Report

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Scoping Study of the Gladhammar Gold Project

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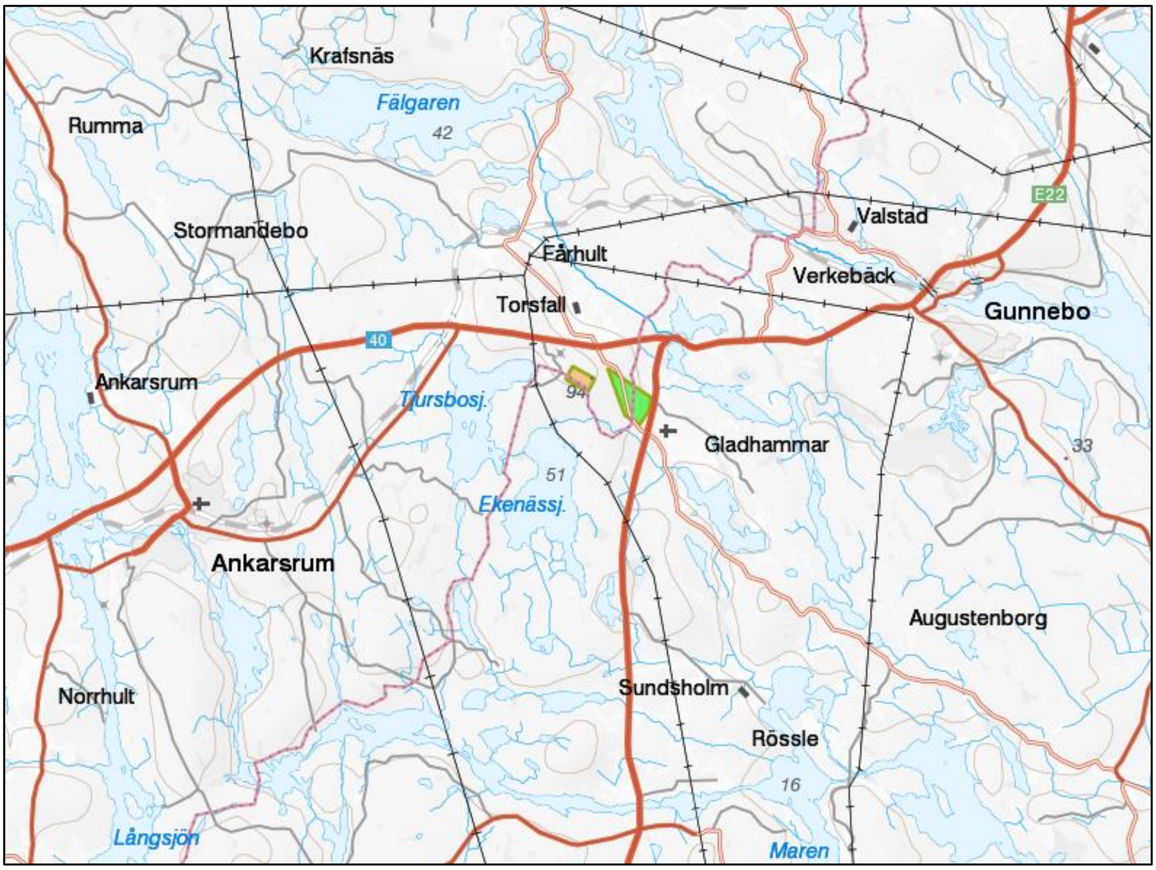
1 Introduction - The Gladhammar Gold project

1.1 Gladhammar Project

Gladhammar is a gold property located about 10 km southwest of the city of Västervik in Kalmar County, in southeast Sweden. It is an old mining area that was mined in the previous centuries. Boliden, the Swedish mining company had conducted drillings there in the 70's and 80's. The concession ensures the ownership of the deposit and gives the owner company exclusive rights to exploit gold, silver, copper and bismuth.



1.1-1. Figure – Map of Gladhammar region. Source: SGU 2016 – listed in appendix

1.2 Mineral Rights and Mineral Legislation in Sweden

Sweden is one of the leading producers of ores and metals in the EU. The principal law in Sweden is the Swedish Minerals Act 1991 (the "Minerals Act"), however, applicants should also be aware of the Swedish Environmental Code 1998 (the "Environmental Code"), the Certain Peat Deposits Act 1985, the Planning and Building Act 2010, the Off-road Driving Act 1975 and the Cultural Heritage Act 1988. The key mining licences available under Swedish legislation are: a. Exploration permit – this provides access to the land for exploration work (Speight and Shabazz 2013). It is valid for three years from date of issue and can be extended in certain circumstances to a period of 15 years. b. Exploitation concession – this is required for the extraction of certain categories of minerals and is granted for a maximum period of 25 years. Applicants should also be mindful of the Environmental Code which is applicable when granting a concession. Permits for exploration must be granted under both the Minerals Act and the Environmental Code.

Project Gladhammar "BK" (Bearbetningskoncession) owned by Svenska Bergsbruk AB sold the project to Trelog Nr. 3421 AB that is under name change to Gladhammar Gruvor AB.

Concession	Ownership	Hectares	Valid till	Mineral	Municipality	County
Gladhammar K nr 1	100%	8	2037.11.21	Au, Ag, Cu	Västervik	Kalmar

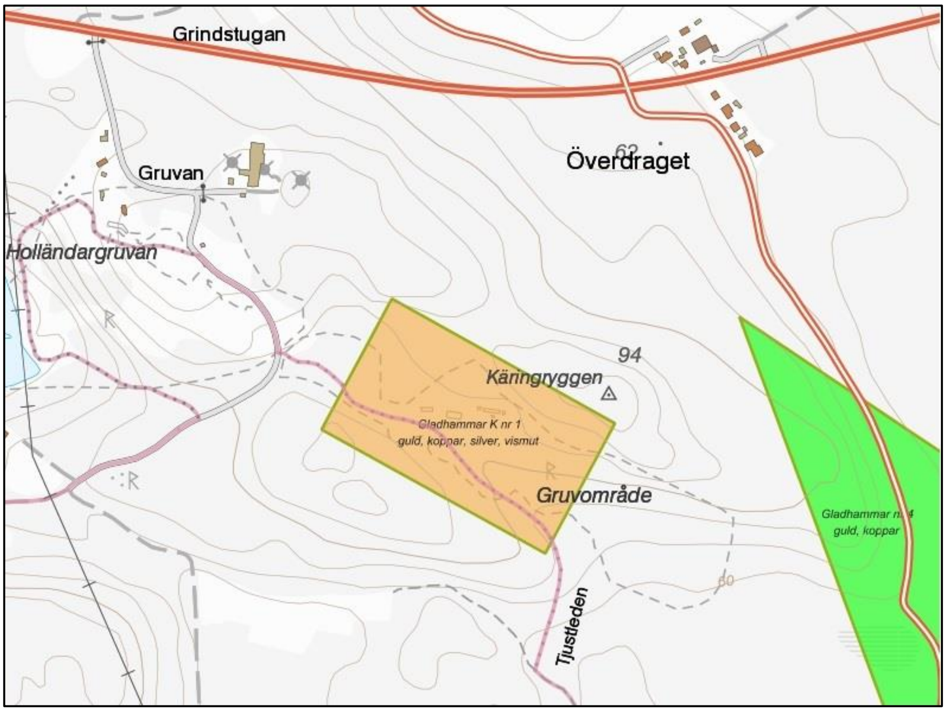
1.2-1. Table – Concession of the Gladhammar Gold Project– source: SGU (Geological Survey of Sweden) 2016

Concession lot boundaries (provided by Bergstaten – Mining Inspectorate of Sweden)

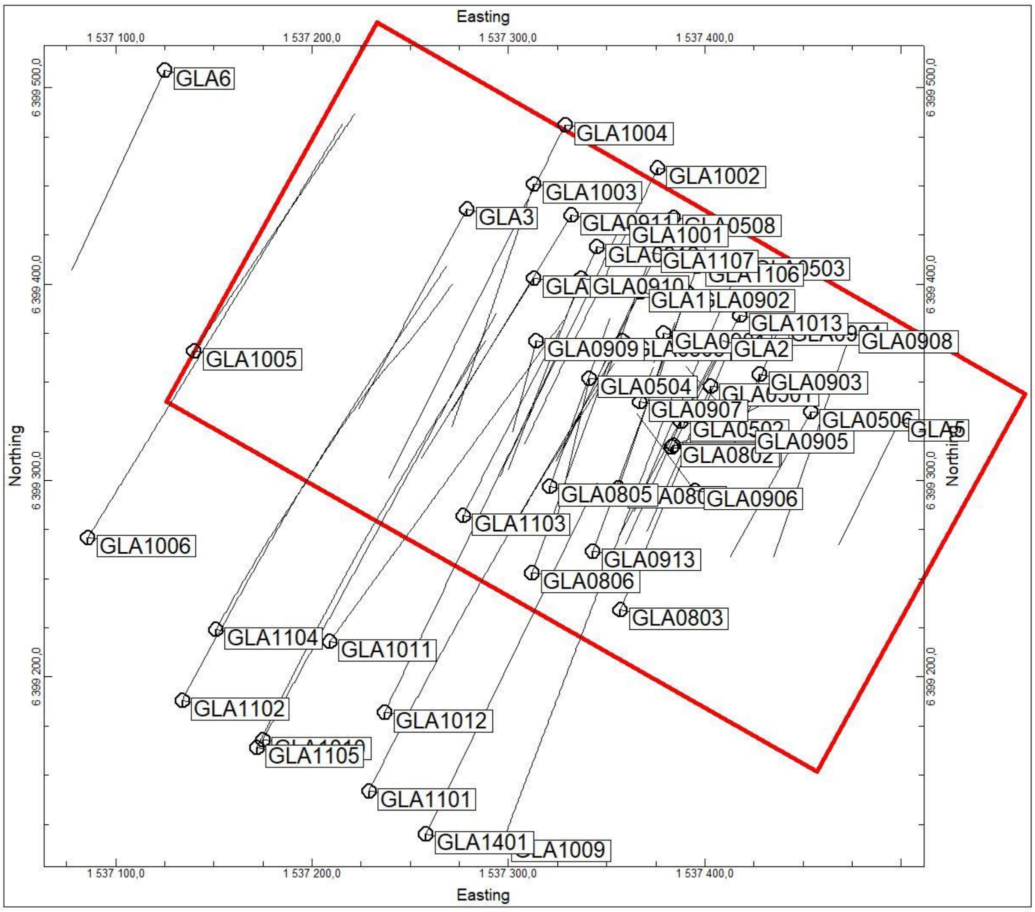
	SWEREF99TM Easting	SWEREF99TM Northing	RT90 2,5gonV0:-15 Easting	RT90 2,5gonV0:-15 Northing
P1	585 181,69	6 398 332,53	1 537 233	6 399 533
P2	585 513,80	6 398 147,53	1 537 563	6 399 344
P3	585 410,13	6 397 954,34	1 537 457	6 399 152
P4	585 077,03	6 398 138,33	1 537 126	6 399 340

1.2-2. Table – Mining lot boundaries - source: Wiking Mineral AB – 2012

Location map with concession-set boundaries of the Gladhammar K nr 1 lot.



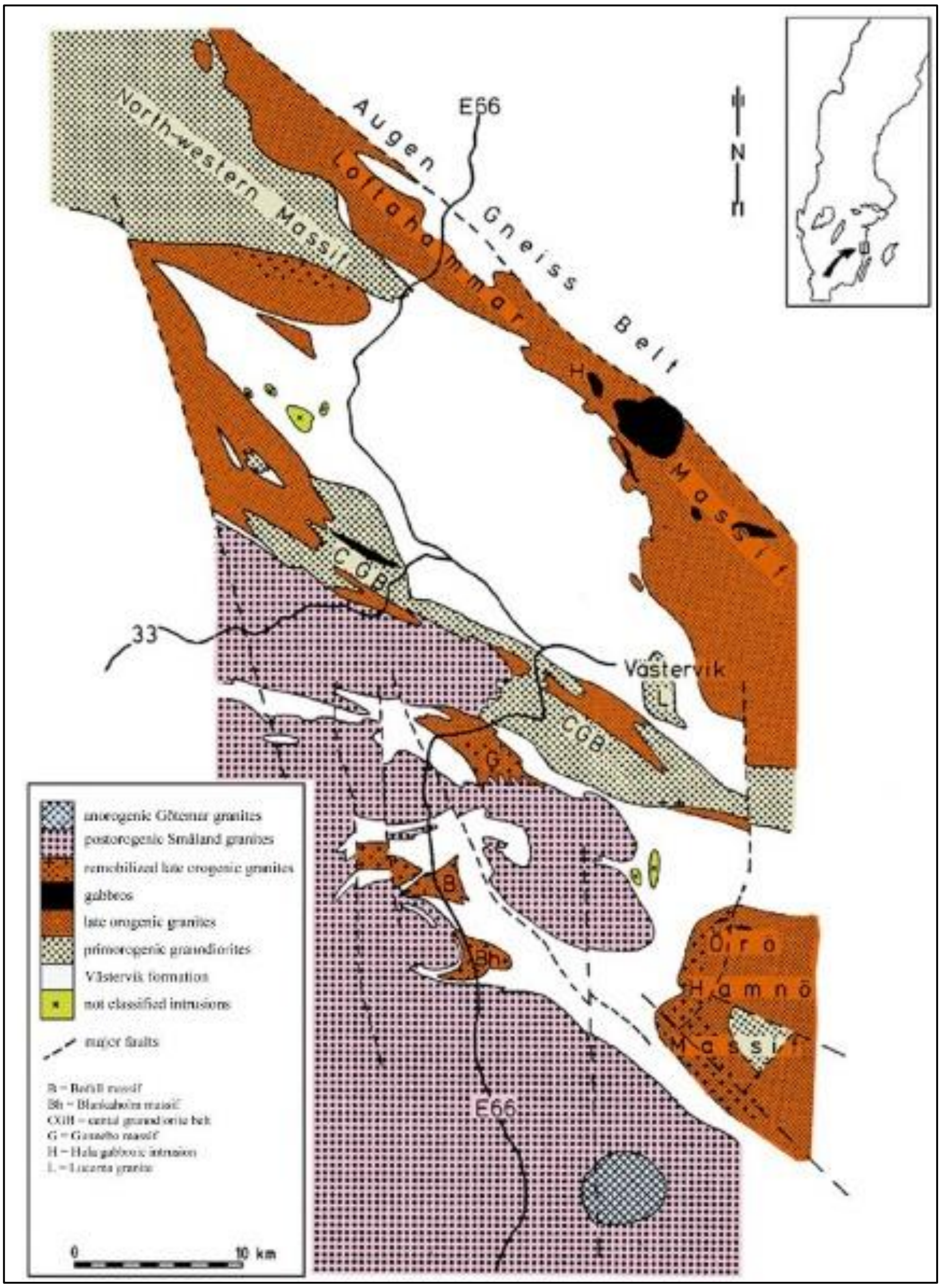
1.2-1. Figure – Gladhammar K nr 1 Concession lot boundaries



1.2-2. Figure - K nr 1 boundaries according to Bergsstaten with drillhole collar positions

2 Regional and Local Geology

Geologically the Västervik Area is located within the southeastern part of the Transscandinavian Igneous Belt (TIB) adjacent to the Svecofennian Domain to the North. The Västervik Area mainly consists of early Proterozoic rocks. Metasediments and metavolcanites are intruded by granitoids and dykes, which had caused contact metamorphism and migmatization of varying intensities (Kresten 1986).

