Milwaukee Public Schools
River Trail School
Sustainable Production Forest

April 21, 2021

Waukesha County Storm Water Workshop

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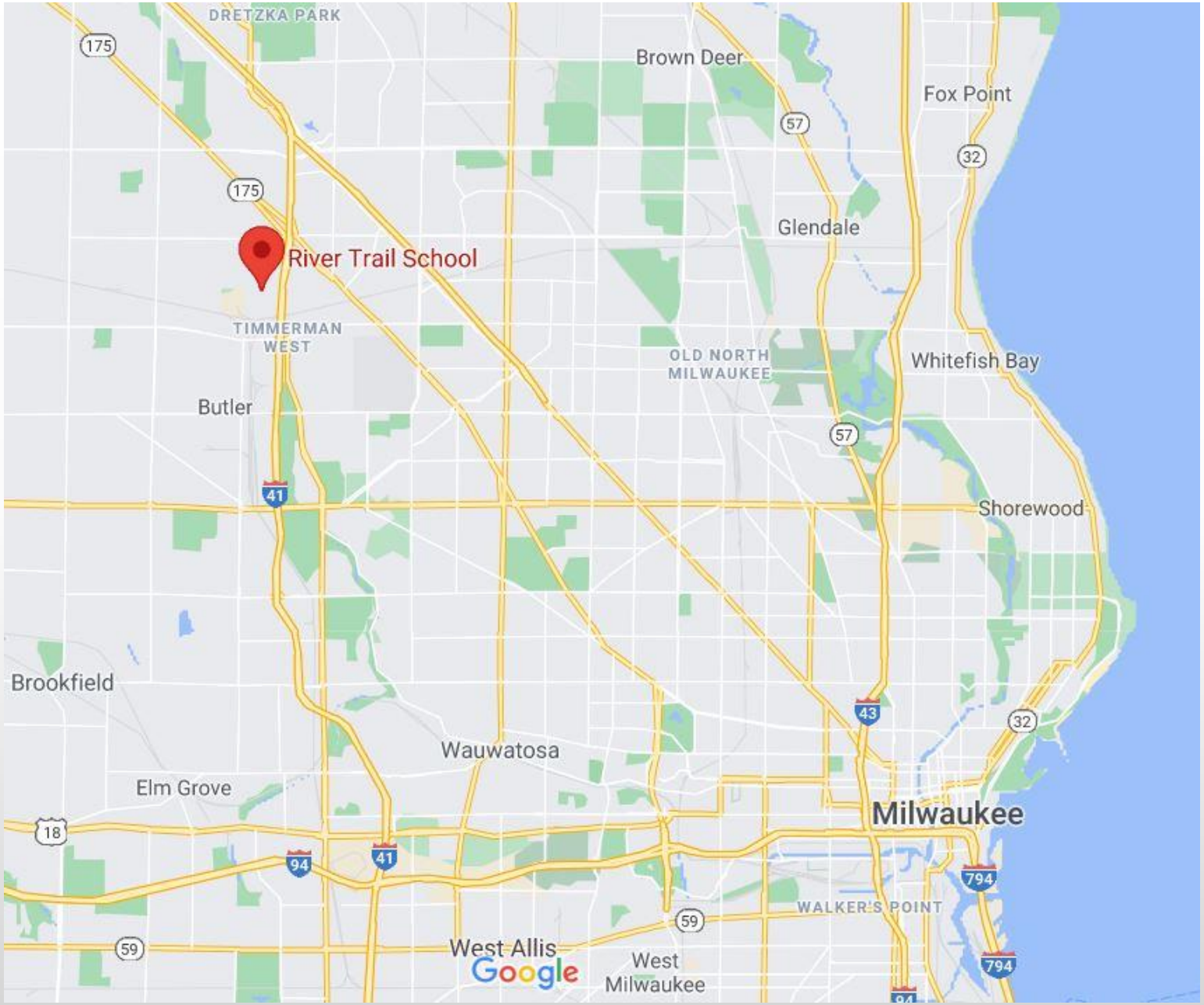
GRĀEF

Sustainable Production Forest

- What is it?
  - A tree farm that provides an annual crop, for use or sale, while providing environmental benefits such as reduced potable water consumption, shading, wildlife habitat, reduced carbon footprint, and reduced erosion.
- Who is doing this and why?
  - River Trail School, a K-8 school in the Milwaukee Public School system, to provide a teaching laboratory for students, prior to High School.
- What does it have to do with storm water?
  - The completed project will capture and use nearly 100% of rain falling on the site.



