Lake Granbury WPP
Alternatives Analysis

5 - ALTERNATIVES ANALYSIS
Stakeholder Meeting
August 18, 2009
DRAFT (08/12/09)

Topics for Today’s Discussion

- Summary of Areas
- Process for incorporating stakeholder input
- Specific materials for additional Areas
- Summary Evaluation Matrices
  - Each Subdivision, with comments to-date
  - Including Educational Components
- Eliminate alternatives by consensus
Summary of Areas

- Rolling Hills Shores
- Oak Trail Shores
- Long Creek
- Sky Harbor
- Indian Harbor
- Nassau Bay II
- Port Ridglea East
- Blue Water Shores
- Walnut Creek

Process for incorporating stakeholder input
Incorporating Stakeholder Inputs

- **PROCESS**
  - Deliver draft materials (DONE)
  - Gather input and comments (IN-PROGRESS)
  - Revise materials per input and comments (FUTURE)
- Final product: one evaluation matrix for each Area of interest
- **The goal of today’s discussion is to gather as much input as necessary to create the final matrices.**

Updates

- **Education Programs**
  - Added available information for education programs applicable to each Area of interest
  - Currently evaluating information related to percent reduction, life cycles and cost index.
- **Additional Areas**
  - Blue Water Shores
    - Cove Dynamics (Dredging)
    - Cove Circulation (Intake/Discharge)
  - Walnut Creek
General Comments

- **Evaluation Criteria**
  - Comment: Include Long term sustainability
    - Resolution: Incorporated into life cycle costs
  - Comment: Evaluation criteria wording “Watershed % Reduction” not appropriate
    - Resolution: Change to “Bacteria % Reduction”
  - Comment: Can we determine what % reduction in each subdivision needs to be reached to meet stakeholder goals?
    - Resolution: Recognize significant constraints to this approach, bacteria are living organism with complex life cycles – difficult to predict accurate reductions in concentrations at specific locations

- **Suggestion:**
  - Prioritize areas and alternatives for implementation planning and funding outreach

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General Comments

- **Weighting of evaluation criteria**
  - All draft materials assume equal weighting for
    - Life cycle
    - Bacteria % reduction
    - Cost index
  - No comments on this yet
  - Is one factor more important than another?
General Comments

On-site Sewage Facilities

- Septic Inspections
  - Comment: Hood County Health Dept. has limited staffing resources to perform detailed inspections for all subdivisions.
  - Resolution: Need to investigate enforcement of real estate inspections

- Life Span for Replacement of Septic Systems
  - Assumption: 25 yrs
  - Comments: 12 to 20 yrs to longer
  - Resolution: 20 years

- Terminology for Onsite Systems
  - Comments: Consistency between OWTS vs OSSF
  - Resolution: OSSF

General Comments

Wastewater Collection Systems

- Power for wastewater collection systems
  - Assumption: 3-phase
    - Comment: May be optimistic for some areas.
    - Resolution: This assumption is fine.
  - Assumption: Cost $0.11/kWh
    - Comment: Recently increased by 8%
    - Resolution: Continue with current assumption unless otherwise resolved.

- Time to Implement wastewater collections systems
  - Comment: Is time to implementation the same for all subdivisions?
  - Resolution: Reduce for Port Ridglea East and Nassau Bay II considering plans already underway.

- Number of connections
  - Assumption: Equals the number of lots based on subdivision parcels
    - Comments: Some subdivisions have residences with double lots
    - Resolution: Determine appropriate ratio for each subdivision based on stakeholder input
General Comments
Cove Dynamics and Circulation

- Structures in coves and canals may constrain navigability
- Some of the water is too shallow to implement circulation features

Areas Not Previously Presented

Decision Points
Nassau Bay II

- Wastewater collection systems
  - 123 connections = # of lots
- Aggregate collection system with Port Ridge East
### Water’s Edge

<table>
<thead>
<tr>
<th>Subdivision</th>
<th>BMP Alternative</th>
<th>Weighting</th>
<th>% Reduction Bacteria</th>
<th>Time to Implement</th>
<th>Equivalent Annual Cost Index</th>
<th>Score</th>
<th>Feasibility (Constraints/Considerations)</th>
<th>Funding</th>
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<tbody>
<tr>
<td>Indian Harbor</td>
<td>Urban Education on Fertilizer Application</td>
<td>1-2 yrs</td>
<td>4</td>
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<tr>
<td></td>
<td>Pet Waste Education</td>
<td>1 yrs</td>
<td>5</td>
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</tr>
<tr>
<td></td>
<td>Waterfowl and Wildlife Feeding Ordinances</td>
<td>1-2 yrs</td>
<td>4</td>
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</table>

- How are we going to determine cost index for waterfowl control at Water's Edge?
- How many lots share the costs?