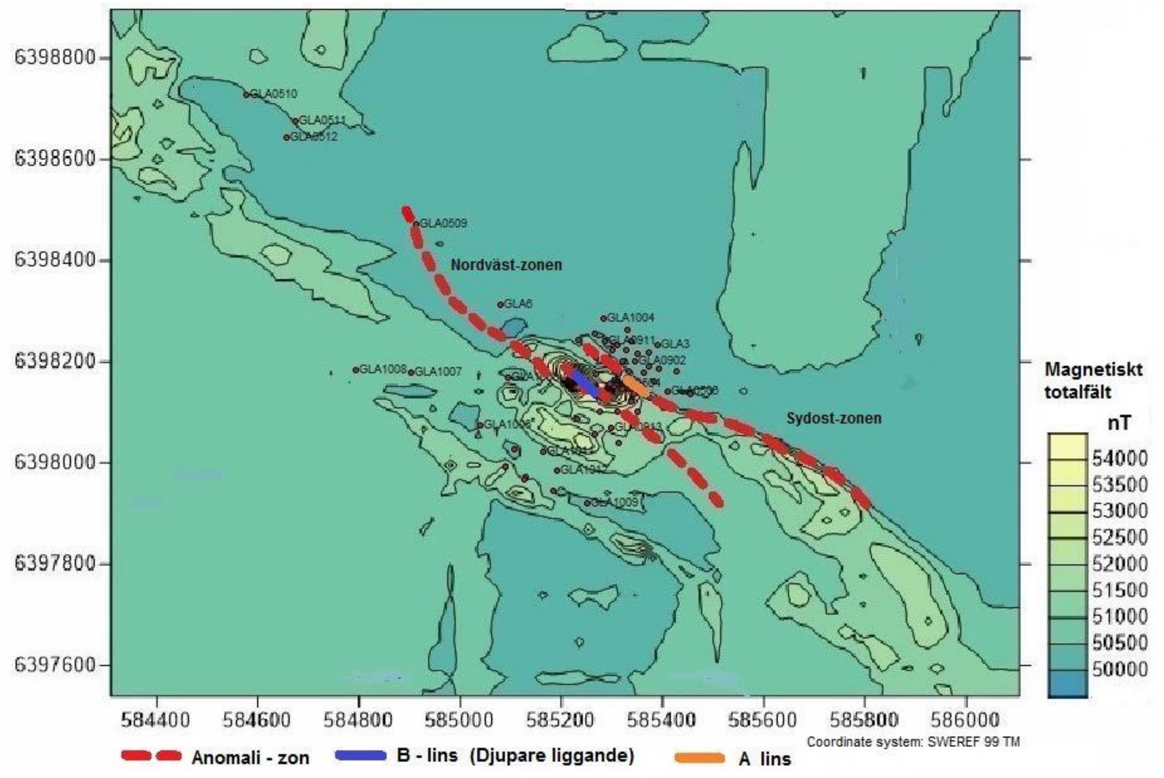


1.2-1. Figure – Geology map of SE Sweden by Kresten, source: Kresten 1986

2.1 Exploration History

Gladhammar is an old mining area in southern Sweden. Iron and copper were mined in the small-scale mine of Gladhammar till the end of the 19th century. Cobalt was also mined here. The area has an abandoned mine north-west from the concession area, called the Holländergruvan.Three main groups of mines were established here, from NW to SE: Ryssgruve Field- Holländare Field and Solbergs Field, respectively. Further southeast some smaller test pits and mines are scattered. All exist within a stretch of just above 1000m. Iron mining in the area is first mentioned in 1525, followed by copper mining from the 1560s and cobalt mining from 1777. Closed 1892. (Mindat.org 2016)

In the 1930's a rich gold mineralization was found here in the waste rock from previous mining activities in the concession region, Solberget. The Swedish Boliden AB has carried out drillings in the 70's and 80's that resulted in scattered sections containing gold. Wiking Mineral has been exploring the region from 2005 onwards, and as a result of successful drilling in 2011 the application for exploitation concession was handed in. This and the following preparations has resulted in the winning of the exploitation concession in 2015. The estimated exploitable mineral resources were 156.000 tonnes ore containing 5.5 g/t Au, 14 g/t Ag and 0.27% Cu in the A lens.



2.1-1. Figure – Geomagnetic survey shows increased magnetic flux above mineralized lenses. Source: Wiking Mineral AB 2014 Geophysics Report

2.2 Gladhammar Geology

The geology of Gladhammar mainly consists of widely spread and recrystallized Västervik quartzite. These are from sedimentary formation of shallow marine origin, with mainly foliated quartzite and other forms found in boreholes. In the southwestern part of the area the quartzite is intruded by Småland granite. Loftahammar granite, which is older than Småland granite, occurs northeast of Gladhammar. Metamorphism in the area is thought to be taken place at the time of intrusions of these granites (Wilden 2011). The dominating structural feature at Gladhammar is a wide and steeply dipping shear zone. This is shown on all geological maps of the region, and even on historical mining maps. The mineralization of gold and the shear zone correlates highly.

The Solberget area is found in the center of the Gladhammar area, where the concession area is located. The main shear zone striking across Gladhammar is also slices the Solberget area, leaving the massive quartzite with resulted mylonitization. The shear zone is approximately 200 m wide and leaves the subsurface rocks with a lot of foliation discoverable in the drilling logs. Besides the massively and weakly foliated quartzite, chlorite-biotit, mafit and mafit-skarn occurs in drill logs. Crush zones and underground creeks of the shear zone just resulted core loss due to crushed zone in a few times. Mineralization that is dominated by magnetite, chalcopyrite and gold in the north east region of the shear zone, where also skarn breccias are present. The breccias are consisting of a network of biotite and chlorite and also magnetit in quartzite. A well preserved skarn breccia occurs in the northern border of the shear zone. The S-shaped breccia is 10 m wide and 100 m long and is referred as Solberget Skarn Breccia. Boreholes also revealed skarn breccias in massive and foliated quartzite, the dominant rock form in the area. (Wilden 2011).

2.3 Mineralization

The magnetite mineralization is found in foliated quartzite as thin layers and merged sheets in the shear zone. Breccia-type magnetite was found in weakly foliated quartzite as supposedly originally caused by brecciation. The main part of the magnetite present, due to the geologists, is delimited to an extended area outside the Solberget Skarn Breccia. Another magnetite mineralization is thought to be present at the southeast area.

The magnetite mineralization is well surrounded by chalcopyrite mineralization, extensive to the shear zone border. The chalcopyrite has an average of 0.1-0.3 % Cu grade. The widely spread hematitization and the copper-bearing solutions colored the quartzite to reddish in many places. The copper mineralization contains minor bronite and chalcocite.

Another mineralization that is clearly visible is the bismuth mineralization, with an average general grade of 0.1% Bi. The most common bismuth minerals present are bismuthinite and several occurring sulphosalts with bismuth. Much of the bismuth occurs amidst the chalcopyrite blocks towards the shear zone.

Gold has been found in two geological environments. Mostly in foliated quartzite associated with wide-spread chalcopyrite and a distant zone with no chalcopyrite in massive quartzite near the shear zone. The gold grade is low in the foliated quartzite, rarely reaching 1g/t Au. Most of the gold mineralization occurs in the A-lens, with an elongated west pointing core of 60 g/t Au. The mineralization is often complemented with inconsistent mineralizations of molybdenium (Wildén 2011 and Svensson 2014).

2.4 Mineralogy

The metallurgical results from test programs completed on the A lens gold mineralization in 2010 to 2011 by ALS Chemex who are certified and recognized internationally as a specialist in assaying and mineral processing. The assay results were announced previously by Wiking Mineral in their exploration report of the project.

Core drilled samples for chemical analysis were prepared and examined by ALS Chemex laboratory, one of the largest testing service provider. The industry defined mineralization test procedures were used to highlight occurrences of target mineral presence.

The assay methods highlighted in the data included the following codes of ALS Chemex are listed in Appendix E with detailed information about the processes:

- ME-ICP41,
- Au-AA25 & Au-AA26,
- Ag-OG46,
- Cu-OG46,
- Pb-OG46.

Samples for chemical analysis have been prepared and analyzed by ALS according to code OG-46 for Ag, Cu, Pb and Zn, Pb-VOL70, Zn-VOL50, AuAA-25, NE-ISP41 and NE-OG46. To check the validity of the results, standard samples have been regularly inserted. Assay results used from boreholes drilled by Boliden were analyzed at Boliden’s laboratory at Rönnskär, Sweden.

2.5 Geophysics and Geochemical Exploration

The lithology model made it possible to model geophysical data, based on known rock physics values of certain rock types. Based on that the rock slope design is possible, and also some deep mining engineering drafts are available to design.

2.6 Exploration Data used in the Geological Model

The drillings were conducted in previous years by Boliden. They have started the exploration in 2005.

The resource estimation was carried out by the data provided by Wiking Mineral. Recent and historic drilling data was used to create the 3D geologic and stratigraphic model. The 58 boreholes were drilled by mainly Wiking Mineral with the conduct of chief geologist Torgrim Svensson. The borehole locations were verified by GPS therefore all collar data were sufficient and followed local geography. The boreholes were surveyed after core drillings and deviation and dip of holes were also logged. The interval data as well as azimuth, collar position, elevation and dip were imported to Rockworks 16 and all consecutive mineralization values were adapted to the model as well. Thus the gained 3D model was very well prepared for further analysis.

Geologists who provided the drill logs are Mats Larsson and Göran Petersson. The core logs contained the name and position of the drill holes as well as strike and dip values. The main sections were divided to sub sections, where mineralization was examined and logged. Foliation, banding, contact and shearing information was also present besides complete textual description of rock type and different impregnations. Color and material properties were also logged and indicated in the log files, which were processed and entered to the 3D lithology model to provide more geologic data for the model.

The lithology model was constructed by the drilling logs. All the logs from historic and recent drillings were entered to a database, thus resulting of more than 3000 lines of mainly textual data. This data contained all the observed information from sampled sections of core drilling. Section start, end, length, subsection measures, rock type, mineralization, alteration, color, grain and description. The logs were then processed to result a database that may be entered to the computer software.

3 Mineral Resources

After Boliden's drillings Wiking Mineral has re-drilled the area in 2005-2012 and the resource estimation was verified and confirmed, with additional ore bodies found.

3.1 Resource Estimation Methodology

Mineral resource estimation is one of the key processes of mine planning. The mineral resource estimate needs to provide dependable data on the tonnage, grade, size, shape and location of mineral deposits.

As in this phase no economic or mining engineering related characteristics were considered, like mining method or mining costs of a certain width of ore, although some basic guidelines were kept in mind. These were the continuity of the ore body or the width and inclination of the lenses to make continuous mining achievable.

Resource estimation methodologies are meant to be the processing and assaying of physical characteristics of the mineral deposit. The core drilling provided the necessary samples to gain information on the mineralogy of the area. The physical characteristics were logged in each borehole log and the samples were processed by chemical analysis. The data gained were then entered to a three dimensional modelling space to localize and later visualize the measured characteristics. Borehole logs provided Au, Ag, Bi and Cu concentration and rock density.

The geologic and assay data was compiled to maps and a computer database for creating a model. Grade distributions are shown on these histograms.

The computer model made it possible to show how certain cutoff grade ranges modify the volume of mineral bodies. The likely cutoff grade was then selected by a method described later. Degree of selectivity and the selective mining unit (SMU) has been determined for the likely mining method. Since located right under surface, not any parts deeper than 60 meters subsurface, the A lens has been at this point was presumed to be mined by bulk open-pit method.

3.2 Data Collection and Verification

The total number of bore holes in the field are 57. The earliest holes were drilled in 2005, and the latest ones were drilled last year. All boreholes were surveyed after drilling, to justify the exact coordinates of each sample. Borehole deviation data, like azimuth, dip, Station, , Azimuth, GHS, GTF, DLS, Easting, Northing, Elevation, UpDown, LeftRight, Shortfall, GravField, Drift check, Accumulated roll, Accumulated roll (rev), Roll to station, Roll to station (rev), Time to station, Temperature, Battery Station acc., Station rate, Station Quality Max. rate, Motion Quality. These data were verified by borehole assays.

Data collection expanded to drill hole name, number, easting, northing and elevation of collars, diameter, sample intervals, assay data, geologic data such as lithology, alteration, oxidation. Geotechnical data was also included in the database as well as resistance and gravity values. The gravity map was consistent with the gravity map that was published by SGU.

Data verification was done by random data comparison on the hard copies and the electronically imported data. Boreholes were mapped and searched for outlier values, but none were found to be located outside of the project boundaries, nor any held corrupted data.

No errors were found during the comparison, therefore I've accepted the data to be consistent and sufficient for analysis.

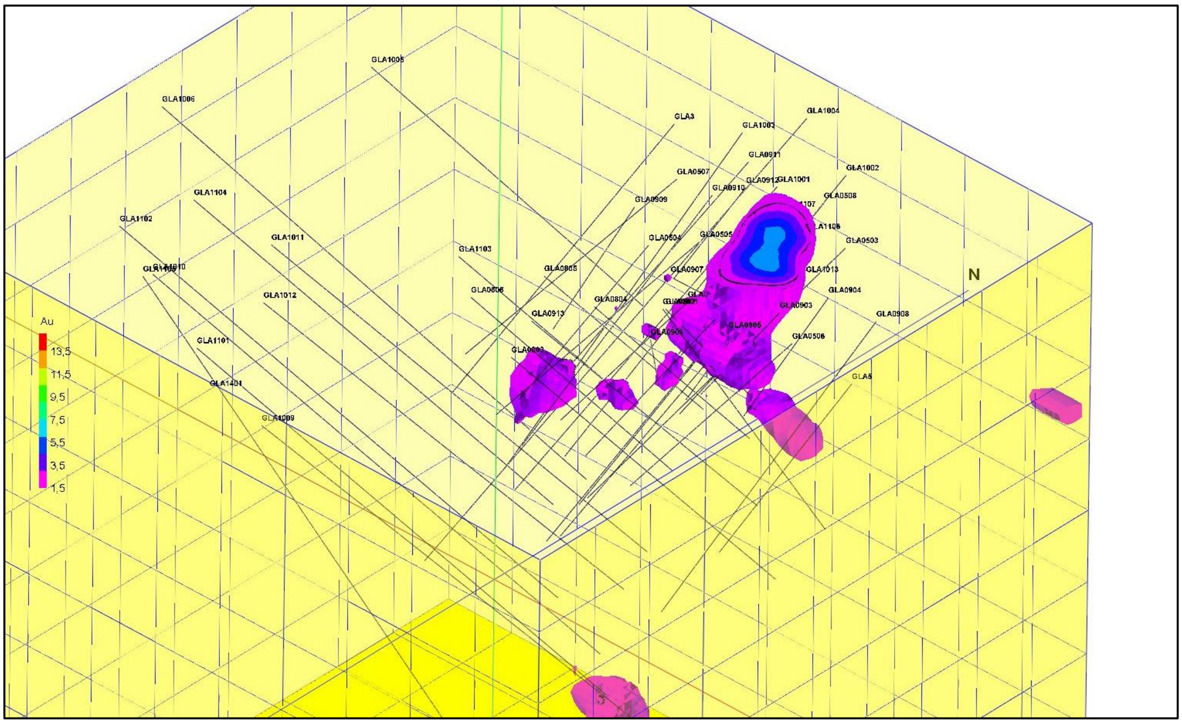
3.3 Resource Estimation

Cutoff grade estimation and later the verification through the economic model.

Resource estimation was done in a 3D simulation environment in Rockworks 16. The software was fed by the data of diamond drilling results. Then with the survey results of the boreholes, the straight lines of drillings were corrected by the actual xyz coordinates. The grade of the minerals were also submitted to the database, thus leading to certain 3 dimensional coordinates to bear with different values. The software allows the user to apply different methods of estimation. Several methods were used to perform the 3D interpolation of the data. Each operated differently as all has its strength and weakness. The calculations required high computational power to perform. The 3 dimensional space was divided to mining units. With quicker settings, that meant a rougher resolution in mining blocks each measuring 5m at each side gave a high number of 571 040 units.

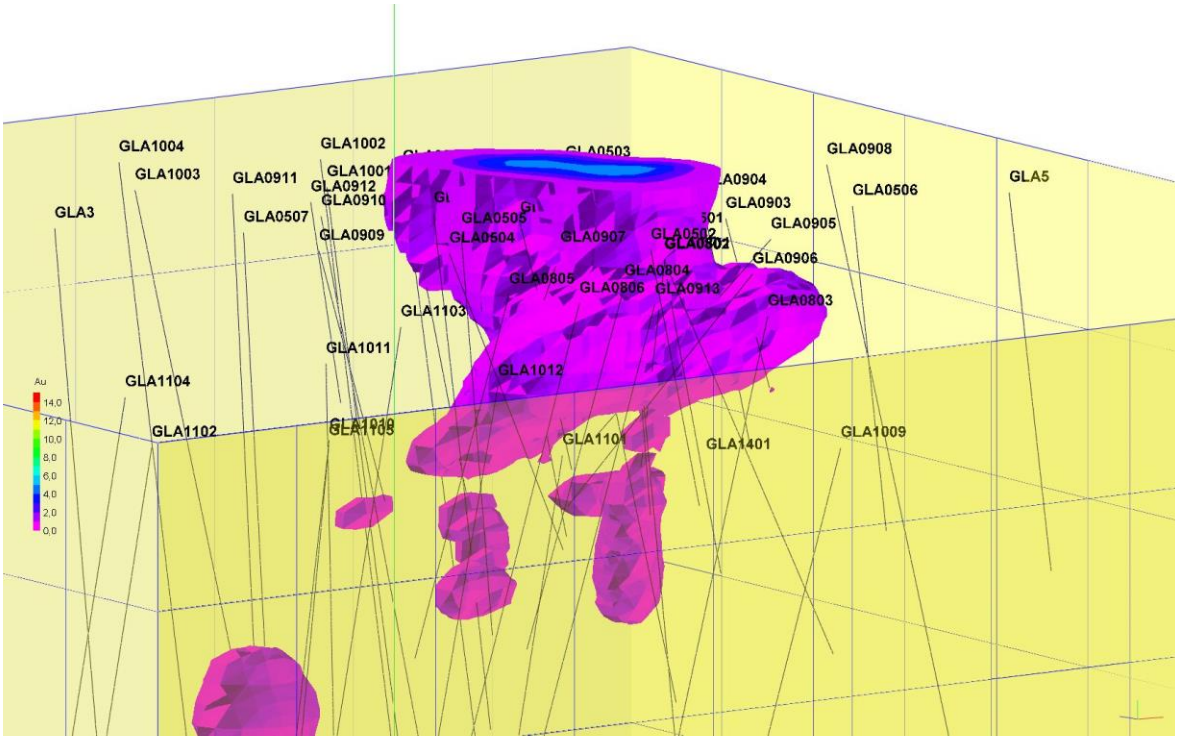
3.4 Gold reserves

For an initial cutoff grade a 1.5 g/t was used that is shown on Figure 1. Volume at this grade was calculated to be 105 125 m^3. Several models were used to get the most accurate estimate possible. The solid model was based on the interval data of the drilling data.



