

Appendix XIII: Worley Parsons Technical Note



TECHNICAL NOTE

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TO	LandCorp
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Purpose

The brief for the preparation of the Boodarie Strategic Industrial Area (BSIA) as documented in the *Summary of Factors Affecting Selection of Port Corridor Alignment* report (Report No. 301012-01355a07) was limited to the planning of the estate, corridors and associated considerations within the land area available for development of the Estate itself. Master Planning investigations for the estate and the infrastructure corridors focussed on the area south of the Goldsworthy Rail only. These investigations examined the width of corridor required to allow for the full development of BSIA while also working within the constrained land availability in the area.

During the development of the master plan the extent of the constraints on the planning of the BSIA had become evident as the product handling and transport volumes were quantified. As a result, the allocation of areas and corridors within the estate was increasingly constrained and the orientation of the BSIA areas had become impacted by the surrounding development. In particular, the following developments had become of increased importance to finalising this planning process:

- The BHPBIO outer harbour development including the proposed rail loops, port landside, corridors, Proposed BHPB MOF and MOF haul road alignment and finally the position of the proposed outer harbour conveyors;
- The position of the Goldsworthy rail alignment, the drainage diversion channel and its limitations on port access;
- The relative position of the BSIA product corridor and its position and impact on South West Creek drainage and also on the adjacent FMG rail and train unloading facilities;
- The western corridors for rail and iron ore facilities proposed for other users and their constraint on product handling facilities from BSIA to the outer harbour facilities in future; and
- The port and its proposed allocation of deepwater berths and how this will influence the corridor alignments proposed and the capacity to support the development within the BSIA.



As a result of many of these significant constraints, it was noted that the alignment of the BSIA Master Plan and the proposed port and adjacent developments had to be reconciled as limited to no flexibility existed to vary the position of key infrastructure in this highly constrained area.

Many of the matters noted in the list above have been discussed in the existing reporting for the BSIA Master Planning, however the interface with the port remained unresolved. At the time of submitting the BSIA Master Plan report, the Port Hedland Port Authority (PHPA) was also finalising its revision to their *Multi User Outer Harbour (MUOH) Port Master Plan* and it was agreed with the Department of State Development (DSD) that the alignment of these plans was essential.

The purpose of this technical note is to document the preparation of the resulting *Combined Port Area and Boodarie Strategic Industrial Area (BSIA) Master Plan* adopting the two plans as the basis of this process and addressing any outstanding issues at the interface with these plans.

This document forms an addendum to the Structure Plan being prepared for the BSIA for LandCorp and the Department of State Development and to a number of earlier investigations undertaken by WorleyParsons and urbanplan into the planning of infrastructure corridors in support of this area.

In summary, this investigation essentially extends the study area from its previous extent to incorporate the transportation of products from the BSIA to potential port destinations and incorporates all connections to the inner harbour at South West Creek and the newly proposed outer harbour facility. In line with the PHPA planning as tabled to the study team since completion of the previous study. In doing this, the combined port area and BSIA Master Plan presents an overall scenario for the development of the area, rather than a single project in isolation and is therefore an important planning source for key stakeholders.

Sources of Information

Multiple sources of information were used in developing the combined port area and BSIA Master Plan. Included within these was the following:

- Existing infrastructure and leases.
- Previous BSIA Master Planning and the investigations undertaken as part of this.
- PHPA's MUOH Master Plan, which includes the BSIA Near Shore Harbour, the alignment and configuration of the MUOH Corridor, Lumsden Point development, and proposed Great Northern Highway realignment.
- The drainage design solution as developed by GHD on behalf of Landcorp for the BSIA area, including the swales and the interaction of the corridor and other infrastructure within the estate.

