

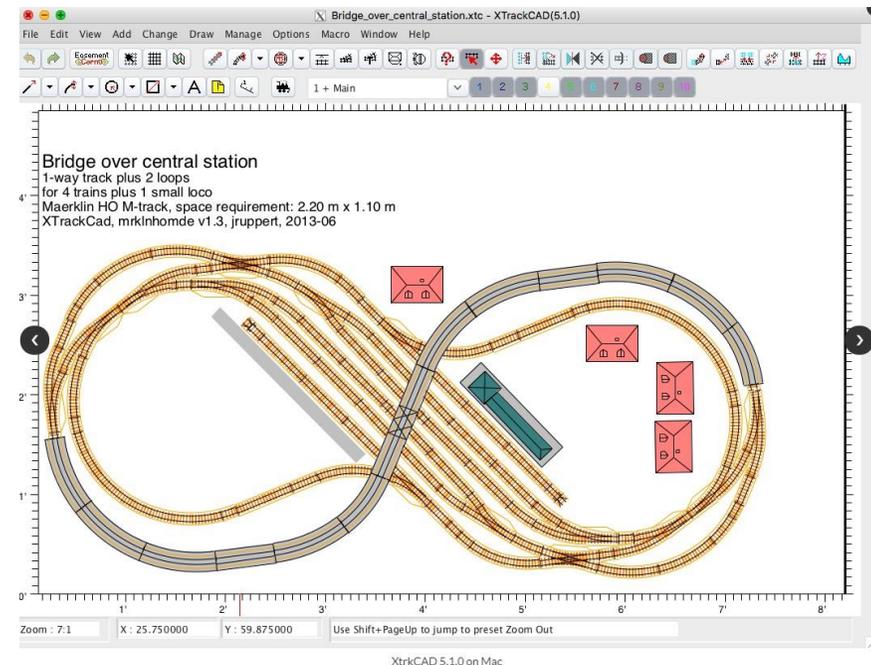
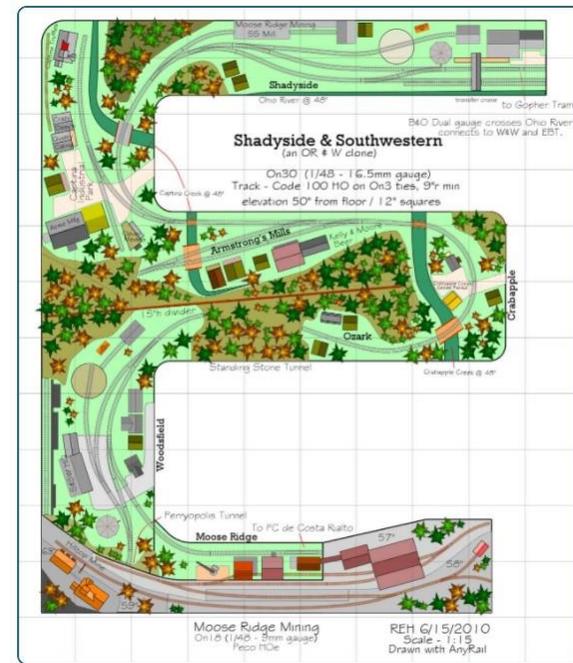


# Taking Full Advantage of Your Layout Design Software

PRESENTED VIA "ZOOM" BY STEVE MIAZGA  
TO THE SOUTH CENTRAL WISCONSIN DIVISION NMRA  
NOVEMBER 1, 2020



# What is layout design software?



# The Programs

- ▶ Typically a Computer Assisted Design (CAD) program
- ▶ Programs vary in capability and complexity
- ▶ Simplest versions are geared toward a manufacturer (like Atlas)
- ▶ Some are focused on simulation/operation – not design
- ▶ A **good** CAD package opens up other possibilities for use

# This Presentation will focus on Cadrail

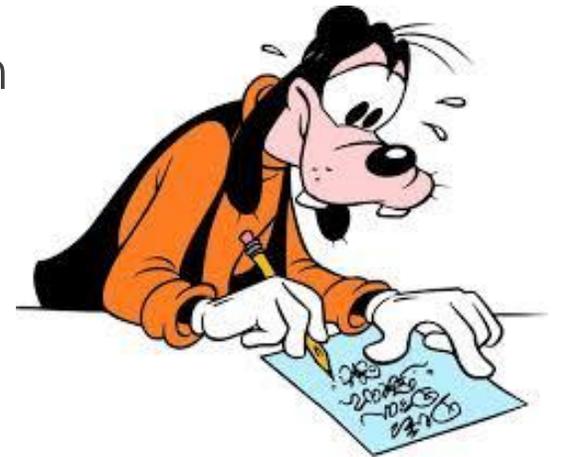
- ▶ Using it in the planning stages
- ▶ Furthering the design toward construction using the design tools
- ▶ Documenting your design utilizing utilities
- ▶ Post construction – what else can you do with the program



Alternatives to Cadrail can be found at: [www.alternativesto.net/software/cadrail](http://www.alternativesto.net/software/cadrail)

# Layout Planning

- ▶ Establish your **design goals** and recognize the **constraints**
- ▶ Use the **software to guide you** in your concept decisions – **sketch time!**
- ▶ Determine **turnout control** – manual or machine – conflicts with Benchwork?
- ▶ **Power** districts & reverse loops
- ▶ **Hidden track accessibility** for operations and maintenance
- ▶ Allow and **plan for more** than just track!



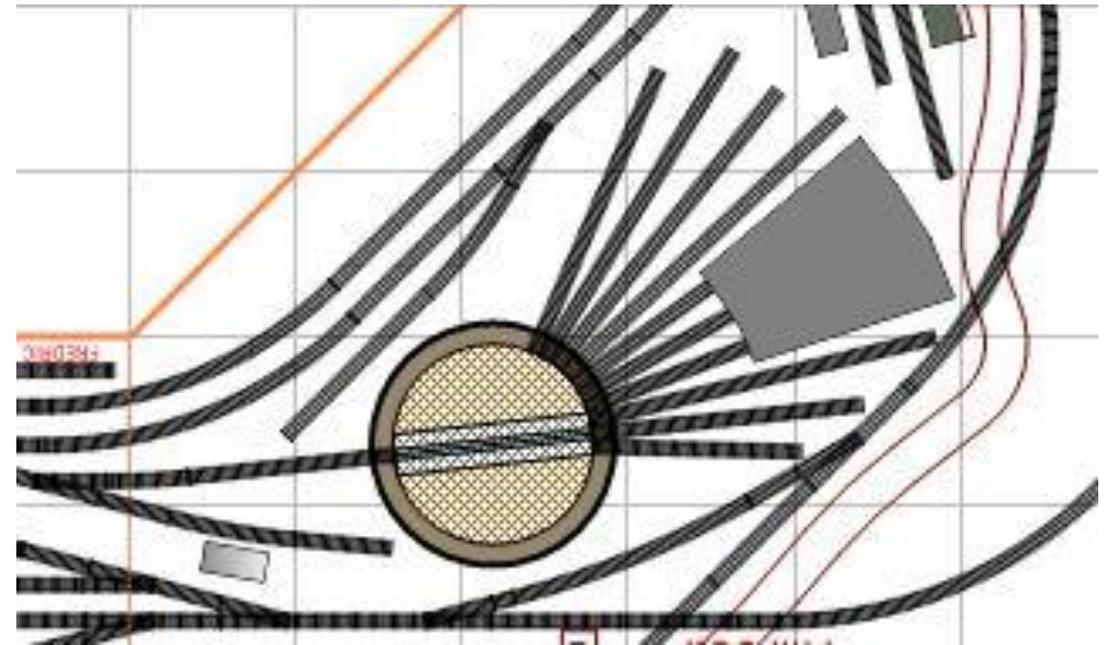
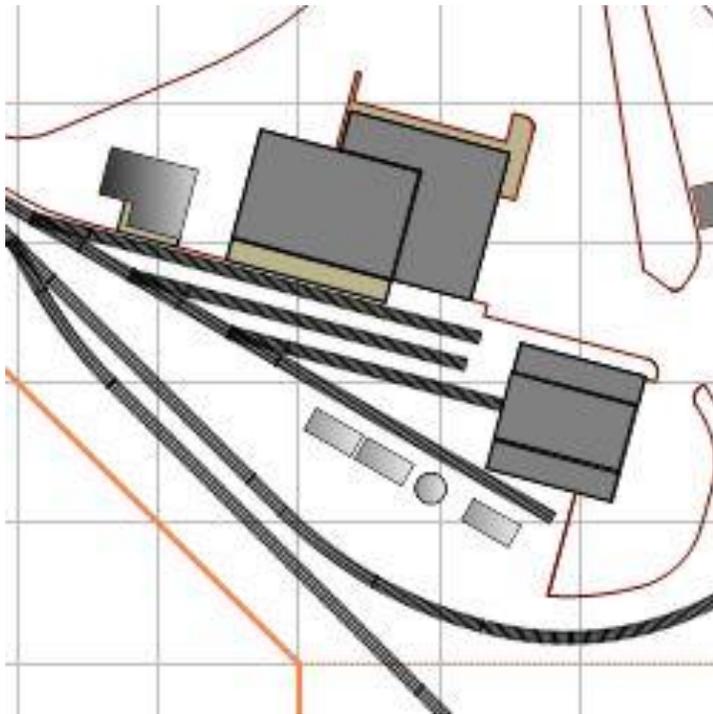
# Design Goals

- ▶ Prototype or freelance?
- ▶ Track Plan → switching or cross country?
- ▶ Multi Level?
- ▶ Staging?
- ▶ Operations or just a pretty model?
- ▶ Trains on the move – how many?
- ▶ Aisle width – plan for operations in the long term – allow bodies to pass!
- ▶ Minimum radius, maximum grade and minimum turnout size
- ▶ Wiring and signals



