

# Archaeological Impact Assessment

with comment on Paleontology

## Construction of Sewer Pipelines for Mossdustria and Erf 6422, District Mossel Bay, Western Cape Province

prepared for  
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by



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## **Executive Summary**

*An Archaeological Impact Assessment was conducted on 16 and 17 March 2009. Due to former farming and other human activities, surface and subsurface sediments along considerable stretches of the proposed sewer pipeline are extensively disturbed. Were heritage related resources to occur in these sediments, their context and significance are irreparably compromised.*

*Considerable portions of the study area are not open to investigation due to the nature and density of vegetation cover. Consequently, moderate extents of surface and subsurface sediments were exposed. Archaeological and paleontological visibility was restricted to formerly plowed and grazed areas, mole heaps, vehicle and pedestrian tracks, sand quarries and borrow pits as well as trenches.*

*Archaeological resources identified during the study originate in the Early and Middle Stone Age periods. Earlier archaeological studies on adjacent properties revealed that artifacts of Early Stone Age origin are particularly common. No paleontological remains, Colonial material culture or other heritage related resources were observed.*

*Given the nature of the archaeological record identified here and in earlier studies, and potential for occurrences of subsurface archaeological and paleontological remains, it is recommended that the below mitigatory measure be implemented. If mitigatory measures as approved by Heritage Western Cape are implemented, then it is recommended that the proposed project be approved.*

- *Along substantial stretches of the pipeline route, upper sediments are disturbed and archaeological traces are not in primary context. The proposed construction activities, however, are likely to have a negative impact on archaeological and potentially paleontological materials in previously undisturbed sediments. Consequently, it is recommended that full-time monitoring be conducted by a suitably qualified professional during vegetation clearing and earthmoving activities. Monitoring will ensure that negative impact on archaeological and paleontological materials is avoided or minimized.*
- *If archaeological materials are exposed during vegetation clearing and/or earth moving activities, then they must be dealt with in accordance with the National Heritage Resources Act (No. 25 of 1999) and at the expense of the developer. In the event of exposing human remains during construction, the matter will fall into the domain of Heritage Western Cape (Mr. Nick Wiltshire) or the South African Heritage Resources Agency (Ms Mary Leslie) and will require a professional archaeologist to undertake mitigation if needed.*

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## **1. Introduction**

### **1.1 Background**

As a result of the proposed construction of a sewer pipeline and associated pump stations for Mossdustria and Erf 6422 housing project, Municipality of Mossel Bay, Western Cape Province (Figures 1 & 2), Mr. Alex Erens of PD Naidoo & Associates appointed CHARM to conduct an Archaeological Impact Assessment (AIA) and to comment on the Paleontological sensitivity of the affected areas. Layout plans for alignment of the sewer pipeline and placement of pump stations are shown in Figures 2, 5 and 6. Detailed information is available from the client.

Proposed construction activities that potentially affect archaeological, paleontological and heritage related resources include:

- vegetation clearing
- substantial trenching for pipeline (to depth of around 2.5m)
- pipe covered to former ground level
- excavation for pump station construction (to depth of around 3m)
- maximum height of western pump station to around 3.5m
- maximum height of eastern and southern pump stations to around 4.8m
- detailed specifications for pump stations are available from the client

### **1.2. Purpose and Scope of the Study**

Objectives of the Archaeological Impact Assessment are:

- To assess the study area for traces of archaeological and heritage related resources;
- To identify options for archaeological mitigation in order to minimize potential negative impacts;
- To make recommendations for archaeological mitigation and
- To evaluate and comment on the paleontological sensitivity of the affected area.

Terms of Reference (ToR):

- a) Locate alignment and boundaries of the study area.
- b) Conduct a foot survey of the study area to identify and record archaeological, heritage related and paleontological resources.
- c) Assess the impact of the proposed development on above-named resources.
- d) Recommend mitigation measures where necessary.
- e) Prepare and submit a report to Mr. Alex Erens of PD Naidoo & Associates that meets standards required by Heritage Western Cape in terms of the National Heritage Resources Act, No. 25 of 1999.

### **1.3 Study Area**

The proposed sewer pipeline originates in two localities, – where pump stations are planned – meet near a dump site and run down to the new WWTW built by Pinnacle Point Resorts (Pty) Ltd where another pump station is planned immediately east of the WWTW. Coordinate data for the pipeline and placement of pump stations is available from the client.

The Mossdustria sewer pipeline starts on Portion 6 of Farm Rietvallei Erf 225, crosses the R327 and runs parallel to the South, turns East before the N2 and runs parallel with and North of it through various portions Farm Rietvallei Erf 225, north of Total before it crosses the N2 on the Mossel Bay side of Engen, runs East parallel to and South of the N2

towards Mossel Bay, turns South near a dump site and runs towards the Pinnacle Point WWTW (see Figures 2, 5 & 6). Note that the pipeline route – indicated in blue – is mostly obscured by the overlay of walk tracks and waypoints. The original pipeline alignment where it turns toward the Pinnacle Point WWTW is changed to run adjacent to the existing single vehicle, unpaved track.

