Beargrass Creek Revisited – A Perspective on the Evolution of Stream Restoration over the Past 15 Years

Mid-Atlantic Stream Restoration Conference

November 16, 2011

Rocky Gap, Maryland

One Team. Infinite Solutions

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Presentation Outline

- Brief History of Stream Restoration Profession
- Overview of Beargrass Creek - 1997
- Overview of Beargrass Creek - 2010
- Comparisons Between Approaches

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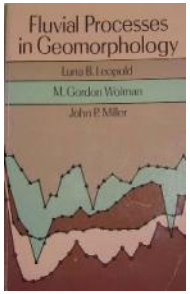
Stream Restoration Time Line

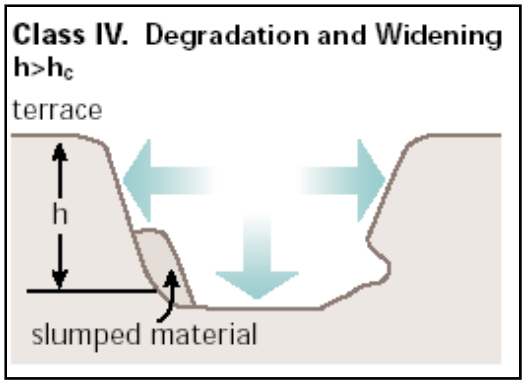


1964 – "Fluvial Processes in Geomorphology" published by Leopold, Wolman & Miller

1972 – Clean Water Act

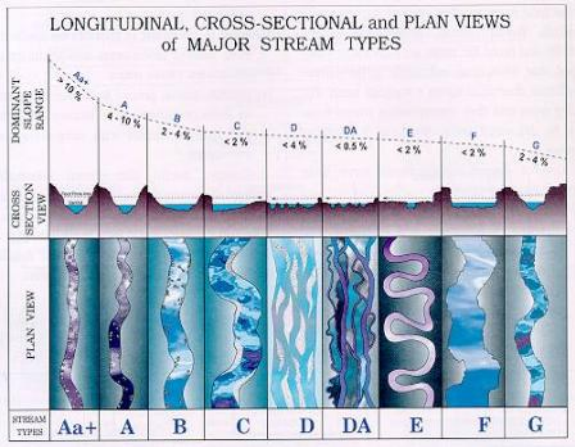
1986 – Dave Rosgen Begins Teaching Short Courses

1960 1970 1980 1990



1984 – Initial work on Channel Evolution Model by Schumm, Harvey & Watson

Stream Restoration Time Line



2000 - 1st Conference Dedicated to Stream Restoration in Boone, North Carolina

1994 – Rosgen's Classification System Published in Catena Paper

1998 – First In-Lieu Fee Program

1990

2000

1995 – NRCS Soil Bioengineering Guidelines

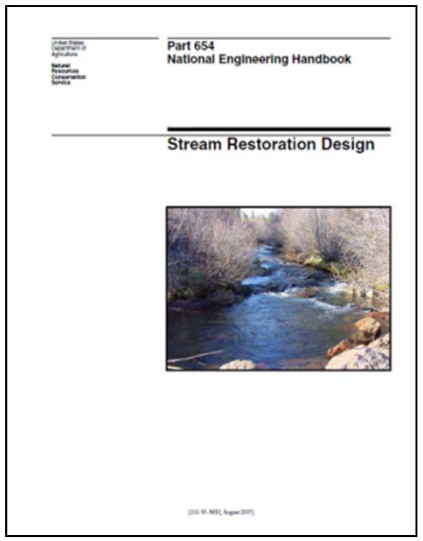
1998 – Federal Interagency Stream Corridor Restoration Handbook

