Vegetation types

Disturbed Mopane woodland, Dense Mopane woodland, Mopane woodland, Acacia woodland, Riparian vegetation, Cultivated areas, *Terminalia sericea* woodland, Miombo woodland and Wooded grasslands.

1. **Disturbed Mopane woodland (35K0809319 7543794; 36K UTM0199780 7551295; 0208703 7562717; 0219879 7573943; 0259908 7628481; 0265442 7658864)**

This type of vegetation was recorded on a number of places especially close to settlement where mopane is valued for its use as firewood. Starting from the junction of Beitbridge-Bulawayo and Harare road, the vegetation is quite disturbed with small mopane trees identified. Species identified also includes *Colophospermum mopane* with 50% relative density and other species noted like *Lannea schweinfurthii, Boscia salicifolia, Combretum imberbe, Acacia tortilis* and *Acacia rehmanniana* had 8.3% each relative density.

Figure 1: Junction of Beitbridge-Bulawayo and Harare road

2. **Dense Mopane woodland (36K UTM0236840 7589938; 0250267 7610177; 0253723 7618757; 0255709 7622130)**

The mopane woodland varies in density especially in areas that are close to settlement where signs of disturbances are shown. In areas like Bubi, Fauna, Alko, and Mwenezi Ranches, mopane trees are quite dense mainly due to protection as these areas are fenced off. The relative

species density of mopane in these areas is 70.8% as compared to other mopane woodland with 45.5% relative density. *Adansonia digitata, Acacia mellifera* and *Acacia erubescens* are typically common also. Other species noted in this vegetation type was *Cissus quadrangularis, Acacia tortilis*, and *Commiphora pyracanthoides*.

Figure 2: *Dense Mopane woodland*

3. **Mopane woodland (0191457 754416; 0192891 7545483; 0196727 7548027; 0204005 7556384; 0205210 7557964; 0213188 7567960; 0229558 7581708; 0264419 7635952; 0264979 7644109; 0265335 7652962; 0264602 7672674; 0265226 7675280)**

This vegetation type was recorded on a number of areas. Although the species were almost similar to the dense mopane woodland above, this type of vegetation is more open and the trees are not very tall. *Colophospermum mopane* had a relative density of about 40% relative density. Also common in this woodland type are species like *Acacia fleckii, Acacia erubescens, Grewia bicolor, Sterculia rogersii* and *Grewia monticola*.

The herbaceous layer is too sparse with few species noted on this layer like *Blepharis kirklii* and trailing succulents like *Sarcostemma viminale* and *Cissus quadrangularis*.

Figure 3: Mopane woodland with a baobab tree (*Adansonia digitata*)

4. Acacia woodland (36K UTM0241131 7597289; 0202773 754775; 0259962 7720630; 0258098 7724864; 0273240 7778348)

This type of vegetation was recorded close to Chikwarakwara turn-off where mopane tress were destroyed opening way for Acacia species to take over the area. Other areas where it was noted was close to Mucheke River in Masvingo and along Bubi River where a number of Acacia trees were identified. The relative species density of the Acacia species in these areas varies from 4% to 15%. The species recorded include *Acacia Karroo, Acacia tortilis, Acacia rehmanniana, Acacia erubescens, Acacia galpinii, Faidherbia albida, Acacia polyacantha* and *Acacia mellifera*. Typically present in this woodland type were species like *Peltophorum africanum, Ziziphus mucronata, Piliostigma thonningii, Combretum imberbe, Terminalia pruinoides* and *Combretum apiculatum.*

The herbaceous layer in this woodland type was dense in Masvingo area unlike around Chikwarakwara area where it was sparse. Common species were *Heteropogon contortus, Urochloa mossambicensis, Sporobolus pyramidalis, Themeda triandra, Melinis repens* and *Eragrostis capensis*.

Figure 4: Acacia woodland.

5. **Riparian vegetation (35K UTM0273223 7778289; 0268908 7688077; 0268864 7688203; 0241131 7597289)**

This was recorded along Mucheke, Bubi, and Runde Rivers as other streams and rivers were dry. The woody species identified include *Faiderbia albida, Ficus sycomorus, Croton sp, Hyphaene petersiana, Ziziphus mucronata, Acacia galpinii, Combretum imberbe, Acacia tortilis,* and *Acacia fleckii*.