River Trail School

- 12021 W. Florist Avenue – Northwest corner of the City of Milwaukee

Today’s Presentation

- Preliminary Project Overview
- Description of the Sustainable Forest Concept
- Focus on Storm Water Management Design

Sustainable Production Forest

- Perennial crops
- Grows polycultures
- Reduces erosion
- Supports beneficial fauna
- Reduces carbon footprint

Swales and Berms

- Cut swales to contour about 24 feet apart, down the slope
- Plant trees on the berms
- Sell all products from this endeavor

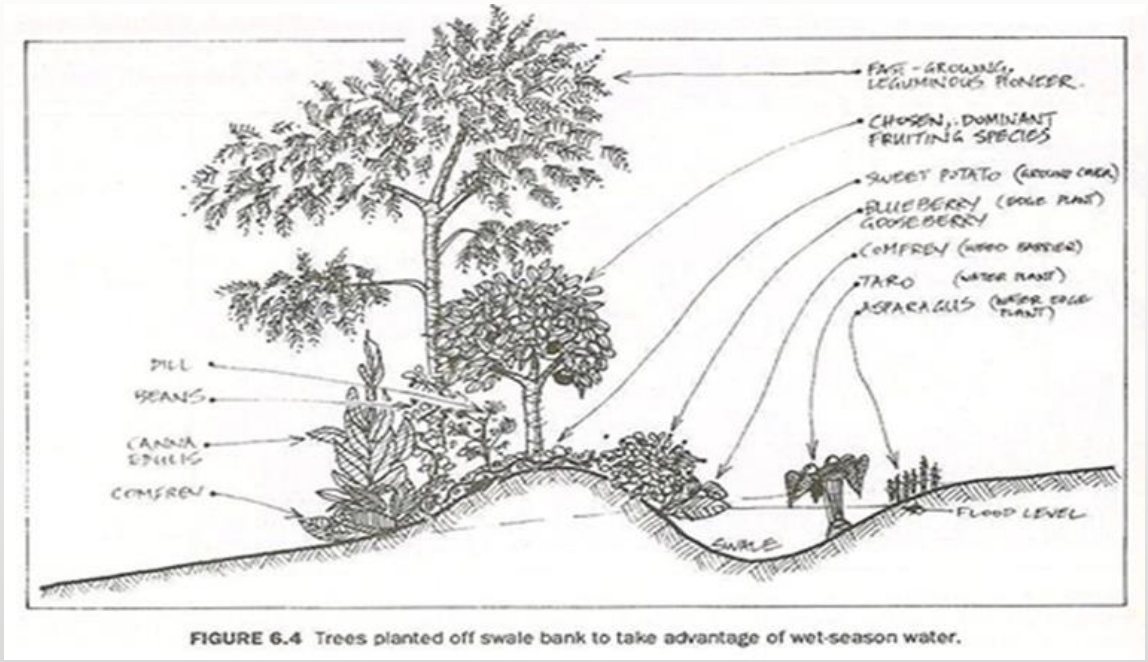


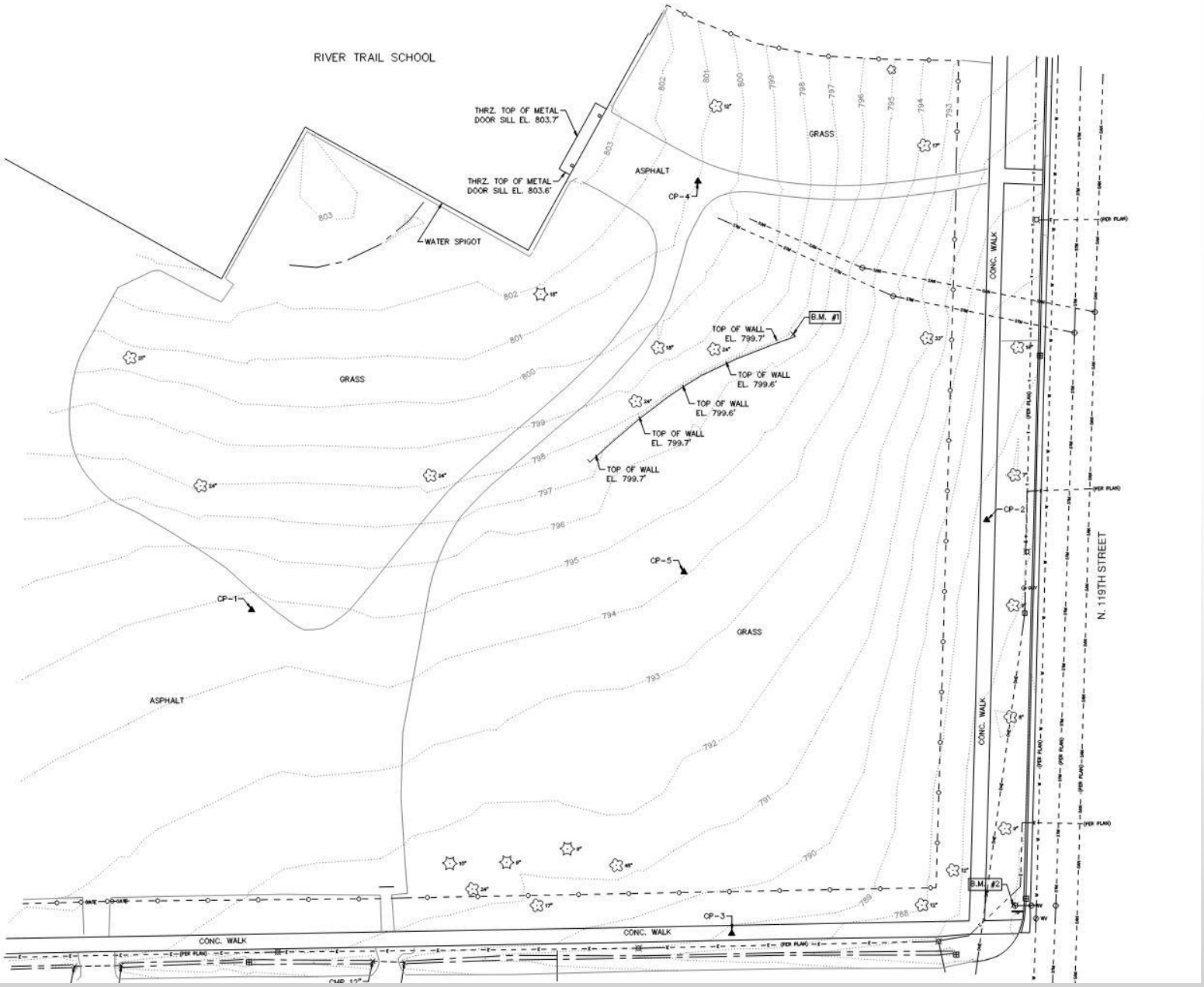
FIGURE 6.4 Trees planted off swale bank to take advantage of wet-season water.

