

In this workshop, you will:

- Install and open HEC-RAS 5.0.3
- Create a project file
- Obtain terrain and projection data
- Import terrain data into RAS Mapper and adjust appearance
- Import aerial imagery and GIS files and adjust appearance
- Interrogate terrain data to cut profile lines

By the end of this workshop, you should be able to:

• Set up an HEC-RAS model and view geospatial data in RAS Mapper

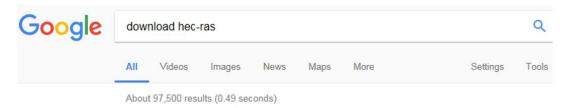
Upon completion of the workshop, you should have the following electronic files:

- Project file (*.prj)
- RAS Mapper file (*.rasmapper) [this file is automatically generated not saved manually]

Program setup:

• Download the latest version of HEC-RAS (Version 5.0.3)

- Google "Download HEC-RAS"
- o Download link: http://www.hec.usace.army.mil/software/hec-ras/downloads.aspx
- o Recommend installing with Example Projects



HEC-RAS Downloads - Hydrologic Engineering Center - Army www.hec.usane.army.mil/software/hec-ras/downloads.aspx ▼ These setue package include HEC-RAS 5.0.3, Documentation, and optionally the Example Projects. Primary Download Site: Download HEC-RAS 5.0.3 Setup ... HEC-RAS Documentation - HEC-RAS Whats New - Demo - FAQs

	Hydrologic Engineering Center Army Corps of Engineers ABOUT NEWSLETTERS SOFTWARE PUBLICATIONS TRAINING VISITORS LINKS CONTACT
HOME > SOFTWARE > HEC-RAS > DO	
HEC-RAS HEC-RAS Features What's New	HEC-RAS has been developed for the U.S. Army Corps of Engineers (USACE). However, software developed at the Hydrologic Engineering Center is made available to the public whenever appropriate. Use is not restricted and individuals outside of USACE may use the program without charge. HEC will not provide user assistance or support for this software to non-USACE users. Downloading this software indicates full acceptance of your responsibility in the use of this program. Please see the distribution policy for more details.
Downloads	Current Version HEC-RAS 5.0.3:
Documentation	These setup package include HEC-RAS 5.0.3, Documentation, and optionally the Example Projects.
FAQs	Primary Download Site:
Known Issues	Jownload HD:-RAS 5.0.3 Setup Package Documentation, and Example Data sets (540 MB) Jownload HEC-RAS 5.0.3 Setup Package and Documentation (214 MB)
Bug Report	
Suggestions	Alternate bownload Site:
Demo	Download HEC-RAS 5.0.3 Setup Package and Documentation (214 MB)
Sponsors	Supported Operating Systems:
Collaborators	Windows XP, Vista, 7, 8, 8.1, and 10 both 32-bit and 64-bit

Open HEC-RAS 5.0.3 (Select HEC-RAS 5.0.3 from Start Menu)



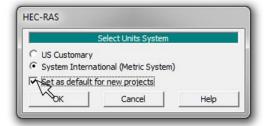
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Project:	
Plan:	
Geometry:	
Steady Flow:	
Unsteady Flow:	
Description :	SI Units

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Set unit systems to default to SI units (Options | Unit System)

File Edit Run View Option:	GIS Tools Help			
Project: Ut Plan: Cc Geometry: Cc	ogram Setup ifault Parameters it system (US Customary/SI) invert Project Units onvert Horizontal Coordinate Systems	*		
Steady Flow: Unsteady Flow: Description :			ا ا ا ا ا	SI Units



• Start a new project in SI units (File | New Project)

HEC-RAS 5.0.3	
File Edit Run View Options GIS Tools Help	
New Roject	🛛 🗗 oss 🛛 🚺 📲
Open Project	
Save Project	
Save Project As	
Rename Project Title	
Delete Project	
Project Summary	👙 🛄 SI Units
Import HEC-2 Data	

