Designing A Model Railroad for Operation and The Chief Dispatcher AP Certificate

W. J. Scheerer MMR®

- Designing a Model Railroad for Operation Begins with

Identifying What you are trying to Achieve

&

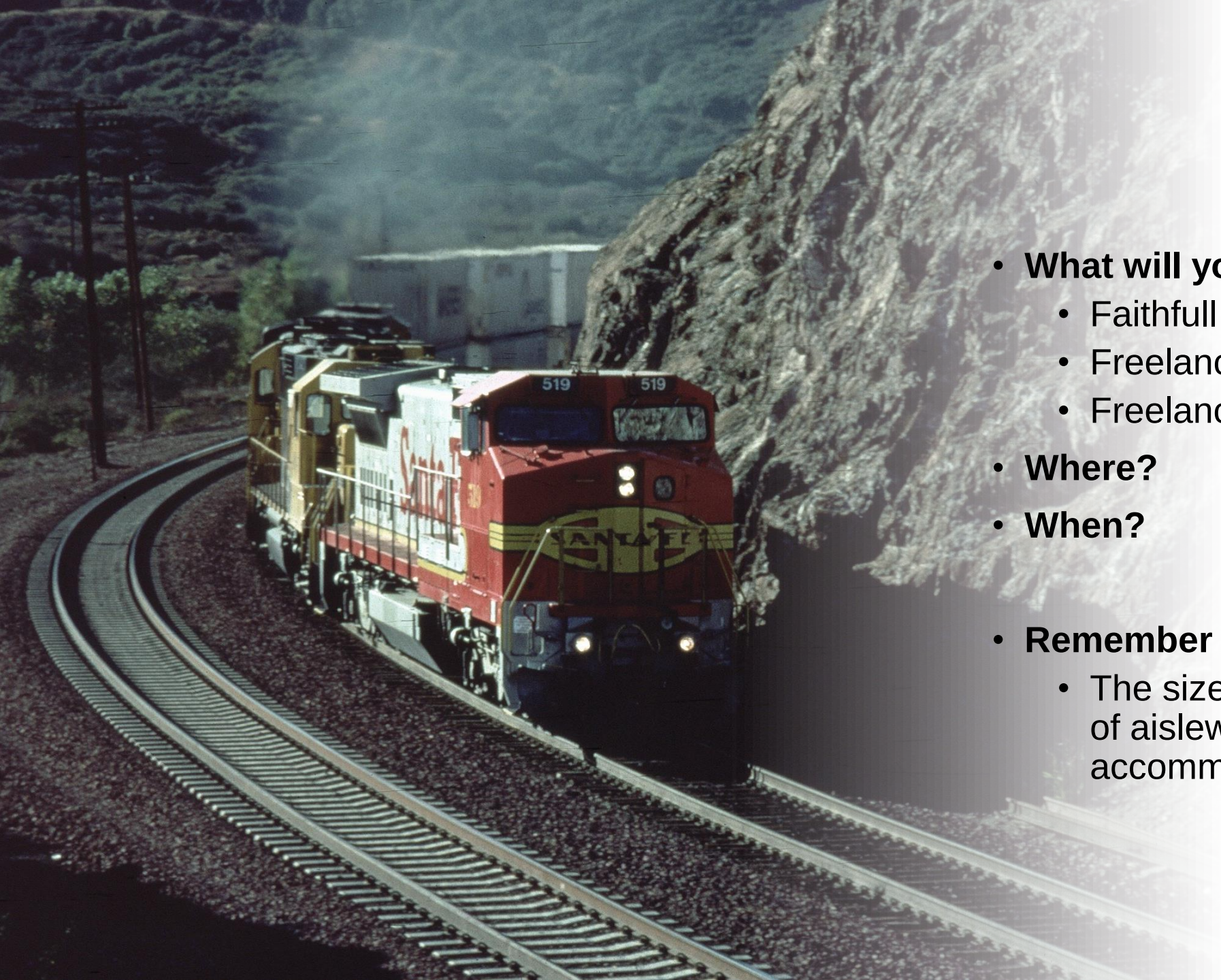
PLANNING

Because . . .

Everything about your track plan and operating plan must be <u>focused</u> on **What you are trying to Achieve.**

Remember

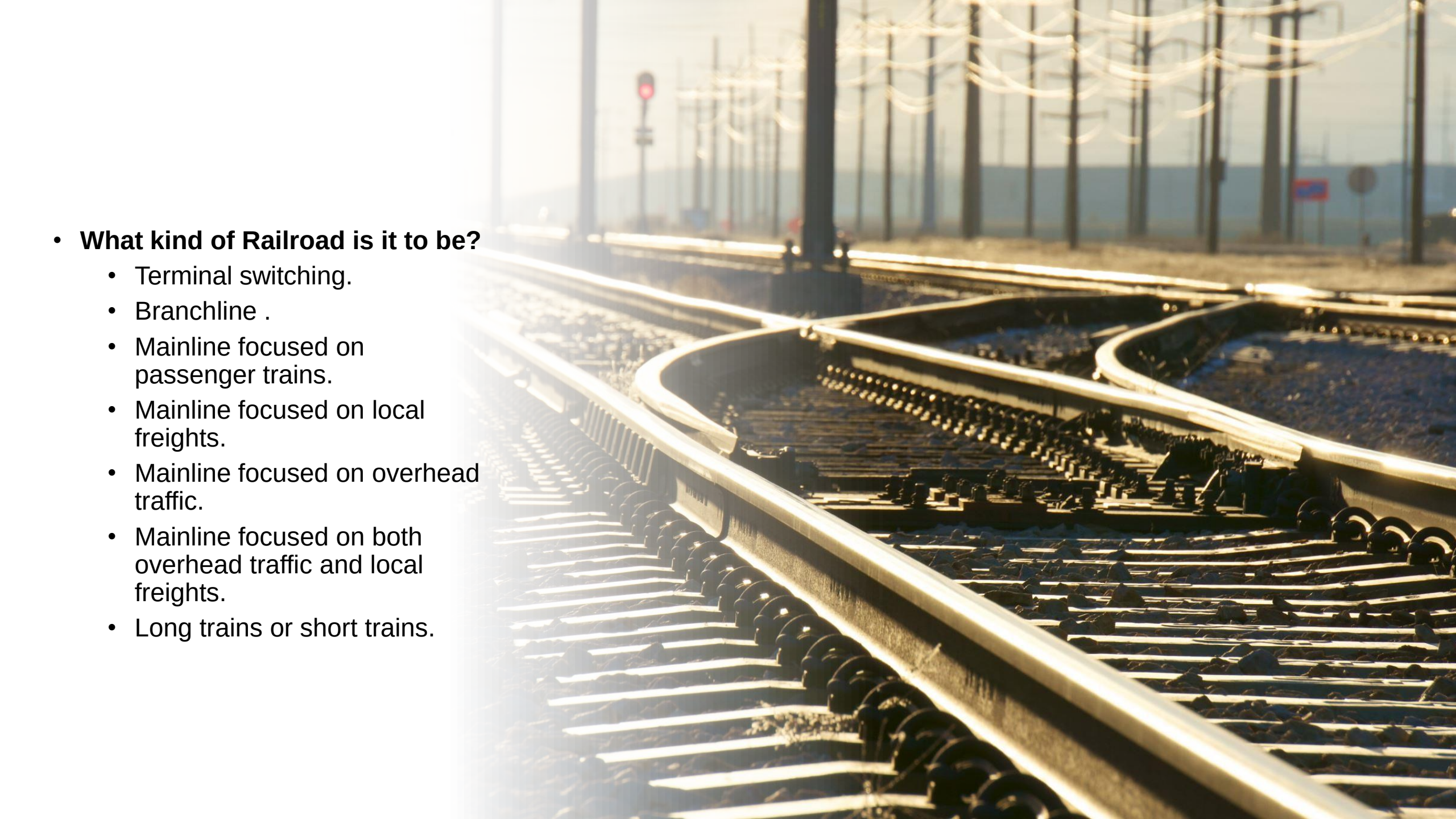
The size of your space and the width of aisleways necessary to accommodate full scale people may significantly impact what you are trying to achieve.

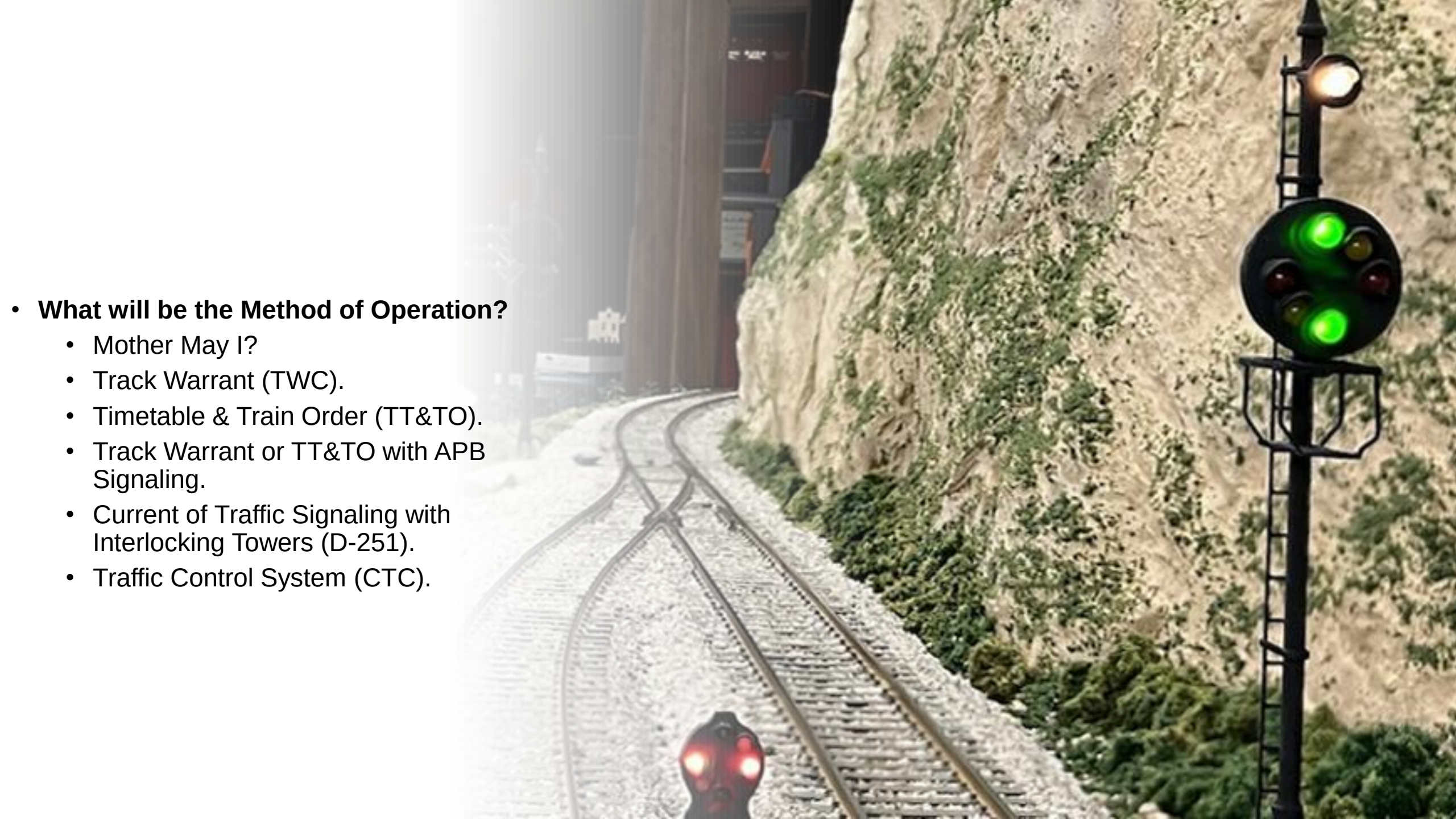


- **What will your railroad be based on?**
  - Faithfull recreation of a prototype.
  - Freelance based on prototype .
  - Freelance.
- **Where?**
- **When?**

- **Remember**
  - The size of your space and the width of aisleways necessary to accommodate full scale people.

- **What kind of Railroad is it to be?**
  - Terminal switching.
  - Branchline .
  - Mainline focused on passenger trains.
  - Mainline focused on local freights.
  - Mainline focused on overhead traffic.
  - Mainline focused on both overhead traffic and local freights.
  - Long trains or short trains.





- **What will be the Method of Operation?**
  - Mother May I?
  - Track Warrant (TWC).
  - Timetable & Train Order (TT&TO).
  - Track Warrant or TT&TO with APB Signaling.
  - Current of Traffic Signaling with Interlocking Towers (D-251).
  - Traffic Control System (CTC).

