

**STX EE WATERSHEDS**

**RETROFITS**



Site Name/ID: TH-R-1 / Point Udall  
 Date: 1/21/2011

Watershed: TURNER HOLE  
 Assessed by: RAC, ACS

**EXISTING SITE/STORMWATER MANAGEMENT**

Site Contact Info: Paige @EEMP

Land Use:  Public  Private  Unknown:

Single Family Residential  Multi-Fam. Residential  School  Golf Course  Park  Agricultural  Road  
 Commercial/Industrial  Resort  Marina  Other: \_\_\_\_\_

Is the site a hotspot?  Yes  No  Unknown:  
 Sources/pollutants observed?  No  Sediment  Nutrients/organics  Oil/grease  Trash/Floatables

Existing Stormwater BMP on site?  Yes  No  Unknown:

Soils:  Unknown  poor infiltration  good infiltration

Describe Existing Stormwater Conditions, Including Existing Site Drainage and Conveyance:  
Surface runoff from road (paved) and parking area to trail  
water bars on trail + check dams/diversions w  
silt fence / sed. trapping ves each project  
road = 20' wide

**PROPOSED RETROFIT CONCEPT (CONT. ON BACK)**

Proposed Retrofit Practice(s):  existing BMP upgrade  new BMP

island bio/rain garden  swale  planter  tree pits  infiltration  permeable paver  sand filter  pond  
 constructed wetland  proprietary practice  soil amendments  reforestation  impervious cover removal  
 rainwater harvesting  disconnection  Other (describe): \_\_\_\_\_

<p><b>Area Draining to Retrofit</b></p> <input type="checkbox"/> Hotspot <input type="checkbox"/> Individual rooftop <input checked="" type="checkbox"/> Parking Lot <input type="checkbox"/> other small impervious area <input checked="" type="checkbox"/> Street <input type="checkbox"/> Pervious area <input type="checkbox"/> Other (describe): _____	<p><b>Drainage Area to retrofit</b> ≈ _____ acres/sq ft</p> <p><b>Imperviousness</b> ≈ _____ %</p> <p><b>Impervious Area</b> ≈ _____ acres/sq ft</p>
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Benefits of Retrofit (primary & secondary):  Storage  Water Quality  Recharge  Gut Protection  Demonstration / Education  Repair  Other: protect trail from erosion

<p>Possible Conflicts due to: <input checked="" type="checkbox"/> Soils <input type="checkbox"/> Access  <input type="checkbox"/> Adjacent Land Use <input type="checkbox"/> Existing Utilities  <input type="checkbox"/> Contamination <input type="checkbox"/> High water table  <input type="checkbox"/> Limited access to water <input checked="" type="checkbox"/> Other: <u>Positive outlet</u></p>	<p>Describe conflicts:</p>
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**NEXT STEPS**

Candidate for pilot project  yep, love it  OK  undecided  no, but keep listed  no way

Follow-up needed to Complete Field Concept NO

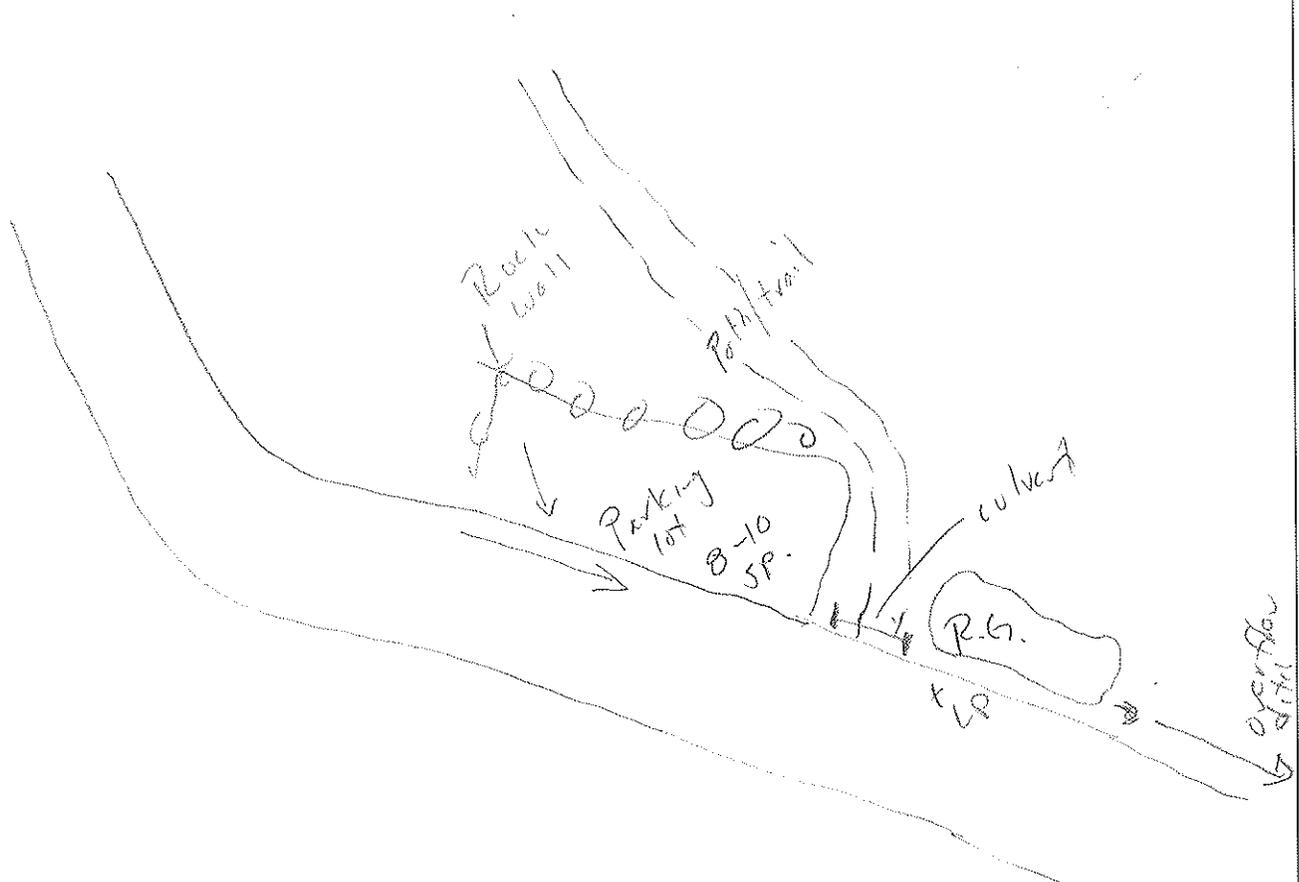
<input type="checkbox"/> Confirm property ownership	<input type="checkbox"/> Obtain existing as-builts/site plans	<input type="checkbox"/> Obtain utility mapping
<input type="checkbox"/> Confirm drainage area/impervious cover	<input type="checkbox"/> Obtain detailed topography	<input type="checkbox"/> Confirm soil types
<input type="checkbox"/> Confirm volume computations	<input type="checkbox"/> Confirm storm drain invert elevations	
<input type="checkbox"/> Complete concept sketch	<input type="checkbox"/> Other:	