Title	File Name	Selected Folder Default Project Fold	ler Documents
	*.prj	e:\HEC-RAS	
		HEC-RAS	
OK Cancel	Help Create Folder	e:	•



• Assign new project title and file name

N	lew Project		
ш.	Title WODA Tutorial Model Brisbane River	File Name BrisbaneHECRAS.prj	Selected Folder Default Project Folder Documents e:\HEC-RAS\Brisbane
			ििवः\ ििHEC-RAS ि Brisbane
	OK Cancel Help	Create Folder	e:
Ľ	Set drive and path, then enter a new project title and file	name.	

RAS	
Tutor Direc The u	a new project with "BrisbaneHECRAS.prj" as its file name and "WODA rial Model Brisbane River" as its title, in the "e:\HEC-RAS\Brisbane\" tory? units system will be set to "SI Units" but can be changed under the Options u on the main RAS window.
	Cancel

ET HEC-RAS 5.0.3	
File Edit Run View Options GIS Tools Help	
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Project: WODA Tutorial Model Brisbane River e: \HEC-RAS\Brisbane\Brisbane\BrisbaneHECRAS.prj	
Plan: Geometry: Project Title Project File Name	
Steady Flow:	
Unsteady Flow:	
Description :	SI Units



• Google "Australia elevation data" and select Geosciences Australia website

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	All	Images	News	Maps	Videos	More	Set	tings Tools
	About	2,550,000 r	esults (0.4	8 seconds)				
	www. Digital issues	ga.gov.acts elevation relating to t	hentific-to lata which he impacts	pics/nation describes of climate	Australia's I change, dis	information/digita andforms and sea		
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National Location Our Capabilities Data / Spatial App Digital Elevation (National Eleva Framework (NI Urban Digital Eleval) (DEM) Project Contributors Built Environment National Surface (Information	on Informations Data tion Data EDF) and Elevation M Data and Expose Water	ation D Col • N • Col • F • F • F • odel Aust mee is cri acco acce	igital E Intents Iational Elevat Online data Packaged data Related Information ralia's future s t the needs of Jucial for addre ronmental mar ss all levels of sss to the best ational	Elevat ion Data Fran ation afety, prosper today, and the ssing issues ro hagement, urb government, i available elev II Elev	ty and sustainat decades ahead elating to the imp an planning and industry and aca ation data to me	ility depends on making I. Digital elevation data v vacts of climate change, infrastructure design. G demia to ensure decisio et local, regional and na Data Fram	which describes Austra disaster management ieoscience Australia is ion makers, investors an itional needs.	ilia's landforms and seab , water security, working collaboratively nd communities have



Select Extract Data icon

Australian Government Geoscience Australia



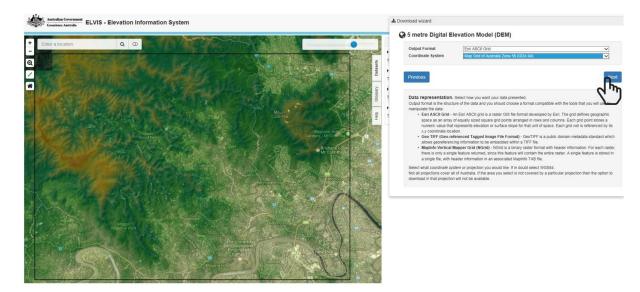
• Zoom/pan to area of interest and Select "Draw"

🛓 Download wizard

S metre Digital Elevation Model (DEM)

	Y Max:	X Max:
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• Select Output format (suggest ASCII) and coordinate system (suggest GDA 94)



• Enter e-mail address and file name

🛓 Download wizard

S metre Digital Elevation Model (DEM)

Email	hec-ras@surfacewater.biz		
Filenam	e Brookfid	×	.zip
Only up to 9	characters made up of alphanumeric or "_" allowed for file na	ame	

Confirm details

Lownload wizard

S metre Digital Elevation Model (DEM)

The Digital Elevation Model (DEM) 5 Metre Grid of Australia derived from LiDAR model represents a National 5 metre (bare earth) DEM which has been derived from some 236 individual LiDAR surveys between 2001 and 2015 covering an area in excess of 245,000 square kilometres.

