Comhairle Chontae na Mí
Roinn Pleanáil,
Mealltna Mainstreach, Bótharna Mainstreach
An Uaimh, Contae na Mí
Fón: 046 – 9097500/Fax:046 – 9097001
R-phost: info@meathcoco.ie Web: www.meath.ie

Meath County Council
Planning Dept.,
Abbey Mall, Abbey Road,
Navan, Co. Meath.
Tel: 046 – 9097500/Fax: 046 – 9097001
E-mail: info@meathcoco.ie Web: www.meath.ie

16 JUN 2011

ENVIRONMENTAL PROTECTION AGENCY
16 JUN 2011

Planning Section
15th June 2011

Environmental Protection Agency
Ardcavan,
Co Wexford

Re: Further Information – Boliden Tara Mines- NA/101054

Dear Sir/Madam,

I refer to your correspondence received in connection with the above and enclose a copy of further information response for the above application.

Please let me have your report on this application by 21/06/2011.

Yours faithfully

PLANNING

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BOLIDEN

Meath County Council
Planning Department
Abbey Mall
Abbey Road
Navan
Co. Meath

May 6th 2011

RE: Planning Reference No. NA/101054
Extension of Mining Operations into new areas in Liscartan and Rathaldron

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The enclosed submission contains responses to items raised by Meath County Council in a further information request to the above mentioned planning application.

Sincerely,

Brendan O'Reilly
Environmental Department
Boliden Tara Mines Limited

06-05-11 10108

Encl.

RECEIVED
PLANNING DEPT.
- 6 MAY 2011
Counter
Reference No.

Boliden Tara Mines Limited
Knockumber, Navan, Co. Meath, Ireland. Tel: +353 (0) 46 908 2000, Fax: +353 (0) 46 908 2581

Directors: J. Moström (Chairman) (Swedish), M. Arnqvist (Managing Director) (Swedish),
T. Farrell, Y. Scannell
Registered in Ireland 33148

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BOLIDEN

Boliden Tara Mines Limited

ENVIRONMENTAL PROTECTION AGENCY
16 JUN 2011

Further Information
Submission to Meath County Council
Planning Application NA/101054

Extension of Mining Operations into the new areas in Liscartan and Rathaldron

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FURTHER INFORMATION

Submitted by:
Boliden Tara Mines Limited
Environmental Department
Knockumber
Navan
Co. Meath

Submitted to:
Meath County Council
Abbey Mall
Abbey Road
Navan
Co. Meath

May 2011

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Item 1 (a)

The applicants are requested to provide details on what surface subsidence and geotechnical monitoring will be undertaken (particularly in respect of areas of poor ground), and to give a clear commitment that all appropriate measures will be deployed to reduce the risk of ground subsidence. Where monitoring points are to be installed on lands not in the ownership of the developer, the necessary consents from landowners should be submitted as well as a map to accompany the consent and illustrating to which precise are of land the consent pertains to.

Response to Item 1(a)

Surface subsidence monitoring has been conducted over the existing mining operations at Tara Mine for many years, and a substantial database of measurements is regularly updated. The precise levelling network is extensive and measurements are taken annually. Networks such as these are commonplace in the mining industry, and are the standard approach to monitoring for surface settlement.

A recommendation of the EIS, Section 5 (dealing with geotechnical aspects) was to extend the subsidence monitoring network to cover the new areas of Rathaldron and Liscartan, and a proposed extension to the network into the new areas has now been developed (refer to Figure 1).

In designing the extended network Tara Mines geotechnical engineers identified the following three key monitoring "targets":

- The area directly above the 2009 ore reserve outline;
- the Kells Road and associated facilities; and
- the Blackwater River.

The proposed network satisfies these objectives.

Given that the existing Tara Mines network is so extensive, and in the interests of survey accuracy, where possible new stations are positioned so as to create closed survey 'loops'. Stations are also located along field boundaries to minimise interference with and the potential for damage from agricultural operations.

The proposed extension to the precise levelling network will provide good coverage over the areas of interest.

Section 5 of the EIS also recommends the use of extensometers to monitor ground behaviour immediately above underground stoping, installed from hangingwall development, particularly in any areas of poorer ground conditions. This is a conventional monitoring response and such instruments are used extensively in the existing Tara Mines operations. In respect of the proposed mining in Rathaldron and Liscartan, drilling densities are presently too wide to specifically identify any poorer ground conditions. This is a normal level of information at any pre-mining stage and the later underground drilling will provide a much greater level of geological information. The available information suggests ground conditions

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associated with stoping will be very similar to those in the very competent Pale Beds in the existing operations, though one would expect some poorer than average conditions may be present close to or within major structures (refer to Section 5 of EIS for a discussion on major structures).

The design and operational philosophy of the mine is to maintain stable excavations at all stages of the mining process, and the use of tight filling (the efficacy of which is enhanced by the stoping geometries) maintains stability on a larger scale as mining progresses (refer to Section 5 of EIS). The stope design process includes progressively tighter-spaced diamond drilling as design moves from conceptual to final stages. This drilling identifies any areas of poorer ground conditions and the mine can then implement various responses such as modifying stope designs, or using grouted cable bolts in the hangingwall for additional support of the rockmass. Currently the drilling densities only support conceptual stope designs – specific monitoring requirements can only be identified with more detailed information, during the final stages of the design process once the positions of all excavations are fixed, and local ground conditions determined.