**PROPOSED RETROFIT CONCEPT (CONT.)**

**Narrative Description (Including key elements, aprox. surface area/ depth of treatment, conveyance structures):**

Arid Rain garden with arid vegetation (e.g. cactus)  
ditch to discharge down road to bypass high point  
possible culvert at trail head

**Sketch and/or Sizing Calcs:**



**Existing Head Available/Where Measured:**

**Initial Feasibility and Construction Considerations/ Design or Delivery Notes:**

Thoughts on Maintenance Burden:  Low  Medium  High

**STX EE WATERSHEDS**

**RETROFITS**



Site Name/ID: TH-R-2 / DIVI CASINO

Watershed: TURNER HOLE

Date: 1/25/2011

Assessed by: RAC, ACS

**EXISTING SITE/STORMWATER MANAGEMENT**

Site Contact Info: Divi Casino Manager / Owner

Land Use:  Public  Private  Unknown:

Single Family Residential  Multi-Fam. Residential  School  Golf Course  Park  Agricultural  Road  
 Commercial/Industrial  Resort  Marina  Other: Casino

Is the site a hotspot?  Yes  No  Unknown:

Sources/pollutants observed?  No  Sediment  Nutrients/organics  Oil/grease  Trash/Floatables

Existing Stormwater BMP on site?  Yes  No  Unknown: detention pond

Soils:  Unknown  poor infiltration  good infiltration

**Describe Existing Stormwater Conditions, Including Existing Site Drainage and Conveyance:**

Sheet flow off parking lot to swale then directed to detention pond  
existing flume in rear parking and directs flow behind casino

**PROPOSED RETROFIT CONCEPT (CONT. ON BACK)**

Proposed Retrofit Practice(s):  existing BMP upgrade  new BMP

island bio/rain garden  swale  planter  tree pits  infiltration  permeable paver  sand filter  pond  
 constructed wetland  proprietary practice  soil amendments  reforestation  impervious cover removal  
 rainwater harvesting  disconnection  Other (describe): ED retrofit w/micro-pool wetland/long flow path w/baffle

**Area Draining to Retrofit**

Hotspot  Individual rooftop  
 Parking Lot  other small impervious area  
 Street  Pervious area  
 Other (describe):

Drainage Area to retrofit ≈ \_\_\_\_\_ acres/sq ft

Imperviousness ≈ \_\_\_\_\_ %

Impervious Area ≈ \_\_\_\_\_ acres/sq ft

Benefits of Retrofit (primary & secondary):  Storage  Water Quality  Recharge  Gut Protection  Demonstration / Education  Repair  Other:

Possible Conflicts due to:  Soils  Access  
 Adjacent Land Use  Existing Utilities  
 Contamination  High water table  
 Limited access to water  Other:

**Describe conflicts:**

**NEXT STEPS**

Candidate for pilot project  yep, love it  OK  undecided  no, but keep listed  no way

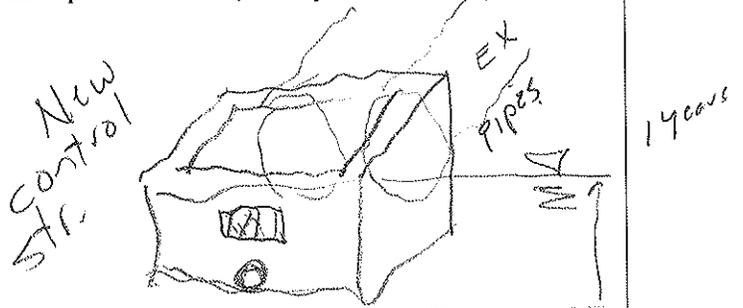
**Follow-up needed to Complete Field Concept**

