Beach Capture Using UAV Drones Web Map

Monitoring the Impacts of Sea Level Rise and Climate Change on our Coast.

"This project acknowledges the funding contribution of the Commonwealth Government and support of the Department of Fire and Emergency Services."

The portal is managed by DTMI Maritime GIS team.

WA's coastal infrastructure and communities are being exposed to heighten levels of storm surge, waves due to the changing climate and a dynamic tide increasing the frequency and severity of coastal inundation and erosion. The information gap is to understand the impacts of the hazards at the "beach level" driven by an ever-expanding human activity along our coasts.

The solution is to provide high-resolution imagery and digital elevation data captured using drone of the intra-annual changes at the "beach level". The advantage of using drones is that they can fly at low altitude, capturing high-resolution and high-accuracy data at a low cost identifying at-risk areas leading to the setup of an effective risk management strategy.

This web map portal allows the user to visualize and download beach monitoring data for each capture interval.

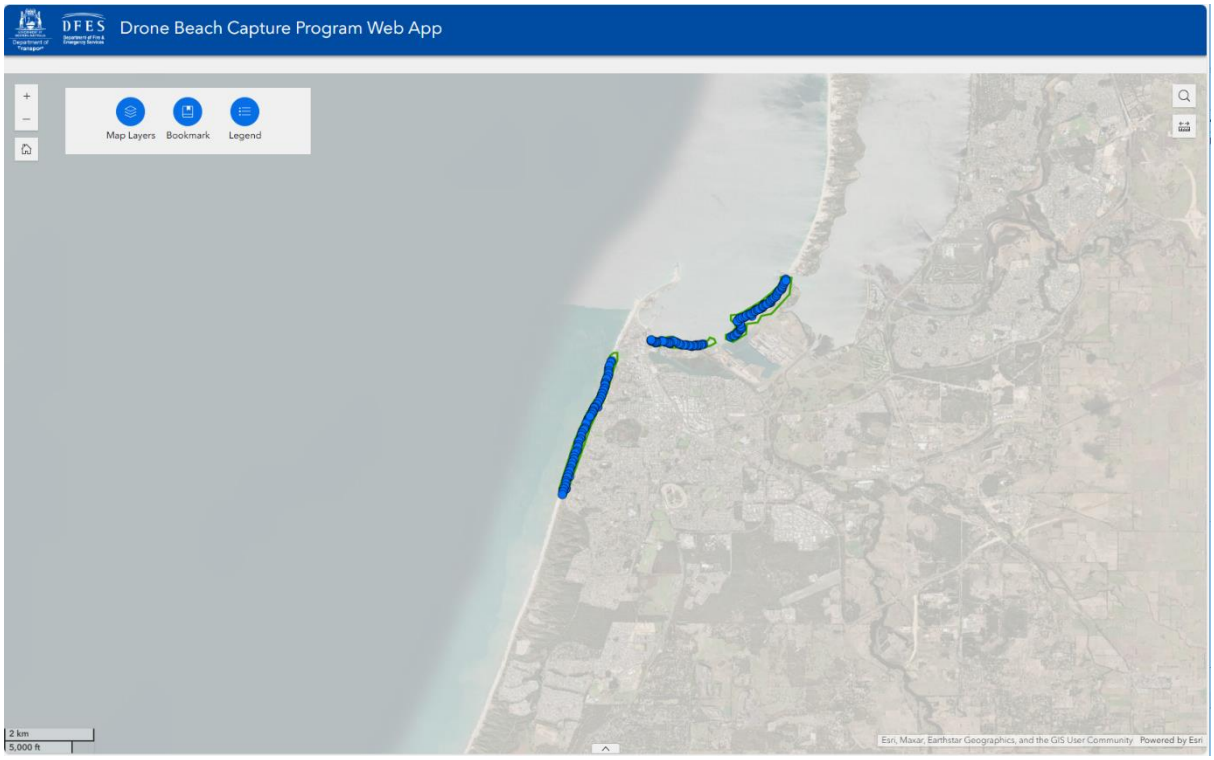
Portal Link: Drone Beach Capture Program Web App

The portal is housed and managed by the Department of Transport Major Infrastructure (DTMI) supported by the Pawsey Centre.

Contents

1. Splash Screen

The splash screens opens by default.