### Indian Harbor

<table>
<thead>
<tr>
<th>Subdivision</th>
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<th>Feasibility (Constraints/Considerations)</th>
<th>Funding</th>
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<tbody>
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<td>0.25</td>
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<td>Cove Circulation Systems (Fountains, etc)</td>
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<td>0.1</td>
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- Wastewater Collection Systems
  - 1909 connections = # of lots
Port Ridglea East

Site-specific development of Alternatives:

Blue Water Shores

Most likely Potential Sources = Domestic pets or septic discharge
Most likely Potential Sources = Domestic pets or septic discharge

Blue Water Shores Subdivision
Cove Dynamics: Dredge

357 lots/residences in subdivision

- **6’ depth**
  - 5 year life cycle
  - Percent concentration reduction = 30%
    - Greater reduction if direct discharge source reduced
  - EAC Index = 0.98

- **8’ depth**
  - 10 year life cycle
  - Percent concentration reduction = 45%
    - Greater reduction if direct discharge source reduced
  - EAC Index = 1.0
Blue Water Shores
Cove Circulation

Intake-Discharge Circulation System
- 4 day turnover rate
- 1 discharge point
- 357 lots in subdivision
- PVC pipe
  - 955 linear feet
  - 6” diameter
- 15 year life cycle
- Potential concentration reduction = 38%
- EAC index = 0.09

Cove Dynamics
- Only dredge canal with high E. coli observations
- 4-day turn over
Site-specific development of Alternatives:

Walnut Creek

Most likely Potential Sources = Cattle, Pets, Feral hogs, Septic, Deer
### Walnut Creek – Possible Alternatives Matrix

<table>
<thead>
<tr>
<th>Subdivision</th>
<th>BMP Alternative</th>
<th>% Reduction Bacteria</th>
<th>Time to Implement</th>
<th>Equivalent Annual Cost index</th>
<th>Score</th>
<th>Feasibility (Constraints/Considerations)</th>
<th>Funding</th>
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<tbody>
<tr>
<td>Walnut Creek</td>
<td>Catchment Basin</td>
<td>0.5 yrs</td>
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<tr>
<td></td>
<td>Vegetative Filter Strips</td>
<td>1 yr</td>
<td>1</td>
<td>1</td>
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<td></td>
<td></td>
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<tr>
<td></td>
<td>Septic Maintenance and Education</td>
<td>0.5 yrs</td>
<td>3</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Pet Waste Education</td>
<td>1 yr</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Feral Hog Education Program/Policy</td>
<td>0.5 yrs</td>
<td>3</td>
<td>1</td>
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</tbody>
</table>

Legend:
- **E coli Concentration (MPN/100 mL)**
  - Low (<5)
  - Medium (1-12)
  - High (12+)

- **Weighting**
  - Low: 1
  - Medium: 2
  - High: 3

- **Funding**
  - Low: 1
  - Medium: 2
  - High: 3

- **Equivalent Annual Cost index**
  - Low: 1
  - Medium: 2
  - High: 3

- **Score**
  - Low: 1
  - Medium: 2
  - High: 3

- **Feasibility (Constraints/Considerations)**
  - Low: 1
  - Medium: 2
  - High: 3
## Summary Evaluation Matrices by Area

