

General Overview

Almost every interurban in the country had elements that were particular to its own circumstances and geography. The Trenton Northern is a free-lanced interurban not based on any particular prototype. Elements typical of interurban operations and physical characteristics have been combined to make the Trenton Northern representative of interurban railways that were once found across the United States.

Physical Elements found on the Trenton Northern typical of interurban railways:

- Overhead wire for power collection by motors
- Lighter weight rail
- Street running
- Grades and curves not typically found on a “steam” railroad
- Equipment that is shorter and narrower than typical “steam” railroad equipment

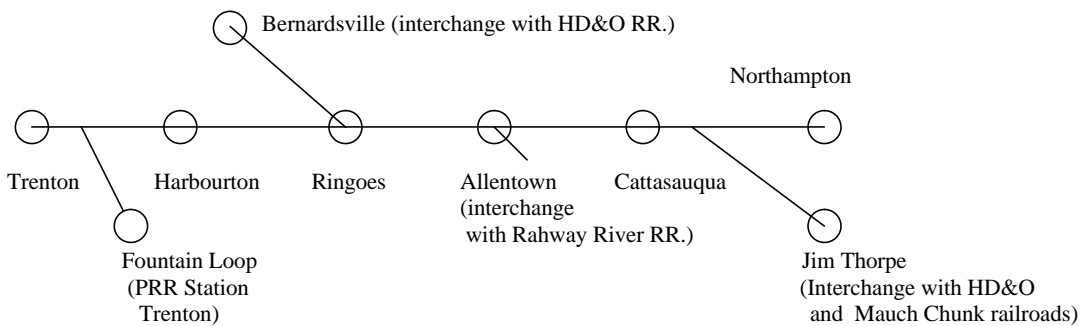
Operational Elements found on the Trenton Northern typical of interurban railways:

- Frequent Passenger Service – both limited and local
- Passenger rush hour service
- Less than Carload Service
- Express Service
- Interchange Freight Service
- Shorter train lengths than typical “steam” trains

The Trenton Northern is able to combine these typical elements in a way that makes it unique among interurban installations in the United States without it appearing unrealistic. As each interurban developed according to its own local circumstances, so has the Trenton Northern Transportation & Light Company.

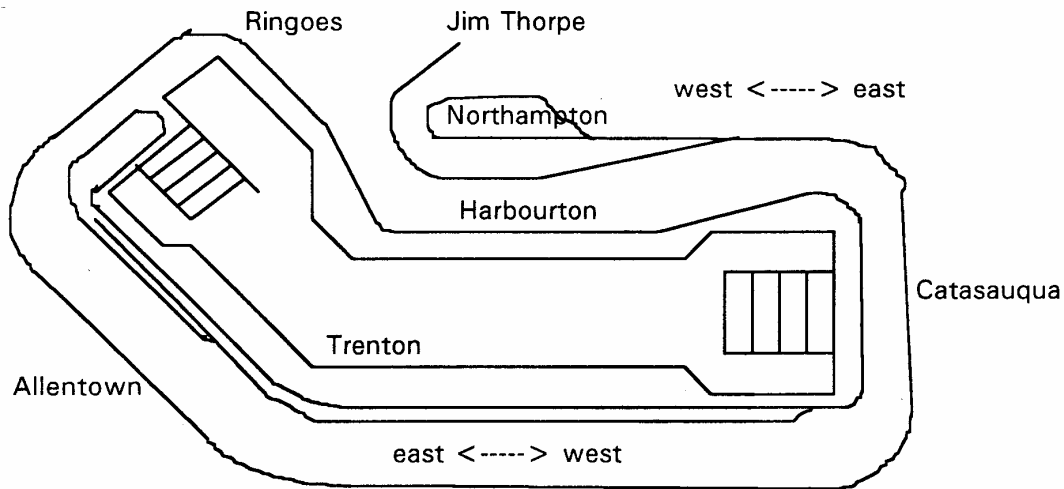
Geographical Location

The Trenton Northern Transportation & Light Company’s main line runs between Trenton, New Jersey and Northampton, Pennsylvania. There are three branches in addition to the main line. There is short branch from the Grand Avenue Station in Trenton to a streetcar loop at PRR Station in Trenton, (Pittsburgh Passenger Terminal on the Hudson, Delaware & Ohio), a branch from Ringoes, N.J. to Bernardsville, N.J. and a branch from Junction (just west of Cattasauqua, Pa.) to Jim Thorpe, Pennsylvania.



