One Module Challenge: First place winner

Pembroke: One module at a time

BY RENÉ GOURLEY

Planning the TOMA way avoids unpleasant surprises and organizes construction ...

READERS OF THE *MODEL RAILROAD HOBBYIST* forum are likely familiar with Pembroke (mrhmag.com/blog/2760), the slice of the Canada Atlantic Railway that I am modeling in Proto:87. What they may not know is that it has always been part of a larger building program, or that this is the second version.

I've been interested in the Canada Atlantic Railway (CAR) since being inspired in high school by Niall MacKay's book, *Over the Hills to Georgian Bay.* The railroad stretched over 400 miles from Parry Sound, Ontario to Swanton, Vermont, running near my boyhood home in Ottawa. It survived as a separate corporation from 1882 until 1905, when it was absorbed into the Grand Trunk Railway.

As a modeler, to me the CAR presents both challenges and opportunities. Operationally, the mainline was incredibly busy. Contemporary reports speak of trains every fifteen minutes.

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However, because there are few who model it, there is virtually nothing available off the shelf – not even decals.

Modeling all that mainline traffic may never be feasible, but there were some quieter branches off the mainline that are a good place to start. Of course, "quieter" is relative. These are not sleepy once-a-week operations, dodging closure in annual appearances before the Board of Railway Commissioners. That pattern is for a later time, after cars and trucks came along wrecking everything. No, as we will see, the branch lines prior to the age of the automobile were going concerns, with plenty of traffic for a fun, albeit small operating layout.

The town of Pembroke is about 100 miles west of Ottawa on the Ontario bank of the Ottawa River. It was the terminus for one such quiet branch that connected with the Canada Atlantic, 20 miles to the south at Golden Lake. Technically, the branch was its own railroad, the Pembroke Southern, but the CAR operated it from the day it opened.

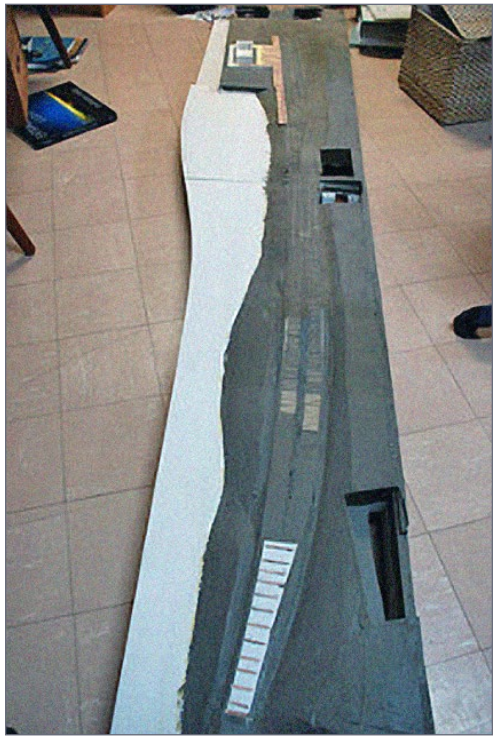
The end of the branchline, Pembroke, requires only one or two engines to operate. I anticipate that it will entertain me for years while I develop equipment for mainline operations. Once I have sufficient equipment, I will extend the line down to Golden Lake and connect with the mainline. As my skills improve, I expect that Pembroke itself will get old, and will be replaced with more mainline.

1. The station area of Pembroke, along the bank of the Muskrat River. The roundhouse is about ¼ mile down the track around the bend in the river. *Author's collection*

Pembroke I

I built the first version of Pembroke in the 10'x10' bedroom of a rented townhouse in Burnaby, B.C. I had minimal tools and even less skill. However, "Pembroke I" did prove the resilience of the One Module Approach in the face of household moves. Indeed, the modules moved with me several times.

Being in a rented townhouse, Pembroke I was initially free-standing. It sat atop a pair of L girders wedged against the walls. I built ladder-shaped legs for it that incorporated shelves for the myriad books, tools and materials we model railroaders accumulate. In the second installation, I was less concerned about making holes in the wall, and the layout was mounted on sturdy shelf brackets..



2. Pembroke I just before its trip to the dump.

Unfortunately, my skill gaps made for real gaps between the modules. Even worse, during my research information surfaced that showed I had taken too many liberties with the track plan and scenery. I was never satisfied with the inaccuracies, and wound up starting over before much track was ever laid.

Pembroke II

Pembroke II resides in our 15'x16' rec room. The room is not only a train room, but also a home office, guest room, playroom, and occasionally a home gym. The layout occupies a shelf above two cabinets and two desks that I made to support the office and train activities. Staging is built onto a wide windowsill.

