



Webinar 2 of 2: LVRRS Implementation Actions - Feasibility of Alternative Water for Mine Rehabilitation (Action 4) and Identification of non-water and contingency rehabilitation options to manage land stability and fire risks if sufficient water is not available (Action 5)

Tuesday 9 February 2021, 5:30pm AEST

Emeritus Professor Ray Mackay, Chair Mine Land Rehabilitation Authority Board

Welcome to all. Thank you very much for joining us for this second webinar in our session looking at the LVRRS implementation actions. I'm Ray Mackay, I'm the chair of the MLRA Board and will be the host for this evening. To get things started, I'd first of all like to acknowledge that we are hosting this webinar from the traditional lands of the Braiakaulung people of the Gunaikurnai nation and pay respects to their elders past and present. We also acknowledge the traditional custodians of the various lands on which you are all located, and any Aboriginal and Torres Strait Islander people who may be online with us today, welcome.

Before we begin I'd just like to take you through some housekeeping. As a participant, you are not able to turn on your camera or your microphone, this helps to limit interruptions to our presenters and improves the audio and video quality for all attending. Most importantly, please make sure that you add your questions using the Q&A function within Microsoft Teams. To access this function, click on the speech icon with a question mark on the top right hand corner, and the Q&A bar should open to you on the right of your screen. You can like the questions by clicking the thumb icon, and as last week those questions that received the most likes are going to be those questions that we will try and answer this evening. If there are a lot of questions then we will have to follow up with written answers to the questions that we can't get to through the night. So there have been a few questions submitted by Slido which is great and I will probably cover those off as the first questions that will be asked once we get to those. And we're going to ask all the questions after we've had both of today's presentations.

It's appropriate to say that technology may not work perfectly for everyone, and if you do experience problems just let us know in the Q&A box and our team working behind the scenes will endeavour to help. Obviously, to ensure that nobody misses out, we're recording the event and will publish the recording on our website. So if by any reason you do dropout then we apologise for that but you will be able to catch up and of course you can contact us at the Mine Land Rehabilitation Authority at any time to have a further conversation if you so wish.

We're really delighted by the number of people who registered to attend the event. There were over 170 registrations, so that's fantastic, and I hope the majority of the people who registered are able to be with us this evening. As you'll know, the Latrobe Valley Regional Rehabilitation Strategy is concerned with safe, stable, and sustainable rehabilitation of the Latrobe Valley brown coal mines. And last week we heard about the availability of water in the Latrobe River system and the issues around climate and climate adjustments that are taking place into the future that are likely to lead to lower available water sources. This week we are covering off two, what I regard as extremely important actions. The first, which will be presented by Anna May, will be looking at access to alternative water sources other than the Latrobe River system and the local water

source systems. And the other one will be looking at how we might continue rehabilitation if we need to in the absence of water. Or how we actually might stop if we find that water-based rehabilitation cannot continue for any reason, because we actually do not have the water supplies that we expected or anticipated.

So we're going to move straight on with the presentations. We're going to first of all, listen to Anna May who is the director of Water Resources Assessment and Planning at the Department of Environment, Land, Water and Planning. She is going to present on the feasibility of alternative water for mine rehabilitation. So thank you Anna, over to you.

Anna May, Director, Water Resource Assessment and Planning, DELWP

Thank you Rae. Thanks Rae, and good evening everyone. It's nothing like throwing a spanner in the works with internet troubles, so hopefully that doesn't happen for me. Firstly, I would also like to acknowledge the traditional owners of the lands in which I'm located as well as the Gunaikurnai people who are the traditional owners of the Latrobe Valley, and I pay my respects to elders past, present, and emerging. My name is Anna May and I'm the director of Water Resources Assessment and Planning at DELWP as Rae mentioned, and I've worked at DELWP over the last four years. Prior to that, I've spent 15 years in the water industry, as well as in local government, and different consultancies. I really do feel privileged to be able to work across the different sectors to chip away at this really gnarly problem, and help navigate a pathway to find a good solution for everyone. Some of you may remember me from last week. I presented on water sharing in the Latrobe River alongside my colleague Geoff Steendham who spoke about the latest research and guidance from Victoria's Water and Climate Initiative. Tonight will be building upon these discussions to further provide information on alternative water and non-water based work streams that make up the implementation of the Latrobe Valley Regional Rehabilitation Strategy, or the LVRRS, as I might call it that later on in the presentation. It is a bit of a mouthful.

I hope tonight helps complete that picture for you of the work that's underway and gives you an appreciation of the magnitude and complexity of mine rehabilitation in the Latrobe Valley. I think it is worth reiterating that within DELWP we are treating this work as a priority and we are coordinating across government to get the best possible outcome. We are mindful of its significance to the residents of the Latrobe Valley and we're acutely aware of the interest in alternative water sources which was made apparent through the Q&A session last week. I think I've already answered some questions on alt. water last week already. The Minister for Resources's words really resonated with me when she said as part of the release of the strategy last year that rehabilitation must consider a drying climate and alternate water rather than relying on water from the Latrobe River system. This may be required protecting existing water entitlements and the rights of existing users including farmers, communities, and the environment. exploring these alternate water options, we are exploring these alternate water options. We are committed to doing a thorough job, and we're also committed to approaching it with as much openness and transparency as possible.

So, as many of you are aware there's six implementation of the LVRRS actions, and four of them are really focused on the improved information base to inform rehabilitation options, they're the ones highlighted here, and the focus of these different MLRA webinars. So we as DELWP are responsible for leading three of those six implementation actions, and they're the ones highlighted blue on the slide, and these will provide guidance on the processes and pathways to potentially access water for mine rehab. These include accessing water from the Latrobe River system which we know from last week's presentation has significant challenges due to the trends we're seeing in that drying climate and the prospect that this will continue. And we know there are existing users and values that must be protected. DELWP is also assisting pathways to potentially access larger volumes of climate independent water from outside of the Latrobe River. And that's going to be the focus of my presentation today, which is to investigate the feasibility of alternate water sources of mine rehabilitation. Anthony Feigl from DJPR will also talk to the work they're leading in assessing non-water based rehabilitation options. So these discrete work packages when combined, aim to provide clear guidance and an improvement information base to respond to community feedback and provide better transparency across all rehabilitation options, including those non-water based options which didn't form a part of the initial LVRRS. It's to identify pathways for different rehabilitation approaches and also support the mine licensees in the

development of their rehabilitation plans. The information and guidance developed as part of the discrete work packages and streams will need to be considered together and be optimised by mine licensees and government in consultation with key stakeholders in the community to determine the most appropriate approach for rehabilitation of each of the Latrobe Valley mines.