You have chosen:

Area	Lower left (lat/lng°): -27.545870, 152.808490
	Upper right (lat/ing°): -27.439280, 152.976380
Output format	Esri ASCII Grid
Coordinate system	Map Grid of Australia Zone 56 (GDA 94)
Email address	hec-ras@surfacewater.biz
Filename	Brookfid

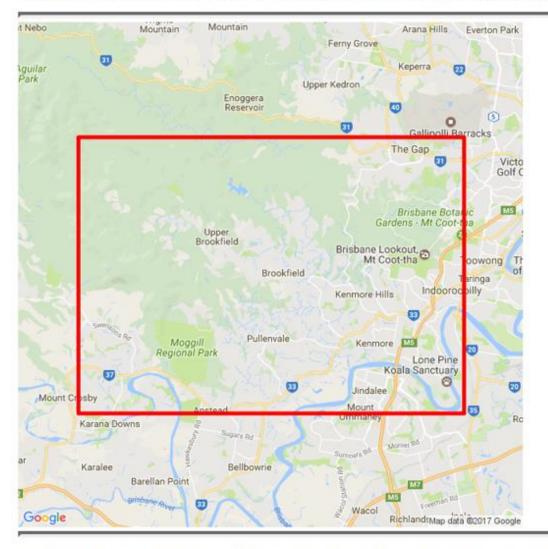
Back



• Check e-mail; download and extract zip file to project directory (suggest creating "Terrain" subdirectory)

	elevation@ga.gov.au Tue, April 25, 2017 3:45 pm
	hec-ras@surfacewater.biz
Priority:	
Options:	View Full Header View Printable Version Download this as a file View Message details

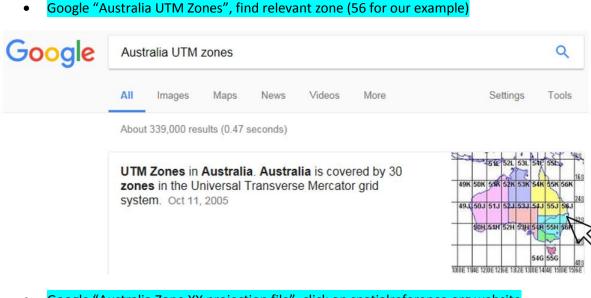
You requested 5m DEM Esri ASCII Grid data within the area bounded by latitudes -27.54587 to -27.43928 and longitudes 152.80849 to 152.97638 (in GCS WGS84) with coordinate system Map Grid of Australia Zone 56 (GDA 94) [MGA94-56].



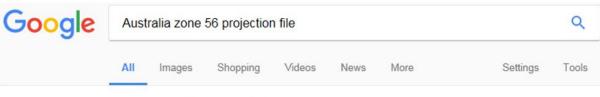
WARNING: The zip file is approximately 66.8 MB. You can extract data from a smaller area or select fewer datasets to decrease the size of the download.

Click the link below to download the data package: http://download.elvis.ga.gov.au.s3.amazonaws.com/Brookfld_1513929.zip





Google "Australia Zone XX projection file", click on spatialreference.org website

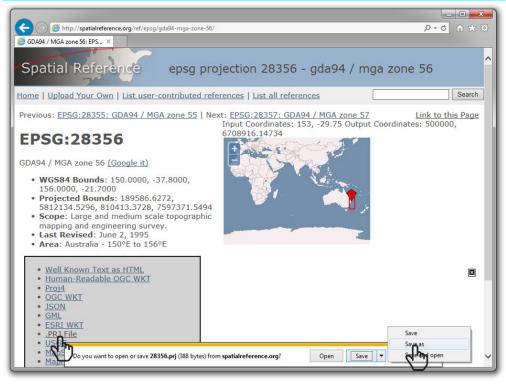


About 736,000 results (0.46 seconds)