Figure 5: Woody species along Bubi River

Along Mucheke River, the plant species noted include the aquatic species like *Eichhornia crassipes, Spidorella sp, Ludwigia stolonifera, Phragmites australis* and *Typha latifolia.*

Figure 6: Aquatic plant species along Mucheke River

6. **Cultivated areas (36K UTM0272092 7774419; 0261531 7765469; 0258979 7758150; 0257450 7735727; 0258181 7726471; 0259596 7722114; 0272168 7703549; 0263849 7633705)**

Cultivated areas were noted in most of the settled areas apart from areas along the ranches and towards Beitbridge. Most of the crops identified were Sugar cane and Mango plantations near Mwenezi turn-off after Mwenezi River. Other areas under cultivation had crops like Sorghum, Finger Millet and Maize.

Figure 7: Sugar cane plantation near Mwenezi turn-off

Figure 8: Mango plantation near Mwenezi turn-off

7. Disturbed *Terminalia sericea* woodland (36K UTM 0257061 7731187)

This vegetation type occurred on sandy soils in association with *Combretum apiculatum, Sclerocarya birrea, Kigelia Africana, Peltophorum africanum* and *Dichrostachys cinerea.* The herbaceous layer composed of mainly *Aristida congesta* and *Vernonia glabra.*

Figure 9: Disturbed *Terminalia sericea* woodland

8. ***Terminalia sericea* woodland (36K UTM 020267082 2682720; 0265885 764400; 0268908 7688077; 0262268 7717179)**

This type of vegetation was recorded south of Runde River opposite Truck Inn. Terminalia sericea covered 59% relative density with other species typically common like *Combretum zeyheri, Peltophorum africanum, Tabernaemontana elegans, Strychnos madagascariensis, Afzelia quanzensis, Spirostachys Africana, Acacia nigrescens, Combretum collinum* and *Drypetes mossambicensis.*

Figure 10: *Terminalia* woodland

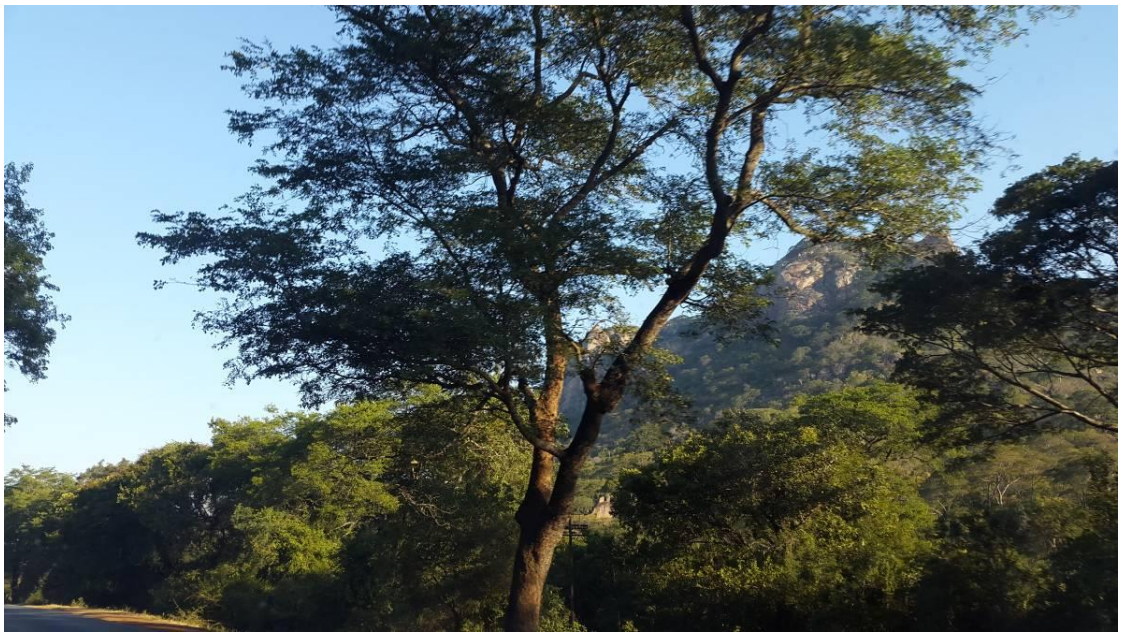
9. Miombo woodland (36K UTM 0265394 7768472; 0257218 7737168; 0265176 7712243; 0272195 7700846; 0269114 7696500; 0271245 7699357)

