VEGETATION MANAGEMENT PLAN

LOT 56, 57 & 58, DP 1120933

542 MOORE CREEK ROAD, MOORE CREEK

18TH NOVEMBER 2024

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EXECUTIVE SUMMARY+

This vegetation management plan (VMP) is a requirement for any controlled activity with development encroaches into a drainage buffer along a defined watercourse. It is also a deemed to satisfy provision in the Hills Plains control plan of the Tamworth regional DCP. The subject property is mostly cleared as grassland for livestock with very isolated vegetation retained along the existing watercourse for shelter. This vegetation comprises isolated canopy trees with an improve pasture understorey. The biodiversity assessment for the development application indicated that the retained vegetation was a degraded community that does not match any Plant community Type (PCT).

The VMP has two key objectives to enhance and manage the existing vegetation whilst permitting residential development in the proposed lots. These objectives are to enhance water quality y planting within a defined margin along the channel and reduce soil erosion and to revegetate the remaining drainage buffer with a mixture of canopy trees and understorey shrubs to improve the habit for fauna species in the area.

The management tasks are outlined for each of the respective objectives and summarised in the Schedule of Works.

In tandem with the replanting and weed management works, the selection of photo-points from which annual photographs can be taken will provide a visual record of the revegetation works. This shall be carried out for the entire life of the development.

Conclusions

Based on the tasks outlined, there is a high probability that these works shall significantly enhance the existing vegetation on the property and improve the connectivity with adjoining areas of vegetation to encourage fauna movement.

The proposed Vegetation Management Plan shall comply with the principals outlined in the DPI guidelines for instream works.

VEGETATION MANAGEMENT PLAN

1.0 INTRODUCTION

A development application for the residential subdivision of a vacant grazing property at 542 Moore Creek Road, Moore Creek is being prepared by Altus Property. The preliminary subdivision of this development shows a connector road from Moore Creek Road passing through the residential precincts to Bowden Lane that shall cross an un-named tributary stream to Moore Creek. Additionally, perimeter roads to the two residential precincts and part of a proposed detention basin will encroach into a drainage buffer required under the Hills plain Control plan of the Tamworth Development Control Plan. These encroachments will involve construction works within the drainage buffer and trigger the requirement for a Controlled Activity Assessment (CAA) under the Water Management Act. The preparation of this vegetation management plan (VMP) is a requirement outlined in the guidelines for the CAA.

1.1 Objectives

The VMP shall be prepared in accordance with State Government guidelines (Department of Planning and Environment, 2022), Commonwealth and State Government listing and conservation advice for potential native vegetation communities, Tamworth Regional Council advice and in consideration of the biodiversity studies completed as part of the development application.

The VMP shall have the following objectives:

1. Establish an aquatic buffer of at least 5-metres in width, either side of the existing channel along the un-named watercourse to define flow path and improve downstream water quality (Management Zone 1)

2. Provide management recommendations for the channel downstream of the drainage basin (DBA) to connect with the main watercourse channel (Management Zone 1).

3. Establish a vegetated buffer of at least 15-metres in width, either side of the water course through assisted replanting of native species consistent with riparian zones within the Moore Creek area (Management Zone 2).

4. Provide management recommendations for the culvert crossing of the watercourse for the connector road to improve fauna movement along the drainage buffer and enhance local biodiversity.

5. Modify the margins of the two farm dams along the watercourse to create a range of aquatic habitats (Management Zone 3).

These objectives shall be achieved through several specific tasks including:

- Identify the extent of existing native vegetation communities on the property and manage to improve species diversity.
- Undertake assisted revegetation using locally sourced native species in sites of high ecological value.
- Weed management for known and potential environmental weeds throughout the construction phase and regularly thereafter.
- Exclusion of livestock grazing and vehicle access to aide in natural regeneration.