Confirm property ownership  Obtain existing as-builts/site plans  Obtain utility mapping  
 Confirm drainage area/impervious cover  Obtain detailed topography  Confirm soil types  
 Confirm volume computations  Confirm storm drain invert elevations  
 Complete concept sketch  Other:

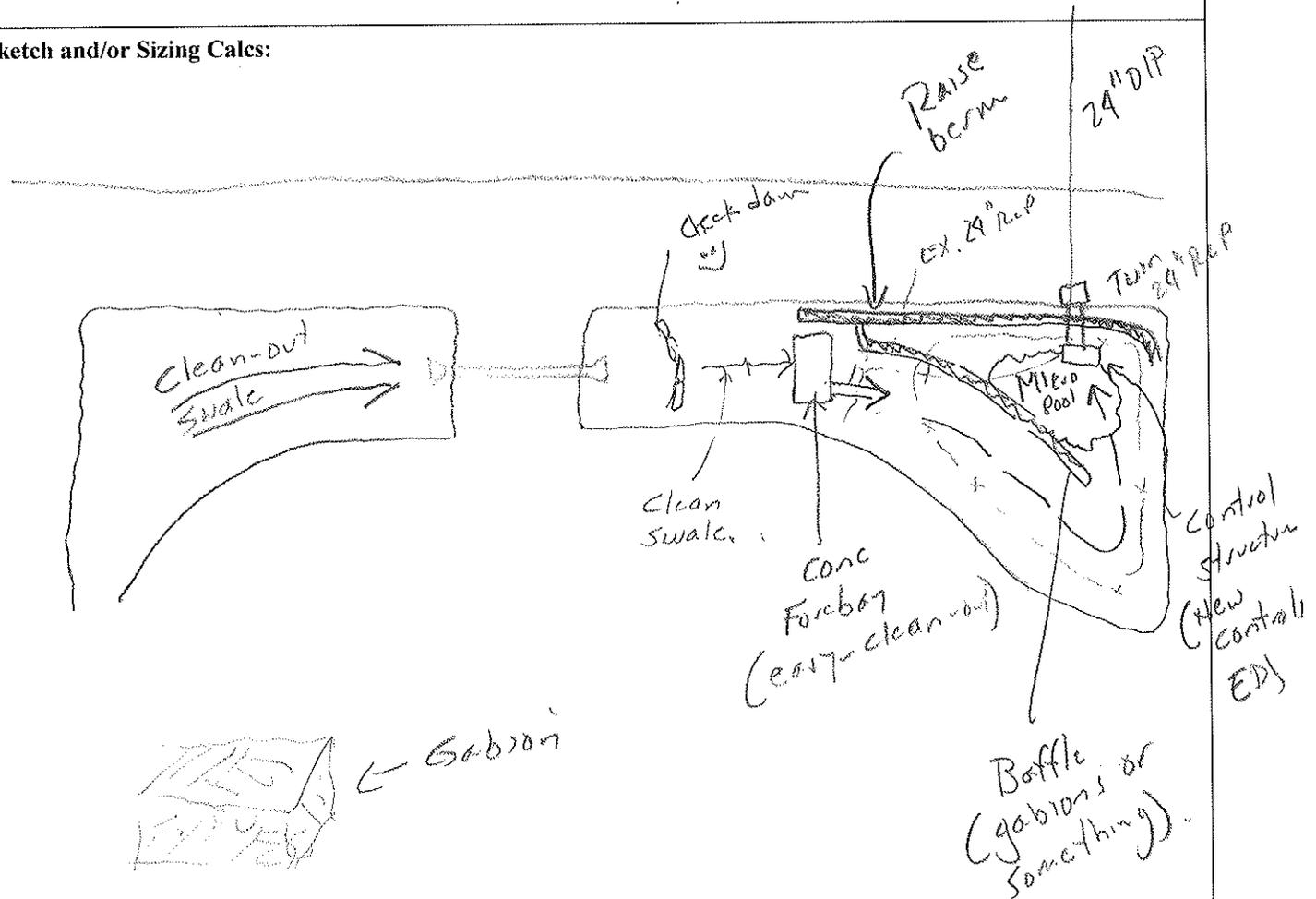
**PROPOSED RETROFIT CONCEPT (CONT.)**

Narrative Description (Including key elements, approx. surface area/ depth of treatment, conveyance structures):

Classic ED Retrofit  
w/ micro-pool wetland  
long flow-path w/  
baffle.