# Layout Space Hogs...

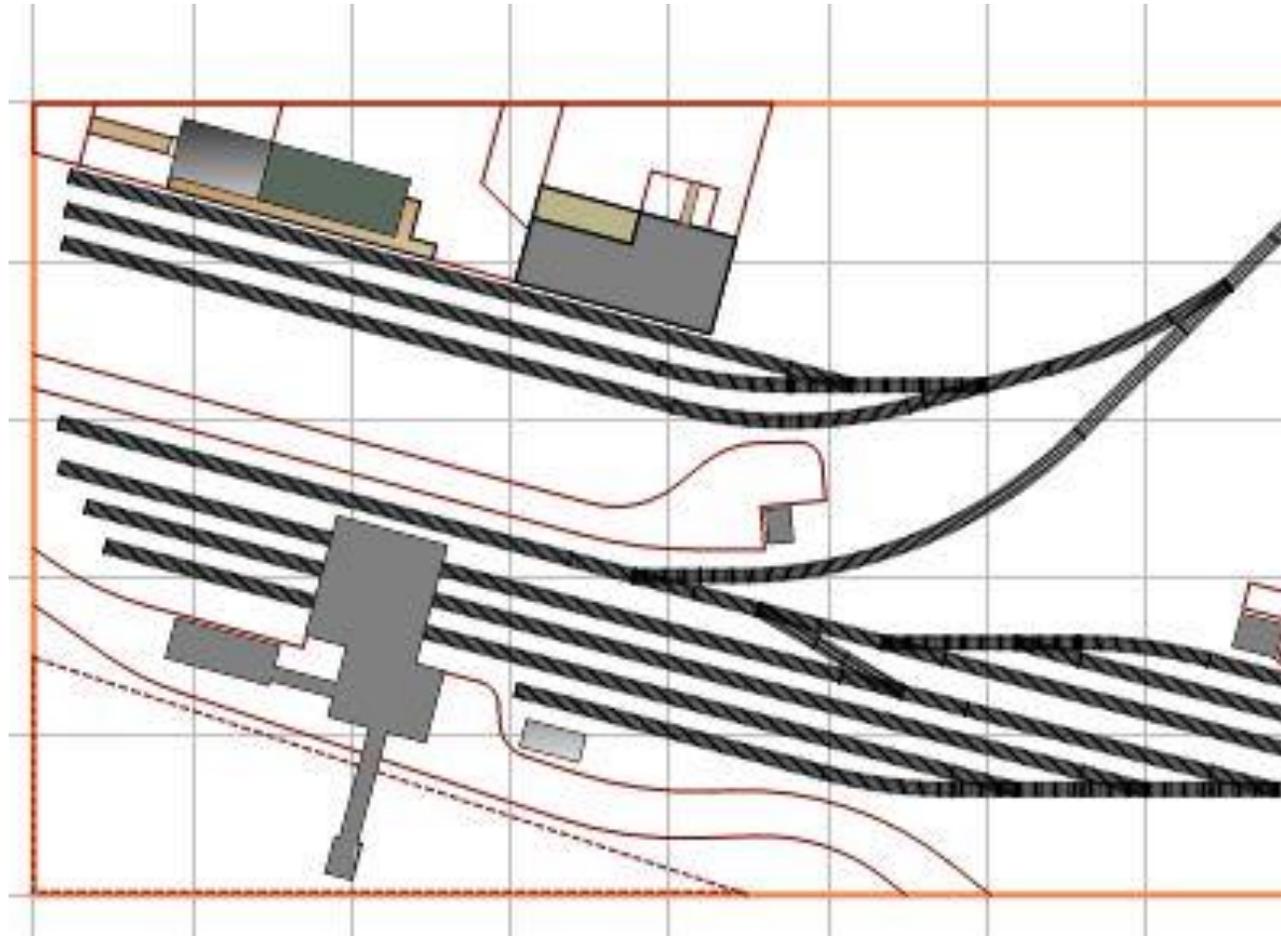
## Large Industries



## Turntables and Engine Facilities

# More Space Hogs...

**Industrial  
Service Yards**



# Design Constraints

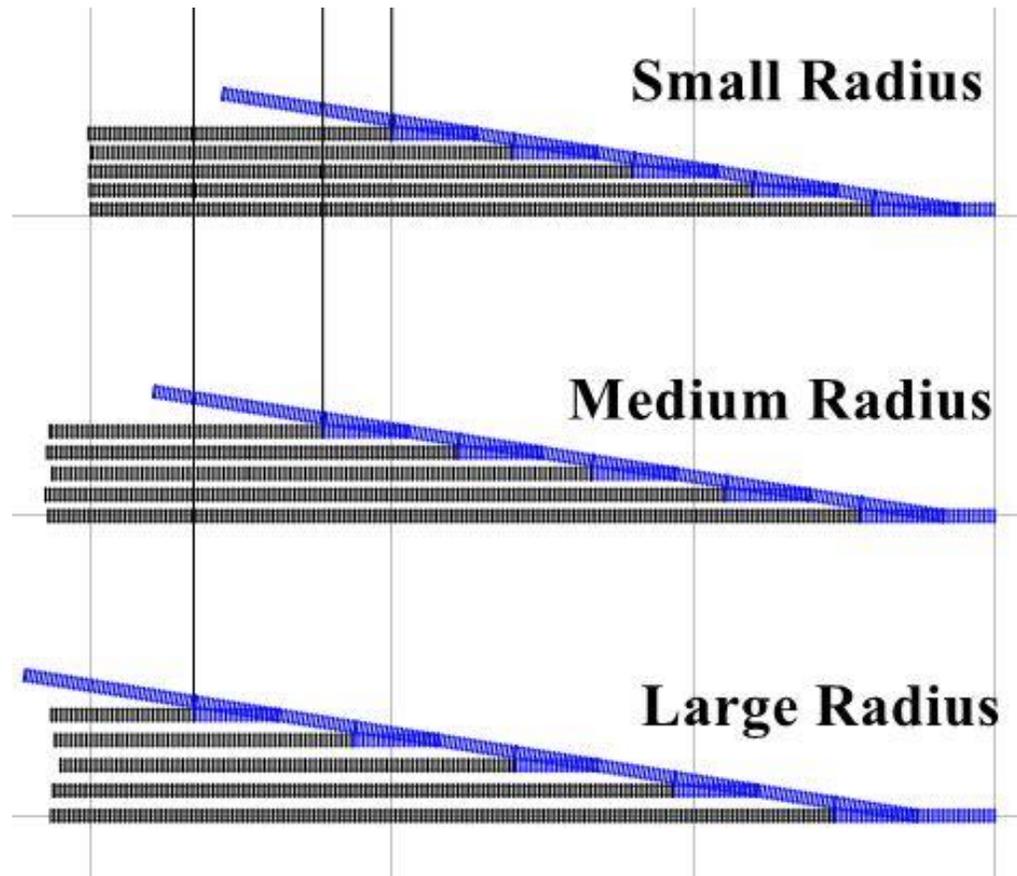
- ▶ Available **space**
- ▶ **Budget**
- ▶ **Operating period** of the layout → steam, transition, modern
- ▶ Maximum **car length** may dictate design standards – don't skimp
- ▶ **Time** to construct

# Use the Software to Plan

- ▶ **Test radii** of track and **space** requirements
- ▶ Test **grades** → how long to go up how much
- ▶ Yard design → **ladders** take up more space than you think
- ▶ Use smooth **transitions** before turnouts – minimum ½ car length rule
- ▶ **Building locations** – decide to build complete scenes or simply use backdrop mounted facades

# Yard Ladder Impacts

The Turnout selected will impact the length of the ladder as well as the yard track spacing.



# Cadrail Design Tools that Help

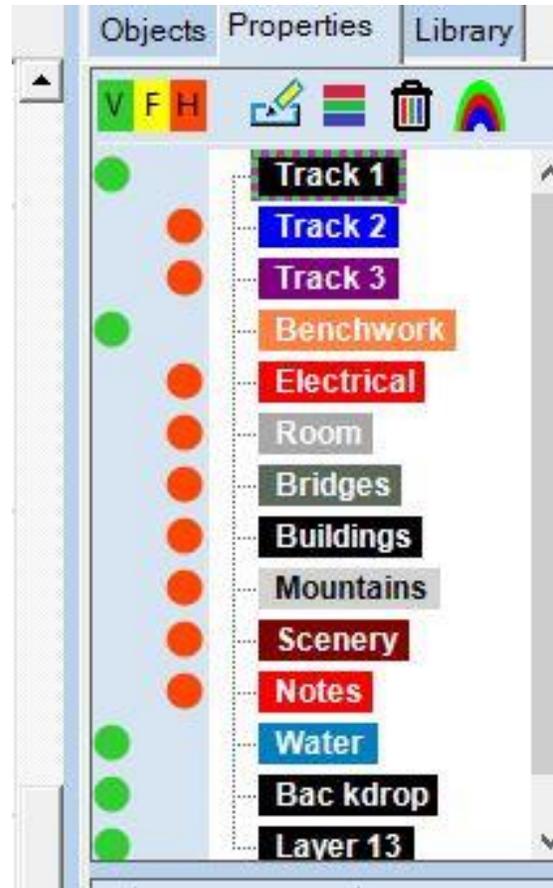
- ▶ **Templates and Libraries** improve accuracy and add simplicity to design
- ▶ You keep it square – tools like “**Line Offset, Grid Snap, and Auto Align**” help make sure the plan works
- ▶ **Layers** help you keep organized – can be worked on individually and overlaid to check design issues and conflicts
- ▶ **Printouts** can be produced using **variable scales**

# Good Start??

- ▶ **Double check measurements** of space for layout
- ▶ **Check your arm reach** with your layout height and depth
- ▶ Double check your **aisle space** allowance, wider is always better
- ▶ Test your **mainline curves, transitions and grades**
- ▶ Double check the **electrical** – reverse loops, power districts, circuit protection, signals – access to control boards

# Cadrail Layers Keep it Organized

**Turn Layers  
On and Off  
To Test for  
Conflicts**



**Define the color, line type  
And assign names to your  
layers**

# Cadrail Libraries Simplify Design

- 1\_MARK
- 2018 Expansion Cutting List
- BUILDING
- CAMPBELL
- DOORS
- DPM kits
- ELECTRIC
- FURNITUR
- G Aristocraft
- G\_LGB
- HO Bachman
- HO BRIDGES 3D
- HO BUILDINGS 3D
- HO BUILDINGS
- HO Fast Tracks
- HO Fleischmann
- HO Marklin C
- HO Marklin K
- HO PECO 75
- HO PECO 83
- HO PECO 100
- HO PORTALS 3D
- HO Shinohara Code 100
- HO TREES 3D
- HO Walthers Code 83
- HO\_A83
- HO\_A100
- HO\_MICRO
- HO\_R83
- HO\_R100
- KIT\_BATH
- N Atlas Code 55
- N BRIDGES 3D
- N BUILDINGS 3D
- N Fast Tracks
- N PORTALS 3D
- N Shinohara Code 70
- N TREES 3D
- N\_ATLAS
- N\_KATO
- N\_MICRO
- N\_PECO
- NMRA
- O Atlas
- O BRIDGES 3D
- O BUILDINGS 3D
- O Gargraves
- O LIONEL BUILDINGS 3D
- O Lionel
- O MTH RealTrax
- O PORTALS 3D
- O Ross Custom
- O TREES 3D
- Patio Steps
- Rock Harbor 1
- S\_GILBER
- SCENERY
- SHAPES
- SIEVER
- SIGNALS1
- TUTOR 3D
- TUTOR
- WALTHERS 2
- WALTHERS
- WINDOWS
- WISE Meet Location Map
- YARDS4
- Z\_MARK

