Integral Field Campaign Southwold, UK

Field Report

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Field Report

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Contents

1 Introduction

Royal HaskoningDHV is the consultant to study the morpho-hydrodynamics of the Southwold tidal system in relation to coastal zone management, coastal protection and potentially re-engineering of coastal and port structures. SHORE was commissioned to draft and execute an integral survey campaign, consisting of:

- topographic- and bathymetric data of the tidal channel, port and buffer approx. 100 meters seaward of the end of the piers
- velocity profiling and discharge measurements (spring and neap tide)
- bed sediment samples
- suspended sediment samples (spring tide only)
- turbidity measurements (spring tide only)
- water level measurements (spring and neap tide)

This document is the Field Report, describing the measurements and resulting deliverables.

1.1 Terminology

Table 1.1: Terminology

Abbreviation:	Meaning:
SHORE	Shore Monitoring & Research BV.
SWMS	Safe Work Method Statement
PPE	Personal Protective Equipment
KNRM	Koninklijke Nederlandse Redding Maatschappij
RNLI	Royal National Lifeboat Institution
VHF	Very High Frequency
SBES	Single Beam Echo Sounding
RTK	Real Time Kinematic
PPK	Post-processed kinematics
BM	Benchmark (marker with known coordinates)
Base	GNSS receiver positioned over a BM for PPK and RTK
Rover(s)	moving GNSS receiver for positioning of platform or position measurements
LiDAR	Light Detection And Ranging
SVP	Sound Velocity Probe
M9	Sontek M9 RiverSurveyor ADCP for discharge measurements
RIB	Rubber Inflateble Boat

1.2 Project Scope of Work

Royal HaskoningDHV requires field data to be able to numerically model hydrodynamics and assess erosion/sedimentation patterns for the initial system situation and future variants. The scope of this project is formulated by Royal HaskoningDHV and further shaped by SHORE as:

1. Create a local benchmark for clear vertical referencing of rovers and measurements
2. Maintain tide gauge or obtain tide gauge readings within the harbour throughout all survey work. Which is performed by installing 3 water level loggers for the duration of the measurements

3. Bathymetric survey from 50m seawards of the harbour piers to the Bailey Bridge. Note data from recent bathymetric surveys of the harbour, which has been provided.
4. Topographic LiDAR survey of channel banks
5. Over a spring tide and a neap tide, measure tidal current profiles at 6 locations within the harbour entrance and Blackshore area. Maintain positional control and recording for all observation points. Note wind, wave, weather and tidal conditions.
6. Obtain 10 sediment grab samples from the sea bed within the harbour entrance, plus 10 sediment grab samples from the channel upstream to the Bailey Bridge. Sample locations to be agreed.
7. On the Spring tide only, take suspended sediment turbidity measurements from two locations. Suspended sediment samples also to be taken from these locations.

1.3 Area of Interest

The area of interest (AOI) is the tidal system of Southwold from approximately 100m offshore of the seaward end of the harbour piers until Blythburgh (Fig. 1.1). Based on GoogleEarth imagery it is quite a busy place with fishing and recreational activities on the water and its related services/activities on land. Summer pictures show lots of tourists.

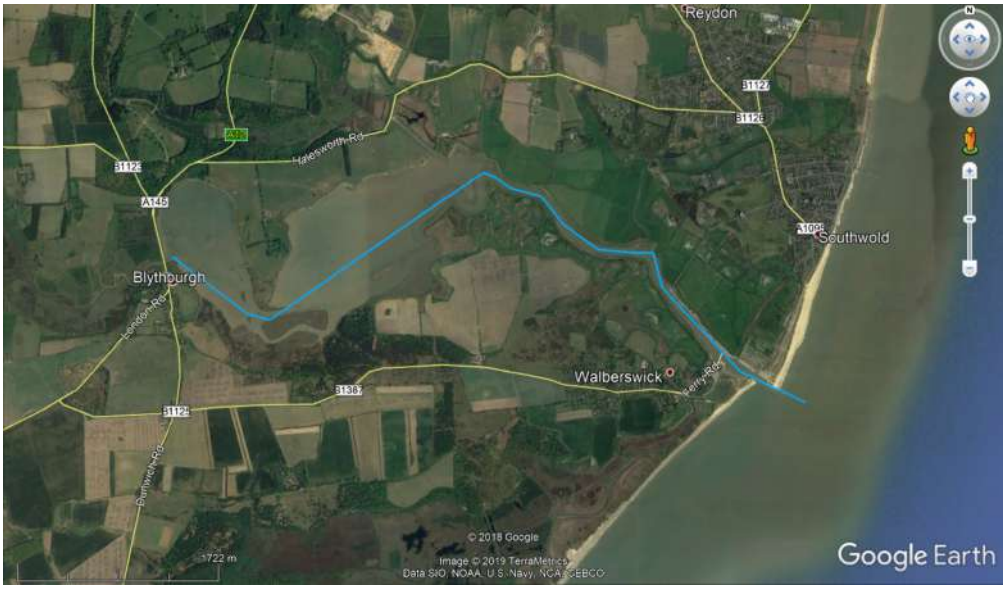


Figure 1.1: Area of interest

The channel has shallow intertidal (muddy) embankments, with a few boat ramps and a pedestrian/-cyclists ferry. Moorings/births are present on both sides of the channel. The north bank appears to be accessible by car/4x4 vehicle. The south bank only by foot. The harbour quay is located just inside the harbour entrance on the north side of the channel. Wooden, quite open, structures (south) and a breakwater (north) flank the entrance channel to the harbour (Fig. 1.2 - 1.3).

Figure 1.2: Channel survey area

Figure 1.3: Harbour entrance coastal structures

2 Deliverables

The following products are delivered:

1. Water level time series in .csv files, geo-referenced to ODN and in UTC time.
2. Sediment grab-samples labelled with unique point-id's, dropped off at the Harbour Masters Office in Southwold, for pick up by a Lab (arranged by RHDHV). A .txt file with X,Y,Z coordinates of the samples per point-id.
3. Time series of turbidity values in NTU and in UTC time per location for spring tide.
4. GeoTiff / .asc grid with bed level elevation of bathymetric survey result
5. GeoTiff / .asc grid with bed level elevation of topographic survey result
6. 6 time series of measured discharges (Q m^3/s). The raw measurement data with current velocities over water depth along the profile provided as Excel file (.xslx).
7. Water samples with point-id, dropped off at the Harbour Masters Office in Southwold, for pick up by a Lab (arranged by RHDHV). A .txt file with X,Y,Z coordinates and UTC timestamp of the samples per point-id.
8. This short field report to provide information on the area and data for future use.

All data is delivered with coordinates in UK OSGB36-BNG ODN and UTC time.

3 Survey Campaign

The executed survey campaign consisted of:

- Creation of a new benchmark and determination of its coordinates with OS NET Data, used to provide rovers with GNSS corrections,
- The PingDSP survey system on SHORE's tailored survey vessel is used to measure the bathymetry of the AOI
- The mobile LiDAR system (AL3-32) mounted on a car/boat is used to survey the topography of the AOI
- Installation of 3 CTD and atmosferic pressure logger (baro) to measure the water level elevation
- Survey the bathymetry with the PingDSP 3DSS survey system on SHORE's tailored vessel
- Survey the topography of the embankments of the channel (and adjacent roads and levees) with SHORE's mobile LiDAR system on a boat, car and walking.
- Two days of 13 hours current and discharge measurements with a Sontek M9 Riversurveyor ADP.
- Installation of 2 turbidity sensors for automatic turbidity measurements
- Suspended Partical Matter sampling with a Niskin bottle for each current measurement cycle on the spring tide.
- Bed sediment sampling with a Van Veen Grabber on predefined locations

Results and brief methodology are presented in the next Chapter.

4 Results

Results and brief description of applied methodology are presented in this Chapter.

4.1 Created Local Benchmark

A local benchmark is created to provide GNSS rovers with GNSS corrections for centimeter accurate position measurements.

The benchmark is created at a convenient, safe location on concrete slap bordering the capping of the northing quay near the harbour entrance (Fig. 4.1). A stainless steel marker is drilled into the concrete and subsequently a GNSS is set up on a tripod over it. The GNSS logs raw satellite observations for at least 6 hours (in this case the entire day). The coordinates of the marker are determined through post processing of the raw GNSS data with OS NET Rinex data from the Aldeburgh reference station. Coordinates are calculated in:

- UTM 31 North (X,Y) and WGS84 elevation (Z)
- OSGB36-BNG (X,Y) and ODN elevation (Z)

The resulting coordinates of the benchmark are presented in Tab. 4.1.

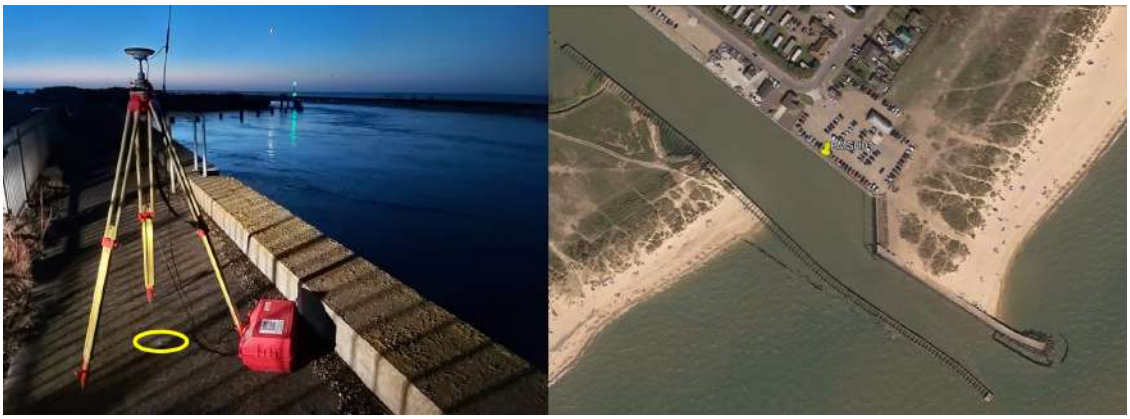


Figure 4.1: Location of created benchmark with marker in the ground indicated (yellow ellips)

Table 4.1: Coordinates of created benchmark at Southwold Harbour Quay

Benchmark ID:	Easting (m)	Northing (m)	Elevation (m)
BM SH01 (UTM/WGS84)	409536.655	5796863.677	47.119
BM SH01 (OSGB36/ODN)	650434.865	274853.914	2.6204

N.B.: The result of post processing with Aldeburgh OS NET rinex data is used for all positioning data in this project.

4.2 Bathymetric MBES survey system on RIB

The bathymetric survey is executed with SHORE's 3DSS PingDSP survey system mounted on a RIB (Fig. 4.2). Table 4.2 lists the components and manufacturers specifications.

Figure 4.2: Example of SHORE's 3DSS PingDSP survey system on a tailored RIB. Components indicated in the picture.

Table 4.2: Overview of instruments and corresponding accuracy used for bathymetric survey. The accuracy is based on the manufacturer's declaration.

Instrument:	**Brand and type:**	**Accuracy:**
MBES	PingDSP 3DSS-DX-450	Range accuracy 1.67 cm Beamwidth 0.4°
Dual antenna RTK-GNSS	Septentrio AsterX-U	± 1.5 cm + 1 mm/km
SVP	YSI Castaway CTD	± 0.15m/s
Motion sensor	SBG NavSight Ekinox Marine	Roll/Pitch 0.02°, Heading 0.05°

This system is compliant with Hydrographic Order NL Norm A, which is the strictest order for hydrographic measurements in the Netherlands and far stricter than IHO special order.

The survey is performed along the direction of the channel until full spatial coverage is obtained (Fig. 4.3). The survey is performed in the high water period.

Regular SVP's are obtained to correct for spatial and temporal gradients in sound velocity.

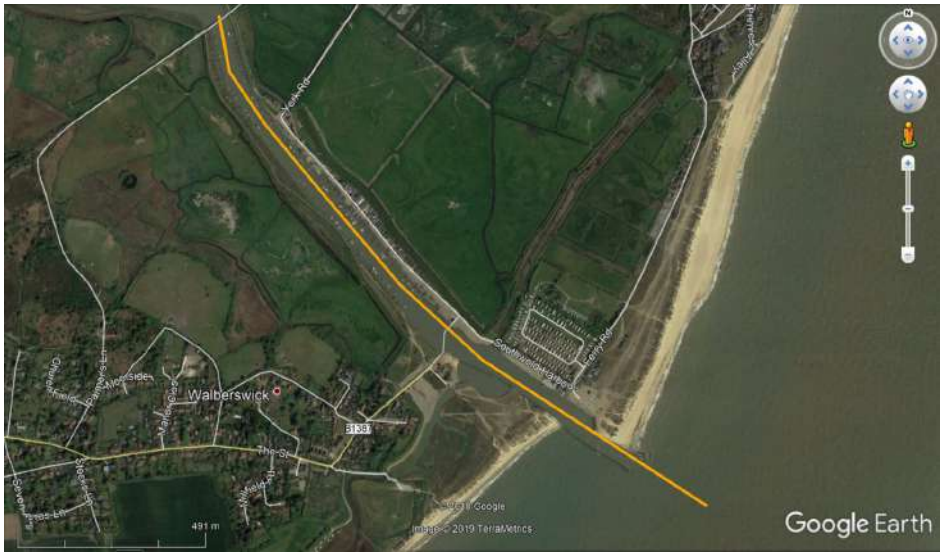


Figure 4.3: Area for bathymetric survey on Google Earth background.

The resulting measured bathymetry is presented in Fig. 4.4 - 4.7. Ripples and waves in the channel bed are observed at several locations. The embankments are measured well with SHORE's bathymetric survey equipment, as well as with the mobile LiDAR system (see Sec. 4.3), resulting in overlap between topographic and bathymetric measurements.

Figure 4.4: Overview of bathymetry on Google Earth background.

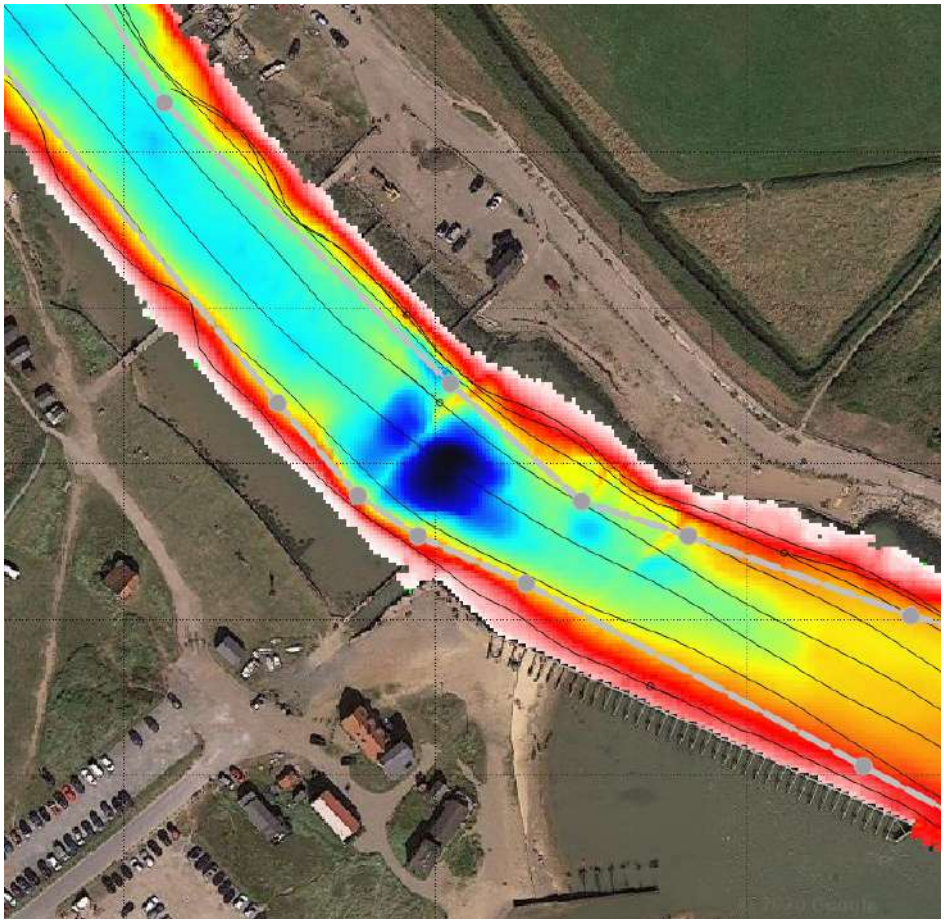


Figure 4.5: Overview of eastern part of bathymetry on Google Earth background.

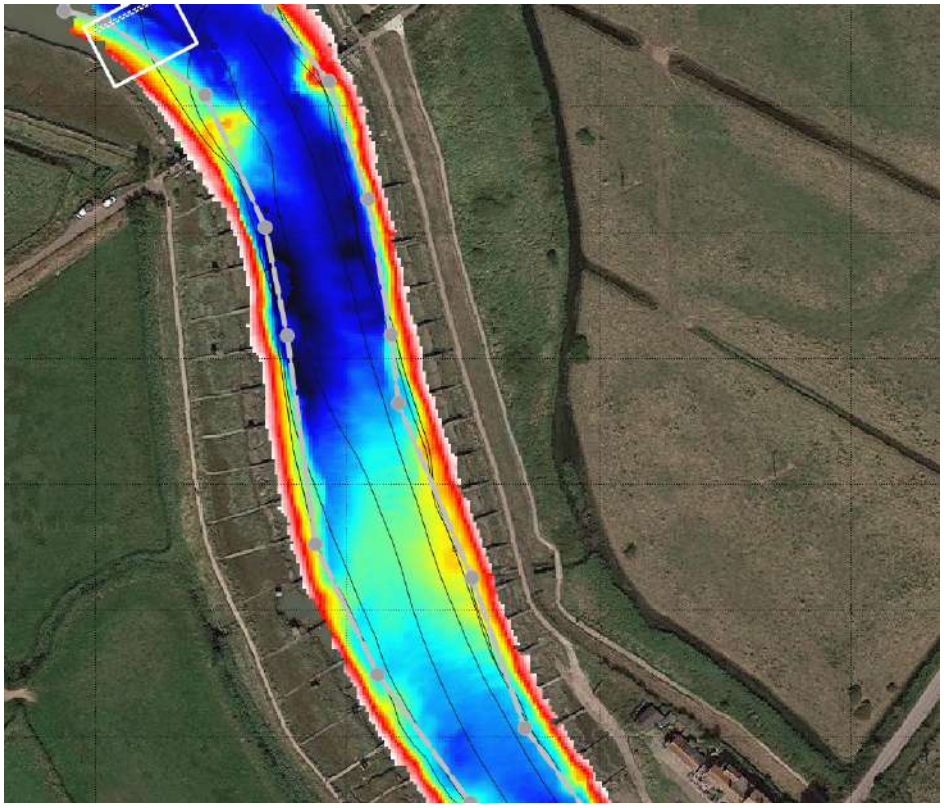


Figure 4.6: Overview of western part of bathymetry on Google Earth background.

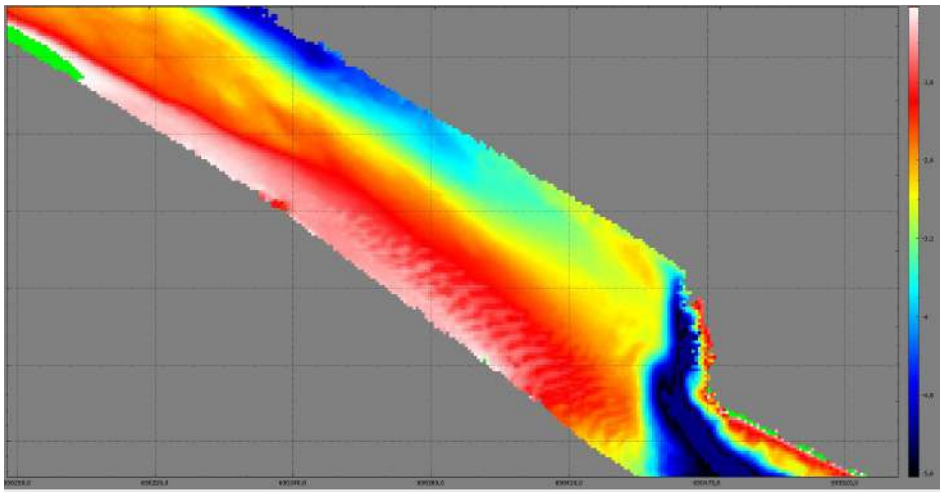
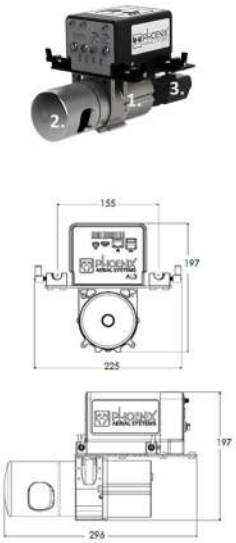


Figure 4.7: Overview of ripples/waves in bathymetry.

4.3 Topography with mobile LiDAR survey system on a vehicle

The topography is measured with a mobile LiDAR system mounted on a vehicle, boat and by foot (Fig. 4.8). Figure 4.9 lists the components and manufacturers specifications.

Figure 4.8: Mobile LiDAR system mounted on the survey vehicle. Components indicated in the picture.



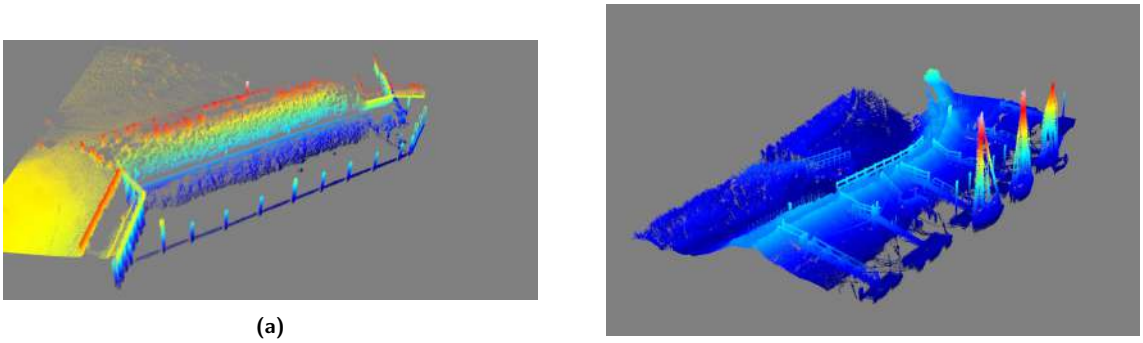
PLATFORM	
OVERALL DIMENSIONS	296 x 225 x 197 mm
OPERATING VOLTAGE	12-28 V
POWER CONSUMPTION	~40 W
WEIGHT	3.2 kg
1. NAVIGATION SYSTEM	
DUAL-ANTENNA / HEADING	Optional
CONSTELLATION SUPPORT	GPS[2], GLONASS[2], Galileo[1], BeiDou[1] [1] Single frequency, dual-frequency optional [2] Dual-frequency
SUPPORT ALIGNMENT	Kinematic, Dual-Antenna
OPERATION MODES	Real-time, Postprocessing optional
ACCURACY POSITION	1cm + 1ppm RMS horizontal
ACCURACY PITCH/ROLL	0.015 deg RMS
ACCURACY HEADING	0.08 deg RMS
2. LiDAR SENSOR (HDL-32e)	
LASER POWER	Class 1 (safe eye)
LASER WAVELENGTH	905 nm
MIN RANGE	1.0 m
MAX RANGE	120 m
MAX RANGING ERROR	20 mm
RANGE RESOLUTION	2 mm
SCAN RATE	700k shots/s, up to 1.4 million points/s
FIELD OF RANGE	+10°, -30° Vertical FOV / 360° Horizontal FOV
MULTIPLE ECHOES	2
POWER CONSUMPTION	12 W
DIAMETER/HEIGHT	85.34 * 144.24 Mm
WEIGHT	1,050 g
OPERATING TEMPERATURE	-10° / 60° C
INGRESS PROTECTION	IP 67
NUMBER OF LASERS/ PLANES	32
RECOMMENDED SCANNING HEIGHT AGL (m)	20 - 60 m

Figure 4.9: Overview of instruments and corresponding accuracy used for LiDAR survey. The accuracy is based on the manufacturer's declaration.

This system is compliant with the strictest requirements of Airborne Laserscanning as required in the Netherlands.

The survey is performed along parallel survey lines until full spatial coverage of the area is obtained.

To cover the full embankments of the channel the LiDAR system is mounted on the car, boat and carried by foot (south embankment), resulting in detailed spatial topographic data. Not just data of the embankments, but also of local infrastructure, buildings, dunes and beach. A screenshot of a part of the pointcloud (with objects in it) is presented in Fig. 4.10.



(a) (b)

Figure 4.10: Two examples of the pointcloud that resulted from the accurate LiDAR scan within the Southwold harbour

The pointcloud is filtered to obtain only the points of the ground (i.e. all non ground points removed). The ground points are gridded to a Digital Terrain Model (DTM). The resulting LiDAR DTM is presented in Fig. 4.11.

Deliverables are:

- DTM with 1x1 m resolution: *SHORE_Southwold-LiDAR-OSGB36-BNG-1m.tif*
- DTM with 0.5x0.5 m resolution: *SHORE_Southwold-LiDAR-OSGB36-BNG-0p50m.tif*

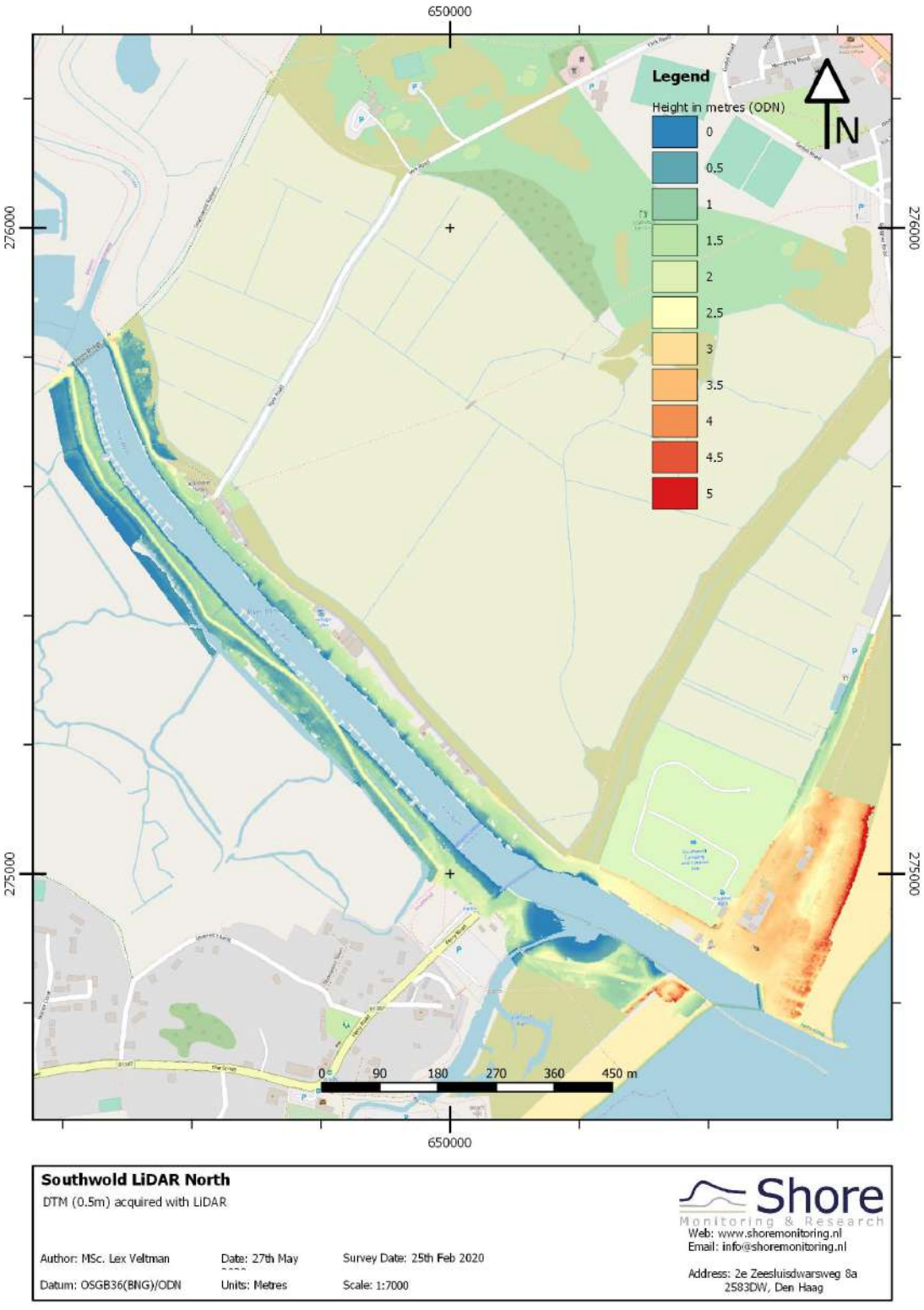
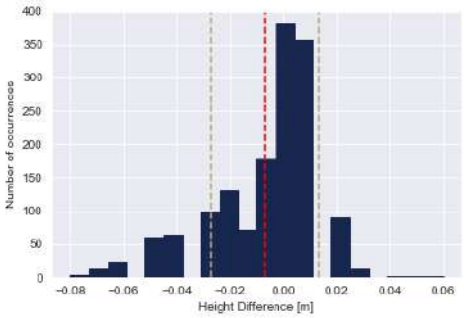


Figure 4.11: Overview of LiDAR DTM on Google Maps background.

4.3.1 Validation of LiDAR DTM

The elevation of the DTM is validated with GNSS measurements of the ground level obtained with a GNSS on a wheelbarrow (Fig. 4.12a). The results show a mean and standard deviation of ground level elevation of 0.007 +/− 0.02 m (Fig. 4.12b).

(a) Acquiring height validation data with SHORE's GNSS Carrier.



(b) Height validation result.

4.4 Combined Integral Topography and Bathymetry

The combined result of the topographic and bathymetric survey is presented by means of (3D) screenshots of the data, showing the integral bottom level elevation of the AOI (Fig. 4.13 & 4.14).

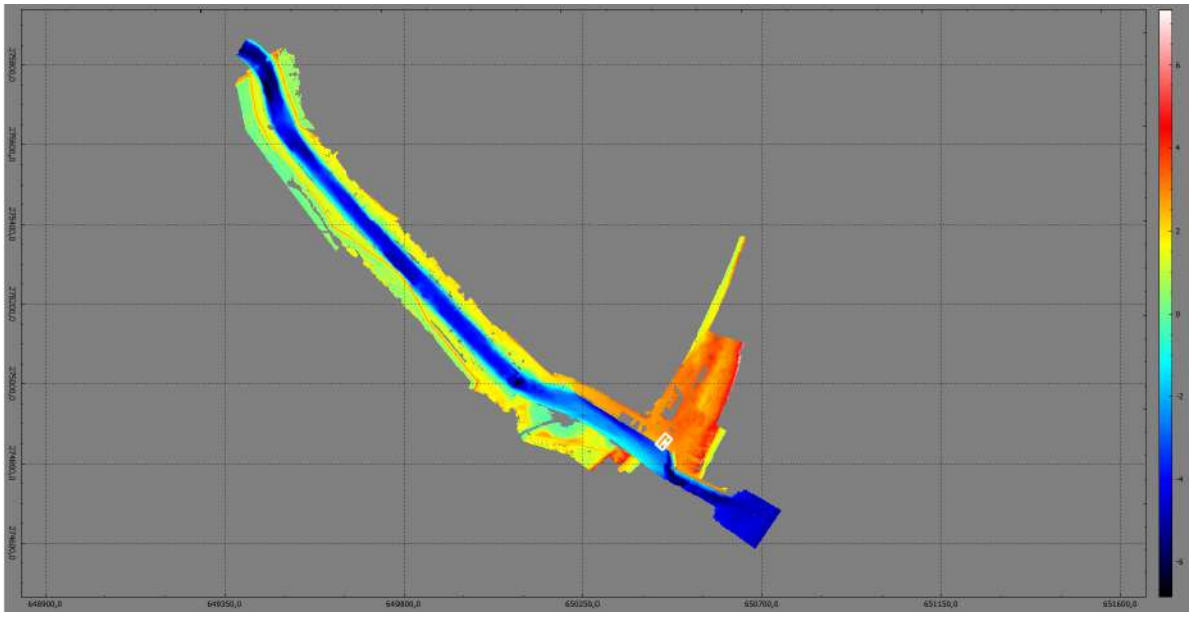


Figure 4.13: Combined Topo (LiDAR) and Bathy (MBES) result.

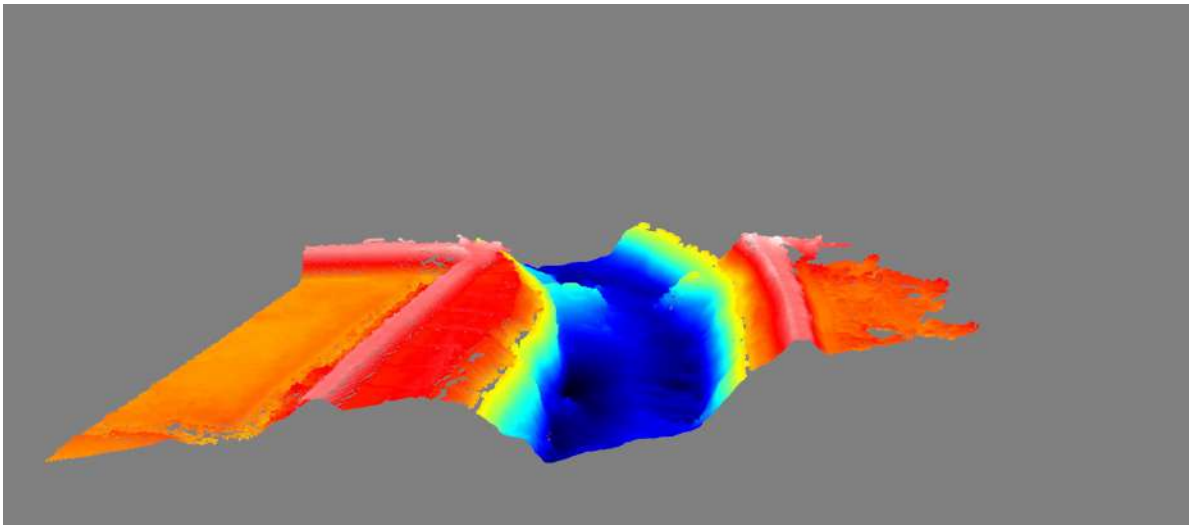


Figure 4.14: Combined Topo (LiDAR) and Bathy (MBES) result.

4.5 Water level measurements with CTD diver

The water level elevation with respect to a well defined vertical reference level is measured with:

- a water level logger (Conductivity Temperature and Depth (CTD) diver) installed in the water, at an accurately measured position (with GNSS)
- a barometric pressure sensor (BARO diver) to compensate for the local atmospheric pressure contribution to the pressure measured by the CTD

A schematic is provided in Fig. 4.15 and Tab. 4.3 lists the specifications and accuracies of the used instruments.

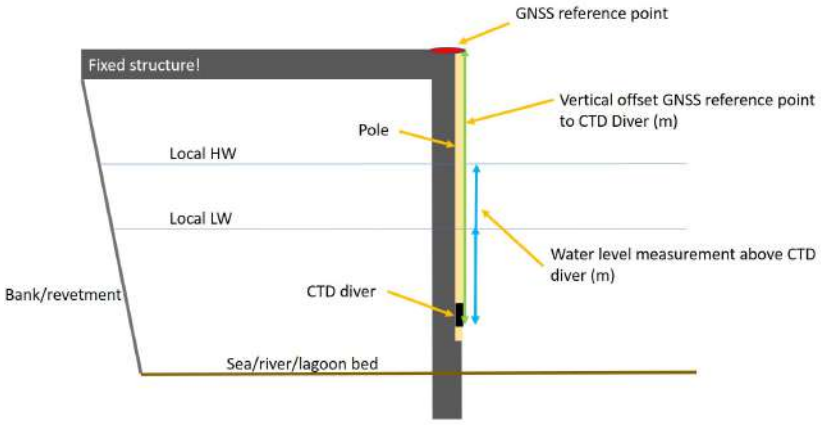


Figure 4.15: Schematic of water level measurement. Measurement of water level relative to CTD (blue) and relative to vertical datum by correcting for vertical offset GNSS reference point to CTD diver (green)

Table 4.3: Overview of used instruments and corresponding accuracy. The accuracy is based on the manufacturer's declaration

Instrument:	**Brand and type:**	**Accuracy:**
Water level and salinity logger	Eijkelkamp CTD-diver	+/-2 cm
Barometer	Eijkelkamp Baro-diver	+/- 0.5 cm
RTK-GNSS	Leica GS10/14 (or comparable)	$\pm$ 2 cm + 1 mm/km

N.B.: Spatial fluctuations in atmospheric pressure can affect the resulting water level elevation, resulting in a relative accuracy between the sensors in the order of 5-10 cm if only a single point BARO diver is used. It is recommended to install a BARO diver at each water level logger location, to minimize the influence of spatial atmospheric pressure fluctuations on the water level elevations, when multiple water level loggers are installed over a large (>10km) area.

CTD's are installed at three locations (Fig. 4.16):

- Harbour pier
- Bailey Bridge area
- Blythburgh

Coordinates of the GNSS reference point and vertical offset to the CTD diver location are also provided (Tab. 4.4).

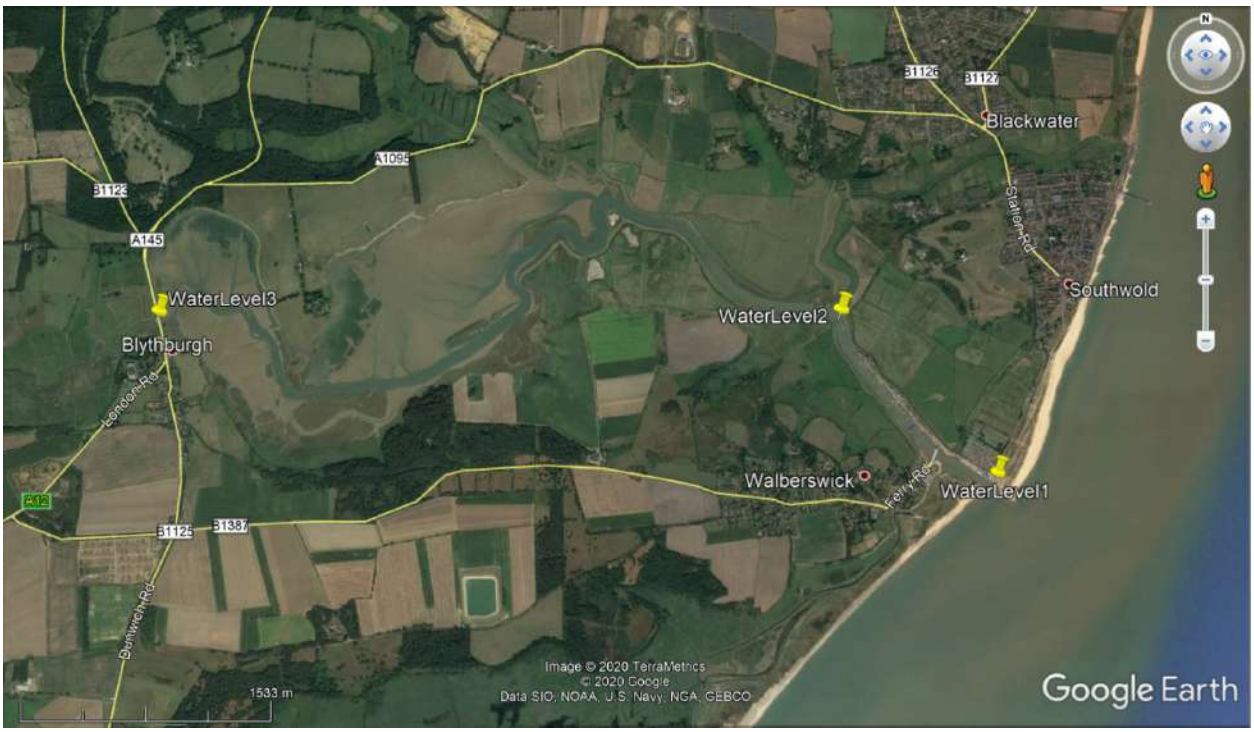


Figure 4.16: CTD measurement locations

Table 4.4: GNSS reference points of water level loggers and vertical offset to CTD diver in OSGB36-BNG.

Location:	Easting [m]	Northing [m]	Z [m]	Z offset GNSS refpoint to sensor [m]
Harbour pier	650452.08	274841.58	2.88	4.417
Bailey Bridge area	649441.82	275800.90	2.70	4.511
Blythburgh	645210.90	275576.56	1.24	1.82

The **Harbour pier** renders the information closest to the actual tide at sea. The CTD is installed to the stepladder in the quaywall, very close to the benchmark location. The baro meter was installed on the fence on top of the quay. Fig. 4.17 shows the location of the installed logger.

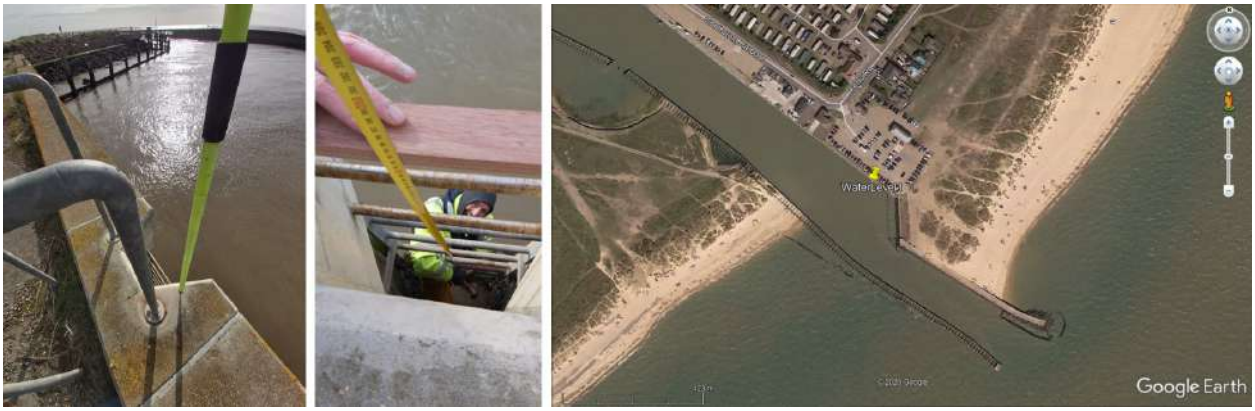


Figure 4.17: Harbour pier water level logger location

The **Bailey Bridge** CTD provides valuable water level gradient information over the channel. The CTD is installed on one of the bridge pillars. The baro meter was installed below the bridge deck, on the same pillar. Fig. 4.18 shows the location of the installed logger.

Figure 4.18: Bailey Bridge water level logger location

The **Blythburgh** CTD renders the inland boundary condition. The CTD was installed to the water level gauge of the Environment Agency (TM 452756). The baro meter was installed below the top stair of the staircase leading to the gauge. RoyalHaskoningDHV is encouraged to request the EA data of this gauge, for comparison with the newly obtained data by SHORE. Fig. 4.19 shows the location of the installed logger.

Figure 4.19: Blythburgh water level logger location

The resulting measurements of the water level are presented in Fig. 4.20 relative to ODN, over the deployment duration. Note the varying increase and decrease in water level elevation on timescales of days (larger than the tide), most likely due to meteorological conditions at the Northern end of the Northsea, governing the water level at the southern parts of the Northsea.