River Trail School – The Site

- Chestnuts
  - Mimics oaks, but produces every year
  - During a poor year, produces 1000 pounds of nuts
  - Sells for $5/lb., producing a projected $7,500 per year.
  - Provides habitat for birds and wildlife

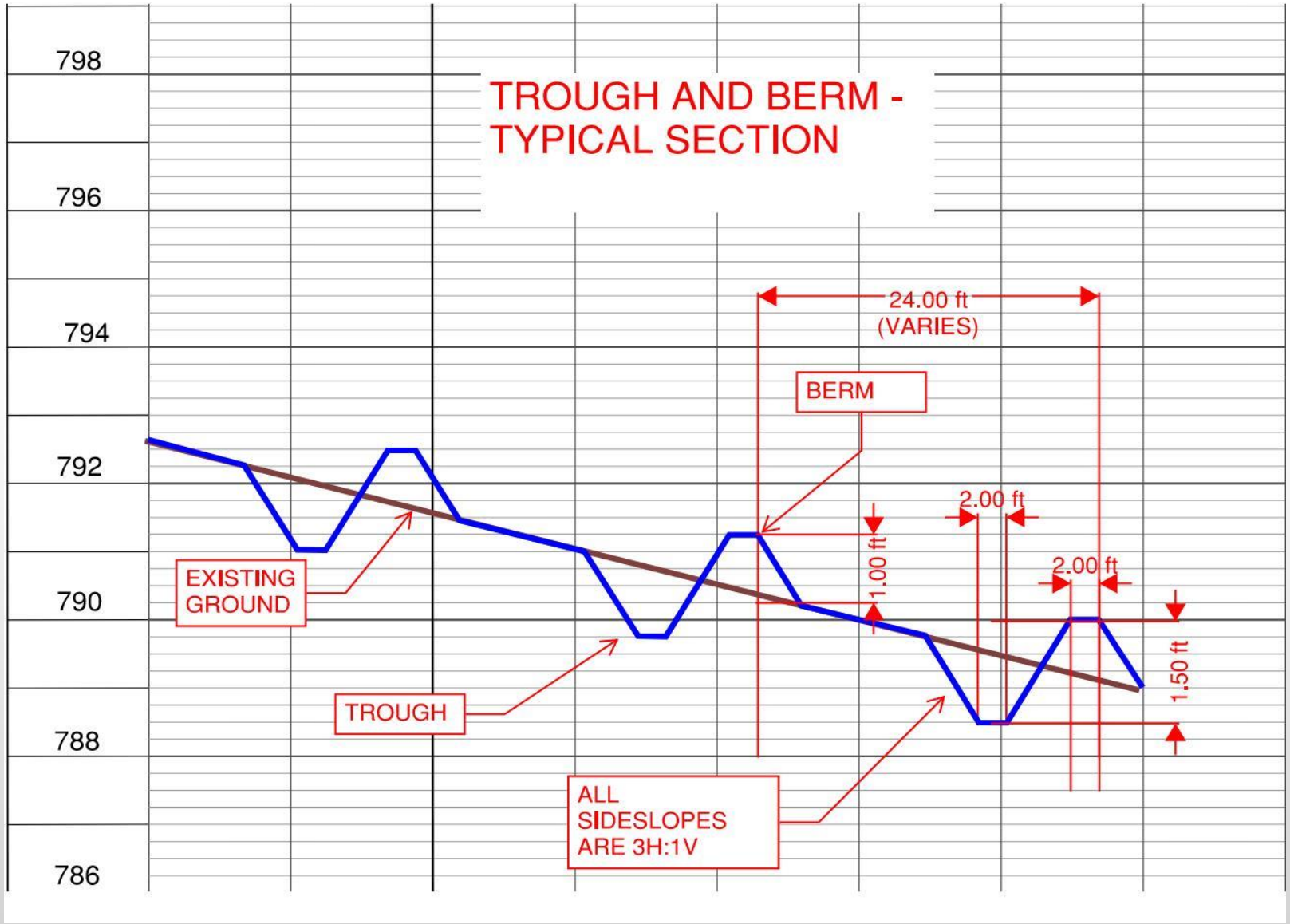
- Asian Pears
  - Hardy
  - Niche market
  - Average tree will produce 200 pounds
  - At 200 pounds X 60 trees X $2 pound results in $24,000/year