# Cadrail Library for Peco "N"



P-SL384 Sm  
F 227



P-SL392 Med  
F 228



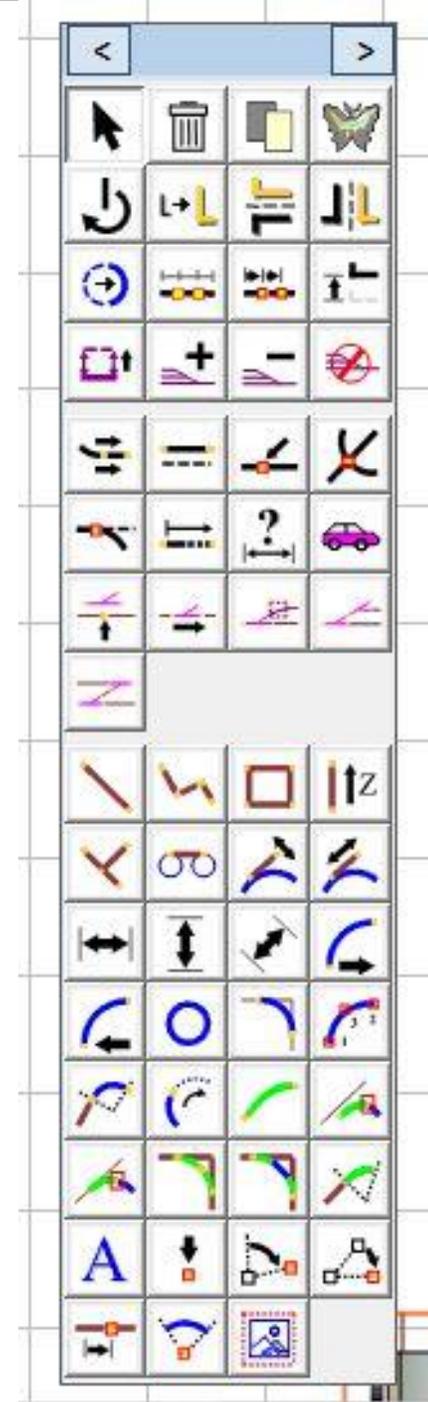
P-SL388 Lrg  
F 229



P55 SL-E391F Sml  
F 230



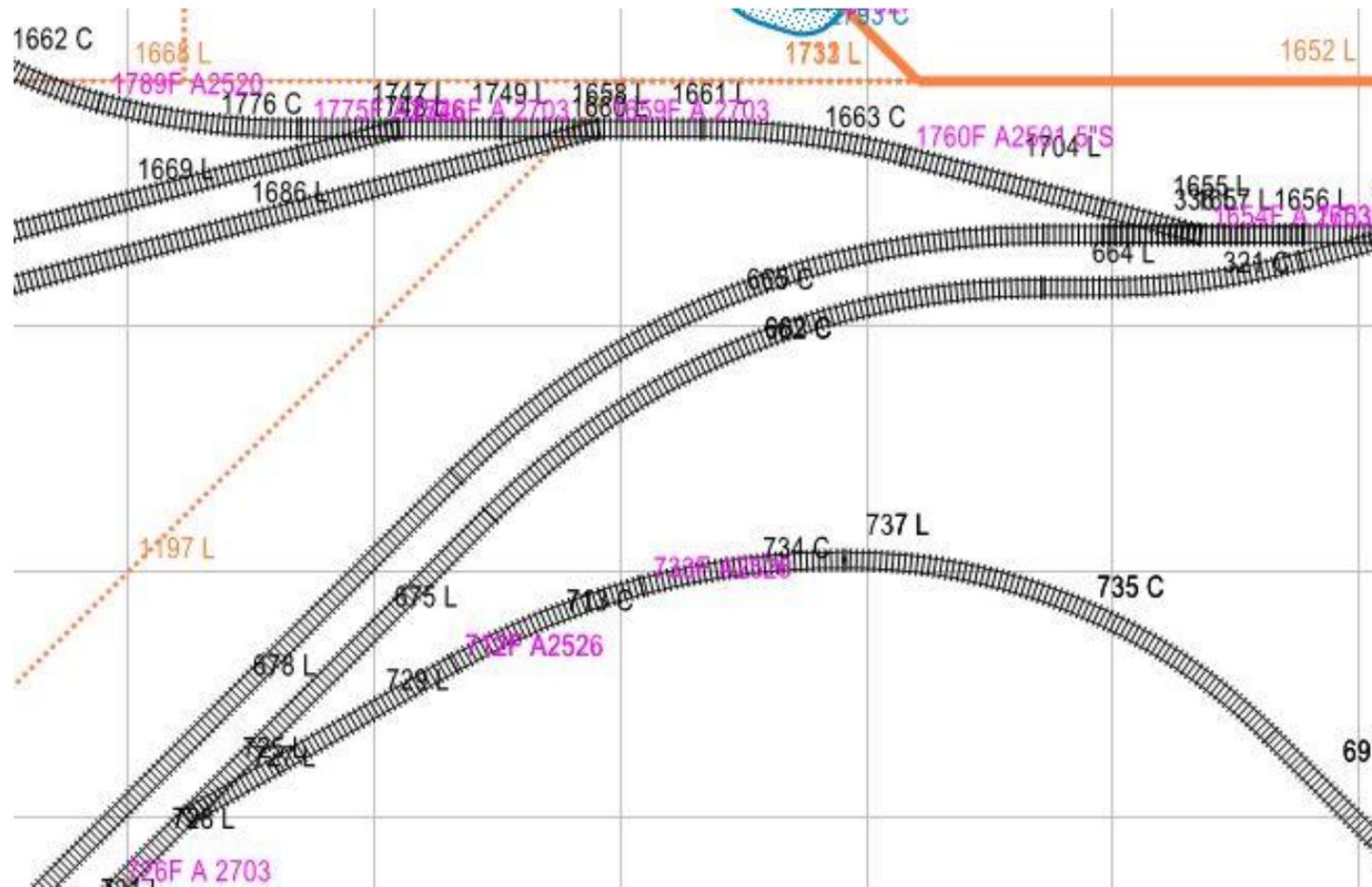
# Cadrail Tools



# Finalize the Concept and Design It

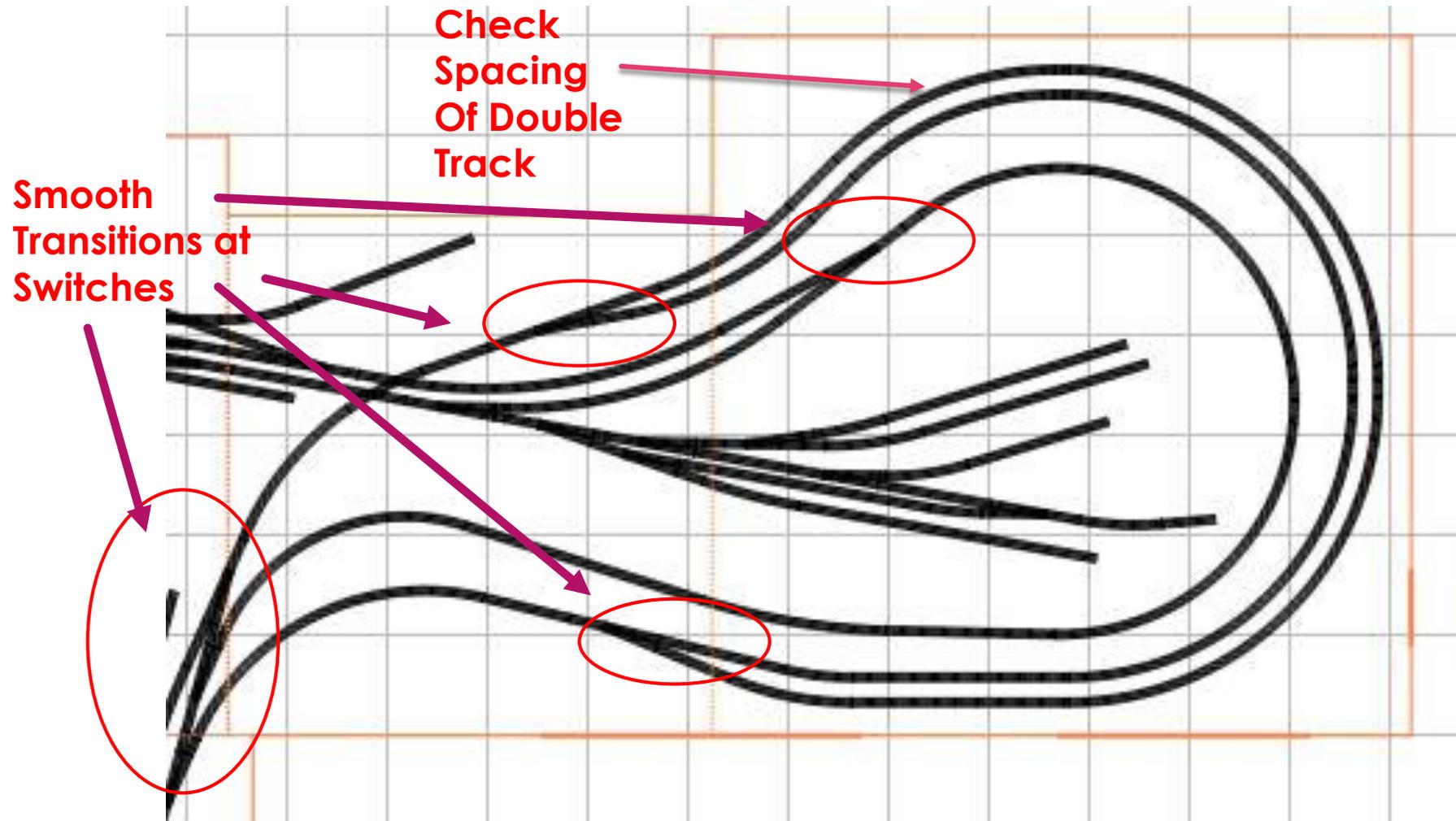
- ▶ Finish and **test the track plan** – you can test run a train in Cadrail
- ▶ **Add buildings** and other non-track elements – do they fit?
- ▶ **Visualize your plan in 3D** if the software allows
- ▶ Setup a **timeline** for what you want to accomplish and when – keeps you focused but be realistic
- ▶ Get ready to **build**