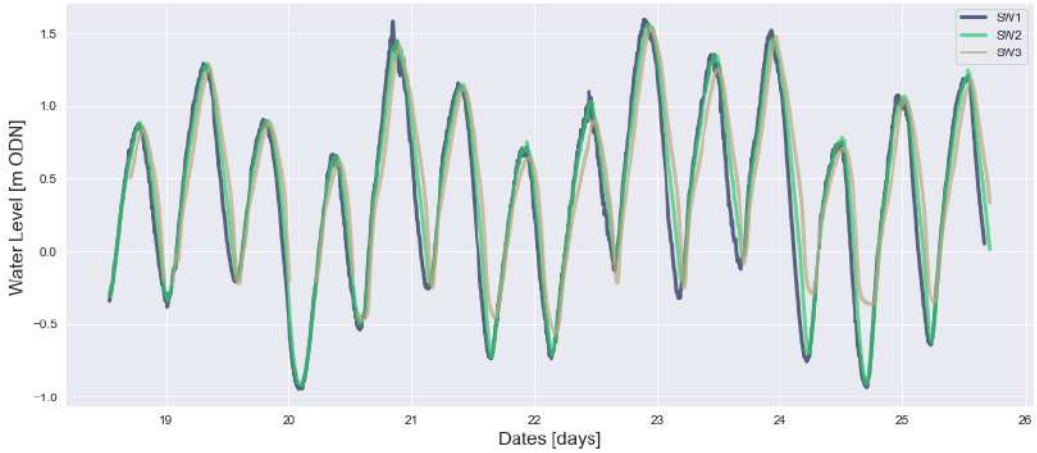
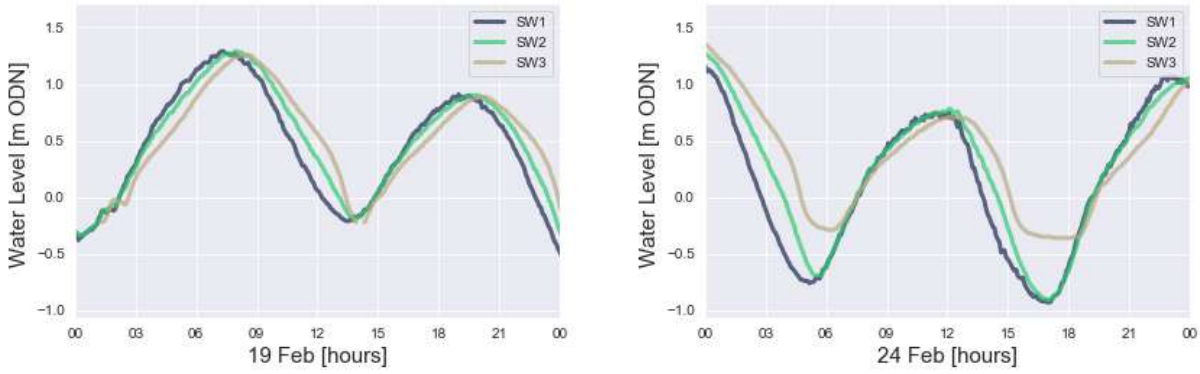


Figure 4.20: Water level timeseries of the three installed loggers, relative to ODN. Harbour Pier (blue), Bailey Bridge (green) and Blythburgh (brown).

All three water level loggers measured similar water elevations with a slight time lag. In figures 4.21a and 4.21b a more detailed view is presented of the water level time series of a single day (19 and 24 February). The time lag between the signals depends on the stage in the time series, but is approximately one hour.



(a) (b)

Figure 4.21: Single day time series of water level elevation for three water level loggers.

Deliverables are:

- timeseries of water level elevation at 3 water level measurement locations in a .csv file (including figure for visualisation of the data)
- GNSS reference points and offsets to water level loggers at 3 water level measurement locations in a .txt file

4.6 Turbidity measurements

The turbidity is measured at two locations with the Neplite 5000 (Fig. 4.22) attached to fixed structures at a fixed (permanently submerged) location above the bed level. The instrument measures the backscatter of light on passing particles in the water in NTU. Water samples are taken with a Niskin bottle (Fig. 4.22) for correlation of NTU and suspended partical matter (SPM). Table 4.5 lists the instruments specifications.

Figure 4.22: Niskin bottle and turbidity sensor.

Table 4.5: Specifications of turbidity sensors and corresponding accuracy. The accuracy is based on the manufacturer's declaration.

Instrument:	Brand and type:	Range:	Resolution:
Turbidity sensor	Analite NEP 5000	100 NTU 400 NTU 1,000 NTU 5,000 NTU	0.01 NTU 0.1 NTU 1.0 NTU 2.0 NTU

Two locations are selected in consultation with the client and the Harbour Master of Southwold (Fig. 4.23):

- Location A: on the stepladder attached to the quaywall, close to the Harbour Entrance and water level logger 1.
- Location B: on a pillar of a fixed birth, at one of the deeper parts of the channel, slightly seaward of the Harbour Master's Office.

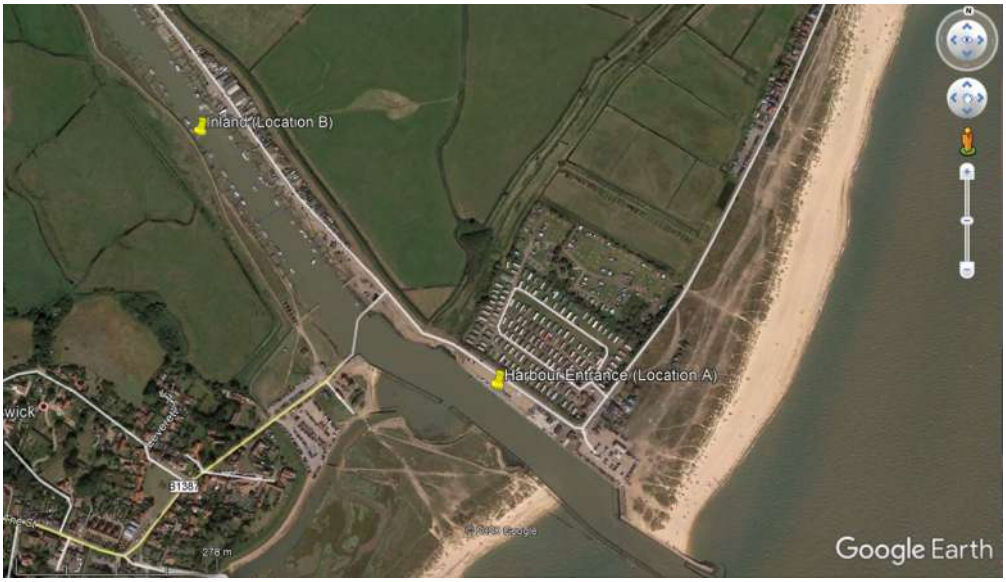


Figure 4.23: Locations of turbidity measurements (NTU) and niskin bottle sampling (SPM).

In analogy to the referencing of the water level loggers, a GNSS reference point is created on top of the vertical fixed structure to which the turbidity sensor is attached, and the vertical offset between GNSS reference point and the sensor is measured. The resulting coordinates of the GNSS reference points and offsets are listed in Tab. 4.6.

Table 4.6: GNSS reference points of turbidity loggers and vertical offset to the logger in OSGB36-BNG.

Location:	Easting [m]	Northing [m]	Z [m]	Z offset GNSS refpoint to sensor [m]	Z sensor [m]
Location A (harbour entrance)	650288.71	274941.17	2.86	4.84	-1.98
Location B (inland birth)	649800.67	275271.61	1.59	3.01	-1.42

The timeseries of the turbidity measurements span a period between February 20th 14:00hr to February 25th 16:25hr[1]. The timeseries show a very asymmetrical pattern over the tidal period. A peak in turbidity on every rising tide (flow into the estuary) is observed, and slow decay during the falling tide (flow towards the Northsea) for both locations (Fig. 4.24). A phase-lag of approximately 20-30 minutes is clearly observed between the steep rise in turbidity between the harbour entrance and the inland location.

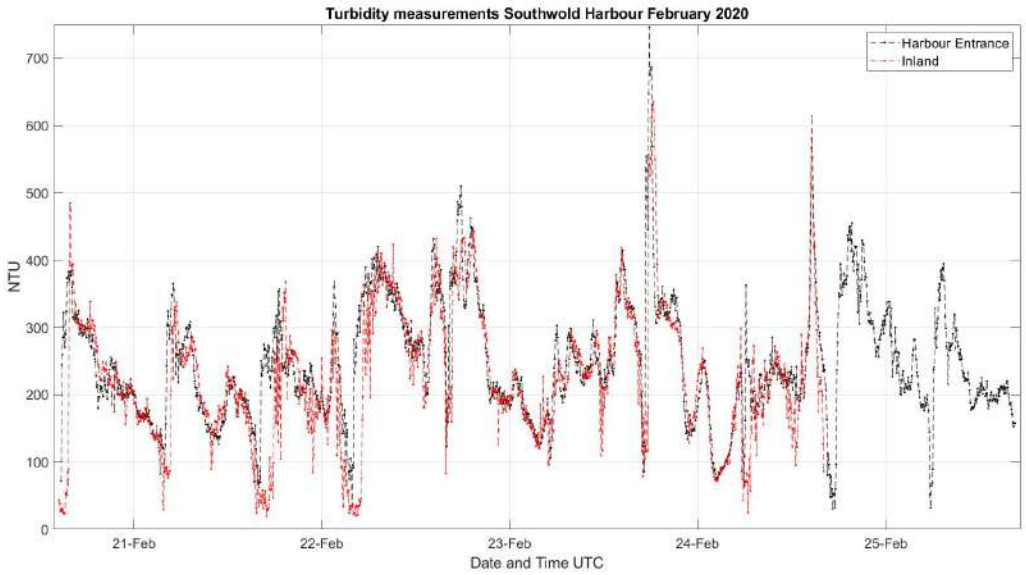


Figure 4.24: Time series of turbidity measurements on Location A - Harbour Entrance (black) and B - Inland (red).

Water samples were obtained for all nine (9) cycles of current measurements over one spring tidal cycle on February 24th. This results in 18 samples (9 moments at location A & B). The water samples are analysed in a laboratory to determine the total suspended particle matter (Total SPM). Tab. 4.7 lists the times and SPM values for each sample.

[1] N.B.: The logger at Location B (inland) experienced a leak in the housing, compromising full time-coverage on February 24th (last observation 16:05hr). However, because of early deployment of the sensors, more data is delivered of the days preceding the 24th.

Table 4.7: Water sample times and SPM values.

Location:	**Time (UTC)** [HH:MM]	**SPM [mg/L]**	**Location:**	**Time (UTC)** [HH:MM]	**SPM [mg/L]**
Loc A	06:42	243.38	Loc B (inland)	07:22	295.54
Loc A	07:56	266.72	Loc B (inland)	08:29	275.23
Loc A	09:29	302.21	Loc B (inland)	09:56	312.05
Loc A	10:56	279.03	Loc B (inland)	11:26	296.72
Loc A	12:29	261.08	Loc B (inland)	12:55	253.82
Loc A	13:56	333.41	Loc B (inland)	14:26	632.41
Loc A	15:24	461.21	Loc B (inland)	15:59	213.63
Loc A	16:50	85.61	Loc B (inland)	17:26	60.99
Loc A	18:26	455.50	Loc B (inland)	18:56	448.91

The SPM values obtained through sampling and lab analysis correspond well with the in-situ measured NTU values of the NEPlite 5000 loggers (Fig. 4.25). The time series of the turbidity measurements (NTU) are transformed into SPM timeseries based on a linear regression relation between the NTU and SPM values. Figure 4.26 shows time series of the NTU measurements (red and black dashed lines), SPM values on sample times (red and black asterix) and calculated SPM values based on NTU-SPM linear regression (solid red and black lines).

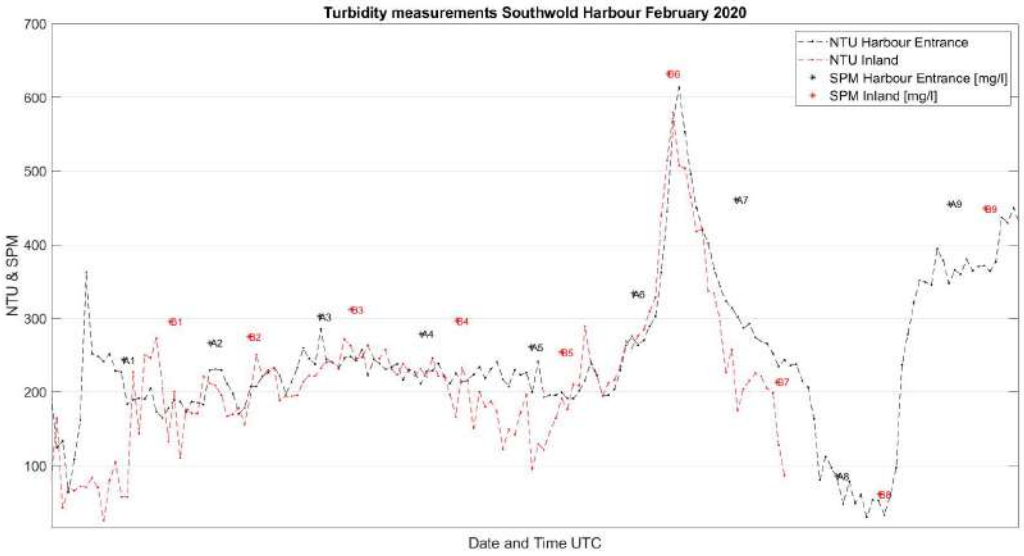


Figure 4.25: Time series of turbidity measurements and SPM samples 24th February, on Location A - Harbour Entrance (black) and B - Inland (red).

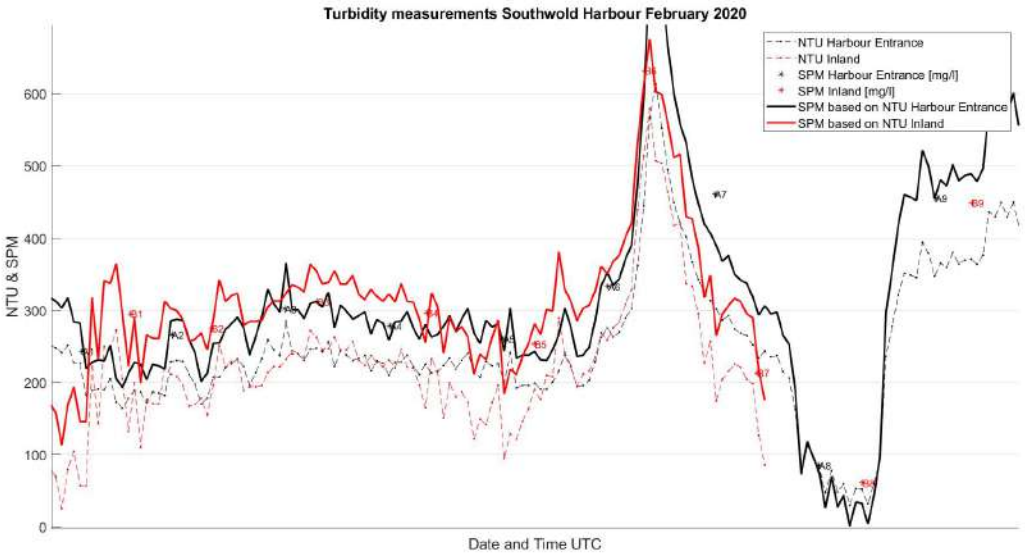


Figure 4.26: Time series of turbidity measurements, SPM samples and SPM based on linear regression NTU & SPM samples. Location A (red) and B (black) on February 24th.

Deliverables are:

- ascii txt file containing measured NTU and calculated SPM timeseries for Location A and B
- csv excel file containing SPM analyses results of nine (9) samples per Location A and B

4.7 Flow velocity and discharge measurements

Flow velocities and discharge are measured with the Sontek M9 RiverSurveyor mounted on a vessel (Fig. 4.27). Table 4.8 lists the specifications of the instrument according to the manufacturers declaration.

Figure 4.27: Example of vessel-mounted RiverSurveyor M9. Left: M9 graphic and specifications. Right: M9 mounted on the survey vessel, note the submerged ADCP (annotation 1), the vertical attachment pole (annotation 2) and the mounting frame (annotation 3).

Table 4.8: Sontek RiverSurveyor M9 accuracy, based on the manufacturer's declaration.

Instrument:	Brand and type:	Accuracy:	Resolution:
ADCP	Sontek RiverSurveyor M9	+/- 0.25% of measured velocity; 0.2 cm/s	0.001 m/s

The survey was performed over predefined transects (Fig. 4.28) and timespans as required by the client.

The boat velocity is measured by bottom tracking of the M9, RTK-GNSS NMEA strings: GGA (positions) and VTG (GNSS velocity by means of doppler shift for each observation). This ensures accurate correction of the ADCP current velocity measurements with the boat velocity.

Six profiles were surveyed within each cycle of 1.5 hours (4.28). Measurements started at the most seaward profile and ended at the most inland profile.

Each profile is measured twice per cycle. Real time QC is performed with the SonTek RiverSurveyorLive software. The first (initial) transect measurement is checked with the second (control) transect measurement. Discharges obtained in the initial and control transect should be in the same order of magnitude to conclude a successful measurement. If the measurements are not in agreement, the transect location is measured again.

Before the first and after the last profile a CTD profile (conductivity, temperature, depth) fter completion of the two transects a CTD-profile using a YSI Castaway is measured in approximately the deepest part of the channel, for accurate sound velocity information.

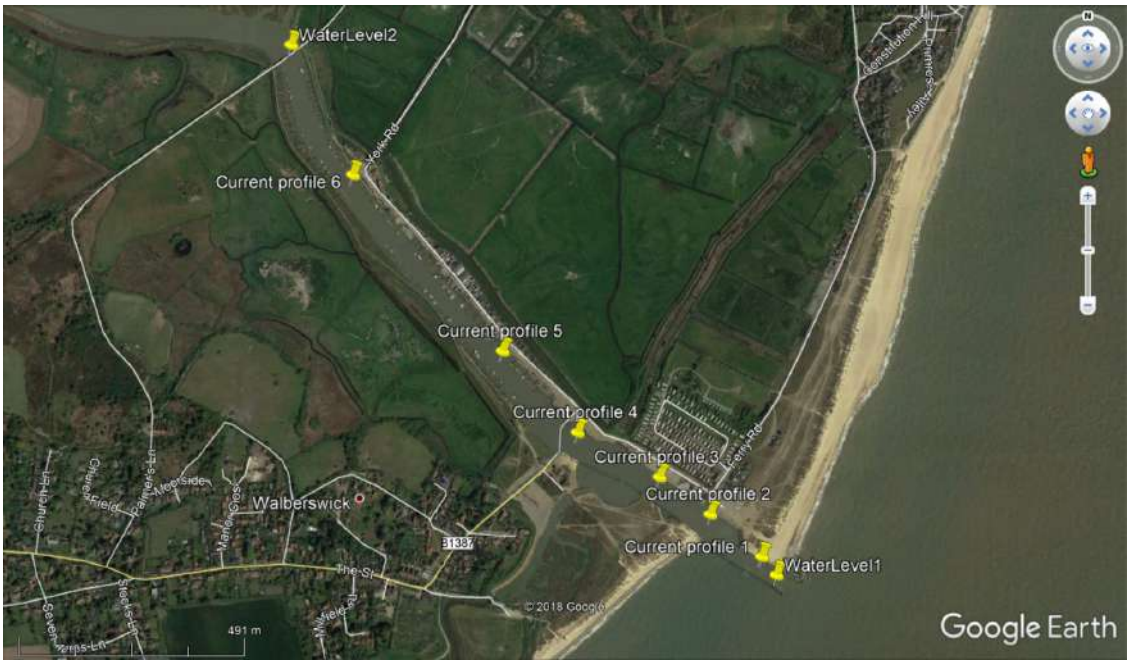


Figure 4.28: Transects for flow velocity and discharge measurement on Google Earth background.

4.7.1 Results

Results for the neap (Fig. 4.29) and spring tide discharge measurements (Fig. 4.30) show peak seaward discharges of approximately 150 - 180 m^3/s and peak inland directed discharges of approximately 100 - 120 m^3/s. Maximum discharges (both sea and landward) are smaller for the springtide measurement. Water levels were substantially lower on the 24th, than on the 19th, due to the boundary conditions in water level elevation on the Northsea. Figure 4.20 shows approximately 0.5 m higher mean water levels

on the 19th than on the 24th. Flooding of the adjacent road was reported the day after the neap tide measurements. This was not observed/reported around the spring tide discharge measurements.

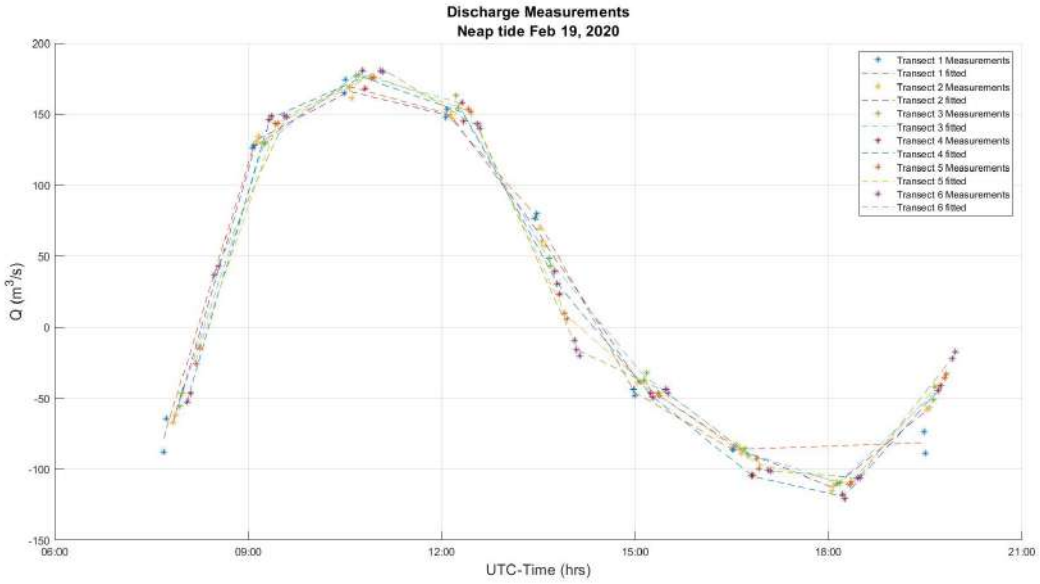


Figure 4.29: Neap tide discharge measurements over time for all six (6) transects and nine (9) measurement rounds in 13 hrs

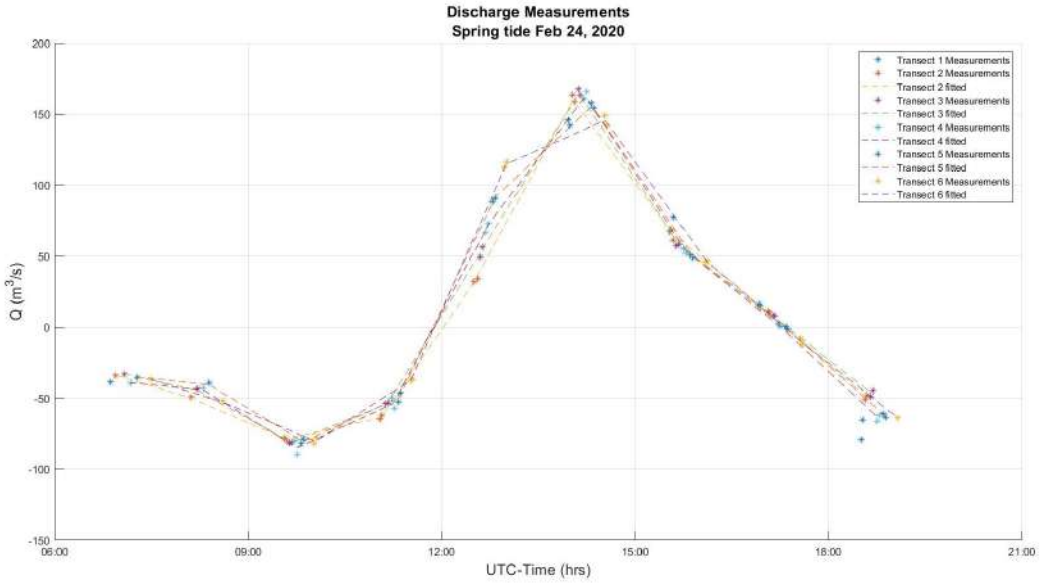


Figure 4.30: Spring tide discharge measurements over time for all six (6) transects and nine (9) measurement rounds in 13 hrs

Deliverables discharge measurments: ascii .txt files for neap and spring tide measurements containing 4 columns:

- UTC time
- Discharge
- X,Easting of transect center in UTM 31 N
- Y,Northing of transect center in UTM 31 N

Deliverables current velocity measurements:
The current velocity measurements, separated per run and per transect, are stored in Excel(xslx) files. In each file, a summary of data processing is presented and the data is stored in the different sheets. This includes both a depth-averaged plan view with flow directions at the transect and flow velocities of the cross section in bins of 0.4 meter water depth. Figures 4.31 and 4.32 show both the cross-section and planview data of one of the measured transects.

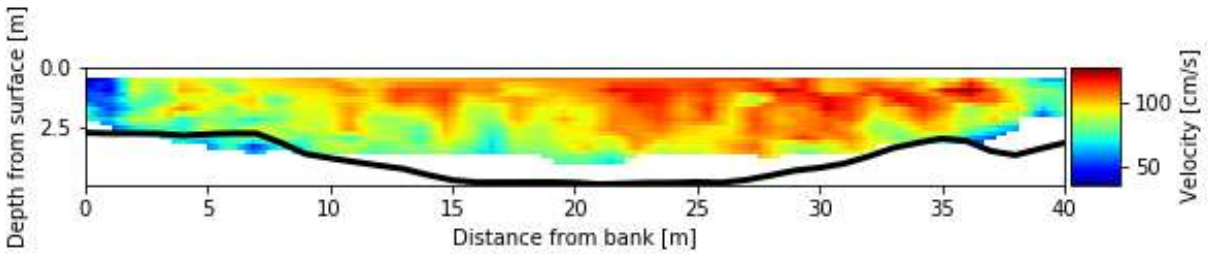


Figure 4.31: Cross Section of one of the transects with magnitude of flow velocity separated in depth-bins

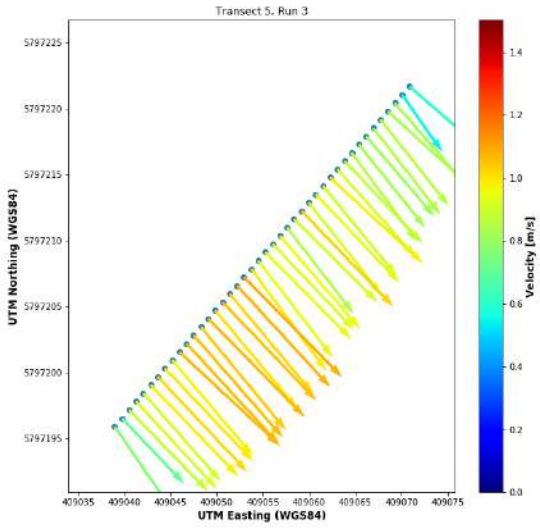


Figure 4.32: Planview of one of the transects with direction and magnitude of the depth averaged velocity

4.8 Sediment sampling

The objective of the sediment sampling and analysis is to account for the correct bed roughness in the modelling by RHDHV, as well as to analyse spatial gradients in sediment characteristics. This contributes to the analysis of the processes governing the present situation.

For modelling purposes typically the D50 is needed. The grainsize distribution is used to assess (non)uniformity of the sediment. Analysis is performed by RHDHV, samples are collected by SHORE.

Locations were selected in consultation with RHDHV (Fig. 4.33).

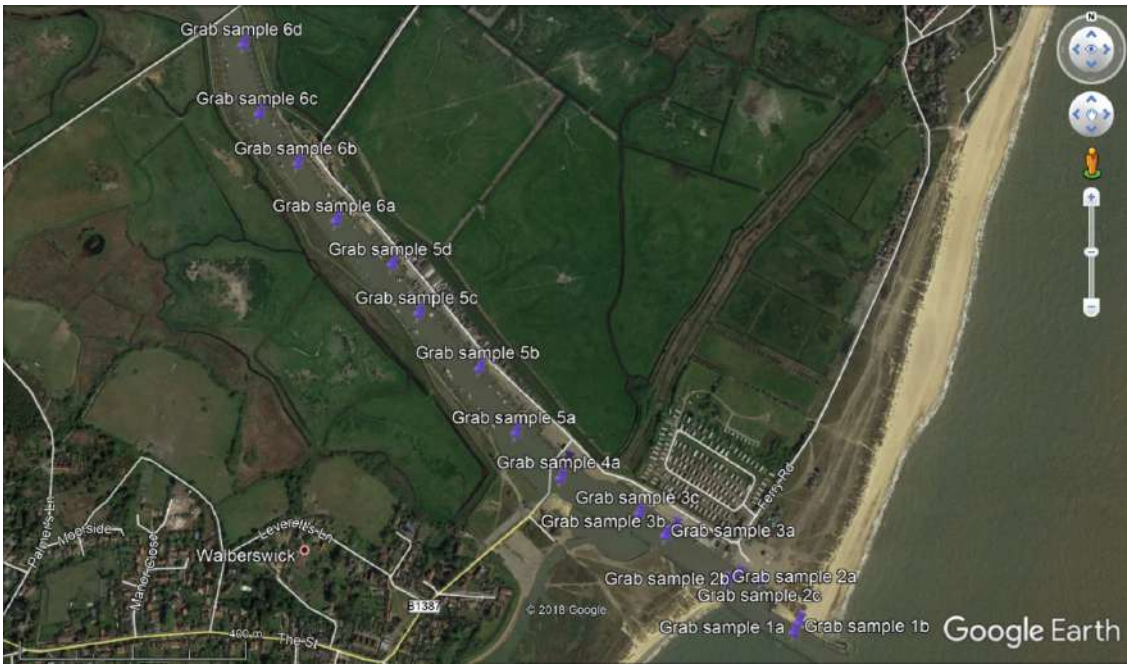


Figure 4.33: Sediment sample locations.

The sediment samples are collected with a 2 liter capacity stainless steel Van Veen Grabber (Fig. 4.34, left panel). If sediment samples are collected in the intertidal area and on the beach a small scoop is used (Fig. 4.34, right panel).

Figure 4.34: Sediment sample equipment.

The execution of the sediment sampling follows a procedure to ensure correct and efficient data collection:

- planned locations are programmed into a handheld GPS (Garmin/phone)
- locations are labelled with specific ID's
- waterproof ziplock bags are prepared with the ID's of the individual locations
- execution of the sediment sampling is scheduled with respect to the tidal water level variation (especially for the intertidal samples)
- the final actual sampling location is measured with the GPS when a sample is taken
- the sample is stored in the corresponding ziplock bag of which a picture is taken
- sampling equipment is rinsed for the next location
- at the field office, all ziplock bags are inventoried and the coordinates of the measured locations are permanently marked on the ziplock bags.
- a list of all sample locations and ID's is compiled including the X,Y coordinates as measured
- samples are packed into a pelicase (to minimise risk on damage)
- samples are supplied to an analysing laboratory/client to determine the D50 and grainsize distribution curves, to assess the (non)uniformity of the samples.

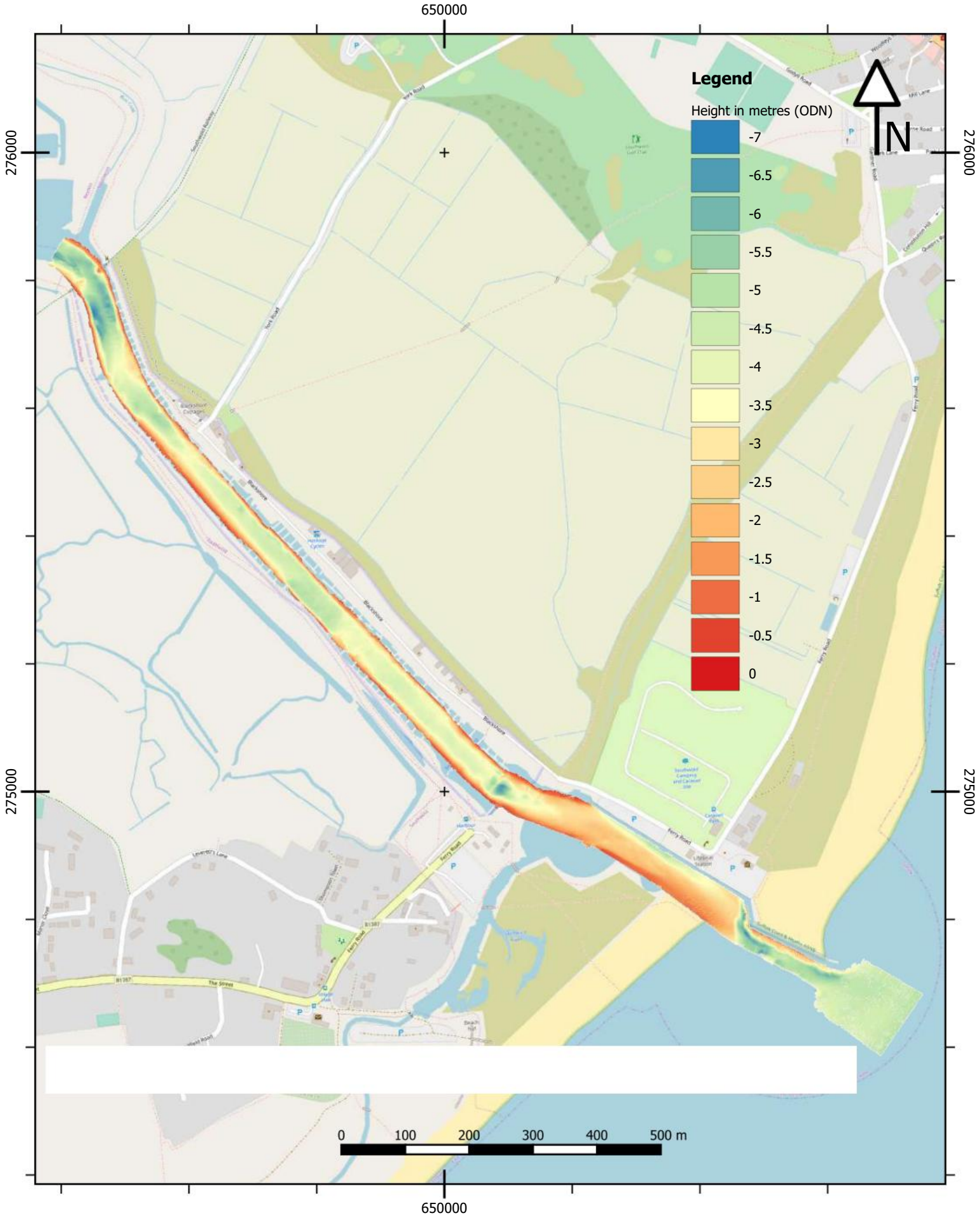
The actual and accurate bed level elevation is sampled from the surveyed bathymetry/topography data for each measured sampling location and delivered in a .txt file.

Important notice to RHDHV: almost all samples in the channel consisted of shingle, clamps, shells and other large objects. A possible explanation for this would be the (very fine) sediment fractions to be washed out of the Van Veen Grabber, during hoisting up. The strong currents probably wash away all fine sediment from the bed, leaving the coarser material (stones, shells) and underlying more cohesive clay fractions as bed material. Reports from locals were in line with the obtained samples. Even reports of complete blockage of the entrance channel by shingle and stones were shared with SHORE.

Additional sediment samples outside of the harbour and on the adjacent beaches were obtained, which did consist of sediment.

Deliverables are:

- Sediment samples in marked zip lock bags, to be collected by RHDHV courier.
- .txt file with point id, x, y and z locations of the samples obtained in the field.



Southwold Bathymetric survey

DTM (1.0m)

Author: MSc. Lex Veltman

Date:25th May 2020

Survey Date: 18th Feb 2020

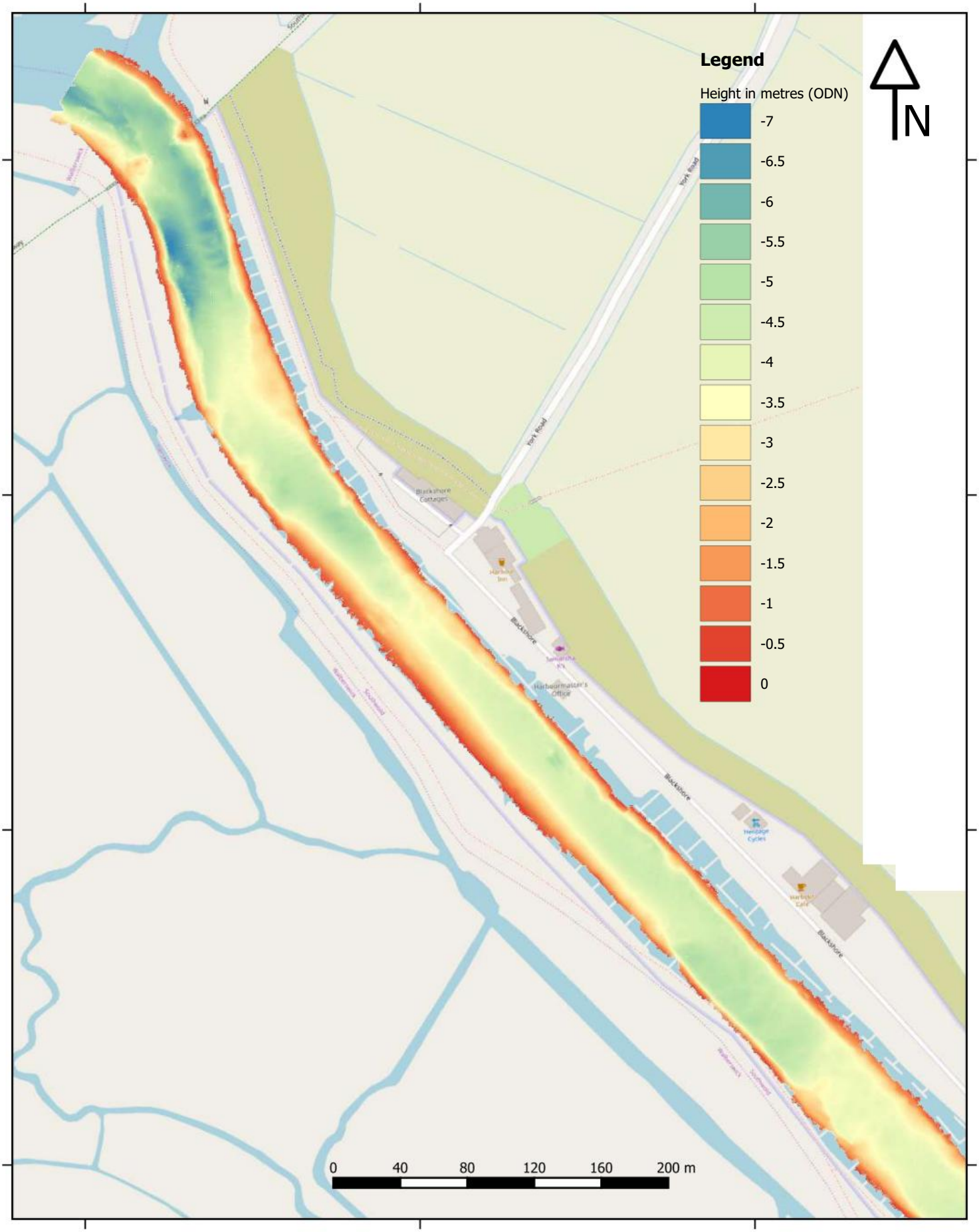
Datum: OSGB36(BNG)/ODN

Units: Metres

Scale: 1:7500

Shore Monitoring & Research
Web: www.shoremonitoring.nl
Email: info@shoremonitoring.nl

Address: 2e Zeesluisdwarsweg 8a
2583DW, Den Haag



Southwold Bathymetric survey

DTM (1.0m) Zoomed in to the northern part of the survey area.

Author: MSc. Lex Veltman
Date:25th May 2020
Survey Date: 18th Feb 2020
Datum: OSGB36(BNG)/ODN
Units: Metres
Scale: 1:3000

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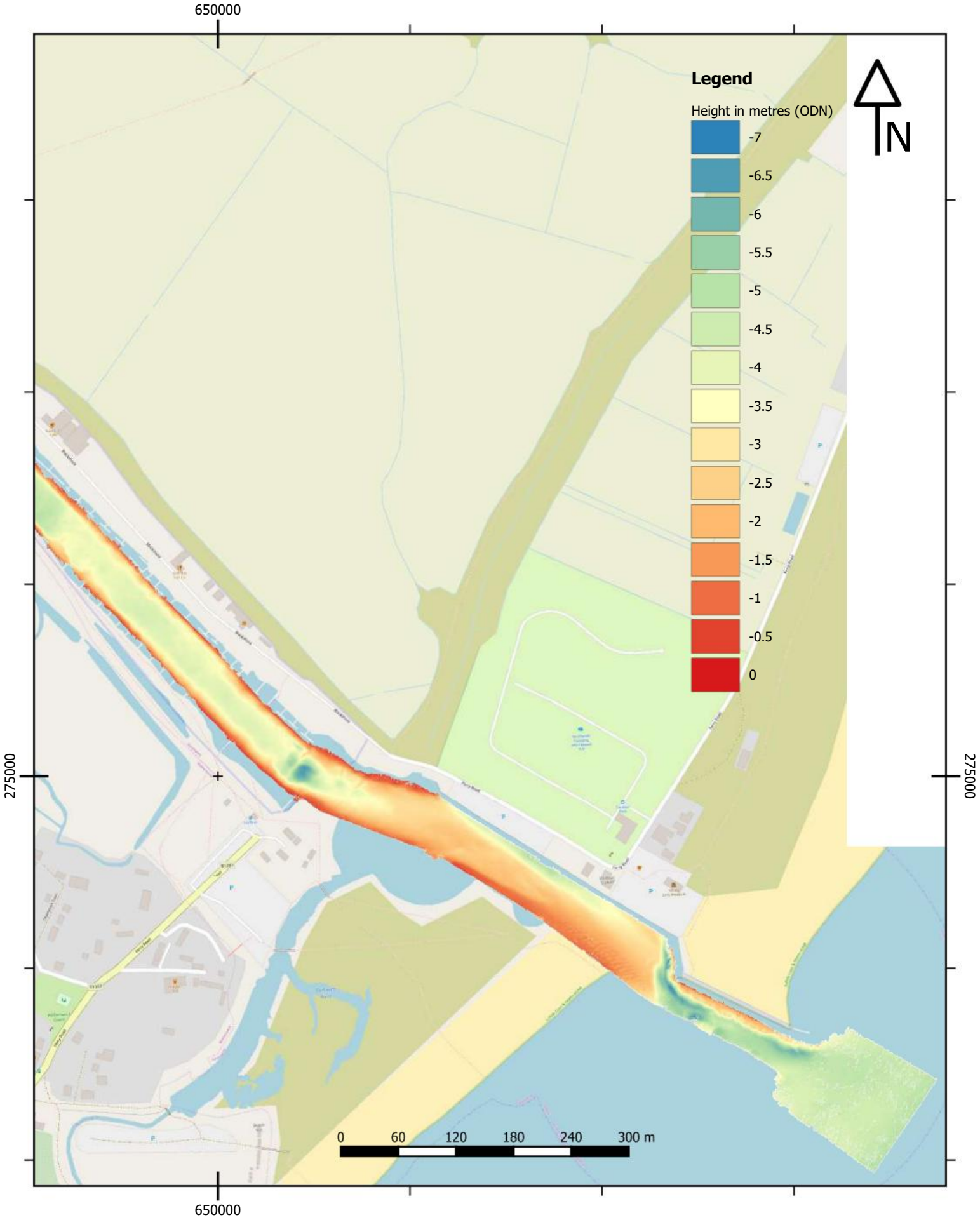

Southwold Bathymetric survey

DTM (1.0m) Zoomed in to the southern part of the survey area.