GDA94 / MGA zone 56: EPSG Projection -- Spatial Reference spatialreference spatialreference

Previous: EPSG: 28355: GDA94 / MGA zone 55 | Next: EPSG: 28357: GDA94 / MGA zone 57 ... Last Revised: June 2, 1995; Area: Australia - 150°E to 156°E.

• Select relevant prj file and download to project directory (suggest "Terrain" subdirectory)





RAS Mapper

• Open RAS Mapper (click on RAS Mapper icon or Menu: GIS Tools | RAS Mapper)

File Edit R	un View Options GIS Tools Help		
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Project:	WODA Tutorial Model Brisbane River	eVNSC-RAS\Brisbane\BrisbaneHECRAS.prj	C
Plan:			
Geometry:			
Steady Flow:			
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Description :		🚊 SI Units	

• Set projection (Menu: Tools | Set Projection for Project)

RAS Mapper			- • ×
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Browse to downloaded projection file

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Jibraries	28356.prj	25/04/2017 4:14 PM	PRJ File	1 KB	
My Documents Public Documents Music Pictures Videos Computer	E				
🖗 System (C:) 🕳 Removable Disk (E:)					

• Confirm details



• Create a new terrain (right-click on Terrain | Create a new terrain) and select "plus" button

🚰 RAS Mapper		
File Tools Help		► ► •
Geometries Results Map Layers Ter Create a new terrain Add existing terrain	New Terrain Layer Set SRS Input Terrain Files Filename Projection Cell Size Rounding Info Output Terrain File Rounding (Precision): Info Filename: e:\HEC-RAS\Brisbane\Terrain.hdf	
Messages Views Profile Lines	Create Cancel	

• Browse to downloaded terrain file (Be sure to drag down to additional file types)

Organize 🔻 New folder)## *	
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My occurrents Public Documents Music Pictures Videos Computer System (C:)	E	🛃 readme vietadata.html	25/04/2017 7:45 AM	HTML Document	9 KB	
Removable Disk (E:)						



• Change file name to relevant description of terrain and click "Create"

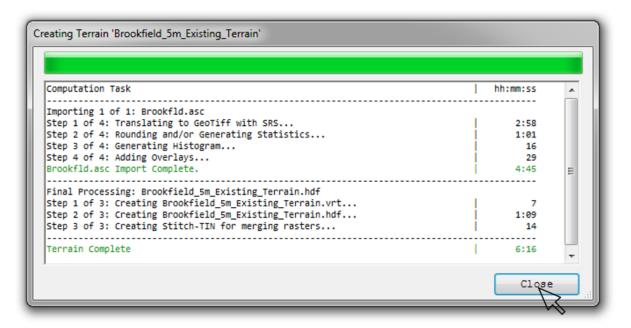
ew Terrain Layer					
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Filename:	e:\HEC-RAS\Brisbane\Terrain\	Terrain.hdf			
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Organize 🔻 New folder				811	- (
Documents Music Fictures Videos Computer System (C:) Removable Disk (E:) System (C:) Syst	Name Brookfid_1513929	Date modified 25/04/2017 4:25 PM	Type File folder	Size	
File name: Brookfield_Sm_Existing_ Save as type: Terrain (*.hdf) Hide Folders	errain			Save	Cancel

Set SRS Input Terrain Files					
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Output Terrain File	1/128 ▼ E:\HEC-RAS\Brisbane\Terrain\Brookfield				