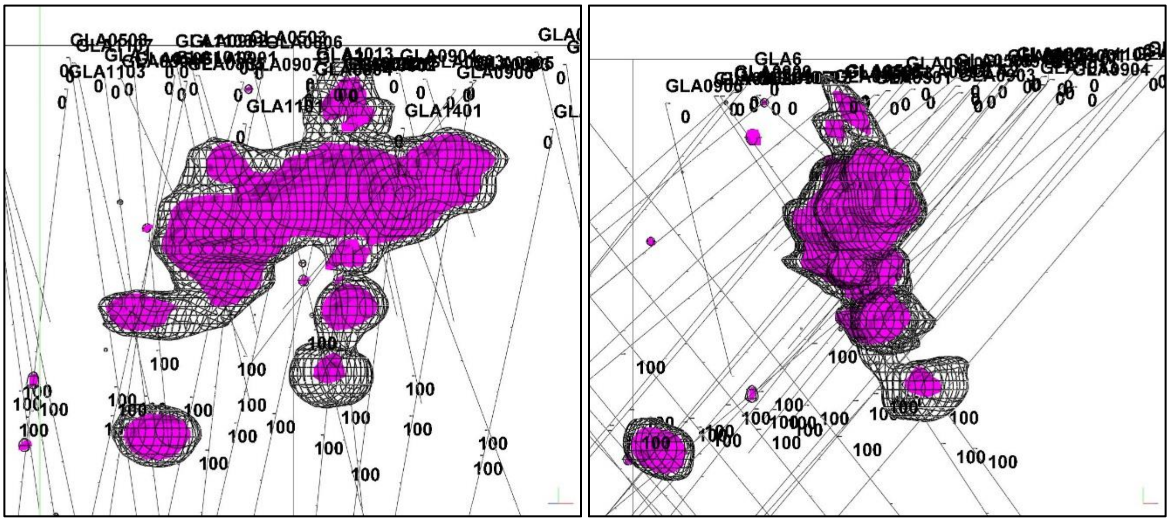
3.4-1. Figure – Au mineralization 3 dimension model at 1.5 g/t cutoff grade – viewed from SE above – own creation

The mining concession of the Gladhammar K1 mining lot allows the owner to mine four commodities: gold, silver, copper and bismuth. The different mineral ore bodies have several overlapping parts in the model space. Therefore a multi mineral cut-off grade was applied to get the estimate, and to define the 3d wireframe model of the ore body.



3.4-2. Figure – Au mineralization at 1.5 g/t cutoff grade – NW-SE section (Azimuth 215° Vertical dip 10°)- own creation

Based on several solid 3 dimension models the inverse-distance anisotropic modeling method was the one that provided the best results in such geologic environment. It was also recommended by the software developer for such mineralizations. Inverse-distance modelling method in general is a more common gridding method. The model grid nodes are assigned by a value each based on the weighted average of neighboring data points, and the value of each data point is weighted according to the inverse of its distance from the grid node, taken to power (2 for squared, 3 for cubed etc.). The advantages of this ID-Anisotropic method are that this kind of directional search can improve the interpolation of voxel values that lie between data point clusters, and can be useful for modeling drill-hole data in foliated deposits. Its disadvantage is that more computational power is required, therefore model creation takes more time. Several hour refinements are not rare during model creation.



3.4-3. Figure – Inverse-Distance Anisotropic model of ore body. Wireframe shows 1.5 g/t grade, purple indication shows gold mineralization above 2.0 g/t (filename: Au_0420_1m_IDW_anisotropic.RwMod) source: author's own creation

According to the JORC and PERC codes mineral resource exploration results should use the terms set for reporting. Therefore there is a need to differentiate mineral resources from ores and differentiation should be based on the increasing level of geological knowledge and confidence. The differentiated categories are the following: indicated or measured mineral resources, and after the consideration of different factors like, mining, processing, economic, marketing, legal etc. ore reserves are differentiated accordingly as probable and proved.

Volumetric report of the model "Au_0420_1m_IDW_anisotropic.RwMod" resulted in the following distance-qualified reserves:

Reserve category by probablility	Volume
Proven Reserves	8 464,0 Cubic meters
Probable Reserves	146 776,0 Cubic meters
Inferred Reserves	45 160,0 Cubic meters
Unclassified	21 592,0 Cubic meters

3.4-1. Table – Volumetric report results of the examined model – source: the author's own creation

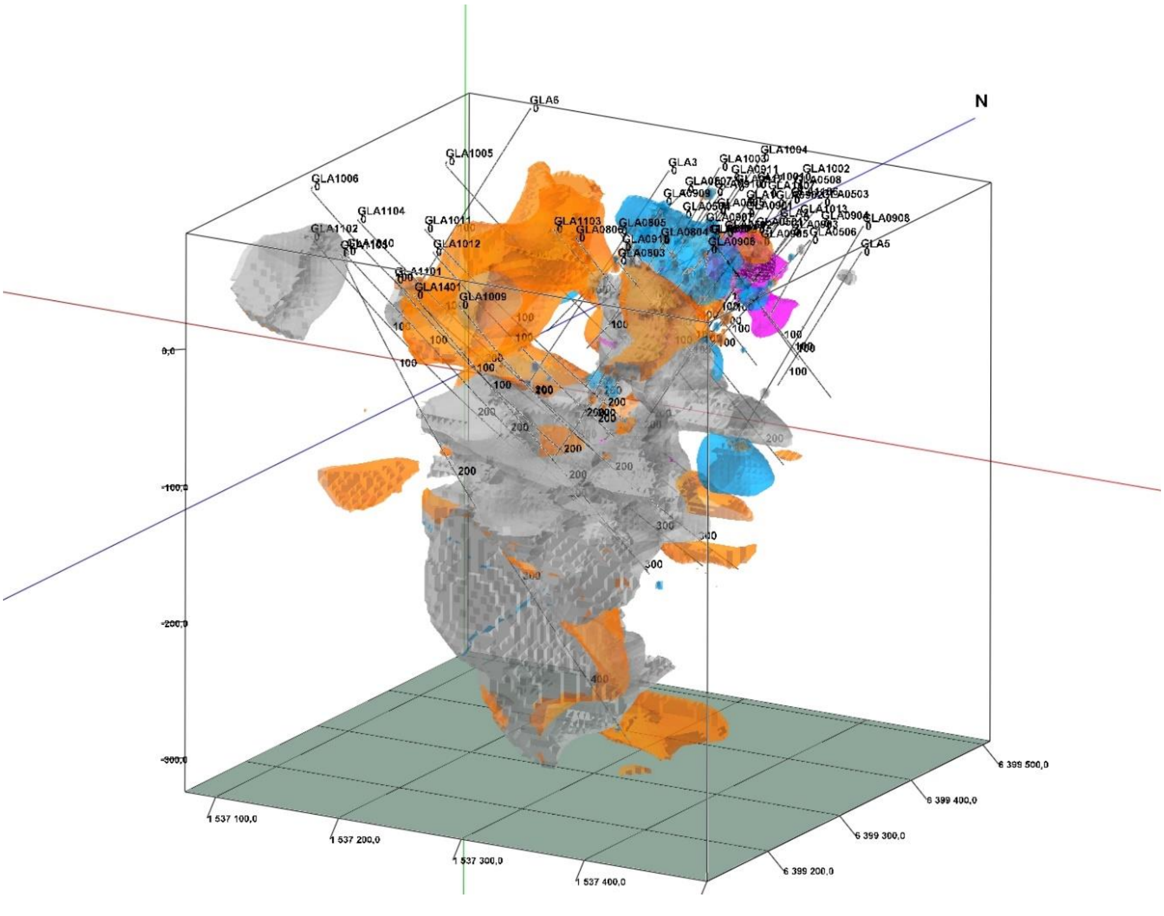
The distance qualifications were set for Cutoff Distance at 3,0 meters, for Probable Reserve Cutoff Distance at 20,0 meters and for Inferred Reserve Cutoff Distance at 60,0 meters.

The model was used to calculate volume information of the different mineralizations at different grades.

Estimates have been calculated in the A lens for gold only, as the B lens and deeper mineralizations of other metals are still under survey. Those prospective mineralizations has not been included in the economic assessment.

Ore Reserve	*Mineral resource classification*	*Tonnes [t]*	*Grade [g/t]*	*Contained mineral [g]*	*Total value [SEK]*	*Total value [EUR]*
Gold at 0,7 g/t cut-off						
	Proven	9 296	1.37	12 736	4.1 M	0.45 M
	Probable	161 205	1.37	220 851	71.5 M	7.77 M
	Inferred	49 599	1.37	67 951	22.0 M	2.39 M
	Total	**220 100**	**1.37**	**301 538**	**97.65 M**	**10.61 M**

3.4-2. Table – Valued mineral estimates



3.4-4. Figure - Polymetallic model showing Au, Ag, Cu and Bi

4 Mining method selection

4.1 Mining

Gladhammar deposit previously been explored under the guidance of manager geologist Mats Willdén is classified as an indicated resource (in accordance with SveMin's recommendations). The deposit estimated to contain around 170,000 tonnes of mineralization with average grades of 5.5 g / t gold, 12,5g / t silver, 0.24% copper and 0.05% bismuth. The metallurgical surveys have shown that around 78% yield of gold, 72% of silver and 83% of copper can be obtained during the processing. The deposit is located close to the surface, as preliminary estimates are made, the mining will take place open pit to 40m and then continue underground. Mining production is planned for around 20-40 000 tonnes per year in which the ore is intended to be transported to another location for enrichment. The mine life is assessed based on known mineral resources from 6 to 8 years of production with favorable conditions for extended life. There good opportunities to find further economic gold mining in the Gladhammar field.

4.2 SMU – Selective Mining Unit

Accoring to the conventional definition of selective mining unit (SMU) is the smallest volume of material on which ore waste classification is determined, but in reality it is more complex. The SMU size would depend on a number of different factors this scoping study is not intended to examine, rather, because of estimative purposes the 2m x 2m x 3m blocks are used. In later versions of the study the SMU needs optimization according to the selected mining equipment, blast engineering and rock mechanics measurements.

4.3 Operation

Before the operations start some additional complementary drilling would be required to increase the security on the geometry and content of the ore. The pit would be opened through a trajectory of a spiraling ramp with a 12-14% declination and at least 5 meters width. The access of the area is through country road 40. The reinforcement and widening of the road is necessary due to heavy traffic. The waste deposit is planned on the north part of the area. Sulphide container rocks would need storing according to environmental regulations to prevent any contamination spreads, as well as the mine water plant that is needed for the dewatering and old mine water treatment, would be operated in accordance with the environmental regulations.

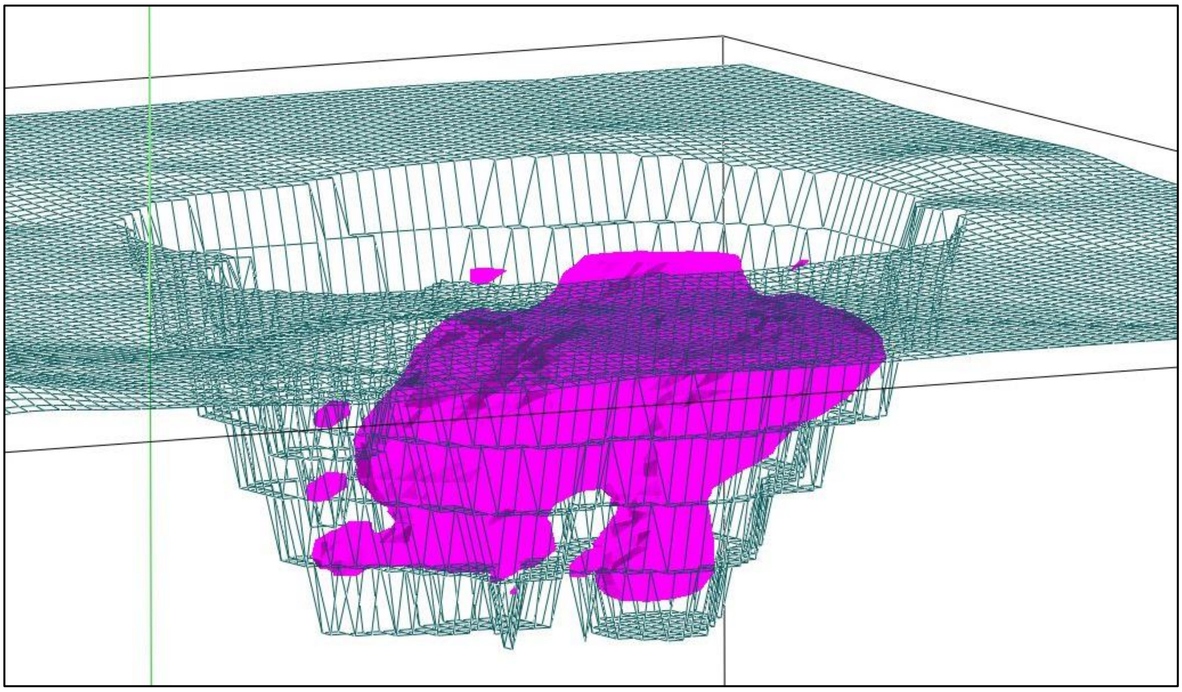
Ore production would preferably start with the exploitation of the outbreak. The pit would be deepened till 40 meters, where the deep pit could transition into the ramp of underground operations. Besides hauling, fans and ventilation is required for the good working environment. Underground operations require constant and continuous dewatering of the tunnels as deep as to a maximum of 68-70 meters according to current plans.

Blasting could be carried out by injecting ammonium nitrate base blaster during daytime with 200-450 tons of rock blown out per sequence. The blasted ore is then loaded by wheel LHD then dump trucks to the landfill, the ore deposit and to the port for shipment to the production plant. A mobile crusher might be set up to crush larger rocks for transportation.

The shipment of raw materials to the port will be done by trucks 4-5 daily. The transport of personnel is planned to be handled by cars. Suppliers of machinery, tools and explosives will transport the requisites upon orders.

4.4 Pit Optimization

Pit optimization is the key economic tool for valuing reserves and controlling the strategy for the development of most open pit hard rock mines. As the mine get deeper and grades and other orebody characteristics change, the pit-optimization technique determines if the next block (preferably SMU) is classified as ore or waste. The most widely accepted algorithm for pit optimization is the Lerchs-Grossman (LG) technique. The block model defined an optimum outline for the pit as slope and cost parameters were given. Key input parameters were given in a general form. Further refinement of key elements like general slope and required bench height should base up on geomechanical data.



4.4-1. Figure – 3D extraction diagram of the pit, with 60° general slope, and 12m bench height

The extraction diagram resulted in the following data:

	Volume [m3]	*Mass [Tons]*
Ore	57 402	154 985
Overburden	275 022	742 560
Total excavation	332 424	897 545

4.4-1. Table – Extraction diagram volume and mass results

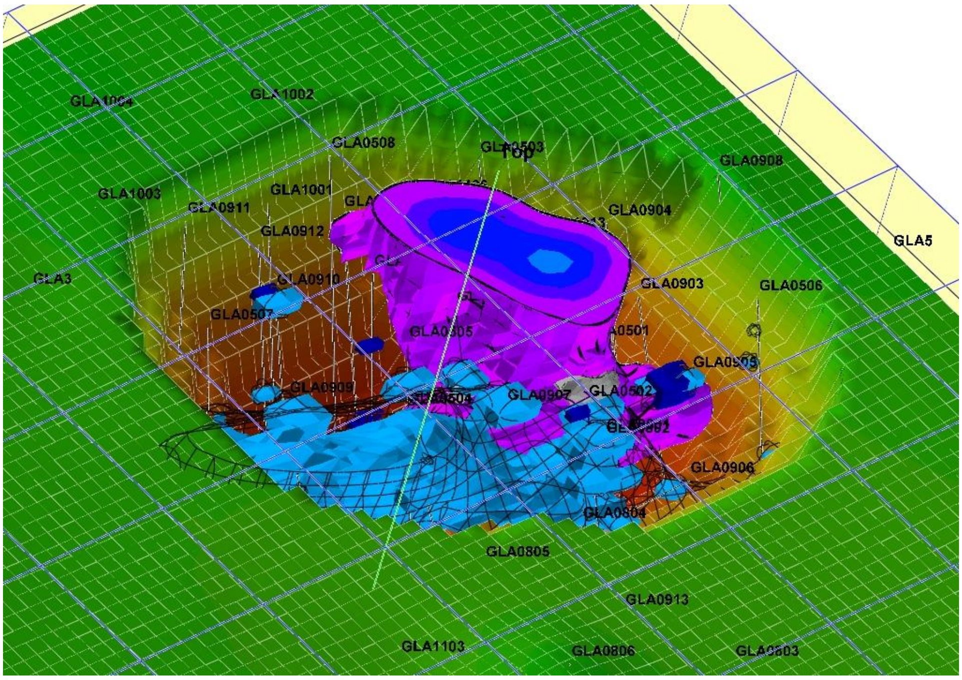
The maximum excavation depth is 61.4 meters from the ground level. Stripping ratio of the pit is 4.791:1 to the maximum depth. If the pit is only excavated to 39 meters deep, then 394 754 tonnes of rock is required to be mined and the total stripping ratio stays as low as 2.572:1.

