

A decorative orange line starts at the bottom left and trends upwards towards the top right, with several horizontal plateaus. The area above this line is filled with a light orange gradient.

Line Series Guide

How to use the Line Series feature
to plot any data over time.

Founders' Message



We originally added the Line Series feature because we needed an easy way to plot the daily progress of tunnel boring machines relative to the overall construction schedule.

Since then, the Line Series has proven useful for communicating all sorts of construction activities, scientific data, and even financial data.

We hope this short guide inspires you to give it a try!



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Line Series Basics



Book2 - Excel

File Home Insert Draw Page Layout Formulas Data Review View **GRAPHICSCHEDULE** Acrobat Search

Create New Sheet

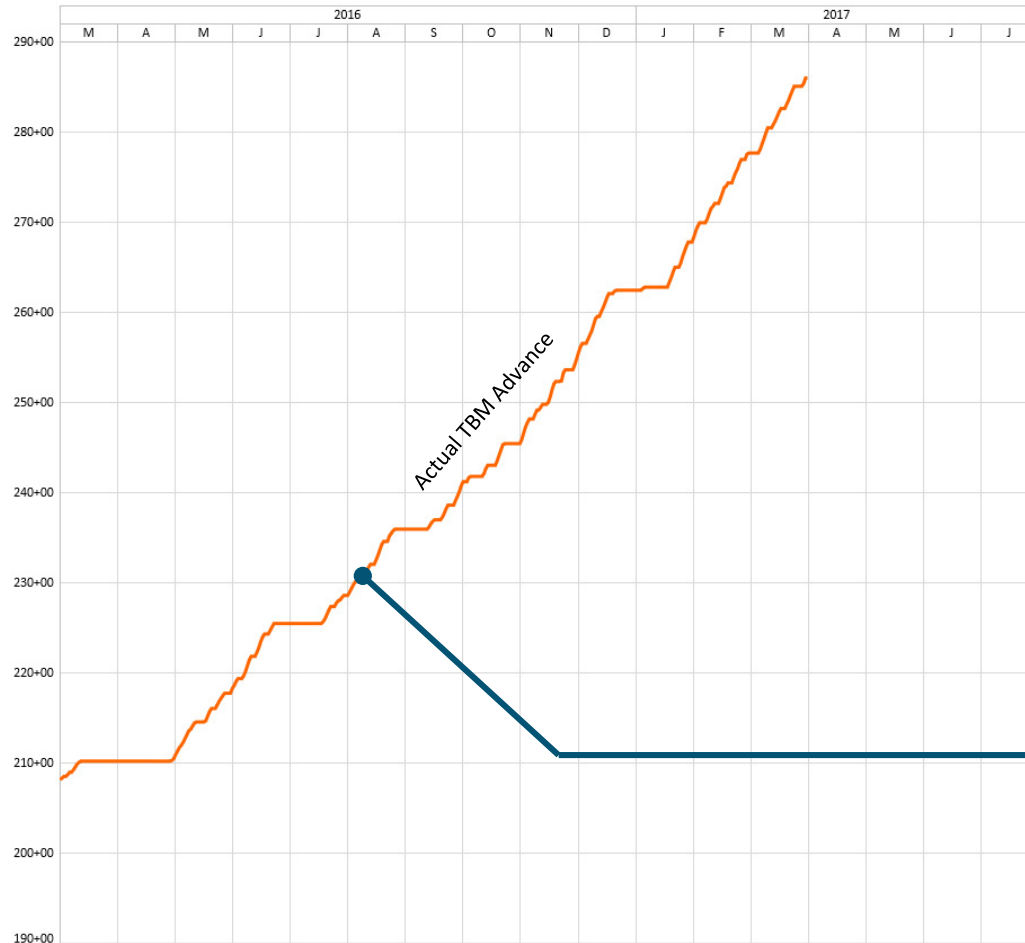
Start: 1-Mar-2016 Finish: 31-Jul-2017 Format Timescale