My friend Andrew and I built the two sections of the layout in the garage. They were wired and turnout controls were partially completed before installation day. With shelves full of printers and books under the layout, working beneath it is a nuisance. So, I am happy that most of that work was completed when I could turn the layout on its side or its end.

I chose not to complete the scenery in the garage because I wanted to be sure I was happy with operations. Besides, I was getting impatient to see trains actually running!

3. Building the bench-work for Pembroke II in the garage kept all the dust and noise out of the house.

4. I completed the wiring and turnout controls while Pembroke II was still in the garage and could be easily stood up on its end or side.

5. Installation day, July 27, 2014. Left to right, the author, Scott Calvert, Ken Catlin, Andrew Hutchinson; the author's children are in the front row.

Pembroke TOMA - Phase 1

At 16'x15', my room is quite similar to the TOMA Challenge room. However, for Pembroke II, I did not restrict myself to 84" in length. Pembroke TOMA was designed with HO in mind, rather than Proto:87. As such, it has a minimum radius of 30".

The good news is that it's 1905, and 72" or 84" is plenty of room to run around the half- dozen or so 36-foot cars that a 4-4-0 can be expected to pull. So, this initial module along with staging is a complete operating layout by itself!

In Pembroke I, I started with the station end of the line. Knowing what I know now, in the One Module Approach, I will start with the engine shed area because Pembroke's 50-foot turntable is critical to its operation.

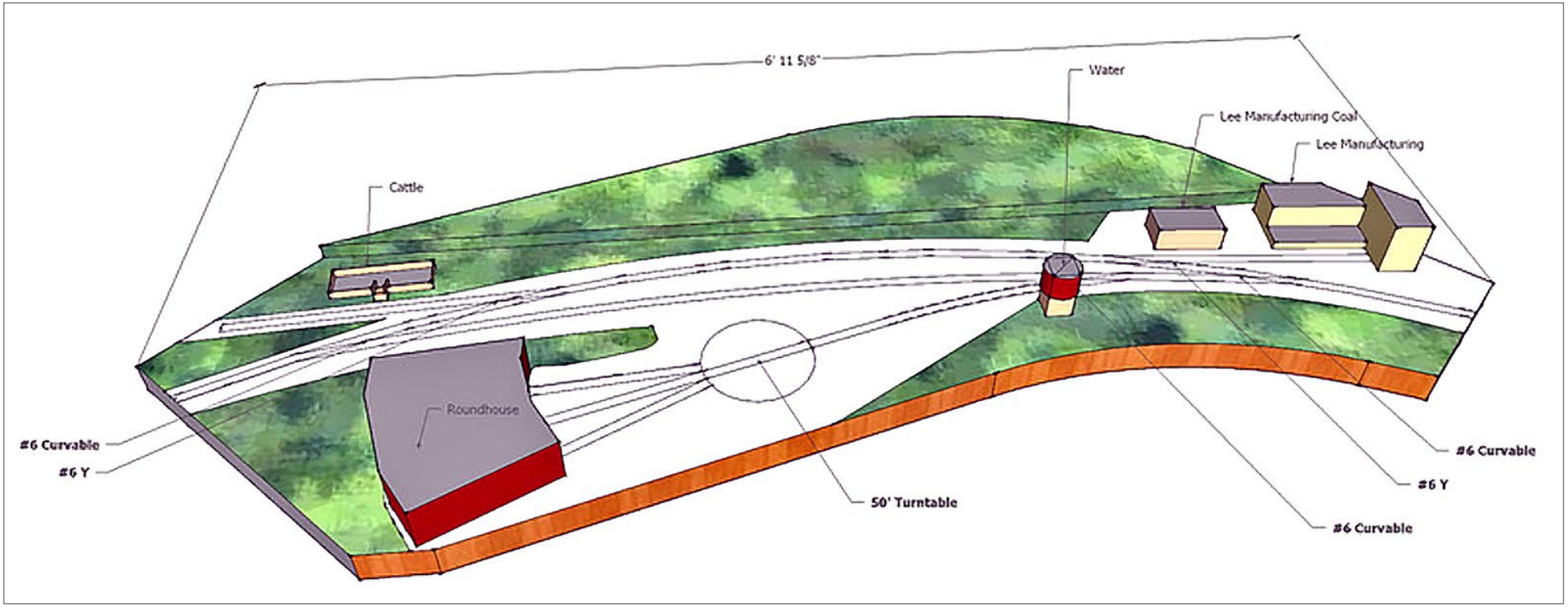
Both in Pembroke II and Pembroke TOMA, the engine house area is in a broad corner. This keeps the town of Pembroke on one wall, and that will be important if future phases are built. The prototype was, of course, as straight as an arrow; also, the engine house was slightly north of the quarter-mile siding. By

moving the siding to overlap with the engine house it shortens the whole of Pembroke so it can fit in a room.