Author: MSc. Lex Veltman
Date:25th May 2020
Survey Date: 18th Feb 2020
Datum: OSGB36(BNG)/ODN
Units: Metres
Scale: 1:5000

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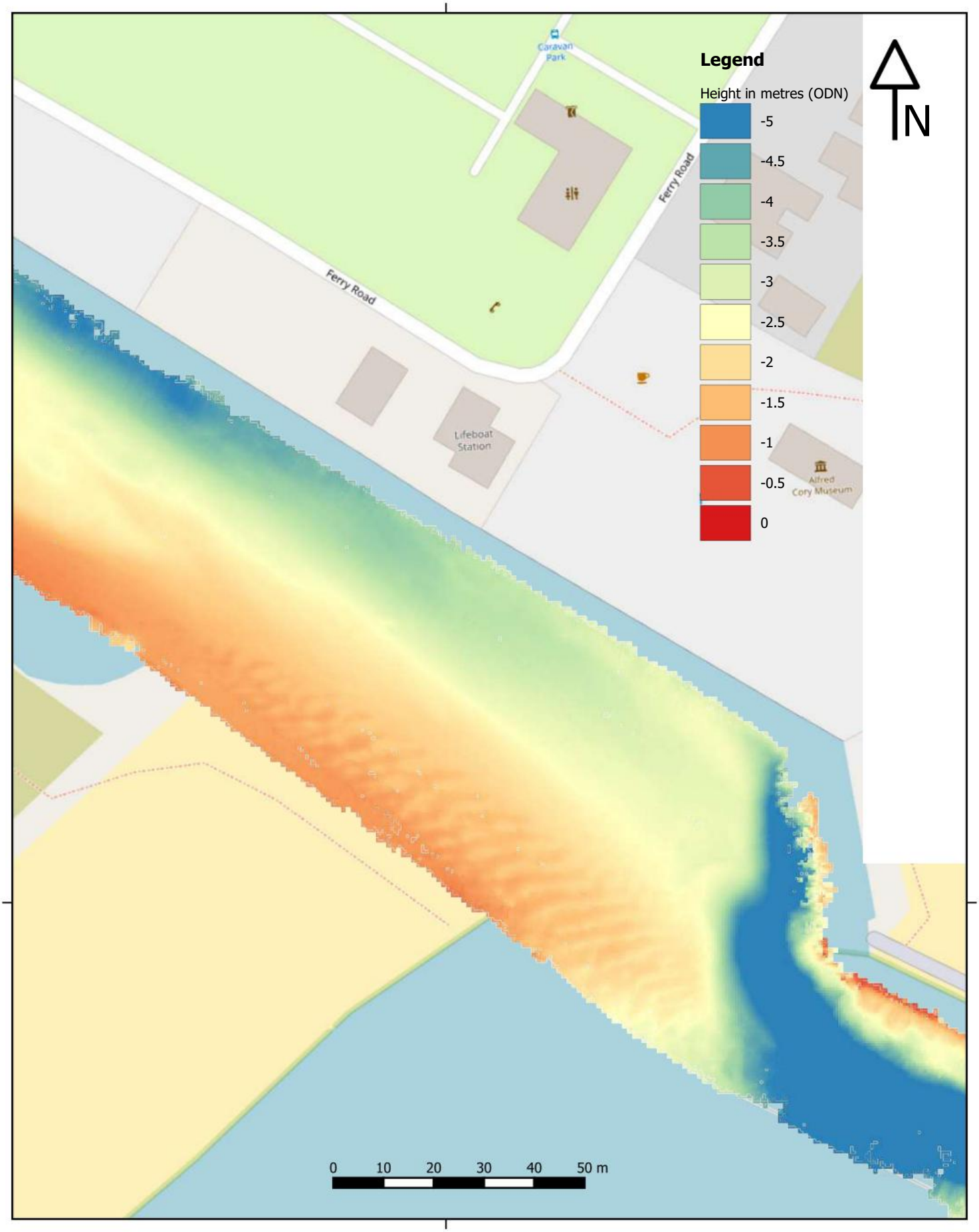
2583DW, Den Haag



Southwold Bathymetric survey

DTM (1.0m) Zoomed to the sand paterns.

Author: MSc. Lex Veltman

Date:25th May 2020

Survey Date: 18th Feb 2020

Datum: OSGB36(BNG)/ODN

Units: Metres

Scale: 1:1000

Shore Monitoring & Research
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Address: 2e Zeesluisdwarsweg 8a
2583DW, Den Haag

Analytical Report: AB20-00632.001

Date: 27/03/2020

HASKONINGDHV UK LTD
RIGHTWELL HOUSE
BRETTON
UNITED KINGDOM
PE3 8DW

CLIENT ORDER NUMBER :	Particle size distribution	SGS ORDER NO.:	329476
CLIENT ID :	Sand for Sieve Analysis		
LOCATION :	North	PRODUCT DESCRIPTION :	Soil
SAMPLE SOURCE :	As Supplied	SOURCE ID :	1a
SAMPLE TYPE :	As submitted	SAMPLE BY :	Client
SAMPLED :	--	RECEIVED :	06/03/2020
ANALYSED :	23/03/2020 - 25/03/2020	COMPLETED :	25/03/2020

PROPERTY	METHOD	RESULT	UNITS
Particle Size and Distribution of Solids by Sieve Analysis	OGC-ABZ-PRO-LAB-026		
Percentage weight at sieve size 1.7mm		99.98	%
Percentage weight at sieve size 1.4mm		0.00	%
Percentage weight at sieve size 1.18mm		0.00	%
Percentage weight at sieve size 1mm		0.00	%
Percentage weight at sieve size 0.85mm		0.01	%
Percentage weight at sieve size 0.71mm		0.00	%
Percentage weight at sieve size 0.6mm		0.00	%
Percentage weight at sieve size 0.5mm		0.00	%
Percentage weight at sieve size 0.425mm		0.00	%
Percentage weight at sieve size 0.355mm		0.00	%
Percentage weight at sieve size 0.3mm		0.00	%
Percentage weight at sieve size 0.25mm		0.00	%
Percentage weight at sieve size 0.212mm		0.00	%
Percentage weight at sieve size 0.18mm		0.00	%
Percentage weight at sieve size 0.15mm		0.00	%
Percentage weight at sieve size 0.125mm		0.00	%
Percentage weight at sieve size 0.106mm		0.00	%
Percentage weight at sieve size 0.09mm		0.00	%
Percentage weight at sieve size 0.075mm		0.00	%
Percentage weight at sieve size 0.063mm		0.00	%
Percentage weight at sieve size 0.045mm		0.00	%
Percentage weight at sieve size <0.045mm		0.00	%

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Analytical Report: AB20-00632.002

Date: 27/03/2020

HASKONINGDHV UK LTD
RIGHTWELL HOUSE
BRETTON
UNITED KINGDOM
PE3 8DW

CLIENT ORDER NUMBER :	Particle size distribution	SGS ORDER NO.:	329476
CLIENT ID :	Sand for Sieve Analysis		
LOCATION :	North	PRODUCT DESCRIPTION :	Soil
SAMPLE SOURCE :	As Supplied	SOURCE ID :	1b
SAMPLE TYPE :	As submitted	SAMPLE BY :	Client
SAMPLED :	--	RECEIVED :	06/03/2020
ANALYSED :	23/03/2020 - 25/03/2020	COMPLETED :	25/03/2020

PROPERTY	METHOD	RESULT	UNITS
Particle Size and Distribution of Solids by Sieve Analysis	OGC-ABZ-PRO-LAB-026		
Percentage weight at sieve size 1.7mm		>100.00	%
Percentage weight at sieve size 1.4mm		0.00	%
Percentage weight at sieve size 1.18mm		0.00	%
Percentage weight at sieve size 1mm		0.00	%
Percentage weight at sieve size 0.85mm		0.00	%
Percentage weight at sieve size 0.71mm		0.00	%
Percentage weight at sieve size 0.6mm		0.00	%
Percentage weight at sieve size 0.5mm		0.00	%
Percentage weight at sieve size 0.425mm		0.00	%
Percentage weight at sieve size 0.355mm		0.00	%
Percentage weight at sieve size 0.3mm		0.00	%
Percentage weight at sieve size 0.25mm		0.00	%
Percentage weight at sieve size 0.212mm		0.00	%
Percentage weight at sieve size 0.18mm		0.00	%
Percentage weight at sieve size 0.15mm		0.00	%
Percentage weight at sieve size 0.125mm		0.00	%
Percentage weight at sieve size 0.106mm		0.00	%
Percentage weight at sieve size 0.09mm		0.00	%
Percentage weight at sieve size 0.075mm		0.00	%
Percentage weight at sieve size 0.063mm		0.00	%
Percentage weight at sieve size 0.045mm		0.00	%
Percentage weight at sieve size <0.045mm		0.00	%

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Analytical Report: AB20-00632.003

Date: 27/03/2020

HASKONINGDHV UK LTD
RIGHTWELL HOUSE
BRETTON
UNITED KINGDOM
PE3 8DW

CLIENT ORDER NUMBER :	Particle size distribution	SGS ORDER NO.:	329476
CLIENT ID :	Sand for Sieve Analysis		
LOCATION :	North	PRODUCT DESCRIPTION :	Soil
SAMPLE SOURCE :	As Supplied	SOURCE ID :	2a
SAMPLE TYPE :	As submitted	SAMPLE BY :	Client
SAMPLED :	--	RECEIVED :	06/03/2020
ANALYSED :	23/03/2020 - 25/03/2020	COMPLETED :	25/03/2020

PROPERTY	METHOD	RESULT	UNITS
Particle Size and Distribution of Solids by Sieve Analysis	OGC-ABZ-PRO-LAB-026		
Percentage weight at sieve size 1.7mm		17.09	%
Percentage weight at sieve size 1.4mm		0.56	%
Percentage weight at sieve size 1.18mm		0.43	%
Percentage weight at sieve size 1mm		0.42	%
Percentage weight at sieve size 0.85mm		0.34	%
Percentage weight at sieve size 0.71mm		0.23	%
Percentage weight at sieve size 0.6mm		0.54	%
Percentage weight at sieve size 0.5mm		1.26	%
Percentage weight at sieve size 0.425mm		2.10	%
Percentage weight at sieve size 0.355mm		7.95	%
Percentage weight at sieve size 0.3mm		19.66	%
Percentage weight at sieve size 0.25mm		32.55	%
Percentage weight at sieve size 0.212mm		14.53	%
Percentage weight at sieve size 0.18mm		1.86	%
Percentage weight at sieve size 0.15mm		0.38	%
Percentage weight at sieve size 0.125mm		0.03	%
Percentage weight at sieve size 0.106mm		0.01	%
Percentage weight at sieve size 0.09mm		0.00	%
Percentage weight at sieve size 0.075mm		0.01	%
Percentage weight at sieve size 0.063mm		0.00	%
Percentage weight at sieve size 0.045mm		0.01	%
Percentage weight at sieve size <0.045mm		0.00	%

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Analytical Report: AB20-00632.004

Date: 27/03/2020

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RIGHTWELL HOUSE
BRETTON
UNITED KINGDOM
PE3 8DW

CLIENT ORDER NUMBER :	Particle size distribution	SGS ORDER NO.:	329476
CLIENT ID :	Sand for Sieve Analysis		
LOCATION :	North	PRODUCT DESCRIPTION :	Soil
SAMPLE SOURCE :	As Supplied	SOURCE ID :	2b
SAMPLE TYPE :	As submitted	SAMPLE BY :	Client
SAMPLED :	--	RECEIVED :	06/03/2020
ANALYSED :	24/03/2020 - 25/03/2020	COMPLETED :	25/03/2020

PROPERTY	METHOD	RESULT	UNITS
Particle Size and Distribution of Solids by Sieve Analysis	OGC-ABZ-PRO-LAB-026		
Percentage weight at sieve size 1.7mm		98.22	%
Percentage weight at sieve size 1.4mm		0.34	%
Percentage weight at sieve size 1.18mm		0.22	%
Percentage weight at sieve size 1mm		0.18	%
Percentage weight at sieve size 0.85mm		0.13	%
Percentage weight at sieve size 0.71mm		0.07	%
Percentage weight at sieve size 0.6mm		0.08	%
Percentage weight at sieve size 0.5mm		0.07	%
Percentage weight at sieve size 0.425mm		0.05	%
Percentage weight at sieve size 0.355mm		0.10	%
Percentage weight at sieve size 0.3mm		0.11	%
Percentage weight at sieve size 0.25mm		0.11	%
Percentage weight at sieve size 0.212mm		0.07	%
Percentage weight at sieve size 0.18mm		0.03	%
Percentage weight at sieve size 0.15mm		0.03	%
Percentage weight at sieve size 0.125mm		0.02	%
Percentage weight at sieve size 0.106mm		0.02	%
Percentage weight at sieve size 0.09mm		0.01	%
Percentage weight at sieve size 0.075mm		0.01	%
Percentage weight at sieve size 0.063mm		0.02	%
Percentage weight at sieve size 0.045mm		0.01	%
Percentage weight at sieve size <0.045mm		0.02	%

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Analytical Report: AB20-00632.005

Date: 27/03/2020

HASKONINGDHV UK LTD
RIGHTWELL HOUSE
BRETTON
UNITED KINGDOM
PE3 8DW

CLIENT ORDER NUMBER :	Particle size distribution	SGS ORDER NO.:	329476
CLIENT ID :	Sand for Sieve Analysis		
LOCATION :	North	PRODUCT DESCRIPTION :	Soil
SAMPLE SOURCE :	As Supplied	SOURCE ID :	2c
SAMPLE TYPE :	As submitted	SAMPLE BY :	Client
SAMPLED :	--	RECEIVED :	06/03/2020
ANALYSED :	24/03/2020 - 25/03/2020	COMPLETED :	25/03/2020

PROPERTY	METHOD	RESULT	UNITS
Particle Size and Distribution of Solids by Sieve Analysis	OGC-ABZ-PRO-LAB-026		
Percentage weight at sieve size 1.7mm		98.81	%
Percentage weight at sieve size 1.4mm		0.20	%
Percentage weight at sieve size 1.18mm		0.13	%
Percentage weight at sieve size 1mm		0.12	%
Percentage weight at sieve size 0.85mm		0.08	%
Percentage weight at sieve size 0.71mm		0.05	%
Percentage weight at sieve size 0.6mm		0.06	%
Percentage weight at sieve size 0.5mm		0.05	%
Percentage weight at sieve size 0.425mm		0.03	%
Percentage weight at sieve size 0.355mm		0.04	%
Percentage weight at sieve size 0.3mm		0.05	%
Percentage weight at sieve size 0.25mm		0.06	%
Percentage weight at sieve size 0.212mm		0.06	%
Percentage weight at sieve size 0.18mm		0.04	%
Percentage weight at sieve size 0.15mm		0.05	%
Percentage weight at sieve size 0.125mm		0.03	%
Percentage weight at sieve size 0.106mm		0.03	%
Percentage weight at sieve size 0.09mm		0.02	%
Percentage weight at sieve size 0.075mm		0.02	%
Percentage weight at sieve size 0.063mm		0.02	%
Percentage weight at sieve size 0.045mm		0.03	%
Percentage weight at sieve size <0.045mm		0.00	%

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Analytical Report: AB20-00632.006

Date: 27/03/2020

HASKONINGDHV UK LTD
RIGHTWELL HOUSE
BRETTON
UNITED KINGDOM
PE3 8DW

CLIENT ORDER NUMBER :	Particle size distribution	SGS ORDER NO.:	329476
CLIENT ID :	Sand for Sieve Analysis		
LOCATION :	North	PRODUCT DESCRIPTION :	Soil
SAMPLE SOURCE :	As Supplied	SOURCE ID :	3a
SAMPLE TYPE :	As submitted	SAMPLE BY :	Client
SAMPLED :	--	RECEIVED :	06/03/2020
ANALYSED :	23/03/2020 - 25/03/2020	COMPLETED :	25/03/2020

PROPERTY	METHOD	RESULT	UNITS
Particle Size and Distribution of Solids by Sieve Analysis	OGC-ABZ-PRO-LAB-026		
Percentage weight at sieve size 1.7mm		99.54	%
Percentage weight at sieve size 1.4mm		0.15	%
Percentage weight at sieve size 1.18mm		0.07	%
Percentage weight at sieve size 1mm		0.05	%
Percentage weight at sieve size 0.85mm		0.03	%
Percentage weight at sieve size 0.71mm		0.01	%
Percentage weight at sieve size 0.6mm		0.01	%
Percentage weight at sieve size 0.5mm		0.00	%
Percentage weight at sieve size 0.425mm		0.01	%
Percentage weight at sieve size 0.355mm		0.00	%
Percentage weight at sieve size 0.3mm		0.01	%
Percentage weight at sieve size 0.25mm		0.01	%
Percentage weight at sieve size 0.212mm		0.02	%
Percentage weight at sieve size 0.18mm		0.01	%
Percentage weight at sieve size 0.15mm		0.00	%
Percentage weight at sieve size 0.125mm		0.00	%
Percentage weight at sieve size 0.106mm		0.01	%
Percentage weight at sieve size 0.09mm		0.00	%
Percentage weight at sieve size 0.075mm		0.00	%
Percentage weight at sieve size 0.063mm		0.00	%
Percentage weight at sieve size 0.045mm		0.00	%
Percentage weight at sieve size <0.045mm		0.00	%

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Analytical Report: AB20-00632.007

Date: 27/03/2020

HASKONINGDHV UK LTD
RIGHTWELL HOUSE
BRETTON
UNITED KINGDOM
PE3 8DW

CLIENT ORDER NUMBER :	Particle size distribution	SGS ORDER NO.:	329476
CLIENT ID :	Sand for Sieve Analysis		
LOCATION :	North	PRODUCT DESCRIPTION :	Soil
SAMPLE SOURCE :	As Supplied	SOURCE ID :	3b
SAMPLE TYPE :	As submitted	SAMPLE BY :	Client
SAMPLED :	--	RECEIVED :	06/03/2020
ANALYSED :	24/03/2020 - 25/03/2020	COMPLETED :	25/03/2020

PROPERTY	METHOD	RESULT	UNITS
Particle Size and Distribution of Solids by Sieve Analysis	OGC-ABZ-PRO-LAB-026		
Percentage weight at sieve size 1.7mm		98.72	%
Percentage weight at sieve size 1.4mm		0.19	%
Percentage weight at sieve size 1.18mm		0.13	%
Percentage weight at sieve size 1mm		0.14	%
Percentage weight at sieve size 0.85mm		0.10	%
Percentage weight at sieve size 0.71mm		0.06	%
Percentage weight at sieve size 0.6mm		0.07	%
Percentage weight at sieve size 0.5mm		0.06	%
Percentage weight at sieve size 0.425mm		0.05	%
Percentage weight at sieve size 0.355mm		0.07	%
Percentage weight at sieve size 0.3mm		0.09	%
Percentage weight at sieve size 0.25mm		0.09	%
Percentage weight at sieve size 0.212mm		0.07	%
Percentage weight at sieve size 0.18mm		0.03	%
Percentage weight at sieve size 0.15mm		0.03	%
Percentage weight at sieve size 0.125mm		0.02	%
Percentage weight at sieve size 0.106mm		0.02	%
Percentage weight at sieve size 0.09mm		0.01	%
Percentage weight at sieve size 0.075mm		0.01	%
Percentage weight at sieve size 0.063mm		0.01	%
Percentage weight at sieve size 0.045mm		0.01	%
Percentage weight at sieve size <0.045mm		0.00	%

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Analytical Report: AB20-00632.008

Date: 27/03/2020

HASKONINGDHV UK LTD
RIGHTWELL HOUSE
BRETTON
UNITED KINGDOM
PE3 8DW

CLIENT ORDER NUMBER :	Particle size distribution	SGS ORDER NO.:	329476
CLIENT ID :	Sand for Sieve Analysis		
LOCATION :	North	PRODUCT DESCRIPTION :	Soil
SAMPLE SOURCE :	As Supplied	SOURCE ID :	3c
SAMPLE TYPE :	As submitted	SAMPLE BY :	Client
SAMPLED :	--	RECEIVED :	06/03/2020
ANALYSED :	23/03/2020 - 25/03/2020	COMPLETED :	25/03/2020

PROPERTY	METHOD	RESULT	UNITS
Particle Size and Distribution of Solids by Sieve Analysis	OGC-ABZ-PRO-LAB-026		
Percentage weight at sieve size 1.7mm		99.61	%
Percentage weight at sieve size 1.4mm		0.12	%
Percentage weight at sieve size 1.18mm		0.06	%
Percentage weight at sieve size 1mm		0.04	%
Percentage weight at sieve size 0.85mm		0.03	%
Percentage weight at sieve size 0.71mm		0.01	%
Percentage weight at sieve size 0.6mm		0.01	%
Percentage weight at sieve size 0.5mm		0.01	%
Percentage weight at sieve size 0.425mm		0.01	%
Percentage weight at sieve size 0.355mm		0.01	%
Percentage weight at sieve size 0.3mm		0.01	%
Percentage weight at sieve size 0.25mm		0.02	%
Percentage weight at sieve size 0.212mm		0.02	%
Percentage weight at sieve size 0.18mm		0.02	%
Percentage weight at sieve size 0.15mm		0.00	%
Percentage weight at sieve size 0.125mm		0.00	%
Percentage weight at sieve size 0.106mm		0.00	%
Percentage weight at sieve size 0.09mm		0.00	%
Percentage weight at sieve size 0.075mm		0.00	%
Percentage weight at sieve size 0.063mm		0.00	%
Percentage weight at sieve size 0.045mm		0.00	%
Percentage weight at sieve size <0.045mm		0.00	%

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Analytical Report: AB20-00632.009

Date: 27/03/2020

HASKONINGDHV UK LTD
RIGHTWELL HOUSE
BRETTON
UNITED KINGDOM
PE3 8DW

CLIENT ORDER NUMBER :	Particle size distribution	SGS ORDER NO.:	329476
CLIENT ID :	Sand for Sieve Analysis		
LOCATION :	North	PRODUCT DESCRIPTION :	Soil
SAMPLE SOURCE :	As Supplied	SOURCE ID :	4a
SAMPLE TYPE :	As submitted	SAMPLE BY :	Client
SAMPLED :	--	RECEIVED :	06/03/2020
ANALYSED :	23/03/2020 - 25/03/2020	COMPLETED :	25/03/2020

PROPERTY	METHOD	RESULT	UNITS
Particle Size and Distribution of Solids by Sieve Analysis	OGC-ABZ-PRO-LAB-026		
Percentage weight at sieve size 1.7mm		98.62	%
Percentage weight at sieve size 1.4mm		0.08	%
Percentage weight at sieve size 1.18mm		0.06	%
Percentage weight at sieve size 1mm		0.07	%
Percentage weight at sieve size 0.85mm		0.06	%
Percentage weight at sieve size 0.71mm		0.03	%
Percentage weight at sieve size 0.6mm		0.06	%
Percentage weight at sieve size 0.5mm		0.06	%
Percentage weight at sieve size 0.425mm		0.08	%
Percentage weight at sieve size 0.355mm		0.14	%
Percentage weight at sieve size 0.3mm		0.12	%
Percentage weight at sieve size 0.25mm		0.12	%
Percentage weight at sieve size 0.212mm		0.14	%
Percentage weight at sieve size 0.18mm		0.06	%
Percentage weight at sieve size 0.15mm		0.06	%
Percentage weight at sieve size 0.125mm		0.03	%
Percentage weight at sieve size 0.106mm		0.03	%
Percentage weight at sieve size 0.09mm		0.02	%
Percentage weight at sieve size 0.075mm		0.01	%
Percentage weight at sieve size 0.063mm		0.00	%
Percentage weight at sieve size 0.045mm		0.05	%
Percentage weight at sieve size <0.045mm		0.02	%

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Analytical Report: AB20-00632.010

Date: 27/03/2020

HASKONINGDHV UK LTD
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BRETTON
UNITED KINGDOM
PE3 8DW

CLIENT ORDER NUMBER :	Particle size distribution	SGS ORDER NO.:	329476
CLIENT ID :	Sand for Sieve Analysis		
LOCATION :	North	PRODUCT DESCRIPTION :	Soil
SAMPLE SOURCE :	As Supplied	SOURCE ID :	4b
SAMPLE TYPE :	As submitted	SAMPLE BY :	Client
SAMPLED :	--	RECEIVED :	06/03/2020
ANALYSED :	24/03/2020 - 25/03/2020	COMPLETED :	25/03/2020

PROPERTY	METHOD	RESULT	UNITS
Particle Size and Distribution of Solids by Sieve Analysis	OGC-ABZ-PRO-LAB-026		
Percentage weight at sieve size 1.7mm		98.42	%
Percentage weight at sieve size 1.4mm		0.15	%
Percentage weight at sieve size 1.18mm		0.11	%
Percentage weight at sieve size 1mm		0.11	%
Percentage weight at sieve size 0.85mm		0.08	%
Percentage weight at sieve size 0.71mm		0.06	%
Percentage weight at sieve size 0.6mm		0.09	%
Percentage weight at sieve size 0.5mm		0.07	%
Percentage weight at sieve size 0.425mm		0.07	%
Percentage weight at sieve size 0.355mm		0.09	%
Percentage weight at sieve size 0.3mm		0.10	%
Percentage weight at sieve size 0.25mm		0.13	%
Percentage weight at sieve size 0.212mm		0.16	%
Percentage weight at sieve size 0.18mm		0.07	%
Percentage weight at sieve size 0.15mm		0.06	%
Percentage weight at sieve size 0.125mm		0.03	%
Percentage weight at sieve size 0.106mm		0.02	%
Percentage weight at sieve size 0.09mm		0.02	%
Percentage weight at sieve size 0.075mm		0.01	%
Percentage weight at sieve size 0.063mm		0.03	%
Percentage weight at sieve size 0.045mm		0.02	%
Percentage weight at sieve size <0.045mm		0.03	%

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Analytical Report: AB20-00632.011

Date: 27/03/2020

HASKONINGDHV UK LTD
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UNITED KINGDOM
PE3 8DW

CLIENT ORDER NUMBER :	Particle size distribution	SGS ORDER NO.:	329476
CLIENT ID :	Sand for Sieve Analysis		
LOCATION :	North	PRODUCT DESCRIPTION :	Soil
SAMPLE SOURCE :	As Supplied	SOURCE ID :	5a
SAMPLE TYPE :	As submitted	SAMPLE BY :	Client
SAMPLED :	--	RECEIVED :	06/03/2020
ANALYSED :	24/03/2020 - 25/03/2020	COMPLETED :	25/03/2020

PROPERTY	METHOD	RESULT	UNITS
Particle Size and Distribution of Solids by Sieve Analysis	OGC-ABZ-PRO-LAB-026		
Percentage weight at sieve size 1.7mm		97.50	%
Percentage weight at sieve size 1.4mm		0.16	%
Percentage weight at sieve size 1.18mm		0.14	%
Percentage weight at sieve size 1mm		0.14	%
Percentage weight at sieve size 0.85mm		0.13	%
Percentage weight at sieve size 0.71mm		0.07	%
Percentage weight at sieve size 0.6mm		0.10	%
Percentage weight at sieve size 0.5mm		0.09	%
Percentage weight at sieve size 0.425mm		0.08	%
Percentage weight at sieve size 0.355mm		0.12	%
Percentage weight at sieve size 0.3mm		0.13	%
Percentage weight at sieve size 0.25mm		0.16	%
Percentage weight at sieve size 0.212mm		0.14	%
Percentage weight at sieve size 0.18mm		0.09	%
Percentage weight at sieve size 0.15mm		0.09	%
Percentage weight at sieve size 0.125mm		0.09	%
Percentage weight at sieve size 0.106mm		0.10	%
Percentage weight at sieve size 0.09mm		0.08	%
Percentage weight at sieve size 0.075mm		0.07	%
Percentage weight at sieve size 0.063mm		0.11	%
Percentage weight at sieve size 0.045mm		0.13	%
Percentage weight at sieve size <0.045mm		0.17	%

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Analytical Report: AB20-00632.012

Date: 27/03/2020

HASKONINGDHV UK LTD
RIGHTWELL HOUSE
BRETTON
UNITED KINGDOM
PE3 8DW

CLIENT ORDER NUMBER :	Particle size distribution	SGS ORDER NO.:	329476
CLIENT ID :	Sand for Sieve Analysis		
LOCATION :	North	PRODUCT DESCRIPTION :	Soil
SAMPLE SOURCE :	As Supplied	SOURCE ID :	5b
SAMPLE TYPE :	As submitted	SAMPLE BY :	Client
SAMPLED :	--	RECEIVED :	06/03/2020
ANALYSED :	23/03/2020 - 25/03/2020	COMPLETED :	25/03/2020

PROPERTY	METHOD	RESULT	UNITS
Particle Size and Distribution of Solids by Sieve Analysis	OGC-ABZ-PRO-LAB-026		
Percentage weight at sieve size 1.7mm		62.39	%
Percentage weight at sieve size 1.4mm		1.70	%
Percentage weight at sieve size 1.18mm		1.81	%
Percentage weight at sieve size 1mm		1.71	%
Percentage weight at sieve size 0.85mm		1.41	%
Percentage weight at sieve size 0.71mm		1.00	%
Percentage weight at sieve size 0.6mm		1.22	%
Percentage weight at sieve size 0.5mm		0.90	%
Percentage weight at sieve size 0.425mm		1.18	%
Percentage weight at sieve size 0.355mm		2.56	%
Percentage weight at sieve size 0.3mm		3.35	%
Percentage weight at sieve size 0.25mm		5.52	%
Percentage weight at sieve size 0.212mm		6.15	%
Percentage weight at sieve size 0.18mm		2.03	%
Percentage weight at sieve size 0.15mm		1.95	%
Percentage weight at sieve size 0.125mm		1.02	%
Percentage weight at sieve size 0.106mm		0.99	%
Percentage weight at sieve size 0.09mm		0.50	%
Percentage weight at sieve size 0.075mm		0.43	%
Percentage weight at sieve size 0.063mm		0.75	%
Percentage weight at sieve size 0.045mm		0.42	%
Percentage weight at sieve size <0.045mm		0.66	%

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Analytical Report: AB20-00632.013

Date: 27/03/2020

HASKONINGDHV UK LTD
RIGHTWELL HOUSE
BRETTON
UNITED KINGDOM
PE3 8DW

CLIENT ORDER NUMBER :	Particle size distribution	SGS ORDER NO.:	329476
CLIENT ID :	Sand for Sieve Analysis		
LOCATION :	North	PRODUCT DESCRIPTION :	Soil
SAMPLE SOURCE :	As Supplied	SOURCE ID :	5c
SAMPLE TYPE :	As submitted	SAMPLE BY :	Client
SAMPLED :	--	RECEIVED :	06/03/2020
ANALYSED :	23/03/2020 - 25/03/2020	COMPLETED :	25/03/2020

PROPERTY	METHOD	RESULT	UNITS
Particle Size and Distribution of Solids by Sieve Analysis	OGC-ABZ-PRO-LAB-026		
Percentage weight at sieve size 1.7mm		87.25	%
Percentage weight at sieve size 1.4mm		1.69	%
Percentage weight at sieve size 1.18mm		0.97	%
Percentage weight at sieve size 1mm		0.87	%
Percentage weight at sieve size 0.85mm		0.59	%
Percentage weight at sieve size 0.71mm		0.37	%
Percentage weight at sieve size 0.6mm		0.42	%
Percentage weight at sieve size 0.5mm		0.39	%
Percentage weight at sieve size 0.425mm		0.44	%
Percentage weight at sieve size 0.355mm		0.89	%
Percentage weight at sieve size 0.3mm		1.02	%
Percentage weight at sieve size 0.25mm		1.28	%
Percentage weight at sieve size 0.212mm		1.40	%
Percentage weight at sieve size 0.18mm		0.50	%
Percentage weight at sieve size 0.15mm		0.32	%
Percentage weight at sieve size 0.125mm		0.22	%
Percentage weight at sieve size 0.106mm		0.18	%
Percentage weight at sieve size 0.09mm		0.14	%
Percentage weight at sieve size 0.075mm		0.12	%
Percentage weight at sieve size 0.063mm		0.17	%
Percentage weight at sieve size 0.045mm		0.17	%
Percentage weight at sieve size <0.045mm		0.21	%

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Analytical Report: AB20-00632.014

Date: 27/03/2020

HASKONINGDHV UK LTD
RIGHTWELL HOUSE
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UNITED KINGDOM
PE3 8DW

CLIENT ORDER NUMBER :	Particle size distribution	SGS ORDER NO.:	329476
CLIENT ID :	Sand for Sieve Analysis		
LOCATION :	North	PRODUCT DESCRIPTION :	Soil
SAMPLE SOURCE :	As Supplied	SOURCE ID :	5d
SAMPLE TYPE :	As submitted	SAMPLE BY :	Client
SAMPLED :	--	RECEIVED :	06/03/2020
ANALYSED :	23/03/2020 - 25/03/2020	COMPLETED :	25/03/2020

PROPERTY	METHOD	RESULT	UNITS
Particle Size and Distribution of Solids by Sieve Analysis	OGC-ABZ-PRO-LAB-026		
Percentage weight at sieve size 1.7mm		95.58	%
Percentage weight at sieve size 1.4mm		0.30	%
Percentage weight at sieve size 1.18mm		0.20	%
Percentage weight at sieve size 1mm		0.17	%
Percentage weight at sieve size 0.85mm		0.17	%
Percentage weight at sieve size 0.71mm		0.12	%
Percentage weight at sieve size 0.6mm		0.18	%
Percentage weight at sieve size 0.5mm		0.20	%
Percentage weight at sieve size 0.425mm		0.19	%
Percentage weight at sieve size 0.355mm		0.28	%
Percentage weight at sieve size 0.3mm		0.32	%
Percentage weight at sieve size 0.25mm		0.35	%
Percentage weight at sieve size 0.212mm		0.32	%
Percentage weight at sieve size 0.18mm		0.14	%
Percentage weight at sieve size 0.15mm		0.20	%
Percentage weight at sieve size 0.125mm		0.13	%
Percentage weight at sieve size 0.106mm		0.16	%
Percentage weight at sieve size 0.09mm		0.13	%
Percentage weight at sieve size 0.075mm		0.12	%
Percentage weight at sieve size 0.063mm		0.18	%
Percentage weight at sieve size 0.045mm		0.16	%
Percentage weight at sieve size <0.045mm		0.22	%

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Analytical Report: AB20-00632.015

Date: 27/03/2020

HASKONINGDHV UK LTD
RIGHTWELL HOUSE
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UNITED KINGDOM
PE3 8DW

CLIENT ORDER NUMBER :	Particle size distribution	SGS ORDER NO.:	329476
CLIENT ID :	Sand for Sieve Analysis		
LOCATION :	North	PRODUCT DESCRIPTION :	Soil
SAMPLE SOURCE :	As Supplied	SOURCE ID :	6a
SAMPLE TYPE :	As submitted	SAMPLE BY :	Client
SAMPLED :	--	RECEIVED :	06/03/2020
ANALYSED :	23/03/2020 - 25/03/2020	COMPLETED :	25/03/2020

PROPERTY	METHOD	RESULT	UNITS
Particle Size and Distribution of Solids by Sieve Analysis	OGC-ABZ-PRO-LAB-026		
Percentage weight at sieve size 1.7mm		96.32	%
Percentage weight at sieve size 1.4mm		0.31	%
Percentage weight at sieve size 1.18mm		0.21	%
Percentage weight at sieve size 1mm		0.20	%
Percentage weight at sieve size 0.85mm		0.16	%
Percentage weight at sieve size 0.71mm		0.11	%
Percentage weight at sieve size 0.6mm		0.14	%
Percentage weight at sieve size 0.5mm		0.17	%
Percentage weight at sieve size 0.425mm		0.16	%
Percentage weight at sieve size 0.355mm		0.30	%
Percentage weight at sieve size 0.3mm		0.41	%
Percentage weight at sieve size 0.25mm		0.47	%
Percentage weight at sieve size 0.212mm		0.30	%
Percentage weight at sieve size 0.18mm		0.13	%
Percentage weight at sieve size 0.15mm		0.14	%
Percentage weight at sieve size 0.125mm		0.07	%
Percentage weight at sieve size 0.106mm		0.07	%
Percentage weight at sieve size 0.09mm		0.05	%
Percentage weight at sieve size 0.075mm		0.04	%
Percentage weight at sieve size 0.063mm		0.04	%
Percentage weight at sieve size 0.045mm		0.05	%
Percentage weight at sieve size <0.045mm		0.04	%

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Analytical Report: AB20-00632.016

Date: 27/03/2020

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PE3 8DW

CLIENT ORDER NUMBER :	Particle size distribution	SGS ORDER NO.:	329476
CLIENT ID :	Sand for Sieve Analysis		
LOCATION :	North	PRODUCT DESCRIPTION :	Soil
SAMPLE SOURCE :	As Supplied	SOURCE ID :	6b
SAMPLE TYPE :	As submitted	SAMPLE BY :	Client
SAMPLED :	--	RECEIVED :	06/03/2020
ANALYSED :	23/03/2020 - 25/03/2020	COMPLETED :	25/03/2020

PROPERTY	METHOD	RESULT	UNITS
Particle Size and Distribution of Solids by Sieve Analysis	OGC-ABZ-PRO-LAB-026		
Percentage weight at sieve size 1.7mm		88.21	%
Percentage weight at sieve size 1.4mm		1.20	%
Percentage weight at sieve size 1.18mm		0.64	%
Percentage weight at sieve size 1mm		0.56	%
Percentage weight at sieve size 0.85mm		0.39	%
Percentage weight at sieve size 0.71mm		0.25	%
Percentage weight at sieve size 0.6mm		0.28	%
Percentage weight at sieve size 0.5mm		0.35	%
Percentage weight at sieve size 0.425mm		0.35	%
Percentage weight at sieve size 0.355mm		0.53	%
Percentage weight at sieve size 0.3mm		0.78	%
Percentage weight at sieve size 0.25mm		1.52	%
Percentage weight at sieve size 0.212mm		1.91	%
Percentage weight at sieve size 0.18mm		0.74	%
Percentage weight at sieve size 0.15mm		0.64	%
Percentage weight at sieve size 0.125mm		0.25	%
Percentage weight at sieve size 0.106mm		0.18	%
Percentage weight at sieve size 0.09mm		0.14	%
Percentage weight at sieve size 0.075mm		0.11	%
Percentage weight at sieve size 0.063mm		0.14	%
Percentage weight at sieve size 0.045mm		0.14	%
Percentage weight at sieve size <0.045mm		0.07	%

AUTHORISED SIGNATORY

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Analytical Report: AB20-00632.017

Date: 27/03/2020

HASKONINGDHV UK LTD
RIGHTWELL HOUSE
BRETTON
UNITED KINGDOM
PE3 8DW

CLIENT ORDER NUMBER :	Particle size distribution	SGS ORDER NO.:	329476
CLIENT ID :	Sand for Sieve Analysis		
LOCATION :	North	PRODUCT DESCRIPTION :	Soil
SAMPLE SOURCE :	As Supplied	SOURCE ID :	6c
SAMPLE TYPE :	As submitted	SAMPLE BY :	Client
SAMPLED :	--	RECEIVED :	06/03/2020
ANALYSED :	23/03/2020 - 25/03/2020	COMPLETED :	25/03/2020

PROPERTY	METHOD	RESULT	UNITS
Particle Size and Distribution of Solids by Sieve Analysis	OGC-ABZ-PRO-LAB-026		
Percentage weight at sieve size 1.7mm		55.85	%
Percentage weight at sieve size 1.4mm		2.57	%
Percentage weight at sieve size 1.18mm		1.85	%
Percentage weight at sieve size 1mm		1.80	%
Percentage weight at sieve size 0.85mm		1.41	%
Percentage weight at sieve size 0.71mm		1.06	%
Percentage weight at sieve size 0.6mm		1.31	%
Percentage weight at sieve size 0.5mm		0.99	%
Percentage weight at sieve size 0.425mm		1.02	%
Percentage weight at sieve size 0.355mm		1.91	%
Percentage weight at sieve size 0.3mm		4.07	%
Percentage weight at sieve size 0.25mm		7.24	%
Percentage weight at sieve size 0.212mm		5.38	%
Percentage weight at sieve size 0.18mm		1.65	%
Percentage weight at sieve size 0.15mm		1.74	%
Percentage weight at sieve size 0.125mm		1.48	%
Percentage weight at sieve size 0.106mm		1.40	%
Percentage weight at sieve size 0.09mm		0.75	%
Percentage weight at sieve size 0.075mm		0.80	%
Percentage weight at sieve size 0.063mm		1.26	%
Percentage weight at sieve size 0.045mm		1.70	%
Percentage weight at sieve size <0.045mm		2.42	%

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Analytical Report: AB20-00632.018

Date: 27/03/2020

HASKONINGDHV UK LTD
RIGHTWELL HOUSE
BRETTON
UNITED KINGDOM
PE3 8DW

CLIENT ORDER NUMBER :	Particle size distribution	SGS ORDER NO.:	329476
CLIENT ID :	Sand for Sieve Analysis		
LOCATION :	North	PRODUCT DESCRIPTION :	Soil
SAMPLE SOURCE :	As Supplied	SOURCE ID :	6d
SAMPLE TYPE :	As submitted	SAMPLE BY :	Client
SAMPLED :	--	RECEIVED :	06/03/2020
ANALYSED :	23/03/2020 - 25/03/2020	COMPLETED :	25/03/2020

PROPERTY	METHOD	RESULT	UNITS
Particle Size and Distribution of Solids by Sieve Analysis	OGC-ABZ-PRO-LAB-026		
Percentage weight at sieve size 1.7mm		90.66	%
Percentage weight at sieve size 1.4mm		1.83	%
Percentage weight at sieve size 1.18mm		0.80	%
Percentage weight at sieve size 1mm		0.71	%
Percentage weight at sieve size 0.85mm		0.60	%
Percentage weight at sieve size 0.71mm		0.37	%
Percentage weight at sieve size 0.6mm		0.40	%
Percentage weight at sieve size 0.5mm		0.36	%
Percentage weight at sieve size 0.425mm		0.30	%
Percentage weight at sieve size 0.355mm		0.41	%
Percentage weight at sieve size 0.3mm		0.45	%
Percentage weight at sieve size 0.25mm		0.66	%
Percentage weight at sieve size 0.212mm		0.55	%
Percentage weight at sieve size 0.18mm		0.24	%
Percentage weight at sieve size 0.15mm		0.19	%
Percentage weight at sieve size 0.125mm		0.18	%
Percentage weight at sieve size 0.106mm		0.18	%
Percentage weight at sieve size 0.09mm		0.15	%
Percentage weight at sieve size 0.075mm		0.11	%
Percentage weight at sieve size 0.063mm		0.03	%
Percentage weight at sieve size 0.045mm		0.25	%
Percentage weight at sieve size <0.045mm		0.30	%

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Analytical Report: AB20-00632.019

Date: 27/03/2020

HASKONINGDHV UK LTD
RIGHTWELL HOUSE
BRETTON
UNITED KINGDOM
PE3 8DW

CLIENT ORDER NUMBER :	Particle size distribution	SGS ORDER NO.:	329476
CLIENT ID :	Sand for Sieve Analysis		
LOCATION :	North	PRODUCT DESCRIPTION :	Soil
SAMPLE SOURCE :	As Supplied	SOURCE ID :	Outside N
SAMPLE TYPE :	As submitted	SAMPLE BY :	Client
SAMPLED :	--	RECEIVED :	06/03/2020
ANALYSED :	23/03/2020 - 25/03/2020	COMPLETED :	25/03/2020

PROPERTY	METHOD	RESULT	UNITS
Particle Size and Distribution of Solids by Sieve Analysis	OGC-ABZ-PRO-LAB-026		
Percentage weight at sieve size 1.7mm		18.76	%
Percentage weight at sieve size 1.4mm		0.60	%
Percentage weight at sieve size 1.18mm		0.42	%
Percentage weight at sieve size 1mm		0.49	%
Percentage weight at sieve size 0.85mm		0.48	%
Percentage weight at sieve size 0.71mm		0.44	%
Percentage weight at sieve size 0.6mm		1.01	%
Percentage weight at sieve size 0.5mm		1.44	%
Percentage weight at sieve size 0.425mm		2.62	%
Percentage weight at sieve size 0.355mm		5.71	%
Percentage weight at sieve size 0.3mm		12.31	%
Percentage weight at sieve size 0.25mm		27.09	%
Percentage weight at sieve size 0.212mm		21.45	%
Percentage weight at sieve size 0.18mm		4.51	%
Percentage weight at sieve size 0.15mm		2.33	%
Percentage weight at sieve size 0.125mm		0.21	%
Percentage weight at sieve size 0.106mm		0.03	%
Percentage weight at sieve size 0.09mm		0.01	%
Percentage weight at sieve size 0.075mm		0.00	%
Percentage weight at sieve size 0.063mm		0.01	%
Percentage weight at sieve size 0.045mm		0.00	%
Percentage weight at sieve size <0.045mm		0.01	%

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Analytical Report: AB20-00632.020

Date: 27/03/2020

HASKONINGDHV UK LTD
RIGHTWELL HOUSE
BRETTON
UNITED KINGDOM
PE3 8DW

CLIENT ORDER NUMBER :	Particle size distribution	SGS ORDER NO.:	329476
CLIENT ID :	Sand for Sieve Analysis		
LOCATION :	North	PRODUCT DESCRIPTION :	Soil
SAMPLE SOURCE :	As Supplied	SOURCE ID :	Outside S
SAMPLE TYPE :	As submitted	SAMPLE BY :	Client
SAMPLED :	--	RECEIVED :	06/03/2020
ANALYSED :	23/03/2020 - 25/03/2020	COMPLETED :	25/03/2020

PROPERTY	METHOD	RESULT	UNITS
Particle Size and Distribution of Solids by Sieve Analysis	OGC-ABZ-PRO-LAB-026		
Percentage weight at sieve size 1.7mm		19.47	%
Percentage weight at sieve size 1.4mm		1.34	%
Percentage weight at sieve size 1.18mm		0.69	%
Percentage weight at sieve size 1mm		0.90	%
Percentage weight at sieve size 0.85mm		0.76	%
Percentage weight at sieve size 0.71mm		0.62	%
Percentage weight at sieve size 0.6mm		1.00	%
Percentage weight at sieve size 0.5mm		1.58	%
Percentage weight at sieve size 0.425mm		1.72	%
Percentage weight at sieve size 0.355mm		4.03	%
Percentage weight at sieve size 0.3mm		8.39	%
Percentage weight at sieve size 0.25mm		23.36	%
Percentage weight at sieve size 0.212mm		22.64	%
Percentage weight at sieve size 0.18mm		7.15	%
Percentage weight at sieve size 0.15mm		5.20	%
Percentage weight at sieve size 0.125mm		0.79	%
Percentage weight at sieve size 0.106mm		0.16	%
Percentage weight at sieve size 0.09mm		0.06	%
Percentage weight at sieve size 0.075mm		0.04	%
Percentage weight at sieve size 0.063mm		0.03	%
Percentage weight at sieve size 0.045mm		0.03	%
Percentage weight at sieve size <0.045mm		0.03	%