Rationale

The combined port area and BSIA Master Plan has been developed based on earlier discussions with key stakeholders and subsequent meetings involving LandCorp, Department of State Development, Port Hedland Port Authority, urbanplan and Urbis. Using these discussions and the information sourced, the following has been taken into account for the development of the combined port area and BSIA Master Plan:



- Berth availability – Given the magnitude of the iron ore industry in the Pilbara region, berth availability is limited within Port Hedland. The original intent was that up to four berths would be made available within South West Creek for BSIA use including the export of product and import of feedstock. The significant growth in the iron ore export potential within the Pilbara region has seen this allocated capacity reduced to two berths and the need for outer harbour capacity to supplement this need.

Future berths AP6 and AP7 at Anderson Point have been identified for the use of BSIA. These berths are alongside FMG berths must be secured in order to allow throughput for products destined for and originating for the BSIA. It is also important that the land backing and supporting these berths to accommodate corridor alignments and berth approaches also be secured to support the product handling and module load out requirements.

- BSIA Near Shore Harbour – While bulk products can be handled on exposed offshore berths in the outer harbour, PHPA have rightly considered protected harbour basin solutions as many unit cargoes and bulk liquids may require a more protected berth than what is available in exposed conditions.

The PHPA Master Plan identifies the development of a Near Shore Harbour for BSIA in the Outer Harbour. Berths at this harbour would be for liquid bulk, break bulk/container and liquefied gas and other dangerous cargoes. It should be noted that the BSIA Near Shore Harbour would require significant funding to develop and may be difficult to justify in a phase 1 development for smaller projects. As such, whilst its development possibility must be secured to align with the full development potential of the BSIA, any first proponent who might also be required to develop other enabling infrastructure might benefit from an inner harbour berth where development costs for port facilities might help shed some of the establishment costs at the BSIA. This further reinforces the need to ensure that berths AP6 and AP7 are reserved for the use of BSIA, and in parallel secure the proposed outer harbour to secure the future development potential.

- MUOH Corridor – PHPA have designated a corridor to the west of BSIA which is referred to as the MUOH Corridor. This corridor connects from the BSIA to both the BSIA Near Shore Harbour and the Outer Harbour and allows for public and private access roads, services easements, pipelines and conveyors.

The MUOH Corridor navigates from east of BSIA north to product berths and is understood to avoid existing and proposed infrastructure and Indigenous sites. Plans showing the configuration of the infrastructure within the Corridor have been provided by PHPA to document that the proposed infrastructure can be accommodated within the allocated Corridor.

Whilst these corridors were identified on previous drawings, it was evident that insufficient space was allocated for the crossing and change in direction necessary to align corridors and pipelines into the proposed corridor alignment to the outer harbour. In this latest planning by the PHPA, this matter has been resolved and a workable re-allocation of space for Iron Ore facilities and the corridor itself has been achieved.

- Drainage system – Earlier investigations undertaken by WorleyParsons have been undertaken under the premise that the existing drainage system must be maintained in the development of the BSIA. The existing system collects water into South West Creek which then travels north



through culverts under BHPB's Goldsworthy Rail Line. Any excess flows are diverted west along the southern side of this railway before travelling north as the rail turns.

Development of the BSIA infrastructure corridor would need to ensure that this drainage system is maintained. Given the constraints present in the location of the BSIA Infrastructure Corridor, the previous investigation undertaken by WorleyParsons proposed to construct a diversion within South West Creek and to maintain the system in the vicinity of the Goldsworthy Rail Line.

It is also significant to note that the total resolution of interfaces with BHPB and other users adjacent to the BSIA must be managed to ensure the drainage network is not compromised. At the time of this work, BHPBIO were still required to provide details of their proposed drainage planning for their outer harbour development. The preference for BHPBIO to provide drainage which did not cross the BSIA corridor alignment was presented to BHPBIO.

- Lumsden Point – This location was investigated as a potential option for the transport of modules to the BSIA. The proposal is that modules of the scale of up to 5,000 tonnes may need to be moved from a berth to the BSIA. This places significant constraints on the alignment and grade of the proposed haul road alignment. In fact, the preference to keep such large packages outside of general public traffic and the complexity of moving such large items over long distances on public roads including Great Northern Highway limits the applicability of Lumsden Point to bulk construction materials and pieces of smaller size.