The module contains five turnouts. However, the corner location means that they are all the more expensive curved ones. To save money, you could substitute straight turnouts, but the curved ones flow more nicely.

There are four or perhaps five car spots on the module:

- Lee Manufacturing receives coal and shipped incubators



6. Pembroke TOMA - Phase 1 is a seven-foot corner module incorporating a turntable, passing siding and two spurs.

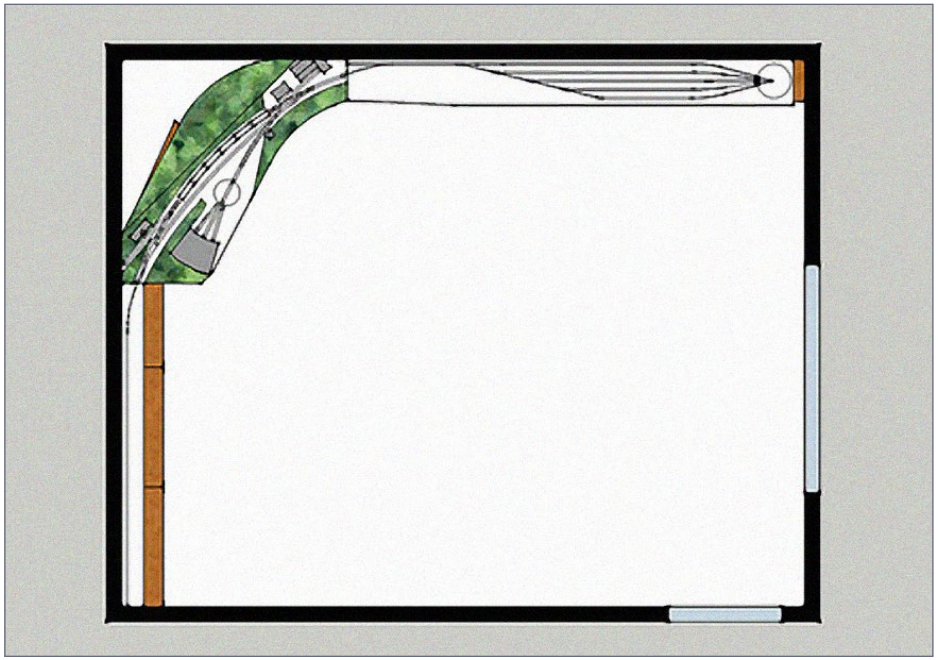
- The cattle pen
- An unknown, small building at the end of the cattle track may have been a car spot
- Only two of the three stalls in the engine shed were used for engines. The last stall may have been used for engine coal.

Because building staging yards is itself akin to layout construction, Phase 1 employs a single long track to represent the town of Pembroke itself. By Phase 2, Golden Lake staging will require a surprising five tracks to support the full operation of Pembroke, and we may as well build them now. The staging yard itself is quite short, but again, we are dealing with short trains. You can go to my post on the forum to see how I came up with the operations plan using Brio Trains. mrhmag.com/node/15589.

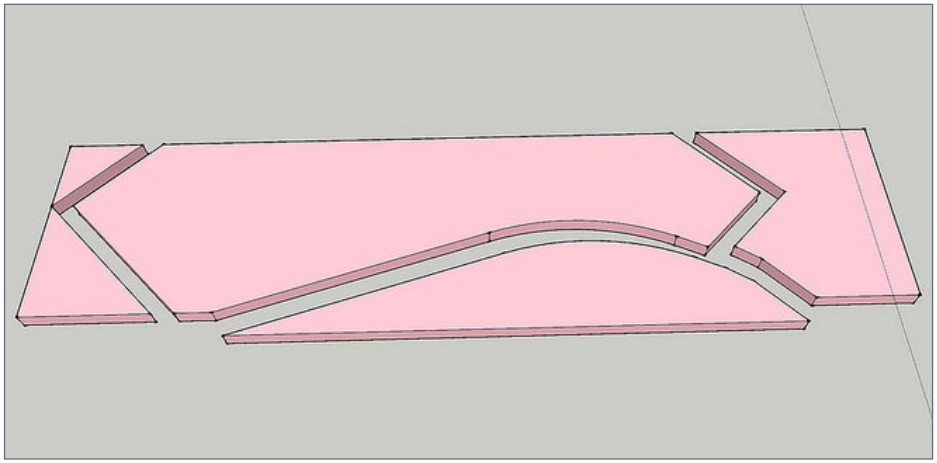
In future phases, the lead into the staging will need to assume different radii. And so, we will only tack it in place, rather than gluing it down permanently. Notice also that the staging yard is not the full length of the wall. This short configuration will be required in Phase 4.