This covered most of the hilly areas towards and after Ngundu area. The Hill areas composed of mainly *Brachystegia glauescens* and *Julbernardia globiflora, Kirkia acuminate, Androstachys johnsonii, Combretum apiculatum, Psydrax livida* and *Gardenia volkensii, Vangueria infausta, Lannea schweinfurthii* and *Pseudolachnostylis maprouneifolia.*

Figure 11: Miombo woodland with *Brachystegia glaucescens*

The other miombo woodland comprised of *Brachystegia speciformis* and *Julbernardia globiflora* and these were quite big trees especially after Ngundu area on both sides of the road. In association with these was *Pseudolachnostylis maprouneifolia*, *Albizia versiclor, Combretum molle, Pterocarpus angolensis, Rhus leptodictya* and *Ozoroa reticulata*.

Figure 11: *Miombo woodland with Brachystegia spiciformis*



10. Wooded grassland (36K UTM 0272432 7774708; 0272315 7774610)

The wooded grassland was doted along the way especially in areas previously cultivated and left to reestablish. Woody species were mainly secondary growth, with species like *Combretum zeyheri, Diplorhynchus condylocarpon, Bolusanthes speciosa, Acacia nilotica, Lippia javanica, Peltophorum africanum* and *Gymnosporia senegalensis*. The herbaceous layer was made up of grasses like *Hyparrhenia filipendula, Hyparrhenia hirta, Sprobolus pyramidalis* and *Heteropogon contortus.* In some places *Aristida congesta* was dominant with other species like *Perotis patens* and *Urochloa mossambicensis*.

Figure 11: Wooded grassland

11. Cultivated areas (36K UTM 0279806 7903308; 0264551 7822635; 0282971 8005718)

Some areas along the Harare to Masvingo road were under cultivation with most of the crops already harvested. Crops that were mainly recorded were Maize (*Zea mays*) and Sweet potato (*Ipomoea batata*). Other plant species recorded were common weeds like *Amaranthus*

hybridus, *Euphorbia hirta, Ceratotheca sesamoides, Vernonia cinerea, Tagetes minuta, Richardia scabra, Bidens pilosa, Conyza sumatrensis* and *Bidens pilosa*.

Figure 12: Maize crop in project area

12. Vlei areas (UTM 36K 0249046 7849350; UTM 36K 0264724 7831590; UTM 36K 0242990 7868758; UTM 36K 0279048 7917344; UTM 36K 0264181 7832546; 36K UTM 02647224 7831590

The vlei / dambo areas were mostly valley grasslands with scattered trees such as *Acacia* species. Some vleis appeared to be dry whilst most were still wet. The herbaceous layer included *Cyperus sp, Phragmites australis* and in some cases the *Nymphaea caerulea* (Water lily); also noted was *Leersia hexandra, Echinochloa colona* and *Hyparrhenia filipendula.*

Figure 15: *Acacia* trees on the vlei with *Nymphaea* and *Phragmites*

13. **Riparian vegetation (UTM 36K 0275570 7943833; UTM 36K 0277959 7939736; UTM 36K O250904 7878906; UTM 36K 0250904 7878906; UTM 36K 0278523 7925750; UTM 36K 0278985 7914182; UTM 36K 0253943 7843160; UTM 36K 0278970 7914126; UTM 36K 028 4252 8010882; UTM 36K 0260296 7839350; UTM 36K 0273093 7970041; 36K UTM 0265863 7794060; 36K UTM 0278985 7914182**

This vegetation type was recorded along streams and rivers found along the proposed road onstruction site and consist of *Acaccia karoo*, *Rhus lancea, Acacia polyacantha, Ziziphus mucronata, Terminalia sericea, Julbernadia globiflora,* and *Parinari curatellifolia.* Also recorded along the river channel were species like *Phragmites mauritianus and Cyperus sp.*

Figure 16: Riparian vegetation along Shashe River

14. Miombo woodland (36K UTM 0278970 7914126; 36K UTM0250623 8014590; 0279948 7904742; 0282971 8005718; 0278834 7999367; 02791205 7909112; 0279226 7907696)

This type of vegetation was found to be homogenous along the project area. This area is occupied by mainly *Jubernardia globiflora* and *Brachystegia spiciformis* as woody species. Other major components of the woodland include*, Parinari curatellifolia, Terminalia sericea, Petoforum africanum, Dichrostachys cinera, Bauhnia petersiana, Ziziphus mucronata, Peltophorum africanum, Piliostigma thonningii, Carisa bispinosa,* .