Berths AP6 and AP7 at Anderson Point are considered to be the best workable solution for large module transport working with a Lumsden facility for the bulk of other construction materials. The two facilities will work hand in hand to support the construction effort and volumes of materials to be moved. It is also worthy of note that the facilities at Berth AP6 and AP7 would best be considered as a versatile design which can support module load out along with product handling. The configuration of the materials handling on the berths was not considered in detail.

- BHPB Investigative Corridor – The BHPB investigative corridor is referred to as the land allocation along their rail corridor alignments to their port landside facilities. Land allocation was made in a generous manner to allow BHPB the freedom to optimise the rail geometry and construction in this area. The resolution of the final alignment of the rail and the return of any excess land in this allocation remains to be resolved. This return of land affects the areas along BHPB's rail alignment towards the south and northern extremities of the BSIA.

Further discussion with BHPB is planned by BHPB and Landcorp in this regard.

General Arrangement

Based on the information provided and the key opportunities and constraints, a Combined Port Area and BSIA Master Plan was developed. This plan is as shown on Drawing No. 301012-01831-CI-DSK-0001. The following key characteristics of the BSIA Master Plan are evident in this combined planning process, going beyond the previous planning study work or which result from the considerations completed in this study:



- Central Infrastructure Corridor – A 300m Infrastructure Corridor is provided on the centre of BSIA as determined in previous phases of the BSIA Master Planning and its capacity matched to the selected development scenario.

The potential components of this Infrastructure Corridor were developed based on the BSIA land use data tabled in earlier Master Planning phases and were illustrated in a conceptual sketch.

To the east of this Central Infrastructure Corridor, a 300m drainage channel has been provided which takes flows from within the BSIA and other areas to the south west and deposits them into South West Creek.

The Central Infrastructure Corridor was aligned on the basis that capacity existed within the South West Creek basin berths to accommodate all import and export shipping demands.

- Diversion of Central Infrastructure Corridor – The 300m Infrastructure Corridor diverts into two corridors in the vicinity of the Goldsworthy Rail (refer Figure 1). The first of these corridors is proposed to be 200m wide and travels along the same alignment as the original 300m corridor towards berths AP6 and AP7. This corridor would require some rerouting in order to access berths AP6 and AP7 although this appears to be possible with reclamation in this area. A suitable storage area also appears to be available alongside the berths for the storage of products.

The second corridor is 120m wide and travels west initially before rerouting in a northbound direction and joining the MUOH Corridor. This corridor allows for a buffer to the proposed BHPB Rail Line and is clear of the existing drainage system. Preliminary plans provided by BHPB indicate that the Goldsworthy Rail Line may connect to the proposed BHPB Rail Line loops within the area currently designated for the 120m Infrastructure Corridor and therefore this would require further investigation to determine the potential impact. Further definition would also be required to determine the suitable arrangement where this corridor would intersect the corridor carrying the MUOH iron ore conveyors.

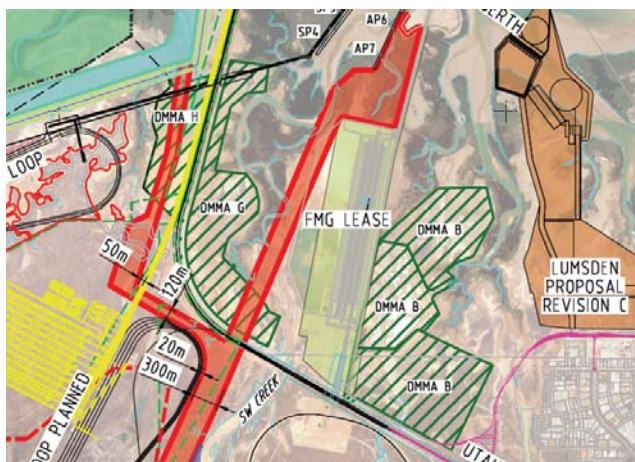


Figure 1 Diversion from 300m Central Corridor to 120m and 200m Corridors



- Connection from BSIA onto MUOH Corridor – Information provided by PHPA identified a connection from the central area of the BSIA into the MUOH Corridor (refer Figure 2). This connection is proposed to facilitate pipelines and dry bulk conveyors.

