

Glyn Rhonwy Pumped Storage (EN010072)

PINS Reference: 10031993 Mike Vitkovitch

Deadline 7 – Submission

10<sup>th</sup> August 2016

FAO.Mr Cowperthwaite

Dear Sir,

I respond to your request for any comments on the Draft DCO and also the Applicant's responses to Deadline 5 submissions.

I provide below my comments on the Draft DCO followed separately my comments on the issues raised in the Deadline 5 submission and the Applicant's responses.

I follow this with a submission on the proposed Section 278 Agreement with the Highway Authority as there is clearly a lack of consideration of several local issues that would arise from it. The Highway Authority appears to accepting of the proposals put before it without any challenge to the engineering, practical or local traffic issues. I raise these not because the ExA has any jurisdiction in this matter, but so you can be aware of the difficulties that will arise for the residents of Waunfawr should the proposals be implemented. At the Public Consultation held in Caethro on 29<sup>th</sup> June, the Applicant's representatives and those of the Highway Authority were unable to provide any satisfactory answers to questions raised and were also clearly unaware of many of the problems that would occur. The Council's Planning Officer's response to my queries addressed none of them but quoted from the PINS DCO Advice Notes stated that the Authority "will want to contribute towards the development ...with the benefit of their detailed local knowledge." It is therefore a shame that the Authority seemed unable to provide this knowledge to help in processing an Agreement.

In general, I consider that the Applicant has not provided any further information to satisfy my concerns regarding the scheme and its effects, both in the short and long term, on both Llanberis and Waunfawr. I remain strongly of the view that this scheme is too big and too close to the village of Llanberis and that the effects of accessing Q1 via Waunfawr are unacceptable. The proposed Application appears to have been put forward with a marked lack of technical research, understanding and valid information, and consequently has presented a significant understatement of the size and effects of the construction work entailed. The programme provided with the Application (Indicative Construction Programme Table 4.2 in 'ES Vol2A Ch 4 'Project Description) is clearly still based on a TBM driven penstock from Q6 and not drill and blast from Q1 as now proposed. By not correctly detailing the work within the activities shown in the programme, the sequencing of activities and their durations is illogical and heavily underestimates the true construction period. This in turn means that the construction effects of the scheme cannot be properly assessed in this Examination.

The Applicant responses regarding GBVN and LFN have again side-stepped the true and lasting impact on the communities has not been properly considered. Neither has the amount of blasting, excavation, crushing and processing, transport, temporary storage and reloading of slate waste for transport by conveyor been properly brought forward in the Applicant's submission. Construction noise assessments, agreed acceptable levels and 'best practical means' based on individual

operations will do little to ease the total and continuous noise from all the concurrent activities around Q6. The village and residences of Llanberis are simply too close for this size of development. I also note that the 'Socio-Economic Report' ES Vol 2B Ch15, makes little comment about the loss of tourism and return business which will occur should this project move to construction. The scale of the 'quarrying' highly visible on the main approach to the village will have a significant adverse impact on visitors. There is no indication of the size or appearance of the temporary stockpile that will dominate the approach to Llanberis. I attach another sketch drawing showing that it will be, of necessity, as high as the Clegir Road and completely covering the large area of trees that hitherto have softened the tip landscapes.

#### Comments on Draft DCO:

In response to the ExA's request for comments on the Draft DCO I welcome the removal of Article 9 as the Applicant has been both unwilling or unable to satisfactorily demonstrate the effects of operational noise, ground based vibration and low frequency noise from the development.

In respect of "2 , Construction Hours 12. "

There remains a need for further clarification of the matter of what is included of what is defined by 'Tunnelling Works'. If this is to be defined as wholly below surface operations then I am content with the statement regarding working hours. However at the oral Hearing in May I proposed that the times of blasting be defined as set times morning and afternoon. The Applicant has acknowledged this in his response SPH\_GREX\_WED6\_02 ,page 3-11. *"It is noted that the Respondent would prefer to have blasting between 10am and 3pm. This will be taken into consideration when the blasting contractor is appointed and the time periods for blasting to take place are agreed"*. Should this accepted blasting window be specifically and clearly stated and included in the draft DCO as TUNNEL and OTHER blasting operations? Given the general agreement on how blasting is to be managed, now is the time to be specific in the definition of restrictions.

If 'Tunnelling Works' is deemed to include any surface works that are an associated operation for 'tunnelling' then this would be contrary to the intentions of the basis of restricting the daytime timing for 'Construction Works'. I would therefore request for clarification, that operations such as HGV movements (particularly as tunnelling is now advised as being from Q1 with traffic moving through Waunfawr), will affect traffic, removal and transport of slate from the tunnel, the importation, movement or batching of construction materials such as concrete, shotcrete, aggregates, crane and conveyor operations, crushing and stockpiling, should not be permitted outside the hours of 7am to 7pm weekday as these will generate the same if not more environmental light and noise pollution as other 'construction' operations which are already accepted as being daytime limited. I direct the ExA to the Applicant's responses my submission in SPH\_GREX\_WED6\_02 on this matter which clearly confirm my concerns for confusion as follows:-

*\_Page 5-36 " The Applicant has allowed for these activities in the assessment presented in the Environmental Statement (Doc ref: 6.02). These activities will be conducted from within the confines of the existing quarries"*

Work within the quarry holes or reservoirs must be stated and included in the DCO as 'surface works' as they are not 'underground'. Without this clarity it is inevitable that arguments over what is above/below ground will proliferate if construction goes ahead.