Figure 1 shows the locations of the Liscartan / Rathaldron proposed levelling network and the lands that are not Tara owned for which the consent letters are attached (lands to the west are owned by Mr Sean Keogan while the lands to the north east are owned by Mr J. Kruger).

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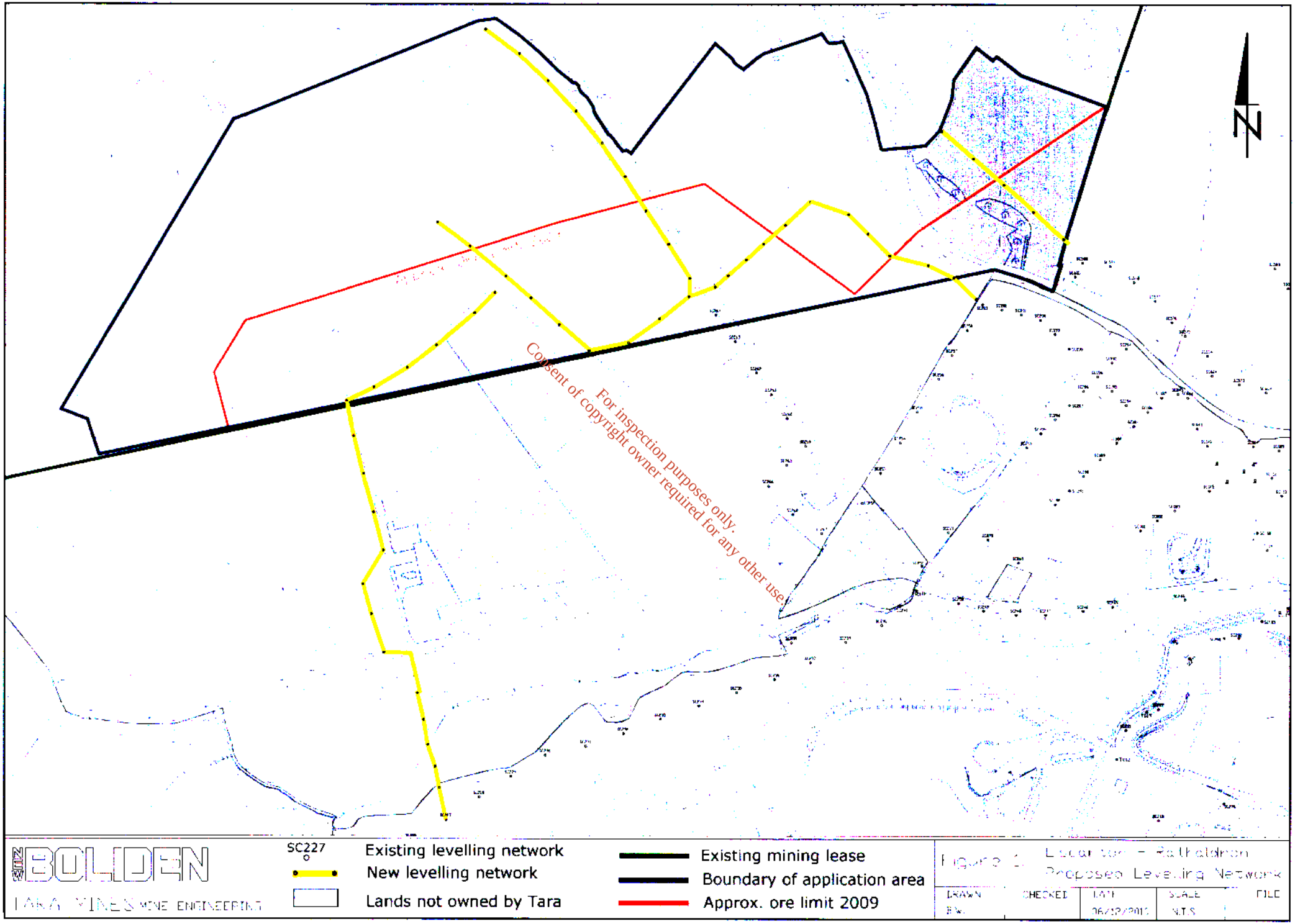

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Mr Sean Keogan,

Liscartan,

Navan,

Co. Meath.

March 31st 2011

Boliden Tara Mines Limited,

Knockumber,

Navan,

Co. Meath.

To Whom it Concerns

I hereby give permission to Boliden Tara Mines Limited to install geo-technical monitoring points on my lands on the understanding that the installations will be left in-situ for the duration of the mining period and removed on completion. I also understand that these monitoring points may be left in-situ post mining for a period of time subject to mutual agreement.

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Yours faithfully

Sean Keogan

Sean Keogan

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Rathaldron Castle
Navan
County Meath
Republic of Ireland

Tel: 046-27433 / 046-23609 / 046-21914 Fax: 046-23804

March 30th 2011

Boliden Tara Mines Limited,
Knockumber,
Navan,
Co. Meath.