4.4.1 Potential production target profile – Pit Shells

The output of pit optimization

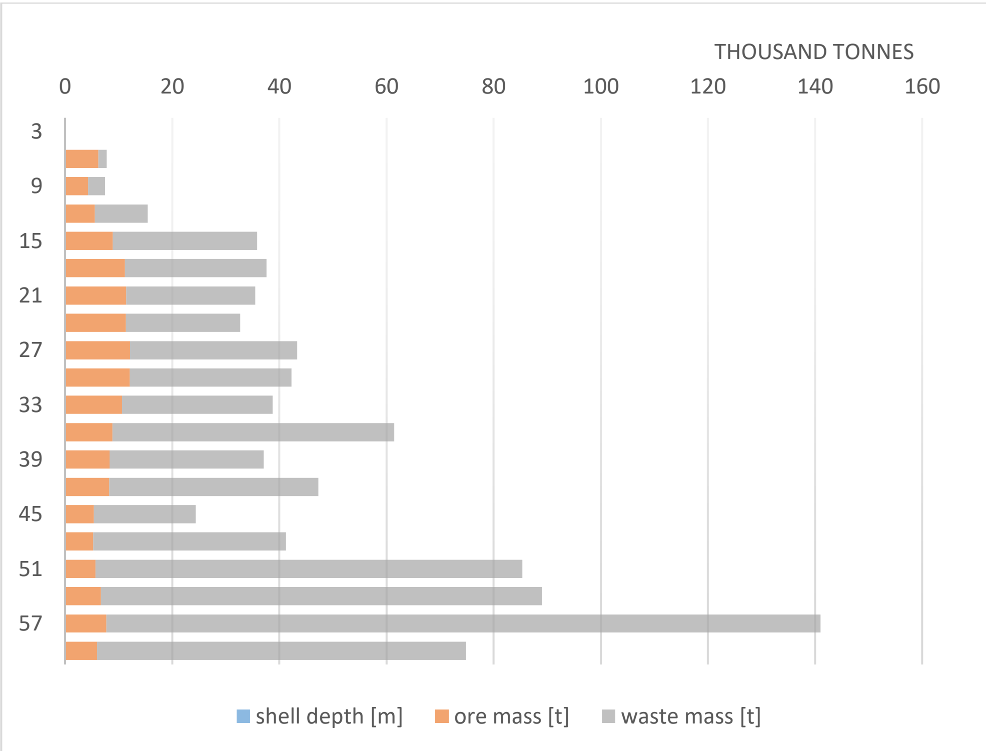
Depth [m]	Pit Total Mass [t]	Ore Mass [t]	Waste Mass [t]	Strip Ratio	Au ppt [g/t]	Au Processed [g]
6	7 727	6 197	1 531	0.247	1.15	6 627
9	15 163	4 301	3 135	0.444	1.14	4 560
12	30 551	5 540	9 847	0.905	1.15	5 925
15	66 412	8 894	26 968	1.664	1.11	9 181
18	103 955	11 154	26 390	1.881	1.27	13 174
21	139 458	11 372	24 130	1.939	1.49	15 759
24	172 117	11 300	21 360	1.929	1.87	19 651
27	215 420	12 101	31 201	2.040	2.46	27 686
30	257 629	12 029	30 181	2.108	2.43	27 183
33	296 339	10 571	28 139	2.171	1.90	18 678
36	357 720	8 821	52 561	2.498	1.62	13 290
39	394 754	8 238	28 796	2.572	1.91	14 633
42	441 993	8 165	39 074	2.724	1.93	14 655
45	466 341	5 322	19 027	2.761	1.38	6 830
48	507 530	5 176	36 013	2.929	1.01	4 862
51	592 823	5 613	79 680	3.398	1.19	6 212
54	681 761	6 634	82 304	3.821	1.18	7 280
57	822 749	7 655	133 334	4.519	0.95	6 763
60	897 545	5 905	68 891	4.791	0.85	4 668

According to the pit shell examination, the ore body position and deeper shells would suggest a transition point at around 45-48 meters deep from surface.



4.4-2. Figure - Pit with ore bodies

According to the pit shell model, the excavation of deeper shells will result in increased waste mining.



4.4-2. Table – Ore and waste tonnage in different pit shells

4.4.2 Overburden

The top soil layer was estimated from the borehole data as well. The 3d model was capable of determining the layer width. The surface height AOD values were given as collar values of each borehole and combining those with the interval data of top soil results gave the clean top layer of soil on both lithology and stratigraphy models. The overburden was then calculated to be 18 759 m^3.

4.5 Life of mine and optimum rate of exploitation

According to the Taylor-Formula for calculating optimal lifetime of mine, both the simpler $n \approx 0{,}2\sqrt[4]{total\ reserve\ tonnage}$ and the $n \approx 6{,}5\sqrt[4]{tonnage\ (in\ million\ tonnes)}$ formulas result in a 6,16 – 6,33 year term with the 897 545 tonnes of total excavation.

Mine life is directly related to the rate of extraction, which is a decision, but can be optimal. The Hotelling r-percent rule provides an overall life of mine modelling methodology, whereby the resource is depleted such that the yearly rate of growth of value of the extracted resource is equal to the discount rate. Thus there exists an optimum depletion strategy. This optimum rate of exploiting will occur somewhere between the point where average cost is lowest and where marginal cost equals marginal revenue.

4.6 Mine dewatering

Any open pit mine is a vast sump collecting water. According to the old mine tunnels of Gladhammars Gruvor and the borehole data regarding aquifer levels, the rest water level in the A lens is between 45 meters and 50 meters AOD depending on seasonal changes. This means a significant amount of ground water may be collected from the pit as ground surface is at 85 meters AOD and the pit is expected to be 61 m deep spreading down to 24 m AOD. All ground water and precipitation should be collected from drill holes by pumping to diversion ditches and some required portion should be pumped through pipelines to the processing plant. According to preliminary calculations, additional cost of pumping would result in higher mining cost for the lower shells of the pit, making the already forecasted layers less attractive economically. Predicting anticipated flow in the overburden rocks should be modelled throughout the whole pit for gathering the required information for hydrology analysis and modelling, thus the cost effect of ground water and underground flows may be forecasted. A daily outtake of 18-25 m^3 water might be calculated, and the purification and cleansing should be provided on site to be able to release to the recipient. Mine water that is contaminated should be transported to a cleansing basin and dealt with on site.

4.7 Metallurgical and Mineral Processing

Mineral processing is planned to be conducted in an Estonian metallurgical processing plant, accessible by waterways. This would dramatically reduce the cost of road transport of the crushed ore.

Estimated average gold recoveries for transitional and fresh ores at the target grind size of 125 µm are around 85-91%. The processing plant design should be based on well proven processing technologies that are available. The recommended processing route in such processing plant is:

- Primary crushing by a gyratory crusher to reach product size of 135 mm
- Grinding in a circuit to a product size of 125 µm for fresh material and coarser for oxide and transitional material
- Treatment of a portion of the grinding circuit cyclone underflow by centrifugal gravity concentration, followed by batch intensive leaching of the gravity concentrate and electroextraction of the resulting pregnant solution
- Thickening, in a high rate thickener, of the grinding circuit cyclone overflow to 50% solids by weight prior to treatment in a hybrid carbon in leach circuit
- Acid washing and split elution of the resulting loaded carbon and thermal regeneration of the barren carbon prior to its return to the carbon in leach circuit
- Smelting of cathode sludge from electro extraction to produce a final product of gold doré
- Tailings thickening in a high rate thickener to 60% solids by weight prior to disposal of the tailings into the tailing storage facility located in an integrated waste landform.

Raw and process water should be sourced from remote bore fields and transferred by overland pipe network and pumps.

4.8 Reclamation

The quarry of the depleted mine is planned to be landfilled with the left waste deposit, levelling the steep walls and leaving the fertile soil on top to initiate the growing back of vegetation.

5 Economic Evaluation

5.1 Capital Expenditure

The total capital cost estimate for the initial development and ramp-up of the facilities at the Gladhammar Project including mining, dispatch, and the development of infrastructural needs is estimated to be under 18.2 M SEK. The capital expenditure is considered proportional to similar projects, with a slight decrease in the development costs of the processing plant facilities. These estimates are at a concept study level of accuracy only.

The following project development assumptions were used:

- Contract mining operation with all mining equipment supplied by the contractor
- The processing plant equipment is relocated from the purchased Enåsen processing plant to a closer distance, where it may service Gladhammar and might another project as well.
- Further metal concentrates of copper trucked or railed to a smelter.

Plant capacity is driven by the A lens open pit. The preparation for reaching the optimum production capacity would require the following items as capital expenditure.

Item	Million SEK	Comments
Plant relocation and development	8,00	Cross-referenced against similar projects with relocated plants
Haul Roads / Site Work	1,10	Provision of site services and access roads as well
Pre-production Stripping	0,93	Top soil removal for 20 SEK / t
Buildings	0,56	Office and workshop
Electrical System	0,08	Connection to the high voltage network
Sustaining Capital	1,26	To sustain production levels
Working Capital	1,00	
Engineering	1,48	Mine planning
Contingency	0,21	Risk management and insurance
Closure costs	3,60	Reclamation costs at PV
Total Capital Costs	18,20	

5.1-1. Table – Capital Cost Estimates

The above estimates were based on industry benchmarks, although those are based on pre-feasibility studies and can be considered preliminary estimates.

5.2 Operating Expenditure

Operating cost estimates for the Gladhammar Project is developed on the basis of industry benchmarks and cost averages of different other projects. Industry cost models were used from different trusted resources applied to Sweden like ÅF Mining AB, Salva Resources Pty Ltd and Infomine.com costing data. The major components of operating costs associated with the open pit mining operation were taken into consideration. Mobile equipment operation by contractor, labor costs of applied workforce, fuel, electric power and maintenance costs were estimated to be included in the unit costs of each mined tonnes of ore and waste. Processing unit cost estimate was based on the power need and maintenance costs of the venue.

Parameter	Unit	Value SEK	Comment
Mining Cost (above ground/pit)	SEK/t	80.00 (70-120)	
Mining Cost (underground)	SEK/t	370.00 (300-420)	
Ore transport Cost	SEK/t	50.00 (37-60)	
Processing / Enrichment Cost	SEK/t ore	85.00 (75-90)	Processing in Estonia
Admin Cost	SEK/t ore	20.00 (18-25)	

5.2-1. Table – Operating cost estimates for certain processes

5.2.1 Mobile Equipment

Although for reduction of the initial capital need mining operation was calculated by involved contractors with available equipment fleet for operation, mining operation may be kept in the company. In this case capital expenditure should be extended to finance a hydraulic shovel, a front-end loader, at least two dump trucks, a drill rig for blasting, a service truck, compressors, pumps and 2-3 pickup trucks.

5.2.2 Other operation costs

As equipment fleet, workforce was included in the unit cost calculations since contractors apply their own people, although there should be definitely a responsible person available for all the shifts, also an engineer, a mechanic and operators of the machinery.

The total installed power estimates for the processing plant and the water pumps were derived from the plant throughput and dewatering requirements of the pit. Since the mining lot is not considered a remote location and electric high power grid is easily accessible for connection, the power need of the mine may be well serviced through the present electric network.

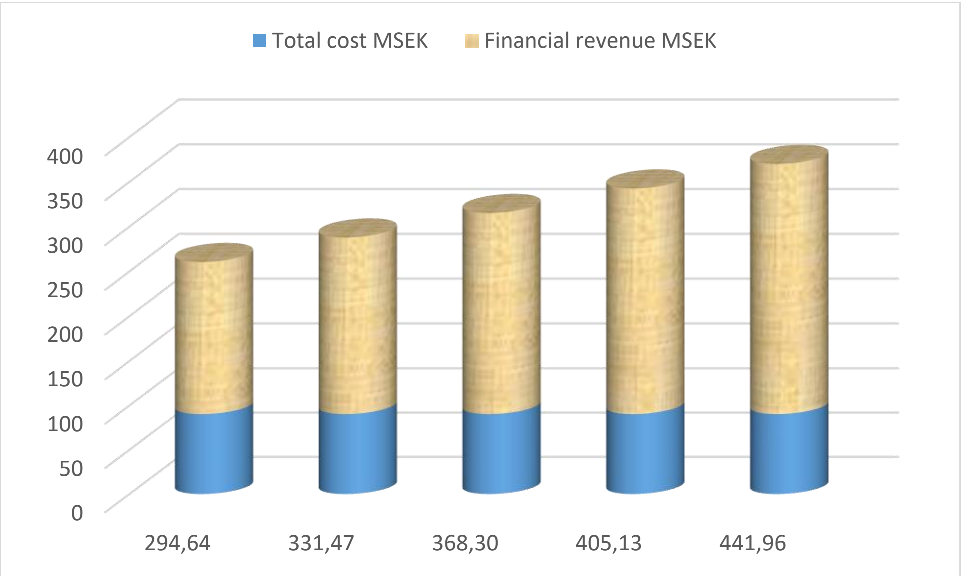
5.3 Revenue Assumptions

There is no mining without the demand of the produced material on the markets. Therefore commodity markets are the major concerns of mining enterprises. As the price is set on the basis of trade for the short term, long term price forecasts are harder to predict. For a reasonable average price selection for gold it is advised to stay away from peaks, therefore a moving average price was applied. The commodity is traded in USD per ounce, therefore a SEK per grams conversion was made to fit the value to the calculations. The conservative average of 325 SEK / g was taken as the gold price in the study.

5.3.1 Gold Price Sensitivity Analysis

A sensitivity analysis was carried out to model potential fluctuations of gold price from the base case cash flow model. The price range of a 20% decrease to a 20% increase was examined.

			Base case		
	-20%	*-10%*	*long term*	*10%*	*20%*
Gold price SEK/g	294,64	331,47	368,30	405,13	441,96
Total ore value MSEK	260,48	287,85	315,21	341,57	369,94
Total cost MSEK	90,29	90,29	90,29	90,29	90,29
Financial revenue MSEK	170,20	197,56	224,92	252,29	279,65



5.3-1. Figure – Sensitivity Analysis results of gold price fluctuation

5.3.2 Royalties

According to Swedish mining regulations the concession holder is required to pay a fee for each calendar year in which exploitation is undertaken. The fee is equal to 0.2% of the calculated value of the minerals covered by the concession that are extracted and brought to the surface.

5.4 Net Smelter Return Calculation

As in most cases a mine produces concentrates, which are in rare cases are rich ore that can be shipped directly. In case of GL K nr1 we need to deal with polymetallic ore.

NSR for Gladhammar K nr 1

N Au x	Au g/t x	79%	+ N Ag x	Ag g/t x	68%	+ N Cu x	Cu(%) x	0,72%	+ N Bi x	Bi g/t x	0,65%
Gold Price (SEK/g)	ave grade		Silver Price (SEK/g)	average grade		Copper Price (SEK/ton)	average grade		Bismut Price (SEK/ton)	average grade	
368,30	5,50		4,84	12,5		52 157	0,24		78 186	0,22	
1600,3			41,15			90,13			111,81		

$$NSR = 1600{,}33 + 41{,}15 + 90{,}13 + 111{,}81 = 1843{,}33\ SEK/ton$$

5.5 Economic Calculation

According to the NSR and expenditure calculations, the mine economy is on stable grounds. Current plans of the 155 000+ tons of ore would need a six year operation for the mine. We are convinced that the potential of the area is large, and this leads to assumptions that the operation would go 10+ years. The assumptions are based on some previous surveys and geophysical measurements of Mats Wilden and Torgrim Svensson.

		years								**Total**
		0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	
Production	pit		45 000	45 000	11 000					
(tons)	underground				8 000	20 000	15 000	15 000	12 000	**171 000**
Costs										
(MSEK)	Mining cost		3,60	3,60	3,84	7,40	5,55	5,55	4,44	
	Ore transport		2,25	2,25	0,95	1,00	0,75	0,75	0,60	
	Enrichment		3,83	3,83	1,62	1,70	1,28	1,28	1,02	
	Administration	2,00	0,90	0,90	0,38	0,40	0,30	0,30	0,24	
Total operation expenses		2,00	10,58	10,58	6,79	10,50	7,88	7,88	6,30	
Capital expenses		12,80				15,00				
Total expenses		14,80	10,58	10,58	6,79	25,50	7,88	7,88	6,30	**90,29**
Income NSR		0,00	82,95	82,95	35,02	36,87	27,65	27,65	22,12	**315,21**
Yearly profit		**-14,80**	**72,37**	**72,37**	**28,24**	**11,37**	**19,77**	**19,77**	**15,82**	**224,92**
Accumulated Cash Flow		-14,80	57,57	129,95	158,19	169,55	189,33	209,10	**224,92**	

5.5-1. Figure - Economic calculations

The forecast shows a steady profit for the project.

5.6 Summary of Economic Assessment

After the completion of economic evaluations the optimum case for the mining operation was revealed. Thus with industry averages used for costing and typical key financial assumptions as gold price set to 325 SEK and a prime plus 5% discount was applied the project has been forecasted to reach a 224.92 Million SEK profit in seven years of operation. This value may greatly differ by fine tuning all the engineering and optimizing the pit, as well as with more precise figures of costing a precise result is expected.

