City of Alexandria Waterfront Master Plan

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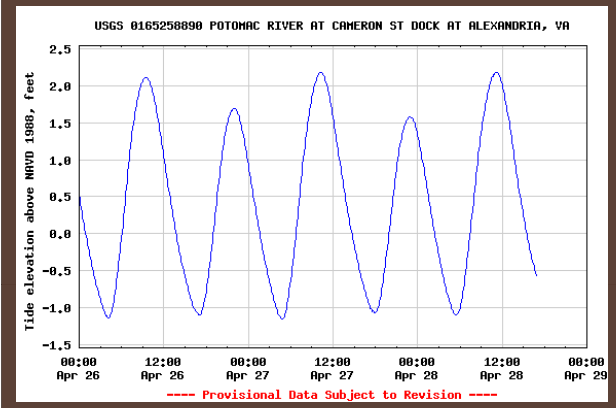
Marine Engineering/Planning Considerations

Waterfront Program Elements

- Shoreline stabilization
- Landside access - fixed piers & floating walkways
- Waterside access – marina, boat slips

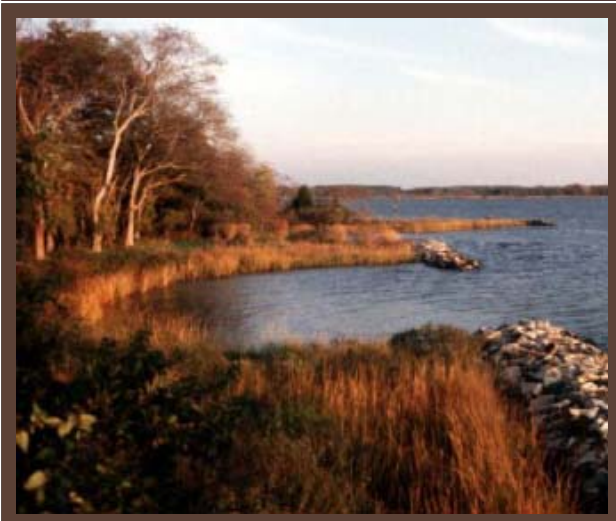
Marine Engineering/Planning Considerations



Shoreline stabilization

- Design may vary along the shoreline & zone (elevation)
- Environmental forcing – potential failure
  - water level (tidal and event based)
  - current, waves (wind/vessel)
  - sedimentation (erosion & deposition)
- Shoreline use & accessibility – landside , waterside
- Public safety
- Environmental considerations – ecological, water quality

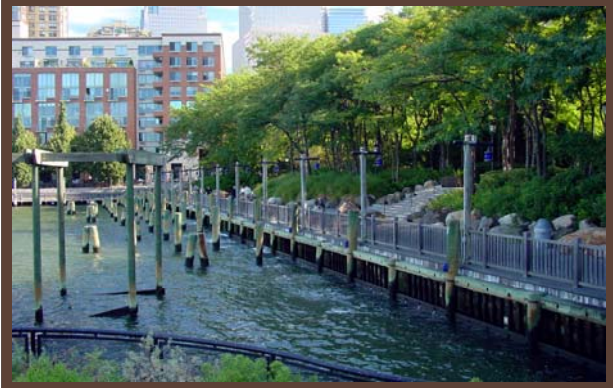
Marine Engineering/Planning Considerations



Shoreline Stabilization (cont'd)

- Reliability, design life, uncertainty/risk – likelihood of success
- Capital improvement/maintenance
- Consider – Scaling
  - Macro – e.g. watershed
  - Meso – e.g. slope stability
  - Micro – e.g shear stress
- Methods for stabilization
  - Reduce energy or mitigate forcing