# Use Cadrail Data Tables for Construction and Material Estimating



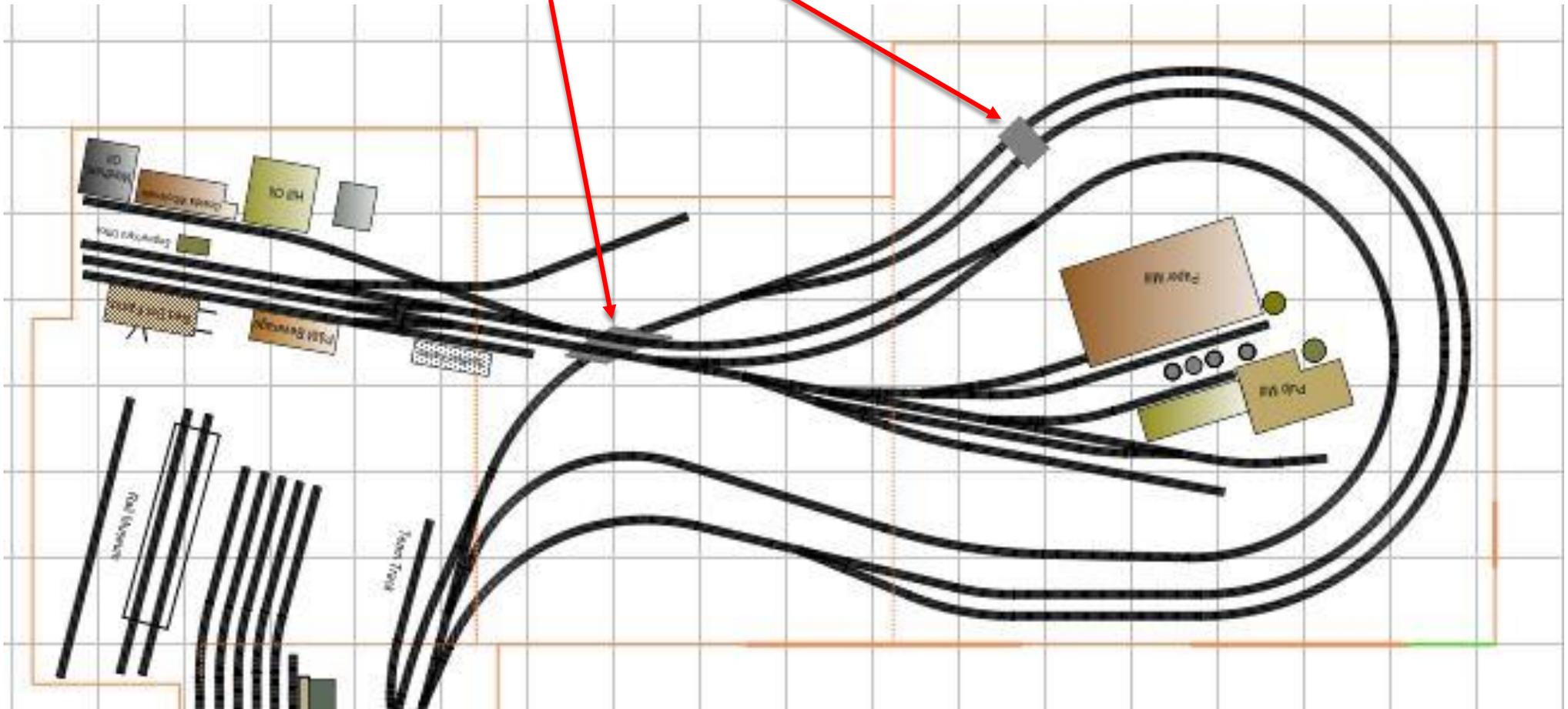


# Test the Track Plan

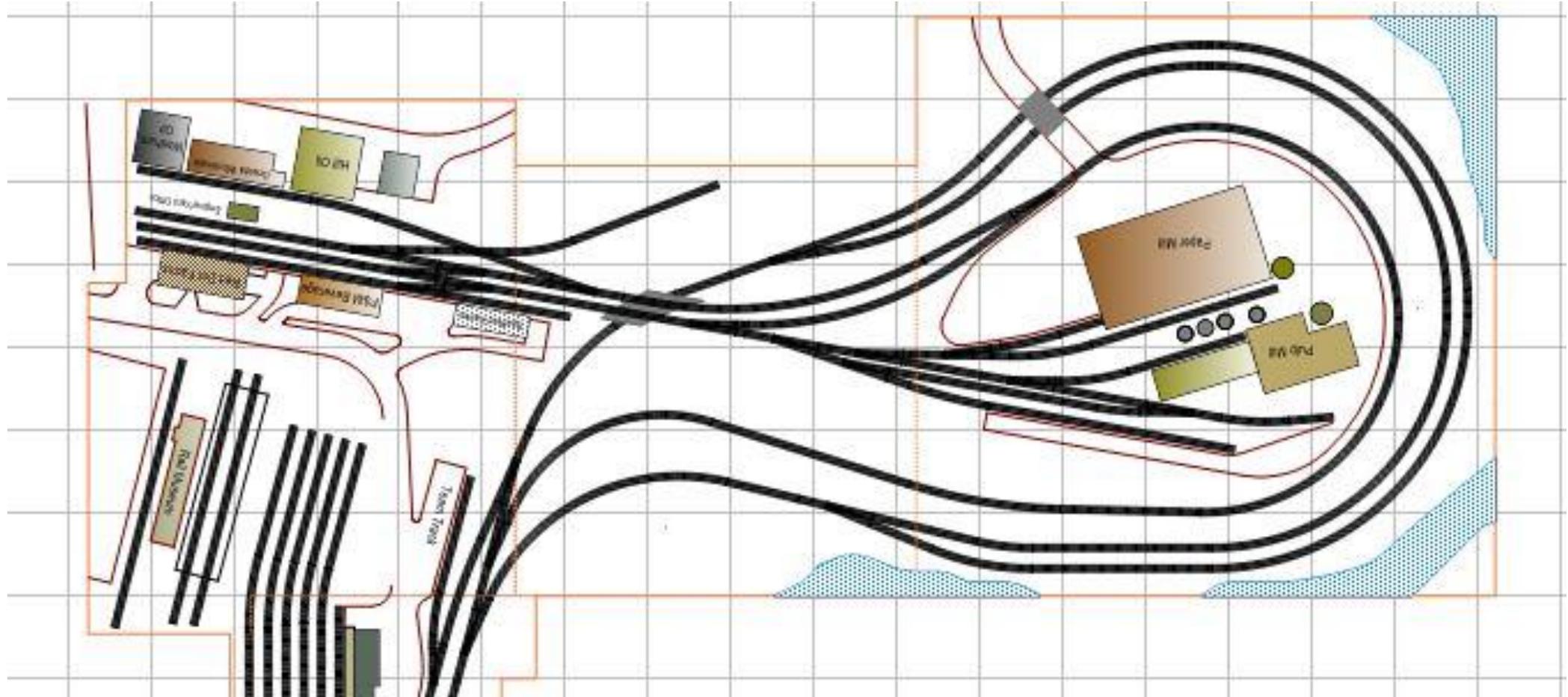




# Add Bridges...



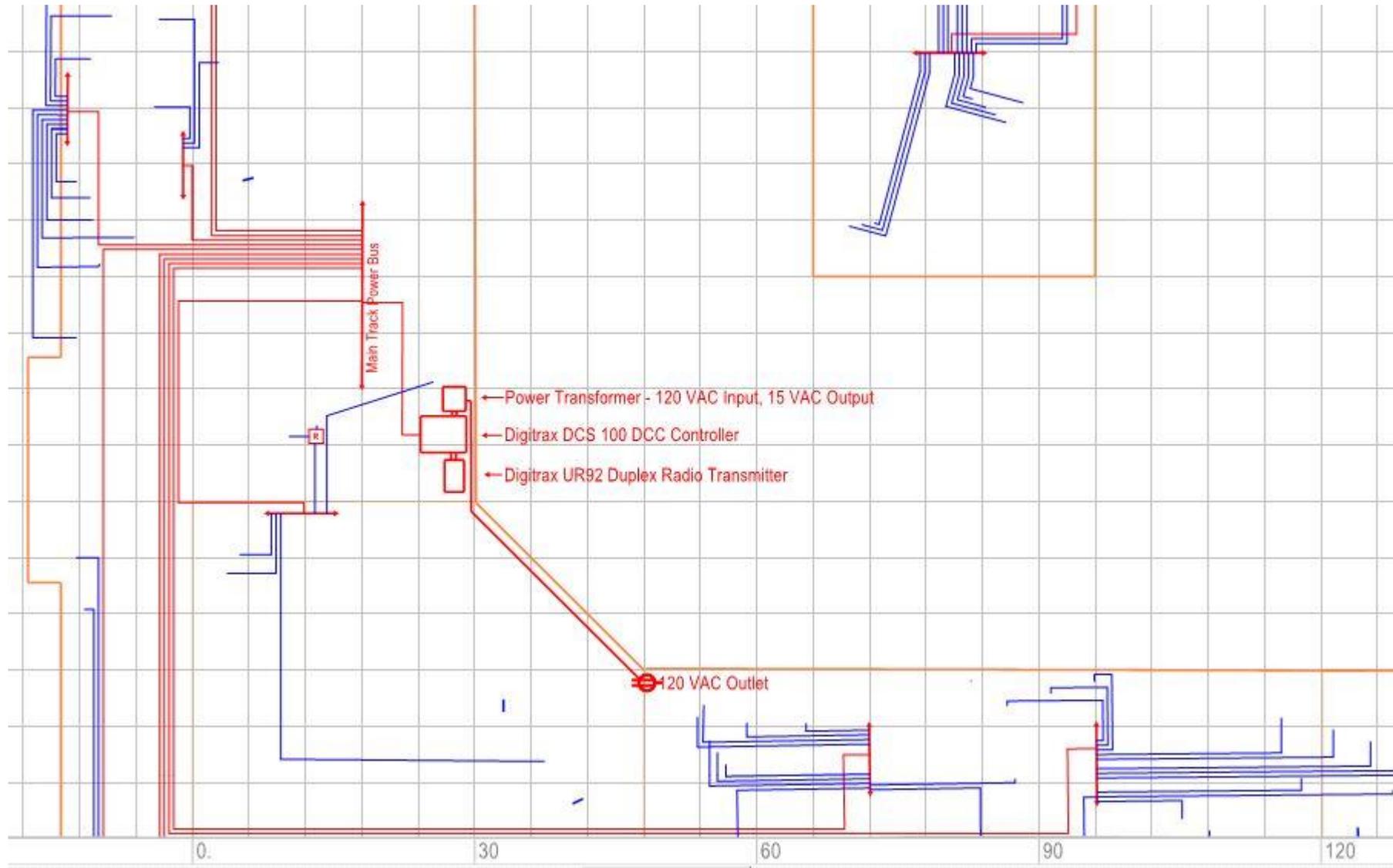
# Add Water and Roads...



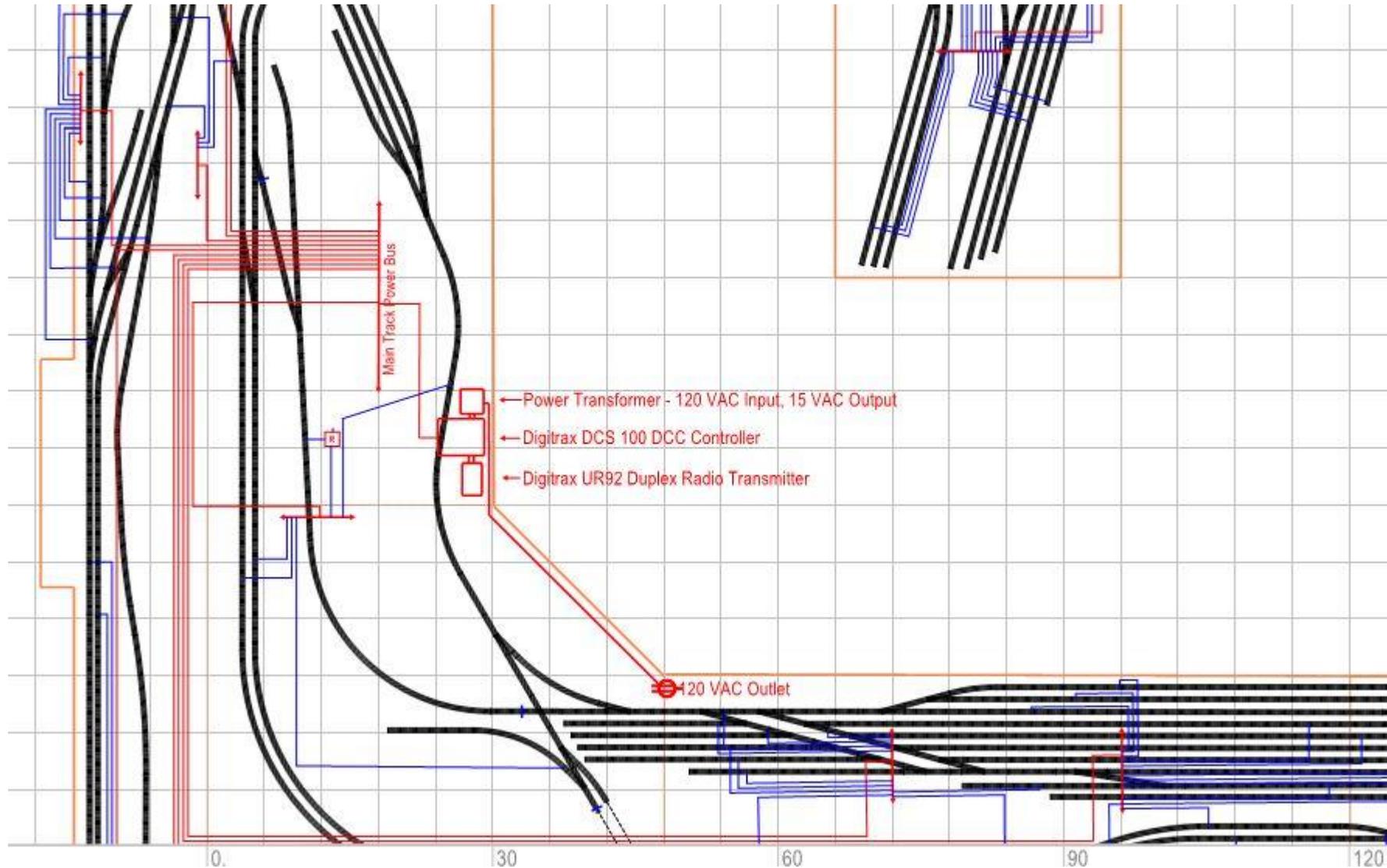
# Other Planning Help

- ▶ Develop a **wiring plan** – take into account Benchwork to Track-work relationships
- ▶ **Cutting diagram** for Benchwork → better than guessing
- ▶ Print out **1:1 plans** for building **complex areas**
- ▶ Identify riser heights by merging track layout to Benchwork locations
- ▶ **Estimate quantities** for roadbed, track, wire

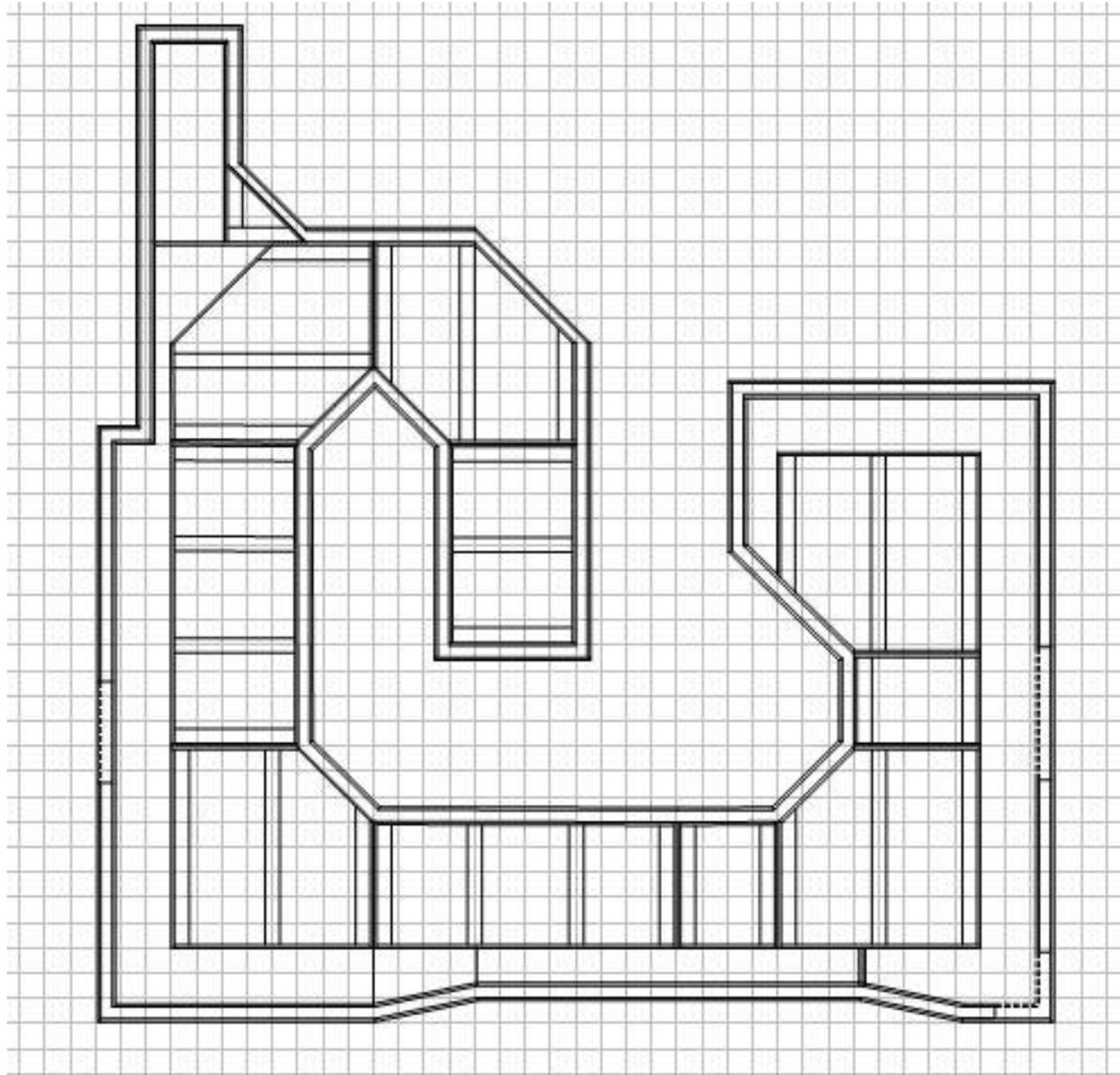
# Electrical Plan Layer Only



# Electrical Schematic with Track



# Benchmark Framing Plan



# Develop a Cutting Schedule for Benchwork

*Just buy the material that you need – not what you think you need 😊*

Vertical Framing				
1x4-10'	42"	28"	29"	40-1/2" 5-1/2"
1x4-10'	99"			21" for braces
1x4-10'	28-1/2"	34-1/2"	40-1/2"	16-1/2" for braces
1x4-10'	28-1/2"	34-1/2"	40-1/2"	16-1/2" for braces
1x4-10'	28-1/2"	34-1/2"	40-1/2"	16-1/2" for braces
1x4-10'	34-1/2"	34-1/2"	40-1/2"	9"
1x4-10'	40-1/2"	40-1/2"	34-1/2"	
Shelf Framing				
1x4-10'	41-1/2"	40-1/2"	33-1/2"	
1x4-10'	99"			21" for braces
1x4-8'	23-1/2"	72-1/2" for bracing		
Shelf Front Face				
1x3-10"	99"		10-1/2" 9"	
1x3-8"	46"	40"	6"	
1x3-10"	49"	35"	23-1/2"	