Before jumping into the implementation action itself I did want to touch on what we heard from stakeholders and community through the LVRRS process. It was clear from mine licensees that a water based mine rehabilitation approach remained their preferred approach. And it was the clear sentiment that mine rehabilitation should not come at the expense or the cost of others. Stakeholders were concerned about availability of water and were keen to ensure that it didn't come as an offset for other productive uses of water and the environment. Some stakeholders raised the Gippsland Lakes RAMSAR sites, and wanted to ensure pit lakes are not created at the expense of Gippsland Lakes. And the community was calling for clarity and transparency of process and information, including the full consideration of rehabilitation options and that's what we're trying to do here. We also heard there is a need for strong partnerships, and a desire for a lasting, positive legacy for these mine sites. Through the implementation of the strategy we're really conscious of what we heard and we're trying to continually build these elements into the delivery of the work streams as much as possible. We've also engaged with different stakeholders in the community through the scoping of the individual discrete actions and I'll reflect on these and what we've heard and how it's shaped our work streams shortly.

So why alternative water, and I won't dwell on this, because this was a bit of a focus of last week. So just briefly, this is because the strategy found there's been an observed decline in water availability in the Latrobe system. Reducing from a long term average of around 800 gigalitres per year to around 600 gigalitres per year. So that's a decline of around 25%. Water availability is tracking along the dry climate projection with future declines quite plausible. Under a dry climate scenario, it's estimated that water availability could decline to around 470 gigalitres a year by 2050. And to put that in context this is around the time of the planned closure of the Loy Yang mine, so when we're talking mine rehabilitation we're talking really long time frames. To completely fill the three Latrobe Valley mine voids would require an enormous amount of water. Around 2800 gigalitres of water and that's equivalent to around five Sydney harbours with an ongoing volume around 15 gigalitres per year to make up for evaporation. Last week we spoke about this at length and around the future uncertainty of water availability. The LVRRS itself made it clear that mine rehabilitation should plan for a dry climate and that water for mine rehabilitation should not impact traditional owner, or environmental values, or the rights of existing water users. So this really means it's prudent that climate resilient water supply is further assessed alongside those non-water based rehabilitation options.

So we've observed declines in water availability over the last 20 years or so, and we can't categorically say that these reductions will continue but the latest climate science predictions are telling us that it's possible. If this was to occur, it would substantially impact the time it would take to fill the voids if they were able to be filled at all. We also know from the geotechnical work that if the mines were to be filled, a faster fill is better, particularly through those coal seams where they're more susceptible to erosion and stability issues. I probably don't need to say this to those on the line, but it's really important to ensure safe and stable conditions can be achieved to provide certainty to us all that the mines can be well rehabilitated. This means the mine voids in the first instance should be designed in a way to minimise the need for intervention, such as bringing in significant volumes of water. And I know Anthony will talk to the work DJPR are completing to better understand how safety and stability can be managed with less or no water. This may not dismiss the need for some or potentially a lot of water to be needed for mine rehabilitation, which means again, it's really prudent to consider the viability of the sources of water which are not dependent on climate or rainfall.

Alternative water sources in the context of mine rehabilitation means water from sources which are able to deliver climate independent water at significant scales. This water must be suitable for its intended end use, which means it may need some or considerable treatment to be compliant with Victoria's strict regulatory standards. The alternative water that we are interested in should make a material difference to speed up rehabilitation on a regional scale for more than one of the mines.

The examples of alternate water illustrated here are stormwater, recycled water, and sea water. Importantly, these are not new or unfamiliar sources of water, and they do currently play an important part in Victoria's water supply portfolio.

If viable we would simply be building on their use and capitalising on the knowledge processes and frameworks already established. For example, almost 500 gigalitres of recycled water is treated every year across Victoria. Around 100 gigalitres of this is put to productive purposes. And I'll talk to some of them now. You may be aware to the Melbourne's West, Class A recycled water, which is the highest quality water from Western Treatment Plant is delivered to vegetable growers in the Werribee Irrigation District. There are proven and accepted regulatory rules which underpin the supply of recycled water, and it's now considered by most to be a product that can be relied upon to help growers withstand dry conditions, but also boost productivity in other years. Just last year, more than 20 gigalitres were supplied by Melbourne Water and delivered by Southern Rural Water to the growers in the district. But recycled water it hasn't just been limited to irrigation use. Another example of its use is where it's being supplied to residents, businesses, parks, and community facilities in the growth areas of Melbourne and the Geelong region. In these areas, recycled water is supplied to residential properties via a dedicated purple pipe network, and yes, it is actually a purple pipe. For toilet flushing, garden watering, and in some cases clothes washing amongst other uses. Almost three gigalitres of recycled water was delivered to customers in Geelong last year. And greater use of alternative water sources gives us a better chance for keeping our communities green, liveable, and resilient, ensuring we are extracting as much value as possible from every drop. The state government policy makes it clear through its integrated water management framework that funding for these types of schemes should be provided by organisations which benefit from them, whether it be local government, a water corporation, or a private enterprise.

Moving on to desalinated water and some of you may be aware of the desalination plant in Wonthaggi. Just last year Melbourne was connected, that supply was connected to regional areas, and 120 billion litres of desalinated water was supplied. Given the growth in Melbourne and surrounding areas, it's expected that the desalination plant will be delivering at its full capacity of 150 billion litres in the not too distant future. Continued growth in the Melbourne and regional areas means it will remain a critical feature of the Victorian water grid for years to come, underpinning the security and reliability of not only the Melbourne water supply but also supporting urban water security in the interconnected regional towns.

Now to the implementation action. I mentioned earlier that when we were scoping this action, we did re-engage with many of the stakeholders and community groups. I'll quickly summarise what we heard. We heard that we need to coordinate and collaborate with stakeholders and be mindful of broader regional programs. So we are talking to people like Southern Rural Water who are responsible for irrigation in the region, as well as people like Latrobe City Council and other groups. We learned that it's important to consider a broad range of climate resilient alternative water options, and that's what we're starting with, really looking at that long list of options and we're continuing to whittle that down with stakeholders. I'll talk more about this process shortly. And finally, it was made clear to us that water quality is a key consideration when assessing alternative water options. For that reason we have commenced a process for assessing water quality risks to a range of end users.