Physical Characteristics:

The main line of the Trenton Northern circles the HO layouts center aisle. The approximate location of the mainline, major towns, and the branch to Jim Thorpe are identified in the map below:

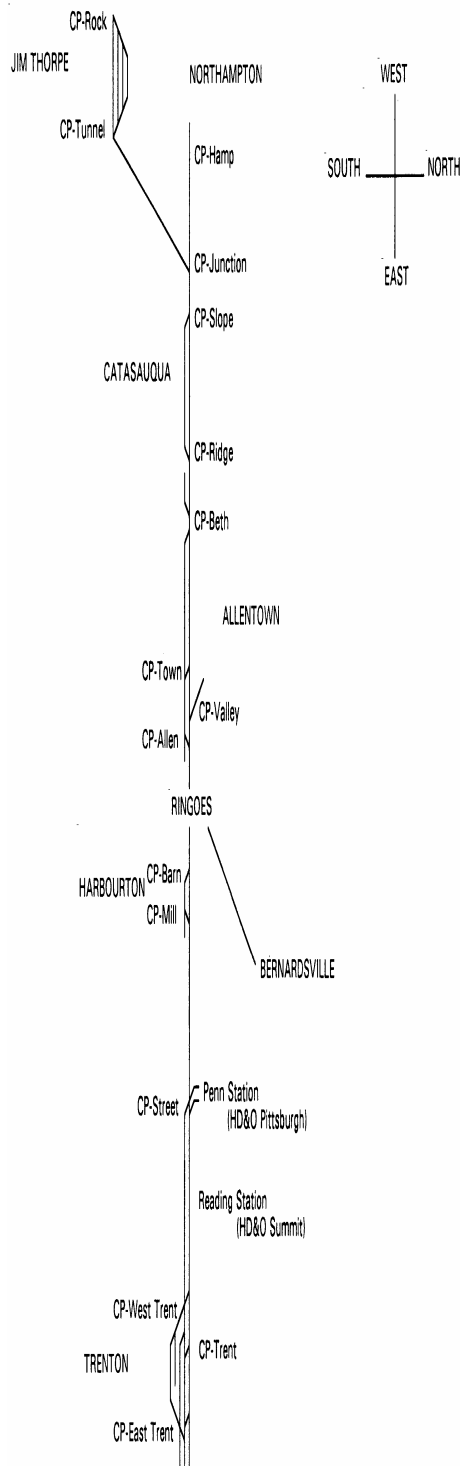


- All operating personnel are in radio or telephone communication with one another.
- All motive power is DCC equipped.
- Wireless throttles are used to control the speed and direction of trains moving about the railroad.
- The dispatcher is located under the layout and cannot see the trains operating. Instead the dispatcher must depend upon the timetable, track detection, communications with the train crews and his own record-keeping to keep track of events on the Trenton Northern.
- Switches on the Trenton Northern are either hand-thrown only (located on a panel and not under the control of the dispatcher), dispatcher-controlled only (thrown by the dispatcher on the CTC machine only) or dual-controlled (the dispatcher may remote the switch control to a panel on the layout fascia).
- The Trenton Northern is a single-track railroad with multiple sidings for meets and passes.

Traffic:

- Passenger Trains run between Northampton, Allentown, Bernardsville, Fountain Loop and Trenton.
- Express items such as newspapers carried in combination cars, box motors and trailers between all stations.
- Less-than-car-load service offered between Trenton and Bernardsville, Ringoes, Allentown and Northampton. Carried in box motors, special traction trailers and conventional railroad equipment.
- Milk train service delivers raw milk to Trenton for loading onto dairy company trucks.
- Major interchange car destinations are Lehigh Cement in Catasauqua and the Power Plant in Ringoes. In addition, towns may have other industries, freight houses and team tracks that serve as destinations for interchange cars.

Management: The Trenton Northern management is committed to dependable, reliable service for its customers and maximizing its return on investment for its shareholders. Presently, freight and express revenues are sufficient to offset modest passenger losses. Many pieces of equipment have been built in the company shops for both passenger and freight service, or bought second-hand from other traction and railroad companies.