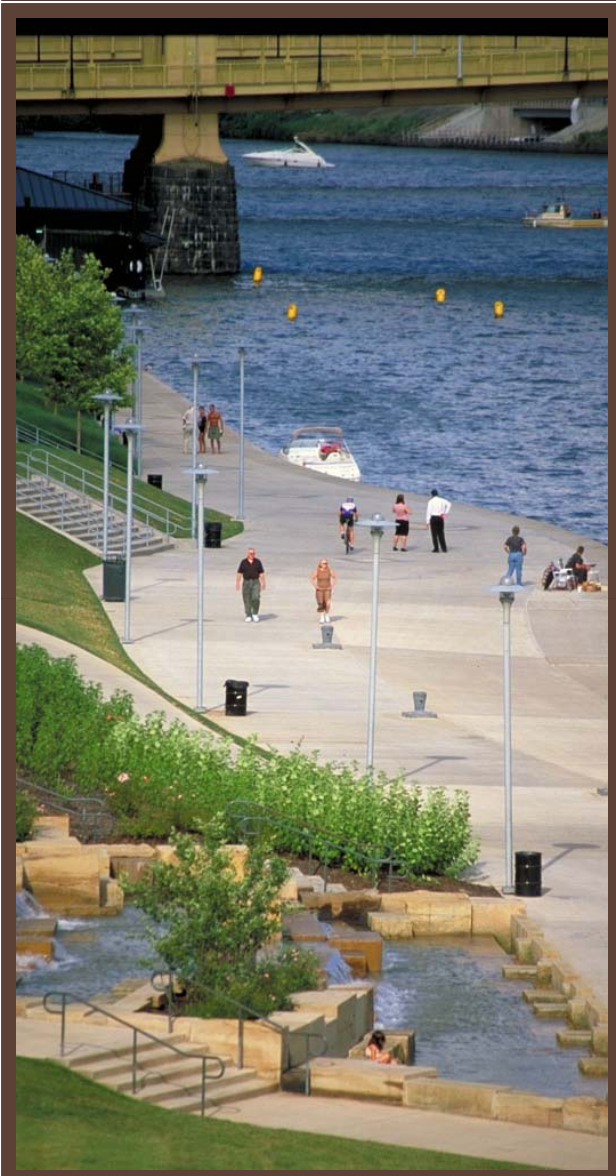
Marine Engineering/Planning Considerations



Shoreline stabilization (cont'd)

- variety of solutions (e.g. bulkead, rip rap, grading, bio-stabilization, wetlands planting)
- zonation (swash, terrace, flood) for protection based forcing and water

Marine Engineering/Planning Considerations



Landside access (fixed piers & floating walkways)

- Siting
  - Navigation, environmental & ecological constraints
  - Programmatic use/access existing/proposed

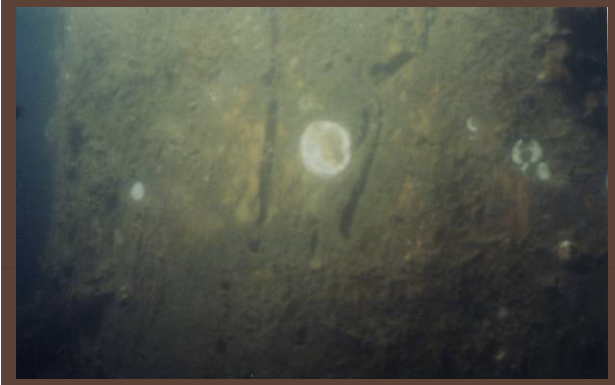
Marine Engineering/Planning Considerations

Landside Access (cont'd)

- Structural detail
  - Environmental forcing - current & debris, waves (wind/vessel), ice, mooring
  - Geotechnical strength/resistance
  - Reliability, design life, uncertainty/risk – likelihood of success
  - Capital improvement/maintenance

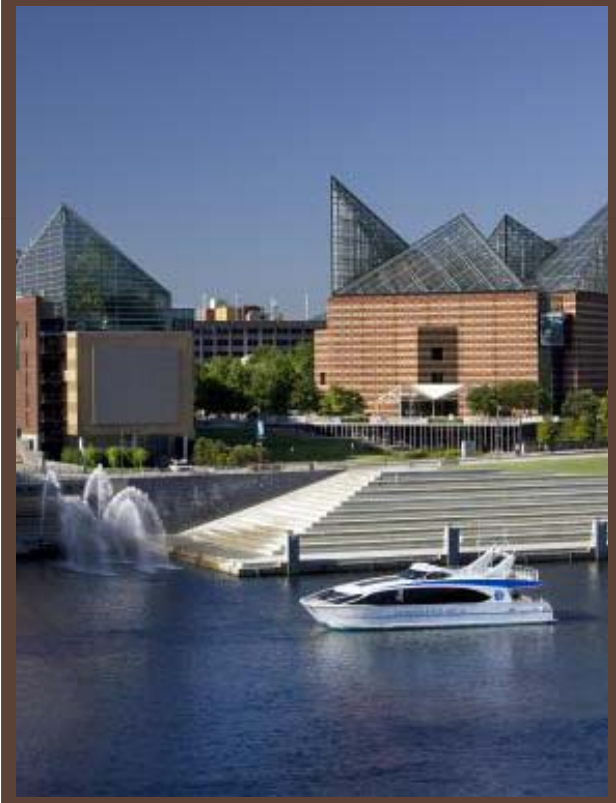
Marine Engineering/Planning Considerations