*I'm Done.....  
Now What Do  
I Use the  
Program For?*



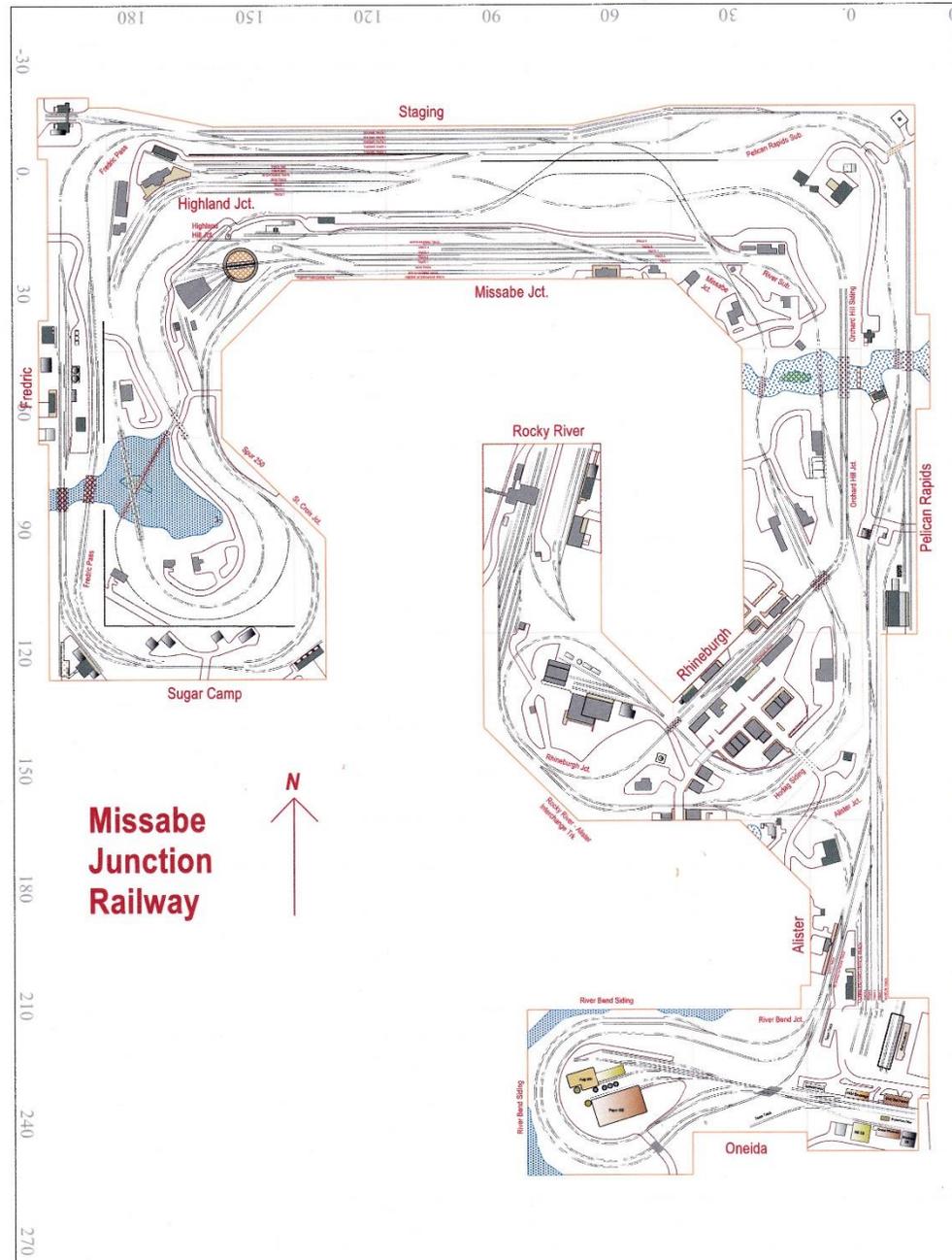
# Here are some examples...

- ▶ Yard schematic signage
- ▶ Operations diagrams for your layout fascia
- ▶ Operating timetable graphs
- ▶ Structure planning and documentation
- ▶ Scratch-built rolling stock plans
- ▶ Maps of anything
- ▶ Wiring diagrams
- ▶ Design around your house → patios, room additions, and more

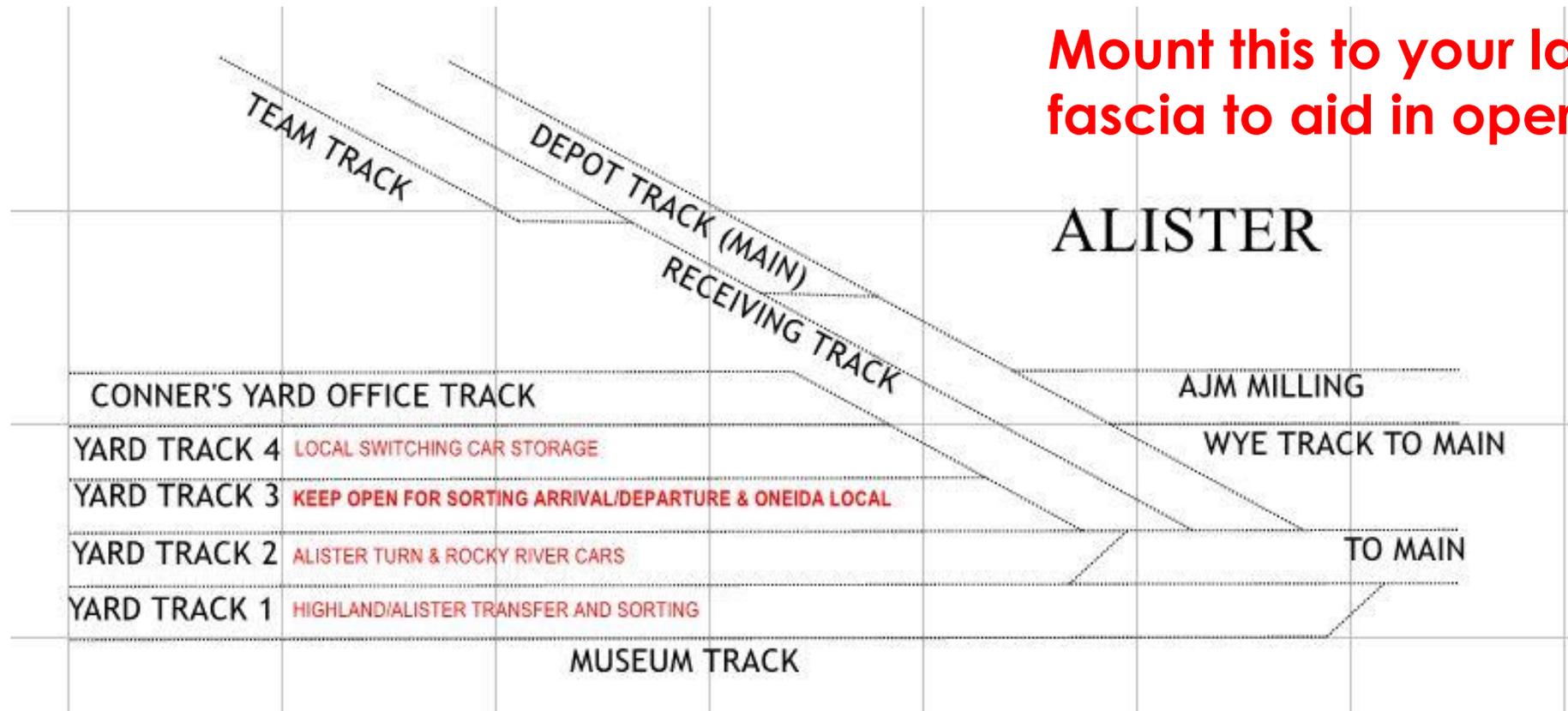


# Overall Layout Map

Use it for Operations  
to help the train  
crews navigate the  
railroad.



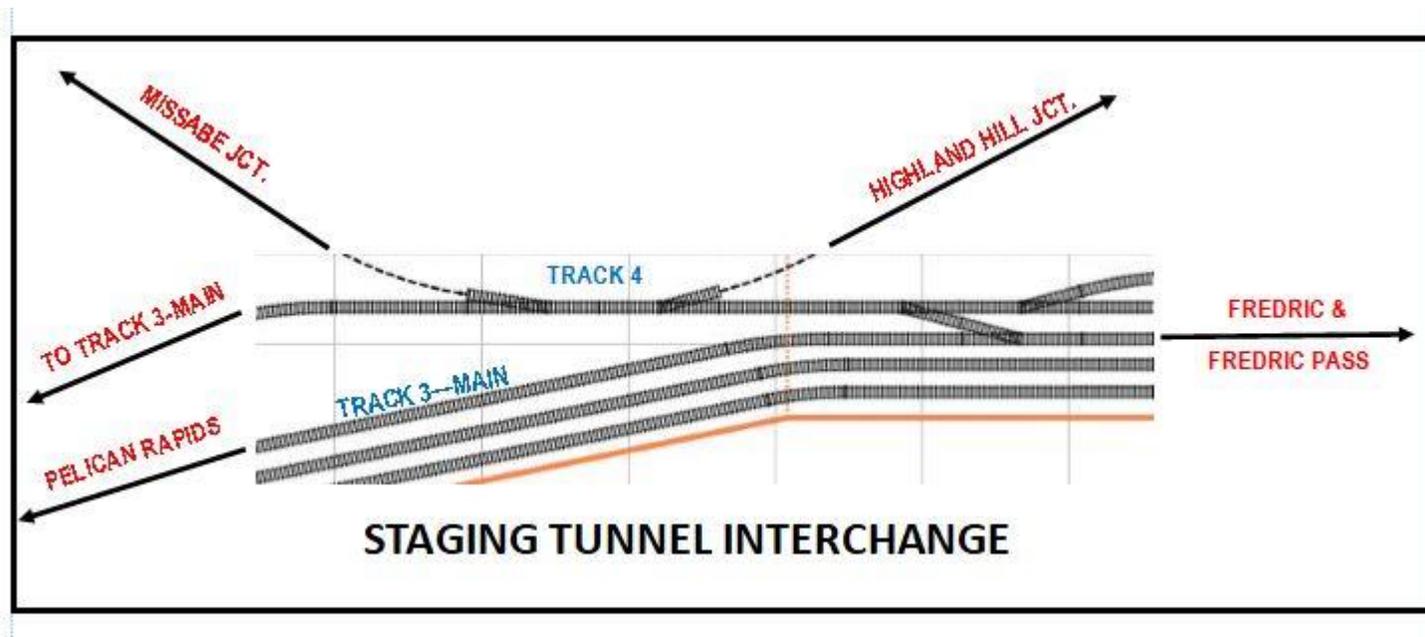
# Schematic Diagram for a Small Yard Drawn in CAD



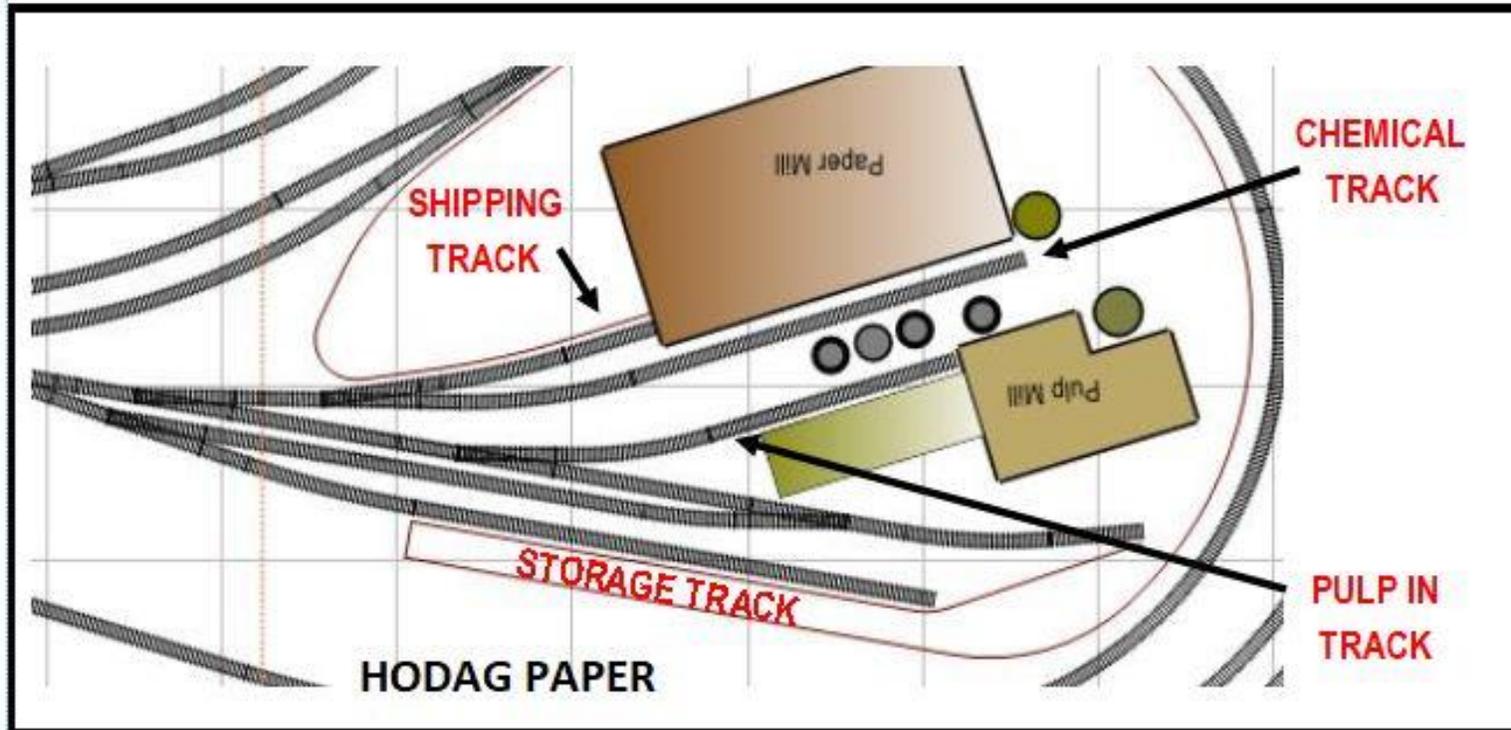
**Mount this to your layout  
fascia to aid in operations**

# Fascia Mounted Sign for Operations Using CAD Image Rather than Schematic

Use a Screen “Snip” program to Save a JPG image you can edit in a publishing program.