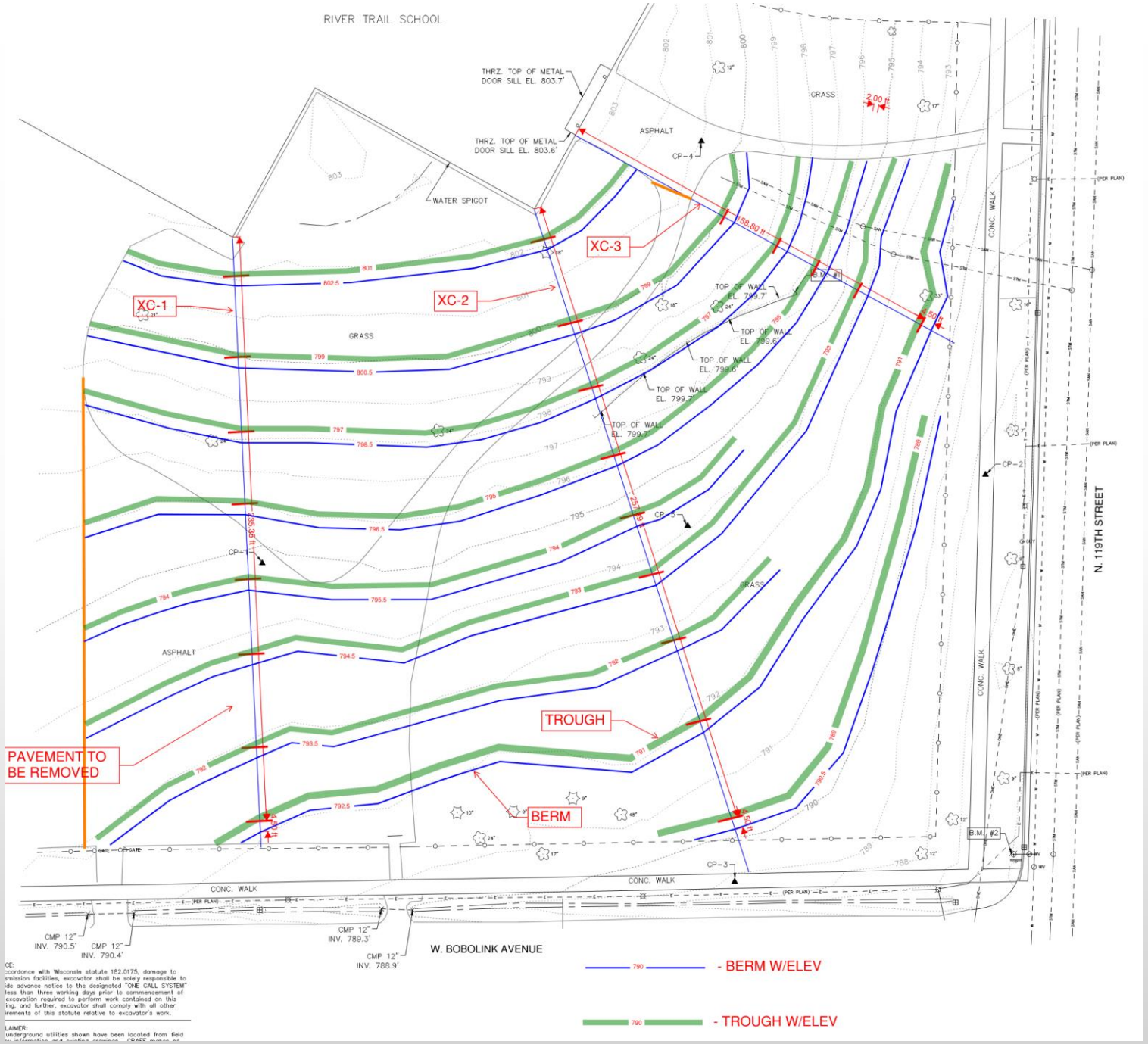
- Hazelnuts
  - Multi-use species: firewood, nuts, paste, oil, nutritional value
  - Produce 20 pounds/bush @325 bushes = 6500 pounds/year
  - 6500 pounds/year X $2/lb. equals $13,000 annually