**Sketch and/or Sizing Cales:**



**Existing Head Available/Where Measured:**

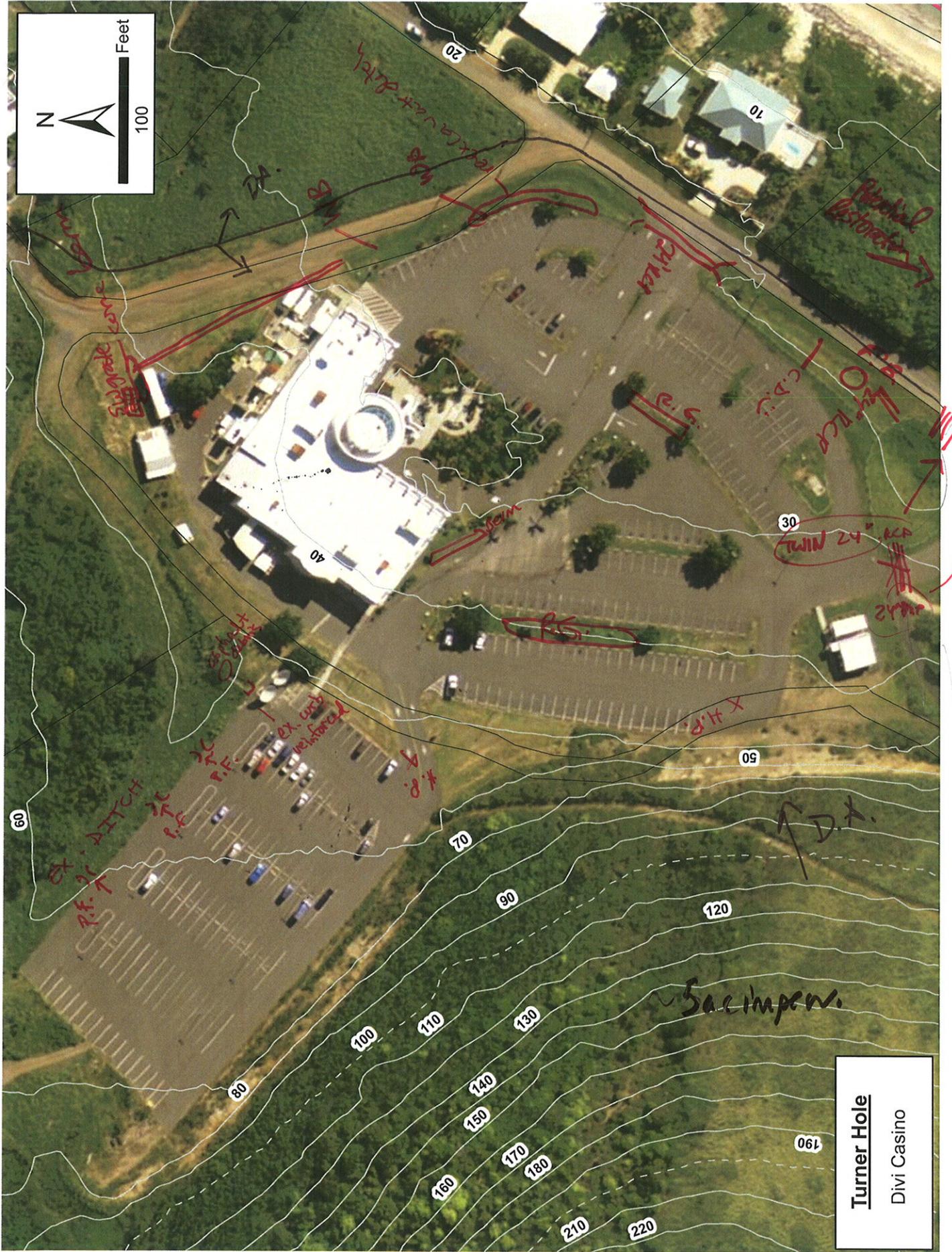
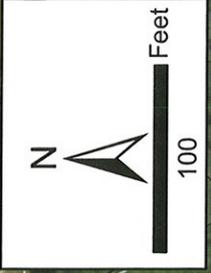
Lots except for swale.

**Initial Feasibility and Construction Considerations/ Design or Delivery Notes:**

See sketch. - Raise berm to get more storage

Thoughts on Maintenance Burden:  Low  Medium  High

TH-R-2



**Turner Hole**  
Divi Casino



STX EE WATERSHEDS

RETROFITS



Site Name/ID: TH-R-3 / Divi Hotel & Resort Watershed: TURNER HOLE

Date: 1/25/2011 Assessed by: RAL, ACS

EXISTING SITE/STORMWATER MANAGEMENT

Site Contact Info: Divi Hotels & Resort

Land Use: [ ] Public [x] Private [ ] Unknown:
[ ] Single Family Residential [ ] Multi-Fam. Residential [ ] School [ ] Golf Course [ ] Park [ ] Agricultural [ ] Road
[ ] Commercial/Industrial [x] Resort [ ] Marina [ ] Other:

Is the site a hotspot? [ ] Yes [x] No [ ] Unknown:
Sources/pollutants observed? [ ] No [x] Sediment [ ] Nutrients/organics [ ] Oil/grease [ ] Trash/Floatables

Existing Stormwater BMP on site? [x] Yes [ ] No [ ] Unknown:

Soils: [x] Unknown [ ] poor infiltration [ ] good infiltration

Describe Existing Stormwater Conditions, Including Existing Site Drainage and Conveyance:
Existing detention basin on west end of property. Catch basin in parking lot directs to basin
16" PVC outlet leads beneath hotel to beach
gut upgradient flows beneath road to basin via three 14" PVC

PROPOSED RETROFIT CONCEPT (CONT. ON BACK)

Proposed Retrofit Practice(s): [x] existing BMP upgrade [ ] new BMP
[ ] island bio/rain garden [ ] swale [ ] planter [ ] tree pits [x] infiltration [ ] permeable paver [ ] sand filter [ ] pond
[ ] constructed wetland [ ] proprietary practice [ ] soil amendments [ ] reforestation [ ] impervious cover removal
[ ] rainwater harvesting [ ] disconnection [x] Other (describe): enhance w/ organic matter & veg.