The Erf 6442 sewer pipeline starts on Northern corner of Erf 6422 and runs along NW boundary, crosses Bill Jeffrey Drive, turns West and runs parallel to Bill Jeffrey Dr, turns South on Erf 2001 and runs along Eastern boundary of Erf 2001 towards the R102, crosses the R102 and runs West parallel to the R102 on the South, turns south in Erf 2001 adjacent to a dump site and towards Pinnacle Point WWTW (see Figures 2 & 6).

The study started at the western extent of the affected area and accessed by vehicle via the N2 from Mossel Bay and the R327 to Herbertsdale. The study area is just over 12km by 6 to 10m in extent depending on vegetation cover and type.

No pristine indigenous vegetation was observed in the study area. Due to extensive farming activities, road construction, vehicle and pedestrian traffic, vegetation clearing, construction of Total and Engen garages, sand quarrying, installation of power cables, construction of Pinnacle Point WWTW, trenching operations and partial installation of piping for the Mossdustrya and Erf 6442 sewer pipeline, surface and subsurface sediments along substantial stretches of the study area are severely disturbed (Figures 2, 5 & 6 and Plates 1 through 3). If archaeological, paleontological or heritage related resources were present in these areas, then the above impacts have irreparably compromised their scientific and aesthetic value.

The topography of the study area consists of an undulating coastal plain with a small ravine at the eastern extent and ranges from roughly 100 to 170 m above mean sea level (amsl). Geological sediments are varied and include soil, silt, aeolian sands, clay, calcrete and hard sediment of the Table Mountain and Bokkeveld Groups.

#### **1.4 Approach to the Study**

Archaeological work conducted in the surrounding area - by the Agency for Cultural Resource Management, the Archaeology Contracts Office at the University of Cape Town and CHARM - revealed that the area contains sensitive archaeological and paleontological resources (Hart 2005, Kaplan 1997, Nilssen 2008, Nilssen et al 2007, Nilssen 2005, Thompson 2006).

On behalf of the Mossel Bay Municipality, Mr. Alex Erens of PD Naidoo & Associates provided details and coordinate data for the proposed sewer line and pump stations. The study area was located by means of this information. Areas that could be inspected for archaeological, heritage and paleontological resources were restricted to formerly plowed and grazed areas, mole heaps, vehicle and pedestrian tracks, sand quarries and borrow pits as well as trenches associated with the proposed sewer pipeline (Figures 1, 5 & 6 and Plates 1 through 3). The pipeline route was followed by navigating with a GPS unit. Survey tracks were fixed with a hand held Garmin Camo GPS to record areas covered during the survey (Figures 3 through 6, gpx tracking file available from author). Observations, photo localities and archaeological occurrences were also fixed by GPS. Notes and a high quality, comprehensive digital photographic record were also made (full data set available from author). Be sure to carefully check the maps you use: both the SA Trig Survey/Surveys and Mapping and Garmin MapSource base maps indicate the southern extent of the R327 around 1km to the west of where it actually is.

## 2. Results

In about 6 hours of survey an area of 15.2 km long and 6 to 10 m wide was covered, of which around 30% provided good archaeological visibility. That 30%, however, is significantly disturbed by a range of agents as described above. As a result, any heritage or paleontological resources that might occur in these disturbed surface and near surface sediments are not likely in primary context.

Observations of relevance comprise stone artifacts originating in the Stone Age and these are overwhelmingly dominated by Early Stone Age (ESA) material with a few Middle Stone Age (MSA) implements occurring in the southern extent of the study area centered on waypoints 17 through 20 (Figure 6 and Plates 2 & 3). Coordinate data in Table 1 and Figures 5 and 6 give locality information while Plates 1 through 3 show examples of identified specimens. Only a representative sample of recorded occurrences is presented and no *in situ* material was seen. A full data set of recorded material is available on request.

ESA implements include hammer stones, a variety of unifacial and bifacial cores, flakes, chunks, choppers and/or damaged hammer stones, cleavers as well as unifacial and bifacial hand axes (Plates 1 through 3). The MSA is represented by a disc core, flakes and a retouched flake-blade (Plates 2 & 3). Most artifacts are in quartzite, but a few quartz and silcrete specimens of indeterminate age were also seen.

**Table 1. Coordinate data for reported archaeological occurrences.**

Waypoint	Photo #/Description	Grid: South African	
		Datum: WGS 84	Elevation
3	img3734&35&37	23 Y0090891 X3783102	150 m
4	img3738&40&41	23 Y0090881 X3783138	152 m
5	img3742&44&46	23 Y0090843 X3783241	152 m
6	img3754&55&58	23 Y0090830 X3783292	152 m
7	img3760&61	23 Y0090704 X3783651	154 m
8	img3763&64&67	23 Y0090641 X3783837	151 m
9	img3786-87&89	23 Y0089253 X3784047	148 m
10	img3792&94&96	23 Y0088566 X3784065	142 m
17	img3867&68	23 Y0084778 X3785179	164 m
18	img3871	23 Y0084769 X3785179	167 m
19	ESA & MSA	23 Y0084725 X3785160	168 m
20	ESA & MSA	23 Y0084720 X3785147	170 m

