York Pg. 162-163.
2. Tobiasson, B.O. & Kollmeyer, R.C. 1991. *Marinas and Small Craft Harbors*. New York: Van Nostrand Reinhold. Pg. 70.

## 5.60 Landside Access

Access to the proposed harbor site is a primary concern when considering the cost and feasibility of the project. Suitable space for upland development and public use are important.

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### From LANDSIDE ACCESS investigation, you should determine:

- 1) If there is an existing road to the site, or if you will need to include one in the project cost. Determine whether a road can be constructed cost effectively.
  - 2) The level of need of a community; small remote communities may need only all terrain vehicle and pedestrian access.
  - 3) If uplands at the proposed site are sufficient to support a fully functional harbor. If there are existing uplands, determine if they are adequate.
  - 4) If upland ownership and rights-of-way are clearly defined.
  - 5) The level of congestion and whether additional space will be needed, if expanding an existing facility.
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**Note 1.** The Army Corps of Engineers (ACOE) National Economic Development (NED) requirements do not include benefits for **adjacent uplands**; however, they are still **necessary for a fully functional harbor**, and you must consider them in the overall design.

**Note 2.** Conduct a traffic assessment of a proposed harbor only for limited access highway connections. In urbanized areas, where this may be a significant concern, a professional traffic planner may conduct a study. It is important for the harbor developer or engineer to understand the potential impact of this study.

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### REFERENCES:

1. ASCE Manual No. 50. Task Committee on Marinas 2000. 1982. *Planning and Design Guidelines for Small Craft Harbors*. New York. Pg. 12-21, 29, & 54-55.
2. Tobiasson, B.O. & Kollmeyer, R.C. 1991. *Marinas and Small Craft Harbors*. New York: Van Nostrand Reinhold. Pg. 71-75, 85-86.

## 5.70 Instrumentation Needs

Collection and analysis of data specific sites will reduce design risks related to estimating winds, waves, currents, or other natural forces. Undeveloped sites require careful instrument placement. Make careful observations and take clear photographs during the site visit to improve data quality.

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### Include INSTRUMENTATION site evaluation when:

- 1) You are including site specific instrument(s) in the study.
  - 2) You have not determined the need for additional instrumentation.
  - 3) You need to determine the specific location and factors affecting an historical data site.
  - 4) Special conditions (wind, wave, ice, water level, or currents, etc.) require added instrumentation sites.
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**Note 1.** Place instruments on individual pilings.

**Note 2.** Pile supported docks are well-suited for wave gauges.

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### REFERENCES:

1. ASCE Manual No. 50. Task Committee on Marinas 2000. 1982. *Planning and Design Guidelines for Small Craft Harbors*. New York. Pg. 12-13.
2. Tobiasson, B.O. & Kollmeyer, R.C. 1991. *Marinas and Small Craft Harbors*. New York: Van Nostrand Reinhold. Pg. 61-63 & 156.