Area Draining to Retrofit: [ ] Hotspot [x] Individual rooftop hotel [x] Parking Lot [x] other small impervious area walkways [ ] Street [ ] Pervious area [ ] Other (describe):
Drainage Area to retrofit ≈ \_\_\_\_\_ acres/sq ft
Imperviousness ≈ \_\_\_\_\_ %
Impervious Area ≈ \_\_\_\_\_ acres/sq ft

Benefits of Retrofit (primary & secondary): [ ] Storage [x] Water Quality [ ] Recharge [ ] Gut Protection [ ] Demonstration / Education [ ] Repair [ ] Other:

Possible Conflicts due to: [ ] Soils [ ] Access [ ] Adjacent Land Use [ ] Existing Utilities [ ] Contamination [ ] High water table [ ] Limited access to water [ ] Other:
Describe conflicts:

NEXT STEPS

Candidate for pilot project [ ] yep, love it [x] OK [ ] undecided [ ] no, but keep listed [ ] no way

Follow-up needed to Complete Field Concept
[ ] Confirm property ownership [ ] Obtain existing as-builts/site plans [ ] Obtain utility mapping
[ ] Confirm drainage area/impervious cover [ ] Obtain detailed topography [ ] Confirm soil types
[ ] Confirm volume computations [ ] Confirm storm drain invert elevations
[ ] Complete concept sketch [ ] Other:

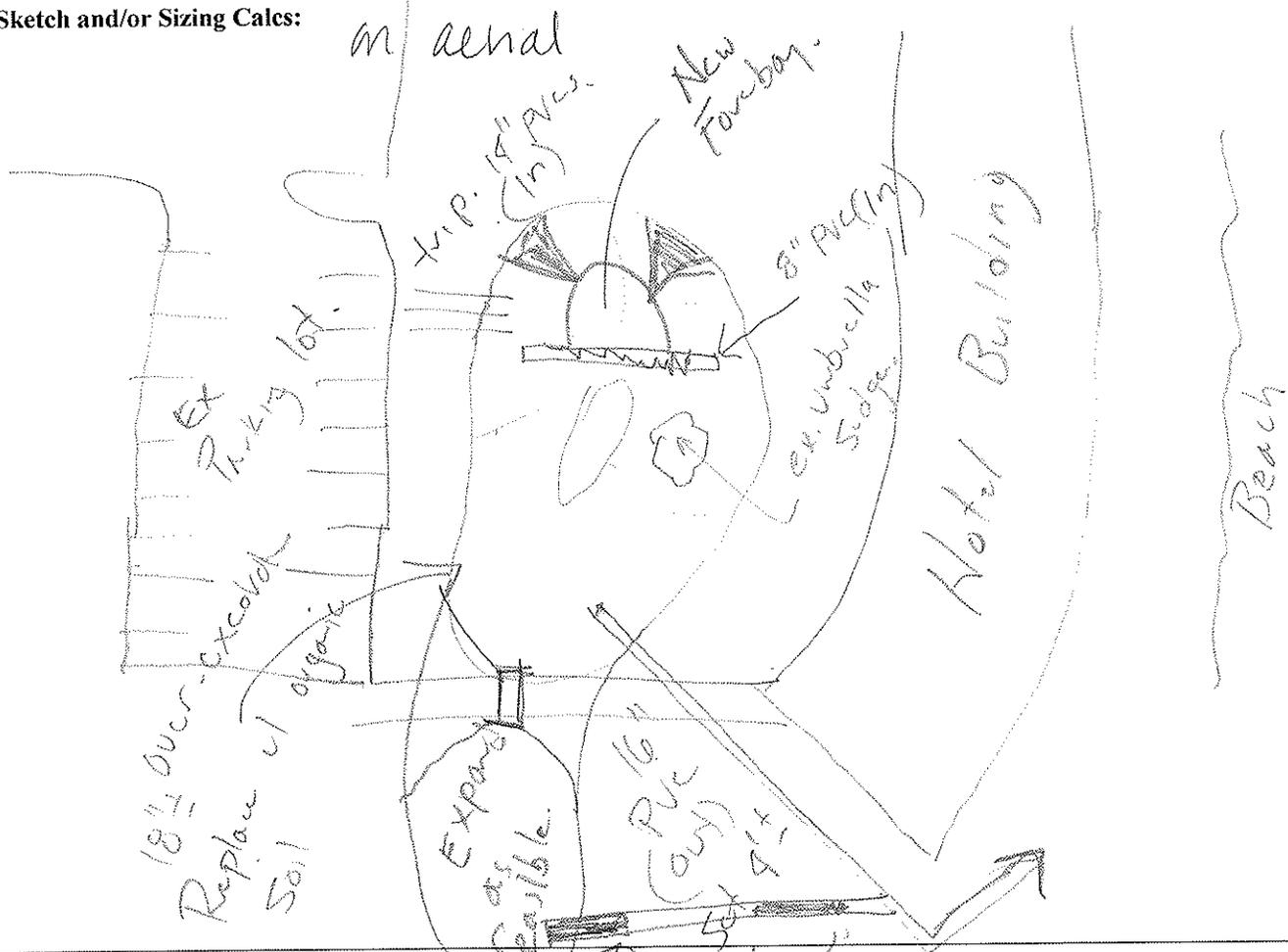
**PROPOSED RETROFIT CONCEPT (CONT.)**

**Narrative Description** (Including key elements, aprox. surface area/ depth of treatment, conveyance structures):

Enhance existing basin by adding new organic material to bottom of basin and install native plantings