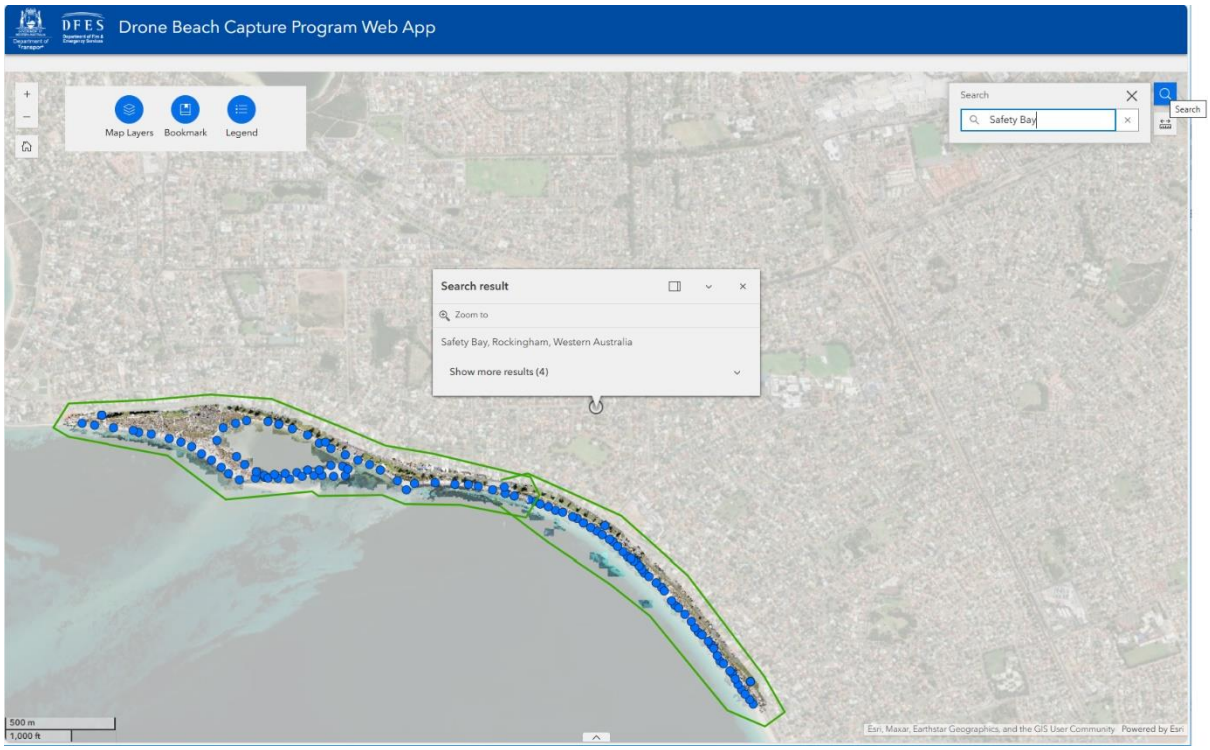
2. Search Tool

Type on the Search Box and insert LGA location from the list provided. The capture program currently services the following list of Local Government Authorities:

1. **City of Rockingham** – Safety Bay and Waikiki
2. **City of Mandurah** – Northern Beaches 1, Doddies Beach, Falcon Bay
3. **City of Bunbury** – Back Beach North, Back Beach South, Koombana Bay, The Cut,
4. **City of Busselton** – Abbey Beach, Mary Brook, Siesta Park, West Busselton, Wonnerup Beach 1 and Wonnerup Beach 2
5. **Shire of Harvey** - Binningup
6. **Shire of Murray** – Yunderup 1 and Yunderup 2
7. **Shire of Capel** – Peppermint Grove Beach 1 and Peppermint Grove Beach 2
8. **Shire of Waroona** – Preston Beach