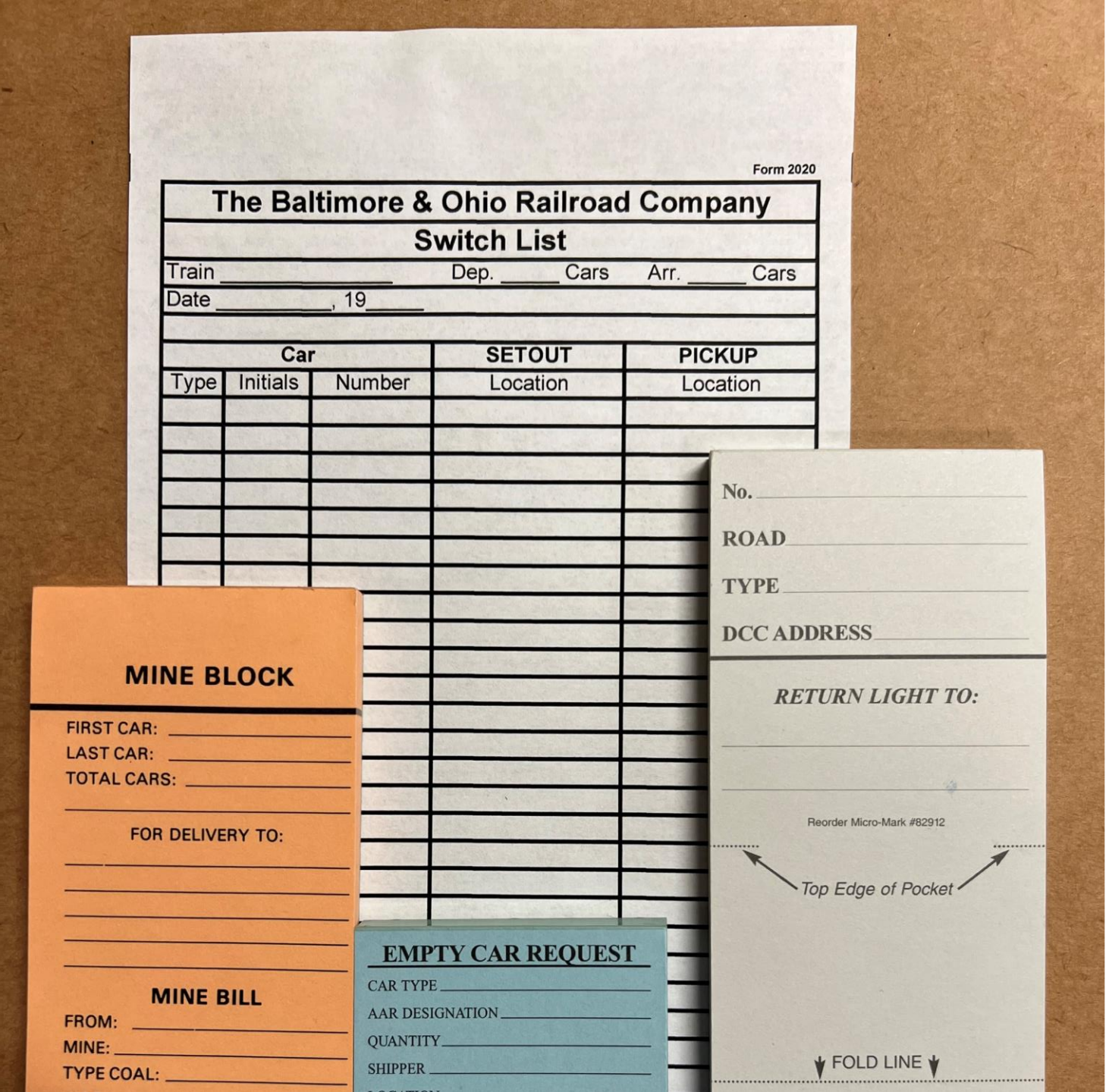
The Track Plan

Knowing what you are trying to achieve, what your railroad will be based on, the type of railroad it will be, and the Method of Operation to be used will set the direction for the track plan.

- For example:
  - Track layouts replicating the prototype.
  - Compact terminal trackage.
  - Small towns with minimal industry.
  - Larger towns with extensive industry.
  - Long runs with little or no industry.
  - Large yards or small yards.
  - Extensive or minimal staging.
  - Length of sidings.
  - A major passenger station and facilities.
  - Etc.

The Operating Plan

- **Now that we have a direction for the track plan, we next need to think about the trains that will run on those tracks.**
  - Yard Jobs.
  - Local Freight Trains.
  - Passenger Trains.
  - Through Trains.
  - Trains that run beyond “The Basement”.
- **And then we need to imagine how they will operate and if our plan will actually work.**

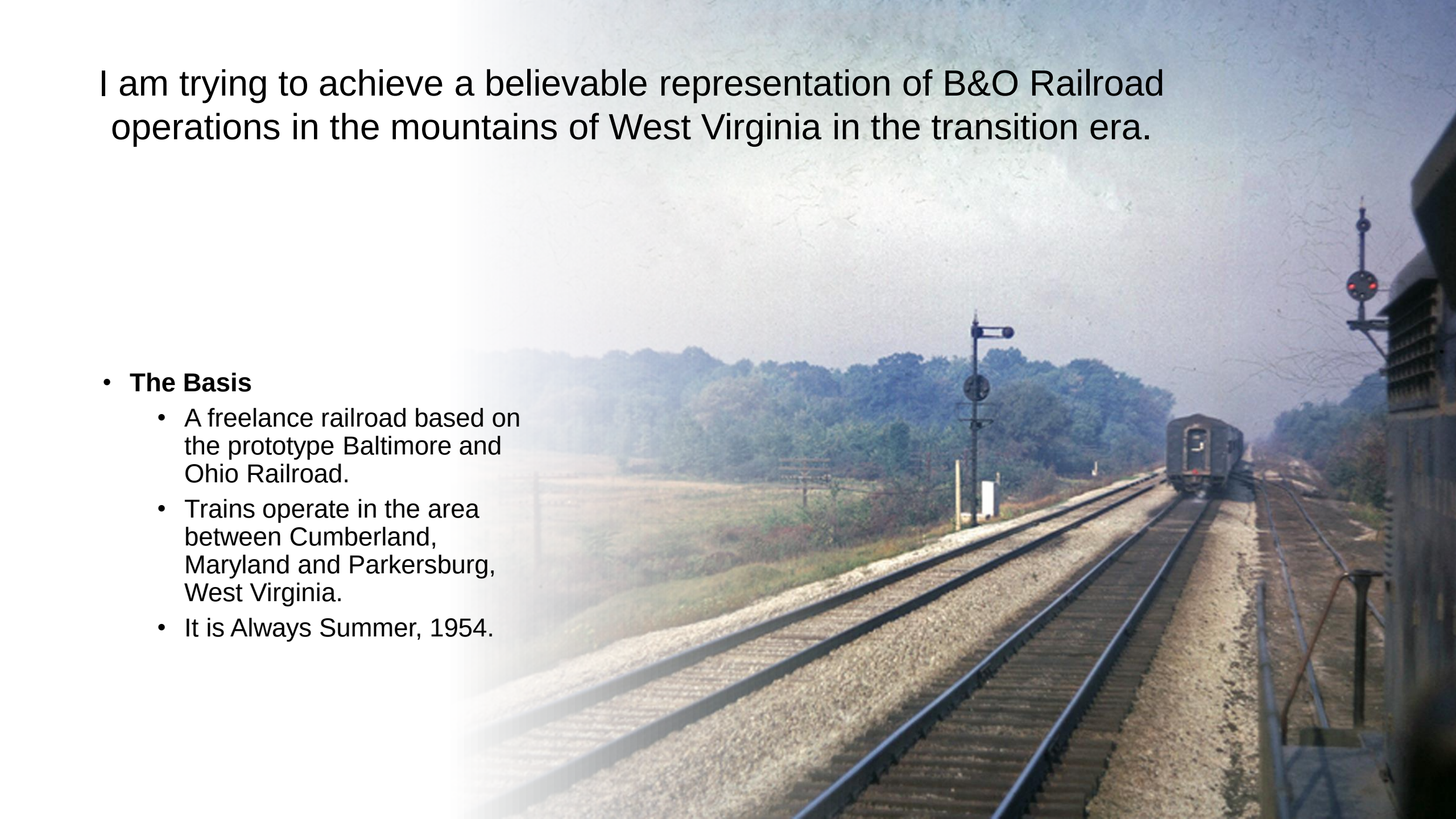


Other Considerations

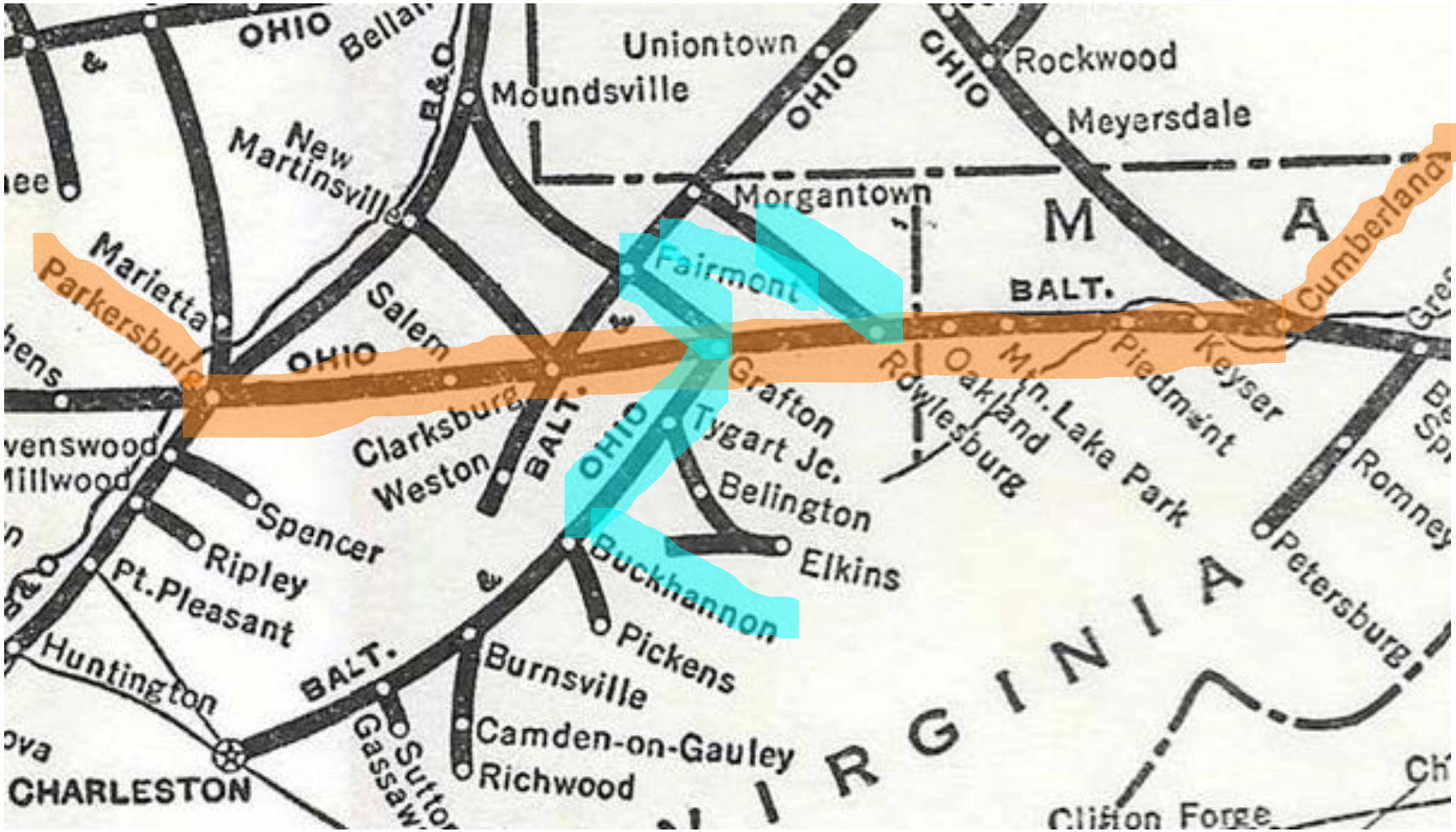
- **How will cars be moved?**
  - There are many and varied methods used by modelers.
    - Thumbtacks.
    - Moving cars by Type and Color.
    - Card Order.
    - The standard four destination car cards.
    - Prototype inspired Waybills.
    - Switch lists.
- **Where Will Traffic Come From and Go To?**
  - Modeled interchanges.
  - Beyond the basement interchanges.
  - Modeled industries.
- **Will a fast clock be required?**
- **How will the Operating Crew know what to do?**

An Operating Model Railroad
The B&O Monongah Division
A Real World Example

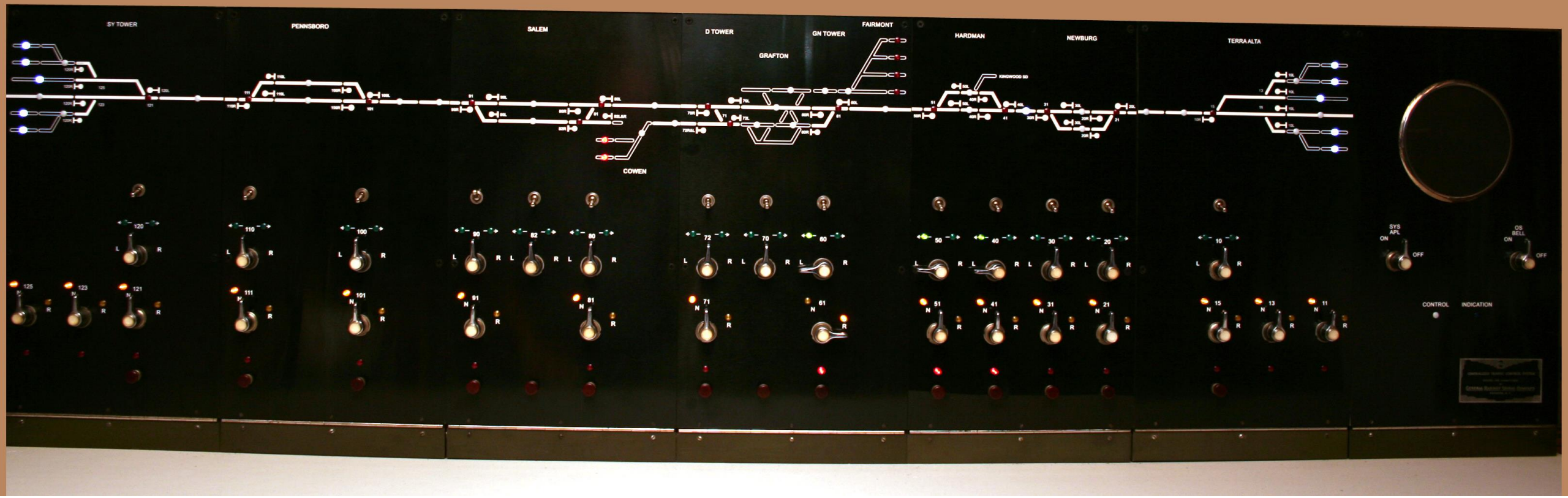
I am trying to achieve a believable representation of B&O Railroad operations in the mountains of West Virginia in the transition era.