*Page 5-37 "It is acknowledged by the Applicant, and reflected in the Environmental Statement (Doc ref:6.02), that the underground excavation works will be undertaken on a 24 hour basis subject to agreement with Gwynedd Council as part of the agreed Construction Noise Management Plan(as required by Requirement 6).*

In addition, as the Applicant has now stated that all the penstock tunnelling will be carried out from Q1, the height and effect of this noise will be more significant within the both the Llanberis and Gwynant valleys, especially at nights and also when frequent low cloud and mist reflect noise. This is a recognised, frequent and significant occurrence within the area that has not been addressed within the Applicant's noise assessments. The manner by which the slightest sounds will travel across the lake and across to Fach Wen have been significantly underestimated as the assessments have been based in generic parameters which do not apply to such a lakeside site as this.

It would, with hindsight, have been both reasonable and easy for the Applicant to have carried out sound tests to support his conclusions and noise envelopes.

For the same reasons, no amount of noise bunding will successfully screen any activities outside Q1 hole, or Q6 hole as these will be at a relatively high level in the valley. If to be employed, cross sections should have been provided to show how high noise bunds would need to be to break the sound path between source and receptor. There is already insufficient space to accommodate the site establishments, batching and crushing plants, vehicle parks, maintenance buildings as well as the temporary slate storage areas access routes lay-down and storage areas within his Order limits, without the space required to construct these bunds. The surface works from these areas will be audible throughout the area. Q1 and Q6 concrete batching plants will be tall pieces of equipment. The loss of the sound absorbing trees behind Glyn Peris and the Lake View will open up the site and the new tips will further reflect sound towards the village and across the lake. This has not been allowed for in the 'standard' noise assessments.

Within the DCO, ALL operations must be clearly described and individually named, where they are being limited to 'daytime' 7am to 7pm hours of working. There is currently too much scope in the DCO to ensure that no noisy operations are carried out: the Applicant is already arguing that these are 'tunnelling operations'.

This aspect of the DCO needs strengthening if night-time noise and light pollution are to be avoided in the valley.

### Responses to SPH's SPH GREX WED6 02 Deadline 5 Comments

The Applicant has responded to my Deadline 5 submissions in Document Reference: SPH\_GREX\_WED6\_02 . (Please note that the reference shown on the footnote of pages following page 5-1 appears to incorrectly show " SPH\_GREX\_WED6\_01". I will however continue to refer to the document as SPH\_GREX\_WED6\_02). The Applicant's responses or documentary excerpts are shown in italics.

I respond to SPH's responses as follows:

Page 5-1        It must be unacceptable for the Applicant to dismiss the established evidence that ground vibrations from turbines can create significant noise and impact on residences situated hundreds of metres from the source. I find it even more surprising that the Applicant can so easily dismiss the GBVN issues evident at Dinorwig as:-

*Page 5-1        " The Applicant is unable to provide comment on a third party compensation agreement for a different scheme. The Applicant does not consider the situation to be a precedent given that it concerns a different scheme designed some time ago and using different equipment to that the Applicant will install."*

The Applicant has consistently failed to give ANY information as to what differences in his equipment or why they will ensure that GBVN will no longer be an issue. The fundamental principles of high mass rotating impellers and generators which must be securely encased in concrete or rock for structural reasons have not changed since hydro-electricity was invented. It is these factors that give rise to the GBVN that cannot be mitigated by design or construction. If this statement is to be accepted then the Applicant should be addressing this issue properly and advising what his mitigation measures will be and demonstrate where these measures have been proven to work in the past.

Unless the Applicant can demonstrate how he will deal with this evidenced problem the conclusion must be that the proposed site is too close to the village of Llanberis.

*Page 5.4           “A response to the detail contained in the Appendix to Mr Vitkovitch’s submission is provided later in this section. The Operational Noise Management Plan (SPH\_GREX\_DC0D5\_05), agreed with Gwynedd Council (submitted at Deadline 5), documents the approach to Low Frequency Noise, Ground-Borne Noise and Ground-Borne Vibration. The Applicant has previously noted that it is aware that attenuation of LFN is better undertaken at the design stage than retro-fitted and that this will be accounted for in the detailed design “*

Although the Applicant appears to accept that LFN is an area that requires consideration, the Expert Witness, Mr Taylor points out cannot mitigate either GBVN or LFN after construction. It would not have been unreasonable or impractical for the Applicant to have carried out tests to demonstrate the predicted effects of both these occurrences, as the frequency of the vibration sources are recognised and known. However the Applicant, without any supporting evidence simply states

*“The Applicant does not accept that there are no means of mitigating LFN or GBVN if experienced.”*

It would have been useful to the Examination if the Applicant could have demonstrate how GBVN and LFN. If the Applicant believes there are ways of addressing the problem at the design stage, then he should have stated what they would be and demonstrate that they are recognised as effective. My Expert Witness Mr Rupert Taylor’s statement and opinion of 7th June 2016 stands as:-

*“In the case of both groundborne noise and low frequency noise, if reliance is placed on a future design process then in the event of actual levels of groundborne noise and/or low frequency noise proving to be in excess of acceptable limits, retrospective mitigation may prove to be impracticable because of the radical nature of necessary re-engineering of the installation and/or excessively high cost or programme implications. The ES does not take account of this risk, for which reason it is not possible for the decision maker to know from the ES what the likely significant effects due to groundborne noise and/or low frequency noise will be.”* Rupert Taylor

*Page 5.7           “ In addition the detailed design, and therefore final specification of the Development including turbines, is subject to approval via Requirement 5 of the DCO.”*

In my opinion this should be a prerequisite to the DCO should the ExA consider it be granted.