A schematic of the Trenton Northern is given at the left in order to give the operator a sense of the relative positions of the major geographic points on the railroad. More detailed town schematics of town locations are included elsewhere in this document.

Trains on the Trenton Northern: The TN operates both passenger and freight trains over the railroad. They may be scheduled or unscheduled. All trains on the Trenton Northern must be given train orders to proceed over the railroad. The only exception is for trains on the Bernardsville Branch, which is not under direct dispatcher jurisdiction. There, pure Timetable and Train Authority rules apply.

- A train may not move between towns on the mainline of the railroad unless given train orders to do so by the dispatcher, regardless if it is scheduled or unscheduled. The Trenton Northern does not yet have a signal system installed and it is the responsibility of the train crew to follow the orders of the dispatcher in order to avoid collisions. The radio is used to communicate orders between the dispatcher and the train crew.
- All timetables time are departure times, except the last stop on a run, which is an arrival time.

To operate a passenger train over the railroad the motorman must keep the following in mind:

- The train's origin and destination.
- The trains scheduled arrivals and departures.
- Orders from the Train Dispatcher to travel over the road.
- Appropriate control points on the railroad.
- Proper use of the throttle, including acquiring and dispatching a consist, if applicable.
- Proper use of the radio to communicate with the dispatcher.

To operate a freight train over the railroad the motorman must keep the following in mind:

- The train's origin and destination.
- Freight car destinations as indicated by the waybill magnet on each freight car. Color coded charts are located on the fascia of the railroad to assist the operator in proper car spotting locations.
- The trains scheduled arrivals and departures, if any.
- Orders from the Train Dispatcher to travel over the road.
- Appropriate control points on the railroad.
- Be aware of scheduled trains in order to clear main tracks prior to their scheduled arrival or departure if working as

an extra train.

- Proper use of the throttle, including acquiring and dispatching a consist, if applicable.
- Proper use of the radio to communicate with the dispatcher.

Control Points: Control Points are signal locations on the railroad. They are used as a way of identifying how far a train may travel, regardless of its timetable orders. The dispatcher will identify control points when communicating train orders with a train crew in order to facilitate the movement of trains over the railroad. Ringoes Yard Territory is not under direct dispatcher control. All train movements through Ringoes Territory must be cleared by the Ringoes Tower regardless of any dispatcher orders.

- The train order “Train 500 clear to CP Allen” means that Train 500 may proceed according to its schedule as far as the CP-Allen signal location.
- The schematic gives the approximate location of CP-Allen.
- The names of all CP-points are on signal boxes on the railroad next to each interlocking.

Radio Procedures

- Do not use the radio if other people are talking.
- The radio is used by depressing the talk button on its side.
- When a train is ready to depart, the train crew must call the dispatcher via the radio. A short, succinct sentence is sufficient. For example, the crew reporting for train 500 would say, “Train 500 to dispatcher, Over”. After your transmission is complete, stop depressing the talk button. Only one person can transmit at a time.
- Wait for the dispatcher to respond to you. The dispatcher may wish to give orders to another train crew before talking to you. The dispatcher may be talking via telephone with the other railroad dispatchers or the Ringoes freight man. If you think the dispatcher did not hear you or forgot about you, you are probably wrong. Wait at least 45 seconds before trying to contact the dispatcher again.

Typical Radio Conversation to convey Train Orders:

Train 500 is in the station at Northampton, ready to depart for Trenton. Before it may proceed the crew must call the train dispatcher for orders.

- Crew: “Train 500 to dispatcher, Over”
- Dispatcher: “Dispatcher to train 500”, Over”.
- Crew: “Awaiting Orders, Over”
- Dispatcher: “Train 500 clear to CP-Allen, Over”.
- Crew: “Train 500 clear to CP-Allen, Roger”

Train 500 should travel as far as CP-Allen, making all scheduled stops between Northampton and CP-Allen. The crew will report to the dispatcher when at control point Allen to receive orders for the rest of its journey.

- Crew: “Train 500 holding at Allen, Over”
- Dispatcher: “Train 500 clear to the Eastbound Track Trenton Station, Over”
- Crew: “Train 500 clear to the Eastbound Track Trenton Station, Roger”

- The order is considered complete when the train crew repeats the order to the dispatcher.