1.2 Site Inspection and Authorship

Field inspection was carried out over several visits to the subject land between November 2020 and April 2023. This included traversing all vegetation communities as well as important geomorphologic features. Detailed recording of slope and aspect was made. Particular focus was applied to the drainage line that flows through the property to the south of the existing dwelling and links a number of farm dams on this and adjoining properties. The information gathered was incorporated with previously undertaken surveys completed for the biodiversity assessment as part of the development application to form the basis for the maps and diagrams attached to this report. The report was written by Stephen Cotter.

1.3 Report structure

To address the specific requirements for the VMP using the DPI guidelines for vegetation management plans as part of in-stream works along defined watercourses that require a controlled activity assessment, the report is separated into five sections. Each addressing the relevant objective.

1.4 Site context

The property comprises an abandoned original dwelling with the rest of the property cleared and managed for improved pastures for livestock grazing. The riparian community along the watercourse that flows through the property is highly degraded with only isolated mature trees retains for shade. The watercourse is affected by channel instability, non-native pasture growth, soil erosion and disturbance from plugging by grazing crossing, construction of two farm farms to disrupt the natural flow of water and the use of the corridor for stormwater management servicing adjacent residential development.

The existing vegetation within the riparian zone is virtually non-existent and does not meet any criteria for a native Plant community type (PCT).

Native vegetation at the margins of the two farm dams is similarly impacted by cattle accessing the water. Both these dams were constructed to retain as much storage as possible with the depth increasing rapidly away from the margins (Figure 1). This provides very limited scope for the establishment of native water plant species that occur in shallow or ephemeral systems. Opportunities to regrade the margins of the farm dams to provide a range of aquatic habits should be considered as part of the VMP to enhance the aquatic habitat this drainage system.

Figure 1: Narrow strip of native vegetation around the margins of the farm dams.

1.5 Timeframe

The VMP shall operate for a period of the development. Annual monitoring and review should be considered to adjust any planting schedules based on prior success or failures.

1.6 Management Zones

Three Management zones are considered in the VMP as shown in Figure 2.

Management Zone 1 is an area of highly degraded grassland along the existing watercourse. The channel is poorly defined with areas of bank instability, soil erosion from cattle crossing tracks and impacted by non0native plants and weeds. The management zone shall extend for a distance of at least 5-metres either side of the channel and shall be revegetated with a range of aquatic reeds and rushes to define a flow path and reduce soil erosion, improving water quality downstream of the development site.

The outflow from the northern detention basin (DBA) to the main watercourse in included in this management zone.

Management Zone 2 includes all available land between the edge of Management Zone 1 and the limit of the Drainage Buffer. Currently, this includes isolated canopy trees and a non-existent native understorey. Revegetation is this area shall establish a riparian corridor

consistent with other streams in the Moore Creek area to improve biodiversity and fauna connectivity along the watercourse.

Management Zone 3 includes the 2-metre buffer at the margin of the two farms dams.