## 3. Sources of Risk, Impact Identification and Assessment

- The proposed sewer pipeline and pump stations will involve vegetation clearing and earthmoving activities that could have a permanent negative impact on archaeological and paleontological resources. Previously disturbed areas contain archaeological material, indicating that undisturbed sediments are archaeologically sensitive. Calcrete deposits in the vicinity house paleontological deposits of high significance.
- Development activities will penetrate sediments unaffected by previous disturbances as well as previously undisturbed areas. Archaeological materials are likely to occur in undisturbed sands and paleontological remains may occur in the calcrete and Bokkeveld beds. Archaeological and paleontological monitoring of vegetation clearing and earthmoving activities associated with the proposed project will avoid and/or minimize negative impacts.

Table 1 summarizes the potential impact of the proposed development on heritage related and paleontological resources with and without mitigation.

**Table 1. Potential Impact on and Loss of Heritage and Paleontological Resources**

	<b>With Mitigation</b>	<b>Without Mitigation</b>
<b>Extent</b>	Local	Local
<b>Duration</b>	Permanent	Permanent
<b>Intensity</b>	Low	Medium to High
<b>Probability</b>	Medium to High	High
<b>Significance</b>	Medium to High	Medium to High
<b>Status</b>	Unknown	Unknown
<b>Confidence</b>	High	High

Provided that mitigatory measures as approved by Heritage Western Cape are implemented, it is recommended that the proposed project be approved.

#### **4. Required and Recommended Mitigation Measures**

The following measures are required:

- In the event that vegetation clearing and earthmoving activities expose archaeological or paleontological materials, such activities must stop and Heritage Western Cape must be notified immediately.
- If archaeological materials are exposed through vegetation clearing or earthmoving activities, then they must be dealt with in accordance with the National Heritage Resources Act (No. 25 of 1999) and at the expense of the developer(s) and/or property owner(s).
- Unmarked human burials may occur anywhere in the landscape and are often exposed during earthmoving activities. Human remains are protected by law and, if older than 60 years, are dealt with by Heritage Western Cape (Mr. Nick Wiltshire 021 483 9685) or the State Archaeologist at the South African Heritage Resources Agency (Mrs. Mary Leslie who can be reached at 021 462 4502).

It is recommended that:

- Full time archaeological and paleontological monitoring of vegetation clearing and earthmoving activities should be conducted by a suitably qualified professional at the start of vegetation clear and then at regular intervals during construction activities. This measure will ensure that negative impact on archaeological and paleontological materials is avoided or minimized

#### **References**

Hart, T. 2005. Initial Heritage Statement: Proposed Open Cycle Gas Turbine Site and Transmission Lines at Mossel Bay, South Western Cape. Prepared for Ninham Shand Consulting by Archaeology Contracts Office, Department of Archaeology, University of Cape Town

Kaplan, J. 1997. Archaeological Study: Proposed Pinnacle Point Development. Prepared for Codev by the Agency for Cultural Resource Management.

Nilssen, P. J. 2008. Archaeological Heritage Impact Assessment. Two Portions of Erf 2861 and the Whole of Erf 6422, Mossel Bay, Magisterial District Eden, Western Cape Province: Proposed Asazani/Zinyoka Subsidised Housing Project. Prepared for Mr. Francois Theron of CSM Consulting Services (Pty) Ltd

Peter Nilssen, Curtis Marean & Royden Yates. 2007. Archaeological Conservation Management Plan: Pinnacle Point Resort (Pty) Ltd, a portion of Remainder Erf 2001 and Erf 343, Pinnacle Point, Mossel Bay, Western Cape Province. Prepared For: Heritage Western Cape & Pinnacle Point Resorts (Pty) Ltd. Centre for Heritage and Archaeological Resource Management cc (CHARM), Mossel Bay.

Nilssen, P. J. 2006. Archaeological Heritage Scoping Survey: Proposed Cemetery, Portion 8, Erf 225, Mossel Bay Farms, Mossel Bay Municipal District, Western Cape Province. CARM cc, Great Brak River

Nilssen, P.J. 2005. Archaeological Monitoring of vegetation clearing and all earthmoving activities during development at Pinnacle Point, Mossel Bay. Progress report to HWC. MAPCRM cc, Great Brak River.

Thompson, Erin. 2006. Artifact Accumulation Formation Processes and their Affect on Studies of Early Hominin Land Use as Reflected in an Acheulean Assemblage near Mossel Bay, South Africa. Unpublished Masters Dissertation.