CP-Allen does not appear on any public timetable. Most likely a meet with another train was arranged between CP-Beth and CP-Allen.

- If the train crew forgets its orders, come to a stop and call the dispatcher. It is unsafe to proceed over the railroad if you do not know where your train is cleared to.

Ringoes Yard Area:

- Ringoes is not under dispatcher control. To enter Ringoes yard limits a train operator must talk to the Ringoes Yardmaster. The Ringoes yard limits are at CP-Allen and CP-Barn on the mainline and CP-Church on the Bernardsville Branch. You must request clearance to enter Ringoes yard limits even if the Dispatcher has given you orders to a point past Ringoes.
- Ringoes and train crews communicate via the radio. Communications with Ringoes follow the same format as train crew to dispatcher communications.

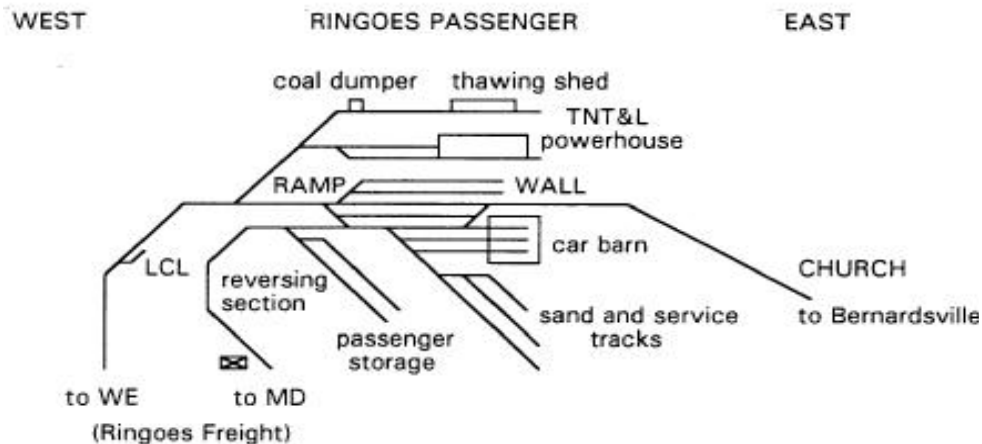
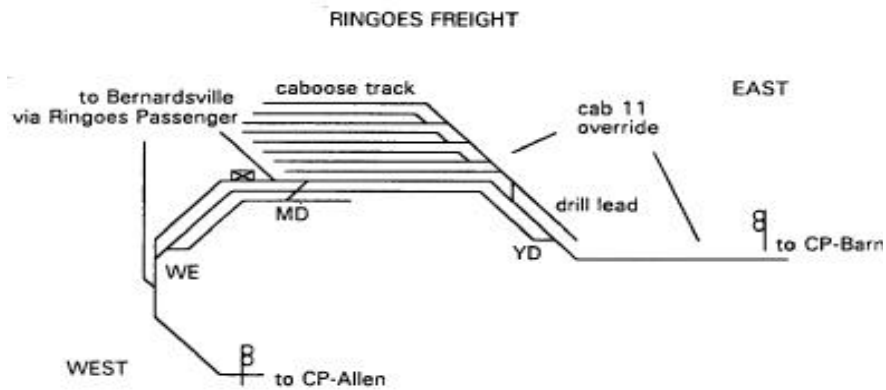
Getting a train through Ringoes Territory:

The dispatcher has cleared train 500 from CP-Allen to Trenton Station. Before it can proceed past CP-Allen it still must get permission from the Ringoes Towerman. An example of the exchange between the Ringoes Towerman and Train 500 is given below:

- Crew: "Train 500 holding at Allen, Over"
- Ringoes Tower: "Train 500 clear to Barn, Over"
- Crew: "Train 500 clear to Barn, Roger"

Ringoes Tower has just cleared Train 500 through its territory. It should proceed according to the dispatcher's previous orders to the Eastbound Track, Trenton Station, making appropriate stops along the way.