*Page 5.8           “Noted. The risk-based staged approach to Ground-Borne Noise and Vibration presented in Section 4.4 of the Operational Noise Management Plan (SPH\_GREX\_DC0D5\_05) agreed with Gwynedd Council (submitted at Deadline 5) allows for early identification of potential effects in order to influence the design.”*

Again this is another ‘throw away’ and unsupported statement. Can the Applicant please give how his design will be changed and demonstrate where such changes are proven to reduce GBVN? These changes should already be before the ExA if the environmental impacts of this scheme are to be properly considered. In their absence the ExA must assume the worst case situation will occur, but the Application makes no statement as to the maximum effects of GBVN and LFN associated with his scheme.

5.10 *“A risk-based assessment procedure has been established in the Operational Noise Management Plan (SPH\_GREX\_DC0D5\_05) agreed with Gwynedd Council (dated 21 June 2016 for Deadline 5). The Applicant does not consider the current situation at Dinorwig to be a precedent given that it concerns a different scheme designed some time ago and using different equipment to that the Applicant will install.”*

How can the Applicant make such a statement unless he is a) aware of the design of Dinorwig and b) he already has designed his own installations? I find it unacceptable how much of the information required to properly assess this development proposal has been passed on to ‘the detailed design’ or the ‘Principal Contractor’.

### **Alternative Access Roads**

Page 5.12 *“It is noted that the possibility of constructing an access road between Q1 and Q6 does not form part of the Application”.*

The Applicant should have considered ALL opportunities to mitigate the effect on the communities around the scheme. A link between the Q1 and Q6 site should have been fully investigated as it is clearly the route to avoid traffic through the narrow streets of Waunfawr entirely. This access road would be temporary, removed and reinstated on completion. The Application is incomplete without full considerations of this route the visual impact of which is inconsequential when considering the loss of trees and the temporary spoil heap and behind Glyn Peris Guest House and Lake View, the size of the dams and the effects of effectively creating an open quarry producing 1million tons of slate waste in one year, only 500m from residences and businesses of Llanberis.

Page 5.14 *“Ffordd Cefn Du is an existing adopted highway and therefore would not necessarily meet modern design standards. Regarding the localised gradients, and the improvements proposed, the Applicant has met with an Abnormal Load Haulier on site and they have confirmed the road’s suitability. This has been confirmed by the Applicant in previous responses. No long sections have been submitted as the Applicant is proposing to widen an existing alignment rather than regrade Ffordd Cefn Du.*

I am not sure what the Applicant means by Ffordd Cefn Ddu being “an existing adopted highway”. It is simply an “existing highway”. ‘Adoption’ does not come into the matter any more than it would for the A4086.

A long section is essential to correctly determining the location of passing places and intervisibility between passing places so HGVs stand some chance of passing each other whilst still being able to restart on the gradient. I note the Applicant does not contest my statement of high gradients on the Cefn Ddu road that “an Abnormal Load Haulier on site and they have confirmed the road’s Suitability” If 20% areas on an 11% grade are acceptable on Cefn Ddu then they can apply to a direct Q1 to Q6 link. The Applicant has consulted an ‘Abnormal Load Haulier’ but as advised at the Waunfawr Consultation, has not consulted HGV hauliers about the suitability of the road widening, the position of passing places and how the HGV movements can be managed. The management of construction, HGVs and local traffic, has not been thought through as the 16 engineering points (listed at the end of this submission) I have made to Gwynedd Council testify.

*Page 5.15 “Without a design based upon a topographical survey, it is not possible to comment on the suitability of the design, the amount of cut / fill required, or its cost implications. The Applicant again notes that the application under examination does not contain any proposal for such a route.”*

I note the Applicant does not disagree with the information provided but remains reluctant to even review the information provided on a point by point basis. A basic desk top study would confirm this is a viable route totally mitigating the effect of widening the Green Road and passing huge amounts of traffic through Waunfawr.

*Page 5-16 “The improvement works are to be undertaken within the existing confines of the Ffordd Cefn Du highway. The localised widening is minor in places above the cattle grid and would not change the conclusions of the ASIDHOL. Notwithstanding this, the highway improvements (as associated development in Wales) are not part of the DCO application and therefore there is no requirement to include these works within the ASIDHOL.”*

I disagree that the effects of this widening should be wholly free of any assessments as to the effects on the Historic Landscape, the Environment and the village of Waunfawr. The decision on whether the ‘effects are minor’ is not up to the Applicant to decide without an assessment by GAPS. The Applicant/Authority should confirm how the effects of the Cefn Ddu Road ‘improvement’ will be assessed and whether an ASIDHOL and an Environmental Statement will be carried out as part of the Section 278 application. GAPS confirmed that they were not party to the information regarding the ‘improvements’ to the Cefn Ddu Road as part of their consultation.

*Page 5:16 “SNPA comments concur with Gwynedd Council’s comments that the site should be accessed from the north and via an existing route. As above Gwynedd Council have agreed with the Applicant assessment of alternative access from Q6 which would have the potential to cause likely significant effects.”*

Please direct me to the record of these statements as this is contrary to the SNPA response to Jane Huuse’s Deadline 4 submission.

*Page 5.17 “As outlined above, the Applicant cannot comment on the feasibility or viability of the Respondent’s proposed route as it is not based upon a topographical survey. The route is not part of the DCO application under examination and the Applicant will not comment on details of speculative route which was dismissed for robust and valid reasons, and this has been agreed with statutory consultees.”*

This alternative is based upon the best information available, that is factual satellite GPS based data available on Google Earth. With an accuracy of 1m at the scale presented the information is sufficient to provide an adequate indicative design. It is churlish to suggest “the Applicant cannot comment on the feasibility or viability of the Respondent’s proposed route as it is not based upon a topographical survey”. As such an Alternative has never been presented to the ‘Consultees’ it is not surprising they have not been able to assess or consider it in preference to widening the Cefn Ddu road through Waunfawr.