- **The Basis**
  - A freelance railroad based on the prototype Baltimore and Ohio Railroad.
  - Trains operate in the area between Cumberland, Maryland and Parkersburg, West Virginia.
  - It is Always Summer, 1954.



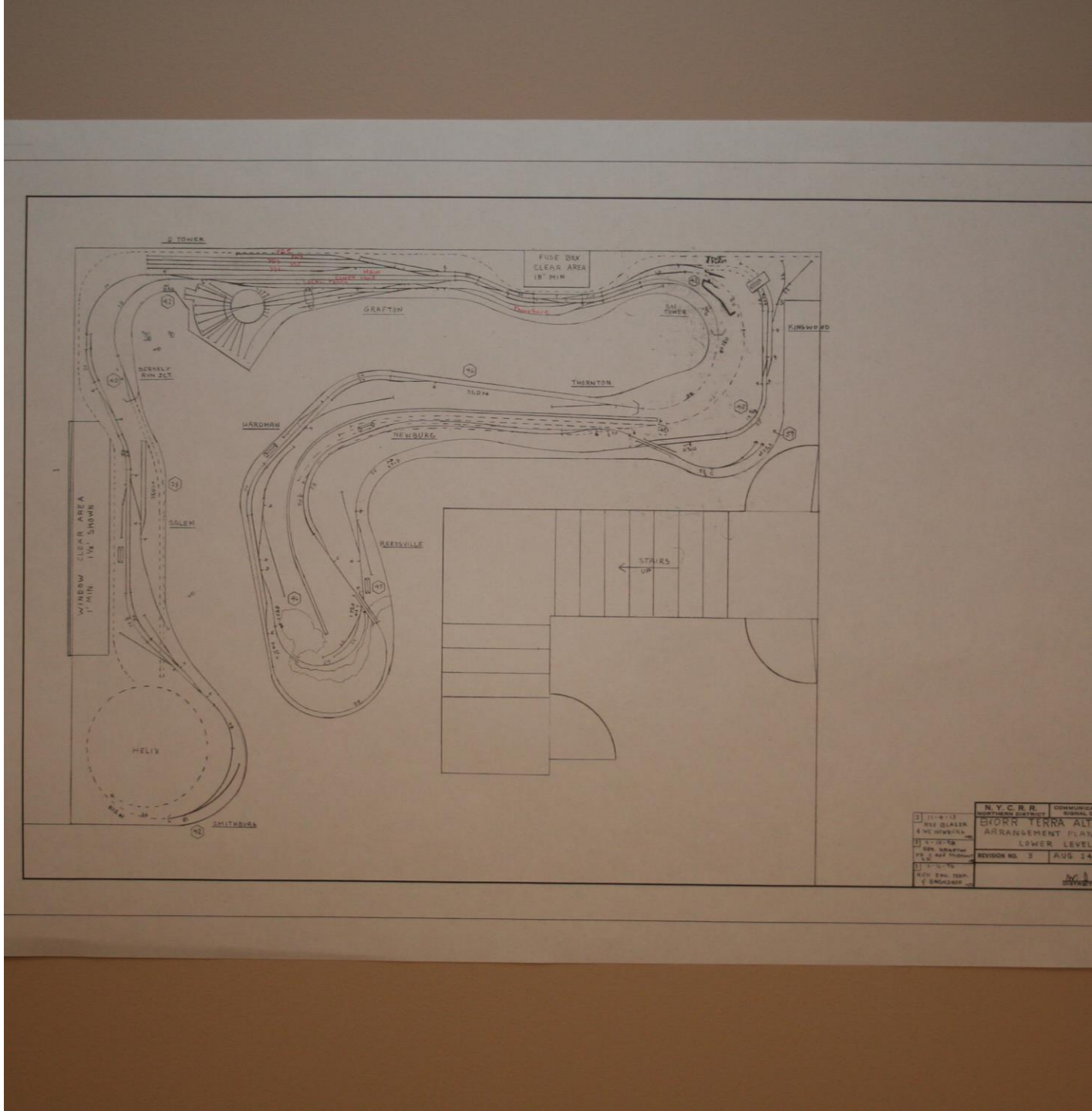
- **What Kind of Railroad**
  - A mainline focused on both overhead traffic and local freights.
  - Some mainline passenger trains.
  - A branchline typical of those serving coal mines in the area modeled.
  - Staging representing Cumberland, Parkersburg, Fairmont and Cowen (near Buckhannon).



- **The Method of Operation**
  - Traffic Control System (CTC) on the mainline between Cumberland and Parkersburg.
  - Timetable & Train Order (TT&TO) on the branchline (Kingwood SD).
  - Rule 93 Yard Limits on the Fairmont and Cowen Subdivisions (staging).

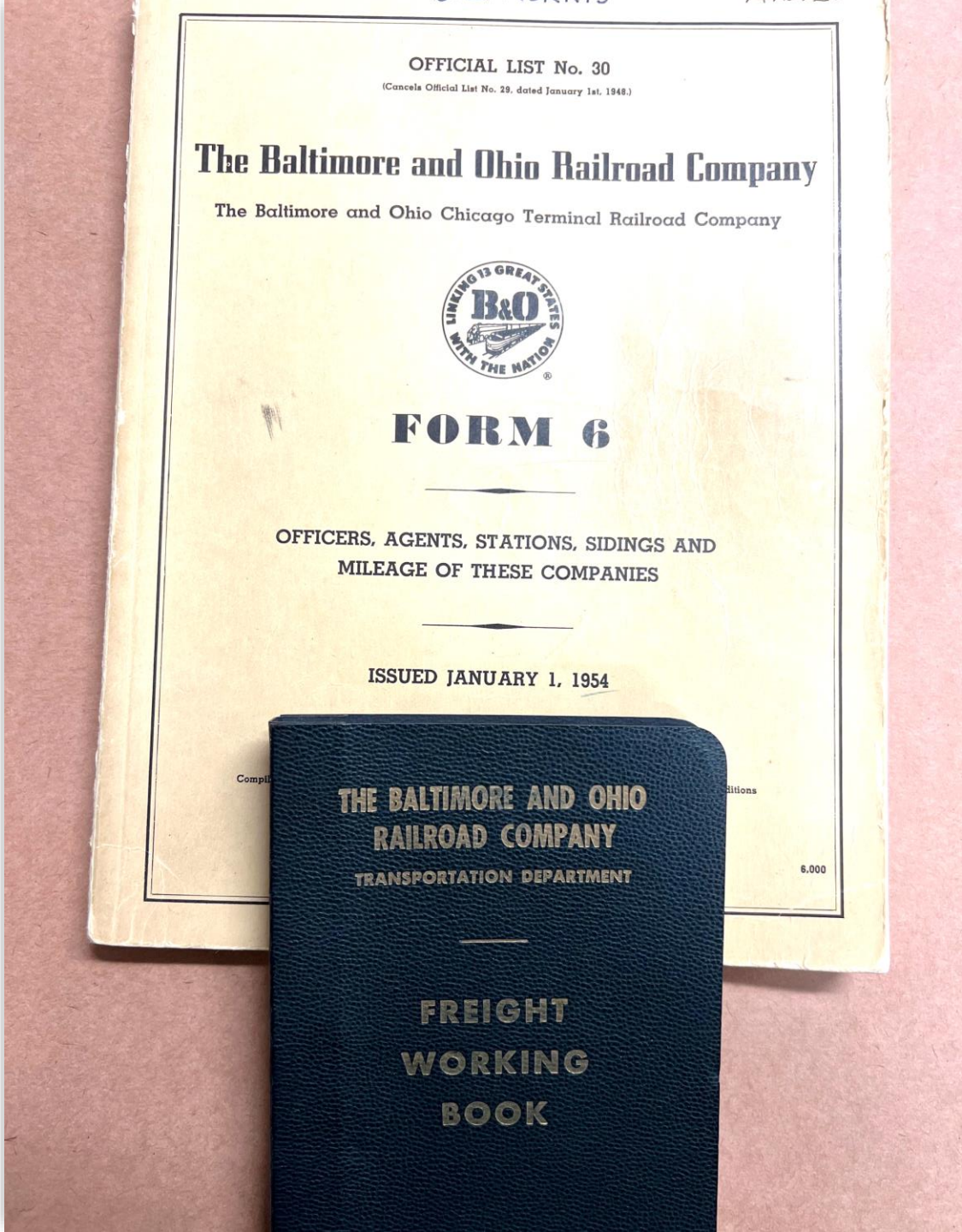
The Track Plan

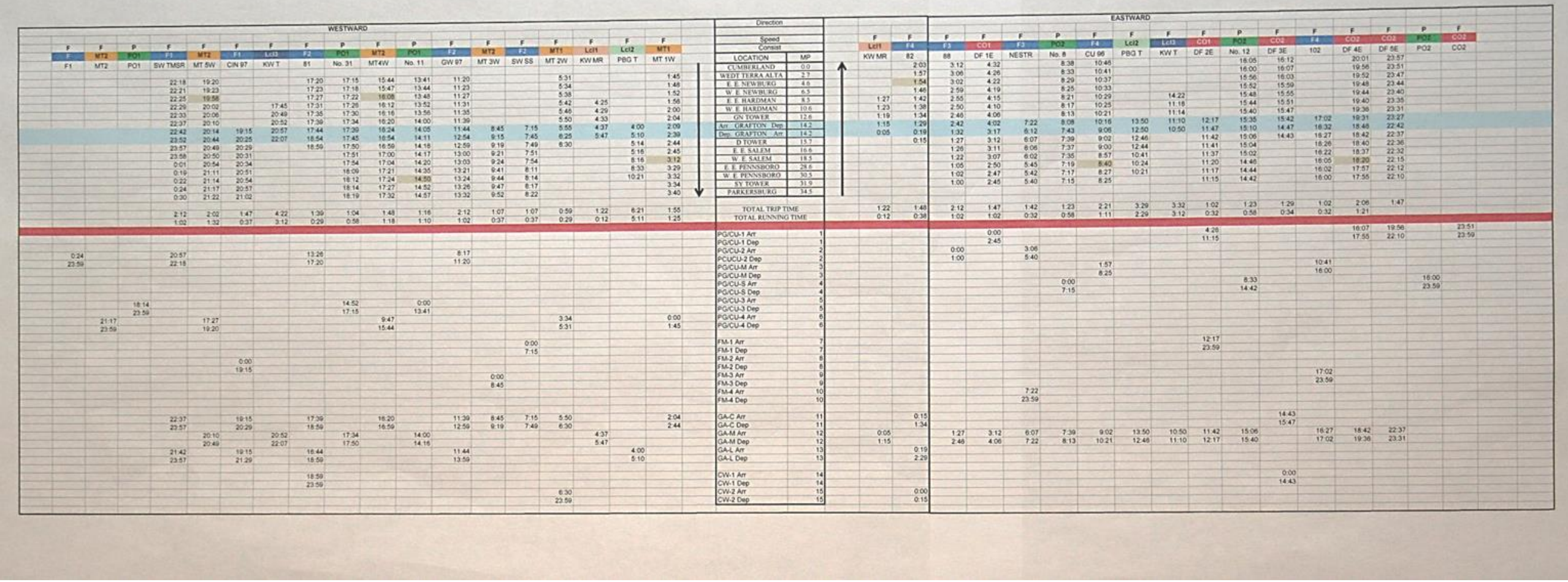
- Longest runs possible in the space available with small towns having adequate industries to make local trains fun to operate.
- A medium sized division point yard suitable in size to originate local trains and handle the pickup and setout of blocks necessary to support local operations.
- Three staging locations totaling 12 tracks.
- Pusher and helper operations consistent with prototype operations between Grafton and Cumberland.