Ringoes is divided into two territories, Ringoes Passenger and Ringoes Freight. A schematic of each part of Ringoes Territory is given below:



--Speeds on the Railroad--

Scale speeds on the railroad are deceptively slow. In HO scale, approximately 1:87, one foot represents eighty-seven feet on the prototype. Speeds should scale down accordingly. But to what? Some not-so-simple math shows us that a scale speed of 60 mph (pretty fast for our tracks) is achieved when an HO scale train travels just one foot (12 inches) in one second. The speed limit for freight trains on the Trenton Northern is 30 mph, with 45 mph the maximum for passenger trains. That's six inches per second, and nine inches per second, respectively.

General Train Operation Guideline:

- Maximum train speed for passenger trains is 45 miles per hour
- Maximum train speed for freight trains is 30 miles per hour
- Smooth starts and stops are essential
- Trains must be completely stopped before reversing directions
- A member of the train crew must flag all unprotected public grade crossings. The motorman should allow for appropriate stops to allow the flagman to get on and off the train in order to flag the crossing.
- Allow ten seconds per car to simulate air-brake tests, for a minimum of thirty seconds and a maximum of three minutes before a train moves from its initial location. Brake tests on all trains involved in local switching must be performed before the train may proceed to the next town if any coupling or uncoupling of cars was done.
- All freight trains must have a caboose or end car suitable for the train crew to ride in.
- Operating at scale speeds and simulating prototypical activities is not necessarily convenient for the dispatcher.

--Train Movements--

There are basically two types of trains: Scheduled trains and Extra trains. A scheduled train, whether freight or passenger, is one for which an effective Timetable schedule has been established. An Extra train is just that – a train that moves without the benefit of a published schedule. In signaled or radio dispatcher territory, where sufficient communications exist between Engineers and Dispatchers, both scheduled and extra trains can be handled with ease; to the Dispatcher, they are nearly indistinguishable. In the absence of such excellent communication, however, the problem of meeting or passing trains on the same track takes on a whole different dimension. Here the Timetable schedule is of real importance to the safety of operations, and the difference between scheduled and extra trains is immediately apparent. Scheduled trains move according to their published schedules, remaining “in the clear” for any other scheduled trains which may be “superior” and which have not yet passed their scheduled meeting points. An extra train in these circumstances requires special thought on the part of the Dispatcher: all of the required meets must be planned in advance, and all trains involved must notified via hand-copied Train-Order – a complicated and elaborate system, and one requiring the utmost awareness by all involved.

The Bernardsville Branch on the Trenton Northern runs according to Timetable and Train Order rules. All trains departing Ringoes for Bernardsville or from Bernardsville for Ringoes must check with the Train register with the Ringoes Towerman, to see if superior trains have cleared the branch.

Operating Positions:

The Trenton Northern assigns jobs on the basis of qualifications and seniority. Jobs may be combined depending upon the availability of crews to man positions. A job board is established so that each operator can anticipate their responsibilities and duties for the operating position. For train crews, the job board lists all scheduled trains that the crewmember will be running and approximate call times for assigned extra freights. In addition, all train crews are assign to the “extra board” for times that they are not engaged in running their assigned tasks. In order of increasing responsibility, the available jobs and their duties are listed below:

- Brakeman – Assists with drilling of cars. Facilitates the coupling and uncoupling of cars. Collects waybills from delivered cars.
- Yard drills – Throws switches, couples and uncouples cars under the supervision of the Ringoes Yardmaster.
- Motorman – Is responsible for the safe and efficient operation of his train. Is familiar with the physical characteristics of the railroad. Is familiar with standard waybill codes and spotting requirements for each industry that his train operates in.
- Yardmaster – Directs all train movements in Ringoes Yard territory, subject to safe operating procedures and timetable authority. Familiar with all aspects of the Trenton Northern’s freight program, including proper blocking of cars, assignment of motive power, and “windows” when extra trains operate. Coordinates the movement of extra freight trains with the Train Dispatcher.
- Dispatcher – Directs train movements over assigned territory. Coordinates extra train movements with the Ringoes Yardmaster. Records all train movements, permission, and location in assigned territory on the train sheet.