Stream Restoration Time Line

2000 – Stream Restoration Estimated to be a Billion Dollar Industry

2002 - In-Lieu Fee Programs Start to Expand

2007 – NRCS Stream Restoration Design Handbook



2000 2010

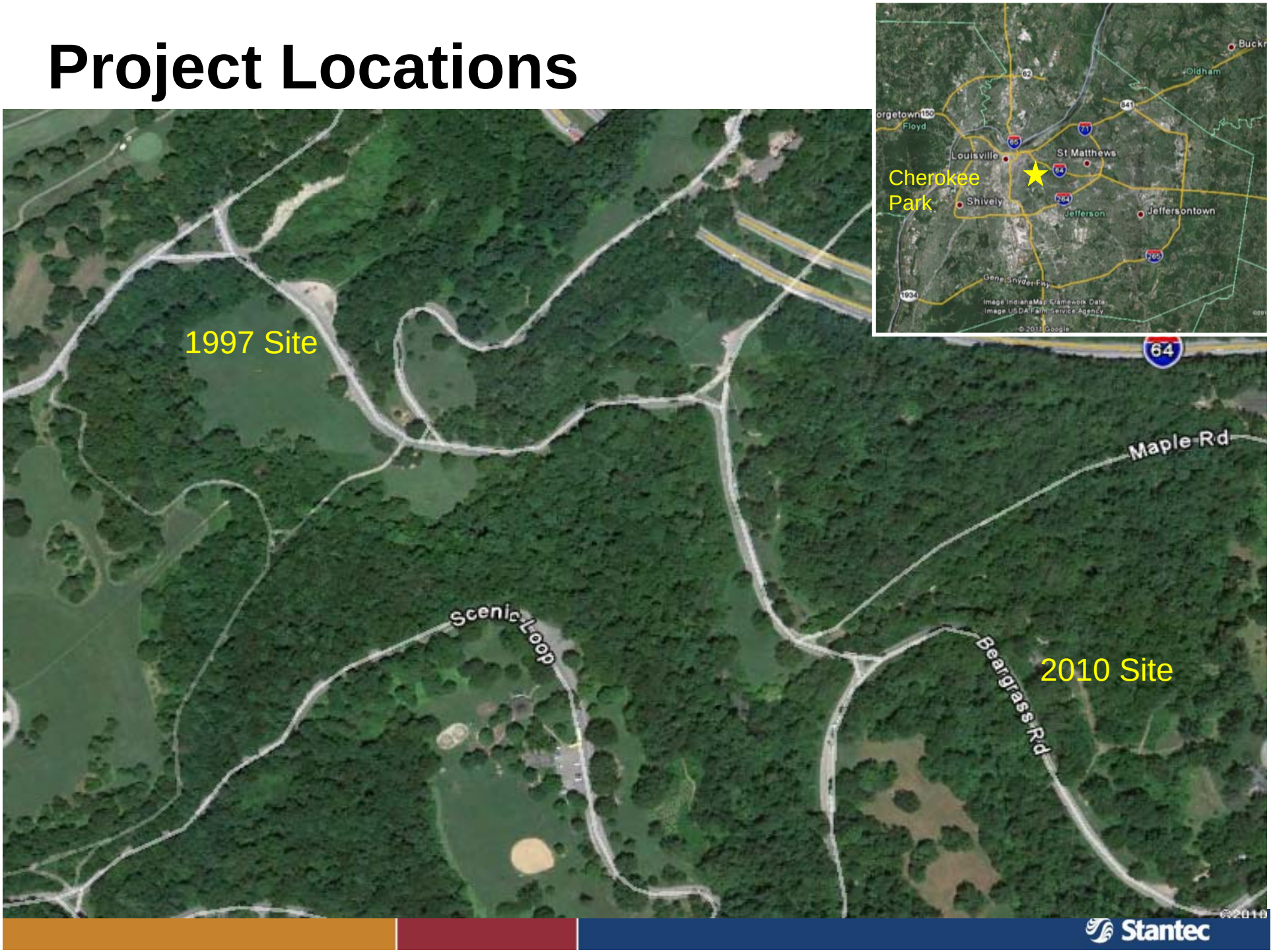
2001 – ASCE River and Wetlands Conference in Reno, NV

2003 - 1st River Restoration Northwest Conference in Skamania, Washington

River Restoration Northwest

2008 – EPA & USACE Develop Revised Mitigation Guidelines

Project Locations



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1997 Site - Cherokee Park Landslide