• Click "Close" when complete

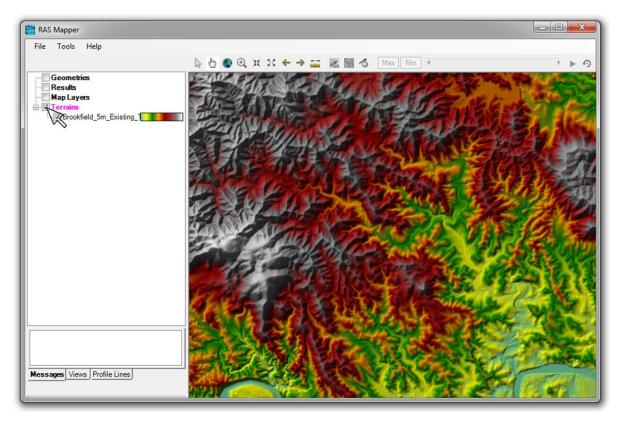
Creating Terrain 'Brookfield_5m_Existing_Terrain'		
Computation Task	hh:mm:ss	<u> </u>
Importing 1 of 1: Brookfld.asc Step 1 of 4: Translating to GeoTiff with SRS		
step i of 4. Hunstelling to deorith with Sustri-		
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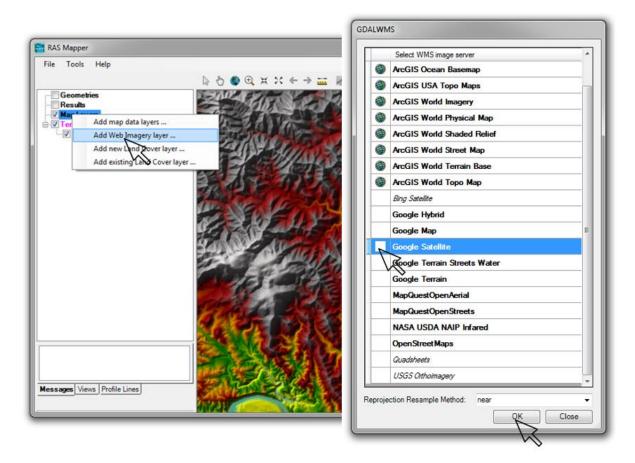
• Right-click on Terrain and click "Zoom to Layer"

RAS Mapper	
File Tools Help ▷ ○	▶ ► •9
Geometries Results Map Layers Perrains Demokrield_Sm_Existing Zoom to Layer Remove Layer Move Layer Open Folder in Windows Explorer Create Contour Bands	

• Toggle on the Terrain button to view

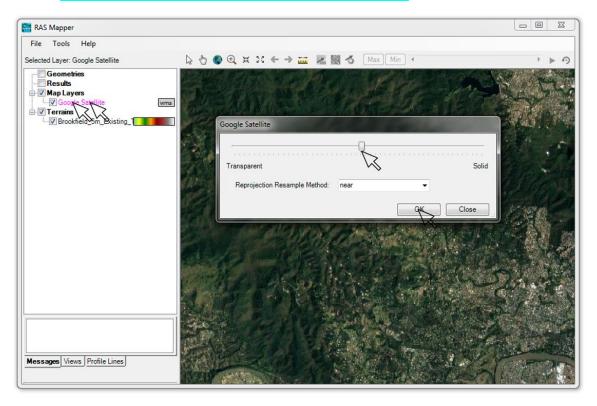


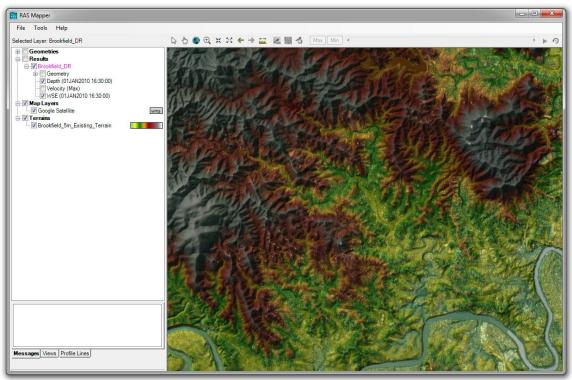
• Right-click on "Map Layers", select "Add Web Imagery Layer", and click on "Google Satellite"