The first module is designed to be cut from a single piece of 2-inch extruded polystyrene insulation. There has been some excellent discussion in the *MRH* forums on using this material for modular display layouts. Pembroke TOMA is not meant to be trucked from one exhibition to the next, and so, I am confident that similar construction methods will be sufficient for our purposes.

Shinohara turnouts and Micro Engineering flex track provide the bulk of the track. To keep things simple, Caboose Hobbies ground throws align the turnouts. The short turntable will have to be scratchbuilt, and I see this as a finger-strong manual



7. The town of Pembroke itself is represented by a single track, while a five-track staging yard represents points south.

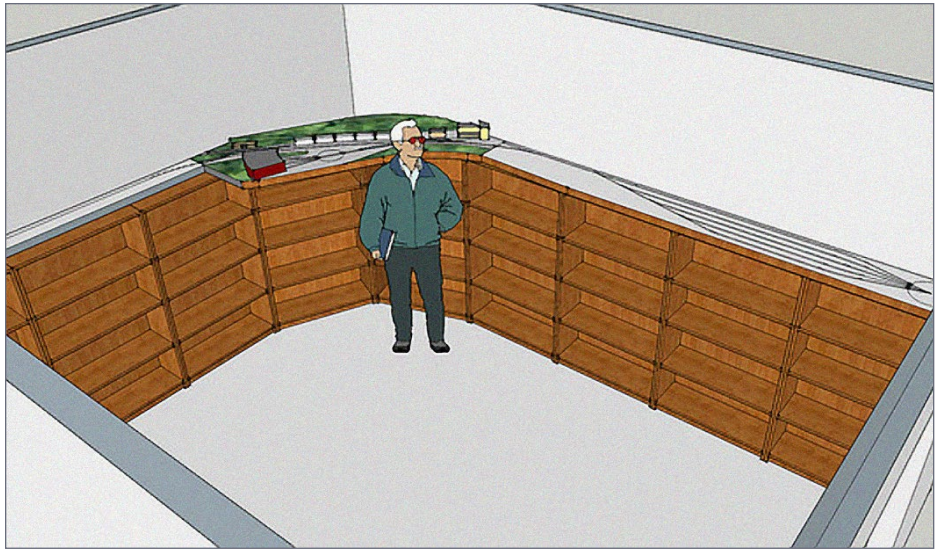


8. The module can be cut from a single piece of 2" insulation.

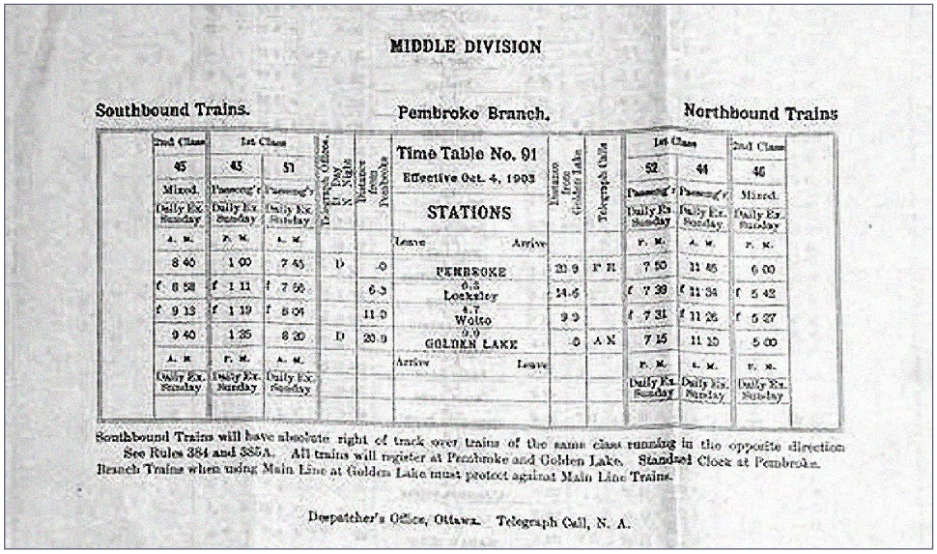
turntable. Being HO rather than Proto:87 it can be aligned by eye. See my blog about building the turntable mrhmag.com/node/21332.