**Figures and Plates** (on following pages)

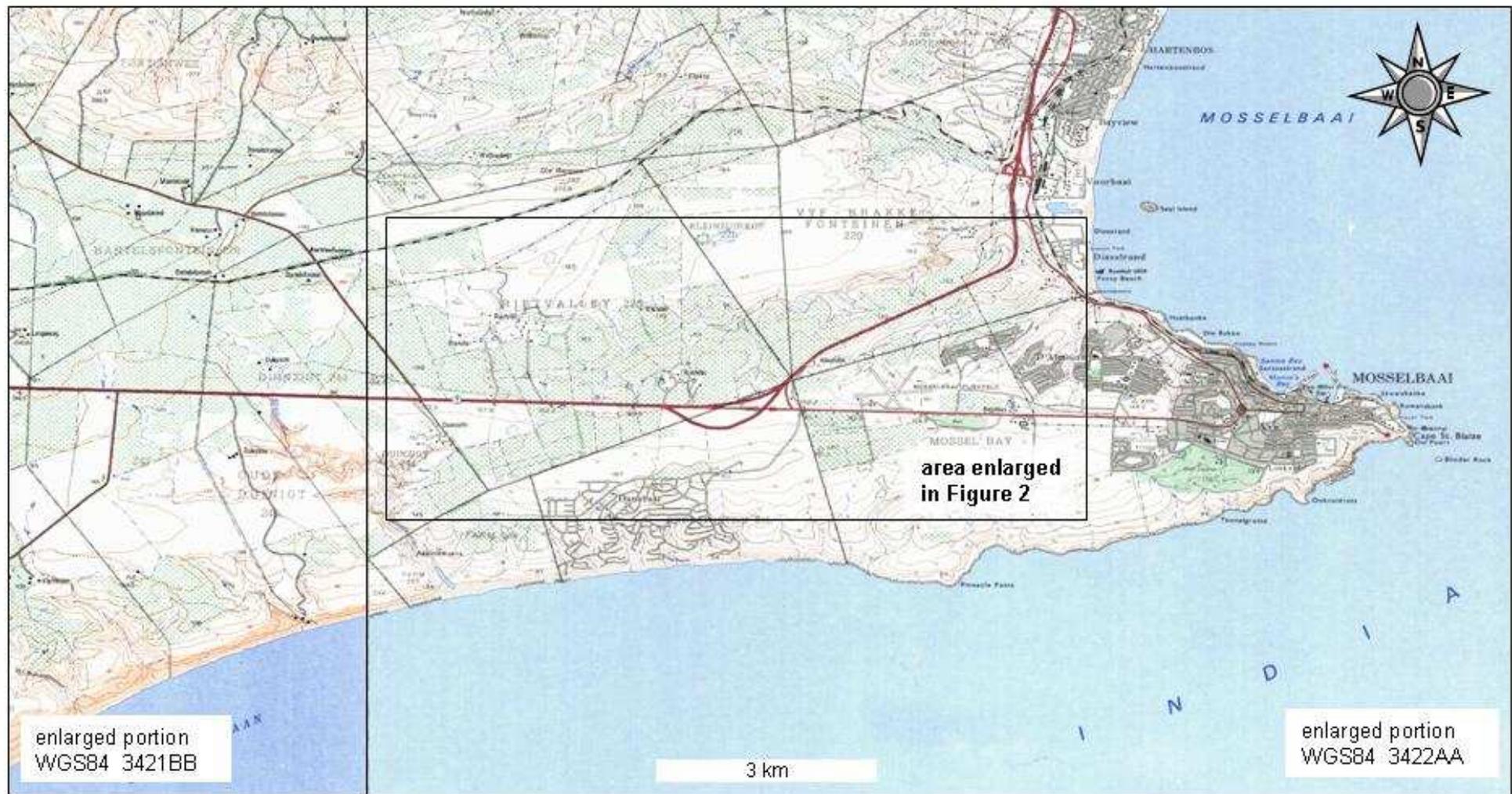


Figure 1. General location of study area – framed in black - relative to Mossel Bay.