2 15 '97

2 15 91

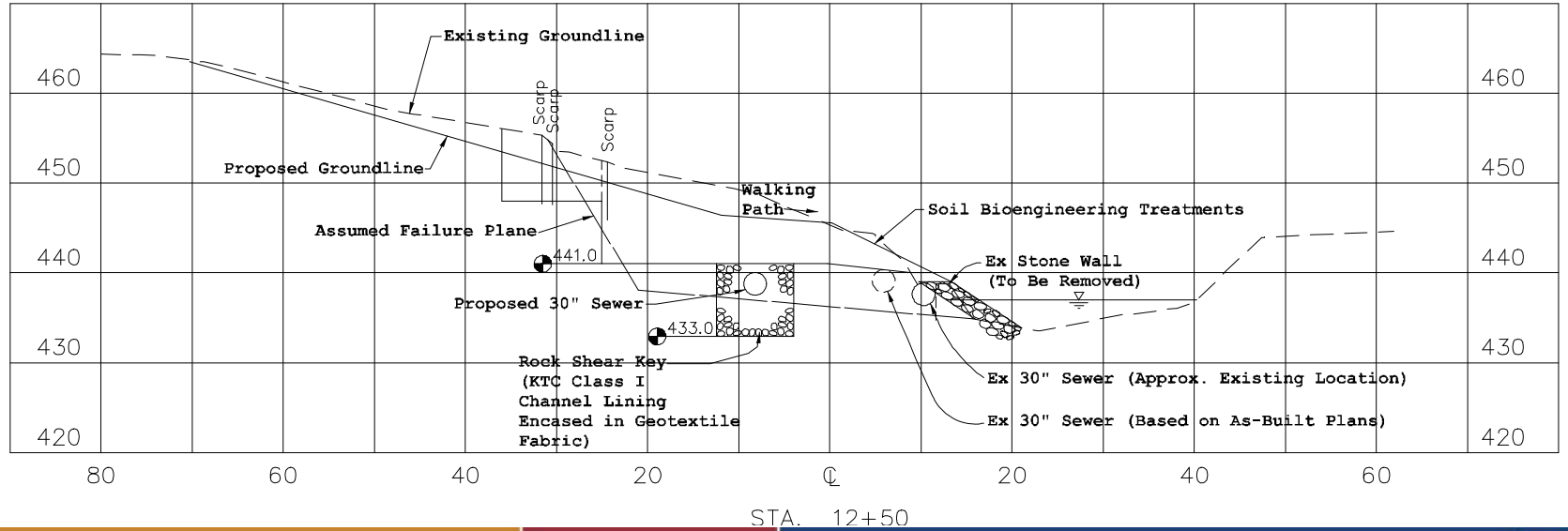
Landslide Limits

Design Objectives

- Stabilize Landslide
- Repair Sanitary Sewer
- Minimize Erosion
- Restore Habitat
- Meet Both MSD & Parks Department's Goals & Objectives