To Whom it Concerns

I hereby give permission to Boliden Tara Mines Limited to install geo-technical monitoring points on my lands on the understanding that the installations will be left in-situ for the duration of the mining period and removed on completion. I also understand that these monitoring points may be left in-situ post mining for a period of time subject to mutual agreement.

Yours faithfully

P.P. Joseph Kruger II

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Item 1 (b)

The applicant's should be requested to clarify which methods of mining will he employed within the proposed mine extension.

Response to Item 1(b)

Mining Methods

Section 5 of the EIS describes three mining methods which Tara Mines proposed would be used in the Rathaldron and Liscartan areas, depending upon ore thickness – longhole stoping with backfill, drift and fill, and room and pillar. It is likely that the majority of the thinner areas of ore will be mined using drift and fill methods. Bench (longhole) stoping with fill will remain the principle method for thicker ore.

Figures 2 and 3 illustrate examples of how these methods will be applied in areas of different ore thicknesses. The examples are from the Rathaldron area, but the same would apply to Liscartan.

Figure 2 shows combinations of longhole bench and drift-and-fill stopes, and the primary-secondary sequencing to be adopted. The division between Nevinstown and Rathaldron is also shown, and illustrates how mining is a natural progression into the new areas. Note the depth below surface of approximately 180m. The location of the hangingwall drift (with backfill holes) is also shown.

Figure 3 is a long-section which illustrates the naturally inclined stope hangingwalls which are very beneficial for the positioning of backfill holes and hence tight filling of the bench stopes. Drift-and-fill stopes will be mined to follow the natural inclination of the ore and consequently will also be ideal for maximising tight filling.

As noted above, the proportions and distributions of the different mining methods can only be finalised once closer-spaced underground drilling has been completed, as the level of detail progressively increases during the mine planning and design process.

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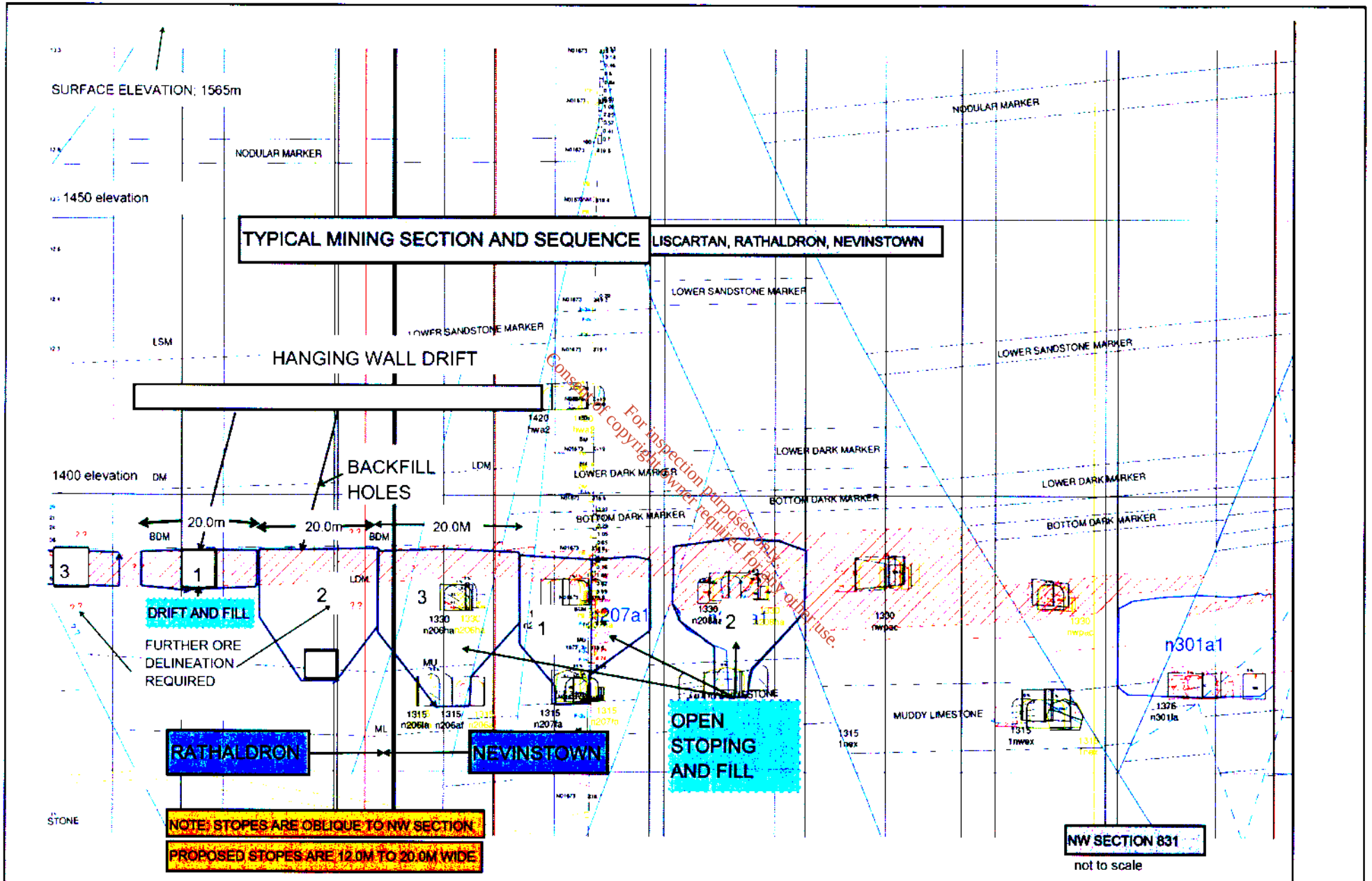