The Operating Plan

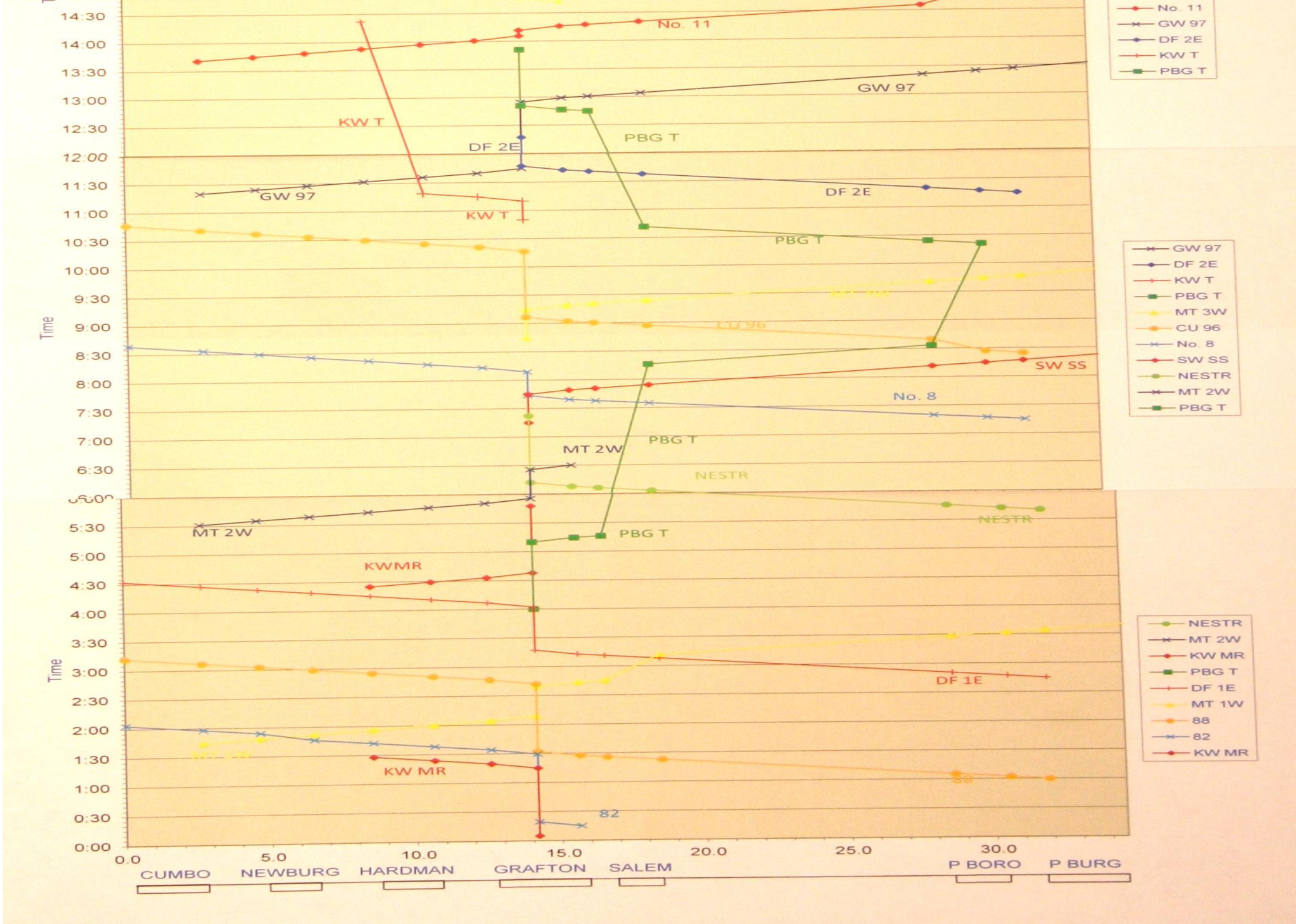
- **The Trains**
- **During a 24 hour cycle comprised of two operating sessions the following trains are operated:**
  - Two yard jobs with footboard Yardmaster.
  - Two local freights West from Grafton.
  - One local freight East from Grafton.
  - One mine run East from Grafton.
  - Ten through manifest freights.
  - Six drags (coal trains).
  - Six coal cars (empty coal trains).
  - Four through passenger trains.
  - Ten pushers & helpers.



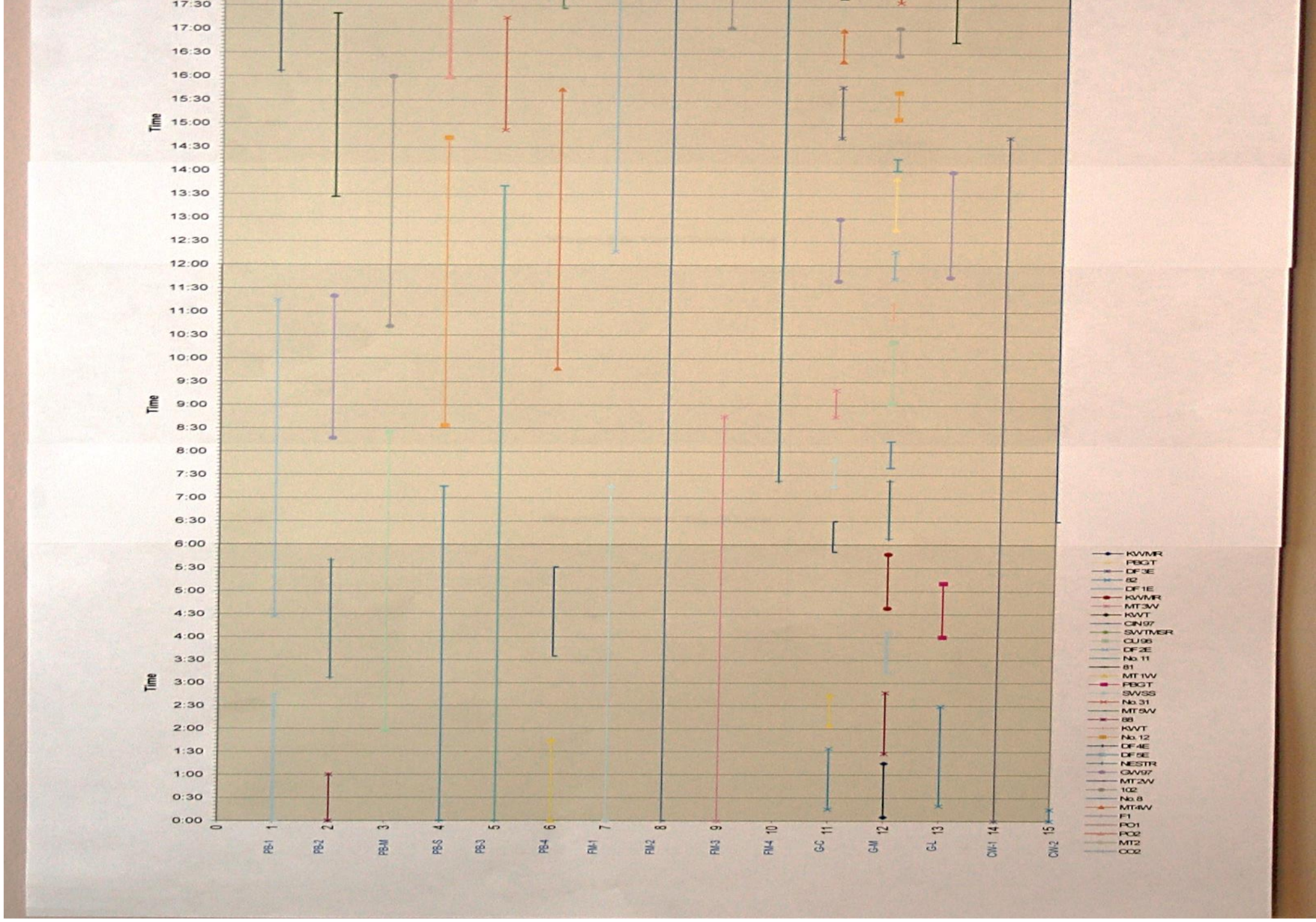


- **How will the Trains Operate and will the plan actually work**
  - Create a train sheet depicting the operation.
  - Create a string line.
  - Resolve meets.
  - Insure staging track availability.