Design Process

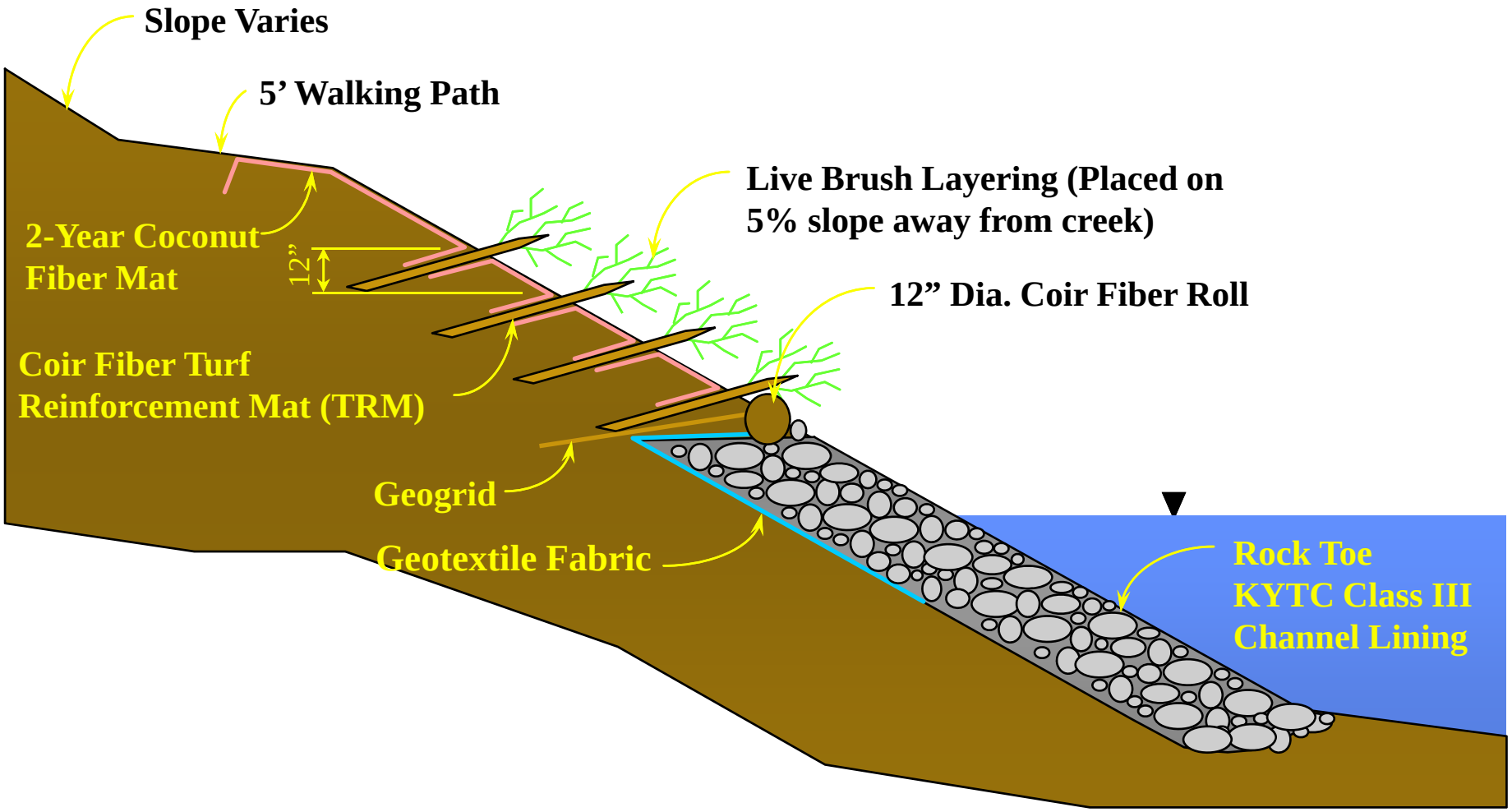
- Geotechnical evaluation
- Slope stability analysis
- Survey of existing resources (e.g. trees, outfall structures, etc.)
- Identify bankfull depth & critical velocity/shear stresses



Landslide Stabilization Alternatives