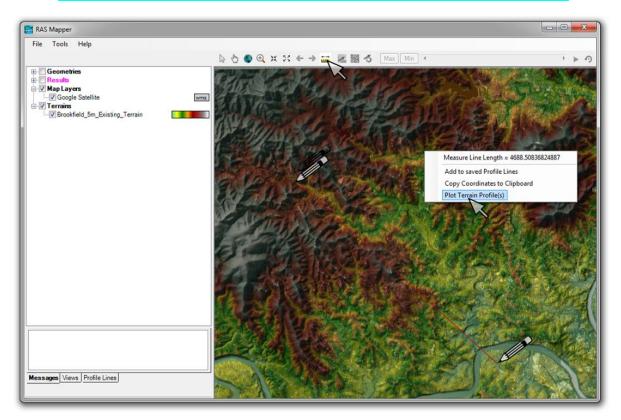
• Double-click on "Google Satellite" and adjust transparency

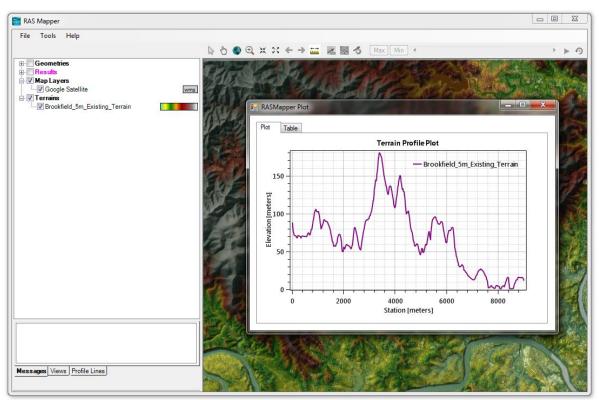




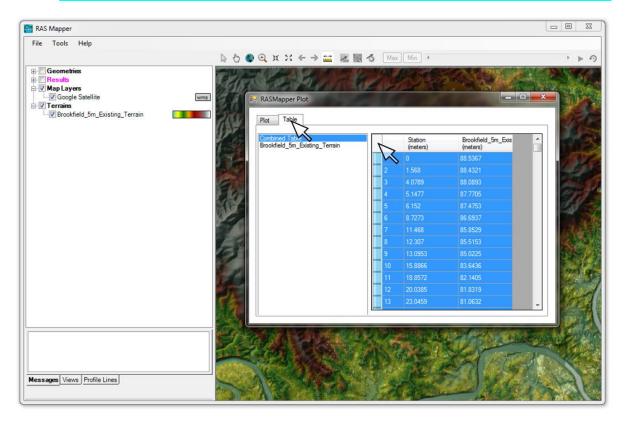


• Select the measure tool, choose a profile location, and select "Plot Terrain Profiles(s)"