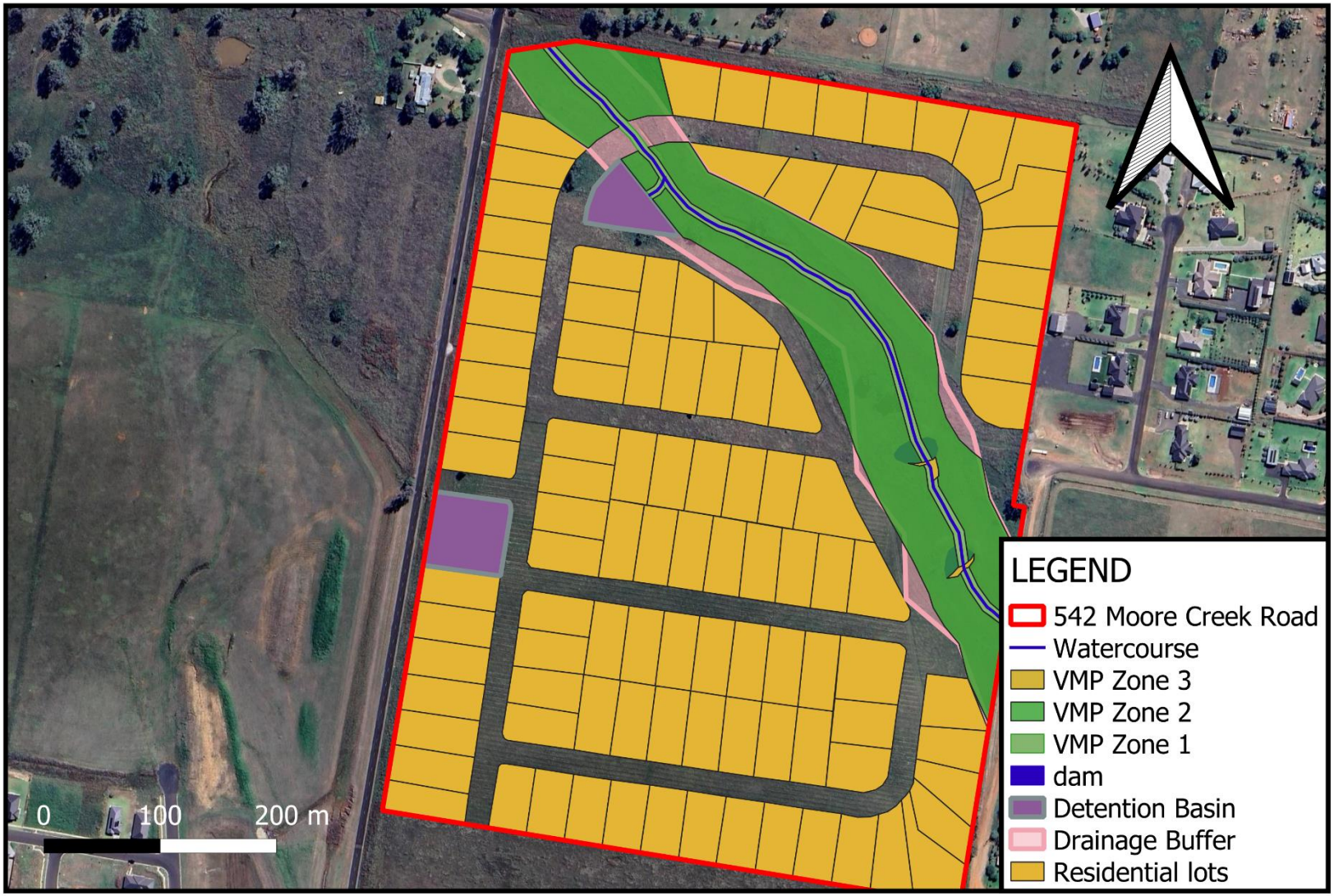

Figure 2: Management Zones for the tasks and actions outlined in the VMP

2.0 Objective 1 – Establish an aquatic buffer of at least 5-metres in width, either side of the existing channel along the un-named watercourse to define flow path and improve downstream water quality.

The following actions and tasks are recommended to achieve this objective and enhance the existing area of grassy woodland vegetation.

2.1 Define perimeter of protected vegetation.

Ensure fencing fully encloses the perimeter area identified for Management Zone 2 using barrier fencing, bunting or a sediment control fence to separate the residential lots from the Drainage Buffer.

Place signs with words to the effect: regularly around the perimeter of the protected vegetation attached to the star pickets.

NO ACCESS

ENVIRONMENTAL PROTECTION AREA

2.2 Weed management

Where present, the removal of Blackberry (*Rubus anglocandians*) from within the drainage buffer and elsewhere on the property should be a primary focus of weed management. Advice of preferred strategies are available for the local weeds authority and shall involve follow up management for a period of at least five years. The use of glyphosate herbicides is not advised due to the proximity of drainage through the property and potential impact on frog species.

2.3 Assisted revegetation

To address the objective and improve the condition of the existing vegetation present on the property, additionally planting of shrub and grass species is required. The species listed below were not observed during the biodiversity assessment but are known to exist in the local area and shall compliment the species diversity present on the property.