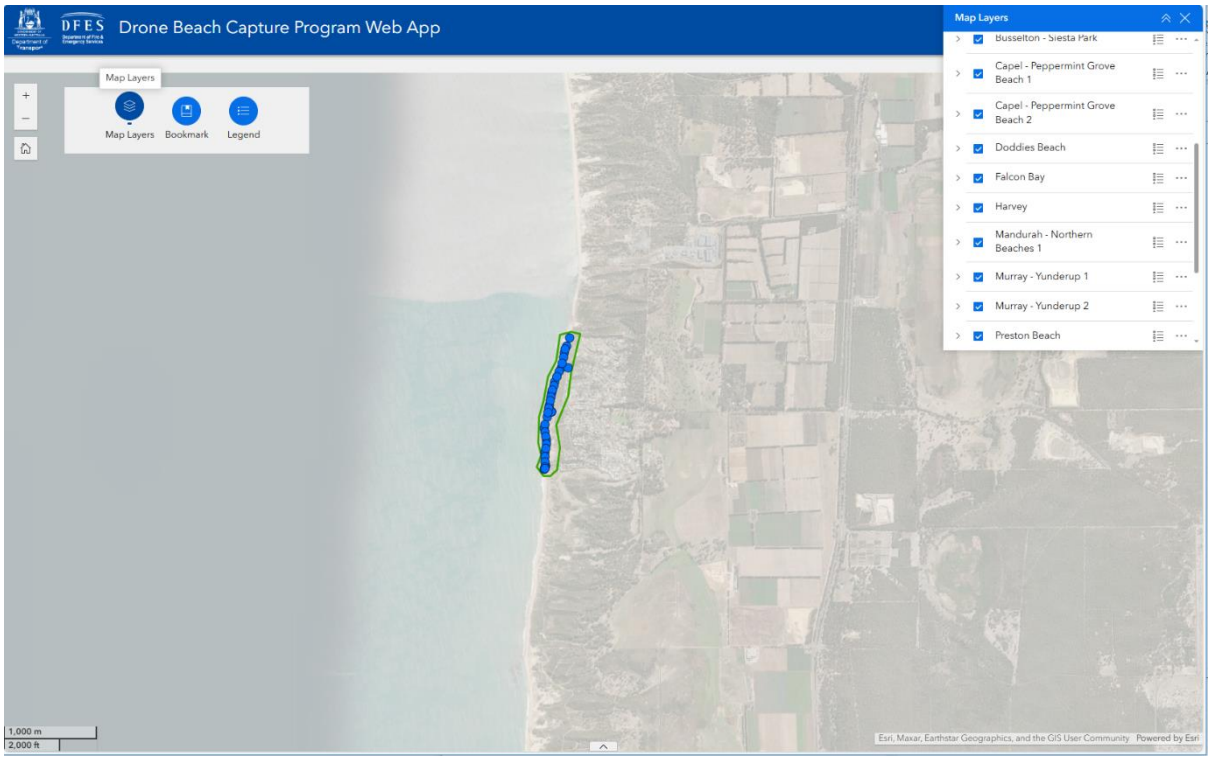
Or use scroll and zoom options.

Note: For each location an image of the processed orthophoto is used as a site underlay.