- Flatten Slopes
- Sheet Pile Wall
- Rock Shear Key

Soil Bioengineering Design



40B

'98

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2010 Site - Cherokee Park SEP Project

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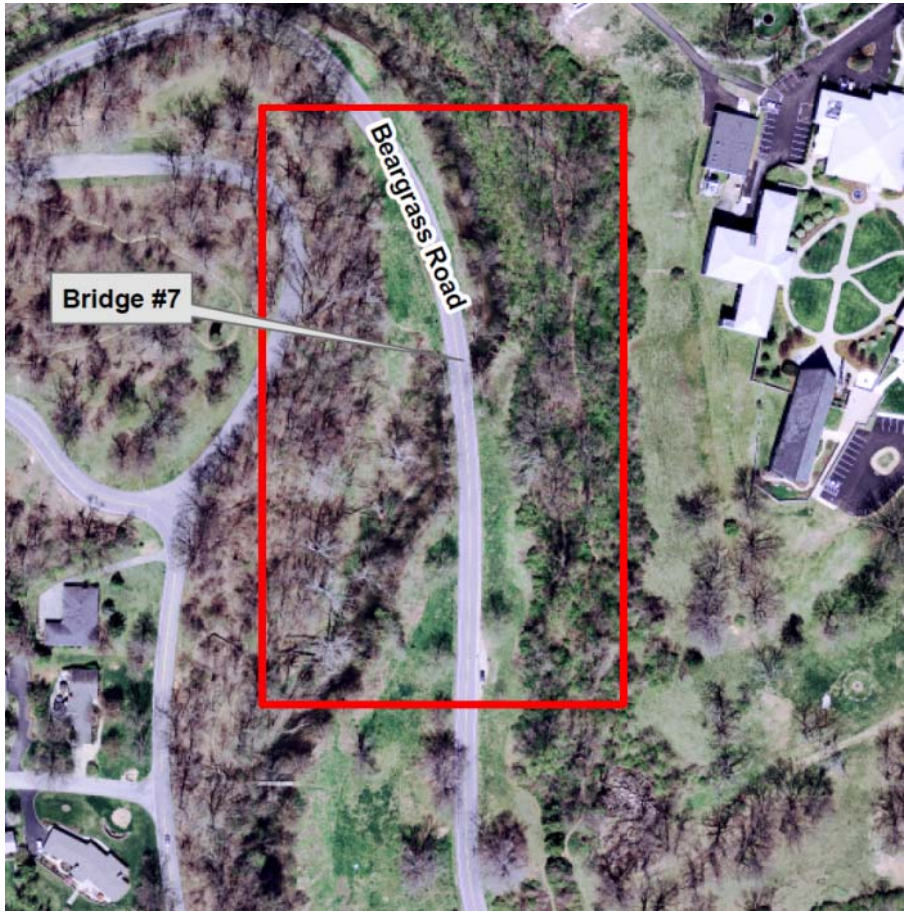
Design Objectives