Top: 290+00 Bottom: 190+00 Interval: 10+00 Print Axis Format Axis

Link To Add Line CPM Series

Email Us

GraphicSchedule



Line Series	
Actual TBM Advance	
Date	Value
1-Mar-16	208+03
2-Mar-16	208+22
3-Mar-16	208+42
4-Mar-16	208+42
5-Mar-16	208+62
6-Mar-16	208+88
7-Mar-16	208+88
8-Mar-16	209+14
9-Mar-16	209+46
10-Mar-16	209+79
11-Mar-16	209+38
12-Mar-16	210+11
13-Mar-16	210+11
14-Mar-16	210+11
15-Mar-16	210+11
16-Mar-16	210+11
17-Mar-16	210+11
18-Mar-16	210+11
19-Mar-16	210+11
20-Mar-16	210+11
21-Mar-16	210+11
22-Mar-16	210+11
23-Mar-16	210+11
24-Mar-16	210+11
25-Mar-16	210+11
26-Mar-16	210+11
27-Mar-16	210+11
28-Mar-16	210+11

Step 1

Press 'Add Line Series' button on the ribbon. An additional table will appear in the current sheet, to the right of the main data table.

You can add as many Line Series as you like.

Step 2

Give your Line Series a name. This establishes the label on the chart.

Step 3

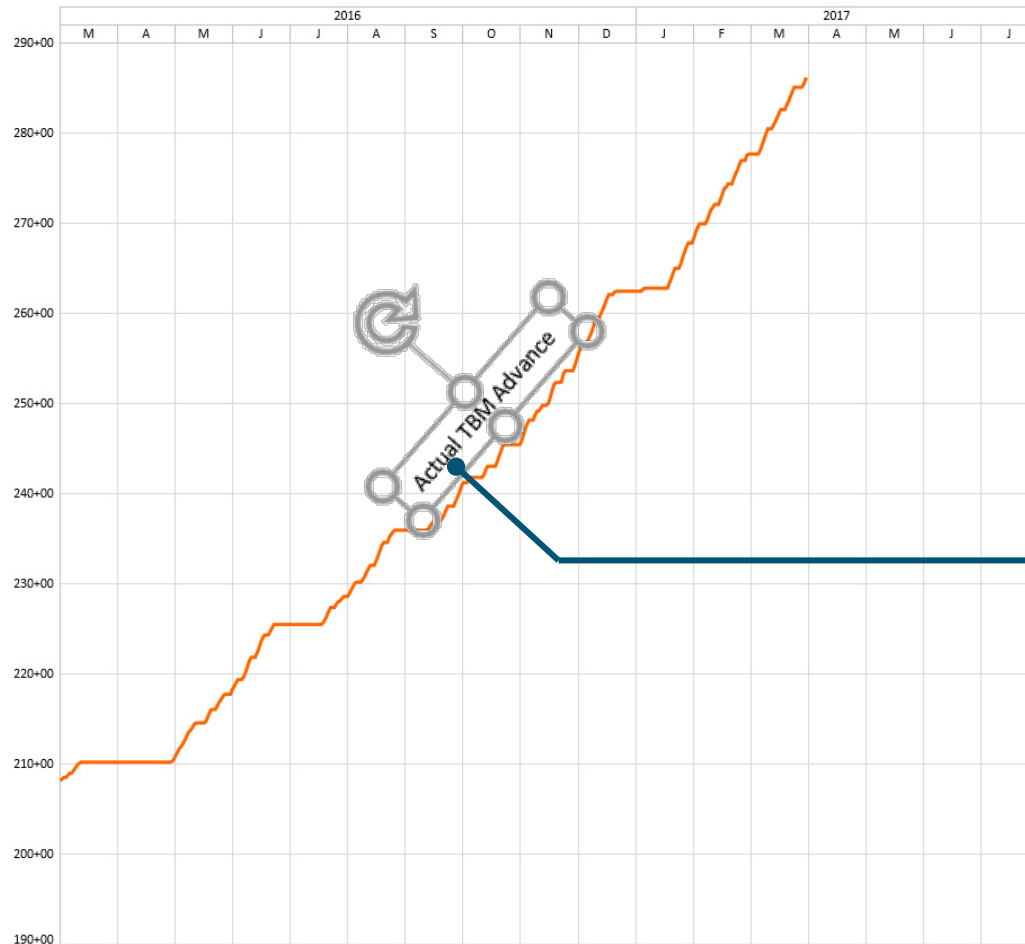
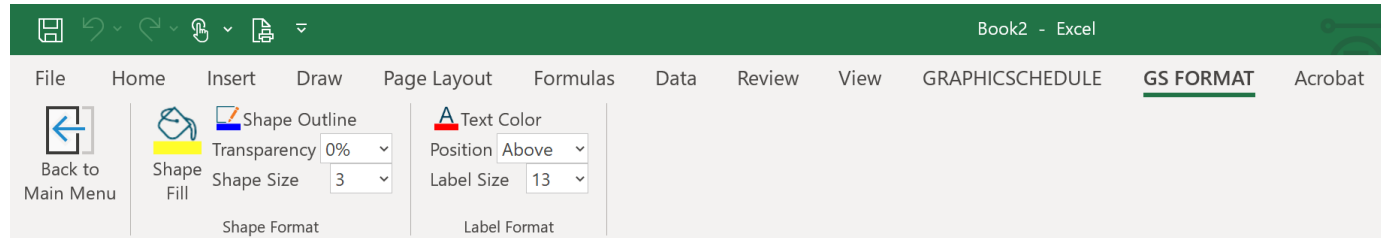
Type or paste your data in this table.