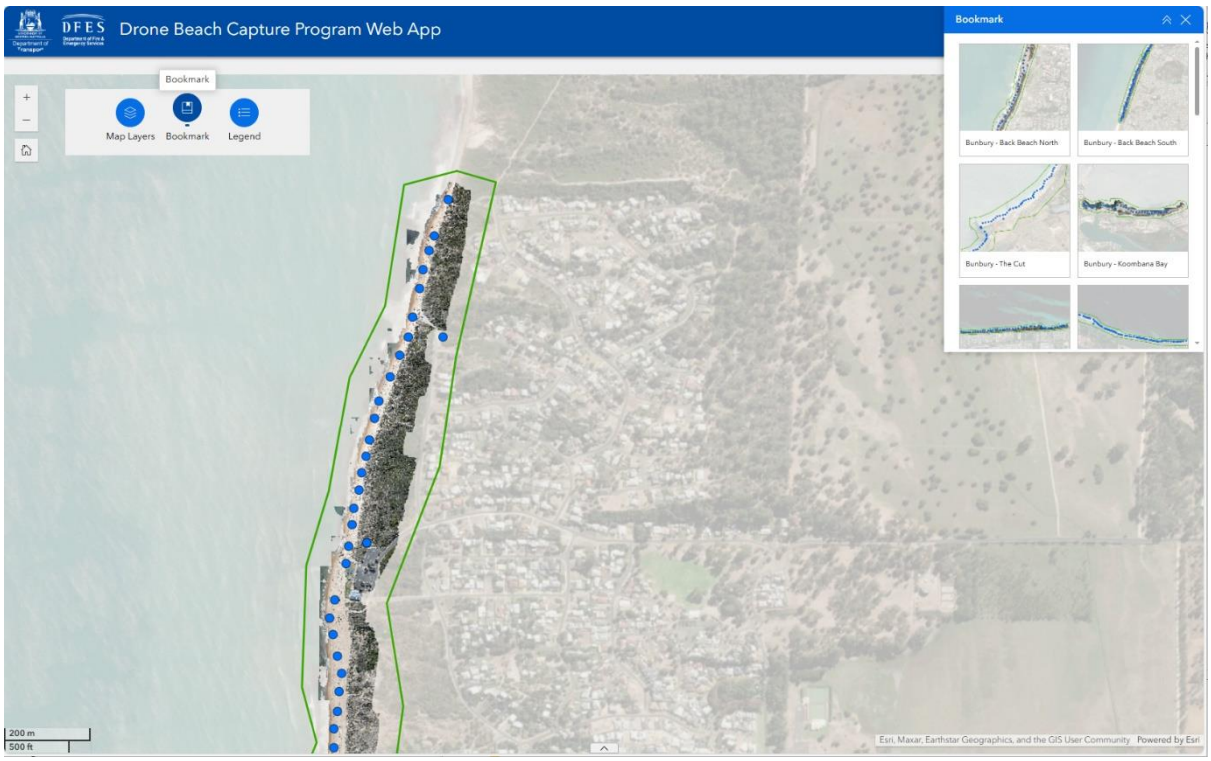
3. Map Layers Widget

The Map Layers icon prompts the visualization of a pull-down menu listing all the capture sites. Currently, all sites are activated and displayed on the map. The option is to use the search function to locate specific capture site or if you know the location use the zoom key. Using the zoom key the user needs to know the location as there is no additional labelling of the site.



4. Bookmark

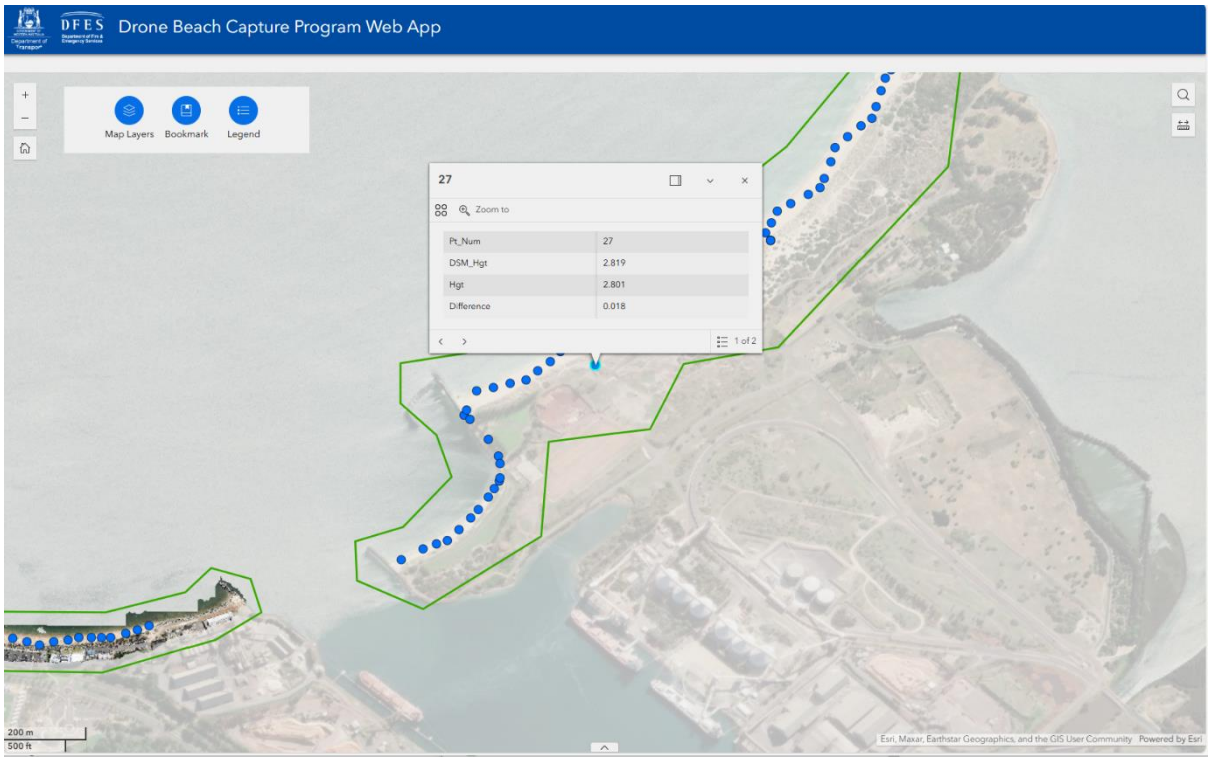
Provides a 2D image and site location name so if unsure of the site naming convention use the site name listed here. For each location an image of the processed orthophoto is used as a site underlay.