- Minimize Erosion
- Restore Habitat
- Create a Better Flow Path through the Bridge
- Improve Riparian Corridor
- Meet MSD's Consent Decree Requirements



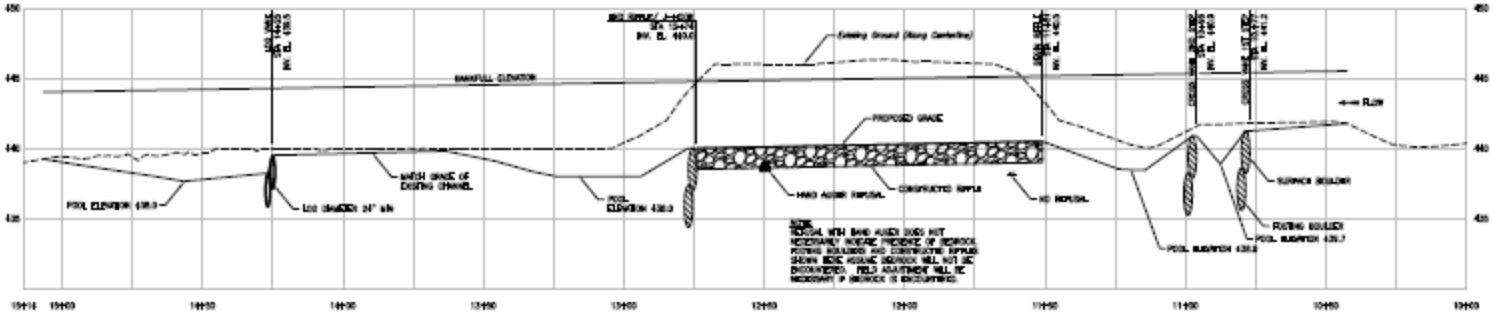
Design Process

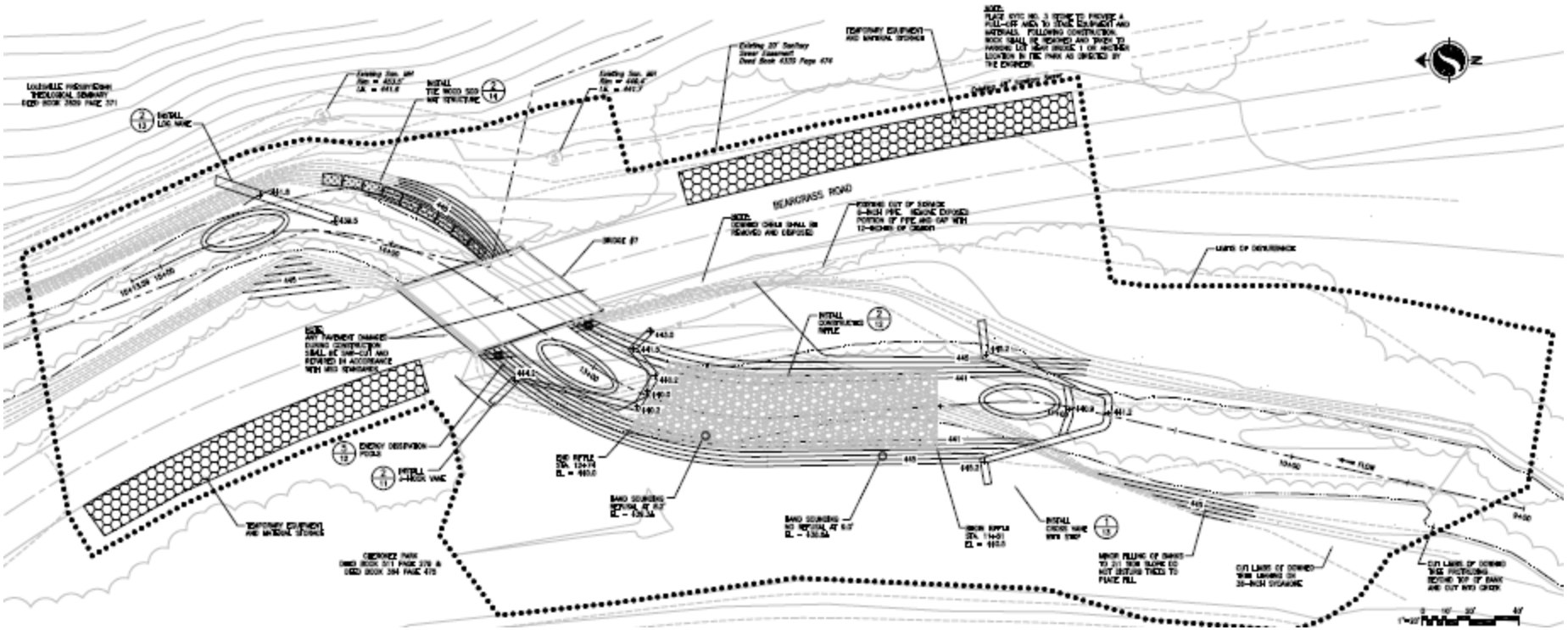
- Review of Watershed
- Overview of Site (Toothpick Survey)
- Gage Analysis/Region Geomorphic Relationships
- Geomorphic Data Collection
  - Cross Sections
  - Longitudinal Profile
  - Pebble Counts
  - Bar Samples
- Sediment Transport Analysis

Stored Information

Bankfull Slope	0.00311

Variable	Min	Avg	Max
S riffle	0.00529	0.02062	0.08464
S pool	0.01414	0.04257	0.12454
S run	0.01116	0.04945	0.13091
S glide	0.00743	0.04576	0.12133
P - P	21	59.57	147.97
P length	21.19	51.91	81.87
Dmax riffle	0.27	0.38	0.52
Dmax pool	0.31	1.08	2.48
Dmax run	0.36	0.77	1.61
Dmax glide	0.15	0.49	0.75
Low Bank Ht	1.54	2.24	3.24


BANKFULL ELEVATION
PROPOSED GRADE
FLOW
MATCH GRADE OF EXISTING CHANNEL
POOL ELEVATION 438.0
LOG DIAMETER 24" MIN
HAND AUGER REFUSAL
CONSTRUCTED RIFFLE
NO REFUSAL
SURFACE BOULDER
FOOTING BOULDER
POOL ELEVATION 438.7
POOL ELEVATION 438.8
NOTE:
REFUSAL WITH BAND AUGER DOES NOT NECESSARILY INDICATE PRESENCE OF BEDROCK. FOOTING BOULDERS AND CONSTRUCTED RIFFLES SHOWN BENE ASSUME BEDROCK WILL NOT BE ENCOUNTERED. FIELD ADJUSTMENT WILL BE NECESSARY IF BEDROCK IS ENCOUNTERED.