- rain garden in parking across road
- rain garden @ east end of hotel / install permeable pavers

**Sketch and/or Sizing Calcs:**



**Existing Head Available/Where Measured:**

N/A

**Initial Feasibility and Construction Considerations/ Design or Delivery Notes:**

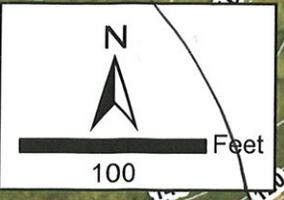
Pond seems undersized based on D.A. → expansion seems feasible

**Thoughts on Maintenance Burden:**  Low  Medium  High

TH-R-3



**Turner Hole**  
 Divi Resort



*Divi WWTP & R.O.*

*Permeable Applet*

*Box*

*Hotel Laundry Facility*

*TH2*

*TH3*

*TH4*

*TH5*

*TH6*

*TH7*

*TH8*

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*TH50*



**STX EE WATERSHEDS**

**RETROFITS**



Site Name/ID: TH-R-4 Hill Restoration

Watershed: TURNER HOLE

Date: 1/22/2011

Assessed by: RAC, ACS

**EXISTING SITE/STORMWATER MANAGEMENT**

Site Contact Info: Hotel owner unknown

Land Use:  Public  Private  Unknown:

Single Family Residential  Multi-Fam. Residential  School  Golf Course  Park  Agricultural  Road  
 Commercial/Industrial  Resort  Marina  Other: restoration/redevelopment

Is the site a hotspot?  Yes  No  Unknown:  
 Sources/pollutants observed?  No  Sediment  Nutrients/organics  Oil/grease  Trash/Floatables

Existing Stormwater BMP on site?  Yes  No  Unknown:

Soils:  Unknown  poor infiltration  good infiltration

**Describe Existing Stormwater Conditions, Including Existing Site Drainage and Conveyance:**  
Sheet flow off existing parking lot currently under renovation/restoration. Parking lot currently used for debris/demo material stockpiling

**PROPOSED RETROFIT CONCEPT (CONT. ON BACK)**

Proposed Retrofit Practice(s):  existing BMP upgrade  new BMP

island bio/rain garden  swale  planter  tree pits  infiltration  permeable paver  sand filter  pond  
 constructed wetland  proprietary practice  soil amendments  reforestation  impervious cover removal  
 rainwater harvesting  disconnection  Other (describe):

<b>Area Draining to Retrofit</b> <input type="checkbox"/> Hotspot <input checked="" type="checkbox"/> Individual rooftop <input checked="" type="checkbox"/> Parking Lot <input type="checkbox"/> other small impervious area <input checked="" type="checkbox"/> Street <input type="checkbox"/> Pervious area <input type="checkbox"/> Other (describe):	<b>Drainage Area to retrofit</b> ≈ _____ acres/sq ft <u>road &amp; site</u> <b>Imperviousness</b> ≈ <u>75%</u> <b>Impervious Area</b> ≈ _____ acres/sq ft
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Benefits of Retrofit (primary & secondary):  Storage  Water Quality  Recharge  Gut Protection   
 Demonstration / Education  Repair  Other:

Possible Conflicts due to:  Soils  Access  
 Adjacent Land Use  Existing Utilities  
 Contamination  High water table  
 Limited access to water  Other:

**Describe conflicts:**  
Parking limitations

**NEXT STEPS**

Candidate for pilot project  yep, love it  OK  undecided  no, but keep listed  no way