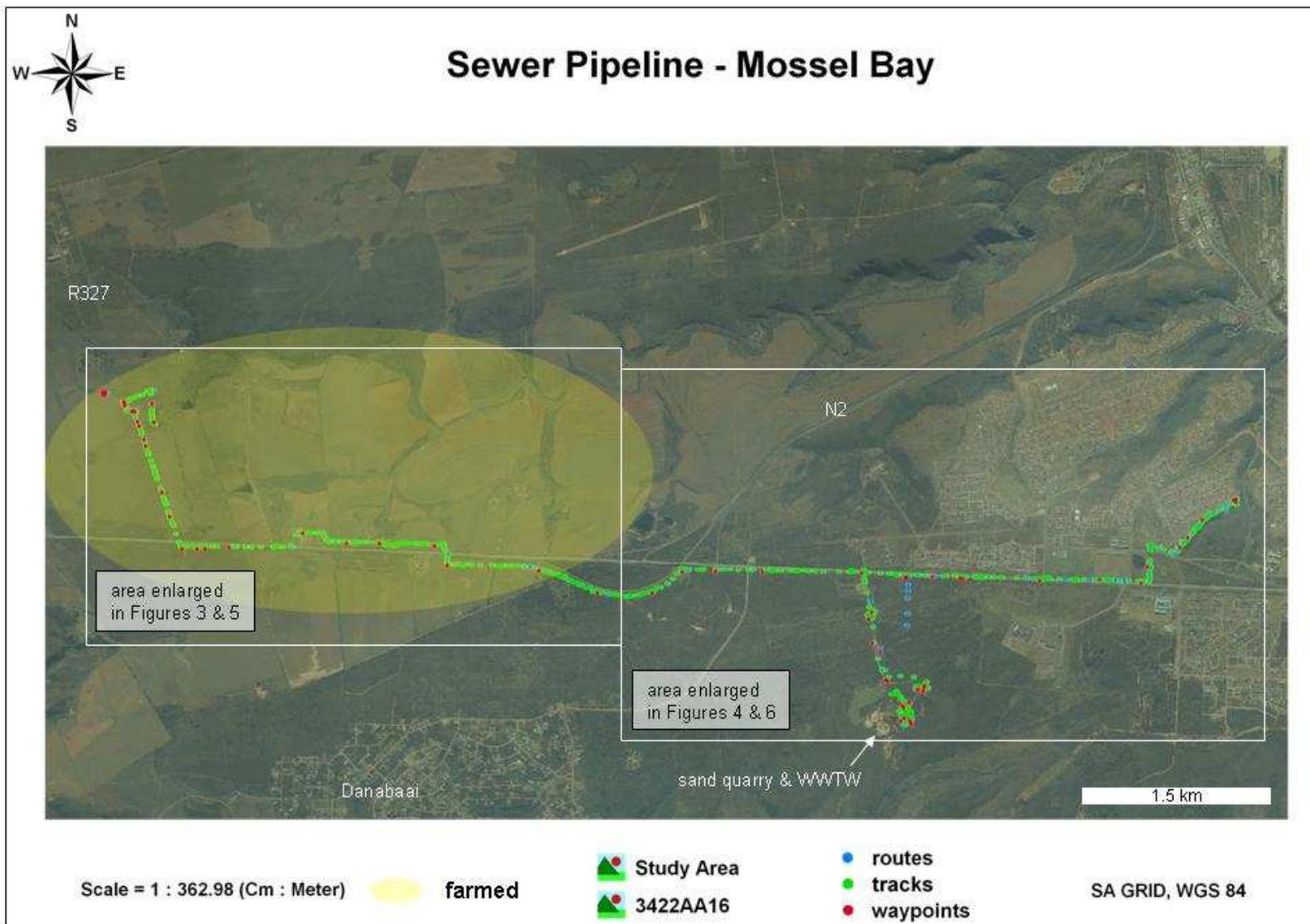


Figure 2. Enlarged area as indicated in Figure 1 showing routes provided by client, GPS survey tracks and waypoints representing archaeological occurrences and some photo localities. Westerly portion includes DWAF aerial photo 3421BB20.