BEARGRASS ROAD
LIMITS OF DISTURBANCE
TEMPORARY EQUIPMENT AND MATERIAL STORAGE
INSTALL LOG VANE
INSTALL TOE WOOD SOD MAT STRUCTURE
INSTALL CONSTRUCTED RIFFLE
ENERGY DISSIPATION POOLS
INSTALL 6-INCH VANE
END RIFFLE
BAND SOUNDING
FLOW

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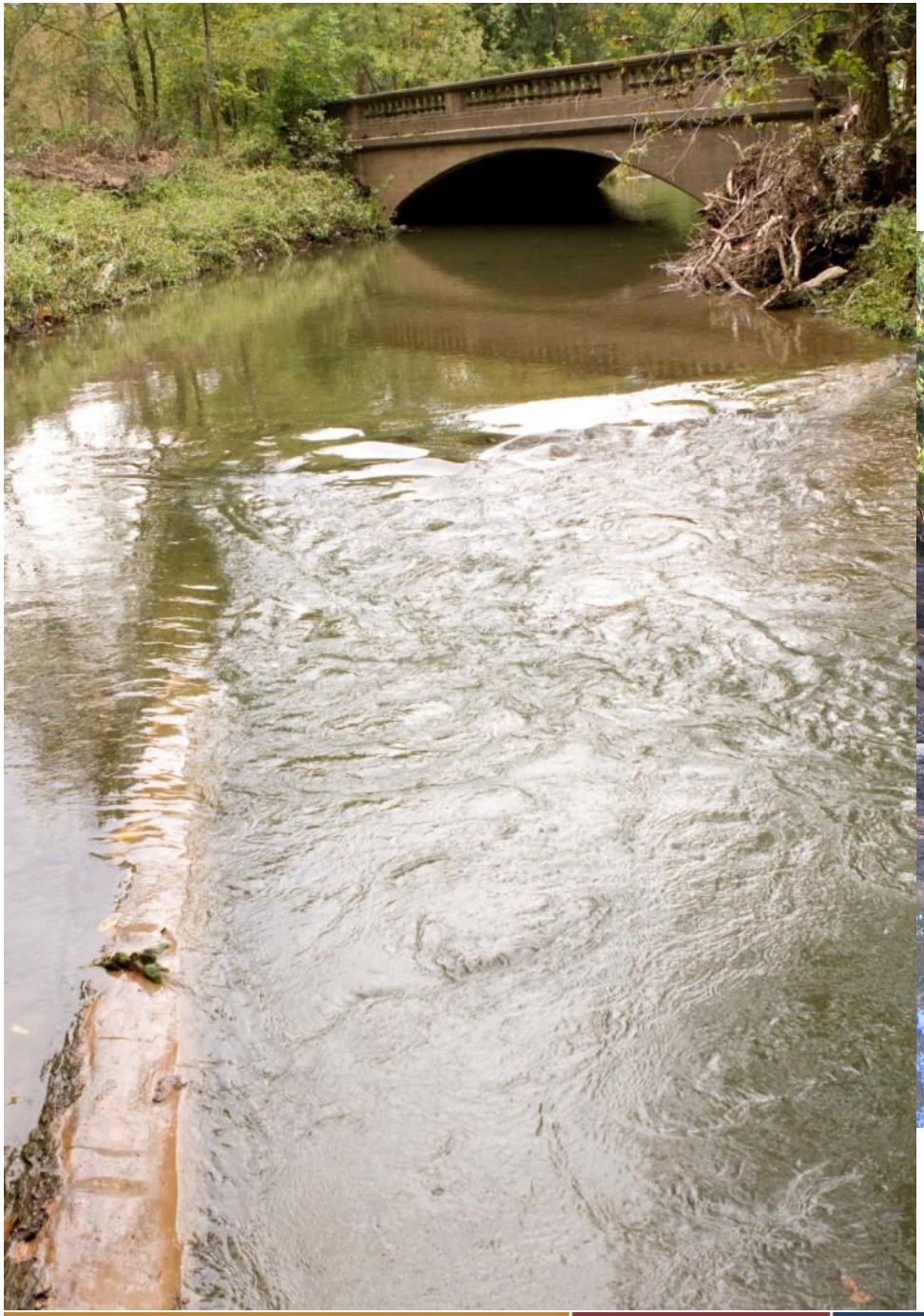