BOLIDEN

TARA MINES MINE ENGINEERING

Figure 2 **Liscarton - Rathaldron Proposed Mining Method**

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P. McC.		08/12/2010	N.T.S	

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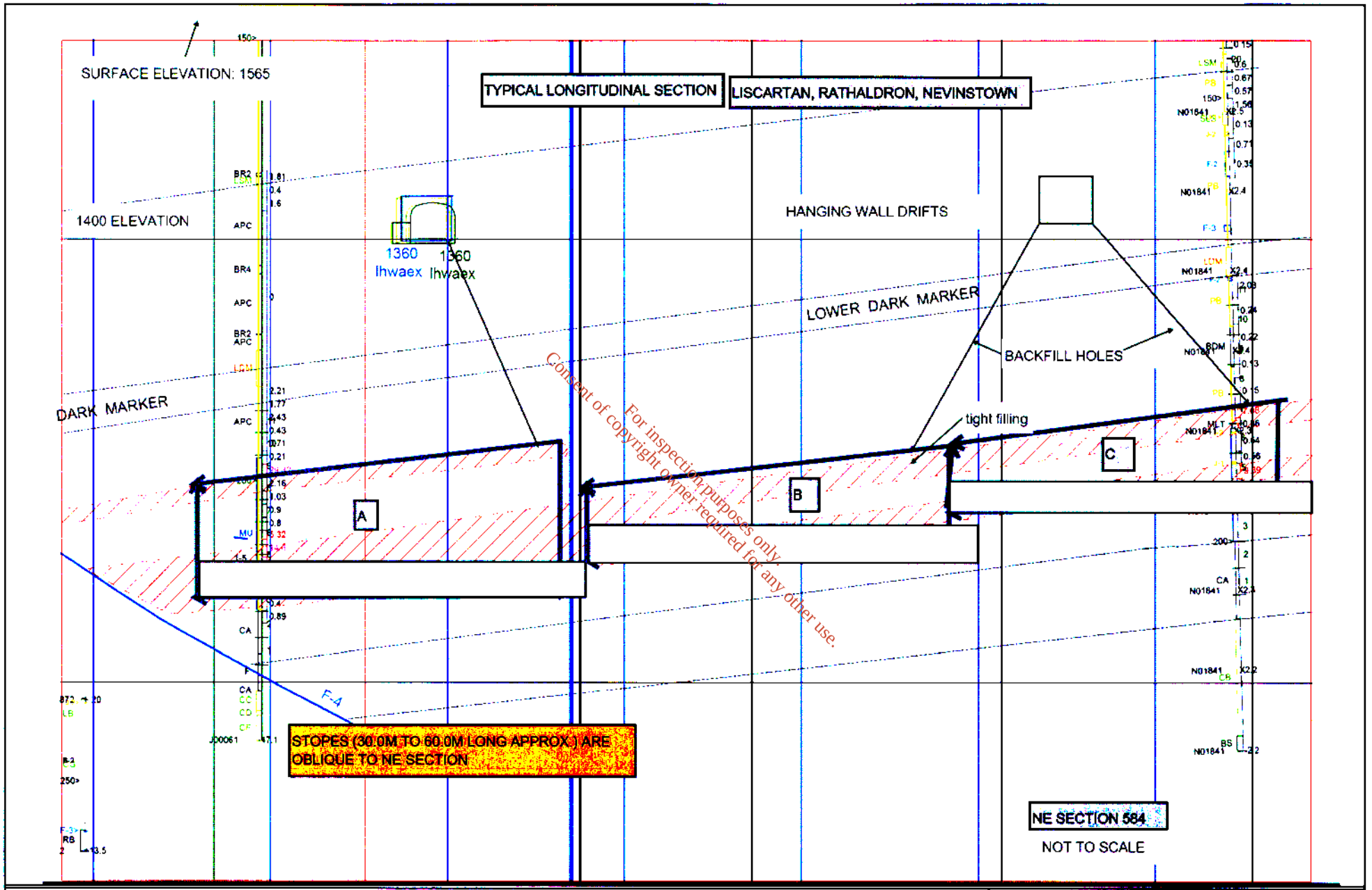

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TARA MINES MINE ENGINEERING

Figure 3 **Liscarton - Rathaldron Proposed Mining Method**

DRAWN	CHECKED	DATE	SCALE	FILE
P. McC.		08/12/2010	N.T.S	

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Item 1 (c)

The applicants are requested to demonstrate that its water monitoring wells have sufficient distribution and that these include the Liscartan/Rathaldron area. If not, then additional monitoring wells may be required to be put in place.