6 Discussion of Results

6.1 Conclusions

Opportunities to optimize and enhance the financial performance of the Gladhammar Project shall be further assessed and evaluated in a preliminary feasibility study, but results of this scoping study show a good financial return in a short time period. The study is based on the drilling data that was provided by Wiking Mineral and the assay data that was provided by ALS Chemex. Mineral resource estimation shows a continuous ore body relatively close to surface, therefore with all the evaluated data and considerations of mining, processing and financial methods the Gladhammar Project is prospected to be a viable mining operation with its relative simplicity compared to other mining operations.

Based on the information currently available the development of the gold deposit is economically viable under the present market conditions. In order to confirm the mineral resources, the process recovery and production means used in the study, an extensive program of confirmatory drilling and geologic model creation is advised as well as evaluation of those data with greater detail. That may lead to different approaches in both mining method selection and the design and development of the mineral processing infrastructure.

During the study the volumetric and tonnage results accrued from the optimized pit and its shells. Practical mining considerations may require additional waste to be mined and left behind. In the absence of geomechanical data the stability of pit walls were calculated at a conservative 60 degrees. This figure has an enormous effect on strip ratio and pit economics.

Further geological exploration and engineering is required to confirm the mineralogy to develop the detailed mine planning and process flowchart. The mineral processing flowchart must be developed to confirm the costing assumptions and capital expenditure needs of the project. The environmental and social impacts of the projects must be reconsidered at a higher level of detail to ensure that legal regulations are met.

6.1.1 Exploration Potential

The geological model has shown other mineralizations under the surface at deeper levels. Silver, copper and bismuth are allowed for production due to the concession. As these mineralizations could be localized by further drilling and with a high resolution geological model some other mining opportunities are in the project. The copper mineralization extends to all directions as well as bismuth. These satellite deposits may be linked to further mine development planning and might be good prospects for further evaluations.

6.2 Recommendations

The recommended next step is the approval of a further preliminary feasibility study by the Board of Directors. Thereafter, the project development should follow the previously outlined work breakdown structure. The main recommendations are the following.

- Cyclical fine tuning of the whole work breakdown structure would strengthen the study's reliability.
- Preparation of a detailed topographic survey to provide exact design boundaries to tailings and waste disposal.
- Undertake geomechanical data collection to optimize pit economics to the highest possible reliability and to get exact figures in rock breakage, cutter and drilling power requirements and blasting.
- Undertake twinning and confirmatory drilling at uncertain mineralizations to clarify those doubted data in the model.
- Recreate the 3D geological model with complex lithology and stratigraphy model to get more exact boundaries of the ore body under surface.
- Hydrogeological model should be prepared to get exact groundwater data and pumping requirements.
- Investigate means of processing and identify capital costs required for those.
- Prepare project schedule for the coming preliminary feasibility stage based on industrial practice and work breakdown structure mentioned in the study.

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Maps of Sweden and the Gladhammar area http://apps.sgu.se/kartvisare/kartvisare-grundvattenmagasin-en.html (SGU 2016)

8 List of Figures

9 List of Tables

10 Appendices

10.1 Appendix A – Assay Procedures

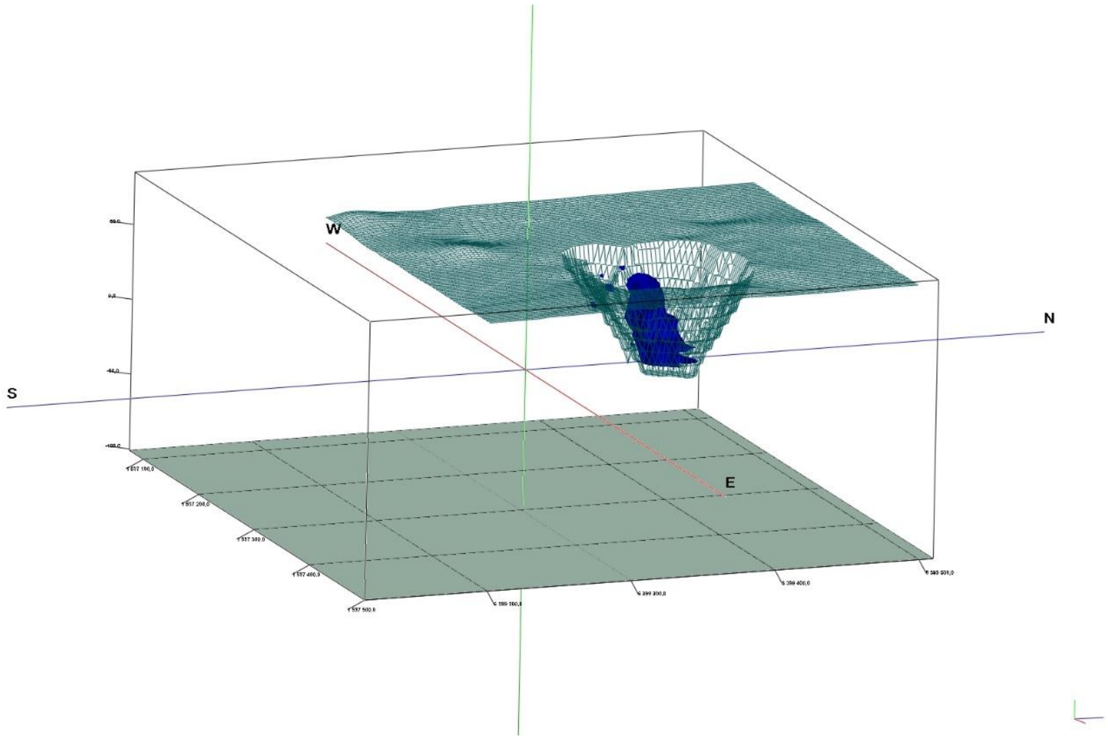
Au-AA25 & Au-AA26							
Sample Decomposition Fire Assay Fusion (FA-FUS03 & FA-FUS04)							
Analytical Method: Atomic Absorption Spectroscopy (AAS)							
A prepared sample is fused with a mixture of lead oxide, sodium carbonate, borax, silica and other reagents as required, inquarted with 6 mg of gold-free silver and then cupelled to yield a precious metal bead. The bead is digested in 0.5 mL dilute nitric acid in the microwave oven. 0.5 mL concentrated hydrochloric acid is then added and the bead is further digested in the microwave at a lower power setting. The digested solution is cooled, diluted to a total volume of 10 mL with de-mineralized water, and analyzed by atomic absorption spectroscopy against matrix-matched standards.							
Method code	Element	Symbol	Units	Sample weight (g)	Lower limit	Upper limit	Default over-limit method
Au-AA25	Gold	Au	ppm	30	0.01	100	Au-GRA21
Au-AA26	Gold	Au	ppm	30	0.01	100	Au-GRA21

Ag-OG46
Sample Decomposition: HNO_3 -HCl Digestion (ASY-4R01)
Analytical Method: Inductively Coupled Plasma - Atomic Emission Spectroscopy (ICP - AES)*
Assays for the evaluation of ores and high-grade materials are optimized for accuracy and precision at high concentrations. Ultra high concentration samples (> 15 -20%) may require the use of methods such as titrimetric and gravimetric analysis, in order to achieve maximum accuracy. A prepared sample is digested in 75% aqua regia for 120 minutes. After cooling, the resulting solution is diluted to volume (100 mL) with de-ionized water, mixed and then analyzed by inductively coupled plasma - atomic emission spectrometry or by atomic absorption spectrometry.

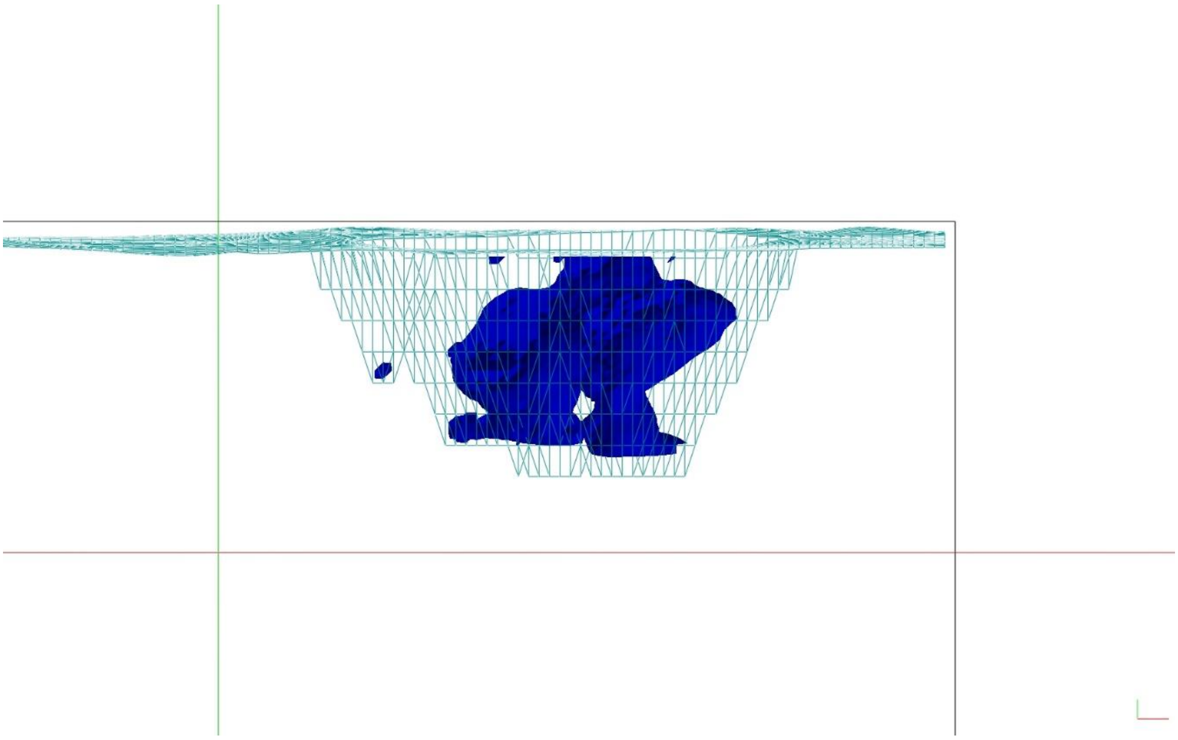
ME-ICP41					
Sample Decomposition: Nitric-hydrochloric acid Digestion (ASY-AR02)					
Analytical Method: Inductively Coupled Plasma - Atomic Emission Spectroscopy (ICP - AES)					
A prepared sample (0.4 g) is digested with concentrated nitric acid for half an hour. After cooling, hydrochloric acid is added to produce aqua regia and the mixture is then digested for an additional 1.5 hours. The resulting solution is diluted to volume (100 mL) with de-ionized water, mixed and then analyzed by inductively coupled plasma - atomic emission spectrometry. The analytical results are corrected for spectral inter-element interferences.					
Element	Symbol	Units	Lower limit	Upper limit	Default over-limit method
Copper	Cu	ppm	5	5,000	Cu-OG46
Lead	Pb	ppm	10	50,000	Pb-OG46

Source: ALS Limited

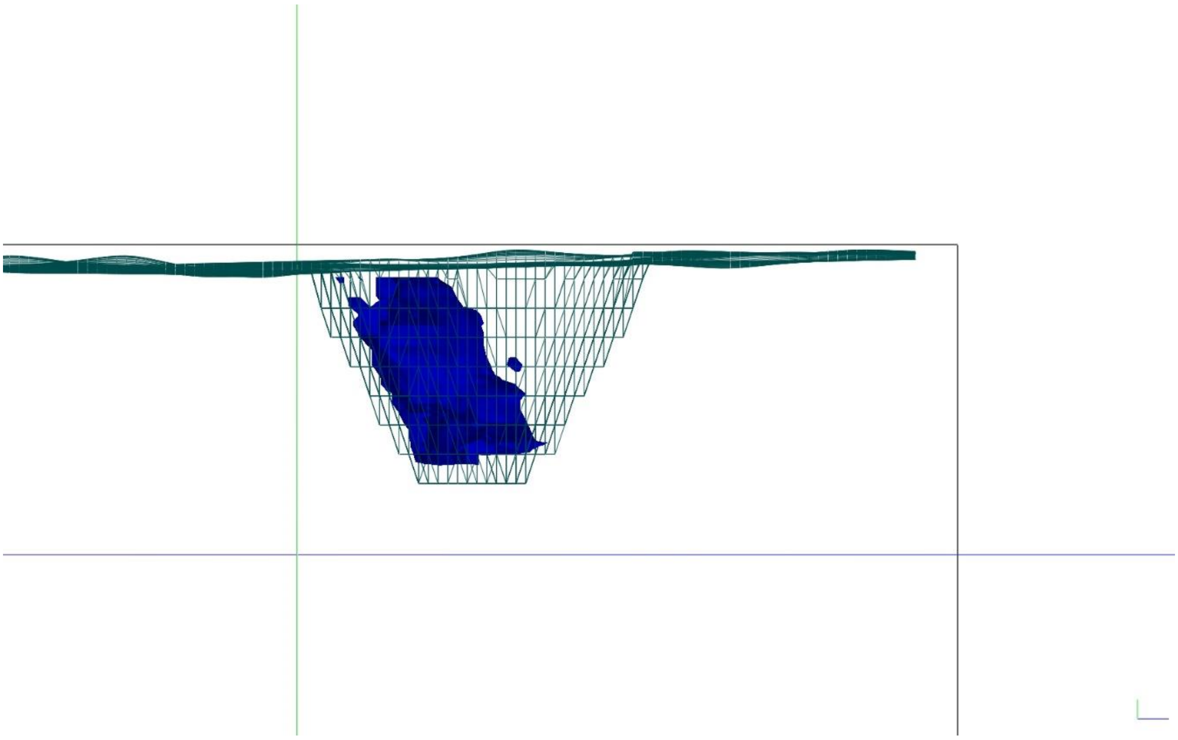
10.2 Appendix C - Long section views of ore body and pit