2.3.1 Management Zone 1

The flow path for the channel shall be defined by aquatic plants planted in a buffer of 5-metres either side of the watercourse.

This vegetation is shown as Management Zone 1 on the plan of the property (Figure 2). The boundary between the aquatic planting scheme along the watercourse and the riparian community within the rest of the Drainage buffer is arbitrary and defined by the topography.

2.3.2 Site preparation

Planting of the tubestock shall follow the procedures outlined in Table 1 to improve success outcomes of the revegetation works. Site preparation should be followed as closely as possible by planting to reduce competition from weed species.

Table 1: Site preparation, planting and post-planting procedures

Exclusion of livestock grazing	• Establish fencing of the extent of the drainage buffer to exclude any livestock from the revegetation site
Source of planting materials	• Obtain tubestock of canopy trees from local nurseries and native plant retailers • Where the shrub layer is non-existent, the sourcing of tubestock from commercial nurseries will be necessary.
Pre-planting site preparation	• Cultivate plant site to a depth of 15cm either manually or by ripping along contour with appropriate sediment control in place, row spacing should not be greater than 30 cm • Remove all competing non-native grasses to reduce competition
Planting	• Tubestock planted to the recommended depth, not more than 15 cm • Watering at the time of planting with remove any pockets of air and improve the root-soil contact
Post-planting maintenance	• Place small tree guard and stakes over tubestock for tree and shrub species, not necessary for rushes • Use of pea straw or sugarcane is preferred to increase the organic matter within the soil profile • Mulch should not rest upon the stems of the plants so as to prevent stem-rot diseases. • Regular monitoring of the vegetation area will be necessary to maintain a weed-free environment.

2.3.3 Species selection

The aquatic vegetation along the existing watercourse is highly degraded and inconsistent along the length of the watercourse. This shall be re-established by planting of native aquatic plants used in wetland rehabilitation works to define the flow path of the watercourse. The following planting schedule shall be adopted (Table 2). Plants shall be placed in clumps with a density of 4 plants per square metre of area. The clumps should comprise the same species with gaps to allow native regrowth to fill the management zone over time.

The planting should occur in two phases. An initial planting in Year 1 and a follow up planting in Year 3 if success has not been optimal according to the table below. The species list includes plants known from the northwest slopes.

Table 2: Planting scheme for Zone 1 within the Drainage Buffer

Species	Year 1	Year 3
Juncus usitatus	500	100
Eleocharis acuta	200	100
Gahnia aspera	100	100
Philydrum langinosum	500	

3.0 Objective 2 – Connection from northern detention basin to the main watercourse.

The northern detention basin proposed for the development will require an outflow channel that links with the existing watercourse as part of the stormwater management strategy for the development. This is entirely within the drainage buffer and therefore is included as part of the vegetation management plan.

In accordance with design recommendations in the guidelines for controlled activities, the base of the outflow point shall be lined with rip-rap (>100mm) rock to create an apron of at least 2 metres downstream of the outflow point. This shall prevent scour during peak flow events.

The flow path between this rock apron and the main watercourse shall be defined by planting of native rushes as outlined for Zone 1 above. The density of planting and the pre-planting procedures are as above with the final flow path to be defined prior to construction.

4.0 Objective 3 – Establish a vegetated buffer of at least 15-metres in width, either side of the water course through assisted replanting of native species consistent with riparian zones within the Moore Creek area (Management Zone 2).

4.1.Management Zone 2

The current vegetation within the Drainage Buffer is in a poor condition, comprising isolated trees with an understorey dominated by non-native grasses. There is a complete absence of the shrub storey with very limited species composition. Within this management zone, tree shrub and grass species are recommended for inclusion in the planting scheme to improve the overall condition of this Drainage Buffer to patch of vegetation.

4.2 Site preparation

Planting of the tubestock shall follow the procedures outlined in Table 3 to improve success outcomes of the revegetation works. Site preparation should be followed as closely as possible by planting to reduce competition from weed species.