Response to Item 1 (c)

The objectives of groundwater monitoring plan for the Liscartan/Rathaldron application area are as follows:

- To reduce the risk of high short term groundwater inflows and pressures in development headings and at the mining horizon.
- To confirm that leakage from the river will be minimal, similar to the last 20 years of mining. To minimise the risk of high short term inflows of alluvial groundwater, close to the river.
- To confirm the district drawdown will be similar to currently observed conditions.
- To confirm there will be minimal overall change to the groundwater balance of the alluvium.
- To monitor for the presence of fracture zones and cavity areas and minimise the risk of these to influence mining or surface conditions.

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The current data set and working knowledge has provided adequate information to characterise the overall groundwater conditions in the area of the Liscartan and Rathaldron extensions. However, there are a number of potential risk areas that have been identified. A monitoring programme has been specified to deal with current operations and to allow for mitigation of future mining and environmental risks.

Currently there is a thorough monitoring and reporting plan for characterising inflows to the underground workings. This has provided excellent data to assess groundwater conditions at Tara. This programme will continue, with the addition of the Liscartan and Rathaldron mining areas.

Flows and pressures will be monitored in geology holes drilled from underground. Routine monitoring will be carried out in all holes that remain open and flowing. As appropriate, selected holes will be completed with valved collars to allow the measurement of shut-in pressure.

The current monitoring plan for the Liscartan/Rathaldron extension includes monthly water level monitoring of surface holes (or more frequently where deemed necessary). There are currently nine existing surface observation points. Monitoring of these and the Nevinstown observation holes will be continued. Once production mining has commenced in the Liscartan/Rathaldron area, additional surface holes will be required. The currently-planned general locations for the new holes are as follows:

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- A new dual-level bedrock observation well close to the River Blackwater. The shallow completion will be installed into the Waulsortian. The deep completion will be installed into the Pale Beds.

- A new dual-level alluvial observation well drilled from the same platform as the dual bedrock observation well. The shallow alluvial completion will be installed at about 4m below river level and the deep alluvial completion will be installed at the base of alluvium.

- A second new dual-level alluvial piezometer set located close to river. Again, the shallow alluvial completion will be installed at about 4 m below river level, with the deep alluvial completion installed at the base of alluvium.

- Two new Pale Beds observation holes drilled into Castle-Liscartan Fault Complex; one in northwest sector of the Liscartan extension, and one in the southwest sector.

- One new Pale Beds observation hole drilled immediately to the east of the Randalstown Fault (immediately to the west of the planned western extent of the planned Liscartan mining area).

The exact location of these new holes will be determined once the detailed mining sequence has been finalized. At that time, a detailed map will be provided to MCC.

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Item 1 (d)

The applicant is requested to verify and demonstrate that the Randalstown Fault is a sealing fault and that appropriately placed monitoring wells are, or will be, installed.

Response to Item 1(d)

Currently, it is not anticipated that mining of the Liscartan/Rathaldron extension will cross any major bounding structures that are not already dewatered on their footwall side. The Randalstown Fault zone cuts the base of the Pale Beds about 75m to the west of the Liscartan/Rathaldron application area and strikes in a NNE direction. The fault zones do not intersect the orebody, so it is expected that the fault will not be intersected during mining of the extension.

The throw on the Randalstown Fault zone is about 200 m or more, and the fault is inferred to have a strike-slip component. It is not known whether the fault carries significant groundwater, but holes drilled in the NW part of the extension area suggest that it is probably a tight shear zone, rather than an open transmissive fault zone. A considerable amount of drawdown is already observed on west side of Castle-Liscartan Fault Complex. Additional drawdown is likely to occur locally to the west of Castle-Liscartan Fault Complex (to the east of the Randalstown Fault Zone).

The potential for additional drawdown to the west of the Randalstown Fault Zone is considered to be low. This will be confirmed by the planned new Pale Beds observation hole immediately to the east of the fault zone (immediately to the west of the planned western extent of the planned Liscartan mining area). If additional drawdown on west side of Randalstown Fault were to occur, it is expected that the incremental increase from current conditions would be marginal.

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Item 1 (e)

The applicants are requested to provide additional information on the area of the River Blackwater relevant to the hydrology which demonstrates the hydro logical similarity of conditions to the south, given that the overburden is thinner in the area under the current application site than it was in the area to the south.

Response to Item 1(e)

Mining at Tara has been carried out close to, or beneath, the River Blackwater for over 20 years. Virtually all stope blocks located in the vicinity of the river are mined with no significant leakage of water from the river, or from the shallow alluvial water table of the floodplain. Extensive monitoring of the Nevinstown and Main Mine inflows and water chemistry over the past 5-6 years has confirmed that most of the water entering the Main Mine and Nevinstown workings is the result of district-scale groundwater flow within the Pale Beds. As inflows have been encountered due to opening up of the Nevinstown workings, there has been a general decrease in the magnitude of inflows down-dip in the Main Mine. A similar situation is expected for the Liscartan/Rathaldron extension.