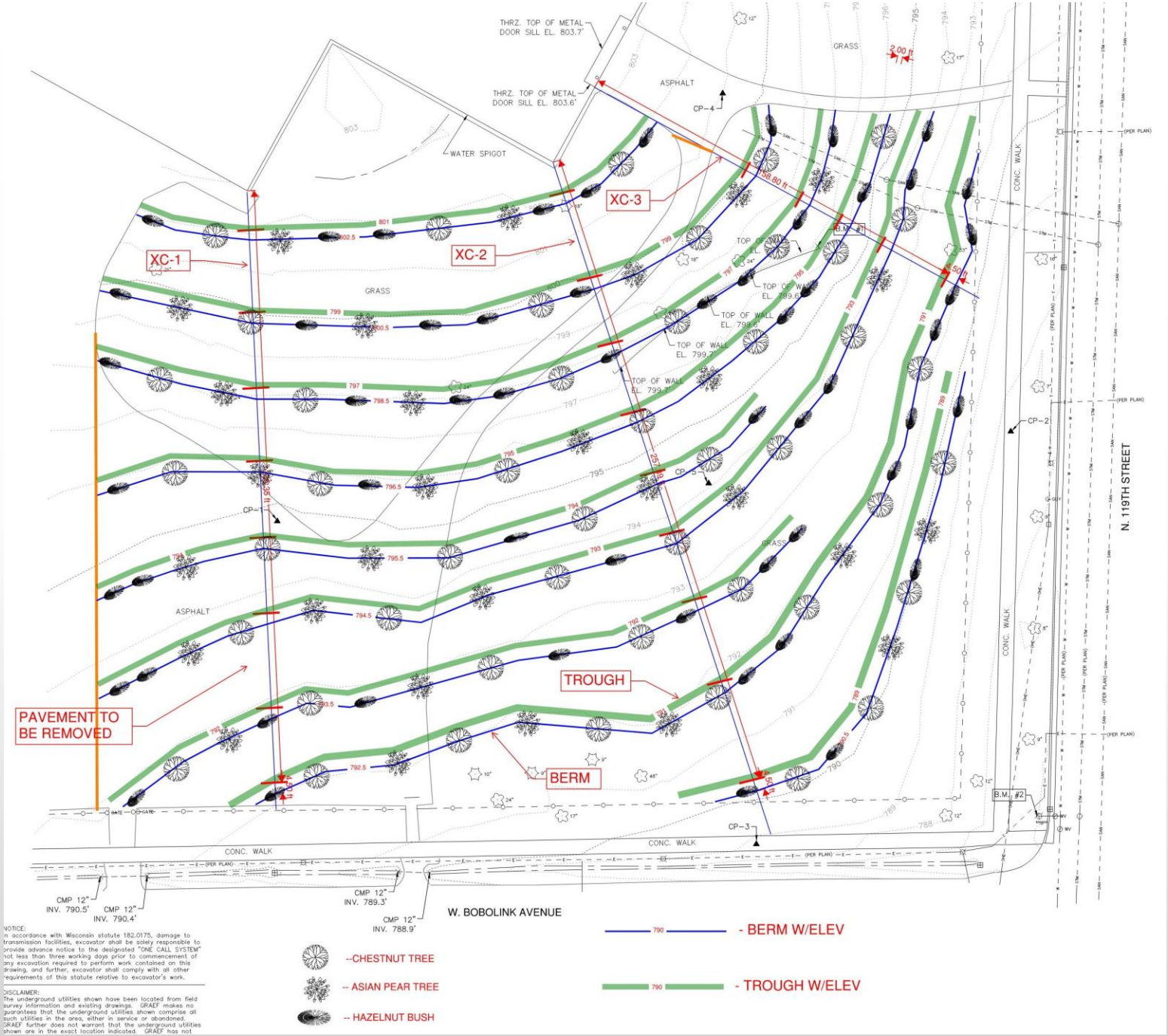
Topographic Survey

Typical Section – Swale and Berm



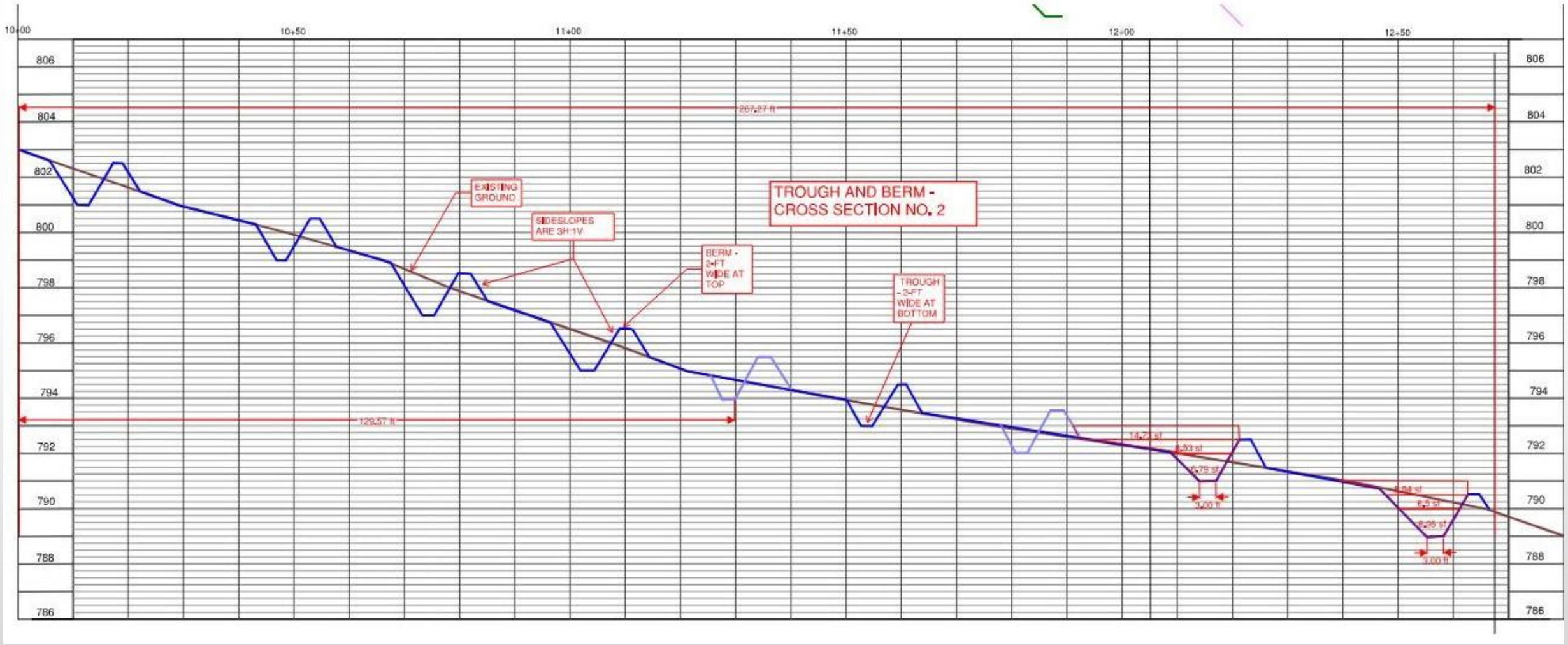


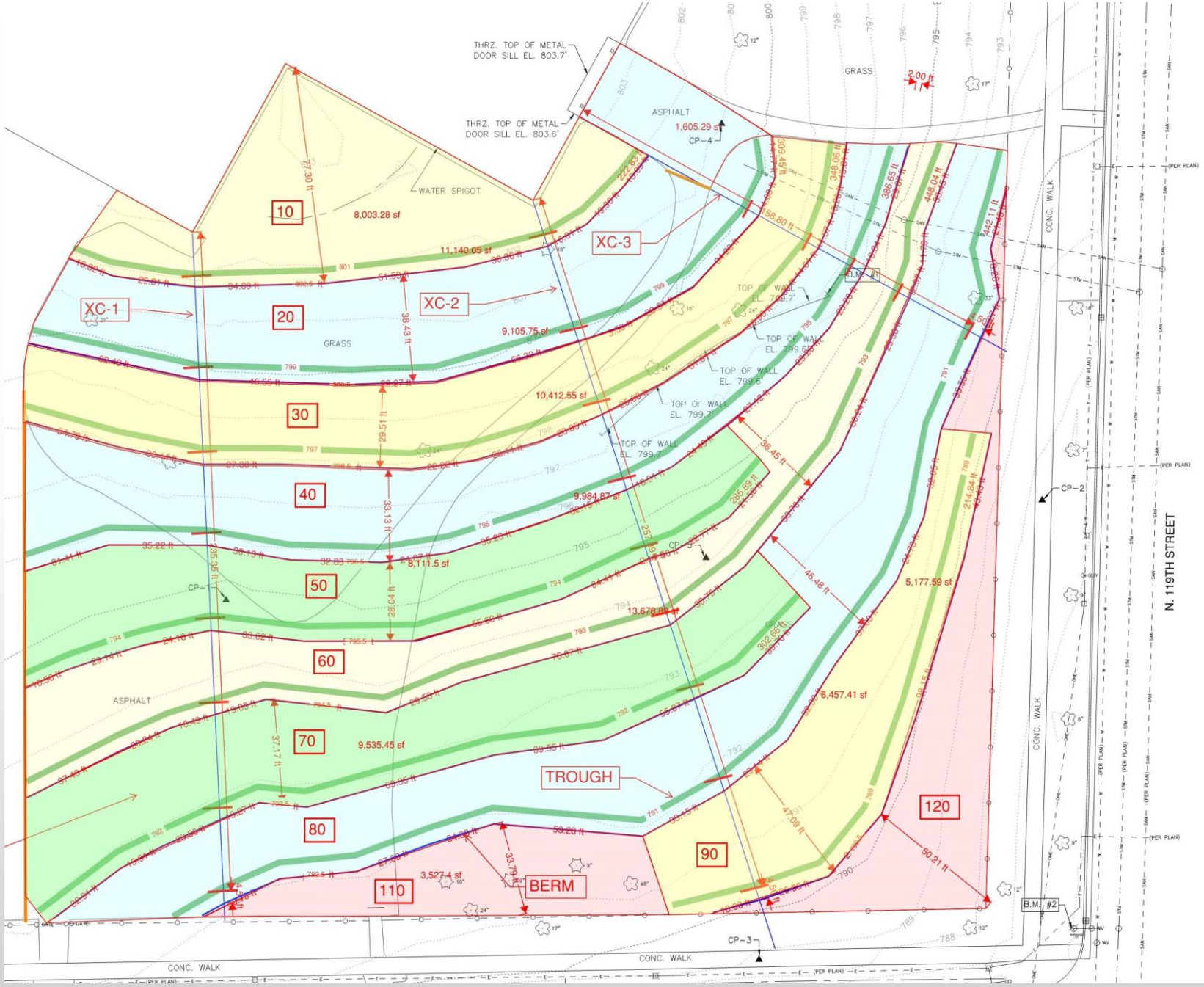
Concept Grading Design



Very Conceptual Planting Plan

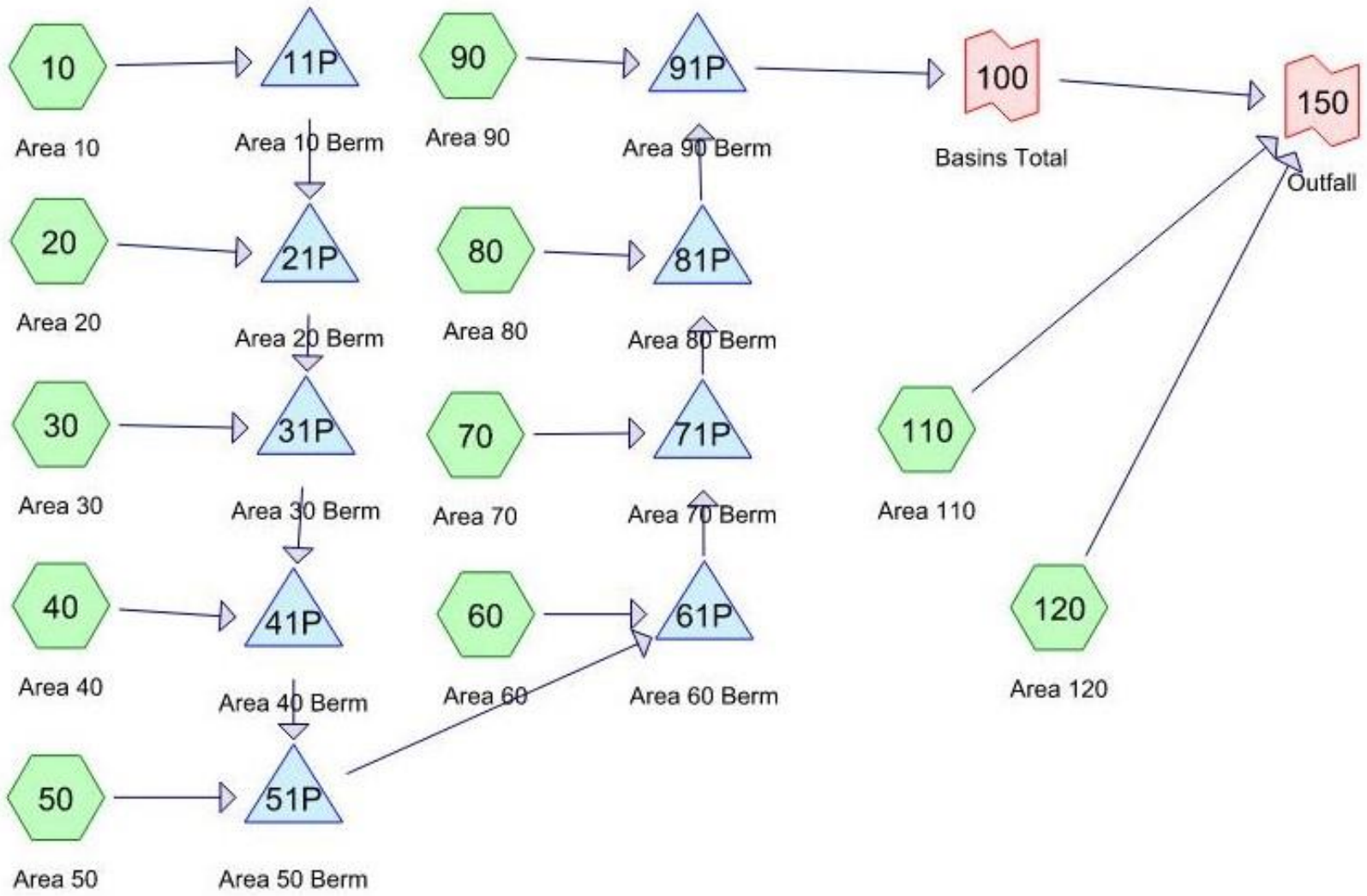
Site Cross-Section No. 2





Storm Water Drainage Subareas

HydroCAD Model Schematic



Conceptual Model Outputs – 100 Year Event

Pond 11P: Area 10 Berm Peak Elev=802.31' Storage=0.043 af Inflow=0.87 cfs 0.050 af
Discarded=0.01 cfs 0.007 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.007 af

Pond 21P: Area 20 Berm Peak Elev=800.39' Storage=0.065 af Inflow=1.67 cfs 0.075 af
Discarded=0.01 cfs 0.011 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.011 af

Pond 31P: Area 30 Berm Peak Elev=798.47' Storage=0.042 af Inflow=1.26 cfs 0.056 af