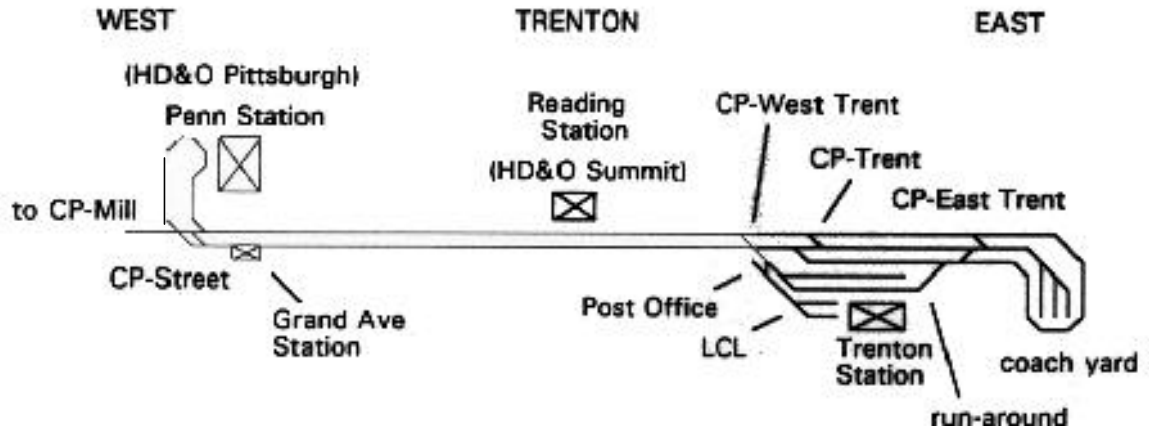
--Freight Movements--

Freight and freight cars only move when they have someplace to go. This demand for an order originates with an order for one of our shipper’s products. An order to be shipped via rail requires the spotting of a freight car on that particular industry’s siding for loading. A cascade effect occurs when the shipper needs raw materials in order to produce the product that is to be shipped. Appropriate cars must be found for the inbound and outbound loads for each industry. Unused empty cars must be returned to their owners. In this way a single order may generate 10 or more car movements.

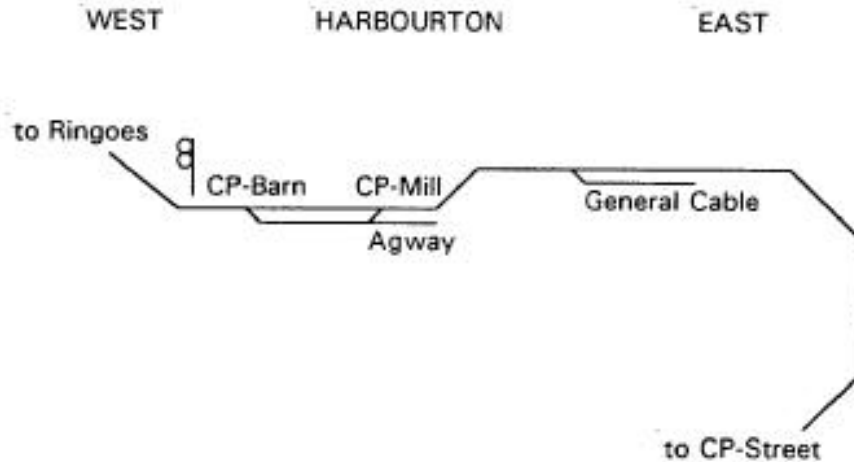
The Trenton Northern uses a computer program to generate inbound and outbound loads for industries along its line. Color-coded waybills are placed on each car to indicate where the car needs to be shipped to.

Station Schematics of the Trenton Northern:

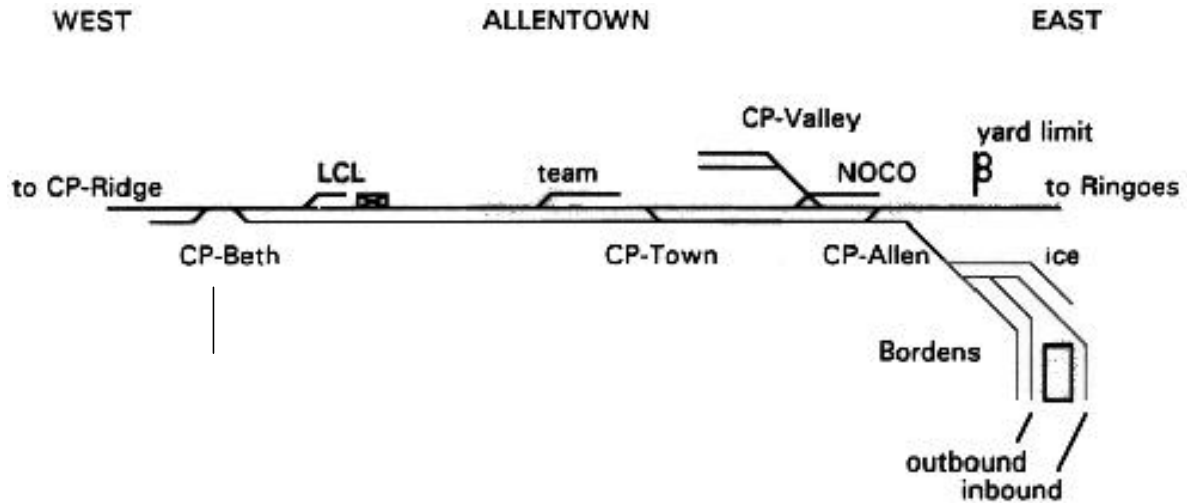
- **Trenton:** Trenton is the Eastern terminus of the Trenton Northern. Most trackage is under the direct control of the dispatcher via TCS. Only two small panels are required for TN operators in the center aisle. First is the LCL/Post Office panel, located to the left of the Trenton Station. The switch from the main-line is electrically locked from the dispatcher's desk, but can only be thrown from the panel. The second panel is for the coach yard, located above the exit stair. Each switch in the coach yard is not locked and can only be thrown from the panel.



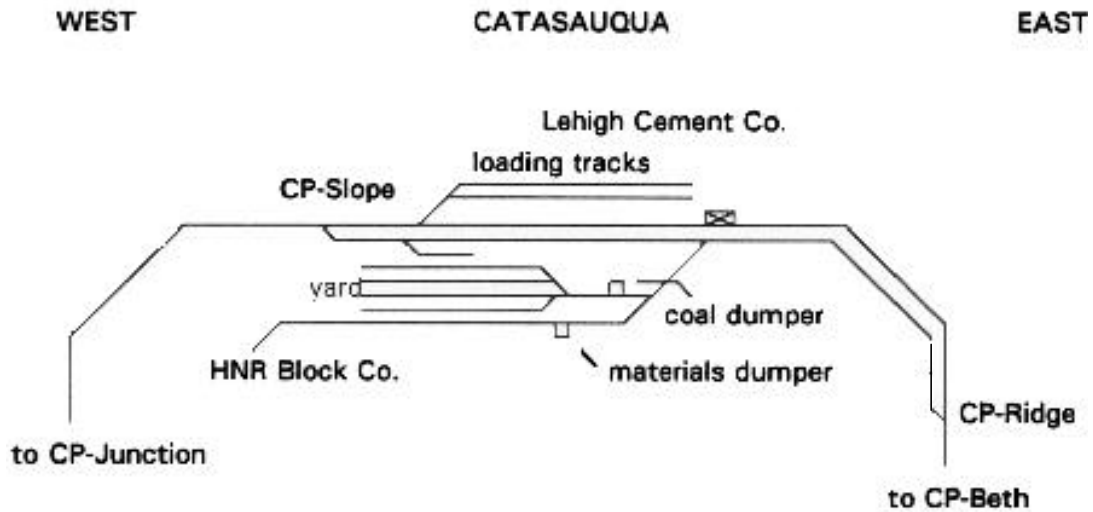
Harbourton: Harbourton is a small farming community adjacent to the center aisle. The switches in the passing siding are dual control (under dispatcher or local control) and the switch to general cable is electric lock only. The train crew must have permission from Ringoes Tower before proceeding west of CP-Barn.