A large amount of drawdown is currently observed in all holes monitored in the Liscartan/Rathaldron application area. The area has become dewatered as a result of inflows to the Main Mine and Nevinstown. Current water level monitoring data indicate that drawdown in the Pale Beds unit in the vicinity of the River Blackwater at Rathaldron is of the order of 30 m (refer to Figure 4). Therefore, there is already a significant vadose zone thickness developed beneath the area of the river and the floodplain. As a result, when incremental drawdown occurs within the Pale Beds due to mining the Liscartan and Rathaldron application areas, the downward leakage from the alluvium is not expected to increase. As the bedrock water level is already below the base of the alluvium, the generally thinner nature of the alluvium in the new mining areas is not expected to be of concern.

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Given the current dataset, there is no indication that conditions beneath the river will be any different in the Liscartan/Rathaldron extension to those in Nevinstown or the Main Mine. This will be confirmed by the planned new monitoring holes described in 1(c). The main potential for increased future inflows is likely to be associated with differential movement across structural zones underlying the flood plain, as discussed in 1(a).

However, Tara Mines appreciates that mining below or adjacent to any surface water body needs to be carried out with great care. As mining is extended into the new areas, the data from new and existing monitoring holes will be carefully evaluated, and the need for further study will be determined. The inflow chemistry will be carefully monitored to detect any chemical signatures similar to river water or shallow alluvial groundwater.

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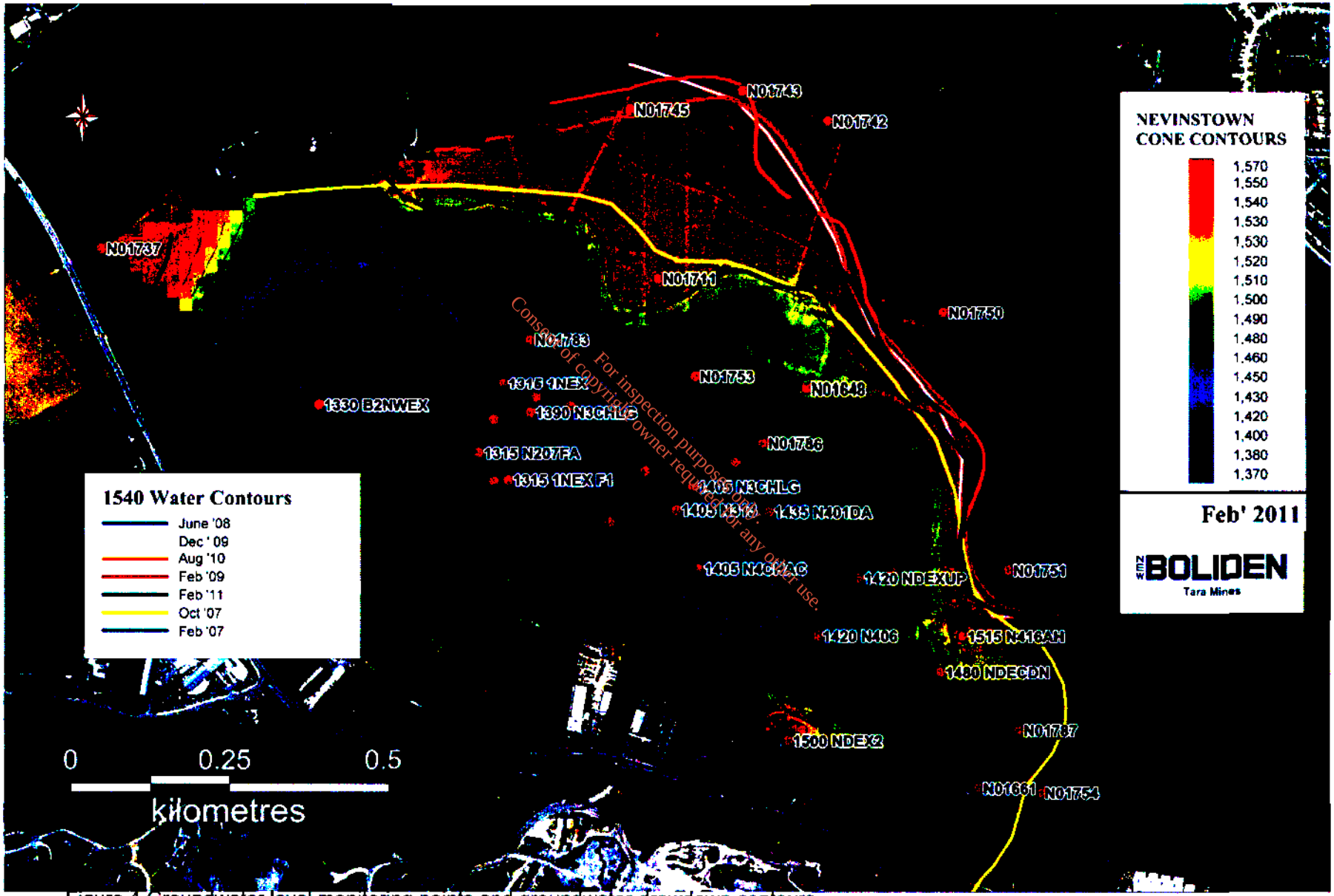

Figure 4 Groundwater level monitoring points and groundwater drawdown contours

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Item 1 (f)

The applicants are requested to provide clarification as to whether any water supplies, and in particular, domestic water supplies, will be affected by mining in the area under application. If water supplies will be affected by the proposed development, appropriate mitigation measures should be submitted in order to address same.