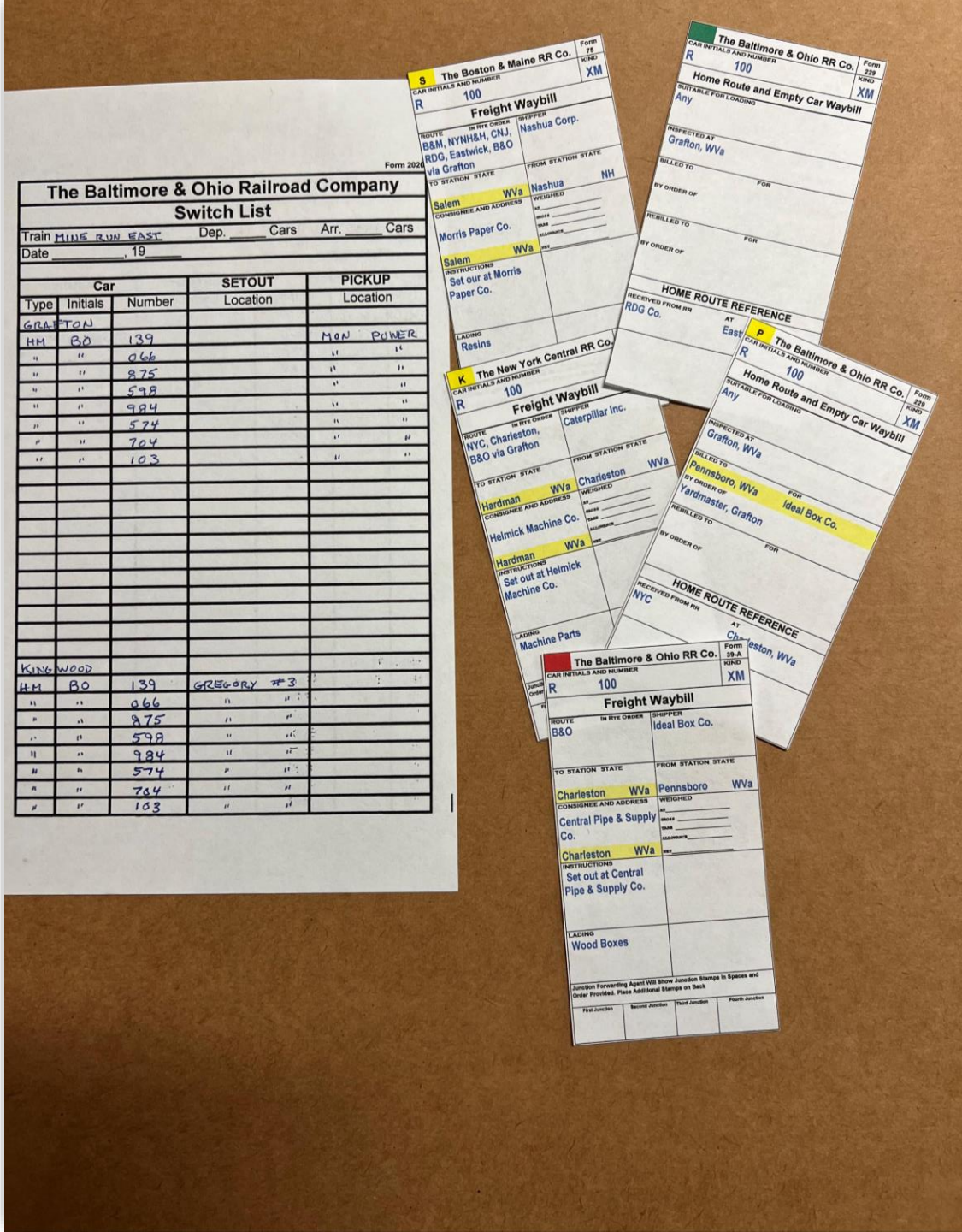
- **The string line**



- **Staging track availability**

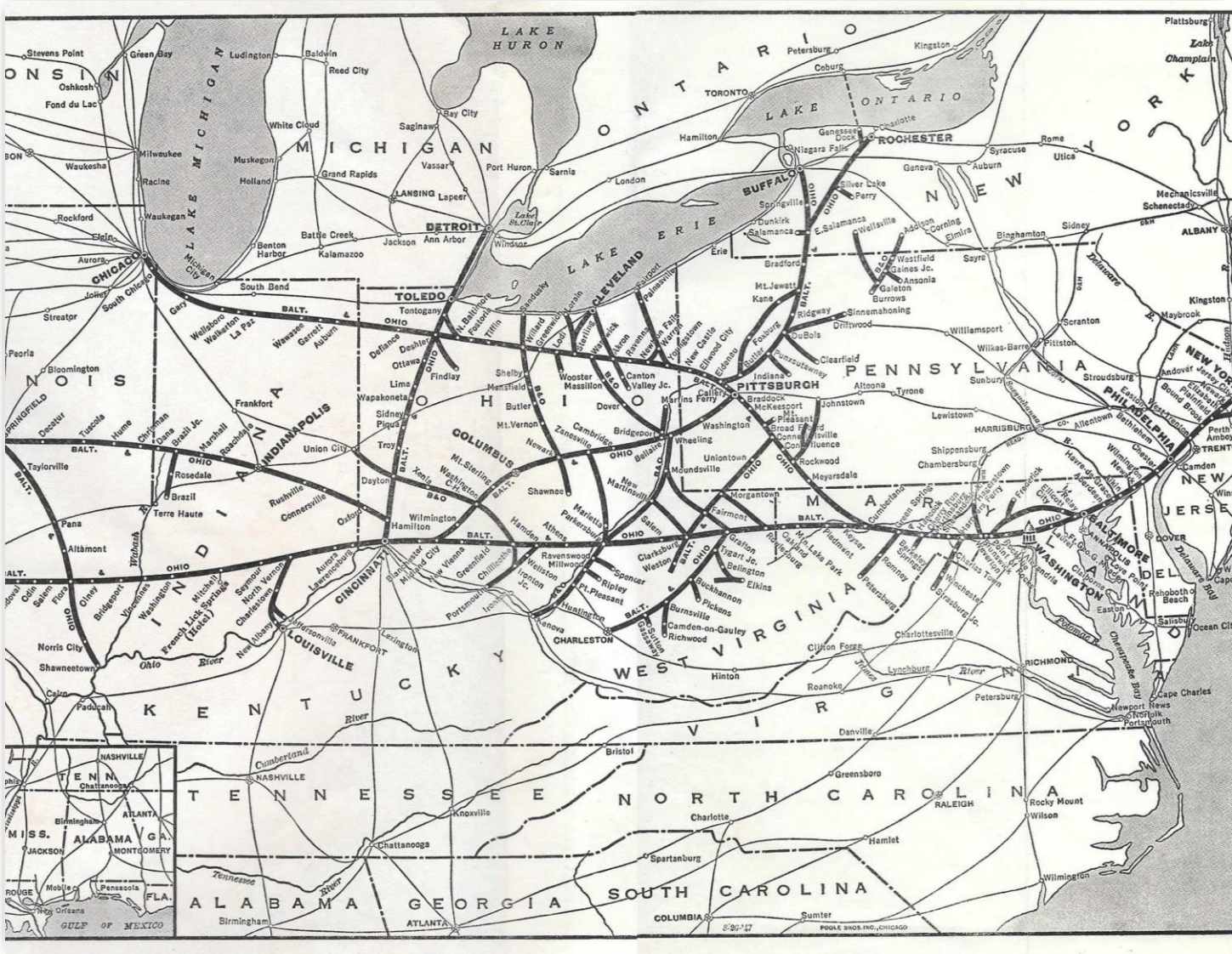


- **Car movement by prototype inspired waybills and switch lists**

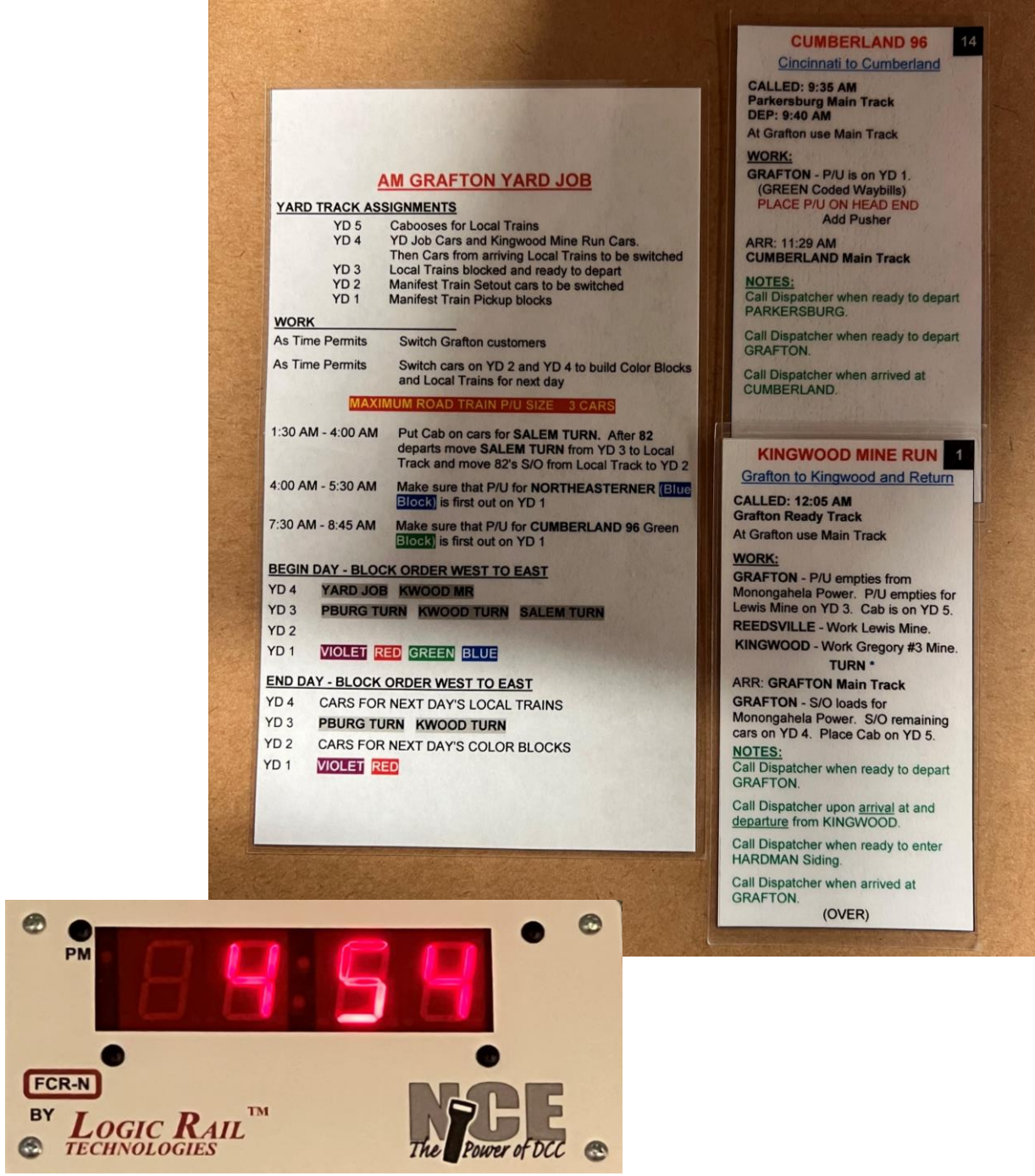


- **Traffic comes from and goes to:**
  - Beyond the basement interchanges
    - Eastwick, PA; Potomac Yard, DC.
    - Pittsburgh, PA; Buffalo, NY.
    - Cincinnati, OH; Charleston, WV.
  - Beyond the basement online (B&O served) destinations.
  - Modeled industries.

- **Through freights setout and pickup blocks of cars at Grafton going to, and coming from, modeled industries which are served by locals originating at Grafton.**



- **A 4:1 fast clock is used to help crews know when to move trains and regulate traffic flow.**
- **Train cards provide instructions for crews on how to operate each train.**
- **Yard job instructions outline yard operation and provide basic instructions for track usage and what work needs to be done and when.**



THE BALTIMORE AND OHIO RAILROAD COMPANY

MONONGAH DIVISION — MOUNTAIN - PARKERSBURG - COWEN - FAIRMOUNT AND KINGWOOD SUB

DISPATCHER'S RECORD OF MOVEMENT OF TRAINS

TIME TABLE No. 44

WESTWARD ↓↓ — Grafton, West Virginia, Feb. 23, 1954

CONDUCTORS / ENGINEERS: JERRY, KEN, MT, MT, BOB, KW, RALPH

TRAIN: 96, 5567, 4636, 7620, 367, 6504, 367

ENGINE: 5567, 4636, 7620, 993x, 6504, 993x

ENGINE: 993x

ENGINE

LOADS

EMPTIES

Distance		Office Designation & Siding Cap.
0.0	CUMBERLAND	DU
1.3	1.3 WEDT TERRA ALTA	CA
1.6	0.3 EE BLASER WYE	
2.3	0.7 WE BLASER WYE	K
3.3	1.0 EE NEWBURG	23 Cars
5.2	1.9 WE NEWBURG	
7.2	2.0 EE HARDMAN	21 Cars
9.3	2.1 WE HARDMAN	Q
11.3	2.0 GN TOWER	GN
12.9	1.6 GRAFTON	GR
14.3	1.4 D TOWER	D
15.3	1.0 EE SALEM	19 Cars
17.2	1.9 WE SALEM	
27.3	10.1 EE PENNSBORO	19 Cars
29.2	1.9 WE PENNSBORO	NR
30.5	1.3 SY TOWER	SY
31.9	1.4 PARKERSBURG	OB
	COWEN SUB-DIVISION	
0.0	D TOWER	D
0.7	0.7 BERKELEY RUN JCT.	
2.4	1.7 COWEN	WN
	FAIRMONT SUB-DIVISION	
3.7	FAIRMONT	FA
2.0	1.7 WD TOWER	WD
0.0	2.0 GRAFTON	GR
	KINGWOOD SUB-DIVISION	
5.7	END OF LINE	
4.6	1.1 EE KINGWOOD	KI
3.7	0.9 WE KINGWOOD	8 Cars
1.7	2.0 REEDSVILLE	RD
0.0	1.7 KINGWOOD JCT.	

DISPATCHERS ON DUTY

from 1145 P M. to 1145A M.
from ____ M. to ____ M.
from ____ M. to ____ M.
from ____ M. to ____ M.

MEMORANDUM OF EXTRAORDINARY OR UNUSUAL OCCURRENCES

DF 7614 Delay 50 mins @ Salem Due Yard Traffic

DISPATCHER'S TRAIN CALL SHEET AM

SEQ No.	CALL Time	DEPART Time	Engine Nos.	Train	Direction	Origin	GRAFTON Arr. Tk	GRAFTON Work	Destination
1E	12:05 AM	12:55 AM	6598 - 6457	Kingwood Mine Run E	E	Grafton Main	Main	P/U Pwr Plant	Kingwood Main *
2	12:10 AM	12:15 AM	5567	82	E	Cowen YD 2	Cowen Lead	S/O on Local Trk & Add Pusher	Cumberland Mai
3	12:45 AM	12:50 AM	7614	Drag	E	Parkersburg YD 1	Main	Add Pusher	Cumberland YD
4	1:25 AM	1:30 AM	4603	88	E	Parkersburg YD 2	Main	S/O on Yd 2 & Add Pusher	Cumberland YD
5	2:00 AM	2:05 AM	367 - 933x - 933	Coal Cars	W	Cumberland YD 4	Cowen Lead		Parkersburg YD
1W		3:03 AM	6457 - 6598	Kingwood Mine Run W	W	Kingwood Main	Main	S/O Pwr Plant	Grafton Main
6W	4:00 AM	4:50 AM	6504	Salem Turn W	W	Grafton Local Track	Local Track		Salem Siding **
7	4:55 AM	5:00 AM	367-933x-933	Coal Cars	W	Cumberland YD 4	Cowen Lead		Cowen YD 2
8	5:05 AM	5:10 AM	92A - 20	No. 32 (Passenger)	E	Parkersburg Siding	Main	Sta Stop & Add Helper	Cumberland Sid
9	5:35 AM	5:40 AM	4603	Northeasterner	E	Parkersburg YD 2	Main	P/U on Yd 1	Fairmont YD 4
6E		6:26 AM	6504	Salem Turn E	E	Salem Siding	Main	S/O on Yd 4	Grafton Main
10	7:25 AM	7:30 AM	7620	Coal Cars	W	Fairmont YD 3	Main		Parkersburg YD
11	8:10 AM	8:15 AM	4636	SW Steel Special	W	Fairmont YD 1	Main		Parkersburg YD
12	8:40 AM	8:45 AM	7614	Drag	E	Parkersburg YD 1	Main	Add Pusher	Cumberland YD
13	9:10 AM	9:15 AM	7620	Coal Cars	W	Cumberland YD 4	Cowen Lead		Parkersburg YD
14	9:35 AM	9:40 AM	5567	Cumberland 96	E	Parkersburg Main	Main	P/U on Yd 1 & Add Pusher	Cumberland Mai
15	11:05 AM	11:10 AM	7614	Drag	E	Parkersburg YD 1	Main		Fairmont YD 1

NOTES:
* Route Kingwood Mine Run E into siding at WE Hardman
** Route Salem Turn W into siding at EE Salem
Times shown in ORANGE are approximate and depend on work