So, to deliver this action we've broken it down into four key tasks. First, we need to understand the underpinning assumptions that will be used to test if an alternate water source could potentially be feasible. For example, understanding the intended use of the water and the mine void, what volumes have been considered and what might acceptable fill rates be. To draw these assumptions out the Latrobe Valley mine licensees and electricity generators are actively collaborating with government and the broader water sector, such as Melbourne Water, and Gippsland Water. This collaboration has been really important because we need all stakeholders to own and support any potential solution if it has any chance of progressing further. This process also allowed us to discuss the characteristics of each mines: their depths, proximity to other features such as water bodies, roads, and townships that we really need to be mindful of. It did become clear that each mine is very different perhaps not leading to a one size fits all approach. So they may need to be nuanced. It also became clear that some mines are still more in the exploratory phase of rehabilitation than others, naturally driven by closure timeframes. For

example, Hazelwood is much further down the path of their rehabilitation planning work than mines like Loy Yang.

Secondly, we will work to develop a shorter list of options to be further explored and identifying both sources that could form part of a regional solution for mine rehabilitation, drilling down into the water source quality and those different requirements. And finally, we will assess and compare how the options impact, both in a positive and potentially a negative sense, the different stakeholders in the community. The plan is to draw this work together into an options comparison which will help to ensure the community is best placed to engage meaningfully on the feasibility of the alternate water options. So, really making it clear what the pros and cons of different options might be. I should emphasise here, that the LVRRS is just one process that will guide mine rehabilitation. Mine licensees themselves are responsible for developing individual rehabilitation plans and seeking the necessary approvals. So from this perspective I would encourage you all to also engage with mine operators on their rehabilitation planning processes. The guidance and information prepared as part of this action and the broader LVRRS will help to inform these individual mine rehabilitation plans and support a regional solution. And the process to narrow down options and assess their feasibility will work towards ensuring they've got a clear understanding of how each option could support mine rehabilitation at a regional scale to provide certainty and ultimately a positive outcome for the community.

This slide illustrates the process that I just spoke to. So it's starting with that long list of options. Some predictable, such as recycled water from Melbourne's Eastern Treatment Plant or from Gippsland Water, and others not so predictable or conventional. So that's the long list. Some examples of the blue sky thinking that has been done to date includes the capture, reuse and sharing of water that is used on site as part of the existing mine operations, or looking at the condensation and use of steam coming from the cooling towers which I think was also mentioned in a comment last week in the webinar.

So finally these options will be whittled down to hone in on the ones that could provide a level of certainty for mine rehabilitation to achieve safe, stable, and sustainable landforms. The narrowed-down options will also meet requirements such as being climate resilient, able to provide benefits across multiple mines, and able to provide the volume to an acceptable water quality within the time frames needed for rehabilitation. So these options will be considered for further assessment including concept design and estimation of costs. And we do know now that some of these options that will be considered are likely to have significant capital costs in the order of billions of dollars. And a water based mine rehabilitation is unlikely to be a cheap solution. The ongoing operating costs are also expected to be significant from these alternative water supplies.

Through this process they're unlikely to categorically rule anything in or out, so will still keep that long list of options. Nor is it a commitment to proceed with any one of the short-listed options. The process is purely an assessment of feasibility to understand which options are more likely to help on a regional scale for mine rehab. So this is a data gathering exercise and is fundamentally designed to improve our information base, and your information base, so any future decisions are robust and informed by good evidence.

So on to next steps. So over the next little while we will be working through the technical aspects to narrow down the options and complete concept level designs. We will be building on this work through two additional and discrete pieces of analysis. The first one I mentioned here is really making sure we've got a really good understanding of the water quality requirements of the alternate water supply. To make sure that any option is fit for purpose and acceptable to the community and has no negative impacts to the environment. The second part will take a broader perspective to assessing the feasibility of different alternative water options to better understand the possible flow on impacts. Again both positive and negative to different stakeholder groups and the community. So, for example, asking the question as to how might an alternate water supply support agricultural expansion of water security for the broader Gippsland Region. So not just focused on the mine rehab. side of things, although that is the primary focus. So there's plenty of water to go under the bridge before this work is finished. But we are looking for this work to inform the feasibility of different alternate water supplies for mine rehab. So this feasibility assessment will need to be considered in light of other work streams of the LVRRS, including the non-water based rehabilitation options which will be discussed by Anthony later tonight. And the

water availability from the Latrobe River system and the local aquifers. So together these work streams will provide guidance and will be an improved information base for mine licensees and government in consultation with key stakeholders in the community to determine the most appropriate approach for rehabilitation of each of the Latrobe Valley mines. Personally, I don't expect any of the individual work streams will achieve a safe, stable, and sustainable rehabilitated mine its own right or an optimised solution, I should say. But it's important to make sure that the individual pathways that we are working on now are well understood through the current process. So that when it comes to developing rehabilitation plans both water and non-water based techniques will need to be optimised to deliver solutions that can provide certainty to mine licensees, the community, and the government that safe, stable, and sustainable landforms can be achieved over the long term. We are conscious that we need to deliver these work packages in the short term, and we are not underestimating the complexity and volume of work required to do this. I can say that over the last few months, I've definitely seen a fair bit of enthusiasm between the different stakeholders involved and through this collaborative effort I believe we're up to the challenge. So finally, I'd like to thank you for your time and your interest in this topic, and thanks to MLRA again for hosting this webinar. And I'll hand back to Rae to introduce the next topic.

Rae:

That was excellent. It gives everybody who's listening in a very clear perspective on just how big a topic that the alternative water options study is. And I think, I'm sure that it's going to generate a number of questions. So, to encourage you again could anybody who has a question, could they pop onto the Q and A forum and type their question in. But I'd also welcome anybody who hasn't actually got a question but would like to just see what sort of questions are being asked to go on and 'like' those questions if you would like to hear them be asked this evening. So it's very important that we actually try and ask those questions that are most important.

The next speaker is Anthony Feigl and he is the current Acting Director of Coal Resources Victoria. He's also the project manager for the LVRRS for the last few years and has a very strong understanding of the whole of the program of the LVRRS. But today he's actually going to talk to you on the identification of non-water rehabilitation options, and contingency options to manage land stability and fire risks. So, I'm going to hand over to you, Anthony.

Anthony Feigl, Acting Director Coal Resources, Department of Jobs Precincts and Regions

Well, thank you Rae, and thank you attendees for your time to attend today. It's a pleasure to be here. Thanks to the MLRA for hosting this event. And thanks also to both Rae and Anna for their acknowledgements to country, which I don't need to do now. So thanks for that and I won't introduce myself either as Rae has just done that.