The applicants are requested to liaise with the Department of Communications, Energy and Natural Resources with regard to the matters raised above.

Response to Item 1(f)

The only deep water supply borehole in the area affected by the Liscartan/Rathaldron extension is the Rathaldron Castle well. This well has already been somewhat impacted by mining at Nevinstown and the Main Mine. As a result, Tara Mines has already substituted the borehole water supply system with mains water. Should any domestic shallow groundwater supply be impacted by mining of the extension, a study will be carried out, and the dwelling(s) will be provided with mains water, similar to the procedures already implemented for dwellings above the SWEX orebody. As per our planning permit any domestic / private well adversely affected will have mitigation put in place including making available an alternative water supply with the full cost of such measures borne by Tara.

The proposed development will not result in any disturbance to the surface of the site, and operations will take place far below the zone of biological interaction with the surface. It is therefore concluded that there will be no significant impacts on the ecological interests of the application area (refer to Section 9.4.2 of EIS).

Tara has liaised with Eileen Doyle and Brian Breslin of the Department of Communications, Energy and Natural Resources with regard to the matters raised above.

Subsequent to this the following significant statement should be noted:

> In the EIS (Section 5 and Section 7) recommendations have been made by consultants AMC and WMG. Where these recommendations have been made Boliden Tara Mines Limited (Tara) **will carry out** the said recommendations.

For example
on page 41 of the EIS it states "AMC recommends Tara geotechnical staff undertake further assessment of rock conditions...", and, "AMC expects that some stress analysis studies should be undertaken..."

This statement now becomes;
"Tara's geotechnical staff **will undertake** further assessment of rock conditions using rockmass classification techniques (e.g. Barton et a, 1974), and plot actual stoping spans on established design charts to compare mining conditions against these empirical guidelines."

and

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"Stress analysis studies **will be undertaken** to examine open stope sequencing and pillar stability at a more detailed stage of the design process."

Also

"In the Non-Technical Summary page ten (x) it is stated that "As mining is extended beneath the River Blackwater, the inflow chemistry should be monitored to detect any chemical signatures similar to river water or shallow alluvial groundwater."

This statement now becomes;
"As mining is extended beneath the River Blackwater, the inflow chemistry will be monitored to detect any chemical signatures similar to river water or shallow alluvial groundwater."

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Item 2 (a)

The applicants are requested to confirm if there will be additional water demand from the public water supply generated by the proposed development. If there will be additional water demand, the applicants shall quantify and identify where the additional water will be used.

Response to Item 2(a)

There will be no additional processing facilities or surface infrastructure required and accordingly there is no additional water demand from the public water supply anticipated.

Item 2 (b)

The applicants are requested to confirm if there are proposals to extend their on-site watermains networks. If there are proposals to extend their on-site watermains networks, the applicants should submit full details of the extent and materials proposed.

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Response to Item 2(b)

There are no proposals to extend its on-site water mains networks at the present time however, as an ameliorative measure to conserve potable water the existing 37year old potable water network has been replaced with a new network. The project was completed in March 2011 (refer to response to Item 2(c)).

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Item 2 (c)

As per Meath County Council Water Bye-Laws 2007 Part 3 Water Conservation, the applicants are requested to submit a comprehensive Water Management and Conservation Plan with the planning application, for the entire development site. The Plan should identify and quantify all water uses. The plan should identify all existing metering arrangements in place and proposed metering arrangements. The plan should identify monitoring arrangements in place to identify high usage areas and potential leakage. The plan should identify and detail all existing and proposed water recycling arrangements. The plan should identify and detail any proposed upgrading/rehabilitation of existing distribution watermains and water supply pipes within the development site.

The plan should set out details of how best practice in water conservation would be applied in respect of the entire development site to include water mains and internal plumbing and how water usage, leaks or excessive consumption may be identified and remedied.

The applicants should demonstrate and quantify how the measures outlined in the said Water Management and Conservation Plan will reduce the potable water demand of the development site.

The applicants are requested to liaise with Mr. Pat Kinsella, Senior Executive Engineer Environment (Water Services Section) Department of Meath County Council in relation to the matters outlined above.

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Response to Item 2(c)

Water Management and Conservation Plan

The existing 37 year old mine site potable water network of cast iron pipeline was tested and shown to contain a number of leakages. Lengths of the pipeline were exposed and repaired, however because the exposed pipe work showed heavy pitting it was decided to replace the entire network with a high density polyethylene pipeline. The installation of the new pipeline with online metering was completed by end of March 2011. The main potable water usage sources and location of metering on site are as shown in Figure 5 and are primarily domestic usage. The highest usage of potable water onsite (almost 70%) results from shower usage and machine washing of coveralls.

There is a high level of water usage in the processing of ore; however process water and water for our drilling operations is entirely sourced from water drawdown in the mining operation, rainfall collection in the tailing storage facility (TSF) and surface area of the mine site. The process /drilling water is recycled in the mine and TSF water management system where it is recycled and reused a number of times. Excess water in this system is discharge to the River Boyne under our IPPC License.