## **Tunnelling**

*Page 5.19 “The Applicant also notes that the volume of tunnel excavation is approximately 2% of the total excavation i.e. a very small proportion. If some further additional excavation is, indeed, required this is well within the contingency allocated for disposal of excess material.”*



It is not the volume of excavation that is the issue here, it is the volume of shotcrete or concrete material required to restore the 4.5m finished diameter in the design. Drill look-out, overbreak and minimum concrete thicknesses will result in an overall average volume of shotcrete or concrete to be installed of over 25,000 m<sup>3</sup>. This will result in over 48,000 T of material to be imported for this activity alone. (The figure of 2.4 Tonne/ m<sup>3</sup> is normally accepted as the density of structural concrete. With cement element of 300Kg/ m<sup>3</sup> for 40N/mm<sup>2</sup> strength concrete, the remainder of the total weight is made up of water (150 Kg/m<sup>3</sup>), crushed stone aggregate (x1150 kg/m<sup>3</sup>), and sand (800 Kg/m<sup>3</sup>.)

*Page 5.20 “To minimise HGV movements through Waunfawr it is currently envisaged that concrete will be batched on site and will use as much of the site excavated material as possible.”*

It is not structurally possible to use any slate material as part of the aggregates or fillers in concrete or shotcrete. I am not aware of slate aggregate being used in structural concrete in the UK and ask the Applicant to show where this has been achieved. Any dolerite dykes encountered are of a very hard rock that would be uneconomic to separate, crush and grade for aggregate.

BS EN 12620:2013 Aggregates for concrete is the European Standard that specifies the properties of aggregates and filler aggregates obtained by processing natural, manufactured or recycled materials and mixtures of these aggregates for use in structural concrete. Pd 6682-1:2013 (guidance on the use of EN 12620): Table 3, recommends a maximum flakiness index of 35 for crushed rock aggregates. TRL Ltd's report 'Ground engineering as potential end uses for recycled and secondary aggregates' Project code: DTI/WRAP Aggregates Research Programme STBF/13/8C' Table 27 shows slate as having a flakiness index between 50 and 70. I attach the report as a pdf document.

'Flakiness' is the term used to describe aggregate particles whose least dimension (thickness) is proportionally much less than its overall dimension ie 'flat'. This characteristic is undesirable in the production of structural concrete due to the following reasons.

Flaky particles have a far greater surface area, leading to higher water demand and higher cement content.

Flaky particles are inherently weak due to their shape and may not meet the strength requirements of aggregates for concrete. This potential weakness may also have an effect upon the strength of the concrete.

Concrete made with an excess of flaky particles is not as workable as concrete made with rounded particles. This could lead to placement and compaction problems and could also lead to higher water/cement demand.

There is documentary evidence that slate aggregate has been used in the production of non-structural concrete, but under these circumstances the concrete would be classed as a 'proprietary' product not suitable for the structural use required in this project.

*Page 5.20 “To minimise HGV movements through Waunfawr it is currently envisaged that concrete will be batched on site and will use as much of the site excavated material as possible. More importantly, it is envisaged that the majority of tunneling works will be undertaken from the Q1 end – again to minimise HGV movements through Waunfawr. To further reduce on site impacts, it is envisaged that use will be made of precast concrete tunnel lining. It is, however, accepted that concrete will be required associated with the tunneling works but because the Applicant is committed to maintaining the excavated profile to that shown on the drawings the volume is anticipated to be in the region of 6000m<sup>3</sup>. Vehicle movements associated with this quantity have been included within the Environmental Statement (Doc ref: 6.02).*

Firstly, the use of a batching plant must not be permitted at night as this is an 'above ground' operation that will have a far reaching noise envelope across the valley from Q1.

Secondly 6,000m<sup>3</sup> is a total underestimate of the volumes of concrete and shotcrete required as this only represents an average tunnel diameter of 5.1m of tunnel. A tunnel cannot be excavated on the basis of its exact finished diameter alone. To avoid cracking and failure a minimum thickness of

250mm will be required for the reinforced concrete lining even in the low pressure sections. The face will therefore be marked for drilling at 5.0 metre diameter. The drill lookout will result in a blasted face of a further 250mm as this is necessary to accommodate the size of the drill itself on the next round. A perfectly blasted hole to suit a 4.5m diameter finished internal lining would therefore average the 5.5 m diameter allowed by the Applicant WITHOUT any consideration of the inevitable over-break. The blocky nature of slate blocky nature will result in significant over-break which, from the experience of Dinorwig could easily result in an increase radius of 300mm on average. Furthermore, a volume allowance for the excavation of the flat floor, passing places, plant and equipment recesses, and drainage will also need to be added to the volume. From a finished diameter of 4.5m the end result will be a minimum average blasted diameter , prior to any shotcrete or concrete linings of at least 6.1 metres. As confirmed by the Applicant in his responses, he has allowed only for his own unrealistic assessment of the volume of concrete required for the tunnel which fails to make ANY allowance for over-break.

*Page 5 -20        “The Applicant notes the reference to structural concrete. However, because it is envisaged that the tunnel lining will be steel, the amount of structural concrete beyond the pre-cast units is much reduced.”*

This statement either demonstrates the Applicant’s fundamental lack of understanding of the processes of drill and blast tunnelling and over-break, profiling and lining operations, or shows how he glosses over the issues. The over-break in an excavated tunnel is a function of the practicalities of drilling, blasting and the rock type and condition OR Rock Mass Rating (RMR) AND not the type of lining. The use of precast concrete linings is common place in TBM bored tunnels and the equipment forms part of the tunnel ‘train’. For the precast units to be erected they must be supported by the excavated ground behind them as a 4.5m circular arch structure cannot ‘hang’ in mid-air whilst the lining is erected and concrete or grout pumped behind. In a drill and blast tunnel the broken profile will require the ‘rough’ tunnel to be pre-lined to within 25mm of the outside diameter of the precast units. However there is no point in pre-lining a low pressure rock tunnel with concrete just to enable the subsequent installation of precast concrete units. The engineering time and cost aspects of lining the tunnel mean a single operation is always preferable and the tunnel would simply be in-situ concrete lined to the finished diameter in the first place. Why do it twice? Although precast concrete units may reduce the volume of concrete BEHIND the lining the volume of imported materials, (be they aggregates, precast concrete or steel) from inside the finished lining to the rock itself, remains the exactly the same. The Applicant has failed to demonstrate how his vehicle traffic assessments are formulated and where he has allowed for each operation. It is therefore easy for him to say

*“Vehicle movements associated with this quantity have been included within the Environmental Statement (Doc ref: 6.02).”* Double counting within his unaccounted assessment has never been easier...