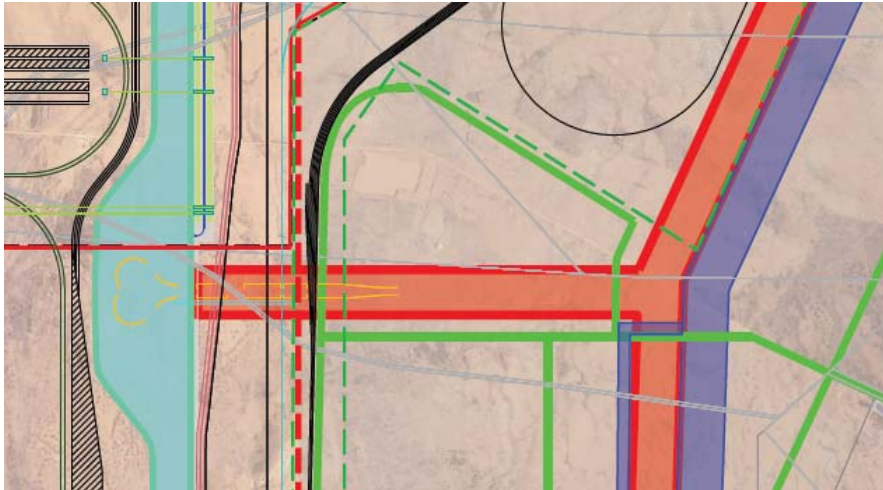


Figure 2 Connection from BSIA onto MUOH Corridor

This corridor alignment has been assessed and subject to more detailed work is now considered a viable solution based on its alignment and its capacity to accommodate the change in directions and transfer stations when compared to the original corridor width allocations and the corridor width allocated in the western corridor.

The western corridor re-alignment and allocation of space has come with a revision to the master planning for future dry bulk terminals which is considered more efficient and able to work well with the new plan.

On the alignment of the Outer Harbour corridor, the area of heritage sites identified by DSD on that outer harbour alignment was intersected by the PHPA proposed corridor. The parallelogram within which the heritage sites are known to exist was investigated further by PHPA and it was confirmed by PHPA that the intersection did not overlap with any of the sites within that area.

- Interface with BHPBIO Outer Harbour Facilities - The interface with BHPB proposed Outer Harbour rail is shown (refer Figure 3) and from this the limiting width which defines the corridor connections to the port via the central corridor is evident in this planning. Also evident are the constraints to the Outer Harbour access which is limited in this area and the constraints to drainage.

The need to confirm the interface with drainage between the BHPB facilities and how this drainage will be redirected into South West Creek is evident from this plan.