### Lake-wide measures

<table>
<thead>
<tr>
<th>Subdivision</th>
<th>BMP Alternative</th>
<th>% Reduction Bacteria</th>
<th>Time to Implement</th>
<th>Equivalent Annual Cost Index</th>
<th>Score</th>
<th>Feasibility (Constraints/Considerations)</th>
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<tbody>
<tr>
<td>Lake Wide</td>
<td>Regional Wastewater Treatment</td>
<td>50%</td>
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<td>1</td>
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<td></td>
<td>Compostal Filter Strips</td>
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<td>1-2 yrs</td>
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<td>1</td>
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<tr>
<td></td>
<td>Septic Maintenance and Education</td>
<td>10%</td>
<td>1-2 yrs</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Urban Education on Fertilizer Application</td>
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<td>1-2 yrs</td>
<td>1</td>
<td>1</td>
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<tr>
<td></td>
<td>Pet Waste Education</td>
<td>10%</td>
<td>1-2 yrs</td>
<td>1</td>
<td>1</td>
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<tr>
<td></td>
<td>Livestock/Rangeland Management Education</td>
<td>10%</td>
<td>1-2 yrs</td>
<td>1</td>
<td>1</td>
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<tr>
<td></td>
<td>Waterfowl Breeding Control Program</td>
<td>10%</td>
<td>1-2 yrs</td>
<td>1</td>
<td>1</td>
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<tr>
<td></td>
<td>Waterfowl and Wildlife Feeding Ordinances</td>
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<td>1-2 yrs</td>
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- **Horse Farm Education (TSSWCB)**
### Rolling Hills Shores

#### BMP Alternative

<table>
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<tr>
<th>Subdivision</th>
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<th>Weighting</th>
<th>% Reduction Bacteria</th>
<th>Time to Implement</th>
<th>Equivalent Annual Cost index</th>
<th>Score</th>
<th>Feasibility (Constraints/Considerations)</th>
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<tbody>
<tr>
<td>Septic System Replacement along Cove</td>
<td>Septic System Replacement along Cove</td>
<td>46%</td>
<td>3 - 1 yr</td>
<td>5</td>
<td>0.32</td>
<td>2</td>
<td>More repairs, floodplain, limited to existing tanks</td>
</tr>
<tr>
<td>Wastewater Treatment - Inland</td>
<td>Wastewater Treatment - Inland</td>
<td>46%</td>
<td>3 - 1 yr</td>
<td>6</td>
<td>0.20</td>
<td>3</td>
<td>More repairs</td>
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<tr>
<td>Septic System Replacement uphill</td>
<td>Septic System Replacement uphill</td>
<td>46%</td>
<td>3 - 1 yr</td>
<td>6</td>
<td>0.20</td>
<td>3</td>
<td>More repairs</td>
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<td>Local Centralized Wastewater Treatment</td>
<td>Local Centralized Wastewater Treatment</td>
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<td>3 - 1 yr</td>
<td>6</td>
<td>0.20</td>
<td>3</td>
<td>More repairs</td>
</tr>
<tr>
<td>Regional Wastewater Treatment</td>
<td>Regional Wastewater Treatment</td>
<td>46%</td>
<td>3 - 1 yr</td>
<td>6</td>
<td>0.20</td>
<td>3</td>
<td>More repairs</td>
</tr>
<tr>
<td>Property Buy Out</td>
<td>Property Buy Out</td>
<td>62%</td>
<td>4 - 2 yrs</td>
<td>4</td>
<td>0.15</td>
<td>4</td>
<td>Public Opinion, Removal of Tanks</td>
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<tr>
<td>Dredge</td>
<td>Dredge</td>
<td>86%</td>
<td>5 - 2 yrs</td>
<td>3</td>
<td>0.76</td>
<td>0</td>
<td>Does not address source(s)</td>
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<tr>
<td>Partial Fill</td>
<td>Partial Fill</td>
<td>9%</td>
<td>0 - 2 yrs</td>
<td>4</td>
<td>0.20</td>
<td>3</td>
<td>Does not address source(s)</td>
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<tr>
<td>Partial Fill &amp; Dredge</td>
<td>Partial Fill &amp; Dredge</td>
<td>9%</td>
<td>5 - 0 yrs</td>
<td>3</td>
<td>0.73</td>
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<td>Flood storage, Property Rights</td>
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<td>Vegetative Filter strips</td>
<td>Vegetative Filter strips</td>
<td>9%</td>
<td>5 - 0 yrs</td>
<td>3</td>
<td>0.73</td>
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<td>Flood storage, Property Rights</td>
</tr>
<tr>
<td>Vegetative Partial Fill &amp; Dredge</td>
<td>Vegetative Partial Fill &amp; Dredge</td>
<td>86%</td>
<td>5 - 2 yrs</td>
<td>3</td>
<td>0.76</td>
<td>0</td>
<td>Flood storage, Property Rights</td>
</tr>
<tr>
<td>Subdivision</td>
<td>Subdivision</td>
<td>9%</td>
<td>1 - 1 yr</td>
<td>5</td>
<td>0.05</td>
<td>5</td>
<td>Does not address source(s)</td>
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<tr>
<td>Septic Maintenance and Education</td>
<td>Septic Maintenance and Education</td>
<td>9%</td>
<td>1 - 1 yr</td>
<td>5</td>
<td>0.05</td>
<td>5</td>
<td>Does not address source(s)</td>
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<tr>
<td>Septic, Management (records, inspections)</td>
<td>Septic, Management (records, inspections)</td>
<td>9%</td>
<td>1 - 1 yr</td>
<td>5</td>
<td>0.05</td>
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<td>Does not address source(s)</td>
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<tr>
<td>Pet Waste Education</td>
<td>Pet Waste Education</td>
<td>9%</td>
<td>1 - 1 yr</td>
<td>5</td>
<td>0.05</td>
<td>5</td>
<td>Does not address source(s)</td>
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<tr>
<td>Waterbony Breeding Control Program</td>
<td>Waterbony Breeding Control Program</td>
<td>9%</td>
<td>1 - 1 yr</td>
<td>5</td>
<td>0.05</td>
<td>5</td>
<td>Does not address source(s)</td>
</tr>
</tbody>
</table>