It is agreed that in the High Pressure section of the tunnel, where a precast or steel lining will be necessary, pre-lining the tunnel with concrete will still be required to ensure that only a narrow annulus outside the lining exists. As a separate advance exercise the invert must have already been concreted to profile to provide a smooth surface and a reference profile for the positioning and securing of precast or steel linings.

The Applicant’s programme takes none of these sequential and access limited activities into account, showing only a 12 month lining programme whilst for the first 3 months also moving the waste spoil from Q6 to Q1. This equates to 8.2m/day which even in a perfect world is more than double that achievable in reality.



*ES Vol 2A XH 4 4.4.14 "It is currently anticipated that at least the lower half of the penstock will require pressure lining (a length of approximately 750m) but this may be lesser or greater depending on the detailed design, analysis and ground conditions. Installation of pressure tunnel lining is expensive. It has currently been assumed that the pressure lining will be steel but it may be formed from heavily reinforced cast in situ concrete (with a smooth internal face)."*

First of all, the processes of lining cannot commence until the tunnelling is complete and all other 'through' operations, such as moving material from Q1 to Q6, are complete. The Applicant has made it clear that there are to be only two ends for possible access. It must be noted that once the first steel lining section is in place, other steel linings cannot pass through it. Therefore the Applicant's stated 750m of High Pressure lining works must start in the middle and work outwards to Q6. The same applies to concreting the invert which is a prerequisite of either the reinforced concrete LP lining or the steel/concrete HP.

From Q1, the LP lining will require a moving and folding steel shutter which can travel either inwards or outwards. Concrete will be pumped behind the shutter. This 3/4 diameter steel lining shutter, which will weigh around 30 tons, will be running on preinstalled rails bolted to the new invert concrete. The length of the shutter will be limited to 5m as longer bays will exacerbate shrinkage cracking significantly.

Clean rock surfaces and remove all loose rock, concrete the invert to finished profiles. Concrete must be several days old before it can accept rail mountings for the travelling shutter and so must be completed well ahead of the shutter. (The logistical issue here is how the concrete deliveries are made along the tunnel and through the main steel shutter. The tunnel is too long for pumping and too small for truck mixers to pass through.)

Position the reinforcement against the rock surface, move shutter, fix in position and stop end to profile. Pump concrete behind lining, taking around 8 to 12 hours. The rate of fill will be restricted and both sides equally balanced to avoid moving shutter and stop end. (Again the logistical issue here is how to get a constant delivery of concrete along the tunnel to be pumped from the invert and up into the tunnel crown. The tunnel is too long for continuous pumping from ground level.) The concrete is pumped into place and left for a minimum 12 hours for concrete to reach earliest acceptable strength to enable the steel shutter to be collapsed and moved to on to the next bay. The maximum rate of lining progress would be 5 m every 2 days, it is not possible to improve on this simply because of the concreting processes. When concreting or shutter movement is in progress there can be no access past the shutter. The lining of 750m of LP tunnel alone will therefore take a minimum of 300 days. The lining of the HP tunnel will take longer due to the time it takes to a) put in a primary concrete lining and invert and b) the time it takes to move and position steel lining sections and grout behind them.

The practicalities of working the LP lining from Q1 whilst the HP lining progresses from Q6 are heavily restricted by the programme operations shown in the "ES page 4-27 Table 4-2 Indicative Construction Programme", which shows that the conveyor is also still in operation. This is something that is physically impossible whilst the invert, LP or HP lining works are ongoing.

I would welcome an explanation of how the Applicant considers all this can be achieved in and demonstrate this around a revised 'Indicative Construction Programme' that clearly demonstrates his logic, sequencing, methods and resources. In the absence of such a proper programme his assessment of the construction period together with transport and vehicle movements through Waunfawr and on other roads, cannot in any way be considered to have been demonstrated in the Application.

*Page 5-21 "The Applicant has deliberately not shown the thickness of concrete lining as this will, indeed, vary over the penstock length and be dependent on a number of variables including rock characteristics and final penstock lining design."*

However in so saying this the Examiner is afforded no opportunity to gain a true indication of the physical and resultant time scales of the penstock construction. We now have confirmation that the penstock is to be driven from the Q1 site alone. The ES had previously stated that it would be Q1, Q6 or both. The Indicative Construction Programme shows the Penstock being driven immediately following the Q6 'launch shaft', which shows that the programme is based around a TBM operation taking 1 year. It is clear that the Table 4.2 does not represent the programme or sequence of events that will happen with a drill and blast approach now proposed by the Applicant which will take the best part of 20 months from Q1.

In the absence of a realistic programme it is not possible for the Examiner to assess the duration or impact of the construction works.