The herbaceous layer seemed to be homogenous also along the project area apart from rivers and streams. The grass species identified include *Hyparrhenia filipendula, Sporobolus pyramidalis, Echinocloa colona, Melinis repens, Cynodon dactylon, Eleusine indica subsp. africana* and *Eragrostis superba.* Other herbs apart from grasses were *Amaranthus hybridus, Euphorbia hirta, Ceratotheca sesamoides, Vernonia cinerea, Tagetes minuta, Richardia scabra, Bidens pilosa, Conyza sumatrensis*.

Figure 17: Miombo woodland.

15. *Eucalyptus* plantation (36K UTM0202629 799393; 36K UTM 0241706 7866104; 0243771 7857512)

The *Eucalyptus* plantations were located between Mvuma and Masvingo. Within the plantations other regenerating species like *Julbernadia globiflora, Bobgunia madagascariensis, Burkea Africana, Albizia amara, Securidaca longepedunculata* and *Terminalia sericea* were noted.

The herbaceous layer along the plantations were also similar to those recorded above and included *Hyparrhenia filipendula, Sporobolus pyramidalis, Eragrostis cylindriflora, Pogonarthria squarrosa, Perotis patens, Cynodon dactylon,* a number of *Helichrysum krausii, Bidens pilosa and Conyza sumatrensis*.

Figure 17: *Eucalyptus* plantation

16. Wooded grasslands (36K UTM 0266322 7792833; 36K UTM 077410 796014; 36K UTM 0264181 7832546; 0271880 789868; 0263022 7805493)

This vegetation type was noted along most of the proposed site. The woody species were varied in some area but the herbaceous layer was homogenous throughout. The woody species identified were *Acaccia rehmaniana, Acaccia nilotica, Acaccia sieberiana, Parinari curatellifolia, Terminalia sericea, Combretum molle, Albizia amara, Ziziphus mucronata, Peltophorum Africana, Bauhnia petersiana, Dichrostachys cinera* and *Lantana camara* were also identified.

Figure 18: Acaccia woodland

The herbaceous layer was mainly occupied by grasses**.** The most common grasses were *Heteropogon contortus, Hyparrhenia filipendula, Sporobolus pyramidalis, Echlinocloa colona, Melinis repens, Cynodon dactylon, Themeda triandra, Hyperthelia dissolute, Eleusine indica subsp. africana* and *Eragrostis superba.*

Mopane woodland

(16.17677S 29.14363E; 16.13731S 29.04687E)

Figure 1. Mopane woodland

This is the dominant vegetation type within the Zambezi escarpment. Species identified within the mopane woodland areas include *Colophospermum mopane*, *Julbernardia globiflora, Brachystegia boehmii, Adansonia digitata, Balanites maughamii, Baikiaea plurijuga, Acacia karroo, Dichrostachys cinerea, Euphobia ingens* and *Acacia amythethophylla.* The herbaceous cover was comprised of species like *Hyparrhenia filipendula, Andropogon, Bidens pilosa, Eragrostis sp., Bothriochloa bladhii, Themeda triandra, Tithonia rotundifolia* and *Sporobolus pyramidalis*

Cultivated areas

(17.42184S 30.46067E; 16.78655S 29.64382E; 17.26439S 30.02311E; 17.39278S 30.39221E; 17.66816S 30.77106E)

Cultivation along the highway was being practiced both on a small and large scale with maize, cotton, tobacco and wheat fields clearly identified. Species also found within the vicinity of these cultivated land areas include *Bidens pilosa*, *Bothriochloa insculpta, Commelina benguelensis, Schkuhria pinnata,* and *Tagetes minuta*

Figure 2. Maize field

Miombo woodlands

(17.78655S 29.64382E; 17.65907S 30.74569E; 17.50351S 30.56119E)

Figure 3. Miombo woodland along the Harare-Chirundu highway

Species identified in the miombo woodlands include *Brachystegia spiciformis, Brachystegia boehmii, Jubernedia glabiflora, Melia azedarach, Piliostigma thonningii, Uapaca sp., Azanza garckeana, Lippia javanica, Hyparrhenia filpendula, Eragrostis sp., Tithonia rotundifolia, Vernonia sp., Kigelia africana, Acacia tortilis, Philenoptera violacea, Cissampelos mucronata, Solanum panduriforme, Steganotaenia araliacea, Panicum maximum, Andropogon and Bidens pilosa*