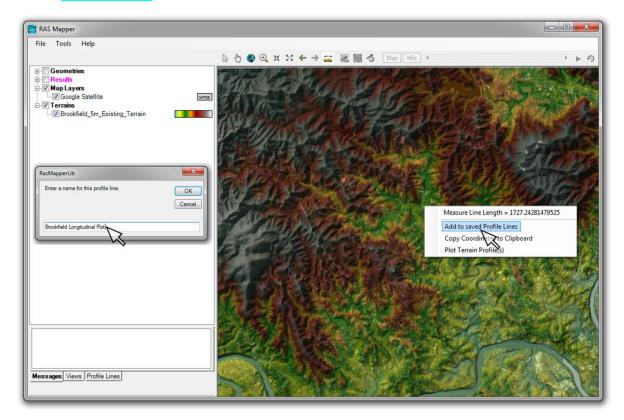




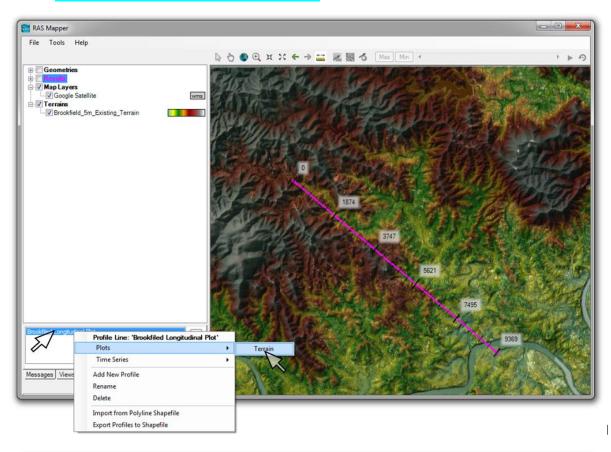
• Click on the "Table" tab to view the profile plot ordinates. Select the blank cell in the upper left to highlight all text. These values can be copied and pasted into Excel or similar program.



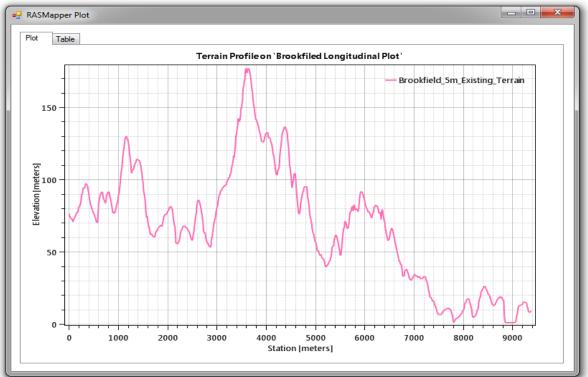
• Repeat the process, but this time click on "Add to Saved Profile Lines" and enter a name for the profile line.



• Left-click on Profile Lines tab at the lower left of the window, then right-click on the newly named profile.

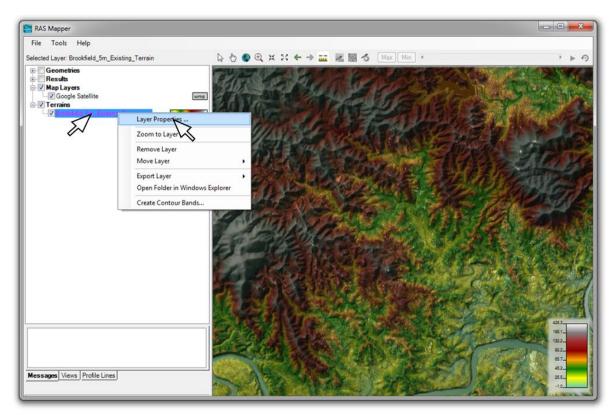


• Select Plot | Terrain to view the long section





• Right-click on the name of the terrain file, then select "Layer Properties"

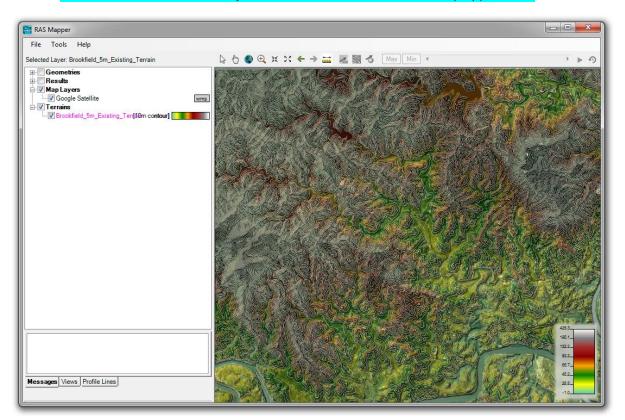


Press the Edit button and adjust all desired parameters, including colour ramp, min/max values, number of displayed values, transparency, and number of values.
Click on "Create" and "Apply" when finished