*Page 5:28          "Noted. The Applicant wishes to clarify that the waste material will not generally be loaded onto the conveyors in an "as dug" condition."*

The Applicant is stating that all the material to be excavated from the Q6 site will require crushing by processing in order to be loaded onto a conveyor. I agree that as-dug slate cannot be conveyed in this way. This means that extensive crushing operations will be ongoing at the lower reservoir and temporary tip site to process ALL 1.25 million tons of material before its passage either up to Q1. In addition all of the material retained for the Q6 dam is to be processed. The effect of this is that there will be an open quarry and huge tip operation being carried out on the main approach to the tourist centre of Llanberis throughout the extended construction period. There seems to be a particular contradiction that a 'green' project starts off by generating 1.2 million tons of waste slate.

Turning to the programme, the duration of construction is indicative of the period over which disruption noise and dust will have potential effects on the localities of Waunfawr and Llanberis. It is linked directly to the sequence of operations and the progress that can be made in each activity. As explained in my earlier submissions, these have been underestimated and now the Applicant's responses to my Deadline 5 submissions have done nothing to change this view.

The penstock has been identified by all parties as the critical path activity that dictates overall progress. The sequence of works indicated in the ES Vol2A Ch 4 'Project Description' Table 4.2 shows a 4 year construction period. The reality will be that the increased duration of the excavation and lining operations alone will add over a year to the main programme. Other operations such as deepening the quarry holes have not been detailed but the periods of time shown for those activities are unlikely to be achievable given the need to blast and support the excavations from the top down in a sequenced and linear process. Each 5m level of excavation will require a slate access platform around the full perimeter of the hole to enable rockbolting and anchoring to take place. This process will have to be completed to the reservoir floor before all the blasted material can be replaced and access to the tunnel entrances achieved.

*Page 5-29          The Applicant can confirm that it is envisaged that the conveyor will run up the temporary access tunnel. The function of the temporary access tunnel is to allow the power house shaft and the tailrace tunnel to be constructed on an independent timeline from the penstock thus avoiding the issue suggested.*

*Page 5-29          "The Applicant can confirm that the material arriving at Q1 will be transported either by further conveyor system or by vehicle up the temporary access ramp over the dam site."*

I presume that the Applicant has considered the steepness of any access road that can get from the bottom of either Q1 or Q6 reservoirs to the top of the dam crest as it will be beyond the scope of any wheeled transport. Particularly at Q6 the reservoir sides are near vertical. As previously suggested the logistical aspects of this scheme, particularly those which determine programme and noise have not been adequately considered or presented. In effect near vertical conveyors and large cranes will be necessary to carry materials both in and out of the tunnels throughout their construction and lining. These must be specified in the DCO as daytime operations only.

*Page 5-29 “Surface construction works are restricted to daytime hours, as secured in Requirement 12(1) of the draft DCO, with the exceptions detailed in 12(2)(b). Once the Primary Contractor has been appointed, a detailed construction noise and vibration assessment will be undertaken, based on the proposed working methods and plant schedule. The tipping of waste material will be fully addressed in this detailed assessment.”*

I presume the Applicant is referring to the Principal Contractor and not the Primary Contractor? The Applicant accepts that the tipping of stone will be a source of noise but there has been no mention of acceptable limits for this specific activity. Although the Applicant refers to this being a ‘daytime’ operation, the Draft DCO does not make this clear in that the same activity may well be considered as part of ‘tunnelling operations’.

*Page 5-36 “The penstock intake does not pass through the upper dam but, rather, is located at the other side of the reservoir. This is shown on the drawing as referred to.”*

Noted. The tunnel commences near the floor of the reservoir an access point that can only be accessed once the reservoir excavation has been completed. All access, for example, for the siting of a batching plant or material movements to and from the tunnel as it at the bottom of a deep excavation with side slopes of 1 in 1. This further creates a logistical and programme restriction.

*Page 5-36 “ The Applicant has allowed for these activities in the assessment presented in the Environmental Statement (Doc ref: 6.02). These activities will be conducted from within the confines of the existing quarries”*

My comments above regarding access to the reservoir floor are relevant to this statement. How will facilities within the reservoir be accessed? It would be illogical to construct a batching plant within the quarry hole at this, or any other stage of the project.

*Page 5-37 “It is acknowledged by the Applicant, and reflected in the Environmental Statement (Doc ref:6.02), that the underground excavation works will be undertaken on a 24 hour basis subject to agreement with Gwynedd Council as part of the agreed Construction Noise Management Plan(as required by Requirement 6).*

As previously commented, for the avoidance of doubt , there needs to be a clear description of the activities that are permitted under the 24 hour ‘underground excavation works’ as ‘underground works’ require a minimum of surface support operations, some that will be acceptable to the ExA and others that may not. The Applicant is suggesting that tunnel support operation that are within the ‘existing quarries’ can operate 24 hours a day, when other identical operations such as concrete batching and the movement of excavated slate are prohibited. There is a clear overlap and the opportunity to carry out noisy activities at night arguing they ‘are part of tunnelling operations’. The DCO must address this issue in more detail.

#### Ffordd Cefn Ddu – Section 278 Agreement

The first paragraph of this document highlighted concerns regarding the lack of information and justifications given by either Gwynedd Council or the Applicant’s representatives at the Section 278 Public Consultation at Caethro Village Hall on 29<sup>th</sup> June 2016.

I copy below the engineering and operational problems that were raised at the meeting.

There has been no response on these matters from Applicant or Authority. It was also of note that although it was expected that ‘widening’ would be proposed above the cattle grid, there is considerable works proposed below the cattle grid and between walls and houses. The effects of the

proposal turned out to be more far reaching and extensive than expected by the residents who unanimously rejected the proposals.