**Follow-up needed to Complete Field Concept**

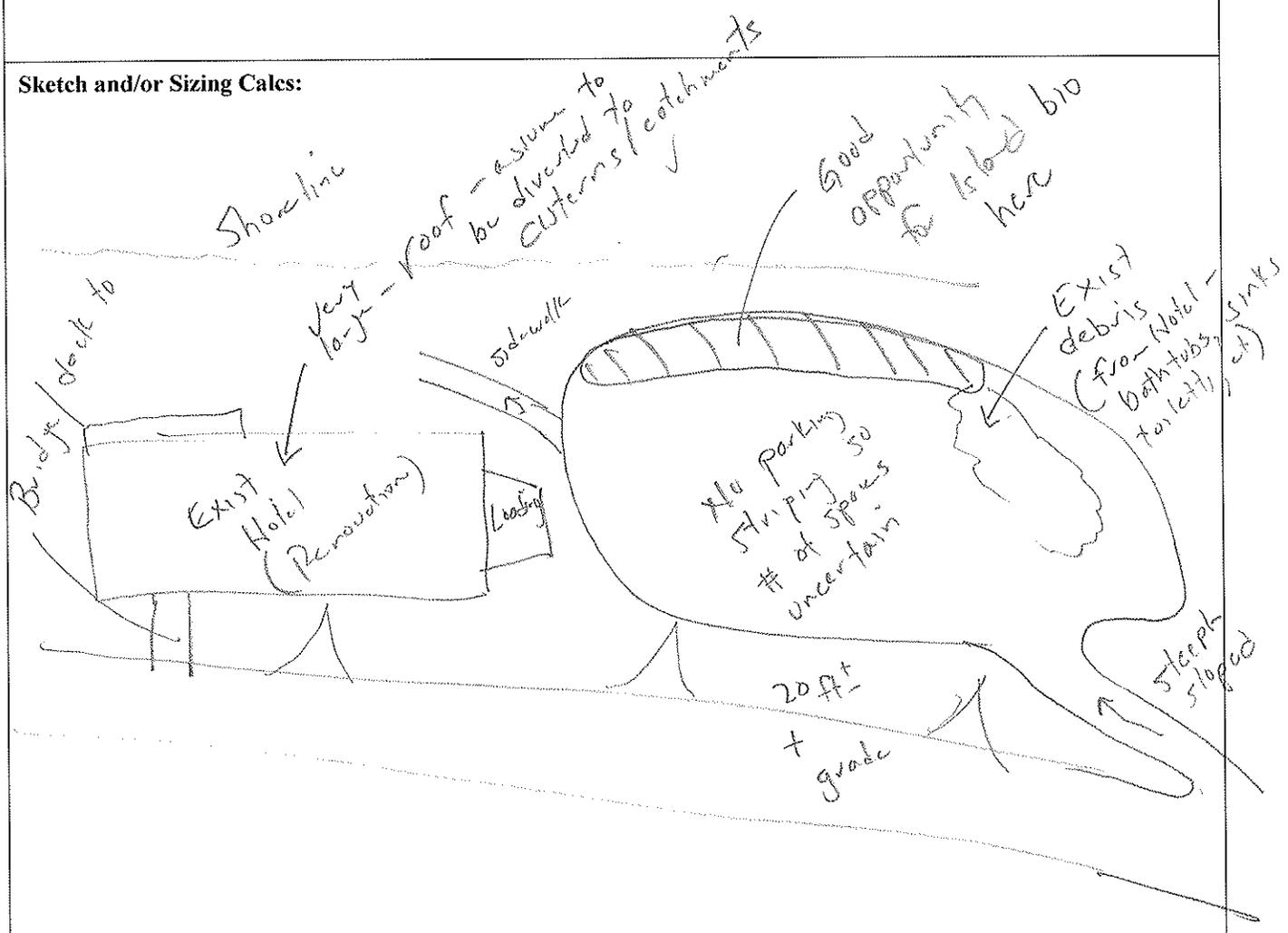
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<input type="checkbox"/> Confirm volume computations	<input type="checkbox"/> Confirm storm drain invert elevations	
<input type="checkbox"/> Complete concept sketch	<input type="checkbox"/> Other:	

**PROPOSED RETROFIT CONCEPT (CONT.)**

Narrative Description (Including key elements, approx. surface area/ depth of treatment, conveyance structures):

- Small DA - just parking lot (assu 1.5Ac)
- Sheet flow to shallow bio

**Sketch and/or Sizing Cales:**



**Existing Head Available/Where Measured:**

no restriction w/ sheet flow to bio

**Initial Feasibility and Construction Considerations/ Design or Delivery Notes:**

Need parking layout/#s

Thoughts on Maintenance Burden:  Low  Medium  High

STX EE WATERSHEDS

RETROFITS



Site Name/ID: TH-R-5 Villa Madeline Watershed: Turner Hole

Date: 1/26/2011 Assessed by: PAC & ACS

EXISTING SITE/STORMWATER MANAGEMENT

Site Contact Info: Condo board? Mgmt office?

Land Use: [ ] Public [x] Private [ ] Unknown:
[ ] Single Family Residential [x] Multi-Fam. Residential [ ] School [ ] Golf Course [ ] Park [ ] Agricultural [ ] Road
[ ] Commercial/Industrial [ ] Resort [ ] Marina [ ] Other:

Is the site a hotspot? [ ] Yes [x] No [ ] Unknown:
Sources/pollutants observed? [ ] No [ ] Sediment [ ] Nutrients/organics [ ] Oil/grease [ ] Trash/Floatables

Existing Stormwater BMP on site? [x] Yes [ ] No [ ] Unknown:

Soils: [x] Unknown [ ] poor infiltration [ ] good infiltration

Describe Existing Stormwater Conditions, Including Existing Site Drainage and Conveyance:
Stormwater primarily sheet flows from top of development south to base of hill into a bio-retention area with 2 paved fumes. A swale is present along entire length of west side of main drive

PROPOSED RETROFIT CONCEPT (CONT. ON BACK)

Proposed Retrofit Practice(s): [x] existing BMP upgrade [ ] new BMP
[ ] island bio/rain garden [ ] swale [ ] planter [ ] tree pits [ ] infiltration [ ] permeable paver [ ] sand filter [ ] pond
[ ] constructed wetland [ ] proprietary practice [ ] soil amendments [ ] reforestation [ ] impervious cover removal
[ ] rainwater harvesting [ ] disconnection [x] Other (describe): minor maintenance to bio retention?