Two or more data points are required to start plotting a line series.

Watch it appear on the chart

The line will grow longer as more data is added to the series.

Line Series Formatting



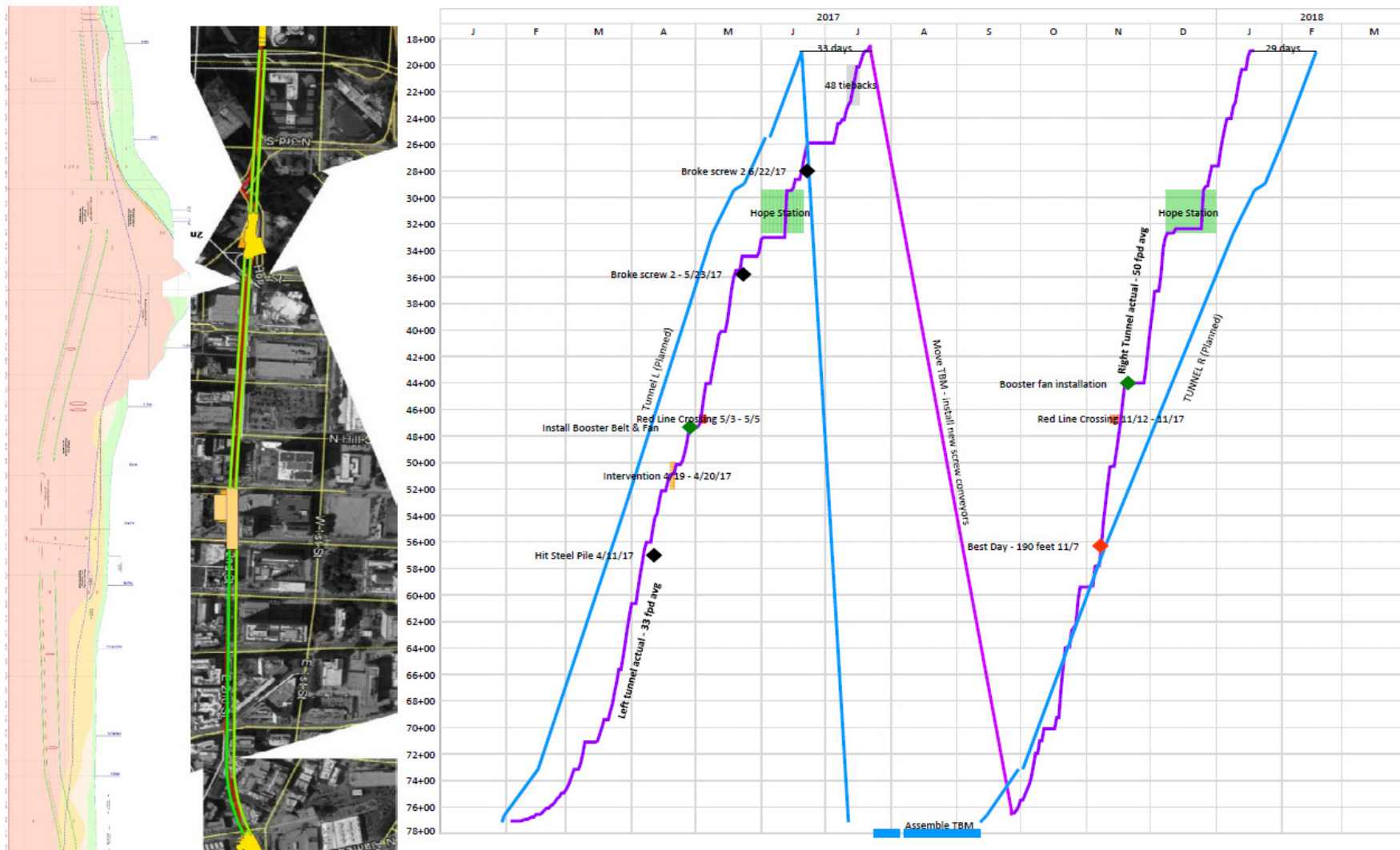
Line Series	
Actual TBM Advance	
Date	Value
1-Mar-16	208+03
2-Mar-16	208+22
3-Mar-16	208+42
4-Mar-16	208+42
5-Mar-16	208+62
6-Mar-16	208+88
7-Mar-16	208+88
8-Mar-16	209+14
9-Mar-16	209+46
10-Mar-16	209+79
11-Mar-16	209+98
12-Mar-16	210+11
13-Mar-16	210+11
14-Mar-16	210+11
15-Mar-16	210+11
16-Mar-16	210+11
17-Mar-16	210+11
18-Mar-16	210+11
19-Mar-16	210+11
20-Mar-16	210+11
21-Mar-16	210+11
22-Mar-16	210+11
23-Mar-16	210+11
24-Mar-16	210+11
25-Mar-16	210+11
26-Mar-16	210+11
27-Mar-16	210+11
28-Mar-16	210+11