- 1) There was no longitudinal section of the road to be widened. Fundamental to any highway design process in this case it would be essential to ensuring that passing places for HGVs were correctly placed at the top of steep gradients and not at the bottom.
- 2) There were no highway cross sections or information on the road below the cattle grid and through the residential section of the road to the crossroads. Plans showed a widening of tarmac road widths with no detail of whether the edges were to be kerbed or otherwise. We were informed that some driveway entrances would need altering because of level changes with no information of how.
- 3) The road is used on a daily basis by horse riders who use the grass verges. In particular this includes the local riding stables and independent riders who regularly use this quiet and scenic road and benefit from the side verges. These verges are to be removed and surfaced over. This in turn increases the rate of runoff of rainwater with no provision for runoff attenuation or discharge on the road between the houses.
- 4) Many properties around the lower section of the road by the crossroads have recently suffered flooding as a result of water cascading down the existing road. The Applicant seemed unaware of this problem. The proposals fail to address the requirements of TAN 15, and the engineering solutions to dealing with the increased runoff are clearly limited by the lack of space between highway boundary walls.
- 5) The developer was unable to demonstrate how their HGVs moving up the road at the rate of 6 or 7 an hour would avoid conflict with their HGVs returning down the hill at the same hourly rate. The journey time was estimated by the Applicant at 7 minutes suggesting that HGV's would be approaching each other at some point along the road several times per hour. Their Management Plans make it clear that "construction traffic will give way to local traffic " but not how this can actually happen without the need for HGV's to reverse away from congestion. When challenged on this point one suggestion was that residents could be given mobile phones to ring in and check it would be safe for them to leave their driveways. There is talk of 'banksmen' and two way radios between the top and bottom of the road but no way of gauging what is happening in between. A 20mph limit has been proposed because 'any less will increase the HGV journey times', without any consideration for the effects HGVs at this speed will have on residents.
- 6) There was no consideration of how on a proposed 4m wide road, the needs of walkers, prams, cyclists, horse riders and resident drivers would be provided for. This situation would be endured for many years during construction. 4 metres is a non standard highway width, only just wide enough for two cars to pass at a crawl, but not enough to allow HGV's to pass cars or each other. We were told it was sufficient for the occasional large load 'with a margin for error'. The widening as proposed will therefore provide a road that is neither suitable for its intended HGV use nor offer any useable advantage for the local traffic.
- 7) During the actual operation of widening the road, daily access to people's property would be impossible as although a 'through road' in the legal sense, it is only accessible by cars from the village end. The existing tarmac is generally about 2.5m wide and not wide enough for cars to pass each other. With the amount of local traffic this is a totally manageable situation. There is now the prospect of 100 plus HGV's travelling up and then down on a daily basis. The road character will be totally changed as will the quiet and rural nature of the village.

- 8) There are many walls along the road that retain the highway from above or below. Where this is the case, the Highway Authority are also responsible for the walls. The proposed widening will almost certainly have an effect on these dry stone structures, No assessment or consideration of this point has been made by either the Council or the Applicant.
- 9) The Applicant has separated the road widening from the Development Consent Order and thereby removed some of the procedure and scrutiny that it would otherwise need under the current Examination. The matter now falls to the Council to decide whether or not the road widening is acceptable and 'will be of benefit to the public'. Section 278 of the Highways Act read:

“(1)A highway authority may, if they are satisfied it will be of benefit to the public, enter into an agreement with any person—

  - (a) for the execution by the authority of any works which the authority are or may be authorised to execute, or
  - (b) for the execution by the authority of such works incorporating particular modifications, additions or features, or at a particular time or in a particular manner,”
- 10) As this is the fundamental requirement of the Act the Highway Authority must establish this before they can enter into a Section 278 Agreement. From the information available from the Council representatives at the Consultation, no-one was able to advise how this had been assessed, if at all.
- 11) No assessments of either the environmental or historic landscape has been carried out. This has been confirmed by the Gwynedd Archaeological Trust. The Applicant and Council representatives seemed to be only to become aware of the presence of a bat and barn owl roosts alongside the road from the public at the Consultation.
- 12) The current design shows 600mm wide and deep concrete drainage channels directly at the side of the new surfacing. This poses an obvious hazard to all users but in particular equestrians trying to pass, or being passed by the construction HGVs. Before the Highway Authority can enter into any agreement the road must have been fully assessed as safe for all users. A Safety Audit and a Non-Motorised User Safety Audit must both be carried out in order to decide whether the proposals presented by the Applicant are of benefit or dis-benefit to the public.
- 13) The local residents consider that the current road width and traffic flows are acceptable. There is very limited traffic beyond the last property above the cattle grid. This is mainly walkers, cyclists and equestrians, with the odd light vehicle. The Applicant is proposing that the road is widened to 4.0m all the way to the Cefn Ddu quarry. The public will gain no benefit from this widening and as the Applicant considers that it should remain at the wider width and not be re-instated to its former width on completion of construction, this will encourage the 'boy racers ' that already occasionally use the road in the evenings. It appears that certainly above the cattle grid the widening is only of benefit to the Developer and not the public in the area.
- 14) The assessment of 'benefit' must recognise the benefits against the dis-benefits of the proposal. The outcome must be demonstrable. There was insufficient information provided at the Waunfawr consultation OR with the Application for the main scheme to make any such assessment. It is therefore very surprising that the Council have already decided to agree to the drafting of an agreement.

Please provide the full justification as to why this proposal to widen the road to Cefn Ddu is 'of benefit to the public' and not simply for the benefit of the Applicant or Developer.

- 15) At the consultation photographs of how the priority of the cross roads would change from north south to east/west by simply changing the Give Way signs and lines were shown. The photographs of only three of the four roads were shown, presumably because the fourth would have revealed how narrow the road actually is and how visibility for locals crossing will be severely affected by the house on the corner. The very reason the priority was set the way it is in the first place was for safety, so how can a change in this junction priority be now be considered beneficial to the public?
- 16) It is also a requirement of entering into a S278 that the proposed works are "for the execution by the authority of any works which the authority are or may be authorised to execute". It has been pointed out that the widening of the road above the cattle grid involves the loss of approximately 6000sqm of common land which can only be done with the authority of the Secretary of State and requires suitable replacement land to be provided. It also involves the loss of Open Access Land. It is clear that these are not matters that the Highway Authority are currently authorised to carry out.