5. Quality Control

Each location has a series of blue dots which represent the independently surveyed quality control points. Clicking on each of the blue dots displays a quality control table for that point. The table displays the vertical AHD height extracted from the processing Digital Surface Model (DSM_Hgt) and is compared with the AHD height of the independently surveyed quality control point. The Difference is displayed in the last line of the table.

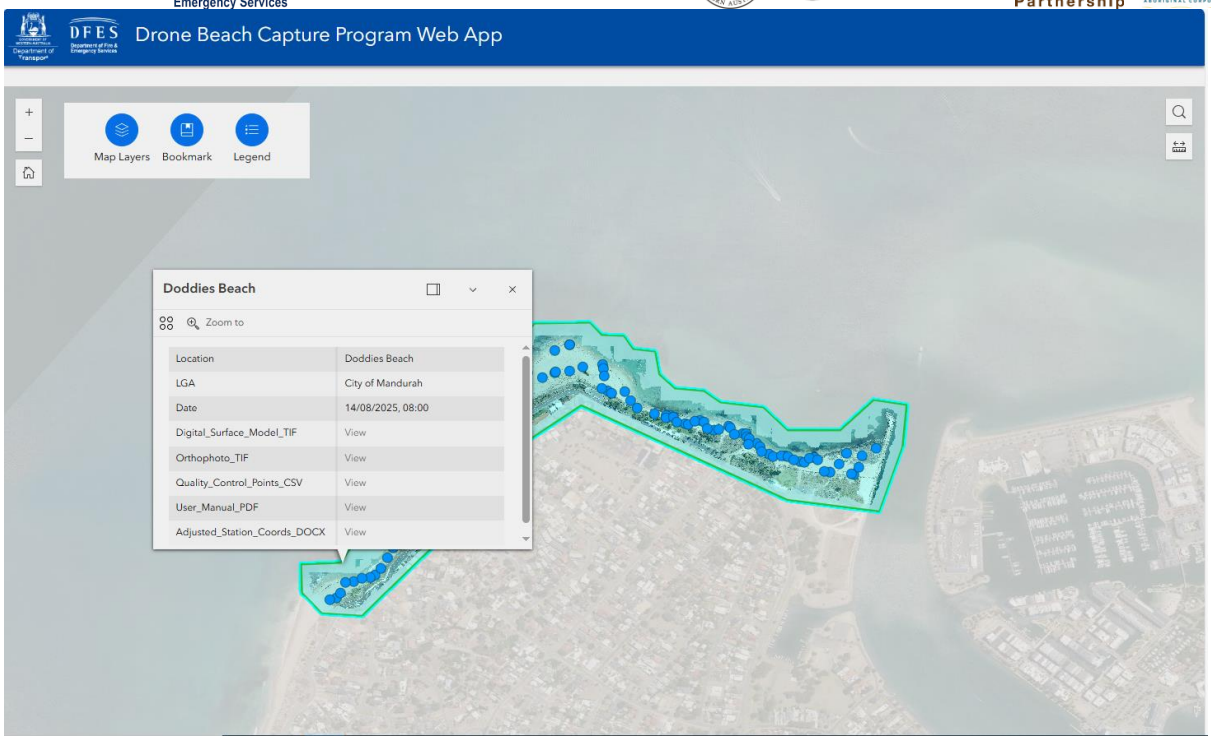
The purpose of including the quality control (blue points) on the orthophoto image



6. Downloading the capture data.

There are five separate downloadable data streams which are accessible by left click on the area of interest which displays a dialogue box, see figure below, providing the downloadable links to the following:

1. Digital Surface Model (DSM). File size up to 4GB's
2. Orthophoto. File size up to 2.5GB's
3. Quality Control File – listing of all quality control points for the selected capture site. Format: *.csv.
4. User manual that includes important metadata.
5. Adjusted Beach Control Base Station Coordinates for each capture location.