All the buildings can be scratchbuilt, although there is only one murky photograph of Lee Manufacturing that I am aware of, and the roundhouse appears only in the background of a few photos. So, here is a place where your creativity can really shine.

I suggest mounting the initial module on Ikea cabinets, such as the Billy series. The lower bookcases are 41 3/4" high and a 13 5/8" extension can be added for 55 ⅜" height. Including the 2" foam, this gives a track height of just over 57", which is a nice height for watching trains, but a difficult height for construction. However, remember that the modules will be built on the workbench, not at their installed height, so the 57" inches is a great height for me.



9. The layout in place atop extended Ikea Billy book cases. The figure is 6' tall. The door and closet are both in the near corner.



MIDDLE DIVISION

Southbound Trains. Pembroke Branch. Northbound Trains

Time Table No. 91
Effective Oct. 4, 1903

STATIONS

2nd Class	1st Class		Distance Office	Distance from Pembroke		Distance from Golden Lake	Telegraph Calls	1st Class	2nd Class
45	43	51						52	44	46
Mixed. Daily Ex. Sunday	Passeng'r Daily Ex. Sunday	Passeng'r Daily Ex. Sunday						Passeng'r Daily Ex. Sunday	Passeng'r Daily Ex. Sunday	Mixed. Daily Ex. Sunday
A. M.	P. M.	A. M.			Leave Arrive			P. M.	A. M.	P. M.
8 40	1 00	7 45	D	.0	PEMBROKE	21.9	P R	7 50	11 45	6 00
f 8 58	f 1 11	f 7 56		6.3	6.3 Locksley	14.6		f 7 39	f 11 34	f 5 42
f 9 13	f 1 19	f 8 04		11.9	5.7 Wolfe	9.9		f 7 31	f 11 26	f 5 27
9 40	1 35	8 20	D	20.9	9.0 GOLDEN LAKE	.0	A N	7 15	11 10	5 00
A. M.	P. M.	A. M.			Arrive Leave			P. M.	A. M.	P. M.
Daily Ex. Sunday	Daily Ex. Sunday	Daily Ex. Sunday						Daily Ex. Sunday	Daily Ex. Sunday	Daily Ex. Sunday

Southbound Trains will have absolute right of track over trains of the same class running in the opposite direction. See Rules 384 and 385A. All trains will register at Pembroke and Golden Lake. Standard Clock at Pembroke. Branch Trains when using Main Line at Golden Lake must protect against Main Line Trains.

Despatcher's Office, Ottawa. Telegraph Call, N. A.

10. The Pembroke Branch schedule in 1903. *Author's collection*

Smaller layouts benefit more than you might expect from DCC when the operations support two engines. While I can delay that purchase until I have a second engine, I did not skimp on wiring now. The module and staging yard should get feeders to every section of rail, connecting to heavy bus wires. To connect the buses, terminal strips mounted to the backs of the module end plates should be sufficient.

From an operating perspective, Phase 1 *could* support the full Pembroke schedule, especially with the addition of a second track in the north staging. However, I will save that for Phase 2. In Phase 1, I will have only a single engine, which operates trains 43, 44, 45, and 46.

An operating session begins with pulling the engine out of the engine house and turning it to face south toward Golden Lake.

Then after watering, it backs down onto the daily mixed, which is parked on the north staging, and pulls it down to Golden Lake. We stop to pick up any outbound cars from the cattle dock, Lee Manufacturing or the engine house.

At Golden Lake, the engine disconnects from its train, turns on the turntable and runs around the train, picking its combine off the rear before returning to Pembroke. The little train passes right across the module and into north staging, where it pauses to drop off passengers before reversing to the siding on the module.