The proposals to 'improve' Ffordd Cefn Ddu create major safety issues for the existing road users. This aspect of the project is clearly not in the best interests of the residents of Waunfawr.

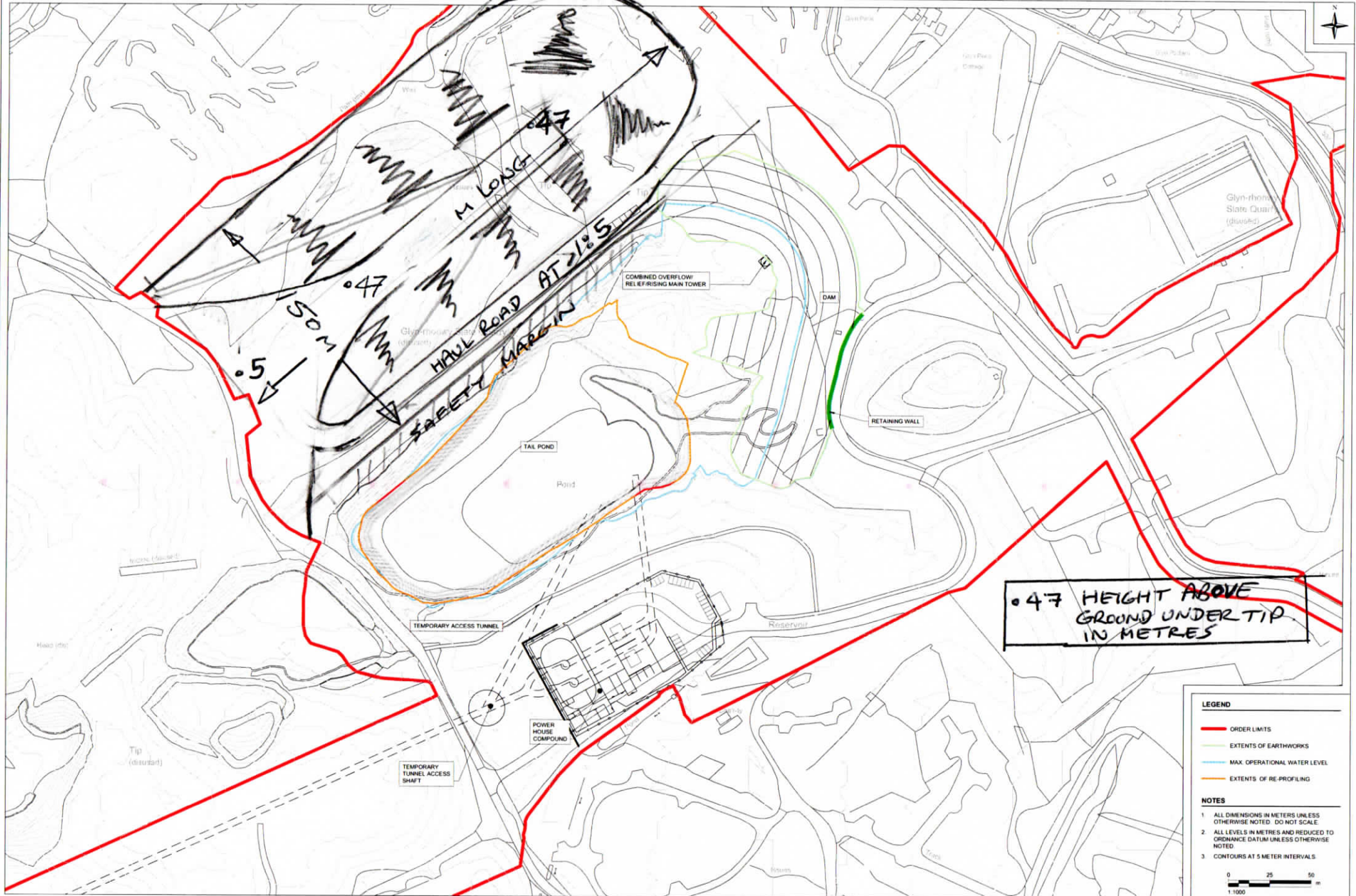
In conclusion, there is insufficient and inaccurate information being presented to the Examiner much of which has been changed as the Examination has progressed. However there are still glaring inconsistencies in the documentation, minimal information on some important areas, particularly temporary tips, how all the activities can coexist on the site during construction and how the construction and operational noise, ground borne vibration and noise and low frequency noise will affect the residences in both Waunfawr and Llanberis. The application should have been a fair representation of the construction and operational aspects of the project. It fails significantly in this respect.

The project as described is too close and directly impinges on the lives of too many businesses, residences and the landscape.

I respectfully urge the Examiner to consider these submissions and reject the Application.

Mike Vitkovitch





0.47 HEIGHT ABOVE  
GROUND UNDER TIP  
IN METRES

- LEGEND**
- ORDER LIMITS
  - EXTENTS OF EARTHWORKS
  - MAX. OPERATIONAL WATER LEVEL
  - EXTENTS OF RE-PROFILING

- NOTES**
1. ALL DIMENSIONS IN METERS UNLESS OTHERWISE NOTED. DO NOT SCALE.
  2. ALL LEVELS IN METRES AND REDUCED TO ORDNANCE DATUM UNLESS OTHERWISE NOTED.
  3. CONTOURS AT 5 METER INTERVALS.