As Rae said, the purpose of this presentation is to provide an update on LVRRS Implementation Action 5: alternative and contingency rehabilitation options. I'll mostly be talking about alternative or non-water rehabilitation options today. But we're also looking at contingency options in a very similar way. This work's being delivered in consultation with the mine licensees, the Mine Land Rehabilitation Authority, and the Latrobe Valley Mine Rehabilitation Advisory Committee, which is made up of community and stakeholder representatives.

So why explore alternative rehabilitation options, or non-water options? Well, during the preparation of the Strategy as Anna mentioned, it became clear that water availability in the Latrobe River system has reduced and may continue to decline. So to meet the aims of achieving safe, stable and sustainable rehabilitated landforms, rehabilitation activities and final landforms must be climate resilient. A range of stakeholders requested that the feasibility of non-water rehabilitation options be further explored. In this work we will help inform the preparation of declared mine rehabilitation plans by the mine licensees, the State's assessment of such plans and provide you the community with an improved information base.

Two basic but really significant requirements for a rehabilitated Latrobe Valley coal mine to be safe and stable are that the fire risk must be no greater than the surrounding environment, and the walls and floor of the mine should not collapse, of course. Two really basic requirements, but actually really quite significant in terms of the work required to ensure that that's in place.

When the mines are operating, the potential for coal to catch fire is managed by covering worked out areas of the mine in soil, and through sprinkler systems delivering water to operational parts of the mine. When the mine is no longer in operation however, minimising the potential of a coal fire would require covering the coal with soil or water or maintaining forever a fire management system.

In terms of assessing the potential stability of mine walls under different operational and rehabilitation designs, there's three main factors. If the stabilising forces are greater than the destabilising forces, the wall is considered stable. A factor of safety is calculated by dividing the stabilising forces by the destabilising forces. So, for example, a factor of safety of two to one would mean that the stabilising forces are twice that of the destabilising forces. The forces for and against stability are calculated using engineering equations that include things like the strength of the coal and other geological layers, the frictional resistance to coal layers sliding over the top of the underlying clay layers, groundwater pressure within the coal clay layers, which can reduce the friction between layers. Because the geology is highly variable and complex there is always some uncertainty in these calculations which can mean the ground might behave differently than was expected. In general therefore the higher the factor of safety, the less likely that local complexities in the geology may cause the wall of the mine to collapse.

The technical approach taken for this implementation includes creating cross sections through the planned final walls of each mine using plans provided by the mine operators and the State's regional geological model. For each geological layer, we're assigning material strength properties from previous testing undertaken by the State Electricity Commission and the mine operators. For each cross section we're now calculating the stability of the wall under different rehabilitation concepts. We're currently working with mine operators and the Mine Land Rehabilitation Authority to assess the extent to which the stability of the walls of the mines can be managed through the rehabilitation process. For example, by changing the slope of the wall of the mine, placing material at the base of slopes to buttress them, reducing the inflow of surface water into cold joints, and draining water from the coal to reduce the hydraulic push on the coal blocks, and improving the strength between layers by placing material on or above the slope known as surcharging, and reducing groundwater pressures within the layers. These are the key controls that are available for mine wall stability.

For non-water rehabilitation options this study will help us collectively understand things like, can slope buttressing and surcharging with groundwater management provide a stable mine wall in the long term. If so, how much material has to be moved? What type is it? Where would it come from? When material is moved, is there enough of the right type of material to make slopes stable and cover all the coal? What are the ongoing maintenance requirements to keep the mine safe, stable, and sustainable, and what are the ongoing risks post-closure?

For non-water rehabilitation options ongoing groundwater extraction would likely be required to manage floor heave at two or three of the mines. Our working assumption is that extracted groundwater would be treated and discharged to waterways or could be used for other uses like irrigation. And long term land subsidence and associated impacts would of course need to be assessed prior to committing to that option.

The study follows a staged assessment process as set out here. Through this process to date we've been consulting with, as I mentioned before, the mine operators who have also provided a lot of data advice and participated in a number of risk workshops, the Mine Land Rehabilitation Authority and the Latrobe Valley Mine Rehabilitation Advisory Committee in particular, to develop the approach to this study. This work, along with the study which Anna has just summarised, will help inform the preparation of declared mine rehabilitation plans by mine licensees, as I mentioned before, the State's assessment of those plans, and provide you the community with an improved information based so that you can provide further inputs to this work, and you are able to fully consider the plans that are put forward by licensees.

Thank you again for your time today.

Rae:

Thank you very much for that, Anthony. Again, there's a significant body of work that needs to be done and again, just to remind everybody if you have any questions in relation to the work that Anthony has presented we would be delighted if you wanted to ask those questions and I'll be able to pass them on to Anthony as we go through.

Now, right at the start of this session I had hoped that I was going to be able to introduce you to David Salmon, our new Chief Executive Officer, and I'm actually going to take the liberty of just allowing him two or three minutes just introduce himself now while our panel of Anna and Anthony get ready to answer what turns out to be a significant number of questions. So I'm going to hand over to you David just to give a very brief introduction to yourself.

David Salmon, CEO, MLRA

It is privilege for me to join the MLRA and to be involved in this exciting and novel initiative, and to be part of the existing and experienced and very capable team. I commence work last month working remotely from Queensland and only for the interim. This week I'm in the Valley meeting with stakeholders and mine operators. My career has spanned nearly 37 years in mining, environmental, mine water management, and closure and rehabilitation management. I studied geology in the UK, worked for the Anglo American Corporation in South Africa for 27 years, and then moved to Australia in 2008 to take up various consulting roles before joining the MLRA. I would like to acknowledge the hard work the team has put into doing this webinar and the one last week, and thank the presenters Anthony and Anna May for their excellent presentations. I'd also like to thank all the attendees and encourage you to do some more questions if you have them. And finally, many thanks to Rae Mackay for hosting this webinar. And now, back to Rae.

Rae:

Anyway, David is going to be leading the work of the Authority as we progress forward and that's fantastic. Doesn't mean that I'm going to disappear; I am actually going to be remaining as Chair of the board and will be working closely with David and the team to assist in delivering the MLRA's program of work. So that'll be a lot of hard work that will be undertaken over the next few years. We look forward to seeing how the Authority develops.

Q & A Session

Rae:

Anyway, I'm going to get back now on to this evening and before I get onto the Q&A questions there were couple of questions that were introduced into Slido earlier today and I just want to ask those questions of Anna and Anthony now.