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The following ameliorative measures are being put (or are) in place within the new pipeline network:

- Installation of flow meters on the water intake to the site with flow meters on the main distribution points on site.
- Computer based with online flow metering.
- Installation of push button flow controls on shower units and taps.
- Installation of centralised temperature control stats system for all hot water usage on site.

With the aforementioned ameliorative measures it is estimated that the quantity of potable water usage will be reduced from a historical daily average usage of 440 m^3 /day to around 215 m^3 /day, a reduction of approximately 50%.

Tara has liaised with Mr. Pat Kinsella, Senior Executive Engineer Environment (Water Services Section) Department of Meath County Council in relation to the matters outlined above.

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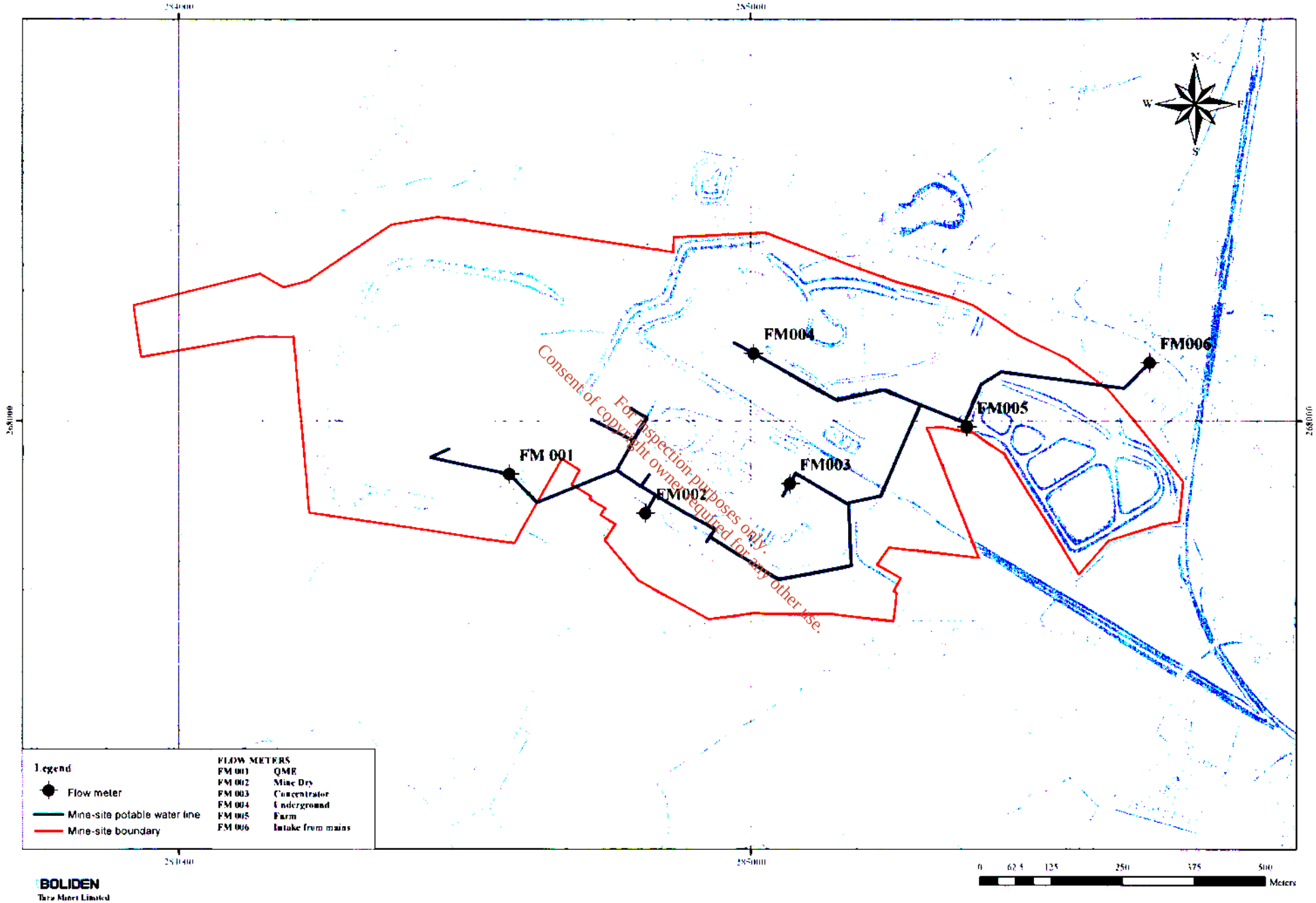

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Figure 5 **Mine-site potable water line**

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Item 3

The applicants are requested to submit a detailed summary or the current/proposed usage of public roads by Tara Mines

The applicants are requested to liaise with Mr Jim Gibney, Senior Executive Engineer Infrastructure (Road Design Section) Department of Meath County Council in relation to the matters outlined above.

Response to item 3

No increase of usage of public roads by Tara Mines is envisaged by any aspect of this proposed development.

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