Table 3: Site preparation, planting and post-planting procedures

Exclusion of livestock grazing	• Establish fencing of the extent of the drainage buffer to exclude any livestock from the revegetation site
Source of planting materials	• Obtain tubestock of canopy trees and shrub species from local nurseries and native plant retailers where necessary.
Pre-planting site preparation	• Cultivate plant site to a depth of 30cm either manually or by deep ripping along contour with appropriate sediment control in place, row spacing should not be greater than 1m • Remove all competing non-native grasses to reduce competition • Planting shall consist of clumps over c. 100m, separated by open grassland of at least 50 metres rather than continuous rows of trees. Infilling of the clumps of open grazing shall occur in subsequent years until natural regeneration occurs.
Planting	• Tubestock planted to the recommended depth, not more than 15 cm • Spacing between canopy tree shall be at least 8 metres and 4 metres between shrubs • Watering at the time of planting with remove any pockets of air and improve the root-soil contact
Post-planting maintenance	• Place small tree guard and stakes over tubestock for tree and shrub species, not necessary for rushes • Use of pea straw or sugarcane is preferred to increase the organic matter within the soil profile • Mulch should not rest upon the stems of the plants so as to prevent stem-rot diseases. • Regular monitoring of the vegetation area will be necessary to maintain a weed-free environment.

4.3 Species selection

A viable shrub layer is absent from this vegetation communities observed on the property due to past clearing and grazing activities. This shall be re-established by planting of native shrubs and grasses. The following planting schedule shall be adopted (Table 4). Planting can be random throughout the fenced area with at least 8 metres separation between planted canopy trees interspersed with shrubs and/or native grasses.

The planting should occur in two phases. An initial planting in shrubs and trees (Management Zone 2) in Year 1 and a follow up planting of native shrubs and grasses in Year 3 according to the table below. The species list includes plants known from the North West Slopes and occur in Grey Box Woodland communities around Tamworth.

Table 4: Planting scheme for Zone 2 along the Drainage Buffer

Species	Year 1	Year 3
Eucalyptus blakelyi	50	
Eucalyptus melliodora	50	
Angophora floribunda	50	
Casuarina cunninghamiana	50	
Bursaria spinosa	200	
Acacia filicifolia	200	
Dodonaea viscosa	200	
Eucalyptus microcarpa		50
Eucalyptus viminalis		50
Acacia dealbata		100
Indigo australis		100
Thermeda australis		200
Aristida ramosa		200

5.0 Provide management recommendations for the culvert crossing of the watercourse for the connector road to improve fauna movement along the drainage buffer and enhance local biodiversity.

The crossing of the watercourse by the proposed connector road to access the eastern precinct of residential lots and provide alternative egress for occupants along Bowden Lane will require the construction of a culvert.

The proposed crossing shall consist of box culverts consistent with DPI document *'Guidelines for watercourse crossings on waterfront land'*. These box culverts shall consist of:

- Multiple 600mm wide concrete box aligned with the channel, positioned in the centre of the watercourse and extending for the entire width of the connector road
- Two 300mm wide concrete boxes positioned above the stable bed level on either side of the central 600 mm boxes to create two dry cells for the entire width of the access road The dry cell culverts shall be lined with gravel and vegetated material to simulate the natural environment and encourage use by fauna.
- Rock armouring on the downstream of the culvert to prevent erosion with an apron extending for at least 750mm from the culvert.

This arrangement for the culvert shall accommodate high flow events and minimise the risks of overbank flow within the riparian corridor whilst preventing scouring of the channel. The design shall also assist in the movement of wildlife through the dry cells during periods of normal flow.

6.0 Modify the margins of the two farm dams along the watercourse to create a range of aquatic habitats (Management Zone 3).

The two existing farm dams along the watercourse provide aquatic habitat for a range of fauna species including waterbirds, frogs and lizards. These dams were constructed for the purpose of water storage for livestock with earth embankment headwall formed from material excavated from the main part of the dams. As such, the depth rapidly increases away from the margins when the dam is close to full capacity and results in a very narrow belt of aquatic plants around the margin.