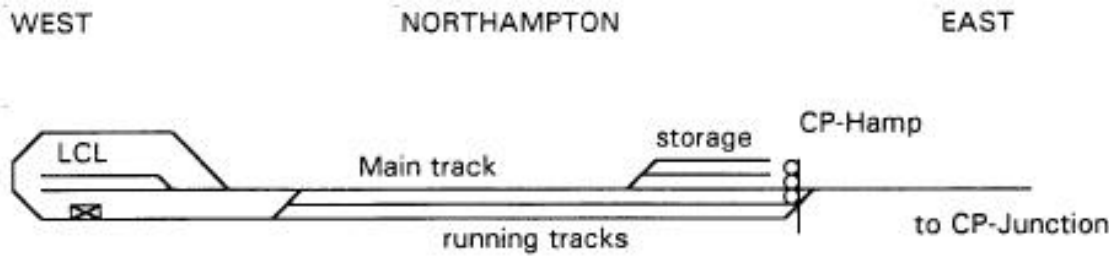
Allentown: Allentown lies on the far side of the Summit cut, as viewed from the center aisle, and boasts the only bi-directional double track main line trackage on the Trenton Northern. Three local control panels serve the town: a single switch in to the LCL platform at Trenton Station, the Allentown Industrial panel which shows the Team Track, Noco Tool and Die, and the Rahway River Interchange track, and the Borden's panel. All switches that allow access to the main tracks are electrically locked. All trains must get permission from the Ringoes Tower before proceeding east of CP-Allen.



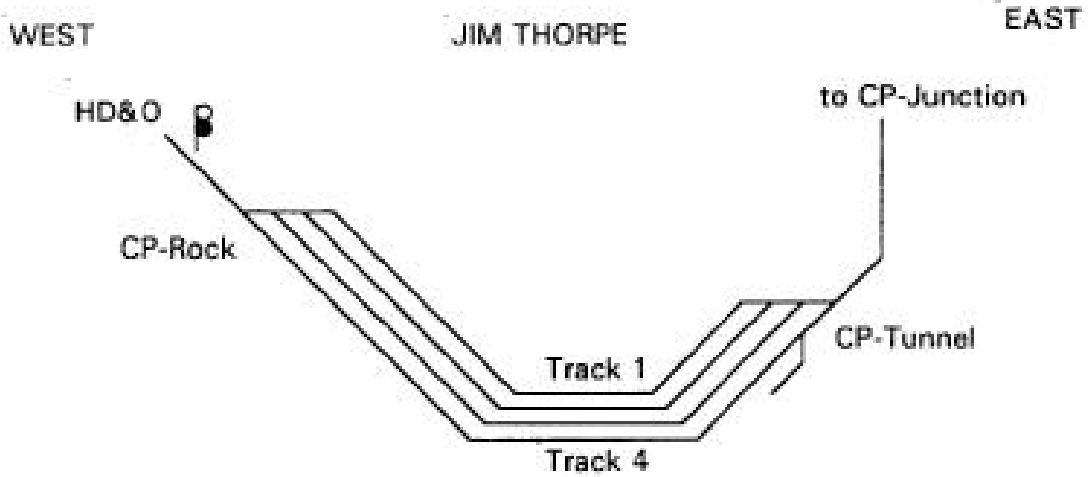
Cattasauqua: Cattasauqua hosts the TN's largest industry, the Lehigh Cement Company. On the West end of the facility is CP-Slope. There is a remote panel for switching the top-side of the plant to the left of the stairs. To the right side of the stairs is a remote panel to switch the bottom-side of the plant. The East end of Cattasauqua is CP-Ridge. All switches are operable from the panels, except for the switch at CP-Ridge.



Northampton: Northampton is the western terminus of the Trenton Northern's main-line. The yard is comprised entirely of hand-thrown switches. TCS territory begins/ends at CP-Hamp. A loop for turning equipment, a combination freight and passenger station and storage tracks are important features of Northampton. All trains must receive dispatcher permission before proceeding east of CP-Hamp.



Jim Thorpe: Jim Thorpe is the primary interchange with the Hudson, Delaware & Ohio railroad. All switches are dual-control. Track under wire extends to onto to HD&O at the west end of the yard to allow TN passenger trains to stop at the Jim Thorpe station and serve as a switching lead for TN trains working Jim Thorpe yard. Permission onto HD&O track is indicated by a green over red dwarf signal which is controlled by the HD&O Jim Thorpe Tower. The Jim Thorpe Tower may be reached via TN telephone.



Bernardsville: All switches are hand thrown. All Train movements are Timetable and Train Order Authority. A secondary interchange with the HD&O is located here. Trains must receive permission from Ringoes Tower before going west of CP-Church.