Discarded=0.01 cfs 0.011 af Primary=0.03 cfs 0.004 af Outflow=0.04 cfs 0.016 af

Pond 41P: Area 40 Berm Peak Elev=796.48' Storage=0.044 af Inflow=1.44 cfs 0.069 af
Discarded=0.01 cfs 0.013 af Primary=0.06 cfs 0.014 af Outflow=0.07 cfs 0.027 af

Pond 51P: Area 50 Berm Peak Elev=795.34' Storage=0.056 af Inflow=1.12 cfs 0.064 af
Discarded=0.01 cfs 0.009 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.009 af

Pond 61P: Area 60 Berm Peak Elev=793.96' Storage=0.049 af Inflow=1.38 cfs 0.062 af
Discarded=0.01 cfs 0.015 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.015 af

Pond 71P: Area 70 Berm Peak Elev=793.49' Storage=0.035 af Inflow=1.32 cfs 0.059 af
Discarded=0.01 cfs 0.010 af Primary=0.11 cfs 0.016 af Outflow=0.12 cfs 0.026 af

Pond 81P: Area 80 Berm Peak Elev=792.46' Storage=0.067 af Inflow=1.89 cfs 0.100 af
Discarded=0.02 cfs 0.018 af Primary=0.09 cfs 0.018 af Outflow=0.11 cfs 0.036 af

Pond 91P: Area 90 Berm Peak Elev=790.46' Storage=0.033 af Inflow=0.89 cfs 0.057 af
Discarded=0.01 cfs 0.009 af Primary=0.09 cfs 0.017 af Outflow=0.10 cfs 0.026 af

Conceptual Model Output

- Rainfall Captured:
  - 2-year Storm – 49,850 Gallons
  - 10-year Storm – 90,250 Gallons
  - 100-year Storm – 178,000 Gallons
- Runoff Discharge from the Site:
  - 2-year Storm – Zero Gallons
  - 10-year Storm – Zero Gallons
  - 100-year Storm – 5540 Gallons
- Time to Drain – Between 2 and 3.5 days for the 100-year event

MMSD Fresh Coast Partnership Program

- Program is focused on capturing storm water before it enters the storm sewer system or waterways
- Administered by Corvias for the MMSD
- Trying to remove 8,000,000 gallons
- Looking for partners, based on several criteria
- Will pay for design and construction, along with initial maintenance
- Requires 11-year conservation easement

Current Project Status

- Working on finalizing agreements with MMSD's program administrator
- Design to proceed immediately
- Current goal is to perform construction during the summer of 2021

Thoughts for Today

- This is a **work in progress**
- The concept could be another tool in the green infrastructure toolbox
- The project has multiple potential benefits:
  - Self-supporting, and even income generating
  - A teaching tool in the urban environment
  - Several sustainable benefits, such as heat island reduction and storm water re-use
  - Reduction of flooding and water pollution
- The concept could be applied at other locations and in different ways

QUESTIONS?

- Stay tuned!