Riparian Vegetation

(17.61479S 30.69024E; 17.43823S 30.47432E; 17.38840S 30.36641E; 17.35756S 30.29395E; 17.23580S 29.99235E; 17.11205S 29.91343E; 16.92477S 29.77587E; 16.89035S 29.75237E; 16.78499S 29.64204E)

Figure 4. Riparian vegetation found along the banks of Manyame River

This vegetation type was recorded along streams and rivers found along the proposed road dualisation site. Along Manyame river species recorded include *Rhus sp., Acacia polyacantha, Albizia versicolor, Mundulea sericea, Afezia quenzensis, Ficus sycomorus, Salix mucronata, Maerua edulis* and *Nuxia oppositifolia*. Also recorded along the river channel were species like *Belpharis involurata, Baleria sp., Asparagus africanus*

Grasslands

(17.54961S 30.60568E; 16.78655S 29.64382E; 17.53723S 30.57387E; 17.53723S 30.57387E)

The herbaceous layer was mainly occupied by grasses**.** The most common grasses were *Themeda triandra, Hyparrhenia filipendula, Heteropogon contortus, Panicum maximum,* M*elinis repens, Eragrostis sp., Urochloa mosambicensis, Andropogon gayanus,* and *Aristida congesta*. The Great Dyke on the eastern and western portions comprises of grasses like *Andropogon gayanus, Themeda triandra* and *Loudetia simplex*. The other herbaceous species present on the Great Dyke and endemic to this area

were *Dicoma niccolifera, Indigofera serpentinicola, Barleria molensis, Ozoroa longepetiolata* (these four species are endemic to the Great Dyke) and *Bolusanthus speciosa*

In wooded grasslands *Cussonia arborea*, *Aloe* sp. and *Acacia sp.* were also identified.

Figure 5. Grassland area found along the Harare-Chirundu Highway

Vleis

(16.53568S 29.53523E)

The woody species along the vlei areas were sparse and comprises mainly of *Acacia sp., Piliostigma thonningii, Ziziphus mucronata,* and *Flueggea virosa*. However, the herbaceous layer is common with species like *Vernonia glabra, Themeda triandra, Tithonia rotundifolia,* and *Hyparrhenia filipendula.*

Floodpans

(16.06831S 28.94571E)

These were a common feature especially in the lower parts of the Zambezi valley towards the Chirundu border post. Species identified in these areas include *Colophospermum mopane*, *Boscia saliciformis, Maerua mossambicense, Maerua edulis, Diopsyros quiloensis, Grewia*

bicolor, Combretum mossambicense and *Cissus quadrangularis*. The pools comprised of *Nymphaea caerulea* (Water lily).

Figure 6. Floodpans found within the Zambezi escarpment.

Adansonia digitata (Baobab) must be spared from cutting where possible and seven trees were recorded within the site (Figure 1.1 above). The community apart from eating fruits and leaves from this tree, they also extract ropes from it (insert on figure 1.1) meant for construction purposes.

Figure 3.2 *Adansonia digitata* (Baobab) and a member of the local community carrying peeled fiber from this tree

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15. Calatropis procera is common along the Zambezi Valley and it was also identified at the Headman's homestead close to the site.

Figure 3.3 *Calatropis procera* outside the site at Headman's homestead

3.1.4 Vegetation types

A number of vegetation types have been recorded in Binga District like *Deciduous thickets on sand and hills, Dry forests on sand*, *Deciduous woodlands on shallow soils and escarpments* and others. However, the vegetation on the Lusulu Power Plant site was almost homogeneous dominated by *Combretum* species with the exception of a small portion towards the southern boundary where the alluvial soils were found and *Acacia robusta* subsp. *clavigera* was recorded. Also the vegetation on the proposed power plant site is made up of secondary vegetation with few tall trees like *Adansonia digitata, Guibourtia coleosperma*, *Bichermia zeyheri* and *Kirkia acuminata*.