As part of the earthworks for the proposed development, partially infilling of the distal margins close to the inflow points should be considered to create a bench of approximately 2 metres in width. The benches shall have a gentle slope towards the dam at a depth of between 20 and 50 cm below full capacity level. The benches can then be planted with native rushes similar to the plants used to define the main watercourse in two clear areas.

Juncus usitatus and *Eleocharis acuta* are planted closest to the margins of the farm dams as these species tolerate ephemeral inundation with *Baumea articulata* planted on the benches with greater water depth. Planting should be widely spaced as natural regeneration with quickly fill any gaps provided the dams remain full. A proposed planting scheme is provided in Table 5 with planting to occur in two separate episodes.

Table 5: Planting scheme for Zone 3 around the farm dams

Species	Year 1	Year 3
Juncus usitatus	50	50
Eleocharis acuta	50	50
Baumea articulata	50	50

The increased width of the aquatic vegetation around the margins of the dams with provide habitat and adequate shelter for nesting waterbirds and other aquatic fauna enhancing the biodiversity of the local area.

If the dam levels drop due to natural reduction in rainfall, the selected aquatic plants are known to re-establish from tubers once the water level returns to full capacity. There is no need for artificial filling of these dams during dry periods.

7.0 Monitoring and reporting

Monitoring of the assisted revegetation works should occur by visual inspection to ensure healthy establishment. If the tube stock plants have not survived, it may be necessary to change species and replant to increase the coverage of the shrub layer within each management zone. Where greater than 10% loss have occurred, subsequent replanting is required.

Photo reference points should be established within each management zone at locations along the entire watercourse. At least 5 reference points for each management zone should be selected prior to any planting and located either by survey or marked by post to ensure the exact location is used in subsequent years. Photographs in each cardinal direction (N, S, E, W) are required from each photo point to document the improvement in the vegetated drainage buffer that may occur over time.

7.1 Reporting

Annual reporting on the success of the revegetation works with reference to the photo reference points should be submitted to the certifying authority on an annual basis. Any proposed changes in the planting scheme because of poor establishment or greater understanding of the existing conditions with reasons clearly outlined.

Once the 5-year period for the operation of the VMP has passed, A short report should be prepared for the certifying authority that outlines the success and issues with the proposed revegetation works.

This report should compare the outcomes against the stated objectives and provide an input that can guide future revegetation schemes within the Hills Plains area and other residential growth areas of Tamworth.

7.2 Works schedule

Table 6 outlines the tasks required to address the objectives and the timeframe to complete the works.

Table 6: Work schedule for the VMP

Objective	Task	Timeframe
Revegetation of the drainage buffer	Define perimeter of protected vegetation	At commencement of the VMP
Management Zone 1	Install signage	At commencement of the VMP
	Weed management	Quarterly for duration of VMP
	Planting within high value conservation area	Spring period in first year
	Exclude grazing from high value conservation area	At commencement of the VMP and for the duration of the VMP
	Establish Photo-points for monitoring	At commencement of the VMP
	Monitor success of replanting	Quarterly
Management Zone 2	Define perimeter of protected vegetation	At commencement of the VMP
	Install signage	At commencement of the VMP
	Weed management	Quarterly for duration of VMP
	Planting within high value conservation area	Spring period in first year
	Limit grazing from management zone during plant establishment	At commencement of the VMP and for a minimum of 5 years to allow tree establishment
	Establish Photo-points for monitoring	At commencement of the VMP
	Monitor success of replanting	Quarterly
Management Zone 3	Partial infilling of the margins of the two farm dams	At commencement of construction phase of development
	Planting within submerged bench around margin of dams	Following partial infilling of margins
	Establish photo-points	At commencement of the VMP
	Monitor success of replanting	Quarterly for 12 months from planting

8.0 References

Department of Planning and Environment, 2022. *Controlled activities – guidelines for vegetation management plans on waterfront land*. Fact Sheet.