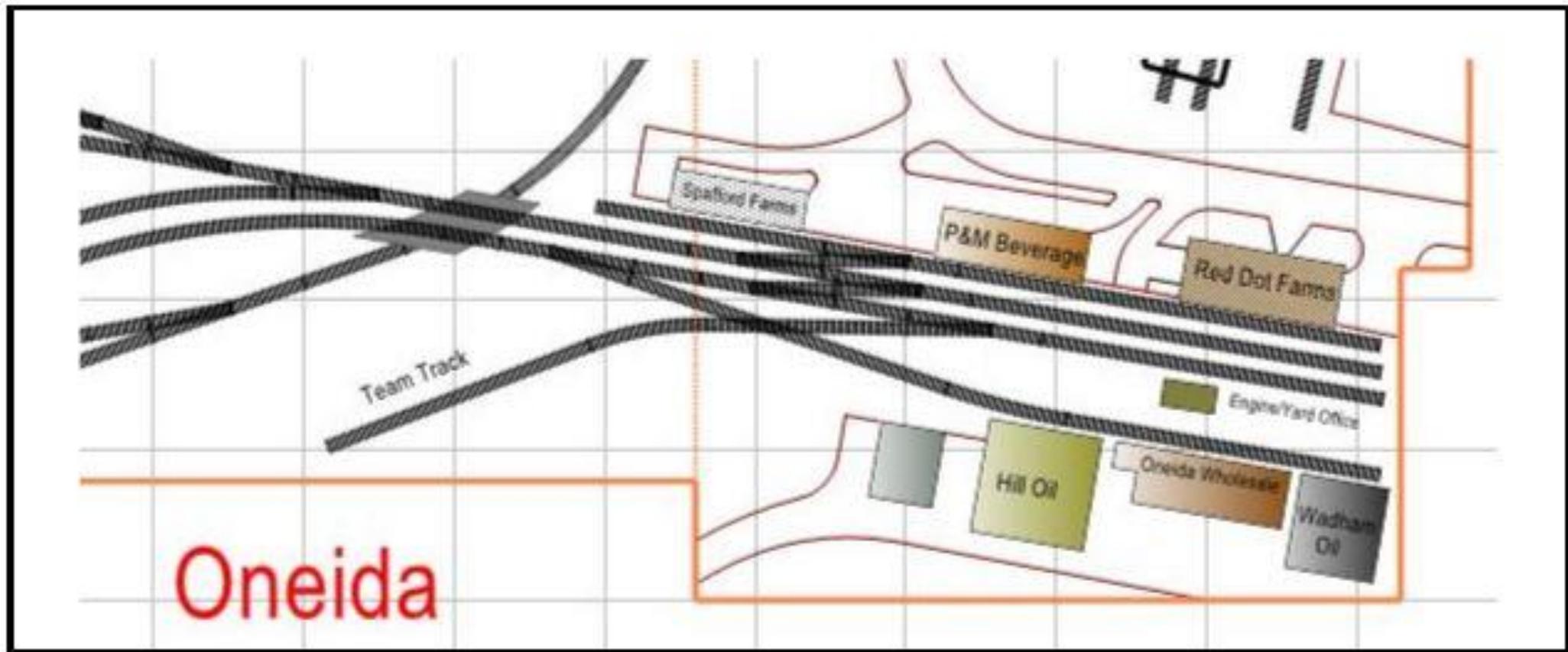


# Another CAD Based Sign for Operations



Text is added to JPG Screen Shots using page layout software like Publisher

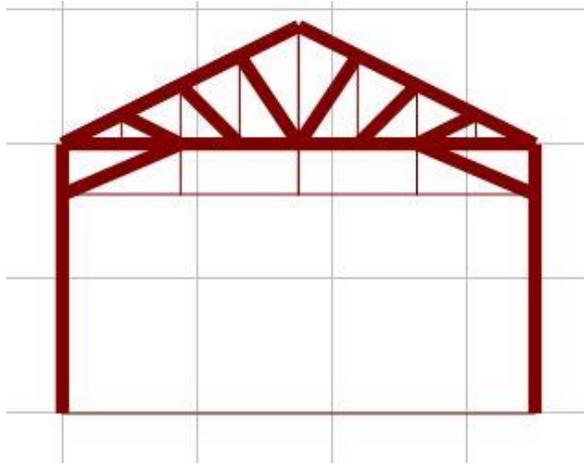
# Another Sign Example with No Text Add-ons – Just a Snip Shot



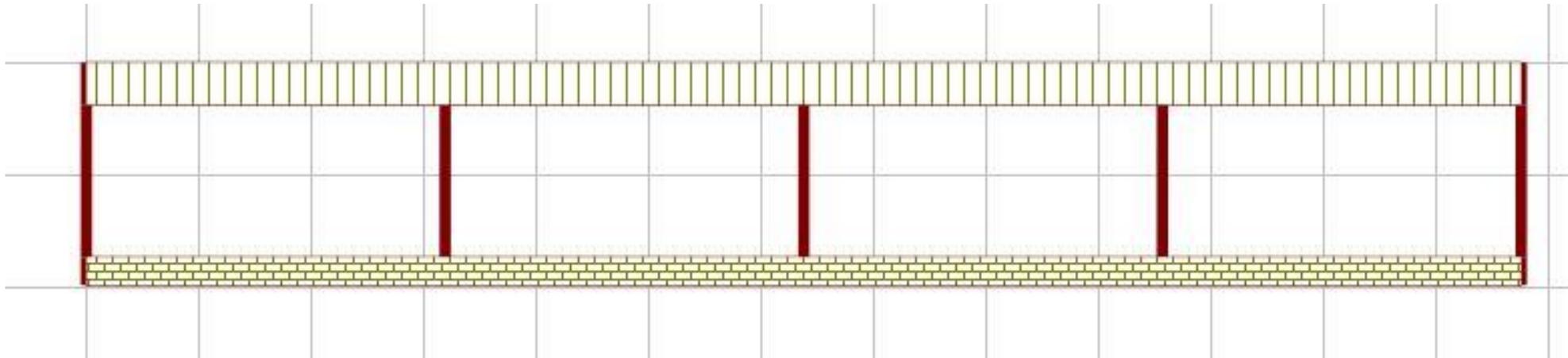
# Develop a Timetable Graph



# Scratchbuild Structure Planning to Scale

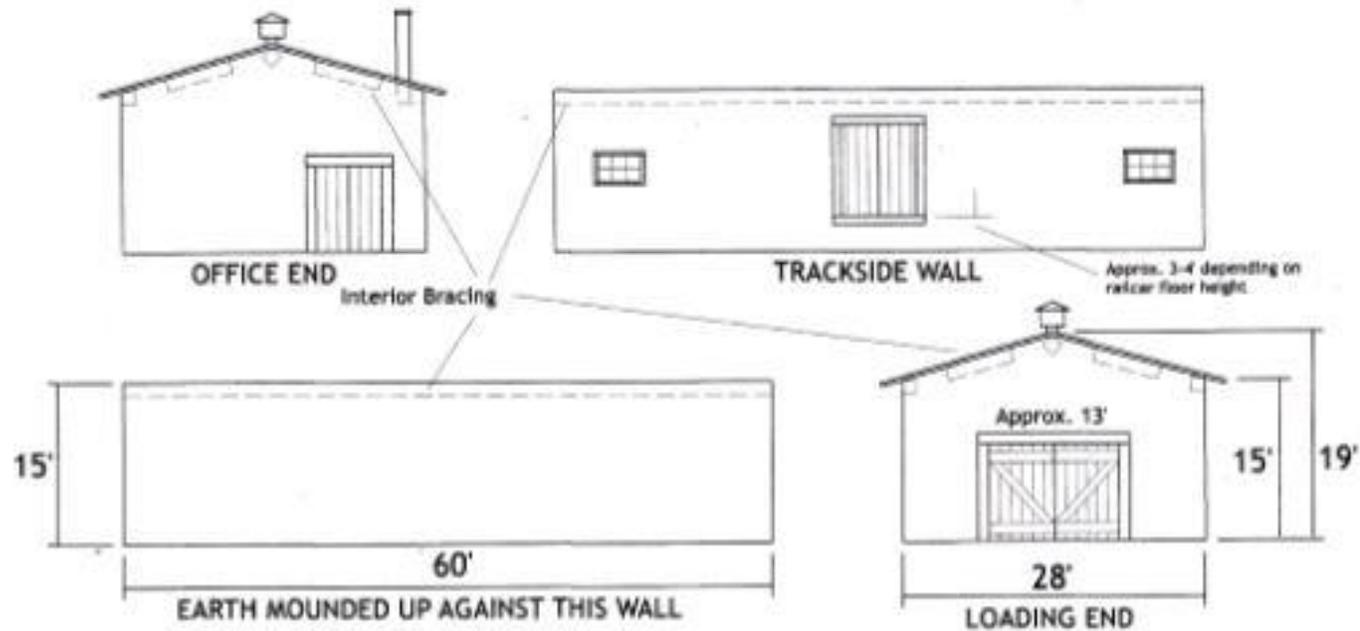


*Use the program to layout a template for building a scratch-built structure*



# Document a Scratch-built Structure to Exact Scale

## Potato Warehouse Building Wall Details

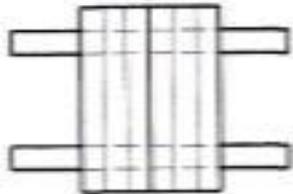


# Building Detail Callouts Documented

## Potato Warehouse Wood Door Details

Leave slight gap  
between center boards only

8'

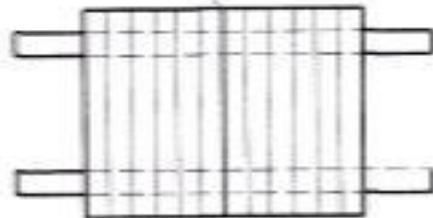


Wood tabs for  
gluing door to  
inside of wall

OFFICE & TRACKSIDE DOORS

Leave slight gap  
between center boards only

Wood tabs for  
gluing door to  
inside of wall



9'

LOADING DOOR

All material Midwest Products #8003 Basswood

# Create Plans for Building Rolling Stock

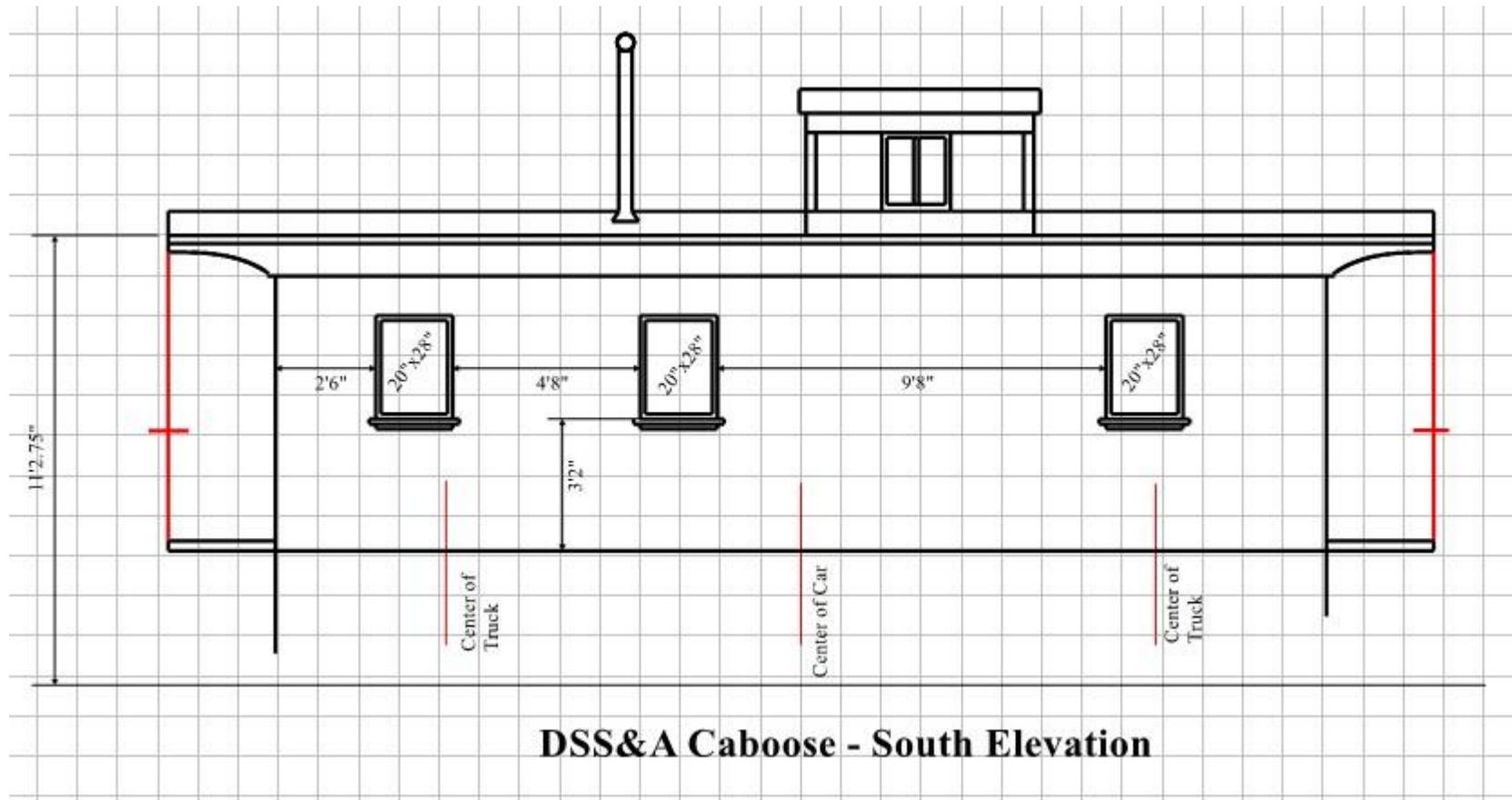
*Design the item in Cadrail and the plans can be output in any scale.*