#### Cove Dynamics

- Bacteria Reduction %
- Time to Implement
- Equivalent Annual Cost index
- Score

- Rolling Hills Shores
  - BMP Alternative
  - Weighting
  - % Reduction Bacteria
  - Time to Implement
  - Equivalent Annual Cost index
  - Score
  - Feasibility (Constraints/Considerations)

#### Rolling Hills Shores - Comments
- Possible Alternative Investigation
  - Terrace or catchment for upper watershed
## Oak Trail Shores

### Oak Trail Shores - Comments

- **Alternatives to Investigate**
  - Flush water through cove from offsite drainage
  - Flush more water through cove from pumping

- **Number of Connections**
  - Assumption: # of lots
  - Comment: Some are double lots
  - Resolution: Use number of parcels because of potential for future redevelopment

<table>
<thead>
<tr>
<th>Subdivision</th>
<th>BMP Alternative</th>
<th>Weighting</th>
<th>% Reduction</th>
<th>Time to Implement</th>
<th>Equivalent Annual Cost Index</th>
<th>Score</th>
<th>Feasibility (Constraints/Considerations)</th>
<th>Funding</th>
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<td>Oak Trail Shores</td>
<td>Septic System Replacement</td>
<td>Section 1</td>
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Long Creek

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<tr>
<th>Area</th>
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<th>% Reduction Bacteria</th>
<th>Time to Implement</th>
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<td>Long Creek</td>
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<td>Pet Waste Education</td>
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<td>1</td>
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<td>Area Conservation Plan and Education for small landowners</td>
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<tr>
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<tr>
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<td>Waterfowl and Wildlife Feeding Ordinances</td>
<td>1-2 yrs</td>
<td>4</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 Long Creek Subdivision Only, does not consider upper watershed

Long Creek - Comments

- Alternatives to Investigate
  - Watershed Management above monitoring point
  - Education should be top of priorities
  - Regional wastewater collection low priority because of remote location

- Other Comments:
  - 200-500 geese can be seen on the turf grass fields.
  - Septic systems are not a problem in this area
  - Slide 4 100% reduction refers to human sources in subdivision
  - Investigate septic pump-out and land application near Hwy 51.
  - Investigate turfgrass farm
    - Use of compost/organic fertilizer?
  - Suggested that the Brazos Coalition sample at the creek outlet for comparison to current station.
Sky Harbor - Comments

- Cove dynamics dredging option:
  - Assumption: 5 years until re-dredging
  - Comments: 5' sediment accumulation in 30 years
  - Resolution: 15 years to re-dredging (evaluate other subdivisions case-by-case)

- Number of connections
  - Assumption: Number of connections = # lots
  - Comment: Many residences use double lots
  - Resolution: Assume connections for 75% of lots
Next Steps

- September Meeting
  - Finalize Evaluation Criteria
  - Discuss how to move forward – prioritize efforts
- October Meeting
  - Distribute revised materials, per input and comments
  - Decide alternatives to pursue

Questions or Comments?

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