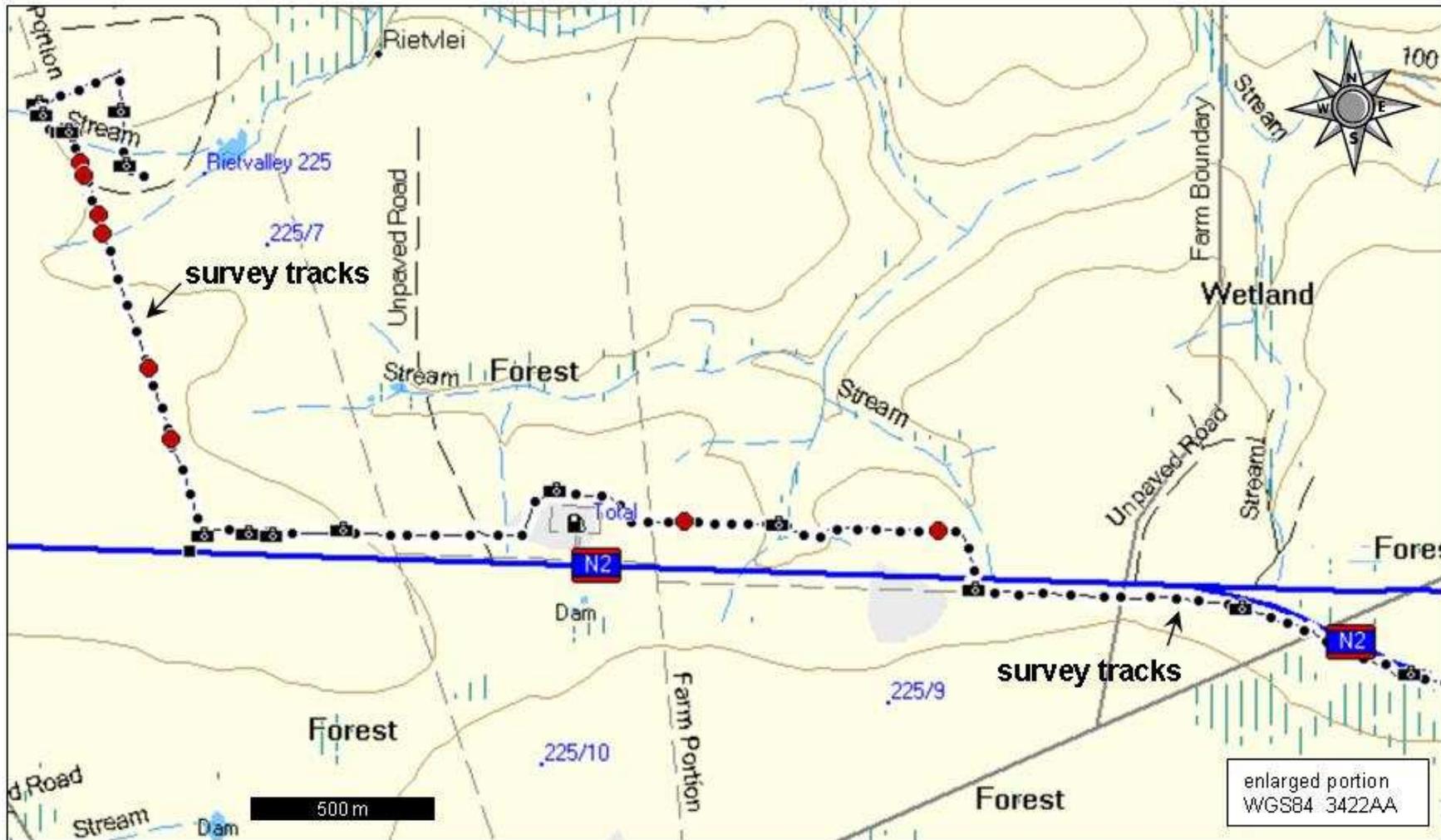


Figure 3. Enlarged area as indicated in Figure 2 showing GPS survey tracks fixed by GPS and waypoints representing archaeological occurrences, observations and photo localities (red dots and camera icons). Note in Figure 5 that GPS data overlaid on aerial photos is skewed and not accurate compared with GPS dedicated software as presented here. Figures with underlying aerial photos allow clearer annotation.