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Analytical Report: AB20-00632.021

Date: 27/03/2020

HASKONINGDHV UK LTD
RIGHTWELL HOUSE
BRETTON
UNITED KINGDOM
PE3 8DW

CLIENT ORDER NUMBER :	Particle size distribution	SGS ORDER NO.:	329476
CLIENT ID :	Sand for Sieve Analysis		
LOCATION :	North	PRODUCT DESCRIPTION :	Soil
SAMPLE SOURCE :	As Supplied	SOURCE ID :	Beach N
SAMPLE TYPE :	As submitted	SAMPLE BY :	Client
SAMPLED :	--	RECEIVED :	06/03/2020
ANALYSED :	23/03/2020 - 25/03/2020	COMPLETED :	25/03/2020

PROPERTY	METHOD	RESULT	UNITS
Particle Size and Distribution of Solids by Sieve Analysis	OGC-ABZ-PRO-LAB-026		
Percentage weight at sieve size 1.7mm		24.45	%
Percentage weight at sieve size 1.4mm		1.04	%
Percentage weight at sieve size 1.18mm		0.71	%
Percentage weight at sieve size 1mm		0.90	%
Percentage weight at sieve size 0.85mm		0.88	%
Percentage weight at sieve size 0.71mm		0.99	%
Percentage weight at sieve size 0.6mm		2.27	%
Percentage weight at sieve size 0.5mm		4.95	%
Percentage weight at sieve size 0.425mm		6.76	%
Percentage weight at sieve size 0.355mm		14.33	%
Percentage weight at sieve size 0.3mm		16.47	%
Percentage weight at sieve size 0.25mm		17.07	%
Percentage weight at sieve size 0.212mm		7.20	%
Percentage weight at sieve size 0.18mm		1.32	%
Percentage weight at sieve size 0.15mm		0.48	%
Percentage weight at sieve size 0.125mm		0.06	%
Percentage weight at sieve size 0.106mm		0.03	%
Percentage weight at sieve size 0.09mm		0.00	%
Percentage weight at sieve size 0.075mm		0.00	%
Percentage weight at sieve size 0.063mm		0.00	%
Percentage weight at sieve size 0.045mm		0.00	%
Percentage weight at sieve size <0.045mm		0.01	%

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Analytical Report: AB20-00632.022

Date: 27/03/2020

HASKONINGDHV UK LTD
RIGHTWELL HOUSE
BRETTON
UNITED KINGDOM
PE3 8DW

CLIENT ORDER NUMBER :	Particle size distribution	SGS ORDER NO.:	329476
CLIENT ID :	Sand for Sieve Analysis		
LOCATION :	North	PRODUCT DESCRIPTION :	Soil
SAMPLE SOURCE :	As Supplied	SOURCE ID :	Beach S
SAMPLE TYPE :	As submitted	SAMPLE BY :	Client
SAMPLED :	--	RECEIVED :	06/03/2020
ANALYSED :	23/03/2020 - 25/03/2020	COMPLETED :	25/03/2020

PROPERTY	METHOD	RESULT	UNITS
Particle Size and Distribution of Solids by Sieve Analysis	OGC-ABZ-PRO-LAB-026		
Percentage weight at sieve size 1.7mm		67.74	%
Percentage weight at sieve size 1.4mm		0.15	%
Percentage weight at sieve size 1.18mm		0.11	%
Percentage weight at sieve size 1mm		0.14	%
Percentage weight at sieve size 0.85mm		0.16	%
Percentage weight at sieve size 0.71mm		0.20	%
Percentage weight at sieve size 0.6mm		0.41	%
Percentage weight at sieve size 0.5mm		0.96	%
Percentage weight at sieve size 0.425mm		1.04	%
Percentage weight at sieve size 0.355mm		2.58	%
Percentage weight at sieve size 0.3mm		5.19	%
Percentage weight at sieve size 0.25mm		11.63	%
Percentage weight at sieve size 0.212mm		7.91	%
Percentage weight at sieve size 0.18mm		1.30	%
Percentage weight at sieve size 0.15mm		0.36	%
Percentage weight at sieve size 0.125mm		0.02	%
Percentage weight at sieve size 0.106mm		0.00	%
Percentage weight at sieve size 0.09mm		0.00	%
Percentage weight at sieve size 0.075mm		0.00	%
Percentage weight at sieve size 0.063mm		0.00	%
Percentage weight at sieve size 0.045mm		0.00	%
Percentage weight at sieve size <0.045mm		0.00	%

** End of Analytical Results **

AUTHORISED SIGNATORY

Derek Bryce
Laboratory Manager

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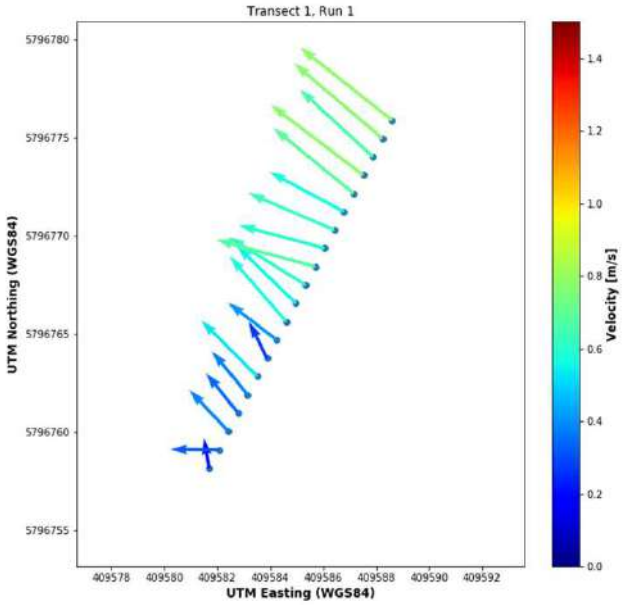
NEAP TIDE

1


Transect 1, Run 1
UTM Northing (WGS84)
5796780
5796775
5796770
5796765
5796760
5796755
409578
409580
409582
409584
409586
409588
409590
409592
UTM Easting (WGS84)
Velocity [m/s]
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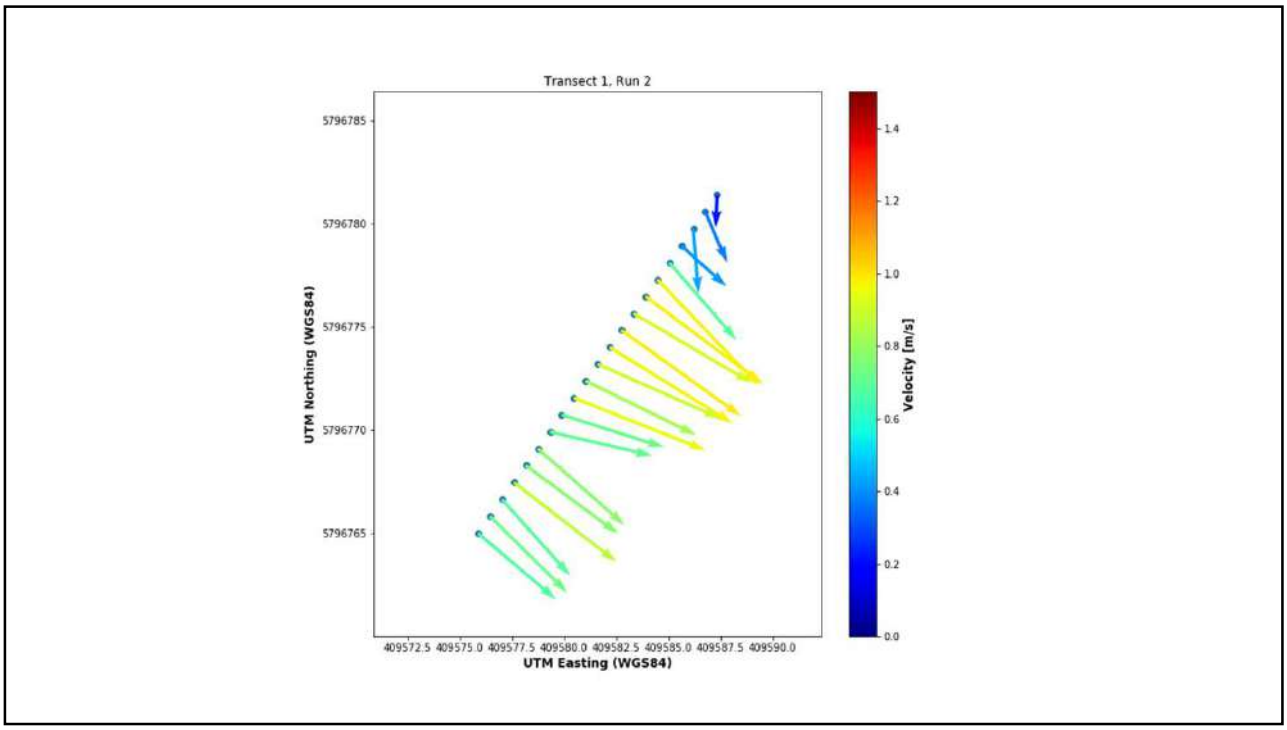
1.2
1.0
0.8
0.6
0.4
0.2
0.0

2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UTM Northing (WGS84)
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5796780
5796775
5796770
5796765
409572.5 409575.0 409577.5 409580.0 409582.5 409585.0 409587.5 409590.0
UTM Easting (WGS84)
Velocity [m/s]
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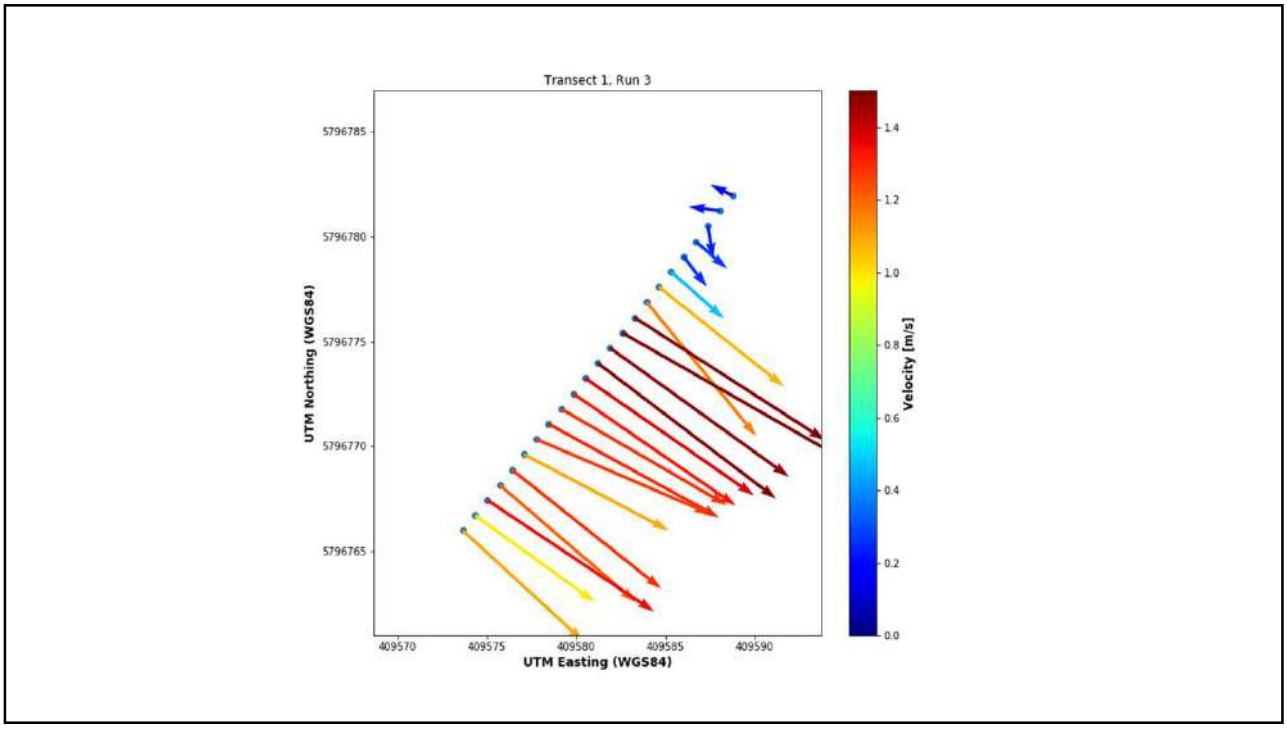
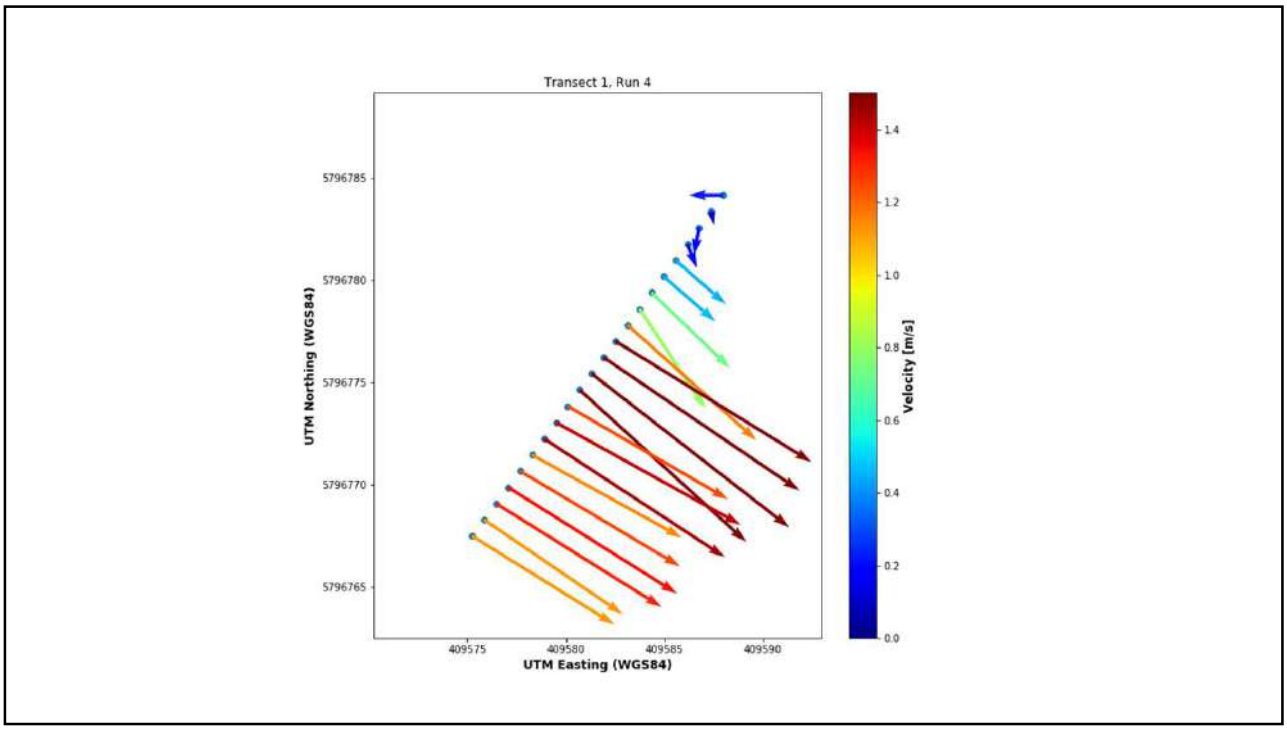
0.4
0.6
0.8
1.0
1.2
1.4

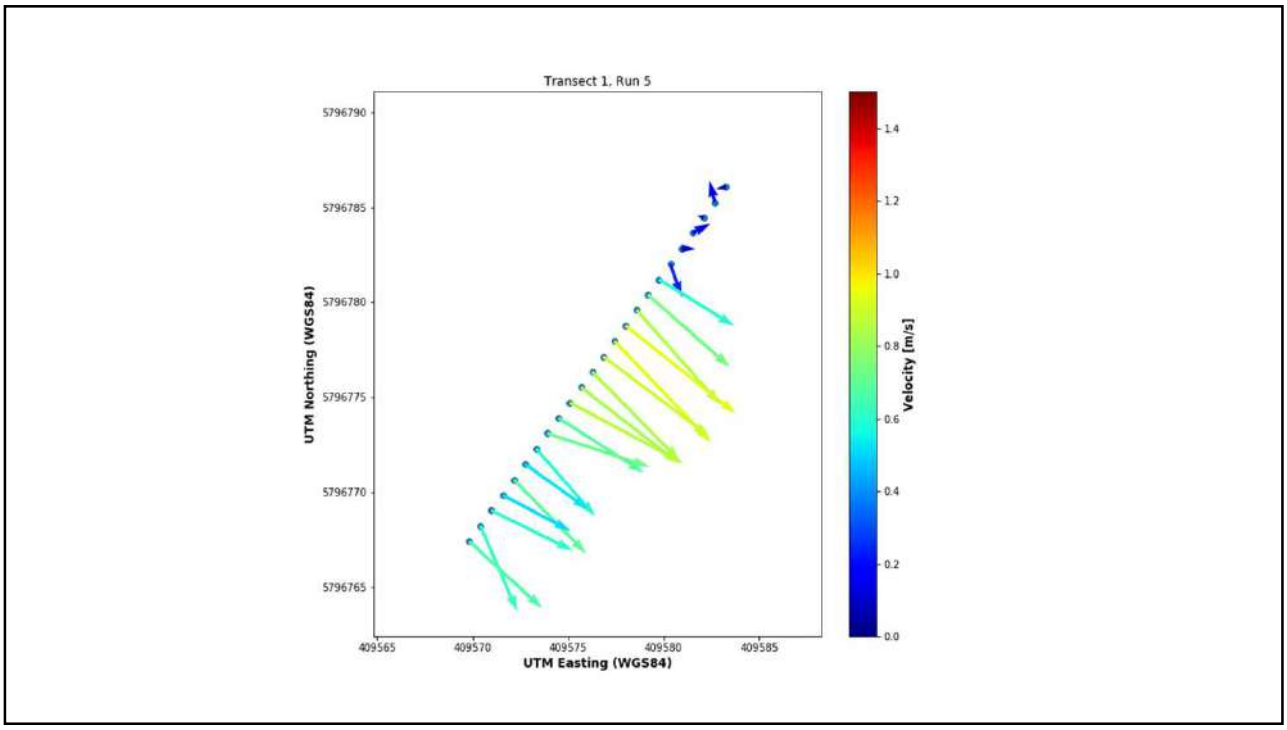
3


Transect 1, Run 3
UTM Northing (WGS84)
5796785
5796780
5796775
5796770
5796765
409570
409575
409580
409585
409590
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

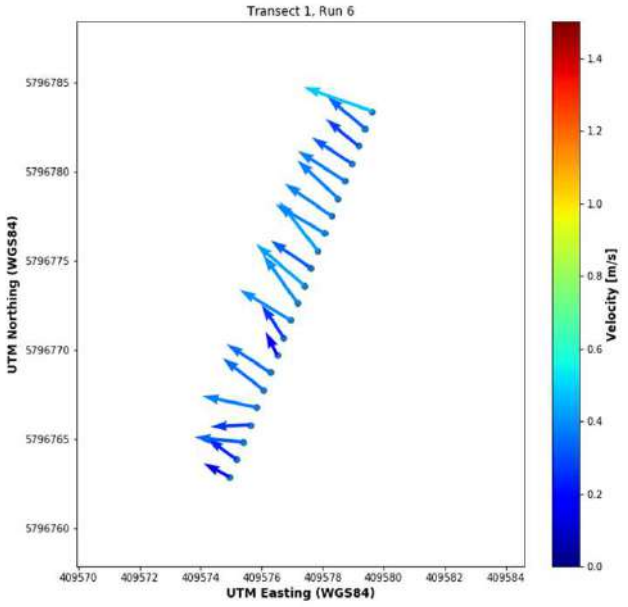
4


Transect 1, Run 4
UTM Northing (WGS84)
5796785
5796780
5796775
5796770
5796765
409575
409580
409585
409590
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

5


Transect 1, Run 5
UTM Northing (WGS84)
5796790
5796785
5796780
5796775
5796770
5796765
409565
409570
409575
409580
409585
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

6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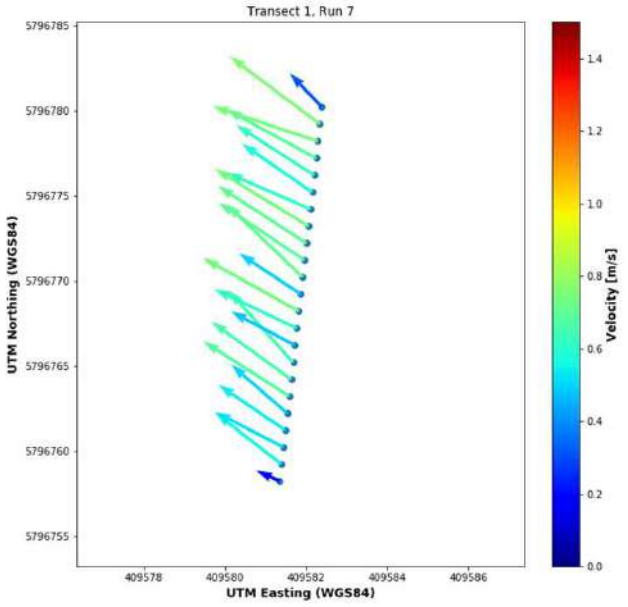
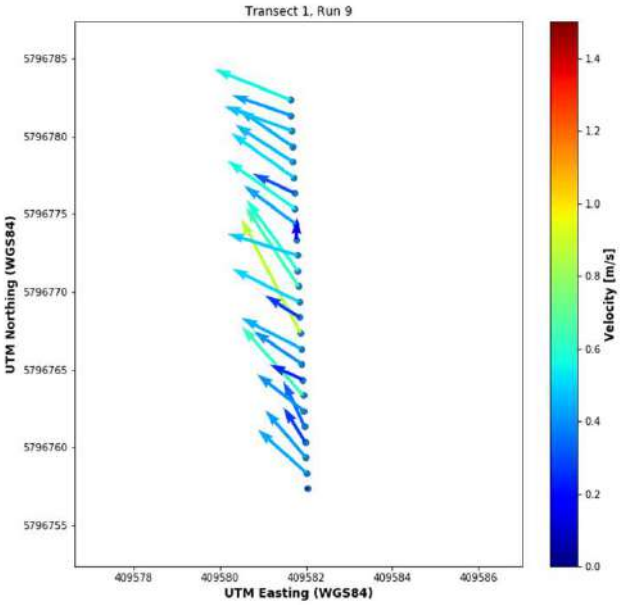
UTM Northing (WGS84)
5796785
5796780
5796775
5796770
5796765
5796760
409570
409572
409574
409576
409578
409580
409582
409584
UTM Easting (WGS84)
Velocity [m/s]
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0

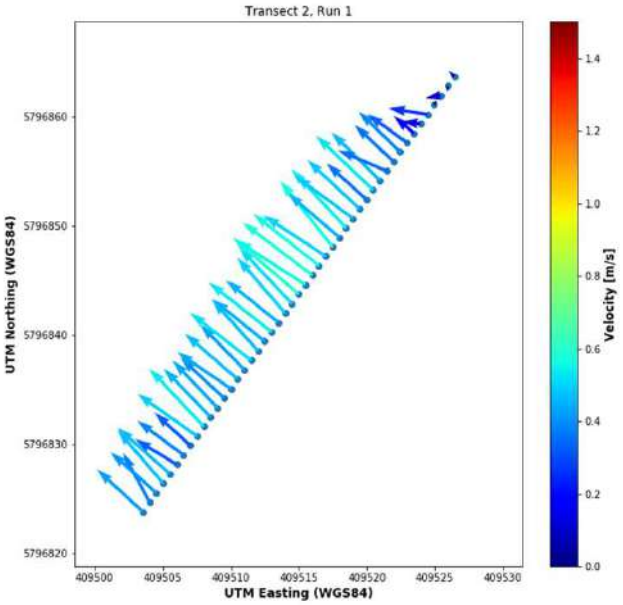
7


Transect 1, Run 7
UTM Northing (WGS84)
5796785
5796780
5796775
5796770
5796765
5796760
5796755
409578
409580
409582
409584
409586
UTM Easting (WGS84)
Velocity [m/s]
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0

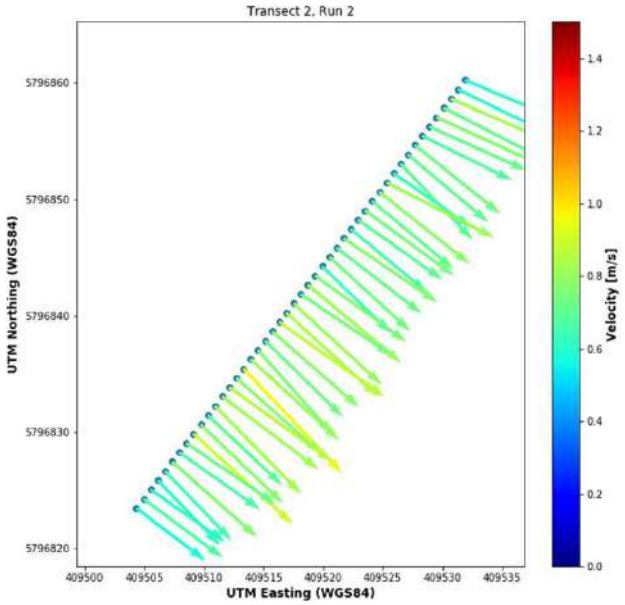
8


Transect 1, Run 9
UTM Northing (WGS84)
5796785
5796780
5796775
5796770
5796765
5796760
5796755
409578
409580
409582
409584
409586
UTM Easting (WGS84)
Velocity [m/s]
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0

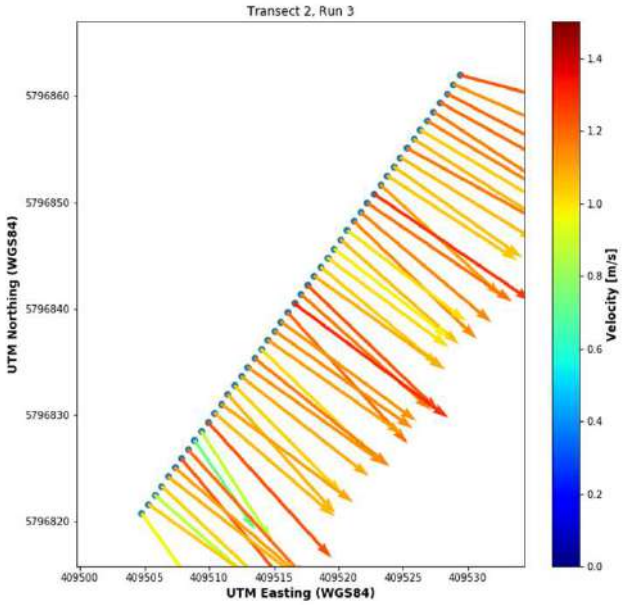
9


Transect 2, Run 1
UTM Northing (WGS84)
5796860
5796850
5796840
5796830
5796820
409500
409505
409510
409515
409520
409525
409530
UTM Easting (WGS84)
Velocity [m/s]
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0

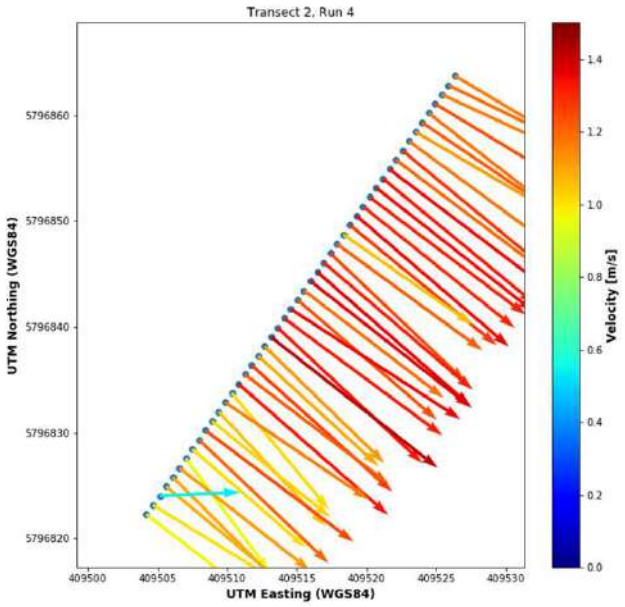
10


Transect 2, Run 2
UTM Northing (WGS84)
5796860
5796850
5796840
5796830
5796820
409500
409505
409510
409515
409520
409525
409530
409535
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

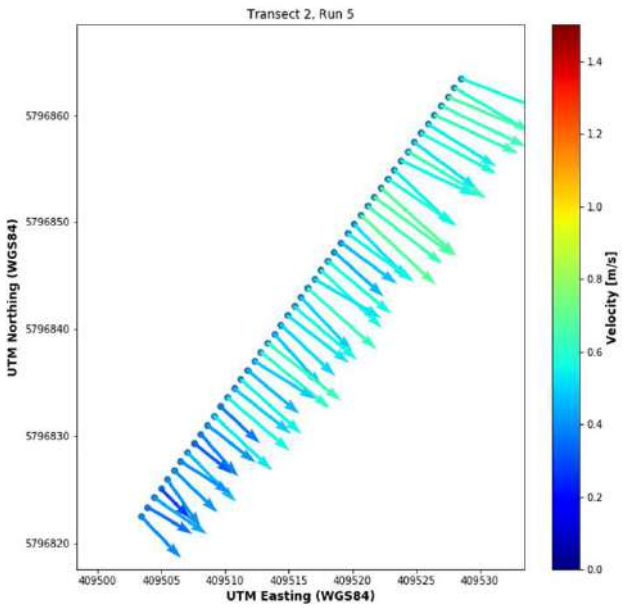
11


Transect 2, Run 3
UTM Northing (WGS84)
5796860
5796850
5796840
5796830
5796820
409500
409505
409510
409515
409520
409525
409530
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

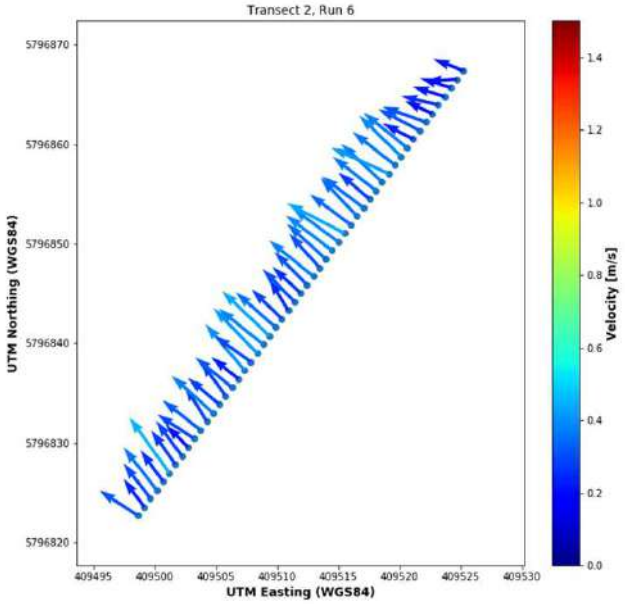
12


Transect 2, Run 4
UTM Northing (WGS84)
5796860
5796850
5796840
5796830
5796820
409500
409505
409510
409515
409520
409525
409530
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

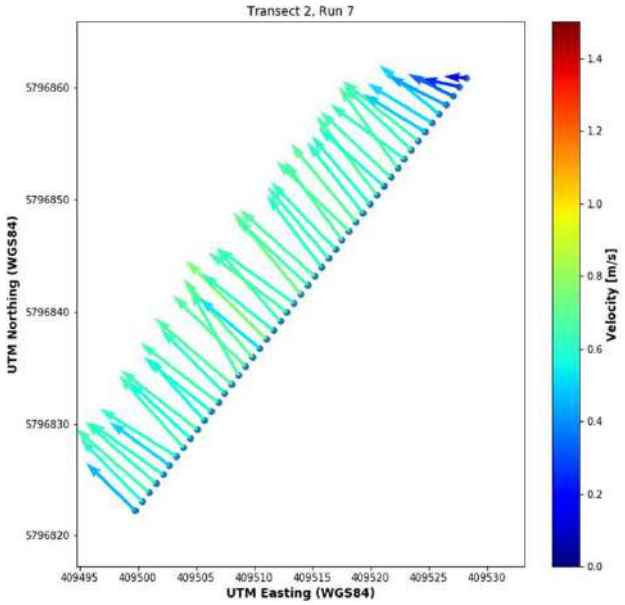
13


Transect 2, Run 5
UTM Northing (WGS84)
5796860
5796850
5796840
5796830
5796820
409500
409505
409510
409515
409520
409525
409530
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

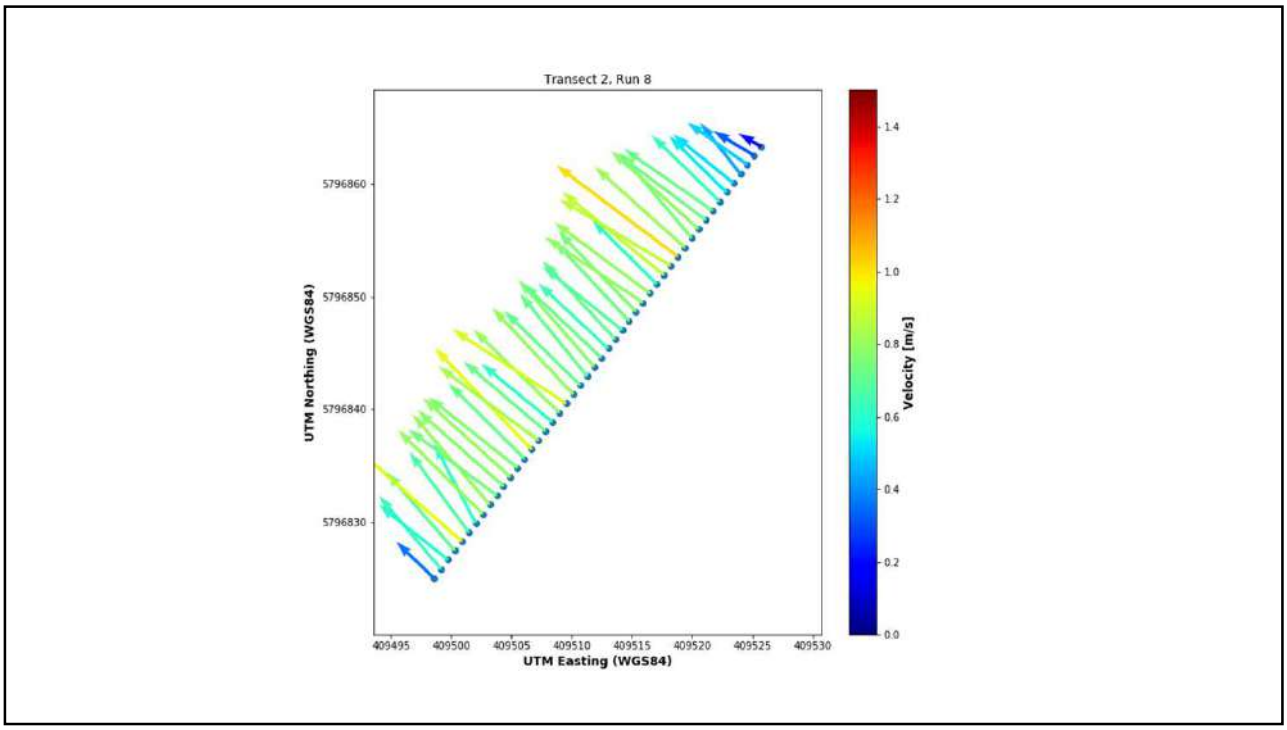
14


Transect 2, Run 6
UTM Northing (WGS84)
5796870
5796860
5796850
5796840
5796830
5796820
409495
409500
409505
409510
409515
409520
409525
409530
UTM Easting (WGS84)
Velocity [m/s]
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0

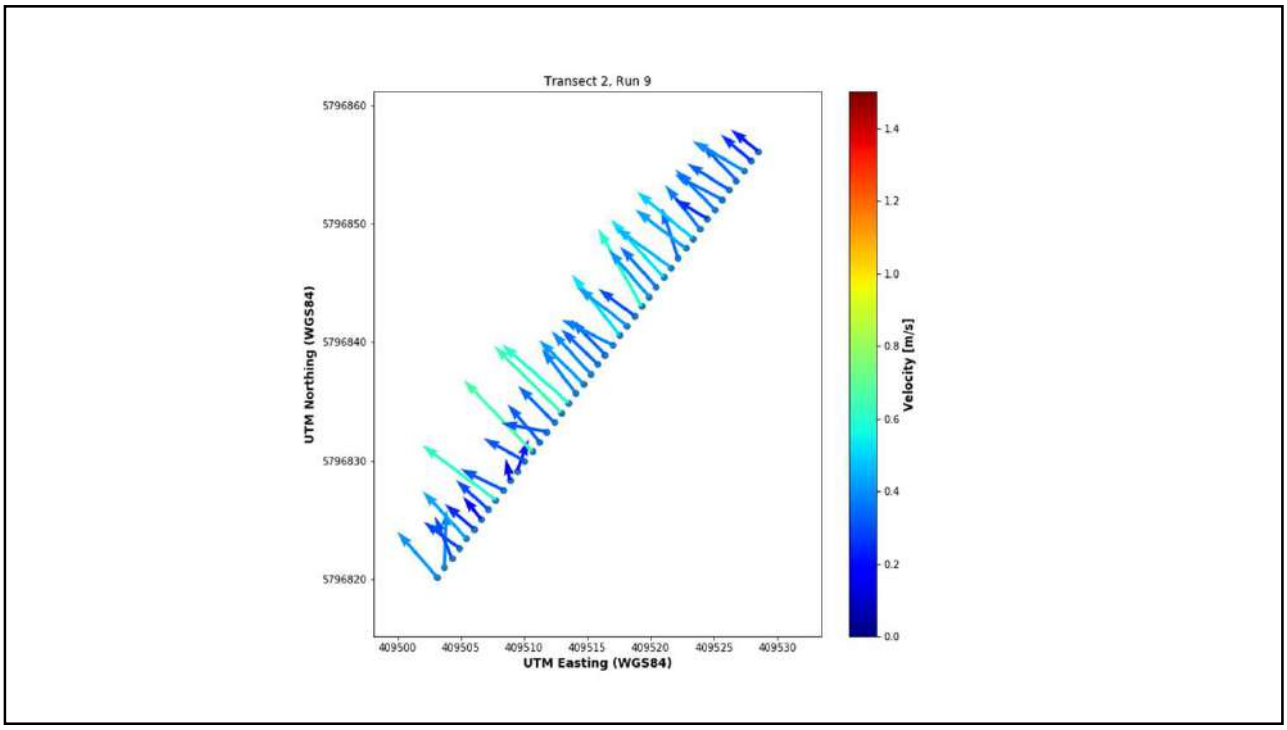
15


Transect 2, Run 7
UTM Northing (WGS84)
5796860
5796850
5796840
5796830
5796820
409495
409500
409505
409510
409515
409520
409525
409530
UTM Easting (WGS84)
Velocity [m/s]
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0

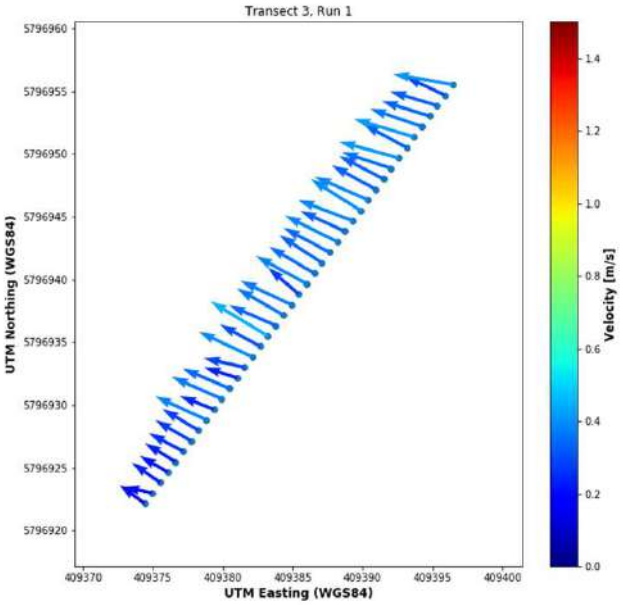
16


Transect 2, Run 8
UTM Northing (WGS84)
5796860
5796850
5796840
5796830
409495
409500
409505
409510
409515
409520
409525
409530
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

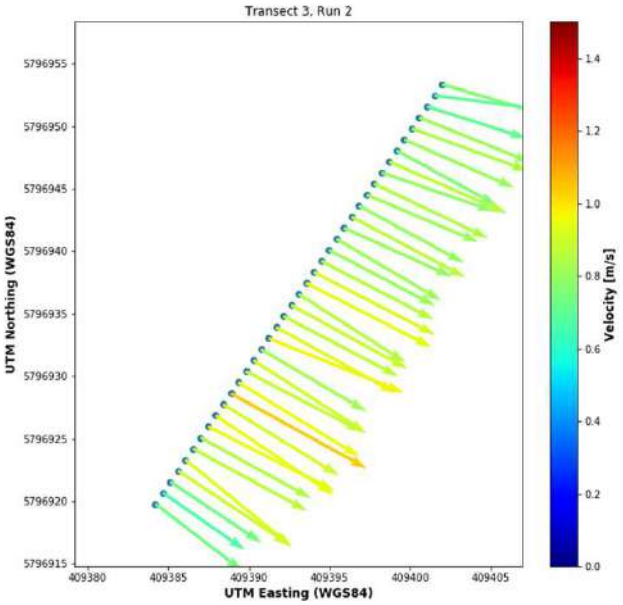
17


Transect 2, Run 9
UTM Northing (WGS84)
5796860
5796850
5796840
5796830
5796820
409500
409505
409510
409515
409520
409525
409530
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

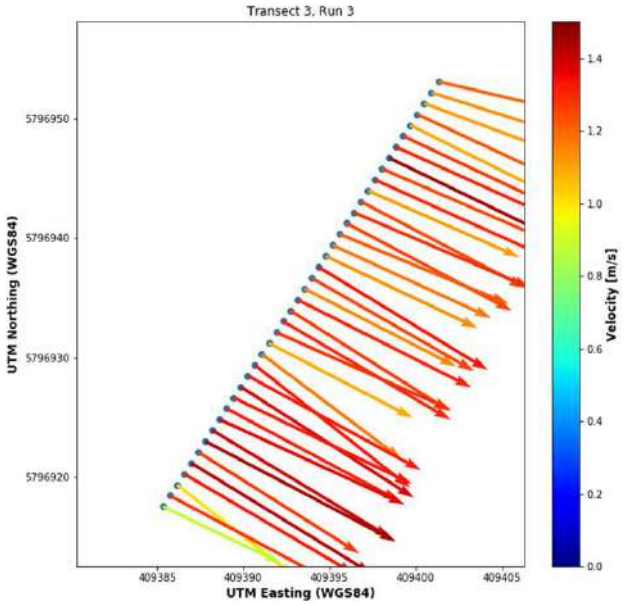
18


Transect 3, Run 1
UTM Northing (WGS84)
UTM Easting (WGS84)
Velocity [m/s]
5796960
5796955
5796950
5796945
5796940
5796935
5796930
5796925
5796920
409370
409375
409380
409385
409390
409395
409400
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

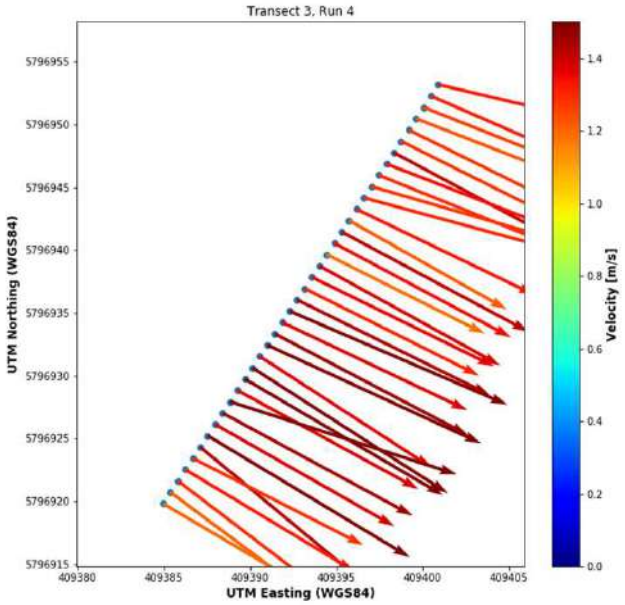
19


Transect 3, Run 2
UTM Northing (WGS84)
UTM Easting (WGS84)
Velocity [m/s]
5796955
5796950
5796945
5796940
5796935
5796930
5796925
5796920
5796915
409380
409385
409390
409395
409400
409405
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