The first question is for you, Anthony. Basically because you're effectively the project manager for the overarching activities of the Strategy: *"Once completed, will all the information relating to the implementation action that you're looking at, which is the alternative contingency options be made publicly available, and will that be a general practice for all of the implementation actions?"*

Anthony:

Thank you Rae for the question or for passing on the question. Thank you whoever submitted the question. The short answer is yes. The slightly longer answer is in June this year will be coming out with some summary information on these studies. Following that there will be a process over the course of the two years between June this year in June 2023 to update the strategy which has to be updated every three years under the Act. And that period there will be further studies that will no doubt be needed. The findings that will be published in June this year will no doubt be a snapshot of point in time knowledge. It will be far from complete knowledge base that will ultimately be needed to rehabilitate all three mines. Yes, we will be releasing information as we go.

Rae:

That's lovely, thanks very much, Anthony. Moving quickly on then to the second question is actually comes in two parts and I'm going to hand a bit to Anthony. The first part, which is "*how are you incorporating and utilising traditional Gunaikurnai vegetation in the rehabilitation of the sites?*". Now before I hand to Anthony, it's probably appropriate to say that there has been quite a bit of what's called progressive rehabilitation that's been done on these sites over the years and some of that work has been done taking full account of using traditional knowledge, traditional plants etc. So there is an ongoing progressive development in that space. So Anthony do you have anything you want to say.

Anthony:

Ah, yes, just to add to that, look, that's a great question, the mine licenses have provided all strong commitments to work closely with GLAWAC on revegetation and management of the land. I think that in terms of the progressive rehabilitation I agree with Rae, that a lot is being done there. There's still obviously a lot of work to do in terms of the final rehabilitation plans. And we will certainly be keen to see the licenses working, continuing to work closely with GLAWAC to plan that.

Rae:

That's excellent, thank you very much, and I'm going to pass the second one to Anna just to give a little bit of information about how the use of cultural water, the thinking about water systems, that have been in place over millennia that have been traditionally managed and managed well by the Gunaikurnai. Can you give a little bit of a background to how these things are developing in terms of the thinking that it was within the LVRRS and within the wider processes of the regional river systems.

Anna:

Thanks Rae. And look, a really important part of the LVRRS and more broader water policy in Victoria as well. The Latrobe Valley Regional Rehab. Strategy does commit that no existing water users and traditional owner values will be worse off as a result of mine rehabilitation, and we are committed to adhering to this. So I did want to put that out up front. But yes, cultural values and the way traditional owners use and see the river systems is quite different to our Western views of accounting for the different water and supplies and things like that. So in short, I guess it's really important that we listen and work with the traditional owners of the land. So related to this, the Gunaikurnai Land and Waters Aboriginal Corporation have recently received two gigitalitres of unallocated water in the Mitchell River. And this is the first time this has happened in Victoria's history, so we're currently, will and continue to partner with traditional owners through GLAWAC, so the Gunaikurnai Land and Waters Aboriginal Corporation, to achieve their aspirations. Recently the West Gipps CMA has completed an updated environmental flows study. And through this work they've partnered with GLAWAC back to incorporate the Gunaikurnai values in the Latrobe River. So this is a really important first step. And, but we do acknowledge that further work is required as this work progresses. And as Anthony says, really encouraging the mine licensees to partner with the traditional owners in the work that they're doing on the mine lands themselves as well. So there's plenty of work on, but still acknowledge that there is a long way to go as well.

Rae:

Thank you very much Anna. I think where we should keep you live and I'm going to talk over your picture, or maybe I'm not, I'm going to be presenting. So the first question that we have which is a significant number of people liking it, is from a gentleman called Nick, he says, "*This sounds like confirming the use of alternative water sources is a long way off. Hazelwood wants to start filling this year. How is that going to work?*". Depending on how Anna answers this I may add in a few comments in myself, but over to Anna.

Anna:

Look you might need to add in some comments here, Rae if you like, but I do understand Hazelwood power station has closed and that rehabilitation planning is very much underway through ENGIE's work. I understand that there has been a plan submitted and there's conversations with government going on. So I can't really make comments here, but probably best to speak to the horse's mouth through the Earth Resources Regulation on this process.

But I guess what I can tell you is that ENGIE the operator of the Hazelwood mine, is actively collaborating on assessing the feasibility of alternate water supplies. They do see this as possibly a long game but I can't talk for them obviously as well. But ENGIE has existing pathways to access water, including through their groundwater licence to take and use that water, and they have historically used water from the Latrobe River system as well. So any water from an alt. water sources could supplement a water based mine rehabilitation approach over that longer term. So that's how I see that fitting in. But over to you as well Rae to add to that answer if you like.

Rae:

That's a good answer Anna. It's very important. Obviously there is a possibility for using water within the Latrobe Valley as a starting point for putting water into the Hazelwood mine, but that doesn't mean to say that it will be available in the long term, and I think as Anna's right to point out that the alternative water options could come into play later in the filling if it's agreed and I think that's an interesting process. So, there's going to be a lot of work going on and at the moment there is still engagement between government and the mine operator ENGIE to actually work out what the next steps will be, so that's an important element in this process. I think it's also important, and there is a question that comes further along which is, "*Why is groundwater being ignored*"? And of course, I'm going to actually answer this one so we can get it out of the way straight forwardly. Because we need to continue to discharge groundwater to maintain stability of the mines, the groundwater can be used as part of the fill process. So, it's such a natural component of the fill process that it's almost strategically ignored because we know we need to extract groundwater, we know that we can potentially, or we can expect to be able to use it as part of the rehabilitation, if a lake option is agreed and approved. So we'll add that in.

I've got another question for you Anna, and in fact I suspect there are a lot of questions for you Anna, I do apologise. I think you got caught out last time. Sorry for this. "*Would a pipeline from the Eastern Treatment Plant to the Latrobe Valley for mine filling be co-funded between mine operators and government?*" And you may not want to answer the second part with the question, "*What would the cost be and what time frame for construction?*" I think probably that's something you're working on, but the first part is, is there an appetite for government to get involved in co-financing?