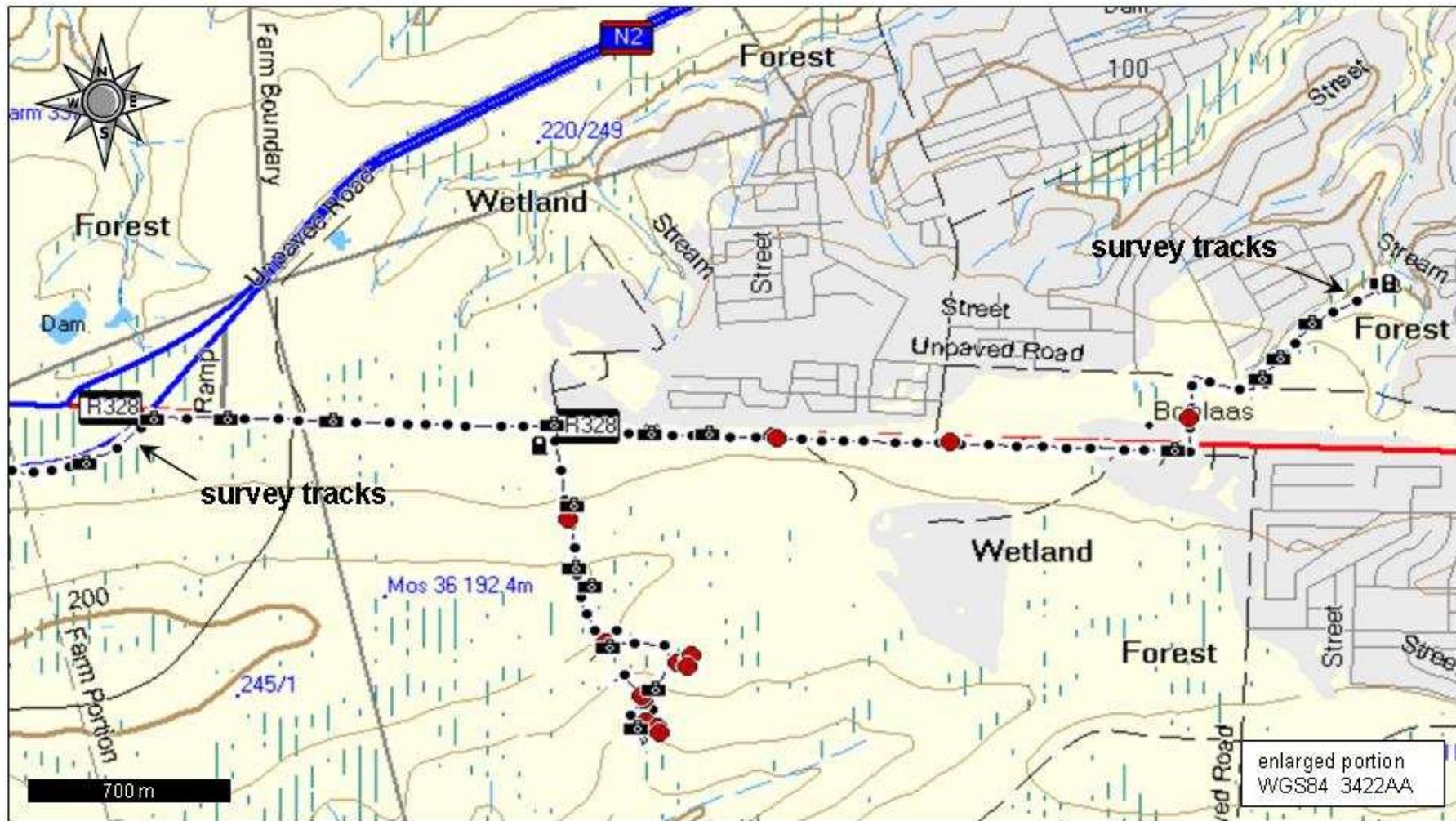


Figure 4. Enlarged area as indicated in Figure 2 showing survey tracks and waypoints - fixed by GPS - representing archaeological occurrences, observations and photo localities (red dots and camera icons). Note in Figure 6 that, in this case, GPS data overlaid on aerial photos is skewed and not accurate compared to using GPS dedicated software as presented here. Figures with underlying aerial photos allow clearer annotation.

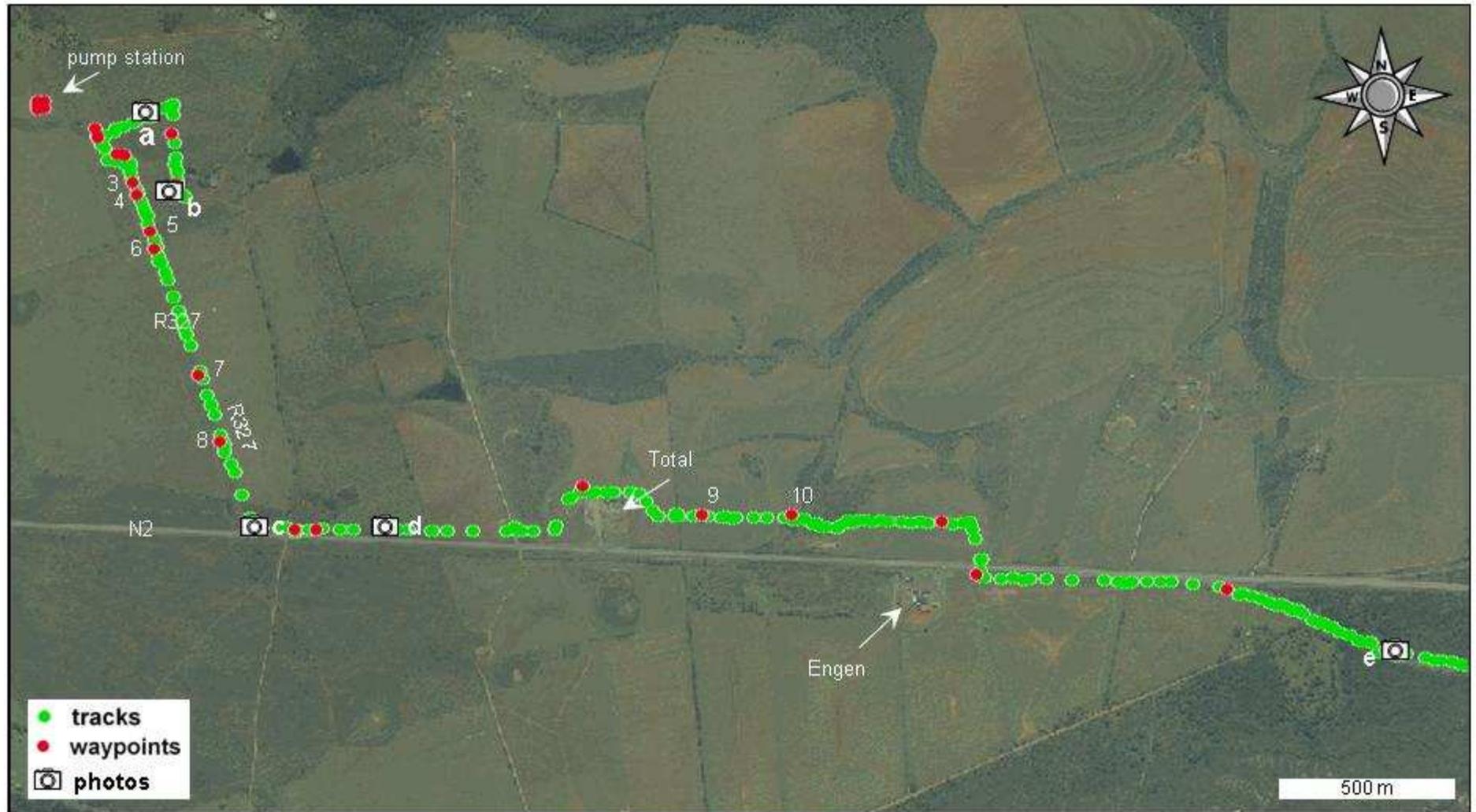


Figure 5. Enlarged area as indicated in Figure 2 showing survey tracks and waypoints representing archaeological occurrences, observations and photo localities (red dots and camera icons). Lower case letters associated with camera icons indicate direction of views shown in Plates 1 and 3. Numbered red dots indicate locations of archaeological occurrences shown in Plates 1 through 3.