Double-click in the color cell to pick a color.

Or click any cell in this table to activate the GS Format ribbon. Using the ribbon above you can apply custom formatting including size (thickness), transparency, label color, and label size.

Position the label as needed
By default the label appears at the midpoint of the line series. Click on the label to move, rotate, or re-size the text box as you wish.

Twin-Bore Light Rail Tunnel Example



In this example one tunnel boring machine was used to excavate two parallel tunnels.

Planned TBM advance for each tunnel drive was plotted using blue line shapes, linked to the P6 schedule.

Actual daily TBM advance is plotted in purple using the Line Series. (Each tunnel has its own line series)

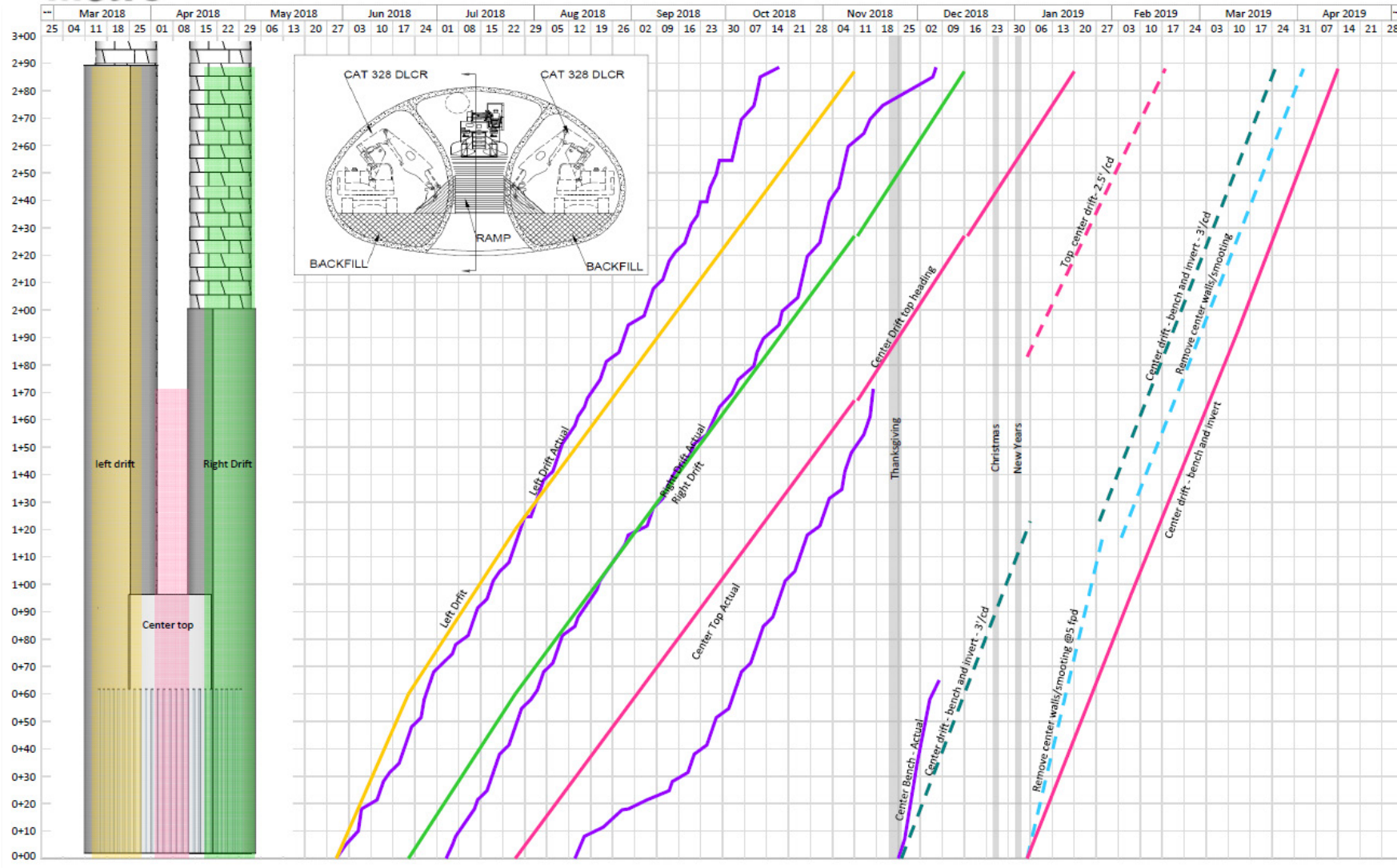
The straight sloping line between tunnel drives represents the time required to retrieve and re-launch the machine.