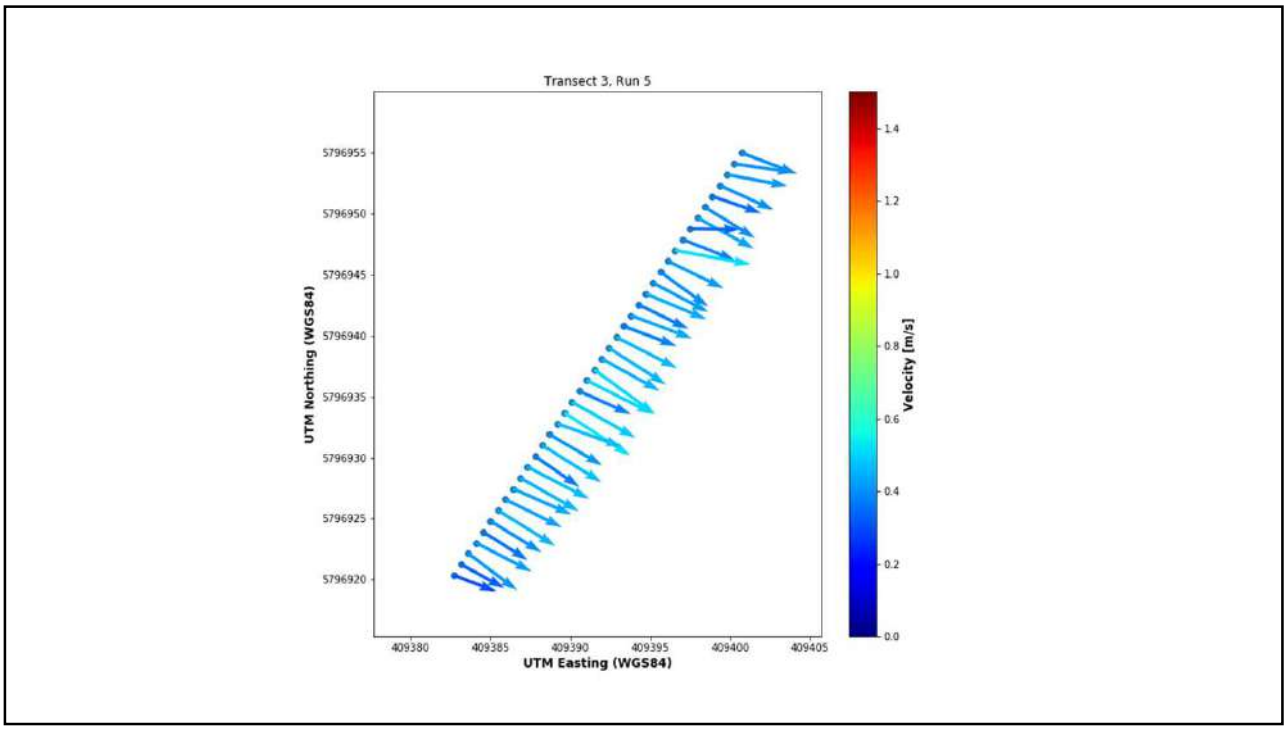
20


Transect 3, Run 3
UTM Northing (WGS84)
5796950
5796940
5796930
5796920
409385
409390
409395
409400
409405
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

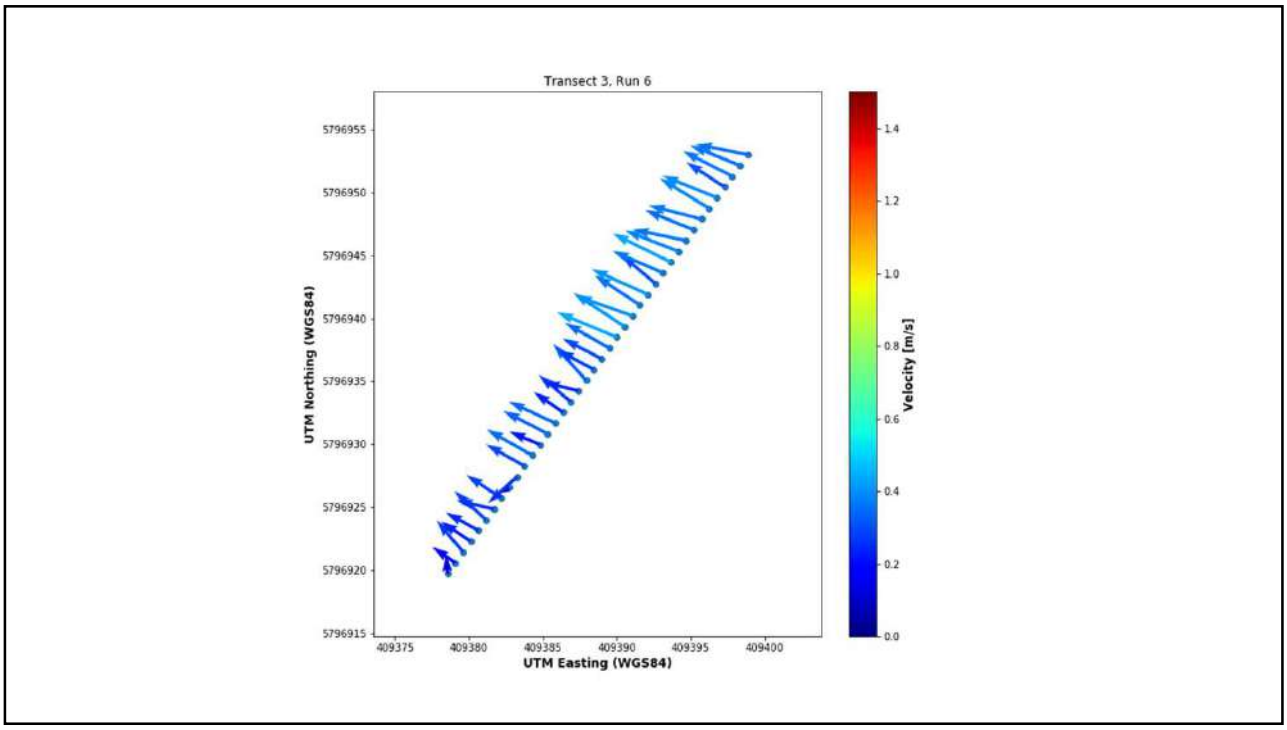
21


Transect 3, Run 4
UTM Northing (WGS84)
5796955
5796950
5796945
5796940
5796935
5796930
5796925
5796920
5796915
409380
409385
409390
409395
409400
409405
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

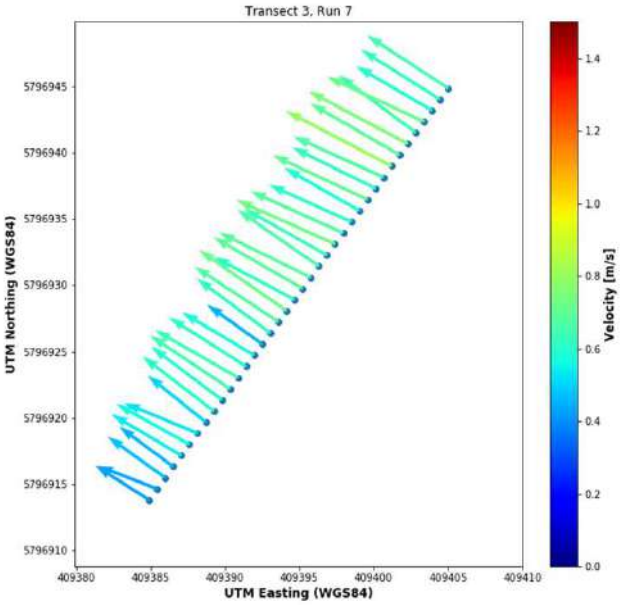
22


Transect 3, Run 5
UTM Northing (WGS84)
5796955
5796950
5796945
5796940
5796935
5796930
5796925
5796920
409380
409385
409390
409395
409400
409405
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

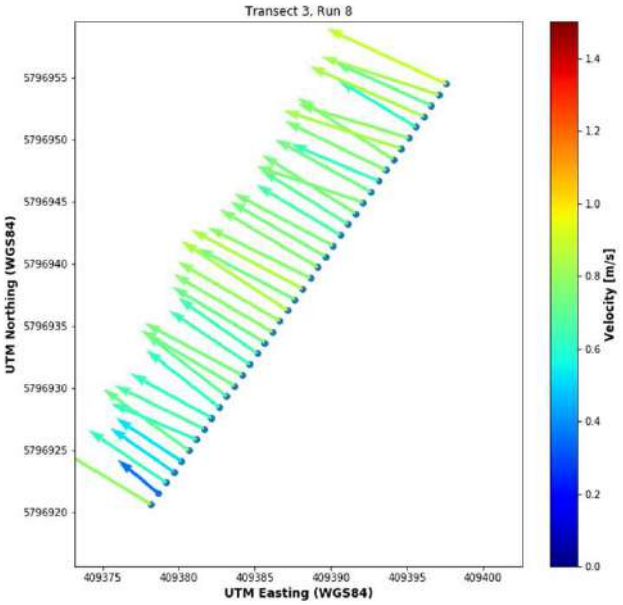
23


Transect 3, Run 6
UTM Northing (WGS84)
5796955
5796950
5796945
5796940
5796935
5796930
5796925
5796920
5796915
409375
409380
409385
409390
409395
409400
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

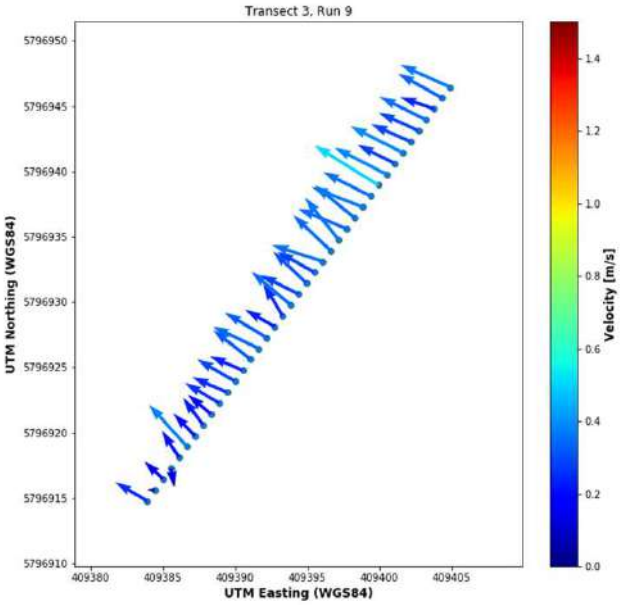
24


Transect 3, Run 7
UTM Northing (WGS84)
5796945
5796940
5796935
5796930
5796925
5796920
5796915
5796910
409380
409385
409390
409395
409400
409405
409410
UTM Easting (WGS84)
Velocity [m/s]
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0

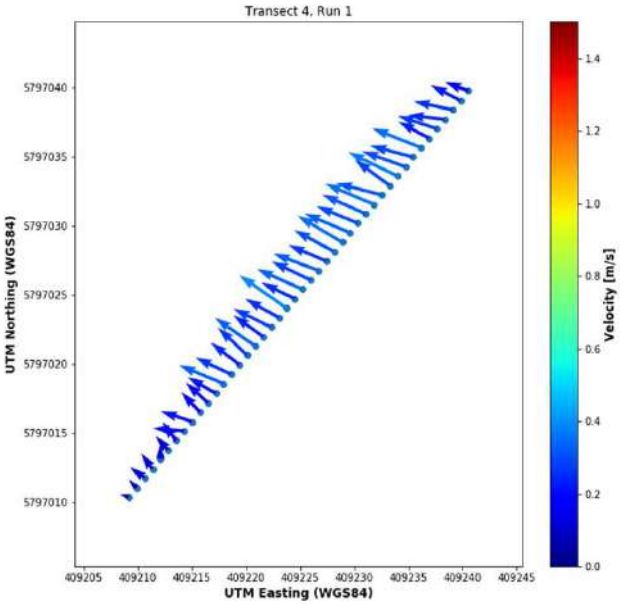
25


Transect 3, Run 8
UTM Northing (WGS84)
5796955
5796950
5796945
5796940
5796935
5796930
5796925
5796920
409375
409380
409385
409390
409395
409400
UTM Easting (WGS84)
Velocity [m/s]
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0

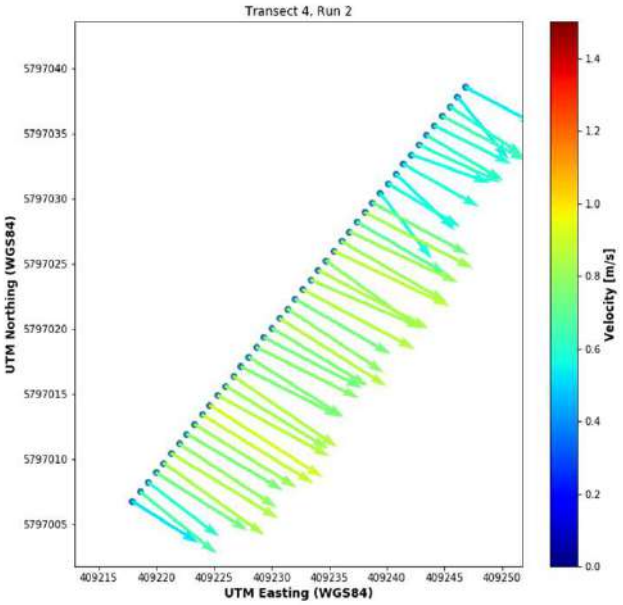
26


Transect 3, Run 9
UTM Northing (WGS84)
5796950
5796945
5796940
5796935
5796930
5796925
5796920
5796915
5796910
409380
409385
409390
409395
409400
409405
UTM Easting (WGS84)
Velocity [m/s]
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0

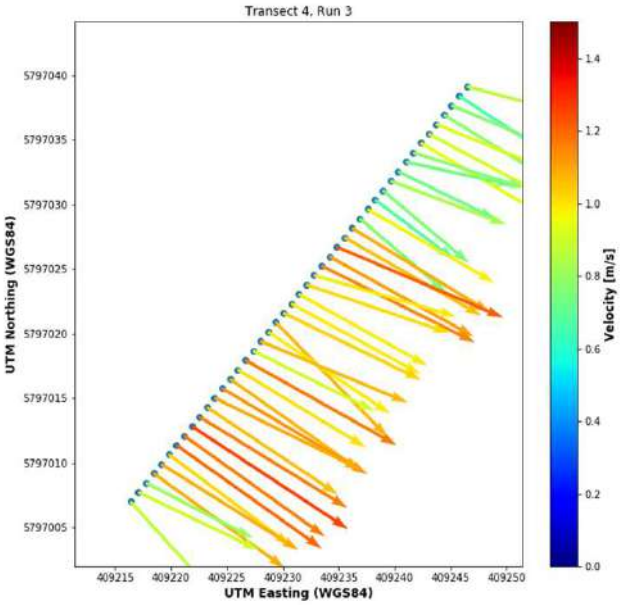
27


Transect 4, Run 1
UTM Northing (WGS84)
5797040
5797035
5797030
5797025
5797020
5797015
5797010
409205
409210
409215
409220
409225
409230
409235
409240
409245
UTM Easting (WGS84)
Velocity [m/s]
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0

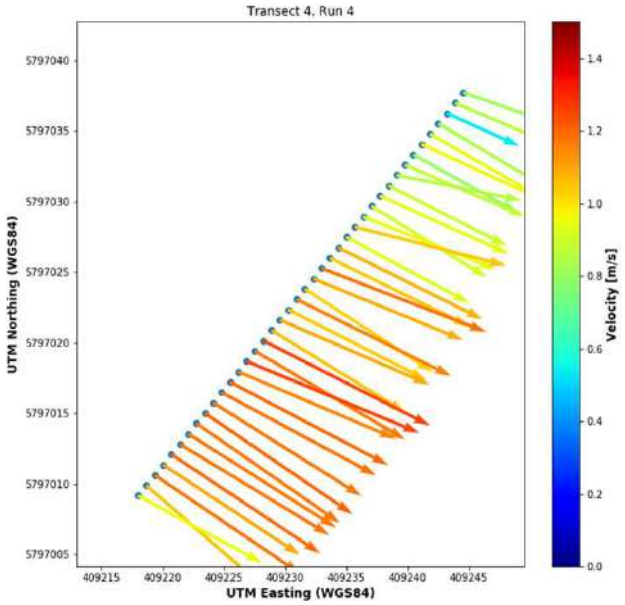
28


Transect 4, Run 2
UTM Northing (WGS84)
5797040
5797035
5797030
5797025
5797020
5797015
5797010
5797005
409215
409220
409225
409230
409235
409240
409245
409250
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

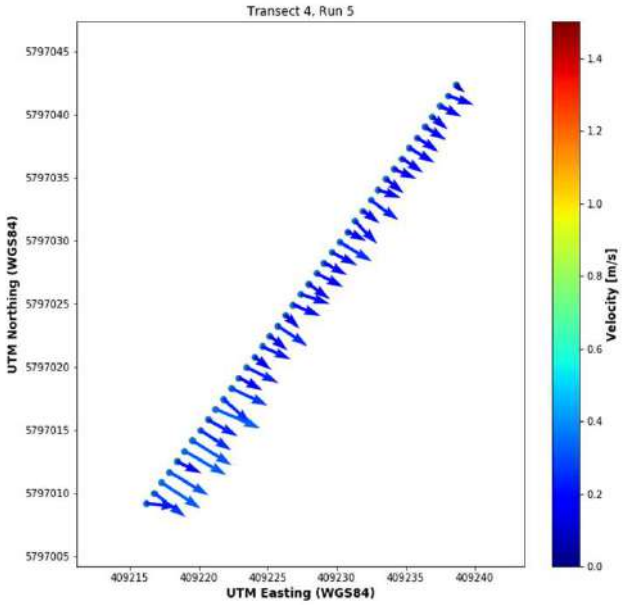
29


Transect 4, Run 3
UTM Northing (WGS84)
5797040
5797035
5797030
5797025
5797020
5797015
5797010
5797005
409215
409220
409225
409230
409235
409240
409245
409250
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

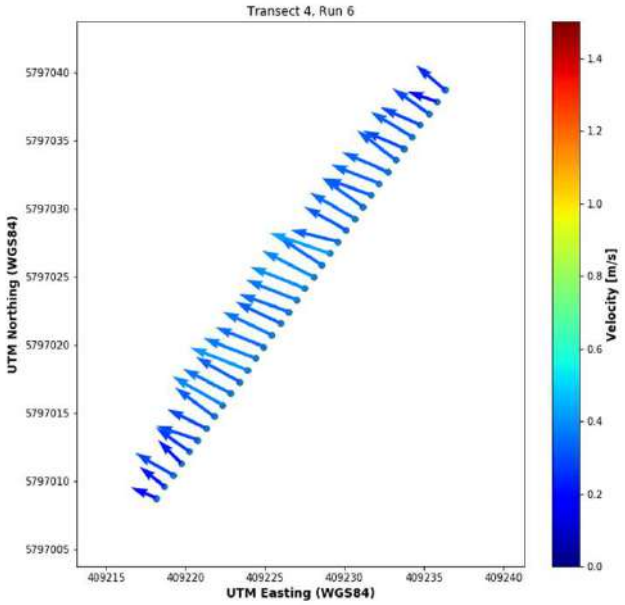
30


Transect 4, Run 4
UTM Northing (WGS84)
5797040
5797035
5797030
5797025
5797020
5797015
5797010
5797005
409215
409220
409225
409230
409235
409240
409245
UTM Easting (WGS84)
Velocity [m/s]
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0

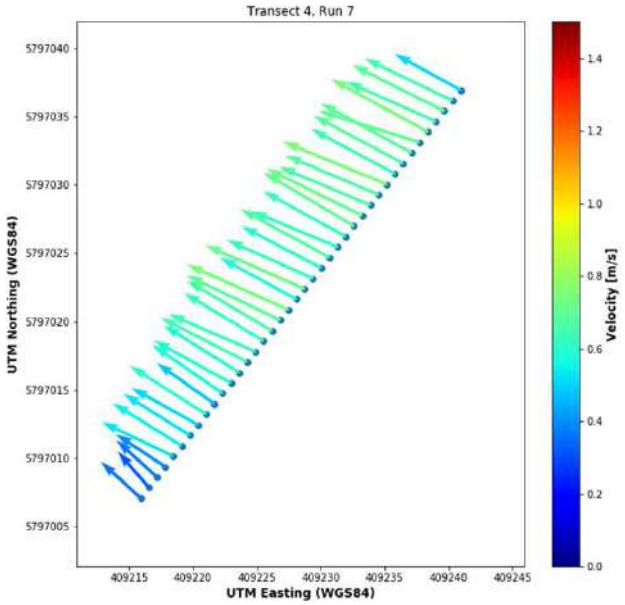
31


Transect 4, Run 5
UTM Northing (WGS84)
5797045
5797040
5797035
5797030
5797025
5797020
5797015
5797010
5797005
409215
409220
409225
409230
409235
409240
UTM Easting (WGS84)
Velocity [m/s]
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0

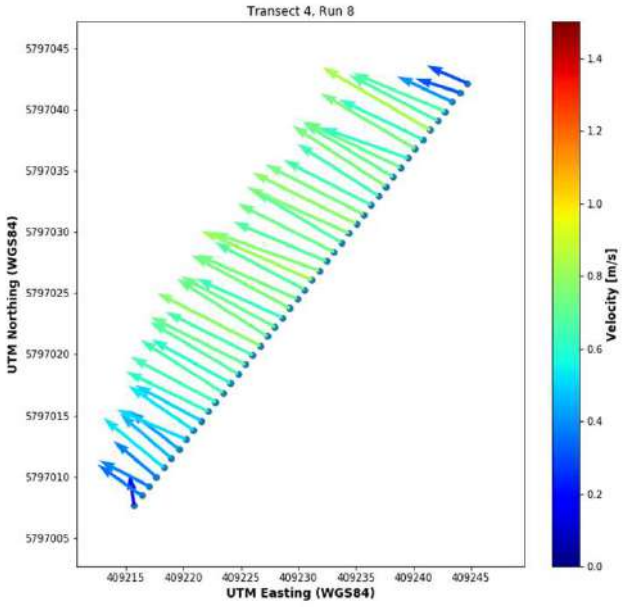
32


Transect 4, Run 6
UTM Northing (WGS84)
5797040
5797035
5797030
5797025
5797020
5797015
5797010
5797005
409215
409220
409225
409230
409235
409240
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

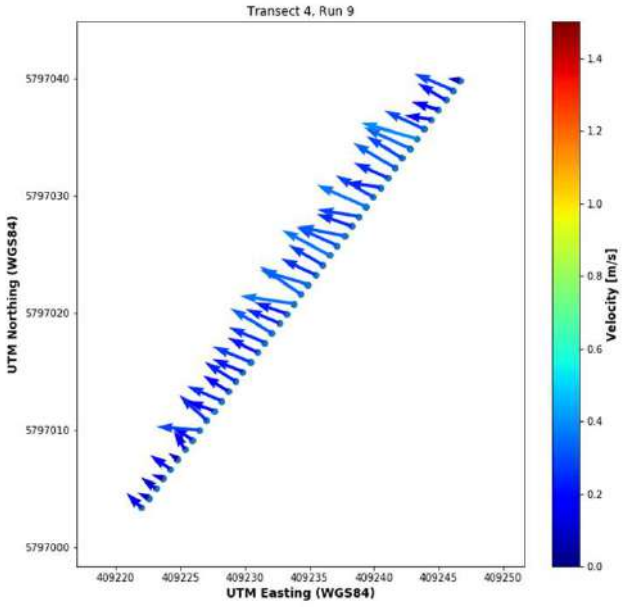
33


Transect 4, Run 7
UTM Northing (WGS84)
5797040
5797035
5797030
5797025
5797020
5797015
5797010
5797005
409215
409220
409225
409230
409235
409240
409245
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

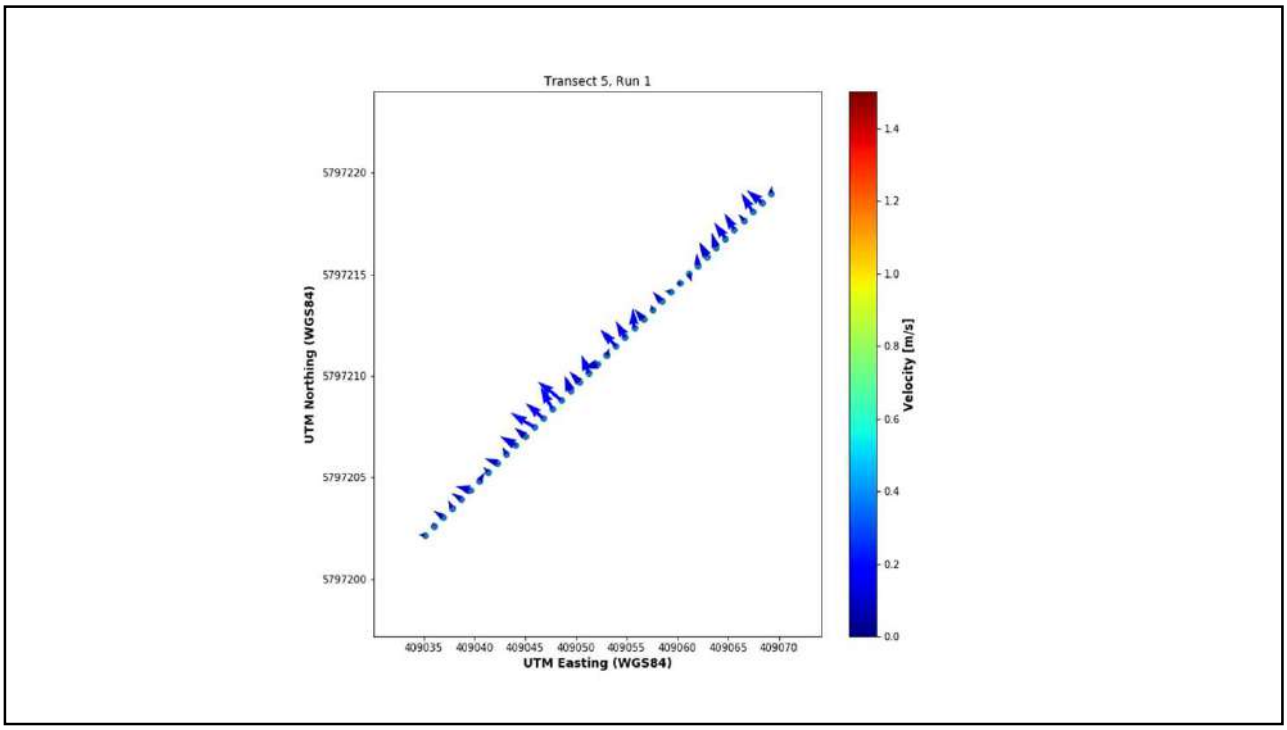
34


Transect 4, Run 8
UTM Northing (WGS84)
5797045
5797040
5797035
5797030
5797025
5797020
5797015
5797010
5797005
409215
409220
409225
409230
409235
409240
409245
UTM Easting (WGS84)
Velocity [m/s]
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0

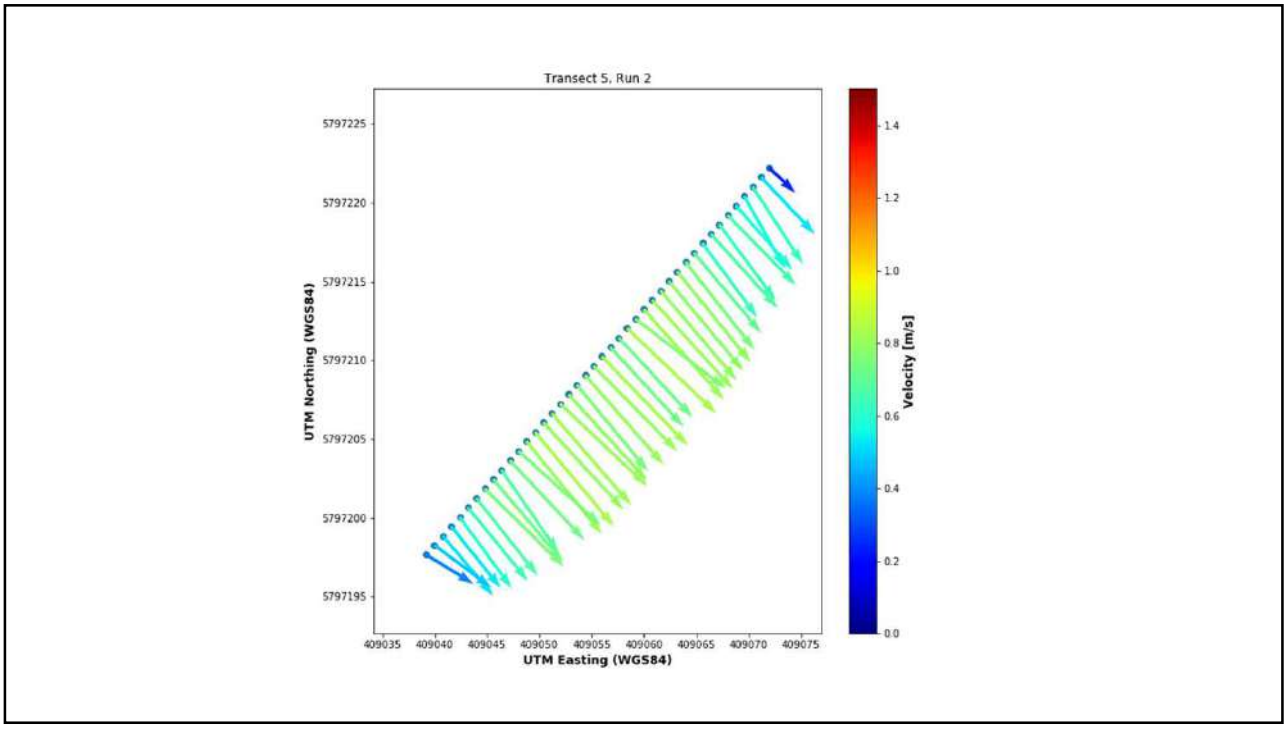
35


Transect 4, Run 9
UTM Northing (WGS84)
5797040
5797030
5797020
5797010
5797000
409220
409225
409230
409235
409240
409245
409250
UTM Easting (WGS84)
Velocity [m/s]
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0

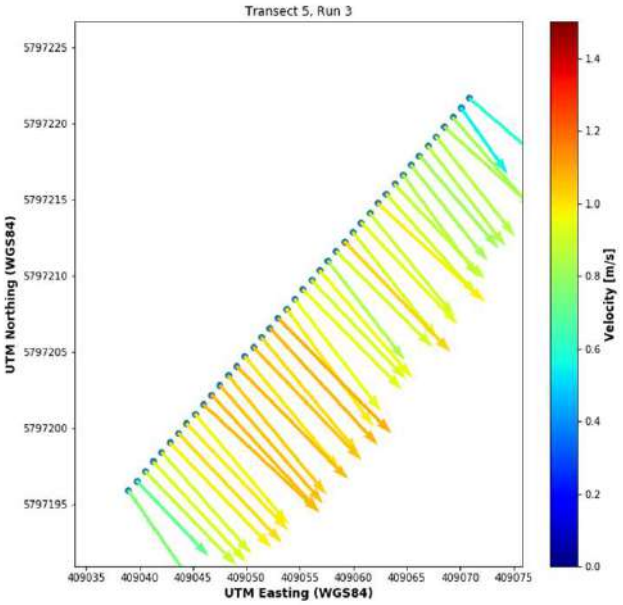
36


Transect 5, Run 1
UTM Northing (WGS84)
5797220
5797215
5797210
5797205
5797200
409035
409040
409045
409050
409055
409060
409065
409070
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

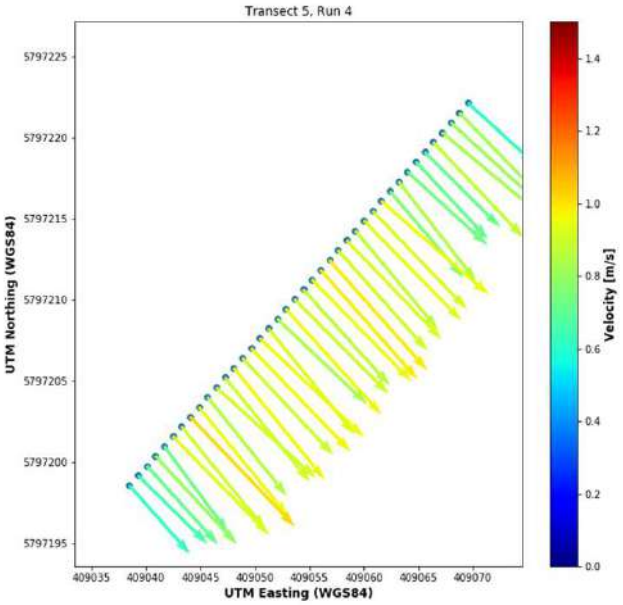
37


Transect 5, Run 2
UTM Northing (WGS84)
5797225
5797220
5797215
5797210
5797205
5797200
5797195
409035
409040
409045
409050
409055
409060
409065
409070
409075
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

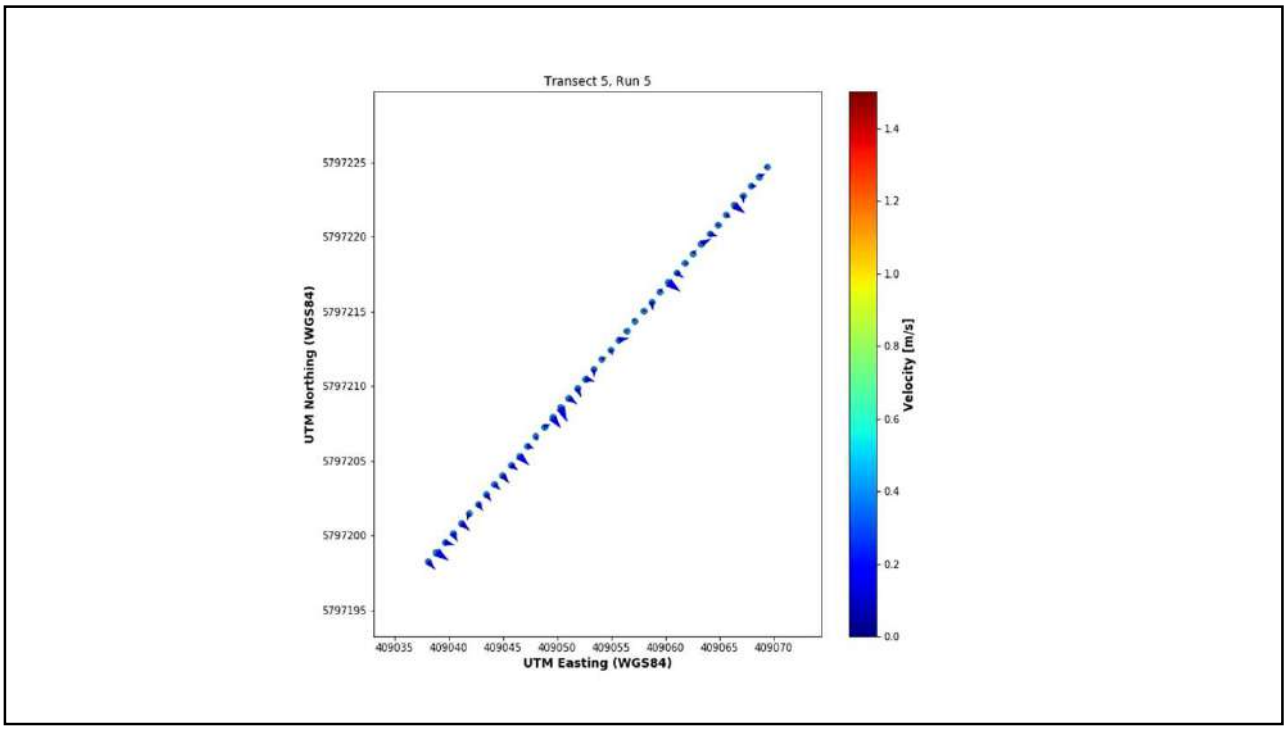
38


Transect 5, Run 3
UTM Northing (WGS84)
5797225
5797220
5797215
5797210
5797205
5797200
5797195
409035
409040
409045
409050
409055
409060
409065
409070
409075
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

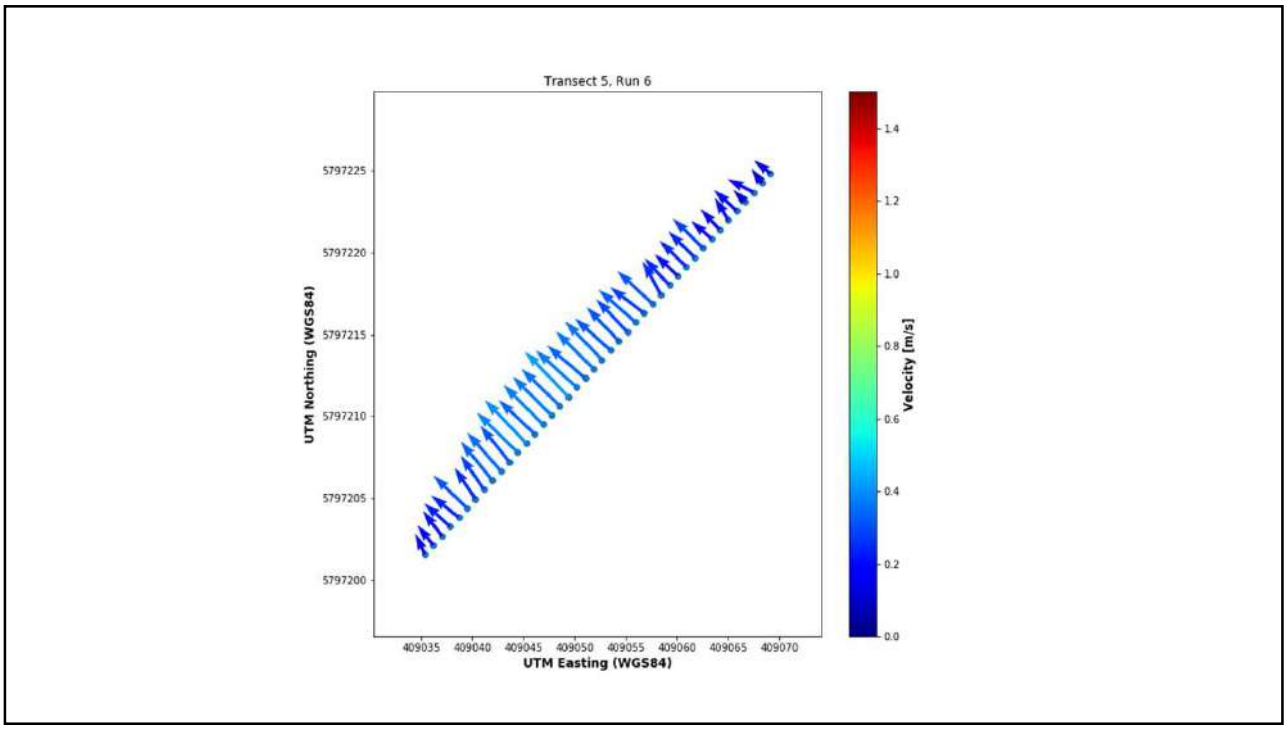
39


Transect 5, Run 4
UTM Northing (WGS84)
5797225
5797220
5797215
5797210
5797205
5797200
5797195
409035
409040
409045
409050
409055
409060
409065
409070
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

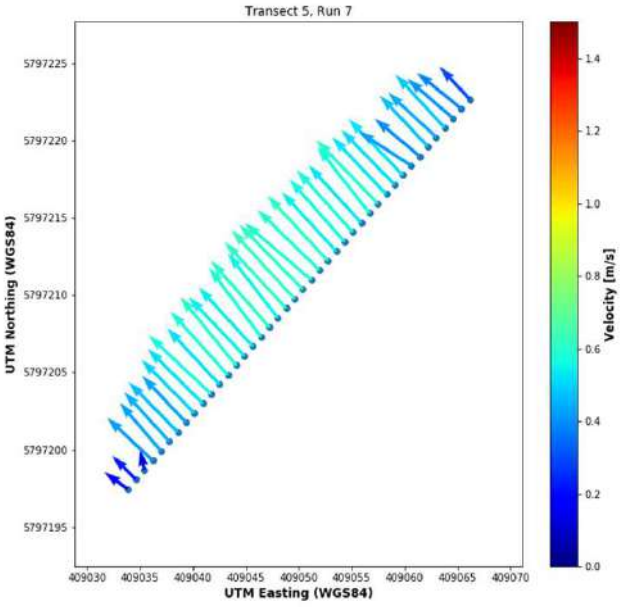
40


Transect 5, Run 5
UTM Northing (WGS84)
5797225
5797220
5797215
5797210
5797205
5797200
5797195
409035
409040
409045
409050
409055
409060
409065
409070
UTM Easting (WGS84)
Velocity [m/s]
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0

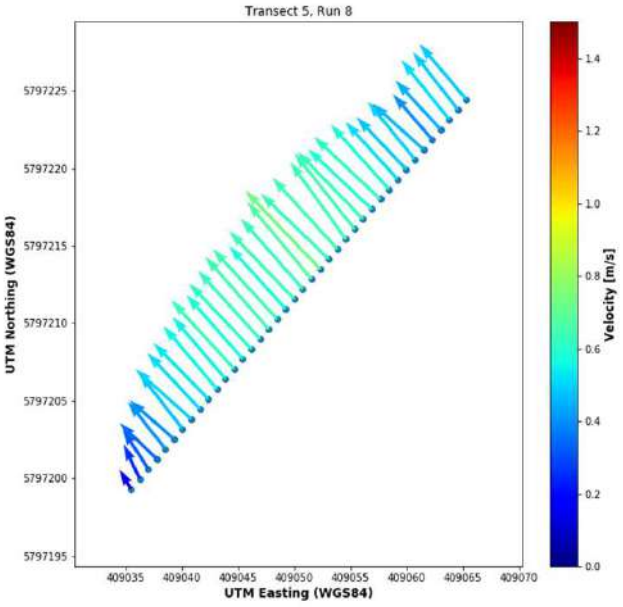
41


Transect 5, Run 6
UTM Northing (WGS84)
5797225
5797220
5797215
5797210
5797205
5797200
409035
409040
409045
409050
409055
409060
409065
409070
UTM Easting (WGS84)
Velocity [m/s]
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0

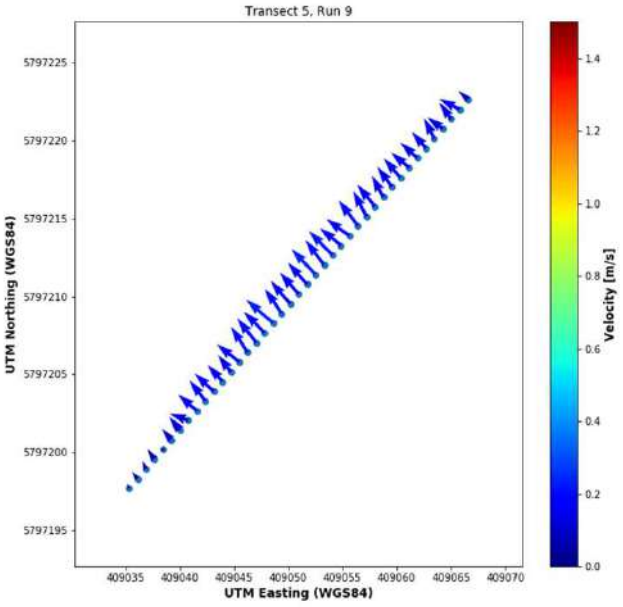
42


Transect 5, Run 7
UTM Northing (WGS84)
5797225
5797220
5797215
5797210
5797205
5797200
5797195
409030
409035
409040
409045
409050
409055
409060
409065
409070
UTM Easting (WGS84)
Velocity [m/s]
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0

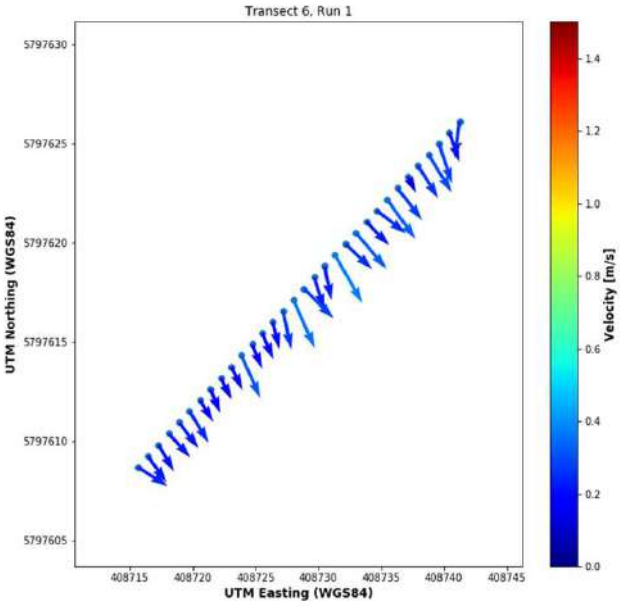
43


Transect 5, Run 8
UTM Northing (WGS84)
5797225
5797220
5797215
5797210
5797205
5797200
5797195
409035
409040
409045
409050
409055
409060
409065
409070
UTM Easting (WGS84)
Velocity [m/s]
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0