PUSHER OPERATION

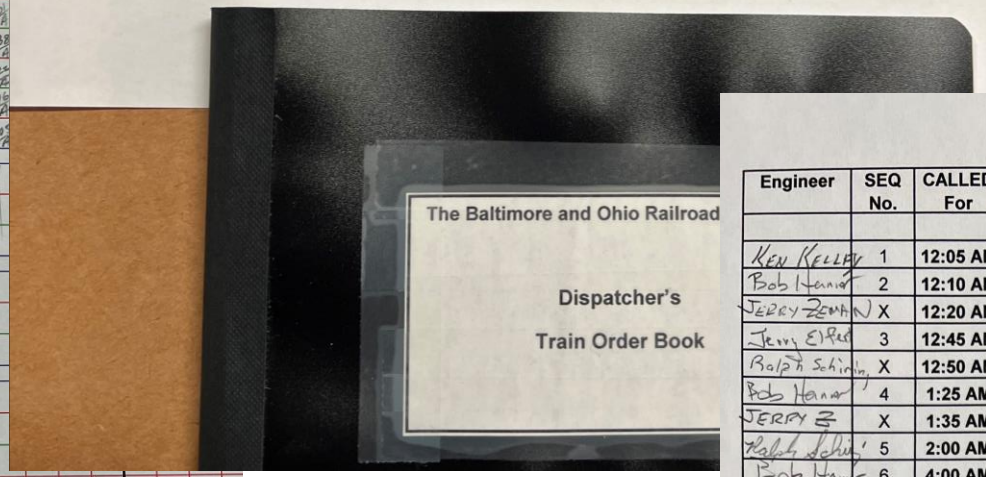
Route Pushers Westbound from Cowen Lead to Main Track at D Tower and then line Eastbound Signal at D Tower for Pusher to couple to train to be pushed

Route Pushers returning to Grafton to Cowen Lead at GN Tower

HELPER OPERATION

Route Helpers Eastbound from Cowen Lead to Main Track at GN Tower while train to be helped is West of GN Tower and then line Eastbound Signal at GN Tower for train to be helped to couple to Helper

Route Helpers returning to Grafton to Cowen Lead at GN Tower



CREW CALL SHEET AM

Engineer	SEQ No.	CALLED For	Engine No.	Train	Direction	Origin	Destinati
Ken Kelley	1	12:05 AM	6598-6457	Kingwood Mine Run	E	Grafton Main	Grafton Main
Bob Hennar	2	12:10 AM	5567	82	E	Cowen YD 2	Cumberland M
Jerry Zenan	X	12:20 AM	4610	Pusher for 82	E & W	Grafton Thorofare	Grafton Thorof
Jerry Elfer	3	12:45 AM	7614	Drag	E	Parkersburg YD 1	Cumberland Y
Ralph Schirin	X	12:50 AM	6197	Pusher for Drag	E & W	Grafton Thorofare	Grafton Thorof
Bob Hennar	4	1:25 AM	4603	88	E	Parkersburg YD 2	Cumberland Y
Jerry Z	X	1:35 AM	4610	Pusher for 88	E & W	Grafton Thorofare	Grafton Thorof
Ralph Schirin	5	2:00 AM	367	Coal Cars	W	Cumberland YD 4	Parkersburg YD
Bob Hennar	6	4:00 AM	6504	Salem Turn	W	Grafton Local Track	Grafton Main
Jerry S	7	4:55 AM	367	Coal Cars	W	Cumberland YD 4	Cowen YD 2
Ken Kelley	8	5:05 AM	92A	No. 32	E	Parkersburg Siding	Cumberland Si
Jerry Z	XX	5:10 AM	5083	Helper for No. 32	E & W	Grafton Thorofare	Grafton Thorofa
Ralph Schirin	9	5:35 AM	4603	Northeasterner	E	Parkersburg YD 2	Fairmont YD 4
Jerry Elfer	10	7:25 AM	7620	Coal Cars	W	Fairmont YD 3	Parkersburg YD
Ken Kelley	11	8:10 AM	4636	SW Steel Special	W	Fairmont YD 1	Parkersburg YD
Ralph Schirin	12	8:40 AM	7614	Drag	E	Parkersburg YD 1	Cumberland YD
Jerry Z	X	8:45 AM	6197	Pusher for Drag	E & W	Grafton Thorofare	Grafton Thorofa
Jerry Elfer	13	9:10 AM	7620	Coal Cars	W	Cumberland YD 4	Parkersburg YD

- **A Dispatcher's train call sheet, train sheet and train order book provide the tools needed by the Train Dispatcher.**
- **Crews sign-up for trains on a crew call sheet.**

SATISFYING
THE CHIEF DISPATCHER
ACHIEVEMENT AWARD REQUIEMENTS

REQUIREMENT:

Participate in the operation of a model railroad, in various positions, for no less than 50 hours. Note that 10 of the 50 hours must be served as a Dispatcher.

SATISFIED BY:

Operating on a model railroad meeting certain requirements and documenting your time and duties. Most model railroads that host operating sessions meet the requirements including many exceptional operating model railroads located in the Kansas City area.

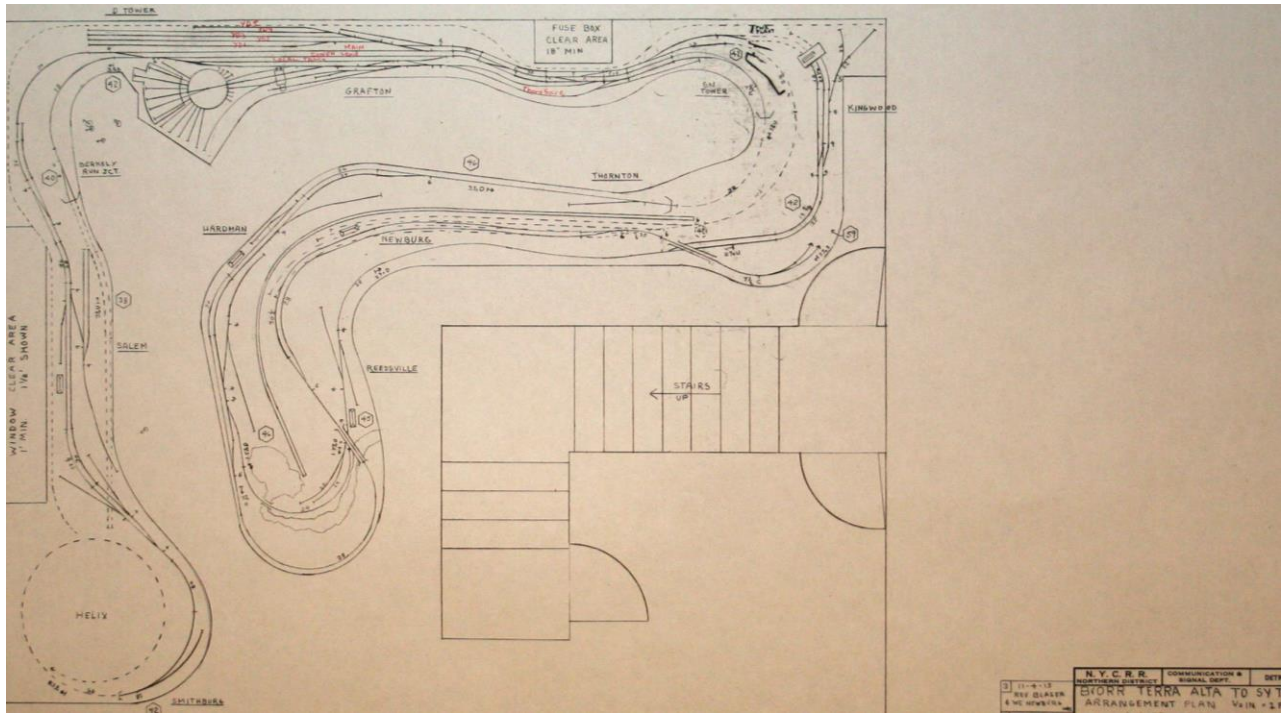
- **Do the Following for a Model Railroad having:**
  - At least two mainline trains plus yard switching in simultaneous operation.
  - And some system for controlling the activity of freight trains, passenger trains and car movements, including road switching.

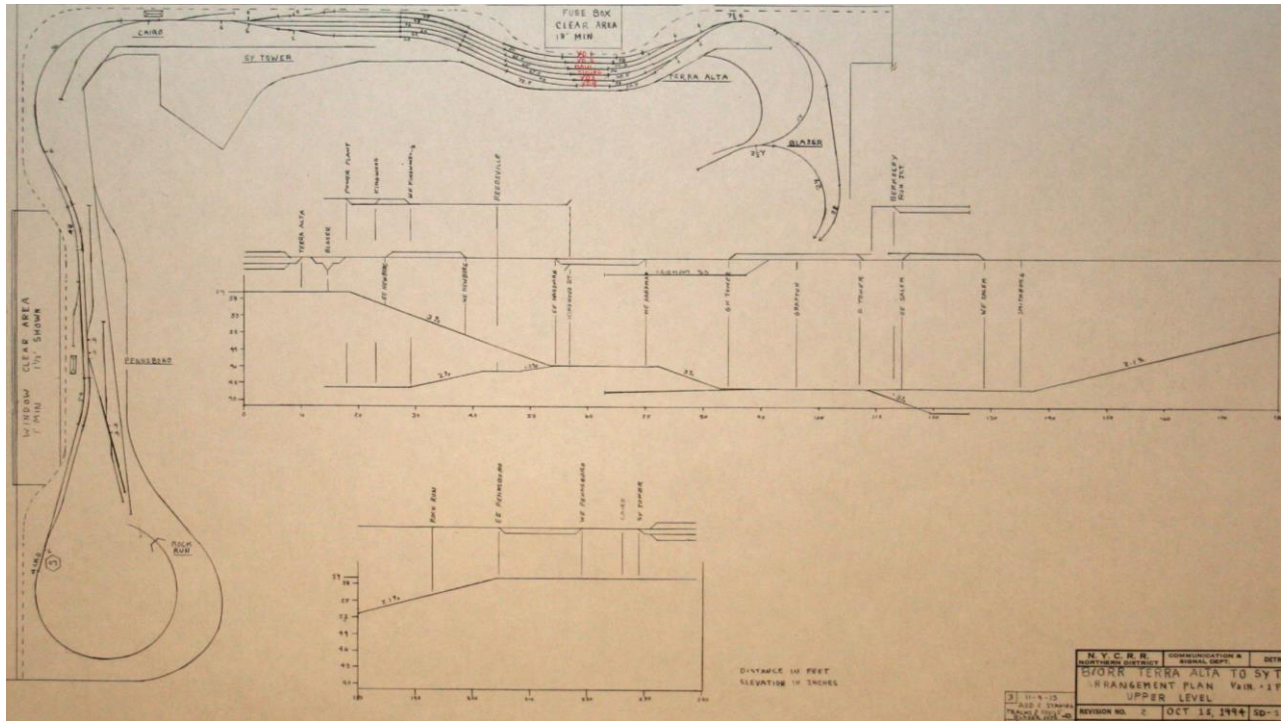
REQUIREMENT:

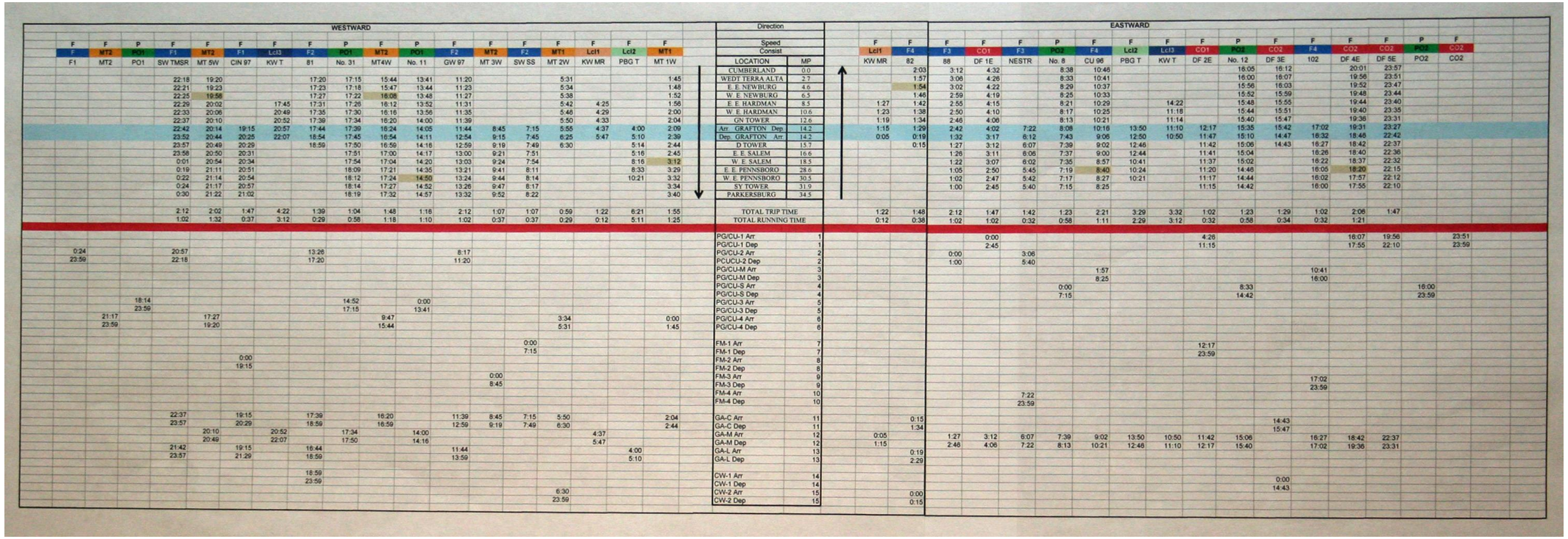
Prepare a schematic drawing of a model railroad layout meeting the operating conditions prescribed and indicate all pertinent simulated distances (“This Model Railroad”).