17. The species diversity along this transect was high using Shannon-Wiener's index of diversity (3.468). Species with relative density above 5% were *Combretum elaeagnoides, Diospyros quiloensis, Gardenia resiniflua, Colophospermum mopane* and *Acacia nilotica.* The transect cuts across the field that was previously under *Pennisetum glaucum* (Bulrush millet) with species recorded mainly regeneration like *Diospyros quiloensis* and *Combretum* species. However, the Baobab trees were always spared out in the field. Typically common species on the site were *Combretum apiculatum, C. celastrides* and *C. collinum, Acacia tortilis, A. nigrescens, A. nilotica, Cassia abbreviata, Commiphora karibensis and C. schimperi, Grewia bicolor, Karomia tettensis, Kirkia acuminata, Makharmia zanzibarica, Pterocarpus lucens, Sclerocarya birrea, Strychnos madagascariensis, Terminalia prunioides, Vangueria infausta, Xeroderris stuhlmannii* and *Ximenia caffra.*

Figure 3.5 Species recorded along transect 1

Figure 3.6 Shrubs of *Diospyros quiloensis* on previously cultivated area

3. 1.4.2 Transect 2

This transect covered the area from south-west corner to south-east corner along the alluvial soils. Three species not recorded on other four transect were identified along this transect that include *Acacia robusta* subsp. *clavigera* (common only at low altitudes), *Combretum imberbe* and *Sterculia africana.* This transect had a high species diversity of 2.981 slightly lower than that of transect 1. Species recorded with relative density above 5% were *Diospyros quiloensis, Combretum imberbe, Acacia tortilis, Acacia robusta* subsp. *clavigera* and *Philenoptera violacea.* Typically common species recorded were *Triplochiton zambesiacus, Maerua juncea, Combretum elaeagnoides, Albizia anthelmintica, Acacia nilotica, Pterocarpus lucens* and *Guibourtia coleosperma.*

Figure 3.7 Woody species along the alluvial soil

The herbaceous layer was sparse and dry with species like *Indigofera tinctoria* and *Ipomoea sp* recorded. The transect also passed through open field previously under *Pennisetum glaucum* (Bulrush millet) as shown by figure 1.1 above.

3. 1.4.3 Transect 3

The third transect covered the area from north-west corner to south-east corner covering the diagonal cross section of the site. The species diversity along this transect was low using Shannon-Wiener's index of diversity (1.891). This was mainly because of the dominancy of the species by four species with relative density of more than 5%. These were *Combretum elaeagnoides, Diospyros quiloensis, Combretum apiculatum* and *C. collinum.* Common species recorded along this transect *Acacia totilis, Strychnos madagascariensis, Xeroderris stuhlmannii, Triplochiton zambesiacus, Boscia mossambicensis, Adansonia digitata,* and *Berchemia zeyheri.* Also identified along this transect were species like and *Guibourtia coleosperma, Strophanthus kombe, Sclerocarya birrea, Vangueria infausta, Kirkia acuminate* and *Grewia flavescens.*

Figure 3.8 Dry *Combretum* species recorded along transect 3

3. 1.4.4 Transect 4

This transect had the lowest species diversity as compared to other four transect using Shannon-Wiener's index of diversity (1.675). However, the species identified were almost similar to those recorded above along transect 3 with *Combretum* species dominating. The species identified with relative density of more than 5% were *Combretum elaeagnoides, Combretum apiculatum, C. collinum, Diospyros quiloensis,* and *Combretum celastroides*. Also common were species *Xeroderris stuhlmannii*, *Guibourtia coleosperma, Scelrocarya birrea, Baphia massaensis and Acacia tortilis.*

Figure 3.9 Dry multi-stemmed shrubs dominated by *Combretum* species recorded along transect 4

3. 1.4.5 Transect 5

This transect covered the area from south-east corner to north-east corner of the site. The species diversity along this transect was low using Shannon-Wiener's index of diversity (1.915). Species recorded with relative density of more than 5% were *Combretum collinum, Combretum elaeagnoides, Terminalia sericea, Diospyros quiloensis* and *Acacia totilis.* Typically present were species like *Strychnos madagascariensis, Terminalia prunioides, Cassia abbreviata, Berchemia zeyheri, Adansonia digitata*, *Sclerocarya birrea, Kirkia acuminata, Vangueria infausta*, Colophospermum mopane and *Guibourtia coleosperma. Terminalia sericea* formed a cluster close to the northern boundary unlike spreading along the site.

Figure 3.10 Sparse shrubs recorded along transect 5