Anna:

So I guess that's a bit of a tricky conversation, tricky question. And I guess from my perspective we are at the feasibility stage, so it is probably too early to say what funding arrangements may be. I guess Anthony might want to speak to this more, but the MRSD Act does place responsibilities for mine rehabilitation of individual mine sites on mine licensees, including the planning and rehabilitation works and associated costs. So the feasibility work that we're looking at as part of these potential alternate water supplies is really focusing on taking that whole of community view, so that the opportunities and impacts of different options can be compared more broadly. I think the feasibility study itself doesn't really deal with this question, but it is a starting point. The starting point I guess for the feasibility study is deliberately focused on what's best for the community both in the Latrobe Valley and more broadly. So that if any of those options are taken up, we can then work through who pays for what. It will however, identify if there are broader benefits of alternate water supplies. So over and above just mine rehabilitation. So that's one of the key considerations that we'll need to take onboard when trying to answer this question of co-funding. So I haven't asked that question directly, but I think taking that deliberate focus on what's best for the community in the first instance, when we're looking at these alternate water options is a really good place to start.

Rae:

Again, thank you very much for that Anna, that was great. I am going to skip what is the next question down because it had a very similar flavour to the one that you've just answered. And I'm going to pass across to Anthony. *"Are you able at this stage to give any detail about whether non water options are likely to be feasible, especially in cost compared to expensive water solutions? How much dirt soil is needed, or is that all still to come?"* So I think the question is, gives you a free rein to answer that in an open way. Over to you, Anthony.

Anthony:

Thanks for the question. I think the important thing is to have a really good factual information base so that we can collectively have informed conversations about it. What we want to have by June is a good start with that information base to understand really what is technically achievable, what isn't. What are the relative benefits of different dry options, different water supply options? What are the risks associated with all of those options in the long term? I think then it's, we're in a far better position collectively to have a good conversation about those things. I don't want to sort of pre-empt things by jumping to any assumptions just yet. Thank you.

Rae:

Thank you very much Anthony. The next question that comes up is, *"Given what we know today about rehabilitation progress what is the shortest lead time before we can see partial access available to the public for beneficial use?"* And I think I'm going to actually answer that a little bit myself first, and then I might see whether Anthony has any follow up commentary in relation to that. Over the last two or three years I've been thinking about that issue quite a lot, and as you know at the early stages the advocacy and the thought process is particularly from the mine operators was around the full pit lake option. And under those circumstances, even for our first mine we were talking about probably 20 plus years before we might be looking at relinquishment. And then the question would be: well if you didn't put water in could you actually rehabilitate the mine more quickly? And doing the analysis of the earthworks and the various options that would have to be, activities that would have to be undertaken, you fairly rapidly get to roughly the same amount of time, even for an empty pit to actually bring it to fruition. So we are realistically looking at a long time frame for giving access. Now the interesting thing there is that, of course there's a lot of land on a mining lease that is not actually inside the mine. So the question would be whether or not some of those areas of land could be made accessible before we get to final relinquishment of the entire mining lease, and that's an interesting question and question which is actually being explored at the present time, and one that I'm certainly personally very interested in, because I think it adds value to the community to be able to get access to land earlier rather than later. I don't know Anthony whether you want to add anything To that or whether you're happy with the stealing your thunder.

Anthony:

I'm happy with you stealing my thunder, so nothing further away, thanks.

Rae:

Very good. So the next question comes in and I'm just trying to get the sense of it. It says *"Now that this modelling is completed and it acknowledged that current values, cultural, current users etc. need to be maintained how will future regional water land use policy develop i.e. will rehabilitation take priority over other regional development requirements or opportunities?"* Now that's a really open question, and it probably needs a little bit of an answer from both of you if you're willing to do that. So I'm going to start with Anthony first. And then hand over to Anna, second. Anthony have you got any thoughts around that?

Anthony:

It's interesting question. I think the first thing is that the rehabilitation of these mines is a statutory obligation. It's a legal obligation and there's no skirting that. It's not like the licenses can say, look we are going to forego rehabilitation of these sites or do it in a limited way because there are other opportunities; it has to be done. There are other legal obligations across the of course, in other sectors as well, so it's about different industries ensuring that they meet those. I think probably the core of the question's probably around where there is competition for resources like water or other materials. So I think in terms of in terms of that, in terms of the water side of things, that's probably, is best answered by Anna if that's okay.

Anna:

That's fine, I'm happy for you to throw to me. I think I'll just really point back to the core principles of the Latrobe Valley Regional Rehabilitation Strategy, which does, one of those principles in there is stating that traditional owner values and environmental values as well as the rights of existing water users need to be protected for any water based mine rehab. option. So it's really clear there that those interests will be protected. That's one of the reasons why we are looking at alternate water sources and these non-water based options. So it's really critical that we do give these options a really thorough look at, because we know water for mine rehab. is likely to be limited moving forward, because we do need to protect those interests of existing users, the environment and traditional owners. So I think that is fundamentally at the core of the LVRRS and I guess, to put it into context, the LVRRS, that's just one policy piece that government is working on. From a water policy piece perspective, we do have the Gippsland, and sorry, the Central and Gippsland Region Sustainable Water Strategy which is kicking off at the moment and we'll be engaging with community on that later this year. And that's where we can point to what are the priorities for water in the Gippsland region? How do we think it should be shared, and what is the best use for that water? So I'd point you I guess to the Sustainable Water Strategy process. It is a process where we do have robust conversations with stakeholders and the community. And it is a process where we do come up with a clear pathway for how water can be shared moving forward. So I don't think mine rehabilitation is going to take over that process. As I said, it's pretty core in the centre of the LVRRS that existing interests need to be protected, and we've got the SWS process which is happening in parallel. I also did want to just touch on the southern Victoria Irrigation Development program as well. That's the program that we are working/ that Southern Rural Water are leading and that's the rural water corporation who's responsible for down in the Gippsland Region and they are looking at the feasibility of expanding irrigation districts in that area. So when we're talking about regional development opportunities, that's one that is getting funded at the moment and it is in the development. And that process, that piece of work will feed into the Sustainable Water Strategy as well. So that we've got quite a good picture of what are the water needs moving forward in the Latrobe River system. Sorry, that was a long winded answer but I hope that gives you some comfort in that space. Thanks Rae.