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195.1 - Transparency 132.2		60.04		255	255	0
92.2-		121.08	1	0	128	0
65.7-		182.13		255	165	0
45.2 -		243.17		139	0	0
25.5-		304.22		165	42	42
-1.0		365.26		128	128	128
Plot Contours Interval: 20 - Color:		426.31		255	250	250
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- Select "Plot Contours" and adjust contour line colours and interval
- Select "Plot Hillshade" and adjust Z factor to observe effect on map appearance



Add shape file

• Google "Brisbane River shape file" (or relevant name for project area)

Google	brisbane river shapefile							٩			
	AII	Images	Videos	News	Maps	More	Settings	Tools			
	Abou	About 23,800 results (0.72 seconds)									
	Land use mapping series - Datasets Data Queensland Government https://data.qld.gov.go/dataset/land-use-mapping-series - This dataset is a digita land use map of the Brisbane River sub-catchment, 0 recent views 0 total views. Land use mapping - 2009 - Burdekin NRMGDB										

- Select Queensland Government land use data (or relevant jurisdiction for project)
- Request download, preferably using the same coordinate system/projection as assigned in RAS Mapper
- Extract file to GIS folder created under project directory



Queensland Governme	ent					
	Contact us Help Site search					
\downarrow Request downlo	bad	Ø				
Conditions of Use: By downloading as specified in the metadata.	this data, you accept the licence conditions and limitations of the da	ta				
Shapefile - SHPshp	\checkmark					
GDA94 / MGA zone 56 (EPSG:28356)						
hec-ras@surfacewater.biz						
✓ I accept the terms and condition	s.					
L Request Download						
Choose categories	This dataset represents the maximum innundation line of the Ja 1974 Bremer River floods as captured by the Ipswich City Counc January 1974 Brisbane River Floods as captured by Brisbane Cit Council. The line is based on surveyed levels captured after the from debri lines. The dataset was digitised from Ipswich City Co	il and y event				
	and Brisbane City Council mapping.					
	↓ Download dataset					
	O Add to my list					

- Right click on "Map Layers" and select "Add Map Data Layer"
- Select "GIS Files" as file type and select the downloaded shape file (along with any other available GIS files)

RAS Mapper				
File Tools Help Selected Layer: Brookfield_5m_Existing_Terrain	}	→ 🖬 🗷 📓 💰 Max Min] •	► • •
Geometries Results ✓ Map Layer ✓ Map Layer Add map data layers ✓ Map Layer ✓ Map Layer Add map data layers ✓ Map Layer ✓ Map Layer Add map data layers ✓ Map Layer ✓ Map Layer ✓ Map Layer ✓ Map Layer ✓ Map Layer ✓ Add map data layers ✓ Map Layer ✓ Map Layer ✓ Add mew Land Cover layer Add existing Land Cover layer	s			
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Removable Disk (E:)	•			
File name: Flood_extentBrisbane_a	nd_Ipswich1974.shp		 ✓ GIS Files (* Open 	.gml;*.shp;*.vrt) Cancel



Double-click on shape file name and adjust symbology to desired appearance

Additional bonus GIS and RAS Mapper tasks:

- Create your own shape file by creating a profile line, then right-click on the assigned name and select "Export Profile to Shapefile"
- Add the newly created shape file to the Map Layers in RAS Mapper and adjust display properties as desired
- Right-click on web imagery and save the view extents as a static image (with a world file)
- Add any additional GIS files or available static aerial images (with world files)
- Adjust symbols, colour palettes, ranges, intervals, and transparency for all layers to optimise the view for use in the Geometry Editor

See <u>www.surfacewater.biz/workshops/</u> for step-by-step instructions on the additional tasks

Next: Workshop #2 Create and Edit Geometric Data