10.2-1. Figure – Aerial view of ore body and pit from E-SE

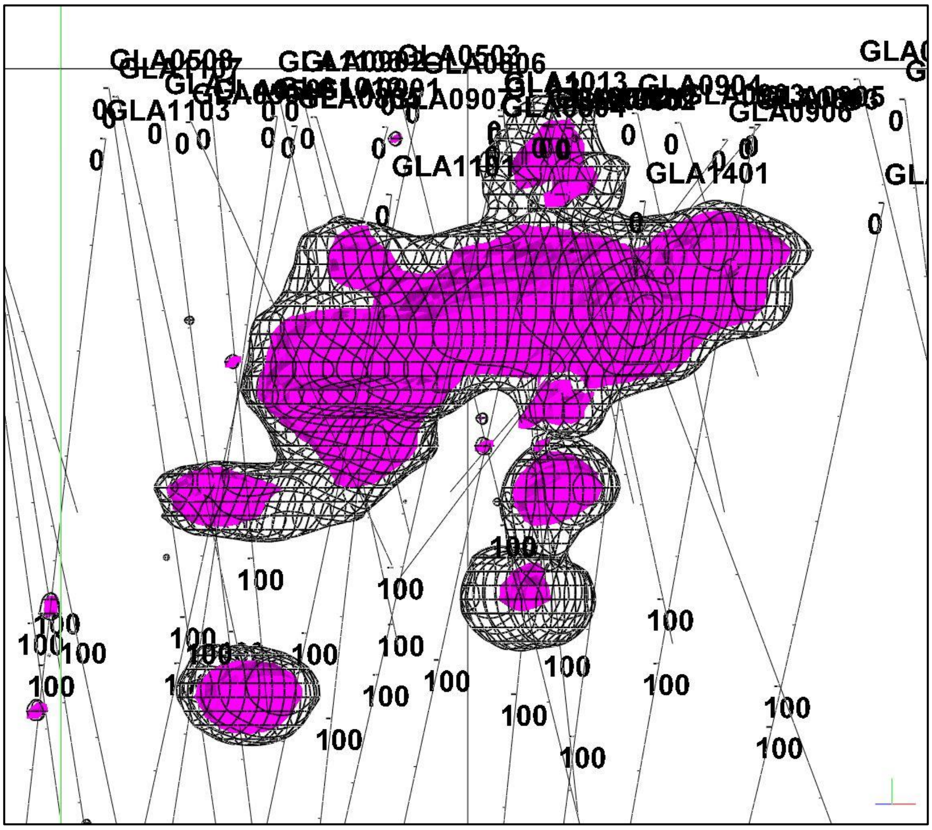


10.2-2. Figure – Long section view of ore body and pit from South

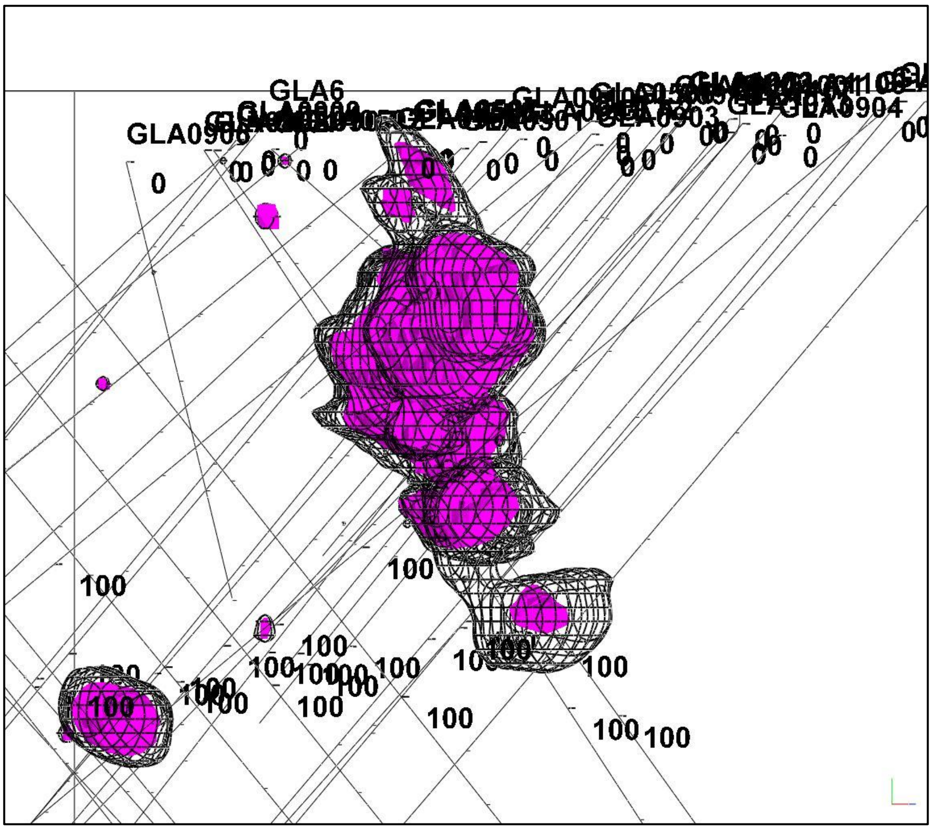


10.2-3. Figure – Long section view of ore body and pit from East

10.3 Appendix D – Ore body

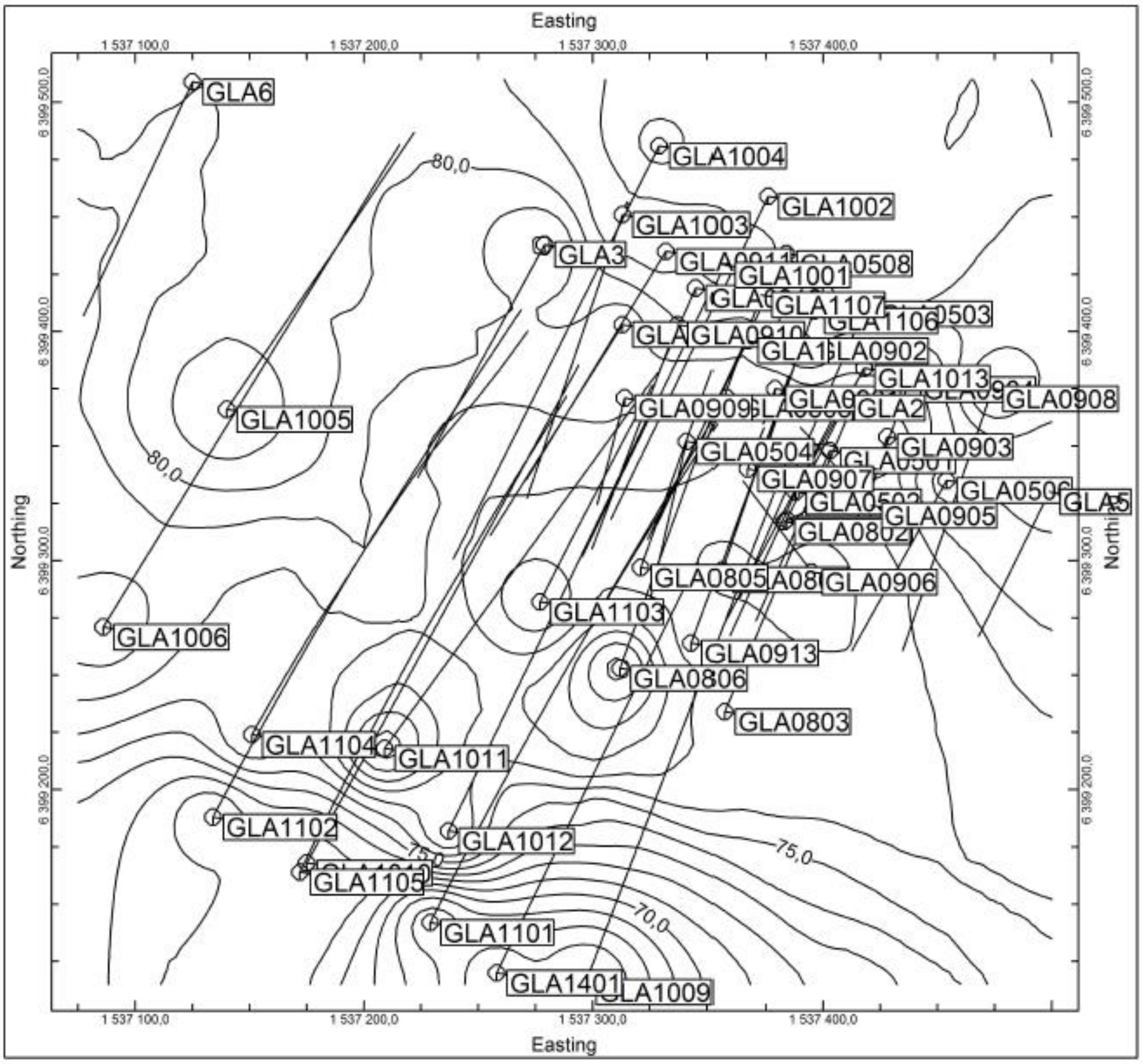


10.3-1. Figure - 1,5 gpT cutoff gold Angle 215 Vertical 0 section - Au_0420_2m



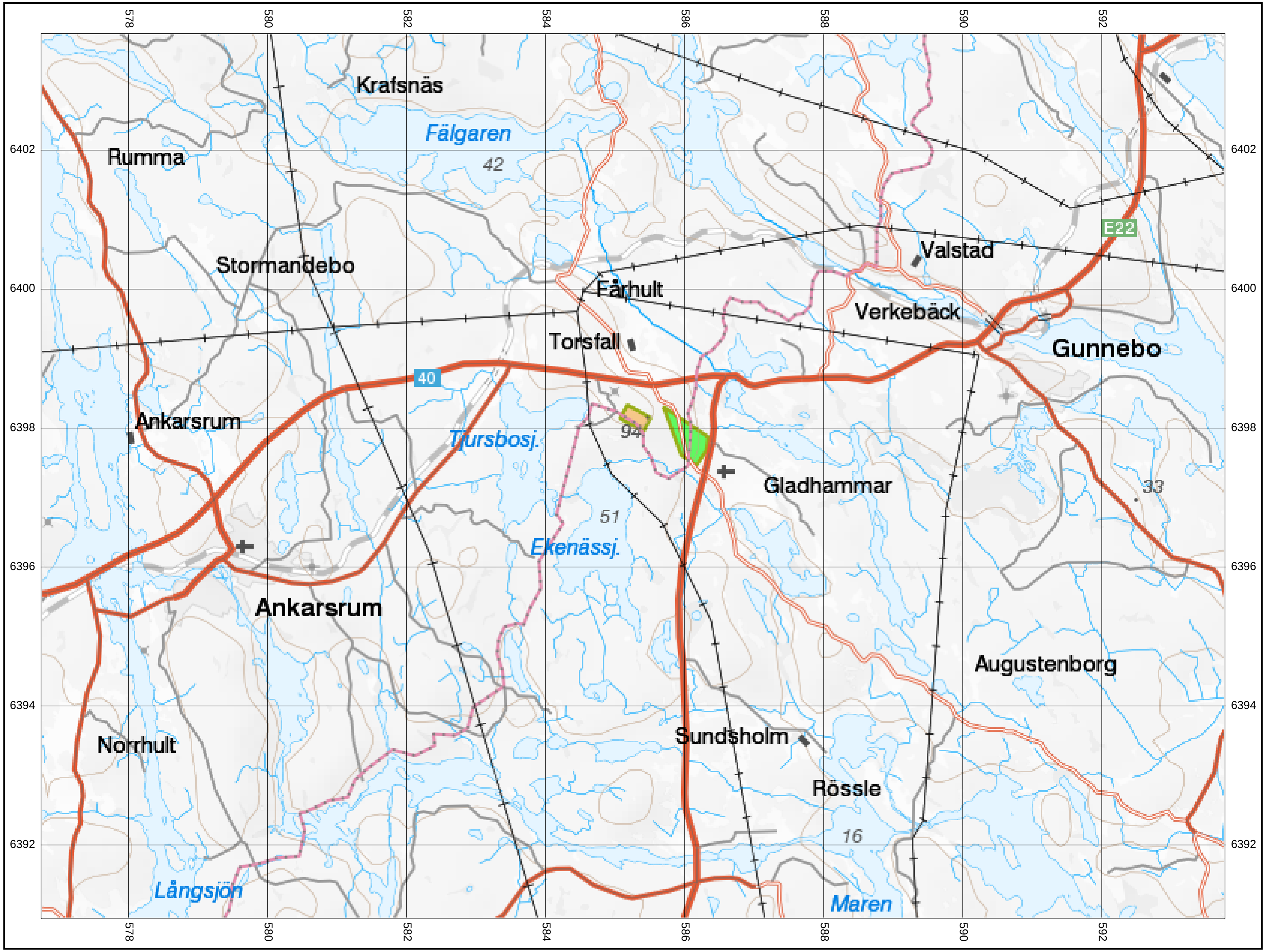
10.3-2. Figure - 1,5 gpT cutoff gold Angle 125 Vertical 0 section - Au_0420_2m

10.4 Appendix E – Borehole map



10.5 Appendix F – Further Appendices

- Gladhammar Region Map – SGU
- Gladhammar Elevation Map – SGU
- Cross Section Profile Index
- Cross Section of Lithology model
- Borehole Deviation Map
- Groundwater Map – SGU
- Sample Borehole Data – Wiking Mineral AB
- Borehole Map from 2009 – Wiking Mineral AB
- Horizontal Projection of A Lens – Wiking Mineral AB
- Vertical Projection of A Lens – Wiking Mineral AB



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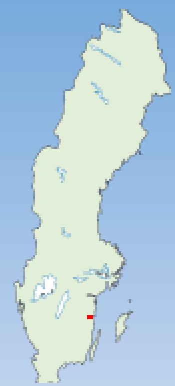

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Skala 1:100000

Topografiskt underlag:
Ur GSD-Vägkartan.

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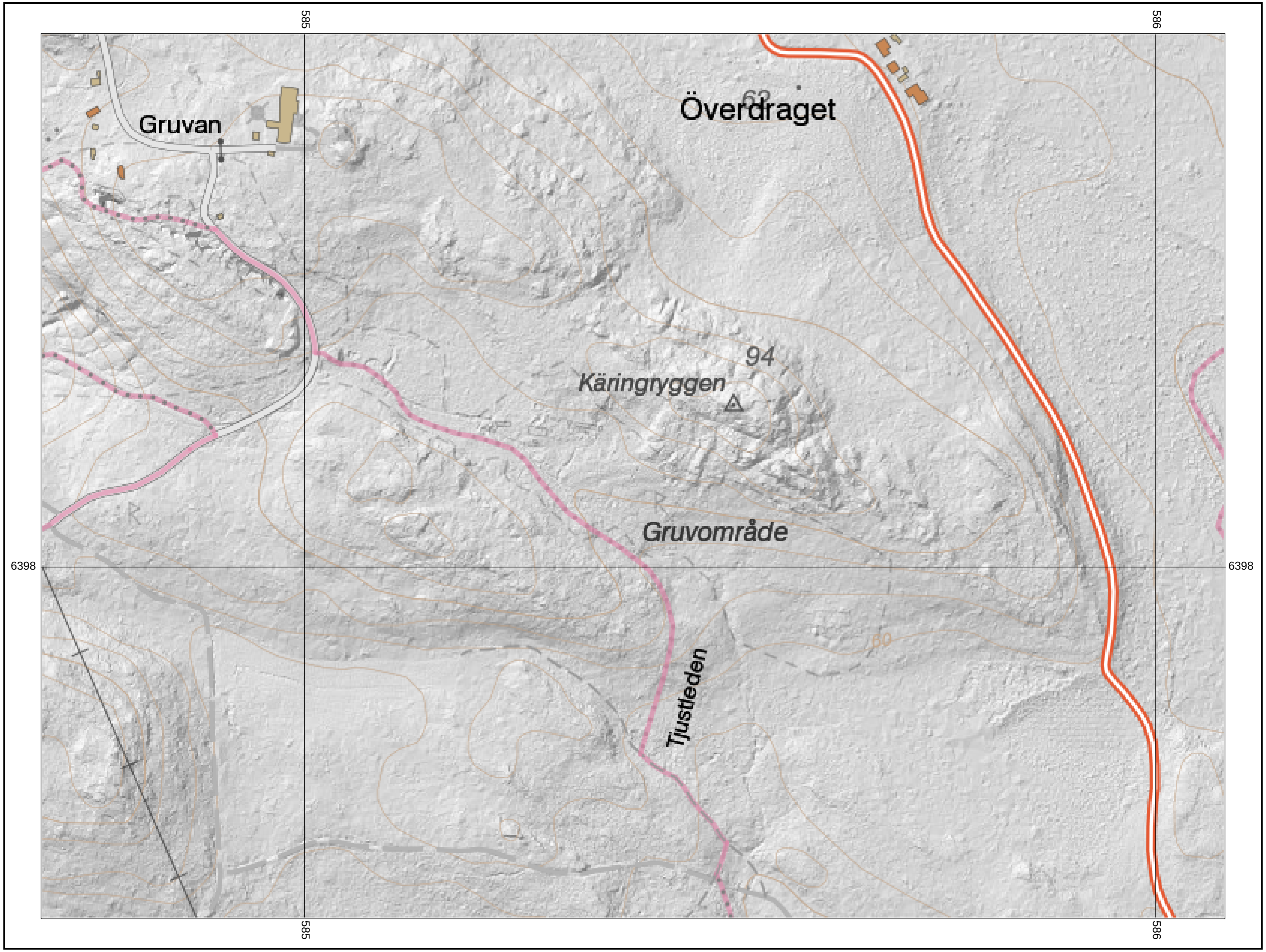