Rae:

Lovely thank you very much Anna. I'm going to flip up the question list a little bit: there is an interesting question which has been asked which is, "*Why can't we fence off the dangerous areas, turn the pumps off and let nature take its course?*" And I'm going to take a snapshot at letting people know what the answer to that is. If you just switch the pumps off the aquifer pressures rise and the ground floor of the mine heaves so it actually rises up, it destabilises the edge of the mines and will cause the edges of the mines to collapse. Now, if you were in the middle of nowhere and you didn't have any infrastructure like power stations and roadways and houses etc. around the edge, you might go that might be worthwhile. It may be just a very convenient way to create a low a low level marshland in a very broken up area that we wouldn't be using. But because we have roads that are running right next to the to the mines, because we have power line systems, because we have infrastructure, because we have houses, all of these are significantly impacted the moment we allow destabilisation to take place. So as much as, you know, we would be happy to do it if we were in a completely remote area and land issues were no problem and there weren't people living locally, it simply isn't a possibility here. And, just to put it in perspective, if we had to move the Princes Freeway, then we're talking billions of dollars to be able to do that. We are not in a position to trade off allowing for relaxation of our rehabilitation

requirements because the costs if we want to be able to allow that to happen become massively unreasonable both socially, culturally and economically. So, really interesting question and I think it's, you know, something one should always ask, but I think it is one where we're not in a position to follow that route.

This one is for you, Anthony. It is: *"Isn't it true that not enough soil exists to cover all the coal in the mines?"*

Anthony:

Thanks, thanks Rae. It's about the depth of that cover; if that cover was of great depth, then that's a reasonable statement, if that cover were optimised so that the amount of soil that's absolutely needed is used to cover coal in places then there probably is enough within the mine licence areas. That's our sort of preliminary feel for, but that's an important part of the work that we're now doing. What are the volumes that are needed to cover coal? What are the volumes that are needed to stabilise batters? What type of material is it and what's the availability of that material within the mine licence areas? So yeah, good question.

Rae:

Excellent, thanks very much Anthony. Next question is I think probably better answered by Anna. *"Have you modelled on the basis of power station closures in advance of their current published closure dates?"* In other words, how likely we, do we need to be in a situation where we have so many mines closed and they're all looking for water. Is it possible to consider that in the work that you're doing at the moment?

Anna:

Thanks Rae and really great question. That's just one of the many uncertainties that we have with mine rehabilitation and so I guess there's no short answer to, there's no easy answer to that one. Except that it is I guess in our consciousness that things might change and we are continuing to work with mine operators to explore options that are compatible with their closure timeframes. So, they are important conversations to continue and we're pretty open with our information, particularly as they relate to these alternate water supplies, that some water supplies might have a much longer lead time than others. So being really open with the mine licensees. That is the case, you just can't click your fingers and build a big new water supply to fill those mine voids if required. So yes, I guess our modelling does take into account a longer-term horizon and our commitment is to provide, be as proactive as possible in that planning space. So that we are really aware of the closure time frames, but also be really open and transparent about those lead times that might be required.

It is important that we get the solution right and we don't rush into it, and I guess some options may have those shorter lead times which might support some those mines that might be closing earlier. So I guess we're talking to them about which options they would prefer us to investigate more fully in, is definitely part of the plan and what we're currently doing. The LVRRS does put the onus on the mine operators to develop their closure plans factoring in these parameters. But we are working very consciously with them to make sure that everything is pretty above board and that we're really clear about these different opportunities and how they might relate to individual mine rehabilitation. And look, it is all about the information base and making the best decisions for those individual mines, and collectively I think we can do that. Thanks Rae.

Rae:

Lovely thanks very much Anna. This is a follow up question for you Anna, and it also goes a little bit wider than that, as well with two questions side by side that have a similar sort of flavour to them. The first question is, *"Will the government be investigating the possible flood mitigation and water storage benefits the mine voids could provide?"* I'll ask that question first, and then I'll actually ask the second part of the question which is, *"How much are you going to be looking into secondary benefits, including availability of water for irrigators, recreation, community benefits, additional flows into the Gippsland Lakes, and potential increases in property values, the ability to*

provide water rapidly for bush fire responses in the local area, etc?" So a big, big open question about the collateral benefits and dis-benefits. So over to you Anna.

Anna:

Look I guess this short answer to that is yes, as part of the alternate water work we are looking at those broader benefits for any alternate water supply. How much detail that goes into is really a matter of how much time we have. So, we are doing it at a level that we think would support our decision about whether or not there are those broader benefits or not. So I'll touch on that in a little bit more detail, but the point that you made around the flood mitigation. So that is a point that we have had a fair bit of discussion with stakeholders on and I guess it's definitely not off the table. But I guess the potential impacts both positive and negative, like with all options need to be considered, including those that are related to the safety and stability of the mine void and these will need to be further assessed.

It's somewhat complicated, this answer, because the flood mitigation, so if you are using those voids for flood mitigation, you'd need to manage them to ensure there's enough air space in them for that to occur. Also making sure that my DJPR counterparts are really across those stability issues and sign off that there's no risk there. And also making sure that quick change in water level that would result from using it as for flood mitigation would need to be managed, and making sure those structural integrity of the mine voids remain.

And I guess it's important to note as well that some high flows are important to the environmental values of the Latrobe River and the lower Latrobe Wetlands. So including, we've got the Sale Common, the Dowd Morass and the Heart Morass which are all part of the Gippsland Lakes, and those RAMSAR sites. So the need for these high flows outlined by the West Gipps CMA in their waterway management strategies, and the state government flood management strategies. So I guess, not all flooding is bad flooding. And so we need to be conscious that of that as well. So it's a bit of a complex one, definitely not off the table, but those risks do need to be explored more fully.

I think the second part of the question was in relation to exploring the different opportunities and secondary benefits, and absolutely that's definitely part of what we will be looking at as part of exploring what alternate water could mean for the region. So looking at it from an agricultural perspective, and feeding into that work that I was speaking about before, which Southern Rural Water are leading through the Southern Victorian Irrigation Development project. I'm sorry if I got that name wrong, Southern Rural Water. But we need to understand what the value is both for mine rehabilitation, but also more broadly. So we are doing that piece of work which I mentioned in the presentation today to make sure that we understand those advantages and disadvantages of making the voids available as for some sort of community benefits. So looking at those amenity values, but also looking at the cultural values, the environmental values, opportunities for expanded agriculture, opportunities for growth, jobs growth, and things like that. Working in with organisations like the Latrobe Valley Authority, like Latrobe City Council, so that we've got a really clear picture on what those regional development needs are and how water could potentially enable jobs growth and economic prosperity in the region as well, because we know that's really important for the Latrobe Valley and it's part of broader government policy as well.