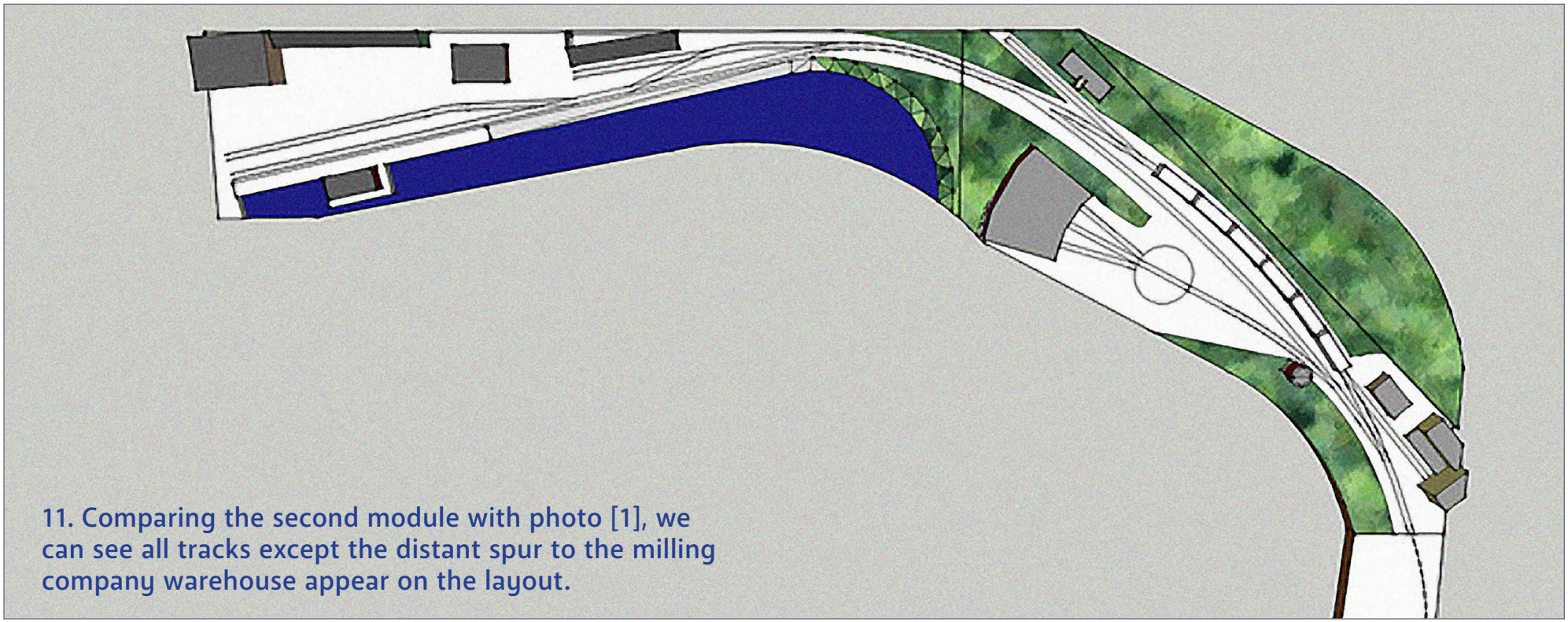
Any inbound traffic was brought in on yesterday's evening train and some cars will have been left at the end of the north

staging. The engine retrieves them and distributes the cars among the industries. Hopefully there is not too much, as our little yard will quickly get crowded!

At the end of the day, we gather our combine and head back for Golden Lake to pick up any passengers as well as cars that may have been dropped by mainline trains during the day.

Pembroke TOMA – Phase 2

That could be the end of Pembroke TOMA. Operating the little layout with a two-person crew could be quite a bit of fun, but remember the goal is to get to Golden Lake and model the action of the Canada



11. Comparing the second module with photo [1], we can see all tracks except the distant spur to the milling company warehouse appear on the layout.

Atlantic mainline. So, I continue to build locomotives and rolling stock, starting with another 4-4-0.

Once the second eight-wheeler is ready, space for a second crew to operate can be made in Pembroke by building the town site itself. With this second module I have all but one of the tracks that were in Pembroke until the station was substantially rebuilt in 1912. What's more, they are only slightly compressed to fit on the 7'1" module.

This second module provides a freight shed, coal dock, carriage factory, and team track, as well as the depot itself. More importantly, it provides space for train 51/52 to hide while the local engine busies itself around the station.

Trains 51 and 52, the daily through service to Ottawa, would not be enough work to keep a second crew fully occupied. In order to make an enjoyable operating session for two crews, a mid-day extra could be added -- either a passenger excursion or a freight extra.