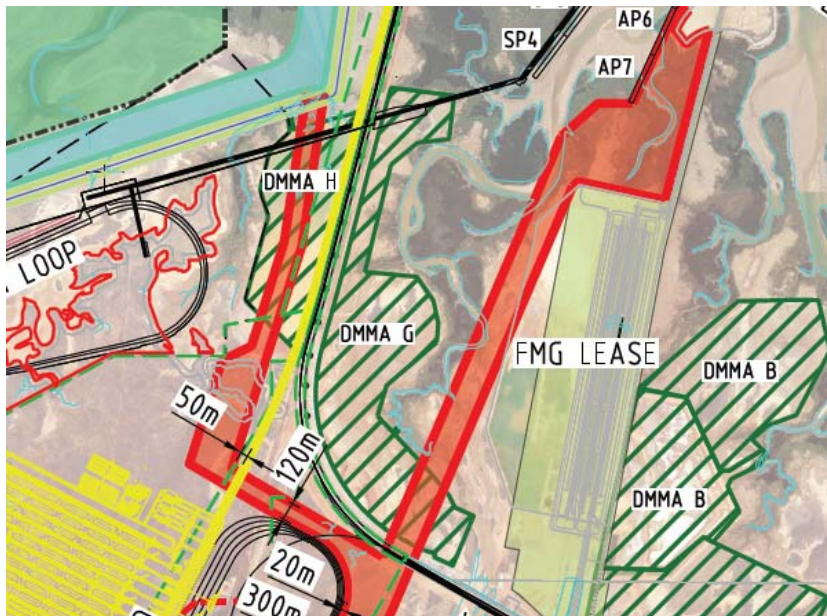


Figure 3 Interface with BHPBIO Outer Harbour Facilities

- BSIA Nearshore Harbour Facilities as Planned - The position of the BSIA nearshore harbour as proposed by PHPA along with the MUOH berths and the BHPB Outer Harbour are also evident from the planning. This includes the materials handling corridor linkages and how they will align to match the marine side development scenarios proposed.
- The Planned Lumsden Point Facilities - The location of the proposed Lumsden Point Harbour and landside facilities including the CUF and its connections to Great Northern Highway and the BSIA are also evident from this drawing (refer Figure 4). This is seen as a critical infrastructure component of the plan as noted herein.

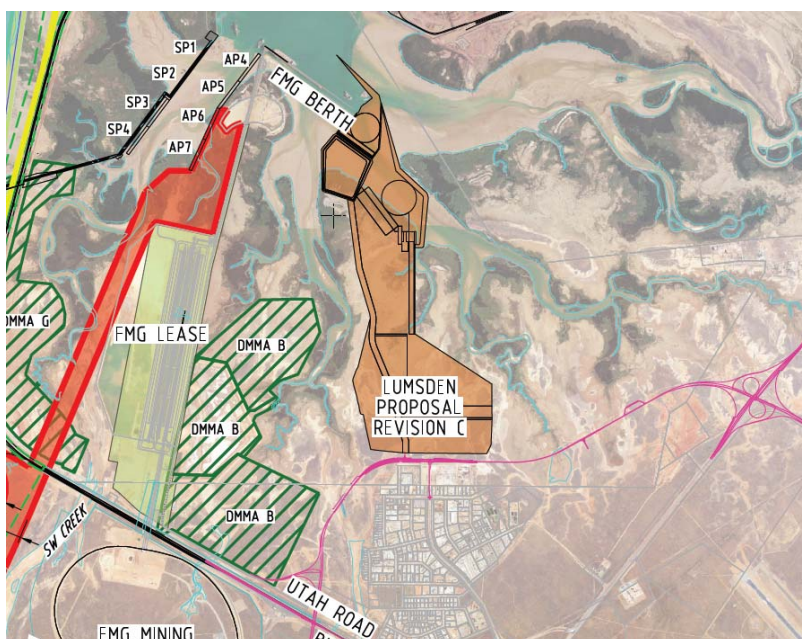


Figure 4 Lumsden Point and Great Northern Highway Realignment



The proposed MOF haul road scenarios remain to be resolved and must consider the needs of BHPB and the BIE via the BSIA near shore harbour, the berths at AP5 and AP6 and Lumsden to ensure the BSIA has maximum flexibility and supports all future project development needs. The scope of these considerations are included in a separate study not completed at the time of preparation of this technical note.

- Necessary Road and Rail Crossings - Numerous road and rail crossings with materials handling and road infrastructure will be necessary to realise the Master Plan objectives. This includes existing facilities which will need to be crossed, facilities designed and currently under construction and also facilities which are planned. It is an important aspect of the planning process to determine the requirements of such crossings and establish the principles for their implementation. These considerations are planned to be addressed in a separate study to be completed.