z N HO S O

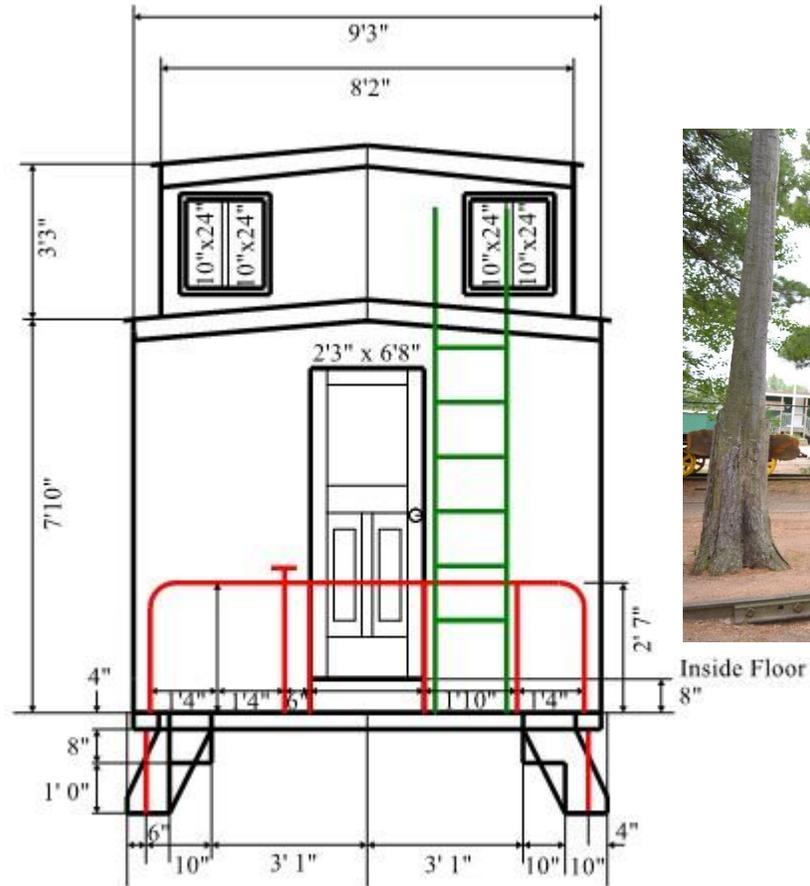
Project:  
Former DSS&A  
Shorty Caboose  
HO Scale