Rae:

Super, thanks very much. Can I go slightly off-piste now, but since we've got the Acting Director of Coal Resource I thought I'd give him the opportunity to do a plug for the HESC project. *"What consideration is being given to mining coal for blue hydrogen in the future?"*

Anthony:

Sure, that's a good question. So the work being done by the Latrobe Valley Regional Rehabilitation Strategy, as the name suggests is regional in nature. It sets the regional context, particularly with respect to things like water resources, regional stability issues, and so forth. So any new coal mining development in Latrobe Valley, should a proponent put that forward, would need to put forward a rehabilitation plan, and have that plan approved prior to that mining

commencing or being approved to commence. Part of government's and community's consideration of that rehabilitation plan will be to consider it in light of the regional issues set out in the strategy. So there's quite a formal process and a logical process that involves a licensee putting forward a plan that's consistent with, aligns with the LVRRS. Hope that's answered the question.

Rae:

Thanks very much. I think it probably is worth saying that because the Hydrogen Energy Supply Chain project is underway at the moment there is, there is a very strong appetite to actually develop hydrogen from coal. But the only way in which that would/ could happen is if carbon dioxide can be sequestered offshore, but if it did happen then what Anthony is saying is absolutely right. Expansion of mining in the area would have to have a properly processed form of rehabilitation locked in and the funding developed for it. So, it's an interesting area, but it is actually happening now.

So, an overarching question. I don't know Anthony how you feel about this one. *"Who would manage the long term and ongoing risks of a dry void option?"* I mean, I could give my answer, but I'll let you give your answer first and then I'll give my answer.

Anthony:

So my response to that is, that it's, there's very clear obligations under the Act. So under the Act, once the mining licence is relinquished, that is rehabilitation has been completed, and the regulator has signed off that rehabilitation has been completed, then the ongoing post closure or post rehabilitation maintenance, monitoring etc. is the responsibility of the landowner. Now, in this instance, at the moment, the landowner is also the mining company in all three instances, in all three mines. Those mining companies can of course sell that land with all of the assets and liabilities that go with that and the obligation to maintain that post-rehabilitated landform is, will be on the title, that's now a formal part of the Act. So the title will have that obligation with it. If another private company or individual chooses to take that up, that's then their responsibility. Alternatively, there is also a formal avenue for the state to agree to become the landowner. And I'll let Rae answer that part because that's where the Mine Land Rehabilitation Authority comes in.

Rae:

Thank you for that Anthony. I mean the important part about the implementation of the Mine Land Rehabilitation Authority was that it has the capacity to become the landowner. So as a landowner the land could be sold if it is appropriate to do so into private ownership. It would only be that way if it was capable of being managed by the owner, but if it was not capable of being managed by a private owner, then we would be looking at the Mine Land Rehabilitation Authority taking ownership of that land and actually managing it in perpetuity. And for the dry option, if we were not able to switch off the pumps, if we were not able to stop the drainage of the batters, if we were not able to stabilise the batters against erosion, etcetera, etcetera, all of those costs and actions would have to be covered by the landowner, and that is likely to be the MLRA.

So the MLRA is a permanent institution deliberately put in place to allow us to take on the management of those risks. We would clearly love those risks to be as low as possible. We would clearly love the activities that are undertaken by the MLRA to be as small as possible because that gives us the most comfort that we will be able to work well on behalf of people, that we'll be able to give maximum access to the community and the public to the land. So it is an interesting challenge. It's potentially a long way off for the Authority, but it is a really important part of the development of the Authority into the future. We become the land owner of last resort which is, a fun place to be potentially. I'm probably won't be around to see it, but that's a shame. But that's a different matter.

I'm going to bring this to a close with one more question. And the question I guess is, the following one. ... I'm just trying to pick one nice one out. I think the question comes through, it says, *"While the focus is on water, it is largely a social challenge of equitable allocation and use,*

which as Anna described, is a gnarly problem. How are social scientists involved in providing insights in what is actually a social challenge, entwined with a biophysical research problem?"

So are you able to give the social perspective of the of the work that the LVRRS is doing? Over to you Anna.

Anna:

Thanks, Rae. I'm probably am not going to finish on my highest note in terms of answering questions, so I really apologise for that 'cause it is a fabulous question and you have hit the nail on the head. Water access and sharing is a social matter and through I guess the central, where I'm going to land this is through the Gippsland and Central Region Sustainable Water Strategy. It's really clear that that process is a process where we have robust consultation with the community. Those social elements, are definitely one of those key pillars that have been considered as part of that broader water strategy, and will definitely be front and centre of any of those considerations.

We are tic tacking very closely with the group who are developing that Sustainable Water Strategy, and we will continue to do so to make sure that any information that we develop as part of the LVRRS is really aligned with what we're hearing from the community and from our stakeholders, as part of that broader water sharing discussion, both in the Latrobe River system, but more broadly across the Central and Gippsland region. So I haven't answered that question directly, so I apologise for that because it is a really, really, great question: you have hit the nail on the head to some degree. But I do assure you that social element and those social scientists will be involved in that broader SWS process and it is a robust conversation that we will be having with the community about water sharing across that region. Thanks Rae.

Rae:

Anthony is there anything you wanted to add to or are you happy that Anna has covered it off beautifully?

Anthony:

That's a great response, I'm happy with that. Thank you.

Rae:

Well, thank you very much Anna. Thank you very much Anthony. There were some really good questions. Some very curly questions in there. I think you've covered those off extremely well and I think, you know, it shows the strength of the work that is being undertaken both on these two implementation actions, but all the implementation actions that they're covering of substantial pieces of work and will deliver some interesting and important outcomes in due course.

So it's beholden on me just to thank everybody for attending and participating today. It's been, it's been great. We will be putting up a recording of the event on our website. So If you want to go to mineland.vic.gov.au in a week, or a couple of weeks' time, then you will be able to pick it up if there are things that you want to just look back over and understand a bit more. We will be sending out a questionnaire. We would love to get feedback from you on the event and also to invite you to suggest any other topics that you would like us to cover as we go forward. And we'll be delighted to try and do that as we try to do that. As you know we try to do these sorts of things every six months and I anticipate that we will continue to use the webinar format as a very good way of actually communicating with the wider community. As well as coming out to any groups who wish to actually speak to us or to hear and have a conversation around any matter related to this.

Any questions that we haven't answered tonight we will look through those and write written responses. So we'll try and capture all of the questions we haven't got. I think we got through a very substantial number of them, so, grateful that we were able to do that. Hopefully you've all gained some useful information today, that's been good, and Just to say thank you and goodbye from Anna, Anthony, myself, and the whole team that has been working behind the scenes to keep moving the process along. So, thank you and goodnight.