Marine Engineering/Planning Considerations



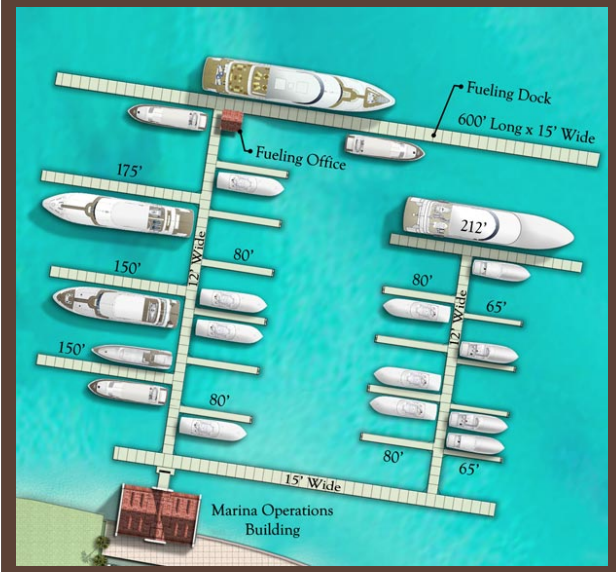
Evaluation / Modification of Existing Structures

Marine Engineering/Planning Considerations



Fixed Pier

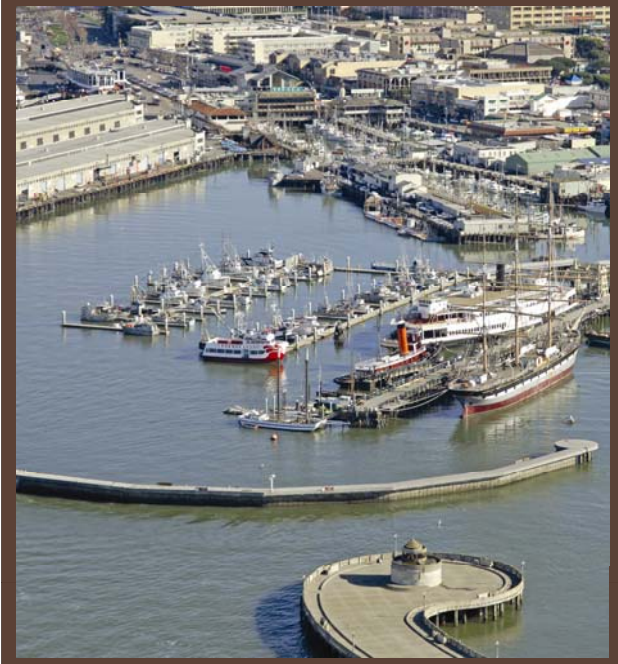
Marine Engineering/Planning Considerations



Waterbased acccess (marina, slips, etc.)

- Establish market demand
- Siting
  - Access to/from
  - Currents, water level ,wave action, sedimentation - navigability
  - Compatibility with existing/planned vessel use
- Layout
  - Vessel characteristics
    - Sail, motor
    - Size of vessels, draft, turning radius
  - Slip size, double vs. single slips

Marine Engineering/Planning Considerations



Marine Engineering/Planning Considerations

Waterbased access (marina, slips, etc.)

- Structure design (e.g. wooden, floating) considerations
  - Fixed vs. floating docks
    - water level
    - use requirements - fixed freeboard between dock and boat
  - Docks - Material Selection - wood, concrete, metal and composite materials
    - Environmental forcing
    - Use – loading, mooring of vessels