SATISFIED BY:

Providing a copy of the track plan I used to construct my railroad which included actual distances and a table of pertinent simulated distances, speed limits and running times based on my fast clock ratio.







REQUIREMENT:

Develop a timetable appropriate to “This Model Railroad”, simulating prototype time and covering a period of eight hours or more, during which time at least three scheduled mainline trains move in each direction.

SATISFIED BY:

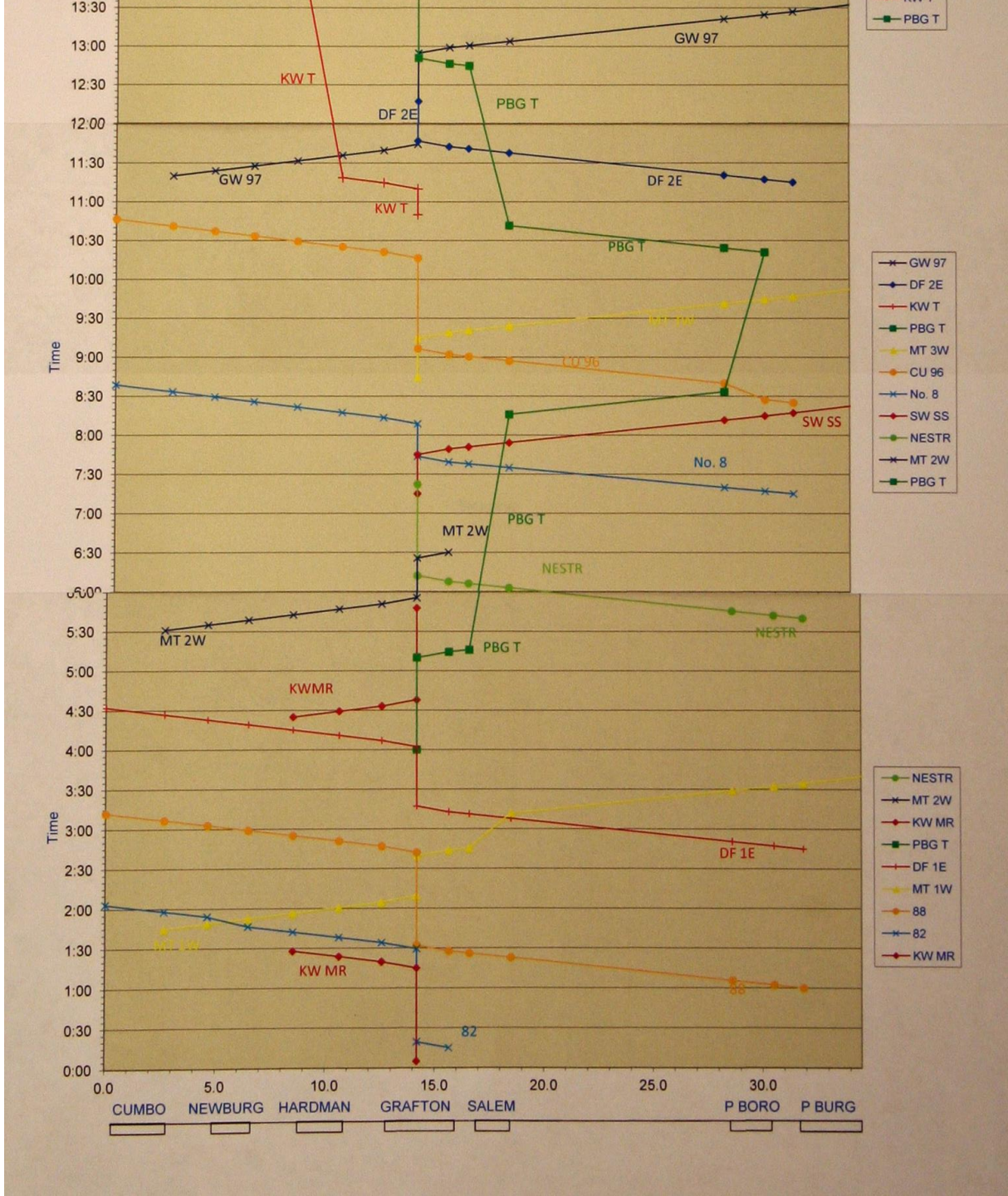
Providing a copy of the train sheet I had already created to depict the operations covering 24 hours, 15 Eastbound and 15 Westbound trains.

REQUIREMENT:

Develop an operating train chart (graph) which interprets the above schedule for timetable operation of “This Model Railroad”.

SATISFIED BY:

Providing a copy of the train operating graph (string line) I had already created to validate my operating plan.



REQUIREMENT:

Indicate at least one train meet on the required schematic drawing of “This Model Railroad”. Show the position of the train(s) involved and describe the action, giving pertinent time and movement data to effect the meet.

SATISFIED BY:

Preparing a schematic and narrative of a train meet from information taken from a train meet depicted on the train sheet I had created to depict the operations.

Train Meet Narrative and Schematic

Meet between Empty Coal Train (MT 1W) and Train 82 at Newburg

Train 82 operating from Charleston West Virginia to Cumberland, Maryland has completed its set out at Grafton, West Virginia and departs Grafton at 1;29 AM with Engine 4636 (Q-4d 2-8-2) and 13 cars. At the East End Hardman the crew of 82 calls an Approach Slow indication on the eastbound signal and passes it at 1:42 AM. At the West End of Newburg the crew of 82 calls a Slow Approach on the eastbound signal and enters the passing siding at 1:46 AM. At 1:50 AM Train 82 stops at the eastbound home signal at the EE Newburg, which displays a Stop indication. At 1:51 AM the Dispatcher reverses the switch at the EE Newburg and clears the eastbound signal for Train 82. The crew calls a Slow Clear indication and leaves the EE Newburg at 1:54 AM.

Extra 7620 East (MT 1 on the train graph), an empty coal train with Engine 7620 (EM-1 2-8-8-2) and 19 cars departing the yard at Cumberland, Maryland enroute Parkersburg, West Virginia passes Terra Alta, West Virginia at 1:45 AM after receiving a Slow Clear Signal indication. At 1:46 AM the crew calls a Clear Signal at the westbound Automatic Signal located at Independence, WV. Extra 7620 East passes the westbound home signal at the EE Newburg, which displays an Approach indication at 1:48 AM holding the main track. At 1:50 AM the dispatcher codes the switch normal at the WE Newburg and clears the westbound signal for Extra 7620 East. The crew calls a clear signal at the WE Newburg and passes it at 1:52 AM.

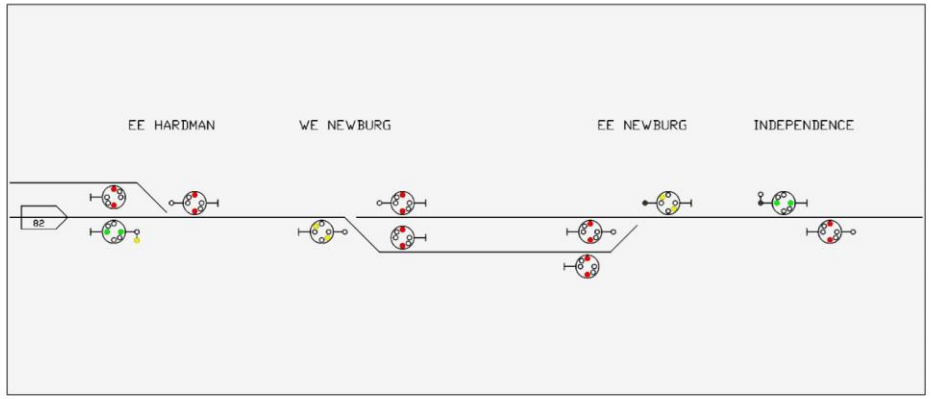
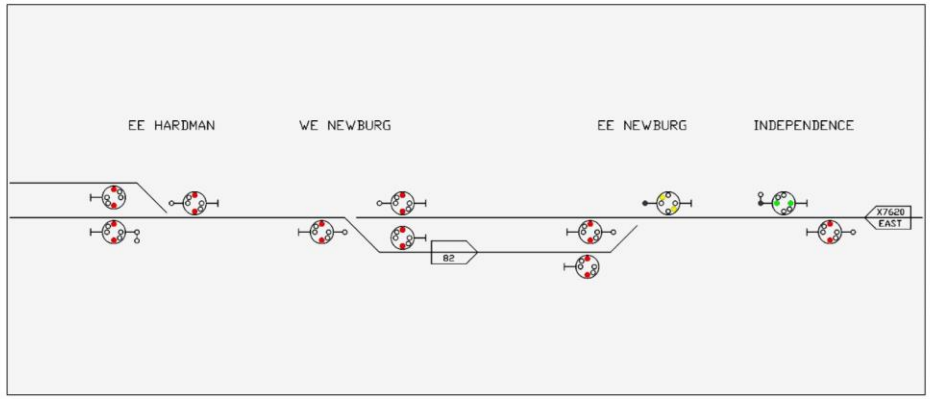


FIG 1. 1:42 AM

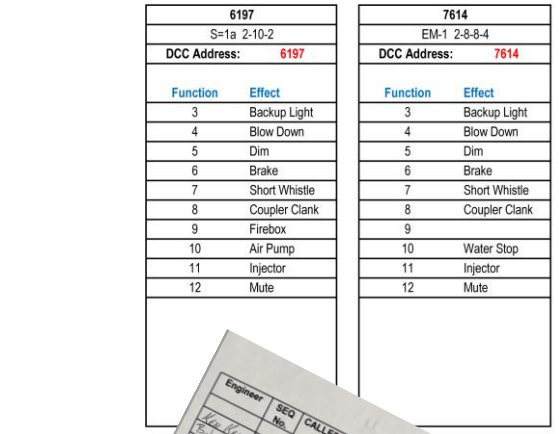


REQUIREMENT:

Develop or adapt a system of operation for “This Model Railroad”, including all the necessary forms and explanations of their use for controlling car movements, train make-up and operation in a prototypical manner.

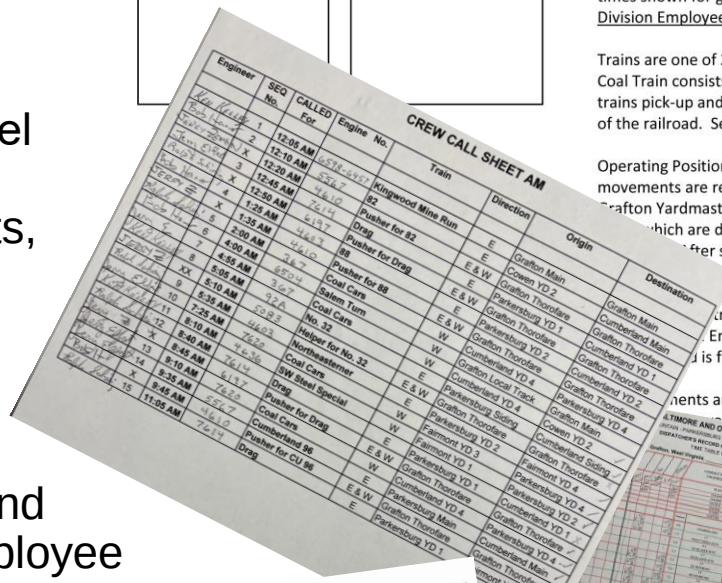
SATISFIED BY:

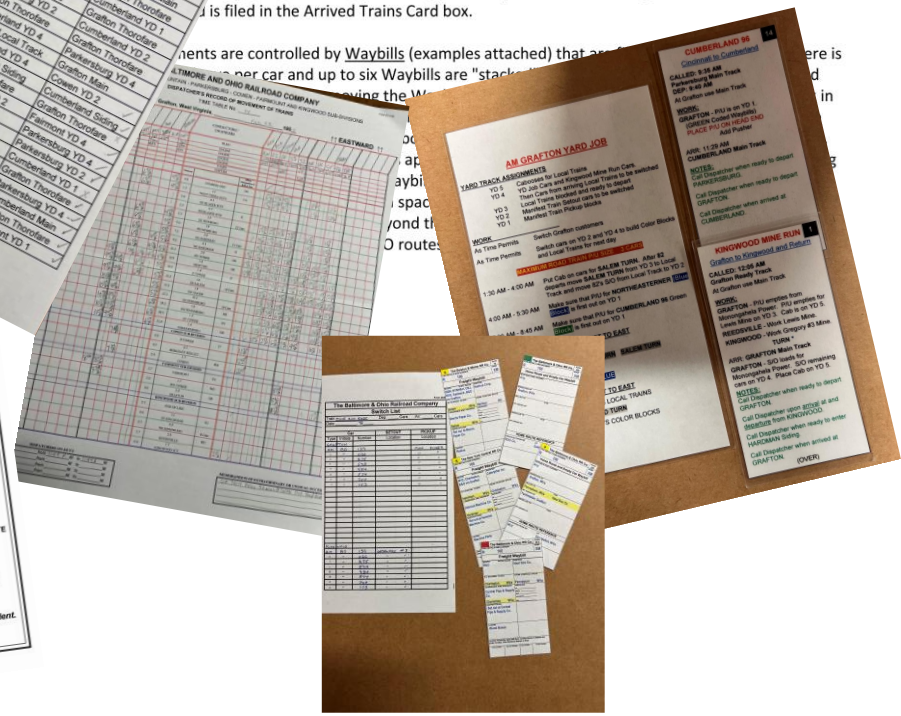
Preparing a description of the System of Operation, and providing copies of operating documents such as Employee Timetable No. 42, Train Consist Map, Dispatcher’s Train Sheet, Grafton Yard Job Instructions, Train Call Sheets, Train Cards, Engine Cards, Waybills etc.

