



Garden Railroad Layout Planning & Design

A clinic presentation by
Tucson Garden Railway Society

and

Tucson Botanical Gardens

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Introduction

1. What are we doing
2. Decisions, decisions
3. Introspection
4. Givens and Druthers
5. Planning the Railroad
6. Layout Design
7. Detailed Design
8. Hands on planning session

What are we doing?

Building a successful Garden Railroad.

Getting enjoyment from the effort.

Trying to avoid costly, time consuming mistakes.

Creating something wonderful!!!

What is success.

- Operating a miniature prototype RR in a tiny world.
- A great garden with a train running in it.
- Sitting on the porch sipping a margarita watching a train run around.
- Building cool models and miniature scenes.
 - Some of the above and more
 - **Success is what You decide it is**

What's your Style

- **Model Builder**
 - Wants to build models & needs a place to put them.
- **Train Engineer**
 - Likes running trains, switching & movement puzzles
- **Dispatcher**
 - Likes to control operations and watch others operate
- **Rail Fan**
 - Likes to watch the trains go round while socializing.

Decisions, decisions

- Where will it go?
 - Inside? Outside? Front yard? Side or backyard
- How long will building it take?
 - All of your spare time.
- How much will it cost?
 - All of your spare cash... **And then some.**
- What kind of Railroad do I want?

A tiny world with towns and people? A garden surrounding a railroad?
A railroad running through a garden? Railroad Scenes with real plants.

Get those plants out of here, I need more Track!

Introspection

- Review Your Situation.
 - How is my physical condition?
 - Can I afford the time this will take?
 - How good a modeler am I?
 - Can I live with kit buildings?
 - Can I get help? (volunteers, hire?)
- Review Your Site.
 - Will my preferences fit in the space.
 - Security issues.
 - Dealing with pets and critters.

Givens – Fixed Parameters

- Site parameters
 - Size of space – Dimensions, Shape
 - Geography – Bedrock, Boulders, Gravel, Caliche.
 - Topology - Grand Canyon, Colorado or Kansas? Raised or Ground Level.
 - Ecology – Critters, Pets, Existing plants? Shade areas
 - Infrastructure – Electrical, Lighting, Walkways, Irrigation, Walls, Seating, Storage.

Givens – Fixed Parameters

- Railroad Parameters
 - Prototype, Freelance, just running trains.
 - Era
 - Early – 1820 to 1870 – Scratch-build everything
 - Vintage – 1850 to 1900 – lots of scratch-building
 - Golden Age – 1890 to 1950 – some models available
 - Transition – 1930 to 1971 – lots available
 - Modern – 1971 to 2010 – some models available
 - RR Class – Class 1 Mainline, Branch line, Mining, Logging or Class 1 Narrow gauge

Givens – Fixed Parameters

- Railroad Parameters
 - Scale and gauge -
 - On G (#1) 45mm track
 - Scale = 1:13.5 – 2 foot
 - Scale = 1:22.5 – Meter
 - Scale = 1:24 – 42 inch
 - Scale = 1:32 - 4'8.5" (std)
 - Scale = 1:29 - 4'3.5 (std)
 - For the rivet counter
 - Scale 1:20.32 (NMRA F-scale)
 - 3' gauge on #1 gauge track
 - 4'8.5" (std) on F (70.6mm) track
 - \approx 2' gauge on 0 (32mm) track

Scales, We don't need no stinkin' scales

–Motive Power – Steam, Diesel, Electric

–Rolling Stock – Passenger, Freight, Industrial

Givens – Fixed Parameters

- Layout Parameters
 - Layout Style – point-to point, loop-to-loop, dog bone, multiple loops,
 - Maximum Grade, Minimum Radius
 - Turnouts – size, operation, control
 - Power and Control
 - Live steam – RC or Fixed running
 - Track DC or DCC, MTS, RC
 - Battery – RC or Fixed running

Druthers

- Make a List of things You'd *like* to have
 - At least 1 tunnel, 3 bridges, 2 towns
 - A water feature, A trolley line
 - Multiple trains running
 - Drought tolerant plants, Drip irrigation
 - NO spines, needles or poison oak!
- Make the list as long as you like.
- Worry about being practical & cost later.

Druthers

- LDE's (Layout Design elements)
 - Features of the real world you'd like to have
 - Turning Wye, switch back grade
 - A passenger station (Grand Central station??)
 - An open pit mine. A Hump yard.
 - Giant Sequoias (240' about 10' tall on the RR)
 - An Industrial siding running down a town street.
- Now take your list and sort the items into three priorities
 - “I want it NOW”,
 - “Maybe I'll do this later”
 - “This is probably impossible”
- Pare down the list to what you'll get done in the first 3 months

Planning The Layout

Parting of the Ways:

- Way 3: Start putting track down in the layout space.
- Way 2: Use the Garden hose/rope method to layout track.
- Way 1: Make a scale drawing of the garden area and add layout and track.

Way 3

- Gets you started fast. But Most likely to cause problems later.
- May be more costly due to layout mistakes.
- Not very useful for “raised bed” layouts.
- Easiest when using sectional track pieces.
- Hard to make elevation changes, add grades during construction.
- Put down your G’s and D’s First . Then connect.