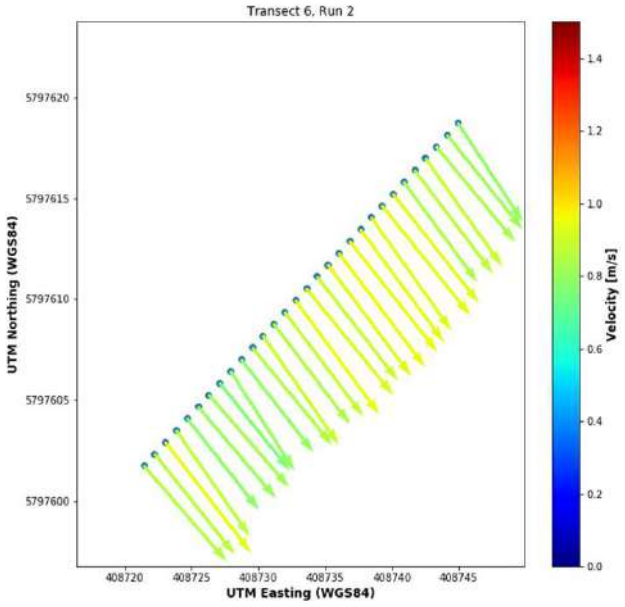
44


Transect 5, Run 9
UTM Northing (WGS84)
5797225
5797220
5797215
5797210
5797205
5797200
5797195
409035
409040
409045
409050
409055
409060
409065
409070
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

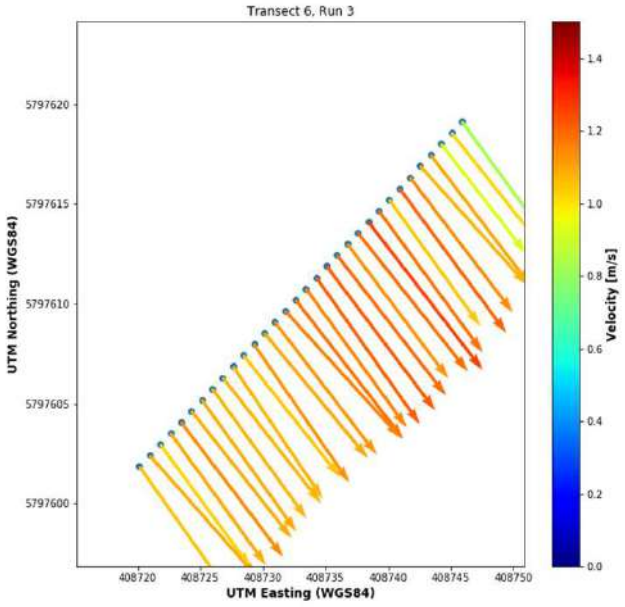
45


Transect 6, Run 1
UTM Northing (WGS84)
5797630
5797625
5797620
5797615
5797610
5797605
408715
408720
408725
408730
408735
408740
408745
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

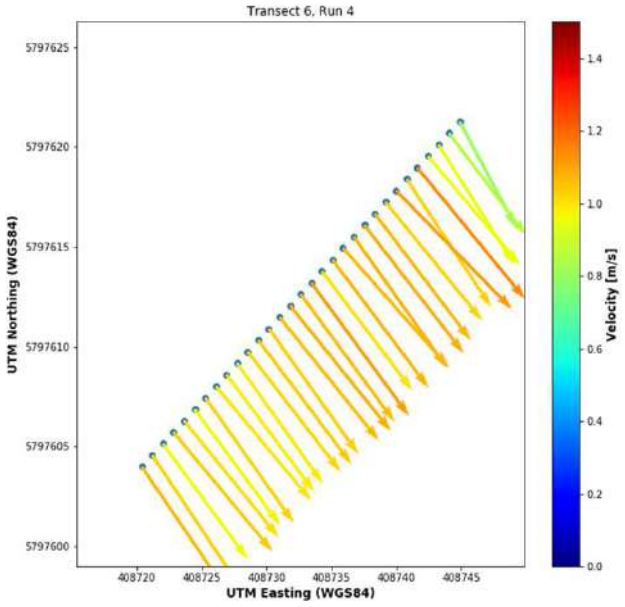
46


Transect 6, Run 2
UTM Northing (WGS84)
5797620
5797615
5797610
5797605
5797600
408720
408725
408730
408735
408740
408745
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

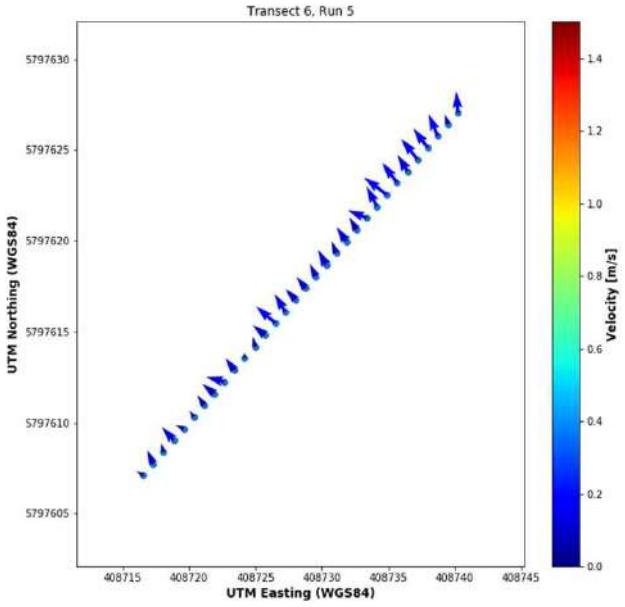
47


Transect 6, Run 3
UTM Northing (WGS84)
5797620
5797615
5797610
5797605
5797600
408720
408725
408730
408735
408740
408745
408750
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

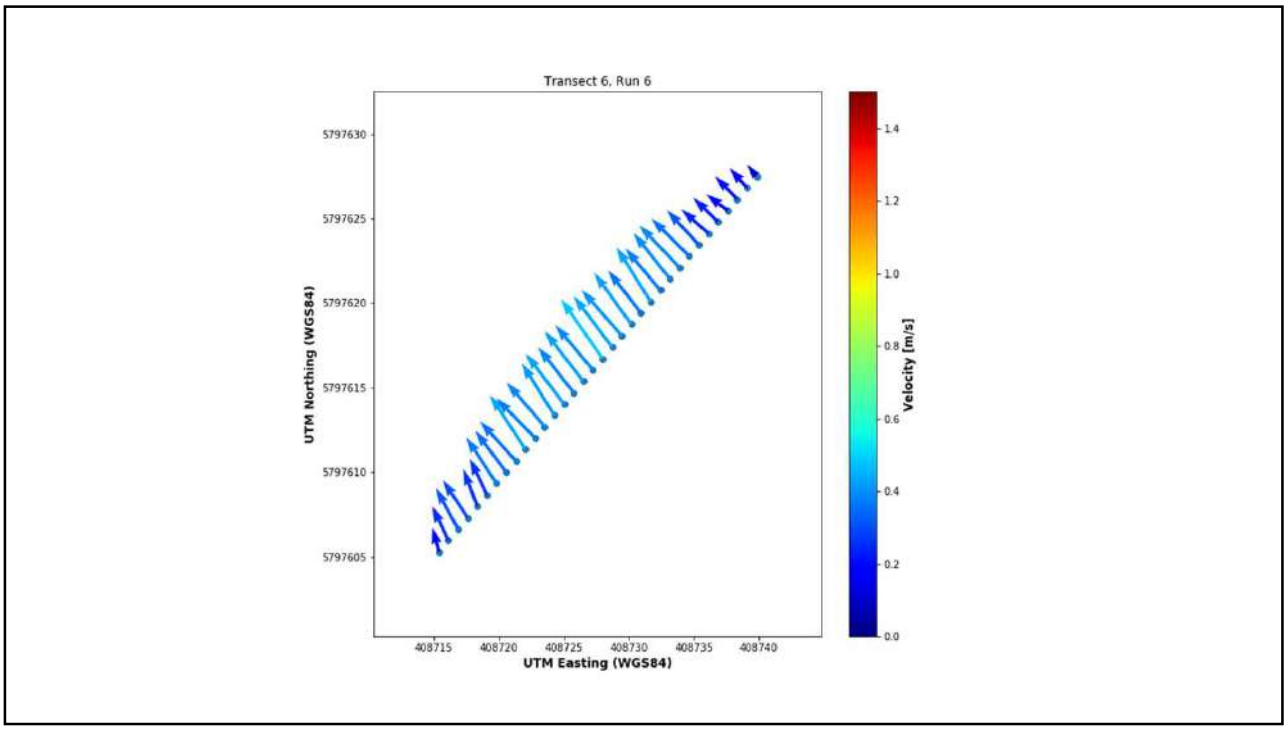
48


Transect 6, Run 4
UTM Northing (WGS84)
5797625
5797620
5797615
5797610
5797605
5797600
408720
408725
408730
408735
408740
408745
UTM Easting (WGS84)
Velocity [m/s]
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0

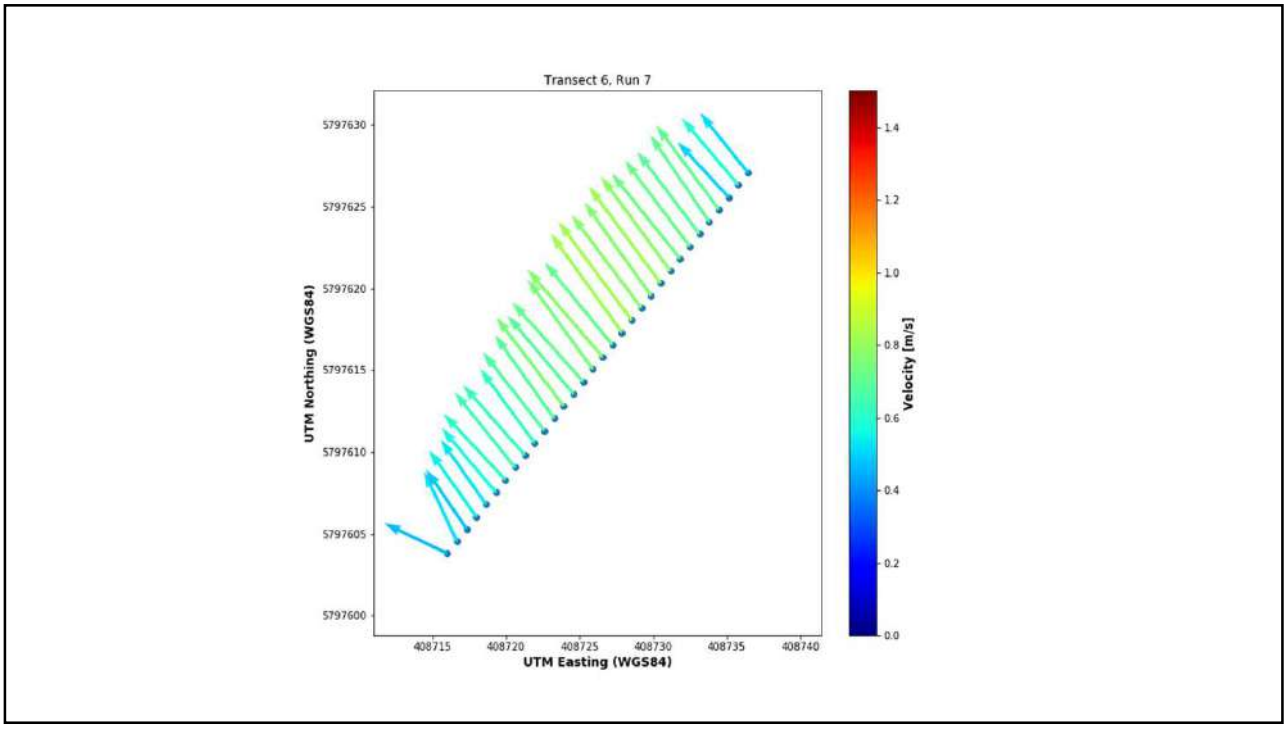
49


Transect 6, Run 5
UTM Northing (WGS84)
5797630
5797625
5797620
5797615
5797610
5797605
408715
408720
408725
408730
408735
408740
408745
UTM Easting (WGS84)
Velocity [m/s]
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0

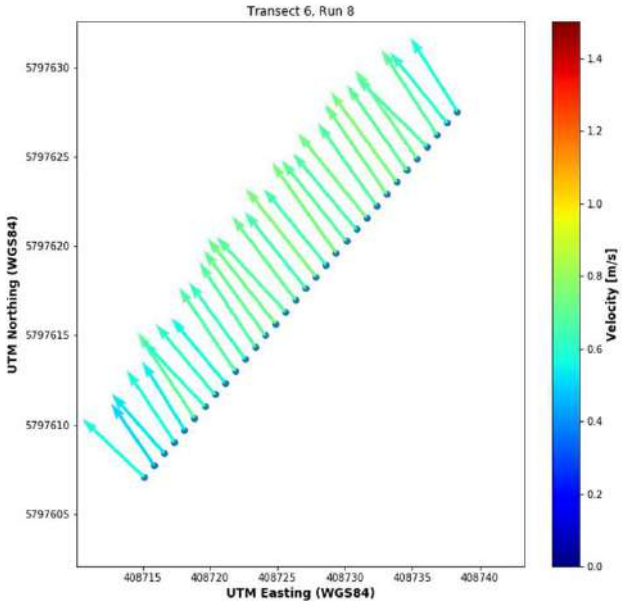
50


Transect 6, Run 6
UTM Northing (WGS84)
5797630
5797625
5797620
5797615
5797610
5797605
408715
408720
408725
408730
408735
408740
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

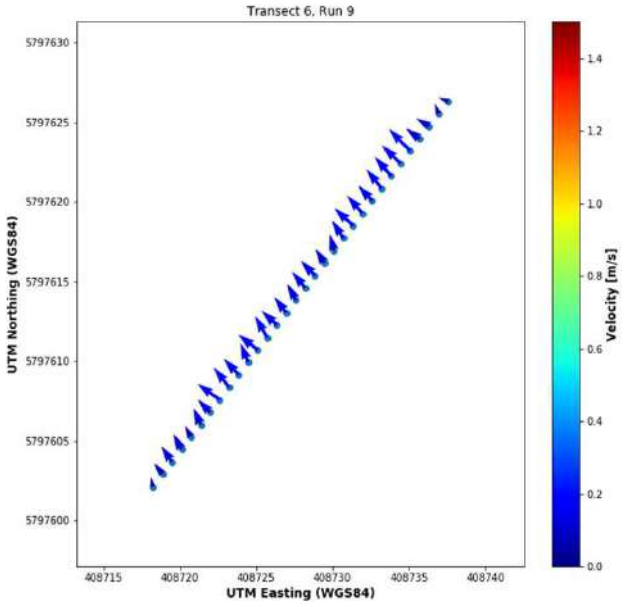
51


Transect 6, Run 7
UTM Northing (WGS84)
5797630
5797625
5797620
5797615
5797610
5797605
5797600
408715
408720
408725
408730
408735
408740
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

52


Transect 6, Run 8
UTM Northing (WGS84)
5797630
5797625
5797620
5797615
5797610
5797605
408715
408720
408725
408730
408735
408740
UTM Easting (WGS84)
Velocity [m/s]
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0

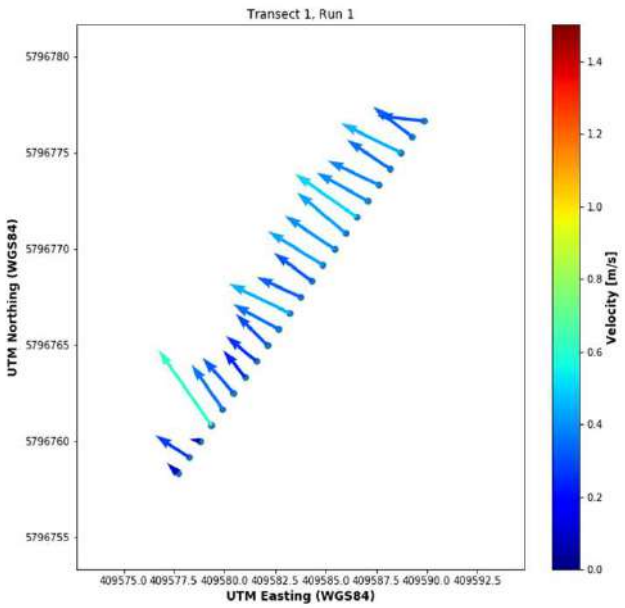
53


Transect 6, Run 9
UTM Northing (WGS84)
5797630
5797625
5797620
5797615
5797610
5797605
5797600
408715
408720
408725
408730
408735
408740
UTM Easting (WGS84)
Velocity [m/s]
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0

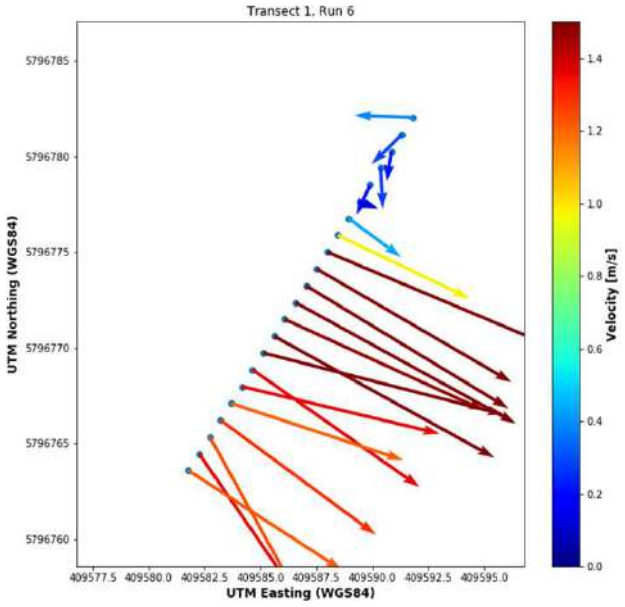
54

SPRING TIDE

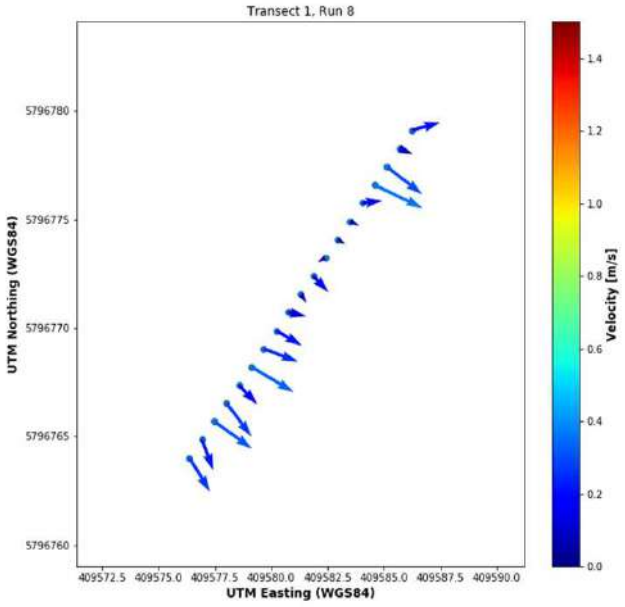
55



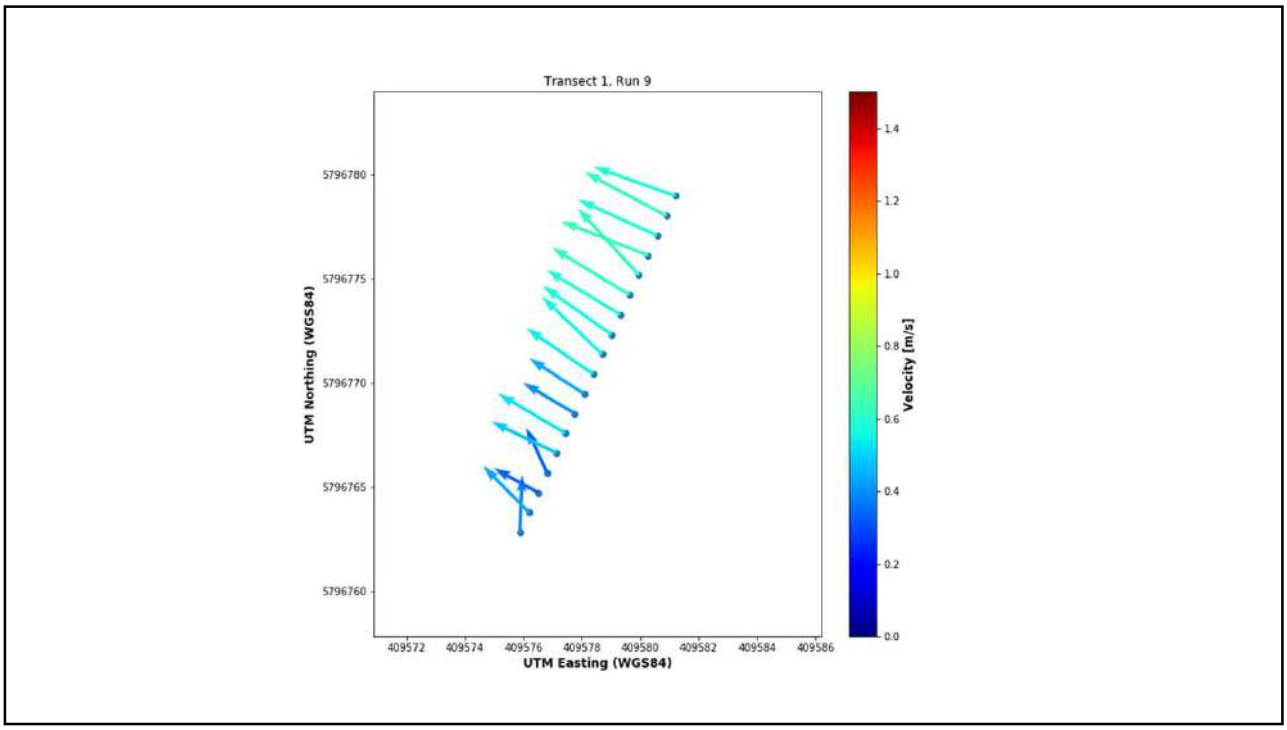
56


Transect 1, Run 6
UTM Northing (WGS84)
5796785
5796780
5796775
5796770
5796765
5796760
409577.5 409580.0 409582.5 409585.0 409587.5 409590.0 409592.5 409595.0
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

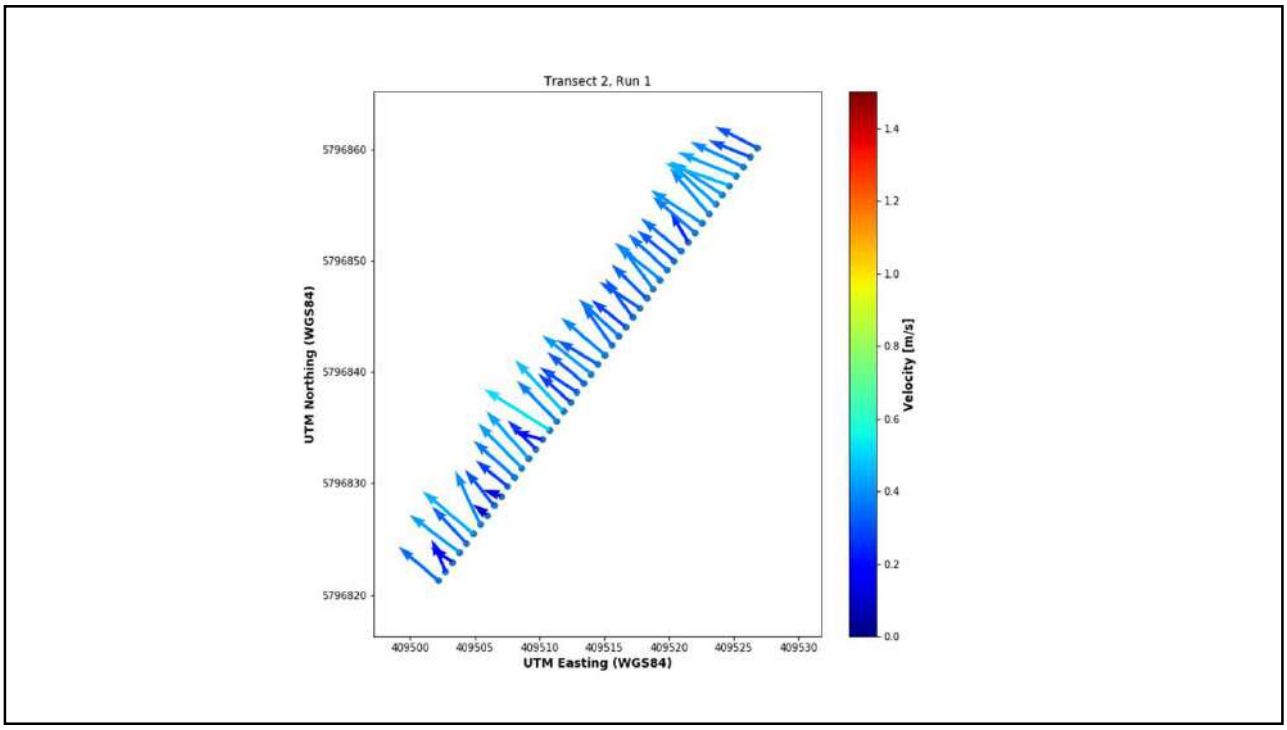
57


Transect 1, Run 8
UTM Northing (WGS84)
5796780
5796775
5796770
5796765
5796760
409572.5 409575.0 409577.5 409580.0 409582.5 409585.0 409587.5 409590.0
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

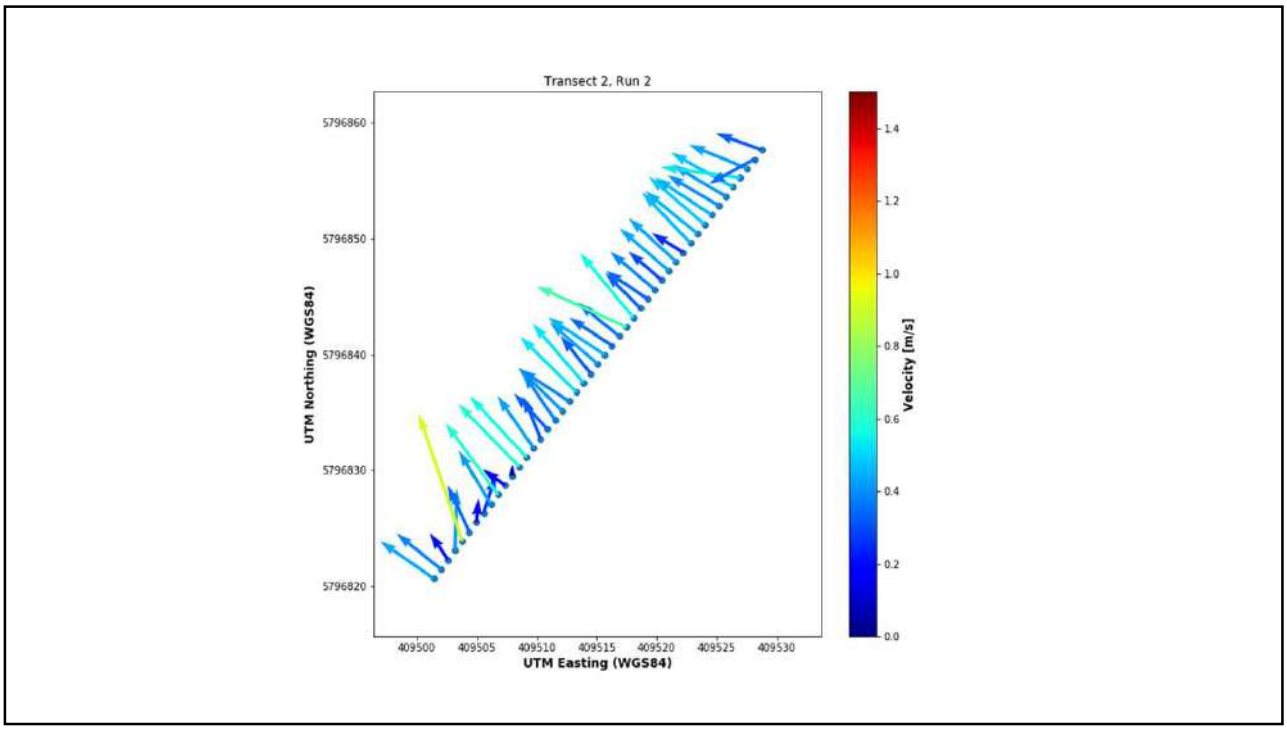
58


Transect 1, Run 9
UTM Northing (WGS84)
5796780
5796775
5796770
5796765
5796760
409572
409574
409576
409578
409580
409582
409584
409586
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

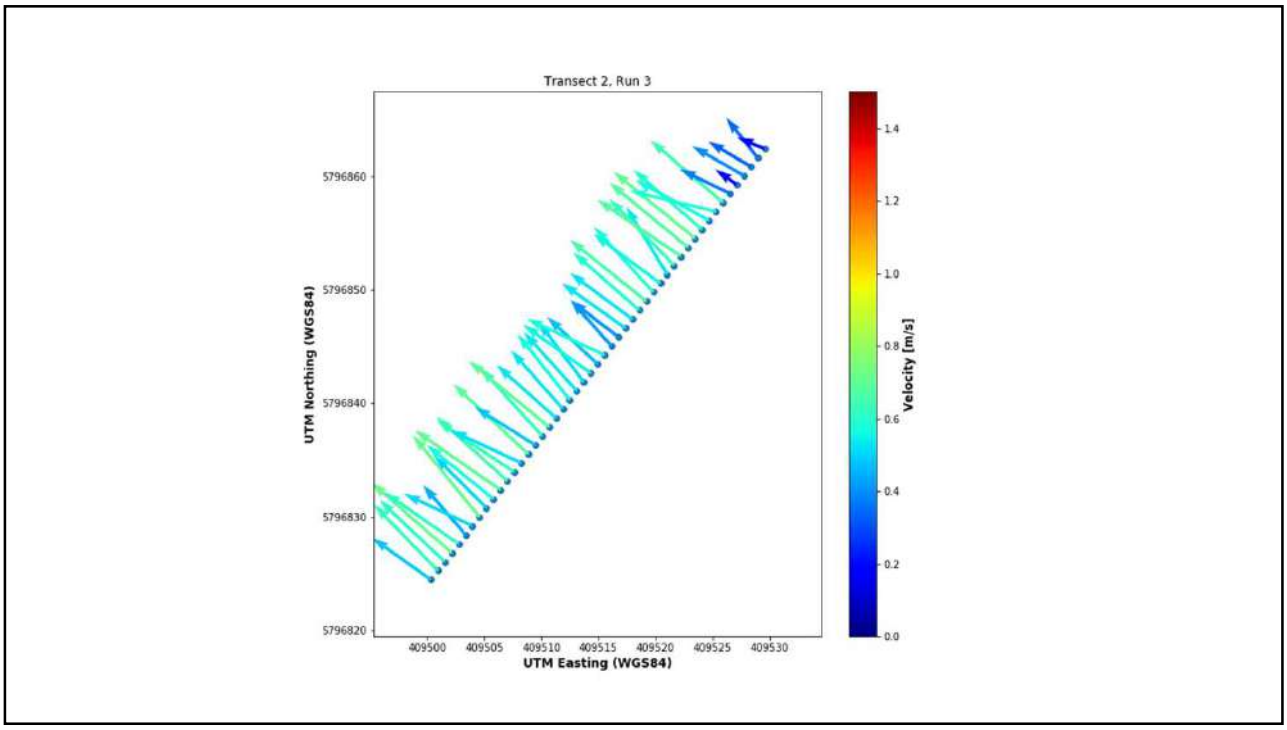
59


Transect 2, Run 1
UTM Northing (WGS84)
5796860
5796850
5796840
5796830
5796820
409500
409505
409510
409515
409520
409525
409530
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

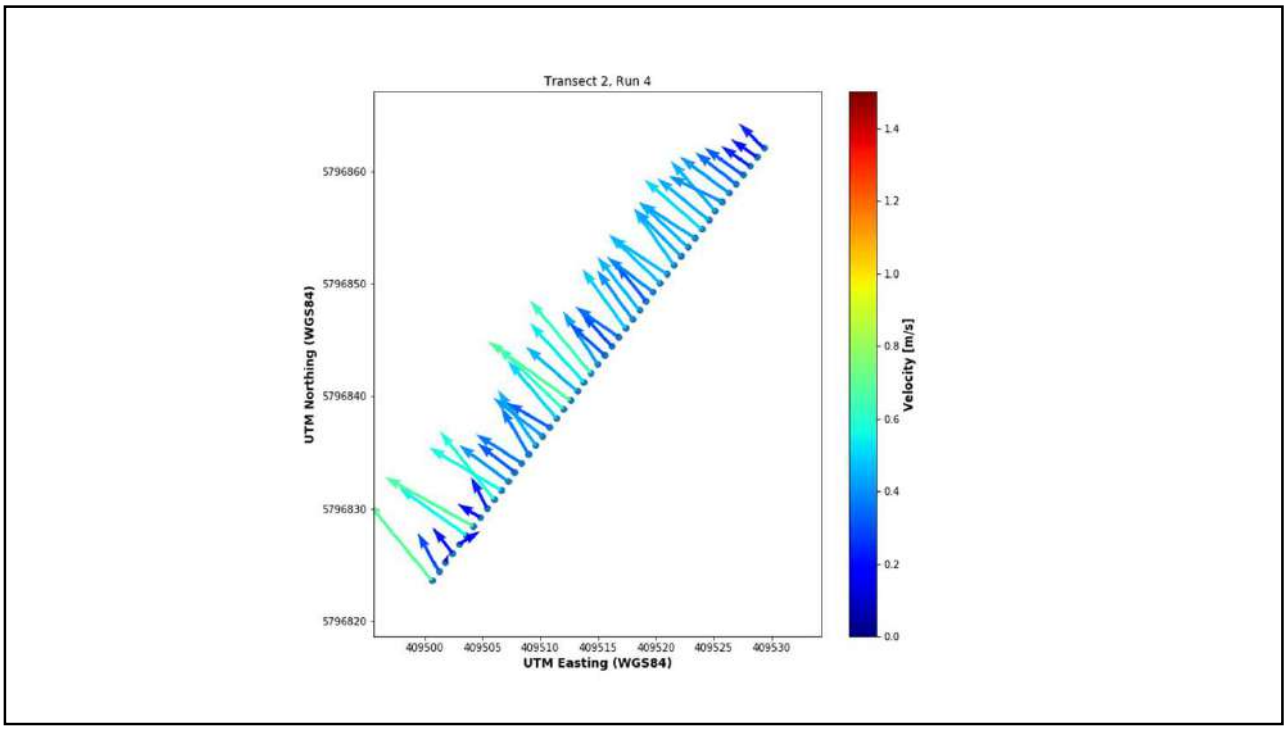
60


Transect 2, Run 2
UTM Northing (WGS84)
5796860
5796850
5796840
5796830
5796820
409500
409505
409510
409515
409520
409525
409530
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

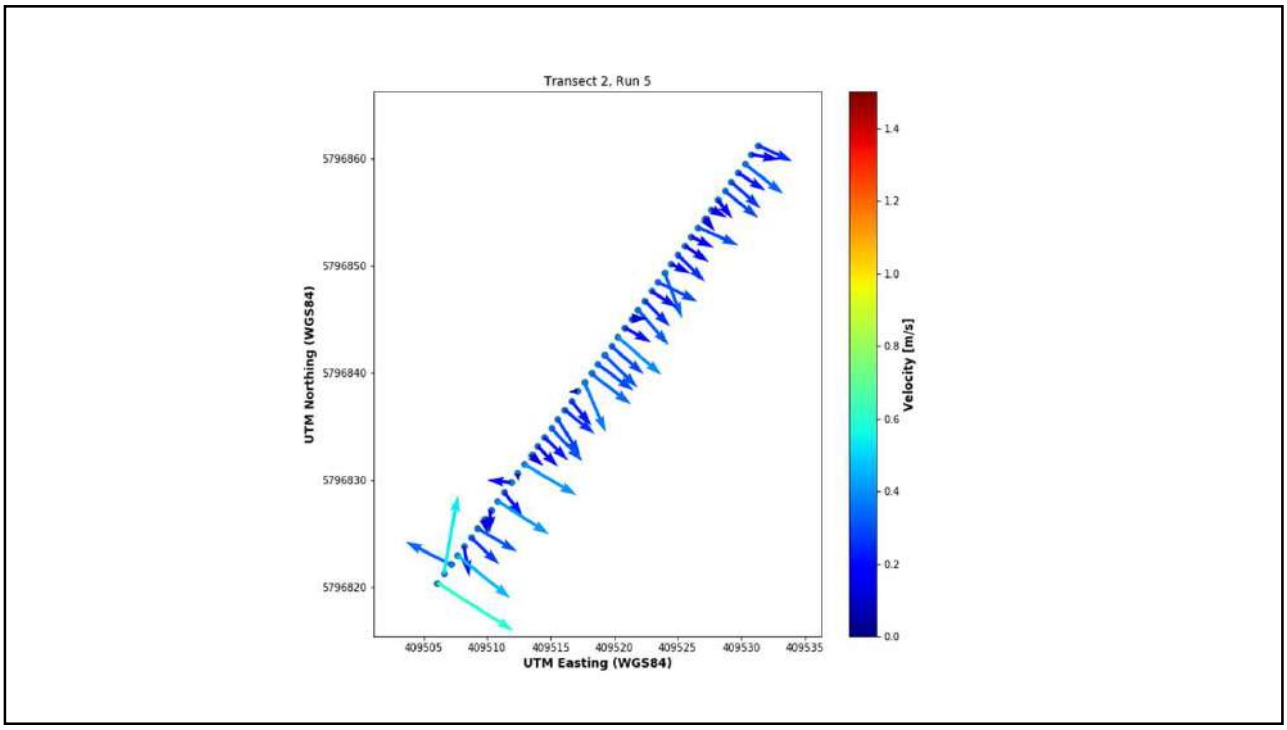
61


Transect 2, Run 3
UTM Northing (WGS84)
5796860
5796850
5796840
5796830
5796820
409500
409505
409510
409515
409520
409525
409530
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

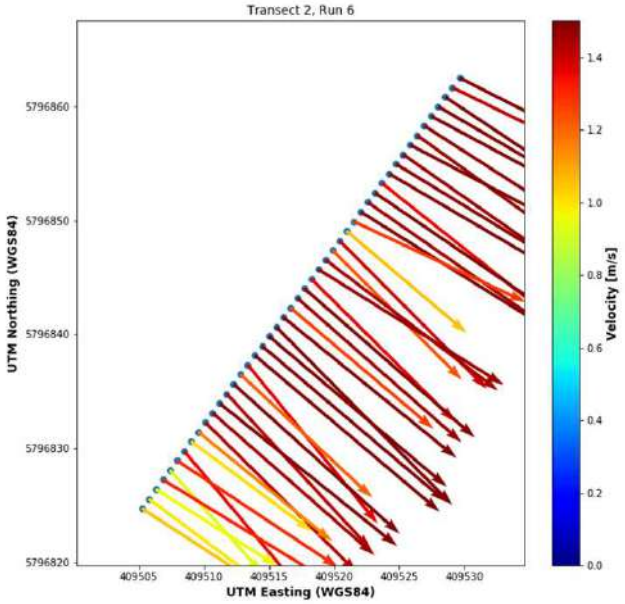
62


Transect 2, Run 4
UTM Northing (WGS84)
5796860
5796850
5796840
5796830
5796820
409500
409505
409510
409515
409520
409525
409530
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

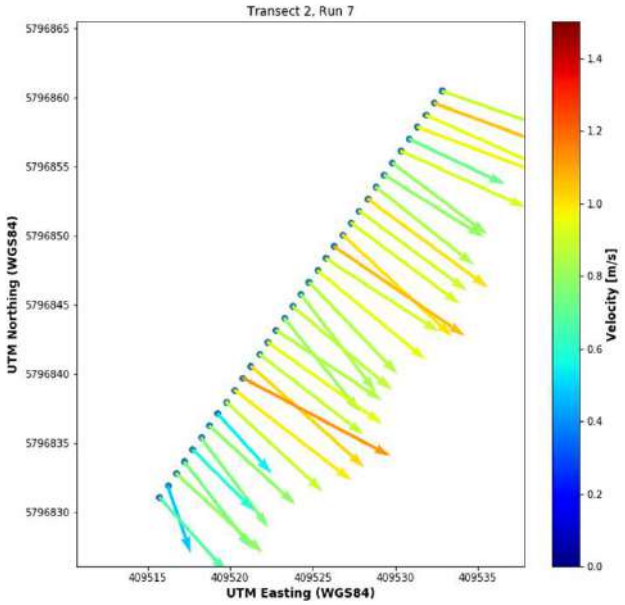
63


Transect 2, Run 5
UTM Northing (WGS84)
5796860
5796850
5796840
5796830
5796820
409505
409510
409515
409520
409525
409530
409535
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

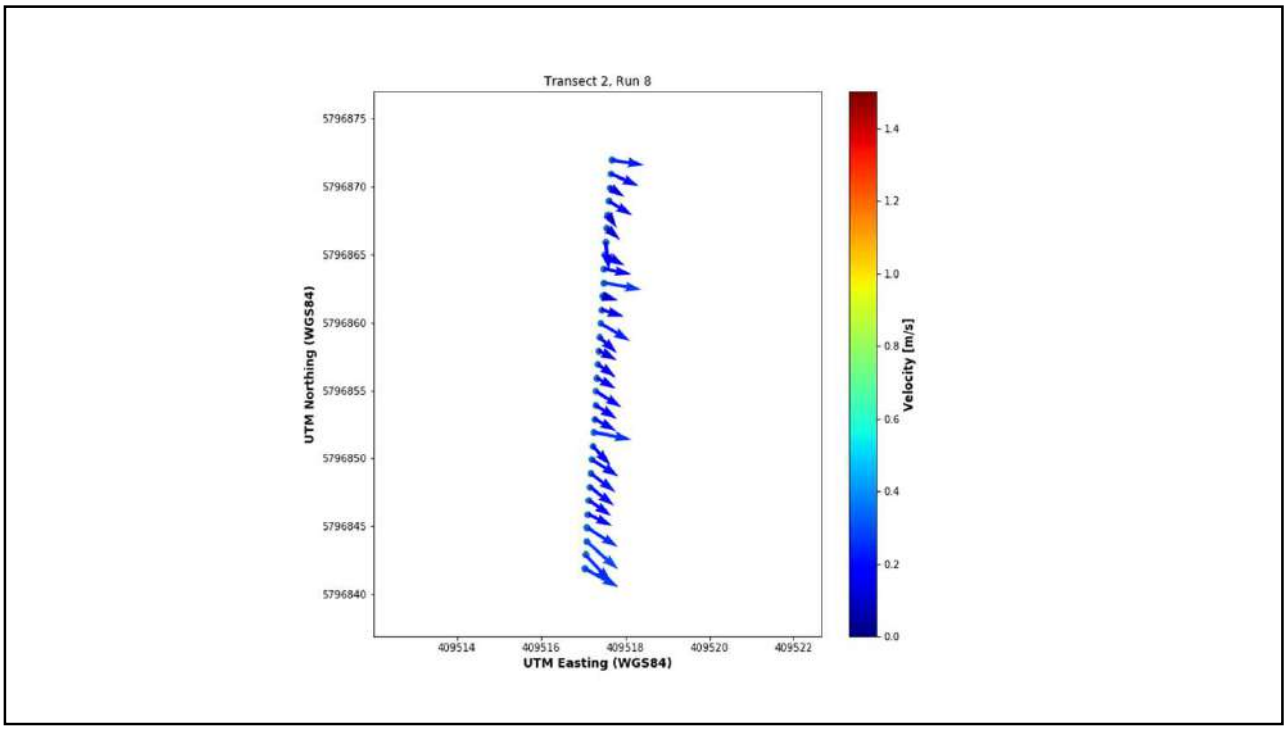
64


Transect 2, Run 6
UTM Northing (WGS84)
5796860
5796850
5796840
5796830
5796820
409505
409510
409515
409520
409525
409530
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