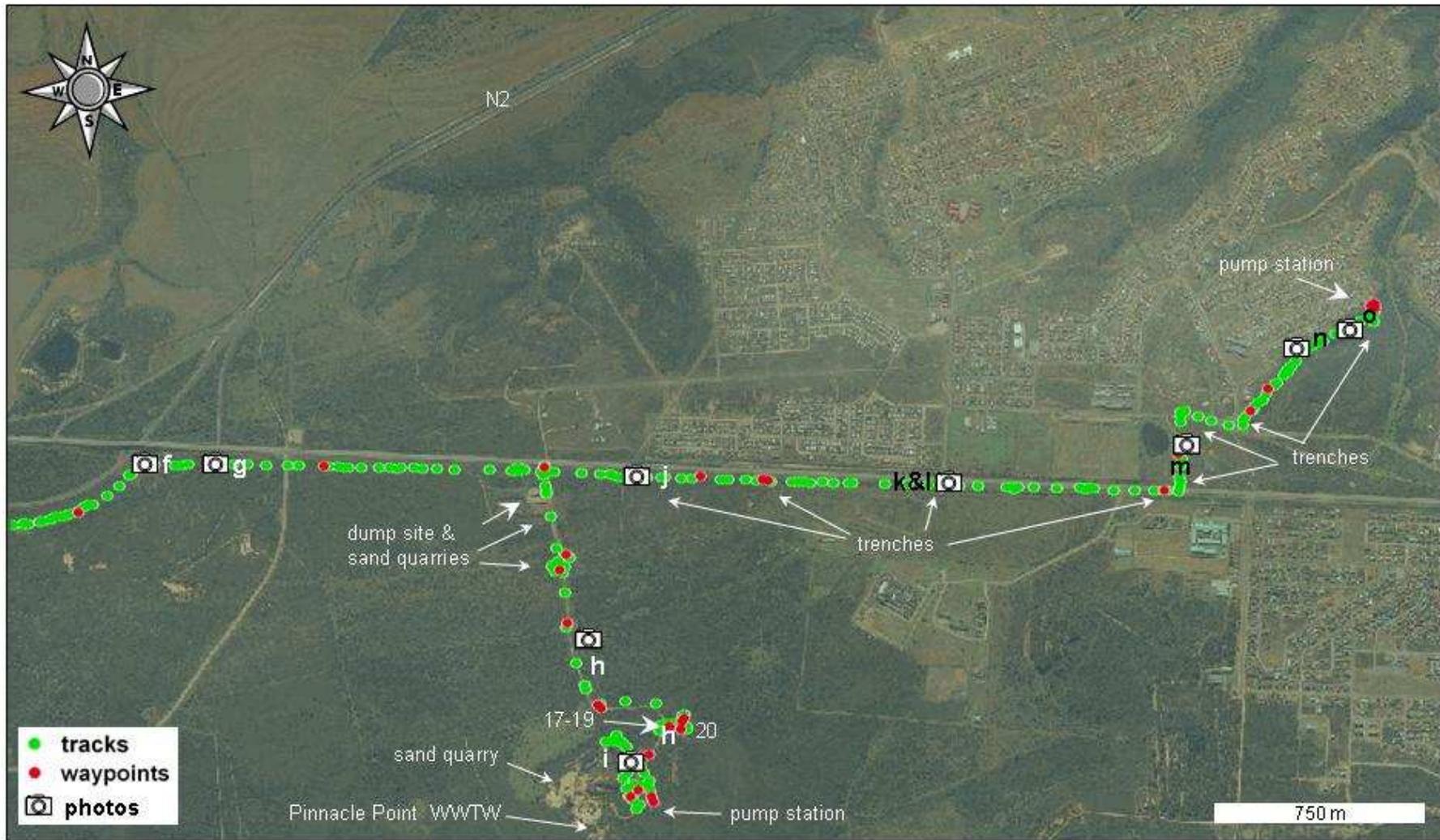


Figure 6. Enlarged area as indicated in Figure 2 showing survey tracks and waypoints representing archaeological occurrences, observations and photo localities (red dots and camera icons). Lower case letters associated with camera icons indicate direction of views shown in Plates 1 and 3. Red dots with numbers indicate locations of archaeological occurrences shown in Plates 1 through 3.



Plate 1. Images a through i show varied vegetation type and cover – also seen in numbered photos of observation contexts - in the study area. Numbered images show context and close-ups of archaeological – 2 views - and other observations. See Figures 5 and 6 for position and orientation of photographs. Garmin Camo hand held GPS as scale for the view closest to it.



Plate 2. Like numbered images show context and close-ups of archaeological observations respectively. See Figures 5 and 6 for positions of observations and photographs. Cm scale and Garmin Camo hand held GPS as scale for the view closest to it.



Plate 3. Image 20 shows examples of stone artefacts observed at locality 20 (cm scale - see Figure 6 for position of observation). Images j through o show examples of trenches and profiles and area cleared of vegetation. See Figures 5 and 6 for positions of observations and photographs and orientation of views. Cm scale.