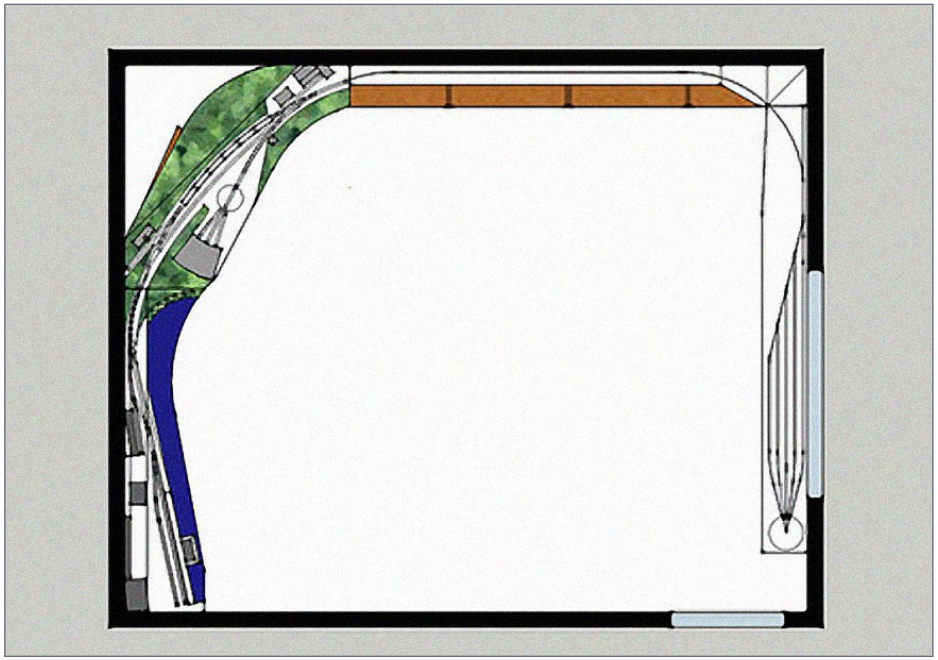
Phase 3

The next phase is a simple section of the branch line. The key here is to avoid painting ourselves into a corner. So, it is important to plan the subsequent phases to ensure there is enough room for them.

In this phase, the staging yard moves to cover the closet. If this is a problem, the branch could be further curved, almost to the branch turnout of Phase 4. The staging yard would then angle into the middle of the room, allowing access into the closet.

Phase 4

With phase 4, it is tempting to dream big, and consider a double-deck layout, with the branch descending to a mainline



12. Phase 3 adds a length of branch line. The staging yard could be further rotated into the room if access to the closet must be maintained.

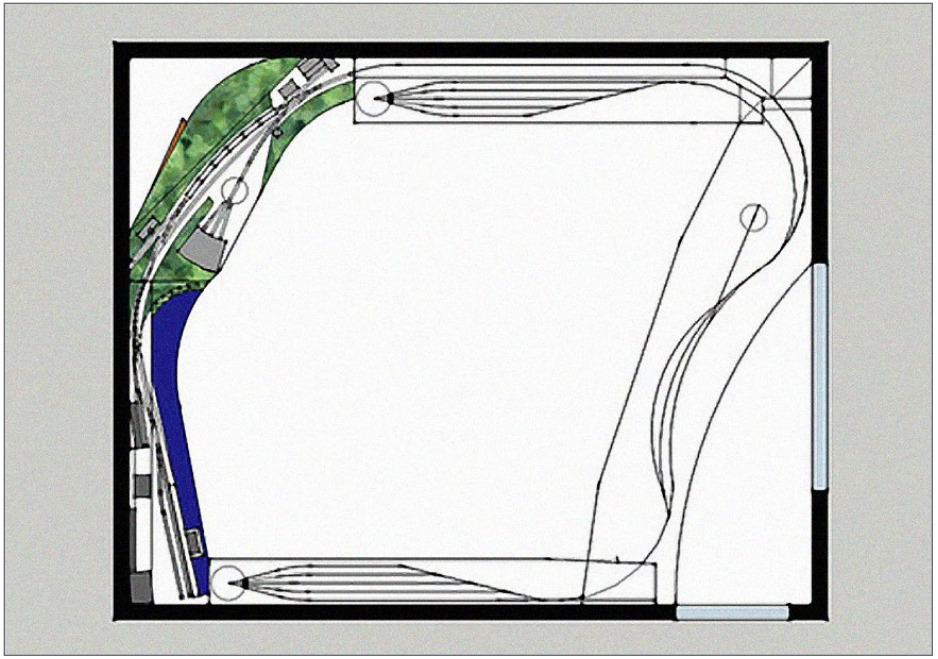
beneath Pembroke. However, the branch motive power is all 4-4-0s, and they are slippery on hills. A 1% grade is probably okay, but 2% is asking for trouble. So, phase 4 is pretty much the end of Pembroke.

The original southern staging yard continues to migrate clockwise around the room, except it now represents Ottawa and points east. A new staging yard, representing the westward line to Lake Huron, tucks up against the branch line modules, and Golden Lake fills the middle of the room.