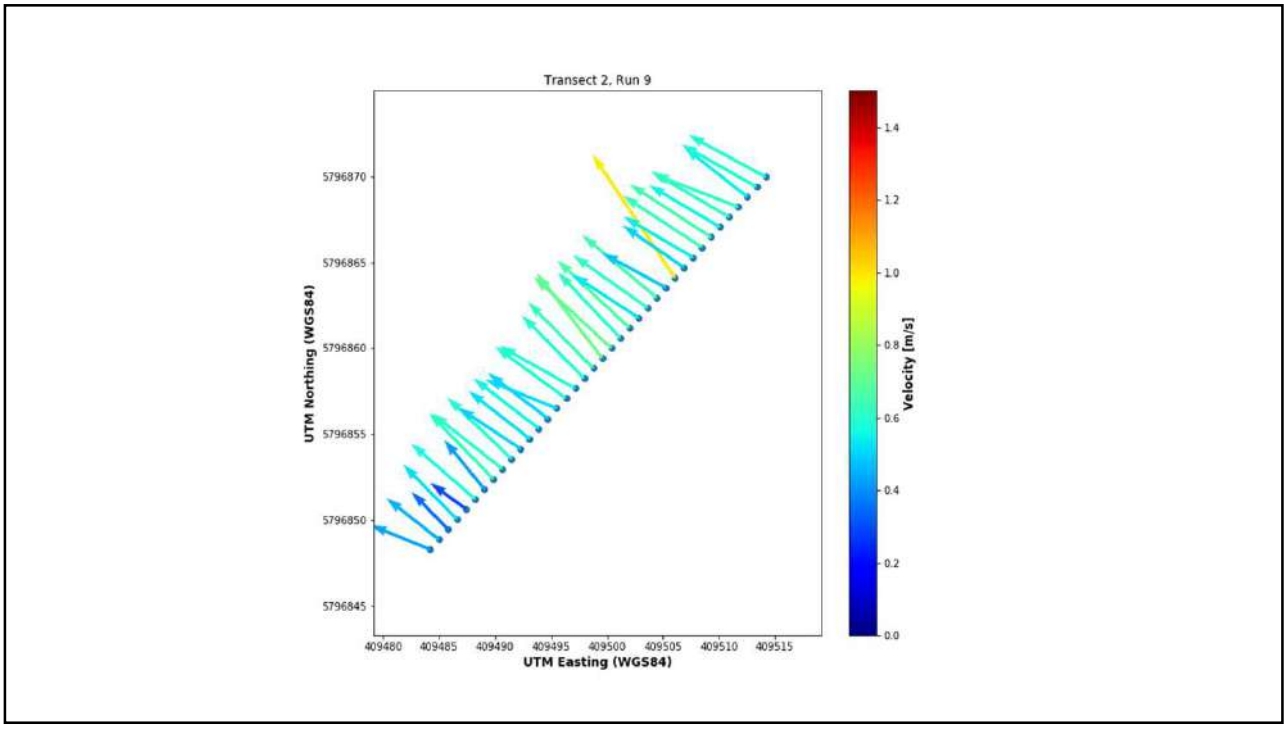
65


Transect 2, Run 7
UTM Northing (WGS84)
5796865
5796860
5796855
5796850
5796845
5796840
5796835
5796830
409515
409520
409525
409530
409535
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

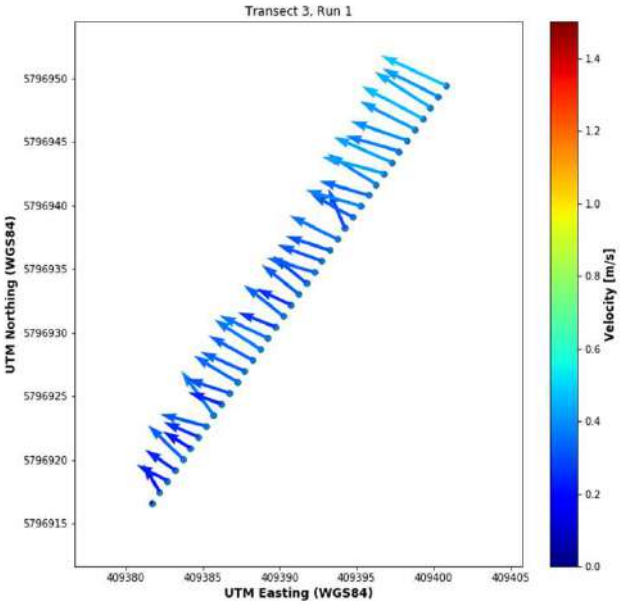
66


Transect 2, Run 8
UTM Northing (WGS84)
5796875
5796870
5796865
5796860
5796855
5796850
5796845
5796840
409514
409516
409518
409520
409522
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

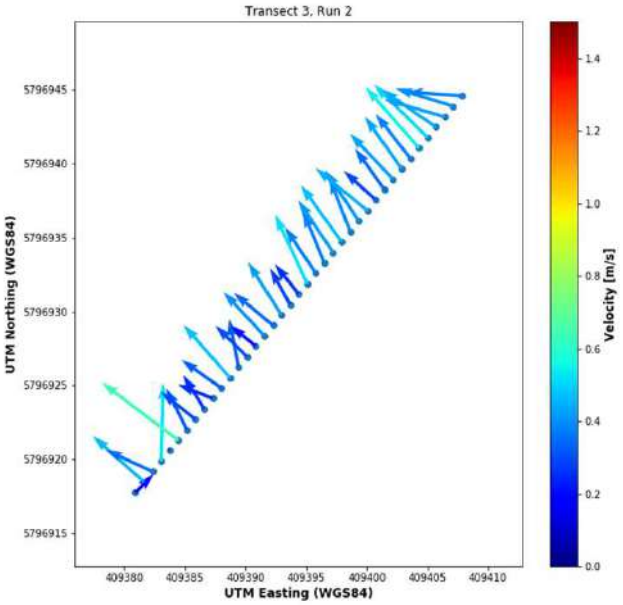
67


Transect 2, Run 9
UTM Northing (WGS84)
5796870
5796865
5796860
5796855
5796850
5796845
409480
409485
409490
409495
409500
409505
409510
409515
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

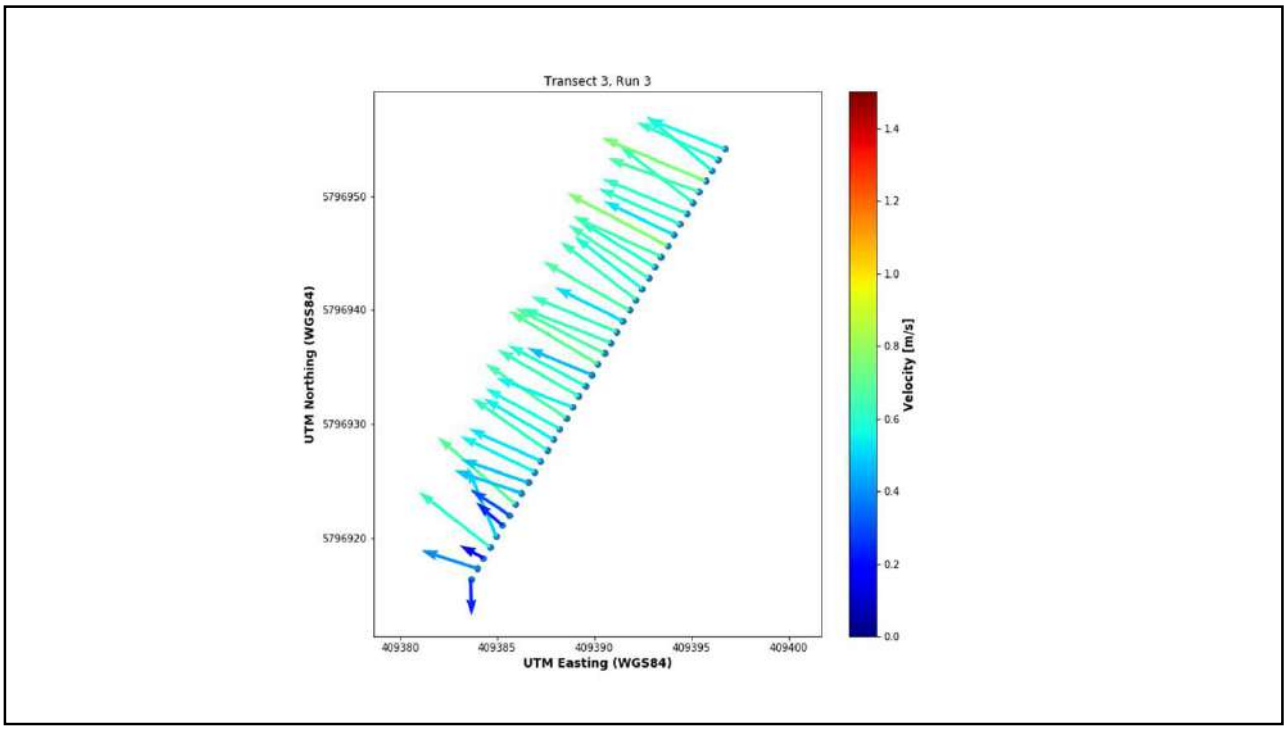
68


Transect 3, Run 1
UTM Northing (WGS84)
5796950
5796945
5796940
5796935
5796930
5796925
5796920
5796915
409380
409385
409390
409395
409400
409405
UTM Easting (WGS84)
Velocity [m/s]
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0

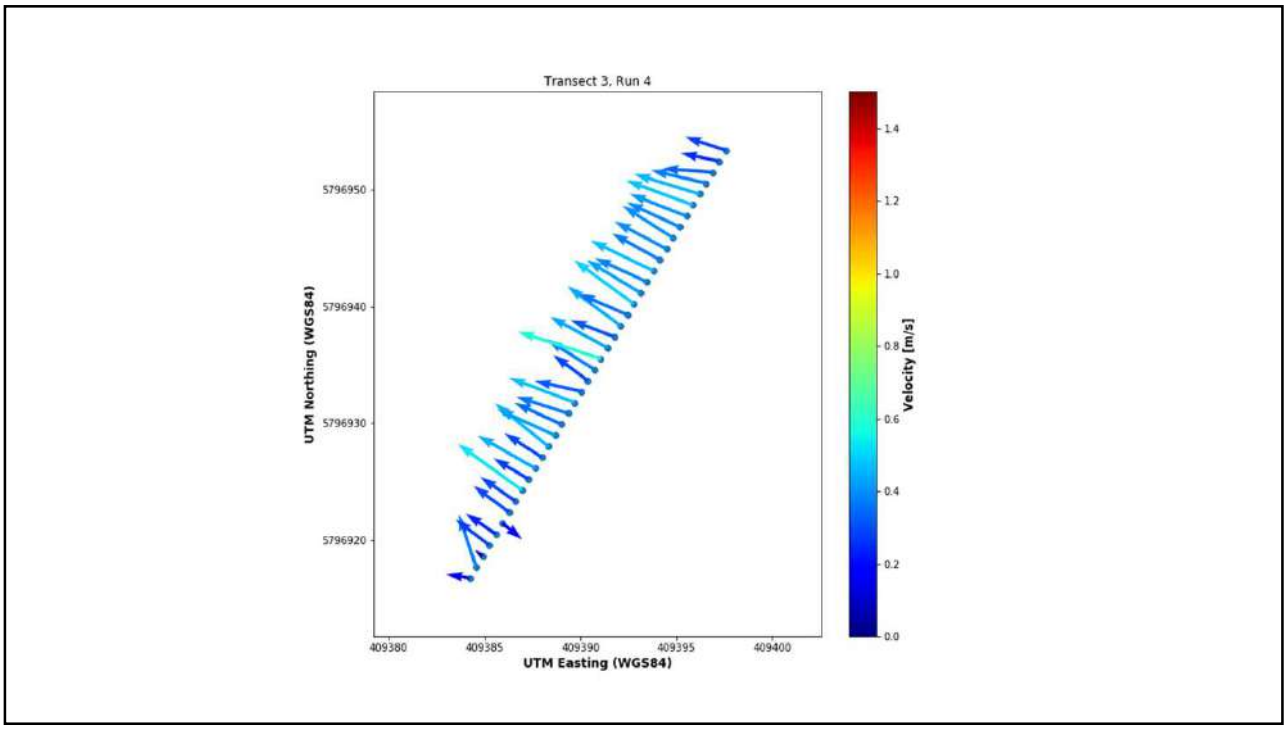
69


Transect 3, Run 2
UTM Northing (WGS84)
5796945
5796940
5796935
5796930
5796925
5796920
5796915
409380
409385
409390
409395
409400
409405
409410
UTM Easting (WGS84)
Velocity [m/s]
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0

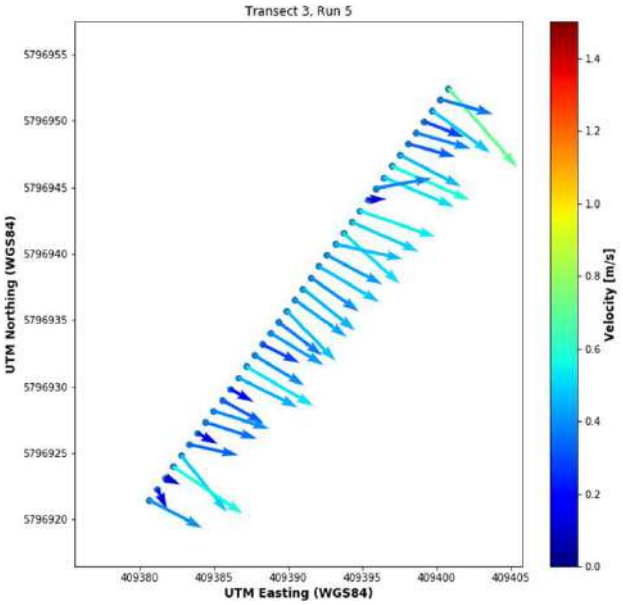
70


Transect 3, Run 3
UTM Northing (WGS84)
5796950
5796940
5796930
5796920
409380
409385
409390
409395
409400
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

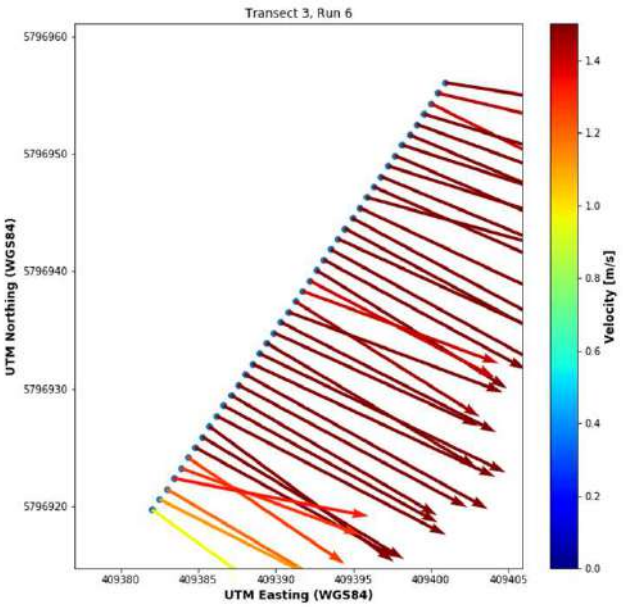
71


Transect 3, Run 4
UTM Northing (WGS84)
5796950
5796940
5796930
5796920
409380
409385
409390
409395
409400
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

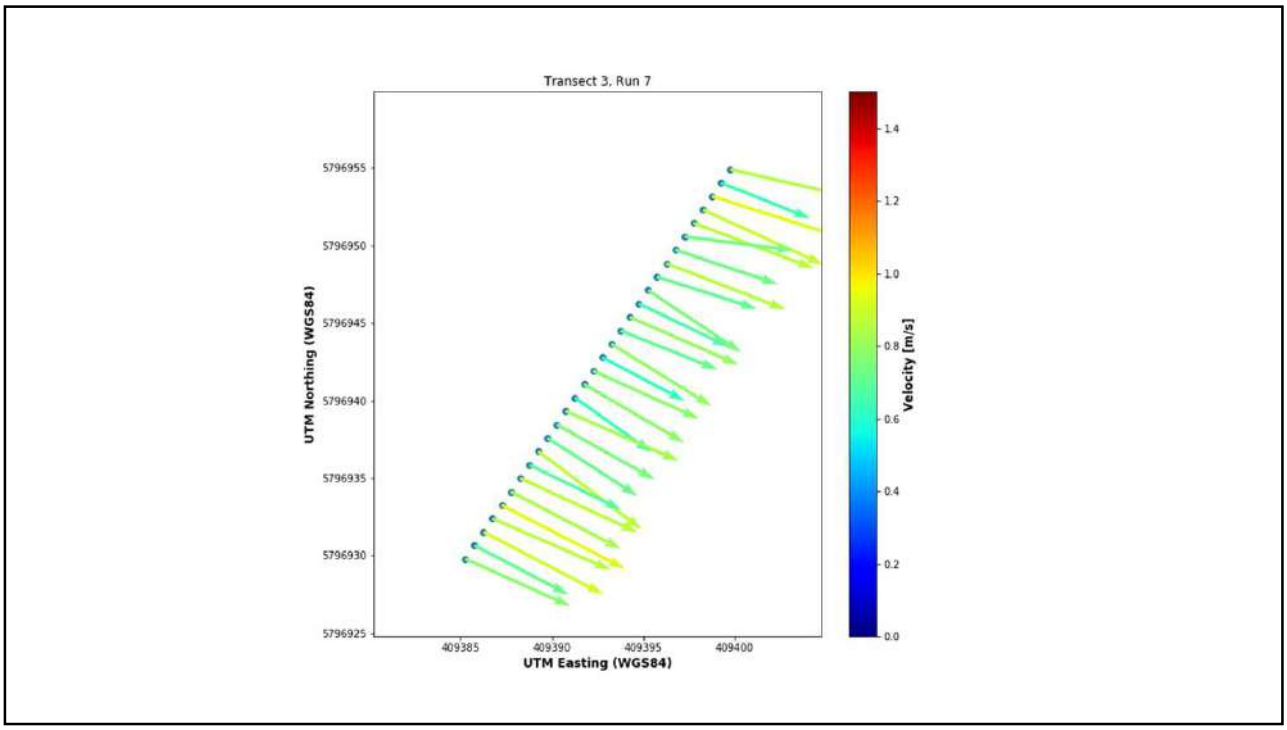
72


Transect 3, Run 5
UTM Northing (WGS84)
5796955
5796950
5796945
5796940
5796935
5796930
5796925
5796920
409380
409385
409390
409395
409400
409405
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

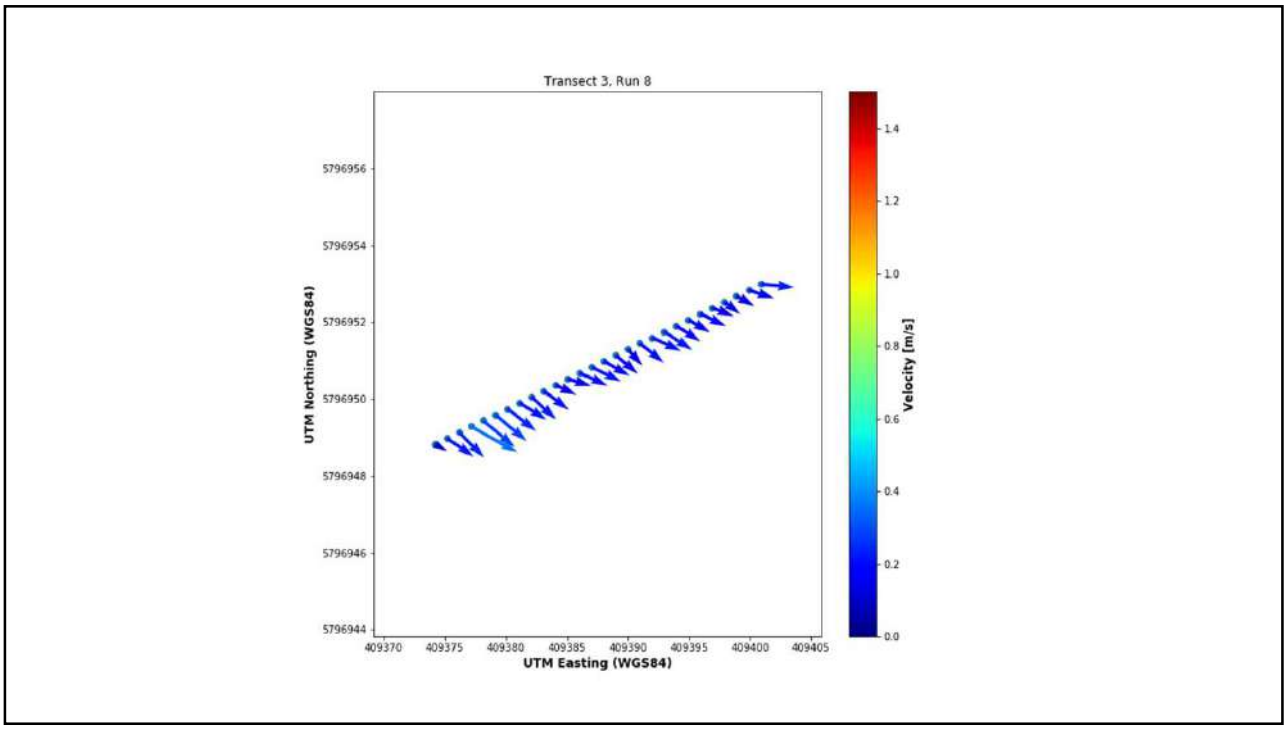
73


Transect 3, Run 6
UTM Northing (WGS84)
5796960
5796950
5796940
5796930
5796920
409380
409385
409390
409395
409400
409405
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

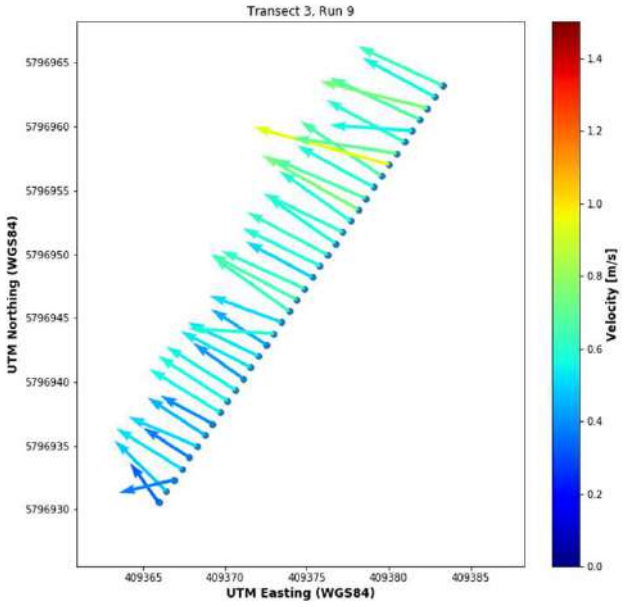
74


Transect 3, Run 7
UTM Northing (WGS84)
5796955
5796950
5796945
5796940
5796935
5796930
5796925
409385
409390
409395
409400
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

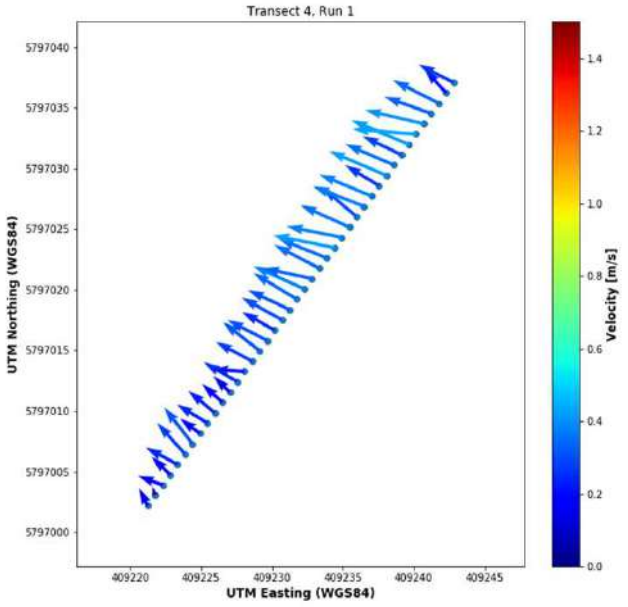
75


Transect 3, Run 8
UTM Northing (WGS84)
5796956
5796954
5796952
5796950
5796948
5796946
5796944
409370
409375
409380
409385
409390
409395
409400
409405
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

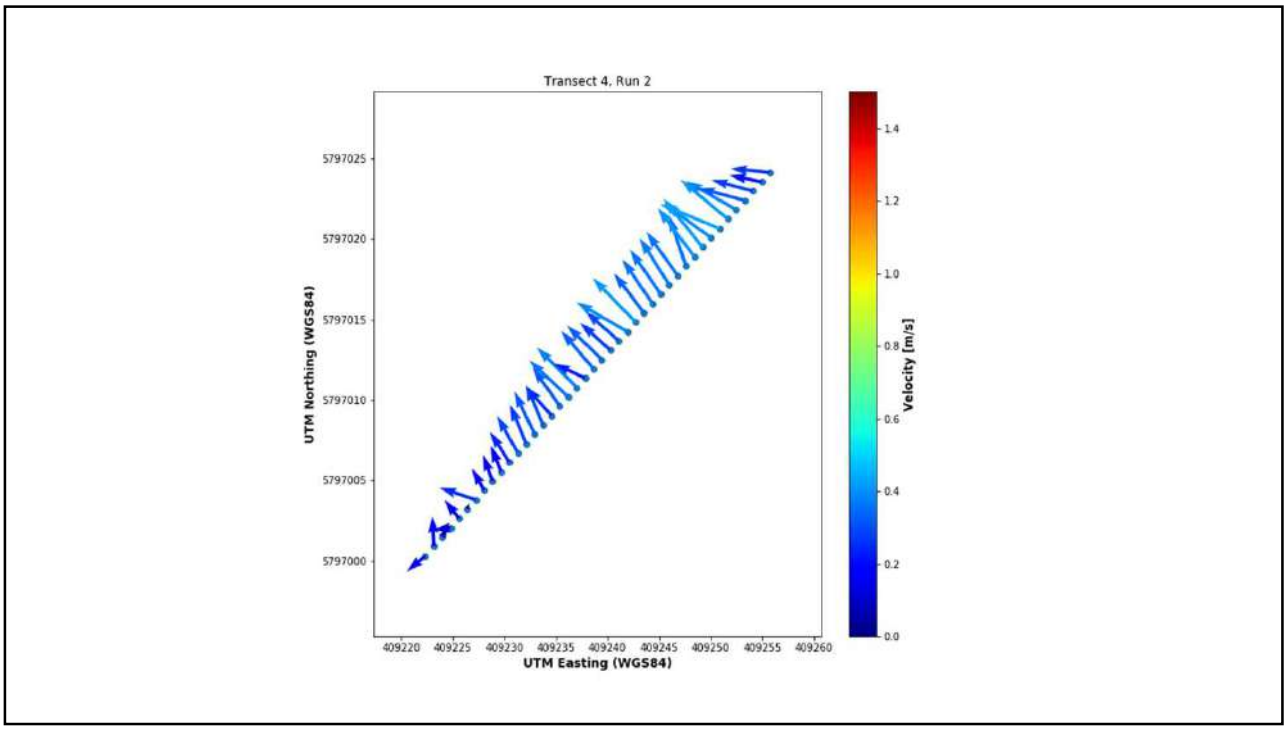
76


Transect 3, Run 9
UTM Northing (WGS84)
5796965
5796960
5796955
5796950
5796945
5796940
5796935
5796930
409365
409370
409375
409380
409385
UTM Easting (WGS84)
Velocity [m/s]
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0

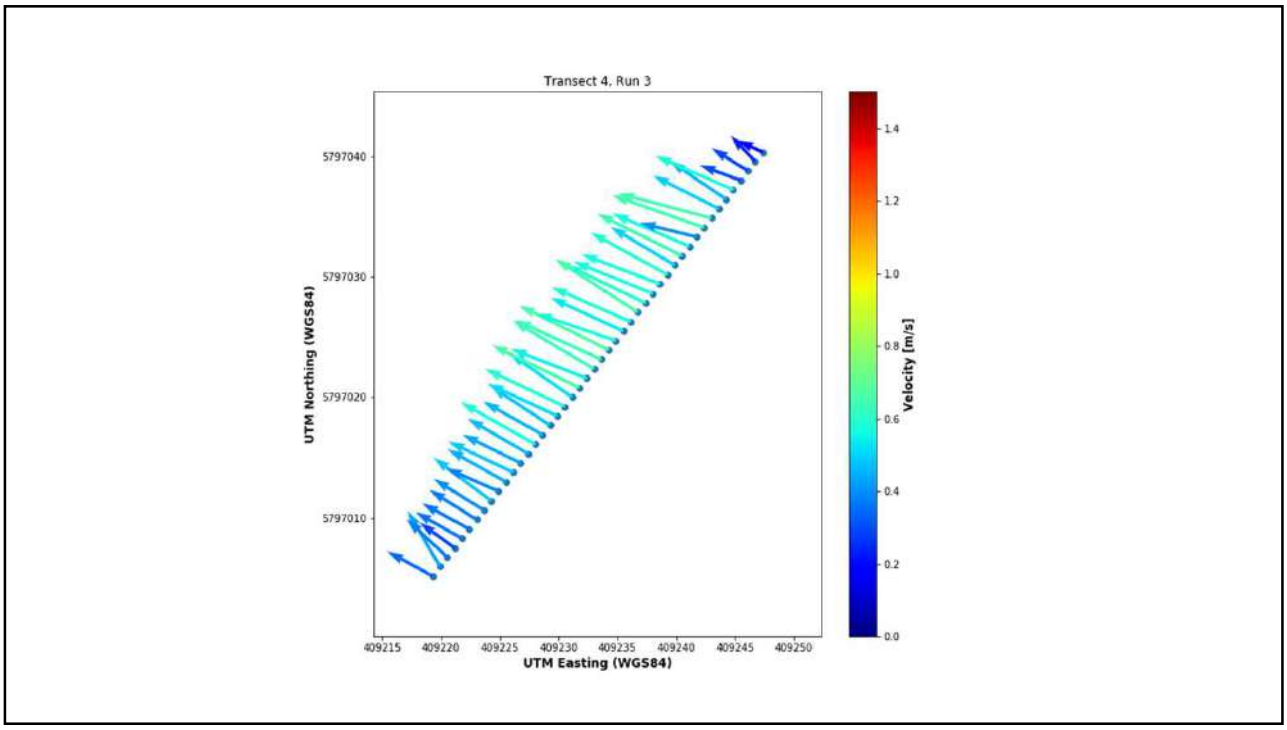
77


Transect 4, Run 1
UTM Northing (WGS84)
5797040
5797035
5797030
5797025
5797020
5797015
5797010
5797005
5797000
409220
409225
409230
409235
409240
409245
UTM Easting (WGS84)
Velocity [m/s]
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0

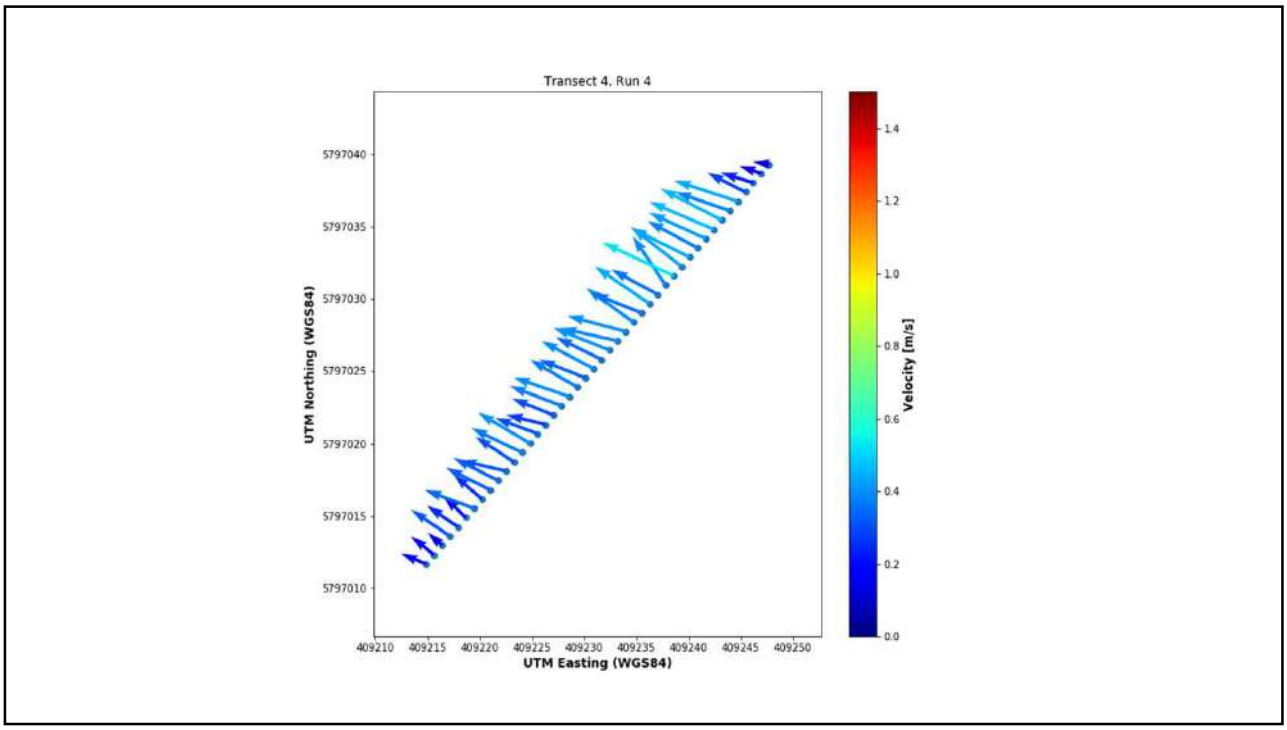
78


Transect 4, Run 2
UTM Northing (WGS84)
5797025
5797020
5797015
5797010
5797005
5797000
409220
409225
409230
409235
409240
409245
409250
409255
409260
UTM Easting (WGS84)
Velocity [m/s]
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0

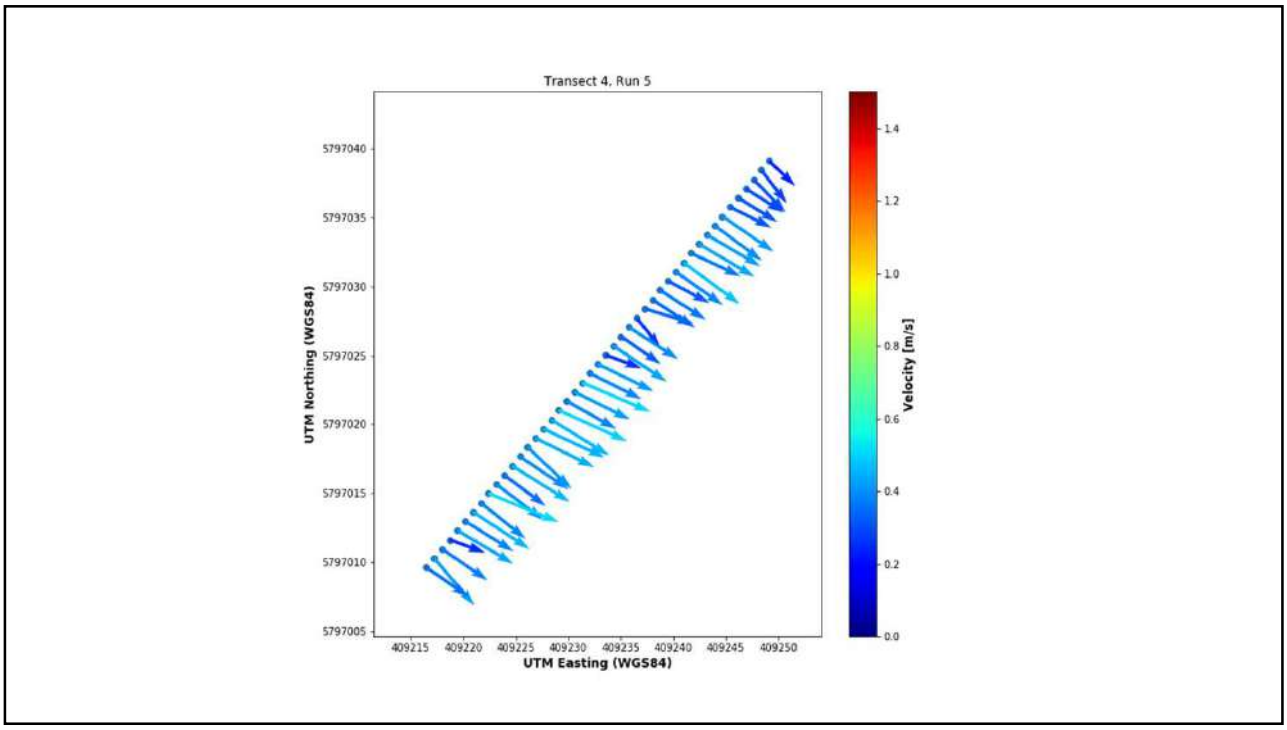
79


Transect 4, Run 3
UTM Northing (WGS84)
5797040
5797030
5797020
5797010
409215
409220
409225
409230
409235
409240
409245
409250
UTM Easting (WGS84)
Velocity [m/s]
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0

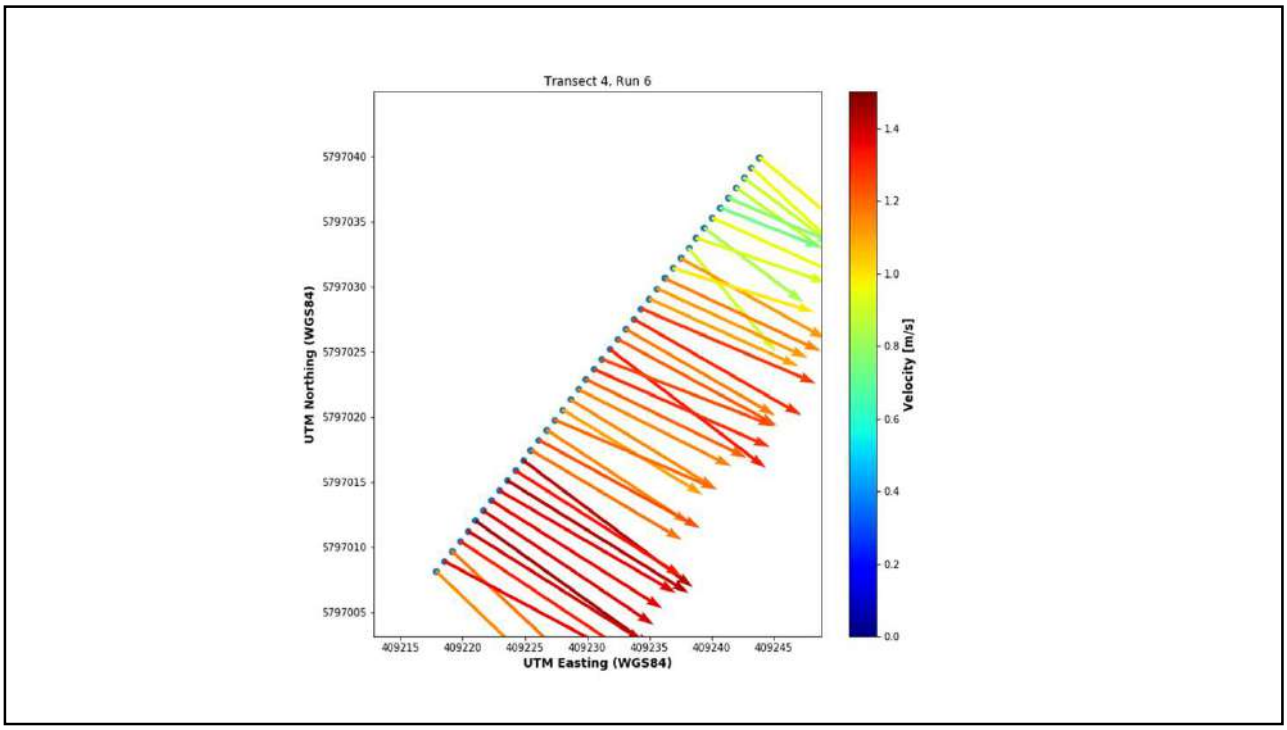
80


Transect 4, Run 4
UTM Northing (WGS84)
5797040
5797035
5797030
5797025
5797020
5797015
5797010
409210
409215
409220
409225
409230
409235
409240
409245
409250
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

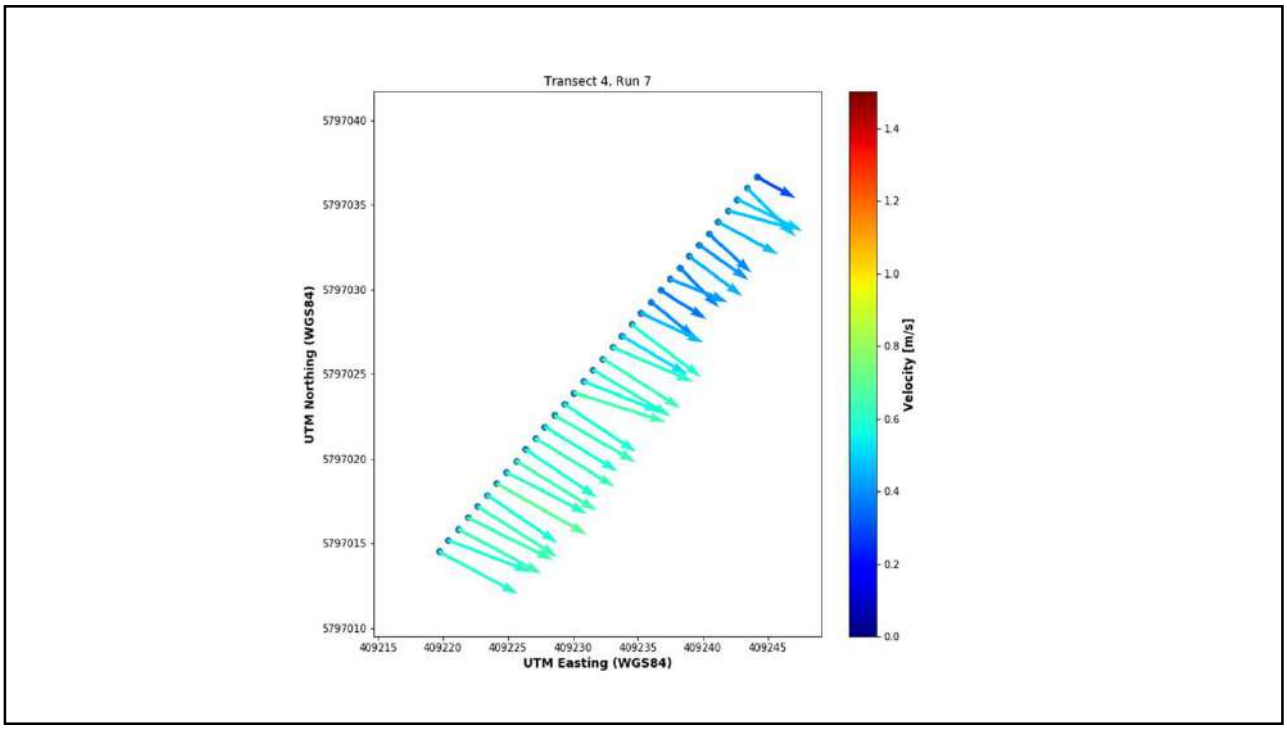
81


Transect 4, Run 5
UTM Northing (WGS84)
5797040
5797035
5797030
5797025
5797020
5797015
5797010
5797005
409215
409220
409225
409230
409235
409240
409245
409250
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

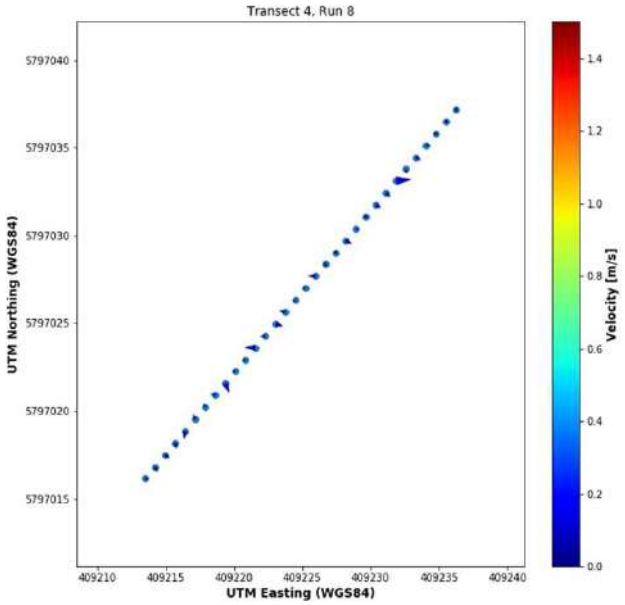
82


Transect 4, Run 6
UTM Northing (WGS84)
5797040
5797035
5797030
5797025
5797020
5797015
5797010
5797005
409215
409220
409225
409230
409235
409240
409245
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