Drone Beach Capture Program Web App
Map Layers
Bookmark
Legend
Doddies Beach
Zoom to
Location
Doddies Beach
LGA
City of Mandurah
Date
14/08/2025, 08:00
Digital_Surface_Model_TIF
View
Orthophoto_TIF
View
Quality_Control_Points_CSV
View
User_Manual_PDF
View
Adjusted_Station_Coords_DOCX
View

7. Capture Method

The capture method:

1. Beach Capture Base Stations have been established near all capture sites. The base stations have been surveyed using two Trimble R12 units and up to three SSM stations as the primary control network using the coordinate datum listed below.

Project file data		Coordinate System	
Name:		Name:	Australia/GDA2020
Size:		Zone:	Zone 50
Modified:		Datum:	GDA2020
Time zone:		Global reference datum:	GDA2020
Reference number:		Global reference epoch:	2020
Description:		Geoid:	AUSGeoid2020(Australia)
Comment 1:		Vertical datum:	AHD71
Comment 2:		Calibrated site:	

Example of the Trimble processed data for the Busselton location is listed below. Currently the file "PNP Beach Monitoring Program - Adjustred Station Coordinates all Sites 20250527.docx" is available to be downloaded.

Busselton

Adjusted Grid Coordinates

Point ID	Easting (Meter)	Easting Error (Meter)	Northing (Meter)	Northing Error (Meter)	Elevation (Meter)	Elevation Error (Meter)	Constraint
bus005	345159.125	0.0036	6275363.042	0.0043	3.212	0.0090	
bus006	344596.066	0.0027	6275184.020	0.0031	2.041	0.0072	
bus007	343998.346	0.0027	6275035.451	0.0036	2.636	0.0087	
bus008	343284.786	0.0033	6274892.165	0.0037	3.319	0.0085	
bus009	340570.725	0.0028	6274632.596	0.0030	1.973	0.0074	
bus011	338303.258	0.0028	6274466.622	0.0027	1.961	0.0069	
bus012	337532.354	0.0024	6274522.194	0.0025	2.951	0.0067	
bus013	336486.171	0.0036	6274581.577	0.0043	2.771	0.0161	
bus014	335515.192	0.0059	6274774.908	0.0069	1.700	0.0192	
bus015	334333.217	0.0072	6274909.507	0.0078	3.614	0.0215	
bus016	332893.536	0.0064	6275404.434	0.0071	1.883	0.0220	

ssm262	336611.026	?	6272627.648	?	3.155	?	LLh - Fixed
ssm47	339222.253	?	6274519.935	?	2.439	?	LLh - Fixed
ssm81	344623.684	?	6274719.539	?	2.202	?	LLh - Fixed

Adjusted Geodetic Coordinates

Point ID	Latitude	Longitude	E. Height (Meter)	Height Error (Meter)	Constraint
bus005	S33°39'01.19139"	E115°19'48.68201"	-29.608	0.0090	
bus006	S33°39'06.70599"	E115°19'26.71814"	-30.758	0.0072	
bus007	S33°39'11.21278"	E115°19'03.42760"	-30.140	0.0087	
bus008	S33°39'15.48542"	E115°18'35.64407"	-29.426	0.0085	
bus009	S33°39'22.45697"	E115°16'50.14612"	-30.649	0.0074	
bus011	S33°39'26.61065"	E115°15'22.03820"	-30.555	0.0069	
bus012	S33°39'24.38386"	E115°14'52.15623"	-29.534	0.0067	
bus013	S33°39'21.87914"	E115°14'11.59399"	-29.675	0.0161	
bus014	S33°39'15.06541"	E115°13'34.04037"	-30.714	0.0192	
bus015	S33°39'10.03639"	E115°12'48.26108"	-28.760	0.0215	
bus016	S33°38'53.16298"	E115°11'52.72670"	-30.449	0.0220	
ssm262	S33°40'25.36198"	E115°14'15.14603"	-29.271	?	LLh - Fixed
ssm47	S33°39'25.38221"	E115°15'57.73906"	-30.118	?	LLh - Fixed
ssm81	S33°39'21.79571"	E115°19'27.49769"	-30.593	?	LLh - Fixed

2. Once the Beach Capture Base Stations are established, surveyed and adjusted using Lease Squares adjustment, the beach capture program commences.
3. Beach control targets are established and surveyed using RTK GPS survey method approximately every 100m along the beach to be captured, see picture below.

4. During the survey of the beach control targets the quality control points are surveyed using the same RTK GPS survey technique. Generally, two points every 100m surveyed and located between the primary beach control targets.
5. The beach capture is then undertaken using DJI M350 drone.