Wondering how we obtain all this wonderful machine data? We export it from the TPC system, developed by our friends at Tunnelsoft.

TPC tunnelsoft

Don't build a tunnel job without it!

Sequential Excavation Example



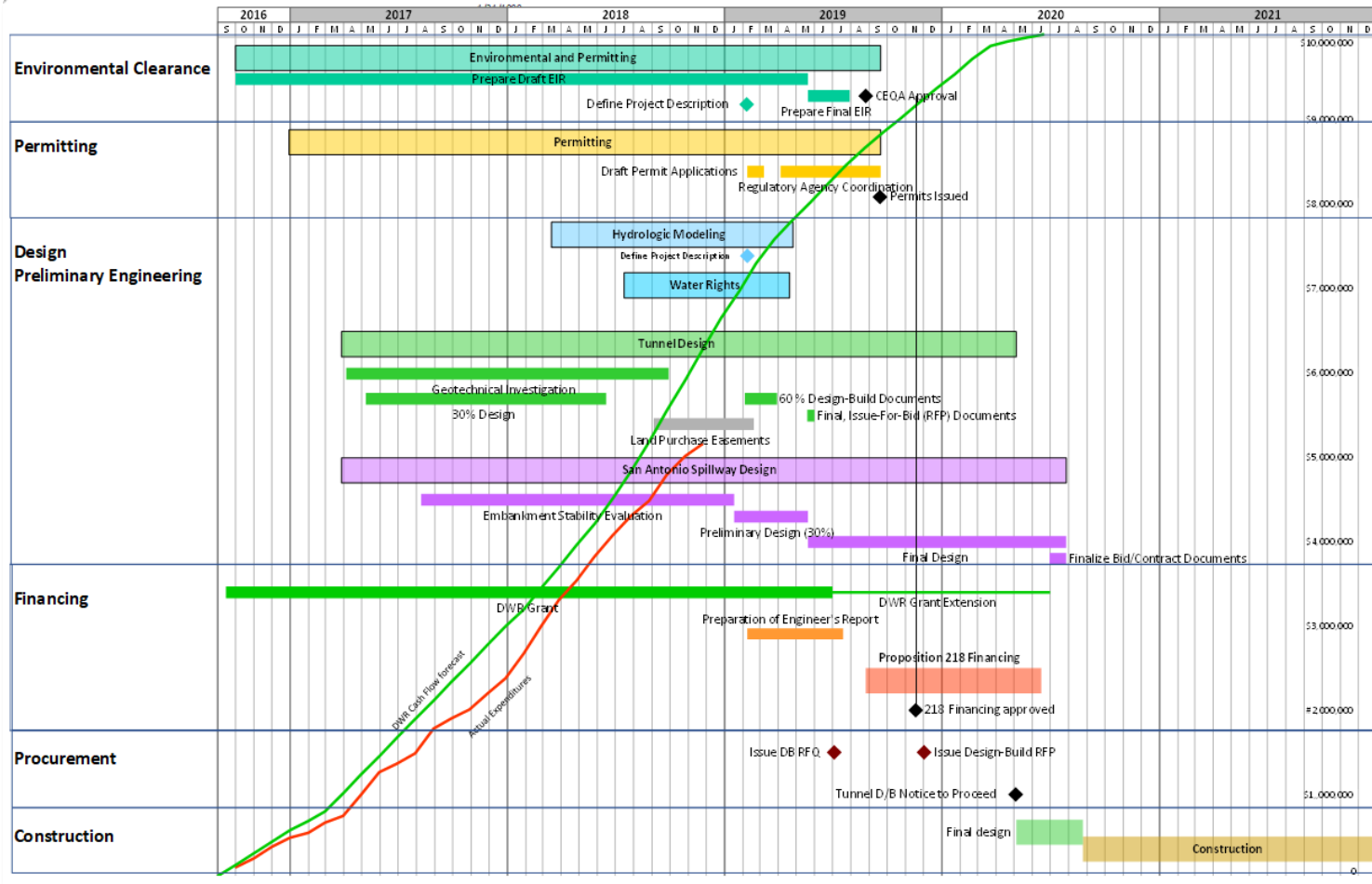
In this example multiple “drifts” are excavated sequentially to construct a large underground cavern that will enable light rail trains to switch tracks via a crossover.