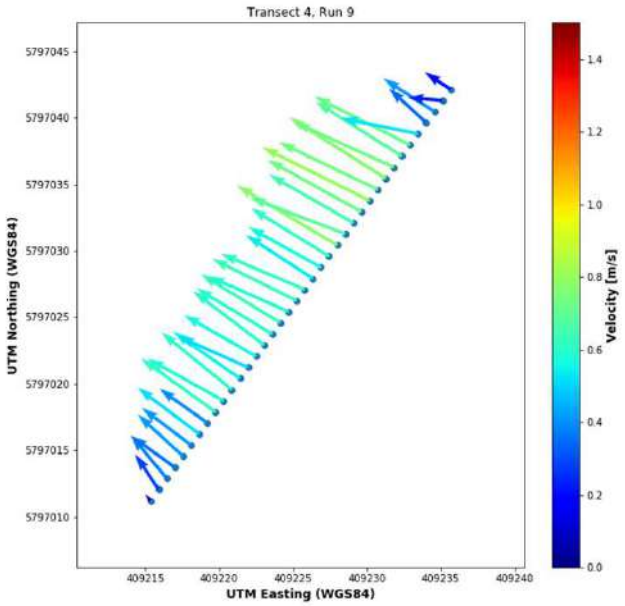
83


Transect 4, Run 7
UTM Northing (WGS84)
5797040
5797035
5797030
5797025
5797020
5797015
5797010
409215
409220
409225
409230
409235
409240
409245
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

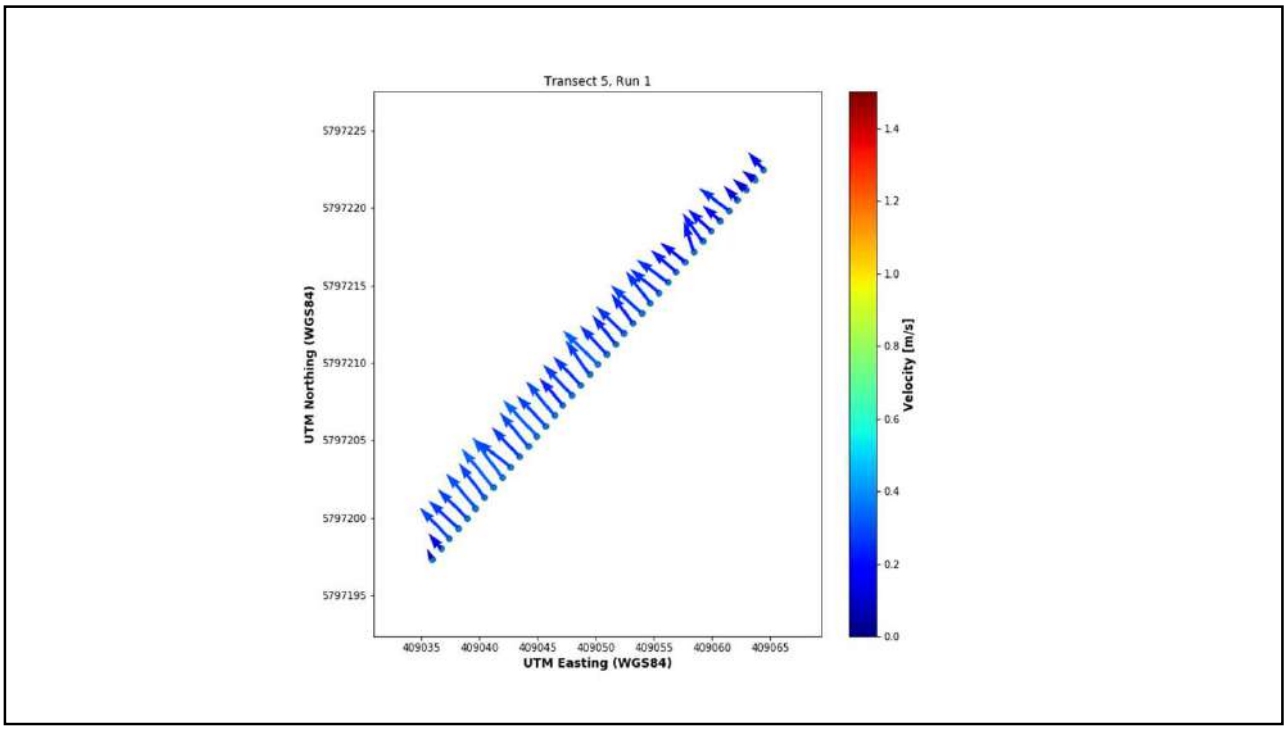
84


Transect 4, Run 8
UTM Northing (WGS84)
5797040
5797035
5797030
5797025
5797020
5797015
409210
409215
409220
409225
409230
409235
409240
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

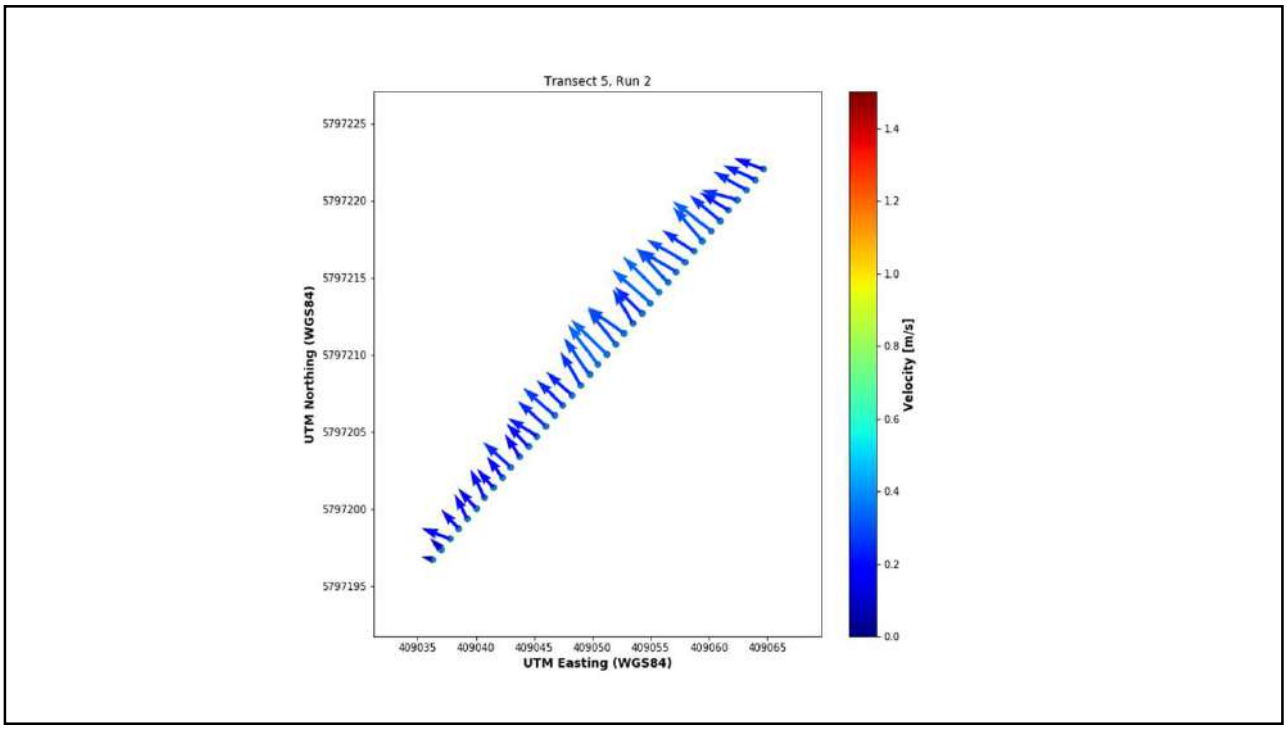
85


Transect 4, Run 9
UTM Northing (WGS84)
5797045
5797040
5797035
5797030
5797025
5797020
5797015
5797010
409215
409220
409225
409230
409235
409240
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

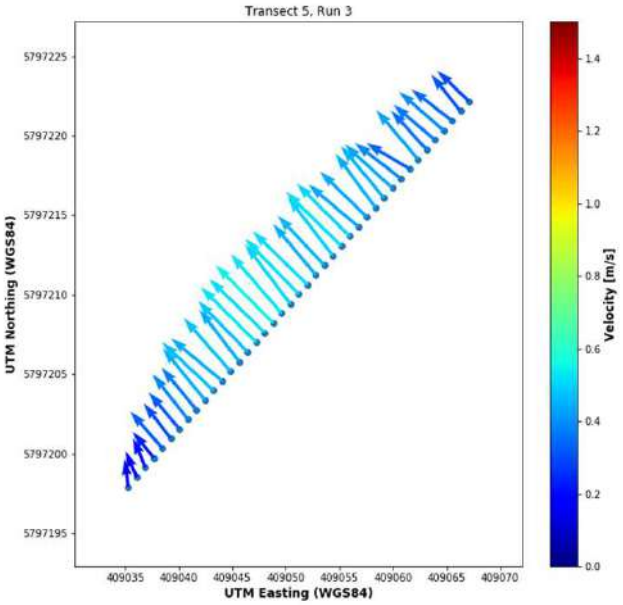
86


Transect 5, Run 1
UTM Northing (WGS84)
5797225
5797220
5797215
5797210
5797205
5797200
5797195
409035
409040
409045
409050
409055
409060
409065
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

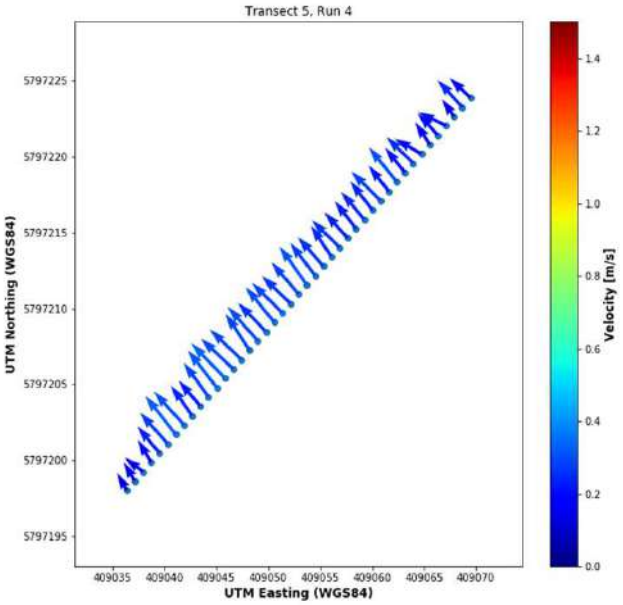
87


Transect 5, Run 2
UTM Northing (WGS84)
5797225
5797220
5797215
5797210
5797205
5797200
5797195
409035
409040
409045
409050
409055
409060
409065
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

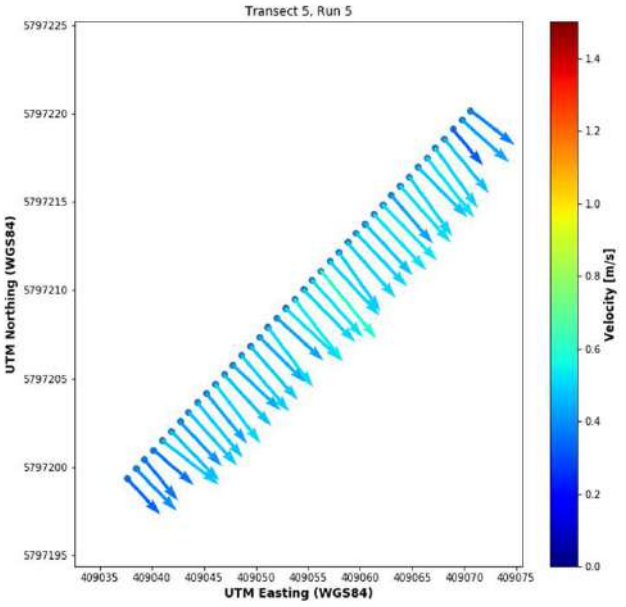
88


Transect 5, Run 3
UTM Northing (WGS84)
5797225
5797220
5797215
5797210
5797205
5797200
5797195
409035
409040
409045
409050
409055
409060
409065
409070
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

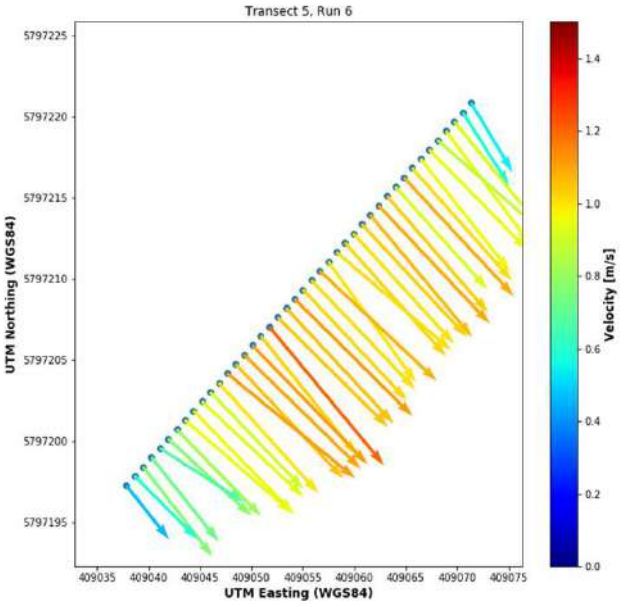
89


Transect 5, Run 4
UTM Northing (WGS84)
5797225
5797220
5797215
5797210
5797205
5797200
5797195
409035
409040
409045
409050
409055
409060
409065
409070
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

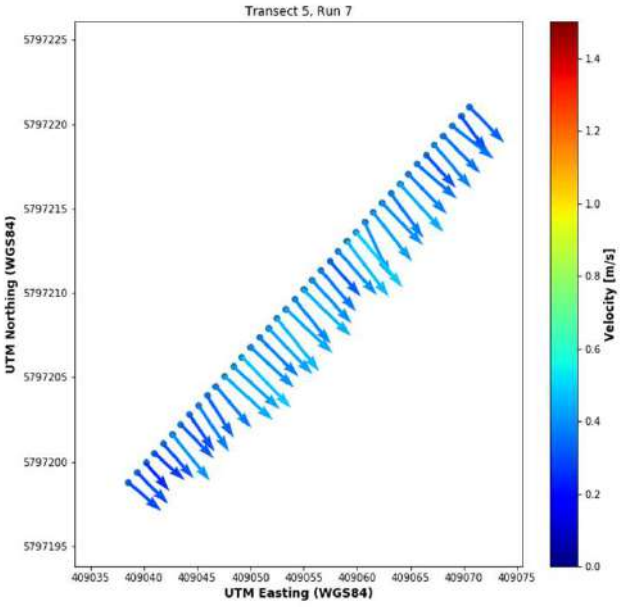
90


Transect 5, Run 5
UTM Northing (WGS84)
5797225
5797220
5797215
5797210
5797205
5797200
5797195
409035
409040
409045
409050
409055
409060
409065
409070
409075
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

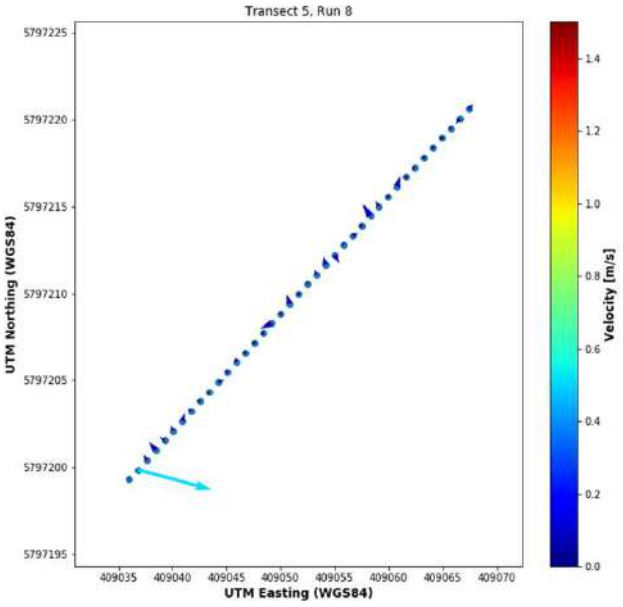
91


Transect 5, Run 6
UTM Northing (WGS84)
5797225
5797220
5797215
5797210
5797205
5797200
5797195
409035
409040
409045
409050
409055
409060
409065
409070
409075
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

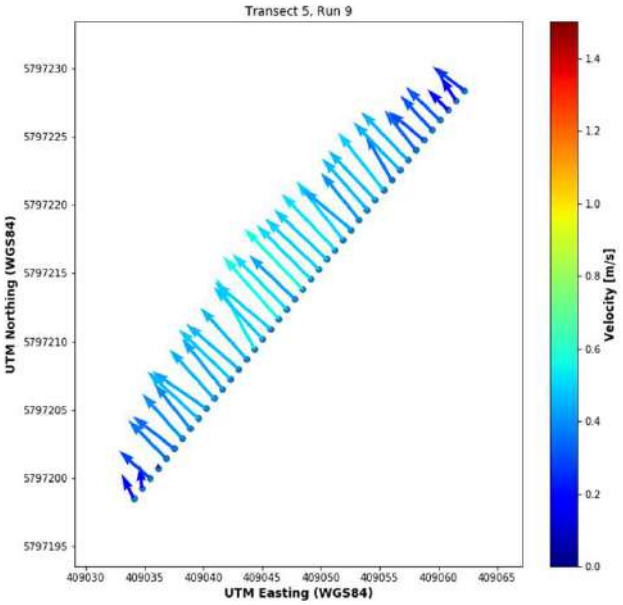
92


Transect 5, Run 7
UTM Northing (WGS84)
5797225
5797220
5797215
5797210
5797205
5797200
5797195
409035
409040
409045
409050
409055
409060
409065
409070
409075
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

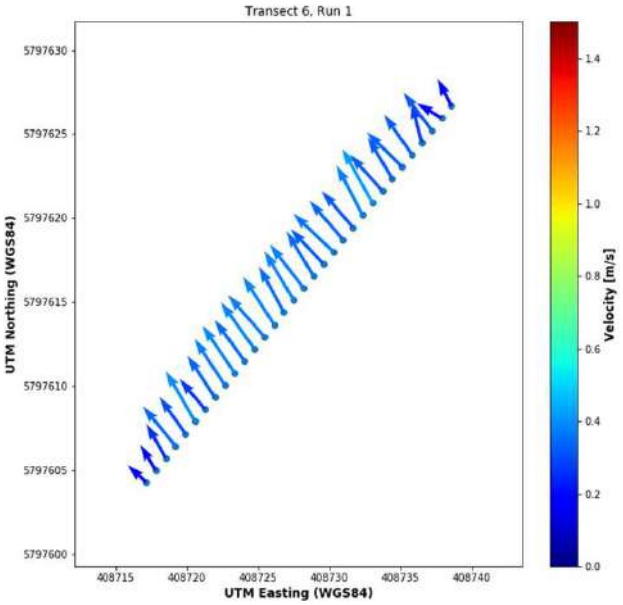
93


Transect 5, Run 8
UTM Northing (WGS84)
5797225
5797220
5797215
5797210
5797205
5797200
5797195
409035
409040
409045
409050
409055
409060
409065
409070
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

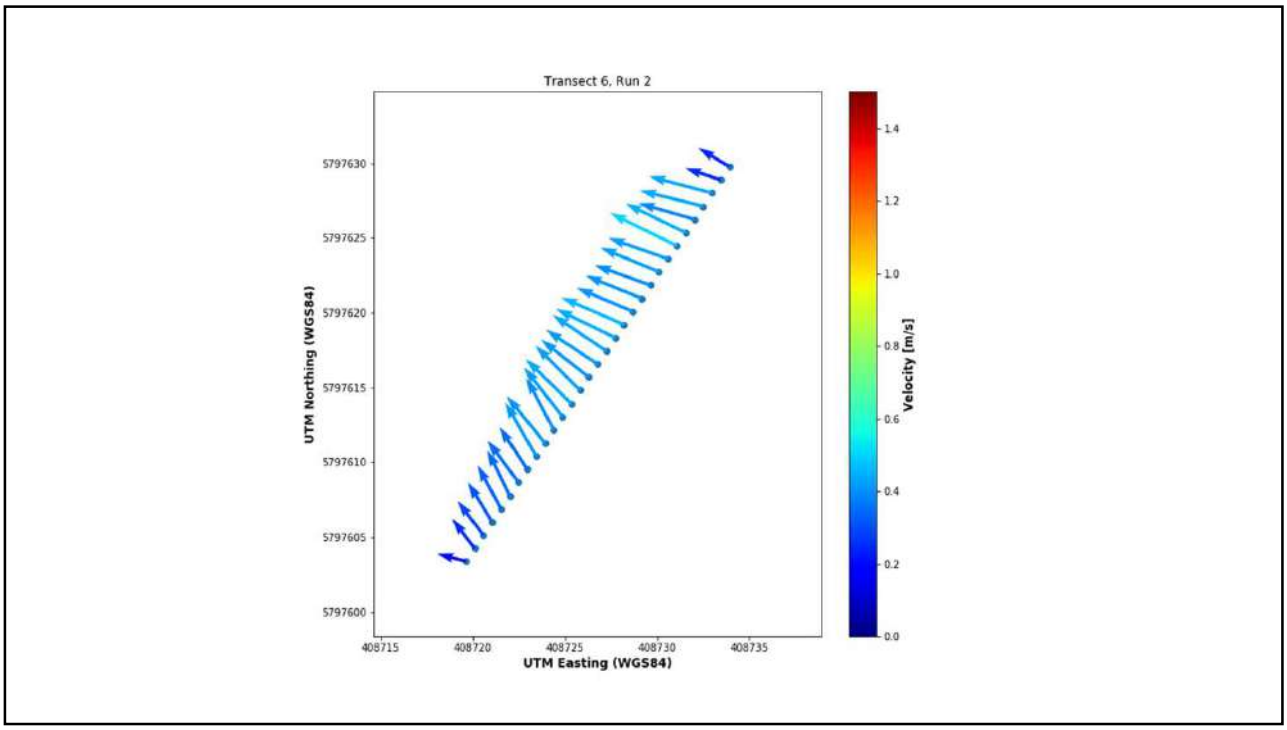
94


Transect 5, Run 9
UTM Northing (WGS84)
5797230
5797225
5797220
5797215
5797210
5797205
5797200
5797195
409030
409035
409040
409045
409050
409055
409060
409065
UTM Easting (WGS84)
Velocity [m/s]
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0

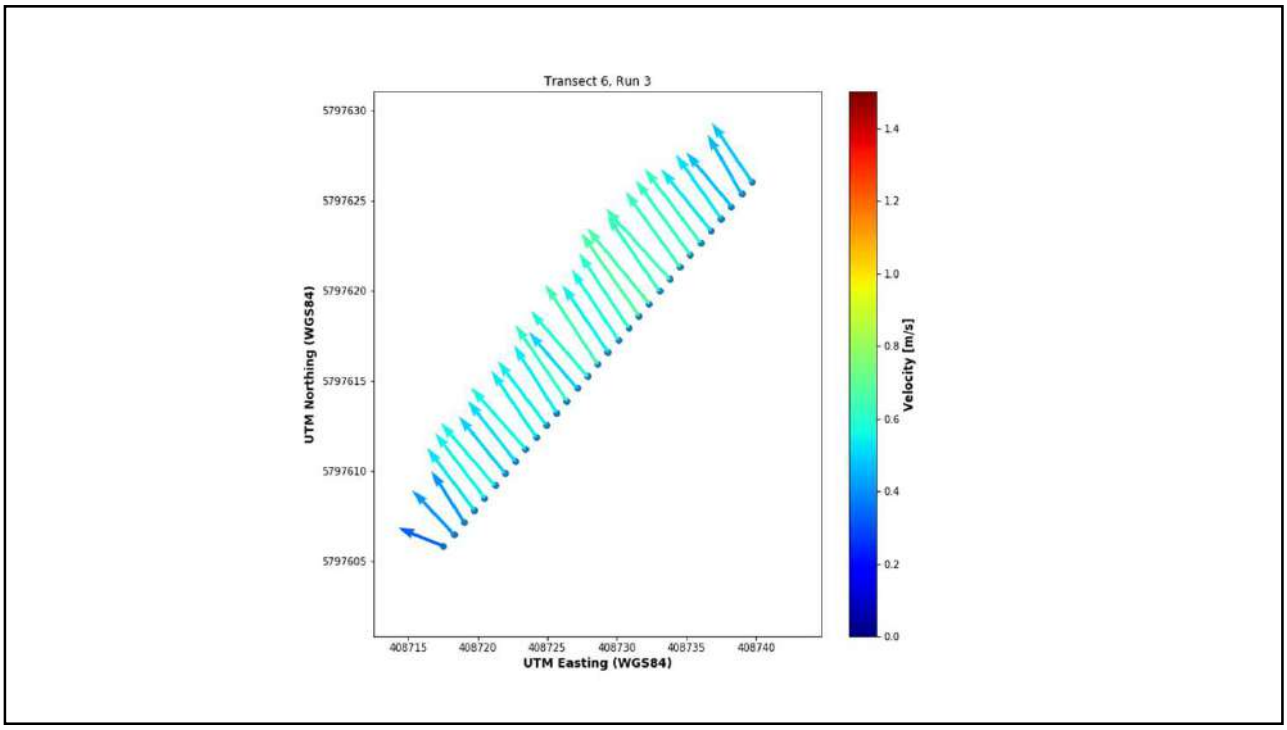
95


Transect 6, Run 1
UTM Northing (WGS84)
5797630
5797625
5797620
5797615
5797610
5797605
5797600
408715
408720
408725
408730
408735
408740
UTM Easting (WGS84)
Velocity [m/s]
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0

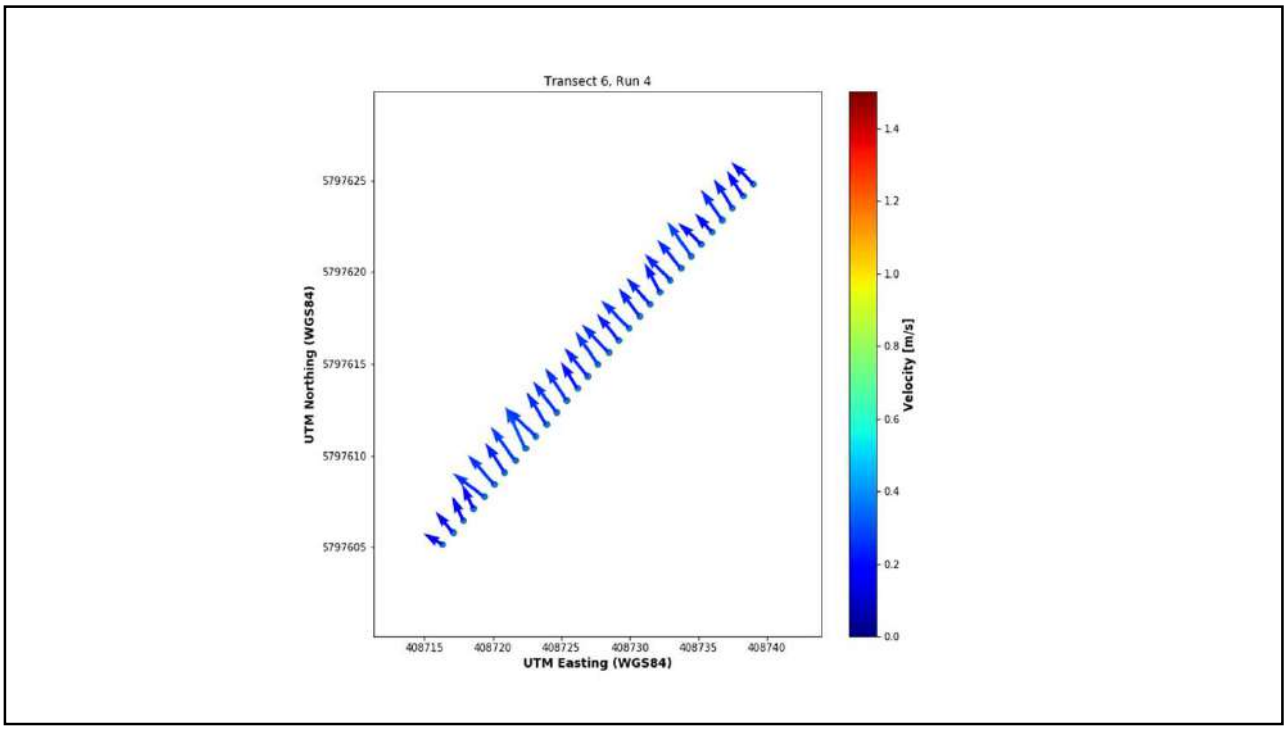
96


Transect 6, Run 2
UTM Northing (WGS84)
5797630
5797625
5797620
5797615
5797610
5797605
5797600
408715
408720
408725
408730
408735
UTM Easting (WGS84)
Velocity [m/s]
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0

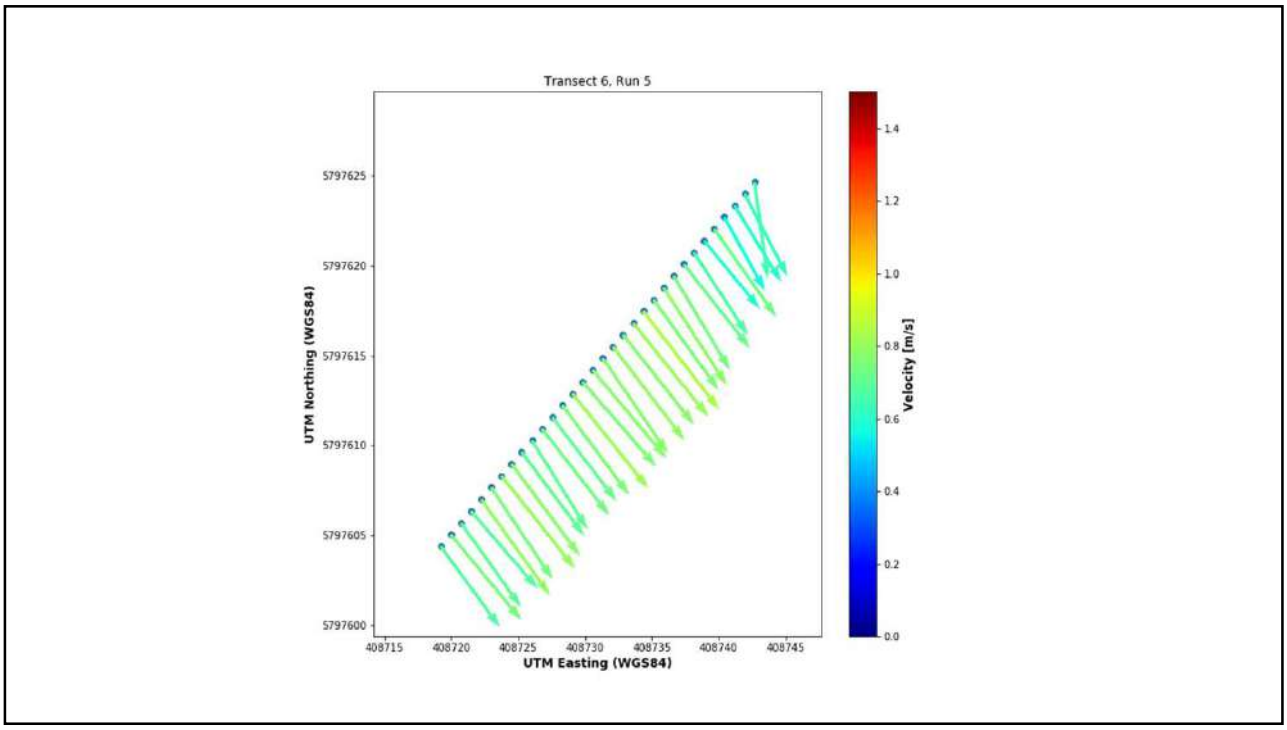
97


Transect 6, Run 3
UTM Northing (WGS84)
5797630
5797625
5797620
5797615
5797610
5797605
408715
408720
408725
408730
408735
408740
UTM Easting (WGS84)
Velocity [m/s]
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0

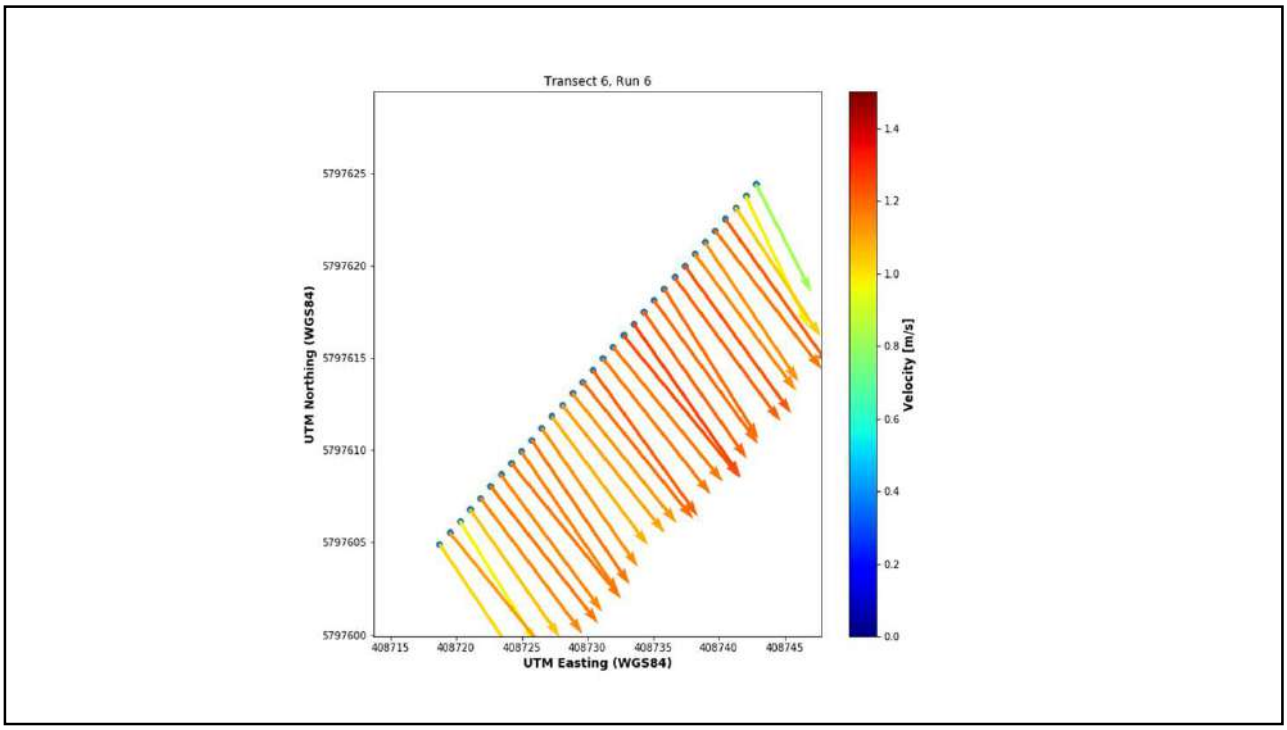
98


Transect 6, Run 4
UTM Northing (WGS84)
5797625
5797620
5797615
5797610
5797605
408715
408720
408725
408730
408735
408740
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

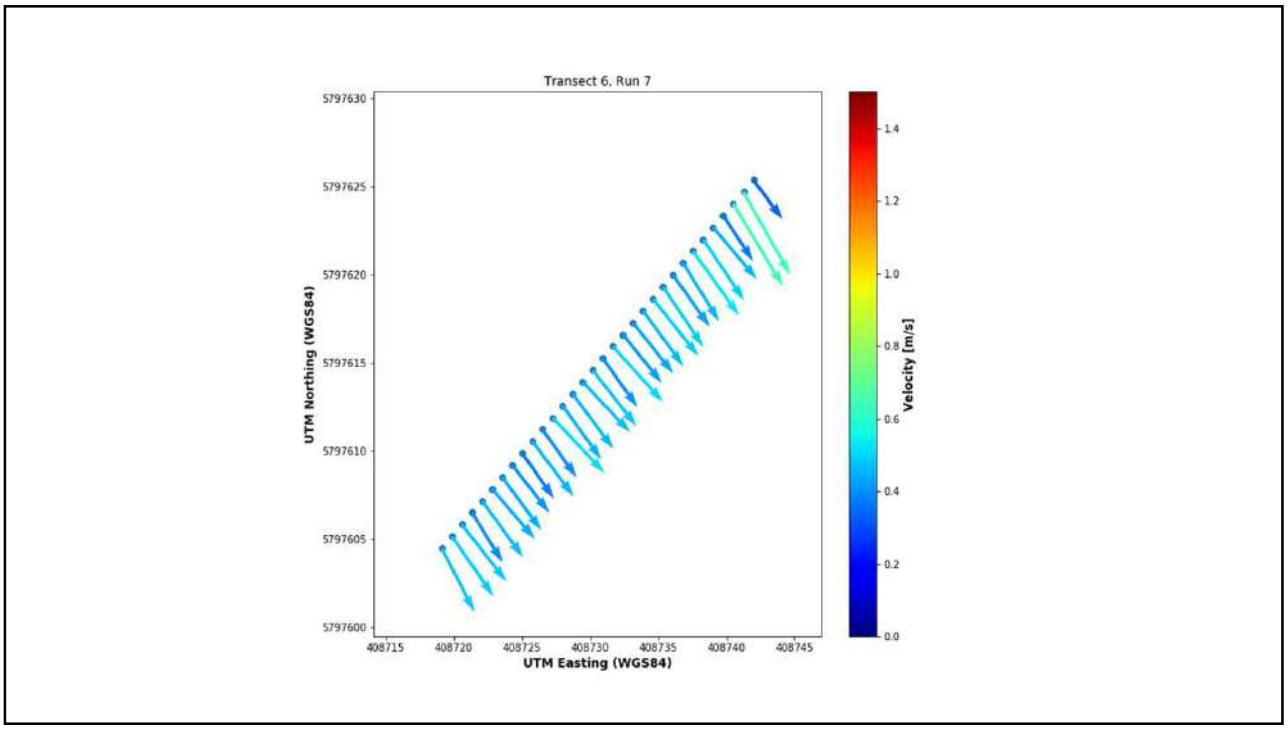
99


Transect 6, Run 5
UTM Northing (WGS84)
5797625
5797620
5797615
5797610
5797605
5797600
408715
408720
408725
408730
408735
408740
408745
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

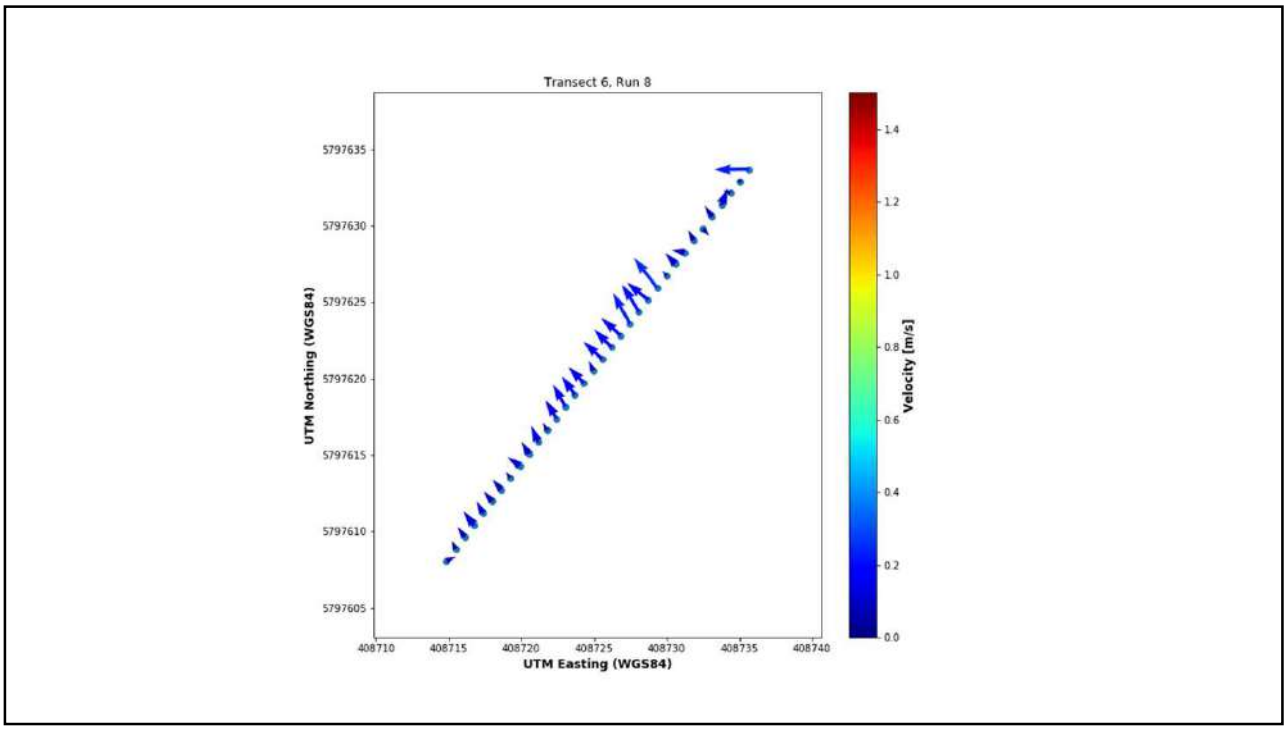
100


Transect 6, Run 6
UTM Northing (WGS84)
5797625
5797620
5797615
5797610
5797605
5797600
408715
408720
408725
408730
408735
408740
408745
UTM Easting (WGS84)
Velocity [m/s]
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0

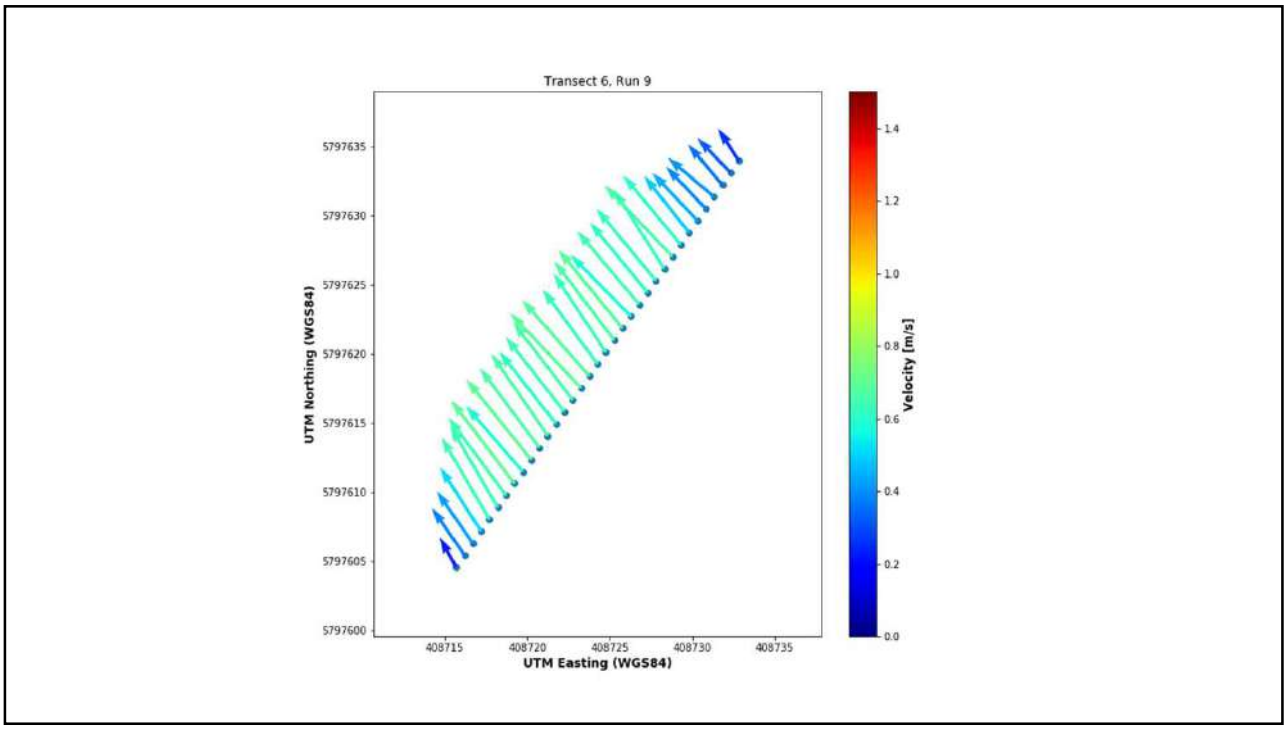
101


Transect 6, Run 7
UTM Northing (WGS84)
5797630
5797625
5797620
5797615
5797610
5797605
5797600
408715
408720
408725
408730
408735
408740
408745
UTM Easting (WGS84)
Velocity [m/s]
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0

102


Transect 6, Run 8
UTM Northing (WGS84)
5797635
5797630
5797625
5797620
5797615
5797610
5797605
408710
408715
408720
408725
408730
408735
408740
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

103


Transect 6, Run 9
UTM Northing (WGS84)
5797635
5797630
5797625
5797620
5797615
5797610
5797605
5797600
408715
408720
408725
408730
408735
UTM Easting (WGS84)
Velocity [m/s]
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4

104