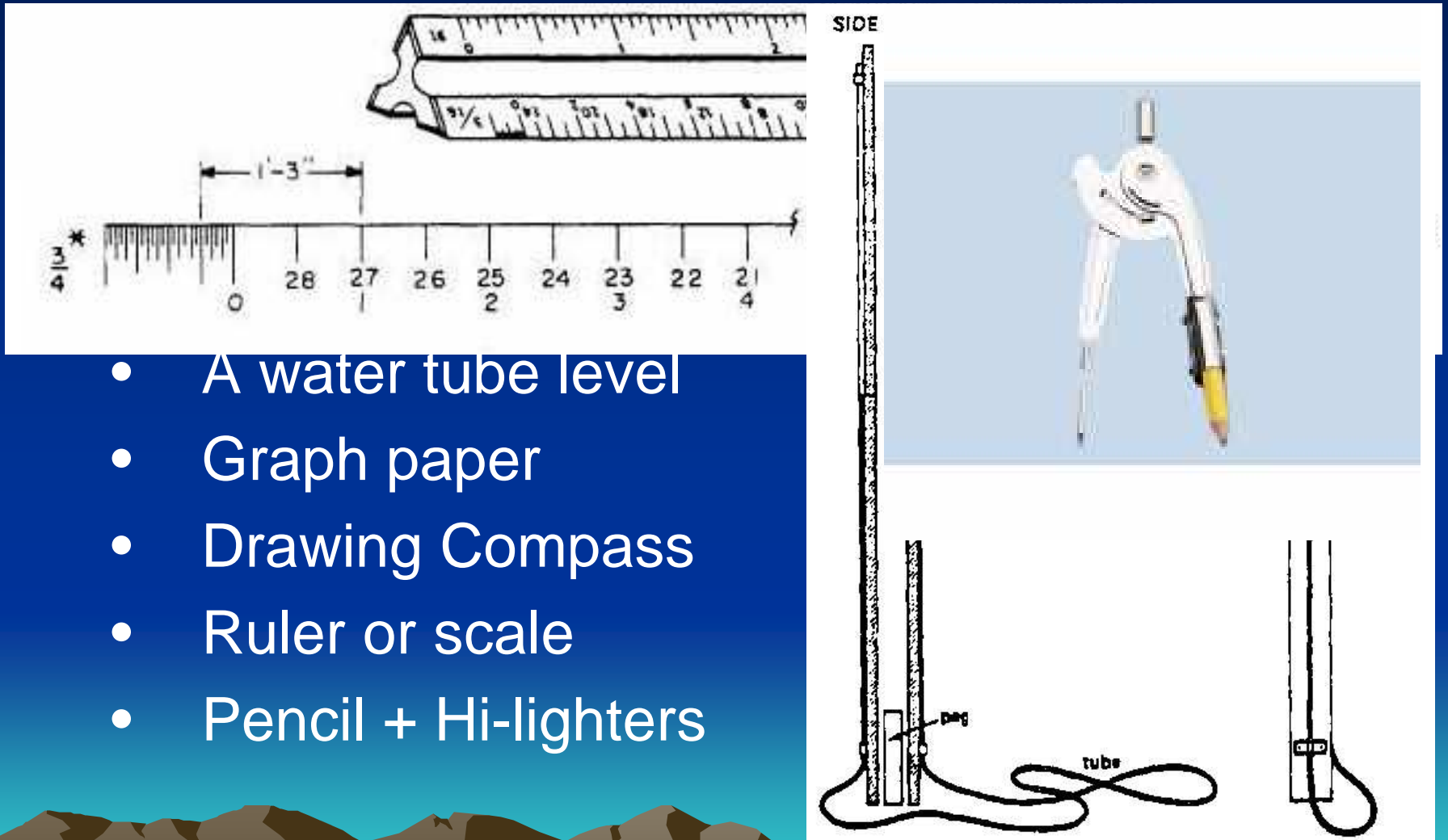
Way 2

- Slower start, less likely to cause problems.
- Allows planning of track, plantings, irrigation
- Can calculate how much track you'll need.
- Helps when planning “raised bed” layouts.
- Can use sectional or flex-track.
- G's and D's can be better planned.

Way 1

- Large front end investment in time.
- Lower chance of costly mistakes.
- Allows calculation of track, switch needs.
- Provides construction plan for “raised bed”.
- Can provide planting & irrigation plan.
- Helps insure the layout meets G’s & D’s.
- Allows you to plan construction in phases.
- Gives you something to work towards.
- Ideal for Flex-track construction.

Planning the layout - Way 1



- A water tube level
- Graph paper
- Drawing Compass
- Ruler or scale
- Pencil + Hi-lighters

Planning the layout - Way 1

1. Draw scale plan of your space.

- Use paper or a computer CAD or Drawing program
- 11x17 is a good size for the plan. Bigger is Better.
- Choose a scale. ($\frac{1}{4}$ " : 1' allows 44'x68' on 11x17)
- Include buildings, fences, walls, BBQs etc.
- Include water and electrical connections
- Include permanent plantings, Trees etc,
- Estimate or measure elevations (pick a spot for 0")

2. Cheat! (Google Maps – satellite)

- Get an image and blow it up

Layout Design

1. Draw minimum radius circles
2. Allow for clearances for rolling stock
3. Sketch in givens and druthers
4. Add new plantings, buildings, bridges, tunnels
5. Connect sections with tangents
6. Determine where you need Elevations

Layout Design

7. Calculate Grades. Go back to 6 if grades are too large
8. Refine positions of track, elevations grades. Go back to 4 if things don't Fit
9. Add plants, rock work, ponds.
10. Review the plan with friends, gardeners, Other garden railroaders

Layout Design

11. Go back to 6 and re-evaluate.
12. When you are happy calculate how much dirt, rock, track you'll need to move.

Detailed Design

- Redo 1-12 but
 - Draw in track widths, switches, Control Panels.
 - Draw in sizes of building.
 - Approximate space for rock work, water features, etc.
 - Rough out a planting plan and schedule.
 - Estimate costs and plan construction schedule.
 - Multiply times in schedule by at least 2.
 - Review, review, review.