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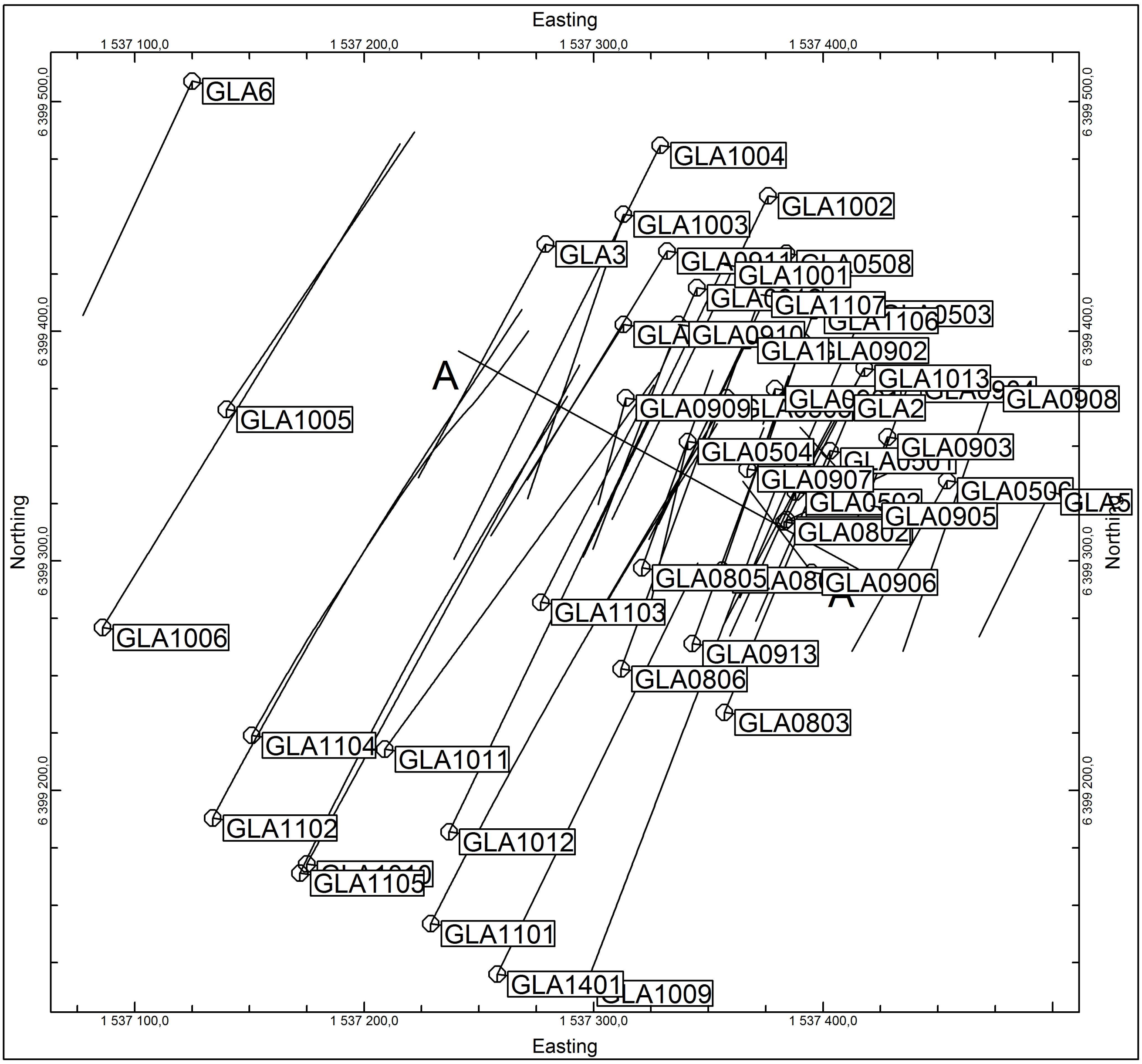
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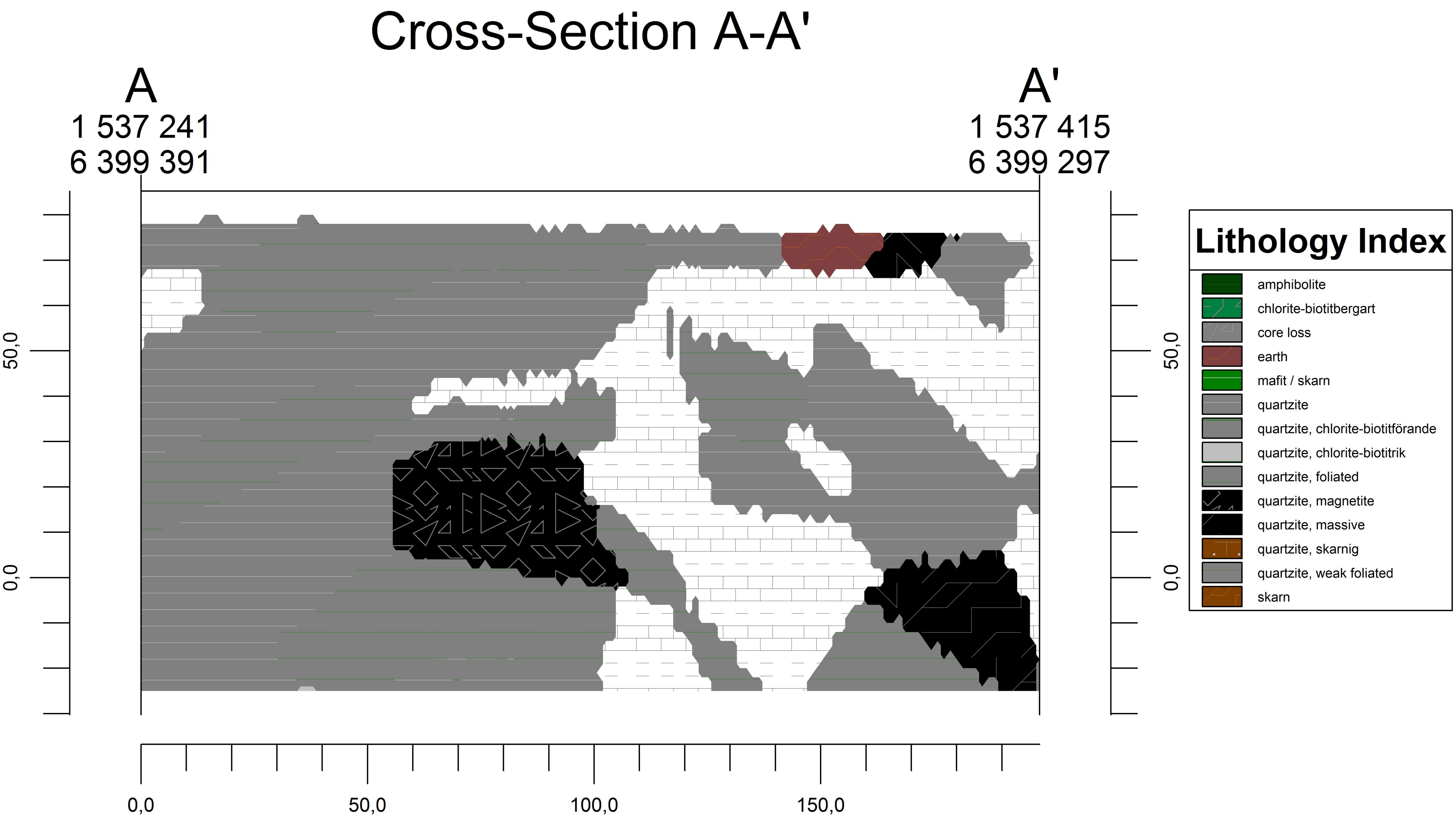
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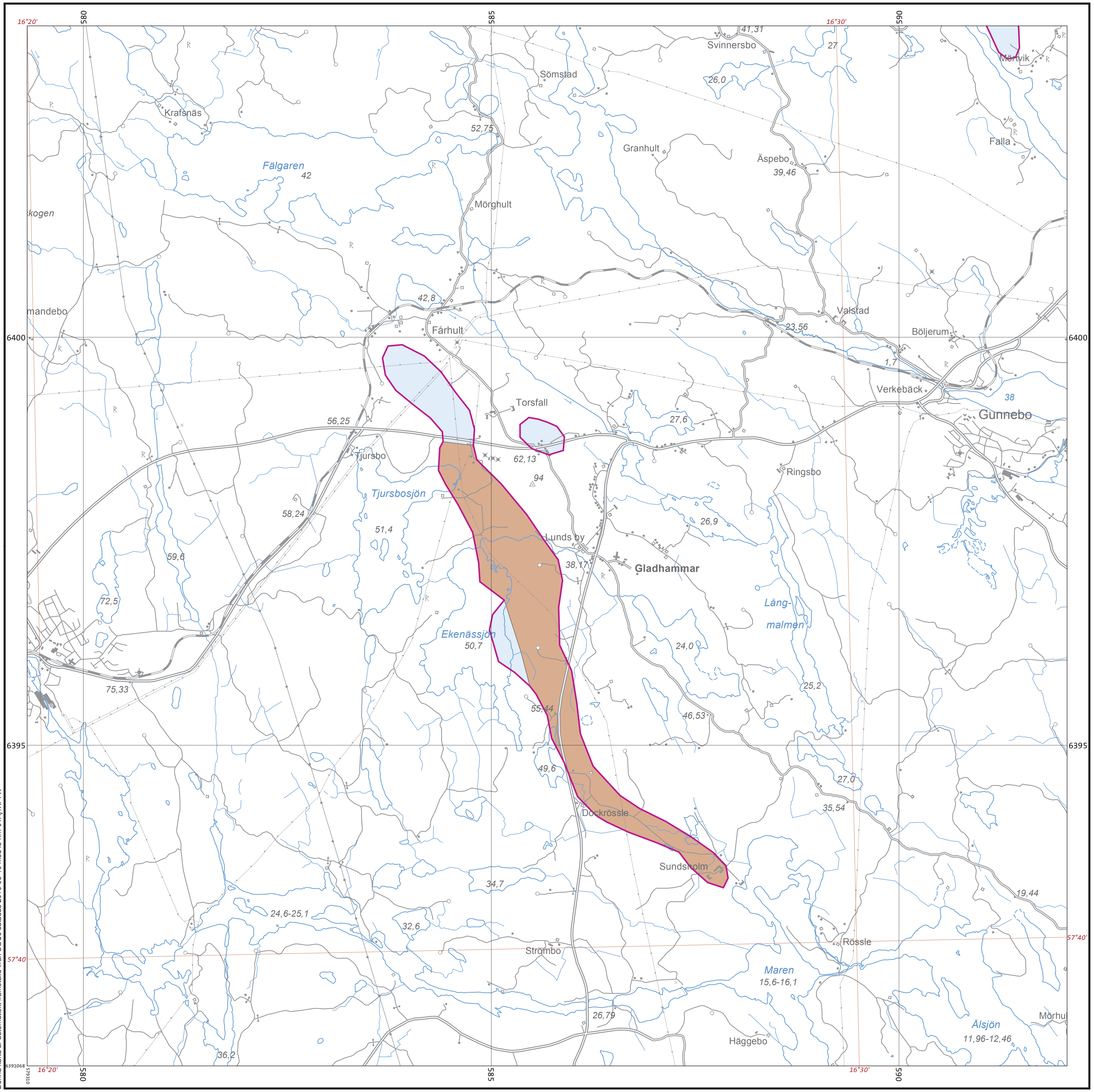

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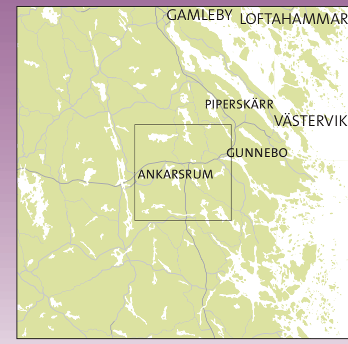
Grundvattenmagasin

J1: Grundvattenmagasin i jordlager

SGU
Sveriges geologiska undersökning



Det kan finnas flera grundvattenmagasin i olika nivåer från markytan sett. Den översta nivån benämns J1eller S1 och den eller de underliggande benämns J2, J3, respektive S2, S3. J står för magasin i jordlager och S står för magasin i sedimentär berggrund.

SGUs data innehåller framför allt information om grundvatten i större magasin längs grusåsar och i sedimentär berggrund. Vid kartläggningen bestäms bl.a. riktningar för grundvattenströmmar, grundvattendelares lägen och grundvattenmagasinets storlek och uttagsmöjligheter.

Vid kartering i detaljerad skala bestäms även tillrinningsområden till magasinet, ytvattenkontakter m.m. Databasen innehåller både översiktlig, regional information (skala 1:250 000) och mer detaljerad, lokal information (skala 1:50 000). Där detaljerad information finns framtagen har den översiktliga informationen ersatts av den detaljerade informationen. Vilka objekt som tillhör vilken karteringstyp syns på sidan "Karteringsmetoder". Den regionala informationen har sitt ursprung i SGUs länskartor som finns publicerade i SGUs serie Ah.

- Fast vattendelare
- Ospec. vattendelare
- Rörlig vattendelare
- Tillrinningsområde per grundvattenmagasin J1
- Grundvattenmagasinets avgränsning J1
- Tätande lager ovanpå magasin J1

Magasinsdelområden, uttagsmöjligheter

- <1 l/s
- 1–5 l/s
- 5–25 l/s
- 25–125 l/s
- >125 l/s
- Okända uttagsmöjligheter

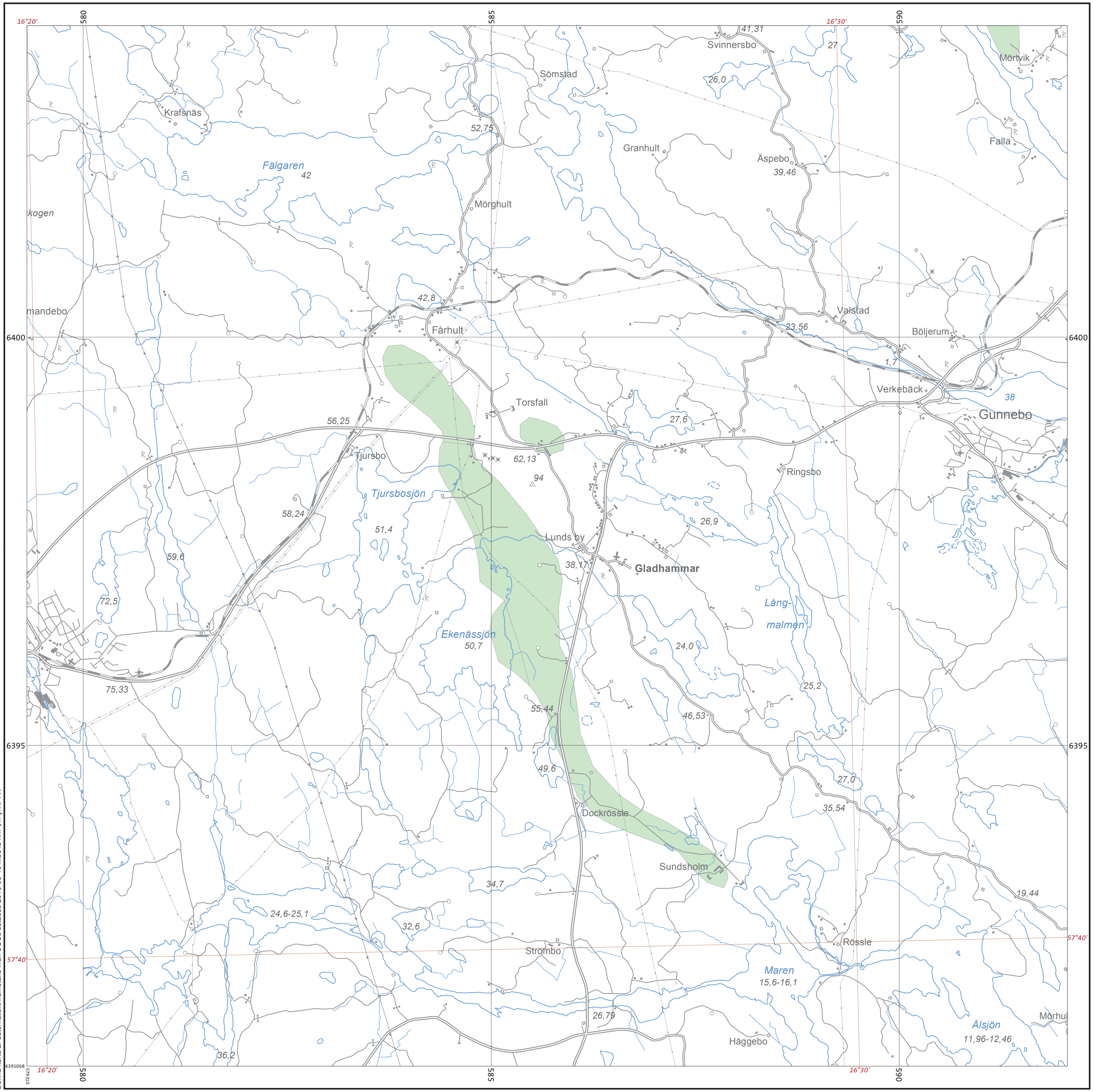
Huvudkontor:
Box 670
751 28 Uppsala
Tel: 018-17 90 00
E-post: kundservice@sgu.se
www.sgu.se

0 1 2 3 4 5 km

Skala 1:50 000

Topografiskt underlag: Ur GSD-Terrängkartan
©Lantmäteriet

Rutnät i svart anger koordinater i SWEREF 99 TM.
Gradnät i brunt anger latitud och longitud i referenssystemet SWEREF99.



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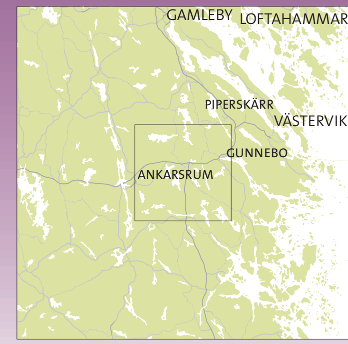
Rutnät i svart anger koordinater i SWEREF 99 TM.
Gradnät i brunt anger latitud och longitud
i referenssystemet SWEREF99.

Grundvattenmagasin

Täckningsområde med
information om karttyp



SGU
Sveriges geologiska undersökning

Det kan finnas flera grundvattenmagasin i olika nivåer från markytan sett. Den översta nivån benämns J1eller S1 och den eller de underliggande benämns J2, J3, respektive S2, S3. J står för magasin i jordlager och S står för magasin i sedimentär berggrund.