Area Draining to Retrofit: [ ] Hotspot [x] Individual rooftop [ ] other small impervious area [ ] Street [ ] Pervious area [ ] Other (describe):
Drainage Area to retrofit ≈ \_\_\_\_\_ acres/sq ft
Imperviousness ≈ \_\_\_\_\_% SEE MAP
Impervious Area ≈ \_\_\_\_\_ acres/sq ft

Benefits of Retrofit (primary & secondary): [x] Storage [x] Water Quality [ ] Recharge [ ] Gut Protection [ ] Demonstration / Education [ ] Repair [x] Other: Sediment

Possible Conflicts due to: [ ] Soils [ ] Access [ ] Adjacent Land Use [ ] Existing Utilities [ ] Contamination [ ] High water table [ ] Limited access to water [x] Other: Area
Describe conflicts: Exist undersized RTIG could increase sediment removal w/ Forceman

NEXT STEPS

Candidate for pilot project [ ] yep, love it [ ] OK [x] undecided [ ] no, but keep listed [ ] no way

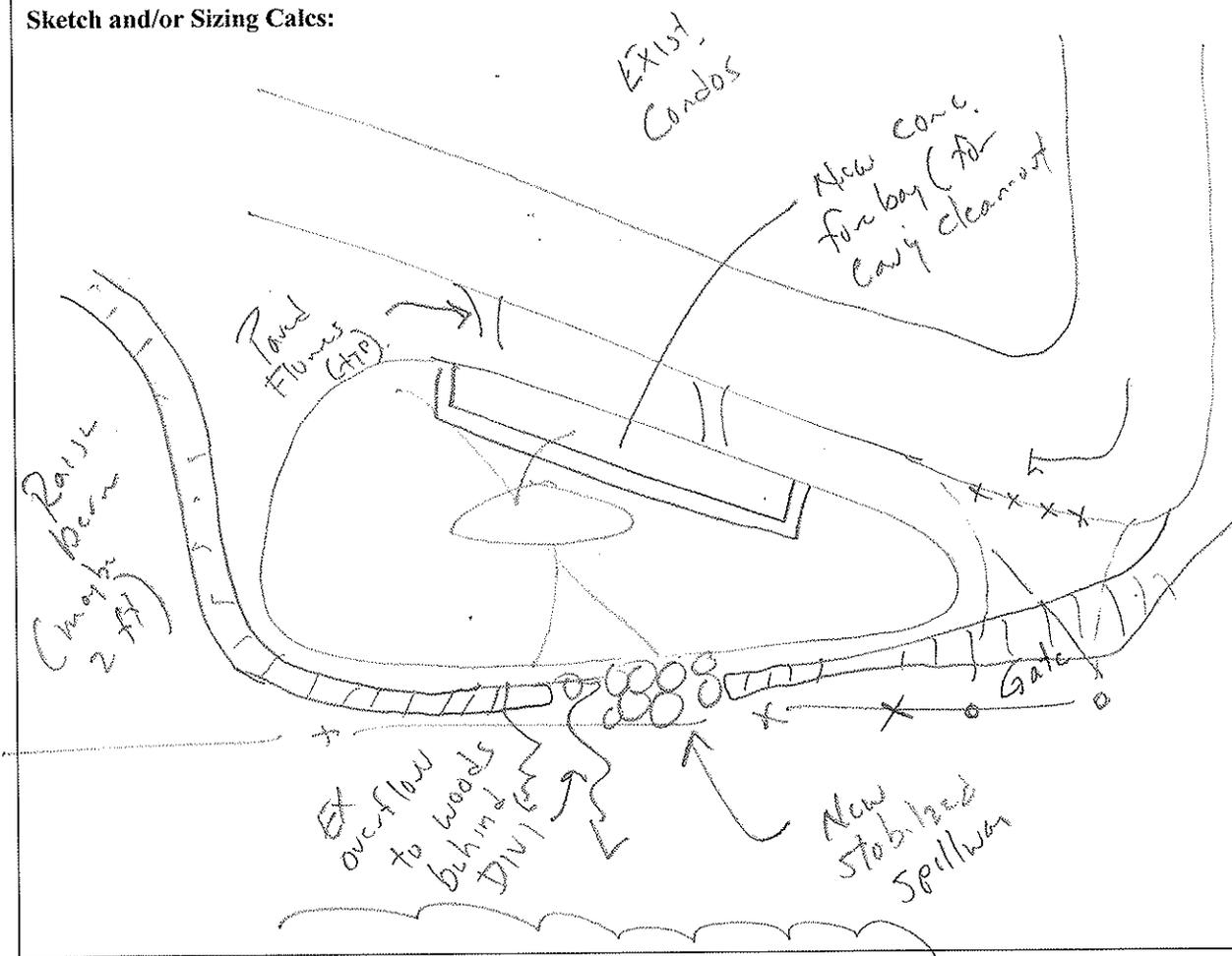
Follow-up needed to Complete Field Concept
[x] Confirm property ownership [ ] Obtain existing as-builts/site plans [ ] Obtain utility mapping
[ ] Confirm drainage area/impervious cover (see map) [ ] Obtain detailed topography [ ] Confirm soil types
[x] Confirm volume computations [ ] Confirm storm drain invert elevations
[ ] Complete concept sketch [ ] Other:

**PROPOSED RETROFIT CONCEPT (CONT.)**

**Narrative Description** (Including key elements, aprox. surface area/ depth of treatment, conveyance structures):

Conduct maintenance on existing bio

**Sketch and/or Sizing Calcs:**



**Existing Head Available/Where Measured:**

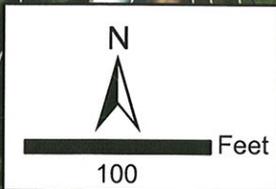
**Initial Feasibility and Construction Considerations/ Design or Delivery Notes:**

Thoughts on Maintenance Burden:  Low  Medium  High

VILLA MADELINE

TH-R-5

*gated community*



*new paved, curved good conditiz*

*swale*

**Turner Hole**  
Condos

*HIS*  
*wading pool*  
*main*  
*main crossing fully down stream of same surface over*