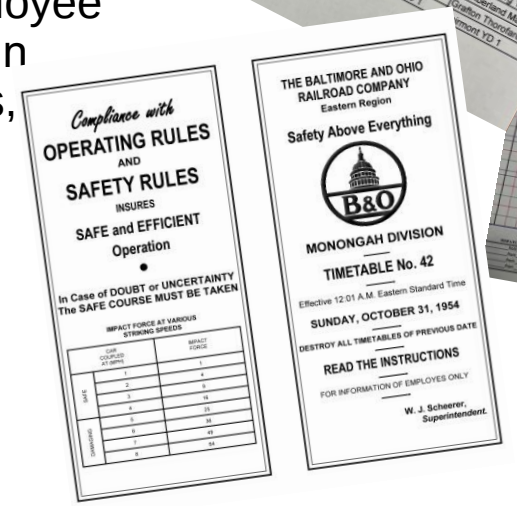


6197	
S=1a 2-10-2	
DCC Address:	6197
Function	Effect
3	Backup Light
4	Blow Down
5	Dim
6	Brake
7	Short Whistle
8	Coupler Clank
9	Firebox
10	Air Pump
11	Injector
12	Mute

7614	
EM-1 2-8-8-4	
DCC Address:	7614
Function	Effect
3	Backup Light
4	Blow Down
5	Dim
6	Brake
7	Short Whistle
8	Coupler Clank
9	
10	Water Stop
11	Injector
12	Mute







Description - System of Operation For B&O Monongah Division

The B&O Monongah Division runs from SY Tower at Parkersburg, WV on the west to Terra Alta, WV located west of Cumberland, MD on the east. Both Parkersburg and Cumberland are simulated by a six track staging yard. Grafton, WV is a division point between the Parkersburg SD and the Mountain SD. Grafton is also the point where the Fairmont SD (from Fairmont, WV and Connellsville, PA) and the Cowen SD (from Charleston, WV) join the Parkersburg and Mountain Subdivisions. The Cowen SD is simulated by a two track staging yard and the Fairmont SD is simulated by a four track staging yard. In addition there is a branch line (the Kingwood SD) that runs from Hardman, WV to Kingwood, WV and ends in a classic loads in empties out between the Gregory No. 3 Mine at Kingwood and the Monongahela Power Co. Generating Plant at East Grafton.

The Method of operation between Parkersburg and Cumberland is Centralized Traffic Control. The method of operation on the Cowen and Fairmont Subdivisions is Yard Limits and the Kingwood SD is operated by Train Order. All trains are operated as extra trains in sequential order with approximate times shown for guidance purposes only. All operators must be familiar with the attached Monongah Division Employee Timetable No. 42 which includes all relevant Operating Rules and Special Instructions.

Trains are one of 2 Passenger consists, 4 Manifest freight consists, 2 Empty Coal Train consists and 2 Coal Train consists which are run more than one time to simulate multiple trains. Various manifest trains pick-up and set-off cars at Grafton which allows for car movements beyond the modeled portion of the railroad. See attached Consist Map for details.

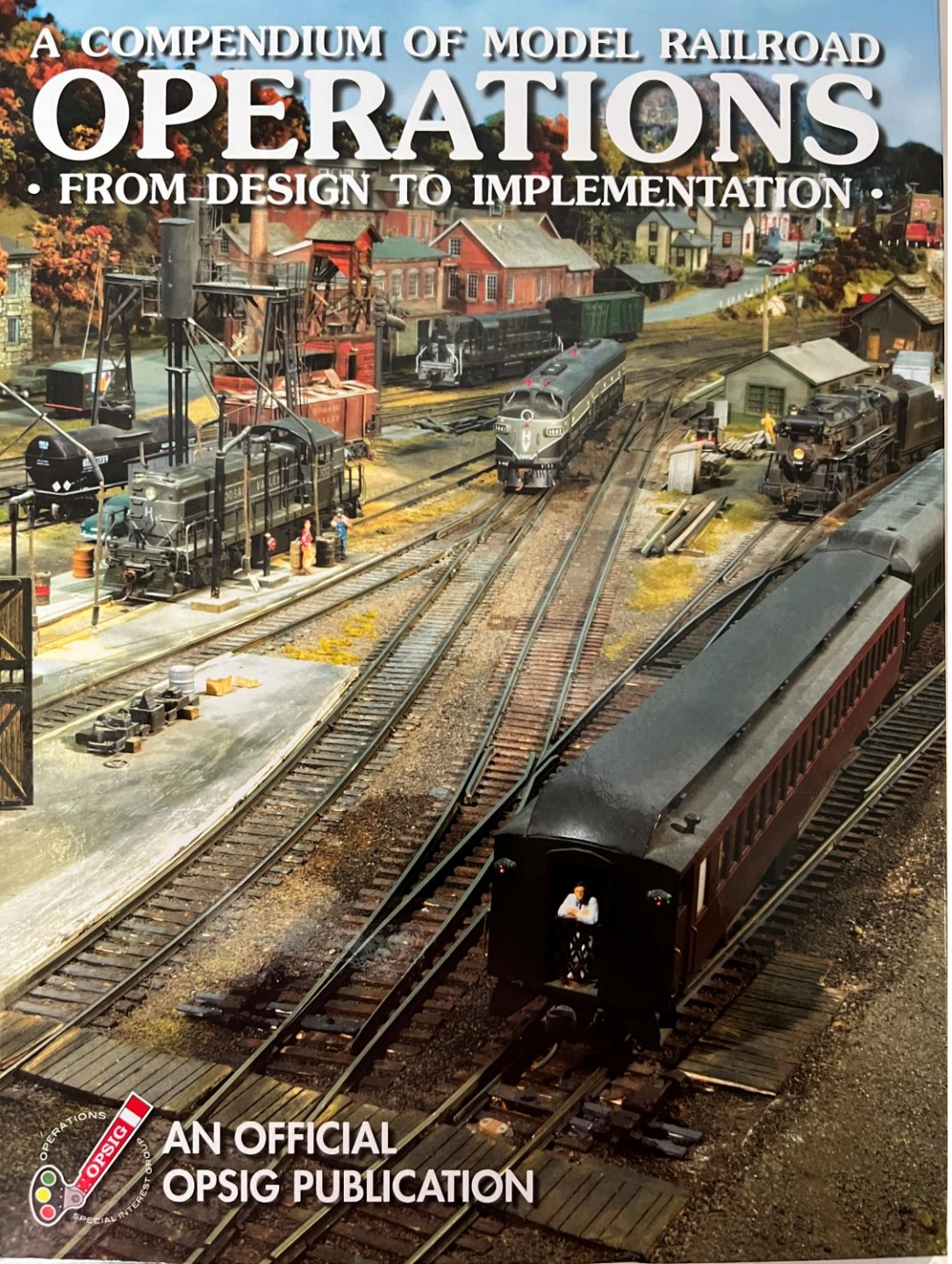
Operating Positions consist of a Dispatcher, Grafton Yardmaster and up to six Engineers. All train movements are recorded by the Dispatcher on the attached Dispatcher's Train Sheet. The duties of the Grafton Yardmaster are detailed on the attached Grafton Yard Job document. Engineers sign up for [illegible] which are dispatched in sequence at or later than the departure time shown on the attached Train [illegible] after signing up for a train, the Engineer gets the Train Card (examples attached) for the [illegible]orting Trains Card box. This card contains operating instructions for the train and also [illegible]the departure track for the train. The Engine Card(s) (examples attached) and [illegible]train are located in the box assigned to that departure track. When the run is [illegible] Engineer files the Engine Card(s) and Waybills in the box assigned to the arrival track and [illegible] is filed in the Arrived Trains Card box.

[illegible]ments are controlled by Waybills (examples attached) that [illegible] per car and up to six Waybills are "stack[illegible]

To Summarize

- Identify what you want to achieve
- Decide:
  - What your railroad will be based on.
  - What kind of railroad you want to model.
  - What will be the method of operation.
- Design the track plan accordingly.
- Plan the operation:
  - What trains will be operated.
  - How trains will be moved.
  - Where will traffic come from and go to.
  - If a fast clock will be required.
  - How crews will know what to do.
- Build your railroad.
- Create the necessary instructions and documents.
- Start operating as soon as possible and fix the things that did not work as planned.
  - Fix what doesn’t work and try again. The Rule is “Only make new mistakes" Don't make the same mistake twice.

- **GET YOUR CHIEF DISPATCHER AP CERTIFICATE!**

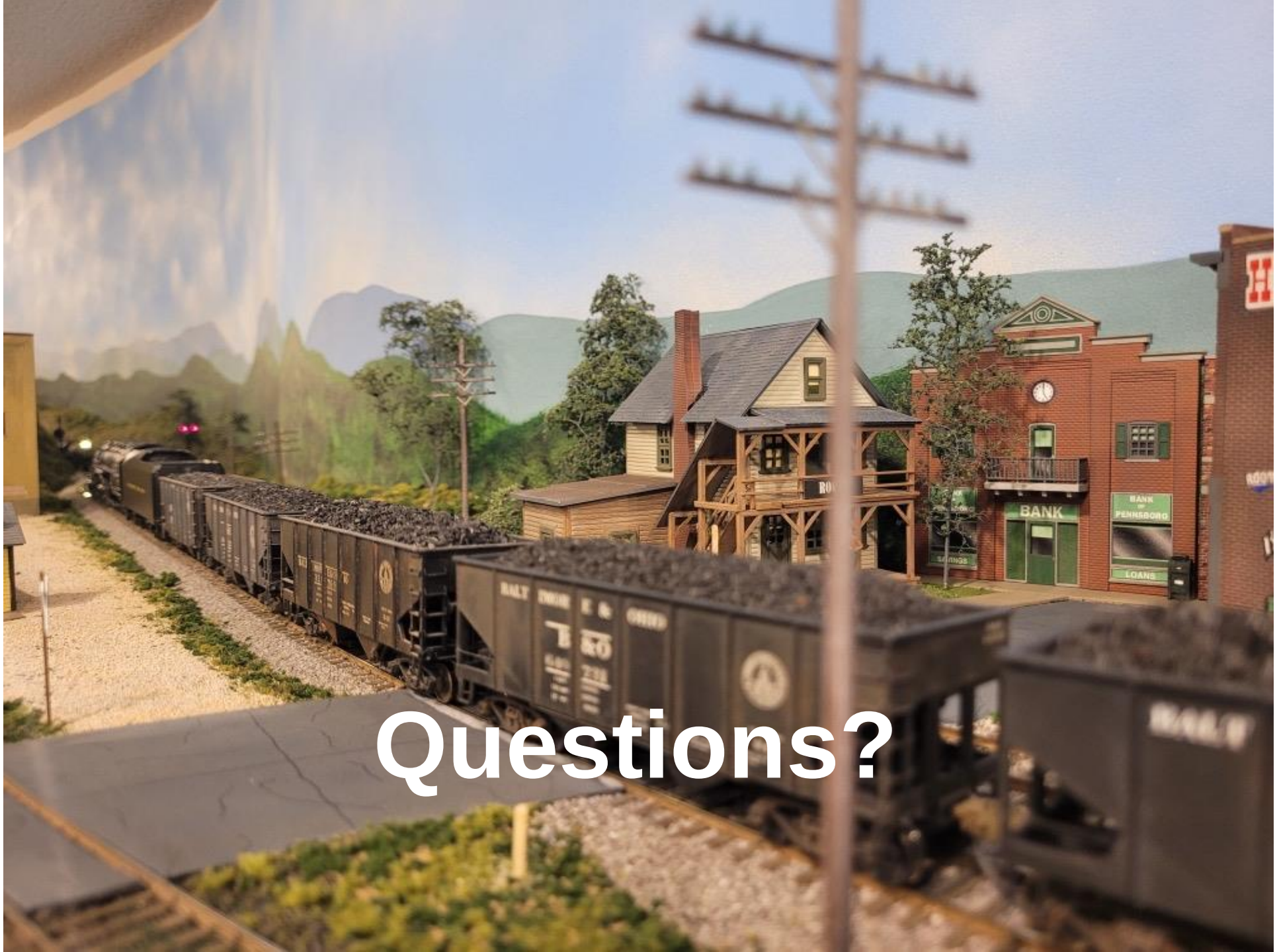


A Must Have Resource

A Compendium of Model Railroad Operations.

Available through
the Operations Special Interest Group at:

https://www.opsig.org/assets/compendium.pdf



Questions?