Planned excavation of each drift was plotted using straight colored line shapes linked to the P6 schedule.

Actual daily progress on each drift is plotted in purple using the Line Series. (Each drift has its own Line Series)

The data for each Line Series is obtained from daily field reports.

Cash Flow Curves Example (Workaround)



GraphicSchedule does not have cost features (yet!) but it is possible to plot cash flow curves using the Line Series, by converting dollars to integers corresponding to the location axis range.

In this example the vertical (location) axis range goes from 0 to 100 (top to bottom). Bars and milestone shapes are positioned relative to that axis to communicate schedule.

To communicate cost, Excel formulas were created in both Line Series tables that convert cumulative expenditures to integers using the following scale:

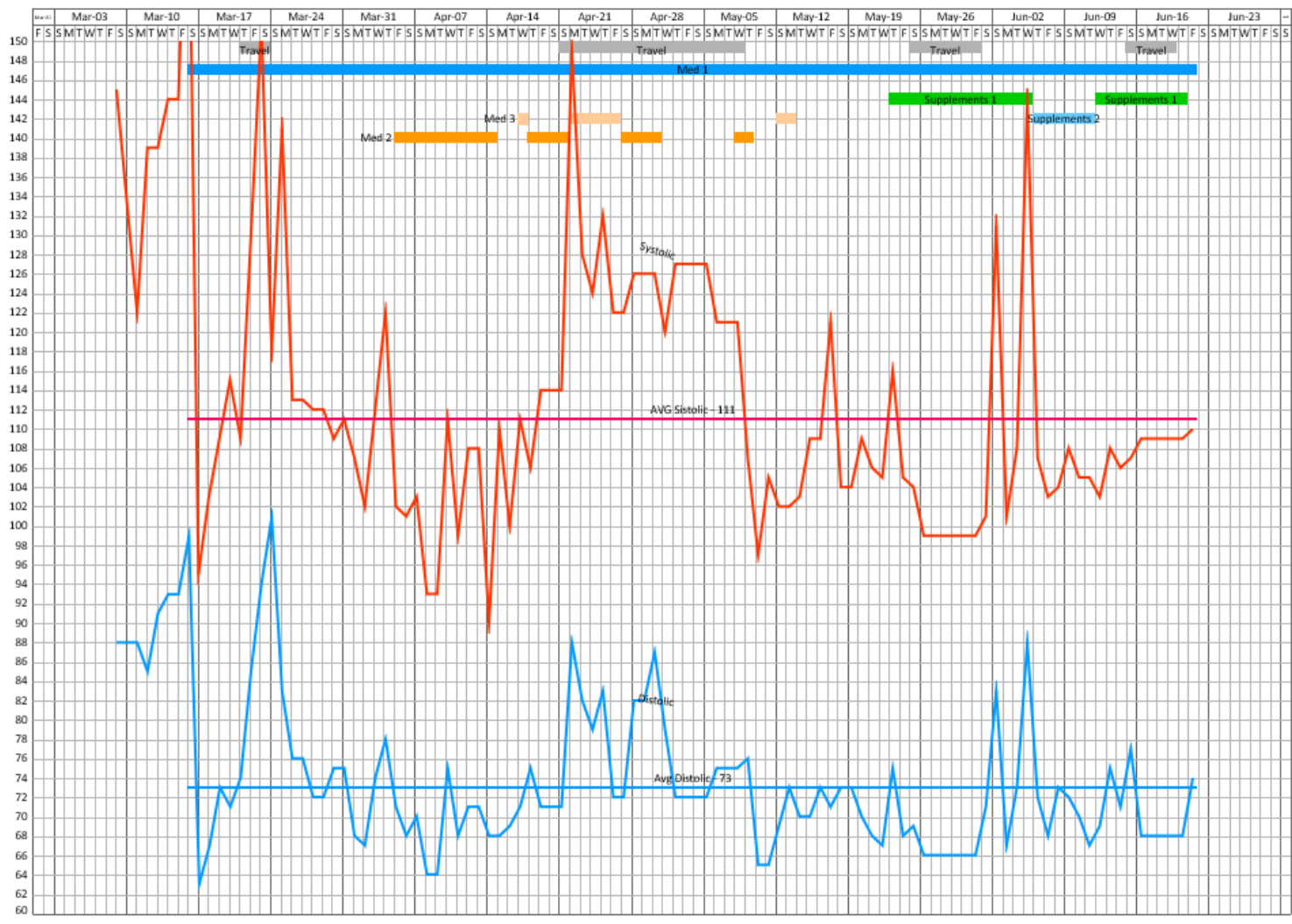
$$\begin{aligned} \$0 &= 100 \\ \$10,000,000 &= 0 \end{aligned}$$