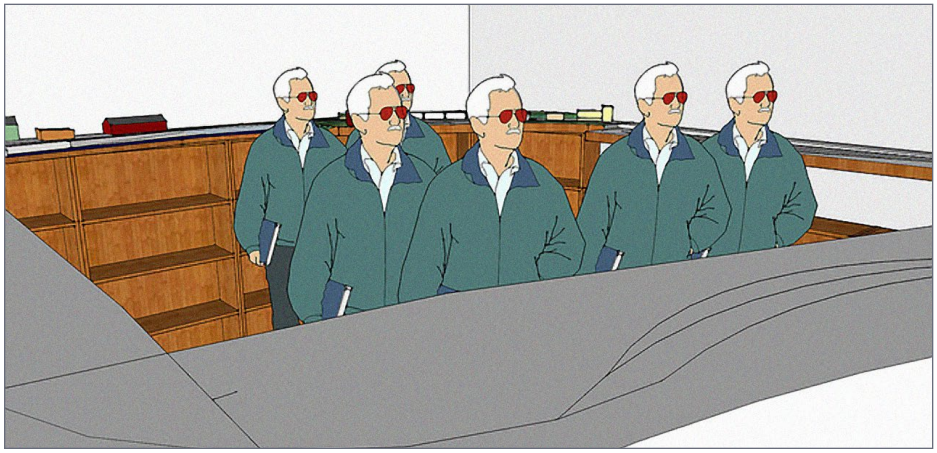
Sadly, the real Golden Lake included the bane of all model railroad planners - a wye for turning locomotives. Fortunately,

it seems that the prototype turned only the locomotive on the wye, rather than the whole train. So, I have replaced the wye with yet another turntable. Trains 51 and 52 are not affected by the loss of the wye as they can proceed straight through the branch line switch, into the eastern staging beside the door to the room. There were three tracks at Golden Lake, but that is just about the only resemblance this rough sketch has to the real place.

While Phase 3 has no operational impact other than a lengthened run, Phase 4 is exciting! Trains 43, 44, 45 and 46 now terminate and originate on the layout, completing the run into



13. Phase 4 finally completes the goal with a representation of the Canada Atlantic mainline.



14. With the middle of the room wide open, there is even room for three two-person crews.

Golden Lake, turning and reversing. Trains 51 and 52 make their runs all the way into eastern staging (Ottawa).

We also have enough staging tracks to represent a small amount of mainline traffic without fiddling new trains together during the operating session. This mainline traffic could either keep a third crew busy, or it could provide entertainment for the crew of 51/52, rather than forcing an extra train up the branch.

Conclusion

Reconsidering Pembroke under the lens of The One Module Approach (TOMA), has been an interesting exercise. TOMA not only provides an incremental approach to layout construction, but also an incremental approach to developing an operating scheme and equipment roster.

Starting with the engine house module surprised me because my natural inclination would have been to start at the end of track. However, with the turntable module, I can begin

operating right away. I was fascinated that the single module not only allowed operations with a very small collection of rolling stock, but that it constrained the operation to a single engine as well.

Reaching forward to think about Phases 3 and 4 also yielded some unexpected results. In order to swing the staging modules around into new positions, they needed to be shorter than allowed by Phases 1 and 2. This realization implies that anyone planning to follow TOMA would want to develop a full plan for the whole railroad before beginning construction of the first module.

The One Module Approach has numerous benefits from a construction and momentum standpoint. If we consider prototypes that naturally ran smaller equipment such as the golden age of railroading, the approach yields interesting and lively operations from a very early stage, even in HO scale. ☑

Bill of Materials for Module 1

Manufacturer	Item	Qty	Each	Cost
Shinohara	Code 70 Nickel-Silver Track -- #6 Turnout - Left-Hand	1	21	21
Shinohara	Code 70 Nickel-Silver Track -- #6 Turnout Rt-Hand	1	21	21
Shinohara	Code 70 Nickel Silver -- Curvable Left Hand Turnout	2	31	62
Shinohara	Code 70 Nickel Silver -- Curvable Right Hand Turnout	1	31	31
Micro Engineering	Code 70 Standard Gauge Flex-Track(TM) pkg(6)	2	36	72
Caboose Industries	Turnout Rigid Ground Throw Operating .280in Travel	5	3	15
Scratch built	50' Turntable			50
Various	Extruded Polystyrene Rigid Insulation - 24 Inch x 96 Inch x 2 Inch	1	30	30
Various	Plywood for end plates, wire, terminal strips			30
Estimated Total:				332

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René lives in North Vancouver B.C., Canada, with his darling wife, Laura, their children and a lively English Springer Spaniel.

He has enjoyed railroad modeling since the age of five, and cycling from about that time too. He works in the software industry, chairs his local community association, and also leads a local annual railroad modeling meet. ■