Log Vane

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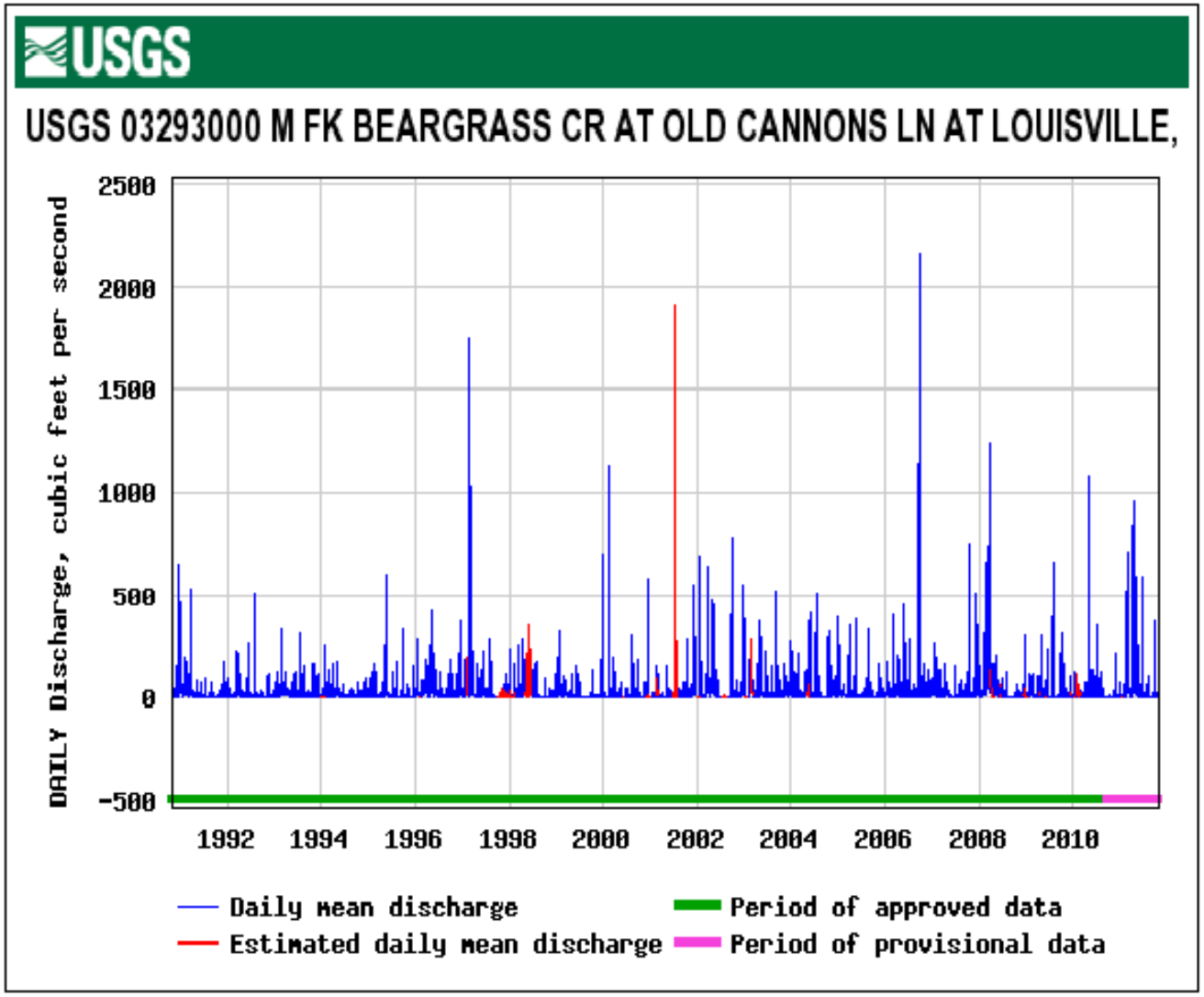
Advancements

- Design Procedures
- Focus on Entire Channel
- Minimal Use of Rock
- Utilize Natural Biodegradable Materials
- Latest Trends Focus More on Ecological Function
- Use of Multi-Objective Techniques
- Structures/Treatments Look More Natural

& Things Remain The Same



& Things Remain The Same

(But Get a Little Older)

- Importance of Vegetation
- Best if Design/Build Approach
- Public Education/Acceptance
- Permitting Requirements
- Monitoring

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