Dollar values were added manually at the right edge of the chart to give the impression of a secondary cost axis even though this axis does not actually exist. Neat trick!

Line Series	
DWR Cash Flow forecast	
Date	Value
1-Sep-16	100
1-Oct-16	98
1-Jan-17	94
1-Feb-17	93
1-Mar-17	92
1-Apr-17	90
1-May-17	88
1-Jun-17	86
1-Jul-17	83
1-Aug-17	81
1-Sep-17	79

Line Series	
Actual Expenditures	
Date	Value
1-Sep-16	100
1-Oct-16	99
1-Nov-16	98
1-Dec-16	96
1-Jan-17	95
1-Feb-17	95
1-Mar-17	93
1-Apr-17	93
1-May-17	90
1-Jun-17	87
1-Jul-17	86

Blood Pressure Analysis



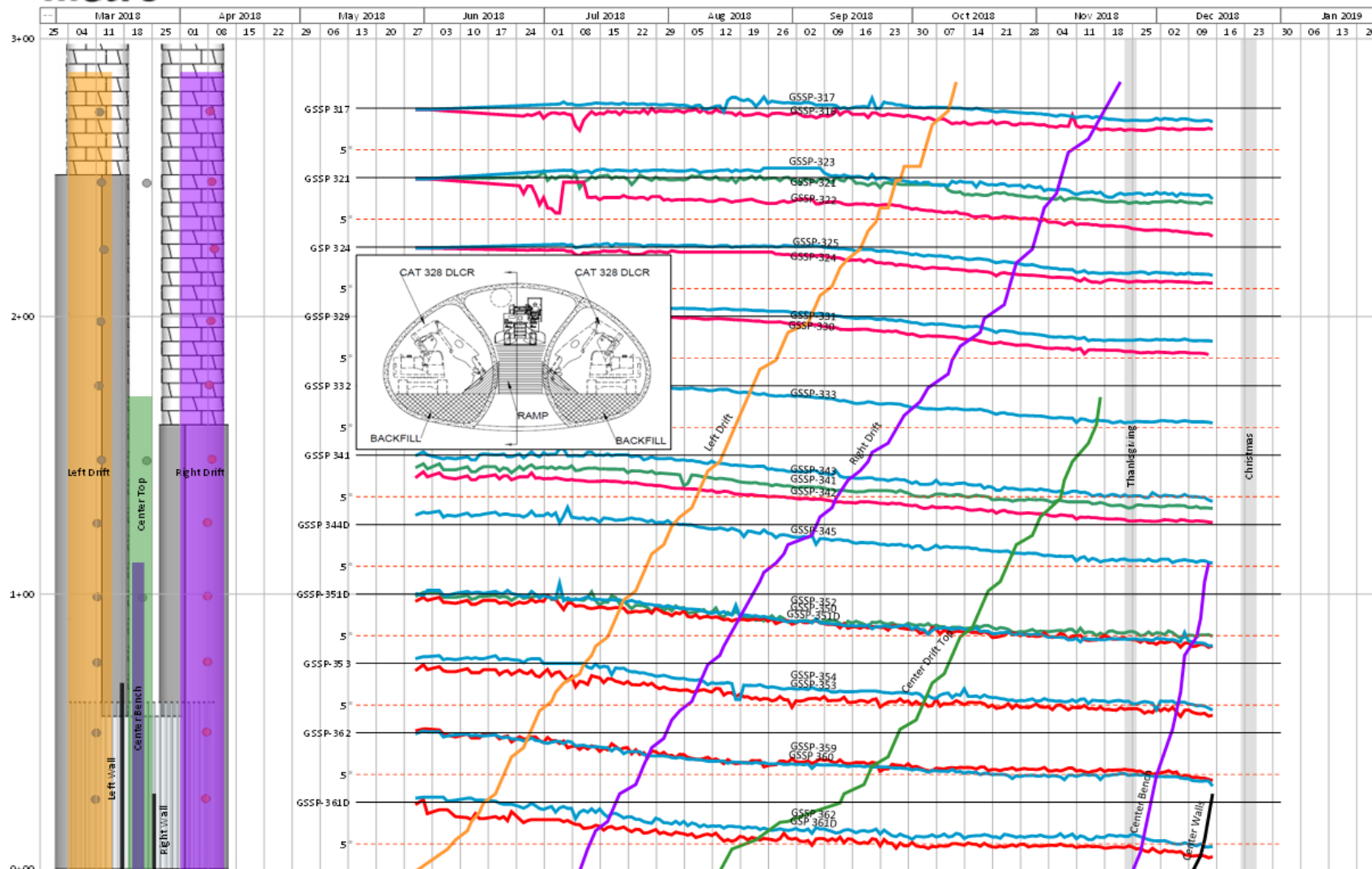
The Line Series feature can also be useful for scientific analysis of any time-related data.

In this example systolic and diastolic blood pressure readings were plotted relative to actual medications, supplements, and travel dates. The results aid evaluation of the timing and dosage of medications to better control blood pressure.

Line Series	
Systolic	
Date	Value
03/03/19	145
03/10/19	122
03/11/19	133
03/12/19	133
03/13/19	144
03/14/19	144
03/15/19	175
03/16/19	95
03/17/19	103
03/18/19	109
03/19/19	115
03/20/19	109
03/21/19	130
03/22/19	152
03/23/19	118
03/24/19	141
03/25/19	113
03/26/19	113

Line Series	
Diastolic	
Date	Value
03/03/19	88
03/10/19	88
03/11/19	85
03/12/19	91
03/13/19	93
03/14/19	93
03/15/19	99
03/16/19	63
03/17/19	67
03/18/19	73
03/19/19	71
03/20/19	74
03/21/19	85
03/22/19	94
03/23/19	101
03/24/19	83
03/25/19	76
03/26/19	76

Geotechnical Instrumentation Data Analysis



Remember the sequential excavation of that underground cavern? This example adds more Line Series to overlay readings from multiple Ground Surface Settlement Points (GSSPs) along the length of the cavern.

The locations of the GSSPs are shown as dots on the map at left. Ground surface settlement at each point is measured in inches, with a 0.5" limit (shown as red dashed lines). Using Excel formulas, the settlement data was adjusted so each Line Series plots at the same geographic location as the instrument itself.

Combining instrumentation data with actual sequential excavation progress makes it possible to see how the ground surface responded to the excavation of each drift as it passed below the instruments.



Got data? Try the Line Series!

About GraphicSchedule:

We're a small startup with a big mission: empowering teams to see the big picture, communicate more effectively, and deliver winning projects.

We got tired of drawing schedules by hand so we developed an Excel app that makes it easy.

Visit our website: GraphicSchedule.com

Read our [origin story](#)

Get in touch: james@graphicschedule.com