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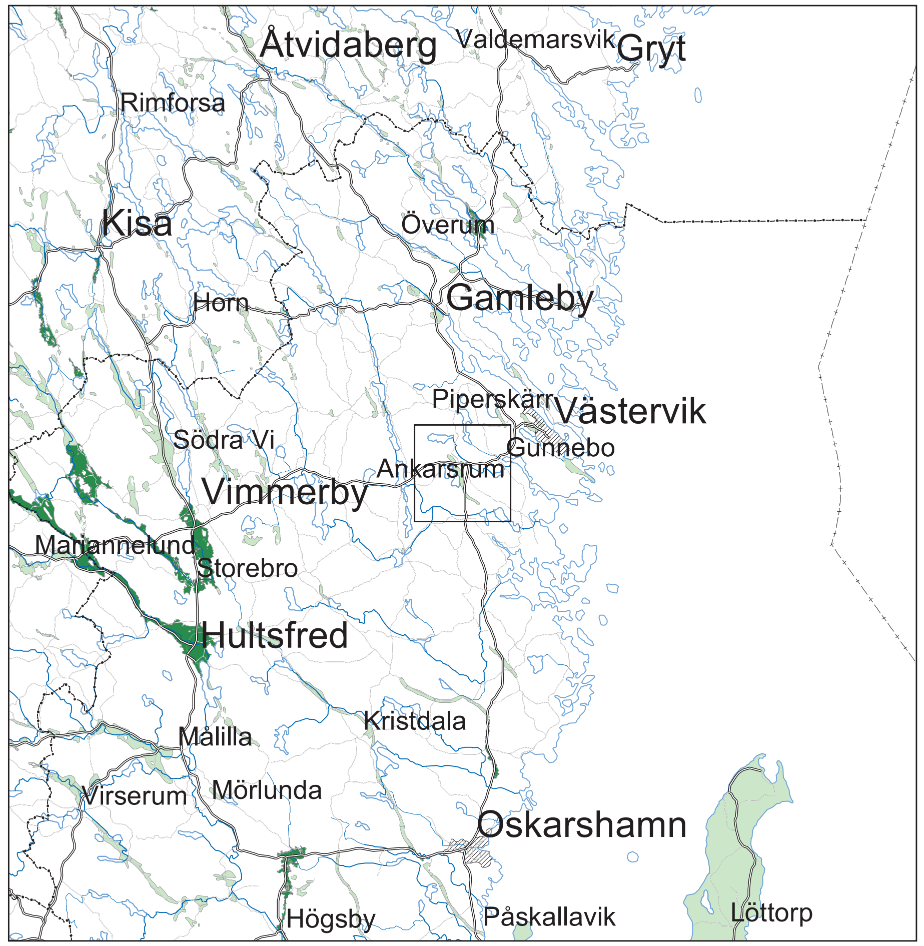
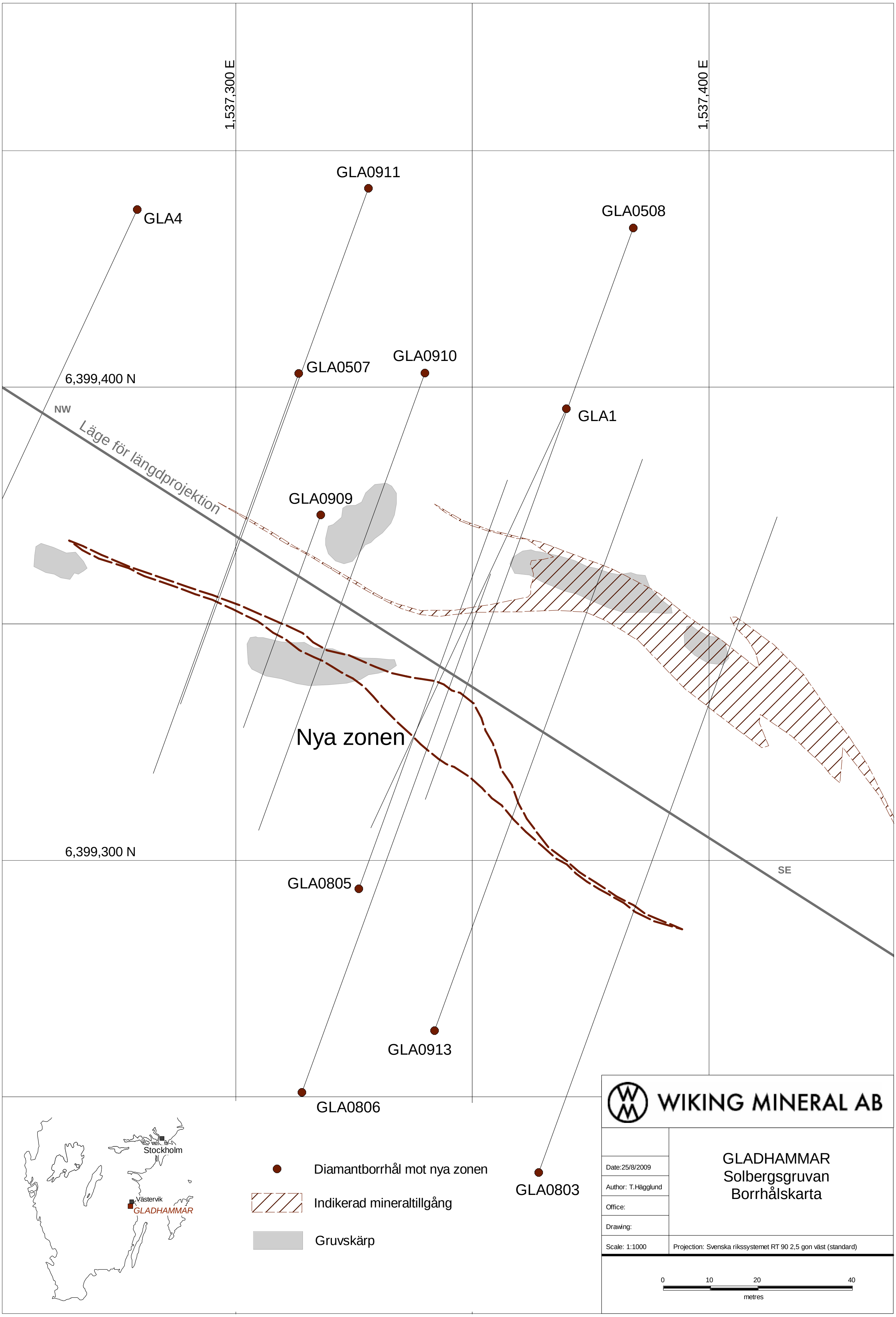


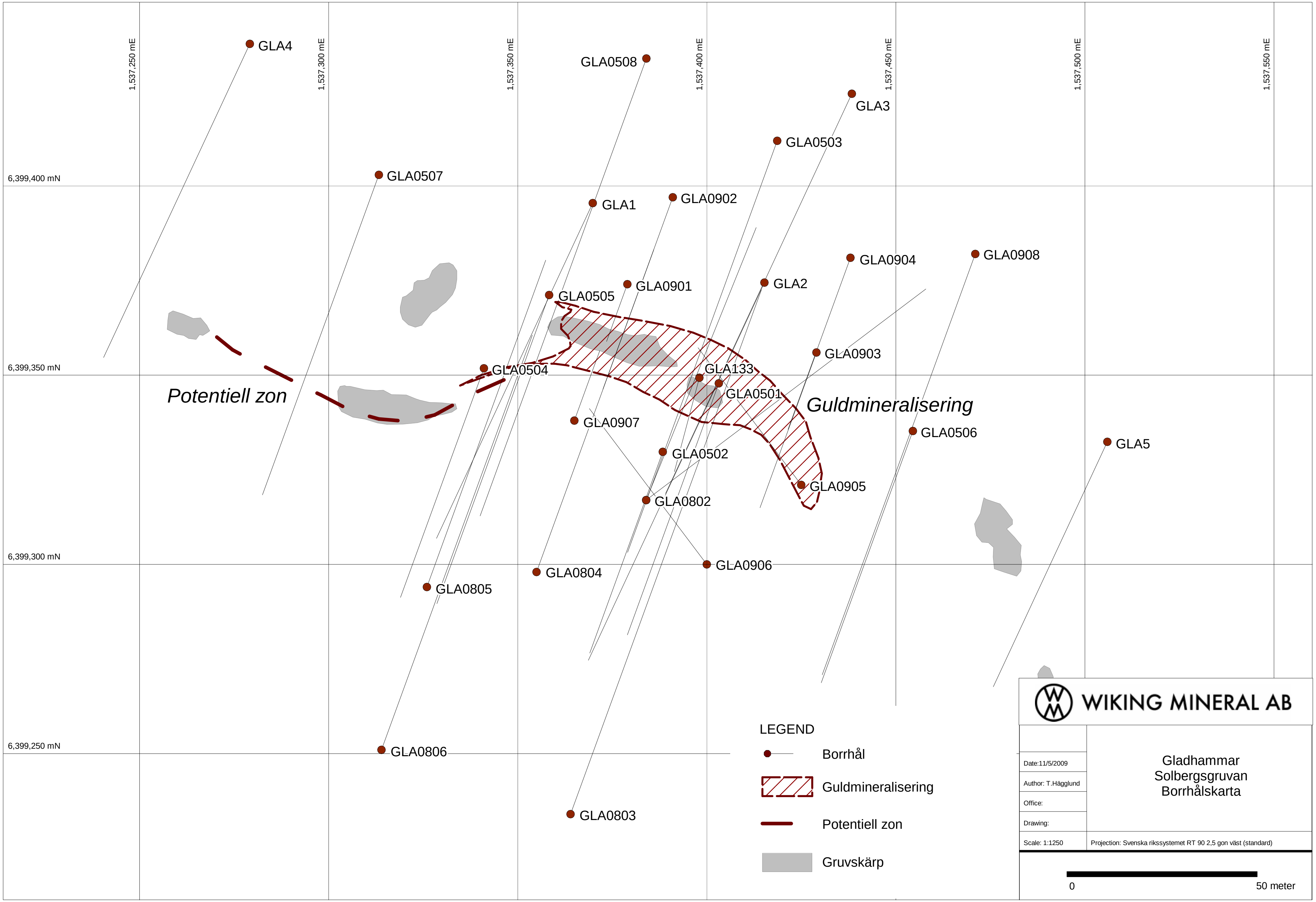
- Lokal metod, skala 1:50 000
- Regional metod, skala 1:250 000 (Länskarta), uppdaterad
- Regional metod, skala 1:250 000 (Länskarta)

Diamantborrhål, Gladhammar **2009-05-18**

Borrhål	**Koordinatsystem RT90** NORD	ÖST	**Riktning**	**Lutning**	**Från** (m)	**Till** (m)	**Intervall** (m)	**Au** g/t	**Ag** g/t	**Bi** %	**Cu** %
Guldfyndigheten											
GLA1	6399395	1537370	205	50	37,00	39,40	2,40	1,20	5	*	0,44
GLA2	6399374	1537415	205	50	31,10	48,80	17,70	10,76	17	0,08	0,13
GLA0501	6399348	1537403	200	50	1,90	16,30	14,40	2,01	8	0,04	0,35
GLA0801	6399317	1537384	22	52	45,55	79,80	34,25	1,93	7	0,03	0,35
GLA0901	6399374	1537379	200	45	16,50	22,74	6,24	0,88	10	0,06	0,46
GLA0902	6399397	1537391	200	50	53,00	63,00	10,00	18,31	50	0,11	0,12
Inkl.					53,00	59,00	6,00	29,00	83	0,16	0,16
Inkl.					55,00	57,00	2,00	63,50	152	0,26	0,20
GLA0903	6399356	1537429	200	40	22,00	31,50	9,50	6,70	13	0,05	0,23
GLA0905	6399321	1537425	323	50	34,52	51,00	20,48	11,81	22	0,02	0,08
Inkl.					33,25	25,10	1,85	60,80	91	0,09	0,15
GLA0907					18,70	25,60	6,90	1,44	3	0,02	0,06
Potentiell zon											
GLA1	6399395	1537370	205	50	101,00	1012,20	11,20	5,00	2	0,20	0,12
GLA0507	6399403	1537313	200	50	77,00	78,00	1,00	1,41	3	0,03	0,32
GLA0806	6399251	1537314	20	50	114,10	129,00	14,90	0,36	5	0,14	0,53

* analys saknas


1,537,300 E
1,537,400 E
6,399,400 N
6,399,300 N
GLA0911
GLA4
GLA0508
GLA0507
GLA0910
GLA1
NW
Läge för längdprojektion
GLA0909
Nya zonen
SE
GLA0805
GLA0913
GLA0806
GLA0803
Stockholm
Västervik
GLADHAMMAR
Diamantborrhål mot nya zonen
Indikerad mineraltillgång
Gruvskärp
WIKING MINERAL AB
GLADHAMMAR
Solbergsgruvan
Borrhålskarta
Date:25/8/2009
Author: T.Hägglund
Office:
Drawing:
Scale: 1:1000
Projection: Svenska rikssystemet RT 90 2,5 gon väst (standard)
0
10
20
40
metres



1,537,250 mE
1,537,300 mE
1,537,350 mE
1,537,400 mE
1,537,450 mE
1,537,500 mE
1,537,550 mE
6,399,400 mN
6,399,350 mN
6,399,300 mN
6,399,250 mN
GLA4
GLA0508
GLA3
GLA0503
GLA0507
GLA1
GLA0902
GLA0904
GLA0908
GLA2
GLA0901
GLA0505
GLA0903
GLA0504
GLA133
GLA0501
Potentiell zon
Guldmineralisering
GLA0907
GLA0506
GLA5
GLA0502
GLA0905
GLA0802
GLA0906
GLA0804
GLA0805
GLA0806
GLA0803
LEGEND
Borrhål
Guldmineralisering
Potentiell zon
Gruvskärp
WIKING MINERAL AB
Date:11/5/2009
Author: T.Hägglund
Office:
Drawing:
Scale: 1:1250
Gladhammar
Solbergsgruvan
Borrhålskarta
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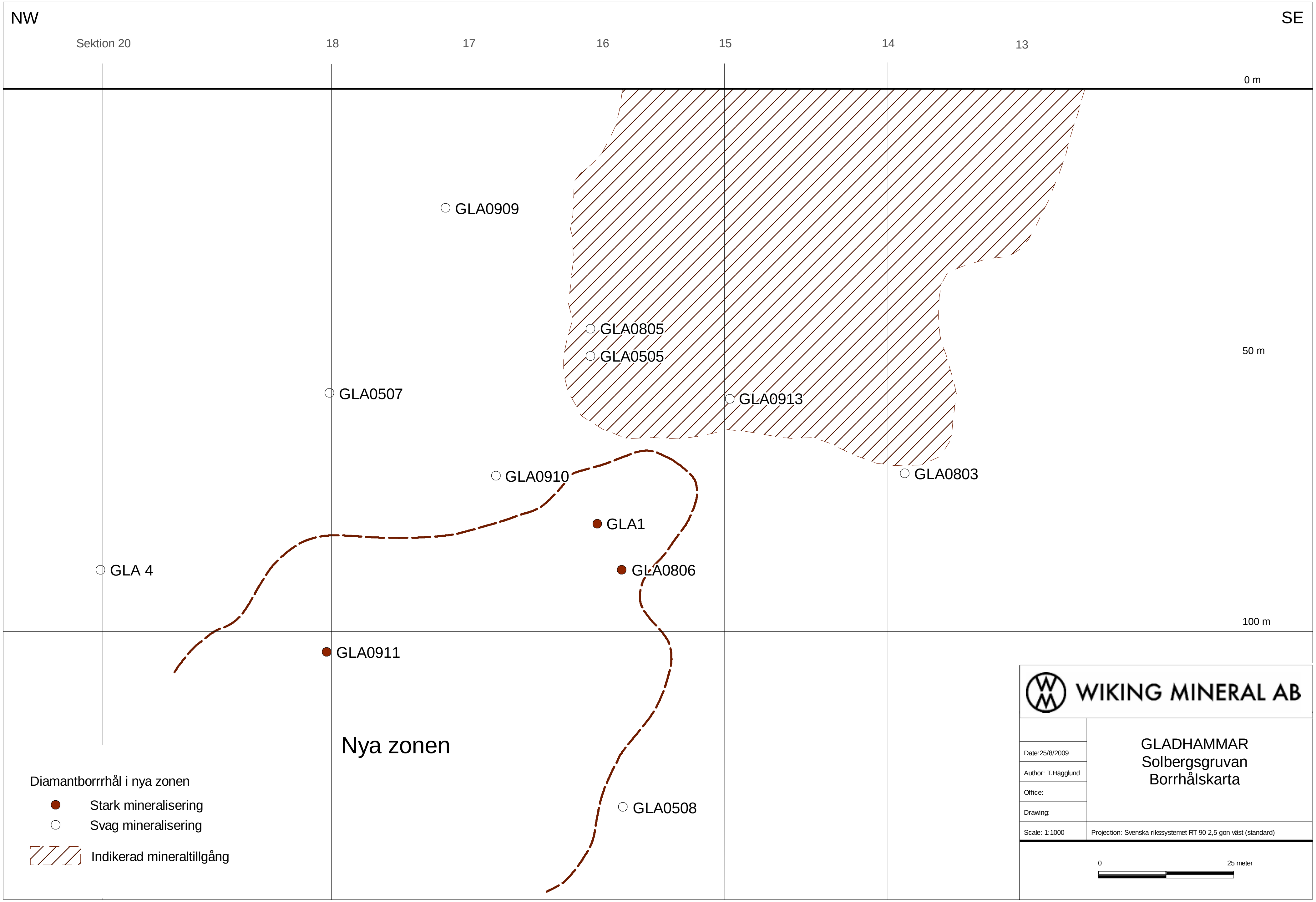
0
50 meter


NW
SE
Sektion 20
18
17
16
15
14
13
0 m
50 m
100 m
GLA0909
GLA0805
GLA0505
GLA0507
GLA0913
GLA0910
GLA0803
GLA1
GLA 4
GLA0806
GLA0911
Nya zonen
GLA0508
Diamantborrrhål i nya zonen
Stark mineralisering
Svag mineralisering
Indikerad mineraltillgång
WIKING MINERAL AB
GLADHAMMAR
Solbergsgruvan
Borrhålskarta
Date:25/8/2009
Author: T.Hägglund
Office:
Drawing:
Scale: 1:1000
Projection: Svenska rikssystemet RT 90 2,5 gon väst (standard)
0
25 meter