# Create Design from Field Measurements and/or Plans

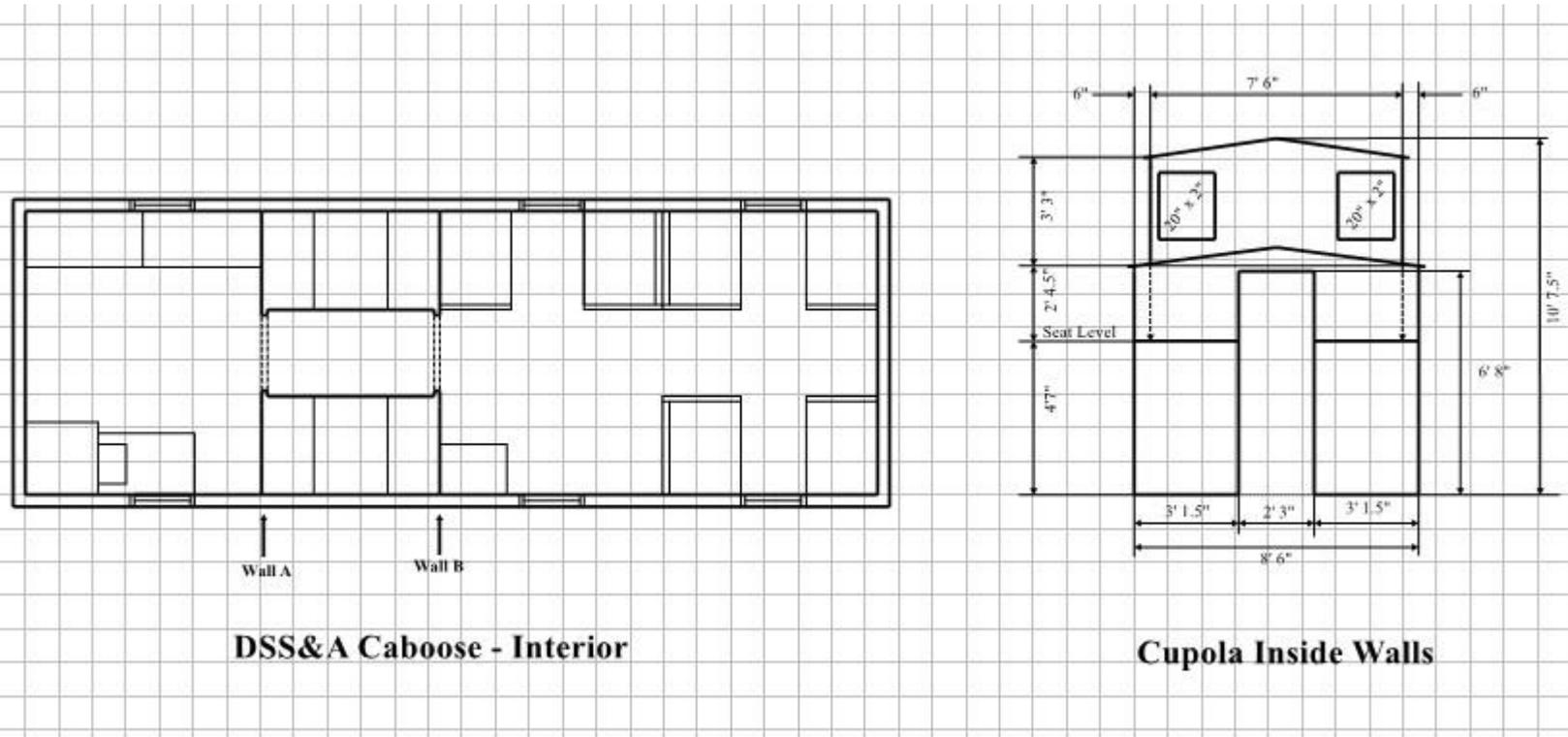


Once the design is created it can be printed out in any scale

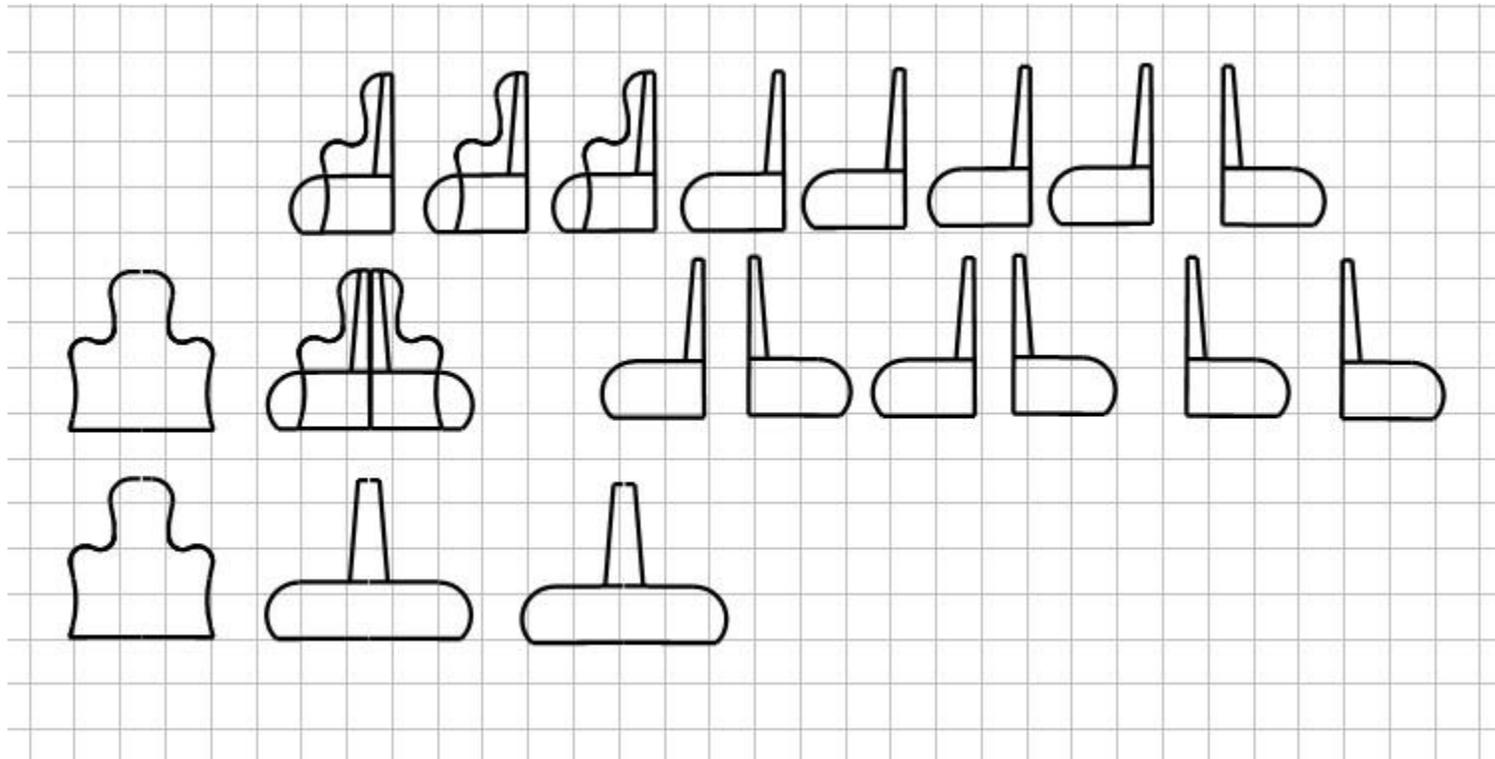


**DSS&A Caboose - East and West Elevations**

Interiors can be designed and printed to scale as well

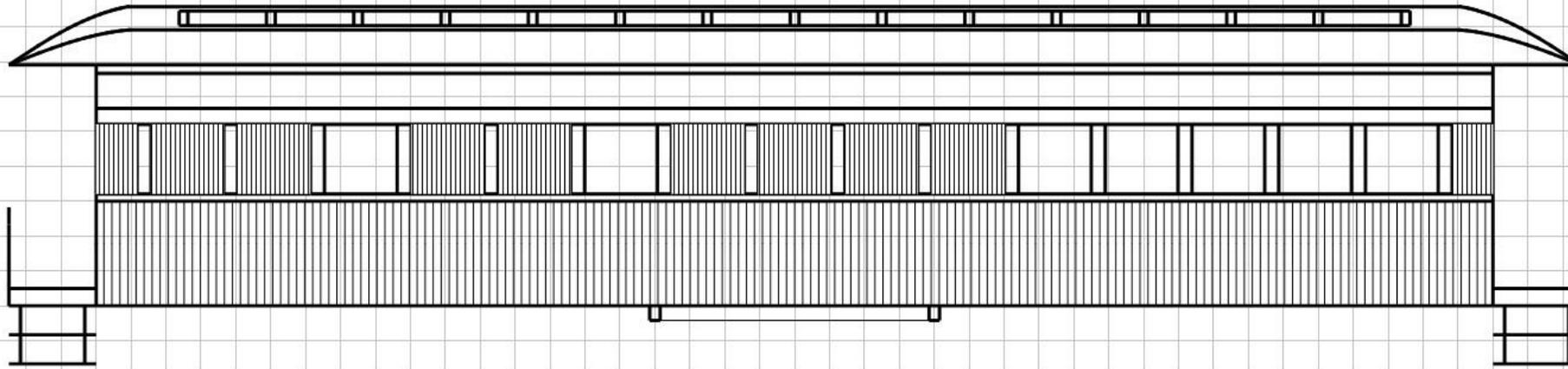


# Cutting patterns for model details

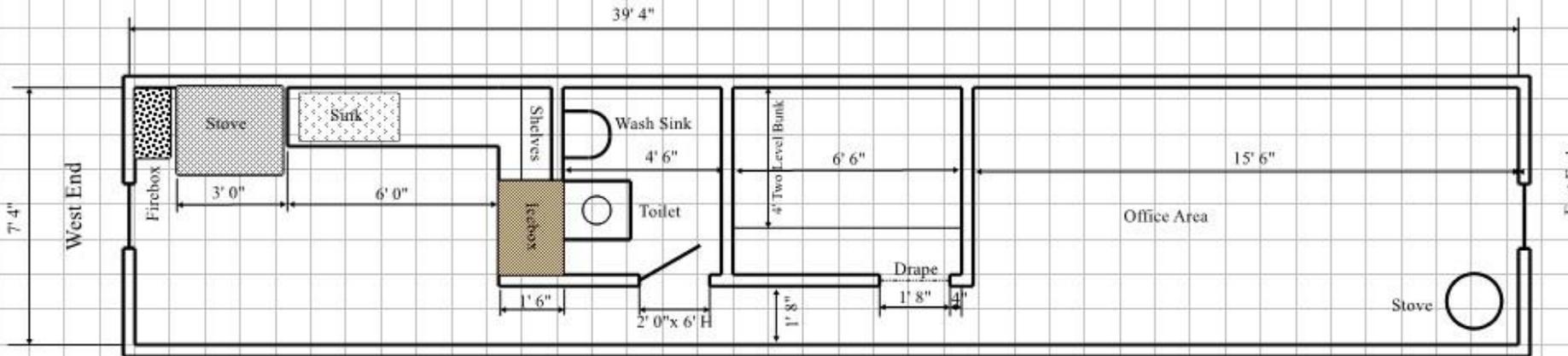


Project:  
Former Thunder  
Lake Lumber Co.  
Business Car  
HO-n3 Scale

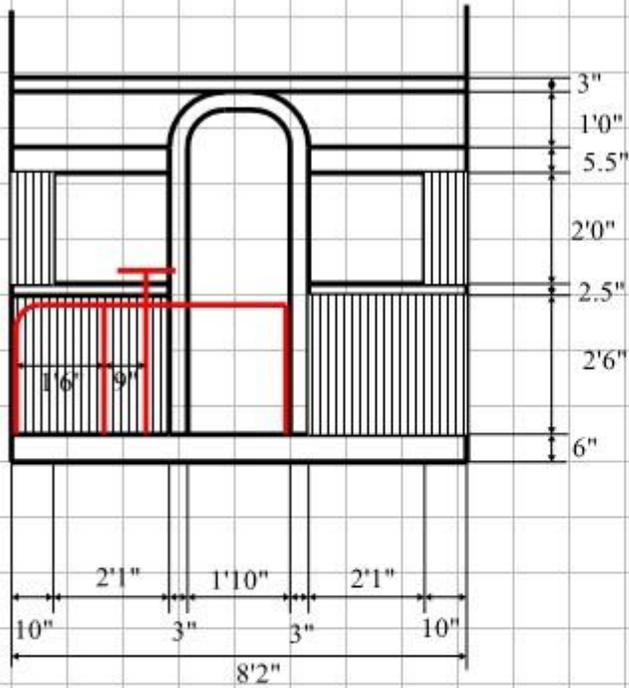




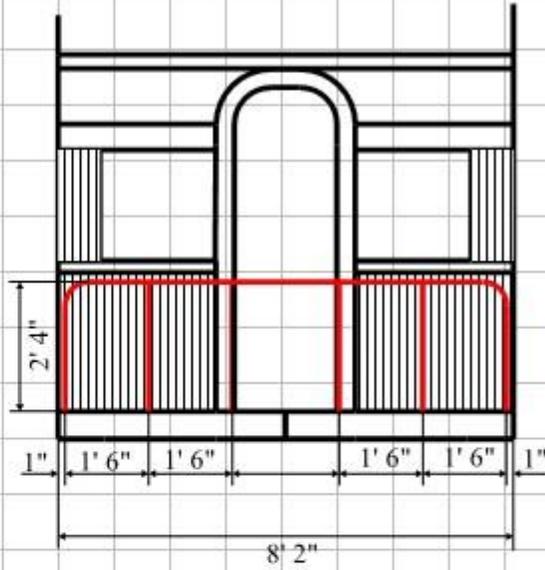
**Thunder Lake Business Car - South Side**



**Thunder Lake Business Car Interior Layout**



**East Elevation**



**West Elevation**

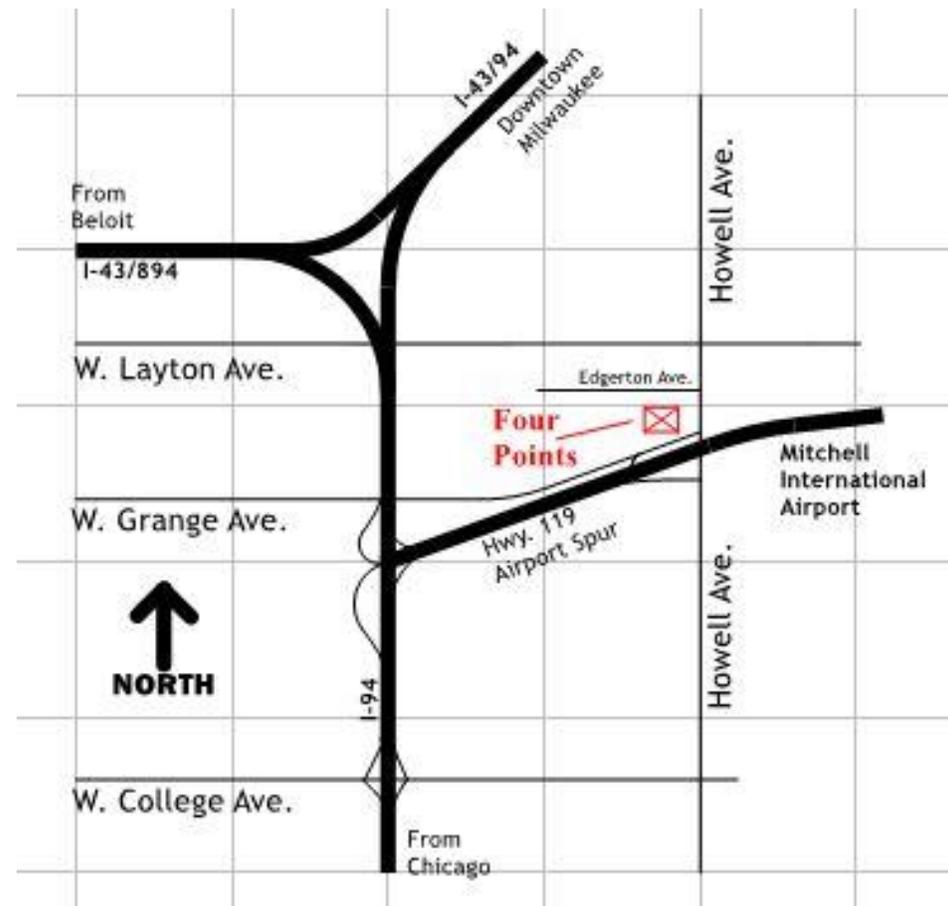
**Thunder Lake Business Car**



# Need a Map?

*Design the map in CAD.  
Take a screen shot with  
Snip-It and save as a  
JPG.*

*JPG format allows for  
easy manipulation in  
your publishing software.*

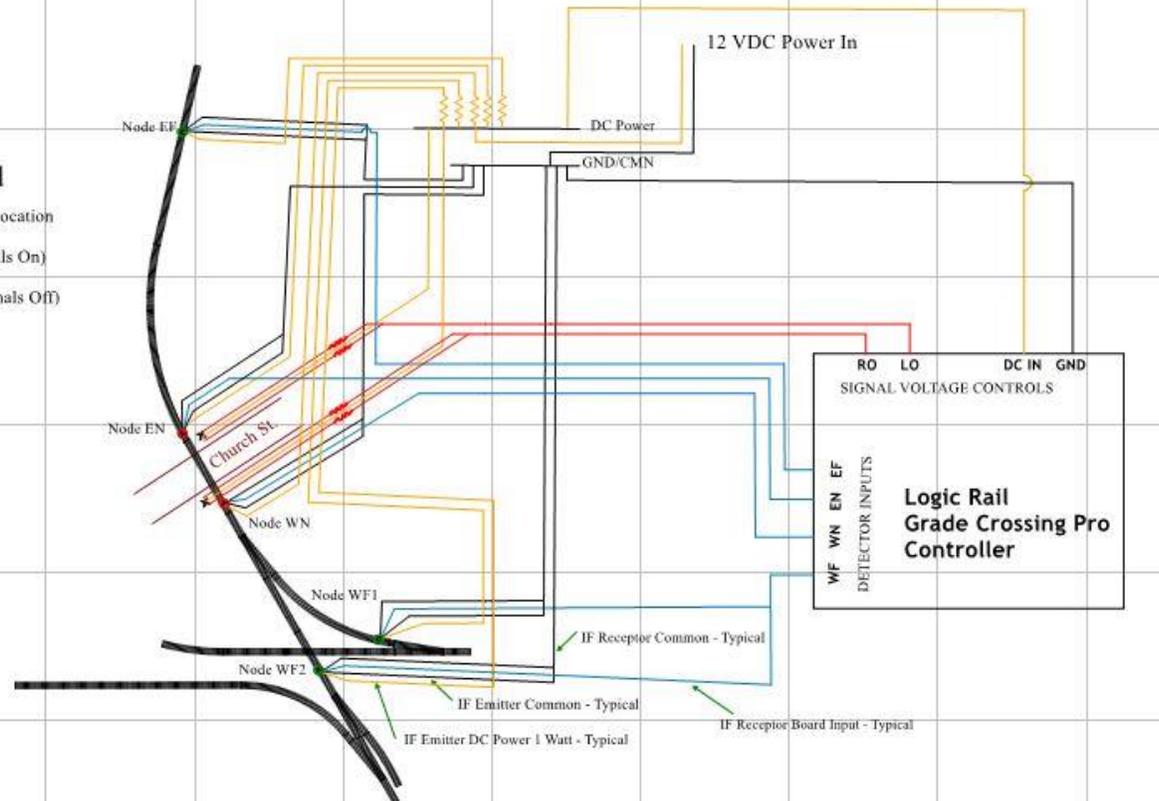
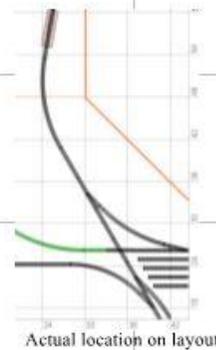


# Document Your Project Wiring

## Schematic of Crossing Signals

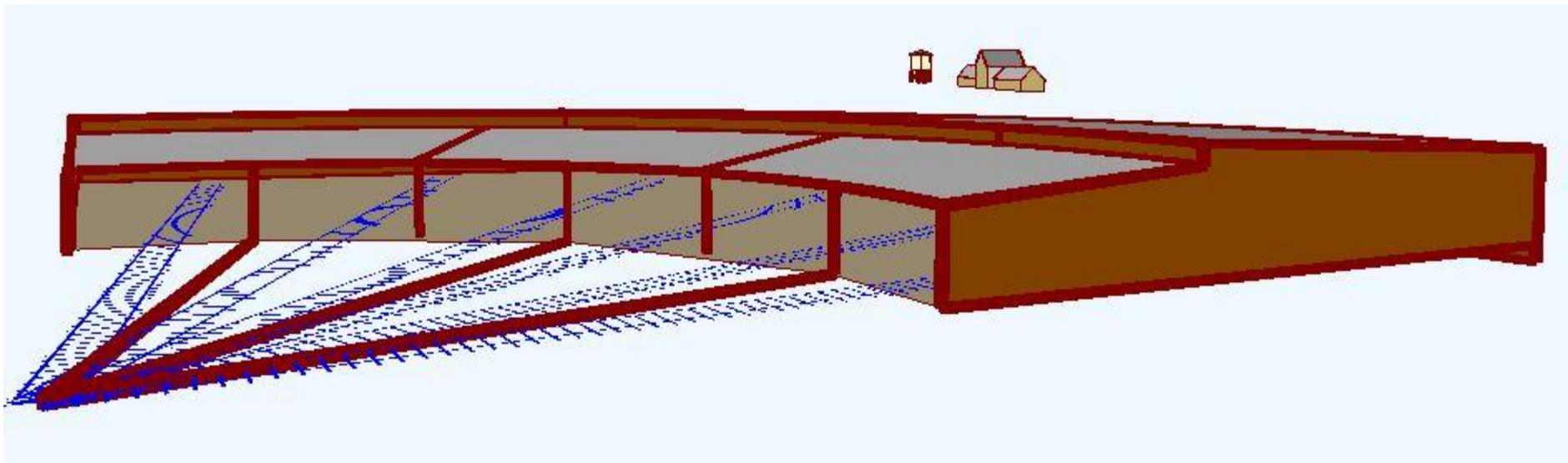
### Component Legend

- ✱ Lighted Crossbuck Signal Location
- Far Detection Sensor (Signals On)
- Near Detection Sensor (Signals Off)



# In a Nutshell...

- ▶ Use the software for anything you need drawn to scale
- ▶ Plan how to include the design sketches with text
- ▶ Optimize the power of screen shots snipped from your designs for your projects



Questions?

